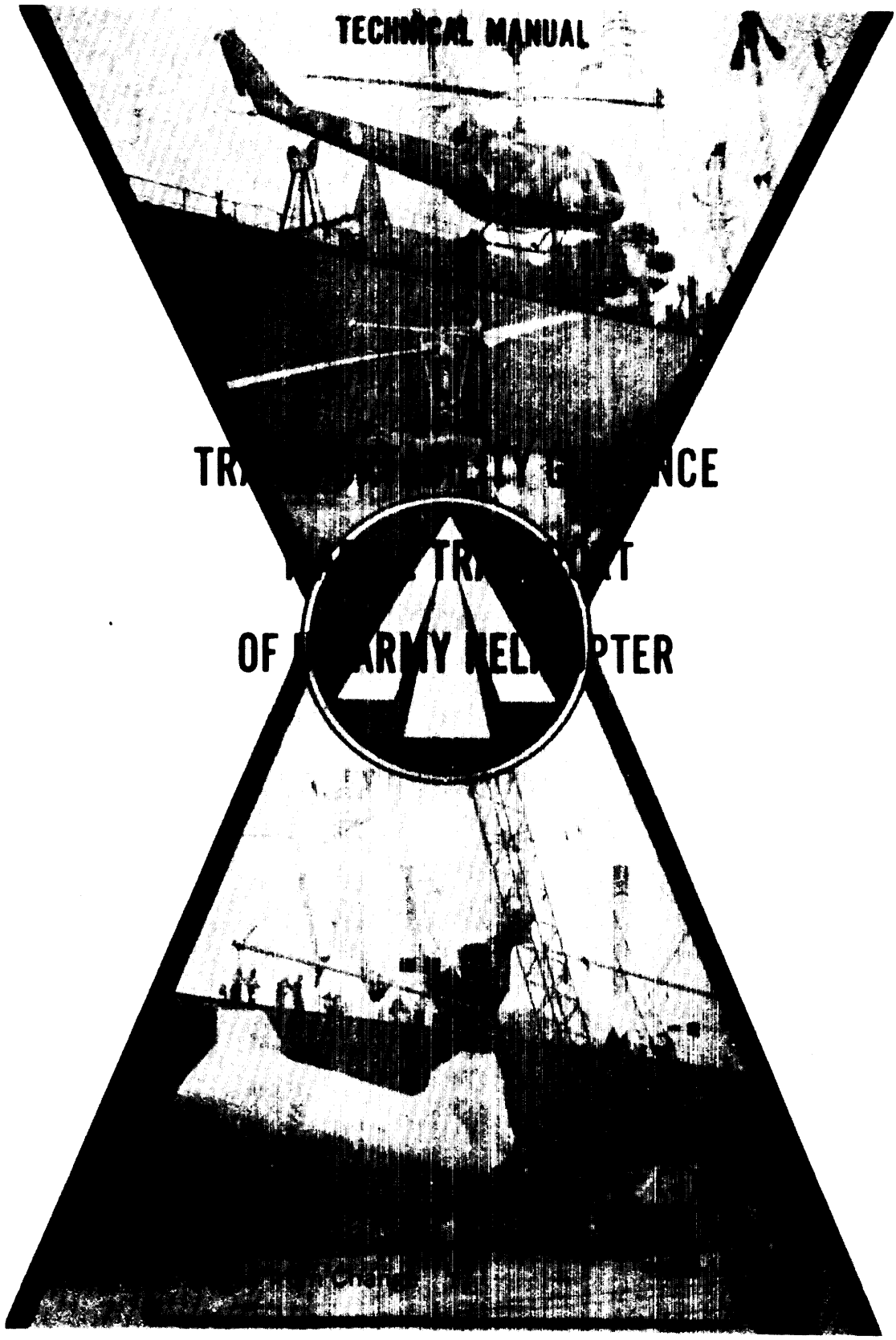

HEADQUARTERS, DEPARTMENT OF THE ARMY

APRIL 1978

CHANGE
NO.1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *16 August 1982*

TRANSPORTABILITY GUIDANCE
MARINE TRANSPORT
OF
US ARMY HELICOPTERS

Changes have been made in the table of contents and in chapters 1, 2, 3, 4, 5, 6, 7, 8, and 9. Chapter 10 is added including procedures for the UH-60 helicopter.

TM 55-1520-400-14, 28 April 1978, is changed as follows:

1. New or changed material is indicated by a star.
2. Remove old pages and insert new pages as indicated below:

Remove pages	*Insert pages*
i through vii	i through viii
1-1 through 1-16	1-1 through 1-11
2-1	2-1
3-1 through 3-10	3-1 through 3-13
4-7 through 4-10	4-7 through 4-10
4-17 and 4-18	4-17 through 4-18
4-31 and 4-32	4-31 through 4-32
4-35 and 4-36	4-35 through 4-36
5-1	5-1
5-5 through 5-8	5-5 through 5-7
5-17 through 5-19	5-17 through 5-19
5-29 and 5-30	5-29 through 5-30.1
5-33 and 5-34	5-33 through 5-34
6-1 through 6-4	6-1 through 6-4
6-31	6-31
6-41 through 6-43	6-41 through 6-45
7-1 and 7-2	7-1 through 7-2
7-5 and 7-6	7-5 through 7-6
7-11 through 7-14	7-11 through 7-13
7-27 and 7-28	7-27 through 7-28
8-1 through 8-4	8-1 through 8-3
8-11 and 8-12	8-11 and 8-12
8-21	8-21
8-29	8-29
9-1 and 9-2	9-1 and 9-2
	10-1 through 10-17
A-1 through A-4	A-1 through A-5
B-1 and B-2	B-1 and B-2
	DA Form 2028-2 (Insert
front cover	at end of manual.)

3. Retain this sheet in front of manual for reference purposes.

By Order of the Secretary of the Army:

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

Official:
ROBERT M. JOYCE
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The Adjutant General

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To be distributed in accordance with DA Form 12-34B, Requirements for TM 55 Series: Transportability Guidance, Aircraft.

TECHNICAL MANUAL
NO. 55-1520-400-14

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *28 April 1978*

TRANSPORTABILITY GUIDANCE

MARINE TRANSPORT OF US ARMY HELICOPTERS

LIST OF ILLUSTRATIONS

LIST OF TABLES

★ CHAPTER 1

INTRODUCTION

1-1. Purpose and scope

a. This manual provides transportability guidance for movement, handling, and stowage of Army helicopters by sealift. The manual contains significant transportability restraint requirements and safety considerations for movement by sea. The material included has been coordinated with the US Army Troop Support and Aviation Materiel Readiness Command (TSARCOM) and the US Army Aviation Research and Development Command (AVRADCOM), and it conforms to Department of the Army doctrine. This manual is intended to be used in conjunction with the appropriate preparation for shipping manual.

b. The intent of this manual is to provide deployment planners, transportation officers, and other personnel involved with aviation unit movement the information needed to plan and execute operations involving sea transport of Army helicopters. Significant technical and physical characteristics, as well as safety considerations required for worldwide movement by roll-on/roll-off (RORO), Seatrain, lighter aboard ship (LASH), sea barge (SEABEE), and containership, are included. Where appropriate, metric equivalents are given in parentheses following the dimension or other measurement. Conversion tables are contained in appendix A.

c. This manual describes the minimum disassembly and preservation requirements for the shipment of Army helicopters aboard LASH, SEABEE, RORO, Seatrain, and container ship vessels.

1-2. Reporting of publication improvements

Users of this publication are encouraged to recommend changes and submit comments for its improvement. Comments should be submitted on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forwarded to Commander, Military Traffic Management Command Transportation Engineering Agency, ATTN: MTT-TR, PO Box 6276, Newport News, VA 23606. (Electrically transmitted messages should be addressed to CDRMTMCTEA, FT EUSTIS VA //MTT-TRC//.) A reply will be furnished by the agency.

1-3. Safety

Appropriate precautionary measures required during movement of helicopters are contained in chapter 2.

1-4. Definitions of warning, cautions, and notes

Throughout this manual, warnings, cautions, and notes emphasize important or critical guidance. They are used for the following conditions:

a. Warning. An operating procedure or practice that, if not correctly followed, could result in personal injury or loss of life.

b. Caution. An operating procedure or practice that, if not strictly observed, could result in damage to or destruction of equipment.

c. Note. An operating procedure or condition that must be emphasized.

1-5. Preservation

Preservation and disassembly will be in accordance with the appropriate preparation for shipment manual. TSARCOM must approve any deviations from preparation for shipment TMs on a case-by-case basis.

CAUTION

Only aircraft maintenance personnel or aircraft packaging specialists can supervise aircraft preservation and preparation for shipment.

★ 1-6. Ship description

a. Barge ship systems. There are two barge ship systems, lighter aboard ship (LASH) and sea barge (SEABEE). Each system has two primary components, a mother ship and a family of lighters or barges, both commonly called barges. By using a stem lifting device, each ship can load or discharge its barges either at an offshore anchorage or at an established port. Both systems are compatible with worldwide inland waterway systems. Although similar in many ways, the physical characteristics of the two systems result in a number of differences that become significant when planning their optimum use.

(1) *SEABEE.*

(a) The SEABEE ship system. The SEABEE (fig 1-1) can carry the aircraft of Army units without extensive sectionalization. The 200- by 100-foot (61- by 30.5-m) deck area between the deckhouse and smokestacks provides a suitable landing area for fly-on/fly-off operations.

(b) Stowage of barges and containers. The SEABEE barges are stored horizontally on 3 decks, 12 each on the main and lower decks and 14 on the upper deck. One hundred and sixty containers can be carried on 10 of the 14 barges on the upper deck. Barges are loaded aboard the SEABEE ship by a 2,000-ton-capacity submersible stern elevator. Under ideal conditions the SEABEE ship can load or discharge its load in 13 hours.

(c) Characteristics of a SEABEE ship. The dimensions and pertinent characteristics of the SEABEE ship areas follows:

Length	874 ft (267 m)
Width	106 ft (32 m)
Deadweight (max)	38,410 LTON (34 000 MTON)
Speed	21.7 knots
Dry cargo	44,350 MTON
Barge capacity	38 barges

(d) Characteristics of a SEABEE barge.

1. The watertight, double-hulled SEABEE barge is the same width and one-half the length of the standard US commercial river barge. It is slightly larger, but has approximately twice the cargo-carrying capacity of the LASH lighter (fig 1-1). The barges are readily accessible during the voyage by catwalk in the ship and by manhole hatches in the barges. Each barge is fitted for smoke monitoring and has water fire-extinguishing systems. Forced draft ventilation while underway is also provided.

2. The SEABEE barge, with the seven hatch covers installed, has a draft of just less than 2 feet (.6 m). The shallow draft allows the barge to be drawn very close to an unprepared river bank. No deck winches are installed on the SEABEE barge. However, sufficient cleats are available for securing the barge. The mooring lines must be kept taut at all times to prevent drift caused by tidal action or strong river currents. As the barge is loaded, the shoreside edge of the hull will settle firmly its full length on the river bank. The settling will add stability to the barge and aid in loading. Should high and low tidal conditions be expected along coastlines it will be necessary to prevent the barge from settling on shore. The loaded lighter can be moved off the river bank easily by crane or by a small harbor tug.

(2) LASH.

(a) Types of LASH ships. There are two types of LASH ships (fig 1-3): The first design is the C8, and the later, is the C9, equipped with a larger lighter capacity. Several configurations of each type are in operation, depending on their trade routes.

(b) Storage *of Lighters.* LASH ships stow their lighters vertically in cells and on top of the hatch covers. Each LASH ship is equipped with a 500-LTON (480-MTON) gantry crane to lift the lighters at the stern of the ship and stow them athwartships throughout the ship. A 35-LTON (31-MTON) gantry crane located forward is used to load containers and stow them athwartships. Three to four lighters normally can be loaded onto or discharged from the ship in one hour. A LASH ship can normally load or discharge its lighters in about 20 hours. The container crane is capable of handling approximately sixteen 20-foot (6-m) containers an hour.

(c) LASH ship characteristics. The dimensions and pertinent characteristics of the LASH mother ships are as follows: Figure 1-3 is a LASH ship underway.

	C8	*C9*
Length	820 ft (250 m)	893 ft (272 m)
Width	100 ft (30 m)	100 ft (30 m)
Deadweight (max):	29,820 LTON (33,500 MTON)	39,100 LTON (39,000 MTON)
Speed (mil-op):	22.5 knots	22.5 knots

(d) LASH lighter characteristics.

1 LASH lighters are thin-skinned boxes with water-tight hatch covers (fig 1-4). Refer to figure 1-5 for a comparison of the LASH lighter and the SEABEE barge. The lighter can carry up to 371 LTON (340 MTON) of cargo at a maximum draft of just over 8 feet (2.4 m). Some lighters are equipped for easy ventilation and provide for smoke detection and fire extinguishing. The lighters are not accessible during transit in the mother ship.

2 The LASH lighter, with covers installed, floats at a draft of just less than 2 feet (61 cm). Each of the hatch covers weighs approximately 6,000 pounds (2 722 kg). The shallow draft allows the barge to be drawn by deck winches very close to the unprepared river bank. By keeping the mooring cables taut, the “drift” caused by strong river current is eliminated. As the barge is loaded, the shoreside edge of the hull will settle firmly its full length on the river bank. The settling will add stability to the barge and aid in loading. Should high and low tidal conditions be expected along coastlines, it is necessary to prevent the lighter from settling on shore. The loaded lighter can be moved

off the river bank easily by crane or by a small harbor tug. (Maximum draft experienced during loading tests was 2.5 feet (76 cm) with eight AH-1 Cobras loaded; this weight was approximately 64,000 pounds (29 030 kg or 28.57 LTON).) Size comparison of LASH lighter to SEABEE barge is shown in figure 1-5.

b. RORO.

(1) RORO ships are designed to load and discharge cargo through stern ramps and/or side ports and to position cargo by using internal ramps between stowage levels. These vessels normally transport wheeled and tracked vehicles and containers mounted on semitrailers.

(2) Roll-on/roll-off (RORO) ships normally will be operated from an improved port facility. Operations from midstream or unimproved ports are considered feasible only with self-sustaining RORO ships. Each RORO ship must be surveyed prior to loadout for tiedown fittings, hatch, hold, and door clearances; ventilation system; lifting capabilities and capacities of installed lifting gear; and fire-fighting equipment. Ramp angle and construction must also be surveyed to determine if RORO operations are feasible for helicopters. When RORO operations are not considered feasible, the helicopter will be lifted by ship's gear or shoreside crane (figs 4-27 and 4-28) and lowered through a hatch, then moved to its final stow position by ground-handling wheels or a portioning dolly. The main advantage of RORO ships is their wide-open decks. (fig 1-6).

(3) The dimensions and pertinent characteristics of the typical RORO used are as follows:

Length:	700 ft (213 m)
Width:	92 ft (28 m)
Deadweight:	14,180 LTON (12,500 MTON)
Draft:	28 ft (8.5 m)
Engine:	30,000 shp
Speed:	25 kn
Deck space:	150,000 sq ft (13.935 m^2)
Liquid storage:	16,000 gal (60.541 1)

c. Containerships (fig 1-7).

(1) *Characteristics of containerships.* Full containerships are designed to stow containers as the normal cargo load, usually using container cell guides and deck container fittings. Those ships capable of lifting fully loaded containers with their own gear are designated as self-sustaining. Non-self-sustaining containerships require the use of shore or floating gear to lift and stow containers. There are also partial containerships which carry containers in addition to other general, liquid, or RORO cargo.

(2) *Types of containers.* Dry-cargo containers are the most useful of the many different types of containers. The International Organization for standardization recognizes three categories of containers that are designated series 1, 2, and 3. Generally, series 1 containers are 8 feet (2.4 m) wide by 8 feet (2.4 m) high and of 40-, 30-, 20-, and 10-foot (12-, 9-, 6-, and 3-m) lengths. The 8-1/2-foot (2.6-m) high, 40-foot (12-m) long container is also included. Series 2 and 3 are metrically sized and are in use in Europe. (App. A contains metric conversions.) The three dominant sizes in use today are the 8- by 8- by 20-foot (2.4- by 2.4- by 6-m), 8- by 8-1/2- by 35-foot (2.4- by 2.6- by 10.7-m), and the 8- by 8-1/2- by 40-foot (2.4- by 2.6- by 12 m) containers. The 35-foot (10.7-m) container, used exclusively by one large United States company, technically is nonstandard. Most of the new large containerships carry combinations of the sizes mentioned.

d. Seatrain ships. The seatrain ships (fig 1-8) are included as part of the National Defense Reserve Fleet (ND RF) Ready Reserve Force (RR F). They are self-sustaining ships with very high deck clearances, a large hatch, and cranes capable of 360–degree operations. The open and uncluttered decks permit the operation of vehicles and materiels handling equipment. Deck tiedown points are located approximately every 5 feet, both transversely and longitudinally, throughout the cargo spaces. Stowage procedures for helicopters aboard Seatrain and RORO ships are identical.

