TECHNICAL MANUAL

PREPARATION FOR SHIPMENT

OF AH-1 HELICOPTERS

This manual supersedes TM 55-1500-339-S, 27 July 1977, including all changes.

HEADQUARTERS, DEPARTMENT OF THE ARMY
6 NOVEMBER 1980

CHANGE
NO. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 13 December 1990

PREPARATION FOR SHIPMENT OF AH-1 HELICOPTERS

TM 55-1500-339-S, 6 November 1980, is changed as follows:

1. Remove and insert pages as' indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
iii and iv	iii and iv
3-1 and 3-2	3-1 and 3-2
4-1 and 4-2	4-1 and 4-2
G-1 through G-4	G-1 through G-9/G-10
2028s and Envelopes	2028s and Envelopes

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Remove pages	Insert pages
i through iv	i through iv
1-1 and 1-2	1-1/1-2
2-1 and 2-2	2-1 and 2-2
2-5 through 2-12	2-5 through 2-12
2-15 and 2-16	2-15 and 2-16
3-1 and 3-2	3-1 and 3-2
4-1 and 4-2	4-1 and 4-2
5-3 and 5-4	5-3 and 5-4
6-1 and 6-2	6-1 and 6-2
D-1 and D-2	D-1 and D-2
E-1/E-2	E-1/E-2
CG- through G-4	

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CHANGE
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HEADQUARTERS
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PREPARATION FOR SHIPMENT
OF
AH-1 HELICOPTERS

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1. Remove and insert pages as indicated below.

Remove Pages	Insert Pages
iii and iv	iii and iv
4-1 and 4-2	4-1 and 4-2
FO-11	FO-11

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DISTRIBUTION:
To be distributed in accordance with DA Form 12-31, Organizational Maintenance ,requirements for AH-1G, AH-IS (MOD) and AH-1S (PROD) aircraft.

WARNING

Personnel performing operations, procedures, and practices included in this manual must observe the following warnings. Disregard of these warnings could cause injury or death.

SOLVENT

Although MIL-C-81302 solvent is safe and non-flammable, use only with adequate ventilation and avoid prolonged breathing of vapors.

PURGED FUEL SYSTEM

TM 38-250 requires that helicopters with purged fuel systems be tested immediately prior to loading. Test for fuel vapors with a combustible gas indicator. If a dangerous level of vapors exists, repurge until a safe reading is obtained.

GROUNDING

Properly ground aircraft prior to any cleaning, disassembly or preservation.

EXPLOSIVES

Before removing ejector tube assemblies and ejector rack cartridges, ensure that safety pins are installed, battery is disconnected, and armament circuit breakers and switches are OPEN or in SAFE position.

BATTERY

Nickel-cadmium batteries contain an electrolyte which corrodes both aluminum, and magnesium. Keep electrolyte from contacting clothing, skin, or eyes.

a/(b blank)

TECHNICAL MANUAL

No. 55-1500-339-S

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 6 November 1980

PREPARATION FOR SHIPMENT OF AH-1 HELICOPTERS

REPORTING OF ERRORS

You can help improve this manual. If you find mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual directly to Commander, US Army Aviation Systems Command, ATTN: AMSAV-MPSD, 4300 Goodfellow Boulevard, St. Louis, MO 63120-1798. A reply will be furnished to you.

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CHAPTER 1
INTRODUCTION

Section I. PURPOSE

1-1. Purpose. This manual prescribes methods and procedures for preparing the AH-1 helicopter for CONUS and overseas logistical and tactical shipments. Unless otherwise stated, it applies to all AH-l/TH-1 series helicopters.

Section II. GENERAL

1-2. Delivery.

a. Flight delivery, when feasible, is the preferred method of transporting aircraft. Delivery by any other method requires preparation of the AH-1 to prevent damage and corrosion.

b. The AH-1 is only designed to withstand stresses encountered in flight. The packer/shipper must prevent damage from vibration, impact, and other shipping hazards by careful preparation and handling. Mounts and tiedowns described in this manual are designed accordingly.

1-3. Deviations. Individual aircraft configuration may vary due to modifications or mission requirements. No special authorization is required to make minor departures from the manual to cope with such situations.

1-4. Dimensions. Overall AH-1 dimensions for planning space requirements are found on figure 1-2, and in the Operator's Manual.

1-5. Disassembly. Perform all disassembly called out in this manual in accordance with the following publications:

AH-1G	TM 55-1520-221-10
	TM 55-1520-221-23
AH-1 S	TM 55-1520-234-10
	TM 55-1520-234-23
	TM 55-1520-236-10
	TM 55-1520-236-23

1-6. Classified Materials. Handle all classified materials in accordance with local procedures.

1-7. Packaging Materials.

a. Packaging materials are called out in this manual by -C number, referencing Appendix D, Table of Consumables.

b. Cushioning consists of shock-absorbing materials or devices which protect components from physical damage. Acceptable cushionings include polyethylene sheeting (C-14) and polypropylene foam IC-15).

c. Items protected with contact preservative must be wrapped with barrier material(C-2) before being covered with cushioning. On partially coated large items, it may be suitable to use barrier material only over coated areas. Regardless of use of preservative, barrier material must protect all parts which could be damaged by fragments of cushioning.

Section III. PRESERVATION CHECKSHEETS

1-8. Preservation Checksheets.

a. The organization actually preparing the helicopter for shipment is responsible for writing preservation checksheets based on the preservation required. An example of a preservation checksheet is in Appendix B.

All data on page 1-2, including Figure 1-1, is deleted.

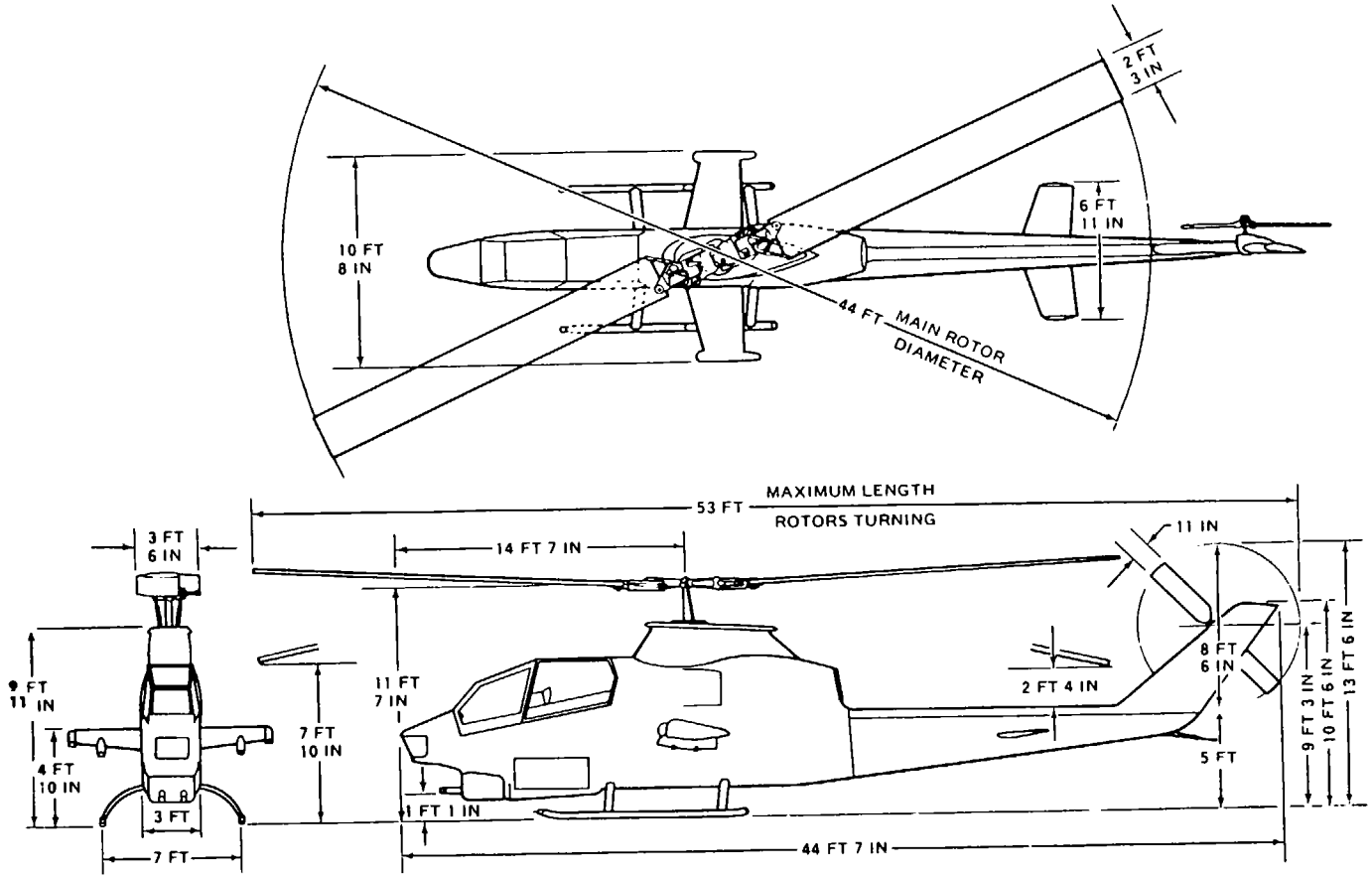


Figure 1-2. Dimensions of AHIS Helicopter.

b. Two copies each of preservation and depreservation checksheets accompany the helicopter. Place one of each in a waterproof bag (C-1 or equivalent), seal, and stencil PRESERVATION AND DEPRESERVATION CHECKSHEETS on the outside of the bag. Tape bag to control stick with C-27. Place second copy of each checksheet in log book.

Section IV. DEPRESERVATION CHECKSHEETS

1-9. Depreservation Checksheets.

a. The organization preparing aircraft for shipment is also responsible for writing depreservation checksheets based on actual preservation applied. Clearly indicate each operation to be performed during depreservation. An example of a depreservation checksheet is in Appendix C.

b. Forward two copies of depreservation checksheet in accordance with paragraph 1-8b.

c. Attach tags in conspicuous locations to draw attention to any operation liable to be overlooked during depreservation.

CHAPTER 2

SHIPMENT BY CARGO AIRCRAFT

Section I. GENERAL

2-1. General.

a. This chapter provides technical information and instructions required for air transport of AH-1 helicopters by USAF cargo aircraft. Preparation procedures are the same regardless of purpose of move. However, variations may occur if full utilization of cargo space is more important than time spent on extra disassembly.

b. Determining aircraft balance and tiedown requirements are functions of the cargo aircraft loadmaster. In case of conflict Air Force requirements found in T.O.-9 Series take precedence.

Section II. CAPACITIES OF CARGO AIRCRAFT

2-2. Capacities of Cargo Aircraft.

a. AH-I helicopters disassembled to the extent stated in Table 2-1 can be transported in Air Force cargo aircraft in the following quantities:

Cargo Aircraft	Number of AH-1's
C-130	1
C-141	;3or4
C-5	12 or 14

b. When ordering a cargo aircraft, add to the order a statement that this load requires full length, width and height of cargo compartment and that all removable items should be excluded.

c. A shelf has been permanently installed in the C-141 cargo aircraft between stations 292 and 378. It is located 2.12m (83 inches) above cargo floor.

d. When helicopters are palletized for shipment, order two 463L pallets for each helicopter shipped.

Section III. PREPARING THE HELICOPTER

2-3. General.

a. To reduce congestion in the vicinity of the cargo aircraft, process helicopter(s) before moving to loading site.

b. No loading plan is prescribed for stowing components within helicopter. Place light objects on top of heavy items to prevent damage by crushing.

c. Ground helicopter prior to cleaning, disassembly, or preservation.

2-4. Cleaning. Clean helicopter as necessary in accordance with paragraphs 7-1 through 7-8.

2-5. Disassembly.

a. Perform all disassembly indicated in Table 2-1 in accordance with TM 55-1520-221-23, TM 55-1520-234-23,or TM 55-1520-236-23.

b. Additional disassembly may be required by circumstances, and is optional with the shipper.

2-6. Preservation and Packaging.

a. Engine, Transmission and Gear Boxes.

(1) Preserve engine, transmission and gear boxes in accordance with paragraph 7-9b through d.

(2) Install engine inlet and exhaust covers or seal openings with barrier material (C-2) secured with tape (C-27).

(3) Visually check entire engine. Plug all holes, cap and ports, and ensure that external parts are complete and secure.

(4 Cover bare metal, including internal and external threads, with a film of corrosion preventive compound (C-13).

b. Fuel System.

(1) Unless the helicopter or its fuel system is damaged, or the cargo aircraft commander objects, ship AlH-1 fueled.

(a) All provisions of TM 38-250 apply.

TABLE 2-1. AH-I DISASSEMBLY REQUIRED FOR CARGO AIRCRAFT SHIPMENT

	MINIMUM DISASSEMBLY			MAXIMUM NO. HELICOPTER M/H			
CARGO AIRCRAFT	**C-5**	**C-130**	**C-141**	**C-5**	**C-130**	**C-141**	
HELICOPTERS PER AIR-CRAFT	**12**	**1**	**3**	**14**	**1**	**4**	
COMPONENTS							
Main Rotor Blades	**X**	**X**	**X**	**X**	**X**	**X**	**3**
Main Rotor Hub		**X**					**2**
Mast & Swashplate Assembly	**7**		**X**		**X**	**X**	
Stub Wings	**X**	**X**	**X**	**X**	**X**	**X**	**2**
Tail Rotor Blade(s) X2	**X**	**X**	**X2**	**X**	**X**	**1**	
Synchronized Elevators	**X**		**X**	**X**		**X**	**2**
Skid Landing Gear	**X4**	**X**	**X**	**X5**	**X4**	**X 3**	
Aft Pylon Fairing Assembly	**X**	**X**		**X**	**X**	**2**	
Center Fairing Assembly	**X**	**X**		**X**	**X**		
Forward Fairing Assembly	**X**	**X**		**X**	**X**		
Transmission Cowling		**X**		**X**		**X**	**X**
UHF/VHF Antenna		**x**	**x**		**X**	**X**	**2**
AN/ARC- 54 Communication Assembly	**X**	**X**		**X**		**X**	
Sand Deflectors		**X**	**X**		**X**	**X**	
Air Intake Duct (ECU)	**X1**	**X1**					
Ejector Tube Assemblies & Cartridges	**X**	**X6**	**X6**	**X**		**X6**	**X 6**
External Stores	**X**	**X**	**X**	**X**	**X**		**X**
Forward Crosstube Fairing	**X8**	**X8**	**X8**	**X8**	**X8**	**X8**	

1. Removed only if AH-1 is mounted on standard skid tubes.
2. Secure remaining blade to tail pylon.
3. AH-1 shipping fixture is required to ship four helicopters in a C-141. If available, it may be used on all shipments by C-130 or C-141.
4. If skid landing gear remains installed, place wedges under forward ends of skids prior to tiedown.
5. Replace skid landing gear with AH-1 shipping fixture, and roll in on rollers. Contact USAAVSCOM, ATTN: AMSAV-SDP for additional information.
6. Top Tow launcher tube remains attached to stub wings. Remove as one assembly.
7. Install tiedown fittings to the wings (1560-01-071-5416, Appendix E).
8. The forward crosstube fairings must be removed, enabling the tow chains to be attached to the air-craft.

(b) Fill fuel tanks 3/4 or less with operating fuel.

(c) Tag fuel caps with number of gallons and type offuel contained in each tank.

WARNING

TM 38-250 requires that helicopters with purged fuel systems be tested immediately prior to loading. Test for fuel vapors with a combustible gas indicator. If a dangerous level of vapors exists, repurge until a safe reading is obtained. To avoid emergency purging, check fuel system periodically prior to loading.

(2) If purging is required, drain and preserve fuel system in accordance with paragraph 7-10b.

c. Battery. Ship battery in helicopter battery carrier. Pull quick disconnect plug and secure to carrier wall with tape (C-27).

d. Removed Components. Preserve and package all removed components indicated in Table 2-1 in accordance with paragraphs 7-11 through 7-28, as applicable.

2-7. Marking. Apply all markings in accordance with paragraphs 7-29 and 7-30.

Section IV. FUNCTIONS OF CARGO AIRCRAFT CREW

2-8. Functions. Air Force personnel are responsible to:

a. Advise and assist Army loading team.

b. Prepare cargo aircraft for loading and unloading.

c. Rig and operate loading aids belonging to cargo aircraft.

d. Designate helicopter location within aircraft.

e. Determine restraint requirements.

f. Provide tiedown devices.

g. Inspect for adequacy of tiedowns.

Section V. FUNCTIONS OF ARMY LOADING TEAM

2-9. Coordination.

a. The Army installation responsible for preparing and loading helicopters must coordinate its activities with Military Airlift Command (MAC). Helicopters must be ready to load as soon as MAC cargo aircraft arrives.

b. All concerned must know how many of which series helicopters are to be shipped and what model cargo aircraft will be used. This enables them to plan disassembly and to gather proper handling equipment, shoring, and cushioning.

2-10. Functions. The Army Loading Team is responsible to: **a**. Prepare helicopter for shipment.

b. Load, tie down, and unload helicopter.

WARNING

Use of predetermined CG's or estimated weights may cause cargo aircraft instability, jeopardizing aircraft, cargo, and crew.

c. Mark center of balance (CG) on each side of fuselage package. Similarly mark major components not stored within helicopter. Verify shipping weight of each major component and record on manifest.

d. Furnish necessary lumber and construct extensions to aircraft loading ramp (figures 2-1 and 2-2).

e. Furnish, rig, and operate loading devices not belonging to cargo aircraft.

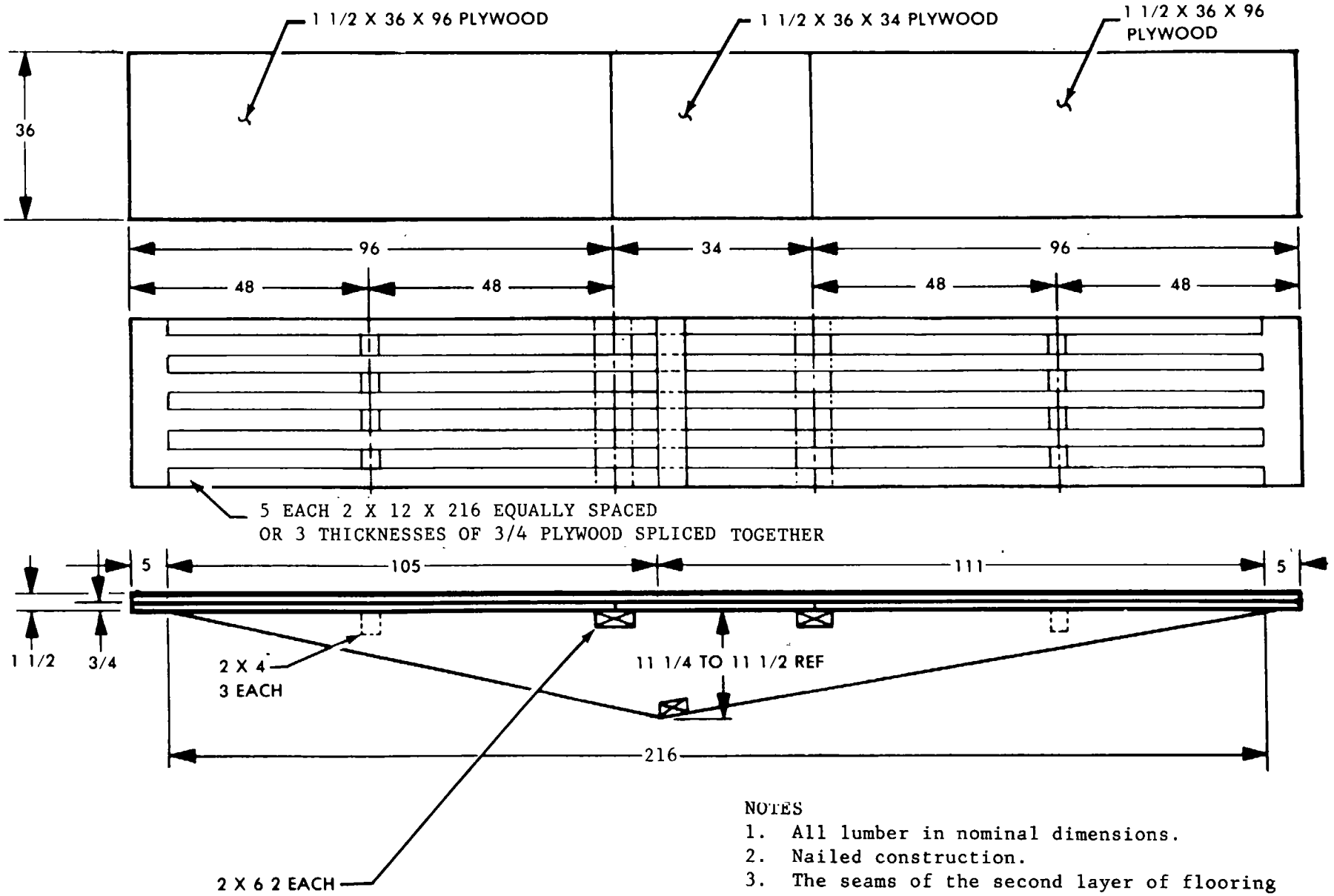
f Furnish and operate auxiliary lights necessary for night loading.

g. Furnish cargo aircraft commander DD Form 1387-28, in accordance with TM 38-250 (AFM 71-4).

h. Prepare manifest, itemizing disassembled components stowed within helicopter as part of fuselage package.

i. Be prepared to demonstrate that disassembled components are packaged correctly and secured in accordance with Air Force restraint requirements.

