

FM 4-30.3

Maintenance Operations and Procedures

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Maintenance Operations and Procedures

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Preface

This manual provides authoritative doctrine for the Army maintenance support systems, which comprise strategic to tactical level maintenance operations (at all echelons) across the full spectrum of military operations as part of the combat service support (CSS) system.

During the transition of the first decade of the 21st Century, there will be a mixture of Legacy (Army of Excellence (AOE) and Force Twenty-One (FXXI)) and Interim units operating simultaneously, for which maintenance support will be required. In this manual, we address AOE, FXXI, Interim Brigade, the emerging Interim Division, emerging Echelon Above Division Redesign Maintenance operations, and Army Maintenance Transformation doctrine as it impacts maintenance operations and procedures, including organizations, equipment, and personnel. Interim updates for this manual; unit-specific field manuals; and tactics, techniques, and procedures will be posted electronically on the CASCOM Ordnance Training (<http://www.cascom.army.mil/ordnance/>) and the USAOCS (<http://130.114.88.10>) home pages.

The intended audience of the manual includes the following:

- Combat and Combat Support Commanders – to give them a more universal understanding of how maintenance support operations are organized and provided.
- CSS Commanders and Staffs – to inform them on the integration of transforming maintenance support operations into the CSS and total Army missions.
- Soldiers and Students – to give them a broad knowledge of the maintenance support operations structure and how it works.

The proponent of this publication is HQ TRADOC. Send comments and recommendations on DA Form 2028 directly to Commander, USACASCOM&FL, Director of Combat Developments-Ordnance, ATTN: ATCL-OA, 3901 A Ave. Suite 250, Fort Lee, VA 23801-1809.

NOTE: Unless otherwise stated, the masculine gender in this manual refers to both men and women.

Chapter 1

Maintenance Fundamentals

Global interdependence, reduced time, and fast-changing technology affects every aspect of how the Ordnance Corps must do business today and into the 21st century. In a Force Projection (FP) Army, maintenance elements are increasingly required to anticipate, analyze, and tailor available resources for effective and timely support of complex weapon systems. Today's focus on adaptive planning, to provide increased options for decision makers, is prompting maintenance managers to embrace change, innovation, and flexibility at all levels. Success will continue to be based on the bottom-line measurement of the following:

- How well our customer's equipment remains operational (availability).
- How quickly it can be returned to service when it becomes inoperable (maintainability).
- How long the user can anticipate failure-free performance (reliability).

Sustaining decisive land force dominance through synchronized maintenance operations will challenge commanders at all levels. They must understand customer requirements, the overall support concept, and the Army Maintenance System to have the right capabilities in the right place at the right time.

MAINTENANCE SYSTEM OVERVIEW

1-1. Maintenance is one of the 11 CSS functions that supports soldiers and their systems in the field. It sustains materiel in an operational status, restores it to serviceable condition, or upgrades its functional utility through modification or product improvement. The Army Maintenance System designates the scope of tasks performed by maintenance activities. It provides support planning requirements for maintenance of materiel systems when fielded and after fielding. It also establishes requirements for managing activities that physically perform maintenance.

1-2. Maintenance levels form the baseline for determining which specific maintenance tasks are assigned to each level. They are a means to select the scope of maintenance and the skill levels necessary for units and activities at various command levels.

1-3. Maintenance tasks include any action that retains or restores materiel to a fully mission-capable condition. Tasks range from simple preventive maintenance checks and services (PMCS) of equipment to complex depot operations performed in fixed shop facilities. The Maintenance Allocation Chart (MAC) remains the primary tool for assigning tasks.

1-4. Distribution Management. Improvements under the distribution management umbrella must allow the soldier to receive their parts faster, better, and cheaper than the current methods of doing business. A

useful way to improve the logistics processes that affect repair cycle is to apply the distribution management methodology. Distribution management is a management program aimed at improving the Army's Logistics processes. Distribution management is the methodology the Army uses to analyze and improve its logistics performance to improve readiness and reduce cost. This methodology is applicable in garrison and while deployed. The aim of distribution management is to get support to the soldiers as quickly and efficiently as possible without interruption in the logistics cycle. Distribution management seeks to improve the processes within the entire supply chain. The supply chain consists of the following:

- Order and ship time (OST).
- Transportation.
- Inventory planning and warehouse management (also referred to as stock determination (SD)).
- Maintenance (also referred to as repair cycle), to include deployed operations.

It does this by reducing non-value added steps in the Army's logistics processes and thereby reducing unnecessary expenditures of resources (such as manpower and dollars).

1-5. Customer Wait Time (CWT). CWT is an "end to end" metric that measures the actual performance of the Army supply chain. It therefore provides a holistic view of the entire Army supply chain process. CWT shows the performance of the sources of supply, including supply support activities (SSAs), maintenance units, direct vendor delivery, referrals, redistribution, distribution centers and depots. Improvements in the order fulfillment process and in the inventory management process both help to improve the repair process. A major source of delay in repairs is waiting for needed parts to arrive. As more orders are filled from local supply points, and as orders filled at the Wholesale Supply System arrive more quickly, the CWT and time mechanics have to wait for parts delivery decreases. Repair cycle times are reduced and weapons systems are returned more quickly to operational readiness.

1-6. The Single Stock Fund (SSF) is a Headquarters, Department of the Army (HQDA) business process reengineering initiative to improve the logistics and financial process in the Army Working Capital Fund (AWCF), Supply Management Army business area. The national maintenance point (NMP) also requires below-depot sources of repair. The overall quality program consists of compliance with International Organization for Standardization (ISO) 9002 and national stock number (NSN) by NSN technical certification for each item awarded for repair under NMP procedures.

1-7. The SSF is merging wholesale and retail elements of the Army Working Capital Fund-Supply Management Army (AWCF-SMA) below department level into a single, nationally-managed fund. This will streamline current operations that has caused many inefficiencies. These include multiple points of sale and credit, multiple ledgers/billing accounts, and duplicative automated systems managing the same inventory. The SSF is also changing how the Army budgets for base operations, real property management, Army, and other accounts.

1-8. A centrally coordinated and controlled, repair-based logistics system is emerging from changes caused by the Revolution in Military Logistics (RML). This was the direct result of the combination of national efforts to improve equipment readiness support to the Army in the field. Although not the result of new equipment fielding, the requirements for general education and skill training are just as significant.

1-9. Anticipatory Maintenance. An Army approach to an optimized condition-based maintenance (CBM) strategy is a key function supporting anticipatory logistics. Anticipatory maintenance on the battlefield begins with the information obtained from the embedded diagnostic sensors located on the weapon system. The sensor will feed the maintenance and supply data to the on-board computer. This will be communicated to appropriate supporting activities so the requisite maintenance support will be available when and where required. When the Combat Repair Team (CRT) arrives at the repair site, they will use interactive electronic technical manual (IETM) compact disks, and test, measurement, and diagnostic equipment (TMDE) to confirm the sensor information and ensure there are no additional failures. If the item can be repaired (without the need for evacuation), information from the IETM will be used to request the part(s). The CRT transfers the IETM requisitioning information to the appropriate Standard Army Management Information System (STAMIS) and forwards the supply request via the tactical internet to the servicing supply company SSA for action. Figure 1-1, page 1-4, provides a visual detail of anticipatory maintenance.

1-10. Effective management of the Army Maintenance System depends on a smoothly functioning organization from the national to the unit level. The depot level performs highly complex maintenance operations while units perform simple PMCS operations.

MAINTENANCE LEVELS

1-11. The Army Maintenance System, less aircraft, consists of a flexible, four-level system (see Table 1-1, page 1-5). Each unique level makes a different contribution to the overall system (see Table 1-2, pages 1-5 and 1-6).

LEVELS OF WAR

NOTE: While these are distinct levels, there is flexibility built into the system due to overlapping capabilities. Maintainers do not lock themselves into rigid levels of maintenance. When mission, enemy, troops and support available, terrain and weather, time available, and civil considerations (METT-TC) permit, maintainers at the various levels may also repair selected components to eliminate higher echelon backlogs and maintain technical skills.

1-12. Coordination of maintenance operations occurs at all levels of war. Table 1-3, pages 1-7 through 1-10, describes how the four levels of maintenance overlay the levels of war. The three levels of war are described as follows:

- **Strategic.** Maintenance operations are largely the purview of the depot maintenance level in concert with the continental United States (CONUS)-based industrial and civilian sectors. Maintenance management primarily links the nation's economic base (people, resources, and industry) to its military operations in theaters.
- **Operational.** Maintenance operations link strategic capabilities to tactical requirements. Managers coordinate DS and GS maintenance, specialized/forward repair activities (FRAs), and base logistics operations. At this level, the maintenance system both drives and supports the supply system. DS maintenance works to meet tactical requirements, while GS maintenance provides commodity-oriented repair of components and end items to support the Theater Supply System. The primary focus is to maximize the number of operational combat systems available to support the tactical battle.
- **Tactical.** Maintenance operations consist of activities required to keep weapon systems operational during battle, thereby supporting the tactical commander's scheme of operation. Managers oversee the operator/crew, unit, and DS maintenance operations. The primary focus is on equipment repair or replacement, and return to the user.

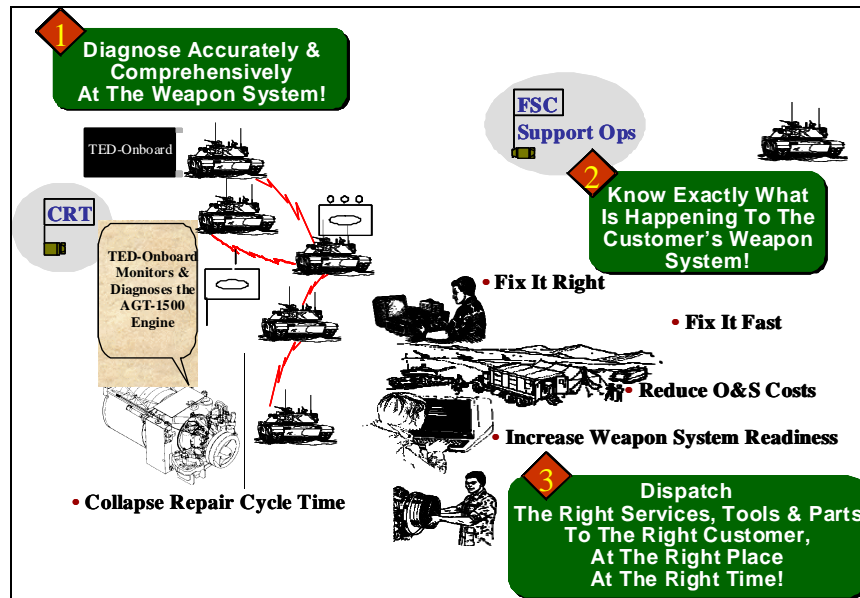


Figure 1-1. Anticipatory Maintenance

Table 1-1. Four Levels of Maintenance

MAINTENANCE LEVEL	CATEGORY
Unit	Operator/Crew Operator/Maintainer Organizational
Direct Support (DS)	Direct Support
General Support (GS)	General Support
Depot	Depot

Table 1-2. Maintenance Level Descriptions

LEVEL OF MAINTENANCE	DESCRIPTION
Unit	<p>Foundation of the maintenance system. Requires continuous emphasis by the commanders.</p> <p>Repairs are made by the operator/crew, as well as the mechanics assigned to the organization.</p> <p>The operator/crew is the cornerstone. They perform PMCS in accordance with the applicable Operator's series (-10 level) technical manual (TM).</p> <p>TM 20-series PMCS tables are used to perform scheduled PMCS services to sustain and extend the combat-capable life of the equipment.</p> <p>Repairs on certain equipment are completed by the operator/maintainer. The operator performs checks, services, and maintenance prescribed in both -10 and -20 level TMs.</p>
DS	<p>Repair and return to user.</p> <p>One-stop service to supported customers.</p> <p>Highly mobile, weapon-system-oriented maintenance.</p> <p>Backup support to unit-level maintenance.</p> <p>Support provided to dedicated customers or on an area basis.</p>

Table 1-2. Maintenance Level Descriptions (continued)

LEVEL OF MAINTENANCE	DESCRIPTION
GS	<p>Commodity-oriented repair of components and end items in support of the Theater Supply System.</p> <p>Backup maintenance support to DS units.</p> <p>Job shop/bay or production line operations with the capability to task/organize to meet special mission requirements.</p> <p>Located at Echelons Above Corps (EAC).</p> <p>NOTE: Based on the METT-TC, platoon/team-sized elements can be found as far forward as required to support the tactical situation.</p>
Depot	<p>Provides combat-ready materiel to the Army Supply System.</p> <p>Maintenance performed by Tables of Distribution and Allowances (TDA) industrial-type activities operated by the Army.</p> <p>Repairs and returns to the Wholesale Supply System at the national level, or, by exception, to the Theater of Operations.</p> <p>Provides technical support and backup to DS and GS maintenance units.</p> <p>In wartime, the "warfighter" combatant commander assumes control of depot-level maintenance operations in the Theater of Operations.</p>

Table 1-3. Maintenance Level Information

LEVEL	UNIT	DIRECT SUPPORT	GENERAL SUPPORT	DEPOT
WHO	Operator Crew Unit Maintenance Personnel Operator/Maintainer	DS Maintenance Units Installation Support Maintenance Shops Host Nation Support (HNS)	GS Maintenance Units Specialized Repair Activities (SRAs) Installation Support Maintenance Shops HNS	Predominately Army Materiel Command (AMC) Commercial Contractors HNS
WHERE	Breakdown Site Equipment Location Unit Maintenance Areas Unit Maintenance Collection Point (UMCP)	Mobile Maintenance Shops Fixed Shops in Installations/Units Equipment Location/ Breakdown Site/ UMCP Division, Corps, and EAC Maintenance Collection Points (MCPs)	Fixed/Semi-fixed Maintenance Facilities Installation Maintenance Shops Equipment Location EAC	Fixed Plant-type Facilities On-site, on exception CONUS and Selected Theaters

Table 1-3. Maintenance Level Information (continued)

LEVEL	UNIT	DIRECT SUPPORT	GENERAL SUPPORT	DEPOT
	<p>PMCS</p> <p>Inspections by sight and touch</p> <p>Lubricating, preserving, cleaning, replacement, and minor adjustments authorized by the MAC</p> <p>Diagnosis and Fault Isolation per MAC</p> <p>Manufacture of parts not otherwise available</p> <p>Replacement of unserviceable Parts, Modules, and Assemblies per MAC</p>	<p>Diagnose and isolate Components and Assembly malfunctions</p> <p>Adjust, calibrate, and align Components and Assemblies</p> <p>Replace Components, Modules, Assemblies, and Piece Parts</p> <p>Repair defective End Items and Components</p> <p>Operate Repair Parts Supply Reparable Exchange Activity (RXA)</p> <p>Recovery</p>	<p>Diagnose and isolate Equipment Components and Assembly malfunctions to the Internal Piece level</p> <p>Adjust, calibrate, align, and repair Components and Assemblies</p> <p>Repair/modification of End Items/Components and Assemblies to the Internal Piece Part level (overhaul)</p> <p>Heavy Body, Hull, Turret, Frame repair</p> <p>Collection and classification of unserviceable Class VII</p>	<p>Overhaul of Components and End Items</p> <p>Repair End Items, Components, Assemblies, and Modules to the original manufactured tolerances/specifications (rebuild)</p> <p>Repair requiring special environmental facilities</p> <p>Non-destructive testing</p> <p>Cyclic overhaul and special Maintenance Programs</p>

Table 1-3. Maintenance Level Information (continued)

LEVEL	UNIT	DIRECT SUPPORT	GENERAL SUPPORT	DEPOT
WHAT	<p>Fault verification and level of repair</p> <p>Requisition, receipt, storage, and issue of Repair Parts Prescribed Load List (PLL)</p> <p>Recovery and transport operations</p> <p>Battle Damage Assessment and Repair (BDAR)</p> <p>Army Oil Analysis Program (AOAP)</p> <p>Reporting Materiel Readiness per Army Regulation (AR) 700-138</p>	<p>Light Body repairs</p> <p>Technical Assistance</p> <p>BDAR</p> <p>Apply DS-level Modification Work Orders (MWOs)</p> <p>DS-level Repair/Issue Operational Readiness Float (ORF)</p> <p>Reinforce support to Unit-level Maintenance</p> <p>Provide Maintenance Support Teams (MSTs)</p> <p>Estimated Cost of Damages (ECOD) Support</p> <p>Repair Parts Supply (Shop Stock)</p>	<p>Evacuate Disposable Materiel</p> <p>Technical Assistance</p> <p>Backup support to DS units</p> <p>Operation of Cannibalization Point</p> <p>Mobile Maintenance Teams (MMTs)</p> <p>GS-level repair of ORF</p> <p>Limited recovery</p>	<p>Manufacture of parts not otherwise available</p> <p>Technical Assistance</p> <p>Reinforcing support to DS and GS units</p> <p>Wholesale-level Repairable Exchange</p> <p>Restoration</p> <p>Conversion</p> <p>Renovation</p> <p>Parts fabrication</p> <p>Modification of serviceable assets</p> <p>Restoration of unserviceables to prescribed levels of serviceability</p> <p>Inspections/modifications requiring extensive disassembly or elaborate Test Equipment</p>

Table 1-3. Maintenance Level Information (continued)

LEVEL	UNIT	DIRECT SUPPORT	GENERAL SUPPORT	DEPOT
	Support user unit's Materiel Readiness	Support using unit Materiel Readiness	Support the Theater Supply System by repair and return to supply stocks Support of local supply stocks, ORF stocks of DS units, and repair and return to user programs	Support of Army/Theater supply inventory by repair and return to supply stocks Support of user unit's materiel readiness with repair cycle float

SUSTAINMENT MAINTENANCE SUPPORT

NOTE: Elements from GS- and depot-level activities can be found as far forward as required to support the tactical situation.

1-13. Sustainment maintenance is generally performed above the DS level. It consists of active and reserve GS maintenance units, directors of logistics (DOLs), depots, SRAs, FRAs, and contractors, which can be tailored to meet sustainment maintenance demands anywhere in the world. It is integrated management that focuses on centralized management with decentralized execution of maintenance programs at local, regional, and national levels. It maximizes repair capability while providing high levels of weapon system availability at the least cost.

1-14. Centers of Excellence (COEs) are established for sustainment activities to determine how maintenance units can best support the Theater Operations Plan. COEs support the Theater Supply System through Tables of Organization and Equipment (TOE) or TDA units, HNS, and contract personnel.

Local Sustainment Maintenance Manager

1-15. The Local Sustainment Maintenance Manager (LSMM) manages the workloading responsibility for all Army sustainment maintenance units and activities in a designated geographical area that could be at multiple maintenance centers. There may be situations where an LSMM operation is established in an overseas theater of operations as part of the logistics support element (LSE).

Regional Sustainment Maintenance Manager

1-16. The Regional Sustainment Maintenance Manager (RSMM) at a designated geographical area has the authority to prioritize or redirect workload among the LSMMs. Depending on the extent of support required, an RSMM operation may be established in an overseas theater of operations as part of the LSE.

National Sustainment Maintenance Manager

1-17. The National Sustainment Maintenance Manager (NSMM) integrates sustainment maintenance for the total Army. The NSMM develops and implements policies and procedures to provide optimal sustainment maintenance support to the full spectrum of total Army missions. The NSMM also participates in developing and integrating the LSE. Support is provided in a seamless process transparent to the user.

Logistics Support Elements

1-18. Logistics support elements:

- Generally move into fixed or semi-fixed facilities in the theater, where they remain for the duration of operations.
- Can displace forward, but through a very time-consuming, labor- and equipment-intensive process. However, they can deploy platoons, sections, or teams as far forward as required to support the tactical situation.
- Are attached, when deployed forward, to the nearest maintenance company; all requirements pass through that headquarters (HQ).

MAINTENANCE ALLOCATION CHART

1-19. The MAC designates overall authority and responsibility for the performance of maintenance functions on an item of equipment. Figure 1-2, page 1-12, displays a MAC. Table 1-4, page 1-12, describes the MAC's six columns.

LOCATION

1-20. The MAC is found in equipment TMs that contain unit-level (-12, -13, -14, -20, -23, and -24) maintenance procedures. Some recently fielded, highly complex weapon systems have separate manuals for the MAC. In those instances, the TM has the same first eight digits as other series TMs, followed by "MAC."

OBJECTIVES

1-21. The Army Maintenance System is organized to service and repair equipment throughout its in-service life. Organizations are tailored to provide the required equipment maintenance capability at appropriate levels throughout the maintenance system.

1-22. To ensure balance in the maintenance system, it is important the responsibilities of each maintenance level be kept in perspective. It is a tactical necessity for user units to perform preventive maintenance. However, users are not expected to perform support or depot maintenance.

MAINTENANCE ALLOCATION CHART						
1	2	3	4		5	6
Group Number	Component Assembly	Maintenance Function	*Maintenance Level		Tools and Equipment	Remarks
			C	O F H D		
05	COOLING SYSTEM CONT					
0505	Fan Tower Assembly	Inspect		0.2		
		Test		0.2		
		Replace		0.3		
		Repair		4.5		A
		Overhaul			35	
					37	
06	ELECTRICAL					
0601	Alternator	Inspect		0.2		
		Test		0.2		
		Replace		2.0		B
		Repair		8.0		
		Overhaul			**	
0602	Voltage Regulation	Inspect		0.2		
		Test		0.2	0.2	
		Replace		2.0		
		Repair		1.0		
		Overhaul				
0603	Motor Starting	Inspect		0.2		
		Test		0.2		
		Replace		2.0		
		Repair		2.4		48
		Overhaul			**	

****Worktimes are included in DMWR**

*C Operator or crew
 O Organizational
 F Direct support maintenance
 H General support maintenance
 D Depot maintenance

Figure 1-2. Maintenance Allocation Chart

Table 1-4. MAC Columns

Column 1 – Group Number	Lists group numbers, which identify components, assemblies, subassemblies, and modules with the next higher assembly.
Column 2 – Component/Assembly	Contains noun names of components, assemblies, subassemblies, and modules for which maintenance is authorized.
Column 3 – Maintenance Function	Lists functions to be performed on items in Column 2. Maintenance functions are limited to, and defined as, those listed in Table 1-5.
Column 4 – Maintenance Level (Four levels of maintenance with specific tasks divided into five maintenance categories)	Specifies the lowest level of maintenance authorized to perform the function listed in Column 3. Listing a work-time figure in the proper subcolumn does this. The work-time figure represents the man-hours required to perform the function. The number of man-hours specified is the average time required to restore an item to use under field operating conditions. This includes preparation, troubleshooting, and technical inspection/quality control time, in addition to the time required to perform the specific task.
Column 5 – Tools and Equipment	Names, by code, the common tool sets, special tools, and test/support equipment required to perform the designated function.
Column 6 – Remarks	Lists references to the page at the end of the MAC.

FUNCTIONS

1-23. There are many functions that are essential to ensure that equipment sustains its service life. Maintenance functions are defined in Table 1-5.

Table 1-5. Maintenance Functions

Title	Description
Inspect	To determine the serviceability of an item by comparing its physical, mechanical, or electrical characteristics with established standards through examination.
Test	To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing with prescribed standards.
Service	To periodically perform required maintenance that keeps an item in operating condition.
Adjust/Align	To maintain or regulate an item, within prescribed limits, by bringing it into proper or exact position or by setting the operating characteristics to specified parameters.
Calibrate	To determine corrections and cause them to be made or to make adjustments on instruments or TMDE used in precision measurement.
Remove/Install	To remove and install the same type of item. Could also occur separately (for example, MWO, installation kit, but nothing removed).
Replace	To remove an unserviceable item and install a serviceable counterpart in its place. This could refer to fluids, such as oil.
Repair	To perform maintenance required to correct material damage and to restore an item to serviceability standards.
Overhaul	To restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications.
Rebuild	To restore unserviceable equipment to a like-new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment.

MAINTENANCE SUPPORT

1-24. Maintenance support is a flexible, decentralized operation (maintenance execution) capable of keeping up with shifts in operational tempo (OPTEMPO). Centralized control (maintenance management) provides maximum resources used to accomplish the mission. The maintenance support concept focuses on sustaining operations by maximizing equipment availability to the FP Army. It strives to create a seamless system operating across strategic, operational, and tactical levels, interweaving and mutually supporting all levels of maintenance for maximum effectiveness. Maintenance support requires continuous coordination with customer units to tie the soldier in the field to the national level. The emerging operational concept for maintenance embraces requirements and capabilities in an interlocking scheme of maintenance support from the breakdown site to the CONUS base.

TWO-LEVEL MAINTENANCE

1-25. It is the Army's intent to transition to a two-level maintenance system beginning in fiscal year (FY) 06. Under a two-level maintenance system the unit and DS levels of maintenance will be combined (and called "field level") and the GS and depot levels will be combined (and be called "sustainment maintenance"). Field maintenance would be characterized by "on-system" maintenance. Field maintenance would be repair and return to user; sustainment maintenance would be repair and return to supply.

FIELD MAINTENANCE

1-26. Field maintenance actions typically involve replacement of Class IX components, on-system, for repair and return to echelon, and in deployable TOE units. These repairs will generally be performed by uniformed maintenance personnel at least through corps/joint task force (JTF) level. Some examples of field maintenance include the following:

- Replacement of a starter on an engine assembly.
- Timing of a fuel injection pump.
- Replacement of a temperature sensor.
- Replacement of a head gasket.
- Replacement of an external maintenance wiring harness.

Determination of exactly which maintenance actions are field maintenance actions will be done during the normal maintenance analysis performed between the materiel developer and the combat developer.

SUSTAINMENT MAINTENANCE

1-27. Sustainment maintenance actions typically involve repair of reparable Class IX components, off-system, for return to the supply system. Sustainment maintenance will be performed at echelons above brigade (EAB), and perhaps eventually at echelons above division (EAD). Sustainment maintenance can be performed by uniformed maintenance personnel, Department of the Army (DA) civilians, or contractors. The decision as to whether or not to have sustainment maintenance includes

detailed off-system inside-the-box repair of line replaceable units (LRUs) thru shop replacement unit (SRU) repair/replacement, and rebuild of engines, transmissions, and the like.

1-28. Operations in peacetime and in combat place heavy demands on equipment. Weapon systems and other equipment are subject to severe use. A tank that will not move is a definite liability to the tactical commander. A radio that does not work can cause a breakdown of communications that could result in the loss of lives. The link between the using organization and maintenance support is a trained operator/crew who can properly use and maintain the equipment. Though time is limited, the continued availability of equipment demands that the operator/crew perform PMCS.

1-29. The cornerstones of maintenance support are the tenets, “fix forward” and “anticipate support.” Repairing equipment far forward enhances the ability to quickly return the maximum number of combat systems, at the earliest opportunity, as close to the using unit as possible. However, as maintenance operations transform with FXXI and beyond, maintenance concepts are evolving in replacing modular components forward and “fixing” in the rear.

1-30. Replace Forward and Repair Rear is the replacing of LRUs or modules instead of attempting to repair them. It is also the leveraging of advanced prognostics and diagnostics tools, support equipment, and training. The LRUs or modules are then retrograded to higher levels of maintenance for repair and returned to the distribution system. FXXI field maintenance operations are characterized by lean, modular, and enabled maintenance units focused on maximizing combat power. At the velocity in which future field maintenance operations must be performed, the workload will consist of FXXI distributed operations and capabilities of battlefield distribution. This would increase expected gains in diagnostics and prognostics, facilitating our ability to fix equipment forward through replacement of LRUs or component assemblies.

Replace Forward

1-31. Replace Forward means a soldier performs “on-system” maintenance. “On-system” refers to replacing components or subcomponents at the point of repair, the breakdown site, or the UMCP. Maintainers normally diagnose down to the major component failure. They then replace that component and return the system to operational condition. Based on the METT-TC, the soldier may diagnose and replace subcomponent items depending on the availability of tools, parts, and time. An example of a replace function is the replacement of a full-up power pack (FUPP). If a serviceable FUPP is available, the maintainer replaces the major assembly. If the FUPP is not available, the maintainer might swap out a serviceable engine from an unserviceable FUPP with a bad transmission.

Repair Rear

1-32. Repair Rear means that soldiers perform “off-system” maintenance. “Off-system” refers to those actions taken to return components and subcomponents of weapon systems to serviceable condition. These repair actions take place at designated places throughout the battlefield. Corps maintenance units may have the

capability to repair certain LRUs or assemblies for major weapons systems they support. Corps component repair companies or special repair activities in the corps or theater area repair other components and assemblies as determined by sustainment maintenance managers (SMMs). An example of a repair function at the corps or theater level is the rebuild of a tank engine or other major assembly.

1-33. Anticipating future requirements allows prepositioning of maintenance support capabilities. Anticipation rests on the ability to foresee future operations and to identify, accumulate, and maintain the assets, capabilities, and information required to support them.

1-34. Leaders must tailor and position maintenance support to provide quick, mobile responses to changes in units and weapon systems. Maintenance managers must coordinate the best use of available resources to repair and return the maximum number of critical items. They must maintain close, consistent interaction between maintenance organizations and their SSAs to ensure quick access to repair parts. Support elements must perform maintenance work as far forward as practical within the limitations of the METT-TC and the commander's priorities.

METHODS

1-35. There are four methods of support used by maintenance organizations. Table 1-6 gives a brief description of each method. The four methods are:

- Forward support.
- Area support.
- Backup/Reinforcing support.
- Passback support.

MANAGING BATTLEFIELD MAINTENANCE

1-36. When requirements have been identified, the maintenance manager must identify the resources on-hand and those already committed. Available resources are then managed within the established support framework to return the maximum number of items to fully mission-capable status.

1-37. When a shift or change in priorities could provide a greater overall return, the maintenance manager takes appropriate action or makes recommendations through the chain of command. Although a maintenance planner may not formally lay out a management matrix as such, a mental estimate of these factors is necessary. Figure 1-3 shows the basic concept for managing maintenance support on the battlefield.

Table 1-6. Description of Support Methods

<p>Forward Support</p>	<p>Maintenance-oriented toward quick turnaround to the user in order to maximize operational time by minimizing repair and evacuation downtime.</p> <p>End item repair thrust as <i>far forward</i> as possible within tactical time criteria, or recovered and evacuated to the point where repairs can be made. "Fix Forward" remains the preferred maintenance concept.</p>
<p>Area Support</p>	<p>Maintenance resources concentrated in a <i>defined geographic area</i> based on the type and quantity of equipment supported.</p> <p>Focus is placed on the supporting units operating in or moving through defined geographic boundaries.</p>
<p>Backup/Reinforcing Support</p>	<p>Customer <i>backup support</i> is provided to the supported unit for excessive maintenance requirements that cannot be performed due to time or resource limitations.</p> <p><i>Backup support</i> is provided to like-maintenance units for temporary excessive requirements that must be performed to meet operational readiness needs.</p>
<p>Passback Support</p>	<p><i>Passback support</i> is provided by one maintenance unit to another supported maintenance unit. This requirement is a predictable and permanent maintenance workload that is allocated by force structure.</p>

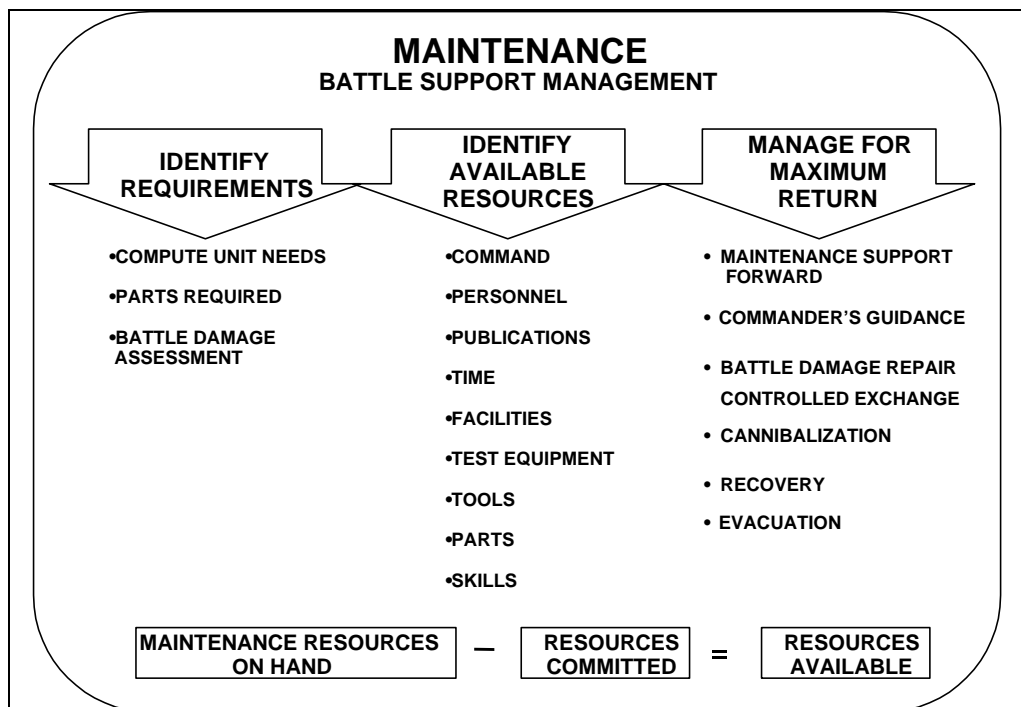


Figure 1-3. Managing Battlefield Maintenance Support

Battle Damage Assessment and Repair

1-38. Use BDAR to inspect damaged equipment to determine the extent of damage, to classify the equipment according to the type of repairs required, and to develop a plan of action for each item. Priorities for repair of battle-damaged systems are as follows:

- Most essential for completion of the immediate mission.
- Can be repaired in the least amount of time.
- Repairable but not in time to continue the immediate mission.

1-39. BDAR uses emergency expedient repairs, as outlined in the BDAR TMs, to return the system to fully or partially mission-capable status. Under combat conditions, BDAR may be performed on fueled or armed systems. The commander may also waive other precautions. All operations must be conducted as safely as possible. More details about BDAR procedures can be found in field manual (FM) 9-43-2.

NOTE: Equipment that is damaged beyond repair becomes a candidate for cannibalization.

Organizational Flexibility

1-40. Maintenance managers must be aware of changing support requirements. Maintenance resources must also be tailored to ensure support is provided as required. This tailoring encompasses adding or removing resources, such as personnel and equipment, to meet mission requirements and to best support the tactical commander's intent. Restructuring Company Maintenance Teams (CMTs) or requesting MST assistance from supporting maintenance units should be done as required.

Repairs and Recovery

1-41. To maximize unit combat readiness, equipment must be repaired and returned to the user as quickly as possible. Repairs should be made as far forward as possible. As equipment in the corps and communications zone (COMMZ) is not always "forward," forward also means on-site or at the supported unit's UMCP.

1-42. Recovery of equipment to maintenance collection points removes equipment from using units and increases the time it is not available. Repairing equipment as far forward as possible reduces transportation requirements and non-mission-capable time and increases equipment availability.

1-43. Commanders must ensure the degree of maintenance performed is consistent with technical and tactical requirements. During combat, only maintenance needed to return equipment to mission-capable status is performed. This concentrates the maintenance effort on those areas that affect the outcome of the battle.

1-44. Non-mission-essential maintenance is deferred until after the battle. Sometimes a weapon or support system may contain redundant systems that enable it to operate even when one or more of them are damaged. Commanders may decide to keep a weapon/support system in the battle at reduced capability rather than lose it entirely while the inoperable system is repaired.

CENTRALIZED MANAGEMENT OF DECENTRALIZED OPERATIONS

1-45. Maintenance managers at all levels must maintain control over their respective maintenance operations even though the support is decentralized. This provides support as far forward as possible and focuses available maintenance resources on the work to be done.

Manager Responsibilities

1-46. Managers must be aware of the maintenance workload and available resources in order to make necessary maintenance support decisions. Since the situation may change rapidly, information must be as near real-time as possible. Managers must direct the use of maintenance resources or shift the workload to the maintenance elements best suited to make the repair. They should avoid having damaged equipment awaiting repairs in one area of the battlefield while maintenance personnel are idle in another. Managers must create a flexible maintenance environment so that resources and workloads can cross various command boundaries.

Reporting Systems

1-47. Accurate reporting is the link between decentralized operations and centralized management. The measure of success of a maintenance manager is based on the ability to manage maintenance operations to maintain desired operational readiness standards. The Unit Level Logistics System-Ground (ULLS-G) performs The Army Maintenance Management System (TAMMS) functions at the unit maintenance level. The Standard Army Maintenance System (SAMS) provides maintenance managers with an automated management information system that can assist them in managing DS maintenance operations. For additional guidance, maintenance managers should refer to Training Circular (TC) 43-4.

1-48. The Army is currently developing a seamless, interoperable system that consolidates the current stovepipe management information systems. The Global Command Support System-Army (GCSS-A) integrates and standardizes the format for data entry used by current Army systems. The GCSS-A also standardizes communication protocols. The GCSS-A consists of multiple modules that interface with each other. The modules and their relationship with ordnance maintenance operations are as follows:

- **Maintenance Module (MNTM).** The GCSS-A combines the functions of the current ULLS-G, Unit Level Logistics System-Aviation (ULLS-A), and Standard Army Maintenance System-Level 1 (SAMS-1) into a single maintenance module. This module manages workload and coordinates repair services, provides applicable financial information, reports maintenance status, and performs

TAMMS records management. The module will also leverage emerging technologies to support split-based operations and increased mission support requirements. This module has the capability to process Class IX supply requisitions.

- **Management Module (MGTM).** The GCSS-A will integrate the capabilities currently found in the Standard Army Retail Supply System-Objective (SARSS-O) Integrated Logistics Analysis Program (ILAP), the maintenance management reporting performed by the Standard Army Maintenance System-Level 2 (Management Level-MMC/Battalion) (SAMS-2), and the planning and management functions developed for the Unit Level Logistics System, S-4 Module (ULLS-S4) (logistics estimates, CSS planning and management-type functions, and unit status reporting). This module will allow users the ability to access required CSS data from a single database and make decisions using that data.
- **Integrated Management Module (IMM).** The GCSS-A integrates the functionality of the Standard Army Ammunition System-Modified (SAAS-MOD), Standard Property Book System-Redesign (SPBS-R), Standard Army Retail Supply System-Level 2A (Division) (SARSS-2A), Standard Army Retail Supply System-Level 2AC (SARSS-2AC), SARSS-Gateway, and SAMS-2. This integration produces a package of functions for use by sections within materiel management centers (MMCs) at all levels.

Chapter 2

Maintenance Organizations

This chapter describes the current battlefield layout of Army units in an operational theater. The theater of operations is divided into two major areas:

- Communications Zone. The COMMZ is the rear part of the theater of operations (behind but contiguous to the combat zone). The COMMZ contains the lines of communications (LOCs), establishments for supply and evacuation, and other agencies required for the immediate support and maintenance of the field forces.
- Combat Zone. The combat zone (CZ) is the area, required by combat forces, to conduct operations. The CZ is the territory forward of the Army rear area boundary.

ARMY SERVICE COMPONENT COMMAND ORGANIZATIONS

2-1. The Army Service Component Command (ASCC) has command and control (C2) of all Army units in the theater of operations. The ASCC is responsible for preparing, equipping, administering, and providing CSS to Army forces (ARFOR) assigned to unified and specified commands. An ASCC has no set structure; its size and composition depends on the mission. Figure 2-1 shows a typical theater of operations. Figure 2-2, page 2-2, shows the typical organization of a theater Army. FM 100-7 provides more details about the Army service component organization.

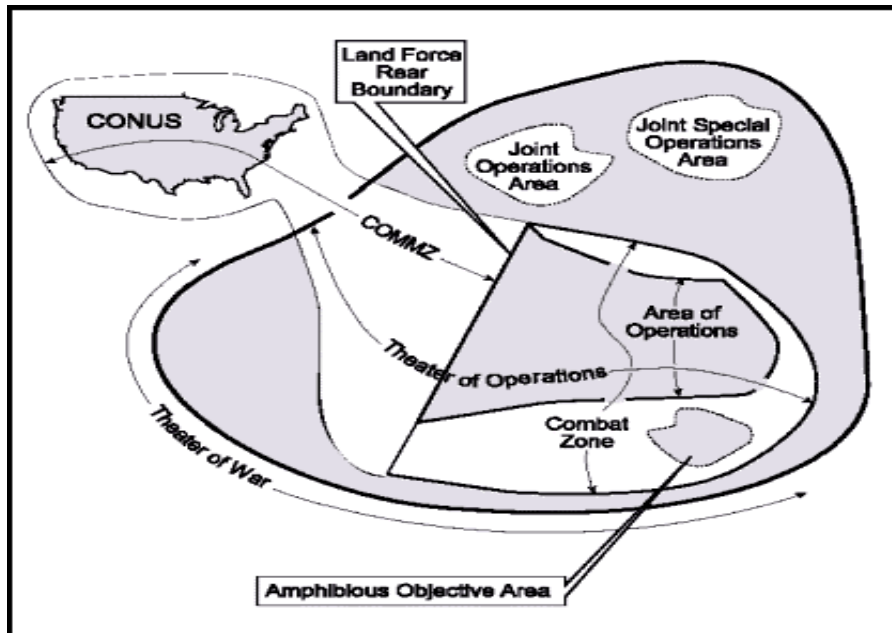


Figure 2-1. Theater of Operations

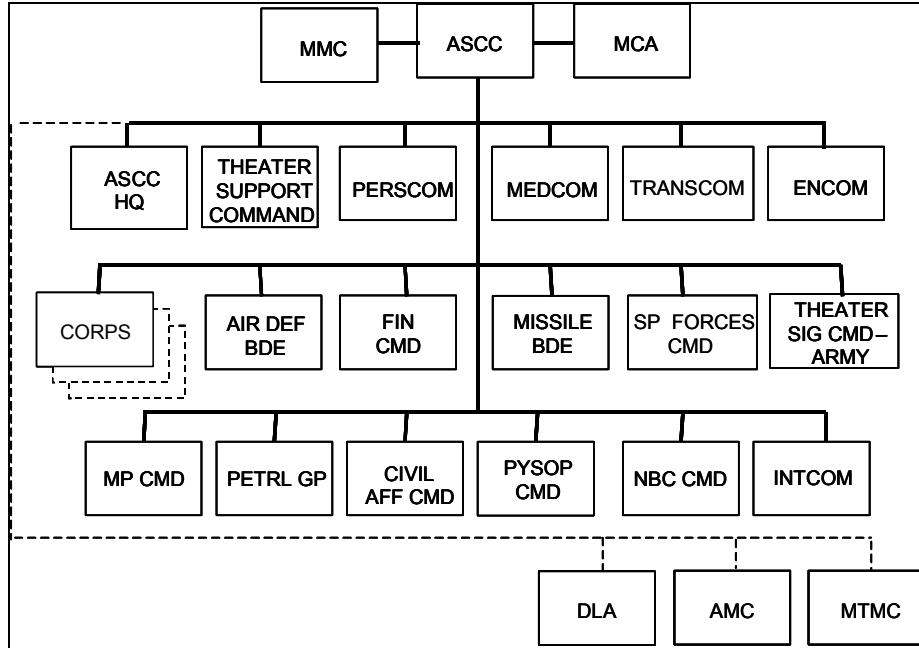


Figure 2-2. Army Service Component Command Organization

2-2. There are seven major commands in the ASCC that handle most CSS operations. Of the seven major Army commands (MACOMs), only the Theater Support Command (TSC) is multifunctional; the other six are functional commands. The Engineer Command (ENCOM), Medical Command (MEDCOM), Transportation Command (TRANSCOM), Personnel Command (PERSCOM), and Finance Command (FINCOM) are specialized commands. Based on the command relationship established by the ASCC (see FM 4-93.4), specialized commands may or may not be attached to the TSC.

LOGISTICS CIVIL AUGMENTATION PROGRAM

2-3. This DA program employs civilian contractors in non-combatant roles to augment military resources. The Logistics Civil Augmentation Program (LOGCAP) leverages civilian corporate resources as facility and logistics service support to United States (U.S.) forces. The U.S. Army Materiel Command (USAMC) is the proponent for LOGCAP management. The Combatant Commander/ASCC formally identifies LOGCAP requirements. The LOGCAP provides augmentation capabilities to support maintenance requirements not covered by other means (such as active and reserve components, multi-national forces, and HNS). The LSE Commander functions as the central focal point to LOGCAP planning and execution in-theater. The commander also provides the Combatant Commander/ASCC with the current status of LOGCAP initiatives and action.

- 2-4. LOGCAP teams are responsible for the following:
- Deploying worldwide in support of any contingency using LOGCAP capabilities.
 - Advising the requiring activity on LOGCAP capabilities.

- Assisting customers in articulating requirements to the contractor and ensuring contractual compliance.
- Integrating LOGCAP augmentation capabilities into the deployed force structure to meet METT-TC requirements.
- Facilitating the teaming of the customer and contractor to accomplish the mission.

LOGISTICS SUPPORT ELEMENT

2-5. The LSE is a flexible, deployable, multifunctional organization assigned to the USAMC. The LSE deploys, at the request of supported operational commanders, to perform traditional USAMC missions forward on the battlefield or area of operations (AO). It has a small peacetime cadre with the bulk of the positions being battle-rostered. Its elements will retain technical LOCs with their MACOMs.

Structure

2-6. The LSE will be rapidly deployable, its structure evolving during the course of the operation to adapt to changing requirements and the capabilities of deployed organizations. Similar to other supporting organizations, it supports the Combatant Commander with personnel and equipment that deploy to the AO. The LSE may also be useful during stability and sustainment operations in controlling the transition of support functions to host nation (HN) authorities, the United Nations (UN), contractors, or other agencies. This allows other ARFOR to redeploy to prepare for the next contingency. More details on the LSE are in FM 100-16.

Mission

2-7. The LSE's primary mission is to enhance readiness through unified, integrated application of the USAMC's logistics force projection of CONUS-based technical capabilities to deployed units in any theater of operations. The LSE shortens the logistics pipeline by providing the similar support in-theater that the USAMC provides in the CONUS.

Functions

- 2-8. The LSE performs the following functions:
- Receipt, storage, issue, and retrograde/ redistribution of high-dollar, high-tech, low-density items and selected maintenance items.
 - Limited GS- and depot-level maintenance to return items to support customers or to support the Repairable Exchange (RX) Program.
 - Flexible, modular GS-/weapon-system-oriented teams from CONUS depots and organic or contractor FRAs. The senior Army logistician will identify maintenance requirements to the LSE, which will workload attach and operationally control (OPCON) maintenance units and activities.
 - Designated maintenance services to support the Theater Aviation Maintenance program.

- Technical, logistics, training, and other specialized services for theater ammunition functions.
- Logistics software management, including troubleshooting and software replacement, until a support group takes over the mission.
- Oversight of contractor-operated activities in the theater through the contracting officer's representatives (CORs) and also administrative services for the representatives.
- TMDE support.
- Linkage between the theater and the technology base and other research, development, test, and evaluation (RDT&E) resources.
- Assistance through interim materiel modifications, operational suggestions, and BDAR of weapon systems.
- Logistics assistance program support to provide on-site technical assistance to users of AMC-fielded equipment in-theater.
- AOAP support.

NON-DIVISIONAL MAINTENANCE ORGANIZATIONS

THEATER SUPPORT COMMAND ORGANIZATION

2-9. TSCs are responsible for supply and maintenance support in their assigned areas in the COMMZ. TSCs are multifunctional organizations and they are not fixed in structure. Their structure is tailored to meet the demands of the mission to include functional and multifunctional organizations. Figure 2-3 shows the organization of a TSC, highlighting its modularity and relationship with supported and supporting organizations.

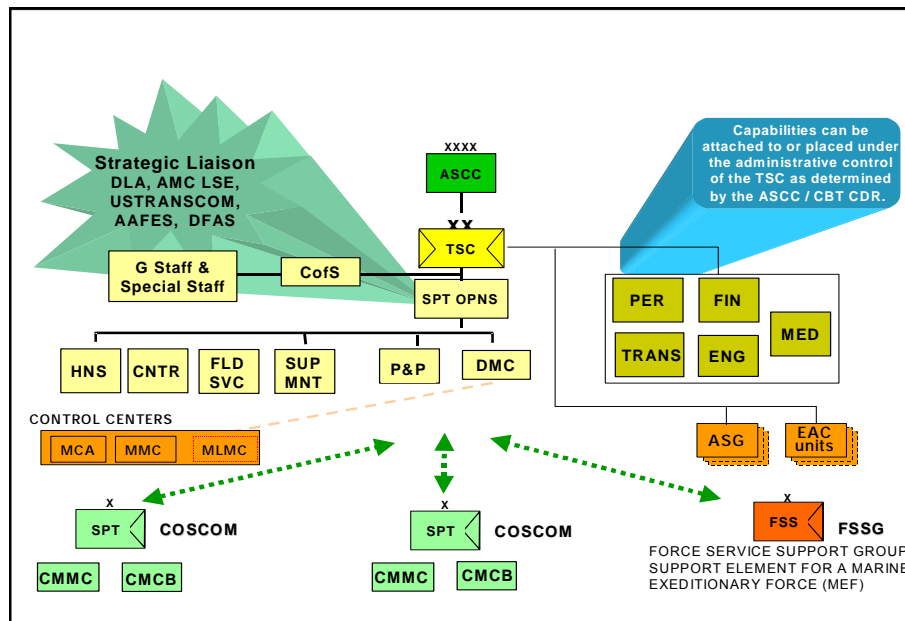


Figure 2-3. Theater Support Command Organizations

2-10. The Area Support Group (ASG) is a multifunctional TSC unit. Functional units include the following:

- Aviation Maintenance Battalion (Aviation Intermediate Maintenance (AVIM)).
- Petroleum Battalion.
- Ammunition Group (Conventional).
- Explosive Ordnance Disposal (EOD) Battalion.

2-11. The TSC is a multifunctional organization that centralizes the command, control, and supervision of support functions at EAC as directed by the ASCC/ARFOR Commander. The TSC HQ and its subordinate organizations are modular in design. Depending on the METT-TC, they are capable of deploying in whole or in selected parts. Modular designs permit the supported Joint Force Commander (JFC) to tailor the EAC support structure.

2-12. The mission of the TSC is to maximize throughput and follow-on sustainment. This includes all logistics functions of ARFOR and other designated supported elements. The TSC is capable of synchronizing logistics and other support operations for the ASCC. It also provides area support to the EAC units in the COMMZ and sustainment support to tactical forces. This support may include the following:

- Supply.
- Procurement.
- Property disposal.
- Maintenance.
- Transportation.
- Field services.
- Health services.
- Civil-military affairs.
- Engineer support.
- Finance support.
- Human resource support.

FM 4-93.4 describes, in detail, the missions, function, and employment of the TSC.

DISTRIBUTION MANAGEMENT CENTERS

2-13. The Distribution Management Centers (DMCs) combine materiel management and support operations into one robust distribution center. DMCs access total asset visibility (TAV) and in-transit visibility (ITV), track shipments, establish priorities, and coordinate transportation. The DMC is the senior control center in the TSC and sets sustainment priorities. The Deputy TSC Commander supervises the DMC.

AREA SUPPORT GROUP ORGANIZATIONS

2-14. The TSC is divided into several smaller areas. An ASG is assigned to the COMMZ to provide maintenance and supply support to units operating within or passing a specified area. ASGs, like the TSC, are multifunctional organizations. However, they are not fixed in structure. Each ASG consists of those units necessary to perform its assigned support mission.

Mission

2-15. The ASG provides DS-level support to units located in or passing through the ASG's AO. The ASG also provides GS-level support for those units assigned to it by the theater.

Structure

2-16. Figure 2-4 shows the organization of a typical ASG in a TSC. Functional CSS Battalions include:

- Supply and Service Battalions.
- Maintenance Battalions.
- Petroleum Supply Battalions.

NOTE: There are no transportation support units in an ASG. All transportation units in the COMMZ belong to the TRANSCOM.

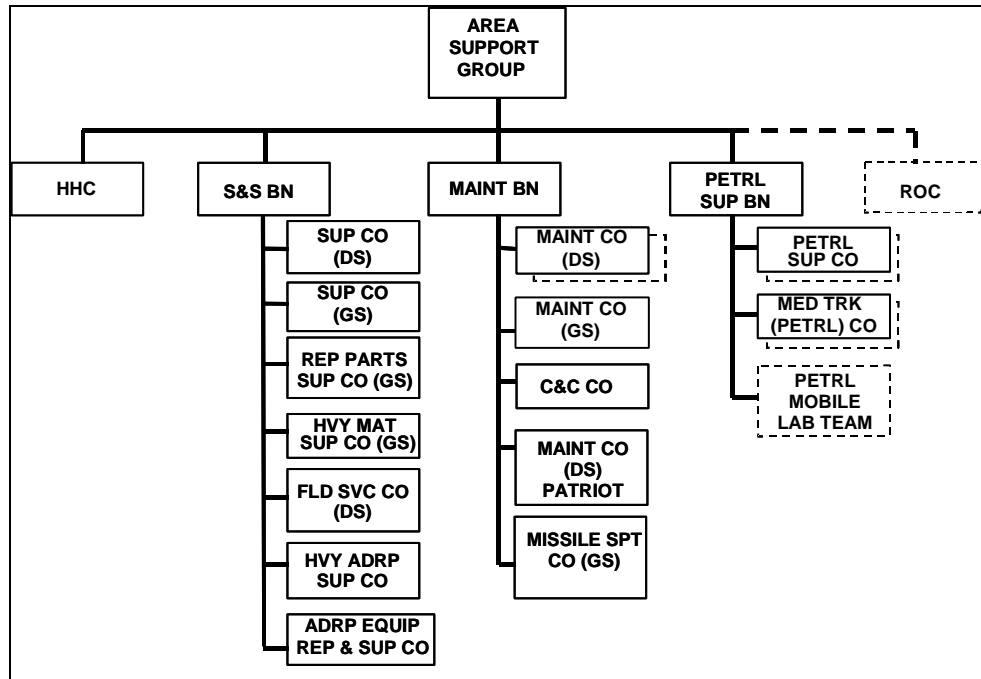


Figure 2-4. Area Support Group

AREA MAINTENANCE AND SUPPLY FACILITY

2-17. The Area Maintenance and Supply Facility (AMSF) provides logistical support for EAC non-tactical communications and information systems used in an overseas theater. The AMSF may provide:

- Logistics support for any EAC communications or information system not specifically assigned to another command or agency for support.
- Support to the Defense Satellite Communications System (DSCS), Army-operated portion of the Defense Industry Initiative (DII), the American Forces Radio and Television Service (AFRTS), the Military Affiliate Radio System (MARS), and other theater-unique communications or C2 systems.
- Maintenance on information systems equipment specifically designated in the AMSF mission statement. Types of equipment repaired at the AMSF include, but are not limited to, the following:
 - **Signal Transmission Systems.** DSCS microwave, troposcatter, high frequency, satellite, special transportable systems, Non-Strategic Nuclear Forces Command and Control Information (NSNFC2I) systems, antennas, associated towers (except for major overhaul), and wire and cable systems (including fiber optic cable).
 - **Automated Communications Systems.** Defense Switched Network (DSN), Automatic Digital Network (AUTODIN), electronic tandem switching centers, commercial off-the-shelf (COTS) data network equipment, COTS computers, and COTS auxiliary information processing equipment.

NOTE: The AUTODIN system is currently being replaced by the Defense Message System (DMS).

- **Dial Central Facilities.** Electronic switching systems and telephone key systems.
- **Special Activity Communications Equipment.** Radio and television, emergency action consoles, command control centers, and air traffic control equipment and systems.
- **Specified Information Management and Processing Equipment (IMPE).** Automation and visual information equipment for strategic and sustaining base services.

2-18. The AMSF may also provide support to other U.S. military departments, Department of Defense (DoD) activities, and government agencies or installations. Support is provided through interservice support agreements on a reimbursable basis.

2-19. Each theater of operations normally will have only one AMSF. The DA Deputy Chief of Staff for Logistics (DCSLOG) gives approval for the creation of an AMSF. AMSFs are task-organized facilities. The structure of an AMSF depends on the support requirements of the theater. The size of the organization is based on the following:

- Number of sites supported.
- Their geographical dispersion.
- The type of operational equipment located at each.

An AMSF may be operated directly by the Army, or it may be operated by a civilian contractor with Army oversight. Soldiers, DA civilians, U.S. civilians, or local national personnel may staff an AMSF.

2-20. Two AMSFs are currently in operation (one in Europe and one in the Pacific). A civilian contractor operates the AMSF-Europe (AMSF-E). It is staffed with U.S. civilians and local national personnel. The AMSF-E provides support for DSCS and DII systems in England, Germany, Italy, and Southwest Asia. The AMSF-Pacific (AMSF-P) is operated directly by the Army and is staffed with a combination of military, DA civilians, and local national personnel. The AMSF-P provides support for DSCS systems in Japan and Korea. Figure 2-5 shows a diagram of a model AMSF. This model may be used as a guide for structuring support activities for specific requirements. Based on support requirements, all sections may not apply to every AMSF or additional sections may be required.

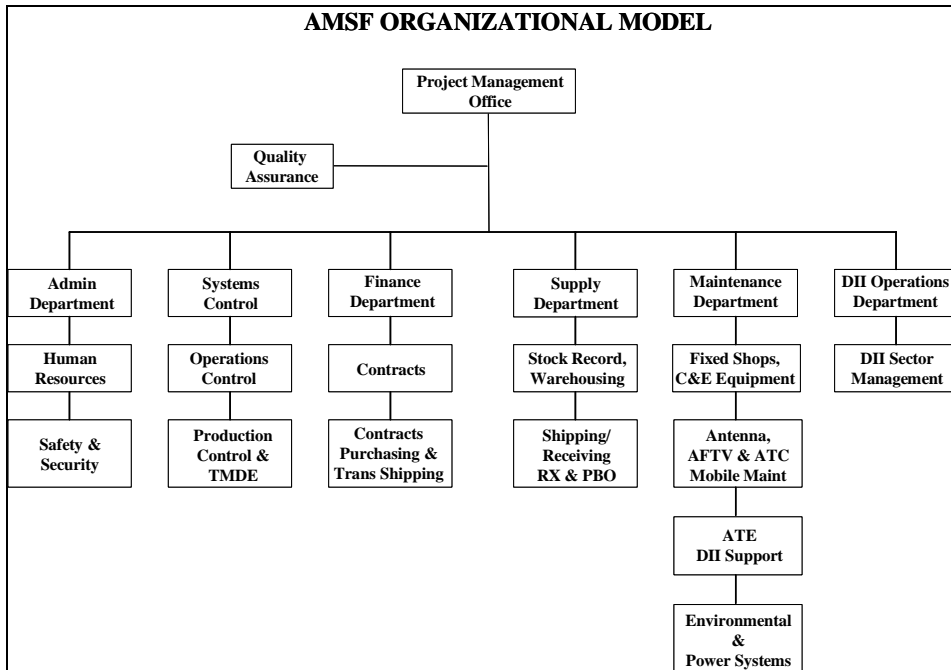


Figure 2-5. Model AMSF

THEATER SIGNAL MAINTENANCE COMPANY (SUSTAINMENT), ECHELONS ABOVE CORPS

Mission

2-21. The mission is to provide dedicated sustainment maintenance and supply support for unique Tri-Tac mobile subscriber equipment (MSE), computers, and conventional communications-electronic end items and components for three signal brigades within an EAC Theater Signal Command-Army (TSC-A). The company also performs SRA component-level diagnostics and repair of selected circuit card assemblies (CCAs).

Capabilities

2-22. This company has the following sustainment repair capabilities:

- Automated data processing (ADP) equipment (including teletype, Tactical Army Combat Service Support Computer System (TACCS), and associated peripherals).
- High-frequency communications equipment.
- Microwave equipment (including multichannel, tactical satellite, troposphere scatter, and fiber optic).
- Communications security equipment (including SRA support for selected controlled cryptographic items).
- Ground support equipment (including power generation units (PGUs) with outputs up to 200 kilowatt (kw), environmental control units (ECUs), forced air heaters, power-driven decontamination equipment, and gasoline engines).

NOTE: The Theater Signal Maintenance Company (TSMC) provides this capability because the TSC-A, as an initial-entry deployer, depends on the immediate readiness of all ground support equipment to facilitate the critical theater signal mission.

Additional Capabilities

2-23. This company also provides the following:

- C2 for three modular theater signal maintenance platoons.
- Class IX repair parts support for all mission-critical equipment organic to the TSC-A.
- Communications security (COMSEC) custodial functions (including materiel management, safeguarding, inventories, and cyclic reports).
- COMSEC logistical functions (including procurement, maintenance, and transport of COMSEC equipment and materiel).
- Organizational maintenance for all equipment organic to the TSMC.

Basis of Allocation

2-24. There is one TSMC per TSC-A. The unit is typically attached to the Headquarters and Headquarters Detachment (HHD), Composite Signal Battalion, source requirement code (SRC) 11626L000. Figure 2-6 shows the organizational structure of the TSMC (Sustainment). This unit is 100 percent mobile.

NOTE: This unit provides dedicated sustainment support to a TSC-A.

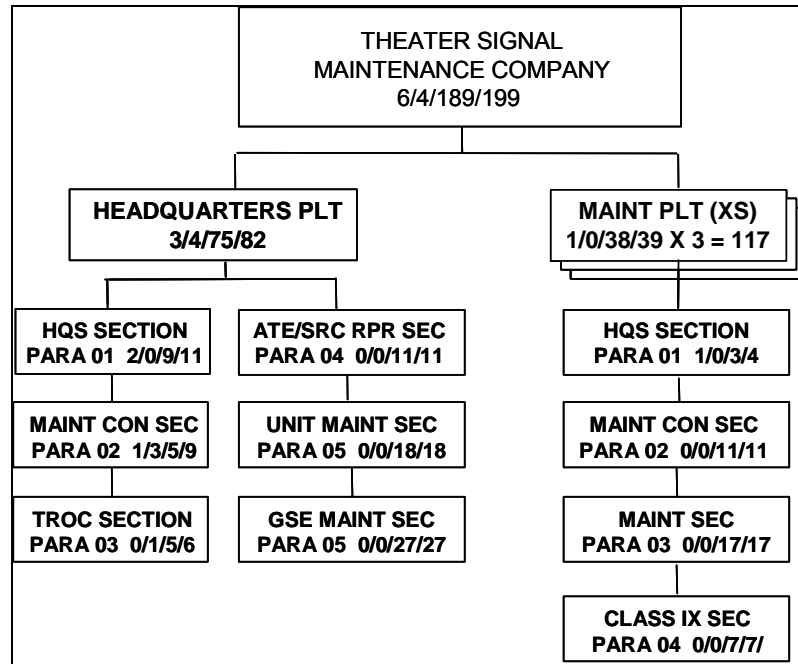


Figure 2-6. Theater Signal Maintenance Company (Sustainment) EAC

TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT CALIBRATION AND REPAIR SUPPORT ELEMENTS

2-25. Army TMDE calibration and repair support (C&RS) is an AMC mission. The U.S. Army TMDE Activity (USATA) has responsibility for executing this AMC worldwide sustainment mission during times of war, military operations other than war (MOOTW), and peace. The total Army TMDE support structure is comprised of active and reserve component military, Department of the Army Civilian (DAC), contracted personnel, and local nationals. In a theater of war, the military components are dedicated to corps and divisional support missions (Chapter 7) with civilian components responsible for the EAC support mission. Beyond the theater of operations is a network of sustainment support elements provided by regional support centers, laboratories, and the Army primary standards laboratory. During times of war and operations other than war, the deployed support elements continue the AMC mission under the C2 of the theater LSE in accordance with FM 63-11.

Mission

2-26. The EAC mission is to provide TMDE C&RS for EAC unit. This unit also provides TMDE support for Army war reserve stocks, and secondary reference support (S-Level) for all area TMDE support teams (ATSTs) in a theater of war.

Capabilities

2-27. EAC TMDE support elements provide:

- One stop service for C&RS of general purpose and selected special purpose TMDE as identified in Technical Bulletin (TB) 43-180 with accuracies traceable to the National Institute of Standards and Technology.
- Mobile ATSTs for designated EAC geographical areas.
- Area Calibration Laboratory (ACL) support functions for all theater ATSTs and TMDE requiring S-Level support. Support is provided from designated regional laboratories not necessarily located in the theater of war.
- Back up support for all theater ATSTs.
- Tailored C&RS for unique requirements.
- Supply support services related to TMDE C&RS.
- Support provided from designated regional support centers not necessarily located in the theater of war.
- Theater-wide C&RS operational and technical coordination through the LSE.

Basis of Allocation

2-28. Echelons above corps are typically allocated three ATSTs per theater of war. One ACL and TMDE-peculiar supply support element provided by a designated regional support center. An operations cell allocated per theater of support and located with the LSE. Figure 2-7, page 2-12, indicates the Army's TMDE C&RS organizational structure at EAC.

NOTES: Corps and divisional level TMDE C&RS provided by military elements are discussed in Chapter 7.

During peacetime operations, the above structured support elements/teams revert back to the appropriate Active or Reserve Component Command for command and control.

At all times, war and peacetime, the USATA maintains the technical authority for all aspects of the Army's TMDE calibration and repair support mission.

NOTE: Deployment of an ACL or TMDE supply support capability with the Theater of War will be determined by the in-theater LSE Commander in coordination with the designated TMDE regional support center and the USATA. Factors impacting deployment are: the maturity of the Theater, availability of fixed facilities, and density of supported TMDE. Normally, existing TMDE support laboratories from one or more designated TMDE geographical regional support centers will provide ACL and TMDE support from fixed facilities outside the Theater of War.

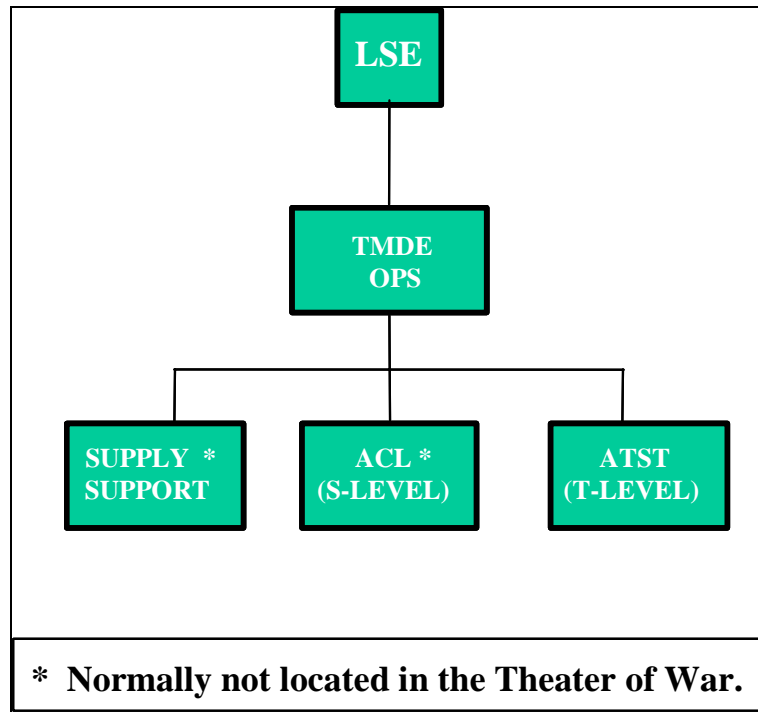


Figure 2-7. TMDE C&RS Organizational Structure at EAC

2-29. The TMDE C&RS elements within EAC are dependent on the assigned ASG for the following:

- Food service, legal, health support, finance, administrative services, religious support, and maintenance support for organic equipment other than TMDE.
- Supply support.
- Packaging, crating, and transportation for relocation of ACL and/or supply support elements when such elements are positioned within the theater of war.
- Signal support for entry into the area communications system.

Operational Concept – Echelons above Corps

2-30. EAC typically use Area TMDE Support Teams to provide TMDE support. When deployed in support of an EAC mission, the attached ATSTs will support EAC units on an assigned area basis.

2-31. **ATST Operations.** The ATST will set up operations in the designated area and provide one-stop TMDE C&RS to all units within or passing through their area of support. One-stop C&RS service is characterized by equipment delivery and pickup by the TMDE owner/user at the ATST location. The ATSTs maintain the capability to respond to selected TMDE calibration requirements in a backup support roll for corps and divisional needs. This is coordinated through the TMDE maintenance company corps operations team and the EAC TMDE operations element. An ATST has the organic mobile capability to relocate as their assigned area of support may dictate based on METT-TC. The ATSTs are dependent on the TMDE operations cell within the theater LSE operations for the following:

- Planning.
- Programming.
- Coordination.
- External technical support.

The ATSTs are also dependent on ACL support for secondary transfer standards and customer TMDE requiring S-level laboratory support. This support will normally be provided from designated regional support centers external to the theater. TMDE Class II and VII supply support is also required from designated regional support centers external to the theater.

2-32. **Modes of Operation.** The ATST's equipment configuration allows the team to operate in a fully uploaded mobile mode or in a dismounted fixed facility mode of operation. Consideration of METT-TC, as assessed by the appropriate Support Operations Office, will determine the mode of operation.

2-33. **Operations Cell.** Elements of the TMDE Operations Support Office, comprised of civilian personnel, are located with the LSE. The number of personnel depends on the type and scope of the support operation. The operations cell provides for the planning, programming, and coordination of technical support for the theater mission. The cell functions as the overall in-theater technical point of contact for TMDE C&RS. The TMDE operations cell serves as an interface with the CONUS- and outside Continental United States (OCONUS)-based technical facilities.

MAINTENANCE BATTALION (AREA SUPPORT GROUP)

Mission

2-34. The primary mission of the Maintenance Battalion is to provide DS/GS-level maintenance support, repair parts support, technical assistance, and recovery support to non-divisional units in its AO. It also provides backup DS-level maintenance support as required.

Capabilities

2-35. This battalion provides maintenance and repair parts support for a great variety of equipment, except for aircraft, marine, rail, airdrop, missile-aircraft armament, office machines, avionics, and photographic equipment. The DS/GS Maintenance Battalion is a functional CSS

organization. Figure 2-8 shows the typical organization of a DS/GS Maintenance Battalion (ASG).

NOTE: The battalion has a variable number of maintenance units attached to a Headquarters and Headquarters Company in accordance with the mission to be performed. A typical DS/GS maintenance battalion includes a Headquarters and Headquarters Company (HHC) and three to five non-divisional DS/GS maintenance companies. At times, the battalion may be augmented with non-maintenance units if doing so improves the quality of support.

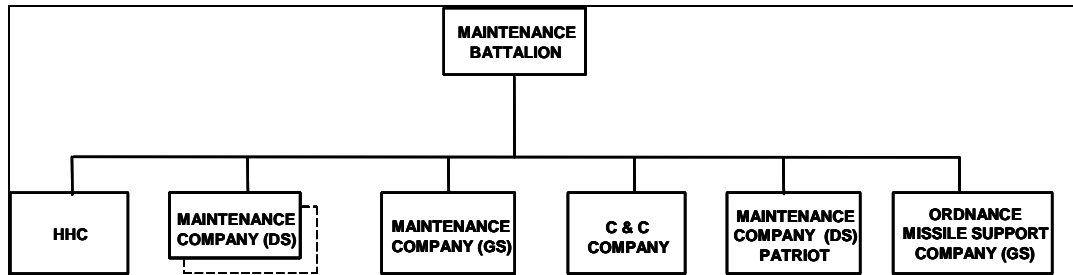


Figure 2-8. Maintenance Battalion, ASG

MAINTENANCE COMPANY (DS), MAINTENANCE BATTALION (AREA SUPPORT GROUP)

Mission

2-36. This unit provides DS-level maintenance and repair parts supply support and technical assistance. This unit will begin its mission with stated capabilities for non-divisional units assigned to or passing through the corps and theater areas.

Capabilities

2-37. This unit provides DS maintenance for the following:

- Automotive equipment.
- Communications-electronics (C-E) equipment.
- Base computer equipment.
- Construction equipment.
- Fabric.
- Fuel and electric components.
- Metalworking.
- Machining.
- Power generation equipment.
- Quartermaster and chemical equipment.
- Refrigeration.
- Small arms.
- Special electronic devices.

- Telephone central office equipment.
- Teletypewriters.
- Radiation detection, indication, and computation (RADIAC) equipment certification.

Additional Capabilities

2-38. This unit also provides the following:

- Class IX from an authorized stockage list (ASL) of up to 5,000 lines, which includes 500 lines of RX items.
- Backup recovery capability for supported units.
- Technical assistance and on-site maintenance support.

The unit performs the following DS maintenance tasks:

- Inspection, diagnosis, and troubleshooting.
- Rapid repair and return of equipment to customers by adjusting and replacing LRUs, assemblies, and components.
- Repair of selected high-usage components in support of RX operations.

NOTE: The ability to perform certain missions is dependent on augmentation of the base company by special teams.

2-39. This unit is also dependent on the following:

- Legal, health service support (HSS), finance, human resource, and administrative services for the elements of the corps/theater.
- Religious support for the HHC.
- Transportation and supplemental stockage of selected major assemblies, RX, major end items, repair parts, and evacuation of unserviceable items and vehicles for appropriate elements of the corps/theater.
- Responsible for the corps or theater Signal Brigade area.
- Entry into the area communications system for the Communications Company.

NOTE: Soldiers from this unit will be spread throughout the corps and COMMZ in performance of their mission.

Basis of Allocation

2-40. The basis of allocation is one or more per ASG. The unit is normally attached to a Maintenance Battalion, TOE 43436L. Figure 2-9 shows a typical DS Maintenance Company, Maintenance Battalion (ASG).

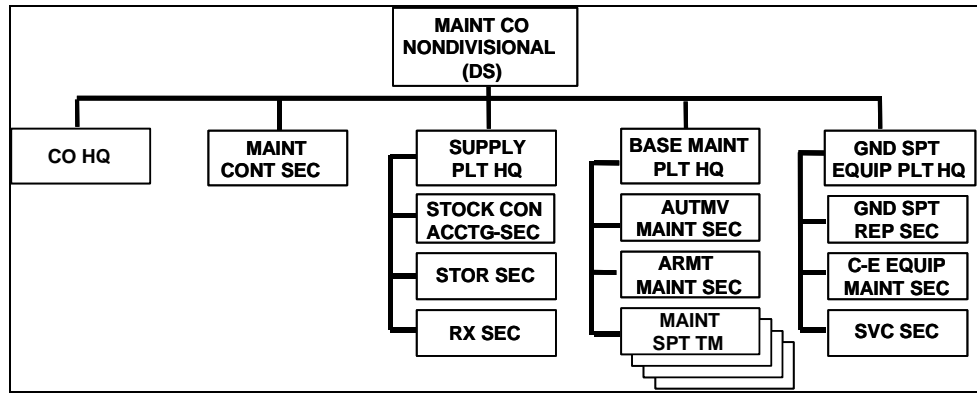


Figure 2-9. Maintenance Company (DS), Maintenance Battalion (ASG)

Mobility

2-41. This company is 80 percent mobile in one lift. The Communications-Electronics Equipment Section will be 100 percent mobile. The MSTs will consist of two personnel to provide assistance with required maintenance tasks and security and safety in-transit.

MAINTENANCE COMPANY (GS), MAINTENANCE BATTALION (AREA SUPPORT GROUP)

Mission

2-42. The mission is to provide GS maintenance for conventional heavy and light equipment end items and components for return to the theater supply system. This maintenance company is organic to the ASG maintenance battalion.

Capabilities

2-43. This unit repairs and returns the following to the supply system:

- Automotive equipment.
- Construction equipment.
- Small arms.
- Tank turrets.
- C-E equipment.
- Special electronic devices.
- Utilities equipment.
- Power generation equipment.
- Quartermaster and chemical equipment.

2-44. The unit also performs the following:

- Canvas repair.
- Metalworking.
- Machining.
- Refrigeration equipment repair.

Additional Capabilities

2-45. This unit also provides:

- C2 for not more than five modular repair platoons.
- All operational, administrative, and logistical support (including food service, personnel, and property accountability for assigned platoons).
- Internal Class IX supply only.
- Area maintenance support, including technical assistance, on-site maintenance, and backup support as required.
- Unit-level maintenance on theater reserve stocks (TRS) when augmented by Unit Maintenance Teams, as required.
- GS maintenance support when augmented by modular platoons for the repair of the following:
 - Fire control instruments.
 - Fire control systems.
 - Artillery equipment.
 - ADP.
 - Printed circuit boards (PCBs).
 - TMDE.
 - Radar.
 - Controlled cryptographic items.
 - Office machines.
 - Audiovisual equipment.
 - Electronic warfare/intercept equipment.
- Unit maintenance of all organic equipment except tracked vehicles and COMSEC equipment for assigned GS Maintenance Platoons.

NOTE: This unit does not perform repairs on aircraft, missiles, ammunition-peculiar items, or medical, cryptographic, marine, and rail equipment.

Basis of Allocation

2-46. The basis of allocation is one or more per TSC. The unit is normally assigned to a Headquarters and Headquarters Detachment, Maintenance Battalion, TOE 43436L. Figure 2-10 is a diagram of a typical GS Maintenance Company, Maintenance Battalion, ASG.

Mobility

2-47. This unit is capable of transporting 158,300 pounds (10,433 cubic feet) of TOE equipment with organic vehicles. The unit has 66,076 pounds (5,366 cubic feet) of TOE equipment requiring additional or auxiliary transportation. This unit also requires 25 percent of its TOE equipment and supplies to be transported in a single lift using its authorized organic vehicles.

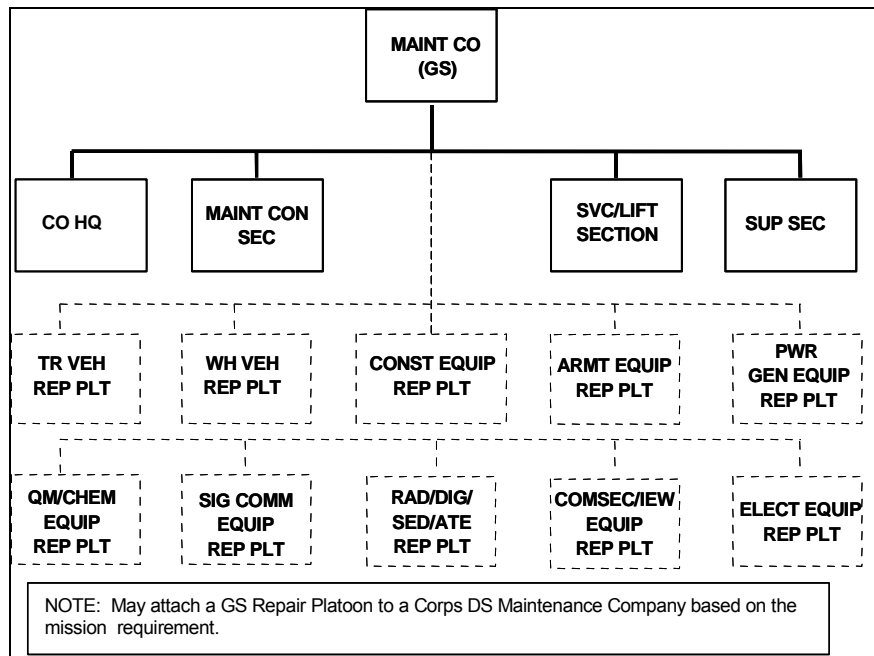


Figure 2-10. GS Maintenance Company, Maintenance Battalion, ASG

COLLECTION AND CLASSIFICATION COMPANY, MAINTENANCE BATTALION (AREA SUPPORT GROUP)

Mission

2-48. This mission of this unit is to establish and operate a collection and classification facility. The unit conducts receipt, inspection, segregation, disassembly, preservation, and disposition of serviceable and unserviceable Class VII and IX materiel and similar foreign materiel (except items peculiar to cryptographic materiel, missile systems, aircraft, airdrop equipment, drones, and medical materiel).

Capabilities

2-49. This unit inspects, segregates, disassembles, and maintains the following:

- Radios.
- Microwave systems.
- Target acquisition/surveillance equipment.
- Special electronic devices.
- Metalworking.
- Small arms/artillery.
- Fire control systems.
- Armament.
- Utilities equipment.
- Power generation equipment.
- Construction equipment.
- Fuel and electric components.
- Tracked vehicles.
- Quartermaster and chemical equipment.
- Wheeled vehicles.
- Survey instruments.

Additional Capabilities

2-50. This unit also performs the following:

- Disassembly of end items.
- Identification and inspection of components and assemblies for repair, return to supply stocks, or disposal to a Defense Logistics Agency (DLA) Property Disposal Office (PDO) [except items peculiar to cryptographic material, missile systems, aircraft, airdrop equipment, drones, and medical materiel].
- Segregation, preservation, and packaging of selected items of materiel and related components for return to supply channels for evacuation and technical intelligence evaluation.
- Operation of a cannibalization point for items processed by the unit, when authorized by higher HQ.

Basis of Allocation

2-51. The basis of allocation is one or more per ASG. It is normally attached to a Headquarters and Headquarters Detachment, Maintenance Battalion, TOE 43436L. Figure 2-11 is a diagram of a Collection and Classification (C&C) Company, Maintenance Battalion (ASG).

NOTE: The Identification and Inspection Section of the Collection and Classification Company, which performs these functions, is unique in its grade structure. The section requires one warrant officer, one section chief noncommissioned officer (NCO), and nine technical Inspectors in the following areas: microwave, special electronic devices, surveillance radar, communications and electronics (COMMEL)/COMSEC, armament, power generation, tracked vehicles, wheeled vehicles, and engineer equipment.

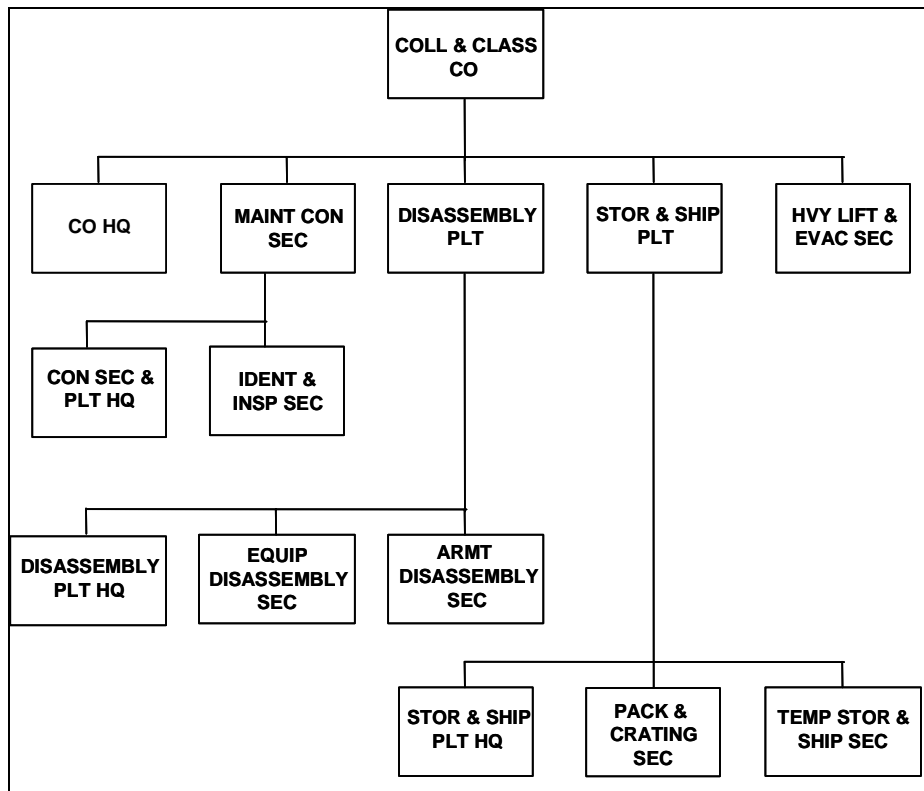


Figure 2-11. Collection and Classification Company, Maintenance Battalion (ASG)

Mobility

2-52. This unit is capable of transporting 440,400 pounds (11,379 cubic feet) of TOE equipment with organic vehicles. It has 53,056 pounds (5,266 cubic feet) of TOE equipment requiring additional transportation. This unit also requires 25 percent of its TOE equipment and supplies to be transported in a single lift using its authorized organic vehicles.

2-53. The C&C Company will continue to play a vital role on the FXXI battlefield. Most C&C Companies are currently found in the reserve component, but two new platoons will be formed (see Chapter 9). One of the platoons will perform vital maintenance inspection functions at distribution hubs along the distribution pipeline. The second platoon will move throughout the battlefield, locating abandoned equipment, assessing the condition of various components on the system, removing serviceable components as directed, and returning critical components to the distribution system. These platoons can be attached to a Support Maintenance or Component Repair Company operating in the theater or corps areas. The reserve component will perform most, if not all, of the C&C mission.

ORDNANCE MISSILE SUPPORT COMPANY (GS), MAINTENANCE BATTALION (AREA SUPPORT GROUP)

Mission

2-54. The mission of this unit is to provide the following:

- GS-level maintenance at EAC for Air Defense Artillery (ADA) and Land Combat Missile Systems (LCMS).
- Repair parts supply support to missile support units assigned to EAC or units passing through the theater Army area. With appropriate augmentation teams, the unit can support up to two corps.
- DS base shop and on-site maintenance support teams (MSTs) that provide maintenance support for units assigned to EACs. The unit also provides maintenance support for Army War Reserve (AWR) stocks.
- Class IX supply support to unit maintenance activities, including receipt, storage, and issue of missile repair parts. The ASL supports the unit's maintenance mission.
- The GS supply support base for combat-essential Class IX repair parts and selected maintenance-related items from other classes of supply to support the ASLs of supported units. It receives all missile parts and supply requisitions from supported units and processes requests on a fill-or-pass basis.

Capabilities

2-55. This Maintenance Company provides the following:

- GS-level support for ADA and LCMS weapon systems in-theater.
- Maintenance for ADA and LCMS associated training equipment.
- DS-level maintenance support for systems on an area basis as required at theater level.

Basis of Allocation

2-56. The basis of allocation is one per TSC. This unit is normally assigned to a Maintenance Battalion, Headquarters and Headquarters Detachment, TOE 43436L, of the ASG.

Mobility

2-57. The unit's mobility is 80 percent (based on the requirement to change locations and maintain the maintenance support mission). All MSTs will be 100 percent mobile and consist of two personnel that will provide assistance with required maintenance tasks and security and safety in-transit.

Augmentation Team

2-58. Based on mission requirements, the unit may be augmented by DS and GS Augmentation Teams. The teams are assigned, as required, based on the density of supported ADA Battalions or units operating LCMS. Figure 2-12 shows the Augmentation Teams that are available to supplement the EAC or Corps Missile Support Company.

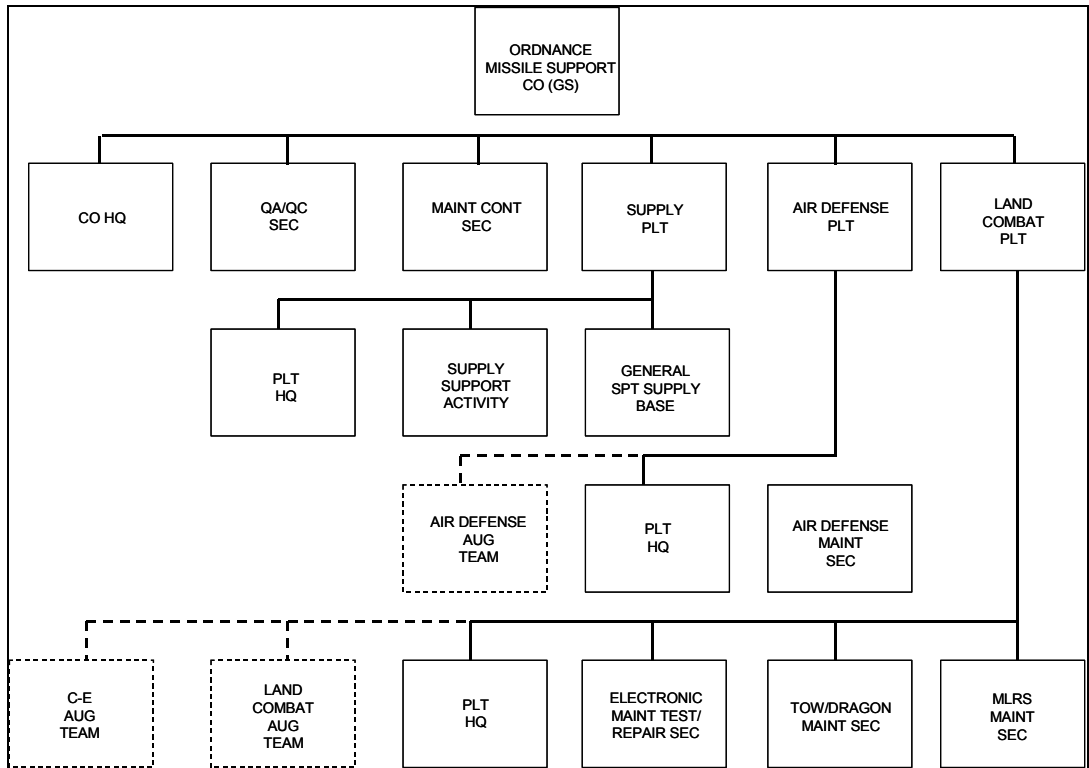


Figure 2-12. Ordnance Missile Support Company (GS)

MAINTENANCE COMPANY (DS), PATRIOT, MAINTENANCE BATTALION (AREA SUPPORT GROUP)

Mission

2-59. The Maintenance Company (DS), Patriot, TOE 43607L, is assigned to a Maintenance Battalion and attached to a Patriot ADA Battalion to provide DS conventional maintenance and Class IX repair parts. The unit, along with the assigned patriot missile system, DS/GS Augmentation Team, makes up the support package for one Patriot ADA Battalion.

Capabilities

2-60. This Maintenance Company provides support to the dedicated patriot missile system. It also supports both DS and GS systems.

Basis of Allocation

2-61. The basis of allocation is one per Patriot Battalion. It is normally attached to a Maintenance Battalion, TOE 43436L. The unit normally collocates with the supported Patriot ADA Battalion. Figure 2-13 shows the organization of a Maintenance Company (DS), Patriot, Maintenance Battalion (ASG).

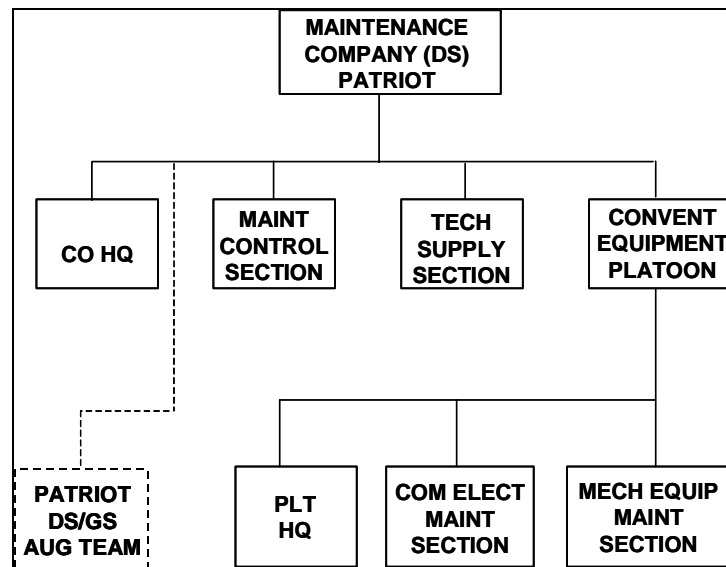


Figure 2-13. Maintenance Company (DS), Patriot

Mobility

2-62. The unit's mobility is 100 percent (based on the requirement to change locations and maintain the maintenance mission). MSTs will consist of two personnel that provide assistance with required maintenance tasks and security and safety in-transit.

Augmentation Teams

2-63. The company is allocated one DS/GS Patriot MST to provide patriot system maintenance capability. TOE 9529LX, Patriot Missile System, (DS/GS) Augmentation Team provides DS/GS maintenance for

patriot missile equipment organic to a Patriot Battalion. Support includes limited base shop and three MSTs for patriot-peculiar equipment, limited GS Class IX, identification friend or foe (IFF) equipment, and stinger air bottle and battery recharging. This team attaches to the Patriot Conventional Maintenance Company for ASL support, base shop, and common maintenance equipment utilization.

CORPS SUPPORT AREA

2-64. Higher HQ designates the corps area within the CZ. The corps organizational structure is not fixed. Its size and composition depends on the situation and mission. The corps usually consists of two to five divisions and the combat support (CS) and CSS units needed to support the maneuver force. The following are the major CSS elements of the corps:

- Corps Support Command (COSCOM).
- Service Battalion.
- Finance Group.

Corps Support Command Organization

2-65. The COSCOM is the primary logistics organization in the corps. It provides supply, field services, transportation, maintenance, and medical support to the divisions and the non-divisional units of the corps. The COSCOM is a multifunctional organization; its organizational structure is not fixed.

2-66. A typical COSCOM will have multiple corps support groups (CSGs) and a Medical Brigade. If there are three or more Transportation Battalions, they may form a transportation group within the COSCOM. Figure 2-14 shows the typical organization of a COSCOM.

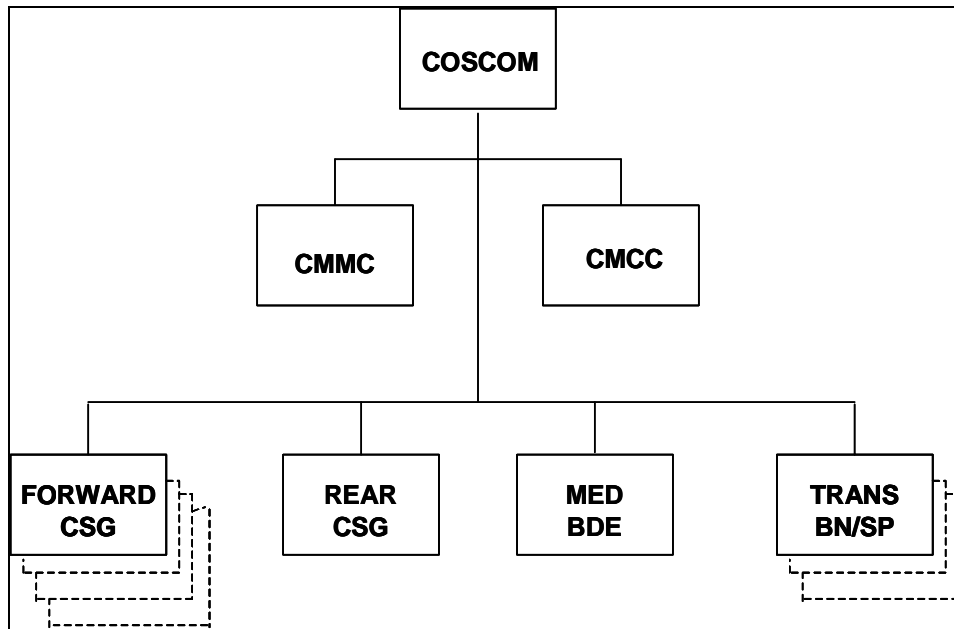


Figure 2-14. Typical COSCOM Organization

Corps Support Group Organizations

2-67. CSGs provide C2, staff planning, and supervision for three to seven subordinate battalions. Similar to the COSCOM, the CSG is multifunctional, not fixed in structure. The basic mission and composition of the CSG varies depending on whether the CSG is employed in the forward or rear areas of the corps.

2-68. **Corps Support Group (Rear).** Rear CSGs operate in the rear area of the CZ and provide area support to units employed or passing through their AO. They also provide reinforcing support to forward CSGs. Rear CSGs normally have three to seven subordinate battalions, which may be functional or multifunctional. Their organizational structures are not fixed; they are determined by COSCOM mission requirements. They provide both DS and GS support to units in the corps area. Figure 2-15 shows a CSG (Rear).

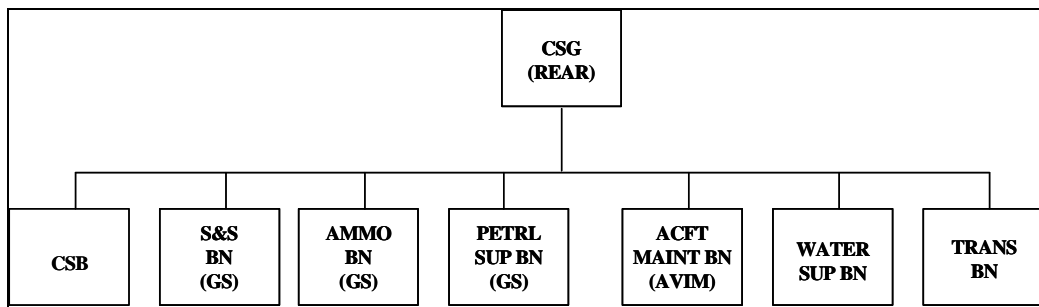


Figure 2-15. Corps Support Group (Rear)

2-69. **Corps Support Group (Forward).** Forward CSGs operate in or near the division area and provide DS to all corps units in their area of responsibility (AOR). They focus their support on combat maneuver forces (such as the Division, Separate Brigade, Armored Cavalry Regiment (ACR), Corps Artillery, and Corps Combat Engineers). They also provide DS to non-divisional forces, area support to units passing through, and back-up/reinforcing support to divisional forces. A COSCOM normally employs one forward CSG with each division in the corps structure. The forward CSG's structure is not fixed, but it usually consists of two or more multifunctional Corp Support Battalions (CSBs). The CSG provides support as far forward as possible and ensures responsive logistical support to corps units operating in or forward of the division sector. The CSGs normally employ one CSB in the division support area (DSA) division rear and one or more CSBs behind the division rear boundary.

2-70. **Corps Support Battalion.** The multifunctional CSBs in the rear CSG provide only DS-level maintenance, supply, field services, and transportation support for all units employed in, or passing through, its AOR in the corps rear area. The functional battalions in the rear CSG provide primarily GS-type support to units throughout the corps area. Rear CSBs of the forward CSG operating behind the division rear boundary are also not fixed; they are task-organized to provide DS and GS support to units in their AOR. The Rear CSB of the Forward CSG also provides area support to the following:

- Units passing through its assigned support sector.
- Backup support (DS and GS) to the forward CSB of the forward CSG.
- Reinforcing support (DS and GS) to division CSS units.

Figure 2-16 shows a Corps Support Battalion in a Forward CSG.

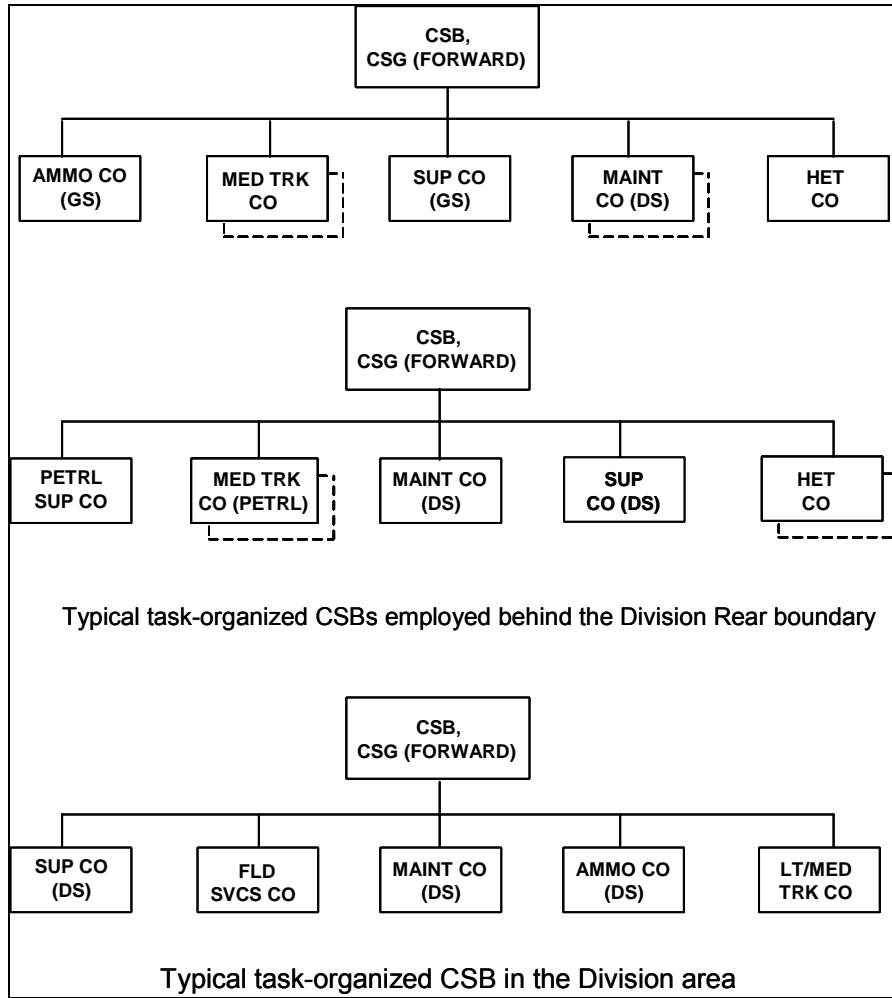


Figure 2-16. CSBs in a Forward CSG

NON-DIVISIONAL MAINTENANCE COMPANY (DS), CORPS SUPPORT BATTALION (CORPS SUPPORT GROUP)

Mission

2-71. The mission of this unit is to provide DS maintenance and repair parts supply support and technical assistance commensurate with stated requirements for non-divisional units assigned to, or passing through, the corps area. It also provides backup support for divisional units, separate brigades, and for ACRs.

Capabilities

- 2-72. This unit provides DS maintenance for the following:
- Automotive equipment.
 - C-E equipment.
 - Base computer equipment.
 - Construction equipment.
 - Fabric.
 - Fuel and electric systems.
 - Metalworking.
 - Machining.
 - Power generation equipment.
 - Quartermaster and chemical equipment.
 - Refrigeration.
 - Small arms.
 - Special electronic devices.
 - Telephone central office equipment.
 - Teletypewriters.

Additional Capabilities

- 2-73. This company also provides:
- Class IX from an ASL of up to 5,000 lines, which includes 500 lines of RX items.
 - Backup recovery capability for supported units.
- 2-74. This unit performs the following DS maintenance tasks:
- Inspection, diagnosis, and troubleshooting.
 - Rapid repair and return of equipment to customers by adjusting and replacing LRUs, assemblies, and components.
 - Repair of selected high-usage components in support of RX operations.
- 2-75. This unit is dependent on the following:
- Elements of the corps/theater for legal, combat health support, finance, human resource, and administrative services.
 - HHC for religious support.
 - Appropriate elements of the corps and theater for transportation and supplemental stockage of selected major assemblies, RX, major end items, repair parts, and evacuation of unserviceable items/vehicles.
 - The corps or theater Signal Brigade Area Communications Company for entry into the area communications system.

NOTE: Soldiers from this unit will be forward of the division's rear boundary and spread throughout the corps in performance of their mission.

Basis of Allocation

2-76. Allocation is based on the workload for systems supported in the area. However, the company will usually be in the CSB assigned to a forward CSG providing backup support to divisions and forward support to non-divisional units operating in the division area. Figure 2-17 shows the typical organization of a DS Maintenance Company, Corps Support Battalion (CSG).

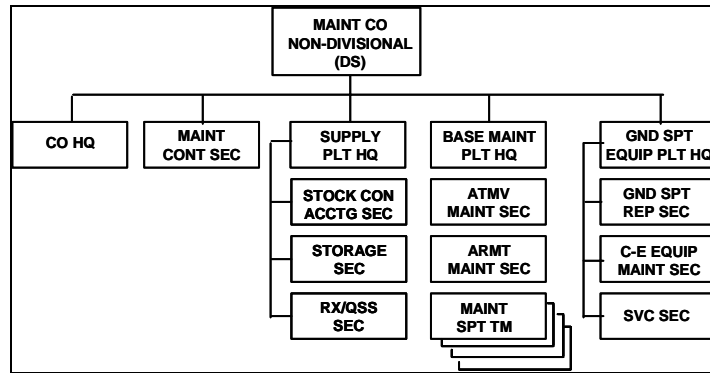


Figure 2-17. DS Maintenance Company, Corps Support Battalion (CSG)

Mobility

2-77. This company is 80 percent mobile in one lift. This unit retain the requirements to change locations in support of maintenance requirements.

ORDNANCE MISSILE SUPPORT COMPANY (DS), CORPS SUPPORT BATTALION (CORPS SUPPORT GROUP)

Mission

2-78. The mission of this unit is to provide a C2 structure for missile systems maintenance support for units assigned to or passing through the corps area. This company, combined with Augmentation Teams, can provide support in the following ways:

- Base shop support for Light Divisions, ACRs, and Separate Brigades. With Augmentation Teams, the unit can support any corps configuration.
- Class IX supply support to the unit's maintenance elements, including receipt, storage, and issue of missile system repair parts to tactical units.

Capabilities

2-79. This unit provides DS support to the following units:

- ADA Battalions.
- Units operating LCMS.

Basis of Allocation

2-80. The basis of allocation is one per COSCOM. The unit would normally be assigned to a CSB, Headquarters and Headquarters Detachment, TOE 63426L. Figure 2-18 shows the organization of an Ordnance Missile Support Company, (DS), CSB.

Mobility

2-81. The unit's mobility is 80 percent (based on the requirement to change locations and maintain the maintenance mission). All MSTs must be 100 percent mobile and will consist of two personnel that provide assistance with required maintenance tasks and security and safety in-transit.

Augmentation Teams

2-82. On mission requirements, DS and GS Augmentation Teams may augment the unit. Teams are assigned, as required, to provide maintenance support to a unit assigned to a corps. Teams are allocated based on the density of supported ADA Battalions or units operating land combat missile systems.

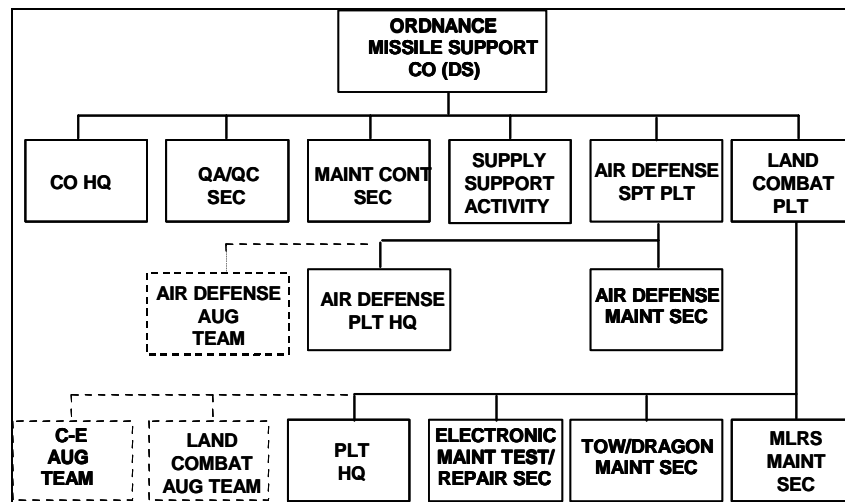


Figure 2-18. Ordnance Missile Support Company, DS, CSB (CSG)

MAINTENANCE COMPANY (DS) PATRIOT, CORPS SUPPORT BATTALION (CORPS SUPPORT GROUP)

Mission

2-83. The mission of the Maintenance Company (DS) Patriot, TOE 43607L, is to provide DS conventional maintenance and Class IX repair parts supply to one Corps Patriot ADA Battalion. The unit, along with the assigned Patriot Missile System (DS/GS) Augmentation Team, makes up the support package for one Patriot ADA Battalion at corps.

Capabilities

2-84. This Maintenance Company provides conventional and system maintenance support to the Patriot Missile System. It also supports both DS and GS systems.

Basis of Allocation

2-85. The basis of allocation is one per Patriot Battalion. At corps, the unit is normally attached to a CSB, TOE 63426L. The unit collocates with the supported Patriot ADA Battalion. Figure 2-19 shows the organization of a Maintenance Company (DS) Patriot, Corps Support Battalion (CSG).

Mobility

2-86. The unit's mobility is 100 percent. Its mobility is based on the requirement to change locations and maintain the maintenance mission.

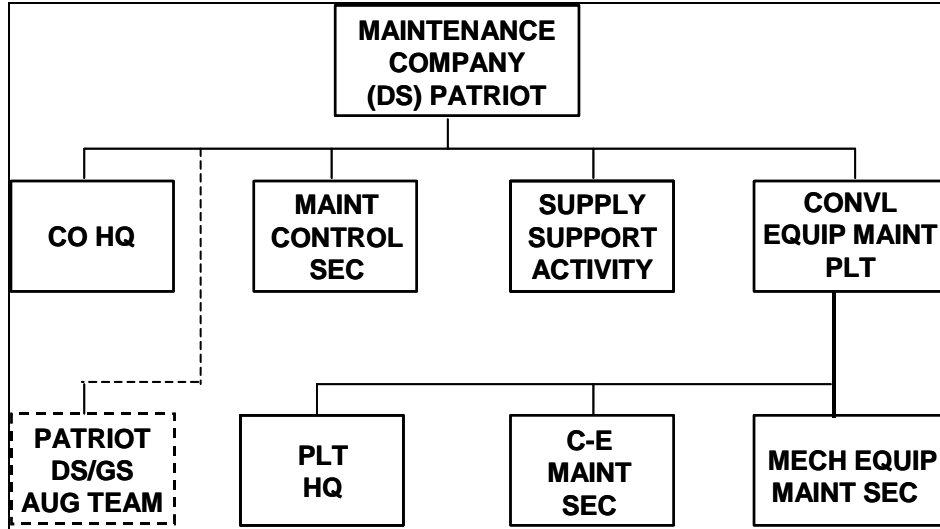


Figure 2-19. Maintenance Company (DS) Patriot, CSB (CSG)

Augmentation Teams

2-87. The company is allocated one Patriot Missile System (DS/GS) Augmentation Team. The 09529LX Patriot Missile System (DS/GS) Augmentation Team provides DS/GS maintenance for patriot missile equipment organic to a Patriot Battalion. Support includes limited base shop and three MSTs for patriot-peculiar equipment, limited GS Class IX, IFF equipment, and stinger air bottle and battery recharging. This team attaches to the Patriot Conventional Maintenance Company for ASL support, base shop, and common maintenance equipment utilization.

NON-DIVISIONAL TASK FORCE SUPPORT

2-88. If organized permanently, the number of non-divisional area logistics task forces (TFs) within the ASG depends on the following:

- Types and density of supported units.
- The geographical area.
- The supported units specific requirements.

NON-DIVISIONAL AREA LOGISTICS TASK FORCE

2-89. Non-divisional area logistics TFs are multifunctional, ad hoc organizations tailored from existing ASG assets to provide DS-level maintenance, supply, field services, and transportation support to units located in or passing through their assigned areas. Their organization may be relatively permanent or it may be a temporary structure. An area logistics TF may be organized to support specific missions or contingency missions where the entire force structure of an ASG is not required.

2-90. The non-divisional area logistics TF provides a single point of contact for units needing a variety of logistical DS support. The DS Maintenance Company assigned to the area logistics TF is the same base company as described earlier along with Augmentation MSTs that support the peculiar needs of units in the COMMZ. DS maintenance units in the ASG may also provide DS-level maintenance backup support to DS maintenance units in the corps. Figure 2-20 shows the organization of a typical non-divisional area logistics TF created by commanders as an ad hoc, multifunctional unit tailored to provide DS support in an AOR in the COMMZ. When entire companies are not necessary, slices of the companies may be task-organized.

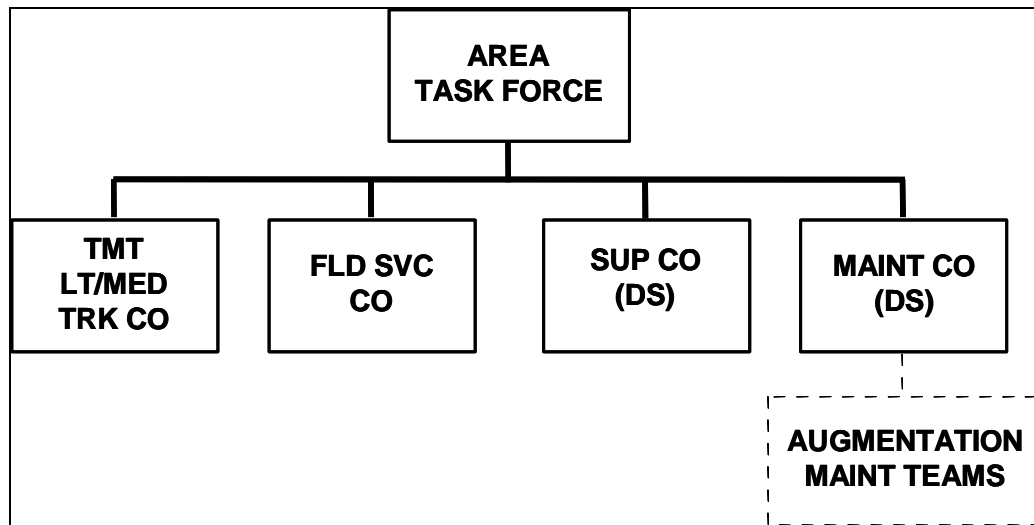


Figure 2-20. Non-divisional Area Logistics Task Force

BATTALION TASK FORCE ORGANIZATION

2-91. A battalion TF is formed at the direction of the Brigade Commander. He will determine the combat, CS, and CSS elements required to accomplish the mission. CSS units face a significant challenge. They must sustain the TF's combat power. Maintenance is performed as far forward as the tactical situation permits to reduce the time it takes to return equipment to combat.

2-92. Battalions are normally task-organized to fight as TFs in Heavy Divisions. The battalion TF is composed of its organic Headquarters and Headquarters Company. It also includes one or more organic companies plus one or more tank or mechanized companies, with CS and CSS assets attached as necessary to accomplish the mission.

2-93. Figure 2-21 shows the organization of a mechanized heavy battalion TF. Figure 2-22 shows the organization of a tank heavy battalion TF. Figure 2-23 shows the organization of a balanced (mechanized) battalion TF. Figure 2-24 shows the organization of a balanced (tank) battalion TF.

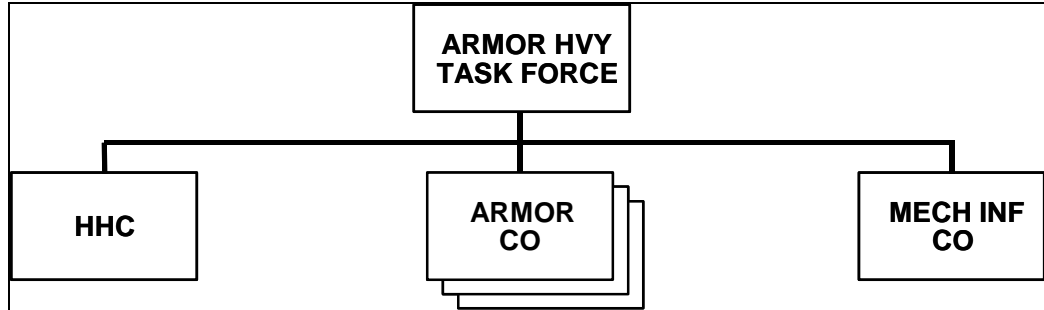


Figure 2-21. Mechanized Heavy Battalion Task Force

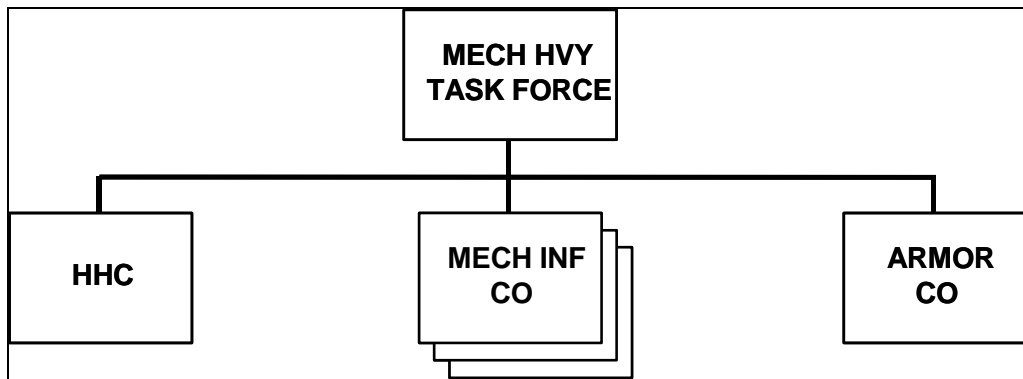


Figure 2-22. Tank Heavy Battalion Task Force

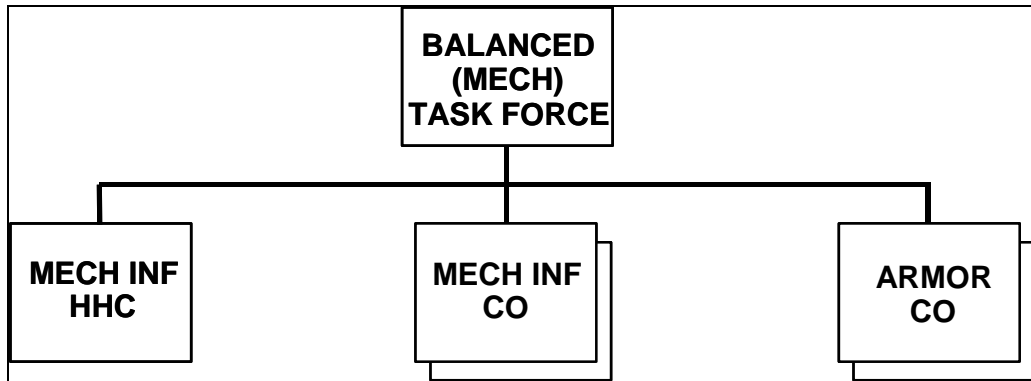


Figure 2-23. Balanced (Mechanized) Battalion Task Force

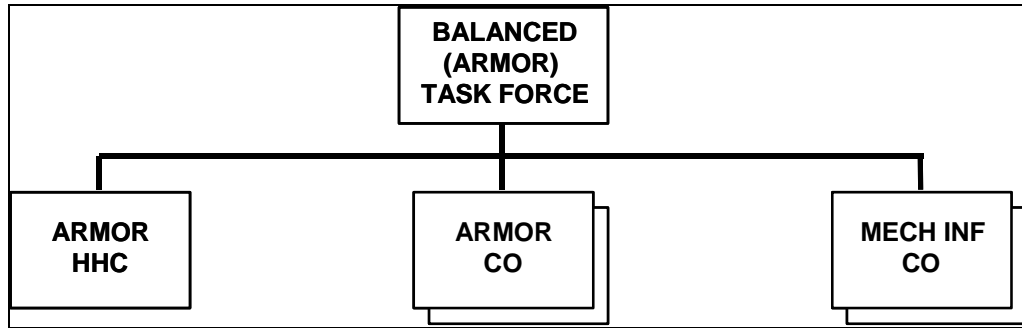


Figure 2-24. Balanced (Tank) Battalion Task Force

UNIT MAINTENANCE ORGANIZATION

2-94. The Maintenance Platoon contains the battalion's organizational maintenance and recovery resources. Figure 2-25 shows the maintenance organization in support of a balanced Battalion TF.

NOTE: Companies detached from their organic battalion must take a slice of their parent battalion's CSS assets to the gaining TF. At a minimum, the slice includes maintenance, supply, and medical personnel and equipment.

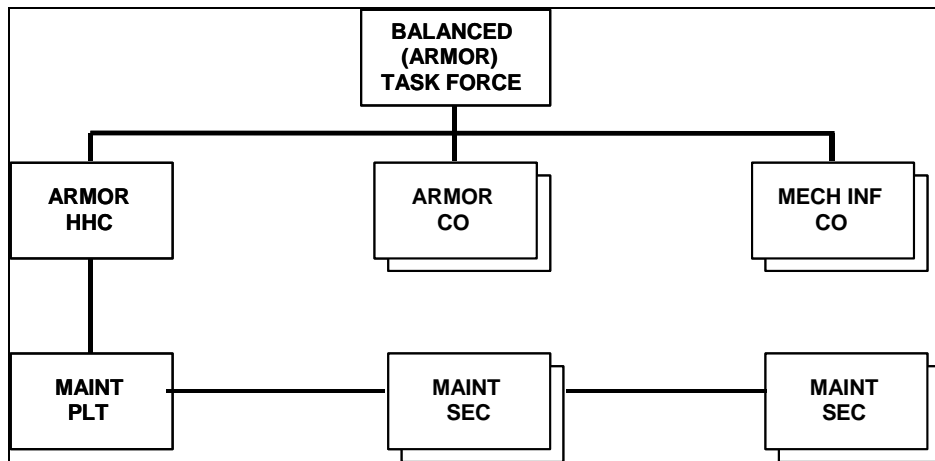


Figure 2-25. Balanced (Armor) Task Force

2-95. Maintenance is task-organized by the Battalion Motor Officer (BMO) to support tactical units. The BMO organizes the platoon into maintenance teams and positions and operates the UMCP. The UMCP is generally located near or with the battalion combat trains. The METT-TC will determine which maintenance capabilities are located at the UMCP. The UMCP will often include the CMTs, the DS MST, a slice from the Battalion Maintenance Platoon, and limited PLL and RX items.

2-96. TF priorities determine how a company will receive CSS. A CMT is a maintenance team tailored to support one company and is sent forward; it is controlled by the BMO. When employed in the company area, the Company First Sergeant (1SG) controls the CMT. Additional personnel and equipment from the Maintenance Platoon may augment

the CMT. The BMO may divert the CMT from one company to support another element.

ARMY OF EXCELLENCE AND BRIGADE SUPPORT AREAS - HEAVY DIVISION - DIVISION SUPPORT COMMAND

HEAVY DIVISION (DISCOM)

Mission

2-97. The Division Support Command (DISCOM) in any division provides DS-level maintenance, supply, transportation, and HSS to all organic and attached elements of the division. It also provides AVIM for division aircraft.

Capabilities

2-98. The Heavy Division DISCOM provides support to one heavy division's organic and attached equipment. A Forward Support Battalion's (FSB's) base TOE is tailored to support either mechanized or armor units with respective System Support Teams (SSTs). The Aviation Support Battalion's (ASB's) TOE is tailored to provide both ground and aviation maintenance support to the Aviation Brigade and the Division Cavalry Squadron. The Main Support Battalion's (MSB's) base TOE is tailored to support division troop units operating in the division rear area. The MSB also provides backup and reinforcing support to the FSBs and ASB.

Basis of Allocation

2-99. The basis of allocation is one DISCOM per Heavy Division. Figure 2-26 shows the organization of a Heavy Division DISCOM.