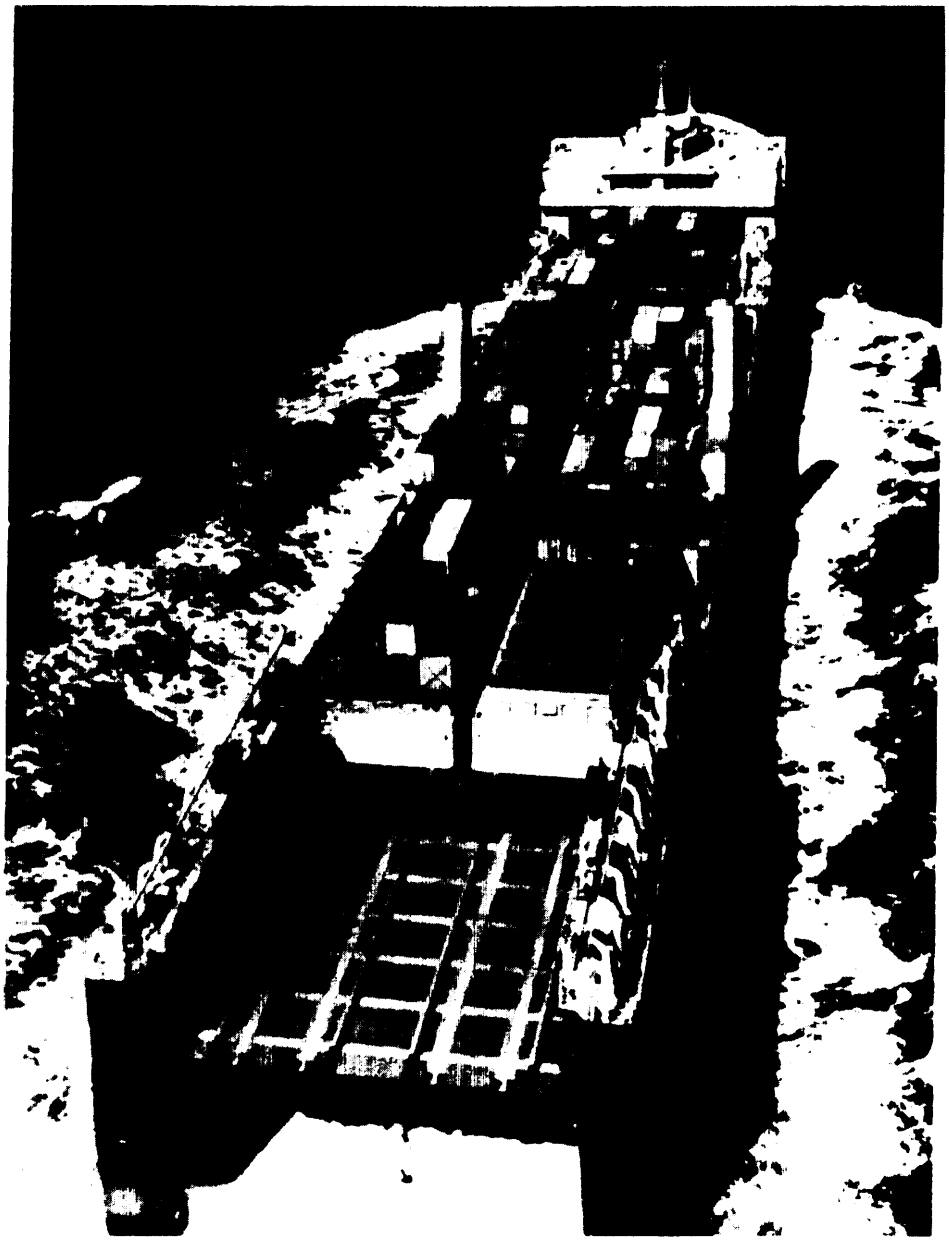
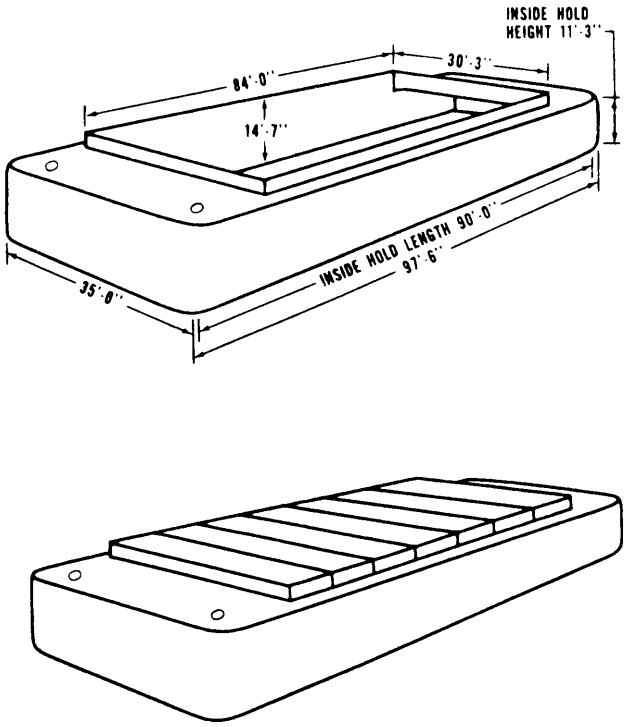


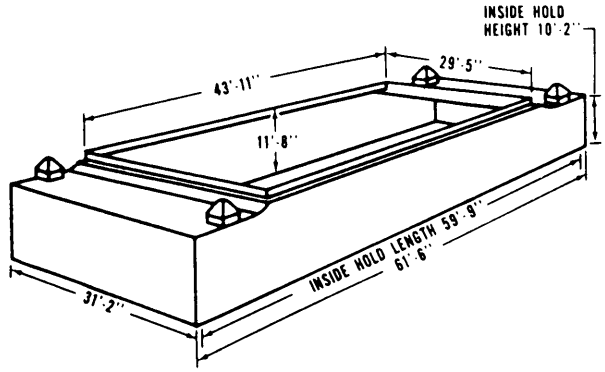
Figure 1-1. SEABEE ship.

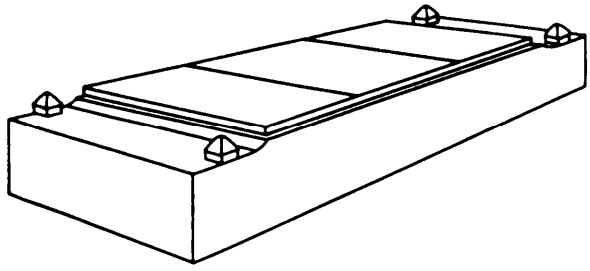


HATCH PANELS: 7 EA, APPROX 5800 LB PER PANEL
CARGO CAPACITY: 834 LTON/39140 CU FT/978.5 MTON
EMPTY DRAFT: 1'-9"
FULLY LOADED DRAFT: 10'-7"
LIGHTWEIGHT BARGE: 150 LTON

Figure 1-2. SEABEE barge characteristics.

Figure 1-3. LASH ship.





HATCH PANELS: 3 EA, APPROX 6000 LB PER PANEL
CARGO CAPACITY: 369 LTON/19500 CU FT/490 MTON
EMPTY DRAFT: 2'-1/2"
FULLY LOADED DRAFT: 8'-7"
LIGHTER EMPTY WEIGHT: 80 LTON

Figure 1-4. LASH lighter.

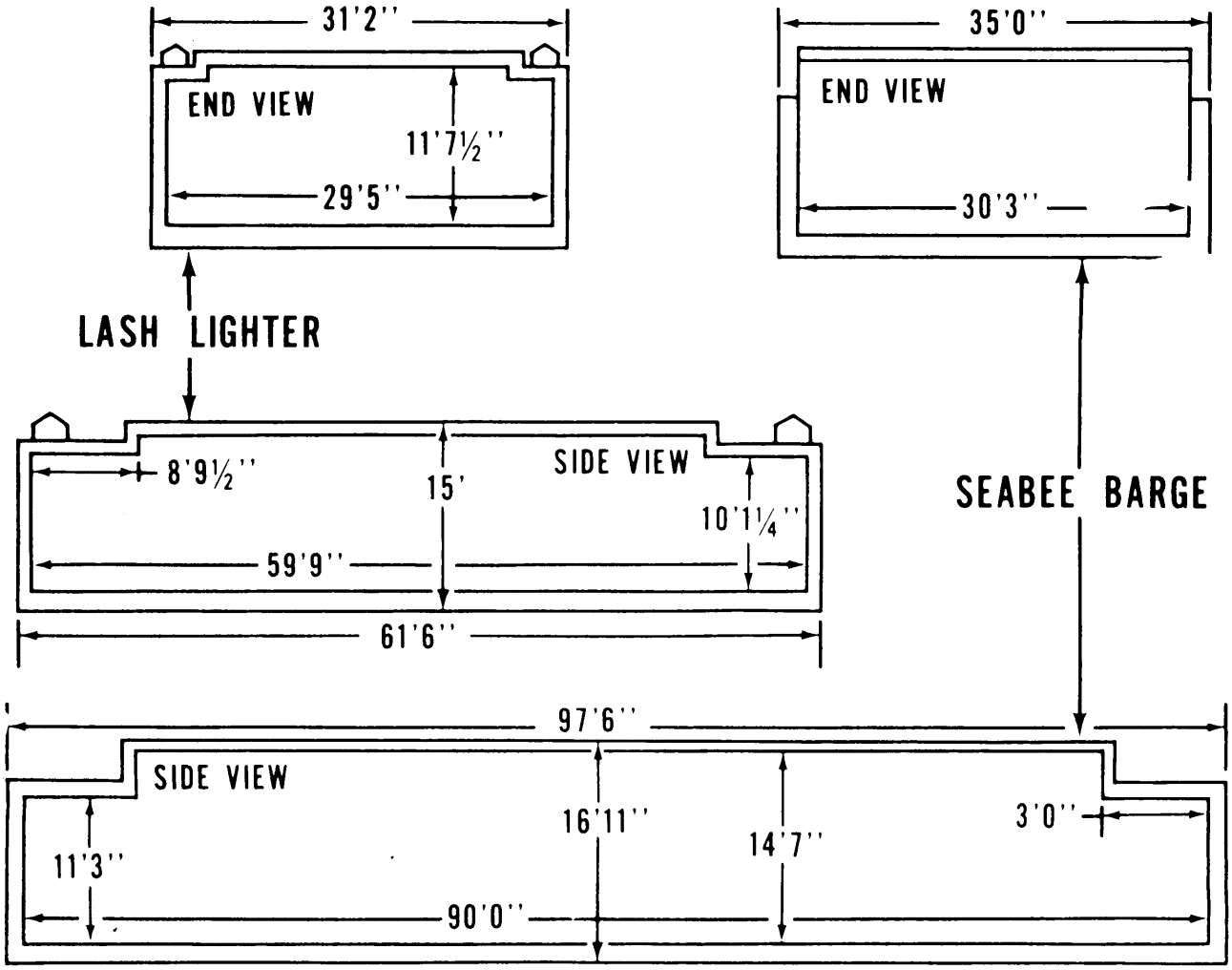


Figure 1-5. Size comparison of LASH lighter to SEABEE barge

Figure 1-6. Roll-on/roll-off (RORO) ship.

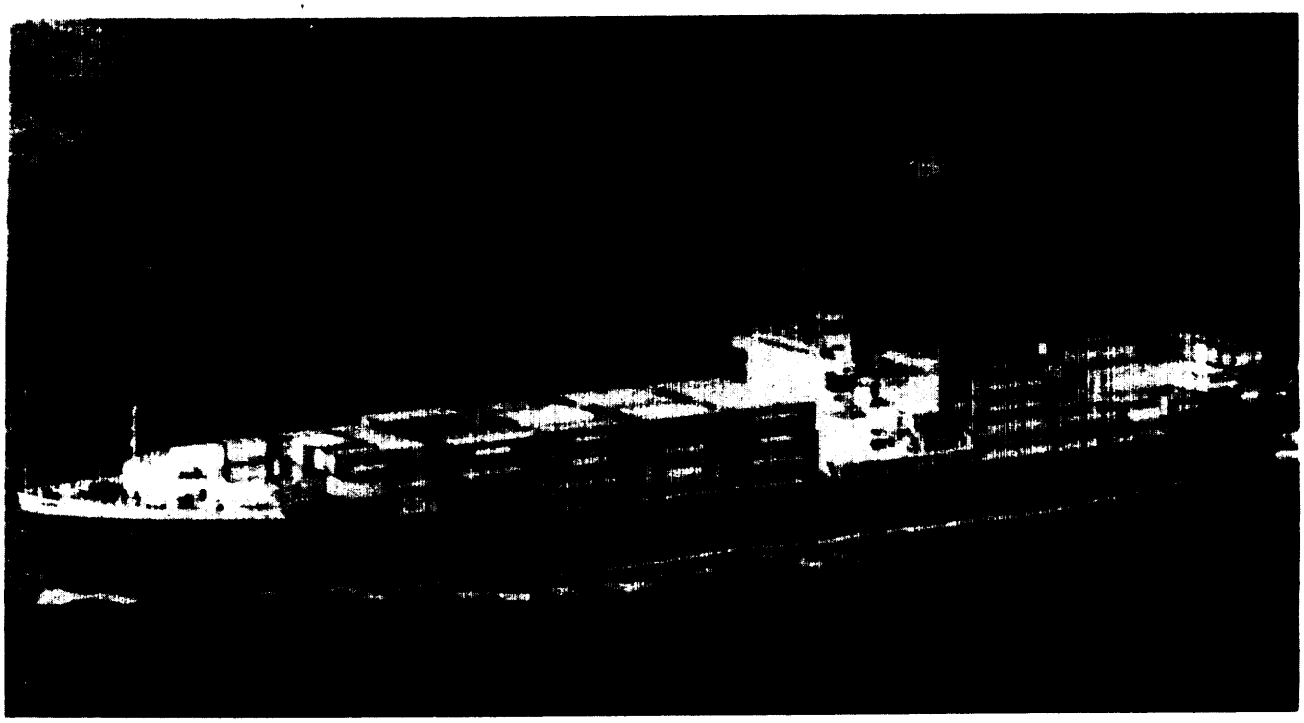


Figure 1-7. Containership.

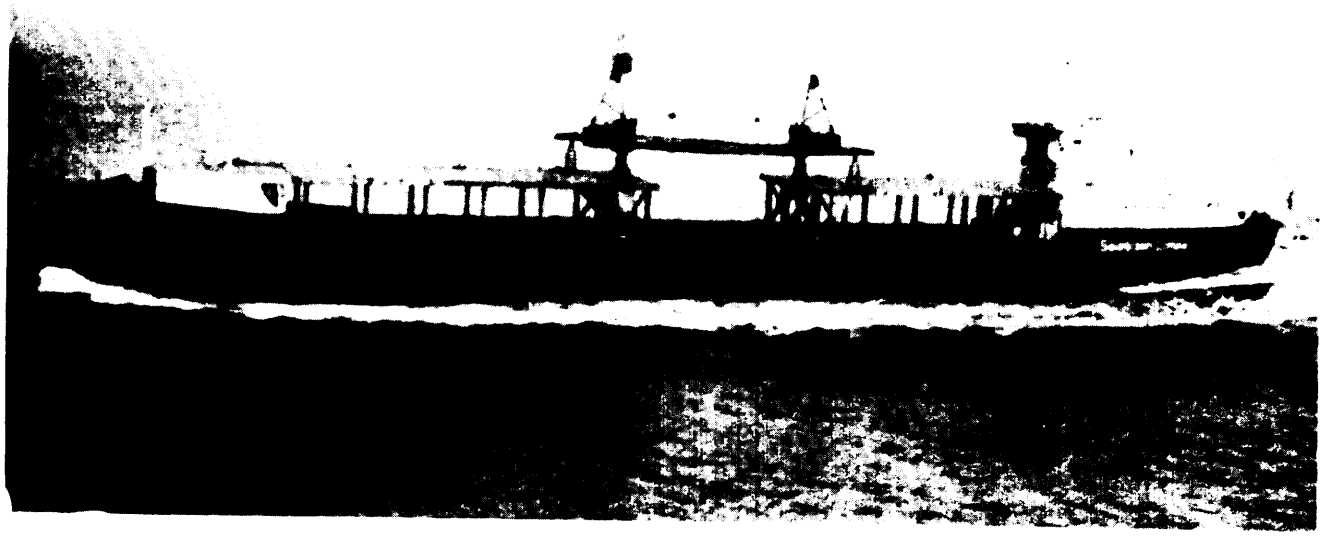


Figure 1-8. Puerto Rico-Class Seatrain ship.

★ CHAPTER 2

SAFETY

2-1. General

General safety considerations and precautions for movement are as follows:

a. Insure adequate ventilation.

b. Check each helicopter and container to insure that all loose items are secured in accordance with applicable regulations.

c. Exercise extreme caution during towing operations.

d. Caution personnel not to walk under any item when it is being lifted.

e. Provide fire extinguishers (foam, soda acid, CO_2, dry chemical) during loading and unloading operations.

f. Inspect helicopter fuel tanks to insure that the tanks are approximately 3/4 full.

g. Exercise extreme caution when handling the hazardous chemicals used in preparing system items for shipment and storage.

h. Wear ear protectors when in a high noise-level area (ear-hazardous area).

i. Before lifting any item, insure that lifting gear is in good condition.

j. Insure wheel chocks are in place for UH-60 helicopter before releasing parking brakes.

WARNING

Only authorized equipment will be used to load, hoist, handle, or tie down aircraft. Locally fabricated equipment will not be used until it has been evaluated and approved by TSARCOM.

All applicable safety regulations will be strictly enforced. Explosive components containing electrical wiring must be protected at all times from stray voltages or induced electrical currents. Handling operations should not be performed during electrical storms.

2-2. Specific Safety Requirements

a. Pertinent safety requirements can be found, where applicable, in the appropriate chapters.

b. A qualified maintenance officer will be present during all loading and discharge operations to note in the aircraft log book any bumps, strikes, or scrapes that occur.

★ CHAPTER 3

TRANSPORTABILITY DATA

3-1. Scope

This chapter provides a general description of the helicopter's transportability characteristics and dimensional data necessary for their movement. Data contained in this chapter are applicable to model and series shown. Changes in model series may affect the loadability of the item, as related to the guidance shown in this manual.

NOTE

Whenever weight and/or measurements are critical factors for transportability purposes, each item must be weighed and measured.

3-2. Descriptions, Item Characteristics, and Related Data

a. OH-58 (fig 3-1 to 3-3).

Nomenclature: Helicopter observation
NSN: 1520-00-169-7137
Line item number: K31042
Item weight
Empty weight plus oil and 75% fuel load . . . . . 1,937 lbs (878.6 kg)
I tern length:
Rotors operating. . . . . 40 ft 11.8 in. (12.50 m)
Fuselage . . . . . 32 ft 2.0 in. (9.81 m)
Item width:
Rotors parallel to fuselage . . 6 ft 5.4 in. (1.97 m)
Item height:
Operational . . . . . 9 ft 7 in. (2.92 m)
Cabin height (mast components removed). . . . 7 ft. 1.3 in. (2.17 m)

b. OH-6 (figs 3-4 to 3-6).

Nomenclature: Helicopter, observation
NSN: 1520-00-918-1523
Line item number: K30645
Item weight:
Empty weight plus oil and 75% fuel load . . . . . 1,565 lbs (709.8 kg)
Item length:
Rotors operating. . . . . .30 ft 3.75 in (9.25 m)
Fuselage . . . . . .22 ft 9.5 in (6.95 m)
Item width:
Rotors static . . . . . 24 ft 4 in (7.42 m)
Blades removed . . . . . .8 ft 5.5 in (2.58 m)
Item height:
Operational . . . . . 8 ft 6 in (2.59 m)
Cabin height (mast components removed). . . .7 ft 2.4 in (2.20 m)

c. UH-1H (fig 3-7).

