TECHNICAL MANUAL

PREPARATION FOR SHIPMENT OF ARMY MODEL OH-58D HELICOPTERS

This manual supersedes TM 1-1520-248-S, dated 31 May 1994

HEADQUARTERS, DEPARTMENT OF THE ARMY
31 JANUARY 1999

SAFETY SUMMARY

This publication describes physical and chemical processes which may require the use of chemicals, solvents, paints, or other commercially available material. The user of this publication should obtain the material safety data sheets (Occupational Safety and Health Administration (OSHA) Form 20 or equivalent) from the manufacturers or suppliers of materials to be used. The user must become completely familiar with the manufacturer/supplier information and adhere to the procedures, recommendations, warnings, and cautions of the manufacturer/supplier for the safe use, handling, storage, and disposal of these materials. The following statements are general safety precautions and instructions that people must understand and apply during phases of operation and maintenance to ensure personnel safety and health and the protection of DOD property. Portions of these statements may be repeated elsewhere in this publication for emphasis.

WARNING AND CAUTION STATEMENTS

WARNING and CAUTION statements have been strategically placed through this text prior to operation or maintenance procedures, and practices or conditions considered essential to the protection of personnel (WARNING) or equipment and property (CAUTION). A WARNING or CAUTION will apply each time the related step is repeated. Prior to starting any task, the WARNINGS and CAUTIONS included in the text for the task will be reviewed and understood. The detailed warnings for hazardous materials only are listed separately in the safety summary as **"**Hazardous Materials Warnings**"**.

HAZARDOUS MATERIALS WARNINGS

Warnings for hazardous materials in this manual are designed to warn personnel of hazards associated with such items when they come in contact with them during actual use. For each hazardous material used, a material safety data sheet is required to be provided and available for review by users. Consult your local safety and health staff concerning any questions on hazardous chemicals, MSDSs, personal protection equipment requirements, and appropriate handling and emergency procedures.

The Hazardous Material Warnings section gives the complete warnings for hazardous materials used in this manual. To help the user understand the potential hazards of these materials, more detailed warnings for these materials and explanations of the hazard symbols follow.

EXPLANATION OF HAZARD SYMBOLS

The abstract bug symbol shows that a material may contain bacteria or viruses that present a danger to your life or health.

The symbol of drops of a liquid onto a hand shows that the material will cause burns or irritation of human skin or tissue.

The rapidly expanding symbol shows that the material may explode if subjected to high temperatures, sources of ignition, or high pressure.

The symbol of a person wearing goggles shows that the material will injure your eyes.

The symbol of a flame shows that material can ignite and burn you.

The symbol of a skull and crossbones shows that a material is poisonous or is a danger to life.

The symbol of three circular wedges shows that the material emits radioactive energy and can injure human tissue or organs.

The symbol of a human figure in a cloud shows that vapors of a material present a danger to your life or health.

WARNING

DANGEROUS CHEMICALS
ARE USED IN THIS EQUIPMENT.
DEATH
OR SEVERE BURNS MAY RESULT IF
PERSONNEL FAIL TO OBSERVE SAFETY PRECAUTIONS.

WARNING

MATERIAL MAY EXPLODE IF SUBJECTED
TO HIGH TEMPERATURES, SOURCES OF
IGNITION, OR HIGH PRESSURE.

WARNING

MATERIAL CAN IGNITE
AND BURN YOU.

WARNING

VAPORS OF A MATERIAL PRESENT
A DANGER TO YOUR LIFE OR HEALTH.

LIST OF EFFECTIVE PAGES

INSERT LATEST CHANGED PAGES DESTROY SUPERSEDED PAGES.

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TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 195, CONSISTING OF THE FOLLOWING:

Page No.	*Change No.
Cover	0
a — c	0
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* Zero in this column indicates an original page.

TECHNICAL MANUAL

NO. TM 1-1520-248-S

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 31 JANUARY 1999

PREPARATION FOR SHIPMENT OF ARMY MODEL OH-58D HELICOPTERS

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028-2 (Recommended Changes to Equipment Technical Manuals) Commander, U.S. Army Aviation and Missile Command, ATTN: AMSAM-MMC-LS-LP, Redstone Arsenal, AL 35898-5200 or by email to <ls-lp@redstone.army.mil>. A reply will be furnished to you.

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CHAPTER 1

INTRODUCTION

SECTION I. PURPOSE AND SCOPE

1.1 PURPOSE.

This manual prescribes methods and procedures to follow in preparing the OH-58D/OH-58D(R) helicopter for logistical and tactical shipments. Only the methods listed are recognized as acceptable modes of transport. This manual is intended for use by Transportation and Mobility planners and by aircraft maintenance personnel in the actual preparation and loading of helicopters.

1.2 SCOPE.

Methods and procedures outlined herein provide for cleaning, disassembly, preservation, packaging, packing, loading, blocking, and bracing of serviceable and repairable OH-58D/OH-58D(R) helicopters for shipment. The procedures provided herein should be performed only by or under the direct supervision of qualified aircraft maintenance personnel.

SECTION II. GENERAL

1.3 DESCRIPTION AND USE OF THIS MANUAL.

This manual contains all essential information required by personnel engaged in preparing and loading OH-58D/OH-58D(R) helicopters for shipment by all modes worldwide. Specific requirements and procedures relating to Shipment by Cargo Aircraft (Chapter 2), Vessel (Chapter 3), Truck (Chapter 4), Crated and Intermodal Container Shipment (Chapter 5), and External Transport by Helicopter (Aerial Recovery) (Chapter 9) are detailed in this manual. Also detailed in this manual are specific requirements for tactical, minimum disassembly logistical, and maximum density logistical shipments. These specific requirements include: cleaning, disassembly, preservation, marking, shipper document preparation, landing, tiedown, unloading, depreservation and reassembly. Consult table of contents in front of this manual and determine chapter and section in which desired information is most likely to appear.

1.4 CLASSIFIED MATERIALS.

Classified information is not included in this manual. No items in this helicopter require removal for security reasons and/or special handling during shipment.

1.5 WARNINGS, CAUTIONS, AND NOTES.

1.5.1 Warning. Highlights an essential operating or maintenance procedure, practice, condition, statement, etc., which if not strictly observed, could result in injury to, or death of, personnel or long-term health hazards.

1.5.2 Caution. Highlights an essential operating or maintenance procedure, practice, condition, statement, etc., which, if not strictly observed, could result in damage to, or destruction of, equipment or loss of mission effectiveness.

1.5.3 Note. Highlights an essential operating or maintenance procedure, condition, or statement.

1.6 DEVIATIONS.

Deviations from the procedures of this manual must be approved by US Army Aviation and Missile Command. The point of contact for deviations and clarification is: Commander, US Army Aviation and Missile Command, ATTN: AMSAM-MMC-LS-DP, Redstone Arsenal, AL, 35898-5230, commercial telephone (205) 876-9282 or DSN 746-9282.

SECTION III. AIRCRAFT DESCRIPTION

1.7 AIRCRAFT DESCRIPTION.

1.7.1 Operational Characteristics and Intended Use.

1.7.1.1 Observation Helicopters. The OH-58D/OH-58D(R) is designed for use in close combat aerial reconnaissance, intelligence gathering, surveillance, and target acquisition. The OH-58D/OH-58D(R) incorporates a mast mounted sight system which enables a crew to perform the aeroscout mission while remaining at a stand-off range and out of direct line of sight of enemy observation. Used for weapons guidance, the sight laser range finder/designator can designate a target for laser-seeking weapons or can accurately determine distance and direction from the

helicopter to an intended target (for target handover to an attack helicopter, TAC AIR, or conventional field artillery engagement). Electronic systems provide communications security, radar warning, accurate navigation data, and aircraft identification. The helicopter is capable of performing these missions day and night, in limited adverse weather, obscured battlefield conditions, and at nap-of-the-earth (NOE) flight conditions.

1.7.1.2 Mounting and Firing. The OH-58D/OH-58D(R) includes provisions for mounting and firing multiple weapons systems. Weapons are mounted on a universal weapons pylon which is installed in the intermediate fuselage. Weapons systems are fully integrated into control and display system.

1.7.1.3 Rapid Deployment Landing Gear. The OH-58D/OH-58D(R) has the capability to install a rapid deployment landing gear system (figure 1-1) that permits the helicopter to be kneeled for loading on C-17, C-130, and C-141 cargo aircraft.

1.7.1.4 OH-58D/OH-58D(R) Helicopter. The OH-58D helicopter is powered by either a T703-AD-700A (250-C30R) or a T703-AD-700B (250-C30R/1) turboshaft engine. The OH-58D(R) is powered by a 250-C30R/3 turboshaft engine. Both models have a four-blade, foldable main rotor system.

1.7.1.5 Basic Weight. Basic Weight of an aircraft is that weight which includes all hydraulic systems and oil systems full, trapped or unusable fuel, and all fixed equipment, to which it is only necessary to add the crew, fuel, cargo, and ammunition (if carried) to determine the aircraft gross weight. The basic weight varies with structural modifications and changes of fixed aircraft equipment. Refer to DD Form 365-3 (Basic Weight and Balance Record) for the individual aircraft.

1.7.2 Shipping Characteristics. Shipping dimensions, which can be used to plan space requirements for any mode of shipment are shown in figure 1-2 for OH-58D/OH-58D(R).

1.7.3 Referencing to Other Manuals. Refer to Appendix A of this manual for operator and organization maintenance manuals and other pertinent publications.

SECTION IV. SHIPPING CHARACTERISTICS

1.8 FLIGHT DELIVERY.

Flight delivery, when feasible, provides the most expeditious method of transporting helicopters. For information on maximum range, refer to TM 1-1520-248-10.

1.9 MODES OF SHIPMENT.

Due to severe longitudinal stresses involved, shipment of Army helicopters by rail is not authorized. Approved modes of transportation are as follows:

a. Cargo Airplane. (Refer to Chapter 2.)

(1) C-130

(2) C-141

(3) C-17

(4) C-5

b. Surface Vessel. (Refer to Chapter 3.)

(1) Roll On/Roll Off (RO/RO)

(2) Lift On/Lift Off (LO/LO)

(3) Landing Platform Helicopter (LPH)

c. Truck. (Refer to Chapter 4.)

(1) Commercial Air-Ride Tractor and Flatbed Trailer

(2) M270A1 Military Tactical Transport Trailer (ground recovery)

d. Crated and Intermodal Container Shipment. (Refer to Chapter 5).

e. External Transport by Helicopter (aerial recovery). (Refer to Chapter 9).

1.10 TYPES OF SHIPMENT.

Approved types of shipment are as follows:

1.10.1 Cargo Aircraft.

a. Tactical shipment (flyable or nearly flyable).

b. Minimum disassembly logistical shipment.

c. Maximum density logistical shipment.

d. Palletized shipment.

1.10.2 Vessel.

a. Tactical shipment (flyable or nearly flyable).

b. Minimum disassembly logistical shipment.

c. Maximum density logistical shipment.

1.10.3 Selection of Type of Shipment. The relative preparation and reassembly times are provided in table 1-1 for each mode and type of shipment.

1.11 TIEDOWNS.

1.11.1 Preparation for Tiedown Operation.

NOTE

The tiedown hardware is not considered flyaway equipment. All three tiedowns (mooring points) shall be equipped with the hardware shown in figure 1-3. It is highly recommended that this hardware be permanently installed because it is also used for mooring during high winds. It should also be noted that shackle P/N 204-031-464-1 is a retrofit item and not original equipment.

a. Install Tiedown Fittings.

(1) Ensure forward jack pad fittings are installed at helicopter forward tiedown locations with machine bolts (E-3) and flat washers (E-52) as shown in figure 1-3.

(2) Ensure tiedown shackles are installed on two forward jack pads and one aft jack pad as shown in figure 1-3.

b. Install Skid Tube Bracing. During ground movement of the helicopter, the landing gear is prevented from spreading at high gross weights by use of aircraft cargo tiedown (E-43).

(1) On Helicopters with a standard landing gear use nylon strap (E-37) to connect forward towing support assemblies and aircraft cargo tiedown (E-43) to connect aft landing gear support fittings (figure 1-3).

(2) On Helicopters with the rapid deployment landing gear installed, use nylon strap (E-37) connecting both skid tubes just forward of the forward crosstube saddles and aircraft cargo tiedown (E-43) (figure 1-4). Tighten only enough to remove slack.

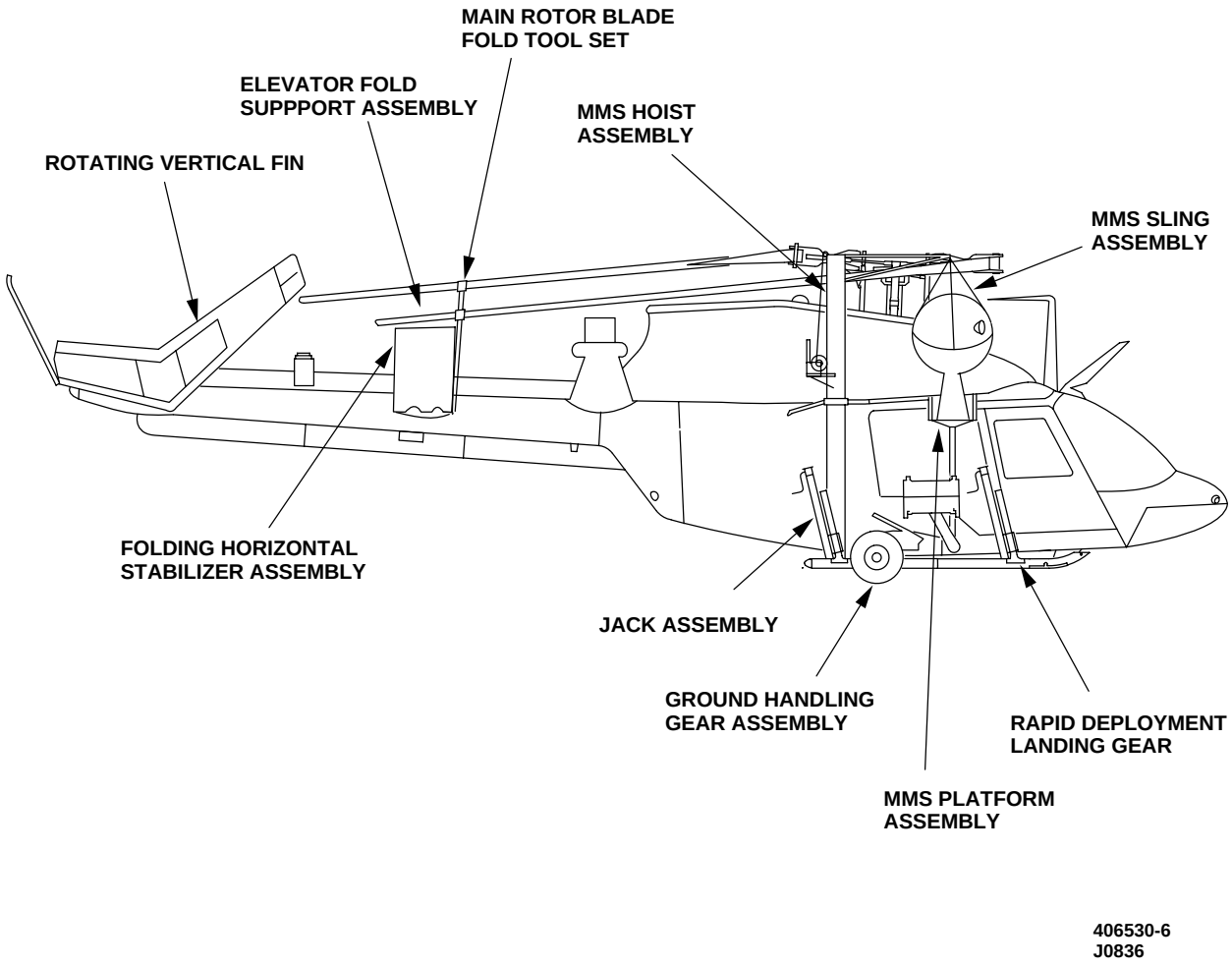


Figure 1-1. Rapid Deployment Configuration

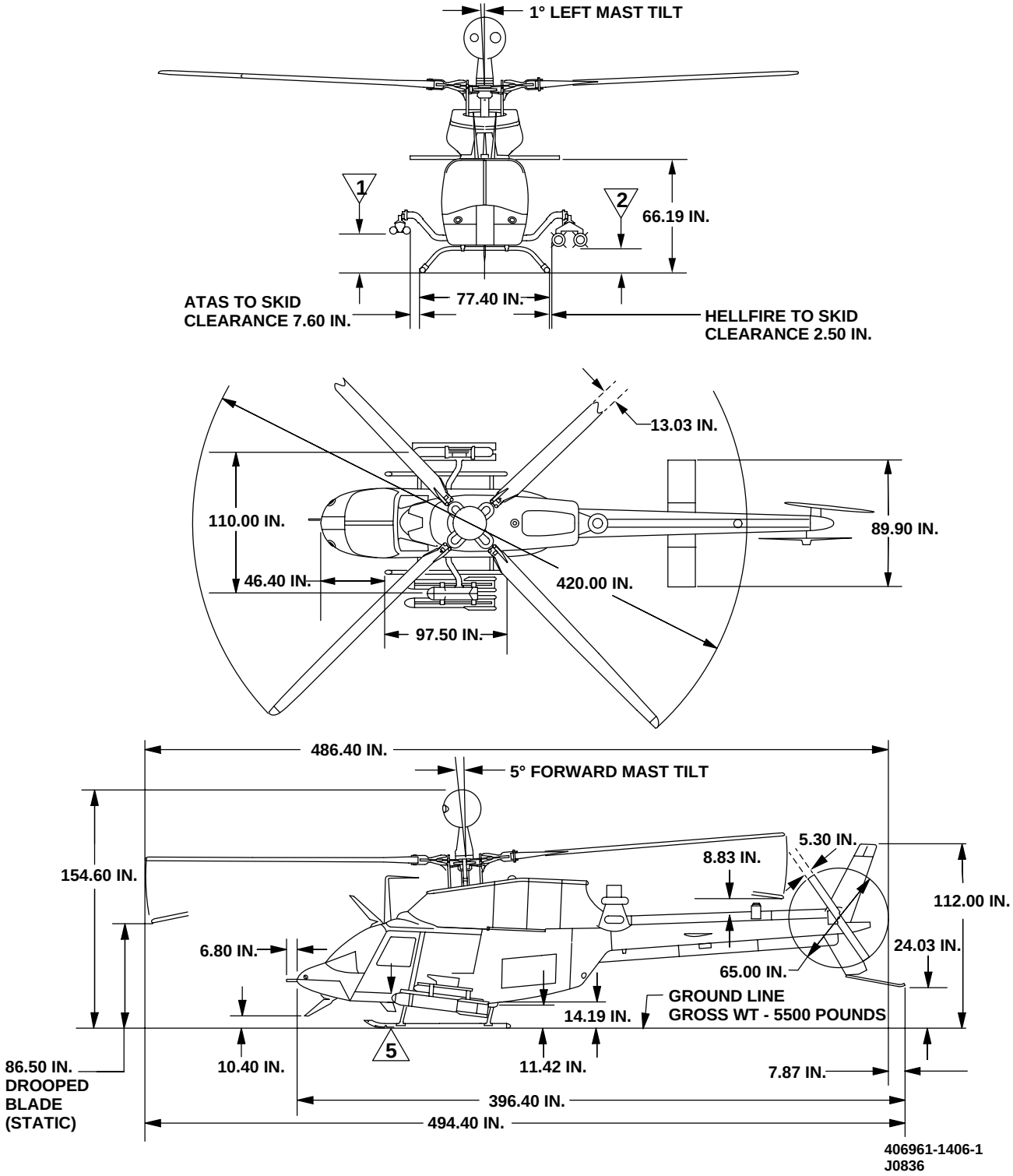


Figure 1-2. Shipping Dimensions and Operational Configuration (Sheet 1 of 10)

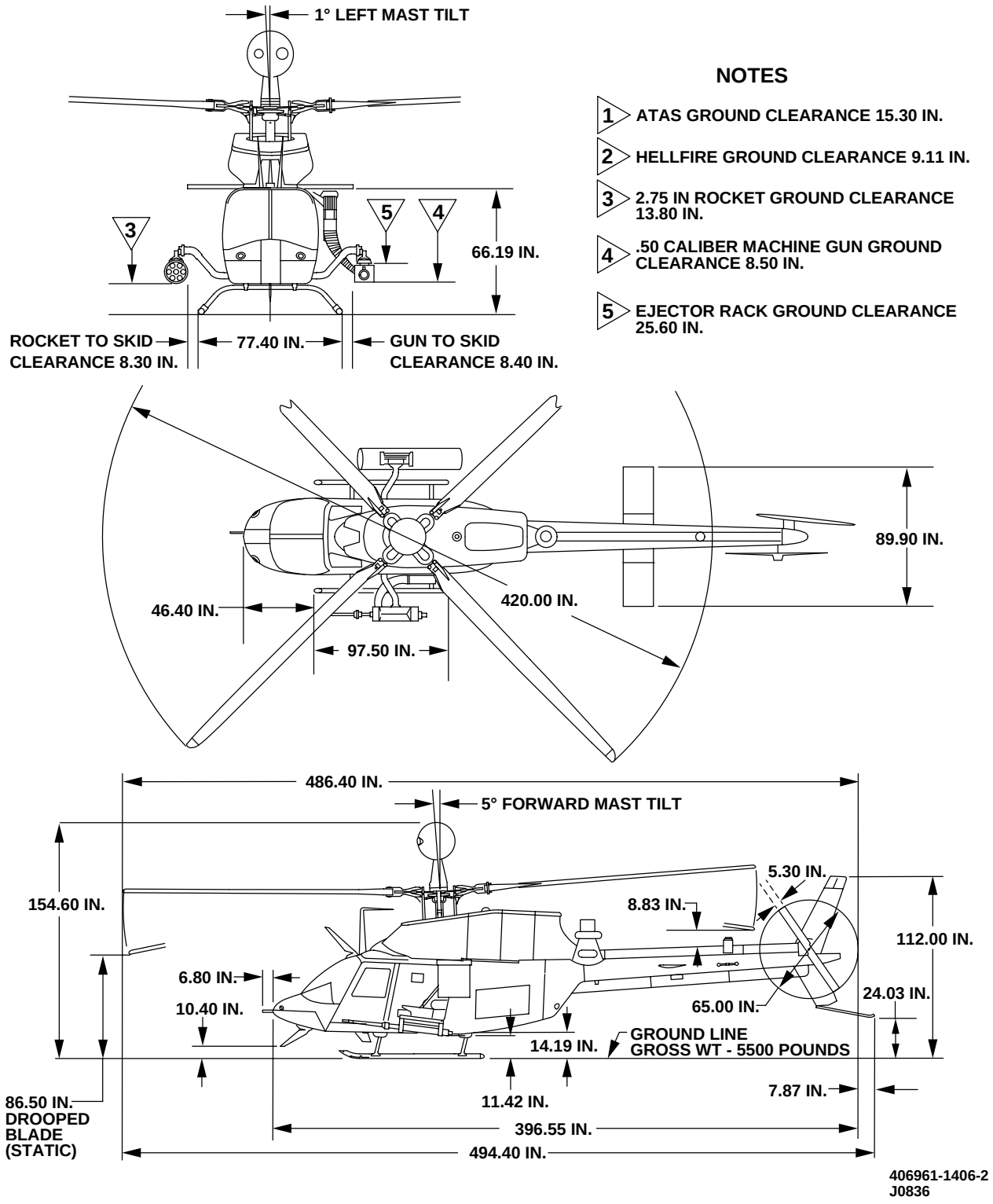
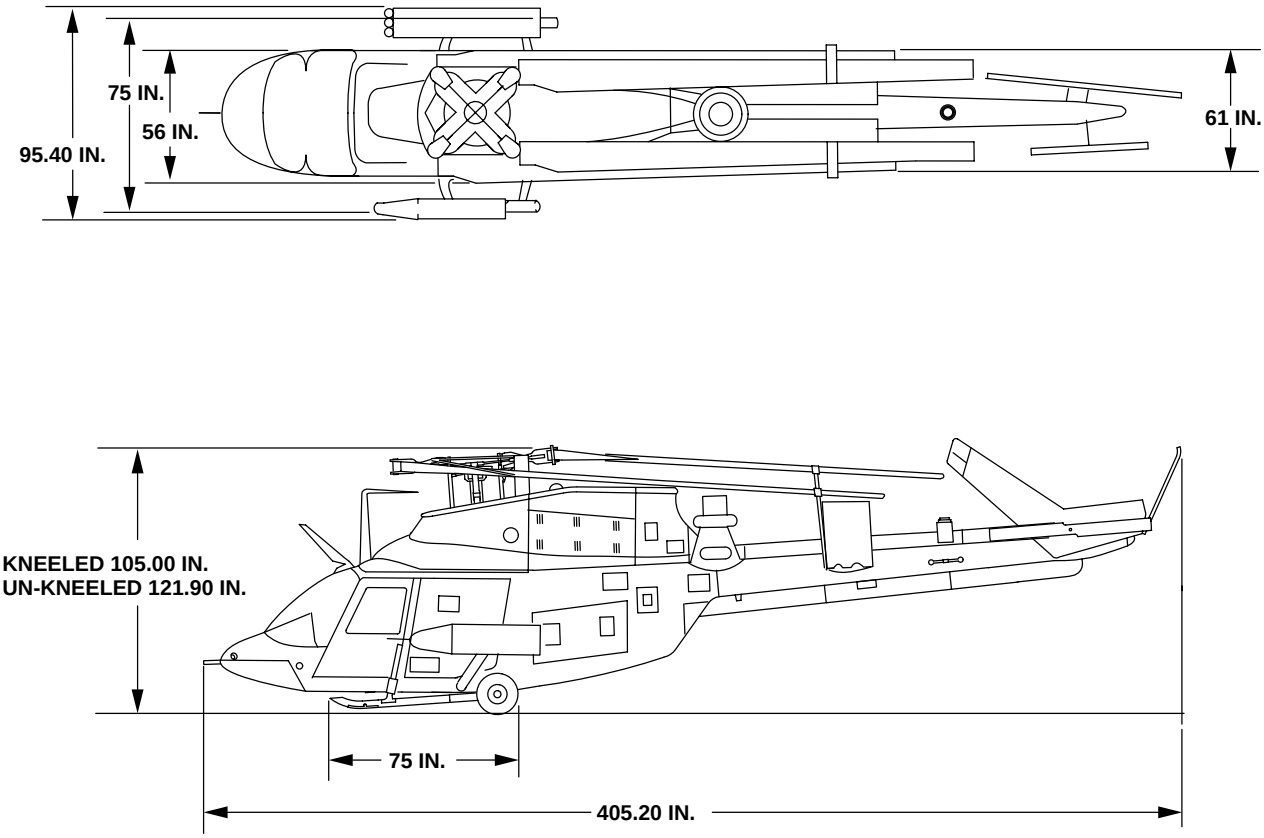


Figure 1-2. Shipping Dimensions and Operational Configuration (Sheet 2 of 10)



FOR LOADING IN C-130 AND C-141 AIRCRAFT AND ON COMMERCIAL AIR-RIDE TRACTOR AND TRAILER:

HELICOPTER ON 406-706-209 TRANSPORT KIT.
MAST MOUNTED SIGHT (MMS) REMOVED.
MAIN ROTOR BLADES FOLDED.
VERTICAL FIN ROTATED.
HORIZONTAL STABILIZER FOLDED.
LOWER WIRE CUTTER REMOVED.
UHF ANTENNA REMOVED.
UNIVERSAL WEAPON PYLONS FOLDED (REMOVED WEAPONS FOR TRAILER TRANSPORT).

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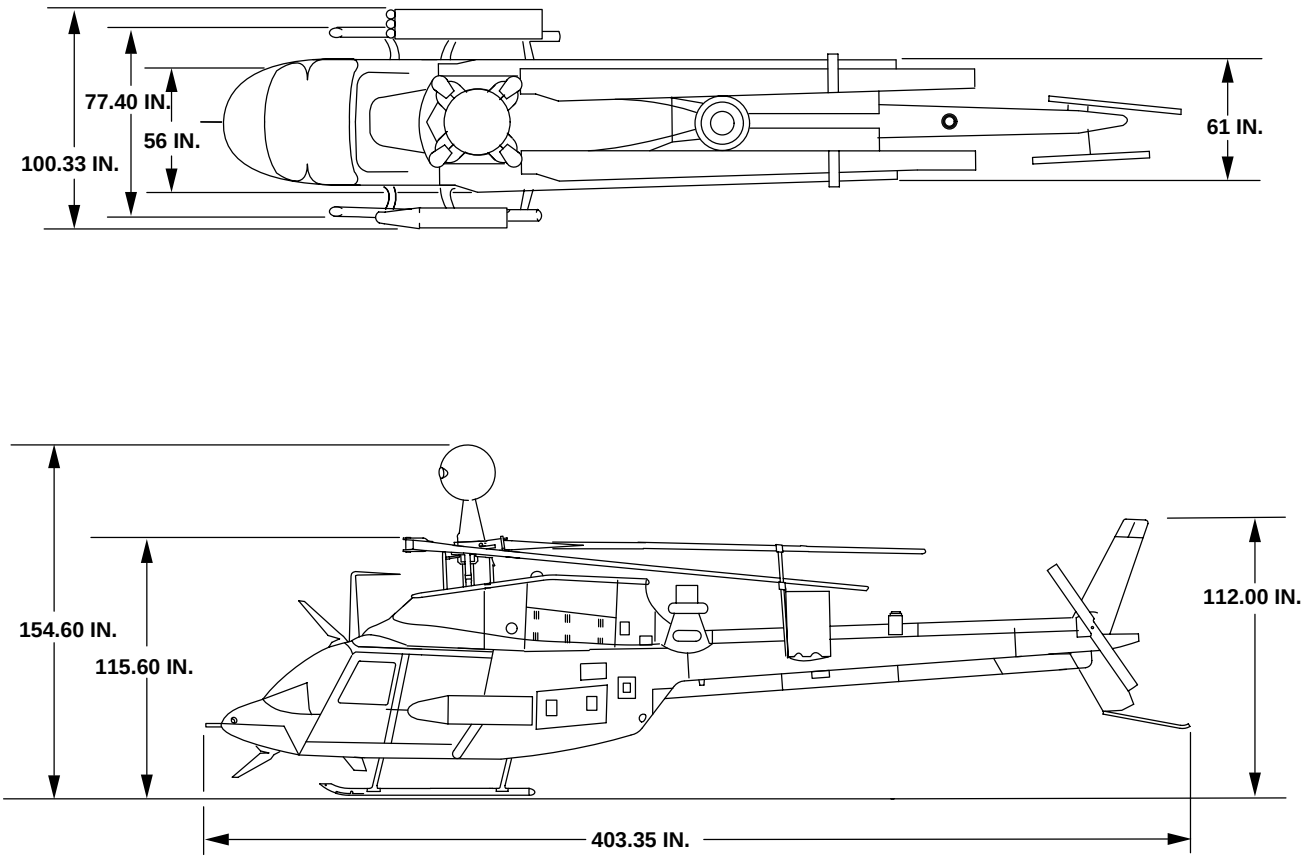
Figure 1-2. Shipping Dimensions and Operational Configuration (Sheet 3 of 10)



FOR LOADING IN C-5 AIRCRAFT (FRONT LOAD ONLY), TACTICAL VESSEL SHIPMENT, AND LAST THREE HELICOPTERS LOADED ON C-17 AIRCRAFT:

HELICOPTER ON STANDARD LANDING GEAR.
MAIN ROTOR BLADES FOLDED.
UNIVERSAL WEAPONS PYLONS FOLDED (REMOVE WEAPONS FOR TRAILER TRANSPORT).
HORIZONTAL STABILIZER FOLDED.

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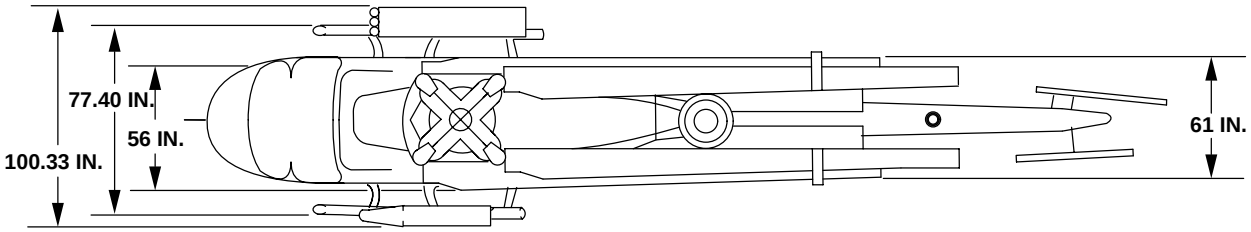
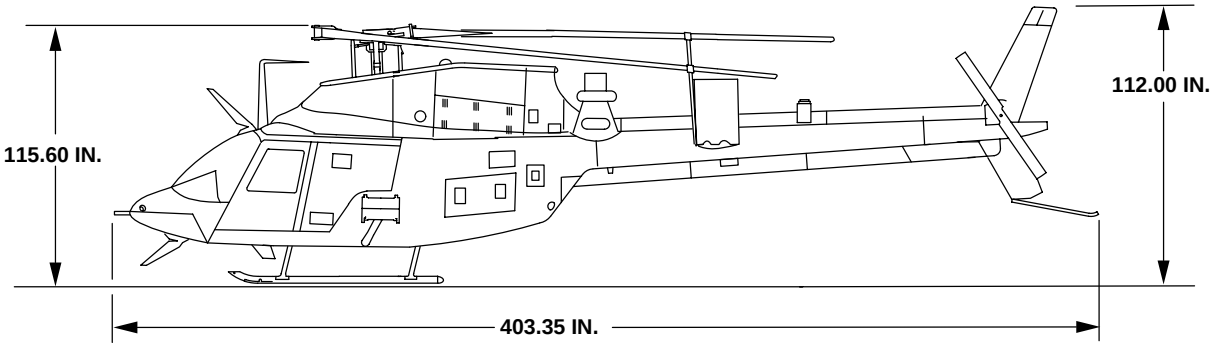
Figure 1-2. Shipping Dimensions and Operational Configuration (Sheet 4 of 10)





FOR LOADING IN C-5 AIRCRAFT (REAR LOAD), C-17 AIRCRAFT (FIRST FOUR HELICOPTERS LOADED), TACTICAL TRUCK TRANSPORT, AND LOGISTICAL VESSEL SHIPMENT:

HELICOPTER ON STANDARD LANDING GEAR.
MAIN ROTOR BLADES FOLDED.
MAST MOUNTED SIGHT REMOVED (TRAILER ONLY).
UNIVERSAL WEAPONS PYLONS FOLDED (REMOVE WEAPONS FOR TRAILER TRANSPORT).
HORIZONTAL STABILIZER FOLDED.

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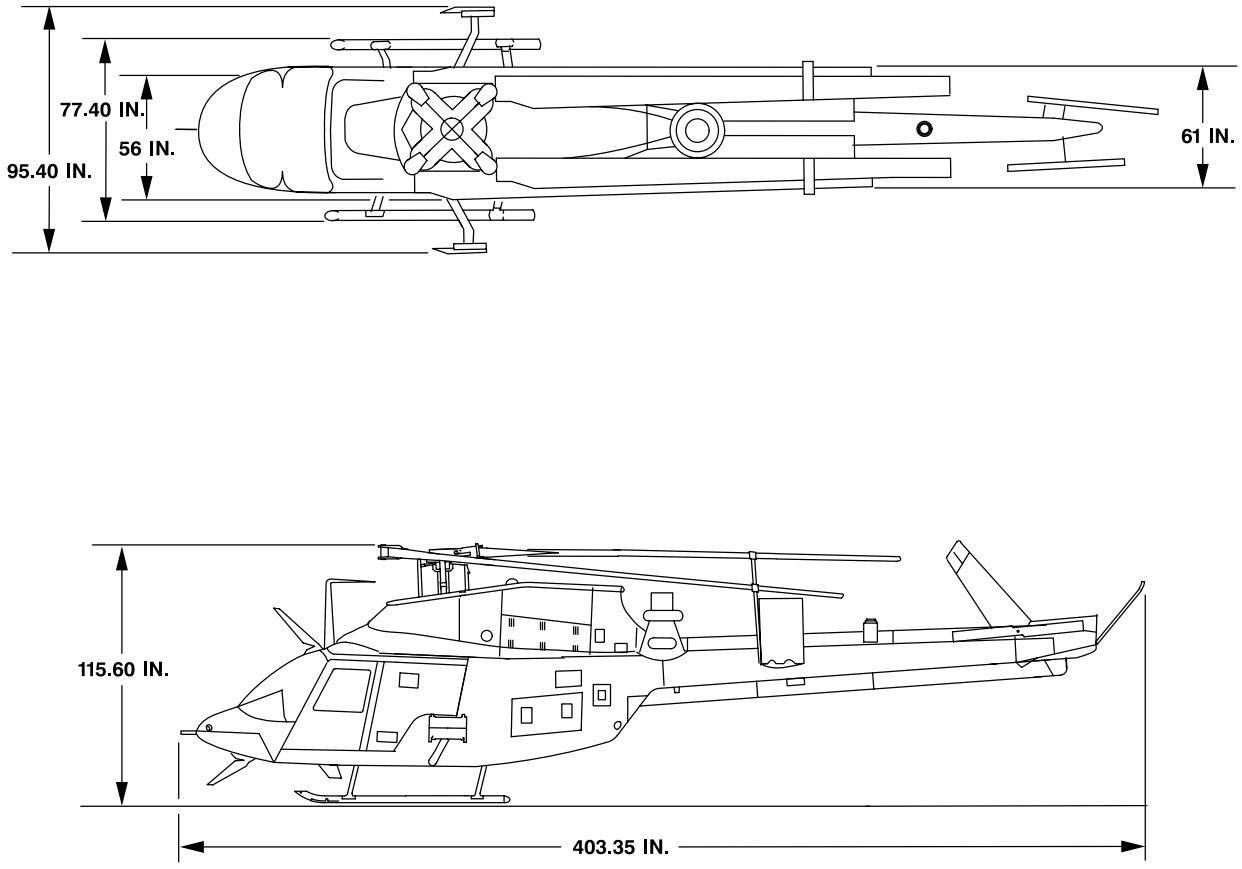
Figure 1-2. Shipping Dimensions and Operational Configuration (Sheet 5 of 10)



FOR LOADING ON COMMERCIAL AIR-RIDE TRACTOR AND LOWBOY TRAILER:

HELICOPTER ON STANDARD LANDING GEAR.
MAIN ROTOR BLADES FOLDED.
MAST MOUNTED SIGHT REMOVED.
VERTICAL FIN ROTATED.
HORIZONTAL STABILIZER FOLDED.
WEAPONS REMOVED (PYLONS REMAIN).

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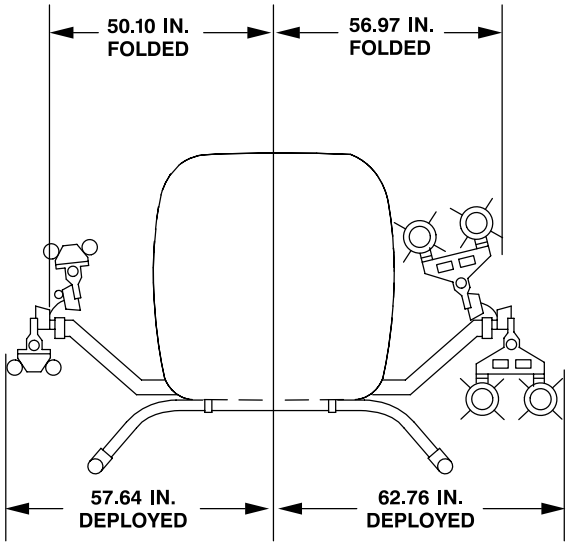
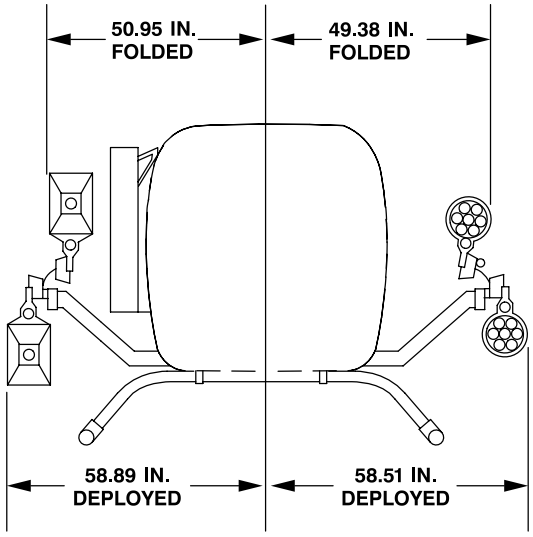
Figure 1-2. Shipping Dimensions and Operational Configuration (Sheet 6 of 10)



HELLFIRE/ATAS INSTALLED



.50 CAL. GUN/2.75-7 TUBE
ROCKET POD INSTALLED

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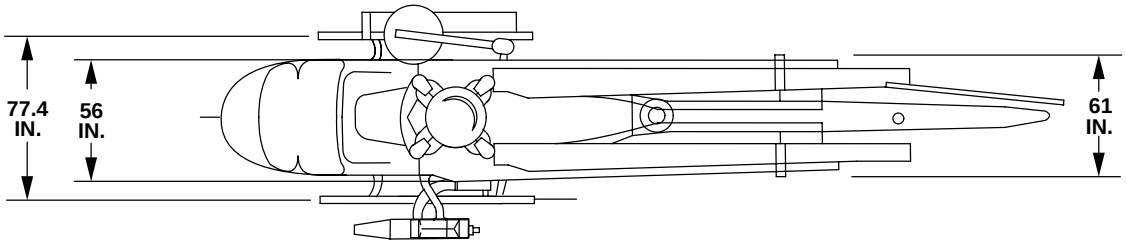
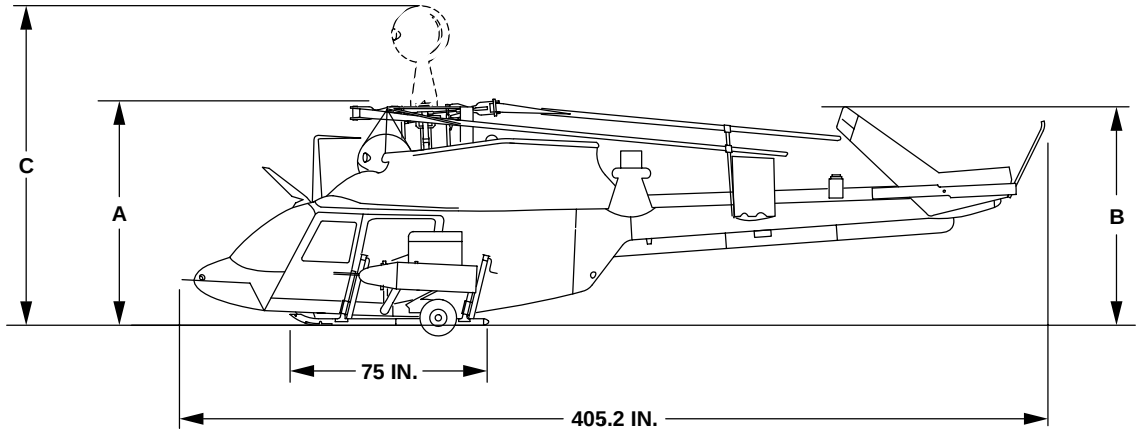
Figure 1-2. Shipping Dimensions and Operational Configuration (Sheet 7 of 10)



DIMENSION	KNEELED	UNKNEELED
A	105.0 IN.	121.9 IN.
B	93.4 IN.	107.8 IN.
C	146.0 IN.	162.9 IN.



FOR LOADING IN C-5, C-130, C-141, AND C-17

HELICOPTER ON RAPID DEPLOYMENT LANDING GEAR
MAST MOUNTED SIGHT (MMS) REMOVED AND INSTALLED ON MMS PLATFORM
MAIN ROTOR BLADES FOLDED AND BLADE RACK INSTALLED
HORIZONTAL STABILIZER FOLDED
VERTICAL FIN ROTATED
MAST MOUNTED SIGHT HOIST ASSEMBLY INSTALLED
LH WEAPONS PYLON INSTALLED AND FOLDED (WITH WEAPONS)
LOWER WIRE CUTTER REMOVED
UHF ANTENNA REMOVED
RESCUE LADDERS REMOVED
BLADE ANTENNA REMOVED
AFT CROSSTUBE TIEDOWN INSTALLED

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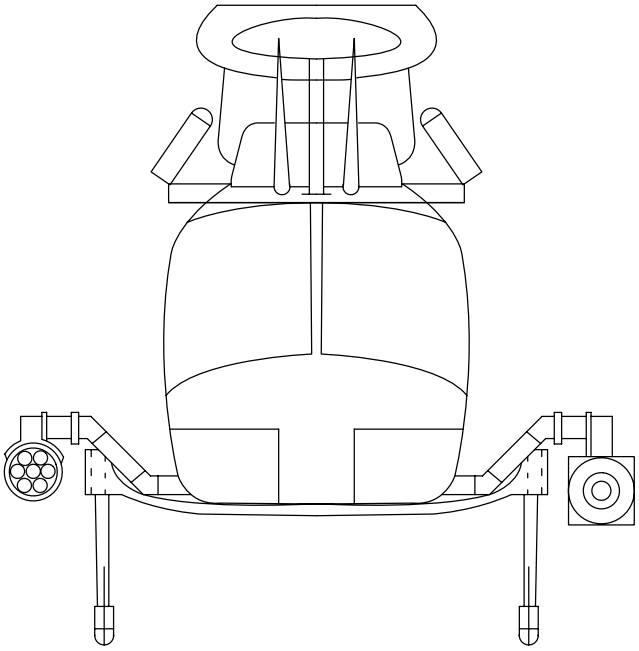
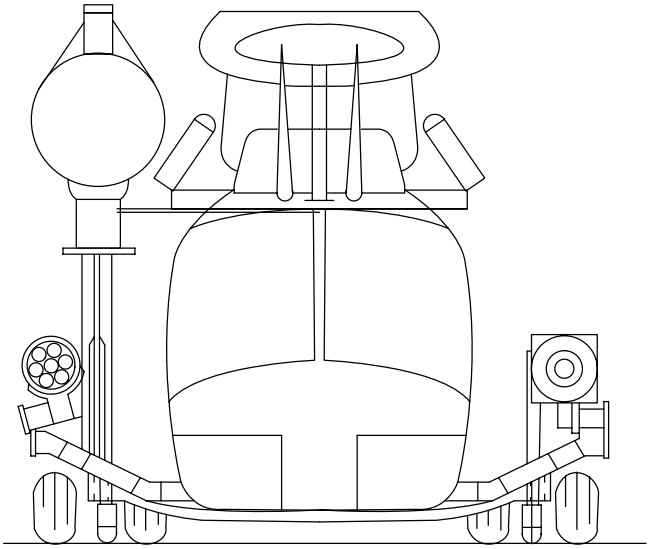
Figure 1-2. Shipping Dimensions and Operational Configuration (Sheet 8 of 10)



WEAPONS PYLONS
IN FIRING POSITION



WEAPONS PYLONS
RETRACTED & LANDING
GEAR KNEELED

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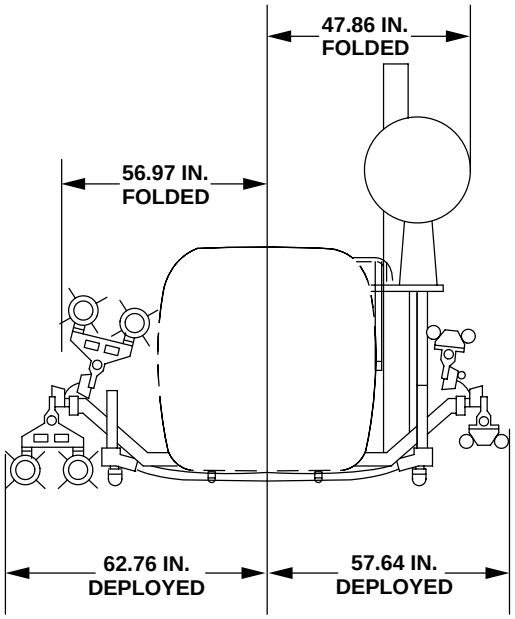
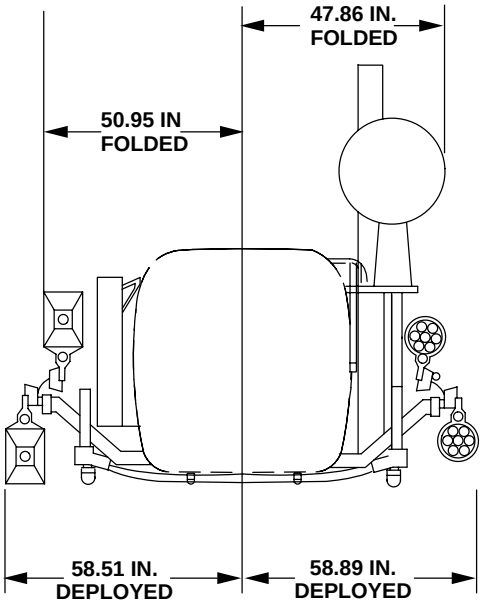
Figure 1-2. Shipping Dimensions and Operational Configuration (Sheet 9 of 10)



HELLFIRE/ATAS INSTALLED



.50 CAL GUN/2.75-7 TUBE
ROCKET POD INSTALLED

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Figure 1-2. Shipping Dimensions and Operational Configuration (Sheet 10 of 10)

Table 1-1. Disassembly Preservation/Depreservation and Assembly Man-Minutes and Personnel Required

COMPONENT	DISASSEMBLY MAN-MINUTES	DISASSEMBLY NO. PERSONS	PRESERVATION AND PACKING MAN-MINUTES	PRESERVATION AND PACKING NO. PERSONS	TOTAL M/M
Mast Mounted Sight	10	3	10	2	20
Main Rotor Blades - Fold	20	4	0	1	20
Horizontal Stabilizer - Fold	05	1	0	1	05
Vertical Fin - Rotate	05	1	0	2	05
Standard Landing Gear/Transportability Kit - Remove/Install	42	4	0	1	42
Lower Wire Cutter	01	1	02	1	04
UHF Antenna	02	1	02	1	04
Rapid Deployment Landing Gear - Kneel	20	5	0	1	20
Universal Weapons Pylons - Fold	05	1	0	1	05

COMPONENT	DEPRESERVATION MAN-MINUTES	DEPRESERVATION NO. PERSONS	ASSEMBLY MAN-MINUTES	ASSEMBLY NO. PERSONS	TOTAL M/M
Mast Mounted Sight	10	2	29	3	39
Main Rotor Blades - Fold	15	2	29	4	44
Horizontal Stabilizer - Fold	0	1	05	1	05
Vertical Fin - Rotate	0	1	05	1	05
Transportability Kit/Standard Landing Gear - Install/ Remove	0	1	11	4	11
Lower Wire Cutter	01	1	03	1	04
UHF Antenna	01	1	03	1	04
Blade Antenna	0	1	05	1	05
Rapid Deployment Landing Gear - Raise	0	1	20	5	20
Universal Weapons Pylons - Fold	0	1	05	1	05

NOTE

These figures are estimated and subject to revision.

CAUTION

Overtightening of tiedown straps and chains will cause structural damage to helicopter. Tighten only enough to remove slack.

c. Shipment by C-141, C-130, and C-17 (first four loaded under wing section) requires installation of the air transportability kit (E-16) for aircraft with standard landing gear, (figure 1-4). Aircraft equipped with rapid deployment landing gear (figure 1-3), require kneeling.

d. Tiedown procedures for helicopter with air transportability kit (E-16) (figure 1-5).

1.11.2 Tie Down Helicopter. Tiedown helicopter for shipment on standard skid gear using tension adjuster assembly (E-44) on ground hand shackles (E-30).

1.12 DISASSEMBLY.

Refer to TM 9-1240-778-23, TM 11-1520-248-23, and TM 1-1520-248-23.

1.13 UNUSUAL CHARACTERISTICS.

For Mast Mounted Sight (MMS) packaging contact Commander, USAAMCOM, ATTN: AMSAM-MMC-LS-DP, DSN 746-9282, for obtaining the MMS containers.

1.14 TRANSPORTABILITY EQUIPMENT AND CONSUMABLE MATERIALS.

a. Refer to Chapter 7 for local manufacture of transportability equipment.

b. Refer to Chapter 8 for transportability equipment operator and maintenance instructions.

c. Refer to Appendix D for identification of consumable materials and bulk items required during helicopter preparation and shipping tasks.

d. Refer to Appendix E for equipment items required for helicopter preparation and shipment.

1.15 INTERNATIONAL SHIPMENT.

Refer to Appendix F for information on customs clearance and quarantine inspection.

SECTION V. GROUND HANDLING

1.16 PREPARE FOR TOWING.

a. In preparation for towing, when weapons rack is fitted with weapons, fold weapons pylon.

b. Install nylon strap (E-37) on forward skid tubes and/or install aircraft cargo tiedown (E-43) on aft skid tubes (Figure 1-3, Standard Landing Gear) or (Figure 1-4, Rapid Deployment Landing Gear) as follows:

CAUTION

Visually inspect landing gear support fittings for damage or cracks.

(1) Place aircraft cargo tiedown ratchet end hook over fitting.

(2) Place aircraft cargo tiedown end hook over opposite fitting.

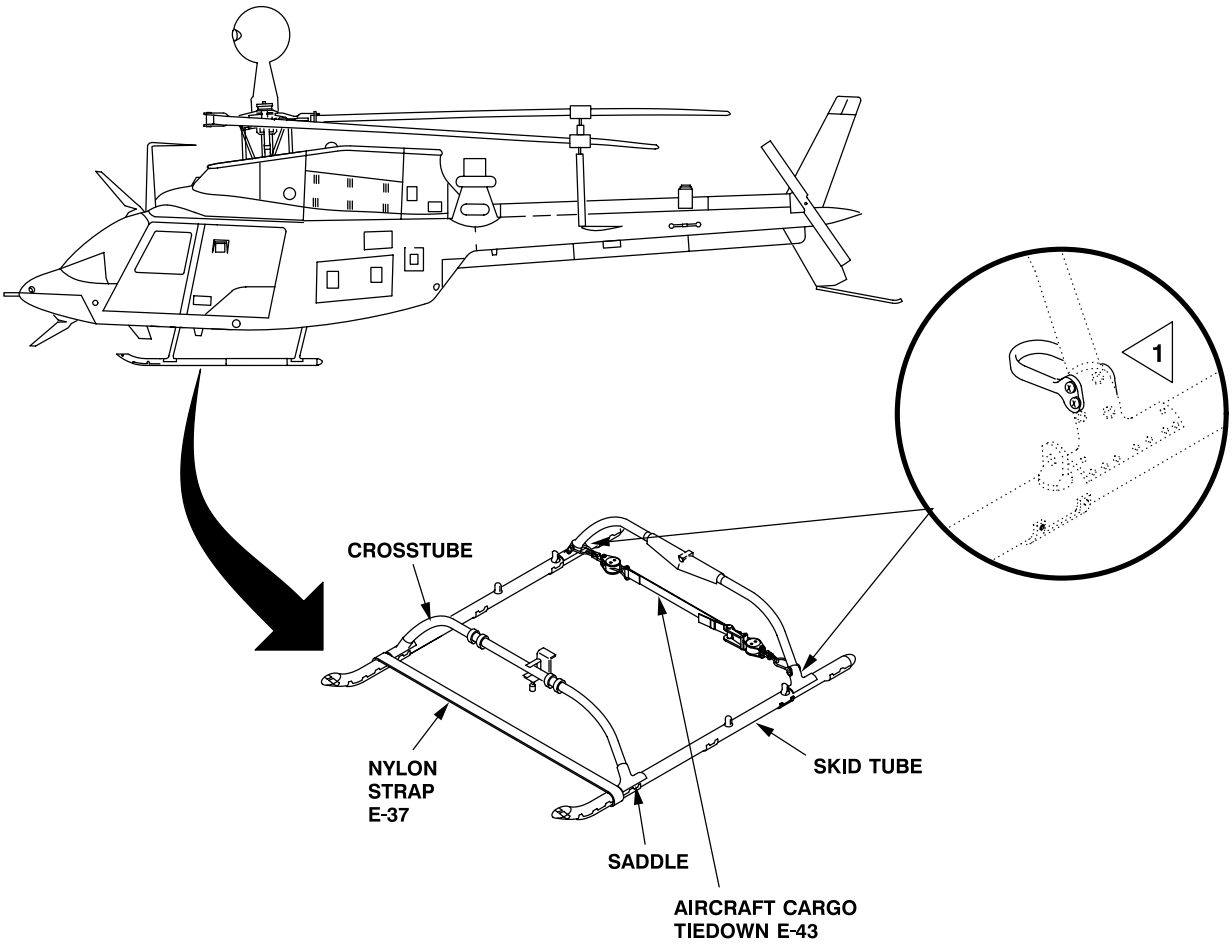
(3) Pull excess tiedown through ratchet slot, leaving approximately 6 inches of slack.

CAUTION

- Aircraft cargo tiedown should have enough slack available to allow one full rotation of ratchet mechanism before tension comes on aircraft cargo tiedown.
- To prevent damage to landing gear do not ever tighten aircraft cargo tiedown.
- In an emergency, helicopter may be towed up to its maximum gross weight, by tying the skid tubes together using aircraft cargo tiedown (E-43) to prevent spreading.

(4) Tighten cargo strap till tight.

(5) Position nylon strap (E-37) at or near the forward crosstube.



NOTES

1 LANDING GEAR TOWING SUPPORT FITTING INSTALLED PER TB 1-1520-248-20-37.

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J1250

Figure 1-3. Standard Landing Gear Tiedown Configuration (Without Air Transportability Kit) (Sheet 1 of 5)

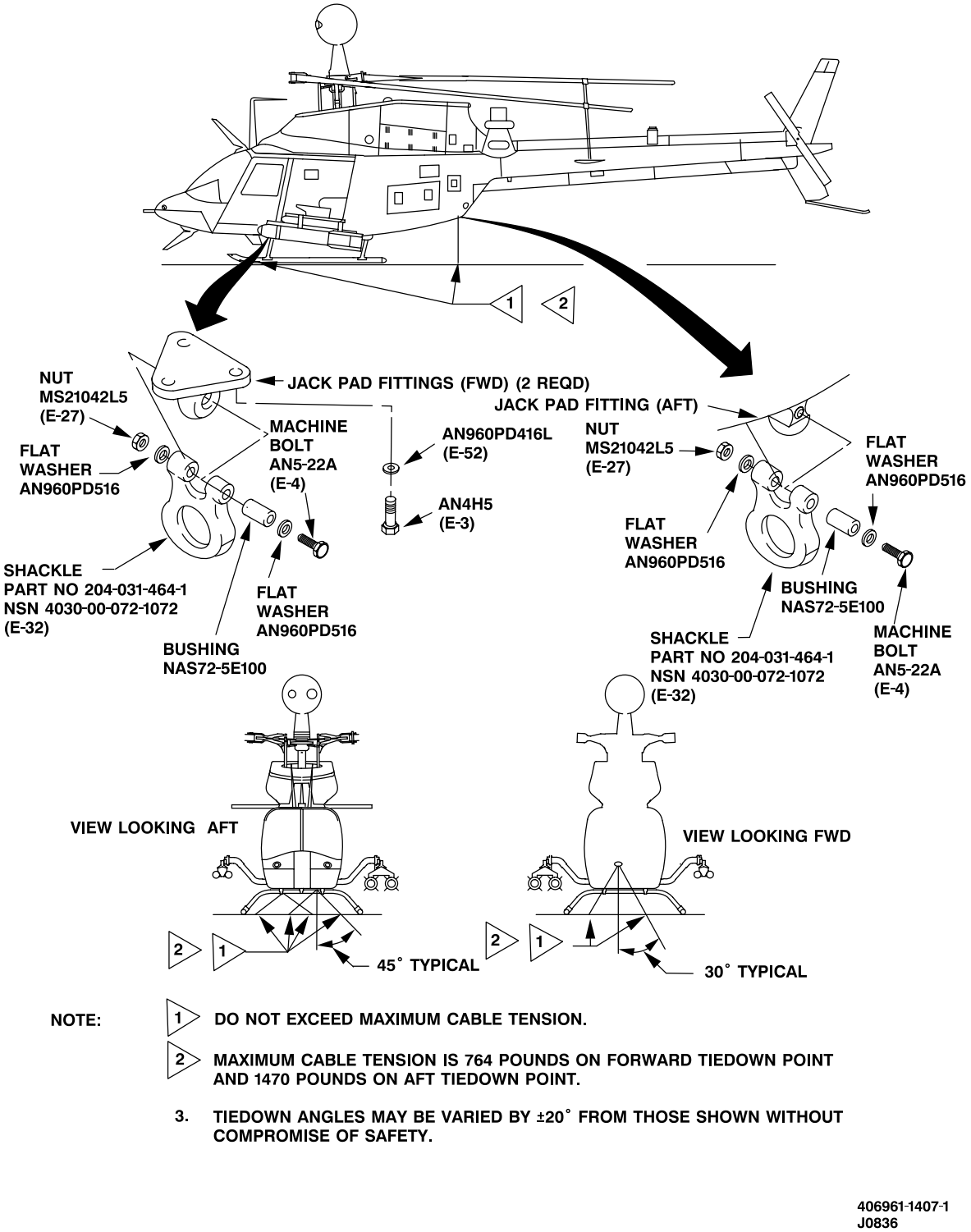
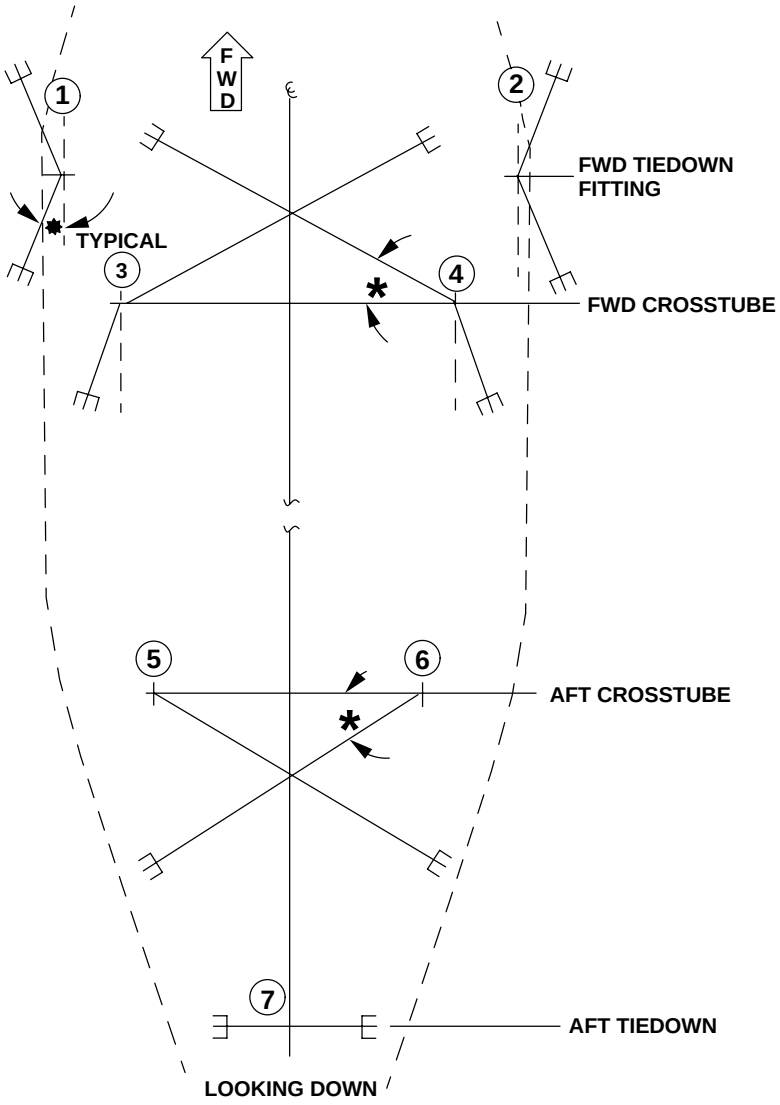


Figure 1-3. Standard Landing Gear Tiedown Configuration (Without Air Transportability Kit) (Sheet 2 of 5)



NOTE

1. ✸ = 10°TO 30° FOR POINTS (1) (2) (3) (4) AND (7)
2. ✱ = 30° TO 60° FOR POINTS (3) (4) (5) AND (6)

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Figure 1-3. Standard Landing Gear Tiedown Configuration (Without Air Transportability Kit) (Sheet 3 of 5)

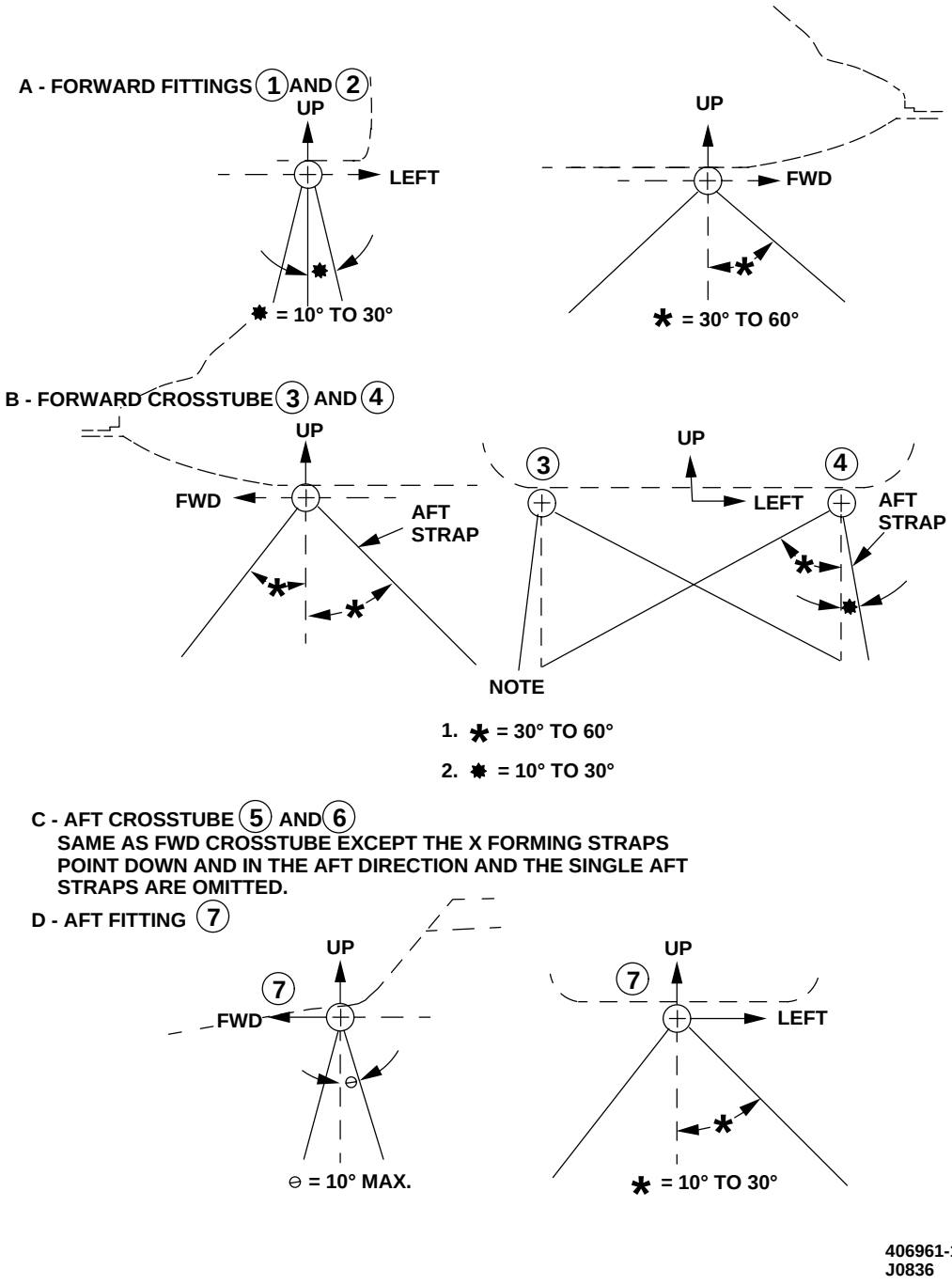
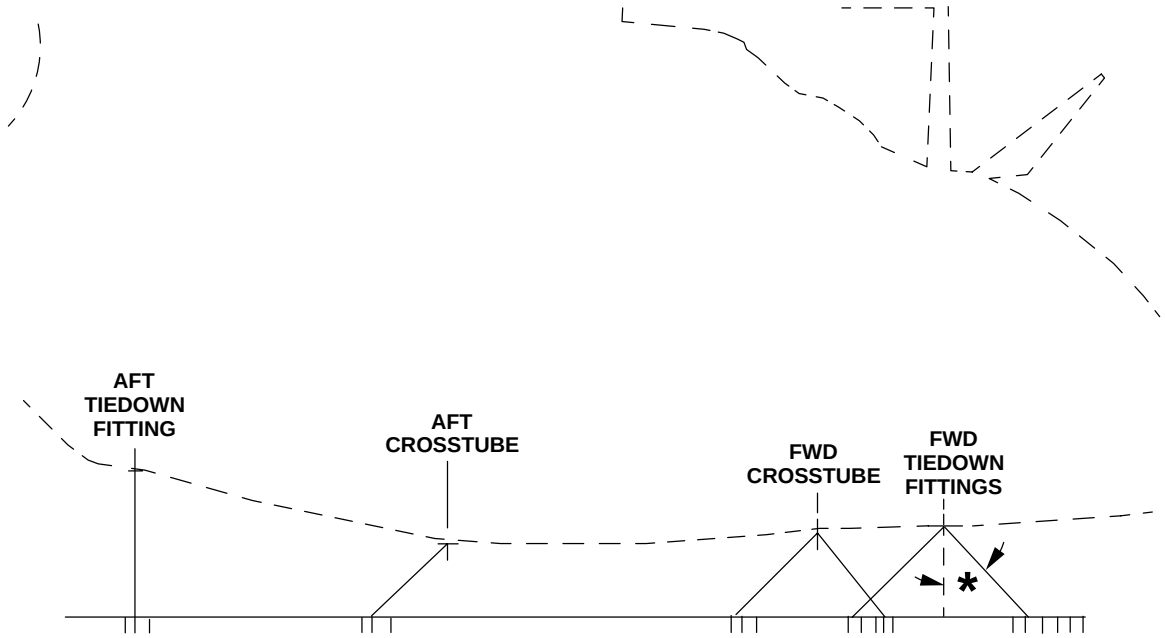


Figure 1-3. Standard Landing Gear Tiedown Configuration (Without Air Transportability Kit) (Sheet 4 of 5)



LOOKING INBOARD RIGHT SIDE

NOTE

SIDE VIEW OF TIEDOWN ARRANGEMENT.