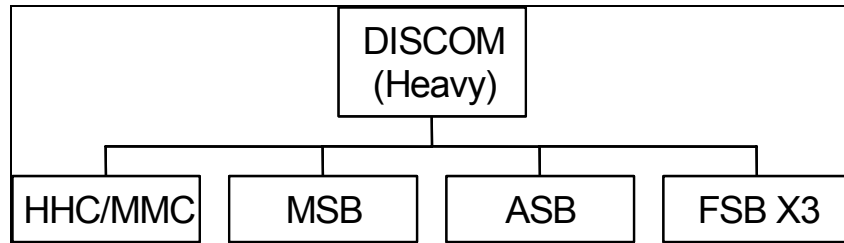


Figure 2-26. DISCOM (Heavy Division)

Mobility

2-100. The overall mobility of the DISCOM is dependent upon the mobility of its subordinate units. See the mobility of the subordinate units.

Units

2-101. The Heavy Division DISCOM consists of the following:

- Headquarters, HHC/Material Management Center (MMC).
- Multifunctional MSB.
- Multifunctional ASB.
- Three multifunctional FSBs.

MAIN SUPPORT BATTALION (HEAVY DIVISION)

2-102. Each DISCOM has one MSB assigned to it. The MSB is located in the DSA.

Mission

2-103. The mission of the MSB, TOE 63135A, a multifunctional organization fixed in structure, is to perform as the division's logistics and medical operator in the division rear area. It provides DS-level support to division units in the division rear area and reinforcing support to the Forward and Aviation Support Battalions. The MSB operates in the DSA, but it provides support forward in the division sector as required. It also provides backup DS-level maintenance support to the FSB.

Capabilities

2-104. The overall mobility of the MSB is dependent upon the mobility of its subordinate units. See the respective subordinate units.

NOTE: The Heavy Division MSB has a Headquarters and Headquarters Detachment separate from other companies in the battalion.

Basis of Allocation

2-105. One Heavy Division MSB is allocated per DISCOM. Figure 2-27 shows the organization of an Heavy Division MSB.

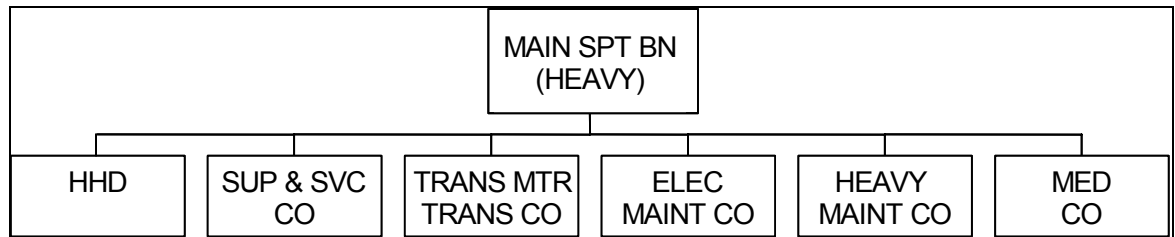


Figure 2-27. Heavy Division MSB

Mobility

2-106. Mobility for the MSB maintenance assets remain critical for sustainment operations. Therefore the HQ is 100 percent mobile.

Units

2-107. The Heavy Division MSB consists of the following:

- HHD.
- Supply and Service Company.
- Transportation Motor Transport Company.
- Electronic Maintenance Company.
- Heavy Maintenance Company.
- Medical Company.

HEAVY MAINTENANCE COMPANY, MAIN SUPPORT BATTALION (HEAVY DIVISION)

Mission

2-108. The mission of the Heavy Maintenance Company, TOE 43008A, is to provide DS-level conventional maintenance to divisional units not supported by the FSBs or ASB. It also provides backup maintenance to FSB Maintenance Companies.

Capabilities

2-109. This unit provides DS-level maintenance for the following:

- Automotive equipment.
- Artillery equipment.
- Engineer equipment.
- Power-generation equipment.
- Fire control instruments.
- Fire control computer equipment.
- Metalworking/machining.
- Canvas.
- Small arms.
- Tank turrets.
- Quartermaster equipment.
- Utilities equipment.

Additional Capabilities

2-110. The Heavy Maintenance Company also provides the following:

- Base shop and on-site maintenance support for division rear units (except the Aviation Brigade).
- Limited backup support for Maintenance Companies of the FSBs.
- Backup recovery assistance to supported units.
- Technical assistance to units in the division with organic unit maintenance elements.
- Unit-level maintenance on organic equipment.

2-111. This unit is dependent on the following:

- The Headquarters and Headquarters Detachment, Main Support Battalion, TOE 63136A000, for food service, unit administration, and religious services.
- Appropriate elements of the division or corps for HSS, legal, finance, and personnel and administrative services.
- The Distribution Management Center (DMC), TOE 63002A000, for centralized materiel management within the division.

Basis of Allocation

2-112. The basis of allocation is one per Main Support Battalion, Heavy Division, TOE 63135A000. Figure 2-28 shows the organization of a Heavy Maintenance Company, MSB (Heavy Division).

Mobility

2-113. This unit is capable of transporting 310,200 pounds (16,145 cubic feet) of TOE equipment with organic vehicles. It has 141,221 pounds (12,706 cubic feet) of TOE equipment requiring transportation. This unit also requires 50 percent of its TOE equipment and supplies to be transported in a single lift using its authorized organic vehicles.

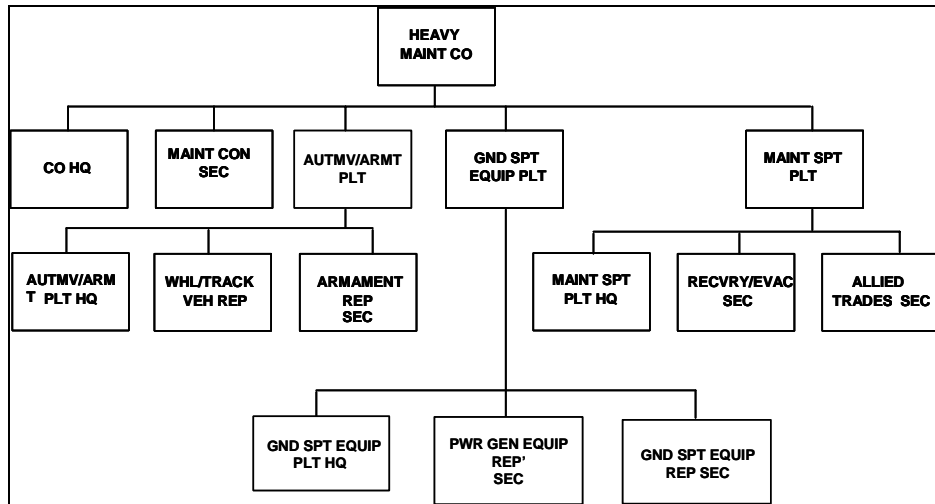


Figure 2-28. Heavy Maintenance Company, MSB (Heavy Division)

ELECTRONIC MAINTENANCE COMPANY, MAIN SUPPORT BATTALION (HEAVY DIVISION)

Mission

2-114. The mission of the Electronic Maintenance Company is to provide DS-level electronic test and diagnostic maintenance (base shop and MSTs). It does this for the following:

- Land combat missile systems.
- Divisional air defense systems.
- Target acquisition and surveillance radar.
- Class IX supply support to divisional units (except signal, military intelligence (MI), combat electronic warfare intelligence (CEWI), and aviation units).

NOTE: The company provides Class IX supply support for all divisional supported units (including RX service for missile, electronic, and conventional LRUs).

Capabilities

2-115. This unit provides DS-level maintenance for the following:

- Close combat anti-armor weapon systems.
- Target acquisition and surveillance radar (except signal-peculiar).
- Divisional air defense systems.
- C-E, radio, and fuel and electric systems.
- Land combat missile systems.
- Manportable common thermal night sights.
- Multiple-launch rocket systems.

Additional Capabilities

2-116. This unit provides many capabilities. The Electronic Maintenance Company also provides:

- Electronic test and diagnostics down to the SRU level (including SRU screening for supported units).
- Base shop maintenance for air defense systems, land combat missile systems, C-E equipment, manportable common thermal night sights, target acquisition and surveillance radar, and fuel and electric systems.
- MSTs for on-site maintenance support of land combat missile systems (tube-launched optically-tracked wire-guided missile (TOW)/Dragon and Multiple Launch Rocket System (MLRS)).
- An ASL of approximately 6,000 lines of Class IX repair parts (common and missile), managed under the Standard Army Maintenance System-Level 1 (SARSS-1).
- An RX service for approximately 500 selected items. Maintains approximately 1,000 lines of shop stock for the DS maintenance base shops.
- Technical assistance and PLL supply support to supported units.
- Unit-level maintenance on all organic equipment.

2-117. This unit depends on others for support. This unit is dependent on the following:

- The Headquarters and Headquarters Detachment, Main Support Battalion, TOE 63136A000, for food service, unit administration, and religious services.
- Appropriate elements of the division or corps for HSS, legal, finance, human resource, and administrative services.
- The DMC, TOE 63002A000, for centralized materiel management within the division.

NOTE: Individuals of this organization can assist in the coordinated defense of the unit's area or installation.

Basis of Allocation

2-118. The basis of allocation is one per Main Support Battalion, Heavy Division, TOE 63135A000. Figure 2-29 shows the organization of an Electronic Maintenance Company, MSB (Heavy Division).

Mobility

2-119. This unit requires 80 percent of its TOE equipment and supplies to be transported in a single lift using its authorized organic vehicles. All MSTs must be 100 percent mobile and will consist of two personnel to help with required maintenance tasks and security and safety in-transit.

Augmentation Teams

2-120. At times the MSB Electronic Maintenance Company may require test facility augmentation. The Base Shop Test Facility (BSTF) Augmentation Team, TOE 09510LA, may augment the unit when the organic BSTF exceeds its workload.

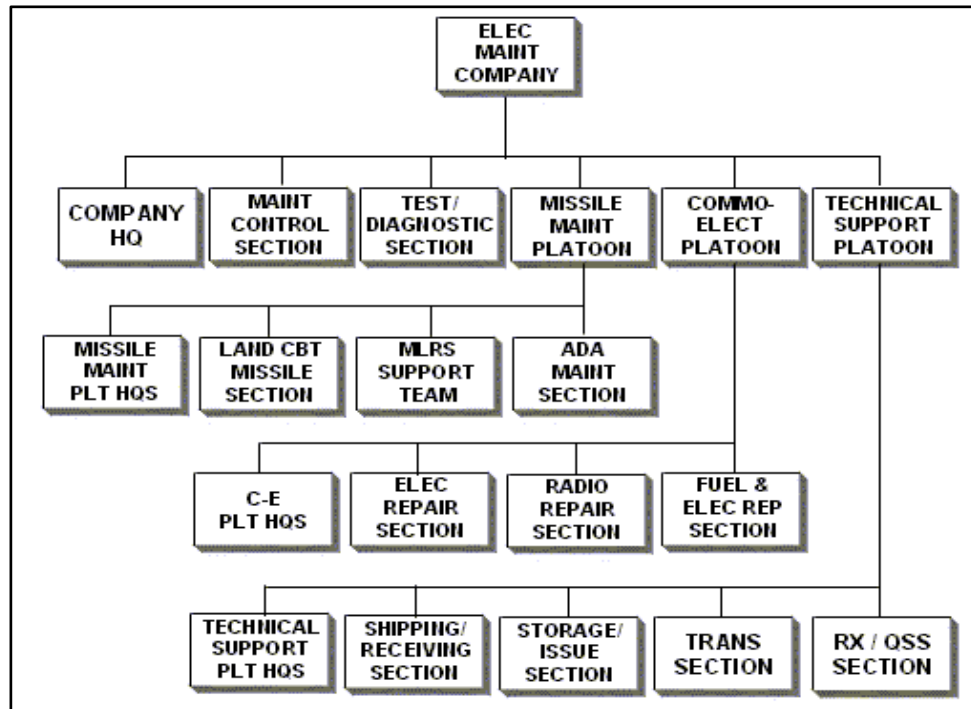


Figure 2-29. Electronic Maintenance Company, MSB

FORWARD SUPPORT BATTALION (HEAVY DIVISION)

Mission

2-121. The FSB provides division-level DS-level maintenance, supply, and HSS to a Heavy Division Brigade. The FSB also provides sustainment to other units operating in the brigade support area (BSA).

NOTE: The Heavy Division FSB also has an HHD separate from the companies in the battalion. Unlike the MSB, the FSB has no transportation support capability in its structure and it has no field service capability in its Supply Company. All of the FSB's maintenance capabilities are consolidated in a single Maintenance Company.

Command Support

2-122. The FSB Commander is responsible for assigned units and the CSS mission. The battalion staff assists and advises the Battalion Commander in accomplishing the support mission. The FSB Commander advises the Brigade Commander on how the unit CSS elements can best support the tactical plan. The FSB Commander coordinates requirements for additional support through the DMC, the DISCOM staff, or the DISCOM Commander. The Brigade Supply Officer (S4) is the key link between the brigade and the FSB. The Brigade S4 monitors the tactical situation and coordinates with the FSB staff to ensure that maintenance support is continuous and responsive to the needs of combat units.

Support Operations Section

2-123. The Support Operations Section is responsible for supervising all FSB CSS support activities. These activities include DS-level maintenance, supply, and HSS for units employed in the brigade area. This section serves as an interface with the Brigade S4; the DISCOM HQ Supply and Services; Transportation Staff Officers; the DMC; and the MSB. This interface resolves maintenance, supply, field services, and transportation support requests and priorities.

Capabilities

2-124. The FSB retains many sustainment capabilities. See respective subordinate units for a complete description.

Mobility

2-125. The FSB must remain mobile for sustainment operations. Therefore the HQ Detachment is 100 percent mobile.

NOTE: This company is tailorable to support Mechanized, Armor, or Mixed Battalions by the addition of TOE 43510LA and 43510LB System Support teams.

Basis of Allocation

2-126. The basis of allocation is one per brigade; assigned to DISCOM. Figure 2-30 shows the organization of a Heavy Division FSB.

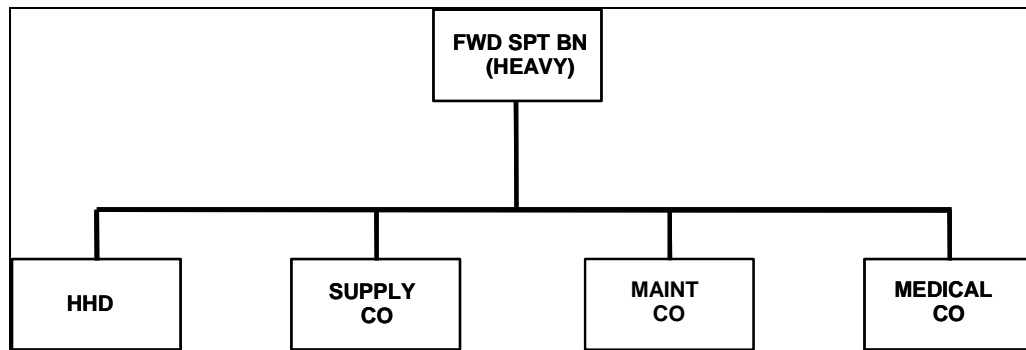


Figure 2-30. Forward Support Battalion (Heavy Division)

Units

2-127. The Heavy Division FSB consists of the following:

- Headquarters and Headquarters Detachment.
- Supply Company.
- Maintenance Company.
- Medical Company.

MAINTENANCE COMPANY, FORWARD SUPPORT BATTALION (HEAVY DIVISION)

Mission

2-128. The mission of this unit is to provide DS-level maintenance and common repair parts supply support to attached and supporting units of a brigade of a Heavy Division. Exceptions to maintenance support are discussed in the next paragraph.

Capabilities

2-129. This unit provides DS-level maintenance to all brigade equipment except medical, COMSEC, airdrop, avionics, aircraft armament, and munitions. Maintains an ASL of up to 3,000 lines. Provides RX service of selected items. MSTs, tank, artillery, and mechanized infantry SSTs provide on-site maintenance for the core of the MST.

Additional Capabilities

2-130. The Maintenance Company also provides the following:

- Inspection, diagnosis, and repair of inoperable vehicles and weapon systems.
- Limited recovery capability for supported units.
- Consolidated unit-level maintenance for attached units operating in the BSA.

2-131. This unit is dependent on the following:

- Appropriate elements of the division for legal, religious, and HSS.
- Appropriate elements of the division or corps for human resource, administrative, and ADP support; for transportation and supplemental stockage of selected major assemblies, RX items, and major end items; and for evacuation of unserviceable items and vehicles.
- The Headquarters and Headquarters Detachment, TOE 63216L000, for food service support.

Basis of Allocation

2-132. The basis of allocation is one per FSB. It is normally employed in the BSA. Figure 2-31 shows the organization of a Maintenance Company, FSB (Heavy Division).

Mobility

2-133. This unit is capable of transporting 84,400 pounds (4,940 cubic feet) of TOE equipment with organic vehicles. It has 67,484 pounds (8,299 cubic feet) of TOE equipment requiring additional transportation. It also requires that 100 percent of its TOE equipment and supplies be transported in a single lift using its authorized organic vehicles.

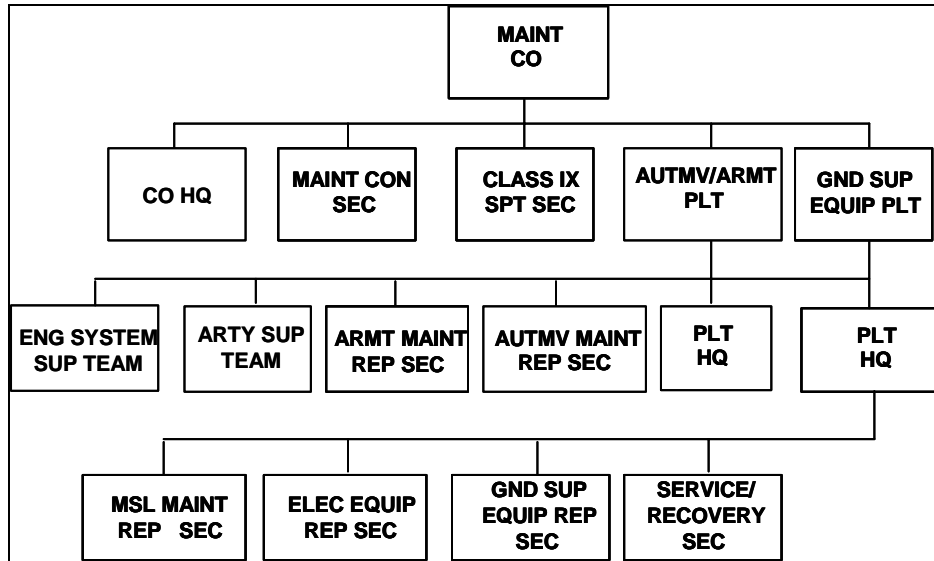


Figure 2-31. Maintenance Company, FSB (Heavy Division)

AVIATION SUPPORT BATTALION (HEAVY DIVISION)

Mission

2-134. The ASB is the newest multifunctional battalion in the division support command structure. It is organized to provide responsive, multifunctional DS-level support: ground, air, and missile. This includes armament, avionics, and aviation-peculiar ground support equipment and aircraft repair parts support to a heavy division’s aviation units,

including the Division Cavalry Squadron. The ASB is tailored to the mix of aviation battalions.

Capabilities

2-135. The Aviation Battalion basis its capabilities on those of its subordinate units. For more details see the capabilities of subordinate units.

Basis of Allocation

2-136. The basis of allocation is one per Aviation Brigade (Heavy Division). It is normally located at the divisional airfield in the division rear area. Figure 2-32 shows an Aviation Support Battalion (Heavy Division).

Mobility

2-137. Aviation units by definition must remain mobile. Therefore the unit HQ detachment is 100 percent mobile.

Units

2-138. The Heavy Division ASB consists of the following:

- Headquarters and Supply Company.
- Ground Maintenance Company (GMC).
- AVIM Company.

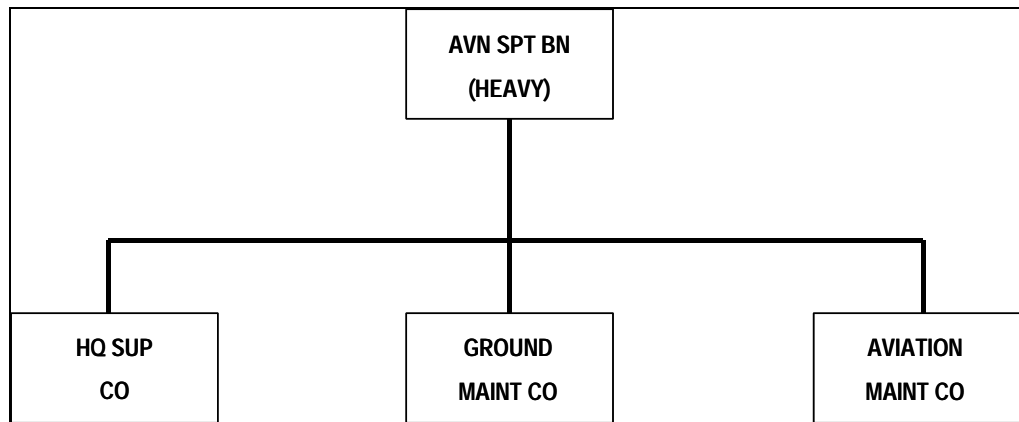


Figure 2-32. Aviation Support Battalion (Heavy Division)

GROUND MAINTENANCE COMPANY, AVIATION SUPPORT BATTALION (HEAVY DIVISION)

Mission

2-139. This company provides conventional DS-level maintenance and Class IX supply support to the Division Aviation Brigade. It also provides DS-level maintenance and Class IX supply support to the Cavalry Squadron, Heavy Division.

Capabilities

2-140. The ground maintenance company provides the following:

- An ASL of approximately 6,000 lines of Class IX repair parts (4,000 aviation and 2,000 common) managed under the SARSS-1.
- RX service for approximately 550 selected items. Maintains approximately 1,000 lines of shop stock for the DS maintenance shops.
- Technical assistance for organizational maintenance and PLL supply support to brigade units.
- Backup recovery capability to supported units.
- On-site combat system-oriented maintenance support to the Cavalry Squadron.
- Consolidated unit-level maintenance to the three units organic to the Division Aviation Support Battalion.

NOTE: Individuals of this organization can assist in a coordinated defense of the unit's area or installation. This unit performs unit-level maintenance on organic equipment.

2-141. The unit is dependent on the following:

- Appropriate elements of the division or corps for legal, finance, human resource, administrative service, unit-level administration, and religious support.
- The Headquarters and Supply Company, Aviation Support Battalion, TOE 63885A100, 200, 300, or 400, for food service support.
- The MSB, Heavy Division, TOE 63135L, for missile maintenance, field services, water supply, HSS, and supplemental ground transportation.
- Appropriate elements of the Division Aviation Brigade for logistics airlift support.

Basis of Allocation

2-142. The basis of allocation is one per Aviation Support Battalion, Heavy Division, TOE 63885A100, 200, 300, or 400. Figure 2-33 shows the organization of a Ground Maintenance Company, ASB (Heavy Division).

Mobility

2-143. This unit is capable of transporting 881,400 pounds (34,629 cubic feet) of TOE equipment with organic vehicles. It has 215,545 pounds (20,874 cubic feet) of TOE equipment requiring transportation. It also requires that 75 percent of its TOE equipment and supplies be transported in a single lift using its authorized organic vehicles.

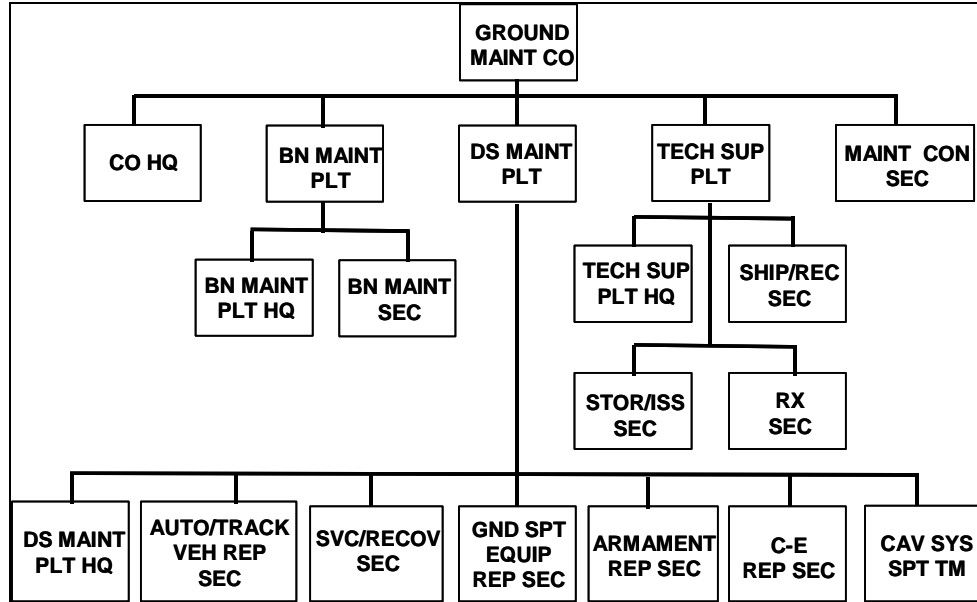


Figure 2-33. Ground Maintenance Company, ASB (Heavy Division)

ARMY OF EXCELLENCE DIVISION AND BRIGADE SUPPORT AREAS – LIGHT DIVISION – DIVISION SUPPORT COMMAND

LIGHT DIVISION (DISCOM)

Mission

2-144. The mission of this unit is to provide logistics to assigned and attached units in the sector. It does this through organic units.

Capabilities

2-145. This unit provides the following:

- Support to one Light Infantry Division's organic and attached equipment.
- Support of all classes of supply.
- DS-level maintenance and AVIM support for all materiel organic to the division.
- Limited transportation for personnel, supplies, and equipment.
- Health and Human Services (HHS).

NOTE: The light division DISCOM is similar in basic structure to the heavy division DISCOM. It has multifunctional battalions (MSB and FSB) that are employed like the structure of the heavy division DISCOM. However, there are differences in structure between the light division MSB and FSB.

The Light DISCOM has limited capabilities to support the division for sustained operations. The DISCOM requires backup AVIM, ground transportation, airlift support, and HHS.

Mobility

2-146. Mobility for the light division DISCOM remains a function of the mobility of the subordinate units. Subordinate unit mobility capabilities follow in this discussion. See the mobility of specific subordinate units.

Units

2-147. The Light Division DISCOM consists of the following:

- The Headquarters and Headquarters Company/MMC.
- A multifunctional MSB.
- Three multifunctional FSBs.
- The Aviation Maintenance Company (AMCO).

Basis of Allocation

2-148. The basis of allocation is one per Light Division. Figure 2-34 shows the organization of a DISCOM for a Light Division.

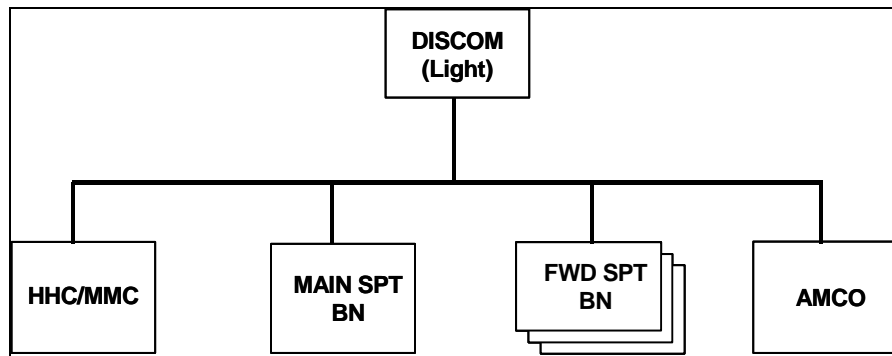


Figure 2-34. Light Division DISCOM

MAIN SUPPORT BATTALION (LIGHT DIVISION)

Mission

2-149. The MSB, a multifunctional organization fixed in structure, is the division's logistics and medical operator in the division rear area. It provides DS-level support to division units in the division rear area and reinforcing support to the FSBs and Aviation Maintenance Company. The MSB operates in the DSA, but it provides support forward in the division sector as required. It also provides backup DS-level maintenance support to the FSB.

Units

2-150. The Light Division MSB consists of the following:

- Headquarters and Supply Company.
- Maintenance Company.
- Medical Company.
- Transportation Motor Transport Company.

NOTE: The Battalion HQ element of the Light Division MSB is consolidated with the Supply Company to form a Headquarters and Supply Company. The MSB Headquarters and Supply Company, when augmented, has the capability to provide mortuary affairs, laundry, shower, and clothing and light textile repair.

Basis of Allocation

2-151. The basis of allocation is one per Light Division DISCOM. Figure 2-35 shows the organization of an MSB (Light Division).

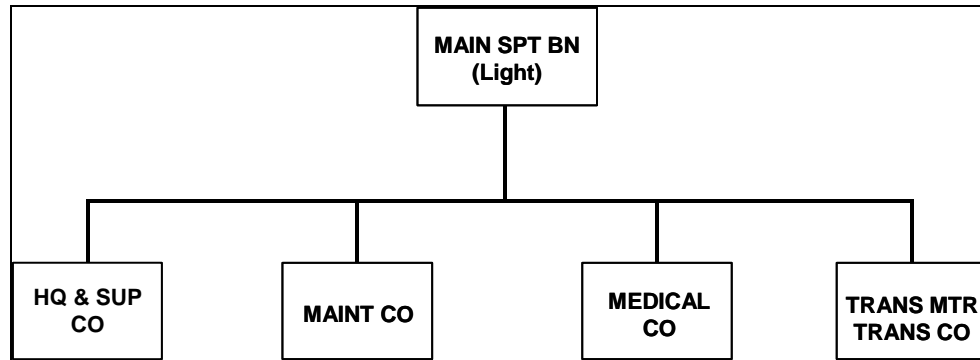


Figure 2-35. Main Support Battalion (Light Division)

MAINTENANCE COMPANY, MAIN SUPPORT BATTALION (LIGHT DIVISION)

Mission

2-152. The mission of this unit is to provide DS-level maintenance and repair parts supply support to the division troops operating in the division rear area. The following capabilities further define the mission of this unit.

Capabilities

2-153. This unit provides DS-level maintenance for the following:

- Fire control equipment.
- Artillery.
- Power generation equipment.
- Engineer equipment.
- Quartermaster/chemical equipment.
- Wheeled vehicles.
- Radar.
- Communications equipment.
- TOW/Dragon missile systems.

Additional Capabilities

NOTE: Individuals of this organization can assist in a coordinated defense of the unit's area or installation.

2-154. The maintenance company also provides the following:

- A 4,000-line ASL.
- Inspection, diagnosis, and repair of vehicle and weapon systems.
- Limited recovery capability for supported units.
- Consolidated unit-level maintenance for battalion units.
- Technical assistance to supported units.

2-155. This unit is dependent on the following:

- Appropriate elements of the division for legal, religious, and HSS.
- Appropriate elements of the corps for finance, personnel and administrative, and ADP support; for transportation and supplemental stockage of selected major assemblies, RX items, and major end items; and for evacuation of unserviceable items and vehicles.
- Corps for backup DS-level maintenance support.

Basis of Allocation

2-156. The basis of allocation is one per MSB. Figure 2-36 shows the organization of a Maintenance Company, MSB (Light Division).

Mobility

2-157. This unit is 75 percent mobile. This unit requires 75 percent of its TOE equipment and supplies be transported in a single lift using its authorized organic vehicles.

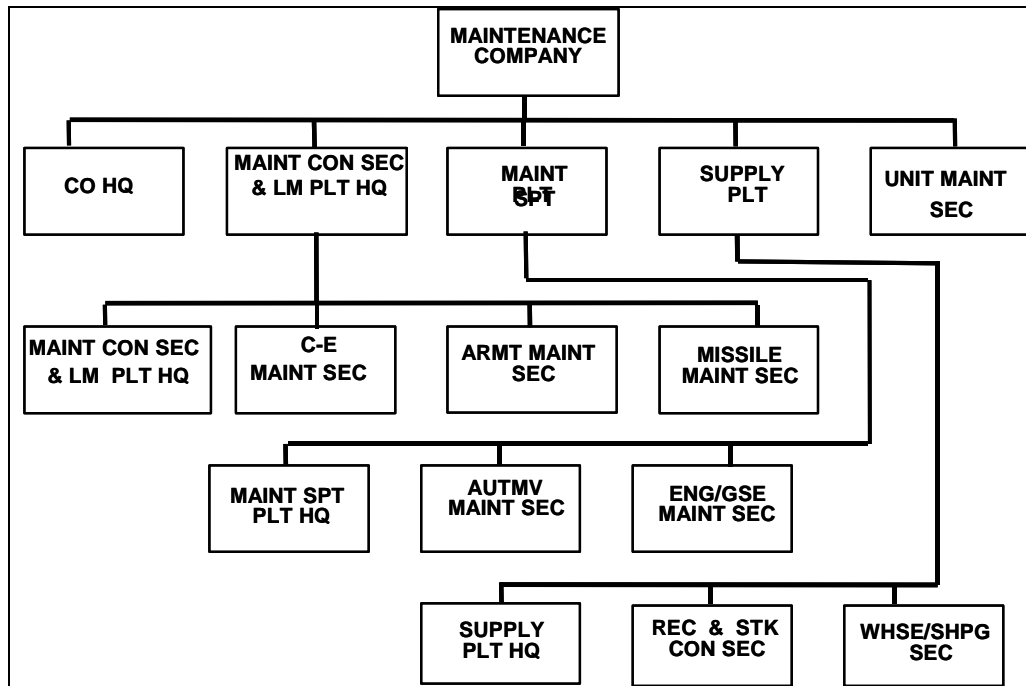


Figure 2-36. Maintenance Company, MSB (Light Division)

FORWARD SUPPORT BATTALION (LIGHT DIVISION)

Mission

2-158. The FSB, Light Division provides DS-level maintenance, supply, and HSS to a Light Division Brigade. It also provides DS-level maintenance to other units operating in the BSA.

Units

2-159. The Light Division FSB consists of the following:

- Headquarters and Supply Company.
- Maintenance Company.
- Medical Company.

NOTE: The Battalion Headquarters element of the Light Division FSB is consolidated with the Supply Company to form a Health Service Command (HSC). The HSC has the capability to operate an Ammunition Transfer Point (ATP).

Figure 2-37 shows the organization of a Light Division FSB.

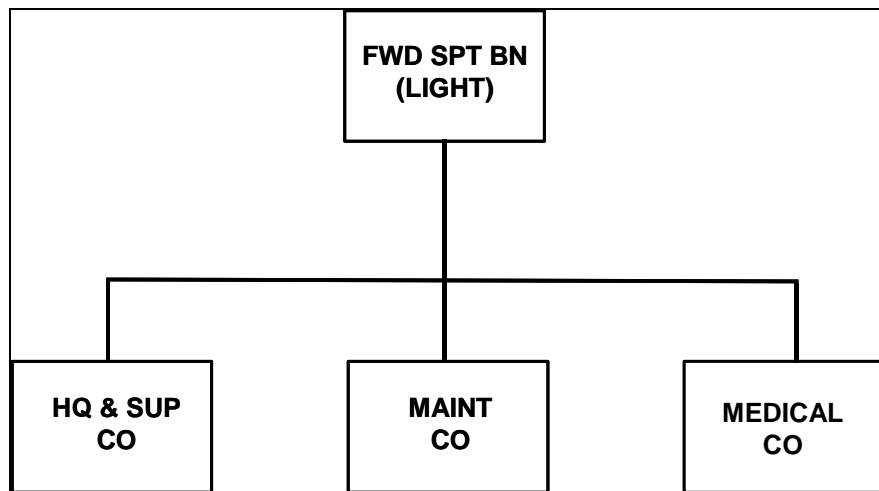


Figure 2-37. Forward Support Battalion (Light Division)

MAINTENANCE COMPANY, FORWARD SUPPORT BATTALION (LIGHT DIVISION)

Mission

2-160. The mission of this unit is to provide DS-level maintenance. It provides DS-level maintenance in accordance with stated capabilities and repair parts supply to a Maneuver Brigade, Light Infantry Division.

Capabilities

2-161. This unit provides DS-level maintenance for the following:

- Fire control equipment.
- Artillery.
- Power generation equipment.
- Quartermaster/chemical equipment.
- Wheeled vehicles.
- Small arms.
- Communications equipment.
- Special electronic devices.

Additional Capabilities

2-162. The maintenance company also provides the following:

- Inspection, diagnosis, and repair of vehicles and weapon systems.
- Limited recovery capability for supported units.
- Consolidated unit-level maintenance for battalion units.

2-163. This unit is dependent on the following:

- Appropriate elements of the division for legal, religious, and HSS.
- Appropriate elements of the corps for finance, human resource, administrative, and ADP support; for transportation and supplemental stockage of selected major assemblies, RX items, and major end items; and for evacuation of unserviceable items and vehicles.
- Headquarters and Supply Company, TOE 63216L00, for food service support.
- Maintenance Company, MSB, TOE 43218L000, for unit maintenance of utilities equipment and DS maintenance of TOW/Dragon systems.

NOTE: Individuals of this organization can assist in the coordinated defense of the unit's area or installation.

Basis of Allocation

2-164. The basis of allocation is one per FSB. Figure 2-38 shows the organization of a Maintenance Company, FSB (Light Division).

Mobility

2-165. This unit is capable of transporting 84,400 pounds (4,940 cubic feet) of TOE equipment with organic vehicles. It has 67,484 pounds (8,299 cubic feet) of TOE equipment requiring additional transportation. It also requires that 100 percent of its TOE equipment and supplies be transported in a single lift using its authorized organic vehicles.

2-166. The Electronic Maintenance Teams will be 100 percent mobile. It consist of two personnel that will provide assistance with required maintenance tasks and security and safety in-transit.

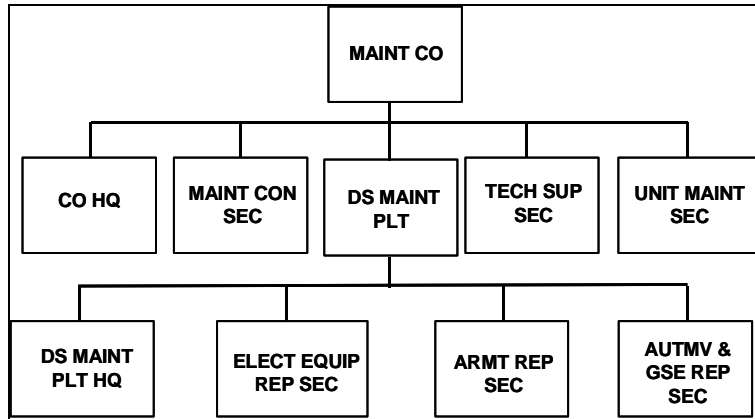


Figure 2-38. Maintenance Company, FSB (Light Division)

AIRBORNE DIVISION (DISCOM)

Mission

2-167. The Airborne Division DISCOM is similar in basic structure to the Heavy and Light Division DISCOMs. It has multifunctional battalions (MSB and FSBs) and a functional Aviation Maintenance Company. However, the airborne MSB has two Maintenance Companies (Light and Heavy) and an Airborne Equipment Support Company.

Units

2-168. The Airborne Division DISCOM is a multifunctional organization. It consists of the following:

- The HHC/MMC.
- A multifunctional MSB.
- Three multifunctional FSBs.
- The functional Aviation Maintenance Company.

Figure 2-39 shows the organization of an Airborne Division DISCOM.

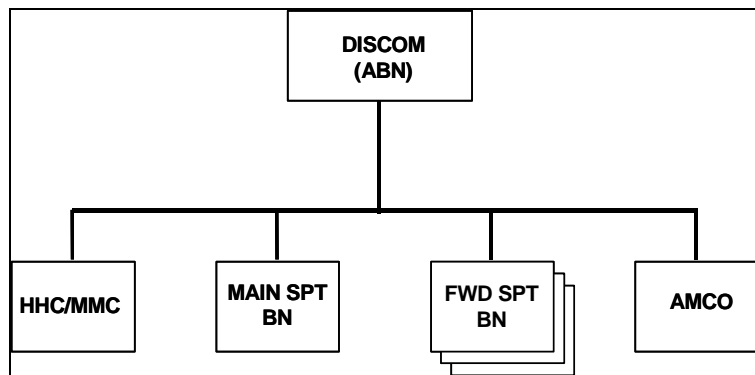


Figure 2-39. Airborne Division, DISCOM

MAIN SUPPORT BATTALION (AIRBORNE DIVISION)

Mission

2-169. The MSB, a multifunctional organization fixed in structure, is the division’s logistics and medical operator in the division rear area. It provides DS-level support to division units in the division rear area and reinforcing support to the FSBs. The MSB operates in the DSA, but it provides support forward in the division sector as required. Figure 2-40 shows the organization of an Airborne Division MSB.

Units

NOTE: The Airborne Division MSB has a Headquarters and Supply Company separate from the other companies in the battalion. It also has an Airborne Equipment Support Company (Riggers).

2-170. The Airborne Division MSB consists of the following:

- Headquarters and Supply Company.
- Airborne Equipment Support Company (Riggers).
- Transportation Motor Transport Company.
- Light Maintenance Company.
- Heavy Maintenance Company.
- Medical Company.

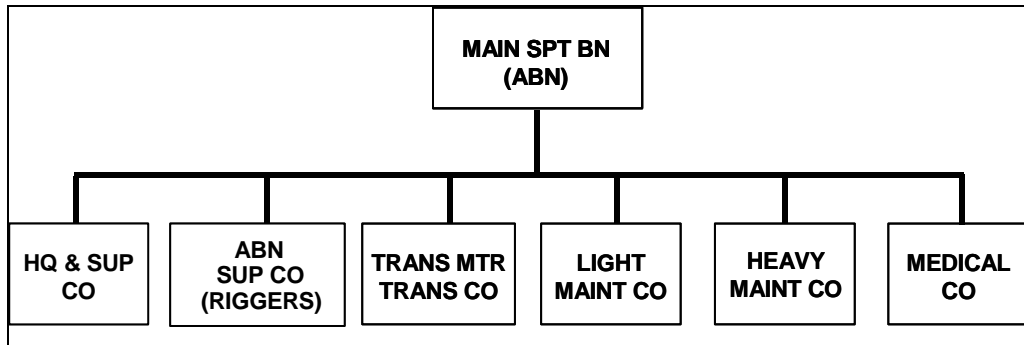


Figure 2-40. Main Support Battalion (Airborne Division)

HEAVY MAINTENANCE COMPANY, MAIN SUPPORT BATTALION (AIRBORNE DIVISION)

Mission

2-171. To provide DS-level maintenance to units deployed in the DSA. It also provides DS-level maintenance to units that provide reinforcing maintenance for the three Forward Maintenance Companies of the FSB.

Capabilities

2-172. The Heavy Maintenance Company provides the following:

- Backup and reinforcing maintenance support to the three Forward Maintenance Companies.
- Limited backup recovery assistance to supported units.

2-173. Individuals of this organization can assist in a coordinated defense of the unit's area or installation. This unit is capable of performing unit maintenance on organic equipment.

2-174. This unit is dependent on the following:

- Appropriate elements of the division or corps for health services, legal, finance, human resource, and administrative services.
- The Headquarters and Supply Company, TOE 63266L000, for food service support.
- The Light Maintenance Company, TOE 63257L000, for organizational C-E maintenance support.

Basis of Allocation

2-175. The basis of allocation is one per MSB, Airborne Division, TOE 63225L000. Figure 2-41 shows the organization of a Heavy Maintenance Company, MSB (Airborne Division).

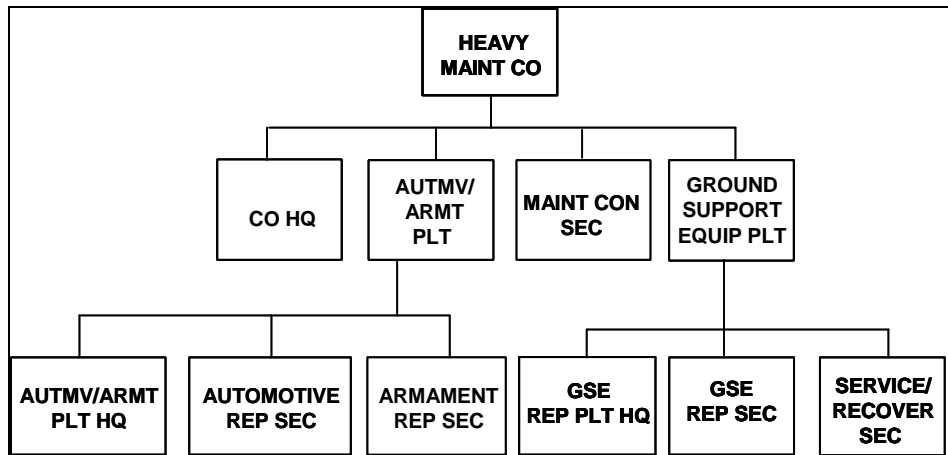


Figure 2-41. Heavy Maintenance Company, MSB (Airborne Division)

Mobility

2-176. This unit can transport 194,100 pounds (10,877 cubic feet) of TOE equipment with organic vehicles. It also requires that 50 percent of its TOE equipment and supplies be transported in a single lift using its authorized organic vehicles.

LIGHT MAINTENANCE COMPANY, MAIN SUPPORT BATTALION (AIRBORNE DIVISION)

Mission

2-177. The mission of this company is to provide DS-level maintenance and common/missile repair parts supply support to units deployed in the DSA area. It also provide reinforcing maintenance for the three Forward Maintenance Companies located in the FSBs.

Capabilities

2-178. This unit provides the following:

- DS-level maintenance on all authorized missile equipment, electronic and COMSEC equipment, and ADP equipment of units in the Airborne Division.
- Backup and reinforcing support to the three Forward Maintenance Companies in the FSBs.
- Technical assistance for missile, electronic, COMSEC, and ADP equipment to divisional units.
- Common and missile repair parts supply support to units in the division area, and to the technical supply elements of the three Forward Maintenance Companies.
- RX service for selected (common and missile) items.

2-179. Individuals of this organization can assist in a coordinated defense of the unit's area or installation. This unit is capable of performing unit-level maintenance on organic equipment and C-E organizational maintenance for the Heavy Maintenance Company.

2-180. This unit is dependent on the following:

- Appropriate elements of the division or corps for HSS, and legal, religious, finance, human resource, and administrative services.
- The Headquarters and Supply Company, TOE 63266L000, for food service support.
- The Assault Helicopter Company, TOE 01147L000, for transportation of critical Class IX repair parts and major assemblies.
- The HHC/MMC, TOE 6325L000, for centralized Class IX management and automated materiel management.

Basis of Allocation

2-181. The basis of allocation is one per MSB, Airborne Division, TOE 63265L000. Figure 2-42 shows the organization of a Light Maintenance Company, MSB (Airborne Division).

Mobility

2-182. This unit is capable of transporting 167,500 pounds (15,900 cubic feet) of TOE equipment with organic vehicles. It also has 209,000 pounds (29,250 cubic feet) of TOE equipment requiring transportation. This unit is 100 percent mobile; MSTs will consist of two personnel that provide

assistance with required maintenance tasks, and security and safety in-transit.

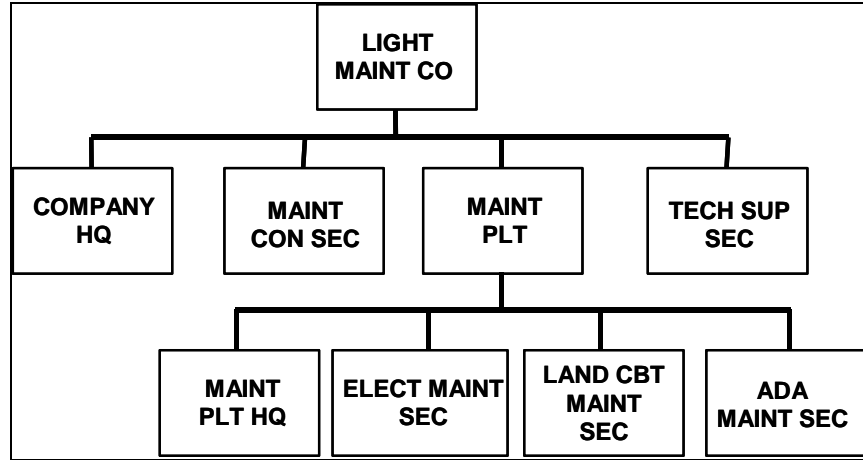


Figure 2-42. Light Maintenance Company MSB (Airborne Division)

FORWARD SUPPORT BATTALION (AIRBORNE DIVISION)

Mission

2-183. The DISCOM has three FSBs, one for each Division Maneuver Brigade. Each FSB provides DS-level support to all division units in the designed brigade sector. Figure 2-43 shows the organization of an Airborne Division FSB.

Units

2-184. The Airborne Division FSB consists of the following:

- Headquarters and Supply Company.
- Maintenance Company.
- Medical Company.

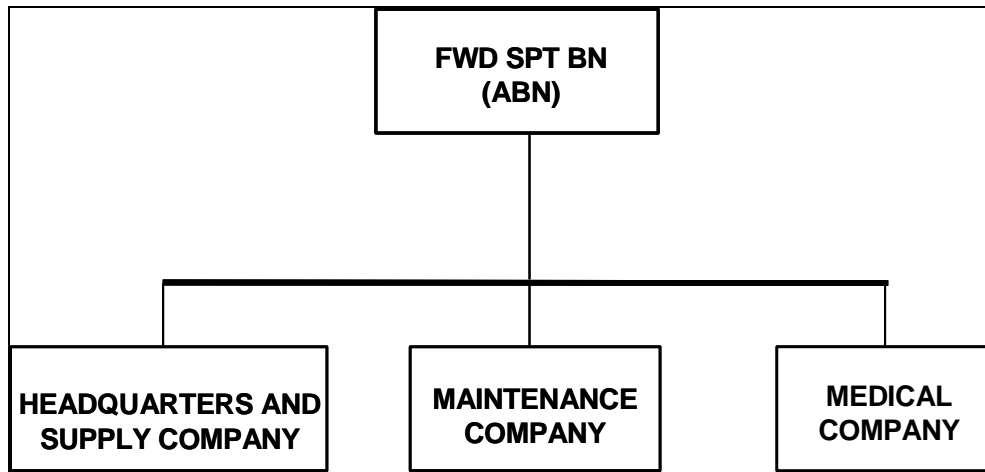


Figure 2-43. Forward Support Battalion (Airborne Division)

MAINTENANCE COMPANY, FORWARD SUPPORT BATTALION (AIRBORNE DIVISION)

Mission

2-185. The mission of this unit is to provide DS-level maintenance, and common and missile repair parts supply support. This unit performs its mission proportionate with stated capabilities, to the attached and supporting units of a Maneuver Brigade in an Airborne Division.

Capabilities

2-186. The Maintenance Company provides the following:

- DS-level maintenance and missile repair parts supply support to supported units; also maintains an ASL of approximately 1,200 lines and an RX service for 350 lines.
- Technical assistance to units in the brigade.

2-187. Individuals in this organization can assist in a coordinated defense of the unit's area or installation. This unit is capable of performing unit-level maintenance on organic equipment.

2-188. This unit is dependent on the following:

- Appropriate elements of the division or corps for HSS, and religious, legal, finance, human resource, and administrative services.
- The Assault Helicopter Company, TOE 01147L000, for transportation of critical Class IX repair parts and major assemblies.
- The HHC/MMC, TOE 63052L000, for centralized Class IX management and automated materiel management.
- The Transportation Motor Transport (TMT) Company, TOE 55068L000, for transportation of Class IX supplies from the DSA to BSA.

Basis of Allocation

2-189. The basis of allocation is one per FSB, Airborne Division. Figure 2-44 shows the organization of a Forward Maintenance Company, FSB (Airborne Division).

Mobility

2-190. This unit is capable of transporting 93,000 pounds (8,150 cubic feet) of TOE equipment with organic vehicles. The unit has 106,800 pounds (15,200 cubic feet) of equipment requiring additional transportation.

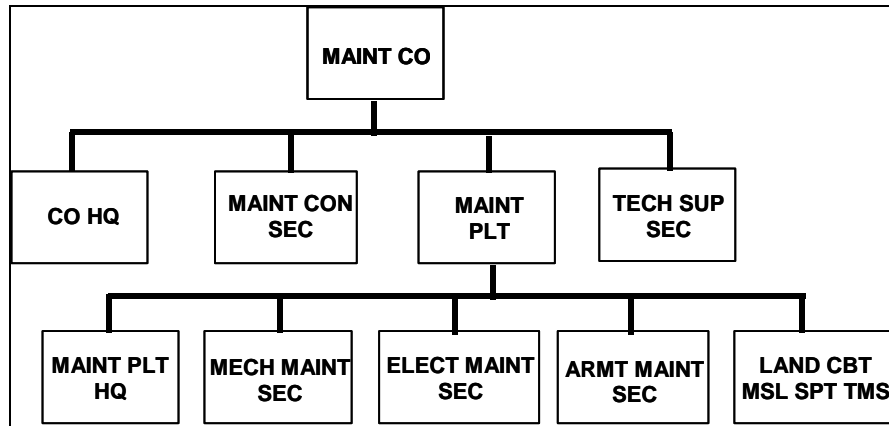


Figure 2-44. Heavy Maintenance Company, MSB (Airborne Division)

AIR ASSAULT DIVISION (DISCOM)

Mission

2-191. The Air Assault Division DISCOM includes both functional and multifunctional battalions. In addition to the multifunctional MSB and FSBs, the air assault division DISCOM has a functional AVIM Battalion instead of a company to support its aviation assets. It also has an Air Ambulance Company to enhance medical evacuation capability. These units are employed in much the same manner as the battalions in the Heavy Division DISCOM. Figure 2-45 shows the organization of an Air Assault Division.

Units

2-192. The Air Assault Division DISCOM consists of the following:

- The HHC.
- A multifunctional MSB.
- Three multifunctional FSBs.
- The AVIM Battalion.
- The Air Ambulance Company.

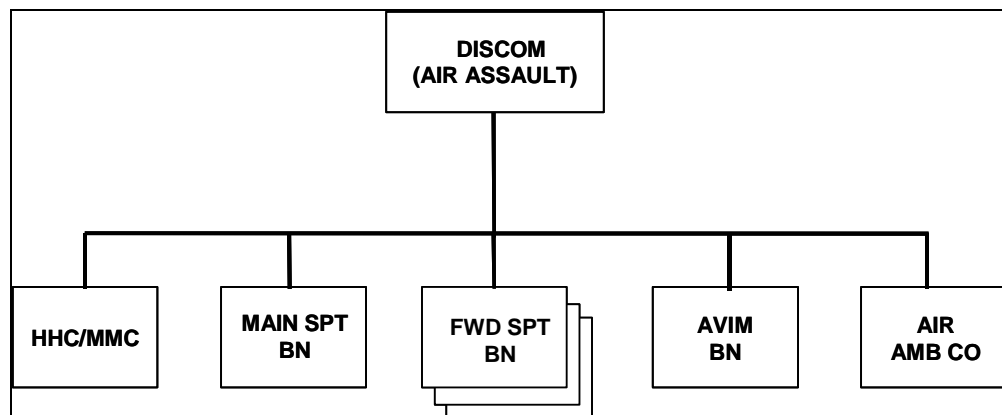


Figure 2-45. Air Assault Division DISCOM

MAIN SUPPORT BATTALION (AIR ASSAULT DIVISION)

Mission

2-193. The MSB, a multifunctional, fixed-structure organization, is the division's logistics and medical operator in the division rear area. It provides DS-level support to division units in the division rear area and designated and reinforcing support to the FSB and Aviation Maintenance Battalion. The MSB is based in the DSA, but it provides support forward in the division sector as required.

Units

2-194. The Air Assault Division MSB consists of the following:

- Headquarters and Supply Company.
- Light Maintenance Company.
- Heavy Maintenance Company.
- Medical Company.
- Transportation Motor Transport Company.

Figure 2-46 shows the organization of an Air Assault Division MSB.

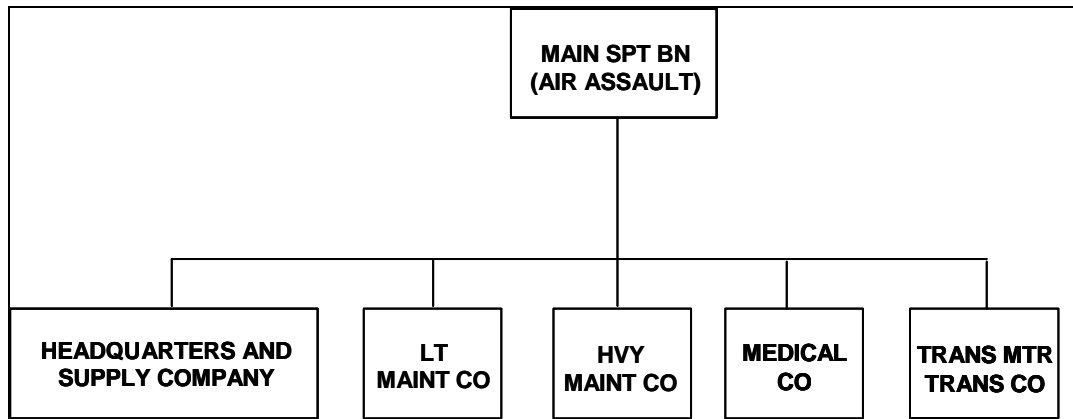


Figure 2-46. Main Support Battalion (Air Assault Division)

HEAVY MAINTENANCE COMPANY, MAIN SUPPORT BATTALION (AIR ASSAULT DIVISION)

Mission

2-195. The mission of this unit is to provide DS-level maintenance to units deployed in the DSA. This unit also provides reinforcing maintenance for the three FSB Forward Maintenance Companies.

Capabilities

2-196. This unit provides the following:

- Backup and reinforcing maintenance support to the three Forward Maintenance Companies, except for repair parts.
- Limited backup recovery assistance to supported units.

2-197. Individuals of this organization can assist in a coordinated defense of the unit's area or installation. This unit is capable of performing unit maintenance on organic equipment, except for C-E.

2-198. This unit is dependent on the following:

- Appropriate elements of the division or corps for HSS, and legal, finance, human resource, and administrative services.
- The Headquarters and Supply Company, TOE 63266L000, for food service support.

Basis of Allocation

2-199. The basis of allocation is one per MSB, Air Assault Division, TOE 63225L000. Figure 2-47 shows the organization of a Heavy Maintenance Company, MSB (Air Assault Division).

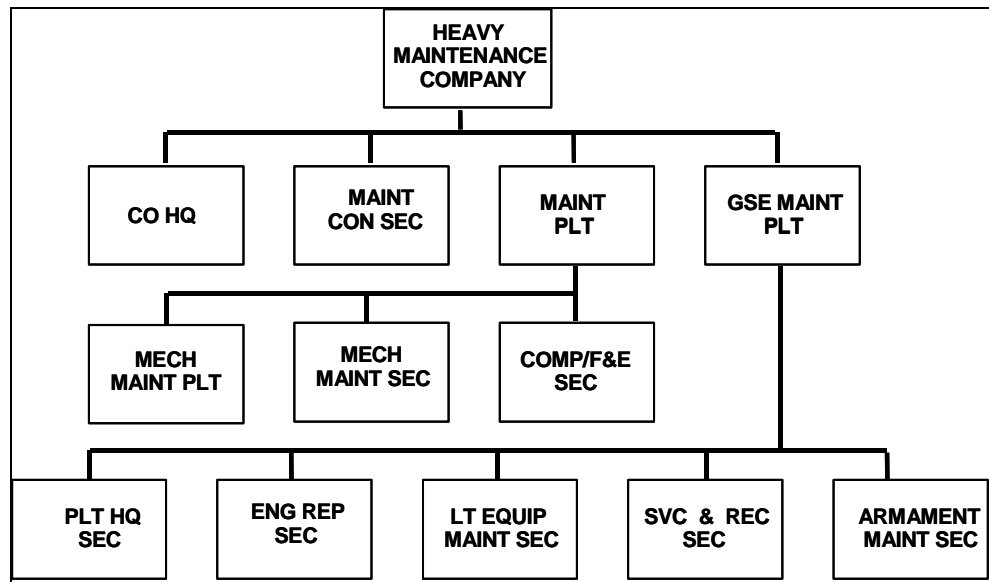


Figure 2-47. Heavy Maintenance Company, MSB (Air Assault Division)

Mobility

2-200. This unit is capable of transporting 194,100 pounds (10,877 cubic feet) of TOE equipment with organic vehicles. It also requires that 50 percent of its TOE equipment and supplies be transported in a single lift using its authorized organic vehicles.

LIGHT MAINTENANCE COMPANY, MAIN SUPPORT BATTALION (AIR ASSAULT DIVISION)

Mission

2-201. The mission of the Light Maintenance Company provides focused maintenance DS for selected systems. The unit also provides the following:

- DS-level maintenance and common/missile repair parts supply support to units deployed in the DSA.
- Reinforcing maintenance for the three FSB Forward Maintenance Companies.

Capabilities

2-202. The Light Maintenance Company, Heavy Maintenance Company MSB (Air Assault Division) provides the following:

- DS-level maintenance on all authorized missile equipment, electronic and COMSEC equipment, and standard 'A' adopted items of ADP equipment to units in an Air Assault Division.
- Passback and backup support to the three FSB Forward Maintenance Companies.
- Technical assistance for missile, electronic, COMSEC, and ADP equipment to divisional units.
- Common and missile repair parts supply to elements of the three FSB Forward Maintenance Companies.
- RX service for selected items (common/missile).

2-203. Individuals of this organization can assist in a coordinated defense of the unit's area or installation. This unit is capable of performing unit maintenance on organic equipment.

2-204. This unit is dependent on the following:

- Appropriate elements of the division or corps for HSS, and religious, finance, human resource, and administrative services.
- Headquarters and Supply Company, TOE 63266L000, for food service support.

Basis of Allocation

2-205. The basis of allocation is one per MSB, Air Assault Division, TOE 67000L000. Figure 2-48 shows the organization of a Light Maintenance Company, MSB (Air Assault Division).

Mobility

2-206. This unit is 50 percent mobile. When deploying this unit requires mobility assistance.

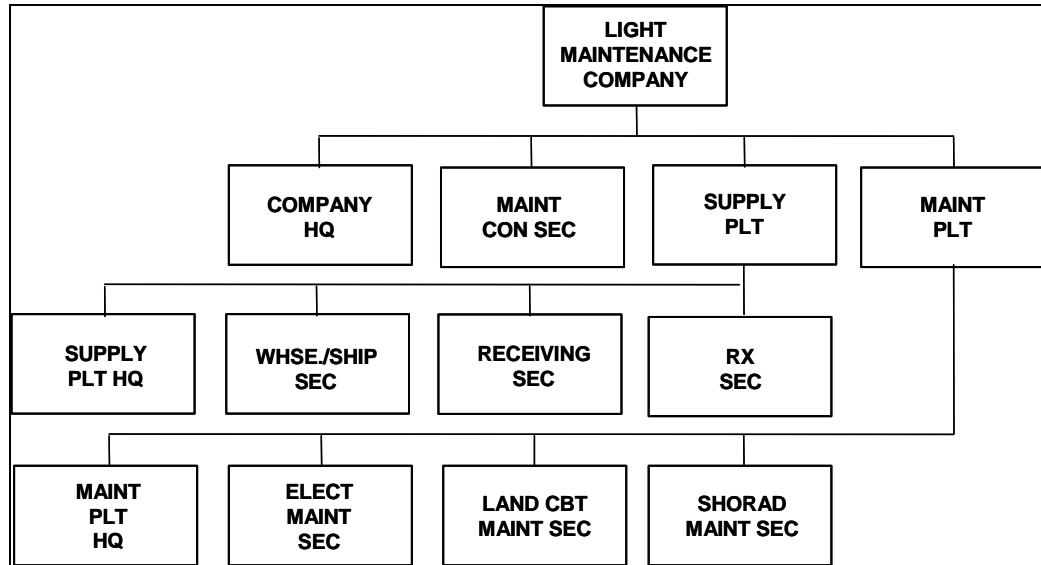


Figure 2-48. Light Maintenance Company, MSB (Air Assault Division)

FORWARD SUPPORT BATTALION (AIR ASSAULT DIVISION)

Mission

2-207. The DISCOM has three FSBs, one for each Division Maneuver Brigade. Each FSB provides DS-level support to all division units in assigned brigade sectors.

Units

2-208. The Air Assault Division FSB consists of the following:

- Headquarters and Supply Company.
- Maintenance Company.
- Medical Company.

NOTE: The Air Assault Division FSB also has a Headquarters and Supply Company separate from the companies in the battalion. Unlike the MSB, the FSB has no transportation support capability in its structure. Nor does it have field service capability in its supply company. All of the FSB's maintenance capabilities are consolidated into one Maintenance Company.

Figure 2-49, page 2-62, shows the organization of an Air Assault Division FSB.

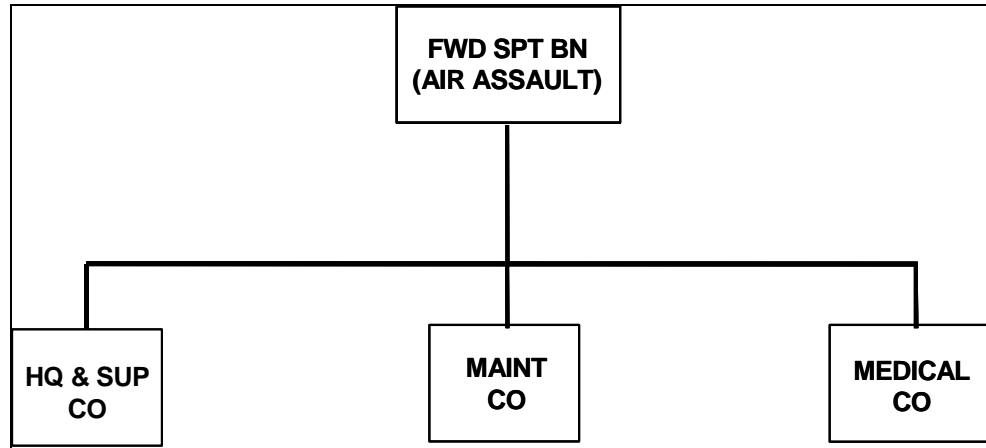


Figure 2-49. Forward Support Battalion (Air Assault Division)

MAINTENANCE COMPANY, FORWARD SUPPORT BATTALION (AIR ASSAULT DIVISION)

Mission

2-209. The mission of this unit is to provide DS-level maintenance and repair parts supply support to a Maneuver Brigade in an Air Assault Division. The capabilities of this unit are further discussed in the following paragraphs.

Capabilities

2-210. This unit provides the following:

- DS-level maintenance to supported units.
- An ASL for a 480-line ASL; and an RX service for 12 lines.
- Technical assistance to units in the brigade.

2-211. Individuals in this organization can assist in a coordinated defense of the unit's area or installation.

2-212. This unit is dependent on the following:

- Appropriate elements of the division or corps for HSS, and religious, legal, finance, human resource, and administrative services.
- The Headquarters and Supply Company, FSB, TOE 63256L000, for food service and unit maintenance.
- The Assault Helicopter Company, TOE 01147L000, for transportation of critical Class IX repair parts and major assemblies.
- The HHC/MMC, TOE 63252L000, for centralized Class IX management and automated materiel management.
- The TMT Company, TOE 55158L000, for transportation of Class IX supplies from the DSA to the BSA.

Basis of Allocation

2-213. The basis of allocation is one per FSB, Air Assault Division. Figure 2-50 shows the organization of the Maintenance Company, FSB (Air Assault Division).

Mobility

2-214. This unit is capable of transporting 93,000 pounds (8,150 cubic feet) of TOE equipment with organic vehicles. It also has 106,800 pounds (15,200 cubic feet) of equipment requiring additional transportation.

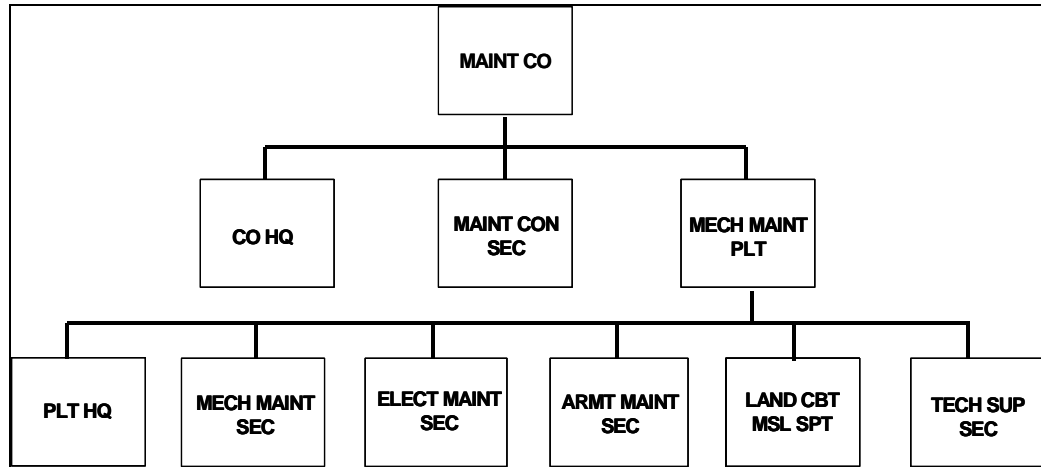


Figure 2-50. Maintenance Company FSB (Air Assault Division)

SEPARATE BRIGADE-SIZED UNITS

2-215. The ACR and Separate Infantry Brigade (SIB) are organizations found in the covering force area. The ACR and SIB are brigade-sized combat maneuver elements that are not part of a division force structure. They are normally assigned to a corps, where they perform missions like covering force operations (forward of the divisions) or screening operations. Figure 2-51, page 2-64, shows the organization of an ACR and a SIB.

NOTE: The ACR and SIB differ structurally from divisional brigades in that they have various combat and combat support units (ADA, MI, field artillery (FA), engineer company) organic to them. In a division, these combat and combat support units operate with the brigades but are not organic to them.

SUPPORT SQUADRON, ARMORED CAVALRY REGIMENT

Mission

2-216. The Support Squadron provides DS-level maintenance, supply, transportation, and HSS to the ACR and its attached units. When augmented, field services are also provided. The squadron has a data center and MMC in the Squadron HQ.

Basis of Allocation

2-217. The basis of allocation is one per ACR. Figure 2-52 shows the organization of a Support Squadron, ACR.

Units

2-218. The Support Squadron, ACR, consists of the following:

- Headquarters and Headquarters troop.
- Supply and Transportation troop.
- Maintenance troop.
- Medical troop.

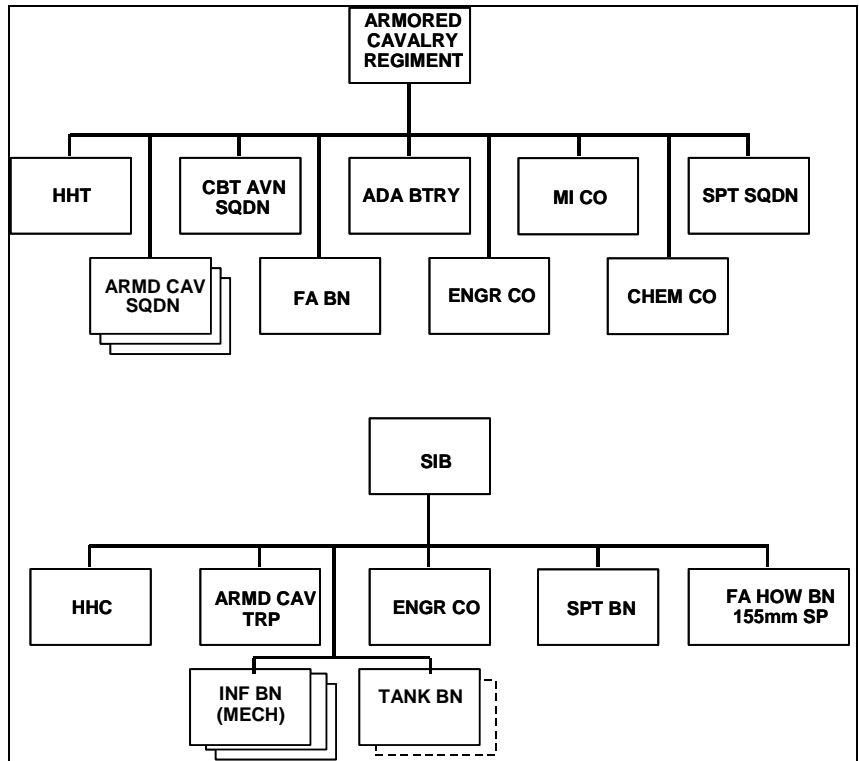


Figure 2-51. Armored Cavalry Regiment and Separate Infantry Brigade

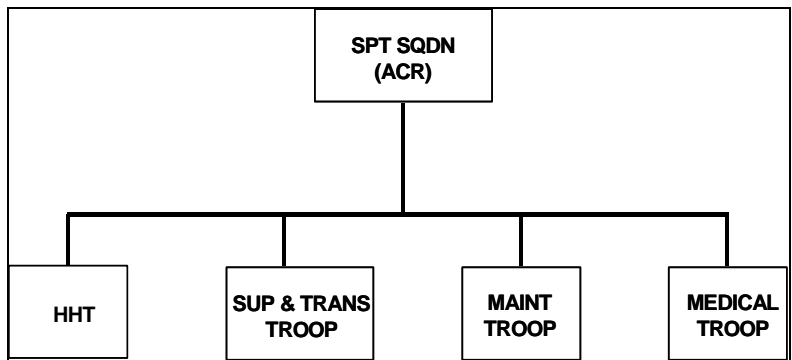


Figure 2-52. Support Squadron, ACR

MAINTENANCE TROOP, ARMORED CAVALRY REGIMENT

Mission

2-219. The mission of this unit is to provide DS-level maintenance and repair parts supply support to the ACR. The following lists the capabilities of this unit.

Capabilities

2-220. This unit provides DS-level maintenance for the following:

- Power generation and engineer equipment.
- Quartermaster and chemical equipment.
- Utilities equipment.
- Communications equipment.
- Special electronic devices.
- Radar equipment.
- Tactical fire (TAC-FIRE) office machines.
- COMSEC equipment.
- Artillery equipment.
- Automotive equipment.
- Metalworking.
- Small arms and tank turret.

2-221. This unit also provides limited recovery to supported units. It maintains the following:

- An ASL up to 3,000 lines.
- The operational readiness float for the ACR.

2-222. This unit is dependent on the following:

- Appropriate elements of the regiment or corps for HSS and religious, legal, finance, human resource, and administrative services.
- The Headquarters and Headquarters Troop, Support Squadron, TOE 63456L000, for food service support, unit administration, and centralized materiel management for Class IX.
- Appropriate assets from the Supply and Transportation Troop, TOE 42457L000, for supplemental transportation.

Basis of Allocation

2-223. The basis of allocation is one per Support Squadron. Figure 2-53, page 2-66, shows the organization of a Maintenance Troop, Support Squadron, ACR.

Mobility

2-224. Mobility for the ACR is critical for sustainment operations. This unit is 100 percent mobile.

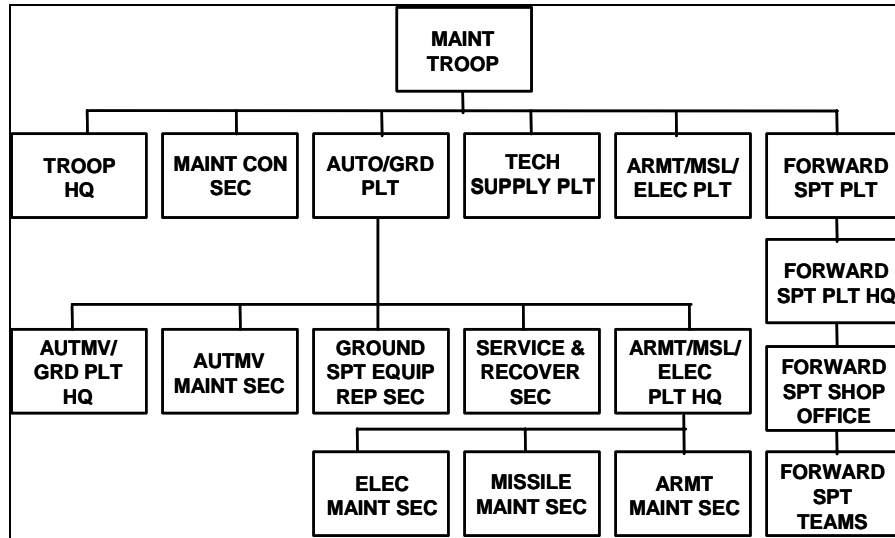


Figure 2-53. Maintenance Troop, Support Squadron, ACR

SUPPORT BATTALION, SEPARATE INFANTRY BRIGADE

Mission

2-225. The Support Battalion provides DS-level maintenance, DS supply, transportation, and HSS to an SIB and its attached units. When augmented, field services are also provided. The battalion has a data center and MMC in the Battalion HQ.

Basis of Allocation

2-226. The basis of allocation is one per SIB. Figure 2-54 shows the organization of a Support Battalion, SIB.

Units

2-227. The Support Battalion, SIB, consists of the following:

- Headquarters and Headquarters Company.
- Supply and Transportation Company.
- Maintenance Company.
- Medical Company.

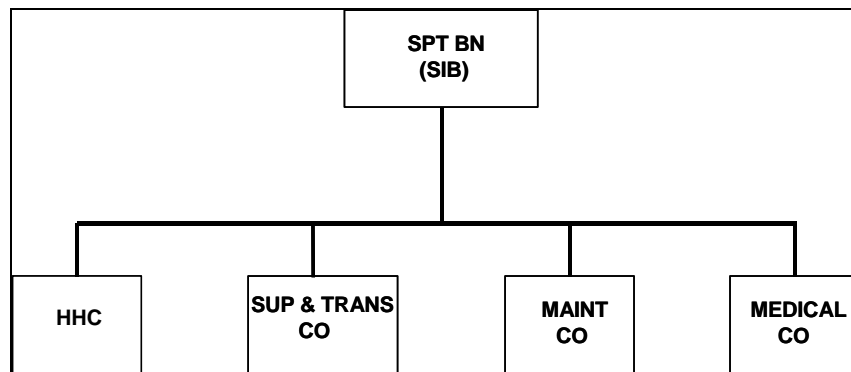


Figure 2-54. Typical Organization, Support Battalion, SIB

MAINTENANCE COMPANY, SEPARATE INFANTRY BRIGADE

Mission

2-228. The mission of this unit is to provide DS-level maintenance and repair parts supply support to attached and supporting units of a SIB. The capabilities of this unit are discussed in the following paragraphs.

Capabilities

2-229. This unit provides DS-level maintenance for the following:

- Power generation and engineer equipment.
- Quartermaster and chemical equipment.
- Utilities equipment.
- Communications equipment.
- Special electronic devices.
- Radar equipment.
- TAC-FIRE.
- Office machines.
- COMSEC equipment.
- Artillery equipment.
- Automotive equipment.
- Metalworking.
- Small arms and tank turret.

2-230. This unit also provides the following:

- A MST for on-site maintenance of the supported unit.
- Limited backup recovery to supported units.
- RX service of selected items.

2-231. This unit also maintains the following:

- An ASL up to 4,200 lines.
- The operational readiness float for the SIB.

The base company may be augmented with SSTs to tailor the support to specific vehicle densities.

2-232. This unit is dependent on the following:

- Appropriate elements of the brigade or corps for HSS and legal, finance, human resource, and administrative services.
- The Brigade Materiel Management Center (BMMC), TOE 63446L000, for centralized materiel/supply management.
- The Headquarters and Headquarters Company, SIB, TOE 63446L000, for religious, unit administration, and food service support.
- Medical Company, Support Battalion, SIB, TOE 08438L100 for unit-level HSS.

Basis of Allocation

2-233. The basis of allocation is one per Support Battalion, SIB. Figure 2-55 shows the organization of a Maintenance Company, Support Battalion, SIB.

Mobility

2-234. Mobility remains critical for successful SIB sustainment operations. Therefore, this unit is 100 percent mobile.

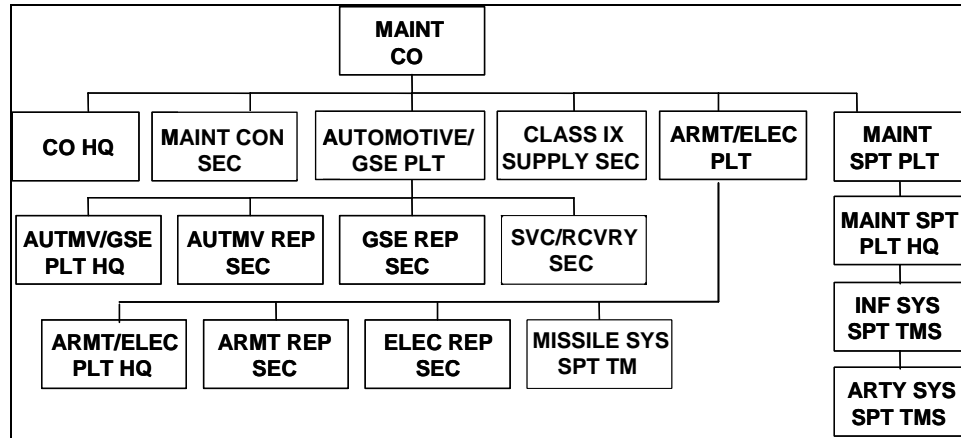


Figure 2-55. Maintenance Company, Support Battalion, SIB

FORCE XXI DIVISION MAINTENANCE ORGANIZATIONS

2-235. With the advent of digitization, the digitized FXXI division came into being. Relying on a myriad of advanced information management tools, FXXI maintenance operations rely on a repair system that replaces forward and fixes in the rear.

DIVISION SUPPORT COMMAND (DIGITIZED)

2-236. The DISCOM (see Figure 2-56) consists of a Headquarters and Headquarters Company, an Aviation Support Battalion, a Division Support Battalion, and one Forward Support Battalion for each Maneuver Brigade in the division. The DISCOM coordinates and synchronizes all support requirements and activities (horizontally and vertically) inside and outside the division. The DISCOM Commander, the division's battle logistician, directs the flow of support before, during, and after combat operations. The DISCOM conducts logistics integration with a staff fully equipped with the interactive FXXI Battle Command Battalion/Brigade and Below (FBCB2), Army Tactical Command & Control System (ATCCS), Combat Service Support Control System (CSSCS), and STAMIS that provide a high fidelity common operational picture (COP) and the capability to logistically influence the battle. FM 4-93.52 (FM 63-2-2) provides more information about the FXXI DISCOM.

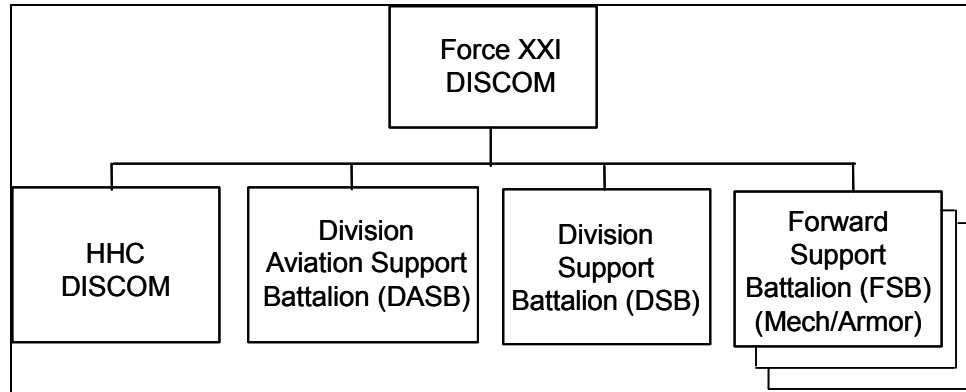


Figure 2-56. Force XXI DISCOM (Digitized)

DISCOM HEADQUARTERS

2-237. The DISCOM HQ provides C2 for all CSS organic and attached elements in the division. The DISCOM HQ contains the HQ Company, Command Section, Staff sections, Unit Ministry Team (UMT), and Support Operations Section. Figure 2-57 shows the organization of the DISCOM Headquarters.

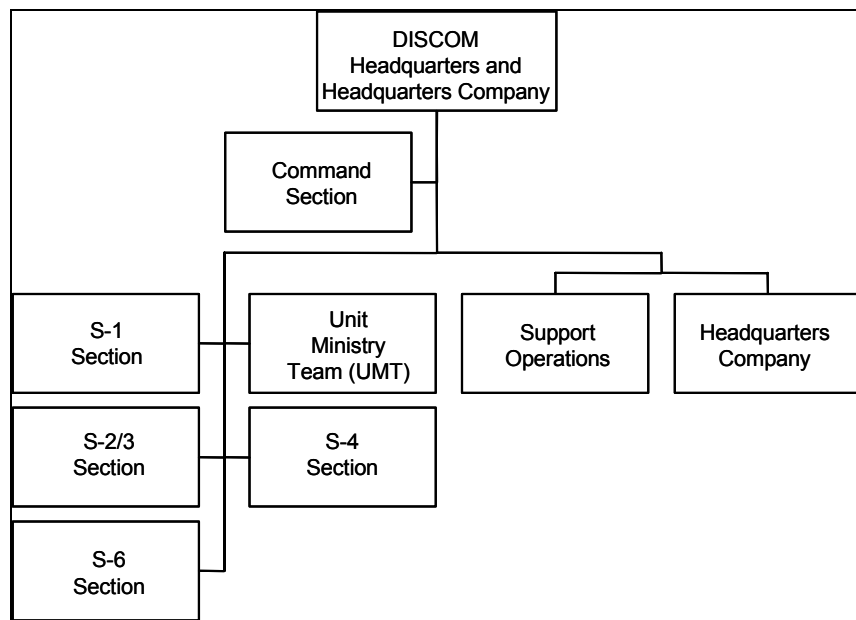


Figure 2-57. DISCOM Headquarters

DIVISION SUPPORT OPERATIONS

2-238. The Support Operations Section materiel managers, transportation coordinators, and operations planning personnel plan and execute support for the division. All horizontal and vertical logistics coordination efforts within the division converge on the Support Operations Section. The DMC, a vital cell within this section, provides the Support Operations Officer (SPO) overall TAV and ITV of all commodities, movements, and units within, assigned, or inbound to the

division AO. The DMC serves as the “logistics fusion center” to collect and analyze TAV/ITV information. All Support Operations sections channel information to this section to improve the total distribution “pipeline” visibility. Figure 2-58 shows the organization of the Division Support Operations.

DIVISION SUPPORT BATTALION (DIGITIZED)

2-239. The Division Support Battalion (DSB) provides medical support on an area basis to division rear area troops, transportation support to the entire division, as well as DS supply and maintenance support to the Division HQ, DSB, DISCOM HQ, Division Artillery (DIVARTY) HQ, MLRS Battalion, ADA Battalion, MI Battalion, Signal Battalion, and military police (MP) Company. Similar to the AOE MSB, the DSB also provides Class III (bulk) reinforcing and resupply support to the FSBs. Unlike the AOE MSB, the DSB no longer provides umbrella support to the FSBs for the other classes of supply. FM 4-93.51 (FM 63-21-1) provides more detail about the DSB. Figure 2-59 shows a Division Support Battalion (Digitized).

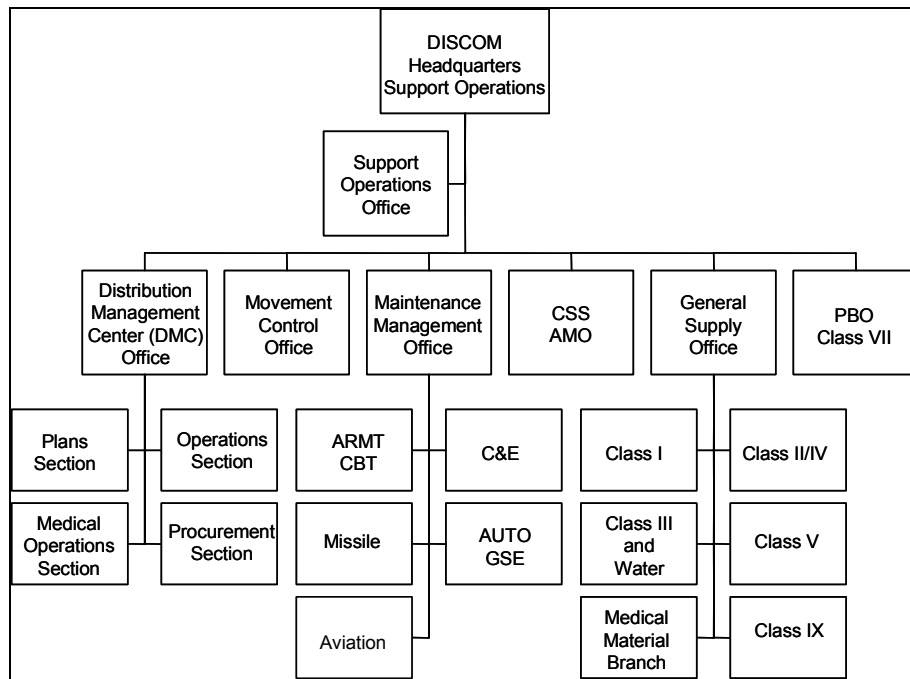


Figure 2-58. Division Support Operations

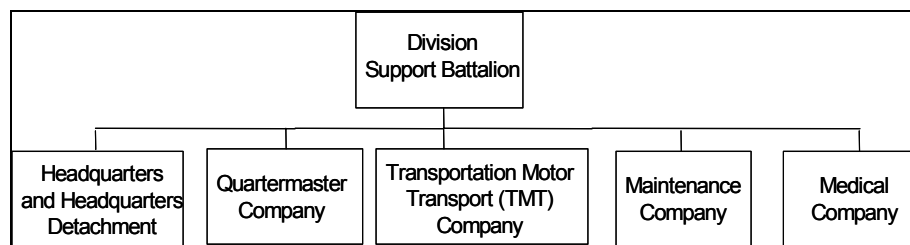


Figure 2-59. Division Support Battalion (Digitized)

HEADQUARTERS AND HEADQUARTERS DETACHMENT, DIVISION SUPPORT BATTALION

2-240. The Headquarters and Headquarters Detachment, DSB provides command, control, and administration support for all organic and attached DSB units. The HHD provides distribution management for all division rear (DREAR) supply and services support. It also provides food service support for units organic and attached to the DSB. Figure 2-60 shows the organization of a Headquarters and Headquarters Detachment, Division Support Battalion.

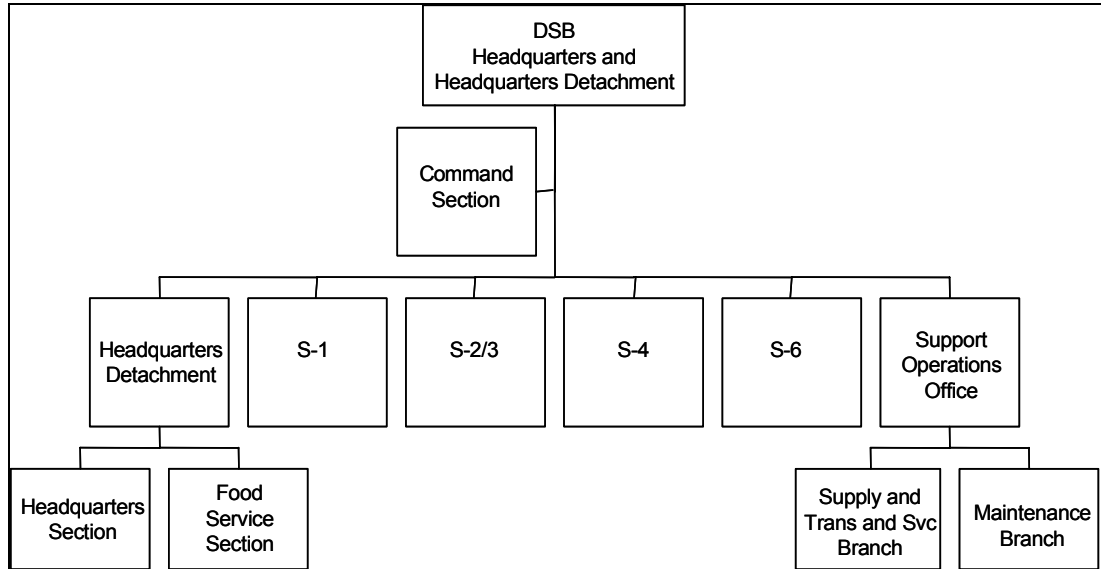


Figure 2-60. Division Support Battalion Headquarters and Headquarters Detachment

DIVISION SUPPORT BATTALION MAINTENANCE COMPANY

2-241. The Division Support Battalion Maintenance Company provides dedicated DS ground maintenance to division toop units, DIVARTY HQ, and DSB CSS elements operating in the division rear area. The company provides limited recovery and evacuation assistance on an area basis. The DSB Area Maintenance Company provides unit maintenance to itself and the HHC DISCOM only. The Area Maintenance Company also provides modular DS maintenance teams in support of the MI, Signal, and FA (MLRS) units. Figure 2-61, page 2-72, shows the organization of the Division Support Battalion Maintenance Company.

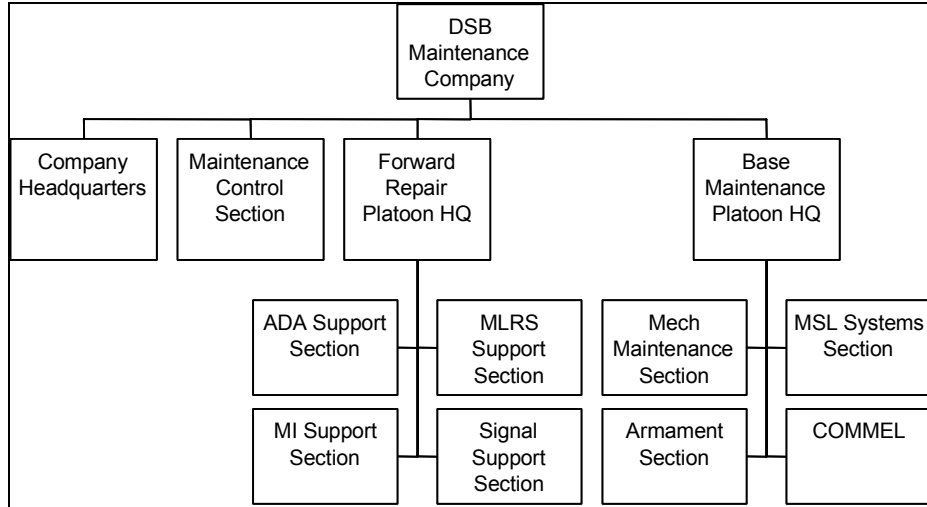


Figure 2-61. Division Support Battalion Maintenance Company

DIVISION AVIATION SUPPORT BATTALION (DIGITIZED)

2-242. The Division Aviation Support Battalion (DASB) provides DS to the Aviation Brigade and the Division Cavalry Squadron. The DASB supports the Aviation Brigade and the Division Cavalry Squadron by providing or coordinating all classes of supply and maintenance. The DASB can function in a dispersed manner to support the Cavalry Squadron or Attack Battalion when they are operating forward. The DASB may attach Aviation and Ground Maintenance Teams and fueling assets forward to augment the FSBs, who then provide area support to the Division Cavalry. The DASB does not have any HSS capabilities. Based on METT-TC, medical support is provided by either the DSB or FSB Medical Companies to the DASB, Aviation Brigade and Division Cavalry Squadron. The DASB contains a Headquarters and Supply Company, a Ground Maintenance Company, and an Aviation Intermediate Maintenance Company. The DASB maintains one day of operational fuel requirements for the Aviation Brigade, Cavalry Squadron, and the DASB (14.5 hours (hrs) tracks, 100 kilometer (km) wheels, and 4 hrs flying). FM 4-93.53 (FM 63-23-2), provides more information about the DASB. Figure 2-62 shows the organization of a Division Aviation Support Battalion (Digitized).

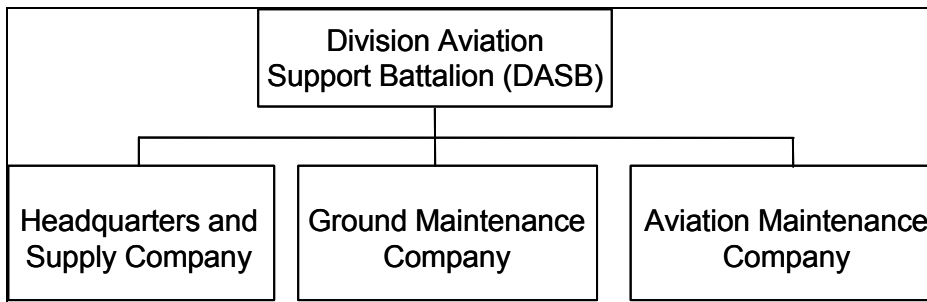


Figure 2-62. Division Aviation Support Battalion (Digitized)

HEADQUARTERS AND SUPPLY COMPANY, DIVISION AVIATION SUPPORT BATTALION

2-243. The Headquarters and Supply Company consists of a Battalion HQ and a Supply Company. The Battalion HQ provides command, control, and administration support for all organic and attached DASB units. The Battalion HQ plans, directs, and supervises support for the Aviation Brigade and Division Cavalry Squadron. The Supply Platoon provides receipt, issue, and limited storage of Class II, III (P), IV, and IX (common and air) items in support of the Aviation Brigade and Division Cavalry Squadron. It also receives and issues Classes I and VI at the field ration issue point, and receives and issues Class VII as required. The supply platoon maintains the STAMIS (the SARSS-1 or GCSS-A). The III-V platoon provides bulk Class III and Class V support to its customers. It also operates a division rear aircraft refuel point for divisional and medical evacuation (MEDEVAC) aircraft. The DASB maintains one day of operational fuel requirements for the Aviation Brigade, Cavalry Squadron, and the DASB (14.5 hours tracks, 100 km wheels, and 4 hours flying). The company also provides food service support for units organic and attached to the DASB. Figure 2-63 shows a DASB Headquarters and Supply Company.

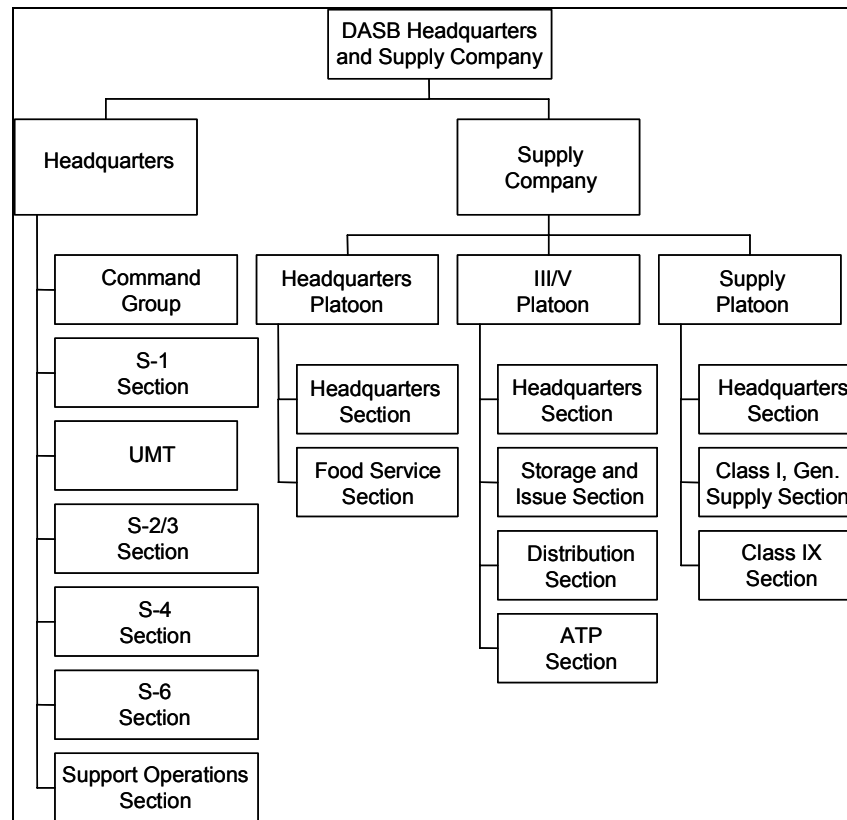


Figure 2-63. DASB Headquarters and Supply Company

GROUND MAINTENANCE COMPANY, DIVISION AVIATION SUPPORT BATTALION

2-244. The Ground Maintenance Company consists of a Company HQ, a Battalion Maintenance Platoon, and a DS Maintenance Platoon. The Ground Maintenance Company provides units for all DASB non-air items and DS maintenance for all Aviation Brigade DASB and Division Cavalry non-air items, including track, turret, missile, automotive, C-E, engineer, utility, power generation, and small arms. Figure 2-64 shows the organization of a DASB Ground Maintenance Company.

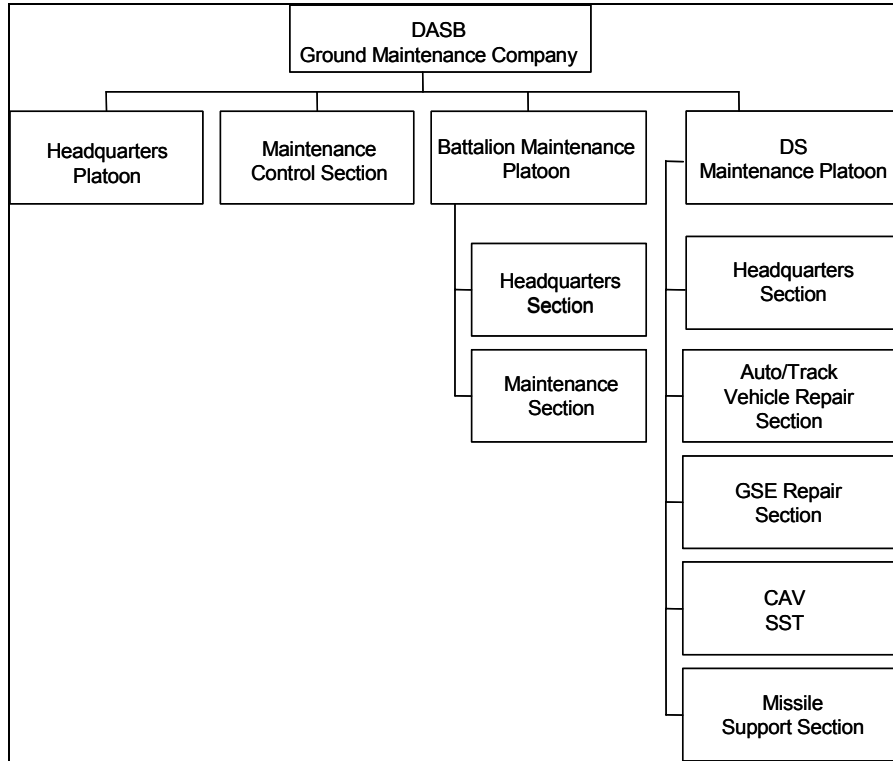


Figure 2-64. DASB Ground Maintenance Company

FORWARD SUPPORT BATTALION (DIGITIZED)

Mission

2-245. The FXXI Digitized DISCOM has three FSBs, providing multifunctional DS to Brigade Combat Teams. The FSB is the Brigade Commander’s battle logistician, providing all logistical support, and ties together the entire spectrum of supplies and services for the Maneuver Brigade. The FXXI FSB design (see Figure 2-65) consolidates all CSS into one organization. FM 4-93.54 provides more detail about the FXXI FSB.

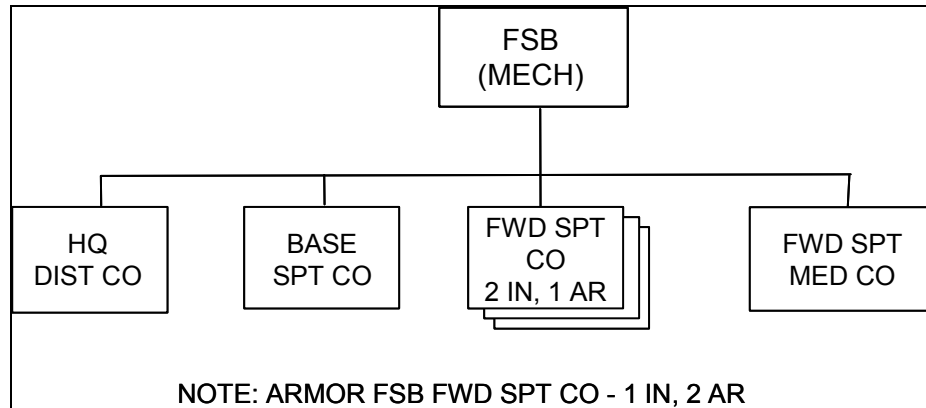


Figure 2-65. Force XXI Forward Support Battalion (Digitized)

NOTE: The FXXI FSB is similar in structure to the AOE FSB, except for multifunctionality and a “distribution” focus; a consolidated SSA; organizational/DS supply and maintenance capability; provides food service to the Brigade HQ; Forward Surgical Teams are attached from corps; FSB has a habitual DS relationship to supported Maneuver Battalions.

Units

2-246. The FXXI Forward Support Battalion consists of the following:

- Headquarters and Distribution Company (HDC).
- Forward Support Company (FSC) – one for each Maneuver Battalion.
- Base Support Company (BSC).
- Forward Support Medical Company (FSMC).

FORWARD SUPPORT COMPANY, FORWARD SUPPORT BATTALION

2-247. For FXXI, CSS elements organic to the maneuver units were combined with DS CSS elements under the “centralized logistics concept” to form the FSC. This new FSC is as mobile as the unit it supports. This mobility provides greater flexibility for the Maneuver Commander. The FSC also gains increased efficiency and effectiveness through centralized support. Centralized support allows the FSB Commander to cross-level between FSCs and weigh the battle logistically as required. The FSB’s multifunctional FSC includes an Supply and Transport (S&T) Platoon, a Medical Platoon, and a Maintenance Platoon organized to provide habitual support to a Maneuver Battalion. The FSC provides all classes of supply, food service, medical support, and tactical field maintenance (DS/unit) to itself and the battalion it supports. Figure 2-66, page 2-76, shows the organization of a FSC.

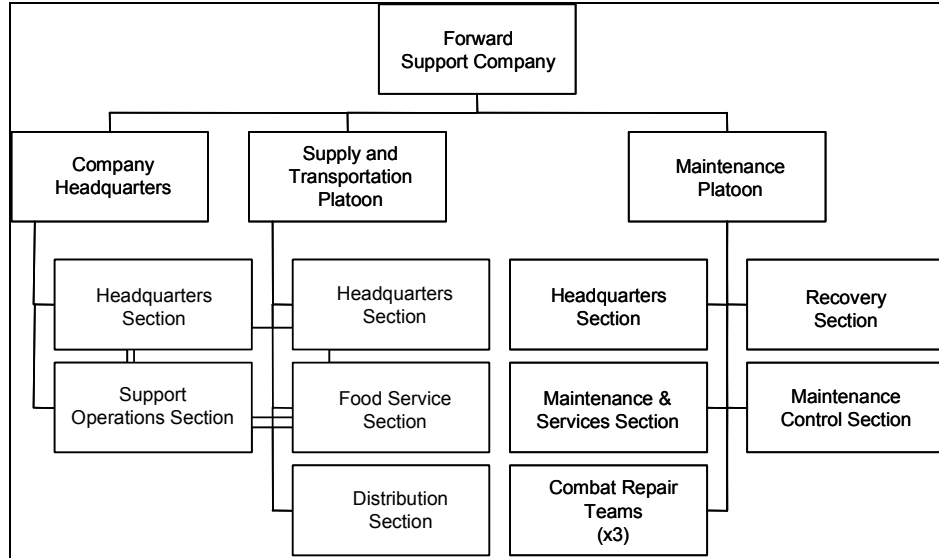


Figure 2-66. Forward Support Company

Forward Support Company Headquarters Section

2-248. This section consists of the Headquarters Section and the Support Operations Section. It provides C2 to all CSS elements in support of a designated Maneuver Battalion Combat Team.

Forward Support Company Maintenance Platoon

2-249. The Maintenance Platoon provides dedicated tactical field maintenance, and Class IX support and recovery to itself and a Maneuver Battalion. The Maintenance Control Section (MCS) is the focal point for all maintenance activity and maintains the STAMIS. This platoon’s capabilities rely heavily on the Control Repair Teams, which provide dedicated tactical field maintenance support at the company level. If an end item cannot be repaired in time for the battle, the platoon passes it to the base support company or possibly the corps. Maintenance advances, such as the multi-capable maintainer, digital and predictive maintenance technology, and improvements in maintenance support equipment, will enhance the FSC Maintenance Platoon’s capabilities.

BASE SUPPORT COMPANY, FORWARD SUPPORT BATTALION

2-250. The multifunctional BSC provides logistics support to the brigade rear area (less medical and Class VIII) and limited backup and reinforcing support to the FSCs. Figure 2-67 shows the organization of a FSB Base Support Company.

Base Support Company Headquarters Section

2-251. This section provides C2 to all organic and attached elements. It also coordinates area support within the BSA, and coordinates reinforcing support to the FSCs as required.

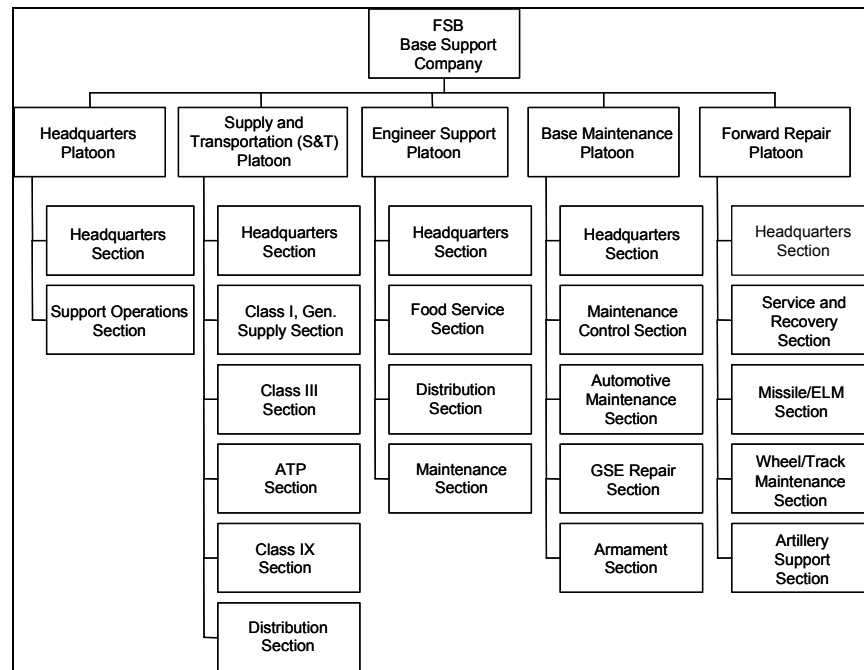


Figure 2-67. Force XXI Forward Support Battalion, Base Support Company

Base Maintenance Platoon

2-252. The Base Maintenance Platoon provides tactical field maintenance to the Brigade HQ, Brigade Reconnaissance Troop, FSB HQ, Medical Company, and Base Support Company. This platoon also provides DS base shop, commodity-specific maintenance to the entire Brigade Combat Team (BCT). On an area basis, it provides DS maintenance to BCT units within the BSA, and limited reinforcing and backup support to the FSCs. The MCS maintains the STAMIS serves as the focal point for all maintenance activity. The GSE Repair Section provides base shop tactical field maintenance on all power generation and refrigeration equipment. The Automotive Maintenance Section provides base shop tactical field maintenance on wheel and track vehicles. The Armament Maintenance Section provides base shop LRU, armament and small arms repair capability. Maintenance advances, such as a multi-capable maintainer, and digital and predictive maintenance technology, will enhance the platoon's capabilities.

Forward Repair Platoon

2-253. The Forward Repair Platoon provides on-site DS maintenance to divisional units that are not covered by the FSCs on an area basis. The Service and Recovery Section provides welding services and limited recovery/lift support. The Missile/Electronic Maintenance Support Team provides TOW, Dragon, Stinger, Bradley Fighting Vehicle System (BFVS), and COMMEL maintenance support either forward on-site or at the base shop as directed by the MCS. The Artillery Support Team provides on-site DS only maintenance to the Artillery Battalion supporting the brigade. The Wheel/Track Team is capable of providing contact support to the Brigade HQ Reconnaissance troop, and reinforcing

support to the FSCs as directed by the MCS or FSB SPO. The platoon also provides limited reinforcing and backup support to the FSCs.

STRYKER BRIGADE COMBAT TEAM

BRIGADE SUPPORT BATTALION, STRYKER BRIGADE COMBAT TEAM

2-254. The Brigade Support Battalion (BSB) is designed to perform distribution-based, centralized logistics functions in accordance with Army XXI CSS concepts, although capability is limited. Its effectiveness depends on the employment of the latest advances in CSS C2, enhancement of CSS situational understanding (SU), and the exploitation of regionally available resources through joint, multi-national, HN, or contract sources. The small size of the battalion significantly minimizes the CSS footprint in the Stryker Brigade Combat Team (SBCT) AO. The Forward Maintenance Company is the maintenance management operator organization for the SBCT.

2-255. CSS functions are almost entirely consolidated under the C2 of the BSB HQ. The BSB Commander is the SBCT Commander's primary CSS operator. His staff manages most CSS operations through an array of digital information systems and other technological innovations. In addition, the BSB Support Operations Section requires the capability to integrate the activities of the CSS assets required to support SBCT augmentation slices into BSB operations. If the augmentation slice is large enough, a Corps Support Battalion may have to deploy to provide the required C2. Figure 2-68 shows the organization of a Brigade Support Battalion.

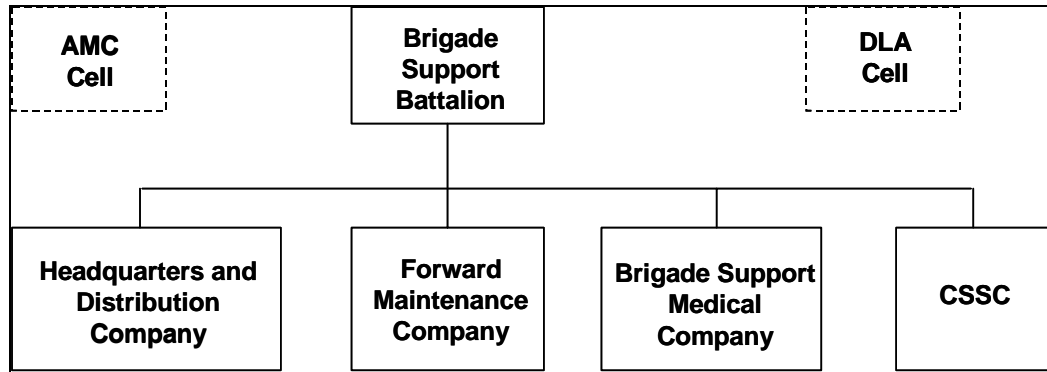


Figure 2-68. Brigade Support Battalion

Support Operations Section

2-256. The SPO is the principal staff officer for coordinating CSS to the SBCT. He provides the technical supervision for the external CSS mission of the support battalion. He is the key interface between the supported units and the support battalion. The SPO performs logistics preparation of the battlefield (LPB) and advises the commander on support requirements versus support assets available. The SPO coordinates and directs external support requirements. He also provides technical expertise to supported units and synchronizes support requirements to ensure they remain consistent with current and future operations. Requirements are determined in coordination with the

Brigade S4, the BSB Intelligence and Operations Officer (S2/3), and the CSS representatives of the supported units. The SPO plans and monitors support operations and makes necessary adjustments to ensure support requirements are met. The SPO coordinates with the Adjutant (S1) and S4 to track available CSS assets. He also coordinates with the S2/3 for the support locations and schedules of supported units. The SPO monitors daily Battle Loss reports to anticipate requirements. The SPO requests and coordinates augmentation with the higher echelon (DISCOM/DMSB/TSC) SPO when requirements exceed capabilities. The SPO prepares and distributes the external Service Support Standing Operating Procedure (SOP) and annex that provides guidance and procedures to supported units. The SPO provides input to the supported units on the Logistics Estimate and Service Support annex. The Support Operations Section is composed of a number of functional cells (see Figure 2-69).

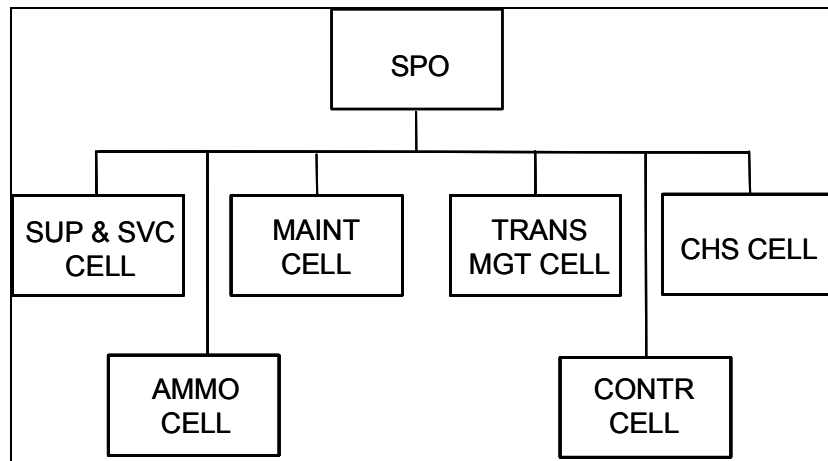


Figure 2-69. Functional Cells for the Support Operations Section

2-257. SPO assets act as the distribution management support element for the BSB, functioning as a DMC does in other organizations. They synchronize operations within the distribution system to maximize throughput and sustainment, and to ensure priorities are executed in accordance with the SBCT Commander's guidance. The distribution managers maintain SU of the distribution system and act as the "fusion center" for distribution-related information. They work closely with and synchronize the operations of the battalion's sections and elements, including limited contracting, medical logistics, and transportation. Only one mortuary affairs (MA) soldier plans and coordinates the MA later in this chapter. The distribution management resources also include an austere two-person materiel management capability. These personnel will monitor the Movement Track System (MTS), FBCB2, Transportation Coordinators' Automated Information for Movements System II (TC-AIMS II), CSSCS, legacy STAMIS/GCSS-Army, and the daily Battle Loss reports to anticipate requirements. Requirements exceeding BSB capabilities are coordinated with higher echelon support operations elements and utilize reach operations. The SPO assimilates end-to-end information from the distribution pipeline to create a synchronized picture of the flow of units, personnel, and materiel into and throughout

the AO concurrently. Distribution managers work closely with other elements of the Support Operations Section, as well as with the battalion and ARFOR planners to ensure adequacy of plans and orders.

2-258. The Support Operations Section, under the direction of the SPO, provides collaborative, centralized, integrated, and automated command, control, and planning for all distribution management operations within the SBCT. Operating under the concept of anticipatory CSS, this section collaborates and coordinates with logistics operators in the fields of supply, field services, maintenance, medical, contracting, finance, and movement management for the support of all units assigned or attached to the SBCT. Its primary concern is customer support and increasing the responsiveness of support provided by subordinate units. It continually monitors support and advises the Battalion Commander on the ability to support future tactical operations. With the legacy STAMIS/GCSS-A, CSSCS, FBCB2, TC-AIMS II, and MTS, the Support Operations Section has access to substantial information and receives information in near real-time. The Support Operations Section possesses the capability to view the situation and combat power in the maneuver units. This allows the SPO to identify problems quicker, anticipate many requirements, and allocate resources more efficiently. CSSCS provides support operations the visibility of the CSS status from the BSB to EAB. This battle staff section serves as the point of contact (POC) for supported units. It directs problems to appropriate technical experts within subordinate cells. Some key duties and responsibilities of the Support Operations Section include the following:

- Conduct continuous LPB.
- Provide execution-focused CSS.
- Coordinate and provide technical supervision for the BSB's CSS mission, which includes supply activities, maintenance support, combat health support (CHS), and coordination of transportation assets.
- Coordinate most CSS reach requirements with higher echelon SPO elements.
- Advise the Battalion Commander on the status of CSS.
- Coordinate CSS for units passing through the SBCT's area.
- Revise customer lists (as required by changing requirements, workloads, and priorities) for support of tactical operations.
- Coordinate external logistics.
- Develop supply, service, maintenance, and transportation SOPs.
- Establish a daily CSS Plan and Synchronization matrix, planning both current and future logistics operations.
- Synchronize operations within the distribution system to maximize throughput and follow-on sustainment, and ensure priorities are executed in accordance with directives.
- Manage the distribution pipeline within the SBCT AO.

- Track and investigate high-priority requests.
- Track assets and resources (for example, trucks, ambulances, and CRT and battlefield automation system (BAS) workloads).

2-259. The SPO is the CSSCS manager. He must collaborate with the S1, S2/3, S4, and Communications Staff Officer (S6) to establish and manage the CSSCS network and database. He must also maintain DS supply point and maintenance data entered into the system.

Maintenance Cell

2-260. The Support Operations Maintenance Officer plans and recommends the allocation of maintenance resources in coordination with the supported unit's chain of command. He also forecasts and monitors the workload for all equipment by type. The Maintenance Officer and Maintenance NCO use the SAMS-2 to collect and process maintenance operations data and to assist in the management of maintenance operations. It processes maintenance information required to control workload, manpower, and supplies. SAMS-2 capabilities are designed to assist in both maintenance and readiness management.

2-261. Maneuver units will transmit FBCB2 logistics situation reports (LOGSITREPs) electronically through the chain of command. These reports will be entered into the CSSCS through either the battalion or SBCT S4. Once into the CSSCS and transmitted to the other CSSCS nodes, these reports will enable support operations personnel to identify problems quickly and allocate resources more efficiently. The Maintenance Officer can monitor TF equipment status of units on various CSSCS reports. The Equipment-Unit Status report provides specific unit Class VII data. The Equipment-Force Echelon Status report provides specific data for the force echelon. It includes authorized quantity, battle loss, not mission capable (NMC) (DS), and NMC (organizational). The Equipment Item Status report provides specific data for an individual piece of equipment. The FBCB2 and CSSCS also provide map graphics that portray unit locations, grid coordinates, and terrain features so support operations can track maintenance on the battlefield.

2-262. The Support Operations Maintenance cell develops the plans and policies for reparable exchange operations. It monitors Shop Production and Job Status reports in the FMC. It also monitors and reviews the Class IX stockage, and coordinates critical parts status with the EAB. For unserviceable items, it generates disposition instructions based on the Brigade Commander's guidance. Instructions include evacuation, cannibalization, and controlled exchange policies. With the SBCT S4, it reviews backlogs on critical weapons systems. For any additional support requirements, the BSB support operations coordinates through the EAB Support Operations branch. The duties of the Maintenance Officer include the following:

- Conduct continuous LPB.
- Track and investigate Class IX high priority requisitions.
- Assist with planning and coordinating contingency support.
- Direct redistribution of maintenance workloads.

- Coordinate maintenance back-up support with the EAB.
- Monitor the units' maintenance posture using the SAMS-2.
- Coordinate maintenance priorities with the SBCT S4.
- Establish maintenance priorities for workload management through coordination with the supported unit.