Figure 2-1. Ramp Extension.



NOTES

1. All lumber in nominal dimensions.
2. Nailed construction.
3. The seams of the second layer of flooring should overlap the first layer seams.
4. All dimensions are in inches.

Figure 2-2. C-5A Ramp Extension

Section VI. PREPARING THE CARGO AIRCRAFT

2-11. Preparing Cargo Aircraft.

a. The cargo aircraft crew prepares cargo aircraft for loading, assisted by Army loading team.

b. Army personnel construct necessary ramp extensions (figures 2-1 and 2-2) to change angle of approach to cargo aircraft. This prevents skid tubes from scraping the ground or gouging the ramp. Retain ramp extension materials for use in unloading.

Section VII. LOADING C-5 CARGO AIRCRAFT

2-12. General.

a. Twelve AH-is with minimum disassembly can be loaded in a C-5 cargo aircraft. Refer to FO-1.

b. Loading requires ground handling wheels.

2-13. Loading With Ground Handling Wheels.

CAUTION

Do not abuse ground handling wheels by running them over 2x4 lumber, rocks, or chuck holes. This is likely to blow out tires or strain wheel supports.

a. Install ground handling wheels.

b. A minimum of seven men constitute the loading team.

(1) Station one man on each side to check side clearance as helicopter is maneuvered within cargo aircraft

(2) Place one man to check overhead clearance, especially around pressure door.

(3) Position four men at end of tailboom to prevent vertical stabilizer from hitting cargo aircraft ceiling and tail skid from being broken as helicopter moves up ramp.

c. Build ramp extensions in accordance with figure 2-2 or equivalent.

WARNING

Do not attach winching bridle or any other towing device to the towing rings on skids. These rings will not support the helicopter when moving up the ramp.

CAUTION

Be sure the winching bridle is secure around the crosstubes and when under tension does not slide up toward the fuselage. If lateral crosstubes are equipped with fairing, the fairings must be removed prior to attachment of the winch bridle.

d. Attach a winching bridle made up of six MBI 1 chains around the helicopter lateral crosstubes, above the longitudinal skids. Place chains twice around the crosstube strut.

CAUTION

Ensure that open portion of winch hook is up, or cargo floor may be damaged.

e. Winch helicopter up ramp with electric winch and snatch blocks.

NOTE

Cargo aircraft crew rig and operate winch and snatch blocks, under direction of loadmaster. Army personnel maneuver helicopter as directed by loadmaster.

f. As cable slack is taken up, lift tailboom until helicopter is far enough up ramp to prevent tail skid from dragging.

g. As vertical stabilizer approaches cargo aircraft doorway, pull tailboom down to keep vertical stabilizer from hitting ceiling.

h. Place plywood or aluminum strips under aft end of skid tubes as they approach ramp hinge, to protect cargo floor.

i. When ground handling wheels reach horizontal section of cargo floor, release winch hook and remove towing bridle.

j. Manhandle helicopter into tiedown position indicated in FO-1.

k. Tie down helicopter in accordance with figures 2-4 and 2-5.

l. After each AH-1 is loaded, place main rotor blades under fuselage on polyethylene sheeting (C-14). Place additional sheeting over blades.

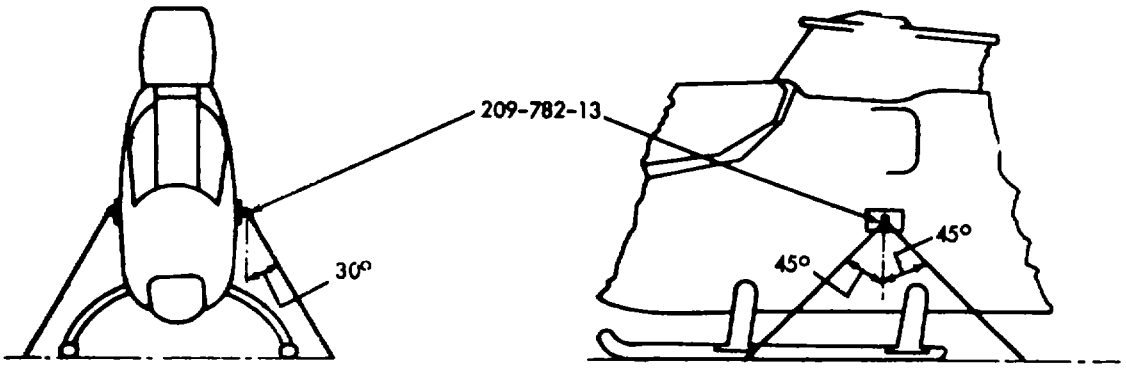
(1) Secure blades laterally with two 5,000pound (2270 kg) tiedown straps.

(2) Restrain blades against forward movement with a third tiedown strap.

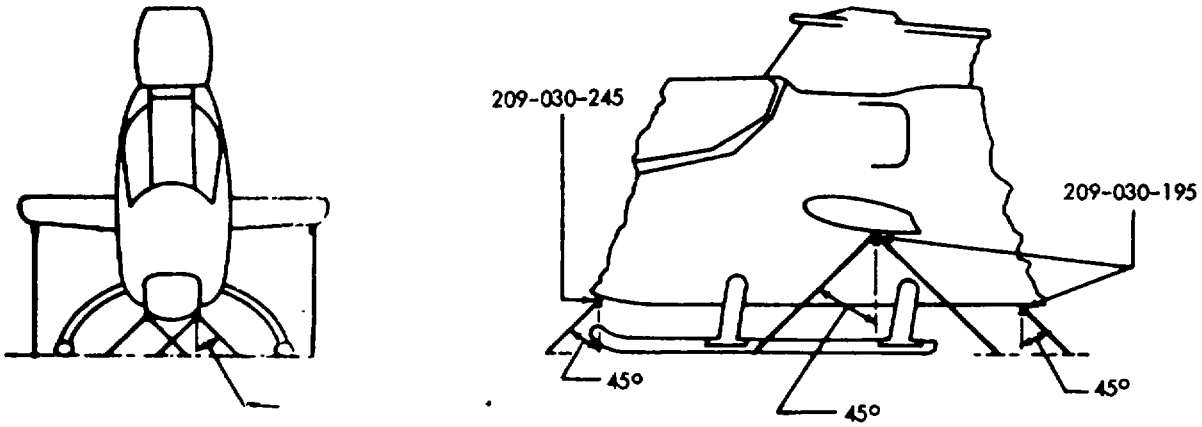
m. Stow disassembled components on ramp.

2-14. Deleted.

Figure 2-3. Deleted.



AIR TRANSPORTABILITY



SURFACE SHIPMENT

Figure 2-4. Tiedown Angles.

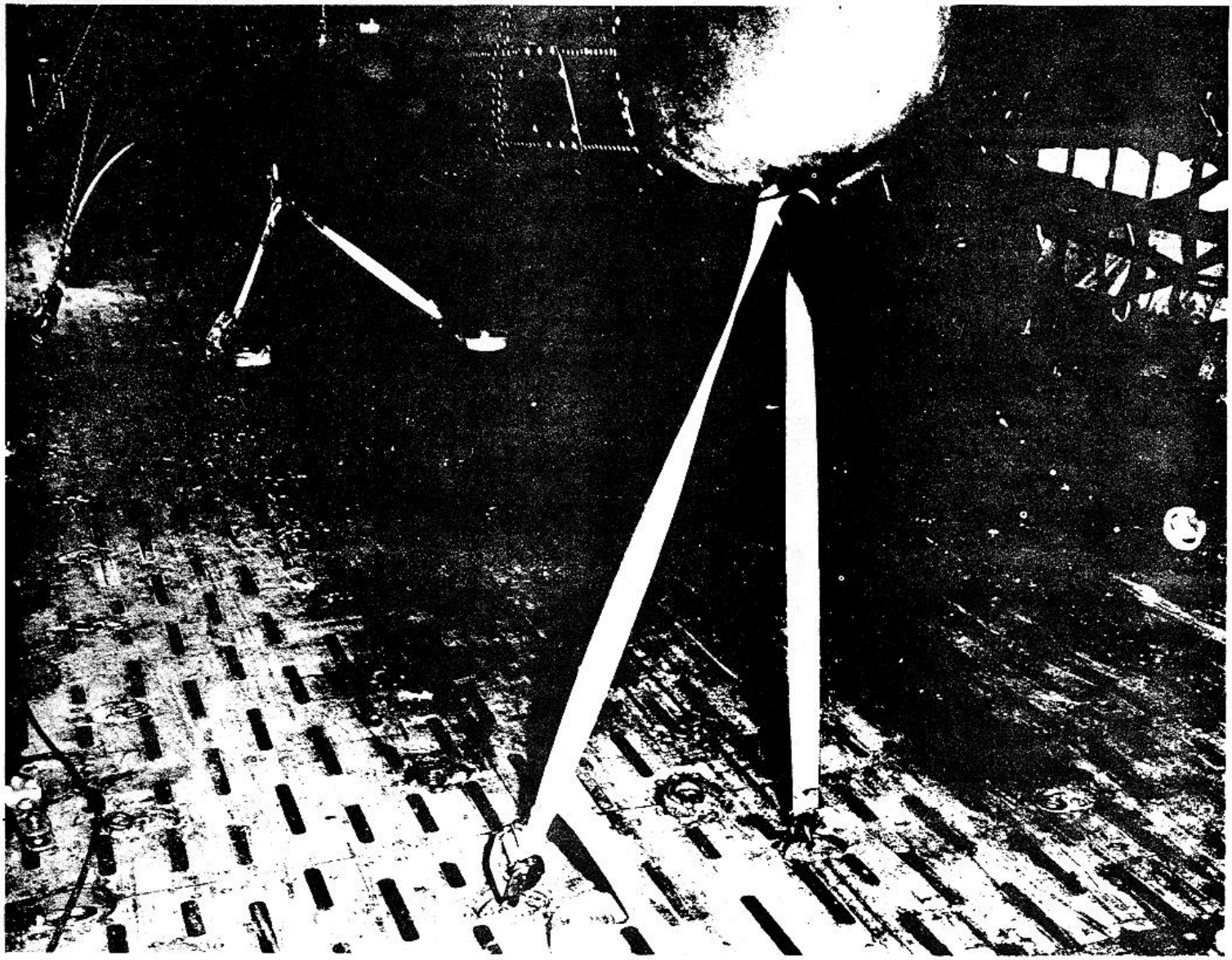


Figure 2-5. Tiedown.

Figure 2-6. Deleted.

Figure 2-7. Deleted.

Section VIII. LOADING C-141 CARGO AIRCRAFT

2-15. General. Two methods of loading the AH-1 into C-141 cargo aircraft are possible:

a. Mounted on AH-1/OH-568 air transportability fixture and on two 463L pallets, using a Kloader.

b. Deleted.

c. Rolled into cargo aircraft using ground handling wheels.

2-16. Loading With AH-1/OH-58 Air Transportability Fixture and 463L Pallets.

NOTE

Use of the shipping fixture reduces landing gear width from 2.24m (88 inches) to 1.42m (56 inches). This minimizes pace between helicopters and increases space available for removed components. The fixture also lowers aft portion of fuselage so that tail pylon clears aft cargo door. This eliminates use of wedges under skid lading gear while positioning helicopter.

a. Replace helicopter skids with transportability fixture (figure 2-8).

b. Lock two 463L pallets together. Place two spacer blocks between pallets. Secure locked pallets to Air Force K-loader, using pallet locking devices and two 5,000-pound (2270 kg) tiedown devices.

c. Hoist helicopter onto locked pallets.

NOTE

Load the first two helicopter nose first.

(1) Place center of wing tiedown point as closeas possible over pallet junction.

(2) Position skid tubes exactly as shown on FO-2.

d. Secure helicopter from each side to pallets with 10,000-pound (4540kg) tiedown devices and chains (figure 2-9).

(1) Attach one chain from forward cross tube hoisting ring forward to number 4 tiedown ring on forward pallet.

(2) Attach one chain from forward cross tube hoisting ring aft to corner tiedown ring on aft pallet.

(3) Attach one chain from aft cross tube hoisting ring to corner tiedown ring on forward pallet

(4) Attach one chain from aft cross tube hoisting ring to number 4 tiedown ring on forward pallet.

(5) Attach one chain from stub-wing tiedown fitting straight down to closet pallet tiedown ring.

(6) Attach one 5,000-pound (2270kg) tiedown device from number 2 tiedown ring on forward pallet across skid tube to number 2 tiedown ring on forward edge of aft pallet.

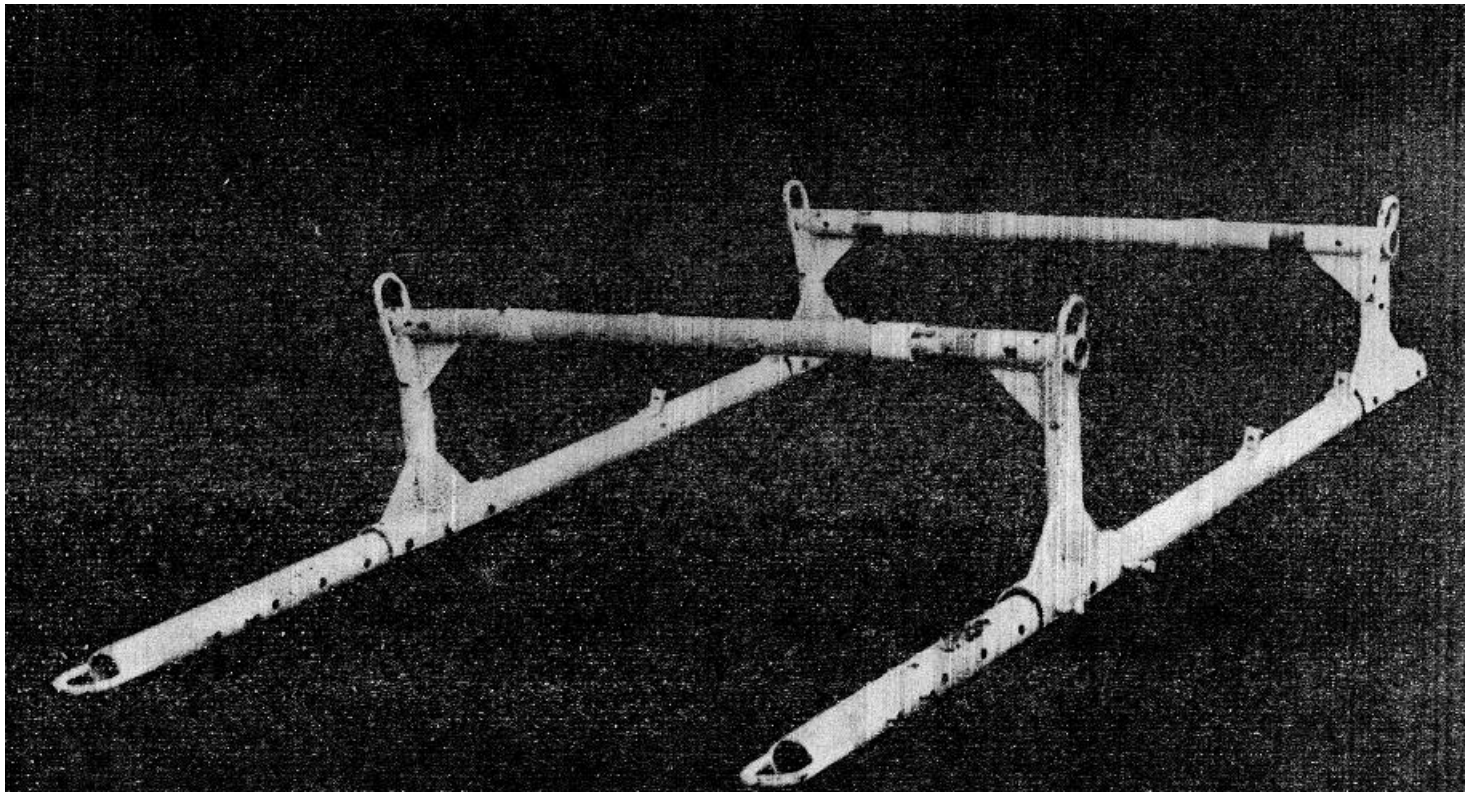


Figure 2-8. Shipping Fixture

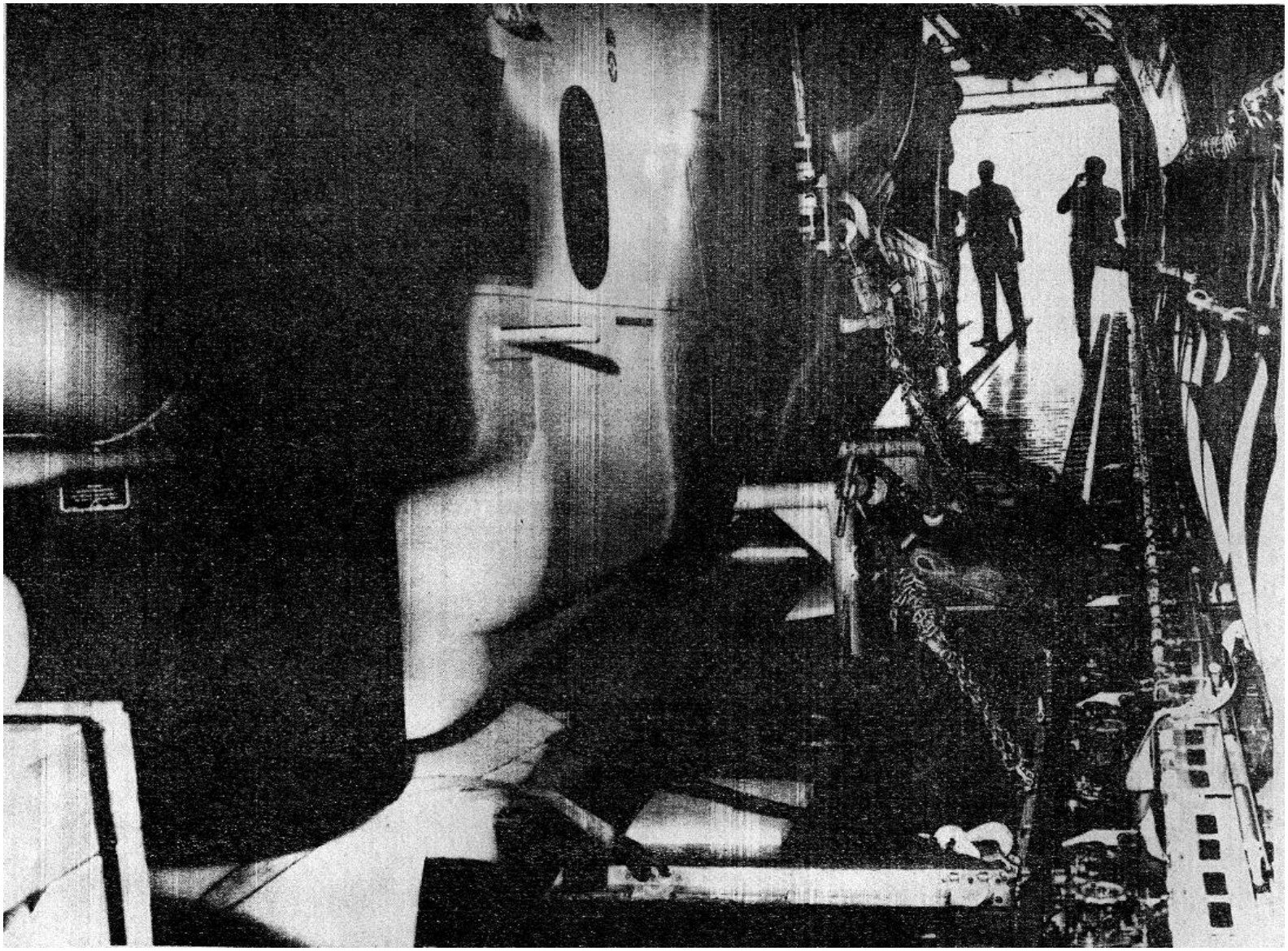


Figure 2-9. Shipping Fixture Tiedown Angles.

e. . Position main rotor blades (root ends forward) under helicopter on polyethylene sheeting (C-14). Place root ends 0.84m (33 inches) forward of loading edge of forward pallet. Place additional polyethylene (C-14) over blades.

(1) Secure laterally with two 5,000-pound (2270kg) tiedown devices.

(2) Restrain blades against forward movement with a third 5,000-pound (2270 kg) tiedown device .

f. Position K-loader against cargo aircraft and adjust to height of cargo floor.

(1) Remove 5,000-pound (2270kg) tiedown devices securing pallets to K-loader.

(2) Disengage pallet locking devices.

g. A minimum of six men constitute loading team.

(1) Station one man on each side of helicopter to check side clearance, since space between helicopters is extremely limited.

(2) Station four men at rear of helicopter to push it into cargo aircraft.

h. Slowly push helicopter mounted on pallets into cargo aircraft to position shown in FO-3. Lock pallets in place with locking devices.

i. Stow and secure disassembled helicopter components within cargo aircraft.

NOTE

Storage space is at a premium: unless each component is placed in its designated location, helicopter and /or cargo aircraft damage may result.

(1) The method of packing components depends upon the availability of cushioning, boxes, crates and cradles, and the cost of materials. Nevertheless, containers conserve space and facilitate loading.