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Figure 1-3. Standard Landing Gear Tiedown Configuration (Without Air Transportability Kit) (Sheet 5 of 5)

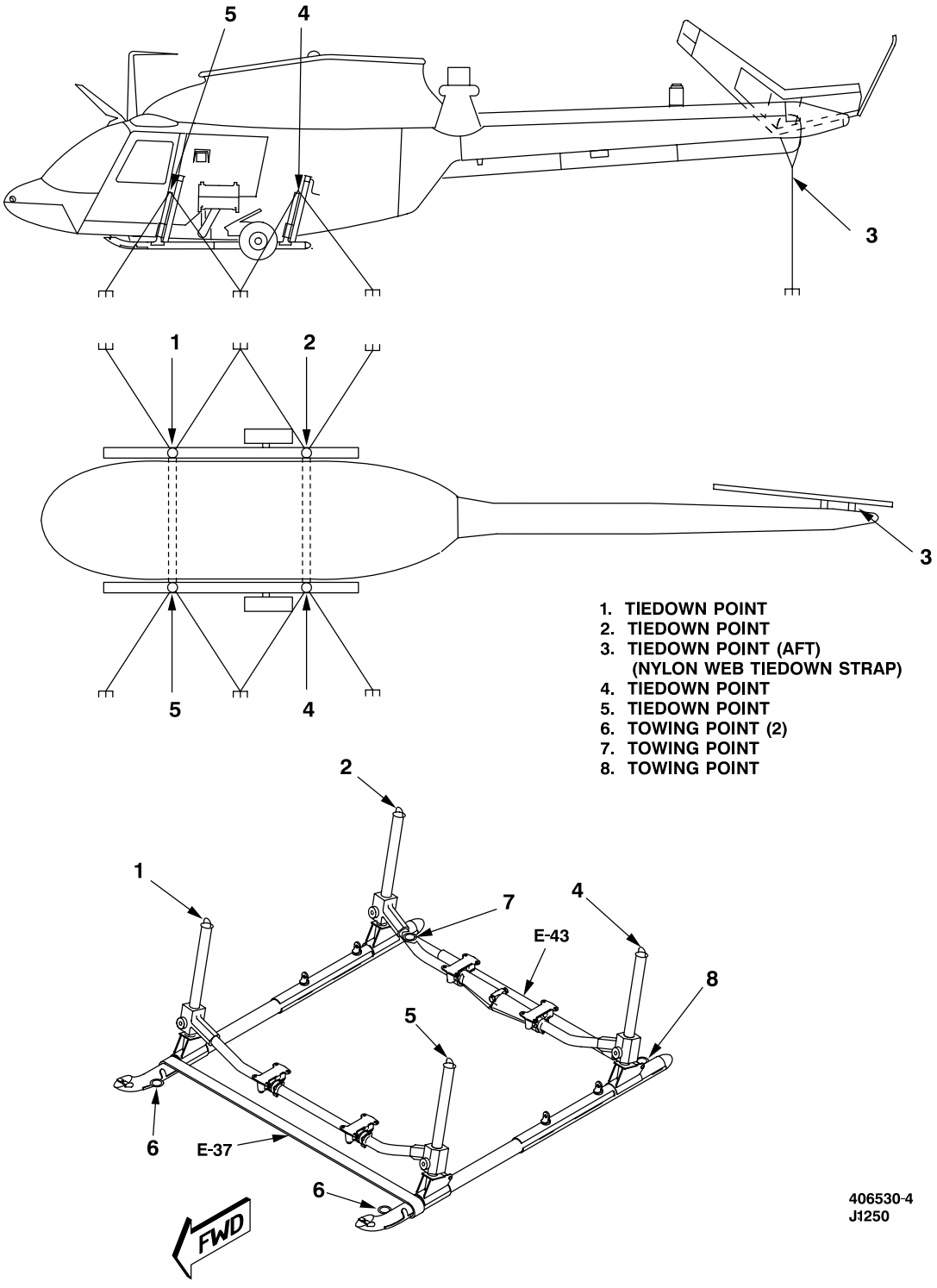
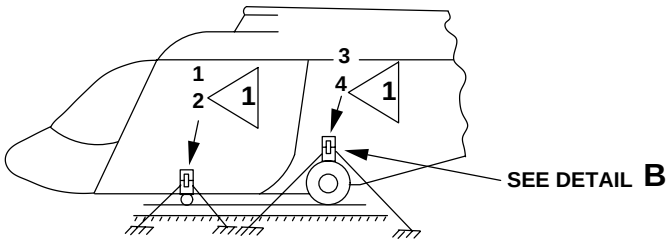


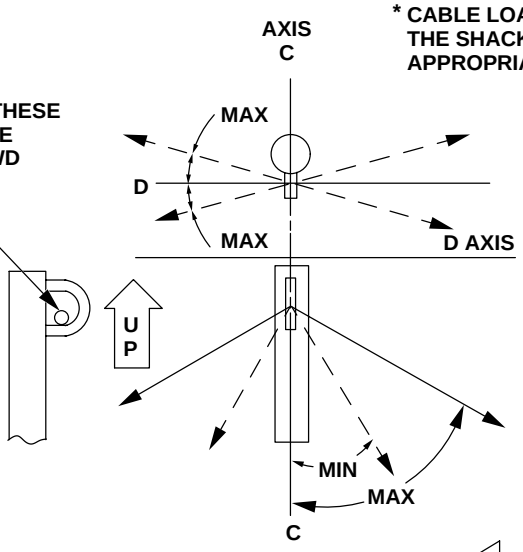
Figure 1-4. Tiedown Configuration-Rapid Deployment Landing Gear



NOTE

* CABLE LOADS ARE BASED ON THE TIEDOWN OR THE SHACKLE CAPABILITY. USE CABLES WITH APPROPRIATE STRENGTH.

ONE CABLE REQUIRED AT EACH OF THE POINTS. CABLE MUST PASS THROUGH.
NO ATTACHMENT PERMITTED AT THESE TIEDOWN POINTS. CABLE MUST BE SECURED AT TWO POINTS ONE FWD OF RING AND ONE AFT.



MIN = 30°
MAX = 56°
AXIS C

MAX = ±15°
AXIS D

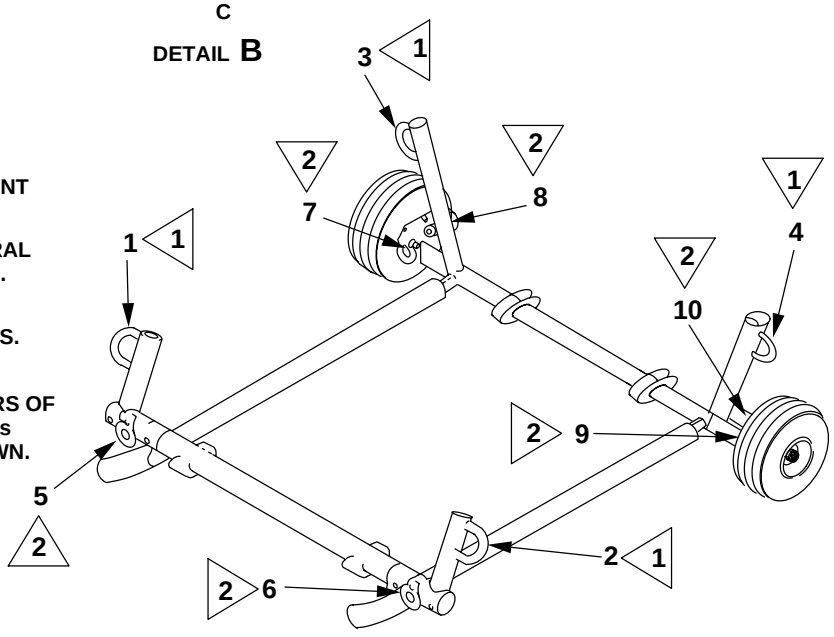
MAXIMUM CABLE TENSION 3820 LBS*

1. TIEDOWN POINT
2. TIEDOWN POINT
3. TIEDOWN POINT
4. TIEDOWN POINT
5. SHACKLE
6. SHACKLE
7. SHACKLE
8. SHACKLE
9. SHACKLE
10. SHACKLE

DETAIL B

NOTE

1. MAXIMUM VERTICAL ALLOWABLE POINT LOAD IS 4127 LBS.
2. MAXIMUM FORWARD, AFT AND LATERAL ALLOWABLE POINT LOAD IS 4500 LBS.
3. TIEDOWN LOADS ARE BASED ON A MAXIMUM GROSS WEIGHT OF 3814 LBS.
4. TIEDOWN LOADS ARE BASED ON AIR TRANSPORT ULTIMATE LOAD FACTORS OF 3.0 G´s FORWARD, 1.5 G´s AFT, ±1.5 G´s LATERAL, 2.0 G´s UP AND 6.75G´s DOWN.



DETAIL A

AIR TRANSPORTABILITY KIT 406-706-209

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J0836

Figure 1-5. Tiedown Strength and Shipping Weights — Transportability Kit (Sheet 1 of 2)

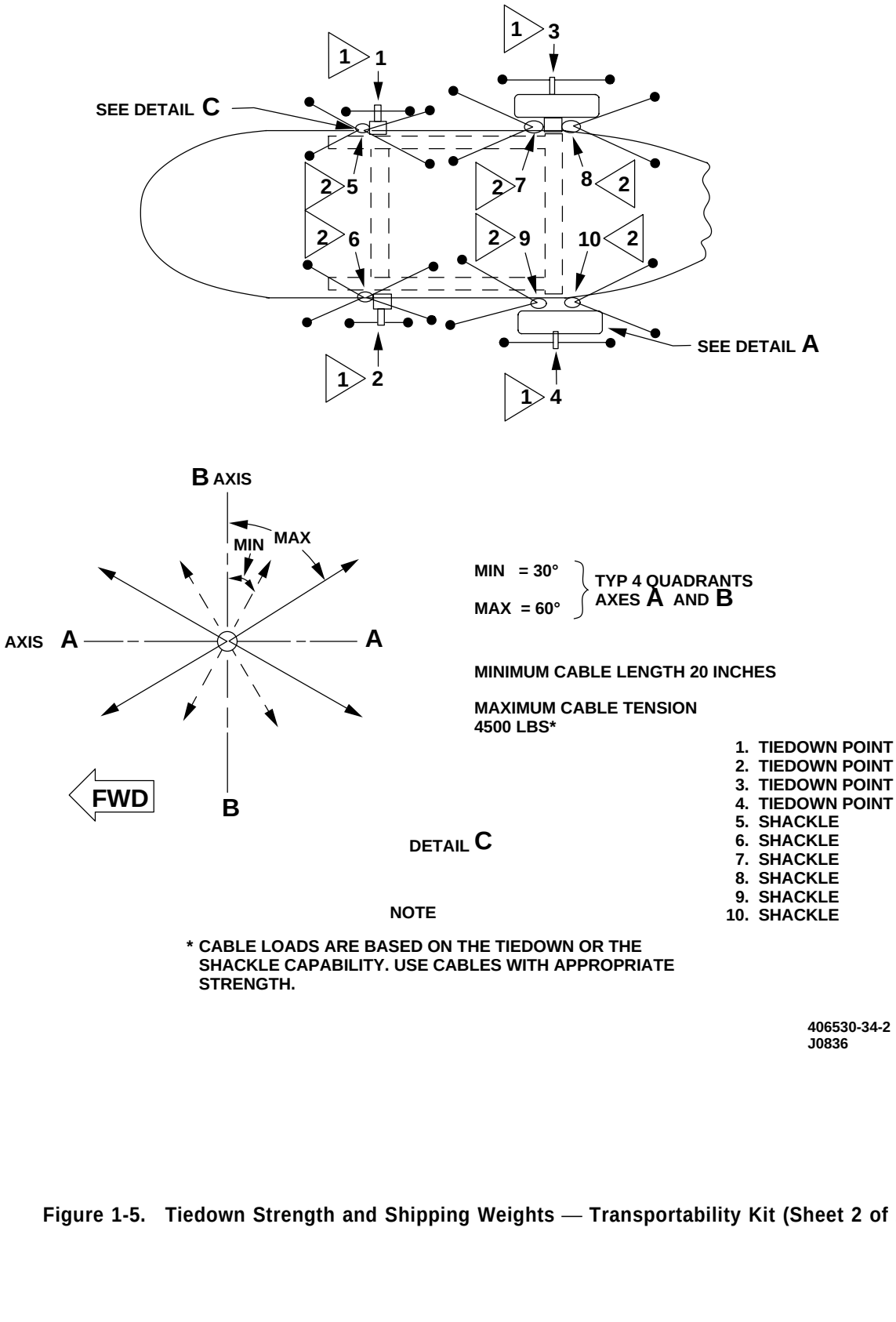


Figure 1-5. Tiedown Strength and Shipping Weights — Transportability Kit (Sheet 2 of 2)

c. On helicopters with landing gear support fittings, install nylon strap (E-37) and aircraft cargo tiedown (E-43) as follows:

CAUTION

Visually inspect landing gear support fittings for damage or cracks before use.

(1) Place aircraft cargo tiedown ratchet end hook over fitting.

(2) Place aircraft cargo tiedown end hook over opposite support fitting.

(3) Pull excess cargo tiedown through ratchet slot, leaving approximately 6 inches of slack.

CAUTION

To prevent overtightening of nylon cargo tiedown, only one person should tighten ratchet lever.

(4) One person should work ratchet lever by hand until aircraft cargo tiedown cannot be tightened further. Aircraft cargo tiedown is now properly tightened.

(5) Position connecting strap (E-37) at or near the forward crosstube.

d. Install helicopter ground handling trucks (E-10) as follows:

CAUTION

- To preclude damage to the gyro, do not move helicopter for 25 minutes after power has been removed from AN/ASN-43 compass. However, if helicopter must be moved before 25 minutes have passed, apply power to compass and allow 5-minute warmup. Helicopter may then be moved with power applied without damage to gyro.
- Towing helicopter on rough terrain (unprepared surfaces) or across hangar door tracks, etc., at weights of 4100 pounds or greater may cause permanent set in aft crosstubes. In an emergency, helicopter may be towed up to its gross weight limitation (5,200 pounds) by tying skid tubes together using aircraft cargo tiedown (E-43) to prevent spreading.
- If helicopter is moved by hand, do not push on any part of helicopter that could result in damage to helicopter, i.e., antennas, horizontal stabilizer, etc.
- Helicopter ground handling trucks can be installed with retractable pin(s) facing either forward or aft. Helicopter loading (center of gravity) dictates the position in which wheels should be installed. If helicopter center of gravity is aft, install both helicopter ground handling trucks with retractable pins facing forward.
- Do not leave helicopter unattended with helicopter ground handling trucks extended. Unstable condition of helicopter may allow movement and damage to helicopter.

(1) Place helicopter ground handling trucks (E-10) over left and right skid tubes as shown in figure 1-6. Align cradle with eyebolts and insert fixed pins (not shown) into eyebolts.

(2) Release hydraulic pressure on cylinder first, then push down on cradle to align retractable pins with eyebolts. Ensure retractable pins extend through eyebolts.

(3) Operate handles to extend wheels simultaneously and raise skids clear of ground.

(4) Install aircraft tow bar (E-46) on tow fittings.

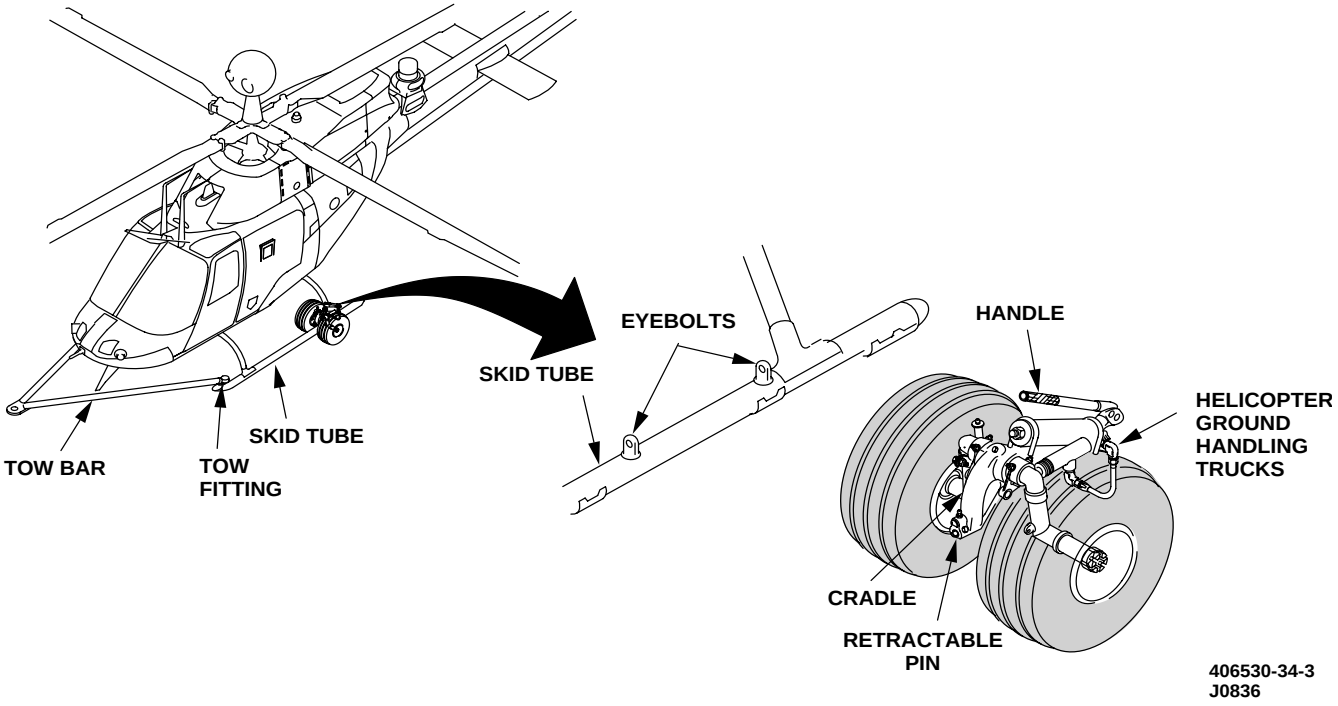


Figure 1-6. Helicopter Towing

1.17 TOWING.

CAUTION

- To prevent structural damage to helicopter, aft crosstube strap must remain in place for towing and shipment.
- Prior to towing, all covers, panels, access doors and fairings must be installed to preclude structural damage.

a. Station a person at tail skid to maintain helicopter at level position during towing operation.

b. Clear towing area of auxiliary support equipment.

c. Tow or push slowly, balancing helicopter with tail skid.

WARNING

Injury to personnel could result when retracting ground handling ground handling helicopter ground handling trucks. Keep feet from under skid gear.

d. After reaching destination, lower ground handling helicopter ground handling trucks simultaneously.

1.18 REMOVE GROUND HANDLING EQUIPMENT.

a. Disengage helicopter ground handling truck retractable pins as shown in figure 1-6 and remove wheels from helicopter skid gear.

b. Install grounding (electrical bonding) cables as required.

c. Remove aircraft tow bar (E-46).

d. Remove nylon strap (E-37).

e. Release tension on aircraft cargo tiedown (E-43).

(1) Open clamps and remove aircraft cargo tiedown from aft crosstube.

(2) Stow both nylon strap (E-37) assembly and aircraft cargo tiedown (E-43) strap assembly.

1.19 MOOR HELICOPTER.

WARNING

To prevent possible injury to personnel, caused by ground resonance, do not operate helicopter with rotors turning and fuselage tied down.

CAUTION

Helicopter should be hangared or evacuated to safe area when wind conditions above 50 knots are expected. Structural damage can occur from flying objects during high wind conditions.

NOTE

The mooring hardware is not considered flyaway equipment. All active mooring points shall be equipped with this hardware.

1.19.1 Preparing Helicopter. Install jack pad tiedown fittings (paragraph 1.11.1 a).

a. Fold or secure main rotor blades with tiedowns (TM 1-1520-248-23).

b. Install covers on pitot tube, engine exhaust, engine inlets, and mast mounted sight (MMS) (TM 1-1520-248-23).

c. Remove and secure all ground handling equipment (paragraph 1.18).

1.19.2 Mooring Helicopter on Paved Surface.

a. Position helicopter on mooring pad with longitudinal centerline of helicopter directly above and parallel to longitudinal axis of pad. Forward mooring rings are to be located 5 feet 4 inches aft of first mooring point.

b. Place hook-ends of mooring chains into appropriate clevis rings. Adjust chains using adjusting devices provided on mooring pad. Chains should be adjusted to point where slack has been removed. Moor helicopter as shown in figure 1-7.

1.19.3 Mooring Helicopter on Unpaved Surface.

a. If suitable ramp tiedowns are not available, park helicopter skid landing gear on unpaved parking area headed in direction from which highest velocity winds are expected.

b. Use mooring anchor rods to make **"**dead man**"** anchors.

c. Moor helicopter as described in paragraph 1.19.2 step b.

SECTION VI. SAFETY

1.20 SAFETY.

In addition to the potential hazards associated with helicopter operations, preparation for shipment, loading, and unloading of helicopters presents a whole series of unique hazards. These hazards range from rigging and lifting the helicopters and ensuring proper tiedown to the application of that shrink protective film. The procedures presented herein are safe if carefully followed. Basic safety considerations are as follows:

a. Accomplish all maintenance operations as instructed in applicable maintenance manuals.

b. Be thoroughly familiar with the procedures herein prior to arrival at the loading site.

c. Prepare in advance to have all required material and equipment available and on site for completion of task prior to beginning the work effort. Do not use 'work around' methods to accomplish this task.

d. Record all preservation, preparation, and maintenance actions in the helicopter logbook.

e. Strictly comply with instructions and safety check sheets for the application of heat shrink film (Appendix G).

f. Never walk or stand under a helicopter being lifted.

g. To prevent personal injury, all personnel involved in loading and offloading operations will wear gloves, hearing protection, and safety goggles.

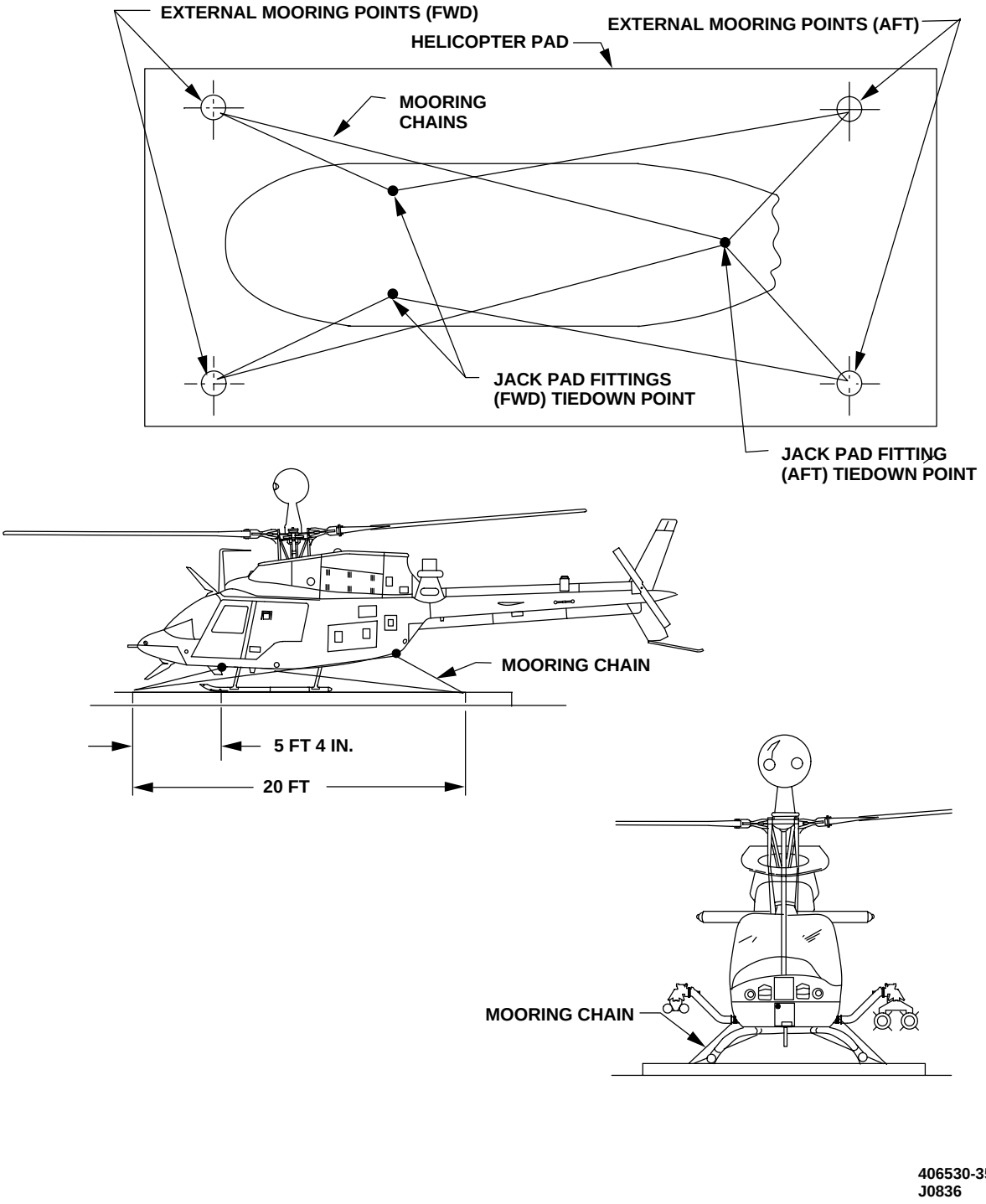


Figure 1-7. Moor Helicopter

SECTION VII. CHECKSHEETS

1.21 PRESERVATION/DEPRESERVATION CHECKSHEETS.

The organization preparing the helicopter for shipment shall prepare the Preservation/Depreservation Checksheets on DA Form 2408-13-2 (DA PAM 738-751). Items that apply only to depreservation will be included on the form, and the appropriate status symbol will be entered at the time the helicopter is prepared for shipment. Entries will be signed off (DA PAM 738-751) when the helicopter is depreserved and made ready for flight.

CHAPTER 2
SHIPMENT BY CARGO AIRCRAFT

SECTION I. GENERAL

2.1 GENERAL.

This section presents technical information for planning, disassembly, loading, tiedown, off-loading, and reassembly necessary to accomplish air transport of OH-58D/OH-58D(R) helicopters by cargo aircraft. Preparation for shipment procedures varies depending on the type of cargo aircraft used, the mission and the number of the helicopters and other cargo to be shipped. The maximum number of helicopters that can be loaded on each type of transport aircraft and type of shipment and the actions required to prepare the helicopters are shown In table 2-1. The approximate time required to accomplish each action is shown in table 2-2.

NOTE

When ordering a cargo aircraft to carry a maximum load, add to the order a statement that this load requires the full length, width, and height of the cargo compartment, and that all removable Items must be excluded.

2.2 TYPES OF SHIPMENT.

2.2.1 Tactical Shipment. The object of tactical shipment is to arrive with helicopters in flyable or nearly flyable condition. Primary concern is to avoid removal of components. Density of load is a secondary consideration. Tactical shipment of OH-58D/OH-58D(R) helicopters without rapid deployment landing gear is applicable to transport by C-5 and C-17 cargo aircraft. C-17 tactical shipment limited to three aircraft, see figure H-3.

2.2.2 Minimum Disassembly Logiatical Shipment. This type of shipment applies to OH-58D/OH-58D(R) helicopters and is to be used when shipment of less than maximum density of helicopters is indicated. It is applicable to shipment by all types of cargo aircraft.The primary advantage of this type of shipment is that it reduces preparation time and makes the helicopters easier to load.

2.2.3 Logistical Shipment. Logistical shipment is associated with shipment of helicopters for new system fielding and to and from maintenance depots. Primary consideration is to reduce dimensions of helicopters to permit high density loading.

2.2.4 Restraint criteria in g's. (TED).

2.3 FUNCTIONS OF CARGO AIRCRAFT CREW.

Responsibility for deciding when a United States Air Force aircraft is safe to fly is vested in the aircraft commander. Air Force personnel can be expected to:

a. Advise and assist Army loading teams.

b. Prepare cargo aircraft for loading and unloading.

C. Rig and operate all loading/off-loading aids that are part of cargo aircraft.

d. Designate hellcopter and equipment locations within cargo aircraft.

e. Provide tiedown devices.

f. Inspect for adequacy of tiedowns.

2.4 FUNCTIONS OF THE ARMY LOADING TEAM.

Helicopters are loaded, tied down, and unloaded by a U.S. Army loading team with technical advice and assistance provided by the cargo aircraft loadmaster. Army loading team is expected to:

a. Coordinate with U.S. Army Aviation and Missile Command (USAAMCOM) the number and type of helicopters to be shipped, the cargo aircraft to be used, and date and time of movement

b. Plan all aspects of the move so that required materials, tools, equipment, and manpower are available.

c. Prepare helicopters for shipment and ensure fuel on board does not exceed 150 gallons or 3/4 full per tank, whichever is less.

d. Ensure helicopters are ready for loading on schedule.

Table 2-1. Disassembly Requirements for Air Cargo Shipment

TRANSPORT AND MODE	C-130		C-141		C-17			C-5	
	M	L	ML	L	T	ML	L	T	L
No. of OH-58D/OH-58D(R) per cargo aircraft	2	2	4	4	3	7	7	13	13
Components to be removed, folded, or rotated:									
Horizontal Stabilizer (Folded)	X	X	X	X	X	X	X	X	X
Vertical Fin (Rotated)	X	X	X	X	x	x	X	X	X
Universal Weapons Pylons (Folded)									
(RH weapons removed)	X	X	X	X	X	X	X	X	X
Main Rotor Blades (Folded)	X	X	X	X	X	X	X	X	X
Lower Wire Cutter (Removed)	X	X	X	X		X	X		
UHF Antenna (Removed)	X	X	X	X		X	X		
Mast Mounted Sight (Removed)	X	X	X	X		*	*		
Rapid Deployment Landing Gear (Kneel)	X	X	X	X		X	X		
Blade Antenna (Removed)	X	X	X	X		X	X		
Jack Assembly (Installed)	X	X	X	X		X	X		
Blade Rack (Installed)	X	X	X	X	X	X	X	X	X
Mast Mounted Sight Hoist (Installed)	X	X	X	X		X	X		
Mast Mounted Sight Platform (Installed)	X	X	X	X		X	X		
Rescue Ladder (Removed)	X	X	X	X		X	X		
Mast Mounted Sight Sling (Installed)	X	X	X	X		X	X		

Key:

T Tactical Shipment
ML Minimum Disassembly Logistical Shipment
L Logistical Shipment
* Remove Mast Mounted Sight (MMS) from first four aircraft loaded on C-17, leave MMS installed on last three aircraft.

(TABLE I.D. 911507

Table 2-2. Disassembly and Assembly Man-Minutes Required

Task	Number Persons Required	Man-Minutes C-130	C-141	C-17	C-5
OH-58D/OH58D(R)		TIME L,ML	TIME L,ML	TIME L,ML	TIME L,ML
Components to be installed, removed, folded, or rotated:					
Horizontal Stabilizer (Folded)	1	3	3	3	3
Vertical Fin (Rotated)	1	5	5	5	5
Universal Weapons Pylons (Folded)					
(RH Weapons Removed)	2	2	2	2	2
Main Rotor Blades (Folded)	4	15	15	15	15
Lower Wire Cutter (Removed)	1	2	2	2	
UHF Antenna (Removed)	1	2	2	2	
Mast Mounted Sight (Removed)	3	5	5	5	
Landing Gear (Kneel)	5	5	5	5	
Blade Antenna (Removed)	1	2	2	2	
Blade Rack (Installed)	2	6	6	6	6
Jack Assembly (Installed)	1	4	4	4	
Mast Mounted Sight Sling (Installed)	3	6	6	6	
Mast Mounted Sight Platform (Installed)	2	4	4	4	
Rescue Ladder (Removed)	1	2	2	2	
Mast Mounted Sight Hoist (Installed)	3	6	6	6	

Key:

T Tactical Shipment
ML Minimum Disassembly Logistical Shipment
L Logistical Shipment

NOTE

Manpower and times shown here apply for one helicopter. Apply this data to each helicopter being shipped. Man-minutes called out here are estimates and subject to revision.

(TABLE I.D. 911506)

WARNING

Center of gravity and exact weight must be computed for each helicopter so that loadmaster can accurately determine center of gravity for loaded cargo aircraft.

e. Mark center of gravity (cg) and weight on each side of hellcopter fuselage and provide weight of each helicopter and major component in loading configuration. Refer to paragraph 2.9. Ensure that shipping weight does not exceed maximum certified for shipment.

f. Provide all necessary dunnage and shoring, and/or furnish necessary lumber and construct extension to aircraft loading ramps required to load helicopters and protect cargo aircraft floor. See figure 7-6.

g. Furnish, rig, and operate loading devices not integral to cargo aircraft.

h. Furnish and operate auxiliary lighting necessary for night loading.

i. Load helicopters on cargo aircraft.

j. Furnish cargo aircraft commander with Shipper's Declaration for Dangerous Goods.

k. Prepare manifest, itemizing weight and location of aircraft, equipment, and disassembled components stowed within cargo aircraft.

l. Be prepared to demonstrate for cargo aircraft commander that disassembled components stowed within the helicopters are packaged correctly and secured with Air Force restraint requirements specified in the applicable Air Force technical order for loading instructions.

m. Unload helicopters at destination.

n. Depreserve, assemble, and prepare helicopters for flight.

2.4.1 Coordination. The Army installation responsible for preparing and unloading helicopters must coordinate with the Air Mobility Command (AMC) in order to have helicopters ready to load as soon as AMC cargo aircraft arrive. All concerned must know how many helicopters are to be shipped and what model cargo aircraft will be used to plan disassembly, obtain proper handling equipment, have necessary shoring available, obtain cushioning material, and provide for many other things that circumstances dictate.

2.5 EQUIPMENT REQUIREMENTS,

Refer to Appendix E for a comprehensive list of tools and equipment applicable to shipment by cargo aircraft. Refer to tables in each section for specific information pertaining to shipment by each type cargo and each type shipment.

2.6 MATERIAL REQUIREMENTS.

Refer to Appendix D for the consumable materials list. Refer to table 2-3 for specific requirements for shipment by cargo aircraft.

Table 2-3. Consumable Materials Required for Shipment by Cargo Aircraft

Nomenclature	Ref No.
Envelope, Packaging	D-1
Barrier material, greaseproof flexible	D-3
Cushioning material	D-9
Cushioning material, polypropylene	D-13
Tape, pressure sensitive, adhesive	D-30
Plywood, aircraft, flat panel	D-24

2.7 MANPOWER REQUIREMENTS.

Manpower requirements for each configuration can be computed using tables 2-1 and 2-2.

2.8 FACILITY REQUIREMENTS.

2.8.1 Foul-Weather Shelter. A hangar or other enclosure will be made available for operations in poor weather.

2.8.2 Fire Protection. Firefighting equipment must be on site and ready for use.

2.8.3 Electrical Grounding. A good electrical ground will be used during preparation and parking of helicopters.

2.8.4 Area Clearance. Area of operation will be cleared of all unneeded equipment and vehicles to allow free movement of helicopters. Cleared area must accommodate helicopter turning radius when helicopter ground handling trucks (E-IO) are installed. Refer to ground handling procedures in Chapter 1.

2.9 WEIGHT AND BALANCE.

Each helicopter shall be weighed and the center of balance (center of gravity) computed prior to shipment.

When weighed, the helicopter shall be configured as for shipment as with any internal cargo secured for transport. Weight and center of balance will be marked or placarded on each side of the aircraft. For the approved computational method for determining weight and balance, refer to appendix C.

2.10 HELICOPTER SECURITY. The helicopters shall have security provided as dictated by local directives.

2.11 HELICOPTER SAFETY. All local safety directives shall be followed. Refer to appropriate sections for specific safety requirements.

SECTION II. SHIPMENT BY C-5

2.12 C-5 CHARACTERISTICS.

2.12.1 Description. The U.S. Air Force C-5 aircraft is a high speed, high capacity, long-range cargo jet aircraft. It is mainly used as a strategic intertheater aircraft for the transport of cargo and troops. Helicopters are loaded onto the C-5 cargo aircraft through the forward and aft cargo doors via forward and aft cargo ramps (figure 2-1).

2.12.2 Capability. Thirteen OH-58D/OH-58D(R) helicopters can be loaded into a C-5 cargo aircraft (figure H-4). (Refer to tables 2-1 and 2-2).

2.12.3 Preparation of the C-5. Cargo aircraft are prepared for loading by members of aircraft crew, assisted by Army loading-team. For maximum loads, all cargo or equipment which precludes placing transported helicopter within 20 inches of forward bulkhead must be removed from cargo aircraft. Stow such cargo or equipment on ramp at conclusion of loading. Army personnel must construct necessary ramp extensions (figure 7-6) to change angle of approach to cargo aircraft to keep skid tubes from scraping ground or gouging ramp (figure 2-1 and 2-2). Retain lumber used in construction of ramp extensions for use in unloading.

2.12.4 Safety. General helicopter shipment safety considerations are provided in paragraph 1.20. C-5 hazard diagrams are provided in figure 2-3.

2.13 PREPARING THE HELICOPTERS FOR LOGISTICAL SHIPMENT.

WARNING

Ensure all armament systems are cleared and safe prior to performing any preparation on helicopters.

2.13.1 General.

a. To reduce congestion in the vicinity of the cargo aircraft, preparation should be completed prior to moving helicopters to the loading site.

b. Ground helicopters prior to beginning preparation.

c. Tag all removed components with serviceable material tags (DA PAM 736-751).

d. Refer to table 2-3 for consumable material requirements.

e. Refer to table 2-4 for helicopters with standard and rapid deployment landing gear for shipment on C-5 cargo aircraft.

Table 2-4. Tools and Equipment Required for Shipment of Helicopters with Standard and Rapid Deployment Landing Gear on C-5 Cargo Aircraft

Nomenclature	Ref No.
Trucks, Helicopter Ground Handling	E-10
Jack, Aircraft Landing Gear	E-12
Jack, Hydraulic, Tripod (2 required)	E-14
Kit, Air Transportability	E-16
Tool Set, Main Rotor	E-17
Ramp Assembly, Aft, Aircraft	E-28
Shackle, Ground Hand (2 required)	E-30
Shackle (4 required)	E-31
Shackle	E-32
Strap, Nylon	E-37
Tiedown, Cargo, Aircraft	E-43
Tow Bar, Aircraft	E-46
Sling and Wire Rope Assembly Set	E-6

WARNING

Helicopters will not be shipped with known or suspected fuel leaks. If a fuel leak is suspected and cannot be repaired, drain, purge, and preserve the fuel system (TM 1-1500-204-23).

2.13.2 Fuel Tanks. Service fuel tank to 3/4 full or approximately 75 gallons. Record fuel quantity and tag fuel cap with type and quantity of fuel (TM 38-250).

2.13.3 Battery. Disconnect battery and secure quick-disconnect to airframe with adhesive pressure sensitive tape (D-30).

2.13.4 Clean Helicopter. For helicopter cleaning procedures see paragraph 6.4.

2.13.5 Lubrication. Lubricate and service helicopter (except fuel). to Lubrication Chart (TM 1-1520-246-23).

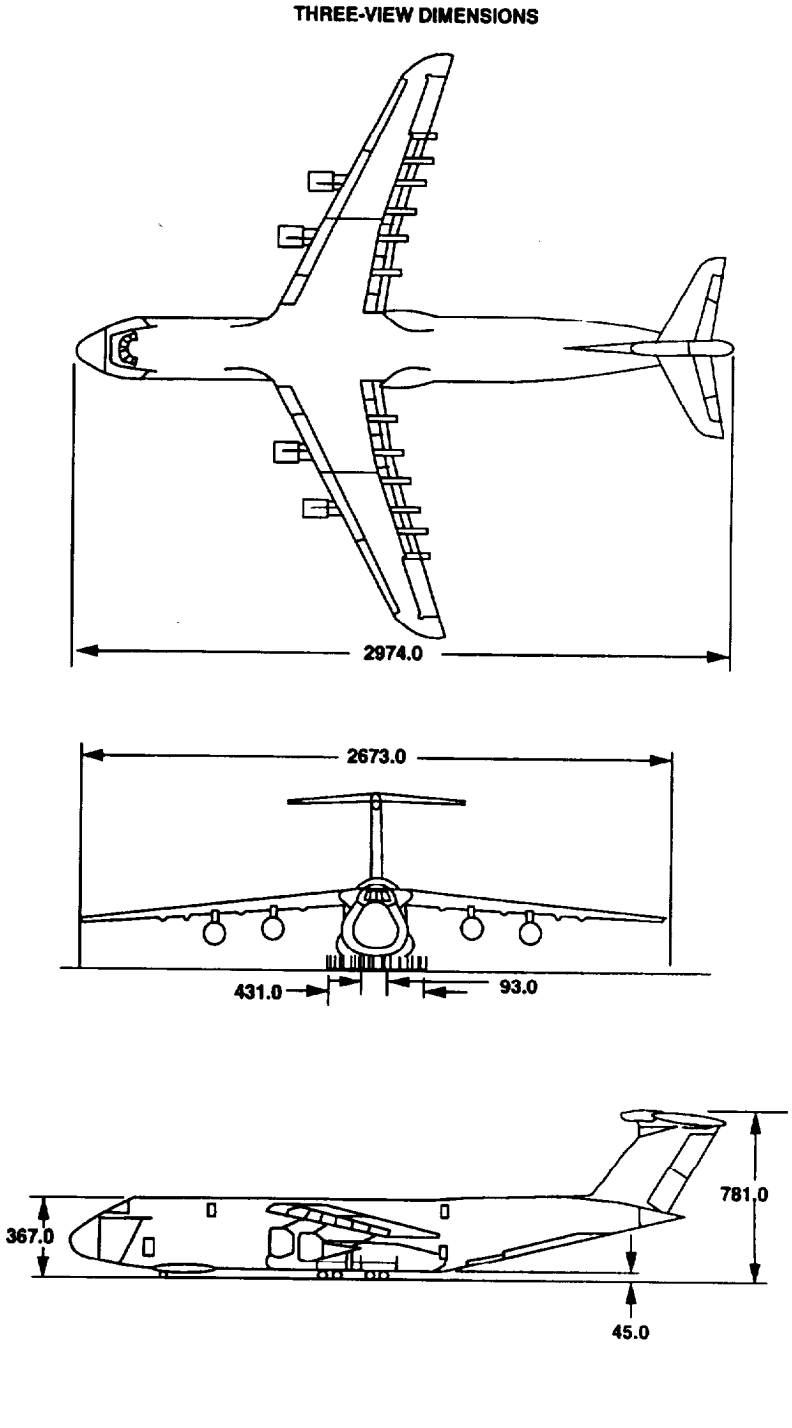
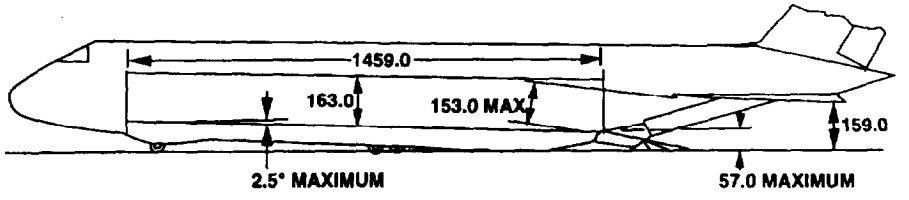


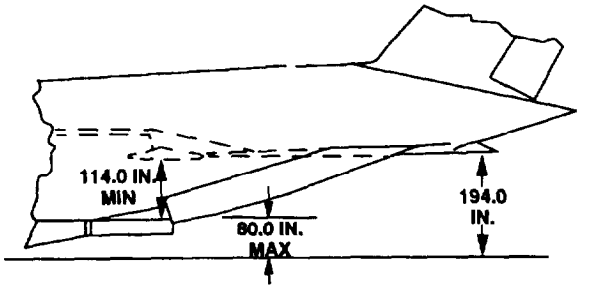
Figure 2-1. C-5 Characteristics (Sheet 1 of 3)

THREE-VIEW DIMENSIONS



AFT KNEELED POSITION DRIVE-IN LOADING (NLG FULLY EXTENDED)

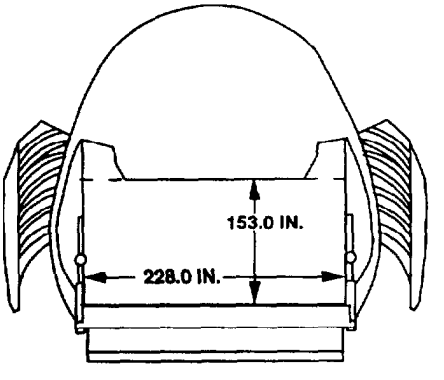
AIRPLANE KNEELING LOADING POSITIONS (ON/OFF LOADING).



LEVEL KNEELED POSITION TRUCK LOADING

NOTE

1. COMBINED LENGTH OF AFT RAMP AND PRESSURE DOOR DRIVE-IN POSITION 311.5 INCHES.
2. ANGLE OF AFT RAMP TOES IS 24° MAXIMUM.
3. CLOSED ANGLE OF AFT RAMP IS 10° MAXIMUM.
4. THIS FIGURE REPRESENTS A 350,000 POUND AIRPLANE WITH A C.G. AT 39 PERCENT MAC.
5. ALL DIMENSIONS ARE IN INCHES.



VIEW TYPICAL FOR DRIVE-IN LOADING -UNLOADING

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Figure 2-1. C-5 Characteristics (Sheet 2 of 3)

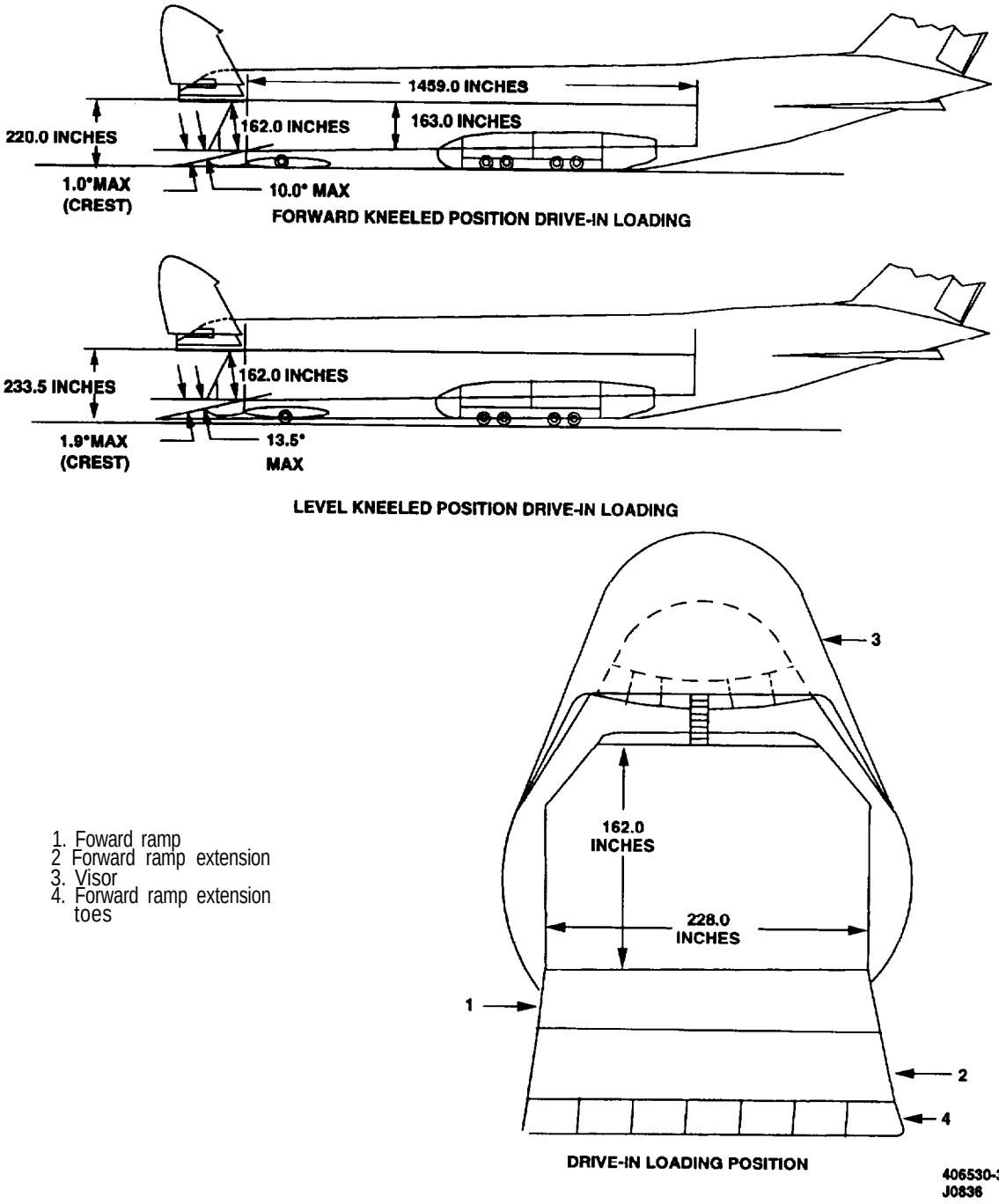


Figure 2-1. C-5 Characteristics (Sheet 3 of 3)

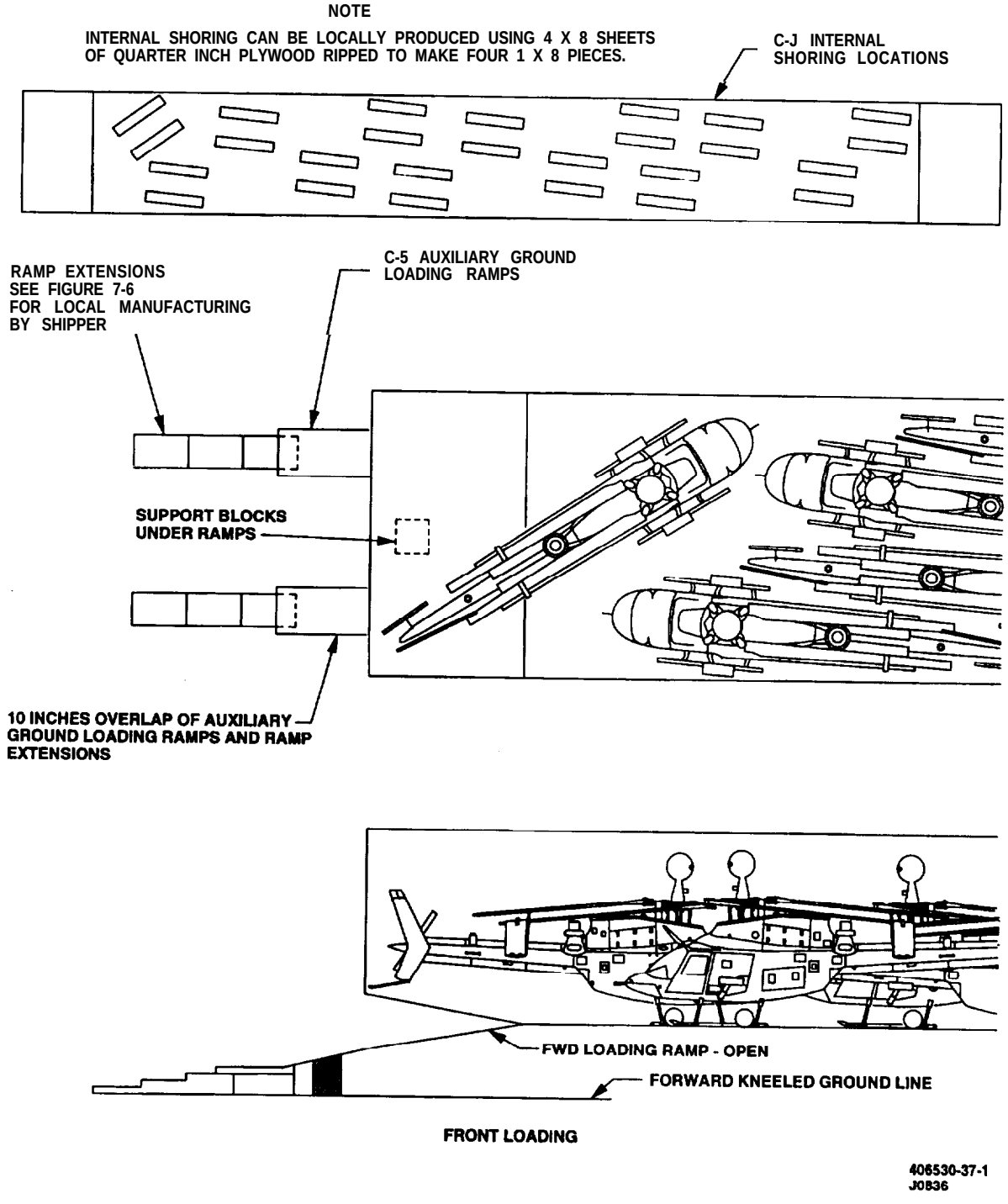


Figure 2-2. C-5 Shoring Requirements (Sheet 1 of 2)

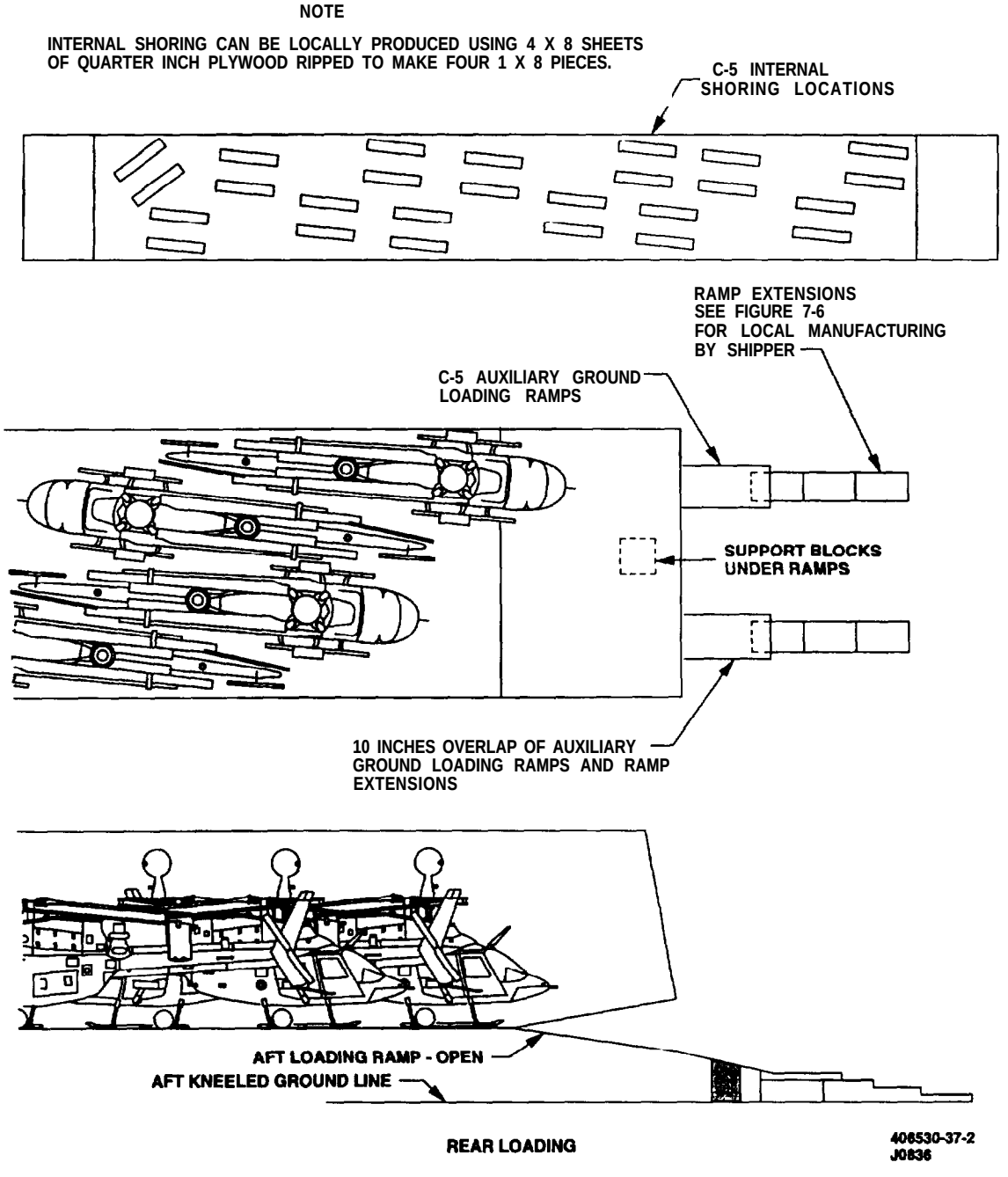
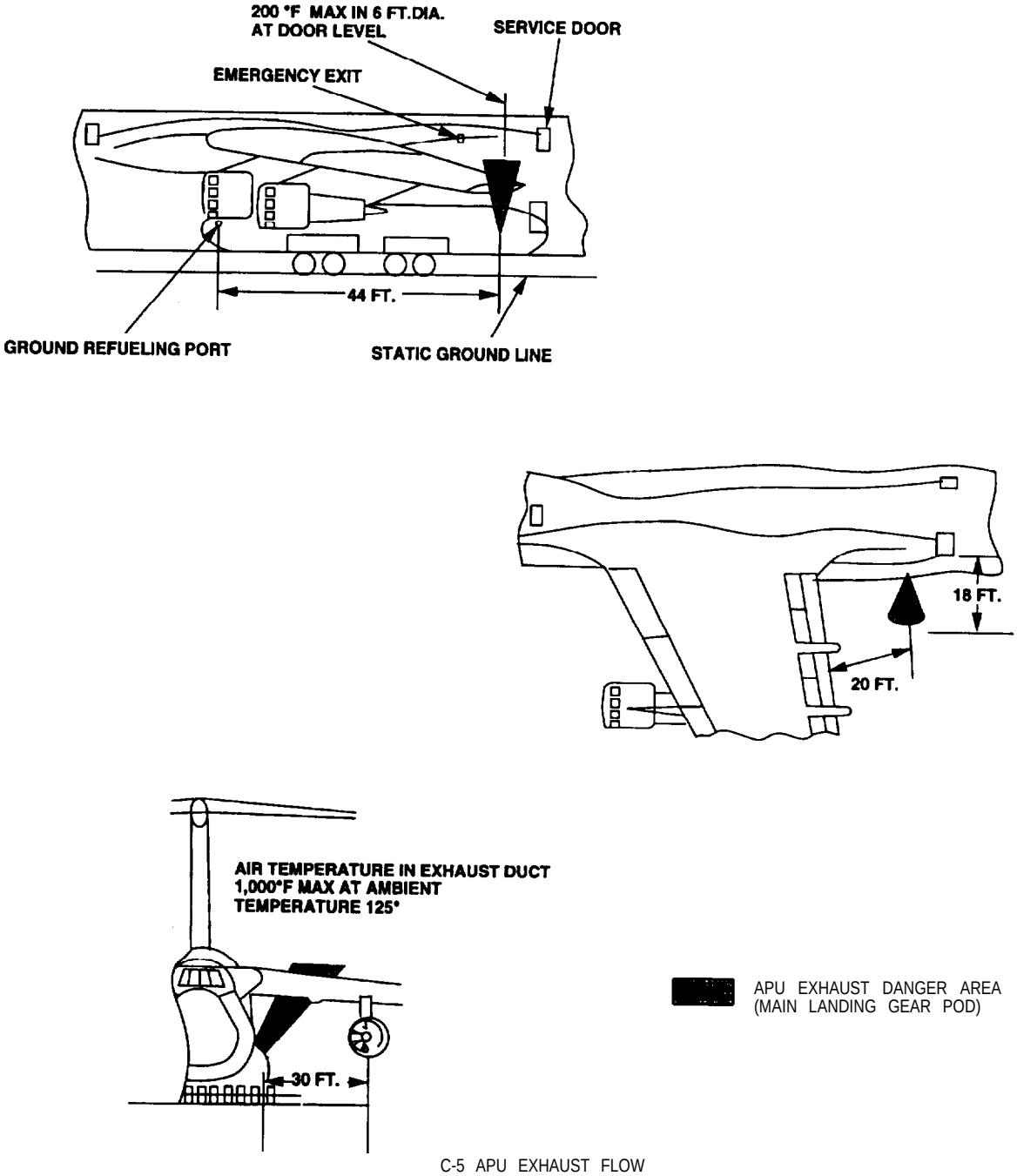


Figure 2-2. C-5 Shoring Requirements (Sheet 2 of 2)



C-5 APU EXHAUST FLOW

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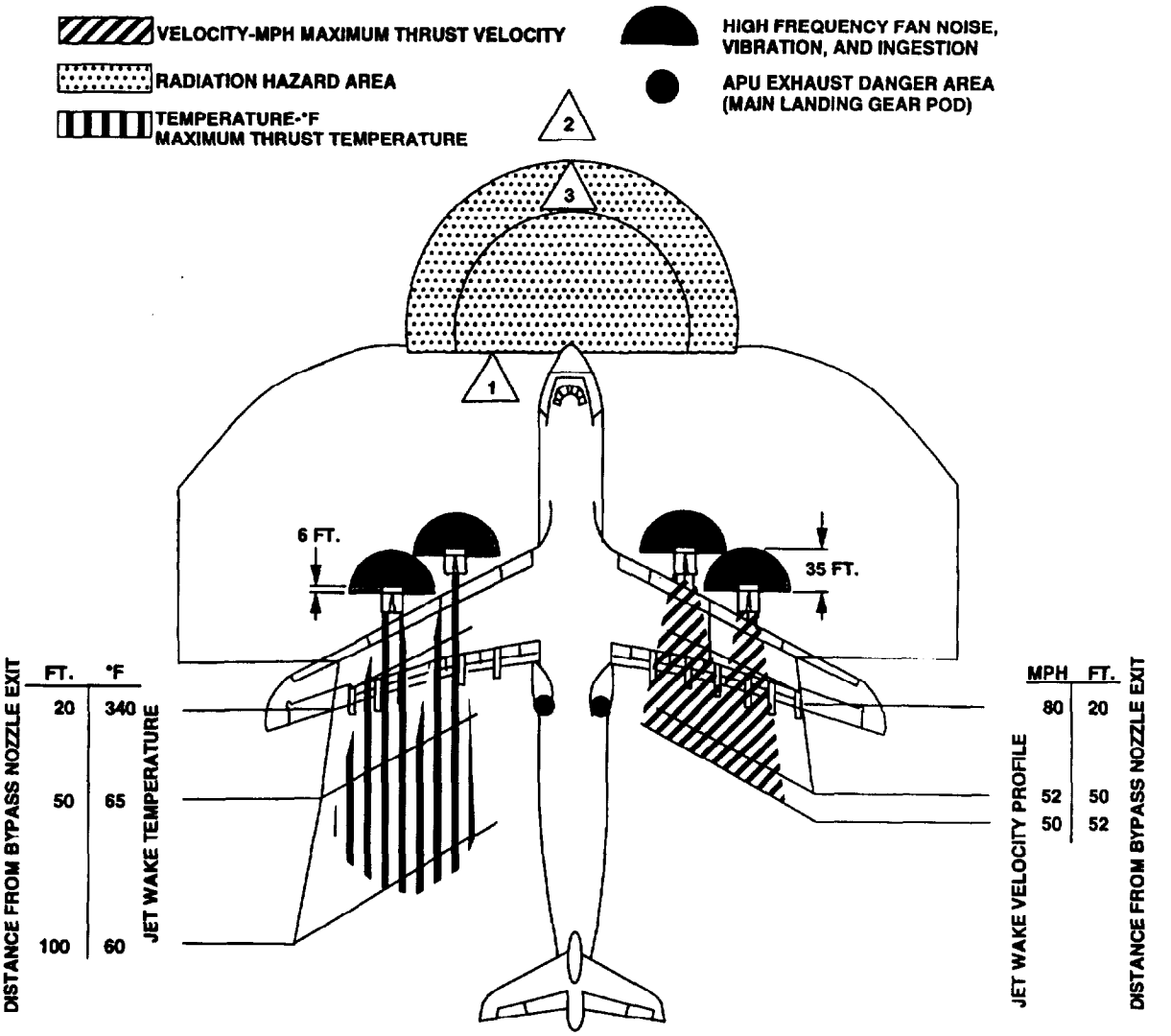
Figure 2-4. C-5 Danger Areas (Sheet 2 of 2)



ENGINE DANGER AREAS AT IDLE POWER

1. HAZARDOUS RADIATION AREA WITH RADAR OPERATING.
2. FUELING HAZARD 46 FEET.
3. PERSONNEL AND ELECTRO-EXPLOSIVE DEVICES 34 FEET.