FORWARD MAINTENANCE COMPANY, STRYKER BRIGADE COMBAT TEAM, BRIGADE SUPPORT BATTALION

2-263. The Forward Maintenance Company (FMC) together with the essential equipment supported contractors provide all maintenance support for the SBCT, less medical and the limited automation capability which is integrated into the Brigade's S6 Section and the Signal Company. The FMC (see Figure 2-70) has the maintenance capabilities to perform automotive, armament, missile, communications, special devices, and ground support equipment repair; however, its depth is very shallow. The combination of organizational/DS maintenance (field maintenance) unifies organizational and DS level maintenance responsibilities and capabilities into one organization. The FMC Maintenance Control Section will be able to focus maintenance leadership, management, technical expertise, and assets under a single CSS operator, ensuring maintenance can be planned, allocated, and swiftly executed when and where needed to satisfy the commander's requirements.

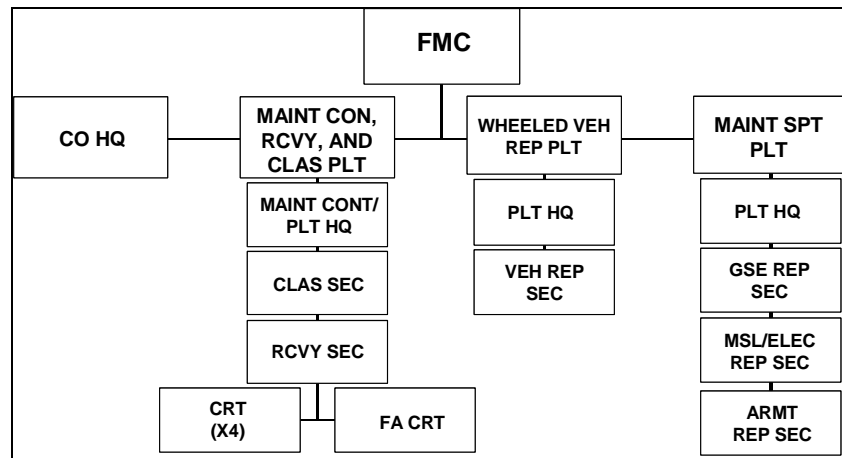


Figure 2-70. SBCT Forward Maintenance Company

2-264. Efficiency in maintenance management and effectiveness of maintenance operations are maximized when organizational and DS maintenance operations are collapsed into one level. This concept eliminates the loss of time and loss of job continuity associated with the transition of organizational level job orders to DS job orders and vice versa. Field maintenance provides a greater capability to dispatch more effective maintenance capabilities forward because of centralized control and access to more capabilities. The concept pools maintenance assets under a single CSS operator for maintenance, the Maintenance Control Officer (MCO). Enablers, such as the Forward Repair System (FRS) and emerging diagnostics and prognostics, will enhance the forward deployed CRT's ability to execute this concept. The CRTs are tailored with the

right people with the right tools and test equipment to provide automotive field maintenance forward on the battlefield and rapidly return combat systems to the fight.

2-265. The FMC is composed of a Maintenance Control, Recovery, and Classification Platoon (with CRTs), a Wheeled Vehicle Repair Platoon, and a Maintenance Support Platoon. Command and control is provided by the company headquarters.

Maintenance Control, Recovery, and Classification Platoon

2-266. The Maintenance Control, Recovery, and Classification Platoon consists of the Maintenance Control Section, the Classification Section, and the Recovery Section. The following describes each of these sections.

2-267. **Maintenance Control Section.** The MCS is the nerve center for maintenance operations within the SBCT. The section consists of the MCO, Maintenance Control Sergeant, and the Equipment Records/Parts Specialists. The Equipment Records/Parts Specialists have oversight responsibility for all TAMMS operations in the brigade and manage the DS shop stocks. CRTs are equipped with automated maintenance systems and a minimal number of operators. The MCS also dispatches Contact Maintenance Teams and MSTs to provide forward support. MSTs, such as the Missile Repair Teams, are teams operating from the BSA and are designed to move forward to provide support.

2-268. **Classification Section.** The Classification Section is responsible to the FMC Commander for quality assurance, quality control, and technical inspections for all field maintenance functions. The Classification Section classifies inoperative and damaged equipment according to condition codes. The classifications are determined according to instructions provided in technical bulletins, and directives from higher HQ. The Classification Section also has the mission, in coordination with the HDC Supply Section and the Support Operations Section, of managing the cannibalization point.

2-269. **Recovery Section.** The Recovery Section provides recovery support to all elements of the brigade, to include recovery of the heavy expanded mobility tactical truck (HEMTT), the high mobility multi-purpose wheeled vehicle (HMMWV), the interim armored vehicle (IAV), lighter vehicles, and trailers.

2-270. **Combat Repair Teams.** CRTs assigned to the FMC and based in the BSA, will be dispatched as needed to forward locations of the maneuver units and the FA Battalion to conduct maintenance, and then return to the BSA. The CRTs are controlled by the FMC MCO, who coordinates with the S4/XO of each maneuver and FA battalion/TF to establish work priorities, control movements, and integrate CRT operations into the maneuver/FA units' operation plans (OPLANs). A principal task of the CRT is to assess and report maintenance requirements to the MCS. Supported by maintenance STAMISs in the BSA, IETMs, the Soldier Portable On System Repair Tool (SPORT), the contact maintenance truck (CMT), and the FRS, the teams identify faults, monitor embedded prognostics as they become available through materiel fielding, advise Unit S4s regarding forward maintenance management, and conduct component and major assembly replacement for supported equipment.

Wheeled Vehicle Repair Platoon

2-271. The Wheeled Vehicle Repair Platoon (WVRP) provides field maintenance for the organic wheeled vehicles in the supported SBCT and all supported units within the BSA. It is workloaded by the Maintenance Control Section. The WVRP also provides back-up maintenance to the forward CRTs and employs the Replace Forward/Repair Rear maintenance philosophy. The WVRP performs equipment and component troubleshooting, minor (non-structural welding), major and secondary component replacement, and tire and LRU replacement as part of its Replace Forward concept.

Maintenance Support Platoon

2-272. The Maintenance Support Platoon is composed of an Armament Repair Section, a GSE Repair Section, and a Missile/Electronics Repair Section. Each of these sections are described below. Command and control is provided by the platoon headquarters.

2-273. **Armament Repair Section.** The Armament Repair Section provides field maintenance on all armament-related equipment to include: turrets, fire control systems, small arms, sight units, and artillery within the brigade. The MCS will make a determination (METT-TC dependent) on sending out an Armament Maintenance Support Team (AMST) to make forward repairs or have the equipment evacuated to the BSA.

2-274. **Ground Support Equipment Repair Section.** The GSE provides field maintenance for all the brigade's non-vehicular environmental control, power generation, water purification, petroleum, oil, and lubricants (POL), and engineer equipment. It works primarily from the BSA. It relies heavily on Class VII spares as replacements for equipment requiring repairs better accomplished outside the AO.

2-275. **Missile/Electronics Repair Section.** The Missile/Electronics Repair Section provides field maintenance to the brigade's missile and electronic equipment/weapon systems. The section has two distinctly separate missions: missile weapons system maintenance and C-E maintenance. The missile maintenance support mission requires contact and base operations, while the C-E support aligns primarily to base shop operations.

Combat Service Support Company

2-276. In order to maintain a high state of readiness, the SBCT's vehicle and equipment must undergo comprehensive maintenance in garrison. The BSB's current design does not have this ability. Even with the additional maintainers in the Combat Service Support Company (CSSC), a maintenance shortfall still exists. However, with all the technical enablers and a highly reliable common platform, the combined capabilities of the BSB, CSSC, and some augmentation (TDA, contractor/contracted logistical support (CLS), or system contractors) should achieve this state of readiness. The enablers that will assist in mitigating the maintenance shortfall (for example, reliability but into the future IAV) are not yet fielded. The SBCT will also contain legacy equipment for which enablers will not be able to offset the current maintenance shortfall. Additional maintenance capability is necessary

both in garrison and deployments. In deployments, the CSSC will enhance sustained operations in all environments and will provide deployable support in more intense combat scenarios.

2-277. The Maintenance Platoon will provide follow-on maintenance support to augment the BSC in providing field maintenance. Additionally, a "Planned Pulse Maintenance" concept will allow for a short term, cyclical maintenance pulse, focused on a particular unit (company or battalion) to perform required and limited preventive maintenance. The Planned Pulse team is task organized from within CSSC assets.

2-278. The team composition, the maintenance location, and the cyclic frequency are based on METT-TC considerations. Normally, the team will consist primarily of automotive repair assets, supported with armament and power generation mechanics as necessary. It is imperative the Battalion S4 and the SPO have a common picture of the maintenance requirements to facilitate sending an appropriately tailored Pulse Maintenance Team forward. The concept allows for a four-battalion rotation cycle, performed on company (+) sized elements. The Pulse Team task will include conducting technical inspections to identify current and future equipment to the BSA, and performing limited services (METT-TC dependent). When employed, the Maintenance Platoon will also augment the maintenance capability of the BSC by:

- Providing scaled maintenance capability forward to support the CRTs deployed forward to the maneuver units.
- Providing scaling to the Automotive, Armament, Electronics, and Ground Support sections.

The Maintenance Platoon consists of several teams, which augment the capabilities of specific sections of the BSC:

- The Vehicle Support team assists the Wheeled Vehicle Repair Section of the BSC in providing base shop and on-site maintenance for wheeled vehicles. The section also assists the Service and Recovery Section of the BSC with recovery support to the SBCT. This section is capable of forming several Contact Maintenance Teams simultaneously.
- The Ground Support Equipment (GSE) Support Team assists the GSE Repair Section of the BSC with performing field maintenance on utility, chemical, power generation, construction, and quartermaster equipment of the SBCT. This section is capable of forming several Contact Maintenance Teams simultaneously.
- The Electronic Support team assists the Missile/Electronic Repair Section of the BSC in performing field maintenance support on communications, electronics, and automation equipment repair. This section is capable of forming several Contact MSTs simultaneously.
- The Field Artillery CRT Support Team augments the FA Battalion Combat Repair Team of the BSC in providing field

maintenance support to the Field Artillery Battalion of the SBCT.

- Four CRT Support Teams augment the CRTs of the BSC in providing field maintenance support for three Maneuver Battalions and the Reconnaissance, Surveillance, & Target Acquisition (RSTA) Squadron of the SBCT.
- The Armament Support Team assists the Armament Repair Section of the BSC in providing armament, turret, LRU, fire control systems, and artillery maintenance support to the SBCT. Figure 2-71 shows a Combat Service Support Company.

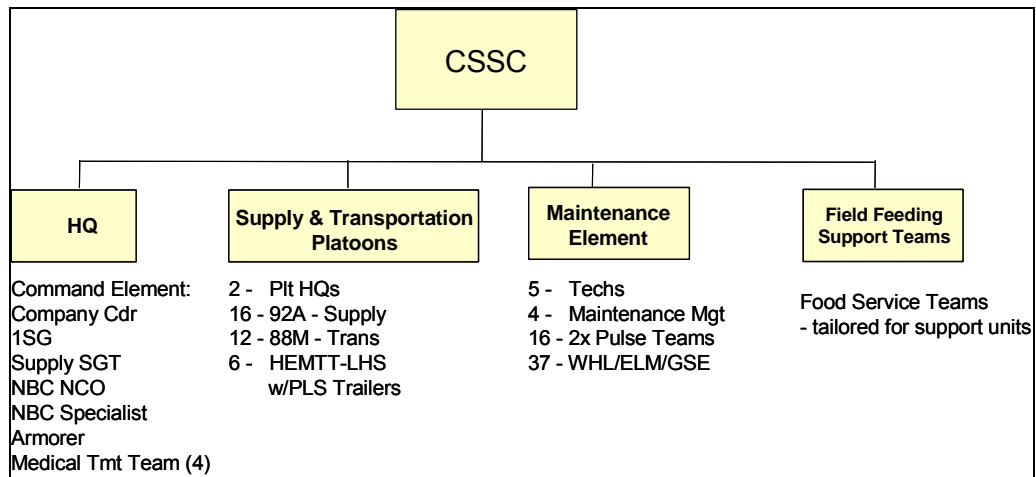


Figure 2-71. Combat Service Support Company

UNIT MAINTENANCE ORGANIZATION FOR COMBAT UNITS

MISSION

2-279. Army units are organized to support their individual missions. To be successful, units must obtain and maintain the maximum level of combat effectiveness. This is accomplished by using Organizational Maintenance sections that balance people and equipment, and maintenance units that provide more complex DS and GS-level maintenance.

COMBAT BATTALION ORGANIZATION

2-280. The unit TOE establishes maintenance requirements and resources. Guidance on how to employ those resources is contained in this manual and in manuals pertaining to particular units. In combat units, organizational maintenance personnel are located at the battalion level.

2-281. In armored and mechanized infantry units, CSS assets are assigned to the Headquarters and Headquarters Company. CSS is moved forward to the companies as required. This allows Company Commanders to concentrate on the combat mission and on the performance of operator/crew maintenance tasks.

2-282. A team effort is needed for responsive maintenance support. Keeping equipment operational and repairing it quickly takes the

combined effort of many individuals. To function effectively, team members must know each other's responsibilities and capabilities, as well as the limitations. Although the following discussion is oriented toward Armored and Mechanized Infantry Battalions, most provisions also apply to other units.

Armored/Mechanized Infantry Battalion

2-283. Combat battalions are organized to accomplish their combat mission and to provide unit-level maintenance on assigned equipment. Figure 2-72 shows the organization of an Armored/Mechanized Infantry battalion.

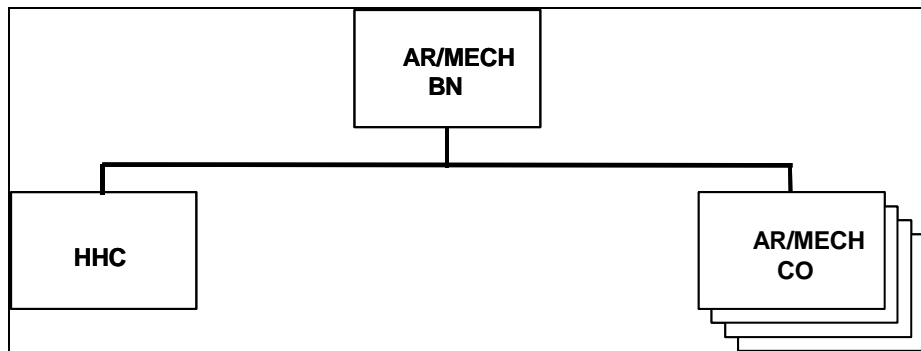


Figure 2-72. Armored/Mechanized Infantry Battalion

Headquarters and Headquarters Company

2-284. The HHC provides the battalion's C2, CS, and CSS elements. Figure 2-73 shows the organization of a Headquarters and Headquarters Company, Combat Battalion.

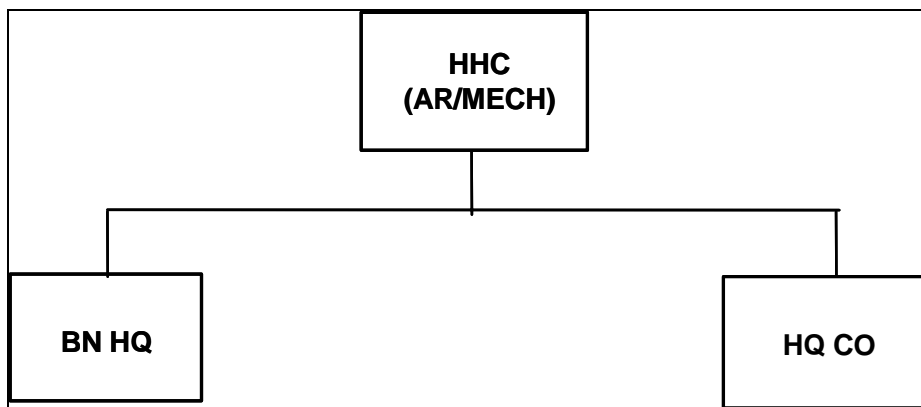


Figure 2-73. Headquarters and Headquarters Company, Combat Battalion

BATTALION HEADQUARTERS

2-285. The HQ provides the officers and soldiers needed to support battalion operations. Key personnel of the command group include the Battalion Commander, the Executive Officer (XO), and the Command Sergeant Major (CSM). The battalion staff consists of the S1, S2, S3, S4, and all special staff officers.

Company Headquarters

2-286. The Company Headquarters provides C2, communications, administration, and logistics support for the company. The Company HQ consists of a Company Commander, XO, 1SG, and the Company Supply Section. The Company Commander is responsible for the battalion/TF brigade trains. The commander establishes the HHC command post, coordinates support with the FSB, and serves as the Battalion TF Rear Operations Officer. Figure 2-74 shows the organization of a Company Headquarters.

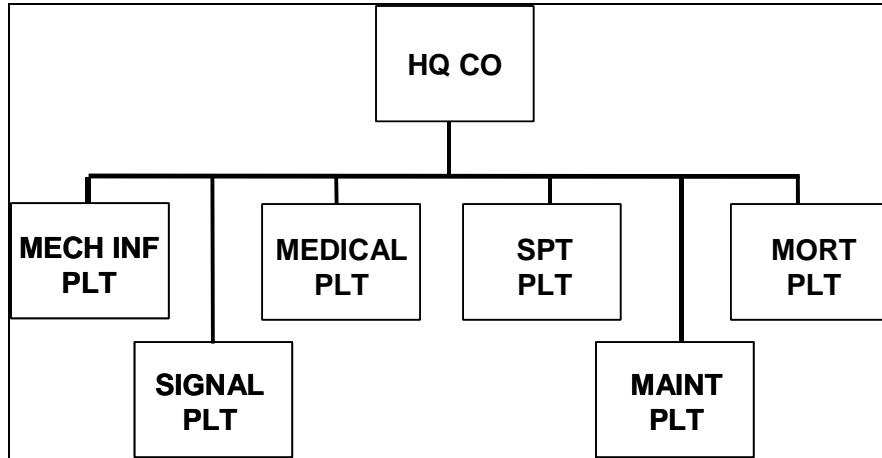


Figure 2-74. Company Headquarters

2-287. In a Tank Company, both the commander and the XO are mounted in tanks, and the XO is required forward in the battle area. This makes the 1SG the key person for maintenance support and coordination.

2-288. In a Mechanized Infantry Company, the XO is in a Bradley and the 1SG has an M113 vehicle; thus, the support coordination task may be shared to a larger degree. A unit armorer provides unit maintenance for assigned small arms. Equipment users provide unit maintenance for nuclear, biological, chemical (NBC) defense equipment.

Maintenance Platoon

2-289. The Maintenance Platoon consists of the Headquarters; the Maintenance Administrative, Recovery Support, and Maintenance Service sections; and the CMTs. The platoon operates from the UMCP, field trains, and company/team combat trains. It is responsible for maintaining the battalion's PLL and TAMMS automated maintenance records. Figure 2-75 shows the typical organization of an Armored/Mechanized Infantry Battalion Maintenance Platoon of the HHC.

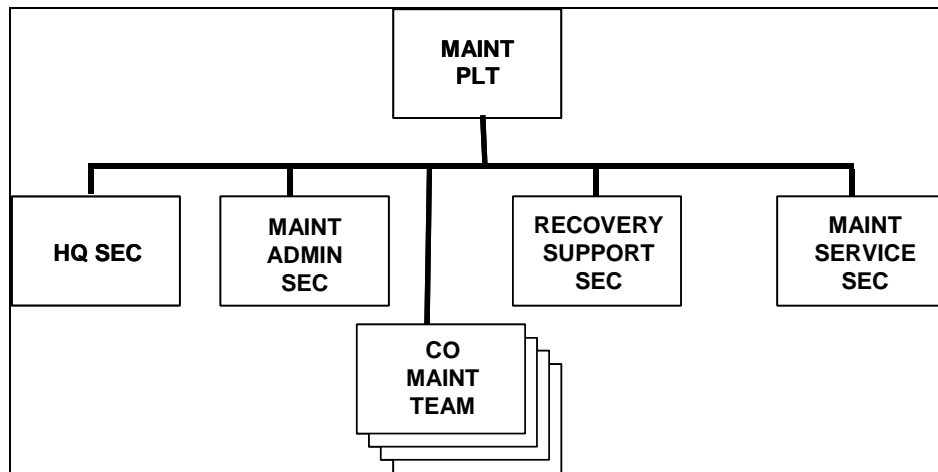


Figure 2-75. Maintenance Platoon, Armored/Mechanized Infantry Battalion, HHC

2-290. The platoon provides Company Maintenance Teams to support the battalion/TF maintenance mission. In addition, the platoon interfaces with the FSB and the DS MST. It provides organizational maintenance for battalion/TF equipment. The Maintenance Service Section of the Maintenance Platoon augments the CMTs as required. CMTs are controlled by the Battalion Maintenance Officer (BMO) when they are employed outside the company/team combat trains area.

Headquarters Section

2-291. The Headquarters contains the C2 elements. It consists of a Platoon Leader (who is also the BMO), a Battalion Maintenance Technician (BMT), and a Battalion Maintenance Sergeant (BMS). This element develops maintenance support plans consistent with the battalion's combat mission. It tailors the platoon to meet mission requirements and also directs platoon operations. It focuses the maintenance effort forward to sustain maximum combat power. The Headquarters Section is responsible for providing maintenance priorities for the DS MST.

Maintenance Administrative Section

2-292. This section maintains repair parts and automated TAMMS maintenance records using the ULLS-G. It maintains the collocated PLL for each combat company and is responsible for requisitioning, storing, and issuing repair parts for CMTs and Maintenance Service Teams. On the battlefield, the Maintenance Administrative Section will employ PLLs based on maintenance requirements, the tactical situation, and risk assessment.

2-293. The majority of combat weapons systems are located forward of the combat trains. PLL assets required to support forward weapons systems are located in the UMCP, with some specific parts located forward with CMTs. Since this is a high-risk area, a portion of the unit PLL remains in the field trains, with PLL repair parts pushed forward as required. Two or three TF Company PLLs may be pushed forward with one or two held for reserve in the rear. PLL assets must be placed on the

battlefield based on the tactical situation. Due to frequent movement, it is essential that units operate with a combat PLL.

Maintenance Service Section

2-294. The Maintenance Service Section provides combat flexibility in placing maintenance assets on the battlefield at the place and time when and where needed most. It supports mission priorities established by the battalion leadership. This section is organized into teams with transportation capabilities for mobility on the battlefield.

2-295. During combat, this section's first priority is to reinforce the CMTs in their mission of returning equipment requiring minimum repair (the TF Commander establishes timelines for repair at the point of breakdown) to the battle. Teams not forward are located in the UMCP concentrating their efforts toward repairing weapon systems for the current battle or the start of the next battle.

2-296. The FSB MST assists the Maintenance Service Section in its maintenance efforts in the UMCP. Systems requiring additional maintenance are recovered to and repaired in the UMCP. (The TF Commander establishes timelines for repair at the UMCP.) These repairs are critical to the combat mission, and are performed by the CMTs and the FSB MST. The Maintenance Service Section provides a CMT in the field trains. It supports vehicles of the Headquarters Company Support Platoon and Rear elements.

Recovery Support Section

2-297. The Recovery Support Section provides the battalion with the flexibility of placing recovery assets on the battlefield where they can best support battalion mission requirements. This section places its combat vehicle recovery assets forward. The BMO shifts assets based on the maintenance and recovery workload.

2-298. Recovery vehicles are used to reinforce the CMTs' recovery capability. They recover equipment from the battlefield (point of breakdown), recover equipment from the company area to the UMCP or designated heavy equipment transport points, and assist in moving the UMCP.

Company Maintenance Team

2-299. CMTs are organized and equipped to provide mobile organizational maintenance support to the combat companies. CMTs perform BDAR, diagnose maintenance problems, and conduct organizational repairs and recovery. When required, they deploy with the PLL associated with their company. They establish a close working relationship with the supported company.

2-300. The BMO provides the company with a CMT based on the battalion/TF maintenance priorities. The team's focus is on completing those repair jobs that quickly increase the combat power of a unit. It normally deploys with RX components and high-usage repair parts. In accordance with established guidance, it reports equipment requiring more extensive repairs to the BMT. Maintenance personnel of the Maintenance Service Section and the FSB MST recover this equipment for repair to the UMCP.

2-301. The CMT recovery vehicle remains in the forward area where it is used to return vehicles to the battle. The recovery vehicle crew performs BDAR and pulls vehicles out of the line of fire for further repair. Vehicles requiring repair in the UMCP are recovered to a collection point in the forward area. Recovery teams from the Recovery Support Section move the weapons systems to the UMCP.

MODULARITY

2-302. Modularity builds flexibility into the force design process. To enhance their ability to tailor CSS forces, force developers pursue opportunities to develop modular CSS elements tailored to support the assigned mission.

DEFINITION AND FUNCTIONS

2-303. Modularity is a force design methodology. It establishes a means of providing force elements that are interchangeable, expandable, and tailorable to meet the changing needs of the Army. Modularity also provides the tailored functions and capabilities needed by Force Projection forces across the range of military operations. Modularity provides the methodology for the Army to achieve a force structure that optimizes rapid assembly of mission-oriented contingency forces that are effective and efficient. Modularity provides a means of rapidly identifying, mobilizing, and deploying doctrinally sound, sustainable, and fully mission-capable elements and organizations capable of operating in a joint and/or combined environment.

2-304. To achieve modularity, the Army needs to examine the processes of determining current deployment requirements. For example, functions not likely to be needed in smaller contingencies or in early phases of a major contingency can be planned for later deployment. Requirements generated by multiple echelons may be eliminated (such as eliminate echelon-induced duplicate or redundant requirements); combine requirements for the same unit developed at multiple echelons.

Tenets

2-305. Modularity allows units to be:

- Responsive.
- Economical.
- Effective.
- Flexible.
- Selective.
- Identifiable.

Responsive

2-306. Modularity provides functions and capabilities to meet a commander's requirements with an initial element. It allows ease of identification and deployment of specific functions on short notice. Modularity permits appropriate force tailoring of necessary functions in a force projection environment. It provides required functions and capabilities with less strategic lift and with reduced sustainment requirements.

Economical

2-307. Modularity allows the Army to meet functional CSS requirements earlier but with a smaller footprint. It enables the Army to achieve economy of scale by deploying only those functions and capabilities needed for the mission. Needed functions and capabilities will be provided at the appropriate time and place. This is especially crucial when considering limited airlift capabilities.

Flexible

2-308. Modularity enables support that is expandable, contractible and flexible. It enables interconnecting support with diversified functions and capabilities operating in the same area.

Selective

2-309. Modularity applies to selected organizations that meet the mission profile criteria (for example, those required early in deployment). It should be noted that some organizations are already modular in nature, and some organizations may not need modularity.

Identifiable

2-310. TOE documentation must clearly identify sub-elements (such as platoon, section, squad, or team) designed for modularity. This allows rapid identification of minimum Army force package requirements for deployment and effective mission accomplishment. Further identification of units at the modified tables of equipment (MTOE) level can be accomplished by the unit identification code (UIC) or a derivative UIC.

MAJOR APPROACHES

2-311. There are many approaches to modularity. However, the modularity concept focuses on the following two major approaches.

- **Functionally Emulative Increments (FEIs).** FEIs consist of increments of an organization constructed to emulate functions and capabilities of the whole organization.
- **Modular Designed Units.** Modular organizations consist of modules or elements that replicate, augment, or provide discrete functional capabilities, which allow the unit to operate as an entity in one location or as self-sustaining parts of that entity at a different location.

The object is to regroup the organization for maximum effectiveness and efficiency as soon as possible, but to allow its separate parts to function effectively where and when needed.

FUNCTIONALLY EMULATIVE INCREMENTS

2-312. Functionally emulative increments are organizations constructed with increments, so that each increment reflects the complete essence (functions) of the organization. The increments are interchangeable, expandable (to all or part of the whole), and tailorable to meet changes in METT-TC considerations.

2-313. FEIs apply primarily to CSS organizations at EADs and EACs. The projection of forces from the CONUS or forward presence locations for contingency operations will challenge sustainment operations. FEIs enable CSS Commanders to provide more precise functions and capabilities needed in force projection across the entire range of operations.

2-314. The following are more characteristics of FEIs:

- Reflect the organization as a whole.
- Apply normally to specific organizations expected to deploy early before follow-on deployment of the entire organization (or when required by METT-TC for the duration).
- Deploy incrementally without loss of effectiveness. Some scenarios may require minimum capability over a long period (Macedonia); others may require building to full capability to support a theater as it matures (Desert Shield).
- Operate independently. Each increment emulates the functions of its parent organization (with less capability).
- Expand, contract, and connect with other FEIs.
- Merge with other FEIs.

2-315. Life support must be planned for FEIs if they deploy to an austere area and are separated from the supported unit. The whole may never require deployment. Follow-on deployment (expansion) will be METT-TC driven.

MODULAR-DESIGNED ELEMENTS

2-316. Modular-designed elements are organizations constructed with discrete elements of specific capabilities. The elements are specific parts/elements of the organization, which, when combined, create the functional capability of the unit. Each subordinate element does not mirror the functional capability of the entire unit.

2-317. Fundamentals of modular design include the following:

- Apply primarily to selected combat and combat support organizations. They may also apply to selected CSS organizations (such as DS Maintenance Support Teams, TOE 43509) and may be constructed as modular designed elements or as FEIs.
- Facilitate effective packaging of Army forces for contingency operations by permitting a better mix of both mission and support organizations based on theater and contingency mission requirements.

2-318. Support operations require logisticians to carefully think, plan, act, and evaluate the support provided to an operation. Modular-designed CSS capabilities provide mission-essential support to combat, combat support, and CSS organizations.

2-319. CSS modular-designed elements:

- Consist of modules and elements of specific capability.
- Permit TOE sub-elements to be detached from a parent unit and assigned to a contingency force for an indefinite period.
- Are achieved by splitting an organization into separate elements. For example, a parent module or element may remain in a secure location (permanently or until it, too, displaces forward) while a Force Projection module or element deploys independently of the parent.

2-320. Modular designed elements may be created as teams to provide augmentation to units requiring special capabilities for specific missions. Modular-designed elements will permit projection of specific modules and elements of capability that meet the minimum needs of a commander in contingency operations, with additional modules and elements provided as events require.

OTHER APPROACHES

2-321. Other redesigns fall into the following categories:

- **Nested Modules.** These modules can be formed and combined in multiples of the basic module (such as squad or section) depending on the requirement.
- **Functional Modules.** In this approach, each module performs a separate function.
- **Forward Modules.** In this approach, selected functions are formed into a forward module. The remainder of the unit must deploy to sustain continuous operations.

DEPLOYMENT CONSIDERATIONS

Mission, Enemy, Terrain, Troops, Time, and Civil Considerations

2-322. The commander's analysis of METT-TC determines required functions and capabilities. This will drive which functions and capabilities are deployed.

Strategic Lift

2-323. Modularity optimizes the use of strategic lift. Modularity enables smaller, autonomous, but fully capable, elements that can deploy earlier to establish an infrastructure.

Life Support and Equipment Maintenance

2-324. Life support and equipment maintenance may not be organic to deploying increments and elements. Therefore, planners should consider these requirements when planning deployment.

Command and Control

2-325. C2 relationships of organizations must be addressed for deploying increments and elements. C2 must be established between organizations within the contingency area, as well as with the parent organization, which may be separated by significant distances. Both vertical and horizontal C2 must be established.

Increments and Elements

2-326. Increments and elements that deploy early may be used to support staging for follow-on forces. As the force size increases standard TOE units or additional increments and elements will be deployed to meet force structure needs.

Structure

2-327. Deployment of a modular structure must not render the parent unit incapable of providing proportional mission capability for other operations. Required equipment will be provided for deploying increments and elements, as well as for the parent command.

Automation and Communications

2-328. Assured communications is critical to meeting deployment needs. Automation support must continue without interruption for both non-deploying and deploying increments and elements.

Mobility

2-329. Mobility must be maintained for increments and elements during Force Projection operations. Modularity requires increased levels of mobility to move from one location to another as the tasks and missions change.

PERSONNEL RESPONSIBILITIES

2-330. Battalion leaders responsibilities are key to accomplishing the tactical maintenance support mission. The following discusses the logistic responsibilities of Battalion HQ staff personnel and company-level personnel.

BATTALION HEADQUARTERS STAFF

2-331. The Headquarters supports battalion operations. Key command group personnel are the Commander, XO, SPO, and the CSM. The battalion staff consists of the S1, S2, S3, S4, and all special staff officers. Primary maintenance responsibilities are summarized below.

BATTALION COMMANDER

2-332. The Battalion Commander establishes and enforces maintenance standards. He prioritizes and allocates resources, provides training guidance, and is responsible for executing the maintenance mission, quality assurance/quality control (QA)/(QC), and materiel readiness.

BATTALION EXECUTIVE OFFICER

2-333. The Battalion/TF XO is the principal staff coordinator of logistical support (internal to the battalion). He coordinates all staff actions relating to maintenance and provides overall staff supervision of battalion maintenance. He also provides staff supervision over the S1, personnel services, the S4, all classes of supply, and transportation.

SUPPORT OPERATIONS OFFICER

2-334. The SPO provides technical supervision of CSS functions. The Maintenance Officer in the Support Operations Office plans, coordinates, and provides technical supervision of DS-level functions performed by

maintenance companies. This officer interfaces with Brigade and Battalion S4s, and with BMOs to establish maintenance priorities and resolve maintenance support issues.

BATTALION COMMAND SERGEANT MAJOR

2-335. The CSM is the senior NCO in the battalion/TF. He advises the Battalion/TF Commander on matters relating to the training of maintenance personnel. The CSM assists the CSS staff with logistics operations and is the CSS troubleshooter. He advises the commander on enlisted maintenance personnel assignments.

BATTALION S1 (ADJUTANT)

2-336. The Battalion S1 is responsible for the battalion/TF human resource support functions. As the principle human resource staff officer for the battalion, the S1 provides manning, personnel support, and personnel services in accordance with the commander's priorities. The S1 assists the S4 with Administrative/Logistics Operations Center (ALOC) operations. During the early phases of deployment the primary focus of the S1 is on personnel, strength accounting, casualty operations, and replacement operations.

BATTALION S2 (INTELLIGENCE)

2-337. The Intelligence Officer informs the commander regarding the enemy situation. CSS planners use intelligence data to plan future maintenance operations. The intelligence effort provides maintenance personnel with information concerning weather, terrain, and enemy force capabilities.

BATTALION S3 (OPERATIONS)

2-338. The S3 has staff responsibilities for the organization, training, and operations of the battalion and attached units. This officer provides current and future guidance on battalion operations and is responsible for the operation of the Tactical Operations Center (TOC).

BATTALION S4 (LOGISTICS)

2-339. The S4 has primary staff responsibility for supply, transportation, and field services. This officer supervises all logistical elements in the battalion/TF and is responsible for the ALOC.

BATTALION MAINTENANCE OFFICER

2-340. The BMO is directly responsible for QA/QC, UMCP operations and controlled maintenance support within the Maintenance Platoon. The BMO directs the maintenance effort to repair jobs within established maintenance repair timelines. He shifts maintenance assets to meet battalion/TF requirements in accordance with the commander's priorities. The BMO maintains close contact with the Battalion XO and S3 to remain current on the tactical situation.

2-341. The BMO coordinates maintenance support with the Battalion S4 and the FSB's Support Operations Section. This officer determines the location of the UMCP based on METT-TC elements. The BMO focuses on placing maintenance support forward to sustain maximum combat power. He coordinates with the FSB MST and establishes maintenance

priorities. The BMT and BMS assist the BMO in coordinating unit maintenance operations.

BATTALION MAINTENANCE TECHNICIAN

2-342. Located in the UMCP, the BMT assists the BMO in all maintenance repair and quality control operations. The BMT's primary function is to ensure the maximum number of combat weapons systems is returned to the battle in the forward area. This technician controls BDAR, recovery, and maintenance operations in the forward area of the battlefield by maintaining continuous communications with the Company Maintenance Team Chiefs (CMTCs).

2-343. The BMT organizes and moves teams from the Maintenance Platoon forward to reinforce the CMTs. These maintenance teams provide maintenance resources (skills, test equipment, parts, and personnel) in addition to that provided by CMTs. The BMT determines which damaged weapons systems will be recovered to the UMCP, and works with the FSB MST Team Chief to determine maintenance priorities. He alerts the BMO when the FSB MST requires reinforcement. The BMO is the commander's executive agent for QA/QC.

BATTALION MAINTENANCE SERGEANT

2-344. The BMS is the senior maintenance NCO in the battalion/TF. The BMS assists and coordinates with the BMO and BMT to control and prioritize maintenance operations, quality control in the field, and combat trains. The BMS coordinates the maintenance workload with the FSB MST and directs the flow of repair parts from the field trains. The Battalion Maintenance Sergeant is normally located in the field trains.

COMPANY PERSONNEL

2-345. The Company HQ consists of the Company Commander, XO, and First Sergeant; a Maintenance Section; and a Company Supply Section. It provides C2, communications, administrative, and logistics support for the company. The XO, MCO (for maintenance units), First Sergeant, and Supply Sergeant are the four key leaders. They have primary responsibility for CSS.

COMPANY COMMANDER

2-346. The HHC Commander is responsible for the battalion/TF field trains. The commander establishes the HHC command post, coordinates support with the FSB, and serves as the Battalion TF Rear Operations Officer.

2-347. The Maintenance Company Commander plans, directs, and supervises the operations and employment of the company. The commander is responsible for providing maintenance support to the brigade. He provides guidance to the MCO concerning maintenance support and repair parts availability, and technical supervision/assistance to supported unit commanders.

COMPANY EXECUTIVE OFFICER

2-348. The Company XO is the logistical planner and coordinator. The XO works with the 1SG to ensure CSS activities are set up and supervised. He determines the general location for the company resupply

point and receives constant updates concerning the status of vehicle maintenance and levels of supply. His responsibilities are similar to those of a chief of staff. The XO serves as the second in command. Based on direction from the unit commander, some other key responsibilities include the following:

- Establishes the primary staff interface between the battalion and company.
- Ensures that all external company-generated reports are completed on time. Reviewed by the commander, and submitted with accurate information.

As the company unit status report (USR) officer, the XO develops and provides unit readiness reporting data to the battalion staff. Based on guidance from the unit commander, the XO coordinates and develops maintenance plans to support company tactical operations. As the company supply officer, he collaborates all property book hand receipts to reinforce accountability. He also ensures cyclical property inventory schedules are met. The XO is responsible for coordinating maintenance support related activities with the maintenance platoon leader(s) or MCO shop officer in the following key areas:

- Coordinates the conduct of unit weekly maintenance readiness meetings with the unit commander.
- Monitoring implementation of and recommends maintenance data requirements and ULLS-G reporting formats.
- Analyzes data and reports (automated and manual) to identify trends, problem areas, and other information that generate requirements for action by the maintenance company and battalion leadership.

As the company motor officer, the XO monitors and compiles special reports on the status of organizational maintenance operations and evaluates procedures and use of equipment and personnel. As the company environmental control officer, he monitors and ensures company compliance with all environmental control regulations/policies. As the unit movement officer, he establishes and manages the unit movement and hazardous materials plan. As the company training officer, he develops and manages soldier and MOS specific company training programs. As the company facilities management officer, he maintains the status of all MWOs for equipment and recommends priorities for the completion of MWOs. As the company information management officer (IMO), he implements ADP collection procedures and supervises operations of maintenance data reporting systems. The XO also assists in the development of policies and plans (maintains the company policy book) and as the unit safety officer, ensures that all safety and risk assessment analysis policies and procedures are adhered to during daily unit operations.

COMPANY FIRST SERGEANT

2-349. The 1SG is the primary logistics operator, who executes the logistics plan. The 1SG directly controls the combat trains, their movements, and employment. He receives, consolidates, and sends

reports received from the Platoon Sergeants to the Battalion ALOC. The 1SG is responsible for all maintenance operations for the company and directs the efforts of the CMT.

COMPANY SUPPLY SERGEANT

2-350. The Supply Sergeant is the company's representative in the battalion field trains. The Supply Sergeant requisitions Class II, IV, VII, and limited Class VIII items. He coordinates with the support platoon for Classes I, III, and V, and assists the 1SG in establishing company resupply points and logistical package (LOGPAC) operations.

MAINTENANCE SERVICE SECTION NON-COMMISSIONED OFFICER IN CHARGE

2-351. The Maintenance Service Section noncommissioned officer in charge (NCOIC) organizes the section into teams based on guidance provided by the BMO and BMT. Teams are sent forward to reinforce the critical areas when requested by the BMT. Each team has an NCOIC and works under the direct control of the CMTC requesting reinforcing support. This NCOIC ensures deploying teams have appropriate skills, tools, test equipment, and parts to support the mission. He ensures all deploying teams have a link-up plan and location. Most of the NCOIC's effort is directed toward repairing equipment in the UMCP.

RECOVERY SUPPORT SECTION NON-COMMISSIONED OFFICER IN CHARGE

2-352. The NCOIC of the Recovery Support Section coordinates the workload with the BMT to ensure priority of recovery in accordance with the battalion's mission requirements. The NCOIC ensures crews are trained in both recovery operations and BDAR. He maintains communications with the crews at all times and is prepared to react to emergency surge recovery requirements.

RECOVERY EQUIPMENT OPERATORS

2-353. Recovery equipment operators are responsible for BDAR and for recovering disabled, damaged, mired, and abandoned vehicles. They perform unit-level maintenance on recovery assets. Recovery operators provide lift for maintenance operations, such as removal and replacement of power packs. Their duties include solving towing and rigging problems, and making on-site repairs and adjustments.

COMPANY MAINTENANCE TEAM CHIEF

2-354. The CMTC organizes and directs CMT mechanics. The team chief identifies damaged combat weapons systems for recovery and is responsible for recovery operations to a collection point. The CMTC supervises BDAR and cannibalization efforts, and controls all repair parts. The team chief works closely with the 1SG and responds to all maintenance requirements. When the team's workload is exceeded, the CMT Chief requests reinforcement from the BMT. The chief, along with the BMT, is responsible for all maintenance operations forward of the UMCP.

COMPANY MAINTENANCE TEAM MECHANICS

2-355. CMT mechanics are controlled by the CMTC. They perform organizational maintenance and assist in recovery operations.

MAINTENANCE CONTROL OFFICER (MAINTENANCE UNITS)

2-356. The MCO (Shop Officer) coordinates directly with customer units and higher HQ to accomplish the external customer oriented maintenance mission. This officer is the principal assistant to the Company Commander for support of maintenance operations to supported units. This officer coordinates directly with supported unit BMOs. The MCO controls MST operations and maintenance operations and provides technical assistance to supported units in the brigade area. The MCO supports the weekly support maintenance meetings normally conducted at Support Operations or the Brigade S4. As supervisor of the DS shops, he performs the following:

- Monitors implementation of the company QA/QC program.
- Monitors maintenance operations for production control (workload analysis and so on).
- Recommends maintenance data requirements and reporting formats.
- Analyzes data and reports (automated and manual) to identify trends, problems areas, and other information that generate requirements for action by the maintenance company and battalion leadership.

The MCO also coordinates corrective actions for identified problems with platoon/shop leaders and coordinates with platoon/shop leaders to manage the optimization of company shop and bench stock supply levels.

SYSTEMS SUPPORT TEAM (MAINTENANCE UNITS)

2-357. SSTs are task-organized into MSTs. MSTs move forward of the UMCP to perform on-site repairs. There is normally one MST per supported battalion/TF. The Battalion/TF BMO establishes priorities for the MSTs while they are in the UMCP.

MAINTENANCE SUPPORT TEAMS (MAINTENANCE UNITS)

2-358. MSTs normally work in the UMCP under the control of the MCO. They are emplaced by, take instruction from, and follow the priorities given by the supported unit BMO. The MST, more familiar as a "contact team" in the H-series TOE, is tailored to fit the needs of the TF. The base structure for an MST comes from SSTs assigned to the maintenance company in the FSB.

Chapter 3

Maintenance Support Operations

This chapter describes maintenance tactics and techniques associated with supporting full spectrum offensive, defensive, stability, and support operations. It also describes maintenance tactics and techniques supporting operations in limited visibility and NBC environments and the reconstitution function and BDAR.

MAINTENANCE FUNDAMENTALS OF FULL SPECTRUM OPERATIONS

3-1. Maintenance is one of the 11 CSS functions that support soldiers and their systems in the field. It sustains materiel in an operational status, restores it to serviceable condition, or upgrades its functional utility through modification or product improvement. The Army Maintenance System designates the scope of tasks performed by maintenance activities. It provides support planning requirements for maintenance of materiel systems when fielded and after fielding. It also establishes requirements for managing activities that physically perform maintenance.

3-2. The dramatic end to the Cold War has caused significant changes in our nation's domestic and foreign policies and priorities. During the Cold War, our military strength was focused on the defense of Europe. Today, instability and uncertainty originate from the spectrum of small and unorganized threats from rogue nations. These threats can have a profound impact on the stability of U.S. national security. To keep pace with the ever-changing threat, the Army has moved from a Forward Deployed Force to a Force Projection strategy. Recent humanitarian assistance operations in Somalia and the Caribbean, and peace operations in Haiti and Bosnia, all point to an ever-increasing number of operations other than war.

3-3. The centerpiece to the operational full spectrum framework is the decisive operations of **Offense, Defense, Stability, and Support Operations**. Planning for maintenance operations during these decisive operations requires thorough mission analysis, careful identification of the force supported, and an understanding of the commander's intent. Also, the nature and conduct of maintenance-related sustainment activities will always depend on the operational environment constructs of either contiguous or non-contiguous operations. FM 4-0 provides detail about CSS support of full spectrum operations.

MAINTENANCE OPERATIONS – OFFENSE

3-4. Offensive operations are characterized by fast movement and rapid changes in the situation. Command, control, and communications for the CSS effort are difficult. Maintenance elements normally operate as part of a larger CSS element, which reduces some of this difficulty.

3-5. The DISCOM provides information to the Division HQ on the locations of all support elements operating in the division area. Under conditions of rapid movement and displacement, it is not always possible to provide specific information on the proposed locations of units in sufficient time for inclusion in division orders.

3-6. In a fast-moving situation, the DISCOM might be able to keep the Division Operations Center informed only of its command post (CP) location. This information is contained in administrative orders, on operations overlays, or in fragmentary orders. With this minimal information, units must locate the DISCOM CP to obtain precise locations of subordinate units. The DISCOM continues to provide follow-up reports or situation overlays to support the division's Daily Operations report.

3-7. In extremely fast-moving situations, DISCOM units operating in forward areas may move before advising the DISCOM HQ. These units coordinate their movements and locations with the major subordinate command HQ (normally brigade). Because of distances involved and communications limitations, it may not be possible for these units to effect timely notification to the DISCOM in the DSA. However, since major subordinate HQ report all new locations to the Division Operations Center, the DISCOM HQ will learn of new locations of brigade trains areas from the Division TOC. Each DISCOM unit is responsible for notifying its parent headquarters of the opening and closing of its CP, and for providing advance information of planned moves. Advance information is essential for providing support forward. Table 3-1 lists support procedures units should complete before initiating offensive ground operations.

Table 3-1. Support Procedures

Step	Action
1	Inspect and perform required maintenance on unit equipment.
2	Fill equipment shortages and repair parts stockage to authorized or directed levels, focusing on critical items.
3	Prepare and disseminate operations and administrative orders.
4	Establish support priorities, including priorities for issue of operational readiness operational readiness float stocks and critical repair parts.
5	Establish procedures, priorities, and conditions for resupply.

PLANNING FOR MAINTENANCE OPERATIONS – OFFENSE

3-8. Planners ensure maintenance operations support momentum and massing at critical points. Maintenance personnel maximize momentum by fixing inoperable equipment at the point of malfunction or damage. They enhance momentum by keeping the maximum number of weapon systems operational. Therefore, maintenance and recovery personnel perform their mission as far forward on the battlefield as possible.

3-9. Prior to offensive operations, maintenance planners should consider the following:

- Available support units.
- Stockage levels for repair parts.
- Forward placement of MSTs and the UMCP.
- Channels and procedures for recovery, collection, evacuation, and disposition of captured or abandoned materiel.

3-10. As the tempo of the situation and the distance involved increase, support units may have difficulty keeping pace with requirements. Maintenance support is positioned as far forward as possible, normally placing MSTs with the BMO in the UMCP. In operations where the overall situation requires bypassing pockets of the enemy or guerrilla elements, the effects of bypassing on support units and other logistical activities must be considered. In some situations combat elements may be required to provide security.

3-11. CSS commanders and staff officers must plan for redirection of logistical support to satisfy changing tactical requirements. The following take time and require close coordination and planning:

- Redirection of effort and supplies.
- Redeployment of units.
- Realignment of the support structure.
- Changes in support procedures and emphasis.
- Continuous movement limits the time available to make repairs.

3-12. If the offensive is successful and gains momentum, a culminating point may be reached where logistical support limitations make the entire force vulnerable. Lacking the ability to maneuver and displace as rapidly as combat forces, CSS forces may be outdistanced by combat units. Resupply of repair parts by unit distribution may break down or become ineffective due to lack of transportation, difficulty in locating units, and increased OST.

3-13. The TF commander must be kept informed of the tactical situation's effect on the support structure's capability to provide the support required. Expedient methods for providing maintenance support under these circumstances include:

- Institution of BDAR.
- Authorization of controlled exchange.
- Procedures and controls allowing MSTs to draw items anticipated to be needed from the main warehouse, ASL, or RX high-usage items.
- Increased emphasis on evacuation of unserviceable equipment, with repair operations in forward areas limited to component replacement, adjustment, and servicing.
- Round-the-clock operations by supporting units to the limits of physical endurance.
- Use of air transportation to move maintenance personnel and repair parts.
- Attachment of MSTs to tactical units.

RESOURCING MAINTENANCE OPERATION -- OFFENSE

3-14. Organizational maintenance resources are in increased demand. Unit mechanics accompany or follow the most forward attacking elements. Plans include recovery of weapon systems that mechanics cannot fix within established maintenance repair timelines. Maintainers use BDAR to rapidly return disabled essential equipment to the commander.

3-15. DS maintenance resources are in increased demand. DS maintenance elements in the form of MSTs may also operate with the spearhead of the attack. MSTs and other elements need the following:

- Right people (skills and numbers).
- Equipment (transportation, tools, TMDE, and communications).
- Supplies (components, assemblies, and repair parts).

3-16. Repair parts stockage (in terms of days of supply (DOS)) is kept consistent with mobility requirements. Based on the type of operation, geographical area, and terrain/weather conditions, certain items are increased. For example, extensive operations over rough terrain dictate a buildup in stockage of vehicle springs, shock absorbers, and tires. Forward-deployed MSTs increase stockage of small high-usage RX items such as fire control instruments and automotive subassemblies.

3-17. Maintenance units must maximize repair efforts forward. Unserviceable equipment requiring more than limited component replacement, adjustment, and servicing will be recovered to a centrally located MCP. The centralized MCP maximizes BDAR cannibalization and controlled exchange operations. Unserviceable equipment requiring extended repairs is consolidated and turned over to follow-on maintenance elements. Figure 3-1 shows various maintenance activities and the flow of maintenance elements in the forward area in support of offensive operations.

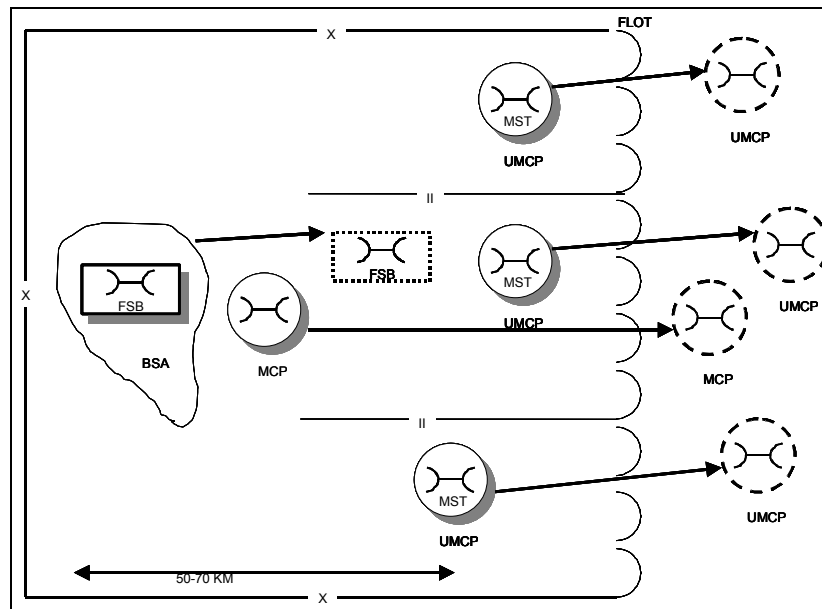


Figure 3-1. Flow of Maintenance Elements, Forward Area, Offensive Operations

CONDUCTING ORGANIZATIONAL MAINTENANCE - OFFENSIVE OPERATIONS

3-18. The four general types of offensive operations are:

- Movement to Contact.
- Attack.
- Exploitation.
- Pursuit.

These operations are roughly sequential and may develop into a more fluid operation or into a defensive operation. This potential for change must be considered in planning maintenance support of offensive operations. Offensive operations are marked by forward movement of combat elements. As the operation moves forward, support elements join in the movement.

Movement to Contact

3-19. During the preparation phase of movement to contact, there is a major effort in logistics. Maintenance personnel place maximum maintenance effort on preparing equipment for combat. The Maintenance Platoon in the combat trains area moves closely behind the TF main body easements during this phase. The platoon's position in the march column is selected to support the combat units while being protected from enemy fire.

Attack

3-20. The attack is quick and violent. The BMO monitors the tactical situation to support the attack. The BMO informs the S3 and S4 of specific UMCP locations. On-site maintenance support and recovery operations are accomplished with high risk.

3-21. During the attack, the majority of the Maintenance Platoon is located in the TF combat trains area. The CMTs are forward with the Maneuver Companies. Maintenance activities during this phase concentrate on recovery and BDAR. After the attack, the BMO coordinates maintenance requirements with the Battalion XO. They discuss the current situation, priority of effort, and plans for the next operation.

Exploitation and Pursuit

3-22. The TF covers a large area during the Exploitation and Pursuit phase. Combat units strike at objectives deep in the enemy rear while keeping pressure on retreating enemy forces. Command, control, and communications are extremely difficult. CMTs perform on-site repair. Equipment that cannot be repaired on-site is recovered to the UMCP or BSA (whichever location can best complete the required maintenance). Maintenance Platoon personnel perform quick repairs in the UMCP. Equipment in the UMCP may be repaired on the spot or evacuated to the field trains or BSA. The UMCP and the field trains move forward to support exploitation and pursuit operations.

CONDUCTING DIRECT SUPPORT LEVEL MAINTENANCE – OFFENSIVE OPERATIONS

3-23. The Maintenance Unit Commander prepares for support of offensive operations in much the same way as the Maneuver Unit Commander. The Maintenance Unit Commander appraises the combat situation, determines the needed support, and then organizes resources to provide the maintenance support. DS maintenance units, as part of the division, must maneuver and deploy to provide maintenance support. Maintenance support operations are influenced by the division's deployment and its organization for combat, the tempo and type of combat operation, and the availability of suitable terrain.

3-24. In some combat situations, maintenance units are deployed well forward; in other situations, they are deployed to the rear. In some cases, maintenance units accompany or closely follow supported units; in others, they remain behind until ordered to move forward. In still other situations, the bulk of the maintenance units may deploy prior to the supported units.

3-25. The type and tempo of combat also affects the nature of the DISCOM maintenance unit's workload. During fast-moving offensive operations, the maintenance shop workload may be light. When the advance slows or the pursuit phase ends, maintenance units must increase their activities. During the offensive phase, priority will be placed on recovery, BDAR, and roadside repair, or on collecting, classifying, and reporting abandoned equipment.

3-26. In extremely fast-moving situations, DISCOM units operating in forward areas may move before advising the DISCOM HQ. These units coordinate their movements and locations with the major subordinate command HQ (normally brigade). Because of distances involved and communications limitations, it may not be possible for these units to effect timely notification to the DISCOM in the DSA. However, since major subordinate HQ report all new locations to the Division Operations Center, the DISCOM HQ will learn of new locations of brigade trains areas from the Division TOC. Each DISCOM unit is responsible for notifying its parent HQ of the opening and closing of its CP and for providing advance information of planned moves. Advance information is essential for providing support forward.

MAINTENANCE OPERATIONS – DEFENSE

MOBILE DEFENSE

3-27. A mobile defense requires maneuver and movement on the part of elements of the defending force. Maintenance units may also expect to move more frequently than during an area defense. In a mobile defense, maintenance requirements are greater than in area defense, particularly for tracked vehicles. This results in increased recovery distance from Forward MSTs to maintenance elements farther to the rear.

AREA DEFENSE

3-28. In an area defense:

- The defending force remains in position for longer periods. Movement and maneuver of the defending force are considerably reduced in comparison to a mobile defense or an offensive operation.
- Support units are not required to move as often as in other types of operations.
- More time is available for maintenance operations.
- Maintenance facilities can operate better since they do not have to react as often to changing situations and requirements.

DELAY AND WITHDRAWAL

3-29. Detailed planning, control, and coordination are required to support delaying or withdrawal operations. Emphasis is given to evacuation of unserviceable equipment that cannot be repaired before opposing forces overtake the position. Displacement of support elements must not conflict with the movement of combat units. When possible, maintenance support units should be displaced at night.

PLANNING FOR MAINTENANCE OPERATIONS – DEFENSE

3-30. The primary thrust of the maintenance effort in the defense is to maximize the number of combat-ready weapon systems. Once the defensive battle begins, the thrust is to fix the maximum number of inoperable systems and return them to the battle. This requires forward support at, or as near as possible to, the intended AO of the systems.

Maintenance Teams locate well forward. Likewise, critical components are placed forward to overcome the effects of combat wear and damage.

3-31. Planners also consider augmenting the maintenance support to covering force elements when they return to the main battle area. Such support may allow them to return more rapidly to fighting condition.

3-32. Maintenance plans must be closely coordinated with the tactical plan to provide maximum support without interfering with combat elements' operations. MSTs will be attached to tactical units to provide a rapid on-site maintenance capability.

RESOURCING MAINTENANCE OPERATIONS -- DEFENSE

3-33. Repair parts stockage is generally focused on supporting critical weapon system components. Care should be exercised in selecting only needed items so as not to impair mobility. Equipment inspections and technical assistance are emphasized to maintain readiness at a high level.

CONDUCTING ORGANIZATIONAL MAINTENANCE - DEFENSIVE OPERATIONS

3-34. Types of defensive operations include area defense and mobile defense. Activities associated with defensive operations include the following:

- Counterattacks.
- Passage of lines.
- Withdrawals.
- Relief to continue the defense.

Large defending formations, such as the division, may have portions of their forces simultaneously conduct any of these operations or activities. Defense may be static or dynamic. It takes a coordinated effort to defeat the attackers and prevent them from achieving their objectives.

MOBILE DEFENSE

3-35. Maintenance support of the mobile defense is marked by reduced available maintenance time. This reduces opportunities for on-site maintenance and CMT support. Equipment that cannot be repaired or recovered must be destroyed to prevent enemy capture.

AREA DEFENSE

3-36. More time is available for maintenance in the area defense when a unit is not actively engaged with the enemy. This provides an opportunity to conduct maintenance to improve materiel readiness.

CONDUCTING DIRECT SUPPORT LEVEL MAINTENANCE - DEFENSIVE OPERATIONS

3-37. DS-level maintenance support for defensive operations must be planned, organized, and executed with the same attention to supported unit requirements as to offensive operations. Supported units in the defense are not as widespread as in the offense. Maintenance support operations can therefore be more centralized. Defensive operations also do not require displacement as often as in the offense, which simplifies

command, control, and communications. The exception is support of retrograde operations such as delay or withdrawal. The need for continued support while engaged in a unit move makes this a difficult operation to support.

3-38. MSTs deployed with maneuver units are task-organized to maximize on-site repair capability. A team may relocate several times a day, keeping pace with supported units. Maneuver organizational maintenance elements must assess unserviceable equipment for on-site maintenance or recovery to the nearest MCP.

3-39. The forward MCP generally contains MST elements not deployed with maneuver units. Initial battle damage assessment (BDA) is determined and a plan is formulated for each unserviceable item. MST elements notify follow-on maintenance elements of maintenance requirements beyond their capacity in order to allow follow-on elements to better allocate their maintenance resources. The Base Company and Forward MCP must leap-frog forward in order to maintain continuous support.

MAINTENANCE STABILITY AND SUPPORT OPERATIONS

OVERVIEW

3-40. Sustainment for stability operations involves supporting U.S. and multi-national forces in a wide range of missions. Stability operations range from sustainment-focused operations in humanitarian and civic assistance missions to major peace enforcement missions. It may involve significant offensive and defensive operations to supporting large-scale Army operations.

3-41. The key to success with support operations is interagency coordination. Only in the most extreme situations will the U.S. military be providing relief directly to those in need. In most support operations, the U.S. military will be assisting non-governmental organizations (NGOs) in providing the required level of support to the affected population. Multi-national support, HNS, and support from NGOs may reduce the demands on transportation, medical, food, water, and housing.

CONDUCTING STABILITY AND SUPPORT MAINTENANCE OPERATIONS

3-42. Maintenance operations during stability and support operations present unique challenges to logisticians. Friendly CSS units are primary targets. Moreover, the constant presence of civilians in these AOs makes identification of threat elements very difficult. Defense against incidents (such as boobytraps, sniping, theft, and partisan activities), quickly reduces personnel and equipment resources. Recognizing operations inside and outside unit perimeters will be hazardous. Logistics planners must prepare for and deliver timely maintenance support (see FM 3-07). These manuals reflect operational doctrine prescribed by FM 3-0. CSS is often the primary focus of support operations as Army forces provide assistance to civil authorities, respond to national and international crises, and provide humanitarian assistance. Army forces have the ability to move large amounts of equipment and supplies under adverse conditions. They can also provide small tailored forces on short notice. This makes Army CSS forces a valuable asset in both domestic support operations and foreign humanitarian assistance missions.

3-43. Divisional or non-divisional units may be deployed to provide maintenance support during peacekeeping, humanitarian, or disaster relief operations. They will probably be at least company size or larger. The type and density of customer equipment will largely determine the modular structure of subordinate Maintenance Companies. A Maintenance Company may be modularized as follows:

- One platoon to perform organizational maintenance for supported customers.
- One platoon to perform DS maintenance.
- Sections and teams as needed to perform specific system support.

PEACEKEEPING

3-44. From a doctrinal standpoint, peace operations do not alter the way in which the Army performs maintenance. However, when planning maintenance support during peace operations, logisticians must consider the following factors:

- Hostile environment.
- Joint or multi-national chain of command.
- Support to multi-national forces.
- Risk assessment.
- Security of maintenance operations.
- Environmental impact.

3-45. Peacekeeping operations will most likely be accomplished as part of a multi-national coalition. This presents new challenges for the Maintenance Commander, who could potentially support HN military and commercial equipment. There may also be a requirement to support coalition force equipment. Beyond some of the special considerations noted here, much of the maintenance support for peacekeeping will not differ substantially from normal maintenance.

NOTE: FM 3-07 covers the full range of peace operations (including peacemaking, peacekeeping, peace enforcement, preventive diplomacy, and peacebuilding).

HOSTILE ENVIRONMENT

3-46. National policy may require the Army, either singularly or as part of a joint or multi-national TF, to conduct peace operations in politically sensitive areas of the world. At such times, regional combatants may disregard the peace initiative and continue a sporadic or repeated armed struggle. Commanders must anticipate this and be prepared to provide logistics support in hostile, potentially life-threatening situations.

LACK OF HOST NATION SUPPORT

3-47. Since friendly forces must operate in hazardous and politically sensitive areas, commanders should never assume availability of dedicated HNS during peace operations. Instead, they must plan for maintenance support using organic resources.

MULTI-NATIONAL OPERATIONS

3-48. Since the Army frequently conducts peace operations with other nations, Logistics Commanders may encounter a multi-national chain of command. In such cases, they must quickly establish communications channels to confirm or clarify mission requirements. Commanders must also determine how and from where they can expect timely resupply to perform their critical maintenance mission. Prompt coordination of mission and support requirements with higher HQ ensures logistics planners deliver timely maintenance support to customer units.

3-49. Logistics Commanders must anticipate support to all friendly forces. To accomplish that task, they must contact higher HQ as well as known customer units to coordinate support requirements. At times, support to multi-national forces may present unique logistical challenges. In such cases, logistics planners must take the initiative to determine customer equipment type and density.

MAINTENANCE OPERATIONS – HUMANITARIAN RELIEF

3-50. As in peace operations, maintenance doctrine does not change during humanitarian operations. However, humanitarian operations do introduce unique challenges to logisticians. Depending on the regional political situation, the Army may conduct humanitarian missions in either friendly or hostile environments.

3-51. Since humanitarian missions are conducted in either friendly or hostile environments, logistics planners must consider the situation and do the following:

- Locate maintenance operations away from dense population centers.
- Identify maintenance sites that units can easily secure and defend.
- Establish and secure LOCs.
- Coordinate with engineer support for earthen barriers if required by the Base Cluster concept.
- Enclose maintenance operations areas with barrier materiel if required by the Base Cluster concept.
- Establish entrance and exit control points and procedures.
- Position crew-served weapons for maximum defensive firepower.
- Maintain responsive 24-hour perimeter security.
- Consider the impact on the environment.

MAINTENANCE OPERATIONS – DISASTER RELIEF

3-52. During the summer of 1992, Hurricane Andrew devastated large areas of Florida. The ensuing calamity and distress placed the Army in a unique and significant support role.

3-53. In disaster relief operations, maintenance and logistics planners perform the following:

- Identify commercial vendors who can quickly supply the technical and repair parts support required.
- Organize assets from other agencies, contractors, and local maintenance resources for economy of effort.

Planners must also consider the impact on the environment and they evaluate and prioritize repair of the following infrastructure equipment:

- Firefighting equipment.
- Medical equipment.
- Construction equipment.
- Generators.
- Organic equipment.
- Equipment belonging to other military elements involved in the operation.

3-54. The type of disaster provides the Maintenance Commander with some insight on whether to plan on availability of fixed facilities or to rely on maintenance under field conditions. The commander also considers how operations and facilities will conform with national, state, local, and HN environmental laws. The type of disaster will dictate Class III and IX supply requirements.

OTHER MAINTENANCE OPERATIONS

Recovery

3-55. Recovery is the process of retrieving or freeing immobile, inoperative, or abandoned materiel from the point where it was disabled or abandoned. The materiel is returned to operation or to a place where it can be repaired, evacuated, or otherwise disposed of. Recovery also consists of the following:

- Returns immobilized equipment to operation.
- Retrieves equipment for repair and return to the user.
- Prevents enemy capture of equipment.
- Uses enemy equipment to support the U.S. and friendly forces intelligence.

Responsibility

3-56. Recovery is a using-unit responsibility. In units below the battalion level where maintenance assets are authorized, the Motor Sergeant, Motor Officer, or another designated individual manages recovery operations. In units where maintenance resources are concentrated at the battalion level, the BMO manages recovery

operations. Recovery operations in CS or CSS units can be either a battalion or individual company responsibility.

3-57. Maintenance units are responsible for recovering their own organic equipment and providing limited backup support with organic wreckers or tracked recovery vehicles when requirements exceed a supported unit's maintenance capability. They may also be tasked to provide recovery support on an area basis to units without a recovery capability.

Management

3-58. The BMO or Unit Motor Officer (depending on the type of unit) coordinates recovery operations with the overall repair effort and the available resources to support the commander's priorities and the tactical situation. The goal is timely return of equipment to operation with the least expenditure of resources. The following general principles apply to the management of recovery operations:

- Centralize management of recovery operations at the battalion level whenever possible. This does not preclude delegation of recovery authority for specific operations to the CMT.
- Coordinate recovery operations with the maintenance effort. Maintenance personnel repair equipment as far forward as possible within the limits of the tactical situation, amount of damage, and available resources. Use maintenance time guidelines established by the commander to make repair-or-recovery decisions. The estimated repair time helps determine to which maintenance activity the item should be recovered.
- Use the right recovery equipment for the recovery mission. Tracked recovery vehicles normally recover tracked equipment while wheeled wreckers normally recover wheeled vehicles. When a unit has only limited assets, it is very critical to select the right recovery vehicle for the mission.
- Do not return recovery vehicles to the rear. Instead, keep them available as far forward as the tactical situation permits. This keeps them available for immediate response as needed. The BMO coordinates recovery and evacuation requirements and may request additional support from the DS Maintenance Company MST or the Support Battalion Support Operations Section.
- Coordinate recovery missions with the Tactical Commander during all combat operations.
- Establish recovery priorities when recovery assets are limited. These depend on the commander's need for an item and the tactical situation. The type of maintenance or repair required will also affect the priority when two or more like items must be recovered. As a general rule, always recover weapons systems before tactical vehicles.

Initiation

3-59. There are four steps in equipment recovery procedures. Table 3-2 outlines the procedural steps for equipment recovery.

Table 3-2. Equipment Recovery Procedures

Step	Action
1	<p>When the equipment operator and crew detect an inoperable condition, they should:</p> <ul style="list-style-type: none"> • Assess the damage and cause of the inoperable condition. • Initiate action based on their analysis and the tactical situation.
2	<p>Operator/crew/organizational maintenance personnel use organic repair and recovery capability, including:</p> <ul style="list-style-type: none"> • BDAR techniques. • Self-/like-vehicle recovery. • Assistance from other unit's on-site when unit-level recovery resources are insufficient.
3	<p>Unit requests assistance from the Recovery Support Section located in the UMCP. Requests must provide the following information:</p> <ul style="list-style-type: none"> • Unit identification. • Equipment identification. • Location (map coordinates, when possible). • Nature of disability. • Evaluation of on-site repair capability. • Repair parts required. • Organic recovery capability. • Tactical situation and security requirements. • Recommended route of approach. <p>Until equipment is recovered, the operator/crew must remain with the equipment and follow unit SOPs.</p>
4	<p>Once the operator and crew initiate SOP/corrective measures, they should:</p> <ul style="list-style-type: none"> • Take cover. • Provide local security. • Wait for assistance. <p>Assist maintenance/recovery personnel on their arrival with the recovery action.</p>

Repair and Recovery Plan

3-60. The key unit personnel responsible for developing the unit repair and recovery plan are the BMO, Unit Motor Officer, or Motor Sergeant

(depending on the type unit). They develop a plan of action for repair and recovery of the disabled equipment based on the request for assistance.

3-61. **Action Plan.** The BMO, Unit Motor Officer, or Motor Sergeant (depending on the type unit), develops an Action Plan that includes evaluation of the following:

- Extent of damage or system failure at the breakdown site.
- Established priority for support.
- Tactical situation.
- Workload.
- Availability of maintenance and recovery personnel.
- Availability and maintenance status of recovery equipment.

3-62. **Checklist.** The BMO assigns the repair/recovery mission to the CMT. The CMT is provided a Unit Checklist containing the following information:

- Breakdown location and grid coordinates.
- Cause of the breakdown.
- Specific designation of required support:
 - Personnel by rank and MOS.
 - Equipment by line item number (LIN), NSN, and quantity.
- Supply requirements – required classes of supply:
 - Class I (rations and water).
 - Class III.
 - Class V (by type and quantity).
 - Class IX (by part and quantity).
- Tactical situation:
 - Road and movement restrictions.
 - Primary and alternate routes of march.
 - METT-TC and special security or NBC defense requirements.
 - Individual clothing and equipment and NBC defense items.
 - Equipment and supplies to decontaminate the disabled vehicle.
- Communications equipment availability, including applicable call signs, primary and alternate frequencies, and required reports.
- Security and safety requirements.
- Applicable special instructions regarding the disposition of contaminated equipment, Contingency Plans, and any special tactical or security considerations.

Special Considerations

3-63. Recovery personnel requires special training and special consideration of the following when recovering abandoned or unmanned equipment:

- Must be trained to identify contamination and search for booby-traps.
- Must wear MOPP when chemical contamination is suspected.
- Must be trained to clear or disarm the weapons systems of supported equipment to prevent accidental discharge.

3-64. **Abandoned Equipment.** Once the CMT makes the equipment safe, it proceeds with the recovery operation. The equipment is inspected to assess the damage and determine repair or recovery requirements. The CMT reports findings and the situation to the BMO. The BMO may direct repair or recovery of equipment or it may send additional parts or personnel. The CMT proceeds with repair/recovery as directed.

3-65. If the BMO cannot be contacted, the CMT proceeds with the original plan or modifies it based on judgment, the commander's priorities, and the unit SOP. During defensive operations, CMTs recover equipment to the first terrain feature. From there they coordinate its removal to the UMCP. However, this should be done only if the equipment cannot be repaired at the Forward MCP. During offensive operations, MSTs recover to the MSR. From that point, Maintenance Platoon personnel pick up the equipment as they move forward.

3-66. **Recovery Destination.** The following items may influence the CMT's ability to recover equipment to a destination:

- Tactical situation.
- Recovery vehicle requirements.
- Workload.
- Available resources at the unit MCP and the supporting maintenance unit.
- Extent of repairs required.

Logisticians use maintenance time guidelines established by the commanders in conjunction with these factors to decide which maintenance activity can best make the repair. The bottom line is to repair the equipment as far forward as possible using the least amount of maintenance resources.

3-67. **Night and Limited Visibility.** Sometimes the tactical situation prevents access to disabled equipment. When that occurs, the BMO must carefully weigh the potential benefits of recovery against the possible loss of personnel. This is particularly true during night operations when the need for noise and light discipline further complicates the recovery process.

3-68. Recovery operations at night or during limited visibility are generally the same as during daylight. Recovery elements may require night vision devices and additional personnel assistance for ground guides. In some cases, the mission may require the Tactical Commander to approve the compromise of light and noise discipline. When tactical

elements are conducting night or limited-visibility operations, maintenance units must anticipate a potential increase in workload.

3-69. **Foreign Materiel.** Responsibilities for recovery and evacuation of foreign equipment and materiel at various levels are similar to those for U.S. materiel. Capturing units must report the discovery of foreign materiel through intelligence channels. Items for which there are no disposition instructions, should not be evacuated until it is coordinated with technical intelligence elements.

3-70. The capturing unit may be directed to evacuate the item to the C&C Service Company or the supporting technical intelligence unit. The unit may be instructed to guard the item and leave it in place for on-site preliminary examination by technical intelligence personnel. When materiel does not need to remain in place for intelligence evaluation and the discovering unit is incapable of evacuating it, the unit may request recovery and evacuation assistance directly from the support battalion responsible for DS-level maintenance.

3-71. **General Equipment.** Handle the following with a special degree of care and security:

- Electronically-sensitive equipment.
- Items easily damaged by weather.
- Pilferable items.
- High-cost, low-density equipment.

Using units must turn in such items directly to the supporting Maintenance Company. MSTs from the maintenance unit must transport equipment when feasible. The Maintenance Company repairs these items within its capability and evacuates the remainder as directed by the MMC.

3-72. **Explosive Items.** The presence of ammunition and explosives often complicates recovery. Personnel must remain constantly alert and should presume abandoned items are booby-trapped. Exercise caution to prevent explosion, fire, or accidental weapon discharge. When unexploded ammunition (such as bombs, explosive projectiles, or booby-traps) is found or suspected, request assistance from an EOD team.

3-73. If quantities of abandoned ammunition are found during recovery operations, leave the ammunition in place and notify the nearest EOD unit immediately. Do not, **under any circumstances**, attempt to touch or move abandoned ammunition.

COLLECTION AND CLASSIFICATION OPERATIONS

3-74. The UMCP is a geographical area containing maintenance resources that allow maintenance support to adapt to the three-dimensional battlefield. Organizational and DS-level maintenance personnel perform required repairs designed to return maximum numbers of weapon systems to the battlefield. Repairs are designed to keep the force at maximum combat strength for the current battle and the next battle. The UMCP is the integration point of the field maintenance concept. From the UMCP, logisticians coordinate and manage maintenance operations and resources to support the warfighting effort.

Battalion Maintenance Officer

3-75. The BMO has overall responsibility for maintenance operations. Directly responsible to the Battalion Executive Officer, the BMO stays informed of the TF Battle Plan and coordinates maintenance efforts to support those operations. The BMO directs the CMT to place recovery assets forward to support warfighting units. In turn, those assets support the recovery of equipment to the UMCP for repair. The BMO further ensures the following:

- The DS MST coordinates requirements with the MCO.
- The BMT understands the support priority and manages maintenance in the forward area of the battlefield.
- The BMT gives maintenance resource priority to forward fighting elements.
- Soldiers from the Maintenance Service Section (MSS) reinforce the CMT.

Setting Up and Positioning a Unit Maintenance Collection Point

3-76. The UMCP is located on the battlefield in the combat trains area. The BMO must coordinate with the S4 in site selection. Locate the UMCP in an area that facilitates effective radio communication with the CMT. Consider METT-TC in the overall determination and do the following:

- Locate as far to the rear as communications allows during defensive operations.
- Locate as far forward as possible during offensive operations (preferably behind a terrain feature such as a hill mass out of range of enemy mortars).

Direct Support Maintenance Collection

3-77. Maintenance or supply personnel inspect materiel, report its quantity and condition, and perform processing necessary for further repair or evacuation. There will be wide diversity in the types and condition of materiel brought into the collection points. Procedures must be established to control incoming materiel and to direct it to specific locations within the collection point area. This will aid in inspecting, classifying, and processing items for repair or movement to the rear. DS maintenance units will inspect evacuated mechanical and electronic materiel, and dispose of it as follows:

- Report equipment requiring no maintenance or no more than GS maintenance to the MMC. Ship it to the supporting DS/GS maintenance facility or supply activity based on the MMC's disposition instructions.
- Report equipment requiring depot maintenance or considered a candidate for property disposal to the MMC. Ship it to the supporting C&C point based on the MMC's instructions.
- Deliver U.S. medical and cryptographic equipment to the supporting medical or signal activity.

- **DO NOT** send containers of chemical agents, ammunition, explosives, or aircraft to C&C Service Companies. Report them to the MMC for disposition instructions.
- Repair only those items directed by the MMC (friendly forces may not require such equipment even if it can be repaired).

Materiel Classification

3-78. U.S. and foreign materiel returned to a maintenance unit is of no value until it is inspected, classified, and reported. Classifying materiel through close inspection allows the condition code of an item to be established. Classification, which indicates the physical condition of the returned materiel, is necessary to determine the proper disposition of an item. It identifies the extent of repairs required (if repairs can be accomplished) and whether the item is worth repairing. The objective is the efficient, rapid return to use of the greatest amount of materiel.

3-79. At DS-level maintenance, qualified technicians inspect materiel in accordance with instructions and specifications in technical manuals, technical bulletins, and MMC directives. The inspection's results establish the materiel's condition code (classification). The classification complies with instructions in TMs, TBs, and MMC directives. A complete listing of condition codes is provided in AR 725-50.

EVACUATION OPERATIONS

3-80. The purpose of evacuation is to move damaged equipment from one maintenance unit to another (normally a maintenance unit with a higher-level capability). An important logistics function, evacuation, also moves disabled materiel into the logistics support system. Evacuation also does the following:

- Reduces the maintenance backlog at a location.
- Moves damaged equipment to a maintenance activity where it can be repaired
- Maximizes use of critical supplies and equipment.
- Matches the maintenance workload with maintenance resources.

Principles

3-81. Logisticians manage evacuation to return the maximum number of serviceable items to using units or to the supply system. This requires close coordination of recovery, repair, and transportation activities to include the following:

- Evacuate equipment to the designated maintenance activity immediately after recovery.
- Make maximum use of road and railway networks.
- Evacuate by the fastest means available.
- Prioritize equipment for evacuation (evacuate critical warfighting items first).
- Streamline the evacuation process. Ensure disposition instructions move equipment to the supporting activity best suited to repair it.

- Maximize use of available transportation. Use vehicles to backhaul unserviceable assemblies and end-items on the return trip.
- Prevent further damage to equipment. Protect it from damage in-transit and from the elements with packaging, bracing, and preservation materials.

Responsibility and Control

3-82. Each commander is responsible for evacuating unserviceable materiel as rapidly and efficiently as possible. MACOMs publish evacuation policies through their MMCs. The MCT requests transportation to evacuate unserviceable materiel from one maintenance unit to another.

3-83. The ASCC MMC, in conjunction with subordinate MMCs, controls the flow of unserviceable materiel from the time of recovery until final disposition. ASCC logisticians establish general evacuation policies. In turn, subordinate commanders develop detailed standards and procedures based on ASCC policies. This ensures organizations processing unserviceable materiel have definitive disposition instructions.

3-84. Evacuation success depends largely on instructions supplied to Maintenance Companies by the MMC. These instructions must be complete, timely, and seek to eliminate all unnecessary handling. If higher HQ issues the proper evacuation instructions, the condition and classification of each item will determine its destination. Automatic disposition instructions are used to the maximum extent possible to avoid undue delay.

RETROGRADE OPERATIONS

3-85. Overseas commands return (retrograde) materiel to the CONUS. Retrograde cargo normally consists of unserviceable, economically repairable items and weapon systems destined for depot repair. Reclamation operations involve the removal by collection and classification units of serviceable or economically repairable components, assemblies, and repair parts from end-items or large components classified as uneconomically repairable. Reclamation operations significantly reduce demands on the supply system.

3-86. Units are dispersed during retrograde operations. Command, control, and communications are difficult. A high degree of coordination is required. Movement of combat elements may be performed under enemy pressure.

3-87. Maintenance operations concentrate on quick repairs, BDAR, controlled exchange, and cannibalization. MSTs in the UMCP move to predetermined locations to support combat elements.

Responsibility

3-88. The various areas of responsibility for retrograde operations are listed below:

- The ASCC MMC, in coordination with CONUS Commodity Commands, establishes the type, quantity, and condition of equipment for retrograde.
- The MMC develops and publishes criteria for maintenance units. Materiel managers identify retrograde items as far forward as practical to prevent unnecessary handling and shipment.
- In some cases, the DS-level maintenance unit can make the inspection and decision to retrograde. In other instances, GS-level maintenance units make this determination.
- When required, the MMC publishes updated lists of items to be retrograded with the quantity and destination of each. They also coordinate transportation requirements for retrograde cargo.
- The MMC coordinates and directs all retrograde shipments.

Procedures

3-89. Customer units may requisition Class IX repair parts from their supporting collection and classification unit. Table 3-3 gives an example of how materiel (a tank, combat) is reclaimed, based on the assignment of a serviceable, repairable, or uneconomically repairable condition code by DS-level collection and classification units.

Table 3-3. Materiel Reclamation Procedures

Serviceable Item	Repairable Item	Uneconomically Repairable Item
The serviceable engine of an otherwise destroyed tank is placed back into the supply system.	The unserviceable yet repairable transmission of the destroyed tank is directed to the proper maintenance activity for repair and eventual return to the supply system.	The totally destroyed hull of the tank is directed through the Property Reutilization Office as scrap.

Support Priority

3-90. Maintenance is concentrated on those weapon systems and materials directly required to support the retrograde operation. Priority of support should be given to units that have completed the movement to the next location and are preparing a new position. Emphasis must be placed on items that can be repaired most readily. Other equipment should be evacuated directly to future planned support areas. Extensively damaged and non-repairable equipment should be used for controlled exchange or cannibalization.

Equipment Recovery

3-91. Destroy equipment that cannot be repaired or recovered to prevent enemy capture. Recovery capability is of utmost importance. The first method of choice is self- and like-vehicle recovery. Wheeled and tracked recovery vehicles are used at critical points to keep the route of march open. Recovery Support sections remain close to the combat unit to assist the CMT's recovery assets.

3-92. Recovery equipment is critical to support of retrograde operations. Its use must be rigidly controlled and coordinated. Recovery equipment should be marshaled at critical locations to keep routes open and to recover all materiel possible. Badly damaged equipment should be evacuated or destroyed. Specific instructions must be provided for destruction of supplies and equipment.

Planning

3-93. Continuous maintenance support throughout the retrograde operation is essential to keep the maximum number of weapon systems operational. Maintenance planners should concentrate on providing essential support forward while moving the bulk of the maintenance units to the rear. They organize teams to provide support to essential weapon systems in the forward areas.

3-94. Maintenance efforts should concentrate on "quick fix" items, using assemblies brought forward to facilitate rapid turnaround of weapon systems. BDAR and fixing equipment are top priority. Maintainers should maximize use of controlled exchange and cannibalization.

RECONSTITUTION OPERATIONS

3-95. Reconstitution is an extraordinary action used to restore units to a desired level of combat effectiveness commensurate with mission requirements and available resources. No resources exist solely to perform reconstitution. It is a total process whose major elements are reorganization, assessment, and regeneration. FM 100-9 contains more information on reconstitution.

REORGANIZATION

3-96. Reorganization is a shift of resources within a degraded unit to restore its combat effectiveness. Reorganization can be immediate or deliberate. It includes cross leveling, matching crews to equipment, and forming composite units from two or more attrited elements.

ASSESSMENT AND REGENERATION

3-97. Assessment and regeneration is done as far forward as possible so units may return to combat with minimum delay. It occurs normally in the support area two levels higher than the unit being reconstituted. It measures a unit's capability to perform its mission and evaluates regeneration needs.

3-98. Maintenance support of these operations initially consists of assessing the damage. It then shifts to repairing as many weapon systems as possible to meet the commander's priorities.

BATTLE DAMAGE ASSESSMENT AND REPAIR

3-99. BDAR is rapid damage assessment and repair, bypassing or jury-rigging components, to restore minimum essential capability to support a combat mission or enable self-recovery. Such enabling repairs may be temporary or permanent, depending on the repairs required. In many cases, they may not restore full mission capability. BDA determines damage and reparability, the assets needed to make the repair, and where the repair should take place. Battle damage repair (BDR) includes any expedient action that returns a damaged part or assembly to mission-capable or limited mission-capable condition. The purpose of BDAR is to return disabled combat equipment as quickly as possible to the Tactical Commander.

3-100. BDA is used to appraise major weapon systems status. This effort shows the number of items destroyed or damaged beyond repair in the forward area and the number that can be repaired forward. It also shows the location of forward maintenance and salvage collecting points and the transportation required to support recovery or evacuation. Mechanics concentrate on mission-essential maintenance only and the priorities established by the Senior Commander.

Battle Damage Assessment and Repair Actions

3-101. BDAR actions include the following:

- Using shortcuts to install or remove parts.
- Modifying and installing components designed for other vehicles or equipment.
- Using parts serving a non-critical function on a like vehicle.
- Jury-rigging to bypass non-critical components.
- Cannibalizing critical repair parts.
- Fabricating critical parts.
- Using substitute fuels, fluids, or other POL.

3-102. All repairs are made in accordance with applicable BDAR TMs and available BDAR kits. At the completion of immediate combat operations, mechanics will make repairs that will return the equipment to fully mission-capable status in accordance with appropriate vehicle TM.

3-103. Anyone on the battlefield can perform some BDAR. However, crew, organizational, and DS-level mechanics and technicians must be trained in assessing battle damage in addition to their specialties. The operator/crew performs initial BDA and repairs the damage if possible. The commander decides whether or not to use BDAR instead of normal maintenance procedures. Since it may not be possible to train BDAR techniques in peacetime using actual equipment, the best substitute is to train system-oriented crews and mechanics to understand the theories and principles associated with weapon systems.

Battle Damage Assessment and Repair Training

3-104. All soldiers associated with a piece of equipment, from the operator through the DS-level maintenance mechanic, must be trained and proficient in the conduct of BDAR operations. The operator/crew must be able to perform initial BDA and repair damage if possible. CMT members must also be proficient in BDAR techniques. A good reference is FM 9-43-2, designed for use by operators and by organizational and DS-level maintenance personnel. BDAR TMs:

- Provide a single document for each weapon system that contains proven, effective techniques. They are not meant to be all inclusive and are no substitute for an experienced mechanic who understands how a weapon system moves, shoots, and communicates.
- Are used by operators and by organizational and DS-level maintenance personnel. They have been developed for major weapons systems and are issued with the normal complement of TMs.
- Have been developed for tactical wheeled vehicles, as well as for combat weapon systems.
- Have the same first eight digits as other 9-series TMs followed by the letters "BD" (the BDAR Manual for the M1 Tank is TM 9-2350-200-BD-1).

NIGHT OPERATIONS

3-105. Night operations use the same organization and require the same functions as daylight maintenance support. Commanders continue to effect internal adjustments of their organic maintenance assets to meet unique situations. Additional maintenance assistance is requested from higher echelon resources when needed. Maintenance elements retain responsibility for performing their assigned function. Those that must be deferred until daylight remain the responsibility of the deferring maintenance element.

Training

3-106. The goal of night maintenance operations is to attain the same degree of effectiveness as in daylight operations. Its goal is also to sustain the effort over long periods of time. Intensive night training is a key element in attaining this goal. Such training improves the capabilities of unit personnel performing technical tasks under less than normal light conditions and provides a sound basis for developing a night maintenance SOP.

3-107. Tasks that cannot be performed under subdued visible light or by using night vision goggles are identified. Procedures are developed for deferring them until daylight hours. Procedures are developed for preposition of equipment, tools, and repair parts supplies to allow ready access, identification, and handling at night. Procedures for night movement and relocation stress light discipline and camouflage.

Planning

3-108. Detailed planning for maintenance support of night operations is essential. Maintenance support planners must provide a realistic assessment of the capability to support night operations. The assessment is based on the degree of proficiency attained by the maintenance elements concerned in training and on the SOP for night maintenance operations. Requirements must be identified and coordinated for additional maintenance support from higher echelons to assist in working off the repair of items deferred for daylight maintenance.

3-109. With the present night vision technology, planners must anticipate built-in backlog each morning. They must ensure that the Maintenance Support Plan provides timely support without interfering with or compromising the Tactical Plan.

Procedures

3-110. Using night vision devices, organizational and DS maintenance elements repair and return to service those critical items within their repair capability. Night vision devices are used for tasks that must be accomplished outside. Bulky items or repair parts supply, as well as equipment and tools, are pre-positioned for rapid location, identification, and handling during the night.

3-111. Where enemy observations may be possible, field expedient drape-type shelters are constructed to hide the light source. Lightproof shelters with visible subdued light are used for the repair of small items of equipment (such as radios and small arms). They also provide a place to use required TMs. The Tactical Commander must approve the use of subdued visible light.

3-112. Night recovery is conducted on a case-by-case basis depending on the tactical situation and the need for recovery of the item. Equipment, tools, and repair parts are pre-positioned and marked for easy location, identification, and handling. Elements must also be concerned with aerial observation of heat and light source signatures. Where required, the supported unit provides security for the recovery element. MSTs dispatched from support elements into areas farther forward should have night vision devices.

NUCLEAR, BIOLOGICAL, OR CHEMICAL ENVIRONMENT

3-113. Maintenance personnel must be prepared to provide maintenance support on the integrated battlefield. To do this, individual soldiers must be trained to survive an initial NBC attack and to continue the mission in a toxic environment under great mental and physical stress.

3-114. Leaders must recognize that performance in an NBC environment is greatly degraded, causing a detrimental effect on mission performance. Long-term problems caused by contamination make it doubly important that maintenance units protect themselves. When possible, maintenance activities should occupy protected areas (such as underground garages or concrete buildings) to provide cover from liquid chemical agents and shielding from radioactive contamination.

CONTAMINATED EQUIPMENT

Standing Operating Procedure

3-115. Units should establish SOPs for contaminated vehicle and equipment maintenance procedures for the following:

- Responsibilities for establishing and operating contaminated and uncontaminated MCPs.
- Procedures for operating contaminated and uncontaminated MCPs.
- Procedures for performing unit-level hasty decon or requesting deliberate equipment decontamination from an NBC Defense Company.
- Procedures for contaminated equipment inspection.
- Procedures for repair without electronic test equipment (destroyed by blast or electromagnetic pulse (EMP)).

Hazards

3-116. The following are some special hazards involved in working on contaminated equipment:

- Petroleum products tend to trap chemical contaminants.
- A vehicle that is safe for an operator without MOPP-4 protection may be unsafe for a mechanic to repair.
- Chemical contaminants may collect in bolt threads, hydraulic fluids, and closed assemblies. For example, a mechanic might break open an air filter and be exposed to lethal concentrations of hazardous vapors. Casualties could be high unless all repairs and preventive maintenance on previously contaminated vehicles are performed in MOPP-4.
- Oil, grease, and dirt seriously degrade the protective qualities of a chemical overgarment. Mechanics must keep themselves as clean as possible. Extra overgarments should be on hand to replace dirty ones.
- Wet-weather gear helps keep overgarments clean but increases heat buildup and will eventually be penetrated. The combination of protective gear and wet-weather gear provides good (although hot) protection from a combination of toxic chemicals, grease, and oil contamination. Fuel handlers' aprons and field expedient rubber sleeves provide some added protection with less heat buildup.
- Mission performance is greatly degraded. Repair times are significantly increased with increased MOPP levels. This reduced capability affects the combat readiness of supported units.

Control Principles

3-117. Do not spread contamination or bring contaminated equipment into a clean area. Units may establish separate MCPs or, at a minimum, separate storage areas for contaminated and uncontaminated equipment.

3-118. Mark equipment to protect others. Every effort must be made to repair contaminated equipment in a contaminated area.

3-119. At the MCP BDA/NBC detection point, all personnel and equipment returning from forward areas are properly routed to control the spread of contamination during the repair process. Units will establish an NBC control point for monitoring and decontaminating personnel. Equipment will be decontaminated prior to evacuation to the supporting backup DS-level maintenance facility. All equipment evacuated must be marked with the level of decontamination it has undergone. All equipment evacuated to EAC must be decontaminated and marked using the "x"-system.

Marking Vehicles and Equipment

3-120. Mark vehicles and equipment to protect others. Vehicles and equipment that are contaminated or that have been decontaminated to low-risk levels for operators and crews could still present a serious hazard to mechanics. They need to know the equipment has been contaminated.

Standard Contamination Signs

3-121. Contaminated vehicles must be identified with standard triangular contamination signs on all four sides and at the operator's controls. The type and date of contamination should be written on the signs. The signs should be easily visible from the outside of the vehicle. Contamination signs on vehicles and equipment contaminated with persistent agents will not be removed even after decontamination. Non-vehicular equipment should be similarly marked in a conspicuous location.

Additional Marking System (x-system)

3-122. An additional marking system may be used to alert personnel of possible hazards, as well as to show the level of decontamination the equipment has undergone. The x-system is the easiest to use. The mark must be made in a contrasting color so that it can be seen from all directions. If a vehicle is marked, the logbook must specify where the contamination was located, as well as the results of each decontamination attempt. See Table 3-4, page 3-28, for a description of the four levels of decontamination.

3-123. No item without at least an XX marking will be taken into MCPs. A detailed decontamination results in an XXX marking. Corps chemical unit decontamination results in an XXXXX marking. Only those marked XXXXX will be evacuated to EAC.

NOTE: A contaminated item is marked initially and then modified as different levels of decontamination are reached.

Table 3-4. X-System

Level	Description
X- One	Item is contaminated; no decontamination was attempted.
XX- Two	Item underwent immediate or operational decontamination: Crew or individual soldier removed gross contamination and prevented its unnecessary spread. Item should still be handled very carefully; only gross surface contamination was removed.
XXX – Three	Item underwent a more detailed decontamination: Detection tests after decontamination attempts show negative results. Disassembly may not have been done; some contamination may be discovered if item is broken down further.
XXXXX – Five	Item was disassembled and completely decontaminated: Completely disassembled and usually exposed to extreme heat for sufficient time to completely destroy all of the agent. If item could not be subjected to heat, other methods ensured absolute decontamination.

Disposition

3-124. Whenever possible, return contaminated repaired equipment with no more than a negligible risk to the owning contaminated unit. Even if equipment has gone through hasty decon, it can still be hazardous to handle. A previously contaminated unit will already be conducting periodic contamination checks and will be able to use the equipment safely because of the precautions being taken.

Evacuation

3-125. Contaminated equipment and tools must be stored at a location downwind of clean areas. Every effort must be made to control the spread of contamination. Contaminated vehicles and equipment should not be sent to the base shop for repairs. NBC considerations may outweigh established maintenance repair timelines. If DS-level maintenance is required, an MST will be sent forward to make repairs in the contaminated MCP. DS maintenance units should treat all customer equipment as contaminated until detection equipment proves otherwise.

Tools

3-126. Since it is difficult to decontaminate equipment well enough to eliminate risks to mechanics, it may be impractical to decontaminate tools and equipment used to repair contaminated equipment. Segregate

tools and equipment used to repair contaminated equipment from other tools. Use these contaminated tools and equipment to repair contaminated equipment.

SAFEGUARDS

3-127. Even though decontamination is done, MSTs cannot be sure that toxic vapor trapped by oil or held inside a closed assembly will not appear at some point during the maintenance process. Since decontamination cannot guarantee safety for unprotected mechanics, the Maintenance Officer must decide which MOPP level mechanics should use. This is a tactical decision. Mechanics should use MOPP levels consistent with the threat and the mission.

3-128. Safeguards must be taken to protect people inside and outside contaminated areas. Chemical agent detection equipment should be operated while contaminated equipment is being repaired. The testing must be a continuous process. Vapor hazards may not be present in open terrain. However, as soon as the vehicle is moved into an area where air does not circulate, significant toxic vapors may concentrate.

CONTAMINATED PARTS REMOVAL

3-129. If a vehicle is contaminated and a part removed for use elsewhere (controlled exchange), the part must also reflect the appropriate level of decontamination. This must be done due to the possibility of hidden contamination. A removed item could potentially contain a hidden agent that was never detected. It could pass through all the various levels of maintenance and then be released once it is disassembled. It is worth the few seconds it takes to mark an XXX.

CONTAMINATED ASSEMBLIES

3-130. If contamination is detected after an assembly is opened, the assembly can be deconned quickly by flushing with diesel fuel or motor gasoline. The unserviceable component must then be marked and taken to the contaminated holding area, where it can undergo more thorough decon. For reparable assemblies, personnel should either wait until the assembly no longer gives off vapor or replace it with a new assembly. The fuel used for flushing must also be marked "contaminated" and dumped into the contaminated sumps at the decon site or disposed of per unit SOP.

RADIOLOGICAL CONTAMINATION

3-131. Maintenance personnel repairing equipment with radiological contamination should wear dosimeters and be closely monitored for radiation exposure. They must never exceed exposure levels. When the highest acceptable levels are reached, personnel should be replaced, mission permitting.

3-132. The amount of radiological contamination personnel should be exposed to will vary depending on operational exposure guidance and the tactical situation. The priority for monitoring equipment should go to the Recovery Teams, next to inspection points, and then to the MCP. MSTs should satellite off their supported units for NBC monitoring as much as possible. Figure 3-2, page 3-30, shows how an MCP is set up to

accommodate both contaminated/uncontaminated equipment repair on the integrated battlefield.

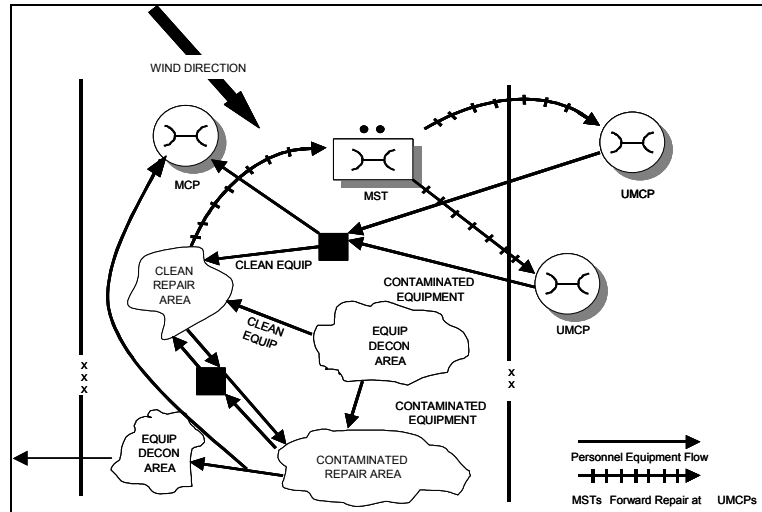


Figure 3-2. MCP for Contaminated/Uncontaminated Equipment Repair

CLEAN AREA SUPPORT STRATEGY

3-133. The strategy for supporting from a clean area is the prevention of contaminated personnel from entering the clean area. Work within a clean area can be done at reduced MOPP and with greater efficiency. When NBC attacks occur within the combat area, the unit must assume all equipment is contaminated and the maintenance unit will set up separate inspection points and MCPs.

3-134. All vehicles, personnel, and supplies must pass through the inspection point before they enter the maintenance area. Here, inspectors in MOPP-4 can use heaters or torches to warm equipment while they check it for contamination. The vapor hazard from liquid contamination may be undetectable at 65° F (18° C) in the open. It becomes lethal at 80° F (26° C) or when brought into a closed area. Some biological contamination, including toxins, may not be detectable. Assume contamination is present if the equipment came from a known contaminated area. Radiac meters can easily detect radiological contamination.

INSPECTION TEAM

3-135. The Inspection Team must segregate the equipment. Uncontaminated equipment can go straight to the clean maintenance area. Contaminated vehicles and equipment must be marked with contamination signs.

3-136. A decision must then be made on the disposition of each item. If equipment is contaminated and repairs can be performed in MOPP-4, the item is sent through decontamination or left to weather. If weathering is the choice, the marked equipment is placed in a holding area where it can decontaminate itself. Waiting for equipment to weather before repair may be a luxury a commander cannot afford. In cool weather, weathering can take weeks. If the choice is to decontaminate, consider the following:

- Before any repairs are made, equipment should go through decontamination to a level deemed necessary by the command.
- Priority equipment must be decontaminated first. Setting priorities is often not easy. For instance, there may be four armored personnel carriers equipped with antitank weapons. If they are lightly contaminated, perhaps all four could be decontaminated and repaired in the time it would take to decontaminate and repair one heavily contaminated tank.
- Decisions require coordination between maintenance units and operational staffs.

Decontamination

3-137. Decontamination should only be done if it is cost-effective. When a persistent agent is involved, every effort should be made to replace a contaminated component with the next higher assembly that can be replaced in MOPP 4. Mark and place contaminated equipment or components in the holding area to await disposition instructions from higher HQ.

On-Site Maintenance

3-138. Uncontaminated teams should not perform on-site maintenance and generally should not attempt recovery of contaminated equipment. Unserviceable, contaminated equipment and vehicles should be recovered to the decontamination site or contaminated MCP by other contaminated vehicles.

SUPPORT TEAMS

3-139. If it is not known whether vehicles and equipment are contaminated, organizational and DS-level maintenance activities will send teams forward to repair or recover vehicles and equipment. Teams must be in MOPP 4 and they must test the equipment for contamination. Testing is a continuous process. Vapor hazards may not be present in open terrain, but significant toxic vapor may concentrate as soon as the vehicle is moved into an area where air does not circulate.

3-140. If contamination exists, the teams must decide whether or not repairs can be made in MOPP 4. If they cannot, the equipment must be deconned. Any surfaces the team will touch to repair or recover the vehicle must be given an operator's hasty decontamination with an on-board decontamination apparatus (such as the M11 or M13). This will not reduce the level of MOPP needed, but it will offer some additional protection and limit the spread of contamination.

3-141. Contaminated equipment maintenance tools may remain contaminated if further maintenance of contaminated equipment is needed. Use rags to wipe off only the gross contamination. Dispose of the rags in a sump or bury them and mark the location. Teams may go through a MOPP gear exchange or detailed troop decontamination, but the team's equipment and tools should be left alone.

3-142. A fresh team can use the contaminated tools on other contaminated equipment. For extended repairs, a rested team relieves a contaminated team, which moves back and undergoes detailed decon. After a rest, the newly deconned team rotates forward and relieves the contaminated team.

TIME AND RESOURCES

3-143. It may be possible to extend the length of time the unit can continue to support from a contaminated location. This can be done by scheduling periodic withdrawal of personnel to a clean area for complete personnel decontamination and a rest period at a reduced MOPP level. However, for continued effectiveness, the unit must leave the area, go through a detailed equipment and decontamination process, and set up shop in a clean area.

3-144. Time may dictate that only the most critical repairs continue while a portion of the unit moves to a clean area. Limited organic transportation may require that some unit and customer equipment be left behind. After reorganization at the clean area, this equipment may be recovered or repaired using the procedures described for support from a clean area.

CONTAMINATION AVOIDANCE

3-145. Avoiding contamination should be the keystone of the support strategy in an NBC environment. Unit NBC defense personnel should monitor the NBC situation by maintaining contact with higher HQ and their counterparts in supported units. Before dispatch of the MSTs, obtain as much information as possible relating to the threat along the route of march and at the support location. The location and availability of complete equipment decontamination stations must be carefully monitored. These facilities are operated under the supervision of elements of the Corps Chemical Company.

CONCEPTS OF SUPPORT FOR MAINTENANCE OPERATIONS

NON-DIVISIONAL MAINTENANCE

3-146. EAD maintenance support is a combination of modularly oriented support groups (Theater ASGs and CSGs). These groups are dependent upon the size and scope of overall TSC CSS operations.

3-147. The TSC provides centralized control and management of maintenance operations through the Support Operations Control Center. TSC maintenance operations provide the following:

- DS maintenance support to units located and or passing through the COMMZ.
- DS maintenance support back up to corps and divisions or other units.
- GS maintenance support to the theater by repairing end items, modules, assemblies, and components evacuated for repair and return to the supply system.

3-148. The Supply and Maintenance Directorate of the TSC Support Operations Control Center plans and manages maintenance support for the TSC. They establish policy, plans, and procedures for all theater maintenance support programs. Maintenance information management at the TSC is accomplished through the retrieval of data from the SAMS-1 and SAMS-2 into the CSSCS system. This provides a theater maintenance database for the commander.

3-149. ASGs are the operational arm for the TSC composed of functional units. ASGs provide DS support to units in its area. The Maintenance Battalion for an ASG usually includes three to five non-divisional DS Maintenance Companies. The Maintenance Battalion may be augmented when required.

3-150. The COSCOM Materiel Management Division of the Support Operations Center provides for overall policy and management for maintenance operations within the corps AOR. The COSCOM Support Operations Center retrieves data from the COSCOM Maintenance Unit SAMS-1 sites and manages the data through the SAMS-2. COSCOM maintenance operations are exercised by maintenance units assigned to the CSG (Rear) and the CSGs (Forward). The CSG (Forward) provides DS to non-divisional troops in its assigned area and GS support to the division. Maintenance support from the multifunctional CSG is provided by a DS Maintenance Company. The COSCOM Rear CSG supports non-divisional units in the corps rear with a Maintenance Company assigned to one of the CSG (Rear) Corps Support Battalions.

MAINTENANCE BATTALION

3-151. The DS Maintenance Battalion normally provides support to all units located in or passing through a designated area. However, it may operate in whole or in part in support of specially designated units.

Location

3-152. The battalion normally operates from multiple locations within its assigned AO. The HHC is located as centrally as possible within the area. Maintenance Companies are located in various parts of the battalion AOR and are oriented on equipment densities. Factors affecting the position of DS units include:

- Tactical situation.
- Road network.
- Availability of suitable terrain for CSS.
- Security requirements.
- Location of other support activities.

3-153. Maintenance Companies may be temporarily attached to another DS Maintenance Battalion when the situation warrants. For example, when one DS Battalion of a support group is not employed to the full extent of its productive capacity, while the other battalion in the group has exceeded its capacity, a temporary attachment of maintenance assets to the overtaxed battalion may be necessary.

Repair Exceeding Capabilities

3-154. Maintenance is performed either in the supported unit with MSTs or in MCPs of DS Maintenance Companies. Equipment exceeding repair capabilities or capacities of the Maintenance Company may be evacuated to another DS Maintenance Company in the TSC ASG or COSCOM. The equipment may also be evacuated to a GS maintenance unit in-theater.

BATTALION HEADQUARTERS

3-155. The battalion is assigned specific AORs by the ASG or CSG based on mission assignments made by the TSC or COSCOM. In the support area assigned to the battalion, the HQ assigns specific areas to attached Unit Commanders and assists in reconnoitering sites for new AOs. Support Group HQ is continually kept apprised.

Mission

3-156. Battalion HQ keeps track of workload, production, and maintenance issues of subordinate units through reports, visits, liaison, and briefings. The Battalion HQ must also stay alert to potential changes in mission and inform subordinate units accordingly. Mission changes might include the following:

- Support of new units.
- Changes in unit end item priority.
- A requirement for repair parts fabrication.

Battalion HQ provides attached units with pertinent instructions governing operations and performs maintenance management and staff supervision to ensure adherence to established policies.

Augmentation

3-157. When the workload exceeds the unit's capability or capacity, the Battalion HQ makes appropriate recommendations to the CSG/ASG and MMC concerning augmentation requirements. Such action is taken only when maintenance management and control within the battalion will not solve the problem. Battalions normally contain at least three Maintenance Companies. When one of them becomes overloaded, Battalion HQ may augment that unit's capacity by temporarily attaching personnel and equipment from another unit.

NON-DIVISIONAL (DS) MAINTENANCE COMPANY

3-158. The company establishes its base of operations in the area with greatest equipment density in its AOR and locates it as centrally as possible within the area. The area selected for operations should be adjacent to a good road network to facilitate easy access to supported units.

Mission

3-159. The company provides DS-level maintenance, repair parts supply support, and technical assistance to units in its AOR. It may be tasked to provide backup or passback support to other Maintenance Companies and recovery/evacuation assistance to supported units. Out-of-sector

support for specific operations may also be a mission of this company. METT-TC will determine the length of time a non-divisional DS Maintenance Company occupies a single field site.

On-site Maintenance

3-160. The company provides on-site maintenance to supported units when practical. This service is provided with the dispatch of properly manned and equipped MSTs to a supported unit UMCP or to the site of equipment failure. All company elements provide personnel for on-site maintenance as directed by the MCS and set forth in the applicable TOE.

3-161. After receiving equipment, the MCS inspects the items that can be inspected and fault-diagnosed without disassembly. It then schedules equipment for shop repair, depending on shop workloads, parts availability, the priority of the requesting unit, and the priority of the specific equipment to support current operations.

Small Items

3-162. Small items and items requiring some disassembly (C-E equipment) or diagnosis using TMDE are normally sent to the appropriate maintenance shop after receipt. In the company, DS-level repairs consist of the following:

- Troubleshooting/replacing defective components and modules.
- Tightening and adjusting components.
- Welding operations.
- Repairing minor components using repair kits.

Records and Reports

3-163. Under a fully automated Maintenance Management System, most maintenance data and reports required by higher HQ are submitted on diskette or transmitted by modem. The company operates the SAMS-1 to manage maintenance and transmit data to the Battalion Support Operations Section. Data submitted by the SAMS-1 pertains to DS Maintenance Company operations. The Battalion Support Operations Section transmits SAMS-2 data to the CSG/ASG, Support Operations Section, or directly to the MMC.

Workload

3-164. Items repaired by the DS Maintenance Company are normally returned to supported units. Items not returned are those repaired for return to RX stocks (starters, generators, fuel pumps, and so on) or to operational readiness float. Items repaired in a backup role are returned to the supported maintenance unit or direct support unit (DSU).

3-165. Workloads exceeding the company's capacity or capability are evacuated according to disposition instructions provided by the MMC. Instructions, which are normally preset, designate shipment to specific units based on type and condition of the item.

3-166. Items repairable at the GS level are evacuated through the Class IX Supply System to a sustainment maintenance base. Certain items with specific condition codes are evacuated to a C&C Company. The Maintenance Company is required to report critical, controlled, or short-supply items to the MMC before evacuation.

Non-tactical Information Systems

3-167. The Defense Information Systems Network (DISN) is a worldwide, non-tactical communications network established by the DoD. The Defense Information Infrastructure (DII) is a worldwide complex of DoD-established information systems networks and control centers organized into a single, seamless, interoperable, long-haul, general-purpose Theater Communications System (TCS). DII facilities may be operated by any of the U.S. Armed Services. In a theater of operations where the Army manages the DII, the responsibility is assigned to the TSC-A.

3-168. The TSC-A Commanding General has the mission to establish, operate, and control the TCS. The commander responds to the operational direction of the ASCC and the Defense Information Systems Agency (DISA) for the DII (Army) under his control. The TSC-A is responsible for expanding and restoring DII web links in-theater and for providing liaison and interface to DII networks managed by the other services. During wartime, the TSC-A provides information systems support to the Wartime Theater Army and its forces in the theater of operations.

3-169. DII and TSC-A fixed information systems facilities use fixed-plant, COTS, and complex systems unique to TCS or DII operations. System complexity, criticality, and equipment configurations mandate that logistical support for non-tactical information systems equipment be provided differently than for ASCC tactical equipment.

Location

3-170. Supported sites may be dispersed over a large geographical area and the equipment maintained may be unique to the theater of operations. A theater may use equipment operating in a frequency range different from another theater's. Equipment may include systems manufactured in the HN.

Support Organization

3-171. The TSC-A Commander is responsible for the operation and maintenance management of facilities and resources that support or relate to the DII. The organization created to provide logistical support to non-tactical information systems in TSC-A is the AMSF. The AMSF may be a TDA organization or an MTOE organization with TDA augmentation. The AMSF provides both maintenance and supply support for TSC-A supported equipment. If specified in the Mission Statement or Statement of Work (SOW), the AMSF may operate as well as maintain telecommunications facilities for the TSC-A. The AMSF provides logistics support to fixed-station, semi-fixed, and special transportable information systems. Maintenance support provided by an AMSF includes DS, GS, and SRA levels.

Functions

3-172. **Maintenance.** Maintenance functions performed at the AMSF include repair of components, assemblies, modules, and PCBs evacuated by supported sites or MSTs. These include COTS equipment and systems. Repairs require specialized skills, special tools, TMDE, and disciplined QC. Repaired items are returned to the sites or RX, or they are restocked in the AMSF. Items beyond the AMSF's repair capability or beyond the scope of the AMSF Contractor SOW are returned to the manufacturer for repair.

3-173. **Supply.** The AMSF provides C-E repair parts for information systems operated at supported sites. It maintains a stockage of repair parts, circuit components, modules, subassemblies, special design tools, and test equipment for its own operation, as well as for supported site requirements. The AMSF provides complete support for all peculiar repair parts requests and organizational PLL. Repair parts support to customer units does not include repair parts for other items of organizational equipment, such as automotive, arms, and NBC equipment. The DS maintenance unit of the theater CSS organization charged with the normal DS support mission provides non-C-E parts support.

3-174. AMSFs requisition C-E repair parts and supplies directly from the appropriate CONUS NICP and other wholesale sources as prescribed by Integrated Logistics Support (ILS) Plans and Wholesale Interservice Supply Support agreements. They also receive, store, maintain account for, and issue non-force organic information systems project materiel and equipment (formerly referred to as Class IV project materiel) in support of the DII (Army).

3-175. **Operational.** If specified in the Mission Statement or SOW, the AMSF may also operate, as well as maintain, selected DII telecommunications facilities, AUTODIN, the Standard Theater Army Command and Control System (STACCS), Defense Red Switch Network (DRSN), and government-owned, contractor-operated (GOCO) facilities in the theater for the TSC-A.

NOTE: Chapter 2 of this manual provides additional information about the various non-divisional maintenance support organizations that may be required to provide maintenance support, based on the theater overall concept of support.

Liaison, On-site, and Emergency Service

3-176. Maintenance units must be mission-oriented and proactive in providing as much assistance to customer units as possible. Customer-oriented support is the overriding principle all DS maintenance operations are based on. Maintenance units will provide on-site maintenance to supported units whenever practical. On-site support keeps the maximum amount of serviceable equipment in the hands of supported units, reduces operational downtime for certain types of equipment, and provides supported units with on-the-spot instruction and advice to improve their operations. It also reduces the maintenance unit's workload, as well as handling and transportation requirements

needed if all unserviceable equipment were work-ordered to the maintenance unit for repair.

Liaison Visits

3-177. To provide adequate, effective support, the location of the supported unit, its equipment status, repair parts supply status, equipment density, and repair requirements must be determined. Upon being assigned a support mission and arriving in their operating area, DS maintenance units perform liaison visits to make initial contact with supported units.

3-178. The SPO, accompanied by one or more key personnel, makes initial contact. Supported units are informed of the supporting unit's location, services to be provided, and procedures for obtaining these services. Maintenance and repair parts issues and requirements are discussed. After initial contact, liaison is maintained on a frequent basis. The DS Unit Commander makes additional visits to supported units to maintain good working relationships.

Technical Assistance

3-179. Technical assistance is providing instruction and technical guidance to supported units to enable them to perform their mission more efficiently. It can increase the quality of maintenance at the unit level, thereby reducing the workload at the DS level. Technical assistance may be provided formally by the AMC Logistic Assistance Program or MACOM-level Maintenance Assistance and Instruction Teams (MAITs). The DS Maintenance Unit Commander may also provide assistance informally. Technical assistance includes visits by Technical Assistance Teams made up of competent experienced soldiers from the DS unit. The team's functions include, but are not limited to the following:

- Advising the supported Unit Commander on the responsibilities for unit-level maintenance and repair parts supply.
- Determining the nature and scope of maintenance support required so that a properly manned and equipped MST can be sent to provide on-site maintenance.
- Assisting the supported unit in the operation of maintenance management automation (ULLS-G).
- Discussing and resolving mutual maintenance support issues regarding personnel, equipment, or operational procedures and policies.
- Assisting the Unit Commander with the evaluation of equipment condition and the effectiveness of the maintenance program, and formulating required remedial action.

On-Site Maintenance

3-180. On-site maintenance support includes the following:

- Performing maintenance at the location of equipment failure or at the supported unit's MCP.
- Delivering repair parts directly to supported units.
- Providing technical assistance.

It also includes liaison visits to identify issues and requirements of supported units and to inform them of the support available and the procedures required to obtain it. Liaison Teams and MSTs provide on-site maintenance support.

MAINTENANCE SUPPORT TEAMS

3-181. MSTs perform on-site maintenance. They may also be used to help supported units determine the condition of supported equipment and to provide advice and assistance for correcting equipment failures noted in inspections. The MST organization varies according to the mission.

Employment

3-182. Employment of MSTs depends on maintenance support requirements. Some teams are dispatched in response to a specific requirement in a specific area. They return to the DS unit after completing their mission. Other teams may operate away from the DS unit in a UMCP for extended periods. The MCO determines how the MST operates. It depends on the mission of the team concerned and known requirements for on-site maintenance support. MSTs not only are dispatched as a result of requests from supported units, but also to satisfy planned operations (such as responses to anticipated requirements).

Equipment

3-183. MSTs will be equipped with the tools, equipment, and repair parts needed to do a specific job. When requesting on-site maintenance, supported units report the type of malfunction and any known parts requirements. MSTs must also know the supported unit's equipment density and any special support requirements (for example, welding). This helps determine the proper composition of personnel, equipment, and repair parts for the MST organization.

Personnel Assignment

3-184. When possible, personnel and supervisors are assigned to an MST permanently. This simplifies management, facilitates cooperation, and promotes better understanding of the job by team personnel.

ENVIRONMENTAL/TACTICAL SITUATIONS

3-185. The environmental or tactical situation and reports from supported units often permit an accurate forecast of on-site maintenance requirements. Caution and good judgment must be used. In a situation where supported units operate from remote locations, it may be necessary to attach a DS MST temporarily to the supported unit.

3-186. The relative merits of transporting personnel and equipment to repair items, as opposed to receiving items at the company base, must be weighed before a decision is determined. This is especially true in situations where air transport is the only means of personal contact. In these situations, great reliance must be placed on providing DS-level maintenance at the supported unit's location (especially for maintenance of heavier and bulkier items), which are difficult to transport, by air.

EMERGENCY MAINTENANCE SERVICE

3-187. Besides providing DS-level maintenance to specific units in a specific geographic area when requested, each DS maintenance unit provides emergency maintenance support. This service may be provided at the roadside, in the DS shop, or on-site.

ROADSIDE SERVICE

3-188. Roadside service may consist of the repair of disabled equipment, BDAR actions, or recovery of disabled vehicles. Normal BDAR repair involves a minimum of parts, tools, and time. Fuel system failures, overheated engines, and electrical failures are the usual malfunctions. The form and scope of emergency roadside service are governed by need, the weather, the tactical situation, and traffic. Road patrols, recovery service, or maintenance elements at refuel points provide this type of service.

Road Patrols

3-189. Road patrols consist of two or more automotive mechanics in a light vehicle carrying a small stock of repair parts, repair kits, and tools. Patrols are dispatched and routed so they will pass any given point on a main supply route (MSR) at least every two hours. However, road patrols reduce the unit base shop maintenance capability. Emergency service is rendered on the spot to any disabled vehicle found along the route. When necessary, a recovery vehicle is called by the patrol to recover the disabled equipment to an MCP, evacuation point, or the DS maintenance shop.

Recovery Vehicle

3-190. A recovery vehicle may be stationed at a convenient intersection along the route or may remain on call in the DS maintenance unit. Recovery vehicles are the primary source of heavy-lift capability for removal and replacement of automotive power train assemblies in the field. Therefore, they should not accompany a road patrol unless the requirement for their services is known beforehand.

Refuel Points

3-191. DS-level maintenance support can be set up at refuel points along heavily traveled routes. This is a practical method of providing efficient, economical roadside maintenance service. Petroleum platoons can provide assets along roads for convoy refueling. These services can be extended to provide fuel to all vehicles using the route. A small maintenance element can also be located here. This element may consist of four to six automotive mechanics equipped with a vehicle and cargo trailer carrying small, easily replaceable repair parts and RX items.

3-192. While vehicles are being refueled, the maintenance element can assist the operator/crew in performing spot checks of the vehicle. Minor deficiencies can be corrected on the spot with available tools, repair parts, and BDAR techniques. Deficiencies that do not deadline the vehicle will be annotated on DA Form 5988-E. This form is given to the vehicle driver for action on return to the unit.

DIVISIONAL MAINTENANCE CONCEPTS OF SUPPORT

ARMY OF EXCELLENCE CONCEPT OF MAINTENANCE SUPPORT

3-193. AOE maintenance uses the “four-level fix forward” philosophy. The mission support requires that sliced support elements must be task-organized (not modular). Only selected component repair is conducted in the CZ. EAD assets provide support to Corps units in the Division CZ and backup DS support to DISCOM Maintenance Companies. AOE maintenance units have very limited on-board prognostics and diagnostics.

3-194. The primary STAMIS’ that provide supply support, maintenance management, and materiel readiness data are the ULLS-G, the SAMS-1, the SAMS-2, and the SARSS. ULLS-G systems are located in every organizational maintenance element. SAMS-1 systems provide maintenance support to all DS maintenance activities. SAMS-2 systems provide maintenance management support at the Maintenance Battalion and MMC levels.

3-195. AOE DISCOM maintenance elements operate throughout the division area. They typically perform their functions on-site, at MCPs, and company base shops. The DMC provides maintenance management for the ASB as it does for the MSB and FSBs.

3-196. The Materiel Section of the DMC manages repair parts supply and maintenance. It designs and manages the division Class IX inventory and directs the Class IX issue.