Nomenclature: Helicopter, utility
NSN: 1520-00-087-7637
Line item number: K31795
Item weight:
Empty-weight plus oil and 75% fuel load . . . . . 6,211 lbs (2,817.2 kg)
Item length:
Rotors operating. . . . . 57 ft 0.67 in (17.40 m)
Fuselage . . . . . 41 ft 5.0 in (12.63 m)
Item width:
Rotors parallel to fuselage. . 9 ft 4.3 in (2.85 m)
Synchronized elevator removed . . . . . 9 ft 0.5 in (2.75 m)
Synchronized elevator and stabilizer removed. . . . . 8 ft 6.6 in (2.61 m)
Item height:
Operational. . . . . 13 ft .074 in (3.97 m)

d. AH-1G (fig. 3-8)

Nomenclature: Helicopter, attack
NSN: 1520-00-999-5821
Line item number: K29660
Item weight:
Empty weight plus oil and 75% fuel load . . . . . 7,141 lbs (3,239.1 kg)
Item length:
Rotors operating. . . . . 52 ft 11 in (16.14 m)
Fuselage . . . . . 45 ft 2.2 in (13.78 m)
Item width:
Rotors parallel to fuselage. .10 ft 4 in (3.15 m)
Item height:
Operational . . . . . 11 ft 7in (3.53 m)

e. AH-1S (fig. 3-9)

Nomenclature: Helicopter, attack
NSN: 1520-00-504-9112
Line item number: K29694
Item weight:
Empty weight plus oil and 75% fuel load. . . . . 8.399 lbs (3,809.7 m)
Item length:
Rotors operating. . . . . 53 ft 1 in (16.19 m)
Fuselage . . . . . 44 ft 7 in (13.60 m)
Item width:
Rotors "parallel" to "fuselage," wings only. . . . . 10 ft 9 in. (3.28 m)
Tow missile launchers installed on wings . . . . . 11 ft 8 in. (3.56 m)
Item height:
Operational . . . . . 12 ft 3 in. (3.74 m)

f. CH-47B/C (fig. 3-10)

Nomenclature: Helicopter, cargo
NSN: B/1520-00-990-2941
C/1520-00-871-7308
Item weight:
Empty weight plus oil and 7590 fuel load . . . . . .
B . . . . . 21,960 lbs. (9,960.9 kg)
C. . . . . 22,590 lbs (10,246.7 kg)
Item length:
Rotors operating. . . . . 98 ft 10.5 in. (30.16 m)
Fuselage . . . . . 50 ft 9 in. (15.48 m)
Item width:
Rotors static . . . . . 52 ft (15.86 m)
Rotors removed . . . . . 12 ft 5 in. (3.79 m)
Item height:
operational . . . . . .18 ft 11.5 in. (5.78 m)

g. CH-47D (fig. 3-11)

Nomenclature: Helicopter, cargo
NSN: 1520-01-088-3369
Line item number: Z33490
Item weight:
Empty weight plus oil and 75% fuel load . . . . . 28,009 (12 705.6 kg)
Item length:
Rotors operating. . . . . 99 ft (30.20 m)
Fuselage . . . . . 51 ft (15.55 m)
Item width:
Rotors parallel to fuselage. .52 ft (15.86 m)
Rotors removed . . . . . 12 ft 5 in. (3.79 m)
Item height:
Operational. . . . . 18 ft 7.82 in. (5.69 m)

h. CH-54A/B (fig. 3-12).

Nomenclature: Helicopter, cargo
NSN: 1520-00-113-5776
Line item number: K30515
Item weight:
Empty weight plus oil and 75% fuel load . . . . . 26,426 lbs (11,986.7 kg)
Item length:
Rotors operating. . . . . 88 ft 6 in. (26.99 m)
Fuselage . . . . . 70 ft 3 in. (21.42 m)
Item width:
Rotors parallel to fuselage. .72 ft 2 in. (22.01 m)
Main rotor blades removed .21 ft 10 in. (6.65 m)
Item height:
Operational . . . . . 25 ft 4 in. (7.73 m)
Tail rotor blade removed . . .19 ft 1.9 in. (5.84 m)

i. UH-60A (Blackhawk) (fig. 3-13)

Nomenclature: Helicopter, utility
NSN: 1520-01-035-0266
Line item number: K32293
Item weight:
Empty weight plus oil and 75% fuel load . . . . . 12,305 lbs (5,581.5 kg)
Item length:
Rotors operating. . . . . 64 ft 10 in (19.77 m)
Fuselage . . . . . .50 ft 7.5 in (15.44 m)
Rotors and pylon folded. . . . 41 ft 4 in (12.61 m)
Item width:
Rotors static . . . . . 53 ft 8 in (16.37 m)
Main rotor blades folded . . .14 ft 4 in (4.37 m)
Blades folded and stabilator removed (IR Suppressor installed) . . . . . 10 ft 9 in (3.28 m)
Blades folded and stabilator removed (IR Suppressor removed). . . . . 9 ft. 8.1 in (2.95 m)
Item height:
Operational . . . . . 17 ft 6 in (5.34 m)
Tail rotor blades removed . .12 ft (3.66 m)

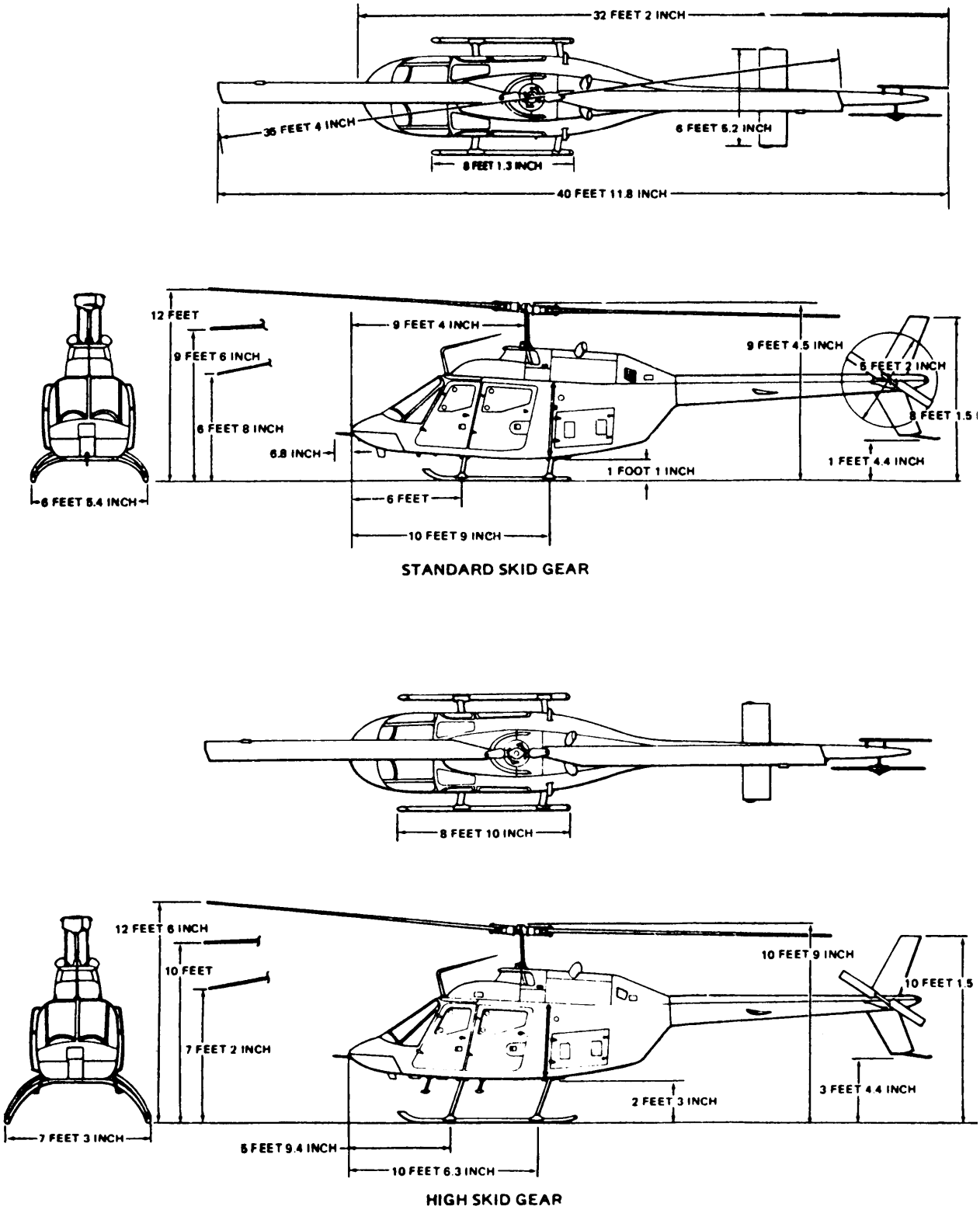


Figure 3-1. Principal dimensions, OH-58 (front, top, and side views).

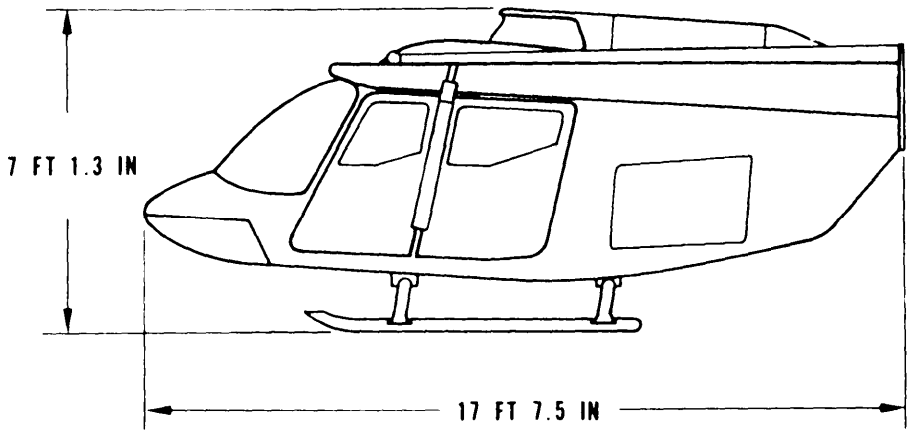


Figure 3-2. Side view, reduced dimensions, OH-58.

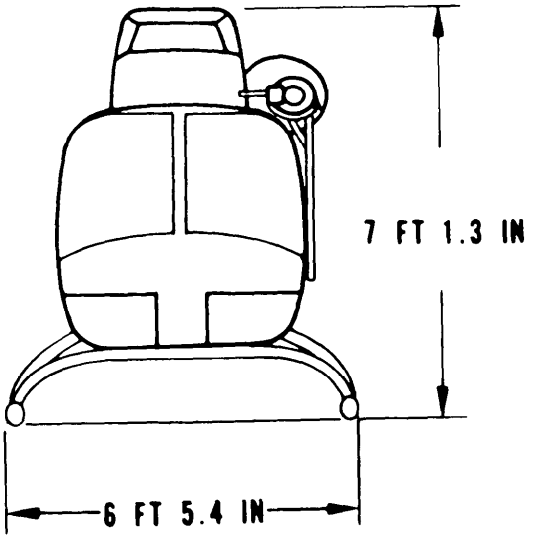


Figure 3-3. Front view, reduced dimensions, OH-58.

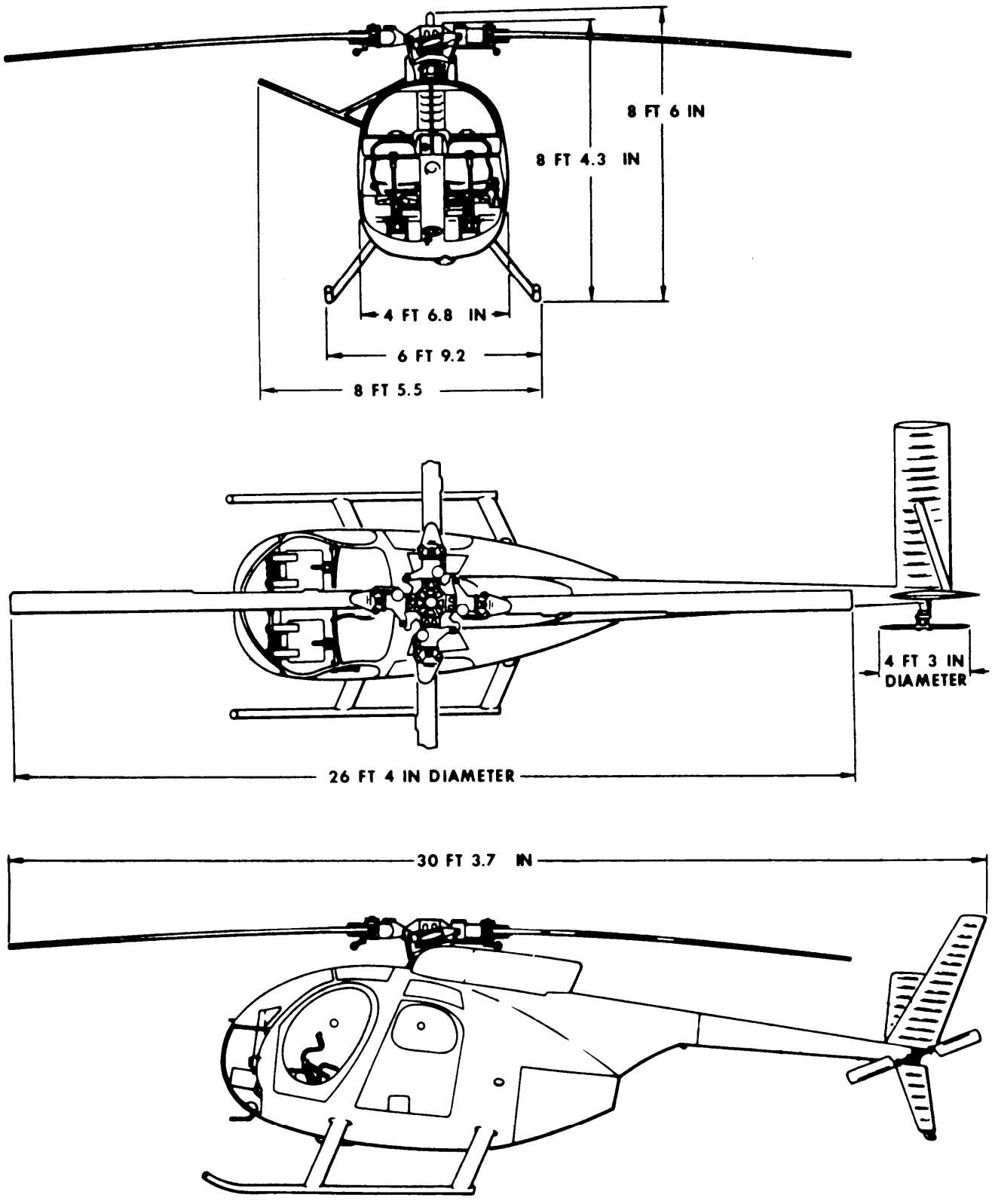


Figure 3-4. Principal dimensions, OH-6 (front, top, and side views)

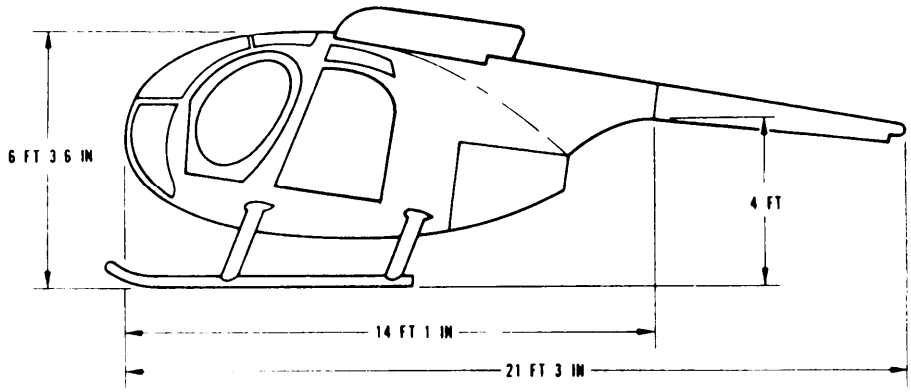


Figure 3-5. Side view, reduced dimensions, OH-6.

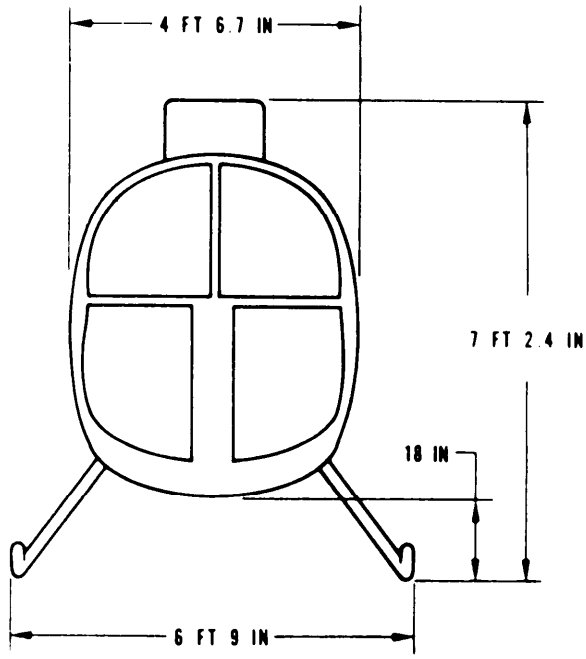


Figure 3-6. End view, reduced dimensions, OH-6.

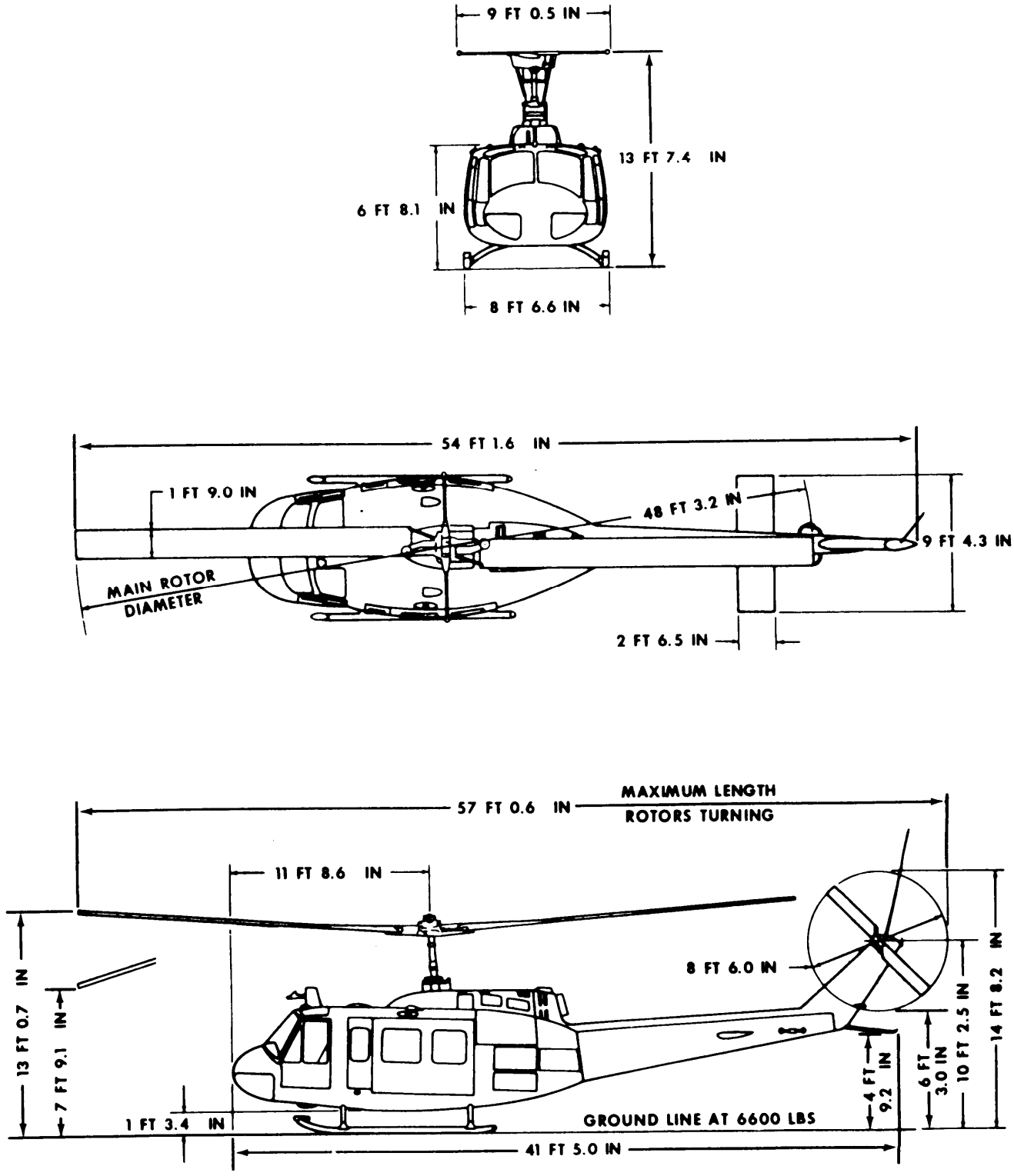


Figure 3-7. Principal dimensions, UH-1H (Front, top, and side views).