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Figure 2-3. C-5 Danger Areas (Sheet 1 of 2)

2.13.6 Tiedown. Prepare helicopters for tiedown (paragraph 1.11).

2.13.7 Covers. Install protective (flyaway) covers as applicable (TM 1-1520-248-23).

2.13.8 Horizontal Stabilizer. Fold horizontal stabilizer (TM 1-1520-248-23).

2.13.9 Vertical Fin and Tail Rotor Assembly.. For helicopters being loaded with tail extending over cargo airplane ramp-prepare vertical fin and tail rotor assembly per paragraph 2.21.3 to provide clearance between cargo airplane ramp and helicopter.

2.13.10 Main Rotor Blades. Fold main rotor blades (TM 1-1520-248-23).

2.13.11 Preserve Helicopter. Preserve helicopter (TM 1-1520-248-23, Appendix E).

2.13.12 Universal Weapons Pylons. Fold weapons pylons (TM 9-1090-214-23 & P).

2.13.13 Weigh Hellcopter. Weigh helicopter (paragraph 2.9). Mark helicopter weight and center of gravity (center of balance') on both sides on the helicopter.

2.13.14 Logbook. Ensure all required entries are complete. Place logbook in a waterproof type packaging envelope (D-l) and secure to pilot seat using the seatbelt after weighing of helicopter Is complete.

2.14 PREPARING HELICOPTERS FOR MINIMUM DISASSEMBLY LOGISTICAL SHIPMENT.

The configuration for minimum disassembly logistical shipment is the same as for logistical shipment. To prepare helicopter, refer to paragraph 2.13.

2.15 PREPARING HELICOPTERS FOR TACTICAL SHIPMENT.

The configuration for tactical shipment is the same as for logistical shipment. Prepare helicopters (paragraph 2.13).

2.16 LOADING.

2.16.1 Load Plan.

Figure H-4 is provided as a guide for placement of the maximum number of helicopters for all types of shipment.

NOTE

Placement of helicopters is directed by the cargo aircraft loadmaster, with assistance provided by the Army loading team, as requested.

2.16.2 Prepare Helicopters for Loading.

a. Ensure helicopters are prepared for tiedown (paragraph 1.11.1).

b. Ensure helicopters are prepared for towing (paragraph 1.16).

C. Construct towing bridle by looping the sling and wire rope assembly set (E-6) around front crosstube for helicopters loaded nose first and around aft crosstube for helicopters loaded tail first. Wrap sling and wire rope assembly set (E-6) around crosstube on both sides of helicopter, at a point midway between saddles and fuselage belly. Bring ends of sling and wire rope assembly set (E-6) together to form a towing bridle (figure 2-4). Wrap straps around crosstube so that straps are on outside of saddles where crosstubes connect to helicopter fuselage. Two straps are required on each side on the helicopter. Bring end of straps together to form a towing bridle (figure 2-4). For aircraft with rapid deployment landing gear, connect sling and wire rope assembly set (E-6) to forward tow fittings on gear skids.

CAUTION

- To prevent damage to cargo aircraft floor, ensure open portion of cargo winch cable hook is up.
- To prevent damage to helicopter during ground handling and loading, do not push on tail cone, vertical fin, or antennas.
- To protect cargo aircraft floor from damage, aircraft flat panel plywood (D-24) or similar protective sheeting must be placed under helicopter skids at all times.

d. Under direction of cargo aircraft loadmaster, position first helicopter to be loaded at base of ramp. Connect cargo aircraft winch cable to sling and wire rope assembly set (E-6) of either Standard Landing Gear or Rapid Deployment Landing Gear (Figure 2-4).

e. Place aircraft flat panel plywood (D-24) ramp shoring or similar protective sheeting must be placed under helicopter skids at all times.

f. Position Loading Team. Station one person on each side to check side and overhead clearance as helicopter is maneuvered into the cargo aircraft. Place four persons at tail of helicopter to maneuver helicopter as directed by the load master.

WARNING

To prevent personal injury:

- Do not straddle winch cable when loading or unloading helicopters.
- Always be prepared for winch failure when loading or unloading helicopters on/ from cargo aircraft.
- If winch failure occurs be prepared to place chocks downslope from helicopter ground handling trucks.
- Do not leave helicopter unattended with helicopter ground handling trucks extended.

CAUTION

- To prevent damage to helicopter, ensure that any helicopter loaded with its tail extending over the airplane cargo ramp has the vertical stabilizer and tail rotor assembly prepared (paragraph 2.213).
- When helicopter is started up the ramp of the cargo aircraft, the tailboom will drag. The loading crew must be prepared to lift tailboom to prevent damage. When landing gear is in proximity of or crossing the top of the ramp or inclined floor, the tailboom must be pulled down and kept down until skid tubes are parallel with the airplane floor. Once the helicopter ground handling trucks have met the joint of the ramp and cargo floor, the tailboom must be held down to be parallel with the cargo aircraft floor. Persons selected to control the tailboom should be strong enough to hold it down until it clears the top of the door opening. These persons may also have to swing the tailboom to keep the helicopter headed properly into the cargo aircraft.

NOTE

Helicopter loading, positioning, and tiedown are to be performed only under the direction and supervision of the Air Force loadmaster.

g. Winch helicopter into the cargo aircraft slowly, using the cargo aircraft winch.

h. When helicopter nears the position shown in figure H-4, release winch hook and remove towing bridle. Final positioning will be accomplished by hand.

WARNING

To prevent personal injury, ensure feet are not under landing gear when retracting helicopter ground handling trucks.

i. Release the helicopter ground handling trucks (E-10) ensure skids are in full contact with protective plywood on the cargo aircraft floor.

2.17 TIEDOWN. Tie down helicopters (paragraph 1.11.2).

2.18 UNLOADING.

2.18.1 Preparation for Unloading Operations. The following preparations are required before proceeding with the unloading.

a. Position ramp extension as required (figures 2-1 and 2-2).

b. Position one person at each side of ramp to exchange signals with cargo aircraft loadmaster.

CAUTION

To preclude damage, do not push on tail cone, vertical fin, or HF antenna.

c. Position four persons at tail end of helicopter to guide tail and to prevent it from coming in contact with airplane or striking the ground as it comes off the ramp. A web strap secured around tailboom under tail rotor driveshaft will enable the persons to control the tail more effectively.

2.18.2 Mechanical Power Unloading Procedures.

a. Install helicopter ground handling trucks (E-10).

b. Move helicopter to cargo compartment exit.

c. Attach strap bridle loops in the same manner and to the appropriate points used for loading. Refer to paragraph 2.162.

d. Attach aircraft winch hook to bridle attachment with hook opening upward.

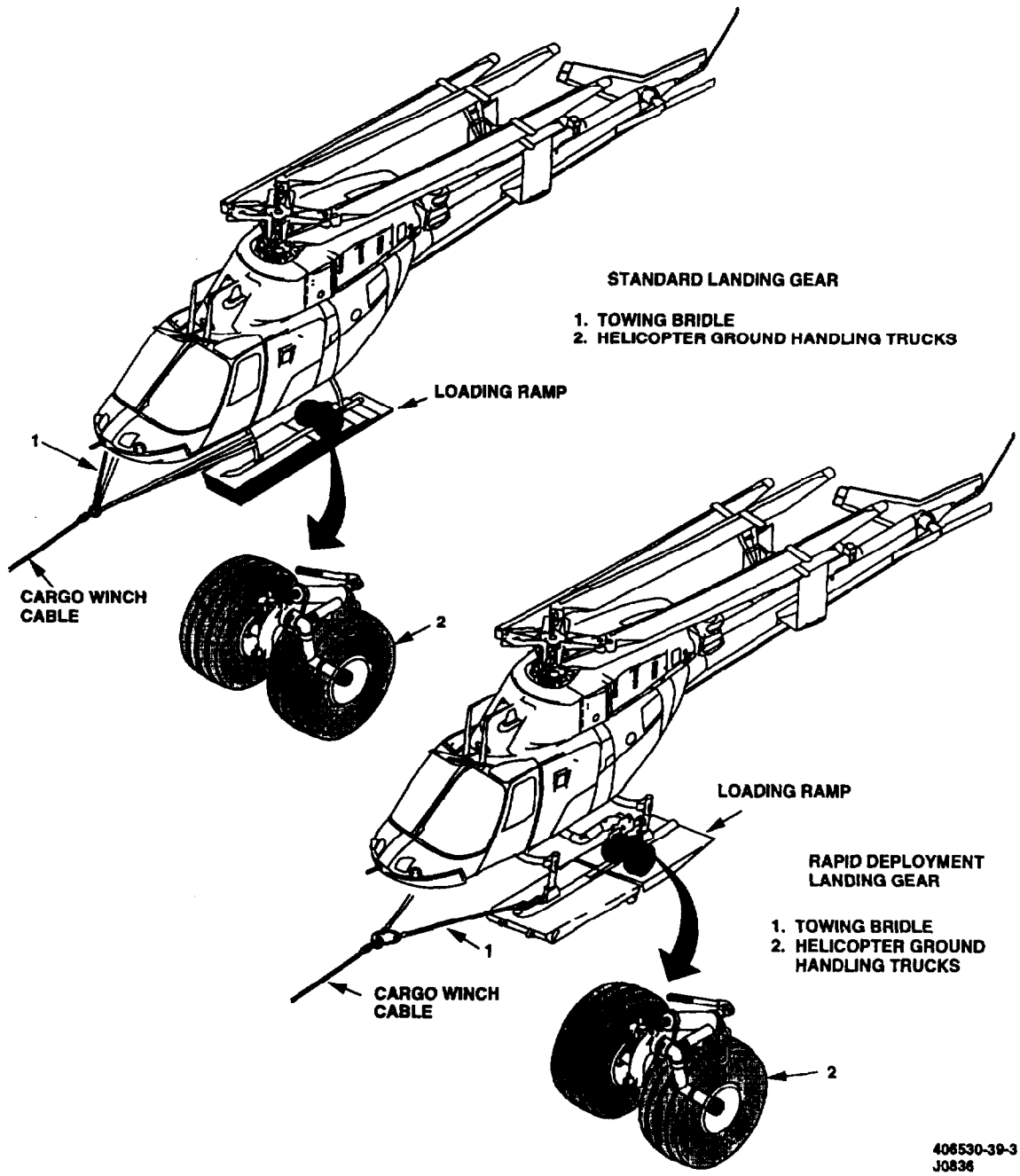


Figure 2-5. Towing Bridles

e. Manually guide helicopter down cargo aircraft ramp. Restrain helicopter descent to ground with cargo aircraft winch.

f. Unhook winch cable and remove towing bridle from helicopter.

2.19 DEPRESERVATION AND ASSEMBLY.

2.19.1 Depreservation. Remove required components, tables 2-1 and 2-2, from containers and stowed areas. Refer to TM 1-1520-248-23 Appendix E, TM 9-1240-778-23, and TM 11-1520-248-23 for additional instructions.

2.19.2 Assembly. Assemble components shown in tables 2-1 and 2-2 (TM 9-1240-778-23, TM 11-1520-248-23, and TM 1-1520-248-23).

SECTION III. SHIPMENT BY C-17

2.20 C-17 CHARACTERISTICS.

2.20.1 Capability.

2.20.1.1 Direct Delivery. Capabilities follow:

a. Advancing the state of the art for military transport aircraft, the C-17 combines the best features of a long-range cargo aircraft with performance and flexibility of a short-range theater transport. (Refer to figure 2-5).

b. The C-17's large payload, long range, and ability to carry cargo too big or too heavy to be carried by the C-130 or C-141 is essential to meet worldwide needs of a rapid deployment force in dealing with modern crises.

c. The short-field landing capability of the C-17 enables it to land on three times more airfields, which means it can bypass large congested airfields and deliver cargo closer to where it is needed. This direct delivery capability increases speed of delivery by substantially reducing transshipment through an intermediate base.

d. The C-17 complements the existing airlift fleet and provides a much greater capability to rapidly reposition combat firepower to or within a theater.

2.20.1.2 Loading Flexibility. Capabilities follow:

a. Broad flexibility is designed into the C-17 cargo compartment to allow it to accommodate vehicle, cargo pallet and paratroop or airdrop loads. Its two cargo handling systems are fully compatible with standard USAF 463L system and are designed to permit rapid loading and offloading. The cargo compartment can be readily configured for mixed vehicle and pallet pads or reconfigured from one type of pad to another by one loadmaster. The compartment is capable of being reconfigured by one loadmaster in 1 hour, either in flight or on the ground.

b. Controls for C-17 cargo and airdrop systems, as well as for cargo compartment lighting and temperature control, are consolidated at a loadmaster station located in the forward right corner of the cargo compartment. Also at the loadmaster station is a laptop computer and printer, used to enter load and balance data. Selected controls are duplicated at rear of cargo compartment to improve loading efficiency.

c. For operational configuration and overall dimensional data on C-17 airplane, see figure 2-5.

d. Seven OH-580 helicopters can be loaded into a C-17 cargo aircraft (table 2-1 and figure 2-7).

2.20.2 Preparation of the C-17. For Army personnel responsibilities in preparation of cargo aircraft refer to paragraphs 2.4 and 2.12.3.

2.20.3 Safety. General helicopter shipment safety considerations are provided in paragraph 1.20. See Figure 2-6 C-17 Danger Areas.

2.21 PREPARING THE HELICOPTERS.

Preparing helicopters for shipment by C-17 cargo aircraft is the same as shipment by C-5 cargo aircraft except as shown in figure H-4. Refer to paragraphs 2.13. Refer to figure 2-7 for C-17 shoring requirements. For special tools and equipment required to load onto C-17 cargo aircraft, refer to Table 2-5.

Table 2-5. Tools and Equipment Required for Shipment of Hellcopters with Standard and Rapid Deployment Landing Gear on C-17 Cargo Aircraft

Nomenclature	Ref No.
Trucks, Helicopter Ground Handling	E-10
Jack, Aircraft Landing Gear	E-12
Jack, Hydraulic, Tripod (2 required)	E-14
Kit, Air Transportability	E-16
Tool Set, Main Rotor	E-17
Ramp Assembly, Aft, Aircraft	E-28
Shackle, Ground Hand (2 required)	E-30
Shackle (4 required)	E-31
Shackle	E-32
Strap, Nylon	E-37
Tiedown, Cargo, Aircraft	E-43
Tow Bar, Aircraft	E-46
Sling and Wire Rope Assembly Set	E-6

2.21.1 UHF Antenna. Remove UHF Antenna (TM 11-1520-248-23).

THREE-VIEW DIMENSIONS

WING AREA	45,600.0^2 IN.
WING SWEEP	25 DEG
ASPECT RATIO	7.165
CRUISE SPEED	MACH 0.77
THRUST RATING	40,700 LB
MAX TOGW	580,000 LB
MAX PAYLOAD (2.25 G)	172,200 LB
MAX FUEL CAPACITY	176,200 LB

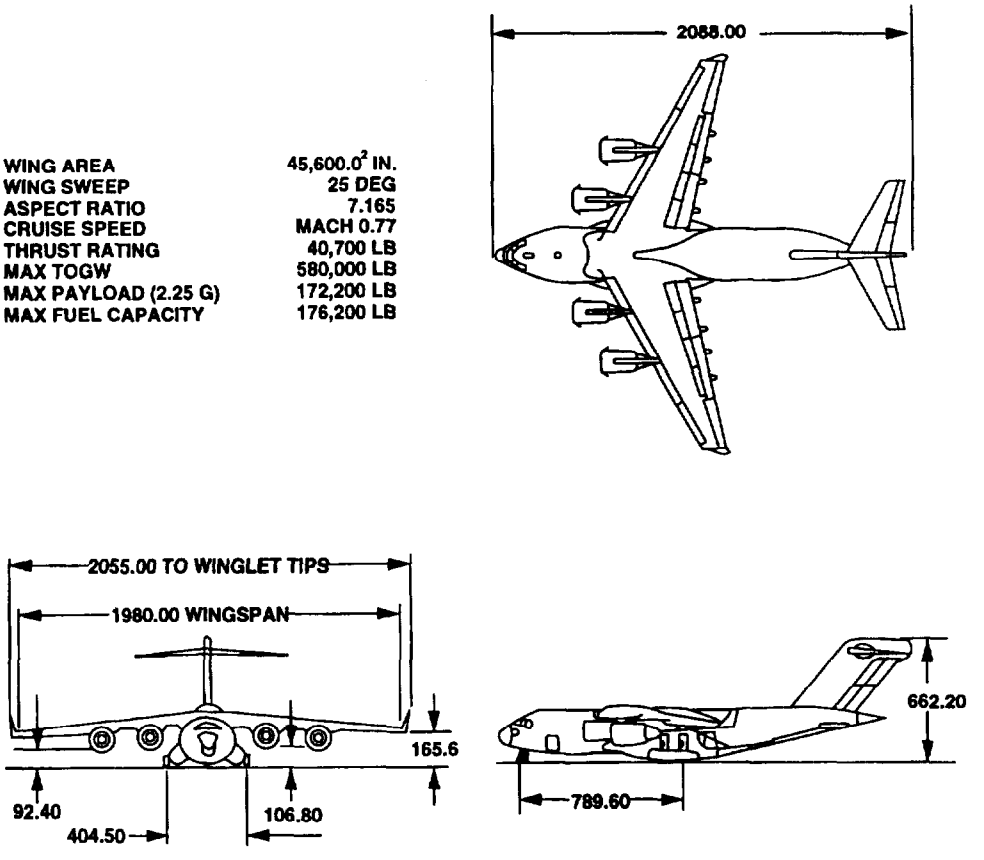
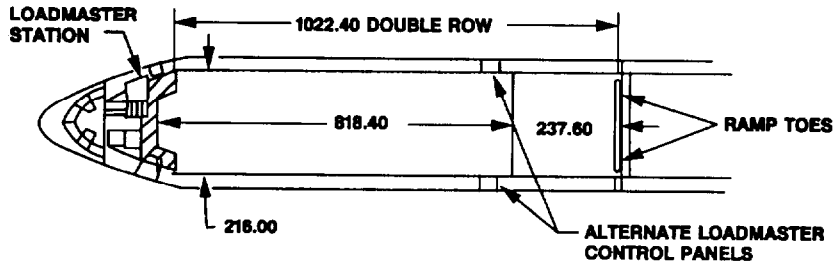
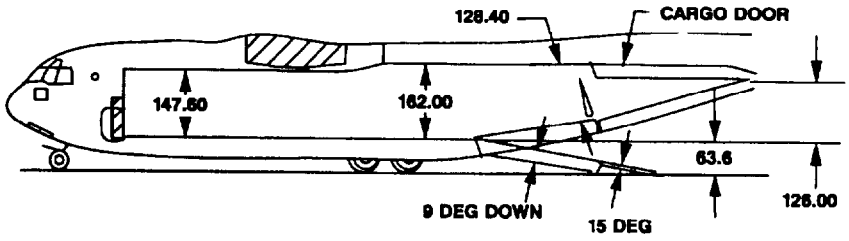


Figure 2-6. C-17 Characteristics (Sheet 1 of 2)

CARGO COMPARTMENT DATA

- TWO PALLETIZED CARGO SYSTEMS
  - DOUBLE ROW LOGISTICS SYSTEM - 18 PALLETS (463L)
  - SINGLE ROW AERIAL DELIVERY SYSTEM - 11 PALLETS (463L)
- CONSTANT STRENGTH FLOOR (NO TREADWAYS)
- HIGH CAPACITY VARIABLE SPEED WINCH
- ALL TIEDOWN RINGS RATED AT 25,000 LB CAPACITY





NOTE

ALL DIMENSIONS ARE IN INCHES

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Figure 2-6. C-17 Characteristics (Sheet 2 of 2)

WARNING

- ENGINES, AT ANY POWER SETTING, ARE CAPABLE OF DEVELOPING ENOUGH INLET DUCT SUCTION TO CAUSE FATAL INJURIES TO A PERSON TOO CLOSE TO THE INLET.
- WHEN LOADING OR UNLOADINQ PERSONNEL, BAGGAGE, OR EQUIPMENT THROUGH THE CREW ENTRY DOOR WITH ENGINES OPERATING, STAY CLEAR OF ENGINE INLETS.

CAUTION

TO PREVENT DAMAGE TO ENGINES, SECURE ALL LOOSE PERSONAL ITEMS BEFORE PASSING IN FRONT OF OPERATING ENGINES.

NOTE

IF WINDS EXCEED 25 KNOTS OR RAMP SURFACES ARE SLIPPERY, ADD 50% TO DISTANCE AT INTAKE.

LEGEND

RADAR

RADIATION
48 FT RADIUS

TAKEOFF THRUST

INTAKE
16 FT RADIUS

BLAST

200 MPH AT 115 FT OR LESS
136 MPH AT 170 FT
68 MPH AT 338 FT

TEMP
200 °F AT 68 FT
150 °F AT 96 FT
100 °F AT 202 FT

IDLE THRUST

INTAKE
9 FT RADIUS

BUST
138 MPH AT 28 FT
68 MPH AT 95 FT

TEMP
125 °F AT 22 FT
100 °F AT 50 FT

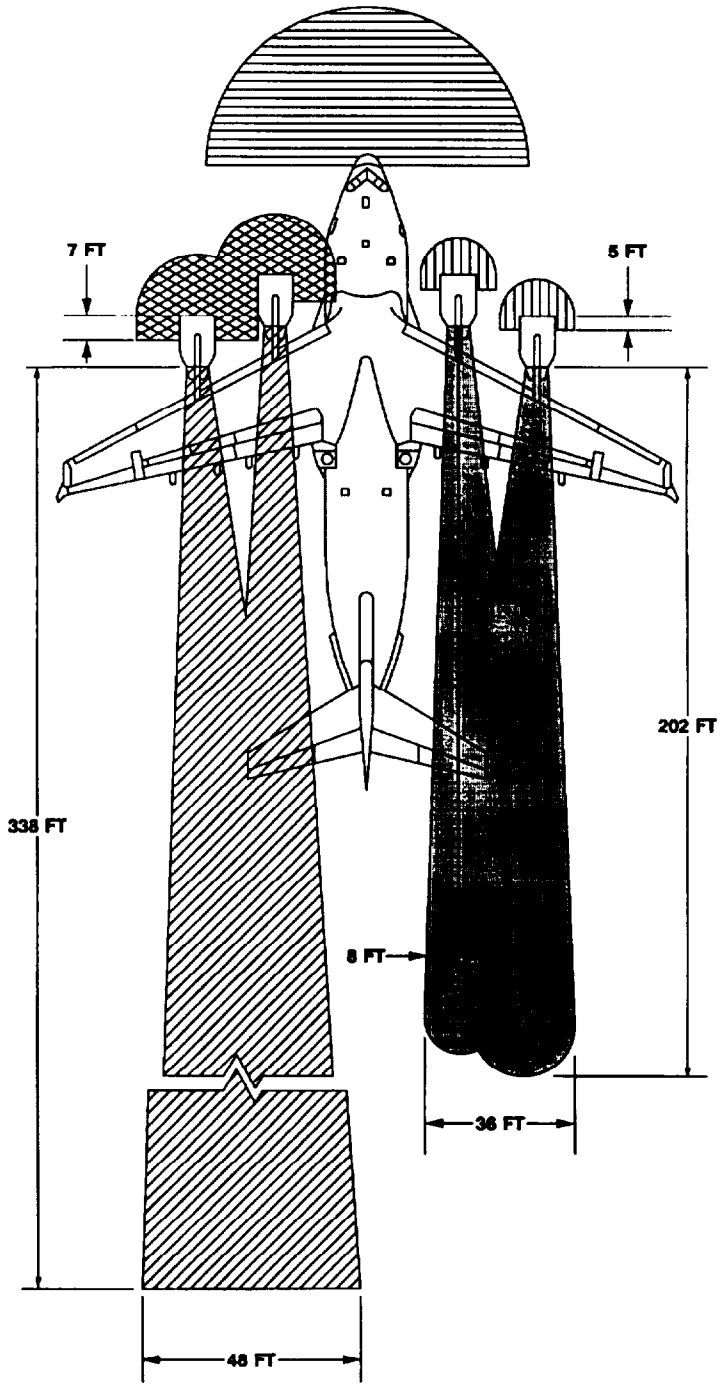

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Figure 2-7. C-17 Danger Areas

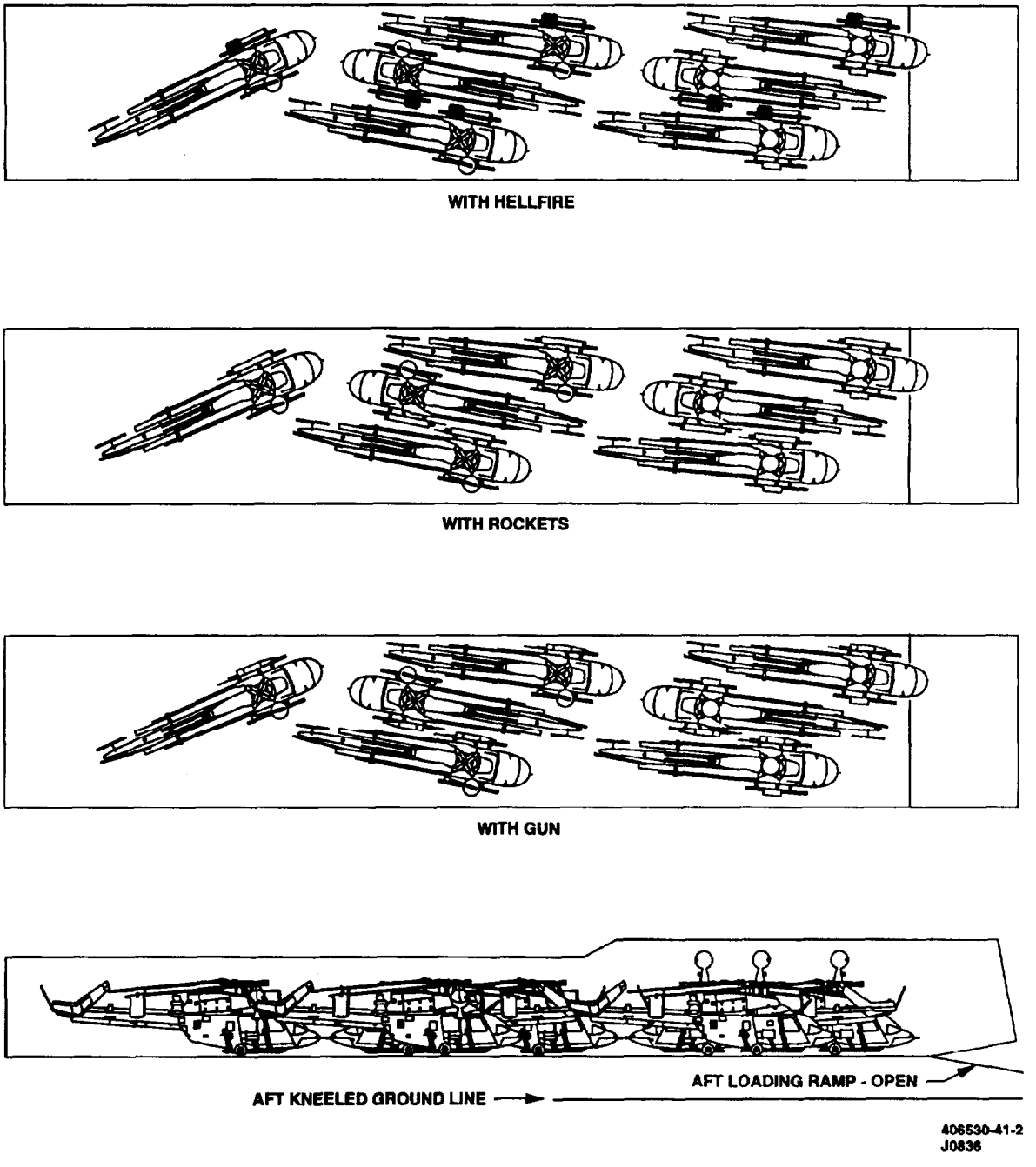

Figure 2-8. C-17 Diagram for Loading and Shoring Requirements (Sheet 1 of 2)

NOTE

INTERNAL SHORING CAN BE LOCALLY FABRICATED USING 4 X 8 FT SHEETS OF QUARTER INCH PLYWOOD RIPPED TO MAKE FOUR 1 X 8 FT PIECES.

C-17 INTERNAL
SHORING LOCATIONS

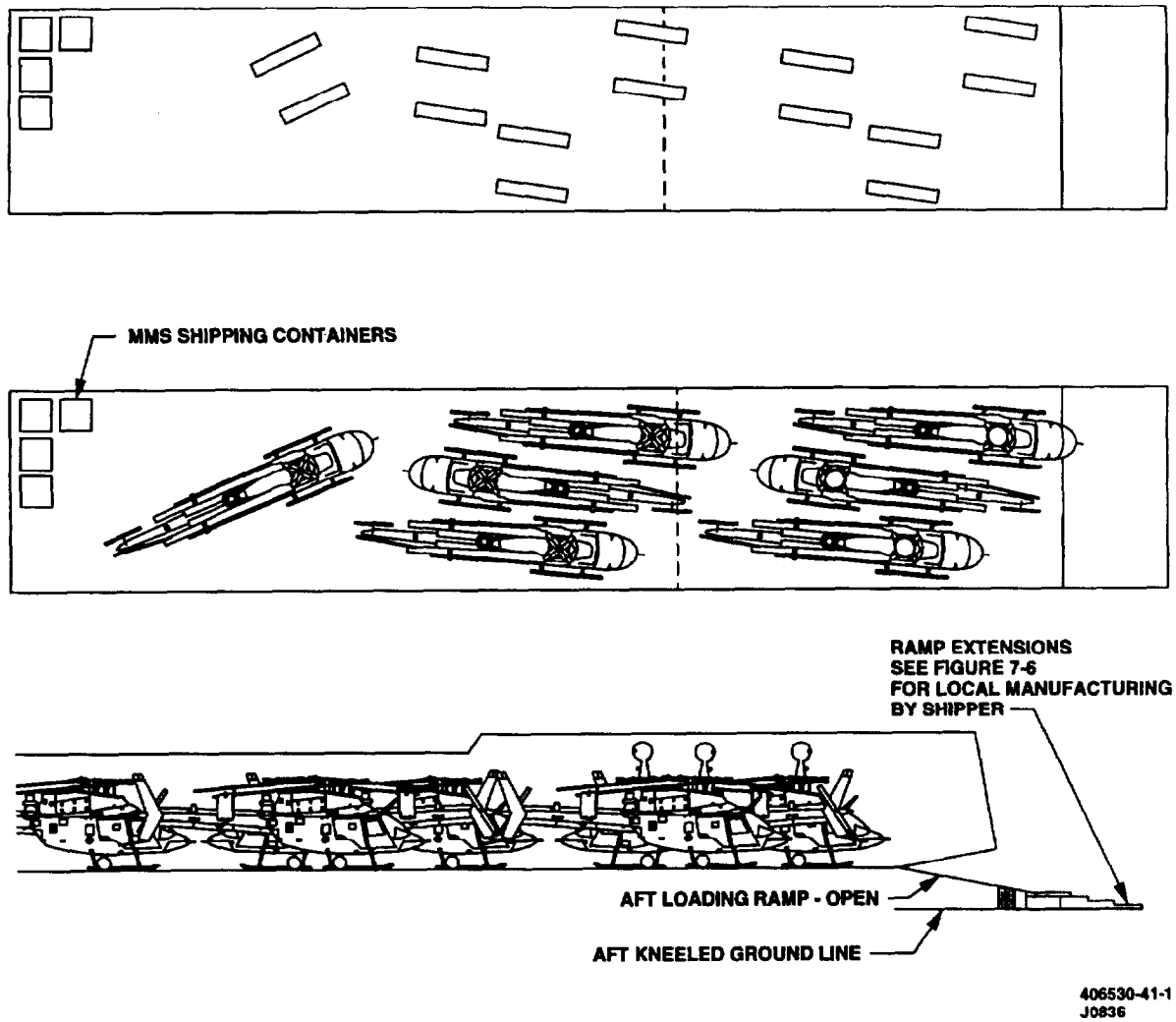

Figure 2-8. C-17 Diagram for Loading and Shoring Requirements (Sheet 2 of 2)

2.21.2 Wire Strike Kit. Remove lower wire cutter assembly (TM I-1520-248-23).

2.21.3 Vertical Fin. Rotate vertical fin (TM 1-1520-248-23).

2.21.4 Rescue Ladders. Remove rescue ladders (TM 1-1520-248-23).

2.21.5 Jacking Assemblies. Install four hand screw jacks (E-13) on rapid deployment landing gear (TM 1-1520-248-23).

2.21.6 Landing Gear. Kneel rapid deployment landing gear (TM 1-1520-248-23).

2.21.7 Main Rotor Blades. Fold main rotor blades (TM 1-1520-248-23).

2.21.8 Horizontal Stabilizer. Fold horizontal stabilizer and install elevator fold support assembly (TM 1-1520-248-23).

2.21.9 Mast Mounted Sight (MMS) Hoist. Install MMS hoist (E-22) (TM 1-1520-248-23).

2.21.10 Mast Mounted Sight Platform. Install MMS platform (E-23) (TM 1-1520-248-23).

2.21.11 Mast Mounted Sight. Remove MMS as follows:

a. Install eye sling (E-24) on MMS (figure 2-8).

(1) Slide sling (5) over MMS (10).

(2) Ensure nylon (inside) straps (1), straps (2 and 3), and strap assemblies (12 and 14) are not damaged or twisted.

(3) Ensure stencil (4), "THIS STRAP MUST BE INSTALLED BETWEEN THE EYES OF SIGHT" is placed properly.

(4) Secure fastener-hook (15) to fastener-pile (16).

(5) Insert connector (9) into buckle (8) on strap assemblies (12 and 14) and snug buckle straps.

(6) Fold ends of buckle straps and secure fastener-piles (7) to fastener-hooks (11 and 13).

b. Connect eye sling (E-24) to MMS hoist (figure 2-9).

(1) Extend MMS hoist (E-25) to eye sling level.

(2) Connect hook at end of MMS hoist arm to eye sling on top of eye sling.

(3) Extend MMS hoist until eye sling is snug.

c. Remove MMS (TM 9-1240-778-23, Chapter 3).

(1) Remove bolts from MMS and retain hardware in plastic bag and tape to MMS support.

(2) Extend MMS hoist to lift MMS as required to disconnect electrical connectors.

d. Mount MMS to MMS platform (E-23) and secure (figure 2-9).

(1) Rotate MMS hoist arm clockwise and align MMS to MMS platform.

(2) Lower MMS to MMS platform, aligning bolt holes to four alignment pins in platform (figure 2-9, view A).

(3) Secure MMS to platform using toggle clamps and pin clamp handles (figure 2-9, view B).

(4) MMS sling will remain attached to MMS hoist during rapid deployment transportation.

(5) Ensure RH weapons are removed.

(6) Install ceramic cap utilizing duct tape.

2.21.12 Universal Weapons Pylons. Fold weapon racks. (TM 1-1520-248-23).

2.21.13 Ground Handling Gear. Install helicopter ground handling trucks (E-10) (paragraph 1.16).

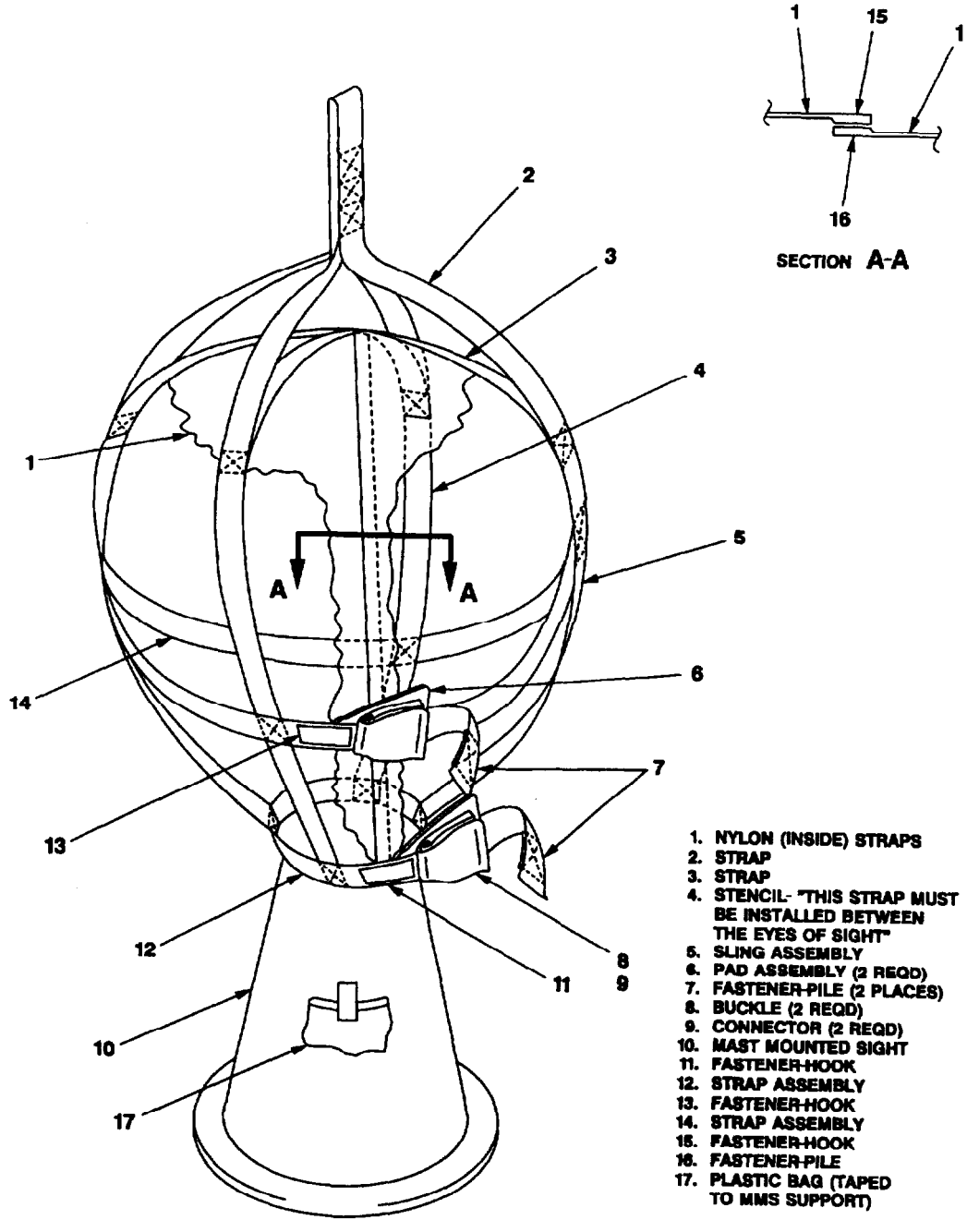

Figure 2-9. Mast Mounted Sight Eye Sling Installation

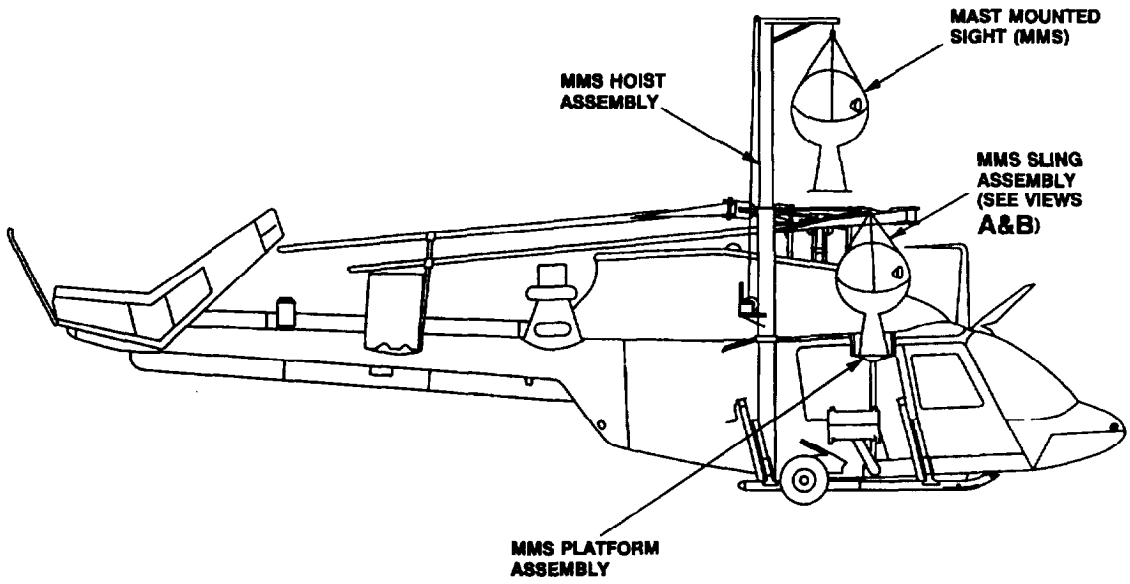

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Figure 2-10. Mast Mounted Sight Removal (Sheet 1 of 2)

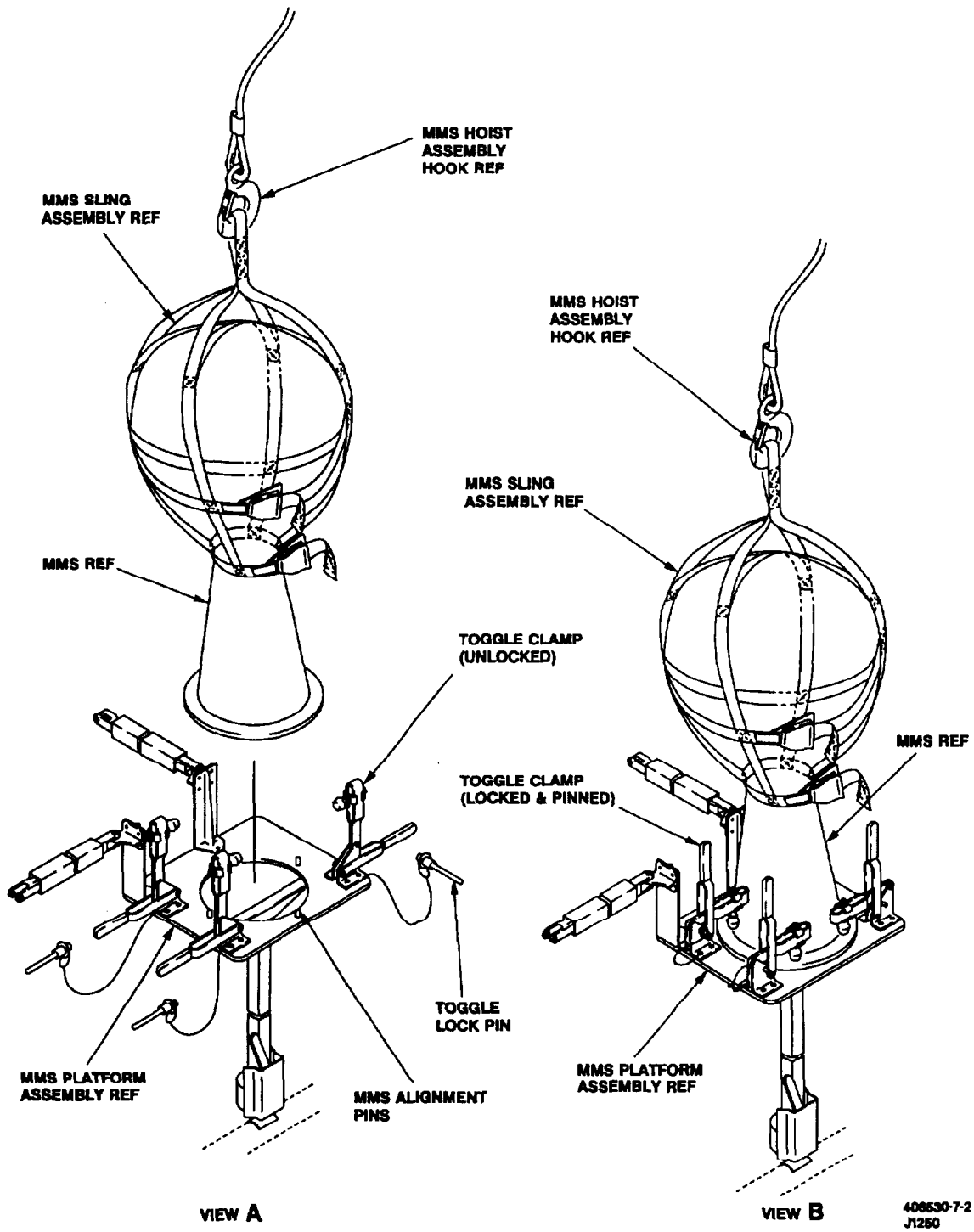


Figure 2-10. Mast Mounted Sight Removal (Sheet 2 of 2)

2.21.14 Battery Connectors. Disconnect battery and cover connectors with tape.

2.21.15 Logbook. Place helicopter logbook in waterproof bag and secure to pilot seat with seat belts.

2.21.16 Air Transportability. Air transportability kit (E-16) figure 2-101 must be installed for shipment by C17 cargo, aircraft. Install air transportability kit as follows:

a. Jack helicopter (TM 1-1520-248-23).

b. Remove landing gear from helicopter (TM 1-1520-248-23). Wrap disassembled portions of landing gear in suitable cushioning material (D-9) for proper storage aboard cargo aircraft.

C. Secure support fixture (E-40) to helicopter with four bolts and washers.

d. Secure support fixture (E-39) to helicopter with four bolts and four washers.

e. Secure support fixture (E-40) to support fixture (E-39) with quick-release pin (one each side).

f. Rotate transportability kit wheels to lower position and secure with quick-release pins.

g. Place ramps under helicopter and lower helicopter until wheels rest on ramps.

h. Chock wheels.

i. Lower and remove aft jack.

j. Exert downward force on tailboom to balance helicopter on wheels and remove weight from forward jacks.

k. Remove forward jacks.

I. Roll helicopter from ramps.

2.22 LOADING.

CAUTION

Due to the lower roof area under and forward of the wing, it is necessary to remove the mast mounted sights of the first four helicopters to be loaded.

Loading helicopters for shipment by C-17 cargo aircraft is the same as for shipment by C-5 cargo aircraft except only seven OH-58D/OH-58D(R) helicopters can be loaded into a a C-17 aircraft as shown in figure 2-7. Refer to paragraph 2.16.

2.23 TIEDOWN.

Tiedown procedures for C-17 cargo aircraft are the same as for C-5 cargo aircraft. Refer to paragraph 1.11.2.

2.24 UNLOADING.

Unloading procedures for C-17 cargo aircraft are the same as for C-5 cargo aircraft. Refer to paragraph 2.18.

2.25 DEPRESERVATION AND ASSEMBLY.

Depreservation and assembly (paragraph 2.19).

SECTION IV. SHIPMENT C-141

2.26 C-141 CHARACTERISTICS. (Figure 2-11)

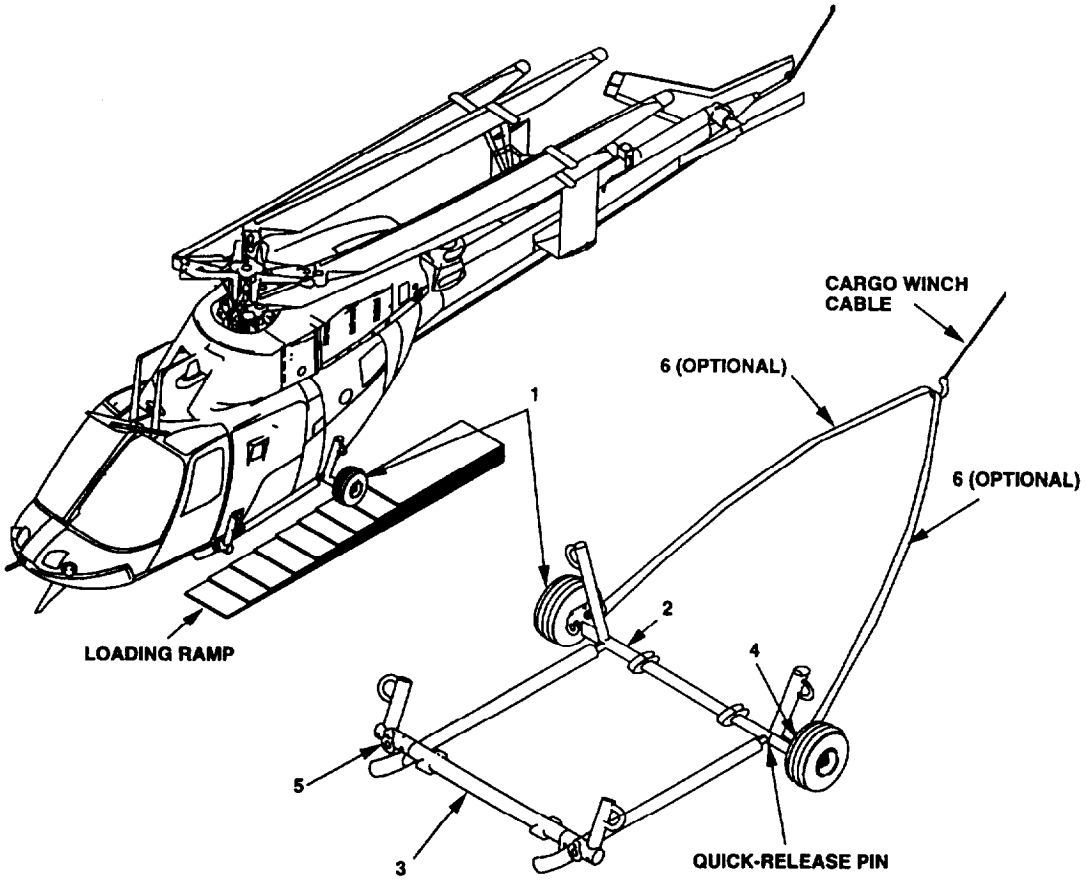
2.26.1 Capability. Four OH-58D/OH-58D(R) helicopters can e loaded into a C-141 cargo aircraft (table 2-1 and figure 2-12).

2.26.2 Preparation of the C-141.

a. OH-58D/OH-58D(R) with Standard Landing Gear. Army personnel must construct necessary ramp extensions (figure 7-6) to change angle of approach to cargo aircraft to keep skid tubes from scraping ground or gouging ramp (figure 2-7). Retain lumber used in construction of ramp extensions for use in unloading.

b. OH-58D/OH-58D(R) with Rapid Deployment Landing Gear. When preparing the cargo aircraft for loading, attach three locked, folded aircraft aft ramp assembly (E-28) to the hooking bar located on the end of the hook end of the C-141 cargo aircraft ramp/door. Ensure the hook end inscription is facing up, reads C-141, If C-130 inscription is facing up, remove the bolts attaching each hook to the ramp frame with the C-141 inscription facing up. Torque the attaching hardware to 95-110 inch pounds. See figure 2-14.

2.26.3 Safety. General helicopter shipment safety considerations are provided in paragraph 1.20. A C-141 hazard diagram is provided at figure 2-13. To prevent



1. AIR TRANSPORTABILITY KIT (PN 406-706-209-101)
2. AFT SUPPORT FIXTURE (P/N 1101827401)
3. FORWARD SUPPORT FIXTURE (P/N T101826-101)
4. AFTSHACKLE (P/N AN116-10)
5. FORWARD SHACKLE (P/N 209-782-065-1)
6. TOWING BRIDLE

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Figure 2-11. Sling and Wire Rope Assembly Set (Air Transportability Kit)

personal injury, all personnel involved in loading and off loading operations will wear gloves, hearing protection and safety goggles.

2.27 PREPARING THE HELICOPTERS.

a. Disconnect battery(ies).

b. Cover connectors with tape.

Prepare helicopters for shipment by C-149 cargo aircraft as shown in figure 2-10. To reduce congestion in the vicinity of cargo aircraft, the following should be completed prior to taking helicopters to loading site. Disassembly of components indicated in table 2-1 is required for space and clearance consideration. Refer to Table 2-6 for tools and equipment required for shipment on C-141 cargo aircraft.

Table 2-6. Tools and Equipment Required for Shipment on C-141 Cargo Aircraft

Nomenclature	Ref No.
Jack, Aircraft Landing Gear	E-12
Jack, Hydraulic, Tripod (2 required)	E-14
Kit, Air Transportability	E-16
Tool Set, Main Rotor	E-17
Hoist, Mast Sight	E-25
Shackle, Ground Hand (2 required)	E-30
Shackle (4 required)	E-31
Shackle	E-32
Strap, Nylon	E-37
Support Fixture	E-39
Support Fixture	E-40
Tow Bar, Aircraft	E-46
Sling and Wire Rope Assembly Set	E-6

2.27.1 Air Transportability. Air transportability kit (E-16)(figure 2-10) must be installed for shipment by C-141 cargo aircraft. Install air transportability kit as follows:

a. Jack helicopter (TM 1-1520-248-23).

b. Remove landing gear from helicopter (TM 1-1520-248-23, Chapter 3). Wrap disassembled portions of landing gear in suitable cushioning material (D-9) for proper storage aboard cargo aircraft.

c. Secure support fixture (E-40) to helicopter with four bolts and four washers.

d. Secure support fixture (E-39) to helicopter with four bolts and four washers.

e. Secure support fixture (E-40) to support fixture (E-39) with quick-release pin (one on each side).

f. Rotate transportability kit wheels to lower position and secure with quick-release pins.

WARNING

To prevent personal injury, ensure feet are not under landing gear when retracting helicoprer ground handling trucks.

g. Place ramps under helicopter and lower helicopter until wheels rest on ramps.

h. Chock wheels.

i. Lower and remove aft jack.

j Exert downward force on tailboom to balance helicopter on wheels and remove weight from forward jacks.

k. Remove forward jacks.

l. Roll helicopter from ramps.

2.27.2 Wire Strike Kit. Lower wire cutter assembly must be removed for shipment by C-141 cargo aircraft. (Refer to table 2-1). Disassembly (TM 1-1520-248-23).

2.27.3 Mast Mounted Sight. Remove MMS (paragraph 2.21.11).

2.27.4 UHF Antenna. For UHF antenna removal requirements, refer to table 2-1. Refer to TM 11-1520. 248-23 for additional instructions.

2.27.5 Wire Cutter. Wrap wire cutter and UHF antenna with cushioning material (D-9) and adhesive pressure sensitive tape (D-30). Place on copilot seat and secure with seat belts.

2.27.6 Universal Weapons Pylons. For universal weapons pylons disassembly requirements, refer to TM 9-1090-214-23 & P.

2.27.7 Logbook. Place helicopter logbook in waterproof type packaging envelope (D-l) and secure to pilot seat with seat belts.

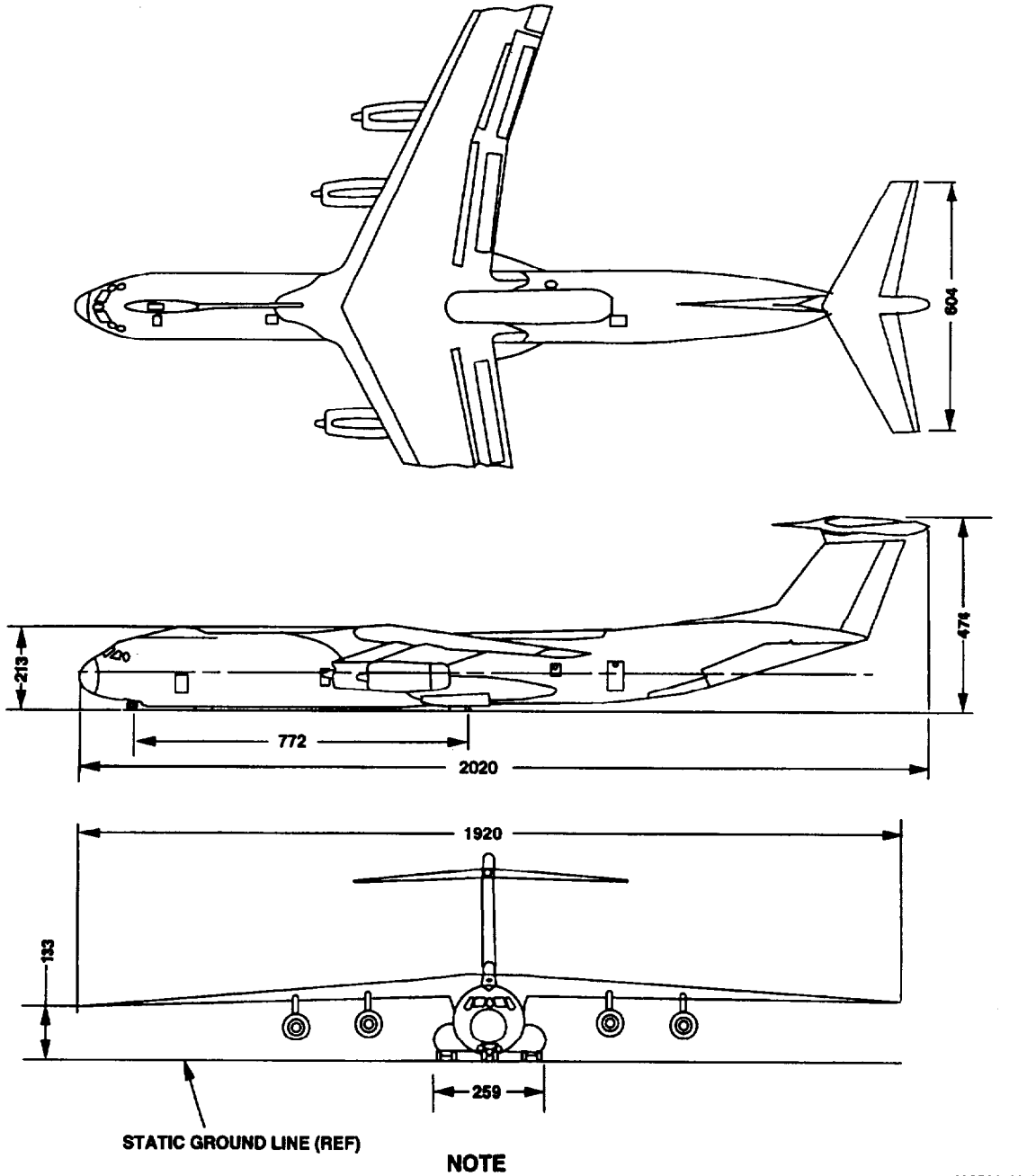


Figure 2-12. C-141 Characteristics (Sheet 1 of 2)

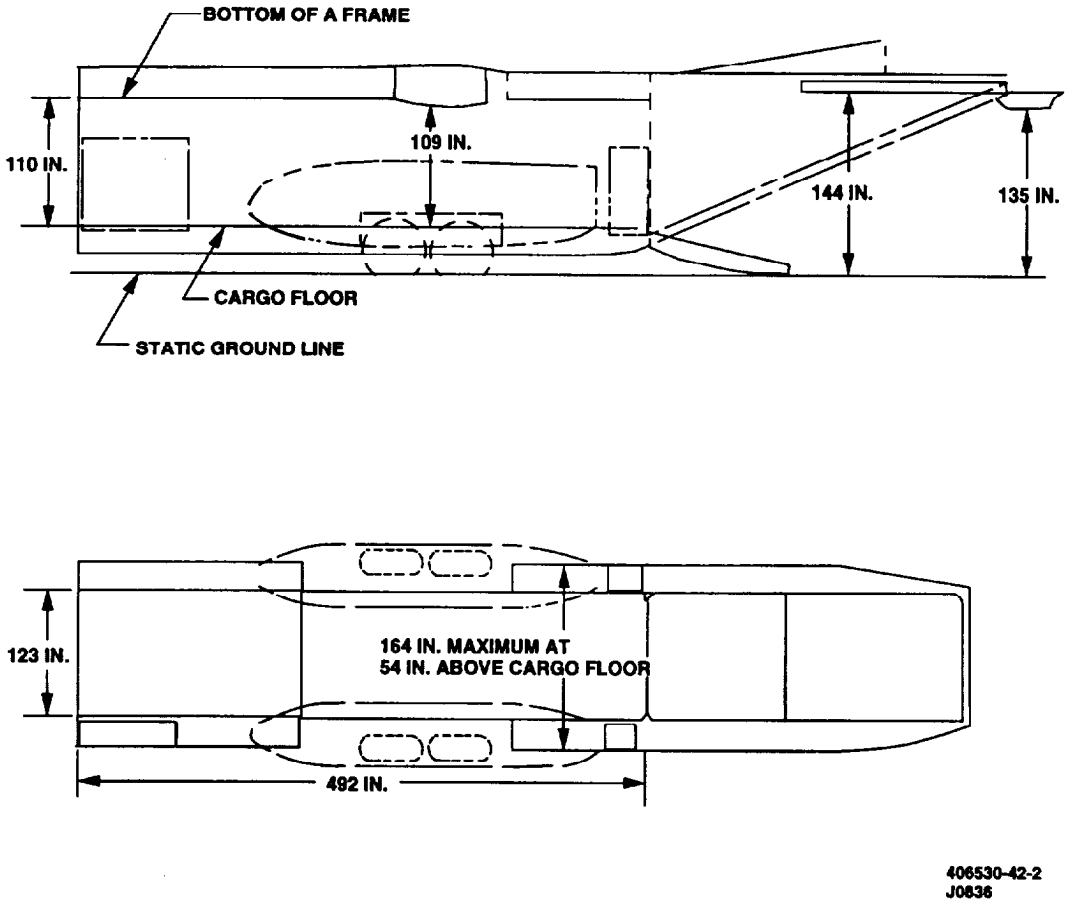
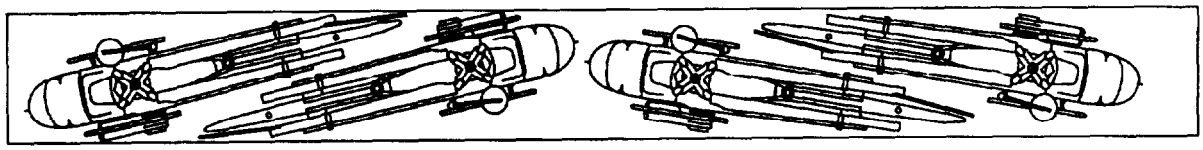


Figure 2-12. C-141 Characteristics (Sheet 2 of 2)



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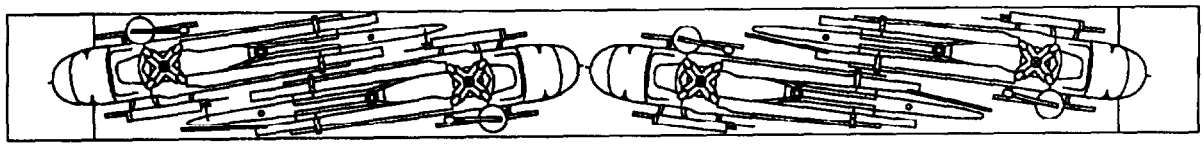
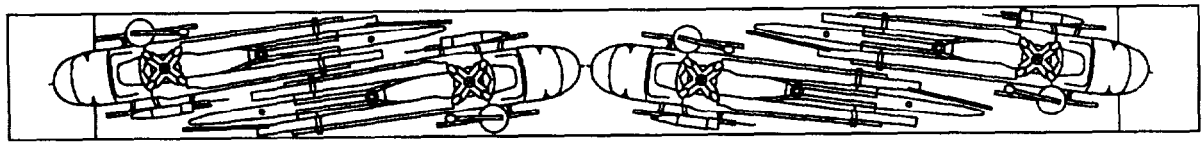


WITH ROCKETS



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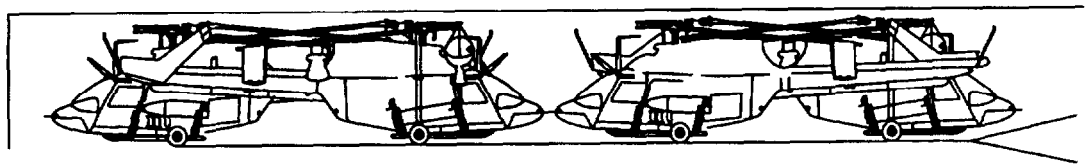

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Figure 2-13. C-141 Loading Diagram

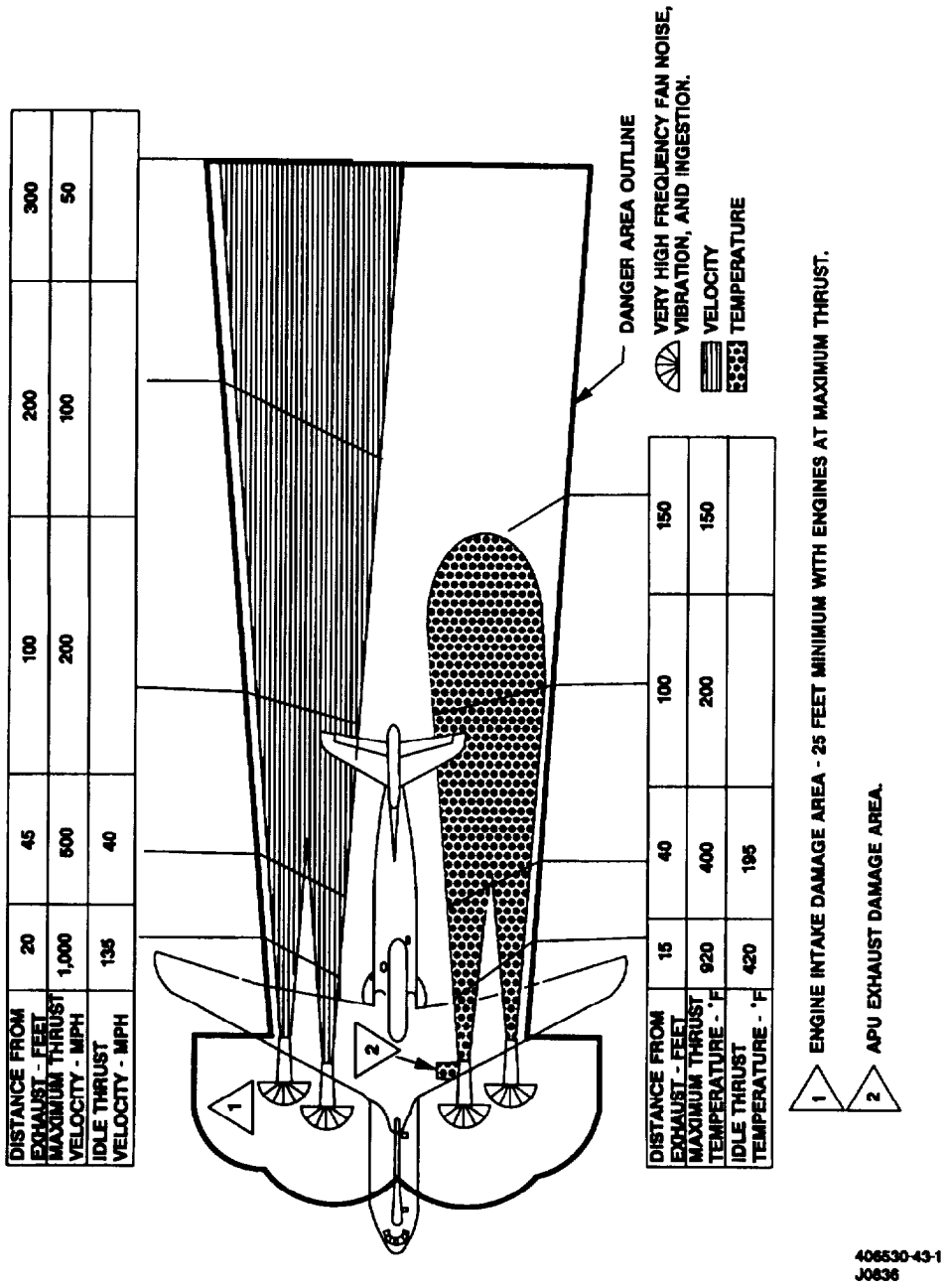


Figure 2-14. C-141 Engine Intake/Exhaust Danger Areas

2.28 LOADING.

2.28.1 General. Four OH-58D/OH-58D(R) helicopters can be loaded into a C-141 cargo aircraft. Refer to figures 2-14.

CAUTION

Ground handling and air transportability kit wheels should not be abused by being run over objects such as pieces of 2 x 4 or planks. This is likely to blow out tires or strain parts of handling wheels supports at places where they tie into the helicopter.

a. When helicopter ground handling trucks reach a point approximately 2 feet below ramp hinge on cargo aircraft, lay a sheet of heavy aluminum 1 foot wide and 4 feet long in the path of approaching wheels. This will preclude gouging ramp or cargo floor with rough end of helicopter skid tube.

