



**NONRESIDENT  
TRAINING  
COURSE**



March 1995

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# **Naval Construction Force/Seabee 1 & C**

**NAVEDTRA 14233**

Although the words “he,” “him,” and “his” are used sparingly in this course to enhance communication, they are not intended to be gender driven or to affront or discriminate against anyone.

COMMANDING OFFICER  
NETPDTC  
6490 SAUFLEY FIELD RD  
PENSACOLA, FL 32509-5237

ERRATA #1

23 Oct 2001

Specific Instructions and Errata for  
Nonresident Training Course

NAVAL CONSTRUCTION FORCE/SEABEE 1 & C, NAVEDTRA 14233

1. No attempt has been made to issue corrections for errors in typing, punctuation, etc., that do not affect your ability to answer the question or questions.
2. Delete the following questions, and leave the corresponding spaces blank on the answer sheets:

Questions

1-37  
2-30  
7-8  
7-28  
7-45  
8-16  
8-30

## PREFACE

By enrolling in this self-study course, you have demonstrated a desire to improve yourself and the Navy. Remember, however, this self-study course is only one part of the total Navy training program. Practical experience, schools, selected reading, and your desire to succeed are also necessary to successfully round out a fully meaningful training program.

**THE COURSE:** This self-study course is organized into subject matter areas, each containing learning objectives to help you determine what you should learn along with text and illustrations to help you understand the information. The subject matter reflects day-to-day requirements and experiences of personnel in the rating or skill area. It also reflects guidance provided by Enlisted Community Managers (ECMs) and other senior personnel, technical references, instructions, etc., and either the occupational or naval standards, which are listed in the *Manual of Navy Enlisted Manpower Personnel Classifications and Occupational Standards*, NAVPERS 18068.

**THE QUESTIONS:** The questions that appear in this course are designed to help you understand the material in the text.

**VALUE:** In completing this course, you will improve your military and professional knowledge. Importantly, it can also help you study for the Navy-wide advancement in rate examination. If you are studying and discover a reference in the text to another publication for further information, look it up.

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## **Sailor's Creed**

“I am a United States Sailor.

I will support and defend the Constitution of the United States of America and I will obey the orders of those appointed over me.

I represent the fighting spirit of the Navy and those who have gone before me to defend freedom and democracy around the world.

I proudly serve my country's Navy combat team with honor, courage and commitment.

I am committed to excellence and the fair treatment of all.”

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# INSTRUCTIONS FOR TAKING THE COURSE

## ASSIGNMENTS

The text pages that you are to study are listed at the beginning of each assignment. Study these pages carefully before attempting to answer the questions. Pay close attention to tables and illustrations and read the learning objectives. The learning objectives state what you should be able to do after studying the material. Answering the questions correctly helps you accomplish the objectives.

## SELECTING YOUR ANSWERS

Read each question carefully then select the BEST answer. You may refer freely to the text. The answers must be the result of your own work and decisions. You are prohibited from referring to or copying the answers of others and from giving answers to anyone else taking the course.

## SUBMITTING YOUR ASSIGNMENTS

To have your assignments graded, you must be enrolled in the course with the Nonresident Training Course Administration Branch at the Naval Education and Training Professional Development and Technology Center (NETPDTC). Following enrollment, there are two ways of having your assignments graded: (1) use the Internet to submit your assignments as you complete them, or (2) send all the assignments at one time by mail to NETPDTC.

**Grading on the Internet** Advantages to Internet grading are:

- you may submit your answers as soon as you complete an assignment, and
- you get your results faster; usually by the next working day (approximately 24 hours).

In addition to receiving grade results for each assignment, you will receive course completion confirmation once you have completed all the

assignments. To submit your assignment answers via the Internet, go to:

**<http://courses.cnet.navy.mil>**

**Grading by Mail:** When you submit answer sheets by mail, send all of your assignments at one time. Do NOT submit individual answer sheets for grading. Mail all of your assignments in an envelope, which you either provide yourself or obtain from your nearest Educational Services Officer (ESO). Submit answer sheets to:

COMMANDING OFFICER  
NETPDTC N331  
6490 SAUFLEY FIELD ROAD  
PENSACOLA FL 32559-5000

**Answer Sheets:** All courses include one “scannable” answer sheet for each assignment. These answer sheets are preprinted with your SSN, name, assignment number, and course number. Explanations for completing the answer sheets are on the answer sheet.

**Do not use answer sheet reproductions** Use only the original answer sheets that we provide— reproductions will not work with our scanning equipment and cannot be processed.

Follow the instructions for marking your answers on the answer sheet. Be sure that blocks 1, 2, and 3 are filled in correctly. This information is necessary for your course to be properly processed and for you to receive credit for your work.

## COMPLETION TIME

Courses must be completed within 12 months from the date of enrollment. This includes time required to resubmit failed assignments.

## **PASS/FAIL ASSIGNMENT PROCEDURES**

If your overall course score is 3.2 or higher, you will pass the course and will not be required to resubmit assignments. Once your assignments have been graded you will receive course completion confirmation.

If you receive less than a 3.2 on any assignment and your overall course score is below 3.2, you will be given the opportunity to resubmit failed assignments. **You may resubmit failed assignments only once.** Internet students will receive notification when they have failed an assignment--they may then resubmit failed assignments on the web site. Internet students may view and print results for failed assignments from the web site. Students who submit by mail will receive a failing result letter and a new answer sheet for resubmission of each failed assignment.

## **COMPLETION CONFIRMATION**

After successfully completing this course, you will receive a letter of completion.

## **ERRATA**

Errata are used to correct minor errors or delete obsolete information in a course. Errata may also be used to provide instructions to the student. If a course has an errata, it will be included as the first page(s) after the front cover. Errata for all courses can be accessed and viewed/downloaded at:

<http://www.advancement.cnet.navy.mil>

## **STUDENT FEEDBACK QUESTIONS**

We value your suggestions, questions, and criticisms on our courses. If you would like to communicate with us regarding this course, we encourage you, if possible, to use e-mail. If you write or fax, please use a copy of the Student Comment form that follows this page.

## **For subject matter questions:**

E-mail: n314.products@cnet.navy.mil  
Phone: Comm: (850) 452-1001, Ext.1826  
DSN: 922-1001, Ext.1826  
FAX: (850) 452-1370  
(Do not fax answer sheets.)  
Address: COMMANDING OFFICER  
NETPDTC (CODEN314)  
6490 SAUFLEY FIELD ROAD  
PENSACOLA FL 32509-5237

## **For enrollment, shipping, grading, or completion letter questions:**

E-mail: fleetservices@cnet.navy.mil  
Phone: Toll Free: 877-264-8583  
Comm: (850) 452-1511/1181/1859  
DSN: 922-1511/1181/1859  
FAX: (850) 452-1370  
(Do not fax answer sheets.)  
Address: COMMANDING OFFICER  
NETPDTC (CODEN331)  
6490 SAUFLEY FIELD ROAD  
PENSACOLA FL 32559-5000

## **NAVAL RESERVE RETIREMENT CREDIT**

If you are a member of the Naval Reserve, you will receive retirement points if you are authorized to receive them under current directives governing retirement of Naval Reserve personnel. For Naval Reserve retirement, this course is evaluated at 12 points. (Refer to *Administrative Procedures for Naval Reservists on Inactive Duty*, BUPERSINST 1001.39, for more information about retirement points.)

## **COURSE OBJECTIVES**

In completing this nonresident training course, you will demonstrate a knowledge of the subject matter by correctly answering questions on the following subjects: administration; project and construction planning management; advanced base planning and embarkation; battalion turnover and tool management; NCF camp maintenance; environmental pollution control; contract Quality Assurance; and facilities maintenance management.





## Student Comments

**Course Title:** Naval Construction Force/Seabee 1 & C

**NAVEDTRA:** 14233 **Date:** \_\_\_\_\_

### We need some information about you

Rate/Rank and Name: \_\_\_\_\_ SSN: \_\_\_\_\_ Command/Unit \_\_\_\_\_

Street Address: \_\_\_\_\_ City: \_\_\_\_\_ State/FPO: \_\_\_\_\_ Zip \_\_\_\_\_

### Your comments, suggestions, etc:

**Privacy Act Statement:** Under authority of Title 5, USC 301, information regarding your military status is requested in processing your comments and in preparing a reply. This information will not be divulged without written authorization to anyone other than those within DOD for official use in determining performance.

NETPDTC 1550/41 (Rev 4-00)



# CHAPTER 1

## ADMINISTRATION

*LEARNING OBJECTIVE: Identify the administrative duties and responsibilities of a petty officer first class within a Naval Construction Force occupation in relation to the Personnel Readiness Capability Program, crew member training, preparation of work assignment/schedules, and writing of evaluations.*

As you attain each higher rate in your rating, both you and the Navy benefit. This is understandable since you have more experience in your particular rating, you have probably been to several Navy schools, and your overall attitude is generally well oriented to Navy life. You are now better qualified and in a better position to impart your knowledge and experience to the personnel under you. Your bearing, actions, and disposition are under scrutiny not only by your seniors, but also by your subordinates.

Advancement brings both increased rewards and increased responsibilities. These include higher pay, greater prestige, more interesting and challenging assignments, and the satisfaction of getting ahead in your chosen career. As a first class petty officer, you will have many responsibilities added to those you had as a second class petty officer. You have acquired valuable knowledge, and now it is your turn to pass this technical know-how on to others.

In addition to supervising and training lower-rated personnel, you must be able to perform various administrative duties. These duties include giving Personnel Readiness Capability Program interviews, maintaining reports, drafting rough evaluation reports, and organizing daily work assignments for team/crew leaders.

The command to which you are assigned will determine the way you should carry out your administrative responsibilities. But it is your skills in planning and organizing, applying effective techniques of supervision, and getting along with people that will help you succeed in the Navy, regardless of your assignment.

### **THE PERSONNEL READINESS CAPABILITY PROGRAM**

The Personnel Readiness Capability Program (PRCP) is a management tool used throughout the

active and reserve Naval Construction Force (NCF). It is a skill inventory designed to provide managers at all levels of the NCF with timely personnel information. This information tool increases management's capabilities in planning, decision making, control, and determining unit readiness.

Before PRCP was developed, personnel information was kept on an as-required basis by various members of the unit in personal notebooks, files, and records. This information was collected as management required it to determine military and construction capabilities, training requirements, logistics support, and so forth. The collection of this information was usually a time-consuming, laborious task that required a piecemeal inventory of the command's capabilities and requirements. Another way of getting this information was through the use of rough estimates. Neither way, however, produced the accuracy or rapid response desired. PRCP has established standard procedures for identifying, collecting, processing, and using this information.

The PRCP requires each command to gather and continuously update information on each member of the unit. Most of this information concerns skills acquired through actual job experience or through some type of training program. Other information, such as expiration of enlistment or rotation date, is required for accurate planning. This information is placed in a document called a skill update record. Each enlisted individual within an NCF unit is required to have a skill update record, which is maintained at the company/department level. Regular updates are forwarded to the unit's PRCP manager.

### **SKILL INVENTORY**

An accurate and current skill inventory is the backbone of PRCP. Without it, the reliability of any planning based on information stored in the PRCP

data bank is questionable. Unreliable data can result in unnecessary retraining, reduced manpower availability, or skill deficiencies. The PRCP is the management tool used to determine a unit's readiness and skill deficiencies. It is used in conjunction with the requirements established by the Commander, Second Naval Construction Brigade (COM2ND-NCB), and the Commander, Third Naval Construction Brigade (COM3RDNCB), which are issued in their joint instruction COMSECOND/COMTHIRDNCB-INST 1500.1 (series). Additionally, these skills have been conveniently classified into the following five major categories:

1. Individual general skills (PRCP 040 - 090). These are essentially nonmanipulative skills (knowledge) related to two or more ratings, such as material liaison office operation (PRCP 040), instructing (PRCP 080), and safety (PRCP 090).
2. Individual rating skills (PRCP 100 - 760). These are primarily manipulative skills associated with one of the seven Occupational Field 13 (Construction) ratings. Some examples are light-frame construction (PRCP 150) for the Builder, cable splicing (PRCP 237) for the Construction Electrician, and shore-based boiler operation (PRCP 720) for the Utilitiesman.
3. Individual special skills (PRCP 800 - 830). These are technical skills performed by personnel in several ratings, including people that are not in Occupational Field 13; for example, forklift operation (PRCP 800), ham radio operation (PRCP 804), and typing (PRCP 803).
4. Military skills (PRCP 901 - 981). These skills are further classified into three subcategories: mobilization, disaster recovery, and Seabee combat readiness. Examples are aircraft embarkation (PRCP 902); M-16 rifle use and familiarization (PRCP 953); and disaster recovery, heavy rescue (PRCP 979).
5. Crew experience skills (PRCP 1000A - 1010A). These skills are gained by working with others on specific projects. Most of these projects are related to advanced base construction, such as observation tower (PRCP 1002A), fire fighting (PRCP 1009A), and bunker construction (PRCP 1008A).

A skill inventory has three principal steps. First, each skill is closely defined and broken down into task elements. Second, a standard procedure for obtaining the information is developed. This procedure helps to ensure that the information, regardless of where it is

collected or by whom, meets certain standards of acceptability. The third step is the actual collection of the skill data and includes the procedures for submitting the data to the data bank.

## **Skill Definitions**

PRCP, NAVFAC P-458, volume I, *Skill Definitions*, contains a definition for every PRCP skill identified in the PRCP. Each definition has been jointly approved by COM2NDNCB and COM3RDNCB and applies to the entire NCF.

## **PRCP Standards and Guides**

The skill definitions alone do not contain sufficiently detailed information to accurately classify people, nor do they provide any classification procedures. Recognizing this, the Civil Engineer Support Office (CESO) conducted special Seabee workshops where the PRCP, NAVFAC P-458, volume II, *Standards and Guides*, was developed under the guidance of CESO. This volume consists of seven separate manuals—one for each Seabee rating. The PRCP *Standards and Guides* is the principal tool used in collecting and updating skill data. By following the interviewing procedures in the PRCP *Standards and Guides*, a trained interviewer is able to classify people to a predetermined skill level with an acceptable degree of uniformity. With a thorough knowledge of the tasks required of each skill, anyone so authorized can classify others to an appropriate skill level by actually observing them perform the tasks, either in training or on the job.

Skill information obtained by interview or observation is recorded on the individual's skill update record (fig. 1-1). Skill information is forwarded to the unit's training department where it is recorded on the Seabee Automated Mobile Management System (SAMMS) and forwarded to the appropriate Naval Construction Regiment (NCR). The information is reviewed, skill deficiencies determined, and training requirements established to maintain the unit's readiness. Complete instructions and information for using the PRCP skill update record, and other PRCP data processing information, can be obtained from the training officer of the units participating in the program.

As a crew/squad leader, you are directly responsible for using the PRCP *Standards and Guides* to assist a designated interviewer in maintaining an accurate skill profile on your personnel. You also are

responsible for providing the initial information for the PRCP data bank. Subsequent updating of this initial information for each person is based on performance on the job (which you observe), completed training, and regular interviews. Newly reporting personnel, regardless of previous assignment, require interviewing within 30 days.

### PRCP INTERVIEWS

There are two types of PRCP interviews. The first and most important is the individual rating skill interview. The second type is simply called other interviews. Both types require the use of the PRCP *Standards and Guides*.

#### Rating Skill Interviews

When conducting an individual rating skill interview, the interviewer uses a discussion technique

to classify Seabees in the skill levels of the various individual rating skills. This technique requires a thorough understanding of the skills and tasks defined in the PRCP *Standards and Guides*. Few individuals possess the talent required to interview in all the skills of a rating. Interviewers must be mature enough to recognize their own limitations and be willing to seek assistance from qualified individuals. For example, the interviewers could use the crane crew supervisor to assist in interviewing personnel for crane skills.

#### Other Interviews

Other interviews are used to classify people into the individual general and special skills, military skills, and crew experience. With few exceptions, these skills do not require an experienced interviewer. In many cases, skill levels can be assigned to individuals on the basis of their service or training record and by completed training evolutions, such as

PRCP SKILL UPDATE RECORD																																															
NCTC PORHUE		UIC		DET		COMPANY																																									
		UTC	PNEC 0000	SNEC 9502	TNEC 0000																																										
SKILL CATEGORY	SKILL TITLE	SKILL CODE	SKILL LEVEL	SKILL YEAR	COMPANY CHANGE																																										
					DET / TEAM CHANGE																																										
GENERAL	GENERAL MATHEMATICS	000	1	81	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="4" style="text-align: center;">SKILL ADD / CHANGE / DELETE</th> </tr> <tr> <th style="text-align: center;">SKILL CODE</th> <th style="text-align: center;">SKILL LEVEL</th> <th style="text-align: center;">SKILL CODE</th> <th style="text-align: center;">SKILL LEVEL</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>			SKILL ADD / CHANGE / DELETE				SKILL CODE	SKILL LEVEL	SKILL CODE	SKILL LEVEL																																
	SKILL ADD / CHANGE / DELETE																																														
	SKILL CODE	SKILL LEVEL	SKILL CODE	SKILL LEVEL																																											
	PLANNING, ESTIMATING AND SCHEDULING	030	1	81																																											
	INSTRUCTING	080	3	84																																											
UTILITIESMAN	SAFETY	090	1	81																																											
	PLUMBING	710	2	81																																											
	SHORE BASED BOILERS	720	2	81																																											
	WATER TREATMENT	740	3	81																																											
	SEWAGE DISP AND FIELD SANITATION	750	2	81																																											
	AIR-CONDITIONING AND REFRIGERATION	760	1	81																																											
SPECIAL	DRIVERS LICENSE	801	1	81																																											
	DISEASE VECTOR PEST CONTROL	812	1	81																																											
MILITARY	AMPHIBIOUS EMBARKATION	901	1	81																																											
	FIREFIGHTING	904	1	81																																											
	CIVIL DISTURBANCE	907	1	81																																											
	MILITARY INSTRUCTOR	909	1	81																																											
	SQUAD LEADERS	942	1	81																																											
	M-16 RIFLE	953	2	84																																											
	.45 CAL PISTOL	954	1	84																																											
	COMBAT COMMUNICATIONS	964	1	84																																											
	SURVIVAL, EVASION, RESIST, ESCAPE (SERE)	974	1	81																																											
	MINES AND BOOBY TRAPS	978	1	81																																											
DISASTER RECOVERY, HEAVY RESCUE	979	1	84																																												
CBR PERSONAL PROTECTION AND DECONTAMINATION	980	1	84																																												
DISASTER RECOVERY, CNTRL COMMNCTN	981	1	81																																												

Figure 1-1.—PRCP skill update record.

<b>710—Plumbing</b>	
<u>Contents</u>	
710	Skill Definition
.1	Skill Level 1
.01	Install sewage collection systems
.02	Install interior plumbing
.03	Install water distribution systems
.04	Install steam piping systems
.05	Install galley equipment
.06	Gas cutting and welding pipe/tube
.2	Skill Level 2
.01	Lay out piping systems
.02	Test newly installed piping systems
.03	Maintenance of interior plumbing fixtures
.04	Maintain water distribution systems
.05	Maintain galley equipment

Figure 1-2.—Title and content of the PRCP *Standards and Guides*.

contingency construction crew training or block military training. Skill level classification should be done whenever possible to cut down on interviewing time. Then, when a person is scheduled for interviewing, it will be just a matter of verification or updating.

### USING THE STANDARDS AND GUIDES FOR INDIVIDUAL RATING SKILLS

When assigned as an interviewer, you must obtain, read, understand, and use the PRCP *Standards and Guides*. The format is standard. After the skill title, you will find the contents, the skill definitions, and the tasks, which are broken down into task elements. (See figs. 1-2 through 1-4.)

#### Skill Title and Contents

The title identifies the skill; for example, figure 1-2 identifies the individual Utilitiesman skill of 710, Plumbing. The number 710 is a numerical code for this skill. The contents can be used to ensure there are no missing pages. The skill definition is always listed

<u>SKILL DEFINITION</u>	
<b>710—Plumbing</b>	
<u>Skill Level 1:</u>	Individual must select, use, and care for hand tools, equipment, and machines commonly used for measuring, marking, cutting, threading, and joining the following types of pipe; steel, wrought iron, copper, plastic, cast iron, cement-asbestos, concrete, and vitrified clay; and gas cut and weld pipe/tubes using methylacetylenepropadiene (MAPP) gas. He/she must also install plumbing systems for water, steam, air, fuel, sewage and rough-in plumbing for building; install fixtures and accessories such as bathtubs, water closets, sinks and urinals; apply insulation on steam, hot and cold water piping systems; and hook up equipment such as hot water heaters, water coolers, and galley equipment such as steam chests, coppers, dishwashing machines, ranges and ovens, both gas and oil fired.
<u>Skill Level 2:</u>	Skill Level 1 plus uses drawings and specifications to determine grade, bedding, and backfilling requirements, and types of materials; to locate risers and position of sleeves in walls, floors and footings; to establish rough-in measurements; to designate the spacing of pipe supports for all types of piping systems. Also, he/she must read and interpret grade stake marks used in laying out trenches; uses batter boards and grade lines; specify the location and size of thrust blocks; make service connection on transite pipe; cut machine pipe and install transite pipe utilizing lathe; perform hydrostatic and gravity tests on newly installed piping systems; treat and test water in new distribution systems; be able to operate drilling tapping machines; maintain all types of piping systems specified in Skill Level 1, including such items as faucets, valves, pressure regulators, fire hydrants, and galley equipment; and diagnose problems and make repairs or adjustments in any of the above.
<u>Skill Level 3:</u>	Not applicable.

Figure 1-3.—Individual rating skill definition.

first and directly beneath it is .1 Skill Level 1. The tasks are listed under each skill level. You must interview each candidate to see if he or she is qualified for that skill level.

### Skill Definitions

The purpose of the skill definition in the PRCP *Standards and Guides* is to introduce the skill material to the interviewees. Figure 1-3 illustrates an individual rating skill definition. The definition shown is for Plumbing and is a statement of tasks to be performed at each skill level.

There are one, two, or three skill levels, depending upon the complexity and number of tasks. Each level within a given skill is more difficult than the previous one and requires a broader knowledge in both application and theory. For example, a person having Skill Level 1 in Plumbing performs comparatively easy tasks. Whereas, at Skill Levels 2 and 3 a person must demonstrate a skill and knowledge factor for a much more complex phase of this specific area of the trade.

### Task and Task Elements

A TASK is a specific portion of the overall skill level. (See fig. 1-4.) Some tasks cover relatively broad

410.1.01 TASK: Perform as Chainman								
Apply these ACTION STATEMENTS to the TASK ELEMENTS listed below:								
A.	Describe the sequence of steps of this procedure and explain the reasons for each.							
B.	List significant tools and materials used in this procedure.							
C.	Describe principal materials used in this procedure.							
D.	Discuss the parameters of this procedure.							
E.	Describe assistance required while performing this procedure.							
F.	Explain results if this procedure is not performed properly or is neglected.							
G.	Perform the steps of this procedure when practical.							
<u>TASK ELEMENTS:</u>								
		A	B	C	D	E	F	G
.01	Perform as head chainman:							
a.	Select and set traverse station.	X	X			X	X	X
b.	Horizontal chaining using plumb bob.	X	X	X		X	X	
c.	Break chaining using Locke hand level.	X	X	X		X	X	
d.	Slope chaining using clinometer.	X	X	X		X	X	
e.	Keep control point notes	X	X			X	X	
f.	Give and set foresight for angle turning.	X	X	X		X	X	
<u>TASK ELEMENTS:</u>								
		A	B	C	D	E	F	G
.02	PERFORM AS REAR CHAINMAN:							
a.	Give backsight for alignment.	X	X	X		X	X	
b.	Hold tape or chain.	X	X			X	X	
c.	Drive and mark stakes.	X	X			X	X	
d.	Clear line of sight.	X	X			X	X	
.03	Transport, clean, and store:							
a.	Chains.	X	X			X	X	
b.	Range poles.	X	X			X	X	
c.	Plumb bobs.	X	X			X	X	
d.	Cutting tools.	X	X			X	X	

Figure 1-4.—Typical task analysis with task elements and related action statements.



areas. Others may be quite specific and brief. Each task is further broken down into several smaller jobs called task elements.

A TASK ELEMENT is a basic part of each task. When interviewing, you use the task elements and their related ACTION STATEMENTS to determine the interviewee's qualifications. Action statements tell you the type of information you should get from the person being interviewed. Each action statement is identified in the guides by a capital letter (*A, B, C*, and so forth). Capital letters are listed near the top, and how many are used varies from task to task. The first action statement in figure 1-4 is, "Describe the sequence of steps of this procedure and explain the reasons for each." A matrix is used to show how the statements relate to the task elements.

To gain familiarity with the matrix, refer to task element .01, "Perform as head chainman." Under the task element subparagraph a, you find "Select and set traverse station." If you follow this line and look to the right of this statement at the matrix, you see Xs under letters A, B, E, F, and G, indicating which action statements apply to this task element.

## INTERVIEWING STEPS

When interviewing, the first thing you should do is to attempt to put the interviewee at ease. A good way of doing this is to explain the purpose of the interview. For example, explain to the interviewee that the interview will cover the following:

1. what he or she is actually expected to know and to do,
2. determine what he or she can actually do so the right job can be assigned, and
3. what his or her deficiencies are so that he or she can receive proper training.

Next, explain to the interviewee that he or she should discuss the knowledge of the skill honestly. There should be no embarrassment if an individual doesn't know every item covered in the guides. Tell each interviewee what skill and skill level he or she is being interviewed for. Read the skill definition aloud to see if the person is knowledgeable of the subject.

### Task Interviewing

Begin interviewing by reading aloud the task. This directs the interviewee's concentration to the right area. Then rephrase the task in your own words. For

example, you could rephrase it as follows: "The first thing we will discuss in surveying is the performance of the chainman."

Now read aloud the first TASK ELEMENT (Perform as head chainman) (fig. 1-4). When you apply this task element through ACTION STATEMENT A (Describe the sequence of steps of this procedure and explain the reasons for each), it sounds similar to the following: "Describe the sequence of steps a head chainman should take in selecting and setting traverse stations, and explain the reason for each step."

This rephrased sentence is not a question. It is a statement that directs the interviewee to tell you what he or she knows about performing the steps required and the reasons for performing them. There are no questions in the PRCP *Standards and Guides*; therefore, no answers are provided. The guides point out the areas to be discussed (in terms of TASK ELEMENTS and ACTION STATEMENTS). The interviewee's replies are evaluated by the interviewer on the basis of his or her own personal experience, knowledge, and judgment.

It should be obvious now why all rating skill interviewers **MUST** be experienced in the skills for which they interview. The only way you can determine that the interviewee knows the task element is to thoroughly know it yourself. If you are unfamiliar with, or "rusty" in, any tasks in the guides, you must study these areas thoroughly before attempting to interview anyone. Also, if you do not understand how a particular action statement is used with a task element, you must resolve this before interviewing. One way of doing this is to discuss the problem with others who are familiar with the skill.

Discuss the task element **ONLY** with the action statements indicated in the columns to their right by an X in the matrix. For example, in figure 1-4, only action statements A, B, D, F, and G are used with task element .02a. In task element .03a of the same figure, only action statements A, C, E, and G are applied. As an expert in the skill, you may want to ask questions about tasks not covered by the guides. You must avoid doing this, as you would have no applicable standard against which to gauge interviewees' replies. If you feel strongly that the guides can be improved, discuss your recommendations with the PRCP coordinator.

## Scoring Interviews

If interviewees have a Navy Enlisted Classification (NEC) in the skill for which they are being interviewed, they are automatically assigned to that skill level without being interviewed for any of the lower skill levels. When interviewing, you should use a positive approach. If the interviewees say they can do the related work, you may continue with the interview for the skill level; however, if they say they CANNOT do the work, it is obvious that you should go on to some other skill. The interviewees either do or do not know the skill. The decision is left up to the interviewer. **ALL TASKS** must be accomplished for each skill level. The results of the interview are then introduced into the PRCP system. The procedures used for doing this are contained in NAVFAC P-458, volume III, *Systems Documentation*.

## TRAINING

Each training program is formulated to provide personnel with the skills needed to accomplish current missions and mobilization missions. The program is developed according to the pattern, priorities, and tempo established by the commanding officer. It covers many phases from orientation courses to special technical courses. The success of a training program depends upon operational commitments, policies, and directives from higher authorities. The experience, previous training of the personnel assigned, and the availability of training facilities also impact on a training program's success. Although much of the construction training is provided by class A and C-1 advanced schools and special construction battalion training (SCBT) courses, additional skill and experience must be acquired.

## TRAINING ORGANIZATION

Navy regulations state that the naval mobile construction battalion (NMCB) executive officer supervises and coordinates the work, exercises, training, and education of personnel in the command. The executive officer supervises the training of officers, coordinates the planning and execution of the training program and, when necessary, acts to correct deficiencies in the program. The executive officer does this in the capacity as chief staff officer (CSO). The executive officer's principal assistant is the plans and training officer.

Company commanders are directly responsible for training their company personnel and for fulfilling training goals established by the commanding officer. The company commanders help to formulate training programs, supervise training of subordinate officers, and direct technical military and general training of their companies. The battalion service department heads are responsible for individual training in their departments. They conduct training for advancement and administer the OPNAV-sponsored general training. Platoon leaders monitor the training progress of personnel in their platoons. They directly supervise on-the-job construction and military training. All petty officers assume the responsibility for training their members. Good petty officers are able to conduct effective training courses using lectures, discussions, project work, and so on.

The plans and training officer is assisted by a permanently assigned staff of three or four petty officers and by additional personnel on a part-time basis as necessitated by the formal training work load. This group is headed by a chief petty officer. Group members function as the unit's central training coordinators. Responsible for the entire training program, this group is concerned with the formulation and administration of both the formal military training program and the technical training program. These programs include formal schools, SCBT, advanced base construction, and disaster recovery. Individual class assignments are formulated and administered within each company and must correspond to the guidelines established by the plans and training officer.

In the Amphibious Construction Battalion (PhibCB), the training officer may serve as assistant to the operations officer. The training officer arranges and schedules all formal training of officers and enlisted personnel. The PhibCB training officer performs essentially the same duties as the plans and training officer in the NMCB. However, the training program planned by the training officer of a PhibCB is tailored to meet the specialized mission of the PhibCB. This specially tailored training program provides the knowledge that operational teams and crews apply in carrying out all phases of their primary mission. Included are seamanship, installation and operation of causeway piers, fuel systems, and beach salvage techniques.

## TRAINING GUIDELINES

In general, training should be consistent with the following guidelines:

- Training must be closely integrated and coordinated with daily operations of the battalion. The adopted plan must not interfere with essential construction functions.

- Notwithstanding the guideline just listed, the construction schedule should be flexible so it can use opportunities for training that might even expedite the construction schedule.

- Maximum advantage should be taken of the opportunity to derive training benefits from routine operations.

Figure 1-5 shows a typical battalion training organizational chart.

## TRAINING NEEDS

Training for advancement is a continuous concern of all personnel within a battalion, whether at the company or platoon level.

In home port, training programs become the primary mission. The NMCB is expected to spend about 75 percent of the available man-days in formalized technical, military, and general training. In addition, the planning and estimating group may be considered to be involved with on-the-job training (OJT). Approximately 2 months before an NMCB

returns to home port, it sends a training conference team to the home port regiment to prepare the training schedule for the battalion's home port stay. This team schedules the training required for the battalion to meet its readiness and construction tasking for its next deployment. They also coordinate home port support for berthing, supplies, and recreation. All personnel are trained in the areas of technical, military, and general topics. However, the program may be tailored to meet the specialized mission of the battalion's next deployment. If one of the projects scheduled is the construction of an airstrip, there will undoubtedly be a great deal of site preparation occurring. You will need to know how many qualified Construction Mechanics are available and if you need to train more personnel to maintain and repair specific equipment. Take advantage of any opportunities to train as many of your personnel as possible on the jobs expected to come up on the next deployment.

Take inventory of the skills possessed by crew members, whether through actual job experience or through some type of training program. After you make this study, you can easily see whether the required skills for a particular job match the available skills. When they do not match, you know that training is needed. You may need to conduct refresher training or provide instruction on new techniques.

As an individual's supervisor, you may check service records, conduct PRCP interviews, and select those best suited for training given at a Navy C-1 advanced school or at a special construction battalion training course.

## ON-THE-JOB TRAINING

There are many forms of OJT. It may be in the form of an especially tailored, well-organized program, such as one designed to help Utilitiesmen acquire advanced skills in air conditioning and refrigeration. Then again, OJT may be in the form of simple instruction, like explaining and showing a person how to tie a certain type of knot. In other words, when one person helps others to learn to do a job and makes sure they learn the right way, it is a form of OJT.

In the Seabees, OJT goes on around us all the time. For instance, two strikers were assigned a job of copper pipe installation. Although they had performed many comparable jobs, they had not done that particular one. Their supervisor assigned an experienced crew member to guide them. This person explained the exact procedure for laying out the pipe;



Figure 1-5.—Training organizational chart.

how it was marked, cut, and joined; and why that particular joint was necessary. The strikers understood and easily proceeded with the job.

There are as many examples of OJT as there are contacts between personnel in the Seabees. In a Seabee organization, OJT is important because of the continuous changes in equipment and personnel. OJT provides continuous opportunities for new and better methods of doing construction work.

In the Seabees, as well as in private industry, the term *on-the-job training* means helping an individual acquire the necessary knowledge, skill, and habits to perform a specific job. This definition implies that the job training applies not only to the Constructionman or to the new personnel in an organization, but also to any other person who is assigned a new job. It indicates that job training is a continual process in the Seabees. No one is completely trained. Performance can always be improved. It is by keeping interest high and by sharing directions, suggestions, and information that we increase proficiency.

Bear in mind, however, that OJT is an active process and requires supervisors who are aware of the needs of the trainees and who can motivate them to learn. Use methods that add meaningful experiences to the trainees' storehouse of knowledge.

A supervisor who does a good job of training personnel benefits in many ways. For one thing, well-trained crew members brag about their supervisor, especially to their buddies in other crews. If you have a valuable skill, knowledge, or attitude and impart that skill, knowledge, or attitude to 10 others—you have multiplied your effectiveness considerably.

### Setting Up a Program

In setting up an OJT program, one of the first things you should do is an administrative analysis to determine the training needs.

One of the training needs may be for advancement in rate for your personnel. Few things will make you as proud as seeing Constructionmen that you have trained make third class petty officer. Do you know what they are thinking? Their comments may be, "Oh boy, no more mess cooking." But their real thoughts are probably that they cannot wait until they can sew on the next stripe. In preparing a program, keep three things in mind:

- The subjects to be taught
- Your broad knowledge pertaining to the training objectives
- Ways you can best share your experience

When breaking the subjects down into lessons, consider the length of time to be devoted to each subject, and determine if you are going to teach these subjects in a classroom, field, or shop. You may have to determine lesson objectives, establish lesson sequence, analyze reference materials, prepare lesson plans, and so on. Remember that in any type of training program, the objective is to help the trainee learn the most information in the shortest time possible.

### Implementing a Program

You should consider various courses of action in implementing an OJT program. To the supervisor or trainer, some of the most important are as follows:

- Survey unit assignments and be sure each assignment fits an individual's classification and specific skills background.
- Determine the exact need for training. To determine this need, establish two things: (A) the specific job requirements and (B) the individual skills of the trainee. when A and B are known, the OJT required can be stated in a simple formula.  
$$A + B = \text{OJT required}$$
- Determine the most effective method or methods of training. The number of people, time available, facilities required, nature of the training, and individual capabilities are factors that will affect your decision.
- Select the individuals who will actually conduct the training. You should remember that the end product will be no better than those who conduct the training program.
- Procure all available materials that may help supplement the program.
- Monitor the program continually. You need to be sure that the OJT does not lag, that training records are kept current, and that newly developed skills are properly applied.

This is truly a large order. But now, more than ever, our Navy depends upon quality training. It is an important job, and it is one that never ends.

## **Training Methods**

In OJT, you must tailor the training methods around the nature of the subject, the time available, and the capabilities of the trainee.

No other method of training is as effective, as intelligent, or as interesting as coach-pupil instruction. In addition to being a quick way of fitting a new worker into the operation of a unit, it serves as one of the best methods of training. Without specific directions and guidance, a worker is likely to waste time and material and form bad work habits. Many industries have apprenticeship programs designed to train workers in a trade or skill. Most apprentice training consists both of coach-pupil instruction with skilled worker supervision and periodic group instruction.

Self-study should be encouraged. Skilled and semiskilled jobs require a considerable amount of job knowledge and judgment ability. Even in simple jobs, there is much basic information a worker must acquire. But the more complicated technical jobs involve highly specialized technical knowledge and related skills that must be taught.

Group instruction is a practical adjunct to direct supervision and self-study. It is a time-saver when several workers need the same job-related knowledge or procedures. The supervisor or trainer can check training progress and clarify matters that are difficult for the trainees to understand. Group instruction, if intelligently used, can speed up production. For example, suppose you have six trainees learning the same job. Four of the trainees are having trouble with a certain job element, while the other two have learned it. The four people having trouble can be brought over to the other two, and in a short time the difficulty will most likely be solved. In OJT, this is called group instruction. As you can see, group instruction is not the same as classroom or academic instruction.

Another type of OJT is piecemeal instruction. For instance, a crew member asks you for information and you supply it. That is piecemeal instruction. A supervisor's orders are, in a sense, a piecemeal method of instruction because they should let others know what, when, where, how, and why. Other examples of piecemeal instruction are explaining regulations, procedures, and orders; holding special meetings; indoctrinating a new person; and conducting organized meetings.

## **Trainee Development**

In any type of effective training where one individual is working directly under the supervision of another, the trainers and trainees must understand the objectives of the training. Factors deserving careful consideration include determining the training needs of the trainees, defining the purpose of training, and explaining or discussing job training concerns with the trainees.

In determining training needs, it is often a good idea to interview the trainees. A summary of previously acquired skills and knowledge relative to the job can be learned by proper questioning. Compare jobs the trainees know how to do with those they will be doing. Determine training needs (required knowledge and skills minus the knowledge and skills the trainees already possess). Training needs should be determined for each job pertaining to the trainee's position assignment. Analyze the job to be done and have all the necessary equipment and materials available before each job training situation.

In defining the purpose of training, you should clearly explain the purpose of the job, duty, or task to be performed by the trainees. You should also point out to the trainees their place on the team and explain to them how they help in getting the unit's mission done. Stress the advantages of doing the job well, and how the training benefits them, their organization, and the Seabees.

The trainers should also explain facts about the job to be done, principles that are proven and workable, and directions on ways to do the job safely, easily, and economically. The trainers should explain any technical terms or techniques that will improve the skill of the trainees. The importance of teamwork and attention to detail in each operation in a job should be stressed.

The trainers and trainees should discuss the problems that arise in doing a job, and try to clear up any questions the trainees may have concerning the job. Trainers should point out to the trainees the similarity of different jobs. The relationship of procedures in a particular job, to things with which the trainees are acquainted, should also be discussed. This allows the trainees to learn through association with past experiences. It also is important for the trainers to discuss the progress of the trainees.

The most valuable end product of a peacetime military operation is trained personnel. Regardless of

your unit's mission, you must have trained personnel to carry it out. All petty officers in the Navy are responsible for training the personnel under their immediate supervision. Do **NOT** take this responsibility lightly.

## **SYSTEMATIC TRAINING**

Effective training requires a great deal of planning and directed effort. To prevent a haphazard approach to the job of training, you must organize materials into logical sequence and have an accurate method for measuring the results. If any learning takes place, there must be some results. If you push as hard as you can on an object and there is no result—if you fail to move it—no work has been done regardless of the energy you expended. **If no learning takes place, you have not trained.** Three steps that may help you in planning and carrying out your training programs are as follows:

1. Encourage learning by using the comet training methods.
2. Measure achievement at regular intervals to assure that learning is taking place.
3. Record results to document progress and to improve your training system.

## **Evaluation**

Evaluations are worthwhile tools. Both you and the trainee will want an evaluation of the work accomplished. Generally, the most valid trainer evaluations are obtained by testing the trainees. If they have learned to perform in a highly satisfactory manner, this is an indication that training has occurred. Personnel must be trained correctly. Improper training, in many cases, is worse than no training at all.

## **Performance Testing**

Performance testing can help you do a better job of conducting an OJT program. You can use performance tests to find how well your trainees are doing their jobs. However, it is difficult to find a test that truly assists you in evaluating performance.

Performance tests should enable you to rate the work of subordinates accurately enough to carry out the following objectives:

- To help you determine the qualifications of personnel entering OJT programs.
- To aid you in rating the improvement of persons undergoing OJT.
- To help determine whether trainees can actually perform the tasks they are being trained to do.
- To assist you in assigning new people to particular jobs.
- To help you locate the strengths and weaknesses in OJT programs.

Since it is a practical check on a work project, a performance test must be a sample work situation in which the trainee performs some active piece of work that can be examined. The test is not designed to measure what a person knows about the job (a written or oral test may fill that need for you). Instead, it is intended to help you rate that person's ability to actually do the job. Do the best you can in organizing and administering the performance test. There will always be room for improvement in most of the testing that you do.

## **WORK ASSIGNMENTS/SHOP SCHEDULES**

Being the supervisor of a crew or shop is an important responsibility. You have personnel assigned to you whom you must employ effectively and safely. Your supervisor expects you not only to meet production, but also to conduct training. The following section contains information that will assist you in the daily planning, organizing, and coordinating of work assignments and shop schedules. You must master these skills to meet the production schedule safely.

## **PLANNING**

In planning, you determine requirements and devise or develop methods and schemes of action for constructing a project. In addition to day-to-day planning, consider the following primary matters in construction: work element estimates, material estimates, equipment estimates, manpower estimates, job or job site layout, material delivery and storage. These matters depend upon each other and all are part of any well-planned project. The success of any project depends to a great extent upon the attention to detail and the care taken in planning.

Proper planning saves time and money, makes the work easier and more pleasant for your crews, and expedites the work. It can eliminate friction, jealousy, and confusion. Good planning can free you from many of the details of the work, thus giving you time to carry out other important duties. Also it eliminates "bottlenecking" (remember that the neck of the bottle is always at its top).

As the petty officer in charge of a crew, you are responsible for crewmember time management as well as your own. You must plan constructive work for your crew. Always remember to **PLAN AHEAD!** A sure sign of poor planning is crewmembers standing idle each morning while you plan the day's events. At the close of each day, you should confirm plans for the next workday. In doing so, you may need answers on the availability and use of manpower, equipment, and supplies. Keep the following questions in mind:

1. Manpower. Who is to do what? How is it to be done? When is it to be finished? Since idleness may breed discontent, have you arranged for another job to start as soon as the first one is finished? Is every crewmember fully utilized?

2. Equipment. Are all necessary tools and equipment on hand to do the job? Is safety equipment on hand?

3. Supplies. Are all necessary supplies on hand to start the job? If not, who should take action? What supply delivery schedules must you work around?

Have a definite work schedule and inspection plan. Set up daily goals or quotas. Plan to personally check at intervals the work being done and the progress toward meeting the goals. Spot check for accuracy, workmanship, and the need for training.

Seabees must be trained to do a wide variety of jobs. The rotation method, OJT, and classroom work require you to plan training time. Allow time too for handling personnel problems and military duties. Your planning must include time for records, reports, and other paper work necessary for the control of personnel and materials under your charge.

## **ORGANIZING**

As a Seabee Petty Officer First Class, you must be able to organize. This means that you must analyze the requirements of a job and structure the sequence of events that will bring about desired results.

You must develop the ability to look at a job and estimate how many man-hours are required for completion. You will probably be given a completion deadline along with the job requirements. Next (or perhaps even before making your estimate of man-hours), plan the job sequences. Make sure that you know the answers to the following questions. What is the size of the job? Are the materials on hand? What tools are available, and what is their condition?

Before assigning work, carefully consider the qualifications of your personnel. Are they experienced, or do they need training? Is anyone scheduled for leave? Will you need to request outside support? After getting answers to these questions, you should be able to assign your crews and set up tentative schedules. If work shifts are necessary, arrange for the smooth transition from one shift to another with a minimum of work interruption. How well you do so is directly related to your ability to organize.

## **COORDINATING**

A supervisor must be able to coordinate. When several jobs are in progress, you need to coordinate completion times so one can follow another without delay. Possessing coordinating skill is also very helpful when working closely with your sister companies. Coordination is not limited to projects only. You would not want to approve a leave chit for a crewmember and then remember a school during the same time period. Nor would you want to schedule a crewmember for the rifle range only to find the range coaches unavailable at that time.

## **PRODUCTION**

The primary responsibility of every supervisor is PRODUCTION. You and your crew can produce best by doing the following: (1) planning, organizing, and coordinating the work to get maximum production with minimum effort and confusion; (2) delegating as much authority as possible, but remaining responsible for the final product; (3) continuously supervising and controlling to make sure the work is done properly.

## **SAFETY**

Safety and production go hand in hand, since the only efficient way to do anything is the safe way. When your personnel are absent because of injury, your shop equipment is down because of damage, or completed work is destroyed by accident, production

is sure to fall. Therefore, you must teach safety constantly and set examples by always observing safety precautions. Teach safety as part of each training unit, and plan each job with safety in mind.

## **WORK ASSIGNMENTS**

The assignment of work is an important matter. On a rush job, you may have to assign the best qualified person available to meet the deadlines. When time and workload permit, rotate work assignments so each person has an opportunity to acquire skills and experience in the different phases of their rating. When assignments are rotated, the work becomes more interesting for the crew. Another good reason for rotating work assignments is to prevent a situation where only one person is capable of doing a certain type of work. This specialization could be a severe disadvantage if that person were to be transferred, hospitalized, or go on leave for a lengthy period.

You need to give special consideration to work assignments for strikers. They should be assigned to jobs of gradually increasing levels of difficulty. Strikers may be useful assistants on a complicated job, but they may not fully understand the different phases of the job unless they have worked their way up from basic tasks.

In assigning work, be sure to give the worker as much information as necessary to do the job properly. An experienced worker may need only a general statement concerning the finished product. A less experienced worker is likely to require more instruction concerning the layout of the job and the procedures to be followed.

Often, you may want to put more workers on a job than it really requires. Normally the more workers, the less time it takes to get the job done. But remember, there is a limit to the number of workers that can successfully work on one job at any given time. Do not overlook the advantages of assigning more crews or crewmembers to a project when their services are needed or when presented an opportunity to learn a unique phase of the rating. Teamwork, versatility, and new skills can be learned from a variety of work assignments.

## **ENLISTED PERFORMANCE EVALUATION REPORTS**

The Navy Enlisted Performance Evaluation Report is a periodic recording of an individual's

qualifications, performance level in comparison to contemporaries, conduct, and prospects for increased responsibilities. This report is the most significant personnel management tool in the enlisted service record. It is primarily designed for use by the Commander, Naval Military Personnel Command (COMNAVMIIPERSCOM), in making advancement and assignment decisions. It is also used in determining a person's eligibility for the Good Conduct Medal, reenlistment, and character of service at time of discharge. Various selection boards use performance evaluation reports to select members for advancement, continuation of active duty, retention, appointment to commissioned status, assignment to special duties, and special educational programs. The performance appraisal process cannot be over-emphasized and it demands command attention.

As a first class petty officer, it is your job to see that the rough draft of the evaluation report is filled out clearly. You can get a copy of NAVMILPERSCOMINST 1616.1A or *Military Requirements for Petty Officer First Class*, NAVEDTRA 10046-A, chapter 3, to show you what information goes in each block. See that you have the Enlisted Performance Evaluation Report—Individual Input, NAVPERS 1616/2 1, filled out by each person on whom you are making an evaluation report. (See fig. 1-6.) All of the blocks must be filled in before you forward it through the chain of command. (See figs. 1-7 and 1-8.) Preparation of rough evaluations reports is your single most important administrative task. It is important for you to be thorough, timely, and fair. Give the continuing evaluation of your personnel top priority.

As a first class petty officer, you will write evaluations in the rough on people in paygrades E-1 through E-5. The evaluations for people in pay grades E-1 through E-3 do not include narrative remarks. The evaluations for people in paygrades E-4 (PO3) do not include narrative remarks, but they should contain a listing of significant qualifications achieved during the reporting period. Evaluations for people in paygrades E-5 (PO2) include narrative remarks, and all of the blocks must be filled in. Some examples of comments that may help you are as follows:

Paragraph 1. First sentence. Use one to three adjectives that best describe the person plus a statement concerning overall performance. State the person's job within the sentence and how it relates to the command's mission. Be careful not to use redundant adjectives.



ENLISTED PERFORMANCE EVALUATION REPORT -  
INDIVIDUAL INPUT  
NAVPERS 1818/21 (B-78)  
S/N 0106-LF-016-1705

DATE PREPARED

DEPARTMENT

NAME *(Last, first, middle)*

RATE

PRESENT SHIP OR STATION

THE SUBMISSION OF THIS FORM IS A MEANS OF ENSURING THAT YOUR PERSONAL ACCOMPLISHMENTS ACHIEVEMENTS AND CREDITABLE ACTIVITY DURING THE CURRENT REPORTING PERIOD ARE BROUGHT TO THE ATTENTION OF YOUR REPORTING SENIOR THROUGH THE CHAIN OF COMMAND

1. IN RATE AND NORMAL DUTY QUALIFICATIONS ACHIEVED

2. SPECIAL QUALIFICATIONS ACHIEVED

3. IN RATE PROFESSIONAL DEVELOPMENT

4. OTHER EDUCATIONAL AND TRAINING ACCOMPLISHMENTS

5. VOLUNTARY NAVY RELATED CIVIC AND COMMUNITY SUPPORT ACTIVITY

6. OTHER CIVIC AND COMMUNITY SUPPORT ACTIVITY

7. COMMENDATORY CORRESPONDENCE RECEIVED DURING THIS REPORT PERIOD

8. OTHER ACHIEVEMENTS ACCOMPLISHMENTS AND SIGNIFICANT EVENTS ACTIONS

NOTE: THE USE OF THE INFORMATION PROVIDED BY THE RATEE IS DISCRETIONARY ON THE PART OF THE REPORTING SENIOR UPON COMPLETION OF THE EVALUATION REPORT THIS FORM SHALL BE RETURNED TO THE RATEE.

Figure 1-6.—Enlisted Performance Evaluation Report—Individual Input.

1616-1

### ENLISTED PERFORMANCE EVALUATION REPORT

1 NAME (LAST, FIRST, MIDDLE OR MIDDLE INITIAL)				2 RATE				3 SSN						
BRANCH/CLASS		STATUS		MEMBER'S UIC		DATE REPORTED		MEMBER'S UIC		DATE REPORTED				
4 <input type="checkbox"/> USN		5 <input type="checkbox"/> USNR		6 <input type="checkbox"/> ACTIVE		7 <input type="checkbox"/> INACTIVE		8 <input type="checkbox"/> TEMAC		9 <input type="checkbox"/> ACDUTRA				
10 MEMBER'S SHIP OR STATION				11 MEMBER'S UIC				12 DATE REPORTED						
OCCASION FOR REPORT				PERIOD OF REPORT				DATE OF RATE						
13 <input type="checkbox"/> PERIODIC		14 <input type="checkbox"/> TRANSFER		15 OTHER		16 FROM		17 TO		18 DATE OF RATE				
18 <input type="checkbox"/> REGULAR		19 <input type="checkbox"/> CONCURRENT		20 PHYSICAL READINESS		21 RESERVE PART		22 DATE OF RATE		23 DATE OF RATE				
23 REPORTING SENIOR'S NAME (LAST AND INITIALS)				24 RANK				25 TITLE						
26 SSN				27 SSN				28 SSN						
EVALUATION SECTION *REQUIRES COMMENT IN BLOCK 36				NOT OBS	4.0	3.8	3.6	3.4	3.2	3.0	2.8*	2.6*	2.0*	1.0*
PROFES- SIONAL FACTORS	27 MILITARY KNOWLEDGE/ PERFORMANCE													
	28 RATING KNOWLEDGE/ PERFORMANCE													
PERSONAL TRAIT	29 INITIATIVE													
	30 RELIABILITY													
	31 MILITARY BEARING													
	32 PERSONAL BEHAVIOR													
SELF EXPRESSION	33 HUMAN RELATIONS INCL EQUAL OPPORTUNITY													
	34 SPEAKING ABILITY													
LEADERSHIP	35 WRITING ABILITY													
	36 DIRECTING													
37 COUNSELING														
38 MANAGEMENT (E-7/E-9 ONLY, NOB FOR E-6 AND BELOW)														
39 OVERALL EVALUATION					*									
40 SUMMARY														
ADVANCEMENT RECOMMENDATION				45 SIGNATURE OF REPORTING SENIOR				46 ADDRESS OF REPORTING SENIOR						
41 <input type="checkbox"/> RECOM- MENDED		42 <input type="checkbox"/> PROGRESS TOWARD		43 <input type="checkbox"/> NOT RECOM		44 ACKNOWLEDGEMENT BY AND SIGNATURE OF MEMBER I ACKNOWLEDGE THAT I HAVE SEEN THIS EVALUATION REPORT AND UNDERSTAND MY RIGHTS UNDER ARTICLE 1110, U.S. NAVY REGS. 1973, TO SUBMIT A STATEMENT. I INTEND TO SUBMIT/NOT TO SUBMIT A STATEMENT. (CIRCLE YOUR INTENTION).								
DATE SIGNED BY MEMBER:				47 TYPED NAME AND SIGNATURE OF REGULAR REPORTING SENIOR ON CONCURRENT REPORT				48 DATE FORWARDED						
								49 DATE FWD (IF 47 USED)						

NAVPERS 1616/24 (REV 6-04) SN 0106-LF-016-1722  
REPORT NAMP 1616-1

WORK SHEET

Figure 1-7.—Enlisted Performance Evaluation Report (front).

OCR TYPING FONT NOT REQUIRED FOR COMPLETION OF THIS SIDE		
50 MEMBER'S LAST NAME, INITIALS	51 SSN	PERIOD OF REPORT 52 From                      53 To
54 DUTIES AND RESPONSIBILITIES		
55 SPECIAL ACHIEVEMENTS		
56 EVALUATION COMMENTS		

Figure 1-8.—Enlisted Performance Evaluation Report (back).

Example: Petty Officer Seabee is self-motivated and resourceful, and can be relied upon to complete difficult assignments without direction or guidance. He is aggressive and initiates workable ideas for ways of doing things more accurately, more quickly, and more thoroughly with the same means and resources as his contemporaries.

Second sentence. Use words describing leadership ability and effectiveness in integrating people with the mission. Discuss difficulty of billet, number of people being supervised, and where appropriate, the dollar value of the equipment for which he is responsible.

Example: Sets and maintains a high standard of performance for himself and subordinates. Maintains a high state of operational and material readiness. In the supervision of five assigned personnel, he is extremely firm and fair. He is responsible for the operation and working condition of equipment valued at \$2 million dollars.

Third sentence and remainder of paragraph 1. Use words related to technical competence on the job.

Example: Continually maintains a high state of operational and material readiness despite antiquated equipment and nonavailability of spare parts and material support.

Paragraph 2. List of solid accomplishments taken from individual input. Do not overdo the superlatives. Talk about facts that are a matter of record: This part should be "hard hitting," in bullet format, capitalized, and underlined for emphasis.

Example:

- Major contributor to the department achieving zero report deficiencies in FY 92's TYCOM Inspection.
- Received numerous superlative comments from the inspection team regarding condition of the equipment.

Paragraph 3. Attaboys, if any. State the source of the citation. If signed by an admiral, state his name. For unit attaboys, tie in personal performance as a key to unit success if, in fact, the person was a significant contributor to the successful evolution.

Example: Received CO's letter of appreciation for superior preparation of facility for change of command.

Received letter of appreciation from OIC, NAS Annex, for volunteer work on their emergency generator during a station power outage.

Paragraph 4. Specific aspects of performance. Comment on any particularly outstanding or adverse mark assigned, Personal traits may be mentioned. Identify extracurricular activities that have been of benefit to the Navy. Comment on family involvement that has been an influential factor in the person's performance.

Example: Petty Officer Seabee is deeply involved in many community activities, He is a Boy Scout troop leader, a youth counselor at the local Boys Club, and a deacon on the First Baptist Church council. He and

his wife Mary, who is currently the secretary for the enlisted wives club, are excellent representatives of the U.S. Navy,

Paragraph 5. Recommendations. Cover the following items, as appropriate:

- Next duty
- Augmentation/officer programs
- Potential for C school, or special education

- Retention and promotion

Be consistent, The report must track with the monthly and/or feeder evaluations for enlisted personnel. The strength of the recommendations must match the overall strength of the evaluation. The report must be accurate, hard hitting, and to the point. Flowery language is of no value. When a person is good, say so and back it up with examples. Above all else, evaluations must be consistent with performance.



## CHAPTER 2

# PROJECT PLANNING AND MANAGEMENT

*LEARNING OBJECTIVE: Recognize the elements required to plan, manage, execute, and monitor a construction project using precedence diagrams and barcharts, Identify the techniques for estimating man-hours and material, establishing safety responsibilities, and closing out a project.*

Good construction planning and estimating procedures are essential to the ability of the Naval Construction Force (NCF) to provide quality construction response to the fleet's operational requirements. This chapter contains information that you can use in planning, estimating, and scheduling construction projects normally undertaken by the Seabees.

### CONSTRUCTION MANAGEMENT

After World War II, the construction industry experienced the same critical examination the manufacturing industry had experience 50 years before. Large construction projects came under the same pressures of time, resources, and cost that prompted studies in scientific management in the factories about the year 1900.

The emphasis, however, was not on actual building methods, but upon the management techniques of programming and scheduling. The only planning methods being used at that time were those developed for use in factories. Management tried to use these methods to control large construction projects. These techniques suffered from serious limitations. The need to overcome these limitations led to the development of network analysis techniques.

In the late 1950s, a new system of project planning, scheduling, and control came into widespread use in the construction industry. The critical path analysis (CPA), critical path method (CPM), and project evaluation and review technique (PERT) are 3 examples of about 50 different approaches. The basis for each of these approaches is the analysis of a network of events and activities. The generic title of the various networks is network analysis.

The network analysis approach is now the accepted method of construction planning in many organizations. Network analysis forms the core of project planning and control systems.

Construction management in the Seabees is based on the CPM. A major advantage to using the CPM method is training. CPM gives the new project supervisor exposure to the fundamentals of project management. These fundamentals can be broken down into the following steps:

#### **1. Develop construction activities.**

After careful review of the plans and specs, your first step is to break the job down into discreet activities. Construction activities are generally less than 15 days in duration and require the same resources throughout the entire duration.

#### **2. Estimate construction activity requirements.**

Evaluate the resource requirements for each construction activity. Identify and list all of the materials, tools, equipment (including safety-related items), and manpower requirements on the Construction Activity Summary (CAS) sheet.

#### **3. Develop logic network.**

List the construction activities logically from the first activity to the last, showing relationships or dependencies between activities.

#### **4. Schedule construction activities.**

Determine an estimated start and finish date for each activity based on the sequence and durations of construction activities. Identify the critical path. This will help focus management attention on those activities that cannot be delayed without delaying the project completion date.

## 5. Track resources.

As the crew leader, you must be sure the necessary resources are available on the project site on the day the work is to be performed. For materials on site, this will be as easy as submitting a material request, NAVSUP Form 1250-1, to the material liaison office (MLO) several days in advance. For local purchase requirements, such as a concrete request to MLO, a request may be required 2 to 3 weeks in advance.

## 6. Control resources.

As the crew leader, you are also responsible for on-site supervision of all work performed. Productive employment of available resources to accomplish assigned tasking is your greatest challenge.

## OPERATIONS DEPARTMENT

An understanding of the operations (Ops) organization and its responsibilities in the planning and execution of construction tasking is necessary before any further discussion of project management. You can refer to figure 2-1 for a clear picture of the organization.

### Operations Officer (S3)

The S3 has functional authority over the construction and disaster preparedness programs in the battalion. In this capacity he or she has direct supervisory authority over the line companies. The S3 reports directly to the commanding officer. The S3 is responsible for the assignment of all construction

resources: personnel, equipment, tools, and materials. Since the project planning process involves allocating these resources to specific projects, the S3 controls the project planning process, oversees each planning phase, and approves all final project packages.

### Assistant Operations Officer (S3A)

The S3A is generally responsible for the administrative/executive efforts and record keeping of the Ops department. The S3A acts for the Ops officer in case of his or her absence.

### Operations Chief (S3C)

The S3C is normally responsible for the day-to-day coordination of personnel within the department and assists them in carrying out their duties. The S3C also assists crew leaders through daily visits to the jobsites and generally assigns E6 and below OF-13 personnel within the battalion.

### Engineering Division

The engineering division provides a variety of engineering services including surveying, concrete slump and strength tests, compaction tests and drafting. Engineering also maintains the "as-built" drawings for projects under construction.

### Operations Administration

In addition to typing operations reports such as situation reports (SITREPs), the Ops admin staff also provides centralized timekeeping and personnel distribution status.

### Quality Control (QC) Division

The QC division is staffed with a group of highly skilled technicians capable of instructing personnel to perform the work in the plans and specifications. These technicians are normally included in the planning and estimating and deployment planning groups. They have detailed knowledge of all facets of a project and are knowledgeable on the critical inspection items that must be followed for each network activity during each phase of construction. This group of technical experts, as agents of the Ops officer, is the group within the battalion most capable of resolving field problems with the individual construction units.

The QC division develops a QC plan intended to be a single-source document. This document outlines

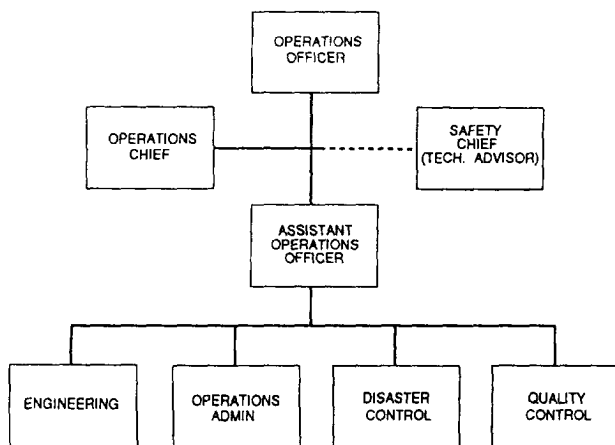


Figure 2-1.—Operations department organization.

the command policies and the detailed methods of implementing, administering, and monitoring construction to ensure the highest quality product. In all aspects of construction work, the battalion is considered to be a contractor who works with and through the officer-in-charge of construction (OICC), engineering field division (EFD), resident officer-in-charge of construction (ROICC), or the individually designated customer representative to accomplish the project.

All construction work done by the battalion is according to the construction quality control (CQC) program. This construction work is outlined in the P-445, Construction Quality Control Manual, and various implementing instructions provided by EFDs, OICC and ROICC offices, and COM2NDNCB/COM3RDNCBINST 4355.1 series.

### PRELIMINARY DEPLOYMENT PLANNING

Planning for construction tasking begins approximately 10 months before deployment when the battalion receives the tentative tasking message. Many decisions must be made before the crew leader can begin detailed project planning. Most of these decisions are among the following:

1. **Officer/Chief Petty Officer Assignments** — announced by the commanding officer.
2. **Safety/QC Staff Assignments** — announced by the Ops officer.

3. **Detachment Manning** — announced by Ops with input from detachment OICs, assistant officers in charge (AOICs), and company chiefs,

4. **Prime/Subcontractors** — assigned by Ops. The prime contractor is responsible for the safety, quality, and timeliness of the construction effort and directs subcontractors accordingly. The subcontractor is responsible for assigning resources in sufficient quantity and quality to accomplish their portion of the project according to the coordinated schedules. Figure 2-2 shows the prime/subcontractor organization and the line functional authority in execution of construction tasking.

5. **Crew Leaders** — nominated by company commander/detachment OIC and appointed by Ops.

6. **Planning and Estimating Team** — must include members of both the prime and subcontractor crews. Crew leaders must work with their chain of command to have their crews identified as early in home port as possible. After the crews are assigned, planning effort can be scheduled around the planning milestones.

### DETAIL PROJECT PLANNING

The entire history of each NCF project, from the initial planning phase through the execution phase to the closeout phase, is documented in a standard

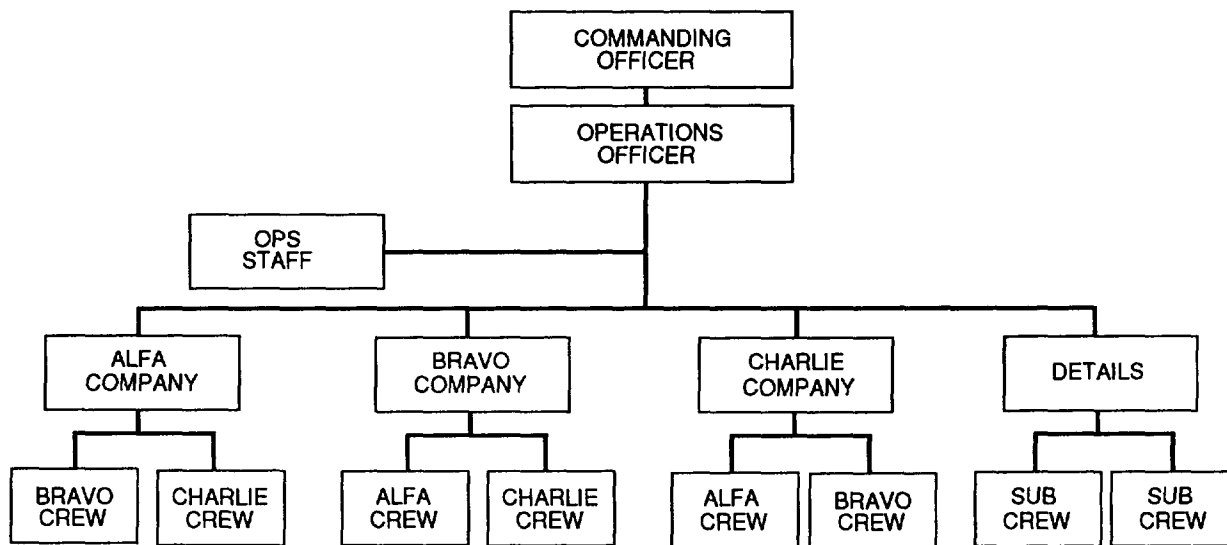


Figure 2-2.—Construction organization.



**STANDARD NCF PROJECT PACKAGE OUTLINE**

<b>FILE # 1 GENERAL INFORMATION FILE</b>		<b>FILE # 5 MATERIAL FILE</b>	
LEFT	Project Scope Sheet Tasking Letter Project Planning Check List Project Package Sign-Off Sheet	LEFT	List of Long Lead Time Items 45-Day Material List Material Transfer Requests Add On/Reorder Justification Forms Bill of Materials/Material Take-Off Comparison Worksheets Material Take-Off Worksheets
RIGHT	Project Organization Deployment Calendar Preconstruction Conference Notes Predeployment Visit Summary	RIGHT	Bill of Materials (including all Add-On/Reorder BMs)
<b>FILE # 2 CORRESPONDENCE FILE</b>		<b>FILE # 6 QUALITY CONTROL FILE</b>	
LEFT	Outgoing messages and correspondence	LEFT	Various Quality Control Forms Field Adjustment Requests (Design Change Directives)
RIGHT	Incoming messages and correspondence	RIGHT	Daily Quality Control Inspection Reports Quality Control Plan
<b>FILE # 3 ACTIVITY FILE</b>		<b>FILE # 7 SAFETY/ENVIROMENT FILE</b>	
LEFT	Constrution Activity Summary Sheets of completed activities	LEFT	Required Safety Equipment Stand-Up Safety Lectures Safety Reports Accident Reports
RIGHT	Master Activity Summary Level II Level II Precedence Diagram Master Activity Summary Sheets Construction Activity Summary Sheets (Recommend Including filled out 1250s and mineral products requests.)	RIGHT	Safety Plan Highlighted EM 385 Environmental Plan (if applicable)
<b>FILE # 4 NETWORK FILE</b>		<b>FILE # 8 PLANS FILE</b>	
LEFT	Computer Printouts Level III Precedence Diagram	LEFT	Site Layout Shop Drawings Detailed Drawings (if required) Rebar Bending Schedule Form Material Worksheet
RIGHT	Resource leveled plan for manpower and equipment Equipment Requirement Summary	RIGHT	Project Plans
		<b>FILE # 9 SPECIFICATIONS FILE</b>	
		LEFT	Technical Data
		RIGHT	Highlighted Specifications

**Figure 2-3.—Standard NCF project package outline.**

nine-folder project package. Figure 2-3 is an outline of the standardized NCF project package. You will use this format on all tasked projects. The forms for each file may be obtained from the regimental operations department. A flowchart showing the sequence of planning steps is provided in figure 2-4. We will examine the planning sequence and see how the project package is created step by step. These steps also are listed in the project planning milestones list in figure 2-5. Planning milestones should be assigned by Ops at the beginning of home port.

**REVIEWING THE PLANS AND SPECIFICATIONS**

A thorough review of the plans and specifications are absolutely necessary. Figure 2-6 provides a checklist for this review. In addition to the checklist

items, many questions, such as those in the following list, must be answered:

• **Scheduling**

- What is the scheduled progress at turnover?
- Is sufficient time allotted?
- Will long lead-time materials be available?
- Is work required in occupied buildings?
- Is roofing, sitework, or other weather-dependent work to be done in the rainy season?
- Do the specifications require phasing of work?

• **Site conditions**

Are there any hazardous materials present (such as asbestos floor tile, siding, roofing, insulation)?

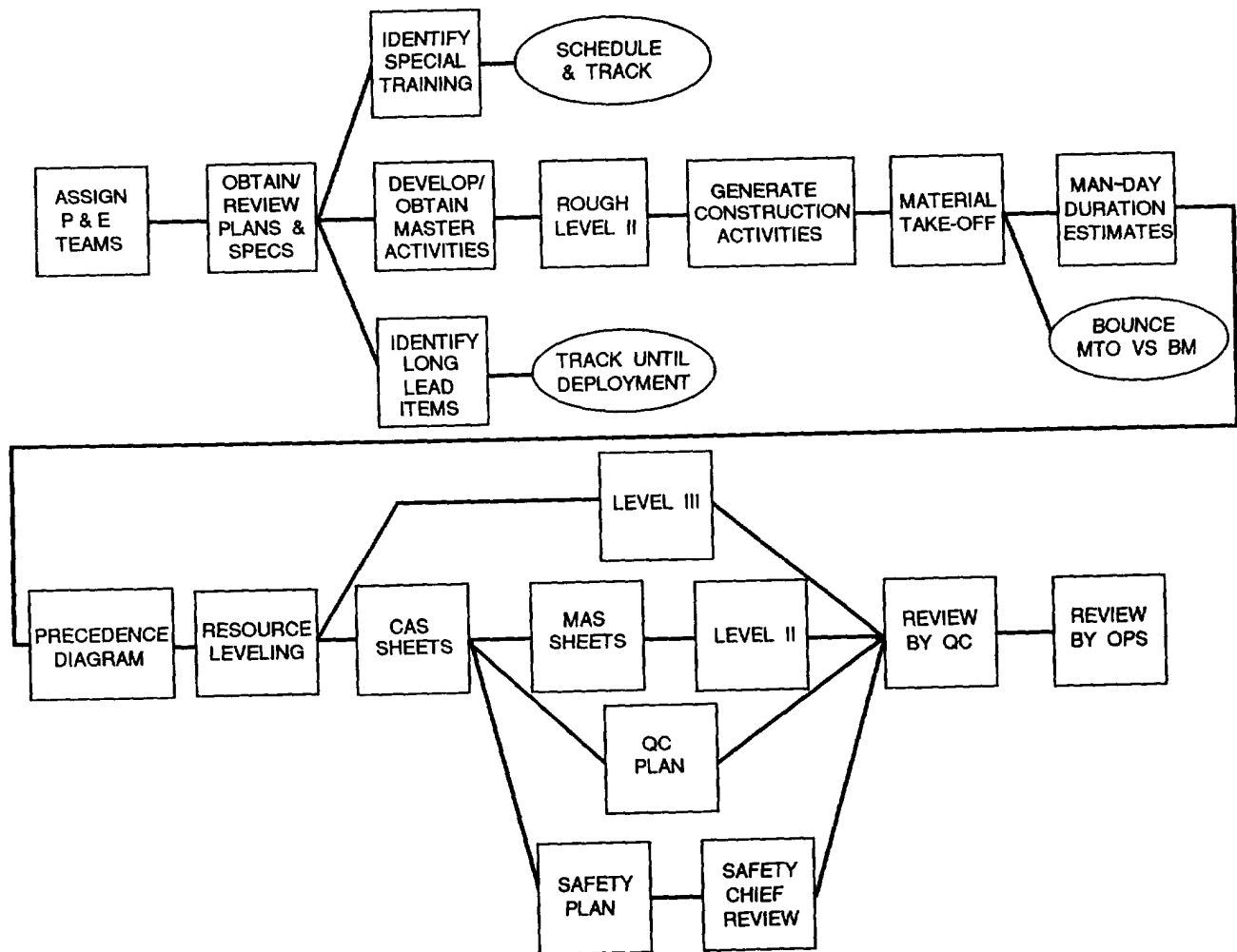


Figure 2-4.—Project planning flowchart.

## PROJECT PLANNING MILESTONES

PROJECT _____		DATE REQUIRED	DATE COMPLETED
MILESTONE			
1.	Designate Crew Leader and Planning Team	_____	_____
2.	Pre-Planning Conference	_____	_____
3.	Review Plans and Specifications	_____	_____
4.	Identify Long Lead Materials	_____	_____
5.	Identify Required Skills and Training	_____	_____
6.	Complete Project Scope Sheet	_____	_____
7.	Complete Master Activity Listing	_____	_____
8.	Develop Level II Network	_____	_____
9.	Generate Construction Activity Listing	_____	_____
10.	Develop Independent Material Take-Off	_____	_____
11.	Develop BM/MTO Discrepancy List	_____	_____
12.	Calculate Man-days and Durations	_____	_____
13.	Complete Construction Activity Summary Sheets	_____	_____
14.	Develop Level III Network	_____	_____
15.	Input Network into Computer	_____	_____
16.	Resource Level Project	_____	_____
17.	Complete Master Activity Summary Sheets	_____	_____
18.	Develop Level II Barchart	_____	_____
19.	Consolidate Tool Requirements	_____	_____
20.	Consolidate Equipment Requirements	_____	_____
21.	Consolidate Safety Plan	_____	_____
22.	Consolidate Quality Control Plan	_____	_____
23.	Prepare Project Briefing	_____	_____

**Figure 2-5.—Project planning milestones.**

# REDICHECK Plan and Specification Review

1. Preliminary Review
    - a) Quickly make an overview of all sheets spending no more than one minute/sheet to become familiar with the project.
  2. Specification Check
    - a) Check spec for bid items. Are they coordinated with the drawings?
    - b) Check spec for phasing of construction. Are phases clear?
    - c) Compare architectural finish schedule to specification index. Ensure all finish materials are specified.
    - d) Check major items of equipment and verify they are coordinated with contract drawings. Pay particular attention to horsepower ratings and voltage requirements.
    - e) Verify that items specified "as indicated" or "where indicated" are in fact indicated on contract drawings.
    - f) Verify that cross referenced specifications sections exist.
    - g) Try not to indicate thickness of materials or quantities of materials in the specifications.
  3. Plan Check Structural
    - a) Verify property line dimensions on site plan against architectural.
    - b) Verify building is located behind set back lines.
    - c) Verify column lines on structural and architectural.
    - d) Verify all column locations are same on structural and architectural.
    - e) Verify perimeter slab on structural matches architectural.
    - f) Verify all depressed or raised slabs are indicated.
    - g) Verify slab elevations.
    - h) Verify all foundation piers are identified.
    - i) Verify all foundation beams are identified.
    - j) Verify roof framing plan column lines and columns against foundation plan column lines and columns.
    - k) Verify perimeter roof line against architectural roof plan.
    - l) Verify all columns and beams are listed in column and beam schedules.
    - m) Verify lengths of all columns in column schedule.
    - n) Verify all sections are properly labeled.
    - o) Verify all expansion joint locations against architectural.
    - p) Verify dimensions.
  4. Plan Check Architectural
    - a) Verify all concrete columns and walls against structural.
    - b) Verify on site plans that all existing and new work is clearly identified.
    - c) Verify building elevations against floor plans. Check in particular roof lines, window and door openings, and expansion joints.
    - d) Verify building sections against elevations and plans. Check roof lines, windows, and door locations.
    - e) Verify wall sections against architectural building sections and structural.
    - f) Verify masonry openings for windows and doors.
    - g) Verify expansion joints through building.
    - h) Verify partial floor plans against small scale floor plans.
    - i) Verify reflected ceiling plan against architectural floor plan to ensure no variance with rooms. Check ceiling materials against finish schedule, check light fixture layout against electrical, check ceiling diffusers/registers against mechanical, check all soffits and locations of vents.
  5. Plan Check Mechanical and Plumbing
    - a) Verify all new electrical, gas, water, sewer, etc. lines connect to existing.
    - b) Verify all plumbing fixture locations against architectural. Verify all plumbing fixtures against fixture schedule/specs.
    - c) Verify storm drain system against architectural roof plan. Verify size of all pipes and that all drains are connected. Verify wall chases are provided on architectural to conceal vertical piping.
    - d) Verify sanitary drain system pipe sizes and that all fixtures are connected.
    - e) Verify HVAC floor plans against structural.
    - f) Verify sprinkler heads in all rooms.
    - g) Verify that all sections are identical to architectural/structural.
    - h) Verify that adequate ceiling height exists at worst case duct intersection.
    - i) Verify all structural supports required for mechanical equipment are indicated on structural drawings.
    - j) Verify dampers indicated at smoke and fire walls.
    - k) Verify diffusers against architectural reflected ceiling plan.
    - l) Verify all roof penetrations (ducts, fans, etc.) are indicated on roof plans.
    - m) Verify all ductwork is sized.
    - n) Verify all notes.
    - o) Verify all A/C units, heaters, and exhaust fans against architectural roof plans and mechanical schedules.
    - p) Verify all mechanical equipment will fit in spaces allocated.
  6. Plan Check Electrical
    - a) Verify all plans are identical to architectural.
    - b) Verify all light fixtures against architectural reflected ceiling plan.
    - c) Verify all major pieces of equipment have electrical connections.
    - d) Verify location of all panel boards and that they are indicated on the electrical riser diagram.
    - e) Verify all notes.
    - f) Verify that there is sufficient space for all electrical panels.
  7. Plan Check Kitchen/Dietary
    - a) Verify equipment layout against architectural plans.
    - b) Verify all equipment is connected to utility systems.
- j) Verify all room finish schedule information including room numbers, names of rooms, finishes and ceiling heights. Look for omissions, duplications and inconsistencies.
  - k) Verify all door schedule information including sizes, types, labels, etc. Look for omissions, duplications and inconsistencies.
  - l) Verify all rated walls.
  - m) Verify all cabinets will fit.
  - n) Verify dimensions.

Figure 2-6.—Redicheck plan and specification review.

Is removal of existing debris/material specified?

Is the laydown area sufficient?

Are other forces (public works or contractors) working in the same area?

Are clearances required for access to secured spaces?

What types of permits are required?

### Methods

Are methods specified more difficult/expensive than methods more common to Seabees?

Do you have necessary skills (special training, tech reps, subcontracts)?

## POSSIBLE LONG LEAD ITEMS

- |                                     |   |
|-------------------------------------|---|
| 1. Pre-Engineered Buildings         | 24. Structural Pipe                               |
| 2. Marine Piles                     | 25. Marine Hardware                               |
| 3. Telephone Poles                  | 26. Carpet  |
| 4. Doors                            | 27. Rubber Fender Systems                         |
| 5. Windows                          | 28. Bolted Steel Tanks                            |
| 6. Screens                          | 29. Epoxy Mortars/Grouts                          |
| 7. Transformers                     | 30. Galvanized Metal Products                     |
| 8. Circuit Breakers                 | 31. Chain Link Fence Fabric                       |
| 9. Switch Stations                  | 32. HVAC Components                               |
| 10. Fire Alarm Systems              | 33. Fire Protection Systems                       |
| 11. Intrusion Alarm Systems         | 34. Large Quantities/Odd Sizes of Pipe/Fittings   |
| 12. Air Conditioning Systems        | 35. Fire Pumps                                    |
| 13. Specialty Electrical Items      | 36. Control/Feedback Systems                      |
| 14. Partitions                      | 37. Annunciator Panels                            |
| 15. Water Heaters                   | 38. Power Panels                                  |
| 16. Timber (especially large sizes) | 39. Explosion Proof Systems                       |
| 17. Lumber, Plywood (large orders)  | 40. Large Quantity or Specialty Cable             |
| 18. Roof Systems                    | 41. Cathodic Protection Systems                   |
| 19. Pre-Fab Joists                  | 42. High Intensity Discharge Light Fixtures/Lamps |
| 20. Structural Steel Members        | 43. High Voltage Specialty Switchgear             |
| 21. Louvers                         | 44. Silver Solder                                 |
| 22. Treated Wood Products           | 45. Cabinets (wood and metal)                     |
| 23. Specialty Coatings              | 46. Hardware/locks/cipher locks                   |

Finish items such as decorative brick, clay tiles, unusual carpeting may require time to locate. Large purchases of any item (over \$10k or 25k depending on local purchase authority) require time to competitively bid.

Electrical items tend to be unique to each installation and require additional time.

Figure 2-7.—Possible long lead-time items.

What tools are in the central tool room (CTR) and what is available for rent from local vendors?

It is important that you identify long lead-time items as soon as possible. For realistic schedules, you must take into account anticipated material delivery dates. Figure 2-7 is a list of possible long lead-time items. Any special training requirements must be addressed to the chain of command as soon as possible. Special training requires scheduling additional training after home port has begun and requires much coordination.

### ESTIMATING

The crew leader is responsible for ensuring all required resources are identified. The crew leader must estimate materials, tools, equipment, and labor required to complete each construction activity. All required resources are listed on the CAS sheets. The scheduled start and finish dates for each activity are taken from the level III barchart and shown on the CAS sheet. The resources are then tied to the schedule,

and any action required to track or request resources can be monitored on the CAS sheet.

### ACTIVITY LISTINGS

Before you go any further with detailed project planning, the project must be broken into smaller parts. Each part can then be estimated individually. The project will first be broken into between 8 and 10 master activities representing large, functional parts of the project. Each master activity will then be broken into between 5 and 10 construction activities.

#### Master Activities

The regiments usually assign master activities to the projects. The master activities can be broken into at least 5 construction activities. Most commonly, master activities number between 8 and 10. These activities identify functional parts of the facility and are often tied to a particular company or rating. It must be clear to all personnel involved in the planning process exactly what work is included in each master activity. That is the purpose of the master activity listing (fig. 2-8). By providing a good narrative

MASTER ACTIVITY LISTING			
Master Act. Number/Title	PROJECT # _____	TITLE _____	
	Master Activity Description	M-Ds	Duration

Figure 2-8.—Master activity listing.

description of each master activity, it will be clear to all where each work element falls. A good narrative description reduces the chance of omitting any work items from the estimate. Master activities for a typical building might look like the following:

10XX	Sitework
20XX	Underslab Utilities
30XX	Foundation and Slab
40XX	Walls
50XX	Roof
60XX	Rough Utilities
70XX	Interior Finish
80XX	Finish Utilities
90XX	Exterior Finish

### Construction Activities

As the crew leader, you must break the master activities into construction activities. The work element checklist contained in appendix A to the NAVFAC P-405, *Seabee Planner's and Estimator's Handbook*, is a good guide for the development of the construction activity list. A typical Naval Mobile Construction Battalion (NMCB) project might contain between 15 and 50 construction activities. Construction activity numbers are usually four digits. The first two digits identify the master activity and the second two digits show a specific construction activity within a master activity. The number also includes a prefix assigned by Ops that identifies the specific project. Looking at the list of master activities example, this project could have a construction activity for "Pull Wire" numbered 6025. The number 60 represents master activity "Rough Utilities" and 25 distinguishes "Pull Wire" from other construction activities in that same master activity.

### MAN-DAY ESTIMATES AND DURATIONS

You need to know how to calculate mandays and duration for each construction activity, The P-405 is the primary reference for Seabee man-day estimates. The P-405 lists how many man-hours it takes to do one unit of work, The size of the unit is also given. The quantity of work is divided by the unit size and multiplied by the man-hours required to do one unit. You then divide by 8 man-hours per man-day and multiply by a delay factor (DF). **Tasking, estimating,**

**and reporting are always done in 8-hour man-days, regardless of the length of the workday.**

$$MDs = QTY \text{ of } WORK \div UNIT \text{ SIZE} \times MHRS \text{ PER } UNIT \div 8 \times DF$$

For example, to install 16,000 SF of 1/2-inch drywall over wall studs would require how many man-days? (See page 4-78 of the P-405.)

$$MDs = 16,000 \text{ SF} \div 1000 \text{ SF} \times 33 \text{ MHRS} \div 8 = 66 \times DF$$

### Production Efficiency Factors

Production efficiency factors are the first step in adjusting man-day estimates based on your unique circumstances. The intent of a production efficiency factor is to adjust for factors that will make you more or less productive than the average Seabee. In calculating a production efficiency factor, consider only those factors that affect the crew **while on the job**. Table 2-1 has listed eight production elements in the far-left column. You need to consider the impact of each of these production elements on each activity given a specific crew, location, equipment condition, and such. You need to assign a production factor between 25 (low production) and 100 (high production) for each element. A production factor of 67 is considered average. Average these eight factors to figure your production efficiency factor (PEF).

### Delay Factors

Before you can adjust the man-day estimate, you must convert the production efficiency factor to a delay factor. You can find the delay factor by dividing 67 (the average production factor) by the production efficiency factor ( $DF = 67/63.6 = 1.05$ ). (See table 2-1.) Using the delay factor of 1.05 you now can adjust the original man-day estimate.

$$66 \times 1.05 = 69.3 \text{ or } 70 \text{ MD}$$

This mathematical procedure has limitations. If for example you are working outside in extremely bad weather, and all other factors are considered average (weather = 25, all others = 67), you would obtain a production efficiency factor of 62 and a delay factor of 1.08. This 8 percent increase in the man-day estimate would not adequately compensate for working in extreme weather. You are not limited to the method of delay factors in the P-405. Use **common sense** when impacted by extreme circumstances.

Table 2-1.—Production Efficiency Guide Factor Chart

## PRODUCTION EFFICIENCY GUIDE FACTOR CHART

	LOW PRODUCTION			AVG PRODUCTION			HIGH PRODUCTION	
	25	35	45	55	65	75	85	95
1. WORKLOAD	CONSTRUCTION REQ'T HIGH, MISC. OVERHEAD HIGH			CONSTRUCTION REQ'T AVG, MISC. OVERHEAD AVG			CONSTRUCTION REQ'T LOW, MISC. OVERHEAD LOW	
2. SITE AREA	CRAMPED WORK AREA, POOR LAYDOWN/ACCESS			WORK AREA LIMITED, AVG LAYDOWN/ACCESS			LARGE WORK AREA, GOOD LAYDOWN/ACCESS	
3. LABOR	POORLY TRAINED/MOTTIVATED CREW			ADEQUATELY TRAINED/MOTTIVATED CREW			HIGHLY TRAINED/MOTTIVATED CREW	
4. SUPERVISION	POORLY TRAINED/MOTTIVATED OR INEXPERIENCED			ADEQUATELY TRAINED/MOTTIVATED EXPERIENCED			HIGHLY TRAINED, MOTTIVATED, AND EXPERIENCED	
5. JOB CONDITION	HIGH-QUALITY WORK REQ'D, SHORT FUSE			AVG QUALITY WORK REQ'D, ADEQUATE TIME			ROUGH/UNFINISHED WORK REQ'D, WELL PLANNED	
6. WEATHER	ABNORMAL HEAT, RAIN, OR COLD			MODERATE RAIN, HEAT, OR COLD			FAVORABLE RAIN, HEAT, OR COLD	
7. EQUIPMENT	POOR COND., MAINT., REPAIR, OR APPLICATION			FAIR COND., MAINT., REPAIR, OR APPLICATION			GOOD COND., MAINT., REPAIR, OR APPLICATION	
8. TACTICAL/ LOGISTICAL	SLOW SUPPLY, FREQUENT TACTICAL DELAYS			NORMAL SUPPLY, FEW TACTICAL DELAYS			GOOD SUPPLY, NO TACTICAL DELAYS	

Let's calculate a production efficiency factor for our 16,000 SF of drywall. Let's say we are going to do this drywall work as part of a project to rehab the station CO's admin spaces. We must evaluate each production element from the table and assign a factor:

<u>Production element:</u>	<u>Percentage</u>	<u>Remarks</u>
Workload	67	No specific impact
Site Area	75	Good access, work area
Labor	35	Crew inexperienced, OJT required
Supervisor	75	Good supervisor
Job Condition	45	High quality work required
Weather	67	No impact
Equipment	70	Sufficient tools in adequate condition
Tactical/Logistical	75	Materials on-hand believed sufficient
	509	

$$PEF = 509/8 = 63.6$$



Come up with what you feel is a reasonable delay factor and discuss it with your chain of command. You are not bound by either the delay factors or the production rates in the P-405. To figure, man-day estimates, you can use your experience to determine the logical production rates to use. Keep in mind that the delay factor is only used to determine the man-day estimate for a particular construction activity. Each activity will have a different delay factor. All other calculations use the availability factor.

### Availability Factors

Availability factors take into account that Seabees assigned as direct labor are not available 100 percent of the time. The 2nd/3rd Naval Construction Brigade provides the availability factors for planning purposes. Availability factors are sometimes still referred to as site efficiency factors. These factors vary between 0.75 for mainbody sites to 0.85 for detail sites. Using the following equation, you can determine the man-day capability (MC) for the main body and each detail.

$$MC = DL \times WD \times ME \times AF$$

Use DL to represent the number of direct labor assigned, WD for the number of available workdays, ME for the length of the workday divided by 8 ( $9/8 = 1.125$ ), and AF is the availability factor. Multiply these four factors to figure the man-day capability. You can use this same equation to determine the direct labor manning for a detail if you substitute tasked man-days for MC and plug in AF, ME, and WD. The number of work days is taken from the deployment calendar.

### Construction Activity Durations

The MC equation also can be used to determine construction activity durations. By substituting MD estimated for MC, plugging in crew size (CS) for direct labor assigned (DL), availability factor (AF), and man-day equivalent (ME), you can solve for the number of workdays required or project duration.

$$Duration = MD \text{ estimated} \div CS \div AF \div ME$$

The activity duration is increased by including the availability factor to account for time lost from the project site. The actual crew you would expect to see on the jobsite on the average day would be the

assigned crew multiplied by the availability factor. Always use the availability factor.

If in the drywall example you had a crew of 12 assigned, how long would it take to complete this task (availability factor 0.75, man-day equivalent 1.125)? Remember to use the revised man-day estimate, which includes the delay factor.

Using the formula:

$$Duration = 70 \div 12 \div 0.75 \div 1.125 = 6.91 \text{ or } 7.$$

## CONSTRUCTION ACTIVITY SUMMARY (CAS) SHEETS

Once the master activities have been broken into construction activities, you will need to use a CAS sheet (figs. 2-9 and 2-10) for each activity. In addition to the activity description and scheduled dates, all the required resources are shown on the front. Safety and QC requirements are on the back. The space at the bottom of the back page should be used for man-day and duration calculations.

The CAS sheets should be able to stand alone. The CAS sheets should contain all of your notes, information, and calculations pertaining to man-days, durations, tools, and equipment. This way, if you are not available, someone else can use this information and the project can continue. It is very important that CAS sheets be filled out correctly. Almost all of your remaining planning is driven from the CAS sheets. Always use a pencil to fill them out, because they change constantly.