3-197. Logistics Support Activity (LOGSA) provides the Maintenance Master Data File (MMDF) to the SAMS-2 MMC. The MMDF is subsequently forwarded to the SAMS-1 and ULLS-G. The MMDF provides reportable systems and subsystems materiel readiness reporting guidelines. The Materiel Section manages maintenance for all items of materiel and oversees the document control and edit functions. This section supervises its branches in providing integrated maintenance management using SAMS-2 materiel management processes and materiel readiness procedures.

3-198. DMC management is limited to the maintenance functions that are generally external to the MSB, FSBs, and AMCO. These include the monitoring of unit maintenance throughout the division. The section also collects, analyzes, and reports maintenance statistics and maintains records on the status of MWOs. The Materiel Readiness Section also processes the materiel readiness data for all reportable systems that is forwarded to LOGSA. It compiles reports on the operational status of division equipment and provides disposition instructions on unserviceable materiel.

3-199. The DMC Materiel Section uses the SAMS-2 MMC as a tool for developing data and reports for maintenance management. The SAMS includes a maintenance control system and MWO accounting procedures. Data to support the SAMS is provided from using organizations and maintenance units using the SAMS-1. The data is summarized and prepared in the form of reports that are used by SAMS-1 and SAMS-2 Maintenance Managers and Commanders. These reports are used for management purposes by supported units, Maintenance Unit Commanders, the DMC, and the DISCOM Commander and staffs.

3-200. The Light/Electronic Maintenance Companies of the MSB operate the Main Division MCP at the base shop in the DSA. The MCP receives unserviceable equipment from supported units. The Electronic Maintenance Company also establishes a base shop in the DSA. When required, these companies send MSTs out in the division rear to make repairs as close to the site of equipment failure as possible. Teams may also be sent to augment the FSB's maintenance capability. At the MCP, maintenance personnel, assigned by the MCO, perform large-scale BDA. They may use controlled exchange and cannibalization to maximize operational systems. All supported units are responsible for recovery of equipment. Units bring recovered materiel to the nearest collecting point. When units cannot recover equipment to an MCP, they should recover items as close as possible to an MSR to await maintenance support. The unit must provide or arrange for security. It must also provide accurate location information to the MCS.

3-201. The Electronic Maintenance Company operates from the DSA. It normally collocates with the main Maintenance Company. It has a base shop capability to repair equipment for which it is responsible. The objective of the company is to return to operation the maximum amount of light equipment in the least time.

3-202. The MSB Support Operations Section coordinates with the DISCOM Support Operations branch to arrange all reinforcing support for the MSB. This includes evacuation of materiel, emergency needs, and technical help. The Support Operations Section monitors the ASL and PLL levels. It ensures the company maintains proper operating levels. The Support Operations Section also coordinates MST operations with Maintenance Companies and supported units. The Maintenance Support Platoon of the MSB combined with the C-E Support Platoon set up and operate the base of operations. When required, the company sends MSTs into the division rear or forward to the FSB to provide support consistent with tactical limitations and support capabilities.

3-203. The Electronic Maintenance Company is organized and equipped to provide forward support maintenance. It also operates a base shop in the DSA. MSTs of the Electronic Maintenance Company provide limited on-site DS maintenance of malfunctioning equipment, to include repair by RX of selected components. Malfunctioning components are returned to the Electronic Maintenance Company base shop by MSTs for repair. MSTs provide support for land combat missile systems, multiple launch rocket systems, and air defense artillery systems. The Electronic Maintenance Company has an additional mission of fielding BDA Teams. This function will normally be accomplished by the MSTs as they perform their mission.

3-204. The maintenance relationship between the MSB and the ASB is established by the DISCOM Commander. Command priorities and the ASB's capabilities to accomplish specific missions determine the amount of support. The MSB provides timely, tailored reinforcing support for DS maintenance. The ASB Support Operations Section coordinates with the DISCOM S3 when the GMC needs reinforcing support. The MSB Electronic Maintenance Companies maintain technical heavy maintenance relationships with the GMC.

3-205. The ASB GMC is a critical engineer, utility, power generation, C-E equipment, component in fixing the force. The Cavalry System Support Team (CSST) is structured for ASB non-air items and DS maintenance to support the Aviation Brigade (AB) Cavalry Squadron. This team for AB/ASB non-air items, including automotive, normally works in a maneuver BSA.

3-206. DS units and the DMC share the job of Class IX Supply in the division. The DS units receive, store, issue, and turn in the parts. Supply personnel in the Materiel Section of the DMC manage and account for the Class IX inventory. They use demand history and command-directed actions to help them.

3-207. To prevent overstockage in the FSB Maintenance Companies, forward stockage of Class IX is restricted. Selection of this forward stockage is made in coordination with the MSB and FSB SPOs and the FSB Maintenance Company Commander. Determinations are based on the PLLs of the units to be supported and on the immediate mobility needs of the forward support maintenance units. The remaining stocks of the division Class IX ASL are maintained by the proper maintenance operating units. Examples of these operating units would be Conventional and Electronic Maintenance Companies usually located in the DSA.

3-208. Customers in the DSA submit their requests directly to their supporting DS Supply Support Activity SARRS-1 via the ULLS-G. The MSB Maintenance Company also passes requests directly to the SARRS-1 via the SAMS-1.

3-209. Class IX items arriving in the division are received by the Electronic Maintenance Company of the MSB. This company reports receipt of the item to the DMC and updates the SARRS-2 management files. Non-stocked items are forwarded directly to the user in the DSA. Items are forwarded to the FSB Maintenance Company for issue to the user located in the brigade area. All issues are reported to the DMC for updating SARRS records. Turn-ins are handled in the same manner as receipts and are also reported to the DMC. Missile Class IX items are managed through the MSB Electronic Maintenance Company in the same manner.

3-210. On the basis of METT-TC considerations, the FSB Maintenance Company Commander, MCO, and the FSB Support Operations Section form MSTs to operate at battalion unit MCPs. The core of the MSTs are the SSTs for infantry artillery and tank systems. Typically the FSB Commander has the assets of two Tank SSTs and one Mechanized Infantry SST. Operating out of the battalion TF UMCP, SSTs provide on-site repair for heavy maneuver systems. The SAMS-1 is the FSB's

primary automated maintenance management tool for work load management and shop operations. Though the Maintenance Company Commander retains command and control of these teams, the Maneuver Battalion Maintenance Officers set the priorities for equipment repair. The Maintenance Company provides DS maintenance and common repair parts service to supported units in the brigade area. The FSB Maintenance Company includes a variable number of SSTs. Each team is designed to support a Tank or Mechanized Infantry Battalion. The company receives one team for each Maneuver Battalion assigned to the brigade.

3-211. Other FSB maintenance assets are positioned at MCPs or the base shop. When unit maintenance resources cannot handle the workload, MSTs or other teams of Maintenance Company assets may be dispatched to perform on-site repairs. On the basis of maintenance timelines and the tactical situation, the Team Chief will determine whether to perform on-site repairs or to recover the equipment to a MCP.

3-212. The FSB can operate up to two MCPs to receive unserviceable equipment from supported units. MCP personnel perform large-scale battle damage assessment and may use controlled exchange and cannibalization to maximize operational systems.

3-213. All other FSB maintenance elements are located at the base shop. The base shop is responsible for receipt, inspection, control, repair, and coordination of evacuation of equipment. Elements of MSB Maintenance Companies may be used to augment the FSB's maintenance capability when the workload across the division and the division's mission dictate. Figure 3-3 provides a visual representation of AOE maintenance operations. Chapter 2 of this manual provides more detail about each AOE maintenance organization.

FORCE XXI CONCEPT OF MAINTENANCE SUPPORT

3-214. The overarching principle of FXXI maintenance is to replace forward and repair rear. This philosophy of maintenance allows the FSCs to maintain pace with their supported units. In the redesigned division, some maintenance procedures and doctrinal methods are changed to gain greater effectiveness and efficiencies. Increasing emphasis is placed on prognostics and diagnostics. FXXI maintenance has limited component repair conducted in the CZ. The majority of repairs are passed back to EAD elements. The FXXI primary maintenance STAMIS' remain. The ULLS-G, SAMS-1, SAMS-2, and SARSS-1 provide the automated maintenance management and supply support to the FXXI force structure similar to the AOE.

3-215. Generally speaking, all DS and unit maintenance functions are consolidated in the FSB and are now called "field maintenance." This applies to the Mechanized and Armor Maneuver Battalions, Engineer Battalions, Brigade HQ, Division HQ, and Brigade Reconnaissance Troops. The division troops and field artillery retain their unit maintenance sections. Division troops are provided DS maintenance from either the base shop of the Area Maintenance Company of the DSB or MSTs organic to the DSB. The only exception is the Artillery Battalion supporting a Maneuver Brigade. The BSC of the FSB provides a DS MST to support the Artillery Battalion in that scenario. Mechanics accomplish

their mission by using advanced diagnostics and prognostics to diagnose to the major component fault, at which point, the component is replaced under the “replace forward” concept. “Replace forward” focuses on “on-system” maintenance tasks or those tasks that can be performed at the breakdown site, if possible, or UMCP.

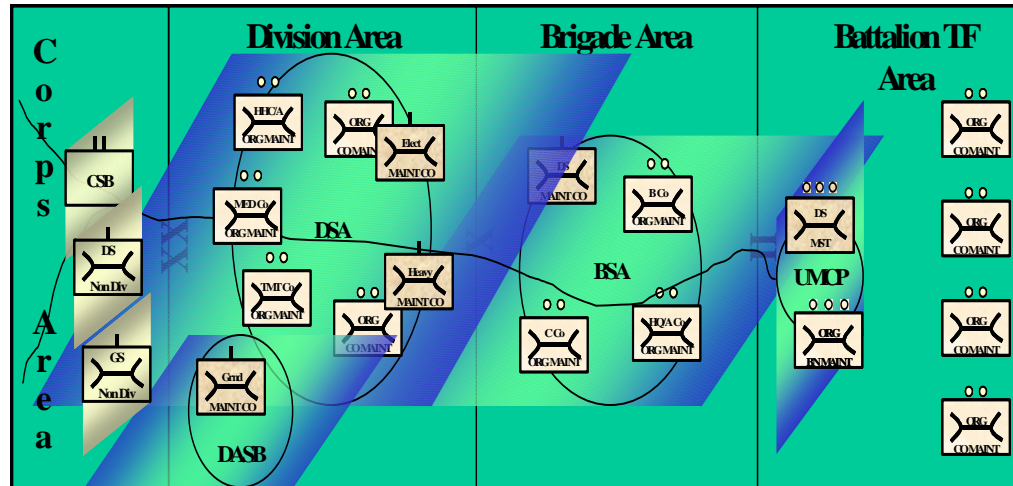


Figure 3-3. AOE Maintenance Concept

3-216. The Maintenance Section of the division support operations manages maintenance workload and priority of effort. It manages the maintenance functions that are generally external to the DSB, DASB, and FSBs. The section monitors unit maintenance throughout the division. It collects, analyzes, and reports maintenance statistics. It maintains status on the materiel readiness of the reportable systems and subsystems. This section also provides disposition instructions for the evacuation of all unserviceable materiel.

3-217. The DSB Area Maintenance Company provides DS maintenance to division troop units not supported by the Brigade Support Company or Forward Support Company of the FSB. The DASB provides maintenance support to the Aviation Brigade and Division Cavalry Squadron.

3-218. The ASMC establishes base shop operations in the DSA. As directed, MSTs from the Area Maintenance Company provide on-site maintenance support to elements of the ADA, Signal, and MI Battalions, as well as the Division’s MLRS Battery. The company is focused on returning as many systems to the battle as quickly as possible. The Area Maintenance Company is oriented toward equipment through the replacement of major components and LRUs. The Area Maintenance Company typically collocates near the Quartermaster Company to facilitate the flow of Class IX parts to and from the company.

3-219. All requests for Area Maintenance Company maintenance support are directed through the DSB Support Operations Section. The DSB Support Operations Section receives the maintenance calls for support (CFS) and forwards the task orders (TOs) to the Area Maintenance Company MCS. The MCS forwards the TO to the applicable section or team that will perform the mission.

3-220. The Area Maintenance Company Maintenance Control Section provides command, control, and communications for the DS maintenance mission. This section coordinates maintenance priorities with the Company Commander and DSB SPO. The MCO task organizes the DS maintenance assets to execute the established maintenance priorities. Maintenance assets provide maintenance support from either the base shop located in the DSA, from predetermined MCPs, or from on-site based on the METT-TC. As the division task organizes to conduct combat operations, ASMC maintenance assets are tailored to support the changing missions.

3-221. The Area Maintenance Company manages organizational maintenance using the ULLS-G. When unit level parts are required, the ASMC checks its PLL. If not available, the ULLS-G forwards the request to the SARSS-1 site in the DSB Quartermaster (QM) Company where the request is either filled out or passed to the SARSS-2A site at the DISCOM Support Operations Section. The SARSS-2A site checks divisional SSAs and either issues the part or forwards the request to the Corps MMC.

3-222. When DS level maintenance support is required, the supported unit sends a call for support to the DSB Support Operations Section via the FBCB2 or SINCGARS radio. The DSB Support Operations Section sends a TO to the Area Maintenance Company Maintenance Control Section. The MCS dispatches appropriate maintenance personnel and equipment to link up with the supported unit at the predetermined place and time to diagnose/troubleshoot and repair the piece of equipment. If repairs cannot be made on-site, the inoperable piece of equipment is recovered to the Area Maintenance Company MCP or other designated location.

3-223. The MST and Base Shop Platoon order all required DS level repair parts on a DA Form 2407 (Maintenance Request), which is then inputted into the SAMS-1. The MCS issues the available shop stock items and orders the remaining parts through the SARSS-1 site in the DSB QM Company. The MCS monitors inoperable equipment using its SAMS-1 computer system. The DSB Support Operations Section and the Maintenance Section of the Division Support Operations Section also use the SAMS-2 to assist in inoperative equipment repair, maintenance workload, and materiel readiness management.

3-224. The Ground Maintenance Company of the DASB provides unit maintenance for all DASB non-air items. They also provide DS support maintenance for Aviation Brigade/Division Cavalry Squadron non-air items, including automotive, engineer, utility, power generation, C-E equipment, and small arms. Its mission is to provide support as far forward as possible to return, as rapidly as possible, ground combat systems to the battle. Repairing equipment forward saves transportation assets and time. Whenever practical, equipment repair should be done on-site. The tactical situation, extent of damage, and availability of resources may require recovery and evacuation. The ULLS-G provides automated maintenance management in support of the organizational maintenance mission.

3-225. The CSST is structured to support the Division Cavalry Squadron. This team normally operates out of the Cavalry Squadron trains area. It is reinforced with other DISCOM elements as required. The team's repair capabilities include the following:

- Automotive/tracked vehicles.
- Armament/fire control systems.
- Ground support equipment.
- C-E.

3-226. The digitized division depends on a significant number of automated systems to accomplish its missions in peacetime and wartime operations. Automation is a critical component of gaining information dominance, shaping the CZ, conducting decisive combat, and protecting the force. A major part of the success in leveraging all this automation involves the development of an integrated Maintenance Plan for keeping all the associated hardware and software operational and functioning. The ULLS-G, SAMS 1, SAMS-2, and SARSS-1 are the backbone of the FXXI integrated automated and SSAs. The Maintenance Plan must be integrated to maximize operator level, organizational, and DS maintenance capabilities within the division and the reinforcing DS and contractor maintenance capabilities at EAD.

3-227. The maintenance mission of the BSC is to provide field maintenance not only to itself but also to the following:

- Brigade HHC.
- Brigade Reconnaissance Troop.
- FSB FSMC.
- HDC.

It also provides limited backup maintenance to the FSCs and divisional units in the brigade area. The BSC also provides DS maintenance to FA units that are part of the brigade.

3-228. The BSC Base Maintenance Platoon provides field maintenance (organizational and DS) to the HDC FSB, BSC, FSMC, HHC Brigade, and Brigade Reconnaissance Troop. It also provides DS maintenance support to other units operating in the BSA. The platoon performs and coordinates backup and reinforcing support to the FSC Maintenance Platoons and the engineer support element (ESE) Forward Engineer Repair Teams. The goal of the "replace forward" concept is to repair systems forward on the battlefield, returning combat systems to battle as rapidly as possible.

3-229. The FSC Commander is the single CSS operator at the maneuver BN/TF level. The FSC provides field maintenance and all classes of supply, minus medical, to its supported battalion/task force (BN/TF). The FSCs accomplish their core functions through centralization of support and new technologies. Centralized support allows the FSB Commander to cross-level between FSCs and weigh the battle logistically, or surge as required. Centralization of support is enhanced through employment of maturing technology available to the Division Logistician. The FBCB2 and its capability to provide near real-time SU to all on the battlefield greatly assist in the support effort. CRTs from the FSCs are placed

forward with each Maneuver Company under the operational control of the Maneuver 1SG. The FSC CRTs are the Maneuver Battalion's first level of support. These modular, task-organized teams provide tactical field maintenance for all organic Maneuver Company systems.

3-230. A FFCB2 call for support message is the preferred method to initiate recovery operations. This will enable recovery vehicles to identify the inoperable piece of equipment's exact location. Figure 3-4 provides an overview of FXXI maintenance operations. Chapter 2 provides more detail about FXXI maintenance organizations.

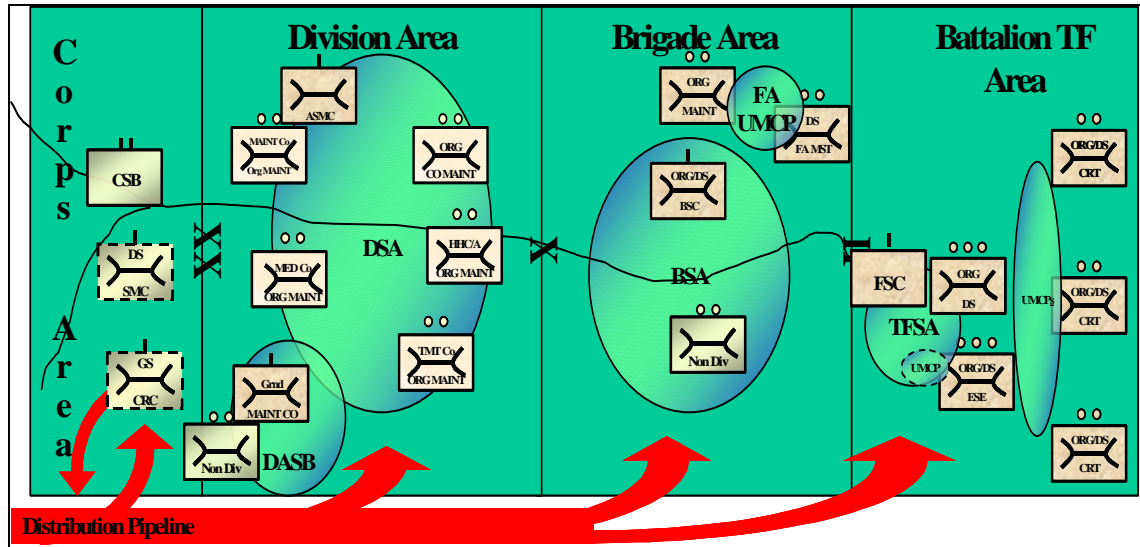


Figure 3-4. Force XXI Maintenance Concept

STRYKER BRIGADE COMBAT TEAM CONCEPT OF MAINTENANCE SUPPORT

3-231. The SBCT Maintenance concept is related to the emerging FXXI doctrine using a two-tiered maintenance system and centralized management. These tiers are field and sustainment maintenance. Field maintenance tasks are those that directly return the system to an operational status. Sustainment tasks are those that support the supply system. Field maintenance tasks are the responsibility of the operators and tactical maintenance units performed in the CZ. The primary methods of returning systems to a mission-capable status are through the use of Class IX repair parts, BDAR, controlled substitution, cannibalization, and Class VII replacement. The essential maintenance tasks for this organization are LRU, component, and major assembly replacement in the CZ.

3-232. The FMC of the BSB, combined with the essential equipment supported contractors, provide all maintenance support for the SBCT, (less medical) and the limited automation capability, which is integrated into the Brigade's S6 Section and the Signal Company. The FMC has the maintenance capability to perform automotive, armament, missile, communications, special devices, and ground support equipment repair. However, its depth is very shallow.

3-233. The combination of organizational/DS maintenance (field maintenance) unifies organizational and DS level maintenance responsibilities and capabilities into one organization. The FMC Maintenance Control Section will be able to focus maintenance leadership, management, technical expertise, and assets under a single CSS operator. This will ensure that maintenance can be planned, allocated, and swiftly executed when and where needed to satisfy the commander's requirements.

3-234. The interim SBCT Maintenance concept, pools maintenance assets under a single CSS operator (for example, the MCO). It also brings together maintenance leadership and management ensuring that maintenance support is planned, resourced, and executed when and where needed, with a unified focus, in support of a common mission and objective. Enablers (such as the FRS and emerging diagnostics and prognostics) will enhance the forward deployed CRTs' ability to execute this concept. The CRTs are tailored with the right people with the right tools and test equipment to provide automotive field maintenance forward on the battlefield and rapidly return combat systems to the fight. The FMC does not provide full manpower requirement code (MARC) support to the SBCT.

3-235. The MCS is the nerve center for maintenance operations within the SBCT. It operates the SAMS-1 and provides maintenance management and materiel readiness data to the commanders and materiel readiness managers. The section consists of the MCO, Maintenance Control Sergeant, and the Equipment Records/Parts Specialists. The Equipment Records/Parts Specialists have oversight responsibility for all TAMMS operations in the brigade and manage the DS shop stocks. CRTs are equipped with a remotely operated ULLS-G (legacy STAMIS) and a minimal number of operators. The remotely operated ULLS-G provides near real-time inoperative equipment data for reportable systems and subsystems. It also identifies repair parts requirements for inoperable equipment that the CRT was not able to repair on-site. When forward, CRTs may take STAMIS equipment with them and may use any available means (such as at the Battalion S4 or Battalion Aid Station) to establish connectivity to pass maintenance data back to the FMC. Using available systems, the CRTs perform as much of the repair operations as far forward as possible. The FMC will require augmentation in both garrison and deployed environments to perform all TAMMS management functions, dispatching operations, and coordination for all maintenance and recovery support to units within the brigade. While deployed, TAMMS management is extremely limited until additional maintenance management personnel arrive. This may be in the form of either civilian or military augmentation. The MCS also dispatches Contact Maintenance Teams and MSTs to provide forward support. MSTs, such as the Missile Repair Teams, are teams operating from the BSA that are designed to move forward to provide support. Contact Maintenance Teams are task organized as the situation warrants and are not formally organized.

3-236. CRTs are based at the BSA. They move forward to conduct maintenance operations and then return to the BSA for further tasking to support the next maneuver element requiring maintenance. CRTs may

take a remotely operated automated maintenance system (ULLS-G) forward with them and establish near real-time reporting connectivity via the Battalion S4 or Battalion Aid Station. If connectivity can be established, this should increase the speed of the Class IX requisition system and thereby reduce repair cycle time. However, the CRT's primary focus is combat replacement/repair. CRTs will often require daily Class IX resupply in order to maintain sufficient readiness levels. Supported by IETMs and the FRS, the teams perform the following:

- Identify faults.
- Monitor embedded prognostics.
- Advise Unit S4s regarding forward maintenance management.
- Conduct component and major assembly replacement for supported equipment.

3-237. The FMC retains maintenance capability in the BSA due to limited resources and mobility of certain pieces of test equipment. The Base Maintenance sections provide dedicated field maintenance on an area basis to brigade troops, as well as backup support to the CRTs and Maneuver Battalions. The MCS maintains automated maintenance systems (legacy STAMIS or when developed, GCSS-Army) to support the SBCT separate companies and the BSB. It also serves as the MCP for all maintenance records prior to being sent to the support operations staff. Base Repair sections can perform contact maintenance missions as required depending on the criticality of the NMC system and METT-TC. The MCS assesses all vehicles requiring evacuation to determine if they can be returned to a mission-capable status. Vehicles that cannot be returned to a mission-capable status in the AO are evacuated through the HDC to a sustainment maintenance facility as time permits. Maneuver units will employ like-vehicle recovery to the greatest extent possible. When this is not a reasonable alternative, the inoperable vehicle may be recovered to the CRT or evacuated to the BSA location either by the CRT or the FMC Recovery Section.

3-238. Class IX repair parts will be carried in many locations throughout the SBCT AO to perform field maintenance. The HDC will maintain the ASL of Class IX repair parts in its Supply Support Platoon. Requests for Class IX resupply will be near real-time and originate at a maintenance node (CRT or base shop) and travel through maintenance STAMIS' to the supporting Class IX activity. Requests may also be sent via the FBCB2 or voice communication as an alternative. This alternative requires additional time and effort to input the necessary fields in the system so that a part can be ordered. Objectively, mechanics will be connected via IETMs that have embedded prognostics and diagnostics. The mechanic will determine the fault and input it into the IETM that will then order the necessary part(s) through the STAMIS. Many Class IX LRUs normally repaired by FSBs and MSBs in the AOE CZ will not be repaired in the SBCT CZ due to the mobility and OPTEMPO demands noted above. Instead, they will be evacuated to a Sustainment Maintenance Center for return to the supply system. In these cases, an LRU is turned into the SSA and subsequently retrograded via normal resupply operations by EAB. Replacement LRUs, repaired at sustainment

maintenance facilities, will be returned via the same channels to the SBCT/BSB.

3-239. Maintenance management in the SBCT will require close coordination and collaboration between the Battalion/Brigade S4s, the support operations staff, CRTs, and the MCO. The SPO performs the following:

- Tracks maintenance/supply data and trends.
- Provides guidance to the MCO on priorities as they are passed down from the Brigade Commander.
- Develops current and future support plans.
- Acts as the central logistics integrator for the SBCT and BSB Commanders.

Contracted maintenance personnel may perform much of the maintenance management and TAMMS functions within the brigade to include ULLS-G and SAMS-1/2 (to be replaced by GCSS-Army modules) operations while in garrison.

3-240. As the OPTEMPO of the brigade intensifies or the duration of a deployment increases, the FMC will require additional capabilities. In both garrison and deployed environments, the SBCT will require external support to perform scheduled and unscheduled maintenance, as well as TAMMS functions to maintain readiness. When deployed, the SBCT may receive additional support by increasing the existing capabilities of the force with people and equipment (scaling) or adding capabilities that are presently non-existent in the deployed force (augmentation). One source of augmentation will be the CSSC.

3-241. The need to augment the BSB, in order to sustain the force after the initial stages of employment in extended operations, has been a key tenet of the concept of support. Even if a CSSC is available to support an SBCT in garrison, it does not have all the resources to maintain SBCT readiness on a sustained basis. The CSSC is an austere solution to fill only the most critical requirements of the SBCT that the BSB cannot provide. Even with a CSSC, the SBCT will require additional support in such areas as personnel transportation, servicing, and maintenance. The CSSC is intended to deploy after the initial stages of employment in order to sustain an SBCT in extended operations.

3-242. The CSSC provides the FMC with a Maintenance Platoon that increases the capabilities of each section in the FMC. Technical expertise, TAMMS functions, and increased repair capability are provided to the CRTs in terms of Warrant Officers, Equipment/Repair Part Specialists, and Mechanics. The CSSC Maintenance Platoon also provides increased repair capability to the base shops of the FMC. The addition of the CSSC Maintenance Platoon enables the FMC to move from remedial maintenance (move, shoot, and communicate repairs) towards 10/20 level maintenance. This scaling also decreases the FMC's heavy reliance on Class VII exchange. The FMC will still require further scaling beyond the CSSC to perform scheduled services on equipment. Figure 3-5, page 3-52, provides an overview of SBCT maintenance operations. Chapter 2 provides more information about SBCT maintenance organizations.

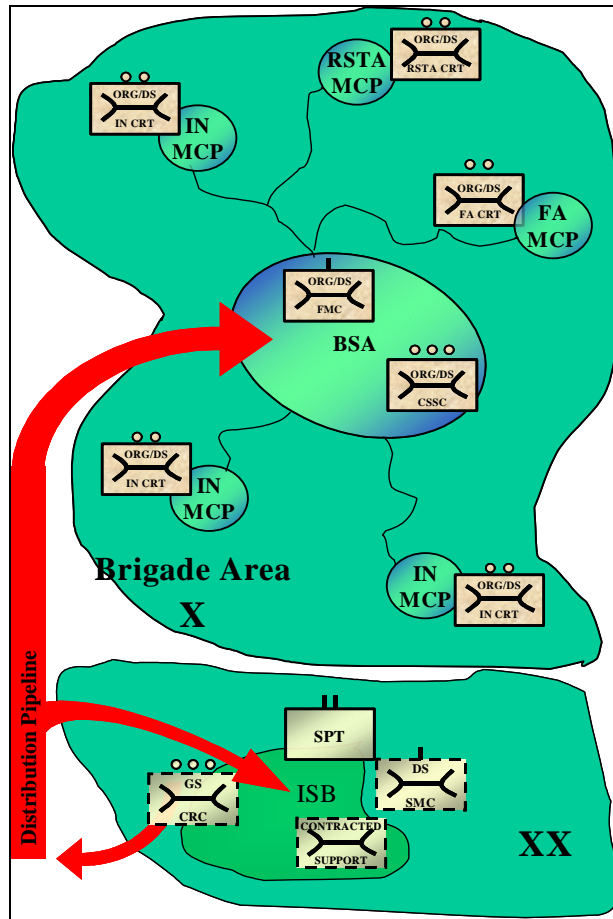


Figure 3-5. SBCT Maintenance Concept

ADVERSE ENVIRONMENTS

3-243. The first step in preparing for maintenance support operations is an analysis of the mission. Time, tools, skills, and repair parts (Class IX) are important to maintenance operations. A detailed analysis of the AO to identify LOCs will play a major part in determining how maintenance support operations will be conducted.

3-244. It is probable that LOCs will be limited in hostile environments. Airfields, good roads, and railroads will be the exception rather than the rule. Airdrop of supplies and equipment is an effective alternative to air landing. Airdrop is a rapid means of delivery that makes deliveries to isolated units possible without further transshipping. Armor-Infantry-Mechanized (AIM) Divisions have no organic airdrop support. They rely on corps units for airdrop support. Maintenance Unit Commanders must keep themselves informed at all times of user requirements and their own maintenance capabilities.

DESERT OPERATIONS

3-245. Maintenance support for desert operations requires an understanding of the environment. Temperatures vary according to latitude and season (from over 136° F to the bitter cold of winter). In some deserts, day to night temperature fluctuation can exceed 70° F. Some species of animal and plant life have adapted successfully to desert conditions where annual rainfall may vary from zero to ten inches. Desert terrain also varies from place to place; the common denominator is lack of water and little, if any, vegetation. This environment can profoundly affect military operations.

Location

3-246. Desert locations are seldom close to normal LOCs. The effects of the environment on equipment are severe, requiring increased levels of support to maintain a standard level of efficiency. Distances between units and LOCs are long. Due to their importance, maintenance units are primary targets.

Security

3-247. Enemy ambushes on MSR routes are a threat in desert operations. Enemy patrols may lay nuisance mines on routes, especially at critical points. The following are some actions that can reduce the threat to supply routes:

- Patrol routes before immediate use and at irregular intervals when not in use. If the route is patrolled by surface vehicles, they must have maximum protection against mine blasts. MP patrols also provide a resource for continuous monitoring of supply routes.
- Locate observation posts so their surveillance equipment interlocks in poor visibility conditions. Observation posts can maintain a constant presence along the route but are relatively expensive in manpower.
- Schedule convoys at irregular intervals. Convoys may require armed escorts, as determined by the commander on the basis of the METT-TC.

Operations in a Nuclear, Biological, and Chemical Environment

3-248. NBC contamination of personnel and equipment make maintenance operations more difficult and time-intensive. Automatic chemical alarms on vehicles do not react fast enough to prevent passengers from receiving incapacitating doses of a chemical agent. Therefore, vehicle movement in a potential NBC environment normally occurs in full MOPP.

3-249. Although training extends a soldier's ability to operate effectively in MOPP, they eventually reach a physical and psychological limit. Since continuous wearing of full MOPP may hinder the recovery mission, a uniform modification may become necessary. Commanders make decisions based on the following variables:

- Chemical threat to the unit's mission.
- Unit vulnerability to future chemical attacks.
- Reaction time of unit personnel.
- Time required donning protective clothing.
- Types of potential threat agents.
- Weather conditions.
- Work rate.

3-250. Water, solvents, and petroleum products degrade the protective quality of MOPP garments. When the mission permits, individuals should replace protective clothing. Units operating in an uncontaminated area must establish NBC inspection points to monitor recovered equipment entering the area. Process contaminated vehicles through a decontamination station or leave them downwind in a holding area away from the unit for weathering and decontamination. Label all chemically contaminated equipment and repair parts.

3-251. **Contaminated Equipment.** If practical, decontaminate and recover equipment previously contaminated by NBC agents. Both using units and supporting maintenance units have chemical agent detection kits and radiometers to detect chemical and nuclear contamination. If the item cannot be decontaminated and the contamination is severe enough to prevent recovery and evacuation, carefully note the location of the item. Coordinate through the Battalion HQ for decontamination or disposal instructions. Ensure maintenance unit SOPs include instructions on recovering and evacuating contaminated materiel.

3-252. **Hazards.** There are certain actions and precautions to take for hazard recovery. Table 3-5 lists these recovery hazards.

Class IX Supply Support

3-253. Demand for Class IX supplies will increase due to environmental effects on equipment and the extra maintenance effort required. Small items with high-usage rates should be held as far forward as practical. Typical high-consumption items include:

- Filter elements.
- Tires.
- Water pumps, gaskets, fan belts, water hoses, and clamps.
- All parts for ignition systems.
- Wheel and sprocket nuts and wedge bolts.
- Spare caps for all liquid containers.
- Speedometers and cables (due to dead reckoning navigation, these are critical).
- Cleaning fluids for electronic equipment and windshields.

3-254. A unit's PLL depends on its equipment, but parts should be limited to only those items preventing equipment from performing if the items failed. Larger, heavier items are carried by MSTs from the DS Maintenance Company. As demand varies from day to day, arrangements must be made for unexpected requirements to be moved to repair sites.

Table 3-5. Recovery Hazards

Hazard	Action
Wire Rope and Cables	Personnel handling wire rope and cables must exercise caution. Frayed cable can cause serious injury, whether static or moving. Wear heavy leather-palmed gloves and handle cables carefully.
Rigging	Inspect equipment before the recovery operation begins. Shut off engines and apply brakes to prevent movement. Ensure rigging lines do not cross or rub against each other. Cross cables only when towing a disabled vehicle.
Disabled Vehicles	Before hooking up or unhooking a tow bar, or disconnecting any drive parts, chock the disabled vehicle with blocks so that it cannot move during the hooking and unhooking procedure. Failure to block disabled vehicles can result in serious damage or injuries. See FM 9-43-2 for proper procedures.
Backlash	During winching operations all personnel must stand clear of the wire rope a distance of the cable length plus two feet. Snapped wire cables can cause serious injury. Operators and other personnel assisting in the recovery effort should keep their hatches closed and use periscopes to view hand signals directed to them by ground guides. To eliminate confusion, use only one ground guide.
Gun Tubes	Position the main gun tube in a manner that avoids damage to personnel and equipment. If the gun tube of a disabled tank collides with the recovery vehicle, have it examined by DS-level maintenance personnel before firing.
Armed Weapon Systems	Recovery crews should know how to make Weapon systems safe in an emergency. Get immediate help from the supporting EOD unit.

Effects of Desert Environment on Equipment

3-255. **Terrain.** Terrain varies from nearly flat with high traffic areas to lava beds and salt marshes with little or no traffic areas. Drivers must be trained to judge terrain in order to select the best method for conditions. Tracked vehicles are best suited for desert operations. Wheeled vehicles will go many places that tracked vehicles can go. However, their lower average speed on poor terrain may be unacceptable during certain operations.

3-256. Vehicles should be equipped with the following:

- Spare fan belts.
- Tires.
- Tow cables or chains (if not equipped with a winch).
- Extra water cans.
- Fuel cans.
- MREs.
- Desert camouflage nets.
- Other items likely to malfunction.

Air recognition panels, signal mirrors, and a tarpaulin (to provide shade for the crew) are also very useful to have on hand. Wheeled vehicles should also carry spurs, mats, or channels as appropriate to aid mobility.

3-257. The harsh environment requires a high standard of maintenance. This maintenance may have to be performed well away from specialized support personnel. Operators must be fully trained to operate and maintain their equipment. Some types of terrain can have a severe effect on suspension and transmission systems, especially those of wheeled vehicles. Items affected by mileage (such as wheels, steering assemblies, track wedge bolts and sprocket nuts, and transmission shafts) must be checked for undue wear when completing before-, during-, and after-operation maintenance checks.

3-258. **Heat.** Vehicle cooling and lubrication systems are interdependent. A malfunction by one rapidly places the other under severe strain. All types of engines may overheat to some degree, leading to excessive wear and, ultimately, to leaking oil seals in the power packs.

3-259. Commanders should be aware of which vehicle types are prone to overheating and ensure extra maintenance is given to them. Check oil levels frequently (a too high level may be as bad as a too low level) and check seals for leaking. Keep radiators and airflow areas around engines clean and free of debris and other obstructions. Water-cooled engines should be fitted with condensers to avoid waste of steam through the overflow pipe. Cooling hoses must be kept tight (one drip per second amounts to seven gallons in 24 hours). Operators should not remove hood side panels from engine compartments while the engine is running. This causes turbulence, leading to ineffective cooling.

3-260. Batteries do not hold their charge efficiently in intense heat. Battery-specific gravity must be changed to adjust to this environment. The unit can either adjust the electrolyte to 1.200 or 1.225 specific gravity or obtain sulfuric acid with a specific gravity of 1.2085 to 1.2185. Air vents must be kept clean or vapors may build up pressure and cause the battery to explode. Voltage regulators should be set as low as practical. Stocks of dry batteries must be increased to offset the high attrition rates caused by heat exposure.

3-261. Severe heat increases pressure in closed, pressurized systems and increases the volume of liquids. Care must be exercised to ensure working pressure of all equipment is within safety limits. Caution must be exercised when removing items such as filler caps. Some items of equipment are fitted with thermal cutouts that open circuit breakers when equipment begins to overheat. Overheating can be partly avoided by keeping the item in the shade and wrapping it in a wet cloth to maintain a lower temperature by evaporation. Wood shrinks in a high-temperature, low-humidity environment. Equipment, such as axes carried on tracked vehicles, can become safety hazards as heads are likely to fly off as handles shrink.

3-262. Keep ammunition away from direct heat and sunlight. If it can be held by bare hands, it is safe to fire. White phosphorous ammunition filler tends to liquefy at temperatures over 111^o F, which will cause unstable flight unless projectiles are stored in an upright position.

3-263. **Radiant Light.** Radiant light or its heat effect may be detrimental to plastics, lubricants, pressurized gases, some chemicals, and Infrared Tracking and Guidance systems. Items like CO² fire extinguishers, M13 decontamination and reimpregnating kits, and Stinger missiles must be kept out of constant direct sunlight. Since optics may discolor in direct sunlight, limit their exposure to the sun's rays.

3-264. **Dust and Sand.** Dust and sand are probably the greatest dangers to efficient functioning of equipment in the desert. Lubrication must be the correct viscosity for the temperature. The temperature must be kept to the absolute minimum in the case of exposed or semiexposed moving parts. Sand mixed with oil forms an abrasive paste. Lube fittings, which are critical items, should be checked frequently. Teflon bearings require constant inspection to ensure that the coating is not being removed. Engine maintenance is critical due to the strong possibility of sand or dust entering cylinders or moving parts when the equipment is stripped. Screens against flying sand are essential. They also provide shade for mechanics.

3-265. Examine and clean air cleaners on all equipment at frequent intervals. The exact interval depends on operating conditions but should be at least daily. Use filters when refueling all vehicles. Keep the gap between the nozzle and the fuel tank filler covered. Fuel filters require frequent cleaning and oil filters require replacement more often. Engine oils require changing more often than in temperate climates. Over time, windblown sand and grit will damage electrical wire insulation. All cables likely to be damaged should be protected with tape before insulation becomes worn.

3-266. Sand will also find its way into parts of items like spaghetti cord plugs. This can prevent electrical contact or make it impossible to join the plugs together. A brush (for example, an old toothbrush) should be carried and used to brush out such items before they are joined.

3-267. Dust affects communication equipment such as amplitude-modulated (AM) radio frequency (RF) amplifiers and radio-teletypewriter sets. The latter is especially prone to damage due to their oil lubrication, so use dust whenever possible. Some receiver-transmitters have ventilating parts and channels that can get clogged with dust. Check them regularly and keep them clean to prevent overheating.

3-268. Weapons may become clogged or missiles jammed on launching rails due to sand and dust accumulation. Sand- or dust-clogged barrels can lead to in-bore detonation. Keep muzzles covered by a thin cover so an explosive projectile can be fired through the cover without risk of explosion.

3-269. Missiles on launchers must also be covered until used. Working parts of weapons must have minimum lubrication. It may even be preferable for them to be totally dry, as any damage caused during firing will be less than that produced by the sand-oil abrasive paste.

3-270. All optics are affected by blowing sand. Their performance gradually degrades due to small pitting and scratches. It is necessary to guard against buildup of dust on optics that may not be apparent until low-light optical performance has severely deteriorated. It may be advisable to keep optics covered with some form of cling film until operations begin, especially if the unit is near a sandstorm. Store optics in a dehydrated condition using hydroscopic material. Those in use should be kept where free air can circulate around them and they should be purged in frequent intervals.

3-271. Sand and dirt can accumulate in hull bottoms of armored vehicles and, when combined with condensation or oil, can cause jamming of control linkages. Sand accumulation in the air bleeder valve can inhibit heat from escaping the transmission and result in damage.

3-272. **Temperature Variations.** In deserts with relatively high dew levels and high humidity, overnight condensation can occur wherever surfaces are cooler than the air temperature (such as metal exposed to air). This condensation can affect optics, fuel lines, and air tanks. Fuel lines should be drained at night and in the morning. Optics must also be cleaned frequently. Weapons, even if not lubricated, will accumulate sand and dirt due to condensation; another reason for daily cleaning.

3-273. Air and fluids expand and contract according to temperature. Tires inflated to the correct pressure during the night may burst during the day. Fuel tanks filled to the brim at night will overflow as temperatures rise. Check the air pressure when equipment is operating at an efficient working temperature and fill fuel tanks to their correct capacity as defined in the appropriate TM.

3-274. **Static Electricity.** Static electricity is common in the desert, caused by atmospheric conditions coupled with an inability to ground out due to dry terrain. It is particularly likely with aircraft or vehicles having no conductor contact with the soil. The difference in electrical potential

between separate materials may cause a spark on contact. If present, flammable gases may explode or cause a fire. A grounding circuit must be established between fuel tankers and vehicles being refueled. It must be maintained before and during refueling and both tankers and vehicles must be grounded.

3-275. **Winds.** The velocity of desert winds can be destructive to large, relatively light material (such as aircraft, tentage, and antenna systems). To reduce wind damage, materiel should be given terrain protection and firmly picketed to the ground.

Maintenance Support

3-276. The following are general guidelines for desert repair of equipment:

- Repair only what is necessary to make the equipment combat-ready.
- Recover the equipment to the nearest reasonably secure site, followed by on-site repair.

Establish a recovery and maintenance SOP before or immediately after arrival in-theater. The SOP should include the following:

- Crew-level recovery and expedient repair.
- Unit-level maintenance recovery.
- DS-level maintenance recovery.
- Recovery priorities by vehicle types.
- Limitations of field expedient recovery techniques (for example, the distance/time that one tank is allowed to tow another considering the heat buildup in transmissions in this environment).
- Security and guides for Recovery Teams.

3-277. The Recovery Plan should include locations of maintenance collection points for equipment that cannot be repaired forward. These points must be located where they can be reached by heavy equipment transporters (HETs), which may require the recovery vehicle to perform a longer than normal tow.

3-278. The MCP should cover a large area to allow for dispersion of the supporting unit's equipment and inoperable weapon systems. An MST from the forward maintenance unit will normally be located at the MCP to determine the disposition of inoperable equipment. Equipment authorized for disposal may be used for controlled exchange to support the repair of like vehicles. When considering recovery in the desert, pay special attention to ground-anchoring equipment since natural anchoring material is scarce.

COLD WEATHER OPERATIONS

3-279. One of the major problems for units operating in cold weather conditions is the lack of personnel with adequate training in cold weather operations and maintenance support. If troops stationed in warm climates must move to cold climates to perform their mission, cold weather training is of utmost importance. Much time and energy in cold

weather areas are expended in self-preservation. This reduces personnel efficiency in operating and maintaining materiel. Maintenance personnel must learn how to live and work in cold regions.

Locations

3-280. Operation of materiel in temperatures down to -10° F present a few problems. Conditions are similar to those in the northern portions of the CONUS during the winter. From -10° F to -40° F, operations become difficult.

3-281. Proper training will prevent failures of materiel and injuries to operating personnel. When the temperature is below -40° F, operations become increasingly difficult. At temperatures near -65° F, the maximum efforts of well-trained personnel are required to perform even a simple task with completely winterized materiel. Figure 3-6 displays the levels of increasing difficulty as temperatures drop.

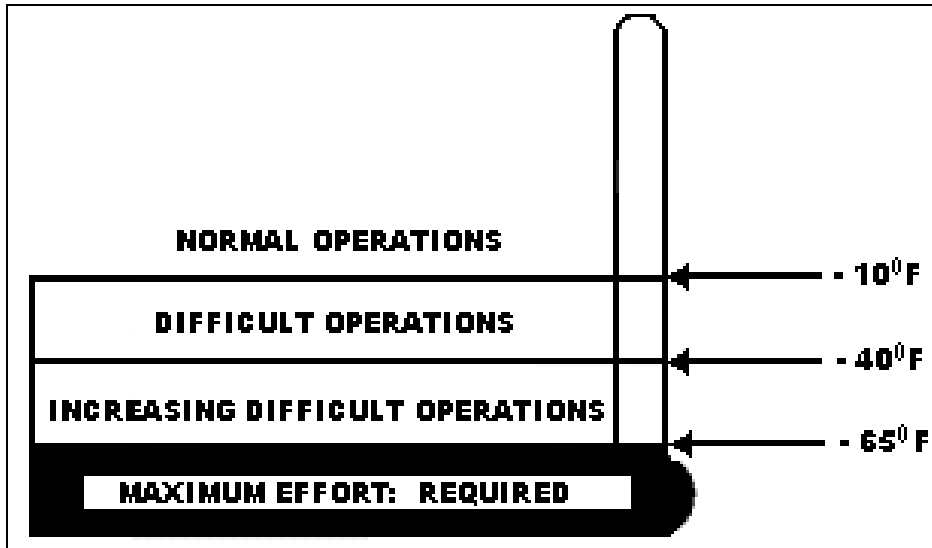


Figure 3-6. Cold Weather Operations – Levels of Difficulty

Security

3-282. Enemy ambushes are always a threat in snow-covered terrain. Since units must furnish their own security, reconnaissance, and surveillance, camouflage is a basic tool used to defeat detection by the enemy. In the absence of issued camouflage uniforms, soldiers can improvise camouflage suits, adapting color and pattern to the terrain background.

3-283. A white garment designed to blend with a white or mottled white and black background is used in snow-covered terrain. This snowsuit does not conceal small patches of shadow that surround a human figure, but this is not necessary since snow country usually contains many dark spots and shadows. If certain snow areas are all white with absolutely no shadows, make use of defiles and natural folds in the ground.

Class IX Supply Support

3-284. The effect of cold weather on Class IX supply support makes handling and storage of materials of prime importance. Supplies are delivered as far forward as weather, terrain, and the tactical situation permit. However, the following supply handling requirements will vary significantly from those encountered in temperate climates:

- Metals become brittle at extremely low temperatures. Parts cannot withstand the shock loads that they sustain at higher temperatures.
- Extreme care is required when handling rubber-covered cables at low temperatures. If rubber jackets become hard, cables must be protected from shock loads and bending to prevent short circuits caused by breaks in the covering. Neoprene jackets on cables become very brittle and break readily at low temperatures.
- Tires become rigid when cold, causing flat spots on portions that come into contact with the ground during shutdown periods. At extreme low temperatures, sidewalls become brittle and crack.
- Plastics expand and contract much more than metal or glass. Any parts or materials made of plastic must be handled carefully.
- Glass, porcelain, and other ceramics should perform normally at low temperatures if handled carefully. Cracking may result if heat is applied directly to cold windshields or vehicle glass.
- Fabrics retain their flexibility even at extremely low temperatures provided they are kept dry.

Maintenance

3-285. Personnel must be aware of the importance of maintenance, especially PMCS. Maintenance of mechanical equipment is exceptionally difficult during cold weather. Automotive and other mechanical maintenance cannot be completed with normal speed because equipment must be allowed to warm up before maintenance personnel can make repairs. Routine tasks require additional time. The time lag, which cannot be overemphasized, must be included in all planning. Personnel efficiency is reduced by bulky clothing, which must be worn at all times.

3-286. The resulting loss of the sense of touch further reduces efficiency. Even the most routine operations, such as handling latches or opening engine enclosures, become frustrating and time-consuming with gloves. At temperatures below -20° F, maintenance requires up to five times the normal time. Complete winterization, diligent maintenance, and well-trained crews are the keys to efficient cold weather operations.

3-287. The following requirements, affecting maintenance planning and preparation, should be complied with before beginning a cold weather operation:

- Shelter for materiel requiring maintenance.
- Proper clothing and tools for maintenance personnel.
- Ground cover (plywood or canvas) for personnel to lie on under vehicles.
- Adequate portable heaters.
- Suitable methods to store and issue antifreeze materials, fuels, hydraulic fluids, and lubricants.
- Sufficient lighting equipment.
- Supply of repair parts for equipment.
- Sufficient equipment for removal of snow and ice.

Building And Shelters

3-288. Heated buildings or shelters are needed for cold weather maintenance operations. Maintenance of many components requires careful, precise servicing. Without heaters, the increase in maintenance manhours will be from 25 to 500 percent above normal requirements. When buildings are not available, maintenance tents are used as a temporary expedient. When possible, wooden flooring should be laid inside all tents. Heat tents by portable duct heaters or tent stoves.

3-289. In the absence of buildings or maintenance tents, tarpaulins may be used as a field expedient to create overhead shelter and wind breaks. The tarpaulin can be supported on a framework of poles erected around the vehicle. Parachutes can also serve as temporary shelters. The parachute should be deployed over the vehicle, securely staked down at the bottom, and then inflated with air from a portable duct heater. If parachute shelters are used, extreme care should be taken to avoid carbon monoxide poisoning.

WARNING

Provide proper ventilation to avoid the danger of carbon monoxide poisoning caused by operation of engines or from contaminated hot air from defective heaters.

Do not use heaters that produce contaminated hot air in buildings or maintenance tents where personnel are present.

Fill fuel tanks/containers of vehicles, generators, and POL containers brought into warm storage from the cold no more than three-quarters full. Failure to follow this procedure results in expansion of the cold POL products in the fuel containers, which could cause spillage and a serious fire hazard.

Be constantly on the alert to detect vehicle deficiencies that expose personnel to carbon monoxide poisoning. Inspect and test passenger and crew compartments of wheeled and tracked carriers at regular intervals to detect any signs of air contamination from exhaust gases due to leaking gaskets, improper exhaust installation, cracked exhaust pipes, defective personnel heaters, or auxiliary generators.

Lighting Equipment

3-290. Sufficient equipment must be available to furnish lights during maintenance operations. Lights with ample cable extensions, attachment plugs, connectors, and spare bulbs are essential.

Maintenance Personnel, Tools, and Equipment

3-291. An increase in the number of mechanics will be required to maintain equipment in cold weather operations. As a minimum, a highly organized, more intensive effort is required of personnel on-hand. Remember that the amount of work performed under cold conditions is considerably less than work accomplished in moderate temperatures.

3-292. An additional supply of battery chargers must be available to meet the heavy requirements for battery maintenance in subzero temperatures. Hydrometers and testers must be on-hand to check the state of charge of batteries. Tools provided in the various tool kits are adequate for maintenance at subzero temperatures.

3-293. Gloves worn while performing maintenance on fuel systems and lubrication of cooling systems may become saturated with fluids. This reduces the insulating value of the gloves and may result in cold injury to personnel. Maintenance personnel should carry extra gloves.

3-294. Personnel should avoid leaning on cold, soaked equipment or kneeling or lying on the ground. Rapid body cooling caused by heat transfer to the equipment or ground may result in cold injury. Some sort of insulation (such as fiber packing material, corrugated cardboard, rags, or tarpaulins) should be placed between the mechanic/repairer and the equipment.

3-295. When performing maintenance under arctic winter conditions, a box or a pan should be used to hold small parts. A tarpaulin should be placed under the vehicle to catch parts that may be dropped to prevent them from being lost in the snow. See FM 9-207 for more information.

JUNGLE OPERATIONS

3-296. Maintenance units in a jungle environment retain the same basic mission and capabilities as in other environments. However, they must make adjustments due to terrain, weather, and vegetation.

Location

3-297. Jungle operations subject personnel and equipment to effects not found in other environments. Traffic areas and security problems often affect maintenance units as much as maneuver forces. The lack of an extensive all-weather transportation network in many jungle areas makes the mission of support units more difficult. Transportation difficulties may dictate that maneuver units be resupplied by air, pack animals, or human portage.

Security

3-298. Ambushes and infiltration characterize jungle combat operations. The security threat caused by infiltrators requires that LOCs be patrolled frequently and that convoys be escorted. Therefore, maintenance support must be performed as far forward as the tactical situation permits. This

improves response time, reduces road movement, and allows maintenance units to take advantage of the security offered by combat units.

Class IX Supply Support

3-299. Repair parts that deteriorate or wear out faster in the jungle environment must be identified. The PLL must reflect the increased turnover of these parts.

Maintenance

3-300. Maintenance units in the jungle function essentially the same as in other operations. High humidity and temperatures in jungle areas increase maintenance requirements. PMCS on any items affected by moisture and heat is extremely important. Emphasis must be directed toward on-site maintenance and the use of aircraft to transport MSTs and repair parts to the supported unit. The need for responsive maintenance support means the number of repair parts for immediate use must be increased.

Transportation

3-301. Maintenance units should consider the employment of all types of transportation. Surface transportation facilities are poor in most jungle areas. They especially cannot handle heavy military traffic without extensive improvements. An ALOC can eliminate many of the problems associated with surface movement. Human portage is a basic means of moving supplies and equipment in jungle operations. However, this method, at best, is slow, laborious, and inefficient.

3-302. Wheeled vehicles are normally restricted to roads and wider trails. However, sometimes even these may prove impassable during heavy rains. Sometimes repair parts must be transported by transloading from wheeled to tracked vehicles. For example, large wheeled vehicles move supplies as far forward as possible, where they are transloaded to tracked vehicles. The tracked vehicles move the supplies cross-country. In rugged terrain, supplies may require further transloading to pack animals or native supply bearers.

3-303. Fixed-wing transport aircraft can usually operate at greater distances without refueling than cargo helicopters. However, use of fixed-wing aircraft to land supplies requires more landing strips than may be available. Construction and maintenance of airfields in jungles are difficult engineering tasks, but a savanna may be large and firm enough to use as an airstrip.

3-304. Airdrop of supplies is an alternative to air landing. Airdrop makes deliveries to isolated units possible without further transloading. Disadvantages include the dispersion of supplies and the possibility of lost cargo under the jungle canopy, vulnerability to local enemy air defense, and requirements for, at least, local friendly air superiority.

MOUNTAIN OPERATIONS

3-305. Historically, the focal point of mountain operations has been the battle to control the heights. Changes in weaponry and equipment have not altered this fact. In all but the most extreme terrain and weather, infantry, with its light equipment and mobility, remains the basic

maneuver force in the mountains. With proper equipment and training, the infantry is ideally suited for fighting the close-in battle commonly associated with mountain warfare. Mechanized infantry can also enter the mountain battle, but it must be prepared to dismount and conduct operations on foot. Because of the severity of the environment, maintenance support in mountainous areas can be somewhat difficult.

Location

3-306. Due to terrain constraints, it may be necessary to disperse support units over a wide area. Dispersion reduces the vulnerability of maintenance units. However, it may cause problems with command, control, and local security. Since maintenance units will be high-priority targets, they must have adequate protection against ground and air attack to ensure continuous operations. In all cases, maintenance units must locate as far forward as possible.

Security

3-307. Mountains provide excellent opportunities for ambush and attacks on vehicle traffic on MSRs. Enemy units can be airdropped or air landed on key terrain that dominates supply routes. Maintenance units must be alert for enemy infiltration detachments that may seize important road junctions to isolate combat units from maintenance support. Route patrols and observation posts are required to secure MSRs.

Class IX Supply Support

3-308. In mountain operations, rugged terrain and climatic extremes cause repair parts consumption to increase. Movement of repair parts should be expedited into and within the combat area. Parts with high usage rates should be stocked on the ASL at both the MSB and FSB. Typical high-consumption repair parts include the following:

- Tires.
- Tie rods.
- Transmissions.
- Brake shoes.
- Tracks and pads.
- Final drives.
- Winch parts.

Isolated operations require an increased repair parts stockage in each category. However, ASLs should contain only those repair parts that are combat-essential and demand-supported for a particular piece of equipment.

Maintenance

3-309. Fixing equipment as far forward as possible is extremely important in mountain operations. Vehicle crews and maintenance personnel must be trained to accurately evaluate damage to their equipment. Maintenance Teams from the organizational maintenance element of the supported unit or by MSTs from the DS Maintenance Company should make the repairs. Recovery of equipment will be very

difficult. When recovery is required, equipment should be moved only as far rearward as the point where repairs can be made, frequently the combat trains area.

Transportation

3-310. Although vehicles are used to move a large share of repair parts forward, they are not always able to reach deployed units. Locally obtained animals or individual soldiers must often move repair parts from roads to unit positions. Whenever possible, use vehicles to move heavy, bulky items or repair parts.

3-311. When weather permits, use helicopters to move repair parts from the SSA directly to forward units. Helicopters speed resupply operations and reduce multiple handling. Helicopters are good for emergency resupply and movement of high-priority supplies. Use helicopters whenever possible. Resupply by U.S. Air Force aircraft is another option.

URBAN TERRAIN

3-312. The urban battlefield does not cause significant changes in maintenance doctrine or organizations. However, it does impact how maintenance is provided. Urban regions normally contain a well-developed distribution system, major portions of which are highways, rail lines, airfields, manufacturing plants, and storage areas.

3-313. Built-up areas frequently provide suitable locations for deployment of maintenance units. Such areas offer excellent cover and concealment. They may also contain easily adaptable maintenance and storage facilities. At the same time, rubble or damaged built-up areas may present obstacles along LOCs, which are vital to the effective functioning of maintenance units.

Location

3-314. Because of the tactical situation, maintenance units may support from a built-up area. When using built-up areas, protection and physical security become important considerations. Supplies and equipment must be protected from both enemy attack and theft. Refugees may seriously impede or block movement over routes required by MSTs or movement of equipment to MCPs. Maintenance units may take advantage of hard stands, overhead lift, installed communication systems, and maintenance facilities existing in their areas of responsibility.

Security

3-315. Buildings provide excellent locations for snipers and thieves to use to attack maintenance units. Maintenance units must be alert for enemy infiltration detachments that may move among the civilian population. Maintenance shop areas should be blocked off, as required to secure the area, with patrols and observation posts.

Class IX Supply Support

3-316. In urban terrain operations, the use of vehicle repair parts may decrease as units dismount. Consumption of repair parts for small arms and engineer equipment may subsequently rise. Concentrated operations allow centralized control of repair parts in urban operations. MSTs may operate on-site with the supported unit or from the base company location.

Maintenance

3-317. Fixing equipment on-site is extremely important in urban operations. Organizational maintenance personnel must be trained to evaluate damage to their equipment accurately. Recovery of equipment will prove very difficult. When recovery is required, equipment should be moved only as far rearward as the point where repairs can be made. Consider the following when selecting the maintenance site:

- Security.
- A sufficient area around equipment for lift or recovery vehicles to operate in.
- Use of a nearby maintenance facility or garage.

Transportation

3-318. Although wheeled vehicles are used to move many repair parts forward, they are not always able to reach the unserviceable equipment due to rubble and blocked roads. Tracked vehicles can often move repair parts forward over the obstruction. Individuals and soldiers must often move repair parts from clear areas to equipment locations.

Chapter 4

Maintenance Management

This chapter describes maintenance management processes and resources, levels of management, maintenance management information systems, maintenance control, and unit internal management procedures for various types of maintenance operations.

PRINCIPLES OF MAINTENANCE

4-1. Broad principles of maintenance that provide the framework for operating a maintenance shop are found in AR 750-1. Those that apply to maintenance support are listed below.

- Commanders are responsible for establishing a command climate that ensures all assigned equipment is maintained according to appropriate TMs and AR 750-1.
- Commanders are responsible for providing resources, assigning responsibility, and training their soldiers to achieve the desired standard.
- The MAC is the primary tool used to determine the degree of maintenance and to specify the tasks to be performed at each level.
- The decision to repair or evacuate is based on the maintenance recovery code (MRC) and the recovery code (RC), the urgency of need, and the METT-TC considerations.
- Unserviceable reparables beyond the MAC's authorization to repair must be evacuated promptly to the appropriate maintenance activity for repair.

PROCESS

4-2. The Maintenance Management process includes the following:

- Forecasting.
- Scheduling.
- Production control.
- Quality assurance.
- Technical assistance.
- Provisioning of repair parts.
- Workloading/cross-leveling regional workload.
- Developing reparable programs to meet local, regional, and national needs.

4-3. Inherent in the maintenance management responsibility is the obligation to provide a safe environment while conducting maintenance operations. Maintenance management is as important during field or combat operations as it is for garrison maintenance missions. Safety concerns must be addressed in the SOP and the Operation Orders (OPORDs).

4-4. Maintenance management policies and procedures are contained in the Maintenance Management UPDATE, which includes AR 750-1, AR 710-2, and DA Pamphlet 710-2-2. Divisional and non-divisional units use the SAMS to collect maintenance data and provide management information to each level of command. Repair parts management policies and procedures for both the using unit and DS maintenance units are found in the Unit Supply UPDATE.

Sustainment Maintenance

4-5. Sustainment maintenance structures and operations are based on requirements generated by the ASCC and TSC. Sustainment maintenance leadership will perform the following:

- Provide sustainment functional training to TSC Maintenance/Supply Directorates and ASGs.
- Assist ASCC/TSC managers concerning sustainment maintenance issues to optimize capabilities.
- Assist in planning and updating theater-focused Maintenance Support Plans to capitalize on fixed-base and mobile maintenance capabilities, including review of RC GS-level maintenance MOS proficiencies to support assigned missions.

4-6. The sustainment information management systems will perform the following:

- Include connectivity with current maintenance and supply STAMIS' (for example, SAMS, Standard Army Retail Supply System (SARSS), Availability Balance File (ABF), and so on).
- Recommend pre-assigned maintenance support routing identifier code (RIC) instruction to Theater Materiel Management Center (TMMC)/ Corps Materiel Management Centers (CMMCs) for in-theater and strategic base (CONUS/OCONUS) integrated sustainment maintenance (ISM) operations.
- Monitor worldwide component availability for items identified as ASCC/TSC core weapon systems and critical equipment components (Classes VII and IX).
- Maintain visibility over repair part availability, identifying potential line-stopper parts for critical items that support the repair of components of major and secondary items.
- Assist in maintenance retrograde and redeployment phases of the operation.

Figure 4-1 lays out the sustainment maintenance support structure from the sustainment base to the corps rear.

Readiness and Sustainment Maintenance Managers

4-7. The various management functions required resulted in classification of maintenance management into two echelons – readiness and sustainment. Commanders are responsible for equipment readiness. Readiness maintenance managers at corps and lower echelons support commanders by managing operations to enhance equipment readiness. Readiness maintenance managers maximize combat readiness by

coordinating repairs as far forward as possible for quick return to battle. Readiness maintenance managers assigned to support battalions support brigade-sized units.

4-8. SMMs integrate sustainment maintenance (minus medical) for the total Army. They recommend support structure to the Combatant Commander, and implement policies and procedures that provide optimal sustainment maintenance support to the full spectrum of total Army missions. This is a seamless process, transparent to the user. They participate in development and integration of the LSE.

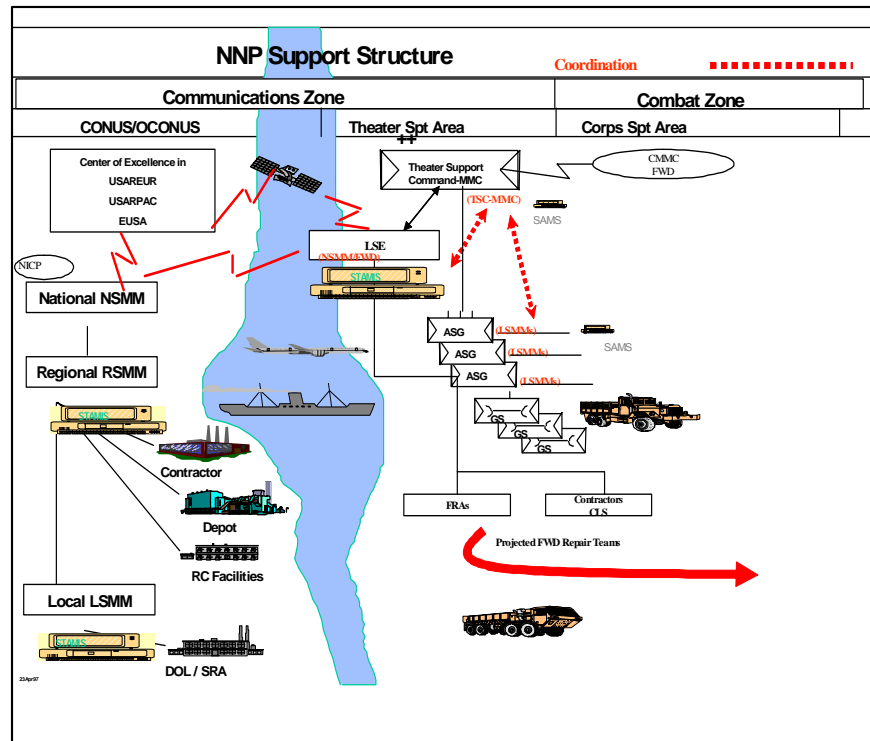


Figure 4-1. Layout of Sustainment Maintenance Support Structure

4-9. **National Sustainment Maintenance Manager.** The NSMM has the following responsibilities:

- Serves as the principal agent for developing, coordinating, and integrating the Sustainment Maintenance (SM) relations portions of contingency Stability and Support Operations Plans.
- Provides a SM support structure as part of the LSE to support the theater.
- Provides oversight of the total Army SM capabilities and capacities.
- Recommends changes in infrastructure, facility upgrades, realignments, and modernization. Also recommends consolidation of SM capability to maximize efficiency.

- Rounds out RC GS maintenance unit technical training requirements with existing resources. Assist in the development of training plans to enhance SM skills.
- Develops, integrates, and standardizes SM procedures, policies, and operations.
- Coordinates and provides input to materiel developers and commodity managers in the ILS process as it relates to SM support resources.
- Works with combat developers to revise input to materiel developers in identifying special tools and TMDE requirements for new weapon systems.
- Works with combat developers in articulating SM aspects and requirements for standard and emerging logistics management information system integration, including financial system interface.
- Provides recommendations to regional and national level agencies on how best to achieve SM objectives by consolidating regional and national requirements.
- Identifies non-executable SM requirements and recommends resolutions.
- Monitors and tracks SM cost, production, and performance data. Also recommends improvements on day-to-day and future operations.
- Assists regional and national agencies in resolving line stoppers, non-mission-capable equipment, and quality deficiency reports.
- Monitors and realigns/balances the regional workload by cross-leveling between regional and national agencies.
- Provides continuity mechanism for backfill of regional and local management functions during mobilization, contingencies, deployments, and stability and support operations situations.

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION 9000

4-10. National Maintenance Program Certification is a two-part process. This process leads to a fully certified National Provider both in terms of having a compliant quality system and in technical competence capable for performing the required repairs. The process for assessing Quality System compliance and evaluating Technical Capability are sequential in nature. A candidate Source of Repair (SOR) must first develop, implement, and maintain its Quality System in accordance with the provisions of the ISO 9002 standard. Once the quality system has been determined to be in compliance, the candidate SOR's facilities, tools, equipment, and skills will be evaluated for technical capability, capacity, and competence on an NSN-by-NSN basis.

4-11. Once the SOR has satisfied the certification requirements, it will be certified as a National Provider and is eligible to participate in National PP&C. National Provider certification will be on a three-year cycle. National Provider may also be subject to decertification.

Decertification may be total or partial. Total decertification means all National Maintenance program work will be transferred to a certified national provider and the decertified National Provider will be prohibited from participating in future National PP&C until cause(s) for decertification are resolved to the total satisfaction of the National Provider Officer (NPO). Failure to remain in compliance with ISO 9002 will result in total decertification.

4-12. Partial decertification means that a certified National Provider may have a technical issue with one or more lines as a result of a facility, tool, equipment, or skill issue that has caused it to lose the Technical Certification for the line(s) in question. The line(s) in question may be transferred to another workload process. The loss of Technical Certification for National Maintenance Program line(s) places the National Provider in an ineligible category for the line(s) in question during the next National PP&C.

4-13. In order for a decertified National Provider to again become eligible for National Maintenance Programs, the NPO will direct the site to develop, implement, and maintain corrective and preventive action plans for all decertification issues. Once the plans are approved, the NPO will closely monitor implementation and maintenance. Each decertified National Provider must undergo a complete compliance audit and a comprehensive evaluation of its facilities, tools, equipment, and skills in order to be eligible to participate in future National PP&C. Once recertified, the repair site will be eligible to participate in the next scheduled PP&C. Programs lost through decertification will not be returned unless awarded during the PP&C or direct workload process.

4-14. Reasons for decertification are as follows:

- Failure to comply with ISO 9002 Standards.
- Failure to correct internal and external audit findings.
- Failure to conduct an annual internal audit.
- Excessive Quality Deficiency Reports.

4-15. **Regional Sustainment Maintenance Manager.** The RSMM, located at a designated geographical area, has the authority to prioritize and redirect workloads among the LSMMs. Depending on the extent of support required, an RSMM operation may be established in an overseas theater of operations as part of LSE support. The RSMM has the following responsibilities:

- Tailors reparable programs submitted by LSMMs to meet regional demands and training requirements, weapon system availability, and cost avoidance.
- Determines regional normal and surge capability and capacity.
- Determines COE selections.
- Receives national-level requirements, performs capacity and capability assessments, bids on national workload, and submits program status reports.
- Performs cost analysis assessments.

- Identifies work that cannot be accomplished within the region and elevates it to the NSMM.
- Plans for sustainment maintenance support for mobilization and deployments.
- Interfaces with LSMMs, the NSMM, Field Commanders, and staff.

4-16. **Local Sustainment Maintenance Manager.** The LSMM workloads all sustainment maintenance units and activities in a designated geographic area, which could be at multiple Maintenance Centers. There may be situations where an LSMM operation is established in an overseas theater of operations as part of LSE support. The LSMM has the following responsibilities:

- Develops repairable programs to meet local demands.
- Conducts work center capability and capacity assessments.
- Prepares bids and competes for COE selection for the region, as well as for national work.
- Performs exception management.
- Identifies work that cannot be accomplished within the local geographical region and elevates it to the RSMM.
- Conducts cost analyses.
- Interfaces with customers, other LSMMs, and the RSMM.
- Plans for mobilization, deployments, and stability and support operations.
- Plans for capacity and capability modernization.

4-17. SMMs at corps and above focus on materiel management. They focus on fixing by repair, sustaining units, and supporting joint/multi-national equipment and standard Army systems. SM managers are assigned to Theater and DA Support Commands. Managers use their maintenance knowledge and experience, along with assistance from their management interfaces and CSS computers, to determine potential and developing problems and to facilitate avoidance or resolution. Figure 4-2 illustrates how sustainment managers interface.

Materiel Management Center

4-18. The MMC is the maintenance manager for deployed Army forces. It is the link between the deployed forces and the support base. The MMC maintains a close working relationship with the LSE. Theater-level GS Maintenance Companies may come under the LSE for workloading. The MMC may also support equipment of other services or multi-national forces.

Distribution Management Center

4-19. The DMC acts as the distribution management support element for the deputy commander for support operations (DCSO). It provides staff supervision to the TSC MMC and Movement Control Agency (MCA), and coordinates with the Medical Logistics Management Center (MLMC). It synchronizes operations within the distribution system to maximize

throughput and follow-on sustainment, and executes priorities in accordance with ARFOR Commander directives.

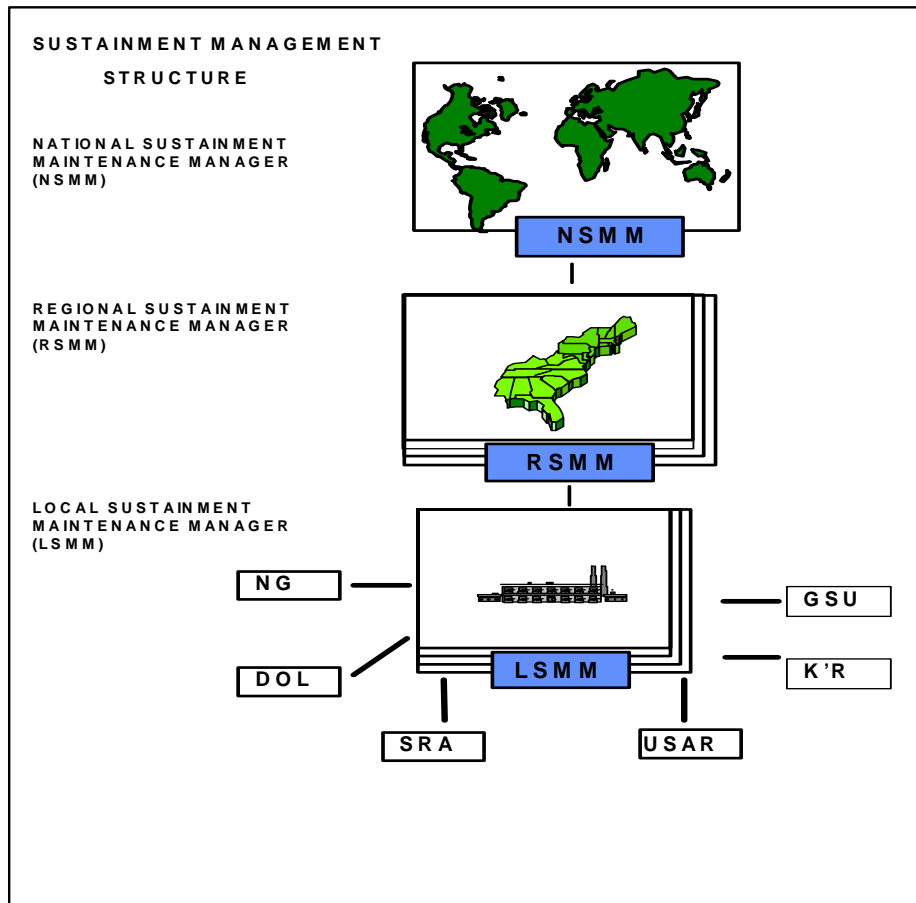


Figure 4-2. Sustainment Management Interface

RESOURCES

4-20. Resources are the tangible and intangible assets needed to accomplish the mission. They include the following:

- People.
- Tools.
- Test equipment.
- Repair parts.
- Publications.
- Facilities.
- Time.
- Skills.
- Funds.

4-21. Maintenance managers' objectives are to maintain readiness at the optimal level with the least expenditure of resources. Managers must decide which resources are needed to support specific mission

requirements and advise the commander on the logistics impact of various courses of action (COAs).

4-22. Maintenance management deals with the following various factors effecting a unit's mission:

- Command emphasis.
- Day-to-day management skills.
- Supervision.
- Motivation.
- Technical skills.

Managers use these tools to channel maintenance efforts. Failure to achieve wanted results often stems from failure in one or more of these areas.

Command Emphasis

4-23. The commander sets the tone for what is important within the command. The personal example of leaders shows their concern for specific aspects of the unit's mission. The soldiers in the command translate this concern into action. To place command emphasis on maintenance operations, the commander shows an active interest in these operations and in the materiel readiness of unit equipment. Maintenance managers use command emphasis to influence the support mission even though they may not be in the chain of command. Commanders need to balance mission, training, and administrative requirements to form a cohesive unit.

Management Skills

4-24. Maintenance managers continually strive to improve their operations. Since the management process itself plays a key role in maintenance operations, managers should always look for ways to improve planning, organizing, coordinating, directing, and controlling. Managers must also look for ways to be proactive (influencing events before they happen) rather than reactive (reacting to events as they happen). Feedback and After-Action Reports are also vital tools used by maintenance managers.

4-25. Under the stress of day-to-day operations, these elements may lose visibility and may not seem to have a direct bearing on materiel readiness. However, small improvements in the total system bring greater overall benefits than a heroic effort directed toward one or two items. The maintenance manager must be extremely careful that changes to maintenance operations do not undermine other initiatives established by the commander.

Supervision

4-26. First-line supervisors are a vital link in the chain of command. The commander depends on them to accomplish the day-to-day mission and to ensure the welfare of the troops. First-line supervisors receive instructions and turn them into tangible results. Passing along the commander's requirements is only a small part of their responsibilities. Their major challenge lies in ensuring the people they supervise accomplish the mission. First-line supervisors are the individual soldier's

primary source of assistance and further professional development. They need to know the standards and objectives set by the chain of command in order to direct their soldiers' efforts.

4-27. First-line supervisors must be aware of mission requirements and the capabilities and limitations of the soldiers under their control. They must continuously train their subordinates to support the needs of the battlefield. Next to the mission, the welfare of soldiers and their professional development are paramount in the supervisor's mind.

Motivation

4-28. Motivation is the need instilled in an individual to perform designated tasks. The leadership demonstrated by commanders and supervisors greatly influences motivation of soldiers. Effective leadership is the key to motivation. Effective leaders define objectives, communicate them, evaluate how well they are achieved, and provide feedback to soldiers doing the work. Maintenance managers often underestimate the importance of this process. Most soldiers want to perform well, but they must know the objectives and standards and receive performance feedback. Superior achievement must be recognized and substandard performance must be corrected.

Technical Skills

4-29. Technical skills are the ability to perform tasks associated with duty positions. Training provides these skills. A soldier's skills are one of the commander's most important assets. When the battle begins, there will be little time for training. The commander must always strive for high levels of training. The Army training system depends on the Unit Commander's continuance of the training process begun during advanced individual training. Many training resources are available. The commander and the maintenance manager must use these resources to maximum advantage. To a Maintenance Company Commander, training on technical tasks is as important as training on tactical skills. Mission Training Plans (MTPs) and soldier training publications (STPs) establish the requirements for technical maintenance training.

UNIT SET FIELDING

4-30. Unit Set Fielding is the Army's capstone program for fielding new/enhanced capabilities to units in combat team packages. Unit Set Fielding does not replace Total Package Fielding and other materiel fielding processes. The goal of Unit Set Fielding (normally brigade equipment sets) is to modernize all equipment and automation support in a designated unit. It is seen as a major improvement in fielding systems over incremental system fieldings. Unit Set Fielding produces combat capable units, in the shortest time. As the Army moves forward with modernization, the environment must shift from a focus on fielding "stand alone" systems, to fielding "systems of systems" configured unit sets.

4-31. One of the top Army G4 modernization priorities is the disciplined modernization process and strategy that results in the fielding of an increased capability/function in support of the Legacy, Interim, and finally, the Objective Forces. The Unit Set Fielding process drives the integration and synchronization of multiple systems fieldings occurring

during a defined fielding window, to reduce the impact on force readiness, increase force effectiveness, and streamline the fielding process. Execution of unit set fielding focuses on system interdependencies and operational readiness impacts because readiness is the driver. The Unit Set Fielding process is a cycle that begins seven years prior to the beginning of a unit's Unit Set Fielding window and ends approximately two years after the window closes. A Unit Set Fielding cycle consists of five steps: *Preparation*, *Reorganization*, *Fielding*, *Training*, and *Validation*.

- **Preparation:** This step covers actions seven years to six months before a unit enters its Unit Set Fielding window. Program managers (PMs), MACOM, the Corps of Engineers, and installation managers ensure requirements for installation facilities, ranges, information infrastructure, training simulators, or other infrastructure changes are identified and submitted for military construction funding. These requirements are then submitted to HQDA and MACOMs for inclusion in the Program Objective Memorandum-build. MACOMs will also ensure environmental impacts of all actions are documented. MACOMs and units will receive the Critical Mission Equipment List and schedule the fielding windows on their long range training calendars. The MACOM and unit will receive a detailed Materiel Fielding schedule two years out. New Materiel Introductory briefs and reorganization planning will begin one year out.
- **Reorganization:** Unit reorganization begins about six months prior to the Unit Set Fielding window and concludes at fielding-date. This reorganization includes actions and activities required to transition from the unit's current MTOE to a new MTOE, which reflects the new equipment and personnel in the unit. Facilities are completed; training devices, training support infrastructure, and tactics, techniques, and procedures are in place; personnel are assigned; and equipment turn-ins are completed.
- **Fielding:** Systems in the unit set will be fielded during the window. The PM for each system will conduct new equipment training (NET). Completion of NET for all systems in the unit set closes the window and the unit will be taken off C5 status.
- **Training:** The unit is responsible for conducting collective and sustainment training. This training will start after completion of NET and will normally be completed within 18 months after the unit's fielding date.
- **Validation:** The gaining MACOM is responsible for ensuring validation of the operational readiness of the unit to execute its assigned mission. Validation will be the final activity conducted during the training step. Validation completes the Unit Set Fielding cycle.

4-32. Current and future warfighting systems are interdependent and require interconnectivity to maximize effectiveness. The Army uses Unit Set Fielding as a modernization process to assemble and issue individual

and interdependent systems. However, this process may not be practical for all units and components in brigade sets, particularly in the reserve components. Therefore, Unit Set Fielding may be executed at battalion, separate company, or team/detachment.

4-33. Synchronizing equipment and software fielding increases efficiency and reduces disruption to the unit. With the increased number of digitized and modernized systems being fielded, along with accompanying successive software upgrades, Unit Set Fielding ensures these digitized systems, inherently designed to be used in a system-of-systems environment, create the intended synergistic effect.

4-34. A unit can realize the full capability of new weapons, sensors, digital command and control systems, and corresponding training aids, devices, simulators, and simulations. To do this, equipment must be integrated into the unit as a set to include the facilities to operate, maintain, and train on the delivered equipment.

LEVELS OF MANAGEMENT

4-35. Maintenance operations must have careful direction, supervision, and management. These functions are accomplished at the company and higher HQ levels. The higher HQ elements concerned with maintenance operations are the MMC for the command and the Support Operations Office for the battalion. The chain of command and other supporting units provide technical assistance on request. Close coordination with the MMC and the battalion's Support Operations Office is essential. The MMC and the battalions must work together and have a thorough understanding of the capabilities and limitations of each.

4-36. Unprogrammed requirements have a significant impact on the maintenance mission. The MMC and the Support Operations Office must identify known requirements in advance. Commanders and supervisors seek out information, predict future requirements, and assess requirements for their impact.

MATERIEL MANAGEMENT CENTER

4-37. The MMC mission performs the following:

- Is the central data collection and analysis element for all maintenance activities belonging to the command.
- Has the responsibility for gathering, maintaining, analyzing, and acting on information in maintenance management information systems.
- Establishes procedures for gathering data and distributing the resulting information to subordinate units and commanders as required.
- Provides technical direction and control of battalion operations for the higher HQ.
- Provides guidance and day-to-day planning for integrated maintenance and supply management.

- Disseminates information, instructions, and directions through the Battalion HQ.
- Controls attachment of augmentation MSTs to tailor support to match the requirements of the supported force. The Support Group HQ performs administrative support and exercises command and operational control functions (except for technical direction of maintenance support operations).

A principal function of the MMC is to advise the command and staff on significant trends and deviations from established standards and to recommend necessary actions.

Capabilities

4-38. The MMC provides most instructions and directives to the Maintenance or Support Battalion relative to disposition of end items or components requiring evacuation. It sets priorities and controls ORFs (peacetime only), provides maintenance and repair parts status, and establishes maintenance repair time guidance. Instructions are broad enough to provide flexibility to Battalion HQ in the organization and deployment of maintenance units and the management and control of their operations.

4-39. The MMC provides the following:

- Disposition instructions for evacuation of unserviceable items that must be routed to other maintenance units or C&C Service Companies.
- Information and instructions on the use of MWOs.
- Information on priorities relating to repairs of specific types of equipment or support of specific units.
- Maintenance management information derived through analysis of maintenance data and reports; ensures availability of repair parts required for Maintenance or Support Battalion operations.

The MMC does not directly control workload input of DS maintenance units. However, it can influence the workload and accomplish workload balancing by recommending priorities and changes in repair time guidance.

Evacuation Management

4-40. Items being evacuated by owning units are normally turned in directly to a maintenance unit or prepared for retrograde as directed by the MMC. If materiel is identified for retrograde, it will be processed by DS units and shipped directly to a port.

4-41. The MMC will normally publish evacuation instructions applicable for a specified time period to avoid the necessity for providing individual instructions for the disposition of all items requiring evacuation. The MMC may require reports on certain critical or controlled items before issuing disposition instructions. The TSC or Corps-COSCOM C&C Company performs the mission.

SUPPORT OPERATIONS OFFICE

4-42. The Support Operations Office coordinates all maintenance operations in a support group or battalion, provides guidance on maintenance priorities, and sets objectives for production. The relationship between the Support Operations Office and Shop Officers is vital to mission success. The SPO coordinates and integrates the battalion's DS-level maintenance mission.

BATTALION-LEVEL MANAGEMENT

4-43. At the battalion level, the SPO manages DS-level supported customer units. He supervises, controls, and directs the operation of battalion units for the following:

- DS-level maintenance.
- Recovery/evacuation.
- Repair parts supply.
- RX.
- Technical assistance.

The Support Operations Office is also a key element in maintenance data collection by ensuring its units provide automated data and generate appropriate Maintenance Reports on their operations.

4-44. The Battalion HQ commands and controls the displacement, mission assignment, and operations of its units in accordance with higher HQ plans, policies, and directives. It provides command direction and instructions, supervises, provides assistance, and performs management and control functions to satisfy requirements of supported units in accordance with the higher commanders intent.

4-45. The Battalion HQ advises Support Group HQ on maintenance and repair parts supply matters. These include recommendations concerning the following:

- Personnel requirements.
- Facilities and equipment requirements.
- Maintenance performance.
- Repair parts supply status.

They also identify other problem areas as required. The HQ reports the state of materiel readiness, deployment, and employment of battalion units.

COMPANY-LEVEL MANAGEMENT

4-46. Unlike at battalion and higher levels, maintenance management at company level is more focused on each job. The DS-level maintenance mission is resourced and accomplished at company level. It is here that the assets of personnel, time, and repair parts must be managed most effectively to provide the best support possible with the resources available.

4-47. Many techniques used at battalion level also apply at company level, but they require a more personal, direct approach along with an

immediate response to actual or anticipated problems. Effective management at company level requires the following:

- Leadership.
- Production control.
- Workload analysis.
- Determining maintenance requirements.
- Work simplification and work measurement.
- Total quality management (TQM).
- Quality assurance.
- Motivation.

Leadership

4-48. All supervisors must use effective leadership. Leadership is the most powerful of the management techniques. Supervisors must know what is to be done and how and when to do it. They must know the resources available to do the job. They must also know the limitations and other factors influencing job performance and how to motivate personnel to improve performance and productivity.

Production Control

4-49. Production control involves the following tasks:

- Production planning and scheduling.
- Proper routing and rerouting of work.
- Attaining maximum production by keeping all shop elements working at or near capacity.
- Proper shop layout to achieve time, motion, and movement economies.

4-50. **Workload Analysis.** Workload analysis is part of the overall production control process. It requires a continuous review of work in process as well as new work and it is a prime responsibility of the MCS. It helps prevent over commitment of resources when too much work is accepted with unrealistic priorities and deadlines. Analysis is continuous and is aided by the use of automated SAMS outputs.

4-51. **Estimating Maintenance Requirements.** In order to forecast maintenance locations and anticipated workload, the Control Section of each DS maintenance unit maintains a current operations map and equipment density list. The operations maps show personnel the location of adjacent units and supply distribution points, indicate aircraft landing areas, and denote MCP and UMCP locations. MSTs also use them to make strip maps to ensure they arrive at their proper destination. Equipment density lists keep personnel up-to-date on which and how much equipment is supported and where it is.

4-52. **Work Simplification and Measurement.** Work simplification and measurement is applied in every unit. Work measurement standards are developed and applied to measure and compare work of repairers and maintenance units engaged in similar types of operations. Units keep records that show production results on a week-by-week basis.

4-53. The most efficient repairers can be compared against the least efficient in terms of quality and quantity of production to obtain a mean or median for measurement of overall performance. Battalion HQ has information obtained from production reports of other units to permit comparison of production among units or individuals performing the same type of work. Work simplification techniques may, in themselves, uncover ways to improve unit layout to eliminate wasted effort and movement.

Total Quality Management

4-54. TQM is a management technique used to supplement QC procedures by motivating all personnel to produce high-quality work the first time. A functional TQM program becomes evident when soldiers display the motivation and initiative to inspect their own work and take immediate corrective action to resolve QC problems. TQM should be applied in all units, at all times, in all functions.

Quality Assurance and Quality Control

4-55. The objective of QA is to produce high-quality work the first time. A valuable QA program is essential for proper, effective, and efficient performance of any level maintenance mission. It covers all actions necessary to provide adequate confidence that materiel, data, supplies, and services conform to established technical and performance requirements. QA, both as a function and as an organizational element, must be separated from Production Control (PC). This separation of QA and PC insulates QA from the pressures of meeting production schedules at the expense of meeting standards. Within most maintenance organizations, this places the QA function and section directly subordinate to the commander. However, to facilitate coordination, the QA section (frequently called the Inspection Section) is located close to, and works closely with, the PC Section or even specific work centers. Persons assigned to the QA Section should be technically qualified and have additional training on QA techniques and procedures. Additional QA measures are provided in the form of technically- and process-oriented assistance visits and inspections from higher HQ. Regardless of the source, QA focuses an independent set of eyes on products and processes to ensure standards are met.

4-56. QC is a separate and distinct function. QC is a leadership function and must be applied to all aspects of unit operations, including initial, in-process, and final inspections. Usually, organizational leadership personnel who are inherently subject to production pressures perform QC functions. Persons performing QC functions must be trained and motivated to place quality concerns at least on par with production concerns.

4-57. **Technically-Oriented QA/QC.** As equipment, requiring repair, works its way through a maintenance organization, it is subjected to a series of inspections, which demonstrate the interplay between QA and QC. Initial, in-process, and final inspections all represent opportunities for QA to overlay QC. This happens most frequently as the repair work nears completion. Repairmen/Repair Teams accomplish the tasks necessary to complete the job, subject to in-process QC inspections at both random and critical points in the work. Upon completion, a supervisor

conducts a final QC inspection before sending the equipment for a final QA inspection. At each inspection point, QC directs corrections of the repairer's errors and positively reinforces the repairer's adherence to proper procedures. Similarly, QA personnel direct correction of QC shortfalls and positively reinforce adherence to standards by QC and production personnel. TMs appropriate to various items of equipment are the basic tools of QA and QC. Thorough familiarity with DA Pamphlet 738-750, AR 710-2, and AR 750-1 is required.

4-58. **Process-Oriented QA/QC.** So far, QA/QC has been discussed in the context of the repair of equipment. However, it has an application for keeping the various processes and programs used within maintenance organizations on track and performing to standard. Whether it is ordering parts in the Shop Supply Section, planning work in the Production Control Section, or arranging shop space within a work center, the QA/QC model used for technical inspections applies.

4-59. **How QA/QC Pays Off.** Routinely and consistently applied in peacetime garrison and field training, the concept of supervisors exercising QC by inspecting the work, directing the correction of errors, and reinforcing adherence to proper procedures. It is reinforced by an independent set of eyes assuring quality by validating achievement of the applicable standards. QA/QC results in soldiers, supervisors, and leaders knowing proper procedures and correct standards; and, most importantly, applying them as a matter of course. QA/QC pays off in the form of a high quality, more effective and efficient maintenance operation. The practice of leaders exercising QC by observing and inspecting work, directing correction of errors, and reinforcing adherence to proper procedures will spill over into other unit operations to produce a high performance, high quality unit.

Motivation

4-60. Supervisors must continually motivate personnel to perform to Army maintenance standards. Commanders and Shop Officers must develop incentive programs that reward superior performance.

MAINTENANCE MANAGEMENT INFORMATION SYSTEMS

4-61. Automation greatly increases the ability of maintenance managers to manage the flow of maintenance data. The SAMS automates the DS-level maintenance functions while the ULLS-G automates unit-level functions. Maintenance management includes forecasting, distributing, scheduling, and controlling the production of maintenance workloads. Factors that impact on maintenance management are budget, supply, personnel, and property accountability.

4-62. At division and non-division levels, work force utilization data, maintenance performance measures, and cost accounting are managed by the SAMS and ULLS-G. The SAMS provides a maintenance management system that ranges from the DS/GS maintenance unit to the MMC level. The ULLS-G provides unit-level maintenance activities with automated maintenance management procedures. The SAMS and ULLS-G procedures are in DA Pamphlet 738-750 and the applicable End User manuals. Figure 4-3 depicts an overview of the relationship between the SAMS-1, SAMS-2, ULLS-G, and SARSS.

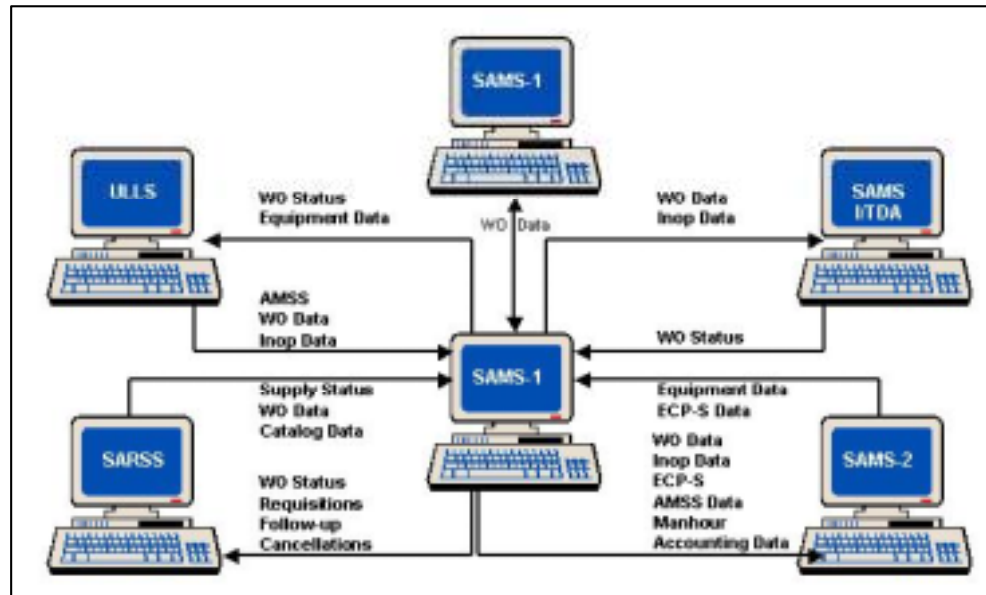


Figure 4-3. Relationship between the SAMS-1, SAMS-2, ULLS, and SARSS

STANDARD ARMY MAINTENANCE SYSTEM

4-63. The SAMS for the DS/GS levels provides maintenance and management information to each level of command from user to division, corps, wholesale, and DA. The SAMS is the primary tool used by maintenance managers to maintain maintenance information flow between the users, DS and GS levels, and higher-level commands. The use of SAMS output reports as tools to manage maintenance operations is discussed later in this chapter. The SAMS is divided into two levels, SAMS-1 and SAMS-2.

Standard Army Maintenance System–Level 1

4-64. The SAMS-1 operates at the DS/GS Maintenance Company level. It is an interactive, real-time maintenance management system that operates on a desktop computer system. The SAMS-1 has the capability to produce work order numbers automatically, requisition parts, manage bench and shop stocks, manage shop workload, and provide detailed civilian and military labor costs related to specific work orders.

4-65. **Functions.** The SAMS-1 tracks all work orders and repair parts requisitions, and processes status and usage information received from supporting units (ULLS-G). It also passes significant management information to higher commands (SAMS-2).

4-66. **Interfaces.** The SAMS-1 interfaces with the following STAMIS':

- SAMS-2.
- ULLS-G.
- SARSS.
- SAMS-I/TDA.

NOTE: Interface infers data flow in both directions.

4-67. **Inputs and Customer Benefits.** Table 4-1 shows which information the SAMS-1 receives. It also shows how that information is a benefit to the customer.

Table 4-1. SAMS-1 – Inputs and Customer Benefits

Inputs	Customer Benefits
<p>The SAMS-1 receives the following information:</p> <p>Data from customer units (ULLS-G).</p> <p>Data from DS/GS maintenance units (SAMS-1).</p> <p>Data from higher levels (SAMS-2 and SARSS).</p> <p>Military standard requisitioning and issue procedure (MILSTRIP).</p> <p>Shop stock list (SSL) and bench stock list (BSL).</p>	<p>The SAMS-1 provides accurate and timely:</p> <p>Requisitioning of parts.</p> <p>Issuing of bench and shop stock.</p> <p>Transferring of repair parts.</p> <p>Accounting of non-stock items ordered but not used.</p> <p>Maintenance of SSL and BSL records.</p> <p>Posting of the document register.</p> <p>Replenishing of shop stock.</p> <p>Controlling of funds for expendable supplies.</p> <p>Issuing and repairing of ORF assets.</p> <p>Accounting for manhours.</p>

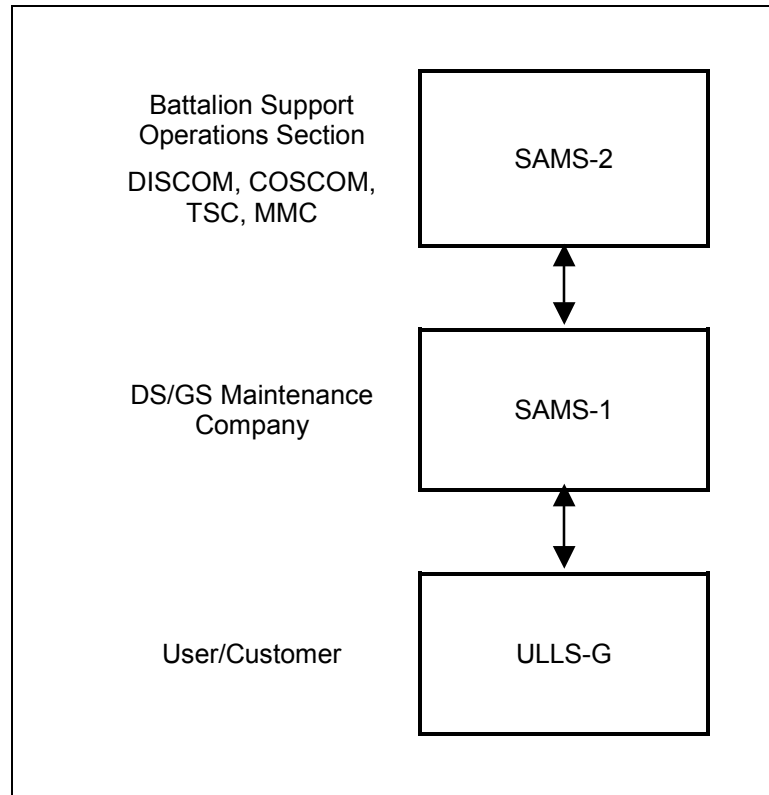
Standard Army Maintenance System – Level 2

4-68. The SAMS-2 is an interactive, real-time, maintenance management system that operates on a desktop computer system. The SAMS-2 performs the following:

- Operates at command levels above the DS/GS Maintenance Company, such as the Support Battalion or Maintenance Battalion (Support Operations Office) or Maintenance Battalion Materiel Officer (MATO), MMC, Division Support Command, Corps Support Group, Corps Support Command, and EAC (TSC/ASGs).
- Has the capability to automatically produce management information related to work orders, shop capabilities, backlogs, manpower and parts costs, and inoperative equipment status.
- Provides information through preformatted reports, manager-created reports, and visual displays.

4-69. **Functions.** The SAMS-2 collects, stores, and retrieves maintenance and supply information from the SAMS-1 and allows managers to coordinate maintenance workloads. The SAMS-2 also passes significant information on to higher commands, as well as down to the SAMS-1. Table 4-2 shows the progression of SAMS management levels.

Table 4-2. Progression of SAMS Management Levels



4-70. **Communications Capabilities.** As the system interfaces, the SAMS has three types of automated communications capabilities:

- Monitored asynchronous protocol.
- Communications man-machine interface.
- Blocked asynchronous transmission.

UNIT-LEVEL LOGISTICS SYSTEM - GROUND

4-71. The ULLS-G collects maintenance and supply data and provides management information at the unit level. The ULLS-G has replaced portions of TAMMS. The ULLS-G interfaces with the SAMS and SARSS.

4-72. This section will concentrate on the ULLS-G in support of general Army maintenance. The ULLS-G is an automated system developed to meet the maintenance and repair parts management requirements of Company (Unit) Commanders conducting unit-level maintenance operations.

Function

- 4-73. The ULLS-G provides Unit Commanders with the following:
- Improved accuracy and maintenance reporting.
 - Consolidated data needed for unit status reporting by automating the following:
 - Unit maintenance functions in DA Pamphlet 738-750.
 - Class IX supply functions in DA Pamphlet 710-2-1.

The ULLS-G gives commanders and maintenance managers on the battlefield more immediate accurate information for decision-making.

Hardware

- 4-74. ULLS-G hardware may differ from unit to unit, but the operating principles of the system inputs and outputs are compatible. Figure 4-4 shows some of the major inputs to the ULLS-G.

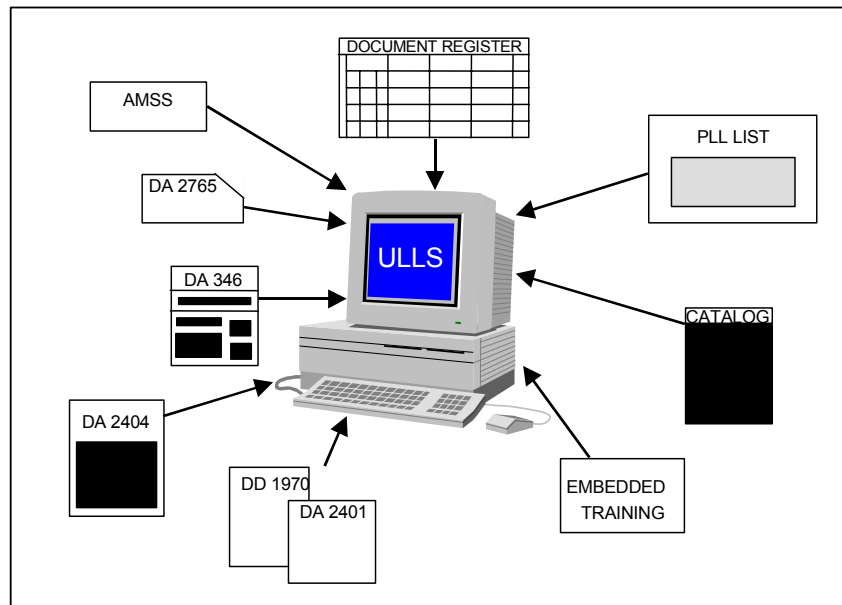


Figure 4-4. Major Inputs to the ULLS-G

- 4-75. **Functional Groups.** The six functional groups available in ULLS-G include the following:

- Supply.
- Maintenance operations.
- Utilities.
- Embedded training.
- Army Materiel Status System.
- Security.

Table 4-3 shows the function of each group.

Table 4-3. ULLS-G – Functional Groups

Group	Function
Supply	Enables the operator to process supply transactions and maintain PLL data, including demand records.
Maintenance	Enables the operator to input and maintain records on equipment, operators, scheduled services, and dispatched equipment.
Utilities	Provides backup and restores capabilities for unit data system files and permits establishment of passwords.
Embedded Training	Provides sustainment training with self-paced tutorials and allows novice users to learn system operation without damage to live files.
AMSS	Provides automated materiel condition status reporting.
Security	Controls for system users.

4-76. **Supply Options.** The supply options available in the ULLS-G include the following:

- On-line Class IX Catalog.
- Document Control Register (DCR).
- Automated PLL.

Table 4-4, page 3-22, describes the functions of each supply option.

Maintenance Options

4-77. The ULLS-G interfaces with the Army Maintenance Management System by automating many maintenance operation forms, procedures, and records. Figure 4-5, page 4-22, shows ULLS-G Maintenance Management outputs.

Unit Level Logistics System – Ground Generated Forms

4-78. The ULLS-G automates or replaces many complete or partial TAMMS forms with ULLS-G printouts. Some TAMMS forms become unnecessary with the ULLS-G. Table 4-5, page 4-23, compares some DA/DD forms with their ULLS-G equivalents.

Table 4-4. ULLS-G – Supply Options

Option	Description	Function
Class IX Catalog	A tailored Army Master Data File (AMDF) of stock items that have current demands	Provides user with current part usage information
Document Control Register	Automatically updated list of parts, supplies, and their status	Provides user with: Current status list of parts and supplies List of parts on hand but not installed
Automated Prescribed Load List	List of authorized quantities by unit	Provides user with automatic replenishment of PLL items Recommends additions and deletions to PLL

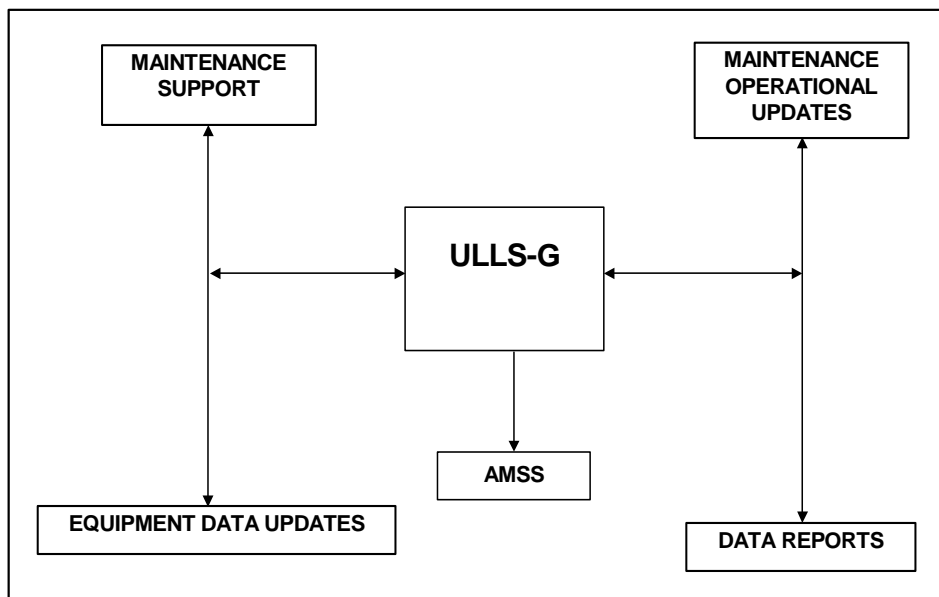


Figure 4-5. ULLS-G Maintenance Management Outputs

Table 4-5. ULLS-G Equivalent Forms

Form Name	TAMMS	ULLS-G Equivalent
Equipment Utilization Record	DA Form 5823	Not needed in ULLS-G
Motor Equipment Utilization Record	DD Form 1970	DA Form 5987-E
Organizational Control Record for Equipment	DA Form 2401	DA Form 5986-E
Preventive Maintenance Schedule and Record	DD Form 314	DA Form 5986-E
Materiel Condition Status Report	DD Form 2406	Will be automated with completion of AMSS module
Equipment Inspection and Maintenance Worksheet	DA Form 2404	DA Form 5988-E
Maintenance Request Register	DA Form 2405	DA Form 5989-E
Maintenance Request	DA Form 2407	DA Form 5990-E
Uncorrected Fault Record	DA Form 2408-14	DA Form 5988-E
Oil Analysis Request	DD Form 2026	DA Form 5991-E
Equipment Operator's Qualification Record	DA Form 348	DA Form 5983-1-E
Equipment Control Record	DA Form 2408-9	DA Form 5992-E
US Government Motor Vehicle Operator's Identification Card	OF Form 346	DA Form 5984-E

Menu Options

4-79. The five maintenance options available from the ULLS-G menu are as follows:

- Maintenance operational processes.
- Equipment data updates.
- Equipment data reports.
- Maintenance support.
- Army Materiel Status System (AMSS).

Maintenance Operational Processes

4-80. Maintenance operational processes and system-generated reports provide the information needed to plan, manage, and control equipment. The operational processes menu contains the options and functions listed in Table 4-6.

Table 4-6. Maintenance Operational Processes

Process	Function
1. Equipment Dispatch and Return	Permits regular or alert equipment dispatching with/without DA Form 2404/5988-E. Records equipment return from dispatch. Lists all equipment dispatches.
2. Maintenance and Inspection Worksheet (DA Forms 2404, 5988-E)	Provides worksheet for all equipment with a Department of Defense Activity Address Code (DODAAC).
3. Maintenance Faults	Lists all maintenance faults found during PMCS; records technical inspections and parts ordered.
4. Parts Received/Not Installed	Lists all parts received for a document number or administrative number.
5. Services Performed	Lists all services performed, or scheduled to be performed, on specified equipment Updates service due files and equipment data files.
6. Operator Records	Maintains record of operator documentation. Automatically calculates operator's miles and maintains records of restrictions, awards, and training.

Equipment Data Updates

4-81. This process allows the user to update equipment and administrative number data. The user can update the equipment catalog, change NSN and serial number (SN) data for administrative number data, and update the equipment data files (EDFs). Administrative number changes will update all applicable system files (such as document control registers, dispatch control files, maintenance fault files, equipment service files, and inoperative equipment files).

Equipment Data Reports

4-82. The equipment data report option allows users to quickly prepare maintenance and usage reports. Table 4-7 lists some of the available reports.

Table 4-7. ULLS-G Equipment Data Reports

Report	Type
Oil Analysis Request	Routine or special
Equipment Availability	Availability and status
Fuel Usage	Monthly, quarterly, or yearly
Service Schedule	By administrative, DODAAC or NSN numbers
Non-mission-capable	Deadline report
Equipment Operator/Class Code	Operator qualifications by class code or by operator ID card
Equipment Usage	Automated DA Form 2408-9
Equipment Data File	Data on major end items, components, or system/subsystems by NSN or administrative number

Maintenance Support Functions

4-83. The following ULLS-G functions are necessary to provide an interface with the SAMS. Table 4-8 lists ULLS-G and SAMS interface functions and what they provide for the user.

Table 4-8. ULLS-G and SAMS Interface Functions

Function	Action
SAMS Transactions	Allow user to send maintenance request data directly to SAMS
Maintenance Request	Produces maintenance request with/without administrative number Produces equipment inspection maintenance worksheet
Manual Maintenance Status Updates	Allow user to manually update the maintenance status of equipment on the maintenance request register

Table 4-8. ULLS-G and SAMS Interface Functions (continued)

Function	Action
Automated Maintenance Status Updates	Allow ULLS-G, through SAMS, to automatically update the maintenance status of equipment that is in direct support
Maintenance Request Register	Displays or prints the maintenance request register
Automated Maintenance Master Data	Updates the equipment catalog file and allow user to print the master file
AMSS	Sends the Materiel Condition Status Report forward to the MMC

Utilities Options

4-84. Utilities options that can be selected from the menu system provide system security features through commander-assigned passwords and user identifications. The passwords and user identifications permit only authorized users to enter the ULLS-G.

Embedded Training

4-85. The embedded training package available on the ULLS-G allows novice operators to receive ULLS-G training directly from the system software. The embedded training package available from the menu system provides the following user benefits:

- A guided tour of the ULLS-G, including the menu system, available reports, and hardware-software interface with other systems.
- Practice using the system without risk of damage to live files.
- Sustainment training for all users.

Army Materiel Status System Options

4-86. AMSS options automate the Materiel Condition Status Report (MCSR). The AMSS options allow units to send and receive AMSS records from the ULLS-G through the SAMS to the LOGSA. It also allows the unit to generate and submit an automated MCSR for unit status reporting.

Security Options

4-87. The ULLS-G security options allow the commander to control user access to the system. The options include updating user information, user access, and adding or deleting system users.

COMBAT SERVICE SUPPORT CONTROL SYSTEM

4-88. The CSSCS is one of a suite of five C2 systems, which collectively comprise the Army Battle Command System (ABCS). The CSSCS receives data from the current CSS STAMIS': the SPBS-R, ULLS, SAMS, SARSS, and Defense Integrated Military Human Resources System

(DIMHRS). Also receives data from manual inputs by operators and by interfaces with the FBCB2 system.

4-89. Apart from forming a bridge between the CSS STAMIS' and the Army's Command, Control, Communications, Control and Intelligence (C4I) architecture, the CSSCS provides commanders and their staffs (from FSB through COSCOM and TSC) with current CSS data, which can be tailored to be displayed graphically or in detail. The CSSCS enhances deployment capabilities by performing split-based operations. The CSSCS matches logistics TEMPO to the warfighters' OPTEMPO. The CSSCS collects, processes, and displays the types of information that, in the past, was gleaned from voice, message and courier reports, and hard copy outputs from the CSS STAMIS'. Staff personnel then manually condensed this information into formats usable by commanders. This was a time-consuming and laborious process, which yielded information from which decisions had to be made that was hours (if not days) old. Figure 4-6 details the integrated architecture of the CSSCS from the brigade through the theater.

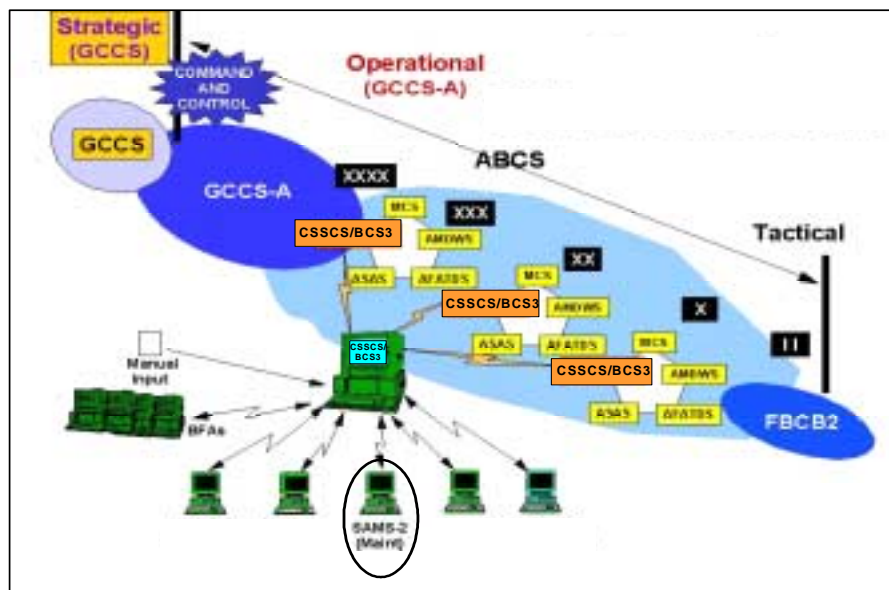


Figure 4-6. The CSSCS Integrated Architecture

NOTE: From its inception, CSSCS has been the premiere C2 logistics system for the Army. However, in today's operational environment, the Army needs the ability to command, control, and track not only Army forces, but also Joint and Combined/Coalition forces. To meet the sustainment information needs of the Army, the Battle Command Sustainment Support System (BCS3) will replace CSSCS. BCS3 in its objective state will use data provided by GCSS-Army with merged ERP business solutions.

BATTLE COMMAND SUSTAINMENT SUPPORT SYSTEM

4-90. BCS3 is the Army’s maneuver sustainment C2 system used to fuse sustainment, in-transit, and force data to aid commanders in making critical decisions. BCS3 is the Army’s logistic “fusion center” at all echelons for maneuver sustainment support. It is modular, tailorable, and scalable to meet the full spectrum of operations and interoperates with ABCS. The BCS3 design will include those features of CSSCS that are relevant to current and future needs and will incorporate the features from other automated systems such as Joint Deployment Logistics Model (JDLM), ILAP and ITV, which currently comprise the Logistics Common Operating Picture (LCOP). BCS3 will provide a near real time, continuous graphical representation of the current situation within the land AO to include all friendly and enemy (known and suspected) locations, identification, and unit status and provide the logistics portion of the COP to maneuver and logistics commanders with enhanced briefings and data management capabilities.

4-91. The CSSCS does not replace the CSS STAMIS’. It complements them and makes their data user-friendly for C2. CSSCS devices are located down to the battalion level for CSS units. The CSS-STAMIS’ and their eventual successor (the GCSS-A) are still needed to provide the management and operational tools to make sustainment work. See Chapter 9 for more detail about the GCSS-A.

Force XXI Battle Command, Brigade and Below

4-92. The FBCB2 system is the FXXI digitized battle command information system for mounted and dismounted units providing real-time information and SU for the Heavy Division Brigade and below. This system is designed to provide the status of equipment and stocks to CSS Commanders (see Figure 4-7. The FBCB2 system enables CSS (maintenance) managers to respond to FBCB2 generated support requests.

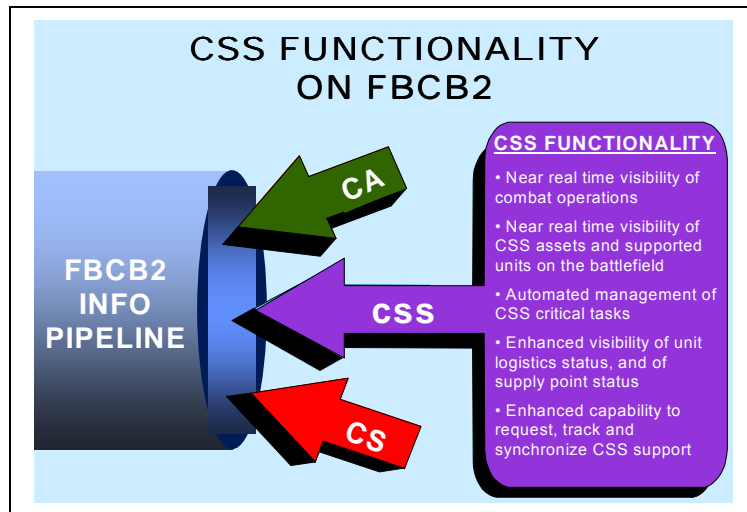


Figure 4-7. CSS Functionality on FBCB2

4-93. Functionally, the FBCB2 system will support lower-echelon battle command tactical mission requirements including the following:

- Real-time SU for commander, staff, and soldiers.
- Shared common picture of the battlespace.
- Graphical displays with friendly and enemy unit locations.
- Target identification.
- Integrated logistics support.
- Communications/electronics interfaces with host platforms.

The FBCB2 system is comprised of hardware, software, and databases being acquired under the applique and other programs. The FBCB2 system interfaces with the following:

- Items already found at brigade-and-below echelons. Examples of these are C4I capabilities embedded in weapons systems/platforms.
- The Army Tactical Internet.

4-94. A COP is provided by collecting, integrating, and displaying a common picture of the battlefield that is consistent in both time and space at each user display. Software being developed for the FBCB2 COP allows the geographical location of individual soldiers, weapons/platforms, command posts, and other operational facilities to be collectively presented on a display. Since the Army Tactical Internet is a true, seamless internet based on the worldwide Internet model, it is possible to communicate each individual geolocation to every FBCB2-equipped user within the Tactical Internet. Addressing mechanisms allow geolocations to be flexibly and selectively communicated, and SU software functionality will contain the necessary filters and roll-up mechanisms for each user to be able to selectively display only the locations of units of interest.

4-95. The application of the COP, with the enhanced capability to request maintenance support, results in more effective and efficient application of repair parts and CRT utilization. These efficiencies ultimately translate into reduced footprint for sustainment operations in the operational area.

SOLDIER PORTABLE ON SYSTEM REPAIR TOOL

4-96. Further complementing the family of maintenance management related information systems is the SPORT (see Figure 4-8, page 4-30). The SPORT is the Army standard system tester and is an essential maintenance tool in support of the Army's ground vehicle and aviation fleets. It is used at all levels of maintenance to automatically diagnose weapon system operations and to identify faulty components for immediate replacement. The SPORT hosts interactive electronic manuals and expert diagnostics systems, conducts intrusive testing in support of weapon systems, and provides a means for accessing electronic gateways into the standard Army logistics systems.



Figure 4-8. Soldier Portable On System Repair Tool (SPORT)

INTERACTIVE ELECTRONIC MAINTENANCE MANUALS

4-97. Greatly enhancing maintenance management information capabilities are IETMs that provide the mechanic with compact disk read only memory (CD ROM) access to all maintenance TMs via laptop computer or the SPORT. They also provide the capability to requisition repair parts from the same platform. This technology, coupled with embedded diagnostics and prognostics, serves as a maintenance “force multiplier” by allowing limited maintenance personnel resources to concentrate on repairing equipment expeditiously and correctly by automating and streamlining the front-end diagnostics and repair parts identification and requisitioning tasks.

DIAGNOSTICS AND PROGNOSTICS

Diagnostics

4-98. Diagnosing equipment faults is as old as maintenance itself. However, the ability of equipment to self-diagnose is a relatively new development. As equipment designs have become more complex and sophisticated, the level of self-diagnostics has increased. Most current equipment, even today’s family car, is equipped with some type of on-board diagnostics device, which captures and stores fault indicators for later retrieval by maintenance personnel. When queried by maintenance personnel using devices such as the SPORT, on-board diagnostics allow identification of faults to the LRU level. This capability shortens the fault isolation process and helps to eliminate misdiagnoses.

4-99. More sophisticated designs display the fault indicators for the operator to see and react. This capability allows the operator to provide the fault information to the supporting maintenance activity in advance of an inspector or technician actually seeing the equipment. This is particularly helpful in preparing for on-site maintenance visits.

4-100. The evolving capability is for the on-board diagnostics devices to capture fault indicators and transmit them to maintenance personnel at remote locations in real-time, as well as displaying them for the operator. The purpose of all this is to allow repairers and maintenance managers to

capture the most accurate and fullest possible view of their current requirements in real-time so they can make best use of their resources. Systems that can report their faults to remote locations in real-time allow maintenance managers to see the “maintenance battlefield” and marry this information with his customers operational view to determine how best to repair systems in concert with the customers battle rhythm. Chapter 9 provides more detail about evolving diagnostics/prognostics systems.