NOTE

Scrap aluminum sheet is preferred for protecting cargo aircraft floor and ramp. If this is not available, substitute material such as plywood, fiberglass, or plastic. It should not be more than 1/8 to 3/16 inch thick, or the skid landing gear may hang up on it.

b. Prior to moving helicopter up ramp of cargo aircraft, check that slope of ramp is less than 10 degrees to ensure safe clearance exists. If ramp slope is more than 10 degrees, a ramp extension may be used to reduce the slope to less than 10 degrees. Place support blocks under center of aircraft ramp as shown in figure 2-2.

WARNING

- Helicopters scheduled for shipment in cargo aircraft which require fuel system to be purged to meet applicable requirements of TM 38-250 will be tested for a dangerous level of fuel vapors immediately prior to loading. Test with a combustible gas indicator.
- If a dangerous level of fuel vapors exists, the fuel system must be repurged. To avoid emergency purging operations, fuel system must be rechecked periodically prior to loading.

NOTE

The maximum number of hellcopters which can be loaded to the extent of disassembly listed in table 2-1, the direction helicopters must face. and how they are fitted into each cargo aircraft are shown in figures 2-12.

2.28.2 Helicopters with Standard Landing Gear Loading Procedures. Load each helicopter into C-141 aircraft as follows:

CAUTION

To preclude damage, do not push on tail cone, vertical fin, or HF antenna.

NOTE

A minimum of six persons constitute a loading team.

a. Station one person on each side of ramp ahead of helicopter. These persons act as signal men, and check side clearance. Station four persons along side of tailboom who will guide helicopter as it moves up ramp into cargo aircraft.

b. There are three bridal assembly configuration that may be used for towing the helicopter into the cargo aircraft.

(1) Sling and wire rope assembly set (E-6) (paragraph 2.16.2 c).

(2) Make a sling and wire rope assembly set (E-6) by looping a 5,000 pound rated strap around each shackle (E-30 or E-31) of the transportability support fixture (E-39 or E-40) nearest cargo aircraft. Two nylon straps are required one each side. Bring ends together to form a triangular bridle. Attach cargo aircraft winch cable to towing bridle as shown in figure 2-4.

CAUTION

- To preclude damage, do not push on tail cone, vertical fin, or HF antenna.
- Ensure open portion of winch hook is up, or damage may result to cargo floor.

c. When loading helicopter, pull helicopter slowly into cargo aircraft using cargo aircraft winch.

d. As soon as air transportability kit wheels reach horizontal section of cargo floor, release tow

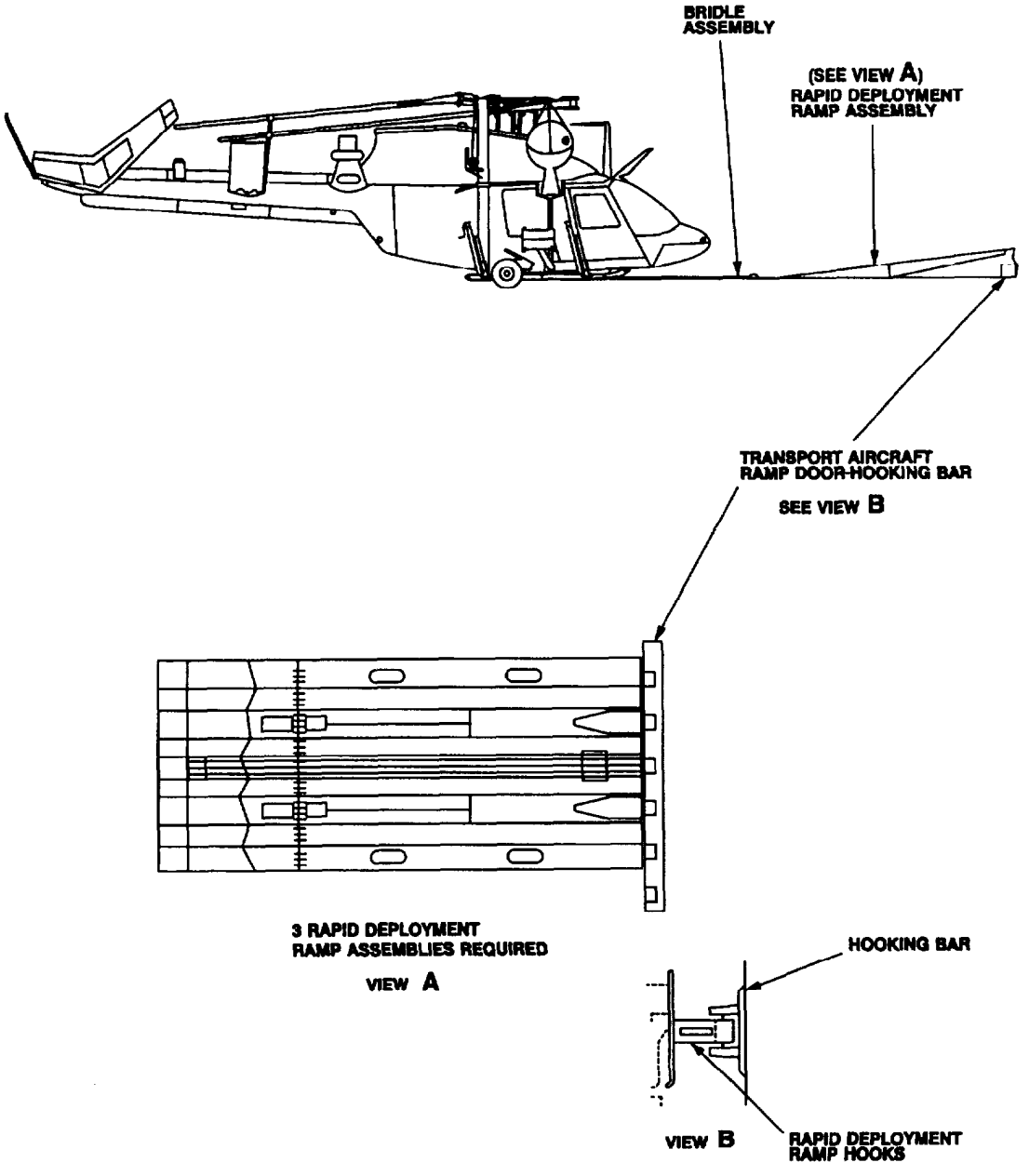


Figure 2-15. Loading on C-141 or C-130 Cargo Aircraft (Sheet 1 of 2)

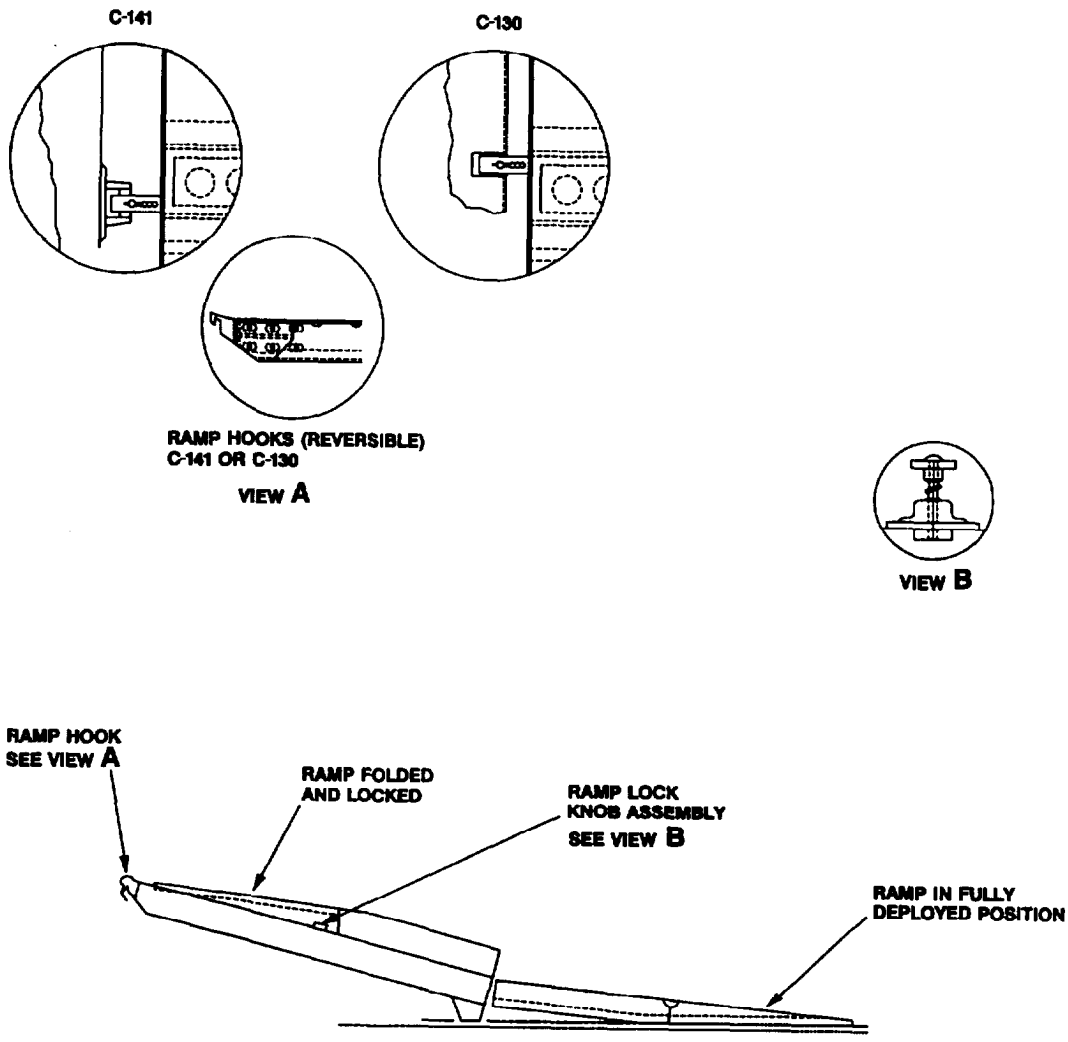


Figure 2-15. Loading on C-141 or C-130 Cargo Aircraft (Sheet 2 of 2)

cable, and manhandle helicopter into tiedown position designated by aircraft loadmaster. Care must be taken in spotting helicopter to allow sufficient clearance for aircraft crewmembers to move along sides of aircraft. At least 4 inches clearance must be maintained at all times between fuselage of one helicopter and fuselage of next helicopter.

NOTE

- Loadmaster pry bar can be used, instead of jacking, to raise helicopter for rotation of wheels. If pry bar is used, ensure firm contact between pry bar and hard points next to wheel.
- Contact area of jack abase divided into weight of helicopter plus (+) the weight of the jack must not equal (=) a weight greater than 50 psi on the treadways or 25 psi between the treadways. If the weight is greater, shoring will be required. Refer to figure 2-15.

e. Place aircraft landing gear jack (E-12) under aft jack point of helicopter and raise helicopter until the air transportability kit (E-16) wheels clear deck of cargo aircraft.

f. Rotate air transportability kit (E-16) wheels to the up position and secure with quick-release pin.

g. Lower helicopter until air transportability kit (E-16) rests on cargo aircraft deck.

h. Remove aircraft landing gear jack (E-12) and secure aboard cargo aircraft.

2.28.3 Helicopters with Rapid Deployment Landing Gear Loading Procedures. Load each helicopter into C-141 aircraft as follows:

a. The maximum number of helicopters which can be loaded are listed in the table 2-1, the direction helicopters must face, and how they are fitted into each cargo aircraft as shown in figure 2-12.

WARNING

To prevent personal injury:

- Do not straddle winch cable when loading or unloading helicopters.
- Always be prepared for winch failure when loading or unloading helicopters on/ from cargo aircraft.
- If winch failure occurs be prepared to place chocks downslope from helicopter ground handling trucks.
- Do not leave helicopter unattended with helicopter ground handling trucks extended.

CAUTION

To preclude damage, do not push on tail cone, vertical fin, or HF antenna.

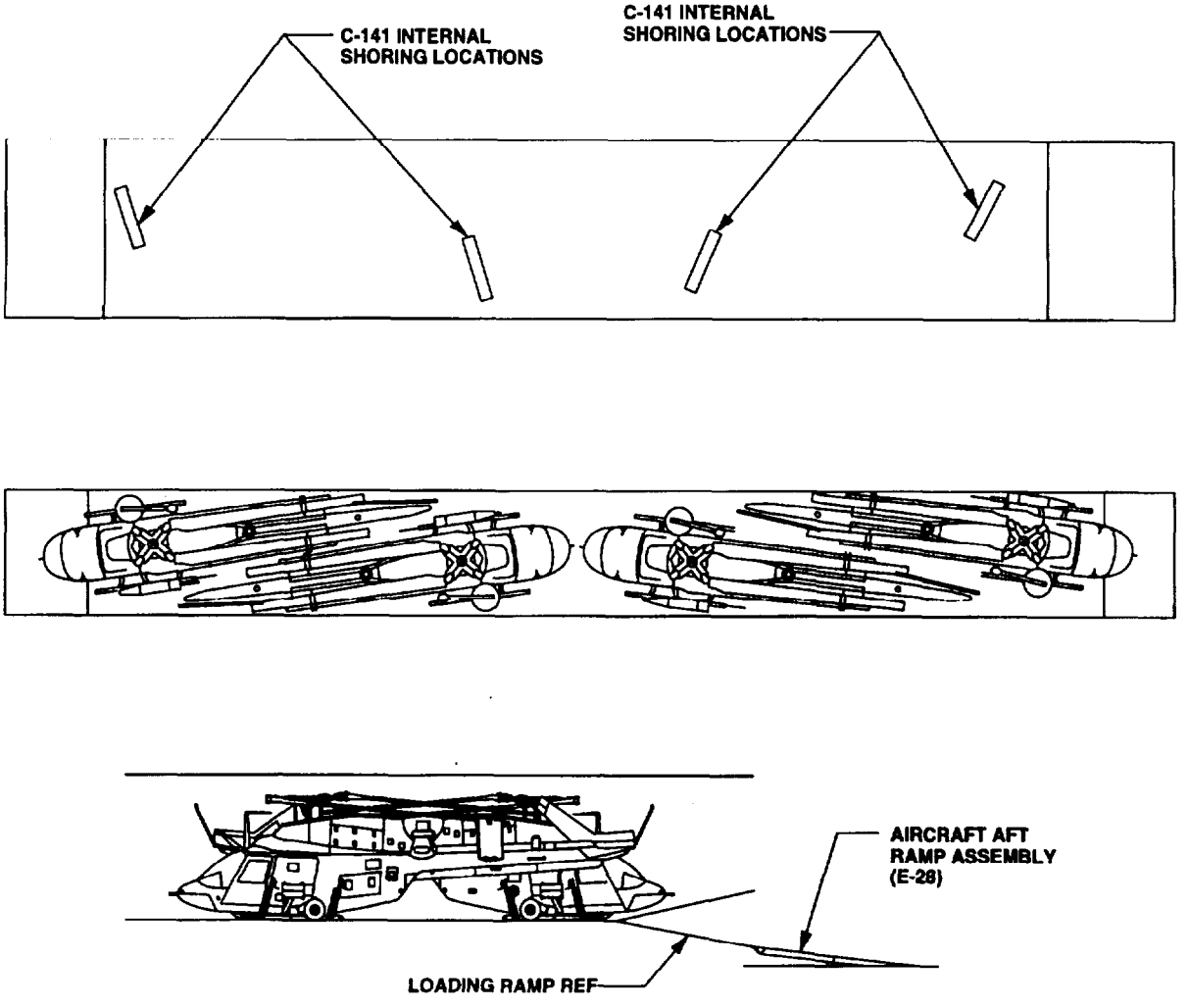
b. Attach three aircraft aft ramp assemblies (E-28) to cargo aircraft ramp (figure 2-14).

CAUTION

When the helicopter is started up the ramp of cargo aircraft, the tailboom will drag. The loading crew must be prepared to lift tailboom to prevent damage. When landing gear is in proximity of or crossing top of ramp or inclined floor, tailboom must be pulled down and kept down until skid tubes are parallel with cargo aircraft floor. Once the helicopter ground handling trucks have met the joint of the ramp and the cargo floor, the helicopter tail must be parallel with the cargo aircraft floor. Persons selected to control the tailboom should be strong enough to control tailboom and able to hold it down until critical area is cleared. These persons may also have to swing the tail to keep the helicopter headed properly into cargo aircraft.

c. A minimum of six persons constitute a loading team. Station one person on each side of ramp ahead of helicopter. These persons act as signalmen and check side clearance. Station four persons along side of tailboom to guide helicopter as it moves up ramp into cargo aircraft.

d. Attach sling and wire rope assembly set (E-6) to tow fittings located on skid tubes rapid



NOTE

INTERNAL SHORING CAN BE LOCALLY FABRICATED USING 4 X 8 FT SHEETS OF QUARTER INCH PLYWOOD RIPPED TO MAKE FOUR 1 X 8 FT PIECES.

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Figure 2-16. C-141 Shoring Requirements

deployment landing gear nearest cargo aircraft. Attach cargo aircraft winch cable to sling and wire rope assembly set (E-6).

CAUTION

To preclude damage, do not push on tail cone, vertical fin, or HF antenna.

e. Loop a 5,000 pound rated nylon web tiedown strap through vertical fin support casting, letting ends hang free.

CAUTION

Open portion of winch hook must be up, or damage may result to cargo floor.

f. When loading helicopter, pull helicopter slowly into cargo aircraft using cargo aircraft winch.

g. When helicopter is well inside cargo aircraft, move helicopter into tiedown position designated by cargo aircraft loadmaster. Care must be taken in spotting helicopter to allow sufficient clearance for aircraft crewmembers to move along sides of cargo aircraft. At least 4 inches clearance must be maintained at all times between fuselage of one helicopter and fuselage of next helicopter.

h. Place a strip of 1/4 inch plywood under each landing gear skid tube to' prevent damage to skids or cargo floor. Place plywood shoring under aft saddle mount. Lower ground handling gear until skids of rapid deployment landing gear rest on plywood. Release tow cable.

i For aft tiedown, take nylon web tiedown strap mentioned in step e. and secure it snugly to a tiedown point in cargo aircraft.

j Fold each lower ramp extension over its upper extension ramp half and lock the two together by turning the knob assembly clockwise into the receiver. The ramp assemblies should be stored on the cargo aircraft to be available for rapid deployment unloading.

2.29 TIEDOWN.

Tiedown procedures and requirements are the same as C-5 cargo aircraft except as shown in figure 1-3 (Standard Landing Gear without Air Transportability Kit) and figure 1-4 (Rapid Deployment Landing Gear). Refer to paragraph 1.11.2.

2.30 UNLOADING.

WARNING

To prevent personal injury:

- Do not straddle winch cable when loading or unloading helicopters.
- Always be prepared for winch failure when loading or unloading helicopters on/ from cargo aircraft.
- If winch failure occurs, be prepared to place chocks downslope from helicopter ground handling trucks.
- Do not leave helicopter unattended with helicopter ground handling trucks extended.

2.30.1 Preparation for Unloading Operations. The helicopter shall be unloaded by mechanical power only. Mechanical power is usually available using the cargo aircraft winch, a vehicle equipped with a winch, or a combination of the two. Regardless of method used to unload helicopter, rate of descent must be controlled as the helicopter rolls down the inclined floor and ramp. The following preparations are required before proceeding with unloading operations:

a. Once cargo aircraft ramp has been lowered, hook the three folded and locked rapid deployment ramp assemblies on to the cargo aircraft ramp door hooking bar. Unlock each ramp assembly by disengaging the knob assembly from the receiver. Unfold the three assemblies, making sure they remain attached to the cargo ramp door hooking bar.

b. Position one person al each side of ramp lo exchange signals with aircraft loadmaster.

C. Position two persons at tail end of helicopter to guide tail and to prevent it from coming in contact with cargo aircraft or striking the ground as it comes off ramp. A nylon strap (E-37) looped through vertical fin support casting will enable the persons to control the tail more effectively.

d. Lower air transportability kit (E-16) wheels.

e. Attach sling and wire rope assembly set (E-6) loops in same manner and to appropriate points for loading (paragraph 2.27.2 b).

2.30.2 Unloading Procedures for Helicopters with Standard Landing Gear or Rapid Deployment Landing Gear.

Unloading procedures for C-141 cargo aircraft is same as C-5 cargo aircraft except as follows (refer to paragraph 2.18):

a. Using ground handling gear or air transportability kit (if installed), raise helicopter (TM 1-1520-248-23).

b. Move helicopter to cargo compartment exit.

c. Attach cargo aircraft winch hook to bridle assembly with hook opening up.

CAUTION

- To prevent damage to helicopter, loading personnel must not push on tail cone, vertical fin, or HF antenna.
- To prevent damage to helicopter, persons selected to control the tailboom should be strong enough and heavy enough to hold it down and swing the tailboom to keep the helicopter headed properly down the cargo aircraft ramp.

NOTE

When landing gear is In proximity of or crossing the top of the ramp or inclined floor, the tailboom must be pulled down and kept down until it clears the top of the door opening.

d. Manually guide helicopter down cargo aircraft ramp. Restrain helicopter descent to ground with cargo aircraft winch.

e. Unload helicopter (paragraph 2.18).

f. Unhook winch cable and remove sling and wire rope assembly set from helicopter.

g. Move helicopter to safe distance from cargo aircraft.

h. Remove air transportability kit (E-16) (figure 2-10), and install landing gear (refer to paragraph 2.34).

i. Remove rapid deployment ramps from cargo aircraft.

2.31 DEPRESERVATION AND ASSEMBLY.

2.31.1 Depreservation. Remove required components (table 2-1) from containers and stowed areas, and depreserve (TM 9-1240-778-23, TM 11-1520-248-23, and TM 1-1520-248-23, Appendix E).

2.31.2 Assembly. Assemble components listed in table 2-1 (TM 9-1240-778-23, TM 1-1-1520-248-23, and TM 1-1520-248-23).

2.32 INSTALLATION OF STANDARD LANDING GEAR.

a. Remove air transportability kit (E-16) (Figure 2-10) and install landing gear as follows:

(1) Place ramps in front of helicopter. Move helicopter until air transportability kit (E-16) wheels are on highest part of ramps.

(2) Place tripod hydraulic jack (E-14) under each forward jack point and aircraft landing gear jack (E-12) under aft jack pad.

(3) Raise helicopter and remove ramps.

(4) Remove quick-release pins (one each side) securing support fixture (E-40) to support fixture (E-39).

(5) Remove support fixture (E-39) from helicopter by removing four bolts and four washers.

(6) Remove support fixture (E-40) from helicopter by removing four bolts and four washers.

(7) Install landing gear (TM 1-1520-248-23).

(8) Lower aircraft landing gear jacks (E-12) and tripod hydraulic jacks (E-14) until landing gear rests on floor (surface).

(9) Remove both types of jacks (E-12 and E-14).

SECTION V. SHIPMENT BY C-130

2.33 C-130 CHARACTERISTICS. (Figure 2-16).

2.33.1 Capability. Two OH-58D helicopters can be loaded into a C-130 cargo aircraft (table 2-1).

2.33.2 Preparation of the C-130.

a. OH-58D/OH-58D(R) with Standard Landing Gear. Army personnel must construct necessary ramp extensions (figure 7-6) to change angle of approach to cargo aircraft to keep skid tubes from scraping ground or gouging ramp. Retain lumber used in construction of ramp extensions for use in unloading.

b. OH-58D/OH-58D(R) with Rapid Deployment Landing Gear. When preparing the cargo aircraft for loading, attach three locked, folded aircraft aft ramp assembly (E-28) to the hooking bar located on the end of the C-130 Cargo aircraft ramp/door. Ensure the hook end inscription, facing up, reads C-130. If C-141 inscription is facing up, remove bolts attaching each hook to the ramp frame, and rotate the hook end. Attach the hook to the ramp frame with the C-130 inscription facing up. Torque the attaching hardware to 95-110 inch pounds. See Figure 2-14.

2.33.3 Safety. General helicopter safety considerations are provided in paragraph 1.20.

2.34 PREPARING THE HELICOPTERS.

Procedures used preparing the helicopters for shipment by C-130 cargo aircraft are the same as those used for C-141. Prepare helicopters (paragraph 2.27).

Table 2-7. Tools and Equipment Required for Shipment on C-130 Cargo Aircraft

Nomenclature	Ref No.
Jack, Aircraft Landing Gear	E-12
Jack, Hydraulic, Tripod (2 required)	E-14
Kit, Air Transportability	E-16
Tool Set, Main Rotor	E-17
Hoist, Mast Sight	E-25
Ramp Assembly, Aft, Aircraft	E-28
Shackle, Ground Hand (2 required)	E-30
Shackle (4 required)	E-31
Shackle	E-32
Strap, Nylon	E-37
Support Fixture	E-39
Support Fixture	E-40
Tow Bar, Aircraft	E-46
Sling and Wire Rope Assembly Set	E-6

2.35 LOADING.

Loading helicopters for shipment by C-130 cargo aircraft is same as shipment by C-141 cargo aircraft except only two OH-58D/OH-58D(R) helicopters can be loaded into a C-130 cargo aircraft as shown in figure 2-18. Refer to paragraph 2.28.

2.36 TIEDOWN.

Tiedown procedures and requirements are shown in Figure 1-3. (Standard Landing Gear) and Figure l-4. (Rapid Deployment Landing Gear). Also, see paragraph 1.11.2.

Installation of Landing Gear Support Fitting Assemblies on Standard Landing Gear is described in TB 1-1520-248-20-37.

2.37 UNLOADING.

Unloading procedures for C-130 cargo aircraft are same as for C-141 cargo aircraft. Refer to paragraph 2.30.

2.38 DEPRESERVATION AND ASSEMBLY.

2.38.1 Depreservation. Remove required components (table 2-1) from containers and stowed areas. Depreserve (TM 1-1520-248-23 Appendix E, TM 9-1240-778-23, and TM 11-1520-248-23).

2.38.2 Assembly. Assemble components listed in table 2-1 (TM 9-1240-778-23, TM 11-1520-248-23, and TM 11-1520-248-23).

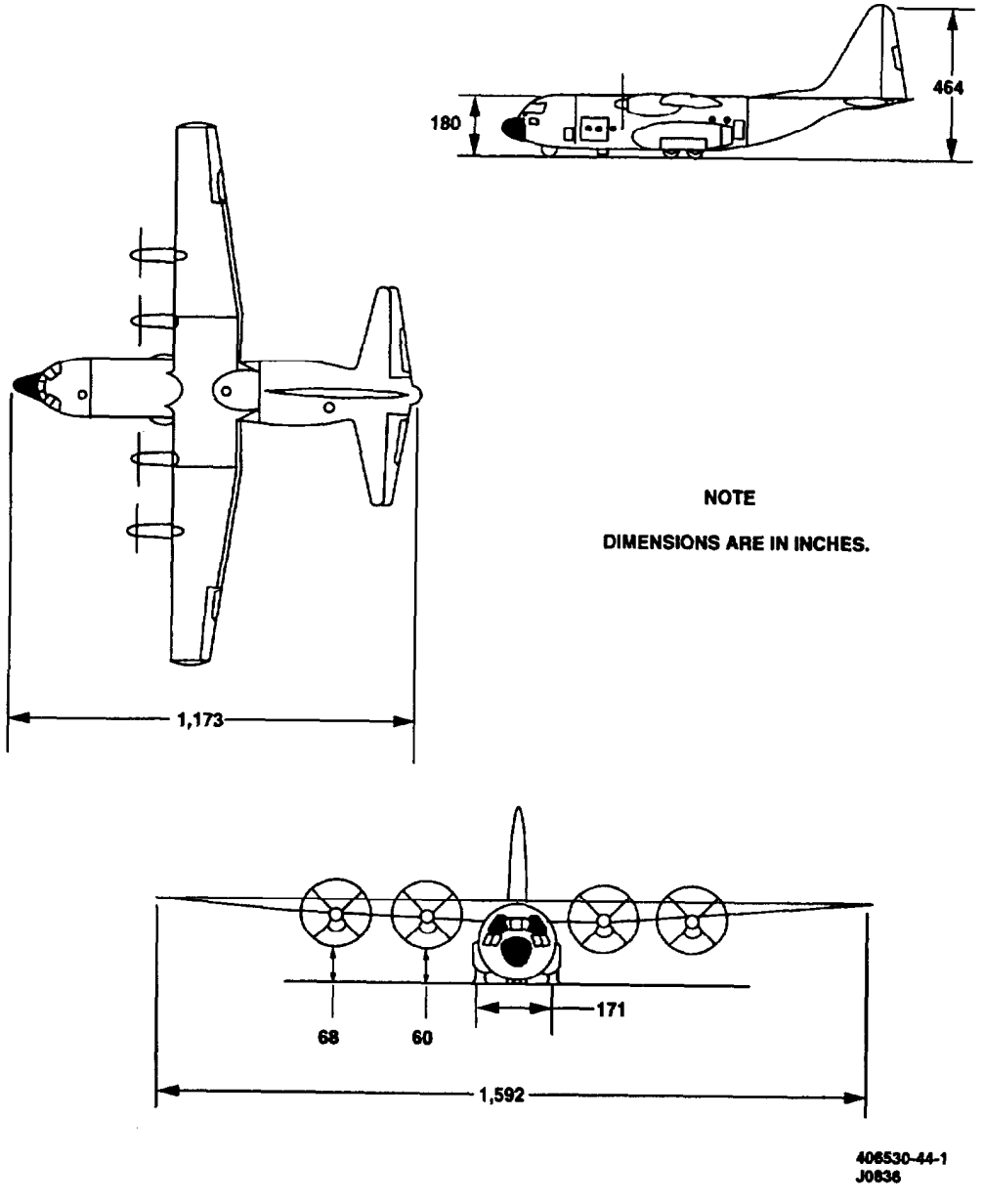


Figure 2-17. C-130 Characteristics (Sheet 1 of 2)

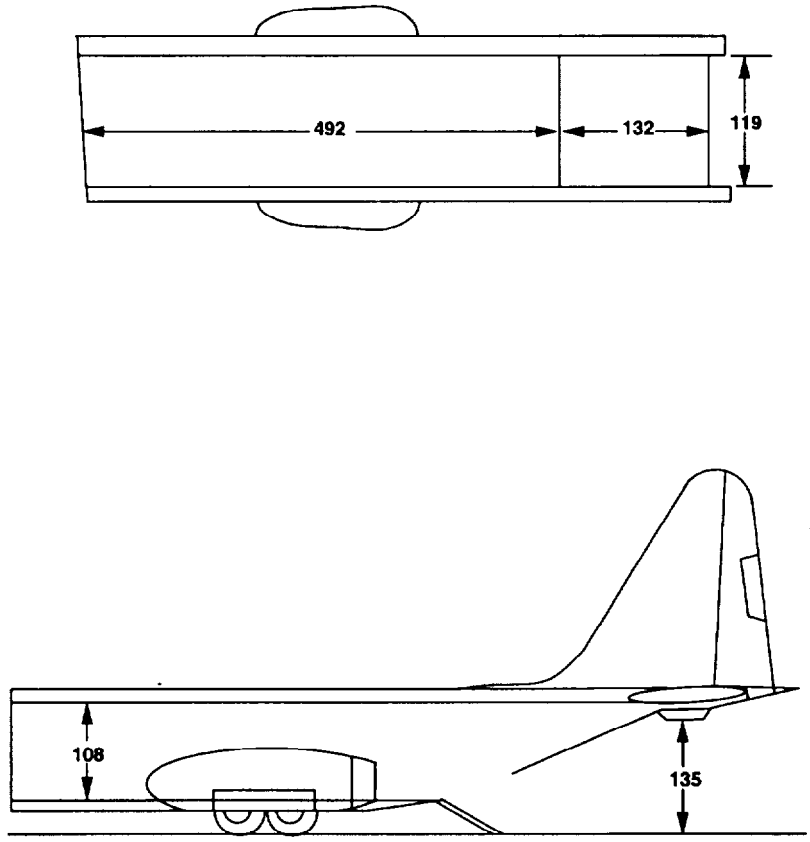


Figure 2-17. C-130 Characteristics (Sheet 2 of 2)

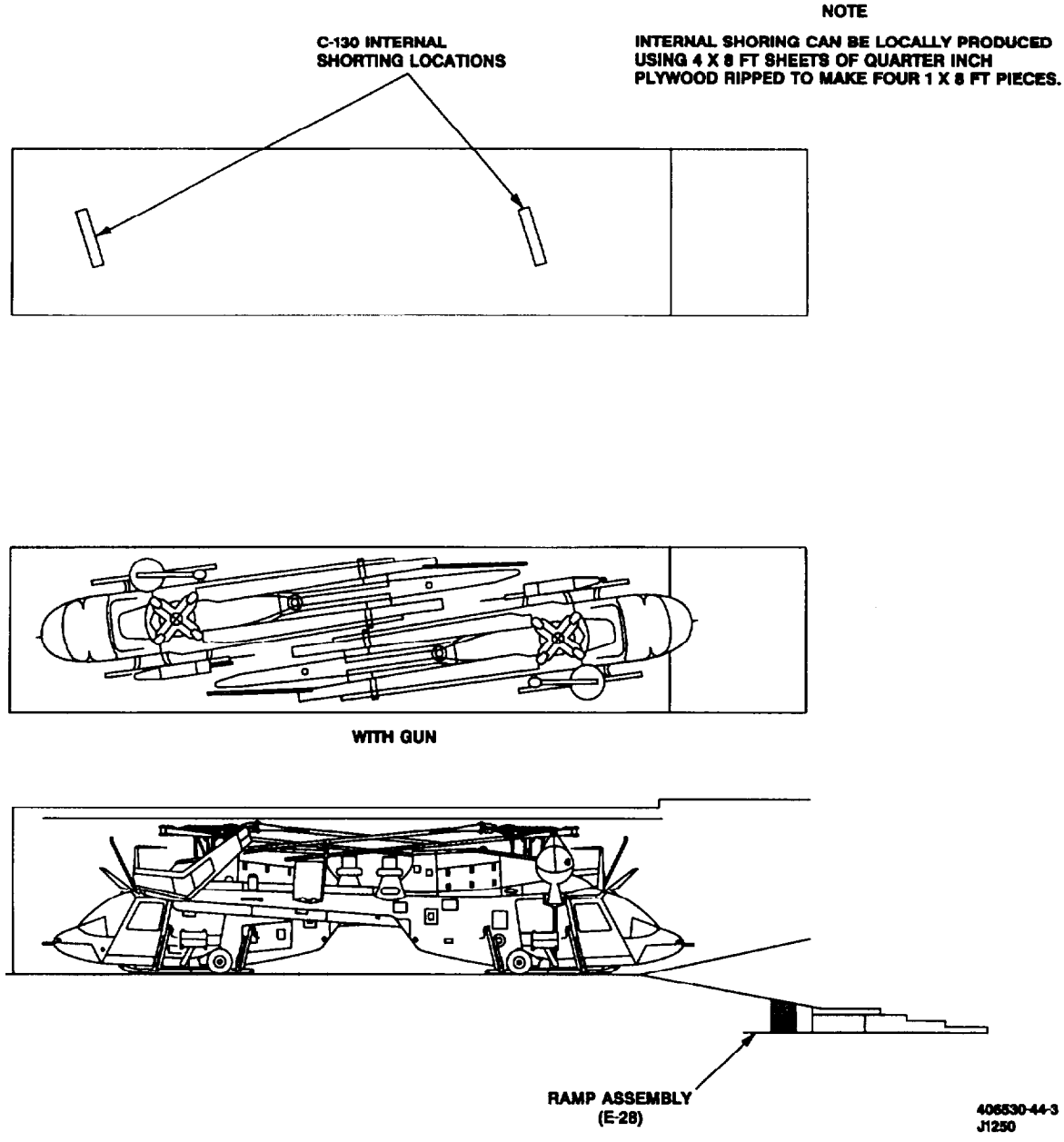
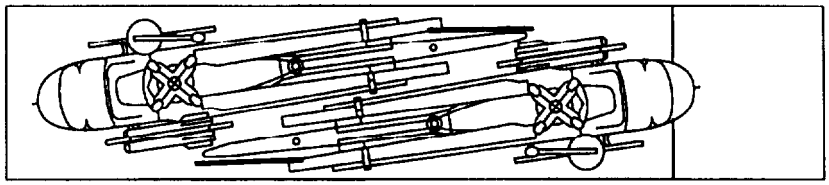


Figure 2-18. C-130 Shoring Requirements



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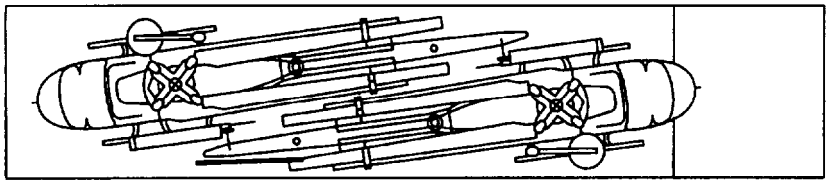
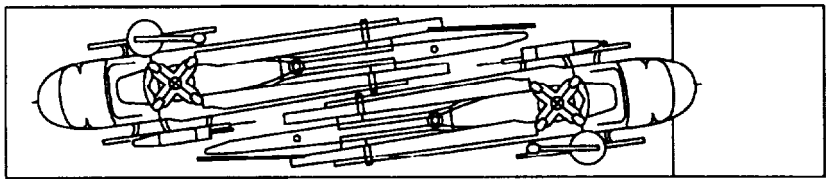


WITH ROCKETS



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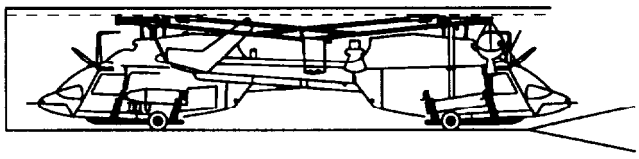

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Figure 2-19. C-130 Loading Diagram

CHAPTER 3

SHIPMENT BY VESSEL

SECTION I. GENERAL

3.1 TYPES OF SHIPMENT.

3.1.1 Logistical Shipment. Logistical shipment is associated with shipment of helicopters for new system fielding and to and from maintenance depots. Primary consideration is to reduce dimension of helicopters to permit maximum density loading.

3.1.2 Minimum Disassembly Logistical Shipment. This type of shipment is to be used when shipment is of less than maximum density of helicopters. Components will be removed only to accommodate vessel hold dimensions.

3.1.3 Tactical Shipment. The object of tactical shipment is for the helicopters to arrive in a flyable or nearly flyable condition. Primary concern is to avoid removal of components. Disassembly, if any, is kept to a minimum. Density of the load is a secondary consideration. Tactical shipment is generally the type shipment associated with deployments.

3.1.4 Landing Platform Helicopter (LPH). Operations from an LPH are fly on/fly off. LPH operations should be addressed in unit Standing Operation Procedures. Information provided herein is limited to preparation of helicopters for landing on ship elevators, corrosion control concerns and helicopter tie down. Sixty-three OH-58D/OH-58D(R) helicopters can be loaded on a LPH flight deck.

3.1.5 Crated and Intermodal Container Shipment. Refer to Chapter 5 for crated and intermodal container shipment.

3.2 RESPONSIBILITIES OF MILITARY TRAFFIC MANAGEMENT COMMAND (MTMC).

3.2.1 Shipping Arrangements. It is the responsibility of the Military Traffic Management Command to make necessary arrangements with the Military Sealift Command (MSC) for use of vessels for ocean shipment of helicopters when contacted by the appropriate command. MTMC will provide shipper with vessel name, proposed load date, proposed sail date, and type of load (Roll On/Roll Off—RO/RO or Lift On/Lift Off—LO/LO).

3.2.2 Preparation of Loading Plan and Manifest. MTMC will prepare a loading plan and manifest under close coordination based on information provided by the Army loading team.

3.2.3 Loading and Tiedown. Along with MSC it is also the responsibility of MTMC to make arrangements with a service or commercial stevedore activity to load, tie down all helicopters with component parts, and supervise these activities. Aviation maintenance personnel from the shipping unit or the Port Support Activity will supervise all loading and tiedown procedures.

3.3 FUNCTIONS OF MARINE TERMINAL PERSONNEL.

a. Prepare the vessel for loading.

b. Provide all necessary dunnage, shoring, and/or ramps required for loading and unloading.

c. Rig and operate all loading/offloading devices.

d. Perform all loading and offloading functions.

e. Tie down (lash) all helicopters (with supervision by the Army loading team) inside vessel.

3.4 FUNCTIONS OF THE ARMY LOADING TEAM.

a. The shipper will coordinate with MTMC information required to efficiently load vessel. Information coordinated will include number, type, weight, dimensions, and fuel load of helicopters to be shipped and vessel to be used, loading dates, and sail date.

b. Plan all aspects of the move so that required materials, tools, equipment, and manpower are available.

c. Prepare the helicopters for shipment as described in this manual.

d. Ensure that helicopters are ready for loading on schedule. Helicopters will be transported or flown to loading point at time designated by MTMC.

e. Rig helicopter for lifting (LO/LO operation) at both departure and destination ports.

f. Brief marine terminal and contractor personnel on ground handling and tiedown safety requirements. Provide technical assistance of both departure and destination ports.

g. Ensure that provisions are made for enroute maintenance and daily tiedown inspections by Army escort personnel.

h. Provide technical assistance to MTMC as required on ground handling and unloading at destination.

i. Depreserve, assemble, and prepare helicopters for flight upon arrival at destination.

3.5 PORT SUPPORT.

Assistance in support of deploying aviation assets is available through Army Material Command (AMC). Areas of available assistance include flight operations, maintenance, aircraft preparation (to include shrink film) parts, tools, and materials support. Support required must be requested through official channel.

3.6 EQUIPMENT REQUIREMENTS.

Refer to Appendix E for a comprehensive list of tools and equipment applicable to shipment by vessel. Refer to table 3-1 for information on specific requirements.

Table 3-1. Tools and Equipment Required for Tactical Shipment

Nomenclature	Ref No.
Strap, Webbing	E-1
Trucks, Helicopter Ground Handling	E-10
Heat Gun, Propane	E-11
Safety Knife	E-18
Combustible Gas Indicator Set	E-21
Transmission Cover Lift Plate	E-47
Tow Bar, Aircraft	E-46
Sling, Aircraft Maintenance	E-34
Sling, Rescue, Helicopter	E-35

3.7 MATERIAL REQUIREMENTS.

Refer to Appendix D for a comprehensive list of consumable materials applicable to shipment by vessel. Refer to table 3-2 for information on specific requirements.

Table 3-2. Consumable Materials Required for Tactical Shipment

Nomenclature	Ref No.
Barrier Material, Greaseproof, Waterproof, Flexible	D-2
Barrier Material, Greaseproof, Flexible	D-3
Polish, Plastic	D-4
Corrosion Preventive Compound, Cold Application	D-6
Corrosion Preventive Compound, Cold Application	D-7
Corrosion Preventive Compound, Cold Application	D-8
Cushioning Material	D-9 and D-13
Cushioning Material, Packaging	D-10
Cushioning Material, Packaging	D-11
Box, Shipping	D-15
Heat Shrinkable POL	D-22
Plastic, Sheet	D-23
Hydraulic Fluid, Petroleum Base	D-17
Lubricating Oil Aircraft, Turbine	D-20
Vent, Stick-On	D-31
Strapping	D-27
Tag, Shipping	D-28
Drycleaning Solvent	D-14
Plastic Strip	D-29
Tape, Pressure Sensitive, Adhesive	D-30
Envelope, Packaging	D-1

3.8 MANPOWER REQUIREMENTS.

Refer to tables 2-1 and 2-2 to determine manpower estimates for specific configurations.

3.9 FACILITY REQUIREMENTS.

3.9.1 Foul Weather Shelter. A hangar or other enclosure will be made available for operation in poor weather.

3.9.2 Fire Protection. Firefighting equipment must be on-site and ready for use.

3.9.3 Electrical Power. Electrical power must be on-site and ready for use.

3.9.4 Electrical Grounding. A good electrical ground will be used during preparation and parking of helicopters.

3.9.5 Area Clearance. Area of operation will be cleared of all unneeded equipment and vehicles to allow free movement of helicopter. Cleared area must accommodate the helicopter turning radius when the helicopter ground handling trucks (E-10) are installed. Ground handling will be performed as described in Chapter 1.

3.9.6 Fresh Water. Low pressure, clear, fresh water must be on-site and ready for use.

3.10 HELICOPTER SECURITY.

Helicopters shall have security provided as dictated by local directives.

3.11 HELICOPTER SAFETY.

In addition to the potential hazards associated with helicopter operations, preparation for shipment, loading, and unloading of helicopters presents a whole series of unique hazards. These hazards range from rigging and lifting the helicopters and ensuring proper tiedown to the application of heat shrink protective film. The procedures presented herein are safe if carefully followed. Basic safety considerations are as follows:

a. Accomplish all maintenance operations as described in applicable maintenance manuals.

b. Be thoroughly familiar with the procedure herein prior to arrival at the loading site.

c. Prepare in advance to have all required material and equipment available and on site for completion of task prior to beginning the work effort. Do not use "work around" methods to accomplish this task.

d. Record all preservation, preparation, and maintenance actions in the helicopter logbook.

e. Strictly comply with instructions and safety check sheets for the application of heat shrink film (Appendix G).

f. Never walk or stand under a helicopter being lifted.

g. Hard hats must be worn on ship and in vicinity of port operations.

h. Operations in and around port and vessel loading and unloading operations are extremely hazardous due to the nature of the operations. The requirements for vigilance cannot be overemphasized.

SECTION II. TACTICAL SHIPMENT

3.12 CHARACTERISTICS OF VESSEL SHIPMENT.

3.12.1 Vessel Survey. Because of the wide variety of vessel designs, the actual vessel to be used must be surveyed. The physical characteristics of the vessel determine its capability and may impact the extent of helicopter disassembly required. In the pre-deployment survey, note layout of tiedown fittings; hatch, hold, and door clearances; ventilation systems; fire fighting equipment; and capabilities of lifting devices. Ramp angles and ship construction must be surveyed to determine if RO/RO operations are feasible.

3.12.2 Capability. The number of helicopters that can be shipped in a given vessel is determined by the type of helicopters, the configuration of the helicopters (tactical vs logistical) and the other cargo on board ship. Stowage of helicopters is normally limited to the first deck below the weather deck due to vessel trim considerations.

3.12.3 Above Deck Shipment. Shipment of helicopters above deck (on the weather deck) is considered a high risk option. It should only be considered under exceptional circumstances. Damage to helicopters is likely.

3.13 PREPARING THE HELICOPTERS.

See figure 1-1 for tactical vessel shipping dimensions and operational configuration. Refer to paragraphs 3.6 through 3.9 for resource requirements.

WARNING

Ensure all armament systems are cleared and safe prior to performing any preparation actions on the helicopters.

NOTE

To reduce congestion in the port area, all preparation should be completed prior to moving the helicopters to a marshalling area.

a. Ground helicopters (TM 1-1520-248-23).

WARNING

Helicopters will not be shipped with known or suspected fuel leaks. If a fuel leak is suspected and cannot be repaired, drain, purge, and preserve the fuel system (TM 1-1500-204-23).

b. Service fuel tanks to between 1/4 and 3/4 full (28 gal. to 75 gal.) If this is not possible, drain, purge, and preserve the fuel system (TM 1-1500-204-23 and TM 1-1520-248-23).

c. Disconnect battery and secure quick-disconnect to airframe with tape (D-30).

d. Clean helicopters (paragraph 6-4).

e. Lubricate and service helicopters (except fuel), refer to lubrication chart (TM 1-1520-248-23).

f. Prepare helicopters for tiedown (paragraph 1.11.1).

g. Install protective (flyaway) covers (TM 1-1520-248-23).

h. Fold horizontal stabilizers (TM 1-1520-248-23).

i. Fold main rotor blades (TM 1-1520-248-23).

j. Preserve helicopters for vessel shipment (Chapter 6).

k. Fold universal weapons pylons (TM 9-1090-214-23 & P).

l. Ensure all required logbook entries are complete. Place logbook in waterproof type packaging envelope (D-1) and secure to pilot seat with seat belt.

m. Weigh helicopters (paragraph 2.9). Install heat shrink protective covering (Appendix G). Mark the center of balance and weight on the helicopters.

3.14 LOADING.

3.14.1 Lift On/Lift Off (LO/LO) Operation.

NOTE

- Prior to loading the vessel arrange a meeting through the Transportation Terminal Unit (TTU) among representatives from the aviation Port Shipping Authority (PSA), the shipping aviation unit, the stevedore contract (longshoremen), and the TTU. Establish responsibilities for rigging, handling, and lashing the helicopters. Movement and lashing is normally accomplished by longshoremen under supervision of aviation personnel.
- Rigging is normally done by aviation maintenance personnel. This must be established before loading operations begin, as it is different from the handling of other types of cargo.
- Placement of tugs and ground handling equipment on the ship will expedite the loading operations.

a. Tow helicopter into position for loading.

b. Rig helicopter for lifting. (See figure 3-1).

(1) Attach the ends of the four upper slings attached to the spreader bar (E-29).

(2) Attach one end of the helicopter rescue sling (E-35) to the spreader bar (E-29).

(3) Secure retaining pin in clevis with bolt and nut.

(4) Place clevis in hook of dockside or shipboard crane.

(5) Position spreader bar (E-29) centered directly over mast mounted sight.

(6) Attach one end of aircraft maintenance sling (E-34) to clevis on spreader bar. Pass other end of sling down through upper yoke of main rotor hub and back up to the same clevis on the spreader bar and secure clevis.

(7) Repeat the procedure for the three remaining spreader bar legs.

(8) Pass webbing strap (E-1) through forward mount of vertical stabilizer and through free end of the helicopter rescue sling (E-41) attached to clevis.

(9) Secure ends of webbing strap (E-1) together and remove slack.

c. Remove helicopter ground handling trucks (E-10) and aircraft tow bar (E-46) (paragraph 1.18).

WARNING

Do not walk under the helicopter or any other cargo being lifted.

CAUTION

Stabilize helicopter with tag lines as it is being lifted and lowered to prevent it from striking the ship structure.

d. Lift helicopter onto the ship and down through the hold to lower deck.

e. Disconnect sling from helicopter.

CAUTION

To prevent spreader bar damaging mast turret assembly or helicopter, ensure helicopter weight is firmly on gear and spreader bar assembly is supported away from top of mast turret assembly before disconnecting sling.

(1) Disconnect one end of the aircraft maintenance sling (E-34) from the clevis on each end of the spreader bar (E-29).

(2) Pass each webbing strap (E-1) back through the upper yoke on the spreader bar (E-29) so that slings are clear of the helicopter.

(3) Disconnect webbing strap (E-1) and pass back through forward vertical stabilizer mount so that strap is clear. Reconnect webbing strap (E-1) through aircraft maintenance sling (E-34).

CAUTION

Ensure that all straps remain clear of helicopter to prevent possible fouling and subsequent damage.

(4) Hoist entire rig out through hold and position for the next helicopter. Remove rig and stow if load is completed.

f. Install ground handling equipment.

NOTE

Helicopters may be towed into position or manhandled, as conditions allow.

g. Position helicopter in vessel as directed by vessel crew.

h. Place wood shoring under skids.

i. Remove ground handling equipment (paragraph 1.18).

3.14.2 Roll On/Roll Off (RO/RO) Operation.

CAUTION

To prevent damage to helicopters, place necessary shoring at base of ramp and at crest.

NOTE

The amount of shoring required will vary with time as the ship rises and falls with the tide.

a. Place shoring to reduce angle as necessary at base of ramp and at ramp crest.

CAUTION

- To preclude damage do not push on the tail cone, vertical fin, or antenna.
- Position four persons at rear of helicopter to prevent tailboom from striking base of ramp to control helicopter at ramp crest.

b. Tow helicopter up the ramp and into the ship. Position the helicopter as directed by ship's crew.

c. Removed ground handling equipment (paragraph 1.18).

CAUTION

TO PREVENT SPREADER BAR DAMAGING MAST TURRET ASSEMBLY OR HELICOPTER, ENSURE HELICOPTER WEIGHT IS FIRMLY ON GEAR AND SPREADER BAR ASSEMBLY IS SUPPORTED AWAY FROM TOP OF MAST TURRET ASSEMBLY BEFORE DISCONNECTING SLING.

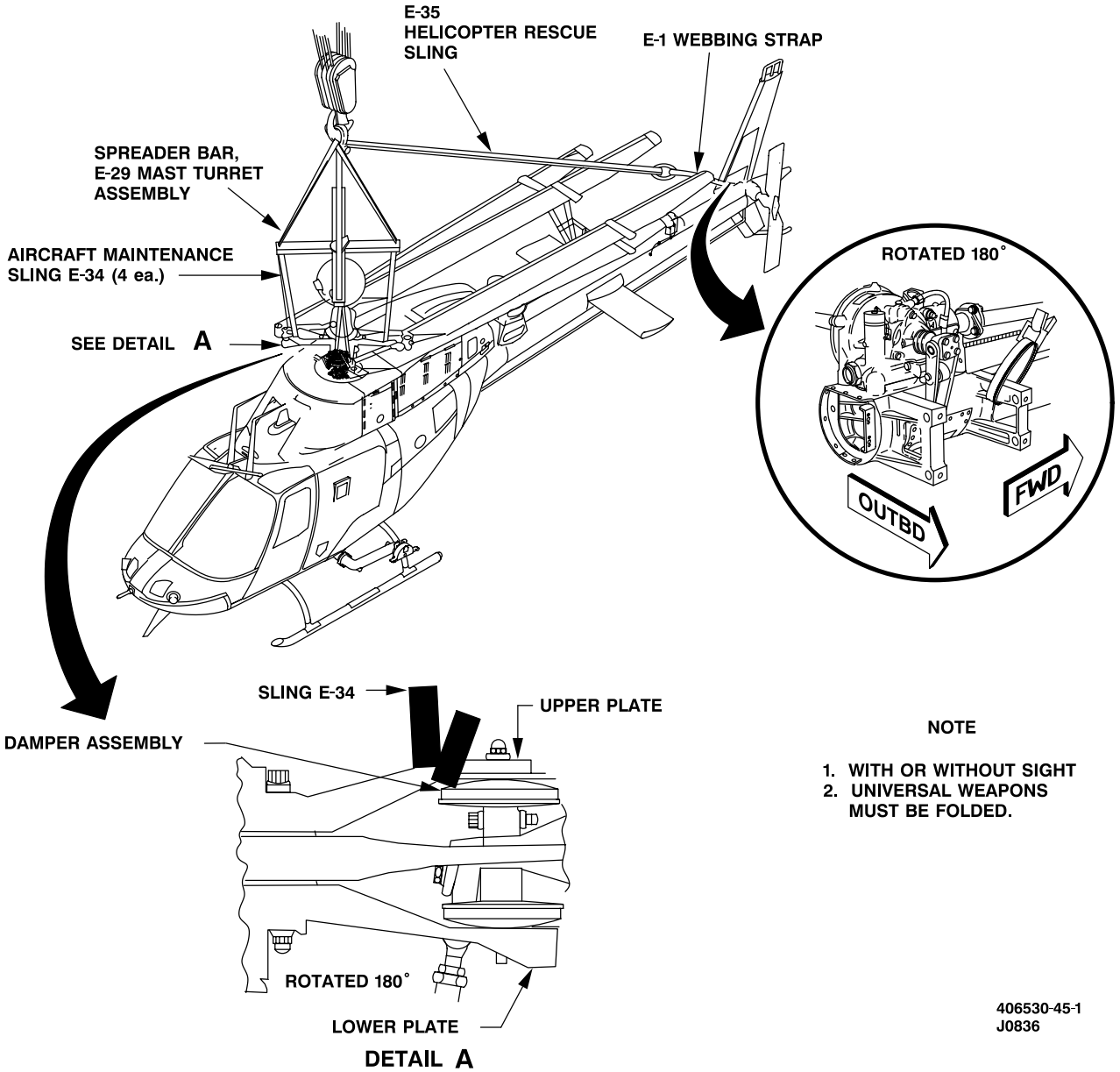


Figure 3-1. Rotor Head Suspension Rigging Configuration — (LO/LO), for Vessel Shipment

3.15 TIEDOWN.

Lash helicopter (paragraph 1.11.2).

NOTE

If vessel tiedown points will not accommodate required lashing diagram, create additional tiedown points using a grid of chains on the vessel deck.

3.16 UNLOADING.

NOTE

Unloading helicopter by manpower should not be attempted unless there is no mechanical device to assist in unloading operations.

3.16.1 Lift On/Lift Off. Unloading LO/LO operations are the reverse of loading. Unload using procedures in paragraph 3.14.1.

3.16.2 Roll On/Roll Off. Unloading RO/RO operations are the reverse of loading. Unload using procedures in paragraph 3.14.2.

3.17 DEPRESERVATION AND ASSEMBLY.

a. Remove heat shrink protective covering as described in Appendix G of this manual.

b. Clean helicopter as required (Chapter 6).

c. Unfold main rotor blades (TM 1-1520-248-23).

d. Unfold horizontal stabilizer (TM 1-1520-248-23).

e. Unfold Universal Weapons Pylons (UWP) (TM 1-1520-248-23).

f. Install weapons (TM 9-1090-214-23 & P).

g. Perform Preventative Maintenance Services (PMS) Inspections (TM 1-1520-248-PPM).

h. Perform Maintenance Operational Check (MOC) (TM 1-1520-248-MTF).

SECTION III. MINIMUM DISASSEMBLY LOGISTICAL SHIPMENT

3.18 PREPARING THE HELICOPTERS.

The tactical configuration is the preferred configuration for vessel shipment. The additional component removal indicated in this section will be performed only if required to accommodate vessel hold dimensions. Refer to figure 1-1.

a. Prepare helicopters (paragraphs 3.13 a. through 3.13 i).

b. Remove mast mounted sight (TM 9-1240-778-23). Clean and preserve sight and secure in mast mounted sight container.

c. Complete helicopter preparation (paragraphs 3.13 j. thru 3.13 n).

3.19 LOADING.

NOTE

The same rigging is used for LO/LO with or without the mast mounted sight installed.

Load helicopter (paragraph 3.14).

3.20 TIEDOWN.

Lash helicopters (paragraph 1.11.2).

3.21 UNLOADING.

3.21.1 Lift On/Lift Off. Unloading LO/LO operations are the reverse of loading. Unload using procedures in paragraph 3.14.1.

3.21.2 Roll On/Roll Off. Unloading RO/RO operations are the reverse of loading. Unload using the procedures in paragraph 3.14.2.

3.22 DEPRESERVATION AND ASSEMBLY.

a. Depreserve helicopter (paragraphs 3.17 a. through 3.17 c).

b. Install mast mounted sight (TM 9-1240-778.23).

c. Complete depreservation and assembly (paragraphs 3.17 d. through 3.17 h).

SECTION IV. LOGISTICAL SHIPMENT

3.23 PREPARING THE HELICOPTERS.

The configuration for logistical shipment is identical to that for minimum disassembly logistical shipment (paragraph 3.18).

a. Prepare helicopters (paragraph 3.13 a. through 3.13 i).

b. Remove mast mounted sight (TM 9-1240-778-23).

c. Complete helicopter preparation (paragraphs 3.13 j. through 3.13 n).

3.24 LOADING.

Load helicopters (paragraph 3.14).

3.25 TIEDOWN.

Lash helicopters (paragraph 1.11.2).

3.26 UNLOADING.

Unload helicopters (paragraph 3.21).

3.27 DEPRESERVATION AND ASSEMBLY.

a. Depreserve helicopter (paragraphs 3.17 a. through 3.17 c).

b. Install mast mounted sight (TM 9-1240-778-23).

c. Complete depreservation and assembly (paragraphs 3.17 d. through 3.17 h).

SECTION V. SHIPMENT BY LANDING PLATFORM HELICOPTER (LPH)

3.28 CHARACTERISTICS.

3.28.1 Vessel Survey. Because of a wide variety of vessel designs, the individual ship to be used must be surveyed. The characteristics of the vessel will determine its capabilities. Prior to deployment, the vessel must be surveyed for tiedown fittings; hatch, hold, elevator, and door clearance; ventilation systems; fire fighting equipment; and lifting capacities and capabilities of installed lifting devices. Below deck environmental conditions must also be determined.

3.28.2 Capability. The number of helicopters that can be shipped on an LPH vessel is determined by characteristics of specific vessel used.

3.29 PREPARING THE HELICOPTERS.

3.29.1 Fly On/Fly Off. The amount of helicopter preparation will depend on the amount of helicopter maintenance support available throughout the voyage. If helicopters are to be maintained as flyable, the only requirements are to maintain the helicopter in flyable storage (TM 1-1520-248-23, Appendix E) and perform effective corrosion control. If no helicopter maintenance is available on the vessel, the helicopters will be prepared as described in Section II.

3.29.2 Transport. If the LPH is to be deployed only as method of transport, prepare and load helicopters as described in Section II. The application of heat shrink protective covering may be eliminated only if sufficient helicopter maintenance personnel are available to perform corrosion control. Unloading and depreservation will be accomplished as described in Section II.

3.30 TIEDOWN.

Lash helicopters (paragraph 1.11.2).

CHAPTER 4

SHIPMENT BY TRUCK

SECTION I. GENERAL

4.1 GENERAL.

Flight delivery, when feasible, provides the most expeditious method of transporting the helicopter. Shipment of helicopter by cargo aircraft is the primary method of transporting when flight delivery is not feasible.

An alternate method of shipping the helicopter is via truck. These procedures may be used for transporting helicopters on a commercial trailer with an air-ride suspension or a military M270A1 semi-trailer without air-ride suspension.

4.2 TYPES OF SHIPMENT.

4.2.1 Tactical (Short Haul) Truck Shipment. This is defined as short haul (not to exceed 100 miles) shipment (including helicopter recovery) by using the military M270A1 semi-trailer. This type of shipment is intended for evacuation of a helicopter to a maintenance unit for repair or preparation for a different mode of shipment. In this configuration, the load shall not normally exceed maximum waiveable U. S. highway limits.

4.2.2 Logistical (Long Haul) Truck Shipment. This is defined as long haul (in excess of 100 miles) shipment by standard commercial flatbed trailer with air-ride suspension. It is intended to evacuate a disabled helicopter to a major overhaul facility. In this configuration the load will normally exceed commercial legal U. S. limits. Serviceable helicopter may be shipped by logistical truck mode when prepared by these procedures. Normally, truck transport of a serviceable helicopter is not a primary mode recommended for use; however, it is permissible when transported on air-ride suspension tractor and trailer and prepared by these procedures.

4.3 SHIPMENT OF DAMAGED HELICOPTER.

For technical assistance in repairing a structurally damaged helicopter for truck shipment, contact Commander AMCOM, ATTN: AMSAM-MMC-LS-DP, Redstone Arsenal, AL, 35898-5230, commercial telephone (205) 876-9282 or DSN 746-9282.

4.4 RESPONSIBILITIES OF SHIPPER.

a. Coordinate movement. The shipper shall coordinate all shipments through the Installation Transportation Office (ITO) as soon as data is available.

b. Coordinate lifting devices. The shipper shall coordinate through command channels for availability of appropriate lifting devices and operator to load helicopter on the truck. Also coordinate with the receiving activity to ensure availability of appropriate lifting devices for unloading the helicopter.

c. Prepare helicopter for shipment. Helicopter disassembly (component folding, removal, and storage of components/equipment), cleaning, preservation, packaging, and installation of heat shrink film protective covering shall be accomplished by the shipper.

d. Provide equipment and materials. The shipper shall provide all necessary equipment and materials to prepare, load, and secure the helicopter on a truck trailer.

e. Rig helicopter. The shippers shall furnish and rig all lifting devices.

f. Identify center of balance and weight. The shipper shall mark accurate weight and center of balance of the helicopter on both sides of helicopter fuselage.

g. Load helicopter. The shipper shall function as an advisor and will provide lifting device operator with technical assistance in lifting the helicopter.

h. Secure helicopter. The shipper shall function as an advisor and will assist in tiedown of helicopter and components to trailer as described in this manual.

4.5 EQUIPMENT REQUIREMENTS.

Refer to Appendix E for a comprehensive list of tools and equipment applicable to transport by truck. Refer to tables 4-1 and 4-2 for information on specific requirements.

Table 4-1. Disassembly Requirements for Truck Shipments

Action	30-Inch Lowboy Trailer (Air Cushion Ride Suspension)	(Tactical/Aircraft Recovery Only)
Remove Mast Mounted Sight	X	X
Fold Main Rotor Blades	X	X
Fold Horizontal Stabilizer	X	X
Remove Weapons and Fold Universal Weapons Pylons	X	X
Rotate Vertical Fin	X	
Preserve Helicopter	X	
Drain, Purge, and Preserve Helicopter Fuel System	X	
Install Aircraft Protective Covering (Appendix G)	X	

Table 4-2. Equipment and Tools Required for Truck Shipment

Nomenclature	Ref.No.
Strap, Webbing	E-1
Trucks, Helicopter Ground Handling	E-10
Clevis Assembly	E-19
Shackle	E-31
Strap, Webbing	E-33
Hoisting Tool T101284-107	
Strap, Nylon	E-37
Rope, Fibrous (25 ft. rope)	E-41
Tow Bar, Aircraft	E-46

4.6 MATERIAL REQUIREMENTS.

Refer to Appendix D for the consumable materials list. Refer to table 4-3 for specific requirements for transportation by truck.

Table 4-3. Consumable Materials Required for Truck Shipment

Nomenclature	Ref No.
Envelope, Packaging	D-1
Cushioning Material	D-9
Heat Shrinkable POL	D-22
Plastic Sheet	D-23
Tape, Pressure Sensitive, Adhesive	D-30

4.7 MANPOWER REQUIREMENTS.

Refer to table 4-4 for estimates for specific configurations.

4.8 FACILITY REQUIREMENTS.

4.8.1 Foul-Weather Shelter. A hangar or other enclosure will be made available for operations in poor weather.

4.8.2 Fire Protection. Firefighting equipment must be on-site and ready for use.

4.8.3 Electrical Grounding. A good electrical ground will be used during preparation and parking of helicopter.

4.8.4 Area Clearance. Area of operation will be cleared of all unneeded equipment and vehicles to allow free movement of helicopter. Cleared area must accommodate the helicopter turning radius when the helicopter ground handling trucks (E-10) are installed. Ground handling will be accomplished as described in Chapter 1.

4.9 HELICOPTER SECURITY.

The helicopter shall have security provided as dictated by local directives. The doors on the helicopter will be locked during shipment.

4.10 HELICOPTER SAFETY.

All local safety directives shall be followed.

Table 4-4. Manpower Requirements for Tactical Truck Shipment

Task	No. Persons	Man-Hours	Elapsed Time
Prepare helicopter for shipment	2	1.0	0.5
Load helicopter	6	3.0	0.5
Tie down helicopter	1	0.5	0.5
Unload helicopter	6	3.0	0.5
Prepare helicopter for flight	2	1.0	0.5

NOTE

Manpower requirements shown here apply to one helicopter.

Apply this data to each helicopter being shipped.

SECTION II. AIRCRAFT RECOVERY AND TACTICAL TRANSPORT

4.11 GENERAL.

For tactical shipment (aircraft recovery) the helicopter may be transported for short distances of up to 100 miles on the M270A1 semi-trailer when prepared for tactical shipment as described in this chapter (figures 4-1 and 4-2).

CAUTION

To prevent damage to the helicopter, the following speeds are to be considered maximum and will be reduced for less than perfect conditions. Road imperfections such as holes and broken pavement will be avoided.

4.11.1 Capabilities and Limitations. The published operating limits for the M270A1 semi-trailer will not be exceeded. In addition, the following speed limits apply, depending on the type of surface:

Unimproved surface — slow walk.
Unpaved improved road — 10 MPH.
Smooth paved road — 20 MPH.

4.11.2 Highway Permits. For highway permits and routing, it is the responsibility of the shipper to ensure all required highway permits are obtained. Permits and routing information are obtained by contacting the supporting transportation office.