## CONSTRUCTION SCHEDULING

You must put together realistic, workable schedules during your project's planning and estimating stages if you hope to finish the tasking on schedule during the deployment. Crucial to a workable schedule is the proper, logical sequence of activities and good realistic durations. Performing the forward and backward pass will identify the critical path. The critical path gives you a list of milestones (activity completion dates) that must be met. If these milestones are met, the project will be on track and finished by the scheduled completion date.

### LEVEL II ROUGHS

As the construction schedule unfolds, a commitment of resources (labor and equipment) from

# CONSTRUCTION ACTIVITY SUMMARY SHEET

PROJECT TITLE: \_\_\_\_\_  
 B. M. CODE: \_\_\_\_\_ PREPARED BY: \_\_\_\_\_ CHECKED BY: \_\_\_\_\_  
 START SCHEDULED: \_\_\_\_\_ FINISH SCHEDULE: \_\_\_\_\_  
 ACTUAL: \_\_\_\_\_ ACTUAL: \_\_\_\_\_

ACT. NO. _____		GROUP CODE _____			
ACT. TITLE: _____					
DESCRIPTION OF WORK METHOD: _____					
DURATION: ESTIMATED _____		MAN-DAYS: ESTIMATED _____			
ACTUAL _____		ACTUAL _____			
Production Efficiency Factor: _____		RESULTING DELAY FACTOR: _____			
<b>LABOR RESOURCES:</b>					
NO.	DESCRIPTION	QTY.	NO.	DESCRIPTION	QTY.
<b>EQUIPMENT RESOURCES:</b>					
NO.	DESCRIPTION	QTY.	NO.	DESCRIPTION	QTY.

<b>MATERIAL RESOURCES:</b>					
NO.	DESCRIPTION	QTY.	NO.	DESCRIPTION	QTY.

ASSUMPTIONS: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Figure 2.9.—Construction activity summary sheet (front).



several different companies is required to ensure that you can maintain the schedule. Rough level II schedules coordinate the planning effort between companies and ensure that no particular company or rating is overtasked during any phase of the deployment. Good coordination in the beginning is less painful than a major overhaul later. Having determined the sequence and approximate duration of each master activity, you can construct a level II barchart. Each project will have a level II. The Ops officers and the company commanders typically track projects using a level II. Barcharts will be covered in greater detail later in this chapter.

### LOGIC NETWORK

The logic network is the basic management tool for control, monitoring, and distribution of all resources that are directly related to time. The logic network at the planning stage is a pure dependency diagram. All activities are drawn in the order in which they must be accomplished, without regard to particular construction preference. One of the major uses of the logic network during the planning stage is to indicate all activities that must be accomplished to complete a particular project (fig. 2-11). The individual network activities should be well-defined elements of work within the project and should be normally limited to a single rating. As a general rule, an activity should be created for any function that consumes or uses direct labor resources. Resources (manpower, equipment, tools, or materials) MUST be tied directly to the CAS sheet and network.

The crew leader constructs a logic network showing the sequence of construction activities from the first to the last and the dependencies between activities. It is important to do the logic network when breaking the project down into construction activities

to ensure no items of work are left out. You do not yet have construction activity durations, so you are only concerned about the sequence of work. Each construction activity is represented by an activity block. In the network shown in figure 2-11, activities 1020 and 1030 cannot start until activity 1010 is finished. Activity 1040 cannot start until 1020 is finished, and activity 1050 cannot start until 1030 and 1040 are finished.

### THE BASIC SCHEDULE (FORWARD AND BACKWARD PASS)

Using the crew sizes, you can now determine construction activity durations. Go back to the logic diagram and insert the durations to determine the basic schedule. Practice with the example here and those included later. Some minor revisions may be required to the basic schedule (see resource leveling) prior to setting the final schedule. On the precedence network you will need to insert into an activity block the activity number, description, and duration for each activity. A typical block is shown in figure 2-12.

ACTIVITY NUMBER		ACTIVITY DURATION	
EARLY START	ACTIVITY DESCRIPTION		EARLY FINISH
LATE START	ACTIVITY RESOURCES		LATE FINISH
	TOTAL FLOAT	FREE FLOAT	

Figure 2-12.—Typical activity block.

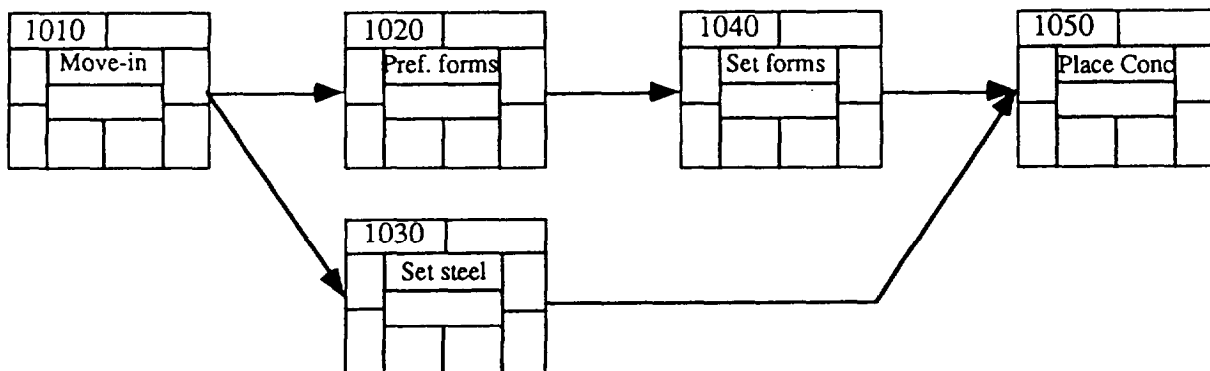


Figure 2-11.—Logic network.

The first step in determining the basic schedule is to do a **forward pass**. The forward pass gives you the total duration of your project. You start with the very first activity and plug in a zero for its early start date. Then add the duration to the early start date to get the early finish date. The early finish date for an activity becomes the early start date for the next activity. Notice that activity 1050 in figure 2-13 had two preceding activities (1020 and 1040) and you chose the larger of the early finish dates (11 vice 10). Remember to add any lag between the activities (between activity 1070 and the next activity there are 3 days lag time). **Lag times are mandatory wait times between activities.** A common example is concrete cure times. Cure times require you to wait several days to several weeks after placing concrete before you strip the forms. Follow the following two equations through the network in figure 2-13:

$$\text{Early Start} + \text{Duration} = \text{Early Finish}$$

$$\text{Early Finish} + \text{Lag (if any)} = \text{Early Start (next activity)} *$$

Look at the network in figure 2-13, the early start and finish dates for an activity depend on the number and duration of the activities that have to be done before it.

The next step in determining the basic schedule is a **backward pass**. The backward pass determines your critical path. You start by taking the early finish date for the last activity and making it the late finish for the last activity. For each activity, subtracting the duration from the late finish date will give you the late start date. The late start date will become the late finish date for the preceding activity. Notice that activity 1040 in figure 2-13 has two follow-on activities and you took the smaller of the late starts (11 vice 12). Follow the equations shown through the network in figure 2-13. For any activity where the early start is the same as the late start and the early finish is the same as the late finish, that activity is critical!

$$\text{Late Finish} - \text{Duration} = \text{Late Start}$$

$$\text{Late Start} - \text{Lag (if any)} = \text{Late Finish (preceding activity)} *$$

### TOTAL FLOAT

Total float is the number of days an activity can be delayed without delaying the project completion date. Looking at activity 1020 in figure 2-13 you see that it could finish as early as day 10 or as late as day 12. The 2 days of leeway between day 10 and day 12 in activity 1020 are called total float. To calculate total float you subtract the early finish date from the late

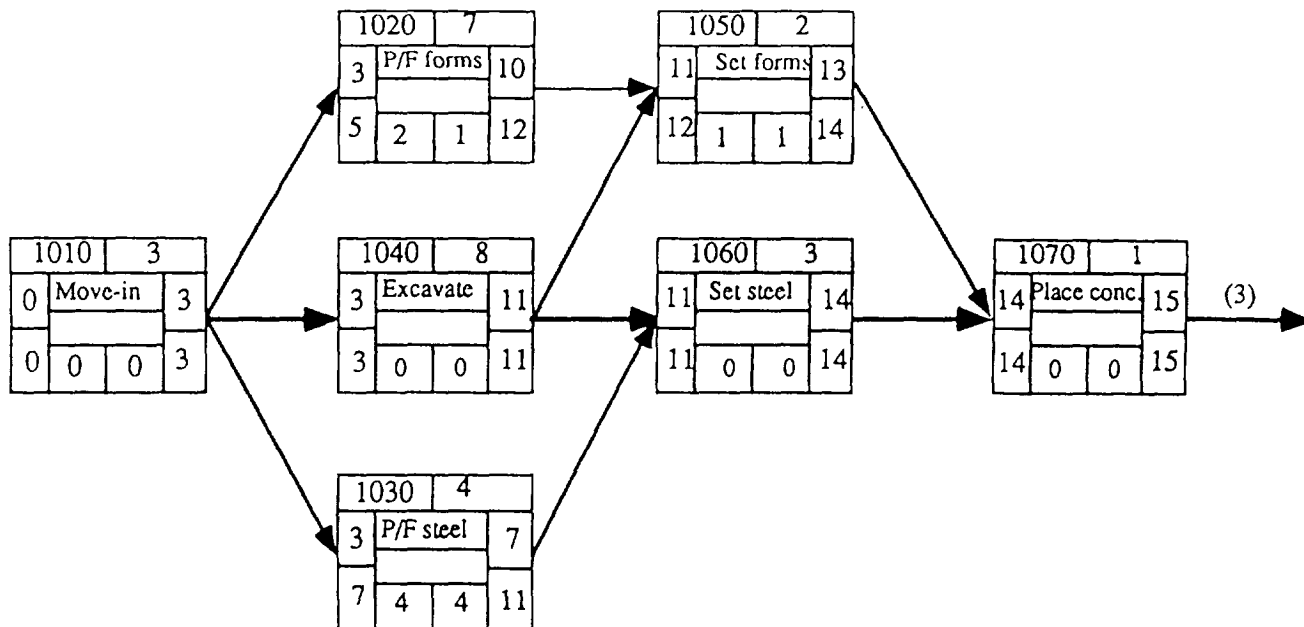


Figure 2-13.—Typical network.

finish date or the early start date from the late start date. The numbers will be the same. If not, you made a math error.

$$\text{Total Float} = \text{Late Start} - \text{Early Start} \\ (\text{or Late Finish} - \text{Early Finish})$$

## FREE FLOAT

Free float is the number of days an activity can be delayed without taking float away from the next activity. Another way of saying the same thing is that free float is the number of days an activity can be delayed without delaying the early start date of the next activity. To calculate the free float for an activity, you subtract any lag and the early finish for the activity from the early start for the next activity. To calculate the free float for activity 1020 in figure 2-13 you would take the early start for activity 1050, subtract any lag between 1020 and 1050 (zero in this case), and subtract the early finish for activity 1020 ( $11 - 0 - 10 = 1$ ). Free float for activity 1020 is 1 day. You can see that delaying activity 1020 by 1 day will not delay activity 1050 from its early start date. Delaying activity 1020 by 2 days will delay the start of activity 1050 until day 12 and will reduce the float for activity 1050 by 1 day (to zero, in this case). Delaying activity 1020 by more than 2 days will delay the project completion date because 1020 has only 2 days of total float.

$$\text{Free Float} = \text{Early Start (next activity)} - \text{Lag (if any)} \\ - \text{Early Finish}^*$$

## CRITICAL PATH

Looking at activity 1020 in figure 2-13 you see you could start that activity as early as day 3 or as late as day 5. Now subtract 3 from 5 and enter 2 days as the total float. Where the early start and late start are the same there is no float. No float means you have to start that activity on its early start date. It cannot be delayed without delaying the project completion. Activities with no float are said to be critical. The first and last activities will always be **critical** and there will be a **critical path** of activities between them. The critical path in figure 2-13 is 1010-1040-1060-1070. The critical path allows management to focus attention on those activities that cannot slip.

## DIFFERENT LOGIC TYPES

All examples shown so far have used finish-to-start logic. This logic type requires an activity to finish before the next one can start. There are two other types of logic relationships that are frequently encountered. They are the start-to-start (S/S) and finish-to-finish (F/F). S/S is where the start of the second activity is dependent on the start of the first activity. F/F is where the finish of the second activity is dependent on the finish of the first activity. **Finish-to-start logic will give you the longest total project duration and is the most common logic type used in the NCF.** The S/S and F/F logic can be used to compress (shorten) the schedule. This compression is often used in the execution phase of the project to catch up. These logic relationships also can be used to plan repetitive work such as roadways or sewer lines. For a sewer line you wouldn't want to excavate the entire ditch before starting to lay pipe.

**NOTE:** Equations marked with an (\*) are changed with different types of logic (S/S or F/F).

### Start-to-Start

Forward Pass:  $\text{Early start} + \text{Lag} = \text{Early start (next activity)}$

Backward Pass:  $\text{Late start} - \text{Lag} = \text{Late start (preceding activity)}$

Free Float:  $\text{Early start (next activity)} - \text{Lag} - \text{Early start}$

### Finish-to-Finish

Forward Pass:  $\text{Early finish} + \text{Lag} = \text{Early finish (next activity)}$

Backward Pass:  $\text{Late finish} - \text{Lag} = \text{Late finish (preceding activity)}$

Free Float:  $\text{Early finish (next activity)} - \text{Lag} - \text{Early finish}$

The general rule to follow with different types of logic is to **always follow your logic connectors.**

Figure 2-14 is an example of a network with lag times (between activities B and F, C and D, C and E). Figure 2-15 is an example of logic relationships. Using the formulas, work through the calculations.

## LEVEL III BARCHARTS

Having determined the construction schedule on the precedence network, you must now transfer that

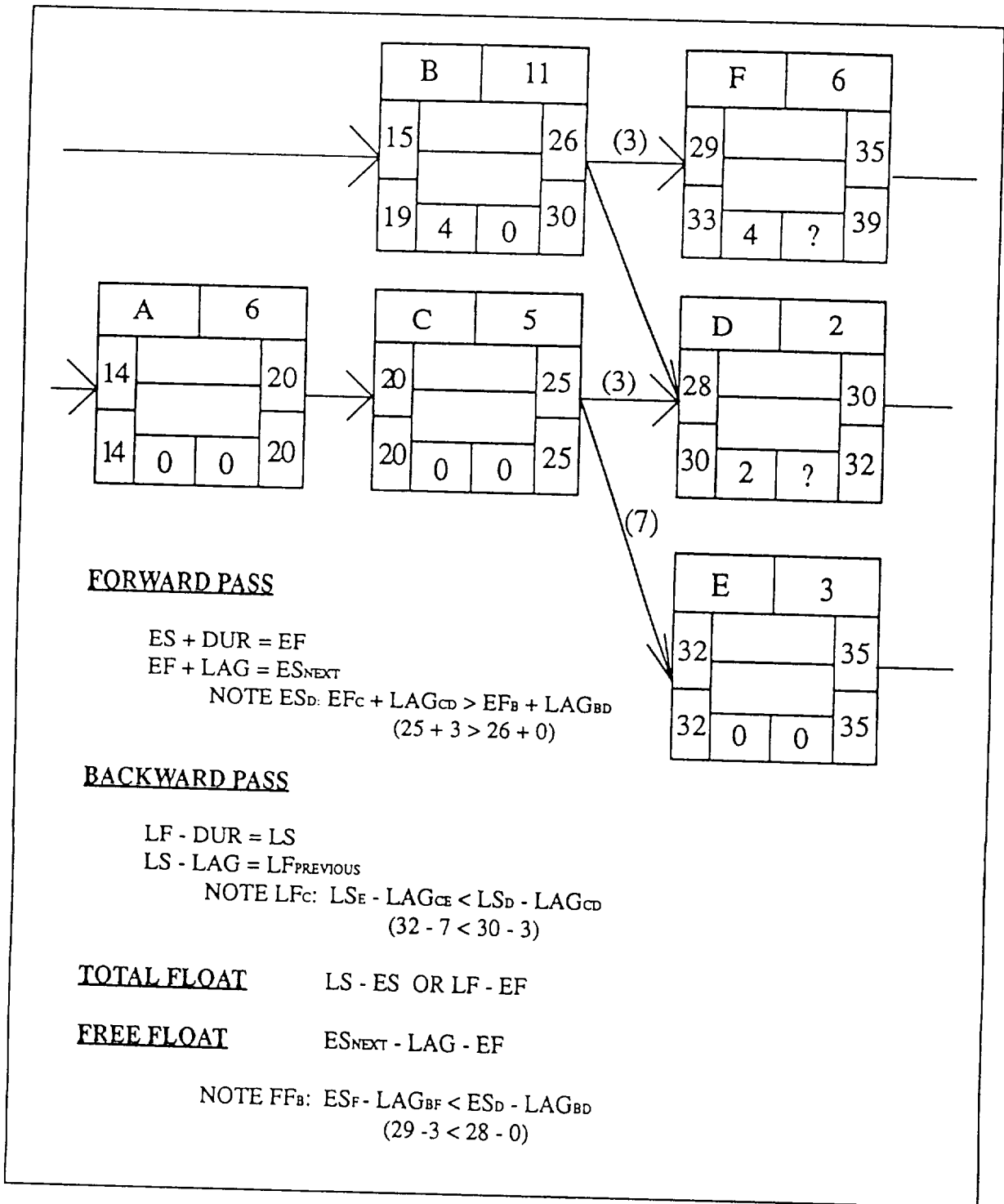


Figure 2-14.—Network calculation.

information to a barchart. Scheduled dates are much easier to read on a barchart. Figure 2-16 is a level III barchart sorted by early start date. All of the construction activities are listed down the left-hand side. A time scale is at the top of the page. The time scale goes from the first workday of the project to the last workday. The start date, finish date, and duration of each construction activity is shown on the barchart. The double horizontal dash lines represent critical construction activity durations. The single dash lines represent noncritical activity durations. Free floats are shown as dots behind each noncritical activity. For activities with no free float you have to look at the activity that they are sharing floats with to find the total float. For example, the total float for activity 4000 is shown behind activity 4005. No free float on 4000 means you cannot delay it without delaying 4005 also.

### RESOURCE LEVELING

Resource leveling involves matching the construction activities scheduled to the crew size available. You want the entire crew to be gainfully employed every day. You also want to keep up with the scheduled work

and not fall behind. To perform resource leveling, you need a known crew size, a time-scaled schedule, and a histogram. The histogram shows how many people in each rating are required on a daily basis to complete the tasks scheduled. You can create these documents by hand or computer. Figure 2-16 represents only the first page of a level III barchart. Look at figure 2-16 and you see can the resource histogram at the bottom of the page. The numbers give the required resources needed to complete the critical activities scheduled for each day. These activities cannot be moved without delaying the project!

The primary task in resource leveling is to schedule the noncritical work as you have people to do the work. In figure 2-17 the total float for noncritical activities has been penciled-in in the space between the activity numbers and descriptions. The crew sizes for each noncritical activity also have been penciled-in next to the activity start date. The total crew size in this example is 7. You have resource leveled this project for a small detachment scenario. Here the prime/sub arrangement is not practical and extensive cross-rate use of personnel is common.

In figure 2-18 notice the resource leveling process was started by committing to doing the critical path as shown and plugging in the resources. These resources can be figured by the computer or drawn in manually at the bottom of the page. The critical path will obviously not keep the entire crew busy (see the original total resource numbers at the bottom of the page). The noncritical activities are shown on their early start dates, but you may need to delay the start dates if you lack the people to start the noncritical activities at that time. If you delay the start of a noncritical activity, you want to schedule its start as soon as you have people (available those days where total resources are less than 7).

Figure 2-18 has been resource leveled. The activities were scheduled beginning with the least amount of total float to those with the most total float. Activity 2050 was scheduled first, then 2090, 3020, 3010, 4000, 4005, 4030, and 4010. This process should be continued through the rest of the project. Notice that there were not yet any personnel to schedule for activities 2010, 2020, 2030, 7010, or 7020. These resources would be carried over to the next page of the barchart. We also did not schedule activities 6020, 8080, 9010, or 8095. Even though they have the least amounts of total float, these activities have early starts late in the project and can be rescheduled later. Remember the activities are shown by early start dates and can be moved forward only,

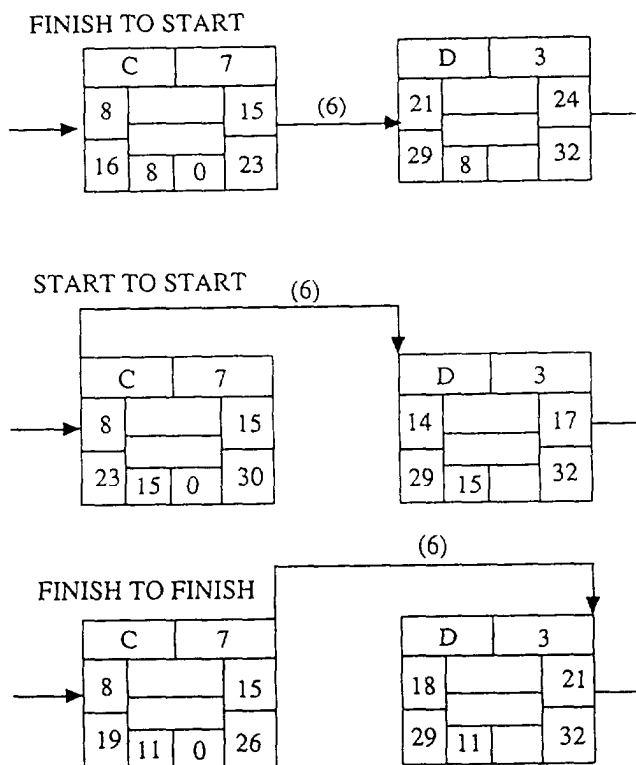


Figure 2-15.—Logic relationships.



Time Scale Report by Early Start

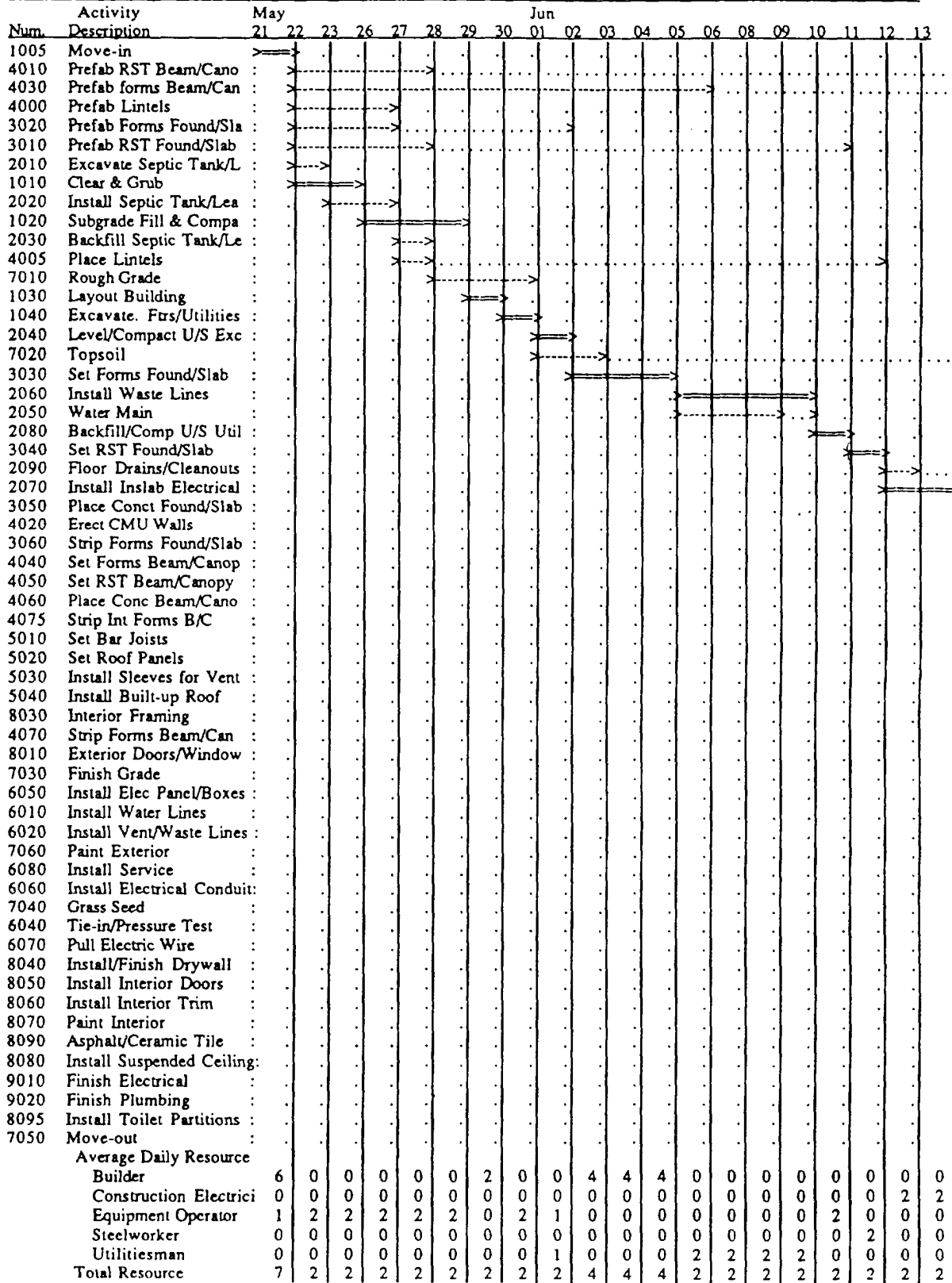


Figure 2-16.—Level III barchart sorted by early start date.

Time Scale Report by Early Start

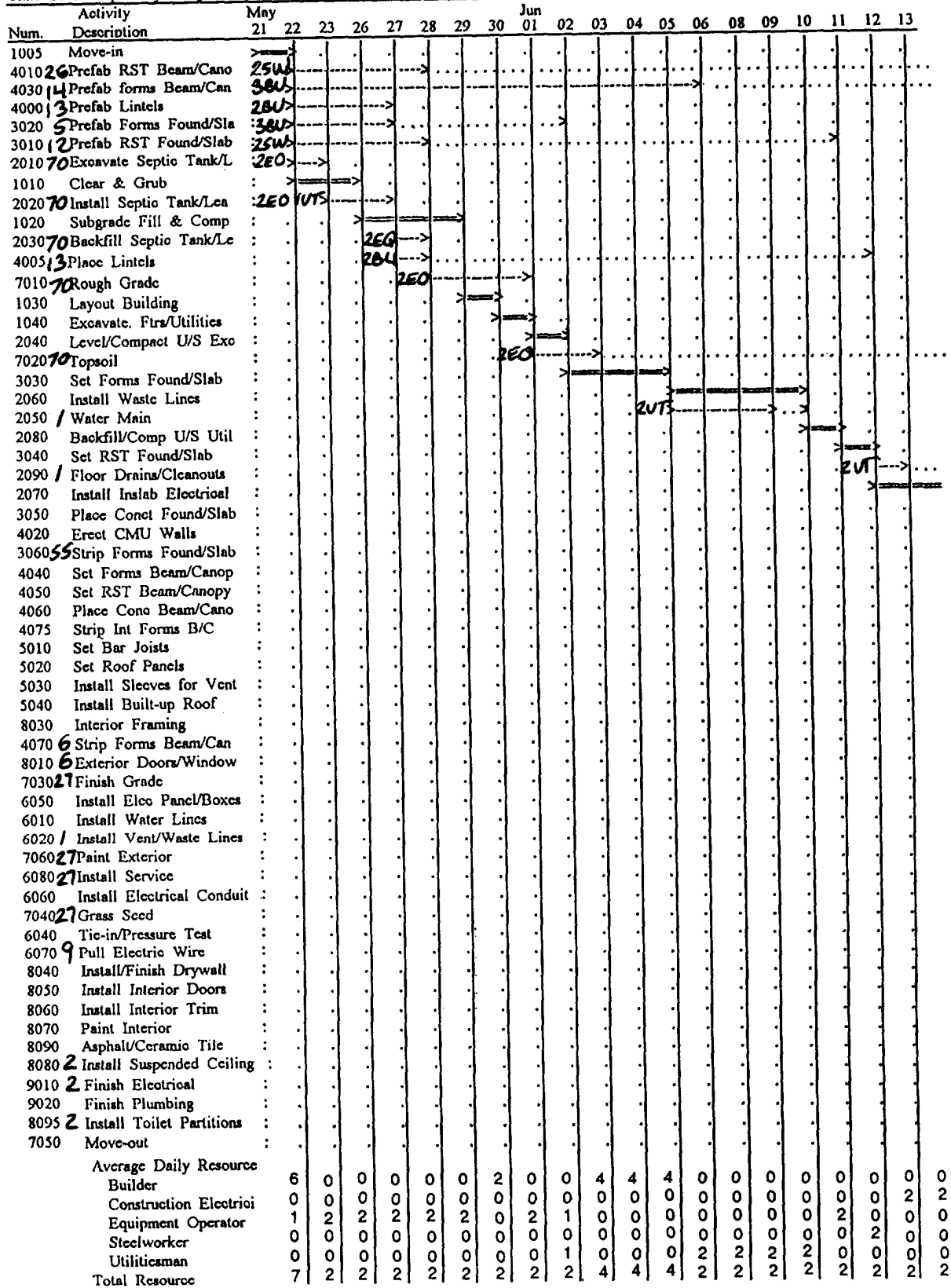


Figure 2-17.—Level III barchart with total float and crew sizes penciled-in.

\* (14 ON 1005 = 14 DAYS LEAD ON 1005)

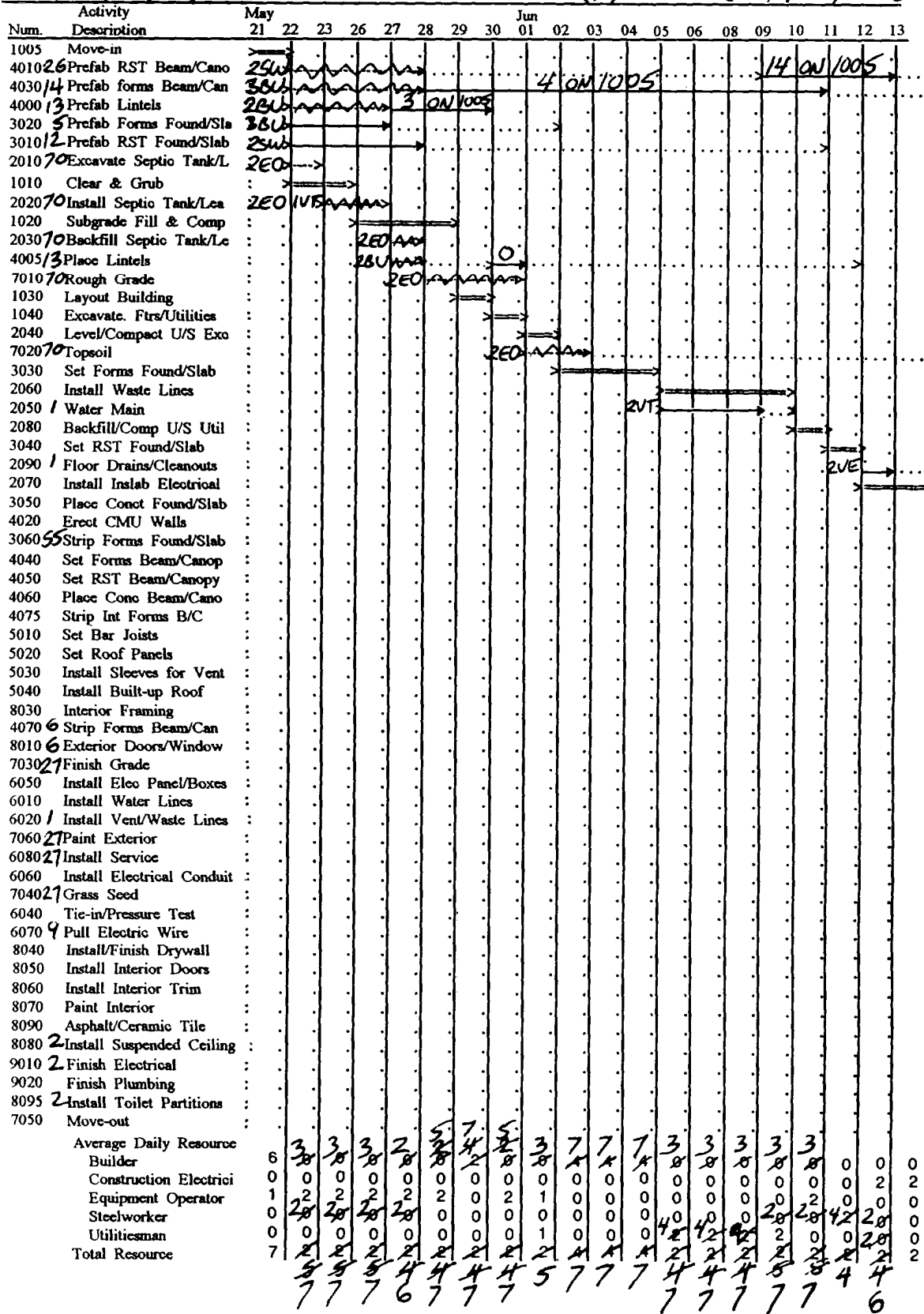


Figure 2-18.—Resource leveled level III barchart.

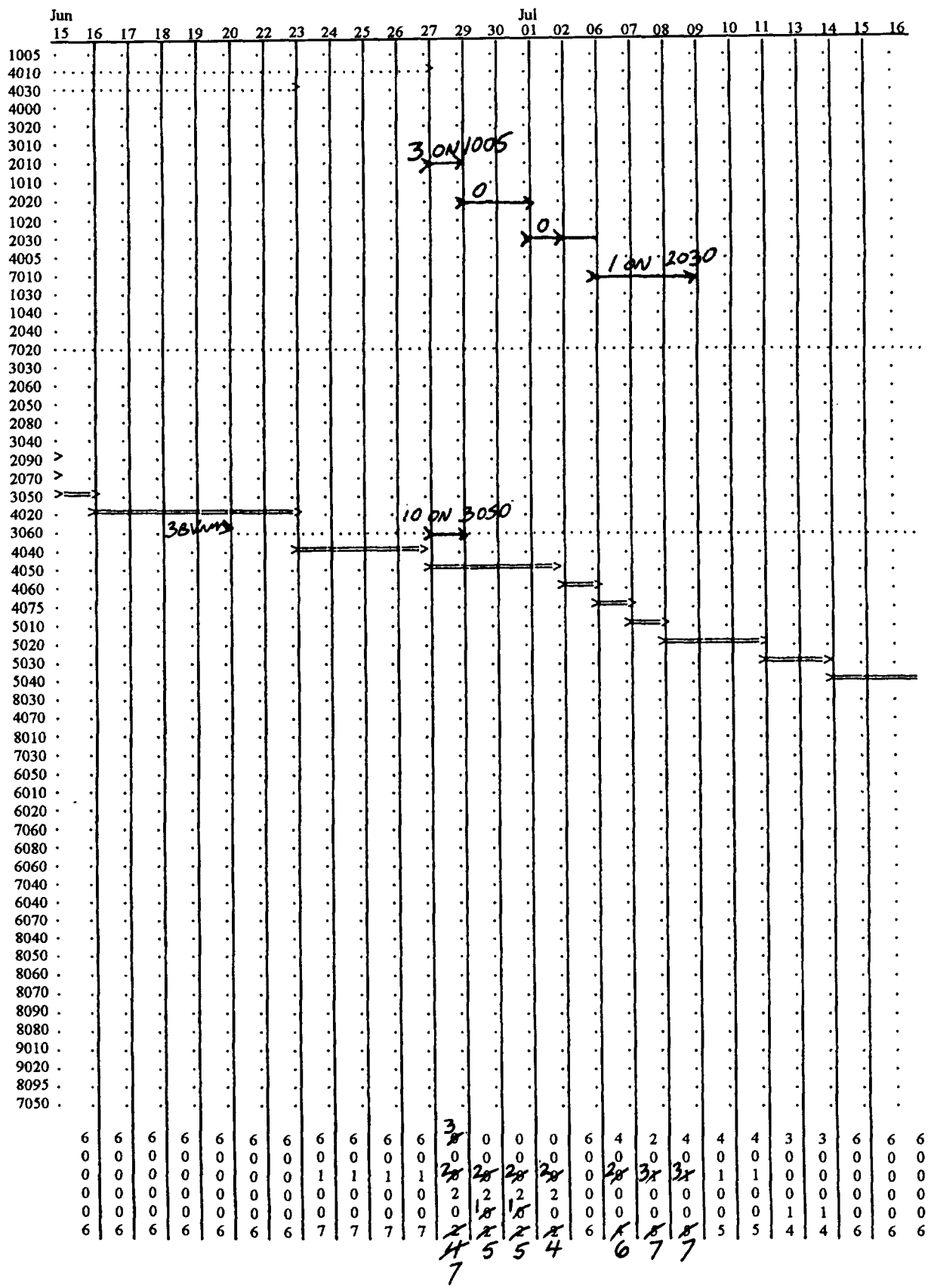


Figure 2-18.—Resource leveled level III barchart—Continued.

Time Scale Report by Activity Number

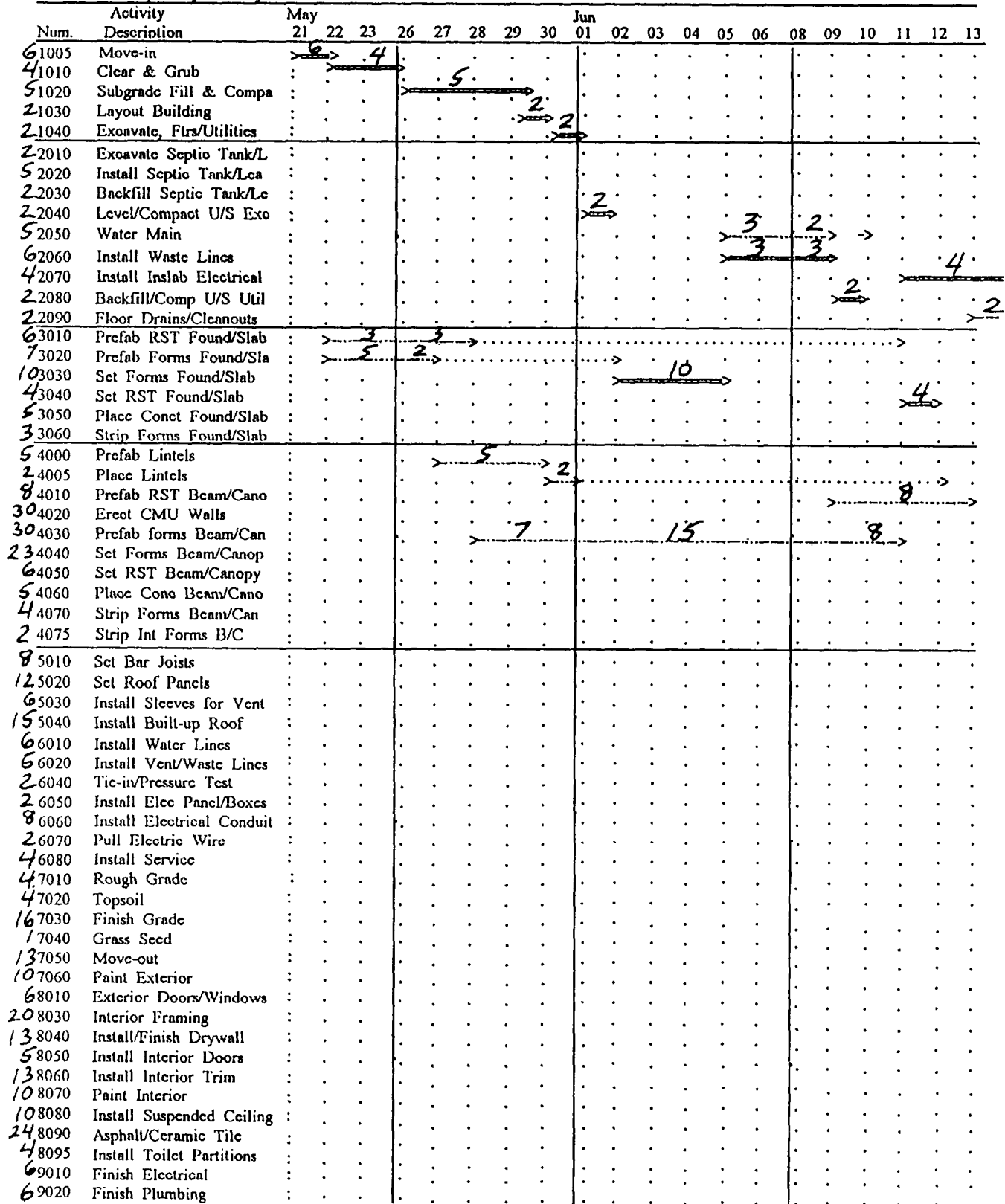


Figure 2-19.—Level III barchart sorted by activity number.

never backward. Also remember that activities that show no free float are tied by dependency to other activities. If one moves the others must move. Such is the case of activities 4000 and 4005.

Some minor adjustments on crew sizes and durations may be required to ensure full use of assigned crew. Once all the activities are scheduled, you can input the noncritical resources and delayed start dates (using lags) and create a new barchart. You can create this new barchart with the computer or manually.

### LEVEL II BARCHART

You make a level II barchart from the information gained from the level III. Figure 2-19 is a level III barchart with construction activities sorted by activity number. This sorting allows for an easy transfer of information to the level II. Vertical lines on the level

III separate the weeks and horizontal lines separate the master activities. The man-day estimate has been taken off the CAS sheets and penciled-in to the left of each activity number. The man-days have also been written over each line representing the activity duration. Where an activity was split between 2 weeks the man-days were prorated between the 2 weeks. Master activity 10 has a total man-day estimate of 19 (the sum of the construction activity estimates). You can now transfer the information to a level II barchart.

Figure 2-20 is a level II barchart. The master activities are listed in a column on the left and the weeks of the entire deployment across the top. The dates used are always the Monday of that week. Next to each master activity is the man-day estimate for that master activity. The next column is the weighted percent, which is the master activity man-day estimate divided by the total project man-day estimate

## NCF LEVEL II

PROJECT # _____				TOTAL MAN-DAY ESTIMATE <u>434</u> TASKED MAN-DAYS <u>434</u>																																		
TITLE <u>Admin Building</u>				MAY			JUN			JUL			AUG			SEP			OCT			NOV																
ACT #	MASTER ACTIVITY	MDS	WT %	4	11	18	25	1	8	15	22	29	6	13	20	27	3	10	17	24	31	7	14	21	28	5	12	19	26	2	9	16	23	30	7			
10	Sitework	19	4			10	9																															100%
20	U/S Utilities	30	7					8	13			9																										90%
30	Foundation/Slab	35	8			8	5	10	4	5	3																											80%
40	Walls/Canopy	115	27				14	15	16	25	29	10	2		4																							70%
50	Roof	41	9									23	18																								60%	
60	Rough Utilities	29	7											10	13	3	3																				50%	
70	Exterior Finish	48	11										4	4	10	16	1	13																			40%	
80	Interior Finish	105	24										6	20	7	14	20	34	4																		30%	
90	Finish Utilities	12	3															3	9																		20%	
	Total	434	100																																		10%	
MDs Scheduled This Period				0	46	66	62	48	62	63	61	26																										
Cumulative Man-days Scheduled				0	46	112	174	222	284	347	408	434																										
% Complete Scheduled (Plot)				0	11	26	40	51	65	80	94	100																										
MDs Expended This Period																																						
Cumulative Man-days Expended																																						
% Man-days Expended																																						
% WORK-IN-PLACE (Plot)																																						

Figure 2-20.—NCF level II barchart.

expressed as a percent (multiplied by 100). If you look back at the level III barchart, you will see that master activity 10 has 10 man-days scheduled during the week beginning 18 May, and 9 man-days scheduled during the week beginning 25 May. Figure 2-20 has a horizontal bar connecting the weeks of 18 and 25 May for master activity 10 (sitework). The scheduled man-days for activity 10 are printed above the bar.

Once you have all the bars signifying master activity durations and the man-days scheduled on the barchart, you total the man-days scheduled for each 2-week period at the bottom of each column. The cumulative man-days scheduled is equal to the man-days scheduled for each 2-week period added to all previous man-days scheduled. The percent complete scheduled (plot) is equal to the cumulative man-days scheduled divided by the total project man-days. The scheduled progress curve is then drawn by plotting the percent complete scheduled at the end of each 2-week period plotted against the percentage scale on the right of the level II barchart.

### PROJECT EXECUTION

Satisfactory execution of construction tasking requires that various resources come together at a specific time and place. It is **not** just materials, equipment, and personnel. It is the **correct** materials, the **proper** equipment, and **capable** personnel. Your job of managing construction projects is made much simpler if you have already identified what you need to complete each activity. During the project planning stage, you identified the tools, equipment, materials, and personnel required for each part of the construction activity. This section of the chapter explains the various methods you can use to track these resource requirements from the home port planning phase to the day you begin work and eventually close out the project.

### CAS SHEETS

Proper use of CAS sheets greatly reduces the chance of the construction effort being slowed or halted due to a lack of resources. The majority of the resource requirements identified on the CAS sheet require some further action on the part of the crew leader. Any action required can be tracked right on the CAS sheet. Highlight the required action whether it is a requisition to be submitted or an equipment request to be turned in. List the required action and the due

date on the CAS sheet and circle it in yellow. Of particular significance are the local purchase materials. In general, no local purchase material is procured until requested by the crew leader. This request may be in the form of a 45-day material plan completed by the crew leader while in home port or a 1250-1 turned into MLO several weeks in advance. It is the crew leader who must initiate the local purchase action. Lead times for obtaining equipment and materials vary from several days for materials in the MLO yard to several weeks for equipment rented from a private contractor. If MLO needs a lead time of 2 weeks for a concrete request and you have a concrete placement scheduled for 30 September, make a note on the CAS sheet to turn in a 1250-1 by 16 September.

### LEVEL III BARCHARTS

An accurate assessment of the project status must be maintained on the jobsite continuously. Even a single day's deviation from your schedule makes a big difference to the concrete supplier, the hired crane operator, and your subcontractors. This does not mean that your project has to be replanned every 2 weeks. Updated project status can be reflected on the posted level III barchart. The critical path should be highlighted in red. The daily status should be shown in yellow. Daily status will show where you stand on each activity in comparison to the schedule. Figure 2-21 demonstrates a technique for reflecting total project status on a biweekly basis. Two vertical lines are drawn on the barchart, one at the 15th and one at the 30th of each month. The line on the 15th is broken and the line on the 30th is solid. Depending on the date, the line shows at a glance which activities are ahead or behind. Refer to figure 2-21; notice that activities 101 and 102 were completed by the 15th. Also notice that activity 401 is 1 day ahead and activity 402 is 1 day behind. By the 30th all scheduled work will be completed.

### TWO WEEK SCHEDULES

A successful crew leader must **manage** a project on three different planes. The crew leader must directly supervise the construction effort underway. The crew leader must also look at activities scheduled for the next 2 weeks to ensure an uninterrupted flow of resources to the project. And he/she must keep an eye on any long lead items. It is the long lead items that, if not tracked continuously, would be most likely

# LEVEL III BARCHART

SHOWING BIWEEKLY PROJECT STATUS

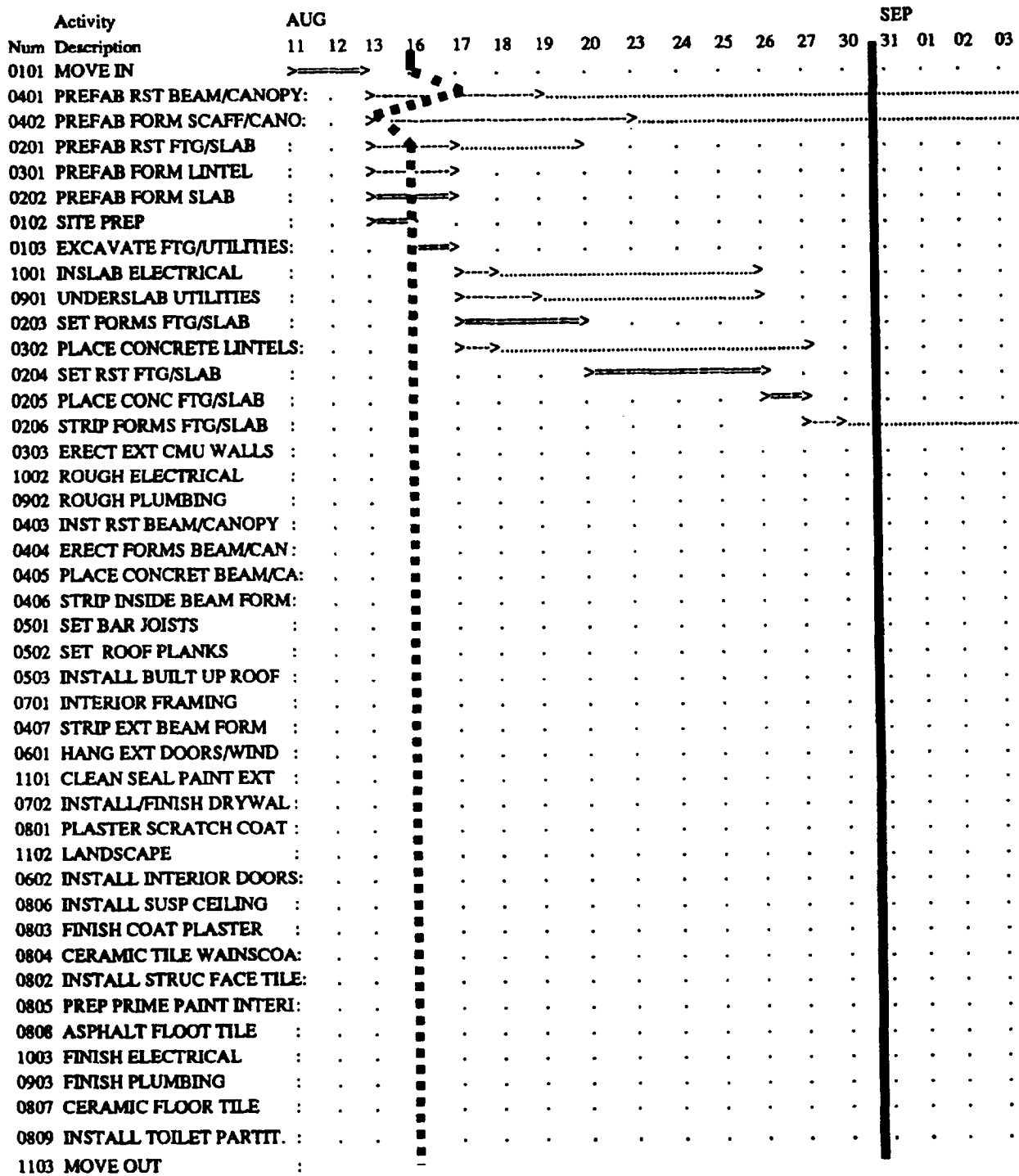


Figure 2-21.—Level III barchart showing biweekly project status.



to cause a work stoppage or delay. Figure 2-22 is a sample of a page from a 2-week schedule. The items of work listed on 2-week schedules must be clear and measurable. All 2-week schedules must show the work on the level III for that period. If you are behind schedule, the 2-week schedules must also reflect how you are going to get back on track. Key resource requirements for the activities scheduled for the next 2 weeks are listed on this schedule. This scheduling tool is used primarily by the crew leader to ensure that all materials required are either on the jobsite or have been requested with sufficient lead time to ensure availability. The 2-week schedules are used in crew briefings, to provide ongoing project status to the chain of command, and to give a heads up to MLO and the subcontractors. Two-week schedules are also referred to as weekly goals.

**REQUESTING RESOURCES**

Ensuring that the resources you need are available when you need them is much less painful when you adhere to the required lead times. If you need to better understand what MLO's turnaround times are, ask! The 1250-1s can be filled out and retained in the project packages weeks or even months in advance.

Dropping off 1250-1s at MLO 3 days before you need the material (for material in the yard) is easier on you and on MLO. The short-fused, "I need it now" requests are tough on everyone. The crew leader should consider the 3 days a minimum required lead time for requesting material from MLO. MLO operates more effectively and cooperates more readily when they are not required to drop what they are doing to get your material. If everyone gave MLO more lead time, there would be better service to all project sites.

**CREW BRIEFINGS**

Crew briefings are a must! Obviously the crew needs to know what they are going to be doing and how they are going to get it done, but they need to know much more. They need to be aware of safety hazards and preventive measures (stand-up safety lectures). They need to know what the quality measures are (How smooth is smooth? How vertical is vertical?). And they need to know the schedule. Crews need to know how much time has been scheduled for the current activity and what the impact on the overall schedule will be if the current activity is delayed. Figure 2-23 is a prep list you can use to improve crew briefings.

TWO-WEEK SCHEDULE					
PROJECT NUMBER _____		PROJECT TITLE _____		WEEK ENDING _____	
Construction Activity		Goal	Material, Tools, and Equipment Required	Special Requirements	Remarks
Number	Description				

Figure 2-22.—Two-week schedule.

## MASTER ACTIVITY PREP LIST

Project Number \_\_\_\_\_  
Project Title \_\_\_\_\_  
Activity Number \_\_\_\_\_  
Activity Description \_\_\_\_\_  
Early Start Date \_\_\_\_\_  
Late Finish Date \_\_\_\_\_  
Estimated Duration \_\_\_\_\_

Resource check to be completed by the crew leader prior to commencement of work: (Y/N)

Have the construction methods been clearly described on the CAS sheets? \_\_\_\_\_

Are all the materials estimated on the CAS sheets on site, stored properly and in compliance with the plans and specifications? \_\_\_\_\_

Have required shop drawings been prepared? \_\_\_\_\_

Has the equipment listed on the CAS sheets been reserved? \_\_\_\_\_

Are the tools listed on the CAS sheets on site or being reserved? \_\_\_\_\_

Is the safety equipment/personal protective gear listed on the CAS sheets on site or reserved? \_\_\_\_\_

Briefing of crew to be completed by the crew leader prior to commencement of work: (✓)

Discuss all required tests and inspections \_\_\_\_\_

Establish levels of quality for each element of the work \_\_\_\_\_

Discuss all other pertinent parts of the specifications \_\_\_\_\_

Discuss each individual's job and establish specific measures of performance \_\_\_\_\_

Define each crew member's responsibility and authority \_\_\_\_\_

Clearly outline the sequence of work activities \_\_\_\_\_

Discuss all safety requirements from the CAS sheets and instruct crew members in the proper use of safety equipment \_\_\_\_\_

Stress the importance of good housekeeping \_\_\_\_\_

Figure 2.23—Master activity prep list.

## REGAINING THE SCHEDULE

Many unanticipated problems appear during the execution of your tasking. All of these problems will likely have at least some impact on the schedule. Finding yourself 1-2 percent or several days behind schedule is not a catastrophe. But you will need a plan to get back on track and regain the schedule. There are nearly limitless possibilities for solving the problems and regaining the schedule.

### Better Methods

Often there are faster methods of construction than the ones you originally planned or are currently using. If you are behind, a quick scan of the CAS sheets' upcoming activities might reveal an opportunity to shave some man-days by changing methods. Better equipment frequently results in less time being expended. For an underground pipe job, renting a trencher would save many man-days over using the backhoe. Better methods and equipment are tied to the availability of project funds. Consult others in identifying man-day saving alternatives, and remember to "work smarter, not harder."

### Increase Effective Workday

Obviously, by skipping quarters every morning you could get another 20 minutes of work out of your crew. But it is not likely your chain of command will find that to be an acceptable method of increasing the workday. Another way of getting more hours out of the same number of people is to increase your actual availability. Remember, for planning purposes you used a site specific factor that was somewhere between 0.75 and 0.85. You can calculate the actual availability factor for the project using the following formula:

$$AF = \frac{MD \text{ expended}}{Crew \text{ assigned} \times WD \times MDE}$$

To determine an actual availability factor you need to know the size of the crew assigned, the man-days they expended over a certain period, and the number of workdays in that period. If the actual availability is low (below 0.75), you may want to consider permanent changes to the daily crew routine (haircuts, paychecks, liberty, gedunk runs, and such) to increase availability. Even if your availability is average you can increase it for a short time to get back on schedule. Work with your chain of command to coordinate dental appointments, disbursing problems,

page twos and other things that take crew members away from the jobsite. Increasing availability by 10 percent has the same effect as adding another member to your crew.

### Phasing of Activities

Projects are usually laid out initially on a logic diagram using nearly all finish-to-start logic relationships. This has the effect of stretching project duration and reducing required crew size. It also leaves plenty of opportunity to compress the schedule by working several activities at the same time. You may be able to squeeze a few days out of your schedule by splitting your crew and having some of them work on the next activity. To make any real gains on your schedule you will probably need additional people. If you present your chain of command with a plan designed to get back on track, you could get those additional crew members temporarily.

## MEETING THE SCHEDULED PROJECT COMPLETION DATE

After the 45-day review, project schedules are firm. The battalion is committed to meeting the scheduled project completion dates. As soon as the crew leader feels the completion date is no longer within reach, the chain of command must be informed. If the company staff cannot get the project on schedule, the Ops officer should be informed. The customers are counting on getting the facilities delivered on the scheduled date, and delays may have a big impact on their plans. Delays may also impact on the schedules of the follow-on battalion.

## EFFECTIVE MANPOWER UTILIZATION

In maintaining project schedules, crew leaders must make effective use of personnel assigned to them. An established policy for mid-watch sleep-ins and a means for getting them to the job at the correct time must be coordinated. Many of the paper work problems can be handled by the company staff/chain of command. Use them to help your crew members get their problems solved and minimize time lost. People are either involved in productive work or they are not. It is the crew leader's responsibility to keep the crew productively employed. To maximize productive output, the crew leader must remove obstacles to productive work. Look at some potential time-wasters and consider how you could best increase the productive output of the crew.

After morning quarters, crews should be able to get on a crew truck and depart for the project site with no further delay. Crews should not return to the barracks or the galley after quarters. Any tools or materials to be used up that morning should be drawn and loaded on to the crew truck before quarters. Turning in 1250-1s for materials and tools several days in advance will greatly reduce the time spent drawing them from MLO/CTR. Tools requiring safety checks should be dropped off the afternoon before and picked up in the morning. The hours of operation for MLO, CTR, and the other outlets should be addressed prior to deployment. It is very common to see MLO and CTR open an hour before quarters.

### Breaks

The frequency and duration of breaks are determined by the crew leader based on how strenuous the work is, the temperature, and other climatic factors. The crew should understand the daily break routine. Watch for people anticipating breaks, standing around 5 minutes before the break is scheduled, or waiting for the crew leader to announce it. You want the crew working until they are told to break. This can be a particular problem near lunchtime and the end of the workday. Similarly, the crew must be back “swinging hammers” immediately after the break concludes.

### Paydays

There are usually several options on locations and times for cashing paychecks. Find the shortest lines. Remember you are trying to minimize time lost. A common scenario is to knock off 2 hours early on paydays to get checks cashed and make an exchange run. If this tactic is used, be sure your crew does not abuse it.

### Medical/Dental

Try to schedule appointments for routine treatment/examinations first thing in the morning or at the end of the workday. If several members of your crew need to be seen for dental recall, try to get them scheduled together. Getting a group back to the jobsite will be easier than getting them back separately. Coordinate a transportation plan with other crews working in the same general location to get crew members left in camp back out to the jobsite.

The techniques used to evaluate the status of a project and compare the actual progress to the scheduled progress is referred to as **project monitoring**. To monitor a project's progress, crew leaders **must** master completing timecards, submitting SITREP input, figuring work in place (WIP), updating barcharts, and arranging project photos. This section of the chapter will explain the techniques used to monitor a construction project.

### TIMECARDS

Timecards are the most accurate way to record man-days being expended on a construction project. Timecards allow you to monitor the efficiency and accountability of your crew. It is imperative that timecards be filled out correctly since they are the basis of your SITREP input. Timecards are also the basis for historical data on the project, availability factors, P-405 estimates, and such. Daily Labor Distribution, COMTHIRDNCB-GEN 5300/1, is the form used when recording man-days expended.

### Crew Leaders

Crew leaders must prepare timecards each day that reflect man-days expended by all personnel assigned to them. Subcontractor crew leaders must use a timesheet (fig. 2-24) in lieu of the standard timecard. An additional copy of this timesheet can be made with a sheet of carbon paper, but in all other ways it is identical to the standard timecard. The sub crew leader must fill out the timesheet in duplicate while on the project. The timesheet reflects all subcontractor labor and is signed by both the prime and sub crew leaders. The prime keeps the copy and turns it in with the timecard for prime personnel. The sub turns in the original to the company timekeeper. This method allows the prime crew leader and the chain of command to monitor the effort being expended by the subs and the time being charged against the project. All labor should be recorded to the nearest half hour. Timecards must be maintained on file in the company office for the duration of the deployment.

### Productive Labor

Productive labor is man-days expended that directly contribute to the accomplishment of the battalion mission. This includes construction

Project # _____											Date _____				
Project Title _____															
Prime Company _____															
Sub Company _____															
<b>Prime/Sub Time Sheet</b>															
Sub Crew Assigned Rate/Name	Direct Labor Man-hours Expended by Master Activity											Indirect/Overhead/Other Man-hours Expended			
	10	20	30	40	50	60	70	80	90	100	Total				Total
Total															

Prime Crew Leader Signature \_\_\_\_\_ Sub Crew Leader Signature \_\_\_\_\_

Figure 2-24.—Prime/sub timesheet.

operations, military operations and readiness, disaster recovery operations, and training.

**Direct Labor**

Direct labor includes all man-days expended directly on assigned construction activity, either in the field or in the shop. Direct labor also includes any labor that contributes directly to the completion of the project. Direct labor must be reported separately for each assigned master activity.

**Indirect Labor**

Indirect labor is man-days expended to support construction operations, but that does not produce an end product in itself. Equipment maintenance and production of shop drawings are examples of indirect labor.

**Overhead Labor**

Overhead labor is man-days expended that must be performed regardless of the assigned mission.

**Military Operations and Readiness**

Military operations and readiness are man-days expended in actual military operations and unit embarkation. Operations and readiness man-days also include any planning and preparation necessary to ensure unit military and mobility readiness.

**Disaster Recovery Operations**

Disaster recovery operations is man-days actually expended during disaster recovery operations.

**Training**

Training is man-days expended for service schools, factory and industrial training, fleet-type

training, military training, and organized training conducted within the battalion.

**SITREP INPUT**

The battalion sends to 2ndNCB/3rdNCB monthly SITREPs that report on the progress of construction tasking. The accuracy of the SITREPs is a reflection of how well the crew leaders have documented labor expended on the projects (timecards) and the quality of the input provided by the crew leaders and the

companies. Figure 2-25 is an example of a SITREP feeder with information, calculations, and totals designed to help you create accurate reports.

**Weighted Percent**

The weighted percent for each master activity in figure 2-25 is simply the man-days estimated for that master activity divided by the total project man-days estimated. For master activity 60, rough utilities, the

**SITREP FEEDER**

Project Number _____							
Project Title _____							
Period Covered _____							
% Complete Scheduled _____							
Date _____							
			a	b	a x b		
Master Activity #	Description	Original MD Est	Weighted Percent	Master Activity & Comp (WIP)	Project % Complete	Man-days Remaining	Man-days Expended
10	Sitework	19	.04	100	4.0	0	22
20	U/S Utilities	30	.07	80	5.6	6	23
30	Found/Slab	35	.08	57	4.6	14	27
40	Walls/Canopy	115	.27	0	0	115	0
50	Roof	41	.09	0	0	41	0
60	Rough Util	29	.07	0	0	29	0
70	Exterior Fin	48	.11	0	0	48	0
80	Interior Fin	105	.24	0	0	105	0
90	Finish Util	12	.03	0	0	12	0
TOTALS		434	1.00	<del>X</del>	14.2	370	72
Comments:							

Figure 2-25.—SITREP feeder example.

man-day estimate was 29. When 29 is divided by 434 the answer is 0.07 weighted percent.

**Master Activity Percent Complete (WIP)**

Obviously, for master activities not started the WIP is zero percent and for completed master activities the WIP is 100 percent. For master activities that are partially complete, the crew leader must look at the status of the individual construction activities. Table 2-2 is expanded from figure 2-25 for master activity 30, foundation/slab.

In evaluating the progress on master activity 30 you can see that you have completed the prefab of the forms and the RST. These construction activities represent 17 and 20 percent of the master activity. For the set forms/RST activity you obtained the 50 percent complete by actual measurement. **Do not use man-days expended, for they have nothing to do with WIP.** In this case you measured and determined that one-half of the forms and RST have already been set. Set forms/RST represents 40 percent of the master activity, since you are half done you get credit for 20 percent. Add the 20 percent plus the previous 17 percent and 20 percent for a total of 57 percent completion for master activity 30.

**Project Percent Complete**

Project percent complete represents that portion of the work completed on the master activity that contributes to the overall project completion. You get the project percent complete by multiplying the weighted percent by the master activity percent complete (WIP) for each activity. Look at figure 2-25 master activity 20, underslab

utilities. The project percent complete was determined by multiplying the weighted percent of 0.07 times the percent WIP of 80 to get a project percent complete of 5.6 (0.07 x 80 = 5.6).

**Actual Percent Complete**

Actual percent complete for the project is the total of the project 90 complete column. For the example in figure 2-25 the actual percent complete for this project is 14.2 percent. You will need to record the scheduled percent complete at the bottom of the SITREP feeder. You need to compare the actual progress to the scheduled progress. The scheduled percent complete comes from either the Deployment Execution Plan (within the first 45 days of the deployment) or the Revised Deployment Execution Plan (after the 45-day review). The allowable percent deviation between actual WIP and scheduled WIP is shown in table 2-3.

If the actual WIP is less than the scheduled WIP by more than the percentage shown in table 2-3, the battalion must advise 2ndNCB/3rdNCB by message. This message must contain a plan detailing how to get the project back on track. It must also request approval for any required changes to the battalion level I or the project level II in the revised deployment execution plan.

**Man-days Remaining**

Man-days remaining area reflection of how much work remains to be done on the project. **Man-days remaining has nothing whatsoever to do with how many man-days have been expended.** For master activities that are complete (see master activity 10, fig. 2-25) the man-days remaining are zero. For master

Table 2-2.—Master Activity Percent Complete

<u>Construction Activity</u>	<u>Man-days Estimate</u>	<u>Weighted Percent</u>	<u>Percent Complete</u>	<u>Master Activity % Complete</u>	<u>Man-days Remaining</u>	<u>Man-days Expended</u>
Prefab forms	6	.17	100	17	0	8
Prefab RST	7	.20	100	20	0	7
Set forms/RST	14	.40	50	20	7	8
Place concrete	5	.14	0	0	5	0
Strip forms	3	.09	0	0	3	0
	<u>35</u>	<u>1.00</u>		<u>57</u>	<u>15</u>	<u>23</u>

Table 2-3.—Percent Deviation

<u>Total Project Man-day Range</u>	<u>Allowable % Deviation Btwn Actual WIP vs. Scheduled WIP</u>
0 - 1000 MD	10%
1000 - 2000 MD	5%
2000 & above MD	2.5%

activities not started, the man-days remaining will equal the original man-day estimate for that master activity. For master activities under construction you must calculate the completion status of each individual construction activity. Construction activities that are 100 percent complete has zero man-days remaining. Construction that has not begun has man-days remaining equal to the original man-day estimate. If a construction activity with an original estimate of 20 man-days is 25 percent complete, the man-days remaining is 15. There are 15 man-days remaining because 75 percent of the work is left to be done and  $75 \times 20/100$  equals 15.

**Man-days Expended**

Man-days expended have nothing to do with percent complete and are not included in the SITREP when it leaves the battalion. It is included on the SITREP feeder so the company staff and the Ops department can see where your man-days have gone. The man-days expended may be used for insight into why a particular project is behind. The total man-days expended is also needed to update the level II with actual progress and cumulative man-days expended.

**Comments Lines**

The SITREP feeder also has several lines for comments. This is for the crew leader's draft input for the SITREP. The battalion must include in its SITREP brief comments describing work performed since the last SITREP. Remember, if the actual WIP is less than the scheduled WIP, the delay must be explained and a plan for getting the project back on schedule must be included.

**SITUATION REPORT (SITREP)**

With the information from your SITREP input, the battalion can now formulate the situation report. A message SITREP must be submitted monthly by the battalion within 3 workdays after the last day of each month. The report includes all tasked projects listed in increasing numerical sequence. Once construction has started on a project, the project is considered as active and is not removed from the report until such time as the project has been accepted as totally complete by the RO1CC. Once a project has been completed, and a UCD/BOD (usable completion date/beneficial occupancy date) has been established, it may be deleted from future reports.

**Project Status Summary**

All SITREPs include a project status summary by location. This summary provides project WIP, remaining project man-days, and completion date percentage data. The status summary also contains a brief description of the work accomplished during the reporting period for each project. Each location must be detailed as a separate subparagraph. For projects for which no work was accomplished during the reporting period, the master activities status and activities reporting lines may be shown as no report. However, when no work is accomplished, the reason for a no work status must be adequately explained in the comments lines as part of the status explanation.

**Change of Usable Completion Date (UCD)**

During the home port planning process, 2ndNCB/3rdNCB will discuss UCDs with the battalion as required. This discussion ensures that applicable information is considered when



# NCF LEVEL II

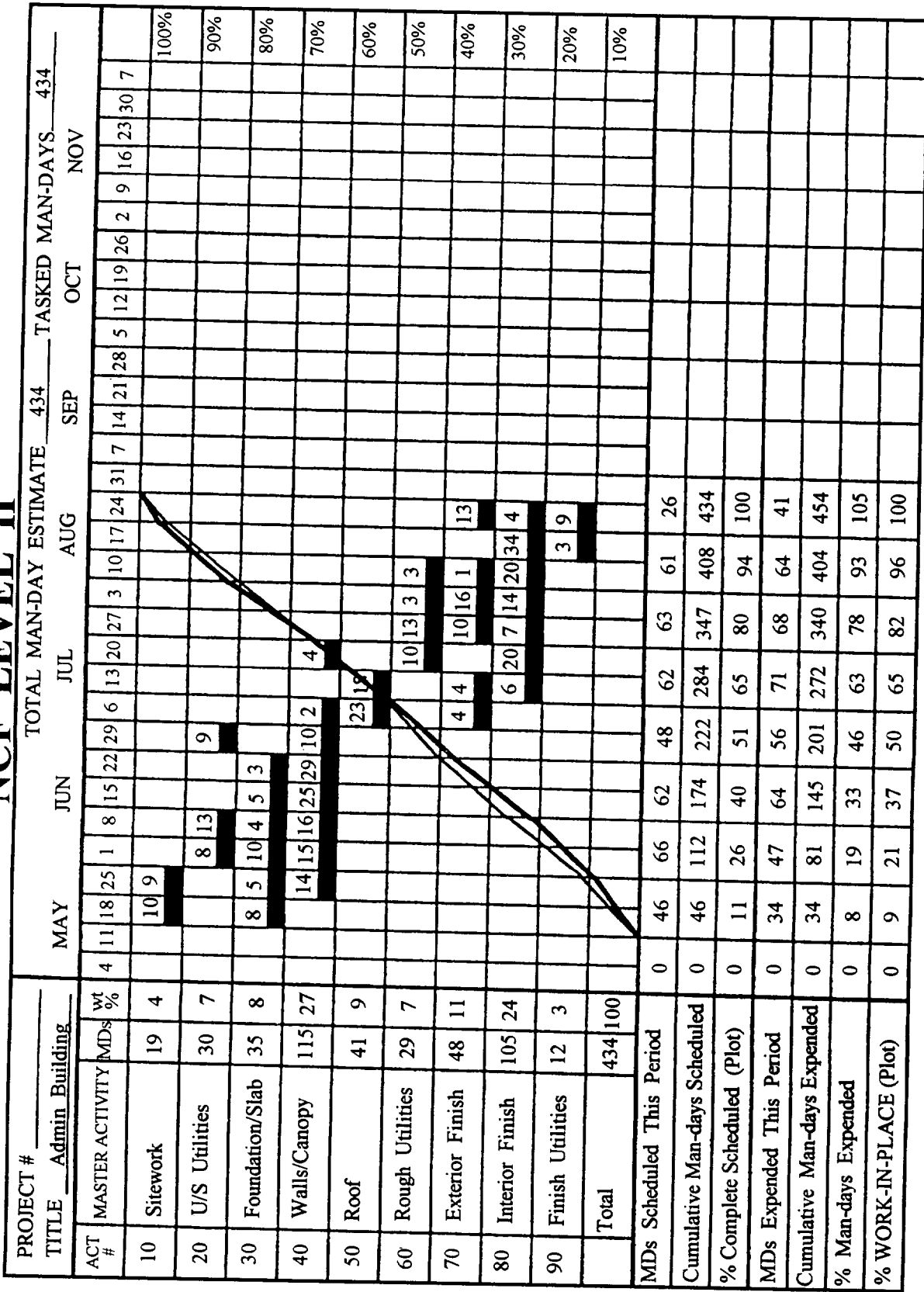


Figure 2-26.—Level II barchart with progress curve.

establishing the UCD. UCDs, except for specific projects with critical completion dates, are established by the battalion. When delay of a UCD becomes necessary, the battalion must advise 2ndNCB/3rdNCB in writing of the cause and estimated duration of the delay. The UCD reflected in the SITREP, however, shall not be adjusted until approved by 2ndNCB/3rdNCB. When adjusting UCDs, the battalion takes appropriate action to ensure that only the minimum number of UCDs are affected by the delay.

**BARCHARTS**

Barcharts are used to plot and track your progress as you work your project. They graphically show you if you are ahead, behind, or on schedule. Barcharts help you track how well you are doing against what you had planned. At the end of each month you need to update your level II barchart with the actual man-days expended and percent completed. To plot these figures, you need to total the man-days expended for direct labor (from your time cards) and obtain the percent complete from the SITREP. To make a progress curve you just connect the dots. If the progress curve is above the planned progress curve, your project is ahead of schedule; if below, you are behind. As previously stated, man-days expended have nothing to do with percent complete. However, a rough comparison can be made between the man-days expended as a percent of the total man-day estimate versus the scheduled percent complete. A large variation in these numbers indicates a problem. Figure 2-26 is a level II with an actual progress curve and cumulative man-days figures. This illustration shows all the information plotted through the end of the project.

**PHOTOGRAPHIC COVERAGE**

The battalion shall provide to 2ndNCB/3rdNCB on a monthly basis at least two color slides of each active project. These slides must arrive not later than the fifth of each month. Vantage points are chosen

based on the broadest coverage. The same view should be used for slides taken during the following months. Consistency in vantage points and view help show sequence of construction. Include slides/prints of working crew members and major construction evolutions that depict Seabees in action. It is the crew leader's responsibility to produce photographic proof of the project's progress. Be sure the slides/prints show a commitment to a quality product, teamwork, and zero safety violations.

**SAFETY**

The battalion safety office is not responsible for safety on your jobsite. **YOU ARE!!!** According to the *NCF Safety Manual*, COM2NDNCB/COM3RDNCB-INST 5100.1 series, the battalion safety office administers the battalion safety program and provides technical guidance. It is the crew member, the crew leader, the project supervisor, the company chief, the company commander, the Ops officer, and the commanding officer who are 100 percent responsible for safety on the jobsite. If you have any questions concerning safety on the project, the battalion safety office is a good place to get your questions answered. It is not the responsibility of the safety office to prevent you from doing something you know or suspect is unsafe. They do not have the staff to be present on the jobsite at all times. Safe construction is your responsibility, and ignorance is no excuse. It is your responsibility to find out how to do construction in a safe manner.

**MISHAP PREVENTION**

The goal of our safety program is to prevent mishaps. Seabees do not use the word *accident* because it implies the absence of fault (accidents happen). Mishaps most commonly result from failure to follow safe construction practices. Consider an activity to replace the deck on a marina pier. Follow the seven-step process in figure 2-27 to see how you can best avoid a mishap.

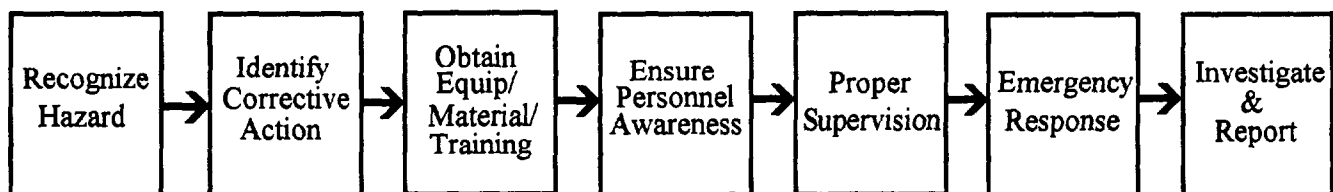


Figure 2-27.-Seven steps to avoid a mishap.

## Recognize Hazards

Begin by recognizing that construction is a dangerous business. The potential for death or serious injury is present daily on jobsites. Identify very specifically what hazards could cause death or injury. One obvious hazard in the pier example is drowning.

## Identify Corrective Action

Our primary reference for preventive measures is the *U.S. Army Corps of Engineers Safety and Health Requirements Manual*, EM 385-1-1, October 1992. The table of contents, section 5, addresses work near water. In chapter 5, specific requirements for work safety near the water include the following:

- A U.S. Coast Guard-approved international orange personal flotation device (PFD) type III, type V, or better vest must be provided to and worn by persons on structures extending over or adjacent to water unless guardrails or safety nets are in place.
- The PFD must be inspected for defects before and after each use.
- Ring buoys, conforming to 46 CFR 160 (U.S. Coast Guard-approved), with 90 feet of 3/8-inch solid braid polypropylene (or equal) attached, must be provided at intervals of not more than 200 feet on piers extending over or immediately adjacent to water.
- At least one equipped skiff must be immediately available at locations where employees are working over or immediately adjacent to water.
- Personnel trained in launching and operating the skiff must be readily available during working hours.

## Obtain Equipment/Material/Training

The Ops department and safety office will provide assistance in obtaining the PFDs, the buoys, and the skiff. The customer may be persuaded to provide unavailable equipment, or the equipment will have to be purchased/rented using project funds. Training for the crew in operating the skiff maybe required and the Ops and training departments will assist in setting up this training.

## Ensure Personnel Awareness

Use the daily 5-minute stand-up safety lecture to ensure the crew understands the proper use and purpose of the safety equipment and the locations of the buoys and the skiff. Safety lectures must address all hazards identified on the CAS sheet for work scheduled that day. Remember to inspect the PFDs before and after each use.

## Proper Supervision

The crew leader is responsible for ensuring that personnel wear PFDs at all times while on the pier.

## Emergency Response

To be sure that an emergency response is not delayed, the location of the nearest phone, a map showing the nearest medical facility or first-aid station, and all emergency phone numbers must be posted on the jobsite.

## Investigate and Report

Any mishap (regardless of how minor) or near miss must be investigated and documented. Documentation helps minimize the chance that an incident will happen again. Figure 2-28 is the form used for the supervisor's report of injury.

## SAFETY RESPONSIBILITIES

The safety responsibilities for various levels in the chain of command are listed in the *NCF Safety Manual*.

### Crew Leader's Responsibilities

Crew leaders and other supervisors are identified in the *NCF Safety Manual* as the key people in a successful and aggressive safety program. The *NCF Safety Manual* lists but is not limited to the following responsibilities:

- Being familiar with safety rules and regulations for jobs and facilities in his/her area, and acting in a safe manner.
- Enforcing safety rules and correcting unsafe acts.
- Inspecting jobs and work areas for hazards and taking corrective action.

# SUPERVISOR'S REPORT OF INJURY

Name of injured: \_\_\_\_\_

Injury date: \_\_\_\_\_ Time: \_\_\_\_\_

Number of light duty days: \_\_\_\_\_

Nature of injury: \_\_\_\_\_

Where and how did the accident occur? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Unsafe act or condition: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Measures taken to prevent a similar type of accident: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
Crew leader

\_\_\_\_\_  
Date

Figure 2-28. Supervisor's report of injury.

- Educating and training personnel in safe work procedures and rules.
- Reporting all mishaps and near-mishaps to the safety office promptly.
- Ensuring personnel that need medical treatment receive prompt care.
- Investigating all mishaps in his/her area, determining basic causes, taking corrective action, and requesting assistance from the safety office when necessary.
- Reviewing safety and health records of employees and facilities in his/her area as required.
- Taking corrective action on reported hazards and protecting employees from reprisal of hazard reporting.
- Ensuring that correct personal protective equipment is provided to personnel and that they wear and maintain the equipment properly.
- Obtaining advice and assistance from the safety office in the positive implementation of the NAVOSH program.
- Knowing the limitations of subordinate personnel and avoiding hazardous job assignments to personnel who are not physically and/or mentally capable of safely performing work assignments.
- Removing from service any defective machinery, material, or tools until repairs can be made to assure safe operation.
- Posting appropriate safety precaution signs in conspicuous areas near or on equipment, material, stowage areas, and other designated hazards or hazardous areas.
- Understanding and adhering to safety and health precautions applicable to their work and work areas.
- Reporting to their immediate supervisor any unsafe conditions including unusual or developing hazards or any materials that may be considered unsafe.
- Cautioning those who may be endangered by suspected, known, unusual, or developing hazards.
- Reporting to the immediate supervisor any mishap, injury, or evidence of impaired health.
- Using all protective equipment and/or clothing of the type required, approved, and supplied for the safe performance of the task at hand.
- Ensuring that clothing worn is appropriate for work assigned. Jewelry or loose scarves shall not be worn when they subject the individual to a potential hazard.
- Ensuring that hair and beards are suitably restrained around hazardous machinery and open flames.

### **Crew Member's Responsibilities**

Crew leaders should ensure that each crew member understands the responsibilities listed in the *NCF Safety Manual*.

- Knowing, understanding, and complying with the safety rules and regulations applicable to their assigned work and work area.
- Reporting to the work site rested and emotionally prepared for the task at hand.

### **PROJECT SAFETY PLAN**

For each construction activity, all identified hazards and corrective actions are listed on the back of the CAS sheet. The safety plan (fig. 2-29) lists the hazards and corrective action from the back of the CAS sheets. A cover sheet (fig. 2-30) for the safety plan summarizes the training and equipment required for review by the chain of command. The project safety plan must be posted on the jobsite. A daily jobsite safety inspection (fig. 2-31) is performed by safety office personnel.

### **STAND-UP SAFETY LECTURES**

The key to mishap prevention is personnel awareness. Personnel awareness is the purpose of the daily stand-up safety lecture. Use the form in figure 2-32 to document the daily stand-up lectures. It is **not** enough to anticipate the hazard and provide protective equipment. The crew leader must ensure that the crew is properly trained and motivated to use the equipment properly. If the corrective action includes specific procedures or methods, the crew leader must make sure those procedures are followed **every** time. Never let a member of your crew get lackadaisical! Make

## SAFETY PLAN

PROJECT NUMBER \_\_\_\_\_ PROJECT TITLE \_\_\_\_\_ DATE \_\_\_\_\_

ACTIVITY NUMBER	ACTIVITY DESCRIPTION	HAZARD	REF.	ACTION REQUIRED	PAGE NUMBER

**Figure 2-29.-Safety plan.**

sure the crew knows the safe way to perform the task at hand, and then accept nothing less than 100 percent compliance. Working safely 99.9 percent of the time is **not** enough. One shortcut can kill!

**SAFETY TRAINING**

The following safety training is required by the *NCF Safety Manual* for the identified crew personnel.

**NCF Supervisory Safety Course**

There is a 40-hour course taught by Naval Construction Training Center (NCTC) or the battalion safety chief. Attendees are familiarized with the safety program, the use of safety manuals, identification of construction hazards, and the inclusion of safety in project planning. All E5-E7 personnel in line companies and detail, all project safety representatives, and all crew leaders are required to attend.

**Hazard Recognition/Mishap Prevention Course**

A 16-hour course taught by the battalion safety chief familiarizes working level personnel with common hazards and safe work practices. Project safety representatives and crew leaders who have not attended the NCF Supervisory Safety Course are required to attend this course.

**ELECTRICAL SAFETY**

All jobsite electrical supplies are considered to be temporary power sources. Even existing outlets in buildings being renovated are temporary power sources. All temporary power sources must be inspected, certified as safe, and tagged with the inspector's name, company, and date before first use. Recertifications are required every 2 weeks thereafter. Ground fault circuit interrupters (GFCIs) must be used with all power tools, whether double insulated or not.

**COVER SHEET FOR PROJECT SAFETY PLAN**

- I. Project Name and Number
- II. Project Location
- III. Prime Contractor  
Sub-Contractors (a)  
(b)
- IV. Project Scope
- V. Type of Inherent Risks (electrical, welding, etc.)
- VI. Type of Associated Risk (fire, fumes, noise, etc.)
- VII. Special Training Requirements
- VIII. Special License Required
- IX. Engineering Controls (guard rails, welding curtains, etc.)
- X. Special Safety Equipment Required (state how it is to be used)
- XI. Personal Protective Equipment Required
- XII. Safety Standards/Restrictions Pertaining to Project Scope

Project Planner: \_\_\_\_\_  
Print name, rate and company/det

Safety Chief: Approved/Disapproved \_\_\_\_\_  
Signature

Reason for disapproval \_\_\_\_\_  
\_\_\_\_\_

Figure 2-30.-Cover sheet for project safety plan.

<b>SAFETY INSPECTOR'S REPORT</b>		Report No.		
		Route to:	Initial	Date
Date	Time	Project No.		
Prime Co.		Project Title		
Sub Co.		Weather		
Crew leader		Inspector		
				Yes No
				Yes No
1. Safety lecture given (subject)	<input type="checkbox"/>	<input type="checkbox"/>	12. Welding	<input type="checkbox"/>
2. GFI protection on project	<input type="checkbox"/>	<input type="checkbox"/>	13. Monthly PM for elect. tools	<input type="checkbox"/>
3. Personal protective equipment in use?	<input type="checkbox"/>	<input type="checkbox"/>	14. Electrical boxes	<input type="checkbox"/>
4. Fire Extinguishers	<input type="checkbox"/>	<input type="checkbox"/>	15. Tool storage area	<input type="checkbox"/>
5. Flammable liquid stored properly	<input type="checkbox"/>	<input type="checkbox"/>	16. Hand tools (saw, chisel, etc.)	<input type="checkbox"/>
6. First-aid kits on project	<input type="checkbox"/>	<input type="checkbox"/>	17. Excavation (shoring, permits)	<input type="checkbox"/>
7. Good housekeeping	<input type="checkbox"/>	<input type="checkbox"/>	18. Hard hats worn	<input type="checkbox"/>
8. Ladders - safe condition & use	<input type="checkbox"/>	<input type="checkbox"/>	19. Crew leaders using safety plan	<input type="checkbox"/>
9. Scaffolding - safe condition & new	<input type="checkbox"/>	<input type="checkbox"/>	20. Open floor holes covered	<input type="checkbox"/>
10. Portable radial saw condition	<input type="checkbox"/>	<input type="checkbox"/>	21. Wall openings guarded	<input type="checkbox"/>
11. Area sanitation	<input type="checkbox"/>	<input type="checkbox"/>	22. Tripping hazards present	<input type="checkbox"/>
23. Other				
<b>CRANE SAFETY</b>				
1. Who inspected the rigging used for lift (required daily)?				
2. Are the proper barriers in place behind the crane?				
3. Are tag lines used on the load?				
4. Is the crane certified (check with the operators)?				
5. Who is the crane director?				
<b>SAFETY HAZARD</b>			<b>ACTION TAKEN</b>	
Note: Action taken on repeat discrepancies must be submitted in writing to the safety office within three working days after receiving report				
_____ Safety Inspector			_____ Crew leader	

Figure 2-31.-Safety inspector's report.



From: Crew Leader Project No. \_\_\_\_\_

To: Battalion Safety Chief

Subj: DAILY FIVE-MINUTE SAFETY LECTURES FOR THE DATES \_\_\_\_\_ THROUGH \_\_\_\_\_

Date	Topic of Safety Lecture	Instructor	Location	Rates	Number of Men

Figure 2-32.—Daily stand-up safety lecture form.

All electrical portable tools, extension cords, small gasoline, pneumatic, and power-actuated tools (including those borrowed from other units) must be inspected monthly and tagged with the safety color of the month. Equipment or circuits that are de-energized shall be tendered inoperative and have tags attached at all points where such equipment or circuits can be energized. Refer to 29CFR1910. 147 and ANS1 Z244.1 for lockout/tag-out procedures.

**ASBESTOS OPERATIONS**

Asbestos removal is not normally conducted by NCF personnel. COM2NDNCB/COM3RDNCBINST 5100 series gives detailed guidance on NCF asbestos policy and procedures.

**RESPIRATORY PROTECTION**

All of the following requirements must be met prior to the use of respirators:

- Correct equipment identified by the local Respiratory Protection Program manager
- Medical evaluation of potential users
- Fit test performed by competent personnel
- Respiratory protection training for all potential users
- Written standard operating procedures (SOPs) developed for the work site, including emergency and rescue guidance, and posted on the jobsite

**SHORING**

The following excerpt is taken from the EM 385-1-1:

Banks more than 5 feet high shall be shored, laid back to a stable slope, or provided with other equivalent protection where employees may be exposed to moving ground or cave-ins.

Trenches less than 5 feet in depth shall also be protected when examination of the ground indicates hazardous ground movement may be expected. The safe angle of repose for soil conditions and bracing systems shall be determined by a qualified person.

Refer to the EM 385 for specific details. All excavations must follow 29CFR1910.28, OSHA Standards.

## SCAFFOLDING

Here is a general listing of scaffolding requirements (for a complete list see the EM 385 and 29CFR1910.28):

- Scaffolds or platforms are required for all work that cannot be done safely from the ground.
- Work requiring lifting of heavy materials or substantial exertion cannot be done from ladders.
- Scaffolds must be kept clear of ice, snow, grease, mud, and such.
- All scaffolds and walkways must be at least 18 inches wide.
- Ladder jacks, lean-tos, and prop scaffolds are prohibited.
- Scaffolds must be placed on a firm, smooth foundation and may not be placed on loose bricks, blocks, or other unstable objects.
- Nails must be driven full length; double-headed nails are not allowed.
- Planking must be lapped at least 12 inches.
- The EM 385 and 29CFR1910.28 list the correct dimensions and type of scaffold material.
- A scaffold in excess of 6 feet in height (4 where horizontal dimension is less than 45 inches) requires standard railing on open sides and ends.

## SAFETY ITEMS REQUIRED ON THE JOBSITE

The following safety equipment is required on all project sites. See the EM 385 for additional information.

1. **Emergency Plans**— Each jobsite must have posted the location of the nearest phone with the telephone numbers and reporting instructions for ambulance, hospital, physician, police, and fire department personnel.
2. **First-Aid/CPR Qualified Personnel** — If a medical facility is not readily accessible (due to time or distance), two crew members must be first-aid and CPR qualified.
3. **First-Aid Kits**— There must be one kit for every 25 or less personnel, and it must be checked weekly for consumed items.
4. **Toilet Facilities**— If toilet facilities are not readily available, portable facilities must be provided.
5. **Drinking Water**— Water must be provided from an approved source. It must be labeled for drinking only and not used for other purposes. Common cups are not allowed.
6. **Temporary Fencing**— If the jobsite is in an area of active public use, temporary fencing is required.
7. **Warning Signs**— Post red for immediate hazards and yellow for potential hazards.
8. **Eyewash Facility** — Where personnel are exposed to or handling poisons, acids, caustics, or toxic chemicals, eyewash facilities are required.
9. **Fire Extinguishers** — There must be one approved fire extinguisher for every 3,000 square feet (or major fraction thereof) of building space with at least one per floor.
10. **Material Safety Data Sheets** — This paper work is required for any hazardous material on the jobsite.
11. **Safety Manuals**— Both the EM 385 and 29CFR1926 are required to be kept on the jobsite.