(2) Regardless of packing method, stow items in exact locations shown FO-3.

j. Disassemble and secure skid tubes to pallets beneath helicopter.

NOTE

Skid tubes may remain assembled. If so, stow on cargo aircraft ramp.

2-17. Deleted.

2-18. Loading with Ground Handling Wheels.

a. Load in accordance with paragraph 2-13.

NOTE

C-6 ramp extension is required to ensure canopy vertical clearance during loading.

b. Three helicopters will be loaded nose first. (Exception when loading three helicopters with the air data system (ADS) attached, load first and second helicopter nose first and the third helicopter tail first.)

(1) Position helicopter aft of position shown in FO-3.

(2) Move disassembled components forward, as necessary.

c. Since the AH-1S canopy system is higher than that of other model helicopters, top clearance during loading is extremely critical. Care must be taken to ensure that it does not strike the ceiling of the cargo aircraft as it ascends the ramp and is positioned.

2-19. Launcher Tubes. When launcher tubes are shipped with the helicopter, the following instructions apply.

a. Leave top TOW launcher attached to stub wings. Ship as one assembly.

b. Cushion stub wings, cowling, tail rotor blades, elevators, skid tube fairings, antennas, and anti-collision light with polyethylene sheeting (C-14). Secure with tape (C-27). Place in 1.55m x 0.99m x 0.91m (57 x 39 x 36-inch) boxes (C-4), two per helicopter.

c. Place launcher tubes in 2.24m x 0.56m x 0.48m (88 x 22 x 19-inch) boxes (C-4), four per helicopter.

d. Position helicopters and containers in accordance with FO-3.

Section IX. LOADING C-130 CARGO AIRCRAFT

2-20. Loading C-130 Cargo Aircraft.

a. Due to restricted height and length of the C-130 cargo compartment, it is not recommended for carrying AH-1 helicopters.

(1) Even with extensive disassembly (Table 2-1), only one AH-1 can be transported (figure 2-10).

(2) Because of vertical stabilizer height, use of shipping fixture (figure 2-9) is recommended. This requires two 463L pallets and K-loader for loading.

(3) All models of the AH-1 have been successfully loaded on the standard skid. In this case, the loading and positioning device must be used.

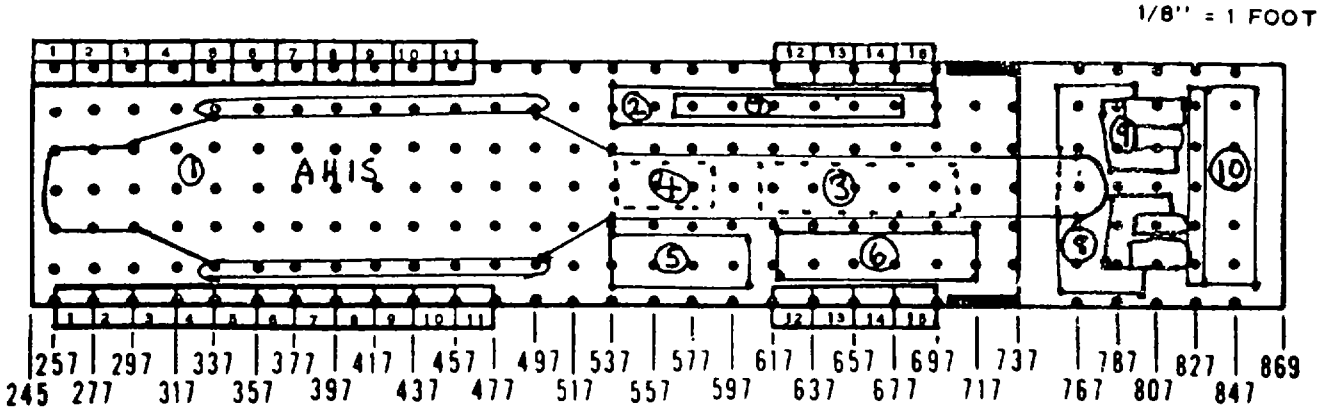
CAUTION

Extreme care is required during loading, as clearances are critical.

b. Use C-141 loading procedures described in paragraph 2-16 with the following additional considerations.

(1) Use ramp extension and sufficient shoring to minimize ramp slope.

(2) Both wing stores, with TOW missile launchers and rocket pods attached, can be safely stored on the cargo aircraft ramp.



LOAD SEQUENCE	ITEM	WEIGHT	FUSELAGE STATION
1	AH-1 S	3608.4kg (7955 lb)	440
2	Main Rotor Blades (2)	206.8kg (456 lb)	610
3	Mast Assembly	127kg (280 lb)	670
3	Mast Assembly	127kg (280 lb)	670
4	Elevators & Tail Rotor	15.9kg (35 lb)	545
5	Rotor Head	231.3kg (510 lb)	560
6	Transmission Cover	27.2kg (60 lb)	670
7	Loading Ramps (over Blades)	68.1kg (150 lb)	610
8	Loading Ramp (over Wing Stores)	167.9kg (370 lb)	790
9	Wing Stores (Weapons Mounted)	6.8kg (500 lb)	780
10	Tool Box	181.4kg (400 lb)	840

Figure 2-10. C-13OLoadag Plum.

CHAPTER 3 SHIPMENT BY VESSEL

Section I. GENERAL

3-1. General. Shipment on top deck risks wind damage, since the AH-1 is not stressed to withstand winds of gale force when moored. This chapter provides for adequate protection from corrosion during shipment, but does not protect against wind damage.

Section II. RESPONSIBILITIES

3-2. Military Commands.

a. Military Traffic Management Command (MTMC) is responsible for making necessary arrangements with Military Sealift Command (MSC) for ocean shipment of aircraft, after being contacted by the appropriate command.

b. MTMC is also responsible for making arrangements with a service stevedore activity or a commercial stevedore firm to load and tiedown aircraft and components. MTMC and MSC supervise these activities.

c. MTMCprepares load plan and manitests, after close coordination with the shipper.

3-3. Shipper.

a. The shipper is responsible for cleaning, disassembly, preservation, and packing of aircraft.

b. He furnishes MTMC any information required to efficiently load the vessel, such as weight and cube, fueled or unfueled, covers or no covers.

c. He will be available to advise on loading and tiedown procedures, asnecessary.

d. Shipper will coordinate with MTMC to determine if aircraft are to be shipped on top deck of a vessel. A protective covering of polyethylene plastic must be applied to each aircraft in accordance with Appendix G.

Section III. PREPARING THE AIRCRAFT

3-4. Cleaning. Clean helicopter as necessary in accordance with paragraphs 7-1 through 7-8.

3-5. Disassembly. Perform the following disassembly in accordance with TM 55-1520221-23. TM 55-1520-234-23 or

a. Remove main rotor blades.

b. Remove tail rotor blade(s) as necessary.

(1) If helicopter will be transported by truck from processing site to dock area, remove one tail rotor blade.

(2) Deleted.

c. Remove ejector tube assemblies and ejector cartridges.

d. Remove launcher tubes as necessary.

e. Remove tow sight azimuth indicator as necessary.

3-6. Preservation for Shipment Below Deck.

a. Engine and Gear Boxes. Preserve engine and gearboxes in accordance with paragraph 7-9.

b. Fuel Tanks.

(1) Aircraft are generally shipped fueled. See paragraph 7-10a.

(2) If the aircraft is damaged or the vessel captain objects, purge and preserve fuel system in accordance with paragraph 710b.

c. Hydraulic System. Preserve hydraulic system in accordance with paragraph 7-23.

d. Power Train. Preserve power train in accordance with paragraph 7-22.

e. Battery. Preserve battery in accordance with paragraph 7-21.

f. Main Rotor Blades. Preserve main rotor blades in accordance with paragraph 7-11.

g. Main Rotor Head and Mast Assembly. Preserve main rotor head and mast assembly in accordance with paragraphs 7-12 and 7-13.

h. Tail Rotor Blade(s). Preserve tail rotor blade(s) in accordance with paragraph 7-14.

i. Canopies. Preserve canopies in accordance with paragraph 7-24.

j. Bare Metal Surfaces. Preserve bare metal surfaces in accordance with paragraph 7-26.

k. ***Skid Landing Gear***. Preserve skid landing gear in accordance with paragraph 7-20.

l. ***Fuselage.*** Preserve fuselage in accordance with paragraph 7-27.

m. ***Launcher Tubes***. Preserve launcher tubes in accordance with paragraph 2-19, if removed.

3-7. Preservation for Shipment on Top Deck.

a. ***General.*** Unless otherwise stated, apply procedures for shipment below deck.

b. Bare Metal Surfaces.

CAUTION

Do not apply preservative to Teflon bearings.

Coat unprotected metal surfaces with preservative compound (C-13). Wrap with barrier material (C-2) secured with tape (C-27).

c. Plexiglass. Cover all plexiglass surfaces with barrier material (C-2) to prevent scratching by shipping covers.

d . Engine and Fuel System.

(1) After engine and fuel system are preserved, ensure that there is no leakage or dripping of preservatives or fluids. Wipe off outside surfaces with dry rags.

(2) Where vent sand drains consist of tubes extending outside of skin surface, extend them with flexible plastic tubing so that they can function with shipping covers installed.

e. ***Flyaway Equipment.*** Pack flyaway equipment in a fiberboard box (C-5). Stow in pilot's cockpit.

f. Deleted.

Section IV. LOADING

3-8. Loading.

a. Attach ropes to tail skid or to landing gear to prevent swinging.

b. Hoist helicopter by a clevis attached to mast nut.

c. When heavy dock equipment is used to hoist helicopter, use shackle adapter in conjunction with a larger clevis (figure 3-1).

Section V. TIEDOWN

3-9. Tiedown.

a. When oversea shipment involves truck movement to the dock, tie down helicopter to truck bed, utilizing aircraft tiedown points. Restrain skid tubes to prevent flexing.

b. The vessel commander is responsible for mooring aboard the vessel. Tie down helicopter in accordance with TM 55-1520-234-23 or TM 551520-235-23, and figure 2-5.

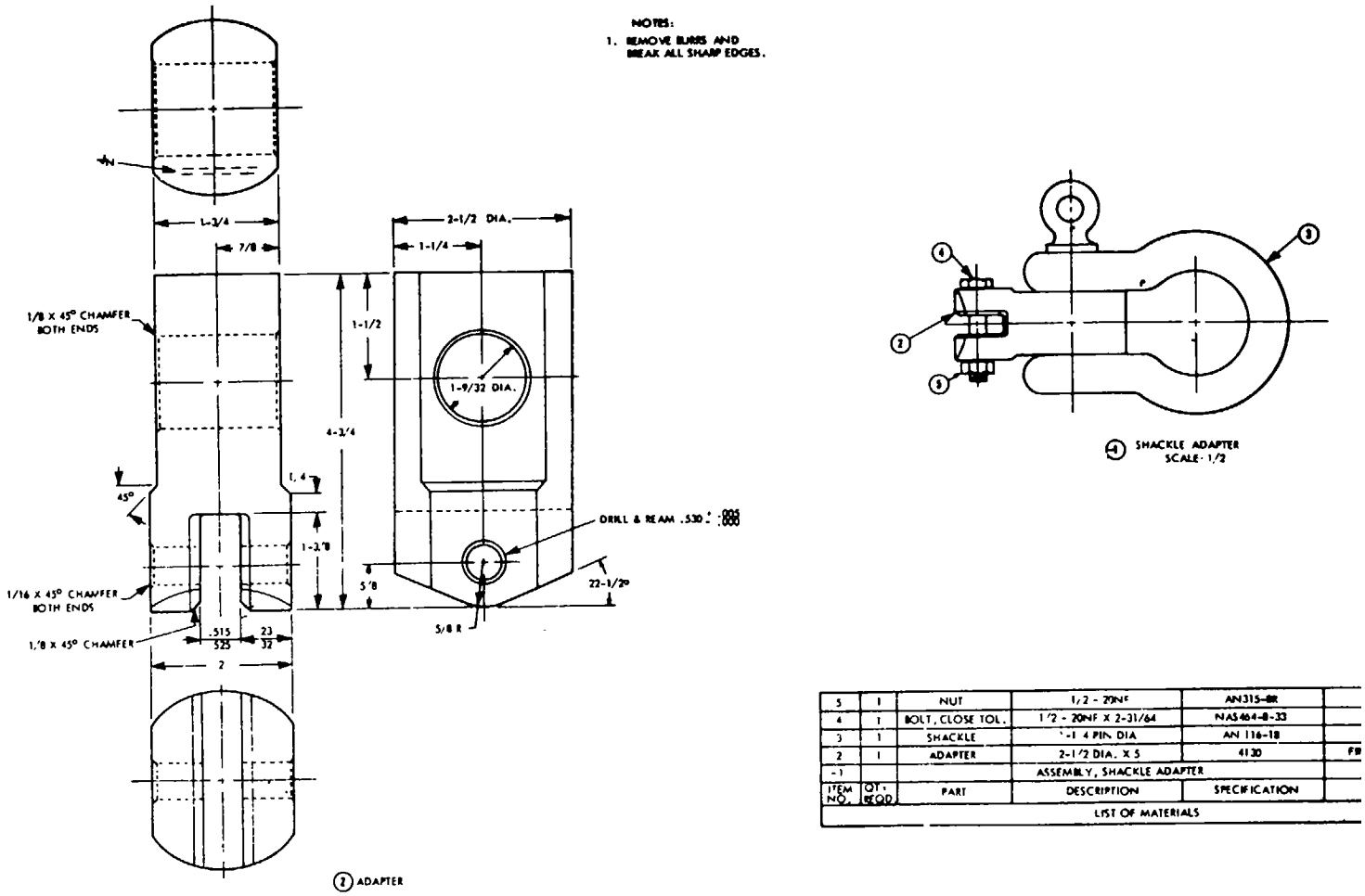
Section VI. CARE ENROUTE

3-10. Care Enroute.

a. Minimize chances of corrosion damage by providing a maintenance escort to inspect aircraft daily. Maintenance escort shall check security and tiedown cables for proper tension. Care should be exercised to avoid excessive tension which could cause damage to aircraft structure.

b. Repair any damage to heat shrink protective plastic covering with heat shrink tape listed in Table G-I.

c. Deleted



ITEM NO.	QTY REQD	PART	DESCRIPTION	SPECIFICATION	
5	1	NUT	1/2 - 20NF	AN315-8R	
4	1	BOLT, CLOSE TOL.	1/2 - 20NF X 2-31/64	NAS464-8-33	
3	1	SHACKLE	1-1/4 PIN DIA	AN 116-18	
2	1	ADAPTER	2-1/2 DIA. X 5	4130	FS
-1		ASSEMBLY, SHACKLE ADAPTER			

LIST OF MATERIALS

Figure 3-1. Shackle Adapter for AH-1.

CHAPTER 4
SHIPMENT BY TRUCK OR RAIL
Section I. GENERAL

4-1. General.

NOTE

No acceptable procedures have been established for shipment of Army aircraft by rail. For further information, contact US Army Aviation Systems Command. ATTN: AMSA V-SDP.

a. Flight delivery is preferred for transporting helicopters. Cargo aircraft shipment is the alternate method of transport. However, when jet fuel is limited, AH-i may be transported within CON US by truck.

b. Shocks and stresses imposed on helicopters during truck shipment may exceed design strength of some parts. Therefore, use only trucks or trailers with soft ride suspension system.

c. Use judgment in omitting or reducing preservation and physical protection for short hauls under controlled conditions.

d. MTMC has the responsibility to provide appropriate vehicles for truck shipment when contacted by the appropriate command. MTMC will prepare a loading plan and manifest under close coordination with shipper. Cleaning, disassembly, preservation and packing of aircraft is the responsibility of the shipper. Aircraft are to be delivered to loading point at time designated by MTMC. The shipper will provide MTMC with information required to efficiently load vehicle and will be available to give advice on loading and tiedown procedures as required.

Section II. PREPARATION FOR SHIPMENT

4-2. Cleaning. Clean helicopter as necessary in accordance with paragraphs 7-1 through 7-8.

4-3. Disassembly.

a. Remove the following components in accordance with TM 55-1520-221-23, TM 55-1520-234-23 or TM 55-1520-236-23:

(1) Main rotor blades.
(2) Main rotor hub.
(3) Main rotor mast and swashplate assembly.
(4) Synchronized elevators.
(5) Spinner assembly
(6) Sand deflectors.
(7) Ejector cartridges.
(8) Tail rotor blades.
(9) Stub wings.
(10) External stores.
(11) Tow sights, if applicable.
(12) Antennas, as necessary.

b. If center pylon fairing and transmission cowling are removed in order to remove mast and swashplate assembly, replace fairings and cowlings prior to shipment.

c. If three or more helicopters are shipped, remove tail booms, UHF/VHF antennas, and AN/ARC-54 antennas.

4-4. Preservation. Preserve aircraft and components in accordance with paragraphs 7-9 through 7-28, as applicable.

4-5. Packaging.

a. Main Rotor Blades.

(1) Pack main rotor blades in reusable shipping container or rotor blade crate (FO-10), if available (2) If neither container nor crate is available, place polyethylene sheeting (C-14) under, between, and over blades. Secure covered blades to carrier floor with nylon straps.

b. Main Rotor Hub.

(1) Wrap main rotor hub with barrier material (C-2) and cushion with C-14. Place in main rotor hub container and secure to trailer bed.

(2) If container is not available, wrap packaged rotor hub in polyethylene sheeting (C-14). Cushion and secure hub to trailer bed.

c. Main Rotor Mast and Swashplate Assembly.

(1) Cushion assembly with C-14.

(2) Attach mast cushioning blocks to base of a cleated plywood box (C-4), 2.13m x 0.61m x 0.46m (84 x 24 x 18 inches).

(3) Secure cushioned assembly on blocks.

(4) Secure plywood box to trailer bed.

d. Synchronized Elevators. Secure elevators to trailer floor, being careful not to damage boxes during tiedown.

e. Tail Rotor Blades. Secure packed blades in cockpit.

f. Stud Wings.

(1) Cushion wings with C-14.

(2) Pack in a cleated plywood box (C-4).

(3) Secure box to trailer bed.

g. Miscellaneous Equipment. Secure miscellaneous equipment box in cockpit with nylon straps.

h. Tail Boom. Mount 3 to 5 removed tail booms on aft end of carrier, using shipping racks constructed to fit contour of tail booms.

i. Landing Gear.

(1) If skid landing gear is damaged and unable to support helicopter, mount fuselage on AH1/OH-58 air transportability fixture (figure 2-9).

(2) Do not preserve ground handling wheels which accompany helicopter. Pack wheels in cleated plywood boxes (C-4). Secure to trailer bed.

j. Airframe.

(1) Install transportation tiedown fitting PN 17300TP005.

(2) Cover all plexiglass surfaces with barrier material (C-2).

(3) Install heat shrink film protective covering in accordance with Appendix G.

Section III. LOADING

4-6. Loading.

a. Load one AH-1 nose forward on each trailer.

b. If three or more helicopters are transported, load two helicopters (with tail booms removed) nose first on first trailer. Load third helicopter and tail booms on second trailer.

Section IV, TIEDOWN

4-7. Tiedown.

a. Immobilize skid by nailing a 4x4 to trailer bed on the outside of each skid. This prevents lateral movement.

b. Tie down helicopter in accordance with air transportability portion of figure 2-5 using 10,000pound (4540kg) tiedown devices, or equivalent.

CAUTION

Excessive tension on tail boom can permanently deform structure.

c. If tail boom is not removed, restrain it by a rope attached to tail skid SNUG tight.

d. Secure crated or boxed components to trailer bed, using 5,000-pound (2270 kg) tiedown devices, or equivalent.

CHAPTER 5
CRATED SHIPMENT
Section I. GENERAL

5-1. General.

a. Crated shipment provides the best protection from combined hazards of exposure, rough handling, and physical damage.

b. Crating is indicated for ocean vessel shipment, for lengthy overland shipments involving carrier transfers or poor handling facilities, and for shipments combining these conditions.

Section II. CLEANING

5-2. Cleaning. Clean helicopter in accordance with paragraphs 7-1 through 7-8.

Section III. DISASSEMBLY

5-3. Disassembly. Remove the following components in accordance with TM 55-1520-221-23 TM 55-1520-234-23 or TM 55-1520-236-23.

a. Main rotor blades.
b. Main rotor hub.
c. Mast and swashplate assembly.
d. Stub wings.
e. Tail rotor blades.
f. Synchronized elevators.
g. Skid landing gear.
h. Aft pylon fairing assembly.
i. Center fairing assembly.
j. Forward fairing assembly.
k. Transmission cowling.
l. UHF/VHF antenna.
m. AN/ARC-54 antenna.
n. Sand deflectors.
l. UHF/VHF antenna.
m. AN/ARC-54 antenna.
n. Sand deflectors.
o. Air intake duct.
p. Ejector tube assemblies and cartridges.
q. Tail boom.
r. Battery.
s. External stores.
t. Tow sights and azimuth indicator.

NOTE

On AH-IS helicopters, top TOW launcher will remain attached to stud wings.

Section IV. PRESERVATION AND PACKAGING

5-4. Preservation. Perform all preservation in accordance with paragraphs 7-9 through 7-28.

NOTE

Preserve engine, fuel systems, and gear boxes before disassembly.

5-5. Packaging.

a. Battery.

(1) Seal vent tubes with barrier material (C-2) secured with tape (C-27).

(2) Pack battery in a wooden box lined on all faces with 2 inches of cushioning (C-14 or C-15).

NOTE

Ensure that battery is right side up.

b. Main Rotor Assembly. Secure in fuselage crate (FO-4, FO-5, FO-6).

c. Main Rotor Hub.