4.11.2.1 Responsibilities. The transportation office will provide necessary coordination with the Military Traffic Management Command (MTMC) and local authorities.

4.11.2.2 Loading Characteristics. The shipper will provide the transportation officer with the load characteristics of the shipment (figures 4-1 through 4-3) as described in AR 55-162 for CONUS shipments and local directives for OCONUS shipments. Shipment by this mode will require disassembly (table 4-1).

4.12 PREPARING THE HELICOPTER.

Tactical shipment procedures are intended primarily for the recovery of disabled helicopters to a maintenance site to permit repair or preservation for another mode of shipment or storage. The amount of helicopter preparation required is the decision of the Unit Commander. Factors to be considered are route height restrictions (both legal and physical), terrain, and environmental conditions. Height measurements indicated (figures 4-2 and 4-3) will vary depending on the condition of the skid crosstubes. The operating limits of paragraph 4.11 apply.

4.12.1 Required Resources.

4.12.1.1 Equipment. Equipment and tools required for shipment are listed in table 4-2. Refer to Appendix E for part number and national stock number information.

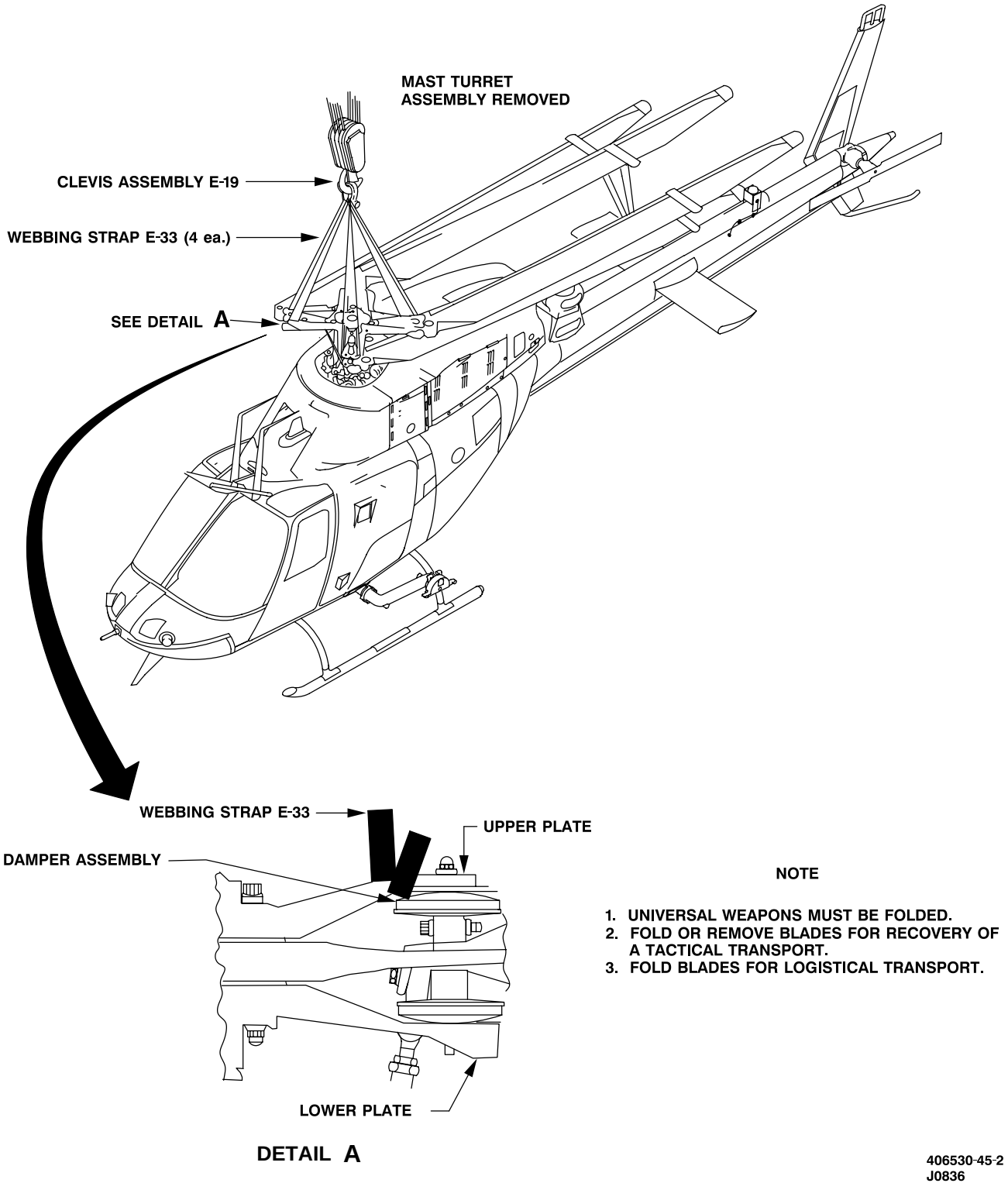
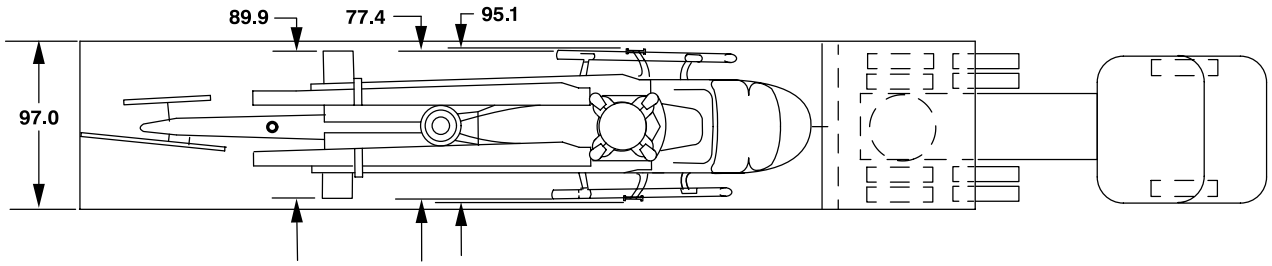
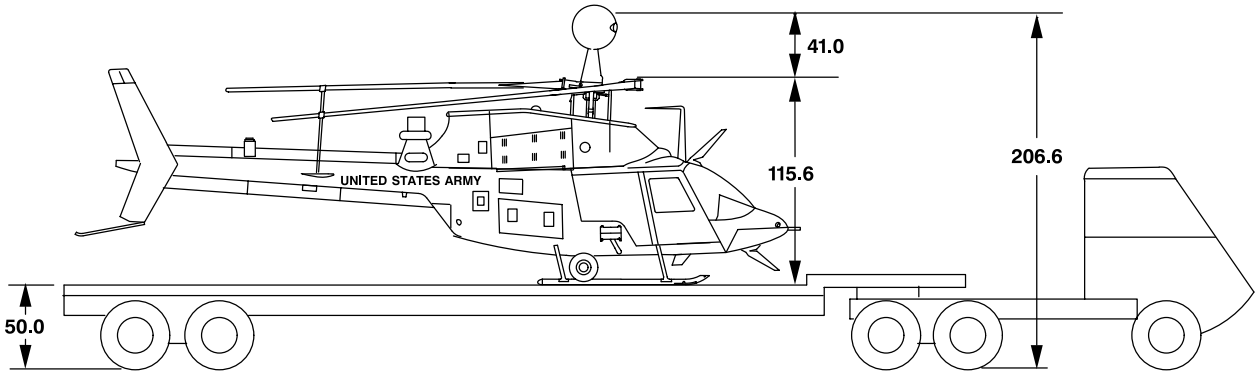


Figure 4-1. Rotor Head Suspension Rigging Configuration — ARK, for Truck Transport



NOTE

All dimensions are in inches.



NOTE

Secure blades in blade racks.

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Figure 4-2. Loading Diagram for M270A1 Military Tactical Transport Semi-Trailer

4.12.1.2 Consumable Materials. Consumable materials required for shipment are listed in table 4-3. Refer to Appendix D for part number, national stock number, and unit of issue information.

4.12.1.3 Manpower Requirements. Table 4-4 lists manpower requirements for tactical transport by truck.

4.12.2 Disassembly.

a. Disconnect battery. Remove quick-disconnect plug and secure to airframe with tape (D-30).

b. If fuel system is intact, adjust fuel level to a maximum of 1/2 full.

c. If fuel system is leaking, preserve it (Chapter 6, Section IV).

d. Remove and prepare mast mounted sight for shipment (TM 9-1240-778-23).

e. Fold or remove main rotor blades (TM 1-1520-248-23) and cushion with cushioning material (D-9).

f. Secure tail rotor to prevent flapping.

g. Prepare helicopter for tiedown (paragraph 1.11.1).

4.12.3 Load Plan. No special procedures are required for a load plan. No equipment is stowed inside the helicopter.

4.13 LOADING.

4.13.1 Rigging.

a. Align transport trailer for loading. Position trailer to the rear of and in line with the helicopter. The rear end of the trailer should be approximately 15 feet to the rear of the helicopter tail.

b. Install webbing strap (E-33).

(1) Place one end of strap (E-33) through clevis assembly (E-19). Pass other end of strap under upper main rotor yoke and back to lifting eye clevis.

(2) Repeat for three more straps.

(3) Secure lifting eye clevis with attaching hardware (refer to figure 4-1).

c. Install fibrous rope (E-41). Install 25-foot fibrous rope (E-41) to front and aft crosstubes to guide helicopter during hoisting.

d. Add ballast to cockpit area as necessary to maintain helicopter in a level attitude during lifting.

4.13.2 Hoisting.

WARNING

During hoisting operations, remain clear of helicopter at all times.

a. Insert crane hook into clevis assembly (E-19) of helicopter sling.

b. Slowly hoist helicopter to a height approximately 1 foot higher than the trailer.

4.13.3 Placement.

CAUTION

To prevent structural damage to helicopter, use care to provide adequate clearance when backing trailer under helicopter.

a. Back trailer under helicopter.

b. Lower helicopter onto trailer. Use tag lines to keep helicopter parallel with trailer center line.

c. Position helicopter on semi-trailer (figure 4-2).

d. Remove tag lines and sling assembly.

4.13.4 Tiedown. Lash helicopter to trailer (paragraph 1.11.2).

4.13.4.1 General. Lash Mast Mounted Sight (MMS) container to trailer.

4.13.4.2 Main Rotor Blades (If Removed). Cushion and lash main rotor blades to trailer.

4.14 UNLOADING.

a. Remove tiedowns.

b. Install webbing strap (E-33) (step 4.13.1 b.).

c. Install fibrous rope (E-41).

d. Hoist helicopter (paragraph 4.13.2).

e. Drive truck from under helicopter.

f. Lower helicopter to ground. Use tag lines to stabilize helicopter while carefully lowering it to the ground.

g. Remove tag lines and sling assembly.

4.15 DEPRESERVATION AND ASSEMBLY.

a. Install MMS (TM 9-1240-778-23).

b. Remove cushioning and install main rotor blades (TM 1-1520-248-23).

c. Perform hard landing inspection (TM 1-1520-248-23).

d. Perform Progressive Phase Maintenance Inspection (PMS) (TM 1-1520-248-PPM).

e. Perform Maintenance Operational Check (MOC) (TM 1-1520-248-MTF).

f. Perform engine vibration check (TM 55-2840-256-23 or TM 1-2840-263-23).

g. Perform Maintenance Test Flight (TM 1-1520-248-MTF).

SECTION III. LOGISTICAL TRANSPORT BY TRUCK

4.16 GENERAL.

4.16.1 Capabilities and Limitations. To prevent damage to helicopter bearings from shock and vibration, both the tractor and trailer will be equipped with an air-ride suspension for long haul shipment. The trailer will be a lowboy flatbed trailer with a maximum height of 30 inches (figure 4-3).

4.16.2 Highway Permits. Refer to paragraph 4.11.2 for highway permit requirements.

4.16.3 Responsibilities. Because there are no air ride suspension flatbed trailers in the Army inventory, the shipper must coordinate with the supporting transportation office to obtain a commercial contract carrier.

4.16.4 Load Characteristics. The shipper will provide the transportation officer with the load characteristics of the shipment as described in AR 55-162 for CONUS shipments and local directive for OCONUS shipments.

4.17 PREPARING THE HELICOPTER.

4.17.1 Required Resources.

4.17.1.1 Equipment. Equipment and tools required for shipment are listed in table 4-2. Refer to Appendix E or part number and national stock number information.

4.17.1.2 Consumable Materials. Consumable materials required for shipment are listed in table 4-3. Refer to Appendix D for part number, national stock number, and unit of issue information.

4.17.1.3 Manpower Requirements. Table 4-5 lists manpower requirements for logistical transport by truck.

4.17.2 Preservation and Packaging.

a. Refer to Chapter 6 for detailed procedures for preserving the helicopter and its components.

b. Refer to Appendix G to apply helicopter protective covering.

WARNING

Prior to performing any preservation or disassembly, ensure that all helicopter armament systems are cleared and safe.

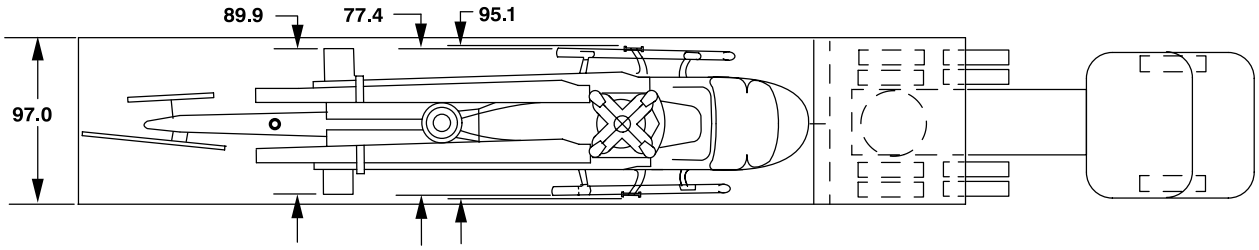
4.17.3 Helicopter Preparation.

a. Ground helicopter (TM 1-1520-248-23).

b. Drain, purge, and preserve fuel system (Chapter 6).

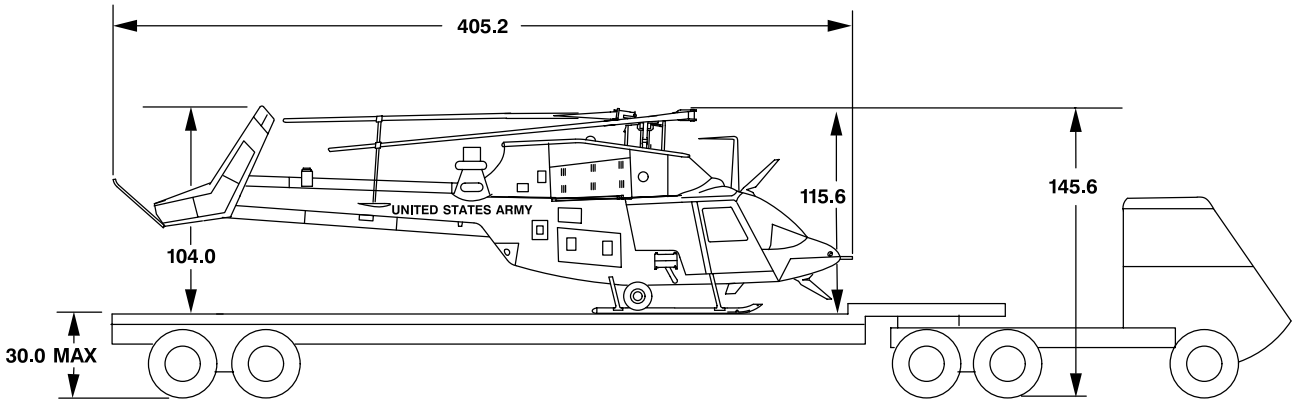
c. Clean helicopter (Chapter 6).

d. Preserve helicopter for intermediate storage (Chapter 6).



NOTE

All dimensions are in inches.



NOTE

Secure blades In blade racks.

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Figure 4-3. Loading Diagram for Commercial Air-Ride Tractor and Lowboy Semi-Trailer

Table 4-5. Manpower Requirements for Logistical Truck Transport

Task	No. Persons	Man Hours	Elapsed Time
Prepare helicopter for shipment	2	1.0	0.5
Load helicopter	6	3.0	0.5
Tie down helicopter	1	0.5	0.5
Unload helicopter	6	3.0	0.5
Prepare helicopter for flight		Not applicable	
Install heat shrink protective covering	3		1.0

NOTE

Helicopter preparation for flight does not apply for logistical truck transport.

The purpose of this type of transport is to recover a disabled helicopter.

e. Disconnect battery and secure quick-disconnect to airframe with tape (D-30).

f. Lubricate and service helicopter (except fuel). Refer to lubrication chart (TM 1-1520-248-23).

g. Prepare helicopter for tiedown (paragraph 1.11.1).

h. Install protective (flyaway) covers (TM 1-1520-248-23).

i. Remove and prepare mast mounted sight for shipment (TM 9-1240-778-23).

j. Fold main rotor blades (TM 1-1520-248-23).

k. Remove weapons and fold universal weapons pylons (TM 9-1090-214-23 & P).

l. Ensure all logbook entries are complete. Place logbook in waterproof type packaging envelope (D-1) and secure to pilot seat with seat belt.

m. Remove main rotor blades. Preserve (Chapter 6) and install in helicopter shipping and storage container (E-8).

n. Weigh helicopter (paragraph 2.9).

o. Apply heat shrink film protective covering. Refer to Appendix G. Mark center of balance on side of helicopter.

4.17.4 Load Plan. No special procedures are required for stowing equipment in helicopter for shipment. No load plan is required.

CAUTION

To prevent vibration damage to helicopter, and ballast to trailer if necessary. Ensure that truck trailer is equipped with sufficient weight to activate air ride suspension.

4.18 LOADING.

Load helicopter (paragraph 4.13).

4.19 UNLOADING.

Unload helicopter (paragraph 4.14).

4.20 DEPRESERVATION AND ASSEMBLY.

a. Remove heat shrink protective covering (Appendix G).

b. Perform helicopter inventory (TM 1-1520-248-23).

c. Depreserve helicopter (Chapter 6).

d. Complete depreservation and assembly (paragraph 4.15).

CHAPTER 5

CRATED AND INTERMODAL CONTAINER SHIPMENT

SECTION I. CRATED SHIPMENT

5.1 CHARACTERISTICS.

The following paragraphs describe handling, security, facility, and resource requirement for crated shipment.

5.1.1 Handling Methods. No special handling of crate is required.

5.1.2 Security Requirements. The helicopter or crate shall have security provided as dictated by local directives.

5.1.3 Facility Requirements.

a. A hangar or other enclosure will be used for crafting in foul weather.

b. Firefighting equipment shall be on site and ready for use.

5.1.4 Required Resources.

5.1.4.1 Equipment. Equipment and tools required for shipment are listed in table 5-1. Refer to Appendix E for part number and national stock number information.

Table 5-1. Equipment and Tools Required for Crated Shipment

Nomenclature	Ref No.
Trucks, Helicopter Ground Handling	E-10
Transmission Cover Lift Plate	E-47

5.1.4.2 Consumable Materials. Consumable materials required for shipment are listed in table 5-2. Refer to Appendix D for part number, national stock number, and unit of issue information.

5.1.4.3 Manpower Requirements. Table 5-3 lists manpower requirements for crated shipment.

5.2 PREPARING THE HELICOPTER.

5.2.1 Cleaning. Prior to disassembly, clean helicopter per Chapter 6.

Table 5-2. Consumable Materials Required for Crated Shipment

Nomenclature	Ref No.
Barrier Material Greaseproof, Waterproof, Flexible	D-2
Barrier Material Greaseproof, Flexible	D-3
Corrosion Preventive Compound, Cold Application	D-7
Corrosion Preventive Compound, Cold Application	D-8
Cushioning Material	D-9
Cushioning Material, Packaging, Plastic Polyurethane,	D-12
Hydraulic Fluid, Petroleum Base	D-17
Plastic Strip	D-29
Tape, Pressure Sensitive, Adhesive	D-30

5.2.2 Disassembly. Remove components shown in table 5-4. All removed components must be tagged with serial number of helicopter immediately after removal.

5.2.3 Preservation. Prepare helicopter for intermediate storage refering to TM 1-1520-248-23, Appendix E and the following steps.

NOTE

Lubricate helicopter refering to lubrication chart (TM 1-1520-248-23).

a. General. Preserve drive system, engine, fuel system, hydraulic system, main rotor blades, main rotor head and mast assembly, tail rotor assembly, batteries, instruments, transparent plastic surfaces, and airframe. Unless otherwise specified, coat bolts, washers, etc., with a light film of cold application corrosion preventive compound (D-8) and reinstall as removed from major component. Use barrier material (D-2 or D-3) and tape (D-29) unless otherwise specified.

Table 5-3. Manpower Requirements for Crated Shipment

Task	No. Persons	Man-Hours	Elapsed Time
Prepare helicopter for shipment	2	1.0	0.5
Disassemble helicopter (refer to table 5-4)	4	32.0	8.0
Preserve helicopter			
a. Engine	2	1.0	0.5
b. Transmission	1	0.5	0.5
c. Tail rotor gearbox	1	0.5	0.5
d. Fuel system	1	1.0	1.0
e. Mast mounted sight	1	0.5	0.5
f. Hydraulic system	1	0.5	0.5
g. Main rotor blades	1	0.5	0.5
h. Main rotor hub	1	0.5	0.5
i. Mast and swashplate	1	0.5	0.5
j. Landing gear	2	2.0	1.0
k. Tail rotor assembly	1	0.5	0.5
l. Horizontal stabilizer	1	1.0	1.0
m. Vertical fin	1	1.0	1.0
n. Taillight support assembly	1	0.5	0.5
o. Tailboom	2	2.0	2.0
p. Exhaust stacks	1	0.5	0.5
q. Fuselage	2	6.0	3.0
r. Universal weapons pylons	1	1.0	1.0
Crate Helicopter			
a. Mast and swashplate	2	1.0	0.5
b. Tail rotor	1	0.5	0.5
c. Horizontal stabilizer	2	1.0	0.5
d. Vertical Fin	2	1.0	0.5
e. Universal weapons pylons	2	1.0	0.5
f. Main rotor blades	2	1.0	0.5
g. Main rotor hub	1	0.5	0.5
h. Ground handling wheel	1	0.5	0.5
i. Exhaust stacks	1	0.5	0.5
j. Tailboom	2	1.0	0.5
Uncrate helicopter	2	10.0	5.0
Assemble helicopter	4	32.0	8.0
Return helicopter to flyable status	2	1.0	0.5

Table 5-4. Disassembly Requirements for Crated Shipment

Components to be Removed	TM 1-1520-248-23	TM 9-1240-778-23
Mast mounted sight	– – –	Chapter 3
Main rotor blades	Chapter 5	– – –
Main rotor hub	Chapter 5	– – –
Mast and swashplate	Chapter 6	– – –
Tail rotor	Chapter 5	– – –
Lower wire cutter	Chapter 2	– – –
Vertical fin	Chapter 2	– – –
Horizontal stabilizer	Chapter 2	– – –
Taillight support	Chapter 2	– – –
Tailboom	Chapter 2	– – –
Exhaust stacks	Chapter 4	– – –
Batteries	Chapter 9	– – –
Landing gear	Chapter 3	– – –
Universal weapons pylons	TM 9-1090-214-23 & P	– – –

NOTE

- Perform only the preservation procedures referenced here in the following steps, which are found in the PRESERVATION AND PACKING OF COMPONENTS section of Chapter 6.
- The sequence of disassembly, preservation, and packaging prescribed herein is arranged for maximum operational efficiency, however, it is not imperative that the work be accomplished in the order listed.
- Crate construction should be completed prior to beginning this procedure.

b. Engine, Transmission, and Tail Rotor Gearbox. Preserve engine, transmission, and tail rotor gearbox. Refer to paragraph 6.9.2.

c. Fuel System. Drain, purge, and preserve fuel system. Refer to paragraph 6.9.3.

d. Mast Mounted Sight. Preserve mast mounted sight (TM 9-1240-778-23).

e. Batteries. Prepare batteries for shipment. Refer to paragraph 6.9.4.

f. Hydraulic System.

(1) Fill hydraulic reservoir to normal operating level, check hydraulic system for leaks, and repair as necessary (TM 1-1520-248-23).

(2) Coat actuator control rods on side of engine with petroleum base hydraulic fluid (D-17).

g. Main Rotor Blades.

(1) Prepare rotor blades for shipment. Refer to paragraph 6.9.6.

(2) Secure blades in main rotor blade container (figure H-6).

h. Main Rotor Hub.

(1) Coat blade retaining, bolt, washers, and nuts sparingly with cold application corrosion preventive compound (D-6) and replace in grip exactly as removed. Coat splines, threads, blade retention bolt holes, and other exposed metal surfaces on grip with same compound.

(2) Wrap assembly in greaseproof flexible barrier material (D-3) and secure wrapping with pressure sensitive adhesive tape (D-30). Place assembly in container (figure H-7). Cushion adequately with plastic polyurethane packaging cushioning material (D-12). Secure container in export crate (figure H-5).

i. Mast and Swashplate Assembly.

CAUTION

- Do not handle mast, particularly around the splined area, with bare hands. Use gloves when contacting this highly critical component.
- Nicks, scratches, or corrosion cannot be tolerated on this highly finished, critical part. Transmission and bearing end of mast must be kept clean to prevent dirt from entering transmission at time of reassembly.
- To prevent foreign object damage (FOD), the transmission cover lift plate (E-47) (figure 5-1) shall be installed immediately upon mast removal. The transmission shall never be left open.

(1) Preserve mast and swashplate assembly (paragraph 6.9.7).

(2) Place in container (figure 7-1) and secure in export crate (figure H-5).

j. Landing Gear.

(1) If helicopter ground handling trucks (E-10) are to be shipped with helicopter, place wheel assemblies in container (figure H-8) and secure to floor of export crate (figure H-5).

(2) Attach suitable hoist to transmission cover lift plate (E-47).

(3) Lower helicopter slowly until it rests on fuselage fixture mounted to floor of export crate (figure H-5).

(4) Disassemble skid tubes and crosstubes (TM 1-1520-248-23).

(5) Wrap skid tubes and crosstubes in flexible greaseproof waterproof barrier material (D-2) and secure with pressure sensitive adhesive tape (D-30).

(6) Secure skid tubes and crosstubes to wall of export crate (figure H-5).

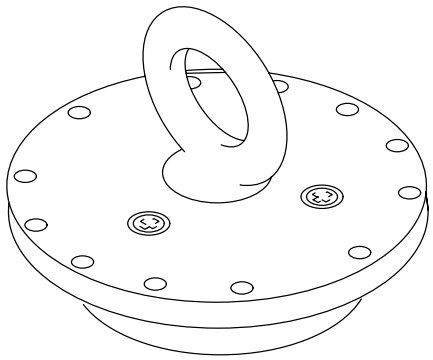

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Figure 5-1. Transmission Cover Lift Plate

k. Tail Rotor Assembly. (Refer to paragraph 6.9.11).

CAUTION

Care must be taken not to coat Teflon bearings with preservative compound.

(1) Remove tail rotor hub and blade assembly and cost splined surfaces and exposed metal surfaces with cold application corrosion preventive compound (D-7).

(2) Wrap assembly in flexible greaseproof waterproof barrier material (D-2), and secure with pressure sensitive adhesive tape (D-30). Cushion adequately with cushioning material (D-9).

(3) Pack in designated container (figure 7-2) and secure in export crate (figure H-5).

l. Horizontal Stabilizer.

(1) Preserve horizontal stabilizer (paragraph 6.9.8).

(2) Place preserved and packaged horizontal stabilizer in designated container (figure 7-3) and secure in export crate (figure H-5).

m. Vertical Fin.

(1) Preserve vertical fin (paragraph 6.9.9).

(2) Place preserved and packaged vertical fin in designated container (figure 7-4) and secure in export crate (figure H-5).

n. Taillight Support Assembly. Preserve taillight support assembly (paragraph 6.9.10).

o. Tailboom.

(1) Preserve tailboom (paragraph 6.9.12).

(2) Install in tailboom container (figure H-9).

(3) Secure tailboom container in export crate (figure H-5).

p. Exhaust Stacks. Prepare exhaust stacks (paragraph 6.9.13).

q. Fuselage. Prepare fuselage (paragraph 6.9.16).

r. Universal Weapons Pylons (paragraph 6.9.18 and figure 7-5).

5.3 CRATING.

5.3.1 Crate Construction. Construct one demountable plywood sheathed crate (Export Crate) (figure H-5). Construct containers (Chapter 7).

a. Nailing. When nailing flat faces of two pieces of lumber together, the combined thickness of which is 3-1/8 inches or less, nails will be long enough to pass through joint, and will be clinched not less than 1 inch. When pieces of different thicknesses are joined, nail heads will be in thinner piece. When nailing flat faces of two pieces of lumber together, the combined thickness of which exceeds 3-1/8 inches, and when nailing flat faces of one or more pieces to edge or end face of another piece, nails will be as long as practicable without splitting pieces. The portion of nail in thicker piece will be two to two and one-half times the length of nail in thinner piece for ten-penny nails and smaller; and not less than 1 inch for twelve-penny nails and larger. Generally, in crate construction, no nail should be driven closer than the thickness of piece from edge of lumber. No two nails in same row should be closer than 3 inches. Nails that are not clinched will be cement coated or etched.

b. Use of Lag Screws. To assemble crate with large screws, in all instances drill lead holes and turn in lag screws with a plain washer under head of each. Do not drive by hammering or other impact.

c. Bolted Connections. After Nuts have been tightened, coat exposed bolt threads with thick paint or bituminous compound to resist loosening of nuts.

5.3.2 Packing. Pack helicopter into export crate (Chapter 6). Perform only the packing procedures.

5.3.3 Marking. Apply markings in accordance with MIL-STD-129N. Include serial number of helicopter in container markings. Identify each disassembled part or assembly by marking or tagging it with correct part or assembly number and serial number of helicopter from which removed.

a. Use No Hooks. Mark each side and end of crates with 2 inch stenciled letters: USE NO GRAB HOOKS.

b. Opening Instructions. Stencil instructions for opening in 1 inch letters on front end of each crate:

(1) REMOVE ALL LAG SCREWS FROM SIDES AND END ADJACENT TO TOP.

(2) REMOVE TOP.

(3) REMOVE ALL LAG SCREWS IN THIS END.

(4) REMOVE THIS END.

c. Center of Balance. Indicate center of balance of loaded crate by a painted black strip 1 inch wide on each side for crate, extending upward 3 inches from lower edge of sheathing. Stencil: CENTER OF BALANCE in 1 inch letters adjacent to strip.

d. Sling Points. Indicate sling points by conspicuous arrows and SLING POINT in 1 inch letters.

e. Preservation Date; Stencil in 1 inch letters adjacent to inspection doors: PRESERVED FOR INTERMEDIATE STORAGE. REPRESERVE IF NOT ACTIVATED BY... followed by 180 days after the helicopter was preserved.

f. MIL-STD-129N Preservation Method and Level of Protection. Preservation method and level of protection marking required by MIL-STD-129N are only applicable to marking of crates. The marking will be C/C.

5.4 UNPACKING AND ASSEMBLY.

5.4.1 Uncrating. No special unpacking procedures are required.

5.4.2 Assembly. Install components shown in table 5-1.

5.4.3 Depreservation. Remove helicopter from intermediate storage (TM 1-1520-248-23, Appendix E).

5.4.4 Returning Helicopter to Flyable Status. Upon completing depreservation, helicopter is in flyable status.

SECTION II. INTERMODAL SHIPMENT

5.5 GENERAL.

Intermodal container shipment requirements for the OH-58D/OH-58D(R) helicopter are for the same as crated shipment.

CHAPTER 6

PRESERVATION AND PACKAGING

SECTION I. GENERAL

6.1 GENERAL.

Before the helicopter is transported, it must be preserved and its components preserved and packaged. Types of transport include air, truck, and sea vessel. In addition to the mode of transportation involved, the length of time a helicopter shall remain inactive is a primary concern.

6.1.1 Cargo Aircraft. If a helicopter is to be shipped by cargo aircraft and will be operational within 14 days, minimal preservation is required. Items that require preservation and/or packaging are noted in Chapter 2. If the helicopter may remain inactive for more than 14 days, the preservation procedures in this chapter apply. Helicopter cleaning is highly recommended prior to transport by cargo aircraft.

6.1.2 Vessel Shipment. The cleaning, preservation, and packaging requirements in this chapter apply except those noted **"**Container Shipment Only**"**. See Chapter 3, Section V for exclusions pertaining to Landing Platform Helicopter (LPH) operations.

6.1.3 Truck Shipment. Logistical truck transport requires the cleaning, preservation, and packaging specified in this chapter except for those noted **"**Container Shipment Only**"**.

SECTION II. HELICOPTER CLEANING

6.2 GENERAL.

Cleaning the helicopter before preparing it for shipment is important because residue from exhaust gases, dirt, and contamination of any kind will accelerate corrosion, whether coated with preservative compound or not.

6.3 RESOURCES.

6.3.1 Equipment. Equipment and tools required for preservation and packaging are listed in table 6-1. Refer to Appendix E for part number and national stock number information.

Table 6-1. Equipment and Tools Required for Preservation and Packaging

Nomenclature	Ref No.
Combustible Gas Indicator Set	E-21
Transmission Cover Lift Plate	E-47

6.3.2 Materials. Consumable materials required for preservation and packaging are listed in table 6-2. Refer to Appendix D for part number, national stock number, and unit of issue information.

Table 6-2. Consumable Materials Required for Preservation and Packaging

Nomenclature	Ref No.
Barrier Material, Greaseproof, Waterproof, Flexible	D-2
Barrier Material, Greaseproof, Flexible	D-3
Polish, Plastic	D-4
Corrosion Preventive Compound, Cold Application	D-6
Corrosion Preventive Compound, Cold Application	D-7
Corrosion Preventive Compound, Cold Application	D-8
Cushioning Material, Polypropylene	D-13
Cushioning Material, Packaging,	D-10
Cushioning Material, Packaging	D-11
Box, Shipping	D-15
Hydraulic Fluid, Petroleum Base	D-17
Lubricating Oil Aircraft, Turbine	D-20
Tag, Shipping	D-28
Drycleaning Solvent	D-14
Tape, Pressure Sensitive, Adhesive	D-30
Envelope, Packaging	D-1

6.4 HELICOPTER CLEANING PROCEDURES.

a. Clean helicopter interior, exterior, and Plexiglass (TM 1-1520-248-23, Chapter 1).

b. Treat aluminum and magnesium alloy corrosion (TM 1-1500-204-23, Chapter 3).

c. Apply protective paint finish to affected area immediately after chemical treatment is dry (TM 55-1500-345-23).

SECTION III. PRESERVATION

6.5 GENERAL.

Preservation should be accomplished in uninterrupted series of operations. When periods fo interruption are necessary, temporary protection shall be provided for partially processed items as required to avoid contamination. The length of time the helicopter will be inactive and the facilities and personnel available will determine which of the following categories of storage will be used:

a. Flyable Storage (No time limit). Flyable storage is the procedure prescribed to maintain a stored helicopter in an operable condition. Next to daily use, this keeps the helicopter in the best possible condition. It does, however, require attention periodically.

b. Short Term Storage (From 1 to 45 days). This type of storage is used to store a helicopter up to 45 days with very little attention during the storage period.

c. Intermediate Storage (From 46 to 180 days). A helicopter that will be inactive for more than 45 days, but not exceeding 180 days, shall be prepared and maintained in intermediate storage.

6.6 RESOURCES.

6.6.1 Equipment. Refer to table 6-1.

6.6.2 Materials. Refer to table 6-2.

6.6.3 Manpower Requirements. Table 6-3 lists manpower requirements for preservation of helicopters.

6.7 PRESERVATION PROCEDURES.

Refer to TM 1-1520-248-23, Appendix E, for helicopter preservation.

Table 6-3. Manpower Requirements for Preservation of Helicopter

Task	No. Persons	Man-Hours	Elapsed Time
Flyable storage	2	4.0	2.0
Short term storage	2	8.0	4.0
Intermediate storage	2	28.0	14.0

SECTION IV. PRESERVATION AND PACKAGING OF COMPONENTS

6.8 RESOURCES.

6.8.1 Manpower Requirements. Table 6-4 lists manpower requirements for preserving and packaging helicopter components.

6.8.2 Packaging. Containers used for transportability are locally manufactured. Refer to Chapter 7 for procedures required for container construction.

Table 6-4. Manpower Requirements for Preservation and Packaging of Helicopter

Task	No. Persons	Man-Hours	Elapsed Time
Preserve and/or package:			
a. Engine	2	1.0	0.5
b. Transmission	1	0.5	0.5
c. Gearboxes	1	0.5	0.5
d. Fuel System	1	0.5	0.5
e. Batteries	1	0.5	0.5
f. Hydraulic system	1	0.5	0.5
g. Main rotor blades	1	0.5	0.5
h. Mast and swashplate	1	0.5	0.5
i. Horizontal stabilizer	1	1.0	1.0
j. Vertical fin	1	1.0	1.0
k. Taillight support assembly	1	0.5	0.5
l. Tail rotor	1	0.5	0.5
m. Tailboom	2	2.0	1.0
n. Exhaust stacks	1	0.5	0.5
o. Skid landing gear	1	0.5	0.5
p. Lower wire cutter	1	0.5	0.5
q. Fuselage	2	6.0	3.0
r. Avionics	1	0.5	0.5
s. Universal weapons pylons	1	1.0	1.0

6.9 PRESERVATION AND PACKAGING PROCEDURES — COMPONENTS.

NOTE

Lubricate helicopter refering to lubrication chart (TM 1-1520-248-23, Chapter 1).

6.9.1 General. This section covers preservation of drive system, engine, fuel system, hydraulic system, main rotor blades, main rotor head and mast assembly, tail rotor assembly, batteries, instruments, transparent plastic surfaces, universal weapons pylons, and airframe. Unless otherwise specified, coat bolts, washers, etc., with a light coat of cold application corrosion preventive compound (D-7) and reinstall as removed from major component. Use flexible greaseproof waterproof barrier material (D-2) flexible greaseproof barrier material (D-3) and pressure sensitive adhesive tape (D-30) unless otherwise specified. The sequence of disassembly, preservation, and packaging prescribed here in is arranged for maximum operational efficiency; however, it is not imperative that the work be accomplished in the order listed.

6.9.2 Engine, Transmission, and Gearboxes.

CAUTION

Contact preservatives of any kind shall not be used internally or externally on compressor section.

a. Exercise every precaution to keep engine and its accessories clean. Keep air intake ducts, plenum chambers, and compressor inlet screens clean and free from any foreign materials. When external cleaning is required, use drycleaning solvent (D-14).

b. Service oil tank, transmission, and tail rotor gearbox to normal operating level with standard operating oil.

NOTE

- APU can be used for starting if available.
- Ground runup, when preparing engine, will complete necessary preservation of transmission or gearboxes.

c. If engine has not been started within 24 hours, start it and run (TM 1-1520-248-10). Accelerate engine to 75 percent of normal operating speed and operate until oil temperature reaches 88 °F (31 °C), but for no more than 5 minutes.

WARNING

Ignition system shall be off for at least 5 minutes before removing igniter lead.

d. Disconnect cable to ignition exciter (TM 1-1520-248-23, Chapter 4).

e. Cover air intake, exhaust stacks, and all engine openings with flexible greaseproof barrier material (D-3) and secure with plastic strip (D-29) if fuel system is not to be preserved.

NOTE

Fuel and oil openings shall not be covered with tape. Tape adhesive is soluble in petroleum compounds, which can cause contamination.

f. Tag engine and cyclic stick as follows: LUBRICATION SYSTEM PRESERVED WITH OPERATING LUBRICANT. Record extent of engine preservation in logbook.

NOTE

If helicopter is scheduled for "FLY-OFF at DESTINATION", fuel tanks shall be filled to 50 percent of capacity with JP-5 fuel, and a tag attached to fuel filler cap so stating.

6.9.3 Fuel System. Fuel system may be preserved by one of two methods. The method to be used is determined by availability of preservative oil, equipment, or inert gas.

a. Primary Method. If an oil tank of at least 90 gallon capacity and an adequate supply of aircraft turbine lubricating oil (D-20) are available, preserve as follows:

WARNING

- To prevent injury to personnel while preparing fuel tanks for shipment, ensure helicopter is grounded and work stands are equipped with copper or zinc static discharge plates.
- Fuel cells shall not be drained and allowed to stand empty overnight.
- Refer to TM 1-1520-248-23 and FM 10-67-1 for precautions to observe when fueling and defueling helicopter.
- A fire truck must be physically present during defueling and fuel cell operations.

(1) Defuel helicopter fuel cell (TM 1-1520-248-23, Chapter 1).

(2) The flashpoint of empty fuel cells may be reduced by pouring 5 gallons of diesel fuel into fuel cell. Allow diesel fuel to remain in cell 10-15 minutes before draining.

NOTE

Reduction of flashpoint in purging operations reduces the amount of lubricating oil necessary when an assembly line operation is set up.

(3) When cell is completely drained, close drain valve and fill cell with aircraft turbine lubricating oil (D-20). Allow oil to remain in fuel cell for at least 8 to 10 hours, or overnight.

(4) Disconnect igniter lead at igniter, and place a plastic cap over the ceramic connector (TM 55-2840-256-23 or TM 1-2840-263-23).

CAUTION

Observe starter limits (TM 1-1520-248-10).

(5) Move twist grip to IDLE DETENT. Motor engine with starter (use APU if available) and continue until fuel-free oil flows overboard from engine combustor fuel drain line. Move twist grip to OFF position and cease motoring engine.

(6) Connect igniter and exciter input leads (TM 55-2840-256-23 or TM 1-2840-263-23).

(7) Remove oil from fuel cell.

NOTE

Oil can be saved to flush other cells.

(8) After 2 or 3 hours, test fuel cells with combustible gas indicator set (E-21) for fuel vapors. If an unsafe condition exists, discard drained lubricating oil, and reflush with fresh oil until a safe reading is obtained.

(9) Attach tag to cyclic stick and fuel filler cap stating: THIS FUEL SYSTEM HAS BEEN PRESERVED WITH MIL-L-6081, GRADE 1010 LUBRICATING OIL. NO FLUSHING REQUIRED DURING DEPRESERVATION; FILL CELL WITH STANDARD OPERATING FUEL.

b. Alternate Method. If proper equipment is not available, or lubricating oil supply is limited, use the following procedure to preserve fuel system:

(1) Drain all fuel from fuel system (TM 1-1520-248-23, Chapter 1).

(2) Pour approximately 5 gallons of lubricating oil into fuel cell.

(3) Drain oil from fuel cell.

CAUTION

To prevent moisture from accumulating in the fuel cell, only dehydrated air shall be used.

(4) With drains and vents open and filler cap off, introduce into filler neck a reduced pressure air hose supplying air through a 1/4-inch orifice at approximately 50 psi. Purge fuel cell for approximately 1/2 hour. Close all drains.

(5) Introduce into fuel filler neck carbon dioxide or nitrogen from a tank set to discharge at a rate of not more than 1 pound of purging gas per minute.

(6) Use at least 3 pounds of carbon dioxide or nitrogen to purge fuel cells.

(7) After purging fuel cell, wait approximately 3 hours, then test cell for dangerous fuel vapors with combustible gas indicator. If an unsafe condition exists, use additional purging gas until a satisfactory test is made.

(8) Preserve fuel cell by coating all interior surfaces with aircraft turbine lubricating oil (D-20).

(9) Attach tag to cyclic stick and fuel filler cap stating: FUEL SYSTEM HAS BEEN PRESERVED WITH MIL-L-6081, GRADE 1010 LUBRICATING OIL. NO FLUSHING REQUIRED DURING DEPRESERVATION. FILL CELL WITH STANDARD OPERATING FUEL.

6.9.4 Batteries.

WARNING

To avoid injury or death to personnel, battery switches on overhead panel shall be in OFF position prior to working on batteries.

CAUTION

- To avoid damage to instruments, battery switches on overhead panel shall be in OFF position prior to working on batteries.
- The nickel-cadmium battery contains an electrolyte composed of potassium hydroxide, a strong alkali, which will corrode both aluminum and magnesium.

a. If serviceable, the nickel-cadmium battery will not deteriorate if left standing for a long period of time whether wet or dry, charged or uncharged; therefore, ship all nickel-cadmium batteries fully charged and wet.

WARNING

- Extreme care should be taken to keep electrolyte from coming into contact with clothing, skin, or eyes.
- Contact of any chemicals with battery may cause explosion.

b. Remove each battery and thoroughly clean its exterior, battery shelf, quick-disconnect plug, vent hoses, and cables with water and nonmetallic stiff bristle brush. Rinse with clean water and allow to dry.

c. Install vent hoses and install each battery.

d. Cover quick-disconnect receptacle on side of each battery with pressure sensitive adhesive tape (D-30), cover lug with flexible greaseproof waterproof barrier material (D-2), and secure plug to airframe with pressure sensitive adhesive tape (D-30).

6.9.5 Hydraulic System.

a. Fill hydraulic reservoir to normal operating level, check system for leaks, and repair as necessary.

b. Coat exposed portions of hydraulic actuator rods with a light coat of petroleum base hydraulic fluid (D-17).

6.9.6 Main Rotor Blades (When Removed).

CAUTION

To avoid damage when removing blade, do not change position of latch nut on leading edge as it determines alignment position of blade.

a. Color code all parts for ease of reassembly, then remove main rotor blade from grips.

b. Apply cold application corrosion preventive compound (D-7) sparingly to bolt holes in root end of blade and all exposed metal surfaces.

c. Wrap root end and that portion of blade which rests within contours with flexible greaseproof waterproof barrier material (D-2) and secure with pressure sensitive adhesive tape (D-30).

d. Pack blades in shipping container. See figure H-6.

6.9.7 Mast and Swashplate (Container Shipment Only).

CAUTION

To prevent Foreign Object Damage (FOD) transmission shall never be left open.

a. Preserve main rotor mast splines and threads with cold application corrosion preventive compound (D-7).

b. Wrap mast and swashplate with flexible greaseproof waterproof barrier material (D-2) and secure wrap with pressure sensitive adhesive tape (D-30).

c. Pack mast and swashplate in suitable shipping container. Manufacture per Chapter 7.

6.9.8 Horizontal Stabilizer.

a. Remove horizontal stabilizer (TM 1-1520-248-23, Chapter 2). Place screws and washers in a packaging envelope (D-1) and attach to tailboom with pressure sensitive adhesive tape (D-30).

b. Coat exposed metal surfaces with cold application corrosion preventive compound (D-7).

c. Wrap stabilizer with flexible greaseproof waterproof barrier material (D-2) and secure wrap with pressure sensitive adhesive tape (D-30). Install stabilizer in shipping container (Chapter 5). Adequately cushion with polypropylene packaging cushioning material (D-13).

6.9.9 Vertical Fin (Container Shipment Only).

a. Remove vertical fin (TM 1-1520-248-23, Chapter 2). Install mounting bolts and washers on tailboom.

b. Coat exposed metal surfaces with cold application corrosion preventive compound (D-8).

c. Wrap vertical fin with flexible greaseproof waterproof barrier material (D-2) and secure with pressure sensitive adhesive tape (D-30). Install in shipping container (Chapter 5). Adequately cushion with polypropylene cushioning material (D-13).

6.9.10 Taillight Support Assembly.

a. Remove taillight support assembly (TM 1-1520-248-23, Chapter 2). Cushion adequately and stow in crew compartment.

b. Install screws and washers in tailboom.

6.9.11 Tail Rotor Assembly.

a. Remove tail rotor assembly (TM 1-1520-248-23, Chapter 5).

b. Wrap entire tail rotor assembly, including tail rotor blades, with flexible greaseproof barrier material (D-3), and secure with pressure sensitive adhesive tape (D-30) so as to firmly secure, but not damage them.

c. Install tail rotor assembly in shipping container (Chapter 5). Adequately cushion container with polypropylene cushioning material (D-13).

6.9.12 Tailboom (Container Shipment Only).

a. If shipment is by rail, perform the following:

(1) Remove tailboom (TM 1-1520-248-23, Chapter 2).

(2) Coat attachment fittings, bolts, washers, nuts, and exposed metal surfaces with cold application corrosion preventive compound (D-7), and install hardware in tailboom exactly as removed.

(3) Coat tail rotor shaft, including splines, with cold application corrosion preventive compound (D-7), wrap with flexible greaseproof waterproof barrier material (D-2), and secure with pressure sensitive adhesive tape (D-30).

b. If the shipment is to be by crate, perform the following:

CAUTION

To prevent damage to tailboom, ensure that care is taken when handling after removal.

(1) Remove tailboom from fuselage (TM 1-1520-248-23, Chapter 2).

(2) Place bolts, washers and nuts in a waterproof type packaging envelope (D-1), identify, and attach to tailboom.

6.9.13 Exhaust Stacks (Container Shipment Only).

a. Remove exhaust stacks (TM 1-1520-248-23, Chapter 4). Install clamp on exhaust stack flange.

b. Wrap the exhaust stacks in flexible greaseproof waterproof barrier material (D-2), cushion as necessary with polypropylene cushioning material (D-13), and secure with pressure sensitive adhesive tape (D-30). Stow exhaust stacks in ground handling wheel container (Chapter 5).

c. Cover engine exhaust ports with flexible greaseproof barrier material (D-3) and secure with pressure sensitive adhesive tape (D-30).

6.9.14 Skid Landing Gear. Apply heat shrink protective covering (Appendix G).

6.9.15 Lower Wire Cutter.

a. Remove lower wire cutter (TM 1-1520-248-23, Chapter 2).

b. Wrap lower wire cutter in flexible greaseproof waterproof barrier material (D-2), cushion as necessary with polypropylene cushioning material (D-13), and secure with pressure sensitive adhesive tape (D-30). Stow inside crew compartment.

6.9.16 Fuselage.

CAUTION

To prevent damage, ensure that tape does not contact plexiglass.

a. Cover all plexiglass with flexible greaseproof barrier material (D-3) and secure with pressure sensitive adhesive tape (D-30), ensuring that no tape contacts plexiglass.

b. Coat all exposed metal surfaces with cold application corrosion preventive compound (D-7) and cover with flexible greaseproof barrier material (D-3) secured with pressure sensitive adhesive tape (D-30).

c. Group all technical manuals, handbooks, equipment logbooks, maintenance and historical records (required to be shipped with the helicopter as described in AR 750-31 and DA Pamphlet 738-751, first aid packs, magnetic compass, headsets, microphones, clocks, and fire extinguishers. Wrap in flexible greaseproof waterproof barrier material (D-2) and pack in a shipping box (D-15) conspicuously marked to identify contents. Place container in pilot seat, and secure in place using seat belt and shoulder harness. Roll loose ends of belts, and secure with pressure sensitive adhesive tape (D-30). Secure copilot seat belt and shoulder harness in like manner.

d. Install pitot tube cover and secure with pressure sensitive adhesive tape (D-30) if cover is not available, wrap pitot tube with flexible greaseproof waterproof barrier material (D-2) and secure with pressure sensitive adhesive tape (D-30). Cover static vents with flexible greaseproof waterproof barrier material (D-2) and secure with pressure sensitive adhesive tape (D-30). Attach a red cloth streamer to fuselage in area of each static vent, so that streamer is clearly visible from exterior of helicopter.

e. Inflate helicopter truck tires (TM 1-1520-248-23).

f. Secure overhead instrument lights to overhead panel fixture with pressure sensitive adhesive tape (D-30).

g. Firmly secure removed components stowed in crew compartment.

h. Close all doors and windows and secure all cowling, inspection panels, and covers. Cover fresh air heater inlet and ram air ventilating grill with flexible greaseproof barrier material (D-3) and secure wrap with pressure sensitive adhesive tape (D-30).

i. Pad anticollision and landing lights with polypropylene cushioning material (D-13) and secure with pressure sensitive adhesive tape (D-30).

j. Cover all remaining openings in fuselage with flexible greaseproof barrier material (D-3) secured with pressure sensitive adhesive tape (D-30).

6.9.17 Avionics.

a. Avionics is defined as any electronic equipment installed in the helicopter, including the mast mounted sight.

b. No preparation or preservation for avionics is required for shipment in any transportability mode, except for those shipment modes that may require removal of mast mounted sight to provide necessary clearances. If removal of MMS is required, refer to TM 9-1240-778-23.

6.9.18 Universal Weapons Pylons.

a. Remove universal weapons pylons (TM 9-1090-214-23 & P).

b. Coat unpainted surfaces with cold application corrosion preventive compound (D-7).

c. Wrap universal weapons pylons with 1/4 inch packaging cushioning material (D-10) and secure with pressure sensitive adhesive tape (D-30). Avoid taping part.

d. Place preserved and packaged universal weapons pylons in wood container (Chapter 5) on top of 1/2-inch packaging cushioning material (D-11). Use extra cushioning where the tubes cross and where the parts touch the wood box.

e. Use three 2 x 4 braces to restrict universal weapons pylons movement.

f. Secure universal weapons pylons wood container (Chapter 5) on flooring of export crate (Figure H-5).

SECTION V. MARKING AND PREPARATION OF SHIPPING DOCUMENTS

6.10 GENERAL.

Apply all markings (MIL-STD-129N). Include serial number of helicopter on container markings. Show special handling instructions, markings, and warnings required by TM 38-250, Packing and Material Handling: Preparation of Hazardous Material for Military Air Shipment for transportation by military aircraft. In addition, label all shipments containing dangerous and hazardous materials and any other materials requiring special handling with a DD Form 1387-2 Data/ Certification Label. Detailed instructions for copies and preparation of labels are given in TM 38-250. Secure DD Form 1387-2 to fuselage or container in a clearly visible location.

6.11 COMPONENT.

6.11.1 Identification. Identify each disassembled part or assembly by marking or tagging (D-28) it with correct part number, assembly number and/or serial number of helicopter from which it was removed.

6.11.2 Color Coding. Ensure rotor blades are properly color coded prior to removal to assure proper positioning upon installation.

6.12 CENTER OF BALANCE.

NOTE

Center of balance and exact weight must be computed for each helicopter so that loadmaster can accurately determine center of gravity for loaded cargo aircraft (parapraph 2.9).

a. Mark the center of balance.

b. Furnish loadmaster exact weight of each helicopter.

6.13 PRESERVATION INFORMATION.

Tag each aircraft in a conspicuous location with the following: **"**AIRCRAFT PRESERVED FOR UP TO ...**"** followed by the number of days applicable to applied preservation. **"**REPRESERVE IF NOT ACTIVATED BY ...**"** followed by the date the appropriate number of days after the preservation date. The same information shall be included with the shipping documents. Adherence to the procedures of this chapter provides preservation for 180 days.

6.14 SHIPPING DOCUMENTS.

Apply heat shrink protective covering (Appendix G).

SECTION VI. DEPRESERVATION

6.15 COMPONENTS.

Remove required components, table 2-1, from containers and stowed areas, and preserve (TM 1-1520-248-23, Appendix E; TM 9-1240-778-23; and TM 11-1520-248-23).

6.16 HELICOPTER.

Refer to TM 1-1520-248-23, Appendix E, for helicopter depreservation.

CHAPTER 7

LOCAL MANUFACTURE — TRANSPORTABILITY EQUIPMENT

SECTION I. GENERAL

7.1 GENERAL.

All shipping containers and one fixture require local manufacture. Table 7-1 lists these items.

Table 7-1. Local Manufacture — Transportability Equipment

Fig. No.	Equipment
7-1	Mast and swashplate container
7-2	Tail rotor assembly container
7-3	Horizontal stabilizer container
7-4	Vertical fin container
7-5	Universal weapons pylons container
7-6	Ramp extensions and ramp support blocks
H-5	Export crate
H-6	Main rotor blade container
H-7	Main rotor hub container
H-8	Helicopter ground handling trucks and exhaust shroud container
H-9	Tailboom container
H-10	Tailboom attachment fixture

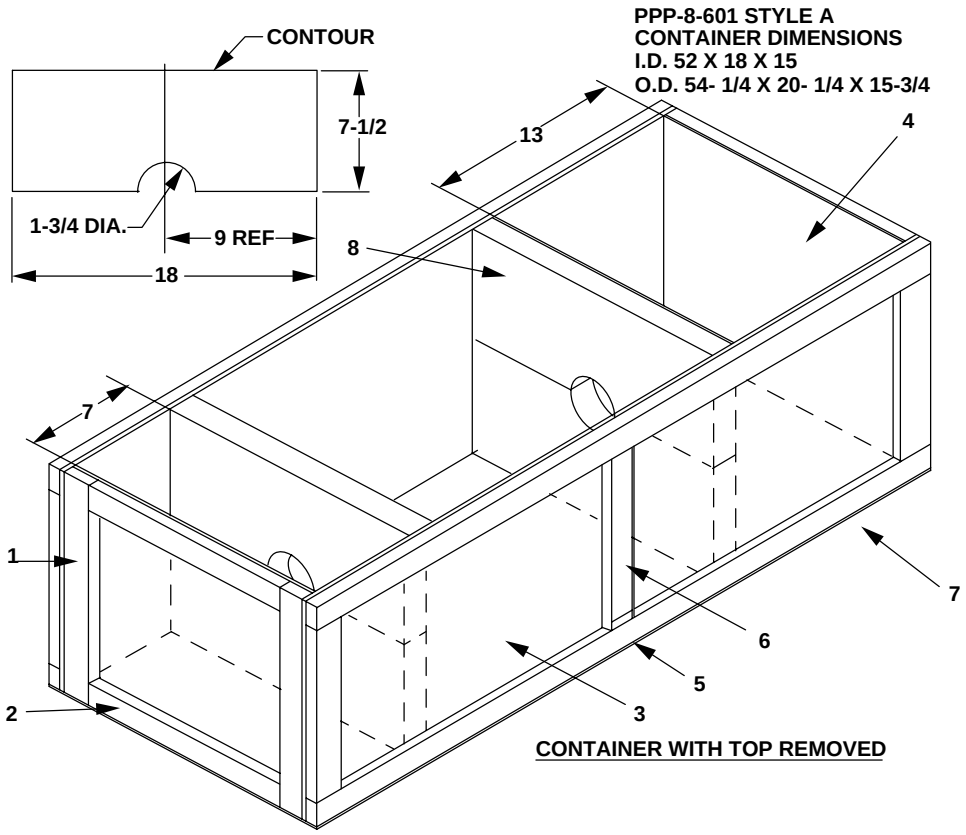
7.2 RESOURCES.

7.2.1 Materials Required. All materials required for constructing transportability equipment are listed in the figures listed in table 7-1.

7.2.2 Manpower Requirements. Table 7-2 lists manpower requirements for local manufacture of transportability equipment.

Table 7-2. Manpower Requirements for Local Manufacture of Transportability Equipment

Task	No. Persons	Man-Hours	Elapsed Time
Manufacture containers for:			
a. Mast and swashplate	1	1.5	1.5
b. Tail rotor	1	1.0	1.0
c. Horizontal stabilizer	1	1.0	1.0
d. Vertical fin	1	1.0	1.0
e. Universal weapons pylons	1	2.0	2.0
f. Main rotor blades	2	4.0	2.0
g. Main rotor hub	1	1.0	1.0
h. Helicopter ground handling trucks and exhaust stacks (shroud)	1	1.5	1.5
i. Tailboom	1	2.0	2.0
Manufacture:			
a. Ramp extensions	1	1.5	1.5
b. Ramp blocks	1	0.5	0.5
c. Export crate	2	4.0	2.0
d. Tailboom attachment fixture	1	2.0	2.0



NOTE

1. ALL DIMENSIONS IN INCHES.
2. PLYWOOD SHALL BE STANDARD GRADE WITH EXTERIOR GLUE OF U.S. PRODUCT STANDARD PSI-66 (INT-DFPA). PLYWOOD WILL HAVE THE GRADE STAMP OF APPROVED/TESTING AGENCY AND WILL BE SURFACE TREATED IN ACCORDANCE WITH TT-W-672.

*WOOD MIL-STD-731
**PLYWOOD NN-P-530

ITEM	QTY	NOMENCLATURE	MATERIAL
1	4	CLEAT	1 x 2 x 15*
2	4	CLEAT	1 x 2 x 14- 1/2*
3	2	SIDES	54 x 15 x 3/8**
4	2	ENDS	18 x 15 x 3/8**
5	2	CLEAT	54 x 1 x 2*
6	6	CLEAT	11-1/2 x 1 x 2*
7	1/1	TOP/BOTTOM	54 x 20 x 3/8**
8	4	CONTOUR	18 x 2 x 8 WOOD*
	A/R	NAILS	FF-N-105

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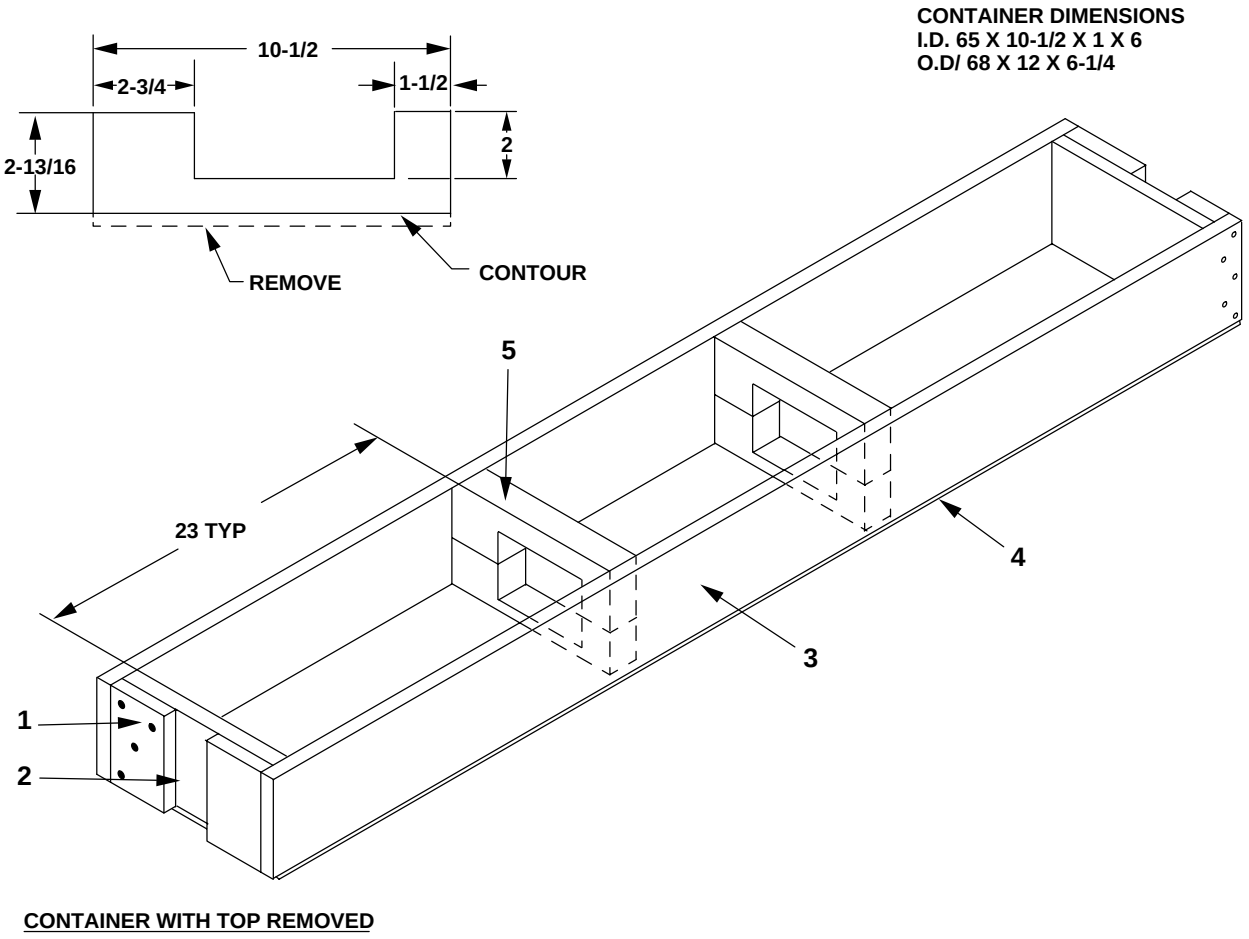
Figure 7-1. Mast and Swashplate Container



CONTAINER WITH TOP REMOVED

NOTE

1. ALL DIMENSIONS IN INCHES.
2. PLYWOOD SHALL BE STANDARD GRADE WITH EXTERIOR GLUE OF U.S. PRODUCT STANDARD PSI-66 (INT-DFPA). PLYWOOD WILL HAVE THE GRADE STAMP OF APPROVED TESTING AGENCY AND WILL BE SURFACE TREATED IN ACCORDANCE WITH TT-W-572.

*MIL-STD-731
**NN-P-530

ITEM	OTY	NOMENCLATURE	MATERIAL
1	4	CLEAT	4-3/4 x 1 x 4 WOOD*
2	2	END	10-1/2 x 1 x 6 WOOD*
3	2	SIDE	68 x 1 x 6 WOOD*
4	1/1	TOP/BOTTOM	66-1/2 x 3/8 x 12 PLYWOOD**
5	4	CONTOUR	10-1/2 x 2 x 4 WOOD*
	A/R	NAILS	FF-N-105

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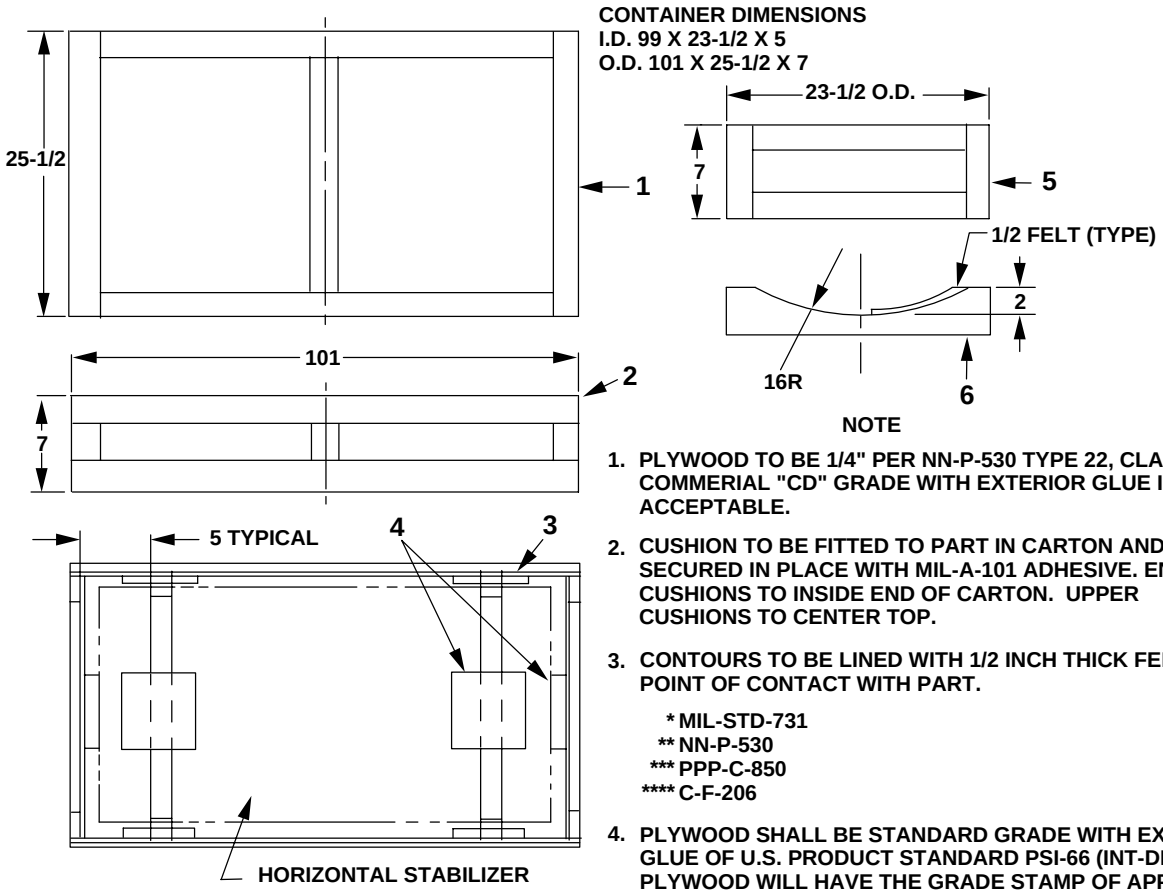
Figure 7-2. Tail Rotor Assembly Container



NOTE

1. PLYWOOD TO BE 1/4" PER NN-P-530 TYPE 22, CLASS 1. COMMERIAL "CD" GRADE WITH EXTERIOR GLUE IS ACCEPTABLE.
2. CUSHION TO BE FITTED TO PART IN CARTON AND SECURED IN PLACE WITH MIL-A-101 ADHESIVE. END CUSHIONS TO INSIDE END OF CARTON. UPPER CUSHIONS TO CENTER TOP.
3. CONTOURS TO BE LINED WITH 1/2 INCH THICK FELT AT POINT OF CONTACT WITH PART.