## PROJECT CLOSEOUT

This section will assist the crew leader in completing operational and administration steps when the project comes to a close. This section also will assist you with the preparations for your final inspection.

**TOOL, EQUIPMENT, AND MATERIAL TURN-IN**

The crew leader must ensure the jobsite is clean! All tools, excess material, and civil engineering support equipment (CESE) must be properly **cleaned**, inventoried, and returned to the proper outlet. Tools

and tool kits returned to CTR must be inventoried with 1250-1s filled out for any missing or broken items. Turn all material into MLO using a 1250-1 filled out in red ink with the appropriate bill of material line item number. Project material as well as tools purchased with project funds must be offered to the customer prior to being considered "excess."

<b>PRE-BOD INSPECTION REQUEST</b>		
Project No:	Crew leader:	Date:
This inspection is conducted prior to the final acceptance (BOD) inspection. This "pre-BOD" inspection is conducted jointly with battalion and ROICC representatives and is intended to identify any corrective steps necessary prior to customer occupancy.		
Requested Date:	Time:	Requested by: (name/rate)
The following checklist shall be completed by the crew leader and forwarded to QC two working days prior to the requested date of the inspection. The crew leader should use the following checklist as guide but the pre-BOD inspection will not be limited to these items.		
<b>SITework</b>		crew leader init.
Final Grading (Grassing)		
Disposal of all Trash		
Sidewalks		
Curbs & Paving		
Lights		
<b>MECHANICAL</b>		
Installation of Piping, Fixtures and Equipment		
Application of Insulation and Hangers		
Sterilization (Water System)		
Shop Drawings		
Water Supply Test		
Gas & Oil Piping		
Heating and Cooling Units		
Duct Work		
Thermostat Controls		
Registers		
Exhaust Fans and Hoods		
Manufacturers' Catalogs		
Working Test (Boilers)		
<b>ELECTRICAL</b>		
Manufacturers' Catalog		
Test All Lights		
Test Fire Alarms		
Telephone Hook-up		
Main Panel Box (All Breakers Labelled)		
<b>CONCRETE &amp; MASONRY</b>		
Joints		
Cracks		
<b>STRUCTURAL STEEL</b>		
Touch-up Paint		

Figure 2-33.—Pre-BOD inspection request (page 1).

**AS-BUILT DRAWINGS**

During construction, the crew leader must keep all prints updated and every 2 weeks check with the engineering department to make sure they are making the same updates. At the close of the project, the battalion is required to turn in two sets of as-built

(red-line) drawings to the ROICC. These drawings show how the project was actually constructed.

**PRELIMINARY ACCEPTANCE**

At the completion of your project use the pre-BOD checklist (fig. 2-33, page 1, and fig. 2-34, page 2) to

<b>HARDWARE</b>		Crew leader init.
Closet		
Bathroom Accessories		
Door Hardware		
Gate Hardware		
Miscellaneous Hardware		
<b>DOORS &amp; WINDOWS</b>		
Clean		
Fit		
<b>FINISHES</b>		
Acoustic Tile		
Ceramic & Quarry Tile		
Floor Covering		
Painting		
Plastering		
<b>FURNISHINGS</b>		
Fabrication		
Installation		
<b>GENERAL</b>		
Project Package Up to Date		
As-Builts Completed		
Site Clean		
Excess Material Turned-in		
<b>REMARKS</b>		
Crew leader		QC Inspector

Figure 2-34. Pre-BOD inspection request (page 2).

make sure your project is ready. Arrange, through your QC staff, for a preliminary acceptance inspection with the ROICC. After this inspection, the battalion will take the necessary actions to complete any punchlist items. The battalion will complete these items as soon as possible. The punchlist should be provided in writing from the ROICC following the inspection similar to figure 2-35.

## FINAL ACCEPTANCE

In most cases the project will not be turned over to the customer until all of the punchlist items have been completed. When all of the punchlist items have been completed, the crew leader will arrange through the QC for a final inspection with the ROICC and a customer representative. There should be no punchlist at this

<b>COMMAND LETTERHEAD</b>	
	Date:
<b>MEMORANDUM</b>	
From: ROICC	
To: NMCB	
Subj: Project XXX-XXX	
1. A preliminary inspection was conducted at 1500H on 30 January 1994 for the subject project. The following personnel were present:	
2. As a result of the inspection, the following discrepancies were noted:	
_____ Signed	
Copy to: 2nd NCB/3rd NCB	

Figure 2.35.-Punchlist from ROICC.

inspection. If there are no discrepancies, beneficial occupancy is established upon completion of the final inspection and the 1-year warranty takes effect. At this time, the battalion prepares a letter to the ROICC advising that the project has been completed. This transfer letter shall include two sets of as-built drawings, all installation, operation, maintenance, and other technical service manuals, including parts catalogs.

The transfer letter also must include a statement of actual material cost and statistical labor costs. Figure 2-36 is a sample of the transfer letter. If the ROICC did not include 2ndNCB/3rdNCB on the distribution of their acceptance letter, the battalion will forward a copy. The ROICC acceptance letter is placed in the project files. The project files are then closed and retained for 2 years.

<b>COMMAND LETTERHEAD</b>	
<b>DATE:</b> _____	
<b>From:</b> NMCB <b>To:</b> ROICC  <b>Subj:</b> PROJECT XXX-XXX	
1. A final inspection was held for subject project on (date) with the following personnel in attendance:	
<b>NAME</b>	<b>ORGANIZATION</b>
_____	_____
_____	_____
_____	_____
_____	_____
2. As no discrepancies were noted during the final inspection, NMCB___'s tasking is hereby considered complete. The one year warranty commenced (same date as inspection).	
3. As-built drawings and maintenance manuals for installed equipment are provided as enclosures ( ) through ( ).	
4. The total material cost was & ___ and the total labor cost was \$ ___.	
_____ <b>BATTALION REPRESENTATIVE</b>	

Figure 2-36.-Project transfer letter.



## CHAPTER 3

# CONSTRUCTION MANAGEMENT

*LEARNING OBJECTIVES: Identify the techniques used in developing a quality control program for projects; the methods used in tracking project materials and equipment through home port and on deployment; and the importance of maintaining accountability of project money, materials, and equipment. Recognize the need and requirements for jobsite management.*

### QUALITY CONTROL

The main purpose of the quality control program (see 2ndNCB/3rdNCBINST 4355.1C) is to prevent discrepancies where the quality of the workmanship and the materials fail to match the requirements in the plans and specifications. The responsibility for quality construction rests with the crew leader and the chain of command. The quality control division of the operations department as described in chapter 2 is responsible for conducting tests and inspections to ensure compliance with the plans and specifications. The crew leader must plan quality into the project. Quality planning avoids discrepancies found by the quality control (QC) inspectors while performing their inspections. Each discrepancy identified by the QC inspector represents a failure in the crew leader's QC plan.

### ENSURING QUALITY

The crew leader is responsible for developing an aggressive QC plan for each project. An aggressive QC plan guarantees that the quality of the construction meets the standards in the plans and specifications. The development and implementation of a QC plan can be broken down into steps.

#### Establish Quality Measures

The first step in ensuring quality is to establish the means of measuring QC progress. The crew leader must review the plans and specifications and identify the required quality criteria. For reinforcing steel, the quality criteria would be the size, the placement, the anchoring, and the distance lapped. Quality measures must be specific (for example, the specifications may require that rebar be at least 1 1/2 inches from inside of forming and that rebar must be lapped 24 inches at splices). QC measures are to be listed in "plain language" on the CAS sheet. These measures are then

transferred to the QC plan. The crew leader, QC rep, and resident officer-in-charge of construction (ROICC) inspector should agree in advance on how the various tests are to be performed and exactly what the requirements are. For example: If laying asphalt 2 inches thick, how is it to be measured, with a poker device or with a string line and a tape measure? If laying block and the requirement is within 1/4 inch plumb within 10 feet, will this be measured with a string line, level, or some other method? Figures 3-1 and 3-2 are samples of project QC plans.

#### Select Construction Methods

The second step in ensuring quality is the proper selection of construction methods that are essential to safe, quality construction. Construction methods must be determined very early in the planning stage of the project as they impact on equipment, tools, material, labor, training, and safety requirements. Construction methods selected in the planning stage will also, to a great extent, determine the quality of the finished product. Commonly accepted construction practices have resulted from people doing the same work for many years. They are usually the most effective way to accomplish safe, high-quality work. Use these accepted practices where you have the skills and equipment to do so. Discuss methods with your crew, your chain of command, and the QC inspector if you have any doubts about the value or safety of these practices.

#### Identify Required Training and Equipment

The crew leader must be aware that many activities require specialized training or qualifications. Some activities, such as welding certifications or cable splicing, may only be satisfied through formal instruction. Formal training for a great many activities is simply impractical. It is frequently necessary to



**PROJECT QC PLAN**

- I. Project Name and Number
  
- II. Project Location
  
- III. Prime Contractor  
Sub-Contractors (a)  
(b)
  
- IV. Project Scope
  
- V. Type of Testing Required (Soil, Concrete, etc.)
  
- VI. Type of Associated Risk (fire, fumes, noise, etc.)
  
- VII. Special Training Requirements
  
- VIII. Special License Required
  
- IX. Engineering Controls (guard rails, welding curtains, etc.)
  
- X. Testing Equipment Required (state how it is to be used)
  
- XI. Personal Protective Equipment Required for Testing

Project Planner: \_\_\_\_\_  
Print name, rate and company/det

QC Chief: Approved/Disapproved \_\_\_\_\_  
Signature

Reason for disapproval \_\_\_\_\_  
\_\_\_\_\_

Figure 3-1.—Project QC plan cover sheet.

# QUALITY CONTROL PLAN

PROJECT NUMBER \_\_\_\_\_ PROJECT TITLE \_\_\_\_\_ DATE \_\_\_\_\_

ACTIVITY NUMBER	ACTIVITY DESCRIPTION	QUALITY CONTROL REQUIREMENT	SPECIFICATION REFERENCE	REMARKS/RESULTS

**Figure 3-2.-QC plan.**

identify the skills required and find alternate sources of training. The most common source of informal training is on-the-job training (OJT). Use OJT when you can identify at least one person who knows how to perform the task correctly (yourself, a crew member, a QC rep, or such) and schedule enough time to show the remaining crew the proper technique. Remember that one purpose of projects is to provide training for our people. Teaching your crew the proper methods and techniques should be high on your list of priorities. Besides the required training, required equipment must also be available to accomplish the task according to the method selected. Finishing a large concrete pad without the use of a power trowel (whirly-bird) might prove to be difficult. Renting one with project funds maybe an option if you do not have one at the deployment site.

**Ensure Personnel Awareness**

Another important step in the implementation of a QC plan is personnel awareness. To perform the work

satisfactorily, each crew member must understand what the quality measures are. Before starting work on an activity, all crew members should be briefed about critical measurements, inspection items, potential problems, and each member's responsibility for quality. Remember, **quality is everyone's responsibility**. If you use the crew briefing checklist in figure 2-23 of chapter 2, all these items will be addressed.

**Evaluate Completed Work**

The last major step in QC plan development is the daily QC inspection report. This daily report is required for all projects. The purpose of this report is to document the completion of all required checks, tests, and inspections. All work completed or in progress either is or is not according to the specifications. The daily report is signed by both the QC inspector and the crew leader and forwarded to the operations officer or detail OIC with a copy to the ROICC office, the company commander, and the crew

leader. Figure 3-3 is a form for the daily QC report. All checks, tests, and inspections are listed on the back of the CAS sheet. Everyone on the crew should know in advance what the inspections will consist of and what the end results are.

## **ROICC INTERFACE**

The ROICC is responsible for inspection and surveillance of ongoing NCF projects. The ROICC is also responsible for reviewing daily QC reports to ensure compliance with the plans and specifications. The ROICC office also has to approve any battalion recommended field changes or customer requested changes. Scope changes require the approval of the customer's major claimant. Any changes that require 50 or more man-days of additional direct labor or increase the cost of the project by \$500 or more require approval of 2ndNCB/3rdNCB. The ROICC also conducts the final inspection and accepts only those facilities built according to the plans and specifications. The QC staff provides direct liaison between the battalion and the ROICC on all matters, such as change requests and project specification questions. No field changes can be made without a request being forwarded through the QC staff and being approved in writing by the ROICC. Change requests must include the same level of detail as the original specification. The engineering division can provide assistance on sketches for your change requests. Figure 3-4 is a sample design change request. A log of all design change requests in a format similar to figure 3-5 must be kept in folder 6 of the project package.

## **PRECONSTRUCTION CONFERENCES**

Before starting work on any project, the battalion must hold a preconstruction conference (precon) with the ROICC or his or her designated representative. The purpose of this meeting is to discuss the scope of the project, construction schedule, utility requirements, QC plan, and any other items that may affect the project. The OPs/QC staff will head these meetings from the battalion side and will keep the minutes of the meeting. Figures 3-6, 3-7, and 3-8 are sample forms for minutes of a precon.

## **RED-LINE DRAWINGS**

The crew leader is responsible for maintaining a set of drawings on the project site that have any field changes marked in red. These "red-line drawings" must be updated every 2 weeks by entering all changes and

comparing with the drawings held in the operations department. At the end of the deployment or at project completion, the red-line drawings will be turned over to the engineering division. Engineering will reflect all of the changes on two sets of drawings which will be provided to the ROICC as "as-built" drawings with the project completion letter.

## **MATERIAL TESTING AND INSPECTION**

Any material tests required by specification will be performed by the engineering division. The crew leader should include these tests in the QC plan and coordinate time schedules with engineering. Figure 3-9 is an engineering service request (ESR) form. Inspection of the materials to ensure compliance with the plans and specifications is also the crew leader's responsibility. These inspections must be done when the materials are received in the material liaison office (MLO). They will be inspected again 30 days prior to use to be sure that the shelf life has not expired, storage damage has not occurred, and the material is still usable. These inspections can be done by the company expediter, but the crew leader is still the one responsible for seeing that they are done and done correctly. The QC inspector will inspect the materials again as they are brought to the jobsite.

## **OTHER QC FORMS**

Besides the normal design change requests, precon summaries, and engineering service requests, there are other QC forms. For example, rebar bending schedules, concrete forming plans, and clearance forms need to be prepared by the crew leader during the home port planning process. The engineering division may assist in preparing shop drawings that make details clearer and provide a ready reference for field use. A "hard-card" is a checklist to be completed before the placement of concrete or asphalt. The hard-card ensures the site of the placement has been adequately prepared. Figures 3-10 and 3-11 are forms for concrete and asphalt hard-cards. These forms are to be completed 24 hours before placement of materials. Figure 3-12 is a site visit checklist for use on predeployment trips. Figure 3-13 is a utility interruption request.

## **MATERIAL MANAGEMENT**

As a CB/PO1, material management and accountability is **YOUR** responsibility. MLO is merely a means by which to buy materials for your job. All tools and materials are tied to master activities and identified

<b>DAILY QUALITY CONTROL INSPECTOR'S REPORT</b>				Route to:	Initial	Date	Remarks
				S3			
				S3C			
				S3QC			
				00S			
				Prime Sub			
Date	Time	Project No.	Report No.				
Prime Co.	Project Title						
Sub Co.	Weather						
Supervisor			Inspector				
Activity	Rate	Description of Work Performed					
Activities started		Activities Completed					
Construction Inspection Plan Items Checked		Results					
Delays		Safety hazards present					
Remarks							
Material Received							
Certify all work performed this date is IAW plans and specifications							
Project Supervisor		QC Inspector	Reviewed (S3QC)				
Dist: 1. ROICC 2. QC File via S3 3. Prime Contractor							

Figure 3-3.—Daily QC inspector's report.

**FIELD ADJUSTMENT REQUEST/  
DESIGN CHANGE DIRECTIVE**

FAR/DCD # \_\_\_\_\_  
Page \_\_\_\_ of \_\_\_\_  
Date \_\_\_\_\_

Project Number: \_\_\_\_\_

Project Title: \_\_\_\_\_

Requested by: \_\_\_\_\_

Description of and reason for request: (include drawings and sheet numbers and attach drawings as necessary for description)

Estimated additional cost:

Estimated additional mandays:

Approved/disapproved      Prime Contractor \_\_\_\_\_      Date \_\_\_\_\_

Approved/disapproved      Quality Control \_\_\_\_\_      Date \_\_\_\_\_

Approved/disapproved      Engineering \_\_\_\_\_      Date \_\_\_\_\_

Approved/disapproved      Operations \_\_\_\_\_      Date \_\_\_\_\_

Approved/disapproved      ROICC \_\_\_\_\_      Date \_\_\_\_\_

As Built \_\_\_\_\_ Date \_\_\_\_\_  
(initial)

- Notes: 1. Route original and 3 copies through to ROICC  
2. ROICC return original and 2 copies

Figure 3-4.—Design change request.

**FIELD ADJUSTMENT REQUEST (FAR)/DESIGN  
CHANGE DIRECTIVE (DCD) SUBMITTAL LOG**

FAR #	Description	Spec Section	Drawing Number	Date to Ops	Date Returned	Approved/ Disapproved

Figure 3-5.-Field adjustment request submittal log.

Date \_\_\_\_\_

### PRECONSTRUCTION CONFERENCE SUMMARY

PROJECT: \_\_\_\_\_

1. ROICC Project Manager: \_\_\_\_\_  
ROICC Inspector: \_\_\_\_\_
2. Public Works Representative: \_\_\_\_\_  
Customer Representative: \_\_\_\_\_
3. NMCB Point of Contact: \_\_\_\_\_  
NMCB Prime Contractor: \_\_\_\_\_  
NMCB Project Officer: \_\_\_\_\_  
NMCB Project Crew leader: \_\_\_\_\_  
NMCB QC Representative: \_\_\_\_\_
4. Point of Contact after normal working hours:  
Customer: \_\_\_\_\_  
ROICC: \_\_\_\_\_  
NMCB: \_\_\_\_\_
5. Point of Contact during working hours:  
Customer: \_\_\_\_\_  
ROICC: \_\_\_\_\_  
NMCB: \_\_\_\_\_
6. Planned start/completion dates: \_\_\_\_\_  
Known interruptions: \_\_\_\_\_
7. Outstanding question regarding plans and specs or execution of work:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Figure 3-6.-Preconstruction conference summary, page 1 of 3.

8. Customer initiated changes to the scope of work are to be directed to the ROICC. Customer initiated changes must be via field adjustment requests and approved by the ROICC prior to execution. Approved field adjustment requests are the only authorized means of creating changes to the plans and/or specifications. Battalion engineering is responsible for updating plans and/or specifications upon receipt of approved field adjustment requests.

9. Have field conditions been verified? Yes \_\_\_\_\_ No \_\_\_\_\_ N/A \_\_\_\_\_  
 Any unusual conditions? \_\_\_\_\_

10. Have all permits been acquired? Yes \_\_\_\_\_ No \_\_\_\_\_ N/A \_\_\_\_\_  
 A. Site Approval Yes \_\_\_\_\_ No \_\_\_\_\_ N/A \_\_\_\_\_  
 B. Excavation Permit? Yes \_\_\_\_\_ No \_\_\_\_\_ N/A \_\_\_\_\_  
 C. Tree Removal? Yes \_\_\_\_\_ No \_\_\_\_\_ N/A \_\_\_\_\_

11. What operation and maintenance manuals have been or are to be provided to the customer? \_\_\_\_\_  
 \_\_\_\_\_

12. What are the project submittal/report requirements? \_\_\_\_\_  
 \_\_\_\_\_

13. Safety Plan to ROICC Provided \_\_\_\_\_ To be provided \_\_\_\_\_  
 Special Safety Concerns \_\_\_\_\_

14. Quality Control Plan to ROICC Provided \_\_\_\_\_ To be provided \_\_\_\_\_  
 Special Quality Control Concerns \_\_\_\_\_

15. Materials to be customer supplied: \_\_\_\_\_  
 \_\_\_\_\_

16. Project tools and equipment to be provide to the customer upon project completion:  
 \_\_\_\_\_

17. Is non-organic technical assistance required, and if so what arrangements have been made? \_\_\_\_\_

18. Will this project be affected by priorities of other projects/functions? \_\_\_\_\_  
 \_\_\_\_\_

Figure 3-7.—Preconstruction conference summary, page 2 of 3.



- 19. What is the schedule for required utility outages? \_\_\_\_\_  
\_\_\_\_\_
- 20. What arrangements been made for connection of new utilities to existing service?  
\_\_\_\_\_
- 21. What provisions have been made for temporary utilities service? \_\_\_\_\_  
\_\_\_\_\_
- 22. What security clearances, if any, are required for construction site? \_\_\_\_\_  
\_\_\_\_\_
- 23. What off site prefabrication is scheduled and where is the prefab yard located?  
\_\_\_\_\_
- 24. What environmental protection is required? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- 25. Other comments/remarks: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
ROICC Representative/Date

\_\_\_\_\_  
Operations Officer/Date

Figure 3-8.-Preconstruction conference summary, page 3 of 3.

# ENGINEERING SERVICE REQUEST

PART I (To be completed by requestor)

From: \_\_\_\_\_ Phone: \_\_\_\_\_ Date: \_\_\_\_\_

To: Engineering Division

Subj: ENGINEERING SERVICE REQUEST

1. It is requested that the following service(s) be provided:  
( ) surveying ( ) drafting ( ) reproduction ( ) other

2. Date needed: \_\_\_\_\_

3. Description of work: (include sketch, location, size, job no., etc.)

\_\_\_\_\_  
Requestor's signature

PART II (To be completed by Engineering Division)

Date request received \_\_\_\_\_

Priority assigned \_\_\_\_\_

Approved/disapproved \_\_\_\_\_

Completed by \_\_\_\_\_

Date work started \_\_\_\_\_

Manhours exp. \_\_\_\_\_

Date work completed \_\_\_\_\_

Original - File

Copy - Requestor upon completion of work

ESR # \_\_\_\_\_

Copy - To section performing work

Figure 3-9.—Engineering service request.

# CONCRETE PLACEMENT CLEARANCE FORM

PART I  
 Project Number \_\_\_\_\_ Title \_\_\_\_\_ Date \_\_\_\_\_  
 Location \_\_\_\_\_  
 Date/time Desired \_\_\_\_\_ QTY \_\_\_\_\_ Strength (PSI) \_\_\_\_\_  
 Slump (in.) \_\_\_\_\_ Max Aggregate Size \_\_\_\_\_ Admixtures \_\_\_\_\_  
 Type of Placement ( ) Roof ( ) Slab ( ) Wall ( ) Other  
 Finish Required (type): \_\_\_\_\_ Tolerance ( )  $\pm$  1/4 in. ( ) Other

PART II Item	Conforms to Requirements			Item	Conforms to Requirements		
	N/A	Crew-leader	QC Insp		N/A	Crew Idr	QC Insp
Subgrade Prep				Electrical			
Elevation				Conduit inst/stubbed up			
Dimension				Sleeves (foundations)			
Compaction				Pull Cords			
Capillary Barr (sand)				Mechanical			
Vapor Barrier				Sleeves (foundations)			
Misc. (insec, Drain rack, etc.)				Sub slab piping			
Forms				- pressure tested			
Elevation				Floor Drains (elevation			
Dimensions				& location)			
Alignment				Floor Cleanouts (elevation			
Bracing				& location)			
Condition				Stubups (location, type)			
Keyways				Placing/Finishing Equipment			
Water Stop				Screed Boards Set			
Embedded Items				Screed Boards Checked			
Anchor Bolts				Placing Tools Set			
Sleeves				Placing Tools Checked			
Misc.				Finishing Tools Set			
Reinforcing				Finishing Tools Checked			
Size				Curing Materials			
Location and Spacing				Testing Materials (cylinders,			
Chairs (meshups)				slump cone, etc.) arranged			
Bracing				for or on site)			

Submitted: \_\_\_\_\_ Crewleader \_\_\_\_\_ Date \_\_\_\_\_  
 Approved: \_\_\_\_\_ QC Inspector \_\_\_\_\_ Date \_\_\_\_\_  
 Scheduled For: \_\_\_\_\_  
 Remarks \_\_\_\_\_

Figure 3-10.-Concrete placement clearance form.

<b>ASPHALT PLACEMENT CLEARANCE FORM</b>			
Project Title:		Area Covered:	
Part I Subgrade Prep		N/A	Crewleader
Materials (specs)			QC Insp
Compaction			
Misc.			
Part II Base Course			
Materials (specs)			
Compaction			
Embedded Structures			
Blue Top Elevation			
Misc.			
Part III Asphalt Prime			
Type (specs)			
Rate of Application			
Application Temperature			
Cure			
Edge Preparation			
Other			
Part IV Asphalt Mix Requirements			
Design			
Extraction Tests			
Marshall Stability			
Placement Temp			
Part V Equipment (onsite/good cond.)			
Spreader			
Breakdown Roller			
Intermediate Roller			
Finish Roller			
Hand Tools (rakes, shovels, etc.)			
Cleanup Equip			
Barricades or other Traffic Control			
Other (specify)			
Part VI Order			
Spec:	Quantity:	Date of Delivery:	
Submitted by: _____		Approved by: _____	
Crew leader		QC Inspector	

Figure 3-11.—Asphalt placement clearance form.

## PREDEPLOYMENT SITE VISIT SUMMARY

Project: \_\_\_\_\_ Number: \_\_\_\_\_  
 Site Visit Conducted by: \_\_\_\_\_ Date: \_\_\_\_\_

1. Status of Project: New Start \_\_\_\_\_ Turnover \_\_\_\_\_ Multiple Turnover \_\_\_\_\_

If a turnover project:

List any differences between observed and reported status: \_\_\_\_\_  
 \_\_\_\_\_

Obtained copy of onsite battalion's project package?	Yes _____	No _____
Obtained copies of management tools now in use?	Yes _____	No _____
Obtained status of required project submittals?	Yes _____	No _____
Is project to be worked during turnover?	Yes _____	No _____
Will all project material be returned to MLO for turnover?	Yes _____	No _____
Which items won't be returned?	_____	

2. Obtained copies of following missing documents:

Project Plans:	Yes _____	No _____	Not missing _____
Project Specifications:	Yes _____	No _____	Not missing _____
Project Bill of Materials:	Yes _____	No _____	Not missing _____

3. Obtained copies of local forms, instructions and required procedures? Yes \_\_\_\_\_ No \_\_\_\_\_

4. Are the following permits required for construction?

Excavation permit?	Yes _____	No _____
Utility Outage permit?	Yes _____	No _____
Burning permit?	Yes _____	No _____
Hauling permit?	Yes _____	No _____
Other permits?	_____	

5. Percentage of materials on hand: Conus \_\_\_\_\_ Local \_\_\_\_\_

Estimated percentage at turnover: Conus \_\_\_\_\_ Local \_\_\_\_\_

6. What special skills are required? \_\_\_\_\_

7. Who is responsible for installation of collateral equipment? \_\_\_\_\_

8. What level of security clearance is required for access to jobsite? \_\_\_\_\_

Who is the point of contact for clearances/access? \_\_\_\_\_

What is the expected delay entering and departing site? \_\_\_\_\_

9. ROICC: \_\_\_\_\_ Phone: \_\_\_\_\_

Chief Inspector: \_\_\_\_\_ Phone: \_\_\_\_\_

10. Photographs/sketches taken of site? Yes \_\_\_\_\_ No \_\_\_\_\_

11. Other comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Figure 3-12.—Predeployment site visit summary.

Date:

From: Naval Mobile Construction Battalion  
To: Public Works Officer

Subj: UTILITY INTERRUPTION REQUEST

1. Request authorization for a scheduled utility interruption involving the following utilities:

<input type="checkbox"/> Electric	<input type="checkbox"/> Water
<input type="checkbox"/> Steam	<input type="checkbox"/> Sewerage
<input type="checkbox"/> Communications	<input type="checkbox"/> Other

2. Location: \_\_\_\_\_

3. Planned start date/time: \_\_\_\_\_

4. Planned completion date/time: \_\_\_\_\_

5. The interruption is for project \_\_\_\_\_ and is required to: \_\_\_\_\_

6. Point of contact: \_\_\_\_\_ phone no. \_\_\_\_\_

\_\_\_\_\_  
Signature/printed name of requestor

**INTERNAL PUBLIC WORKS ROUTING**

Code	Work Center	Approve/ Disapprove	Signature	Date	Remarks
_____	<u>Line Crew</u>	_____	_____	_____	_____
_____	<u>Water Crew</u>	_____	_____	_____	_____
_____	<u>Engineering</u>	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

**PUBLIC WORKS DEPARTMENT ENDORSEMENT**

From: Public Works Department  
To: Naval Mobile Construction Battalion

1. Returned APPROVED/DISAPPROVED

\_\_\_\_\_  
Signature/printed name of approving official

Figure 3-13.—Utility interruption request.

on CAS sheets. This section of the chapter will cover the procedures used to identify those "hard-to-get" materials, the techniques used to track them through home port and on deployment, and how to maintain accountability of your money and materials.

### HOME PORT RESPONSIBILITIES

Home port is the time to plan your projects and identify what resources it will take to complete them. The first two things to learn is where your materials will come from and who is going to pay the bill. To minimize cost, most of your project materials will come from the Continental United States (CONUS). Most materials ordered on the deployment site are bulk items like cement, concrete, aggregate, sand, CMU block and such. Bulk items are too expensive to ship. It is the goal of 2ndNCB/3rdNCB to have 100 percent of your critical path materials on site at project start. It is your responsibility to be sure they know exactly what these critical path materials are and when you need them.

### Bills of Material (BM)

After plans and specifications for your project are drawn up, bills of material are generated by either the

20th or 31st NCR planning and estimating staff. You will receive copies of these BMs about 5 months before you deploy. These BMs must include everything you need to complete your project! These BMs usually include construction materials, plans and specifications, special tools, and safety gear not already in the battalion's table of allowance (TOA). Any technical assistance you may require, such as balancing an HVAC system or certifying a fire alarm system, also should be listed in the BM. Not only do you have to ensure the regimental staff identified the right tools and materials, but you also have to ensure they identified the right quantity. Figure 3-14 is an example of a BM.

BM's are arranged by material type—structural, electrical, mechanical, or such. Your number one job in home port is to make sure the BMs contain all the material you need to complete your job!

### Material Take-off (MTO)

The most important phase of project planning to help you identify materials is the material take-off. You must generate a material list completely independent of the BM. This is a critical step, because it is a check-and-balance against the regiment's planning and

BILL OF MATERIAL															
PROJECT		ADMINISTRATION BLDG						AUTHORITY/ORIGINATOR				BM NO.		SECTION	
TWI-025								31st NCR				GER-110		STRUCT	
RID	MAS	SERV & RECONR	DEM	SERV & SUPP ADD	SIG	FUND	ONS	PRJ	PRJ	JON	ROS	ACCOUNTING DATA			
4-6	7	30-35	11	15-50	31	32-33	34	37-39	60-61	62-64	72-77				
P96	3	N66450	R	N62604	A	BC	W	OOH	76	309	OHC104				
DOC ID	COG	NSN			UNIT OF ISSUE	QTY	DOCUMENT NUMBER		ADV	L1	DESCRIPTION/VENDOR SOURCE INTENDED USE		UNIT PRICE	TOTAL PRICE	
1-3	33-36	8-20			23-24	25-29	36-43		65-66						
AOB		5510-00-220-6146			BF	6508	0214-1744				1	LUMBER 2" X 4" X 12"	.32	2082.56	
AOB		5510-00-220-6196			BF	420	0214-1745				2	LUMBER 2" X 6" X 12"	.32	134.40	
AOA		5315-00-010-4663			BX	3	0214-1746				3	NAIL 16d COMMON 50 LB BOX	16.86	50.58	
AOA		5640-00-847-0235			BD	90	0214-1747				4	WALLBOARD 5/8 X 4" X 8"	12.50	1125.00	
AOA		5315-00-753-3890			PG	2	0214-1748				5	NAIL FINISHING 6d	2.15	4.30	
AOA		5315-11-100-0139			BX	5	0214-1749				6	HILTI NAILS 2 7/8"	21.20	106.00	
AOA		1377-11-100-0464			BX	8	0214-1750				7	HILTI CHARGES PURPLE	19.40	155.20	
AOA		5640-00-634-8891			RO	8	0214-1751				8	TAPE, WALLBOARD 250' ROLL	1.40	11.20	

Figure 3-14. Bill of material.

### BM/MTO COMPARISON WORKSHEET

Activity No.	Material Description	U/I	BMLI No.	BM QTY	MTO QTY	Diff.	Remarks
332015	LUMBER 2" X 4" X 12'	BF	GER-110-1	6508	6850	-342	STRUCTURAL INTERIOR WALLS
332015	LUMBER 2" X 6" X 12'	BF	GER-110-2	420	420	0	STRUCTURAL INTERIOR WALLS
332015	NAILS 16d COMMON	BX	GER-110-3	3	4	-1	STRUCTURAL INTERIOR WALLS
332015	WALLBOARD 5/8 X 4' X 8'	BD	GER-110-4	90	75	15	STRUCTURAL INTERIOR WALLS

Figure 3-15.—BM/MTO comparison worksheet.

estimating staff. After all, who knows your job better than you? Once the MTO is generated, list materials by material type and compare it to the BM. If the BM does not list your material, you must order it. If they do not give you enough, you must get more. And if they gave you too much, you must cancel the extra. The following example should help make this concept clearer.

During your project planning you identified the following materials needed to complete the job:

- 6,850 board feet (BF) of 12 foot 2x4s
- 420 BF of 12 foot 2x6s
- Four 50 lb boxes (BX) of 16 penny nails
- 75 pieces of 5/8 x 4x8 wallboard

Now go back to figure 3-14 and see how much the BM gave you. Using a BM/MTO comparison worksheet (fig. 3-15) you can make this comparison.

We just took one activity and compared what we think we need to what the NCR thinks we need. Did you find all those on the BM? The bill of material line item (BMLI) is the BM number taken from the upper

right-hand corner of the BM (GER-110) and the line item number of your material. We found the BM shortchanged us 342 board feet of 2x4s and 1 box of nails. They did give us 15 extra pieces of wallboard. Now it is time to correct these oversights.

#### BM Add-Ons

Add-ons and reorders are two commonly misunderstood terms. A **reorder** is used to order an already existing BMLI. An **add-on** is used to order a completely new line item not found on the BM. Reorders use the same BMLI number. Add-ons use a new item number. The easiest way to remember the difference between the two tools is, if your material was lost or damaged in shipment, reorder it. If you just need more, do an add-on. You are the person who makes this step happen. Now that the problems are identified, use the flowchart in figure 3-16 to do the paper work.

The first step is to do add-ons for the material you are short. Figure 3-17 has the blanks filled in for the material not sent but still needed.



Figure 3-16.—Flowchart for add-ons.

Project Number		Project Title		Date:	MLO USE ONLY			
TWI-025		Administration Building		23 Nov 90				
BM Number		Master Activity Number	Dwg. No.	Prepared By:				
GER-110		15	724387	CE2 S. L. Olson				
BM Item No.	Unit of Issue	Qty	Description	Justification		Unit Price	Total Price	Requisition Number
9	BF	342	Lumber 2" x 4" x 12'	Required to meet MTO qty				
10	BX	1	Nail 16d Common	Required to meet MTO qty				

Figure 3-17.—Add-on BM.



Notice these additional items are labelled line items 9 and 10. With add-ons you must go to the last line item and create new line items for the material you need. MLO will help you with this step. There is no fancy form to cancel the extra 15 sheets of wallboard, but you must inform MLO you do not need them so they can do their paper work. **Remember: Add-ons cost money!**

### Tracking Your Material

Once your material is ordered from the states the only way you can track it is with the **project status report (PSR)** if you deploy to an Atlantic site, or the **project control report (PCR)** if you deploy to a Pacific site. The PSR/PCR tells you the current status of your materials and is generated by the NCR. Twice a month the battalion receives a PSR/PCR showing outstanding requisitions. Once a month the battalion receives a PSR/PCR showing the status of all project materials. After you have corrected the BMs, you now have to make sure your materials get to your site. Figure 3-18 is a PCR for your materials.

The PCR is listed by BMLI number. Look at the original order of 2x6 lumber and nails and at when the

add-ons were approved (listed as line items 9 and 10). Be sure the quantities on the PCR match the quantities on the BM. The final step is to identify what materials you need to complete your first 45 days of construction. Two months before deployment, your operations officer will send a letter like the one in figure 3-19 to the NCR listing these identified materials.

### Money Management

Money management is another area under your control. When a project comes on line, the original estimated amount of money is given by the customer to 2ndNCB/3rdNCB. The bulk of this money is given to the NCR to purchase CONUS material. A smaller pot of money goes to the main body and detachments to buy materials locally. Money for local purchases is held by station fiscal departments and tracked by MLO. Every month the MLO officer completes an estimate at completion (EAC) report. The MLO uses EAC reports to track money spent on locally procured materials and to give a projected final cost estimate of the project. Every time you submit an add-on, the final project cost (EAC) increases. Requests for additional funding are **ONE TIME ONLY**. A second request is considered poor management, so be sure your material estimates

PROJECT CONTROL REPORT														
FACSO RPT SYM/NO 04421/B57AMR07										15 FEB 91				
CONTROL LI	REQUISITION	PROJ	RDD	ROS	EOS	DESCRIPTION	UI	QTY	LATEST	DATE RCRD/	ESD	S/S	UI M	POE DATE
								REQ	STATUS	FLAGS	QTY			SHIP
GER110	1 R6645002141746 ZD4	06	1100	0360	0000	LUMBER 2X4X12	BF	6508	AS1 RR625836973215XX	1035	0355	6508	BF Z	3GA 1003
GER110	2 R6645002141747 ZD4	06	1100	0360	0000	LUMBER 2X6X12	BF	420	AS1 RR625836973216XX	1035	0355	420	BF Z	3GA 1003
GER110	3 R6645002141748 ZD4	06	1100	0360	0000	NAIL 16D CMN	BX	3	AS1 RR625836973217XX	1035	0355	3	BX Z	3GA 1003
GER110	4 R6645002141749 ZD4	06	1100	0360	0000	WALLBOARD	BD	90	AS1 RR625836973218XX	1035	0355	90	BD Z	3GA 1003
GER110	5 R6645002141750 ZD4	06	1100	0360	0000	NAIL 6D	PG	2	AS1 RR625836973219XX	1035	0355	2	PG Z	3GA 1003
GER110	6 R6645002141751 ZD4	06	1100	0360	0000	HILT NAILS	BX	5	AS1 RR625836973220XX	1035	0355	5	BX Z	3GA 1003
GER110	7 R6645002141752 ZD4	06	1100	0360	0000	HILT CGS PRPL	BX	8	AS1 RR625836973221XX	1035	0355	8	BX Z	3GA 1003
GER110	8 R6645002141753 ZD4	06	1100	0360	0000	TAPE, WALLBD	RO	8	AS1 RR625836973215XX	1035	0355	8	RO Z	3GA 1003
GER110	9 R6645002571246 ZD4	06	1100	0360	0000	LUMBER 2X4X12	BF	342	AS1 RR625836973215XX	1035	0355	342	BF Z	3GA 1003
GER110	10 R6645002571247 ZD4	06	1100	0360	0000	NAIL 16D CMN	BX	1	AS1 RR625836973216XX	1035	0355	1	BX Z	3GA 1003

<p><b>KEY</b></p> <p>Control = BM No.          PROJ/PRI = MILSTRIP Project code/Priority Code          RDD = Required Delivery Date          ROS = Required On Site Date          S/S QTY = Status/Shipped Quantity          POE = Port of Embarkation</p>	<p>Latest Status = Supply Status          Date-RCRD = Date Status was Recorded          Flag = Critical flag          ESD = Estimated Shipping Date          M = Mode of Shipment          Date Ship = Date Shipped</p>
--	---

Figure 3-18. Project control report.



are accurate. Figure 3-20 is what a completed EAC report looks like.

Remember, the EAC is only for tracking materials bought locally. Every time you put in an add-on your EAC goes up and the money left to complete your project goes down!

**DEPLOYMENT RESPONSIBILITIES**

Home port is through and you are ready to start your project! How successful your home port planning was will now be obvious to all concerned. You are ready to draw your materials from MLO using NAVSUP form 1250-1s. One important thing to remember while deployed is to only keep 10 working days worth of materials on the jobsite. Your 2-week windows are a good tool to use here.

**Procuring Local Materials**

Materials bought locally require special attention and a little foresight. Countries using the metric system often provide materials incompatible with ours, especially with pipe thread and diameter. A good turnover with the previous battalion will help identify and avoid some of the pitfalls associated with locally procured materials.

**Requisitioning Materials from MLO**

All material is requisitioned from MLO on a 1250-1. Your company will give MLO a list of people authorized to requisition and receive material. Your name must be on the list authorizing you to requisition material. The only rule MLO has is that the same person cannot requisition **AND** receive the same material. You must give MLO the 1250-1s in advance so they can process the paper work and pull the material out of storage and stage for pick-up or delivery to your job. Table 3-1 lists the lead times that your material will be available for pick-up after your 1250-1 reaches MLO.

If you requisition material from the CONUS, allow at least 60 days for normal requisitions and 120 days for long lead items. You turn in materials to MLO using a 1250-1 completed in red ink

**Storing Material on the Job**

Requisition only the materials you will use for the next 2 weeks. Materials required to complete your 2-week windows are a good measure of this. Once materials are on your job you must protect them from pilferage, weather, and jobsite damage. Store them indoors if possible. If materials have to be stored outdoors, keep them off the ground. Lock up high-value

ESTIMATE AT COMPLETION (EAC) REPORT									
A	B	C	D	E	F	G	H	I	J
PROJECT NUMBER	PROJECT TITLE	ORIGINAL ESTIMATE WITHIN SCOPE	FUNDS PROVIDED	ACTUAL EXPENDITURE COST	PIPELINE COST	FUTURE FUNDING REQUIREMENTS	TOTAL MATERIAL & SERVICES COST (E+F+G)	FUNDING CONTINGENCY 0.1(F+G)	ESTIMATE AT COMPLETION (H+I)
GGB-413	ALFA Maint Shp	250,000	275,000	150,000	20,000	70,000	240,000	9,000	249,000
GER-110	Admin Building	500,000	550,000	350,000	44,000	90,000	484,000	13,400	497,400

**KEY:**

1. **Original Estimate within Scope** - NCR s determine with input from the battalions based on your project planning.
2. **Funds provided** - The amount of money 3 NCB/2 NCB gave you to purchase materials locally.
3. **Actual Expenditure Cost** - Cost of materials MLO received and paid for.
4. **Pipeline Cost** - Cost of materials MLO received but have not paid for. The check hasn't cleared yet.
5. **Future Funding Requirements** - Materials you will need in the future but do not have.
6. **Funding Contingency** - 10% of the sum of Pipeline + Future Funding.
7. **Estimate at Completion** - The projected cost of the completed project.

Figure 3-20.-EAC report.

**Table 3-1.-Requisition Lead Times**

(Available for pick-up in MLO)

<u>Priority</u>	<u>On Shelf Items</u>	<u>Locally Ordered Items</u>	<u>Signature Authorization</u>
A	24 hours	2-3 days	Operations officer
B	48 hours	4 days-2 weeks	Company commander
C	3-5 days	2 weeks plus	Company commander

items that are easily pilfered. With a little prior planning and your 2-week windows, you can have the materials you need, when you need them, and not worry about damage or theft.

**Excess and Borrowed Materials**

When a job is completed, all remaining materials must be offered to the customer. Materials the customer does not want are stored in MLO for 6 months. This material is listed in the excess file, and you can use any material off it on your project free of charge using a dummy requisition number. MLO routinely publishes this excess list. Screen the excess list before writing an add-on BM. Remember that material is only kept 6 months so look ahead to activities you will complete 3 or 4 months down the road. If you need a particular line item, let MLO know so they do not send it to the Defense Reutilization and Marketing Office (DRMO). The borrow file is a dangerous tool. If you need material on your job and MLO has the identical item waiting for another job, the operations officer can authorize you to use it. Use of this borrowed item is allowed *only if* MLO can replace it before the project's start date.

**Material Shelf Life**

Most paints, glues, and adhesives have a shelf life. If you order these materials too early, their shelf life may be expired by the time you use them. MLO has a computer to track shelf life and may extend that shelf life depending on the condition of the material. Monitor shelf life, but do not dispose of old materials without first checking quality.

**SAMMS**

The SAMMS (Seabee Automated Mobile Management System) computer system is a fully automated management system that has a program for MLO. Items the computer tracks that can help you include the following:

- \* Received materials
- \* Materials due
- \* Excess material
- \* Borrowed material
- \* Hazardous material
- \* Shelf life data

Use MLO and these programs to your advantage. One of the handiest reports from the computer is the materials due report. This report provides a list, by project, of all materials ordered but not received. MLO should provide a materials due report for each project every 2 weeks. The Ops meeting is a convenient place for companies to mark up these reports for materials needed. If the companies tell MLO which materials are needed in the next 30, 60, or 90 days, MLO can take appropriate action to ensure the materials are on hand when needed. Supply will help you only if you work closely with them and plan ahead. Your lack of prior planning is not a reason for them to give you a higher priority or better service.

**EQUIPMENT MANAGEMENT**

As a crew leader you need to be familiar with the proper care and maintenance of the equipment your personnel use. In this section of the chapter we will discuss first echelon maintenance, preventive maintenance, and general requirements as per the COMSECOND/COMTHIRDNCBINST 11200.1 series.

**GENERAL REQUIREMENTS**

Every operator of equipment should ensure the following:

1. Equipment is operated according to established procedures and all safety precautions are rigidly observed.
2. Transportation of passengers is based on authorized trips and for official business only. **Picking up hitchhikers is strictly forbidden!**
3. All construction and material handling equipment is authorized for assigned construction tasks only. Construction equipment is not to be used for transporting personnel.

The number of persons on any piece of operating construction equipment will not exceed the number of seats.

4. Personnel assigned to operate automotive, construction, or material handling equipment must be qualified and licensed.

5. Equipment is made available for preventive maintenance service as scheduled by the maintenance branch.

6. Personnel operating automotive, construction, or material handling equipment perform operator maintenance as scheduled.

7. Personnel are familiar with current published battalion policies for the use of CESE (civil engineering support equipment) for recreational purposes.

8. Equipment is not to be used to store tools, materials, or personal gear.

### **FIRST ECHELON MAINTENANCE**

Proper maintenance is the responsibility of the operator. Each operator must perform daily maintenance and keep the assigned vehicle and/or equipment clean, safe, and in serviceable condition. An operator must inspect equipment daily and note any defects. Defects noted must be corrected before a serious breakdown or mishap occurs. Many units of equipment have hourly and daily lubrication points. This lubrication is the responsibility of the operator. Supervisors must ensure that equipment is maintained as outlined in the operator's manual.

Operators are responsible for the prestart inspection. This inspection consists of performing the services listed on the operator's Inspection Guide and Trouble Report, NAVFAC 9-11240/13 (hard card), or the operator's Daily PM Report, NAVFAC 11260/4, as appropriate. This inspection basically covers inspection of fuel, oil, water, hydraulic fluid, and battery levels. And it includes inspections of tires, lug nuts, lights, safety devices, drive belts, and cargo and mounting equipment. The prestart inspection also covers leaks, exterior or interior damage, and any required lubrication. Do not operate or allow crew members to operate defective or unsafe equipment. Note the discrepancies on the hard card/daily PM report and forward them immediately to the dispatcher.

The operator must use his/her senses to detect items needing attention. Each sense (smell = burning rubber, grease, or clutches; hearing = unusual noises; sight = instruments; and feeling = drag, pull, or vibration) signals information. Tires should be inspected

periodically for flats and rocks. If you suspect a defect, stop the equipment and investigate. Before returning equipment to use be sure that defects that could damage the equipment or impair safe operation are repaired.

After completing operation, each operator must perform the established shutdown procedures (as prescribed in the appropriate operator's manual) and other directed services. These services usually consist of checking equipment cleanliness (wash and steam clean as appropriate); draining air tanks and covering exhaust stacks; closing doors, windows, and hoods; setting brakes and chocking wheels; blocking dumpbeds for draining; and topping-off fuel tanks. Supervisors need to be sure that the equipment is protected against the weather and that the hard card/daily PM report is completed and returned to the dispatcher.

### **PREVENTIVE MAINTENANCE**

Preventive maintenance is scheduled maintenance that has as its prime objectives maximizing equipment availability and minimizing unnecessary repair cost. Preventive maintenance consists of safety and serviceability inspections, lubrication and minor services, and adjustments beyond those of operator maintenance.

The "standard" interval between PM service inspections for NCF equipment is 40 working days. It is the maintenance supervisor who determines if the PM interval for an item of equipment should be reduced. You must **never** extend the interval between PM service inspections beyond the prescribed 40 working days for active CESE.

### **SCHEDULING AN EXCAVATION**

Coordinating equipment requirements between several companies and many projects takes good communications. ALFA company tracks their workload based on original schedules and weekly goals. If the crew leader can see an activity requiring ALFA company support is going to slip, the crew leader must contact the chain of command immediately. The chain of command needs to know if a crew is not going to be ready and when to reschedule an excavation. Getting clearances for an excavation (digging permits) are the responsibility of the crew leader. These permits will become part of the project package. Figure 3-21 is a form for requesting clearance from public works.

### **JOBSITE MANAGEMENT**

The rest of this chapter will cover ways to help you organize your construction site. Jobsite management includes material, tools, jobsite appearance, visitors, field offices, initial setups, and inspections.

Date:

From: Naval Mobile Construction Battalion  
To: Public Works Officer

Subj: EXCAVATION REQUEST

1. Request clearance to excavate for the purpose of (describe excavation):
2. Method of excavation:
3. Planned start date:
4. Planned completion date(including backfill, compaction, ground cover, paving repair, etc.):
5. The excavation is for project \_\_\_\_\_ and is required to: \_\_\_\_\_
6. Point of contact: \_\_\_\_\_ phone no. \_\_\_\_\_
7. Sketch showing location of planned excavation is attached (mandatory).

\_\_\_\_\_  
Signature/printed name of requestor

INTERNAL PUBLIC WORKS ROUTING

Code	Work Center	Approve/ Disapprove	Signature	Date	Phone	Remarks
_____	Line Crew	_____	_____	_____	_____	_____
_____	Water Crew	_____	_____	_____	_____	_____
_____	Engineering	_____	_____	_____	_____	_____
_____		_____	_____	_____	_____	_____

PUBLIC WORKS DEPARTMENT ENDORSEMENT

From: Public Works Department  
To: Naval Mobile Construction Battalion

1. Returned APPROVED/DISAPPROVED

\_\_\_\_\_  
Signature/printed name of approving official

Fig. 3-21.-Excavation request.

## **MATERIAL**

Of the many things to look at when setting up a construction site, material is just one of them. Depending on the project, you may need to answer the following questions:

- How big is the area for storing material on site?
- Can the material be secured?
- Is the material exposed to the weather?
- Does all the material have to be on site?
- Is the material stored properly?
- Are there MSDSs on all required material?
- Is the material the right material?

You should not store more than 2 weeks of material on the job. If you do not need it now, do not draw it now! If you must build a material storage area, try and make it in an area that is not going to be in the way of construction.

## **TOOLS**

Tool accountability is one item you as a crew leader must control. The simplest way to be sure you have all the tools you signed for is through tool kit inventories and subcustody cards. Twice monthly tool kit inventories are required by the Seabee Supply Manual with the exception of some large kits. Inventory schedules are listed in an appendix of the Seabee Supply Manual. A kit inventory list will be provided by CTR for each kit you have checked out. During each inventory, you count each item and check the quantity on hand versus the quantity on the inventory list. You indicate the shortages for each item and determine a dollar amount for all items not accounted for. Along with accountability, serviceability is also important. You have to ensure all electrical tools are safety checked each month and the right color tape is placed on the cord. All power tools whether gas or air operated must also be checked. Be sure to remove any defective tools from service. Provide safety protection equipment for any tool that requires such. Tools must be kept clean and organized. To prevent theft, secure all tools at the end of each work day. Remember, you are the one responsible for the tools.

## **JOBSITE APPEARANCE**

The first thing anyone notices about your jobsite is the general appearance. You can be doing high-quality work but if your jobsite looks bad that is the only thing people are going to remember. Have the crew members pick up after themselves during the workday and

conduct a final cleanup at the end of each day. A clean jobsite is a safe jobsite.

## **VISITORS**

One of the most important impressions made upon command visitors is the one made by the crew leaders when presenting the job. Remember your military bearing and speak positively. Be professional; first impressions are lasting impressions. Describe the project in general, including the type of construction and finishes. Mention specific safety measures taken regarding any hazards present. Explain the project schedule to the visitor(s) by using the level III barchart. If you are behind schedule, explain how you are going to catch up. You want each visitor to leave with an impression that you know what you are doing. Do not try to bluff your way through. If asked questions you cannot answer, ask the visitors if you can get back to them with the answers later. Then be sure you do. Remember that visitors often carry an impression, good or bad, back to higher headquarters.

## **FIELD OFFICES**

The field office may be an equipment shelter or appropriate structure separate from tool and material storage. Any material used to construct the field office shall be waste material, material from MLO excess, or material listed for office construction on the project BM. The following list of required field office items is updated daily and is available to the chain of command and project crew:

- \*1. Level III bar chart
- \*2. Safety plan/EM385 1-1
- \*3. Quality control plan
- \*4. Construction activity summary sheets
- \*5. Weekly goals
- \*6. Daily safety topics
- \*7. Emergency telephone numbers
- \*8. Crew Organization/chain of command
9. Complete project package
10. Clean working drawings (with changes marked in red pencil and construction notes in blue)
11. Construction crew location chart
12. Material status

The eight items marked with an asterisk(\*) must be posted on the jobsite information board as in figure 3-22.

# POSTED JOBSITE INFORMATION

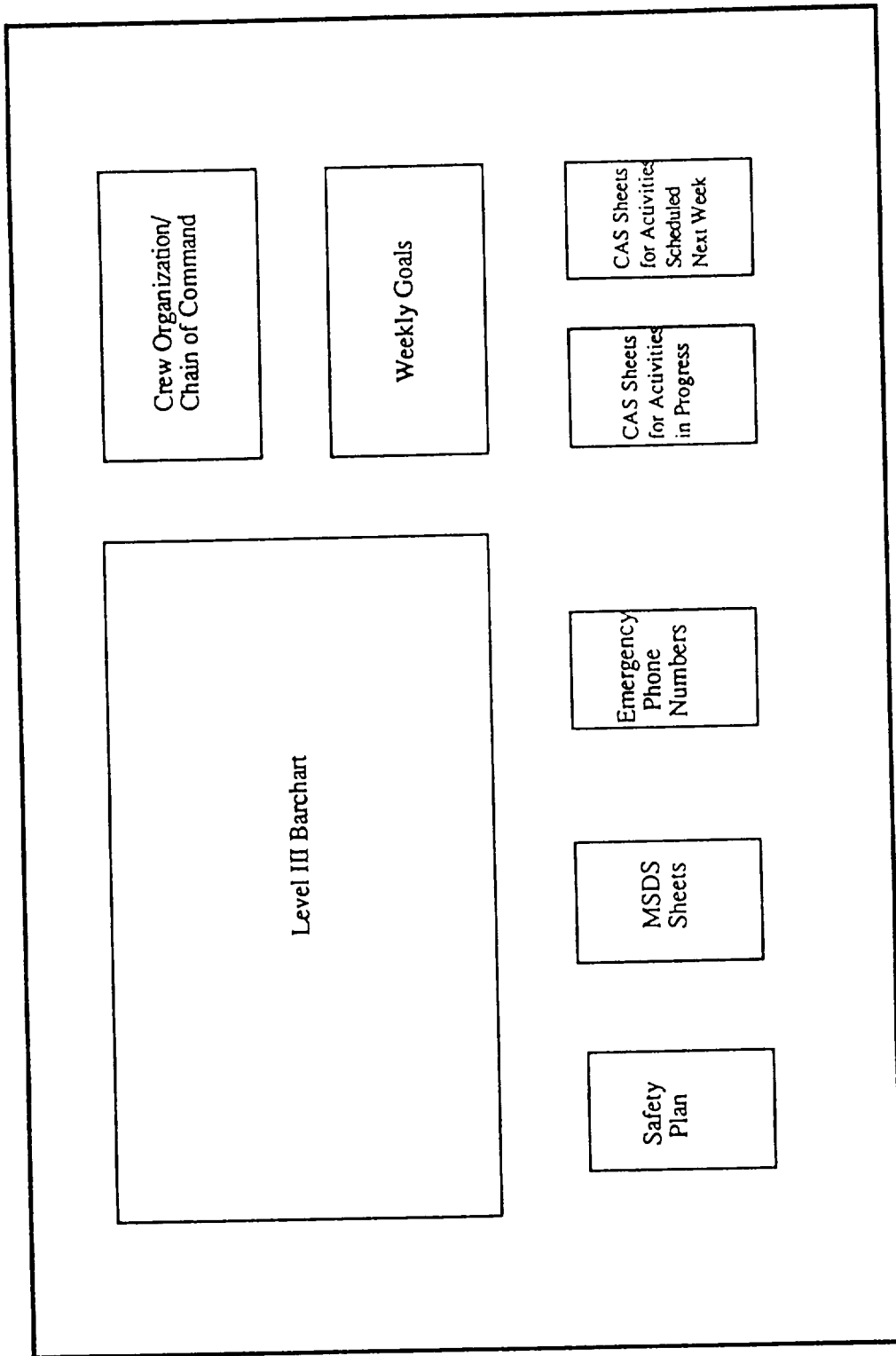


Figure 3-22.—Posted Jobsite information.



## INITIAL SETUP

You must consider many things when setting up your jobsite. Such problems as access, haul roads, head

facilities, potable water, project sign, parking for heavy equipment, safety requirements, and power supply must all be solved. The following objectives checklist (fig. 3-23) is a valuable tool for laying out a project site.

<u>SITE LAYOUT OBJECTIVES CHECKLIST</u>	
A.	Economy of operation and minimum resource waste <ol style="list-style-type: none"><li>1. Less crew</li><li>2. Less equipment</li><li>3. Less material waste</li><li>4. Less time</li><li>5. Less management</li><li>6. Less money</li></ol>
B.	Importance of effective site organization <ol style="list-style-type: none"><li>1. Raises both individual and overall Seabee team productivity.</li><li>2. Maximizes productive time and reduces handling, transporting, and waiting time caused by workflow interferences.</li><li>3. Saves total project man-days.</li><li>4. Enables more timely project completion.</li><li>5. Reduces equipment usage and callbacks.</li><li>6. Produces less loss, pilferage, damage, and deterioration of staged materials.</li><li>7. Produces less wear and tear on finished and installed work surfaces.</li><li>8. Creates safer work environments.</li><li>9. Improves security against enemy action.</li><li>10. Reduces supervisor's time spent on minute production decisions, freeing up time for more significant tasks.</li><li>11. Leaves better impression on visitors/chain of command.</li></ol>
C.	Specific objectives <ol style="list-style-type: none"><li>1. Increase unimpeded workflow.</li><li>2. Create shortest, simplest transport paths.</li><li>3. Safeguard project resources.</li><li>4. Ease the receiving, inventorying, and staging of materials, parts, and equipment.</li><li>5. Optimize the crew leader's ability to monitor and control work site operations.<ol style="list-style-type: none"><li>a. Visibility of work and staging areas</li><li>b. Ease of access to work and materials</li><li>c. Ease of inspection of work and materials (task checks, verifying work-in-place)</li></ol></li><li>6. Maintain operational flexibility as the work progresses from rough and heavy trades to finishing trades.</li><li>7. Cope with site constraints:<ol style="list-style-type: none"><li>a. Dust, temperature, wind, sun, rain, humidity, and so on</li><li>b. Terrain, surface, and subsurface conditions</li><li>c. Scope and class of work</li><li>d. Other interferences and operations</li></ol></li></ol>

Figure 3-23.—Site layout objectives checklist.

Besides the layout objectives checklist to help keep the overall goals in mind, a site organization checklist (fig. 3-24) can help with specifics. Many of the details

of traffic, prefabrication, material and equipment, roads, utilities, safety, and defense are easier to handle with a checklist.

### SITE ORGANIZATION CHECKLIST

- A. Job work and traffic flows (congestion)
  - 1. Exterior access to site
  - 2. Interior traffic and cross traffic
  - 3. Material bottlenecks
  - 4. Work access bottlenecks
  - 5. Trades and processes working through other trades
  - 6. Analysis of work sequences
  - 7. Movements of both temporary and installed materials from staging area and delivery yards to installation points
  - 8. Methods used by each trade for:
    - a. Delivery of materials - erection of materials
    - b. Use of scaffolds, hoists, elevators
    - c. Work areas required for proper usage of mobile equipment
  - 9. Benefits or hindrances caused by growing mass of installed work
  - 10. Priority of continuous flow (shorter) paths over occasional flow paths
  - 11. Closer location priority for heavier, bulkier, less delicate components over lighter, less bulky, more delicate items
  - 12. Equipment access to all working points and adequate work bay maneuvering room
- B. Yard spaces and areas for component prefabrication
  - 1. Temporary structures and assemblies
    - a. Concrete forms
    - b. Scaffolds
    - c. Hoists
    - d. Lagging, shoring, braces, and so on
    - e. Saw tables and jigs
    - f. Pine fabrication tables and jigs
  - 2. Installed assemblies
    - a. Rebar
    - b. Embedded items
    - c. Piping and plumbing
    - d. Lumber framing
    - e. Steel framing
    - f. Sheet and miscellaneous metals
    - g. Electrical duct, panels, and wire harnesses
    - h. Masonry
    - i. Tile
    - j. Cabinetry and finish carpentry
    - k. Pile driving
    - l. Dewatering
    - m. Instrumentation
    - n. Precast framing, lintels, walls, and slabs

Figure 3-24.—Site organization checklist.

## SITE ORGANIZATION CHECKLIST

- C. Materials staging and storage
  - 1. Planned concurrent with job traffic and workflow analysis and location of yard work plants and spaces.
  - 2. Assigned delivery points for inspection receiving and counting.
  - 3. Stored by trade in separated areas.
  - 4. Stockpiled by arrangements:
    - a. First-used, last-used material locations
    - b. Palletized, stacked, sheltered, and raised off ground
    - c. Drainage
    - d. Unpacking and assembly space
    - e. Aisle and loader access
    - f. Storage space (particularly for pipe, steel, rebar, joists, electric duct, poles, and standards)
    - g. Space for phased delivery of perishable or long lead-time materials
  - 5. Protection against:
    - a. Environmental deterioration
    - b. Handling and transporting
    - c. Theft, losses, and shrinkages
  - 6. Box trailers for small and valuable parts
  - 7. Ground treatment, platforms, corduroying mats, and so on, for heavy loads on soft ground
  - 8. Aggregate stockpiles
- D. Equipment and field maintenance sites
  - 1. Parking
  - 2. Maintenance pads, shops, and shelters
  - 3. FOG/POL storage
  - 4. Fueling stations
  - 5. Parts van and box trailers
  - 6. Tires
  - 7. Attachments
  - 8. Lowboys
  - 9. Loading/unloading ramps
  - 10. Dust control
  - 11. Batch and mix plants
    - a. Compressed air
    - b. Water
    - c. Power
    - d. Foundations
    - e. Bias, stockpiles, and surge piles
    - f. Loading, scalping, screening, crushing, conveying, washing, stockpiling, reloading, and hauling
    - g. Cooling or heating aggregates
    - h. Methods of delivery and placing
    - i. Proximity to aggregate sources and jobsite

Figure 3-24.—Site organization checklist—Continued.

## SITE ORGANIZATION CHECKLIST

- E. Haul roads and pits
  - 1. Haul economy
    - a. Elevation (minimum climb, level) - length (minimum haul time)
    - b. Grades (minimum shift downs) - surface (rolling resistance)
  - 2. Haul maintenance
    - a. Temporary drainage
    - b. Haul road maintenance
- F. Temporary utilities
  - 1. Electric power distribution points and lighting
  - 2. Water points and water storage
  - 3. Potable water
  - 4. Sanitary toilets
  - 5. Temporary storm drainage
  - 6. Fire lines
  - 7. Fuel
  - 8. Office space
  - 9. Employee bulletin boards
  - 10. Guard shack
- G. Security and safety
  - 1. Gates, fences, and locked storage
  - 2. Barricades and safety lights
  - 3. Guard
    - a. Shack
    - b. Telephone
    - c. Security lighting
- H. People
  - 1. Personnel report-in procedure
  - 2. Safety and administrative instructions
  - 3. Parking
  - 4. Visitors
  - 5. OICC/ROICC office
  - 6. First aid
- I. Military defense
  - 1. Fire lines
  - 2. Weapons positions
  - 3. Perimeter trenches and foxholes
  - 4. Secondary defense and final fires
  - 5. Ammunition storage and supply
  - 6. Wire, booby traps, obstacles, and concealment

Figure 3-24.—Site organization checklist—Continued.

## INSPECTIONS

The two biggest inspections for crew leaders are operational readiness inspections (ORIs) under the

3rdNCB and departmental management inspections (DMIs) under the 2ndNCB. Figure 3-25 is a jobsite inspection checklist. This will assist you in preparing for these inspections.

<b>JOBSITE INSPECTION CHECKLIST</b>	
<b>Safety items</b>	
<input type="checkbox"/>	Clean drinking water with plenty of cups
<input type="checkbox"/>	EM 385 present on jobsite
<input type="checkbox"/>	Power tagged with safety color of the month
<input type="checkbox"/>	Power sources tagged reflecting re-certification within the last month
<input type="checkbox"/>	Fire extinguishers staged and checked within the last month
<input type="checkbox"/>	Welders or light plants not used as power source
<input type="checkbox"/>	GFI's/spider boxes in use
<input type="checkbox"/>	All rebar is capped
<input type="checkbox"/>	Scaffolding has handrails, toeboards and bracing
<input type="checkbox"/>	Project site roped off
<input type="checkbox"/>	All vehicles have wheels chocked
<b>Housekeeping</b>	
<input type="checkbox"/>	Jobsite should be spotless for inspection
<input type="checkbox"/>	Conex boxes and kits neat and orderly
<input type="checkbox"/>	Vehicles clean and pre-started
<input type="checkbox"/>	Excess material removed from the jobsite
<input type="checkbox"/>	Professional project sign with current info
<b>Crew members</b>	
<input type="checkbox"/>	Must know who the project safety petty officer is
<input type="checkbox"/>	Must know the safety color of the month
<input type="checkbox"/>	Must wear hard hats at all times
<input type="checkbox"/>	Must know who the QC inspector is
<input type="checkbox"/>	Must know the information on the CAS sheets for the next several activities
<input type="checkbox"/>	If current project will be finished before end of deployment, they must know where they are going when the project is done
<input type="checkbox"/>	Must know timekeeping procedures
<input type="checkbox"/>	Unit integrity should be maintained to the maximum extent possible.
<input type="checkbox"/>	Military organization = construction organization = berthing arrangements
<input type="checkbox"/>	Strict adherence to daily routine
<input type="checkbox"/>	Assistant crew leader designated
<b>Project Management</b>	
<input type="checkbox"/>	Barcharts and CAS sheets reflect actual status
<input type="checkbox"/>	Project package is complete and in use by the crew leader
<input type="checkbox"/>	As-built (redline) drawings up to date and on project
<input type="checkbox"/>	BM reflects accurate material status
<input type="checkbox"/>	Kit inventories up to date and inventories maintained on the jobsite
<input type="checkbox"/>	Project log is up to date

Fig. 3-25.—Jobsite inspection checklist.

## CHAPTER 4

# ADVANCED BASE PLANNING AND EMBARKATION

*Learning Objective: Recognize the principles involved in the use of the Facilities Planning Guide and identify procedures used in preparing material and equipment for embarkation.*

The Advanced Base Functional Component (ABFC) system was developed to provide support facilities to constantly changing tactical and strategic situations. A modular or building-block concept was developed. Components were needed that would incorporate personnel, materials, equipment, and facilities. These components were designed and developed to fulfill specific functions, no matter where the components were placed. The Navy ABFC system is based on early experiences in advanced base planning and shipment used in World War II. Additional improvements were adopted from experiences learned in Korea, Vietnam, and the Persian Gulf.

ABFCs are normally complete entities. The basic groupings of the ABFC system are (1) component, a complete unit; (2) facility, a portion of a complete component; and (3) assembly, a portion of a facility. ABFCs, though normally complete, may not be supplied with housing, messing, medical facilities, maintenance facilities, defensive ordnance, communication equipment, and utilities with each component. These service components or facilities are to be integrated into an overall base development or augmentation plan. The ABFC system consists of two general-purpose publications: *Table of Advanced Base Functional Components with Abridged Initial Outfitting Lists*, OPNAV 41P3A, and *Facilities Planning Guide*, volumes 1 and 2, NAVFAC P-437.

ABFCs are assigned descriptive names to indicate their functions and alphanumeric designators to facilitate reference. A detailed advanced base initial outfitting list (ABIOL) is an itemized line-item printout of the material in each ABFC. Each system's command or bureau is responsible for maintaining a detailed listing of that part of the ABIOL assigned to it.

This chapter discusses use of the *Facilities Planning Guide*, NAVFAC P-437, which is an advanced base planning document. This chapter will provide you

with guidelines for a system of preparing material, equipment, and personnel for embarkation.

### FACILITIES PLANNING GUIDE

When tasked to assist in planning the construction of an advanced base, you should consult the *Facilities Planning Guide*. This FPG document identifies the structures and supporting utilities of the Navy ABFC system. This system was developed to make pre-engineered facility designs and corresponding material lists available to planners at all levels. While these designs relate primarily to expected needs at advanced bases and to the Navy ABFC system, they also can be used to satisfy peacetime requirements. Facility, logistic, and construction planners will find the information required to select and document the materials necessary to construct facilities.

The NAVFAC P-437 consists of two volumes. Volume 1 contains reproducible engineering drawings organized as follows:

Part 1, Component Site Plans, indexed by component and ABFC designation

Part 2, Facility Drawings, indexed by facility number and DoD category code

Part 3, Assembly Drawings, containing assembly information and indexed by assembly number

Each drawing is a detailed construction drawing that describes and lists the facilities, assemblies, or line items required to complete it. A summary of logistic, construction, and cost data is provided for each component, facility, and assembly of the ABFC system. A component is defined as a grouping of personnel and material that has a specific function or mission at an advanced base. Whether located overseas or in CONUS, a component is supported by facilities and assemblies.

A construction network is included in each facility of the ABFC system as part of the design package in the NAVFAC P-437 (fig. 4-1). The network includes such information as tool kits, equipment, and PRCP skills required for each facility. Time and effort are saved by using the construction networks that were developed for each facility in the ABFC system. To benefit from the construction networks, you must have an understanding of the basic principles and assumptions upon which the networks are based. Network analysis procedures for precedence diagramming are contained in chapter 5 of the *Seabee Planner's and Estimator's Handbook*, NAVFAC P-405, and chapter 2 of this TRAMAN.

Volume 2 of NAVFAC P-437 contains the detailed data display for each component, facility, and assembly. (Except for earthwork, material lists in volume 2 are complete balls of material.) It also is arranged in three parts.

Part 1 lists and describes by DoD category code the facilities requirement for each component.

Part 2 lists and describes by assembly number the assembly requirement for each facility.

Part 3 lists line-item requirements by national stock number (NSN) for each assembly.

The P-437 also contains other useful information for planners, such as crew sizes; man-hours by skill; land areas; amounts of fuel necessary to make a component, facility, or assembly operational; and information about predesigned facilities and assemblies that are not directly related to components shown in the ABFC table (OPNAV 41P3A). These predesigned facilities and assemblies give the planner alternatives for satisfying contingency requirements when the callout of a complete component is not desired. To make the P-437 compatible with other DoD planning guides, *Category Codes Facilities*, NAVFAC P-72, a related publication, establishes the category codes, nomenclature, and the required units of measure for identifying, classifying, and quantifying real property. The cardinal category codes are as follows:

- 100 Operations and Training
- 200 Maintenance and Production
- 300 Research, Development, and Evaluation
- 400 Supply
- 500 Hospital and Medical
- 600 Administrative
- 700 Housing and Community Support

800 Utilities and Ground Improvement

900 Real Estate

If a facility is required for enlisted personnel quarters, for example, it will be found in the 700 series (Housing and Community Support). The assemblies within each facility consist of a grouping of line items at the NSN level which, when assembled, will perform a specific function in support of the facility. An assembly is functionally grouped in such a way that the assembly number relates to the Occupational Field 13 (Seabee) skill required to install it. The groupings are numbered as follows:

Description	Number	Sequence
	Start	Stop
Builder (BU) oriented	10,000	19,999
Utilitiesman (UT) oriented	20,000	29,999
Construction Electrician (CE) oriented	30,000	39,999
Steelworker (SW) oriented	40,000	49,999
Equipment Operator (EO) oriented	50,000	54,999
Waterfront equipment	55,000	57,999
Underwater construction and diving equipment	58,000	59,999
Operational supplies	60,000	62,499
Operating consumables	62,500	64,999
NBC warfare	65,000	67,499
Personnel-related supplies	67,500	69,999
Unassigned at present	70,000	79,999
Shop equipment including maintenance tools	80,000	80,999
Unique ABFC tool kits	81,000	81,999
Naval Construction Force (NCF) Table of Allowance (TOA) construction tools and kits (power tools)	82,000	82,099
NCF TOA construction tools and kits (electrical)	82,500	82,599
NCF TOA construction tools and kits (miscellaneous)	83,000	83,199
NCF TOA construction tools and kits (rigging)	84,000	84,099
Shop equipment (ABFC unique)	85,000	87,499

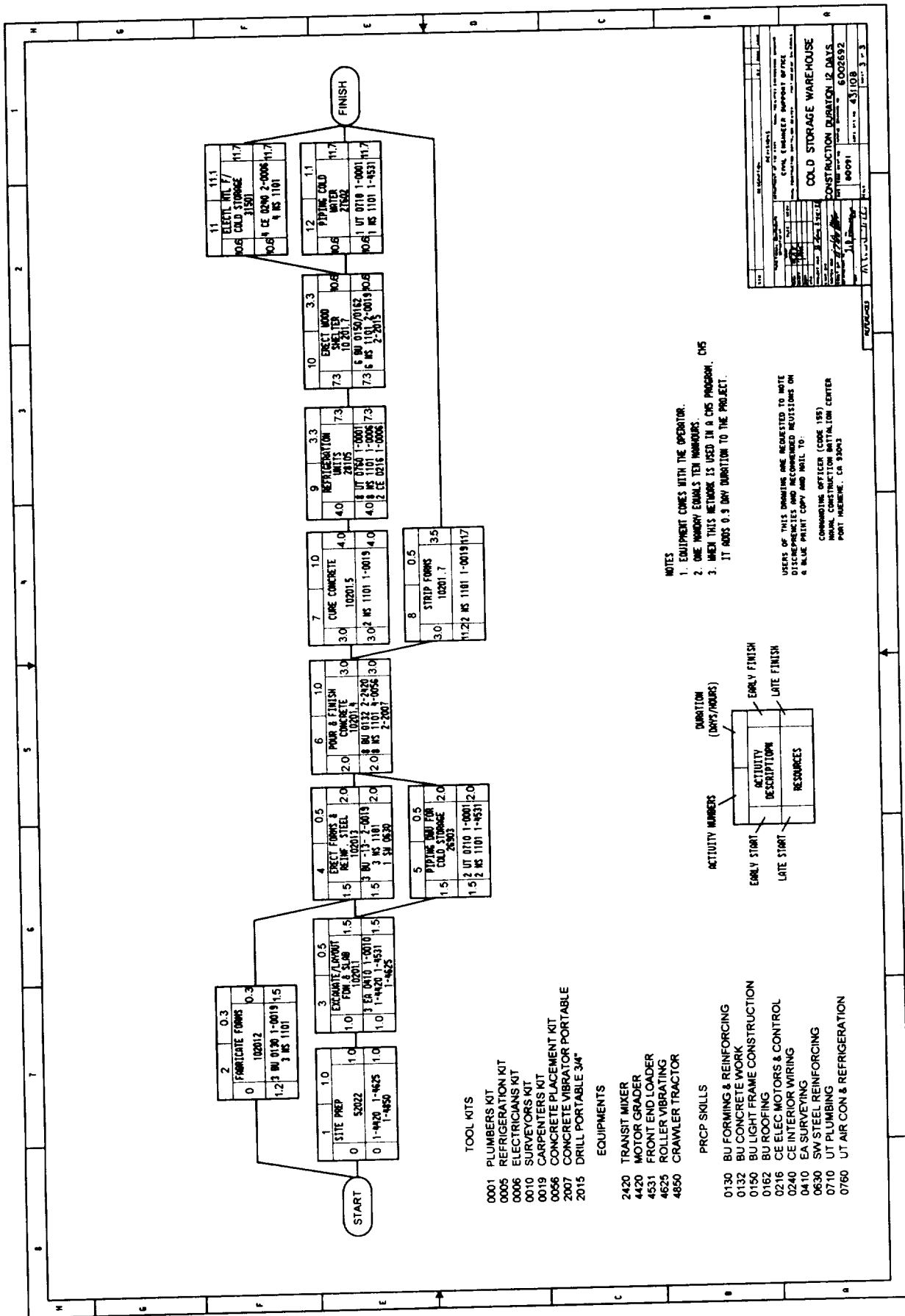


Figure 4-1.—Construction network.



## TAILORING COMPONENTS AND FACILITIES

When you are using the ABFC system, remember that tailoring it to serve your specific needs is possible. Know your exact mission and requirements. Choose the components, facilities, or assemblies that best fit or can be tailored to meet your desired goals. Modular elements can be developed to serve similar functions in various locations. The exact requirements for a specific base cannot be defined, economically designed, nor supported within the general system. However, the base development planner knows the specific location, mission, unit composition, and availability of other assets. The planner can then select from the ABFC system the components or facilities that satisfy these specific requirements. Tailoring is then applied to the preplanned ABFC assets to come up with what is needed.

Components or facilities can be tailored by (1) deleting or adding facilities or assemblies and (2) specifying requirements for the Tropical or North

Temperate Zone. Assemblies required only in Tropical installations are coded with the letter *T* in the zone column to the right of the assembly description. Assemblies required only in North Temperate installations are coded with the letter *N*. Uncoded assemblies are common to both zones.

## USE AND APPLICATION OF THE FACILITIES PLANNING GUIDE

Although a listing in the P-437 may help you order individual items in general supply, it does NOT replace stock lists of systems commands or bureaus, offices, single managers, or inventory control points. Stock numbers and descriptions can be verified through appropriate stock lists. You are responsible for verifying stock numbers when ordering a component, facility, or assembly.

### Component

Figure 4-2 shows a typical component breakdown of the P25. A brief header describes the mission and

COMPONENT P25										SEP 15 88
NAVAL MOBILE CONSTRUCTION BATTALION										
PROVIDES PERSONNEL, ADMINISTRATION, SUBSISTANCE, EQUIPMENT, AND MINIMAL HOUSING REQUIRED FOR THE MOBILIZATION OF ONE MOBILE CONSTRUCTION BATTALION.										
SITE PLAN 602764D					MAJOR REV 06 11 85					
FACILITY	DESCRIPTION	FACILITY CAPACITY	QTY	COMPONENT CAPACITY	WEIGHT SHORT TON	CUBE MEAS TON	DOLLAR VALUE	CONST EFFORT MAN-HOURS		
123 10T	POL STOR-DSPNSG FACIL 20000 GAL	1 OL	2	2 OL	3.8	9.0	51,515	470		
143 45AD	ARMORY SMALL (TRICOM)	100 SF	2	200 SF	0	0	0	0		
143 45AE	ARMORY CONTAINERIZED-STANDARD 20	160 SF	2	320 SF	0	0	0	0		
214 20M	A CD AUTO/CONST EQUIP MAINT SHOP	4000 SF	2	8000 SF	7.3	16.0	54,148	210		
219 10J	B C AND D COMPANY SHOPS MINIMAL	5024 SF	1	5024 SF	4.2	10.1	30,143	85		
219 10P	CENTRAL TOOL ROOM 16X32 TENT	512 SF	4	2048 SF	2.0	6.8	19,539	32		
441 10B0	STORAGE/SUPPLY/SPARE PRT 16X32 TENT	512 SF	5	2560 SF	2.0	7.0	11,858	20		
530 10R0	MEDICAL-DENTAL/FIRST AID	1024 SF	1	1024 SF	1.3	4.4	8,184	40		
610 10V	ADMINISTRATION OFFICE TENT	512 SF	6	3072 SF	3.0	9.6	15,448	48		
722 10R0	GALLEY MESS FLD ROOM F/RAPID DEPL	800 MM	1	800 MM	8.3	25.6	85,791	265		
723 20JA	HEAD 4-HOLE BURN OUT W/LATRINE	336 SF	17	5712 SF	27.2	45.9	17,570	0		
723 61C	SHOWER BATH UNIT PORTABLE 9 HEAD	1 EA	4	4 EA	4.0	22.8	47,386	116		
725 10AD	AIR DET TENT CAMP FACILITY	4608 SF	1	4608 SF	10.7	29.9	50,571	334		
725 10J	TROOP HOUSING EMERGENCY 16X32 TENT	512 SF	53	27136 SF	26.5	64.8	106,458	424		
730 40H	LAUNDRY SKID-MOUNTED	280 SF	1	280 SF	.4	1.7	21,217	8		
811 10R	ELEC PWR PLANT DSL 2-200KW W/O TANK	400 KW	1	400 KW	.7	1.3	22,737	5		
812 300P	DISTR CIR PORT 480-208/120V 30KVA		10		7.0	12.0	129,628	30		
812 30PE	ELEC DISTR LINE 1000FT #6AWG	250 LF	2	500 LF	.2	.6	1,486	22		
812 30PF	ELEC DISTR LINE 1000FT #1 EXPED	250 LF	2	500 LF	.2	.4	2,401	40		
812 30PG	ELEC DISTR LINE 1000FT 250MCM EXPED	250 LF	10	2500 LF	7.0	9.0	31,017	670		
812 30PK	DISTR CIR PORT 208/120V 30A 3PH		4		.4	1.2	9,053	8		
812 30PL	DISTR CIR PORT 480-208/120V 15KVA		4		2.0	4.8	56,922	8		
812 30Z	ELEC DISTR SPLC ENCL LARGE		2		.6	3.4	4,260	56		
841 10M	WATER TREATMENT FACILITY 1500 GPH	30 KG	2	60 KG	9.0	15.2	101,167	38		
841 40E	WATER STORAGE POTABLE	30000 GA	2	60000 GA	6.0	10.6	48,473	166		
872 10R	SECURITY ANCHORING FOR TENTS		10		.0	1.0	1,672	0		
872 10Y	SECURITY FENCE BARRIER (2000 FT)	2000 LF	3	6000 LF	9.3	8.1	6,720	218		
872 10Z	SECURITY FENCE BARRIER (2000 FT)	2000 LF	5	10000 LF	17.5	40.5	21,352	1,200		
872 200	BUNKER COMMAND POST	1 EA	3	3 EA	31.2	33.6	19,035	2,679		
TOTAL NORTH (TEMPERATE)					191.7	415.3	1,004,789	7,200		
TOTAL TROPICAL (BASIC)					181.9	395.0	958,266	7,044		
COMPONENT P25										
CONST STD	LAPSED DAYS	LAND ACRES	POWER KVA CONNECTED	POWER KVA DEMAND	WATER GPD	SEWER GPD	FUEL GAL/30 DAYS		PWR GEN DSL	
INIT	G	53.0	236	178	19,000	15,000	37,884	698	0	
SKILLS MAN-HOURS	EA	BU	UT	CE	SW	ED	CM	NS		
	145	1,229	351	633	604	546	0	2,728		

Figure 4-2.—Component.

capabilities of the component. The site plan pertaining to each component is depicted by a NAVFAC drawing number. However, drawings in volume 1, part 1, are indexed by component designation, not drawing numbers. The word *NONE* appears for components that have no site plans. The facilities required to make the component operative are listed in numerical sequence by DoD category code. The alpha suffix for each facility designator indicates differences between sizes, types, or layouts of facilities with the same functional purpose. Facility capacity is expressed in terms of the units of measure used in the *Category Codes Facilities*, NAVFAC P-72. The component capacity is figured by multiplying the facility capacity and the quantity. Weight and cube are measured in normal units for export packing. Weight and construction efforts are computed using the *Seabee Planner's and Estimator's Handbook*, NAVFAC P-405. Average construction conditions are assumed and computations are based on normal Seabee skill levels.

You compute the total of the weight, cube, and dollar value columns by adding all facilities or assemblies required in both tropical and northern climates plus the unique requirements for either tropical or northern areas.

Summary data located below the component facility listings provides information on the following:

1. Construction standards (CONST STD) taken from *Joint Chiefs of Staff (JCS)*, publication 3, are grouped into two classifications: initial and temporary. Initial (INIT) is a duration requirement of less than 6 months. Temporary (TEMP) is a duration requirement of from 6 to 60 months.

2. Days of construction duration (LAPSED DAYS) are based on job requirements, optimum construction crew size, and full-material availability.

3. Often the land requirements (LAND ACRES), based on the assumed plot plan, will not be followed exactly because of terrain or existing buildings. The idealized plot plan was developed to design supporting utility systems. The information contained in the utility facilities has been increased to allow for variation in terrain.

4. The connected electrical load (POWER KVA) has been computed based on knowledge of ABIOL or TOA contents. A load diversity factor has been applied to compute the kVA demand.

5. Water and sewer (GPD) are based on ABIOL or TOA contents and the utility systems designed to this criteria.

6. Fuel usage (FUEL GAL) is computed on 30-day requirements for installed engine-driven or fuel-fired equipment only. No allowance for automotive, construction, weight handling, and other jobsite support equipment fuel is included. Fuel is not provided when facilities or assemblies are shipped. NAVSUP provides fuel as a contribution when whole components are shipped.

7. The skill requirements (SKILLS MAN-HOURS) are designated by Seabee (OF-13) ratings and are expressed in man-hours, as computed for each facility.

## Facility

Figure 4-3 shows a typical facility entry in part 2 of volume 2—the electric power plant diesel 2-200 kW generators, without tank, facility 811 10R. Adjacent to the facility number, the heading shows the JCS planning factor applied. This planning factor is based on *Planning Factors for Military Construction in Contingency Operations*, Joint Staff Memorandum (MJCS) 235-86. The header also describes the basic capability of the facility. After the facility capability description is the NAVFAC drawing number. The drawing number is shown for reference purposes. All drawings in volume 1, part 2, are indexed by facility number.

The assemblies required to make the facility functionally operational are listed in assembly-number sequence. These numbers were derived from the prime trade involved in the construction. The 30,000 series indicates Construction Electricians. There is an exception to this numbering system. The exception is for Civil Engineer Support Equipment (CESE). CESE is identified by an equipment cost code (ECC). In this example, ECC 512801 is a 200-kW generator.

A brief description appears next, followed when appropriate by the code “N” for the North Temperate Zone or “T” for the Tropical Zone. Only assemblies required for Arctic operation are designated code “N.” Other facilities or assemblies are designed for use in both North and South Temperate Zones and Tropical Zones. The quantity given is used as a multiplier, indicating the number of assemblies to be ordered. Weight and cubic feet are measured in normal terms for export packing. Weight, cubic feet, and dollar value reflect totals for each line.

FACILITY 811 10R  
 ELECTRIC PWR PLANT DSL 2-200KW GEN W/CESE  
 W/O TANK

SEP 15 88

PLANNING FACTOR (0.4-1.5)KW/MN  
 PROVIDES UP TO 400KW OF POWER AT 416Y/240 VOLTS  
 OR 208Y/120 VOLTS 3-PHASE.

MAJOR REV. 06 14 88

NAVFAC DRAWING NUMBER NONE

ASSEMBLY	DESCRIPTION	ZONE	QTY.	WEIGHT POUNDS	CUBIC FEET	DOLLAR VALUE	CONST EFFORT MANHOURS				
32064	SUPPORT EQUIP F/200KW GEN ECC512801		2	48.6	1.3	145.08	0				
512801	GENERATOR 200KW		2	210.0	.0	988.80	0				
32602	PANELBOARD ASSY 1200A WEATHERPROOF		1	1,157.7	48.1	21,533.17	4				
32604	PARALLELING CABLE F/GENERATORS		1	4.0	4.0	69.72	1				
TOTAL NORTH (TEMPERATE)				SHORT TON	MEAS TON						
				.7	1.3						
TOTAL TROPICAL (BASIC)				.7	1.3	22,736.77	5				
FACILITY 811 10R				PRIMARY UNIT OF MEASURE	400 KW	SECONDARY UNIT OF MEASURE	0				
CONST STD	LAPSED DAYS	LAND ACRES	POWER KVA	CONNECTED DEMAND	VOLTS	PHASE	GPD	WATER TOT. GPM	WATER PEAK GPD	SEWER RECOV. CODE	
INIT	2	.00	0	0	0	0	0	0	0	A	
FUEL (GAL/30DAYS)											
HEATING											
DSL	MOGAS	DSL	EA	EA	BU	UT	CE	OURS	SW	ED	CM
0	0	0	0	0	0	0	4	0	0	1	0
										NS	0

Figure 4-3.—Facility.

Construction estimates are computed in the same manner as components, with the following exception. In addition to primary facility capacity, secondary capacity, as described in the NAVFAC P-72, is included. This is used, for example, in the 700 series of facilities where the primary capacity is expressed in personnel and the secondary, in square feet.

The recoverability code is a broad indication of the relocatability or recoverability. The code "A" indicates total recoverability, and "D" indicates a disposable facility. More details are found in table 4-1, Recoverability Code.

### Assembly

Figure 4-4 shows a typical entry for an assembly. Assembly 32602 provides the necessary material for the installation of a 200-kW generator. Header information is the same as that for a facility. Assembly line-item requirements are listed by cognizance symbol and NSN. The unit of issue, weight, cubic feet, and dollar value are extracted from supply files once the requirement data is entered. This data changes often, but frequent changes are not made in the *Facilities Planning Guide* for stock numbers with minor price-level changes.

### Ordering of Components, Facilities, or Assemblies

Components are usually ordered only under a mobilization situation and requested through the CNO. Facilities and assemblies can be ordered without CNO approval if reimbursement is provided. Requests for release are forwarded to NCBC, Port Hueneme. Attention is directed to the *Facilities Projects Manual*, OPNAVINST 11010.20 series (July 1985), regarding

project approvals for peacetime use, and to *Relocatable Buildings, Procurement and Use of*, OPNAVINST 11010.33 series (October 1984), and DOTINST 4165.56 (April 1981), regarding the relocatable building program.

### Index of Facilities

Suppose you have a requirement for an electrical distribution system underground. To determine what is available in the ABFC system to satisfy the requirement, look in P-437, volume 2, part 2, *Index of Facilities*, under the 800 series (Utilities and Ground Improvements), as shown in figure 4-5. If an approximate 11,000-foot system is needed, facility 81230AB can be used. Figure 4-6 gives the information you need to fulfill the requirement for an underground electrical distribution system.

Certain installed equipment or collateral equipment, such as furniture and fixtures contributed by others, are not furnished with the facilities or the assemblies listed in the P-437. You must request this equipment separately. The assembly listings indicate what is installed or what NAVFAC collateral equipment is provided.

### EMBARKATION

A naval mobile construction battalion (NMCB), an amphibious construction battalion (PHIBCB), a construction battalion unit (CBU), or any other unit of the NCF must be ready to deploy or redeploy by sea, air, or land. NCF units must respond to an assigned mission by providing immediate support to Navy, Marine Corps, and other forces. Mobile units may also be required to perform disaster recovery operations.

Table 4-1.—Recoverability Code

A. Relocatable:	Designed for the specific purpose of being readily erected, disassembled, stored, and reused. Includes tentage.
B. Pseudo-relocatable:	Not specifically designed to be dismantled and relocated, but could be, with considerable effort and loss of parts. Rigid-frame building included.
C. Nonrecoverable:	A structure not designed to provide relocatability features or one where the cost of recovery of the shelter exceeds 50% of the initial procurement cost. Bolted tanks and steel bridges included.
D. Disposable:	Those temporary structures having low acquisition and erection costs, which are not designed for relocation and reuse and may be left on site or destroyed, such as SEAHUTS.