Prognostics

4-101. Prognostics are the predicting of faults before they occur. Until recently, prognostics has been a matter of taking note of when and how equipment fails and taking pre-emptive action before the time at which the failure is anticipated. The odometer, hour-meter, equipment logbook, and technical publications were the primary tools employed by operators and maintainers in this method of prognostics. At set intervals (miles driven, hours operated or rounds fired), equipment was taken out of service, inspected, specified parts were replaced (based on a set service life), and any additional faulty or suspect parts were also replaced. Absent any other means of prognostics, this method still has application, especially for equipment whose failure can lead to injury of personnel or mission failure.

4-102. Sampling methods (such as the AOAP) allows the equipment to remain in service while the sample is analyzed and predict faults without having to take the equipment out of service for lengthy inspections. When the sample indicates an impending failure, corrective action is taken before the equipment fails. This prevents failure during operation and allows the affected components and assemblies to be repaired using less resources than if they are operated to failure.

4-103. The evolving prognostics capability is on-board sensors. These sensors monitor systems, subsystems, and even components, and report the impending or future failure to the operator as well as to remote maintenance personnel. This will allow maintenance managers to capture the most accurate and fullest possible view of their future requirements in real-time so they can plan the best use of their resources. Systems that can report their predicted faults to remote locations in real-time allow maintenance managers to see the “future maintenance battlefield” and marry this information with his customers current and future operational plans to allow pre-emptive maintenance and repair actions to be integrated with the customers battle rhythm. Chapter 9 provides more detail about evolving diagnostics/prognostics systems.

MAINTENANCE CONTROL

4-104. Maintenance control is a critical element of effective maintenance management for shop operations and procedures. It directs and controls work in a maintenance shop in a manner that provides for maximum output of quality work.

4-105. A primary function of maintenance control is to reduce and, when necessary, correct overload conditions in the shop. While a maintenance shop should always work at or near capacity, backlogs must be kept manageable. Overloads are caused by improper routing of work, lack of personnel, or failure to inform higher HQ of workload problems. TC 43-4

provides details on how to use automation as a tool supporting effective, efficient maintenance operation management.

PROCEDURES

4-106. Maintenance control is a key element of maintenance management. In a maintenance shop, maximum production, effective use of personnel and facilities, and orderly progression of work depends on an efficient, effective maintenance control element. Maintenance units have a MCS, commonly referred to as the “shop office,” to accomplish production control functions.

4-107. For operational purposes, the MCS is usually organized according to the functions performed. The result is a maintenance control element, a quality control or inspection element, and a shop supply element. Maintenance control elements perform the following functions:

- Carefully screen maintenance requests.
- Assign work to various Shop Sections.
- Maintain workload status in the Shop Section.
- Improve operational procedures.
- Assist in determining parts requirements.

Operations

4-108. Maintenance control operations involve directing and controlling work flow. Maintenance control requires common sense, effective planning, close supervision, and prompt remedial action. It also requires the managerial tools to direct and control workflow through a maintenance shop in a manner that results in the maximum production of quality work.

Coordination

4-109. The MCS must effectively coordinate with the unit’s SSA to ensure prompt availability of required repair parts and other maintenance supplies. Table 4-9 outlines the coordination steps.

Table 4-9. Coordination Steps

Step	Action
1	Schedule shop input and assign work to various Shop sections to keep all shop elements working at capacity.
2	Carefully screen Maintenance Requests and Inspection Reports to ensure maximum unit-level repair. This may also involve evacuation of an item based on the availability of resources, the capability of personnel, and shop capacity.
3	Keep abreast of the status and quantity of work in each Shop section to foresee and minimize overload, and to take corrective action when necessary.
4	Aggressively pursue repair parts that are not available within the unit.

Overloads

4-110. A prime function of a MCS is to take action to reduce overload conditions in any of the Shop Sections. Supported units expect prompt repair and return of items taken to DS level maintenance. Overload conditions in any of the Shop Sections can seriously delay repair operations to the detriment of the unit's overall maintenance mission. Overload conditions can result from the following:

- Failure to perform unit-level maintenance.
- Required workload temporarily exceeding the available capacity of one or more Maintenance Shop Sections.
- Temporary loss of maintenance capability in the Maintenance Shop Section.
- Failure to evacuate work as directed.
- Competing priorities due to tactical operations.

Avoiding Overloads

4-111. To avoid overloading, adhere to the following:

- Distribute work among the various Shop Sections to keep all sections working at or near capacity. This is accomplished by carefully routing jobs entering the shop. Routing is the sequence of repair operations that ensures complete repair of each item in the shortest time possible. Any interruption in the normal flow of work needs immediate attention.
- Resolve the problem by rerouting work or supplementing the capacity of the overloaded section with personnel from other sections working below capacity. The battalion may also take action to realign missions, reduce workloads, or provide additional personnel (see Table 4-10, page 4-34).
- Analyze workloads during field operations. This is critical. Available manhours may be severely reduced by guard duty, defense operations, enemy attacks, weather, unit movement and set up, details, and so forth.
- Work with the chain of command to ensure necessary details are properly apportioned. Therefore, an overloaded section provides a few personnel for special requirements while another section that is not overburdened picks up the majority of the special duty.

Table 4-10. Rerouting the Work

When...	Consider...
Shifting personnel,	Their individual capabilities. The degree of training necessary to permit them to perform the functions required.
Unit personnel are cross-trained in several specialties,	This as an alternative to shifting personnel.
Movement is impractical due to the partial disassembly of bulky equipment or other factors,	Moving repairers from other sections to the job. Changing the sequence of repair operations. Moving all items to another shop section.
A vehicle needs engine repairs, as well as body and fender work,	Performing the engine repairs first.
The number of engine repair jobs exceeds the capacities of available automotive mechanics,	Completing the body repair work first.

Maintenance Control Officer

4-112. For an effective maintenance control operation, the Maintenance Control Officer must do the following:

- Have a thorough knowledge of the mission and functions of the entire company.
- Be thoroughly familiar with capabilities and capacities of the individual sections.
- Keep informed of priorities assigned to supported units, expected workloads, shop progress, difficulties encountered, and maintenance supply status.

Management Tools

4-113. Maintenance control requires a continuous flow of data from all maintenance elements in the company and the shop supply element. The Control Section serves as the center for the Production Control process. The SAMS-1 reports listed in Table 4-11 are commonly used for automated maintenance management at DS level.

Table 4-11. Commonly Used SAMS-1 Reports

Title	Function
Production / Backlog Status Report (AHN-022)	Shows overall distribution of workload by Maintenance Shop: Backlog, distribution by section. Workable backlog. Work orders evacuated. Work orders deferred. Status. Back order age. (Report can be run daily or weekly.)
Work Order Register Status (AHN-007)	Work orders in WON sequence. Equipment, customer, manhours, and work order status data. Total unit backlog and trends.
Shop Section Summary (AHN-006)	Open work orders and their status. Work order parts required and supply action. Only parts on document register. Current, 30-, 60-, and 90-day status (tailored). This data is used for reviewing— Shop backlog. Shop expediency of repairs. Workload trends efficiency in determining and ordering repair parts.

Tub File

4-114. Tub files are constructed by the unit as a backup to the automated systems. Their use is not mandatory and other file systems may be used. Size and design are dictated by unit requirements. Tub files are used to store Maintenance Work Request Envelopes (DA Form 3999-4), which contain active Maintenance Requests (DA Form 5988-E/5990-E), and pertinent records such as parts requests, continuation sheets, and inspection forms.

4-115. Tub files are organized into sections by status. It is recommended for ease of maintenance that common files be located in a single location. This encourages use and accuracy. The DA Form 3999-4s are moved from section to section as a particular job progresses. They are stored in maintenance request number sequence in respective Tub File sections.

4-116. Tub files are maintained by the following four sections in order to control the maintenance backlog:

- Inspection.
- Maintenance Control.
- Shop Supply.
- Maintenance Shop Sections.

Each Maintenance Shop Section maintains its work orders in status tub files as shown in Figure 4-8.

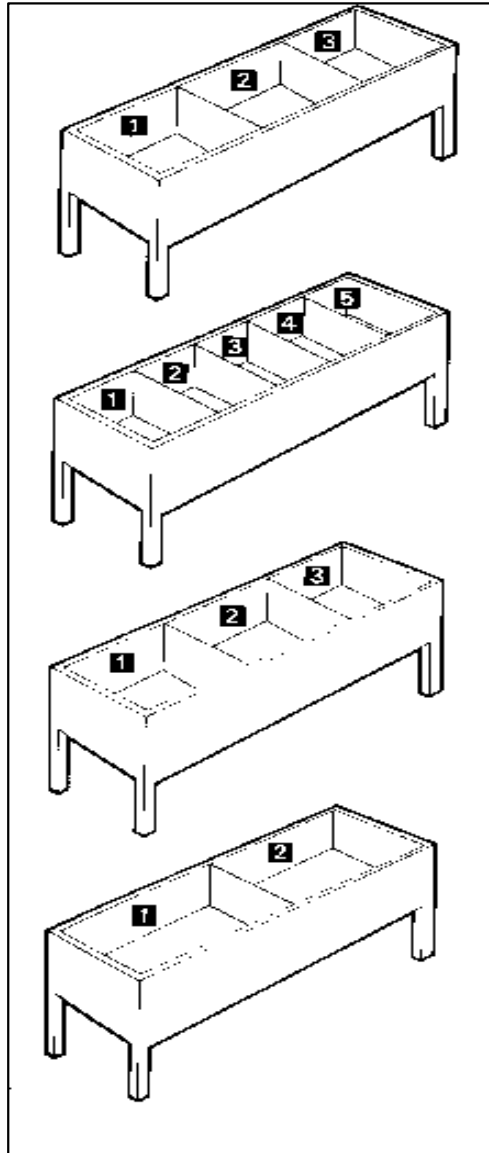


Figure 4-8. Tub Files

PRODUCTION METHODS

4-117. Production methods used in a DS maintenance unit include base shop (bay shop and job/bench shop) and on-site maintenance operations. The method used depends on the type of materiel to be repaired and the personnel, facilities, and time available. The production line is a production method primarily used by GS and higher-level maintenance activities. It may be used to a very limited extent at DS level for repairing large quantities of RX items.

Planning and Control

4-118. The PP&C process is used as a major tool at the local, regional, and national levels. This process plans and controls sustainment maintenance requirements and performance. PP&C meetings are held monthly at the local level and quarterly at regional and national levels.

4-119. Local-level initial PP&C meetings review the performance of the current year's production program and identify requirements for the upcoming fiscal year. The local manager develops the annual program based on requirements for the geographic area and its capabilities and capacity. The local manager forwards the recommended program to the regional manager, who reviews the requirements and uses this information to select NSNs for concentrated repairs at single installations called COEs.

4-120. **Center of Excellence Selection.** COE-reparable candidates are generally selected from items that appear on the installation's RX lists. Lines are reviewed in light of readiness and availability needs, cost avoidance, and annual demands. Readiness and availability impacts are determined by reviewing historical weapon system readiness/availability, asset posture, and the item's availability through the wholesale system.

4-121. Selection priority is assigned to each candidate item based on potential cost avoidance per hour. Cost avoidance is evaluated on the difference between the repair or buy cost prior to the establishment of the COE and the repair cost as a COE item repaired at one location. The "top 300 cost drivers" for each installation may be used to identify candidates for repair in a COE, even though they may not already be on an installation RX list.

4-122. COE candidates are reviewed and selected based on the following criteria:

- The item must support a major weapon system or be a significant readiness/availability item.
- The cost to repair (including transportation, packing, and fully burdened labor and materiel) must be less than 80 percent of the buy cost (AMDF price minus table credit). Or the item must be in short supply at the wholesale level and projected demands will exhaust current stockage within six months.
- There must be at least two demands for components per year within the region for aviation reparables.
- Items on DS RX lists that do not require GS-level repair should not be considered.

- The item must currently be repaired by one installation with at least six repairs per year (ground) and three repairs per year (air).
- The washout rate for the item must be less than 25 percent at the COE.
- Wholesale items must meet established stockage thresholds.

4-123. **Repair Quotas.** Maintenance activities will be workloaded based on their capacity and capability. When the SMM selects an item for the reparable program, an annual repair quota, by month, will be assigned for the item during the PP&C. The repair quota assigned to a COE item will be initially based on projected demands. These quotas may be reviewed and modified at subsequent PP&Cs. Changes may be required based on specific reasons, such as actual demands, capacity limitations, training cycles, or reported installation excess.

4-124. COE repair quotas will be initially set at 80 percent of the previous year's demands and will be sent to each RSMM for review prior to the quarterly regional PP&C. All changes in production goals will be justified to the RSMM and the other LSMMs. Changes in production schedules for national work will be coordinated with the NSMM. Input for all the LSMMs, the RSMM, and the NSMM is required to establish a COE line.

4-125. Once a COE line is accepted, the installation has a maximum of 90 days to prepare the production line before the quota is executed. The RSMM recommends which maintenance activities in the region will be the COE site for a specific reparable line based on the local bid submitted by the LSMM. The recommendation is based on several criteria, including the bid for manhours and parts submitted by the LSMMs. The recommendations and criteria which should be considered include:

- Repair costs (parts and fully burdened labor).
- Washout rate.
- Capacities and capabilities.
- Training requirements.
- Demands.
- End item density.
- COE for similar item.
- Special repair authority.

4-126. **Realignment.** COE lines are realigned as follows:

- COE assignments and performance evaluations are conducted on a quarterly basis during PP&C meetings.
- The evaluation process identifies COE lines that may be advantageous to reassign to another installation or state within the region.

- The RSMM uses the following guidelines to reassign COE lines:
 - All COE lines with average repair costs exceeding the COE bid by 25 percent or greater after 12 or more months are reviewed to determine reassignment or retainment.
 - When COE turnaround time (TAT) over the last 6-12 months is excessive (approximately 25 percent greater than the regional average), and another installation/state can repair the items with a shorter TAT at comparable costs, the COE will be reassigned.
 - When the current COE no longer has the capability to repair the regional program, the RSMM may recommend a new or multiple COEs.
 - When a new installation/state meets all repair criteria and is clearly advantageous as the CEO due to significantly lower costs, predominance of the regional demand, SRA authority, or material time and training required, the COE will be reassigned.
 - When the current COE's capacity is overwhelmed by new regional players or increased demands from current regional participants, a new COE or a second COE will be assigned.

4-127. National-level work is work that can be accomplished in the region by sustainment maintenance activities to meet wholesale-level requirements. Wholesale item managers identify candidate assets for regional repair and send the RSMM requests for bid and a comprehensive statement of work for review and distribution to LSMMs.

4-128. The LSMMs assess their work center capacity and capability, parts costs, packaging/crating costs, and so on; and submit their bid to the RSMM. The RSMM reviews the LSMM's bid and submits the regional proposal to the NSMM, who reviews and submits it to the item manager. The proposal becomes an official document representing a binding agreement with the installation and the wholesale level.

Bay Shop

4-129. The Bay Shop production method is used when a variety of jobs are performed in the shop or when the item being repaired is difficult to move. Under a Bay Shop method of operation, the equipment to be repaired remains in one shop location until work is complete. The soldiers, tools, and equipment needed to do the work move to the Equipment Bay Shop. Under a modified Bay Shop operation, personnel or equipment performing the same or similar jobs are grouped together in sections. The equipment to be repaired moves from one section to another at irregular intervals until the work is complete.

4-130. Bay Shops are used to repair vehicles, artillery, construction equipment, major missile items, and materiel handling equipment (MHE). Assemblies, components, and on-equipment materiel may be

removed from an end item in a bay and repaired in other shops (for example, a Fuel and Electric Shop). In a field environment, bays are nothing more than physically separated sections of the maintenance area where work is performed in the open or under maintenance shelters (tents). If adequate covered space is available, buildings may be divided into bays (or stalls).

Job/Bench Shop

4-131. Job/Bench Shops are used to repair small items, items requiring a high degree of technical skill, or items requiring repair with equipment mounted in a shop vehicle. Work performed at stands or benches under maintenance shelters or in shop vehicles is considered Job Shop repair. Items repaired by this method include the following:

- Components and assemblies.
- Small arms and fire-control instruments.
- Fuel and electrical system components.
- Electric motors.
- Leather and textile items.
- C-E equipment.
- Missile electronic items requiring repair under controlled conditions.
- Similar items that can be moved without difficulty.

On-Site Maintenance

4-132. On-site maintenance is performed by MSTs to the maximum extent possible. There are several advantages to conducting maintenance at the equipment breakdown site. Some of the advantages include the following:

- Reducing equipment downtime, thereby increasing customer unit readiness.
- Eliminating time and resources required for recovery/evacuation.
- Reducing the battlefield signature caused by recovery/evacuation.
- Reducing the potential for increased damage during recovery/evacuation.

4-133. MSTs providing on-site maintenance are organized based on known requirements. Therefore, before being dispatched, they should be fully informed on the following:

- Problem; including type of equipment, malfunction symptoms, and anticipated repair.
- Location, route, and link-up point.
- Requesting unit, point of contact, and frequency and call sign for radio contact.
- Enemy situation and current threat.

Production Line

4-134. The Production Line method is used to repair or overhaul several similar items when the repair sequence can be divided into a series of independent operations. Production Lines provide the most efficient method for repairing a large volume of similar items when individual operations are not too complicated or time-consuming, and the item can be easily moved. The Production Line is a series of workstations through which similar equipment is passed. Work is performed in sequential order until the final product is repaired.

TECHNICAL INSPECTION

4-135. A technical inspection of materiel is one of the most important aspects of the DS-level maintenance operation. Inspection is essential for an effective, overall QA program. Accurate initial, in-process, and final inspections are vital in maintaining efficient shop operations and ensuring quality repairs.

Initial Inspection

4-136. Large, bulky, or heavy items (such as vehicles, artillery, and MHE) are normally inspected before shop entry to determine the following:

- Equipment faults.
- Extent of work required.
- Economical reparability.
- Parts requirements.
- All on-equipment materiel is present.

This initial inspection or preliminary diagnosis is also useful in determining if the using unit has been fulfilling its unit-level maintenance responsibilities. The inspection provides a basis for the following:

- Recommending evacuation of the item.
- Determining ORF candidates.
- Recommending Report-of-Survey action (AR 735-5), in lieu of accepting the item when it appears that equipment damage or unserviceable condition is the result of misconduct or negligence, rather than fair wear and tear or battle damage.
- Determining repair parts requirements.
- Determining manhours required per the MAC.
- Determining necessary maintenance tasks.
- Estimating required maintenance manhours.
- Determining if required work is DS-level repair.

See Table 4-12, page 4-42, for other items.

4-137. Jobs noted in Table 4-12 are normally placed into an "in shop" status during inspection for fault diagnosis. This also applies to items that require disassembly to determine equipment faults. Diagnostic

inspections are performed using the applicable TM. Equipment fault and parts requirements are recorded on DA Form 2404 and DA Form 2407.

Table 4-12. Other Initial Inspection Items

Other items, such as...	Which...	Are...
C-E Equipment	Do not present bulk or weight problems.	Inspected in the Shop section.
Small Arms		
Fire-control Instruments	Require inspection at a bench or by special diagnostic equipment.	Responsible for their repair.
Generators		
Motors		

In-Process Inspections

4-138. In-process inspections are necessary to ensure work is being performed properly. Shop supervisory personnel perform these inspections. Inspectors assigned to the MCS may assist them.

Final Inspection

4-139. Inspectors perform a final inspection after work is completed. This inspection determines the adequacy of repairs and requires a technical inspection of an item, including an operability test to determine serviceability and safety. Final inspections are recorded like initial inspections. If a final inspection reveals uncorrected faults or unsatisfactory repair, the item is returned to the responsible shop element with the cause for rejection indicated on DA Form 2407. Inspectors may make minor repairs or adjustments during the final inspection when they do not warrant formal rejection of the item.

Personnel

4-140. **Maintenance Unit Area.** In the Maintenance Company, inspectors are assigned to the Control Section for inspection of automotive, engineer, generator, and communications equipment before shop entry. Although assigned to the Control Section, inspectors are directly responsible to the Company Commander for the quality of their inspections. However, their immediate supervisor and the Maintenance Control Officer direct their daily work.

4-141. If the commander desires additional inspection capabilities in the Control Section, qualified maintenance personnel from the Maintenance Shop sections may be used. These personnel become part of the inspection element. When no longer required as inspectors, they revert to their respective Maintenance Platoon or section. Inspection personnel work closely with the maintenance control element when performing inspections. Commanders ensure inspectors are allowed to independently evaluate work and determine whether quality standards are met without shop influence or coercion. If desired, the commander may designate inspection personnel on unit orders.

4-142. **On-site Maintenance.** Inspections are also required during the performance of on-site maintenance. On-site inspection is the

responsibility of the team chief or supervisor of the team performing the on-site maintenance functions.

WORK FLOW

4-143. The procedures discussed here apply particularly to vehicular end items and similar heavy items inspected prior to shop entry. With slight modifications, they can be adapted to most maintenance shop operations. Forms used in the maintenance shop are illustrated and explained in DA Pamphlet 738-750. The following procedures (see Table 4-13 and Table 4-14 and Tables 4-15 through 4-23, pages 4-44 through 4-48) are in accordance with the automated SAMS.

Table 4-13. Work Flow Procedures Number 1 (Customer Unit Action)

Step	Customer Actions
1	Verifies equipment malfunction.
2	Annotates the signature of the requestor on DA Form 2407/5990-E.
3	Prepares DA Forms 2404/5988-E and 2407/5990-E and equipment for support maintenance.
4	Performs unit maintenance on equipment.
5	Enters unit data on DA Form 2407/5990-E.
6	Forwards equipment/request and related forms to maintenance unit Maintenance Control section.

Table 4-14. Work Flow Procedures Number 2 (Maintenance Control Section Action)

Step	Maintenance Control Clerk Actions
1	Receives work request.
2	Edits/screens/verifies work request.
3	Annotates DA Form 2407/5990-E with the work order number and tasks.
4	Prepares DA Form 3999-4.
5	Assigns work section to perform repair (if known).
6	Enters DSU data on required DA Form 2407/5990-E into the SAMS-1.
7	Enters status "A" on the work order. (Status is updated daily from the Work sections.)
8	Directs the customer with DA Form 3999-4 to the Inspection section.

Table 4-15. Work Flow Procedures Number 3 (Inspection Section Action)

Step	Inspector Actions
1	Receives DA Form 3999-4.
2	Edits/screens/verifies DA Form 2407/5990-E.
3	Performs acceptance/initial inspection.
4	Annotates DA Form 3999-4 maintenance tasks and parts requested on DA Form 2407/5990-E.
5	Prepares the intra-shop work request (if required).
6	Assigns a task sequence number to each required repair task on DA Form 2404/5988-E.
7	Enters the signature (from the inspector who accepts the work order) on DA Form 2407/5990-E.
8	Submits status change "C" to the Maintenance Control Clerk (if no parts are required).
9	Issues a copy of the work request to the customer.
10	Forwards DA Form 3999-4 with forms and records to the Maintenance Control Supervisor or Shop Supply Clerk.

Table 4-16. Work Flow Procedures Number 4 (Maintenance Control Section Action)

Step	Maintenance Control Supervisor Actions
1	Receives DA Form 3999-4.
2	Edits/screens/verifies DA Form 2407/5990-E.
3	Annotates DA Form 3999-4.
4	Prepares the evacuation request (if required).
5	Determines repair priorities (repair, evacuation, ORF, intra-shop, or deferred, and so on).
6	Enters tasks from the Inspection Section into the SAMS-1 (through the Maintenance Control Clerk).
7	Submits the appropriate status (evacuated, ORF, deferred, and so on) to the Maintenance Control Clerk.
8	Forwards DA Form 3999-4 with forms and records to the Shop Supply Clerk and Shop Repair section.

Table 4-17. Work Flow Procedures Number 5 (Shop Supply Section Action)

Step	Shop Supply Section/Clerk Actions
1	Receives DA Form 3999-4.
2	Edits/screens/verifies DA Form 2407/5990-E.
3	Annotates DA Form 3999-4 and DA Form 2407/5990-E when parts are issued.
4	Prepares the repair parts listed on DA Form 2407/5990-E using the SAMS-1.
5	Performs supply actions and follow-ups.
6	Submits status change "1" or "K" for awaiting parts and "C" when parts are on-hand to the Maintenance Control Clerk.
7	Issues repair parts to the Shop Repairer.
8	Forwards DA Form 3999-4 with forms and records to the Maintenance Control Supervisor or Shop Section Supervisor.

Table 4-18. Work Flow Procedures Number 6 (Repair Shop Section Action)

Step	Shop Section Supervisor Actions
1	Receives DA Form 3999-4.
2	Annotates DA Form 3999-4.
3	Assigns the Repairer/Mechanic based on repair priority.
5	Submits status change "B" to the Maintenance Control Clerk when work is started.
6	Enters manhours remaining on the task worksheet.
7	Forwards the task worksheets for daily manhour accounting to the Maintenance Control Clerk.
8	Performs in-process inspections.

Table 4-19. Work Flow Procedures Number 7 (Repair Shop Action)

Step	Repairer/Mechanic Actions
1	Receives job and repair parts.
2	Verifies correct parts on hand for task/job completion.
3	Annotates DA Form 2407/5990-E (work started by) and logbook entries (when required).
4	Performs assigned repair task.
5	Enters the signature (from the Repairer) on DA Form 2407/5990-E.
6	Informs the Supervisor when the job is completed.
7	Forwards the work completion information on DA Form 2407/5990-E to the Shop Section Supervisor.

Table 4-20. Work Flow Procedures Number 8 (Repair Shop Section Action)

Step	Shop Section Supervisor Actions
1	Receives information from the Repairer.
2	Verifies all tasks on DA Form 2407/5990-E are completed.
3	Annotates DA Form 3999-4.
4	Performs a quality control inspection.
5	Directs rework as needed (places items in the holding area).
6	Submits status change "E" to the Maintenance Control Clerk when the work is finished and "C" if other work is required.
7	Forwards DA Form 3999-4 with forms and records to the Inspection sections.

Table 4-21. Work Flow Procedures Number 9 (Inspection Section Action)

Step	Inspection Section Actions
1	Receives DA Form 3999-4.
2	Edits/screens/verifies DA Form 2407/5990-E.
3	Annotates DA Form 3999-4 and DA Form 2407/5990-E (final inspection).
4	Performs the final inspection.
5	Directs additional/corrective work if the job does not pass final inspection.
6	Assigns additional task sequence numbers (if required).
7	Enters the signature (from the Inspector) on DA Form 2407/5990-E.
8	Submits status change "F" to the Maintenance Control Clerk for final inspection passed (other status as appropriate).
9	Forwards DA Form 3999-4 with forms and records to the Maintenance Control Clerk.

Table 4-22. Work Flow Procedures Number 10 (Maintenance Control Section Action)

Step	Maintenance Control Clerk Actions
1	Receives DA Form 3999-4.
2	Edits/screens/verifies signatures/entries on DA Form 2407/5990-E, including intra-shop jobs.
3	Annotates DA Form 3999-4 (initial customer notification).
4	Prepares the closeout of all tasks on DA Form 2407/5990-E. Submits status change "S" when the work is completed.
5	Performs initial unit contact.
6	Enters the contacted unit/time on DA Form 3999-4. Submits status change "R" when the customer is notified
7	Issues the completed work request to the customer. Submits status change "U" to close the job when picked up.
8	Forwards the completed work request to the shop office files.

Table 4-23. Work Flow Procedures Number 11 (Customer Unit Action)

Step	Customer Actions
1	Receives repaired equipment.
2	Annotates the receipt of equipment with a signature on DA Form 2407/5990-E.
3	Performs an acceptance inspection on equipment.
4	Submits the unit's copy of work required to the Maintenance Control Clerk and receives the completed copy for the unit files.

Intra-shop Work Orders

4-144. Intra-shop work orders are used when components or assemblies are removed by a Shop Section for repair by another section in the same unit. Work orders prepared for these transactions provide an audit trail for the parent work order. The Inspection Section or requesting Shop Section personnel prepare the Intra-shop Maintenance Request (DA Form 2407/5990-E). When the Maintenance Control Clerk enters the intra-shop work order into the SAMS-1, the parent work order remains in the Shop Office. If work can be done on the parent and intra-shop work orders simultaneously, both work orders are routed to their respective Shop sections.

EVACUATION

4-145. Evacuation is the act of moving equipment and documentation from a maintenance activity to another maintenance activity. For example, during a major offensive operation, a DS Maintenance Company Shop Officer realizes that the shop has become overwhelmed with work and a backlog of open jobs is beginning to accumulate. Evacuation of the maintenance requests backlogged may allow equipment to be repaired and returned to the using unit on a more timely basis.

4-146. The Support Operations or Maintenance Control Officer's decision to evacuate equipment is based on the following:

- Initial inspection findings (repairs beyond authority of activity).
- Current or projected workload at the repair activity.
- The time required to repair the item.
- Capability of the unit to complete repair (lack of personnel, equipment, time, and so on).

Follow the procedures in Table 4-24 to conduct evacuation procedures.

Table 4-24. Evacuation Procedures

Step	Who...	Will.....
1	Support Operations Officer or Maintenance Control Officer	Coordinate the decision to evacuate a work order with the: Maintenance Control Supervisor. Supporting Maintenance Activity.
2	Maintenance Control Supervisor	Alert appropriate Maintenance Shop sections to prepare for and evacuate designated work order.
3	Maintenance Control Clerk	Prepare DA Form 2407/5990-E, annotate DA Form 3999-4, and obtain the MCO or MCS signature for approval. Enter status code "O" (awaiting evacuation) and place DA Form 3999-4 in the tub file. Annotate DA Form 3999-4 (once evacuated) and place the request number and support activity in upper left corner. Retain copy number 1 (receipt) of DA Form 2407/5990-E and enter status code "M" (evacuated for repair and return). Upon completion of repair, place copy number 3 (organization) into DA Form 3999-4. Annotate and close DA Form 2407/5990-E in accordance with procedures.

MANAGEMENT TOOLS AND TECHNIQUES

4-147. Automation greatly increases the ability of maintenance managers to make decisions regarding maintenance operations. The SAMS provides the maintenance manager with the tools needed to make timely and accurate decisions.

Primary Tool

4-148. The SAMS is the primary tool used for maintenance management. Daily transfers of data from the Maintenance Company MCS to the Battalion Support Operations Section (SAMS-1 to SAMS-2) keeps the Support Operations Section Maintenance Officer abreast of the maintenance situation in subordinate unit shops.

4-149. In addition to automated SAMS reports, Support Operations sections may develop local procedures and reports to track maintenance status (such as daily submission of DA Forms 2406, Daily Production Reports, Backlog Reports, jobs awaiting parts, and so forth).

Daily Analysis

4-150. The daily analysis of SAMS printouts (or other locally directed reports) will reveal trends or situations requiring command or staff action. Examples of problems to watch for are:

- Jobs greater than 30-60-90 days.
- Significant increases in shop input.
- Excessive number of items awaiting parts.
- Low production.
- Excessive time in any status.
- Class IX requests with no status.

The problems mentioned above might be caused by the following poor conditions:

- Unit-level maintenance.
- Supply procedures.
- Production/quality control.
- Repair techniques.
- Treatment of equipment.
- Emphasis on site maintenance.

Corrective actions for these problems might include augmenting subordinate units with additional repair capability, cross training, revising evacuation policies or maintenance time guidelines, and/or increased use of controlled exchange or fabrication.

Daily Transfers

4-151. On a larger scale, the MMC keeps abreast of the maintenance situation in the corps or TSC through its SAMS-2. Daily transfers are received from subordinate company or battalion SAMS sites. This data is used for the following:

- Evaluate workload capabilities and the capabilities of maintenance units.
- Cross-level maintenance resources and repair parts.
- Establish maintenance priorities.
- Direct evacuation and retrograde.
- Coordinate maintenance issues through the Support Operations Section for resolution.

Maintenance data is also used by TRADOC and the AMC in analyses to determine manpower requirements and TOE structures, repair parts requirements, trends, equipment reliability, and force readiness. These analyses require accurately reported data.

SAMS-1 Reports and Outputs

4-152. Table 4-25 is a listing of SAMS-1 outputs. These outputs are readily available for making maintenance management decisions.

Table 4-25. SAMS-1 Outputs

PCN	Title
AHN-001	Workable Jobs
AHN-002	Shop Stock List (SSL)
AHN-003	SSL/Work Order (WO) Issue Candidate Listing
PCN	Title
AHN-004	Customer WO Reconciliation
AHN-005	WO Master Schedule Listing Part I – Work Orders in Shop Part II – Work Orders Awaiting Shop Part III – Work Orders Awaiting Parts Part IV – Other
AHN-013	Supply Activities Requirements
AHN-014	Manager Exception Data
AHN-015	SSL Constrained Replenishments
AHN-016	Error Exception Listing
AHN-017	SSL Audit File Purge Listing
AHN-018	Work Order Detail
AHN-019	Supply Status Listing
AHN-020	RPM Update Exception Listing
AHN-021	Equipment Status Listing
AHN-022	Production/Backlog Status
AHN-023	Bench Stock List
AHN-024	Bench Stock Replenishment Review List
AHN-025	Shop Stock Bin Labels

Table 4-25. SAMS-1 Outputs (continued)

PCN	Title
AHN-026	Bench Stock List (Purged)/Recommended Deletions
AHN-027	Bench Stock Bin Labels
AHN-028	Follow-Up Error Listing
AHN-029	Baseline Versions Report
AHN-030	Turn-In to Supply Support Activity (SSA) (D6Z)
AHN-031	Recoverable Items Report
AHN-032	SSL Manual Inventory Listing
AHN-033	SSL Inventory Report Part I – Inventory Adjustments Part II – Exception Listing Part III – New Labels Required
AHN-034	NSN/UI Change Report
AHN-035	Man-Hour Accounting Utilization Report (Transfer)
AHN-036	Man-Hour Accounting Utilization Report (History)
AHN-037	RPM NSN Change Report
AHN-038	Task Work Sheet

SAMS-2 Reports and Outputs

4-153. Table 4-26 is a listing of SAMS-2 outputs. These outputs are readily available for making maintenance management decisions.

NOTES: Preformatted reports are available for management at the SAMS-2 site (Battalion Support Operations Office and MMC).

Hard-copy ad hoc reports may also be produced that provide a wide variety of management data. The SAMS-2 currently has eight preformatted ad hoc reports available. Additionally, the ad hoc inquiry process provides maintenance managers with the ability to produce hard-copy reports per the command's data and format requirements.

Procedures and contents are in AISM 18-L26-AHO-BUR-EM and TC 43-4.

Table 4-26. SAMS-2 Outputs

PCN	Title
AHO-001	Deadlined Equipment Listing Weapon System Part I – Reportable Items Part II – Maintenance Significant Items
AHO-002	Command Deadlined Equipment Summary Part I – Reportable Items Part II – Maintenance Significant Items Part III – Summary
AHO-003	Equipment Deadlined Over NNN Days by Unit Part I – Reportable Items Part II – Maintenance Significant Items Part III – Summary
AHO-004	Completed Work Order Summary
AHO-005	Support Maintenance Turnaround Time (Days) Unit/Activity
AHO-006	Support Maintenance Turnaround Time (Days) ECC
AHO-007	Support Maintenance Meantime to Repair (Manhours), Unit/Activity
AHO-008	Support Maintenance Meantime to Repair (Manhours), ECC
AHO-009	Selected Work Order Status Listing
AHO-010	Workload Status Listing Part I – ECC Part II – Unit/Activity
AHO-011	Workload Age Summary Listing Part I – ECC Part II – Unit/Activity
AHO-012	Parts Detail Exception Listing
AHO-013	Multiple Parts Request Exception Listing
AHO-014	Production/Backlog Status
AHO-018	Completed Work Order File Purge Listing
AHO-019	Maintenance Cost Command Roll-Up

Table 4-26. SAMS-2 Outputs (continued)

PCN	Title
AHO-020	Maintenance Cost by Commodity
AHO-021	Maintenance Cost by ECC
AHO-022	Maintenance Cost by Customer
AHO-023	Maintenance Cost by APC
AHO-024	Bypassed Receipted Parts Records
AHO-025	Maintenance Production/Backlog Report
AHO-026	Equipment Deadlined over NNN Days by Battalion Part I – Reportable Items Part II – Maintenance Significant Items Part III – Summary
AHO-027	Reportable Equipment Validation File Listing
AHO-028	Diskette/Comm Interface Parameter File Listing
AHO-029	Maintenance Production/Backlog Report (by Work Order Count)
AHO-030	Maintenance Production/Backlog by ECC (for Support Unit by Item Count)
AHO-031	Maintenance Production/Backlog by ECC (for Support Unit by Work Order Count)
AHO-032	Work Order Status/Parts Listing
AHO-033	Maintenance Production/Backlog by ECC (for Battalion by Item Count)
AHO-034	Maintenance Production/Backlog by ECC (for Battalion by Work Order Count)
AHO-035	Maintenance Production/Backlog by ECC (for Division by Item Count)
AHO-036	Maintenance Production/Backlog by ECC (for Division by Work Order Count)
AHO-037	Inop Transfer Listing
AHO-039	Monthly Float Usage and Accumulative Report (by SPT UIC)

Table 4-26. SAMS-2 Outputs (continued)

PCN	Title
AHO-040	Monthly Float Usage and Accumulative Report (by LIN)
AHO-041	ORF Status and Utilization Report
AHO-042	Serial Number Tracking Report
AHO-043	Serial Number Tracking Report Purge Listing
AHO-044	Manpower Utilization Report
AHO-046	Manpower Utilization Report Purge Listing

Inspections and Visits

4-154. Inspections and visits are management tools, which contribute materially to an effective QA/QC program. They indicate materiel readiness, proficiency of personnel, adequacy of operations, and effectiveness of maintenance and supply management. They allow staff personnel to see conditions as they are in the unit, rather than only as represented in reports. If used properly, they are a quick, effective way of noting and correcting problems. The Battalion Commander, Command Sergeant Major, SPO, Maintenance Company Commander, and Maintenance Control Officer should make subordinate unit visits a matter of routine.

OPERATIONAL READINESS FLOAT TRANSACTIONS

4-155. ORF is a quantity of selected end items or major components of equipment authorized for stockage at CONUS installations and overseas support maintenance activities, which extends their capability to respond to materiel readiness requirements of supported activities. It is accomplished by providing supported activities with serviceable replacements from ORF assets when their like items of equipment cannot be repaired or modified in time to meet operational requirements. The SPO or Shop Officer is responsible for reviewing equipment requirements of supported units in accordance with ARs 710-2 and 750-1, and when appropriate in directing ORF transactions.

Process

4-156. When an ORF transaction becomes necessary, the following process should be followed:

- The Maintenance Control Supervisor reviews all transactions and their documentation before submission to the Support Operations or Maintenance Control Officer for final approval.
- The SPO or MCO directs/approves the ORF transaction.
- The Maintenance Control Clerk prepares all documentation for the ORF transaction.

Procedures

4-157. Follow the procedures in Table 4-27 when an ORF transaction becomes necessary.

Table 4-27. ORF Procedures

Step	Who...	Will.....
1	Maintenance Control Supervisor	Monitor and supervise the Maintenance Control Clerk in conducting the ORF transaction.
2	Maintenance Control Clerk	<p>Generate a new work order on the SAMS-1 for issuing a serviceable float item.</p> <p>Annotate awaiting float transaction status code "7" (initially) on the new work request on completion of the ORF transaction.</p> <p>Annotate a "U" (picked up).</p> <p>Report to the Maintenance Supervisor when the actual issue and turn-in of property are completed in accordance with policy and procedures identified in ARs 710-2 and 750-1, and DA Pamphlet 710-2-2. Correct accountability is maintained at the ORF SRA and in the Property Book.</p>

STATUS CHANGES

4-158. Status changes annotated on a maintenance request document are the result of the physical tracking of a job and its documentation. Routinely updated status allows managers to have current visibility of a specific job. Therefore, effective emphasis can be applied to expedite supply and repair actions. Table 4-28 outlines procedures for changing the status on a work request.

NOTE: Unit must update Property Book, AOAP, ULLS-G, and so on when a float transaction occurs.

SHOP SUPPLY OPERATIONS

4-159. Shop Supply is a critical aspect of shop operations. This element provides repair parts and consumable items to support DS-level maintenance operations. A unit with an effective shop supply operation provides effective support to its customers.

4-160. The Shop Supply element is usually collocated with the maintenance control element. It normally consists of one to two equipment automated logistics specialists who do the following:

- Prepare repair parts requests based on information from repairers or inspectors.
- Maintain an automated or manual document register.
- Process monthly recon with SSA.
- Record information on repair parts supply transactions.
- Receive, store, and issue parts for specific job orders.

- May obtain, store, and issue demand-supported repair parts (shop stock) and obtain and issue high-demand, low-cost consumables (bench stock).
- Monitor turn-in of recoverable items.

Table 4-28. Status Changes on Work Requests

Step	Who...	Will.....
1	Shop Section Chiefs	<p>Submit daily manhour accounting to the Maintenance Control Clerk on each work order (by Shop section that performs hands-on work) using the Task Worksheet, PCN AHN-038.</p> <p>Submit changes in status by other means (for example DA Form 3999-3-R) for sections that do not track manhours.</p> <p>Report status changes for all maintenance requests in the section to the Maintenance Control Clerk daily.</p>
2	Maintenance Control Clerk	<p>Enter all status changes submitted from Shop sections into the SAMS-1 at the end of the workday.</p> <p>Ensure data transfer to the SAMS-2 is correct, complete, and timely.</p> <p>Identify and verify each open maintenance request in the shop against the piece of equipment in for repair.</p> <p>Monitor and manage the progress of each job in the section.</p> <p>Provide daily customer disk status report.</p>
3	Maintenance Control Supervisor	<p>Monitor and review the status of all maintenance requests and ensure the most current status is annotated on all documents.</p> <p>Directly supervise the Maintenance Control Clerk to ensure end-of-day status changes are properly annotated into the SAMS-1.</p>

Ordering Repair Parts

4-161. Shop Supply Clerks use DA Form 2407/5990-E or DA Form 2407-1 to request parts with the SAMS-1. DA Form 2407/5990-E or DA Form 2407-1 must list all parts based on data provided by the Inspector. Clerks need the following information for ordering parts electronically:

- Action code.
- Related task number.
- NSN or part number.
- Quantity required.
- Not-mission-capable supply (NMCS) status.

Types of Shop Supply

4-162. DS maintenance units maintain the following two types of Shop Supply:

- Bench stock.
- Shop stock.

AR 710-2 and DA Pamphlet 710-2-2 contain additional details on bench stock and shop stock.

4-163. **Bench Stock.** Bench stock consists of low-cost, high-usage, consumable items used by maintenance personnel at an unpredictable rate. It must meet criteria set forth in AR 710-2. Bench stock includes the following:

- Common hardware.
- Transistors.
- Resistors.
- Webbing.
- Thread.
- Welding rods.
- Sandpaper.
- Capacitors.
- Wire.
- Tubing.
- Hose.
- Rope.
- Other expendable materials.

4-164. The Maintenance Control Officer performs the following:

- Selects stockage based on mission needs. The only required records for maintenance of bench stock are Bench Stock Record Lists (approved semiannually by the commander) and Bench Stock Replenishment tags. For information of these records, see DA Pamphlet 710-2-2.
- Closely monitors bench stocks to maintain unit mobility and supply economy. Frequent stockage review and prompt requisition for bench stock items ensures adequate levels of supply. Maintenance activities may stock up to a 15 to 30 day supply of bench stock.

4-165. **Shop Stock.** Shop stocks are demand-supported repair parts and consumables used by a DS-level maintenance activity. Programmed and unprogrammed shop stocks support internal DS-level maintenance requirements. Shop stocks are authorized for the following:

- To repair items in support of the reparable exchange program.
- For elements of maintenance units operating at a remote location, such as MSTs.

- To repair items requiring diagnostic modules.
- For maintenance units not supported by an organic supply support activity operating under the direct support system (DSS).

DSS customers are those units that requisition directly from the wholesale supply system through the intermediate level with no backup assigned stockage list at the DS level.

4-166. To qualify for shop stock, an item must have at least three demands in a 180-day control period. Stockage level for shop stock is developed from the requisitioning objective table contained in DA Pamphlet 710-2-2. As the Army's efforts at distribution management produce shorter, more reliable OSTs, shop stocks' stockage levels will be reduced, if not eliminated. Replenishment is based on a reorder point. Automated systems may use the "use-one, order-one" concept. Each shop stock list is reviewed at least quarterly. Items are deleted from stockage because of the following:

- When they fail to receive at least one demand in a 180-day control period.
- Unless they support seasonal requirements and demand is anticipated.
- Unless they support requirements peculiar to nonstandard equipment.

FACILITATING WORKFLOW THROUGH FIELD SITE SELECTION AND LAYOUT

4-167. In a maintenance operation, the objective of a good layout is to facilitate the flow of work through the shop and to reduce movement of repair parts, tools, equipment, and personnel. Some compromise must be made because of the need to defend the area (see Chapter 10). Field environments seldom permit a unit to operate under ideal conditions. The layout must be tailored to the terrain, tactical situation, proximity of supported units, and type and amount of equipment supported.

Site Selection

4-168. When selecting a field site for maintenance support operations, consider the following criteria. The area should include the following:

- Be reasonably flat with good drainage.
- Be firm enough to permit parking and movement of heavy vehicles and equipment.
- Be accessible to supported units.

Any terrain features in the area that facilitate unit defense must be considered in planning. Streams or marshes can provide flanking security. Hills can provide observation and facilitate fire on avenues of approach. Built-up areas inherently enhance defense and mission support capabilities.

Layout

4-169. The following are the principles for laying out the company area:

- Locate:
 - Work sections within ready access to the external road network and to each other.
 - Supply storage areas close to a road to permit easy access for trucks.
 - The Service Section within easy access of all Maintenance Shops.
 - Recovery elements in the vicinity of the Base Maintenance Platoon to facilitate support and movement of vehicles.
 - The Maintenance Control Section, Inspection Section, Shop Supply, and SSA near the entrance to the company area.
- Ensure:
 - Maintenance areas provide vehicle dispersion and positions where control and security are possible.
 - The area is capable of being defended, using the terrain's natural defense characteristics to augment the Defense Plan and unit capabilities.

The company area should be reasonably flat, provide good drainage, and contain firm soil for movement of heavy vehicles. Use terrain features to enhance unit defense.

Area Requirements

4-170. Area requirements depend on the style and tempo of combat, which influence the following:

- Workload.
- Security requirements.
- The ASL volume carried.
- The commander's willingness to risk.
- Evacuation policy.
- Size of the workload backlog permitted.

Consider the following situations:

- In a desert environment, an enemy that possesses great indirect fire capability or that attains air parity may require the unit to maintain greater dispersion.
- Military operations in urban terrain (MOUT) operations or an enemy in close terrain, one that relies on infiltrating unit perimeters, or one that possesses few indirect-fire weapons may mandate a smaller company area than prescribed by Army doctrine. Figure 4-9 shows a sample Maintenance Company layout.

NOTE: Under most conditions, the planning area provides enough dispersion to operate without serious degradation of unit efficiency and without significant vulnerability to insurgent attacks.

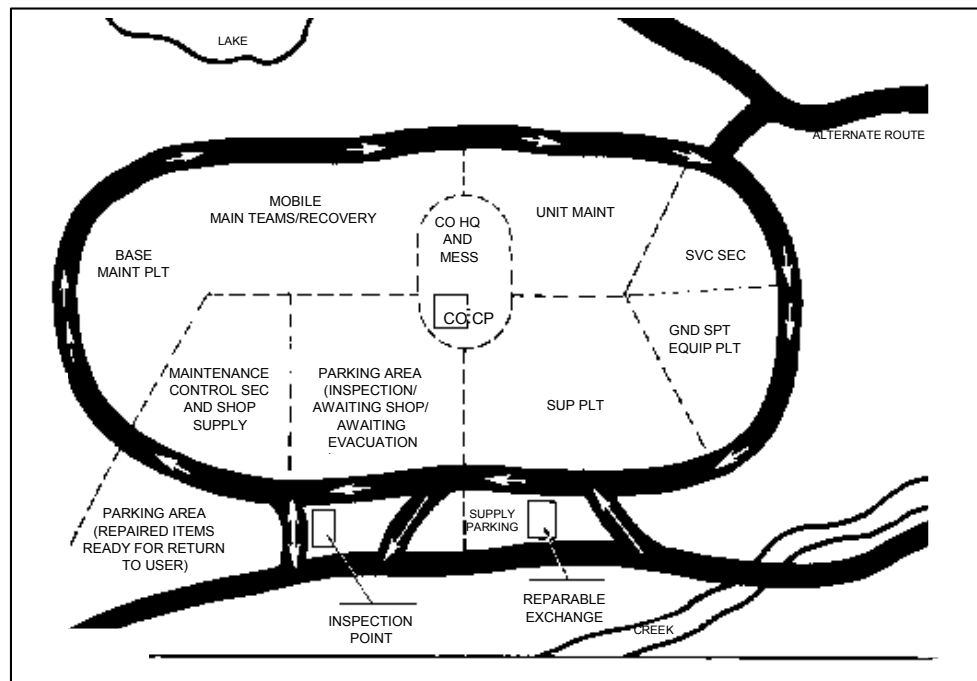


Figure 4-9. Sample Maintenance Company Layout

UNIT INTERNAL MANAGEMENT

4-171. DS Maintenance unit internal management operations include the following:

- Unit administration.
- Personnel management.
- Inspections.
- Unit dining facility operation.
- Movement and defensive operations.
- Unit security, including physical security and OPSEC.
- Safety.
- Training.
- Communications.
- Rear operations (see Chapter 10).
- Unit maintenance and supply operations.

4-172. Many of the aforementioned operations become routine, either by their nature or the commander's decision. SOPs can be prepared for these operations, which facilitate positive internal unit management and relieve the commander of repeated planning and issuing of directives for operations that follow an established pattern. The commander can then concentrate on operations that require planning and directing as requirements develop. One of the most complicated unit missions is Self Defense (Force Protection). Force protection constantly changes with the threat environment. Maintenance organizations operating as part of a base or in a remote location must ensure adequate force protection if continuity of customer support is to be assured in the AO. Additional information about the establishment of Force Protection can be found in Chapter 10.

Chapter 5

Repair Parts Supply Operations

This chapter describes supply support operations (including SSA organizations, operating procedures, and supply sources), and repair parts supply. Repair parts supply support is a crucial part of all maintenance operations. Repair parts make up 92 percent of the total Army inventory. The number of Class IX items stocked in the CONUS or pre-positioned in-theater affects supply elements, maintenance, and aviation units. Maintenance personnel need repair parts, tools, test equipment, cleaning materials, and other supplies to do their job. In order to get the right supplies in the right quantity to the right place at the right time, maintenance personnel need to know the Repair Parts Supply system and understand how the system works. DS maintenance units manage three types of supply operations:

- Unit Supply – obtains, accounts for, stores, and replenishes supplies and TOE equipment required for the unit's internal operations.
- Shop Supply – obtains and provides repair parts and maintenance materials required for the unit's DS-level maintenance mission.
- Performs all functions related to acquisition, storage, accounting, and distribution of maintenance supplies and RX items in support of unit-level maintenance activities and the unit's DS-level maintenance mission.

Supply policy below the wholesale level is described in AR 710-2. AR 710-2 also implements policy for DS and GS SSAs and describes supply support operations that apply to divisional and non-divisional DS maintenance units.

SUPPLY SUPPORT OPERATIONS

5-1. Class IX items consist of repair parts and components (including kits, assemblies and subassemblies, reparable and non-reparable items, required for maintenance support of all equipment. Class IX items range from small items of common hardware to large, complex LRUs. Class IX does not include medical-peculiar repair parts.

5-2. One of the key Army programs that continues to have a positive effect on getting repair parts to the user as quickly and accurately as possible is distribution management. The distribution management program has reduced the time it takes for a repair part requisition filled at the national level and returned to the SSA from more than 30 days down to 9.4 days. Distribution management has established many protocols enabling SSAs to increase their effectiveness and efficiency.

5-3. The Army began the distribution management program as a means of improving (re-engineering) its logistics processes. One of the major focuses of distribution management is to reduce CWT. CWT is the

total time between the issue of a customer order and satisfaction of that order for repair parts.

5-4. Distribution management's performance metric is CWT. This is an end-to-end metric standard that measures the speed and efficiency of the logistics system's ability to support the soldier in the field. Unlike OST, CWT accounts for the time when the need is identified rather than ordered. CWT also accounts for the time necessary to get the item from the supporting SSA to actual receipt by the unit.

5-5. There is a direct relationship between an effective and efficient SSA and an effective and efficient maintenance activity. The materiel readiness of supported units, their ability to train effectively, their ability to perform their mission, and the success of the Army, depends on effective supply and maintenance.

OPERATING CONCEPT

5-6. The degree of repair parts management required is proportional to the contribution the parts make to operational readiness of the end-items they support. The type and quantity of stocked items directly relates to readiness requirements.

Strategic Level

5-7. Strategic supply activities, in coordination with the United States Army Transportation Command (USATRANSCOM) and in synchronization with the Combatant Commander's Joint Operations Planning and Execution System (JOPES)-developed movement program, ensure that required supplies have unit line number designations. They also ensure that supplies move from stockpiles or other sources to the theater to meet the priorities of the Combatant Commander. Many less-than-container loads are shipped on 463L pallets. Although containers are the preferred method of shipment, much of the cargo is flown on 463L pallets from the CONUS. When required to reduce handling in-theater, depots unitize and package supplies received from CONUS military stockpiles and the economic base. The depots offer them to the transportation component command for movement. If a container contains multiple consignees, packaging maintains consignee integrity. A copy of the documentation accompanies the container. TAV will provide an automated capability to track both the container and its contents.

Operational Level

5-8. Supply operations at the operational level involve the requisitioning or acquiring, receipt, storage, protection, maintenance, distribution, and salvage of supplies. Supply planners and managers must understand the JFC's/ASCC's/ARFOR Commander's priorities and the requirements for support of campaigns and major operations. Requirements include consideration of the needs of joint and multinational forces. Supplies are throughput whenever possible from the port of departure (POD) or local sources to the appropriate SSA or receiving unit.

5-9. The supply system depends on an efficient and effective materiel management system. MMCs and materiel managers with DMCs must know the prioritized requirements of the force and the status of available resources. They manage distribution in coordination with movement

control elements that know the capabilities of the transportation system to move required supplies. This management requires an effective automated supply system, as well as extensive coordination. Materiel managers will be linked to strategic and tactical supply and transportation elements to provide TAV.

5-10. The operational level of supply focuses on providing repair parts and a level of stockage for items not sent to the theater by ALOCs. Sustainment maintenance organizations ease the supply requirements by providing serviceable assets and components. Theater-generated assets reduce the requirement to provide support from the strategic level of supply. GS maintenance units' shop stocks support authorized maintenance tasks. They requisition replenishment stocks through their supporting MMCs and do not maintain ASLs.

Tactical Level

5-11. Repair parts operations at the tactical level support both unit- and DS-level maintenance missions. Tactical-level supply operations focus on readiness and support the commander's ability to fight battles and engagements or achieving his stability or support mission. Parts managers and planners work with supporting commanders and materiel managers to ensure the required supplies are available when and where the user needs them. Units carry a basic load of supplies with them to support their operations until the operational and tactical distribution systems are established and can resupply them. When time and mission constraints require, a "push" system provides supplies. Under this type of system, planners estimate the supply requirements and arrange to have supplies delivered to supported elements. As the theater/operational distribution system matures, supply elements convert, by commodity, to a "pull" system. Requests generated by supported elements are the basis of a "pull" system. FM 10-1 and FM 10-27 discuss planning considerations and request procedures.

5-12. Repair parts items at the tactical level support both unit- and DS-level maintenance missions. Organizations can stock a limited number of items on the PLL to support their unit-level maintenance mission. Normally, the number of lines is restricted to approximately 150. However, they should be demand-supported or combat-essential. The commander has some latitude to add lines to accommodate expected requirements (an example would be seasonal items or a special training requirement) and other justifiable reasons. Mobility of PLL items is another consideration. The PLL should be 100 percent mobile on organic transportation assets.

5-13. DS maintenance units maintain an ASL based on supported unit anticipated requirements. Maintenance units maintain different quantities of ASLs depending on the mission, organizations supported, and the organic mobility capability of the organization. GS- and DS-level missile system maintenance units maintain the theater ASL for all supported missile systems. They provide missile parts supply support for the theater.

5-14. Both operational and tactical supply systems include SSAs operated by GS and DS supply and maintenance units. These units establish SSAs throughout the theater as far forward as the BSA. On a

temporary basis, DS elements may operate even further forward at forward logistics bases to reduce the distances users have to travel to receive support. The support structure at each command level from separate brigade/division up also includes a materiel management organization to manage supply and maintenance operations.

5-15. One of the most serious management concerns is the inability to immediately obtain required repair parts. To help reduce delays and prevent a zero balance, personnel can do the following:

- Check to ensure requests and work orders are filled out correctly.
- Follow up repair parts requests.
- Verify the correct part has been ordered. If not, the unit should cancel the request and order the correct item.
- Verify the request has been received at the SSA and if necessary, pass on to the higher source of supply. If not, the unit should reorder.
- Check the AMDF for an interchangeable or substitute NSN. If one exists, personnel should check the stock status of that item.
- Determine if the part can be obtained locally or can be made.
- Check on the possibility of using controlled exchange procedures.
- Consider a cannibalization point or the Division Resource Management Office (DRMO) as a source of supply.
- Use up-to-date supply manuals and correct priority designators (PDs) and stock numbers to properly identify repair parts on request.
- Check whether supply specialists have entered any required advice code on issue and turn-in documents.
- Stress the need for follow-up and continual review.
- Check the SSA to see if a similar major item is available in ORF

SUPPLY SYSTEM

5-16. The supply system includes the wholesale level, retail level, and unit level. Wholesale supplies are managed at the strategic management level, retail supplies are managed at the operational and tactical levels, and unit level supplies are managed at the unit level.

Wholesale Level

- 5-17. The wholesale level includes the following:
- National Inventory Control Points (NICPs).
 - Supply depots.
 - Arsenals.
 - Central wholesale data banks.
 - Plants.
 - Factories associated with commodity command activities.
 - Special Army activities controlled by the USAMC.

The wholesale supply system's major focus is procuring supplies from the manufacturer and bringing them into the Army inventory. The wholesale supply system also works in concert with the wholesale maintenance system to return overhauled major end items and components into the Army's supply inventory.

Retail Level

5-18. The retail level includes all portions of the supply system not classed as wholesale. It is subdivided into user, DS, and GS levels:

- Users are combat, combat support, and combat service support units that stock supplies to support their own operations. These stocks are termed PLLs for Class IX and basic or operational loads for other classes. Users are also referred to as customers.
- DS supply and maintenance units stock supplies for issue to customer units. Stocks at the DS level are called ASLs. Each DSU has a list of customer units it supports. The DMC sets requisition objective and retention levels for divisional units. The CMMC/TSC MMC sets requisition objective and retention levels for non-divisional units. Stock control and accounting is performed by DSUs.
- GS supply units provide backup supply support to DS supply and maintenance units and act as transshipment points. Stocks at this level are also called ASLs. GS supply units are not located in the division; they are found in the COSCOM and TSC. GSUs at the COSCOM MMC and TSC MMC perform their stock control and accounting.

ORGANIZATION FOR SUPPLY SUPPORT

5-19. The general mission statement of any SSA is to maintain an ASL. This includes the receipt, storage, and issue of supplies for all supported unit requirements. The mission statement is modified based upon the type of support provided (Class IX versus Classes II and IV versus Class VII), and the level of assignment (DSB or Corps Support Command). The mission statement of the SSA can be found in Part 1 of a unit's MTOE. The two mission statements shown below provide some insight into the general size of the activity and its customer base.

Supply Support Activity Critical Tasks

5-20. Regardless of the size of the SSA or the class of supply being issued, the following basic critical tasks apply to all SSAs:

- Provide technical management and guidance.
- Receive stock.
- Store stock.
- Issue stock.
- Pack and crate materials to be shipped (if a Packing/Crating section is authorized).

Material Management Centers (Operational and Tactical)

5-21. CMMCs perform integrated supply and maintenance management for the theater/corps and division. They also perform integrated supply and maintenance management for all classes of supply (less classified maps, medical, and COMSEC) for which the support command has responsibility.

Battalion Headquarters

5-22. Support Operations Offices have a supply manager and a repair parts manager who operates under the supervision of the SPO. These personnel monitor supply support operations of subordinate units, make recommendations relating to repair parts supply policies and procedures, establish controls to fulfill the Class IX mission, and assist other staff officers and units attached to the battalion with supply-related issues. Personnel in the Battalion Headquarters Support Operations Offices work closely with the accountable officer in the Quartermaster Supply Company.

Quartermaster Supply Company Supply Support Activity

5-23. The Class IX SSA mission is performed by a Supply Platoon composed of a Platoon HQ, a Stock Control and Accounting section, a Storage section, and an RX section. The Supply Platoon maintains the company's ASL. This ASL includes types and quantities of repair parts authorized for unit-level maintenance activities of supported units, as well as those authorized for support of the DS-level maintenance mission.

Stock Control and Accounting Section

5-24. The Stock Control and Accounting section performs the following functions:

- Maintains stock accounting records and files.
- Receives requests for issue from supported units and from its maintenance elements.
- Edits requests for issue or turn-in.
- Screens its stock records for availability.
- Records issuing of supplies.
- Issues materiel release orders to the Storage section.
- Maintains a critical items list and non-stocked items records.

- Assists in compiling RX lists.
- Requests disposition instructions and evacuates materiel as directed.
- Prepares requisitions for replenishment of stocks.

NOTE: Divisional requisitions are submitted through the DMC to the COSCOM MMC or, if in the Corps or COMMZ, to the COSCOM MMC or TSC MMC.

This section also uses SARSS software for receipt, storage, and issue operations and automated Class IX management. Under the SARSS, this section uses the SARSS-1 to communicate directly with the SARSS-2 at the MMC. Under the SARSS-2, the MMC assumes stock record accounting and management functions. Information on requisitions, management actions, and status is exchanged daily between the SARSS-1 and SARSS-2 sites by diskette or electronic transmission.

5-25. Class IX and RX transactions are normally processed using standard requisition and turn-in documents. The ULLS-G facilitates the automated request and issue process between the customer and the SSA. Units exchange Class IX information daily between the ULLS and SARSS-1 by diskette or electronic transmission. Similar procedures are also used to exchange daily Class IX information between the Maintenance Company's Shop Supply section operating the SAMS-1 and SARSS-1.

5-26. The SSA keeps current references on stock accounting supply procedures. These references include regulations, technical publications, SOPs, and policy and procedural guidance and information. The SSA also provides, as necessary, personnel the references needed to satisfy inspection or technical assistance requirements.

STORAGE SECTION

5-27. The Storage section physically receives, stores, maintains in storage, and issues required parts and RX items. Supplies are issued in accordance with materiel release orders from the Stock Control and Accounting section. The section is also responsible for safeguarding and storing supplies, for preparing supplies for shipment, and for maintaining proper parts locations.

REPARABLE EXCHANGE SECTION

5-28. RX is a repair parts supply procedure that exchanges serviceable repair parts, components, and assemblies for unserviceable items, using standard issue and turn-in documents and procedures. Normally, items being exchanged must be repairable or recoverable. However, this procedure is also sometimes used for other types of items whose issue must be controlled. The RX section is established in an area with convenient access to supported units (within or adjacent to the Supply Office). Under automated procedures, SARSS-1 software accommodates RX operational procedures.

Supply Support Activity Procedures

5-29. Quartermaster and Repair Parts Companies carry a specified level of demand-supported, fast-moving repair parts required to support DS-level maintenance operations and supported unit requirements. Stockage requirements are continually appraised to keep stockage to the minimum required for support requirements and to avoid accumulation of excess stocks.

Distribution

5-30. The normal method used to distribute items to supported units is supply point distribution. Supported units are advised when shipments are ready. Units dispatch transportation to pick up their supplies. Arrangements may be made for delivery by requesting transportation from supporting transportation sources. Delivery of repair parts may occur by air in situations where supply lines are not secure or terrain is impassable. Air transportation may also be used to retrograde unserviceable components for repair.

Storage

5-31. The storage element provides physical receipt, storage, maintenance-in-storage, and safeguarding. It maintains a locator system and issues items as directed by the Stock Control and Accounting section. Storage personnel also package, crate, and handle items. Units should emphasize proper storage of Class IX during field operations. Unprotected repair parts, components, and assemblies can quickly deteriorate if exposed to dirt and moisture.

5-32. To ensure proper storage, a Storage Plan must be developed and used for all stocks. The plan must comply with policies established by the Company Commander, which, in turn, is based on higher HQ policies. Space available and types, sizes, and quantities of items to be stored are the principal factors to consider when developing a Storage Plan.

5-33. Most repair parts and maintenance supplies are stored in vehicles organic to the maintenance unit. ISO containers may be used for storage when they are available and their use is authorized. This provides maximum protection with little or no requirement for preparation or processing for storage. Except for glass and other fragile items (windshields, sediment bowl, and so forth), which are subject to breakage in-transit, all items received in original packages should be accepted unopened.

5-34. An Inspection Schedule should be established for stored stock. Unpackaged and unpreserved items should be inspected for rust, corrosion, and broken packs. Particular emphasis must be placed on items with an established shelf life (such as rubber gaskets, neoprene seals, and batteries) to ensure expired-date packages are not issued. All storage practices should be in compliance with safety and environmental laws and regulations.

Reparable Exchange

5-35. Items authorized for repair at support maintenance may be supplied through an RXA. Supply and maintenance personnel jointly determine selection of RX items for repair. Authority to stock RX and the levels in which these items are stocked is governed by AR 710-2. Items selected are those that are reparable and that have an essentiality code of "C" and an air eligibility code of "1" or "3," with at least 9 recurring demands in the last 360 days. Stocked items failing to receive at least 3 recurring demands in the previous 360 days will no longer qualify for stockage and will be deleted.

5-36. Procedures for customers to obtain an item from the RXA are provided in DA Pamphlet 710-2-1. Items are exchanged on a one-for-one basis using a DA Form 2765-1 to turn in the unserviceable item and another DA Form 2765-1 to request a replacement. Placing items on the RX list serves two useful purposes:

- First, users do not have to prepare job orders and wait for repairs. The customer simply prepares the issue and turn-in documents and hand-carries the item to the RXA where a similar item is issued.
- Second, only the supply activity job-orders the components to the maintenance activity for repair. This reduces paperwork and allows the maintenance unit to manage the workload for programmed repair.

Prescribed Load List

5-37. The PLL is a list of the authorized quantities of supplies required by a unit to do its daily unit maintenance. Units that are authorized personnel, tools, and equipment to perform maintenance maintain a prescribed load of repair parts. Units that regularly support other units without maintenance capabilities include the supported unit's equipment in their PLL computations. PLL items must always be on-hand or on request. PLLs must be on file in the using units and in the supporting SSA.

5-38. A PLL consists of repair parts and other stocks. The unit PLL consists of unit-level maintenance repair parts that are demand-supported (15 DOS), non-demand-supported, and specified initial stockage for newly introduced equipment. Other items that can be added to the PLL include the following:

- Demand-supported items with essentiality codes other than "C."
- Initial-issue repair parts to support newly fielded equipment (Code "P") items.
- Items added with approval of the First General Officer in the chain of command or his designated representative.

5-39. Each unit is responsible for maintaining PLL records, submitting timely replenishment requests, and conducting inventories. All items must be on-hand or on order. PLL policy is in AR 710-2. Manual procedures are in DA Pamphlet 710-2-1. Automated procedures are in System User manuals.

5-40. The combat PLL consists of a mandatory stockage of repair parts needed for essential battlefield maintenance for a prescribed number of days in combat. These loads must be able to be moved into combat in one lift with organic transportation. These loads are also used to support peacetime demands.

Authorized Stockage List

5-41. The ASL consists of those parts stocked in DS repair parts supply units for issue to user units and to support DS-level maintenance operations. The MMC, based on priorities established by the commander, will establish the guidelines for issue, ASL design, or distribution. The MMC is the common exit point for requisitions and other supply documents for the division. ASL lines are distributed among the units based on the critical combat needs of customer units. Quartermaster Supply and Repair Parts Companies will stock repair parts that are combat-essential to customer units. Steps in the repair parts process are in Table 5-1.

Table 5-1. Repair Parts Process

Step	Action
1	Units submit repair parts requests to their Repair Parts Supply Company SSA.
2	If repair parts are on-hand, they are issued. If parts are not on-hand, the request is back-ordered and a requisition is passed to the COSCOM or TSC MMC.
3	The COSCOM or TSC MMC prepares the MRO, back-orders the requisitioned item, and passes the requisition to a higher supply source.
4	When issues are made by the COSCOM or TSC MMC, the parts are shipped to the Repair Parts Supply Company with the ASL.
5	The QM Supply Company will report the receipt of parts to its supporting MMC.
6	The QM Company Supply Section places items in a storage location (for ASL replenishment) or releases them to the customer if the request was a passing action.
7	The DMC directs the forward movement of ASL stocks held by the MSB or DSB QM Company whenever replenishment (of the Forward Support Companies' ASL) is needed or to satisfy critical needs of customers.

5-42. Combat ASLs are available for DSUs. The combat ASL includes repair parts and components to support DS combat maintenance. The combat ASL will cover all MPLs and demand supported items on supported unit PLLs.

Mandatory Parts Lists

5-43. MPLs, which are published as DA pamphlets, are used to standardize the combat PLLs. The MPL is the mandatory portion of the standardized combat PLL. Parts on the MPL must be on-hand or on order at all times.

Weapon System Replacement

5-44. Weapon System Replacement Operations (WSRO) is a management tool used to supply the Combat Commander with fully operational major weapon systems, including both the required equipment and trained crews. Procedures for issue of weapon systems differ from those for other Class VII items. Weapon systems replacement is managed at each level of command. Two terms often used to describe WSRO are *ready-for-issue* and *ready-to-fight*. Weapon systems managers are generally appointed as indicated below:

- Battalion – XO.
- Brigade – XO.
- Division – Assistant DMMO (DMC).
- Corps – COSCOM MMC.

Ready-for-Issue Weapon System

5-45. A Ready-for-Issue Weapon system is one that has been removed from its preservation status and made mechanically operable according to current equipment serviceability criteria or other appropriate standards. Additional equipment, such as fire control, machine guns, radio mounts, and radios, is installed. The vehicle has been fueled and basic issue items (BIIs) are aboard.

Ready-to-Fight Weapon System

5-46. A Ready-to-Fight Weapon system is one that is manned and ready-for-issue with ammunition stowed aboard. The weapon has been boresighted and verified. Transportation of weapon systems to corps normally occurs by rail. Systems are shipped to division by rail or HETs and to battalions by HETs.

REPAIR PARTS SUPPLY CONCEPT OF SUPPORT

5-47. Repair parts stockage philosophy focuses on stocking only a limited amount of high demand parts deemed critical for maintaining unit end items. The supporting Class IX SSA stocks repair parts, not meeting the criteria for PLL, on an as required basis. Request for repair parts, not available at the serving SSA, are referred to the next level repair parts management node (SARRS-2) to conduct a lateral and vertical search for the required part. Whenever the requested part is located, automated (SARRS) National Release Order process directs a release and shipment to the requestor. If the repair part is not available within the theater, the request will be electronically forwarded to the NICP.

5-48. The management of repair parts at the national level is usually based on the general classification of the item, rather than its end use. Therefore, requisitions for repair parts may go to more than one NICP or Commodity Command. Where the end item is a major system (for example, the M-1 Abrams Tank), the PM ensures that repair parts support at the national level is effective. At the strategic level, supply requirements for high dollar, tightly-controlled Class IX items may drive the use of depot maintenance repair to support supply demands from the field.

OPERATIONAL LEVEL REPAIR PARTS SUPPLY

5-49. To reduce the inventory of lines of repair parts that must be stored, a large percentage of Class IX items are flown from the CONUS into the theater. If the theater has pre-positioned war reserve materiel stocks (PWRMS), they will be used as the initial source of supply until sufficient quantities of Class IX can be shipped from the CONUS. Though stored in COSCOM storage sites, the TSC controls PWRMS items until they are released to the corps by theater.

5-50. The TSC Support Operations Center-MMC manages Class IX for the theater. The operational level of Class IX supply focuses on providing a GS-level of supply that provides a safety level (15 DOS) for non-ALOC repair parts and 30 DOS safety level for items that will be sent to the theater via ALOCs. ALOC cargo arrives daily at a pre-determined aerial port. Most Class IX ALOC eligible items will be accelerated through the distribution pipeline and delivered directly to the requesting SSA. The remaining Class IX ALOC items will be delivered to a GS Repair Parts Supply Company in the COMMZ or combat zone ASG(s).

5-51. Air eligible Class IX support begins when the ALOC is established. Non-ALOC support must wait until a sea line of communication (SLOC) is established. Easing supply requirements are the serviceable assets that GS maintenance units repair and return to the Class IX inventory. Combat essential and high dollar value items are intensely managed at all levels (the SARSS-2 provides asset visibility at management levels). Low cost, non-combat essential items are managed within the established parameters of automated systems at the various echelons of supply (primarily the SARSS-1 at the DSU, and the SARSS-2 at the management level). This allows the manager to concentrate on fewer items.

TACTICAL LEVEL REPAIR PARTS SUPPLY

5-52. The tactical level for repair parts supply addresses the corps and below. For the purposes of this discussion, Class IX operations for the current Force (AOE and FXXI) are discussed.

Corps

5-53. Corps manages repair parts for the tactical level, organizational, and DS maintenance missions. Organizations can stock a limited number of demand-supported PLL items (normally no more than 300 lines). Commanders must always consider the amount of PLL stocked since PLLs must be 100 percent mobile. Having the ability to project Class IX on the battlefield is a valuable combat multiplier. Battlefield repair parts projection is enhanced with throughput as far forward as possible, containerization, and enhanced mobility through the highly versatile and modularized ASL mobility system.

5-54. Direct support SSAs provide organizational repair parts to customers and DS-level parts to their organic DS maintenance activities. Levels of stockage are computed and managed by the SARSS. Repair parts authorized for stockage in an SSA are called ASL items. To ensure mobility of DS SSAs, stockage is limited to 5,000 lines of authorized items.

5-55. At the COSCOM level, the QM Support Company is the consolidated (“one stop shopping”) SSA (CSSA) operator for DS Class IX (less aviation and COMSEC) for maintenance repair units operating within its support area. When supporting DS, SSAs cannot fill a request from the ASL; requisitions are transmitted by the SARSS-1 to the COSCOM DMC. The Parts Supply branch will conduct a lateral search (using the SARSS) to see if the part is located in another corps SSA. If the request cannot be filled, the request is forwarded by the COSCOM SARSS to the TSC MMC or CONUS NICP as appropriate. The COSCOM DMC immediately transmits requests for ALOC Class IX items to the NICP, while theater-selected Class IX item requests are forwarded to the TSC MMC. The TSC MMC conducts theater-wide searches (with the SARSS) to determine availability at one of the subordinate QM Support Companies or the QM Repair Parts Supply Company (GS).

Division and Brigade

5-56. **AOE Division Concept.** Repair parts support begins with a Class IX requirement from the supported unit FSB MST, providing front line repair support to maneuver units. When a repair part is not available for the MST, the request is passed by the MCS to the ULLS-G and the SAMS-1. The ULLS-G and SAMS-1 requests are then forwarded to the SARSS-1 site, located in the FSB Supply Company SSA. If the SARSS-1 site at the FSB Supply Company does not maintain stockage of the particular Class IX item, the request is forwarded to the MSB Supply and Service Company, where the division ASL is maintained. If the MSB has the item, it is released and pushed to the FSB. If the MSB does not have the item in stock, the SARSS permits the DMC to look laterally across the division SSA structure to locate the item. If the item is found within the division area, an MRO is generated at the division MMC to cross-level the item to their requiring SSA for issue. If the repair part is not found in the division, the request is forwarded to the COSCOM Support Operations SARSS-2 site for a corps-wide look (for the item). The corps will either release the item or forward the request. Once the part is identified, the item is pushed forward to the lowest level SSA possible. The FSB Supply Company SSA provides DS Class IX support not only for the brigade, but also for divisional units operating in the BSA.

5-57. Within the DISCOM, the MSB’s Supply and Service Company maintains the division rear Class IX ASL (common). The MSB provides DS Class IX support for customer units in the division rear. Requests are submitted via the ULLS-G and SAMS-1 to the SARSS-1 in the MSB Supply Company SSA. Requests not filled from the division ASL, are passed to the SARSS-2 site at COSCOM.

5-58. Within the DASB (which also supports the Cavalry Squadron), the Headquarters and Supply Company (HSC) maintains the Class IX ASL. Organizational Class IX requests are submitted from the ULLS-A to the SARSS-1 at the HSC. If the item is on-hand, it is released to the requesting Aviation Ground Repair activity. If the item is not on-hand, the request is forwarded to the COSCOM Support Operations SARSS-2 for a search of Corps SSAs. Figure 5-1, page 5-14, depicts the requisition flow for Class IX repair parts in a theater of operations for an AOE division.

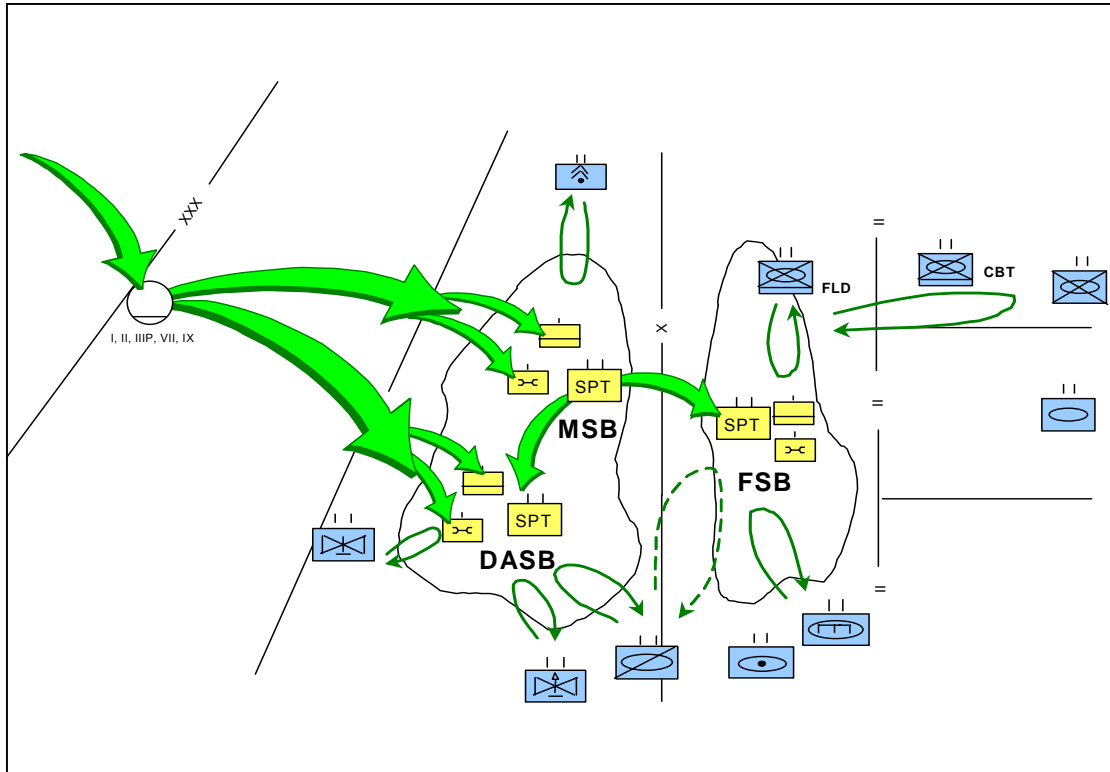


Figure 5-1. AOE Division Repair Parts Concept

5-59. **Force XXI Division (Digitized) Concept.** FXXI incorporates a change in the business rules for operational logistics. The use of strategic packaging, flatrack- and container-oriented distribution, and throughput (as far forward as possible; bypassing intermediate levels) represents FXXI supply support. Stockages in SSAs are reduced to enhance mobility while SSAs undergo a redesign to make them consolidated. What makes this possible is the enhanced digitization/information management technology that begins the approach to near real-time repair parts supply data that seeks to achieve precision distribution.

5-60. For the FXXI warfighter, repair parts support begins with a Class IX requirement from the supported unit FSB CRT, providing front line repair support to maneuver units. When a repair part is not available for the CRT, the request is passed by the MCS to the ULLS-G and SAMS-1. The ULLS-G and SAMS-1 requests are forwarded to the SARSS-1 site located in the FSC's Supply section (FXXI). Since the SARSS-1 site at the FSB FSC does not maintain stockage of Class IX, the request is forwarded to the FSB BSC, where the Brigade ASL is maintained. If the BSC has the item, it is released and pushed to the FSC; otherwise, the request is forwarded to the COSCOM Support Operations SARSS-2 AC site for a corps-wide look (for the item). The corps SARSS-2 AC will either release the item or forward the request to the theater. Once the part is identified, the item is pushed forward to the lowest level SSA possible. The FSB BSC provides DS Class IX support not only for the brigade, but also for divisional units operating in the BSA. Within the FXXI structure, the DISCOM does not provide back-up Class IX support to the FSBs.

5-61. Within the DISCOM, the DSB's QM Company maintains the consolidated division rear Class IX ASL (common). The DSB provides DS Class IX support for customer units in the division rear. Requests are submitted via the ULLS-G and the SAMS to the SARSS-1 in the DSB QM Company. Requests not filled from the division ASL are passed to the SARSS-2AC site at COSCOM.

5-62. Within the DASB (which also supports the Cavalry Squadron), the HSC maintains the consolidated Class IX ASL. Organizational Class IX requests are submitted from the ULLS-G and DS repair parts are requested via the SAMS-1 and forwarded to the SARSS-1 at the HSC. If the HSC has the item on-hand, it is released to the requesting ground repair unit. If the item is not on-hand, the request is forwarded to the COSCOM Support Operations SARSS-2AC via a wireless modem for a search of corps SSAs. If the repair part is not found, the request is forwarded to the theater. Figure 5-2 depicts the requisition flow for FXXI Division Class IX repair parts in a theater of operations.

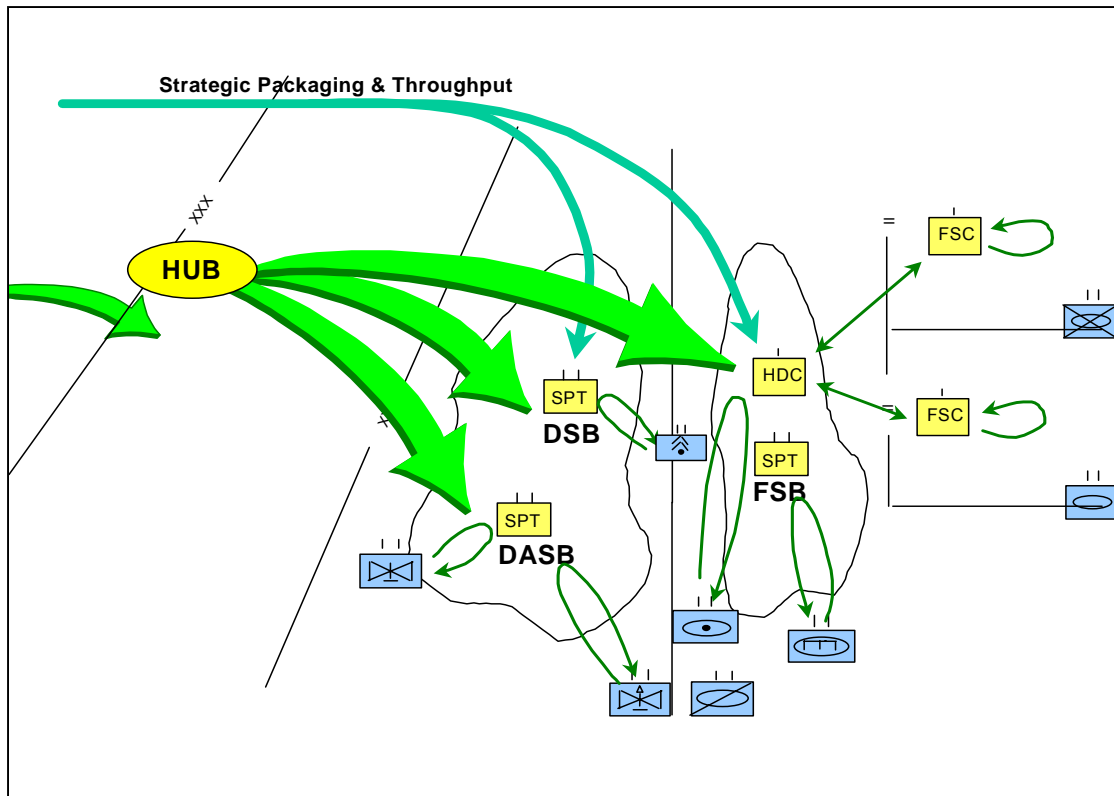


Figure 5-2. Force XXI Division Repair Parts Concept

5-63. **Stryker Brigade Combat Team Concept.** As a full spectrum combat force, the SBCT maintains an offensive orientation. By deploying with CSS packages tailored for a specific operation, the SBCT can sustain itself with a minimum of external support for up to 72 hours. Sustainment is normally provided via throughput from EAB to the brigade battlespace. Sustainment will be tailored and packaged by EAB elements for specific supported units based on a specific time and location.

5-64. Although distribution capability is limited, the BSB is designed to perform distribution-based, centralized CSS functions in accordance with Army XXI CSS concepts. Although the BSB may conduct multiple resupply operations per day, resupply is conducted only when necessary and is based on actual and/or projected requirements. Class IX is an exception and will be pushed to CRTs daily with unserviceable Class IX being retrograded to the BSA. When the battalion supported by a CRT is not scheduled for a delivery that day, a non-standard means of delivery (aviation, non-CSS assets, and so on) will be used for Class IX resupply when CRTs require an unscheduled delivery of repair parts.

5-65. CRTs assess and report maintenance requirements to the SBCT FMC. The battle rhythm permits, perform repair of NMC equipment with battle damage repair and LRU/major assembly replacement. The CRTs will carry a smart, simple Class IX repair parts package to perform this function. Due to its limited size, the CRT will often require a daily resupply of mission-critical repair parts. Excellent and assured communications dedicated to the transfer of logistics data between forward deployed CRTs and the FMC and HDC will provide the critical link to effective Class IX resupply. These communications will also provide the BSB and SBCT S4 with a common understanding of the operational combat power at any given time.

5-66. The BSB is equipped with a Support Operations capability embedded with Supply and Services and Maintenance Management cells. The SPO is responsible for the synchronization and integration of all logistics for the SBCT. The Support Operations Supply and Services cell monitors, coordinates, and manages daily Class IX distribution to the CRTs. The Support Operations Maintenance cell develops the plans and policies for RX operations. It monitors shop production and job status reports in the FMC. It also monitors and reviews the Class IX stockages and coordinates critical parts status with the EAB.

5-67. Repair parts at the BSB consist of a limited ASL maintained by the HDC. PLL/shop/and bench stock is controlled by the FMC Shop Office and its Repair sections. The FMC MCS and CRTs will deploy with contact team stocks and limited bench stock (such as lubricants, seals, starters, and batteries). The MCS is responsible for maintaining shop stock and bench stock consisting of a broad but shallow inventory of high use, combat essential parts that support a replace-forward maintenance philosophy. On-board spares are limited repair parts located with the vehicle/system that the crew and operators can replace as necessary. On-board Class IX repair parts provide a buffer for the lead-time it takes the distribution system to deliver a required part and also act as insurance against interruptions in the distribution pipeline. There will also be pre-configured Class IX fly-away packages maintained at EAB that will flow

into the theater shortly after closure of the brigade. CSS enablers, such as TAV and dedicated communications, are essential to the requisitioning and tracking of Class IX. Class IX repair parts are prioritized based on the commander's priority of maintenance. Critical requirements may be delivered by aerial delivery as far forward as tactically possible.

5-68. The BSB HDC Supply Support Platoon has a Repair Parts section that receives, stores, issues, and transloads Class IX. This section is equipped with a SARSS (to be replaced by the GCSS-Army SSA module) workstation and two ISO containers for storage of the ASL. The section deploys with a pre-determined high demand ASL to provide Class IX support to the brigade.

5-69. The HDC maintains the brigade' optimized ASL. An operator identifies a fault, annotates the fault, and notifies the CRT. The CRT will diagnose the fault, identify the repair part(s) required, and forward the request to the MCS of the FMC using the FBCB2 system. The MCS will either issue the part if it is on-hand or it will pass the requisition on to the Repair Parts section of the HDC via the ULLS-G (to be replaced by the GCSS-Army Maintenance module). If the part is on-hand in the ASL of the HDC, it is released. If the requested repair part is not on-hand, the Repair Parts section will process the requests via the SARSS-1 (to be replaced by the GCSS-Army SSSA module) and forward the request to the EAB materiel management elements SARSS-2AD (to be replaced by the GCSS-Army module) in the CONUS or theater. The SARSS-2A (to be replaced by the GCSS-Army module) fills requisitions from other ASLs or passes requisitions to wholesale level, where requisitions are filled from other sources of supply (SSAs, depot, or vendors). Upon receipt of a requisition, the EAB SARSS-2A (to be replaced by the GCSS-Army module) will conduct a subordinate search of all SSAs in the AO to locate the requested repair part. Once the SARSS-2A (to be replaced by the GCSS-Army module) identifies the location of the repair part, the EAB materiel manager will coordinate for delivery of the part to the requesting unit or the nearest APOD. Once in-theater, supplies will be throughput to the HDC of the BSB. The Repair Parts section will position the Class IX on flatracks/Container Roll In/Out Platforms (CROPs) by unit loads for delivery. The Transportation Platoon of the HDC will deliver the flatracks/CROPs daily to the unit resupply points. The FMC is collocated in the BSA and will pick up its own parts. Additional ASL packages are sent by LOCs until augmentation arrives in-theater.

5-70. Repair parts are further discussed in FM 10-1. Figure 5-3, page 5-18, depicts the source of repair parts management for the SBCT, Headquarters and Distribution Company.

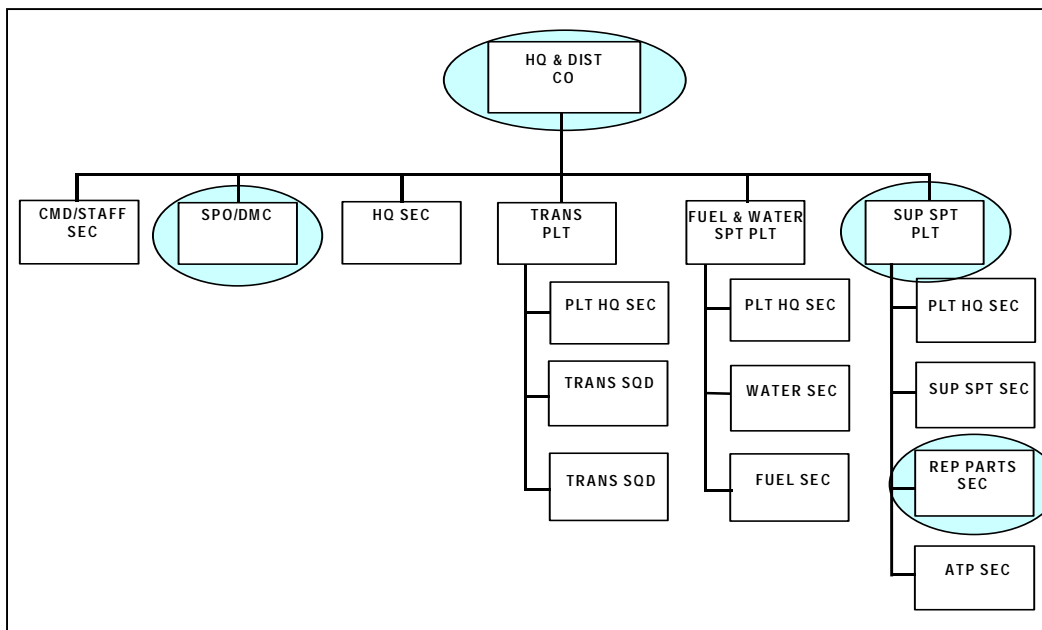


Figure 5-3. SBCT Headquarters and Distribution Company

5-71. The need to augment the BSB, in order to sustain the force after the initial stages of employment in extended operations, has been a key tenet of the SBCT concept of support. In such cases, the HDC requires augmentation to increase Classes I, II, III, IV, VII, and IX distribution support. The CSSC is an austere solution to fill only the most critical requirements of the SBCT that the BSB cannot provide for itself. The CSSC is intended to deploy after the initial stages of employment and provides scaling and augmentation in the form of DS-level CSS to the SBCT. When fully deployed in support of the SBCT, the CSSC provides supply support augmentation, to include Class IX (as well as other support). The CSSC is designed to facilitate the modular employment of any or all of its elements. The CSSC Supply and Transportation Platoon, when employed, provides additional follow-on sustainment for supply and repair parts operations of the BSB HDC.

Planning Considerations

5-72. Proper implementation of policies and procedures that govern supply of repair parts will ensure units remain operationally ready. Some planning considerations are:

- **Stockage.** Authorization for stockage of items is based on demand for an item over a particular time period. Consumption may be affected by location, environment, or OPTEMPO.
- **Transition to War.** During the transition to war, SSAs must divest ASLs of non-combat essential parts. Adjustment for low demand to no demand items in lieu of high demand items is an ongoing process for repair parts managers. The LOGSA can help with determination of combat usage profiles for a

particular environment. LOGSA can be accessed via the web at www.logsa.army.mil).

REPAIR PARTS INFORMATION MANAGEMENT SYSTEMS

5-73. The SSA and its SARSS-1 operating system are part of a network of SSAs linked into the total Army supply system. SSA managers and personnel need to understand how they fit into the overall Army and DoD order-ship process.

5-74. Every SSA in the Army is different in that it operates in a different environment. Its physical layout and location (city or county, state, parish or province, the nation) influence the environment of each SSA. More importantly, the local command, MACOM, the Army, and DoD all affect the SSA.

5-75. The automated system used by the SSA to manage its mission is the SARSS. The SARSS is an automated, multi-echelon, supply management and stock control system designed to operate in tactical and garrison environments. It supports the ULLS-G, ULLS-A, ULLS-S4 (to be replaced by PBUSE), SAMS-1, SPBS-R STAMIS, non-automated customers, and the split-based operations concept. The SARSS has four levels: the SARSS-1, SARSS-2AD (Division), SARSS-2AC (Corps), and SARSS Gateway (see Figure 5-4). More specific information about the SARSS, including updated technical notes and bulletins, can be found at the web site of the PM for the GCSS-Army at <http://www.gcss-army.army.mil>.

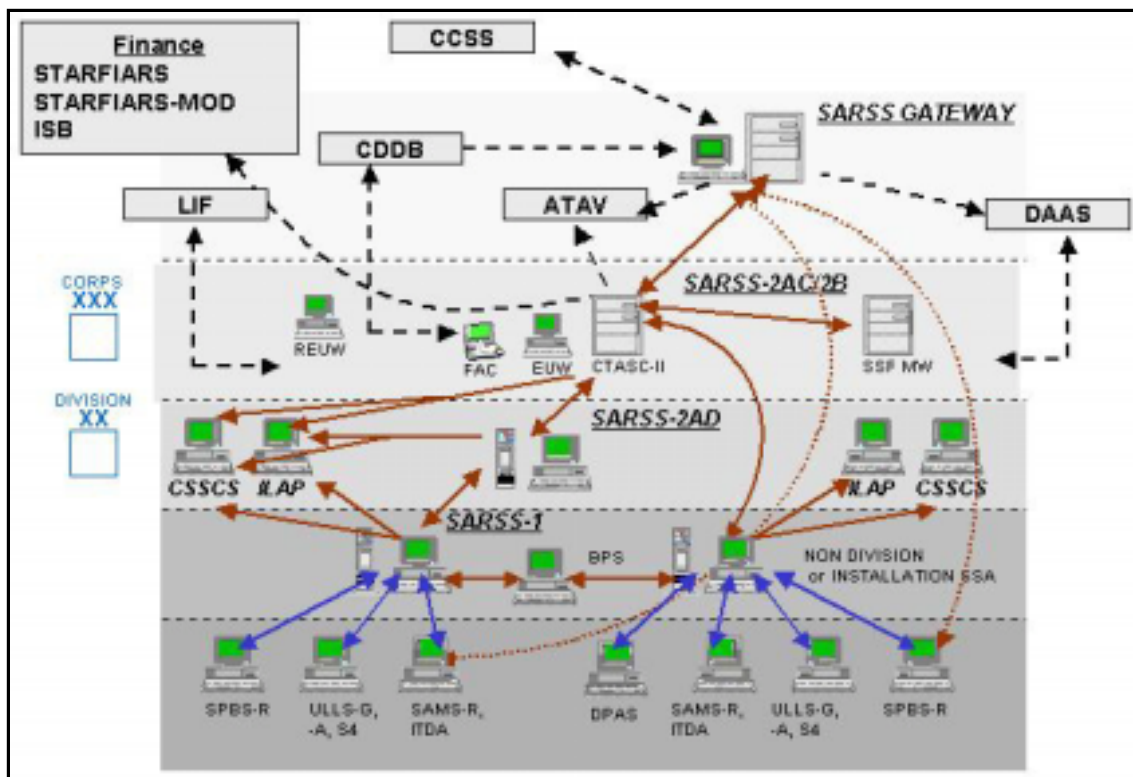


Figure 5-4. SARSS Architecture

5-76. The SARSS-1, as a component of the SARSS architecture, is fully integrated from the user through theater Army level. Operating on a modular, portable microcomputer, it has the capability to support worldwide deployment of combat forces in various scenarios and AOs across the full operational spectrum. It is used in DSU and general support unit (GSU) SSAs. The automatic information technology (AIT) source data automation is provided through the use of RF tags, fixed and hand-held RF interrogation devices, optical laser card reader/writers, and bar-code readers.

5-77. The SARSS-1 is the system of record. Inventory control and accountability of user stocks are at user level. The SARSS-1 is supported by a SARSS-2A activity. The SARSS-1 determines replenishment based on stockage levels furnished by the supporting SARSS-2B.

5-78. The SARSS-2A performs time-sensitive supply functions. These include management of controlled items, a lateral search of stocks to fulfill unsatisfied customer requirements from subordinate SARSS-1 or SARSS-2A activities, and redistribution of excess.

5-79. The SARSS-2B performs management functions that are not time-sensitive. These include document history, demand analysis, and catalog update.

5-80. The entire SARSS architecture is continuously being improved to provide enhanced support. FXXI digitization technology has enabled the recent advances toward global asset visibility. Leveraging digital capability to enable the requisition of repair parts as they are needed becomes essential for meeting the distribution management criteria associated with CWT standards. Figure 5-5 depicts repair parts requisitioning that leverages FXXI digital capabilities.

INTEGRATED LOGISTICS ANALYSIS PROGRAM

5-81. The ILAP is an information management program that provides managers with a set of analytical tools to measure, among other things, the efficiency of stockage criteria, based on dollars invested and CWT. The MACOM/Corps/Installation ILAP combines supply, maintenance, and financial data to produce comprehensive management reports tailored to user requirements, without affecting the data sources.

LOGISTICS INTELLIGENCE FILE

5-82. The LIF is an on-line, computerized database that centralizes the collection, correlation, and retrieval of supply and transportation data on Army-sponsored requisitions placed in the wholesale logistics system. AR 725-50 outlines specific details of LIF use.

NOTE: The database does not include Class I (subsistence), Class III (bulk petroleum), Class V (ammunition), and security assistance materiel.

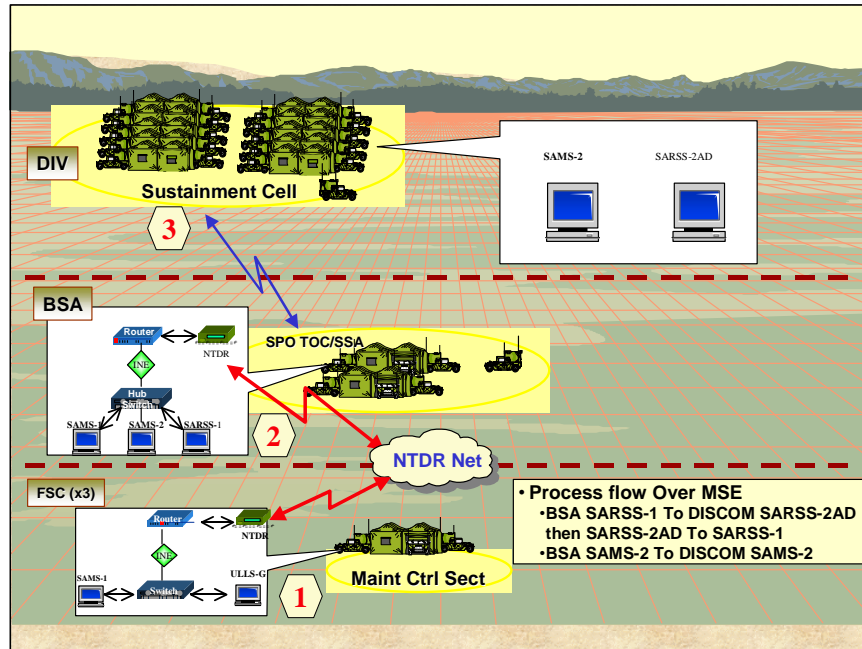


Figure 5-5. Leveraging Force XXI Digital Capability to Requisition Repair Parts

5-83. The LIF unites the supply and transportation function systems through the following three basic conditions essential to logistics intelligence:

- Automation of the standard supply and transportation systems, MILSTRIP and MILSTAMP.
- Electronic transmission of requisition, status, receipt, and transportation lift notices and receipt postings.
- Automatic acquisition of essential data from the Defense Automatic Addressing System (DAAS).

5-84. The LIF provides the following:

- A single source of logistics intelligence.
- A single source of determining the status of a requisition placed against the wholesale system.
- A capability of diverting, reconciling, expediting, or suspending items or shipments on short notice.
- A reconstitution of shipments involved in casualties on aircraft, ships, or other conveyances.
- A way of informing Requisition Activities Commanders of shipment delays due to labor disputes, natural disasters, or other causes.
- A way of informing Requisition Activities Commanders of equipment and lift data.
- A mass cancellation service in coordination with other commands and activities.
- Special analysis and LIF products tailored to customer needs.

OTHER SOURCES OF SUPPLY

5-85. Repair parts are available from several other sources. The following discusses alternative sources of repair parts supply.

OTHER REPAIR PARTS STOCKAGE SOURCES

Shop Stocks

5-86. Shop stocks are demand-supported repair parts and consumable supplies stocked in a DS or GS OD activity. Since these supplies are issued to the OD unit, they are not part of an ASL. Shop stock supplies are to be used only by OD shops. They are not to be issued to supported units. Shop supply allows OD units to keep frequently used repair parts and expendable maintenance supplies on-hand. It helps maintenance units avoid repair delays and reduces the number of supply transactions.

5-87. Shop stock supply items are selected for demand-supported stockage when they are requested frequently (at least three requests in the initial 180 days and one demand every 180 days thereafter). Maintenance personnel request parts and supplies from the MMC or stock control activity.

Bench Stock

5-88. Bench stock items are low-cost consumable repair parts and supplies used by maintenance shop repair personnel at an unpredictable rate. The Maintenance Shop Officer decides which items are to be stock based on how essential the items are to unit repair operations.

Program Stocks

5-89. Program stocks are those repair parts and maintenance supplies stocked by the Shop Supply section for programmed repairs. Program stocks are used primarily by GS maintenance units to support scheduled overhaul programs. Use it to support maintenance of components or assemblies such as engines and transmissions. Stockage levels should be based on anticipated workloads and demand history from similar overhaul programs. As a rule, stocks are requested six months before the start of the program. Retain items only as long as they are needed for the program. Turn in those not needed to the SSA as soon as possible.

Quick Supply Store

5-90. The use of the Quick Supply Store (QSS) provides a quick method for supplying certain low cost expendable items. The purpose of the QSS is to simplify accounting, eliminate paperwork, and reduce work loads of supply personnel. Once an item is selected for QSS stockage, it is no longer available to customers from any other source. Items may be selected for or deleted from QSS stockage based on certain criteria. To qualify for stockage in a QSS, an ASL item must meet the entire mandatory QSS stockage criteria described in AR 710-2 and DA Pamphlet 710-2-2.

Cannibalization

5-91. Cannibalization is the authorized removal of the following:

- Serviceable and unserviceable assemblies.
- Serviceable repair parts from unserviceable, uneconomically repairable, or excess end-items of equipment authorized for local disposal.

When done on the battlefield, cannibalization's final aim is to return as many weapons systems and tactical support systems to the battle as quickly as possible. Cannibalization supplements and supports supply and RX operations by providing assets not available through other sources. On the battlefield, the MMC maintains visibility of all cannibalization-eligible equipment in order to direct these operations.

5-92. Cannibalization operations fall into the two following general categories:

- Cannibalization point operations conducted by the C&C Service Company. This provides repair parts and assemblies for immediate use, repair parts and assemblies for stockage, and unserviceable components and assemblies for GS-level repair. Operations are conducted in accordance with DA Pamphlet 710-2-2.
- Battle support cannibalization conducted by maintenance personnel in accordance with established procedures, usually in response to immediate tactical requirements. This is done only for returning equipment to combat, not for repair parts stockage.

BATTLE SUPPORT CANNIBALIZATION PROCEDURES

5-93. Battle support cannibalization procedures are based on policy guidance from the corps and ASCC. These procedures are designed to support maintenance operations. The goal of battle support cannibalization is to return a maximum number of weapon systems and tactical support systems to units for their immediate tactical requirements. Table 5-2, page 5-24, shows procedures for possible incorporation into a battle support cannibalization policy.

Wartime Policy

5-94. During war and transition to war, the ASCC must establish a cannibalization policy. Waivers of NIPC disposition requirements must be coordinated with the NIPC concerned. Corps and Division Commanders implement the theater policy. Cannibalization point operations remain the same as during peace. When items have been authorized for disposal, maintenance personnel remove parts and components. Serviceable items are made available for issue. Unserviceable repairable items are work-ordered for repair.

5-95. After selected recoverable items are removed, the cannibalization point makes the end-item available for further supply action. Lists of end-items available for cannibalization are periodically provided to supported customers. Customers bring requisitions to the cannibalization point where issue is made on a fill-or-kill basis.

Table 5-2. Battle Support Cannibalization Procedures

Equipment Category	Authority	Action
Abandon/ Destroy	Corps/Division Commander	Equipment is destroyed to prevent enemy capture (only when recovery or evacuation is not feasible). The Division Commander has the authority to abandon/destroy equipment but may delegate authority to lower commands. Before destruction, sighting and fire control equipment and other critical items are removed and evacuated. When possible, maintenance personnel conduct cannibalization and destroy the item.
Obvious Code H (Salvage)	Senior Maintenance Person	Maintenance personnel remove critical repair parts and assemblies in short supply. Parts from the cannibalized item are used first to conserve parts in the Supply system. Following cannibalization, the item is abandoned, destroyed, or recovered/evacuated at low priority.
Reparable at Unit Level	Tactical Unit Commander (Item meets Criteria set by Division Commander)	Controlled exchange should be used to the maximum extent possible. When cannibalization of unit-level parts contributes to increasing the number of Weapon systems available for the immediate tactical requirement, organizational maintenance personnel request cannibalization authorization from the Tactical Commander concerned.
Reparable at FSB (BSA)	Tactical Unit Commander (Item meets Criteria set by Division Commander)	Controlled exchange should be used to the maximum extent possible. When cannibalization of DS-level maintenance parts contributes to increasing the number of Weapon systems for the immediate tactical requirement, DS-level maintenance personnel request authorization from the Tactical Commander concerned. The cannibalized item is repaired at the earliest opportunity.
Reparable at MSB/DSB (DSA)	Maintenance Control Officer	Controlled exchange should be used to the maximum extent possible. The Maintenance Control Officer with the Division WSRO, coordinates cannibalization decisions in the DSA. Only parts needed for immediate requirements should be removed. The cannibalized item is repaired at the earliest opportunity.
Reparable at General Support	Maintenance Control Officer	Controlled exchange should be used to the maximum extent possible. Cannibalization decisions should be coordinated with the supporting GS maintenance unit. Only parts needed for immediate requirements should be removed. Following cannibalization, equipment is evacuated to GS-level maintenance.

Peacetime Policy

5-96. Peacetime policy guidance is contained in AR 710-2, AR 750-1, and DA Pamphlet 710-2-2, which deals with cannibalization point operations. NIPC approval is required before weapon systems may be cannibalized. CONUS cannibalization points are normally set up at installations with fixed maintenance facilities.

Unauthorized Cannibalization

5-97. Unauthorized cannibalization during peacetime operations degrades readiness. Commanders and maintenance leaders should avoid this practice and correct all violations. Leaders should also ensure cannibalization is not performed under the disguise of controlled exchange. This happens when unserviceable components are not replaced on, or affixed to, the donor end-item.

FABRICATION

5-98. DS maintenance units may sometimes be able to locally fabricate a critical part when it is not available through the supply system. A DA Form 2407 is annotated with specifications, and a sample item, if available, is provided.

CONTROLLED EXCHANGE

5-99. Controlled exchange is the removal of serviceable parts, components, assemblies, and subassemblies from unserviceable, economically reparable equipment for immediate use in restoring a similar item of equipment to a combat mission-capable condition. Controlled exchange ensures that unserviceable yet reparable components are recovered and repaired. Controlled exchange expedites repair and return to user in support of materiel readiness or operational effectiveness. Using units and support maintenance organizations also performs controlled exchange.

5-100. During combat or transition to war, major Army Commanders may modify the conditions in which controlled exchange is performed. Controlled exchange and cannibalization will not apply to end-items that have been involved in accidents until the Investigating Officer formally releases them. The document register, due-in records, and records of demands must be adjusted when controlled exchange is used. Specific procedures for controlled exchange should be in the unit maintenance SOP. Circumstances under which controlled exchange is authorized are outlined in AR 750-1.

LOCAL PURCHASE

5-101. Local purchase is a source of supply that may be used to procure items required to satisfy immediate needs. The supporting SSA Accountable Officer is the approving authority for local purchase. The servicing finance unit supplies funds for local purchase either directly or through a Class A agent or Imprest fund cashier. The advent of unit credit cards has facilitated local purchase of repair parts; however, caution must be used in their application. Procedures and conditions that must exist are contained in AR 710-2.

Chapter 6

Test, Measurement, and Diagnostic Equipment Calibration and Repair Support

GENERAL

6-1. TMDE is defined as any system or device used to evaluate the operational condition of an end item or subsystem thereof to identify and/or isolate any actual or potential malfunction. In general, usage TMDE refers to both general purpose (GP) and special purpose (SP) TMDE. TMDE-SP is developmental in nature for a specific weapon or support system. TMDE-GP can be used in a variety of applications and is normally procured as commercial off-the-shelf items. Types of TMDE range from torque wrenches in a toolbox to complex equipment supporting sophisticated weapon systems. The Army's TMDE program supports a number of technical parameters such as:

- Infrared.
- Electro-optics.
- Direct current and low frequency.
- Microwave.
- RADIAC.
- Mechanical, hydraulics, and pneumatics.

TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT PROGRAM OBJECTIVES

6-2. The objective of the Army's TMDE program is to ensure accurate and serviceable TMDE is available for Army use with measurement accuracies traceable to the National Institute of Standards and Technology (NIST). A highly technical force of military, civilian, and contractor personnel carry out the execution of this Army program. The integrity of the Army's TMDE C&RS program is based on a hierarchy of traceable calibration accuracies. The accuracy of a calibration can be traced from the owner's/user's item of TMDE to the standards used by the C&RS elements with subsequent traceability of supporting standards through Army calibration laboratories to the NIST. Figure 6-1, page 6-2, reflects the hierarchy of calibration traceability.

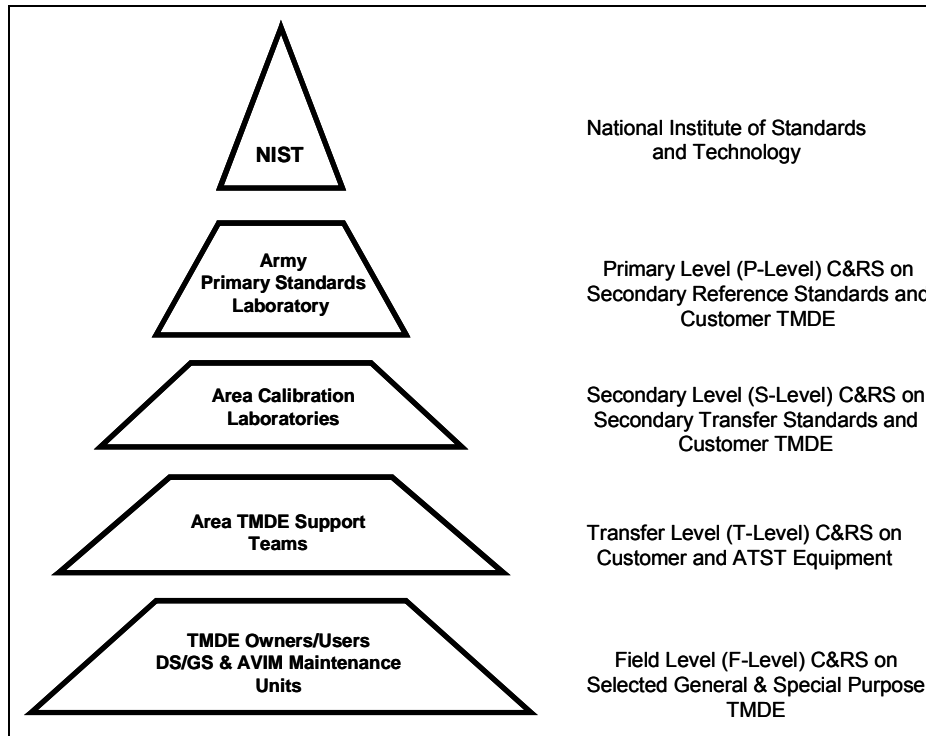


Figure 6-1. Hierarchy of Calibration Traceability

NOTE: TMDE levels of support are designated in TB 43-180.

TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT MAINTENANCE COMPANY

MISSION

6-3. To provide calibration and repair for all GP and selected SP TMDE in support of division and corps units. In addition to the TMDE Maintenance Company's corps and divisional CSS mission, the overall theater support mission includes civilian support elements at EAC that provide TMDE calibration and repair for EAC units. A designated civilian ACL provides support for all theater calibration standards, to include "S"-level TMDE. The EAC mission also includes technical supply support for all theater TMDE calibration standards. Chapter 2 addresses the TMDE calibration and repair support operations at EAC.

ORGANIZATIONAL STRUCTURE

6-4. The typical TMDE Maintenance Company is structured from a number of TOE teams. The size of the company and the expanse of its mission capabilities are dependent on the number of teams assigned. Figure 6-2 displays the organizational structure of a TMDE Maintenance Company.

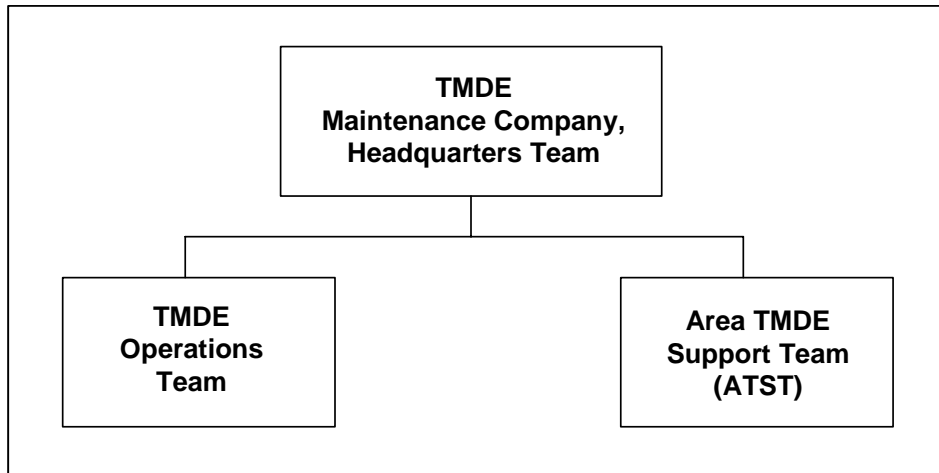


Figure 6-2. TMDE Maintenance Company Organizational Structure

6-5. The TMDE Maintenance Company’s organizational structure is designed for flexibility relative to the theater mission requirements. The capabilities to perform the core mission of the TMDE Maintenance Company are contained in a single ATST. The number of ATSTs required to support the overall TMDE Maintenance Company mission is based on the category and densities of supported TMDE and the geographic dispersion of supported units. Operational control for all technical aspects of the mission falls under one of the company’s operations teams. Typically, the company would have an operations team for each corps supported, a dedicated ATST for each division, and a number of ATSTs assigned area support missions at EAD for corps units and units passing through the corps area.

6-6. All elements of a deployed TMDE Maintenance Company are dependent on a host unit for support functions. Through memorandums of agreement (MOAs), the Operations Team establishes the attachment relationship with the host unit. Support is required in the areas of logistics, soldier support services, maintenance support for organizational equipment (less TMDE), and supply support (less Classes II and VII).

**TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT
 CALIBRATION AND REPAIR SUPPORT TACTICAL OPERATIONS
 COMMAND AND CONTROL**

6-7. During wartime and MOOTW, the AMC exercises theater C2 over all TMDE CSS assets in the theater of operations through the in-theater LSE. These assets include TMDE C&RS mission functions provided by civilian elements at EAC and all TMDE Maintenance Company organizational elements within the theater of war, to include National Guard C&RS elements. Where ATST elements are attached to a unit within a designated force, the unit of attachment exercises operational control of the ATST. When deployed, the TMDE Maintenance Company HQ Team will locate with the theater LSE operations element. During wartime, MOOTW, and peacetime operations, the AMC’s activity responsible for execution of the Army TMDE Program (the U.S. Army

TMDE Activity) provides logistical, technical, and materiel sustainment support to all TMDE support elements worldwide.

Operational Concept – Corps

6-8. Located within the corps, the TMDE Operations Team (either Active or National Guard) provides planning, programming, coordination, and overall quality assurance for all ATSTs within the corps, including divisional ATSTs. The TMDE Operations Team is the central point within the corps for coordinating internal and external TMDE C&RS technical and operational requirements. When deployed in support of a corps mission, the attached ATSTs will support the corps on an assigned area basis. The ATST will set up operations in the designated area and provide one-stop TMDE C&RS to all units within or passing through their area of support. One-stop C&RS service is characterized by delivery and pickup by the TMDE owner/user at the ATST location. The corps ATST maintains the capability to respond to selected TMDE calibration requirements in a backup support role for divisional needs as established through the TMDE Maintenance Company Corps Operations Team and operational elements of the LSE. The ATST has the organic mobile capability to relocate as their assigned area of support may dictate. The Corps ATST can also employ a two-man mobile capability in response to divisional backup support requirements in forward areas based on METT-TC and overall corps C&RS requirements. The Corps ATSTs are dependent on the Corps TMDE Operations Team for planning, programming, coordination, and external technical support. The ATSTs are also dependent on ACL support for secondary transfer standards and customer TMDE requiring “S”-level laboratory support.

Operational Concept – Division

6-9. When deployed with a division, the ATST is attached to the DSB Maintenance Company. The ATST will set up operations within the designated division support area and provide one-stop TMDE C&RS to all units within the division. One-stop C&RS service is characterized by delivery and pickup by the TMDE owner/user at the ATST location. The ATST also maintains a split-based, mobile capability to respond to selected TMDE calibration requirements within the divisional area for a limited timeframe and as determined by the elements of the Division G4 (SPO), in coordination with the ATST and Corps TMDE Operations Team. The divisional ATST is dependent on the Corps TMDE Operations Team for planning, programming, and coordination of external technical support. The ATST is also dependent on ACL support for secondary transfer standards and customer TMDE requiring “S”-level laboratory support.

MISSION EQUIPMENT

6-10. The ATST consists of two major equipment sets. The principal set is the fully mobile and environmentally-controlled calibration and repair facility. A dedicated tactical vehicle with power generation equipment provides for the facility’s mobility and electrical power requirements. The facility houses calibration standards, ancillary TMDE, communications equipment, production control facilities, and workspace for repair functions. The ATST mission can be supported from this single facility. In addition to the principal equipment set is a secondary equipment set

consisting of a HMMWV-mounted shelter with on-board power and environmental control systems. The shelter houses a limited calibration capability (RADIAC, torque, meter, and oscilloscope standards) for use in a split-based mode of operations, where high densities of TMDE are located. When used in a split-based mode of operations, the two-man mobile facility is dependent on the parent ATST's principal equipment set for repair functions and production control operations.

MODES OF OPERATION

6-11. The ATST's equipment configuration allows the team to operate in a fully uploaded mobile mode, or in a dismounted fixed facility mode of operations. Within the fixed facility mode of operations, the team may retain limited mobile calibration capability with the HMMWV set of equipment for special or split-base requirements. METT-TC considerations, as determined by the appropriate SPO, determine the mode of operations.

Chapter 7

Safety, Security, and the Environment

This chapter discusses general safety, physical security in maintenance areas, and environmental management. For assistance with specific questions in these areas, contact the unit, installation, or MACOM safety, security, or environmental officer.

SAFETY

7-1. Safety has many different focus points. Some of these include:

- General Safety Programs.
- Safety Plans.
- Responsibilities and duties of leaders and managers.
- Accident follow-up procedures.
- Risk assessment and management procedures.

Injuries and accidents reduce a unit's effectiveness, impact adversely on morale and discipline, and deplete operational capabilities. Under combat conditions and during continuous operations, fatigue and the stress of battle add to the causes of accidents.

SAFETY PROGRAM

7-2. The impact of a poor Safety Program or low safety awareness is a reduction in the maintenance structure's ability to provide quality maintenance support. An effective Safety Program is essential to the success of maintenance operations.

7-3. Safety must encompass all phases of support operations. Leaders and managers must ensure personnel are trained and aware of the proper handling of material, the safe use of hand tools, and the consistent application of safety practices. Personnel must be constantly vigilant to detect potential hazards, to apply control measures, to reduce or eliminate danger, and to promptly report accidents and safety hazards.

MAINTENANCE HAZARDS

7-4. Maintenance support operations involve many potential safety hazards. These hazards are present in operations involving the following:

- High voltage and amperage.
- High-pressure air.
- Hydraulics.
- Infrared radiation.
- Radioactivity.
- Radio frequency energy.
- Lasers.
- Mechanical devices.
- Solvents and chemicals.
- Explosives and flammables.

MAINTENANCE SAFETY

7-5. Personnel in maintenance units must be familiar with the contents of all pertinent publications. DA Pamphlet 25-30 lists regulations for safety policies and procedures. Technical bulletins and technical manuals provide information on the safe handling, use, storage, and maintenance requirements of tools, equipment, and hazardous materials. Optimum safety depends on personnel following correct safety procedures. Shortcuts or deviations can result in accidents.