   * MIL-STD-731
   ** NN-P-530
   *** PPP-C-850
   **** C-F-206

4. PLYWOOD SHALL BE STANDARD GRADE WITH EXTERIOR GLUE OF U.S. PRODUCT STANDARD PSI-66 (INT-DFPA). PLYWOOD WILL HAVE THE GRADE STAMP OF APPROVED TESTING AGENCY AND WILL BE SURFACE TREATED IN ACCORDANCE WITH TT-W-572.
5. ALL DIMENSIONS IN INCHES.

ITEM	QTY	NOMENCLATURE	MATERIAL
1	1/1	TOP/BOTTOM ASSY	101 x 25-1/2 x 1/4 PLYWOOD**
2	2	SIDE ASSY	101x7x1/4 PLYWOOD**
3	8	CLEAT	7 x 1 x 2 WOOD*
4	6	CUSHION	66-1/2 POLYSTYRENE***
5	2	END ASSY	20 x 7 x 1/4 PLYWOOD**
6	2	CONTOUR	20 x 2 x 4 WOOD*
	A/R	NAILS	FF-N-105
	A/R	ADHESIVE	MIL-A-101
	A/R	FELT	1/2 FELT****

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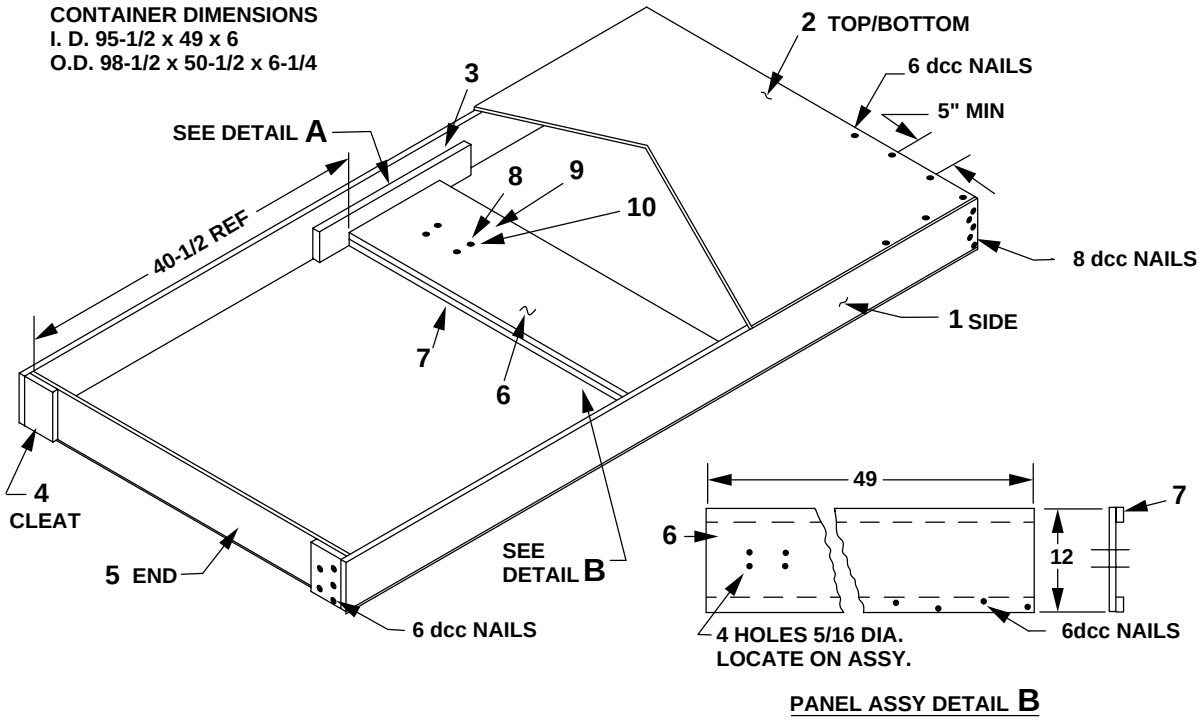
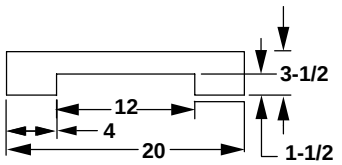
Figure 7-3. Horizontal Stabilizer Container



*MIL-STD-731
**NN-P-530

ITEM	QTY	NOMENCLATURE	MATERIAL
1	2	SIDE	98-1/2 x 1 x 6 WOOD *
2	1/1	TOP AND BOTTOM	97 x 50-1/2 x 3/8 PLYWOOD**
3	2	POCKET CLEAT	20 x 3-1/2 x 3/4 PLYWOOD*
4	4	CLEAT	5-1/2 x 1 x 4 WOOD*
5	2	PANEL	49 x 1 x 6 WOOD*
6	1	PANEL	49 x 12 x 3/4 PLY-WOOD**
7	2	RISER	43-3/4 x 1 x 2 WOOD*
8	4	BOLT	1/4 x 2-3/4 (NAS1304-38)
9	4	LOCKNUT	1/4 INCH
10	4	FLAT WASHER	1/4 INCH AL
	A/R	NAILS 6 dcc	FF-N-105
	A/R	NAILS 8 dcc	FF-N-105



1. PLYWOOD TO BE 3/8 AND 3/4 CD INTERIOR WITH EXTERIOR GLUE. WOOD TO BE NOMINAL 1 X 2, 1 X 4, 1 X 6.
2. PLYWOOD SHALL BE STANDARD GRADE WITH EXTERIOR GLUE OF U.S. PRODUCT STANDARD PSI-66 (INT-DFPA). PLYWOOD WILL HAVE THE GRADE STAMP OF APPROVED TESTING AGENCY AND WILL BE SURFACE TREATED IN ACCORDANCE WITH TT-W-572.
3. ALL DIMENSIONS ARE IN INCHES.

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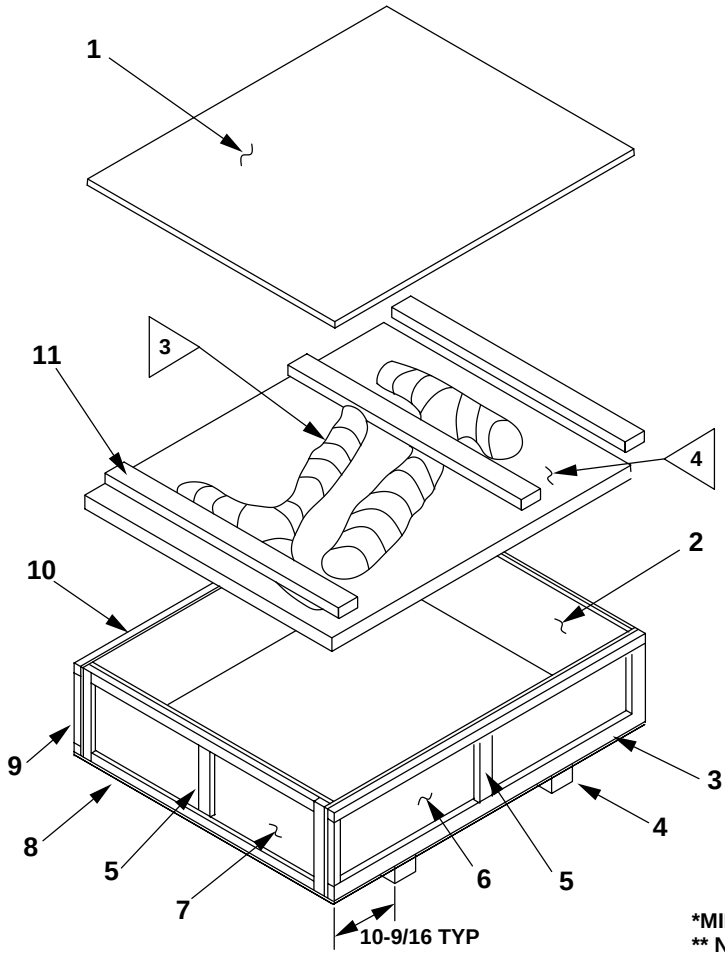
Figure 7-4. Vertical Fin Container



CONTAINER DIMENSIONS
I.D. 48 X 39 X 12
O.D. 50-1/4 X 41-1/4 X 12-3/4

NOTE

1. CONTAINER SHALL BE BUILT, ASSEMBLED, AND MARKED PER PPP-B-601.
2. ALL DIMENSIONS ARE IN INCHES.
3. USE CUSHION MATERIAL PPP-C-1752, CLASS 1, GRADE A, TYPE III, 1/4 INCH THICK AND SECURE WITH TAPE, PPP-T-60, TYPE IV, CLASS 1, 2 INCHES WIDE.
4. USE CUSHION MATERIAL PPP-C-1752, CLASS 1, GRADE A, TYPE III, 1/2 INCH THICK.

*MIL-STD-731
** NN-P-530

ITEM	QTY	NOMENCLATURE	MATERIAL	
1	2	TOP/BOTTOM ASSEMBLY	50-1/4 x 41-1/4 x 3/8	PLYWOOD**
2	2	ENDS	39 x 12	WOOD/PLYWOOD
3	4	CLEAT-THRU EDGE	50-1/4 x 1 x 12	WOOD*
4	2	SKID	41-1/4 x 3 x 4	WOOD*
5	8	CLEAT-INTERMEDIATE	9 x 1 x 2	WOOD*
6	2	SHEATHING	50-1/4 x 12 x 3/8	PLYWOOD**
7	2	SHEATHING	39 x 12 x 3/8	PLYWOOD**
8	4	CLEAT-FILLER EDGE	36 x 1 x 2	WOOD*
9	4	CLEAT-THRU EDGE	12 x 1 x 2	WOOD*
10	2	SIDES	50-1/4 x 12	WOOD/PLYWOOD
11	3	BRACE	2 x 4 x 39	WOOD*
	A/R	NAILS	FF-N-105	
	A/R	STAPLES	FF-N-105	

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Figure 7-5. Universal Weapons Pylons Container

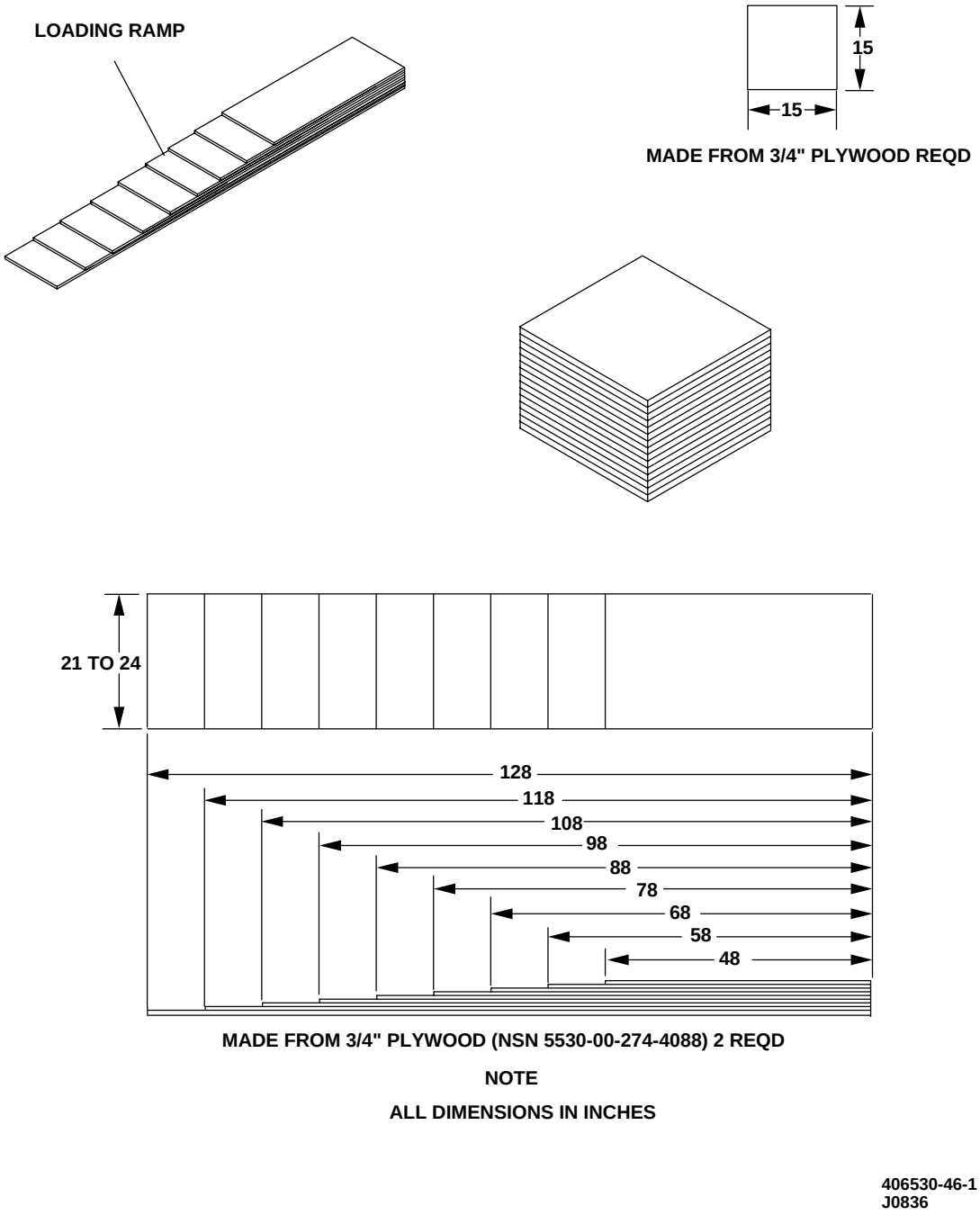


Figure 7-6. Ramp Extensions and Ramp Support Blocks

CHAPTER 8

OPERATOR AND MAINTENANCE INSTRUCTIONS WITH REPAIR PARTS AND SPECIAL TOOLS LIST FOR TRANSPORTABILITY EQUIPMENT INCLUDING DEPOT LEVEL REPAIR PARTS

SECTION I. OPERATOR INSTRUCTIONS

8.1 GENERAL.

This section contains operating procedures for the main rotor tool set, ground handling helicopter trucks, rapid deployment kit, and air transportability kit.

8.2 MAIN ROTOR TOOL SET.

Refer to TM 1-1520-248-23, Chapter 1, for using main rotor tool set during blade folding/unfolding procedures.

8.3 HELICOPTER GROUND HANDLING TRUCKS.

Refer to TM 1-1520-248-23, Chapter 1, for using ground handling gear assembly.

8.4 AIR TRANSPORTABILITY KIT.

Refer to Chapter 2 for using air transportability kit.

SECTION II. REPAIR/OVERHAUL PROCEDURES

8.5 GENERAL.

This section contains repair and overhaul procedures for the main rotor tool set. helicopter ground handling trucks, rapid deployment kit, and air transportability kit.

8.6 MAIN ROTOR TOOL SET.

Replace defective components by disassembly of the tool set to the extent needed to effect repair.

8.7 HELICOPTER GROUND HANDLING TRUCKS.

Replace defective components by disassembling helicopter ground handling trucks to the extent needed to effect repair. Refer to TM 1-1520-248-23, Chapter 1 for maintenance procedures.

8.8 RAPID DEPLOYMENT KIT.

Replace defective components by disassembly of the kit to the extent needed to effect repair.

8.9 **AIR** TRANSPORTABILITY KIT.

Replace defective components by disassembly of the kit to the extent needed to effect repair.

SECTION III. REPAIR PARTS AND SPECIAL TOOLS LIST

8.10 INTRODUCTION TO THE REPAIR PARTS AND SPECIAL TOOLS LIST.

This section lists repair parts and special tools required for logistical and tactical shipment at Aviation Unit Maintenance (AVUM) and Depot Maintenance Levels of Repair.

8.11 GENERAL.

This repair parts and special tools list is arranged as follows:

a. Repair Parts and Special Tools List. Figures 8-2 and 8-3 list special, tools and repair parts authorized for use. This is arranged In top-down breakdown order and is listed in figure and item sequence. Items are indented to indicate relationship to the next higher assembly. Illustrations will appear immediately preceding each figure of text.

b. Alphabetical Numerical Index. This serves as an index to the Repair parts and Special Tools List, and lists in alphabetical-numerical order all part numbers contained in figures 8-2 and 8-3. National Stock Numbers (NSN) will be listed with part numbers. If an NSN is available for a particular item, it should be used when ordering that item.

8.12 EXPLANATION OF COLUMNS.

The following provides an explanation of columns found in the tabular listings:

a. Illustration. This column is divided as follows:

(1) Figure Number. Indicates the figure number of the illustration in which the item is show (see figure 8-1).

(2) Item Number. The number used to identify each item called out in the Illustration.

b. Source, Maintenance, and Recoverability Codes (SMR). Six-digit codes used to indicate how to procure, what level of maintenance can repair and what level of maintenance can dispose of a reparable item. SMR codes are set up as follows:

(1) Source Code. Source codes are assigned to indicate the manner of acquiring support items for maintenance, repair, or overhaul of end items. Source codes are entered in the first and second positions of the Uniform SMR Code format as follows:

Code	Definition
PA	Item procured and stocked for anticipated or known usage.
PB	Item procured and stocked for insurance purposes.
PC	Item procured and stocked and which otherwise would be coded PA except that it is deteriorative in nature.
PD	Support item, excluding export equipment, procured for initial issue or outfitting and stocked only for subsequent or additional initial issues or outfittings.
PE	Support equipment procured and stocked for initial issue or outfitting to specific maintenance repair activities.
PF	Support equipment which will not be stocked but which will be centrally procured on demand.
PG	Item procured and stocked to provide for sustained support of the life of the equipment.
KD	An item of a depot overhaul/ repair kit and not purchased separately.
KF	An item of a maintenance kit and not purchased separately.
KB	Item included in both a depot overhaul/repair kit and a maintenance kit.
MO	Item to be manufactured or fabricated at Aviation Unit Maintenance (AVUM) level.
MF	Item to be manufactured or fabricated at Aviation Intermediate Maintenance (AVIM) level.
MD	Item to be manufactured or fabricated at the depot maintenance level.
AO	Item to be assembled at Aviation Unit Maintenance (AVUM) level.
AF	Item to be assembled at Aviation Intermediate Maintenance (AVIM) level.
AD	Items to be assembled at depot maintenance level.
XA	Item is not procured or stocked because the requirements for the item will result in the replacement of the next higher assembly.
XB	Item is not procured or stocked. If not available through salvage, requisition.
XD	A support item that is not stocked. When required, item will be procured through normal supply channels.
x c	Installation drawing, diagram, instruction sheet, or field source drawing that is identified by manufacturers part number.

NOTE

Control exchange or salvage may be used as a source of supply for any items source coded above except those coded XA, XD, and aircraft support items as restricted by AR 700-42.

(2) Maintenance Code. Maintenance codes are assigned to indicate the levels of maintenance authorized to USE and REPAIR support items. The maintenance codes are entered in the third and fourth positions of the uniform SMR Code format as follows:

(a) The maintenance code entered in the third position will indicate the lowest maintenance level authorized to remove, replace, and use the support item. It will indicate one of the following levels of maintenance:

Code	Application/Explanation
0	Support item is removed, replaced, and used at the Aviation Unit Maintenance (AVUM) level.
F	Support item is removed, replaced, and used at the Aviation Intermediate Maintenance (AVIM) level.
D	Support item is removed, replaced, and used at depot, or mobile depot, or specialized repair activity only.

(b) The maintenance code entered in the fourth position indicates whether the item is to be repaired and indentifies the lowest maintenance level with the capability to perform complete repair (ie., all authorized maintenance functions). This position will contain one of the following maintenance codes:

Code	Application/Explanation
0	The lowest maintenance level capable of complete repair of the support item is the Aviation Unit Maintenance (AVUM) level.
F	The lowest maintenance level capable of complete repair of the support item Is the Aviation Intermediate Maintenance (AVIM) level.
	The lowest maintenance level capable of complete repair of the support item is the depot level, performed by depot, mobile depot, or specialized repair activity.
L	Repair restricted to designated specialized repair activity.
Z	Nonrepairable. No repair is authorized.
B	No repair is authorized. The item may be reconditioned by adjusting, lubricating, etc., at the user level. No repair parts or special tools are procured for the maintenance of this item.

(3) Recoverability Code. Recoverability codes are assigned to support items to Indicate the disposition action on unserviceable items. The recoverability code is entered in the fifth position of the Uniform SMR Code format as follows:

Code	Definition
Z	Nonrepairable item. When unserviceable, condemn and dispose at level indicated in position 3.
0	Repairable item. When uneconomically repairable, condemn and dispose at Aviation Unit Maintenance (AVUM) level.
F	Repairable item. When uneconomically repairable, condemn and dispose at Aviation Intermediate Maintenance (AVIM) level.
D	Repairable Item. When beyond lower level repair capability, return to depot. Condemnation and disposal not authorized below depot level.
L	Repairable item. Repair, condemnation, and disposal not authorized below depot/specialized repair activity level.

Code	Application/Explanation
A	Item requires special handling or condemnation procedures because of specific reasons (i.e., precious metal content, high dollar value, critical material or hazardous material). Refer to appropriate manuals/directives for specific instructions.

c. National Stock Number. Indicates the national stock number assigned to the item and will be used for requisitioning purposes.

d. Part Number. Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity) which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements to identify an item or range of items.

e. Contractor and Government Entity code (CAGE). The CAGE code is a 5-digit numeric code listed in SB 708-42, which is used to identify the manufacturer, distributor, or Government agency, etc.

f. Description. Indicates the Federal item name and any additional description required to identify the item.

g. Unit of Measure (U/M). Indicated the standard of the basic quantity of the listed item as used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., EA, IN, PR, etc.). When the unit of measure differs from the unit of issue, the lowest unit of issue that will satisfy the required units of measure will be requisitioned.

h. Quantity Incorporated in Unit. Indicates the quantity of the item required for one assembly only, including instances when similar assemblies are broken down together. A "v" appearing in this column in lieu of a quantity indicates that no specific quantity is applicable (e.g., shims, spacers, etc.).When parts are shown as attaching two or more items, the quantity of these parts is that necessary to attach only one of the Items.

8.12.1 Special Information.

a. Usable on codes are shown in the description column. Uncoded items are applicable to all models. Identification of the usable on codes used in this publication are:

Code	Used On
A.	C-5 - Aircraft
B.	C-130 - Aircraft
C.	C-141 - Aircraft
D.	C-17 - Aircraft
E.	Vessel
F.	Truck

b. Detailed manufacturing instructions for items source coded to be manufactured or fabricated (MO, MF, or MD) are found in Chapter 7. Manufacturer of repair parts assigned source codes other than MO, MF, or MD is prohibited.

c. When details of an assembly are shown on another text page, the description of that assembly is followed by a notation stating where these details can be located. Example: "204.200-009-3, Pylon Assembly. See figure 165 for breakdown." The parts that make up the pylon assembly will be found on the text listing for figure 165.

d. Directional references left and right are determined by standing at the rear of the aircraft or engine and looking forward.

8.13 **HOW TO FIND A PART..**

a. When the Part Number is Known (figure 6-1). Locate the part number in the Numerical Index. Note the figure and index number. Turn to the figure and index number indicated to obtain the desired information. If the illustration of the part is desired, refer to the same index number on the accompanying illustration.

b. When the Part Number is not Known (figure 8-1). Refer to the introduction of the OH-58D RPSTL to determine the chapter in which that particular part is most likely to appear. Within the chapter, determine the figure on which the part should be shown. Note the index number of the part on illustration and refer to the same index number on the text listing for that figure. Opposite the index number will be shown the part number, part name, and all other necessary information.

c. When the National Stock Number is Known (figure 6-1). Locate the national stock number in the Numerical Index. Note the figure and index number. Turn to the figure and index number Indicated to obtain the desired information. If the illustration of the part is desired, refer to the same index number on the accompanying illustration.

8.14 VENDOR CODES.

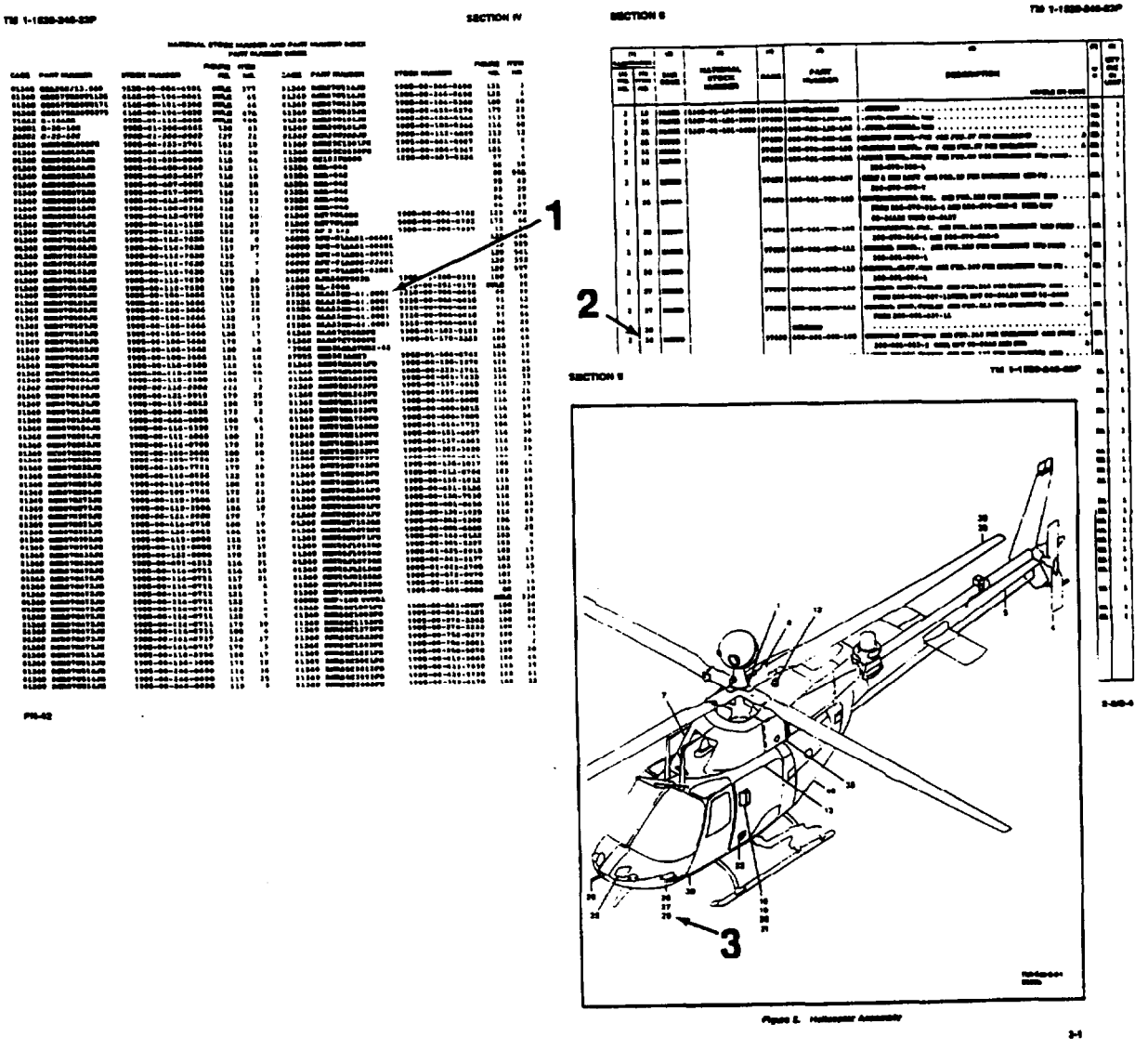
Vendor Code No.	Vendor Name and Address
2U979	Burr Engineering Division of Barker Manufacturing Battle Creek, MI 49016

25500	Loral Corp. Defense Systems Div - Akron 1210 Massillon Road Akron, OH 44315-0001
33269	Parker-Hannifin Corp. Aircraft Wheel and Brake Division 1160 Center Road P.O.Box 158 Avon, OH 44011
99862	Carr Lane MFG Co. 4200 Carr Lane Court St. Louis, MO 63119-2129

6.15 ABBREVIATIONS. Abbreviations used are as follows:

ASSY	Assembly
FWD	Forward
MOD	Modification
MMS	Mast Mounted Sight
INSTL	Installation
LH	Left Hand
RH	Right Hand

HOW TO USE THE REPAIR PARTS AND SPECIAL TOOLS LIST



WHEN THE PART NUMBER/NATIONAL STOCK NUMBER IS KNOWN

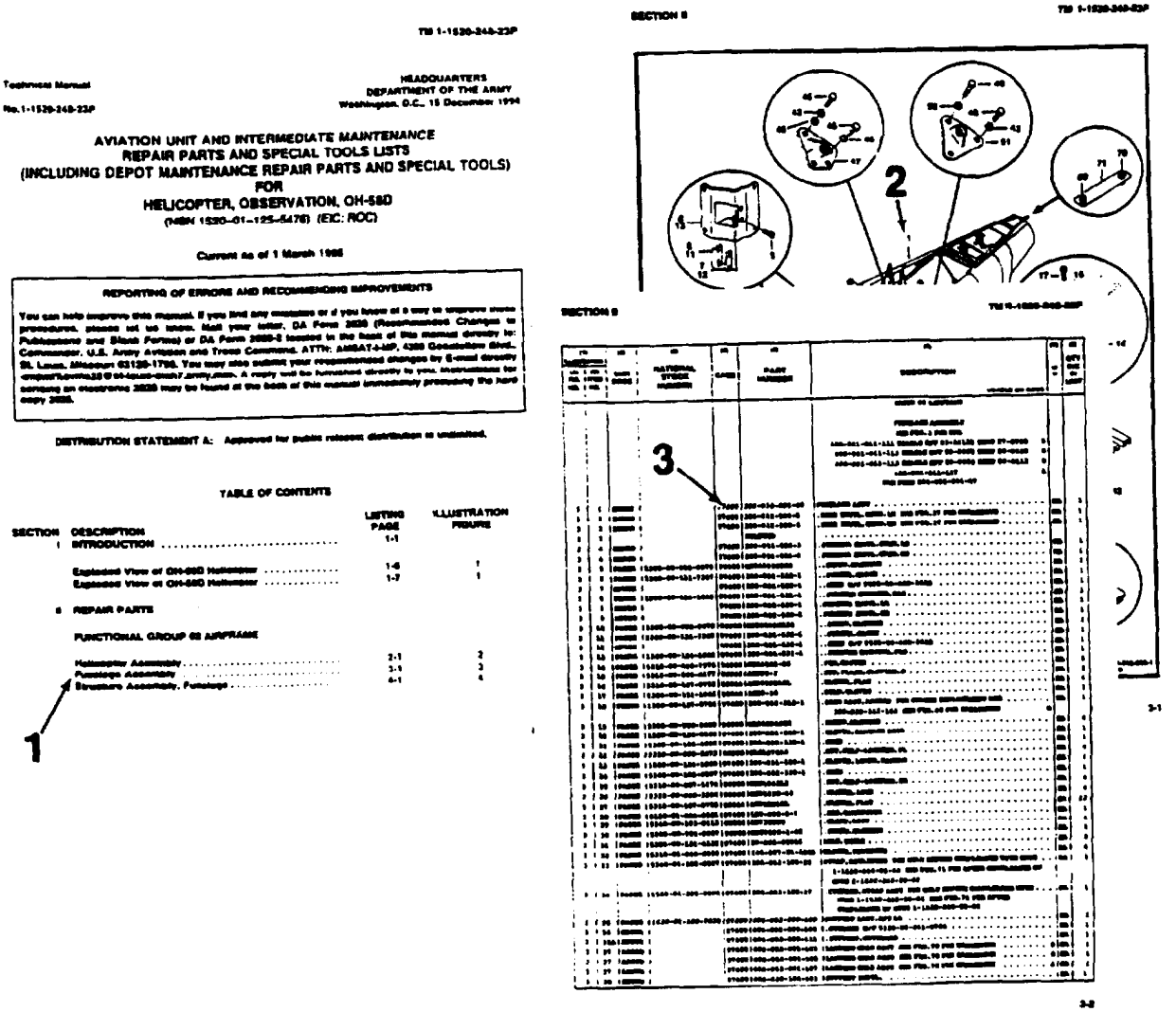
1. When the Part Number/National Stock Number is known, refer to Alphabetical Numerical Index. Locate the Part Number/ National Stock Number and note the figure and item number assigned to the Part Number/ National Stock Number.

2. Turn to the figure number indicated and locate the item number referenced in the Alphabetical/Numerical Index.

3. If a pictorial representation of the part or its location is desired, refer to the same item number on the accompanying illustration.

Figure 8-1. Typical Example of How to Use the Illustrated Parts Catalog (Sheet 1 of 2)

HOW TO USE THE REPAIR PARTS AND SPECIAL TOOLS LIST



WHEN THE PART NUMBER IS NOT KNOWN

1. Determine the function and application of the part required. Turn to the Table of Contents and select the most appropriate title. Note the illustration page number.

2. Turn to the page indicated and locate the desired part on the illustration.

3. From the illustration, obtain the item number assigned to the part desired. Refer to the accompanying description for specific information regarding the part.

Figure 8-1. Typical Example of How to Use the Illustrated Parts Catalog (Sheet 2 of 2)

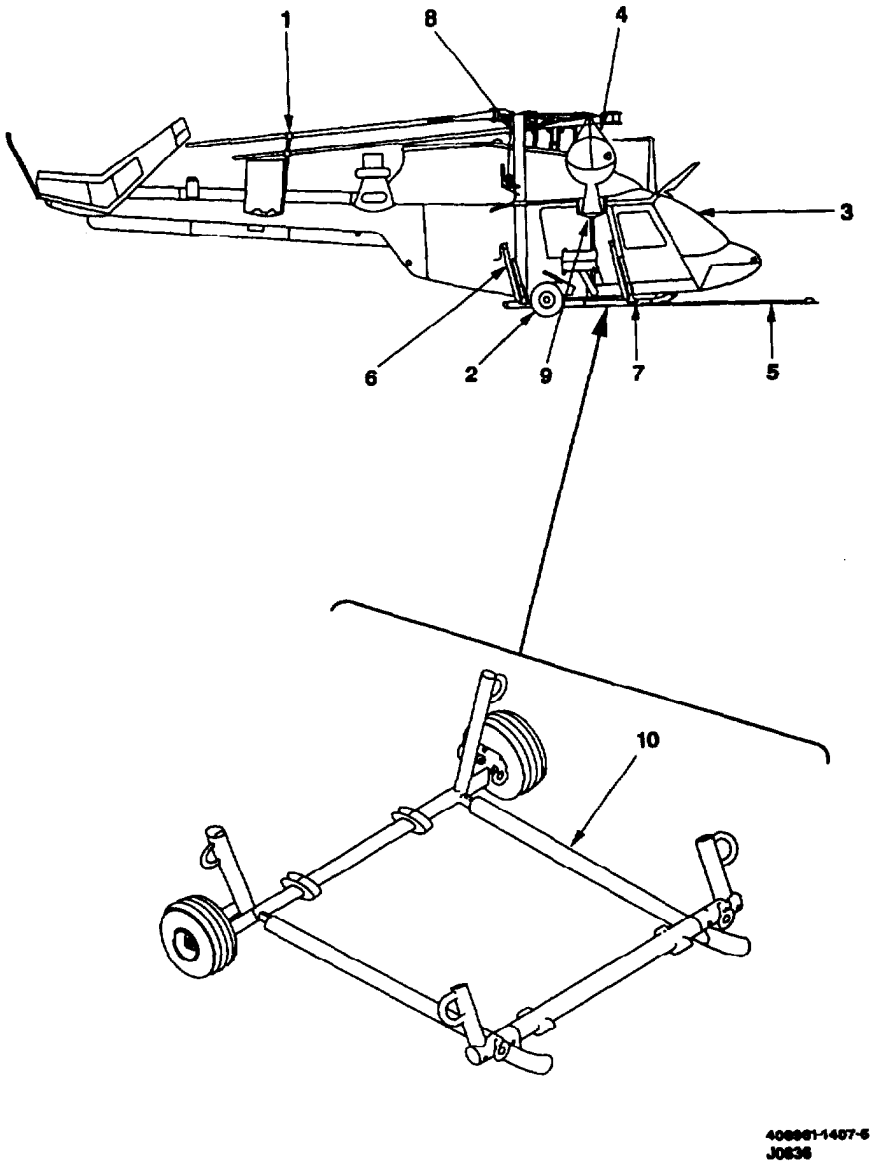


Figure 8-2. Special Took for Shipment of the OH-58D Helicopter

(1) ILLUSTRATION (A) FIG NO.	(1) ILLUSTRATION (B) ITEM NO.	(2) SMR DOE	(3) NATIONAL STOCK NUMBER	(4) CAGE	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
8-2		XCODD		97499	406-961-001-109	MOD-HELICOPTER ASSY	EA	REF
8-2	1	PBOOO	1730-01-227-1750	97499	T101840-105	.TOOL SET, MAIN ROTOR (SEE TM 1-1520-24B-23P FOR . . . . . BREAKDOWN)	EA	1
8-2	2	PAFOO		97499	406-052-200-101	.GEAR ASSY, GROUNG HANDLING (SEE TM 1-1520-248-23P . . . . FOR BREAKDOWN)) B,C	EA	2
8-2	3	PDDDD		97499	406-706-005-101	.KIT-RAPID DEPLOYMENT. . . . . B,C,E,F	EA	1
8-2	4	PAOZZ		97499	406-092-009-101	..SLING ASSY, MMS (SEE TM 1-1520-246-23P FOR . . . . . BREAKDOWN) B,C,E,F	EA	1
8-2	5	PA000		97499	406-092-103-103	..BRIDLE ASSY (SEE TM 1-1520-248-23P FOR BREAKDOWN). . . . . A,B,C	EA	1
8-2	6	PAOZZ		20979	19031	..JACK ASSY (SEE TM 1-1520-248-23P FOR BREAKDOWN . . . . . B,C,E,F	EA	4
8-2	7	XCOFF		97499	406-052-011-101	..LANDING GEAR INSTL (SEE TM 1-1520-248-23P FOR. . . . . BREAKDOWN) A,D	EA	2
8-2	8	XCODD		97499	406-270-002-101	..HOIST INSTL (SEE TM 1-1520-248-23P BREAKDOWN) . . . . . B,C,E,F	EA	I
8-2	9	XCOFF		97499	406-270-003-101	..PLATFORM INSTL (SEE TM 1-1520-248-23P FOR . . . . . BREAKDOWN) B,C,E,F	EA	I
8-1	10	XCOFF		97499	406-706-209-101	.KIT, AIR TRANSPORTABILITY (SEE FIG 8-3 FOR BREAKDOWN) . . . . . B,C	EA	I

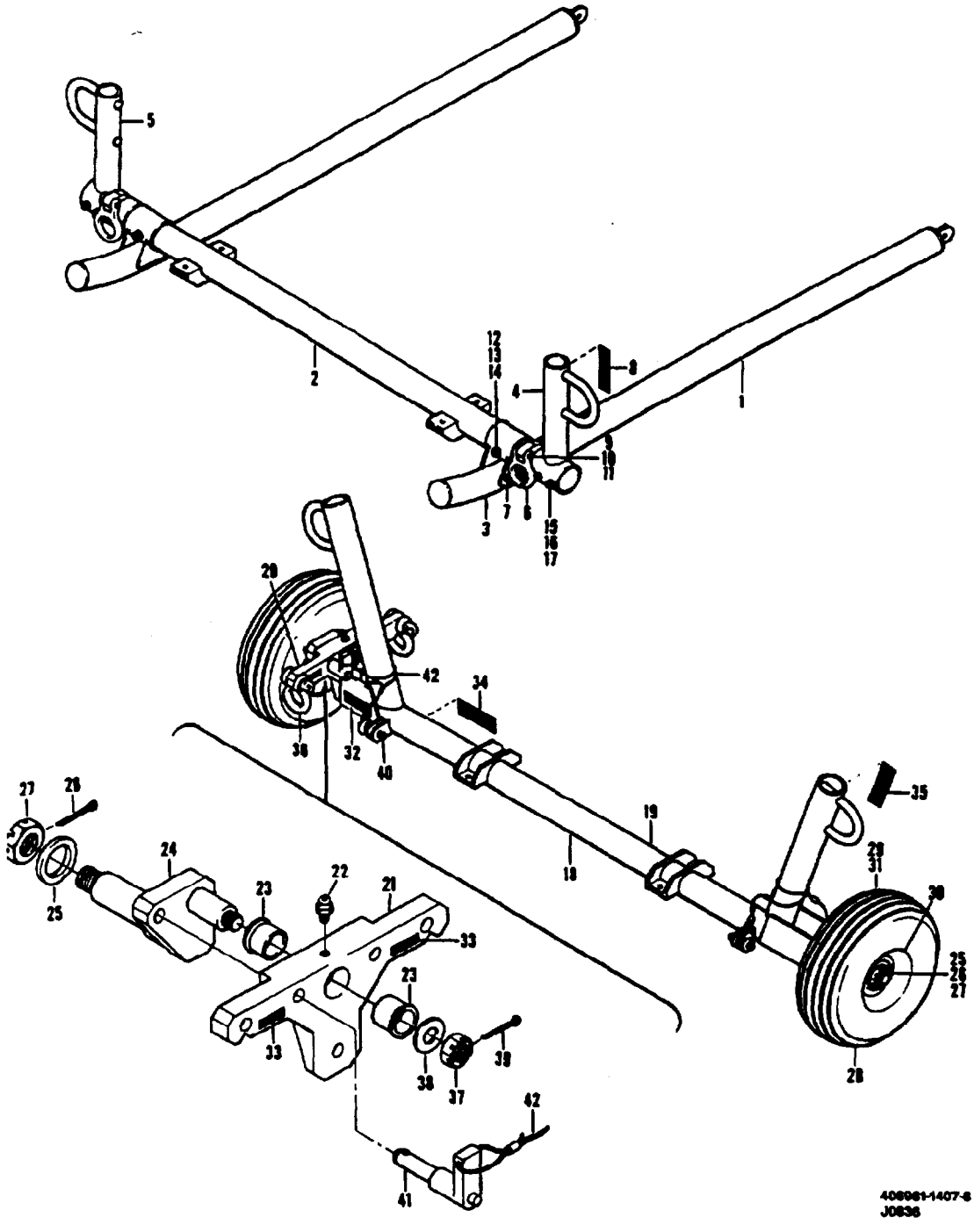


Figure 8-3. Kit, Air Transportability

(1) ILLUSTRATION (A) FIG NO.	(B) ITEM NO.	(2) SMA CODE	(3) NATIONAL STOCK NUMBER	(4) CAGE	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) u/M	(8) QTY INC IN UNIT
						GROUP 83 KIT, AIR TRANSPORTABILITY SEE FIGURE 8-2 FOR NHA		
8-3	1	PAOOO	4920-01-195-001	97499	T101826-101	SUPPORT FIXTURE	EA	1
8-3	2	PBOZZ	4920-01-236-9136	97499	T101826-103	.CROSS TUBE ASSY...	EA	1
8-3	3	PBOZZ	4920-01-236-9837	97499	T101826-105	.SKID ASSY	EA	2
8-3	4	PBOZZ	4920-01-236-9838	97499	T101826-107	.TIEDOWM ASSY	EA	1
8-3	5	PBOZZ	4920-01-236-9839	97499	T101826-108	.TIEDOWN ASSY	EA	1
8-3	6	PBOZZ	1730-01-252-0359	97499	209-782-056-1	.SHACKLE, GED HANDLIN	EA	2
8-3	7	XDOZZ		97499	406-052-018-101	.STENCIL	EA	2
8-3	8	XDOZZ		97499	406-052-021-101	.STENCIL	EA	2
8-3	9	XDOZZ		96906	MS20392-4C63	.PIN, STRAIGHT, HEAD	EA	2
8-3	10	PAOZZ	5310-00-167-0814	80205	NAS1149C0532R	.WASHER, FLAT	EA	2
8-3	11	PAOZZ	5315-00-839-2326	96906	MS24665-281	.PIN COTTER	EA	2
8-3	12	PAOZZ	5306-01-241-6298	80205	NAS6606-44	.BOLT, SHEAR	EA	2
8-3	13	PAOZZ	5310-00-891-0943	96906	MS21043-6	.NUT, SELF-LOCKING	EA	2
8-3	14	PAOZZ	5310-00-167-0804	88044	AN960C616	.WASHER, FLAT	EA	4
8-3	15	PA0ZZ	5306-01-241-3965	80205	NAS6604-44	.BOLT, SHEAR...	EA	6
8-3	16	PAOZA	5310-00-844-4872	96906	MS31043-4	.NUT, SELF-LOCKING.....	EA	6
8-3	17	PAOZZ	5310-00-515-7449	88044	AN960C416L	.WASHER, FLAT	EA	12
8-3	18	PAOFF	4920-01-192-4921	97499	T101827-101	SUPPORT FIXTURE BOI: 1 AUTH FOR 1-13 EQUIP	EA	1
8-3	19	PBOFF	4920-01-325-2875	97499	T101827-103	.FIXTURE, AIRCRAFT...	EA	1
8-3	20	XDOFF		97499	T101827-104	...SUPPORT ASSY	EA	2
8-3	21	XDFZZ		97499	T101827-127	...SUPPORT	EA	1
8-3	22	PBOZZ	4730-00-050-4203	96906	MS15001-1	...FITTING, LUBRICATION	EA	1
8-3	23	XDFZZ		97499	22-108B64-48-84	...BUSHING, SLEEVE	EA	2
8-3	24	POZZ	5340-01-325-5968	97499	T101827-111	.HANDLE, MANUAL CONT	EA	2
8-3	25	PBOZZ	5365-00-845-2200	97499	204-050-165-1	.SPACER, RING	EA	2
8-3	26	PAOZZ	5315-00-285-7161	96906	MS24665-377	.PIN, COTTER	EA	2
8-3	27	PAOZZ	5310-00-451-9021	96906	MS17826-20	.NUT, SELF-LOCKING	EA	2
8-3	28	AOOOO		97499	214-052-171-101	.WHEEL, PNEUMATIC	EA	2
8-3	29	PBOZZ	2620-01-333-0241	73842	15X6.00-6TT	..TIRE PNEUMATIC....	EA	1
8-3	30	PBOZZ	2530-01-324-9401	33269	40-140	..WHEEL, PNEUMATIC	EA	1
8-3	31	PBOZZ		25500	6.00-6	..INNER TUBE, PNEUMA	EA	1
8-3	32	XDOZZ		97499	406-052-018-101	.STENCIL	EA	1
8-3	33	XDOZZ		97499	406-052-019-102	.STENCIL	EA	1
8-3	34	XDOZZ		97499	406-052-020-101	.STENCIL..	EA	2
8-3	35	XDOZZ		97499	406-052-021-101	.STENCIL	EA	1
8-3	36	PAOZZ	4030-00-149-5574	88044	AN116-10	.SHACKLE..	EA	4
8-3	37	PAOZZ	5310-00-176-8115	88044	AN320-12	.NUT, PLAIN, SLOTTED	EA	2
8-3	38	PAOZZ	5310-00-167-0842	88044	AN960-1216L	.WASHER, FLAT	EA	2
8-3	39	PAOZZ	5315-00-236-8353	96906	MS24665-306	.PIN, COTTER	EA	2
8-3	40	XDPOZZ		96906	MS17984-610	.PIN, QUICK RELEASE	EA	2
8-3	41	PAOZZ	5315-01-305-2691	80205	NAS1338C5C22D	.PIN, QUICK RELEASE	EA	2
8-3	42	PBOZA	4010-01-101-8639	99862	CL-21-KA-12-00-LR	.WIRE ROPE ASSY	EA	4

NATIONAL STOCK NUMBER AND PART NUMBER INDEX
NATIONAL STOCK NUMBER INDEX

STOCK NUMBER	FIGURE NO.	ITEM NO.	STOCK NUMBER	FIGURE No.	ITEM NO.
4730-00-050-4203	8-3	22			
4030-00-149-5574	8-3	36			
5310-00-167-0804	8-3	14			
5310-00-167-0814	8-3	10			
5310-00-167-0843	8-3	38			
5310-00-176-8115	8-3	37			
5315-00-236-8353	8-3	39			
5315-00-285-7161	8-3	26			
5310-00-451-9021	8-3	27			
5310-00-515-8449	8-3	17			
5315-00-839-2326	8-3	11			
5310-00-644-4872	8-3	16			
5365-00-845-2200	8-3	25			
5310-00-881-0943	8-3	13			
4010-01-101-8639	8-3	42			
4920-01-191-4921	9-3	18			
4920-01-195-0691	8-3	1			
1730-01-227-1750	8-2	1			
4920-01-236-9836	8-3	2			
4920-01-236-9837	8-3	3			
4910-01-236-9838	8-3	4			
4920-01-236-9839	8-3	5			
5306-01-241-3965	8-3	15			
S306-01-241-6298	8-3	12			
1730-01-252-0359	8-3	6			
5315-01-305-2691	8-3	41			
7530-01-324-9407	8-3	30			
4910-01-325-2975	8-3	19			
5340-01-325-5968	8-3	24			
2620-01-333-0249	8-3	29			

NATIONAL STOCK NUMBER AND PART NUMBER INDEX
PART NUMBER INDEX

CAGE	PART NUMBER	STOCK NUMBER	FIGURE NO.	ITEM NO.
88044	AN116-10	4030-00-149-5574	8-3	36
80044	AN320-12	5310-00-176-8115	8-3	37
88044	AN960-1216L	5310-00-167-0142	8-3	38
88044	AN960C416L	5310-00-515-7449	8-3	17
88044	AU960C616	5310-00-167-0104	8-3	14
99862	CL-21-KA-12-00-LR	4010-01-101-9639	8-3	42
96906	MS15001-1	4730-00-050-4203	8-3	22
96906	MS178326-20	5310-00-451-9021	8-3	27
96906	MS17984-610		8-3	40
96906	MS20392-4C63		8-3	9
96906	MS21043-4	5310-00-844-4872	8-3	16
96906	MS21043-6	5310-00-881-0943	8-3	13
96906	MS24665-281	5315-00-839-2326	8-3	11
96906	MS24665-306	5315-00-236-8353	8-3	39
96906	M824665-377	5315-00-285-7161	8-3	26
80205	NAS1149C0532R	5310-00-167-0814	8-3	10
80205	NAS1338C5C22D	5315-01-305-2691	8-3	41
80205	NAS6604-44	5306-01-241-3965	8-3	15
80205	NAS6606-44	5306-01-241-6298	8-3	12
97499	T101826-101	4920-01-195-0691	8-3	1
97499	T101826-103	4920-01-236-9836	8-3	2
97499	T101826-105	4920-01-236-9837	8-3	3
97499	T101826-107	4920-01-236-9838	8-3	4
97499	T101826-108	4920-01-236-9139	8-3	5
97499	T101827-27-101	4920-01-192-4921	8-3	18
97499	T101827-103	4920-01-325-2875	8-3	19
97499	T101827-104		8-3	20
97499	T101827-111	5340-01-325-5968	8-3	24
97499	T101827-127		8-3	21
97499	T101840-105	1730-01-227-1750	8-2	1
73842	15x6.00-6TT	2620-01-333-0249	8-3	29
2U979	19031		8-2	6
97499	204-050-165-1	5365-00-845-2200	8-3	25
97499	209-792-056-1	1730-01-252-0359	8-3	6
97499	214-052-171-101		8-3	28
97499	22-018B64-48-84		8-3	23
33269	40-140	2530-01-324-9407	8-3	30
97499	406-052-011-101		8-2	7
97499	406-052-018-101		8-3	7
97499	406-052-018-101		8-3	32
97499	406-052-019-101		8-3	33
97499	406-052-020-101		8-3	34
97499	406-052-021-101		8-3	8
97499	406-052-021-101		8-3	35
97499	406-052-200-101		8-2	2
97499	406-092-009-101		8-2	4
97499	406-092-103-101		8-2	5
97499	406-270-002-101		8-2	1
97499	406-270-003-101		8-2	9
97499	406-706-005-101		8-2	3
97499	406-706-209-101		8-2	10
97499	406-961-001-109		8-2	
25500	6.00-6		8-3	31

CAGE	PART NUMBER	STOCK NUMBER	FIGURE NO.	ITEM NO.

CHAPTER 9

EXTERNAL TRANSPORT BY HELICOPTER (AERIAL RECOVERY)

SECTION I. GENERAL

9.1 TYPE OF TRANSPORT.

Aerial recovery of an OH-58D/OH-58D(R) — series helicopter is performed with one of two kits: Aerial Recovery Kit (ARK) and Helicopter Recovery Kit (HRK). The following helicopters are used to recover disabled helicopters per the rotor head suspension method described in Section II.

ARK	HRK
CH-47 Series	
CH-54 Series	
H-53 Series	
UH-1 Series	
UH-60 Series	

Refer to FM 1-513 for specific information regarding types of transport.

9.2 FUNCTIONS OF THE HELICOPTER RECOVERY TEAM.

9.2.1 General. The helicopter recovery team is the most important element in the recovery and evaluation of a helicopter. Skilled personnel are required to recover helicopters, and much emphasis should be placed on the selection and organization of each recovery team. In counterinsurgency operational environments, a security force must accompany the recovery team, or be provided at the crash site, to defend against possible guerrilla or insurgent attack during recovery operation.

9.2.2 Primary. The primary functions of the helicopter recover team are:

a. Coordinate with the recovery helicopter crew the type, weight, location, and condition of the helicopter being recovered.

b. Provide all equipment and materials needed to prepare and rig the disabled helicopter.

c. Prepare and rig helicopter for transport.

d. Provide hookup of helicopter to recovery helicopter.

9.2.3 Specific. Refer to FM 1-513, Chapter 1 for specific functions of the helicopter recovery team.

9.3 EQUIPMENT REQUIREMENTS.

Refer to Appendix E for part number and national stock number information for tools and equipment required to accomplish helicopter aerial recovery. Refer to FM 1-513, Chapter 1 for ground crew equipment requirements.

9.4 MATERIALS REQUIREMENTS.

Refer to Appendix D for part number, national stock number, and unit of issue information for consumable materials required to accomplish helicopter aerial recovery. Refer to table 9-5 for specific materials requirements for aerial recovery using ARK (E-2). Specific materials requirements for aerial recovery using HRK (E-50) are listed in table 9-6.

9.5 MANPOWER REQUIREMENTS.

Refer to FM 1-513, Chapter 1 for manpower requirements for aerial recovery.

9.6 SAFETY.

Refer to FM 1-513, Chapter 1 for specific safety requirements for aerial recovery.

a. Eliminate fire hazards.

b. Disconnect batteries.

c. Remove weapons.

d. Remove ammunition.

e. Drain fuel as required.

f. Clear pickup site of all trees, obstacles, and trash.

g. Check for combustible gas.

h. Do not stand on rigged helicopter during hookup.

i. Safely discharge static electricity from the cargo hook prior to hookup.

SECTION II. SINGLE CARGO HOOK HARD POINT LIFT

9.7 GENERAL.

The only recovery method is the rotor head suspension method described in this section. Procedures for single cargo hook hardpoint lift using the rotor head suspension method are outlined in the following paragraphs. In addition to using ARK for aerial recovery, the helicopter may be recovered with HRK (E-50). In this configuration, the helicopter is lifted by the rotor hub with slings from a spreader bar which provides a load path around mast turret assembly (MTA). The helicopter is flown with the main rotor blades attached and tied down during the aerial recovery.

9.8 CHARACTERISTICS.

Table 9-1 lists all helicopters (with corresponding lift capabilities) that are used for helicopter aerial recovery.

9.8.1 Load Description. Table 9-2 provides the load description of the OH-58-series helicopters using either ARK or HRK.

9.8.2 Flight Parameters. Table 9-3 provides flight parameters that must be maintained by the recovery helicopter using ARK, and table 9-4 provides flight parameters that must be maintained while using HRK.

9.9 PREPARING THE HELICOPTER.

9.9.1 Tools and Equipment Using ARK (E-2). Table 9-5 lists the tools and equipment needed to accomplish an aerial recovery. Refer to Appendix E for part number and national stock number information.

9.9.2 Tools and Equipment Using HRK (E-50). Table 9-6 lists the tools and equipment needed to accomplish an interim unit maintenance aerial recovery. Refer to Appendix E for part number and national stock number information.

Table 9-1. Helicopters Used for Aerial Recovery

Helicopter	Lift Capability (pounds)
CH-47C	20,000
CH-47D	
Forward and aft hook	17,000 each
Tandem hook	25,000
Center hook	26,000
CH-54A	20,000
CH-54B	24,000
H-53	20,000
UH-60	8000
UH-1	4000

FM 1-513, Chapter 1 provides specific considerations for using these helicopters for aerial recovery.

Table 9-2. Load Description — Typical

Weights	Pounds
Empty weight	2935
With armor	3035
Combat weight	
No armament	3750
With Armament	4840 — 5140

Table 9-2. Load Description — Typical (Cont)

Dimensions	Feet	Inches
Length with blades displaced or removed	33	8-1/4
Height with MTA	13	3/4
Height without MTA	9	6-3/4
Tread	6	5-3/4

Table 9-3. Flight Parameters Using ARK

Maximum speed	50 knots
Optimum speed	40-50 knots
Maximum angle of bank	20°
Rate of climb and descent	500 feet per minute

Table 9-4. Flight Parameters Using HRK

CH-47

Maximum air speed with main rotor blades on or removed: 30 knots
Maximum angle of bank: 20 degrees
Maximum rate of climb: 1000 feet per minute
Maximum rate of descent: 1000 feet per minute

UH-60

Maximum air speed with main rotor blades on or removed: 30 knots
Maximum angle of bank: 20 degrees
Maximum rate of climb: 1000 feet per minute
Maximum rate of descent: 1000 feet per minute

Table 9-5. Required Materials Using ARK

Quantity (each)	Description
2	Cargo sling, 12 feet long
2	End Chain Link
1	Static discharge wand
4	Sling straps, 4 feet long
1	Sling link
1	Nylon rope, 33 feet (1-1/2 inch-diameter)
1	Drogue chute (60-inch diameter)

Other required materials

Helicopter Rescue Sling FE14198G102 (E-35) (4 each)
End Chain Link NAS 1049-14 (E-20)
Pressure Sensitive Adhesive Tape (D-30) (2.0-inch)
Tubular nylon
Turret hoist fixture (FSN 4920-01-231-8508); MTA cover (P/N ID 49625-1)
Tools for component removal (TM 1-1520-248-23)
Radio
Axes
Sandbags
Flashlight
Goggles (NSN 4240-00-052-3776)
Earplugs (NSN 4240-00-759-3290)
Rubber gloves (NSN 8415-00-266-8677)
Applicable technical manuals for helicopter or component disassembly

Table 9-6. Required Materials Using HRK

Quantity	Description
(each)	
1	Lift sling, 100-foot
1	Helicopter rescue sling
1	Aircraft cargo tiedown
2	Apex fitting assy, 25K
4	Blade tiedown boot, OH-58D
4	Securing line
1	Adhesive Pressure sensitive tape (roll)
2	Combination wrench, 9/16 inch
1	OH-58D Helicopter hoisting sling assembly

9.9.3 Consumable Materials. Consumable materials required for performing aerial recovery using either ARK (E-2) or HRK (E-50) are listed as requried materials in tables 9-5 and 9-6.

9.9.4 Manpower Requirements. Refer to FM 1 513, Chapter 1 for aerial recovery manpower requirements.

9.10 DISASSEMBLY.

No disassembly of the helicopter is required to perform an aerial recovery. Using either ARK (E-2) or HRK (E-50), it is intended that the helicopter remain intact for aerial recovery. If any disassembly is needed, refer to the appropriate chapter in TM 1-1520-248-23.

9.11 LOAD PLAN.

Not applicable.

9.12 RIGGING.

Rigging consists of pre-rigging procedures and actual rigging procedures. The following paragraphs describe these procedures using the ARK (E-2) and HRK (E-50).

9.12.1 Pre-Rigging Using ARK.

a. Disconnect the battery (FM 1-513).

b. Disarm and unload the weapons (FM 1-513).

c. Remove the four main rotor blades and store them in the recovery aircraft.

d. Turn the tail rotor blades until they are parallel to the tailboom. Lash the tail rotor blade to the tailboom using nylon rope or tubular nylon.

e. Attach two turns of tubular nylon or nylon rope to the tailboom adjacent to the vertical fin to provide an attachment for the drogue chute. Ensure rope is not wrapped around HF antenna under tailboom.

f. Remove and prepare mast mounted sight for transport in the recovery aircraft (TM 9-1240-778-23).

9.12.2 Rigging Using ARK (E-2). (Figure 9-1)

a. Add weight required for ballast at the nose section of the helicopter (500 pounds, approximately).

b. Install sling assembly.

(1) Place one end of webbing strap (E-33) through clevis assembly (E-19). Pass other end of strap under upper main rotor yoke and back to clevis assembly.

(2) Repeat for three more straps.

(3) Secure clevis assembly with attaching hardware.

c. Drain all remaining fuel from the disabled helicopter, as required (FM 1-513).

d. Attach the drogue chute to the tubular nylon or nylon rope previously secured to the tailboom for this purpose.

CAUTION

Do not allow clevis assembly to strike aircraft while rigging for lifting.

e. Using two 12-foot cargo slings with a shackle assembly at the top and a shackle assembly with a sling link at the bottom, attach the top shackle to the helicopter lifting the helicopter.

f. Adjust ballast as necessary to maintain proper helicopter attitude.

9.12.3 Pre-Rigging Using HRK (E-50).

a. Determine if the downed helicopter is a candidate for recovery by the HRK (E-50). If the helicopter is upright, with no obvious damage to the rotor head, transmission mounts or serious structural damage to the tailboom, HRK can be used.

b. Attach one securing line to each of the blade tiedown boots.

c. Rotate the main rotor head so that the main rotor blades are at a 45-degree angle to the longitudinal axis of the fuselage. Slip one tiedown boot with the securing line attached over each of the main rotor blades. Secure blade tiedown boot to the rotor blade with one wrap of pressure sensitive tape to prevent it from blowing off due to downwash from the lifting helicopter. Rotate the tail rotor blade slightly, if needed, to align one end of the tail rotor blade with the tailboom.

CAUTION

The downward deflection of the main rotor blade due to tension in the securing lines should be about 6 inches and must not exceed 12 inches. Excessive tightening could result in blade and/or rotor head damage.

d. Tie the free ends of the forward main rotor blade boot securing lines to the forward skid crossover tubes. Tie the free ends of the aft main rotor blade boot securing lines to the aft skid crossover tubes. Secure the free ends of all the securing lines with pressure sensitive tape.

9.12.4 Rigging Using HRK. (Figure 9-2.)

CAUTION

Exceeding the flight parameters listed in this procedure for any reason necessitates replacing the main rotor blades on the recovered helicopter.

a. Center the OH-58D helicopter hoisting sling over the mast turret assembly and secure the lower (shorter) slings to the upper hub spokes. Apply three twists to each sling leg before attaching to the large hooks.

b. Apply five twists to the upper straps and secure the small hooks to the pear ring.

NOTE

Twisting the upper and lower straps is important to prevent aerodynamic induced flapping and vibration.

c. Criss cross two strips of pressure sensitive tape across tube hub of the OH-58D helicopter hoisting sling spreader bar to secure it to the mast turret assembly.

d. Band the upper straps together using the pressure sensitive tape at 2-foot intervals and drape the straps and the pear ring on the downwind side fo the recovered helicopter to the rear quarter (between the aft main rotor blades and the tailboom assembly).

e. Attach one end of the helicopter rescue sling to the pear shaped ring by a choked connection.

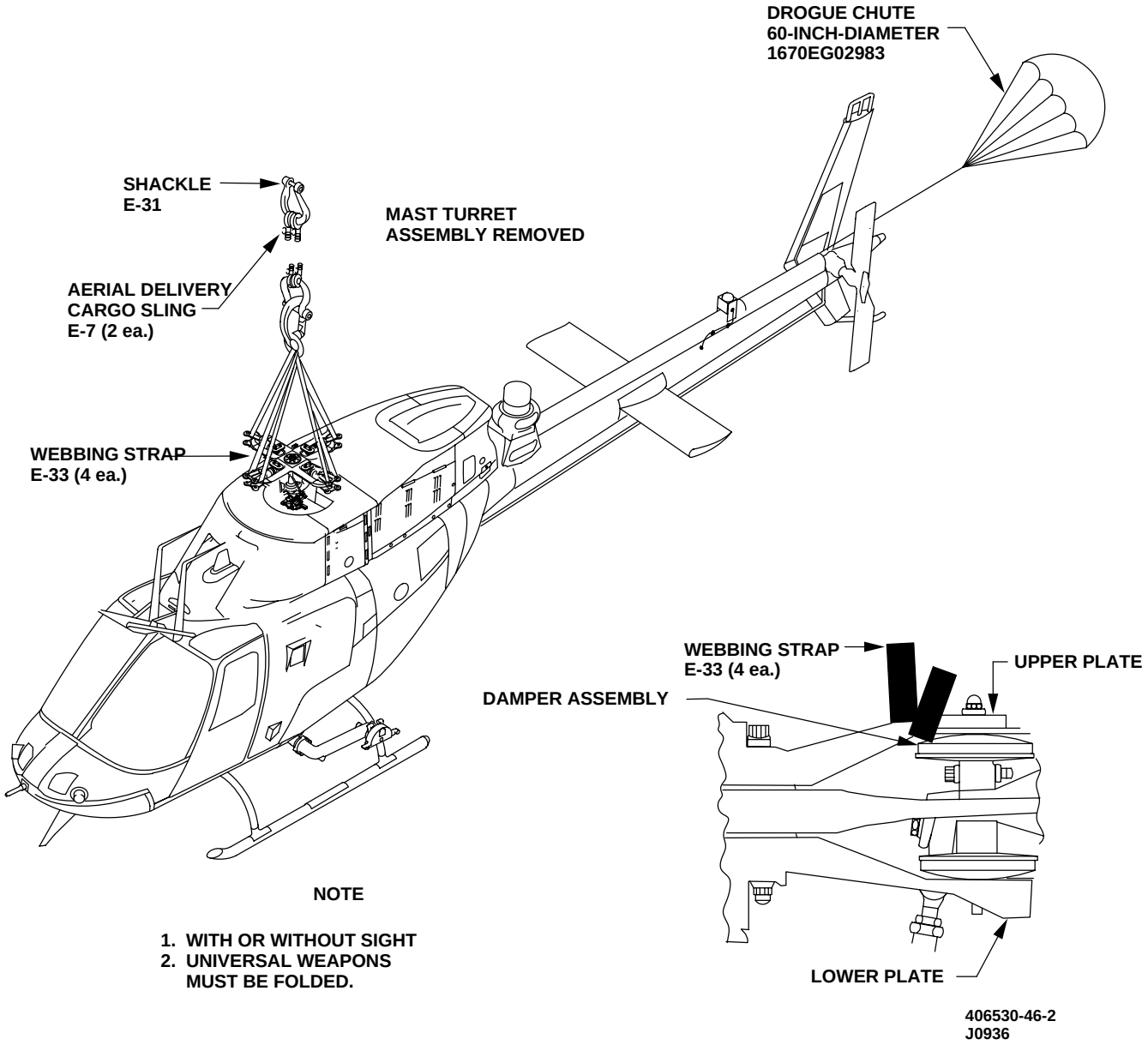
f. Pass one end of the 5K aircraft cargo tiedown strap through the tailboom vertical fin and the 90-degree gearbox support bracket. Pass the other end of the 5K aircraft cargo tiedown strap through the eye in other end of the 30-foot lift sling. Hook both ends of the 5K aircraft cargo tiedown strap together to form a continuous loop through the support bracket and then through the eye in the end of the helicopter rescue sling. Adjusting the length of the 5K aircraft cargo tiedown strap such that they eye of the sling is 2 feet from the support bracket when pulled toward the rotor head. Secure this connection with several wraps of pressure sensitive tape.

g. Using the two 9/16-inch combination wrenches provided, remove the locknut and bolt from the apex fitting pin on the 25K apex fitting assembly. Remove apex fitting pin and spacer from the apex fitting assembly and retain for reassembly.

h. The recovered helicopter is now ready for the ground rigging crew to hook up to the recovery helicopter by passing one end of the 25K apex fitting through the pear shaped ring and the eye in the lower end of the 100-foot lift sling connected to the recovery helicopter. Hold the spacer previously removed from the assembly in line with the apex fitting pin holes in the apex fitting and insert the apex fitting pin through the apex fitting and spacer and secure the apex fitting pin in place by inserting the bolt through the hole in the end of the apex fitting pin. Retain the bolt by installing the locknut previously removed. Tighten the locknut with the two 9/16-inch combination wrenches provided.