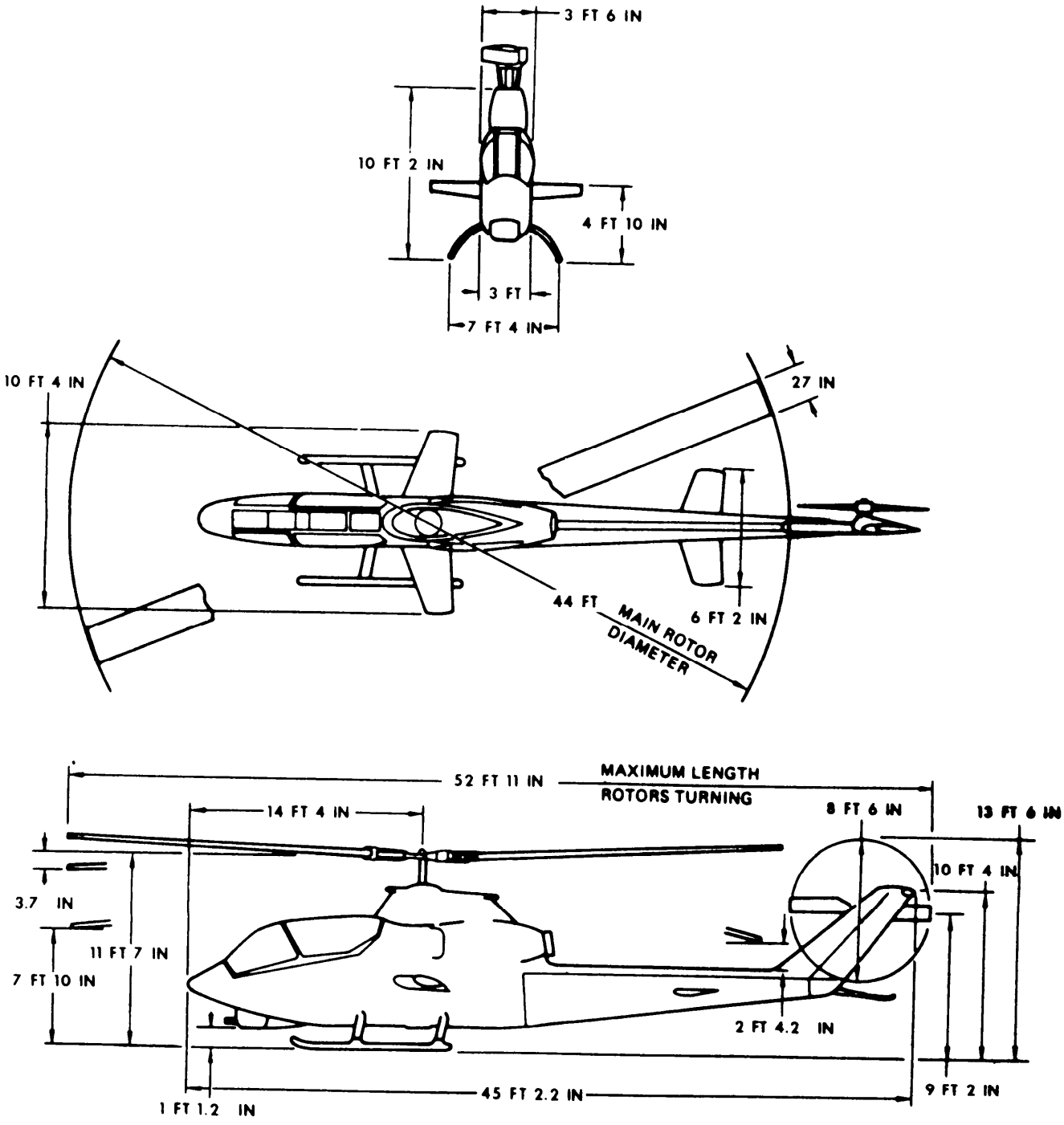
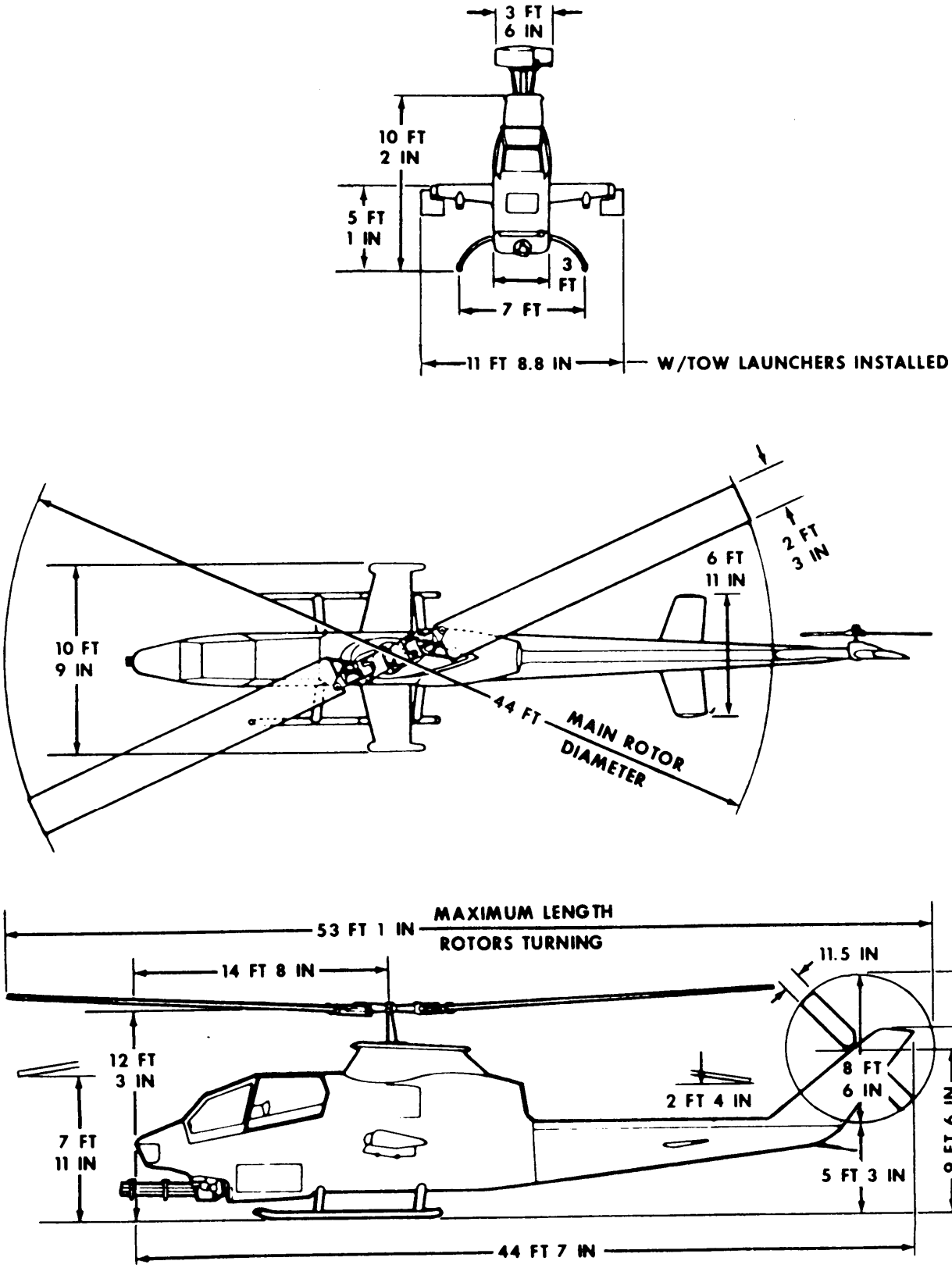


Figure 3-8. Principal dimensions, AH-1G (front, top, and side views).



NOTE

DIMENSIONS ARE FOR UNDEFLECTED SKID GEAR.

Figure 3-9. Principal dimensions, AH-1S (front, top, and side views).

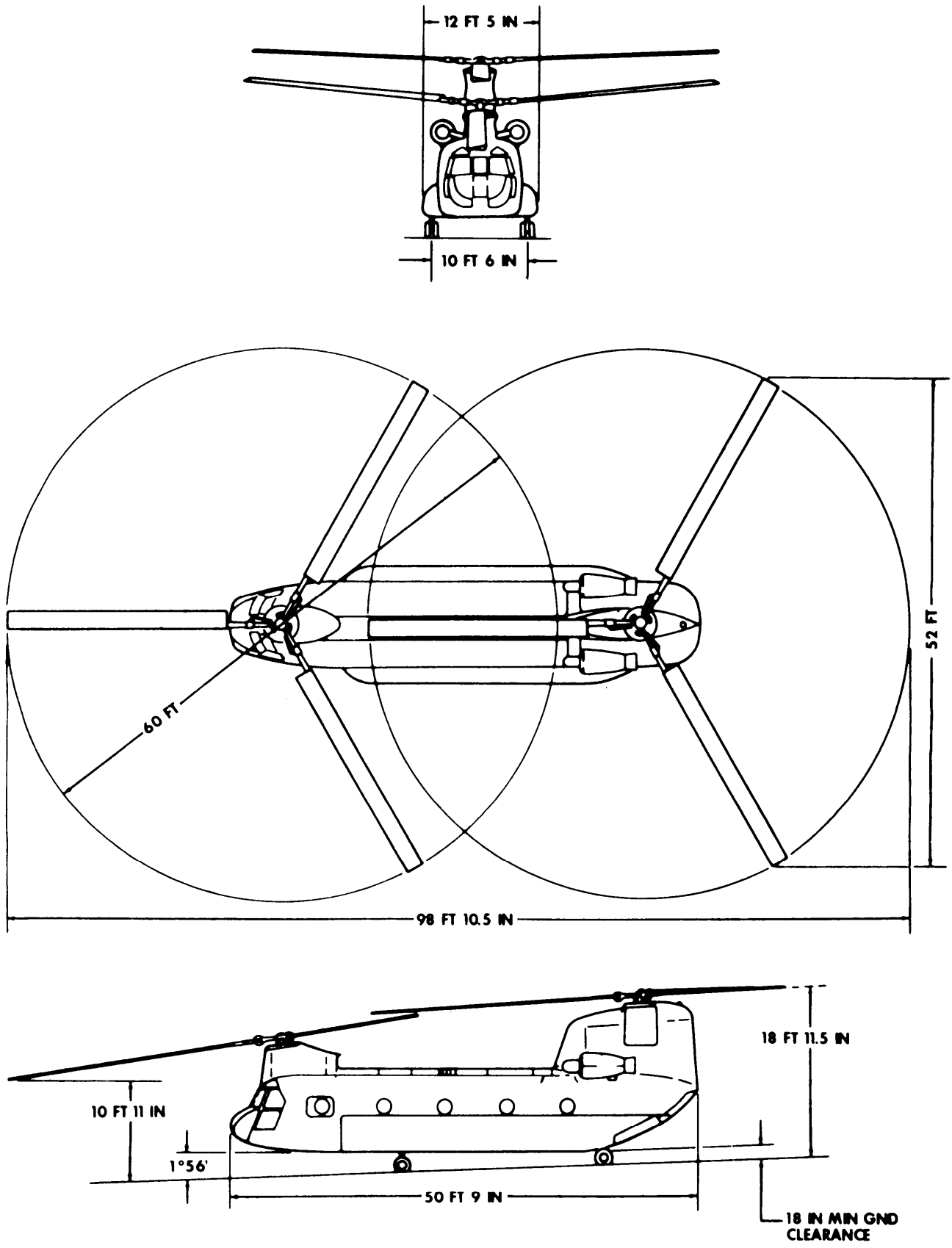


Figure 3-10. Principal dimensions, CH-47B/C (front, top, and side views).

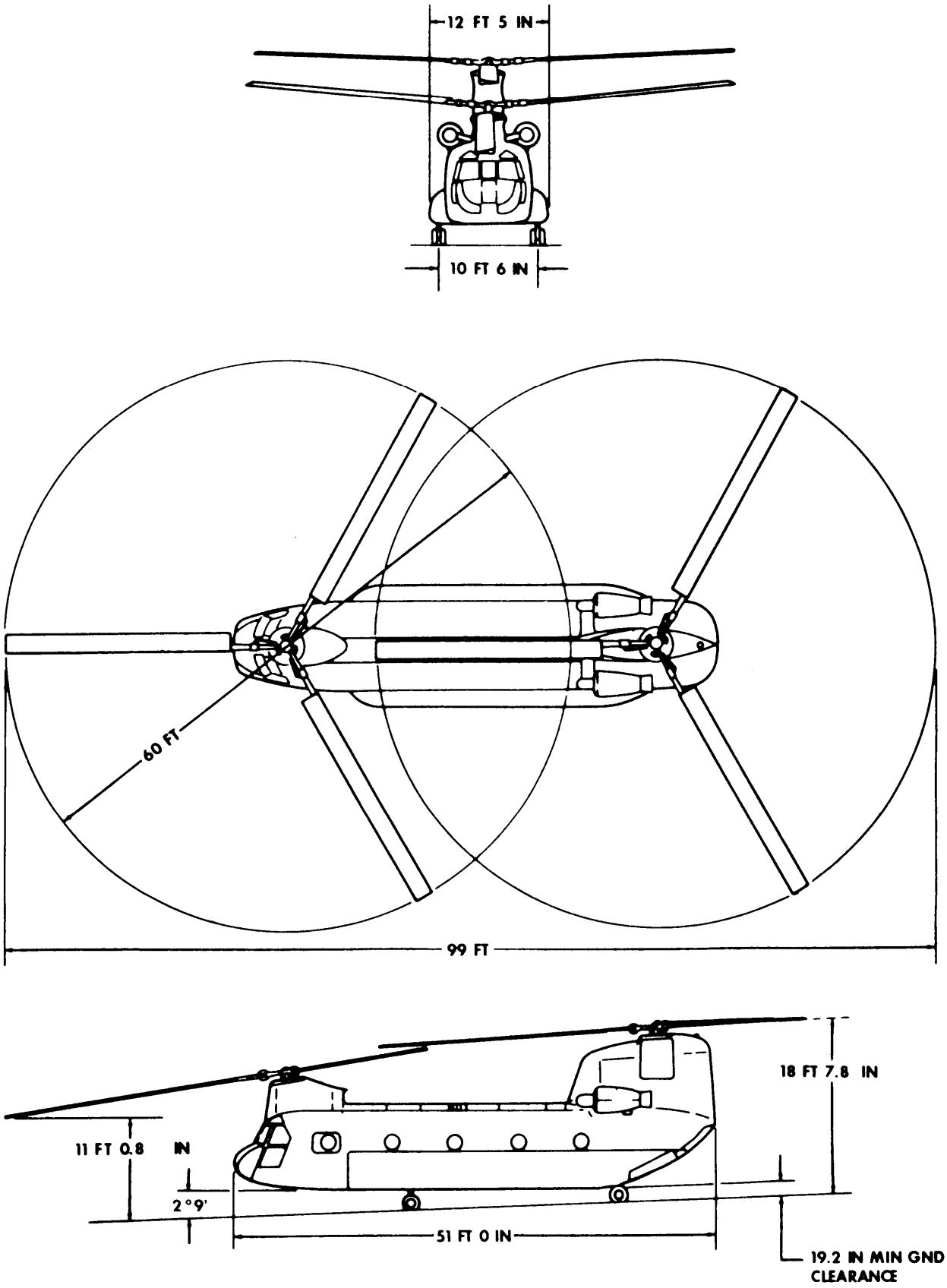


Figure 3-11. Principal dimensions, CH-47D (front, top, and side views).

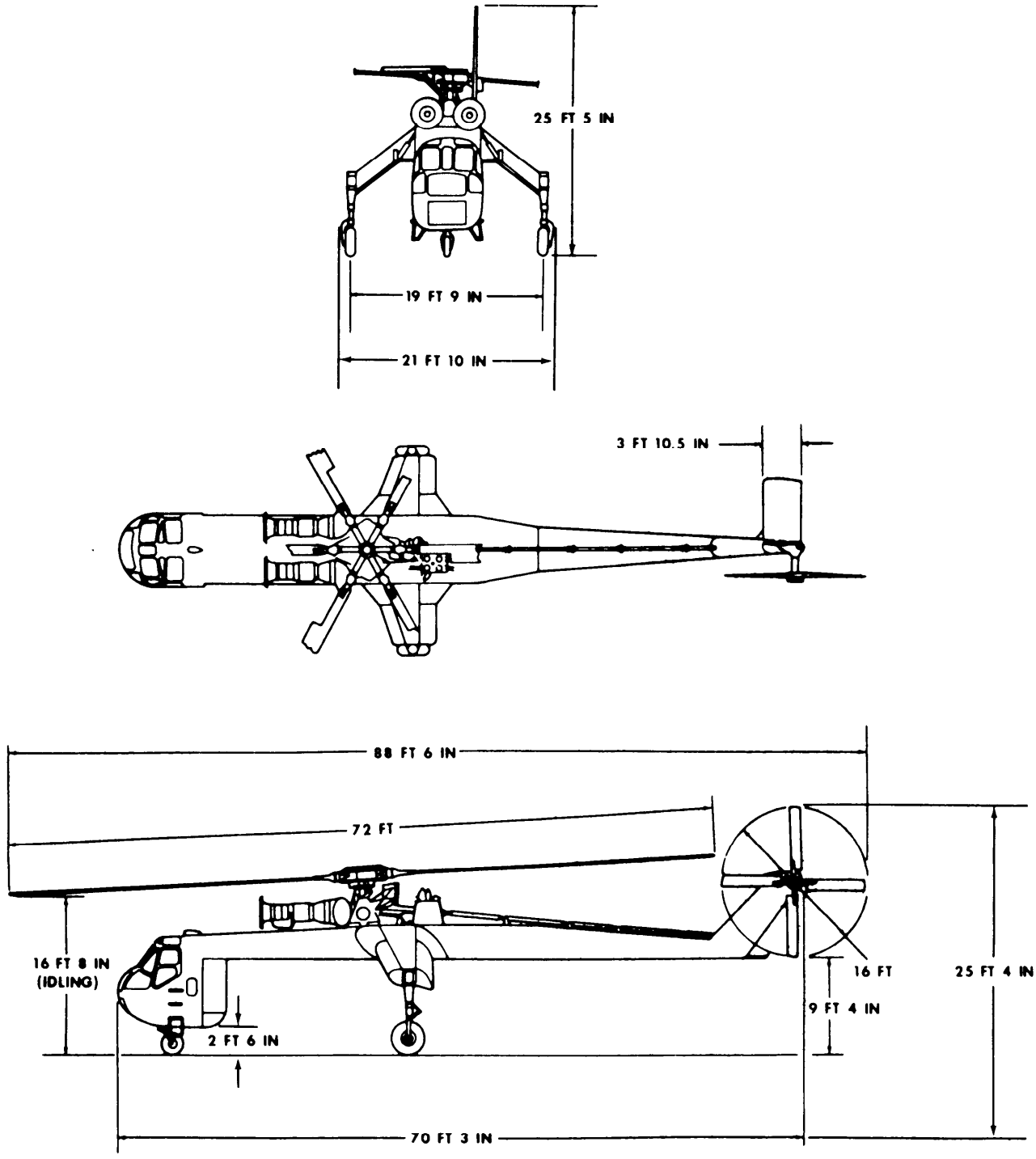


Figure 3-12. Principal dimensions, CH-54A/B (front, top, and side views).