(1) Place wrapped and cushioned main rotor hub in hub container.
(2) Secure hub to fuselage crate base (FO-4).

d. Main Rotor Mast and Swashplate Assembly.
(1) Mount wrapped and cushioned blocks.
(2) Secure blocks to fuselage crate base (FO-4).

e. Tail Rotor Assembly. Secure assembly in cockpit.

f. Synchronized Elevators.
(1) Pack cushioned elevators in a fiberboard box (C-5).
(2) Secure box to fuselage crate base (FO-4).

g. Stub Wings.
(1) Pack cushioned wing sections (2) in plywood container (C-4).
(2) Secure container to fuselage crate base.

h. Ejector Tube Assemblies.
(1) Pack cushioned assemblies in a plywood box (C-4).
(2) Secure box in cockpit.

i. Tail boom.

CAUTION

Tailboom longeron fittings are aluminum alloy forgings; neither scratches nor gouges on any surface, nor the slightest elongation of bolt holes can be permitted on these highly stressed fittings.

(1) Secure tailboom in fuselage crate as shown in FO-4.
(2) Bolt tailboom forward support (figure 5-1) to end bulkhead of tailboom with four AN6 bolts.
(a) Ensure that steel plate is smooth and flat where it contacts longeron fittings.
(b) Insulate plate from fittings with two thicknesses of barrier material (C-2).
(c) Use an aluminum washer under bolt head and a self-locking nut.
(d) Insert each bolt with head on longeron fitting and nut against steel plate.
(e) Torque nut to same value as when assembling helicopter.
(3) Rest tail skid above crate floor.

NOTE

Skid cutouts (FO-4) are designed to prevent lateral and vertical movement, while allowing fore and aft movement.

(a) Allow 3-6cm (1-2 in) clearance over top of tail skid on forward saddle marked "elevator cradle".
(b) Maintain at least 2.5cm (1 in) clearance between end of tail skid and 4 x 4 header at end of crate.
(4) Keep a loose fit on tail boom aft support.
(a) Maintain at least 2.5cm (one inch) clearance at top.
(b) Adjust width of cut and padding toallow vertical fin to move 1.4cm (1/2-inch) right and left.

j. Fuselage. Secure the following items in cockpit:
(1) Aircraft records and publications.
(2) UHF/VHF antenna.
(3) AN/ARC-54 antenna.

k. Fairings and Cowlings.

(1) Secure center and forward fairing assemblies, transmission cowling, duct assembly, and sand deflectors in a plywood box (C-4).
(2) Secure box to fuselage crate base (FO-4).

l. Skid Landing Gear.
(1) Secure cross tube fairing in cockpit.
(2) Secure disassembled portions of skid landing gear to side wall of crate with nylon straps.

m. Aft Pylon Fairing Assembly.
(1) Place fairing on top of boxed stub wings.

NOTE

Assembly is not indicated on FO-4.

n. Launcher Tubes. If applicable, place tubes in 2.24m x 0.56m x 0.48m (88 x 22 x 19-inch) boxes (C-4).

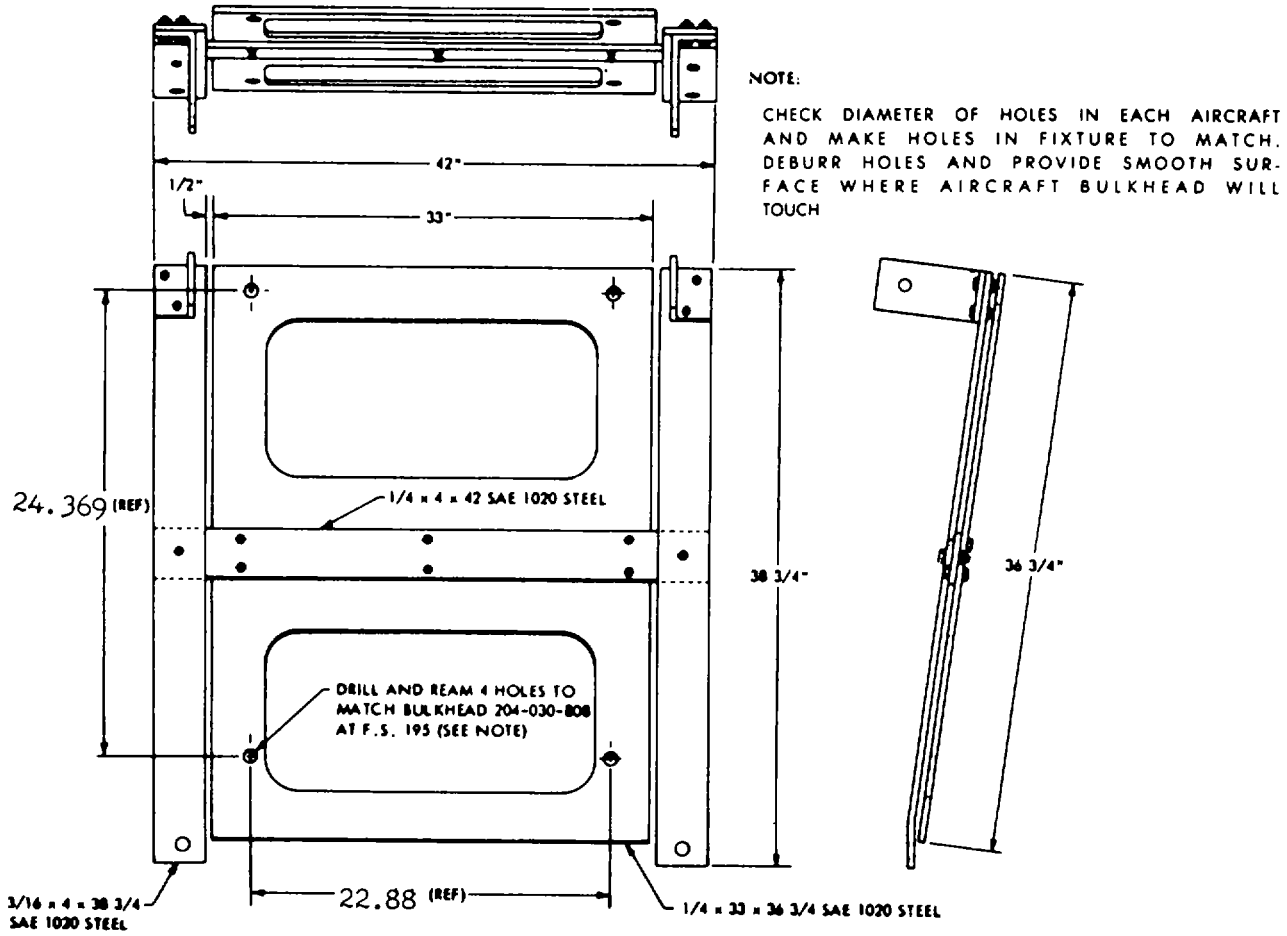


Figure 5-1. Tailboom Forward Support.

Section V. PACKING

5-6. General.

a. Description and approximate quantity of materials needed' for crate and box construction are shown on FO-3 and FO-4.

b. Drawings for containers or fixtures used to support disassembled components may be obtained from HQ, USAAVSCOM, ATTN: AMSAV-SDP, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798.

5-7. Crate. Construct demountable plywood-sheathed crate as shown in FO-4.

5-8. Nailing.

a. When nailing flat faces of two pieces of lumber together with a combined thickness of 80mm (3 1/8 inches) or less, use nails long enough to pass through the joint and be clinched at least 6mm (1/4 inch).

b. When nailing flat faces of two pieces of lumber together, with a combined thickness exceeding 80mm (3 1/8 inches), and when nailing one or more flat faces to edge or end face of another piece, use nails as long as practicable without splitting pieces.

c. When pieces of different thicknesses are joined, position nail heads in thinner piece. Have the nail portion in thicker piece 2 to 2½ times the nail length in the thinner piece for ten-penny nails and smaller, and at least 40mm (1% inches) for twelve-penny nails and larger.

d. No nail should be driven closer than the thickness of the piece to the edge of the lumber.

e. No two nails in the same row should be closer than 75mm (3 inches).

f. Cement coat or etch any unclinched nails.

5-9. Lag Screws.

a. Assemble crates with lag screws.

b. Always drill lead holes and turn in lag screws. Do not drive by hammering or impact.

c. Use a plain washer under the head of each lag screw.

5-10. Bolted Connections. After nuts are tightened, coat exposed bolt threads with lacquer primer to resist loosening.

Section VI. MARKING

5-11. General. Apply markings in accordance with paragraph 7-29 and 7-30.

5-12. Crate Markings.

a. Mark each side and end of crate with 5cm (2 inch) stenciled letters: USE NO GRAB HOOKS.

b. Stencil instructions for opening in 2.5cm (1 inch) letters on one side of crate.

TO OPEN CRATE

1. REMOVE ALL LAG SCREWS FROM SIDES AND ENDS ADJACENT TO TOP.
2. REMOVE TOP.
3. REMOVE ALL LAG SCREWS IN THIS END.
4. REMOVE THIS END.

c. Indicate center of balance of loaded crate with a painted black strip 2.5cm (1 inch) wide on each side of crate, extending upward 7.5cm (3 inches) from lower edge of sheeting. Stencil CENTER OF BALANCE in 2.5cm (1 inch) letters adjacent to strip.

d. Indicate sling points by conspicuous arrows and SLING HERE in 2.5cm (1 inch) letters.

e. Stencil in 2.5cm (1 inch) letters adjacent to inspection doors: NOT PRESERVED FOR STORAGE. REPRESERVE IF NOT ACTIVATED BY ... (enter date 90 days from date of preservation).

f. MIL-STD-129 preservation method and level of protection marking is B/A.

CHAPTER 6
TACTICAL SHIPMENT
Section I. GENERAL

6-1. General Tactical shipment represents the fastest deployment of a unit by any given mode of transport. It requires shipment of the maximum number of aircraft with the least possible disassembly/reassembly. That is, the aircraft must be in as near to fly-away condition as possible. If full carrier utilization is required, it may be combined with logistical procedures, as necessary.

Section II. DEPLOYMENT BY CARGO AIRCRAFT

6-2. Deployment by C-5.

a. General.

(1) The C-5 is the largest cargo aircraft available. Its cargo compartment is 36.93m (1454 inches) long, 5.79m (228 inches) wide, and 4.11m (162 inches) high.

(2) Restraint criteria are: 3G's forward, 1.5G's aft and lateral, and 2G's vertical.

(3) The maximum number of AH-1's in flyable configuration which can be carried is seven.

b. Helicopter Preparation.

(1) Refer to Table 2-1 for minimum disassembly requirements, when AH-1's will not be shipped in flyable configuration.

(2) Prepare helicopter in accordance with Chapter 2, as applicable.

c. Loading.

(1) Attach ground handling wheels to move AH-1.

(2) Make a towing bridle by looping a 5,000pound tiedown device around each end of cross tube nearest cargo aircraft. Two chains are required on each side. Bring ends together to form triangular bridle (figure 2-4).

(3) At least eight people are required for loading team.

CAUTION

Two persons must monitor main rotor blade position at all times. Bear in mind that any rotation of main blades causes a greater movement of tail rotor blades.

(a) Station one person at each rotor blade extremity to check clearance as helicopter ascends ramp. They will prevent blade from hitting the ground and/or striking C-5 ceiling.

(b) Station one person on each side of ramp ahead of AH-1 to check side clearance.

(c) Station four persons at tail to guide AH-1 as it moves up ramp and into C-5.

(4) Winch helicopter up ramp with cargo winch and snatch blocks.

NOTE

Ensure that winch hook is UP.

(5) As AH-1 ascends ramp, lift tail boom to keep it from dragging.

(6) When AH-1 reaches ramp crest, restrain vertical stabilizer to keep it from hitting C-5 ceiling.

(7) When AH-1 reaches horizontal cargo floor, manually move it into tiedown position.

(8) Locate helicopter so that crew members can move along sides of cargo aircraft.

(9) Rest skids on pieces of plywood to avoid damage to cargo floor.

d. Tiedown. Tie down AH-1 in accordance with paragraph 2-13. Secure blades with two 5,000-pound (2270 kg) tiedown straps.

e. Offloading.

(1) Offloading is the reverse of loading. Pay particular attention to main rotor blade clearance.

(2) Use outside winch or manpower to move helicopter to ramp incline.

(3) Use cargo aircraft winch, if available, to restrain AH-1 during descent.

6-3. Deployment by C-141.

a. General.

(1) The C-141 cargo compartment is 25.88m (1019 inches) long, 3.12m (123 inches) wide, and 2.77m (109 inches) high.

(2) Restraint criteria are: 4G's forward, 1.5G's aft and lateral, and 2G's vertical.

(3) Flyable AH-1's cannot be carried in the C-141.

b. Helicopter Preparation.

(1) Refer to Table 2-1 for minimum disassembly requirements.

(2) Prepare AH-1 in accordance with Chapter 2, as applicable.

c. Loading. Load in accordance with paragraph 2-16 and 2-18.

d. Tiedown. Tie down AH-1 in accordance with paragraph 2-16 and 2-18.

e. Offloading. Offloading is the reverse of loading.

6-4. Deployment by C-130.

a. General

(1) The C-130 cargo compartment is 12.50m (492 inches) long, 3.02m (119 inches) wide, and 2.74m (108 inches) high.

(2) Restraint criteria are: 8G's forward, 1.5G's aft and lateral, and 4G,s vertical.

(3) Only one AH-1 can be transported in a C-130.

b. Helicopter Preparation.

(1) Extensive disassembly is required. Refer to Table 2-1.

(2) Prepare helicopter in accordance with Chapter 2, as applicable.

c. Loading. Load in accordance with paragraph 2-20.

d. Tiedown. Tie down AH-1 in accordance with paragraph 2-20.

e. Offloading. Offloading is the reverse of loading.

Section III. DEPLOYMENT BY VESSEL

6-5. Deployment by Ship. Follow procedures contained in Chapter 3.

6-6. Deployment by Barge.

a. General. Two barge systems are currently available. AH-1 helicopters have been test loaded in the Lash Lighter and successfully shipped in Seabee Barges.

b. Lash Lighter.

(1) The Lash Lighter is a relatively thin-skinned double-hulled container, made of steel or fiberglass. It has a water-tight hatch cover, but the inner skin is not water-tight.

(a) The Lighter can carry as much as 407ST (370LT (long ton)) of cargo at a draft of just over eight feet; helicopter loads draw five to six feet.

(b) The Lighter is 18.76m (61.5 feet) long, 9.00m (29.5 feet) wide, and 3.57m (11.7 feet) high.

(2) Eight AH-1's can be shipped (FO-7).

(a) Remove main rotor blades, tail rotor blades, elevators, and stub wings.

(b) Prepare AH-1 in accordance with Chapter 2.

(3) Six AH-1's can be shipped with only blades removed.

(4) Since hatch opening is 13.42m (44 feet) long and AH-1 is 13.57m (44.5 feet) long, take extreme care while inserting AH-1 into barge.

(5) AH-1 height (4.12m (13.5 feet) precludes installation of all but the center hatch cover. Cover open ends with water-proof material.

(6) If other Lighters are stored above AH-1's, install spacers or Lighter lifting posts.

c. Seabee Barge.

(1) The Seabee Barge is water-tight and double-hulled. It is 27.45m (90 feet) long, 9.21m (30.2 feet) wide, and 4.42m (14.5 feet) high, the same width as and half the length of standard US commercial river barges. It can carry 834LT (917.4ST) at a draft of 3.20m (10.5 feet) (0.53m (1.75 feet) when empty).

(2) Fourteen AH-1's can be shipped by Seabee Barge (FO-8).

(a) Remove main rotor blades, tail rotor blades, and stub wings.

(b) Prepare AH-1 in accordance with Chapter 2.

(3) The Seabee holds six AH-1's with no disassembly (FO-9). However, considerable care and cushioning is required to keep rotor blades from contacting barge or each other.

(4) Tie down as for air shipment (figure 2-5). Weld additional tiedown rings to deck, as necessary.

CHAPTER 7
PREPARATION FOR SHIPMENT
Section I. CLEANING

7-1. General.

CAUTION

Ground aircraft before doing any work. Install safety pins in ejector racks. Remove ejector rack tubes, if installed. Ensure that armament circuit breakers and switches are OPEN or in SAFE position.

Clean helicopter before preparing it for shipment. Residues from exhaust gases, dirt, and any contamination accelerate corrosion, whether coated with preservative or not.

7-2. Interior.

a. Clean upholstery with mild soap(C-26) and water.

WARNING

Although solvent (C-8) is safe and nonflammable, use with adequate ventilation and avoid prolonged breathing of vapors. Do not use near open flames or heat. Avoid contact with skin.

b. Remove grease and oil spots with solvent (C-8). Wipe dry with a clean cloth. (C-9).

c. Thoroughly vacuum aircraft.

7-3. Exterior.

CAUTION

The AH-1 contains bearings which are sensitive to many petroleum compounds. Do not use any solvent to clean main rotor group above fuselage.

Clean exterior structure with a mixture of one part cleaning compound (C-7) and three to seven parts water.

a. Use stronger mixtures for exhaust outlet and other very dirty areas. Rinse off any cleaning solution splashedon plexiglass with clean water before it dries.

b. Wash a small area at a time, rinsing thoroughly with pressurized water. If allowed to dry or not completely rinsed off, compound could harm painted surfaces.

c. A soft brush (C-6) may be used to apply compound.

7-4. Plexiglass.

CAUTION

Do not use compounds containing any Do not use compounds containing any abrasive material or solutions containing esters, ketones, aromatic hydrocarbons, or chlorinated carbons. Avoid excessive scrubbing during washing.

a. Clean all transparent plastics with large quantities of mild soap (C-26) and water.

b. Gently free caked mud or dirt with finger pads. Do not use sponges or coarse cloths. Rinse continuously while removing mud.

c. Remove grease and oil with aliphatic naphtha (C-21).

d. Allow surfaces to drip dry.

e. If further cleaning is required, apply cleaning and polishing compound(C-10) to plexiglass with a clean, soft cloth (C-9). Use another cloth to polish entire area until it is clean and dry.

NOTE

Repeated thin applications of polishing compound provides better protection than infrequent thick application.

7-5. Rotor Blades. Wash rotor blades with mild soap (C-26) and water.

7-6. Engine.

a. Clean engine, air intake ducts, plenum chambers, and compressor inlet screens.

b. Clean engine exterior as necessary with a clean cloth (C-9) dampened with solvent (C-17).

c. Remove air particle separator. Clean with solvent (C-17). Reinstall.

7-7. Aluminum and Magnesium Alloy Corrosion.

a. Treat aluminum and magnesium alloy corrosion in accordance with TM 55-1500-204-25/1.

b. Apply protective paint finish to affected area immediately after chemical treatment dries, in accordance with TB 746-93-2.

7-8. Canopy Removal System. Deactivate canopy ejection system in accordance with TM 55-1520221-23, TM 55-1520-234-23 or TM 55-1520-236-23.

Section II. PRESERVATION AND PACKAGING

7-9. Engine, Transmission, and Gear Boxes.

CAUTION

Lubricating oil may soften paint upon contact. Remove spilled oil with a clean cloth (C-9) dampened with solvent (C-17).

a. Add corrosion preventive concentrate (C-25 or equivalent) to engine oil system and gear boxes in accordance with TB 55-9150-200-24.

b. Fill oil tank, transmission, tail rotor intermediate gear box, and tail rotor gear box to normal operating level with operating oil.

NOTE

Ground run-p completes internal preservation of transmission and gear boxes.

CAUTION

Do not exceed maximum temperatures and pressures for engine run-up.

c. If engine has not been started within 24 hours, start it and run at flight idle for 10 minutes.
   (1) Check all instruments for normal operation.
   (2) Ensure that engine temperature stabilizes.

d. Shut down engine.

e. Disconnect cable to ignition unit to prevent accidental firing of engine ignition.

f. Remove particle separator, fuel inlet strainer, pump discharge strainer, and servo supply filter from fuel regulator. Clean with solvent (C-17) and reinstall.

g. Disconnect main fuel hose from main fuel flow divider, and starting fuel hose from inlet side of starting fuel solenoid valve. Install temporary lines on end of hoses to allow drainage into suitable container.

h. Attach a line from a container of lubricating oil (C-20) to fuel control inlet fitting.

i. Ensure that engine has cooled enough to prevent auto-ignition. Set throttle arm to IDLE.

j. Motor engine with starter to pump lubricating oil through engine fuel system.

k. Open and close throttle to flush fuel control.

l. Continue motoring until fuel-free oil drains into container. Shut down engine.

m. With engine stopped, spray turbine rotor with lubricating oil (C-20), covering blades.

NOTE

Use dehydrated air for spraying.

n. Disconnect lubricating oil hose from fuel control, connect fuel control. Connect fuel inlet line.

o. Remove temporary lines from fuel hoses. Connect main fuel hose to main fuel flow divider. Connect starting fuel hose to starting fuel solenoid valve.

p. Connect cable connector to ignition exciter.

q. Install engine inlet and exhaust covers, if available, or seal openings with barrier material (C-2) secured with tape (C-27).

r. Remove oil filter, disassemble and clean. Immerse in operating oil, reassemble, and reinstall.

s. Tag controls with: ENGINE AND FUEL CONTROL PRESERVED WITH MIL-L-6081 OIL. FLUSH WITH STANDARD FUEL BEFORE PLACING IN SERVICE.

t. Visually check entire engine.
   (1) Plug all holes and cap all ports.
   (2) Ensure that external parts are complete and secure.
   (3) Cover bare metal, including internal and external threads, with a film of corrosion preventive compound (C-13).

u. Record date and extent of engine preservation in engine historical records.