CAUTION

AFTER COMPLETION OF THE RECOVERY, ENSURE THAT THE HELICOPTER IS FIRMLY ON THE GROUND AND HAVE GROUND CREWMEMBER HOLD THE SHACKLE ASSEMBLY BEFORE DISCONNECTING THE SLING LINK TO PREVENT THE SHACKLE FROM SHIFTING AND DAMAGING THE HELICOPTER.



NOTE

1. **WITH OR WITHOUT SIGHT**
2. **UNIVERSAL WEAPONS MUST BE FOLDED.**

Figure 9-1. Rotor Head Suspension Rigging Configuration — ARK

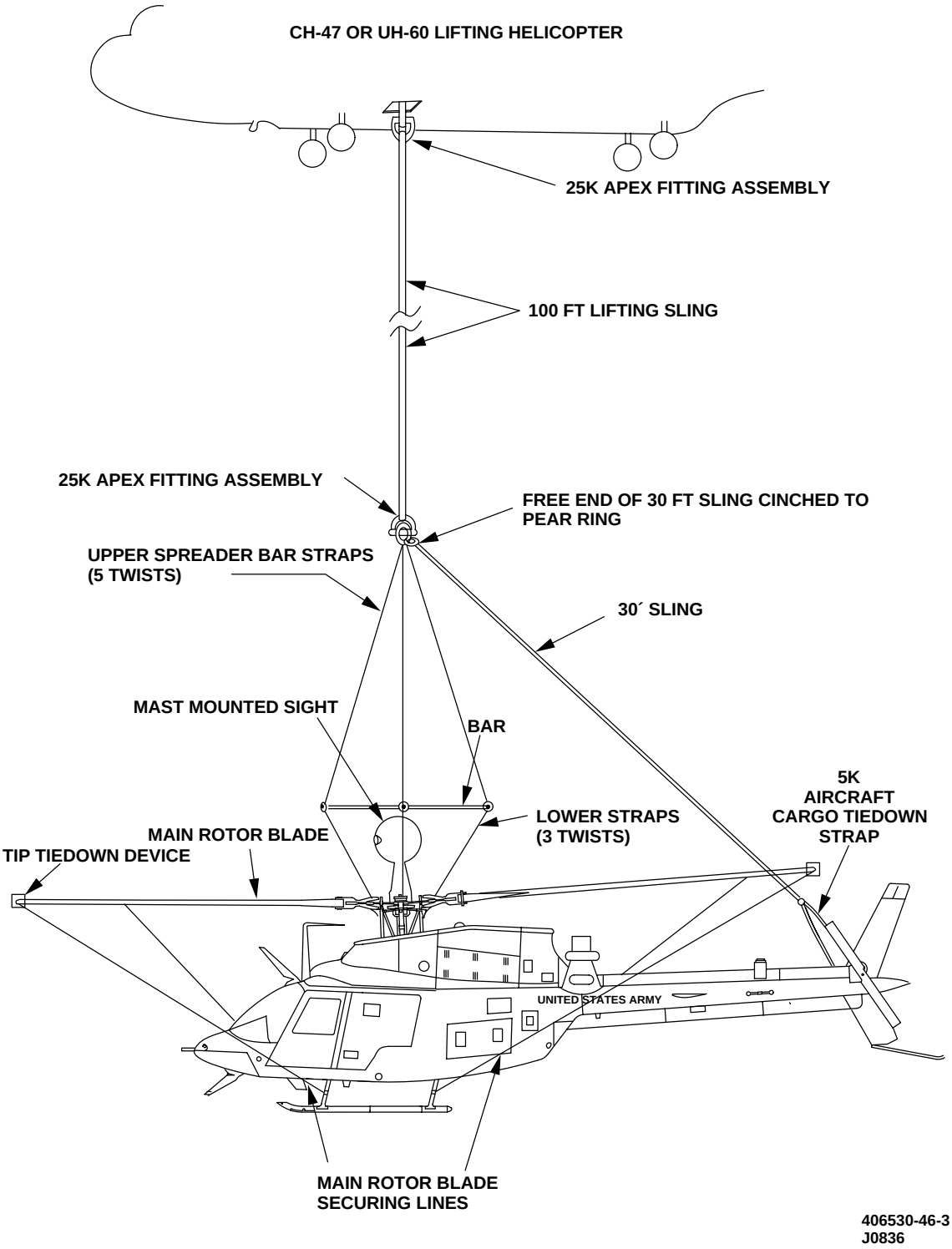


Figure 9-2. Rotor Head Suspension Rigging Configuration — HRK

9.13 HOOKUP.

a. Perform hookup procedures per FM 1-513, Chapter 1.

b. Perform lift-off procedures per FM 1-513, Chapter 1.

9.14 ASSEMBLY.

9.14.1 Recovered Helicopter Delivery.

a. Upon reaching the destination with the recovered helicopter, the recovery helicopter must come to a hover with the load a few feet off the ground. It is important that the hover time be brief to reduce the tendency for the recovered aircraft to start to spin.

b. After the recovered helicopter has been lowered onto the ground, the recovery helicopter hovers to the side. The recovery helicopter crewman must direct the pilot to maneuver to a point where the recovery sling can be released from the hook and not dropped onto the recovered helicopter.

9.14.2 Post Recovery Inspection. Use special inspections in TM 1-1520-248-23, chapter 1 to perform post-recovery inspections.

9.14.3 Assembly. No special assembly procedures are required. Refer to the appropriate chapter in TM 1-1520-248-23 if any assembly is needed.

APPENDIX A

REFERENCES

Publication Number	Title
AR 40-12	Quarantine Regulations of the Armed Forces
AR 55-162	Permits for Oversize, Overweight, or Other Special Military Movements on Public Highways in the United States
AR 700-42	Classification, Reclassification, Maintenance, Issuance, and Reporting of Maintenance Training Aircraft
AR 750-31	Technical Publications for Aircraft Files
DA Form 2408-13-1	Aircraft Inspection and Maintenance Record
DA Form 2408-13-2	Related Maintenance Actions Record
DA PAM 738-751	Functional Users Manual for the Army Maintenance Management System - Aviation (TAMMS-A)
DD Form 1387-2	Special Handling Data/Certification Label
FM 1-513	Battlefield Recovery and Evacuation of Aircraft (T.O. 00-80C-3)
FM 10-67-1	Concepts and Equipment of Petroleum Operations
MIL-STD-129N	Standard Practice For Military Marking
SB 708-42	Federal Supply Code for Manufacturing; United States and Canada--Code to Name (H4-2) {GSA-FSS-H4-2} (24X Microfiche) (2-PT)
TB 1-1520-248-20-37	Installation of Landing Gear Support Assembly On All OH-58D Helicopters
TM 1-1500-204-23 (series)	General Aircraft Maintenance Manual
TM 1-1520-248-MTF	Maintenance Test Flight Manual
TM 1-1520-248-PPM	Progressive Phase Maintenance Inspection Checklist and Preventive Maintenance Services
TM 1-1520-248-10	Operator’s Manual for Army OH-58D Helicopters
TM 1-1520-248-23	Aviation Unit and Intermediate Maintenance Manual
TM 1-1520-248-23P	Aviation Unit and Intermediate Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools) For Helicopter, Observation OH-58D NSN 1520-01-125-5476
TM 1-2840-263-23	Operation and Maintenance Manual for Model 250-C30/R3 Engine
TM 5-632	Military Entomology Operational Handbook

TM 9-1090-214-23 & P	Aviation Unit and Intermediate Maintenance Manual for Armament Subsystems
TM 9-1240-778-23	Aviation Unit and Aviation Intermediate Maintenance Manual for Mast Mounted Sight Subsystem (MMSS)
TM 11-1520-248-23	Aviation Unit and Intermediate Maintenance Manual for Electronic Equipment Configuration Army Model OH-58D Helicopters
TM 38-250	Preparing Hazardous Material for Military Air Shipments
TM 55-1500-345-23	Painting and Marking of Army Aircraft
TM 55-2840-256-23	Aviation Unit and Intermediate Maintenance Manual for Model T703-AD-700B Engine
---	International Maritime Organization Dangerous Goods Code

APPENDIX B

PRESERVATION/DEPRESERVATION CHECKSHEET

B.1 GENERAL.

Refer to Chapter 1, Section VII for preparing and dispositioning preservation/depreservation checksheets. Checksheets for use after transport by cargo aircraft, vessel, truck, or helicopter (during external transport) can be locally reproduced. DA Form 2408-13-1 (Preservation/Depreservation Checksheet) to be used.

APPENDIX C

WEIGHT AND BALANCE INFORMATION FOR TRANSPORTABILITY

C.1 GENERAL.

A computational method of determining weight and balance is not approved at this time. Procedures will be provided when approved.

APPENDIX D

CONSUMABLE MATERIALS LIST

NOTE

Method of shipment dictates materials and amounts required. Any given material may have different lenghts, widths, thicknesses, etc., and so have more than one NSN. Thus, the following NSNs are for guidance only.

No.	Nomenclature	NSN	Part No. Specification No.	Source	Unit of Issue
D-1	Envelope, Packaging	8105-00-274-2390	MIL-B-121, Type I, Class C		As Reqd
D-2	Barrier Material, Greaseproof,Waterproof, Flexible	8135-00-753-4661	MIL-B-121, Type I, Class 2, Grade A		Roll
D-3	Barrier Material, Greaseproof Flexible	8135-01-321-6272	MIL-B-131, Class		Roll
D-4	Polish, Plastic	7930-00-634-5340	P-P-560		As Reqd
D-5	Cleaning Compound, Aircraft Fuselage	6850-01-045-7931	MIL-C-43616		55 Gal Drum
D-6	Corrosion Preventive Compound, Cold Application	8030-00-231-2345	MIL-C-16173, Class I, Grade 1	Commercial	As Reqd
D-7	Corrosion Preventive Compound, Cold Application	8030-00-244-1297	MIL-C-16173, Class II, Grade 2	Commercial	As Reqd
D-8	Corrosion Preventive Compound, Cold Application	8030-00-526-1605	MIL-C-16173, Class I, Grade 4		As Reqd
D-9	Cushioning Material	8135-00-028-8634	PPP-C-843		As Reqd
D-10	Cushioning Material, Packaging	8135-01-187-6615	PPP-C-1752, Type III, Class 1		As Reqd
D-11	Cushioning Material, Packaging	8135-01-187-6615	PPP-C-1752, Type III, Class 1		As Reqd
D-12	Cushioning Material, Packaging, Plastic Polyurethane,	8135-01-184-7169	MIL-P-26514, Type II, Class 1		As Reqd
D-13	Cushioning Material, Polypropylene	8135-00-300-4905	PPP-C-1797, Type I		As Reqd
D-14	Drycleaning Solvent	6850-00-285-8011	P-D-680, Type II	Commercial	As Reqd
D-15	Box, Shipping	8115-01-126-1383	PPP-B-636		As Reqd

(Cont)

No.	Nomenclature	NSN	Part No. Specification No.	Source	Unit of Issue
D-16	Gloves, Welder's	8415-00-269-0433	AA-50022		As Reqd
D-17	Hydraulic Fluid, Petroleum Base	9150-00-935-9807	MIL-H-6083		As Reqd
D-18	Insecticide, Dichlorvos Strips	6840-00-142-9438	DOD-I-51323, Type III		As Reqd
D-19	Lockwire, Steel, Corrosion, Resistant (0.032 Diameter)	9505-00-293-4208	MS20995-C32	Commercial	1 Roll
D-20	Lubricating Oil Aircraft, Turbine	9150-00-231-6676	MIL-L-6081	Commercial	55 Gal Drum
D-21	Plastic Sheet	8135-00-579-6487	L-P-378		As Reqd
D-22	Heat Shrinkable POL	8135-01-250-2301	8135SDP000-2		As Reqd
D-23	Plastic Sheet	8135-01-250-4931	8135SDP000-1		As Reqd
D-24	Plywood, Aircraft, Flat Panel	*	MIL-P-6070	Commercial	As Reqd
D-25	Cushioning Material, Packaging	8135-00-180-5922	PPP-C-1752		As Reqd
D-26	Rodenticidal Bait, Anticoagulant	6840-00-089-4664	Cut Sheet 6840-00-089-4664		As Reqd
D-27	Strapping	8135-00-956-2151	ASTM D 3950-87		As Reqd
D-28	Tag, Shipping	8135-00-292-2345	A-A-1266		As Reqd
D-29	Plastic Strip	7510-01-250-2299	7510SDP000-1		As Reqd
D-30	Tape, Pressure Sensitive, Adhesive	8135-00-266-5016	PPP-T-60, Type IV, Class 1		As Reqd
D-31	Vent, Stick-On	8115-01-255-3445	BSV-1		As Reqd

* To obtain the appropriate flat panel aircraft plywood (D-24) thickness required throughout this manual, refer to the following list of NSNs when referring to an individual size.

¼" thickness — 5530-00-266-4027
⅜" thickness — 5530-00-266-4019
½" thickness — 5530-00-274-4090
¾" thickness — 5530-00-274-4088

APPENDIX E

SPECIAL TOOLS AND EQUIPMENT LIST

No.	Nomenclature	NSN	Part No.	Remarks
E-1	Strap, Webbing	5340-00-980-9277	10900880 (19207)	
E-2	Recovery Kit, Aerial (ARK)	1670-00-264-8941	1670EG109A (81996)	
E-3	Bolt, Machine	5306-00-182-1926	AN4H5 (88044)	6 reqd
E-4	Bolt, Machine	5306-00-180-2705	AN4H22 (88044)	3 reqd
E-5	Bolt, Machine	5306-00-180-2672	AN5H22A (88044)	3 reqd
E-6	Sling and Wire Rope Assembly Set	3940-01-397-1860	406-092-103-101 (97499)	
E-7	Sling, Cargo, Aerial Delivery	1670-01-027-2900	38850-00001-044 (56646)	Note 2
E-8	Shipping and Storage Container, Helicopter	8145-01-227-9530	406-015-001-MUSC1 (97499)	
E-9	Cylinder, Compressed Gas, Butane-Propane	8120-00-530-5225	RR-C-910/2 (81348)	
E-10	Helicopter Ground Handling Trucks	1730-00-980-9552	1730-EG-100 (28510)	AVUM
E-11	Heat Gun, Propane	4940-01-250-2300	3540SDP000-1 (81996)	
E-12	Jack, Aircraft Landing Gear	1730-00-540-1238	53D22034 (80049)	
E-13	Jack, Screw, Hand	5120-01-420-2440	19031 (2U979)	
E-14	Jack, Hydraulic, Tripod	1730-00-734-9382	MIL-J-58094 (81349)	3 reqd
E-15	Tool Set, Aircraft Armament Repairer's Basic	5180-00-987-9816	SC5180-95-CL-B09 (19204)	AVUM/AVIM
E-16	Kit, Air Transportability (consisting of E-32, E-33, E-39, E-40, E-41, and E-42)		406-706-209-101 (97499)	
E-17	Tool Set, Main Rotor	1730-01-227-1750	T101840-105 (97499)	
E-18	Safety Knife	7330-01-255-3444	15 (OA4E6)	

(Cont)

No.	Nomenclature	NSN	Part No.	Remarks
E-19	Clevis Assembly	1680-00-543-7292	T101897 (97499)	
E-20	Link, Chain, End	4010-00-714-6107	NAS 1049-14 (80205)	Note 2
E-21	Combustible Gas Indicator Set	6665-00-664-4650	89220 (55799)	
E-22	Mast Mounted Sight Hoist See Fig. G11 TM 1-1520-248-23P		406-070-108-101	
E-23	Mast Mounted Sight Platform See Fig. G10 TM 1-1520-248-23P		406-070-100-101	
E-24	Sling, Eye	3940-01-398-8951	406-092-009-101 (97499)	
E-25	Mast Sight Hoist	1730-01-265-1825	ES-C-38609 (16250)	
E-26	Nut, Self-locking, extended washer	5310-00-807-1475	MS21042L4 (96906)	3 reqd
E-27	Nut, Self-locking, Extended washer	5310-00-807-1476	MS21042L5 (96906)	6 reqd
E-28	Ramp Assembly, Aft, Aircraft	1560-01-444-9036	406-070-063-101 (97499)	3 reqd Note 3
E-29	Spreader Bar		20090327-1	Note 1
E-30	Shackle, Ground Hand	1730-01-252-0359	209-782-056-1 (97499)	2 reqd Kit (AVIM) E-16 Kit, Air Transportability 406-706-209-101 (TP)
E-31	Shackle	4030-00-286-3518	AN116-10 (88044)	4 reqd Kit (AVIM) E-16 Kit, Air Transportability 406-706-209-101 (TP)
E-32	Shackle	4030-00-072-1072	204-031-464-1 (97499)	3 reqd
E-33	Strap, Webbing	5340-01-333-4703	FE14198G102 (01276)	Note 2, 4 reqd
E-34	Sling, Aircraft Maintenance	1730-01-236-9827	T101284-107 (97499)	
E-35	Sling, Rescue, Helicopter	1670-01-388-3917	PRS5E030 (81996)	Note 1
E-36	Spacer, Sleeve	5365-00-810-1744	NAS43HT4-64 (80205)	3 reqd on bolts
E-37	Strap, Nylon	5340-01-366-4681	DAA7249D059-001 (IW025)	

(Cont)

No.	Nomenclature	NSN	Part No.	Remarks
E-38	Strap, Tiedown, Electrical Component	5975-00-111-3208	MS3367-5-9 (96906)	AVUM
E-39	Support Fixture	4920-01-192-4921	T101827-101 (97499)	Kit (AVIM) E-16 Kit, Air Transportability 406-706-209-101 (TP)
E-40	Support Fixture	4920-01-195-0691	T101826-101 (97499)	Kit (AVIM) E-16 Kit, Air Transportability 406-706-209-101 (TP)
E-41	Rope, Fibrous	4020-00-928-3438	C1832 (88001)	25 ft rope
E-42	Support, Aircraft, Tail	1730-00-168-5555	1730MKC001 (81996)	
E-43	Tiedown, Cargo, Aircraft	1670-00-725-1437	SP4212-1 (08484)	
E-44	Adjuster Assembly, Tension	1670-00-212-1149	45024-13 (31272)	
E-45	Tie Down, Cargo, Aircraft	1670-00-516-8405	627728A (13743)	
E-46	Tow Bar, Aircraft	1730-00-967-9556	AA1730-1251 (81996)	AVUM
E-47	Plate, Transmission Cover Lift	4920-01-185-9023	T103314-101 (97499)	
E-48	Tool Kit, Aircraft Maintenance, General Mechanic	5180-01-375-6925	SC5180-99-B01 (81996)	
E-49	Fixture, Aircraft Maintenance	4290-01-236-9841	T103353-101 (97499)	
E-50	Recovery Kit, Helicopter (HRK)	1670-01-414-8114	1670EG20090123 (81996)	
E-51	Washer, Flat	5310-00-167-0740	G169-416 (20418)	6 reqd
E-52	Washer, Flat	5310-00-184-9001	AN960PD416L (88044)	6 reqd
E-53	Washer, Flat	5310-00-187-2399	7723550-1 (92003)	6 reqd

Note 1: Component of HRK, NSN: 1670-01-414-8114

Note 2: Component of sling assembly, NSN: 1730-01-236-9827

Note 3: All questions concerning ramps should be addressed to the following:

(Cont)

No.	Nomenclature	NSN	Part No.	Remarks
	COMMANDER U.S. ARMY AVIATION and MISSILE COMMAND ATTN: AMSAM-DSA-ASH-L Redstone Arsenal, AL 35898-5000			DSN 645-7971 Comm (205) 955-7971

APPENDIX F

QUARANTINE INSPECTION/CUSTOMS CLEARANCE

F.1 SCOPE. This appendix provides procedures necessary to prepare helicopter (including removed components which are packed separately) for quarantine inspection and deprocessing of such equipment at destination. This appendix is not a directive; it was derived from existing regulations and is presented in a convenient form for your information. AR 40-12 and TM 5-632 should be checked periodically for possible changes.

F.2 PREPARATION OF MATERIAL FOR QUARANTINE INSPECTION.

a. All equipment and/or containers will be completely free of soil when loaded on ships or aircraft.

b. All containers, such as CONEX, sea vans, and other containers will be cleared of all spilled grain, food, and soil before being loaded with retrograde cargo or returned empty to CONUS.

c. Wooden containers and packing materials will be inspected for termites, wood borers, and other insect infestations before being packed in larger containers or loaded on ships or aircraft. Under no circumstances will infested wood or packing material be used.

d. All containers and packing material will be inspected immediately prior to packing to assure the absence of rodents, snakes, and other animals and insects.

e. Only authorized packing material will be used. In no instance will native grasses or fiber be used. All packing material will be stored to prevent infestation by insects and rodents.

WARNING

To prevent injury, personnel involved in handling and placing insecticides and rodenticides shall wear rubber gloves, protective clothing, and respirators and be properly instructed in their handling.

f. Dichlorvos strips will be attached to the interior of each closed container, wood or metal, in excess of 10 cubic feet, at a rate of 5 linear inches of strips per CONEX. Initial procurement will be 2-inch strips which should be used at the rate of three per CONEX. Equal or lesser amounts should be used for smaller containers. Crates or boxes with small vent holes and helicopters that cannot be completely sealed will have slightly larger amounts used per container.

NOTE

All accessible areas within a helicopter will be considered a closed container.

(1) Dichlorvos strips operate by the release of vapor and should not be used in open containers.

(2) The following supply information is furnished:

NSN	Item Description
6840-00-142-9438	Insecticide, Dichlorvos Strip 2-inch (D-18)
U/I	NICP
144/CASE	DGSC

g. Retrograde helicopters will be treated as follows:

NOTE

All accessible areas within a helicopter will be considered a closed container.

(1) Dichlorvos strips, 2-inch, will be used for insect control in helicopters that have been sealed while being processed for return to the United States. The insecticide strips will be used as follows:

Helicopter	Dosage
OH-58D	Five 2-inch Strips

When multiple numbers of strips are used, they will be suspended in different sites rather than in a single location.

WARNING

To prevent injury, personnel involved in handling and placing insecticides and rodenticides shall wear rubber gloves, protective clothing, and reprirators and be properly instructed in their handling.

(2) One each 8 ounces anticoagulent rodenticidal bait (D-26) will be placed near the door of the helicopter. The red tape that is attached to the block will be led to the outside of the helicopter in such a manner as to be clearly visible when the door is sealed.

h. All open containers of more than 10 cubic feet that will be shipped separately will be treated as follows: 8 ounces anticoagulent rodenticidal bait (D-26) will be used in containers.

(1) One block will be placed near the center of each CONEX or applicable smaller container. The red tape attached to the block will be led to the outside of the container in such a manner as to be clearly visible when the container is closed.

(2) Large vans of the Sea/Land type will be treated as follows:

(a) Three blocks are to be used per loaded van, evenly spaced throughout the length of the van. The block nearest to the door shall have its red tape led to the outside so as to be clearly visible.

(b) Empty vans meeting the following conditions do not require the use of bait blocks: vans which have been swept out and sealed by the van line operator, vans free from holes through which rodents could gain entry, and vans with tight fitting doors. Empty vans do not meet all of the above conditions require one bait block.

i. Large items of equipment such as helicopters will have the enclosed areas treated in accordance with paragraphs f. and g., above.

NOTE

All accessible areas of helicopters, including the tailboom, will be treated.

j. Supplies and equipment should be available in the command.

k. In the event these instructions vary with the command regulations regarding shipment of retrograde cargo, the command entomologist should be consulted. Technical assistance and advice regarding these instructions should be obtained from the command entomologist.

F.3 DEPROCESSING OF TREATED MATERIAL.

a. Collection and disposal of insecticides and rodenticides will be accomplished during depreservation of the helicopters.

(1) All containers and vehicles which have red tape extending from them contain one or more blocks of rodenticide, diphacin paraffin, with red tape attached. Removal of this material is necessary before individual items are unpacked or equipment processed.

(2) The procedures will be as follows:

WARNING

To prevent injury, personnel involved in handling and placing insecticides and rodenticides shall wear rubber gloves, protective clothing, and reprirators and be properly instructed in their handling.

(a) When opening a container treated with rodenticide bait blocks, a vacuum cleaner will be used to collect the rodenticide residue as individual items or packages are removed from the container. The rodenticide residue should be removed from each package.

(b) After all contents of the container have been removed and cleaned, the inner surfaces of the container will be vacuumed to remove all remaining residue.

(c) All rodenticide bait blocks will be removed during depreservation.

(d) All dichlorvos strips and bait blocks will be stored in seperate closed containers for collection by the post engineer for proper disposal.

b. The post engineer or post surgeon should be notified immediately if living or dead insects, rodents, or other animals are found during depreservation.

APPENDIX G

HEAT SHRINK FILM PROTECTIVE COVERING

G.1 GENERAL.

a. This appendix provides procedures necessary to assist personnel in the installation of protective covering on OH-58D/OH-58D(R) helicopters during transport via vessel.

b. Plastic heat shrink films, materials, and equipment as listed in Appendixes D and E have been approved for use in the protection of helicopters from corrosion, salt water spray, dirt, dust, and foreign objects.

c. Protective covering is required for all helicopters shipped on a vessel and in areas that may be subjected to salt laden spray. Helicopters shipped under hatch covers shall be protected with plastic sheets as a minimum. Protective covering of helicopters shipped below deck is the option of the Commander. The Commander's decision on the amount of protection required will be based on the resources available and below deck environment of the vessel used for shipment. For helicopters shipped below deck, it is approved to partially cover helicopter and/or partially shrink the heat shrinkable POL (D-22) and sheet plastic (D-23).

d. Protective covering will be applied to those helicopters being shipped by tractor-trailer truck on highways. The level of protective covering required for short distance shipments by military truck will be determined by shipper.

e. The helicopters will be disassembled, preserved, and prepared for shipment (Chapter 6).

f. Installation of protective covering is the responsibility of shipper.

g. When applying the heat shrink film protective covering, sufficient working space around the helicopters shall be provided to move maintenance stands, ladders, supplies, and equipment.

h. In addition to the equipment listed in Appendix E, it is essential that an adequate number of maintenance stands are available for preparation and covering of helicopters. There should be two stands for each helicopter being prepared at a given time. For uncovering process, a single maintenance stand shall be adequate.

i. Ensure that adequate waste receptacles are available for waste film and cushioning materials, for both covering and uncovering.

j. Environmental conditions of rain and wind cause considerable difficulty in the application of the helicopter protective covering, and should be avoided if possible. Although the preferred method of covering is outdoors, the covering is approved for installation indoors providing the safety precautions of paragraph G.2 are adhered to.

k. For planning purposes, one OH-58D/OH-58D(R) will require approximately 85 feet of 14 foot-wide plastic sheet (D-23), two rolls of plastic strip (D-29), 1/2 roll of cushioning material (D-9), five stick-on vents (D-31), five pounds of propane, and 200 feet of strapping (D-27).

l. The optimum number of personnel for covering procedure is three per helicopter. One helicopter will require 3 people approximately 6 hours to cover. With experience, elapsed time can be reduced to approximately 5 hours. Adverse weather conditions and/or dirty (oily) helicopters will increase the optimum time. It is highly recommended that personnel become thoroughly familiar with the heat shrink process prior to working on a helicopter. This can be accomplished by applying the general procedures to available objects such as boxes or crates for practice.

G.2 SAFETY.

The minimum safety procedures listed below shall be followed to ensure a safe heat shrink operation.

a. Comply with all safety procedures outlined in applicable chapters of this manual.

b. Ground the helicopter (TM 1-1520-248-23, Chapter 1).

c. Ensure that the fuel tank levels are properly adjusted for shipping (maximum 1/2 capacity or 53.5 gallons per tank, whichever is less).

d. Seal fuel filler ports, vents, drains, and battery vents prior to covering helicopter.

e. Provide fire truck and adequate fire fighting equipment on site and ready for use prior to operating the propane heat gun (E-11).

f. Ensure that the helicopter exterior and the adjacent area is free of fuel and other combustibles prior to operating the propane heat gun (E-11).

g. The helicopter shall be covered outdoors if environmental conditions permit. The covering procedure may be accomplished in hangar if the following additional procedures are adhered to.

(1) The area must be well-ventilated.

(2) No other helicopter shall be within 50 feet of the helicopter being covered.

(3) No other maintenance operations shall be permitted in the hangar while the helicopter is being covered.

WARNING

To prevent injury while operating propane heat gun, welder gloves (D-16) shall be worn.

h. Prior to the operation of the propane heat gun (E-11), the helicopter and adjacent areas shall be tested with an combustible gas indicator set (E-21) (or equivalent) for combustible vapor. The areas to be tested on the helicopter are the fuel filler, drain, vent ports, battery vents, and engine compartment. If the indicator shows an unsafe condition, do not attempt to apply heat shrink film.

i. Helicopter shall be inspected for fuel leaks prior to covering. No attempt shall be made to cover a helicopter that is known to have or suspected of having fuel leaks.

j. Covering on the helicopter shall be applied so that large pieces of film are centered on fuel filler ports, vents, and drains so that no adjoining seams are formed near potential fuel fume sources. Fuel filler ports, vents, and drains shall be padded with cushioning material to further protect from heat.

k. After covering and shrinking processes are complete, the film shall be cut to allow removal of tape seals applied to fuel vents. Plastic strip (D-29) shall be used to reseal heat shrinkable POL (D-22) and plastic sheet (D-23).

l. Table G-1, Safety Checklist shall be completed prior to the use of propane heat gun (E-11). The completed Safety Checklist shall be attached to the aircraft logbook.

Table G-1. Safety Checklist

Item	Item Description	Mech	Insp
1	Ground helicopter (TM 1-1520-248-23, Chapter 1).		
2	Fire truck/fire fighting equipment ready for use.		
3	Adjust fuel levels.		
4	Cover fuel access, vent and drain areas.		
5	Perform test with combustible gas indicator set.		
6	Working area well-ventilated.		
	AFTER COVERING COMPLETE		
7	Inspect covering seams for complete bonding.		
8	Remove seal from fuel vent areas and tape film openings.		
9	Make handling instructions entry on DD Form 1387-2 "FUEL IN TANKS". Attach form to helicopter.		

CAUTION

Composite main rotor and tail rotor blades, rubber, plexiglass, and plastic surfaces, are heat sensitive. These surfaces must be completely covered with cushioning material to provide insulation to prevent serious damage to the helicopter.

G.3 HELICOPTER PREPARATION.

a. Ensure that helicopter is prepared for shipment (Chapter 3).

b. Helicopter Cleaning. Washing helicopter is necessary to remove corrosive substances such as dirt, bugs, and exhaust residue. It will make the task of helicopter preparation much easier by providing oil-free surfaces for adhesion of tape. A dirty helicopter will take more time to cover.

c. Flyaway Equipment. Install flyaway equipment covers (Chapter 2 or 4) as applicable.

d. Outside Air Gage. Remove outside air temperature gage and tape it to the cyclic stick.

e. Protect Windshield and Plexiglass Windows. Install foam cushioning material over glass and plexiglass surfaces to prevent scratching and protect them from heat. Secure padding with heat shrink tape using care not to apply tape to glass or plexiglass areas.

f. Seal Vents. Locate all fuel filler ports, drains, vents, and battery vents. Seal with plastic strip (D-29) and heat shrinkable POL (D-22). These areas must remain sealed throughout the heat shrink process. All but the fuel vents may remain sealed after covering.

g. Preparation of sharp edges, protrusions, and heat sensitive areas. Pad all protrusions and sharp edges with tape or cushioning material to prevent damage to heat shrinkable POL (D-22) after shrinking.

(1) Plastic strip (D-29) may be used to protect the heat shrinkable POL (D-22) from sharp edges such as trailing edge of the horizontal stabilizer. For best results, apply 2-inch wide

plastic strip (D-29) along the bottom edge so that approximately 1/2 inch adheres to the bottom surface. Fold the plastic strip (D-29) over so that approximately 1/2 inch adheres to the top surface. Tape alone may be used to protect the heat shrinkable POL (D-22) from many protrusions such as hinges, louvers, and wingnuts.

(2) Cushioning material is used to pad protrusions and to provide insulation from heat of film application process. Cushioning material may be held inplace with plastic strip (D-29) and/or 2 inch strapping (D-27).

NOTE

Examples below are not intended to be all-inclusive.

(a) Examples of techniques using cushioning primarily for protection are:

1 Wrapping material around main rotor control tubes.

2 Individually wrapping main rotor blade grips.

3 Padding over top of and underneath main rotor head.

4 Padding over tail rotor head and blade grips.

5 Padding over edges of exhaust stacks.

6 Padding around pitot tube.

(b) Examples of techniques using cushioning material for both protection and insulation are:

1 Complete padding of main rotor blades.

2 Complete padding of tail rotor blades.

3 Padding of antennas.

4 Padding of fuel filler ports, vents, and drains.

G.4 APPLICATION OF FILM.

WARNING

To prevent injury to personnel, ensure that adequate maintenance stands are available for use when applying shrink film to helicopter.

CAUTION

To prevent damage to helicopter during application of heat shrink, ensure that all personnel are thoroughly familiar with no step areas.

NOTE

- Because the film is subjected to damage from handling on rough surfaces, it is recommended that a piece of film (approximately 14 feet x 30 feet) be cut and secured to the ground as a measuring and cutting work surface.
- Ensure that the provisions of Appendix F, Quarantine Inspection and Customs Clearance, is obtained for the helicopter prior to the application of heat shrink protective film.

a. Shrink Film Characteristics. The shrink film is provided in a bulk roll. It is a white, opaque, 7 mil thick, polyethylene that contains an ultraviolet inhibitor. The white color is used to reflect the sun to maintain a lower inside temperature. When heated to approximately 325 °F, the film becomes soft. When the heat is removed, the film will shrink about 25% of its original size. The melting temperature of the film is only slightly higher than the shrinking temperature.

b. Propane Heat Gun (E-11) Characteristics. The propane heat gun (E-11) operates on bottled propane. It produces an even flame with a temperature of 750 °F 12 inches from the propane heat gun (E-11). The propane heat gun (E-11) has safety features designed to automatically shut off the flame if it is dropped. The open flame is safe for use on helicopters when the procedures of this appendix are strictly adhered to.

c. After the helicopter has been prepared as in paragraph G-3 above, it is ready for the application of heat shrinkable POL (D-22). The heat shrink film cover is created by first visually dividing the helicopter into sections. Heat shrink

film sections are cut from the bulk roll with a safety knife (E-18) to piece together a complete cover. The pieces are held together with heat shrink tape until they are fused together. The following is a workable procedure:

(1) Determine sections such as small protrusions, antenna, tail rotors, and main rotor controls, that need to be covered separately. These should be wrapped with sufficient excess material to allow later fusing to the larger pieces of heat shrink film.

CAUTION

To prevent damage, the HF antenna must be wrapped separately from the tailboom.

(2) The larger sections to be wrapped include the blades and the fuselage.

(a) The fuselage can be sectionalized by using the width of the bulk film and cutting it to a length equivalent to the helicopter circumference for the section being wrapped (plus overlap).

(b) The main rotor blades should be wrapped two at a time. Each package (2 blades stacked vertically) will require a piece of film 22 feet x 7 feet.

(3) Large void areas in the heat shrink film covering are to be avoided. This can done by using strapping (D-27). For example, voids near transmission and engine cowls may be eliminated by wrapping horizontally and tying strapping (D-27) snug. Also, to prevent voids, slits may be cut in large pieces of covering to allow previously covered small protrusions to stick through. Covering on these protrusions will then be fused to the large piece.

d. Fusing Heat Shrinkable POL (D-22) Pieces Together.

NOTE

Ensure that all requirements of parapraph G.2 have been complied with prior to fusing heat shrink film.

(1) After the helicopter has been completely covered, all seams and pieces must be fused together before the heat shrinkable POL (D-22) is shrunk. Where two pieces come together to form a horizontal seam, the top piece should overlap the bottom to prevent the possibility of water entrapment.

WARNING

To prevent injury while operating propane heat gun, welder gloves shall be worn.

(2) To fuse two pieces together to form a seam, pull the pieces together to form a snug fit around the area being covered. A minimum overlap of 6 inches is required for fusing. Hold pieces in place with plastic strip (D-29) or adhesive. Heat the area to be fused by first shooting the flame between the top and bottom layers to be fused and then holding the propane heat gun (E-11) 8 to 12 inches from the seam, moving the heat along the seam. As the shrink film becomes soft, pat the seam gently with a safely gloved hand (the film is HOT).

CAUTION

To prevent water leakage at seams, ensure that seams are completely bonded.

(3) Repeat this process until all seams are fused.

(4) After shrink film has cooled, test seams for proper bonding by trying to pull seams apart with fingernails. If seam comes loose, reseal it.

e. Shrinking Film.

WARNING

To prevent injury while operating propane heat gun, welder gloves shall be worn.

(1) After all the seams have been fused and the helicopter has been completely enclosed in shrink film, the shrinking process should be accomplished. To shrink the shrink film, hold the propane heat gun (E-11) 8 to 12 inches from the surface, moving the cannon evenly along the surface. Apply just enough heat to soften the film. After the heat is removed, the shrink film will shrink to a glove tight fit.

(2) If a hole is inadvertently burned through, it may be easily repaired by fusing a piece of film to the damaged area and/or repairing with plastic strip (D-29).

f. Inspection. When the shrinking process is completed and allowed to set for approximately 30 minutes, inspect the helicopter covering to

determine if any areas require further shrinking. Ensure that all seams are completely fused and that no holes are present. Repairs may be made as necessary by applying the procedure in step e. above. Ensure good seals around landing gear and other protrusions.

g. Marking. Stencil cover "No Step", "No Push", "Helicopter Serial Number" in 1-inch letters, as required, with locally manufactured stencil and spray paint.

G.5 FUEL AND BATTERY VENTS.

WARNING

Do not attempt to patch, shrink, or fuse the heat shrink material with the propane heat gun after fuel vents have been unsealed.

After inspection of covering has been found satisfactory, the fuel and battery vents must be unsealed. Cut a small slit in the area of vent and remove seal. Repair cut with heat shrink tape. Repeat this process for each vent.

G.6 INSTALLATION OF VENTILATORS.

CAUTION

Adequate ventilation of the cover is essential to minimize condensation and permit drainage.

After inspection of covering has been completed, covering must be ventilated. Ventilators are to be placed to allow a flow of air through the covering. Each helicopter will require approximately five ventilators. They should be placed to allow air to flow through the helicopter. At least one vent will be required at each low point on the helicopter to drain condensation. The vents are applied by peeling the backing off the adhesive surface and pressing vent to the shrink film. The cover is then removed and the center hole is cut in the shrink film. The vent cover is then replaced and secured with heat shrink tape.

G.7 HOISTING.

Hoist helicopter (TM 1-1520-248-23, Chapter 1). The shrink covering on the rotor head will require cutting to allow sling assembly straps to be looped under the hub upper plate and back up to the hooks. After hoisting is complete, remove straps and seal cuts in film with heat shrink tape and shrink film.

G.8 TIEDOWN POINTS.

After loading helicopter, restrain (Chapter 2 or 4) as appropriate.

G.9 ENROUTE MAINTENANCE.

Shrink covers should be checked daily by designated escort personnel and/or vessel crew for damage. Damaged areas may be repaired by patching the shrink film using 2-inch heat shrink tape.

G.10 REMOVAL OF SHRINK FILM.

CAUTION

To prevent damage to helicopter when removing shrink film only the safety knife shall be used.

a. To remove the shrink film, use the safety knife (E-18) and cut along the top and side surfaces. The shrink film does not adhere to the helicopter and will fall away.

b. All shrink film and cushioning material shall be removed prior to depreservation.

c. Recycling of used shrink film can be established through the Defense Reutilization and Marketing Service of DLA.

G.11 DEPRESERVATION.

Depreserve helicopter (TM 1-1520-248-23, Appendix E).

APPENDIX H

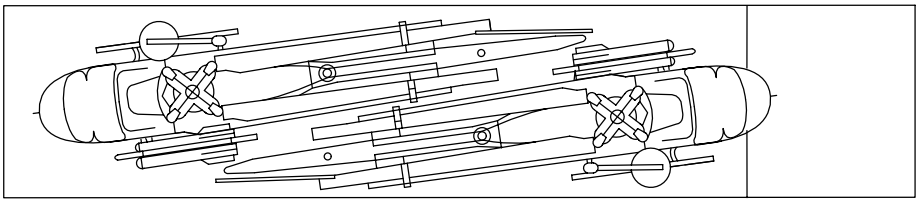
DIAGRAMS AND DRAWINGS

SECTION I. DIAGRAMS

H.1 SCOPE.

This section contains the diagrams displaying the loading configurations for C-130, C-141, C-17, and C-5 procedures described in this manual.

LIST OF ILLUSTRATIONS



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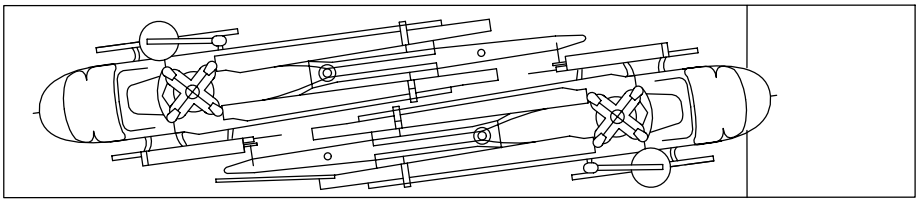

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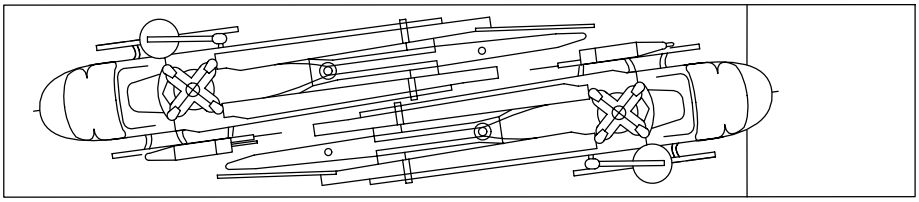

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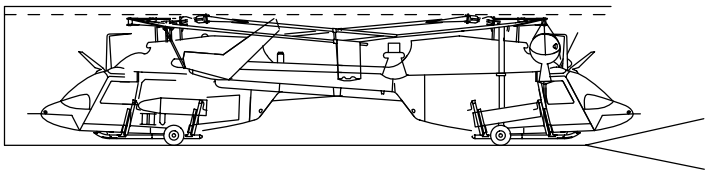

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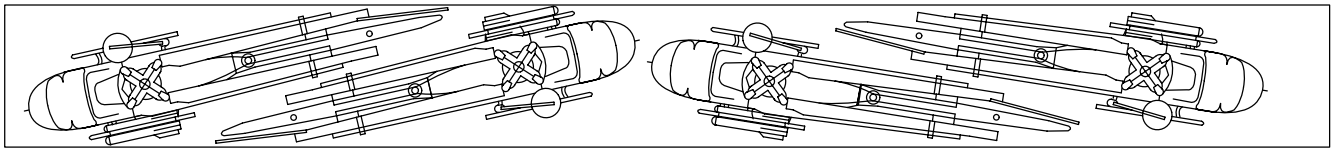
Figure H-1. C-130 Loading Diagram



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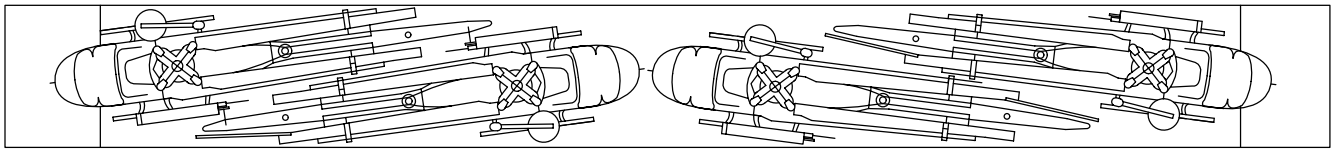

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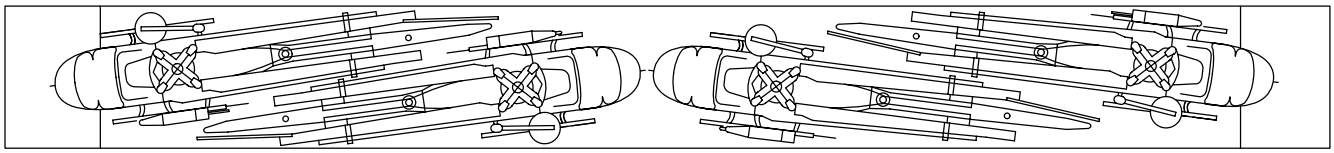

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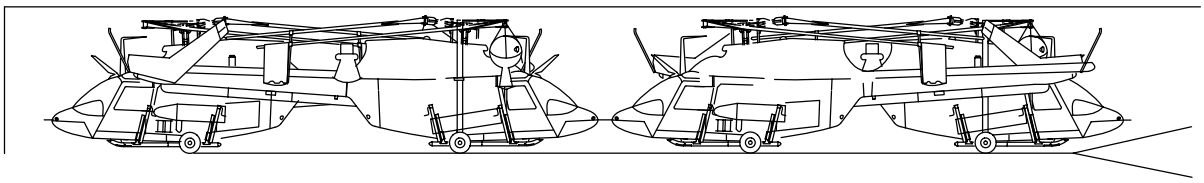

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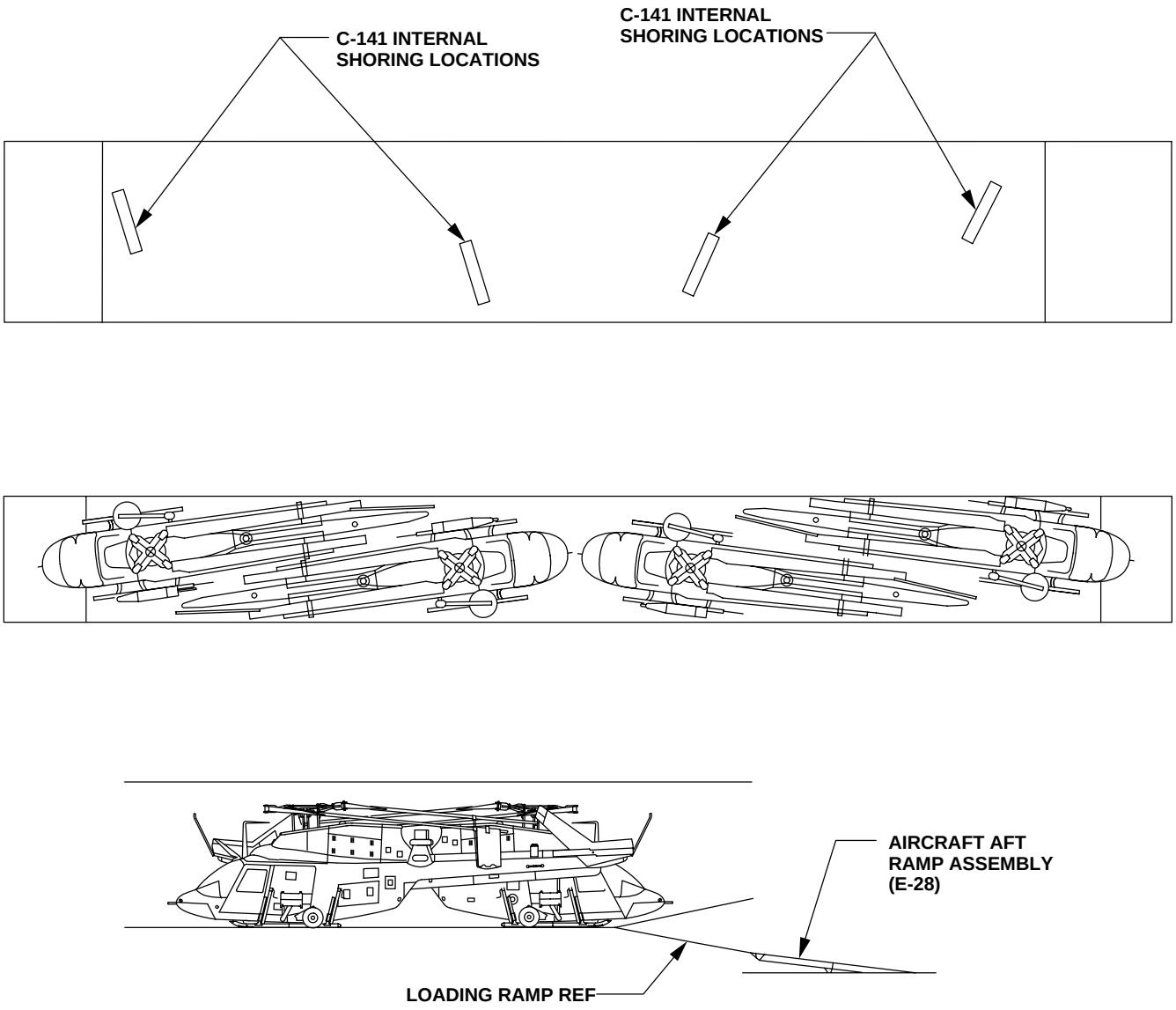
Figure H-2. C-141 Loading Diagram (Sheet 1 of 2)



NOTE

INTERNAL SHORING CAN BE LOCALLY FABRICATED USING 4 X 8 FT SHEETS OF QUARTER INCH PLYWOOD RIPPED TO MAKE FOUR 1 X 8 FT PIECES.

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Figure H-2. C-141 Loading Diagram (Sheet 2 of 2)

NOTE

INTERNAL SHORING CAN BE LOCALLY FABRICATED USING 4 X 8 FT SHEETS OF QUARTER INCH PLYWOOD RIPPED TO MAKE FOUR 1 X 8 FT PIECES.

C-17 INTERNAL SHORING LOCATIONS

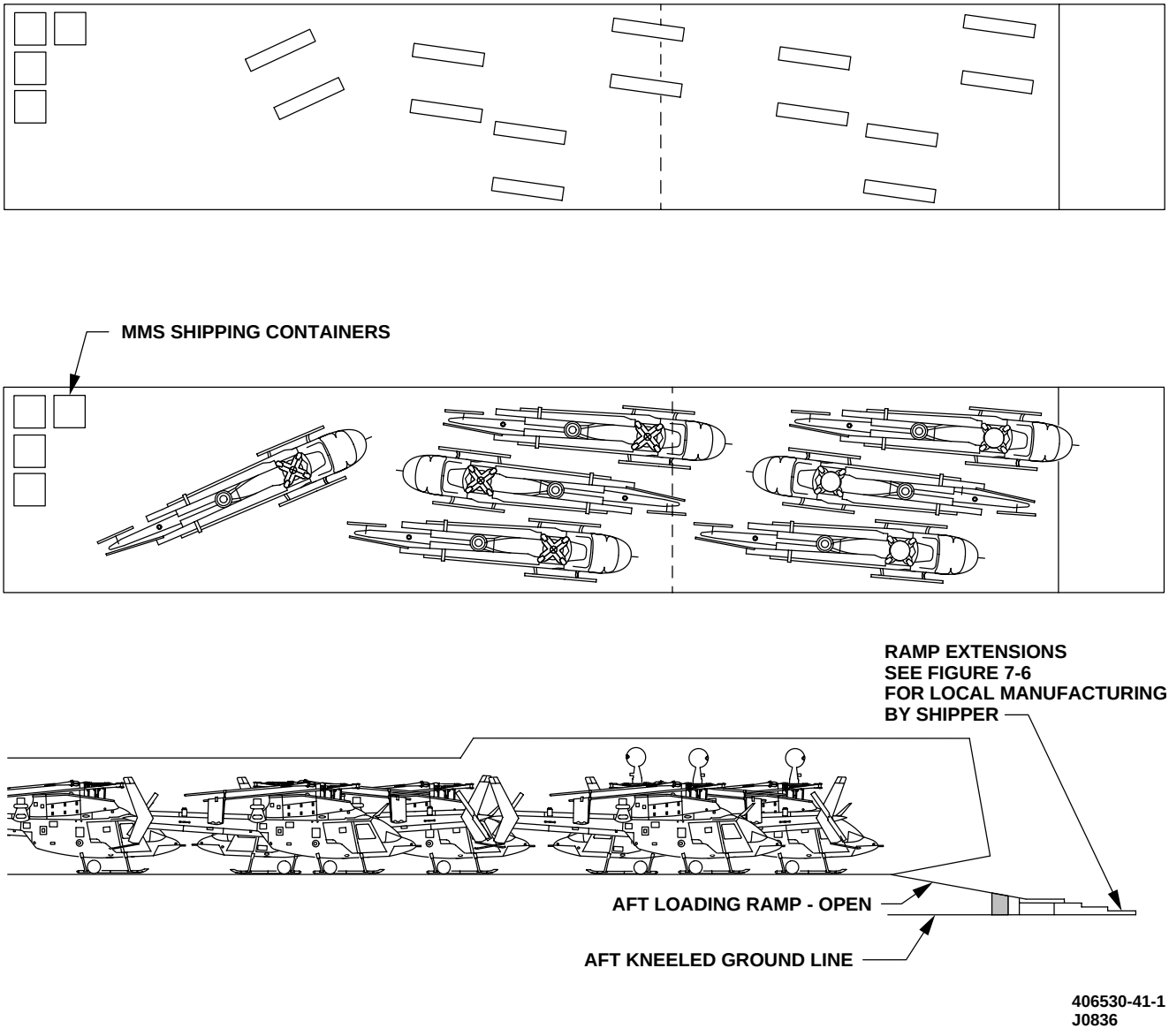
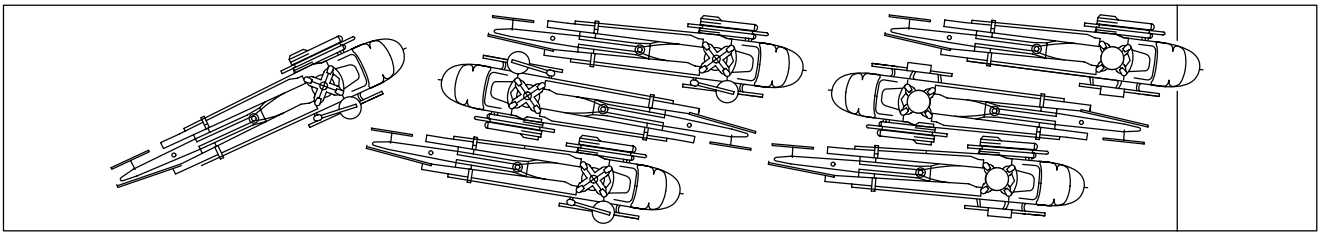
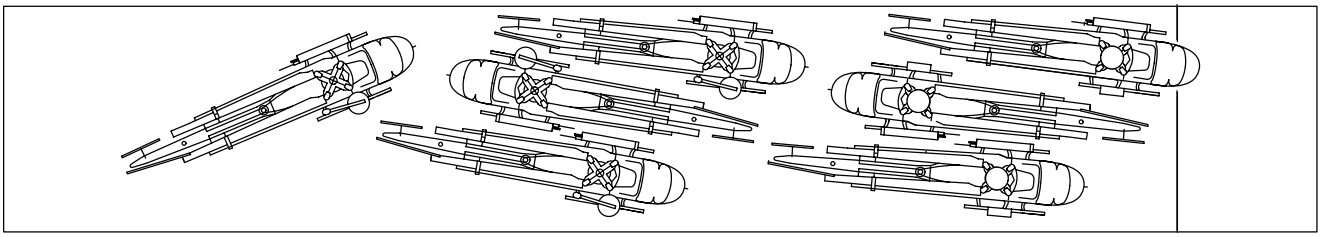


Figure H-3. C-17 Loading Diagram (Sheet 1 of 2)



WITH HELLFIRE



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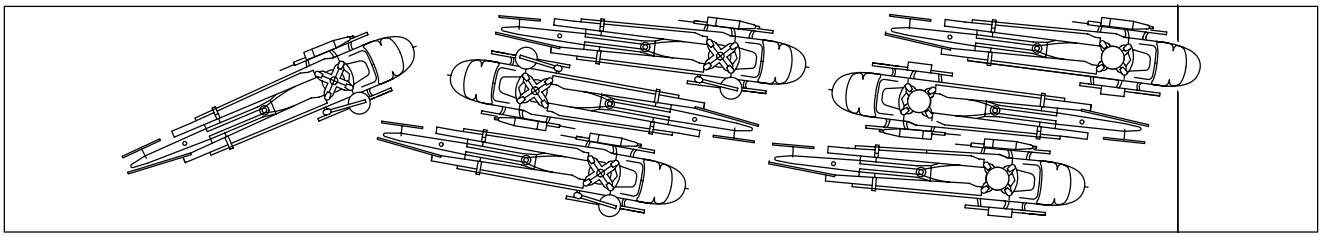

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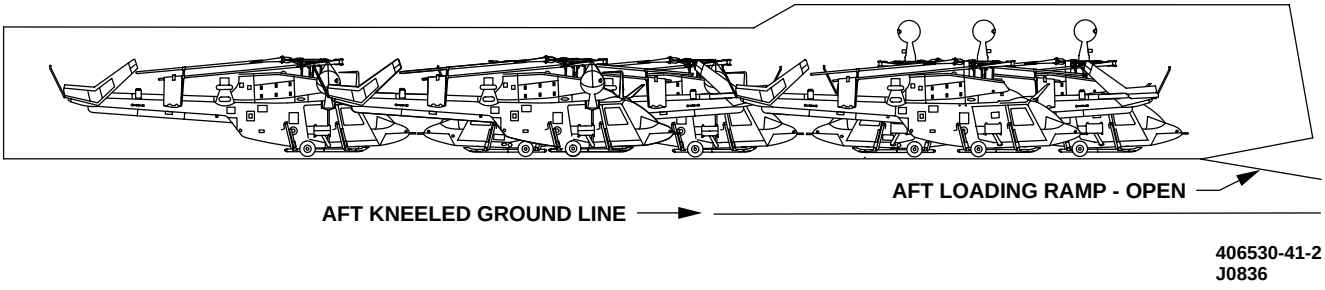


Figure H-3. C-17 Loading Diagram (Sheet 2 of 2)

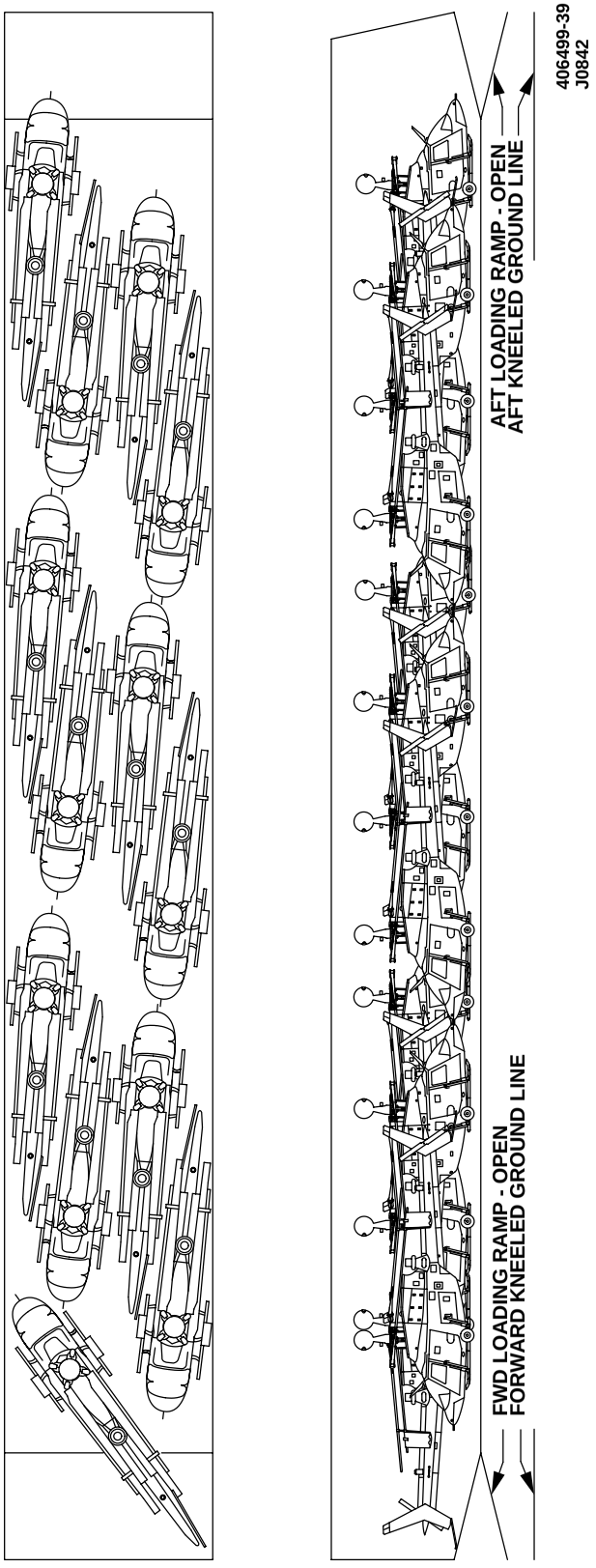


Figure H-4. C-5 Loading Diagram

SECTION II. DRAWINGS

H.2 SCOPE.

This appendix contains the necessary drawings for local manufacture of items applicable to the shipping procedures described in this manual.