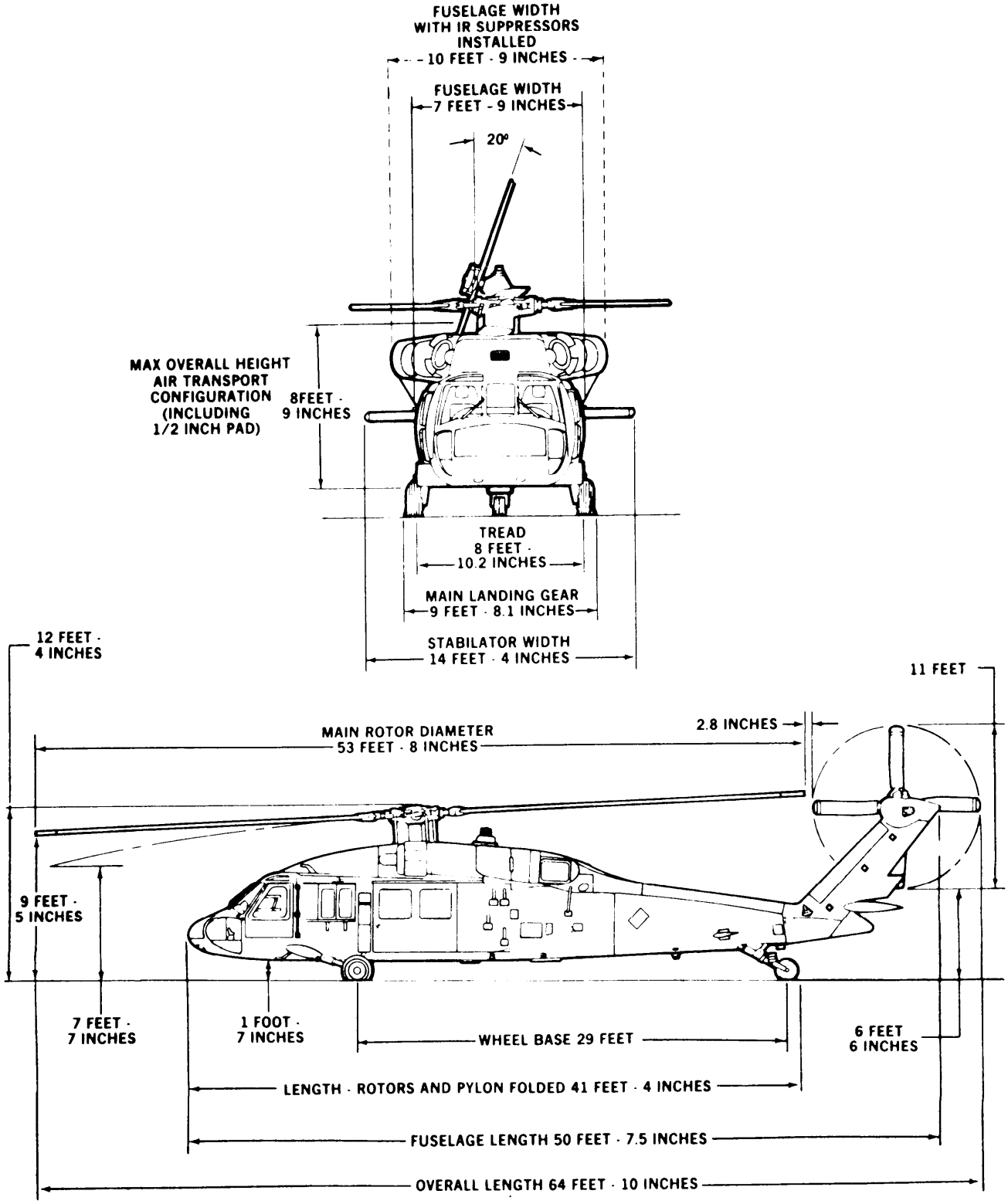


Figure 3-13. Principal dimensions, UH-60A (front and side views).

CHAPTER 4
TRANSPORTABILITY GUIDANCE, OH–58 HELICOPTER

Section I. TRANSPORT OF OH–58 HELICOPTER IN CONTAINERS

CAUTION

TM 55-1500-338-S will be consulted before any disassembly and loading takes place.

CAUTION

Container chassis trailers equipped with soft-ride suspension system will be used only to transport the container by highway to the port. The use of soft-ride suspension chassis trailers within the port is not necessary. Deviations from this procedure will be authorized only by Commander, TSARCOM. Stuffing the container at locations other than the port is not recommended.

4–1. Preparation

Disassembly, preservation, and packaging are accomplished in accordance with TM 55–1500–338-S. Additional guidance may be obtained by contacting the US Army Troop Support and Aviation Material Readiness Command (TSARCOM), St. Louis, MO 63166. To reduce congestion in the vicinity of the loading area, the main rotor blades are removed and protected with cushioning material for later loading under helicopter cabin. The following items are removed, wrapped with cushioning material, and secured in the helicopter cabin: pitot tube, top anticollision light fixture, engine exhaust stacks, main rotor hub, main rotor drive shaft, main rotor mast, tail boom support, tail rotor blades, and antennas (as necessary). The vertical fin and horizontal stabilizer are removed and boxed. The tail boom section is removed, and the tail rotor rods are removed from the tail boom; then the tail boom is mounted on top of the helicopter fuselage.

4–2. Positioning for Loading

The loading site should be a loading platform with a height equal to the height of the container floor. Two ground-handling wheel assemblies are used for moving the helicopter on the ground. Each assembly consists of a wheel, support, and lever that is used to retract or extend the wheels. The wheels are manually operated and are held in place by a lock pin. The helicopter (with the aid of the wheels) should be maneuvered to the rear of the container and aligned with the container door for loading.

4–3. Loading

CAUTION

Extreme care must be taken in loading and unloading helicopters to prevent gouging, scratching, or tearing the airframe skin.

a. General. Bridging material is placed between the loading dock and container in front of the landing skids. It consists of ½-inch-(1.27-cm) thick plywood or ¼-inch-(.63-cm) thick steel plate of sufficient width to accommodate the widest point on the helicopter and of sufficient length to span the distance between the loading platform and extending into the container beyond the rear door header. Approximate measurements of removed and packaged components for each helicopter are as follows:

Vertical fin assembly: 86- x 45¼- x 6¼-in. (218- X 115- X 15.9-cm)

Horizontal stabilizer: 81- x 20- x 7-in. (205.7- x 50.8- x 17.8-cm)

b. Two Helicopters on Loading Skids in 35- or 40-Foot Containers. The two boxed vertical fins are placed on end, one on each side at the front of the container. The first helicopter is moved into the container nose first, with the aid of ground-handling wheels, and is positioned 4 inches (10 cm) from the front of the container with left rear end and right front end of the landing skids close to the sides of the container (fig. 4-1). The two boxed horizontal stabilizers are then placed side by side between the landing skids under the helicopter. The second helicopter is moved, tail first, into a position similar to that of the first helicopter with the nose 4 inches (10 cm) from the door of the container. The main rotor blades are protected with cushioning material and secured to the main rotor blade tiedown fixture under the second helicopter (fig

4-2). The tail rotor control rods are protected with cushioning material and stowed with the main rotor blades. Securement of both helicopter and boxed component parts is in accordance with paragraph 4-4.

c. One Helicopter in a 20-Foot Container. When loading only one helicopter in a 20-foot container, the identical preparation and loading procedures used for two helicopters are applicable with the following exceptions: all of the boxed components are secured in the front of the container, and the fuselage is located in the center of the container with the end of the tail boom 6 inches (15 cm) from the front of container.

4-4. Blocking and Restraining Item on Landing Skids in Container

See tables 4-1 and 4-2.

Table 4-1. Bill of Materials for Blocking and Restraining Item on Landing Skids in Container

Item	Description	Approximate quantity
Lumber	Douglas fir, or comparable lumber such as long-leaf dense southern yellow pine or western larch, straight grain, free from material defects, 2- x 4-inch (5- x 10-cm), federal specification MM-L-751c	33 linear ft (10 m)
Plywood	1/4- x 3 5/8-in. (.6- x 9.2-cm), federal specification NN-P-515	21 linear ft (6.4 m)
Securing devices	Preferred. Lag screw, 7/16-inch (.4375-cm) x 3-inch (7.5-cm) hex bolt; 7/16-inch (.4375-cm) hexagon nut, or equal	60
	Alternate. Nails; common or cement-coated double head, or suitable substitute, 10d; federal specification FF-N–105a	120
Eyebolt assembly	7/16-inch (4.375-cm), 1.812-inch (4.53-cm) diameter washers (2); 7/16-inch (.4375-cm) hexagon nut; MS51937-4, eyebolt; MS63040-7, washer; MS16285-4, nut; or equal	16
Tiedown devices	CGU-1/B	10
Phenolic assembly	1 1/8- x 3/8-inch (2.8- x .9-cm) machine bolt; 2 1/2-inch-(6-cm)-diameter washer; 3 3/8-inch- (8.4-cm) phenolic bushing, 1 7/16-inch-(3.6-cm)-diameter with 3/8-inch (.9-cm) coarse thread, 1-inch (2.5 cm) depth (each end); 3/8-inch (.9-cm) flat washer; 2- x 3/8-inch (5- x .9-cm) machine bolt	4
Cord	Nylon, natural, type III, 550-pound-(250-kg) capacity, NSN 4020-00-240-2146	as required
Cushioning material	1/2- x 48-inch (1.25- x 120 cm) unicellular polyethylene, NSN 8135-00-180-5922, or suitable substitute	as required

NOTE

The carrier must be consulted before any holes are drilled in the container floor. If the carrier will not permit the drilling of holes in the container floor to accommodate the securing bolts, then the alternate method (nailing) of securing the tiedown fixtures may be used.

Table 4-2. Application of Materials for Blocking and Restraining Item on Landing Skids in Container (Fig 4-1, 4-2,4-3, and .4-4)

Item	No. required	Application
A	4	Main rotor tiedown fixture, each to consist of 2- x 4- x 15-in. (5- x 10- x 37.5-cm) lumber with phenolic assembly and piece of 1/4- x 3 5/8- x 13-in. (.6 x 9- x 32.5-cm) plywood (fig 4-2). Place 1/4- in. (.6-cm) plywood under 2- x 4-in. (5- x 10-cm) lumber with ends of plywood 1 inch (2.5 cm) from ends of 2- x 4-in. (5- x 10-cm) lumber. Place as indicated in figure 4–1, and secure each to container with two 7/16-inch lag screws (10d nails).
B	as required	Cushioning material, 1/2-in. (1.25-cm), cut-to-fit. Use around main rotor blades.
C	12	Tiedown fixture, each to consist of one piece of 2- x 4- x 15-in (5- x 10- x 37.5-cm) lumber with eyebolt assembly and one piece of 1/4- x 3 5/8- x 13-in. (.6- x 9- x 32.5-cm) plywood (fig 4–3). Place 1/4-inch (.6-cm) plywood under 2- x 4-in. (5- x 10-cm) lumber. Place adjacent to landing skids of helicopter, as indicated in figure 4–1, and secure each to container floor with four 7/16-inch lag screws (10d nails).
D		Tiedown device, CGU-1/B. Secure to eyebolt of tiedown fixture (item C) pass over and around helicopter cross tube, secure to eyebolt of tiedown fixture (item C) on same side of container on opposite side of cross tube, pull tight, and lock in place.
E		Tiedown device CGU-1/B. Tiedown fittings (item C), pass over cushioning material on top of rotor blades and control rods to eyebolt tiedown fitting on opposite side of container, secure, pull tight, and lock in place.
F		Tiedown fixture, each to consist of one piece of 2- x 4- x 12-in. (5- x 10- x 30-cm) lumber with eyebolt assembly and one piece of 1/4- x 3 5/8- x 10-in. (.6- x 9- x 25-cm) plywood (fig 4-4). Place 1/4-in. (.6-cm) plywood under 2- x 4-in. (5- x 10-cm) lumber with ends of plywood 1 inch (2.5 cm) from ends of 2- x 4-in. (5- x 10-cm) lumber. Place one at the end and one at the side of each boxed fin assembly, as indicated in figure 4-1, and secure each to the container floor with four 7/16-inch lag screws (10d nails).
G		Blocking, to consist of one piece of 2- x 4- x 12-in. (5- x 10- x 30-cm) lumber and one piece of 1/4- x 3 5/8- x 10-in. (.6- x 9- x 25-cm) plywood. Place 1/4-in. (.6-cm) plywood under 2- x 4-in. (5- x 10-cm) lumber with ends of plywood 1 inch (2.5 cm) from end of 2- x 4-in. (5- x 10-cm) lumber. Place against boxed stabilizer, and secure each to the container floor with four 7/16-inch lag screws (10d nails).
H		Tiedown device, CGU-1/B. Secure to eyebolt of tiedown fixture (item F), pass diagonally over boxed stabilizers to eyebolt of tiedown fixture (item F) on opposite side, pull tight, and lock in place.
I		Blocking, to consist of one piece of 2- x 4- x 12-in (5- x 10- x 30-cm) lumber and one piece of 1/4- x 3 5/8- x 10-in. (.6 x 9- x 25-cm) plywood. Place 1/4-in. (.6-cm) plywood under 2- x 4-in. (5- x 10-cm) lumber with ends of plywood 1 inch (2.5 cm) from ends of 2- x 4-in. (5- x 10-cm) lumber. Place against boxed fin assemblies, and secure each to container floor with four 7/16-inch lag screws (10d nails).
J	1	Bracing, to consist of one piece of 2- x 4-in. (5- x 10-cm) cut-to-fit lumber. Secure to top of boxed fin assemblies with three 7/16-inch lag screws (10d nails) at each end,
K	as required	Nylon cord, consisting of four strands. Secure to eyebolt as noted, pull all strands tight, and tie with a square knot after passing strands over item J.

NOTE

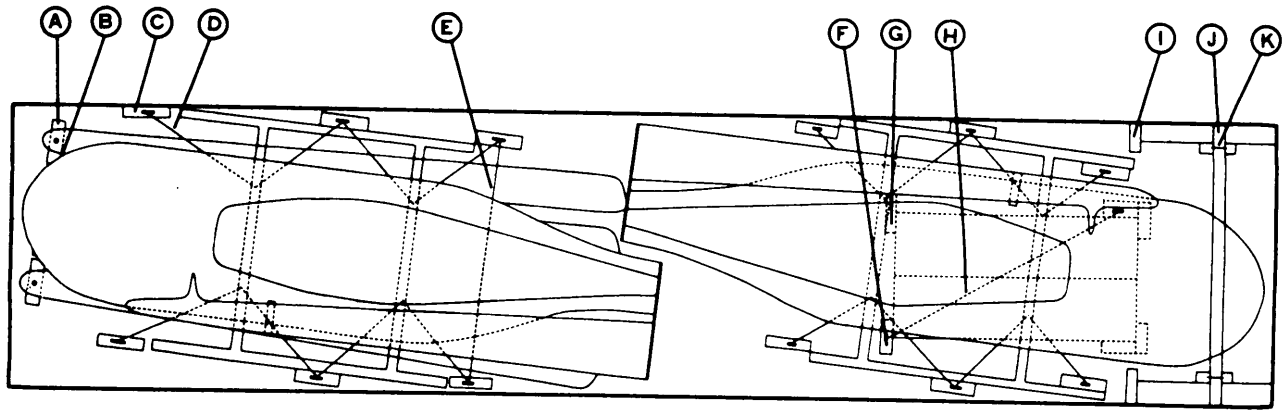
When 10d nails are used, a piece of 1/4-inch (.6-cm) plywood must be used under the 2- x 4-inch (5- x 10-cm) lumber to prevent 10d nails from penetrating through the container's wooden floor.

The 1/4-inch (.6-cm) plywood is stepped in under the 2- x 4-inch (5- x 10-cm) lumber to facilitate the removal of the blocking and tiedowns from the container floor.

Double-headed 10d nails are also recommended to facilitate removal of the blocking and tiedown from the container floor. Two cleats may be nailed 3 3/4 inches (9.4 cm) apart in the center of the top end of the two boxes of fin assemblies, before loading, so as to permit the insertion of the 2- x 4-inch (5- x 10-cm) brace (item J) which also can have cleats nailed 6 1/2 inches (16.3 cm) from each end. These cleats will prevent sideward and inward movement of the two boxed fin assemblies.

CAUTION

Do NOT drive double-headed nails below first head.



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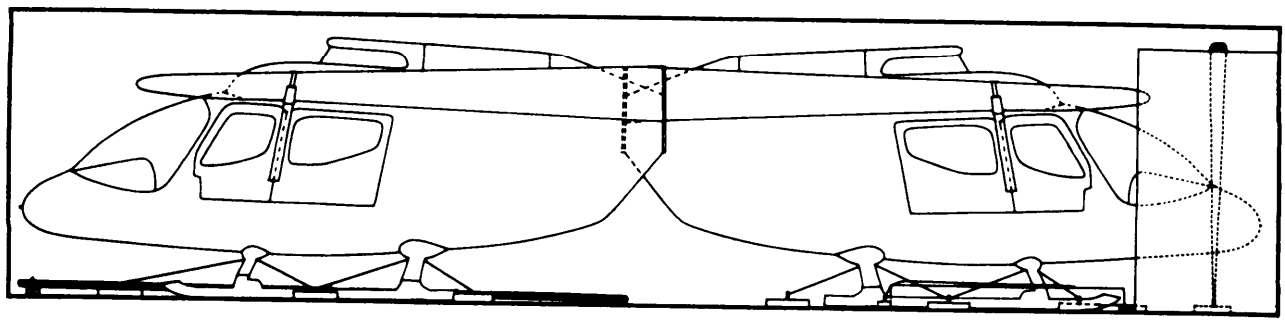


SIDE

Figure 4-1. Blocking and restraining diagram.