7-10. Fuel Tanks.

a. Aircraft are normally shipped fueled.

(1) Fill fuel tanks to within 15-20 gallons of capacity to allow for expansion.

(2) Tag fuel cap with: AIRCRAFT FUELED WITH_____: NO SMOKING.

(3) Make entry in logbook showing type of fuel, date, and activity.

b. If the helicopter is damaged or the transporter insists, purge fuel tanks.

WARNING

Ground aircraft and all defueling equipment. Equip work stands with a personal static discharge plate of copper or zinc plate, affixed so that workers can contact plate before contacting aircraft. Do not drain fuel tanks near the end of work day and allow tanks to stand "empty" overnight. This could produce explosive vapors.

(1) Primary Method.

(a) Drain fuel tanks.

(b) Flush with 5 gallons of diesel fuel (C-16); drain through gravity fuel valve.

(c) Fill fuel tanks with diesel fuel (C-16). Allow to remain in tanks at least eight hours, then drain.

(d) Test tanks with combustible gas indicator. If a dangerous level of fuel vapors remains, discard drained diesel fuel and reflush with fresh diesel fuel (C-16) until a safe reading is obtained.

(e) Fog fuel tanks with 5 gallons of lubricating oil (C-20).

(f) Tag fuel cap with: FUEL SYSTEM PRESERVED WITH MIL-L-6081, GRADE 1010 OIL. NO FLUSHING REQUIRED.

(2) Alternate method.

(a) Drain fuel tanks.

(b) Flush tanks with 5 gallons of diesel fuel (C-16); drain.

(c) Open drains and vents; remove fuel cap.

CAUTION

Use only dehydrated air.

(d) Purge tanks for one-half hour with reduced pressure air supply. Use hose with 1/4-inch orifice set at 50 psi.

(e) Close all drains.

(f) Purge tanks with C02 (C-11) or nitrogen (C-22). Set gas to discharge at rate of not more than 1 pound of purging gas per minute. Use at least three pounds of C02 or nitrogen per fuel cell.

(g) Three hours after purging, test fuel tank for dangerous vapors with combustible gas indicator. If an unsafe condition exists, repurge until a safe reading is obtained.

(h) Fog fuel cell with 5 gallons of lubricating oil (C-20).

(i) Tag cyclic stick and fuel cap with: FUEL SYSTEM PRESERVED WITH MIL-L-6081, GRADE 1010 OIL. NO FLUSHING REQUIRED. DURING DEPRESERVATION FILL TANK WITH STANDARD OPERATING FUEL.

7-11. Main Rotor Blades.

CAUTION

Carefully examine all attaching hardware, such as bolts, nuts, bushings. Replace any unserviceable item prior to shipment.

a. Apply preservative compound (C-13) sparingly to bolt holes in root end of blade and to all exposed metal surfaces.

b. To ship by cargo aircraft, wrap root end of blades with barrier material (C-2) secured with tape (C-27).

c. To ship by vessel:

(1) Wrap root end and that portion of blade which rests within container saddle with barrier material (C-2) secured with tape (C-27).

(2) Secure blades in rotor blade container or rotor blade crate (FO-10).

7-12. Main Rotor Hub.

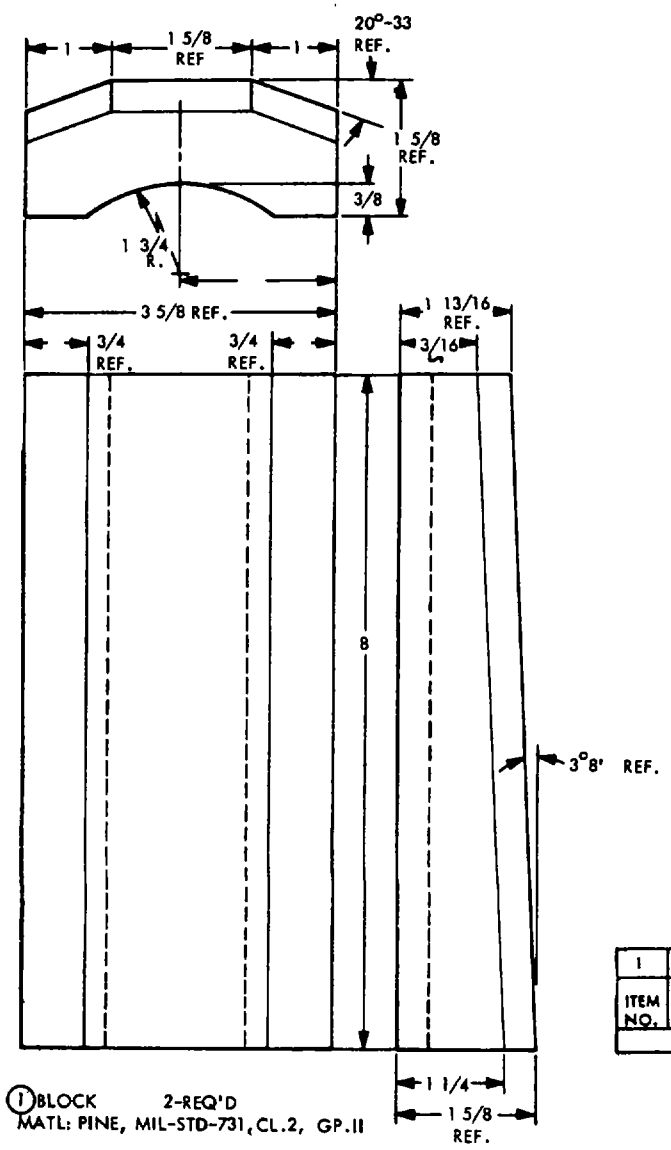
a. Coat main retention and drag link bolt holes with corrosion preventive compound (C-13).

b. Wrap main rotor grips with barrier material (C-2) secured with tape (C-27).

c. If main rotor hub is not removed for shipment:

(1) Immobilize rotor head by installing rotor head lock blocks (figure 7-1) on each side of rotor mast; strap in place.

(2) Wrap entire rotor head and mast assembly down to pylon fairing with barrier material (C-2) secured with tape (C-27).



NOTES:
1. INSERT BLOCKS ON EACH SIDE OF ROTOR MAST UNDERNEATH ROTOR HEAD AND WEDGE IN PLACE. AFTER INSTALLING, LOCK IN PLACE WITH1/2" WIDE STEEL STRAP.

1	2	BLOCK	2 X4 (NOM) X 8	PINE, MIL-STD-731,	CLASS 2, GROUP II.
ITEM NO.	QTY. REQD.	PART	DESCRIPTION	SPECIFICATION	NOTES
LIST OF MATERIALS					

Figure 7-1. Rotor Head Lock Blocks.

d. If main rotor hub is removed:

(1) Coat splines with corrosion preventive compound (C-13).

(2) Wrap removed rotor hub with barrier material (C-2).

(3) Secure packaged rotor hub in main nylon cord (C-23) or straps.

7-13. Main Rotor Mast and Swashplate Assembly.

a. Carefully clean top of transmission and mast upper bearing assembly with a clean cloth (C-9) dampened with solvent (C-17).

b. Remove retainer plate from top of transmission top case.

c. Carefully lift and guide mast out of transmission.

d. Carefully clean flange and bolt studs on transmission case with a clean cloth (C-9) dampened with solvent (C-17). Ensure that no foreign material is on top of transmission.

e. Inspect covers and lift plate assembly for contaminates. Clean, as necessary, prior to installation on transmission.

f. Carefully lower clean transmission adapter or cover and lift plate assembly onto top or transmission. Install washers and nuts. Tighten nuts evenly to standard torque.

CAUTION

The aircraft technical inspector must ensure that government inspection verifications are made. He must also ensure that the transmission case is uncovered only when absolutely necessary, and that all components are clean before reassembly.

g. Install decal or seal with inspector's stamp on transmission adapter or transmission cover plate and transmission top case.

h. Wrap lower end of mast (which is covered with oil) with barrier material (C-2) secured with tape (C-27).

i. Coat splined area and exposed metal surfaces of mast and swashplate assembly with corrosion preventive compound (C-13).

j. Wrap entire assembly with barrier material (C2), cushion with C-14, and secure wrap and cushioning with tape (C-27).

k. Wrap packaged rotor mast assembly with polyethylene sheeting (C-14) secured with nylon cord (C-23) or straps, or mount packaged assembly on cushioned blocks.

7-14. Tail Rotor Group.

a. For removed blade(s).

(1) Coat exposed metal surfaces of tail rotor blade(s), including bolt holes, with corrosion preventive compound (C-13).

(2) Wrap blade(s) with barrier material (C-2), overwrap with cushioning (C-15), and secure with tape (C-27).

(3) Secure packaged blade(s) in cockpit with nylon straps.

b. If tail rotor blade is not removed:

(1) Immobilize installed blade(s) with a pad of cushioning (C-14 or C-15) placed between rotor blade and pylon.

(2) Secure pad in place by wrapping tape (C-27)around blade and pylon.

7-15. Synchronized Elevators.

a. Coat attachment fittings with corrosion preventive concentrate (C-13); wrap with barrier material (C-2) secured with tape (C-27).

b. Cushion entire elevator with C-14.

c. Pack both cushioned elevators in a fiberboard box (C-5).

7-16. Stub Wings.

WARNING

Before removing ejector tube assemblies and ejector rack cartridges, ensure that safety pins are installed, battery is disconnected and armament circuit breakers and switches are OPEN or in SAFE position.

a. Remove ejector tube assemblies and ejector rack cartridges.

(1) Apply a light coat of lubricating oil (C-20) to ejector tube assemblies.

(2) Wrap assemblies and ejector rack cartridges individually with barrier material (C-2) and cushion with C-14.

(3) Pack assemblies and cartridges in a fiberboard box (C-5). Mark in accordance with paras 7-29 and 7-30.

(4) Turn in box to cargo aircraft commander for safe keeping.

b. Remove launcher tubes (if applicable). Do not remove top TOW launcher tube.

(1) Cushion tubes with C-15.

(2) Pack tubes in boxes (C-4) and identify.

c. Remove stub wings.

(1) Coat attachment fittings with corrosion preventive compound (C-13).

(2) Wrap entire wing section with barrier material (C-2) and cushion with C-14 secured with tape (C-27).

(3) Cushion in triple-wall (C-5) or plywood boxes (C-4) and identify.

d. Install air transport tiedown fitting (FO-ll), if applicable.

7-17. Antennas.

a. Wrap UHF/VHF and AN/ARC-54 antennas with barriermaterial (C-2).

b. Cushion as necessary with C-14 or C-15, and secure with tape (C-27).

c. Place packaged antennas in cockpit. Secure in place with nylon straps.

7-18. Fairings and Cowlings.

a. Wrap center and forward fairing assemblies, transmission cowling, duct assembly and sand deflectors with barrier material (C-2).

b. Cushion as necessary with C-14 or C-15 secured with tape (C-27).

7-19. Aft Pylon Fairing Assembly.

a. Drain engine oil tank. Cap or plug all lines to prevent leakage of residualoil during shipment.

b. Securely wrap fairing with barrier material (C2).

c. Cushion fairing with C-14 secured with tape (C-27).

d. Stow assemblies with oil tanks in an upright position.

7-20. Skid Landing Gear.

a. Restore any bare metal surfaces on skid landing gear. If paint cannot be touched up, coat bare metal surfaces with preservative compound (C-12).

b. Disassemble skid landing gear, if necessary.

(1) Coat small attaching hardware with corrosion preventive compound (C-13).

(2) Pack hardware in a cloth bag; identify.

(3) Secure bag to a skid with tape (C-27).

c. Wrap cross tube fairing with barrier material (C-2), cushion with C-14 or C-15 and secure with tape (C-27).

d. Secure fairings in cockpit.

7-21. Battery.

WARNING

Ensure that battery switch on instrument panel is OFF prior to working on battery.

a. Ship nickel-cadmium batteries fully charged and wet.

WARNING

Nickel-cadmium batteries contain an electrolyte which corrodes both aluminum and magnesium. Keep electrolyte from contacting clothing, skin, or eyes.

b. Remove battery.

c. Thoroughly clean battery exterior, quickdisconnect plug, cables, carrier, and vent hoses with a solution of 5 ounces of boric acid crystals (C-3) dissolved in one gallon of water. Rinse with clean water. Allow to drip dry.

d. Assemble all parts. Install battery in aircraft battery carrier.

e. Use quick disconnect plug to open electrical system circuit.

f. Cover quick disconnect plug with barrier material (C-2). Secure in a safe position with tape (G27).

7-22. Power Train.

a. Clean exposed metal surfaces of power train system with a clean cloth (C-9) dampened with solvent (C-17).

b. Service power train lubrication system, including sight gages, as necessary.

c. Coat exposed metal surfaces with corrosion preventive compound (C-13); cover with barrier material (C-2) secured with tape (C-27).

7-23. Hydraulic System.

a. Fill hydraulic reservoirs to operating level with hydraulic fluid (C-18) in accordance with lubrication chart.

b. Check for leaks; repair as necessary.

c. Wipe exposed portion of hydraulic boost cylinder actuator pistons with a lint-free cloth (C-9) moistened with hydraulic fluid (C-18).

7-24. Canopies. Cover all plexiglass surfaces with barrier material (C-2) secured with tape (C-27).

NOTE

Take care not to get tape on plexiglass surfaces.

7-25. Lubrication. Lubricate helicopter as necessary in accordance with lubrication chart.

7-26. Bare Metal Surfaces. Coat all unprotected bare metal surfaces with preservative (C-13).

7-27. Fuselage.

a. After all entries are made, place equipment log book, maintenance and historical records in a bag (C-1 or equivalent), identify, seal, and secure to pilot's seat with safety belt.

b. Attach pilot's and gunner's safety belt and shoulder harness together. Tighten to eliminate slack. Roll loose ends of belts and secure with tape (C-27).

c. Pack technical manuals, fire extinguishers, first aid packs, TOW sight (if removed) and clock in a fiberboard box (C-5); secure flap with tape (C27); identify contents. Secure box in cockpit.

d. Deenergize circuit breaker panels.

e. Secure cockpit lights to panel fixtures with tape (C-27).

f. Lock cyclic and collective pitch controls.

g. Secure all loose gear within helicopter with nylon straps.

h. Cover static air pressure vents with barrier material (C-2) secured with tape (C-27).

i. Install pitot cover or wrap pitot tube with barrier material (C-2) secured with tape (C-27).

j. Install TOW sight cover or wrap TOW sight with barrier material (C-2) secured with tape (C-27).

k. One set or ground handling wheels accompanies each cargo aircraft and a maximum of three sets each vessel shipment to facilitate loading and unloading.

(1) Service tires to 38 psi.

(2) No preservation is required.

l. Complete preservation and depreservation checksheets; secure to cyclic stick with tape (C-27).

m. Cover all remaining openings in fuselage with barrier material (C-2) secured with tape (C-27).

7-28. Tailboom.

a. Remove antenna from aft end or tailboom.

(1) Wrap antenna in barrier material (C-2).

(2) Secure to tailboom with tape (C-27).

(3) Cover mounting hole with barrier material (C-2) secured with tape (C-27).

b. Lubricate tail rotor control assembly in accordance with lubrication charts.

c. Lubricate tail rotor drive shaft bearings in accordance with lubrication chart.

d. Coat tail rotor shaft with preservative compound (C-13); cover with barrier material (C-2) secured with tape (C-27).

Section III. MARKINGS

7-29. Markings.

a. Apply all markings in accordance with MILSTD-129.

b. Identify each removed component with correct part number and serial number of helicopter from which removed.

c. Color code main and tail rotor blades.

d. Indicate center of balance (CG) of major components.

e. In addition to any other markings required by shipping instructions, tag helicopter with: THIS AIRCRAFT PRESERVED ONLY FOR LENGTH OF TIME NORMALLY REQUIRED TO REACH DESTINATION. IF NOT SHIPPED WITHIN 15 DAYS OR IF NOT IMMEDIATELY PREPARED FOR OPERATION UPON RECEIPT, IT MUST BE PLACED IN A STORAGE STATUS. THE AIRCRAFT TECHNICAL MAINTENANCE MANUAL COVERS PREPARATION FOR STORAGE PROCEDURES.

(1) Waterproof tag and secure to aircraft in a conspicuous location, such as on door handle.

(2) Include same information with shipping documents, in addition to tag.

Section IV. DANGEROUS AND HAZARDOUS MATERIALS

7-30. Dangerous and Hazardous Materials.

a. Show special handling instructions, marking and warnings required by TM 38250 (AFM 71-4).

b. In addition, label all shipments containing dangerous or hazardous materials with a DD Form 1387-2 Data/Certification Label.

c. Secure DD Form 1387-2 to fuselage or container in a clearly visible location.

APPENDIX A
REFERENCE

TECHNICAL MANUALS

TM 5-632	Military Entomology Operational Handbook
TM 38-250 (AFM 71-4)	Preparation of Hazardous Materials for Military Air Shipment
TM 55-1500-204-25/1	General Aircraft Maintenance Manual
TM 55-1520-221-10	Operator's Manual: AH-1G/TH-1G Helicopters
TM 55-1520-221-10-1	Operator's Manual: AH-1Q Helicopter
TM 55-1520-221-23	Aviation Unit/Intermediate Maintenance Manual AH-1G and AH-1Q Helicopters
TM 55-1520-234-10	Operator's Manual AH-1S(MOD)
TM 55-1520-234-23	Aviation Unit/Intermediate Maintenance Manual AH-1S(MOD)
TM 55-1520-236-10	Operator's Manual: AH-1S (PROD)
TM 55-1520-236-23	Aviation Unit/Intermediate Maintenance Manual: AH-1S(PROD)

TECHNICAL BULLETINS

TB 55-9150-200-24	Engine and Transmission Oils, Fuels, and Additives for Army Aircraft
TB 746-93-2	Painting and Marking of Army Aircraft

MILITARY STANDARDS

MIL-STD-129	Marking for Shipment and Storage

ARMY REGULATIONS

AR 40-12	Medical and Agricultural Foreign and Domestic Quarantine Inspections

APPENDIX B
PRESERVATION CHECKSHEET

The activity preparing aircraft for shipment may use this appendix as a guide in writing checksheets to fit particular shop practices, working conditions, and available manpower. Checksheets only record what has been accomplished. Reference to the manual is required to determine how operations should be accomplished.

PRESERVATION CHECKSHEET
VESSEL SHIPMENT OF AH-1
SERIAL NUMBER:_____

ITEM NO.	ITEM DESCRIPTION	MECH INSP
	PRESERVATION STATUS	
1.	Date helicopter received.	
2.	Date of preliminary inspection.	
3.	Date preservation completed.	
4.	Date helicopter shipped.	
	AIRFRAME	
1.	Ground helicopter.	
2.	Remove tubes and ejector rack cartridges.	
3.	Clean helicopter interior.	
4.	Clean plexiglass.	
5.	Clean exterior surfaces.	
6.	Wash rotor blades.	
7.	Lubricate helicopter as necessary.	
8.	Inspect for corrosion and treat as necessary.	
9.	Service engine, main transmission, and tail rotor gear box.	
	ENGINE	
1.	Clean engine air intake, plenum chambers, and screens.	
2.	Perform ground runup.	
3.	Disconnect cable to ignition unit.	
4.	Remove, clean, and reinstall air particle separator, fuel inlet strainer, pump discharge strainer, and servo supply filter.	
5.	Preserve fuel control system.	
6.	Remove, clean, reinstall oil filter.	
7.	Reconnect cable to ignition unit.	
8.	Seal engine air intake, exhaust, and openings.	
9.	Attach engine preservation tag to cyclic stick.	
10.	Enter data on DA Form 2408-13.	

ITEM NO.	ITEM DESCRIPTION	MECH INSP
	FUEL TANKS	
1.	If shipped fueled, drain or add fuel to fill tanks to 3/4 capacity.	
2.	If shipped unfueled, drain and purge fuel tanks.	
3.	Tag fuel caps.	
	POWER TRAIN	
1.	Clean power train, as necessary.	
2.	Lubricate power train.	
3.	Preserve and wrap exposed metal surfaces.	
	BATTERY	
1.	Ensure that battery is serviceable and fully charged.	
2.	Clean battery, components, and compartment.	
3.	Wrap quick-disconnect plug and secure to airframe.	
	HYDRAULIC SYSTEM	
1.	Service hydraulic reservoirs.	
2.	Repair leaks, as necessary.	
3.	Clean hydraulic boost cylinder actuator pistons.	
	MAIN ROTOR BLADES AND MAIN ROTOR GROUP	
1.	Color code main rotor blades and hub.	
2.	Identify each blade with aircraft serial number.	
3.	Preserve rotor blades.	
4.	Secure blades in container.	
5.	Preserve main rotor blade retaining bolt holes, bolts, nuts, and washers.	
6.	Preserve drag brace bolt holes, bolts, nuts, and washers.	
7.	Preserve and wrap rotor grips.	
8.	Wrap main rotor group down to fuselage.	
	TAIL ROTOR BLADES	
1.	Preserve and wrap exposed metal surfaces of tail rotor assembly.	
2.	Color-code and remove blade(s).	
3.	Replace nuts, bolts, and washers in tail rotor hub exactly as removed.	
4.	Preserve, wrap, cushion rotor blades(s) and tail rotor assembly.	
5.	Cushion and secure installed blade(s) to tail pylon.	
	LANDING GEAR	
	Touchup paint or preserve bare metal on skid tubes.	