ASSEMBLY 32602 ZONE 32602

PANELBOARD WEATHERPROOF 480 VOLTS 3-POLE 3-WIRE  
1200 AMPERE

NAVFAC DRAWING NUMBER 6002625 MAJOR REVISION DATE 06 11 85

COG	STOCK NUMBER	DESCRIPTION	UI	QTY	WEIGHT POUNDS	CUBIC FEET	DOLLAR VALUE
9G	5975-00-152-1143	BOX CONN CA STR FOR 1N KO					
9G	5975-00-878-3791	ROD, GROUND, 3-3FT SECTIONS, 5/8N DIA, STEEL, COPPER	EA	2	1.06	.0200	.56
	1	CLAD, W/DRIVING STUD, GROUND WIRE CLAMP AND TERMINAL	EA	1	7.00	.0840	13.83
9N	5999-00-257-7025	LUG, AND 6FT NO. 6 AWG BARE STRANDED COPPER WIRE					
2C	6110-00-213-8078	CLAMP GND 3/4 ROD 2-8 SOL	EA	1	.47	.0100	.43
	8	PANELBOARD, POWER DISTRIBUTION, PORTABLE, WEATHER-	EA	1	500.00	42.0000	20,317.00
	8	PROOF, 400 KILOWATT, INPUT-480 OR 208 V., 3-PHASE, 4-					
	8	POLE, 5-WIRE, 60 HZ, BUS CAPACITY-1200 AMPS, 4-3 POLE					
	8	INPUT AND 8-3 POLE OUTPUT CIRCUIT BREAKERS.					
	8	APPENDIX E OF PD APPLIES					
9Z	6145-00-129-9320	WIRE COP SOL 6 AWG SOFT BARE	FT	15	1.20	.0225	1.35
9Z	6145-01-212-0272	WIRE ELECTRICAL #4/O AWG EXPED	FT	600	648.00	6.0000	1,200.00
				TOTAL	1,157.73	48.1365	21,533.17

ASSEMBLY 32602

FUEL (GAL/30DAYS)	HEATING PWR GEN	DSL MOGAS	DSL	EA	BU	UT	S	K	I	L	L	S	M	A	N	H	O	U	R	S	E	O	CM	NS	CONST EFFORT MANHOURS
0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	1	0	0	0	0	0	0	0	0	4

Figure 4-4.—Assembly.

INDEX OF FACILITIES  
ALPHABETIC

JUN 15 90

FACILITY	DESCRIPTION	CAPACITY	AREA	DRAWING	PAGE
		PRIMARY	SE.		
811 10CN	ELEC PHR PLANT DSL 1-100KM W/PLNTNK	100 KM		6027582	
811 10AA	ELEC PHR PLANT DSL 1-15KM W/PLNTNK	15 KM		6139176	
811 10AE	ELEC PHR PLANT DSL 1-30KM W/PLNTNK	30 KM		6139175	
811 10AJ	ELEC PHR PLANT DSL 1-60KM W/PLNTNK	60 KM		6139174	
811 10TY	ELEC PHR PLANT DSL 2-100KM W/CESE	200 KM		NONE	
811 10AP	ELEC PHR PLANT DSL 2-100KM W/PLNTNK	200 KM		6139172	
811 10AB	ELEC PHR PLANT DSL 2-15KM W/PLNTNK	30 KM		6139176	
811 10R	ELEC PHR PLANT DSL 2-200KM W/D TANK	400 KM		NONE	
811 10AU	ELEC PHR PLANT DSL 2-200KM W/PLNTNK	400 KM		6139179	
811 10AF	ELEC PHR PLANT DSL 2-30KM W/PLNTNK	60 KM		6139175	
811 10AK	ELEC PHR PLANT DSL 2-60KM W/PLNTNK	120 KM		6139174	
811 10AR	ELEC PHR PLANT DSL 3-100KM W/PLNTNK	300 KM		6139173	
811 10CR	ELEC PHR PLANT DSL 3-100KM W/PLNTNK	300 KM		6027582	
811 10AC	ELEC PHR PLANT DSL 3-15KM W/PLNTNK	45 KM		6139176	
811 10AV	ELEC PHR PLANT DSL 3-200KM W/PLNTNK	600 KM		6139179	
811 10AG	ELEC PHR PLANT DSL 3-30KM W/PLNTNK	90 KM		6139175	
811 10AL	ELEC PHR PLANT DSL 3-60KM W/PLNTNK	180 KM		6139174	
811 10AM	ELEC PHR PLANT DSL 4-200KM W/PLNTNK	800 KM		6139179	
811 10BC	ELECTRIC POWER PLANT DIESEL 1-10KM	10 KM		NONE	
811 10CA	ELECTRIC POWER PLANT DIESEL 1-15KM	15 KM		6027585	
811 10CJ	ELECTRIC POWER PLANT DIESEL 1-60KM	60 KM		6027583	
811 10BD	ELECTRIC POWER PLANT DIESEL 2-10 KM	20 KM		NONE	
811 10CU	ELECTRIC POWER PLANT DIESEL 2-200KM	400 KM		6027581	
811 10CF	ELECTRIC POWER PLANT DIESEL 2-30KM	60 KM		6027584	
811 10BB	ELECTRIC POWER PLANT DIESEL 2-5KM	10 KM		NONE	
811 10CK	ELECTRIC POWER PLANT DIESEL 2-60KM	120 KM		6027583	
811 10CC	ELECTRIC POWER PLANT DIESEL 3-15KM	45 KM		6027585	
811 10CY	ELECTRIC POWER PLANT DIESEL 3-200KM	600 KM		6027581	
811 10CG	ELECTRIC POWER PLANT DIESEL 3-30KM	90 KM		6027584	
811 10CL	ELECTRIC POWER PLANT DIESEL 3-60KM	180 KM		6027583	
811 10CH	ELECTRIC POWER PLANT DIESEL 4-200KM	800 KM		6027581	
811 10CM	ELECTRIC POWER PLANT DIESEL 4-60KM	240 KM		6027583	
811 10P	ELECTRIC POWER PLANT DIESEL 5-200KM	1000 KM	2450 SF	6139179	
811 10IA	ELECTRIC POWER PLANT GED SKN	5 KM		NONE	
811 45A	ELECTRIC PHR PLANT 2-750KM DIESEL	1500 KM		NONE	
812 30AB	ELECTRICAL DISTRIBUTION LINE-UGND	11000 LF		NONE	
812 30AD	ELECTRICAL DISTRIBUTION LINE-UGND	4200 LF		NONE	
812 30U	ELECTRICAL DISTRIBUTION LINES	2500 LF			
812 30CV	ELECTRICAL DISTRIBUTION LINES EXPED	2000 LF		NONE	
812 30CZ	ELECTRICAL DISTRIBUTION LINES EXPED	4000 LF		NONE	
812 30AE	ELECTRICAL DISTRIBUTION LINES-UGND	3500 LF		NONE	
812 30AF	ELECTRICAL DISTRIBUTION LINES-UGND	5000 LF		NONE	
812 30AT	ELECTRICAL DISTRIBUTION LINES-UGND	1875 LF		NONE	
812 30AX	ELECTRICAL DISTRIBUTION LINES-UGND	125 LF		NONE	
812 30BF	ELECTRICAL DISTRIBUTION LINES-UGND	750 LF		NONE	
812 30BG	ELECTRICAL DISTRIBUTION LINES-UGND	500 LF		NONE	
812 30BH	ELECTRICAL DISTRIBUTION LINES-UGND	5000 LF		NONE	
812 30BK	ELECTRICAL DISTRIBUTION LINES-UGND	4000 LF		NONE	
812 30BM	ELECTRICAL DISTRIBUTION LINES-UGND	2500 LF		NONE	
812 30BS	ELECTRICAL DISTRIBUTION LINES-UGND	7500 LF		NONE	
812 30CY	ELECTRICAL DISTRIBUTION LINES-UGND	1000 LF		NONE	
812 30E	ELECTRICAL DISTRIBUTION LINES-UGND	2000 LF		NONE	
812 30J	ELECTRICAL DISTRIBUTION LINES-UGND	875 LF		NONE	
812 30K	ELECTRICAL DISTRIBUTION LINES-UGND	750 LF		NONE	
812 30M	ELECTRICAL DISTRIBUTION LINES-UGND	2700 LF		NONE	
812 30P	ELECTRICAL DISTRIBUTION LINES-UGND	4000 LF		NONE	
812 30N	ELECTRICAL DISTRIBUTION LINES-UGND	750 LF		NONE	

Figure 4-5.—Alphabetical index of facilities.

FACILITY 812 30AB PLANNING FACTOR NA  
 ELECTRICAL DISTRIBUTION LINES-UNDERGROUND 11000 FT

SEP 15 88

NAVFAC DRAWING NUMBER NONE

MAJOR REV. 04 14 78

ASSEMBLY	DESCRIPTION	ZONE	QTY.	WEIGHT POUNDS	CUBIC FEET	DOLLAR VALUE	CONST EFFORT MANHOURS
32200	ELEC CONDUCTOR BURIAL 10AWG 1000FT		3	796.8	16.6	459.00	99
32203	ELEC CONDUCTOR BURIAL 1AWG 1500FT		3	1,948.4	27.3	1,161.63	144
32205	ELEC CONDUCTOR BURIAL 250MCM 1500FT		3	4,758.0	77.2	6,872.58	267
32227	SPLICE BOX FIBERGLASS W/COVER		2	278.1	33.1	1,064.92	14
TOTAL NORTH (TEMPERATE)				SHORT TON	MEAS TON		
				3.9	3.9		
TOTAL TROPICAL (BASIC)				3.9	3.9	9,558.13	524
FACILITY 812 30AB				PRIMARY UNIT OF MEASURE	11,000 LF	SECONDARY UNIT OF MEASURE	0
CONST STD	LAPSED DAYS	LAND ACRES	POWER KVA	WATER TOT. GPD	WATER PEAK GPM	SEWER RECOV. CODE	
TEMP	0	.00	0	0	0	0	
FUEL (GAL/30DAYS)							
HEATING PWR GEN							
DSL	MOGAS	DSL	EA	BU	UT	CE	SW
0	0	0	0	0	0	311	0
							ED
							84
							CM
							0
							NS
							129

Figure 4-6.—Selection of facility from index.

## **CONTINGENCY REQUIREMENTS**

To meet the requirements for contingency support of the Naval Task Force and the Fleet Marine Task Force, PHIBCBs and CBUs must be able to redeploy within 3 and 6 days, respectively. After 30 days in home port, other NCF units should be able to redeploy within 10 days. During the first 30 days after return to home port, each NMCB must be capable of deploying an air detachment within 48 hours. While deployed, NMCBs should be able to redeploy within 6 days. While en route to or from a deployment site, the units must be prepared for immediate diversion to emergency, contingency, or mobilization assignments.

## **EMBARKATION MOUNT-OUT**

The NMCB is used in this chapter as a sample embarkation. These same basic methods of embarkation are used by the underwater construction teams (UCTs) and PHIBCBs.

For a smooth, expedient mount-out, careful planning and organizing are required. Embarkation, whether by air, land, sea, or any combination, is an all hands evolution where TOTAL support is mandatory for a successful move.

Organization charts for mount-out, staging area flow charts, CESE flow charts (both in the shop and to the staging area), pallet buildup, transport flow charts, and personnel flow charts/checklists are used in tracking the unit's progress throughout the embarkation evolution. Failure to maintain control and status may result in a unit not being able to meet its embarkation commitment. Pre-positioning of materials and maintaining the CESE in a constant state of readiness will help to effect a smooth, expedient mount-out.

## **EMBARKATION PLANNING**

Embarkation is a joint undertaking by both the unit and the organization providing the lift. Proper embarkation depends on a mutual understanding of objectives and capabilities and full cooperation in planning and execution. Throughout the planning and execution of the embarkation phase, officers of the embarking unit will be working with their counterparts in other organizations. Early communication and coordination between the user and the organization providing the lift are extremely important.

The U.S. Air Force Airlift Mobility Command (AMC) is normally used when the lift is to be by air. AMC can furnish strategic airlift using the C-141/C-5B

aircraft for long-range airlift or C-130 aircraft for tactical airlift. This capability allows for placement of the troops close to the trouble spot. The U.S. Air Force has developed the Computer-Aided Load Manifesting (CALM) system, the same system that is used by the NCF. The purpose of the CALM system is to provide standardized automated capability to design load plans. This system provides placement of mobility equipment, cargo, and personnel on military and Civil Reserve Air Fleet (CRAF) cargo capable aircraft. CALM provides a standard automated capability that edits and stores incremental data and produces load plans. CALM can be used in preplanning, exercises, or actual deployments.

Planning for embarkation includes all unit moves, regardless of the method used for movement. Movement methods are determined by the availability of transportation and the transportation requirements of the unit. In amphibious embarkation, there must be determinations of the overall shipping requirements and the embarkation schedules. These determinations are made at the OPNAV level in the chain of command to enable subordinate units to prepare detailed loading plans for individual ships. Planning requires constant coordination between Navy and Air Force leaders. Coordination and cooperation stem from a mutual understanding of the problems of each support group. In the final analysis, the embarkation plan must support the tactical deployment plan of the unit. And in the case of an amphibious landing, the embarkation plan must support the tactical plan for landing and the scheme of maneuvers ashore.

Embarkation planning requires detailed knowledge of the characteristics, capabilities, and limitations of ships, aircraft, and amphibious vehicles and their relationships to the troops, supplies, and equipment to be embarked. The planner must be familiar with transport types of amphibious ships, Military Sealift Command (MSC) ships, merchant ships, and cargo aircraft. MSC ships and merchant ships are not designed or equipped for, and do not have crews large enough for amphibious operations. These problems must be anticipated and resolved. Any additional requirements for hatch crews, winchmen, cargo-handling equipment, cargo nets, assault craft, or other facilities must be provided by the user.

## **PRINCIPLES OF EMBARKATION PLANNING**

To ensure proper embarkation, it is mandatory that these four principles be observed in planning



embarkation of the landing force. Both ship amphibious operations and aircraft assault force support operations must observe the following embarkation principles:

1. Embarkation plans must support the plan for landing and the scheme of maneuvers ashore. Personnel, equipment, and supplies must be loaded in such a manner that they can be unloaded at the time and in the sequence required to support operations ashore.

2. Embarkation plans must provide for the highest possible degree of unit self-sufficiency. Troops should not be separated from their combat equipment and supplies. Thus, weapons crews should be embarked on the same ship or aircraft with their weapons, radio operators with their radios, and equipment operators with their equipment. In addition, each unit should embark with sufficient combat supplies, such as ammunition, fuel, and radio batteries, to sustain its combat operations during the initial period at the operational area. Each individual should have sufficient water and rations to last for 24 hours.

3. Plans must provide for rapid unloading in the objective area. This can be achieved by a balanced distribution of equipment and supplies.

4. Plans must provide for dispersion of critical units and supplies among several ships or aircraft. The danger of not doing so is obvious. If critical units and supplies are not dispersed, loss of one ship or aircraft could cause a loss of combat capability that might seriously jeopardize the mission.

## **EMBARKATION TEAM PLANNING**

Effective embarkation team planning is dependent upon the early receipt of information from higher authority. Detailed planning begins with the determination of team composition and the assignment of shipping. The following factors are included in team embarkation planning:

- Designation of the team embarkation officer(s)
- Preparation and submission of basic loading forms by troop units of the embarkation team
- Preparation of detailed loading plan
- Designation of billeting, messing, and duty officers during the period of the embarkation
- Designation and movement of advance parties and advance details to the embarkation area

- Establishment of liaison with the embarkation control office in the embarkation area
- Preparation of the schedule for movement of troops, vehicles, equipment, and supplies to the embarkation area
- Preparation of plans for cargo security in the embarkation area

## **EMBARKATION PLAN**

There are three basic embarkation plans that are normally prepared by the various command levels within the landing force. The landing force embarkation, the group embarkation, and the unit embarkation plans differ in preparation and content.

1. The landing force embarkation plan is prepared by the landing force commander. It includes the organization for embarkation; supplies and equipment to be embarked; embarkation points and cargo assembly areas; control, movement, and embarkation of personnel; and miscellaneous information. The landing force embarkation plan contains information that the embarkation group commander uses to prepare a more detailed plan.

2. The group embarkation plan is prepared by the embarkation group commander. It establishes the formation of embarkation units and assigns shipping or flights to each embarkation unit. While it contains the same basic information as the landing force embarkation plan, there is much greater detail. The group embarkation plan has attached or included within it the embarkation organization and shipping assignment table.

3. The unit embarkation plan is prepared by the embarkation unit commander. It establishes the formation of embarkation teams. It contains, generally, the same information as the group embarkation, but in even greater detail. Attached to the unit embarkation plan is the unit embarkation organization and shipping and/or flight assignment table. NCF units embarking alone and outside of the landing force, either by amphibious means or by air, should prepare an embarkation plan incorporating all of the data necessary for proper embarkation by the unit.

## **PRE-POSITIONED STOCKS AND SUPPLIES**

Because of the mobile nature of the NCF, it is necessary to pre-position certain supplies and

equipment in anticipation of their use in contingency mount-outs. These stocks include oil, fuels, lubricants, rations, ammunition, and a full allowance of equipment. During a contingency mount-out, all or part of these pre-positioned stocks may be used. As part of the planning phase, NCF units should check the plan to determine the exact amount and types of supplies to be embarked and the location of the supplies.

Standard boxing procedures are required in an effort to minimize shipping, packing, and repacking of allowance items. Standardized boxing also helps to establish uniformity among the NCF units.

Present mobility requirements make it necessary to keep as much as possible of the battalion's TOA packed or partially packed for redeployment at all times. The best method of maintaining this state of readiness is to use packing boxes for day-to-day storage and for dispensing battalion allowance items. Each NCF unit must fabricate mount-out boxes according to COMSECOND/COMTHIRDNCBINST 3120.1 series. These fabricated boxes are for all the unit's TOA authorized allowance items that can be boxed. On-hand boxes may be used provided the color and marking codes conform with standard box markings.

You must prepare multiple copies of the packing lists for each box. One copy is placed inside of the box. One copy is mounted in a protective packet on the outside of the box. One copy is kept on file in the embarkation mount-out control center (MOCC). And one copy is retained by the department to which the supplies or equipment belong. Packing lists must contain sufficient details so you can locate items without having to open and search several boxes.

Consider the following when constructing mount-out boxes:

- Use screw nails or flathead screws and glue for assembly
- Bolt covers to tapped metal inserts (as shown in COMSECOND/COMTHIRDNCBINST 3120.1 series, or an equal type of bolting method)
- Customize box interiors to suit the contents
- Limit gross weight of the boxes to 250 pounds (for easy handling without material-handling equipment)
- Fabricate boxes of 3/4-inch exterior grade plywood, reinforced with 2 by 4 inch ends

- Create for large authorized items special boxes (must conform to the criteria set forth in COMSECOND/COMTHIRDNCBINST 3120.1 series)
- Install metal corners or other protection to prevent shipping damage

### **EMBARKATION PERSONNEL**

To carry out their respective duties efficiently, no matter what level of the embarkation chain they are associated with, embarkation officers/staff must be familiar with the following:

- Naval and Air Force customs and terminology
- Applicable tables of organization, allowance, and equipment (within the TOA)
- Amphibious task force organizations and flight operations
- Landing force organization
- Supply and equipment classifications
- Standard operating procedures for loading, packing, crating, marking, and waterproofing supplies and equipment
- Ship's loading characteristics pamphlets (SLCPs)
- Loading and unloading time factors
- Amphibious ships, landing craft, amphibious vehicles, helicopters, and transport aircraft characteristics

### **STAFFING**

Embarkation staff personnel must interface with other command embarkation staffs. Therefore, a brief description of the duties and responsibilities for each of the staffs is described in the following paragraphs.

COMSECOND/COMTHIRD Naval Construction Brigade Embarkation Staff

The COMSECOND and COMTHIRD NCB embarkation staff has the following duties:

1. Heads the embarkation section of the Readiness Department.
2. Reviews and updates current embarkation directives and instructions.

3. Obtains and maintains current tonnage tables of equipment and embarkation library references at Naval Construction Regiment (NCR) and deployment sites under their operational control (OPCON).
4. Obtains and maintains complete and current files of SLCP for amphibious shipping.
5. Obtains and maintains complete and current files on air-certified CESE.
6. Advises and assists subordinate embarkation staffs under their OPCON.
7. Prepares operational orders to exercise the battalion's embarkation plan while deployed.
8. Maintains constant liaison with other services and external organizations responsible for supporting the embarkation process.

### **Regimental Embarkation Staff**

The training regiments under COMSECOND/COMTHIRD NCB establish and maintain an embarkation section/office staffed according to the COMSECOND/COMTHIRDNCBINST 3120.1 series. The embarkation section ensures that current COMSECOND/COMTHIRD NCB embarkation instructions and directives are adhered to by the NCF units under their OPCON. The embarkation section ensures that a training program is established and used for training NCF personnel in all phases of embarkation for amphibious, air, and land operations.

The embarkation officer and staff consist of trained and experienced personnel who have successfully completed the formal embarkation school(s) listed in COMSECOND/COMTHIRDNCBINST 1500.20. Schooling is a prerequisite for personnel assigned to the embarkation staff.

The regimental embarkation officer, a Civil Engineer Corps (CEC) officer, is qualified in embarkation and directly responsible to the regimental commander. The regimental embarkation officer's duties and responsibilities include (but are not limited to) the following:

- Knowing the locations and general condition of all supplies and equipment assigned to the regiment to support NCF contingencies during the home port period.
- Ensuring the embarkation/MOCC files are kept current on all embarkation data.

- Maintaining liaison with COMSECOND/COMTHIRD NCB embarkation staff.
- Ensuring that adequate files (such as SLCPs, aircraft data, TOAs, and road convoy data) are maintained in support of the NCF units.
- Ensuring that a training program is instituted and monitored by the regiment to train NCF personnel in all phases of amphibious, air, and land operations, and both tactical and nontactical embarkation.
- Heading the embarkation section assigned to the NCR Planning and Training Department.
- Preparing the organization for embarkation and assignment to the shipping schedule for approval by the embarkation unit commander.
- Assigning cargo assembly areas, vehicle staging areas, and embarkation points to subordinate elements or teams.
- Overseeing unit embarkation planning.
- Advising battalion or team embarkation officers in the preparation of loading plans.
- Coordinating all loading activities of subordinate embarkation echelons.

The regimental embarkation staff assignment is a primary duty assignment. The composition of the staff must be the same as the NCF units. Their duties and responsibilities are as follows:

- Maintain the serial element management system (SEMS) computer printouts (for ships), if used.
- Maintain the CALM system computer printouts (for aircraft), if used.
- Maintain a complete P-25 equipment template file, both 1/8-inch and 1/4-inch scale.
- Establish and maintain a training record file of all embarkation training.
- Maintain lesson plans for training and indoctrination of the NCF unit personnel involved in embarkation.
- Monitor and evaluate all NCF home port embarkation exercises.
- Maintain a file of all NCF embarkation exercises held in home port.

- Accomplish such other embarkation duties as may be necessary or assigned.

### **Battalion Embarkation Staff**

The battalion embarkation officer and embarkation chief, when not actually engaged in the embarking process, are responsible for the following:

- Knowing the location and the general condition of all supplies, equipment, and vehicles assigned to the battalion.
- Keeping current the MOCC files relative to all embarkation data.
- Training sufficient personnel outside of the embarkation staff to perform embarkation functions during an actual mount-out.
- Ensuring that adequate files are maintained in the event of incapacitation or absence during an embarkation. Thus allowing the assistant to assume all duties with a minimum of lost effort.
- Conducting training for the embarkation staff to increase their proficiency in embarkation.
- Preparing and maintaining a template file of all current deployment site Tab A equipment attached to the battalion.
- Coordinating through the operations officer (S-3) all requirements associated with battalion movement.
- Validating DD Form 2327, Unit Aircraft Utilization Plan, with supporting airlift control element (ALCE) affiliate within 14 days of the arrival of the main body.
- Validate/update preliminary load plans (PLP) for deployment of air detachments and air echelons on C-130, C-141B, and C-5B type of aircraft within 30 days of the arrival of the main body. Criterion for PLP will be current Tab A, equipment list, and TOA materials and supplies.
- Validate the CALM system database as changes are received to the Tab A from the equipment officer (A6).

The battalion embarkation staff consists of a nucleus of trained, experienced personnel assigned to embarkation as a primary duty. This staff is augmented by company and departmental representatives serving on a collateral-duty basis. During an exercise or actual

contingency mount-out, the full embarkation staff reports to the battalion embarkation officer. Then they assume full-time responsibility for embarkation within their assigned area of responsibility. In the case of an actual mount-out, the embarkation staff members continue to function on a full-time basis until landing of the troops, supplies, and equipment has been completed.

Each company/department having material that requires shipment should designate one responsible officer/petty officer to act as the embarkation representative for that company/department.

Details are expected to be able to rejoin and integrate into the main body on short notice. Detail OICs should maintain current military and commercial transportation schedules as part of their detail embarkation plan. Companies/departments at the main body should maintain contingency rosters integrating detail personnel back into their military organization. Plans for the details to join the main body en route to or at the new deployment site should also be considered.

All details should include in their embarkation plan the possibility of being tasked to respond as an advance party component of the battalion or to redeploy independently. The location and semi-independent nature of details provide ready capability. These small well-trained units are capable of responding quickly to a situation not requiring full battalion participation.

All detail sites are required to have rollback plans as stated in the NCF OPLAN. These plans are routinely reviewed as part of the training management assistance visit (MAV).

### **EMBARKATION TRAINING REQUIREMENTS**

Embarkation aboard amphibious ships or cargo aircraft cannot be accomplished smoothly and efficiently without prior training and actual experience. Personnel must know their specific assignments, and they must know the proper way in which to carry them out. All personnel training must be geared to the level of skill required to embark the unit efficiently. For unit efficiency the accent must be on maximum training for the embarkation staff and loadmaster. When the embarkation staff is used in routine embarkation of supplies and equipment by air or sea to details and detachments, additional qualified personnel are required.

## Formal Training

Formal embarkation schooling prepares only a small portion of the unit's personnel to conduct an orderly mount-out. Within each unit, periodic formal embarkation training briefings must be held to indoctrinate fully all personnel with specific responsibilities in the embarkation field. These training briefings assist those key petty officers who must transform the planning into reality. All officers and key company and department personnel must have a working knowledge of the embarkation sequence to prepare their respective company/department adequately for mount-out. All formal training must be conducted according to COMSECOND/COMTHIRDNCBINST 1500.20.

## Loading Teams

Loading aboard a ship or aircraft presents problems in the loading of vehicles. This is especially true of heavy construction equipment. To provide rapid embarkation and to prevent vehicle damage, you must give personnel prior training in the loading of these complex pieces of equipment. Embarkation exercises must be carefully designed to provide training and practical experience to drivers, equipment operators, and loading personnel. These exercises must be conducted at frequent intervals so an adequate number of capable and experienced loading personnel are available at all times.

## EXERCISE FLYAWAYS AND SHIPLOADING

COMSECOND and COMTHIRD NCB will schedule, as a minimum, one amphibious/MSA/air exercise per deployment. All exercise simulations within the exercise scenario must be approved by COMSECOND/COMTHIRD NCB. The scope and specific directions for the exercise will be specified in the EXERCISE-OPORD issued by COMSECOND or COMTHIRD NCB. Additional exercises may be called when the battalion is assigned one of the contingency designations of the Atlantic or Pacific Fleet's NCF. This exercise is designed to determine the unit's capability to fulfill mission requirements.

The appropriate home-ported NCR will schedule, as a minimum, one mobilization exercise during each battalion's home port period. This exercise will test the ability of the battalions to mount-out from home port. One or all of the exercise types, air detachment, air echelon, and sea echelon, will be scheduled.

## Static Load Exercises

Static load exercises are provided to familiarize NCF personnel with the different types of AMC aircraft. These exercises should be used with the AMC affiliation planning/loading courses. Personnel and equipment are provided by the requested organization.

## Emergency Deployment Readiness Exercises

The intent of this training is to exercise both the Air Force and the NCF personnel in their joint capability to load, move, and unload troops and cargo in a no-notice emergency environment.

## EMBARKATION EXECUTION

Embarkation planning and preparation of personnel, supplies, and equipment to conduct an amphibious operation or air movement are expensive in terms of time and manpower. **Remember, embarkation efficiency is usually directly proportional to the time and effort spent in developing and preparing the plan.** A well-developed plan usually reduces the time and effort required for embarkation. Well-developed plans help ensure that the embarkation is orderly, efficient, and effective. Staff officers responsible for embarkation must be sure that embarkation is executed on schedule according to the timetable that has been established by their command or by higher authority.

## MOUNT-OUT CONTROL CENTER (MOCC)

Upon receipt of an initiating order from higher authority to mount-out and deploy, the executive officer or second in command, such as the AOIC, must implement the MOCC. The MOCC controls, coordinates, and monitors the movement of all personnel, supplies, and equipment to the embarkation staging area. The MOCC usually has authority to establish traffic control, issue movement orders to units concerned, and control transportation used in the embarkation mount-out. The MOCC also coordinates and schedules the movement of personnel, supplies, and all related equipment from the storage areas, warehouses, or unit's base camp area to the staging area for embarkation. Within an NCF unit, the MOCC, with the embarkation staff, has the function of controlling all aspects of an NCF mount-out. The MOCC serves as the coordinating center for all of the companies and all of the staff section heads.

The ability to evaluate, process, and disseminate information is of utmost importance to the functioning

of the MOCC. Sufficient communication equipment must be located in the MOCC to ensure the continuing flow of information to and from the MOCC. External and internal communications to and from the MOCC are essential to a successful embarkation evolution.

The actual loading of vessels or aircraft is the responsibility of the embarkation officer of the deploying unit, and the combat cargo officer of a ship, or the departure airfield control group (DACG). Actual aircraft loading is made with the U.S. Air Force ALCE for aircraft. The MOCC must be kept informed as to the progress of loading by the embarkation staff. This enables the MOCC to file the required reports with higher authorities.

A preplanned checklist that indicates the responsibilities of each staff member in the NCF unit forms the basis for reporting to the MOCC and for display of status information. See figure 4-7, which shows a mount-out checklist for the company commanders. Figure 4-8 shows a mount-out for the project officer or chief. Each staff member in a department of an embarkation unit should have a copy of the checklist. Each item on this checklist should be reported when it is due, along with any other information that could have an impact on the organization. Any information you are uncertain about regarding its value to the MOCC should be resolved in favor of reporting. It is impossible to have an MOCC that is too well informed.

## **AIR EMBARKATION**

An airlift can be affected adversely by weather, enemy air superiority, and airfield limitations (some airfields are not able to handle every type of cargo aircraft). Still, movement by airlift offers commanders distinct advantages, and the demand far exceeds current capabilities. An airlift is essential when the rapid response to a threat halfway around the world may govern the outcome of a confrontation. The aircraft load planner must be familiar with each type of aircraft that may be used during inter-theater and intra-theater operations. The planner must anticipate changes in the allowable cabin load, types of aircraft, and unit destinations (facilities available). Other considerations include CESE air certification on one type of aircraft and not another, hazardous cargo limitations (as stated in AFR 71-4/NAVSUP 505, *Packaging of Materials*, volumes 1 and 2), and other variables. An airlift provides the means for commanders to achieve mission success. The mobility an airlift provides affects the strategy of tactical forces, and permits those forces to move quickly

into the battle area. With an airlift, forces can easily and rapidly cross such barriers as water, mountains, or jungles.

The movement of personnel, supplies, and equipment by fixed-wing aircraft or helicopter involves the same planning and embarkation procedures as for amphibious loadouts. However, the requirement for a detailed load plan is considered even more essential in air movements. A loading diagram is required aboard each aircraft. This diagram lists all equipment and supplies to be carried and specifies where the supplies are located in the fuselage station.

## **Movement Planning**

Rapid and orderly deployment of units by air requires careful and detailed preplanning. Air movement plans must be flexible so they can be readily adapted to last minute changes. The number and type of available aircraft are subject to change. The payload for any transport aircraft can vary widely depending on distance, head winds, and various other factors. Changes in the weather may require adjustments in aircraft loads just minutes before takeoff. Remember, planning for an air movement must be continuous. You can make the following assumptions when planning for an air embarkation movement:

1. The airlift maybe strategic or tactical depending on the situation.
2. Peacetime preliminary load plans for an allowable cabin load (ACL) are 25,000 pounds for a C-130, 50,000 pounds for a C-141B, and 150,000 pounds for a C-5B.
3. Combat situations may drastically increase the size of these loads.

## **Aircraft Capabilities**

Under normal operations, the NCF uses three types of aircraft for embarkation. Each aircraft type has specific capabilities and limitations. These include takeoff or landing requirements on tactical runways, packed dirt, or on a short airfield for tactical support (SATS) type of landing facility. Presently the C-130, which is considered a tactical aircraft, is used for this kind of operation. The C-141 and C-5 aircraft normally require a full-service air facility, and they are considered strategic aircraft. Tables 4-2 and 4-3 show the load dimensions and limitations of each of these aircraft. This information should be very useful in the planning of aircraft loads.

<u>COMPANY COMMANDERS</u>	<u>SCHEDULED COMPLETION DATE</u>		<u>INITIAL</u>
	TA 41	TA 31/22	
1. Hold interim inspection of personnel for:	H + 5	H + 15	9-36
a. ID cards			
b. ID tags			
c. Wills and power of attorney			
d. Personal gear to be shipped after mount-out for adherence to custom regulations			
2. Hold initial check of personnel for:	H + 5	H + 15	9-36
a. Complete seabag issue			
b. 45-day supply of toilet articles			
c. 782 gear and weapons			
3. Submit rough personnel manifest to S-1/Personnel Officer.	H + 13	H + 39	36-81
4. Require all battalion owned library books and special service gear to be turned in.	H + 17	H + 51	81-84
5. Prepare company gear for storage and/ or embarkation.	H + 24	H + 72	84-101
6. Have men mark seabags, packs, weapons, and other baggage with tags.	H + 31	H + 93	122-135
7. Brief company on:	H + 36	H + 108	135-146
a. Security of information			
b. Mail or censorship requirements			
c. Baggage allowance and packing requirements			
d. Disposition of personal fire arms, vehicles, etc.			
e. Code of conduct			
8. Provide working and security parties as requested by Operations Officer.	H + 5	H + 15	9-36
9. Designate personnel to fill required billets aboard ship while in transit. Give list to Personnel Officer.		H + 90	101-122
10. Conduct personnel, 782 gear and weap- ons inspection.	H + 36	H + 108	135-146
11. Inspect company spaces for cleanliness prior to embarkation, secure company of- fice spaces.	H + 44	H + 132	146-160
12. Have company stand by for briefing.		H + 138	160-164
13. Draw served weapons.			
14. Supervise moving personnel to embarkation site for departure.	H + 46	H + 138	160-164

Figure 4-7.—Mount-out checklist for the company commander.

PROJECT OFFICERS

SCHEDULED  
COMPLETION  
DATE

INITIAL

TA 41 TA 31/22

- 
- |   |        |         |               |
|---|--------|---------|---------------|
| 1. Assist S-3/Operations Officer in classifying projects to be closed out.  | H + 5  | H + 15  | (10) — (37)   |
| a. <u>Class 1 Projects:</u>   |        |         |               |
| A regular project which requires little or no equipment or vehicle support in immediate area.   |        |         |               |
| b. <u>Class 2 Projects:</u>   |        |         |               |
| Those projects which depend mainly on heavy equipment or vehicle support for successful completion.   |        |         |               |
| c. <u>Class 3 Projects:</u>   |        |         |               |
| Details not deployed in camp or immediate area. Establish immediate communication with Class 3 project officer to begin setting up securing of details. Arrange for air transportation to return men and equipment as soon as possible. |        |         |               |
| 2. Initiate close out.  | H + 6  | H + 18  | (37) — (57)   |
| 3. Begin close out of Class 2 and 3 Projects.   | H + 18 | H + 54  | (57) — (86)   |
| 4. Advise operations of any waste or damage likely to result from unfinished construction, non-grading or poor storage.   | H + 30 | H + 90  | (86) — (123)  |
| 5. Close out Class 1 Projects.  | H + 30 | H + 90  | (86) — (123)  |
| 6. Secure all projects, project shops and battalion shops not required by delayed party or rear echelon.  | H + 34 | H + 102 | (123) — (139) |
| 7. Schedule and conduct field day.  | H + 34 | H + 102 | (123) — (139) |

Figure 4-8.—Mount-out checklist for the project officer or chief.



Table 4-2.-Aircraft Cargo Compartment Dimensions and Limitations

CAPABILITIES DIMENSIONS AND LIMITATIONS						
CARGO COMPARTMENT						
Popular Name	Hercules		Starlifter		Galaxy	
Model Designation	C-130E/H		C-141A		C-5A	
Length (inches)	492		840		1454	
Width	123		123		228	
Height	108		109		162	
Troop Door Height/Width	Height 72	Width 36	Height 72	Width 36	Height 72	Width 36
Allowable Cabin Load	35,000		50,000		100,000 (Restricted)	
Loading Ramp Length	120		133.25		Fwd 122      Aft 155	
Loading Ramp Width	123		123		228              228	
Max Takeoff Gr. Wt.	155,000		323,100		712,500	
Max Landing Gr. Wt.	154,000		257,500		635,850	
CB Forward Limit	512		910		1200	
CB Aft Limit	536		945		1300	
Optimum CB Location	524		925		1244	
Restraint Factor in "G" Forward	3		3		3	
Restraint Factor in "G" Aft	1.5		1.5		1.5	
Restraint Factor in "G" Vertical	2		2		2	
Restraint Factor in "G" Lateral	1.5		1.5		1.5	
Passenger Load (Max)	90	Side Seats 42	152	Side Seats 70	Cargo Floor 270 EWP Upper Deck 73 (20 Now)	
Floor Height	50		50		Forward 36 to 70	Aft 73 to 105
Nr. of Pallets (463L)	6		10		36	
Cargo Floor Limits Treadway Axle Loads	E-F-G-H-I-J 13,000 C-D-K 6,000		D-E-F + L-M-O 10,000 G-H-I-J-K 20,000		N/A	
Between Treadway Axle Loads	C thru J 5,000 Tongue Load 2,000		D↔F G↔K L↔O 5000 4400 3700		N/A	
Treadway PSI	50		50		N/A	
Between Treadway PSI	50		25		N/A	

Table 4-3.—Aircraft Cargo Compartment Load Limitations with Pallet Position Center of Balance

	C-130E/H	C-141A	C-5A
Treadway Cargo Floor Length & Width	Length 492 Width 35 Each	Length 810 Width 34 Each	Fwd/Aft Ramp Limitations  Total maximum allowable load, including cargo, pallets, nets and any other equip. on ramps shall be limited to a maximum of 15000 lbs for each ramp.  Maximum allowable load 3600 in any 20-inch length of the ramp (Fwd & Aft) or 2 7500 lb pallets.  <u>Cargo Floor Limitations</u>  Maximum allowable load 36000 lbs in any 40-inch length of cargo floor from Fus. Sta. 724 to 1884.  Maximum allowable load 20000 lbs in any 40-inch length of cargo floor from Fus. Sta. 517 to 724 and 1884 to 1971.  Maximum bogey axles are 25000 lbs each.  Maximum single axles are 36000 lbs each.  Side by side or multiple wheeled vehicle axles loaded between F.S. 1458 and F.S. 1518 are limited to a combined maximum weight of 25000 lbs. Tracked vehicles are excluded from this restriction.  Maximum pallet weight cargo floor 10354 lbs each. Ramp pallets max. wt. 7500 lbs each. Aft ramp pallet height (back side) 75 inches.
Ramp Limitations			
Treadway Axle Loads	L-M Single Axle 2500 Item 3500	7500 With Shoring Gr. Wt. Ramp 7500	
Between Treadway Axle Loads	L-M Tongue Load 1200 450	Max. Axle 5000 Max. Wheel 2500	
Treadway PSI	50	On Treadway 50 Between Treadway 25	
Ramp Treadway Length & Width	Length 132 Width 35	Length 131.25 Width 34	
Ramp Maximum Vehicle Height	80	80	
Ramp Maximum Pallet Height	76 (Pallet Pos.#6)	76(Pallet Pos.#10)	
Ramp Maximum Pallet Weight	4700 (Plt. Pos. #6)	2500 Out of Pos. 7500 In Pallet Pos.	
Cargo Floor Vehicle & Pallet Limitations			
Cargo Floor Maximum Vehicle Height	105 245-737	80 492-538 108 539-1292	
Cargo Floor Maximum Pallet Height	100 (Pos. 1 thru 5)	76 (Pallet Pos. #1) 100 (Pos. 2-9)	
Cargo Floor Maximum Pallet Weight	10375 (Pos. 1-4) 8500 (Pos. #5)	10354 (Pos. 1-9)	
<b>AIRCRAFT PALLET POSITIONS CB</b>			
	C-130E/H	C-141-A	C-5A
PP	Fuselage Station	PP	Fuselage Station
1	332	1	531
2	422	2	621
3	512	3	711
4	602	4	801
5	692	5	891
6	803	6	981
		7	1071
		8	1161
		9	1251
		10	1352
			1&2
			3&4
			5&6
			7&8
			9&10
			11&12
			13&14
			15&16
			17&18
			19&20
			21&22
			23&24
			25&26
			27&28
			29&30
			31&32
			33&34
			35&36
<p>Note: Add or subtract 44 inches to these figures to find where a pallet starts or stops.</p> <p>Example; C-141 pallet position #5 would start at 937 and end at 1025.</p>			

## **Airlift Requests**

Units designated as mobile and tasked with developing contingency plans (such as NMCBs) should continually maintain a list of air transportable equipment and the type of aircraft on which the equipment can be carried. This is necessary because the NCF and other types of mobile units are constantly receiving new and updated equipment.

The U.S. Air Force Airlift Mobility Command (AMC) is the primary transport service of the DoD. AMC provides scheduled and special airlifts of armed forces personnel for the following categories:

- Airlift support of basic or continuation aircrew training. This category may include static load training (unilateral training).

- Airlift purchased or contracted by a user for its own unilateral support. This is designated as a special assignment airlift mission (SAAM). This category includes commercial charter aircraft used to deploy a unit to an overseas site.

- Joint Chiefs of Staff (JCS) approved airlifts used in support of joint exercises. These are designated as JCS exercise airlifts. This category maybe required for multiservice/multinational exercises.

- Out-of-CONUS or theater service airlifts over established routes. These flights are designated as AMC channel flights and are normally managed similar to scheduled flights. This category also may be contracted to a commercial carrier to fly specific high-use routes.

- Joint Airborne/Air Transportability Training (JA/ATT) airlifts. These are part of an AMC-sponsored program that provides AMC aircrews and support units with training in the various AMC aircraft, equipment, and procedures. This category provides specific training data in the loading and transporting of all military equipment and particularly NCF-unique CESE.

Airlift requests must be prepared according to OPNAVINST 4630.18. It is important to remember that only equipment that is certified to be air transportable by the U.S. Air Force can be moved by AMC aircraft.

## **Unit Responsibilities**

The unit requesting airlift support from AMC headquarters is required to provide specific personnel in support of the airlift. Support personnel are designated as follows:

Departure Airfield Control Group (DACG). The DACG is responsible for controlling all items to be airlifted. The DACG ensures that the flow of personnel, material, and equipment is smooth and efficient when called from the alert holding area to the call forward area. The DACG also is responsible for providing security, food service, and rest areas, if required.

Arrival Airfield Control Group (AACG). The AACG is responsible for the receipt of all airlifted items to the AMC-contracted airfield. The AACG also is responsible for ensuring orderly and timely movement of personnel, material, and equipment from the airfield to the deployment site. If troops remain at the arrival airfield area because of transportation or other unforeseen delays, the AACG team is responsible for providing food service, and rest areas, if required, at the arrival area.

The staging and marshalling area is where equipment and material are received and placed into a configuration (chalk) for each aircraft. All vehicles are checked for cleanliness and minor leaks are repaired. It is here that mobile loads are completed, vehicles are weighed and marked for center of balance, and cargo is palletized on approved Air Force 463L cargo pallets, which are also weighed and balanced. The staging and marshalling area is not necessarily in the vicinity of the departing airfield. It is usually in close proximity to the CESE equipment preparation area and the main supply area, where palletizing and mobile loading is done.

The alert holding area is where vehicles and passengers are held in the vicinity of the departing airfield. At this time control is passed to the DACG, and chalks are inspected to ensure everything manifested is actually present. When all manifested items have been confirmed, the DACG supervisor and representatives of the U.S. Air Force ALCE will direct the movement of assigned chalks to the call forward area. The call forward area is where the joint inspection of chalks by the ALCE team and the NCF representative takes place. After the complete chalk is inspected, it is moved to the ramp loading area when called for by the ALCE team.

## **Flight OIC**

A flight manifest must be prepared for each aircraft. It must include the name of the unit to be airlifted, the OIC, and the type of aircraft. The manifest should also have the number of the aircraft tail, mission, and passengers. It should have the total weight of any passengers, hand-carried and hold baggage, a description of cargo, weight and cube of cargo, and the total weight.

The senior individual in each aircraft load of troops is designated as the OIC and is provided a copy of the passenger manifest. Each OIC must be thoroughly briefed on his or her responsibilities. This example of an information sheet outlining OIC duties and responsibilities should be of value to you.

#### A. Duties of a flight OIC

You have been selected as the OIC for this planeload of passengers. Such action is necessary for proper control and coordination of troop loads with the limited passenger and processing personnel available. Your timely execution of assigned duties will reduce confusion and greatly assist in the prompt dispatching of the aircraft.

Step 1. Familiarize yourself with the properties of dangerous cargo aboard the aircraft and be prepared to assist the flight crew in any cargo-related emergency, if requested.

Step 2. When the aircraft lands en route to or from home base, make arrangements for proper cargo security. Use your assistant as a guard, or make other necessary arrangements to ensure the cargo is protected.

Step 3. Familiarize yourself with the priority of the cargo aboard. In the event it becomes necessary to off-load cargo en route, advise the aircraft commander or AMC transportation representative of what cargo should be off-loaded.

Step 4. If any portion of cargo is off-loaded at a base en route, one custodian must remain with the off-loaded cargo, and one custodian must remain with the aircraft (or as directed by the unit mobility officer). Off-loaded cargo should be reported by naval message, finishing all pertinent information to the appropriate commander at the base where the cargo was loaded and to the commander at the forward operating base,

Step 5. Upon arrival at the forward operating base or at the home station, the senior cargo custodian should report to his or her unit and deliver the cargo manifest to the unit's property custodian.

#### B. Responsibilities of a flight OIC

You will need to ensure the following:

- All baggage and personnel are weighed.

- Transportation is arranged for movement to the airfield.
- Each piece of baggage returning to CONUS has been inspected, customs regulations followed, and DD Form 1854 (Customs Declaration) completed.
- Flight rations are supplied.
- Personnel have up-to-date immunization and identification cards.

Obtain from the administration officer (S-1) all information, such as medical certificates of absence of communicable disease, group travel orders, cargo manifests, and customs declarations if returning to CONUS.

The flight OIC should muster his or her personnel and maintain them in a 1/2-hour ready status from 24 hours before the scheduled flight time until the flight departs. The OIC must be sure that personnel and baggage arrive at the air terminal 3 hours before the scheduled arrival of the aircraft or as directed.

Before departing the camp area, the OIC should do the following:

1. Muster all personnel to confirm the flight manifest.
2. Collect a copy of DD Form 1854 from each person returning to CONUS.
3. Have all personnel complete next-of-kin cards for submission at the air terminal before embarkation.
4. Hold a personnel inspection to ensure that everyone is in proper uniform.

At the departure airfield, the OIC and the embarkation officer should coordinate embarkation with the DACG. This is necessary to make certain that all personnel, baggage, cargo, bagged 782 gear, boxed weapons, and ammunition are loaded aboard the aircraft. During the transit, the flight OIC should perform on a routine basis the following duties:

1. Maintain a rough log of significant events, beginning with the first muster.
2. Exercise military control over personnel in the flight.
3. See that personnel are kept informed of all pertinent matters.

4. Detail working parties for loading and unloading of cargo and gear.
5. Ensure that 782 gear, weapons, and ammunition accompany the flight after all intermediate stops.
6. See that flight personnel are provided meals. If meals are not available during the flight, have the aircraft commander radio ahead to request box lunches or hot meals available at each refueling point.
7. In the case of a delay, the OIC should arrange for berthing when necessary and provide guards for weapons, baggage, and cargo.
8. In the event the aircraft commander orders the removal of personnel, the OIC must ensure their personal baggage and leave forms (DD Form 1854) accompany them. The OIC must also see to it that their orders are properly modified so they may proceed via another AMC flight. If an AMC flight is unavailable, those orders should be modified so they can proceed via commercial transportation. The allocation of aircraft to Seabee units is done by AMC after the requirements for airlift have been received. When airlifted by AMC, the movement schedule is prepared by the air transport command designated to control the aircraft.

hazardous must be handled according to these manuals!  
**There are no exceptions!**

Hazardous cargo must be certified on a special handling data/certification form (fig. 4-9) before it can be accepted for movement by airlift. As the user, it is the responsibility of the deploying unit to provide qualified personnel to certify hazardous cargo. It also is the deploying unit's responsibility to be sure that the information on the special handling data/certification form is complete and correct.

### Vehicle/CESE Preparation

ALFA company is responsible for all CESE preparation. All vehicles and equipment must be absolutely clean before being loaded aboard an aircraft. Mud, oil, grease, or any other foreign matter must be removed, and all leaks must be repaired before assignment to a chalk. The flow of the CESE through ALFA company is similar to the Battalion Equipment Evaluation Program (BEEP). Embarking on an aircraft requires special loading procedures for several types of CESE assigned to the battalion TOA. These procedures are outlined in the *Naval Construction Force Embarkation Manual*, COMSECOND/COMTHIRD-NCBINST 3120.1 series. ALFA company is responsible for following the procedures, including the removal of dump truck headache racks, equipment exhaust stacks, dozer blades, counterweights, and equipment roll-over protective structures (ROPS).

### Hazardous Cargo

Hazardous cargo must be packaged and handled according to AFR 71-4/TM 38-240/NAVSUP 505/MCO P4030.19 series. Cargo that is considered

Vehicle fuel tanks must be at least one-fourth full and not more than three-fourths full. If the vehicle is to be placed on the ramp of an aircraft, fuel tanks should never be more than one-half full.

ITEM NOMENCLATURE Sodium Aluminate Solution Corrosive Material Corrosive		NET QUANTITY PER PACKAGE 1 Gal	TRANSPORTATION CONTROL NO N0017102261904XXX	
		CONSIGNMENT GROSS WEIGHT 10 lbs	DESTINATION Washington Navy Yard DC	
SUPPLEMENTAL INFORMATION This shipment is within the limitations prescribed for passenger aircraft. Neutralizing agent 5% Acetic Acid			LOAD STORAGE/GROUP Z0	FLASH POINT NA
<small>This is to certify that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Dept of Transportation. THIS IS A MILITARY SHIPMENT. (Complete applicable lines below)</small>				
X	This shipment is within the limitations prescribed for PASSENGER AIRCRAFT/CARGO-ONLY AIRCRAFT (Delete nonapplicable aircraft)		ATA/ATA/IMCO REGULATIONS	
X	AFR 71-4, TM 38-240, NAVSUP 505, MCO P4030.19, DLAN 4145.3, Paragraph 8-8a (2)		49 cfr	PARAGRAPH 173.7 (a)
	DOD 4500.33H (MAILSTAMP)			EXEMPTION DOT E 1573
ADDRESS OF SHIPPER Address			TYPED NAME, SIGNATURE AND DATE Name and Date	
DD	FORM 1 MAY 78	1387-2	PREVIOUS EDITION IS OBSOLETE. SPECIAL HANDLING DATA/CERTIFICATION	

Figure 4-9.—Hazardous Cargo Certification, DD Form 1387-2.

When required for immediate use at deployment sites, engines and other equipment with fuel tanks may be airlifted uncrated and with fuel tanks three-fourths full.

Fuel-in-tank limitations from trailer-mounted and single-axle units must not exceed one-fourth full when these units are disconnected from the prime mover with the tongue resting on the aircraft floor. Additionally, the fuel tank must be drained, but not purged, when these units are positioned on the aircraft cargo ramp.

Tankers and refuelers containing fuel are not authorized for air movement. They must be emptied, purged, and labeled according to NAVSUP 505. Water tanks and water trailers must be airlifted empty according to AFM 76-6, paragraph J-5.

After the CESE has passed the equipment inspection, it is then turned over to the weight and balance team.

### Weight and Balance

To plan an airlift and correctly break down loads for individual aircraft, it is necessary to determine the weights and centers of balance (C/B) of the cargo units. There are two main categories of cargo: vehicles and general cargo.

**VEHICLES.**—The weights and centers of balance of vehicles are determined with secondary loads (mobile loads) mounted. Mobile loads are items of baggage or cargo transported in truck beds and trailers that must be included in the total weight of a vehicle. To determine the C/B on a vehicle, the 20th Naval Construction Regiment Embarkation Staff (R23), Gulfport, Mississippi, recommends the following procedures:

Step 1. Establish the reference datum line (RDL). The RDL is the farthest forward point of a vehicle.

Step 2. Measure distance 1 (D1). D1 is the measurement in inches from the RDL to the center line of the front axle.

Step 3. Measure distance 2 (D2). D2 is the measurement in inches from the RDL to the center line of the intermediate axle or rear axle.

**NOTE:** The D2 measurement location for vehicles with tandem axles is measured from the RDL to the trunnion.

Step 4. Measure distance 3 (D3). D3 is the measurement in inches from the RDL to the center line of the rear axle. This step is performed on vehicles that have three or more axles or on towed vehicles that will remain married (attached) to a vehicle when loaded on the aircraft. The axles on a towed vehicle will become D4, D5, and so forth (fig. 4- 10).

To perform steps 5, 6, and 7, drive the vehicle onto portable scales placed under the tires on each axle.

Step 5. Determine the forward axle weight (FAW). The FAW is the total weight reading of the scales under each front tire. (Example: The left front tire scale reads 3,000 pounds, and the right front tire scale reads 3,000 pounds. In this example, the FAW would be written as FAW 6,000 pounds.) Write the FAW on a piece of weather-resistant material, such as duct tape, with a grease pencil, and attach to the vehicle fender above the axle. Upon arrival at the site, remember to remove this tape to avoid peeling any paint from the vehicle.

Step 6. Determine the intermediate axle weight (IAW). The IAW is the total weight reading of the scales under the intermediate tires. Follow the procedures for step 5 and label the reading as IAW on the masking tape. Remember, the IAW is the weight readings of both the left and right tire scales added together and recorded in pounds.

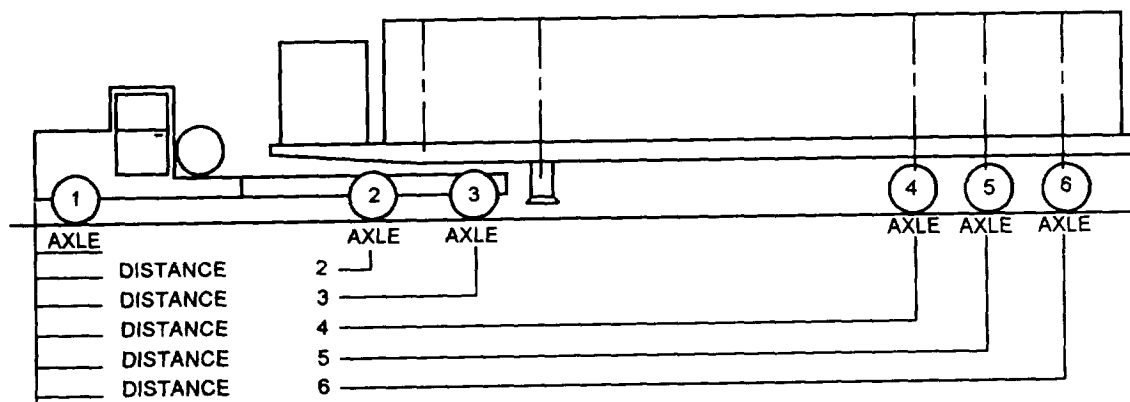


Figure 4-10.—CESE distance measurement locations.

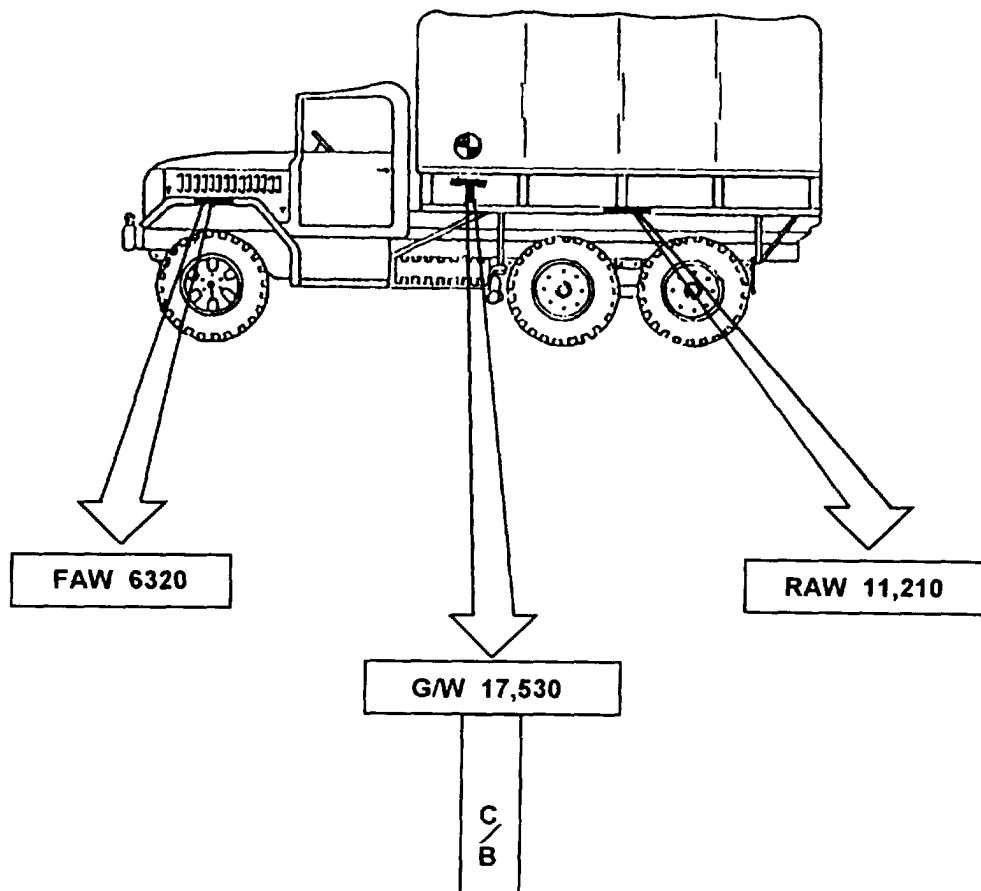


Figure 4-11.—Marking procedures.

Step 7. Determine the rear axle weight (RAW). The RAW is the total weight reading of the scales under the rear tires. Follow the procedures for step 5 and label the reading as RAW on the masking tape. Remember, the RAW is the weight readings of both tire scales added together and recorded in pounds.

**NOTE:** The RAW for vehicles with tandem axles is the weight of the IAW and the RAW added together and labeled above the trunnion (fig. 4-11).

Step 8. Compute moment 1 (M1). The formula for M1 is distance 1 times the forward axle weight, or  $D1 \times FAW = M1$ .

Step 9. Compute moment 2 (M2). The formula for M2 is distance 2 times the intermediate axle weight, or  $D2 \times IAW = M2$ .

Step 10. Compute moment 3 (M3). The formula for M3 is distance 3 times the rear axle weight, or  $D3 \times RAW = M3$ .

Step 11. Compute the gross vehicle weight (GVW). GVW is determined by adding the axle weights. The formula for GVW is  $FAW + IAW + RAW = GVW$ .

Step 12. Determine the total moment (TM). TM is determined by adding all the moments. The formula is  $M1 + M2 + M3 = TM$ .

Step 13. Compute the C/B of the vehicle. This is done by dividing the GVW into the total moment, which

**TO DETERMINE CENTER OF BALANCE**

DRIVE VEHICLE ONTO WOODEN BEAM UNTIL IT BALANCES.

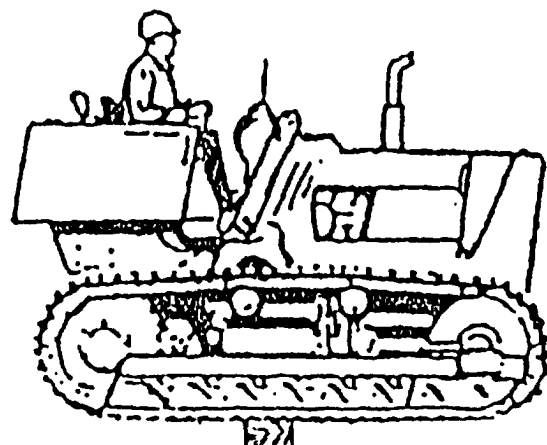


Figure 4-12.—Center of balance of tracked vehicle.

provides the C/B value in inches. This formula is  $TM/GVW = C/B$ .

Step 14. Locate the C/B. You locate the C/B by measuring from the RDL the number of inches computed in step 13. At that point, create a letter *T* on the side of the vehicle with masking tape. The horizontal portion of the tape is labeled GW plus the weight. The vertical portion of the tape is labeled C/B and is the distance in inches measured from the RDL (fig. 4-11).

To find the C/B of a track vehicle (dozer), drive the vehicle onto a wooden beam until it balances (fig.4-12). The weight of a track vehicle is determined by laying wood

on top of the scales and driving the dozer onto the wood. The sum of the weight of the scales provides the GVW.

Once all the weights have been computed, they are marked on both sides of the vehicle and are annotated on the manifest list. The vehicle is then staged on the scheduled chalk.

Although there are other procedures used to compute the C/B for vehicles, the previously listed procedures must be followed when you use the CALM computer program currently used in the NCF.

**PALLETIZED CARGO.**— Cargo should be palletized on 463-L air certified pallets, as shown in figure 4-13.

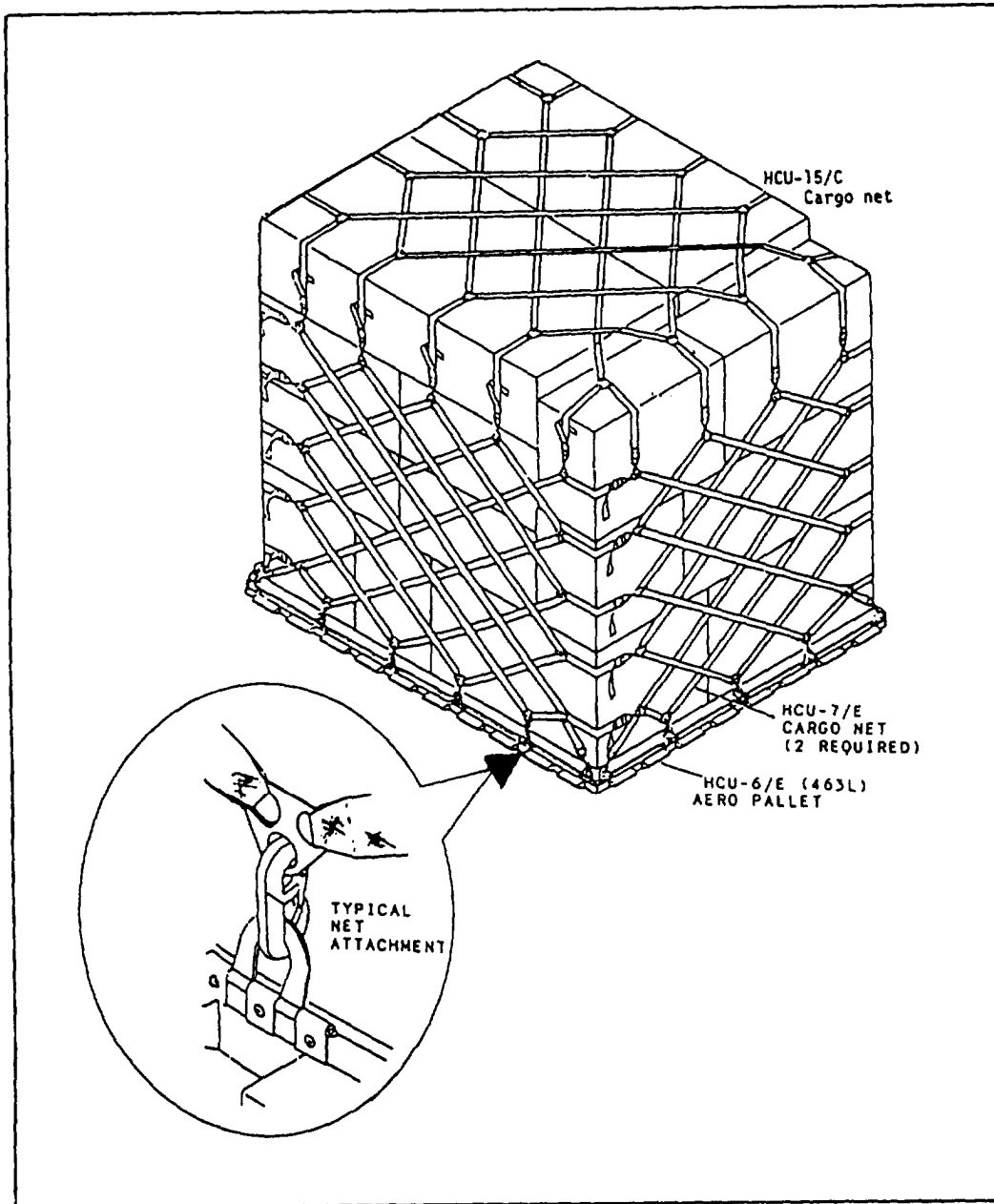


Figure 4-13.—463-L pallet with cargo and nets.



Pallets and pallet nets are procured from the Air Force. The 463-L pallet is the standard system for the movement of concentrated cargo used by the Air Force. Military airlift aircraft are equipped with a dual-rail system consisting of rows of rollers, which allow 463-L pallets to move easily into and out of the aircraft. The 463-L pallet is made of corrosion-resistant aluminum and has a soft wood core. The pallet has an outside dimension of 108 inches by 88 inches and is 2 1/4 inches thick. The cargo area space is 104 inches by 84 inches, which is enough space to allow 2 inches around the 463-L pallets to attach straps, nets, or other restraint devices. A 463-L pallet weighs 290 pounds empty and has a maximum load capacity of 10,000 pounds. However, to prolong pallet life do not exceed a pallet load of 7,500 pounds.

Pallet nets can provide adequate restraint for 10,000 pounds of cargo when properly attached to the 463-L pallet. A net set contains two side nets and one top net. The side nets are green, and the top net is yellow. The side nets attach to the pallet rings, and the top nets attach by hooks to the side nets. These nets have multiple adjustment points and may be tightened to fit snugly on most any load. A complete set of 463-L nets (three nets) weighs 65 pounds. Other cargo restraints are chains and chain tiedown devices. These are used for large items, such as Conex boxes, Seabee shelters, and reefer units. Five thousand-pound tiedown straps (fig. 4-14) are used to secure equipment attachments and provide individual item restraints. Additionally, the tiedown straps provide supplemental restraint to the 463-L pallet nets.

Cargo is palletized from the heaviest to the lightest. Large and heavy objects are distributed evenly from the center of the pallet outward to prevent the pallet from becoming heavy on one end. This distribution also helps to maintain the C/B at or near the center. Lighter or smaller items are

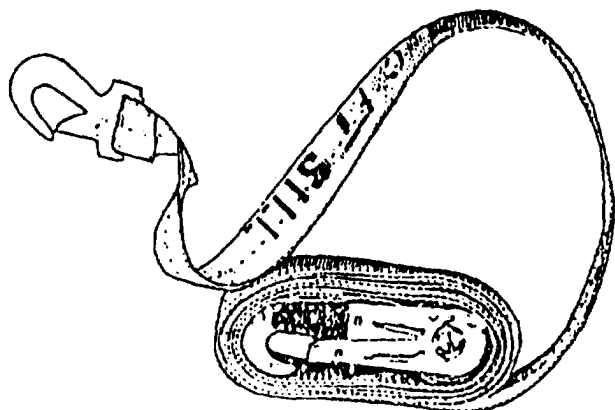


Figure 4-14.—5,000-pound tiedown strap.

positioned on top or along the side of the heavier cargo. Containers marked "THIS SIDE UP" are placed upright, and cargo with special labels are faced outward whenever possible. Pallets should be constructed in a square or pyramid shape whenever possible (fig. 4-15). This makes the load stable, easy to handle, and easier to secure on the pallet.

Each 463-L pallet requires dunnage under the pallet when not on board the aircraft. The dunnage consists of three pieces of 4-inch by 4-inch by 90-inch timbers. The dunnage is placed in the center and close to the outside edges of the pallet. This prevents the pallets from warping and enhances forklift operations. Each aircraft has restrictions as to the dimensional size and shape particular to that specific aircraft. Aisleways must be built on pallet position three or four in a C-130 aircraft. Check the particular requirements of the aircraft for which you are preparing a load.

The marking of the C/B is not necessary on individual 463-L pallets. When 463-L pallet loads are built correctly, the C/B will be at or near the center. The pallets are weighed by using portable scales. The weight of the dunnage must be weighed with the pallet. The scaled weight of the pallet is recorded on the manifest

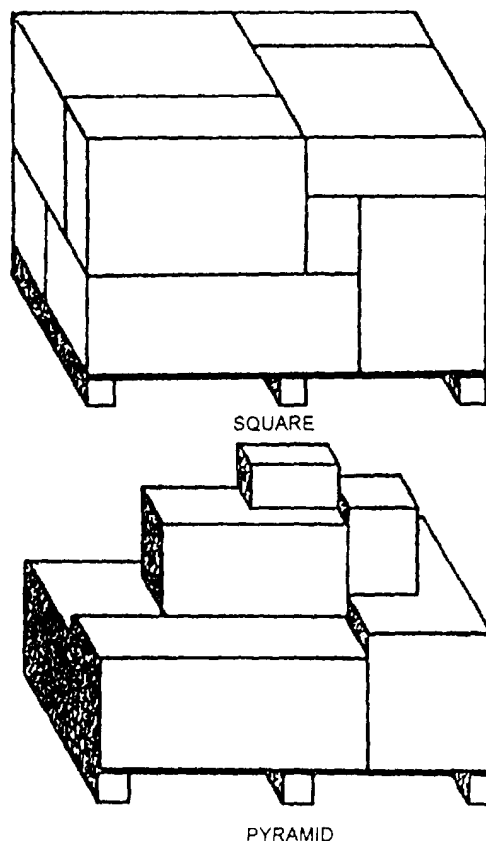


Figure 4-15.—463-L pallet cargo placement.

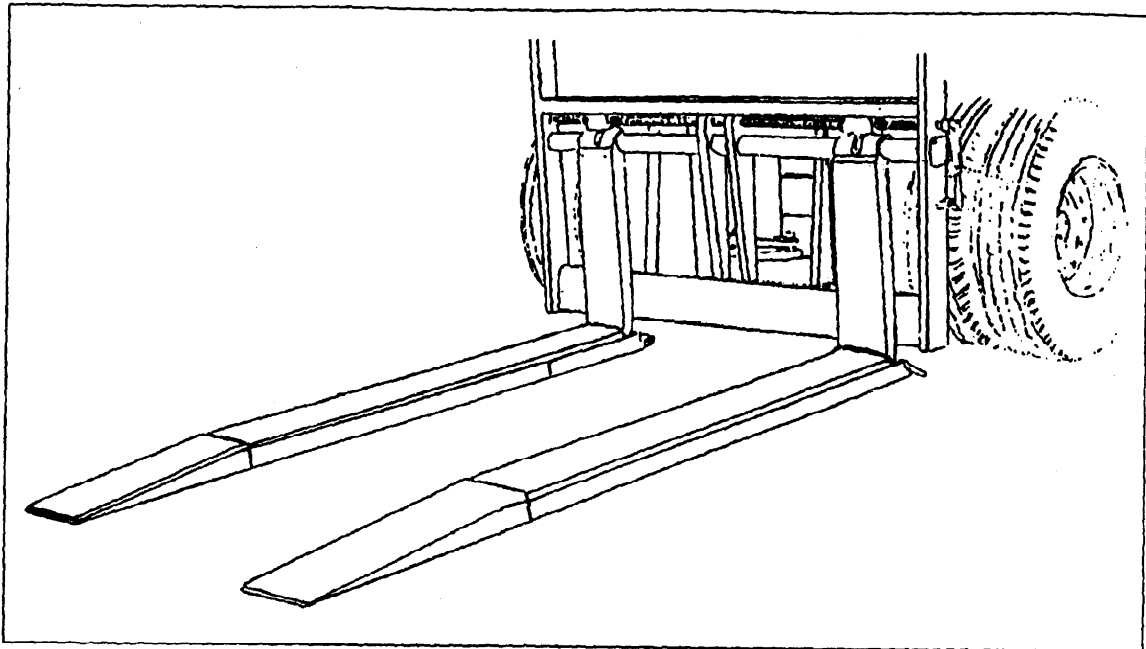


Figure 4-16.—Bare tine extenders.

and labeled on each side (88-inch dimension) of the 463-L pallet.

Handling and loading 463-L pallets with a forklift requires the use of fork extensions (tine fork extenders) to support the weight and size of the pallet fully. Technical publications that govern loading procedures for aircraft require forklift tines be a minimum of 72 inches in length.

The extenders are designed in two configuration: bare tine extenders (fig. 4-16) and rollerized tine extenders (fig. 4-17). The rollerized version of tine extenders is best suited for the rapid handling of 463-L pallets. The bare tine extenders are more useful in pallet building and the placement of mobile loads on beds of vehicles. Either type of extender is acceptable and can be locally manufactured. However, you must exercise

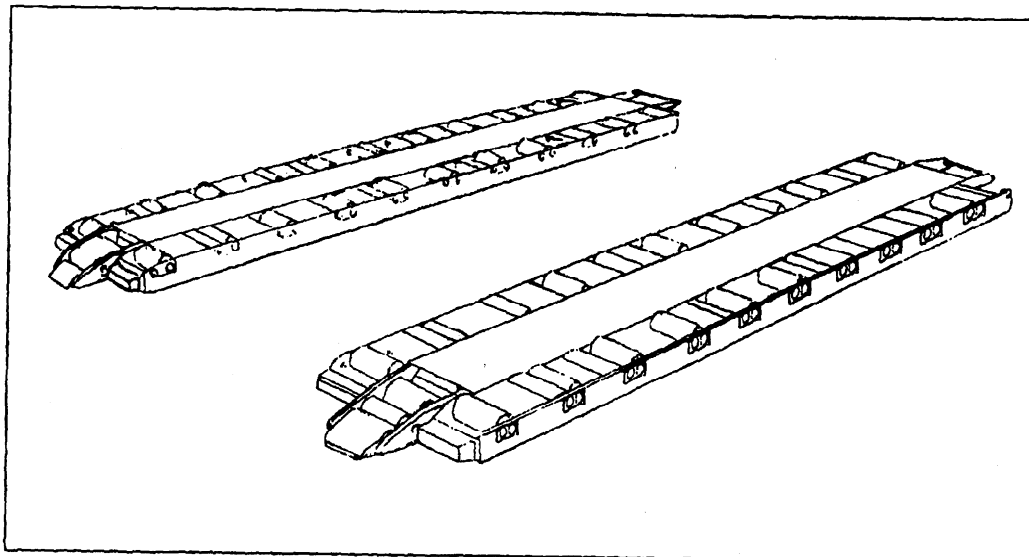


Figure 4-17.—Rollerized tine extenders.

extreme care when handling 463-L pallets, because the tine tips can easily damage a pallet surface and render it unusable. To allow for unloading aircraft and handling pallets at the campsite, you must be sure that a set of tine fork extensions are embarked with the cargo and CESE. The 12K Lift King forklift currently assigned to the NCF TOA has a set of roller tine fork extensions assigned as an attachment.

Once on site, the pallet loads are usually broken down and a supply area is set up for material and tool distribution. Always have control over the location and condition of the pallets, pallet nets, chains, chain tie-down devices, and even the 5,000-pound cargo strap. If you lose control of these items, there is a good chance they will be rendered useless after being run over, walked on, buried, or otherwise damaged or destroyed.

The recommended procedure for storing pallets is to place three sets of 4-inch by 4-inch dunnage down and stack the pallets ten high. Then, place three more sets of 4-inch by 4-inch dunnage and stack ten more pallets. Never stack pallets upside down. This could damage the rings or the aluminum surface. **Never stack pallets over 40 high.** Store all the 4-inch by 4-inch

dunnage, chains, chain tie-down devices, and cargo straps in one location. Be sure to protect pallet nets from adverse climatic conditions. The netting materials may mildew and deteriorate, and the metal hooks can rust if not properly cared for. Custody of 463-L pallets, pallet nets, 4-inch by 4-inch dunnage, chains, chain tie-down devices and cargo straps must be maintained throughout the mission. These items are extremely expensive to purchase and refurbish and may be required for future airlift plans.

### Flight-line Safety

Although mission accomplishment is of paramount importance, it must be done safely and without injury to personnel or damage to equipment. Both efficiency and safety can be accomplished during an air embarkation operation. The following flight-line rules must be strictly observed:

- Smoking is permitted only in designated areas.
- Sitting or lying on the aircraft parking apron is prohibited.
- Extreme caution must be taken around aircraft engines and exhaust. See figures 4-18 through 4-20.

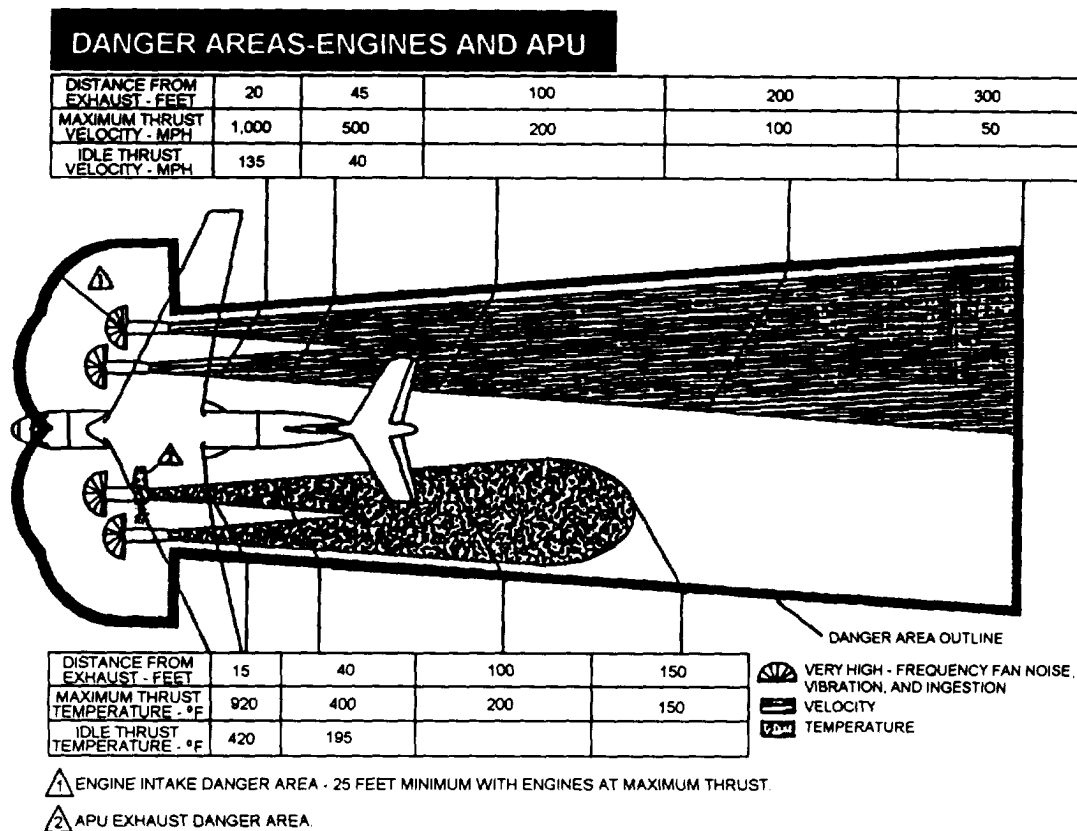


Figure 4-18.—Danger areas—engines and APU.

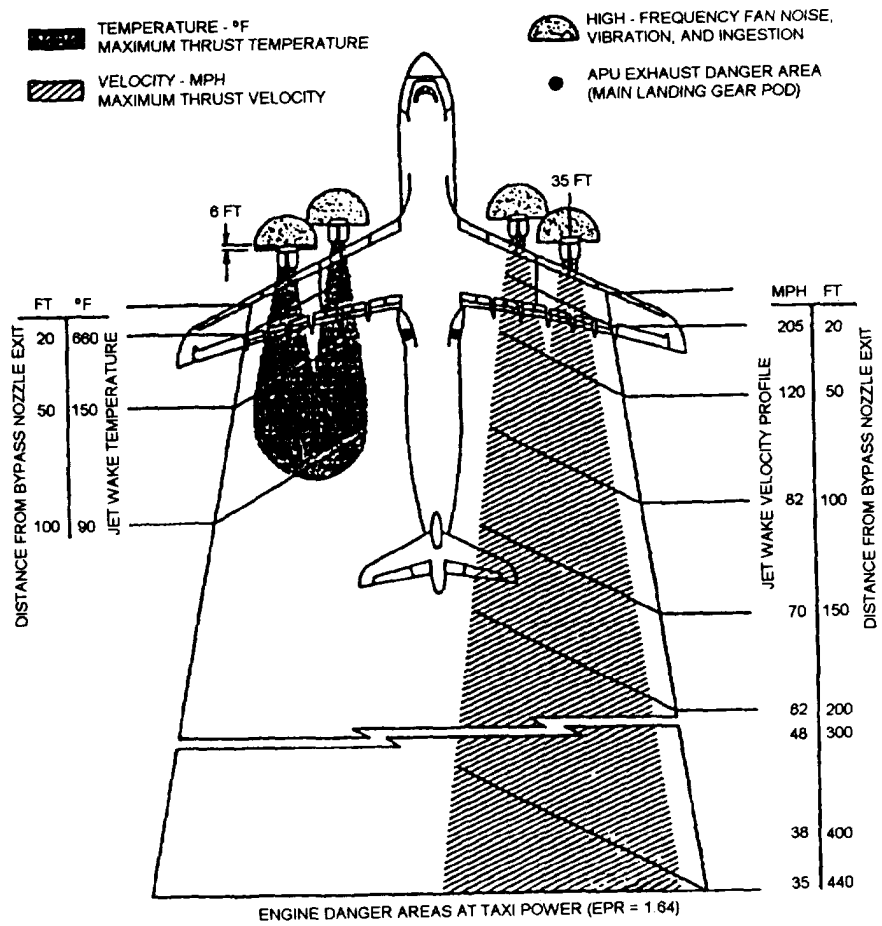


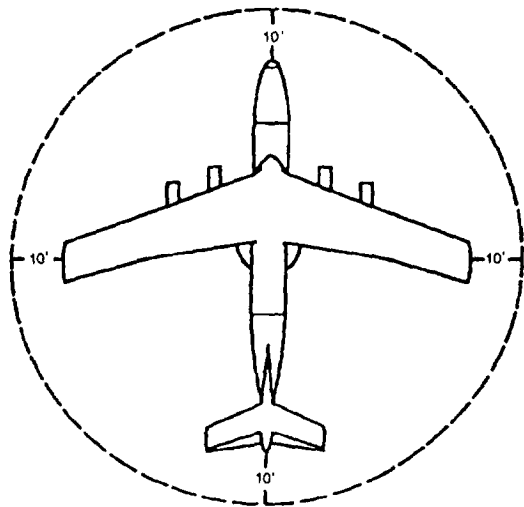
Figure 4-19.—Engine danger areas—at taxi power.

- Do not permit personnel to walk in front of vehicles that are being driven near or are being backed into an aircraft.

REQUIRED EAR PROTECTION	
DECIBELS	REQUIRED EAR PROTECTION
0-85-DB	NO PROTECTION REQUIRED
85-100 DB	EAR MUFFS OR EAR PLUGS REQUIRED
ABOVE 100 DB	EAR MUFFS AND EAR PLUGS REQUIRED
135-145 DB	EAR MUFFS AND EAR PLUGS REQUIRED. LIMITED TIME EX-POSURE
ABOVE 145 DB	PROHIBITED

Figure 4-20.—Required ear protection in vicinity of aircraft.

- Observe the circle of safety rules, as indicated in figure 4-21.
- Do not permit vehicles to park within 25 feet of an aircraft. Park vehicles parallel to the wing axis with the ignition off, transmission in its lowest gear, parking brake set, and wheels chocked (fig. 4-22). Chocks are not required if the driver remains in the vehicle. Between sundown and sunup, lights should be left in the park position.
- Ensure all personnel wait in the marshalling area, unless they are specifically assigned to a job in the aircraft loading zone.
- Do not permit personnel to enter an aircraft cockpit or other restricted areas, unless they are requested to do so by the aircrew.
- Observe all flight-line speed limits. They are aircraft parking ramp = 10 mph, within 25 feet of the aircraft = 5 mph, inside the aircraft= 3 mph. These limits must be followed at all air terminals unless otherwise directed by terminal or flight-line officials.



THE CIRCLE OF SAFETY IS A CIRCULAR AREA EXTENDING TEN FEET BEYOND WING TIPS, NOSE, AND TAIL OF AN AIRCRAFT. ALL VEHICLES WILL BE **PROHIBITED** WITHIN THE CIRCLE OF SAFETY EXCEPT THOSE ABSOLUTELY ESSENTIAL FOR ACCOMPLISHING THE MISSION. GUIDES WILL BE USED

Figure 4-21.—Circle of safety.

In addition to flight-line safety rules, the following rules are required when the aircraft reaches its destination:

- Do not remove restraint devices or start vehicles until told to do so by the loadmaster.
- Move only in the direction straightaway from the front and the rear of the aircraft and at least 50 feet away before turning right or left. Also, move at least 300 feet from the aircraft before stopping.
- During an engines-running offload, passengers other than equipment drivers must exit the aircraft for safety purposes before the vehicles and cargo offloading can begin.

The aircraft loadmaster is the primary authority on any questions that may arise pertaining to the aircraft. This includes changing a planned load or changing the means of debarking from the aircraft. All personnel must cooperate fully with the aircrew at all times. If anything is unclear, call upon the unit embarkation staff for an explanation.

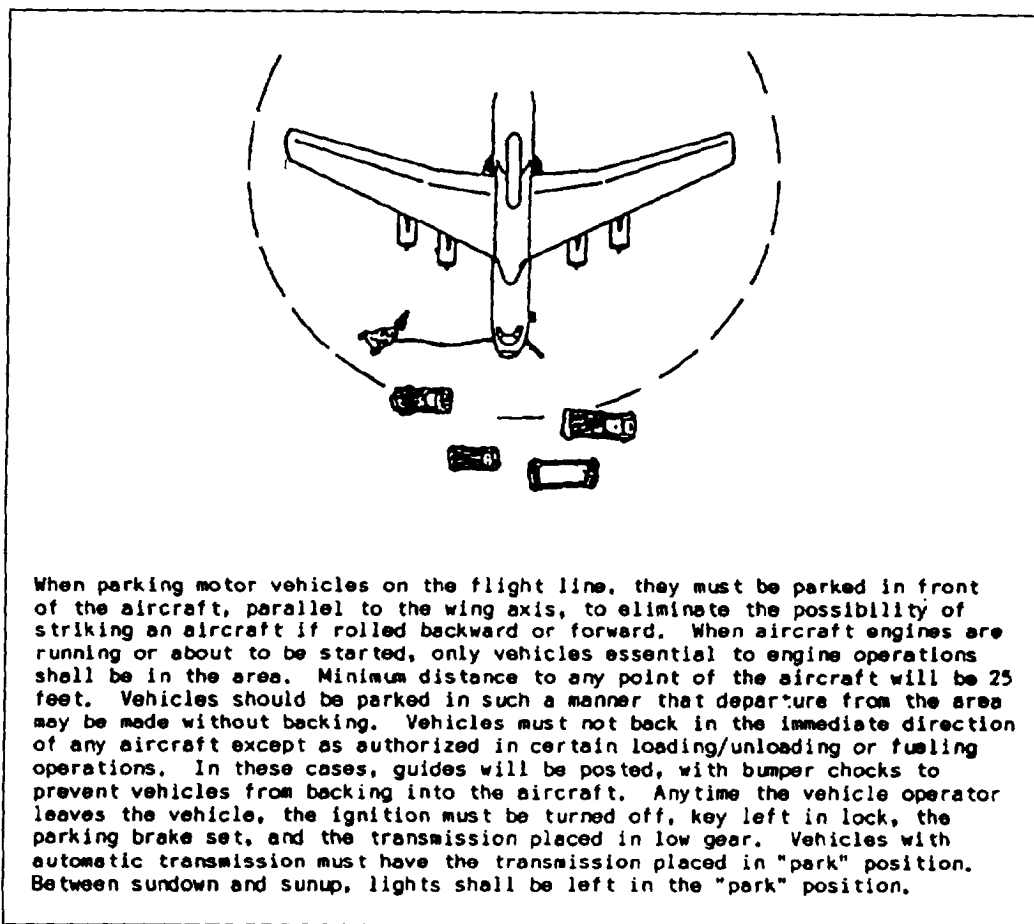


Figure 4-22.—Motor vehicle parking restrictions near aircraft.

## CHAPTER 5

# SEABEE BATTALION TURNOVER AND TOOL MANAGEMENT

*LEARNING OBJECTIVES: Identify the tasks required to turn over and accept a Seabee camp from one battalion to another; describe the methods used in the tool management program.*

The crew leader must be concerned with a variety of items during a turnover. Good use of time available during a turnover will make for a smooth deployment startup. The most important part of a successful turnover is displaying a **professional attitude!**

Battalion personnel definitely make lasting impressions. These impressions, whether good or bad, are based on conduct during the turnover. Outgoing battalions must be concerned about getting the incoming battalion off to the best possible start. Incoming battalions must be concerned with protecting the reputation of the outgoing battalion after they are gone. This good start and good reputation are much more important than any competition between battalions. People outside the NCF often have a misconception of Seabees and their competitive nature. Just remember, our customers are not Seabees. Blaming problems of quality or timeliness of construction on a previous battalion accomplishes nothing. It is unprofessional and harmful. Do not give our customers the impression that the NCF, as a whole, is a less than professional organization. Derogatory statements or signs concerning other battalions cannot be tolerated. A professional attitude must begin at the uppermost level. The main purpose of a turnover is to turn over custody of project files, equipment, and tools from the outgoing battalion to the incoming battalion. Keep this purpose in mind, act professionally, and Seabees and their customers will all benefit.

### PREDEPLOYMENT TRIPS AND ADVANCE PARTIES

Before the deployment of the battalion main body from home port, two significant groups of battalion personnel deploy to the future deployment sites. These two groups are primarily involved in preparing for the arrival of the main body. They make sure that plans are updated and the mission execution phase can begin upon

arrival of the main body. This section of the chapter covers the predeployment trips, the advance parties, and some valuable checklists for items that must be considered during each of these evolutions. The 2ndNCB/3rdNCBINST 5400.9 series and 4650.1 series govern these evolutions.

### PREDEPLOYMENT TRIPS

Approximately 3 or 4 months before the deployment of the main body, a group of selected battalion personnel conduct a predeployment visit to all the sites involved in the upcoming deployment. The visit is intended primarily to provide the relieving battalion with an idea of the facilities, the available equipment, and the current and projected status of projects. This visit also allows the relieving battalion an opportunity to meet key members of each command at each site and review the initial planning efforts of the battalion. To get the desired predeployment trip results, follow these steps before departure:

- Review the existing OORDER/OPLANs for the particular sites to determine likely situations to be encountered.
- Make preliminary organizational assignments and determine site-peculiar requirements.
- Develop a preliminary organizational and resource allocation plan using a listing of construction and military tasks to be accomplished.
- Review all plans, specifications, material listings, and project schedules for developing a total construction plan.
- Make an analysis of available and projected availability of resources (personnel, material, equipment, facilities, time) with specific questions formulated to evaluate uncertainties.