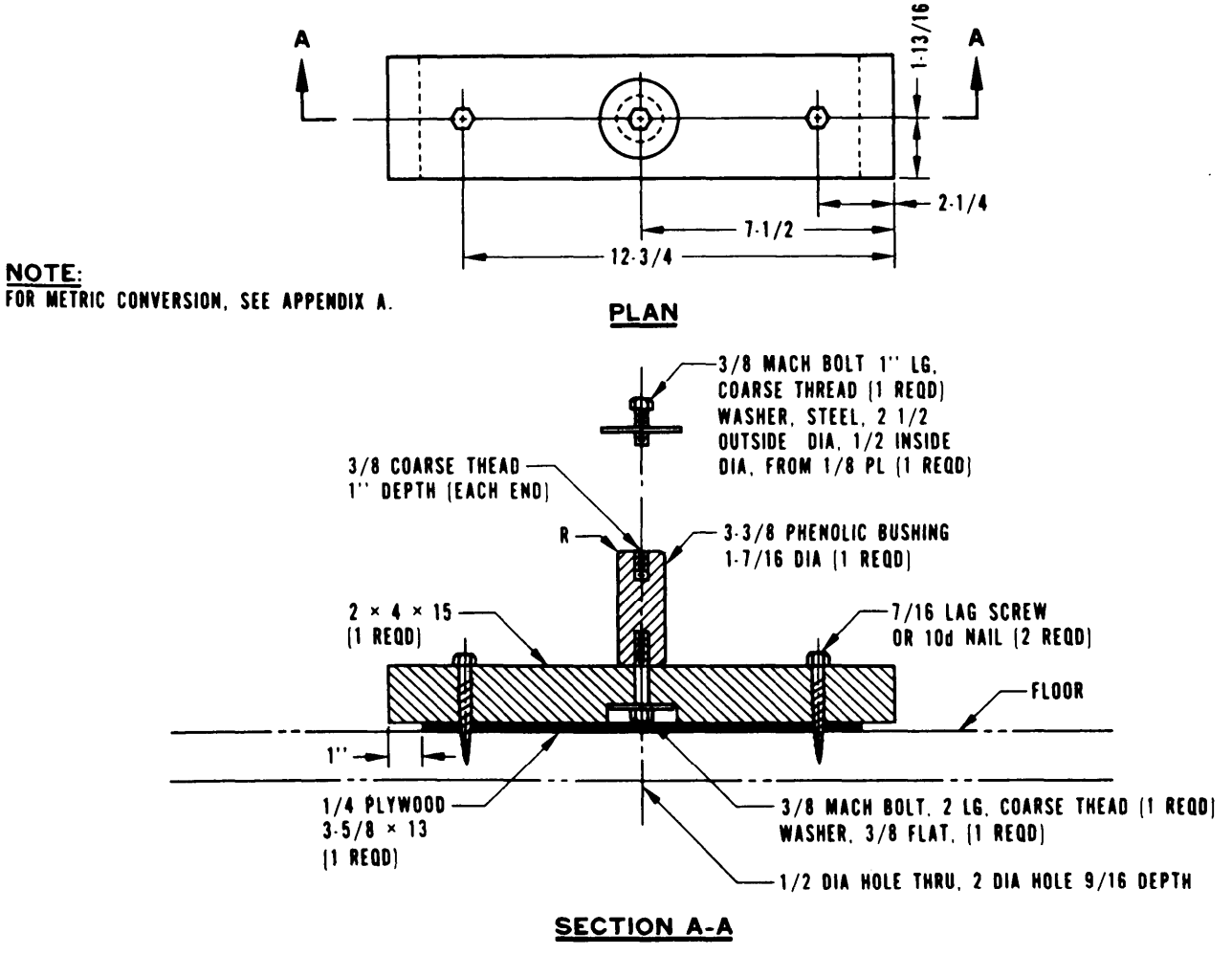


Figure 4-2. Main rotor blade tiedown fixture.

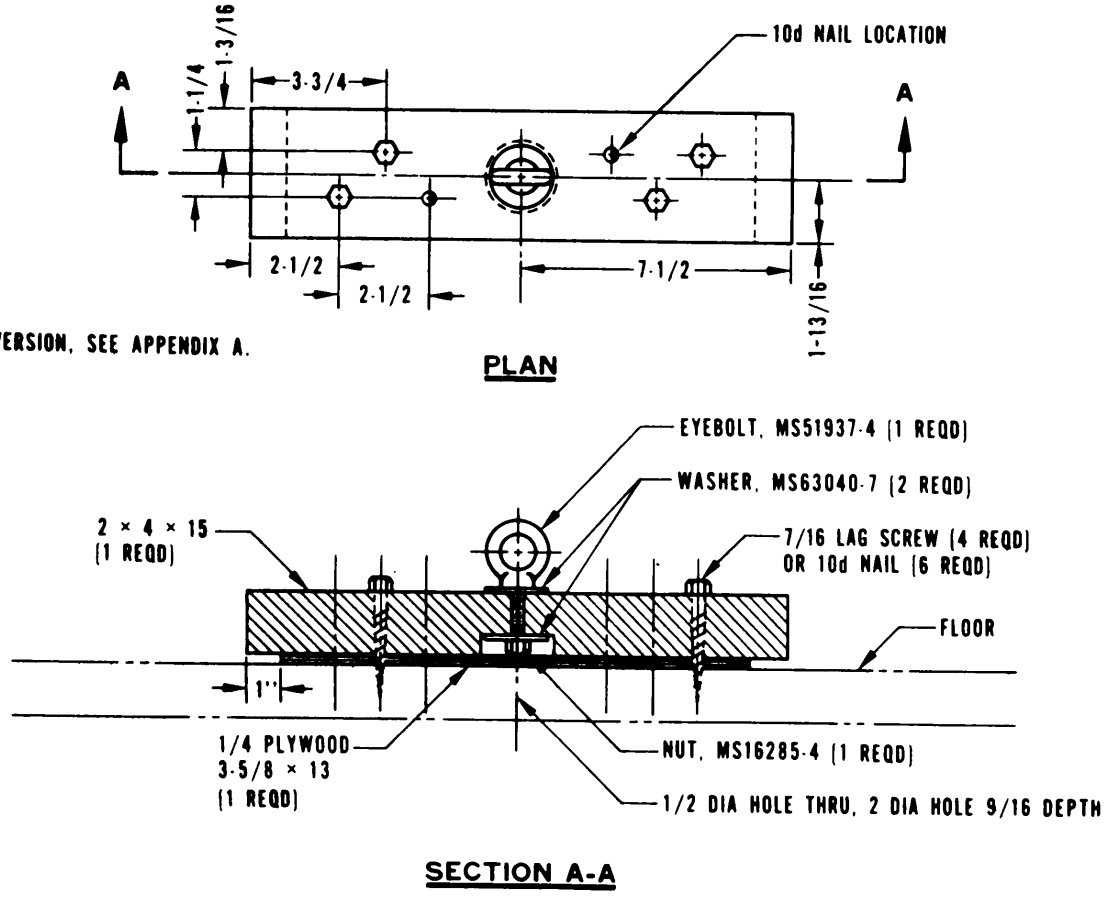
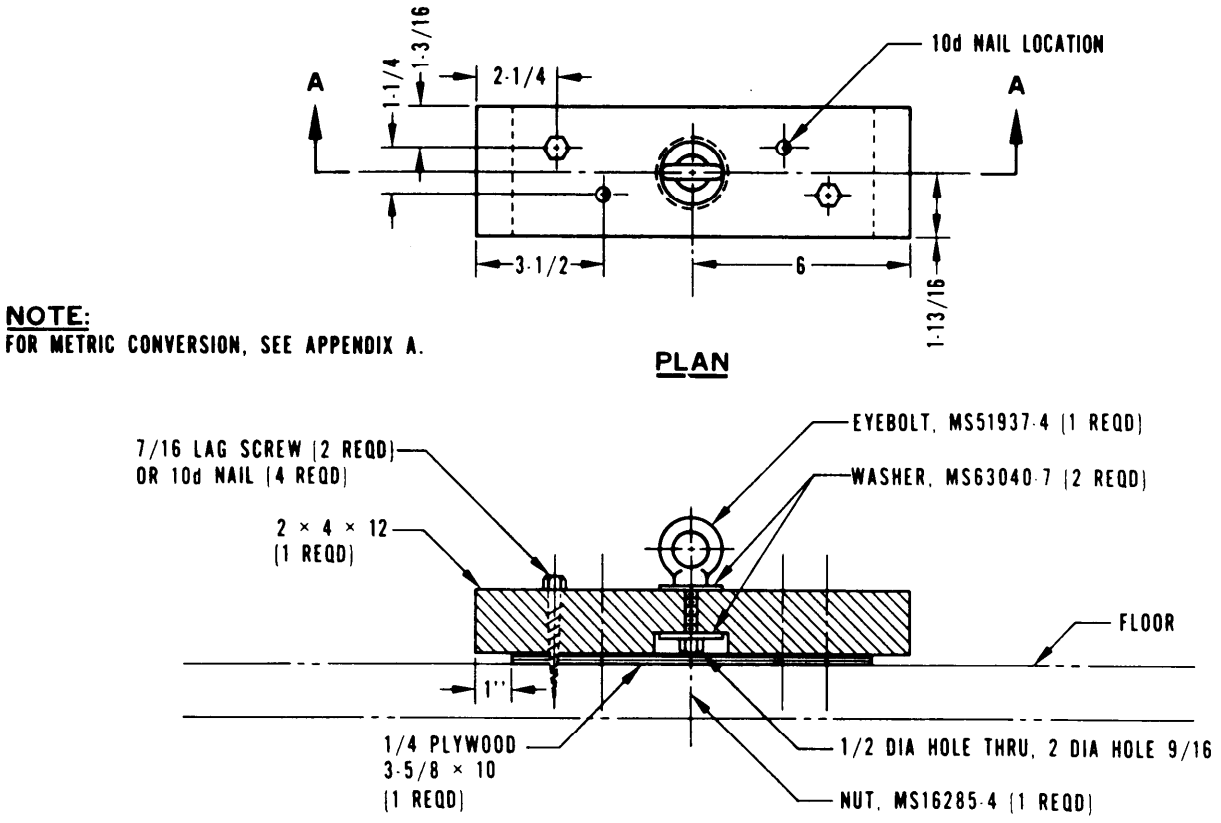


Figure 4-3. Tiedown fixture, 15-inch (37.5-cm).



★ *Figure 4-4. Tiedown fixture, 12-inch (30-cm).*

★ Section II. TRANSPORT OF OH-58 HELICOPTER BY LASH LIGHTER

4-5. General

★ *a. Operational Area.* The area used for disassembly and loading of the helicopters at a port or river bank is normally congested. Level ground is desired, however, an area sloped toward the river with a 1-foot (30-cm) drop in 27 feet (8.2 m) is acceptable. A reasonably level portion of usable surface 243 feet (75 m) long and 60 feet (18 m) wide can accommodate eight OH-58 helicopters for fly-in/fly-out operations. Chalk-mark landing area at 27-foot (8.2-m) intervals to guide helicopters while landing and to insure a safe rotor clearance. The landing and departure sequence is shown in figure 4-5. Landing clearance between rotor tips is sufficient to allow three aircraft on final approach simultaneously. Landing sequence is as follows: helicopters 1, 4, and 7 are landed and shut down and their blades are tied down before the remaining helicopters are landed. Helicopters 2, 5, and 8 are landed, followed by aircraft 3 and 6. This sequencing allows 160 feet (49 m) between rotors on approach and 40 feet (12.1 m) between rotors once the helicopters are on the ground.

★ *b. Materials Required.*

★ (1) A commercial hydraulic crane or equivalent may be used for lighter loading. The crane should be set up 25 feet (7.6 m) from the barge and cribbed level (fig. 4-6). Using 90 feet (27.4 m) of boom, the crane operator is able to load helicopters into the lighter or barge from the disassembly area in one lift (fig. 4-7). A three-part line is used for the crane hook to increase control since some tolerances

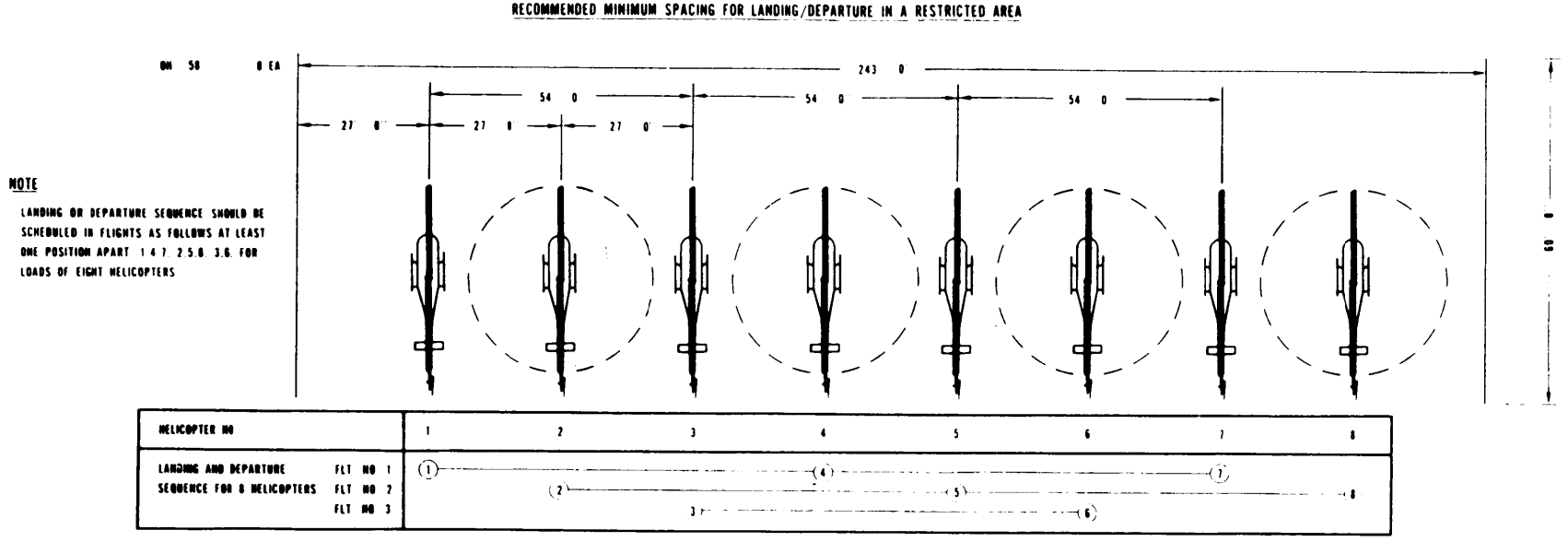


Figure 4-5. Landing and departure sequence of helicopters.

are less than one inch during the loading. The crane operator shall use his own "flagman" throughout the loading to reduce the possibility of damage to any aircraft. Qualified technicians will position helicopters once they are inside the lighter. A smoothly functioning hydraulic crane and an experienced operator and flagman are definite advantages for loading. Helicopter positioning diagrams and rigging procedures are discussed in the paragraphs covering loading procedures (para 4-9).

CAUTION

Extreme care must be taken in loading and unloading helicopters to prevent gouging, scratching, or tearing the airframe skin.

(2) Major items of equipment for preparation and reassembly of OH-58 helicopters for loading in LASH Lighter are listed in table 4-3.

4-6. LASH Lighter and OH-58 Helicopter Preparation

a. LASH Lighter Preparation. Tiedown fittings are installed in the lighter in accordance with figures 4-8, 4-9, and 4-10.

Table 4-3. Major Items of Equipment for Preparation and Reassembly of OH-58 Helicopters for Loading in LASH Lighter

Nomenclature	*NSN*	*Quantity for 8 helicopters*	*Remarks*
★ Toolkit, aircraft mechanic, general	5180-00-232-4692	8	
Wrench, torque 700-1600 in-lb	5120-00-270-3124	1	
★ Hoisting, adapter main rotor	Local manufacture	3	
Hub sling	1730-00-099-8099	1	
Hoist, wrecker, or crane to remove main rotor hub and blades.		1	Helicopter 1 only
Grip-positioning link	Local manufacture	1	
Ground-handling wheels	1730-00-877-4959	2 sets	
Portable APU	6115-00-074-6396	1	
Shoring 2-in. X 4-in. X 8-ft (5-cm X 10-cm X 2.4-m) 1- X 12- X 18-in. plywood		2	Helicopter 1 only
Tiedown fittings	Local manufacture	3	See fig 4-8 showing tiedown fittings
Preservative compound, MIL-C-16173, grade 2	8030-00-244-1297	1 gal	Minimum issue order as required
★ Cleaning compound MIL-C-25769	6850-00-935-0996	5 gal	Minimum issue order as required
Lube oil, MIL-L-6081, grade 1010	9150-00-273-2388	10 qt	Minimum issue order as required
★ Cushioning material, polypropylene foam PPP-C-1797	8135-00-300-4905	100-ft roll	Minimum issue order as required
★ Cushioning material, polyethylene foam PPP-C-1752	8135-00-180-5922	100-ft roll	Minimum issue order as required
Bag, packing, water, vaporproof, MIL-B-117	8105-00-274-2390	100-ft roll	Minimum issue order as required
Rope, 1-1/2-in. (3/8-in. diam) grass	4020-00-231-9021	100-ft roll	Minimum issue order as required
★ Tape, 2-in., cloth	7510-00-266-5016	100-ft roll	Minimum issue order as required

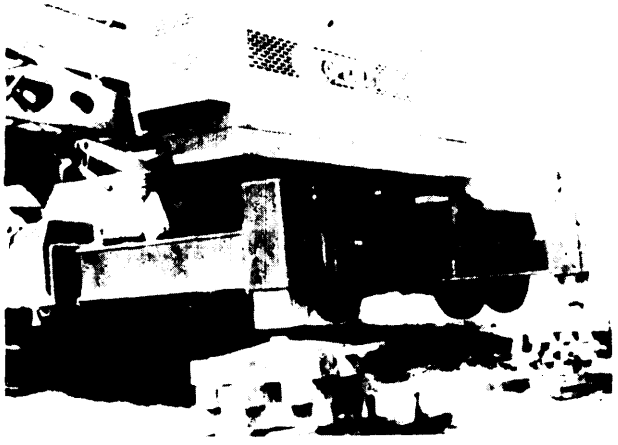


Figure 4-6. Cribbing and crane outriggers in position

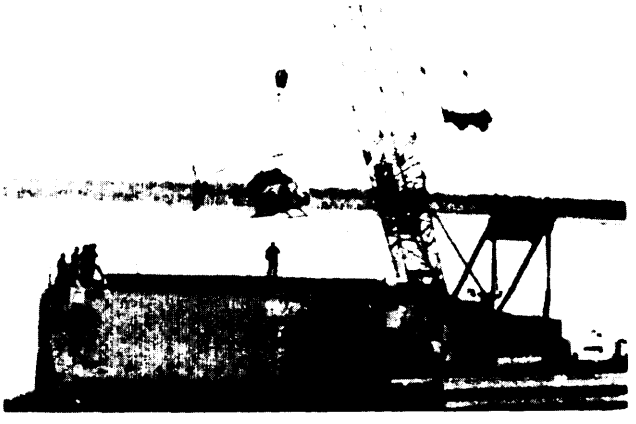


Figure 4-7. Mobile crane with 90-foot boom.

b. Helicopter Preparation. Eight OH-58 helicopters can be loaded into the LASH lighter. Minimum disassembly of the helicopter is desired so that the helicopter can be in a flyable configuration as soon as possible after arrival at destination. All hatch panels can be installed on a lighter loaded with OH- 58 helicopters.