ITEM NO.	ITEM DESCRIPTION	MECH INSP
	CANOPY	
	Cover all plexiglass surfaces.	
	BARE METAL SURFACES	
	Preserve and cover all bare metal surfaces.	
	FUSELAGE	
1.	Place log book, maintenance and historical records in bag, identify, seal, and secure to pilot's seat.	
2.	Secure safety belts and shoulder harnesses.	
3.	Wrap and cushion technical manuals, fire extinguishers, first aid packs and clock. Secure box in cockpit.	
4.	Deenergize circuit breaker panels.	
5.	Lock collective pitch control.	
6.	Secure cockpit lights to panel fixtures.	
7.	Install four jacking fixtures with shackles.	
8.	Preserve, cushion, and pack ejector tube assemblies. Secure in gunner's compartment.	
9.	Turn in ejector rack cartridges.	
10.	Secure all loose gear within helicopter with nylon straps.	
11.	Install pitot cover or wrap pitot tube.	
12.	Cover static air pressure vents-and other openings.	
13.	Install aircraft shipping covers.	

APPENDIX C
DEPRESERVATION CHECKSHEET

The activity preparing aircraft for shipment is also responsible for writing depreservation instructions based on actual preservation applied. The following may be used as a guide.

DEPRESERVATION CHECKSHEET
VESSEL SHIPMENT OF AH-1
SERIAL NUMBER:_____

ITEM NO.	ITEM DESCRIPTION	MECH INSP
	AIRCRAFT: GENERAL	
1.	Ground helicopter.	
2.	Assemble and install skid landing gear, if removed.	
3.	Install ground handling wheels.	
	ENGINE	
1.	Remove all barrier material and tape from engine.	
2.	Service engine transmission and gear boxes to proper oil level.	
	FUEL SYSTEM (IF PURGED)	
1.	Disconnect ignition cable.	
2.	Disconnect fuel hoses and flush fuel system.	
3.	Reconnect fuel hoses and ignition cable.	
	BATTERY	
1.	Remove barrier material and tape.	
2.	Connect quick-disconnect plug to battery.	
	MAIN ROTOR HEAD AND MAST ASSEMBLY	
1.	Remove barrier material and tape.	
2.	Remove lock blocks.	
3.	Remove preservative from metal surfaces.	
4.	Install main rotor blades.	
	TAIL ROTOR ASSEMBLY	
1.	Remove barrier material and tape.	
2.	Remove preservation.	
3.	Install tail rotor blade(s).	

ITEM NO.	ITEM DESCRIPTION	MECH INSP
	FUSELAGE	
1.	Remove all tape and barrier material.	
2.	Clean plexiglass surfaces.	
3.	Prepare seats, belts, and harnesses for use.	
4.	Remove cover from pitot tube.	
6.	Prepare head sets and fire extinguishers.	
6.	Energize circuit breaker panels.	
7.	Unlock collective pitch and cyclic control.	
8.	Locate manuals and historical records for ready use.	
9.	Install ejector tubes and ejector rack cartridges.	

APPENDIX D
CONSUMABLE MATERIALS

NOTE

Method of shipment dictates materials and amounts required. Any given material may have different lengths, widths, thicknesses, etc., and so have more than one NSN. Therefore, the following NSN's are for guidance only.

NO.	NSN	QTY RQR PER AH-1	ITEM DESCRIPTION
C-1	8105-00-274-2390	4 ea	Bag, packing, waterproof, MIL-B-117, type II.
C-2	8135-00-282-0565	125 yds	Barrier Material, water-vaporproof, flexible, MIL-B-131, class 1, 36 in x 200 yds.
C-3	6810-00-264-6535	1 lb	Boric Acid Flakes, O-C-265, 1 lb bottle.
C-4	local mfg.	4 ea	Box, cleated plywood, PPP-B-601.
C-5	as applicable	5 ea	Box, fiberboard, PPP-B-636.
C-6	7920-00-051-4384	4 ea	Brush, round, white nylon and tampico fiber, MIL-B-5612, type III, style 1, 5 3/8 in dia.
C-7	6850-00-826-0818	5 gal	Cleaning compound, aircraft surface, alkaline, water base, MIL-C-25769, 5 gal can.
C-8	6850-00-033-8851	2 qts	Cleaning Compound, solvent, trichlorotrifluoro-ethane, MIL-C-81302, type II, 10 gal drum.
C-9	7920-00-292-9204	24 ea	Cloth, cleaning, CCC-C-46, 12 in X 15 in.
C-10	7930-00-634-5340	1 pt	Cleaning and Polishing Compound, transparent plastic aircraft materials, MIL-C-18767, type I, 1 pt bottle.
C-11	6830-00-281-3053	8 lbs	C02, BB-C-101, grade B, 50 lb tank.
C-12	8030-00-231-2345	1 qt	Corrosion Preventive Compound, solvent cut-back, cold application, MIL-C-16173, grade 1 (P-1) 1 gal can.
C-13	8030-00-244-1297	2 gal	Corrosion Preventive Compound, solvent cut-back, cold application, MIL-C-16173, grade 2 (P-2), 1 gal can.
C-14	8135-00-180-5922	30 yds	Cushioning, polyethylene foam sheeting, PPP-C-1752, 1/2 in x 48 in x 60 ft.

NO.	NSN	QTY RQR PER AH-1	ITEM DESCRIPTION
C-15	8135-00-3004905	30 yds	Cushioning, unicellular polypropylene foam, low density, PPP-B-1797, 1/4 in x 30 in x 225ft.
C-16	·9140-00-286-5294	60 gal	Diesel Fuel, MIL-F-16884. grade 2, bulk.
C-17	6850-00-285-8011	3 gal	Dry Cleaning Solvent, P-D-680, type II, 55 gal drum.
C-18	9150-00-252-6383	1 qt	Hydraulic Fluid, petroleum base, aircraft missile and ordnance, MIL- H-5606, 1 qt can.
C-19	6840-00-142-9438	3 strips	Insecticide, dichlorvous strips MIL-I- 51323, type II, 2 in x 10 in strips, 144 per case.
C-20	9150-00-231-6676	3 gal	Lubricating oil, aircraft jet engine, petroleum base, MIL-L-6081, grade 1010, 55 gal drum.
C-21	6810-00-238-8119	2 qts	Naphtha, aliphatic, TT-N-95, type II, 1 gal can.
C-22	6830-00-292-0131	8 lbs	Nitrogen, BB-N-411, type I, class 1, grade B,230 cu ft cylinder.
C-23	4020-00-246-0688	50 ft	Nylon Cord, 550 lb break strength, MIL-C-5040, spool.
C-24	6840-00-089-4664	2 ea	Rodenticide, bait block, diaphacin paraffin, Fed Code 2763, Part N 788, 40-8 oz blocks per carton.
C-25	6850-00-142-9582	2 cans	Rust Preventative, concentrate, Brayco 599, 8 oz can.
C-26	8520-00-531-6484	1 bar	Soap, toilet, white, floating, P-S-620, type I, 6 oz bar.
C-27	7510-00-266-5016	1 roll	Tape, pressure sensitive, clothbacked, PPP-T-60, type IV, class 1, 2 in x 60 yds.
C-28	8135-00-579-6488	A/R	Plastic film, polyethylene 0006, L-P-378

APPENDIX E
SPECIAL TOOLS AND EQUIPMENT

NSN	P/N (FSCM)	ITEM IDENTIFICATION
1740-00-181-4350	2051140 (81996)	AH-1/OH-58 Air Transportability Fixture
1730-00-157-0810	1730QTP005 (81996)	Air Transportability Tiedown Fitting
	204-011-178	Clevis
6665-00-664-4650	89220 (40912)	Combustible Gas Indicator
	Local Mfg (fig 5-1)	Fuselage Crate
4920-00-908-0372	T101466 (80070)	Grip Positioning Link
1730-00-980-9552	204-050-200-5 (97499)	Ground Handling Wheels
8145-00-919-0176	540-011-011-MUSC-1 (80070)	Main Rotor Blade Container
1730-01-005-1719	1730QNP005 (81996)	Reusable Shipping Cover (AH-1G only)
	Local Mfg (fig 7-2)	Rotor Head Lock Blocks
	68SAVAE-D-105	Rotor Hub Container
	Local Mfg (fig 3-1)	Shackle Adapter
1730-00-967-9556	601364-1 (36659)	Towbar, Aircraft, Universal
1730-00-908-4853	204-040-929-29 (80070)	Transmission Cover
1560-01-071-5416	209-704-167-101	Modification Kit
1730-01-128-1809	1730-SDP001-1(81996)	Cover, Shipping, AH-1S

APPENDIX F
QUARANTINE INSPECTION

F-1. Scope. This appendix outlines procedures for preparing AH-1 helicopters and removed components for Quarantine Inspection, and for deprocessing them at destination. It is derived from AR 40-12 and TM 5-632, and is presented for user information.

F-2. Preparation of Material for Quarantine Inspection.

a. Remove all soil from helicopters and containers before loading on ships or cargo aircraft.

b. Remove any spilled grain, food or soil before loading containers or returning them empty to CONUS.

c. Immediately prior to packing, ensure the absence of rodents, snakes, snails, and other animals or insects.

d. Use only authorized packing materials, not native grasses or fibers. Store packing materials to prevent insect or rodent infestation.

e. Inspect wooden containers and packing materials for termites, wood borers, and other insect infestation.

WARNING

Personnel placing or removing dichlorvous strips or bait blocks must wear rubber gloves, protective clothing and respirators recommended by post surgeon or safety officer.

f. Attach dichlorvous strips (C-19) to the interior of each closed container, including all accessible areas of the aircraft.

NOTE

Dichlorvous strips operate by vapor release. Do not use in open containers.

(1) Use five linear inches (0.13m) of insecticide (C-19) per ten cubic feet (0.28m3).

(2) Use equal or lesser amounts for smaller areas.

(3) Suspend one five inch (0.13m) strip or three two inch (0.05m) strips within each AH-1 cockpit which is sealed prior to return to CONUS.

(4) If several strips are used, secure them in different sites, rather than in a single location.

g. Place one 8oz (0.23kg) rodenticide bait block (C-24) near helicopter door. Lead red tape attached to block outside, so as to be clearly visible when the door is sealed.

h. Place one bait block (C-24) in the center of each container of ten cubic feet (0.28m3) or more. Lead red tape outside, so as to be clearly visible when container is closed.

i. Supplies and equipment should be available in the Command.

j. If these instructions vary from command regulations, consult the Command entomologist for technical assistance and advice.

F-3. Deprocessing of Treated Material.

a. Helicopters and containers with red tape extending from them contain one or more blocks of rodenticide. Remove blocks before individual items are unpacked.

b. Store all strips and bait blocks in separate closed containers for collection and disposal by post engineer.

c. Notify post engineer or surgeon immediately if living or dead insects, rodents, or animals are found during depreservation.

APPENDIX G
HEAT SHRINK FILM HELICOPTER PROTECTIVE COVERING
for
AH-1

G-1. PURPOSE: These instructions are prepared to assist personnel in the installation of protective covering on the AH-1 helicopter during transport via vessel and tractor-trailer truck.

G-2. GENERAL:

a. Polyethylene heat shrink film, materials, and equipment as listed in Table G-1 have been approved for use in the protection of Army helicopters from corrosion, salt water spray, dirt, dust, and foreign objects.

b. Protective covering is required for all helicopters shipped on the top deck of a vessel and in areas that may be subjected to salt laden spray. However, those helicopters shipped under hatch covers will be protected with plastic sheets as a minimum. Protective covering of helicopters shipped below deck is the option of the Commander. The Commanders decision on the amount of protection required will be based on the resources available and the below deck environment of the vessel used for shipment. For helicopters shipped below deck, it is approved to partially cover the helicopter and/or partially shrink the film cover.

c. 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 the shipper.

d. The helicopter will be disassembled, preserved, and prepared for shipment in accordance with Chapter 3 or Chapter 4 of this manual, as applicable.

e. Installation of protective covering is the responsibility of the shipper.

f. When applying the protective covering, heat shrink film, sufficient working space around the helicopterwill be provided to move the maintenance stands, ladders, supplies and equipment.

g. In addition to the equipment listed in Table G-l, it is essential that an adequate number of maintenance stands are available for preparation and covering of aircraft. There should be two stands for each aircraft being prepared at a given time. For the uncovering process, a single maintenance stand will be adequate.

h. Insure that adequate waste receptacles are available for waste film and cushioning materials for bothcovering and uncovering process.

i. 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-3 are adhered to.

j. For planning purposes, one AH-I will require approximately 160 ft. of 14 ft. wide heat shrink film, two rolls of heat shrink tape, 1/2 roll of cushioning material, five plastic vents, five pounds of propane, and 200 ft of polyester strapping.

TABLE G-1
MATERIALS AND EQUIPMENT LIST

NOMENCLATURE	UNIT	P/N, SPEC, (FSCM)	NSN
Plastic, Heat Shrink Film, White, 7 Mil, 14' x 200'	Roll	8135SDP000-1	8135-01-250-4931
Plastic, Heat Shrink Film, White, 7 Mil, 14' x 200'	Roll	8135SDP000-2	8135-01-250-2301
Tape, Heat Shrink 2"	Roll	7510SDP000-1	7510-01-250-2299
Heat Cannon Kit, Propane	Each	3540SDP000-1 (81996)	4940-01-250-2300
Cylinder, Empty, Propane, 25 lb.	Each	RR-C-910/2	8120-00-530-5225
Knife, Safe-t-Cut	Each	Model 10OHD	7330-01-255-3444
Gloves, Safety, Leather	Pair	A-A-50022	8415-00-269-0433
Cushioning Material 1/4" x 30" x 255'	Roll	PPP-C- 1797	8135-00-300-4905
Vent, White Plastic, Stick-on, Air	Each	Airlette Corp	8115-01-255-3445
Strapping polyester 1/2"	Roll (62780)	R40	8135-00-956-2151
Combustible Gas Indicator	Each	6665-00-941-6554	

k. The optimum number of personnel for the covering procedure is three per aircraft. One helicopter will require 3 persons approximately 4 hours to cover. With experience, elapsed time can be reduced to 3 hours. Adverse weather conditions and/or dirty (oily) helicopters will increase the optimum number. 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 procedure to, available objects such as boxes or crates for practice.

G-3. SAFETY: The below minimum safety procedures will be followed to insure a safe heat shrink operation.

a. Prior to working on helicopter insure that all armament system circuit breakers and switches are in the open or safe position.

b. Comply with all safety procedures outlined in applicable chapters three or four of this manual.

c. Ground the helicopter in accordance with TM 55-1520-234-23 or TM 55-1520-236-23 as appropriate.

d. Insure that fuel tank levels are properly adjusted for shipping (maximum 3/4 capacity or 150 gallons per tank, whichever is less).

e. Seal fuel filler ports, vents, drains, and battery vents prior to covering the aircraft.

f. Provide fire truck and adequate fire fighting equipment on site and ready for use prior to operating the heat cannon.

g. Insure that the helicopter exterior and the adjacent area is free of fuel and other combustibles prior to operating the heat cannon.

h. The helicopter will be covered outdoors if environmental conditions permit. The covering procedures may be accomplished in a hangar if the following additional procedures are adhered to:

(1) The area must be well ventilated.

(2) No other aircraft will be within 50 feet of the helicopter being covered.

(3) No other maintenance operations will be permitted in the hangar while the helicopter is being covered.

i. Prior to the operation of the heat cannon, the helicopter and adjacent areas will be tested with an M-6 combustible gas indicator set (or equivalent) for combustible vapor. The areas to be tested on the helicopter are the fuel filler, drain, and vent ports, the battery vents, and the engine compartment. If the indicator shows an unsafe condition, do not attempt to apply heat shrink film.

j. Aircraft will be inspected for fuel leaks prior to covering. No attempt will be made to cover aircraft that are known to have or suspected of having fuel leaks.

k. Covering on the helicopter will be applied so that large pieces of film are centered on fuel filler ports, vents, and drains so that no joining seams are formed near potential fuel fume sources. Fuel filler ports, vents, and drains should be padded with cushioning material to further protect from heat.

l. After the covering and shrinking process is complete, the film will be cut to allow removal of the tape seals applied to fuel vents. Heat shrink tape will be used to re-seal heat shrink film.

m. Leather safety gloves will be worn while using the heat cannon.

n. Table G-2, safety checksheet will be completed prior to the use of the heat cannon. The completed checksheet will be attached to DA Form 2408-13.

WARNING

Composite main rotor and tail rotor blades, rubber and plastic surfaces, the PNVS unit, and the canopy are heat sensitive. These surfaces must be completely covered with cushioning material to provide insulation to prevent serious damage to the helicopter.

G-4. HELICOPTER PREPARATION: Insure that the helicopter is prepared for shipment in accordance with either Chapter Three or Four of this manual as applicable.

a. Aircraft Cleaning. Wash aircraft in accordance with this manual. This 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 an oil free surface for the adhesion of tape. A dirty aircraft will take more time to cover.

b. Flyaway Equipment. Install flyaway equipment, except canopy cover, and gun and turret cover, in accordance with either Chapter Three and Four of this manual as applicable.

c. OAT Gauge. Remove OAT gauge and tape it to cyclic.

d. Protect Glass and Canopy. Install foam cushioning material over glass and canopy 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.

e. Seal Vents. Locate all fuel filler ports, drains, and vents, and battery vents. Seal with heat shrink tape and film. These areas must remain sealed throughout the heat shrink process. All but the fuel vents may remain sealed after covering.

f. Preparation of Sharp Edges, Protrusions, and Heat Sensitive Areas. Pad all protrusions and sharp edges with tape or cushioning material to prevent damage to film during the shrinking process and prevent high stress points on the film after shrinking.

(1) Heat shrink tape may be used to protect the film from sharp edges such as the trailing edge of the stabilizers. For best results apply 2 inch wide tape along the bottom edge so that approximately 1/2 inch adheres to the bottom surface. Fold the tape over so that approximately 1/2 inch adheres to the top surface. Tape alone may be used to protect the film from many protrusions such as hinges, louvers, and wing nuts.

(2) Cushioning Material is used to pad protrusions and provide insulation from the heat of the film application process. Cushioning material may be held in place with shrink tape and/or 1/2 inch strapping.

NOTE

Examples below are not intended to be all inclusive.

(a) Examples of techniques using cushioning primarily for protection are:

1 Wrapping material around the main rotor control tubes.

2 Individually wrapping main rotor blade grips.

3 Padding over top of and underneath main rotor head.

TABLE G-2

SAFETY CHECKLIST

Item	Item Description	Mech	Insp
1.	Ground Helicopter in accordance with TM 55-1520-234-23. or TM 55-1520-236-23		
2.	Insure all armament circuit breakers and switches are in safe or open position		
3.	Deactivate armament - Armament must be cleared and visually checked. TM 55-1500-339-S		
4.	Fire Truck/Fire Fighting Equipment ready for use. TM 55-1500-339-S		
5.	Adjust fuel levels. TM 55-1500-339-S		
6.	Cover fuel access, vent and drain areas. TM 55-1500-339-S		
7.	Perform test with M-6 combustible gas indicator. TM 55-1500-339-S		
8.	Working area well ventilated. TM 55-1500-339-S		
	AFTER COVERING COMPLETELY		
9.	Inspect covering seams for complete bonding. TM 55-1500-339-S		
10.	Remove seal from fuel vent areas and tape film openings. TM 55-1500-339-S		
11.	Make Handling Instructions entry on DD Form 1387-2 "Fuel in Tanks". Attach form to helicopter cover. TM 55-1500-339-S		

4 Padding for turret.

5 Padding around cannon barrel.

6 Padding around pitot tube.

7 Padding over tail rotor head and blade grips.

8 Padding over edges of exhaust stocks.

(b) Examples of techniques using cushioning material for both protection and insulation from heat are:

1 Complete padding of PNVS unit.

2 Complete padding of tail rotor blades.

3 Padding of windshield wipers.

4 Padding of antennae.

5 Complete padding of main rotor blades.

6 Padding around pitot tube.

7 Padding of fuel filler ports, vents and drains.

G-5. APPLICATION OF FILM:

NOTE

Insure that the provisions of Appendix F, quarantine inspection, and customs clearance is obtained for the aircraft 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 ultra-violet inhibitor. The white color is used to reflect the sun to maintain a lower inside temperature. When heated to approximately 325 degree 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. Heat Cannon Characteristics. The heat cannon operates on bottled propane. It produces an even flame with a temperature of 750 degree F approximately 12 inches from the cannon. The heat cannon has safety features designed to automatically shut off the flame if it is dropped. The open flame is safe for use on aircraft when the procedures of this appendix are strictly adhered to.

c. After the aircraft has been prepared as in paragraph G-4 above, it is ready for the application of the film. The film cover is created by first visually dividing the helicopter into sections. Film sections are cut from the bulk roll with a safety knife to piece together a complete cover. The pieces are held together with heat shrink tape until they are fused together. There is no hard and fast procedure for this phase of the process. The following is a workable procedure:

NOTE

Because the film is subject to damage from handling on rough surfaces it is recommended that a piece of film approximately 14' X 30' be cut and secured to the ground as a measuring and cutting work surface.

WARNING

Insure that adequate maintenance stands are available and personnel are thoroughly familiar with no step areas prior to covering the helicopter.

(1) Determine sections such as small protrusions, antennae, the tail rotor, horizontal stabilizer, main rotor controls, and cannon that need to be covered seperately. They should be wrapped with sufficient excess material to allow later fusing to each other and larger pieces as required.