RESPONSIBILITIES AND DUTIES

7-6. Safety is a command responsibility at all echelons. Commanding officers must take an active, aggressive leadership position on safety. They must appoint a Unit Safety Officer and organize a safety committee of technical and supervisory personnel. The commander is also responsible for determining the cause of accidents and ensuring corrective action is taken to prevent their recurrence. When existing safety rules need revision due to changes in equipment, operating conditions, or operating areas, it is the unit commander's responsibility to initiate action accommodating the changes.

LEADER LEVEL

7-7. Leaders and managers ensure soldiers perform their duties safely. The following are some proactive measures leaders can take to prevent accidents:

- Keeping soldiers aware.
- Ensuring soldiers are careful.
- Halting unsafe operations.
- Planning ahead.
- Preparing proactive measures to prevent accidents.

INDIVIDUAL LEVEL

7-8. Safety regulations and guidelines are for everyone's protection and welfare. Each individual is responsible for following all instructions and using all safeguards. Cooperation among workers to develop and practice safe working habits is essential to prevent injuries to personnel and damage to material and facilities. The key to the Safety Program is focusing the whole effort to prevent individuals from having accidents. The prevention equation is simple:

Training + Equipment + Motivation + Leadership = SAFETY

Each element of the equation must be present in the proper amount. Normally, the individual will know if this is the case.

UNIT SAFETY PROGRAM

7-9. An effective Unit Safety Program is necessary for mission accomplishment. A maintenance mission cannot be fully successful if death, injury, or damage to equipment or facilities occurs. Leaders and managers must comply with regulatory requirements for their particular operations. They must ensure the program conforms with AR 385-10 and DA Pamphlet 385-1.

UNIT SAFETY OFFICER

7-10. The Unit Safety Officer supervises, manages, and coordinates activities related to unit safety. He also advises the commander on safety matters (including risk assessment and risk management) and suggests improvements to the Unit Safety Program.

SUPERVISORS' RESPONSIBILITIES

7-11. Supervisors must include safety in their plans and discussions of daily maintenance operations. Supervisors must hold regular meetings in the work area. These meetings serve:

- To review and critique performance, draw out ideas on improving the Safety Program, and publicize new or changed safety procedures.
- As a source of information and ideas that may have a wider use.

ACCIDENT FOLLOW-UP PROCEDURES

7-12. Under the Army Safety Program, the supervisor must record each accident in accordance with DA Pamphlet 385-40. Report accidents on DA Forms 285 or 285-AB-R. Guidance for preparing these forms is in DA Pamphlet 385-40. When an accident occurs, gather all essential information. The following facts should be obtained:

- Names of personnel injured.
- Identification of the equipment or facility damaged.
- The time and place the accident occurred.
- The severity and cost (in manpower and materiel) of the accident.
- The nature of the accident.
- How and why the accident occurred.

7-13. Leaders and managers must concentrate on the prevention of similar accidents. Corrective actions can include removing hazards, improving operations, redesigning or modifying equipment, and training personnel. Near-miss accidents should also be reported so that personnel can exercise preventive measures. Leaders and managers must monitor corrective action to ensure it is being implemented.

EQUIPMENT OPERATOR SELECTION

7-14. The Unit Safety Program must be closely associated with the selection of equipment operators and their training. Leaders and managers must strive for an effective Equipment Operator Qualification Program. AR 600-55 contains guidance about vehicle driver training selection, testing, and licensing.

SAFETY STANDING OPERATING PROCEDURES

7-15. The Safety Officer is responsible for the preparation of the Unit Safety SOP. The following are some of the elements that should be included in the SOP:

- Safety Officer and safety council members responsibilities.
- Safety hazard and accident reporting procedures.
- Accident or injury investigation procedures.
- Fire fighting and first aid team responsibilities.
- Location and use of safety, first aid, and fire fighting equipment.
- Responsibilities of other key unit positions (such as Maintenance Control Officer, Shop Foreman, and Platoon Leaders and Sergeants).

Other considerations include the following:

- Hazardous material (HAZMAT) and hazardous communications (HAZCOM) locally written policies and programs.
- Safety Award Program and policy.
- Location, care, and use of personnel protective clothing and equipment (PPC&E).
- Initial and sustainment safety training for assigned personnel.
- Safety Action Plans outlining goals and objectives.
- Periodic safety meetings.

FIRE PREVENTION PROGRAM

7-16. Fire prevention is important to a maintenance shop. The Unit Fire Prevention Program focuses on training personnel in methods of fire prevention and how to react to a fire. See AR 420-90 for guidance on establishing a Fire Prevention Program. Teach personnel to respond instinctively with the actions required to fight fires. The following are primary methods of fire prevention:

- Keep the shop and vicinity free from oil and other organic materials (such as wood, paper, and fabrics).
- Inspect the area frequently to detect and remove hazards.

HAZARDOUS COMMUNICATIONS PROGRAM

7-17. The HAZCOM Program was created in response to federal law requiring each soldier to know and understand how to safely use, store, handle, and dispose of hazardous materials (primarily chemical). Table 7-1 lists the six steps required for maintaining a satisfactory HAZCOM Program.

7-18. The HAZCOM Program helps leaders determine which hazardous chemicals are present in the unit. It protects soldiers by ensuring they are aware of chemical hazards and it ensures proper storage and use of chemicals. The references applicable to HAZCOM Programs are AR 40-5, AR 385-10, and AR 700-141.

7-19. The Installation Safety Officer is the POC for most HAZCOM matters, including the MSDS Program and the HAZCOM Training Program. The Safety Officer performs the following:

- Maintains an up-to-date list of HAZMAT/HW in the area.
- Ensures hazardous substances are properly stored.
- Ensures containers of hazardous substances are properly labeled.
- Maintains an MSDS for every HAZMAT in the unit.
- Ensures personnel are properly trained and using proper procedures when working with hazardous substances.

Table 7-1. HAZCOM Program Procedures

Step	Action
1	Ensure containers are properly labeled.
2	Identify hazardous materials and associated hazards to assigned personnel. According to federal law, hazardous materials (chemicals) must be shipped with a Material Safety Data Sheet (MSDS).
3	Train personnel in the safe handling, use, storage, and disposal of each hazardous material.
4	Maintain a HAZMAT inventory.
5	Maintain a copy of the MSDS for each hazardous material on hand. Personnel should know the location and how to use the MSDS.
6	Maintain a locally written HAZCOM Program, usually as an appendix to the safety SOP. The program explains how HAZCOM steps are accomplished and addresses any special procedures or requirements.

PERSONNEL SAFETY/PROTECTION PROGRAMS

7-20. The following are some of the many safety programs that can be incorporated into day-to-day maintenance operations:

- Visual Protection Programs.
- Hearing Protection Programs.

- Respiratory Protection Programs.
- Laser/Radiation Protection Programs.

VISION PROTECTION

7-21. The following are the three types of vision hazards:

- Physical impact.
- Chemical contact.
- Energy intensity.

Using personnel protective clothing and equipment appropriate to the maintenance operation can eliminate vision hazards. DA Pam 40-506 provides guidance on establishing a Vision Protection Program.

RESPIRATORY PROTECTION

7-22. Maintenance operations involving the use of chemicals or paints present a health hazard. Protection from these hazards should be a safety consideration in maintenance operations. See TB MED 502 for guidance.

LASER RADIATION PROTECTION

7-23. Laser radiation can be an extreme health hazard. Certain types of equipment used in maintenance operations emit a laser beam or radiation. These hazards are a safety consideration in maintenance operations. See TB MED 524 for guidance on establishing a Laser/Radiation Protection Program.

SAFETY PLANS

7-24. Safety-related plans for fire and emergency evacuation are discussed below. These plans can either be separate from the Safety SOP or appear as an annex.

FIRE PLAN

7-25. General guidance for Fire Plans is contained in TM 5-315. Each installation or activity storing or handling ammunitions must have an effective Fire Plan designed to prevent and fight fires. The plan must do the following:

- Include a description of emergency functions for each section, activity, or outside agency.
- Conform to the individual installation or activity.
- Specify personnel responsibilities.

The following will be incorporated into the Fire Plan:

- Procedures for fire reporting.
- Procedures for orderly evacuation of non-essential personnel.
- Procedures for warning personnel of the impending danger.
- Methods for extinguishing or controlling fires until fire fighting forces arrive.

A detailed map indicating types of ammunition stored, their locations, and specific hazards associated with them will be prepared. Provide this document to the local MPs and the fire department.

EMERGENCY EVACUATION PLAN

- 7-26. The Emergency Evacuation Plan will do the following:
- Provide policies and procedures for emergency evacuation during fires, natural disasters, or hazardous material spills.
 - Be detailed enough for personnel to know which actions to take.
 - Include warnings and cautions concerning special unit operations.

GENERAL SAFETY HAZARDS

- 7-27. General safety hazards include the following:
- Noise.
 - Vehicles.
 - Lifting devices.
 - High pressure.
 - Electricity.
 - Radio frequency.
 - Electro-explosive devices.
 - Radioactive material.
 - Armed weapons.
 - Mechanical equipment.
 - Welding.

NOISE

7-28. Noise is a hazard that can affect the physical and mental abilities of personnel. Constant, high noise levels (either in frequency or volume) have a degrading effect on personnel efficiency. Ear damage can result from loud, sharp noises, including high-frequency chatter from electronic test equipment. See ARs 40-5 and 385-10 for guidance on hearing conservation.

VEHICLES

7-29. Personnel who operate vehicles will be selected and trained in accordance with guidance in AR 600-55. Drivers will conduct a daily safety examination of their vehicle. Speed limits will be established within the shop area (they are not governed by installation or area regulations). Personnel will be informed of military and civilian driving rules. A Motor Vehicle Accident Prevention Program will be established in accordance with AR 385-55.

LIFTING DEVICES

7-30. Safety must be observed during lifting. The capacity of lifting devices should never be exceeded. Lifting devices (such as hoists, lifts, stands, booms) must be load-tested and properly marked with their maximum lift capacity. See TB 43-0142 for detailed guidance on lifting devices.

HIGH PRESSURE

7-31. High pressure equipment maintenance support operations are categorized as either air or hydraulic. Equipment TMs contain general and specific safety rules that must be followed when working with and around such equipment. Personnel should be trained in the hazards and precautions to observe while using high-pressure equipment, as well as in how to use and maintain PPC&E.

ELECTRICITY

7-32. Electrical and electronic components are present in most equipment. When dealing with these items, personnel must be thoroughly familiar with the danger of electrical shock and with lifesaving techniques. Precautions and first aid techniques are usually listed in the front of maintenance TMs. Operators and maintainers should thoroughly familiarize themselves with these precautions and first aid techniques. See TB 385-4 and FM 4-25.11 for further guidance.

RADIO FREQUENCY

7-33. Radio frequency (including microwave and ultrasound energy) and energy policies and procedures are covered in the Operator's Manuals for specific equipment and in TB MED 523. Some equipment radiates high-intensity RF energy, which may be hazardous to personnel or to other equipment. Personnel should be familiar with the hazards and special procedures involved with such equipment. Minimum safe distances are normally referenced in the TMs for major equipment that emits high-intensity RF energy.

ELECTRO-EXPLOSIVE DEVICES

7-34. Some squibs and detonators can be inadvertently fired by RF energy from sources such as radios or radar transmitters. Electronic Explosive Devices (EEDs) are relatively safe (even in strong RF fields) when enclosed in metal containers. For more details on safety under these circumstances, refer to FM 9-6 or the System TM.

RADIOACTIVE MATERIAL

7-35. Observe the following precautions in order to reduce the probability of injury from radioactive material radiation:

- Check the applicable TMs for the designation and location of radioactive material.
- NEVER touch damaged or broken radioactive tubes with bare hands. Use the proper personal protective clothing and equipment.
- Include radiation safety in an SOP and in annual awareness training.
- Inventory all ionizing (radioactive) and non-ionizing (radiating) materials and sources annually. These materials and sources can be found throughout a maintenance unit (for example in the M8A1 chemical agent alarm, some missile system tubes, hand-held compasses, and lasers).

- Check local reporting procedures with the Installation Radiation Protection Officer, who is normally assigned to the Installation Safety Office.
- Check TB 43-0116 and TB 43-0197 to determine where radioactive materials are located in military equipment.
- Check AR 11-9 for guidance on ionizing radiation protection, transportation, and disposal. Coordinate with the Radiation Protection Officer (RPO).
- Report all radiological incidents and accidents to the RPO.
- Post warning signs.

ARMED WEAPONS

7-36. Recovery Teams need to know how to disarm weapon systems. MSTs should know which actions or precautions are necessary if a hangfire or dud ordnance occurs. Applicable Weapon Systems TMs should provide guidance. However, when in doubt, request help from the using unit or the EOD unit.

MECHANICAL EQUIPMENT

7-37. Radar, launchers, transporters, and other associated mechanical equipment present many hazards that can result in falls or entanglement with their moving parts. Specific precautions are normally listed in the front of Maintenance TMs. Observance of the following general precautions will reduce the chances of an accident due to mechanical contact:

- DO NOT wear loose clothing or jewelry while working in the vicinity of equipment with moving components.
- DO NOT attempt to lift equipment that normally requires movement by more than one person.
- Place warning devices or signs around areas with mechanical hazards.

WELDING

7-38. Welders must ensure the following:

- Be familiar with processes and procedures covered in TC 9-237 and in TMs applicable to the equipment they are working with.
- Use the prescribed personnel protective clothing and equipment, and consider the safety of other personnel.
- Not operate welding equipment in areas where sparks might result in fires or explosion or where personnel may suffer eye burns from the arc.

MAINTENANCE ACCIDENT PREVENTION

7-39. Maintenance accidents involving on-duty soldiers and civilians injured while installing, removing, or modifying equipment should be addressed when developing prevention programs. Accident prevention is vital to combat readiness. The following four factors are responsible for most accidents:

- Failure to follow procedures.
- Poor supervision.
- Lack of written procedures.
- Insufficient or no training.

MAINTENANCE FACILITY ACCIDENTS

7-40. Areas that account for accidents in maintenance facilities include the following:

- Operation of tools and equipment.
- Lifting (see DA Pamphlet 385-5).
- Hazardous actions.
- Lack of security and inadequate inspection of equipment.
- Lack of communication.
- Poor housekeeping.
- Carelessness
- Failure to depressurize or disconnect components or equipment.
- Fatigue.

VEHICLE ACCIDENTS

7-41. The following are some common causes of vehicle accidents in maintenance units:

- Lack of driver training.
- Speeding.
- Fatigue.
- Following too closely.
- Improper ground guiding.
- Failure to wear seat belts.

MATERIAL SAFETY DATA SHEETS

7-42. MSDSs are the key to the HAZCOM Program. Each manufacturer of hazardous materials is required by federal law to produce an MSDS for that material. The unit can obtain MSDSs by doing the following:

- Removing them from bulk packages of hazardous materials.
- Requesting them from the manufacturer.
- Requesting them through normal safety channels.

SECTIONS FOR ALL PERSONNEL

7-43. All personnel working with HAZMAT should know the following information (normally found in the first sections of the MSDS):

- Administrative information (for example, the HAZMAT's chemical name).
- General information (for example, the manufacturer's name, address, and emergency phone numbers; unit of issue; container quantity, container type; and net unit weight).
- Ingredients information (the chemicals that make up the material, its characteristics (appearance, odor, and boiling point) needed to identify a spill or leak). The boiling point is important when determining where to store hazardous materials.
- Fire and explosion hazard data (for example extinguishing materials, special fire fighting procedures, and unusual fire and explosive hazards).
- Reactivity (information on stability, conditions, and materials to avoid; and hazardous decomposition products).

SECTIONS FOR SUPERVISORS

7-44. First-line supervisors primarily use the remaining sections to help them comply with their HAZCOM Program responsibilities:

- Health hazards (signs and symptoms of exposure, medical conditions aggravated by exposure, and emergency and first aid procedures – first-line supervisors must inform their personnel of these items).
- Precautions for safe handling and use (what to do if a material is released or spilled, what the waste disposal method is, proper handling and storage precautions, and any special precautions. Most hazardous materials cannot be “simply” thrown away. Supervisors should use the information in this section to train their personnel. Military waste disposal should be handled through normal logistics channels. The Unit Supply or the Installation Logistics Office will advise on procedures for waste disposal. The Installation Safety Office can also help identify the appropriate authority. See AR 200-1 for guidance on environmental protection and enhancements).
- Control measures (type of personnel protective clothing and equipment required to safely use a hazardous material). Supervisors train personnel how to obtain, use, and maintain the equipment. The Unit Safety Officer should be able to answer any question concerning approved safety PPC&E.
- Transportation data (physical and chemical characteristics, fire and explosion hazard data, and reactivity as needed to safely transport hazardous materials). Refer to this information when determining the category or hazard classification of the material being transported.

PERSONNEL PROTECTIVE CLOTHING AND EQUIPMENT

7-45. PPC&E should be used, as appropriate, to enhance safe operations. Safety equipment must be in good working condition and capable of serving the purpose for which it was designed. Persons who are issued PPC&E should understand how to put it on, wear it, and maintain it. Appropriate PPC&E should be selected based on the operation's hazards.

7-46. The most logical method of determining the need for PPC&E and the specific kind needed is a survey of all shop operations. AR 385-10 requires written documentation on the selection of PPC&E. Good maintenance of safety PPC&E prolongs its life as well as the user's, in addition to ensuring proper functioning and use. See AR 385-10 for further information on the use and availability of PPC&E.

RISK ASSESSMENT AND RISK MANAGEMENT

7-47. Tough, realistic training conducted to standard is the cornerstone of Army warfighting skills. An intense training environment stresses both soldiers and equipment, which creates a high potential for accidents. Commanders must find ways to protect their soldiers and equipment from accidents during training. Risk assessment:

- Is a common sense way of identifying hazards and the systemic effects they have on the mission.
- Is a tool leaders can use to make smart decisions. It allows them to execute more realistic training scenarios not otherwise possible through the use of control measures.
- When applied to day-to-day operations, helps reduce accidents by means of proactive prevention and increased awareness.

7-48. Commanders and staff can use the following information as a guide for managing risks as it applies to their organization and mission during peace and war. Conducting risk assessment and then applying risk management should become a fully integrated part of mission planning and execution. These management tools are a way to get the job done by identifying the areas that present the highest risk and taking action to eliminate, reduce, or control the risk.

7-49. Risk assessment and management are ways of thinking through a mission to balance mission demands against risks. Leaders must learn to assess risks during actual training events and then apply the same techniques during combat actions. Risk management techniques and procedures are included in FM 100-14.

COMMANDER'S RESPONSIBILITIES

7-50. As in all other areas, commanders have overall responsibility for the effective management of risk. To meet this responsibility, commanders must do the following:

- Strive for optimum performance from their personnel.
- Select from risk reduction options provided by the staff.
- Accept or reject residual risk, based on the benefit to be derived from an informed position (informed in the sense of knowing what they are accepting or rejecting).

- Train and motivate leaders at all levels to use risk assessment and risk management concepts effectively.
- Ensure the concepts of risk assessment and risk management are understood and applied down to the lowest rank and grade.

SUPERVISOR'S RESPONSIBILITIES

7-51. Supervisors and managerial personnel assist the commander in assessing risks, developing risk reduction options, and integrating risk controls into plans and orders. Additional responsibilities include the following:

- Developing a total commitment to mission accomplishment and the welfare of subordinates.
- Consistently applying effective risk assessment and risk management concepts and methods to operations they lead.
- Reporting risk issues beyond their control or authority to the chain of command for resolution.

SECURITY AREAS

7-52. Maintenance security areas discussed in this chapter are physically defined areas where access is subject to restrictions and controls. To remain as low key as possible, security areas will not normally be posted. Responsibility for the security of a unit rests with the commander. At all levels, commanders must use every means at their disposal to safeguard classified material.

PHYSICAL SECURITY

7-53. Physical security protects operational information and activities using security forces, barriers, dispersal, concealment, and camouflage. It also denies the enemy access to facilities, areas, equipment, materials, and personnel.

FIXED FACILITIES

7-54. Missile and electronics systems maintenance support shops will normally have a perimeter fence around the work area and any area where classified, sensitive, or high-cost items are repaired or stored. Other structural barriers, such as walls, bars, and roadblocks, should be constructed to provide protection equal to a chain link fence. See FM 3-19.30 (FM 19-30) for standards concerning the types and design of perimeter barriers.

7-55. To operate efficiently and safely, the number of perimeter entrances on the installation must be limited. When entrances are not guarded, they must be securely locked. A key control system must be in place for perimeter entrances, facility doors, and locked maintenance shops. See AR 190-11 for further guidance.

OPERATIONAL SUPPORT LOCATIONS

7-56. AR 380-5 describes detailed standards and requirements for physically safeguarding classified materials. Consider the following factors when planning, designing, or maintaining physical security in operational support locations:

- The area used must meet present requirements and anticipated needs.
- Classified material in open view must be covered.
- Perimeter entrances should be accessible and within view of the Maintenance Control section.
- Perimeter entrances and other sensitive locations must be well lighted.
- Control signs should limit personnel to only those necessary so as to control authorized entry and prevent unauthorized or accidental entry. Signs must comply with AR 420-70.
- An unattended barrier entrance must have an effective system for alerting shop personnel to persons desiring entry.
- Enough storage containers for classified or sensitive material should be available.
- A classified document log must be maintained.
- Frequent, unannounced security inspections should be conducted.
- A detailed unit SOP on security should be developed.

INFORMATION SECURITY

7-57. Information security is defined as the control of written, verbal, and graphic information to prevent disclosure of operations. Information security is mandatory in a maintenance support shop. The originators of information that require protection in the interests of national defense are responsible for its proper classification.

TYPES OF CLASSIFIED MATERIAL

7-58. Material condition status and other indicators of system status are often classified. They must be handled in accordance with security regulations and established policy. Maps and other indicators of the physical location of units, assets, and quantities of material are sometimes classified. Information that reveals performance characteristics, test data, vulnerability, countermeasures, and signature characteristics of missile systems is classified. See AR 380-5 for guidance on information security classification.

7-59. Missile and electronics systems and TMDE material (end-items or components of end-items) are sometimes classified. This makes it necessary to give special consideration to them during transportation, storage, and handling. Procedures must be developed and enforced for the control of classified materials and publications used daily by maintenance and supply personnel. See TB 9-380-101-series for classification guidance on missile materials.

CLASSIFICATION GUIDELINES

7-60. The following are the three types of sources that contain the basis for determining the appropriate classification of a document or item:

- AR 380-5 provides information security guidance.
- Classification guides prepared by heads of DA agencies and commanding generals of MACOMs.
- TB 9-380-101-series and other technical publications that establish criteria or precedents for the classification of supplies, equipment, and printed matter.

CONTINUOUS SECURITY PROGRAM

7-61. Each support unit should have frequently scheduled briefings to contact each person in the unit. Such presentations are most effective when they are brief and relatively informal. Security presentations should:

- Link with situations to which personnel are exposed.
- Conform to the academic background and education of the audience.
- Be delivered convincingly by a knowledgeable person.

Assigned personnel transferring out of the unit or those who will be absent for longer than 30 days will be debriefed. The appropriate procedures should be in accordance with local policy and security regulations.

SIGNAL SECURITY

7-62. The purpose of signal security (SIGSEC) is to aid mission accomplishment and to withhold intelligence information from the enemy. Commanders and their staffs must consider and apply SIGSEC in their planning and operations. SIGSEC procedures must be flexible and realistic. This involves signal operations security techniques to prevent the disclosure of operational information.

7-63. The following are some practical techniques for maintenance units:

- **Frequency classification.** Operational radio frequency assignments should be classified confidential as a minimum.
- **Net discipline.** Correct communications procedures should be used (such as call signs, short radio transmissions, and signal silence).
- **Authentication.** Authentication protects a communications network against fraudulent transmissions.
- **Call signs.** Operators must not use personnel call signs, names, and other personnel identifiers when transmitting.
- **Official messages.** Military communications must be limited to official messages.

- **Service messages.** Service and procedural messages should be prepared and transmitted according to established procedures.
- **Emergency instructions.** Operators and supervisors must know and have on-hand emergency operating instructions. Compromised SIGSEC procedures must be superseded as soon as possible.

ENVIRONMENTAL MANAGEMENT

7-64. Proper environmental management and coordination at the installation are necessary to comply with federal, state, local, and HN regulations. This information covers the laws, regulations, policies, and programs the Army follows to comply with these regulations. Environmental management is the Army's means of conserving, protecting, and restoring natural and cultural resources while accomplishing the military mission. Proper environmental management benefits the overall mission by improving public relations and preventing delays and operational shutdowns. It also provides everyone with a cleaner, healthier, safer environment to live in.

DEPARTMENT OF DEFENSE POLICY

7-65. The goal of the DoD is to lead the nation in protecting the environment and conserving natural resources for present and future generations. The Army has established an environmental strategy to support the goal of the DoD. This strategy is an integral part of the Army's vision into the 21st century.

7-66. The Army's environmental strategy can be illustrated in the model of a building with a foundation and pillars supporting the overall vision of environmental stewardship. The model is on a bedrock of shared national values that support the foundation. Across the foundation is the Army's tradition of leadership, which integrates the foundation blocks and provides a sound footing for the four pillars. These four pillars include:

- **Compliance:** To attain and sustain compliance at Army installations.
- **Restoration:** To clean up contamination as quickly as possible.
- **Prevention:** To prevent or reduce pollution at its source to lessen future problems.
- **Conservation:** To conserve and preserve the natural and cultural resources under the Army's control for future generations.

ARMY POLICY

7-67. The Army policy is an integral part of the mission. This policy has been endorsed by the Army Chief of Staff and the Secretary of the Army. Protection of precious environmental resources is the duty of every member of the Army. Charged with the stewardship of over 20 million acres of land, the Army must never lose sight of its responsibility to preserve and protect resources.

PRINCIPLES

7-68. The guiding principle of the policy is that work and actions must be environmentally sustainable, meeting current needs without compromising the integrity of the environment for future generations. As a basis to its environmental management policy, the Army will do the following:

- Integrate environmental consideration into all activities.
- Allocate resources and training to protect the environment.
- Ensure that installation operations are environmentally acceptable and enhance the life of military and civilian members.
- Reduce generation of waste.
- Clean up sites of past contamination.

IMPACT

7-69. Environmental issues are a major concern of the Army. With emerging laws and regulations, these issues will continue to have a growing impact on Army operations. Violations of federal, state, or local environmental laws can result in both civil and criminal penalties.

KEY LAWS AND REGULATIONS

7-70. The four primary sources of environmental law that influence Army actions are federal, state, local, and HN. The Army will comply with laws and regulations as they pertain to individual localities and installations. Since state and local environmental laws differ, personnel need to understand that what is environmentally permissible on one installation may not be permissible on another. Therefore, check with appropriate installation personnel to determine how state and local laws apply.

FEDERAL

7-71. Federal laws provide states and federal agencies with a legal framework in which to operate. These laws include acts and executive orders. For example, the Federal Facilities Compliance Act (FFCA) allows federal, state, and local regulatory agencies to impose civil fines on federal agencies for violations of the Resource Conservation and Recovery Act (RCRA). In many federal environmental laws, Congress has authorized the Environmental Protection Agency (EPA) to delegate primary enforcement responsibility to the states. Such delegated programs must be at least as stringent as the applicable federal laws and regulations. However, states may impose stricter standards in their laws or regulations. Individuals should receive site-specific training regarding their potential liability under applicable federal and state laws and regulations.

STATE

7-72. Each state has its own regulatory organization charged with developing and implementing environmental regulations. While many state regulations parallel federal environmental regulations, some are more stringent.

LOCAL

7-73. Local laws and ordinances address the concerns of the local communities. They are based on federal and state laws. However, each municipality or community may place more stringent restrictions on certain activities (for example, noise restrictions during certain hours of the day).

HOST NATION

7-74. The Army is committed to pursuing an active role in addressing environmental quality issues with neighboring communities and assuring that consideration of the environment is an integral part of all decisions. When an installation or unit is located OCONUS, in an area where a HN has minimal or no environmental laws and is not subject to federal environmental regulations decreed by the EPA, the unit or installation will comply with ARs 200-1 and 200-2. In countries where there are HN laws, the final governing standard (FGS) will be used in accordance with the executive agent of that country.

ENVIRONMENTAL COMPLIANCE ACHIEVEMENT PROGRAM

7-75. The ECAP is an umbrella program that integrates five basic areas needed to achieve and maintain environmental compliance. These five basic areas include:

- Training.
- Planning and programming.
- Resourcing.
- Assessing.
- Correcting deficiencies.

This program was implemented to assist Army personnel in achieving and maintaining compliance with applicable federal, state, local, and HN environmental regulations and to foster a sense of stewardship.

7-76. The ECAP is applicable to worldwide Army installations. It covers Army environmental programs that focus on ongoing and future operations (as compared to the Defense Environmental Restoration Program, which focuses on past Army operations). OCONUS commanders determine the scope for the ECAP within their commands. They often implement procedures to ensure compliance with applicable HN, Status of Forces Agreement (SOFA), and FGS requirements, as well as the requirements of ARs 200-1 and 200-2.

COMPLIANCE

7-77. The Army is committed to setting the standard for DoD and other federal agencies as the leader in compliance with environmental laws, prevention of environmental damage, and the protection and stewardship of natural resources. The Army is making a concerted effort to integrate environmental considerations into all Army activities. It is the responsibility of all military and civilian Army personnel to ensure that the DoD and national standards for environmental challenges in the future are met.

7-78. The Army uses compliance assessment as a vehicle for attaining Army environmental program goals and improving program visibility. If the unit deals with hazardous waste (HW) and HAZMAT, internal inspections are required. HW coordinators for larger units can request a copy of the ECAP protocol to assist in developing inspections and record-keeping plans. However, the installation HW Management Plan should contain information to develop an Inspection Plan for HW generation points and accumulation sites at the unit level. TC 3-34.489 provides a self-assessment checklist.

POINTS OF CONTACT

7-79. Contact the Environmental Office for an ECAP protocol to conduct an internal or self-compliance assessment. The Army Environmental Hotline (CONUS, 1-800-USA-3845; OCONUS, 1-410-671-1699; DSN 584-1699) provides information on the following environmental issues:

- Policy and guidance.
- Points of contact.
- References.
- Stewardship.
- Federal and state laws and regulations.

UNIT-LEVEL ENVIRONMENTAL PROGRAMS

7-80. Leadership direction and support are needed to implement improvements in all areas of Army activities and operations to achieve environmental stewardship. Army leaders will ensure their effective implementation.

LEADER RESPONSIBILITIES

7-81. Unit leaders must ensure their unit has an active and strong environmental program. They must understand the laws and know which actions to take. Leaders bring focus, direction, and commitment to environmental protection. They demonstrate commitment by doing the following:

- Resourcing the effort.
- Organizing for success.
- Training unit personnel.
- Ensuring compliance with all requirements.
- Role-modeling the unit's environmental ethic.

7-82. Environmental awareness must be part of the command policy. It is enforced through the chain of command. Successes in the unit-level environmental program, the installation environmental program, and the Installation Environmental Office increase communications at all levels. Unit leaders must follow the steps in Table 7-2, page 7-20.

Table 7-2. Unit Environmental Program

Step	Action
1	Begin with the basics to ensure unit personnel have had Environmental Awareness training.
2	Designate an Environmental Compliance Officer/HW Coordinator who is properly trained and qualified.
3	Direct the Environmental Compliance Officer to interface with appropriate environmental personnel and ensure that the unit is in compliance with environmental laws and regulations.
4	Meet with the key Battalion Operations and Training Officer (S3), Supply Officer (S4), and installation personnel who deal with environmental issues.
5	Determine the requirements concerning ECAP inspections that may affect the unit and identify unit environmental problem areas and ways to avoid them.
6	Ensure the unit has a well written SOP that addresses environmental issues and procedures that apply to the unit and coordinate environmental requirements with appropriate installation and chain-of-command personnel.

NOTE: At most installations, environmental support personnel are available to help unit leaders understand the various laws and regulations. These personnel include the chain of command and key installation personnel (Directorate of Public Works (DPW) Environmental Officer, Staff Judge Advocate (SJA) Attorneys, and Range Officers).

TYPES OF UNIT ENVIRONMENTAL PROGRAMS

7-83. The environmental programs that the unit should support (installation) and establish (unit) are the following:

- Hazardous Materials Program.
- Hazardous Waste Program.
- Hazardous Communications Program.
- Pollution Prevention and Hazardous Waste Minimization Recycling Program.
- Spill Prevention and Response Plan Program.

HAZARDOUS MATERIALS PROGRAM

7-84. The Hazardous Materials Program's objective is to reduce health hazards and environmental damage due to use/misuse of hazardous material. Because of its quantity; concentration; or physical, chemical, or infectious characteristics; a hazardous material may:

- Cause, or significantly contribute to, an increase in mortality or in serious, irreversible, or incapacitating but reversible illness.
- Pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

MANAGEMENT RESPONSIBILITIES

7-85. Managers must ensure that the best management practices for all hazardous materials are being observed. Some of these practices include the following:

- Maintain liaison with key chain of command and installation personnel.
- Appoint an Environmental Compliance Officer.
- Comply with all applicable hazardous waste regulations.
- Order and use only the hazardous materials required (NEVER stockpile HAZMAT).
- Use non-hazardous substitutes to the maximum extent practicable.
- Conserve resources through recovery, recycling, and reuse.
- Coordinate requirements with appropriate training.
- Comply with chain-of-command and installation HAZMAT requirements.
- Establish the following procedures:
 - To identify and correct management deficiencies.
 - For hazardous waste/materials fires or explosions.
 - For hazardous waste/materials spills or leaks.
 - For emergency first aid.

HAZARDOUS WASTE ACCUMULATION

7-86. One of the Hazardous Waste Program's goals is monitoring the presence of hazardous waste that is a cause of concern to installation personnel or nearby residential populations. Hazardous substances are an unavoidable fact of Army activities, which ultimately result in some waste generation. Proper handling and disposal of these wastes will reduce danger and ensure the safety of people and the environment. The references that are applicable to hazardous waste programs are AR 200-1, AR 420-49, and TM 38-410.

HANDLING AND DISPOSAL

- 7-87. A unit that deals with hazardous waste should do the following:
- Comply with HW regulations.
 - Ensure wastes do not accumulate beyond quantity and time limits.
 - Maintain proper HW records and submit the required report.
 - Employ waste-minimization techniques.

TRANSPORTATION

7-88. Leaders should ensure compliance with on-post HW transportation requirements. They can contact the Installation Defense Reutilization and Marketing Office (DRMO) or Directorate of Logistics (DOL) for details. Leaders also ensure compliance with off-post HW transportation requirements. Public road use increases transportation requirements. The Installation DOL Facilities Management Officer (FMO) grants movement approval. Drivers transporting HW must be qualified. A HW Training Program should be established to ensure personnel are trained properly. Most installations use a HW “train-the-trainer” program.

HAZARDOUS WASTE MINIMIZATION PROGRAM

7-89. The Pollution Prevention and Hazardous Waste Minimization (HAZMIN) Program complements the HAZMAT, HW, and HAZCOM Programs. The HAZMIN is the reduction in the amount and toxicity of HW. Pollution prevention is reduction in the amount of waste, whether it is hazardous or not (for example, recycling or reusing to reduce the amount of trash that goes into landfills). Applicable references for HAZMIN Programs include AR 200-1.

INVENTORY CONTROL

7-90. Leaders ensure their units employ inventory control of hazardous materials. Hazardous materials SHOULD NOT be stockpiled in the unit. If a hazardous material has an expired shelf life, it can cost much more to dispose of the item than it did to obtain it. Any hazardous material with an expired shelf life must be handled like hazardous waste.

REDUCING HAZARDOUS WASTE

7-91. Non-hazardous product substitution is an easy way to reduce hazardous waste generation. Unit personnel should review the HAZMAT inventory in their areas to check if non-hazardous or less hazardous substitutes are available. Changes in the work process can reduce the amount of HW generated. Some of these changes include:

- Using a soap-and-hot-water parts cleaner instead of a vapor degreaser.
- Changing painting operations to reduce overspray and pollution. However, any sprayed water still needs to be treated as HW, since paint particles can become waste material.

RECYCLING PROGRAM

7-92. A Recycling Program promotes increased use of product separation, substituting materials and changing procedures to avoid using hazardous substances (source reduction) and recycling to reduce the volume of solid waste. Most installations have a Recycling Program. Personnel should support it by ensuring that all recyclable materials are being recycled. Check with the Installation Environmental Office to verify the material is recyclable. These materials include the following:

- Plastics.
- Oil.
- Solvents.
- Glass.
- Aluminum cans.
- Computer printouts.
- Corrugated paper.
- Newspaper.
- High-grade white paper.
- Brass.

SPILL PREVENTION AND RESPONSE PLAN

7-93. The Spill Prevention and Response Plan supports the Clean Water Act's requirement to prevent spills of oil and hazardous substances. It also provides a prompt response to contain and clean them up. The discharge of oil or hazardous substances from installations, vehicles, aircraft, and watercraft into the environment without a permit is prohibited. Exceptions will be made in cases of extreme emergency where the discharge is considered essential to protect human life. A discharge may also be authorized by a permit or by the Installation On-Scene Coordinator (IOSC) during a spill-incident response.

PREVENTION

7-94. Every reasonable precaution should be taken to prevent oil and hazardous substance spills. Unit leaders will perform the following:

- Ensure facilities are provided to store, handle, or use oils and hazardous substances, and ensure proper safety and security measures are implemented.
- Appoint a Spill Coordinator and members of the unit Spill Response Team (the designation should be in writing).
- Maintain an up-to-date Spill Response Plan (the plan is an installation requirement).
- Conduct periodic spill response drills.
- Ensure sufficient equipment and supplies (absorbent materials) for spill response are on-hand and are pre-positioned in the unit.
- Locate all drains, drainage ditches, streams, and ponds; plan how to prevent a spill from reaching them.

RESPONSE

7-95. Each unit needs the following:

- A copy of the Installation Spill Contingency Plan (ISCP), which is available from the Environmental Office.
- A current list of essential agency names and phone numbers, including:
 - Fire Department.
 - Safety Office.
 - Provost Marshal.
 - Preventive Medicine.
 - Environmental Office.
- An up-to-date inventory of all HAZMAT/HW (a copy should be provided to the post fire department).
- Spill prevention equipment (brooms, absorbent materials, hand tools, barrel plugs, personnel protection equipment).
- A Spill Response Plan that covers:
 - General issues.
 - Oil.
 - Hazardous substances.
 - Extremely hazardous substances.

7-96. Before attempting to clean up a spill, contact the installation Spill Response Team, Safety Office, Preventive Medicine Office, and Environmental Office to determine the proper PPC&E. Ask when to attempt the spill cleanup and when to leave the area. With the approval of the installation Spill Response Team, ensure small spills are properly cleaned up and collected.

7-97. Ensure oil, fuel, or other hazardous pollutant spills are reported to the Environmental Office and higher HQ. The Battalion S4 and the Post Environmental Office can provide information on reportable spill quantities. Contaminated soil needs to be properly disposed. Contact the Installation Environmental Office for additional information.

TRAINING

7-98. Training is the key to accomplishing the mission. Military personnel need environmental awareness training, which leads to safer performance and establishes an environmental ethic among soldiers. Training should occur as early as possible and be reinforced as personnel progress professionally.

7-99. In addition to general environmental awareness training, specialized training is required based on the duties and responsibilities of the individuals. Some of this specialized environmental training and much of the awareness training can be addressed appropriately through integrated instruction or supplemental material as part of ongoing unit training programs for technical skills and leadership.

SERVICE SCHOOLS

7-100. Service schools provide environmental awareness training for soldiers as they attend professional development courses. This training provides general knowledge of human health issues, the environment, environmental ethics, and the impact of their decisions and actions on the environment. Environmental awareness training will be taught at all levels from initial-entry training to the precommand course. The U.S. Army Engineer Center is proponent for the training.

NON-RESIDENT TRAINING

7-101. The Army Correspondence Course Program (ACCP) provides a variety of environmental subcourses. Students in the ACCP satisfy their particular training needs themselves. Procedures for enrollment are in DA Pamphlet 350-59. Subjects include:

- Environmental Protection.
- Defense Hazardous Materials and Waste Handling.
- Hazardous Materials Handling.
- Hazardous Materials Citizen Orientation.

7-102. Environmental awareness subcourses include:

- EN 5700, Junior Enlisted Environmental Awareness Training.
- EN 5702, Small Unit Leader Environmental Awareness Training.
- EN 5704, Senior Leader Environmental Awareness Training.

UNIT TRAINING

7-103. The U.S. Army Engineer School is proponent for the unit training program for each company-sized unit. The training program assists commanders to better prepare unit personnel to face environmental issues and reduce environmental constraints affecting the mission. The program stresses before, during, and after-operations checks. Commanders must establish a training program to ensure personnel are fully aware of their responsibilities.

SPECIFIC TRAINING

7-104. Many installations (including those that are OCONUS) currently provide a training program for specifically required training (for example, for Unit Environmental Compliance Officers and Spill Coordinators). Other training to support the needs of commanders is currently available. Contact each training proponent for a list of courses and training programs.

PROGRAM ASSESSMENT

7-105. A unit's environmental compliance status can be determined through formal inspection by a regulatory agency or through self-inspection using ECAP checklists as a guide. Non-Army regulatory agencies have the legal right and responsibility to inspect units and individual facilities to ensure compliance.

7-106. Once a year, EPA Inspectors conduct spot inspections of installations. Local and State Inspectors also conduct frequent inspections. Regulatory inspections often concentrate on a particular area, such as HW management. Inspection frequency guidelines have been established under the EPA Federal Facility Compliance Strategy. Inspections in other programs may occur at different frequencies. Installations and units with specific major problems can accept more frequent follow-up inspections.

7-107. Often the first indication that Federal, State, or other Inspectors are on-post is when they drop into the Installation Environmental Coordinator's Office or the Provost Marshal's Office, asking for directions to a site on the installation. The best policy is to be in compliance with all regulations and to be prepared for inspection at all times.

Chapter 8

Emerging Maintenance Operations

Two-Level Maintenance (TLM) describes maintenance transformation initiatives required to sustain ground-based equipment in the first and second decades of 21st century. TLM is consistent with the Army Vision, Joint Vision 2020, Objective Force emerging concepts, and business practice changes, such as the SSF and National Maintenance Program (NMP). The TLM system can be employed in Legacy, Interim, and Objective Force designs for Army equipment (less medical, aviation, watercraft, rail, and military intelligence equipment). TLM supports initiatives such as the NMP, SSF, TSC, Battlefield Distribution (BD), TAV, Distribution Management, and Future Combat System (FCS) concepts.

ARMY MAINTENANCE TRANSFORMATION

8-1. Army Maintenance Transformation impacts all aspects of maintenance support and system design for both current and future systems. Determining which task should be performed in a given maintenance level requires careful consideration. Figure 8-1 provides a decision tree to make the correct maintenance-level assignment.

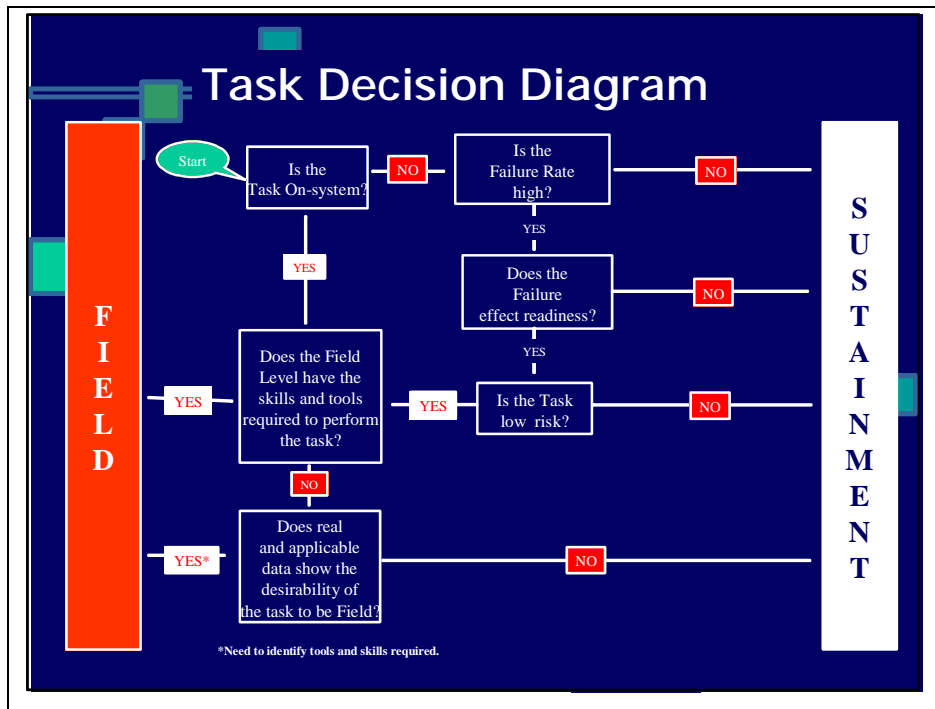


Figure 8-1. Task Decision Tree

8-2. The complete transformation will take time because of the Army's investment in current systems. The conversion to two levels of maintenance will vary from item to item and organization to organization, based upon when the item/organization entered the Army's inventory. The final

application of the concept must result in a seamless maintenance system that can sustain all the Army's equipment. Army Maintenance Transformation (AMT) consolidates maintenance levels in the current system into broad categories, which are on-system and off-system maintenance. These two maintenance systems are described below:

- On-system maintenance includes all maintenance tasks that would cause an end item to be unavailable during its operation, where the item's performance would have a direct impact on sustaining the inherent level of reliability and safety associated with an end item. To perform any given on-system task requires that the field level of maintenance has the prerequisite skills, tools, and operational needs to perform a maintenance task.
- Off-system maintenance includes both component and end item repair. Component repair is the set of all maintenance tasks that would not cause the end item to be unavailable. These are normally repair tasks performed to lower indentured components of the end item after they have been removed from the end item and replaced with a like, serviceable item. After the repair tasks are completed on these lower indentured items, they are returned to stock not to the end item from which they were removed. End item repair is maintenance performed to rebuild or the refurbishment of an item to extend its service life, apply system improvements, or repair battle damage that requires specialized equipment not easily transported in the field or requiring extensive item disassembly.

TWO-LEVEL MAINTENANCE

8-3. During the past decade, the U.S. Army has been engaged in a deliberate and sweeping effort to adapt its organizations, soldiers, equipment, and methods of operations to requirements of a rapidly changing strategic and technological landscape. The Army Vision describes the force characteristics of the future Objective Force. Emerging technologies promise a clear path to that future. The power of advanced technologies, especially information technology, enables the Army to achieve situational dominance and decision-making momentum to create a new construct for the application of force.

8-4. The Army Vision calls for transforming from a forward-deployed force to a strategically responsive Force Projection Army. The current four-level maintenance system will not meet the needs of the future force. The current maintenance system uses multiple echelons with fixed organizational structures containing redundant capabilities. Today's reactive maintenance system creates a large battlefield logprint that is reliant on multiple HQ to coordinate forward support activities (FSAs) and evacuation of inoperative systems. The replacement of the existing maintenance system with a proactive two-level maintenance system will reduce the battlespace footprint by doing the following:

- Eliminating echelonment of maintenance.
- Allowing for responsive flexibility with tailored modular organizations.
- Increasing efficiency to generate and sustain combat power.

Both the SBCT and interim division maintenance systems operate within the TLM construct.

TWO-LEVEL MAINTENANCE CONCEPT

8-5. The current Army maintenance philosophy of “fix forward” will change to a “replace forward/repair rear” TLM system in support of emerging requirements. A transition from a four- to two-level maintenance structure supports the shift to a “replace forward/ repair rear” maintenance philosophy. Characteristics of the TLM system include:

- Eliminates maintenance echeloning.
- Returns equipment to the fight faster.
- Reduces the logistics footprint in the battlespace.
- Reduces repair cycle time to generate and sustain combat power.
- Incorporate tenets of battlefield distribution.

The two levels of maintenance in a TLM system are field and sustainment (see Figure 8-2).

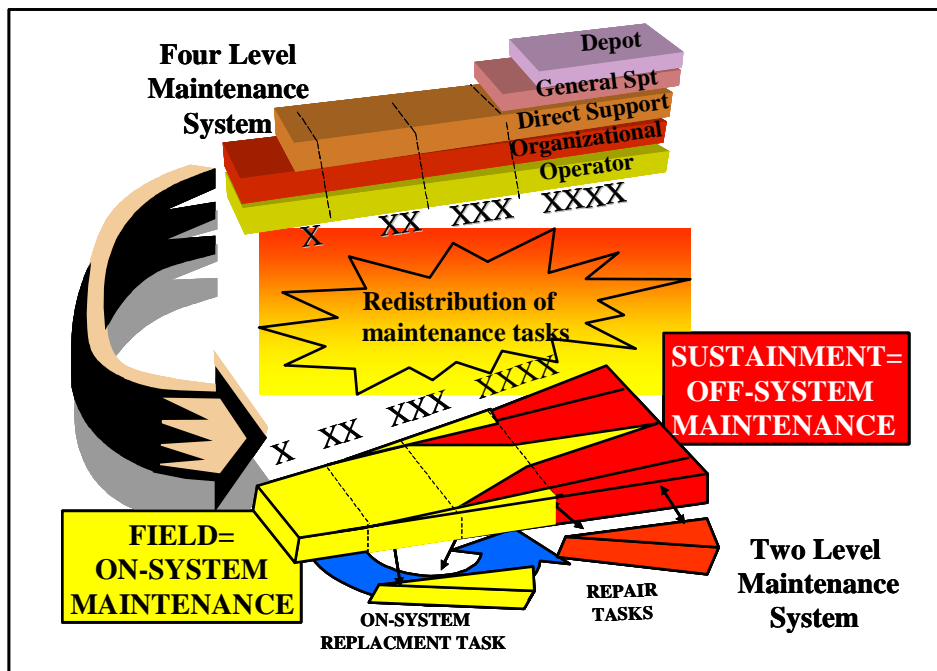


Figure 8-2. Two-Level Maintenance Program

FIELD MAINTENANCE

8-6. Field Maintenance is focused on returning a weapon system to an operational status. The field maintenance level accomplishes this mission by fault isolating and replacing the failed component, assembly, or module on the weapon system. Field maintenance is synonymous with “on system” and “replace forward.” The intent of this level is to replace the failed component, assembly, or module that returns the system to an operational status supporting the Tactical Commander’s needs. The field maintenance level consists of operators/crew and organizational and selected DS maintenance capabilities from the current four-level maintenance system. An example of a field maintenance task would be the fault isolation and replacement of a Laser Range Finder (LRF) on an Abrams tank. The field maintenance level would exchange the failed LRF for a functional LRF from the SSA.

SUSTAINMENT MAINTENANCE

8-7. Sustainment maintenance is focused on repairing components, assemblies, modules, and end items in support of the distribution system (see Figure 8-3). Sustainment maintenance is synonymous with “off system” and “repair rear.” The intent of this level is to perform commodity-oriented repairs on all supported items to one standard that provides a consistent and measurable level of reliability. The sustainment maintenance function can be employed at any point in the distribution pipeline. Ideally, sustainment maintenance activities would support from the CONUS. However, battlefield OPTEMPO may dictate that sustainment maintenance activities be located closer to the battlefield to improve support. An example of sustainment maintenance would be the repair of a failed Abrams component. The component would be retrograded to a sustainment repair activity through the supply/distribution system. Once the repair was effected, the component would be returned to the supply/distribution system as a serviceable asset.

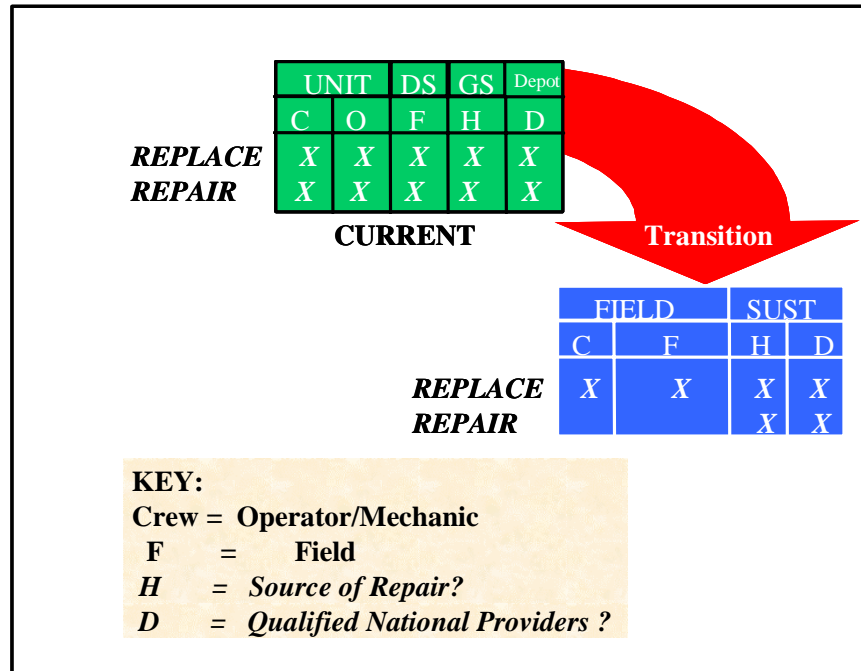


Figure 8-3. Two-Level Maintenance Repair Tasks

Field and Sustainment Maintenance Tasks

8-8. Most component repair tasks (see Figure 8-3) will be shifted to the sustainment maintenance level where components will be repaired to a national standard and returned to the supply system for redistribution. The second group of tasks to be moved will be field maintenance tasks, which are transferred to other field maintenance activities farther to the rear. Examples of tasks that fall into this category include vehicle servicing and tire mounting/repair.

8-9. The skills and abilities of the soldiers that will execute this doctrine will also change. Many of the current Ordnance Maintenance Military Occupational Specialties (MOSs) are being consolidated to create either system-specific repairmen (multi-capable mechanics) or similar skills grouped to create a new MOS capable of performing all required maintenance tasks at one location. For example, in today's structure, the failure of a wheeled vehicle major component (engine) requires the skills of at least two different maintainers (a 63B, Unit Level Wheeled Vehicle Maintainer and a 63W, Direct Support Wheeled Vehicle Mechanic) assigned to two different organizations (the owning unit and the DS unit) with two different skill sets to effect a single repair. This situation creates inefficiencies and unnecessary delays in returning the system to an operational status. The MOS consolidations in support of the two-level maintenance structure will eliminate the inefficiency of repair echelonment by empowering one maintainer with the needed skill set and authority to perform the complete repair at one location.

PERFORMING TWO-LEVEL MAINTENANCE

8-10. The difference between the current system and a TLM system is that performing either field or sustainment maintenance is a deliberate management decision. Committing maintenance resources is based on the customer's needs. Resources (people, parts/materiel, and equipment) are marshaled and dispatched to the repair site from maintenance activities that have the capability and capacity to perform required maintenance task(s). However, the customer equipment may be retrograded through the supporting distribution pipeline to a maintenance facility, which is resourced to perform the required maintenance. Field maintenance tasks are the responsibility of the tactical maintenance units and are performed in the battlespace. The primary methods of returning systems to a mission-capable status are through the use of repair parts, BDAR, controlled substitution, cannibalization, and Class VII replacement. The essential maintenance tasks for this organization are LRU, component, and major assembly replacement in the battlespace. Sustainment maintenance tasks will be coordinated at the national level. National level maintenance managers will designate and workload sources of repair of components and end items.

8-11. The key to performing maintenance in the future will be through the use of the Anticipatory Logistics system. This system continuously monitors weapon system status throughout the battlespace. Weapon systems will report their operational status through commercial technologies such as "On-Star." Equipment monitoring capabilities will transmit and respond to inquiries sending maintenance codes reporting the equipment's status. These reports, when linked to CSS distribution information and Maintenance Activity reports, will provide both field and SMMs the data required to select the best location to perform maintenance.

8-12. The TLM system will add efficiencies to today's AOE force structure. The basic efficiency will be the ability to perform a maintenance function at one location by a multi-skilled maintainer vice echelonment of maintenance to subsequent locations staffed by maintainers with narrowly focused, specialized skills. In AOE designs, unit and DS maintenance will be consolidated similarly to the maintenance capabilities found in the FXXI maneuver units (see Figure 8-4). While it is not practical for all AOE TOE to have their own FSC, fielding new Ordnance MOSs with expanded maintenance skills and automation support in existing maintenance facilities will provide a functioning field level maintenance capability. In the Objective Force and interim brigade/division designs, maintenance support will be reduced to complement deployment requirements. Backup and reinforcing maintenance support for the Objective Force or the interim brigade/division will come from above the brigade/division level (see Figure 8-4).

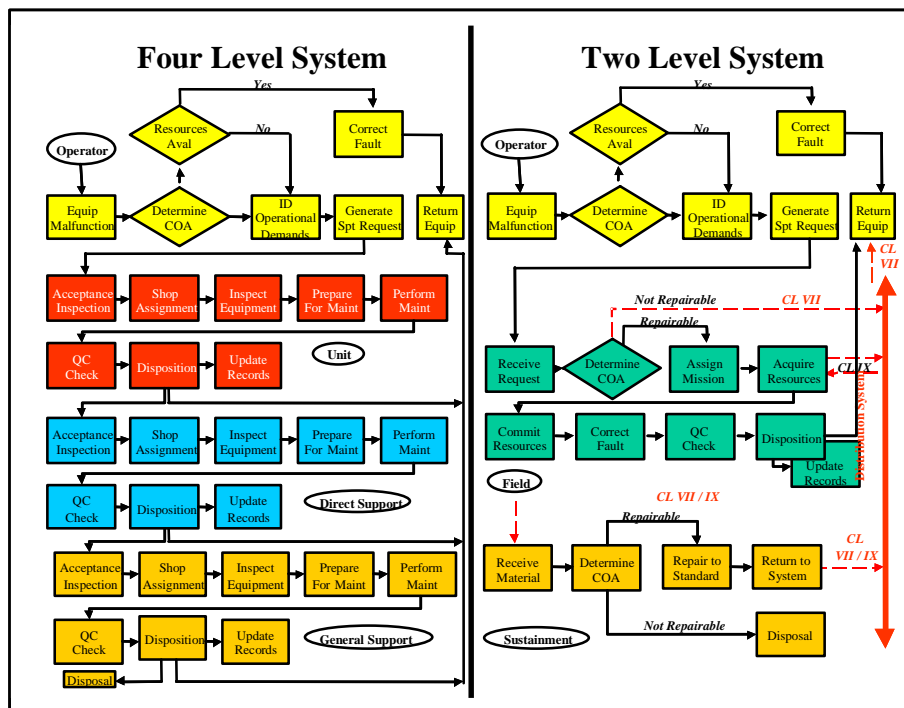


Figure 8-4. Evolving the Four-Level to the Two-Level Maintenance System

8-13. Units outside of the division that perform field maintenance (on-system) or component repair (off-system) will replace current non-divisional Maintenance Companies. These new Support Maintenance Companies (SMCs) will be tailored to perform two area-specific support missions: divisional troop support and support to EAD. The design for the company base of the units will be reduced to minimum staffing and provide C2 and maintenance management. Modular Augmentation Teams assigned to the maintenance activities will dictate the capability and capacity of an individual unit.

8-14. Maintenance augmentation modules will be designed to provide commodity-specific support. The Modular Augmentation Teams will be attached to non-divisional maintenance units to support area maintenance customers. The teams may work from a centralized unit location or be combined as required to form MSTs. The following are the two principal differences between existing Augmentation Teams and future augmentation modules:

- The new modules will be 100 percent mobile with the ability to transport all required tools and test equipment with organic assets.
- The unit designs will be capable of integrating limited numbers of civilians to augment maintenance operations.

8-15. Component Repair Companies (CRCs) will replace existing GS maintenance units. The principle difference between CRC and GS maintenance companies is the new unit only focus is the repair of components. CRCs, unlike GS maintenance units, may be located outside the AO; at any point in the distribution pipeline to repair retrograded material moving through the supply system. CRCs will be attached to CSGs or ASGs. The units will be located along the distribution pipeline to repair retrograded material moving through the supply system or in DS of area support replacement units. In a CSG (Forward), CRCs will focus on division support. The CRC design will be similar to the new non-divisional Support Maintenance Companies, as each will contain a base element with attached augmentation modules. These modules may be commodity-specific teams, similar to modular platoons assigned to existing GS maintenance units, or teams attached to the new field replacement units. The CRC will not provide area recovery support or send out MSTs. Work performed by the unit will focus on repairing fuel and electric, drive train, generator, chemical, engineer, artillery, and electronic components identified by field replacement activities as either faulty or requiring repair due to a projected failure. The CRC may have any combination of augmentation modules attached to it based upon workload and the tactical situation.

8-16. Collection and Classification Platoons will be added to the existing Collection and Classification Companies structure to enhance the return of reparable. The platoons deployed forward may be attached to a SMC or other maintenance activities. The platoons may be pushed into brigade forward areas for limited periods of time to assist in the evacuation of components and end items. The platoon's mission will be to initiate recovery or evacuation of materiel or collect key equipment components needed by theater units based upon their technical assessment. The platoon will receive day-to-day mission guidance through coordination with the MMC or DMC.

8-17. Where practical, repair cycle data will be used to create repair kits that contain the failed component part but also miscellaneous hardware, sealant an/or lubricant, and other materiel used to complete a repair. Repair kits will enable forward deployed maintenance personnel to carry forward the necessary parts and tools without carrying a "basic load" of miscellaneous shop and bench stock. Parts, lubricants, and materiel used by field maintenance personnel to repair equipment will be called "combat spares." It is the consolidation of PLL, shop stock, bench stock, and other common items found in maintenance activities. Combat spares and associated kits may be stocked on weapon platforms and support equipment,

space permitting. When stowed on an item of equipment, the spares may also be called on-board spares.

NOTE: Under a two-level maintenance system maintenance activities evacuate the workload using the distribution system. Also, backup and passback maintenance workload is evacuated to maintenance activities that have the capability and capacity to perform the work.

MAINTENANCE FUNCTIONS SUPPORTED BY TWO-LEVEL MAINTENANCE

PREVENTIVE MAINTENANCE CHECKS AND SERVICES

8-18. PMCS are those maintenance tasks used to identify potential equipment problems. It includes quick turnaround repairs by component replacement, minor repairs, and performance of scheduled services at the operator, crew, company, and battalion/TF levels. PMCS also includes the performance of periodic scheduled checks to monitor the health condition of items of equipment. To reduce the battlefield logprint in forward areas, some equipment service tasks will be migrated to EAD level. These services generally include services on rolling stock, armament systems (25 MM and larger), and ancillary support equipment.

RECOVERY/RETROGRADE DISABLED EQUIPMENT

8-19. Recovery is a critical battlefield capability that must be organic to all tactical units and field maintenance activities. It includes the movement of damaged, discarded, condemned, or abandoned allied or enemy materiel. It includes methods, techniques, and procedures employed in recovering and evacuating disabled equipment.

DIAGNOSE EQUIPMENT FAULTS

8-20. Diagnostic equipment allows the soldier to identify malfunctions through the use of on-board sensors, external test equipment, and visual inspections. These include fault isolation, troubleshooting, battle damage/accident assessment, and differentiating between parts needing repair/replacement and serviceable parts/equipment (see Figure 8-5).

SUBSTITUTION

8-21. Remove serviceable parts, components, and assemblies from unserviceable, economically reparable equipment, or from materiel authorized disposal, and immediately reuse it in restoring a similar item of equipment to a combat-operable or serviceable condition. Includes controlled exchange of parts and cannibalization. Digitization and replacement of existing power trains with hybrid-electric systems will increase the opportunity for materiel developers to design parts that are interchangeable and scalable in function. Adoption of multipurpose parts, such as electric drive motors, which can be used on more than one family of vehicles, will reduce the number of parts required in the battlespace and increase the probability that BDAR techniques can provide a limited combat capability.

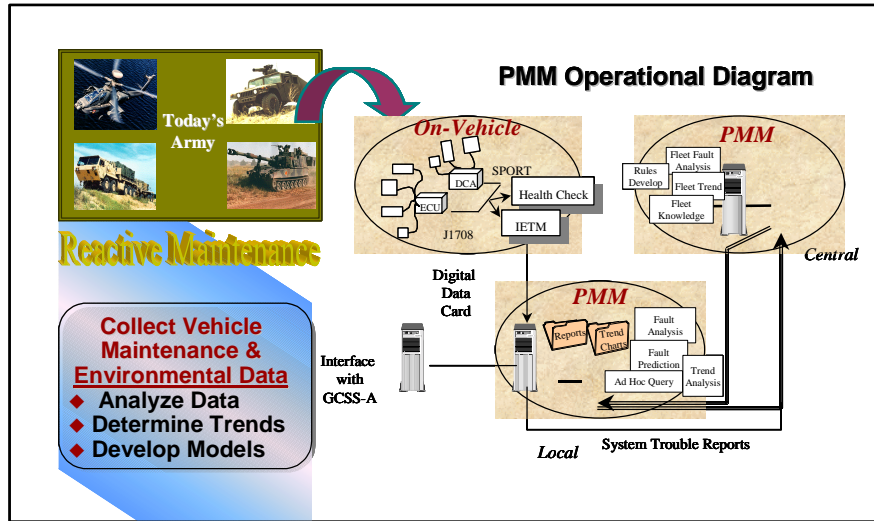


Figure 8-5. Evolving Maintenance Diagnostics

EXCHANGE

8-22. Issue serviceable materiel in direct exchange for unserviceable materiel on an item-for-item basis. Transition from a four-level maintenance system to a TLM system is assisted by new business practices and methods of support, such as the Battlefield Distribution concept. Therefore, support methods based on echeloned “maintenance to maintenance” transactions will migrate to exchange methods, which use the distribution system to retrograde equipment from forward-deployed sites to field and sustainment maintenance activities for repair support (see Figure 8-6).

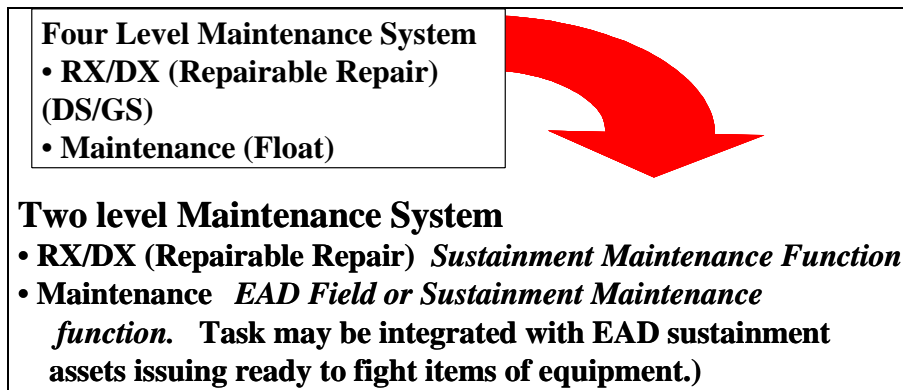


Figure 8-6. Four-level to Two-level Transition

MAINTENANCE FUNCTIONS SUPPORTED BY THE CONCEPT

NOTE: Fix Forward maintenance has been changed to two levels of maintenance (Replace Forward and Repair Rear). Replace Forward means a soldier performs “on-system” maintenance. “On-system” refers to replacing components or subcomponents at the point of repair (prior to failure based on predictive measurements) at the breakdown site or UMCP. Repair Rear means that maintainers perform “off-system” maintenance. “Off-system” refers to those actions taken to return components and subcomponents of Weapon systems to serviceable condition. Backup and passback maintenance workload is evacuated to maintenance activities that have the capability and capacity to perform the work.

REPAIR EQUIPMENT

8-23. Field and sustainment maintenance activities will restore an item to serviceable condition through correction of a specific failure or unserviceable condition. This includes the following:

- Testing/checking equipment.
- Adjusting, aligning, and repairing components and assemblies.
- Repairing and modifying defective end items.
- Replacing components and assemblies.
- Removing/replacing piece parts.
- Marking/painting equipment.
- Systems calibration.

Field maintenance activities focus on the repair of equipment through component replacement. Sustainment maintenance activities repair equipment through both the repair of components and replacement of faulty components.

REPAIR AND RETURN EQUIPMENT TO USER

8-24. Repair and return equipment to user (see Figure 8-7) includes returning repaired equipment to the battle or supply system and providing operationally ready items to the supply stream. Ideally, equipment should be repaired as close to the customer as possible to reduce the logistics burden on the distribution/retrograde system and CWT. New warfighting concepts expanding the size of the battlespace and requiring more self-sufficient weapon platforms are changing conventional support strategies. Maintaining limited amounts of float assets in a ready-to-issue/fight configuration may dictate the creation of new modular maintenance organizations, which support supply or distribution points and maintain exchange equipment. Second, exchange or replacement of inoperative equipment items on the Objective Force battlefield may increase driver training requirements for maintenance personnel as replacements may be driven to a mission support sites.

MAINTENANCE MANAGEMENT

8-25. The revolutionary change between current and future maintenance operations will be the capability to anticipate user requirements. This capability will enable sustainment and readiness maintenance managers to direct maintenance activities that not only support ongoing operations, but position maintenance assets to provide users/commanders freedom of action in future mission/battle cycles. Readiness maintenance managers will be assigned throughout the Army structure, and their task is to maximize combat readiness by coordinating repairs as far forward for quick return of non-mission capable equipment to the battlespace. SMMs working at the operational and strategic levels oversee the repair of components and end items in support of the field maintenance activities (see Figure 8-8). Sustainment maintenance managers located at the EAD level perform two critical functions. First, they ensure field maintenance activities are provided the components and technical assistance required to repair non-mission capable items. Second, they coordinate the workloading of sustainment maintenance organizations so the maintenance system does not repair to excess and performance of all repairs meet a standard that results in a measurable component service life.

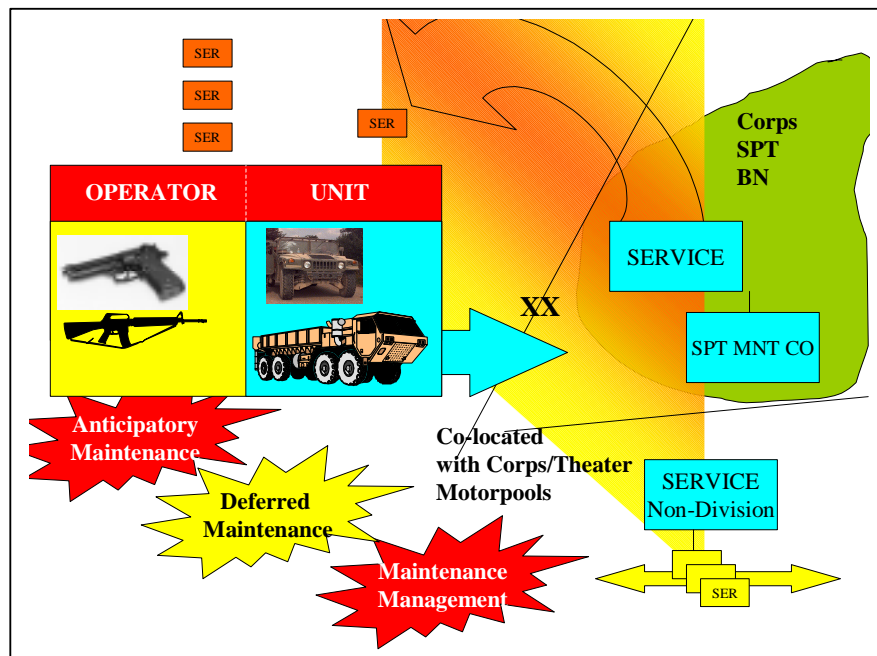


Figure 8-7. Repair and Return

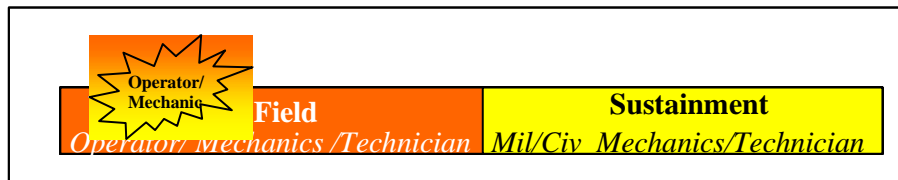


Figure 8-8. Two-Level Maintenance Management Spectrum

Chapter 9

Other Emerging Maintenance Operations

This chapter continues the discussion about emerging maintenance operations. Critical to the continued evolution of maintenance operations into the next century are the emerging FXXI EAD Maintenance Organizations, the Interim Division, Homeland Defense, and technology-enhanced maintenance enablers.

FORCE XXI EMERGING ECHELONS ABOVE DIVISION MAINTENANCE ORGANIZATIONS

9-1. FXXI Maintenance Organizations at corps and above (EAD) continue to evolve in response to new demands placed on the maintenance system by the transforming Army. Newly designed FXXI EAD maintenance organizations discussed in this chapter include the SMC with modular platoons, the CRC with modular platoons, and the new Collection and Classification Platoons for the EAC Collection and Classification Company. The Theater Army Signal Maintenance Company and the TMDE Support Company/Team are both discussed in detail in Chapter 2, Maintenance Organizations-EAD.

GENERAL EMPLOYMENT CONCEPT

9-2. Current EAD maintenance designs are not flexible and modular enough to complement the transforming Army. The lack of communication and mobility continues to plague anticipatory maintenance operations. To accommodate the changing Army, various EAD maintenance organizations are being redesigned to meet emerging maintenance requirements for a transforming Army.

9-3. Emerging maintenance organizations will be modular and tailorable, producing a reduced footprint. They will have an LSE (plug-in) organization, a split-based capability with centralized management and distribution, and will incorporate multi-skilled soldiers that perform maintenance tasks using the latest technology for prognostics and diagnostics.

9-4. The Corps XXI area of responsibility will expand on the battlefield (by 600 percent) causing the distance from the corps rear to the fighting position to increase by over 200 km. When coupled with a 24-hour operational day, increased emphasis is being placed on the use and mobility of MSTs, prognostics/diagnostics, and enhanced repair capability.

9-5. To enhance maintenance support for the transforming Army, the use of augmented MSTs is evolving to the platoon concept. Therefore, MSTs are built from field maintenance organization and provide discrete and tailored maintenance support to customer units (see Figure 9-1, page 9-2).

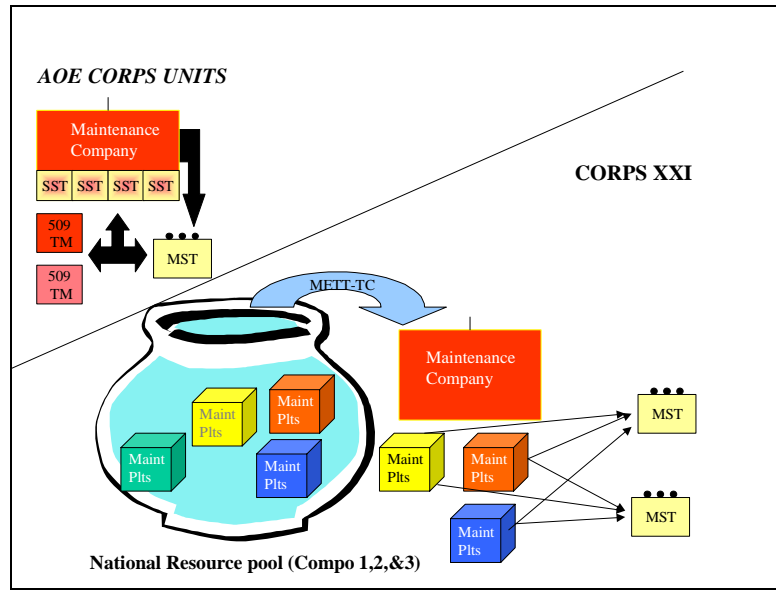


Figure 9-1. Force XXI General Employment Concept

ECHELONS ABOVE DIVISION, SUPPORT MAINTENANCE COMPANY

Mission

9-6. The mission of this company is to command and control assigned cellular platoons, modules, and teams. The company performs field maintenance (on-system repair and replacement) and area recovery operations.

Overview

9-7. The SMC (see Figure 9-2) replaces the non-divisional DS Maintenance Company. The SMC may be found in corps and theater support groups and battalions. The SMC is of modular design, providing for assignment flexibility (at either corps or theater) and has the capacity for attachment of up to 20 civilian personnel. During the conversion from the non-divisional DS Maintenance Company and the Missile Support Company (DS) Corps to the FXXI SME (see Figure 9-3), the Ordnance Force footprint will be reduced by over 3,500 personnel. Also, as a result of overall reduction for the SMC by 30 percent.

9-8. The EAD FXXI SMC design reflects the capabilities of three different maintenance companies (Maintenance Company Non-divisional DS, Missile Support Company DS, and Ordnance Missile Support Company GS (EAC)). It is designed to perform field (on-system) maintenance within the two-level maintenance system. Although designed for EAD operations, the SMC may be employed in the division support area to provide backup maintenance support to division units. Also, separate platoon SRCs permit greater tailoring and MST development (see Figure 9-4, page 9-4). Greater mobility inherent to the maintenance platoons allows the MSTs to move to the breakdown site versus having the customer returning equipment to the support unit. The flexible design also accommodates attachment of Component Repair Platoons, Collection and Classification Mobile Teams, or civilians from the LSE.

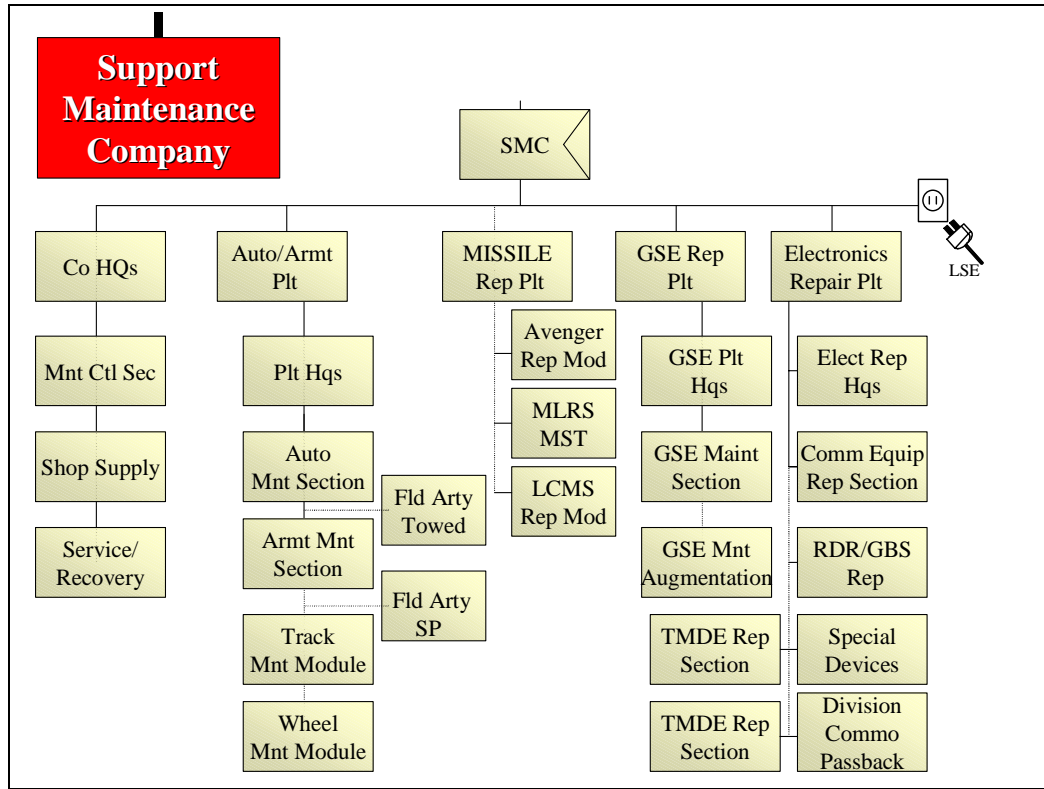


Figure 9-2. Support Maintenance Company

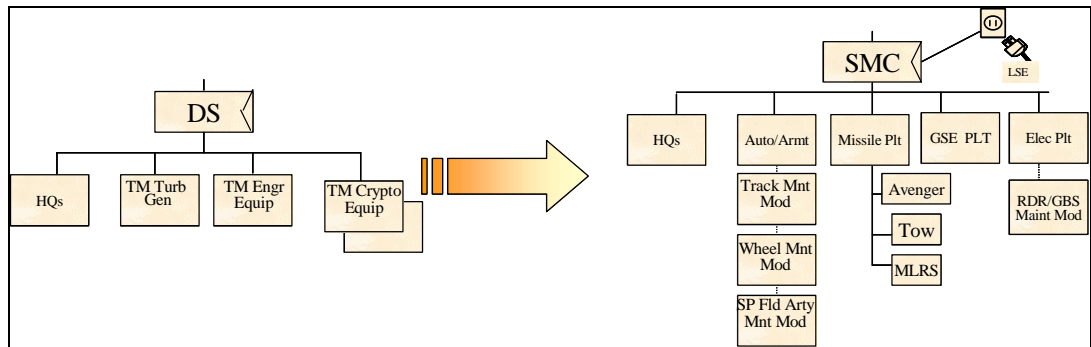


Figure 9-3. Transformation to the Force XXI Corps Redesign Support Maintenance Company

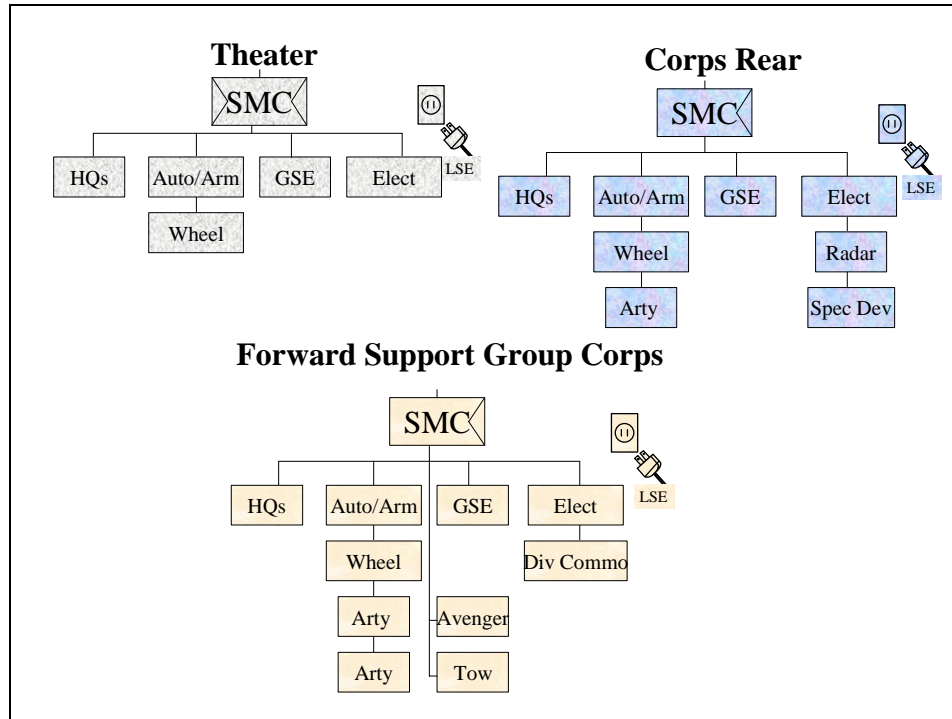


Figure 9-4. Tailoring the SMC for EAD Support

ECHELONS ABOVE DIVISION, COMPONENT REPAIR COMPANY

Mission

9-9. The mission of this company is to perform sustainment maintenance (off-system repair and return to the supply system) repair on components. This unit may be assigned either at corps or theater Army. The CRC has a modular design that permits the attachment with as many as 20 civilians.

Overview

9-10. The CRC repairs components based on a directed workload from the MMC/DMC (see Figure 9-5). This organization has the flexibility to add and remove modules or cells based on the mission. The CRC evolves from the EAC GS Maintenance Company. The SAMS-1 is a maintenance management system which allows the CRC to become a more flexible organization with a primary repair focus on the following:

- Electronic systems (first and foremost).
- Armament systems.
- Automotive systems.
- GSE.

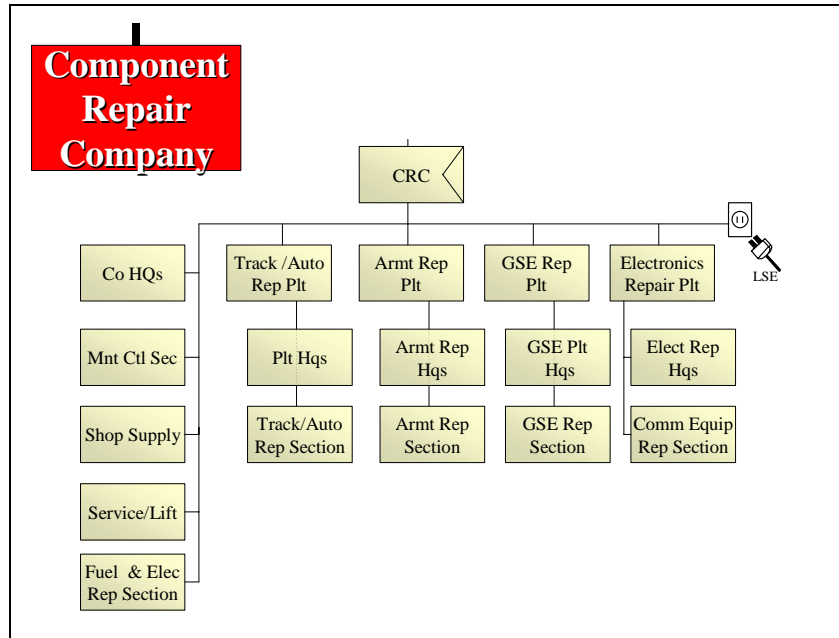


Figure 9-5. Component Repair Company

9-11. The DS Fuel and Electronic Team mission (providing fuel and electronic repair capability DS for the FXXI Heavy Division) also transfers to the CRC. Design accommodations for the CRC will also accommodate attachment (as a plug-in) of the LSE. This unit is designed to perform maintenance operations within the two-level maintenance system at theater and in the rear and forward corps support groups (see Figure 9-6). CRC workloading is expected to be 60 percent performed in the ISB or CONUS, and 40 percent within the operational area.

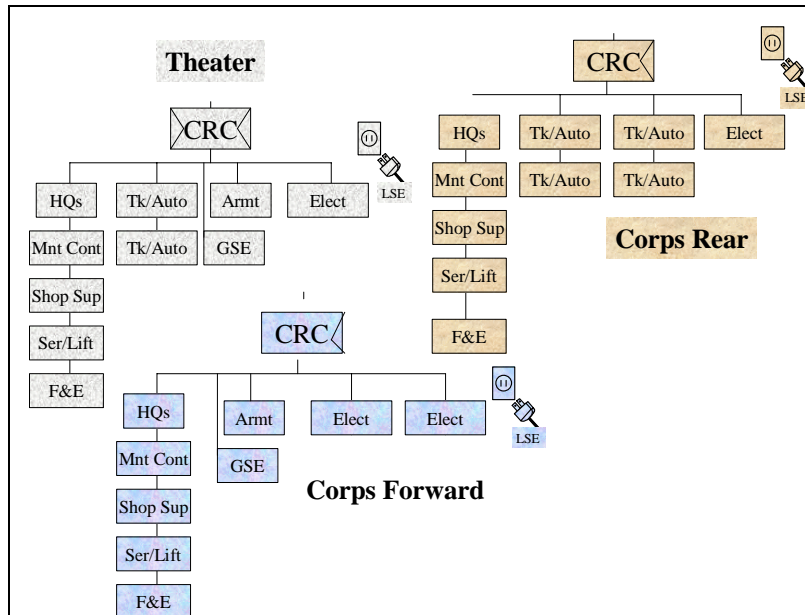


Figure 9-6. Theater and Corps CRC Organizational Designs

ECHELONS ABOVE DIVISION, COLLECTION AND CLASSIFICATION COMPANY

Mission

9-12. The mission of this company is to establish and operate a collection and classification facility. The company will perform the duties of receipt, inspection, segregation, disassembly, preservation, and disposition of serviceable and unserviceable Class VII and IX materiel and similar foreign materiel (except missile systems, aircraft, airdrop equipment, drones, and medical equipment).

Overview

9-13. EAD Collection and Classification Platoons (see Figure 9-7) are added to the existing Collection and Classification Company to assist the DMC to identify and return used LRUs to the distribution system. These platoons receive direction from the COSCOM and theater DMC/MMC managers. These teams may also be attached to a CRC or an SMC, METT-TC dependent (see Figure 9-8). The two Collection and Classification Company Distribution Hub Teams perform vital maintenance inspection functions at distribution hubs along the distribution pipeline for materiel provided by the Collection and Classification Company Weapon System Recovery Teams.

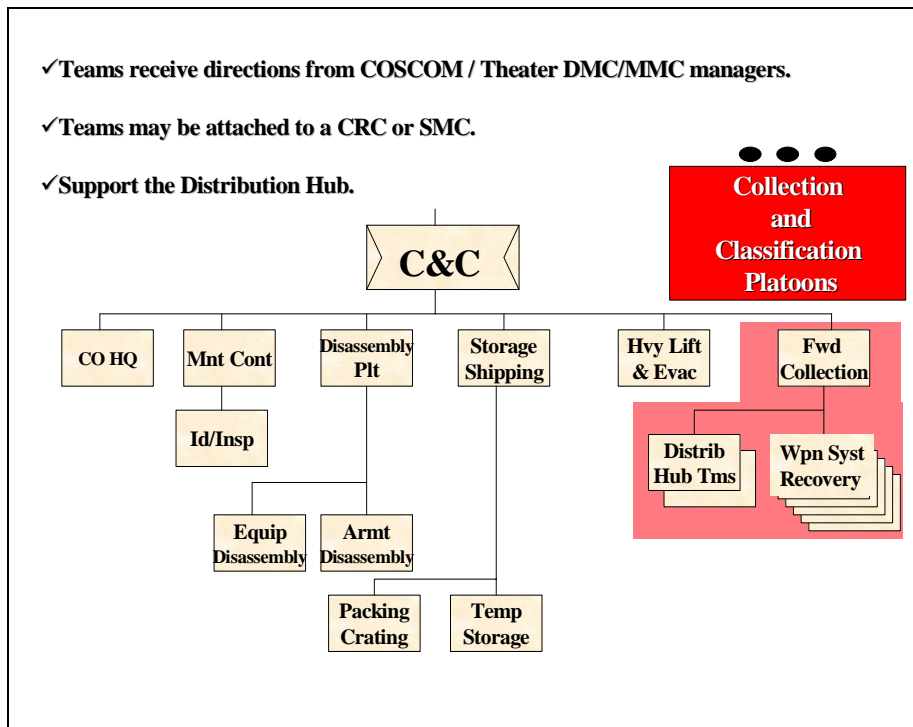


Figure 9-7. Collection and Classification Company

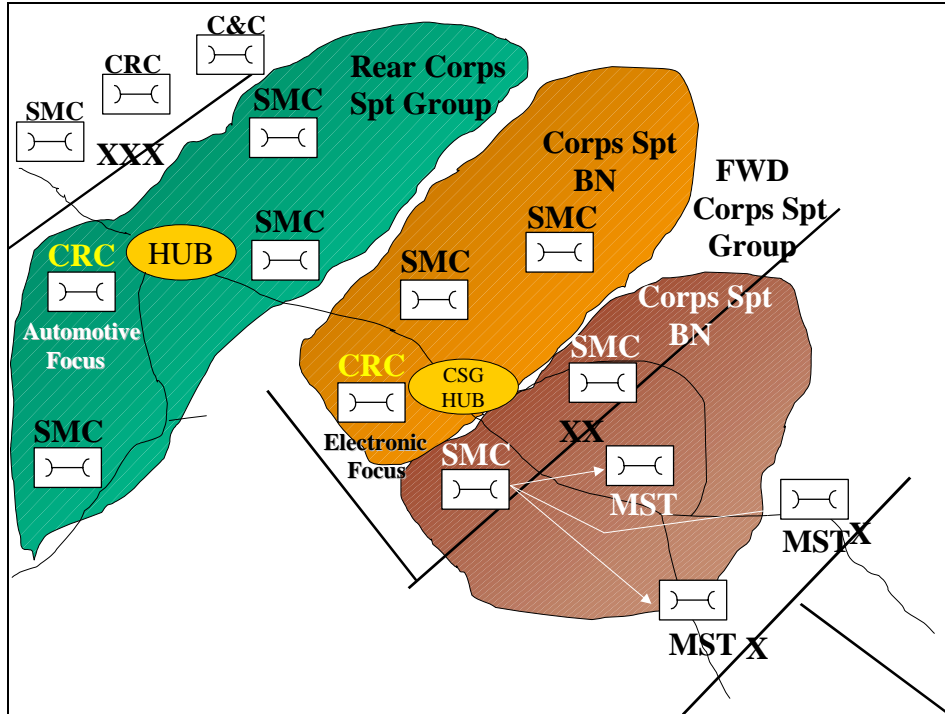


Figure 9-8. Collection and Classification Teams (Attached to SMC or CRC)

9-14. The Collection and Classification Company is assigned at one per theater (no longer one per ASG). The sum total of the redesign and allocation effort will reduce the maintenance footprint by over 1,300 personnel. The following SRCs were eliminated from the force structure:

- TMDE Supply Support Activity (09567LE00).
- Area Calibration Lab Team (09567LF00).
- AN/GSM-268 Support Augmentation Team (09567LD00).

STRYKER MAINTENANCE MANAGEMENT AND DIAGNOSTIC SYSTEM

9-15. The SBCT is designed with an austere support battalion that contains fewer mechanics to support and maintain its vehicles. However, the number of vehicles to support has remained the same even though the number of mechanics has been reduced by two-thirds. As a result, the SBCT cannot afford the luxury of maintainers performing all diagnostics, parts requisitioning, and repairs. Instead, vehicle crewmembers will need to absorb many of the maintenance tasks formerly accomplished by traditional maintenance personnel. Therefore, crew maintainers must use on-board diagnostic information, IETMs, and remote maintenance assistance to effectively and efficiently conduct platform maintenance procedures.

9-16. An on-board, ruggedized, hardened, weather-resistant, compact and portable Maintenance Management and Diagnostic System (MMDS), capable of operating independent of vehicle power, will be installed on all Stryker systems. The MMDS will be capable of hosting standard Army maintenance and related logistics applications that enable the following capabilities:

- Health check/preventive maintenance management (PMM).
- Logistics and maintenance management.
- IETMs.
- Digital preventive maintenance checks and services (DPMCS).
- Stryker crew diagnostics and repair parts requisitioning.
- Stryker maintainer diagnostics and repair parts requisitioning.
- Maintainer's Remote Logistics Network (MRLN).
- Automated logbooks.
- Embedded maintenance training.
- Automatic identification technology/Automatic information data collection (AIT/AIDC) data retrieval.
- Legacy system diagnostics.
- Use of automated CSS information management systems (such as personnel administration, unit supply, and so on) when vehicle is parked and MMDS is not being used for logistics information control function.
- Configuration of database algorithm to support targeted overhaul and condition-based maintenance.

9-17. The MMDS significantly expedites maintenance task accomplishment by replacing many time-consuming tasks (such as diagnostics and manual record keeping) with an automated "single logistics box" approach that integrates parallel logistics functions. MMDS also serves as a tool for fleet management by providing a means to interface with other logistics systems, such as ULLS and SAMS. It also allows for an archival repository for platform-specific historical maintenance management information to support targeted overhauls and condition-based maintenance functions.

9-18. Stryker crews and field maintainers have access to information in the MMDS through the use of a wireless, "touchpad" color display. This display is ruggedized, detachable, hardened, weather-resistant, oil resistant, sunlight readable, and light discipline capable. It also is large enough to accommodate IETM point-to-point schematics viewing. The wireless detachable display is independent from the MMDS and can be used for a multitude of functions. For example, soldiers can conduct tailored DPMCS or access embedded logistics training programs both inside and outside the vehicle uninhibited by the fixed MMDS.

9-19. The portability of the system also provides field maintainers with the ability to query embedded diagnostics, receive technical support through the MRLN, or perform untethered equipment repairs according to procedures from IETMs hosted on the MMDS. The MMDS shall transmit maintenance fault data to tactical communications systems for generation of maintenance support requests without compromising either individual platform or unit security while the platform is concurrently transmitting and receiving tactical information.

HOMELAND SECURITY OPERATIONS

BACKGROUND

9-20. Today's terrorists can strike at any place, at any time, and with a wide variety of weapons. The terrorist threat to America takes many forms, has many places to hide, and is often invisible. Therefore, the need for homeland security is not tied to any specific threat. Instead, the need for homeland security is tied to the underlying vulnerability of American society and the fact that we can never be sure when or where the next attack on the homeland will occur.

DEFINITION OF HOMELAND SECURITY

9-21. Homeland security is made up of two components (homeland defense and civil support) (see Figure 9-9). Homeland Defense is the preparation for, prevention of, deterrence of, preemption of, defense against, and response to threats and aggressions directed towards the U.S. Refer to FM 3-07 for homeland security definitions.

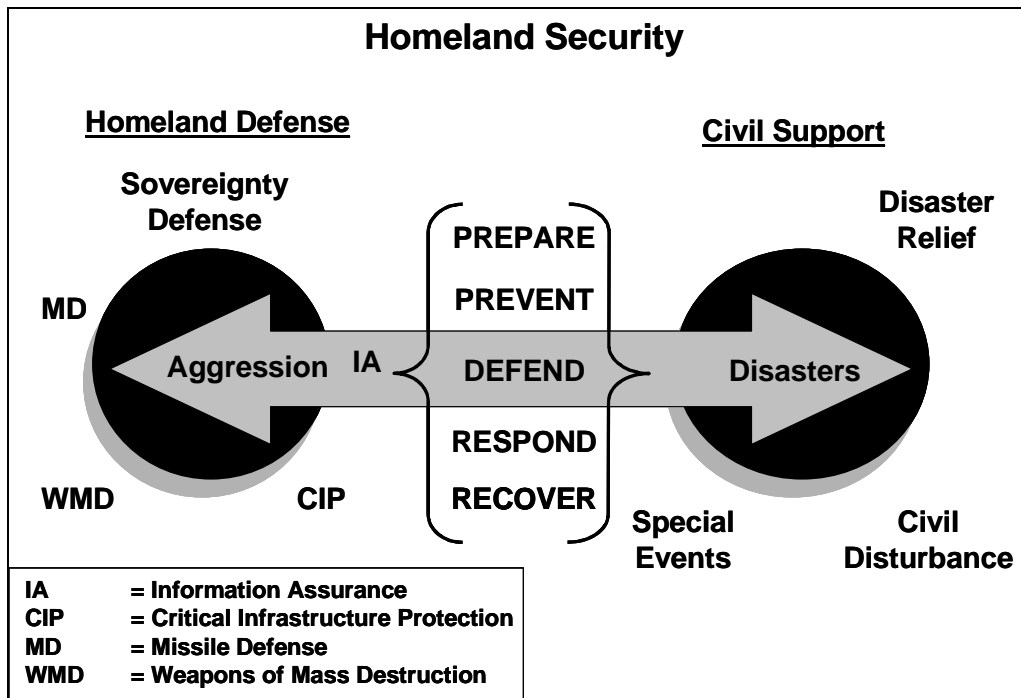


Figure 9-9. Homeland Security

Homeland Security Maintenance Operations

9-22. **Domestic Support Operations.** Domestic support operations within the CONUS may result in the U.S. being designated a theater of operations. Maintenance units may be ordered to deploy within the CONUS to support local and state authorities during a period of national crises. Once alerted, active duty maintenance units invoke deployment SOPs. For example, rear detachment organizations are established to ensure continuity of operations at home station. The sudden departure of maintenance units repair capability may impact on installation maintenance operations. Installation managers can provide augmentation through outside contract support or temporary hires at installation maintenance facilities. Should an active duty maintenance organization (engaged in maintenance support missions at home station) be activated, it becomes essential that continuity of maintenance operations at the unit or installation level be preserved.

9-23. Deploying with the CONUS provides for a number of advantages not available in non-developed countries. These advantages include:

- A fully developed theater of operations.
- Maximization of HN support from CONUS-based resources.
- Ensured communications for information management systems.
- Use of the Government credit card.
- Maximized interface with local, state (including National Guard), and federal agencies.
- Mature and shortened lines of communications.

9-24. Maintenance organizations deployed within the CONUS can be expected to perform either standard MOS skill tasks or basic soldier skills in the area of security operations. In either case, training will remain key to success. The U.S. Army Soldier and Biological Chemical Command (SBCCOM) assists units in developing weapons of mass destruction preparedness programs. Mobile teams can provide on-site delivery of assistance.

9-25. **Installation Security.** Another dimension to homeland security may be the defense and security of the home base or installation. Within this construct, the installation battlespace is analogous to the battlespace for combat operations defined in FM 3-0. Installation defense becomes the responsibility of the Installation Commander, which may at times include assigned active duty units to perform the security mission during heightened force protection condition (FPCON).

9-26. Rules for the use of force (RUF) are different from the more familiar rules of engagement (ROE). RUF are escalating rules for U.S.-based military personnel performing security duties when dealing with U.S. citizens. AR 190-14 prescribes rules for the use of force.

9-27. Should maintenance units be used as an Installation Guard Force, they may be “first responders” when an incident occurs. Installation “first responders” do the following:

- Respond to, contain, and identify the threat.
- Establish security.
- Maintain observation.
- Apprehend perpetrators.
- Safeguard property and personnel.
- Submit serious incident reports.

9-28. In all cases, security resources focus on protecting the military capability of the installation. Additional information about installation security can be obtained from the “Installation Commander’s Force Protection Handbook,” dated July 2002.

EMERGING MAINTENANCE ENABLERS

9-29. Critical for future maintenance operations will be the capture of “leap ahead” technology. This reduces the maintenance footprint while simultaneously enhancing maintenance support to the warfighter. The following key maintenance enablers of the GCSS-A ensure future maintenance operations meet the needs of the transforming Army:

- Rapid Manufacturing Technology (Mobile Parts Hospital).
- Common Engine Program.
- Multi-capable Maintainer Program.
- Application of Prognostics and Diagnostics.

GLOBAL COMBAT SUPPORT SYSTEM – ARMY

9-30. When fielded, the GCSS-Army will be the Army’s AIS to modernize and integrate the capabilities of existing logistics STAMIS. The GCSS-A provides a “one-stop” CSS information warehouse for maintenance support operations. Those capabilities to be integrated will include supply, property, ammunition, and maintenance functions (less medical) with significant enhancements. The principal logistics STAMIS to be functionally integrated include the ULLS, SARSS, SPBS-R, SAAS-MOD, and the SAMS.

9-31. The GCSS-A operates on a commercially-designed Enterprise Resource Planning (ERP) system. This system integrates information from multifunctional CSS data sources (supply, maintenance, ammunition, personnel, medical, and so on) and allows for data exchange, which establishes the logistics COP.

9-32. GCSS-Army ERP enables distribution managers to attain a maintenance COP of materiel in the pipeline, perform decision support analysis, and control their portion of the pipeline based on the three tenants of distribution; visibility, capacity, and control. An AMC led effort, ERP automates supply chain management and defines the process used to manage all maintenance resources and their use in the enterprise. Its objective is to integrate all organizations and CSS functions (including maintenance) into a single data warehouse.

9-33. The GCSS-Army and ERP will improve maintenance information management by eliminating duplicative information systems, improving the sharing of data, and leveraging advances in advanced information technology (see Figure 9-10). It will provide the ability to support joint operations with sister services, as well as provide support to our allies. The GCSS-Army's ERP enables maintenance information fusion, thereby providing CSS SU for decisions affecting performance of the maintenance system. The GCSS-Army will have a link into the GCSS-A through the CSSCS.

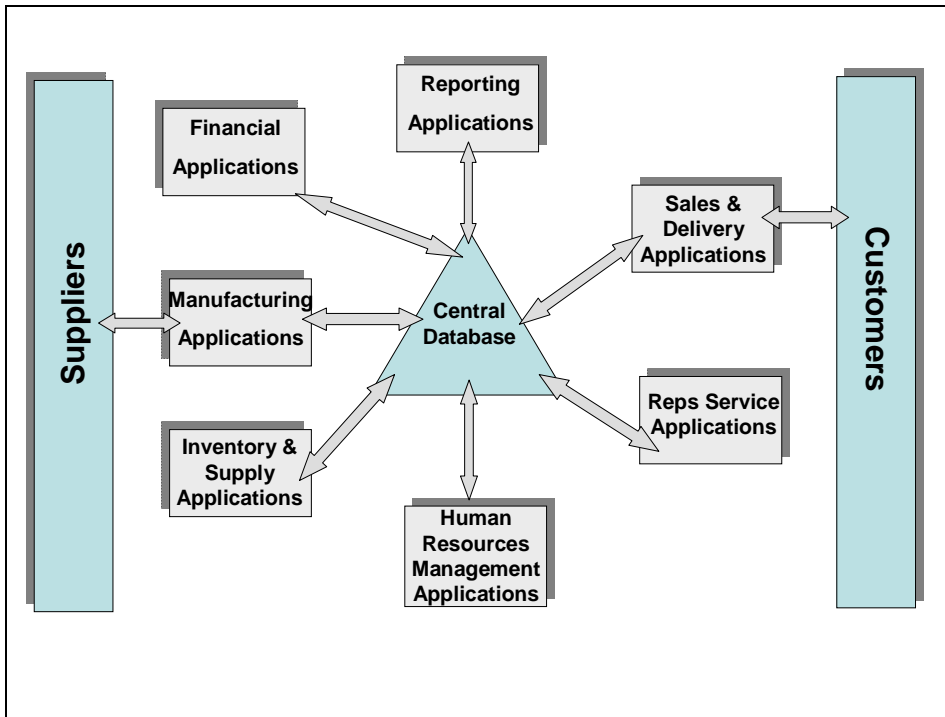


Figure 9-10. Typical ERP Package

Enterprise Resource Planning

9-34. ERP is a software application package of pre-engineered, ready-to-implement, integrated application modules that cater to the business functions of an enterprise. ERP provides an integrated system that meets the Army's Logistics Vision and provides a single version of the "truth" (horizontal and vertical) about the performance of the distribution system. ERP software possesses the flexibility for configuring and customizing dynamically the delivered functionality of the package to suit the specific requirements of the enterprise. ERP enables the enterprise to operate as an integrated, enterprise-wide, process-oriented, information-driven, and real-time network. The three key business objectives intrinsic to ERP are greater efficiencies (the heart of the enterprise), improved integration of functions across the enterprise, and extended integration of outside organizations; for example improved supply chain management. The Army has selected the ERP application of systems, applications, and products (SAP) in data processing to manage supply, maintenance, and other CSS functions as appropriate for the GCSS-Army enterprise. The SAP major elements are financial accounting, human resources, manufacturing and logistics, and

sales and distribution. Each module accesses over 1,000 business processes. SAP's strategy is to integrate all business operations in an overall system for planning, controlling, and monitoring the business activities of the enterprise. SAP consists of a presentation, application, and database component. The presentation server enables access to the enterprise, the application server includes the processing logic of the system, and the central server contains the database. The fundamental change associated with implementing ERP is that ERP operates on streamlined and proven best business practices using a single point of access via a web browser to applications, content, and services, with a personalized, role-based user interface that can be customized to meet individual needs.

RAPID MANUFACTURING TECHNOLOGY

9-35. Rapid Manufacturing Technology (RMT) delivers a field-tested mobile parts hospital (MPH) capable of making Army components in a timely manner, near the point of need (see Figure 9-11). It is designed for deployment to remote locations for emergency repair of non-operational equipment. The MPH can reverse engineer a component when technical data is not available by retrieving manufacturing data via satellite. If a data link is not available, the MPH can gather geometric data through the use of an onboard 3-D laser scanning system. The MPH focuses on decreasing long part procurement times to either a few hours, or at worst, a few days, to provide repair parts near the point of need in the battlespace.



Figure 9-11. Mobile Parts Hospital

9-36. The following are the advantages of the mobile parts hospital:

- Cuts supply and administrative lead times.
- Reduces the logprint on the battlefield.
- Boosts readiness.

COMMON ENGINE PROGRAM

9-37. The Common Engine Program reduces the logprint in the COMZ and reduces the logistics cost. A common engine among all aircraft reduces the number of spare engines and repair parts necessary to maintain the fleet, which reduces the logprint and lowers cost. A common engine also reduces the amount of ground support equipment required, which further

reduces the logprint. A common engine among ground (such as the Abrams/Crusader LV100 engine) provides the following advantages:

- Twenty-five percent improved range.
- Seventy-six percent decreased operating and support costs.
- Forty-three percent fewer parts.
- Decreased maintenance requirements.
- Minimum impact to training and tactics.

MULTI-CAPABLE MAINTAINER

9-38. The goal of the new two-level maintenance system is to provide support as close to the customer as possible. Supporting all customers within a given area will continue to be the cornerstone of maintenance doctrine through the early decades of the 21st century. Toward that end, the Ordnance Corps has fielded two multi-capable MOSs to support the Abrams and Bradley weapon platforms.

9-39. Work has also begun to field one additional multi-capable MOS (see Figure 9-12) to support the Paladin platform, as well as to consolidate common units and DS MOSs tailored to perform replacement maintenance. The new MOS consolidations include fielding a single wheel and track MOS and an electronic repair MOS that consolidates telephone, computer, and special devices repair. The new MOS will be fielded in FY 05, with additional electronic and ground support MOS consolidations following in the out years. The consolidation of future maintenance skill levels and MOSs will shorten repair time; reduce redundancy in repair parts, tools, and equipment; and provide the right Ordnance soldier at the right place on the battlefield. Figure 9-12 provides the blueprint for Ordnance Corps transition through Year 2010 to a fully implemented multi-capable maintainer capability.

EMBEDDED WEAPON SYSTEM PROGNOSTICS AND DIAGNOSTICS

9-40. **IETMs/Embedded Diagnostics and Prognostics.** These are computerized, screen-based, interactive diagnostic and maintenance tools used to troubleshoot, isolate faults, and identify the maintenance processes for Weapons systems and other equipment. IETMs diagnose by communicating and interacting with selected components of the Weapons system.

9-41. **Embedded Diagnostics.** The application of diagnostics equipment/software onboard a system to accomplish fault detection through direct linkage to a system's embedded sensors through an open architecture format. Actual fault conditions are identified and determined by the usage of diagnostic reasoning software and hardware down to the LRU level. This allows for both the static and mobile monitoring of vehicle "health" status.

9-42. Prognostics reflect the evolution of the improved diagnostics and the processing of system information obtained through the embedded diagnostics. It is the software application that allows us to anticipate pending failures and forecast remaining life expectancy of the faulty system and/or part. These predictions are based upon the assessment of equipment parameters and fault codes compared against the sensor data collected from the system (see Figure 9-13).

Chapter 10

Security for Maintenance Operations

Maintenance organizations must seek to become integrated into base defense plans for the MACOMs to which they belong. In order to do this, they must exert influence over its AO. They must also continue to maintain sufficient mass and combat power to ensure overall force protection. Future operations in non-contiguous AOs will leave voids between the brigade AOs. These voids will be outside the direct control of any of the division's combat power. In its most benign form, this situation leaves potential avenues of approach to what (on the traditional, linear battlefield) is known as the division rear area. At its worst, it routinely exposes the division's critical C2, CS, and CSS assets to threats they cannot defend against, much less defeat. This situation also restricts the flow of maintenance support to the brigades.

The division Rear Area Operations Center (RAOC) clusters vulnerable C2, CS, and CSS assets for mutual protection and employs a suite of security measures to counter the negative effects of the porous nature of non-linear, non-contiguous operations. Reinforced by dedicated and/or on-call CS/combat arms security forces and supporting fires, these security measures, leveraged with Non-Line of Sight Command, Control, Communications, Computer, Intelligence, Surveillance, and Reconnaissance (NLOS C4ISR), enhanced SU, and the division's COP, mitigate the risk to the division's critical C2, CS, and CSS assets and allow the flow of maintenance support to the brigades. The type, number, and relationship to the Rear Operations Center (ROC) of CS or combat arms security forces and supporting fires are METT-TC dependent. If the threat to C2, CS, and CSS assets, and/or to the flow of sustainment to the brigades rises to unacceptable levels, the Division Commander can further mitigate the risks by reducing or eliminating the voids between the brigade AOs. Any success enjoyed by the division in protecting its C2, CS, and CSS assets and ensuring the flow of maintenance sustainment through the voids, is negated if EADs cannot regularly project sufficient maintenance into the division AO. Close coordination with EAD CSS providers and their security forces is necessary to keep maintenance support flowing to the division and to maintain a channel through which maintenance operations can be conducted. See FM 3-90, Appendix E for a detailed but generic discussion of rear area and base security.

THREAT EVALUATION AND INTEGRATION

10-1. Threat evaluation is a detailed study of the enemy forces. It considers threat organization, tactical doctrine, equipment, and support systems. Sustainment vehicle drivers and customers coming into the division area are valuable sources of information. This information is obtained through debriefings, spot reports, and procedures delineated in the units TOC SOP. Once the threat evaluation is complete, this information is integrated with weather and terrain factors. This determines how the threat is likely to operate in the sustainment area. Base Cluster Operations

Centers must ensure all Base Commanders understand the different threat levels and the associated actions. The following describes each level:

- Level I threats are those which can be defeated by base or base cluster self-defense measures. They normally involve the activities of agents, saboteurs, and terrorists.
- Level II threats are those beyond base or base cluster self-defense capabilities. Response forces, typically MPs with supporting fires, can defeat this threat. This threat normally involves sabotage, raid, ambush, and reconnaissance operations. Special purpose or unconventional forces and tactical reconnaissance units normally conduct these operations.
- A Tactical Combat Force (TCF) is required to defeat a Level III threat. Depending upon the situation, the TCF may be a maneuver unit or units designated for sustainment area security; all or a portion of the division's reserve; or a maneuver unit diverted from one of the brigades. If previously designated, the TCF would be immediately available to the RAOC, if not already under its C2; otherwise, the TCF would be directed to defeat the threat by the TAC CP. Level III threats normally involve:
 - Heliborne operations.
 - Airborne operations.
 - Penetration by enemy forces from the main battle area.
 - Ground force deliberate operations (for example, operational maneuver groups with a linkup of smaller airborne and assault units).
 - Infiltration operations.

10-2. Receiving early warning of pending enemy actions gives the Base or Base Cluster Commander time to react to threats. Security measures vary with enemy threat, forces available, and other factors. All-around security is also essential. In order to gauge the threat and apply the appropriate security measures, the Base/Base Cluster Commanders must achieve and maintain SU of the division's COP. Any of the following could also warn of pending threat actions:

- Outposts.
- Patrols.
- Military police.
- Ground surveillance and counter-fire radars.
- The local populace.
- HN intelligence.
- Military dogs.
- Air reconnaissance and surveillance.
- Civilian informants.
- Actions of indigenous personnel near the base.

- Transportation missions.
- LOGPAC deliveries.

10-3. Collecting, collating, and disseminating reports, information, and data received from the above sources enhance SU within the sustainment area and larger battlespace, and add to the COP. Achieving SU of the COP by the application of analysis and judgment allows commanders at all levels to assume the appropriate protective posture and allocate scarce resources to countering threats.

BASES AND BASE CLUSTERS

10-4. A base is a unit or multi-unit position with a definite perimeter. The commander, through the operations officer, determines the position of the base in conjunction with the RAOC. The RAOC is collocated with the division sustainment CP under the overall supervision of the Assistant Division Commander (Support) (ADC(S)). The RAOC coordinates and manages the security of bases and base clusters in the division's sustainment area. If the sustainment CP is operating in the intermediate staging base (ISB), the RAOC collocates with the DISCOM CP and provides C2 for rear area security, fires, and terrain management in the DSA. When the sustainment CP operates outside the AO, a DISCOM Company constitutes a base. The Base Commander is normally the senior unit commander present. Selection of the Base Commander should take into consideration not only rank, but also branch and experience. Base clusters contain several bases grouped together to enhance security and mission accomplishment. A base cluster does not normally have a defined perimeter or established access point(s). Base clusters rely on mutual support among bases for protection. Mutual support is achieved through interlocking fires, integrated patrol and surveillance plans, and use of coordinated reaction forces.

10-5. The Base Cluster Commander must designate the personnel in the reaction force and ensure they have sufficient weapons, mobility, and communications. Failure of communications between Base/Unit Commanders can cause friendly fire casualties. They must also be trained to react quickly and appropriately. The base cluster will normally include units located in the support group area or DSA. EAD logistics units, such as maintenance/ammunition supply points, may be located at isolated locations within the sustainment area. These units either operate as separate bases or are assigned to a base cluster by the RAOC. In either case, EAD CSS units must come to the division with sufficient capability to ensure they do not become liabilities to the division's sustainment area defensive operations.

10-6. The Brigade Support Battalion Commander is normally the Base Cluster Commander for units in the BSA. The Base Cluster Commander establishes a Base Cluster Operations Center (BCOC) with assets primarily from the S2/3 section. The BCOC provides the command and control to plan, coordinate, and supervise base cluster operations. The BCOC interfaces with the RAOC on terrain management, movement requirements, and security operations. The BCOC positions units assigned to the cluster, into bases and it designates Base Commanders. The RAOC assigns divisional and non-divisional units in the sustainment area to base clusters or independent bases. The Base Cluster Commander is responsible for integrating Base Defense Plans into a Base Cluster Defense Plan.

SITE SELECTION

10-7. Placing CSS and maintenance units and operations usually requires the balancing of several competing criteria. Ideally, criteria relating to technical requirements (such as dimensions, internal and external routes, proximity to a water supply, availability of hardstand, and so on) will predominate, but frequently other criteria intrude. No matter how ideal the site may be for a particular unit or an operation's technical requirements, if it interferes with the overall scheme of maneuver, is inaccessible, or is indefensible, select another site. Some sites, because of their overall importance to the scheme of maneuver or area security must be occupied. This is to either ensure access by friendly forces or to deny them to hostile forces. This challenge is to select the best fit for the site and ensure it is tied into the overall scheme of bases and base clusters. However, some sites will be unusable for political, cultural, or religious reasons; or because of agreements with the HN and/or friendly forces. This challenge is to ensure these sites do not create gaps in the overall area security scheme or weaken the integrity of nearby bases and base clusters.

SITE SELECTION IN A MILITARY OPERATIONS IN URBAN TERRAIN ENVIRONMENT

10-8. The following are some factors which should be considered when selecting a maintenance operations site in urban terrain:

- **MSR Access.** Avoid sites with only one way to access the MSR(s), especially if the access way is congested or forms a good ambush site. Multiple access ways to the MSR(s) contribute to OPSEC and complicate threat attempts to interdict maintenance activities, whether by civil disturbance or ambush.
- **Space and Facilities.** Select sites with sufficient space for the efficient operation of the unit(s) occupying them. However, the space should not be any larger than necessary to avoid needlessly increasing the perimeter to be secured. Consider conducting intermittent activities outside of the perimeter. Compare the resources needed for occasional activity security against the need for additional full time point security for a larger site.
- **Features.** The following are features that enhance security and force protection:
 - Fences, hedges, walls, and buildings aid in crowd and access control. They can also provide concealment. However, do not assume that a fence or hedge will hold back a crowd or that a wall will stop any particular caliber fire or offer blast or fragmentation protection. Cover will stop a bullet, concealment will not. Imposing iron fencing may be entirely ornamental and flimsily attached to its supports. Many modern structures, particularly industrial shell buildings, are constructed of lightweight materials over a steel frame, offering little more than a weather-tight environment.

- Parking lots, wide streets, and other open spaces provide separation from neighboring activity and increase the effectiveness of crew-served weapons, observation posts, and night observation devices.
- Absence of nearby tall trees, buildings, towers, and other structures that can be used as threat observation posts or firing positions into the site.
- Absence of sewers, storm drains, subways, and other subterranean passageways under the site. Where these features are unavoidable, steps commensurate with the threat and time available must be taken. At a minimum, the locations of manholes and other access ways to the surface must be located, observed, and covered by fires. To prevent infiltration into the site, manhole covers and other surface access ways should be welded shut or blocked. To prevent subterranean passageways under the site from being used for information gathering or to mine the site, they must be physically blocked before they penetrate the perimeter or they must be occupied and integrated into the Site Security and Defense Plan.

RISK ASSESSMENT AND MANAGEMENT

10-9. While threat evaluation and proper positioning of units and activities are key elements of force protection, they are part of a larger continuum, risk management. Conserving the austere CSS capability of the maintenance unit, particularly its maintenance capability, is critical to the division's capability to conduct sustained operations. Loss of personnel and equipment, whether they are caused by enemy action or accident, that are vital to the task of sustaining the brigade's and division's troops, threaten the division's capabilities. Threats to mission accomplishment that are layered on top of the actions of hostile forces and the local indigenous population include the following:

- Fatigue.
- Distraction.
- Inattention.
- Confusion.
- The failure to integrate new personnel into unit routines.

10-10. Failure to consider the totality of risk and take appropriate measures invites disaster. See FM 100-14 for guidance on the fundamentals, process, and implementation of risk management as an integral part of mission planning and execution.

REAR AREA SECURITY OPERATIONS

10-11. Sustainment (including maintenance) unit area defensive operations are actions taken by all units to secure and sustain the supported organization (primarily the division). These actions are taken in a concerted effort. They include those actions necessary to neutralize or defeat enemy operations in the division sustainment area (DSA). Perimeter security, active

intelligence gathering operations (such as interviewing convoy drivers and noise and light discipline) are necessary to neutralize or defeat enemy operations. The objectives are as follows:

- To secure the area.
- To prevent or reduce enemy interference with command, control, and communication.
- To provide unimpeded movement of friendly units throughout the sustainment area.
- To provide area damage control before, during, and after an attack or incident.

SECURITY

10-12. Viewed functionally, the three types of security requirements are point, route, and activity. Each of these are described below:

- Point security requirements are stationary, long term, or defensive in nature. They are related to actions in and around CS/CSS units and HQ that have a limited ability to secure them against Threat Levels I-III (these levels will be discussed later on in the chapter).
- Route security requirements are related to actions in and around the division's MSRs. They may be temporary or long term, and either offensive or defensive in nature.
- Activity security requirements are temporary in nature. They may occur anywhere within the supported unit's AO regardless of the nature of that AO contiguous or non-contiguous. They may also be either offensive or defensive in nature.

10-13. To enhance sustainment operations, DISCOM/maintenance elements, as well as C2, CS, and EAD CSS assets operating within the division AO, are often grouped together. Elements are grouped into bases for security and base clusters for mutual support. The RAOC, under the supervision of the officer in charge of the sustainment CP (normally the ADC(S)), is ultimately responsible for the composition of bases and base clusters in the division rear. A mix of weapon systems, planning and supervisory personnel, and varied communications assets are required to form a viable base. The DISCOM S2/3 sections coordinate with the RAOC on grouping of DISCOM units in the sustainment area. Similarly, the Brigade Support Battalion S2s/S3s coordinate with the brigades for planning security operations.