★ *c. High skid gear.* OH-58 helicopters equipped with high skid gear reduces the total number of helicopters that can be loaded in a LASH lighter to seven. Helicopter number 1, figure 4-10, will require skid gear or transmission mast removal to load eight helicopters.

4-7. Disassembly

★ The eight OH-58 helicopters are disassembled concurrently after being flown to the preparation area (fig 4-11). The individual OH-58 helicopters require varied degrees of disassembly.

a. Helicopter 1 requires the most disassembly. The pitot tube and main rotor hub assembly are removed.

b. Helicopter 2 has the right-hand passenger compartment door removed.

c. Helicopter 4 has both passenger compartment doors removed.

d. Helicopter 6 has the left-hand passenger compartment door removed.

e. Helicopter 8 has the horizontal stabilizer removed.

f. Helicopters 3, 5, and 7 require no disassembly.

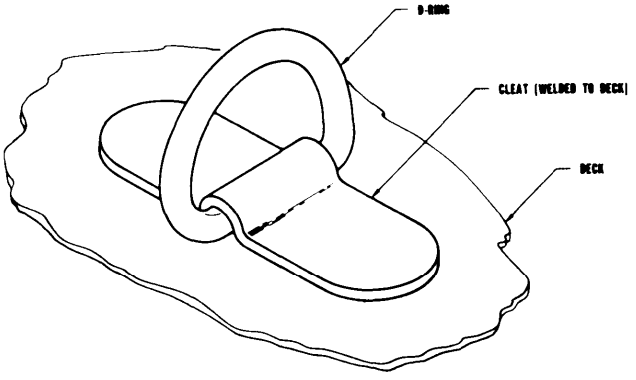


Figure 4-8. Tiedown fitting.

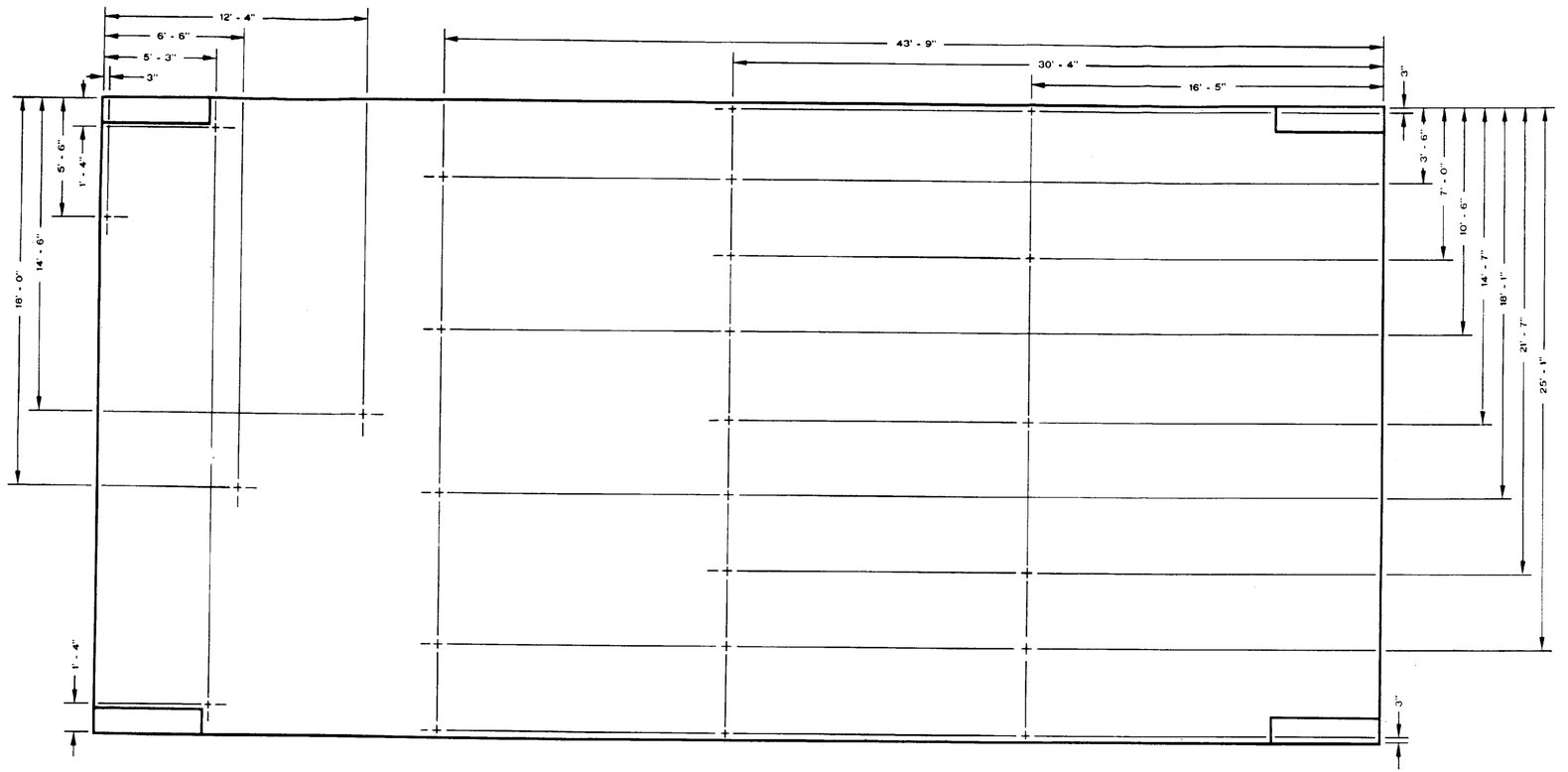


Figure 4-9. Tiedown positioning inside LASH lighter for eight OH-58 Helicopters.

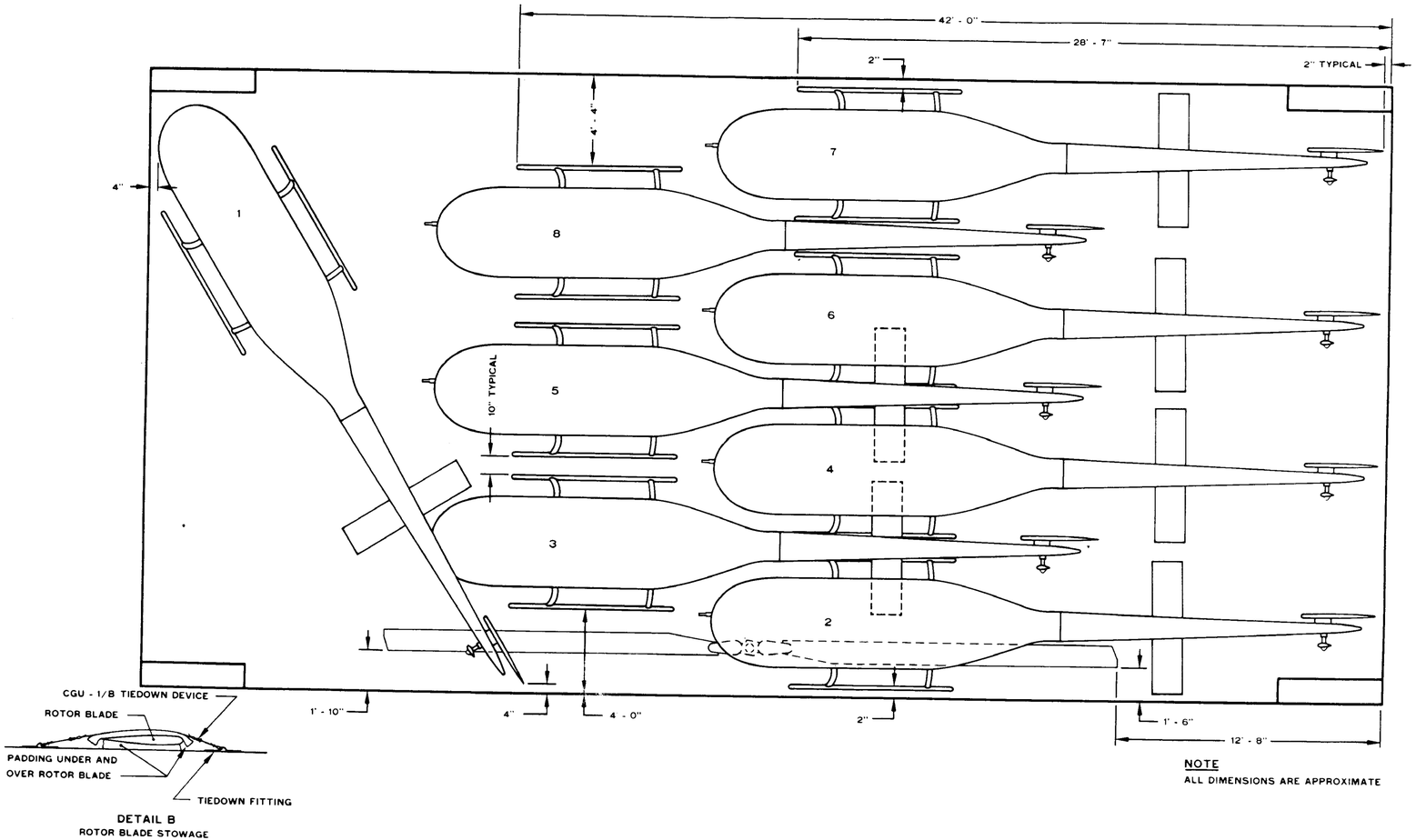


Figure 4-10. Sequential loading diagram for eight OH-58 helicopters in a LASH lighter.

Figure 4–11. OH-58 helicopters on landing/disassembly ramp.

4-8. Preservation

Preserve and prepare the OH–58 for shipment in accordance with TM-55-1500-338-S and/or special instructions provided by TSARCOM for the type shipping to be used.

a. Approximate times for various stages of preparation are shown in table 4-4.

b. The passenger doors removed from helicopters 2, 4, and 6 must be marked with their respective aircraft numbers and placed in the passenger compartments of helicopters 3, 5, and 7 to allow more room for the horizontal stabilizers of adjacent helicopters, which are positioned inside the passenger compartment.

4–9. Loading

a. Rigging the helicopter prior to loading must be done by qualified technicians. The lifting clevis is attached to the main rotor retaining nut. The clevis is then attached to the crane hook. Taglines (ropes) are attached to the skid toe and tail stinger to control the helicopter during the crane movement (fig 4-7 and 4-12).

b. The first item loaded is the main rotor head assembly of aircraft 1. The hub assembly is wrapped with plastic sheeting and placed on cushioning material. Blade tips are supported at each end by 4- x 12- x 18-inch (10- x 30- x 46-cm) dunnage (fig 4–13). Use 4 inches of polyethylene foam sheeting, PPP-C-1752, ½- x 48-in. x 60-ft; place over the head and blade tips and secure; lap to desired thickness. Helicopter 1 is loaded into the center of the barge floor, ground-handling wheels are attached to the skids, and the helicopter is moved into position, as shown (fig 4-14). Positioning of helicopter 1 is critical, because of very limited nose clearance (fig 4-15).

c. OH-58 helicopter 2 is loaded to straddle the head assembly of helicopter 1, with the left skid parallel and 2 inches (5 cm) from lighter bulkhead (wall). The tail stinger of helicopter 2 is positioned 2 inches (5 cm) from the end bulkhead (wall) (fig 4-16). Helicopters 2, 4, 6, and 7 are loaded with no more than 2 inches (5 cm) clearance between tail stinger and lighter bulkhead.

d. OH-58 helicopter 3 is the critical helicopter to move into position. The best method to load the helicopter is to lower it through the hatch opening until the skids are approximately 4 inches (10 cm) off the lighter deck. The nose of the aircraft is moved into position under the tail boom and behind the horizontal stabilizer of aircraft 1 (fig 4–17). Next, the tail is pivoted about the nose by both crane movement and hand positioning aircraft 3 so that approximately 4 inches of clearance remain between the FM homing antenna on 2 and the tail boom on 3 (fig 4-18).

e. The remaining helicopters are loaded by lowering each helicopter to a position within 4 inches (10 cm) of the deck of the barge, then moving it laterally until the horizontal stabilizers are in correct position (fig 4–19). Helicopter 7 is loaded with the right skid parallel to and 2 inches (5 cm) from the lighter bulkhead. Helicopter 8 has no horizontal stabilizer and is lowered vertically into position (fig 4-20). The horizontal stabilizer removed from helicopter 8

Table 4-4. OH-58 Time and Man-Hour Breakdown by Phase of Preparation

Aircraft loading sequence	1	2	3	4	5	6	7	8	Avg time (min)	Men required	Man-hours
Remove rotor head assembly	x								0:18	3	1.00
Remove horizontal stabilizer								x	0:50	2	1.60
Remove passenger doors		x		x		x			0:07	1	0.10
Preserve mast and hub	x								0:05	1	0.08
Place head assembly in barge	x								0:10	2	0.33
Wrap horizontal stabilizer								x	0:10	1	0.17
Secure drag lings to hub	x								0:01	1	0.02
Preserve engine fuel control	x	x	x	x	x	x	x	x	0:25	2	0.82
Install inlet, exhaust, pitot covers	x	x	x	x	x	x	x	x	0:03	1	0.05
Disconnect and tape battery	x	x	x	x	x	x	x	x	0:01	1	0.02
Install clevis assembly	x	x	x	x	x	x	x	x	0:03	1	0.05

is secured on the passenger seat of helicopter 4. Dunnage 2- x 4-inch (5- x 10-cm), cut-to-suit, is required to separate the skids of the aircraft and lighter bulkheads. Wood shoring or rubber stripping is not required between helicopter skids and lighter deck.

Figure 4-12. OH-58 helicopter rigging.

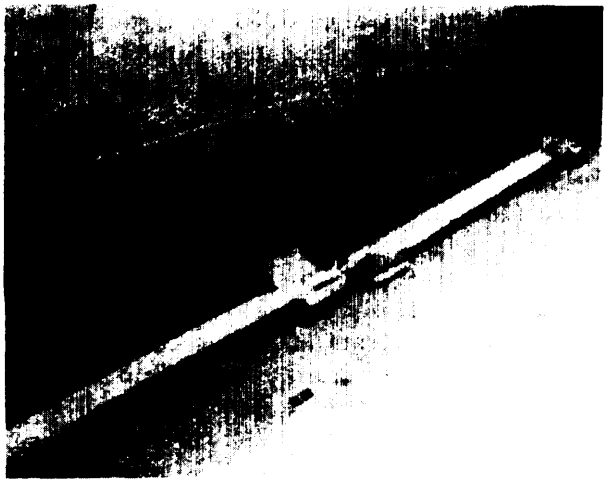


Figure 4-13. OH-58 main rotor head assembly loaded in LASH lighter.

4-10. Tiedown

a. Figure 4-21 is a tiedown positioning diagram. Tiedown of the helicopter will be accomplished with wire rope and turn buckles. The head assembly of helicopter 1 is secured by CGU-1/B, nylon tiedown straps, or equivalent.

CAUTION

Excessive tension on tiedown devices will result in damage to helicopter tiedown points.

The rotor blades of all aircraft are tied both fore and aft in a level attitude to allow the lighter hatch covers to be installed. Cushioning material may be placed between rotor blade tips and hatch combing (fig 4–22 and 4–23). Space is available in the lighter for a CONEX or similar containers to allow maintenance items to be transported with the helicopters, thus making the load self-sufficient at destination.

b. The approximate time breakdown for preparation, loading, and tiedown is shown in table 4-5. Reasonable clock hour requirements to load a lighter with eight OH–58 helicopters are shown in table 4–6.

4-11. Unloading

Unloading the OH-58 load is the reverse of the loading sequence. The time breakdown for unloading the lighter is shown in table 4-7.

4-12. Reassembly

The approximate time breakdown for reassembly is shown at table 4-7. Reassembly includes removal of all preservation materials, installation of removed components, technical inspections, and test flight, when required. Reasonable hour requirements to unload a lighter with eight OH–58 helicopters are shown in table 4–8.

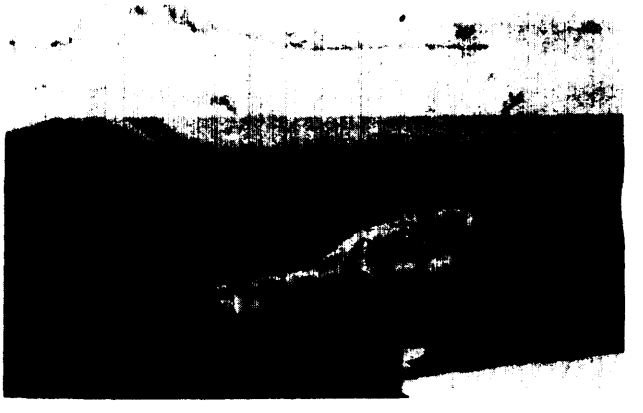


Figure 4-14. OH-58 1 is placed in the center of the barge floor, ground-handling wheels are attached, and the helicopter is moved into position.

★ *Figure 4-15. Limited nose clearance of OH-58.*

★ *. Figure 4-16. OH-58 being loaded "straddle" of main rotor head and blades of OH-58.*

Figure 4-17. OH-58 helicopter 3 being positioned near tail boom of helicopter 1.

Figure 4-18. Horizontal stabilizer of OH-58 helicopter 3 positioned inside passenger compartment door of helicopter 2.

Figure 4-19. OH-58 helicopter 4 positioned around stabilizer of helicopter.

Figure 4-20. OH-58 helicopter lowered into position.