(2) The larger sections to be wrapped include the vertical stabilizer, the stub wings, the fuselage, and the blades.

(a) The vertical stabilizer can be covered with a piece of film 8 1/2' x 12'.

(b) The stub wings can each be wrapped with a piece of film 10 1/2' x 14'.

(c) The tailboom can be wrapped with a piece 10 1/2' x 14'.

(d) The remainder of the fuselage can be wrapped with two pieces of film, top and bottom.

1 The bottom is covered with a piece 27' x 14'.

2 The top is covered with a piece 23' x 14'.

(e) Each blade is covered with a piece of film 7' x 24'.

(3) Large void areas in the film are to be avoided. This can be done by using polyester strapping. For example, voids near the wing roots may be eliminated by wrapping each wing and tying the strapping snug. Also to prevent voids, slits may be cut in large pieces of covering to allow previously covered small protrusions to stick through. The covering on these protrusions will be fused to the cover.

WARNING

Prior to operating the heat cannon, insure that all requirements of paragraph G-3 have been complied with.

d. Fusing Film Pieces Together.

(1) After the helicopter has been completely covered, all seams and pieces must be fused together before the film 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.

(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 heat shrink tape. Heat the area to be fused by first shooting the flame between the top and bottom layers to be fused and then holding the heat cannon 8 to 12 inches from the seam and moving the heat along the seam. As the film becomes soft, pat the seam gently with a safety gloved hand (the film is HOT).

CAUTION

To prevent water leakage at seam insure that seams are completely bonded.

(3) Repeat this process until all seams are fused.

(4) After 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.

(1) After all the seams have been fused and the helicopter has been completely enclosed in film, the shrinking process should be accomplished. To shrink the film, hold the heat gun 8 to 12 inches from the surface and move the gun evenly along the surface. Apply just enough heat to soften the film. After the heat is removed, the 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 heat shrink tape.

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. Insure that all seams are completely fused and that no holes are present. Repairs may be made as required by applying the procedure in paragraph G-5.e. above. Insure good seals around landing gear and other protrusions.

WARNING

Do not attempt to patch, shrink, or fuse the heat shrink material with the heat cannon after fuel and/or battery vents have been unsealed.

G-6. FUEL AND BATTERY VENTS: After the inspection of the covering has been completed and the covering has been found satisfactory, the fuel vents must be unsealed. Cut a small slit in the area of the vent and remove the seal. Repair the cut with tape. Repeat this process for each vent.

CAUTION

Adequate ventilation of the cover is essential to minimize condensation and permit drainage.

G-7. INSTALLATION OF VENTILATORS: After the inspection of the covering has been completed, the covering must be ventilated. Ventilators are to be placed to allow a flow of air through the covering. Each aircraft 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 the 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 tape.

G-8. HOISTING: If the helicopter is being hoisted on a vessel or truck, use the applicable procedures in this manual. If the film is damaged it may be repaired with two inch heat shrink tape and/or a piece of heat shrink film taped to the cover.

G-9. TIEDOWN POINTS: After loading the aircraft, restrain in accordance with either chapter three or four of this manual as appropriate.

G-10. 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 two inch heat shrink tape.

G-11. REMOVAL OF SHRINK FILM: To remove the shrink film, use the safety knife and cut along the top and side surfaces. The shrink film does not adhere to the helicopter and will fall away.

CAUTION

Use only the safety knife when removing the film. A standard knife blade will damage the helicopter.

a. All film and cushioning material will be removed prior to depreservation.

b. Recycling of the used shrink film can be established through the Defence Reutilization and Marketing Service DLA.

G-12. DEPRESERVATION: Depreserve helicopter in accordance with this manual.

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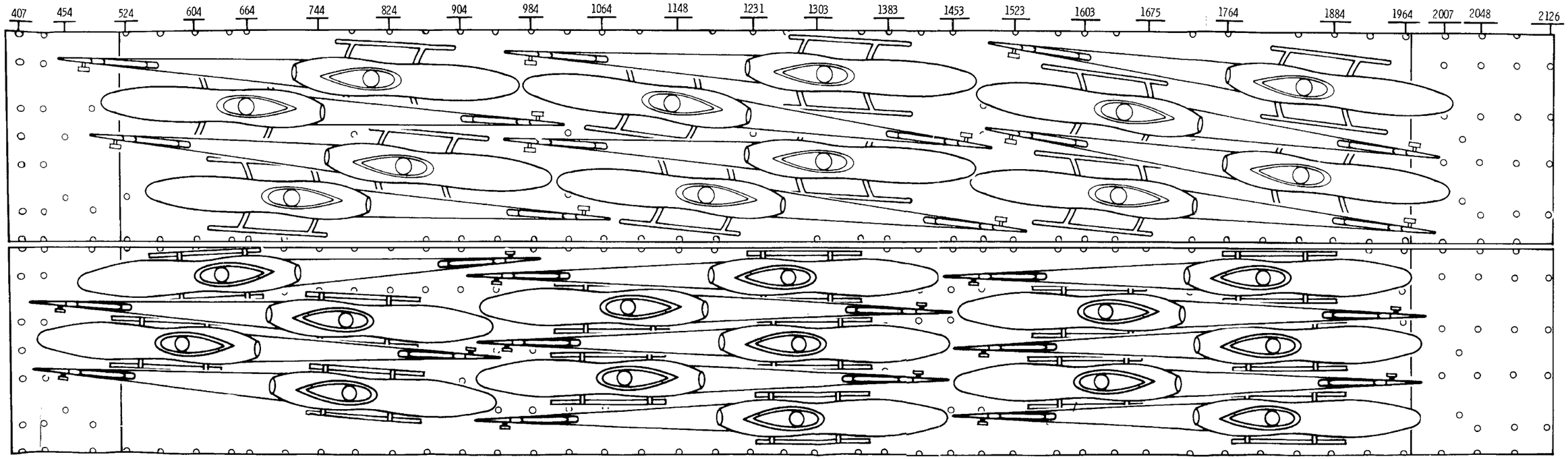
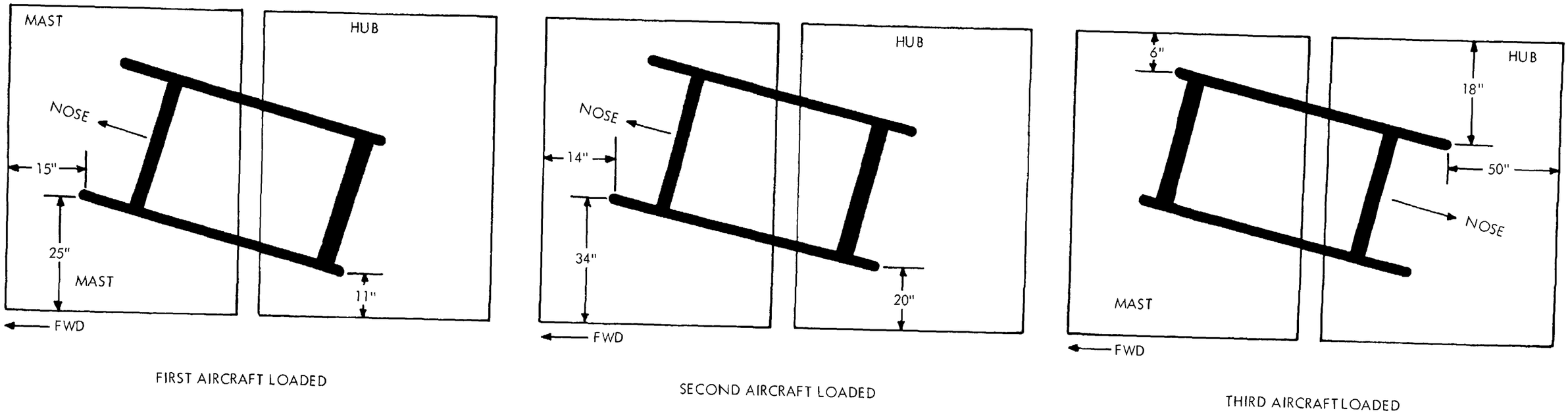
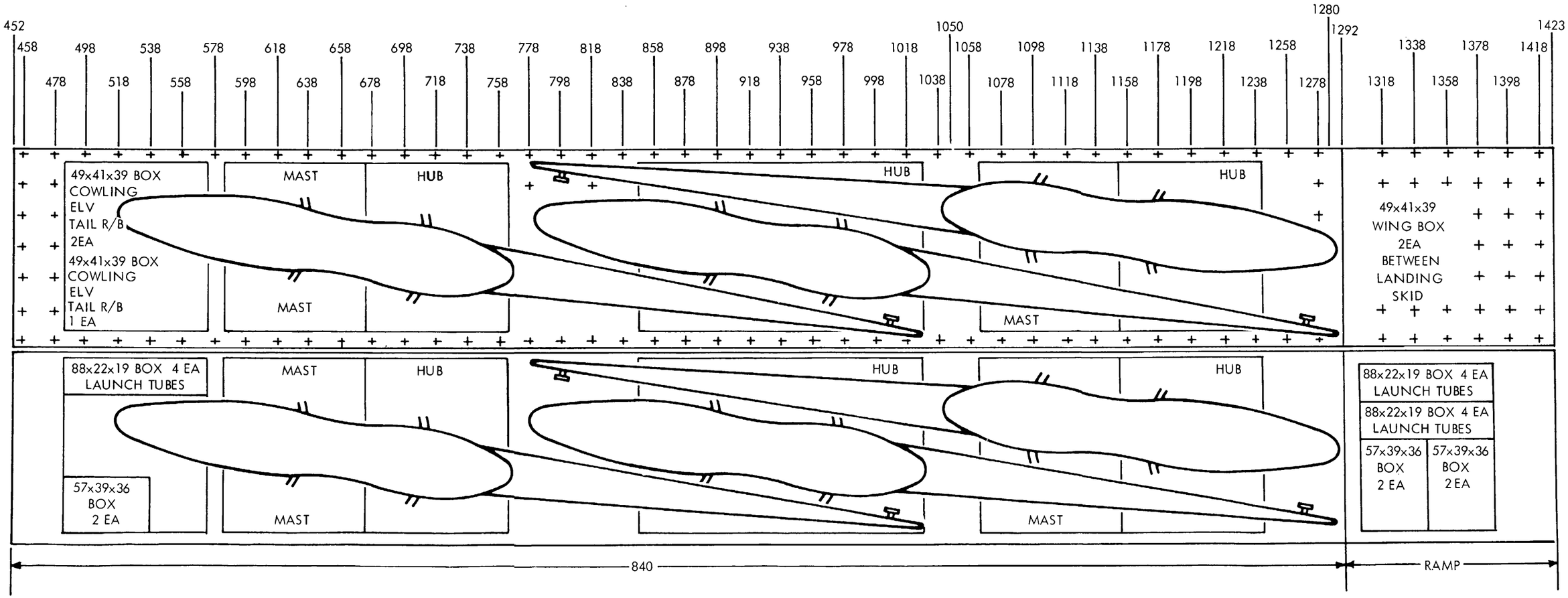


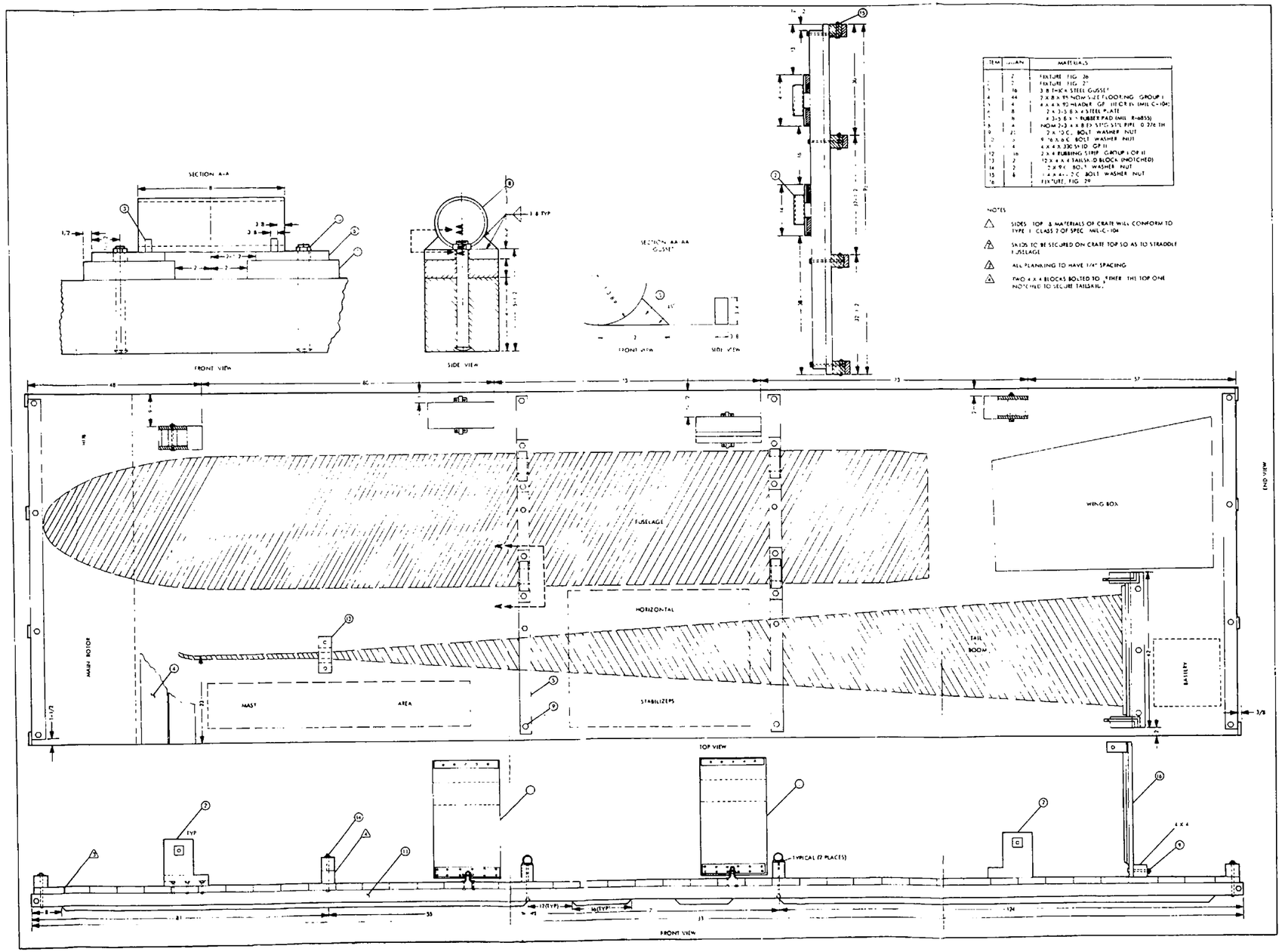
FO-1. C-5 Loading Diagram.



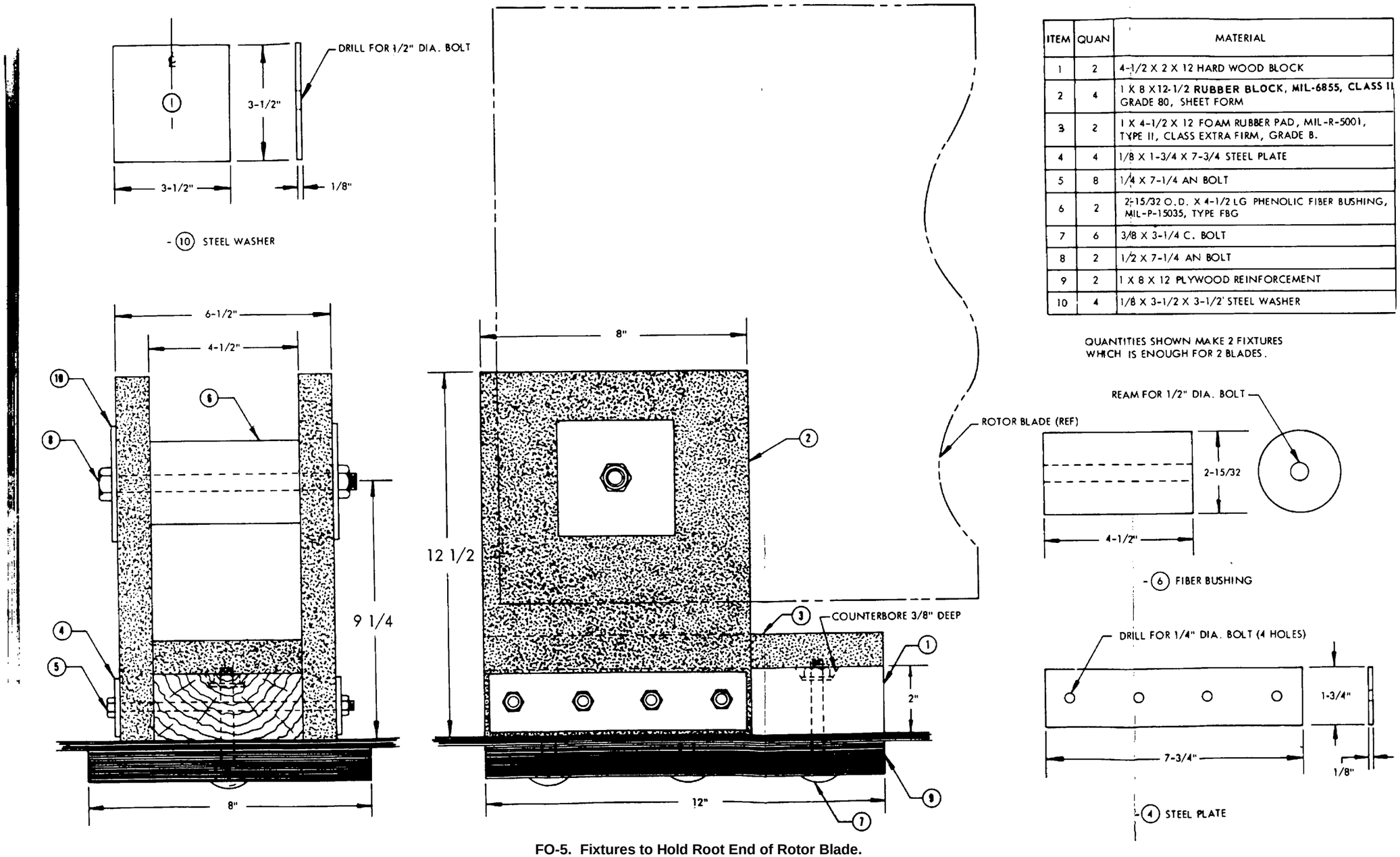
FO-2. Helicopter Positioning on Pallets.
FO-2



FO-3. C-141 Loading Diagram.



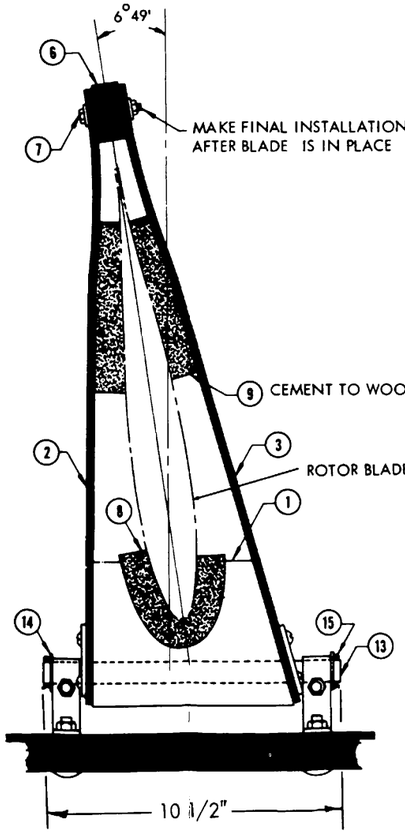
FO-4. AH-1 Fuselage Crate.