- Temporarily designate key personnel to assist in gathering information. These key personnel should establish informal liaison with their counterparts before the predeployment trip.

Possible members of the predeployment party and a list of primary concerns of each individual relating to the deployment site are listed in figure 5-1. Use this listing to help build your understanding of personnel needed for predeployment trips.

The actual composition and numbers of personnel on a predeployment visit are normally limited, but subject to negotiation with 2ndNCB/3rdNCB. Composition and number depend on known or anticipated conditions of the mission. Regardless of the final composition, the functions listed must be done by one of the members of the team. It is imperative that team members be totally prepared and in a position to evaluate tentative plans. Prepared team members can then finalize plans before the departure of the advance party.

In addition to and with the functions listed, there are numerous questions that must normally be resolved during the predeployment trip. A detailed list of questions can be found in the *Operations Officer's Handbook*, 2ndNCB/3rdNCBINST 5200.2 series. You as a crew leader or shop supervisor should review these questions before the predeployment visit. There may be questions of your own that need answers. Pass these questions onto your chain of command.

The on-site battalion should expect questions during the predeployment trip and should be prepared to provide the answers. This information will assist in planning for the upcoming deployment.

Upon return from the predeployment trip, the final deployment planning phase should commence full force. Definite assignment of functions and resources should be made. This final planning phase must be complete before the deployment of the advance party. The planning must include continual follow-up on all items that may affect the future deployment.

## **ADVANCE PARTIES**

Approximately 10 days before the departure of the main body, an advance party will deploy to the sites. The primary purpose of this group is to turn over all continuing functions, finalize construction plans, and prepare for the arrival of the main body. This preparation gives the main body adequate facilities and allows production to begin within 2 or 3 days of arrival. The advance party represents the first permanent group of people at the deployment sites. They will leave a lasting

impression. Accordingly, it is strongly recommended that the advance party be staffed with the best personnel available. Choose professional people who can carry out the required functions in a minimum amount of time.

There is a trend towards reducing both the number of people on the advance party and the duration. This trend is dictated by limited funds and a desire to subject as few battalion personnel as possible to a longer deployment. Experience indicates that an entire battalion main body turnover can be done in 10 days if proper planning is done ahead of time.

The number of personnel required to turn over the main body and detail sites varies with the conditions of the site and the imposed restraints from higher authority. To minimize expenditure of funds, the advance party is frequently limited by the capacity of a standard aircraft. Optimum aircraft use often dictates that the advance party/main body personnel be split. The size of the advance party can be adjusted. The most important consideration is the requirements of the mission. Adjustments can be made to suit available travel arrangements. To assist in determining the minimum requirements, you can use the information in figure 5-2.

You can see that the advance party for a main body site should be approximately 150 people. Of course, this number varies and is dependent upon the actual pieces of equipment and the number of projects undertaken upon arrival of the main body. Detail site advance parties also vary.

The advance party does not normally start work on any assigned project. However, if a project is of such a nature that it demands an early start, the size of the advance party can be adjusted accordingly. The on-site battalion should have completed all work by the time the advance party arrives. The only work continuing should be reaching a good turnover point and cleaning up the projects. Full-scale production during the turnover period benefits neither battalion and should be the exception rather than a general practice.

The turnover period is an extremely rushed time. Rushing tends to fray the nerves of everyone involved. To help eliminate some of the normal stress, the following guidelines should be settled firmly during the predeployment trip and strictly enforced by the advance party.

1. All transportation to and from flights and cargo handling should be furnished by the on-site battalion. Of course the last plane leaving will be loaded by the relieving battalion.

PERSON	TRIP FUNCTION
Commanding Officer	<ul style="list-style-type: none"> <li>a. Interface with command and customer</li> <li>b. Evaluate facilities</li> <li>c. Evaluate mission problems</li> </ul>
Master Chief Petty Officer of the Command	<ul style="list-style-type: none"> <li>a. Evaluate berthing, messing, clubs, and recreational facilities</li> <li>b. Interface with command and customer</li> <li>c. Analyze site-peculiar problems</li> <li>d. Assist other members of team</li> <li>e. Evaluate medical/dental support</li> <li>f. Evaluate MARS equipment</li> <li>g. Evaluate postal service</li> </ul>
Operations Officer/Operations Chief	<ul style="list-style-type: none"> <li>a. Evaluate projects, QC plans, reporting procedures, and anticipated turnover status</li> <li>b. Review existing resource distribution</li> <li>c. Evaluate camp maintenance</li> <li>d. Evaluate facilities</li> <li>e. Evaluate shop equipment</li> <li>f. Gather additional project-oriented documentation</li> <li>g. Consider possible night operations</li> <li>h. Interface with command, ROICC, and customer</li> <li>i. Determine special training requirements</li> <li>j. Review the existing disaster preparedness control plans and determine the battalion's involvement</li> <li>k. Evaluate existing contingency plans and information</li> </ul>
Supply Officer	<ul style="list-style-type: none"> <li>a. Interface with command and customer</li> <li>b. Evaluate warehouse, messing, and disbursing facilities</li> <li>c. Determine existing support agreements and sources of support</li> <li>d. Determine all allowance excesses and deficiencies</li> <li>e. Determine normal requisition lead times and local requisitioning procedures</li> <li>f. Determine budgeting and funding constraints</li> <li>g. Determine camp-owned equipment/equipage</li> <li>h. Determine what battalion-owned items could be left on site</li> <li>i. Determine requirement for mess cooks and other support personnel</li> <li>j. Review status and procedures for MLO</li> </ul>
Equipment Officer	<ul style="list-style-type: none"> <li>a. Evaluate equipment condition and particular maintenance problems</li> <li>b. Evaluate facilities for maintenance, transportation, and support (paint shop, batch plant, quarry, and such)</li> <li>c. Determine normal travel times and ground transportation routes</li> <li>d. Determine local driving conditions and licensing procedures</li> </ul>
Camp Maintenance Officer	<ul style="list-style-type: none"> <li>a. Determine facility conditions</li> <li>b. Determine PM system in use</li> <li>c. Evaluate utility systems</li> <li>d. Evaluate stationary equipment</li> <li>e. Determine unusual maintenance problems</li> <li>f. Determine staffing requirements</li> </ul>
Detail OIC	<ul style="list-style-type: none"> <li>a. Accomplish all of the above functions for the particular site, alone or with one or more other team members</li> <li>b. Evaluate armory and military training facilities</li> <li>c. Evaluate communications equipment</li> </ul>

Figure 5-1.—Sample predeployment party and functions listing.



**Advance Party Personnel for Main Body Site**

- S-1
  - 3 Yeomen (generally an E-7 and 2 YNs)
  - 2 Personnelmen (generally E-4/E-5)
  - 1 Postal clerk
  - 1 Security manager or assistant (could be the YN)
  
- S-3
  - 1 Operations officer (generally the OIC)
  - 1 Operations chief
  - 3 EAs (1 EAC and 2 EAs)
  - 6 P&E/Quality control staff
  - 1 Photographer
  - 1 Yeoman
  
- S-4
  - 1 Supply officer
  - 1 Disbursing officer
  - 1 Disbursing clerk
  - 6 Mess specialists (1 MSC and 5 MSs)
  - 4 CTR/CSR personnel
  - 5 MLO personnel
  - 6 Storekeepers
  - 3 Repair parts personnel
  - 5 Other personnel for inventory
  
- S-7
  - 1 Training chief
  - 1 Communications person
  - 2 Armory personnel
  
- Other staff
  - 1 HMC or HM1
  - 1 Special services person
  - 1 MAA
  
- "A" Company
  - 1 Company commander
  - 1 Maintenance supervisor
  - 2 Operations personnel (1 supervisor and 1 asst)
  - 1 Transportation supervisor
  - 1 Dispatcher
  - 40 Mechanics (approximately)
  - 13 Operators (approximately 1/3 of mechanics)
  - 3 Shop personnel (MR, CE, SW)
  
- "B" Company
  - 1 Company commander
  - 1 Maintenance control director
  - 6 Maintenance personnel
  - 4 Shop personnel (BU, CE, SW, UT)
  - 2 Specialized personnel (A/C, boilers, diesel, or such)
  - 2 Project supervisors
  
- "C" Company
  - 1 Company commander
  - 8 Project supervisors (approximately)
  - 1 Expeditor
  - 1 Clerk

**Figure 5-2.—Composition of advance party personnel.**

### Advance Party Personnel for a Detail Site

- 1 OIC
- Varying number of project supervisors
- 1 MLO/CTR
- 1 Expeditor
- 1 Maintenance supervisor
- Varying number of mechanics and repair parts personnel
- Varying number of operators (1/3 of mechanics)
- Others (dependent on actual site requirements)

**Figure 5-2.—Composition of advance party personnel—Continued.**

2. All watches are stood by the on-site battalion until 2 days before their departure. The advance party assumes all watches at that time.
3. All equipment remains in the custody of the on-site battalion until the Battalion Equipment Evaluation Program (BEEP) is complete.
4. Upon completion of particular inventories, custody should be transferred to the relieving battalion.
5. Minimize all issues during the turnover period to essential items only.
6. All cooking and mess cooking is done under the control of the on-site battalion until the last full day. At which time the function should transfer. The battalion to be relieved must continue to work in the galley until they leave.
7. Projects should be turned over by specific checklists as soon as possible.
8. Turnover of classified materials should be delayed until the very end of turnover.
9. Administrative services should be provided by the on-site battalion.
10. Camp maintenance should be done by the on-site battalion until within 48 hours of departure of the last flight.
11. Sick bay and dental functions are to be operated by the on-site battalion.
12. The relieving battalion is responsible for acceptance of facilities, functions, and projects. The battalion being relieved must provide maximum assistance to ensure a smooth transition.
13. Upon arrival, key command members should meet to establish a mutually acceptable turnover.
14. The battalion being relieved should freely expose problems experienced and lessons learned.
15. Every arriving flight should have access to a meal, other refreshments and, time permitting, rest upon arrival.
16. The OIC of the advance party should arrange for an appropriate, but simple, relieving formation and ceremony.
17. The battalion being relieved should arrange for advance party office spaces and equipment.

Remember . . . the advance party is your last opportunity to deal with the on-site resident expert battalion. It is to your benefit to get as much information as possible from them. This information can help you to efficiently and effectively employ your people upon their arrival with the main body.

### **PROJECTS**

During the life of a battalion project, there are four different types of turnovers that may occur. Battalion relief is when the project is turned over from one battalion to another. Embarkation is when the project is closed because of an actual or exercise embarkation. Beneficial occupancy date (BOD) is when the facility is available for occupancy and ready to fulfill its intended purpose. Final turnover is when all project work, including change orders and punch lists, is complete. This section of the chapter will cover the major points pertaining to the battalion relief type of project turnover.



**B. Subcontract (Summary of work remaining by master activity)**

- (1) Title
- (2) Cost
- (3) Date RFCP Submitted
- (4) Date Contract Awarded
- (5) Start
- (6) Completion
- (7) Status

**5. Labor Statistics:**

- A. Man-day estimate established at 45-day review by NMCB \_\_\_\_\_
- B. Man-days expended by previous battalion \_\_\_\_\_
- C. Man-days expended by NMCB \_\_\_\_\_
- D. NMCB estimate of remaining man-days by rate: (negotiated between crew leaders)

	BU	SW	UT	CE	EO	EA	Total
Rework							
Remaining Work							
Total							

- E. NMCB estimate of man-days remaining master activity: (negotiated between crew leaders)

(1) <u>Master Activity</u>	(2) <u>Estimate of Man-days Remaining</u>	(3) <u>Estimate of Total Man-days</u>	(4) <u>Percent Complete *</u>
-----------------------------------	--	--	--------------------------------------

\*d= (1-(b/c)) x 100

- F. New man-day completion estimates (B+ C+ D) \_\_\_\_\_
- G. Man-days expended total (B+C) \_\_\_\_\_
- H. Percent complete ((1-D/F) x 100) \_\_\_\_\_
- I. Projected BOD \_\_\_\_\_

**Figure 5-3.—Joint turnover memorandum—Continued.**

6. **Project Files:** (Joint inventory by both crew leaders) **Circle One**

A. Correspondence	Y	N	N/A
B. Messages	Y	N	N/A
C. Job specifications	Y	N	N/A
D. QC reports	Y	N	N/A
E. Test results	Y	N	N/A
F. FARs	Y	N	N/A
G. Manufacture's specifications	Y	N	N/A
H. Operations and maintenance manuals	Y	N	N/A
I. BMs/MTOs worksheets	Y	N	N/A
J. QC plans	Y	N	N/A
K. Safety plans	Y	N	N/A
L. Activity sheets	Y	N	N/A
M. <u>File discrepancies explanations</u>			

7. **Engineering:** (Joint inventory by Eng/QC Staffs) **Circle One**

A. As-built drawings	Y	N	N/A
B. Digging permits	Y	N	N/A
C. Other permits	Y	N	N/A
D. Pending FARs	Y	N	N/A
E. <u>Discrepancies/explanations</u>	Y	N	N/A

8. **Construction Company:** (Joint inspection by crew leaders)

A. Project network	Y	N	N/A
B. Electrical systems tagged	Y	N	N/A
C. Piping labeled capped clear	Y	N	N/A
D. Material on jobsite tagged	Y	N	N/A
E. <u>Discrepancies/explanations</u>			

9. **Project Material Status:** (Done jointly by crew leaders)

A. Project status report	Y	N	N/A
B. List of shelf life material expiration	Y	N	N/A
C. List of hazardous material/location	Y	N	N/A
D. Complete PMs/work sheets	Y	N	N/A
E. Payback items identified	Y	N	N/A
F. Review outstanding requisitions	Y	N	N/A
G. Inventory conducted	Y	N	N/A
H. BM status			
(1) Total line items _____			
(2) Line items received _____			

Figure 5-3.—Joint turnover memorandum—Continued.

(3) Line items not received \_\_\_\_\_

I. Discrepancies/explanations

10. Funding Status: (Incoming crew leader identifies material not purchased as future requirements, other info comes from MLO)

- A. Funds provided \_\_\_\_\_
- B. Actual expenditure cost \_\_\_\_\_
- C. Pipeline cost \_\_\_\_\_
- D. Future funding requirements \_\_\_\_\_
- E. Total costs \_\_\_\_\_
- F. Funding contingency \_\_\_\_\_
- G. EAC \_\_\_\_\_
- H. Additional funds requested \_\_\_\_\_  
DTG of message \_\_\_\_\_

11. Project Tools (Specific): (Joint inventory by both crew leaders of tools purchased with project funds)

<u>Tools</u>	<u>Condition</u>	<u>Location</u>	<u>Custodian</u>
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12. Lessons Learned: (Completed by outgoing crew leader/company staff)

13. ROICC Punchlist of Completed Work: (Taken directly from ROICC acceptance letter)

Copy to:  
ROICC  
COM 2NDNCB or COM 3RDNCB

Figure 5-3.—Joint turnover memorandum—Continued.

		<b>BATTALION</b>			
		<b>Relief</b>	<b>Embark</b>	<b>BOD</b>	<b>Final</b>
1.	Is an annotated project schedule available indicating current status?	X	X		
2.	Are activity scope sheets available for remaining activities?	X	X		
3.	Has ROICC approved all work-in-place?	X	X	X	
4.	Is the complete project file and project planning package available containing:				
a.	As-built drawings?	X	X		X
b.	Q/C plan?	X	X		
c.	Safety plan?	X	X		
d.	Q/C reports?	X	X		X
e.	Vendors submittals for approval?	X	X		X
f.	Operations and maintenance manuals?	X	X		X
g.	Change-order records?	X	X		X
h.	Record of manpower expended?	X	X		X
i.	All project correspondence?	X	X		X
j.	Fabrication drawings?	X	X		X
k.	Project specifications?	X	X		X
l.	Job photographs/slides?	X	X		
5.	Is the following information on project materials available:				
a.	Complete MTO and addendums?	X	X		X
b.	BM work sheets and sketches?	X	X		X
c.	Annotated MTO indicating in-place, on-site, in-warehouse, excess, or on-order status	X	X		
d.	Material status reports?	X	X		
e.	Requisition follow-up status?	X	X		

**Figure 5-4.—Questions for project turnover.**

Figure 5-4 is the checklist that should be used to prepare for a project turnover. Depending on the type of turnover, the checklist is annotated with the particular information that must be provided. It is the on-site battalion's responsibility to provide the information to the ROICC or the relieving battalion.

### Project Status at Turnover

One of the difficulties in planning for turnover projects is not knowing exactly what portion of the project is going to be remaining when you get to the deployment site. Sixty days before returning to home port, the on-site battalion is required to furnish the

		<b>BATTALION</b>			
		<u>Relief</u>	<u>Embark</u>	<u>BOD</u>	<u>Final</u>
f.	<b>Listing of shelf life materials and expiration dates?</b>	X	X		
g.	<b>Listing of hazardous materials?</b>	X	X		
6.	<b>What is the current status of funds held by the Naval Construction Force in terms of assigned, expended, obligated, and committed?</b>	X			
7.	<b>What tools for construction have been provided with project funds and what are their condition?</b>	X	X		X
8.	<b>Are progress monitoring tools available?</b>	X	X		X
9.	<b>Has a lessons learned summary been prepared?</b>	X	X		
10.	<b>What recommended methods improvements have been submitted?</b>	X	X		X
11.	<b>Have all noncompleted electrical systems been tagged and completely identified?</b>	X	X		
12.	<b>Are all circuits and piping labeled?</b>	X	X		X
13.	<b>What percent complete is the project?</b>	X	X		
14.	<b>Is a punch list prepared and approved by the ROICC?</b>			X	

Figure 5-4.—Questions for project turnover—Continued.



relieving battalion, 2ndNCB/3rdNCB, and the cognizant NCR with a Construction Project Status at Turnover situation report (SITREP). Figure 5-5 is the format used for this report. The purpose of this message is to project the status of each of the on-site battalion's tasked projects at the end of their deployment. The message includes specific comments on each project.

This will probably be the latest information available to you, unless someone from your battalion makes a late predeployment trip.

**Material Status at Turnover**

Material status is a major concern for the crew leader at turnover. Make arrangements with your MLO

**PROJECT STATUS AT TURNOVER MESSAGE FORMAT**

**FROM: NMCB (ON-SITE BATTALION)**

**TO: NMCB (RELIEVING BATTALION)**

**INFO: COMSECONDCB LITTLE CREEK VA or COM THIRD NCB PEARL HARBOR HI  
COM TWO ZERO NCR GULFPORT MS or COM THREE ONE NCR PORT HUENEME CA**

**UNCLAS // N11000//**

**SUBJ: PROJECT STATUS AT TURNOVER**

1. The purpose of this message is to project the status of NMCB (on-site battalion) tasked projects to the deployment completion turnover date of \_\_\_\_\_.
2. main body (or detail site)
  - A. Project Status.
 

(a) through ( ): List all projects and their status. Comment on anticipated project status at turnover, provide projected WIP at turnover for each master activity, list material problems that will exist at turnover.
  - B. Project Summary. (Read in four columns)

(1)	(2)	(3)	(4)
<u>PROJECT NO.</u>	<u>TITLE</u>	<u>PROJECTED WIP AT TURNOVER</u>	<u>TOTAL PROJECT MD REMAINING (HORIZ/VERT)</u>
RR2-889	Alterations to Bldg 2001	100%	0/0
RR3-800	Pave Perimeter Road	40%	550/50
RR4-899	Repair Bldg 1000	75%	0/500
RR5-888	Const Addn to Bldg 5000	95%	25/75

Figure 5-5.—Project status at turnover message format.

staff to inspect your materials as soon as the joint inventory has been conducted. Material turned over on the project site must be tagged with the bill of material (BM) line item number. The MLO staff will count the material, but the crew leader should double check the size, type, and condition of the materials. It is the responsibility of the on-site battalion to procure and have on site at turnover adequate materials to avoid material delays for the relieving battalion.

For turnover projects and new-start repair/alteration projects, the on-site battalion must procure and have on site 100 percent of the local purchase materials. For new-start construction projects, they must have on hand 50 percent of local purchase materials.

Following the 45-day review, the on-site battalion begins monthly submission of a Local Material Procurement Status SITREP. This SITREP lists all of the projects (turnover and new-start) tasked to the relieving battalion. Crew leaders for the relieving battalion should be monitoring these in home port to be sure local material procurement is progressing satisfactorily.

### **Project Percent Complete at Turnover**

The procedure for determining percent complete at turnover is included in part 5 of figure 5-3. The focus is on man-days of work remaining. The two battalions go through the project estimates activity by activity until they agree on the estimate of total man-days remaining. If there is a dispute as to whether or not part of the WIP conforms to the plans and specifications, the battalions should consult the ROICC for a determination. Remember that any rework estimated to require over 50 man-days or \$500 in materials requires 2ndNCB/3rdNCB approval.

### **Continuity of WIP Curve**

The project WIP curve must be continuous through the history of the project unless there is a 2ndNCB/3rdNCB-approved scope change. If the battalion wishes to revise a previously reported WIP on a project, a request for the change with the justification must be submitted by message to the 2ndNCB/3rdNCB. This message requirement also applies to any downward adjustment in WIP during turnover negotiations. Any downward adjustments in WIP in the turnover SITREP must be explained. After turnover, the relieving battalion cannot reduce the previously reported WIP without justifying it to the 2ndNCB/3rdNCB.

### **Turnover Conference**

A turnover conference should be held for each turnover project. Both battalions and the ROICC must be in attendance. The outgoing battalion should schedule these conferences and provide a schedule to the 2ndNCB/3rdNCB Detachment OIC. Minutes of these conferences must be kept and made part of the project file.

### **PROJECT CLOSEOUT**

This section of the chapter is specially designed to help the crew leader complete the operational and administrative steps when the project comes to a close. This section will also help you prepare for your final inspection.

#### **Tool, Equipment and Material Turn-ins**

The crew leader must make sure the jobsite is clean. All tools, excess materials, and civil engineering support equipment (CESE) must be properly cleaned, inventoried, and returned to the proper outlet. Tools and tool kits returned to the central tool room (CTR) must be inventoried with 1250-1s filled out for any missing or broken items. Turn all material into MLO using 1250-1s filled out in red ink with the appropriate BM line item numbers. Project material as well as tools purchased with project funds must be offered to the customer before being considered "excess."

#### **As-built Drawings**

The crew leader must keep all drawings updated during construction. He or she must constantly check with the engineering department to make sure they are making the same updates. At the close of the project, the battalion is required to turn in two sets of red-line drawings to the ROICC. These prints show how the project was actually constructed.

#### **Preliminary Acceptance**

At the completion of your project, use the pre-BOD checklist of figure 5-6 to make sure your project is ready. Then, through your QC staff, arrange for a preliminary acceptance inspection with the ROICC. Following this

# PRE-BOD INSPECTION REQUEST

Project No:	Crew leader:	Date:
This inspection is conducted prior to the final acceptance (BOD) inspection. This 'pre-BOD' inspection is conducted jointly with battalion and ROICC representatives and is intended to identify any corrective steps necessary prior to customer occupancy.		
Requested date:	Time:	Requested by: (name/rate)
The following checklist shall be completed by the crew leader and forwarded to QC two working days prior to the requested date of the inspection. The crew leader should use the following checklist as guide but the pre-BOD inspection will not be limited to these items.		
<b>SITework</b>		crew leader init.
Final Grading (Grassing)		
Disposal of all Trash		
Sidewalks		
Curbs & Paving		
Lights		
<b>MECHANICAL</b>		
Installation of Piping, Fixtures, and Equipment		
Application of Insulation and Hangers		
Sterilization (Water System)		
Shop Drawings		
Water Supply Test		
Gas & Oil Piping		
Heating and Cooling Units		
Duct Work		
Thermostat Controls		
Registers		
Exhaust Fans and Hoods		
Manufacturers' Catalogs		
Working Test (Boilers)		
<b>ELECTRICAL</b>		
Manufacturers' Catalog		
Test All Lights		
Test Fire Alarms		
Telephone Hook-up		
Main Panel Box (All Breakers Labelled)		
<b>CONCRETE &amp; MASONRY</b>		
Joints		
Cracks		
<b>STRUCTURAL STEEL</b>		
Touch-up Paint		

Figure 5-6.—Pre-BOD inspection request.

<b>HARDWARE</b>		crew leader init.
Closet Hardware		
Bathroom Accessories		
Door Hardware		
Gate Hardware		
Miscellaneous Hardware		
<b>DOORS &amp; WINDOWS</b>		
Clean		
Fit		
<b>FINISHES</b>		
Acoustic Tile		
Ceramic & Quarry Tile		
Floor Covering		
Painting		
Plastering		
<b>FURNISHINGS</b>		
Fabrication		
Installation		
<b>GENERAL</b>		
Project Package Up to Date		
As-Builts Completed		
Site Clean		
Excess Material Turned-in		
<b>REMARKS</b>		
Crew leader		QC Inspector

Figure 5-6.—Pre-BOD inspection request—Continued.

inspection the ROICC will provide the battalion, in writing, a memorandum listing all the punch list items. Figure 5-7 is an example of this memorandum. The battalion will take the necessary action to complete any punch list items as soon as possible.

### **Final Acceptance**

In most cases, the project will not be turned over to the customer until all of the punch list items have been completed. When all of the punch list items have been

<b>COMMAND LETTERHEAD</b>	
	<b>Date:</b>
<b>MEMORANDUM</b>	
<b>From: ROICC</b>	
<b>To: NMCB</b>	
<b>Subj: Project XXX-XXX</b>	
<b>1. A preliminary inspection was conducted at 1500H on 30 January 1994 for the subject project. The following personnel were present:</b>	
<b>2. As a result of the inspection, the following discrepancies were noted:</b>	
<hr/> <b>Signed</b>	
<b>Copy to:</b> <b>2nd NCB/3rd NCB</b>	

Figure 5-7.—Punch list memorandum.

completed, the crew leader arranges through the QC for a final inspection with the ROICC and a customer representative. There should be no punch list at this inspection. If there are no discrepancies, beneficial occupancy is established upon completion of the final inspection and the 1-year warranty takes effect. The battalion prepares a letter to the ROICC advising that

the project has been completed. This transfer letter has two sets of as-built drawings; all installation, operation, maintenance, and other technical service manuals; and parts catalogs. The transfer letter also contains a statement of actual material cost and statistical labor cost. Figure 5-8 is a sample transfer letter. If the ROICC did not include 2ndNCB/3rdNCB in the distribution of

<b>COMMAND LETTERHEAD</b>	
<b>Date:</b> _____	
<b>MEMORANDUM</b>	
<b>From:</b> NMCB	
<b>To:</b> ROICC	
<b>Subj:</b> Project XXX-XXX	
<b>1. A final inspection was held for subject project on (date) with the following personnel in attendance:</b>	
<b>NAME</b>	<b>ORGANIZATION</b>
_____	_____
_____	_____
_____	_____
_____	_____
<b>2. As no discrepancies were noted during the final inspection, NMCB__'s tasking is hereby considered complete. The one-year warranty commenced (same date as inspection).</b>	
<b>3. As-built drawings and maintenance manuals for installed equipment are provided as enclosures ( ) through ( ).</b>	
<b>4. The total material cost was \$ _____ and thse total labor cost was \$ _____.</b>	
<b>_____ BATTALION REPRESENTATIVE</b>	

Figure 5-8.—Project transfer letter.

their acceptance letter, the battalion will forward them a copy. The ROICC acceptance letter is placed in the project files. The project files are then closed and retained by the ROICC for 2 years.

### **BATTALION EQUIPMENT EVALUATION PROGRAM**

The BEEP has a three-fold purpose: (1) to pass on all special knowledge of CESE maintenance and operations techniques; (2) to provide the relieving battalion with a realistic and in-depth condition evaluation of CESE allowance, facilities, tools, and materials; and (3) to use the full expertise and efforts of the two equipment forces to provide the relieving battalion and detachments with the best possible "A" company operation to conduct a successful deployment.

### **BEEP REPRESENTATIVES**

Representatives from 2ndNCB or 3rdNCB must be present at each BEEP and must remain on board until all phases of the BEEP have been completed. There are four primary duties of the BEEP representatives.

1. Present indoctrination to personnel from both battalions to cover and adhere to as a minimum during BEEP. The indoctrination guidelines include the following:

- Collateral equipage is not to be placed on vehicles going through the shop.
- No collateral equipage or repair parts are to be purchased or ordered for equipment scheduled for replacement or disposal.
- Wheels on equipment are not to be pulled for brake inspection unless there is reason to suspect brake problems.
- Engine oil and oil filters are to be changed only on equipment that meets the miles/hours or time criteria as outlined in the COM2NDNCB/COM3RDNCBINST 11200.1 series, *Red Book*.
- No collateral equipage or repair parts are to be ordered or purchased for equipment in A6 condition unless approved by the BEEP representative.
- Time allotted for the BEEP is to be the full turnover period, which includes weekends and holidays.

- Preventive maintenance (PM) continues until 10 working days before the start of the BEEP.
- The 2ndNCB/3rdNCB equipment representatives assign all final CESE codes with input from both units' maintenance supervisors.
- All CESE, with the exception of warehoused CESE units, is to be returned to the ALFA company facility for evaluation or repairs as necessary. Exceptions are requested from, and approved by, the 2ndNCB/3rdNCB equipment representatives.
- No CESE is to be warehoused within 30 days before the BEEP.
- ALL hydraulic attachments are to be tested during the BEEP.
- All generators are to be load tested.
- All welders, pumps, and light plants are to be operationally and functionally tested during the BEEP.
- All cranes must be certified during the BEEP for valid/current certification. All slings must be checked for certification. Each sling must be tagged with its certification. Pile drivers are to be operationally tested. Bucket trucks, where applicable, are to be weight and dielectrical tested during the BEEP. Buckets may not have any damage or holes!
- The machine shop is to be jointly evaluated and inventoried with each unit's MR.
- Tires are to be checked for proper inflation, and valve stems properly positioned with air valve caps in place. Equipment with tracks is to be properly adjusted to the manufacturer's specifications before entering the shop.
- All CESE is to be greased according to the manufacturer's specifications. All grease points not accepting grease must be repaired so that the point of friction can be lubricated.
- Tires or other items that have appreciable wear expectancy remaining are not to be replaced, purchased, or ordered unless they are not in stock (NIS) in supply and no replacements have been ordered.

- All NAVSUP form 1250-1/-2s for procurement of NIS or not carried (NC) repair parts are to be authenticated by the 2ndNCB/3rdNCB equipment representatives.
- Safety will be paramount throughout the entire BEEP!

2. Provide technical assistance during the BEEP.
3. Conduct a critique of the BEEP for appropriate personnel from both battalions.
4. Prepare and submit a BEEP Completion Report to COM2NDNCB or COM3RDNCB with copies to appropriate information addresses.

**NOTE:**

It is understood that it is not possible to have a BEEP representative on board at each detail site throughout the BEEP. In the absence of a BEEP representative on detail sites, detail OICs shall comply with the instructions in the *Red Book*. Where serious doubt exists on what action to take, contact the BEEP representative at the main body site for determination.

**RESPONSIBILITIES OF THE RELIEVING BATTALION**

While in home port, the incoming battalion is responsible for scheduling, reporting, personnel requirements, decals, and PM.

Scheduling is the responsibility of the incoming battalion. The COM2NDNCB Det Gulfport, MS; COM3RDNCB Equipment Office, Port Hueneme, CA; and the battalion being relieved must be notified of the commencement date of the BEEP at least 30 days before the commencement date. You should schedule the BEEP at the earliest date possible after the arrival of the advance party. This early date helps make sure of a completion before the arrival of the main body. It is recommended, therefore, that the BEEP be scheduled to commence at least 6 days before the arrival of the main body.

The incoming battalion also is responsible for the reporting. All required information is provided to the COM2NDNCB/COM3RDNCB equipment representatives for completion of the BEEP report.

The incoming battalion must make sure that all personnel required for the BEEP are assigned to the advance party. The COM2NDNCB/COM3RDNCB-INST 11200.1 series recommends the following personnel:

- ALFA company commander
- ALFA company operations supervisor
- ALFA company maintenance supervisor
- Automotive (Light) shop supervisor
- Heavy equipment shop supervisor
- Support shops supervisor
- Cost control clerk, direct turnover clerk, and PM clerk
- Technical librarian
- Field mechanic supervisor
- Equipment pool supervisor
- Crane crew supervisor
- Crane test director
- Dispatcher
- License examiner
- Senior machinery repairman
- Construction Mechanic (CM) - 28 personnel
- Equipment Operator (EO) - 15 personnel
- Construction Electrician (CE) - 1 (To inspect and evaluate power generators, floodlight trailers, and welders and to perform auto-electrical and battery work.)
- Utilitiesman (UT) - 1 (Must be qualified to inventory and evaluate water purification units, decon sprayers, pumps, and water tanks.)
- Hull Technician (HT)/Steelworker (SW) - 1 (Must have welding capability; also desirable to be able to perform body and fender repairs to vehicles and equipment.)
- Storage/Warehouse supervisor

Total personnel required - 64

The incoming battalion is responsible for ordering sufficient supplies of NMCB decals for organic and augment allowance equipment according to section 5,



paragraph 3501 of the COM2NDNCB/COM3RDNCB - INST 11200.1 series. The decals must accompany the advance party and be available during the BEEP. PM commences within 5 working days after the arrival of the main body.

## **RESPONSIBILITIES OF THE BATTALION BEING RELIEVED**

Before and during the BEEP, the battalion being relieved is responsible for scheduling, personnel requirements, tool requirements, USN-numbered equipment, and the internal BEEP flowchart.

The scheduling of the BEEP date is the responsibility of the battalion being relieved. This date must be coordinated with the incoming battalion.

Both the incoming and the battalion being relieved have personnel requirements. The battalion being relieved must make sure that all personnel counterparts are assigned according to section 7, paragraph 3702 of the COM2NDNCB/COM3RDNCBINST 11200.1 series. Personnel must not be assigned to other duties that conflict with their participation in the BEEP. ALL PERSONNEL ASSIGNED TO THE BEEP MUST REMAIN ON SITE UNTIL THE COMPLETION OF THIS PROGRAM. AIRCRAFT LOADING SCHEDULES SHOULD BE PLANNED ACCORDINGLY.

The battalion being relieved must make available all necessary tools and equipment needed to accomplish the evaluation and repair of the equipment. The battalion being relieved is responsible for the preparation of all USN-numbered equipment for the BEEP. These preparations must include the following:

1. Scheduling of the equipment for evaluation and repairs is coordinated with the relieving battalion. It is recommended that scheduling be done by PM groups, with the appropriate number of groups scheduled each day to permit completion of the BEEP in 6 working days.
2. All equipment repair orders (EROs) with a copy of the equipment evaluation inspection guide, figure 5-9, are prepared for each item of equipment. A copy of the attachment evaluation inspection guide, figure 5-10, for each attachment, when appropriate, is attached to each ERO.
3. All nonpreserved automotive, construction, and material handling equipment are cleaned and made available for evaluation and repair.

4. Have 2 full workdays of equipment precleaned and staged before start of the BEEP. This will assist in the full use of all the mechanics of both battalions.

The relieved battalion is responsible for the internal BEEP flowchart. There must be a plan for the flow of equipment and paper work through the equipment yard and shops. A diagram of the process of the BEEP, with the attachment evaluation inspection guide, equipment evaluation inspection guide, equipment repair order and equipment, is shown in figure 5-11.

## **JOINT TASKS DURING THE BEEP**

To successfully accomplish the BEEP and to provide a continued uniform procedure for the evaluation and accountability of all equipment, attachments, collateral equipage, records and correspondence, the following procedures are joint tasks of both battalions:

1. Nonpreserved Equipment Condition Code - Hold a joint inspection on each nonpreserved item of assigned USN-numbered equipment. Perform a prestart inspection and vehicle performance test using the equipment evaluation inspection guide, figure 5-9. Both operations supervisors establish a recommended condition code.

2. Collateral Equipage - Perform a joint inventory and inspection of all Collateral equipage, noting condition and deficiencies. All shortages and not-fit-for-issue items are ordered by the outgoing unit. For those items already on order, check the requisition numbers to the 1250s. All outstanding requisition numbers over 90 days old should be suspected as having been shipped but not received. Have supply review and determine those requisitions with questionable status before reordering.

3. Equipment Attachments Condition Code - Perform a joint inventory and inspection of all equipment attachments, using the attachment evaluation inspection guide, figure 5-10. Both operations supervisors establish a recommended condition code.

4. Maintenance Records - Perform a joint inspection of all maintenance records, noting accuracy and deficiencies. Perform all required record updates.

5. Correspondence - Perform a joint review and accountability of all correspondence that is pending final action.

					DATE	
CODE		USN NO.	MILEAGE	HOURS	ENGINE SERIAL NO.	
PRESTART INSPECTION	INSPECTORS	INITIALS	NMCB	INITIALS	NMCB	
	COOLING SYSTEM	LEVEL	LEAKS	CONDITION		
	LUBRICATION SYSTEM	LEVEL	LEAKS	CONDITION		
	CHARGING SYSTEM	BATTERY LEVEL	BELTS	CABLES	CONNECTIONS	
	LIGHTING SYSTEM	HEADLIGHTS	TAIL LIGHTS	BLACK OUT	INSTRUMENTS	
		CLEARANCE	REFLECTORS	REMARKS		
	FUEL SYSTEM	LEVEL	LEAKS	CONDITION		
	TIRES	SIZE	TYPE TREAD	CONDITION	INFLATION	
		MOUNTED SPARE SIZE		CONDITION	INFLATION	
	TRACKS	RAILS	PINS	SHOES	SPROCKETS	
		IDLERS	REMARKS			
	MISCELLANEOUS	AUTO TRANS FLUID		MIRRORS	LUG NUTS	
		CONTROLS	CABLES	DOORS	GLASS	
		UPHOLSTERY	BODY CONDITION			
REMARKS						
ENGINE RUNNING	INSPECTORS	INITIALS	NMCB	INITIALS	NMCB	
	ACCESSORIES	INSTRUMENTS	WARNING DEVICES HORN			
		W/S WIPERS	BRAKES	CLUTCH	HAND BRAKE	
	LEAKS	ENGINE	TRANSMISSION		TRANSFER CASE	
		DIFFERENTIALS	BRAKES	STEERING	WINCH	
	ENGINE PERFORMANCE	STARTING	IDLING	FULL LOAD		
		PARTIAL LOAD	REMARKS			
	VEHICLE PERFORMANCE	STEERING	BRAKES	CLUTCH	TRANSMISSION	
		DIFFERENTIALS	TRANSFER CASE	PTO	WINCH	
		HYD SYSTEM	DRIVE SHAFTS	UNUSUAL NOISE/MOTION		
	REMARKS					

Figure 5-9.—Equipment evaluation inspection guide.

<b>INVENTORY</b>	<b>INSPECTORS</b>	<b>INITIALS</b>	<b>NMCB</b>	<b>INITIALS</b>	<b>NMCB</b>	
	<b>COLLATERAL EQUIPAGE INVENTORY</b>	<b>DISCREPANCIES/SHORTAGES</b>				
	<b>OPERATIONS SUPERVISORS</b>	<b>INITIALS</b>	<b>NMCB</b>	<b>RECOMMENDED CONDITION CODE</b>		
		<b>INITIALS</b>	<b>NMCB</b>	<b>RECOMMENDED CONDITION CODE</b>		
<b>REMARKS</b>						
<b>SHOP INSPECTION AND REPAIR</b>	<b>INSPECTORS</b>	<b>INITIALS</b>	<b>NMCB</b>	<b>INITIALS</b>	<b>NMCB</b>	
	<b>MOUNTING BOLTS</b>	<b>ENGINE</b>	<b>TRANSMISSION</b>	<b>AXLES</b>	<b>TRANSFER CASE</b>	
		<b>SPRINGS</b>	<b>BODY</b>	<b>CAB</b>	<b>FENDERS</b>	
		<b>FUEL TANKS</b>	<b>REMARKS</b>			
	<b>MISCELLANEOUS</b>	<b>EXHAUST SYSTEM</b>	<b>SPRINGS</b>	<b>SHOCKS</b>	<b>TIE RODS</b>	
		<b>DRAG LINK</b>	<b>IDLER ARM</b>	<b>CONTROL LINKAGE</b>		
	<b>AIR INTAKE SYSTEM</b>	<b>CLEANER COND.</b>	<b>PIPING CONNECT</b>	<b>TURBOCHARGER,BLOWER</b>		
	<b>FRONT WHEELS</b>	<b>BRAKE LINING</b>	<b>BEARING ASSEMBLIES</b>			<b>SEALS</b>
		<b>BOOTS</b>	<b>DRUMS</b>	<b>CYLINDERS</b>	<b>BACKING PLATE</b>	
		<b>SHOE MOUNT</b>	<b>ADJUST MECH</b>	<b>REMARKS</b>		
	<b>REAR WHEELS</b>	<b>BRAKE LINING</b>	<b>BEARING ASSEMBLIES</b>			<b>SEALS</b>
		<b>BOOTS</b>	<b>DRUMS</b>	<b>CYLINDERS</b>	<b>BACKING PLATE</b>	
		<b>SHOE MOUNT</b>	<b>ADJUST MECH</b>	<b>REMARKS</b>		
	<b>SHOP SUPERVISOR</b>	<b>MAKE MINOR REPAIRS/ORDER PARTS (Initials)</b>				
		<b>FINAL INSPECTION (Initial)</b>				
<b>OVERALL CONDITION Circle Applicable Code (below)</b>						
The following is a complete listing of the possible codes with a brief description.						
<b>Code</b>		<b>Description</b>				
A1	Servicable/ Unused-Good	F8	Unserviceable Repairable-Repairs Required-Fair			
A2	Servicable/ Unused-Fair	F9	Unserviceable Repairable-Repairs Required-Poor			
A3	Servicable/ Unused-Poor	G7	Unserviceable Incomplete-Repairs Required- Good			
A4	Servicable/ Used-Good	G8	Unserviceable Incomplete-Repairs Required- Fair			
A5	Servicable/ Used-Fair	G9	Unserviceable Incomplete-Repairs Required- Poor			
A6	Servicable/ Used-Poor	SX	Unserviceable Scrap/Salvage			
		SS	Unserviceable Scrap/Scrap			
F7 Unserviceable Repairable-repairs Required-Good						
<b>ABOVE CONDITION AGREED TO BY MAINTENANCE SUPERVISORS FROM BOTH BATTALIONS</b>						
<b>NMCB (SIGNATURE)</b>			<b>NMCB (SIGNATURE)</b>			
<b>COM2ND/3RD NCB equip. Rep. (Signature)</b>				<b>Date</b>	<b>Code</b>	

Figure 5-9.—Equipment evaluation inspection guide—Continued.

					DATE																																
I.D. NUMBER	DESCRIPTION	LOCATION																																			
ASSIGNED TO CODE	USN NO.	MOUNTED/UNMOUNTED																																			
INSPECTORS	INITIALS	NMCB	INITIALS	NMCB																																	
PRESTART INSPECTION	FRAME	MOUNTINGS	MOUNTING HARDWARE																																		
	CONTROLS	CABLES/SHEAVES		BUSHINGS/BEARINGS																																	
	HOSES	HYD SYSTEM	CUTTING EDGE/TEETH																																		
REMARKS																																					
INSPECTORS	INITIALS	NMCB	INITIALS	NMCB																																	
OPERATIONAL INSPECTION	PARTIAL LOAD		FULL LOAD																																		
	REMARKS																																				
OPERATIONS SUPERVISOR	INITIALS	NMCB	RECOMMENDED CONDITION CODE																																		
	INITIALS	NMCB	RECOMMENDED CONDITION CODE																																		
REMARKS																																					
SHOP SUPERVISOR	MAKE MINOR REPAIRS/ORDER PARTS (Initials)																																				
	FINAL INSPECTION (Initial)																																				
<p><b>OVERALL CONDITION</b> Circle Applicable Code (below)</p> <p>The following is a complete listing of the possible codes with a brief description.</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 15%;">Code</td> <td style="width: 40%;">Description</td> <td style="width: 15%;">F8</td> <td style="width: 30%;">Unserviceable Repairable-Repairs Required-Fair</td> </tr> <tr> <td>A1</td> <td>Servicable/ Unused-Good</td> <td>F9</td> <td>Unserviceable Repairable-Repairs Required-Poor</td> </tr> <tr> <td>A2</td> <td>Servicable/ Unused-Fair</td> <td>G7</td> <td>Unserviceable Incomplete-Repairs Required-Good</td> </tr> <tr> <td>A3</td> <td>Servicable/ Unused-Poor</td> <td>G8</td> <td>Unserviceable Incomplete-Repairs Required-Fair</td> </tr> <tr> <td>A4</td> <td>Servicable/ Used-Good</td> <td>G9</td> <td>Unserviceable Incomplete-Repairs Required-Poor</td> </tr> <tr> <td>A5</td> <td>Servicable/ Used-Fair</td> <td>SX</td> <td>Unserviceable Scrap/Salvage</td> </tr> <tr> <td>A6</td> <td>Servicable/ Used-Poor</td> <td>SS</td> <td>Unserviceable Scrap/Scrap</td> </tr> <tr> <td>F7</td> <td>Unserviceable Repairable-repairs Required-Good</td> <td></td> <td></td> </tr> </table>						Code	Description	F8	Unserviceable Repairable-Repairs Required-Fair	A1	Servicable/ Unused-Good	F9	Unserviceable Repairable-Repairs Required-Poor	A2	Servicable/ Unused-Fair	G7	Unserviceable Incomplete-Repairs Required-Good	A3	Servicable/ Unused-Poor	G8	Unserviceable Incomplete-Repairs Required-Fair	A4	Servicable/ Used-Good	G9	Unserviceable Incomplete-Repairs Required-Poor	A5	Servicable/ Used-Fair	SX	Unserviceable Scrap/Salvage	A6	Servicable/ Used-Poor	SS	Unserviceable Scrap/Scrap	F7	Unserviceable Repairable-repairs Required-Good		
Code	Description	F8	Unserviceable Repairable-Repairs Required-Fair																																		
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NMCB (SIGNATURE)			NMCB (SIGNATURE)																																		
COM2ND/3RD NCB equip. Rep. (Signature)			Date	Code																																	

Figure 5-10.—Attachment evaluation inspection guide.

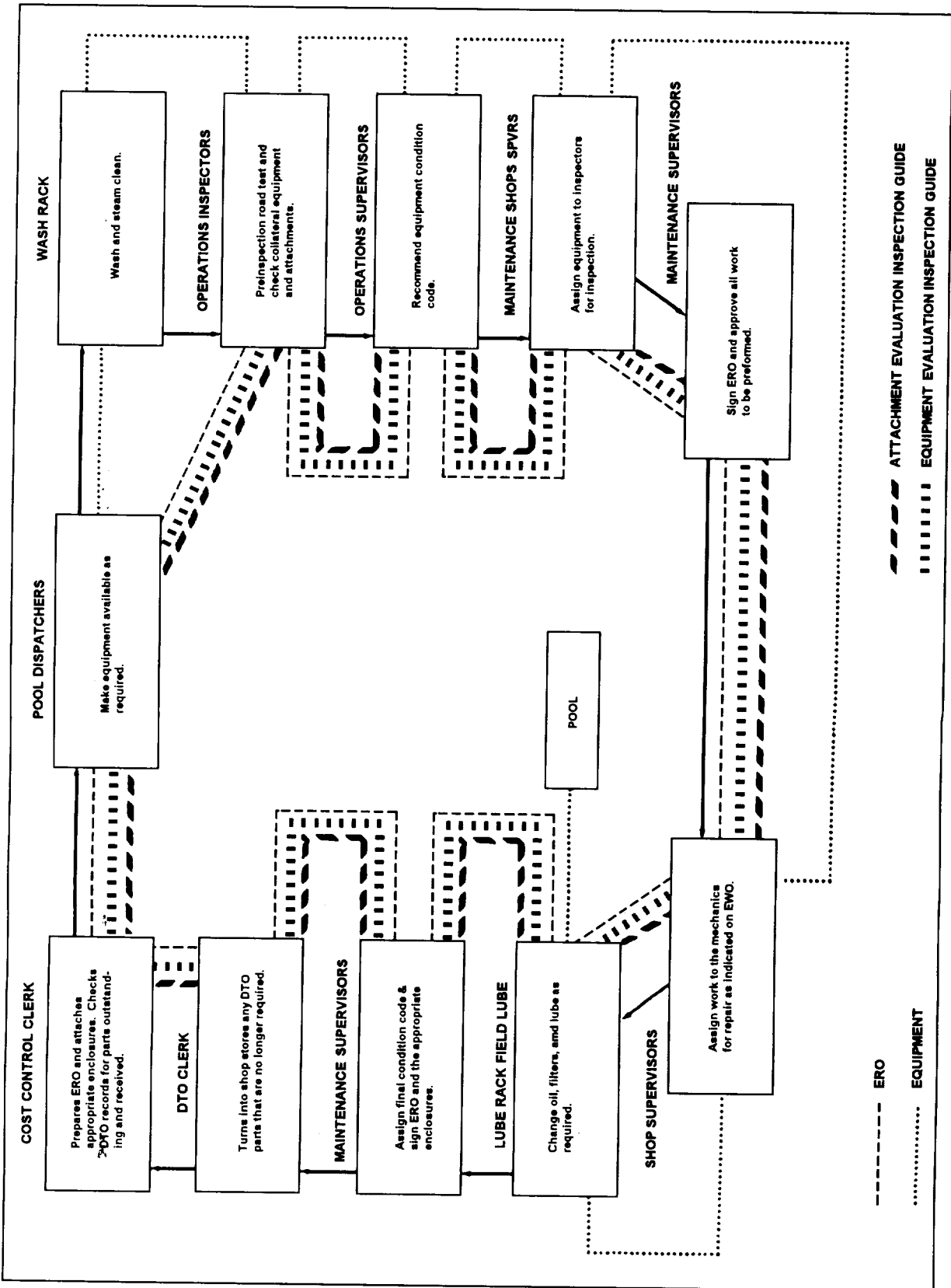


Figure S-11.—BEEP flowchart.

6. Shop Equipment - Perform a joint inventory and inspection of all ALFA company shop equipment, noting conditions and deficiencies.

7. Preventive Maintenance - Perform a joint PM inspection to a "B" PM level on each nonpreserved item of USN-numbered equipment using the evaluation inspection guide, figure 5-9. Do all repairs with zero/minimum deferred work depending upon repair parts availability. Identify major body and paint work on EROs. Defer this work during the BEEP. The maintenance supervisors submit a signed, condition-coded equipment BEEP sheet to the COM2NDNCB or COM3RDNCB equipment representative for each piece of equipment.

8. Stored Equipment - Perform a joint visual inspection of each preserved item of assigned USN-numbered equipment, using the equipment evaluation inspection guide, figure 5-9. Do not depreserve equipment for testing unless visual inspection shows major discrepancies. The maintenance supervisors submit a signed, condition-coded equipment BEEP sheet to the COM2NDNCB or COM3RDNCB equipment representative for each piece of equipment.

9. Equipment Attachment Repairs - Perform a joint PM inspection of all equipment attachments, using the attachment evacuation inspection guide, figure 5-10. Both maintenance supervisors determine jointly that all possible repairs dependent upon work force, space, and repair parts available have been done. The maintenance supervisors submit a signed condition-coded equipment BEEP sheet to the COM2NDNCB or COM3RDNCB equipment representative.

10. Repair Parts - The repair parts portion of the BEEP is done according to COM2NDNCB/COM3RDNCBINST 4400.3, *Seabee Supply Manual*.

11. Tools - After all the equipment has been through the shops and repairs are completed, do a joint tool inventory. All table of allowance (TOA) tool kits must be 100-percent complete or each of the missing kit items must be on order. Those tools that are not physically present in the kit boxes should have been ordered and a copy of the NAVSUP form 1250-1 placed in both the master folder and the appropriate field folder. The 1250-1 form has the requisition numbers and the date when a specific tool was placed on order. In addition to the master and field folder documentation the tool inventory sheets should have the requisition numbers entered next to the item ordered. All requisitions initiated by the battalion being relieved

should be reviewed by both groups to verify the status of tools already ordered. Outstanding requisitions, over 90 days old, should be suspected as having been shipped but not received. These requisitions should be reviewed by supply to determine their actual status before initiating a reorder.

Power tools must be tested and have the proper safety color code for the period of use (the first period after turnover). All deadlined power tools should have repair parts on order. Again, when parts have been on order for over 90 days without good status information, you should consider the requisition questionable and initiate a reorder.

## **TOOL MANAGEMENT**

After the turnover is complete and the main body has arrived, it is time to start your project. You will not only need materials, you will also need tools. Tools in sufficient quantity and suitable condition are essential to the accomplishment of the battalion's mission. The crew leader must be aware of the responsibilities in the area of tool management.

### **CENTRAL TOOL ROOM (CTR)**

CTR manages that portion of the TOA that includes hand and power tools, tradesman's tool kits, and other special tools. These assets require strict inventory management, maintenance of separate records for individual items, scheduled physical inventories, and scheduled PM. Since tools are valuable and highly susceptible to theft, tight security measures and accountability procedures are required.

### **Battalion Tool Allowance**

The Table of Allowance (TA-01) is the primary allowance list for authorized tools. Group numbers within the TOA with a fourth digit of 1 or 2 are CTR items. An alpha listing of TOA tools should be available to all CTR patrons. The TA-01 allowance must be maintained at 100 percent at all times.

The BM will provide you procurement authorization for specific non-TOA project tools if any are required. Letters and messages may further authorize augment and other non-TOA tools.

## **Inventory Management**

Maintain a stock record card (NAVSUP 1114) for all kits, each individual hand and power tool, and all augment tools.

Establish a file of signature authorization cards that identify those individuals authorized to draw CTR tools.

Keep two kit inventory lists for each organic and augment kit on board Augment tools/equipment lists are provided by the respective NCRs. The master inventories are kept by the CTR kit custodian. The duplicates are provided with the kits and are maintained by the crew leader.

CTR maintains a custody file for each loaned/issued tool. Fill out a 1250-1 for each tool. File the 1250-1 alphabetically by company/department and under the individual's name. CTR also maintains a PM card for each power tool.

### **Tool Kit Inventories**

Inventory the tool kits every 2 weeks. Inventory monthly, kit numbers 80002, 80005, 80008, 80011, 80012, 80014, 80015, 80016, 80017, 80021, and 80026.

Inventory the kits in CTR custody at the time of issue and return. If the seal is broken for reasons other than PM or to replace a due-in tool, do an inventory as soon as possible.

Be sure kits are inventoried by the crew leader and the inventory verified by the company commander/company chief. CTR conducts spot inventories in the field. The kit inventory list is used for the inventory. The company commanders submit a report of completion to the supply officer.

Document any shortages not previously reported on a 1250-1. The crew leader keeps the yellow copy and forwards the remaining copies to the CTR kit custodian. When the pink copy comes back from CTR, the crew leader enters the Julian date and serial number of the requisition (block B) under the DEPT NR column of the inventory list and discards the yellow copy. When the tool is received, he/she lines out the quantity short and requisition number and discards the pink copy.

### **Tool Issue**

A 1250-1 is used to draw tools/tool kits from CTR. The requester fills in blocks 1, 2, 8, 14, 21, 22, 24, 25, and 30b and has it signed by the approving authority.

The 1250-1 is then turned in to CTR and the issuing process begins.

For individual tools, the CTR verifies the approving signature, makes the issue, falls in blocks 5 and 7 of the 1250-1, and obtains a **legible receipt signature**. If augment or project tools are involved, a comment is made in the Remarks block. The yellow copy of the 1250-1 goes to the requester and the remaining copies go to the stock battery storekeeper for posting on the back of the stock record card. The 1250-1, minus the yellow copy, is then placed in the custody files under the name of the requester.

Tool kit issue works much the same way. The requestor submits a properly prepared and approved 1250-1 to the CTR kit custodian. The CTR kit custodian makes the issue, files the green copy in the appropriate master kit inventory folder, gives the yellow copy to the requester, and forwards the remaining copies to the CTR counterperson for filing in the custody file under the name of the requester.

### **Tool Return**

Returning tools or tool kits to the CTR is easier than drawing them. The counterperson inspects the returned tool for cleanliness and serviceability. After removing the 1250-1 from the custody file, he/she annotates block 29 of the 1250-1 with the date of the return. Counter personnel forward the pink copy to the stock battery storekeeper, attach the green copy to the tool, and return the remainder to the requester. Power tools should be delivered to the PM shop for a safety check. The green copy of the 1250-1 is removed when tools are returned to their location after the safety checks.

The kit custodian inspects the returned kits and then forwards the green copy to the counterperson. The 1250-1 is then removed from the custody file. Before the kit will be accepted by the CTR, any shortages must be documented!

### **Lost or Broken Tools**

When there are lost or broken tools, the counterperson removes the 1250-1 from the custody file and writes "broken" or "lost" in block 29 and forwards the 1250-1 to the records keeper. The records keeper posts the issue to the front of the 1114 and lines out the corresponding entry on the reverse. The 1250-1 is then processed for stock replenishment. The survey paper work is forwarded to the supply office.

## **Preventive Maintenance**

The supply officer puts out a PM schedule for checked-out power tools. Colored tapes identify the month the PM was performed. Maintenance should be done at night to minimize impact on the construction effort. CTR makes every effort to replace tools that are not fit for re-issue. All power tools and extension cords are safety checked and color coded before issue.

## **CREW LEADER RESPONSIBILITIES**

Crew leaders are held responsible for the tools used by their crews. The company commander authorizes each crew leader to draw tools required by the crew. At the discretion of the commanding officer, one alternate individual per crew also may be assigned authority to draw tools. However, the crew leader remains responsible for the tools issued and their use. The crew leader must maintain complete tool kits at all times. If shortages are discovered during an inventory, the crew leader must turn in the 1250-1s and initiate surveys when required.

Besides tool and tool kit use, crew leaders need to keep the following responsibilities in mind:

- Assignment of tools within the crew
- Proper use and care of assigned tools by the crew
- Reservation of tools held in custody, but not in use
- Security of assigned tools

## **RENTAL TOOLS**

You must make every effort to use TOA or augment tools to perform necessary work before renting tools for the job. Rental tools and equipment can be obtained, for use in place of deadline equipment, only if repair parts are not available. For tools and equipment in use on other projects, replacements can be rented only if the tools or equipment will not be available to meet a firm commitment.

## **PROJECT TOOLS**

The tasked battalion must be sure that any special tools required to complete a project are included on the BM along with attachments, consumables, and operating and maintenance manuals.

## **DISPOSITION OF PROJECT TOOLS**

Tools purchased with project funds must be offered to the customer upon completion of the project. Tools rejected by the customer are retained by the battalion as augment only if the tools are needed on upcoming projects. The battalion must report the tool transfer to the controlling regiment along with justification for the transfer.

Augment tools obtained solely for a specific project are disposed of according to the controlling regiment's instructions. A battalion must justify keeping any specific project tools. This justification must be based on future tasking needs.





## CHAPTER 6

# NAVAL CONSTRUCTION FORCE CAMP MAINTENANCE

*LEARNING OBJECTIVE: Identify the procedures for the operation of a NCF camp maintenance program at NCF camp locations.*

Maintenance is the function of keeping buildings, structures, grounds, and equipment in (or restoring them to) a serviceable condition. Inspection and maintenance are directed toward assuring maximum usage from existing equipment and facilities at minimum cost. A specific level of maintenance should be established for each facility. The level of maintenance established depends on the mission of the activity and the estimated duration of the facility. By knowing the maintenance management system, you are better able to approach the goal of maximum usage and minimum cost.

Each NCF facility represents a significant financial investment. To protect this major investment, a well-organized, continuous maintenance program is required. This maintenance program should include inspections, workload planning and prioritizing, job scheduling and accomplishment, provisions for adequate material stocks, facility/equipment history records, as-built drawings, and turnover procedures. This chapter provides some basic information to help you implement and maintain the basic maintenance management system and principles in day-to-day operations. Additional information can be found in the following references:

- OPNAVINST 11010.20
- NAVFAC MO-321.1, *Maintenance Management of Public Works and Public Utilities*
- NAVFAC MO-322, Volume 1, *Inspection for Maintenance of Public Works and Public Utilities*

### CAMP MAINTENANCE PROGRAM

The resident battalion commanding officer is responsible for managing and operating a public works maintenance program. All camp maintenance

records are maintained continually and turned over to the relieving battalion. Camp maintenance tasking is established by defining a target man-day figure for direct labor. The target figure is a threshold set to define the minimum man-days required for each deployment. Target percentage breakdowns for these tasked man-days are defined later in this chapter. Minor construction projects with less than \$1,000 or 50 man-days, which do not change the end use of a facility, and all maintenance and repair projects with less than \$5,000 and 100 man-days may be approved by the commanding officer with the concurrence of the 2ndNCB/3rdNCB DET. All projects beyond this scope must be submitted to COM2NDNCB/COM3RDNCB via the 2ndNCB/3rdNCB DET by letter for approval. Projects must not conflict with the camp master plan, and site approval must be obtained from the 2ndNCB/3rdNCB DET. An effective COSAL program must be established and maintained to effectively manage camp systems and equipment.

### ORGANIZATION

The NCF camp maintenance management system was designed for any Seabee camp operation, but it was specifically intended for mainbody camps. The requirements apply to all COM2NDNCB and COM3RDNCB camp locations. The Standard Automated Material Management System (SAMMS) camp maintenance management system was formulated and developed from the requirements and systems described in this chapter.

### Maintenance Platoon

The BRAVO company maintenance platoon is responsible for camp maintenance and operation. Figure 6-1 is a recommended manning plan.

Maintenance platoon personnel should be assigned full time and not used for construction project work. Although the numbers and skill levels

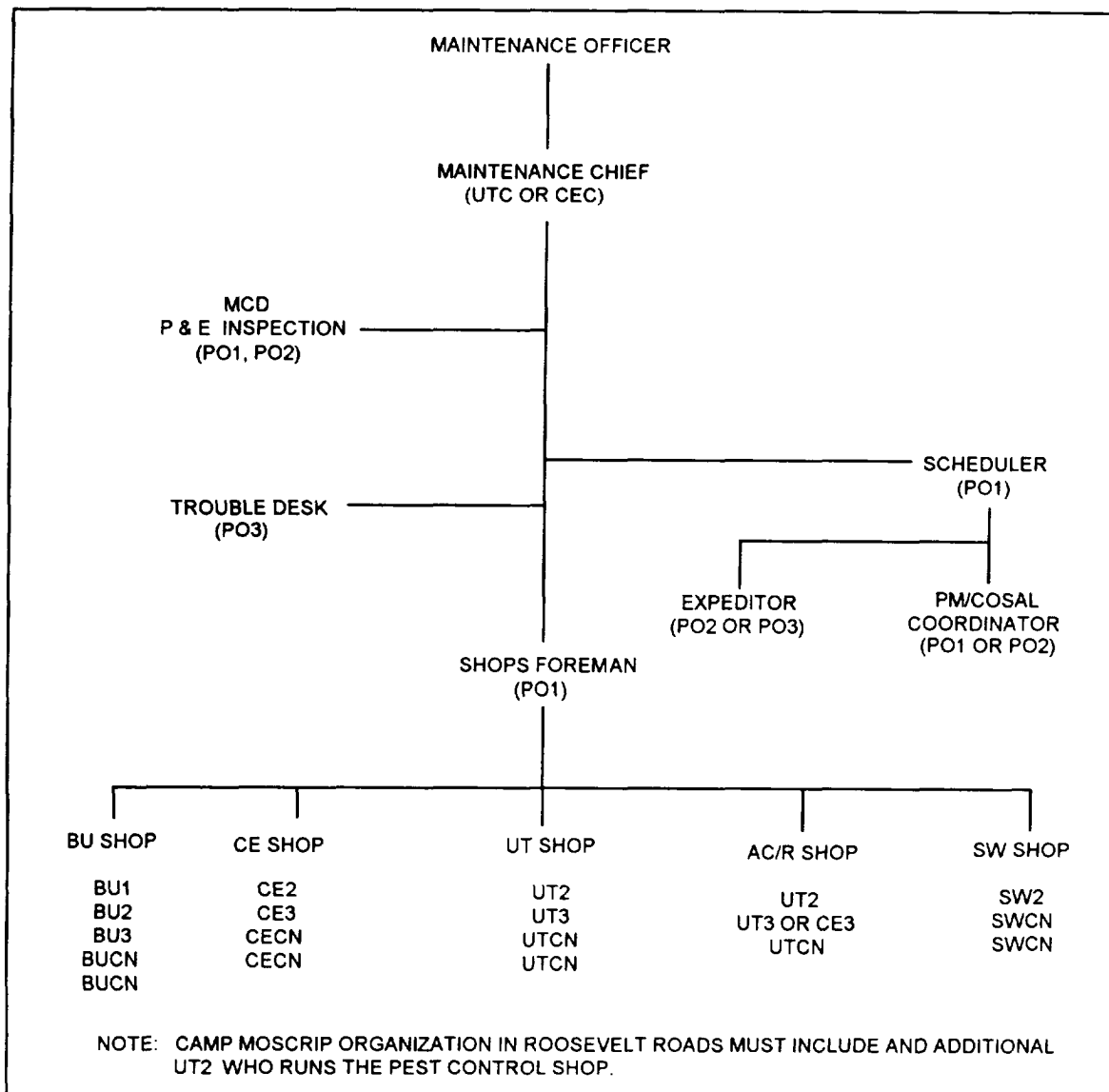


Figure 6-1.—Manning plan.

within the maintenance platoon are flexible, a manning floor of 20 direct labor (shop) personnel has been established as the minimum number necessary to maintain camps in acceptable condition. Specific approval is required from the 2ndNCB/3rdNCB DET to go below this level. No more than 10 percent of the camp maintenance personnel are rotated during a deployment without a written waiver from 2ndNCB/3rdNCB. The eight key player functions specified in this chapter represent full-time overhead positions in the camp maintenance organization. Double-hatting of these functions is **not authorized without a written waiver**. Personnel will not be rotated among

these positions during the deployment. In addition to the regimental camp maintenance program, the maintenance platoon should receive the training listed in table 6-1.

### Camp Maintenance Officer (CMO)

The BRAVO company commander, as CMO, is responsible for the camp maintenance program. The CMO controls all expenditures of OPTAR 03 funds. This includes camp maintenance material, personnel support equipment (PSE)/collateral equipment, and other authorized expenditures. The CMO is

Table 6-1.—Maintenance Platoon Training

<u>AREA</u>	<u>SKILL</u>	<u>APPLICABLE POSITION</u>
Planning, Estimating, and Scheduling	NEC 5915	Maintenance Control Director
Planning, Estimating, and Scheduling	PRCP Skill 103-703	MCD Branch
COSAL Training	COSAL Use and Maintenance	PMS/COSAL Coordinator, Camp Maintenance Storeroom Individual
AC/R Skill	NEC 6104 NEC 6102	One AC/R Shop Individual One UT Shop Individual
SAMMS Computer	Basic Microcomputer Literacy (Skill 824.1) and Camp Maintenance Management System Application	All Key Individuals
Supply Training	Regiment OJT	Expeditor
Pest Control	Pest Control Shop Training	For a UT2 in Camp Moscrip Only

responsible for the preparation of the camp maintenance plan and other reporting requirements as summarized in figure 6-2. Due to the nature of this position, it should be assigned only to an individual scheduled to complete the full deployment. If the CMO has no previous public works experience, it is highly recommended that attendance at the Civil Engineer Corps Officers' School (CECOS) Public Works Management Course be scheduled during the preceding home port period. The CMO must properly staff the maintenance organization and operate under the COM2NDNCB/COM3RDNCBINST 11014.2. He/she must maintain close coordination with the 2ndNCB/3rdNCB DET, and must be aware of all contract work planned and in progress in the Seabee camp. The CMO must attend all precons and act as the alternate point of contact for the 2ndNCB/3rdNCB DET for ROICC-administered contracts. The CMO is the energy/utilities conservation program officer. As

the conservation program officer, the CMO designates a program monitor-in the organization to identify waste and to recommend improvements. The CMO ensures active and meaningful use is made of the SAMMS camp maintenance management system hardware and software. The program's data base must be kept up-to-date at all times.

#### **Maintenance Chief**

The position of maintenance chief should be assigned only to an individual with previous public works experience who will not rotate during the course of the deployment. The maintenance chief is responsible for the day-to-day operation of the maintenance platoon and has a variety of specific duties.

These duties include the camp maintenance plan and a systematic, continuous inspection program for

<u>CAMP MAINTENANCE PRIMARY REPORTING REQUIREMENTS</u>			
<u>REPORT</u>	<u>FREQUENCY</u>	<u>TO</u>	<u>PURPOSE</u>
CAMP MAINTENANCE PLAN	QUARTERLY	2ND NCB/ 3RD NCB DET	-ALL FUNDING SOURCES ACCOMPLISHMENT PLAN -PRIORITIZE WORKLOAD -ACTUALS OF CURRENT QUARTER
MONTHLY PROJECT STATUS REPORT	MONTHLY	2ND NCB/ 3RD NCB DET	-STATUS OF WORKLOAD
SITREP INPUT	MONTHLY	S3	-PROVIDES MONTHLY & CUM. MONTHLY TOTALS PLUS % ESA, STANDING SPECIFICS
SHOP LOAD PLAN	SEMI-MONTHLY	2ND NCB/ 3RD NCB DET	-SCHEDULING OF WORKLOAD FOR A 1-MONTH PERIOD
MANPOWER AVAIL SUMMARY	SEMI-MONTHLY	2ND NCB/ 3RD NCB DET	-PROJECTION OF EXPECTED MANPOWER AVAILABILITY
BUDGET REQUEST	QUARTERLY	S4	-BUDGET FOR O3 OPTAR FUNDS
CONTROL INSPECTIONS	ONE EACH DEPLOYMENT	3RD NCB DET	-IDENTIFY DEFICIENCIES TO UPDATE THE CURRENT AIS
3RD NCB MRP SUMMARY REPORT	MONTHLY	2ND NCB/ 3RD NCB DET	-SHOW LINE ITEM EXPENDITURES OF MRP TIED TO PROJECT NUMBER
AIS REPORT 2ND NCB (ONLY)	ANNUAL	2ND NCB DET	-PROVIDES ANNUAL INSPECTION REPORT REQUIREMENTS TO COM 3RD NCB AS REQUIRED

Figure 6-2.—Camp maintenance primary reporting requirements.

all camp facilities, utility systems, and equipment. The maintenance chief also keeps a log to properly manage and track O3 OPTAR and maintenance and repair (MRP) funds (in 3rdNCB) expenditures. He/she also uses an effective COSAL program to properly maintain camp systems and equipment.

The maintenance chief coordinates all emergency/service form preparations and specific and

standing job orders (SJOs) necessary for camp maintenance. Coordinating includes a review of all emergency/service forms (prior to work performed) for proper use and format.

It is the duty of the maintenance chief to update technical information for all equipment on the preventive maintenance (PM) program. Technical data to be retained includes operation and

maintenance manuals, nameplate data, facility and room locations, SJO numbers, drawings, specifications, repair part requirements, and maintenance histories. The equipment covered by the COSAL program should be separated for ease of identification.

Excluding work in progress, the maintenance chief maintains a 300 man-day backlog of specific work that has 100 percent of material on site and a 600 man-day backlog with all material on order (with valid requisitions). He/she prepares shop load plans semimonthly for review by the CMO and approval by the 2ndNCB/3rdNCB DET. While working with the supply department, the maintenance chief establishes and continually reviews the stocking level of materials available for camp maintenance, including maintenance of a current COSAL equipment listing.

Sometimes an outside public works organization is responsible for maintaining certain items such as telephone or electrical systems. The maintenance chief acts as the point of contact, along with the 2ndNCB/3rdNCB DET, to plan the accomplishment of required maintenance. Copies of all current contracts/agreements for these services should be maintained as part of the camp maintenance program.

It is the responsibility of the maintenance chief to maintain facility history jackets complete with proper records and boiler certification certificates. The left side of the jacket has class 2 property record sheets, equipment listing, and a facility layout drawing. The right side has the current calendar year's completed and canceled emergency/service authorizations (ESA), the last 2 years' work request authorizations, and the latest inspectors' reports for work accomplished.

The maintenance chief reviews, at least weekly, the PM schedule for proper execution and completeness. He/she also maintains appropriate stock levels and monitors the use of all required forms.

### **Maintenance Control Director**

The maintenance control director is in charge of the maintenance control division (MCD) and works for the maintenance chief. The maintenance control director normally generates projects to correct deficiencies identified by the control inspection, annual inspection summary (AIS), and customer requests. The director plans and estimates all projects and reviews all emergency/service requests. The

MCD is the planning arm of the camp maintenance organization. The MCD converts all emergency/service calls and deficiency inputs into projects.

The director of maintenance control maintains the master set of as-built drawings for camp facilities and utilities systems and keeps current property record cards in the facility files. The director is responsible for submitting all corrections and updates to the 2ndNCB/3rdNCB DET for action. The director also maintains the current AIS sheets, AIS work sheets, and the most recent controlled inspection report in individual facility folders.

### **Shop Scheduler**

The shop scheduler works for the maintenance chief. The scheduler is responsible for load plans, tracking all projects tasked to the maintenance platoon, and maintaining current MCD status boards.

### **Camp Maintenance Expediter**

The camp maintenance expediter is a key member of a successful maintenance organization. This position must be filled with a highly motivated petty officer who is capable of maintaining 1250-1 logs for both consumable and project materials. The expediter works for the shop scheduler and is the direct interface between BRAVO company and the supply department for all repair parts, consumables, and MCD project materials. All 1250-1s and 1348 supply forms for camp maintenance are sent to the expediter for processing. The process includes the following seven steps:

1. The expediter receives project packages with 1250-1s attached from MCD or 1250-1s for repair parts or consumables from the shop foreman. All 1250-1s and 1348s must balance against project bills of material (BMs). The expediter then makes sure that the forms are filled out correctly, including the required delivery date, job order numbers (JONs), and MCD number.

2. The expediter ensures that all 1250-1s are signed by the proper authority according to monetary value and priority (\$500 and below, camp maintenance chief; more than \$500 2ndNCB/3rdNCB REP). The expediter makes sure that a valid MCD, ESA, or SJO number is on each 1250-1, and checks for use of 03 OPTAR or MRP funds. For all 1250-1s using OPTAR, the Remarks block must include the proper JON, as provided by the fiscal year job order guide. For MRP

finds used in 3rdNCB, a JON is assigned by 3rdNCB and issued as reimbursable OPTAR.

3. The expeditor logs all 1250-1s in the appropriate MRP or 03 OPTAR funds log and uses the Julian date for tracking.

4. The expeditor delivers all 1250-1s and BMs for MCD projects to MLO. **No 1250-1 copies are to be retained by the expeditor prior to transfer to MLO.**

5. Every 10 days the expeditor will receive from MLO the yellow copies of MCD's 1250-1s. MLO is required to retain the pink copies. Both copies are annotated with the proper requisition number. The yellow copy is put in the proper MCD package for tracking. Additionally, the MCD expeditor should receive from the supply office, the pink copies of all ESA and SJO 1250-1s. These pink copies are then forwarded to the camp maintenance storeroom after the expeditor logs the requisition number.

6. When notified that material has been received by MLO, the expeditor makes the appropriate entries in the log and in the project package. If this is a direct turnover (DTO), the shop foreman is notified of such and the BRAVO-4 is informed by memo.

7. When notified by MLO that a project has 100 percent of the material aboard and staged, the expeditor informs the scheduler, who then transfers the project from the awaiting material board to the projects waiting to be scheduled. **The expeditor should not be tasked to stage or issue material for the shops.** A shop supervisor, who is the prime contractor for these specific job orders, must be assigned to pick up and stage material to ensure that proper material is on hand. The shop foreman makes sure this is done.

Every 10 to 15 days, the MCD expeditor receives the MCD Project Material Status Report from MLO. The expeditor uses this report to identify MCD project material that has been received, all outstanding 1250-1s, and line items that have not been put on order. The status of outstanding requisitions should be checked at 30/60/90/120-day intervals and action taken to make sure required materials are "on track."

The expeditor maintains memorandums accounting for all NCF tasked camp projects funded with 03 OPTAR. The accounting data includes a running balance of total funds allotted for these projects and is maintained in the project files. For

selected projects of larger dollar amounts (\$20K and above), the 3rdNCB establishes individual JONs.

The expeditor also maintains collateral/PSE procurement actions in individual facility folders.

### **PM/COSAL Coordinator**

The PM/COSAL coordinators responsible for the SJO and the camp COSAL programs. The coordinator works for the shop scheduler to accomplish all SJOs and reports directly to the maintenance chief for COSAL. The coordinator's responsibilities include the following:

- Sight and validate all equipment currently under camp COSAL support.

- Validate all equipment under the Preventive Maintenance System (PMS) Program.

- Verify equipment files, library (tech data), and COSAL APL information for all camp equipment under the PMS program. Order technical/maintenance/repair manuals as required.

- Manage all camp equipment under PMS.

- Review COSAL equipment list for additions, deletions, or APL changes. Submit required COSAL changes. Maintain a job sequence number (JSN) log for the COSAL changes.

- Validate the COSAL, allowance parts lists (APLs), and repair parts held by the BRAVO company camp repair parts storeroom.

### **Trouble Desk Attendant**

The trouble desk attendant receives all customer trouble calls, enters this information into the trouble desk log and fills out emergency/service authorization (ESA) forms. The attendant makes sure that ESA forms are properly routed and that outstanding ESAs are completed within the required deadlines. Normally, all facility history jackets are maintained at the trouble desk.

### **Shops Foreman**

The shops foreman directly manages the execution of all camp maintenance work through the five shops in BRAVO company. He/she coordinates with the scheduler to accomplish the workload to

comply with job priorities. The foreman ensures the safety, cleanliness, and effectiveness of the shops.

### CAMP MAINTENANCE PLAN

The key to an effective camp maintenance program is the planning required to identify, prioritize, and execute the workload. A good plan not only guides work accomplishment, but also helps develop the budget, manage the backlog, and plan manpower. The two primary tools used in the planning effort are the camp maintenance plan and the camp maintenance progress report.

The camp maintenance plan guides the execution of the BRAVO company camp program. It is prepared by CMO and updated quarterly. The camp maintenance plan includes the current and next two quarters to give a three-quarter short-range plan for accomplishment. The current camp maintenance plan will be a turnover item for the next battalion. Each

quarter includes a prioritized listing of MCD projects that are planned to be worked during that quarter. The plan also includes a listing of specific collateral equipment/PSE slated to be ordered during that period. This plan helps develop the budget for both 03 OPTAR and MRP funds. Figure 6-3 is a sample camp maintenance plan. The camp maintenance plan should be sent to the 2ndNCB/3rdNCB DET at least 45 days before the end of each quarter.

### Monthly Project Status Report

The monthly project status report shows the current status of all MCD projects in the system. It prioritizes the top 15 MCD projects in each category. The status report provides information on percent complete, man-days used to date and in the period, man-days remaining, and material costs. It is always based on the current estimate of work remaining. The status report should never be the result of subtraction

CAMP MAINTENANCE PLAN														
CURRENT					2ND QUARTER FY8					3RD QUARTER FY8				
1ST QUARTER FY8														
PRI	TASK	COST	MD	FUNDS	PRI	TASK	COST	MD	FUNDS	PRI	TASK	COST	MD	FUNDS
<b>1. COMPLETED</b>														
--	REPAIR BLDG 6 ROOF	1200	85	MRP	PSE	2 WARDROBE, BLDG 16	400	--	03	PSE	COLLATERAL RE-PLACEMENTS (PROJECTED)	750	--	03
--	NEW DRYER BLDG	425	--	03	PSE	2 BEDS, BLDG 12	150	--	03	E/S	PWC REFERRALS	1200	45	03
--	REHAB PHOTO LAB	850	45	MRP	COLL	1 DESK, MLO	60	--	03		CONTROL INSPECTIONS	--	5	--
--	REPLACE BLDG 2 SINK	85	1	03	COLL	1 ICE MACHINE, CPO MESS	250	--	03					
--	PWC REFERRALS	1500	--	03	COLL	2 OFFICE CHAIRS, S-3	75	--	03					
--	E/S 22 CHITS	370	30	03		E/S (PROJECTED) CONTROL INSPECTIONS	1100	45	03					
<b>2. IN PROGRESS</b>														
--	REHAB BEQ 12 HEAD	500	8	03		PWC REFERRALS	1200	--	03	1	REPLACE BLDG 16 ALARM	--	--	--
--	REPLACE EXT DOORS BLDG 22	700	4	03						2	REPAIR BLDG 151 ROOF	2500	40	MRP
--	INSTALL EXT LIGHT, ARMORY	85	2	03	1	SPECIFICS REPLACE WIRING BLDG 17	1400	50	MRP	3	PAINT BEQ 10	300	5	MRP
--	NEW WASHER BLDG B	400	--	03	2	CAMP LIGHTING UPGRADE	1100	42	03	4	REPAIR ROAD TO MLO	3000	20	MRP
					3	REHAB MEDICAL BLDG	700	30	MRP	5	REHAB WAREHOUSE 13	3500	40	03
					4	INSTALL EMERG EYEWASH ALFA BLDG 22	200	3	03	6	INSTALL WATER FOUNTAIN BLDG 12	120	1	03
					5	REHAB HEAD BLDG 30	580	10	03	7	MLO OFFICE UPGRADE	1700	25	03
					6	RELOCATE MARS OFFICE	750	14	03	8	REPAIR BLDG 152 ROOF	3000	50	MRP
					7	REHAB LOUNGE	2000	30	03	9	UPGRADE ENGI-NEERING SPACES	1200	30	03
					8	REPLACE BLDG 26	500	1	MRP					
						A/C								

NOTE 1 - BUDGET SUBMITTAL IS SAME FORMAT WITH ONLY 03 FUND ENTRIES SHOWN.  
 NOTE 2 - THIS REPORT WOULD HAVE BEEN SUBMITTED NOT LATER THAN 15 NOV \_\_ COM 3RDNCBDET.  
 NOTE 3 - THAT PSE/COLLATERAL EQUIPMENT PURCHASE, ESA AND OTHER ITEMS ARE SHOWN FIRST IN EACH QUARTER. THEN PRIORITIZED SPECIFICS ARE DETAILED. NO SJO DETAIL IS INCLUDED.  
 NOTE 4 - THIS FORMAT IS PROVIDED TO DISPLAY ESSENTIAL DATA ONLY AND NOT THE SAMMS REPORT FORMAT.

Figure 6-3.—Camp maintenance plan.



1 October 19\_\_

From: Camp Maintenance Officer, Naval Mobile Construction Battalion \_\_\_\_  
To: Officer in Charge, Naval Construction Battalions, U.S. Pacific/  
Atlantic Fleet Detachment \_\_\_\_\_

Subj: MONTHLY PROJECT STATUS REPORT FOR SEPTEMBER 19\_\_

Ref: (a) COM 2ND NCB/COM 3RD NCB INST 11014.2 SERIES

1. Per reference (a), the following report is submitted:

a. Projects completed in September 19\_\_ :

<u>Project No.</u>	<u>Title</u>	<u>Fac #</u>	<u>M-D This Mo</u>	<u>Total M-D Used</u>	<u>Cost</u>
--------------------	--------------	--------------	--------------------	-----------------------	-------------

b. Projects currently under construction:

<u>Project No.</u>	<u>Title</u>	<u>Fac #</u>	<u>% Comp</u>	<u>Est Comp Date</u>	<u>M-D Total Est</u>	<u>M-D This Mo</u>	<u>Total M-D Used</u>	<u>Est Cost</u>
--------------------	--------------	--------------	---------------	----------------------	----------------------	--------------------	-----------------------	-----------------

c. Projects in design:

<u>Project No.</u>	<u>Title</u>	<u>Fac #</u>	<u>% Comp</u>	<u>Agent</u>	<u>Est Comp</u>
--------------------	--------------	--------------	---------------	--------------	-----------------

d. Projects awaiting material:

<u>Project No.</u>	<u>Title</u>	<u>Fac #</u>	<u>Tasking to</u>	<u>% MTL</u>	<u>M-D Est</u>	<u>Cost</u>
--------------------	--------------	--------------	-------------------	--------------	----------------	-------------

e. Projects currently awaiting scheduling:

<u>Project No.</u>	<u>Title</u>	<u>Fac #</u>	<u>Tasking to</u>	<u>Est Start</u>	<u>M-D Est</u>	<u>Cost</u>	<u>Est</u>
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f. Projects in P&E:

<u>Project No.</u>	<u>Title</u>	<u>Fac #</u>	<u>Est Comp</u>
--------------------	--------------	--------------	-----------------

g. Projects awaiting funding:

<u>Project No.</u>	<u>Title</u>	<u>Fac #</u>	<u>Fund Source</u>	<u>Est M-D</u>	<u>Design Comp Date</u>	<u>BM Comp Date</u>
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NOTE 1: This format is provided to display essential data only and not the SAMMS report format.

Figure 6-4.—Monthly project status report.

from the original estimate. The report (sample shown in fig, 6-4) is submitted to the 2ndNCB/3rdNCB DET by the fifth of each month. It is segregated into the following categories, which match those on the status board:

- MCD projects completed
- MCD projects in design
- MCD projects in P&E
- MCD projects awaiting material
- MCD projects awaiting funding
- MCD projects awaiting scheduling
- MCD projects under construction
- Other MCD projects

### **SITREP Input**

The SITREP input provides the operations officer (S-3) with monthly summary data on camp maintenance work. In the project summary section, work-in-place (WIP) is reported in the WIP scheduled and WIP actual columns. Report the entry as “camp maintenance.” For the 2ndNCB use JONs ending in -400 and for the 3rdNCB use -300. In the level II barchart, show the split in ESA, specifics, and SJOs for the reporting period and deployment to date.

### **General Development Map (GDM)**

To reflect all facility changes, the CMO ensures that the official GDM held by the host command is updated by S-3 engineering during each deployment. The GDM is formally submitted to the 2ndNCB/3rdNCB DET before turnover. Negative reports (the GDM has not changed since the last report) are required for the record.

### **As-Built Drawings**

The CMO ensures that for any change to a camp structure, an “as-built” record drawing is prepared. The as-built drawing may be done by preparing a new drawing, or “red-lining” two copies of the existing drawing. The CMO makes sure the as-built drawing clearly and accurately reflects the changed condition(s). One copy is retained by the camp maintenance MCD branch, and one copy is forwarded to the host command via the 2ndNCB/3rdNCB DET.

The MCD also maintains a master as-built plan of all utility systems.

### **NCF-Tasked Camp Projects**

The MCD maintains BRAVO company files on all NCF camp projects tasked to the battalion for accomplishment. These files provide the camp maintenance organization with required information on these projects. BRAVO company files include expediter fund balance sheets if the project is funded by the 03 OPTAR.

### **Project Completion Report**

After completion of all new construction and any projects that alter a camp’s structure or utility, it is required that the host command’s plant property records be updated. The CMO must also forward a project completion letter to the 2ndNCB/3rdNCB DET. The letter contains the following information:

- Dates of final inspection
- Names and position/title of personnel attending the final inspection
- Punch list items
- Total man-days expended in statutory labor cost
- Total material cost

### **WORK CLASSIFICATION**

Work is divided into three categories depending on urgency, duration, and repetitive nature. These categories are emergency/service work, specific job orders, and SJOs.

#### **Emergency/Service Work**

Work requiring immediate action or any minor work requiring less than 16 man-hours is classified as emergency/service work. Figure 6-5 provides a flowchart of major actions to process an ESA job order.

The following is a summary of the action taken when an ESA is submitted:

#### **1. Requestor Action**

a. An individual identifying service work requirements reports the problem to the camp maintenance trouble desk.

ESA TROUBLE DESK PROCEDURES  
MAJOR ACTION STEPS

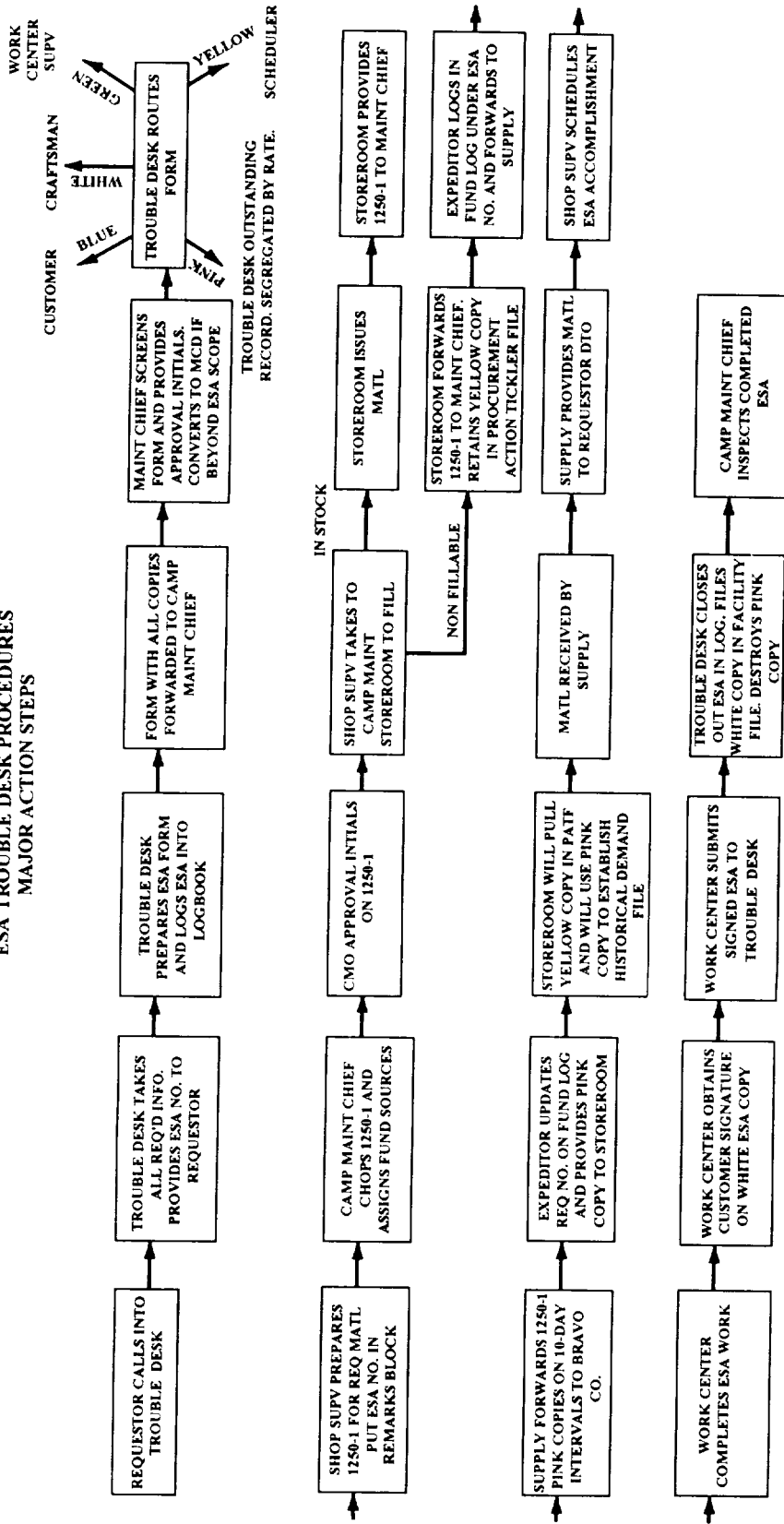


Figure 6-5.—ESA trouble desk procedures.

b. When reporting the trouble, the requester should provide the following information:

- (1) Requestor's name, telephone number, and rate
- (2) Urgency of requirement
- (3) Location of trouble
- (4) Nature of requirement (work description)

c. To assist with future inquiries, cancellation, or additions to the report, the requestor should ask for the service call number assigned.

d. The requestor's signature on the completed service form indicates that the work is satisfactory and complete.