LIST OF ILLUSTRATIONS

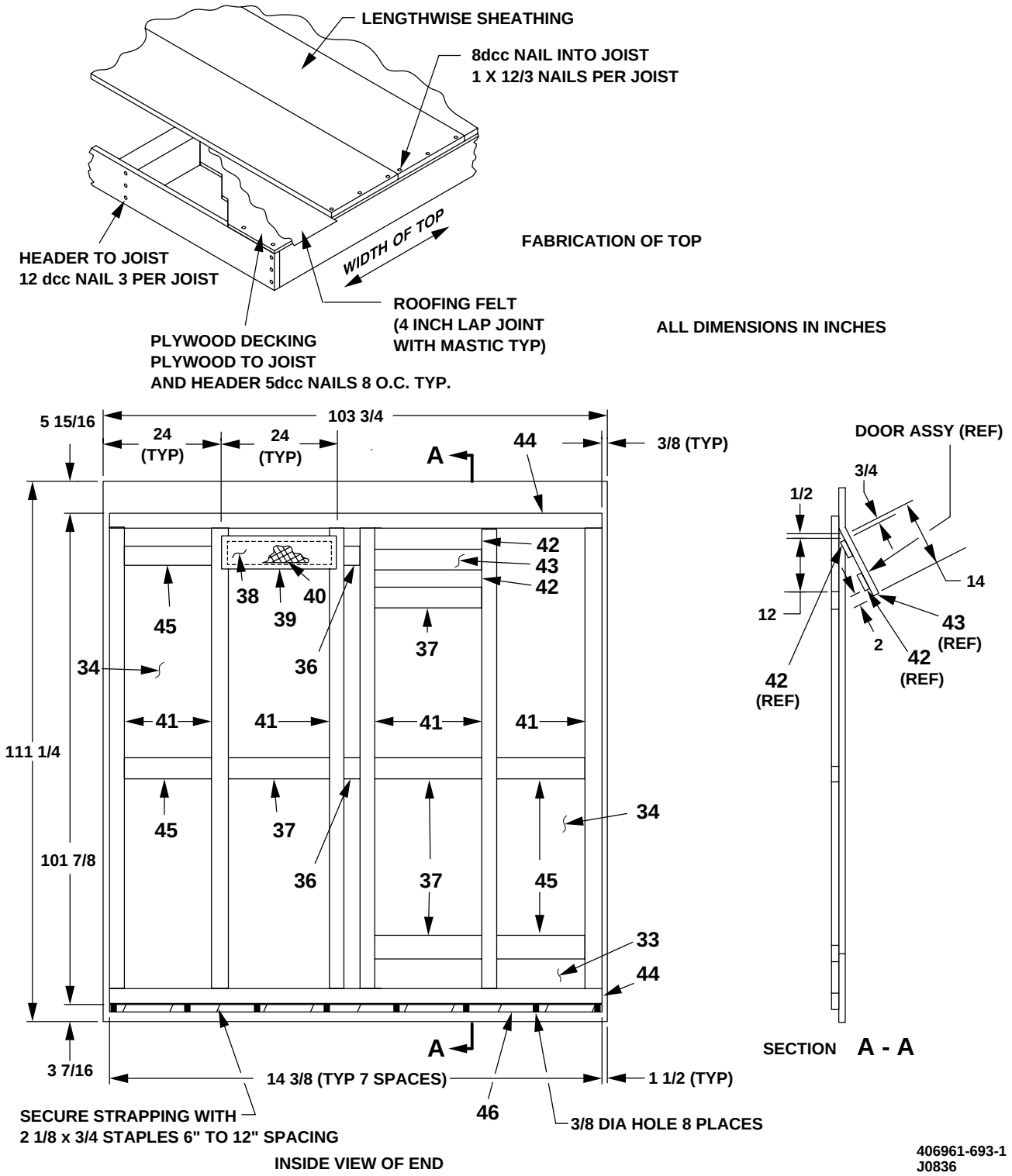
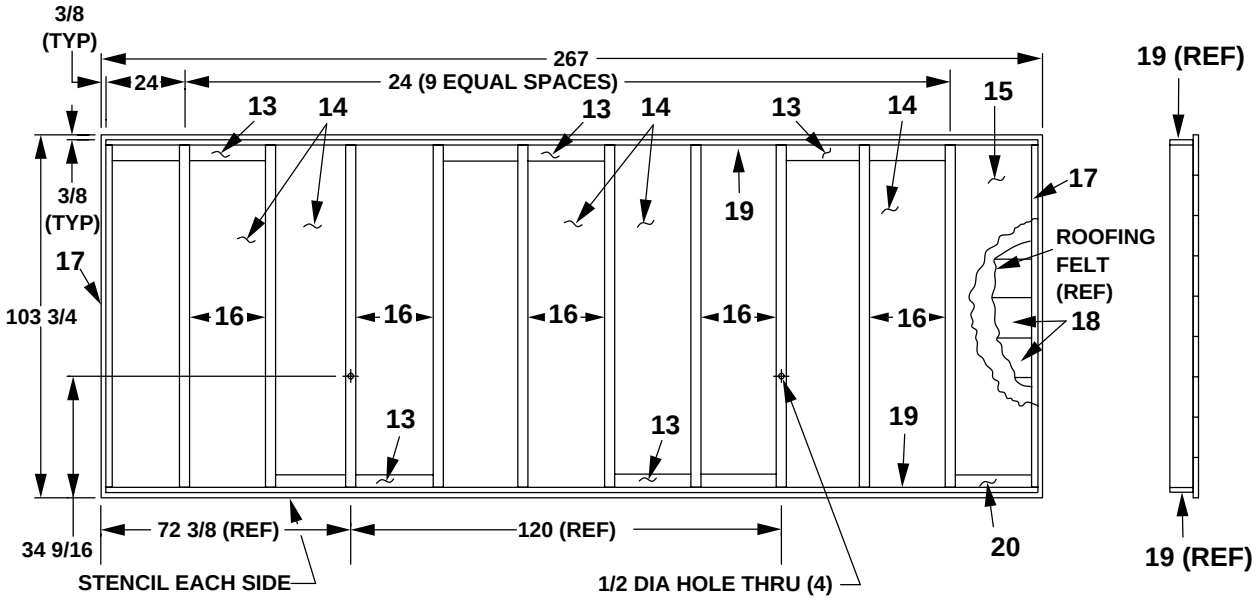
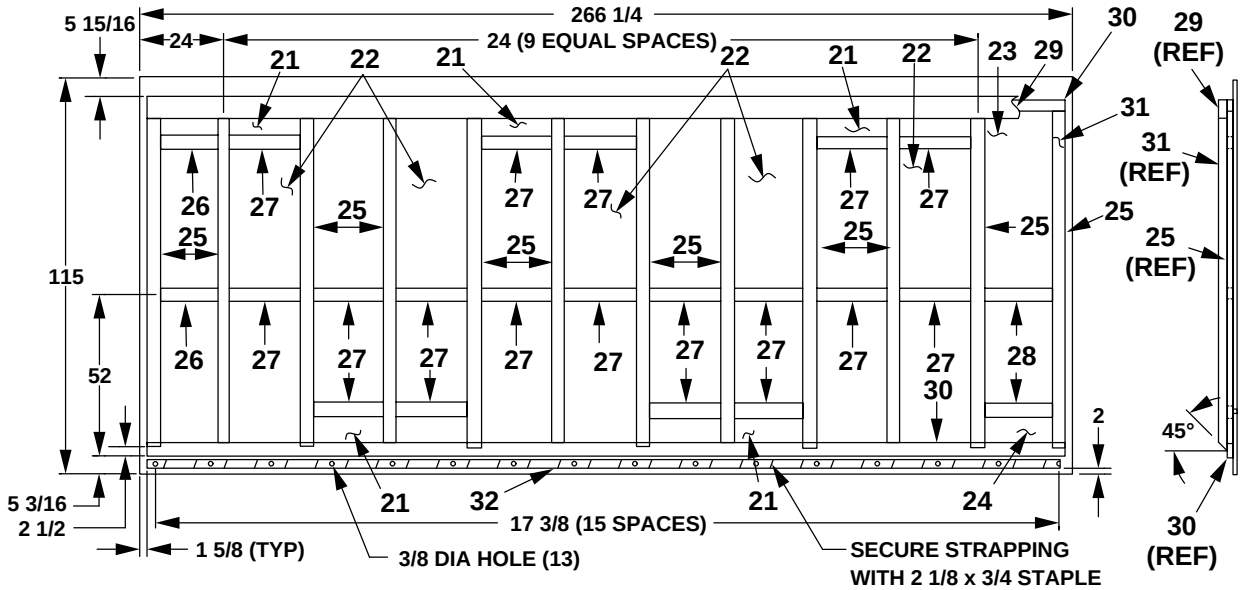


Figure H-5. Export Crate (Sheet 1 of 6)



INSIDE VIEW OF TOP



INSIDE VIEW OF SIDE

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Figure H-5. Export Crate (Sheet 2 of 6)

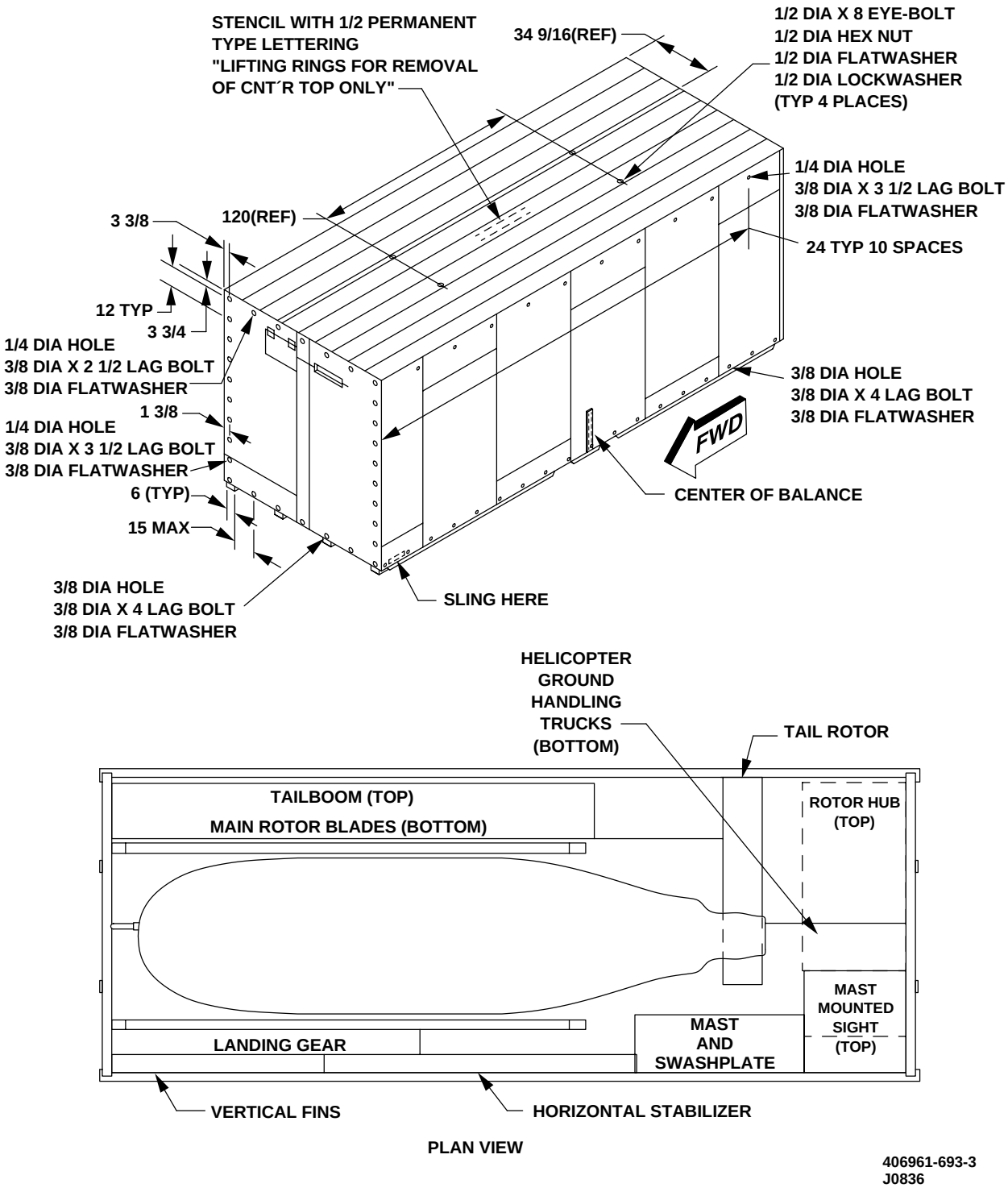

Figure H-5. Export Crate (Sheet 3 of 6)

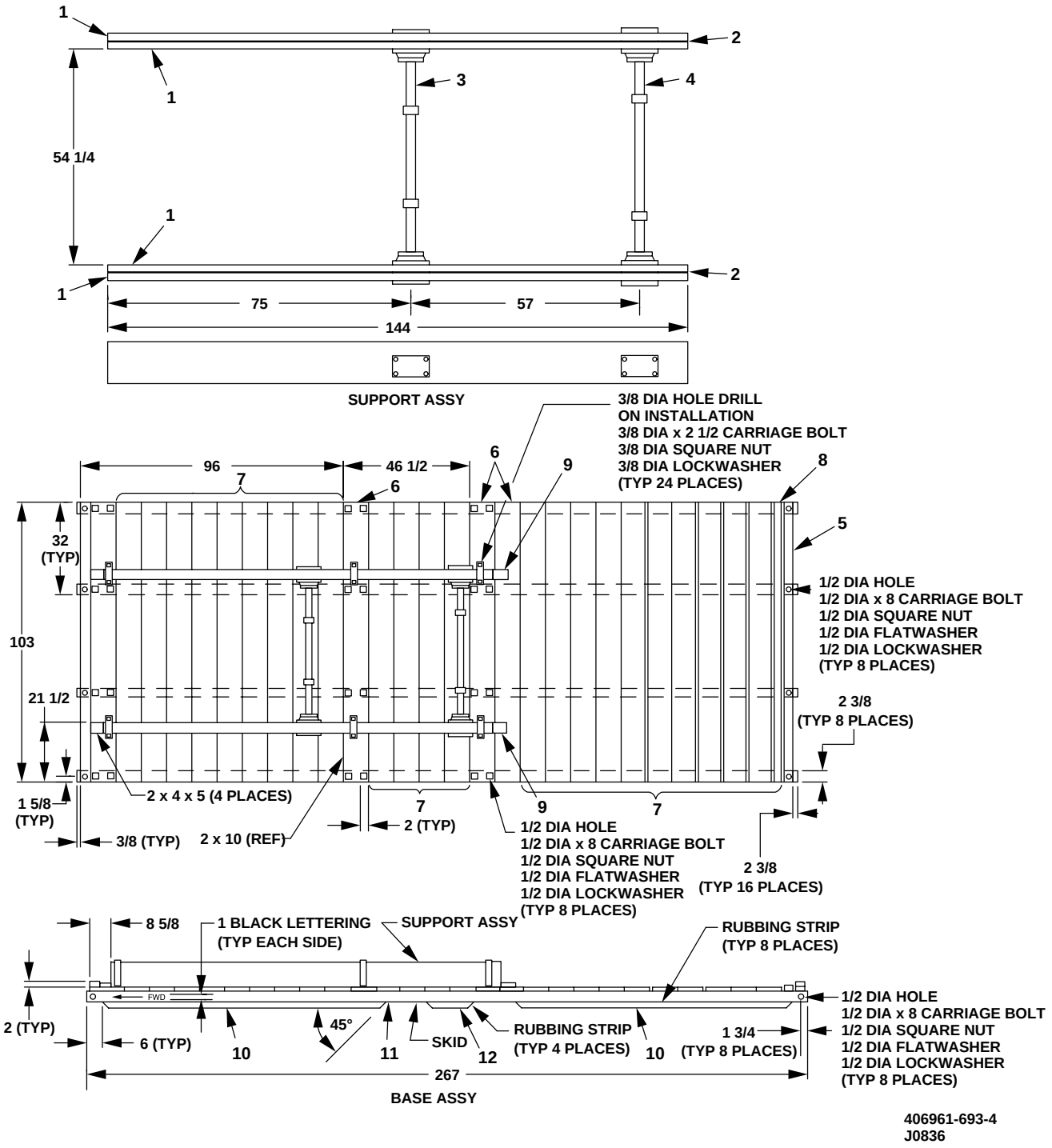

Figure H-5. Export Crate (Sheet 4 of 6)

NOTES

1. ADJACENT TO THE INSPECTION PORT, THE FOLLOWING SHALL BE STENCILED IN LETTERS ONE INCH IN HEIGHT:

   "OPEN FOR VENTILATION IF STORAGE PERIOD EXCEEDS 30 DAYS"

   PACKED _____ (DATE) _____
   OPENED FOR VENTILATION

   DATE _____ BY _____
   DATE _____ BY _____
   DATE _____ BY _____

2. THE CENTER OF BALANCE OF THE LOADED CRATE SHALL BE INDICATED BY A DURABLE PAINTED OR STENCILED BLACK STRIP ONE INCH WIDE ON EACH SIDE OF THE CRATE EXTENDING UPWARDS 24" FROM THE LOWER EDGE OF THE SHEATHING. THE WORDS "CENTER OF BALANCE" SHALL BE PAINTED OR STENCILED NOT LESS THAN 1-3/4 INCH IN HEIGHT ADJACENT TO THE STRIPE. SLING POINTS SHALL BE INDICATED BY CONSPICUOUS ARROWS AND THE WORDS "SLING HERE" NOT LESS THAN 1-3/4 INCH IN HEIGHT. THE NOTE "USE NO HOOKS" WITH THE SYMBOL DIRECTLY BELOW, LOCATED IN THE CENTER OF EACH SIDE SHALL BE STENCILED IN 1-1/2 INCH BLACK LETTERS.

3. OPENING INSTR: TO BE STENCILED ON TWO (2) SIDES OF CRATE.

   (A) SET CRATE ON (8) JACKS (APPROX. 12" TO 15" HIGH-(4) JACKS EACH SIDE)"

   (B) REMOVE TOP, FWD. END. AND SIDES

   (C) UNBOLT CABIN FROM PALLET & TIEDOWNS.

4. ALL ACCESSORY CRATES SHALL BE SECURED INSIDE CRATE USING 1-1/2" STEEL STRAPPING.

5. EYE BOLTS INSTALLED IN THE TOP ASSEMBLY SHALL HAVE THE EYE WELDED TO PREVENT SPREADING DURING LIFTING OPERATION.

6. ALL RADIO EQUIPMENT WILL BE DISASSEMBLED, WRAPPED & PACKAGED SEPARATELY AND SECURED INSIDE HELICOPTER CABIN.

7. PLYWOOD SHALL BE STANDARD GRADE WITH EXTERIOR GLUE OF U.S. PRODUCT STANDARD PSI-66 (INT-DFPA). PLYWOOD WILL HAVE THE GRADE STAMP OF APPROVED TESTING AGENCY AND WILL BE SURFACE TREATED IN ACCORDANCE WITH TT-W-572.

ITEM	QUANTITY	NOMENCLATURE	MATERIAL
1	4	Support	144 x 2 x 10 Wood
2	2	Filler	144 x 3/8 x 9 1/4 Plywood
3	1	Support Install	206-043DP-3 (Procedure from BHT)
4	1	Support Install	206-043DP-37(Procedure from BHT)
5	2	Header	103 x 4 x 4 Wood
6	4	Flooring	103 x 2 x 10 Wood
7	23	Flooring	103 x 1 x 10 Wood
8	1	Flooring	103 x 2 x 4 Wood
9	4	Block	5 x 2 x 4 Wood
10	8	Rubbing Strip	103 x 2 x 4 Wood
11	4	Skid	267 x 4 x 4 Wood
12	4	Rubbing Strip	16 x 2 x 4 Wood
13	5	Decking	7 x 48 x 3/8 Plywood
14	5	Decking	96 x 48 x 3/8 Plywood
15	1	Decking	96 x 26 1/4 x 3/8 Plywood
16	10	Joist	101 1/2 x 3 x 6 Wood
17	2	Joist	101 1/2 x 2 x 6 Wood
18	10	Sheathing	267 x 1 x 12 Wood
19	2	Header	266 1/4 x 1 x 6 Wood
20	1	Decking	7 x 26 1/4 x 3/8 Plywood
21	10	Sheathing	19 x 48 x 3/8 Plywood
22	10	Sheathing	96 x 48 x 3/8 Plywood
23	2	Sheathing	96 x 26 1/4 x 3/8 Plywood
24	2	Sheathing	19 x 26 1/4 x 3/8 Plywood
25	24	Strut	96 7/8 x 2 x 4 Wood
26	4	Brace	17 1/8 x 2 x 4 Wood
27	36	Brace	20 1/2 x 2 x 4 Wood
28	4	Brace	19 3/8 x 2 x 4 Wood
29	2	Joist Support	263 x 2 x 6 Wood
30	4	Frame	263 x 2 x 4 Wood
31	14	Stiffener	95 7/8 x 2 x 4 Wood
32	2	Strapping	263 x 0.050 x 2 Steel
33	4	Sheathing	15 1/4 x 48 x 3/8 Plywood
34	4	Sheathing	96 x 48 x 3/8 Plywood
35	2	Sheathing	96 x 7 3/4 x 3/8 Plywood
36	4	Brace	3 7/8 x 2 x 4 Wood
37	8	Brace	20 1/2 x 2 x 4 Wood
38	2	Baffle	21 x 7 x 1/4 Plywood
39	2	Brace	20 1/4 x 2 x 2 Wood
40	2	Screen	1/4 x 3/8 Mesh Steel
41	12	Strut	94 7/8 x 2 x 4 Wood
42	4	Cleat	20 x 2 x 4 Wood

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Figure H-5. Export Crate (Sheet 5 of 6)

ITEM	QUANTITY	NOMENCLATURE	MATERIAL
43	2	Panel	24 x 14 x 3/8 Plywood
44	4	Frame	103 x 2 x 4 Wood
45	8	Brace	18 3/4 x 2 x 4 Wood
46	2	Strapping	103 x 0.050 x 2 Steel
47	4	Hinge	3 1/2" Butt Brass
	8	Carriage Bolt	1/2 Dia.
	76	Square Nut	1/2 Dia.
	120	Flatwasher	1/2 Dia.
	120	Lockwasher	1/2 Dia.
	60	Carriage Bolt	1/2 Dia. x 6
	8	Carriage Bolt	1/2 Dia. x 4
	24	Carriage Bolt	3/8 Dia. x 2 1/2
	112	Flatwasher	3/8 Dia.
	24	Lockwasher	3/8 Dia.
	24	Square Nut	3/8 Dia.
	4	Eye Bolt	1/2 x 8
	4	Hex Nut	1/2 Dia.
	14	Lag Bolt	3/8 Dia. x 2 1/2
	54	Lag Bolt	3/8 Dia. x 3 1/2
	44	Lag Bolt	3/8 Dia. x 4
	A/R	Felt	1/2" C-F-206A
	A/R	Webbing Material	1/2" CCC-C-467A
	A/R	Nails	1/2" FF-N-105
	A/R	Staples	2 1/8 x 3/4 12 Gauge FF-N-105
	A/R	Roofing Felt	
	A/R	Mastic	Bituminous Base
	A/R	Strapping	1 1/2" Steel QQ-S-781
	1	Mast and Swashplate Container	
	1	Horizontal Stabilizer Container	
	1	Vertical Fin Container	
	1	M/R Hub Container	
	4	M/R Blade Container	
	1	Tailboom Container	
	1	Tail Rotor Assembly Container	
	1	Ground Handling Truck Container	
	1	Mast Mounted Sight Container	

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Figure H-5. Export Crate (Sheet 6 of 6)

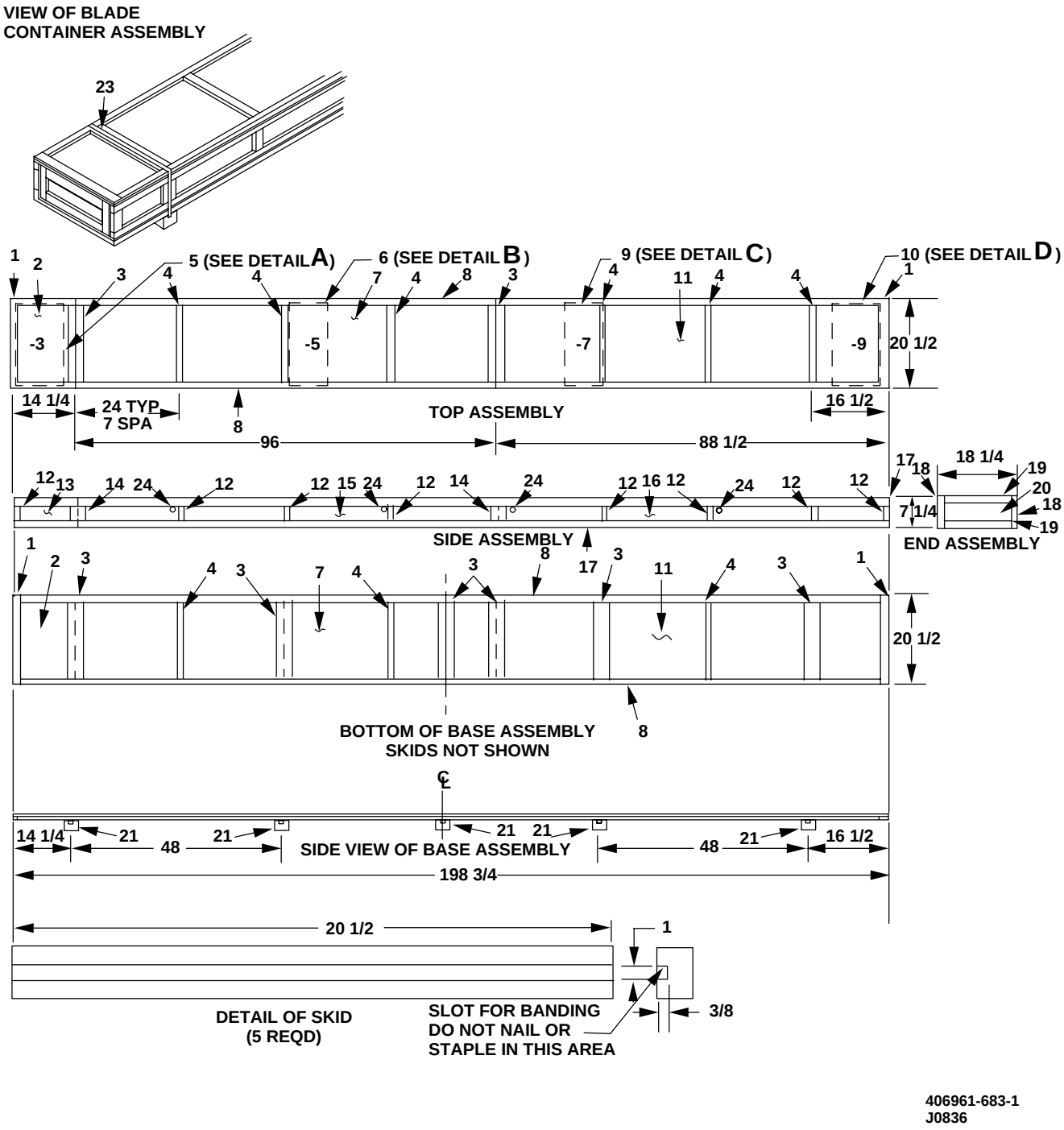

Figure H-6. Main Rotor Blade Container (Sheet 1 of 6)

NOTES

1. Lumber shall conform to MIL-STD-731.
2. Plywood shall conform to NN-P-530.
3. Nails and patterns used shall be in accordance with PPP-B-530.
4. One splice is permissible in thru cleats, provided the location does not exceed six feet from box end, and is over an intermediate cleat. Alternate location in opposite side and adjacent panels.
5. May be purchased from Midget Louver Co., 800 Main Ave., Norwalk, CT 06852. Part number of louvers RLS series, 1 inch diameter.

ALL DIMENSIONS IN INCHES

ITEM	QTY	NORMENCLATURE	MATERIAL
1	4	CLEAT	20 1/2 x 1 x 2 WOOD
2	2	PANEL	14 1/4 x 20 1/2 x 3/8 PLYWOOD
3	8	CLEAT	17 1/2 x 1 x 4 WOOD
4	9	CLEAT	17 1/2 x 1 x 2 WOOD
5	1	CONTOUR (DETAIL A)	18 x 7 x 10 1/2 POLYSTYRENE
6	1	CONTOUR (DETAIL B)	18 x 7 x 9 POLYSTYRENE
7	2	PANEL	96 x 20 1/2 x 3/8 PLYWOOD
8	4	CLEAT (NOTE 4)	195 3/4 x 1 x 2 WOOD
9	1	CONTOUR (DETAIL B)	18 x 7 x 9 POLYSTYRENE
10	1	CONTOUR (DETAIL D)	18 x 7 x 10 1/2 POLYSTYRENE
11	2	PANEL	88 1/2 x 20 1/2 x 3/8 POLYSTYRENE
12	16	CLEAT	4 1/4 x 1 x 2 WOOD
13	2	PANEL	14 1/4 x 7 1/4 x 3/8 PLYWOOD
14	4	CLEAT	4 1/4 x 1 x 4 WOOD
15	2	PANEL	96 x 7 1/4 x 3/8 PLYWOOD
16	2	PANEL	88 1/2 x 7 1/4 x 3/8 PLYWOOD
17	4	CLEAT (NOTE 4)	198 3/4 x 1 x 2 WOOD
18	4	CLEAT	7 1/4 x 1 x 2 WOOD
19	4	CLEAT	15 1/4 X 1 X 2 WOOD
20	2	PANEL	18 1/4 x 7 1/4 x 3/8 PLYWOOD
21	5	SKID	20 1/2 x 3 x 4 WOOD
22	A/R	NAILS	FF-N-105
13	A/R	STRAPPING	3/8 x 0.28 THK. STEEL QQ-S-781
24	8	LOUVER (NOTE 5)	1 IN. DIA. ALUMINUM

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Figure H-6. Main Rotor Blade Container (Sheet 2 of 6)

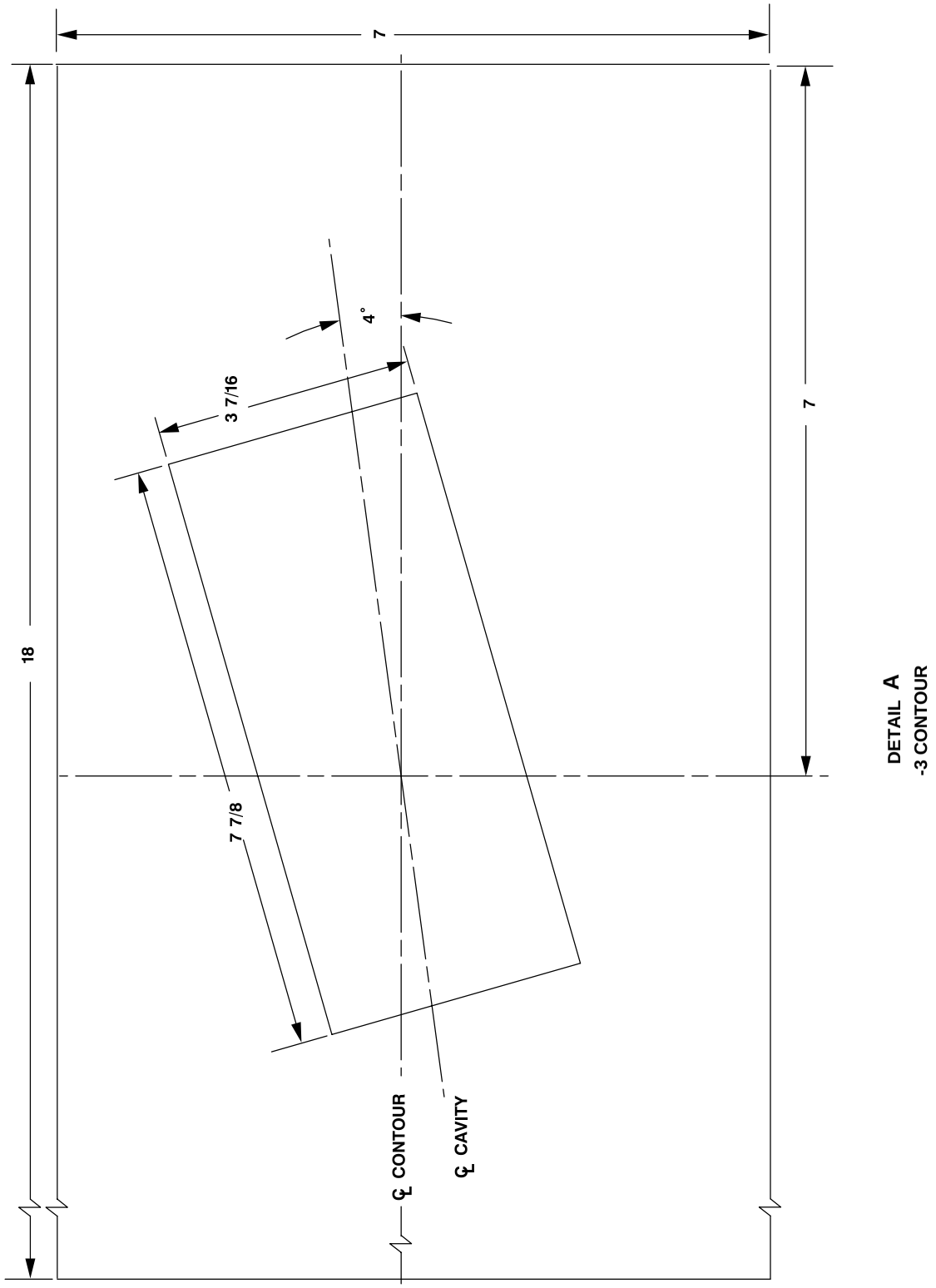

Figure H-6. Main Rotor Blade Container (Sheet 3 of 6)

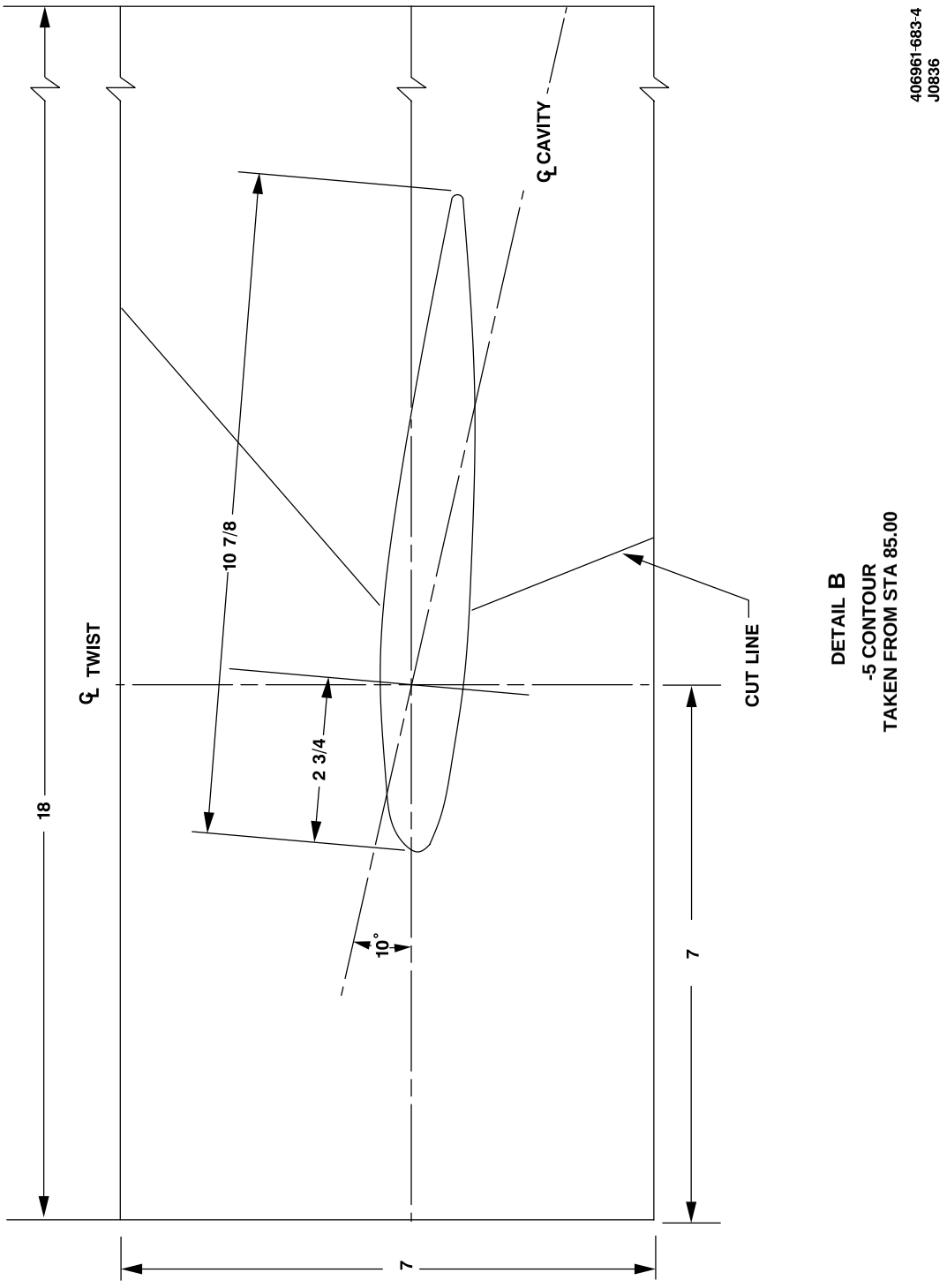

Figure H-6. Main Rotor Blade Container (Sheet 4 of 6)

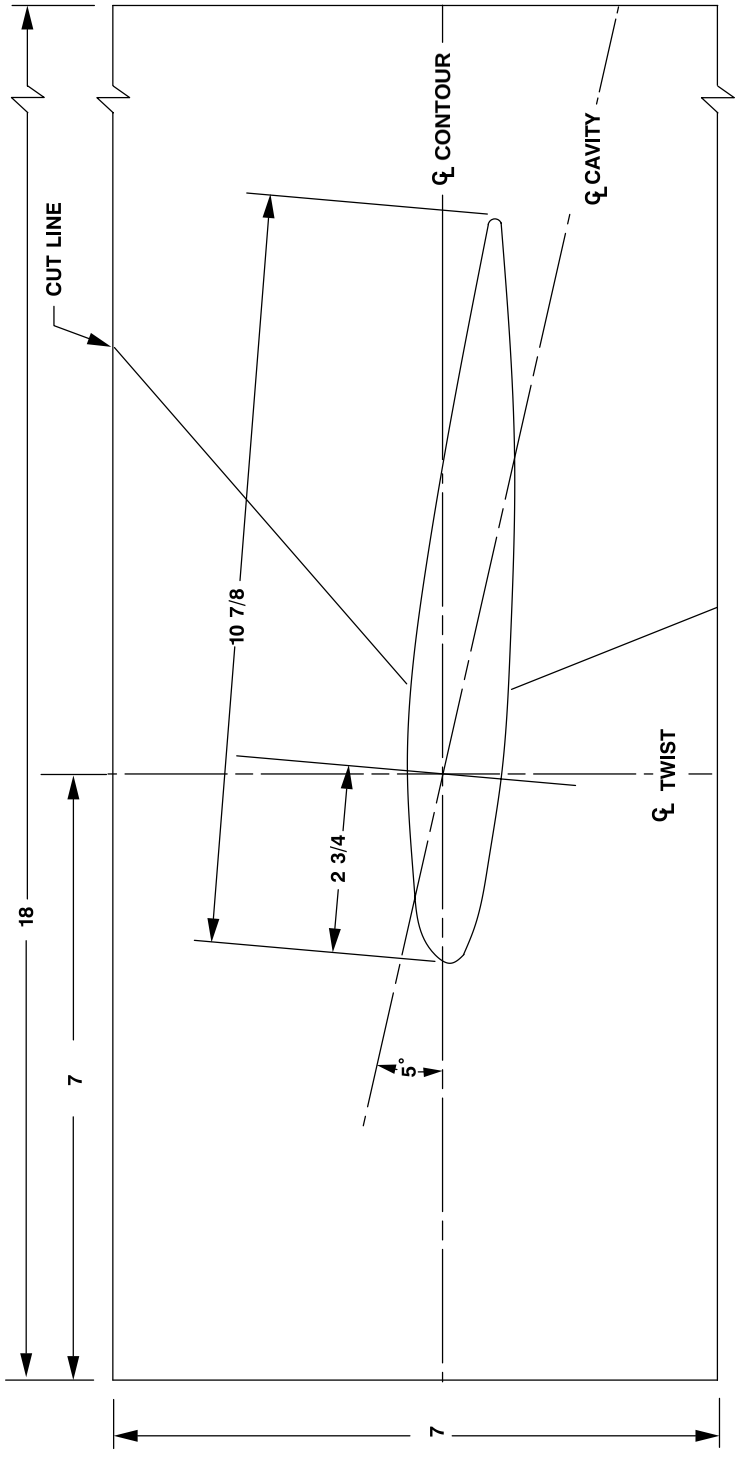

Figure H-6. Main Rotor Blade Container (Sheet 5 of 6)

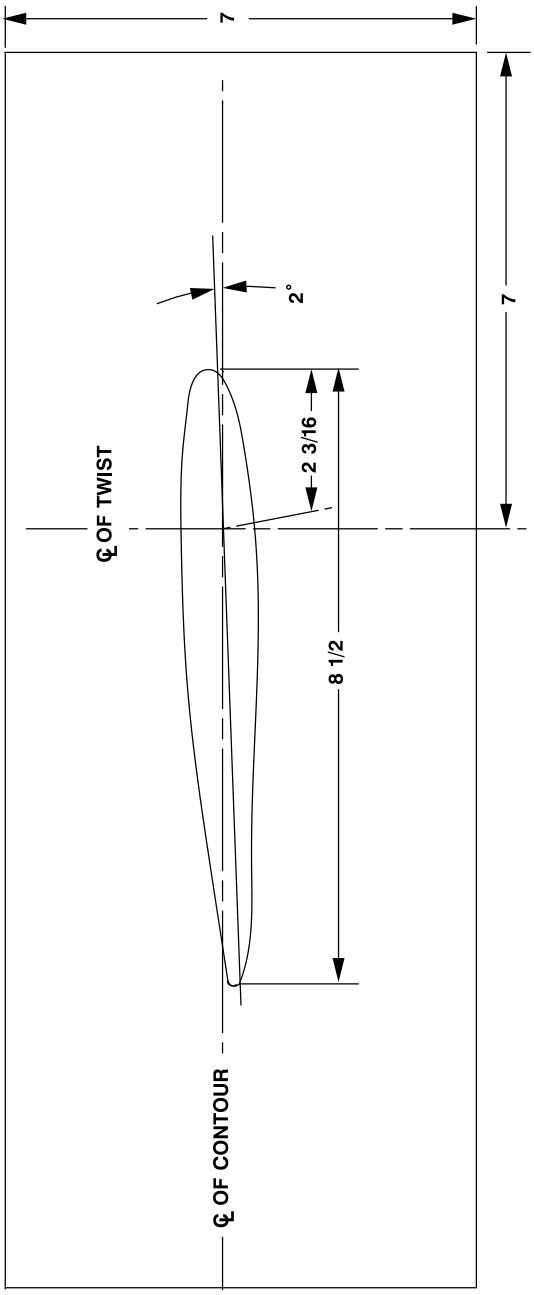

Figure H-6. Main Rotor Blade Container (Sheet 6 of 6)

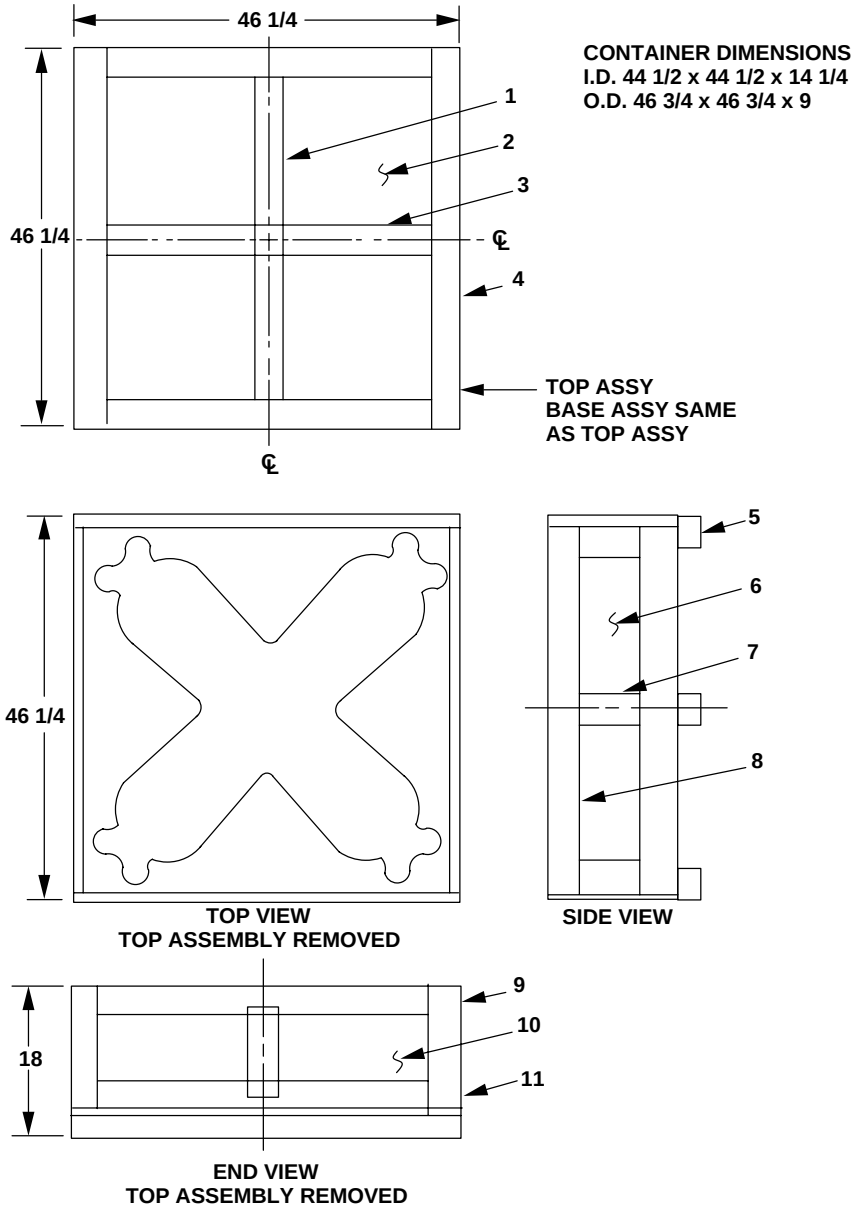

Figure H-7. Main Rotor Hub Container (Sheet 1 of 2)

ITEM	QTY	NOMENCLAURE	MATERIAL
1	4	CLEAT	20 11/16 x 1 x 4 WOOD
2	2	SHEATHING	46 1/4 x 46 1/4 x 3/8 PLYWD**
3	6	CLEAT	43 x 1 x 4 WOOD*
4	4	CLEAT	46 1/4 x 1 x 4 WOOD*
5	3	SKID	46 1/4 x 3 x 4 WOOD*
6	2	SHEATHING	44 1/4 x 14 1/4 x 3/8 PLYWD**
7	8	CLEAT	11 x 1 x 4 WOOD*
8	4	CLEAT	44 1/4 x 1 x 4 WOOD*
9	4	CLEAT	14 1/4 x 4 x 1/4 WOOD*
10	2	SHEATHING	46 1/4 x 14 1/4 x 3/8 PLYWD**
11	4	CLEAT	14 1/4 x 1 x 4 WOOD*
	A/R	NAILS	

NOTE

1. PLYWOOD NN-P-530 TYPE 2 CLASS I WEATHER RESISTANT CD GRADE WITH EXTERIOR GLUE IS ACCEPTABLE.
2. MAIN ROTOR HUB ASSEMBLY TO BE FOAMED IN PLACE USING 2 LB. PER CU. FT. DENSITY FOAM, MIL-P-26514, TYPE II, CLASS I.
3. SKID TO BE NAILED ON BASE ASSEMBLY WITH NO. 10d NAILS DRIVEN FROM WOOD SIDE, AND CLINCHED WHERE APPLICABLE. (1) INCH EDGE DISTANCE WITH (3) INCH STAGGER SPACING (TYP).

Plywood shall be standard grade with exterior glue of U.S. Product standard PSI-66 (Int-DFPA).
Plywood will have the grade stamp of approved/testing agency and will be surfaced treated in accordance with TT-W-572.

*MIL-STD-731
**NN-P-530

ALL DIMENSIONS IN INCHES

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Figure H-7. Main Rotor Hub Container (Sheet 2 of 2)

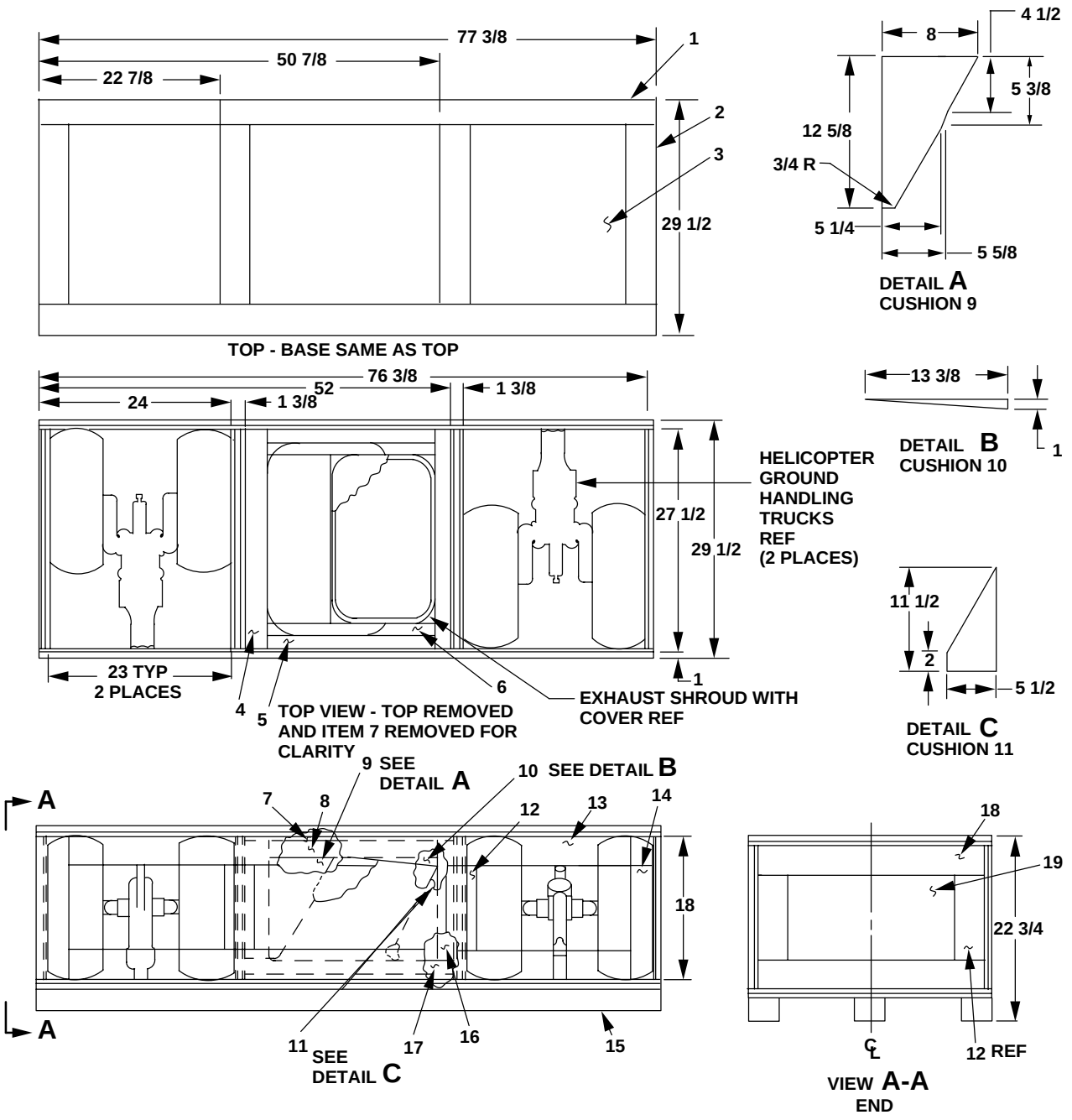

Figure H-8. Ground Handling Wheels and Exhaust Shroud Container (Sheet 1 of 2)

ITEM	QTY	NOMENCLATURE	MATERIAL
1	4	CLEAT	77 3/8 x 1 x 4 WOOD*
2	8	CLEAT	22 1/4 x 1 x 4 WOOD*
3	2	SHEATHING	77 3/8 x 29 1/2 x 3/8 PLYWOOD**
4	1	CUSHION	27 1/2 x 14 x 3 PS***
5	2	CUSHION	21 5/8 x 14 x 2 PS***
6	2	CUSHION	21 5/8 x 14 x 1 PS***
7	2	CUSHION	26 5/8 x 27 1/2 x 1 PS***
8	1	CUSHION	21 5/8 x 12 x 2 PS***
9	1	CUSHION	21 1/2 x 12 x 9 PS***
10	1	CUSHION	21 1/2 x 14 x 1 PS***
11	1	CUSHION	21 1/2 x 11 x 5 1/2 PS***
12	12	CLEAT	10 3/4 x 1 x 4 WOOD*
13	4	CLEAT	70 1/8 x 1 x 4 WOOD*
14	4	CLEAT	18 x 1 x 4 WOOD*
15	3	SKID	77 3/8 x 3 x 4 WOOD*
16	1	CUSHION	27 1/2 x 14 x 2 PS***
17	1	CUSHION	26 5/8 x 27 1/2 x 2 PS***
18	4	CLEAT	27 1/2 x 1 x 4 WOOD*
19	6	SHEATHING	27 1/2 x 18 x 3/8 PLYWOOD**
	A/R	NAILS	FF-N-105

CONTAINER DIMENSIONS
ID 27 1/2 X 23 X 18 (2 PLACES), 27 1/2 X 26 5/8 X 18 (1 PLACE)
O D 77 3/8 X 29 1/2 X 22 3/4

*MIL-STD-731
**NN-P-530
***PPP-C-850

ALL DIMENSIONS IN INCHES

NOTE

1. PLYWOOD NN-P-530 TYPE 2 CLASS I WEATHER RESISTANT CD GRADE WITH EXTERIOR GLUE IS ACCEPTABLE.
2. WRAP OTHER ITEMS IN EXPANDED POLYETHYLENE, 2 LBS PER CU FT DENSITY, PPP-C-1752, AND PRESSURE SENSITIVE TAPE, PPP-T-60.
3. SKID TO BE NAILED ON BASE ASSEMBLY WITH NO. 10d NAILS DRIVEN FROM WOOD SIDE, APPLICABLE. (1) INCH EDGE DISTANCE WITH (3) INCH STAGGER SPACING (TYP).

Plywood shall be standard grade with exterior glue of U.S. Product Standard PSI-66 (Int-DFPA).
Plywood will have the grade stamp of approved/testing agency and will be surface treated in accordance with TT-W-572.

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Figure H-8. Ground Handling Wheels and Exhaust Shroud Container (Sheet 2 of 2)

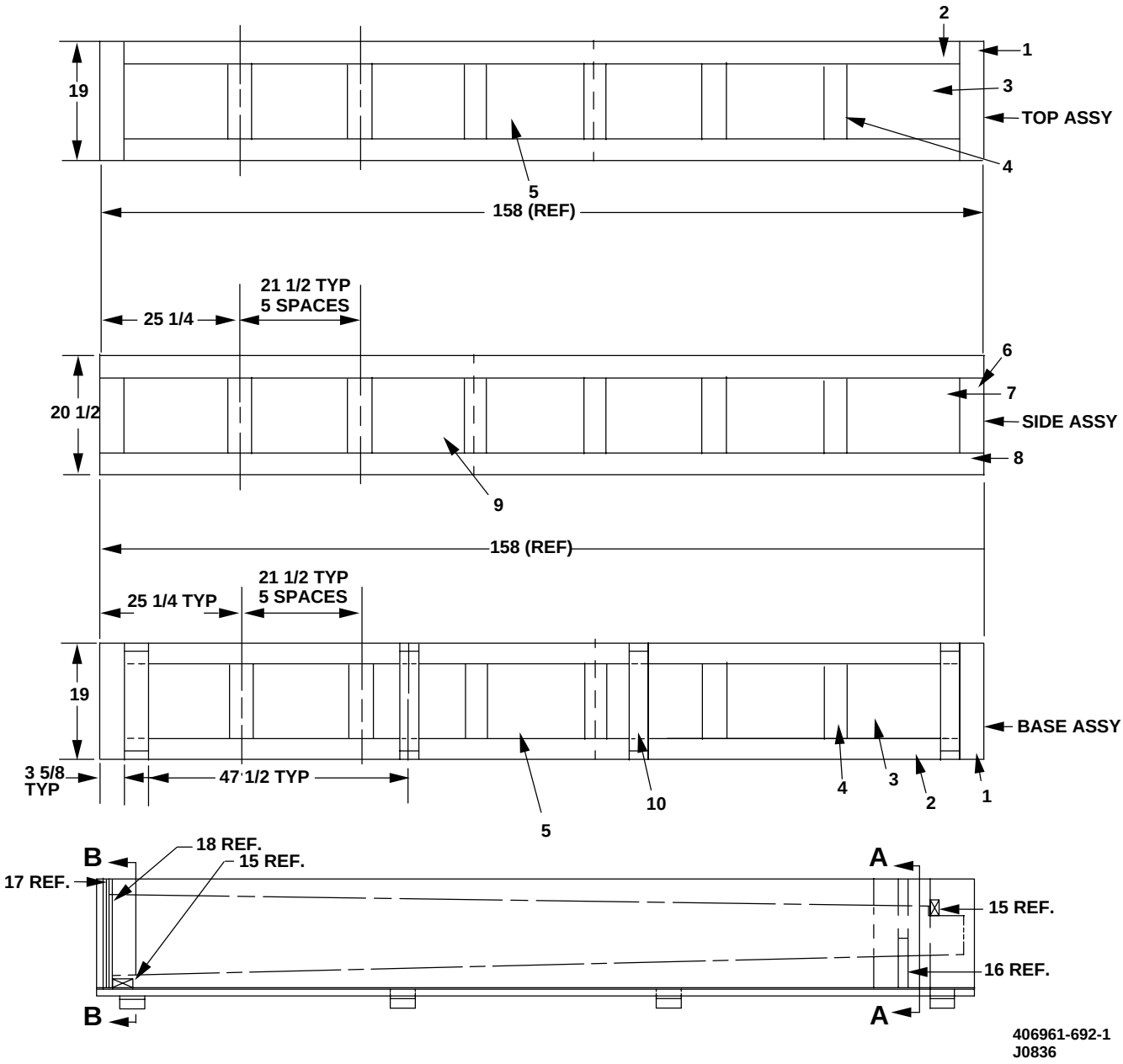


Figure H-9. Tailboom Container (Sheet 1 of 3)

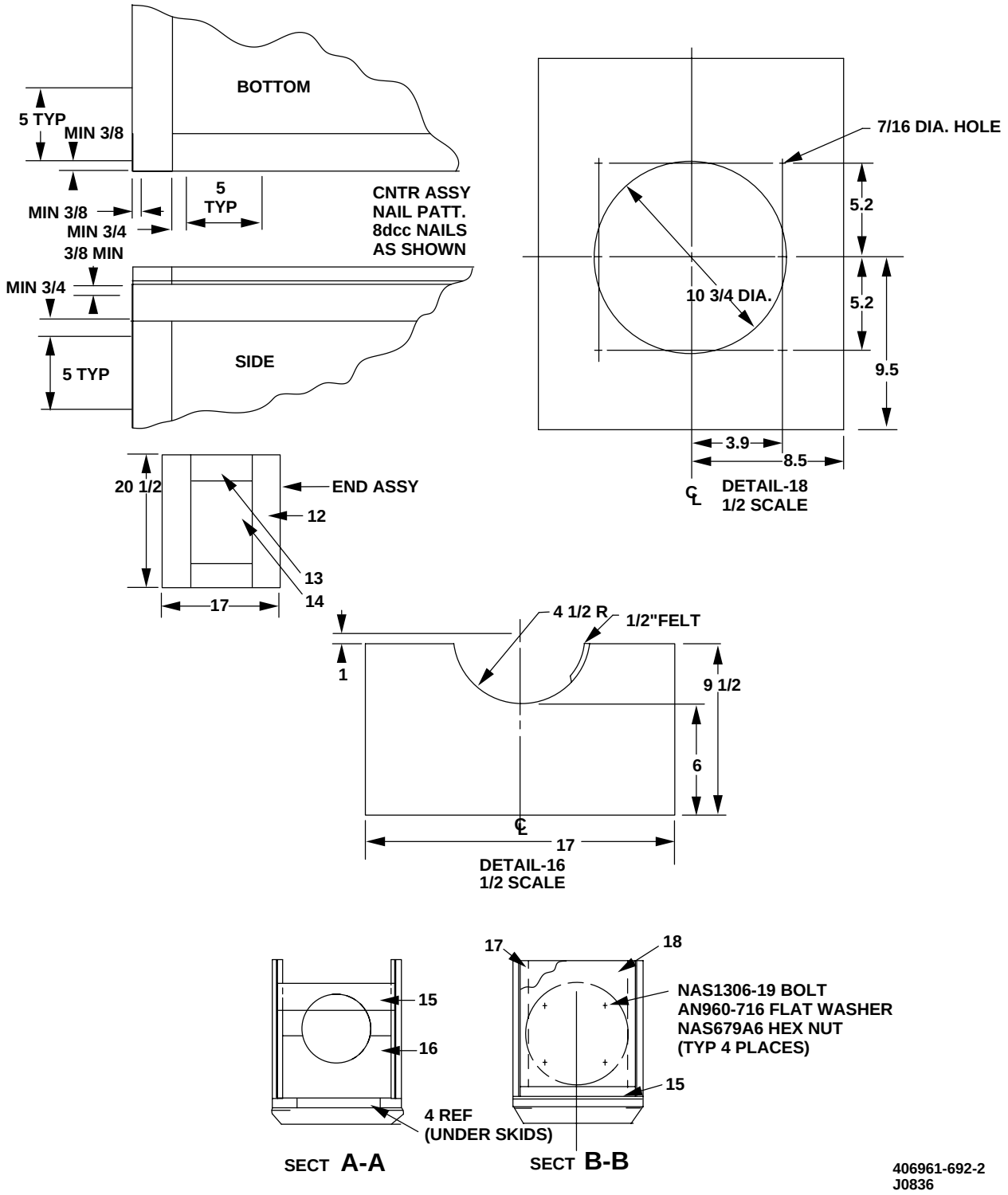
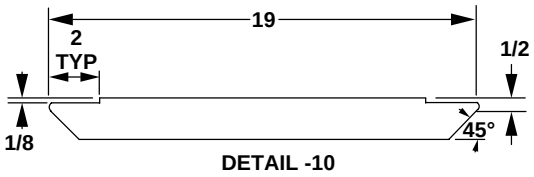


Figure H-9. Tailboom Container (Sheet 2 of 3)



DETAIL -10

NOT ACCEPTABLE

FRACTURE SPLITS AFFECT THE SERVICEABILITY OF THE CNTR. SPLITS AS SHOWN SHALL NOT BE PERMITTED.

ALL DIMENSIONS IN INCHES

Plywood shall be standard grade with exterior glue of U.S. Product Standard PSI-66 (Int-DFPA). Plywood will have the grade stamp of approved/testing agency and will be surface treated in accordance with TT-W-572.

* MIL-STD-731
** NN-P-530

ITEM	QTY	NORMENCLATURE	MATERIAL
1	4	CLEAT	19 x 1 x 4 WOOD
2	4	CLEAT	150 3/4 x 1 x 4 WOOD*
3	2	SHEATHING	68 1/4 x 19 x 5/16 PLYWOOD**
4	16	FILLER CLEAT	11 3/5 x 1 x 4 WOOD*
5	2	SHEATHING	89 3/4 x 19 x 5/16 PLYWOOD**
6	8	CLEAT	13 1/4 x 1 x 4 WOOD*
7	1	SHEATHING	89 3/4 x 20 1/2 x 5/16 PLYWOOD**
8	2	CLEAT	158 x 1 x 4 WOOD*
9	1	SHEATHING	68 1/4 x 20 1/2 x 5/16 PLYWOOD**
10	4	SKID	19 x 2 x 4 WOOD*
11	4	CLEAT	20 1/2 x 1 x 4 WOOD*
12	2	CLEAT	20 1/2 x 1 x 4 WOOD*
13	2	CLEAT	9 3/4 x 1 x 4 WOOD*
14	1	SHEATHING	20 1/2 x 17 x 5/16 PYWOOD**
15	2	TIEDOWN	17 x 2 x 4 WOOD*
16	1	CONTOUR	17 x 2 x 10 WOOD*
17	2	CLEAT	20 1/2 x 1 x 2 WOOD*
18	1	FIXTURE	17 x 20 1/2 x 1/2 PLYWOOD**
	4	BOLT	NAS1306-19
	A/R	WASHER	AN960-716
	4	NUT	NAS679A6
	A/R	FELT	1/2 INCH C-F 206A
	A/R	NAILS	FF-N-150

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Figure H-9. Tailboom Container (Sheet 3 of 3)

NOTES:

1. PAINT ALL COMPONENTS WITH YELLOW, ZINC CHROMATE PRIMER MIL. SPEC. #8585.
2. MARKING DESIGNATIONS MARKINGS ARE SHOWN ON APPROXIMATE LOCATIONS. DESIRED LOCATIONS MAY BE ALTERED SLIGHTLY FOR EASE OF FABRICATION. LOCATIONS SHALL BE CLEARLY VISIBLE AND UNIFORM THROUGHOUT.

NOTE

WEB STRAP SHALL BE SANDWICHED BETWEEN 16 (0.059) GAGE X 2 IN. X 3 IN. STL. SH. AND SHALL BE RIVITED TO SUPPORT YOKE, INDIVIDUAL STRAPS SHALL MEET 500 LBS. MIN. WORKING LOAD.

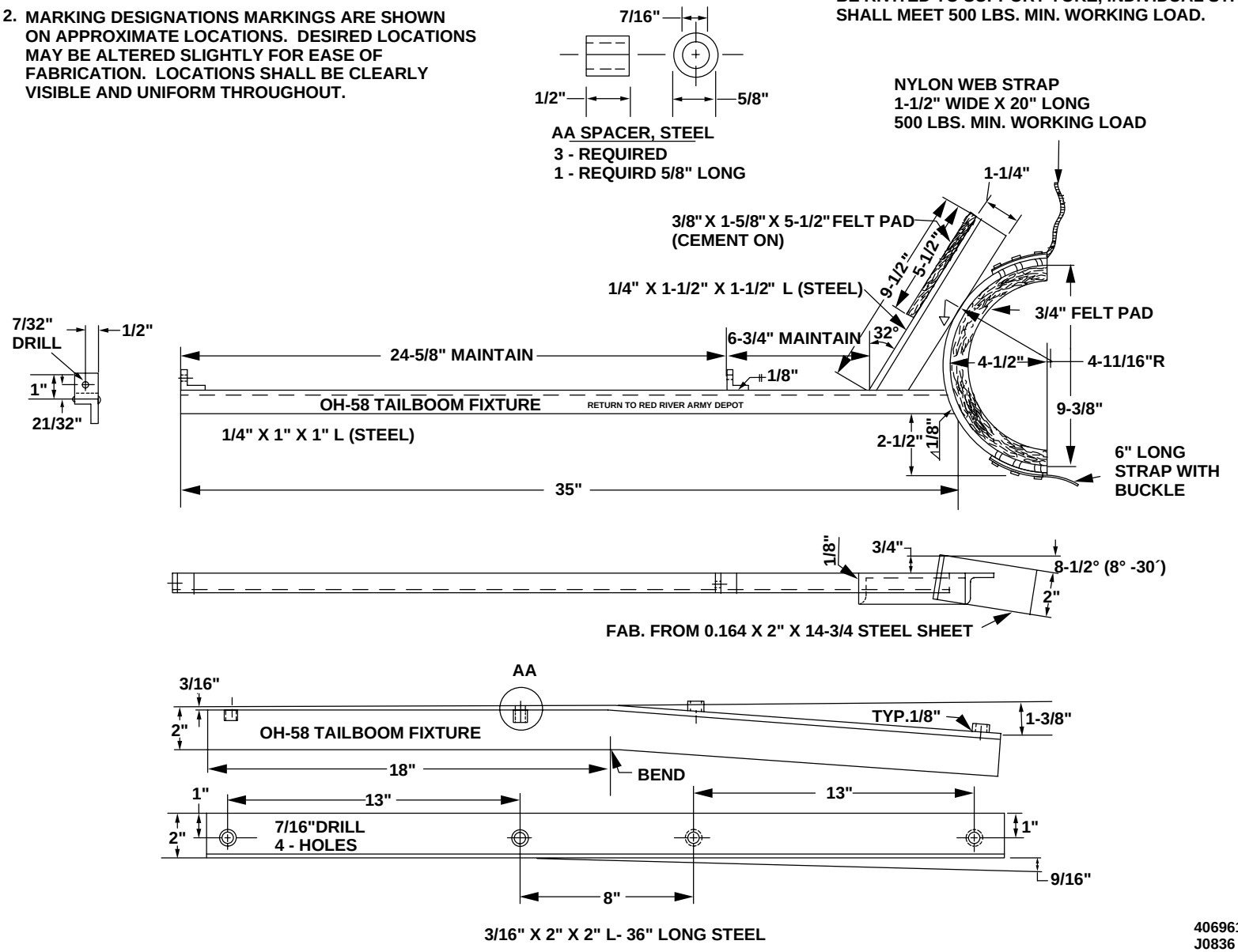

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Figure H-10. Tailboom Attachment Fixture

GLOSSARY

Abbreviation	Meaning
AGL	Above Ground Level
AMC	Air Mobility Command
AMC	Army Material Command
AMCOM	Aviation and Missile Command
APU	Aircraft Power Unit
AR	Army Regulation
ARK	Aerial Recovery Kit
ASSY	Assembly
ATAS	Air-To-Air Stinger
AVIM	Aviation Intermediate Maintenance
AVUM	Aviation Unit Maintenance
CAGE Code	Commercial and Government Entity Code
CG	Center-of-Gravity
CONUS	Continental United States
DA PAM	Department of the Army Pamphlet
DLA	Defense Logistics Agency
DOD	Department of Defense
FM	Field Manual
FOD	Foreign Object Damage
FT	Feet
FWD	Forward
HRK	Helicopter Recovery Kit
INSTL	Installation
ITO	Installation Transportation Office
LH	Left Hand
LO/LO	Lift On/Lift Off
LPH	Landing Platform Helicopter
MAC	Mean Aerodynamic Chord
MIL-STD	Military Standard
MMS	Mast Mounted Sight
MOD	Modification
MPH	Miles per Hour
MSC	Military Sealift Command
MSDS	Material Safety Data Sheet
MTA	Mast Turret Assembly
MTF	Maintenance Test Flight

Glossary (Cont)

Abbreviation	Meaning
MTMC	Military Traffic Management Command
M/R	Main Rotor
NLG	Nose Landing Gear
NOE	Nap-of-the-Earth
NSN	National Stock Number
OCONUS	Outside Continental United States
OSHA	Occupational Safety and Health Administration
PMS	Preventive Maintenance Service
POL	Petroleum, Oils, Lubricants
PPM	Progressive Phase Maintenance
PSA	Port Shipping Authority
RH	Right Hand
RO/RO	Roll On/Roll Off
RPSTL	Repair Parts and Special Tools List
SMR Code	Source, Maintenance, and Recoverability Code
TAC AIR	Tactical Aircraft (Air Force)
TB	Technical Bulletin
TBD	To Be Designated
TM	Technical Manual
TOGW	Take-Off Gross Weight
TTU	Transportation Terminal Unit
UHF	Ultra High Frequency
UWP	Universal Weapons Pylon
U/M	Unit of Measure
VHF	Very High Frequency

ALPHABETICAL INDEX

ALPHABETICAL INDEX (Cont)

ALPHABETICAL INDEX (Cont)

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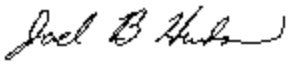

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Administrative Assistant to the Secretary of the Army
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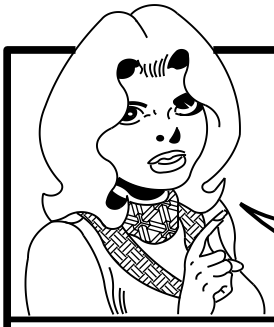

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Ft. Leonardwood, MO 63108

DATE SENT 22 August 1992

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 1-1520-250-10	15 June 1992	Operator's Manual MH60K Helicopter

BE EXACT...PIN-POINT WHERE IT IS

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO
6	2-1 a		
B1		4-3	

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

In line 6 of paragraph 2-1a the manual states the engine has 6 cylinders. The engine on my set only has 4 cylinders. Change the manual to show 4 cylinders.

Callout 16 on figure 4-3 is pointed at a bolt. In key to figure 4-3, item 16 is called a shim - Please correct one or the other

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