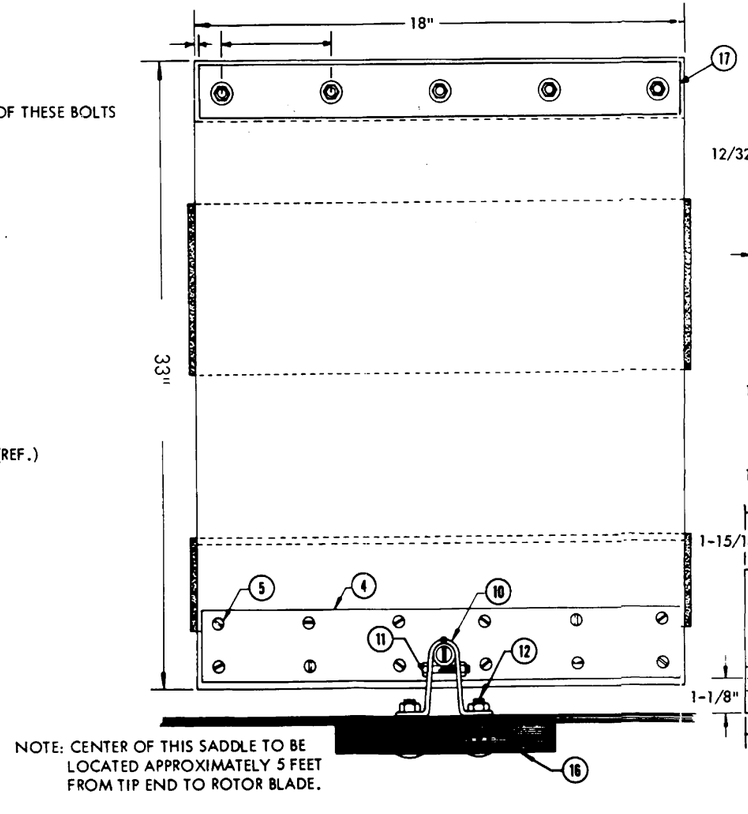


ITEM	QUAN	MATERIAL
1	2	4-1/2 X 2 X 12 HARD WOOD BLOCK
2	4	1 X 8 X12-1/2 RUBBER BLOCK, MIL-6855, CLASS II, GRADE 80, SHEET FORM
3	2	1 X 4-1/2 X 12 FOAM RUBBER PAD, MIL-R-5001, TYPE II, CLASS EXTRA FIRM, GRADE B.
4	4	1/8 X 1-3/4 X 7-3/4 STEEL PLATE
5	8	1/4 X 7-1/4 AN BOLT
6	2	2-15/32 O.D. X 4-1/2 LG PHENOLIC FIBER BUSHING, MIL-P-15035, TYPE FBG
7	6	3/8 X 3-1/4 C. BOLT
8	2	1/2 X 7-1/4 AN BOLT
9	2	1 X 8 X 12 PLYWOOD REINFORCEMENT
10	4	1/8 X 3-1/2 X 3-1/2 STEEL WASHER

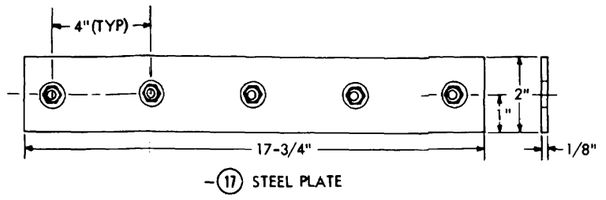
QUANTITIES SHOWN MAKE 2 FIXTURES WHICH IS ENOUGH FOR 2 BLADES.

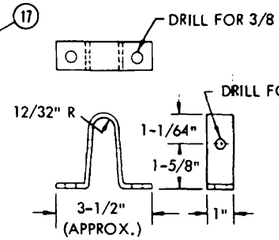
FO-5. Fixtures to Hold Root End of Rotor Blade.

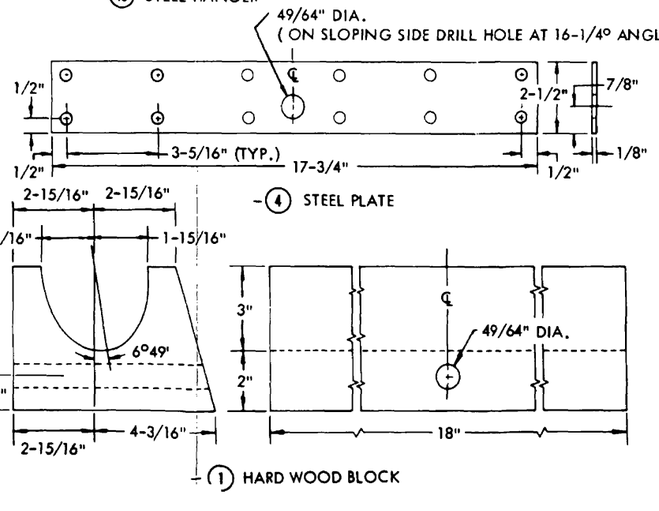




NOTE: CENTER OF THIS SADDLE TO BE LOCATED APPROXIMATELY 5 FEET FROM TIP END TO ROTOR BLADE.



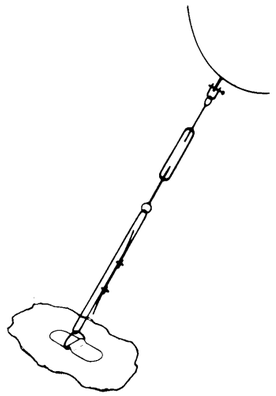




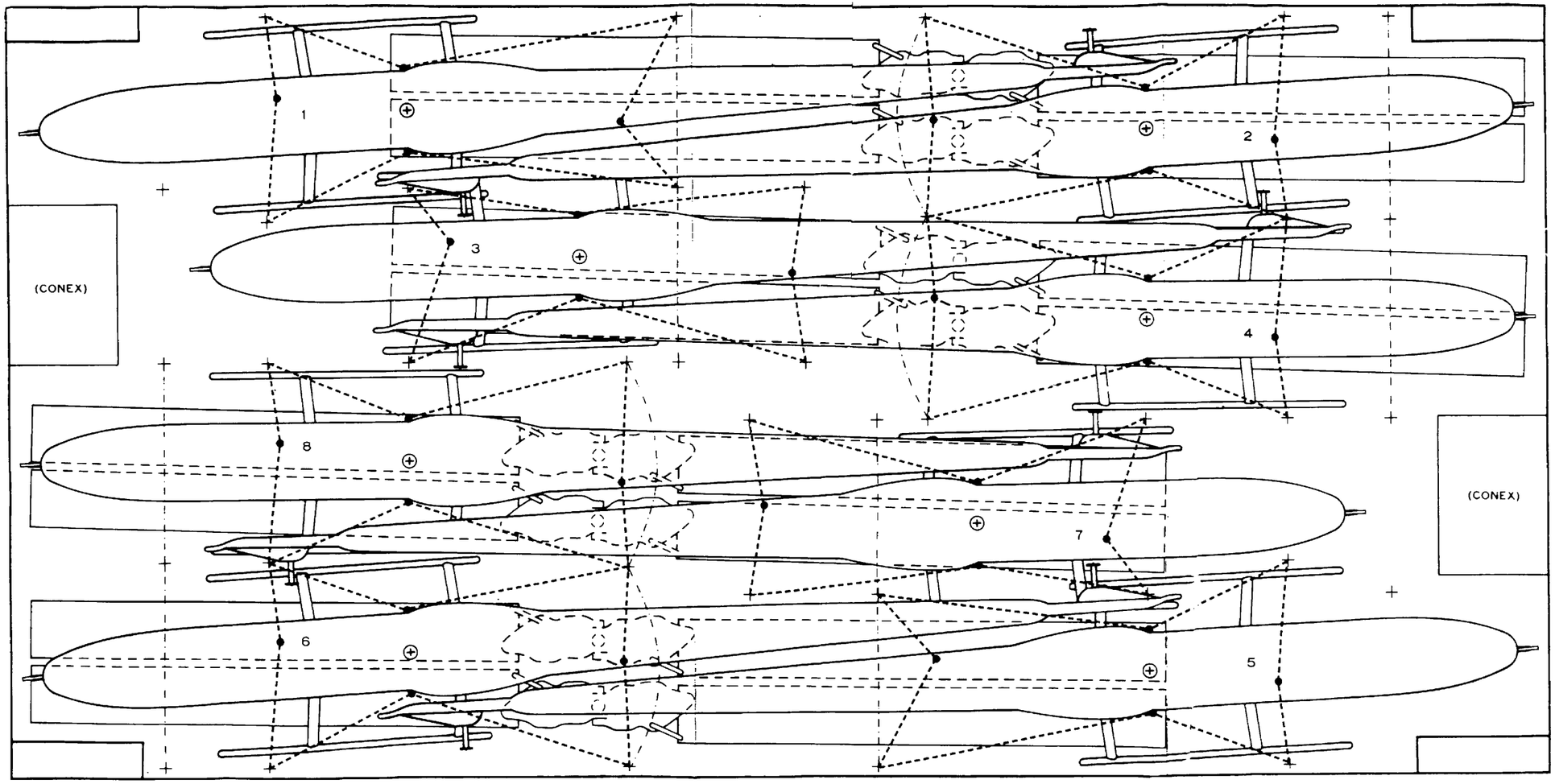
ITEM	QUAN.	MATERIAL
1	2	7-1/4 x 5 x 18 HARD WOOD BLOCK
2	2	1/4 x 18 x 27 PLYWOOD
3	2	1/4 x 28 x 28 PLYWOOD
4	4	1/8 x 2-1/2 x 17-3/4 STEEL PLATE
5	48	10 ROUND HEAD WOOD SCREWS 1-1/2 LG.
6	2	1 x 2 x 18 PLYWOOD
7	10	1/4 x 2-1/4 AN BOLT
8	2	1 x 5-1/2 x 18-1/2 FOAM RUBBER, MIL-R-5001, TYPE II, CLASS EXTRA FIRM, GRADE B
9	4	1 x 6 x 18-1/2 FOAM RUBBER, MIL-R-5001, TYPE II, CLASS EXTRA FIRM, GRADE B
10	4	1/8 x 1 STEEL HANGER
11	4	1/4 x 1-1/2 AN BOLT
12	8	3/8 x 2 C. BOLT
13	2	3/4 O.D. STEEL PIPE II LG.
14	4	3/4 I.D. STEEL WASHER
15	4	1 INCH COTTER PIN
16		2 x 8 x 95 NOM. SIZE FLOORING
17	2	1/8 x 2 x 17-3/4 STEEL PLATE

QUANTITIES SHOWN MAKE 2 SADDLES WHICH IS ENOUGH FOR TWO BLADES

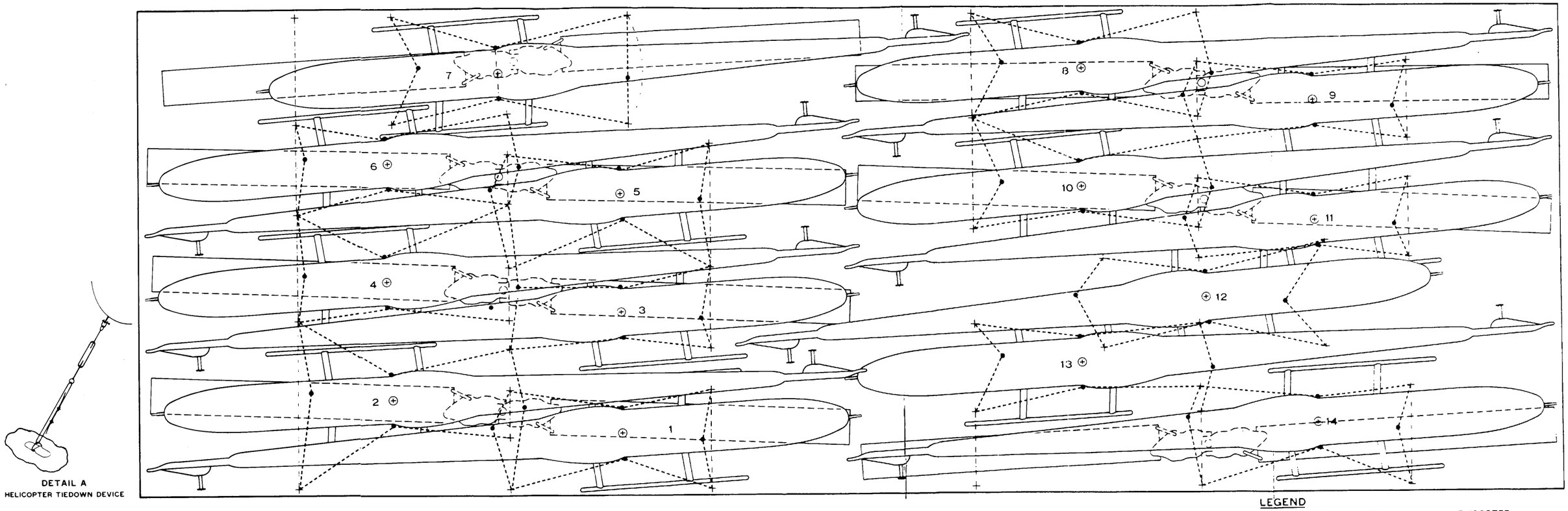
FO-6. Saddle to Hold Rotor Blade
FO-6



DETAIL A
HELICOPTER TIEDOWN DEVICE

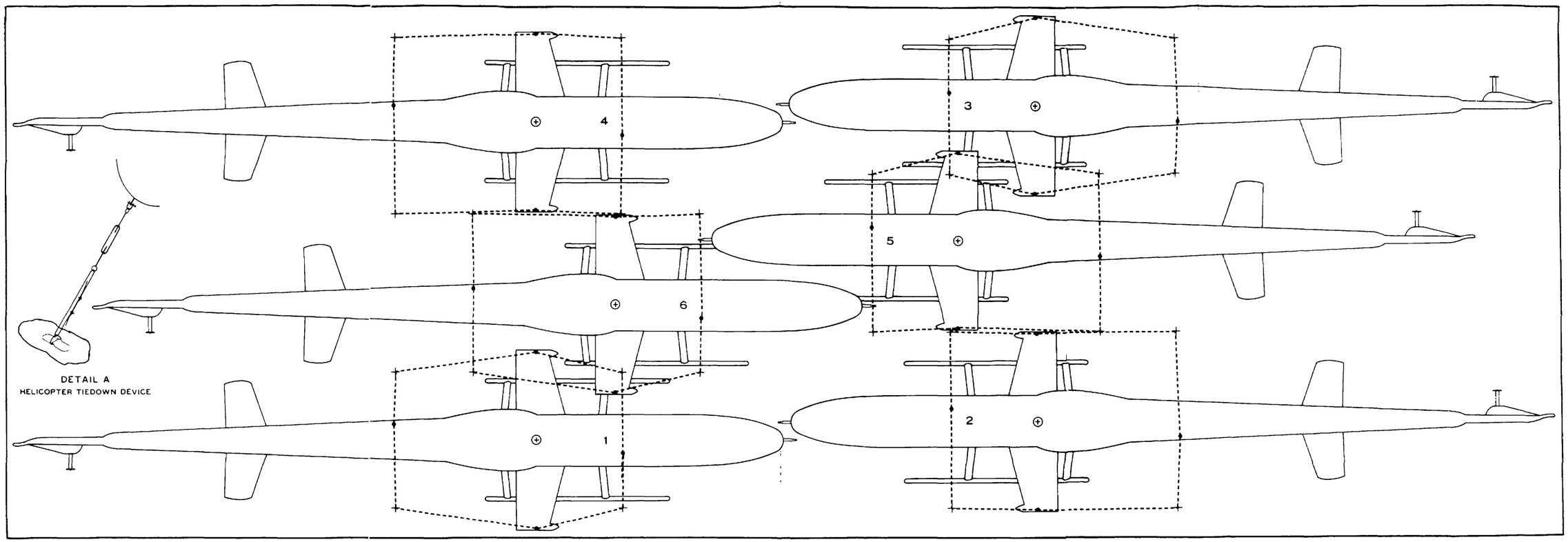


FO-7. Eight AH-1's in a LASH Lighter

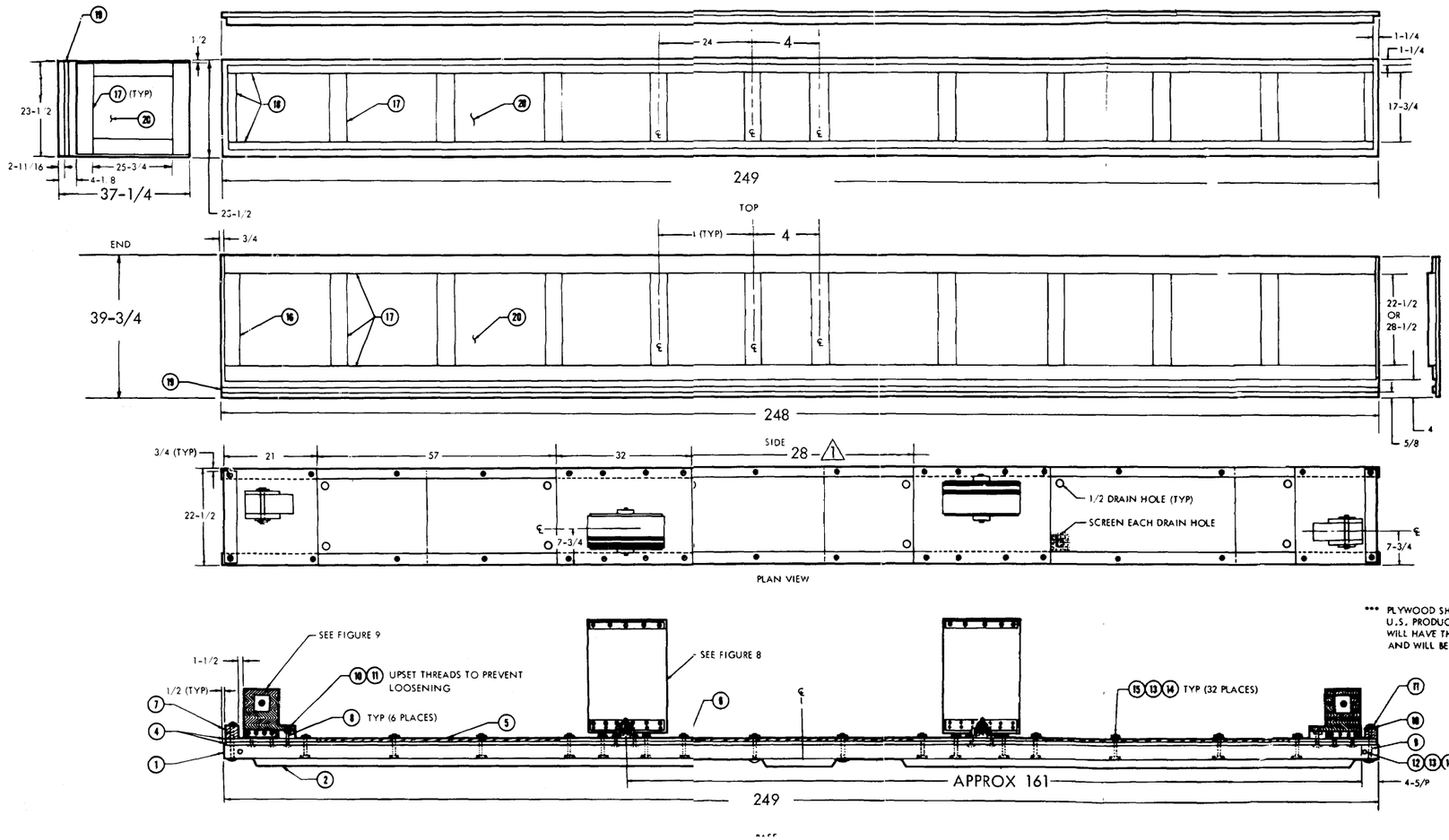


DETAIL A
HELICOPTER TIEDOWN DEVICE

FO-8. Fourteen AH-1's in a SEABEE Barge.



FO-9. Six AH-1's in a SEABEE Barge
FO-9



ITEM	QUAN.	NOMENCLATURE	DIMENSIONS
20	188	PLYWOOD, SQ.FT.	1/2 PLYWOOD * * *
19	50	STEEL, STRAPPING, LIN.FT.	1-1/4 x .035
18	50	FASTENING MEMBER, LIN. FT.	2 x 2 LUMBER*
17	160	FRAMING MEMBER, LIN. FT.	1 x 4 LUMBER*
16	4	STUDS	2 x 4 x 22-1/2 LUMBER*
15	32	BOLT, SQ. NECK, RD HEAD	1/4-20
14	36	NUT, PLAIN, SQ. STEEL	1/4-20
13	36	WASHER, FLAT, FOR WOOD	1/4
12	4	BOLT, SQ. NECK, RD HEAD	1/4-20 x 3-1/4
11	10	WASHER, FLAT FOR WOOD	3/8
10	10	NUT, PLAIN SQ., STEEL	3/8 - 16
9	4	BOLT, SQ. NECK, RD HEAD	3/8 - 16 x 7-1/2
8	6	BOLT SQ. NECK, RD HEAD	3/8 - 16 x 3-1/2
7	2	HEADER	3 x 3 x 21 LUMBER**
6	2	FILLER STRIP	1 x 3 x 54 LUMBER *
5	4	FILLER STRIP	1 x 3 x 57 LUMBER*
4	60	PLYWOOD SQ. FT.	3/4 PLYWOOD***
3	2	RUBBING STRIP	2 x 3 x 16 LUMBER*
2	4	RUBBING STRIP	2 x 3 x 107 LUMBER*
1	2	SKID	3 x 3 x 275 LUMBER**

* MIL-C-104 GROUP II
** MIL-C-104 GROUP III OR IV
*** NN-P-515, TYPE II, CLASS 2
*** PLYWOOD SHALL BE STANDARD GRADE WITH EXTERIOR GLUE OF U.S. PRODUCT STANDARD PS1-66 (INT-DFPA). PLYWOOD WILL HAVE THE GRADE STAMP OF APPROVED TESTING AGENCY AND WILL BE SURFACE TREATED IN ACCORDANCE WITH TT-V-572.

1 THE SCALE OF THIS DIMENSION IS OUT OF PROPORTION WITH OTHER DIMENSIONS ON THIS DRAWING. THIS DRAWING IS A MODIFIED VERSION OF THE UH-1 MAIN ROTOR BLADE CRATE.

FO-10. Main Rotor Blade Crate.
FO-10

ALL DATA ON THIS PAGE DELETED

* U S GOVERNMENT PRINTING OFFICE: 1983-664-028/2187

By Order of the Secretary of the Army:

E. C. MEYER
General, United States Army
Chief of Staff

Official:

J. C. PENNINGTON
Major General, United States Army
The Adjutant General

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PREVIOUS EDITIONS ARE OBSOLETE.

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 decagram = 10 grams = .35 ounce
1 hectogram = 10 decagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	Newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	Newton-meters	1.356	metric tons	short tons	1.102
pound-inches	Newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

PIN: 032861-000