10-14. Base Commanders are responsible for point security of their bases and for the direct fire area of influence surrounding their base. Targets identified and acquired outside that area are assigned to a maneuver or fire support unit. Base Cluster Commanders are responsible for coordinating the activities and fires of their constituent bases to enhance mutual security. Base/base clusters are capable of defeating Level I threats. However, they require additional forces to defeat Level II or III threats. Base Cluster Commanders are responsible for constituting and employing Quick Reaction Forces (QRFs) to delay Level II and III threats until CS or CA elements can be brought to bear to defeat the threat. Support units will typically use the

lowest possible protective posture (PP) in order to maximize available CSS capacity. The support units increase and adjust PP in accordance with the threat. The following are examples of protective postures:

- **PP1:** Crew-served weapons are emplaced and manned; hasty individual fighting position is prepared but not manned; QRF designated; checkpoints established at vehicular points of egress, no perimeter wire.
- **PP2:** Same as above with QRF assembled and ready to fight.
- **PP3:** Same as above with individual hasty fighting positions manned.

NOTE: Perimeter wire added to any protective posture in accordance with METT-TC, fighting positions improved as time permits.

10-15. As the threat pushes bases to higher PPs, the ability of their constituent units to provide CSS drops off sharply. If the threat level remains high for too long, external assistance in maintaining the appropriate PP will be required so logistics units can resume sustainment missions. Maintenance units conduct local security to help protect themselves from enemy actions. They use the physical security measures outlined in FM 3-19.30 to assist their local security efforts. These security measures include the following:

- Use security elements to the front, rear, and, when required, on flanks of convoys. Flank convoys would be required when missions could not be cancelled or altered, mission deemed necessary. Through command channels, the unit responsible for the convoy would request combat force protection or MP escort.
- Use listening and observation posts in bivouac areas.
- Identify probable avenues of approach and cover them with fields of fire.
- Employ obstacles to impede the enemy.
- Use challenge and passwords.
- Use early warning devices.

10-16. Positioning unit equipment and sections is the single most important factor in a unit's ability to provide adequate security while conducting maintenance for supported units. The point defense, with the fullest possible use of unit dispersion, has evolved as the most practical defense method. The concept is to disperse the unit and to emplace it by functional area. Only small areas are actively defended. Commanders at company level must place observation posts (Ops) and listening posts (LPs) on probable avenues of approach. Observation and fields of fire, avenues of approach, key terrain, obstacles, and cover and concealment are factors to be considered when placing Ops. By coordinating with adjacent units, commanders can implement an integrated warning plan that will lessen the impact on any one unit. Unattended ground sensors will further enhance OP and LP effectiveness. In areas where the populace is friendly, local law enforcement and government agencies can be valuable sources of information. Intelligence information can be evaluated for unit security.

SECURITY OF MAINTENANCE OPERATIONS

10-17. The porous nature of non-contiguous operations requires the use of heightened route and activity security measures to project maintenance operations (see Figure 10-1 for a comparison of contiguous and non-contiguous AOs). Faced with the combat power of the brigades and well secured bases in the sustainment area, an overmatched adversary will probably attempt to strike asymmetrically at a perceived weak link (sustainment operations traversing the voids between EAD, the sustainment area, and the brigades). To the extent possible, DISCOM and EAD CSS units exercising active force protection measures while conducting CSS operations contribute to route and activity security in the voids. However, there are practical limitations to their contributions due to lean unit designs and limited weapons systems and communications equipment. This is especially problematic where EAD CSS providers are concerned. EAD CSS units are generally designed for operations on a linear and contiguous battlefield where voids between the combat units are the exception rather than the rule. HN support equipment also tends to be commercial in nature and be operated by paramilitary personnel at best. These limitations notwithstanding, EAD must ensure sufficient security forces are present and employed to ensure the safe and timely delivery of maintenance operations into the division's AO. While ground convoys are less resource intensive, the threat level in the non-contiguous battlespace, OPTEMPO, and OPSEC considerations all contribute to the need for a capability of aerial distribution of sustainment into and throughout the division's AO. Regardless of their limitations, maintenance units can and must vigorously contribute to area and local security by employing all of the tools at their disposal. These tools include the COP; close coordination with all CSS providers, the supported units and any dedicated or on-call security forces; adherence to OPSEC; and the sound application of convoy and air delivery tactics, techniques, and procedures (TTPs).

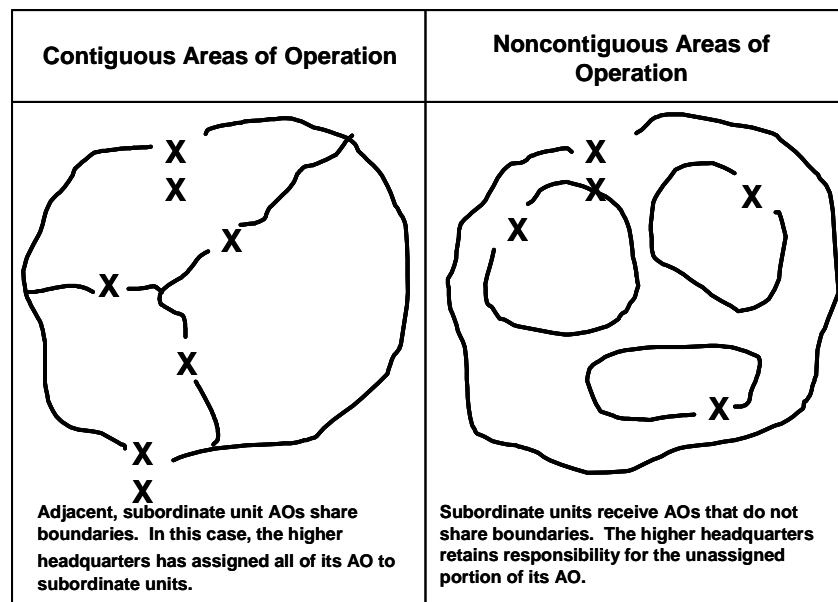


Figure 10-1. Areas of Operation

Using the Common Operational Picture

10-18. Information gathered from a host of sources (Ops, patrols, radars, manned and unmanned aerial sensors, informants, spot reports, and so on) feed the COP. The commander and his staff use the COP as the starting point of their analysis to select optimal times, routes, and methods for receiving and delivering maintenance support throughout their AO. They identify anticipated threats and plan countermeasures. Sharing the COP between the supported and supporting units is as important as sharing it within the supported unit.

Coordination

10-19. **With EAD CSS/Maintenance Providers.** Along with the supported organization's routes, times, and delivery methods are identified threat levels and security measures. Any dedicated and/or on-call security forces provided by the supported unit and all details of the hand-off of security responsibilities are also agreed upon.

10-20. **With the Brigades.** Routes, times, and delivery methods are identified and threat levels and security measures are identified. Any dedicated and/or on-call security support provided by the brigade and all details of the hand-off of security responsibilities are also agreed upon.

10-21. **With Dedicated/On-Call Security Forces.** The type and level of support is identified and link-up times and locations are agreed upon. Indirect fires are preplanned to cover probable ambush locations and air defense is coordinated as appropriate. All preplanned indirect fire points must be observable. Routes, times, and delivery methods are identified and threat levels and security measures are identified. All details of the hand-off of security responsibilities are also agreed upon, including the method of release or stand down of on-call support.

Operational Security

10-22. Avoid activities that signal upcoming events or, when unavoidable, reduce the threat's reaction time between the signal activity and the ensuing event. Vary convoy start times, routes, speeds, vehicle spacing, composition, and security hand-off locations. In other words, avoid patterns. Vary the frequency and order sustainment maintenance is pushed to the brigades. Keying resupply to actual consumption and planned OPTEMPO will aid with this. Vary the method used to push sustainment to the brigades. Inserting the occasional air delivery can mitigate the negative effect of a limited number of routes for convoy operations. Hide the nature of the cargo on vehicles. High pay-off cargos (ammunition, bulk fuel, and rations) are priority targets for destruction or hijacking and focus threat interest; anonymity diffuses it. Vary the locations requiring activity security (remote maintenance operations, ROM sites, FARPs, ATPs, landing zones, drop zones, and so on). Occupy them, as close to the time they are to be used as practicable; and, vacate them as soon afterwards as possible.

Convoy and Air Delivery TTPs

10-23. **Convoy Operations.** Coordinate the following with convoy participants:

- Start times.
- Routes.
- Speeds.
- Vehicle spacing.
- Security hand-off details with convoy participants.
- Dedicated and/or on-call security forces.
- Pre-planned and/or on-call indirect and air defense fires.
- Engineer counter-mine/obstacle support.
- Any elements whose AO will be crossed by the convoy.
- The element receiving the convoy.

These actions are performed for both the outbound and return convoys. Disperse priority targets (high pay-off cargos) throughout the convoy. Carefully tailor passive and active defensive measures to METT-TC and ensure all convoy personnel are briefed. Emphasize any changes in rules of engagement and emergency actions. Convoys, whether they originate from within the division AO or come from EAD, must be provided with sufficient communications equipment (radios, MTS, and FBCB2). They must also be provided crew-served weapons (machine guns and grenade launchers), and external security support to ensure their safe transit of the voids between EAD, the sustainment area, and the brigades. MP will habitually provide the preponderance of convoy escort security details in both the divisional and corps rear area. For more information on convoy security refer to Appendix E of FM 3-90.

10-24. **Airdrop.** Depending upon space available at the receiving unit, activity security may be required for all, or a portion, of the drop zone. To support "replace forward, fix rear," outgoing mail, personnel evacuation, and the recovery of airdrop equipment, airdrop operations require at least occasional supplemental ground convoy, airland, and/or helicopter/slingload operations. Depending upon the threat, airdrop operations may require supporting Suppression of Enemy Air Defense (SEAD) fires.

10-25. **Airland Delivery.** Where suitable airports/airfields/landing strips exist, airland operations are possible. However, securing a given facility for fixed wing aircraft use requires considerably more resources than needed if the same facility is used for rotary wing aircraft. The frequency and duration of fixed wing airland operations and relative threat level will determine whether security of the approach and depart zones is a point or activity requirement. To reduce the amount of time aircraft are on the ground, retrograde shipments must be pre-assembled and ready for loading once the inbound cargo has been discharged.

10-26. **Slingload Operations.** Depending upon space available and the relative locations of the CSS and helicopter units, supporting route and/or activity security operations may be required to support the out-load portion of the slingload. At the receiving unit, activity security may be required for all, or a portion, of the landing zone. Depending upon the threat, helicopter

slingload operations may require supporting SEAD fires in the vicinity of the landing zone and/or at critical points along the flight path. To reduce the amount of time aircraft are on the ground or required to loiter in the vicinity of the landing zone, retrograde shipments must be pre-assembled and ready for loading/slingloading as soon as the inbound cargo has been discharged. For more information on Airdrop refer to FM 4-20.41, FM 55-450-2, FM 90-4, FM 90-26, and FM 100-10-1.

MOUT OPERATIONS

Focus Attacks on Service Support and Unprotected Soldiers. Threat forces may prey on soldiers poorly trained in basic infantry skills. Ambushes may focus on these soldiers while they are conducting resupply operations or moving in poorly guarded convoys. Urban operations are characterized by the isolation of small groups and navigational challenges, and the threat may use the separation this creates to inflict maximum casualties even when there is no other direct military benefit from the action.

FM 7-30, C1, Paragraph J-4. b. (7)

10-27. The above quote may well be applicable anywhere in a non-linear, non-contiguous battlespace. However, it has particular importance for the DISCOM and maintenance operations in urban terrain. Desert terrain is characterized by a scarcity of features. Urban terrain presents an overabundance of features and adds the dimensions of subterranean and vertical elements. A small patch of urban terrain can easily consume most, if not all, of a CSS unit's personnel in establishing and securing a perimeter. Security factors to consider in selecting an urban location for CSS operations include the following:

- Accessibility by streets, sidewalks, and parking lots.
- Sewers, storm drains, and subways.
- Through the interiors of adjacent buildings.
- Overlooked by surrounding structures.

10-28. Occupying and operating from fixed facilities (such as warehouses, factories, and other large buildings) provide CSS/maintenance units with a number of real benefits. Some of these benefits include increased efficiencies, protection from inclement weather, and enhanced OPSEC. The negative trade-offs are overly concentrating critical assets and ending up with a position that may not be able to be secured, much less defended.

10-29. A significant characteristic that differentiates urban terrain from other types is population density. Whether from fear of the unknown, the desire to protect possessions, a lack of transportation, or simply because there is nowhere else to go, substantial urban populations tend to remain in place during times of crisis. During past events, urban centers act as magnets for displaced persons from other areas. However, more recent events have proven that displaced civilians will seek refuge where they believe sanctuary can be found. However, this may not always be in an urban environment. Large populations can inhibit friendly forces ability to perform their missions, even during support operations aimed at aiding that same population. Crowds and civil disturbances, whether they occur spontaneously or are instigated by agitators, can delay or disrupt logistics

operations. During stability operations, instigating civil disturbances can be an effective method employed by one or more of the competing factions seeking an advantage over rivals or to strike asymmetrically at friendly forces. Criminal activity directed at the local population (both crimes of violence and property crimes) could spill over to affect friendly forces.

CONVOY OPERATIONS IN THE MOUT ENVIRONMENT

10-30. Convoy operations in urban terrain can be particularly challenging. Navigating an urban landscape with topographic maps can be difficult under peacetime conditions. Even with first-rate street maps, navigating can become increasingly more difficult when the effects of civil disturbances, rioting, and combat damage alter the landscape. The nature of urban terrain favors snipers and ambushes while offering the convoy only one small advantage. This advantage is the potential of many different routes to choose from for any given operation. However, this leads back to the problem of navigation. During stability and support operations in which the threat tends toward congestion, civil disturbances, criminal activity, and occasional sniping, the use of multiple routes may be the preferred approach. Having multiple routes and the freedom of when and how often to use them leverages the division's SU of a COP, secure communications, and the ability to maintain operational security to select routes that bypass congestion and confound active attempts to interdict convoys. However, in offensive or defensive operations, the intensity and type of threat (mines, ambushes, indirect fires, and so forth) may dictate confining convoy operations to a limited number of routes, which can be secured and maintained with available forces.

10-31. The following will place considerable stress on maintenance operations designed to sustain the brigade combat teams:

- Reduced trafficability.
- Interdiction of the MSRs.
- The fragmentation of units into small, isolated groups (all typical of urban combat operations).

10-32. EAD and divisional maintenance vehicles may prove too thin-skinned to survive the task of delivering maintenance support far enough forward. Even in less hostile environments, the limitations of commercial pattern trucks and/or political considerations may prevent HN vehicles from reaching the desired maintenance points. In either case, MHE- and soldier-intensive transloading operations will result.

DESERT OPERATIONS

Navigating the Urban Landscape

On the surface, the urban landscapes encountered by US troops in Mogadishu, Somalia (1992-1994) and Russian troops in Grozny, Chechnya (1994-1996 and 1999-2000) seem profoundly different. Mogadishu epitomized the lowest tier of third world cities – some places warrens of low, rambling structures crowding narrow, dusty streets and others long stretches of roads, mostly devoid of structures – while Grozny was the prototypical Soviet-style city – downtown, a mixture of older, elegant buildings and newer, drab office buildings; the suburbs, ranks of similar 10- to 12-story apartment blocks lining broad avenues. Mogadishu had a small seaport, an airport, a soccer stadium and only a handful of industrial facilities – all in disrepair, as were its limited utility systems. Grozny, at least prior to December 1994, was a reasonably intact, modern city. It had a wide variety of industrial and commercial installations and functioning, large-scale utilities systems. Like most Soviet-era cities, Grozny suffered from a lack of re-investment to maintain and upgrade its

systems, but, by and large, everything functioned.

Despite these differences, the remarkably similar feature these two cities shared, indeed the tie that binds all cities together for forces attempting military operations in them, is the tremendous difficulty they present to the task of getting from point “A” to point “B” (especially when the indigenous population or an opposing force is actively working to thwart that effort). Simply knowing where “A” and “B” are (no matter how precisely) and dispatching convoys along likely routes between them are not guarantees of success. Rather, getting and using real time knowledge and understanding of route conditions, threat/local populace activity and their likely intentions, and applying weapons, equipment, tactics, techniques and procedures appropriate to the situation are keys to success.

10-33. Desert operations, including unique force protection issues, present a host of operational challenges for CSS units. Because of the openness of desert terrain, site selection for CSS units must place concealment and disguise as high priorities when selecting a site. This is due to the openness of desert terrain and the potential ability for the threat to possess (or has access to the products of) aerial- or space-based observation platforms. CSS units must conform their operations to the local ground patterns. They must also avoid regular spacing, straight lines, right angles, and vertical stacks; all of which signal human activity and are visible for considerable distances. Whenever possible, select sites along and confine vehicle operations to existing trails or tracks to avoid telegraphing the existence of new or increased activity. The openness of desert terrain provides plenty of opportunities to employ crew-served weapons out to their maximum effective ranges and beyond. However, this can be a mixed blessing. Frequently, a base will find that most, if not all, of its perimeter is on a high-speed avenue of approach. This will give its limited crew-served weapons overly wide sectors to cover and diluting their effectiveness. Careful coordination between the bases in a base cluster and the preparation of multiple firing locations at each base can mitigate this and allow fires to be massed when and where necessary.

FRATRICIDE AVOIDANCE

Commanders seek to lower the probability of fratricide without discouraging boldness and audacity.

FM 3-0, Paragraph 4-27

10-34. Fratricide avoidance (a component of the element of combat power, protection) involves the application of measures to ensure the affects of friendly fires are not visited upon friendly forces. Fast-paced, round-the-clock operations involving long-range, high-lethality weapons systems on a non-linear, non-contiguous battlefield call for active measures such as:

- Positive weapons control.
- Disciplined operational procedures coupled with robust passive measures (for example, well-understood identification measures for friendly personnel and equipment).

Conditions that contribute to fratricide can vary with terrain as evidenced by the following discussion of the desert and MOUT environments, which occupy opposite extremes of the terrain spectrum.

Fratricide Avoidance in the Desert Environment

10-35. The ability to fire out to and beyond weapons maximum effective range increases the possibility of fratricide, both upon friendly elements approaching a base cluster and between bases in the same cluster. This situation arises because, unimpeded by terrain, vegetation, and man-made objects, weapons fire extends far beyond the distance at which positive identification of friend or foe can be made (especially at night and other periods of reduced visibility). The featureless terrain also contributes to disorientation and inability to gauge distance. Limiting access to base clusters to specified routes, positive identification measures, appropriate spacing of bases, and fire control measures (such as range cards and limit stakes) all contribute to avoiding fratricide.

Fratricide Avoidance in the MOUT Environment

10-36. Fratricide prevention is an important consideration in MOUT for quite the opposite reason than it is in dessert terrain. The density of urban terrain features, including tall structures and subterranean passages, contributes to a convoluted forward line of own troops (FLOT). This, in turn, leads to sudden, close meetings of friendly and threat forces, as well as potentially unexpected friendly-to-friendly encounters. Particular attention must be paid to the coordination of recognition signals, arrival times, and routes for DISCOM and EAD sustainment convoys entering and moving within the brigade areas. Since meeting engagements in urban terrain tend to occur at close quarters, survival dictates immediate and decisive action to carry the day.

10-37. This can lead to a “shoot first, ask questions later” mindset. This mindset must be countered by clear IFF procedures and techniques to identify and stop “blue-on-blue” engagements. Unintended adverse effects of fires contribute to fratricide and collateral damage. Lethal fires, CAS, and artillery, are difficult to place where needed in denser, built-up area. Grenade launchers and mortars are generally better suited for MOUT environments. This is due to the close proximity of combatants and many

vertical obstacles are problematic for systems that deliver munitions with a low-angle trajectory and have dispersion. Short range, high trajectory fires are useful for hitting targets in yards, narrow streets, alleyways, and the upper floors of multi-story buildings. Indirect fires of any type tend to be less effective against targets on the intermediate, lower, and below ground floors of buildings.

10-38. Against these targets, direct fires and/or assault are usually necessary to prevail, although indirect fires can be useful in obscuring threat observation of friendly operations or suppressing threat activity. Regardless of the type fires employed, the existence of hard, flat surfaces contributes to the production of secondary projectiles and ricochets, which can have undesired results. Engaging threat targets against a backdrop of urban landscape can also be disastrously counterproductive if friendly fire penetrates that backdrop and strikes friendly forces or non-combatants beyond. To mitigate these risks, the RAOC's and DISCOM's SU must include an appreciation of the effects of friendly and threat fires on surrounding urban landscape and the locations of nearby friendly forces and non-combatants so that fires can be employed to best counter the threat while reducing the risk of fratricide and collateral damage.

Appendix A

Sample Battalion (Unit-Level Maintenance) SOP

STANDING OPERATING PROCEDURES

[NAME] BATTALION

1. **PURPOSE.** To prescribe maintenance policies, procedures, responsibilities, and guidance for all units assigned to the [Name] Battalion.
2. **MISSION.** The mission of the [Name] Battalion requires that all equipment be combat-ready at all times.
3. **APPLICABILITY.** This SOP applies to all units and personnel assigned to the [Name] Battalion. This SOP is effective upon receipt and will remain in effect until superseded or rescinded. Any previous editions of [Name] Battalion Maintenance SOP or maintenance policy letters are hereby rescinded.
4. **OBJECTIVES.**
 - a. Maintain 100 percent equipment serviceability with a minimum expenditure of time and repair parts.
 - b. Ensure maximum service life of all materiel and equipment.
 - c. Attain a state of training and discipline where each soldier becomes completely knowledgeable of his maintenance responsibilities.
 - d. Provide procedures for early detection and correction of actual or potential equipment faults at the lowest practical level of maintenance.
 - e. Achieve and maintain the highest materiel readiness posture necessary to accomplish assigned missions.
 - f. Standardize maintenance activities throughout the battalion.
 - g. Make maintenance training (training to prepare to go to war) a top priority.
5. **DEFINITIONS.**
 - a. **Maintenance.** All actions taken to retain materiel in a serviceable condition or to restore it to serviceability when it is unserviceable.
 - b. **Command Maintenance.** A period of PMCS scheduled weekly and devoted to ensuring that all equipment functions and is operationally ready to perform its intended purpose (mission) without notice. Scheduled maintenance services and other equipment training should not be performed during command maintenance periods.
 - c. **Operator Maintenance.** The performance of before-, during-, and after-operations maintenance as prescribed in the appropriate technical manual.

d. Organizational Maintenance. The performance of preventive maintenance services, inspections, minor adjustments, replacement of designated components and assemblies, and evacuation of unserviceable equipment beyond the unit's authorized level to repair as prescribed in the appropriate MAC.

e. Direct-Support-Level Maintenance. The performance of mobile, responsive, and one-stop maintenance support. Performance of all authorized maintenance exceeding a unit's maintenance capability and enhances the quick-repair and return-to-user concept. Includes inspection; troubleshooting; testing; diagnosis; repair; adjustment; calibration; alignment of components, equipment, and systems; replacement and repair of end items; light body repairs; technical assistance; establishment of an ASL, a RX operation, and a limited ORF; collection, classification, and recovery services for serviceable and unserviceable materiel; and establishment and operation of BDA teams.

6. COMMAND AND STAFF RESPONSIBILITIES.

a. Command Responsibilities. Company Commanders are directly responsible for the overall maintenance condition of all materiel assigned or attached; the supervision of maintenance operations and training; and knowing the current maintenance status of all equipment and actions being taken to repair it when it is not mission-capable. Platoon and section leaders and supervisors are directly responsible for performance of proper operator maintenance on all items of equipment, including records, within their platoon or section.

b. Battalion Commander. The battalion's maintenance program will be a direct reflection of how much emphasis the commander places on maintenance. Battalion Commanders are responsible for the following:

- (1) Ensuring the battalion's overall materiel readiness.
- (2) Developing and implementing instructions and procedure guidelines for Company Commanders compliance with regulations governing maintenance activities.
- (3) Providing for the maintenance of materiel and for supporting the efficiency of programs established for this purpose.
- (4) Rendering advice and assistance in planning the battalion/company maintenance program.
- (5) Exercising command supervision (inspections – formal/informal) over maintenance activities throughout the battalion.
- (6) Advising higher headquarters of all aspects of maintenance in the battalion.
- (7) Establishing their units maintenance priorities.
- (8) Establishing battalion maintenance goals and objectives to ensure optimal use of funds and resources for personnel, tools, facilities, repair parts, publications, time, training, and records.
- (9) Conducting maintenance meetings with commanders and the maintenance staff at a prescribed interval.

c. Battalion Executive Officer. The following are the duties of the Battalion Executive Officer:

- (1) Serves as Battalion Materiel Readiness Officer.
- (2) Supervises preparation of the battalion and unit maintenance programs.
- (3) Serves as the principal assistant and advisor to the Battalion Commander in maintenance matters.
- (4) Reviews instructions issued by the staff to ensure conformity with established standards and policy.
- (5) Supervises and reviews periodic and special maintenance reports submitted to higher headquarters.
- (6) Directs staff analysis of maintenance-related issues.
- (7) Evaluates the maintenance program through frequent on-the-spot inspections and evaluations of reports.
- (8) Inspects all maintenance operations, including maintenance management, repair parts systems, and scheduled periodic services.
- (9) Recommends changes to the maintenance program as required.
- (10) Conducts weekly maintenance meetings with Company Commanders.

d. Battalion Maintenance Officer. The following are the duties of the BMO:

- (1) Responsible for the overall staff supervision of all maintenance operations and programs in the battalion.
- (2) Assists subordinate units solving technical problems in maintenance and supply (repair parts), and monitors unit-level maintenance operations.
- (3) Assists the Battalion Commander and Executive Officer in planning, organizing, and coordinating battalion maintenance activities.
- (4) Advises the Battalion Commander and Executive Officer on maintenance matters and keeps them informed on the operational status of all battalion equipment.
- (5) Ensures, through assistance visits and recommendations to Company Commanders, unit-level maintenance procedures and programs conform with current regulations and directives.
- (6) Reviews and consolidates all company maintenance reports.
- (7) Briefs the Battalion Maintenance SOP to all newly-assigned Lieutenants and senior Non-Commissioned Officers.
- (8) Maintains the Battalion Maintenance SOP.
- (9) Monitors the battalion's AOAP.

- (10) Monitors the battalion's TMDE Calibration Program.
- (11) Manages the Repair Parts Local Purchase Program.
- (12) Coordinates maintenance matters with adjacent units.
- (13) Controls and operates the Battalion Local Purchase Program for Class IX repair parts.

e. Battalion Command Sergeant Major. The following are the duties of the CSM:

- (1) Attends scheduled maintenance periods.
- (2) Ensures Unit First Sergeants and first-line supervisors are present during scheduled maintenance periods.
- (3) Advises the Battalion Commander on the units maintenance personnel gains, loses, strengths, and weaknesses.
- (4) Checks maintenance operations (particularly operator training, supervisor involvement), and handles the maintenance and safety awards program.
- (5) Checks motor park areas and motor pool facilities through frequent on-the-spot inspections.
- (6) Identifies maintenance weaknesses, makes corrections through the NCO chain, and advises the Battalion Commander as needed.
- (7) Ensures preventive maintenance is performed on weapons, NBC, communications, and dining facility equipment through frequent inspections; and makes appropriate corrections through the NCO chain.

7. COMMAND MAINTENANCE PERIODS AND PMCS.

a. Every Monday (all day) is Battalion Command Maintenance Day. When Monday is a holiday, the next day will be Command Maintenance Day. Command Maintenance Days will be included in the units weekly training schedules.

b. Commanders will ensure specific maintenance objectives are planned and assigned for each scheduled period of preventive maintenance. "Doing the weeklies" is not an acceptable answer or plan. Maintenance objectives should be rotated to include specific items of special interest (maintenance indicators) on the equipment and maintenance of low-density equipment (for example, generators, communications, NBC, weapons, tentage, tools, and dining facility equipment). Leaders and supervisors must be aware of the maintenance objectives for the period and take an active role in ensuring their accomplishment. As part of the maintenance objectives or plan, at least two items (indicators) (for example, batteries, canvas, parking brakes, jackshaft bolts, and tires) will be checked by commanders, leaders, and supervisors on different items of equipment during the command maintenance day.

c. Results must be checked at the end of the maintenance period by the Company Commander and First Sergeant, with assistance from maintenance personnel. Appropriate feedback is given to all concerned.

d. All equipment will be checked and exercised in accordance with appropriate operator's manual, including low-density equipment (for example generators, pumps, and heaters).

e. During maintenance periods there will be a minimum of one operator present for each major item of equipment.

f. Organizational mechanics will be present to provide assistance to operators and supervisors as required.

g. Every leader/supervisor of the unit's maintenance chain must be present.

h. Platoon/section leaders and supervisors must also have a plan for each Monday. They will ensure that operator's manuals are available and used and that organic tools and materials are provided to assist operators in performing the preventive maintenance checks and services.

i. The Motor Sergeant or maintenance supervisor will ensure POL products and other required materials are available.

j. Supervisors will ensure operators are knowledgeable in the use of DA Form 5988-E, as provided by ULLS-G, and that they understand the flow of the form within the unit's maintenance program when discrepancies are noted during PMCS.

k. Operators will use the ULLS-G DA Form 5988-E to record equipment discrepancies that cannot be corrected on-the-spot or those that require repair parts. The DA Form 5988-E will be turned in through the squad/section/platoon leader to the Motor Sergeant or maintenance supervisor for corrective action at the end of the maintenance period. Operators must check the DA Form 5988-E during PMCS. Supervisors must follow up by coordinating corrective actions with the Motor Sergeant. Staff members will supervise the maintenance of equipment assigned to their sections. Operators, first-line leaders, maintenance supervisors, and commanders are responsible for checking, following up, and keeping information current and correct on the DA Form 5988-E.

l. Operators will perform appropriate PMCS prior to dispatching the equipment. Platoons/sections will follow the same procedures outlined in command maintenance to ensure faults are corrected and necessary parts are ordered.

8. DISPATCHING PROCEDURE.

a. For control and planning purposes, dispatches will be requested using a locally made and reproduced form signed by the individual whose name will appear in the "Report to" block of the automated ULLS-G DA Form 5987-E.

b. Platoons/sections must submit requests for dispatch in ample time to allow operators to perform before-operation PMCS.

c. Prior to issuing the motor equipment utilization record, the dispatcher must verify the intended operator has in his/her possession a valid operator's permit authorizing the individual to operate the item of equipment.

d. Dispatcher, operator, and first-line supervisors are responsible for checking the equipment identification card (in front of Equipment Record Folder – Logbook) for any service or AOAP sampling due.

e. Any discrepancies identified during PMCS rendering the equipment NMC must be corrected prior to dispatch. Dispatch of vehicles/equipment on limited operation must be approved by the Unit Commander and done in accordance with DA Pam 738-750. Operators will use the DA Form 5988-E to list new faults they cannot fix and faults corrected by replacing parts. Faults previously recorded and action taken by maintenance personnel ordering parts must be reflected on the DA Form 5988-E.

f. Vehicle safety standards as outlined in AR 385-55 must be adhered to during the dispatch process. Vehicles with defective parking brakes, any gasoline leak, or Class III diesel, oil, or water leak will render the equipment NMC until repaired. Furthermore, no vehicle will be operated with conditions (standards) outlined in AR 385-55 unless authorized by the Unit Commander (limited operation dispatch using DA Form 5988-E). Such conditions do not automatically "deadline" the equipment.

g. Supervisors/leaders will ensure operators perform PMCS and verify the DA Form 5988-E, which is checked by the dispatcher before issuing the required motor equipment utilization record, DA Form 5987-E. Supervisors on dispatch will also ensure that a fire extinguisher and first aid kit are in serviceable condition and in the possession of the operator.

h. Unit Commanders will closely monitor off-post dispatches. Operators will be given a safety briefing by their supervisor prior to leaving the motor pool. There must be two soldiers in each vehicle going off post, and the "shot gun rider" should be in grade E5 or above.

i. Except for training or emergency purposes, E7s and above are not authorized to operate military vehicles in the battalion.

9. LICENSING AND TRAINING OF OPERATORS.

a. Minimum standards for selecting, training, testing, and licensing drivers of wheeled vehicles are contained in AR 600-55, FM 55-30, and AR 385-55. Criteria for selecting, training, testing, and licensing mechanical/ground support equipment operators are contained in AR 600-55, TB 600-1, and TB 600-2. These publications will be on-hand in each unit and will be the subject of special interest during battalion inspections.

b. Each Company Commander will appoint, in writing, individuals to perform as qualifying officials (examiners) in the grade of SSG or above. Examiner(s) must be qualified on, and licensed to operate, each type of equipment they are authorized to verify or test.

c. Commanders must ensure that a comprehensive training program is implemented in the company (preferably included in the training schedule), which incorporates safe, legal operation of the equipment on and off post, familiarization with all equipment assemblies and components, how to perform PMCS using the appropriate manual, and how to properly fill out DA Form 5988-E. Examiners should be used as chief trainers of their respective items of equipment.

d. The BMO is responsible for monitoring the training program at battalion level in accordance with AR 600-55.

e. Qualifying officials (examiners) must ensure individuals being tested were actually trained and are fully qualified to operate the specific item of equipment. They also ensure individuals understand the appropriate operator's manual and are capable of performing adequate PMCS. Examiners must ensure operators demonstrate the ability to complete DA Form 5988-E.

f. Operator's permits are issued in accordance with the End User Manual for Unit-Level Logistics System (ULLS) and DA Pam 750-35. Information entered on the permit must be accurate. Strikeovers, erasures, correction fluid/tape, and obscuring or otherwise making an illegible entry is not permitted.

g. Operator licenses (DA Form 5984-E) issued by ULLS-G will be laminated for protection from normal wear and tear. The licenses of operators who will receive TMP certification must not be laminated until the automated DA Form 5984-E has received a verification stamp from TMP.

h. ULLS-G 5983-1-E and DA Form 348 for each qualified operator will be maintained by the commander's appointed individual following guidelines contained in DA Pam 750-35 and End User Manual for ULLS.

10. ASSIGNMENT OF OPERATORS AND MARKING OF EQUIPMENT.

a. Commanders will ensure that a qualified operator is assigned to each item of equipment. When practical, an assistant driver/operator should also be assigned.

b. Each vehicle (prime mover) will have the name of the operator and his immediate supervisor stenciled on the lower right-hand corner of the windshield (passenger side) of the cab, visible from the front of the vehicle. All other vehicle markings will be in strict accordance with TB 43-0209. Windshield markings will be in blocked letters not bigger than two inches.

c. For specific polices and guidelines for CARC and camouflage pattern painting (CPP), see AR 750-1. Since there are no adequate painting facilities in the battalion, only spot painting is authorized. Painting of the entire vehicle or equipment will be done only at OSHA-approved facilities. Requests for painting an entire vehicle will be submitted on DA Form 5990-E through the local DOL.

d. Military load classifications (MLCs) are listed in FM 5-170. Every self-propelled vehicle over three tons must display its MLC on the front. If the vehicle's weight doesn't change, paint a nine-inch-diameter forest green circle directly on the vehicle. Paint the MLC in three-inch-high, lusterless black numbers centered on the circle. If the load is likely to change, as when pulling a trailer or driving a truck on equipment that runs empty sometimes and loaded other times, use a kit, NSN 9905-00-565-6267, so the numbers can be changed. For a set of replacement numbers for the sign kit, use NSN 9905-00-565-6268. Every vehicle with an MLC that may change *must* have the truck's/equipment's basic MLC painted on the side. No specific location is called for, but the best place on a truck is the upper right area of the right door, where it is best protected from wear and scrapes. Paint a black number, three inches high, centered inside a circular black border $\frac{3}{4}$ inch wide and six inches in diameter, directly on the painted camouflage. Try not to put it on any black area in the camouflage (extracted from *PS Magazine*, issue 413, April 1987, pages 18-20).

e. Each operator will be familiar with and know his vehicle's military load classification.

f. The numerals and letters used to identify the [Name] DISCOM/Group, [Name] Battalion, company to which the equipment belongs, and administrative number will be made using flat black paint and two-to-three-inch-high letter and number stencils. No rectangles or color background to stencil marking will be used.

g. The prescribed tire pressure will be marked on the fender above each wheel (or on the body or frame immediately above each wheel when fenders are not used), with one-inch letters and numbers. The letters *TP* will precede the applicable tire pressure, using flat black paint.

h. Maximum tank fuel level will be marked using one-inch letters and flat black paint.

i. Maximum speeds for both on- and off-road driving will be stenciled on the dashboard or other appropriate place in the cab of all vehicles using one-inch letters and numbers.

11. TRAINING OF MAINTENANCE PERSONNEL.

a. Unit Commanders will establish formal and on-the-job training programs to further develop mechanics' skills in the areas of troubleshooting malfunctions, and using tools and test equipment. Training must be formalized with records maintained as to particular training and each individual's progress.

b. Commanders will also establish cross-training programs to ensure *critical* maintenance positions can be filled during the absence or shortage of personnel occupying those positions.

12. STANDARDS FOR MAINTENANCE AT UNIT LEVEL. Commanders will include in their respective unit's SOP the standards that guide maintenance personnel and supported platoons. Motor pool working hours, work uniform (coveralls, safety shoes, and so on) for mechanics, cleanup periods, and breaks must be standardized.

13. SCHEDULED SERVICES.

a. All scheduled services will be recorded using ULLS-G and listed on the unit's training schedule. Scheduling of all services will be coordinated with the Battalion S3 in order to have equipment and personnel available to perform the service. Units will publish a training schedule for maintenance services (by bumper number and type of service) at least monthly, and distribute it to all personnel responsible for performing services; operator/crew and organizational mechanics.

b. When possible, the day before the service is to be performed, the Motor Sergeant should assemble the mechanics, first-line supervisor, and operator of the equipment to be serviced and give them a briefing on what is to occur the next day. On the day of the service this team must have the appropriate manuals, including the proper lubrication order (LO), on-hand. The Motor Sergeant must make available all resources and materials needed for the service (for example, filters, lubricants, special tools, and so forth).

c. Leaders and supervisors ensure the assigned operator is present to assist the mechanics during the service.

d. Leaders and supervisors must know how a service is supposed to be performed and check it. This is an integral aspect of quality control.

e. While the service is being performed, maintenance personnel should take advantage of the equipment and the operator's "captive time," and conduct a 100 percent technical inspection (TI) of the item. At the same time, any parts on-hand for the serviced item must be installed and the ULLS-G uncorrected fault record updated.

14. INTERNAL QUALITY CONTROL AND QUALITY ASSURANCE.

a. A sound internal quality control/assurance program in each unit is the key to an effective maintenance program. It should be directed at the following:

- (1)** Preventing defects.
- (2)** Detecting deficiencies.
- (3)** Verifying compliance with established standards.

(4) Taking actions to eliminate rework resulting from improper or inadequate maintenance practices.

b. When inspectors are not assigned; QC/QA is performed by the designated senior maintenance supervisor, technically qualified personnel, the maintenance chain of command, and the owners of the equipment being serviced or repaired.

c. Commanders will address the subject of internal quality control in the unit's maintenance SOP and will define responsibilities concerning QC/QA, especially during equipment service or repair.

15. NON-MISSION-CAPABLE EQUIPMENT POLICY.

a. Commanders and leaders/supervisors at all levels are expected to know at all times the status of assigned equipment, particularly pacing items and low-density equipment.

b. Standards include:

(1) Twenty-four hours to order unit-level repair parts once the equipment is identified as NMC.

(2) Seventy-two hours to work-order equipment to the DS-level maintenance unit upon determining that repair is a DS-level responsibility.

(3) Once repair parts are received for NMC equipment at the unit level, the standard is that the parts are installed immediately, returning the equipment to a fully mission-capable (FMC) status. Operators and first-line supervisors should be an integral part of the process. They should not be allowed to leave while motor pool mechanics work at night repairing their equipment. Only then will operators and supervisors have an appreciation for the mechanic's job and become more cognizant of their own role in the discipline of preventive maintenance.

(4) Once equipment is accepted by the DS-level maintenance units, Unit Motor Officers and maintenance supervisors must stay in constant touch with the maintenance unit's mission requirements. [Unit Name] personnel should be contacted when difficulties are experienced in this area. Leaders'/supervisors' knowledge of the latest status of equipment work-ordered to DS-level maintenance will be an area of special interest during maintenance meetings conducted by the Battalion Commander and XO.

(5) When notified by the maintenance unit that an item of equipment is ready for pickup, units will proceed immediately to pick it up. Once equipment is picked up from the maintenance unit or repaired at unit level, [Unit Name] personnel will be notified immediately

(by phone or in person) to make corresponding changes to the unit's materiel condition status report.

16. SAFETY AND FIRE PREVENTION.

a. The entire chain of command must be safety conscious and ensure all personnel in the unit adhere to these guidelines and practice safety at all times.

b. Commanders will designate a Safety Officer and NCO. Their duties must be defined in the unit's safety SOP.

c. A Fire Marshal will also be designated and his duties specified and defined.

d. At least one safety meeting will be conducted *monthly* by maintenance supervisors and the Safety Officer or NCO for all maintenance personnel. A record of dates and subjects discussed should be maintained and furnished to inspectors upon request.

e. No-smoking signs will be posted in maintenance shop areas. Smoking will be allowed only in designated areas. Smoking will not be permitted *within 50 feet* of stored flammables.

f. Paint, POL products, solvents, and gas cylinders will be stored separately and in proper designated areas. *Never use gasoline as a cleaning solution.*

g. Clean and dirty/oily rags will be segregated and stored in covered metal containers.

h. Do *not* store power-generation or other small-engine equipment with fuel in the tanks in a building.

i. Power generators and small-engine equipment (such as heaters and pumps) will *not* be refueled inside a building while hot from operation or while engine is running.

j. Fire points must be identified and all personnel must be trained in the use of different fire extinguishers. A workable Fire Plan must be developed and posted throughout the maintenance area.

k. Floors must be kept clean and reasonably free of oil, grease, sawdust, and so on.

l. Proper color codes must be used for safety markings throughout the maintenance areas.

m. Gas cylinders must be properly color-coded and equipped with the correct valves and fittings. Also, valve protection covers must be placed on all cylinders when not in use. Cylinders will be stored in accordance with AR 700-68.

n. The maximum speed in the motor pool area is 5 mph.

o. Ground guides will be used when a vehicle is being moved in the motor pool. Ground guides will *never* stand between the vehicle and a stationary object.

p. Equipment will *not* be left unattended with engine running.

q. Rear safety straps (one side will be welded in place) will be used when transporting personnel in equipment cargo beds. Personnel must be seated when equipment is in motion.

- r.** Seat belts will be used by all passengers and drivers when equipment has them.
- s.** Internal combustion engines will *never* be operated in a closed room unless exhaust is properly vented to the outside.
- t.** Vehicle and equipment will be started and operated by only properly licensed individuals.
- u.** Chock blocks will be used when parking vehicles and equipment. This applies at all locations, including the unit area and motor pool.
- v.** Welding areas must be fireproof and vented. When welding is done outside, proper shielding must be provided.
- w.** Horseplay will not be permitted in maintenance facilities or motor pool area.
- x.** Hearing-protective devices will be used in areas with high noise levels. All operators and maintenance personnel must have such protective devices available at all times.
- y.** Personnel will not lean on, stand, or sit under equipment suspended by recovery vehicles, A-frames, jacks, or other forms of overhead lifting devices.
- z.** Jack stands or trestles will be used to support equipment when work underneath is required.
- aa.** Protective supplemental safety clothing will be used when performing welding operations or when handling batteries.
- bb.** Face and eye protection must be worn when performing welding, cutting, grinding, sanding, or chipping operations.
- cc.** All tools will be used only for their intended purpose. Do *not* use power tools with frayed electrical cords or without proper grounding.
- dd.** All lifting and support devices will be maintained, inspected, and/or load-tested at regular intervals as required.
- ee.** There must be a tire-inflating cage in each maintenance facility built in accordance with safety specifications. The inflation cage depicted in TM 9-2610-200-14 will meet all Army requirements and OSHA standards. The entire chain of command is responsible for the cage's adequate and safe use with the correct tire air hose and gauge. Use NSN 4910-00-441-8685 for the air hose and gauge.
- ff.** Proper use of compressed air and hydraulic equipment will be stressed.
- gg.** Power-generating equipment and fuel-dispensing pumps will be properly grounded prior to use.
- hh.** Creepers will be leaned (upright position) against the workbench when not in use.
- ii.** Breathing asbestos dust is hazardous to your health. Danger of inhaling asbestos particles or dust occurs when the material containing asbestos can be crumbled, pulverized, or reduced to powder in the hand; or when it readily releases fibers with only slight disturbance. Use approved respiratory protection as directed by AR 40-5 and TB MED 502.

17. HAZARDOUS WASTE DISPOSAL AND ENVIRONMENT PROTECTION.

- a.** Units will adhere to guidelines of the [Your] Battalion Hazardous Waste SOP. The S4 will coordinate all hazardous waste storage.
- b.** Hazardous waste and waste oil will be collected and stored in separate containers.
- c.** Containers will be marked with the following:
 - (1)** "HAZARDOUS WASTE" or "WASTE/USED OIL."
 - (2)** The date the waste was first collected in the container (for example, "Start: 9-23-99.")
 - (3)** The NSN and nomenclature of the product being collected.
 - (4)** "FLAMMABLE," "CORROSIVE," or "COMBUSTIBLE" as appropriate.
 - (5)** The date when the container was filled.
- d.** Leave at least two inches of air space in filled containers.
- e.** Contaminants will not be released into any water service.
- f.** Waste petroleum products will be stored *only* in approved containers.
- g.** Contaminants will not be discharged directly onto the ground.
- h.** Radiators will *not* be drained onto the ground or into storm drains. Antifreeze waste will be disposed of in approved containers.
- i.** The maintenance chain of command will actively supervise personnel to ensure minimal environmental impact due to maintenance operations.
- j.** Any small spills on hard surfaces will be immediately cleaned using appropriate absorbents and the contaminated absorbent disposed of at the sanitary landfill authorized for hazardous wastes.
- k.** For spills on soil areas, the contaminated soil will be removed and disposed of at the sanitary landfill designed for hazardous wastes. Fresh top soil/gravel will then be spread over the area.
 - l.** Under no circumstances will small spills be washed into floor drains.
 - m.** Immediate action must be taken to contain large spills. Large spills are defined as being more than five gallons in volume or 100 square feet in area.
 - n.** Unit Commanders will be notified immediately when a large spill occurs.
 - o.** Used or contaminated POL products will be turned in to the installation collection point by coordinating with the Battalion S4.

18. ENERGY CONSERVATION.

a. Energy Conservation Officer/NCO. All units will have an Energy Conservation Officer and NCO appointed in writing.

b. Inspections. The Energy Conservation Officer/NCO will conduct unannounced inspections of the maintenance areas and activities at least once a month. Results of inspections will be maintained on file subject to future inspection.

c. Fuel conservation measures related to training activities.

(1) Reduce operations/training that involve vehicles and other fuel-consuming equipment without incurring unacceptable degradation of operational readiness.

(2) Use the smallest vehicle possible consistent with the mission.

(3) Reduce FTX and CPX numbers and scope consistent with readiness requirements.

(4) Establish tight controls on off-post training.

(5) Use maximum foot movement to training/administrative areas and in conduct of training/daily activities.

(6) Extend the length of required field training exercises to maximize use of equipment once in place.

d. General fuel conservation measures.

(1) Exercise good vehicle maintenance and driving practices.

(2) Properly tune engines.

(3) Correctly inflate tires.

(4) Clean and replace air filters (cleaners).

(5) Avoid rapid starts from intersections and excessive use of brakes.

(6) Consolidate trips, dispatching fewer vehicles on a daily basis.

(7) Eliminate unnecessary idling of vehicle engines.

19. ACCIDENT REPORTING.

a. The Unit Safety Officer or Commander must notify the Battalion Safety Officer (or in his/her absence, the Battalion XO) *immediately* following an accident. The following information must be provided (all accidents, regardless of the degree of injuries sustained, must be reported in this manner):

(1) Date of occurrence.

(2) Time and location.

- (3) Name, rank, age of personnel involved.
- (4) Unit.
- (5) Type of injury, if any.
- (6) Brief description.

b. All *classes* of Army accidents are *reportable* to the Battalion Safety Officer. However, only *certain classes* of accidents require a DA Form 285.

c. For accidents requiring a DA Form 285, the Unit Commander will ensure an investigation is conducted to get the information required by the form.

d. The completed form must be forwarded to the Safety Officer or the Battalion XO within two days of the accident. See the Battalion Safety SOP for instructions on how to complete the form.

e. DA Form 285 must be completed on the following:

(1) Class A, B, and C accidents.

(2) Class D accidents dealing with occupational illnesses caused by repeated exposure over a period of time. Examples are noise-induced hearing loss, asbestosis, radiation poisoning, organic solvent exposure, dermatosis, silicosis, and so on.

f. Classes of accidents.

(1) **Class A accident.** The total cost of property damage, injury, or occupational illness is at least \$500,000; a fatality occurs as a result of Army operations; or a soldier is fatally injured off post.

(2) **Class B accident.** The total cost of property damage, injury, or occupational illness is at least \$100,000 but less than \$500,000.

(3) **Class C accident.** The total cost of property damage is at least \$10,000 but less than \$100,000; or an injury or occupational illness results in a lost workday case involving one or more days away from work.

(4) **Class D accident.** The total cost of property damage is less than \$10,000 but an injury or occupational illness resulted in a lost workday case involving one or more days of restricted work activity; or a nonfatal case resulted in no lost workdays.

20. SECURITY OF MAINTENANCE FACILITIES AND EQUIPMENT.

a. All vehicles and equipment will have an approved chain and a 200-series lock available to secure them when not in use or when unattended in both garrison and field training exercises. Brass locks are authorized only to secure POL storage tanks and pumps to prevent sparking.

b. At close of business all responsible personnel will ensure offices, tool rooms, shops, CONEXs, vehicles, equipment, and repair parts are properly secured. Individual toolboxes will be locked with a 200-series lock and secured to a metal rack or stored inside the tool room.

c. Privately owned vehicles (POVs) will not be permitted inside motor pools unless they belong to civilian contractors working in the motor pool facilities. POVs may be parked in designated areas in the motor pool for the purpose of securing them during unit deployment when involved in extensive field training exercises.

21. RECOVERY OPERATIONS.

a. Units in the battalion are responsible for recovery of their organic equipment.

b. When the operator detects an inoperable condition, he assesses the damage and initiates action by informing the chain of command. (The unit's SOP should prescribe notification procedures.)

c. When recovery is beyond the unit's capability to perform, recovery support will be requested from the DS-level maintenance unit.

d. Units requesting recovery support should provide the following information:

- (1) Type vehicle to be recovered.
- (2) Bumper number.
- (3) Exact location of vehicle.
- (4) The problem or suspected problem.
- (5) Location of the requestor.

22. WORK ORDER OF EQUIPMENT TO DS-LEVEL MAINTENANCE.

a. Units in the battalion must coordinate by phone or in person with either the NCOIC or Maintenance Control Officer of DS-level maintenance units on maintenance support issues. Unit Commanders are encouraged to visit at any time; particularly on assumption of command. Supported Unit Motor Officers should make a habit of visiting the DS-level maintenance units at least once a week.

b. The [*Name*] maintenance company is responsible for providing DS-level maintenance and Class IX supply support for the following categories of equipment:

- (1) Tactical vehicles and trailers.
- (2) Weapons.
- (3) Communications and electronics.
- (4) Air conditioning and refrigeration.
- (5) Quartermaster and chemical equipment.
- (6) COMSEC.
- (7) Allied trades (welding, body and fender, radiator repair, glass, light duty fabrication, and machining).

- (8) Canvas and tentage.
- (9) Fuel and electric components.
- (10) Batteries.

c. The standard is two working days from the time equipment becomes NMC to have it work-ordered to the DS-level maintenance unit. When deviations from this standard occur, Unit Commanders must give reasons in the weekly maintenance meeting.

d. With proper coordination between the unit and the DS-level maintenance unit, the initial/acceptance inspection may be conducted at the customer unit or on-site.

23. MAINTENANCE OF WEAPONS AND COMMUNICATIONS, MESS, AND LOW-DENSITY EQUIPMENT.

a. Low-density equipment, such as generators, pumps, and trailers, must be properly maintained and exercised at least once a week. Other types of equipment not normally found under the control of the organizational maintenance section will be maintained in accordance with applicable technical manuals. Weapons, communications, and dining facility equipment fall under this category. Records will be kept of such action and will be subject to special interest during Command Inspection Programs (CIPs).

b. Generators must be exercised under load at least once a month. Load banks from the DS-level maintenance unit may be utilized for this purpose.

24. VEHICLE LOAD PLANS.

a. Each unit must have complete vehicle load plans approved by the Company Commander. They must be adhered to when deploying to the field and when returning from exercises.

b. Copies of the vehicle load plans must be on-hand while convoying and available for inspections during exercises and CIPs.

25. TOOL ROOM OPERATIONS.

a. Unit Commanders will ensure that a primary Tool Room Attendant is appointed and has signed for all hand tools, sets, kits, outfits, and TMDE secured or stored in the tool room.

b. Inventory of tools will be performed in accordance with DA Pam 710-2-1.

c. Tools will be stored and issued in accordance with DA Pam 710-2-1. Items of special interest include a list (to be kept in the tool room) of personnel authorized to draw tools from the tool room. A separate sign-out log (ledger) must be kept for each set, kit, and outfit (SKO) in the tool room. The log will be prepared for the end item only; a major SKO may contain individual sets or kits within the end item. Minimum log entries are:

- (1) NSN and noun nomenclature of tool.
- (2) Quantity issued.
- (3) Date of issue.

- (4) Name and signature of individual receiving the tool.
- (5) Initials of the Tool Room Attendant when the tool is returned.

d. The Tool Room Attendant will check tools when they are turned in for cleanliness and serviceability, will initiate immediate action to get replacement for lost or unserviceable tools, and will turn in all excess and unserviceable tools through proper channels.

26. PUBLICATIONS.

a. Unit Commanders will appoint a Publications Officer and NCO. They will become familiar with the publications system and the contents of DA Pam 25-33, DA Pam 25-30, and [other local command publications].

b. All maintenance and equipment-related Army and local command regulations, circulars, SOPs, supplements, technical bulletins, technical manuals, field manuals, supply manuals, lubrication orders, and blank forms must be on-hand or on requisition at all times.

c. Publications in the [Unit Name] will be requisitioned through the S1 (Publications NCO).

d. *PS Magazine (The Preventive Maintenance Monthly)* publishes in each edition a list of new and changed publications.

e. Maintenance supervisors must ensure that publications on-hand are current, changes are posted, and no pages or sections are missing from manuals.

f. Publications must be available and accessible to mechanics, and all operators must be provided with a -10 (operator's) manual. Evidence of use is a good indication of availability and accessibility.

g. Table A-1 provides a list of recommended publications that should be on-hand in each unit to facilitate implementation of the maintenance program. The list, which is not all-inclusive, is subject to change.

Table A-1. Recommended Publications

ARMY REGULATIONS	
11-1	Command Logistics Review Program (CLRP)
11-2	Management Control
25-30	The Army Publishing Program
25-400-2	The Army Records Information Management System (ARIMS)
71-32	Force Development and Documentation-Consolidated Policies
190-11	Physical Security of Arms, Ammunition and Explosives

Table A-1. Recommended Publications (continued)

ARMY REGULATIONS	
190-13	The Army Physical Security Program
190-51	Security of Unclassified Army Property (Sensitive and Nonsensitive)
220-1	Unit Status Reporting
350-1	Army Training and Education
350-17	Noncommissioned Officer Development Program
385-10	The Army Safety Program
385-40	Accident Reporting and Records
385-55	Prevention of Motor Vehicle Accident
420-90	Fire and Emergency Services
600-20	Army Command Policy
600-55	The Army Driver and Operator Standardization Program (Selection, Training, Testing, and Licensing)
672-20	Incentive Awards
700-4	Logistics Assistance
700-84	Issue and Sales of Personal Clothing
700-138	Army Logistics Readiness and Sustainability
700-139	Army Warranty Program Concepts and Policies
710-2	Inventory Management Supply Policy Below the Wholesale Level
725-50	Requisition, Receipt, and Issue System
735-5	Policies and Procedures for Property Accountability
740-3	Stock Readiness
750-1	Army Materiel Maintenance Policy
750-10	Army Modification Program
750-43	Army Test, Measurement, and Diagnostic Equipment Program

Table A-1. Recommended Publications (continued)

FIELD MANUALS	
3-5	NBC Decontamination
3-7	NBC Field Handbook
3-11.4	Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, Chemical (NBC) Protection
4-0	Combat Service Support
4-25.11	First Aid
4-30.3	Maintenance Operations and Procedures
5-125	Rigging Techniques, Procedures, and Applications
6-0	Mission Command: Command and Control of Army Forces
9-43-2	Vehicle Recovery and Battlefield Damage Assess. And Repair
10-52	Field Water Supply
10-67	Petroleum Supply in the Theater of Operations
11-45	Signal Support to Theater Operations
21-31	Topographic Symbols
21-60	Visual Signals
55-30	Motor Transport Units and Operations
7-0	Training the Force
7-1	Battle Focused Training
DA PAMPHLETS	
25-30	Consolidated Index of Army Publications and Blank Forms
25-33	User's Guide for Army Publications and Forms
25-40	Army Publishing: Action Officers Guide
385-1	Small Unit Safety Officer/NCO Guide

Table A-1. Recommended Publications (continued)

DA PAMPHLETS	
710-2-1	Using Unit Supply System (Manual Procedures)
710-2-2	Supply Support Activity Supply System: Manual Procedures
738-750	Functional Users Manual for The Army Maintenance Management System (TAMMS)
750-1	Leader's Unit Level Maintenance Handbook
750-35	Guide for Motor Pool Operations
TECHNICAL BULLETINS	
5-4200-200-10	Hand Portable Fire Extinguisher Approved for Army Users
9-2300-295 Series	Warranty of Vehicles (see DA Pam 25-30 List for Model)
9-2300-422-20	Security of Tactical Wheeled Vehicles
43-0001 Series	Equipment Improvement Report Digest (Not Stocked. Subscribe on DA Form 12 Series)
43-0002 Series	Maintenance Expenditure Limits
43-0002-87	Brake Fluid, Silicone (BFS) Conversion Procedures for Tank-Automotive
43-0125	Installation of Communications-Electronic Equipment: Hook-up of Electrical Cables to Mobile Generator Sets on Fielded Equipment to Meet Electrical Safety Standards
43-0140	Instructions for Preparation of Request for Disposition of Waiver for USAATCOM Equipment and USATACOM, Non-developmental Item (NDI)
43-0142	Safety Inspection and Load Testing of Lifting Devices
43-0209	Color, Marking, and Camouflage Painting of Military Vehicles, Construction Equipment, and Materials Handling Equipment
43-0211	Army Oil Analysis Program (AOAP) Guide for Leaders and Users
43-0213	Corrosion Prevention and Control Including Rustproofing Procedures for Tactical Vehicles and Trailers
43-0239	Maintenance in the Desert

Table A-1. Recommended Publications (continued)

TECHNICAL BULLETINS	
600-1	Procedures for Selection, Training, Testing, and Qualifying Operators of Equipment/Systems
750-25	Maintenance of Supplies and Equipment: Army Test, Measurement, and Diagnostic Equipment (TMDE) Calibration and Repair Support Program
750-651	Use of Antifreeze Solutions, Antifreeze Extender, Cleaning Compounds
SUPPLY BULLETINS	
3-30-2	Chemical-Biological Canisters and Filter Elements: Serviceability
9-16	Personnel Heater and Winterization Kit Policy for Tank-Automotive
11-6	Communications Electronics Batteries Supply and Management Data
700-20	Army Adapted/Other Items Selected for Authorization/List of Reportable Items.
746-1	Publications for Packaging Army General Supplies
TECHNICAL MANUALS	
-10/120/-20P	For every item of equipment authorized (Unit Level)
-30/-30P	(For DSU) For all items repaired by the DSU
5-618	Paints and Protective Coating
5-1080-200-10-HR	Hand Receipt Manual Covering Contents of Components of End Item (COEI), Basic Issue Items (BII), and Additional Authorization List (AAL) for Lightweight Camouflage Screen Systems
5-1080-200-13&P	Operator's, Unit, and Direct Support Maintenance Manual, (Including Repair Parts and Special Tools List) for Lightweight Camouflage Screen Systems and Support Systems
9-243	Use and Care of Hand Tools and Measuring Tools
9-2610-200-14	Operators, Unit, Direct Support and General Support Maintenance Manual for Care, Maintenance Repair and Inspection of Pneumatic Tires and Inner Tubes

Table A-1. Recommended Publications (continued)

TECHNICAL MANUALS	
9-6140-200-14	Operator's, Unit, Direct Support and General Support Maintenance Manual for Lead-Acid Storage Batteries
10-7200-200-13	Operator, Organizational and Direct Support Maintenance Manual (Including Repair Parts and Special Tools List) for Gasoline and Water Cans
10-8400-201-23	Unit and Direct Support Maintenance Manual for General Repair Procedures for Clothing
38-600	Management of Administrative Use Motor Vehicles
43-0139	Painting Instructions for Army Materiel
LUBRICATION ORDERS	
	For every item of equipment authorized requiring lubrication
PS MAGAZINE	
	Issues for last three years on hand

27. ARMY OIL ANALYSIS PROGRAM (AOAP).

a. The purpose of AOAP is to do the following:

- (1)** Detect potential component failure.
- (2)** Determine oil quality and need for oil change.
- (3)** Extend oil life and conserve resources.
- (4)** Reduce maintenance cost through preventive maintenance prior to major repairs.

b. Each Unit Commander will appoint an AOAP monitor who will be responsible for managing the unit's oil analysis program.

c. The Post AOAP Coordinator [*local installation POC, address, and phone number*] conducts quarterly certification training for unit monitors in accordance with established schedule.

d. The unit's AOAP monitor, under supervision of the Motor Sergeant or maintenance supervisor, will:

- (1) Requisition necessary kits and supplies on a timely basis.
- (2) Schedule equipment to be sampled.
- (3) Take samples in accordance with DA Pam 738-750.
- (4) Prepare and submit DD Form 2026 for each sample taken. Take all samples, together with DD Form 2026, to the post AOAP coordinator in Building [number].
- (5) Take required corrective action on notification from the Post AOAP Coordinator or the BMO.
- (6) Maintain an AOAP publication file.
- (7) Ensure all special samples requested by the lab are taken and submitted immediately.
- (8) Send a copy of the partially completed DA Form 3254-R to the support activity when a vehicle or component is work-ordered for maintenance based on lab recommendation. Once completed, DA Form 2408-20 and DD Form 314 are no longer required. Units will use the monthly computerized reports generated by the lab to manage the AOAP.
- (9) AOAP for ground equipment is fully computerized. Units will use the monthly computerized reports generated by the lab to manage the AOAP.

28. CALIBRATION OF TMDE.

- a.** The BMO/NCOIC is the overall Battalion Coordinator for the calibration of TMDE.
- b.** He receives, monitors, and updates, as necessary, all calibration reports received from the installation calibration facility (Building [number], [your installation, phone number]) and the S4, [name] DISCOM/Support Group. He also distributes calibration-due and delinquency reports to the units.
- c.** Commanders will appoint a TMDE Calibration Monitor who will:
 - (1) Maintain current status of all equipment requiring calibration.
 - (2) Monitor all calibration reports received from the Battalion Coordinator and take action as required.
 - (3) Turn in all TMDE scheduled for calibration to [your installation facility].
 - (4) Pick up calibrated equipment NLT one working day after notification.

d. Calibration printouts (three copies) and cards will be distributed by the S4, [Name] DISCOM/Support Group. The Battalion BMO will keep a copy of the master and delinquent printout, and pass two copies to each unit for appropriate action.

e. Units will confirm printouts, change letter requirements as required, and return one copy, indicating corrective action taken, to the BMO. The BMO will consolidate printouts and forward them to DISCOM/Support Group S4.

f. Recommended calibration publications that should be on-hand include:

(1) TB 43-180.

(2) AR 750-43.

(3) TB 750-25.

(4) Area TMDE Support Detachment External SOP.

29. SAFETY, DRIVER, MECHANIC, OPERATOR AWARDS PLAN.

a. Unit Commanders will:

(1) Establish procedures to monitor the number of accident-free miles/hours completed by each driver or operator and the sustained safe, proficient performance of mechanics/repairers.

(2) Recognize vehicle operators who maintain outstanding safe driving records and sections/platoons with outstanding records. DA Form 1118, DA Form 1119, or other forms of recognition will be used.

b. AR 600-8-22 authorizes the issue of driver and mechanic badges for individuals who excel in the operation and maintenance of equipment.

c. Drivers/operators of military vehicles and equipment who have had exceptional driving or operating performance and safety records for at least twelve consecutive months are eligible for safety awards and may have "ARMY EXPERT" or "MASTER OPERATOR" stamped on their operator's permit (AR 600-55).

d. Requests for awards must be coordinated with the Battalion Safety Officer and submitted to the S1 for appropriate action.

30. PRESCRIBED LOAD LIST.

a. All PLL transactions will be in accordance with the End User Manual for the Unit-Level Logistics System (ULLS), Chapters 4 through 6, using the ULLS-G.

b. For PLL policies and procedures applicable to all units in the battalion, see the ULLS-G paragraph of the SOP and the [Name] DISCOM/Support Group's Internal SOP for Unit-Level Logistics System-G.

c. Commanders must ensure the priority system is not abused; they will monitor and authenticate the use of high-priority requisitions. The ULLS-G does not provide an automated function to satisfy this requirement. PLL clerks will produce a Commander's Exception Report each day high-priority requisitions are created and provide it to the Unit Commander. Commanders must review and sign the report and return it to the PLL clerk to maintain on file.

31. LOCAL PROCUREMENT OF REPAIR PARTS.

a. Authority to place calls against blanket purchase agreements (BPAs) established with local vendors and issued by the [*local contracting office*] will be granted by [*Name, Higher Headquarters*].

b. Only BMO personnel granted authorization from the Chief, Purchasing Division will act as agents allowed to place calls against BPAs. ***No other individuals in the battalion are authorized to place such calls.***

c. The aggregate amount of purchase transactions will not exceed \$1,000.00. Purchases will not be divided to avoid monetary limitations.

d. Individuals from BMO authorized as agents will comply with DOD 5500.7-R and will review the regulation at least semiannually. (A statement must be signed verifying compliance with this requirement and kept on file at BMO to be made available during inspections.)

e. Requests for local purchase must be approved and signed by the Unit Commander. When the following criteria are met, requests will be submitted to BMO using DD Form 1348-6:

(1) The supply system has not responded in a timely manner and has failed to expedite repair parts for NMC equipment.

(2) Low-density equipment, the absence of which will impair the mission, must be repaired.

(3) Equipment being used in critical projects in which the number of pieces of equipment utilized is vital to the project's completion must be repaired.

32. RECOVERY AND DISPOSAL OF RECOVERABLE COMPONENTS.

a. Commanders will ensure the PLL clerk and maintenance personnel know how to use the FEDLOG. Also, a copy of CDA Pam 18-1 must be available and used.

b. The recoverability code is a one-position alphabetic code (Column RC of the AMDF). This code identifies the level of maintenance allowed to *dispose* of the item when it can no longer be used.

c. Recoverable parts and assemblies will be disposed of in accordance with subject codes NLT three working days after their removal.

33. UNIT-LEVEL LOGISTICS SYSTEM.

a. Automated procedures for dispatching, TAMMS, licensing, and PLL will be in accordance with the End User Manual for the Unit-Level Logistics System (ULLS), with this paragraph, and with [name] DISCOM/Support Group's Internal SOP for the Unit-Level Logistics System.

b. The following processes must be accomplished by all units at indicated intervals:

(1) Daily.

- (a)** C12 – Excess Report/CDR; Exception Report (run before U31).
- (b)** U31 – Send transaction to DSU.
- (c)** U32 – Send previous transaction to DSU (run immediately after U31 to make a backup copy of the diskette).
- (d)** C43 – Automatic status processing.
- (e)** M52 – Update Maintenance Request status.
- (f)** F32 – Backup ULLS-G data files (this process must be done at the end of the business day).
- (g)** M20 – Motor equipment utilization record return (if necessary).
- (h)** M75 – Equipment Availability Report
- (i)** C54 – Demand History Add (as it occurs).

(2) Weekly.

- (a)** C70 – Zero Balance Report.
- (b)** M20 – Purge control log.
- (c)** M17 – Parts received not installed.
- (d)** M85 – DCR/Deadline Data File Reconciliation (must be run prior to U35).
- (e)** U35 – Deadline data.

(3) Biweekly.

- (a)** C20 – Request for follow-up.
- (b)** C80 – PLL/DCR Reconciliation.

(4) Monthly.

(a) C60 – Demand History Analysis.

(b) C75 – PLL Update.

(c) C65 – PLL Inventory.

(d) C8B- Catalog Update.

(e) C85 – DCR Purge.

(f) C24 – DCR Print with History.

(g) M60- Scheduled maintenance due.

(h) C55 – Excess management.

(5) Annually. M26 – Periodic Usage Report.

(6) Keep on File.

(a) M40 – Report of all operators individually (Automated Form 348).

(b) C60 – Demand Analysis (monthly requirement).

(c) C65 – PLL Inventory (monthly requirement).

(d) C85 – Purge Inventory (monthly requirement).

(e) M20 – Purge control log.

(f) M80 – Fuel usage.

(g) M65 – Scheduled services performed.

(h) M94 – Equipment data file.

(i) M85 – DCR/Deadline Reconciliation (weekly requirement).

(j) M51 – Maintenance Request Register.

(k) C22 – DCR inquiry (all open records).

(7) As Required. M20 – Alert dispatch.

34. SUGGESTION PROGRAM/PROJECT SMART.

a. Commanders will encourage soldiers to participate in subject programs.

b. Project SMART is designed to improve combat readiness through the individual soldier's evaluating and recommending changes in Army logistical doctrine, policy, and procedures. Ideas may be submitted by anyone, regardless of rank. No command approval is required.

c. Suggestions should be in writing using the following format:

- (1) To Project SMART.
- (2) Date.
- (3) Reference (if any).
- (4) Current problem/procedure (please print).
- (5) Recommendation for improvement (please print).
- (6) Full name.
- (7) Address.
- (8) Send the suggestion to:

PROJECT SMART/TIPS
DIRECTOR OF COMBAT DEVELOPMENTS FOR CSS
3901 A AVENUE SUITE 220
FT LEE VA 23801-1809

d. The individual will receive written notification that the suggestion was received and is being evaluated. If the suggestion is adopted, individual may qualify for a monetary or impact award.

e. Any other suggestions geared toward increasing productivity, improving working conditions, reducing likelihood of accidents, or improving morale should be submitted on DA Form 1045. A more complete definition and details on how to use DA Form 1045 are found in AR 672-20.

f. Suggestions on using DA Form 1045 will be routed through the Battalion S4 for processing and evaluation.

35. SUBMISSION OF QUALITY DEFICIENCY REPORTS.

a. All Army materiel is subject to Quality Deficiency Reports (QDRs) and Equipment Improvement Reports (EIRs). The purpose of submitting a QDR is to report conditions below standard-quality workmanship (shoddy construction). The purpose of the EIR is to report materiel faults in design, operation, or manufacture.

b. The unit that identifies the need for a QDR or EIR is responsible for reporting the condition under AR 702-7 and DA Pam 738-750.

c. SF 368 will be used to report equipment quality deficiencies and to suggest ideas or make recommendations to improve such equipment.

36. EXTERNAL ASSISTANCE.

- a. Unit Commanders are encouraged to utilize all the external assistance available to them in this installation.
- b. Prepare a listing of available assistance in supply and maintenance disciplines.

37. WARRANTY PROGRAM FOR NEW EQUIPMENT.

a. The Warranty Coordinator (WARCO) provides information and assistance to units supported by the Maintenance Division, DOL [*list WARCO information*].

b. Warranties cover defects in materials or workmanship, usually for a specified time. Some warranties run for a remarkably long time.

c. Warranties don't usually cover things that go wrong because of:

- (1) Neglect.
- (2) Improper or unskilled operation.
- (3) Installing wrong parts.
- (4) Floods, hail storms, tornadoes, and so on.
- (5) Alterations of any kind.
- (6) Improper or unskilled repairs.
- (7) Combat.

d. Warranties generally don't cover high-usage or high-expected-failure-rate parts, such as filter elements, electronic tubes, bulbs, fuses, belts, and hoses. The exception is when a failure covered by the warranty causes any of these parts to also fail.

e. Warranty work can generally be done either by Army maintenance activities or by the manufacturer or its dealerships, whichever the Army prefers in each case. To get repairs for the following types of equipment, call the BMO, who will, in turn, call the WARCO:

- (1) Items requiring Equipment Control Records (DA Form 5992-E).
- (2) Non-tactical vehicles such as sedans, trucks, and buses operated from transportation motor pools.
- (3) Engine-driven items costing over \$3,000, such as riding mowers, compressors, generators, and pumps.

f. If the work is to be done by a dealership, units will be advised to submit a DA Form 5990-E in accordance with DA Pam 738-750 to the WARCO office. The WARCO will assign a job order number and monitor the repairs to completion. Before units attempt to perform repairs of items of equipment under warranty, contact the WARCO for authorization and coordination.

g. Small, inexpensive items like toasters, fans, push mowers, tools, vacuum cleaners, and air conditioners are usually covered by "Trade Practice" warranties. The Army has the same warranty rights as private purchasers have. If the item is new or not yet heavily used and it appears to have failed as a result of a defect in the manufacturer's materials or workmanship, call the WARCO to help pursue warranty repairs.

38. SUBMISSION OF MAINTENANCE REPORTS TO BATTALION.

a. All units will submit to the BMO, together with the end of the month DA Form 2406, a report itemizing the previous month's performance in the following areas:

(1) AOAP – samples due, number taken, number delinquent, and reason for failing to comply with standards.

(2) Calibration – number of TMDE due, number delinquent, reason for failing to comply with standards.

(3) PLL – number of lines, number of zero balances, problems experienced with supply system.

(4) Roadside inspections – number inspected, number passed, number failed, what's being done to prevent similar failures.

(5) Scheduled services – number due by type: monthly, quarterly, semiannually, annually; number performed; number delinquent; reason for failing to comply with standards.

b. Input from units will be consolidated by BMO and discussed by Battalion XO during the monthly DISCOM/Support Group maintenance meeting with the DISCOM/Group Commander and during the monthly maintenance with the Battalion Commander.

39. PREPARATION AND SUBMISSION OF MATERIEL CONDITION STATUS REPORT (DA FORM 2406).

a. Reports are due to the BMO as follows:

(1) Weekly. Due every Thursday NLT 1300. Any daily changes, additions, or deletions must be called in to BMO as they occur.

(2) Mid-Month. Two working days prior to the 15th NLT 1300 hours. Front and back of DA Form 2406 must be signed by the Unit Commander in accordance with AR 700-138.

(3) End of Month. Two working days prior to end of the month. Backside only of DA Form 2406 is completed. The status of parts requisitioned at the unit level to repair NMC reportable equipment, and an explanation for deviation from standards are a must in this report.

b. Unit Commanders must ensure DA Form 2406 is prepared in accordance with AR 700-138. Items must be listed by LIN sequence, and model numbers (column c) must be exactly as they appear in Appendix B of subject regulation.

c. In addition, all units will provide their PLL status on the right-hand side of block 11 (remarks) of DA Form 2406 using the following format:

- (1)** Unit's DODAAC.
- (2)** Lines authorized in PLL.
- (3)** Total lines with zero balance.
- (4)** Percentage (%) of lines with zero balance.

d. All parts needed to repair NMC equipment at unit level must be listed in Column I of DA Form 2406 or on an additional sheet, when required. Include the following:

- (1)** NSN part number.
- (2)** Part nomenclature.
- (3)** Document number (Column h).
- (4)** Current status of requisitions (Column h).

e. Contact the BMO for assistance to get latest status of requisitions using the Logistics Intelligence File (LIF).

NOTE: If your unit is operating under the Automated Materiel Status System (AMSS), replace the discussion on DA Form 2406 with the procedures used by the unit to manage AMSS reporting.

Appendix B

Sample DS-Maintenance External SOP

1. PURPOSE. To establish policies and procedures for direct support (DS) level maintenance to units supported by the *[Unit Name]*.

2. SCOPE.

a. This SOP applies to all units provided primary or backup DS-level maintenance by the *[Unit Name]* in the following categories:

- (1) Tactical vehicles and trailers.
- (2) Weapon systems (small arms, artillery, fire control).
- (3) Missile and air defense systems.
- (4) Communications-electronics equipment (special electronic devices, radar, optics).
- (5) Construction-engineer equipment.
- (6) Power-generation and light engineer equipment.
- (7) Air conditioning and refrigeration.
- (8) Quartermaster and chemical equipment.
- (9) COMSEC.
- (10) Allied trades (welding, body and fender, radiator repair, glass, light duty fabrication, and machining).
- (11) Canvas and tentage.
- (12) Topographic equipment.
- (13) Fuel and electric components.
- (14) Batteries.

b. General support (GS)-level maintenance is provided on printed circuit cards and boards for all SINCGARS radios and fire-finder equipment. Note that printed circuit cards and boards will be job-ordered to the *[Name]* Maintenance Detachment by DOL only. All unserviceable printed circuit cards or boards will be turned in to the SSA for further evacuation to DOL. Any other GS-level equipment repairs require the authorization of the Chief, Maintenance Division, DOL.

3. RESPONSIBILITIES.

a. Materiel maintenance is a command responsibility with the primary purpose of sustaining equipment in a fully mission-capable status. Each unit will maintain and repair equipment at the lowest level of maintenance within the capability and authority to perform the work. Unit-level maintenance actions will be accomplished prior to work-ordering equipment to DS-level maintenance.

b. The *[Unit Name]* is responsible for providing direct support-level maintenance to divisional/non-divisional units and backup maintenance for *[Name(s) of Designated Unit(s)]*. Procedures outlined in paragraph 4 (Procedures) of this SOP apply to all customers.

c. The *[Unit Name]* is also responsible for providing technical assistance and liaison visits to customer units. Enhanced readiness can be obtained when problem areas and support requirements are determined and mutually addressed. Technical assistance includes:

(1) Advice, assistance, and training pertaining to the installation, operation, modification, maintenance, and recovery of materiel.

(2) Assistance in the evaluation of the condition of materiel and the effectiveness of unit-level maintenance for supported units.

(3) The coordination of warranty claim actions pertaining to organic or supported unit materiel or the processing of warranty actions through the installation WARCO.

d. Recovery of equipment is the responsibility of the owning unit. Backup recovery support will be provided by the *[Unit Name]* after coordination with the *[Name(s) of Designated Unit(s)]* Support Operations Office and the *[Unit Name]* Maintenance Control Section. Telephonic requests are acceptable; however, submission of a follow-up Maintenance Request (DA Form 2407) is required. Detailed information must be provided to describe the equipment, its problems, location, and point of contact.

e. The Army Oil Analysis Program (AOAP) is a mandatory responsibility at all levels of command. The AOAP is outlined in detail in AR 700-132, AR 750-1, TB 43-0211, appropriate TBs, TMs, and local SOPs. Direct support-level maintenance mandated by the oil-sampling lab will be job-ordered to the *[Unit Name]* for component replacement. *[Unit Name]* will take an oil sample and send it to the lab on any equipment submitted for repair, upon acceptance, to verify the need for component replacement. The unit submitting the job order is required to also provide the *[Unit Name]* with the appropriate filters and oil in order for a sample to be taken by the *[Unit Name]* during final inspection to ensure the problem has been corrected.

f. The Maintenance Management Improvement Program (MMIP) is the responsibility of all commanders; it provides executable actions and information for the improvement of maintenance management, operations, procedures, and techniques. AR 750-1 outlines the MMIP, which is designed to raise a unit's overall readiness condition.

g. Sample data collection is a command responsibility; it will be conducted under approved collection plans in accordance with AR 750-1.

h. Controlled exchange of parts for equipment job-ordered to the *[Unit Name]* will be done only with the owning unit's written authorization signed by the Battalion Commander. The Shop Officer will advise customer units when a controlled exchange is desirable for increased readiness. All controlled exchanges will be performed in accordance with AR 750-1.

i. Supervisory responsibility for the care and safekeeping of government property issued to, or used by, subordinates is inherent in supervisory positions. Proper preservation, handling, and packing of materiel and equipment in the maintenance and supply chain is therefore incumbent upon all supported units, as well as the *[Unit Name]*. Improperly packaged items will be rejected.

j. The *[Unit Name]* Commander is responsible for establishing quality control and quality assurance procedures that will assure product quality and reliability. If, at any time customers are dissatisfied with work performed by the *[Unit Name]*, they should immediately call the Maintenance Control Officer, Company Commander, or the SPO, *[Unit Name]*. Telephone numbers are listed in the applicable appendix.

4. PROCEDURES.

a. General.

(1) Pending technical inspection, materiel and equipment will normally be accepted for repair or classification on the days and hours listed below:

NORMAL CUSTOMER SUPPORT HOURS

Monday	0900-1500
Tuesday	0800-1500 (Pacing items only, training day)
Wednesday	0900-1500
Thursday	0900-1500
Friday	0900-1500

NOTE: Support during other than normal duty hours is best accomplished through prior coordination between the *[Unit Name]* and supported units. For high-priority work orders after duty hours, on weekends, or on holidays, call *[Unit Name's]* CQ at *[phone number]*. The *[Unit Name]* will be open until *[time]* on military paydays.

(2) The Maintenance evacuation chain is depicted below:

<i>[SUPPORTED UNITS (NORMAL)]</i>	<i>[SUPPORTED UNITS (BACKUP)]</i>
CUSTOMER UNIT	CUSTOMER UNIT
↓	↓
<i>[Unit Name]</i>	DISCOM SPT UNITS
↓	↓
DOL	<i>[Unit Name]</i>
	↓
	DOL

NOTE: The *[Unit Name]* will evacuate GS-level repair work directly to DOL using internal maintenance assets.

(3) Customer units are requested and encouraged to make use of both telephonic and personal coordination with the *[Unit Name]* SPO, *[Unit Name]* Company Commander, MCO, or Maintenance Control Supervisor (MCS) on maintenance support issues. Commanders at all levels are encouraged to visit at any time, especially on assumption of command.

(4) All maintenance activity by customer units in the *[Name]* shop area is to be coordinated with the Maintenance Control Section. Visitors are required to contact the MCO or MCS upon arrival in the shop area. Customers are not permitted in any shop area without escort from the Maintenance Control Section.

(5) All special support requirements (field exercises, maintenance support teams, and so on) must be coordinated through *[Major Subordinate Command Unit Name]*, Support Operations Office. Divisional requests should be coordinated thorough the DMC, DISCOM, and G4 where appropriate. Inclusion of support personnel in planning meetings is strongly encouraged and should prove mutually beneficial.

(6) Equipment submitted for repair will have the following supporting documents:

(a) Maintenance Request, DA Form 5990-E. Blocks 1b and c, 5-34b, must be filled out completely and correctly in accordance with DA Pam 738-750. Special attention should be given to completing entries in blocks 6-13. Block 24 will contain a description of deficiencies. Repair as required' is not a description of a problem and will not be accepted. The telephone number of the unit submitting the work request and the bumper number of the vehicle must be annotated on the work request.

(b) One copy of DA Form 5988-E noting faults found during PMCS will accompany DA Form 5990-E. The DA Form 5988-E will be signed by the Maintenance Supervisor, Maintenance Officer, or designated representative. Equipment will not be accepted by the [Unit Name] without a completed DA Form 5988-E. Materiel evacuated through DISCOM maintenance units must also be accompanied by the owning unit's 5988-E to ensure accountability of components. Any unit-level non-deadline faults requiring parts will have a document number with the assigned DODAAC annotated on the DA Form 5988-E. If an item is rejected after the initial inspection by the [Unit Name], the supported unit has 72 hours to correct unit-level deficiencies or provide document numbers for faults requiring repair parts. Failure to comply with the 72-hour rule will result in the submission of another work request and a re-inspection of the equipment by the [Unit Name] inspectors. All unit DA Form 5988-E accompanying work requests must identify failed tests in the STE-ICE go/no-go chains directing DS-level maintenance. These readings will assist the Technical Inspectors in making repair determinations with greater efficiency and accuracy.

(c) All equipment requiring historical records in accordance with DA Pam 738-750 will be work-requested with the appropriate historical records present.

(d) Units on the ULLS-G systems will submit an ULLS-G-generated DA Form 5990-E along with ULLS-G diskette. The diskette will be read by the SAMS-1 computer and a job order number will be assigned. Additionally, the diskette will be updated and returned to the customer with job status.

NOTE: The DS maintenance unit determines how many items will be accepted on a single maintenance request.

(7) Priority Authentication:

(a) All maintenance requests (DA Form 5990-E/2407) with an issue priority designator (IPD) of 01-10 will be authenticated by the Unit Commander or his/her designated representative (as listed on a DA Form 1687) by placing his or her signature in the block marked "PD Authentication."

(b) Personnel authorized to submit or receive equipment on DA Form 5990-E must be designated on a DA Form 1687, filled out in accordance with DA Pam 710-2-1. Include in the remarks block the unit's phone number, commander's name, and the statement, "form executed for work request purposes." Work will not be accepted or released where proper delegation of authority does not exist.

(c) Supported units will provide the Maintenance Control Section with one copy for a current signature card and a copy of the commander's assumption of command orders. The DA Form 1687 must be kept current and should be reviewed every 90 days, updated every 12 months, whenever there is a change of command, or when new personnel are sent to turn in and pick up equipment. No more than three full DA Forms 1687 will be submitted per supported unit and as necessary from units receiving backup support.

(8) Large numbers of work requests should be coordinated with the Shop Officer or Maintenance Control Supervisor prior to submission. Vehicles with shelters should also be coordinated to see if removal is required.

(9) Low priority includes deferred maintenance, cosmetic repairs, MWOs, special equipment installation, and equipment requiring maintenance or repair for which the owning commander or his designated representative has authorized a delay in correcting the fault. A safety technical inspection will be required for deferred maintenance candidates. The equipment will be released to the unit pending the requisition of required parts. Upon receipt of the required parts, the unit will be contacted to return the equipment for repair; or a Maintenance Support team may be dispatched to perform the maintenance on-site. Prior to work starting on a deferred job, a 100 percent technical inspection will be performed. Upon notification, the unit has 24 hours to return deferred equipment for repair. Non-compliance will result in job order closure.

(10) Upon demand, job status printouts will be available containing the latest status of all open work requests. Additional status information will also be available to commanders and maintenance officers only upon request. This includes information on DSU non-available days required for DA Form 2406 computation. The DSU job order number (annotated on the receipt of DA Form 5990-E) should be used when checking the status of specific items.

(11) A fully staffed and equipped Maintenance Support team may be furnished to complete required work. Teams will be established based on the most economical maintenance support responsiveness required to maximize combat time by minimizing repair and evacuation time. Coordination for all Maintenance Support teams must be made through [Unit Name] Support Operations Office to prevent confusion or waste of efforts.

(12) Materiel under warranty will be so identified; actions will be completed in accordance with AR 700-139 and reported under DA Pam 738-750. Unit readiness and mission effectiveness will take priority over warranty actions. Should warranty problems occur, notify the Unit Warranty Coordinator. The Warranty Coordinator will notify the [Installation Name], Maintenance Division of the warranty problem. Authorization of the proper action will be provided at that time.

(13) Changes to a unit's equipment density impact heavily on the [Unit Name]'s abilities to provide adequate support (for example, repair parts stockage, technical publications, training, special tools, and so on). Therefore, each supported unit is required to provide a density list updated each October 15th. The following format is required:

LIN# ERC NSN MOD/NOUN AUTH/OH

Note: The unit's property book hand receipt should be the basis for preparation of the density list. A unit roll-up or similar document will be sufficient for the [Name(s) of Designated Unit(s)]. Changes in the density list must be provided to the [Unit Name] as soon as possible for maximum support readiness.

b. Turn-In Procedures and Inspection: Materiel submitted to the [Unit Name] for repair and return to user, transfer, or turn-in will be serviced and repaired to the standards specified in materiel publications which apply to DS-level maintenance. Equipment meeting the conditions for repair at DS/GS-level maintenance will be job-ordered to the receiving clerk in the Maintenance Control Section. Forms will be checked for completeness and correctness to ensure that all required documents are attached.

(1) **Completeness of equipment:** Missing components or assemblies not required for DS/GS-level maintenance will be noted on the Equipment Inspection and Maintenance Worksheet (DA Form 5988-E) prior to acceptance. Equipment will be rejected if component assemblies are missing that would prevent performance, required DS/GS-level maintenance, or safe testing, inspection, and diagnosis of the equipment. All vehicles will have

an operator's seat. Certain pilferable items must be removed as specified in the applicable appendix. The *[Unit Name]* will not be responsible for loss or damage of equipment left unsecured in the shop area that has not been inspected and accepted.

(2) Damaged/missing equipment: Items that are damaged or missing parts that are determined to be the result of other than fair wear and tear will be accepted for estimated cost of damage (ECOD) and repair. The responsible officer or commander will be notified so he or she may take actions in accordance with AR 735-5. Repairs will not be accomplished without a release statement authorizing the repair of ECOD equipment or, if negligence is not involved, a statement signed by the Unit Commander stating the cause of the damages. Requests for actual cost of damage (ACOD) must be coordinated with the Maintenance Control Officer. The *[Unit Name]* will reject fair wear and tear statements for equipment clearly damaged due to negligence.

(3) DS/GS-candidate vehicles: Vehicles will be accompanied by an organizational mechanic equipped with a general mechanic's toolbox to correct deficiencies that would otherwise result in rejection. The inspections performed in accordance with TM -10/-20 standards will include, but are not limited to:

(a) Brake system: Master cylinder fluid level will be checked. Any leaks in brake systems, including the air supply system, will be cause for rejection.

(b) Parking brake: The parking brake will be inspected for any deficiency making it unsafe, such as adjustment, operation, lining wear, and incorrect mounting. Safety is the primary consideration.

(c) Battery-charging system: The battery compartment will be inspected for proper installation of batteries, and loose or disconnected terminals. Specific gravity reading will be checked for level of charge. Specific gravity on fully charged batteries should be at least 1225. Generator and alternator charging systems will be checked for correct output (TM 9-6140-200-14).

(d) Electrical system: The electrical system will be inspected for loose or bare wires, dash panel gauges' operation, and warning lights.

(e) Engine compartment: All fluid levels will be checked (engine oil, power steering fluid, automatic transmission fluid, and coolant). Leaks of any kind, including oil, fuel, and water, will be noted for appropriate action.

(f) Major components: All major components (for example, axles, transmissions, and transfers) will be checked for low oil levels and contamination. Breather vents will be checked for proper ventilation.

(g) Tires: Tires will be serviceable and inflated to the proper pressure. The unit will be notified to change flat tires on its job-ordered equipment if tires deflate within 48 hours.

(h) Cleanliness: Vehicles must be cleaned to permit technical inspection, repair, or proper evaluation. The steam cleaner at the *[Unit Name]* is available only at the inspector's discretion. All vehicle undercarriages will be free of dirt, oil, and grease.

(i) Fuel: All vehicles will have at least $\frac{3}{4}$ tank of fuel. Fuel tankers and pods will be drained of all fuel and flushed prior to acceptance. A statement signed by the Company Commander certifying system flush is required.

(j) Security: All vehicles will have a means to be secured (lock, keys, welded chain, or similar device).

(k) Safety: All vehicles and trailers will have a pair of chock blocks for proper cribbing when parked or worked on.

(4) Inspection/Analysis: In addition to the technical inspection conducted to determine the condition of each item or piece of equipment, a follow-on economic analysis will be made to determine whether the item qualifies for repair or turn-in/evacuation. Materiel will be considered economically repairable when the estimated cost is less than the overhaul cost specified in the applicable TB 43- and TB 750-series manuals.

(5) Electronic Equipment: All electronic equipment must be tagged to indicate the unit, nomenclature, model number, and serial number. Night vision equipment will only be accepted with charged batteries, protective cover, carrying case, and headset. Mine detectors will be job-ordered with charged batteries. Evidence of unauthorized work or modification will be cause for ECOD and investigation if damage to the equipment results. Repair of communications and sensitive equipment constitutes considerable expenditures of time and money. Military vehicles must be used to turn in or pick up electronics equipment; they are subject to inspection by Shop Section personnel to ensure suitability. Repaired electronic equipment will not be released to the customer unless sufficient cushion and or bracing material is used in truck beds. Salvage mattresses are adequate for this purpose. There are no exceptions to this rule. The Shop Section will not provide cushioning or bracing.

(6) Armament Equipment: All armament items submitted to the *[Unit Name]* must be complete and thoroughly cleaned. Aiming circles, compasses, binoculars, sight units, and gunner's quadrants will have protective covers or carrying cases. Ammunition and explosives will be removed, as well as all rifle slings, prior to turn-in. Units picking up weapons will prevent any unnecessary damage to the weapons while returning them to the unit's arms room. The following will be accomplished before submitting any job:

(a) Fire Control:

1. Aiming circles, compasses, binoculars, sight units, and gunner's quadrant will have protective covers or carrying cases.

2. Sight units will be turned in free of dirt and oil.

3. Howitzer mounts needing maintenance will be job-ordered separately from the howitzer.

4. Sights damaged not due to fair wear and tear will need a damage statement. This statement must be signed by the Unit Commander and endorsed by signature of the next higher command.

(b) Artillery:

1. Borescoping/pullover gauging criteria, as defined in TM 9-1000-202-14, must be strictly adhered to. All tubes must be cleaned and free of carbon buildup in order to obtain an accurate reading. An overdue borescoping and pullover gauge inspection is cause for the weapon system to be deadlined.

2. Requests for borescoping will be turned in 30 days before due date on DA Form 2408-4. Requests will be made by memo for record from the Motor Officer to the Maintenance Control Section. DA Form 5990-E will be turned in to the Maintenance Control Section by the customer on the last working day prior to the inspection.

3. Gun tubes will be cleaned the day before, with only a light coat of oil left in the tube.

4. Semiannual services will be performed and verified on DA Form 5988-E by the Motor Officer or Section NCOIC before requests for annual services are accepted.

5. Organizational maintenance will perform a 100 percent technical inspection in accordance with the crew and organizational technical manual covering the weapons system. A copy of the DA Form 5988-E will be turned in with the DA Form 5990-E when requesting an annual service.

6. Howitzers must have appropriate covers on guns to prevent rusting.

(c) Small Arms:

1. All ammunition and explosives will be removed, weapons will be cleaned, and rifle slings will be removed before turn-in.

2. Weapons must be tagged with the unit designation and the serial number.

3. The M203 grenade launcher will not be separated from the M16 rifle when repair work is needed on either weapon. Both serial numbers will be annotated on the work request.

4. Crew-served weapons will be put on separate job orders.

5. Mortars will be accompanied by their logbooks.

6. Borescoping/pullover gauging criteria, as defined in TM 9-1000-202-14, must be strictly adhered to. Tubes must be cleaned and free of carbon buildup in order for an accurate reading to be obtained. An overdue borescoping and pullover gauge inspection is cause for the weapon system to be deadlined.

7. M60 machine guns turned into maintenance for annual gauging will be submitted with their spare barrels.

8. All annual gauging for M16s will be by appointment only. This action should be requested by a memo to the Shop Office. The memo will state the number of M16s, date preference, location of arms room, and the POC's name and phone number. The memo is signed by the Unit Commander.

9. For allied trades welding, machine shop, and fabrications, some fabrication capabilities exist within the [Unit Name]. Supported units requesting fabrication of items will follow the procedure outlined for normal support with the following exceptions:

a. A detailed drawing (complete with dimensions and so on) must be attached to the work request. When possible, a “like” item should be submitted with the maintenance request so the section doing the fabrication can see a finished product. This saves time and questions.

b. Units will not submit requests to modify military equipment without proper authorization (for example, modification work order (MWO), TM recommendations, or a letter from the commander explaining the modification). In any event, the [Unit Name] will have the final authority in applying the change.

c. Since fabrication of items tends to be very costly in terms of man-hours and materials, all efforts should be made to procure the item from normal supply channels.

d. Radiators must be complete and every precaution must be taken (bracing and padding) to ensure no further damage occurs to the radiator.

e. All canvas/camouflage jobs must be cleaned and dried with organizational repairs completed prior to turn-in.

(7) COMSEC:

(a) All CCI equipment will be zeroed prior to turn-in. Non-secure items will be noted through the [Unit Name] COMSEC custodians.

(b) Lost unkeyed CCI equipment will be documented through the unit’s S2 to [Unit Name].

(c) Qualified repairers will inspect all CCI equipment per COMSEC Maintenance Training and Experience Record, DD Form 1435.

(d) Remove fill batteries for all CCI equipment prior to turn-in.

(e) Modifications of equipment for painting, stenciling, and so on are not authorized and will not be accepted at turn-in in accordance with AR 750-10.

(8) Fuel and Electric:

(a) Items noticeably damaged due to negligence require a damage statement.

(b) The 60-amp generator, stock number 2920-00-909-2483, requires installation of the adjustment plug; otherwise, a missing part statement is required.

(c) Wiring harness jobs or electrical problems on military vehicles require the Inspection Section to inspect the vehicle first.

(d) All components job-ordered to the Fuel and Electric Shop must be cleaned of excess dirt, oil, and water before acceptance. Usually, this responsibility falls on the unit that job-ordered the equipment.

(9) Battery Shop:

(a) Batteries job-ordered to the *[Unit Name]* are not required to be drained prior to turn-in. They will be secured to pallets with the positive and negative posts taped to prevent shorts or sparks. Battery caps must be serviceable and securely affixed to the batteries. Unserviceable batteries found to be leaking or cracked will be drained by the *[Unit Name]* Battery Shop prior to return to customer.

(b) *[Unit Name]* and division tech supply activities will turn in unserviceable batteries to the DRMO on a DA Form 2765-1. The turn-in activity will deliver the batteries to the DRMO on an appointment basis.

(c) Palletized batteries will be placed either sideways or upside-down, stacked no more than two high with plywood separating the levels. Non-metallic spacers will be placed between all batteries. Additionally, non-metallic strapping will be used; do not use banding.

(d) DD Form 1577 is required for turn-in of unserviceable batteries to DRMO.

(10) Engineer Shop:

(a) Power generator equipment:

1. All job-ordered equipment will be accompanied by DA Form 5988-E (unit's copy). Work-ordered equipment will not contain organizational faults. Organizational parts missing from equipment will contain bona fide document numbers with the DODAAC on the organizational copy of DA Form 5988-E.

2. A five-gallon fuel can will accompany generators without fuel tanks.

3. Fully charged batteries are required on all battery-started equipment.

4. Equipment will not be accepted for repair with Class I or Class II oil leaks. If equipment contains a Class III leak, the leak must physically drip from the equipment.

5. If equipment is job-ordered on a priority 013 for a routine modification work order and a non-mission-capable fault is discovered, the owning unit will be advised to submit a job order for the non-mission-capable fault found. The MWO job order will be closed out and the modification completed under the NMC fault work order.

(b) Air Conditioning and Refrigeration Quartermaster and Chemical Equipment:

1. All organizational-level faults will be corrected prior to submitting the equipment for job order. Missing organizational parts will be documented on the organizational copy of DA Form 5988-E.

2. A copy of the applicable technical manual is required to accompany the equipment at the time of initial inspection.

3. Equipment required to be purged will be submitted with a purging statement. Equipment will not be accepted without a purge statement.

4. Damaged equipment requires a damaged statement, authenticated by the Unit Commander or his designed representative.

5. Equipment operators or individuals knowledgeable of equipment must be present for job orders repaired on site.

(c) Heavy-lift/Construction Equipment:

1. Equipment will be accompanied by a DA Form 5988-E (unit's copy). Equipment being submitted for DS-level repairs will contain no organizational faults. Organizational parts missing from equipment will contain bona fide document numbers with the DODAAC on the organizational copy of DA Form 5988-E.

2. Fully-charged batteries are required for all battery-started equipment.

3. Heavy construction equipment rollover protection safety (ROPS) will be fully in place on the equipment prior to submission of the job order.

4. All bulldozers will have blades removed prior to submission of the job order.

5. Equipment required to be tested in accordance with TB 43-0142 will meet applicable requirements prior to submission of the job order.

6. Equipment required to be tested in accordance with TB 43-0151 will meet applicable requirements prior to submission of the job order.

7. Tires on heavy construction and materiel-handling equipment must contain air for a period of 48 consecutive hours. If tires go flat, the unit will be notified to execute repairs as soon as possible.

8. Equipment will not be accepted for repair of Class I or II leaks. If equipment is job-ordered for Class III leaks, the leaks must meet the criteria of a bona fide Class III leak and physically drip from the equipment.

c. Upgrading of Priority Designators:

(1) Priority of work will be given to a unit's pacing items and ERC A-line items. Maintenance requests are then prioritized by the Unit-level Priority Designator and date of receipt. Generally, the highest priority, oldest job will be worked first.

(2) When it becomes necessary to upgrade the IPD before a maintenance request has been completed, the commander should notify the Maintenance Control Section in writing.

(3) Commanders should be aware of priority misuse within their own organizational maintenance area. Suspected misuse of priority found by the *[Unit Name]* will be forwarded to the appropriate commander.

d. Notification and Pickup of Repaired Equipment:

(1) Supported units will be notified by the *[Unit Name]* when completed work requests are available for pickup. The name of the person notified and the date notified will be recorded with the work request. Supported units are expected to expeditiously pick up materiel or equipment upon notification. The following time frames will be adhered to:

IPD	PICK UP WITHIN
01-03	1 working day
04-10	1 working day
11-15	2 working days

(2) Customers failing to pick up equipment after proper notification will be sent a letter of notification. This letter will advise them of impending termination of work order service by the *[Unit Name]*. Lack of immediate action or response will be so noted in a second letter to the customer's Battalion Commander.

(3) The Number 1 (green) copy of DA Form 5990-E is required for pickup of equipment and will be surrendered upon receipt of the equipment. If this copy has been lost, the supported unit will provide a statement verifying that the copy of DA Form 5990-E has been lost. This statement will be signed by the Unit Commander or acting commander.

(4) Repair of communications and sensitive equipment constitutes considerable expenditures of time and money. Military vehicles must be used to turn in or pick up electronic equipment and are subject to inspection by Shop Section personnel to ensure suitability. Repaired electronic equipment will not be released to customers unless sufficient cushioning and bracing material is used in the truck beds. Salvage mattresses are adequate for this purpose. There are no exceptions to this rule. The Shop Section will not provide cushioning or bracing material.

(5) Units picking up weapons will have a weapons rack or cushion to place the weapons on if there are more weapons than one person can hold. This will prevent any unnecessary damage to weapons while returning them to the unit's arms room.

(6) Personnel from supported units who pick up equipment are encouraged to inspect the quality of the work prior to signing for it. Questionable work by the *[Unit Name]* will be brought to the Maintenance Control Officer's attention immediately.

(7) A 100 percent serial number joint inventory will be conducted on components to ensure units are not picking up another customer's equipment (such as weapons).

e. Divisional ORF:**(1)** The customer unit will:

(a) Ensure all organizational deficiencies are corrected and accepted for the direct support faults for which the equipment was placed on work order, and that it meets the TM -10/-20 standards.

(b) Prepare necessary paperwork for float exchange (in accordance with float MOA).

(c) The owning unit must provide the *[Unit Name]* with an ULLS-G diskette containing equipment data.

(2) The Maintenance Control Officer will:

(a) Maintain records in accordance with AR 750-1 and DA Pam 710-2-2.

(b) Ensure that SAMS 1 operators perform ORF transactions in accordance with the SAMS 1 User Manual ALSM 18-L21.

(c) Ensure that float candidate is reparable at DS-level or DOL before the transaction occurs.

(d) Authenticate and date DA Form 5990-E in accordance with DA Pam 710-2-2.

(3) ORF transactions will not be delayed due to non-availability of parts required at the unit level (in accordance with float MOA).

(a) The unit will install all needed repair parts from its PLL.

(b) If repair parts are not available, the unit will cross-level the necessary parts from the float to the equipment job-ordered prior to completion of the transaction.

(c) The *[Unit Name]* Float Section will not pick up job-ordered equipment that was floated if it does not meet 10/20 standards or if it is missing any parts, whether organizational or DS-level.

(4) The following steps are established for ORF procedures. *[Insert local ORF procedures here.]*

(5) When ORF equipment items are needed for a deployment, the Maintenance Control Officer will sign for all equipment along with any historical documents. The Maintenance Control Officer will then follow established procedures. Any equipment job-ordered for maintenance will be correctly updated at the Maintenance Control Section. A joint inventory will be conducted and all supporting documents will be properly executed prior to the Maintenance Control Officer's release from his responsibilities.

Appendix C

Recommended Maintenance Company Organizations

This appendix presents a logical way in which a maintenance company commander might organize the company into a platoon-oriented organization for enhancement of command and control (C2). What is proposed in this appendix is a methodology that is not directive in nature, but should serve as a guide based on METT-TC considerations. For the most part, these recommendations reflect a merging of the headquarters section and the maintenance control section into a HQ platoon. Figures C-1 through C-28 shows a menu of non-divisional and divisional maintenance company organizations for consideration by the maintenance company commander.

PROPOSED NON-DIVISIONAL MAINTENANCE COMPANY ORGANIZATIONS

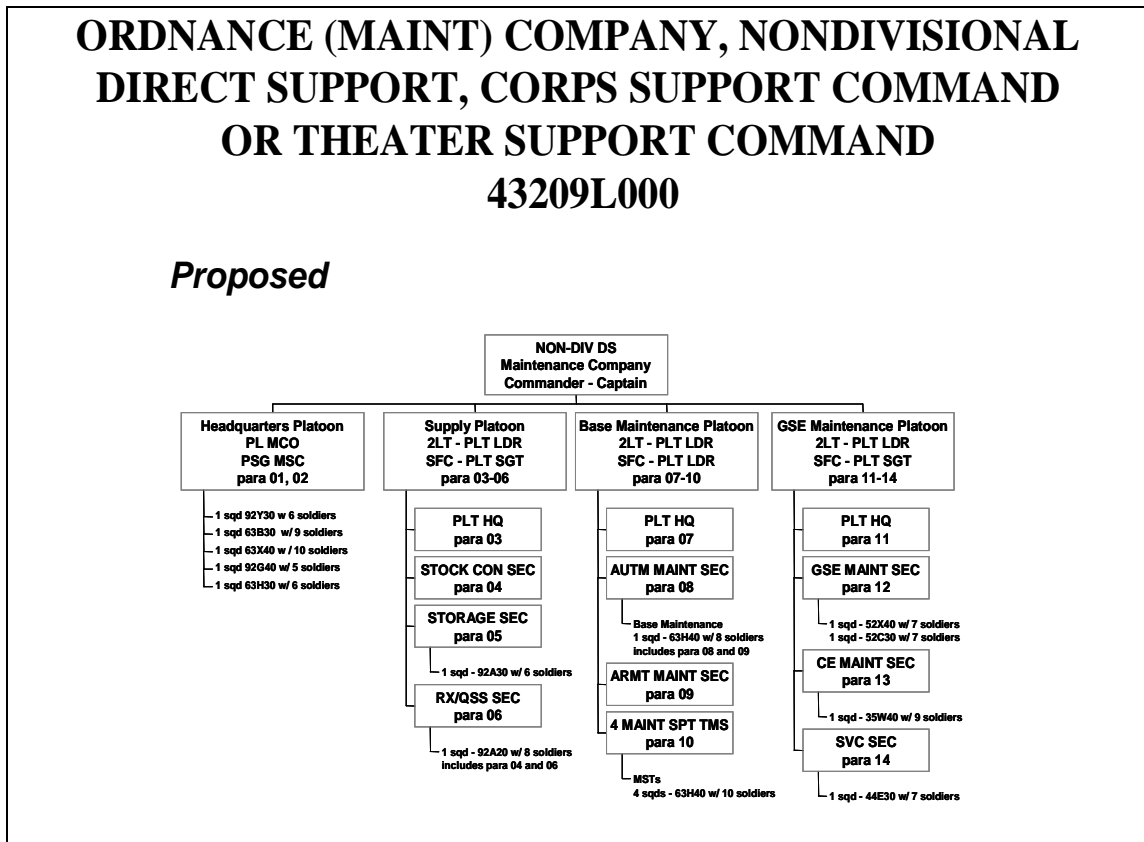


Figure C-1. Ordnance (MAINT) Company, Non-divisional Direct Support, Corps Support Command or Theater Support Command, 43209L000

Concept COA 1 of 2.

The company headquarters (paragraph 01) and the maintenance control section (MTOE paragraph 02) are combined to make a headquarters platoon.

C2 relationships

The maintenance control sergeant the most experienced NCO serves as the headquarters platoon sergeant.

The motor pool is broken down into two squads with the motor sergeant and senior mechanics serving as squad leaders.

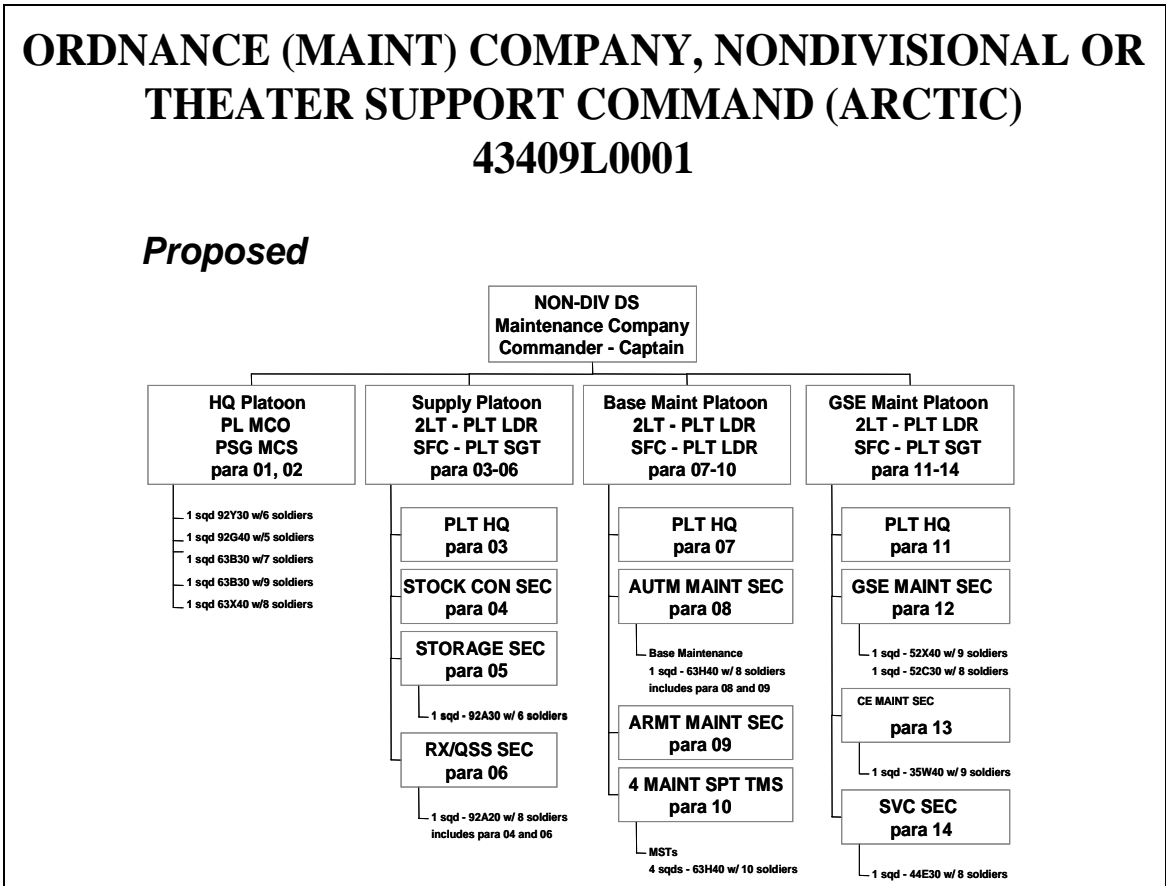
The 92G40 with 5 cooks are a squad.

The supply sergeant is the squad leader for the supply, arms room, NBC room, and personnel sections.

The technical inspector is the squad leader for the maintenance control squad (shop stock clerk, maintenance control clerk and inspectors).

Paragraphs with fewer than 5 soldiers are rolled up as a team within another squad in their platoon. For example, the two soldiers in paragraph 08 are rolled into the Base Maintenance Squad with paragraph 08.

Figure C-1. Ordnance (MAINT) Company, Non-divisional Direct Support, Corps Support Command or Theater Support Command, 43209L000 (continued)



Concept COA 1 of 2.

The company headquarters (paragraph 01) and the maintenance control section (TOE paragraph 02) are combined to make a headquarters platoon.

C2 relationships

The maintenance control sergeant the most experienced NCO serves as the headquarters platoon sergeant.

The motor pool is broken down into two squads with the motor sergeant and senior mechanics serving as squad leaders.

The 92G40 with 5 cooks are a squad.

The supply sergeant is the squad leader for the supply, arms room, NBC room, and personnel sections.

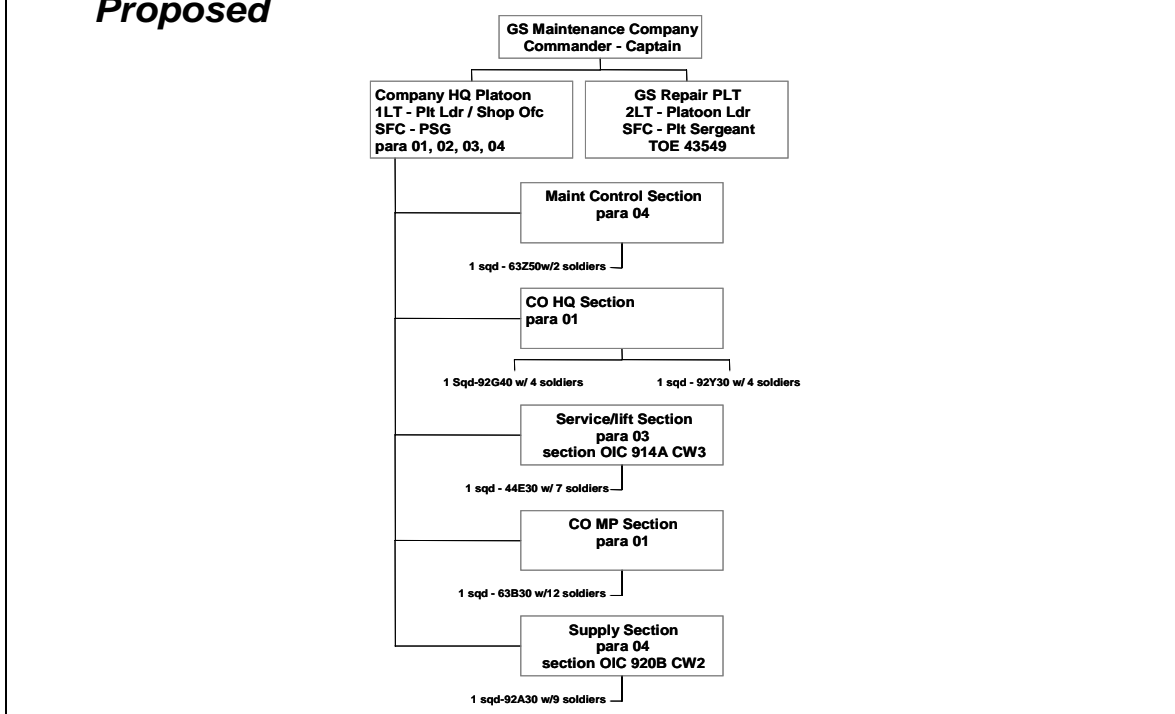
The technical inspector is the squad leader for the maintenance control squad (shop stock clerk, maintenance control clerk and inspectors).

Paragraphs with fewer than 5 soldiers are rolled up as a team within another squad in their platoon. For example, the two soldiers in paragraph 08 are rolled into the Base Maintenance Squad with paragraph 08.

Figure C-2. Ordnance (MAINT) Company, Non-divisional or Theater Support Command (ARCTIC), 43409L001

ORDNANCE (MAINT) COMPANY, GENERAL SUPPORT, THEATER SUPPORT COMMAND (TSC) 43649L000

Proposed



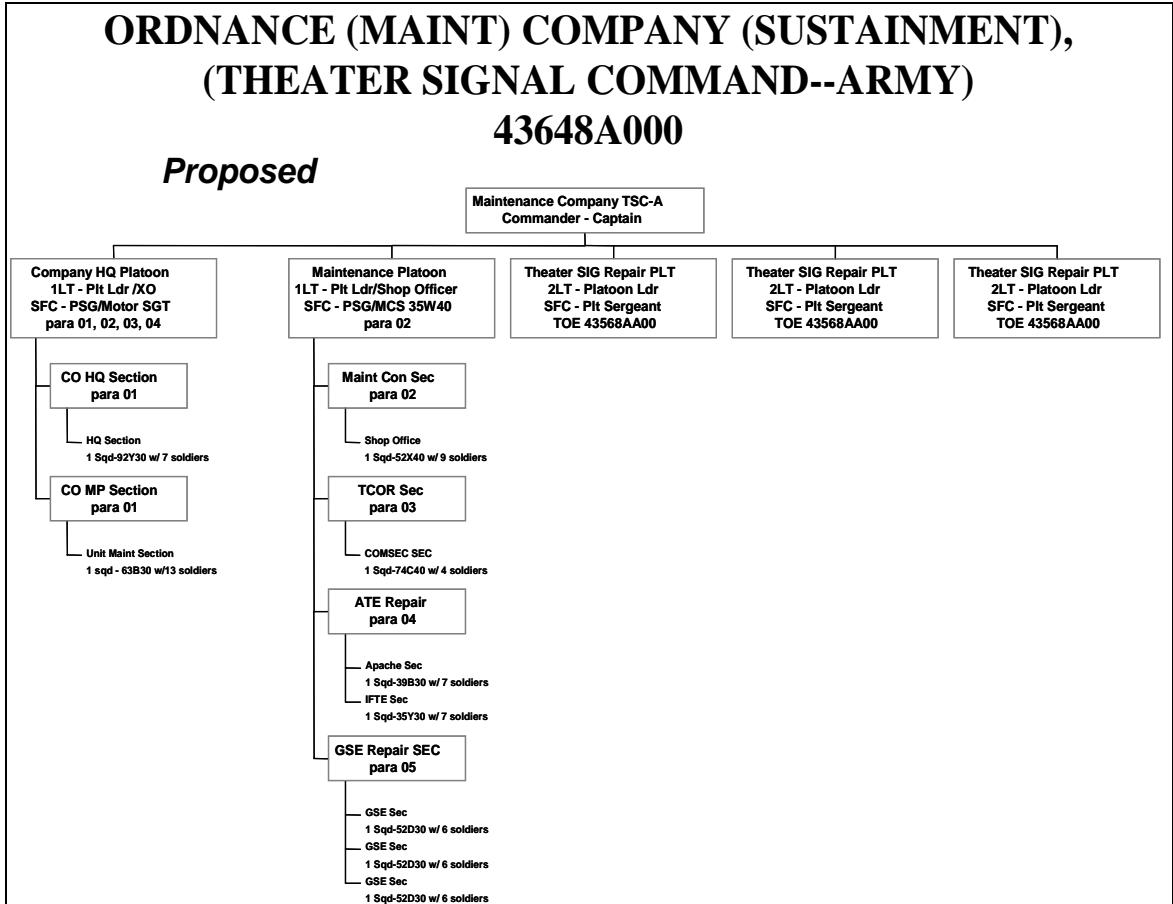
Concept

The maintenance control section (TOE paragraph 02), the service section (paragraph 03) the company headquarters (paragraph 01) and the supply section (paragraph 04) are combined to make a headquarters platoon. The shop officer is dual hatted as the headquarters platoon leader. The motor sergeant acts as the platoon sergeant. The other five platoons are modular GS maintenance platoons that can be added to the company. The platoons come with a platoon headquarters, which includes a platoon leader and platoon sergeant.

C2 relationships

The maintenance control officer (shop officer) is dual hatted as the headquarters platoon leader. The company motor sergeant acts as the platoon sergeant this relieves the maintenance control sergeant of that duty. The supply sergeant is in charge of the headquarters sections (supply, arms room, NBC room, and unit communication, and so on), each section sergeant is also a squad leaders for their respective sections.

Figure C-3. Ordnance (MAINT) Company, General Support, Theater Support Command (TSC), 43649L000



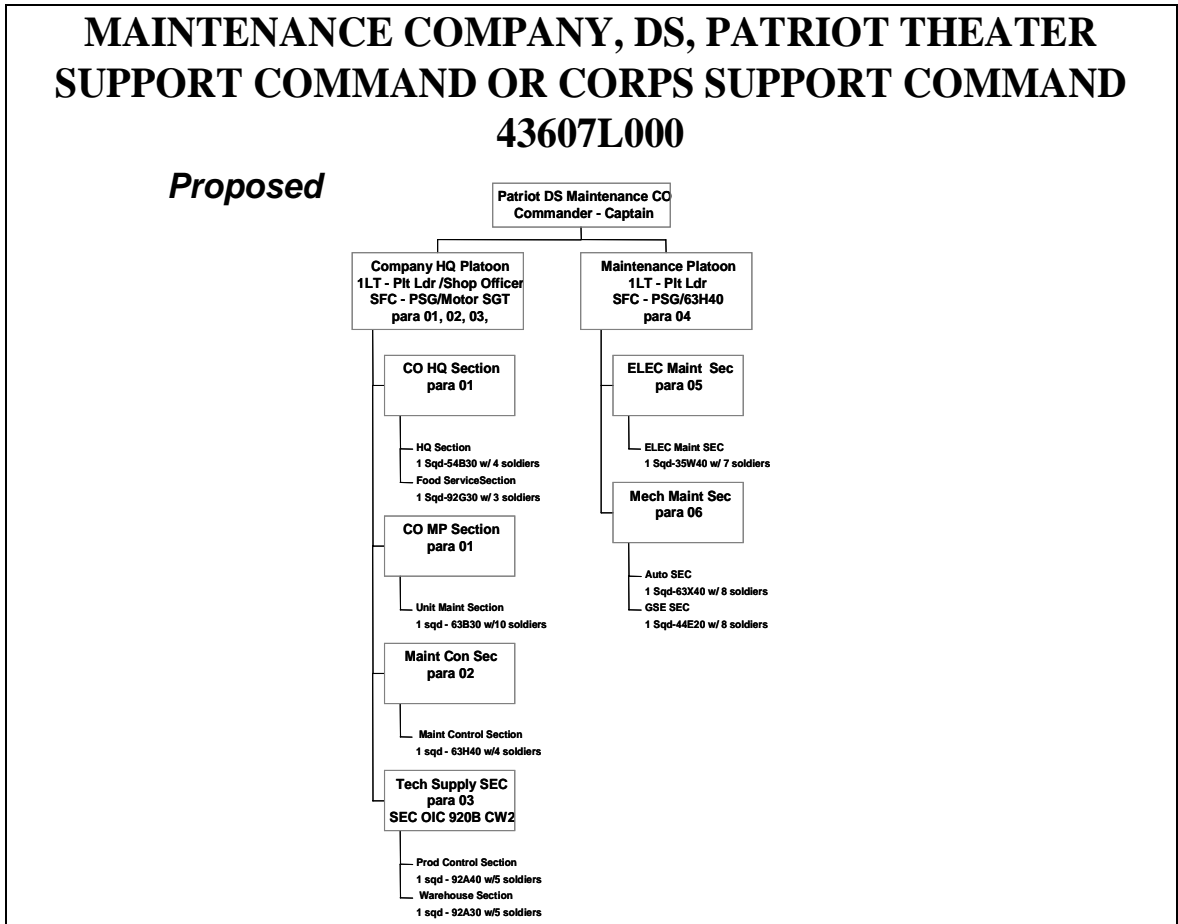
Concept

The company headquarters (paragraph 01) and unit maintenance are combined to make a headquarters platoon. The unit XO becomes the headquarters platoon leader with the company motor sergeant becoming the headquarters platoon sergeant. The shop officer is dual hatted as the maintenance platoon leader, the MCS is his platoon sergeant, and each SFC from the maintenance platoon is assigned as a squad leader for that section.