2. Trouble Desk Action

a. Trouble desk personnel collect the information required for the ESA form (fig. 6-6).

<b>EMERGENCY/SERVICE WORK AUTHORIZATION</b>																													
NAVFAC 11014/21 (Rev. 6-75)																				W.O. NO.					CARD NO.				
CHARGE NO.																									1 1 2 1&2 3				
2 3 4 5 6 7 8 9 10 11 12 13 14															15 16 17 18 19										20				
LCC C C DATE REC'D W C / C STD HRS																													
21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37																													
W C / C STD HRS W C / C STD HRS																													
38 39 40 41 42 43 44 45 46 47 48 49 50 51																													
DESCRIPTION OF WORK																				WORK LOCATION									
52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70																				71 72 73 74 75 76									
ORIGINATOR PHONE																													
NATURE OF WORK																													
SHOP COMMENTS																													
																									CRAFTSMAN				
2 DATE STARTED										DATE COMPLETED										W C / C					HRS USED				
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39																													
W C / C HRS USED																													
40 41 42 43 44 45 46 47 48 49 50 51 52 53																													
BUILDING NUMBER															EQUIPMENT NUMBER														
54 55 56 57 58 59 60															61 62 63 64 65 66 67 68 69 70 71														
S/N 0105-LF-002-7105																													
																									705-461				

Figure 6-6.—ESA form.

b. Desk personnel provide the requestor with the service call identification number assigned from the service call log book. The first digit of the number indicates the last digit of the current fiscal year. The remaining digits give the chronological order in which the form was issued. For example, the 52nd form issued in FY93 would have the number 3/52.

c. Trouble desk personnel complete five copies of the service form and enter the required information in the service call log.

d. Desk personnel forward all copies of the form to the maintenance chief for review and approval. The maintenance chief initials the form in the top right corner. In case of an emergency, the desk personnel immediately notify the appropriate shop or individuals! Notification is done before completing the form, so that emergency work may begin immediately.

e. After approval by the camp maintenance chief, the trouble desk personnel forward the white and green copies to the work center performing the task. The white copy goes to the craftsman doing the work, and the green copy is retained by the work center supervisor. The blue copy is pulled and forwarded to the customer as proof there is an active ESA. The pink copy is retained by the trouble desk and filed in the work center categories in the "outstanding form" file. The yellow copy is an extra copy. In the 3rdNCB, this yellow copy can be retained in a file of ESA-funded host command MRP funds.

f. When work is completed, the trouble desk personnel log the service form as complete in the service call log, destroy the pink copy, and file the white form in the appropriate facility history jacket. If the ESA form has been canceled or converted to a work request, enter the reason for cancellation or the work request number under the Remarks section.

g. The trouble desk also maintains a pink copy on file for all ESAs referred to other companies for accomplishment. The desk personnel file the ESA form in the facility file when completed.

### 3. Maintenance Chief Action

a. The maintenance chief reviews requested work for accurate, complete, and proper information.

b. If the request is beyond the scope of service work or is not an emergency, the chief forwards it to the planning and estimating (P&E) section (via the trouble desk) to develop a specific job order. If the request is

for construction or alteration work, the form is returned to the requestor (via the trouble desk for cancellation). The form must indicate that the requested work was beyond the scope of a service call that requires a work request to be submitted.

c. If the form is for service work, the maintenance chief authorizes accomplishment by initialing the form and forwarding it to the appropriate shop (via the trouble desk).

d. When work is completed and signed by the customer, the chief reviews the completed form and forwards it to the trouble desk.

### 4. Shop Foreman Action

a. When a service form is received from the maintenance chief, the shop foreman integrates the work into the shop schedule as the priority (emergency/routine) of the job dictates and workload permits. The foreman should assign emergency forms that same day and handle routine calls within 36 hours.

b. When work is complete, the job foreman makes sure the service form is marked correctly. The form should describe the problem found, the corrective action taken, name, date started, date completed, and a brief summary of the quality/description of materials used.

c. Lastly, the foreman makes sure that all service forms for completed service work are signed by the requestor (or senior individual present) before returning them to the maintenance chief.

### 5. CMO Action

The CMO must review the trouble call log at least weekly.

### **Specific Job Order Work Requests**

Work requests are used for camp maintenance work that exceeds 16 hours. This work is designated as a specific job order. Work requests are initiated by completion of blocks 1 through 8 (except block 2) of the customer request form (fig. 6-7) and submission of the form to the company commander/department head through the normal chain of command. All work requests go to the department head/company commander for screening. Block 10 of the work request must be signed by the department head/company commander or his/her designated representative before BRAVO company can accept



the request. Figure 6-8 shows the major action steps for a specific job order.

During the development of specific job orders, BRAVO company must exercise caution to prevent increasing the amount of work required to complete a job. Work cannot be segregated or increased to avoid approval requirements. All projects must result in complete and usable products. See OPNAV INSTRUCTION 11010.20 series for details.

The maintenance chief is responsible for the following actions:

1. The maintenance chief obtains a rough estimate for the work from the camp maintenance P&E section and enters it in block 13 of the work request.

2. Depending on the estimated cost, the maintenance chief must obtain approvals from the authorities (2ndNCB/3rdNCB DET reviews all work for compliance with camp master plan). See table 6-2 for the relationship between approval authority, cost, and construction.

3. The maintenance chief sends the work request to the approval authority via the chain of command for review. Blocks 15 through 17 of the request form are reviewed and the approved work request is returned to the maintenance chief. The CMO completes block 9 for funds chargeable. The CMO normally approves local authority work requests and submits them directly to the 2ndNCB/3dNCB DET.

4. For those projects within the battalion's approval authority, the maintenance chief performs the following:

a. Assigns a specific JON of the format MCD-XXX-YY. The XXX is the chronological order

in which the work request was received and YY is the fiscal year. A log of MCD numbers should be maintained, and XXX should run through 999 before going back to 001 regardless of fiscal year.

b. Forwards one copy of the work request to the requester to provide feedback on the action taken.

c. Based on the priority of work and funds availability, plans and estimates the work using the cost estimating form (fig. 6-9), The maintenance chief uses the work authorization/estimate form (fig. 6-10) and develops a BM. The MCD section prepares the BM, any sketches or drawings needed, and all applicable 1250-1s for the material.

d. Signs block 23 of the work authorization/estimate form.

e. Submits a copy of the BM and all NAVSUP form 1250-1s to MLO for material procurement.

f. Places the project on status charts in the scheduler's office. The charts display all specific job orders. All MCDs remain on the charts until completed or canceled. Maintains separate charts for each category reported on the monthly project status report. Priorities the top 15 MCDs on each chart and displays the same information monitored on the monthly project status report. The priorities for MCDs in the SAMMS camp maintenance computer program are those for the camp maintenance plan and not the status board priorities.

5. For those projects requiring COM2NDNCB/COM3RDNCB or higher approval, the maintenance chief is responsible for the following:

a. Assigning a specific JON in the format MCD-XXX-YY.

**Table 6-2.—Required Approval Authority**

<u>Approval Authority</u>	<u>Cost Ranges (Man-days)</u>	
	<u>Maintenance &amp; Repair</u>	<u>Construction</u>
Battalion CO (local)	0 – 5,000 (100)	0 – 1000 (50)
COM2NDNCB/COM3RDNCB/ Host Command	5,001 – 200,000	1,001 – 100,000
CINCPACFLT/CINCLANTFLT (Including MILCON)	Over 200,000	Over 100,000

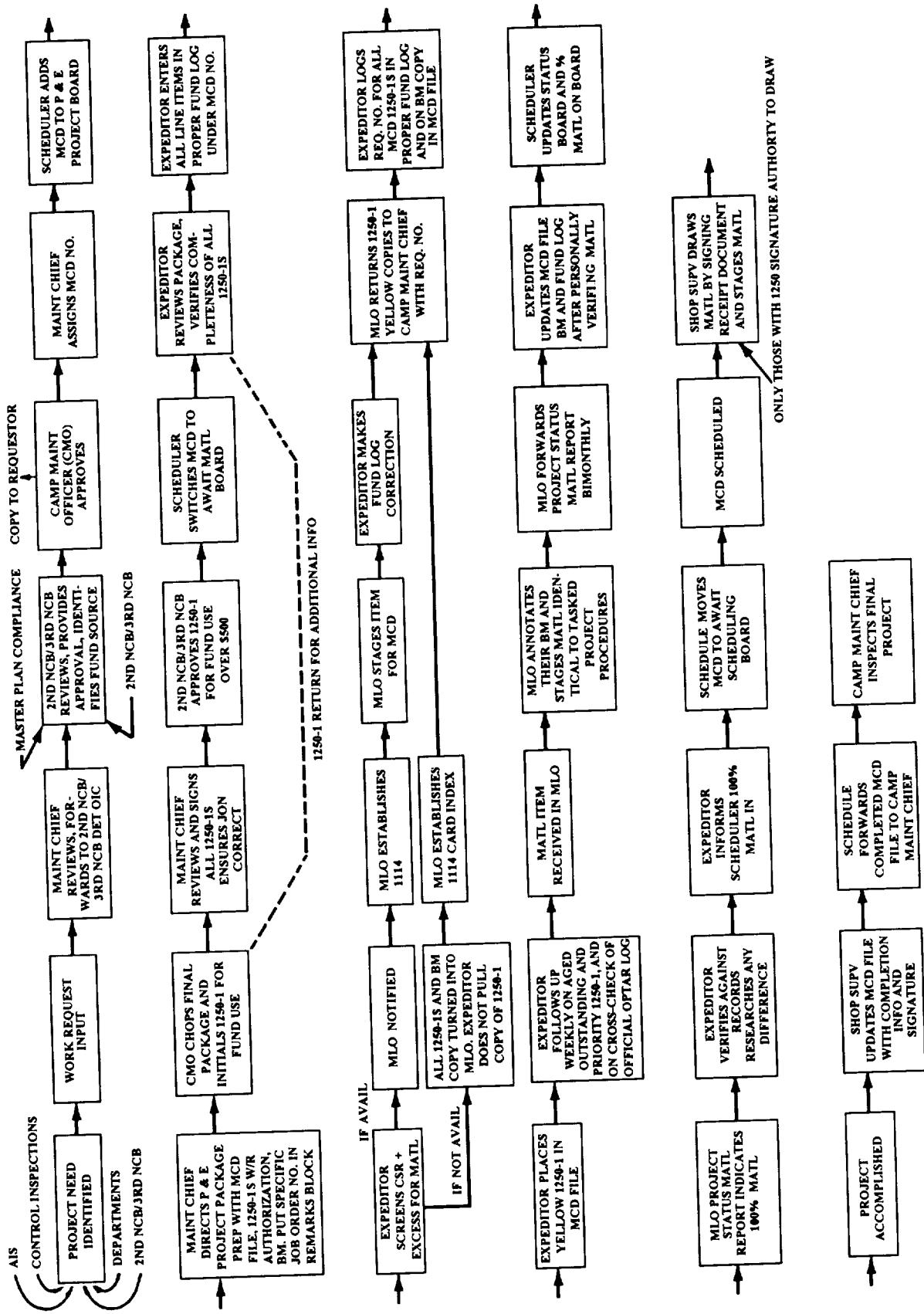


Figure 6-8.—Specific job order major action steps.







b. Forwarding one copy of the work request to the requestor to provide feedback on action taken.

c. Completing the P&E work using the cost estimating form (fig. 6-9) and the work authorization/estimate form (fig. 6-10).

d. Forwarding the project package to COM2NDNCB/COM3RDNCB via the 2ndNCB/3rdNCB DET for review/approval and funding. Include in the package the site sketches, layout, work description, and a cost estimate. Segregate the cost estimate into maintenance, repair, and/or minor construction categories.

e. When funding is received from COM2NDNCB/COM3RDNCB, submitting a copy of the BM and all 1250-1s to MLO for material procurement.

f. Placing the project on the job requirements and status chart. The job order is entered and remains until completed or canceled. The chart contains the same information as those projects within the battalion's approval authority.

g. When all materials are received, scheduling the job for accomplishment.

6. For specific job orders to be done by host command or other forces, the maintenance chief submits a work request according to the host command's instructions to the 2ndNCB/3rdNCB DET for approval via the CMO. He/she leaves blank block 2 of figure 6-9 for host command use. Lastly, the maintenance chief initiates an MCD number for the project in block 14 to provide a cross reference.

### **Standing Job Orders (SJOs)**

SJOs are written for all work that is highly repetitive in nature. With the exception of work that has been referred to outside organizations, all estimated and unestimated SJOs, including PMs, are written using the work authorization form (fig. 6-10). SJO numbers are identified by the code SJO-XXX-YY. The XXX is the sequential order of the SJO and YY is the fiscal year in which the SJO is performed. Each SJO should include an exact description of the work to be accomplished and should specify the frequency cycle. The camp's SJO file, once established, should be a continuous program unaffected by battalion turnovers. The following work is not considered appropriate for SJOs: mount-out boxes, road signs, and grade stakes. The

maintenance chief should periodically review the existing SJOs and forward recommended changes to the 2ndNCB/3rdNCB DET for approval.

A PM schedule is provided to galley personnel 2 weeks before accomplishing galley equipment maintenance. A list of galley equipment with corresponding PM dates must be on file with the food services officer. The camp COSAL program's effectiveness strongly influences the success and responsiveness of SJO accomplishment. The PM coordinator maintains a status chart for all SJOs. Figure 6-11 outlines the major actions in SJO execution.

Preventive maintenance is intended to reduce the breakdown and requisite repairs to designated camp equipment. PM procedures are accomplished on SJOs that entail a systematic and periodic examination, lubrication, minor adjustments, and repairs to camp equipment. They involve duties such as oiling, greasing, cleaning, and tightening of components. This is all with the intent to prevent accelerated deterioration. Any work beyond this level is done by initiating the appropriate service form or work request.

The inspection branch (PM/COSAL coordinator) is responsible for the following specific actions:

1. Inventory all camp equipment that meets the following criteria

- Impairs the operational efficiency of the unit should a breakdown occur.
- Presents a safety hazard in the event of breakdown or damage.
- Is more cost effective to repair than replace.
- Requires a long lead time to replace or procure repair parts.

2. Review equipment files to determine the maintenance requirements. File information should include equipment manuals and brochures, nameplate data, operating instructions, drawings, specifications, replacement/repair parts, and maintenance history. These files are developed and maintained for all equipment covered under PM. Files are also developed and maintained for other systems not under our control. This includes intrusion detection systems, telephones, fire alarms, and such that require maintenance and repair actions.

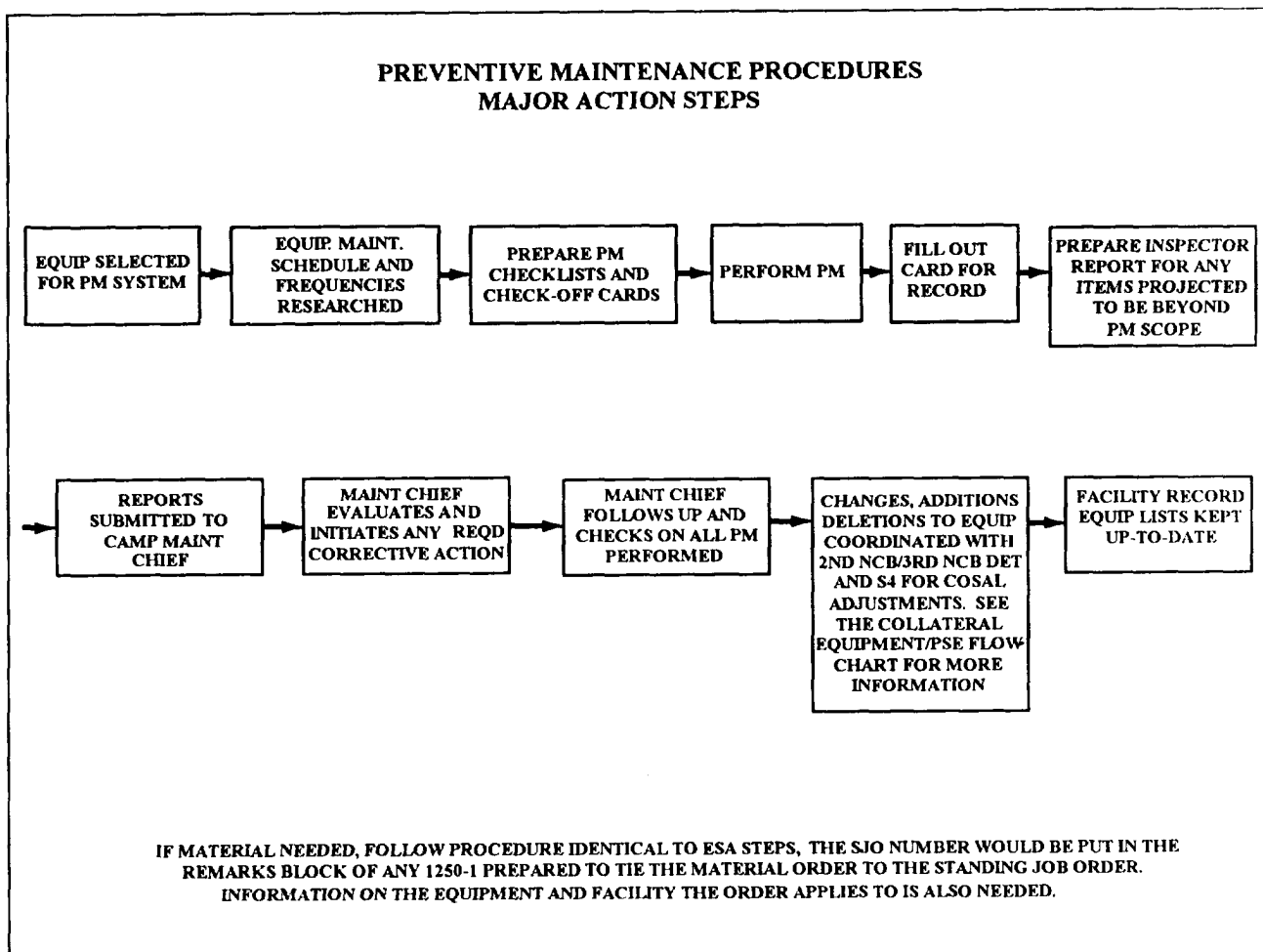


Figure 6-11.—Preventive maintenance procedures.

3. Prepare a PM checkoff card (fig. 6-12) for use by the inspection team (one CE and one UT). The team completes the scheduled inspections for each piece of dynamic equipment.

4. Perform required equipment inspections/PMs and complete the PM card to include the month and year of each inspection action. Generate an inspector's report (fig. 6-13) to identify any required work beyond the scope of the PM.

5. Evaluate the inspectors' reports and initiate any required corrective actions.

6. Do not discard or destroy PM checkoff cards when new cards are required. Staple a new card to the front of the old card to show a continuous record of inspection/service for each piece of equipment.

A current and valid inspection certificate is required for certain sized boilers. If the certification is expiring, the inspector will notify the maintenance

chief. The maintenance chief arranges for the necessary certification from a local certified boiler inspector. The CMO must be aware of all certification requirements and expiration dates to properly monitor camp equipment.

The 2ndNCB/3rdNCB DET conducts periodic random checks of PMs. These checks consist of visual inspection and verification of work completion. Detailed and thorough random checks also are conducted by the PM/COSAL coordinator and the shops foreman.

Any changes or additions to equipment or systems are coordinated with the 2ndNCB/3rdNCB DET. The facility equipment records are modified accordingly.

## INSPECTION PROGRAM

The key to a successful preventive maintenance program is a systematic, continuous inspection





program. Early identification of needed work allows for proper planning and execution. The following types of inspections form the basis for preparing the camp maintenance plan.

### **Control Inspections**

A control inspection reviews all camp facilities to determine the maintenance required during the deployment to preserve or improve the condition of camp structures and property. It is the foundation of the camp maintenance program and work load.

The inspection branch of MCD conducts a control inspection within the first 30 days of the deployment. The MCD inspection branch is responsible for the following specific actions:

1. Identify each facility by identification number and area designation.
2. Prepare an inspection schedule, which includes the facility number, category code, and description.
3. Inspect the facility on the scheduled date. Record the condition on the inspector's report (fig. 6-13). Enter complete details, including the cost estimate for the work required to correct deficiencies. Prepare a separate report for each facility. The inspection should identify structural, electrical, mechanical, civil, and architectural deficiencies for each facility.
4. Inspect any permanent equipment within the facility. The quality of this inspection is vital to establishing a good backlog of work and setting the stage for a meaningful camp maintenance program.
5. Do not count as direct labor those control inspections normally done by the MCD branch.

### **Annual Inspection Summary (AIS)**

The AIS reports document deficiencies on base facilities. These reports are produced annually in the October timeframe. Validating deficiencies and costs is vital to justify the MRP money for the proper maintenance and repair of camp facilities. In the 3rdNCB, the control inspections performed by the resident battalion provide invaluable input and must be done by completely cross-checking and marking the host command's current AIS report. The 3rdNCB DET ensures that the marked AIS report produced by the control inspection is sent to the host command as input to the next AIS. In the 2ndNCB, battalions are responsible for completion and submission of the AIS

report to the 2ndNCB via the 2ndNCB DET by 1 August each year. The battalion performing the 2ndNCB AIS is required to submit corrections to plant record cards. The *SAMM System Camp Maintenance Users' Guide* provides additional details on preparing and submitting a proper AIS.

### **3rdNCB Requirements for AIS/Control Inspection Interface**

During each deployment, the resident battalion BRAVO company uses the inspection reports to update and validate the current AIS report. The report provides a complete and updated record of all camp deficiencies. The completed reports are sent to the 3rdNCB DET along with two copies of the marked AIS report. Inspection report copies are filed in the appropriate facility folders held in MCD. In addition to being updated, the latest AIS must be validated.

After marking the AIS report, the CMO schedules a joint meeting with the 3rdNCB DET and the host command's staff civil engineer (SCE) or public works officer (PWO). New deficiencies, corrected deficiencies, and actions initiated are discussed during this joint meeting. This meeting also identifies the means to correct all remaining deficiencies — MCD projects, host job orders, blanket purchase agreements (BPAs), local contracts, special projects, and such. The 3rdNCB DET OIC forwards a copy of the annotated AIS report of each deployment's control inspection meeting to the host command's SCE and the 3rdNCB.

The CMO discusses, prioritizes, and programs all deficiencies identified for camp maintenance action with the 2ndNCB/3rdNCB DET.

Completed control inspection deficiencies are annotated on the control inspection reports in the individual facility folders with the JON and date. Corrected deficiencies are removed from the master marked-up AIS report.

Based on the inspection and host command meetings, the resident battalion, with the 2ndNCB/3rdNCB DET, prepares a list of deficiencies to be corrected. This list should be prioritized according to the following:

1. For those deficiencies within the battalion's or the 2ndNCB/3rdNCB DET's funding authority, the deficiencies will be corrected as listed earlier under Specific Job Order Work Requests. Normally the correction of AIS or control inspection deficiencies is

funded by host MRP funds. Any use of 03 OPTAR funds to correct deficiencies requires 2ndNCB/3rdNCB DET approval.

2. For all remaining deficiencies, a description of the work to be performed, a cost estimate, and the relative priority of the work is forwarded to the 2ndNCB/3rdNCB. The 2ndNCB/3rdNCB initiates appropriate special project documentation to the host command and programs the work for design and construction.

Periodic inspections of camp facilities to identify corrective actions needed should be made. The CMO, 2ndNCB/3rdNCB DET, and host SCE/PWO should continue to meet. They should meet at least twice a month to update the AIS and discuss deficiencies corrected.

### **Operator Inspections**

Operator inspections consist of examining, lubricating, and making minor adjustments. Operator inspections of constantly attended equipment are another form of PM, but they are performed by the operator assigned to the equipment as part of the day-to-day responsibilities.

### **JOB SCHEDULING**

Job scheduling is done during a weekly maintenance planning meeting and a twice-monthly shop load planning meeting. Job scheduling is intended to permit advance planning by the shops for all work except emergency/service.

### **Maintenance Planning Meeting**

A maintenance planning meeting is held weekly. The attendees include the CMO, maintenance chief, shop supervisors, and the 2ndNCB/3rdNCB DET OIC. This meeting is to schedule the work for the camp maintenance force. Shop loading for the following week is discussed and finalized at this time.

### **Shop Load Planning Meeting**

A shop load planning meeting is held twice monthly. The manpower availability summary (fig. 6-14) and the shop load plans (figs. 6-15 and 6-16) cover 1 month of scheduled work. They are prepared in advance by the Camp Maintenance Scheduling Branch and submitted for review and approval by the 2ndNCB/3rdNCB DET OIC. They are completed

according to the manpower availability summary and the shop load plans (specific or standard job orders).

### Manpower Availability Summary (See fig. 6-14.)

Block 1—Current total maintenance platoon manpower available by rate (current on board).

Block 2—Anticipated gains or losses during the upcoming month.

Block 3—Personnel available for the period. Sum of blocks 1 and 2.

Block 4—The quantity in block 3 multiplied by the number of workdays. This value should be adjusted to account for a 9-hour workday versus an 8-hour man-day (that is, 20 people available multiplied by 22 workdays in a month, multiplied by 1.125 yields 495 mandays available for work).

Blocks 5 and 6—Estimated number of man-days devoted to supervision and project support. This number is based on historical data and trends and modified by anticipated changes or management actions.

Block 7—Man-days consumed by scheduled deployment leave.

Block 8—Estimated man-days for general administrative matters, sick call, dental recall, and scheduled training evolutions, including safety lectures.

Block 9—Sum of blocks 5 through 8.

Block 10—Man-days allocated to specific job orders.

Block 11—Man-days allocated to SJOs.

Block 12—Man-days allocated to emergency/service work based on historical data.

Block 13—Sum of blocks 10 through 12. Compare to block 4 minus block 9.

### Shop Load Plan for Specific Job Orders (See fig. 6-15.)

Jobs are listed in blocks 1 and 2 in descending order of priority.

Blocks 3 through 7 indicate desired use of manpower based on project priority, man-hours required to complete the job, and manpower availability.

Block 8 indicates the planned start date.

Block 9 indicates the cumulative man-days expended to date.



**BRAVO COMPANY MANPOWER  
AVAILABILITY SUMMARY**

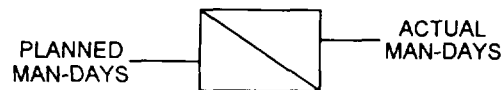
**FROM: TO:  
WORKDAYS THIS PERIOD:**

SHOP	BU	CE	UT	AC/R	SW	TOTAL
1. PERSONNEL CURRENTLY ON BOARD						
2. PLANNED ADJUSTMENTS						
3. AVERAGE AVAILABLE MANPOWER						
4. AVERAGE AVAILABLE MAN-DAYS						

INDIRECT AND OVERHEAD	BU	CE	UT	AC/R	SW	TOTAL
5. SUPERVISOR						
6. INDIRECT						
7. LEAVE AND LIBERTY						
8. ADMIN/TRAINING						
9. TOTAL INDIRECT AND OVERHEAD						

**WORK PLAN SUMMARY**

LABOR DISTRIBUTION	BU	CE	UT	AC/R	SW	TOTAL	%
10. SPECIFICS							
11. STANDINGS							
12. ESA's							
13. TOTAL DIRECT LABOR (10 + 11 + 12)							



**Figure 6-14.—Manpower availability summary.**

BRAVO COMPANY SHOP LOAD PLAN      SPECIFIC JOB ORDERS      FROM:      TO:

1      2      3      4      5      6      7      8      9      10      11

WORKDAYS THIS PERIOD:

JO NUMBER	JOB DESCRIPTION	BU	CE	UT	AC/R	SW	START DATE	CUM M/D TO DATE	TOTAL M/D	REMARKS

Figure 6-15.—Shop load plan (specific job orders).

Block 10 indicates the total estimated man-days for the specific job orders.

Block 11 is used to note work assigned to other companies if priority and availability of shop personnel will not permit completion within an acceptable timeframe.

Shop Load Plan for Standing Job Orders (See fig. 6-16.)

List all SJOs with a brief narrative description in blocks 1 and 2.

Blocks 3 through 8 show planned use of manpower.

Block 9 displays the cumulative man-days expended to date.

**Reporting Requirement**

For management to evaluate the effectiveness of job estimating, manpower utilization, and performance, the shop load plan must be marked at the end of each 2-week period. The marked plans contain the actual start date, the end date, and the productive labor expended on each job order. In addition, the manpower availability summary and work plan summary are marked to reflect actual man-days expended.

The reports are broken down into the categories of ESA, SJO, and specific job orders. The 3rdNCB man-day targets for the three categories are 20 percent for emergency/service work, 30 percent for SJOs, and 50 percent for specific job orders. The 2ndNCB's

BRAVO COMPANY SHOP LOAD PLAN

BRAVO COMPANY SHOP LOAD PLAN		SPECIFIC JOB ORDERS		FROM: WORKDAYS THIS PERIOD:			TO: WORKDAYS THIS PERIOD:		
1	2	3	4	5	6	7	8	9	10
STANDING JON	JOB DESCRIPTION	BU	CE	UT	AC/R	SW	PEST CONTROL	CUM M/D TO DATE	REMARKS


PLANNED MAN-DAYS  ACTUAL MAN-DAYS

Figure 6-16.—Shop load plan (standing job orders).

man-day targets are 30 percent for ESA, 40 percent for SJOs, and 30 percent for specific job orders. In the 2ndNCB camps, specific job orders include only maintenance and repair projects and exclude construction projects. One copy of each marked-up form is forwarded to the 2ndNCB/3rdNCB DET and the other copy is retained by the maintenance chief.

**Continuity**

Since maintenance is an ongoing process, all records for specific jobs, standing jobs, and service calls are retained in the facility/equipment history jacket. This allows for a continuous history to be passed on to each relieving battalion. Suggestions for

improvements or changes should be sent to the 2ndNCB/3rdNCB DET for action.

**MATERIAL MANAGEMENT**

The maintenance chief is responsible for planning and estimating all material requirements, drafting of BMs, initiating NAVSUP form 1250-1s, and preparing the camp maintenance fund log. The camp maintenance fund log contains information used to track the budget for the camp maintenance program. The log includes the following:

- Ž A quarterly breakdown with the remaining fund balance

- Julian date 1250-1s prepared
- Requisition number (supply department provides)
- Line item description/quantity/amount of issue
- Estimated cost
- Julian date material received
- MCD project number and title

All material is ordered on a NAVSUP form 1250-1. The supply department handles all camp maintenance materials according to the *Seabee Supply Manual*, COM2NDNCB/COM3RDNCBINST 4400.3 series. Turn back to figure 6-8 for additional details on the steps for 1250-1s with specific job orders.

### Specific Job Order Support

Supply can track specific job order materials with the computer. The three-digit BM series field corresponds to the BRAVO company MCD project number. MLO can provide automated status reports with updated information on all MCD materials. MLO stages all MCD materials by individual project. This staging is done in the same manner as that used for tasked battalion projects.

Only the CMO or the camp maintenance chief is authorized to transfer material from one job order to another once the material is staged. Both the supply officer (S-4) and the 2ndNCB/3rdNCB DET must be advised in writing when such transfers are made. Use the format in figure 6-17 to report this information.

<u>PROJECT MATERIAL TRANSFER REPORT</u>						
						_____ (Date)
From:						
Subj: PROJECT MATERIAL TRANSFER AND CONTROL REPORT						
Ref: (a) (If applicable)						
1. Per reference(s), the following project material has been transferred from (project number/BM code) _____ to (project number/BM code/customer/excess) ____: (Attach additional sheets as necessary)						
<u>LINE</u> <u>BM NO</u>	<u>ITEM</u>	<u>DESCRIPTION OF</u> <u>MATERIAL TRANSFERRED</u>	<u>U/I</u>	<u>QUANTITY</u> <u>TRANSFERRED</u>	<u>REPLACE</u> <u>REON NO</u>	<u>QUANTITY</u> <u>REORDERED</u>
_____ (Signature)						
Copy to:						
COM 2ND NCB/COM 3RD NCB (if NCF tasked project)						
2ND NCB/3RD NCB DET (if camp maintenance project)						
Project File(s)						
MLO						
Other						

Figure 6-17.—Project material transfer report.

## Emergency/Service Work and SJOs

Material required that is available in the camp maintenance storeroom is obtained as shown in figures 6-5 and 6-11. Material required that is not stocked in the camp maintenance storeroom is acquired through the following procedures:

1. The camp maintenance storeroom retains the yellow copy and returns all nonfillable 1250-1s to the camp maintenance chief.

2. The expeditor logs 1250-1s in the 1250-1 log book. The yellow copy of the 1250-1 is retained by the camp maintenance storeroom and filed in a procurement section tickler file. The other copies of the 1250-1 are forwarded to the battalion supply office.

3. The supply office processes BRAVO company DTO through normal supply procedures and returns the pink copies of the 1250-1s to the CMO after assigning a requisition number. These pink copies, which are provided by the supply department every 10 days, are forwarded to the expeditor for 03 log updating. The pink copies of ESA and SJO 1250-1 forms are then forwarded to the camp maintenance storeroom. Here, the yellow copies are pulled from the tickler file and the pink copy used to establish and maintain historical demand information. By using historical demand information, BRAVO company can advise supply to adjust stock levels on storeroom shelves. Figures 6-5 and 6-11 detail these procedures.

## Camp Maintenance Storeroom

The camp maintenance storeroom is under the control of the supply department and operated according to the *Seabee Supply Manual*, COM2ND-NCB/COM3RDNCBINST 4400.3 series. Material is issued to authorized camp maintenance personnel using form 1250-1. Figure 6-18 details the major actions to reorder camp maintenance storeroom stock.

The supply department manages the camp maintenance storeroom to include construction material used for camp maintenance and repair parts for COSAL supported equipment. "Goody lockers," excess piles, or stockpiles of construction material in camp maintenance spaces are not authorized. The only exception is for that material required to perform work in progress.

## Coordinated Shipboard/Shorebased Allowance List (COSAL)

The COSAL is an authoritative document that lists the following:

- The COSAL-supported equipment installed in a camp.
- The repair parts and special tools required to operate, overhaul, and repair the supported equipment.

The COSAL is both a technical and a supply document. It is a technical document to the extent that the equipment, nomenclature, operating characteristics, and technical manuals are described in the APL. It is a supply document as it lists the items required to continue the maximum self-supporting operations for extended periods of time.

The COSAL is organized into three parts.

- Part I contains indexes and installed equipment.
- Part II contains associated APLs.
- Part III contains repair parts allowance and cross-referenced data.

Two copies of the published COSAL are retained at the camp. One copy is kept in the supply department. The remaining copy is for the BRAVO company camp maintenance PM/COSAL coordinator.

The initial COSAL is based on the equipment configuration data submitted to the Ship's Parts Control Center (SPCC). This information is kept and contained in a computerized weapons system file (WSF) at SPCC. Precise configuration information is essential. The validity of the COSAL depends on initially establishing an accurate configuration and properly updating configuration changes.

### COSAL Maintenance

Proper maintenance of the camp COSAL is vital. All equipment must be validated, reported, and reflected in an updated COSAL. The battalion's supply officer must, based on input from the PM/COSAL coordinator, ensure that any subsequent installations, removals, or modifications are reported to the cognizant inventory control point (ICP). The supply officer also must report any changes to the type commander and ensure that the camp COSAL is revised accordingly. COSAL MAINTENANCE IS THE JOINT RESPONSIBILITY OF BOTH THE

**CAMP MAINTENANCE STOREROOM STOCK REPLACEMENT  
MAJOR ACTION STEPS**

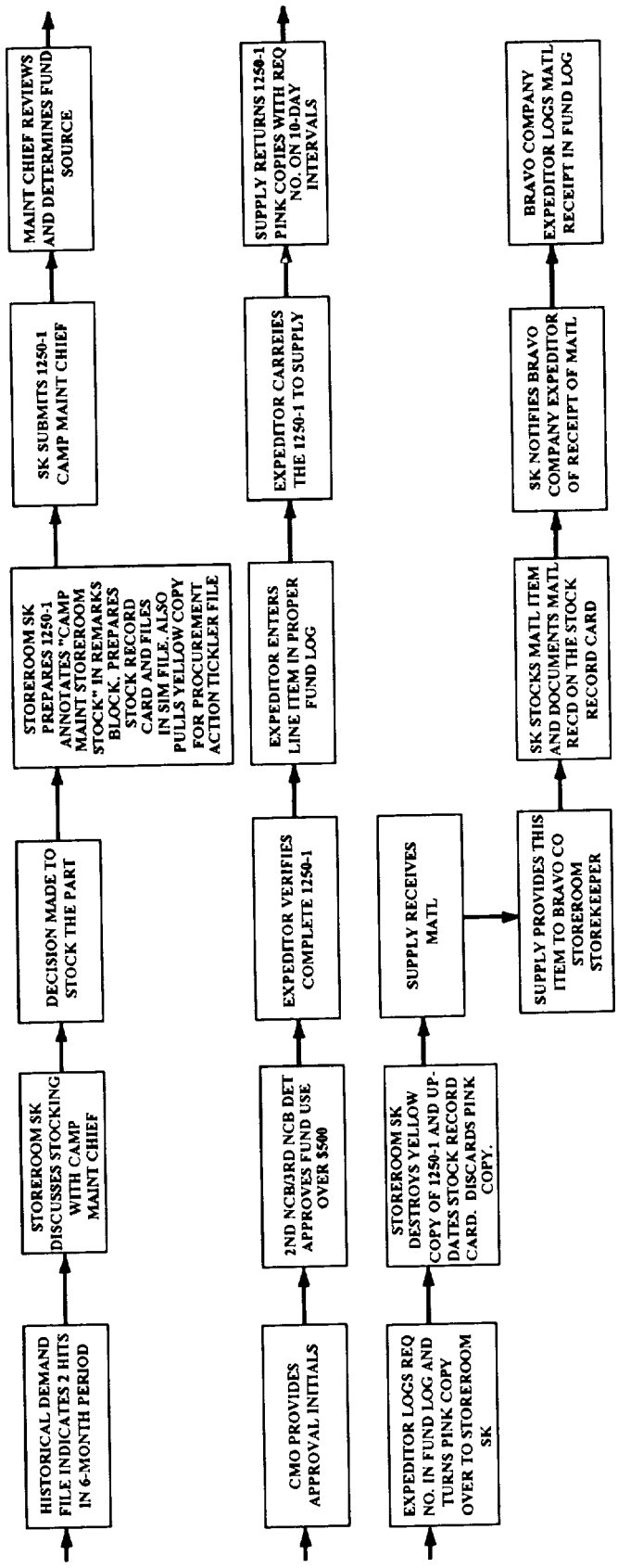


Figure 6-18.—Camp maintenance storeroom stock replacement major action steps.

## MAINTENANCE AND THE SUPPLY DEPARTMENTS.

### COSAL Change Reporting

The **configuration change report** (CCR) is those changes that result from equipment additions, deletions, or modifications, or COSAL errors. These equipment changes are reported according to the *Seabee Supply Manual*, COM2ND/COM3RDNCB-INST 4400.3 series, and the *Afloat Supply Procedures*, NAVSUP P-485, using a CCR.

The PM/COSAL coordinator prepares a Ship's Configuration Change Form, OPNAV 4790/CK, to document an equipment change. A job sequence log (3000 series) is established and maintained by the PM/COSAL coordinator. The PM/COSAL coordinator assigns a four-digit job sequence number (JSN) to every change reported. When completed, the form is routed to S-4. Supply makes sure that the CCR is complete and accurate. Procedures to prepare a CCR are outlined in the *Afloat Supply Procedures*, NAVSUP P-485.

CCRs are distributed as follows:

- The original goes to SPCC via 2ndNCB logistics officer (N4) or 3rdNCB DET LOG REP.
- A copy goes to the permanent camp files maintained by the PM/COSAL coordinator.
- A copy is retained by the supply department (S-4) according to the job control sequence.

The **allowance change request** (ACR) is those requests for repair parts allowance changes being made by using the ACR form. Additions, deletions, or quantity increases/decreases to any published allowance list are documented on NAVSUP 1220-2. The camp maintenance storeroom custodian, with help from the supply officer, prepares ACRs for any repair part stock level changes recommended by the camp maintenance organization. The NAVSUP 1220-2 is prepared per the instructions on the reverse side of the form.

ACRs are distributed as follows:

- The original goes to SPCC via 2ndNCB logistics officer (N4) or 3rdNCB DET LOG REP.
- A copy goes to the permanent camp files maintained by the PM/COSAL coordinator.
- A copy is retained by the supply department (S-4).

The supply department processes all the changes on receipt of the SPCC-approved request. Both copies of the camp CO SAL are updated. Requests disapproved by SPCC are returned to the originating camp for inclusion in the permanent camp files. COSAL additions, deletions, and adjustments incident to approved CCRs/ACRs are processed according to NAVSUP P-485.

### **Collateral and Personnel Support Equipment (PSE)**

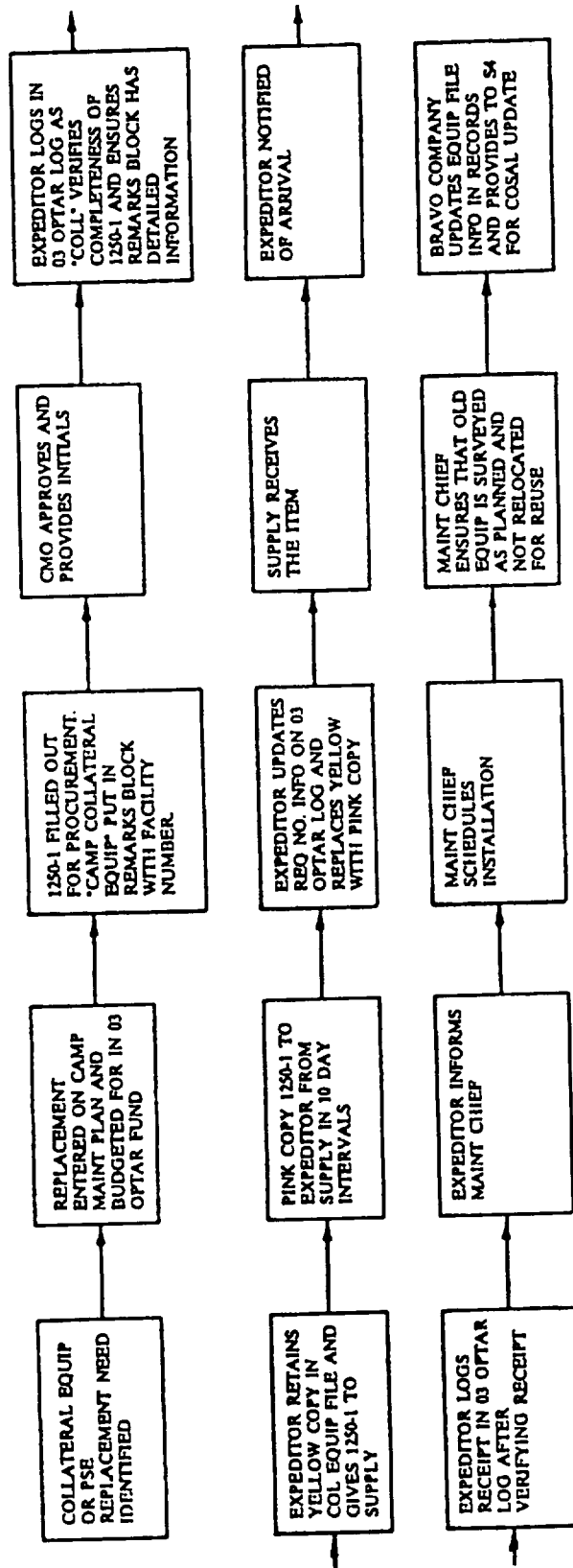
There are two basic types of equipment in Seabee material management. This section covers defining, funding, managing, and marking of collateral and PSE.

Collateral equipment is commonly referred to as class III and class IV plant property and minor property. Collateral equipment consists of noninstalled equipment used in day-to-day operations of the camp. Examples include portable washers/dryers, window air conditioners, galley and dining facility equipment and furnishings, shop equipment, and office furniture and labor-saving devices not included in the augment table of allowance (TOA).

PSE is commonly referred to as habitability items. These consist of furniture and furnishings in unaccompanied officer, chief petty officer, and enlisted living quarters including rooms, lounges, and dayrooms. Examples include beds, mattresses, wardrobes/lockers, desk chairs, lamps, carpets, and drapes. Bedding (bed sheets, pillows, pillow cases, and blankets provided for living quarters) also is included in this equipment category.

Funding for collateral equipment/PSE is 03 OPTAR. Funds from 03 OPTAR are used to fund all personnel support and collateral equipment requirements. BEQ/BOQ managers, department heads, and company commanders monitor equipment condition and identify requirements to the 2ndNCB/3rdNCB DET. The 2ndNCB/3rdNCB DET reviews requirements, does a replacement versus repair analysis, and provides requirements to the CMO for inclusion in the camp maintenance plan. All NAVSUP 1250-1s are forwarded from the CMO to the supply department for approval via the 2ndNCB/3rdNCB DET OIC. Figure 6-19 details the steps for a collateral equipment/PSE replacement within local authority.

**COLLATERAL EQUIPMENT/PSE REPLACEMENT  
MAJOR ACTION STEPS**



ADDITION, DELETION OR MODIFICATION TO ANY EQUIPMENT IN THE COSAL PROGRAM MUST BE REPORTED TO SPOC VIA 2ND NCB/3RD NCB. BRAVO COMPANY MUST INFORM S4 AND 2ND/3RD NCB. DET OIC OF ANY EQUIPMENT CHANGE WHICH AFFECTS COSAL. S4 HAS ACTION TO INSURE COSAL)CIANGIS ARE INITIATED AND KEPT CURRENT.

Figure 6-19.—Collateral equipment/PSE replacement major action steps.



Battalions are responsible for the initial inventory, the establishment of a record system, and the accountability and management of camp assets. To establish equipment records and controls, BEQ/BOQ managers, department heads, and company commanders are required to maintain the following:

- PSE and bedding custody cards
- Camp collateral and PSE inventory

Maintain a complete inventory by building and room/office number during the deployment. Verify manufacturer's serial numbers and equipment condition. Post copies of personnel support and collateral equipment inventories on the back of the doors or near the entries. Note any addition or deletion of furnishings or equipment. Remove unserviceable equipment. Complete survey forms per supply department procedures and forward to the 2ndNCB/3rdNCB DET OIC for approval prior to supply department action. Do not retain equipment for reuse without 2ndNCB/3rdNCB DET OIC approval. During turnover, conduct a joint inventory of all collateral equipment/PSE including designating condition codes. Reconcile differences with the 2ndNCB/3rdNCB on-site representative. Note the value of damaged or lost items in the turnover report. Do the internal custody with a person from the advance party. Initial the listing and accept custody for later reassignment to the final custodian. Original copies of equipment inventories are held by the resident battalion. Duplicate copies are provided to the CMO and the 2ndNCB/3rdNCB DET OIC.

Identification/stenciling is required on each piece of camp equipment. You should mark collateral/PSE with space identification codes to maintain accountability. Place markings on a visible but unobtrusive surface such as side or back. Plant property tags/labels are encouraged as an additional measure to maintain adequate inventory records. Look at this example of a properly identified piece of equipment.

<b>USN Property</b>
Item Name (locker insert)
BEQ
7212-A

(The building number is 7212 and the room is A.)

## ACCOUNTING

S-4 maintains the official records for all OPTAR accounts. The CMO tracks and controls all expenditures of 03 OPTAR funds. The CMO also tracks and controls host MRP funds to make fiscally responsible decisions about camp maintenance. All 1250-1s using 03 OPTAR funds must be signed by the CMO and logged into the BRAVO company's 03 OPTAR log when approved. Individual requisitions exceeding \$500 in total extended cost must be reviewed by the 2ndNCB/3rdNCB DET before obligating funds. It is critical that all quarterly 03 OPTAR funds provided be obligated in the designated quarter. The supply department provides a report every 10 days to the CMO showing 03 OPTAR funds obligated. This report contains the dates, the balance remaining, and all 1250-1 pink copies. This report should cross-check and confirm the CMO's records.

### BRAVO Company Fund Logs

In 3rdNCB camps, the BRAVO company expeditor maintains two fund logs. One is for host MRP funds and the other for 03 OPTAR funds. The 03 OPTAR logs track 1250-1 actions using date, requisition number, item description, date received, cost, and such. A running balance is kept on the right side of each log to show funds remaining at any time during the quarter. Every 1250-1 entry must include the MCD, SJO, or ESA number. With the exception of collateral equipment purchases using 03 OPTAR funds, all 1250-1s using MRP or 03 OPTAR funds should have a job number assigned. The 2ndNCB camps use only 2ndNCB funding and do not require any host MRP log.

### Budget

The CMO submits a budget request for the next two quarters to the supply officer via the 2ndNCB/3rdNCB DET. This budget request is submitted no later than 45 days before the end of the quarter. The request is due to the 2ndNCB/3rdNCB by the first day of the last month of each quarter. This budget request includes continuing expenses as well as a prioritized list of projects to be completed or equipment to be replaced. The budget submittal is in the camp maintenance plan format, but includes only entries involving 03 PPTAR fund use. **No other fund sources are to be shown on the budget request.**

Submit an annual planning budget to the 2ndNCB/3rdNCB by 1 September of each year.

### **Investment Items**

The 2ndNCB/3rdNCB budget call is normally issued during the January/February timeframe. This budget call is for camp investment items (non-TOA, nonstandard, greater than \$15,000 unit price). Refer to NAVCOMPT Manual 074060 for specifics on investment items. The CMO coordinates with the 2ndNCB/3rdNCB DET to identify replacement requirements that are satisfied by planned replacements or new requirements. For emergent requirements during the course of the deployment, the resident battalion sends a message request to COM2NDNCB/COM3RDNCB for priority consideration. The message outlines the need for replacement and contains all necessary supporting justification. For any industrial plant equipment (IPE) procurement over \$5,000, higher command approval is required. For non-IPE, higher command approval is required for all procurements of noncentrally managed equipment over \$15,000.

### **Funding of 2ndNCB Camp Maintenance Work**

Although the 2ndNCB camp facilities are on the host command plant account records, the 2ndNCB is responsible for funding all camp maintenance efforts. Host commands do not provide funding. This is a primary difference in camp maintenance operations between 2ndNCB and 3rdNCB. The 2ndNCB pays the costs of correcting all AIS deficiencies within local authority. Because host commands provide no funding, MRP log keeping and fund tracking are not required at 2ndNCB camps.

### **Funding of 3rdNCB Camp Maintenance Work**

Camp class I (real estate) and class II (facilities) property are controlled by host activities. As real estate and facility holders, the host commands provide financial support for routine maintenance and cyclical repair of facilities. However, additional costs for maintenance or repairs that are beyond those prescribed by the hosts and that are performed at the request of the tenant are funded by the tenant. Maintenance, performed on facilities and property (classes III and IV) held by 3rdNCB, is the financial responsibility of the NCF.

### **3rdNCB Monthly MRP Report**

A monthly summary of MRP fund use by line item is forwarded to the 3rdNCB and the host command via the 3rdNCB DET OIC at the end of each month. This monthly report includes the balance of funds, item description, cost, date, project number, and quantity. The purpose of this report is to provide the host command with detailed information on where MRP funds are being expended. The MRP fund log provides the data needed for this report.

### **TURNOVER PROCEDURES**

The battalion turnover of camp maintenance includes a thorough visual inspection of all facilities, utility systems, and dynamic equipment. As a minimum, the inspection determines the availability of the following:

1. Current camp maintenance plan.
2. Facility and equipment history jackets, including the most recent facility inspection reports.
3. As-built drawings of all camp facilities.
4. Utility system and equipment manuals, complete with nameplate data operating instructions, drawings, specifications, and repair parts requirements.
5. All outstanding specific job orders and E/S forms.
6. SJO file.
7. Emergency/service log.
8. PMS checkoff cards for all camp/facility-related dynamic equipment.
9. Project shop load plan.
10. Job requirements and status charts that contain a minimum maintenance backlog of 900 man-days.
11. Up-to-date master of the annotated AIS report. The two CMOs meet with the 2ndNCB/3rdNCB DET and the host SCE/PWO to discuss the AIS and set the stage for the upcoming control inspections.
12. Camp maintenance budget.
13. Current inventory of camp maintenance materials and spare parts.
14. Current maintenance service contracts.
15. Class III and class IV plant property records.

16. SAMMS camp maintenance application-generated turnover summary report.

17. SAMMS camp maintenance reference material and guides.

### **PREPARATION FOR UPCOMING TURNOVERS**

The outgoing battalion validates all camp records, reports, and status chart data 10 days before the start of turnover. A complete wall-to-wall inventory of MCD material in MLO is held to validate all BM and material status. The BRAVO company expediter will assist in the material inspection.

### **REPORT**

At the completion of the turnover, the relieving battalion provides a report to the 2ndNCB/3rdNCB on any major discrepancies and problem areas that cannot be resolved between the two battalions. A copy is provided to the 2ndNCB/3rdNCB DET.

### **PROCEDURES**

Any change to the established procedures must be authorized by the 2ndNCB/3rdNCB. Other than a change in personnel, battalion turnovers should have no discernible effect on the maintenance system!

## CHAPTER 7

# ENVIRONMENTAL POLLUTION CONTROL

*LEARNING OBJECTIVE: Identify the techniques used in the identification, prevention, and cleanup of water, ground, and air environmental pollutants, including the cleanup of oil spills and other hazardous materials.*

### ENVIRONMENTAL POLLUTION

The Navy's ability to accomplish its mission requires daily land, sea, and air operations. The Navy is committed to operating ships and shore facilities in a manner compatible with the environment. National defense and environmental protection are and must be compatible goals. Therefore, an important part of the Navy's mission is to prevent pollution, protect the environment, and conserve natural, historic, and cultural resources. To accomplish this mission element, everyone must be aware of the environmental and natural resource laws and regulations that have been established by federal, state, and local governments. The Navy chain of command must provide leadership and commitment to ensure that all Navy personnel develop and exhibit an environmental protection ethic.

This chapter will cover ways to prevent water, ground, and air pollution on the jobsite. It will also describe ways you can help prevent, control, and clean up pollution.

### WATER AND GROUND POLLUTION

There are some wastes that should never be flushed into a sewer. Sewage treatment plants and industrial waste treatment plants are not designed to, nor can they, adequately treat all wastes. Some wastes such as those containing more than a trace of oil, cleaning fluids, gasoline or other volatiles, toxic chemicals, acids or alkalies, and some solid materials cannot be handled by sewers.

Besides creating a fire hazard, oil and other petroleum-related products pose many possible pollution threats when spilled in the water, dumped into the storm or sanitary sewer system, or spilled on the ground. Oil products on the ground infiltrate and contaminate surface water supplies with the groundwater runoff caused by rain. Oil products dumped or carried into storm or sanitary sewers are also potential explosion hazards.

Oily waste water from boiler rooms, banks of walk-in refrigeration units, and motor pool operations is caused by

- improper handling and storage of new and waste oil,
- equipment and vehicle washing operations, or
- various other maintenance activities that generate liquid waste or wastewater that must be stored or treated.

As a shop supervisor, one of your prime concerns should be to prevent oils used in the shop from draining into storm sewers and surface drainage systems. During pipe-threading operations, you should use catch pans and have absorbent materials available to soak up spilled oil. Spilled oil and fuels should **NEVER** be washed down a drain or sewer unless an immediate fire hazard exists and an oil-water separator is connected to the discharge line. Where minor spills are expected to occur occasionally (pipe threading, boiler burner cleaning, engine oil changes), sprinkle absorbent material on the spill, pick it up, and then place it in an Environmental Protection Agency- (EPA-) approved container. The EPA containers are normally disposed of through the Defense Reutilization and Marketing Office (DRMO). When this is not possible, the containers must be disposed of through a government-approved contractor or in a sanitary landfill approved by local government authorities.

Waste oils, filters, and contaminated fuel should be collected and disposed of in a nonpolluting manner. Most naval activities collect and dispose of waste oil periodically through a contractor. The contractor may burn it in a boiler plant or in a heating system or reprocess it in an oil reclamation plant. Naval supply fuel farms usually have the means to dispose of waste oils properly.

There will be times that you will see what could be a potential hazard, such as contaminated water running

off the equipment on the washrack. It is your responsibility to check with the person in charge of the washrack to be sure this waste water is treated and not discharged into the storm system. Provisions must be made for pretreating or separating oil products and cleaning solvents used at the washrack.

## Water Pollution

Pollution results from many activities, both mankind's and nature's. Water becomes polluted when wastes from activities flow into a lake or stream in such quantities that the natural ability of the water to cleanse itself is lessened or completely destroyed.

Wastes are dumped into our waters daily. The following list contains wastes and their sources:

- Sewage and other wastes come from cities and industries and from pleasure boats, commercial ships, and marinas.
- Nutrients (principally phosphates and nitrates) leach from sewage, industrial waste, and land runoff.
- Complex chemicals are found in household detergents, pesticides, herbicides, and wastes from industrial processes.
- Oil comes from ships ashore, offshore drilling rigs, and shoreline industrial facilities.
- Crankcase oils are improperly disposed of by auto service stations and home auto mechanics.
- Silt, sand, and debris come from city streets, urban construction, highway construction, farm surface erosion, and dredging from channel clearings.
- Salts flow from winter streets, field irrigation, and industrial processes.
- Heater water from power projects, industrial processes, and reservoir impoundments find their way into our waters.
- Disease-causing bacteria comes mainly from municipal sewage.
- Radioactive wastes come from a variety of sources. These sources include the mining and processing of radioactive ores, materials used in power plants, industrial, medical, and other research, and fallout during nuclear weapons testing.
- Mercury and other heavy metals frequently escape from industrial plants.

- Drainage waste comes from animal feedlots and meat processing plants.

These wastes have placed a serious strain on our waste treatment systems, as well as on our waterways. Some types of waste are difficult to remove. Other types respond to conventional treatment, but there are not enough treatment facilities to keep them out of our waters. Solving the pollution problem is not easy, but it must be solved if we are to have an adequate supply of safe, clean water for future use.

**OIL SPILLS ON WATER.**— An oil slick on the surface of the water blocks the flow of oxygen from the atmosphere into the water. This is harmful to fish and other aquatic life. If the fish do not die from the oil coating on their gills or from eating the oil or oil-laden food, their flesh is tainted and they are no longer fit for human consumption. Besides harming aquatic life, drinking water can become contaminated by oil. Drinking water from wells and surface storage facilities is treated with chemicals to rid the water of harmful bacteria. However, **no amount of treatment can rid a system of contamination from waste oil products.** The system must be abandoned.

Booming of spills has proved to be effective in containing spills of liquids on relatively calm and current-free waters. Because of ecological considerations, booming has become an important means of containing oil spills, even though more effective equipment is now available.

Following confinement of oil spills on water, various methods of removing the confined liquid have been used. One method is the use of absorbents, such as straw, plastics, sawdust, and peat moss. The absorbents are spread on the surface of the spill and then collected and burned on shore. Skimming devices operate on a different principle and must include pumps and separators. Power boats with skimmers on the bow scoop up the oil and water and send them through an oil separator and rollers to which only the oil adheres. The oil is then removed by scraping or compression.

**HARMFUL EFFECTS OF POLLUTED WATERS.**— Several basic biological, chemical, and physical processes affect the quality of water. Organic wastes (natural products, such as food, paper, and human waste) decompose by bacterial action. Bacteria attack wastes dumped into rivers and lakes, using up oxygen in the process. Fish and other aquatic life need oxygen. If the waste loads are so great that large amounts of oxygen are spent in their decomposition, certain types of fish can no longer live in that body of water. A

pollution-resistant lower order of fish, such as carp, replaces the original fish population. The amount of oxygen in a body of water is therefore one of the best measures of its ecological health.

If all the oxygen is used, an anaerobic (without air) decomposition process is set in motion with a different mixture of bacteria. Rather than releasing carbon dioxide in the decomposition process, anaerobic decomposition releases methane or hydrogen sulfide. In these highly polluted situations, the river turns dark and odors-like rotten eggs-penetrate the environment.

Heated water discharged into lakes and rivers often harms aquatic life. Heat accelerates biological and chemical processes that reduce the ability of a body of water to retain dissolved oxygen and other dissolved gases. Increases in temperature often disrupt the reproduction cycles of fish. By hastening biological processes, heat accelerates the growth of aquatic plants such as algae. Finally, the temperature level determines the types of fish and other aquatic life that can live in any particular body of water. The effects of excessive heat operate to change the ecology of an area-sometimes drastically, rapidly, and irreversibly.

One of the most serious water pollution problems is eutrophication—the “dying of lakes.” All lakes go through a natural cycle of eutrophication, but this normally takes thousands of years. Lakes are deep and have little biological life. Lake Superior is a good example. Over a period of time, nutrients and sediments were added and the lake became more biologically productive and shallower. As nutrients continued to be added, large algae blooms grew, the fish populations changed, and the lake began to take on undesirable characteristics. After an extended time, a lake can become a swamp and finally a land area.

People greatly accelerate this process of eutrophication when they add nutrients to the water. Nutrients include detergents, waste food products, fertilizers, and human wastes. The actions of people can, in decades, cause changes that would take nature thousands of years.

Polluted waters harm human health as well as the natural environment. It is true that epidemics of typhoid, dysentery, and salmonellosis borne by polluted water are no longer serious public health threats in the United States. However, it is still vital that we maintain adequate protection of the public from these and other pollution dangers. Often water must be treated to very high levels before it is drinkable. Frequently, beaches must be closed and shellfish left unharvested.

Inadequately disinfected municipal waste overflow from combined sewer systems and runoff from animal feedlots often create high bacteria densities in local water supplies. Ships that are anchored far upstream can contribute to a high bacteria count in a community's water supply. The Navy is exploring the use of many devices and schemes to lessen the effect of waste discharges in water.

## Ground Pollution

Construction site work and repair and maintenance of facilities have the immediate potential for becoming polluting activities. Since the majority of construction efforts take place on land, project supervisors must identify potential pollution hazards and take steps to minimize the effects. Some of the most common pollution activities that affect the ground areas and water ecosystems are grubbing and equipment repair operations.

**GRUBBING OPERATIONS.**— Large-scale clearing and grubbing during the initial stages of a project often produce damaging environmental effects, such as increased soil erosion, reduction of atmospheric oxygen, and destruction of wildlife habitat. Another primary concern is the introduction of particulate matter into streams and riverbeds. Particulate matter released into waterways causes increased siltation and algae growth.

To prevent these damaging effects you should save as much vegetation as possible—trees, grass, and other plants—to hold the soil in place. Consider allowing tree rows to be left in place until the project is completed. Replant cleared areas. Construct a shallow trench around the perimeter of a project to help contain water runoff into streams and rivers and to prevent siltation. The decision to burn scrubs and stumps should be based on atmospheric conditions. Burn only when conditions are favorable and the material to be burned is totally dry. **A burn permit is required in all burning operations on NCF projects!** To prevent wild fires and production of smog, do **NOT** use petroleum-base fuels to start fires! Petroleum-base fuels do not burn completely, and the residue seeps into the underground water table.

**EQUIPMENT REPAIR OPERATIONS.**— Repair and maintenance of CESE whether in the shop or on the project site must always be under controlled and closely monitored conditions. Lubricating oil, fuel, hydraulic fluids, transmission fluids, and antifreeze contain extremely volatile chemical properties. When these petrochemicals are mixed with certain solvents or

acids, they produce deadly toxins that sometimes leak into the groundwater or into the human food chain. Some of these toxins remain reactive and hazardous for up to 100 years before they become nontoxic. When any of these materials are spilled onto the ground, it must be considered a major contaminating spill with dangerous aquifer polluting potential. Some of the larger CESE used by NCF contain enormous amounts of petrochemicals. A 25-ton hydraulic crane contains over 214 gallons of potential pollutants, and a twin-engine scraper contains over 350 gallons. Spillage or dumping of these amounts of contaminants can be disastrous!

Because of the varied conditions that affect migration and recovery of a spill, recovery systems must be tailored for each site. Some of these systems are covered in NAVFAC DM 5.14, *Groundwater Pollution Control*.

Small spills that encounter a shallow groundwater table or that are contained by a natural barrier, such as rock, stone, or impermeable clay, prevent vertical migration and can be recovered by using an interceptor trench, as shown in figure 7-1. This interceptor trench system is relatively simple and can be built by using materials and equipment normally available on a construction site. The trench must bisect the entire width of the spill to contain it; therefore, the interceptor system is useful only on spills that can be contained quickly. The trench depth usually is limited to 6 to 8 feet, because beyond that depth the ground becomes unstable. An impermeable barrier, such as rubber sheeting, should be installed on the downgrade side of the trench. This barrier prevents migration of the accumulated spill product and still allows water to pass beneath the barrier. Since most petroleum products float on water, the spill can be pumped out into a separator, as shown in figure

7-2. The separated spill can then be disposed of off-site at an authorized waste-handling facility.

Another method of clearing a spill area is to completely remove all contaminated soil from the site to a facility or landfill that is designed to receive such material. This is called stripping. Stripping must be done carefully so that the underlying and adjacent soil is not contaminated by the removal process. Once all of the contaminants are removed from the site, the excavation may then be backfilled with dry, clean soil.

The best method, of course, is to be sure that spills do not occur on jobsites.

## AIR POLLUTION

As a first class petty officer, you should be aware of work conditions that cause air pollution and of the efforts required to minimize or correct the problem.

When incomplete combustion occurs in base boilers, space heaters, and stoves, the unburned hydrocarbons and various other fuel components combine chemically to form by-products. Many of these by-products are harmful to people and the environment.

The by-products that have the most adverse effect on the air are carbon monoxide, particulate matter, sulfur oxides, unburned hydrocarbons, nitrogen oxides, and lead. The most effective means of controlling air pollution from incomplete fuel combustion is to properly and frequently maintain the equipment. In this way, the equipment is operating at an optimal fuel and oxygen mixture. Another means of lessening air pollution, not always under your control, is the use of only the best grade of fuel. High-grade fuel contains low particulate matter, low water and sulfur content, and few contaminants.

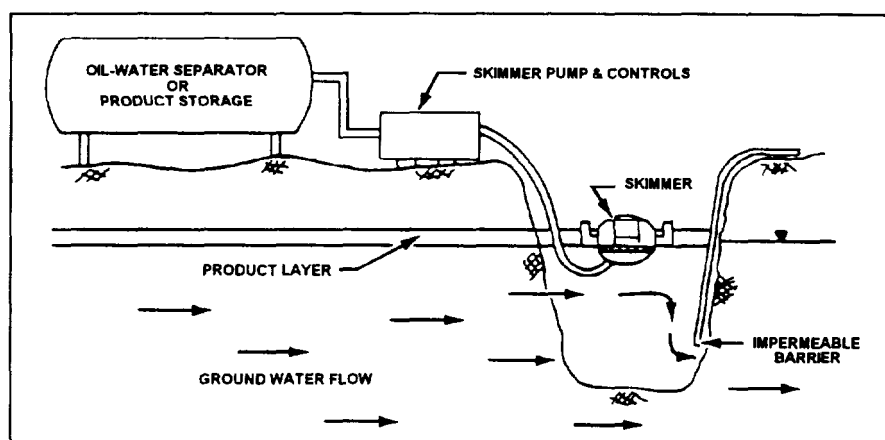


Figure 7-1.—Interceptor trench with skimmer pump.

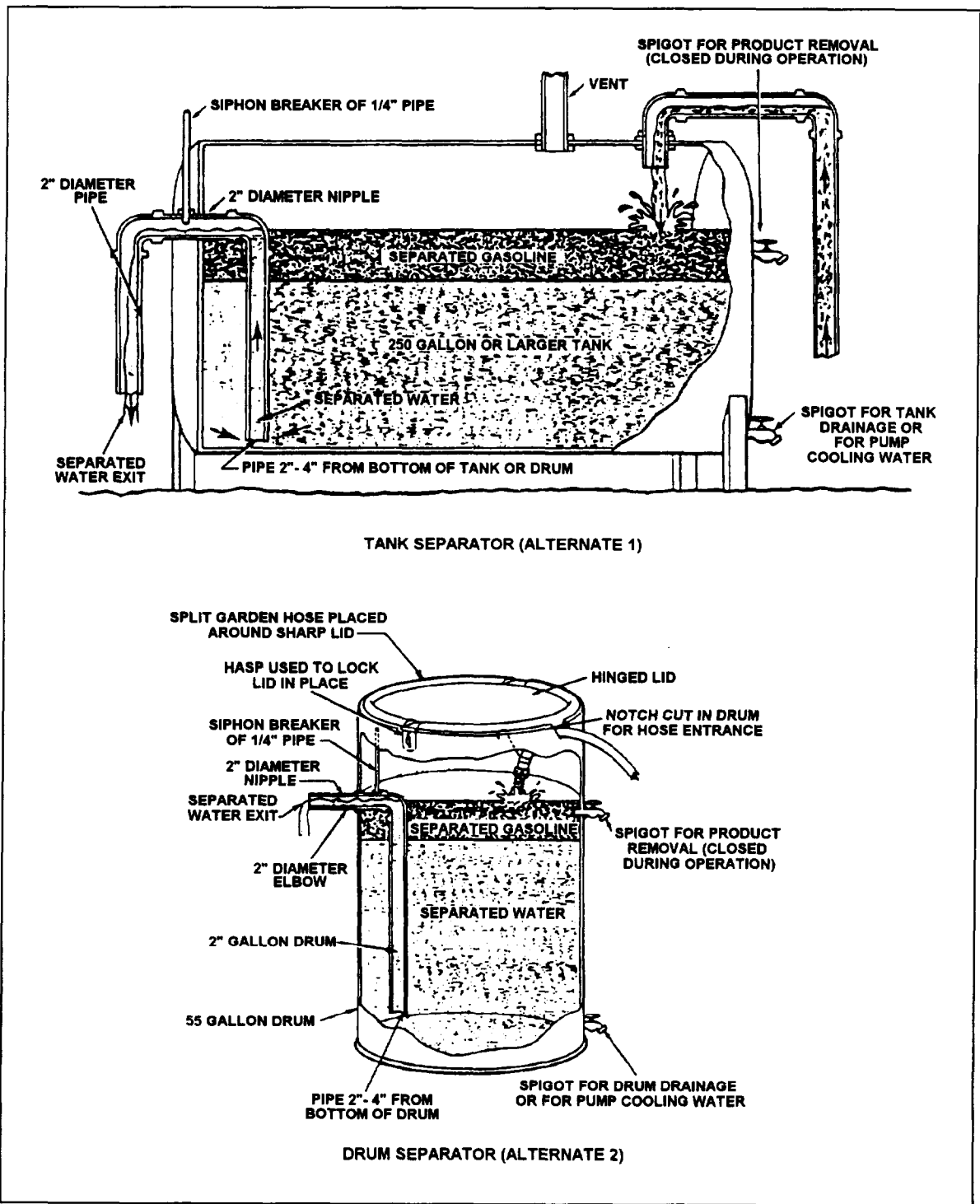


Figure 7.2.—Water-in-oil separators.

### Asbestos

Another air pollutant that you must be knowledgeable of and concerned with is asbestos dust. Asbestos dust occurs in the installation, maintenance, and removal of asbestos material from a construction site.

Asbestos is a fibrous mineral that can be woven like wool. Through a variety of processes, asbestos can be turned into thousands of construction products. These products were used extensively from the 1930s through the 1960s. Asbestos has been used by mankind for over 2500 years. However, it was not until the early 1800s



that asbestos was found to be a health hazard. In the 1900s, only miners and workers in industrial manufacturing plants were believed to be affected by asbestos. As research continued into the 1900s, asbestos was discovered to be the main cause of asbestosis, a generic term for a wide range of asbestos-related disorders and mesothelioma. Mesothelioma, at one time, was a rare form of lung cancer. It is presently occurring much more frequently among people exposed to asbestos dust particles.

There are three terms associated with asbestos dust particle length that you need to know. These terms are *micron*, *nanometer*, and *angstrom*. To give you an idea of their size, in 1 meter, there are 1 million microns, 1 billion nanometers, and 10 billion angstroms.

It was not until the advent of the transmission electron microscope and the scanning electron microscope in the latter part of the 1950s that the true size (200 to 250 angstroms) of an asbestos particle was discovered. Within this size range, air that appears to be dust-free can contain millions of disease-producing asbestos particles. These minuscule asbestos particles have led to many laws, regulations, and cleanup problems. Although these particles cannot be seen, they can remain suspended in the air for months. In working to solve this problem, you must take air samples to ascertain the severity of the situation. To remove these particles, the air must be scrubbed with a special air filtration machine.

The Navy's guidance for asbestos use, demolition, and disposal is covered by the *Navy Occupational Safety and Health (NAVOSH) Program Manual*, OPNAVINST 5100.23 series. However, you should also learn the local laws and restrictions pertinent to the area in which you work. These federal, state, and local laws or ordinances are extremely important. In an overseas location, you need to research and clearly understand the pollution laws of the host country. It is inevitable that somewhere in the disposal cycle, transporting of this type of material to a disposal site will take place over roads not directly under Navy control.

In all cases, you must constantly research the laws governing asbestos. If you are continually involved with asbestos, you need to stay informed of current regulations and laws. Asbestos laws are constantly changing and being updated. At the present time, legislation is proposed to outlaw all forms and uses of asbestos.

## **Pesticides**

There are also numerous chemicals and pesticides that release harmful and deadly fumes into the air. It is important for you to become familiar with all the materials used by shop personnel within your jurisdiction. Normally, toxic substances have warning labels affixed to them. Once the chemicals being used are identified, you can obtain supplemental information from the unit environmental protection office or from the local safety office.

## **POLYCHLORINATED BIPHENYLS (PCBs)**

There are other hazardous substance classes of chemicals that you, as a first class petty officer, must be aware of. These chemicals, polychlorinated biphenyls, better known as PCBs, are a group of toxic chemicals belonging to the chlorinated hydrocarbon family.

PCBs have been used extensively as insulators and coolers in electrical equipment. PCBs have been used primarily in electrical transformers, especially in and around buildings where the danger of fire exists. PCBs have also been used in capacitors, fluorescent light ballasts, electrical appliances, and motors.

PCBs can cause irritation to the eyes, skin, and lungs. PCBs also are suspected of being a cause of cancer. To date, there is still not enough evidence to prove PCBs cause cancer in humans. PCBs accumulate in the environment; more specifically, they accumulate in human fat tissue. PCBs are stable and slow to break down.

Naturally after reading this information, you are asking yourself, how do I recognize containers or equipment that may contain PCBs? To begin with, PCBs were manufactured and used in a variety of electrical and mechanical applications from the early 1930s until regulated by the Toxic Substances Control Act in 1977. They continue to be used today, but only in enclosed systems.

If you are designated as a project supervisor or petty officer in charge (POIC) of a project, you must be aware of items that contain PCBs if these items are to be serviced, modified, or removed from service. If such items exist, you must stop site work secure the site, and notify the activity environmental coordinator and the EPA branch or division. For further information on the PCB program, consult the *PCB Program Management Guide*, NEESA 20.2-028B.

## HAZARDOUS MATERIAL CONTROL

The hazardous material control program is a Navywide program to enforce the correct storage, handling, usage, and disposition of hazardous material. Hazardous waste disposal is a serious concern in today's Naval Construction Force. Cleaners, acids, mastics, sealers, and ever-paints are just a few of the hazardous materials that may be present in your shop or on your project site. As screw leader, you are responsible for the safety and protection of your crew. You are equally responsible for the protection of the environment. There are stiff fines and penalties that apply to NCF work as well as civilian work for not protecting the environment! You are not expected to be an expert in this area. You should, however, immediately contact the environmental representative or the safety office in case of any environmental problem (spill, permits, planning, and such).

## PROPERTIES OF HAZARDOUS WASTE

Few discarded materials are so compatible with the environment or so inert as to have no short-or long-term impact. Hazards that appear minor may have unexpected impacts long after disposal. When two or more hazards pertain to a material, the lesser may not receive the necessary consideration. Mixing of two discarded substances may result in a chemical reaction with severe and unexpected consequences.

Since waste is generally a mixture of many components, its physical and chemical properties cannot be defined with any degree of accuracy. Whenever possible, the approximate composition of a hazardous waste should be ascertained from the originating source or from the manifest accompanying the waste being transported. Generally, when one component predominates, the physical and chemical properties of the waste mixture are nearly those of the major component. This is not true for the hazardous properties of waste mixtures consisting of a relatively harmless major component and small amounts of highly toxic, radioactive, or etiologically (disease producing) active components. The hazard, in this case, is determined by the smaller component.

The EPA defines hazardous solid waste as any material that has the potential to do the following:

1. Cause, or significantly contribute to, an increase in mortality or any serious, irreversible, or incapacitating reversible illness.

2. Pose a substantial hazard to human health or the environment when the hazardous material is improperly stored, treated, transported, or disposed of.

By EPA standards, the determining factor for a material to be classified as hazardous waste is that it must meet one or more of the conditions of ignitability, corrosivity, reactivity, or toxicity.

- **Ignitability:**

It is a liquid, other than an aqueous solution, containing less than 24 percent alcohol by volume and has a closed-cup flash point of less than 60°C (140°F).

It is not a liquid and is capable under standard temperature and pressure of causing fire through friction, absorption of moisture, or spontaneous chemical changes and, when ignited, burns so vigorously and persistently that it creates a hazard.

It is an ignitable, flammable compressed gas, which is defined as a gas that forms a flammable mixture when mixed with air at a concentration less than 13 percent (by volume) or has a flammability range with air that is greater than 12 percent, regardless of its lower flammable limit.

It is an oxidizer, such as a chlorate, permanganate, inorganic peroxide, nitrocarbo nitrate, or a nitrate that yields oxygen readily to stimulate the combustion of organic matter.

- **Corrosivity:**

It is an aqueous solution and has a pH less than or equal to 2 or greater than or equal to 12.5.

It is a liquid, and it corrodes steel at a rate greater than 6.35 mm (0.25 inch) per year at a test temperature of 55°C (130°F).

- **Reactivity:**

It is normally unstable and readily undergoes violent change without detonating.

It reacts violently with water.

It forms potentially explosive mixtures with water. When mixed with water, it generates toxic gases, vapors, or fumes in a quantity sufficient to present a danger to human health or to the environment.

It is a cyanide- or sulfide-bearing waste that, when exposed to pH conditions between 2 and 12.5, can generate toxic gases, vapors, or fumes in a quantity sufficient to present a danger to human health or to the environment.

It is capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement.

It is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure.

It is a known forbidden substance or a class A or B explosive.

- **Toxicity:**

It is a material that contains or degrades into toxic components in concentrations that pose a potential hazard to the environment or to the public health and that may be fatal to human in low doses.

### HAZARDOUS WARNING MARKINGS AND LABELS

Specific hazards can be determined at a glance by referring to warning markings and labels that identify hazardous materials. Hazardous warning markings and labels are necessary to show clearly the hazardous nature of the contents of packages or containers at all stages of storage, handling, use, and disposal. When unit packages (marked packages that are part of a larger

container) are removed from shipping containers, the continuity of the specific hazard warning must be preserved. This is normally done by applying the appropriate identifying hazardous label to the hazardous material container or package.

The Department of Transportation (DOT) labeling system, shown in figure 7-3, is a diamond-shaped symbol segmented into four parts. The upper three parts reflect hazards relative to health, fire, and reactivity. The lower part reflects the specific hazard that is peculiar to the material.

The four specific hazards that the labels are designed to illustrate areas follows:

Health Hazard - the ability of a material to either directly or indirectly cause temporary or permanent injury or incapacitation.

Fire Hazard - the ability of the material to burn when exposed to a heat source.

Reactivity Hazard - the ability of a material to release energy when in contact with water. This term can be defined as the tendency of a material, when in its pure state or as a commercially produced product, to vigorously polymerize, decompose, condense, or

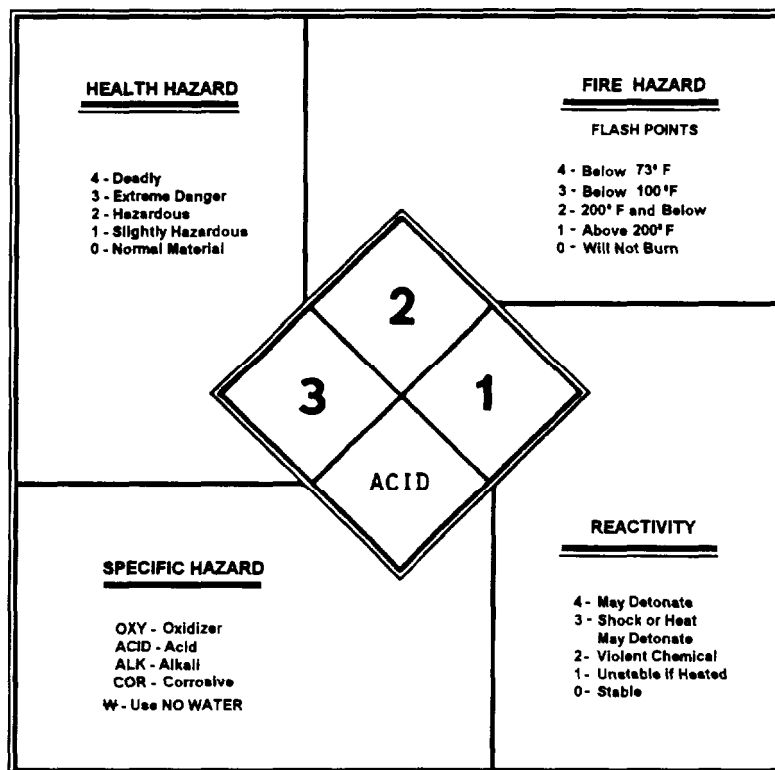


Figure 7-3.—Hazardous code chart.

otherwise become self-reactive and undergo violent chemical changes.

Specific Hazard - this term relates to a special hazard concerning the particular product or chemical, which was not covered by other labeled hazard items.

The degree of hazard is expressed by a numerical code:

- 4 = extremely dangerous material
- 3 = dangerous hazard
- 2 = moderate hazard
- 1 = slight hazard
- 0 = no hazard

The example, shown in figure 7-4, describes the hazards of methyl ethyl ketone. Methyl ethyl ketone is usually found mixed with paints, oils, and greases from solvent cleaning, paint removers, adhesives, and cleaning fluid residues. The numbers on the label identify this chemical compound as follows:

Health Hazard 2, "Hazardous"

Fire Hazard 4, "Flash point below 73°F, extremely dangerous material"

Reactivity 3, "Shock or heat may detonate, dangerous material"

Specific Hazard, "None"

Other specific labeling requirements are provided in the NAVSUPINST 5100.27 series. All supervisors should carefully review the contents of this instruction.

## MATERIAL SAFETY DATA SHEETS

A Material Safety Data Sheet (MSDS), OSHA Form 174, or an equivalent form containing the identical data elements, must be used by manufacturers of chemical products. This form communicates to users the chemical, physical, and hazardous properties of the

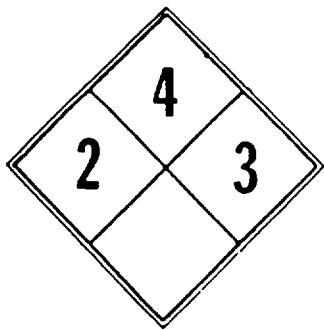


Figure 7-4.—Hazard warning label for menthyl ethyl ketone.

product. Manufacturers must use MSDS forms to comply with the OSHA Hazard Communication Standard, 29 CFR 1910.1200. The completed form identifies key information on the product: name, address, and emergency contact of the manufacturer. The form also contains the identity of hazardous ingredients, physical/chemical characteristics, fire and explosion hazard data, reactivity data, and health hazard data. The form also lists the precautions for safe handling and use, and control measures. **Notice that OSHA Form 20 or DD-1813 forms are considered obsolete and should not be used for supplying MSDS information.** All data submitted must comply with the provisions of FED-STD 313C.

Upon drawing any hazardous material, MLO provides the crew leader with an MSDS. The MSDS identifies any hazards associated with exposure to that specific material. It also will identify any personnel protective equipment or other safety precautions required as well as first aid or medical treatment required for exposure. The crew leader is required by federal law to inform crew members of the risks and all safety precautions associated with any hazardous material present in the shops or on the jobsite. This should be done during each daily safety lecture. Additionally, the MSDS must be posted conspicuously at the jobsite, shop spaces, and any other approved hazmat storage area.

## HAZARDOUS MATERIAL STORAGE

The safest practice concerning hazardous material is to draw **only the amount of material than can be used that day**. Storing hazardous materials on the jobsite requires the use of approved storage containers. These containers must be placed a minimum of 50 feet away from any ignition device or source. Plan for the delivery of proper storage equipment before having hazardous materials delivered to the jobsite. Since many hazardous materials require separate storage containers (for example, corrosives and flammable cannot be stored together), consult with the battalion safety office.

## HAZARDOUS MATERIAL TURN-IN

Any excess material must be disposed of through an authorized hazardous material disposal facility. Proper labeling of hazardous materials is critical. Properly labeled, waste can be disposed of for a relatively low price. Unidentified, it must first be analyzed, which is extremely expensive.

Avoid mixing unlike types of waste. Do not mix waste paint thinner in a waste oil drum. The Navy sells uncontaminated waste oil for a profit. If only minor amounts of any other substance are present in the waste oil, the Navy must pay high prices for analysis and disposal. The best method for disposal is properly labeling the materials and returning them, unmixed to the supply department. Each container must be clearly labeled, preferably with the BM line item or other supply tracking documentation. It is always best to check with the battalion MLO staff or safety office for proper disposal procedures.

This chapter does not attempt to tell all you need to know about environmental pollution. For specific information, refer to the following manuals or instructions:

- *Domestic Wastewater Control*, MIL-HDBK 1005/8
- *Environment and Natural Resources Projection Manuals*, OPNAVINST 5090.1 series and 5090.2 series
- *Groundwater Pollution Control*, DM 5.14
- *Hazardous Waste Storage Facilities*, MIL-HDBK 1005/13
- *Industrial and Oily Wastewater Control*, MIL-HDBK 1005/9
- *NCF Occupational Safety and Health Program Manual*, COM2NDNCB/COM3RDNCBINST 5100.1 series

## CHAPTER 8

# CONTRACT QUALITY ASSURANCE

*LEARNING OBJECTIVE: Recognize the relationships between the Naval Facilities Engineering Command, Engineering Field Divisions, and the facility contracting offices of Public Works; identify surveillance methods and types of quality assurance inspections used to monitor U.S. Navy contracts with civilian contractors.*

The recent trend to contract a large portion of public works functions and construction projects at naval facilities came about because of many factors. A primary factor is manpower restrictions imposed by congressional acts, economics, and requirements for specialized services. Another primary factor is to provide access to state-of-the-art processes and technologies for the Navy shore support facilities.

This chapter introduces general development procedures of facilities support contract specifications and the different contracting authorities used for facility support contracts. This chapter also introduces the quality assurance methods currently in use for surveillance and inspection of a contractor's work performance. The intent is to familiarize Seabee first class and chief petty officers with the operations and administrative requirements of a facility support contract office and NAVFAC facility support contract procedures.

### CONTRACT ADMINISTRATION

An overview of the important functions will prove helpful for the proper administration of a construction contract. Normally, the public works officer (PWO) receives orders to a local engineering field division (EFD). His additional duties will include duty as officer in charge of contracts (OIC).

The OIC will appoint a resident OIC (ROIC). The ROIC will appoint an inspector (QAE) when scheduling a contract for advertising. They will be responsible for the day-to-day administration of the contract. Before the award of a contract, the ROIC and QAE inspectors should conduct a thorough review of all plans and specifications. They should make a visit to the contract site to verify existing conditions and identify potential problems. This process will help reduce the number of problems discovered once the contractor starts work.

Discovering and resolving potential problems eliminates the need for a future change order. Forward recommended changes to the OIC for incorporation into the plans and specifications.

After the award of a contract, the OIC holds a prestart or preconstruction conference when practical with both contractor and government representatives. This provides the contractor an opportunity to become acquainted with the many-required administrative procedures that the government uses. Some contractors are unfamiliar with these methods and the sometimes unique language used by the Navy. The conference also aids in coordinating the contractor's plans with the using activity and other interested parties, such as environmental protection and safety personnel.

Throughout the life span of a contract, document all significant actions in writing at the time they occur. This takes the form of memorandums for the record, letters to the contractor, phone conversation records, or other types of written documents. The preparation of proper and timely correspondence improves the administration of a contract. This includes letters to the contractor on the following:

1. Payment schedules.
2. Progress charts.
3. Explanations of procedures for submission of shop drawings.
4. Instructions for ordering materials under the Defense Priority Materials System.
5. Common letters to or from the contractor need to proceed efficiently. These letters also help the contractor understand the Navy contract system.

The ROIC should monitor the status of replies to the contractor-originated questions, requests, and statements. To accomplish this, stamp all incoming correspondence with the date and time of receipt.

Maintain a log of all correspondence that requires action.

As contract work proceeds, monitor and properly document significant information, such as the contractor's progress, problems experienced, and pending changes. The inspector's daily report is particularly valuable for this purpose. These reports form the historical basis of the position of the government if a dispute develops between the government and the contractor. Therefore, frequent visits to the contractor site and job status meetings are essential.

Besides constantly reviewing the progress of a contract, you must make a constant effort to foresee problems the contractor might meet. One problem that has major influence on the contractor's progress is late delivery of materials and equipment, such as air-handling units or subcontractor prefabricated items. Furnishing its resources and expertise to help the contractor serves the best interest of the government. You must make every effort to relieve this kind of problem instead of trying to justify or explain it.

Many contract specifications are drawn up years ahead of the actual letting of a contract. Some items required by the specifications will no longer be available and require replacement by similar items. This change requires initiating a change order. Change orders are formal changes to a basic contract and must meet with NAVFAC instructions and result from one or more of the following changes:

- Design
- Requirements
- Conditions
- Constructive

Government representatives must ensure change orders do not needlessly delay the contractor's progress. Additionally, they must assure all change orders get promptly started, negotiated, and issued to the contractor. Any delay in progress by a contractor attributed to a change order must be of immediate concern to the government representatives. Take all possible actions to prevent delays that could result from change orders.

Upon completion of a contract, both contractor and government representatives conduct a joint final

inspection. Document all discrepancies found during the final inspection. Meeting contract specifications requires correction of these discrepancies. Upon the contractor's completion of all contract requirements, the contractor executes release forms and submits the final invoice to the OIC.

The NAVFAC P-68, Contracting Manual, guides the administration of contracts and is the primary guide for all Navy representatives of the government on contracts.

## **NAVAL FACILITIES ENGINEERING COMMAND**

In the administration of contracts, the organizational chain of authority must be understood. NAVFAC is the primary contracting authority for all construction contracts, facility support contracts, and A/E contracts related to construction. NAVFAC is also responsible for providing technical and managerial assistance. It also provides related engineering material and equipment to Navy and Marine Corps shore facilities. NAVFAC is also responsible for all automotive, weight-handling (not material-handling equipment), and fire-fighting equipment assigned to the shore facilities of the Navy and Marine Corps. For a review of NAVFAC responsibilities, read NAVFAC P-315.

### **Major Claimants**

Major claimants, such as CINCPACFLT and CINCUSNAVEUR, have the responsibility for the readiness of all their respective shore facilities. This includes the operations, maintenance, and repair of these facilities. NAVFAC is one of several system commands that provide logistical support to these claimants. NAVFAC provides support by assisting with the operation and maintenance of these facilities.

### **Engineering Field Divisions**

NAVFAC presently has five field divisions as its primary field organization. Officers in command of the engineering field divisions (EFDs) are delegated contractual authority to award most NAVFAC contracts without prior approval. The head of the contracts department is responsible for all contract functions except those involving utilities and real estate purchasing. Within the facilities management department, the facilities division has principal interest in facilities maintenance management. This division

acts as a focal point for the public works activities in the EFD's geographical area of responsibility.