C2 relationships

The maintenance platoon also has a total of four warrants to assist in command and control.

Figure C-4. Ordnance (MAINT) Company (Sustainment), (Theater Signal Command – Army), 43648A000

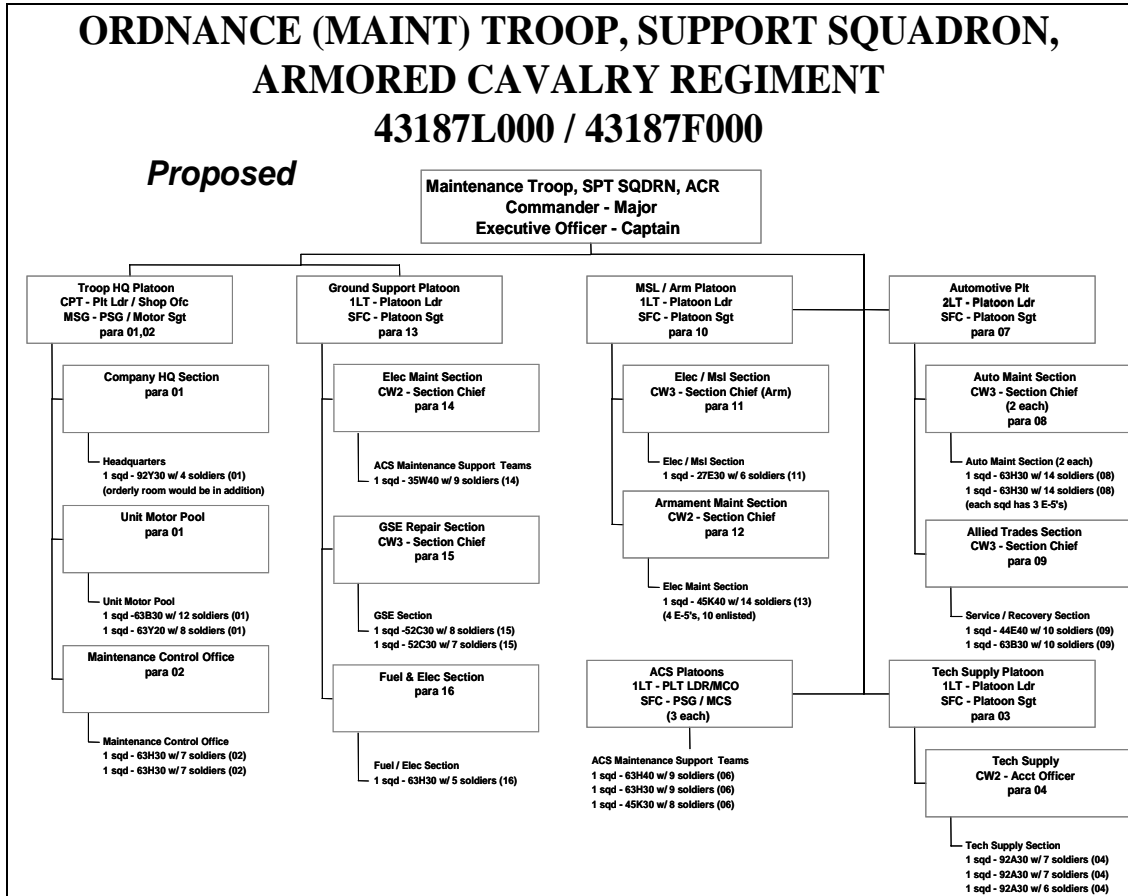


Concept

The company headquarters (paragraph 01) tech supply and unit maintenance are combined to make a headquarters platoon. The shop officer is the headquarters platoon leader and the motor sergeant is the headquarters platoon sergeant, each SFC from the maintenance platoon is assigned as a squad leader for that section. The maintenance platoon also has a platoon headquarters with a platoon leader and platoon sergeant.

Figure C-5. Maintenance Company, DS, Patriot Theater Support Command or Corps Support Command, 43607L000

PROPOSED SEPARATE MAINTENANCE COMPANY ORGANIZATIONS



Concept

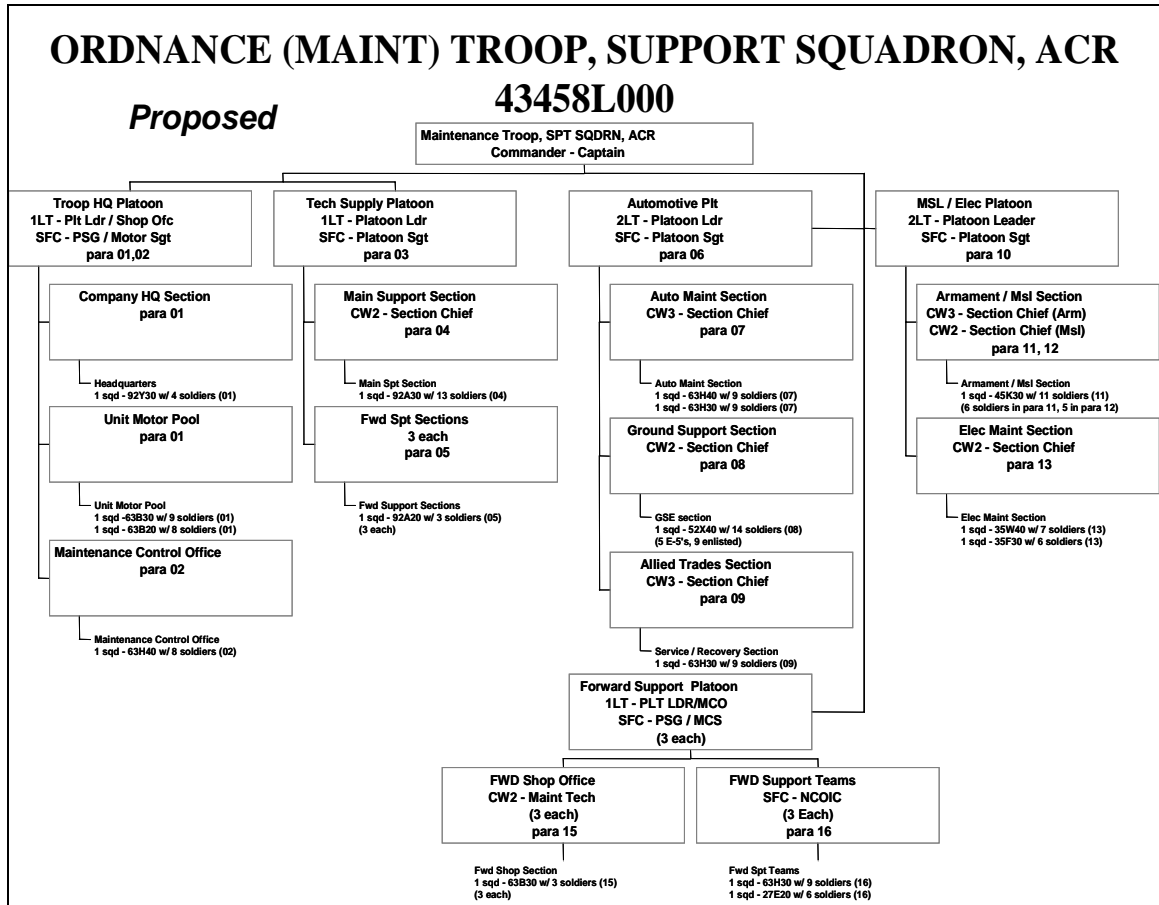
In an effort to standardize the headquarters elements, the company headquarters (supply, orderly room, NBC, and so forth) are combined into a platoon with the unit motor pool and the maintenance control section (TOE paragraphs 01 and 02). Since all assigned LTs are already platoon leaders in the company, the shop officer, a Captain, is assigned as the headquarters platoon leader for formations, and so forth.

C2 relationships

The maintenance control officer is dual hatted as the headquarters platoon leader. The battalion motor sergeant, as the senior enlisted soldier in this platoon, and also who controls the bulk of the soldiers, serves as the headquarters platoon sergeant. For day-to-day operations, the supply sergeant is in charge of the headquarters sections (supply, arms room, NBC room, and so forth), the maintenance tech (CW2) is in charge of the motor pool, and the maintenance control sergeant manages the maintenance control section (shop stock clerk, maintenance control clerk and inspectors).

The rest of the platoons are authorized LTs. It is recommended that senior 1LTs be assigned to MSTs, since these elements are typically not located with their supporting base shops. New 2LTs can be assigned as the GSE, missile/armament, and/or auto platoon leaders. This allows these junior officers time to learn the "maintenance" business and prepare them to take an MST.

Figure C-6. Ordnance (MAINT) Troop, Support Squadron, Armored Cavalry Regiment, 43187L000/43187F000



Concept

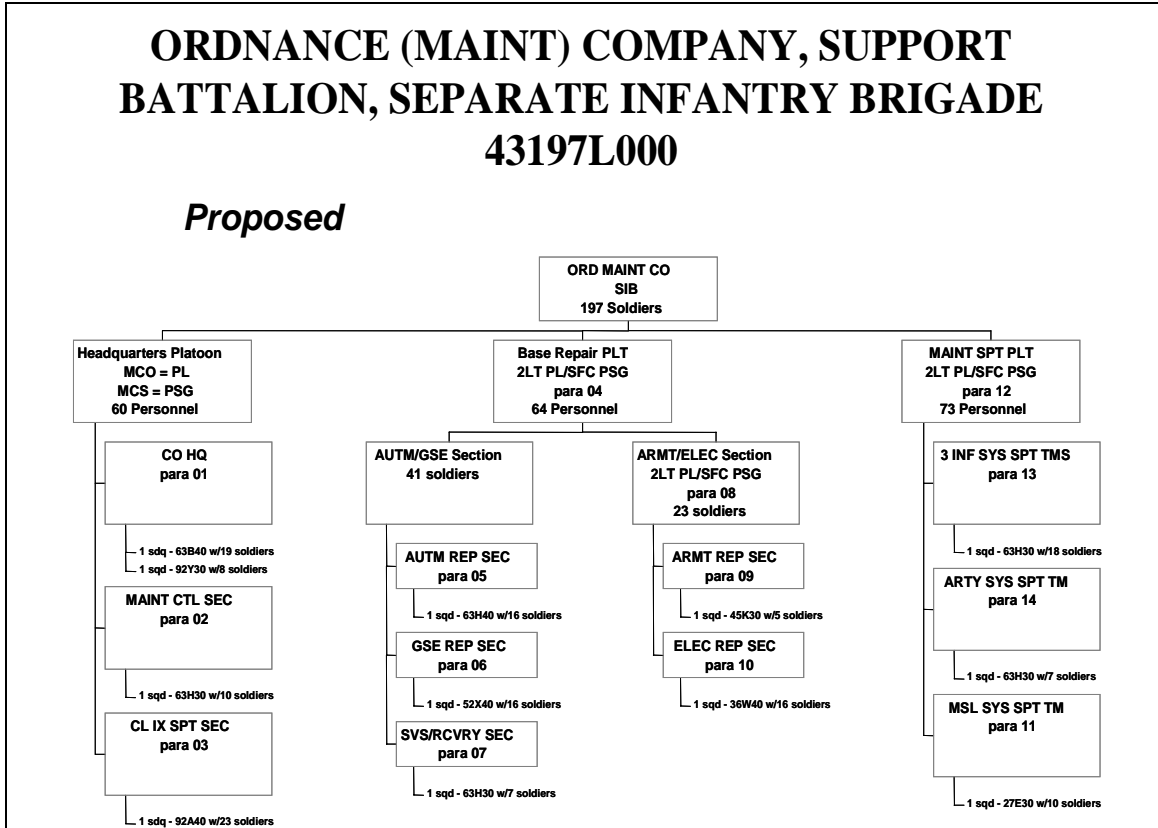
In an effort to standardize the headquarters elements, the company headquarters (supply, orderly room, NBC, and so forth) are combined into a platoon with the unit motor pool and the maintenance control section (MTOE paragraphs 01 and 02). Since all assigned LTs are already platoon leaders in the company, the Shop Office is assigned as the headquarters Platoon Leader for formations, and so forth.

C2 relationships

The maintenance control officer (shop officer) is dual hatted as the headquarters platoon leader. The motor sergeant, as the senior enlisted soldier in this platoon, and also who controls the bulk of the soldiers, serves as the headquarters platoon sergeant. For day-to-day operations, the supply sergeant is in charge of the headquarters sections (supply, arms room, NBC room, and so forth), the motor sergeant is in charge of the motor pool, and the maintenance control sergeant manages the maintenance control section (shop stock clerk, maintenance control clerk and inspectors).

The rest of the platoons are authorized LTs. It is recommended that senior 1LTs be assigned to MSTs, since these elements are typically not located with their supporting base shops. New 2LTs can be assigned as the GSE/ missile/armament, and/or auto platoon leaders. This allows these junior officers time to learn the “maintenance” business and prepare them to take an MST.

Figure C-7. Ordnance (MAINT) Troop, Support Squadron, ACR, 43458L000



Concept

The company headquarters (TOE paragraph 01), maintenance control section (paragraph 02), and class IX support section (paragraph 03) form the Headquarters (headquarters) Platoon. The maintenance control officer is dual hatted as the headquarters platoon leader. The maintenance control sergeant is also dual hatted as the headquarters platoon sergeant.

The automotive/ground support equipment (GSE) section and armament/electronic section form the base repair platoon. The Automotive/GSE platoon leader and platoon sergeant (paragraph 04) are in charge of the base repair platoon. The armament/electronic section is a subordinate element in the base repair platoon and is also authorized a platoon leader and platoon sergeant (paragraph 08).

The maintenance support platoon consists of three Infantry system support teams (SST) (paragraph 13), Artillery SST (paragraph 14), and Missile SST (paragraph 11).

Figure C-8. Ordnance (MAINT) Company, Support Battalion, Separate Infantry Brigade, 43197L000

C2 Relationship

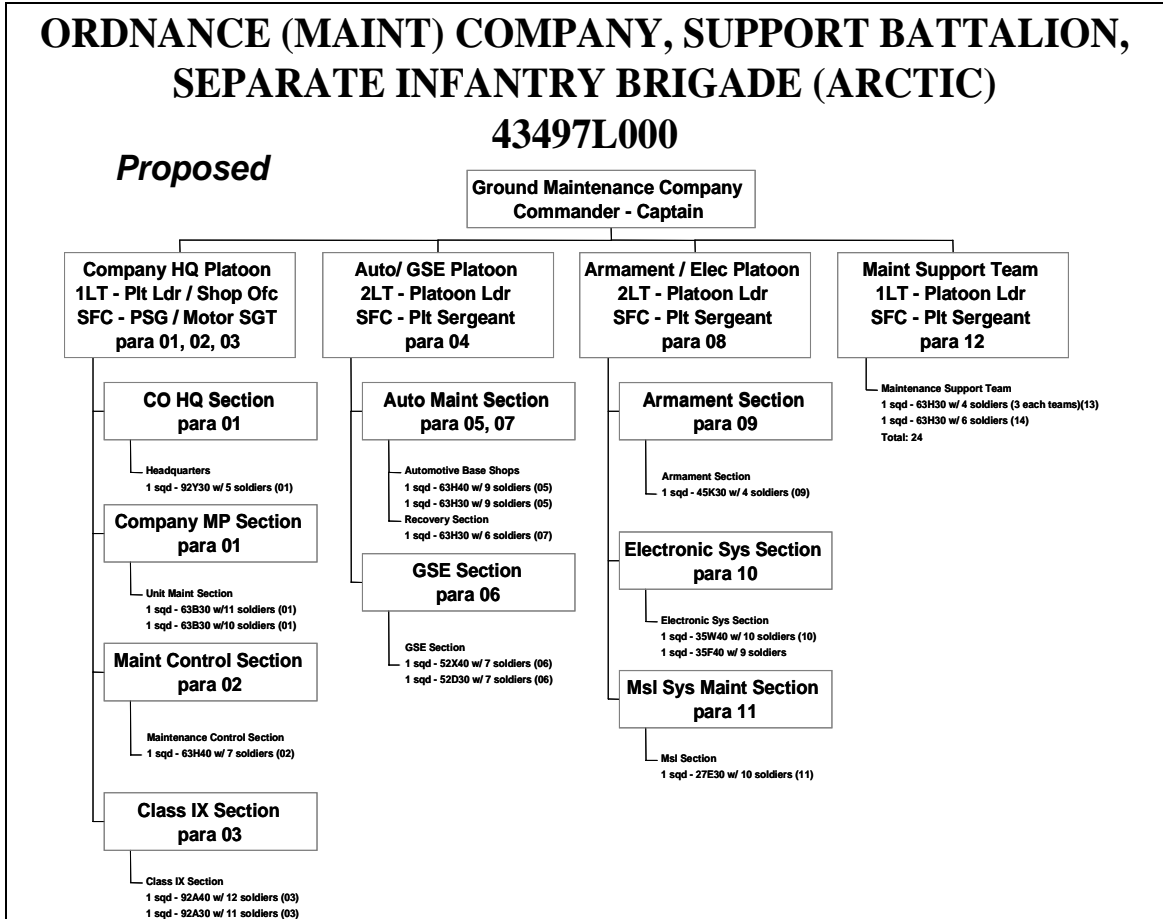
The MCO and MCS are dual hatted as the headquarters platoon leader and platoon sergeant.

The company motor sergeant is dual hatted and serves a squad leader of his section.

The supply sergeant serves as the squad leader for supply, armor, NBC, communications, and all other headquarters personnel not assigned to the motor pool section. The senior inspector, 63H30, is in charge of the maintenance control section personnel. The senior NCO, 92A40, serves the class IX support section squad leader, responsible for both DS CL IX support and assigned personnel support (administrative and training).

The Automotive/GSE platoon headquarters (paragraph 04) platoon leader and platoon sergeant serve as the base repair platoon. The armament/electronic platoon headquarters (paragraph 08) platoon leader and platoon sergeant are in charge of the armament/electronic section, which is a subordinate element in the base repair platoon. The senior NCO of each repair section serve as squad leaders, tasked with DS support and assigned personnel support (administrative and training).

Figure C-8. Ordnance (MAINT) Company, Support Battalion, Separate Infantry Brigade, 43197L000 (continued)



Concept

The maintenance control section (MTOE paragraph 02), the unit MP (paragraph 01), the Class IX section (paragraph 03) and the company headquarters (paragraph 01) are combined to make a headquarters platoon. The shop officer is dual hatted as the Headquarters platoon leader.

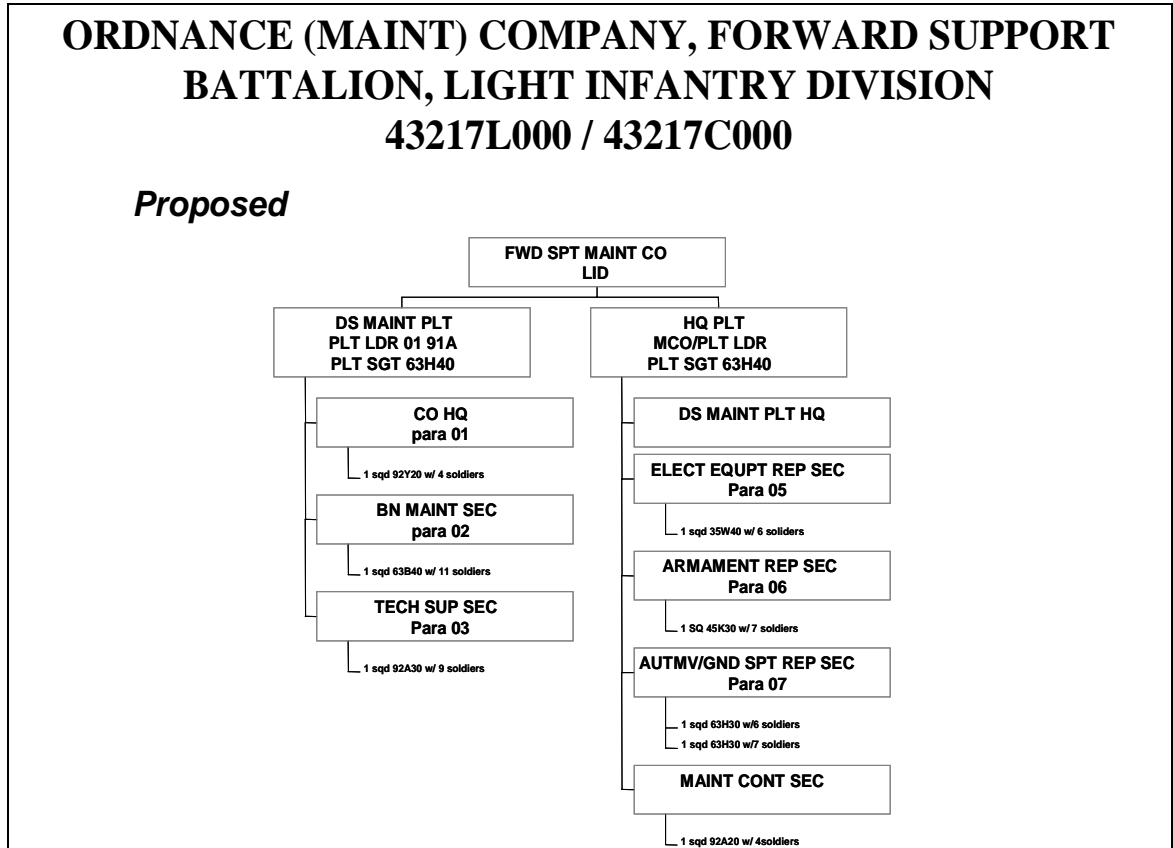
C2 relationships

The maintenance control officer is dual hatted as the headquarters platoon leader. The unit motor sergeant, as the senior enlisted soldier in this platoon, and also who controls the bulk of the soldiers, serves as the headquarters platoon sergeant. For day-to-day operations, the supply sergeant is in charge of the headquarters sections (supply, arms room, NBC room, and so forth) and the warrant officer in charge of the CL IX section controls his or her section.

The DS platoon Leaders are responsible for the two mission related platoons in the company. In addition to normal platoon leader responsibilities, they must be constantly involved in the maintenance production of each DS maintenance section. SFC section sergeants are also squad leaders for their respective sections.

Figure C-9. Ordnance (MAINT) Company, Support Battalion, Separate Infantry Brigade (ARCTIC), 43497L000

PROPOSED DIVISIONAL MAINTENANCE COMPANY ORGANIZATIONS



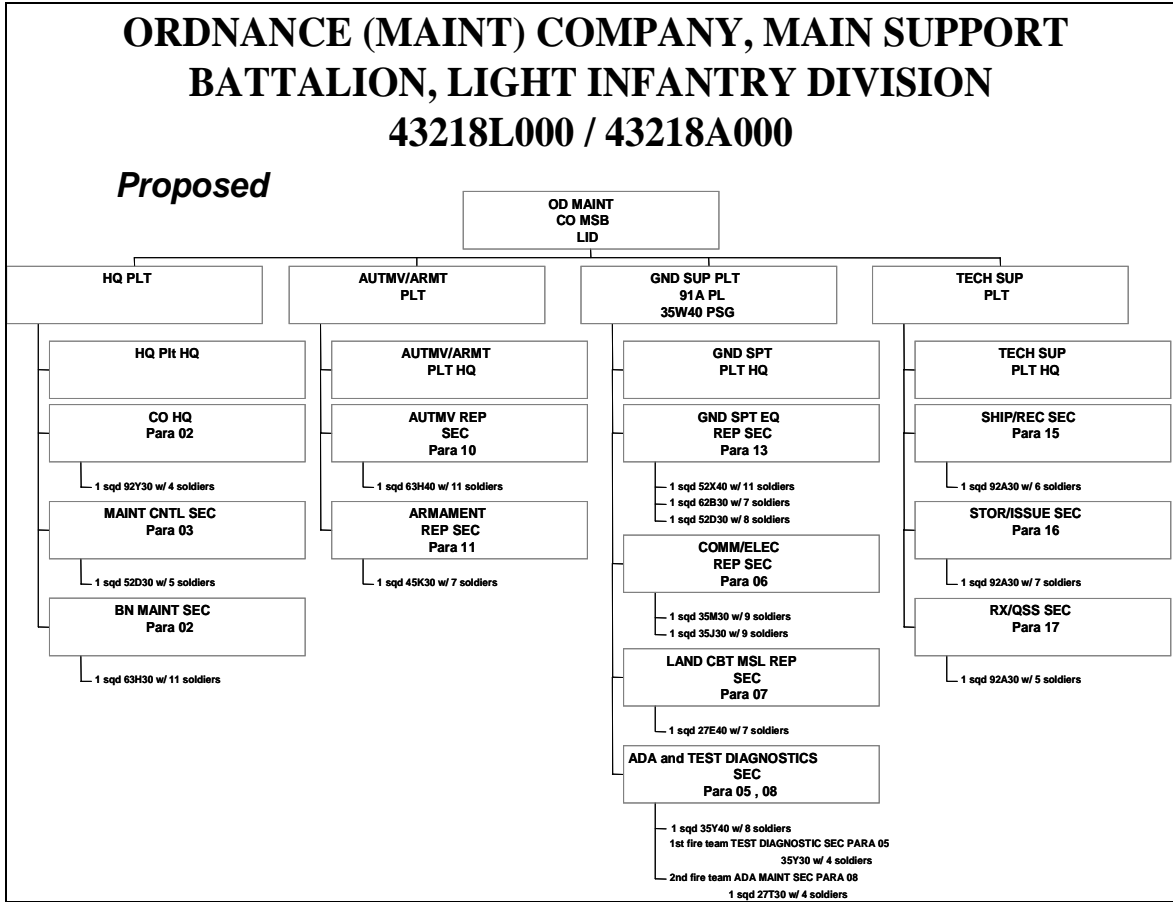
Concept

Consolidate the company headquarters (paragraph 01), battalion maintenance (paragraph 02), and tech supply (paragraph 08) under one platoon.

C2 Relationship

The platoon leader of the headquarters platoon will be the platoon leader formerly authorized for the DS platoon. The majority of the personnel in this platoon are in the battalion maintenance section with the 915A in charge. The platoon sergeant will be the motor sergeant, 63B40. The squad leaders will be 63B30 in the battalion maintenance sec and the tech supply NCOIC 92A30. The DS maintenance platoon is authorized a platoon sergeant. The maintenance control officer will assume additional duty of platoon Leader with the 63H40 authorized (paragraph 04) as platoon sergeant. The NCOIC of each squad (electrical, auto, and armament) will serve as the squad leaders. The 92A20 from maintenance control section would be the squad leader.

Figure C-10. Ordnance (MAINT) Company, Forward Support Battalion, Light Infantry Division, 43217L000/43217C000



Concept

Combine the company elements not currently in a platoon into a headquarters platoon. These will include the Co headquarters sec (paragraph 01), maintenance control office (paragraph 02), and battalion maintenance Sec (paragraph 03). Combine the electrical/missile platoon and the ground support platoon into one ground support platoon.

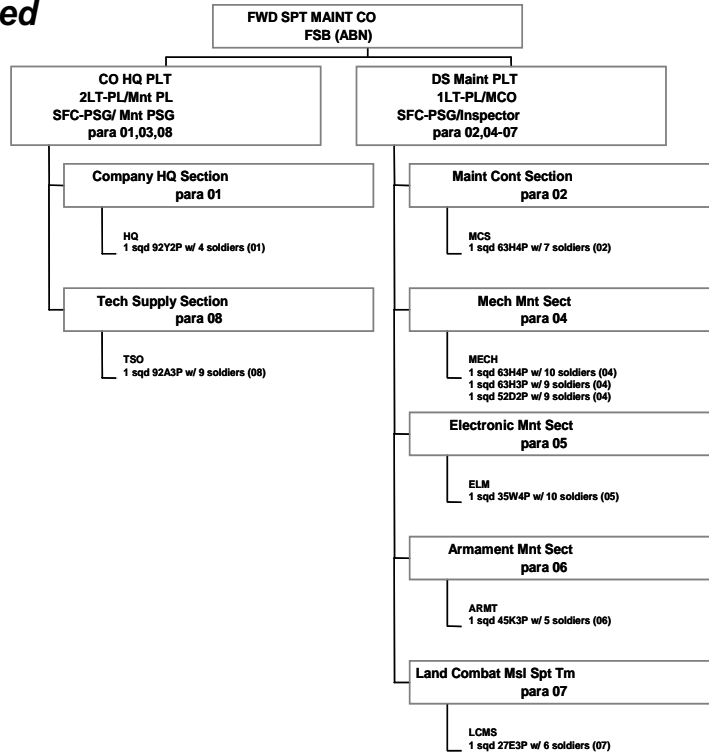
C2 Relationship

The OD 2LT formerly with the electrical/missile platoon (paragraph 04) would serve as platoon leader with the 52X40 (paragraph 12) formerly with the Ground Support Platoon serving as platoon sergeant. Headquarters platoon squad leaders will be as follows. Headquarters squad supply sergeant; shop office 52D30 inspector; battalion maintenance section 63B30 mechanic. OD 2LT authorized with the 35W40, formerly electrical/missile platoon sergeant, serving as GSE platoon sergeant. Total platoon will be 68 soldiers. No change to automotive or tech supply platoons, both are authorized platoon leader and platoon sergeant. All DS shop NCOICs will also serve as squad leaders.

Figure C-11. Ordnance (MAINT) Company, Main Support Battalion, Light Infantry Division, 43218L000/43218A000

FORWARD MAINTENANCE COMPANY, FORWARD SUPPORT BATTALION, AIRBORNE DIVISION 43259L000

Proposed



Concept

The tech supply section (paragraph 08) and the company headquarters (paragraph 01) are combined to make a headquarters platoon. The former maintenance platoon leader is the headquarters platoon leader. The maintenance platoon becomes the DS maintenance platoon.

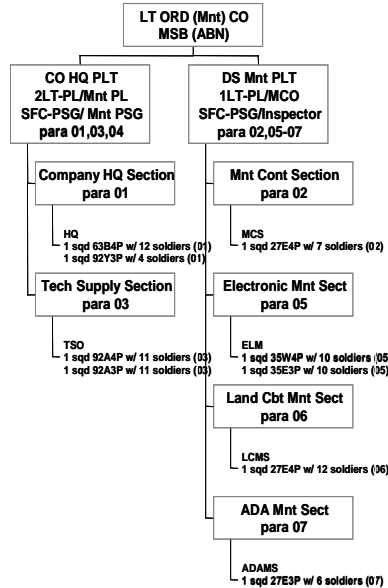
C2 relationships

The former maintenance platoon leader is the headquarters platoon leader. The headquarters platoon sergeant is the former maintenance platoon sergeant. For day-to-day operations, the supply sergeant is in charge of the headquarters sections (supply, arms room, NBC room, and so forth), and the 92A30 in charge of the CL IX Section controls his section. The maintenance control Officer (shop officer) is responsible for the DS Maintenance platoon. The 27E40 Inspector is the DS maintenance platoon sergeant. SFC section sergeants are also squad leaders for their respective sections.

**Figure C-12. Forward Maintenance Company, Forward Support Battalion,
Airborne Division, 43259L000**

LIGHT MAINTENANCE COMPANY, MAIN SUPPORT BATTALION, AIRBORNE DIVISION 43257L000

Proposed



Concept

The tech supply section (paragraph 03) and the company headquarters (paragraph 01) are combined to make a headquarters platoon. The former maintenance platoon leader is the headquarters platoon leader. The maintenance platoon becomes the DS maintenance platoon.

C2 relationships

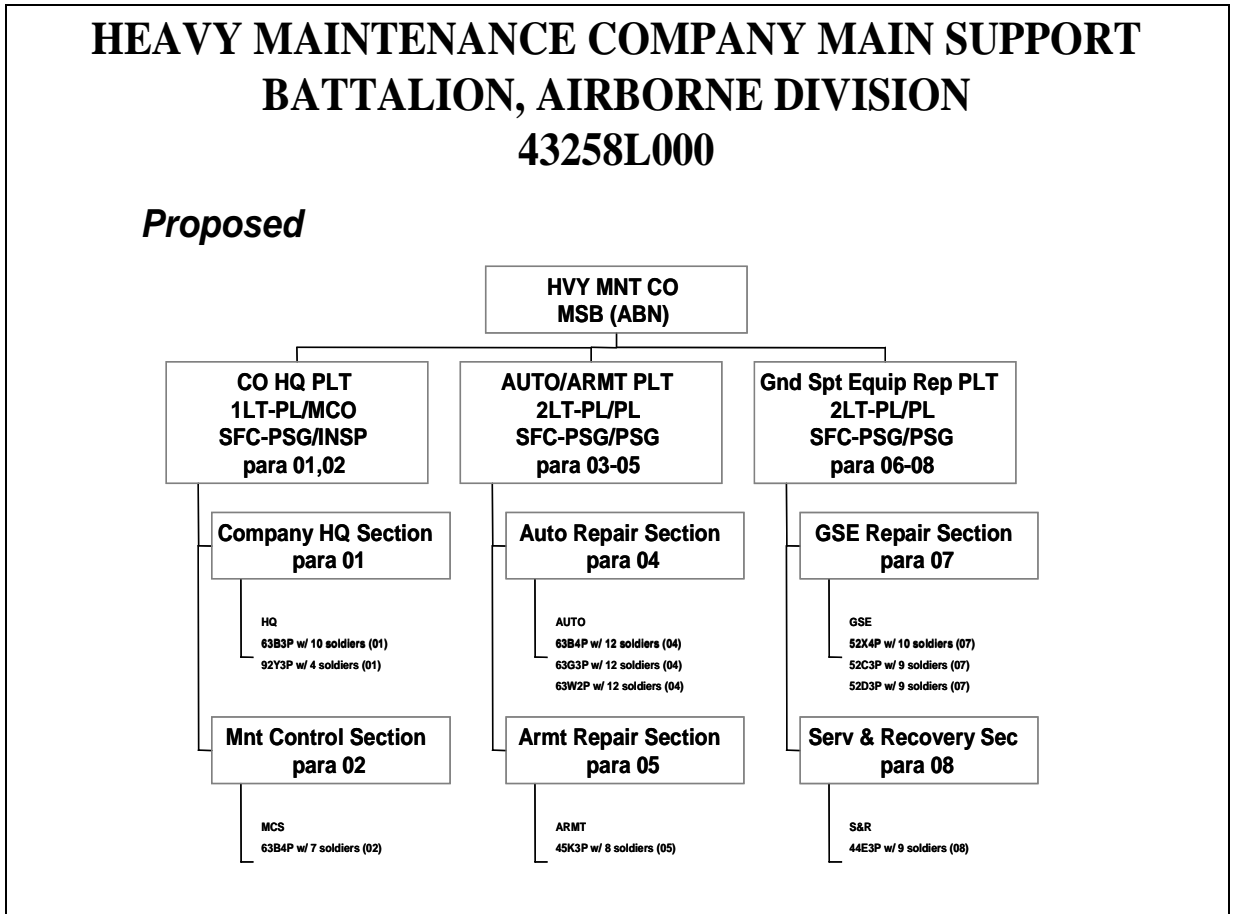
The former maintenance platoon leader is the headquarters platoon leader. The headquarters platoon sergeant is the former maintenance platoon sergeant. For day-to-day operations, the motor sergeant is in charge of the headquarters sections (motor pool, supply arms room NBC room, and so forth) and the 92A40 in charge of the CL IX section controls his section. The maintenance control officer is responsible for the DS maintenance platoon. The 27T40 Inspector is the DS maintenance platoon sergeant. SFC section sergeants are also squad leaders for their respective sections.

Figure C-13. Light Maintenance Company, Main Support Battalion, Airborne Division, 43257L000

HEAVY MAINTENANCE COMPANY MAIN SUPPORT BATTALION, AIRBORNE DIVISION

43258L000

Proposed



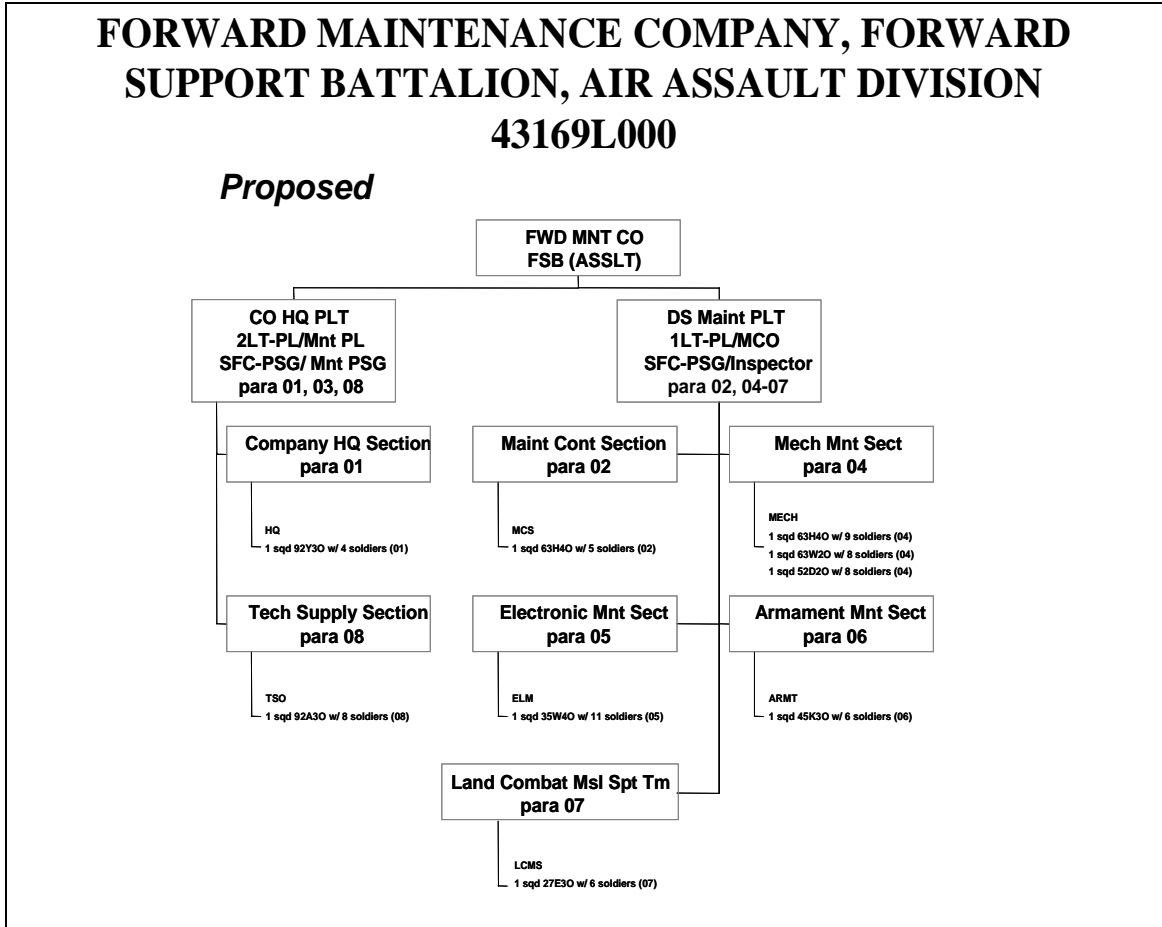
Concept

The company headquarters (paragraph 01) and the maintenance control section (paragraph 02) are combined to make a headquarters platoon. The maintenance control officer is the headquarters platoon leader.

C2 relationships

The maintenance control officer is the headquarters platoon leader. The headquarters platoon sergeant is the 52D30 Inspector. For day-to-day operations, the motor sergeant is in charge of the headquarters sections (motor pool, supply arms room, NBC room, and so forth) and the 63B40 is in charge of the MCS. The automotive/armament and ground support platoon remains unchanged. SFC section sergeants are also squad leaders for their respective sections.

Figure C-14. Heavy Maintenance Company, Main Support Battalion, Airborne Division, 43258L00



Concept

The tech supply section (paragraph 08) and the company headquarters (paragraph 01) are combined to make a headquarters platoon. The former maintenance platoon leader becomes the headquarters platoon leader. The maintenance platoon becomes the DS maintenance platoon.

C2 relationships

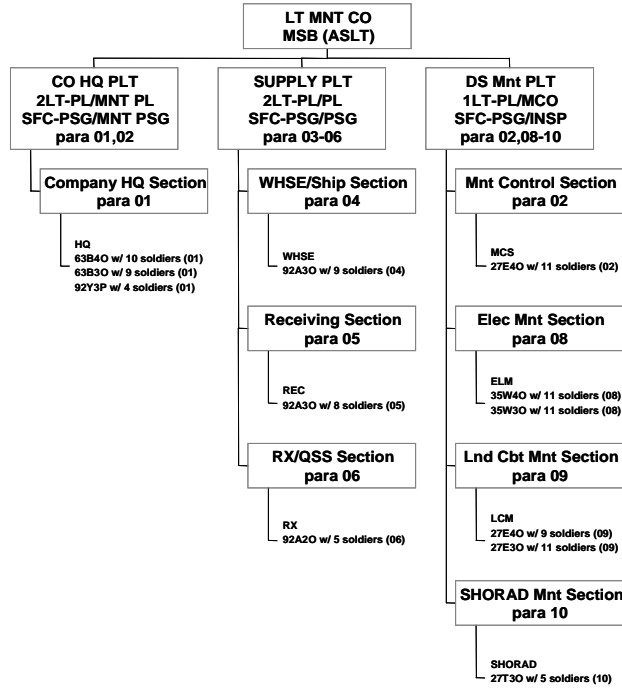
The former maintenance platoon leader is the headquarters platoon leader. The headquarters platoon sergeant is the former maintenance platoon sergeant. For day-to-day operations, the supply sergeant is in charge of the headquarters sections (supply, arms room, NBC room, and so forth) and the 92A30 in charge of the CL IX section controls his section.

The maintenance control officer is responsible for the DS maintenance platoon. The 35W40 inspector is the DS maintenance platoon sergeant. SFC section sergeants are also squad leaders for their respective sections.

Figure C-15. Forward Maintenance Company, Forward Support Battalion, Air Assault Division, 43169L000

LIGHT ORDNANCE (MAINT) COMPANY MAIN SUPPORT BATTALION AIR ASSAULT DIVISION 43167L000

Proposed



Concept

The company headquarters (paragraph 01) becomes a separate headquarters platoon. The former maintenance platoon leader is the headquarters platoon leader. The maintenance platoon becomes the DS maintenance platoon. The supply platoon remains unchanged.

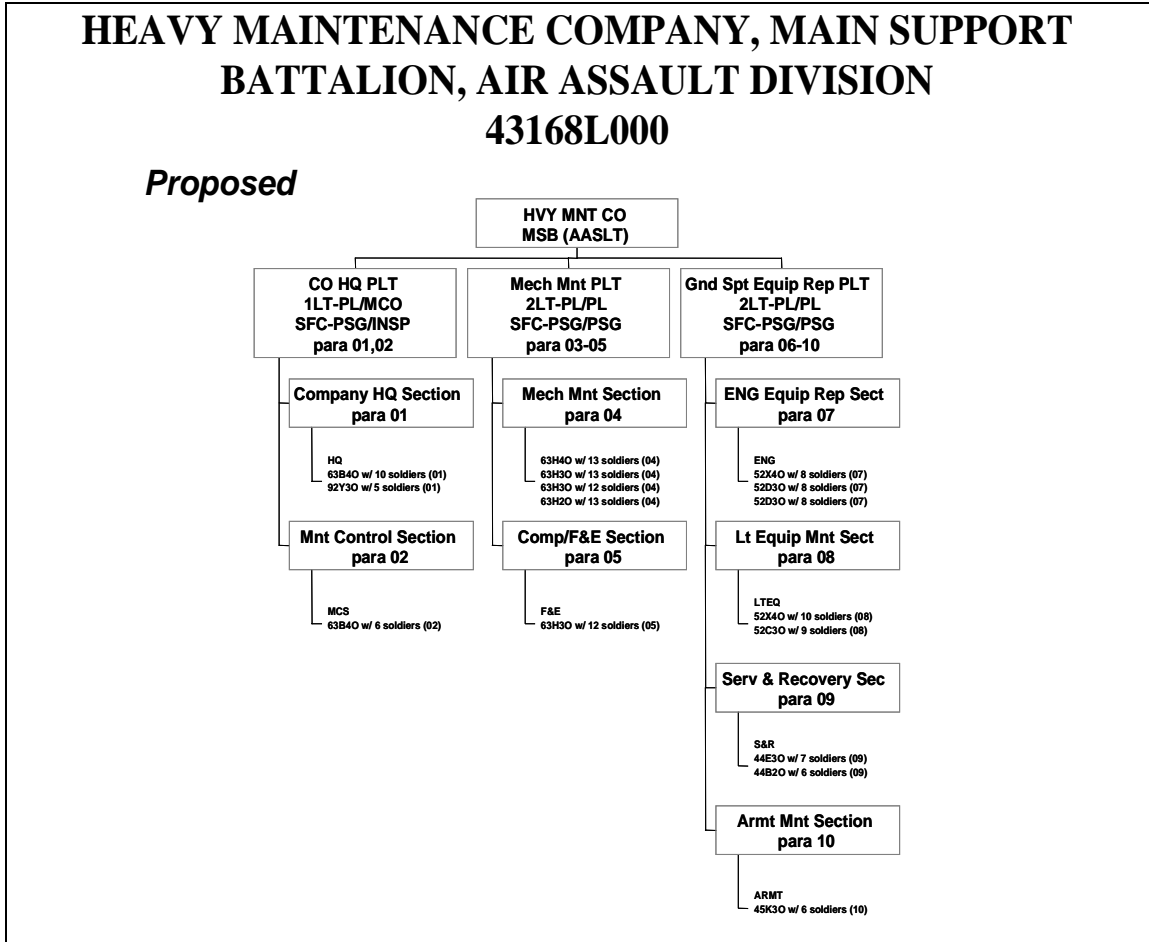
C2 relationships

The former maintenance platoon leader is the headquarters platoon leader. The headquarters platoon sergeant is the former maintenance platoon sergeant.

The maintenance control officer is responsible for the DS maintenance platoon. The 27T40 Inspector is the DS maintenance platoon sergeant.

The supply platoon remains the same. SFC section sergeants are also squad leaders for their respective sections.

Figure C-16. Light Ordnance (MAINT) Company, Main Support Battalion, Air Assault Division, 43167L000



Concept

The company headquarters (paragraph 01) and the maintenance control section (paragraph 02) are combined to make a headquarters platoon. The maintenance control officer is the headquarters platoon leader.

C2 relationships

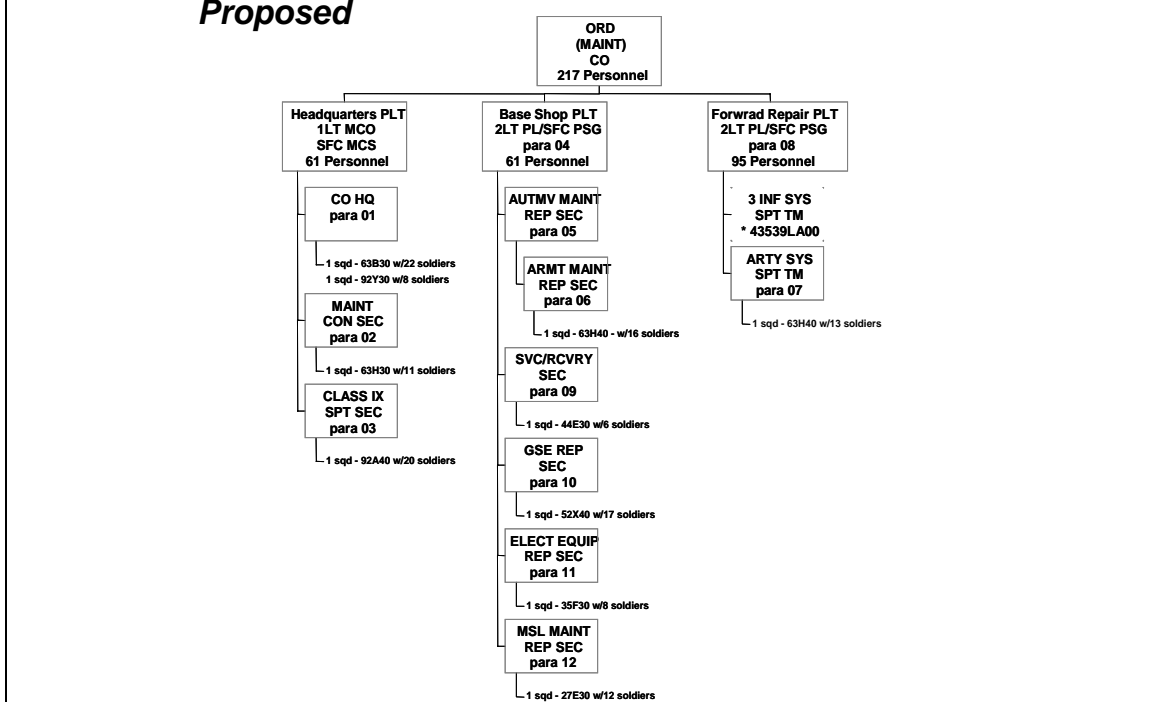
The maintenance control officer is the headquarters platoon leader. The headquarters platoon sergeant is the 45K40 inspector. For day-to-day operations, the motor sergeant is in charge of the headquarters sections (motor pool, supply, arms room, NBC room, and so forth) and the 63B40 is in charge of the maintenance control section.

The mechanical maintenance and ground support platoons remain unchanged. SFC section sergeants are also squad leaders for their respective sections.

Figure C-17. Heavy Maintenance Company, Main Support Battalion, Air Assault Division, 43168L000

ORDNANCE (MAINT) COMPANY, FORWARD SUPPORT BATTALION, MECHANIZED INFANTRY DIVISION 43039L000

Proposed



Concept

The company headquarters (TOE paragraph 01), maintenance control section (paragraph 02), and class IX support section (paragraph 03) form the headquarters platoon.

The Base Shop Platoon consists of the automotive maintenance repair section (paragraph 05), armament maintenance repair section (paragraph 06), service/recovery section (paragraph 09), GSE repair section (paragraph 10), electronic equipment repair section (paragraph 11), and missile maintenance repair section (paragraph 12).

The automotive maintenance repair section and armament maintenance repair section form one squad with the senior NCO, 63H40, of the automotive maintenance repair section serving as the squad leader.

The forward repair platoon consists of three infantry system support teams (SST) (43539LA00) and artillery SST (paragraph 07).

**Figure C-18. Ordnance (MAINT) Company, Forward Support Battalion,
Mechanized Infantry Division, 43039L000**

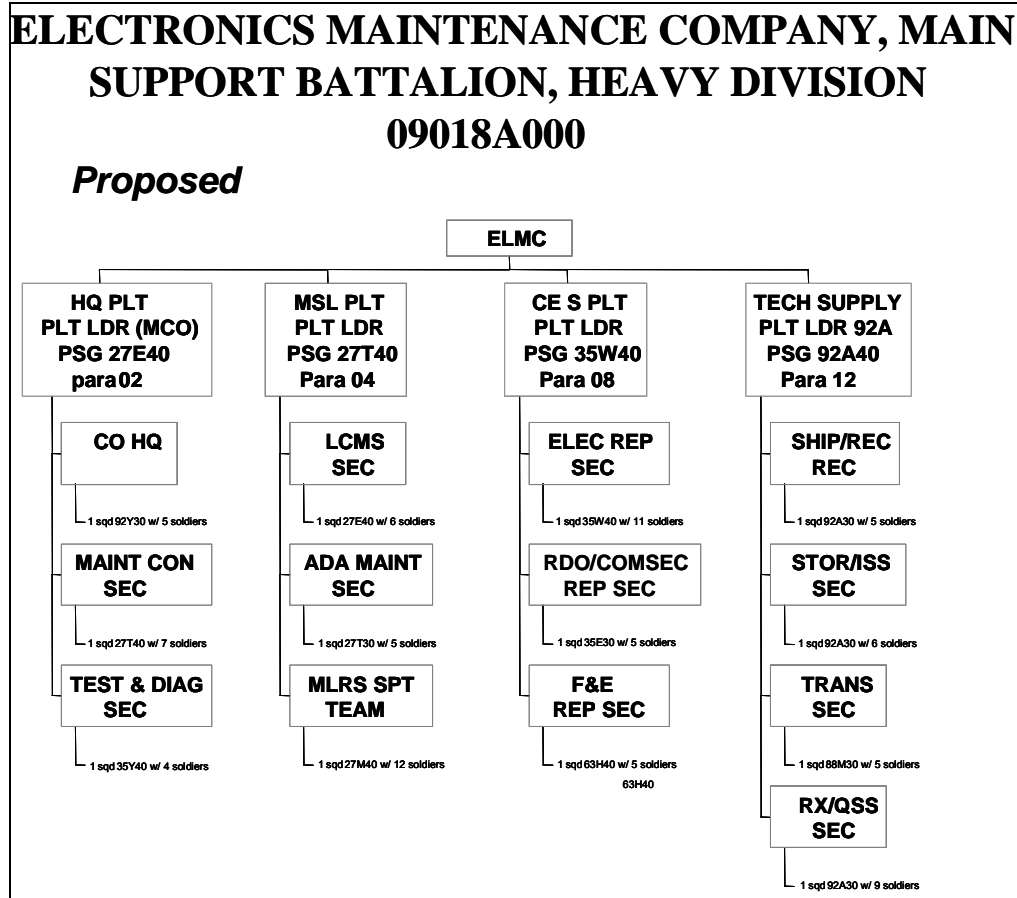
C2 Relationship

The MCO and MCS are dual hatted as the headquarters platoon leader and platoon sergeant. The company motor sergeant is dual hatted and serves a squad leader of his section. The supply sergeant serves as the squad leader for supply, armor, NBC, communications, and all other headquarters personnel not assigned to the motor pool section. The senior inspector, 63H30, is in charge of the maintenance control section personnel. The senior NCO, 92A40, serves the class IX support section squad leader, responsible for both DS CL IX support and assigned personnel support (administrative and training).

The Automotive/Armament Maintenance Platoon headquarters (paragraph 04) platoon leader and platoon sergeant are in charge of the Base Shop Platoon. The senior NCO of each section, minus Automotive/Armament, serve as squad leaders tasked with DS support and assigned personnel support (administrative and training).

The GSE platoon headquarters (paragraph 08) platoon leader and platoon sergeant serve as the forward repair platoon.

Figure C-18. Ordnance (MAINT) Company, Forward Support Battalion, Mechanized Infantry Division, 43039L000 (continued)



Concept

The company headquarters paragraph 01 and the maintenance control section paragraph 02 are combined into a headquarters Platoon.

C2 Relationships

The maintenance control officer is dual hatted as the headquarters Platoon Leader. Designate the 35W40 C/E inspector as the Platoon sergeant. This inspector is under utilized and not needed do to the limited test equipment available (GRM test set Auth 02).

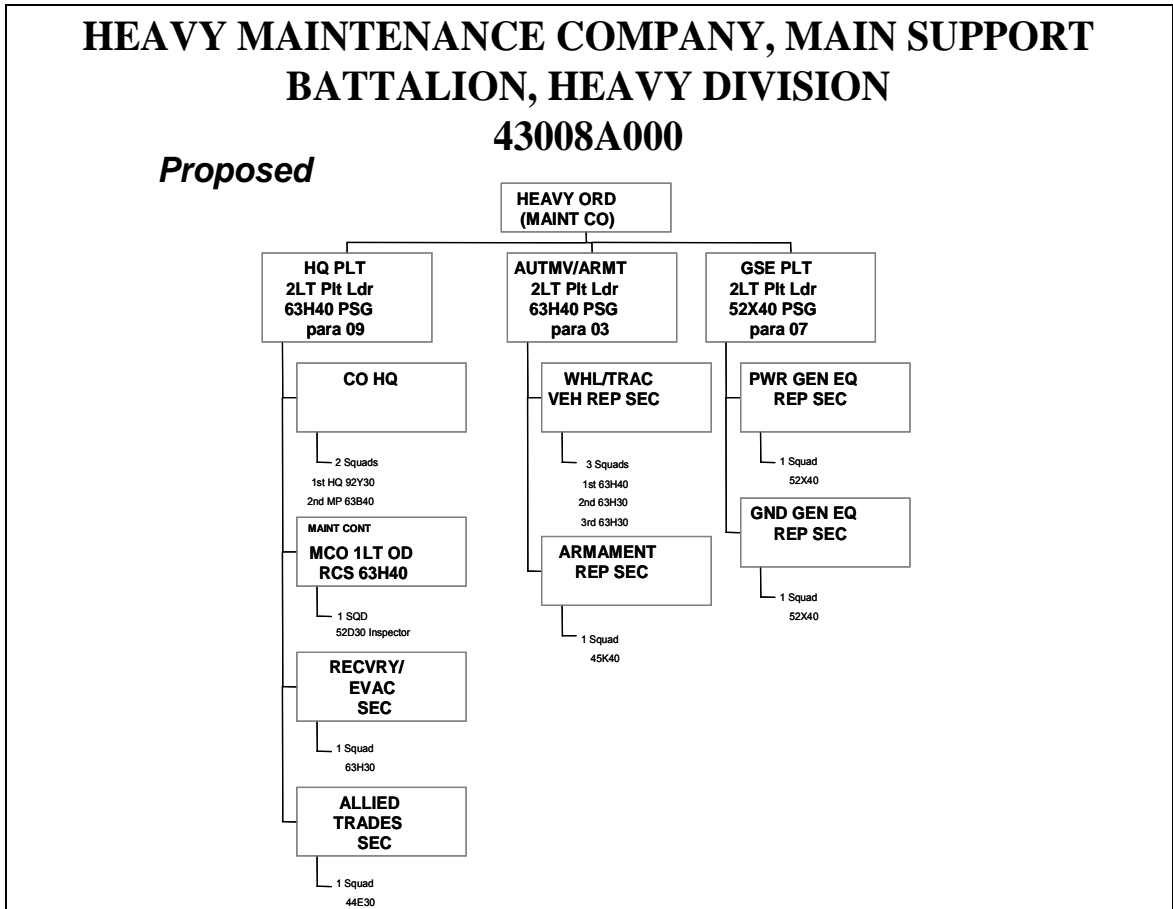
The company headquarters consists of one squad led by the 92Y30 supply sergeant.

The maintenance Control section is one squad led by the 27T40 inspector.

If the test and diagnostics section is attached to the company they will serve as the third squad with the NCOIC the squad leader.

No changes with the MSL maintenance, C/E or Tech Supply Platoons. All are authorized platoon leaders and platoon sergeants. All support section NCOICs will serve as squad leaders.

**Figure C-19. Electronics Maintenance Company, Main Support Battalion,
Heavy Division, 09018A000**



Concept

Consolidate the sections company headquarters (paragraph 01) and MCO (paragraph 02) which do not currently fall under a platoon with the former maintenance support platoon (paragraphs 09, 10, 11) (23 soldiers) into a headquarters platoon.

C2 relationship

The senior first lieutenant will serve as maintenance control officer.

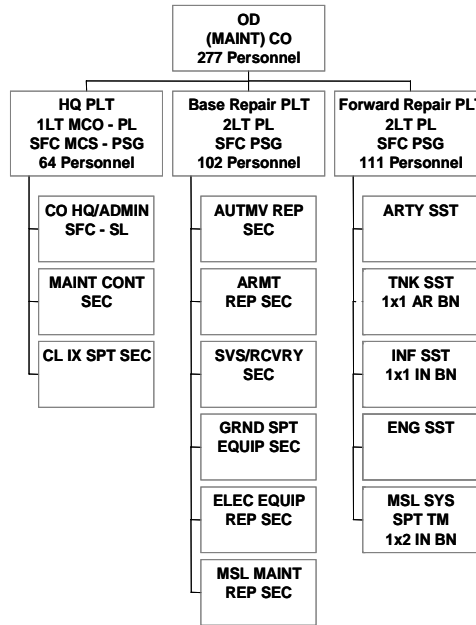
2LT OD platoon leader and 63H40 platoon sergeant comes with the maintenance support platoon (paragraph 09).

Automotive and GSE platoons are both authorized platoon leaders and platoon sergeants. Section NCOICs will serve as squad leaders, with the exception of automotive which due to number of personnel must be broken into three squads with 63H30 squad leaders.

Figure C-20. Heavy Maintenance Company, Main Support Battalion, Heavy Division, 43008A000

**ORDNANCE (MAINT) COMPANY, FORWARD SUPPORT
BATTALION, SUPPORT COMMAND, HEAVY DIVISION OR
INFANTRY DIVISION (HVY/LT) OR INFANTRY DIVISION
43009L000 / 43009L100**

Proposed



Concept

The company headquarters (TOE paragraph 01), maintenance control section (paragraph 02), and class IX support section (paragraph 03) form the headquarters platoon.

The Base Shop Platoon consists of the automotive maintenance repair section (paragraph 05), armament maintenance repair section (paragraph 06), service/recovery section (para 09), gse repair section (paragraph 10), electronic equipment repair section (paragraph 11), and missile maintenance repair section (paragraph 12).

The automotive maintenance repair section and armament maintenance repair section form one squad with the senior NCO, 63H40, of the automotive maintenance repair section serving as the squad leader.

The forward repair platoon consists of three infantry system support teams (SST) (43539LA00) and artillery SST (paragraph 07).

Figure C-21. Ordnance (MAINT) Company, Forward Support Battalion, Support Command, Heavy Division or Infantry Division (HVY/LT) or Infantry Division, 43009L000/43009L100

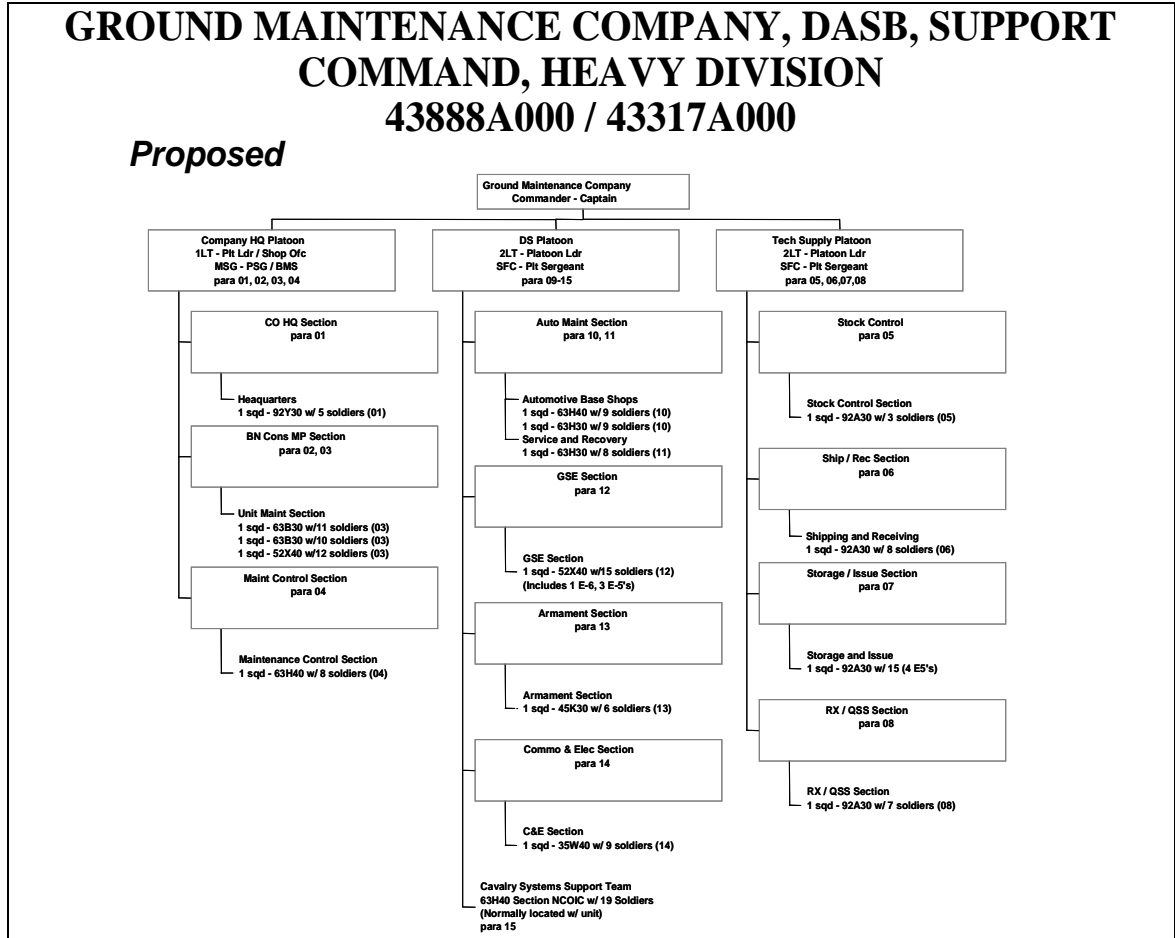
C2 Relationship

The MCO and MCS are dual hatted as the headquarters platoon leader and platoon sergeant. The company motor sergeant is dual hatted and serves a squad leader of his section. The supply sergeant serves as the squad leader for supply, armor, NBC, communications, and all other headquarters personnel not assigned to the motor pool section. The senior inspector, 63H30, is in charge of the maintenance control section personnel. The senior NCO, 92A40, serves the class IX support section squad leader, responsible for both DS CL IX support and assigned personnel support (administrative and training).

The Automotive/Armament Maintenance Platoon headquarters (paragraph 04) platoon leader and platoon sergeant are in charge of the Base Shop Platoon. The senior NCO of each section, minus Automotive/Armament, serve as squad leaders tasked with DS support and assigned personnel support (administrative and training).

The GSE platoon headquarters (paragraph 08) platoon leader and platoon sergeant serve as the forward repair platoon.

Figure C-21. Ordnance (MAINT) Company, Forward Support Battalion, Support Command, Heavy Division or Infantry Division (HVY/LT) or Infantry Division, 43009L000/43009L100 (continued)



Concept

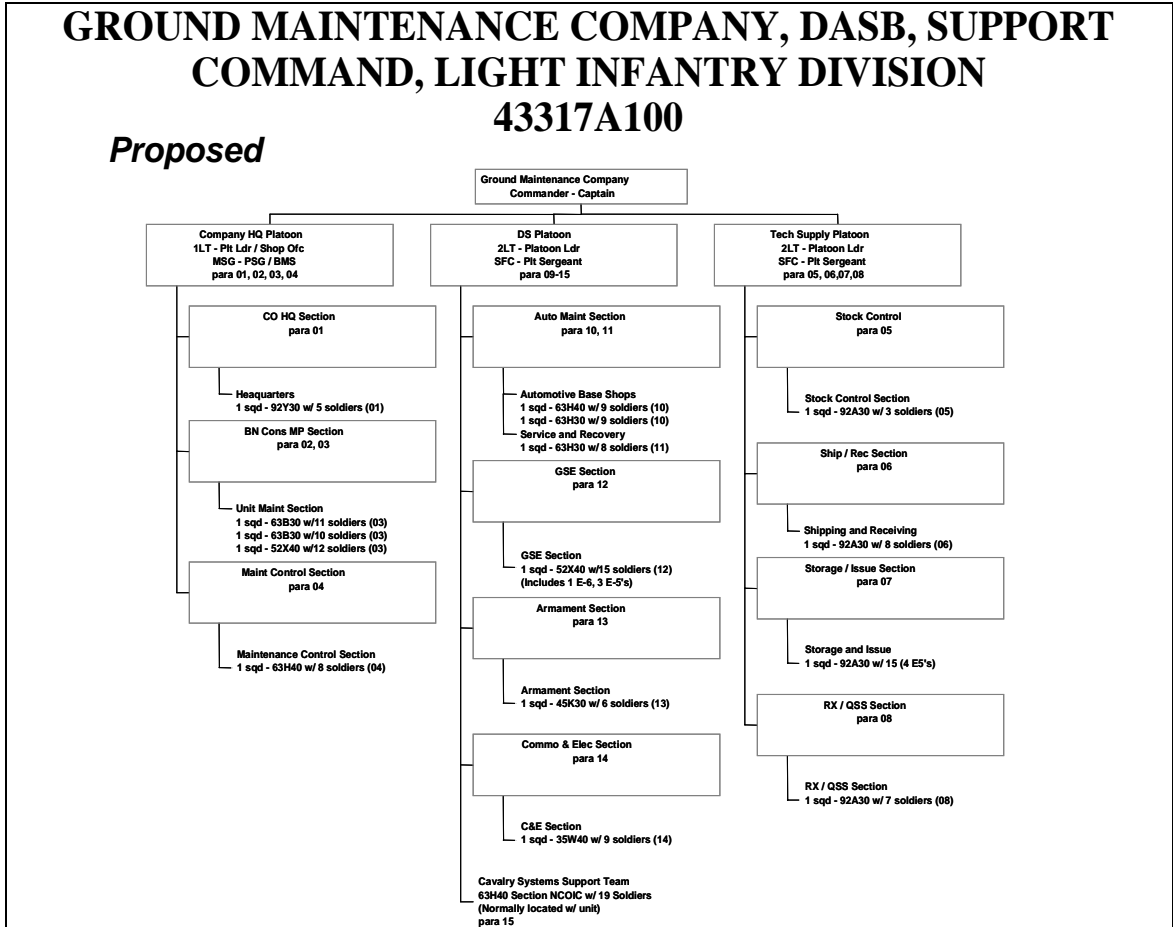
The maintenance control section (TOE paragraph 04), the battalion consolidated motor pool (paragraph 02,03) and the company headquarters (paragraph 01) are combined to make a headquarters platoon.

The cavalry systems support team (paragraph 15) normally operates with the division cavalry in or near their motor pool/UMCP.

C2 relationships

The maintenance control Officer (shop officer) is dual hatted as the headquarters platoon leader. The battalion motor sergeant, as the senior enlisted soldier in this platoon, and also who controls the bulk of the soldiers, serves as the headquarters platoon sergeant. For day-to-day operations, the supply sergeant is in charge of the headquarters sections (supply, arms room, NBC room, and so forth), the maintenance tech (CW2) is in charge of the battalion consolidated motor pool, and the maintenance control sergeant manages the maintenance control section (shop stock clerk, maintenance control clerk and inspectors).

Figure C-22. Ground Maintenance Company, DASB, Support Command, Heavy Division, 43888A000/43317A000



Concept

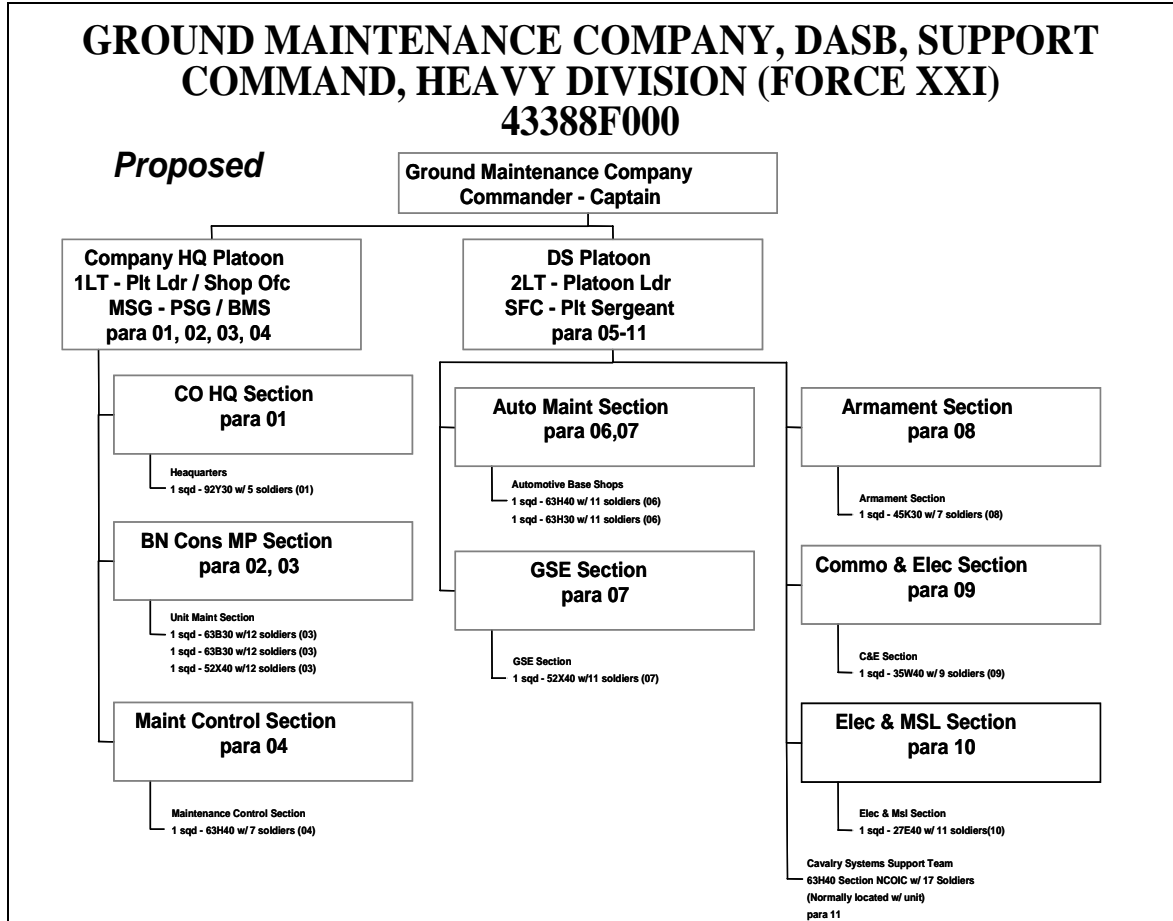
The maintenance control section (TOE paragraph 04), the battalion consolidated motor pool (paragraph 02,03) and the company headquarters (paragraph 01) are combined to make a headquarters platoon.

The cavalry systems support team (paragraph 15) normally operates with the division cavalry in or near their motor pool/UMCP.

C2 relationships

The maintenance control Officer (shop officer) is dual hatted as the headquarters platoon leader. The battalion motor sergeant, as the senior enlisted soldier in this platoon, and also who controls the bulk of the soldiers, serves as the headquarters platoon sergeant. For day-to-day operations, the supply sergeant is in charge of the headquarters sections (supply, arms room, NBC room, and so forth), the maintenance tech (CW2) is in charge of the battalion consolidated motor pool, and the maintenance control sergeant manages the maintenance control section (shop stock clerk, maintenance control clerk and inspectors).

Figure C-23. Ground Maintenance Company, DASB, Support Command, Light Infantry Division, 43317A100



Concept

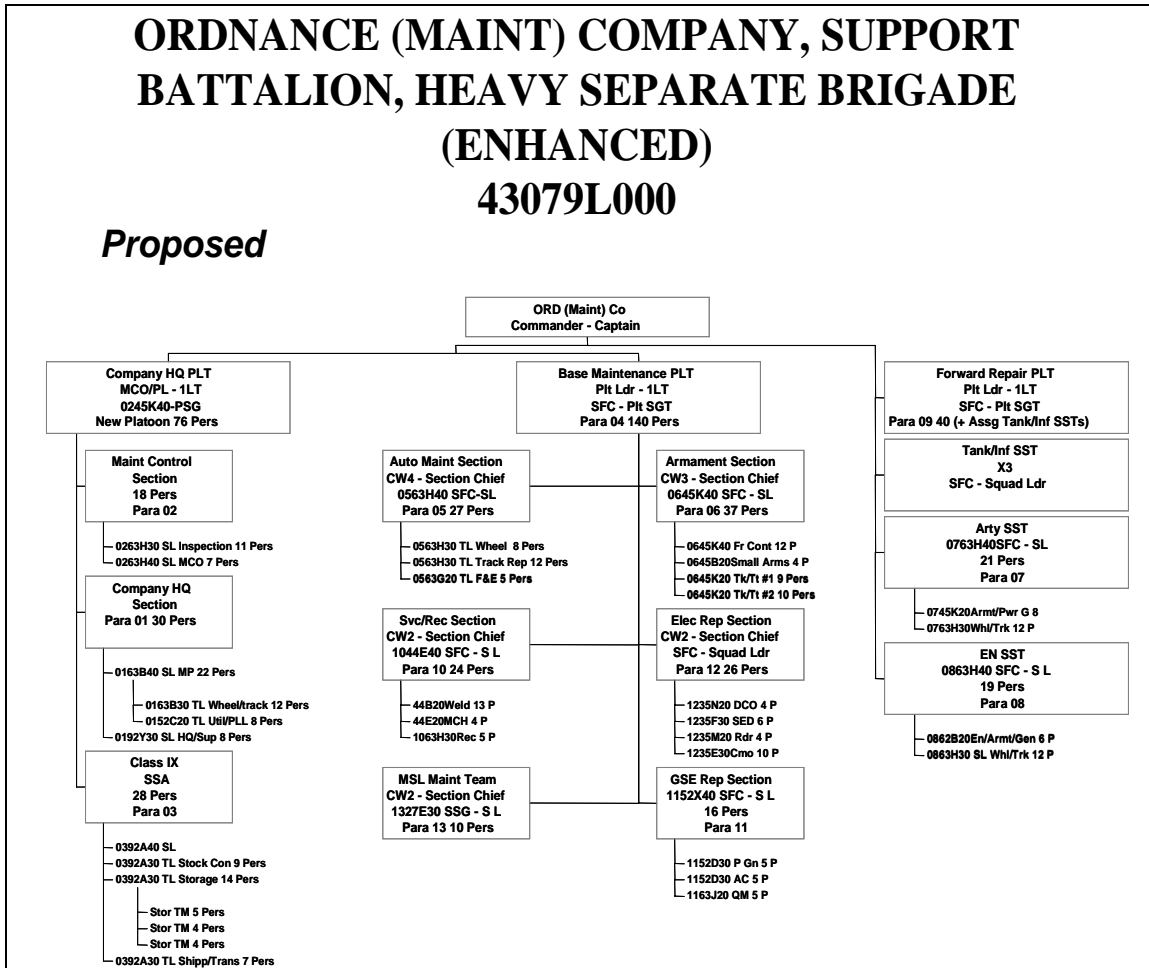
The maintenance control section (MTOE paragraph 04), the BN Consolidated MP (paragraph 02,03) and the company headquarters (paragraph 01) are combined to make a headquarters platoon. The DS platoon has each of the SFC section sergeants assigned as the squad leader for that section.

C2 relationships

The maintenance control Officer (shop officer) is dual hatted as the headquarters platoon leader. The Battalion motor sergeant, as the senior enlisted soldier in this platoon, and also who controls the bulk of the soldiers, serves as the headquarters platoon sergeant. For day-to-day operations, the supply sergeant is in charge of the headquarters sections (supply, arms room, NBC room, and so forth), the Maintenance Tech (CW2) is in charge of the Battalion Consolidated Motor Pool, and the maintenance control sergeant manages the maintenance control section (shop stock clerk, maintenance control clerk and inspectors).

SFC section sergeants are also squad leaders for their respective sections. This ensures a single chain of command for the lower enlisted soldier.

Figure C-24. Ground Maintenance Company, DASB, Support Command, Heavy Division (Force XXI), 43388F000



Concept

Consolidate all base functions and re-name as base maintenance platoon
 Put all MSTs/SSTs under one platoon, re-name forward maintenance platoon.
 Make headquarters platoon out of Co headquarters, MCO and Class IX support section. Give MCO additional duty as platoon leader.
 Convert 45K30 Inspector position to 45K40 and make authorized headquarters platoon sergeant.

C2 Relationship

None not already noted.

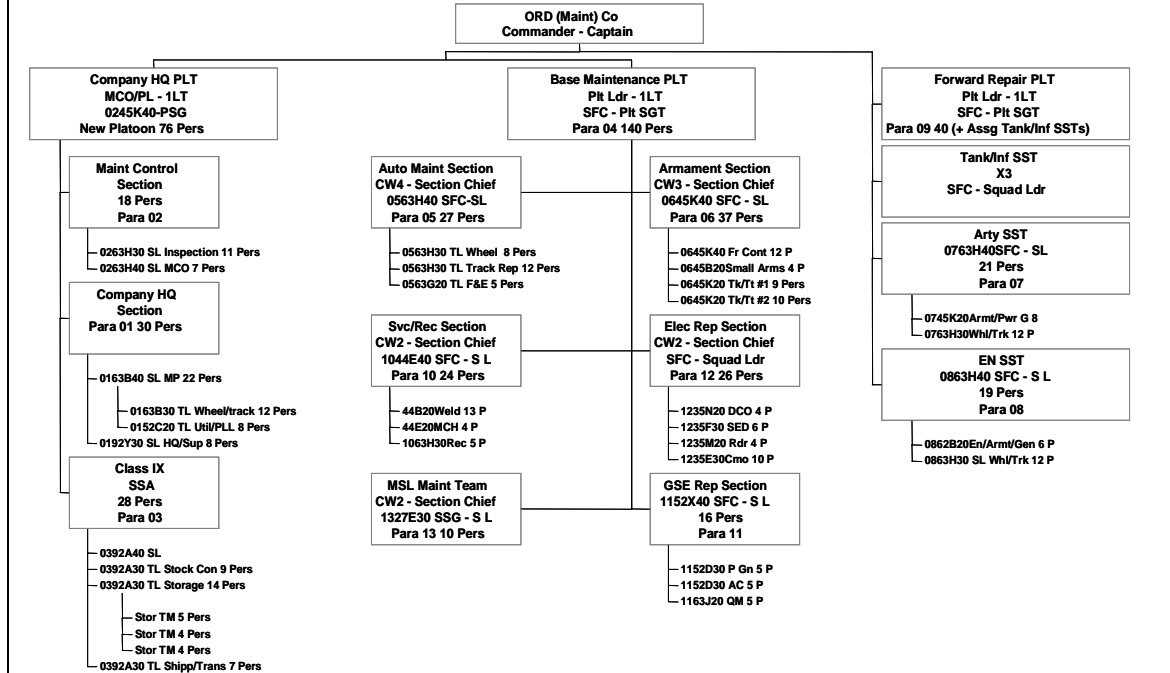
Notes

Although functions are better aligned (MSTs versus base maintenance) one must consider the task and purpose for the forward repair platoon and the platoon sergeant in a field environment. Will the platoon leader and platoon sergeant be able to effectively manage the MSTs and how will they manage this with limited resources (one M998 authorized for both). Although the span of control is acceptable for the base maintenance platoon, one must also consider how much area that platoon will have to defend in a field environment and will the platoon frontage be too much for a platoon leader to manage and defend.

Figure C-25. Ordnance (MAINT) Company, Support Battalion, Heavy Separate Brigade (Enhanced), 43079L000

ORDNANCE (MAINT) COMPANY, SUPPORT BATTALION (LIMITED CONVERSION) HEAVY SEPARATE BRIGADE XXI 43079L100

Proposed



Concept

Consolidate all base functions and re-name as base maintenance platoon
 Put all MSTs/SSTs under one platoon, re-name forward maintenance platoon.
 Make headquarters platoon out of Co headquarters, MCO and Class IX support section. Give MCO additional duty as platoon leader.
 Convert 45K30 Inspector position to 45K40 and make authorized headquarters platoon sergeant.

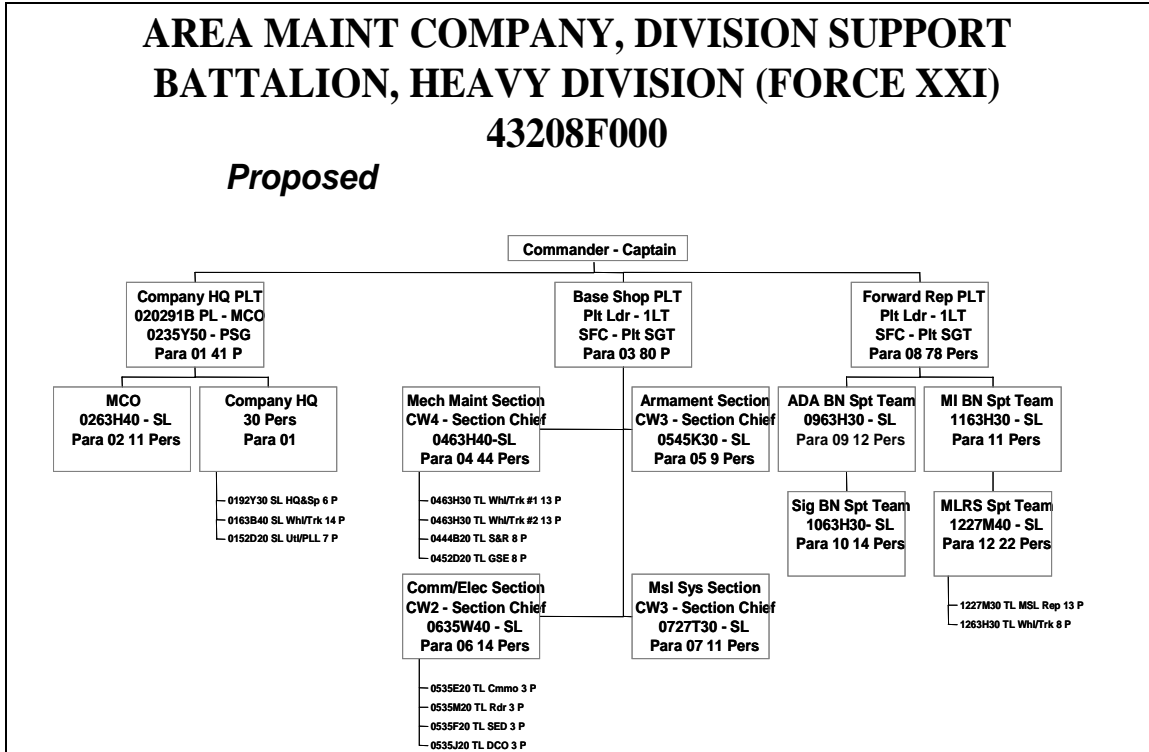
C2 Relationship

None not already noted.

Notes

Although functions are better aligned (MSTs versus base maintenance) one must consider the task and purpose for the forward repair platoon and the platoon sergeant in a field environment. Will the platoon leader and platoon sergeant be able to effectively manage the MSTs and how will they manage this with limited resources (one M998 authorized for both). Although the span of control is acceptable for the base maintenance platoon, one must also consider how much area that platoon will have to defend in a field environment and will the platoon frontage be too much for a platoon leader to manage and defend.

Figure C-26. Ordnance (MAINT) Company, Support Battalion (Limited Conversion), Heavy Separate Brigade XXI – 43079L100



Concept

Minor changes to make due to simplicity of original design.
 Make the MCO and company headquarters section underneath a headquarters platoon give MCO additional duty as platoon leader.
 Make 35Y50 the platoon sergeant (additional duty) for headquarters platoon.

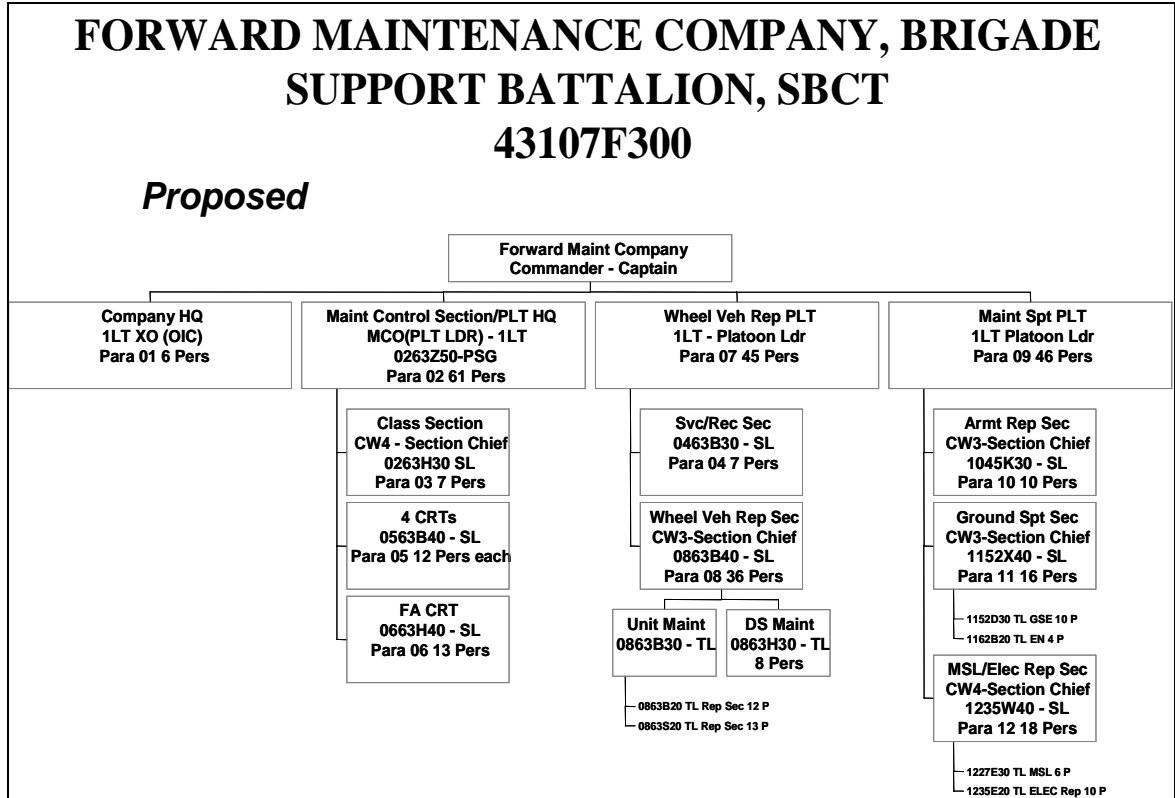
C2 Relationships

None not already noted.

Issues

Task/Purpose for 35Y50 in MCO section when MCS is 63H40—Could put 35Y50 as MCS or, use additional 63Z50 in company headquarters as MCS.
 Task/Purpose for 63Z50 in company headquarters.

Figure C-27. Area MAINT Company, Division Support Battalion, Heavy Division (Force XXI), 43208F000



Changes

Move Service and Recovery Section (7 SM) to Wheel Vehicle Repair Platoon

This move will better align the mission of the wheel vehicle repair platoon to base maintenance while giving a focus of maintaining C2 for the CRTs.

Secondary benefit is that the span of control for the platoons and leader to lead ratio is improved.

**Figure C-28. Forward Maintenance Company, Brigade Support Battalion,
SBCT, 43107F300**

Appendix D

Maintenance Meetings

It was two hours prior to line of departure (LD) and the Infantry Battalion BMO was briefing his TF Commander on projected combat power for the upcoming mission. The TF Commander was not happy! They were conducting a movement to contact, and they were the main effort. The TF Commander wanted to get the maximum amount of combat power to ensure he could meet the Brigade Commander's intent. However, the projections were not as good as the BMO briefed at yesterday's brigade maintenance meeting. The BMO remembered telling the Brigade XO and the SPO that at least two final drives were needed; a Turret Distribution Box (TDB) and several other parts for his key combat systems. However, he did not have document numbers or National Item Identification Numbers (NIINs) for the parts. He thought they had been ordered, but in hindsight it appeared they had not. The SPO and the Maintenance Officer did not make any commitments to get these parts (it was imperative to have the critical information, document numbers and NIINs, to ensure the parts could be obtained).

The battle went as expected. With only 30 of the 44 M1s and M2s operational for the battle, the TF was not successful in meeting the Brigade Commander's intent. As a result, the battalion and ultimately the brigade had to go to a hasty defense. The reality facing the Brigade Commander was far different from the projections he heard from the XO the night before. The Brigade Commander made a mental note to himself to discuss this issue with the XO and the FSB Commander. The reason this happened is because the Brigade did not have a SOP, which specified the purpose of the maintenance meeting. The Brigade Commander embarked upon the operation with inaccurate information concerning the status of his critical combat systems. The problem lay in the flawed maintenance meeting process. The Brigade Commander did not have a reliable system for collecting, analyzing, and acting upon maintenance management information. In this article, the characteristics and dimensions of an effective maintenance meeting will be explored and it will be explained how the components of the maintenance meeting process combine to provide the Brigade Commander with maximum combat power at the decisive point on the battlefield.

THE MAINTENANCE MEETING

D-1. The unit maintenance meeting is the forum where leaders and maintenance managers provide the commander with a clear picture of their maintenance posture, and the projected combat power or maintenance posture for future operations. This event is the key forum for synchronizing the efforts of leaders and maintenance managers. It ultimately ensures sufficient combat power is available to meet the commander's intent for future operations. Figure D-1 illustrates a maintenance meeting. The maintenance meeting at a minimum should:

- Focus on the commander's priority of maintenance and priority of support.
- Build combat power for future operations by:
 - Building contracts specifying who will take specific actions, when these actions will be accomplished, and who will report on these actions.
 - Tracking contracts/issues and ensuring closing-out prior to and during the meeting.
 - Ensuring key maintenance managers and leaders are present.
 - Enforcing standards.

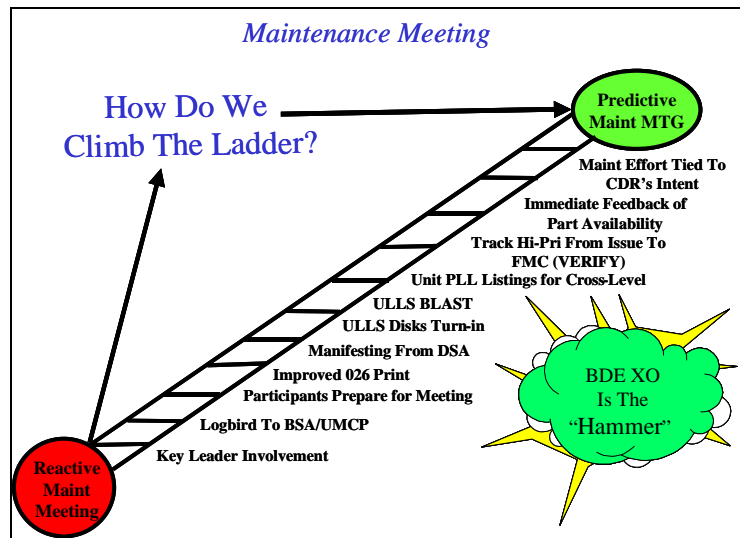


Figure D-1. Maintenance Meeting

D-2. The unit leader's unit has a choice as to whether their maintenance meeting will be reactive or predictive. The leaders ensure the maintenance meeting adheres to the required steps that produce a predictive maintenance meeting. Conducting the meeting in accordance with the ladder displayed in Figure D-1 will result in the meeting being predictive rather than reactive.

MEETING FOCUS

D-3. If the maintenance meeting is not focused on the correct goals, does not have a set agenda, and participants are unprepared,

maintenance managers may miss many critical areas. The meeting will eventually become reactive rather than proactive. Without a clear focus, maintenance managers will not gain a clear picture of their unit's maintenance posture.

ATTENDEES AND THEIR ROLES

D-4. When planning for the maintenance meeting process, it must be considered who should conduct the meeting and which key participants should be involved. A commander would never conduct a training meeting without his key subordinates. The same holds true for the maintenance meeting. For an effective maintenance meeting, unit leadership must be involved. Without key leader involvement, enforcement of contracts between different units is difficult, and the commander's intent may not get adequately relayed or enforced. The following is a suggested list of attendees:

- Higher-unit Executive Officer (such as the Brigade XO for a brigade maintenance meeting) – responsible for chairing the meeting.
- Support Battalion SPO.
- Support Operations Maintenance Officer.
- Material Management Center (MMC) Representative.
- Higher-unit S4 Representative.
- Unit Maintenance Technicians/Officers.
- Separate Company XOs/Motor Sergeants.
- SSA or TSO Supply Technician/Representative.
- DS Maintenance Company Shop Officer.
- Logistics Assistance Representatives (LARs).
- Combat Service Support Automation Management Office (CSSAMO) Representative.

Described below are the roles of the previously mentioned key attendees:

- **Unit XO.** Chairs the maintenance meeting and ultimately, is the “hammer” or the enforcer of contracts. The XO enforces the completion of contracts and ensures the commander's intent is followed during the conduct of the maintenance meeting.
- **Support Operations Officer.** Usually co-chairs the maintenance meeting but chairs the meeting in the absence of the unit XO. In addition, this officer conducts the pre-maintenance meeting, supervises the maintenance meeting site set-up, tracks contracts at the maintenance meeting, and finally, coordinates the efforts of the SSA Supply Technician and Shop Officer.
- **MMC Representative.** Serves as the interface between the support battalion and the units providing support to the support battalion. In a division, the MMC Representative provides interface between the Support Operations Section and the FSB. In addition, the MMC representative has the

capability to provide a shipment status for parts being shipped from the higher echelon warehouse and an updated status on local purchase actions.

- **S4 Representative.** Attends to ensure he has a clear picture of the unit's maintenance posture.
- **Unit Representative.** Primary focus is to provide a status of their unit's current combat power and projections based upon contracts at the maintenance meeting. The Unit Representative ensures he has all NMC equipment information; such as document numbers and the National Stock Numbers (NSNs) for the critical parts required.
- **SSA Supply Technician/Representative.** Focuses on providing information as to which Class IX parts are available within the SSA and which parts are available for customer pick-up.
- **LAO.** Receives updates on systemic maintenance issues. Also provides status concerning long lead-time parts or parts not otherwise available in-theater.
- **CSSAMO.** Monitors maintenance management automation systems status. When Unit Representatives troubleshoot system issues, the CSSAMO Representative retrieves first-hand information in regard to what the problem is and prepares a plan of action to correct it.

D-5. Having the right people at the right place does not equate to an effective maintenance meeting if they do not have the right tools. Just as an effective mechanic has the proper tools and test equipment, the participants of the maintenance meeting must have the right tools and they must be prepared for the business at hand. Figure D-2 shows, at a minimum, what the key participants must have.

<i>Maintenance Meeting</i>	
<i>WHAT THE PARTICIPANTS SHOULD BRING WITH THEM</i>	
<p><u>UNIT</u></p> <ul style="list-style-type: none"> • Status of Combat Power/NMC • ULLS generated NMC reports • PLL listings • Key issues/concerns • UMCP Locations (Curr/Proj) 	<p><u>SUPPORT OPS MAINT</u></p> <ul style="list-style-type: none"> • 026 Print • Theater ASL listing • Listing of contracts/issues from previous meeting • Manifest of Critical Parts Shipments
<p><u>SHOP OFFICE</u></p> <ul style="list-style-type: none"> • 006 print • ULLS disk T/I status • Shop stock listing 	<p><u>TSO</u></p> <ul style="list-style-type: none"> • ASL listing • ULLS disk T/I status • Customer parts P/U status
<p><u>DMC</u></p> <ul style="list-style-type: none"> • Theater ASL listing • Manifests of any recent Class IX shipment • Local purchase status • Critical Parts From MSB 	<p><u>LAO</u></p> <ul style="list-style-type: none"> • Status on any long lead time parts • Status of parts that are not available in theater • Critical Maint Issues/SOUM/MAM

Figure D-2. Maintenance Meeting Participants

Meeting Timing and Agenda

D-6. Another key factor in organizing an effective maintenance meeting must be addressed: timing. When considering the timing of the maintenance meeting there are several variables that must be reviewed for the maintenance meeting to be effective and relevant. Evaluate the disk drop Time-line and Synchronization Plan to ensure the 026 used for the meeting is as current and accurate as possible (this will prevent excessive write-ins and increase the brevity of the maintenance meeting). Establish a set time and location for the maintenance meeting and formulate adjustments in accordance with METT-TC considerations. For example, on days of battle preparation, the maintenance meeting is conducted at 1000 hrs. and on mission days the meeting is conducted two hours after actions cease.

D-7. As with all meetings, a clear, well-defined, focused agenda is a must. With the maintenance meeting, the agenda must meet the commander's intent and focus on what the commander deems critical. Figure D-3 shows a suggested maintenance meeting agenda.

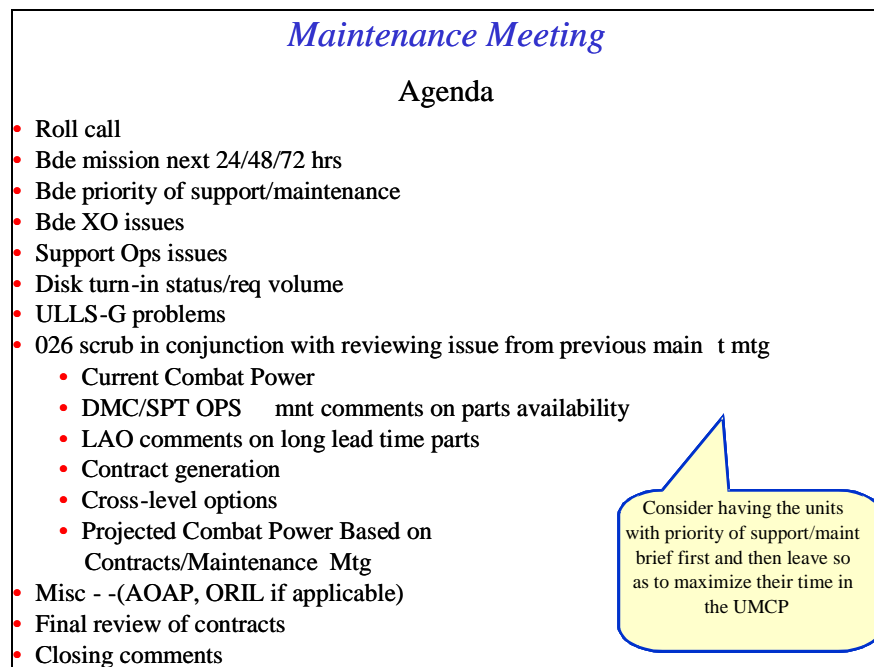


Figure D-3. Maintenance Meeting Agenda

D-8. This sample agenda provides a focus for the maintenance meeting. This focus will ensure all key maintenance managers stay on-top and reduce the time they are away from their units. Another item to consider is to have units with a priority of maintenance scrub their 026 first to result in even less time away from their units.

D-9. A key item in the agenda is the projected combat power based upon the contracts/maintenance meeting. The contract is an essential element of the maintenance meeting. Without a solid contract, maintenance managers do not have a clear understanding as to which actions must be performed to build combat power for the next mission.

For an effective contract, maintenance managers must accomplish the following:

- Ensure contracts are recorded.
- Ensure contracts specify who is going to take actions, when these actions must be completed and who will report completion of these actions.
- Track contracts before the next maintenance meeting and apply necessary adjustments to applicable contracts.

Pre-Maintenance Meetings

D-10. A necessary precursor to the maintenance meeting is the pre-maintenance meeting. The pre-maintenance meeting serves as a dress rehearsal for the maintenance meeting and is the forum where direct support maintenance managers synchronize their efforts and resolve issues prior to the conduct of the actual maintenance meeting. During this pre-meeting the Support Operations Maintenance Officer, SSA Accountable Officer/Representative, Shop Officer, and the MMC Representative should conduct the following actions:

- Conduct an initial scrub of the 026 Report.
- The Shop Officer should pay particular attention to NMC equipment that shows an organizational “M” status (going to DS) and does not have an assigned DS work-order.
- The SSA representative should ID critical parts awaiting customer pick-up and any other critical parts stocked by the SSA.

EFFECTIVE MAINTENANCE MEETINGS

D-11. After the battle, the Brigade Commander meets with the Forward Support Battalion (FSB) Commander, the Brigade XO, and the SPO to discuss development of an SOP and the key issues from the maintenance meeting that should be considered. After reviewing and implementing the key tenets of the maintenance meeting, the maintenance meeting should sound like this:

- The Infantry Task Force BMO briefs:
 - “B31 (M1A1) is down for a #3 right side idler arm. The NIIN is 01-180-8677; I ordered the part this morning and the document number is 0110-5000. I need this part no later than 1900 hrs. in order to get it in to tomorrow's fight.”
- The Support Operations Section representative answers:
 - “That part is stocked at the MSB and it is on-hand.”
- The TSO briefs:
 - “We stock that part but it is zero balance.”

- The SPO gives the following guidance:
 - “DMC, call back to the MSB immediately after the maintenance meeting and get that part put on the 1500 hrs. push; call the Maintenance Officer when the part is on the truck and on its way to the BSA.”
 - “TSO, I want you to call the Maintenance Officer when this part arrives.”
 - “Maintenance Officer, when this part arrives, call the unit and tell them the part is on-hand in the BSA. Write this contract down.”
 - “BMO, when the part is received and the tank is FMC, call the Maintenance Officer and close the loop with him.”
 - Maintenance Officer, Closely track this and provide me with an update at 1900.”
 - “If any of you have problems with completing this contract, call the Maintenance Officer or myself and finally, the final status of this contract will be reviewed at tomorrow’s maintenance meeting.”

D-12. As a result of the maintenance meeting and the synchronized efforts of the maintenance managers, the Infantry TF has a combat power of 40 out of 44. What made this happen? First, the Infantry TF BMO came to the maintenance meeting prepared. He had the NIINs and document numbers for all of his critical parts. In addition, when he prepared for the maintenance meeting he reviewed how long it would take his mechanics to repair this system. If the repair would take longer than the time available, then this system could not be projected to become FMC prior to the fight and, as a result, the critical efforts of the maintenance managers would not have been expended to get this back in the fight. He covered this time concern by giving the maintenance managers a NLT time that he could receive the parts to fix the system. For example, if he gave a NLT time of 1500 hrs., the maintenance managers would not have aggressively sought after the part because the system could not make the fight even if the part was available. The SPO provided clear guidance to the managers; he gave them guidance as to which actions they were to take and who they would call to close the loop on this contract. Finally, the Support Operations Maintenance Officer wrote down this contract to ensure it could be reviewed at the next maintenance meeting; if the contracts were not completed, they could discuss the why it did not occur (a summarized AAR to ensure future contracts could be completed).

D-13. The maintenance meeting ensures efforts of the maintenance managers are synchronized. It also ensures all leaders and maintenance managers have a clear picture of the current and projected combat power, who is conducting specific actions to generate combat power for future operations, and when these actions must occur. The maintenance meeting also serves as the forum to close the loop on open actions and ultimately ensures all maintenance resources are allocated to effect combat power for future operations. The ultimate result is that the commander has the maximum amount of combat power to conduct future operations.

Glossary

AB	Aviation Brigade
ABCS	Army Battle Command System
ABF	Availability Balance File
ACCP	Army Correspondence Course Program
ACL	Area Calibration Laboratory
ACOD	actual cost of damage
ACR	Armored Cavalry Regiment
ADA	Air Defense Artillery
ADC(S)	Assistant Division Commander (Support)
ADP	automated data processing
AFRTS	American Forces Radio and Television Service
AIDC	automatic information data collection
AIM	Armor-Infantry-Mechanized
AIT	Automatic information technology; automatic identification technology
ALOC	Administrative/Logistics Operations Center; air line(s) of communication
AM	amplitude-modulated
AMC	Army Materiel Command
AMCO	Aviation Maintenance Company
AMDF	Army Master Data File
AMSA	Army Materiel Support Activity
AMSF	Area Maintenance and Supply Facility
AMSF-E	AMSF-Europe
AMSF-P	AMSF-Pacific
AMSS	Army Materiel Status System; Automated Materiel Status System
AMST	Armament Maintenance Support Team
AMT	Army Maintenance Transformation

AO	area of operations
AOAP	Army Oil Analysis Program
AOE	Army of Excellence
AOR	area of responsibility
APC	Account processing code
AR	Army Regulation
ARFOR	Army forces
ASB	Aviation Support Battalion
ASCC	Army Service Component Command
ASG	Area Support Group
ASL	authorized stockage list
ATCCS	Army Tactical Command & Control System
ATP	Ammunition Transfer Point
ATST	area TMDE support team
AUTODIN	Automatic Digital Network
AVIM	Aviation Intermediate Maintenance
AWCF	Army Working Capital Fund
AWCF-SMA	Army Working Capital Fund-Supply Management Army
AWR	Army War Reserve
BAS	battlefield automation system
BCOC	Base Cluster Operations Center
BCS3	Battle Command Sustainment Support System
BCT	Brigade Combat Team
BD	Battlefield distribution
BDA	battle damage assessment
BDAR	Battle Damage Assessment and Repair
BDR	battle damage repair
BFVS	Bradley Fighting Vehicle System

BII	basic issue item
BMMC	Brigade Materiel Management Center
BMO	Battalion Maintenance Officer; Battalion Motor Officer
BMS	Battalion Maintenance Sergeant
BMT	Battalion Maintenance Technician
BN/TF	battalion/task force
BPA	blanket purchase agreement
BSA	brigade support area
BSB	Brigade Support Battalion
BSC	Base Support Company
BSL	bench stock list
BSTF	Base Shop Test Facility
C	Celsius
C-E	communications-electronics
C&C	Collection and Classification
C&RS	calibration and repair support
C2	command and control
C4I	Command, Control, Communications, Control and Intelligence
CBM	condition-based maintenance
CCA	circuit card assembly
CD ROM	compact disk read only memory
CEWI	combat electronic warfare intelligence
CFS	calls for support
CHS	combat health support
CIP	Command Inspection Program
CLRP	Command Logistics Review Program
CLS	contractor/contracted logistical support

CMMC	Corps Materiel Management Center
CMT	Company Maintenance Team; contact maintenance truck
CMTC	Company Maintenance Team Chief
COA	course of action
COE	Center of Excellence
COMMEL	communications and electronics
COMMZ	communications zone
COMSEC	communications security
CONUS	continental United States
COP	common operational picture
COR	contracting officer representative
COSCOM	Corps Support Command
COTS	commercial off-the-shelf
CP	command post
CPP	camouflage pattern painting
CRC	Component Repair Company
CROP	Container Roll In/Out Platform
CRT	Combat Repair Team
CS	combat support
CSB	corps support battalion
CSG	corps support group
CSM	Command Sergeant Major
CSS	combat service support
CSSAMO	Combat Service Support Automation Management Office
CSSC	Combat Service Support Company
CSSCS	Combat Service Support Control System
CSST	Cavalry System Support Team
CWT	Customer Wait Time

CZ	combat zone
DA	Department of the Army
DAAS	Defense Automatic Addressing System
DAC	Department of the Army Civilian
DASB	Division Aviation Support Battalion
DCR	Document Control Register
DCSLOG	Deputy Chief of Staff for Logistics
DCSO	deputy commander for support operations
DII	Defense Industry Initiative; Defense Information Infrastructure
DIMHRS	Defense Integrated Military Human Resources System
DISA	Defense Information Systems Agency
DISCOM	Division Support Command
DISN	Defense Information Systems Network
DIVARTY	Division Artillery
DLA	Defense Logistics Agency
DMC	Distribution Management Center
DMMO	Division Materiel Management Officer
DMS	Defense Message System
DMSB	Division Maintenance Support Battalion
DoD	Department of Defense
DODAAC	Department of Defense Activity Address Code
DOL	director of logistics; Directorate of Logistics
DOS	days of supply
DPMCS	digital preventive maintenance checks and services
DPW	Directorate of Public Works
DREAR	division rear
DRMO	Division Resource Management Office; Defense Reutilization and Marketing Office
DRSN	Defense Red Switch Network

DS	direct support
DSA	division support area; division sustainment area
DSB	Division Support Battalion
DSCS	Defense Satellite Communications System
DSN	Defense Switched Network
DSS	direct support system
DSU	direct support unit
EAB	echelons above brigade
EAC	Echelons Above Corps
EAD	echelons above division
ECC	Equipment Category Code
ECOD	Estimated Cost of Damage(s)
ECU	environmental control units
EDF	equipment data file
EED	electronic explosive device
EIR	Equipment Improvement Report
EMP	electromagnetic pulse
ENCOM	Engineer Command
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
ERP	Enterprise Resource Planning
ESE	engineer support element
1SG	First Sergeant
F	Fahrenheit
FA	field artillery
FBCB2	Force XXI Battle Command Battalion/Brigade and Below
FCS	Future Combat System
FEI	Functionally Emulative Increments

FFCA	Federal Facilities Compliance Act
FGS	final governing standard
FINCOM	Finance Command
FLOT	forward line of own troops
FM	field manual
FMC	Forward Maintenance Company; fully mission capable
FMO	Facilities Management Officer
FP	Force Projection
FPCON	force protection condition
FRA	forward repair activity
FRS	Forward Repair System
FSA	Forward support activity
FSB	Forward Support Battalion
FSC	Forward Support Company
FSMC	Forward Support Medical Company
FUPP	full-up power pack
FXXI	Force Twenty-One
FY	fiscal year
GCSS-A	Global Command Support System – Army
GMC	Ground Maintenance Company
GOCO	government-owned, contractor-operated
GP	general purpose
GS	general support
GSE	Ground Support Equipment
GSU	general support unit
HAZCOM	hazardous communication
HAZMAT	hazardous material
HAZMIN	Hazardous Waste Minimization

HDC	Headquarters and Distribution Company
HEMTT	heavy expanded mobility tactical truck
HET	heavy equipment transporter
HHC	Headquarters and Headquarters Company
HHD	Headquarters and Headquarters Detachment
HHS	Health and Human Services
HMMWV	high mobility multi-purpose wheeled vehicle
HN	host nation
HNS	Host Nation Support
HQ	headquarters
HQDA	Headquarters, Department of the Army
hrs	hours
HSC	Health Service Command; Headquarters Supply Company
HSS	health service support
HVY	heavy
HW	hazardous waste
IAV	interim armored vehicle
IETM	interactive electronic technical manual
IFF	identification friend or foe
ILAP	Integrated Logistics Analysis Program
ILS	Integrated Logistics Support
IMM	Integrated Management Module
IMO	information management officer
IMPE	Information Management and Processing Equipment
IOSC	Installation On-Scene Coordinator
IPD	issue priority designator
ISB	intermediate staging base
ISCP	Installation Spill Contingency Plan

ISM	integrated sustainment maintenance
ISO	International Organization for Standardization
ITV	in-transit visibility
JDLM	Joint Deployment Logistics Model
JFC	Joint Force Commander
JOPES	Joint Operations Planning and Execution System
JTF	joint task force
km	kilometer
kw	kilowatt
LAR	Logistics Assistance Representative
LCMS	Land Combat Missile Systems
LCOP	Logistics Common Operating Picture
LD	line of departure
LIF	Logistics Intelligence File
LIN	line item number
LO	Lubrication order
LOC	lines of communication
LOGCAP	Logistics Civil Augmentation Program
LOGPAC	logistical package
LOGSA	Logistics Support Activity
LOGSITREP	logistics situation report
LP	listening post
LPB	logistics preparation of the battlefield
LRF	Laser Range Finder
LRU	line replaceable unit
LSE	logistics support element
LSMM	Local Sustainment Maintenance Manager
LT	light

MA	mortuary affairs
MAC	Maintenance Allocation Chart
MACOM	major Army command
MAINT	maintenance
MAIT	Maintenance Assistance and Instruction Team
MARC	manpower requirement code
MARKS	Modern Army Record Keeping
MARS	Military Affiliate Radio System
MATO	materiel officer
MCA	Movement Control Agency
MCO	Maintenance Control Officer
MCP	Maintenance Collection Point
MCS	Maintenance Control Section; Maintenance Control Supervisor
MCSR	Materiel Condition Status Report
MEDCOM	Medical Command
MEDEVAC	medical evacuation
MEL	Maintenance Expenditure Limits
METT-TC	mission, enemy, terrain, troops, time, and civil considerations
MGTM	Management Module
MHE	materiel handling equipment
MI	military intelligence
MILSTRIP	Military Standard Requisitioning and Issue Procedure
MLC	military load classification
MLMC	Medical Logistics Management Center
MLRS	Multiple Launch Rocket System
MM	millimeter
MMC	Material Management Center

MMDF	Maintenance Master Data File
MMDS	Maintenance Management and Diagnostic System
MMIP	Maintenance Management Improvement Program
MMT	Mobile Maintenance Team
MNTM	Maintenance Module
MOA	memorandum of agreement
MOOTW	military operations other than war
MOS	Military occupational specialty
MOUT	military operations in urban terrain
MP	military police
MPH	mobile parts hospital
MRC	maintenance recovery code
MRLN	Maintainer's Remote Logistics Network
MSB	Main Support Battalion
MSDS	Materiel Safety Data Sheet
MSE	mobile subscriber equipment
MSR	main supply route
MSS	Maintenance Service Section
MST	Maintenance Support Team
MTOE	modified tables of equipment
MTP	mission training plan
MTS	Movement Tracking System
MWO	Modification Work Order
NBC	nuclear, biological, chemical
NCO	noncommissioned officer
NCODP	NCO Development Program
NCOIC	noncommissioned officer in charge
NET	new equipment training

NGO	non-governmental organization
NICP	National Inventory Control Point
NIIN	National Item Identification Number
NIST	National Institute of Standards and Technology
NLOS C4ISR	Non-Line of Sight Command, Control, Communications, Computer, Intelligence, Surveillance, and Reconnaissance
NLT	not later than
NMC	not mission capable
NMCP	not mission capable supply
NMP	national maintenance point; National Maintenance Program
NPO	National Provider Officer
NSMM	National Sustainment Maintenance Manager
NSN	national stock number
NSNFC2I	Non-Strategic Nuclear Forces Command and Control Information
OCONUS	outside Continental United States
OP	observation post
OPCON	operationally control
OPLAN	operation plan
OPORD	Operation Order
OPTEMPO	operational tempo
ORF	Operational Readiness Float
OST	order and ship time
PC	Production Control
PCB	printed circuit board
PD	priority designator
PDO	Property Disposal Office
PERSCOM	Personnel Command

PGU	power generation unit
PLL	Prescribed Load List
PM	program manager
PMCS	preventive maintenance checks and services
POC	point of contact
POD	port of departure
POL	petroleum, oil, and lubricants
POV	privately-owned vehicle
PP	protective posture
PPC&E	personnel protective clothing and equipment
PP&C	Program Planning and Control
PPM	preventive maintenance management
PWRMS	pre-positioned war reserve materiel stocks
QA	quality assurance
QC	quality control
QDR	Quality Deficiency Report
QM	Quartermaster
QRF	Quick Reaction Forces
QSS	Quick Supply Store
RADIAC	radiation detection, indication, and computation
RAOC	Rear Area Operations Center
RC	recovery code
RCRA	Resource Conservation and Recovery Act
RDT&E	research, development, test, and evaluation
RF	radio frequency
RIC	routing identifier code

RML	Revolution in Military Logistics
RMT	Rapid Manufacturing Technology
ROC	Rear Operations Center
ROE	rules of engagement
ROPS	rollover protection safety
RPO	Radiation Protection Officer
RSMM	Regional Sustainment Maintenance Manager
RSTA	Reconnaissance, Surveillance, & Target Acquisition
RUF	rules for the use of force
RX	Reparable Exchange
RXA	Reparable Exchange Activity
S&T	Supply and Transport
S1	Adjutant
S2/3	Intelligence and Operations Officer
S4	Supply Officer
S6	Communications Staff Officer
SAAS-MOD	Standard Army Ammunition System-Modified
SAMS	Standard Army Maintenance System
SAMS-1	Standard Army Maintenance System-Level 1
SAMS-2	Standard Army Maintenance System-Level 2 (Management Level-MMC/Battalion)
SAP	systems, applications, and products
SARSS	Standard Army Retail Supply System
SARSS-1	Standard Army Retail Supply System-Level 1
SARSS-2A	Standard Army Retail Supply System-Level 2A (Division)
SARSS-2AC	Standard Army Retail Supply System-Level 2AC
SARSS-Gateway	Standard Army Retail Supply System-Gateway
SARSS-O	Standard Army Retail Supply System-Objective

SBCCOM	Soldier and Biological Chemical Command
SBCT	Stryker Brigade Combat Team
SD	stock determination
SEAD	Suppression of Enemy Air Defense
SIB	Separate Infantry Brigade
SIGSEC	signal security
SJA	Staff Judge Advocate
SKO	set, kit, and outfit
SLOC	sea line(s) of communication
SM	sustainment maintenance
SMC	Support Maintenance Company
SMM	sustainment maintenance manager
SN	serial number
SOFA	Status of Forces Agreement
SOP	Standing Operating Procedure
SOR	Source of Repair
SOW	statement of work
SP	special purpose
SPBS-R	Standard Property Book System-Redesign
SPO	Support Operations Officer
SPORT	Soldier Portable On System Repair Tool
SPT	support
SRA	Specialized Repair Activity
SRC	source requirement code
SRU	shop replacement unit
SSA	supply support activity
SSF	Single Stock Fund

SSL	shop stock list
SST	System Support Team
STACCS	Standard Theater Army Command and Control System
STAMIS	Standard Army Management Information System
STARPUB	The Standard Army Publications System
STP	soldier training publication
SU	situational understanding
TAC-FIRE	tactical fire
TACCS	Tactical Army Combat Service Support Computer System
TAMMS	The Army Maintenance Management System
TAT	turnaround time
TAV	total asset visibility
TB	technical bulletin
TC	training circular
TC-AIMS II	Transportation Coordinators' Automated Information for Movements System II
TCF	Tactical Combat Force
TCS	Theater Communications System
TDA	Tables of Distribution and Allowances
TDB	Turret Distribution Box
TF	task force
TI	technical inspection
TLM	Two-Level Maintenance
TM	technical manual
TMDE	test, measurement, and diagnostic equipment
TMMC	Theater Materiel Management Center
TMT	Transportation Motor Transport

TO	task order
TOC	Tactical Operations Center
TOE	Tables of Organization and Equipment
TOW	Tube-launched Optically-tracked Wire-guided missile
TQM	total quality management
TRANSCOM	Transportation Command
TRS	theater reserve stocks
TSC	Theater Support Command
TSC-A	Theater Signal Command-Army
TSMC	Theater Signal Maintenance Company
TTP	tactics, techniques, and procedures
UIC	unit identification code
ULLS	Unit-Level Logistics System
ULLS-A	Unit Level Logistics System-Aviation
ULLS-G	Unit Level Logistics System-Ground
ULLS-S4	Unit Level Logistics System, S-4 Module
UMCP	Unit Maintenance Collection Point
UMT	Unit Ministry Team
UN	United Nations
U.S.	United States
USAMC	U.S. Army Materiel Command
USATA	U.S. Army TMDE Activity
USATRANS COM	United States Army Transportation Command
USR	unit status report

WARCO	Warranty Coordinator
WO	work order
WSRO	Weapon System Replacement Operations
WVRP	Wheeled Vehicle Repair Platoon
XO	Executive Officer
XXI	Twenty-One

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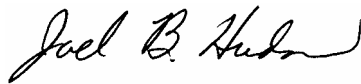
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