The EFD procurement organization takes many forms, depending upon contract work load requirements, such as dollar volume, physical location, and type of work. The EFD can delegate contractual authority to local Civil Engineer Corps officers to act as either procuring contracts officer (PCO) or administrative contracts officer (ACO). As the PCO/ACO, they are responsible for the review and distribution of bid packages. They are also responsible for the receipt and evaluation of bids, awarding contracts, making payments, and resolving matters of contractual interpretation.

## **COGNIZANT AUTHORITY**

Regarding contracting, there are several duties required that have specific authority. The execution of these duties requires specific skills and knowledge. Assign individuals who have the proper technical knowledge and background to these duties. Some cases require assignment of multiple responsibilities and duties. This assignment depends on the size of the activity and its involvement with contracts.

### **Officer in Charge**

The commander, NAVFAC, delegates contract authority to the officer in charge (OIC). The OIC is responsible for all aspects of the contracting office including administration, management, training, and surveillance. This should be done according to Defense Federal Acquisition Regulations (DFARs), the Contracting Manual (NAVFAC P-68), and other pertinent regulations. The OIC is responsible for preparation of the final contract documents and conducts the solicitation and evaluation of bids.

### **Resident Officer in Charge**

The OIC appoints the resident officer in charge (ROIC) who is normally responsible for the post-award management of a contract. As ROIC, he or she will usually arrange for the pre-award conference, certify contractor payments, prepare show cause notices, and monitor the complete performance of contracts assigned to him or her.

### **Facilities Support Contract Manager**

The facilities support contract manager (FSCM) is responsible for the day-to-day management of a

facilities support contract. The ROIC will appoint the FSCM when the contract is a construction, maintenance, or repair contract. His or her primary duty is to make the contract run smoothly. Before the award of a contract, the FSCM or ROIC is responsible for helping the OIC with the preparation of certain documents. Some of those documents are the statement of work government estimate, and the QA surveillance plan. After the award, the FSCM is the contractor's point of contact. The FSCM processes change orders. He or she also coordinates work orders with the ROIC.

The FSCM or ROIC has technical control and supervisory responsibility over the Quality Assurance Program. This program provides the best information on a contractor's performance because of the close daily contact with a contractor.

### **Quality Assurance Evaluator**

The quality assurance evaluator (QAE) is responsible for monitoring the contractor's performance. The QAE works under the direction of the FSCM but is from the part of the organization that has functional responsibility and technical expertise. QAEs are responsible to the customer for ensuring that work meets the needs of the customer as outlined in the performance work statement (PWS). The FSCMs are responsible for confirming that the accomplished work meets the contract requirements. The QAEs are responsible for preparing the quality assurance (QA) plans. They are also responsible for the surveillance, documentation, and evaluation of the work performed. QAEs do not administer contracts but assist the facilities support contract manager through the verification and documentation stage of the contractor's performance.

Accomplishment of the QAE's functions requires in-depth knowledge of the functions evaluated. The QAE must have a detailed knowledge of the contract specification involved and general knowledge of contract administration procedures. Expect QAEs to have, at least, a detailed knowledge of the contract specification involved on assignment. QAEs will gain general knowledge of contract administration from the contract manager.

## **TYPES OF CONTRACTS**

Currently, there are two contracting authorities used by the Navy for facility support contracts. They are NAVSUP and NAVFAC. For clarity, the different contracting authorities are discussed.



## Facilities Support Contracts

Facilities support contracts, as defined in the Defense Federal Acquisition Regulations Supplement (DFARS), call directly for a contractor's time and effort instead of a specific product. There are three agencies providing facility support contracts to the Navy. The agencies are GSA, NAVSUP, and NAVFAC. NAVFAC is the principal agency for providing facility support. The Contracting Manual, NAVFAC P-68, provides a detailed discussion of facilities support contracts and contract procedures.

### NAVSUP Contracts

The Naval Supply Systems Command (NAVSUP) is the Navy's principal agent for procurement of supplies. Services obtained under NAVSUP's contracting authority normally support the command's mission.

### NAVFAC Contracts

NAVFAC is the Navy's principal agent for the procurement of services that support public works and public utilities functions. Classification of NAVFAC facility support contracts is in one of three ways.

The Davis-Bacon Act defines facility support construction contracts (FSCC). The Davis-Bacon Act also specifies regulations and wage requirements for this type of construction when the cost exceeds \$2,000. Construction for facility support is defined as "construction, alterations, and/or repair, including painting and decorating of public buildings or public works." The Department of Labor is responsible for enforcement of the Act. Therefore, the Navy Department does not have final authority to decide whether a contract involves construction as defined by the Act. You would write FSCCs in the Construction Specification format (CSI). This format should be familiar, as it is the format used to write specifications for projects. It contains the same 16 divisions plus one additional division. That is Division O, called "Bidding and Contract Requirements." The contract will include the Standard Construction Contract Clauses prescribed by NAVFAC. It also will include all the items listed in the P-68, subpart 14.2, "Solicitation of Bids." Some of those requirements are bond forms, instructions to bidders, labor provisions, wage rates, certifications required, and any special material important to the contract, such as soils studies. Some examples of construction contracts are as follows:

- Exterior and interior painting of buildings
- Resealing of joints in concrete pavement
- Dredging to a specific depth
- Seal coating asphaltic pavement

Facility support service contracts (FSS) call for a contractor's time and effort and provide a service instead of a product. The provisions of the Service Act of 1965, as amended, apply to these contracts. Contracts exceeding \$2,500 include provisions of the Service Act of 1965. When the Service Contract Act exclusively governs the wage rate, this requires the use of the uniform contract format (UCF) to write the contract. The FAR of subparts 14.2 and 15.4 contain the UCF. The UCF consists of four parts and 13 sections as listed below. The names of some sections might differ. The depends on whether the solicitation of the contract is by sealed bid or competitive negotiation.

#### PART I - THE SCHEDULE

- Section A Solicitation/Contract Form
- Section B Supplies or Services and Prices/Costs
- Section C Description/Specifications/Work Statement
- Section D Packing and Marking
- Section E Inspection and Acceptance
- Section F Deliveries and Performance
- Section G Contract Administration Data
- Section H Special Contract Requirements

#### PART II - CONTRACT CLAUSES

- Section I Contract Clauses

#### PART III- LIST OF DOCUMENTS, EXHIBITS, AND OTHER ATTACHMENTS

- Section J List of Documents, Exhibits, and Other Attachments

#### PART IV - REPRESENTATIONS AND INSTRUCTIONS

- Section K Representatives, Certificates, and Other Statements of Bidders
- Section L Instructions, Conditions, and Notices to the Bidders

## Section M Evaluation Factors for Award

Some examples of facilities support contracts are as follows:

- Custodial services
- Grounds maintenance
- Guard services
- Transportation operation and maintenance

The third type of contract involves both procurement of services and construction work. This type of contract is a facility support combination contract (FSC/COMBO). An example of this contract is maintenance and repair of HVAC systems. Preventive maintenance is service work, and the repair of a system is construction. The Service Contract Act would apply to the service work. Depending on the description of the work, the Service Contract Act or the Davis-Bacon Act could apply to the construction effort. Should the construction cost be less than \$2,000, the Service Contract Act would regulate the wage rate for the contract. Preparation of combination contracts is in the UCF. Housing maintenance contracts are an excellent example of a combination contract.

### **QUALITY ASSURANCE PROGRAM**

When the government purchases goods and services, methods assuring that the contractor provided requirements of the contract must be in place. Naval shore activities must develop and set up procedures to assure that the quality and quantity of goods and services conform to contract requirements to accomplish this. These procedures come under the heading of "quality assurance." Quality assurance differs from quality control, in that, you focus on the quality of the product delivered and not the steps taken to get there. Contractors are responsible for providing quality control that controls the production process. Quality control must also ensure a constant quality output.

Base the Quality Assurance (QA) Program on a written plan and key it to performance-oriented specifications. The QA program focuses on the quality of the product delivered by the contractor, not on the steps taken or contractor procedures that provide the product. This plan also includes the use of scheduled inspections and provides a structural approach to

surveillance. This permits good management control of the quality assurance process.

For an effective QA program, you must meet certain criteria. First, write the performance work statement (PWS) so the quantity and quality of the contracted work is measurable. View the development of the PWS and the quality assurance plan as a simultaneous process since both documents interrelate. The PWS defines required work outputs and quality standards, while the QA plan defines inspection and measurement methods for work production.

Next, the QA plan must provide for adequate and economical contract surveillance. Provide the depth and detail of surveillance compared with the importance of the contract being monitored. Surveillance on a trash pickup service would not require the same depth of surveillance as a new water-service line contract. Also the QA plan must have the authority written into it, so the FSCM/ROIC can take corrective action for nonperformance or unsatisfactory performance.

There are three basic principles that the QAE must follow when performing surveillance. It does not matter whether it is a facilities support contract or a construction contract.

**Product.** Quality assurance evaluates the product provided by the contractor. The product results either from a contractor-developed procedure or from a government-specified procedure. Satisfactory production normally confirms that the contractor is using satisfactory procedures. The government concern arises with the contractor procedures only when output or services are inadequate. When the government specifies the procedure, compliance with the procedure is the desired product.

**Compliance.** Monitor contractor compliance with contract requirements through the performance indicators and standards specified in the PWS. Performance indicators are measurable attributes of the outputs. Compare the contractor's performance against a standard gauge. For example, on a trash pickup service contract, scheduled trash collection is the work required. Timeliness is a good indicator of performance and the standard is trash pickup must be within 4 hours of the scheduled time.

**Cause of the problem.** When observed performance indicators show production does not meet contract requirements, then the QAE identifies the cause of the problem. The QAE looks beyond production to learn the cause of the problem. If the cause of the problem rests with the government, take

corrective action through government channels and no action is necessary by the contractor. If the contractor is at fault, the QAE requests the contractor to take corrective action. Corrective action could be a reduction of payments to the contractor and/or issuance of a Contract Discrepancy Report (CDR).

## **SURVEILLANCE METHODS**

Although the business and industrial community use many surveillance methods, the Navy currently uses the five specific inspection methods shown below.

- 100-percent inspection
- Planned sampling
- Random sampling
- Validated complaint
- Incidental or unscheduled inspection

One hundred-percent inspection of a contract measures a contractor's true level of performance. This method is extremely expensive and time-consuming. This type of surveillance requires an evaluation of the contractor's production for every work occurrence; therefore, use the 100-percent method only when necessary. A good example of this type of surveillance is checking police and ambulance response time or checking the daily cleaning of key public rooms.

Surveillance by planned sampling evaluates a part but not all of a contract requirement. This method of surveillance is useful when inspection requirements at one location are more important than another location. For instance, inspect galley garbage containers as opposed to remote admin spaces. This type of sampling is also useful when a contractor's performance is not good in a particular area of construction but is highly proficient in another. Ensure the contractor is aware of specific areas in which the QAE will place major emphasis within the surveillance process. For example, the grounds around the COS office and the exchange are always well kept. However, the perimeter roads on the back side of the runway often show signs of poor maintenance. The runway areas have little traffic so they will require more inspections.

Surveillance, based on random sampling, evaluates part, but not all, of the work performed by a contractor. The QAE can monitor any work using random

sampling. The QAE's bias does not affect the specific work selected for evaluation. All elements of work have the same level of importance.

This method estimates the contractor's general level of performance for a given contract requirement. It is most useful when evaluating items that are repetitive nature, such as janitorial work, grounds maintenance, or service call work.

Validated customer complaints are a surveillance method based on customer awareness. Customers, familiar with contract requirements, inform the QAE when there is a case of poor performance or nonperformance. Upon notification, the QAE investigates the report and, if valid, documents the performance problem. Formal customer complaints serve for documenting certain types of service problems. The way to obtain and document customer complaints requires careful planning by the people monitoring the facilities support contract. Customer complaints are not random. When validated by the QAE, they can be used to deduct money from the contractor. When random sampling is the chosen method of surveillance, use of a customer complaint does not satisfy a random observance. Use of random sampling as evidence of unsatisfactory performance is possible if random sampling shows that the specific service is unsatisfactory. Use of these complaints can help decide whether other action should be taken.

Explain an aggressive customer complaint program, once established, to every organization that receives the contractor's services. Provide an operating instruction to each organization outlining the customer complaint program. Also, provide the format and the content of a formal customer complaint and the action required from people assigned to monitor and manage the FSC. Normally, deliver each customer complaint, in person or by telephone, to the individual checking the contractor's performance. Enter complaint information into a Customer Complaint Record, like the sample shown in figure 8-1. The record contains the following information:

- Date and time of complaint
- Source of complaint (organization or individual)
- Details of complaint (narrative description)
- Contract reference of complaint-related services

NAVFAC 4330/47 (3-89)		1 CONTRACT NUMBER
<b>CUSTOMER COMPLAINT RECORD</b>		
2 FIRST INFORMED OF COMPLAINT		
DATE	TIME	RECEIVED BY
3 SOURCE OF COMPLAINT		
ORGANIZATION		
INDIVIDUAL:		PHONE:
4 DETAILS OF COMPLAINT (Attach continuation sheet if necessary)		
5 CONTRACT REFERENCE		
6 COMPLAINT VALIDATED		
DATE	TIME	BY
7 CONTRACTOR INFORMED OF COMPLAINT		
DATE	TIME	BY
8 ACTION PLANNED/TAKEN BY CONTRACTOR		
9 WORK INSPECTED/REINSPECTED		
DATE	TIME	BY
10 RESULTS OF INSPECTION (satisfactory, unsatisfactory, actions)		
11 SIGNATURE OF AUTHORIZED INDIVIDUAL		12 DATE
13 SIGNATURE OF REVIEWING OFFICIAL (As Applicable)		14 DATE

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Figure 8-1.—Customer Complaint Form NAVFAC Form 4330/47.

- Valid complaint (yes or no)
- Date contractor is informed of complaint
- Action taken/planned by contractor

- Validation and results of the reinspection

When selecting validated customer complaints as the primary method of surveillance for a particular contract requirement, you must allot ample time for the validation process.

The QAE should conduct an incidental or unscheduled inspection on a contractor's work. This surveillance method is not an accurate way to decide a contractor's complete performance and should not be the primary means for evaluating the contract. This method is useful in finding out if a contractor is having difficulties. The method is also useful to help in predicting or validating any future problem that was possibly overlooked during the scheduled OIC meetings. An example of this type of problem is material deliveries or schedule problems.

## **SURVEILLANCE PROCESSES**

The key to obtaining satisfactory performance from contractors is good government surveillance of a contractor's performance. Haphazard surveillance by untrained personnel is an invitation to poor performance. Historically, some work is more prone to poor quality, such as concrete, heating, and air conditioning, or similar work, that is usually hidden from view. Most government contractors are honest and do not cut corners, but the few who do require monitoring and correcting deficiencies immediately. The QAE is the primary frontline person in contract management and serves as the eyes and ears of the contract manager and the OIC.

The two most important requirements that a QAE must have, to do a good job, are the contract requirements and the contractor's work schedule. The first requirement dictates exactly what work the contractor is to do. It also dictates what the QAE is to evaluate. The work schedule is necessary so the QAE will know precisely when the work is occurring. Obtain this information before the contractor begins any work. Also, the contract manager and QAE can include any modifications to the QA plan and schedule since development was before the awarding of the contract.

After development of QA plans and schedules, normally they remain unaltered for the life of the contract. Conduct contract surveillance strictly according to the QA plan and schedule. Note any contractor discrepancies. The QAE must fully document them and alert the contract manager. The QAE or contract manager will notify the contractor to correct the discrepancies.

At the end of each surveillance period (usually 1 month each), analyze all documented surveillance results to decide the contractor's complete level of performance. There are several courses of action available if the contractor's performance is below

acceptable standards. These courses of action are as follows:

1. Making monetary deductions against the contractor for all observed and documented cases of noncompliance. This can be done despite the contractor's overall performance.
2. Issuing a verbal or written warning to the contractor.
3. Issuing a contract discrepancy report (CDR).
4. Issuance of a show cause letter.

The OIC may take one of the above actions. However, "termination by default" must be coordinated with the commander of the engineering field division. It is important that the QAE provides and maintains good documentation despite the course of action taken to correct poor contract performance.

## **SCHEDULE DEVELOPMENT**

The development of an effective evaluation schedule should be of the highest priority to the QAE. The evaluation schedule permits the QAE to plot where he or she should be on any given day of the week. By developing a balanced inspection schedule, the QAE can plan and execute the QA work load. This enables the QAE to make the most efficient use of available time. The surveillance schedule serves the following purposes:

1. It optimizes time.
2. It provides for management control.
3. Combining the schedule with evaluation reports provides an accurate audit.

Contract surveillance must cover all hours of operation. Schedule random observations at night, on weekends, and on holidays when services are done during these periods. Monitor areas on a set schedule including these in the monthly schedule. This monthly schedule will always show where and what the QAE is monitoring.

Figure 8-2 shows an example of a QAE's schedule. This example shows only a 6-day schedule. The QAE makes up enough sheets to cover the entire month. After preparing the schedule, mark it "FOR OFFICIAL USE ONLY" and never show it to the contractor.

QAE SURVEILLANCE SCHEDULE. (Sample)						
QAE: <u>JANE DOE</u> SCHEDULE FOR WEEK OF: <u>JUNE 19 THRU 25 1994</u>						
TIME	MON	TUE	WED	THU	FRI	SAT
0700	INSPECT GROUNDS PARCEL #7, #108, #156	INSPECT GROUNDS PARCEL #4, #13, #201	REVISE AND UPDATE QA PLANS	INSPECT DUMPSTERS #5, #34, #168, #183	INSPECT BUILDINGS ROOMS #3, #20, #31	
0800	INSPECT DUMPSTER #5, #28, #76	MEET WITH FSCM AND CONTRACT OFFICER TO DISCUSS CONTRACT MODS.	INSPECT DUMPSTER #2, #23, #80, #140, #153, #176, #210, #225, #287	INSPECT BLDG. RMS, #14, #18, #88, #170	INSPECT DUMPSTERS #23, #78, #96, #183, #197, #218	
0900	INSPECT GROUNDS CONTRACT QC FILES			INSPECT WASH RACK		
1000						
1100		INSPECT SERVICE CALLS				
1200	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH	
1300	INSPECT BUILDINGS ROOMS #4, #17, #23, #186, #249	INSPECT DUMPSTERS #21, #94, #97, #167, #193, #236, #256	INSPECT GROUNDS PARCEL #23, #45, #106, #110, #158, #193	INSPECT GROUNDS PARCEL #27, #76, #187, #234, #278, #318	INSPECT GROUNDS PARCEL #29, #86, #193, #245, #307	
1400						
1500			INSPECT BUILDINGS ROOMS #87, #98, #143, #213.	INSPECT BUILDINGS ROOMS #56, #78, #93, #110, 135, 153, #215		MEET FSCM TO DISCUSS CONTRACT PERFORMANCE EVALUATION
1600	PAPER WORK IN OFFICE					
1700						

86NP0002

Figure 8-2.—Sample QAE Surveillance Schedule.

### Documentation

Documentation is a key element of the QAE's job. Some documentation requirements are the QAE's monthly schedule, the completed evaluation worksheets, and the records of customer complaints.

Also useful is any other material that reflects the quality/quantity of the contractor's performance.

Surveillance shows that the number of defects for the scheduled month is excessive. The QAE should try to identify and document the cause of the problem.

Some probable causes of defective contractor production may be due to any of the following:

1. The cause of the problem lies with the government if

- Delivery of government-provided materials or equipment is deficient.

- Government employees (civilian or military) are disrupting the contractor's efforts.

- Subcontractor support is not effective (if contracted by the government).

2. The cause of the problem lies with the contractor if:

- The contractor does not have enough people on the work site.

- There are not enough properly trained people on the work site.

- Supervision by the contractors inadequate.

- The contractor's quality control staff is not identifying problem areas.

- The contractor is not using the proper materials or equipment to accomplish the job.

- The contractor is not using the proper work methods to produce the required product.

During the contract, the QAE retains a copy of all QAE schedules, evaluation worksheets, and checklists. At the end of the contract period, the QAE forwards these records for inclusion in the contract file. A specific service becomes unsatisfactory during a surveillance period. You should forward a copy of the inspection documentation supporting the contract discrepancy to the contract manager and the ROIC for action. You must keep the contractor apprised of surveillance results involving discrepancies. One method is to provide the contractor's representative with a copy of the evaluation worksheet. The contractor's representative should initial the original evaluation worksheet, showing that he or she has received a copy.

## **Surveillance Results and Discrepancies**

At the end of each month, the QAE should assess the results for the evaluation worksheets, checklists, and other documents to figure out the contractor's complete performance. If the contractor has performed excellently with few defects noted, the QAE may suggest that the contract manager inform the contractor of satisfactory performance. The QAE may recommend a reduced level of surveillance.

Poor performance by a contractor requires much more, particularly in documentation and QAE effort. If a contractor has displayed poor performance, take the following actions:

1. The QAE learns that the government created any of the discrepancies. These discrepancies should not count against the contractor's performance. When the government has caused the contractor to perform deficiently, the QAE prepares a letter to the responsible organization requesting corrective action. The QAE sends the letter to the responsible organization through the contract manager.

2. The government did not cause the discrepancy, The QAE tells the contractor's site manager, in person, when the discrepancies occurred and asks the contractor to correct the problem. The QAE notes on the evaluation worksheet the date and time of the deficiency. The QAE has a contractor's representative initial the entry on the worksheet.

3. When the contractor is responsible for failing to meet the limits of satisfactory performance, the contracting officer issues a Contract Discrepancy Report (CDR) to the contractor. If the failure is serious enough, issue the CDR at the time of unacceptable performance instead of at the end of the month.

4. If the contractor does not achieve satisfactory performance of that service by the end of the next month, the contracting officer then calls in the contractor for a personal review of the problems at a formal meeting.

5. Depending on the contractor's complete performance, the government may issue a show cause letter that requires EFD approval.

6. Deduct funds for all documented defects. The QAE checks the contractor's performance and documents instances of noncompliance. However, only the OIC can take formal action against the contractor for unsatisfactory performance. This section presents the normal steps required by contract

administration when the QAE reports these deficiencies. The actions listed are fixed roles and represent a minimum level of action. Take more serious action sooner if the contract manager, ROIC, or OIC deems it needed.

**DEDUCTIONS.**— NAVFAC policy requires deductions for each observed and documented defect. Use the extrapolated deductions based on the random sampling method for deduction only after adjusting the observed defect rate.

The QAE makes a recommendation on the amount of payment deductions required. Base this deduction on documented deficiencies multiplied by the price shown in the “Schedule of Deductions,” or in the “Items of Bid” for indefinite quantity work items. The “Consequences of Contractor’s Failure to Perform” clause shows the amount of the liquidated damages.

When the contractor’s performance is considered unsatisfactory and suggests a need for formal action, the QAE, the contract manager, the ROIC, and the contract specialist meet to decide what action is suitable.

When a decision is reached that a monetary deduction is not required, then document the reasons. The ROIC, in turn, shows agreement by signing the decision documentation.

**CONTRACT DISCREPANCY REPORT.**— Write contract discrepancy reports (CDRs) to identify documented cases of poor performance by a contractor. The contractor, upon receiving a CDR, identifies, in

writing, preventive measures for future occurrences of the problem. He or she also identifies the corrective action he or she intends to take on the current discrepancies. Based on the contractor’s response, the government may or may not take further action.

When there are continuing deficiencies in the contractor performance, the QAE should recommend issuance of a CDR, NAVFAC 4330/48 (fig. 8-3), by the contract manager.

As QAE you are responsible for identifying the problem that caused the poor performance. The QAE should use this information to evaluate the contractor’s response. It is the contractor’s responsibility to have a Quality Control Program to provide feedback on performance.

If the contractor’s response is likely to correct the problem, the QAE could recommend to the FSCM that further government action is not required except for an increased level of surveillance. If the response will not likely to correct the problem, the QAE should identify the shortfall. He or she also should recommend further action required by the government.

Remember, when assigned to a public works field division or any quality control job, diligence, perseverance, and knowledge of the job are important. This chapter has provided some basic information that you need to perform effectively as a QAE. Many different systems exist at various locations. You should take the time to learn the system before starting your new QAE job if assigned to one of these billets.



<b>CONTRACT DISCREPANCY REPORT</b>		1. CONTRACT NUMBER
<b>GOVERNMENT ACTION</b>		
2. TO <i>(Company and Manager name)</i>		3. FROM <i>(name of Government Representative.)</i>
4. DISCREPANCY OR PROBLEM <i>(Describe in detail. Include reference or specification. Attach continuation sheet if necessary.)</i>		
5. CONTRACTOR NOTIFIED <i>(Date, Time, Contact point)</i>		
6. SIGNATURE OF CONTRACTING OFFICER		7. DATE
<b>CONTRACTING ACTION</b>		
8. TO <i>(Contracting Officer)</i>		9. FROM <i>(Contractor)</i>
10. Contractor response as to cause, corrective action and actions to prevent reoccurrence <i>(Attach continuation sheets if necessary)</i>		
11. SIGNATURE OF CONTRACTOR REPRESENTATIVE		12. DATE
<b>GOVERNMENT CLOSE OUT</b>		
13. GOVERNMENT EVALUATIONS <i>(Acceptance, partial acceptance, rejection, attach continuation sheet if necessary)</i>		
14. GOVERNMENT ACTIONS <i>(Payment deduction, cure notice, show cause, other.)</i>		
15. SIGNATURE OF CONTRACTING OFFICER		16. DATE
17. SIGNATURE OF REVIEWING OFFICIAL <i>( As Applicable)</i>		18. DATE

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**Figure 8-3.—Contract Discrepancy Report, NAVFAC Form 4330/48.**

## CHAPTER 9

# FACILITIES MAINTENANCE MANAGEMENT

*LEARNING OBJECTIVE: Identify the advantages of having a maintenance program. Recognize and maintain various standard forms used in a maintenance management program. Analyze benefits of a maintenance/cost control program.*

Maintenance is the function of keeping buildings, structures, grounds, and equipment in (or restoring them to) a serviceable condition. Inspection and maintenance should be used to get maximum use of existing equipment and facilities at minimum cost. Set specific levels of maintenance for each facility. The level of maintenance established depends on the mission of the activity and the projected life span of the facility. By knowing the maintenance management system, you are able to approach the goal of maximum usage and minimum cost.

### MAINTENANCE MANAGEMENT

In the past, both industry and government ignored maintenance management while extensively analyzing and controlling production needs. Then labor costs increased dramatically and indirect costs soared higher than anyone expected. These cost increases encouraged the birth of the maintenance management system. The Naval Facilities Engineering Command established the maintenance management system in the mid- 1950s to control these spiraling maintenance costs.

### OBJECTIVE AND PURPOSE

The basic goal of the maintenance management system is to best use available resources: manpower, equipment, materials, and money. This system provides the framework to place decision making where the analysis of Public Works operations occur. Each Public Works functional area has information that affects the maintenance requirements. For example, the shop feels that connecting a certain deficiency, such as replacing a roof, is necessary. However, because of funding limitations, only a temporary repair is authorized to correct a more serious deficiency elsewhere.

An effective management system assures achievement of the following goals:

- Use of activities resources in the most efficient manner.
- Performance of maintenance based on a schedule instead of breakdown.
- Provide direct control over the maintenance work force performance.
- Performance of the proper level of maintenance.
- Take corrective action before major repairs are required.
- Reduce administrative details that interfere with the direct supervision of the work force.
- Correlate the work center capacity with its work load.
- Obtain optimum shop force alignment by trade skills.
- Provide information that shows trouble areas needing corrective action.
- Provide basis for comparing the cost estimates with the actual cost of maintenance.

### SPAN OF CONTROL

Reducing maintenance control procedures to a simple manual of operations that meets every condition is not possible. Nor can you replace the need for individual judgment and discretion. Placing too much emphasis upon having written procedures for achieving conformity, uniformity, or standardization causes a person to lose sight of the main goal. **Increasing the productivity of the maintenance work force is a**

Table 9-1.—Elements of Control for a Maintenance Management System

ELEMENTS	FUNCTIONS
(1) Inventory (2) Maintenance standards	These two elements are the foundation of the Maintenance Management System. They provide information on what is to be maintained and comprise a basis for evaluating (a) the condition of shore facilities and (b) the effectiveness of part or all of the maintenance effort.
(3) Work classification (4) Numerical identification for reporting	These are controls that channel and identify work documents and work accomplishment.
(5) Work generation (6) Work reception (7) Work input control (8) Planning and estimating (9) Job authorization	Functional controls applied to all processing except that provided in direct support of work performance.
(10) Material coordination (11) Shop scheduling	Controls in direct support of work performance before, and during, the course of the job.
(12) Reports (13) Appraisal	Controls designed to assist management in making judgements and decisions and in taking necessary corrective action during job progress and after completion.

80NP0001

primary benefit of the maintenance management system. Any prescribed procedures or reports should just be tools to help attain this goal. Table 9-1 shows the 13 key elements of control that make up the maintenance management system. If these elements are managed properly, you will have an effective and efficient Public Works organization. For a complete description of the maintenance management system, refer to the *Maintenance Management of Shore Facilities*, NAVFAC MO-321.

Two levels of control exist for this system: complete and modified. Complete control exists when using all the methods and procedures described in NAVFAC MO-321. Exercising modified control occurs when the activities vary from the prescribed methods and procedures. This action does not replace the elements of control. Instead, modified control should show differences in control elements caused by the size of an activity, work load, and any local conditions. Most small activities use some form of modified control.

## SYSTEM ELEMENTS

In the maintenance management system, there are five key elements.

1. Work generation consists of operator inspections, preventive maintenance inspections (for nonoperator equipment), and control inspections for all the facilities and equipment. *The Inspection of Shore Facilities*, NAVFAC MO-322, outlines the frequency of continuous inspections. Work generation also includes observations by tenants and military inspections.

2. Work input control provides basic planning and status information control on the work. It includes screening individual jobs for need, deciding their priority, programming them through the planning phase, and authorizing the work. It also includes maintaining a balanced and adequate workload for each work center, assuring proper completion of the jobs, and keeping informed on the status of the jobs.

3. Planning and estimating provides labor and material cost estimates and a task performance

sequence that allows for proper management control and follow-up.

4. Shop scheduling provides the framework for maximum coordination between various shop crafts and helps reduce the delays caused by the lack of materials, equipment, and transportation.

5. Management reporting provides the Public Works managers with reliable and useful information on performance and manpower distribution. This information is useful for planning, decision making, and reviewing goals.

## ORGANIZATION AND STAFFING

Setting up a maintenance management system provides the Public Works Departments (PWDs) with an effective tool for managing both productivity and the resources available. To help you better understand the elements of control for the maintenance management system (table 9-1), let's review the organizational structure (or staffing) of a PWD.

### PUBLIC WORKS DEPARTMENT

Figure 9-1 shows the recommended organization for a small PWD. As a chief petty officer, you may be assigned to overseas activities, security activities, or remote activities within the United States. At these locations you could perform the functions of either the shop's engineer or the assistant public works officer.

### Public Works Officer

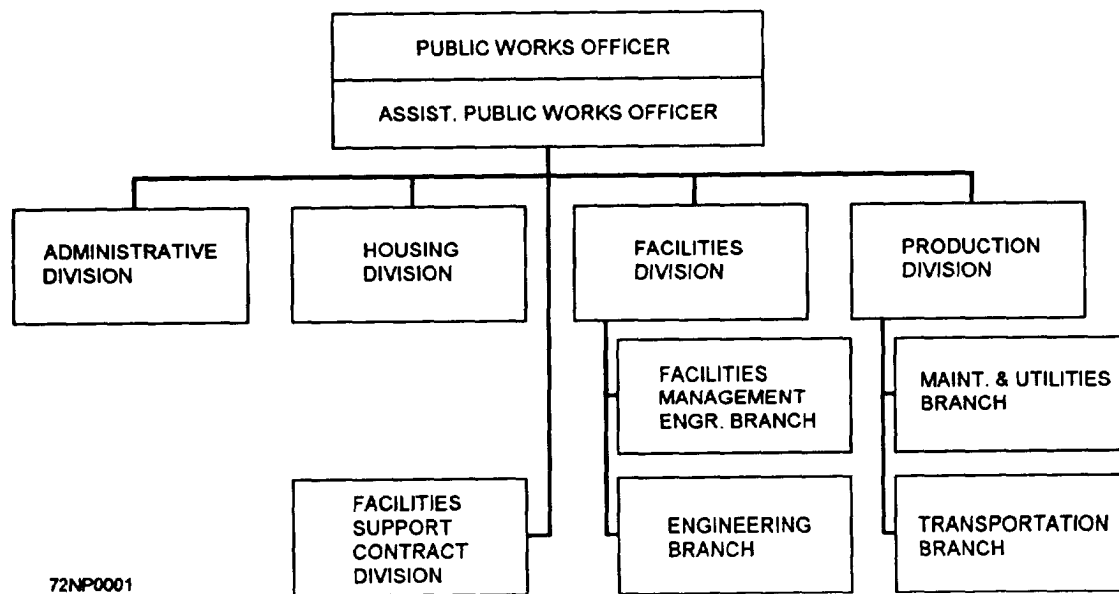
The public works officer (PWO), a Civil Engineer Corps officer, is responsible to the commanding officer of the base or activity for organizing, managing, and supervising the PWD. The PWO's areas of responsibility include the shops, the facilities, and the personnel assigned to the PWD. The PWO is responsible for the planning, designing, maintaining, and repairing of facilities. He or she is also responsible for all the safety certifications, energy conservation programs, and environmental matters. He or she may also be responsible for all the facility support contracts.

### Administrative Division

The Administrative Division is responsible for all matters regarding civilian personnel, office services, reports and statistics, financial management, and management analysis.

### Family Housing Division

Each installation that has family housing must have a centralized family housing office. To centralize the responsibilities for family housing management, you will normally have a Family Housing Division within each PWD. The Family Housing Division has two responsibilities: housing management and housing referral.



72NP0001

Figure 9-1.—Standard organization for a small PWD.

## Facilities Division

The Facilities Division consists of two branches. These branches are the Engineering Branch and the Facilities Management Engineering Branch.

A energy resources management position might also exist in the Facilities Division due to its close association with facilities design and project preparation. This division also has the best technical support available for this program.

**ENGINEERING BRANCH.**— The Engineering Branch is responsible for all the engineering services. The duties include preparing engineering studies, preliminary designs, estimates, performing field engineering, and maintaining the technical files and records.

**FACILITIES MANAGEMENT ENGINEERING BRANCH (FME).**— The Facilities Management Engineering Branch is the only branch in the PWD that directs its entire effort toward maintenance management. FME is responsible for performing control inspections, screening and classifying all the work requests, and preparing material and labor estimates for job orders. FME also prepares preliminary estimates before submitting them to the Engineering Branch for action. The branch also performs the master shop scheduling, maintains the status of inspection reports, tracks work requests from receipt to completion or cancellation, and manages all maintenance service contracts.

## Production Division

The Productions Division has three branches. These branches are the Maintenance Branch, Utilities Branch, and the Transportation Branch. Under normal conditions, a PWD with less than 75 personnel in the Maintenance and Utilities Branches would normally combine these two branches into a single branch. The elements of the Production Division varies with the types and sizes of the activities. For example, the variety of crafts and shops in a PWD at a communications station will be less than that at an industrial activity, such as a shipyard.

The Production Division is responsible for performing preventive maintenance inspections, for maintaining all the camp facilities, and for doing emergency service (E/S) work.

**MAINTENANCE AND UTILITIES BRANCH.**— The maintenance section is responsible for preventive maintenance inspections, maintenance of

all the shore facilities, and performing emergency or routine service work. The utilities section is responsible for equipment operation in producing utilities. The utilities section performs operator inspections, preventive maintenance inspections on the utilities, as well as, doing E/S work on utilities.

**TRANSPORTATION BRANCH.**— The transportation branch provides transportation and construction equipment and equipment operators to all the departments of the activity. This branch also maintains and repairs all the transportation equipment. The performance of this branch is guided by the *Management of Transportation Equipment*, NAVFAC P-300.

## WORK GENERATION

Maintenance work can start with customer requests and command inspections. However, the preferred way is by members of the PWD through the continuous shore facilities inspections system. The maintenance manager must know what facilities he or she is responsible for maintaining to run an effective continuous inspections system. Thus verifying an inventory of all the facilities is an important part of the foundation of maintenance management.

## INVENTORY

A maintenance manager must know what facilities he or she is responsible for maintaining. The manager must know how many facilities, their location, and their mission. The Facilities Management Engineering (FME) Branch collects all this information for each facility. History files of the facility retain this information. By knowing the history of each facility, the FME personnel decide where to apply available maintenance funds.

Take the information for these inventory records from activity plant account records, as-built drawings, and completed job orders. These records may not contain all the essential information about the amount and types of electrical and mechanical systems and related equipment contained in the individual facilities. Therefore, you may need to survey all the facilities to complete the inventory. The information collected forms the basis for the Shore Facilities Inspection System and for planning maintenance requirements. The Shore Facilities Inspection System becomes the basis for developing a preventive maintenance program.

Failing to track the inventory for maintenance (and later' the schedule) causes the inventory to become outdated. For example, properly listing new buildings and deleting demolished structures does not occur. As a result, the picture that you and higher authorities have of your inventory becomes distorted. The inventory, with the maintenance backlog, is the primary basis for fund allocation at the claimant level. The accuracy of your inventory is essential. Not properly documenting the inventory can jeopardize the shore facilities planning cycle. It also can result in fewer operation and maintenance (O&M) dollars for maintenance. These problems could exaggerate unit cost data for maintenance. In addition, an inaccurate inventory makes a logical schedule unlikely.

## **CUSTOMER REQUESTS**

A work request can start as either a written request or a telephone call to the work reception desk. Figure 9-2 shows a typical written work request. Usually, any work requested by a customer that will take longer than a service call (more than 16 man-hours) should be submitted on a Work Request, NAVFAC Form 9-11014/20. The FME director screens and approves work requests for funding. The director forwards all approved work requests to the maintenance control branch for both estimating and scheduling.

## **CONTINUOUS INSPECTIONS SYSTEM**

The purpose of the continuous inspections system is to identify deficiencies in shore facilities. This program also starts corrective actions needed to bring these facilities up to the desired maintenance standard.

You should inspect all facilities by the intervals outlined in NAVFAC MO-322. You must blend the continuous inspections completely into the maintenance management system. The major work load of the PWD is driven by continuous inspections, rather than by a one-time comprehensive inspection or by breakdown reports.

The three major parts of the continuous inspection system are operator inspections, preventive maintenance inspections, and control inspections.

### **Operator Inspections**

The person assigned to operate the equipment or system is responsible for performing the operator inspections. These inspections include pre-operation checks, simple lubrication, and minor adjustments of

the equipment or system. The operator should post detailed instructions either on the equipment or in the watch log.

The operator should report breakdowns and deficiencies beyond his or her capacity or authority immediately to the supervisor. The inspection branch reviews these reported deficiencies and begins further action if required. The branch rates the effectiveness of the operator's inspections at the time of control inspections.

### **Preventive Maintenance Inspections**

Preventive maintenance inspections (PMIs) are similar to operator inspections except the equipment has no specific operator. PMIs concern items that, if disabled, would do the following:

- Interfere with an essential operation of the naval activity.
- Endanger life or property.
- Involve high cost or long-lead time for replacement.

PMIs should be performed by shop personnel. The frequency of these inspections should be based on Navy publications, manufacturers' brochures, and, most importantly, shop personnel advice and experience.

### **Control Inspections**

A control inspection is a scheduled examination of facilities by Public Works inspectors to learn the physical condition using uniform maintenance standards. The goals of control inspections are as follows:

1. Provide periodic examination of all shore facility items not covered by operator inspection or PMI.
2. Assure the adequacy of operator inspection and PMI.
3. Reduce the number of breakdowns and cost of repairs.
4. Provide a balanced flow of work to the shops.
5. Detect and reduce overmaintenance.
6. Allow improved planning for the best utilization of the labor force and material requirements.

WORK REQUEST (MAINTENANCE MANAGEMENT)		<i>(PW Department use Instructions in NAVFAC MO-331)</i>	
NAVFAC 9-11014/20 (REV. 2-88) SW-8105-002-7510 Supersedes NAVDOCK 3 2361			
MS SANS SERIF 20 BOLD		<i>Requestor use Instructions on Reverse Side</i>	
PART I - REQUEST (Filled out by Requestor)			
1. FROM <b>RESEARCH DIVISION</b>		2. REQUEST NO. <b>50 - 001 - 94</b>	
3. TO <b>PUBLIC WORKS DEPARTMENT</b>		4. DATE OF REQUEST <b>7/6/94</b>	
5. REQUEST FOR <input checked="" type="checkbox"/> COST ESTIMATE <input type="checkbox"/> PERFORMANCE OF WORK		5a. REQUEST WORK START	
6. FOR FURTHER INFORMATION CALL <b>JOHN DOE EXT. 419</b>		7. SKETCH / PLAN ATTACHED <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
8. DESCRIPTION OF WORK AND JUSTIFICATION <i>(including location, type, size, quantity, etc.)</i>  <b>PARTITION OFF ROOM IN BUILDING NO. 14 FOR OFFICE SPACE</b>			
9. FUNDS CHARGEABLE		10. SIGNATURE <i>(Representing Official)</i> <b>(signed) JACK JONES</b>	
PART II - COST ESTIMATE (Filled out by Maintenance Control Division if estimate requested)			
11. TO <b>RESEARCH DIVISION</b>		12. ESTIMATE NO. <b>80734</b>	
13. COST ESTIMATE		14. SKETCH / PLAN ATTACHED <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
a. Labor	\$ 1,380	15. <input checked="" type="checkbox"/> APPROVED PROGRAMMING TO START IN <u>computer.</u> <input type="checkbox"/> APPROVED BASED ON PRESENT WORKLOAD, THIS JOB CAN BE PROGRAMMED TO START IN _____ IF AUTHORIZED BY 25TH OF _____ AND FUNDS ARE MADE AVAILABLE <input type="checkbox"/> DISAPPROVED <i>(See Reverse Side)</i>	
b. Material	\$ 2,490		
c. Overhead and / or Surcharge	\$ 400		
d. Equipment Rental / Usage	\$ _____		
e. Contingency	\$ 854		
f. TOTAL	\$ 5,124	16. SIGNATURE <b>(signed) JOHN SMITH</b>	
		17. DATE <b>7/6/94</b>	
PART III - ACTION (Filled out by Requestor)			
18. TO		19. AUTHORIZATION TO PROCEED IS ATTACHED <i>(Check one if other than PW funds are involved)</i> <input type="checkbox"/> NAVCOMPT 148 <input type="checkbox"/> OTHER	
20. WORK REQUESTED <input type="checkbox"/> HAS BEEN CANCELLED <input type="checkbox"/> HAS BEEN DEFERRED <input type="checkbox"/> WILL BE PERFORMED BY OTHERS		21. SIGNATURE	
22. DATE			
<i>(See Part IV on Reverse Side)</i>			

86NP0004

Figure 9-2.—Work Request (Maintenance Management), NAVFAC 9-11014/20.

Personnel assigned to the inspections branch perform control inspections, or other personnel at the request of the inspections branch may perform them. Control inspectors do not adjust equipment but report any deficiencies to the manager of the inspection branch.

Structural, mechanical, and electrical inspections are divisions of control inspections. Figure 9-3 shows a typical Inspector's Report, NAVFAC 11014/38. Emergency/service and minor work requirements should also be noted on the report. NAVFAC MO-321

and NAVFAC MO-322 contain detailed guidance on operating the Shore Facilities Inspection System. The successful operation of a continuous inspection system depends upon an up-to-date inventory of facilities and the use of uniform maintenance standards.

### WORK CLASSIFICATION

Six classifications for work are used at Public Works. Those categories are emergency work, service work, minor work, specific jobs, standing jobs, and rework.

**INSPECTOR'S REPORT**  
NAVFAC 11014/38 (REV. 9-72)  
S/N 9195 - 999 - 7892

Instructions for completing form are contained in NAVFAC MO-322, Vol. I

DE 15     CONTROL INSPECTION

1. FACILITY NO. <b>VARIOUS</b>	2. COST ACCOUNT NO. <b>7160</b>	3. FAC. <b>4</b>	4. CATEGORY CODE <b>61010</b>	5. FUNCT. ACCT. NO.	6. FOC <b>A</b>	7. DATE SCHED. <b>4-85</b> ACT. <b>4-19-85</b>	8. MGA INSPECTION INITIAL <b>JK</b> DATE <b>4-25-85</b>
9. DESCRIPTION AND LOCATION <b>Admin Bldgs Various Locations</b>							
10. INSPECTOR <b>U.L. Crawl &amp; H.E. SNOOPS</b>					11. INSPECTION TIME USED <b>16 hrs</b>		12. SHEET NO. <b>1 of 7</b>

13. DESCRIPTION OF ITEM AND DEFICIENCY

<b>BLDG. # 2</b>	Structural Repairs and painting	<b>\$ 160</b>
" # 4	No deficiencies 4-17-85	
" # 5	No deficiencies 4-18-85	
" # 6	Repairs to roof, plaster & repaint	<b>\$ 780</b>
" # 7	Replace rear entrance stairs and landing	<b>\$ 500</b>
" # 9	No deficiencies 4-24-85	
" # 10	Replace 16-floor joists ROOM. 10	<b>\$ 460</b>
" # 13	Repair counter doors & Replace broken glass	<b>\$ 232</b>

**SUMMARY OF ESTIMATES**

(a) WORK CENTER	(b) LABOR HOURS	(c) LABOR \$	(d) MTRL \$	(e) TOTAL EST. \$
CARP	194	776	540	1316
PAINT	146	584	176	760
LABOR	14	56		56
<b>TOTALS</b>	<b>354</b>	<b>1416</b>	<b>716</b>	<b>2132</b>

86NP0005

Figure 9-3.—Inspector's Report NAVFAC 11014/38.



All the work goes through an initial process of classification and screening at the work reception desk or trouble desk. During this step, the work reception desk personnel identify emergency jobs for immediate issue to the proper work center. The work left after this initial screening should be of a routine nature but may be of greater scope than a service call. He or she also assures customers submit routine work in a written work request and forwards the request to the FME director.

When the balance of work requires more than a service call, it falls into the maintenance and repair work categories. Those categories are minor, specific, or standing work orders and requests for minor construction and improvements.

### **EMERGENCY/SERVICE (E/S) WORK**

Authorization of work is relative to the degree of control required. Small work items of a one-time nature, such as changing light bulbs or making minor repairs to facilities, plumbing, or electrical wiring and fixtures, require little detailed management control. When these small jobs do not relate to a utility system that is down or an essential service, these jobs are routine service work. When these jobs restore essential services, they are emergency service (E/S) work. Authorization of E/S work is on an Emergency/Service Work Authorization (ESA), NAVFAC Form 11014/21 (fig. 9-4), and issued to the shops for completion. Use E/S work authorizations for small work items that take up to 16 man-hours and do not exceed the established limit for material cost.

To reduce the paper work involved in P&E and cost accounting, NAVCOMPT has established cost account numbers for E/S work. This type of work does not need to be charged against the account of the facility receiving the WS work. The exception to this is charging EN work accomplished on family housing to the proper type of housing.

The only detailed management control used by PWD for HS work requires the worker to note both the start and stop times on the ESA. This is done to find out the total man-hours involved in completing the job. Periodic review of service calls often identifies potentially large problem areas that need correcting by either a major overhaul, a replacement, or a change of the equipment used.

### **MINOR WORK**

Classify jobs that range from 16 to 80 man-hours and cost less than the established material limit. Minor work is planned and estimated by using the Engineered Performance Standards (EPS), when applicable. Costs are not collected for individual jobs. These costs are accumulated against a job order number or cost account. This means less paper work for the comptroller and the FME Branch. However, if full-job accounting is received, the work cannot be classified as minor work.

### **SPECIFIC JOB ORDERS**

Write specific job orders to cover work where you want individual job costs for financial and performance evaluation, such as work performed for a tenant activity. Use specific job orders for work that takes more than 80 man-hours to complete. These job orders are also used to provide information for total Public Works planning and to send information to the shops. Charge all the work performed on specific job orders against the proper account according to the actual hours charged by the shops. No additional work should be done on specific job orders without prior approval. When the job order requires additional work, provide an estimate based on the new requirements. An example of a specific job is the repair of deteriorated roofing on a warehouse.

### **STANDING JOB ORDERS**

There are also job orders that are more than 40 man-hours which, because of their repetitive nature, you process as standing job orders.

There are two types of standing job orders: estimated and unestimated.

1. Estimated. Examples of estimated work include janitorial service, trash and garbage disposal, and power plant watch standing. Estimated standing job orders should include an exact work description, a clearly specified frequency cycle, and accurate time and cost estimates. It is useful to develop realistic labor and material estimates for these repetitive functions, based on EPS, when available, and jobsite analysis. Normally, issue estimated standing job orders quarterly.

2. Unestimated. Normally, issue unestimated standing job orders annually. These job orders are usually service work. Issue these job orders primarily as fiscal documents for collecting total annual charges. An example of an unestimated standing job order would be snow removal. Since no one knows how much snow

**EMERGENCY/SERVICE WORK AUTHORIZATION**

NAVFAC 11014/21 (Rev. 8-75)

CHARGE NO. 9NS910 W.O. NO. 26510 CARD NO. 1 1 2 1&2 3

LCC		DATE REC'D		W C		STD HRS	
<u>01A</u>	<u>8.50</u>	<u>0821</u>	<u>55P</u>				
21	22	23	24	25	26	27	28
W	C	C					
STD HRS		W C		C		STD HRS	
29	30	31	32	33	34	35	36
DESCRIPTION OF WORK				WORK LOCATION			
<u>RIPR HOT WATER LINE</u>				<u>0115</u>			
ORIGINATOR PHONE <u>BTIA CARPENTER (3196)</u>							
NATURE OF WORK <u>HOT WATER LINE LEAKING IN RECORDS STORAGE ROOM</u>							
SHOP COMMENTS							
<u>Repaired prior to any damage to records</u>							
DATE STARTED				DATE COMPLETED			
<u>2</u>		<u>8.5.08</u>		<u>22.8.50</u>		<u>22.55P</u>	
37	38	39	40	41	42	43	44
W	C	C					
HRS USED		W C		C		HRS USED	
45	46	47	48	49	50	51	52
BUILDING NUMBER				EQUIPMENT NUMBER			
<u>0115</u>							
53	54	55	56	57	58	59	60
S/N 0105-LF-002-7105				CRAFTSMAN <u>San Howe</u>			

86NP0006

Figure 9-4.—Emergency/Service Work Authorization, NAVFAC 11014/21.

will fall during the year, the costs collected against the job order will not be known until the end of winter.

Do not use a standing job order to authorize a specific task that is service work in nature. For instance, do not write individual standing job orders for replacing window glass, replacing light bulbs, making emergency repairs, or repairing plumbing leaks.

You should review all the standing job orders periodically to determine the requirement of the work authorized and completeness of the specification of the

work involved. You should also review for proper frequency of work performed, reasons for man-hours estimate and work performance variation, and total maintenance force labor requirements.

**WORK ASSIGNMENT PRIORITIES**

Priority assignment of jobs is essential in deciding the importance of each job in relation to other requirements. Manpower and funding limitations may not allow the PWD to do all the necessary and desired

work at the time of the work identification. With a priority classification system, you can get the most use from your resources. Assigning a priority designator provides you with an adequate definition of the importance of each job.

You can express the importance of various functions and types of work by assigning priorities using a matrix (table 9-2). After initial use of the priority matrix, review the results periodically and revise priorities, as necessary. The with the highest priority (lowest number) will precede others of lower priority on the schedule.

The priority matrix lists work classifications shown below.

- **Safety.** Work required primarily for safety reasons.

- **Function.** Work primarily identified with the mission of the activity.

- **Preventive.** Work primarily required to prevent significant deterioration of the plant property or equipment caused by continued use or from natural forces.

- **Appearance.** Work done primarily for preserving or upgrading the appearance of a facility.

Each of these work classifications has three levels of importance. You base the importance level of a particular job on its impact on other jobs in the same classification.

1. High.

Table 9-2.—Priority Matrix

EMERGENCY OR EXCEPTIONAL TOP PRIORITY		WORK CLASSIFICATIONS			
		SAFETY	FUNCTIONAL	PREVENTIVE	APPEARANCE
IMPORTANCE LEVEL	HIGH	2	3	4	8
	ROUTINE	3	5	7	8
	LOW	6	7	9	10

80NP0002

2. Routine. Most work falls into this category.

3. Low.

The PWO or the APWO must give approval for assignment of priority 1 to work. This priority states an overriding emergency, or urgent priority. This priority is an overriding requirement that will insert the final estimated work into the schedule at any point.

**JOB ORDER CLASSIFICATIONS**

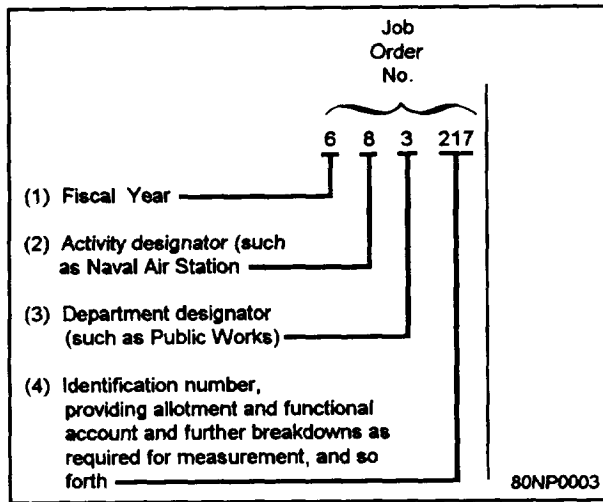
Every specific and standing job order must have a job order number. The *Navy Comptroller Manual* says that you should keep the number of digits in a job order to the minimum required. This will reduce the chance of error and save time in writing the job order number or expenditure documents and in sorting such documents. This statement also applies when entering job order numbers on the labor job time cards, material requests, and other expenditure documents. For maintenance management purposes, more than seven digits are cumbersome. The *Navy Comptroller Manual* states in part:

“No Navy-wide plan of numbering job orders is prescribed because of the variations of requirements in the various naval activities. . . . Generally, all that is required fiscally is a number that will distinguish a job order from all other job orders at the activity and provide an index to the job order itself or to the master card that contains all of the detailed accounting information. Therefore, the number will include in its structure a serial number that by itself or in combination with other codes in the number will satisfy fiscal needs.” (See table 9-3.)

**Master Job Orders for Housing**

When collecting costs by functional accounts or group classification of work (for example, certain types of quarters for which the *Navy Family Housing Manual*, NAVFAC P-930, sets spending limitations), the reduction of some job order paperwork to a single master job order is possible. This job order will cover several functional accounts performed simultaneously or all the work described on the same work request or inspection report. For example, all the work shown in table 9-4 normally written as seven separate job orders, are combined into one job order as follows:

**Table 9-3.—Makeup of Job Order Number**



**Table 9-4.—Identification of Job Orders**

No.	Work	Functional Account	Group Classification	Group Code
1	Paint	44551	2b	22
2	Repair roof	44551	2a	21
3	Replace garage door	44573	3d	34
4	Repair sidewalk	44761	3c	33
5	Trim shrubs	44790	3b	32
6	Repair furniture	44120	6a(1)	61
7	Repair boiler	44688	6b(1)	64

1. Issue one master job order classification identification (group code) in the master job order number.

2. Then draw an additional column (fig. 9-5) on the job order so you can enter the two-digit group code (table 9-4) opposite each item of work (table 9-5).

**Labor Class Codes**

Labor class codes are two-digit figures that represent various categories of overhead and productive work.

Code all man-hour expenditures for a Maintenance and Utilities Branch by labor class, despite the funding source. This is shown in the Tabulated Report A and the Maintenance/Utilities Labor Control Report, NAVFAC 9-11014/29. Assign labor class codes according to the productive work-class performed or

overhead charged, rather than by the funding source. The following labor class codes are standard:

1. Productive. The following labor class codes are productive labor:

- 01 service work
- 02 emergency work
- 03 preventive maintenance inspection
- 04 standing job orders—not estimated
- 05 standing job orders—estimated
- 06 minor work authorizations
- 07 specific job orders

2. Overhead. The following codes are overhead:

- 40 rework
- 41 supervision
- 42 shop indirect
- 43 allowed time
- 44 general office and clerical
- 45 leave

Record the labor class code on the Daily Time and Labor Distribution Card. You must enter the labor class code each time you place a job order number or a shop control number on the time cards.

**Division and Branch Codes**

Because of variation in the types of work performed, work center code standardization is not practical. However, it is practical and desirable to have branch code standardization to help cost accounting procedures. Table 9-6 groupings show branch code standardization.

Sometimes the number of personnel assigned to various crafts may not justify the official designation of separate work centers. However, you may use alphabetical subdivisions as an aid in work programming and scheduling. Subdivide work center codes as shown in table 9-7.

**PLANNING AND ESTIMATING**

The planner and estimator holds a key position in the Shore Facilities Maintenance System. His person is responsible for planning technical jobs and estimating the number of man-hours needed to complete the maintenance work.

WORK AUTHORIZATION/ESTIMATE (MAINTENANCE MANAGEMENT)									
NAVYAC 1181A/22 (11-78) 300001-000-10000-000 Supersedes NAVYAC 2202 and 2002 <i>(Instructions for completing form are contained in NAVYAC AND 22)</i>									
1. ACTIVITY <b>U.S. Naval Station</b>								2. ACTIVITY CODE <b>00188</b>	
3. JOB ORDER NO. <b>2804--22</b>									
4. ESTIMATE NO. <b>50-002-93</b>									
6. REQUESTED STARTING DATE <b>12/93</b>		8. PRIORITY <b>3</b>		7. INSPECTION GENERATED <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		9. FACILITY NO. <b>14</b>		5. EQUIPMENT NO. <b>425</b>	
10. APPLICATION CODE <b>44110</b>			11. COST ACCOUNT CODE <b>7140</b>			12.		13.	
II. NAVY ACCOUNTING DATA									
6. APPROPRIATION SYMBOL AND SUBHEAD <b>17X4912.1993</b>		8. OBJECT CLASS <b>25</b>	7. BUREAU CONTROL NUMBER <b>77777</b>	4. AUTH. ACCOUNTING ACTIVITY <b>00188</b>		5. TRANS. CODE <b>2F</b>	1. PROPERTY ACCTG. ACTIVITY <b>00188</b>		9. COST CODE
16. FOR FURTHER INFORMATION CALL <i>(Name and telephone)</i> <b>Jim Jones 69148</b>				17. BUDGET PLAN ATTACHED IF YES INDICATE NUMBER <input checked="" type="checkbox"/> YES <b>123456</b> <input type="checkbox"/> NO			18. LABOR CLASS CODE <i>(except for maintenance)</i> <b>07</b>		
12. JOB TITLE <b>Change of occupancy rehab.</b>									
13. GENERAL JOB DESCRIPTION <b>Change of occupancy rehab.-- Quarters A must be completed by 28 Jan 1994.</b>									
<b>21. ESTIMATE</b>									
a. BREAKDOWN OF WORK					b. SUMMARY OF ESTIMATE				
JOB PHASE NO. (1)	WORK CENTER (2)	Group Code (3)	DESCRIPTION (4)	EST. HOURS (5)	WORK CENTER (6)	LABOR HOURS (7)	LABOR (8)	MATERIAL (9)	TOTAL ESTIMATE (10)
	02	22	Paint interior	150*	02	180*	540	170	710
	02	22	Paint exterior	30*	01R	15*	45	55	100
	01R	21	Repair roof	5*	34	5*	15	15	30
	01	34	Replace garage door	10*	32	40	80	0	80
	34	33	Repair sidewalk	5*	01F	5*	15	55	70
	32	32	Trim shrubbery	40	51	5	16	5	21
	01F	61	Repair furniture	5*					
	51	64	Repair boiler	5					
<b>22. DISTRIBUTION</b>					TOTAL	250*	711	300	1011
MCD	2	Sched	2		c. CONTINGENCY				
ADP	1				d. OVERHEAD AND/OR SURCHARGE				
MAINT	6				e. GRAND TOTAL				
13. AUTHORIZED WORK TO BE PERFORMED <i>(Signature)</i> <b>H. Betz</b>					TITLE <b>MCD</b>			DATE <b>10/12/93</b>	

86NP0007

Figure 9-5.—Job order for multiple expenditure accounts (housing).

Table 9-5.—Job order structure (Housing)

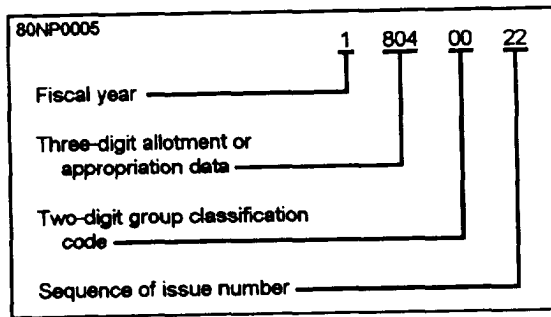


Table 9-6.—Branch Code Standardization

Codes 00 - 49	Maintenance Division
Codes 50 - 59	Utilities Division
Codes 90 - 99	Office Divisions
	- Administrative
	- Maintenance Control
	- Engineering
	- Housing
Maintenance Division	
Building Trade Branch.....	00
Metal Trade Branch.....	10
Electrical Trade Branch.....	20
General Service Branch.....	30
Administrative Branch - Maintenance Division.....	45
Utilities Division	
Administrative Branch.....	50
Generation Branch.....	51
Distribution Branch.....	52
Office Divisions	
Administrative.....	90
Maintenance Control.....	91
Engineering.....	92
Housing.....	95

80NP0006

The estimator defines the scope of a project by specifying the work to be accomplished and the skills required. To help the estimator in this job, the Navy has developed Engineered Performance Standards (EPSs). The EPSs give estimates of the time needed to complete the particular craft phases of a job. You will find a complete description of EPSs in the NAVFAC P-700 series. Since these standards save time and usually provide more reliable estimates than individual

Table 9-7.—Work Center Subdivision

Building Trade Branch.....	00
Carpentry.....	01
Carpenters.....	01C
Millmen.....	01M
Roofers.....	01R
Painting.....	02
Wharf Builders.....	03
Masonry.....	04
Rigging.....	05
Metal Trade Branch.....	10
Plumbing & Pipefitting.....	11
Plumbing.....	11P
Pipe & Steam Fitting.....	11S
Welding.....	12
Sheet Metal.....	13
Electrical Trade Branch.....	20
Electrical - Inside.....	21
Electrical - Linemen.....	22
Refrigeration & Air Conditioning.....	23
General Service Branch.....	30
Janitorial.....	31
Grounds - Labor.....	32
Refuse & Trash Collection.....	33
Ground Structures - Labor.....	34
Etc. ....	
Emergency / Service Branch.....	40
(Becomes work center at small activities)	
*Administrative Branch - Maintenance Division.....	45

\*Should include all clerical personnel of the Maintenance Division and all supervisors and shop planners associated with more than one work center 80NP0007

judgment, the estimators should use them. When an engineered design is needed, the Engineering Branch provides it to the estimator. No types of estimates are used; each conforms to a particular need.

### SCOPING ESTIMATE

Typically, it is helpful for management to get an estimate of job costs before assigning a job priority. The formal planning and estimating process can provide this, but only at significant expense. Since a ball park estimate is normally adequate, NAVFAC has encouraged the use of the scoping estimate—a rough, quick estimate of costs. The scoping estimate is particularly useful when you deal with reimbursable customers. You can inform them of the approximate job costs and ask if they wish to go on with the work. Unit Price Standards, NAVFAC P-716.0, should be used when preparing scoping estimates.

## **FINAL ESTIMATE**

Do not authorize a final estimate until the job is approved. This type of estimate shows all the work operations listed on the job plan and considers the analysis of work operations in detail. Final estimates should be the most accurate forecast possible of the costs, man-hours, and material requirements for a given job. Make every effort to provide a final estimate within a reasonable time.

After planning and estimating the job, formalize it as a job order by assigning a job order number and completing the accounting data. The job is ready for scheduling (first into a specific month, then into a specific week) for completion by the Maintenance Branch.

## **WORK INPUT CONTROL AND SCHEDULING**

To assure completion of authorized work efficiently, you must set up some means of control. To help in the orderly flow and completion of work, you need to use work input control and scheduling procedures. These procedures require you to use several forms and charts.

### **WORK INPUT CONTROL**

Work input control is a formalized means of managing the total PWD work load. It also serves as a centralized source of work status information by using the Job Requirements and Status Chart, the Manpower Availability Summary, and the Work Plan Summary.

#### **Job Requirements and Status Chart**

The Job Requirements and Status Chart, as shown in figure 9-6, provides a ready reference for tracking all the specific and minor jobs established as known maintenance requirements. The chart includes all customer-financed individual jobs and minor construction, alteration, and improvement type of work. In addition, this chart provides information on proposed planning to determine the status of work not programmed for shop accomplishment. You should enter all new work, upon approval, on this chart. The entry should remain until the authorization of work for shop accomplishment, canceled, or completed by contract. You can maintain a different Job Requirement and Status Chart for each major type of work, such as

alterations and minor construction, customer work, and maintenance and repair.

### **Manpower Availability Summary and Work Plan Summary**

The Manpower Availability Summary and Work Plan Summary (fig. 9-7) show the plan of the department for using the Maintenance or Utilities Branch work force. By breaking down the Work Plan Summary by funding sources, you see that the summary also shows a payroll support plan.

Before formulating and adjusting the monthly shop work load, the job order programmer must know the man-hours available for programming within each work center. When customer funds provide significant support to the PWD, the programmer must know the number of man-hours allotted to each funding source. To decide this information, the programmer should develop a Manpower Availability Summary and a Work Plan Summary for each month.

### **Monthly Shop Load Plan**

The work control method used within the maintenance management system is the Shop Load Plan (fig. 9-8). The Shop Load Plan is the Public Works management plan for using shop forces on specific job orders for a given month. This monthly plan provides the shop planner with direction on what jobs to schedule within the month. All levels of management from the shops divisions up to the PWO participate in its preparation.

Express the Shop Load Plan by the obligation of the known available man-hours for each work center and for each job scheduled. The Shop Load Plan consists of sections for short-range and long-range planning. The short-range plan covers the nearest 3 months, and the long-range plan covers the following 9 months. The suggested loading for the short-term plan is 100 percent for the first month, 90 percent for the second month, and 80 percent for the third month. Jobs that appear on the Shop Load Plan become the shop backlog. For maximum productivity, you should always try to have a 3- to 6-month backlog to balance the work that goes to the shops.

### **SHOP SCHEDULING**

Shop scheduling takes place in a two-stage scheduling system: master scheduling of specific job orders weekly and work center scheduling of specific



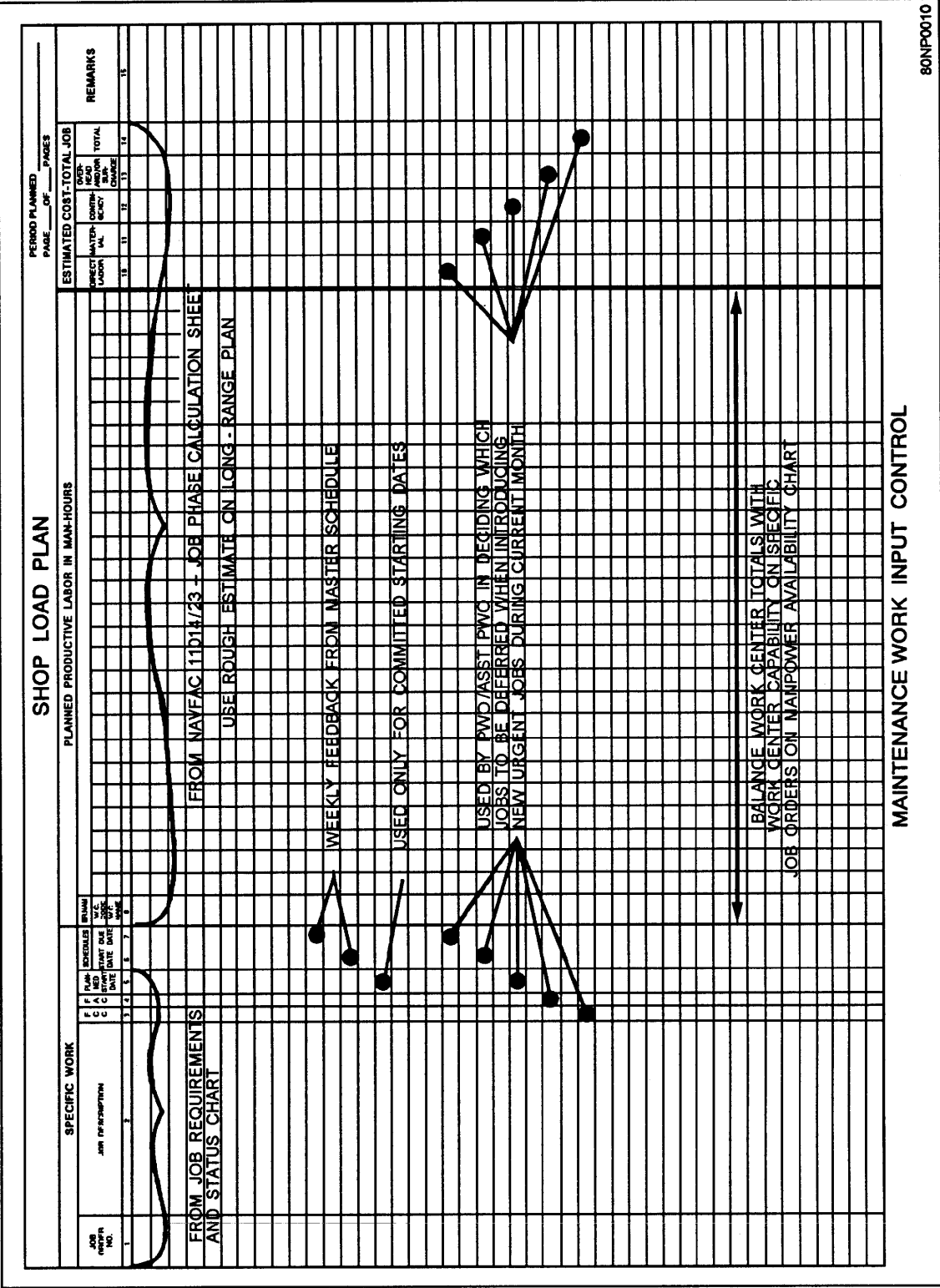


MANPOWER AVAILABILITY SUMMARY												MONTH: _____
											TOTAL ALL WORK CENTERS	
											USERS	
											%	
WORK CENTER AND JOB SHOP CODE												
WORK CENTER AND JOB SHOP NAME												
CURRENT MONTH ON BOARD COUNT												
PLANNED ADJUSTMENTS												
PERSONNEL												
AVERAGE AVAILABLE PERSONNEL												
AVERAGE AVAILABLE MAN-HOURS												
REWORK												
SUPERVISION												
SHOP INDIRECT												
OVERHEAD												
ALLOWED TIME												
GENERAL OFFICE AND CLERICAL												
LEAVE												
TOTAL PLANNED INDIRECT & OVERHEAD MAN-HOURS												
FROM OFFICIAL RECORDS OF ONBOARD COUNT												
KNOWN RETIREMENTS, RIFTS, TEMPORARY HIRES, LABOR TO BE BORROWED (OTHER THAN BETWEEN												
BETWEEN BRANCHES)												
BASED ON HISTORICAL DATA - TRENDS - MODIFIED BY												
ANTICIPATED CHANGES OF MANAGEMENT ACTION												
ANNUAL LEAVE CAN BE CONTROLLED ON MONTHLY BASIS												
ESTABLISHED BY												
MCD												
AFTER CONSULTING												
SHOPS ENGINEER												
DIRECTOR, MAINT. DIV.												
"PLANNED" FIGURES												
FOR LABOR CONTROL REPORT												
DIRECTOR, UTIL.												
DIRECTOR, TRANS. DIV.												
AS APPROPRIATE												
SUBJECT TO APPROVAL												
OF												
PWO /ASST. PWO												
INCLUDE TRANSPORTATION												
DIVISION AVAILABILITY FOR												
SPECIFICS ONLY												
WORK PLAN SUMMARY												
PLANNED PRODUCTIVE LABOR IN MAN-HOURS												
LABOR DESCRIPTION												
SERVICE WORK												
EMERGENCY WORK												
PREVENTIVE MAINTENANCE INSPECTION (PMI)												
STANDING JOB ORDERS UNESTIMATED												
STANDING JOB ORDERS ESTIMATED												
MAJOR WORK												
SPECIFIC JOB ORDERS												
TOTAL PLANNED PRODUCTIVE LABOR IN MAN-HOURS												
TOTAL PLANNED MAN-HOURS (INDIRECT, OVERHEAD AND PRODUCTIVE LABOR)												
BASED ON TRENDS AND SHOP BACKLOG												
BASED ON PM SCHEDULE												
BASED ON HISTORY - MODIFIED BY MANAGEMENT ACTION												
FROM ACTUAL REQUIREMENTS FOR MONTH												
BASED ON TRENDS AND SHOP BACKLOG												
BALANCE LEFT AFTER ALLOCATIONS TO OTHER												
CATEGORIES IF INSUFFICIENT - REVISE ALLOCATIONS												
TO OTHER CATEGORIES. THIS IS THE PLANNING FIGURE												
FOR SHOP LOAD PLAN												
TOTAL ALL WORK CENTERS												
M.H.												
%												

MAINTENANCE WORK INPUT CONTROL

80NP0009

Figure 9-7.—Manpower Availability Summary and Work Plan Summary.



80NPO010

Figure 9-8.—Shop Load Plan.

and minor work. Master scheduling connects specific jobs to each work center for accomplishment during the following week. Work center scheduling takes up where master scheduling leaves off. The work center supervisor breaks down the weekly assignments into daily assignments for the workers in the shop. After making the daily assignments on specific job orders, the work center supervisor assigns work to the remaining uncommitted shop forces.

The shop planner/scheduler, by using the Shop Load Plan of the coming month, consults with the proper shop supervisor to schedule the work for the coming weeks. The man-hours scheduled should be consistent with the available man-hours identified for specific job order work on the Manpower Availability Summary and Work Plan Summary.

Weekly, compare the master schedule with the actual man-hours expended of the work center to find out if jobs meet the estimate of the master schedule. If a job is off schedule, adjust the work center schedule of the following week without making major changes to the master schedule.

The shop supervisor reviews the master schedule and prepares the work center schedule each week. He or she reviews it daily to ensure the maximum use of shop resources. The shop supervisor coordinates with other shops when a requirement for more than one craft exists.

Shop scheduling is required throughout the job when the shop performs at various stages of the work. For example, the carpenters would open an area to allow the plumbers to make a repair. The carpenters would then close the area after the repair with the painters arriving later for final touches. To schedule the job properly, it would be necessary to divide the carpenters' time between two distinct work phases. You must make sure all the plumbing repairs are done before the carpenters' return to the work place. Do not schedule the painters until all the other workers have finished their assignments.

## **MANAGEMENT REPORTING**

Any management system requires management reporting in some form. You compile management reports from data available within the system. These reports provide a periodic status review for determining if there is a requirement for special management action. Maintenance management reports provide performance and manpower distribution information. You can

identify historical trends that can aid you in planning future work force requirements. The three types of reports used by PWDs are the Tabulated Report A, the Maintenance/Utilities Labor Control Report, and the Tabulated Report B.

## **TABULATED REPORT A**

The Tabulated Report A is a monthly report (fig. 9-9). It provides information on labor hours expended in the various work categories for each Maintenance and Utilities Branch work center and branch. The activity comptroller prepares Tabulated Report A. The report is due within ten working days after the last day of the period reported. This report provides basic feeder data to the Maintenance/Utilities Labor Control Report. The data on this report comes from personnel time cards.

## **MAINTENANCE/UTILITIES LABOR CONTROL REPORT**

The monthly Maintenance/Utilities Labor Control Report, NAVFAC Form 9-11014/29 (fig. 9-10), provides data on what was planned, the actual results, and any variances from the plan. It also provides a summary of the man-hours expended on each labor class code. This report permits management to forecast manpower requirements realistically for the various work categories. The report helps in the preparation of the Manpower Availability Summary and the Work Plan Summary. It enables management to decide if the need to issue fully controlled work is increasing or decreasing. The goal is the maximum use of planned, estimated, scheduled, and cost-accounted work. An increased use of unestimated standing job orders and E/S work could show a reduced effectiveness of the maintenance management system. Preparation and distribution of the Maintenance/Utilities Labor Control Report by the management analysis branch occurs within five working days after the receipt of Tabulated Report A.

## **TABULATED REPORT B**

Activities, having less than a 100-man Maintenance and Utilities Branch and do not have full accounting potential, are encouraged to use Tabulated Report B (Completed Job Orders).

This report normally is prepared either weekly or biweekly. Tabulated Report B (fig. 9-11) compares actual and estimated labor hours, labor costs, and

PUBLIC WORKS DEPARTMENT TABULATED REPORT A - FEEDER FOR MAINTENANCE/UTILITIES DIVISIONS LABOR CONTROL REPORT			
Work Center	Labor Class Code	Actual Labor Hours - Month	Actual Labor Hours - Fiscal Year-To Date
11	01	1474.9	638.2
	02	1433.4	397.7
	03	115.0	1438.9
	04	89.6	752.6
	05	218.7	1988.0
	06	175.3	1942.5
	07	788.2	8984.4
		1485.1	16122.3
			51.2
	40	5.5	1820.0
	41	152.0	762.1
	42	80.6	531.0
	43	58.0	
	44		1982.0
	45	178.0	5118.3
	483.1	21238.0	
	1948.2		
12	01	79.0	831.2
	02	16.0	194.6
	03	81.0	754.2
	04		215.8
	05	495.0	5318.1
	06	51.8	438.2
	07	115.0	1630.2
		837.8	8360.1
			31.2
	40		1432.0
	41	120.0	756.0
	42	94.6	421.8
	43	45.0	
	44		1536.0
	45	129.0	4177.0
	398.6	13667.1	
	1228.2		
Branch (A) Summary	01	153.9	1498.4
	02	49.4	592.3
	03	198.0	2183.1
	04	59.6	988.2
	05	713.7	7308.1
	06	228.9	2378.7
	07	903.2	10594.8
		2302.7	25502.4
			82.4
	40	5.5	3252.0
	41	272.0	1508.1
	42	184.2	952.8
	43	103.0	
	44		
	45	307.0	
Maintenance Division Summary	01	389.0	3241.0
	02	218.8	2002.1
	03	594.0	5634.0
	04	421.0	4437.2
	05	2431.6	25333.2
	06	1898.4	2070.4
	07	6945.2	73831.8
		12875.6	11864.9
			115.2
	40	27.8	7211.4
	41	824.5	1974.8
	42	231.2	1438.0
	43	189.6	1537.0
	44	180.0	18536.2
	45	1462.0	30812.6
	2886.1	47482.1	
	15580.9		
Utilities Division Summary	01	79.0	833.2
	02	38.2	311.7
	03	104.6	1312.2
		833.0	
	45	738.0	13321.8
	46	1279.3	67519.2
		7341.8	

Figure 9-9.—Tabulated Report A.

material costs broken down by the work centers for each completed or canceled job order.

The completed job order report with comments on the completed job order document from the shops enables management to determine if major problems are

present. Common problems are poor estimating, low productivity, and poor supervision. If variations are consistently large, management should act to correct the factors that are causing the problems. Future reports and observations show whether the corrective action has been successful or not.

MAINTENANCE DIVISION  UTILITIES DIVISION

1. **U.S. NAVAL STATION, BAYNHURST** 2.  SUMMARY REPORT  BRANCH REPORT  
 3. 4. TOTAL PERSONNEL **328** 5. PERIOD (From-To) **1-30 April 1994**

6. LINE ITEM	7. LABOR CLASS CODE	8. CONTROL ELEMENT	9. CURRENT MONTH MAN-HOURS			10. YEAR-TO-DATE MAN-HOURS				11. ACCEPTABLE RANGE
			a. PLANNED	b. ACTUAL	c. VARIANCE	a. PLANNED	b. ACTUAL	c. VARIANCE	d. % DIST	
1	40	REWORK	0	0	0	0	0	0	0	0.3 - 0.4%
2	41	SUPERVISION	2350	2094	-256	26590	23470	-3120	4.5	6 - 7.8%
3	42	SHOP INDIRECT	1600	1532	-68	16750	16671	-79	3.2	5 - 6%
4	43	ALLOWED TIME	1810	1303	-507	18586	16575	-2010	3.2	2 - 3%
5	44	GENERAL OFFICE & CLERICAL	704	671	-33	8244	7605	-639	1.5	1.5 - 2.5%
6	45	LEAVE	10640	10555	-85	68755	6823	-1832	12.9	14 - 16%
7										
8										
9	TOTAL	INDIRECT AND OVERHEAD MAN-HOURS	17104	1655	-949	138924	131244	-7680	26.3	28 - 32%
10	01	SERVICE	6700	5937	-763	67990	62718	-5272	12.1	6 - 9%
11	02	EMERGENCY WORK	2900	2495	-405	30395	29157	-1238	5.6	1.5 - 2.5%
12	03	DYNAMIC EQUIPMENT INSPECTION EQUIPMENT	106	157	57	4110	3866	-244	0.7	1.5 - 3%
13	04	STANDING JOB ORDERS NOT ESTIMATED	2885	3110	225	37410	32402	-5008	6.2	
14	05	STANDING JOB ORDERS ESTIMATED	3500	3917	417	46280	4129	-5621	7.9	
15	06	MINOR WORK	5980	4649	-1331	66294	52995	-13299	10.2	
16	07	SPECIFIC JOB ORDERS	18551	14533	-4018	207403	165396	-42007	31.9	
17										
18										
19	TOTAL	PRODUCTIVE MAN-HOURS	40624	34798	-5826	460642	387641	-72981	74.1	68 - 72%
20	GRAND TOTAL MAN-HOURS		57728	50953	-6775	599566	518905	-80661		
21	PRODUCTIVE EFFORT (Line 19 Line 20)		70.4 %	68.3 %		76.8 %	74.7 %			68 - 72%
22	LABOR PERFORMANCE - EPS <sup>1</sup>			96 %			103 %			95 - 105%
23	LABOR PERFORMANCE - NON-EPS <sup>2</sup>			108 %			101 %			95 - 105%
24	PRODUCTIVE MAN-HOUR CONTROL (Line 19 - 14 - 15 - 16 Line 19)		69.3 %	66.8 %		70.5 %	67.9 %			80 - 85%
			18139	23256		324001	283384			

86NP0008

Figure 9-10.—Maintenance/Utilities Labor Control Report NAVFAC Form 9-11-14/29.

**ENERGY MANAGEMENT**

During this cost-conscious age, the Navy is looking for ways to reduce dependency on petroleum products and reduce costs for energy. When performing the various inspections, you should look for ways to improve energy usage.

Energy management is not just replacing or removing light bulbs. You must look at all the aspects of your energy usage for each facility. As equipment is improved throughout

the world, better and more efficient equipment is made available. Guidelines have been established for usage reduction throughout DoD. These reductions can be accomplished by equipment upgrade as well as energy conservation.

Special funding is available through NAVFAC and the Navy for projects involving energy usage reduction. These projects could include items, such as replacing lighting fixtures in facilities, replacing the doors and

PUBLIC WORKS DEPARTMENT TABULATED REPORT B - COMPLETED JOB ORDERS

Trade Branch or Work Center	Job Order Number	Estimated Hours	Actual Hours	Estimated Labor Cost	Actual Labor Cost	Estimated Material Cost	Actual Material Cost	Estimated Total Cost	Actual Total Cost	Variation Total Cost
12	7212010	7	8.5	16	18.45	5	5.05	21	23.50	2.50
24	7212010	32	39.8	67	82.72	21	20.15	88	102.87	16.57
33	7212010	16	14.9	32	30.15	12	11.15	44	41.30	2.70
41	7212010	8	8.0	13	12.96			13	12.96	.04
		63	71.2	128	146.28	38	36.35	166	180.63	17.93
14	7242032	252	252.0	529	529.20	346	351.27	875	880.47	5.47
23	7242032	48	52.3	100	108.26	30	27.12	130	135.38	11.14
32	7242032	12	12.1	25	25.25	4	3.65	29	28.90	.60
42	7242032	188	188.3	305	305.09	7	30.83	312	335.92	23.92
		500	504.7	959	967.80	387	412.87	1346	1380.67	34.67
13	7272036	24	22.0	50	45.76	23	21.05	73	66.81	6.19
14	7272036	24	27.7	48	56.28	14	13.85	62	70.13	8.43
51	7272036	16	17.1	33	35.19	10	9.16	43	44.35	3.03
		64	66.8	131	137.23	47	44.06	175	181.29	9.17
12	7272062	265	283.5	548	586.85	187	172.25	735	759.10	53.60
33	7272062	79	74.3	161	150.75	65	59.95	226	210.70	15.30
41	7272062	61	110.1	125	225.72	30	49.33	155	275.05	120.05
		405	467.9	834	963.32	282	281.53	1116	1244.85	129.79
10	TRADE BRANCH A	780	758.2	1870	1819.68	1045	1078.73	2915	2898.41	84.05
20	TRADE BRANCH B	1650	1631.7	4290	4242.42	2580	2231.95	6870	6474.37	395.63
30	TRADE BRANCH C	1324	1280.0	3310	3200.00	1895	2017.51	5205	5217.51	232.51
40	TRADE BRANCH D	942	959.6	1885	1918.00	950	943.75	2835	2861.75	39.25
50	TRADE BRANCH E	631	652.0	1580	1630.00	870	891.15	2450	2521.15	71.15
	MAINT. DIV. SUMMARY	4696	4628.9	11355	11180.10	6470	6271.94	17825	17452.04	372.96
	UTIL. DIV. SUMMARY	631	652.0	1580	1630.00	870	891.15	2456	2521.15	71.15

NOTE: "cents" and decimal hours may be eliminated, if desired.

80NP0012

Figure 9-11.—Tabulated Report B (Completed Job Orders).

windows in many of the older facilities, or replacing entire HVAC systems. You should work closely with the PWO and the FME in determining the cost payback

of the modifications and energy reductions. Energy management is as much a part of facilities maintenance as inspections.



## APPENDIX I

# REFERENCES USED TO DEVELOP THE TRAMAN

**NOTE:** Although the following references were current when this TRAMAN was published, their continued currency cannot be assured. Therefore, you need to be sure you are studying the latest revision.

### CHAPTER 1

*Military Requirements for Petty Officer First Class*, NAVEDTRA 12046, Naval Education and Training Program Management Support Activity, Pensacola, Fla., November 1991.

*Naval Construction Force Manual*, NAVFAC P-315, Naval Facilities Engineering Command, Washington, D.C., February 1978.

*Personnel Readiness Capability Program*, NAVFAC P-458, Naval Facilities Engineering Command, Alexandria, Va., August 1985.

*The Navy Enlisted Performance Evaluation Manual*, BUPERINST 1616.9A, Department of the Navy, Washington, D.C., 24 August 1992.

### CHAPTER 2

*Naval Mobile Construction Battalion Crewleader's Handbook*, COMSECOND/COMTHIRDNCBINST 5200 series, Commander, Third Naval Construction Brigade, Pearl Harbor, Hawaii, and Commander, Second Naval Construction Brigade, Norfolk, Va., September 1992.

*Operations Officer's Handbook*, COMSECOND/COMTHIRDNCBINST 5200.2A, Commander, Third Naval Construction Brigade, Pearl Harbor, Hawaii, and Commander, Second Naval Construction Brigade, Norfolk, Va., May 1988.

*Seabee Planner's and Estimator's Handbook*, NAVFAC P-405, Naval Facilities Engineering Command, Alexandria, Va., October 1983.

### CHAPTER 3

*Naval Mobile Construction Battalion Crewleader's Handbook*, COMSECOND/COMTHIRDNCBINST 5200 series, Commander, Third Naval Construction Brigade, Pearl Harbor, Hawaii, and Commander, Second Naval Construction Brigade, Norfolk, Va., September 1992.

*Operations Officer's Handbook*, COMSECOND/COMTHIRDNCBINST 5200.2A, Commander, Third Naval Construction Brigade, Pearl Harbor, Hawaii, and Commander, Second Naval Construction Brigade, Norfolk, Va., May 1988.

*Seabee Planner's and Estimator's Handbook*, NAVFAC P-405, Naval Facilities Engineering Command, Alexandria, Va., October 1983.



## **CHAPTER 4**

*Department of the Navy Facility Category Codes*, NAVFAC P-72, Naval Facilities Engineering Command, Alexandria, Va., April 1984.

*Embarkation Manual*, COMSECOND/COMTHIRDNCBINST 3120.1, Department of the Navy, Commander, Third Naval Construction Brigade, Pearl Harbor, Hawaii, and Commander, Second Naval Construction Brigade, Norfolk Va., March 1983.

*Facilities Planning Guide*, NAVFAC P-437, Naval Facilities Engineering Command, Alexandria, Va., October 1979.

## **CHAPTER 5**

*Equipment Management Manual*, COMSECOND/COMTHIRDNCBINST 11200.1D, Commander, Third Naval Construction Brigade, Pearl Harbor, Hawaii, and Commander, Second Naval Construction Brigade, Norfolk, Va., September 1988.

*Naval Mobile Construction Battalion Crewleader's Handbook*, COMSECOND/COMTHIRDNCBINST 5200 series, Commander, Third Naval Construction Brigade, Pearl Harbor, Hawaii, and Commander, Naval Construction Brigade, Norfolk, Va., September 1992.

*Seabee Construction Management Student Guide*, Naval School, Civil Engineer Corps Officers, Port Hueneme, Calif., November 1992.

## **CHAPTER 6**

*Maintenance Management Program for Naval Construction Force Camps*, COMSECOND/COMTHIRDNCBINST 11014.2, Commander, Third Naval Construction Brigade, Pearl Harbor, Hawaii, and Commander, Second Naval Construction Brigade, Norfolk Va., July 1990.

## **CHAPTER 7**

*Hazardous Material Control and Management (HMC&M)*, OPNAVINST 4110.2, Department of the Navy, Office of the Chief of Naval Operations, Washington, D.C., June 1989.

*Naval Construction Force Occupational Safety and Health Program Manual*, COMSECOND/COMTHIRDNCBINST 5100.1F, Commander, Third Naval Construction Brigade, Pearl Harbor, Hawaii, and Commander, Second Naval Construction Brigade, Norfolk, Va., March 1991.

*Naval Mobile Construction Battalion Crewleader 5 Handbook*, COMSECOND/COMTHIRDNCBINST 5200 series, Commander, Third Naval Construction Brigade, Pearl Harbor, Hawaii, and Commander, Second Naval Construction Brigade, Norfolk, Va., September 1992.

*Navy Occupational Safety and Health (NAVOSH) Program Manual*, OPNAVINST 5100.23C, Department of the Navy, Office of the Chief of Naval Operations, Washington, D.C., November 1992.

*PCB Program Management Guide*, NEESO 20.2-028, Navy Environmental Support Office, Naval Energy and Environmental Support Activity, Port Hueneme, Calif., November 1980.

## **CHAPTER 8**

*Construction Contract Quality Management*, NAVFAC P-445, Naval Facilities Engineering Command, Alexandria, Va., January 1988.

*Contracting Manual*, NAVFAC P-68, Naval Facilities Engineering Command, Alexandria, Va., March 1994.

*Facility Support Contract Quality Management Manual*, MO-327, Naval Facilities Engineering Command, Alexandria, Va., June 1989.

## **CHAPTER 9**

*Energy Management*, OPNAVINST 4100.1C, Department of the Navy, Office of the Chief of Naval Operations, Washington, D.C., July 1986.

*Facilities Management*, NAVFAC MO-321, Naval Facilities Engineering Command, Alexandria, Va., September 1985.

*Inspection of Shore Facilities*, NAVFAC MO-322, Volume 1, Naval Facilities Engineering Command, Alexandria, Va., July 1977.

*Maintenance Management of Shore Facilities*, NAVFAC MO-321.1, Naval Facilities Engineering Command, Alexandria, Va., November 1978.

*Organization and Functions for Public Works Departments*, NAVFAC P-318, Naval Facilities Engineering Command, Alexandria, Va., September 1992.



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# *Assignment Questions*

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**Information:** The text pages that you are to study are provided at the beginning of the assignment questions.

COMMANDING OFFICER  
NETPDTC  
6490 SAUFLEY FIELD RD  
PENSACOLA, FL 32509-5237

ERRATA #2

05 May 1997

Specific Instructions and Errata for  
Nonresident Training Course

NAVAL CONSTRUCTION FORCE/SEABEE 1 & C

1. This errata supersedes all previous erratas. No attempt has been made to issue corrections for errors in typing, punctuation, etc., that do not affect your ability to answer the question or questions.
2. To receive credit for deleted questions, show this errata to your local course administrator (ESO/scorer). The local course administrator is directed to correct the course and the answer key by indicating the question deleted.
3. Assignment Booklet..

Delete the following questions, and leave the corresponding spaces blank on the answer sheets:

Questions

1-37

2-30

7-8

7-28

7-45

8-30

ASSIGNMENT 1

Textbook Assignment: "Administration," chapter 1, pages 1-1 through 1-17, and "Project Planning and Management," chapter 2, pages 2-1 through 2-12.

- 1-1. The purpose of the Personnel Readiness Capability Program is to provide accurate, up-to-date personnel information. This tool allows the NCF to accomplish its mission in which of the following ways?
1. By scheduling day-to-day work assignments for individual crew members
  2. By combining the information relevant to project planning
  3. By determining unit readiness through timely personnel information
  4. By scheduling project functions into a single master plan

IN ANSWERING QUESTIONS 1-2 THROUGH 1-6, REFER TO FIGURE 1-A.

CATEGORIES OF SKILLS	
A.	Individual general
B.	Individual rating
C.	Military
D.	Crew experience

Figure 1-A

- 1-2. What category of skills is related to two or more ratings and is primarily nonmanipulative?
1. A
  2. B
  3. C
  4. D
- 1-3. You can acquire what type of skills as a result of working with others on a particular project?
1. A
  2. B
  3. C
  4. D
- 1-4. What skills can you acquire as a result of training for combat?
1. A
  2. B
  3. C
  4. D

- 1-5. By working on a boiler installation with other personnel, you acquire skills in what category?
1. A
  2. B
  3. C
  4. D

- 1-6. A technical skill specifically related to one of the construction ratings falls in what category?
1. A
  2. B
  3. C
  4. D

- 1-7. Which of the following management tools should you use to collect crew member skill data?
1. Volume I, PRCP Skill Definitions
  2. PRCP Standards and Guides
  3. Matrix Numbers 1 and 2
  4. Section II, Manual of Navy Enlisted Manpower and Personnel Classifications and Occupational Standards

- 1-8. When collecting personnel data concerning an individual's skills, you should send the information to the unit's PRCP manager in what form?
1. Memorandum
  2. Computer disk
  3. Punched card
  4. PRCP Skill Update Record

- 1-9. What two types of interviews are conducted by a PRCP interviewer?
1. Standard and specific
  2. Individual rating and skill
  3. Other and individual rating
  4. Specific and other

- 1-10. When preparing for an individual rating skill interview, which of the following is the most important?
1. Review the appropriate section of the Occupational Standards Manual
  2. Learn as much as you can about the skill and the tasks explained in the interviewing guides
  3. Prepare the interviewee's service record
  4. Prepare the interviewee's checkoff sheet
- 1-11. Refer to figure 1-3 in the textbook. To qualify for Skill Level I, a craftsman must demonstrate which of the following skills?
1. Select, care, and use proper hand tools for various jobs
  2. Install plumbing systems for water, steam, air, and fuel
  3. Both 1 and 2 above
  4. Designate the spacing of pipe supports for all types of piping systems
- 1-12. Depending upon the complexity and number of tasks in a skill definition, there can be a maximum of how many levels?
1. Five
  2. Six
  3. Three
  4. Four
- 1-13. Refer to figure 1-4 in the textbook. Under task element .02b, what tasks are assigned?
1. A and E only
  2. D and E only
  3. A, B, D, and E
  4. A, B, F, and G
- 1-14. Whether a person does or does not have a certain skill is decided by what individual?
1. PRCP coordinator
  2. PRCP interviewer
  3. Training officer
  4. Company commander
- 1-15. The priorities, patterns, and tempo of a battalion training program are usually established by what authority?
1. The commanding officer
  2. The Naval Training Command
  3. The Chief of Naval Operations
  4. The COMSECOND/COMTHIRDNCB staff
- 1-16. The executive officer supervises and coordinates the work, exercises, training, and education of personnel in the command. He/she does this in what capacity?
1. Training officer
  2. Operations officer
  3. Chief staff officer
  4. Chief of training
- 1-17. Training conducted in an amphibious construction battalion is exactly the same as that conducted in a mobile construction battalion.
1. True
  2. False
- 1-18. The battalion training plan and organization must not interfere with construction schedules as set forth by the deployment operation order.
1. True
  2. False
- 1-19. In home port, training programs become the primary mission. Each NMCB is expected to spend what percentage of available man-days in training while in home port?
1. 55%
  2. 65%
  3. 75%
  4. 85%
- 1-20. When selecting individuals best suited to attend a Navy C-1 advance school, you should check which of the following data?
1. Personnel advancement requirements
  2. Battalion assignments
  3. Time in battalion
  4. Service records
- 1-21. What is the purpose of on-the-job training in a Seabee organization?
1. To indoctrinate new personnel
  2. To assist supervisors in developing management skills
  3. To help individuals acquire the necessary knowledge, skills, and habits to do a specific job
  4. To instill each person with interest and enthusiasm for the work to be done

- 1-22. Before setting up an on-the-job training program, you should perform which of the following actions first?
1. Write a set of lesson plans
  2. Develop task analysis statements
  3. Determine the type of training required
  4. Determine specific training objectives
- 1-23. After an on-the-job training program has been implemented, you should maintain program follow-up in which of the following ways?
1. By keeping an individual's training record current
  2. By ensuring the project does not lag
  3. By ensuring newly developed skills are used properly
  4. Each of the above
- 1-24. When used properly, what method is most effective for training workers on the job?
1. Group
  2. Academic
  3. Self-study
  4. Coach-pupil
- 1-25. In on-the-job training, the term "group instruction" most closely relates to what other type of instruction?
1. Academic
  2. Self-study
  3. Classroom
  4. Technical
- 1-26. What type of instruction explains regulations, indoctrinates new people, and identifies the what, when, where, how, and why of a situation?
1. Formal
  2. Immediate
  3. Piecemeal
  4. Group instruction
- 1-27. Interviews between the trainee and the trainer in a developmental on-the-job training program will NOT accomplish which of the following objectives?
1. Determining training needs
  2. Assessing progress of the trainee
  3. Resolving trainee questions
  4. Evaluating performance tests
- 1-28. Taking which of the following steps may help you to plan and carry out a successful training program?
1. Using correct methods to ensure learning
  2. Measuring achievement at regular intervals
  3. Recording results
  4. Each of the above
- 1-29. Which, if any, of the following methods would be effective in evaluating the success of a training program?
1. Testing the trainee
  2. Spot checking performance at the jobsite
  3. Checking the work schedule backlog
  4. None of the above
- 1-30. The success of any project depends a great deal upon attention to detail and what other factor?
1. Experience
  2. Care taken in planning
  3. Mode of transportation
  4. Distance to jobsite
- 1-31. As the petty officer or chief in charge of a crew, you are responsible for crew member time management. When is the best time to confirm plans for the next workday?
1. At the beginning of each day
  2. At the beginning of each week
  3. At the close of each day
  4. At the close of each week
- 1-32. For you to properly plan your project you must be able to organize. What is the first step in organizing this project?
1. Plan the job sequences
  2. Plan for the equipment
  3. Schedule the material
  4. Schedule the tools
- 1-33. Since safety and production go hand in hand, the only efficient way to do any thing is the safe way. Which of the following is the best way to have a safe project?
1. Post safety slogans on all bulletin boards
  2. Read the Safety Line each week
  3. Visit with the battalion safety chief daily
  4. Teach, observe, and plan with safety in mind

- 1-34. When making work assignments, it is best to rotate the jobs among the crew. What is the main advantage of rotating work assignments?
1. It identifies the less skilled crew members
  2. It prevents specialization of work
  3. It confuses the crew
  4. It lengthens a short project
- 1-35. What is/are the advantage(s) to assigning more crews or crew members to a project that has a unique phase of the rate?
1. Enhances direct labor
  2. Employs all crews
  3. Speeds project completion
  4. Promotes teamwork, new skills, and versatility
- 1-36. The Enlisted Performance Evaluation Report is the most significant personnel management tool in the enlisted service record. It is designed primarily for what use?
1. Making advancement and assignment decisions
  2. Making reenlistment decisions
  3. Making retention decisions
  4. Making special educational decisions
- 1-37. Which of the following instructions shows you what goes in each block of an Enlisted Performance Evaluation Report?
1. BUPERSINST 1430.16
  2. OPNAVINST 5102.1
  3. OPNAVINST 6110.1
  4. NAVMILPERSCOMINST 1616.1
- 1-38. To prepare a rough evaluation report properly, you should have the individual submit what input form?
1. NAVPERS 1616/21
  2. NAVPERS 1616/24
  3. NAVPERS 18068
  4. NAVPERS 18665
- 1-39. CPA, CPM, and PERT are techniques used in the analysis of a flow of events and activities of a construction project. What is the generic title covering these construction management techniques?
1. Network analysis
  2. Planning and estimating
  3. Flow charting
  4. Project analysis
- 1-40. Construction management in the Seabees is based on the critical path method. This method has which of the following major advantages?
1. Mobility
  2. Training
  3. Versatility
  4. Inexpensive
- 1-41. When developing construction activities, they should be less than how many days in duration?
1. 5
  2. 10
  3. 15
  4. 20
- 1-42. In an NMCB, what individual has functional authority over construction projects?
1. A3
  2. B3
  3. H3
  4. S3
- 1-43. All construction work done by the battalion is according to the construction quality control program. This construction work is outlined in which of the following manuals?
1. P-908
  2. P-445
  3. P-404
  4. P-307
- 1-44. The prime contractor and subcontractors are assigned by the Operations department. The prime contractor of a project has which of the following responsibilities?
1. Safety on the project
  2. Quality of the project
  3. Timeliness of the construction effort
  4. All of the above
- 1-45. How many folders are there in a project package?
1. Seven
  2. Eight
  3. Nine
  4. Ten
- 1-46. What folder in a project package contains the project quality control plan?
1. #5
  2. #6
  3. #7
  4. #8

- 1-47. What folder in a project package contains the project specifications?
1. #6
  2. #7
  3. #8
  4. #9
- 1-48. What folder in a project package contains the level II precedence diagram?
1. #5
  2. #6
  3. #3
  4. #4
- 1-49. Project planning milestones are used to help you in the planning of your project and the development of your project package. What department assigns these milestones?
1. P & E
  2. Operations
  3. Planning
  4. Material
- 1-50. When estimating a project, the crew leader is responsible for ensuring all required resources are identified. Where do you list these resources and any action required to track them?
1. CAS sheets
  2. Master sheets
  3. Duration sheets
  4. Production sheets
- 1-51. When planning a project in the NCF, you should not exceed what number of master activities?
1. 5
  2. 10
  3. 15
  4. 20
- 1-52. Master activities can be broken into at least what number of construction activities?
1. 5
  2. 10
  3. 15
  4. 20
- 1-53. A work element checklist is a good guide for developing construction activities. It can be found in what book?
1. NAVFAC P-908
  2. NAVFAC P-404
  3. NAVFAC P-307
  4. NAVFAC P-405
- 1-54. A typical Naval Mobile Construction Battalion project contains how many construction activities?
1. Between 25 and 80
  2. Between 15 and 70
  3. Between 25 and 60
  4. Between 15 and 50
- 1-55. Construction activity numbers are usually four digits. What do the first two digits identify?
1. Construction activity
  2. Master activity
  3. Specific project
  4. Specific element
- 1-56. You need to know how to calculate man-days and duration for each construction activity. What manual is the primary reference for Seabee man-day estimates?
1. NAVFAC P-401
  2. NAVFAC P-405
  3. NAVFAC P-307
  4. NAVFAC P-305
- 1-57. According to NAVFAC P-405, regardless of the length of the workday, tasking, estimating, and reporting of each man-hour are always figured using what number of hours?
1. 6
  2. 8
  3. 10
  4. 12
- 1-58. When figuring the production efficiency factor for a project, you must assign a production factor for each element of the job. What is considered the average production factor?
1. 60
  2. 62
  3. 67
  4. 70
- 1-59. For each particular construction activity, the delay factor is only used in what calculations?
1. Man-day estimate
  2. Activity duration
  3. Man-day equivalent
  4. Project duration



1-60. Availability factors take into account that Seabees assigned as direct labor are not available 100 percent of the time. What is the availability factor for the main body?

1. 0.60
2. 0.65
3. 0.70
4. 0.75

ASSIGNMENT 2

Textbook Assignment: "Project Planning and Management," chapter 2, pages 2-12 through 2-49.

2-1. When determining construction activity durations, lost time from the project site can be accounted for by including what factor in the equation?

1. Delay
2. Availability
3. Production
4. Efficiency

2-2. Once the master activities have been broken into construction activities, you will need to use a CAS sheet for each activity. Where on the CAS sheet do you put the man-day and duration calculations?

1. Front page top
2. Front page bottom
3. Back page top
4. Back page bottom

2-3. Of the following information, what should be put on CAS sheets?

1. Man-days
2. Tools
3. Equipment
4. All of the above

2-4. Which of the following is a major use of a rough level II schedule?

1. To provide an overall picture of the entire deployment
2. To coordinate the planning effort between companies
3. To provide periods where special tools are required
4. To provide material delivery dates

2-5. The logic network is a basic management tool. How is it used in relation to all resources that are directly related to time?

1. Controls
2. Monitors
3. Distributes
4. All of the above

2-6. Which of the following is a major use of the logic network during the planning stage?

1. To indicate all activities that must be accomplished
2. To record the drawings for each project
3. To show structural changes
4. To list the quantities and types of work

2-7. What is the general rule for creating an activity?

1. An activity is created for any function that uses indirect labor
2. An activity is created for any function that does not use indirect labor
3. An activity is created for any function that uses direct labor
4. An activity is created for any function that does not use direct labor

2-8. Resources must be tied directly to the CAS sheet and network.

1. True
2. False

2-9. Why is it important to do the logic network when breaking the project down into construction activities?

1. To ensure network is completed on time
2. To ensure all items of work are included
3. To ensure quality control
4. To ensure safety on the project

2-10. In the logic network, what shape is used to represent activities?

1. An octagonal box
2. A start and finish node
3. A rectangular box
4. A round node

IN ANSWERING QUESTIONS 2-11 AND 2-12, REFER TO FIGURE 2-11 OF THE TEXTBOOK.

2-11. Activity 1020 cannot start until what activity is complete?

1. 1010
2. 1050
3. 1030
4. 1040

2-12. Activity 1030 cannot start until what activity is complete?

1. 1010
2. 1020
3. 1050
4. 1040

IN ANSWERING QUESTIONS 2-13 THROUGH 2-15, REFER TO FIGURE 2-12 OF THE TEXTBOOK.

- 2-13. In the activity block, where will the activity number be inserted?
1. Upper left
  2. Lower left
  3. Upper right
  4. Lower right
- 2-14. Where in the activity block will the late finish be inserted?
1. Upper left
  2. Lower left
  3. Upper right
  4. Lower right
- 2-15. Where in the activity block will the activity description be inserted?
1. Upper right
  2. Lower right
  3. Upper center
  4. Lower center
- 2-16. What is the main objective of the forward pass computations?
1. To determine the duration of the project
  2. To establish early start dates
  3. To determine late start dates
  4. To establish the duration of the activity
- 2-17. What are lag times?
1. Mandatory break times
  2. Mandatory wait times between activities
  3. Optional break times
  4. Optional wait times between activities
- 2-18. What is the equation for finding the early finish time of an activity?
1. Early start minus duration
  2. Late start minus duration
  3. Early start plus duration
  4. Late start plus duration
- 2-19. In a basic schedule, what factor is determined by the backward pass computations?
1. The earliest possible start and finish
  2. The critical path
  3. The duration of the project
  4. The computed float only
- 2-20. Which of the following phrases best describes the critical path in a precedence diagram?
1. It is the shortest path throughout the network
  2. It is the path with the most free float
  3. It is the longest path throughout the network
  4. It is the path with the most total float
- 2-21. What term is used to identify the number of days an activity can be delayed without delaying the project completion date?
1. Float
  2. Allowance of time
  3. Dead time
  4. Total float
- 2-22. Which of the following statements best describes free float?
1. The number of days free during the deployment
  2. The number of days an activity can be delayed without taking float away from the next activity
  3. The number of days free during the project
  4. The number of days off during the project
- 2-23. When network calculations are being performed, the total float of an activity should be determined by the use of what formula?
1. Total float = late start plus early start
  2. Total float = early start minus early finish
  3. Total float = late start plus late finish
  4. Total float = late start minus early start
- 2-24. What is the meaning of the term critical activity?
1. The activity is in bad shape
  2. The activity has no float
  3. The activity has no material
  4. The activity has float
- 2-25. When calculating the start and finish dates of a project network, what logic type will give you the longest project duration?
1. Finish-to-start
  2. Start-to-start
  3. Finish-to-finish
  4. Late finish to early finish

2-26. On a level III barchart, what markings represent the critical construction activity durations?

1. Single dash lines
2. Red lines
3. Double dash lines
4. Black dots

2-27. On the level III barchart, free float is shown as dots behind each noncritical activity. How do you find the total float for an activity with no free float?

1. Look at the activity at the beginning of the network
2. Look at the activity at the end of the network
3. Look at the next activity
4. Look at the activity with shared floats

2-28. Resource leveling involves matching construction activities scheduled with what other factor?

1. The material on hand
2. The crew size available
3. The network
4. The project

2-29. Which of the following do you need to know in order to perform resource leveling?

1. Time-scaled schedule
2. Crew size
3. Histogram
4. All of the above

FOR QUESTIONS 2-30 AND 2-31, REFER TO FIGURE 2-16 OF THE TEXTBOOK.

2-30. Look at activity 1020 in the histogram of June 28. How many equipment operators are required for that day?

1. Zero
2. Two
3. Three
4. Four

2-31. How many equipment operators are required to complete activity 1020?

1. Zero
2. Two
3. Six
4. Eight

FOR QUESTIONS 2-32 AND 2-33, REFER TO FIGURE 2-17 OF THE TEXTBOOK.

2-32. What is the total float for activity 4000?

1. 11
2. 2
3. 13
4. 14

2-33. How many builders are required for activity 4000?

1. 13
2. 2
3. 6
4. 8

2-34. When the level III barchart is sorted by early start dates, an activity can be moved in what direction(s)?

1. Forward only
2. Backward only
3. Forward or backward
4. Any direction

2-35. Activities that show no free float are tied by dependency to what factor?

1. Total float
2. Available resources
3. The network
4. Other activities

2-36. A level III barchart sorted by activity number is used in the development of the level II. Man-day estimates are taken from what source?

1. Histogram
2. Network
3. CAS sheets
4. Level I

2-37. On a level II barchart, the weeks for the entire deployment are written across the top. What day of the week is always used?

1. Sunday
2. Monday
3. Friday
4. Saturday

2-38. On a level II barchart, the scheduled progress curve is drawn by plotting the percent complete scheduled at the end of what period of time?

1. One week
2. Two weeks
3. Thirty days
4. Quarterly

- 2-39. CAS sheets used properly can greatly enhance the construction effort of your project. Of the following, which one is an important use of the CAS sheets?
1. Control the work load
  2. Control the job conditions
  3. Track resources
  4. Track labor skills
- 2-40. What individual initiates local purchase actions?
1. Expeditor
  2. Project chief
  3. MLO
  4. Crew leader
- 2-41. Of the following barcharts, which is used to reflect the daily status of your project?
1. Level I
  2. Level II
  3. Level III
  4. Level IV
- 2-42. The critical path on the barchart that is posted on the jobsite should be highlighted in what color?
1. Yellow
  2. Red
  3. Green
  4. Blue
- 2-43. Which of the following factors, if not tracked continuously, could cause a work delay?
1. Long lead items
  2. Personnel
  3. Tools
  4. Man-days
- 2-44. If the project is behind schedule, what form is used to reflect how you are going to get back on schedule?
1. Level I
  2. Level II
  3. CAS sheet
  4. Two-week schedule
- 2-45. Which of the following tools is used primarily by the crew leader to ensure that all materials are on the jobsite?
1. Inventory log
  2. Expediter log
  3. Two-week schedules
  4. MLO log
- 2-46. A crew leader requesting material from MLO should give a lead time of what minimum number of days?
1. One
  2. Two
  3. Three
  4. Four
- 2-47. When giving crew briefings, which of the following tools can be used to improve the briefings?
1. Plan of the day
  2. Master activity prep list
  3. Project status
  4. Project summary
- 2-48. What is the formula for calculating the actual availability factor for your project?
1.  $AF = \frac{MD \text{ expended}}{Crew \text{ assigned} \times WD \times MDE}$
  2.  $AF = \frac{Crew \text{ assigned}}{WD \times MDE}$
  3.  $AF = \frac{Crew \text{ assigned} \times WD \times MDE}{MD \text{ expended}}$
  4.  $AF = \frac{MDE}{MD \text{ expended} \times WD}$
- 2-49. Increasing availability by 10 percent is the same as adding how many personnel to your crew?
1. One
  2. Two
  3. Three
  4. Four
- 2-50. Projects are initially laid out on a logic diagram using what type of logic relationship?
1. Start-to-finish
  2. Start-to-start
  3. Finish-to-finish
  4. Finish-to-start
- 2-51. What type of logic relationship will stretch the project completion date?
1. Start-to-finish
  2. Start-to-start
  3. Finish-to-finish
  4. Finish-to-start
- 2-52. At what point during the deployment are project schedules considered firm?
1. After the BEEP
  2. After the 45-day review
  3. After the 90-day review
  4. After the project start date

- 2-53. What is the most accurate way of recording man-days expended on a project?
1. Labor reports
  2. Timecards
  3. SITREPs
  4. Barcharts
- 2-54. What type of labor contributes directly to the accomplishment of the battalion's mission?
1. Direct
  2. Indirect
  3. Productive
  4. Overhead
- 2-55. Man-days expended directly on construction activities, in the field or the shop, are considered what type of labor?
1. Direct
  2. Indirect
  3. Productive
  4. Overhead
- 2-56. Labor expended in "A" Co. CM shops is considered what type?
1. Direct
  2. Indirect
  3. Productive
  4. Overhead
- 2-57. When filling out a SITREP feeder, what is the formula for figuring the weighted percent for each master activity?
1. Master activity estimated man-days divided by total project estimated man-days
  2. Total project estimated man-days divided by master activity estimated man-days
  3. Original estimated man-days divided by project estimated man-days
  4. Project estimated man-days divided by original estimated man-days
- 2-58. When computing master activity percent complete (WIP), which of the following data is NOT used?
1. Weighted percent
  2. Man-days expended
  3. Actual work in place
  4. Master activity percent complete
- 2-59. The project percent complete is computed by multiplying what two figures?
1. Weighted percent by man-days remaining
  2. Weighted percent by man-days expended
  3. Weighted percent by master activity percent complete
  4. Weighted percent by original man-days estimated
- 2-60. What is the allowable percent deviation between actual WIP and scheduled WIP for a project of 800 man-days?
1. 20%
  2. 15%
  3. 10%
  4. 5%
- 2-61. A construction activity with an original estimate of 40 man-days is 25 percent complete. How many man-days are remaining?
1. 30
  2. 25
  3. 20
  4. 15
- 2-62. Once construction has started on a project, it is considered active and is not removed from the SITREP until the project is accepted by what individual?
1. The QC chief
  2. The ROICC
  3. The operations chief
  4. The operations officer
- 2-63. What authority approves the adjustment of the usable completion date (UCD) reflected in the SITREP?
1. Operations officer
  2. Commanding officer
  3. 2ndNCB/3rdNCB
  4. ROICC
- 2-64. To make a progress curve on the level II barchart, what figures must be plotted?
1. Estimated man-days and actual man-days expended
  2. Estimated man-days and percent completed
  3. Man-days expended and man-days remaining
  4. Man-days expended and percent completed

- 2-65. Who is responsible for safety on your jobsite?
1. Safety officer
  2. Safety chief
  3. You
  4. ROICC
- 2-66. What is the most common cause of project mishaps?
1. Safety chief not on jobsite
  2. Unsafe construction practices
  3. Material delay
  4. Insufficient tools
- 2-67. What is the purpose of the daily stand-up safety lecture?
1. To discuss daily events
  2. To increase personnel awareness
  3. To distribute routine tasking
  4. To discuss project status
- 2-68. Ground fault circuit interrupters (GFCIs) should be used with what type of tools?
1. Double insulated tools
  2. Uninsulated tools
  3. Old tools
  4. All power tools
- 2-69. How often are all electrical portable tools, extension cords, small gasoline, pneumatic, and power-actuated tools safety inspected and tagged with the safety color of the month?
1. Monthly
  2. Bimonthly
  3. Quarterly
  4. Yearly
- 2-70. Guidance on the removal of asbestos can be found in which of the following instructions?
1. NAVFAC P-908
  2. NAVFAC P-307
  3. COM2NDNCB/COM3RDNCBINST 11200 series
  4. COM2NDNCB/COM3RDNCBINST 5100 series
- 2-71. According to the EM 385-1-1, a bank on stable ground has to be what minimum height to require shoring?
1. 10 feet
  2. 2 feet
  3. 5 feet
  4. 8 feet
- 2-72. Upon completion of a project, where do you turn in excess project material?
1. DRMO
  2. MLO
  3. Dump
  4. CTR
- 2-73. At the close of a project, the battalion is required to turn in how many sets of red-line drawings to the ROICC?
1. Eight
  2. Two
  3. Six
  4. Four
- 2-74. After the preliminary acceptance inspection with the ROICC, who provides the written punchlist?
1. Operations officer
  2. Customer
  3. ROICC
  4. Project supervisor
- 2-75. After the project has been accepted, the project files are closed and retained for what amount of time?
1. 6 months
  2. 12 months
  3. 24 months
  4. 36 months

ASSIGNMENT 3

Textbook Assignment: "Construction Management," chapter 3, pages 3-1 through 3-30, and "Advanced Base Planning and Embarkation," chapter 4, pages 4-1 through 4-8.

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- 3-1. The main purpose of the quality control (QC) program is to prevent discrepancies in workmanship and materials. In addition to the chain of command, who is responsible for quality construction?
1. Crew leader
  2. Project chief
  3. QC chief
  4. Operations officer
- 3-2. Who is responsible for developing an aggressive QC plan for each project?
1. QC chief
  2. Project chief
  3. Company chief
  4. Crew leader
- 3-3. To ensure quality, a means of measuring QC must be established. These QC measures are written on the CAS sheet in what manner?
1. In construction language
  2. In military language
  3. In plain language
  4. In CEC language
- 3-4. When developing a QC plan, what is the last major step?
1. Develop equipment report
  2. Develop material report
  3. Develop daily QC inspection report
  4. Develop visitor report
- 3-5. Where are all test and inspections listed on the CAS sheet?
1. Front
  2. Back
  3. Under Remarks/Results
  4. Under Assumptions
- 3-6. The ROICC approves any battalion recommended field changes. What authority approves any changes that require 50 or more man-days of additional direct labor?
1. ROICC
  2. Customer
  3. Operations officer
  4. 2ndNCB/3rdNCB
- 3-7. What project package folder contains the log of all design change requests?
1. 5
  2. 6
  3. 7
  4. 8
- 3-8. How often are red-line drawings updated and compared with the drawings held by the operations department?
1. Every week
  2. Every 2 weeks
  3. Every 3 weeks
  4. Every 4 weeks
- 3-9. What unit within the battalion performs the material tests that are required by specifications?
1. MLO
  2. Safety
  3. Engineering
  4. Operations
- 3-10. As project materials are received in MLO, they will be inspected by the crew leader for that project. How many days prior to use will they have to be inspected again?
1. 10
  2. 20
  3. 30
  4. 60
- 3-11. The goal of the 2ndNCB/3rdNCB is to have what percent of critical path materials on site at project start?
1. 100
  2. 75
  3. 50
  4. 25
- 3-12. In home port who generates the bills of material for your project?
1. Battalion operations
  2. Battalion engineering
  3. 20th or 31th NCR
  4. Project customer



- 3-13. The material take-off list is used for what purpose?
1. First-stage planning
  2. Check-and-balance
  3. MLO order list
  4. Receipt for MLO
- 3-14. What is the purpose of a BM add-on?
1. To order an existing BMLI
  2. To add a continuation of the BM
  3. To decrease paperwork
  4. To order a completely new item
- 3-15. When deployed on an Atlantic site, what report is used to track your materials?
1. Project control report
  2. Project status report
  3. Project material report
  4. Project supply report
- 3-16. What report is used by MLO to track project money spent on locally procured materials?
1. PCR
  2. PSR
  3. EAC
  4. PBR
- 3-17. Once deployed and your project has started, how many working days of material must you keep on the jobsite?
1. 10
  2. 20
  3. 30
  4. 45
- 3-18. For "B" priority locally ordered items, how much lead time must you give MLO after they receive your 1250-1?
1. 1 to 3 days
  2. 2 weeks plus
  3. 3 to 4 weeks
  4. 4 days to 2 weeks
- 3-19. The excess file in MLO is established from material left over from completed projects. How long will MLO store this material?
1. 1 month
  2. 2 months
  3. 3 months
  4. 6 months
- 3-20. The SAMMS computer system in MLO generates a materials due report. How often should MLO provide this report for your project?
1. Once a week
  2. Twice a month
  3. Monthly
  4. Every six months
- 3-21. What is the policy for picking up hitchhikers?
1. Allowed only in foul weather
  2. Encouraged when it does not interfere with your mission
  3. Strictly forbidden
  4. Always allowed
- 3-22. On a piece of operating construction equipment, what determines the number of personnel allowed on it?
1. Number of seats
  2. Amount of room
  3. Type of task
  4. Size of equipment
- 3-23. When will equipment be made available for maintenance?
1. When workload allows
  2. When scheduled by maintenance branch
  3. Upon completion of project
  4. During slack times
- 3-24. Who performs operator maintenance on equipment assigned to your project?
1. The EO assigned to the project
  2. The CM assigned to the project
  3. The individual operating that piece of equipment
  4. The crew leader
- 3-25. Operators of automotive or construction equipment are responsible for the prestart inspection. Where can a list of these services be found?
1. Equipment Repair Order
  2. Shop Repair Order
  3. Project Inspection List
  4. Inspection Guide and Trouble Report (hard card)

- 3-26. Scheduled maintenance is known as preventive maintenance (PM). Besides maximizing equipment availability, what is the prime objective of this maintenance?
1. To slow project completion
  2. To minimize unnecessary repair cost
  3. To maximize shop workload
  4. To fully train shop mechanics
- 3-27. On a piece of NCF equipment, the standard interval between PM service is what number of working days?
1. 90
  2. 60
  3. 30
  4. 40
- 3-28. On what basis, if any can the interval for PM on a piece of equipment be extended?
1. Operator's decision
  2. Project requirements
  3. Crew leader's decision
  4. None; the interval can never be extended
- 3-29. Tool accountability is controlled by the crew leader through tool kit inventories. How often are tool kit inventories required by the Seabee Supply Manual?
1. Monthly
  2. Twice monthly
  3. Quarterly
  4. Annually
- 3-30. What is the first thing visitors notice about your jobsite?
1. Quality of work
  2. Quantity of work
  3. Appearance
  4. Number of personnel assigned
- 3-31. Crew leaders must be prepared for the inspections given by each brigade. The one given by the 3rdNCB is called an ORI. What is the one given by the 2ndNCB called?
1. FEX
  2. DMI
  3. QCI
  4. SPC
- 3-32. Which of the following data is included among the contents of the NAVFAC P-437, volume 1?
1. Amounts of fuel required to operate components
  2. Sizes of the crew it takes to operate facilities
  3. Number of acres of land a facility occupies
  4. Drawings of facilities and assemblies
- 3-33. A site plan for a specific component may be located in what (a) volume and (b) part of the P-437 ABFC?
1. (a) Volume 1 (b) Part 1
  2. (a) Volume 2 (b) Part 2
  3. (a) Volume 1 (b) Part 2
  4. (a) Volume 2 (b) Part 1
- 3-34. A construction network is included in the ABFC system as part of the design package in the NAVFAC P-437. In what grouping can the networks be found?
1. Assembly
  2. Component
  3. Facility
  4. Project
- 3-35. Volume 2 of the NAVFAC P-437 lists, by national stock number (NSN), the material requirements for which of the following units?
1. Facility
  2. Assembly
  3. Project
  4. Component
- 3-36. NAVFAC P-437, volume 2, lists the requirements referred to in question 3-35 not only by NSN, but also by DoD category codes. These same category codes are also listed in which of the following publications?
1. NAVFAC P-72
  2. NAVFAC P-315
  3. NAVFAC P-405
  4. NAVFAC P-307
- 3-37. To find the facility that is required for enlisted personnel quarters, you should look under what category code?
1. 900 - Real Estate
  2. 800 - Utilities and Ground Improvement
  3. 300 - Research, Development, and Evaluation
  4. 700 - Housing and Community

- 3-38. Assemblies are functionally grouped by numbers so they relate to which of the following installation characteristics?
1. Occupational Field 13 skills required
  2. Size of the crew required
  3. Amount of Alfa Company support required
  4. Amount of supplies on hand

- 3-39. How can components or facilities be tailored?
1. By specifying requirements for Tropical or North Temperate Zones
  2. By deleting or adding facilities or assemblies
  3. Both 1 and 2 above
  4. By requesting additional assistance from NAVFAC only

- 3-40. In the ABFC system, what code identifies assemblies required for use in the North Temperate Zone?
1. T
  2. NT
  3. N
  4. c

IN ANSWERING QUESTION 3-41, REFER TO FIGURE 4-2 OF THE TEXTBOOK.

- 3-41. Approximately how many man-hours should it take to install two 200-kW diesel generators?
1. 10
  2. 9
  3. 7
  4. 5

- 3-42. In the Facilities Planning Guide, how are component site plans represented?
1. Construction drawing numbers
  2. NAVFAC drawing numbers
  3. CECOS drawing numbers
  4. NCF drawing numbers

- 3-43. Construction standards are grouped into two classifications, initial and temporary. What is the duration requirement for initial construction?
1. More than 16 weeks
  2. Less than 12 weeks
  3. More than 8 months
  4. Less than 6 months

- 3-44. Fuel usage is computed for installed engine-driven equipment based on a requirement of how many days?
1. 90
  2. 60
  3. 30
  4. 10

- 3-45. How are facility drawings in volume 1, part 2 indexed?
1. By facility number
  2. By drawing number
  3. By construction number
  4. By CESE number

- 3-46. What numbering system is used to identify the Civil Engineer Support Equipment needed to make a facility functionally operational?
1. CESE
  2. ECC
  3. TOA
  4. ABIOL

IN ANSWERING QUESTION 3-47, REFER TO TABLE 4-1 OF THE TEXTBOOK.

- 3-47. A facility is to be disassembled and moved to another location and reused. What recoverability code is assigned to this facility?
1. A
  2. B
  3. C
  4. D

IN ANSWERING QUESTION 4-48, REFER TO FIGURE 4-4 OF THE TEXTBOOK.

- 3-48. How many construction electricians are required to install assembly number 32602?
1. One
  2. Two
  3. Three
  4. Four

- 3-49. When ordering a component, not in your TOA, what authority must the request go through?
1. NAVFAC
  2. CNO
  3. CESCO
  4. OPNAV

- 3-50. In what publication is the *Index of Facilities* listed?
1. P-404
  2. P-307
  3. P-437
  4. P-315

- 3-51. To obtain fixtures that are not furnished with a facility or an assembly listed in NAVFAC P-437, you should do which of the following?
1. Order them separately
  2. Purchase them on the open market
  3. Pick them up at a supply depot
  4. Build them yourself

ASSIGNMENT 4

Textbook Assignment: "Advanced Base Planning and Embarkation," chapter 4, pages 4-7 through 4-32.

- 
- 4-1. Which of the following terms applies to a naval unit with the capability of deploying and redeploying in response to an assigned mission?
1. Readiness
  2. Operational
  3. Mobile
  4. Tactical
- 4-2. To meet the requirements for contingency support, an NMCB in home port must be capable of redeployment within a maximum of how many days?
1. 10
  2. 20
  3. 30
  4. 60
- 4-3. During the first 30 days after returning to home port, a battalion must be ready to deploy an air detachment within what amount of time?
1. 8 hours
  2. 24 hours
  3. 36 hours
  4. 48 hours
- 4-4. During an embarkation, what personnel are expected to perform the mount-out?
1. Equipment operators
  2. Mechanics
  3. Builders
  4. All hands
- 4-5. What U.S. Air Force command is usually requested to provide strategic airlift requirements for contingency movements of NCF mobile units?
1. The Strategic Air Command
  2. Airlift Mobility Command
  3. The Tactical Air Command
  4. The North American Air Defense Command
- 4-6. Which of the following types of U.S. Air Force aircraft is/are used by the NCF for strategic embarkation?
1. C-130
  2. C-141
  3. C-5
  4. Each of the above
- 4-7. The Air Force uses the same Computer-Aided Load Manifesting (CALM) system as the NCF. What is the purpose of this system?
1. To design mount-out exercises
  2. To design aircraft load plans
  3. To program flight movement
  4. To program unit movement
- 4-8. In an amphibious embarkation, what authority determines the shipping requirements and embarkation schedules?
1. Loadmaster
  2. 2nd NCB
  3. 3rd NCB
  4. OPNAV
- 4-9. The first principle of embarkation planning dictates that the plans must support which of the following evolutions?
1. Personnel, equipment, and supplies must be loaded in a manner that will permit unloading in the time and sequence required to support the landing force ashore
  2. NCF embark plans must contain combat support requirements for use during assault operations
  3. The NCF embark officer must retain control of the assault force debarkation sequence
  4. The embark planners must obtain an exact description of the tactical OPORD tasks ashore in order to modify each wave requirement and beachhead arrival sequence
- 4-10. To provide the highest possible degree of self-sufficiency during embarkation operations, the weapons, communications equipment, and CESE should be shipped in what manner?
1. Separately, troops in one group and equipment in another
  2. Weapons and troops together and CESE separately
  3. Equipment, supplies, and supporting gear should be shipped with the troops using them
  4. As determined by the combat cargo officer or aircraft loadmaster

- 4-11. There are four packing lists prepared for each mount-out box. One copy is placed inside the box, the second copy is retained by the user department, and the third copy is retained by the embarkation MOCC. Where is the final copy placed?
1. In the supply department file
  2. In a protective packet on the outside of the box
  3. In the custody of the aircraft commander or the combat cargo officer
  4. In the group embarkation commander's status files
- 4-12. A mount-out box should be kept to what maximum gross weight to expedite handling?
1. 150 pounds
  2. 250 pounds
  3. 350 pounds
  4. 400 pounds
- 4-13. Which of the following duties is the responsibility of the COMSECONDD/COMTHIRDD NCB embarkation staff?
1. Assigning cargo assembly areas, vehicle staging areas, and embarkation points
  2. Advising battalion or team embarkation officers in the preparation of load plans
  3. Maintaining constant liaison with other services and external organizations that support the embarkation process
  4. Preparing and maintaining template files of all currently deployed Tab A equipment attached to the battalion
- 4-14. In order to be assigned to the regimental embarkation staff, you must complete the formal embarkation schools. In what COMSECONDD/COMTHIRDD instruction can a list of these schools be found?
1. 1500.20
  2. 5100.1F
  3. 11014.2
  4. 11200.1
- 4-15. During home port, what staff has the responsibility of monitoring and evaluating all NCF embarkation exercises?
1. COMSECONDD/COMTHIRDD NCB embarkation staff
  2. Battalion embarkation staff
  3. Regimental embarkation staff
  4. NCF embarkation staff
- 4-16. Which of the following individuals is responsible for keeping the MOCC files current with all necessary information on embarkation?
1. Embarkation chief petty officer
  2. Operation officer
  3. Loadmaster
  4. Executive officer
- 4-17. Which of the following duties is the responsibility of the battalion embarkation chief petty officer?
1. Preparing operational orders to exercise the battalion's embarkation plan while deployed
  2. Maintaining a file of all NCF embarkation exercises held in home port
  3. Maintaining liaison with COMSECONDD/COMTHIRDD NCB embarkation staff
  4. Preparing and maintaining a template file of all current deployment site Tab A equipment attached to the battalion
- 4-18. During an actual mount-out, the battalion embarkation staff must function on a full-time basis until which of the following events occurs?
1. All of the embarked troops, supplies, and equipment have landed at the prescribed destination
  2. The embark officer has initiated a stand-down period
  3. The last aircraft or surface ship has departed the embarkation point
  4. The embarked troops are under the orders of the assault group commander
- 4-19. All details should include in their embarkation plan the possibility of being tasked to respond as an advance party for the battalion. Which of the following characteristics makes them ideal for such tasking?
1. Location and semi-independent nature
  2. Well-trained unit
  3. Quick response capability
  4. All of the above
- 4-20. While on deployment, what organization schedules the battalion's embarkation exercise?
1. NCB
  2. NCF
  3. NCF
  4. MOCC

- 4-21. Upon receipt of an initiating order to mount-out and deploy, what person is responsible for implementing the MOCC?
1. Commanding officer
  2. Executive officer
  3. Operations officer
  4. Intelligence officer

- 4-22. Which of the following staff groups is responsible for controlling, coordinating, and monitoring the movement of personnel, supplies, and equipment to the embarkation staging areas?
1. ALCE
  2. MOCC
  3. DACG
  4. Embarkation staff

- 4-23. What unit within the battalion serves as the coordinating center for all of the companies and all of the staff section heads?
1. Operations
  2. Intelligence
  3. MOCC
  4. Quarter deck

- 4-24. Which of the following units is responsible for the actual loading of vessels or aircraft?
1. MOCC
  2. DACG
  3. NCF
  4. NCB

IN ANSWERING QUESTIONS 4-25 AND 4-26, REFER TO FIGURE 4-7 OF THE TEXTBOOK.

- 4-25. Using the mount-out checklist, at what time is the company gear for the air detachment prepared for storage and/or embarkation?
1. H + 5
  2. H + 24
  3. H + 36
  4. H + 44

- 4-26. At what time is the main body rough personnel manifest submitted to the personnel officer?
1. H + 15
  2. H + 24
  3. H + 39
  4. H + 46

- 4-27. When uncertain about what information to report to the MOCC, you should take what action?
1. Ask your company commander
  2. Report all pertinent information
  3. Assume the MOCC already has the information
  4. Prepare a memorandum for the record

- 4-28. For planning purposes, what is the peacetime preliminary aircraft cabin load (ACL) for a C-130?
1. 15,000 pounds
  2. 25,000 pounds
  3. 30,000 pounds
  4. 50,000 pounds

- 4-29. Which of the following cargo aircraft is capable of takeoffs and landings on packed dirt or a SATS runway?
1. C-5
  2. C-130
  3. C-141
  4. Each of the above

IN ANSWERING QUESTIONS 4-30 THROUGH 4-35, REFER TO TABLES 4-2 AND 4-3 OF THE TEXTBOOK.

- 4-30. What is the (a) height and (b) width, in inches, of the cargo compartment in a C-130 aircraft?
1. (a) 109 (b) 228
  2. (a) 108 (b) 228
  3. (a) 108 (b) 123
  4. (a) 109 (b) 123

- 4-31. What is a maximum number of 463-L pallet positions available in a C-141 aircraft?
1. 10
  2. 21
  3. 36
  4. 40

- 4-32. On the tail ramp of both the C-130 and the c-141 aircraft, what is the maximum permissible vehicle height, in inches?
1. 50
  2. 76
  3. 80
  4. 105

- 4-33. The C-141A aircraft, unstretched and without side seats, can accommodate a total of how many passengers?
1. 62
  2. 70
  3. 90
  4. 152
- 4-34. What is the length, in inches, of the cargo compartment in a C-5A Galaxy aircraft?
1. 1,454
  2. 840
  3. 492
  4. 228
- 4-35. The optimum center of balance for a C-130 aircraft is located at what fuselage station?
1. 512
  2. 524
  3. 536
  4. 925

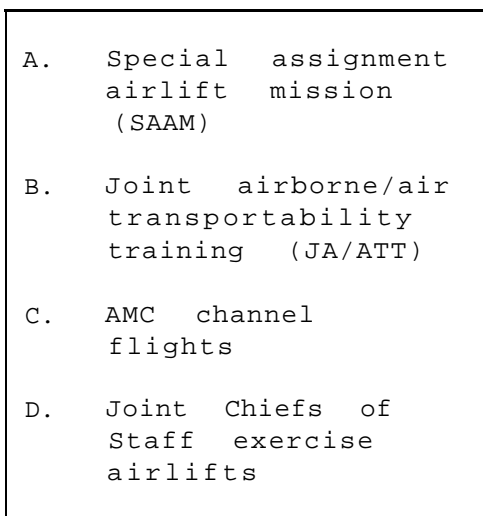


FIGURE 4A

IN ANSWERING QUESTIONS 4-36 THROUGH 4-40, REFER TO FIGURE 4A. SELECT THE TYPE OF AMC MISSION USED TO SUPPORT THE FOLLOWING AIRLIFT MISSIONS.

- 4-36. Airlifts for out-of-CONUS or theater service over established routes.
1. A
  2. B
  3. C
  4. D

- 4-37. Airlifts purchased or contracted by a user for their own unilateral support.
1. A
  2. B
  3. C
  4. D
- 4-38. Airlifts for deploying a unit to an overseas site in commercial aircraft.
1. A
  2. B
  3. C
  4. D
- 4-39. Airlifts for multiservice or multinational exercises, such as NATO.
1. A
  2. B
  3. C
  4. D
- 4-40. Airlifts that provide specific training data in the loading and transporting of NCF-unique CESE.
1. A
  2. B
  3. C
  4. D
- 4-41. Which of the following staff groups is responsible for ensuring orderly and timely movement of personnel, material, and equipment from the airfield to the deployment site?
1. DACG
  2. AACG
  3. MOCC
  4. ALCE
- 4-42. Where is the equipment and material staging and marshaling area usually located?
1. In close proximity to the CESE preparation area
  2. In the vicinity of the departing airfield
  3. In the vicinity of the arriving airfield
  4. In close proximity to Headquarters
- 4-43. When an aircraft lands en route to or from home base, who has the duty of providing cargo security?
1. OOD
  2. Aircraft pilot
  3. Aircraft crew
  4. OIC



- 4-44. As the flight OIC, how many hours before the scheduled flight time must you muster your personnel?
1. 12
  2. 24
  3. 36
  4. 48
- 4-45. Before hazardous cargo can be accepted for movement by airlift, it must be certified on what form?
1. AFR 71-4
  2. DD Form 1387-2
  3. NAVFAC 1706/3
  4. DD Form 1348
- 4-46. What manual outlines the procedures for embarking the CESE assigned to a battalion TOA aboard aircraft?
1. NAVFAC P-404
  2. COMSECOND/COMTHIRDNCBINST 11014.2
  3. COMSECOND/COMTHIRDNCBINST 3120.1 series
  4. NAVFAC P-307
- 4-47. When a piece of CESE is positioned on the cargo ramp of an aircraft, how much fuel, if any, is allowed to remain in the fuel tank?
1. 1/4 tank
  2. 1/2 tank
  3. 3/4 tank
  4. None
- 4-48. Water tanks and water trailers must be airlifted empty according to what manual?
1. NAVFAC P-307
  2. NAVDOCKS P-306
  3. AFM 76-6
  4. OPNAV 5090
- 4-49. When locating the center of balance of a vehicle, you must establish a reference datum line (RDL). The RDL is determined from what location on the vehicle?
1. The farthest forward point of a vehicle
  2. The center line of the front axle
  3. The center line between the rear tandem axles
  4. The center line of the extreme rear axle
- 4-50. What is the preferred method for determining the C/B of a track vehicle?
1. Weigh each end on a scale, then combine the weights and divide by 2
  2. Weigh each track at the center line of the vehicle, then mark it on both sides of the center line
  3. Lift the vehicle with a crane at the tie-down devices, then slide the vehicle until balance is achieved
  4. Drive the vehicle over a wooden beam that is perpendicular to the tracks, then mark the C/B where the vehicle balances on the beam
- 4-51. What is the cargo area space on a 463-L cargo pallet?
1. 96 x 290 inches
  2. 88 x 108 inches
  3. 84 x 104 inches
  4. 84 x 108 inches
- 4-52. A 463-L pallet can hold what maximum weight?
1. 6,000 pounds
  2. 8,000 pounds
  3. 9,000 pounds
  4. 10,000 pounds
- 4-53. When storing the 463-L pallets, what is the maximum number you can stack on top of each other without setting up the 4 x 4 inch dunnage for the next stack?
1. 6
  2. 8
  3. 10
  4. 12
- 4-54. What person is the primary authority on any questions that pertain to the aircraft load?
1. The embarkation officer
  2. The contracting unit representative
  3. The ALCE team supervisor
  4. The aircraft loadmaster

Textbook Assignment: "Seabee Battalion Turnover and Tool Management," chapter 5, pages 5-1 through 5-27.

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- 5-1. Before the deployment of the battalion main body from home port, what two groups of battalion personnel deploy to the future deployment site?
1. Alfa and Bravo company
  2. Predeployment and advance party
  3. Operations and engineering
  4. Operations and maintenance
- 5-2. Which of the following instructions govern the two evolutions referred to in question 5-1?
1. 2ndNCB/3rdNCBINST 11200.1 and P-404
  2. 2ndNCB/3rdNCBINST 5100.1 and P-307
  3. 2ndNCB/3rdNCBINST 5400.9 and 4650.1
  4. 2ndNCB/3rdNCBINST 5200.1 and 8261.2
- 5-3. Which of the following purposes of the predeployment visit is/are considered to be primary?
1. To provide the relieving battalion with an idea of the facilities
  2. To provide the relieving battalion with an idea of the equipment available
  3. To provide the relieving battalion with an idea of the current and projected status of projects
  4. All of the above
- 5-4. During a predeployment trip there are numerous questions that must normally be resolved. Which of the following publications provides a detailed list of these questions?
1. *Equipment Management Manual*
  2. *Operations Officer's Handbook*
  3. *Facilities Management Manual*
  4. *NCF Maintenance Management Program*
- 5-5. Approximately 10 days before the departure of the main body, the advance party will deploy. Which of the following is a primary purpose of this group?
1. To start the deployment cycle
  2. To prepare for the outgoing BEEP
  3. To prepare for the arrival of the main body
  4. To cut down on the size of the main body flight
- 5-6. If the advance party successfully completes its tasking, production can begin within how many days?
1. 6 to 10 days
  2. 2 to 3 days
  3. 5 to 10 days
  4. 8 to 10 days
- 5-7. How many days is normally required to turn over a main body site?
1. 10
  2. 12
  3. 14
  4. 21
- 5-8. The final number of personnel assigned to the advance party can vary for a number of reasons. What is the approximate number of personnel assigned to the advance party?
1. 100
  2. 150
  3. 180
  4. 190
- 5-9. During the turnover, who provides transportation and handles the cargo for all flights except the last one leaving?
1. Local public works personnel
  2. Relieving battalion personnel
  3. Contract personnel
  4. On-site battalion personnel
- 5-10. How many days before the departure of the on-site battalion will all watches be turned over to the relieving battalion?
1. 1
  2. 2
  3. 3
  4. 4

- 5-11. At what point during the turnover is custody of CESE equipment turned over to the relieving battalion?
1. Upon arrival
  2. At the completion of the BEEP
  3. As each piece is accepted by the shops
  4. When the maintenance supervisor signs the repair order
- 5-12. Which of the following is NOT considered a battalion turnover of a project?
1. Beneficial occupancy date
  2. Battalion relief
  3. Embarkation exercise
  4. Natural disaster
- 5-13. During the turnover of each uncompleted project, you must determine how much of the project remains and inspect all materials. What additional determination must you make?
1. Location of the project
  2. Weather conditions
  3. Actual work-in-place
  4. Time to and from project
- 5-14. How many days prior to returning to home port is the on-site battalion required to furnish the relieving battalion with a Construction Project Status at Turnover report?
1. 180
  2. 120
  3. 90
  4. 60
- 5-15. What is the purpose of the Construction Project Status at Turnover SITREP?
1. To project the status of each on-site battalion's tasked projects at the end of their deployment
  2. To project the status of each on-site battalion's future project tasking
  3. To project the status of each relieving battalion's projects
  4. To project the status of equipment available for future projects
- 5-16. For new-start repair/alteration projects, 100 percent of the local purchase materials must be procured and on site. What organization has this responsibility?
1. 20thNCR/31stNCR
  2. On-site battalion
  3. Relieving battalion
  4. 2ndNCB/3rdNCB
- 5-17. When during the deployment does the on-site battalion begin submitting the monthly Local Material Procurement Status SITREP?
1. After the 120-day review
  2. After the 90-day review
  3. After the 60-day review
  4. After the 45-day review
- 5-18. The project estimates must be reviewed by the on-site and relieving battalion. If a project requires over 50 man-days of rework, what authority must approve the additional work?
1. 2ndNCB/3rdNCB
  2. 20thNCR/31stNCR
  3. On-site battalion
  4. Relieving battalion
- 5-19. The project WIP curve must be continuous through the history of any project. A request for a scope change can be submitted by message. What authority must approve this request?
1. NAVFAC
  2. 20thNCR/31stNCR
  3. 2ndNCB/3rdNCB
  4. ROICC
- 5-20. Before MLO or CTR can consider completed project materials or tools as excess, they must be offered to what organization?
1. DRMO
  2. Public Works
  3. 2ndNCB/3rdNCB
  4. Customer
- 5-21. Once a project is complete, when does the 1-year warranty take effect?
1. After the preliminary acceptance inspection
  2. After the pre-BOD inspection
  3. Upon completion of all punch list items
  4. When beneficial occupancy is established

- 5-22. At the completion of a project, the ROICC acceptance letter is placed in the project files. The files are then closed and retained by the ROICC for how long?
1. 1 year
  2. 2 years
  3. Until deployment completion
  4. Until the battalion is relieved
- 5-23. What program provides the relieving battalion with a realistic and in-depth operating condition of the CESE allowance, facilities, tools, and materials?
1. BEEP
  2. CESO
  3. NAVFAC
  4. MMP
- 5-24. During the BEEP, what equipment condition code restricts the ordering or purchasing of collateral equipage or repair parts?
1. A6
  2. A5
  3. A3
  4. A4
- 5-25. How many working days before the BEEP can preventive maintenance of equipment be stopped?
1. 14
  2. 10
  3. 7
  4. 5
- 5-26. What authorities assign the final CESE condition codes?
1. Maintenance supervisors
  2. Operations officers
  3. BEEP representatives
  4. Commanding officers
- 5-27. All CESE, with the exception of warehoused units, is returned to the ALFA company facility for the BEEP. Who approves any exceptions?
1. Operations chief
  2. Safety representative
  3. BEEP representative
  4. ALFA company operations chief
- 5-28. During the deployment, CESE can be placed in the warehouse program up until how many days before the BEEP?
1. 10
  2. 20
  3. 30
  4. 60
- 5-29. In the absence of a BEEP representative at a detail site, the detail OIC will comply with what manual?
1. Maintenance Management Manual
  2. Red Book
  3. Construction Management Manual
  4. OIC Management Handbook
- 5-30. The BEEP must be completed before the arrival of the main body. It is recommended that the BEEP start how many days before the arrival of the main body?
1. 14
  2. 12
  3. 7
  4. 6
- 5-31. After the arrival of the main body, equipment preventive maintenance should start within how many working days?
1. 14
  2. 10
  3. 7
  4. 5
- 5-32. The battalion being relieved prepares a schedule of all USN-numbered equipment prior to the BEEP. How should the equipment be grouped on this schedule?
1. By ECC
  2. By PM
  3. By USN
  4. By ERO
- 5-33. How many working days of equipment must be precleaned and staged before the start of the BEEP?
1. 1
  2. 2
  3. 3
  4. 4
- 5-34. You should suspect an outstanding requisition as having been shipped but not received after how many days?
1. 180
  2. 120
  3. 90
  4. 45
- 5-35. When is major body and paint work performed?
1. During the BEEP
  2. After the BEEP
  3. Immediately
  4. As soon as possible

- 5-36. Stored equipment is not normally depereserved for testing. When, if ever, will this equipment be depereserved?
1. When the incoming battalion decides to activate all the equipment
  2. When operations wants to activate all the equipment
  3. When visual inspection shows major discrepancies
  4. Never
- 5-37. All shop tools and tool kits must be inventoried and be 100 percent complete. If a tool is not physically present in the kit boxes, what form should be in the kit master folder?
1. TOA 1091
  2. NAVSUP 1250-1
  3. NAVSUP 1349
  4. IOU
- 5-38. What manual governs the Repair Parts portion of the BEEP?
1. Equipment Management Manual
  2. Seabee Construction Manual
  3. Seabee Supply Manual
  4. Maintenance Management Manual
- 5-39. What organization in the battalion manages hand and power tools, tradesman's tool kits and other special tools?
1. CTR
  2. MLO
  3. TOA
  4. OPs
- 5-40. What grouping of the TOA does the battalion's allowance list for authorized tools fall under?
1. TA-01
  2. TA-21
  3. TA-31
  4. TA-41
- 5-41. What organization provides the battalion with the augment tools/equipment list?
1. 2ndNCB/3rdNCB
  2. 20thNCR/31stNCR
  3. ROICC
  4. PWD
- 5-42. What department maintains the PM card for each power tool?
1. MLO
  2. Crew leader's company
  3. Operations
  4. CTR
- 5-43. After tools are inventoried and verified, who submits the report of completion to the supply officer?
1. Company chief
  2. Crew leader
  3. Company commander
  4. CTR custodian
- 5-44. After an inventory has been completed, all shortages are documented and a 1250-1 is submitted to CRT. What color copy of the 1250-1 does the crew leader keep for the records?
1. White
  2. Pink
  3. Green
  4. Yellow
- 5-45. When CTR orders a tool, a requisition number is entered on the 1250-1. What color copy of the 1250-1 is then sent back to the crew leader?
1. White
  2. Pink
  3. Green
  4. Yellow
- 5-46. A 1250-1 is used to draw individual tools from CTR. When a tool is issued, CTR will retain all copies of the 1250-1 except what color copy?
1. White
  2. Pink
  3. Green
  4. Yellow
- 5-47. CTR performs a PM and safety check of all power tools. What identifies this check?
1. The tool is tagged
  2. The tool is painted the color of the month
  3. The tool has color-coded tape for the month attached
  4. The tool has a copy of the 1250-1 attached
- 5-48. After the crew leader issues a tool to a crew member, who is now responsible for that tool?
1. Crew leader
  2. Crew member
  3. Company commander
  4. CTR custodian

- 5-49. When, if ever, are you authorized to rent a tool for a project?
1. When there is excess money for the project
  2. When the TOA tool is dead-lined with no replacement repair parts
  3. When the crew can use more than one tool at a time
  4. Never

- 5-50. The tools that were purchased with project funds must be offered to the customer. If the customer rejects these tools, the battalion may retain them under what category?
1. Excess
  2. Organic
  3. Augment
  4. Assigned

ASSIGNMENT 6

Textbook Assignment: "Naval Construction Force Camp Maintenance," chapter 6, pages 6-1 through 6-34, and "Environmental Pollution Control," chapter 7, pages 7-1 through 7-10.

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- 6-1. What is the function of the camp maintenance program?
1. To build any needed buildings or structures for the battalion
  2. To keep existing buildings, structures, grounds, and equipment in a serviceable condition
  3. To distribute materials evenly among the various companies
  4. To provide information for budgeting new buildings
- 6-2. What official in the battalion is responsible for managing and operating a public works maintenance program?
1. Commanding officer
  2. Executive officer
  3. Operations officer
  4. Public works officer
- 6-3. What is the number of man-days that the commanding officer, with the concurrence of the 2ndNCB/3rdNCB DET, can approve for minor construction projects?
1. 15
  2. 25
  3. 50
  4. 65
- 6-4. The NCF camp maintenance management system was specifically designed for what Seabee camp operations?
1. Atlantic detachment sites
  2. Pacific detachment sites
  3. Home port
  4. Mainbody camps
- 6-5. What alternate assignment, if any, should be given to camp maintenance platoon personnel?
1. Construction projects
  2. Environmental control
  3. Safety
  4. None, they should be assigned maintenance full time
- 6-6. What is the minimum number of direct labor personnel necessary to maintain camps in acceptable condition?
1. 10
  2. 20
  3. 30
  4. 40
- 6-7. What is the maximum percent of camp maintenance personnel that can be rotated during a deployment without a waiver from the 2ndNCB/3rdNCB?
1. 10%
  2. 25%
  3. 30%
  4. 45%
- 6-8. What PRCP skill should the planning, estimating, and scheduling personnel assigned to the MCD Branch have?
1. 25-75
  2. 76-100
  3. 103-703
  4. 750-800
- 6-9. If the CMO has no previous public works experience, what school should the CMO attend prior to deployment?
1. Annapolis
  2. CECOS
  3. NLPG
  4. CONP
- 6-10. What series COM2NDNCB/COM3RDNCBINST must the CMO follow to staff and operate the maintenance organization?
1. 5100.23
  2. 5200.2
  3. 11014.2
  4. 11200.1
- 6-11. Which of the following is included as part of the CMO's duties?
1. Operations officer
  2. Energy/utilities conservation officer
  3. Equipment officer
  4. Training officer

- 6-12. How often must the CMO submit the Shop Load Plan Report to the 2ndNCB/3rdNCB?
1. Monthly
  2. Semimonthly
  3. Quarterly
  4. Annually
- 6-13. The maintenance chief maintains a backlog of how many man-days of specific work that has 100 percent material on site?
1. 100
  2. 200
  3. 300
  4. 400
- 6-14. The maintenance chief maintains boiler certification certificates. Where can these certificates be found?
1. In the inspectors' reports
  2. In the facility history jackets
  3. In the PM schedules
  4. In the CMO's backlog records
- 6-15. The MCD generates projects to camp. How are these deficiencies identified?
1. By controlled inspections
  2. By the AIS
  3. By customer requests
  4. All of the above
- 6-16. The camp maintenance chief has authority to sign 1250-1s up to what monetary value?
1. \$ 500
  2. \$1,000
  3. \$1,500
  4. \$2,000
- 6-17. The MCD expeditor receives from MLO the MCD Project Material Status Report. How often should the expeditor receive this report?
1. Every 10 to 15 days
  2. Every 20 to 25 days
  3. Every 30 to 35 days
  4. Every 40 to 45 days
- 6-18. Who validates all equipment under the Preventive Maintenance System (PMS) Program?
1. Expeditor
  2. Trouble desk attendant
  3. PM/COSAL coordinator
  4. Shop foreman
- 6-19. The camp maintenance plan is prepared by the CMO. When is it updated?
1. Monthly
  2. Semimonthly
  3. Quarterly
  4. Annually
- 6-20. The camp maintenance plan should be sent to the 2ndNCB/3rdNCB DET at least how many days before the end of the quarter?
1. 30
  2. 45
  3. 60
  4. 90
- 6-21. Work is classified depending on urgency, duration, and repetitive nature. Which of the following categories is classified as work?
1. Emergency/service
  2. Specific job orders
  3. Standing job orders
  4. All of the above
- 6-22. Which of the following is classified as emergency/service work?
1. Work requiring less than 16 man-hours
  2. Work requiring 20 hours
  3. Work requiring 30 hours
  4. Work requiring 40 hours
- 6-23. When the shop foreman receives a service request form for routine work, the work should be assigned within how many hours?
1. 12
  2. 24
  3. 36
  4. 48
- 6-24. Any work request that exceeds 16 hours is designated as what type of work request?
1. Emergency job order
  2. Service job order
  3. Standing job order
  4. Specific job order
- 6-25. For specific job orders involving maintenance and repairs, the local battalion CO has approval authority for which of the following dollar amounts?
1. \$ 4,000
  2. \$ 5,050
  3. \$ 10,000
  4. \$200,000



- 6-26. Standing job orders are written for what type of work?
1. Work that is of a one time nature
  2. Work that has a high dollar amount
  3. Work that is of a highly repetitive nature
  4. Work that has been referred to an outside organization
- 6-27. An inspection, which reviews all camp facilities to determine the maintenance required during the deployment to preserve or improve the condition of camp structures and property, is classified as what type?
1. Annual inspection
  2. Control inspection
  3. Readiness inspection
  4. Operational inspection
- 6-28. The annual inspection summary is used for which of the following purposes?
1. To inform the commanding officer of camp maintenance repairs
  2. To schedule camp PMs
  3. To document deficiencies on camp facilities
  4. As an inventory for the 2ndNCB/3rdNCB
- 6-29. For the manpower availability summary and the work plan summary, the 3rdNCB has a man-day target for each of the three different types of job orders. What is the man-day target for standing job orders?
1. 10 percent
  2. 20 percent
  3. 30 percent
  4. 50 percent
- 6-30. The supply department handles all camp maintenance materials according to what manual?
1. COM2NDNCB/COM3RDNCBINST 4400.3
  2. COM2NDNCB/COM3RDNCBINST 5501.1
  3. NAVFAC P-300
  4. NAVFAC P-908
- 6-31. A 1250-1 is used to order material that is not in stock in the camp maintenance storeroom. From this 1250-1, an historical demand file is created. What color copy of the 1250-1 is used for this purpose?
1. White
  2. Yellow
  3. Green
  4. Pink
- 6-32. What part of the COSAL for camp maintenance lists the repair parts allowance and cross-reference data for camp equipment?
1. Part I
  2. Part II
  3. Part III
  4. Part IV
- 6-33. What form is used by camp maintenance to document any additions, deletions, or quantity increases/decreases to the published allowance list?
1. NAVSUP 1250-1
  2. NAVSUP 1220-2
  3. NAVSUP 1348
  4. NAVSUP 1140
- 6-34. The two basic types of equipment in Seabee material management are collateral and PSE. Which of the following items are referred to as PSE?
1. Vehicles
  2. Computers
  3. Generators
  4. Furniture
- 6-35. During what timeframe is the 2ndNCB/3rdNCB budget call issued?
1. January/February
  2. March/April
  3. May/June
  4. October/November
- 6-36. During the battalion turnover of camp maintenance, important items include job requirements and status charts. The job requirements and status charts must contain a backlog of a minimum of how many man-days?
1. 100
  2. 500
  3. 800
  4. 900

- 6-37. In what way should an EPA-approved container with contaminated absorbent material be disposed of?
1. Wrap the container of material in a plastic bag and place it in the dumpster
  2. Thoroughly burn the material
  3. Turn the container and material into the local DRMO
  4. Wash the material down the drain and reuse the container
- 6-38. Water pollution in the form of phosphates and nitrates is most likely to result from which of the following?
1. Chemicals used in pesticides and herbicides
  2. Sewage, land runoff, and industrial waste
  3. Oil from ships and offshore drilling rigs
  4. Salts from field irrigation and industrial processes
- 6-39. What is the main source of pollution in the form of disease-causing bacteria?
1. Drainage from animal feedlots
  2. Heater water from power projects and industrial processes
  3. Municipal sewage
  4. Silt, sand, and debris from city streets
- 6-40. What is one of the best ways of determining the ecological health of a body of water?
1. The temperature of the water
  2. The amount of carbon dioxide in the water
  3. The amount of oxygen in the water
  4. The number of different bacteria in the water
- 6-41. Anaerobic decomposition is a form of pollution that releases which of the following?
1. Methane or hydrogen sulfide
  2. Carbon dioxide or methane
  3. Carbon monoxide or hydrogen
  4. Methane or carbon monoxide
- 6-42. The addition of detergents, human waste, and fertilizers to water accelerates the process of a lake becoming a swamp and finally a land area. What is this form of pollution called?
1. Anaerobic decomposition
  2. Eutrophication
  3. Aerobic decomposition
  4. Mistrophication
- 6-43. Environmental damage, such as soil erosion and the destruction of wildlife habitats, is often caused by which of the following phases of construction?
1. Painting operations
  2. Foundation and footer excavations
  3. Grubbing and clearing operations
  4. Equipment maintenance on the project site
- 6-44. To help prevent siltation of nearby rivers and streams, in proximity to a construction site, project managers should perform which of the following actions to contain the water runoff?
1. Construct barriers near fast moving water runs
  2. Dig shallow trenches around the perimeter
  3. Burn the shrubs and trees at the perimeter of the site
  4. Pile construction waste at water runoff areas
- 6-45. Petroleum-base fuels should not be used for burning of brush, scrub, and stumps for which of the following reasons?
1. They do not burn completely and may seep into the underground water table
  2. They are too expensive to waste on scrub burning
  3. They become carcinogenic when mixed with water
  4. They coagulate and become solids, creating an impermeable soil strata

- 6-46. An interceptor trench can be used to recover-small petroleum spills under what conditions?
1. The atmospheric conditions are suitable
  2. The spills are contained by a natural barrier that prevents vertical migration
  3. The runoff permits burning
  4. The trench depth must be greater than 8 feet to break the impermeable strata
- 6-47. To prevent horizontal migration of a spill and still allow water to migrate, you should install rubber or plastic barriers at what location in a trench?
1. Along the bottom of the trench
  2. On both sides of the trench
  3. On the downgrade side of the trench
  4. Across the top of the trench, just below the floating spill material
- 6-48. Stripping of a spill area must be done carefully to remove contaminated soil so the removal process does not contaminate which of the following soil areas?
1. The gravel-sand layer
  2. The water table holding area
  3. The adjacent and underlying soil areas
  4. The topsoil and root structure that retains the moisture
- 6-49. When unburned hydrocarbons and various other fuel components combine chemically, which of the following by-products is normally formed?
1. Carbon monoxide
  2. Carbon dioxide
  3. Sulfur dioxide
  4. Lead sulfite
- 6-50. What three terms are associated with asbestos dust particle size?
1. Centimeter, millimeter, micron
  2. Millimeter, micron, angstrom
  3. Centimeter, micron, nanometer
  4. Micron, nanometer, angstrom
- 6-51. Air must be scrubbed with a special air filtration machine to remove what size of asbestos particles?
1. Millimeter
  2. Micron
  3. Angstrom
  4. Nanometer
- 6-52. When involved in an asbestos removal project, you should obtain which of the following instructions for guidance?
1. DPDOINST 5100.24 series
  2. OPNAVINST 5100.23 series
  3. OPNAVINST 5110.23 series
  4. OPNAVINST 5200.23 series
- 6-53. To identify toxic substance(s) contained in a pesticide, you should look in what location?
1. The warning label attached to the container
  2. The shipping document attached to the container
  3. The pamphlet supplied by the company
  4. The federal supply catalog
- 6-54. The main source of PCBs is found primarily in which of the following types of equipment?
1. Capacitors
  2. Transformers
  3. Ballasts
  4. Appliances
- 6-55. When involved with PCBs, you should obtain which of the following instructions for specific information?
1. OPNAVINST 5090.1 series
  2. OPNAVINST 5100.23 series
  3. NAVSUPINST 5100.27
  4. NEESA 20.2-028B
- 6-56. The EPA classifies material as hazardous waste when that material meets which of the following conditions?
1. Permeability
  2. Corrosivity
  3. Reactivity
  4. Both 2 and 3 above
- 6-57. Which of the following hazard classifications readily yields oxygen to stimulate the combustion of organic matter?
1. Corrosivity
  2. Ignitability
  3. Reactivity
  4. Toxicity

- 6-58. Which of the following hazard classifications is a liquid that corrodes steel at a rate greater than 6.35 mm per year at 130°F test temperature?
1. Corrosivity
  2. Ignitability
  3. Reactivity
  4. Toxicity
- 6-59. Which of the following hazard classifications is a material that normally is unstable and that readily undergoes violent change without detonating?
1. Corrosivity
  2. Ignitability
  3. Reactivity
  4. Toxicity
- 6-60. Which of the following hazard classifications is a material that can degrade into components that may be poisonous to the environment or to the public health, even in low doses?
1. Corrosivity
  2. Ignitability
  3. Reactivity
  4. Toxicity
- 6-61. According to the example shown, what is the flash point of this material?
1. Above 200°F
  2. 200°F and below
  3. Below 100°F
  4. Below 73°F
- 6-62. According to the example shown, what is the reactivity hazard of this material?
1. May detonate
  2. Shock or heat may detonate
  3. Violent chemical
  4. Unstable if heated
- 6-63. According to the example shown, what is the health hazard of this material?
1. Deadly
  2. Extreme danger
  3. Hazardous
  4. Slightly hazardous
- 6-64. Project storage areas for combustible materials should be separated from other sources of ignition by what minimum distance?
1. 10 feet
  2. 20 feet
  3. 50 feet
  4. 100 feet

IN ANSWERING QUESTIONS 6-61 THROUGH 6-63, REFER TO FIGURE 7-3 OF THE TEXTBOOK.

ASSIGNMENT 7

Textbook Assignment: "Contract Quality Assurance," chapter 8, pages 8-1 through 8-12.

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- 7-1. The contracting of public works functions has been brought about by which of the following factors?
1. Congressionally imposed manpower restrictions
  2. State-of-the-art processes
  3. Economics
  4. Each of the above
- 7-2. What person serves as the officer in charge of contracts?
1. QAE
  2. ROIC
  3. A specially detailed officer
  4. Public works officer
- 7-3. Which of the following persons are responsible for the day-to-day administration of a contract?
1. The PWO and OIC
  2. The ROIC and QAE
  3. The PWO and QAE
  4. The ROIC and OIC
- 7-4. The OIC should take which of the following actions after the awarding of a contract?
1. Hold a preconstruction conference with only the government representatives that will manage the contract
  2. Hold a preconstruction conference with both the government representatives and the contractor
  3. Hold a post-award conference with the labor representatives involved
  4. Hold a post-award conference with all inspectors
- 7-5. The inspector's daily report is primarily used for what purpose?
1. To track the contractor's progress
  2. To document the payments due to the contractor
  3. To provide a historical record of the position of the government
  4. To document all safety precautions required by the contract
- 7-6. Change orders are informal contract changes that must meet only the OIC's specifications.
1. True
  2. False
- 7-7. Delays caused by change orders are of no concern to the government.
1. True
  2. False
- 7-8. What publication is the primary guide for Navy contracts?
1. NAVFAC MO-330
  2. NAVFAC MO-327
  3. NAVFAC P-315
  4. NAVFAC P-78
- 7-9. NAVFAC is responsible for which of the following types of contracts?
1. Construction
  2. Facility support
  3. Engineering design
  4. Each of the above
- 7-10. NAVFAC is NOT responsible for which of the following equipment?
1. Fire-fighting
  2. Automotive
  3. Material-handling
  4. Weight-handling
- 7-11. What organization is responsible for the readiness of the shore facilities?
1. Engineering Field Divisions
  2. Public Works
  3. NAVFAC
  4. The major claimants
- 7-12. The head of the contracts department of an EFD is NOT responsible for which of the following contract functions?
1. Purchasing real estate
  2. Approving awards
  3. Developing specifications
  4. Each of the above

- 7-13. As the facilities support' contract manager, you have which of the following responsibilities?
1. Manage the post-award contract
  2. Evaluate the bids
  3. Certify contract payments
  4. Supervise the Quality Assurance Program
- 7-14. The OIC is directly responsible for which of the following contract aspects?
1. The post-award management
  2. The day-to-day management
  3. The contract solicitation
  4. The payment preparation
- 7-15. What official will normally arrange the pre-award conference?
1. OIC
  2. QAE
  3. ROIC
  4. FSCM
- 7-16. What official has the responsibility to ensure that the work meets contract requirements?
1. FSCM
  2. ROIC
  3. QAE
  4. PWS coordinator
- 7-17. What official prepares the quality assurance plan?
1. FSCM
  2. ROIC
  3. QAE
  4. PWS coordinator
- 7-18. The QAE must have, at a minimum, detailed knowledge in which of the following areas?
1. Contract administration
  2. Contract specifications
  3. Contract procedures
  4. Contract evaluation
- 7-19. Facility support contracts are provided by which of the following agencies?
1. NAVFAC and NAVSUP only
  2. NAVFAC and GSA only
  3. NAVSUP and GSA only
  4. NAVFAC, NAVSUP, and GSA
- 7-20. NAVFAC procures services that directly support which of the following functions?
1. Ships
  2. Aircraft
  3. Shore facilities
  4. Submarines
- 7-21. Facility support construction contracts (FSCCs) are defined by what authority?
1. NAVFAC
  2. Davis-Bacon Act
  3. NAVSUP
  4. Contracts officer
- 7-22. FSCCs are written in a format similar to what document?
1. Specifications
  2. Performance work statement
  3. Facility support contract
  4. Davis-Bacon Act
- 7-23. What authority has final determination as to whether or not a contract involves construction?
1. NAVFAC
  2. Department of the Navy
  3. Department of Defense
  4. Labor Department
- 7-24. What is the chief difference between a facility support service (FSS) contract and a FSCC?
1. An FSS calls for a product, not a contractor's time
  2. An FSS does not involve labor
  3. An FSS calls for a contractor's time vice a product
  4. An FSS involves only labor
- 7-25. What is the chief difference between quality assurance (QA) and quality control (QC)?
1. QA deals with the procedures, not the end results
  2. QA deals with the end results, not the procedures
  3. QA is not used on civilian contractors; QC is used instead
  4. QA deals only with the production process

- 7-26. What is the first criterion that must be met to ensure that a Quality Assurance Program is effective?
1. Write a performance work statement that provides a measurable method of determining the quality and quantity of contracted work
  2. Provide an inspection schedule to the contractor
  3. Negotiate any contradictions that may arise pertaining to the Davis-Bacon Act
  4. Determine all nonperformance or unsatisfactory performance before the contract starts
- 7-27. The amount of surveillance on a contract is based on which of the following factors?
1. Importance of the contract
  2. Location of the contract
  3. Cost of the contract
  4. The contractor's previous work
- 7-28. What document gives the FSCM for unsatisfactory performance by the contractor?
1. QA plan
  2. Performance work statement
  3. Letter of appointment
  4. Memorandum of record
- 7-29. When, if ever, should the QAE be concerned with contractor procedures?
1. At all times
  2. When the QAE is dissatisfied with the contractor's performance
  3. When specified by the contract
  4. Never
- 7-30. The Navy currently uses how many methods of surveillance for inspections?
1. Five
  2. Nine
  3. Three
  4. Four
- 7-31. A 100-percent inspection will best measure a contractor's performance. Which of the following drawbacks are identified with this type of inspection?
1. Does not work well with a large contract
  2. Time-consuming
  3. Expensive
  4. Each of the above
- 7-32. The random sampling method works best for which of the following types of work?
1. Grounds maintenance
  2. Dredging operations
  3. Aircraft systems repair
  4. Major military construction projects
- 7-33. Planned sampling works well in which of the following areas?
1. Inspection requirements are all equally important
  2. Locations are all equally important
  3. Contractor performance is weak in one performance area
  4. Customer complaints are high
- 7-34. The incidental method should not be used as one of the primary means of surveillance.
1. True
  2. False
- 7-35. Customer complaints should be forwarded to the QAE in what type of format?
1. On a memorandum of record
  2. On a customer complaint record
  3. On a contract discrepancy record
  4. Any format is acceptable as there is no standard requirement
- 7-36. What key method is used to prevent poor contractor performance?
1. Proper documentation of surveillance
  2. Accurate performance work statements
  3. Good government surveillance
  4. Historical record of the contractor's performance
- 7-37. To properly perform the job, the QAE must have which of the following information?
1. QAE schedule and contract requirements
  2. Contractor schedule and QA plan
  3. QA plan and QAE schedule
  4. Contract requirements and contractor schedule

- 7-38. Normally, you should analyze surveillance results at what minimum recommended interval?
1. Monthly
  2. Weekly
  3. Quarterly
  4. Semiannually
- 7-39. If the contractor's performance is determined to be below standards, which of the following actions should NOT be taken?
1. Renegotiate the contract
  2. Issue a show cause
  3. Issue a contract discrepancy report
  4. Terminate the contractor by default
- 7-40. To optimize time and provide proper management control, the QAE should take which of the following actions?
1. Establish a good rapport with the contractor to ensure speedy replies on feedback reports
  2. Develop a balanced inspection schedule
  3. Develop a reputation for hard-nose compliance of contract
  4. Establish reliable transportation schedules between jobs
- 7-41. Scheduled surveillance should be performed at what time of day?
1. Only during your normal working hours
  2. At any time that the contractor is working
  3. At the end of a contractor's workday
  4. Whenever you can get to the job
- 7-42. Which of the following individuals should be denied access to your schedule?
1. The OIC
  2. The FSCM
  3. The EFD inspector
  4. The contractor
- 7-43. Upon completion of the contract, the QAE takes what action with the files?
1. Forwards them to the contractor
  2. Destroys them
  3. Includes them in the contract file
  4. Maintains them for a period of time specified by the contract
- 7-44. When the contractor's performance is found to be satisfactory, the QAE might make which, if any, of the following recommendations?
1. Reduce surveillance
  2. Pay the contractor a bonus
  3. Issue an LOA to the contractor
  4. None
- 7-45. If the government or one of its agencies has caused a contractor to perform unsatisfactorily, which of the following actions should the QAE initiate?
1. Renegotiate the contract
  2. prepare a letter requesting the responsible agency take
  3. Prepare a letter to the contractor identifying the government's responsibility
  4. Begin preparation of a Contract Discrepancy Report
- 7-46. When should a Contract Discrepancy Report (CDR) be issued?
1. Immediately for a serious failure
  2. At the end of the surveillance period
  3. Both 1 and 2 above
  4. Only at the discretion of the OIC
- 7-47. Deductions for discrepancies are required by what authority?
1. The contract
  2. The ROIC
  3. NAVSUP
  4. NAVFAC
- 7-48. Upon receiving a CDR, which of the following actions must a contractor take?
1. Identify, in writing, the preventive steps taken to prevent future occurrences of the same problem
  2. Call the QAE acknowledging receipt of the CDR
  3. Inform the ROIC, by telephone, of the corrective actions to be taken
  4. Correct all discrepancies immediately
- 7-49. When formal action is required on discrepancies, which of the following personnel decides what action is to be taken?
1. The QAE
  2. The FSCM
  3. The ROIC
  4. Each of the above



7-50. The QAE must identify not only contractor discrepancies, but what other items?

1. Contractor personnel skills
2. Problem areas that caused the discrepancies
3. Material delivered to the contractor
4. Change orders under consideration

ASSIGNMENT 8

Textbook Assignment: "Facilities Maintenance Management," chapter 9, pages 9-1 through 9-21.

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- 8-1. The level of maintenance for each facility is based on which of the following factors?
1. The number of occupants and utility cost
  2. The mission of the activity and the projected life span of the facility
  3. The rehab cost versus replacement cost
  4. The facility budget
- 8-2. What is the purpose of the maintenance management system?
1. To manage personnel properly
  2. To provide information for the next fiscal year budget
  3. To ensure optimum use of available resources
  4. To analyze all PW operations
- 8-3. An effective maintenance management system ensures activities meet which of the following goals?
1. Performing maintenance by breakdown
  2. Streamline maintenance by increasing documentation
  3. Corrective maintenance
  4. Each of the above
- 8-4. What is the primary benefit of the maintenance management system?
1. Increased productivity of the work force
  2. Standardized written procedures
  3. A maintenance operations manual
  4. Maintenance cost reduction
- 8-5. Complete control for maintenance management exists when which of the following conditions are met?
1. PW establishes their own procedures
  2. PW uses the MO-321 for guidance
  3. PW modifies procedures in the MO-321
  4. PW follows all procedures and methods in the MO-321
- 8-6. Which of the following system elements determines the job priority?
1. Work generation
  2. Work input control
  3. planning and estimating
  4. Shop scheduling
- 8-7. Which of the following system elements should use the MO-322?
1. Work generation
  2. Work input control
  3. Shop scheduling
  4. Management reporting
- 8-8. As a CPO assigned to a remote activity, you might be performing which of the following duties?
1. Security Officer
  2. APWO
  3. Transportation dispatcher
  4. PWO
- 8-9. Who is responsible for managing and supervising Public Works?
1. The supply officer
  2. The APWO
  3. The CO
  4. The PWO
- 8-10. The family housing office is responsible for housing management. The housing office has what other, if any, responsibility?
1. Housing maintenance
  2. Financial management
  3. Housing referral
  4. None
- 8-11. Energy management normally operates out of what branch?
1. Facilities
  2. Housing
  3. Facilities management
  4. Engineering
- 8-12. What division or branch in a PWD is responsible for performing control inspections?
1. Facilities management engineering division
  2. Shops division
  3. Housing division
  4. Maintenance and utilities branch
- 8-13. The maintenance and utilities branch is responsible for which of the following inspections?
1. Operator only
  2. Preventive maintenance only
  3. Operator and preventive maintenance
  4. Continuous and operator

- 8-14. The PWD that you are assigned to has 45 personnel assigned. The maintenance branch should then be combined with the utilities branch for better management.
1. True
  2. False
- 8-15. Maintenance work can be generated by which of the following methods?
1. Customer requests
  2. Command inspections
  3. Continuous inspections
  4. Each of the above
- 8-16. What is the most accurate method to verify a facilities inventory?
1. Physically survey all facilities
  2. Use plant account records
  3. Consult the as-built drawings
  4. Perform continuous inspections
- 8-17. What is the basis for developing a preventive maintenance program?
1. The inventory
  2. The Shore Facilities Inspection System
  3. The requests from the customer
  4. Facility history files
- 8-18. The three major parts of the continuous inspection system are operator inspections, preventive maintenance inspections, and control inspections.
1. True
  2. False
- 8-19. Maintenance work that can be completed in 14 hours should be classified in what category?
1. Specific job order
  2. Service work
  3. Standing job order
  4. Preventive inspection
- 8-20. Preventive maintenance inspections (PMIs) are concerned with which of the following problem areas?
1. Interference with an essential mission
  2. Danger to life or property
  3. High cost or long-lead time for replacement
  4. Each of the above
- 8-21. PMIs should be performed by which of the following personnel?
1. PMI inspectors
  2. Shop personnel
  3. Operators
  4. Maintenance supervisors
- 8-22. Control inspections are used to achieve which of the following goals?
1. Provide inspections of facilities only covered by operator inspections
  2. Ensure operator and preventive maintenance inspections are sufficient
  3. Ensure high breakdown maintenance levels are maintained
  4. Each of the above
- 8-23. Guidance for performance of the Shore Facility Inspection System is found in which of the following publications?
1. NAVFAC MO-321 only
  2. NAVFAC MO-322 only
  3. Both NAVFAC MO-321 and MO-322
  4. NAVFAC 11014/38
- 8-24. For the inspection system to work properly, you must maintain which of the following factors?
1. A current facility inventory
  2. A man-hour log on facility inspections
  3. Maintenance records
  4. A firm inspection schedule
- 8-25. The initial classification of work is performed by what code?
1. Work reception desk
  2. Inspection branch
  3. FME director
  4. Shop supervisor
- 8-26. Work classified as emergency/ service work should not exceed how many hours before being reclassified?
1. 8
  2. 2
  3. 16
  4. 40

- 8-27. What purpose is served by reviewing completed service calls?
1. Check shop performance
  2. Review job travel times
  3. Identify personnel training needs
  4. Identify possible facility problem areas
- 8-28. A job may be classified as minor work due to size. However, the requirement exists for full-job accounting. What classification for the job should you use?
1. Minor work
  2. Standing job order
  3. Service work
  4. Specific job order
- 8-29. If a job will exceed 80 man-hours and is not repetitive in nature, what classification for the job should you use?
1. Minor work
  2. Standing job order
  3. Specific job order
  4. Service work
- 8-30. Estimated standing job orders have which of the following characteristics?
1. Issued annually
  2. A specified frequency
  3. Used for specialized service work
  4. Used for fiscal accounting only
- 8-31. Standing job orders should be used for repetitive work, such as replacing light bulbs or broken windows.
1. True
  2. False
- 8-32. Refer to table 9-2 in your text. A code of 4 on the priority matrix indicates what work classification priority?
1. Routine - preventive
  2. High - functional
  3. Routine - functional
  4. High - preventive
- 8-33. Which of the following personnel have the authority to approve a priority 1 on the priority matrix?
1. CO
  2. Shops engineer
  3. FME director
  4. PWO
- 8-34. What is the primary purpose of issuing an activity job order number?
1. To distinguish between job orders for financial purposes
  2. To classify job priorities
  3. To assign the work to the proper work center
  4. To expedite the completion of work
- 8-35. Which of the following labor codes is classified as overhead?
1. Service work
  2. Rework
  3. Emergency work
  4. PMI
- 8-36. Labor class codes are divided into what categories?
1. Productive and indirect
  2. Overhead and direct
  3. Productive and overhead
  4. Direct and indirect
- 8-37. What is the purpose of Engineering Performance Standards (EPS)?
1. To estimate the time needed to complete a task
  2. To provide evaluation guidelines for civil service employees
  3. To assist the engineering department in designing a project
  4. To blend the purpose and direction with engineering standards
- 8-38. What estimate should be used to provide approximate job cost to reimbursable customers?
1. Final
  2. Rough
  3. Scoping
  4. Detailed
- 8-39. The final estimate is prepared at what point in the P&E process?
1. Submission to the customer for funding
  2. Upon project approval
  3. When a scoping approval is not required
  4. 30 days before the material is to be ordered

- 8-40. Taking a job off the Job Requirements and Status Chart is justified by which of the following actions?
1. Canceled
  2. Completed by contract
  3. Job authorized for shop accomplishment
  4. Each of the above
- 8-41. What are the determining factors in formulating and adjusting the Manpower Availability Summary and the Work Plan Summary?
1. Funding and material
  2. Funding and man-hours
  3. Material and man-hours
  4. Material and equipment
- 8-42. The shop planner uses which of the following management tools to schedule jobs for the month?
1. Master Schedule
  2. Monthly Shop Load Plan
  3. Job Requirements and Status Chart
  4. Manpower Availability Summary and Work Plan Summary
- 8-43. In job-order programming, the short-range and long-range plans cover a total of how many months?
1. 6
  2. 9
  3. 3
  4. 12
- 8-44. What percentage is the suggested loading of the Shop Load Plan for (a) the second and (b) the third month?
1. (a) 100 (b) 75
  2. (a) 90 (b) 75
  3. (a) 90 (b) 80
  4. (a) 80 (b) 80
- 8-45. What schedule assigns work that is to be accomplished in the following week?
1. Work center schedule
  2. Master schedule
  3. Manpower schedule
  4. Shop schedule
- 8-46. On which of the following schedules should jobs be assigned on a day-to-day basis?
1. Work center schedule
  2. Master schedule
  3. Shop schedule
  4. Each of the above
- 8-47. The work center schedule should be prepared by what individual?
1. Shops engineer
  2. APWO
  3. PWO
  4. Shop supervisor
- 8-48. The Maintenance/Utilities Labor Control Report obtains information from which of the following reports?
1. Tabulated Report A
  2. Tabulated Report B
  3. Work center schedule
  4. Master schedule
- 8-49. Which of the following management reports provides actual man-hours expended for the month?
1. Tabulated Report A
  2. Tabulated Report B
  3. Maintenance/Utilities Labor Control Report
  4. Each of the above
- 8-50. Which of the following management reports compares actual and estimated man-hours by work center for each completed work order?
1. Tabulated Report A
  2. Tabulated Report B
  3. Maintenance/Utilities Labor Control Report
  4. Each of the above
- 8-51. The completed job order report alerts you to which of the following problems?
1. Poor supervision
  2. Poor estimating
  3. Low productivity
  4. Each of the above