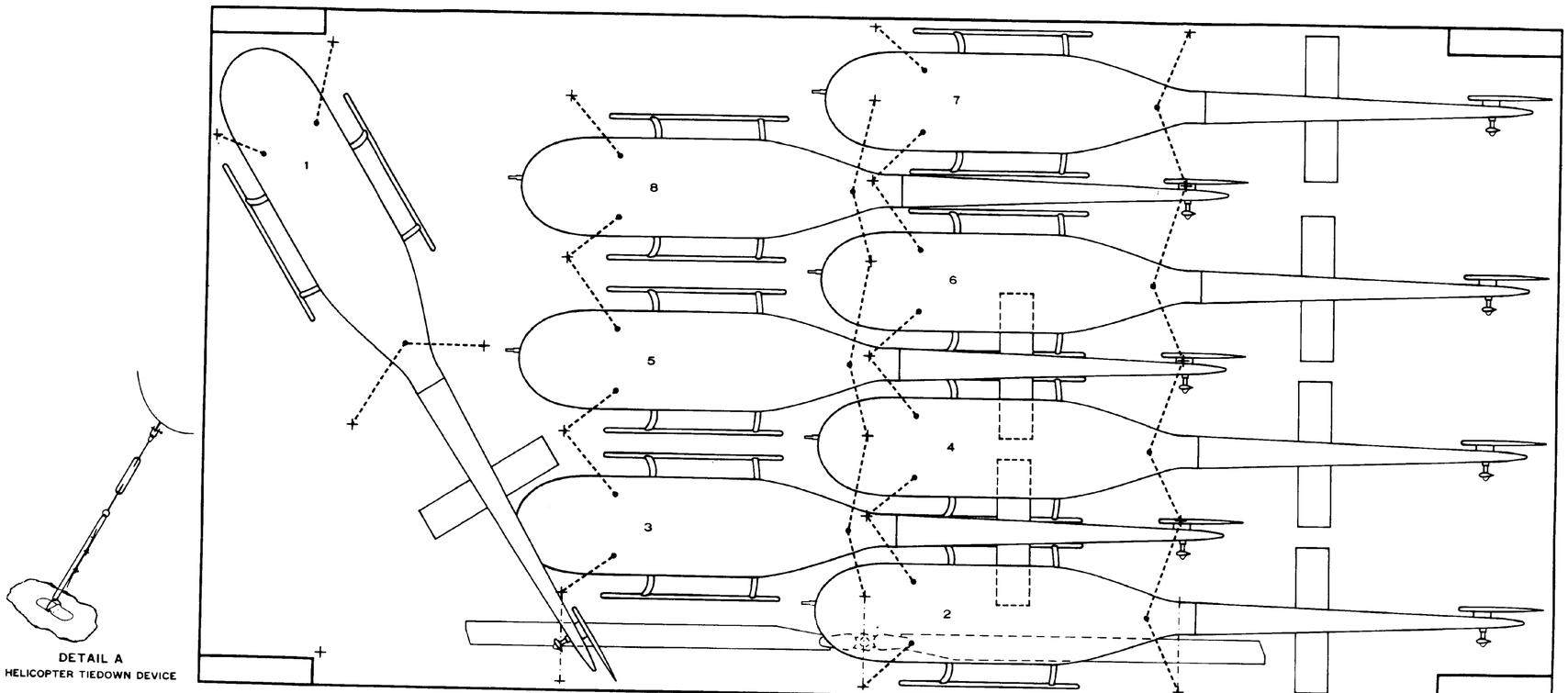


Figure 4-21. Tiedown diagram for eight OH-58s.

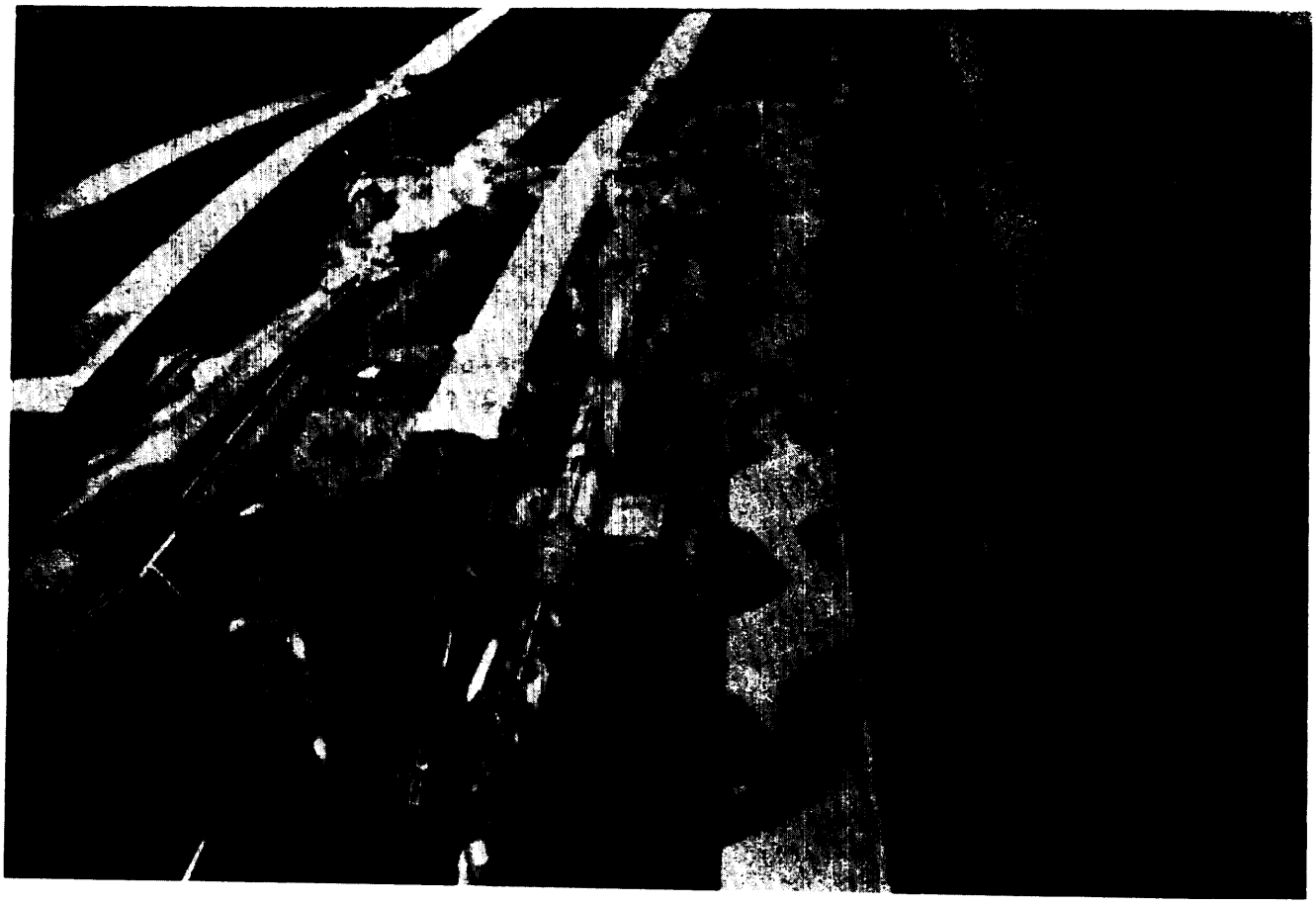


Figure 4-22. Rotor blades tied in a level attitude to permit hatch cover installation.

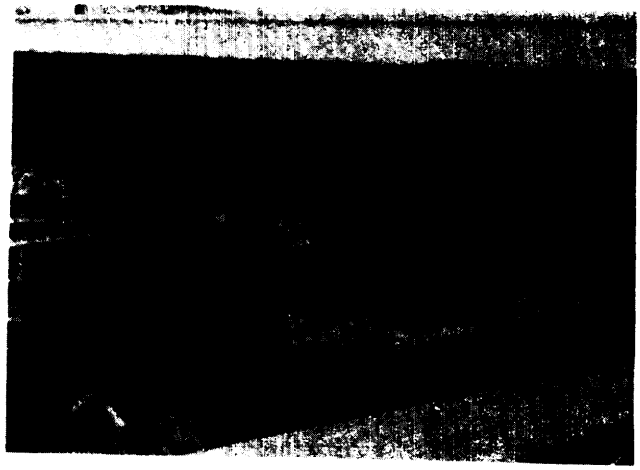


Figure 4-23. Sufficient overhead clearance exists for the load.

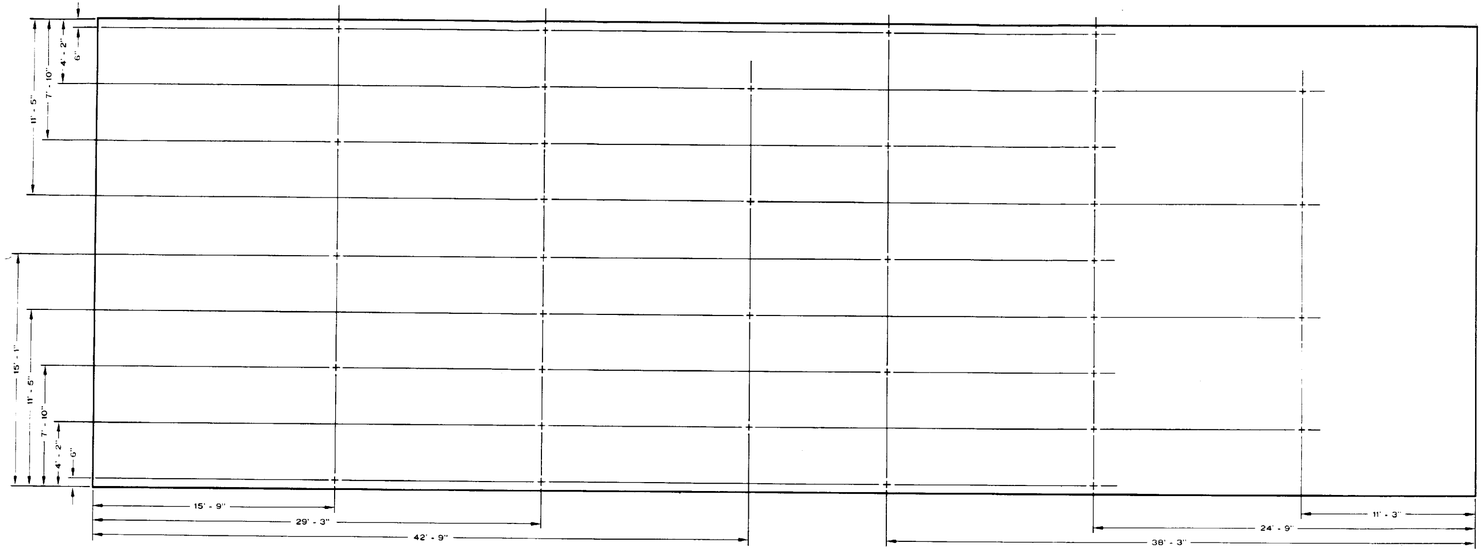


Figure 4-24. Tiedown positioning inside SEABEE barge for OH-58 helicopters.

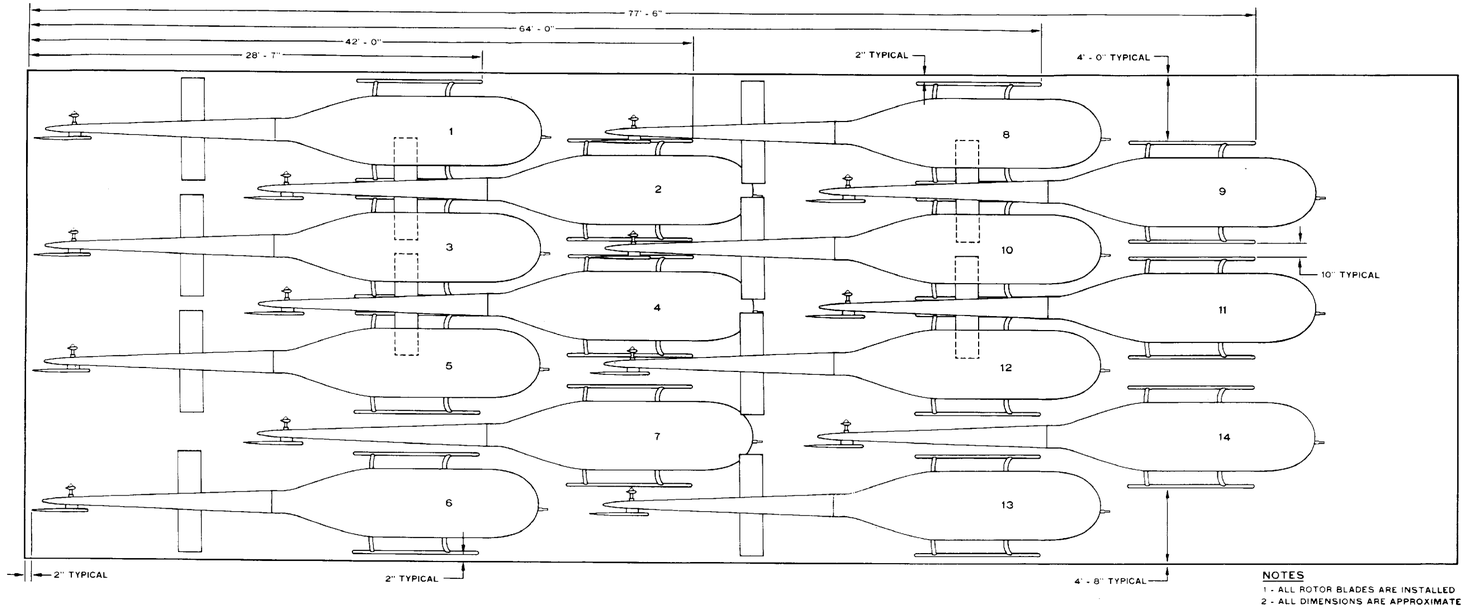


Figure 4-25. Loading sequence for OH-58 helicopters in SEABEE barge.

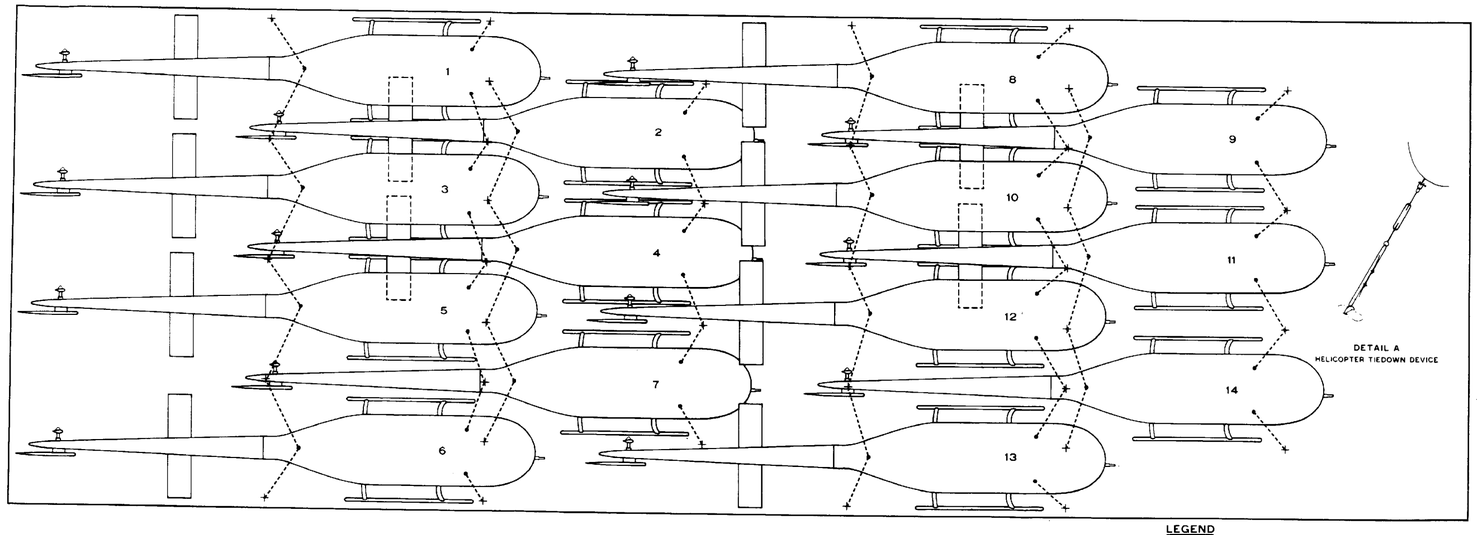


Figure 4-26. Tiedown of OH-58 helicopters in SEABEE barge.

Section III. TRANSPORT OF THE OH-58 HELICOPTER IN THE SEABEE BARGE

4–13. General

a. Operational Area (para 4–5)

b. Barge Characteristics.

(1) The SEABEE barge with the seven hatch covers installed, has a draft of just less than 2 feet (.6 m). Each of the hatch covers weighs approximately 5,800 pounds (2,630 kg). The shallow draft allows the barge to be drawn very close to an unprepared river bank. No deck winches are installed on the SEA BEE barge. However, sufficient cleats are available for securing the barge. The mooring lines must be kept taut at all times to prevent drift caused by tidal action or strong river currents. As the barge is loaded, the shoreside edge of the hull will settle firmly on the river bank along the length of the barge. The settling will add stability to the barge and aid in loading. The barge can be towed readily after settling on the river bank. Should tidal conditions be expected along coast lines it will be necessary to prevent the barge from settling on shore from high to low tide.

(2) The loaded barge can be moved off the river bank by crane or by a small harbor tug.

Table 4-5. OH-58 Man-Hour Breakdown by Helicopter Number

Operation phase	Personnel required	1		2, 4, 6		3, 5, 7		8	
		Man-hour	Clock hour	Man-hour	Clock hour	Man-hour	Clock hour	Man-hour	Clock hour
Preparation	3	2.15	0:43	0.94	0:19	0.94	0:19	2.59	0:52
Loading	5	1.66	0:26	1.33	0:16	1.33	0:16	1.33	0:16
Tiedown	3	0.60	0:12	0.60	0:12	0.60	0:12	0.60	0:12
Total		4.41	1:21	2.87	0:47	2.87	0:47	4.52	1:20

[1] Prepreparation includes preservation, installation of covers, stowing loose equipment, and attaching clevis assembly.
[2] Loading involves rigging the helicopter and positioning it accurately inside the lighter.

Table 4-6. Loading Breakdown in Hours

Concurrent disassembly of eight helicopters	1:21
Load helicopter no. 1 including main rotor assembly	0:26
16 minutes per helicopter for retaining seven aircraft	1:52
Tiedown of last helicopter loaded	0:12
Installation of three hatch covers	0:20
Total loading time	4:11

Table 4-7. OH-58 Man-Hour Breakdown by Helicopter Number

Operation phase	Personnel required	1		2, 4, 6		3, 5, 7		8	
		Man-hour	Clock hour	Man-hour	Clock hour	Man-hour	Clock hour	Man-hour	Clock hour
Remove tiedown	3	0.08	0:05	0.08	0:05	0.08	0:05	0.08	0:05
Unloading	5	0.75	0:09	0.75	0:09	0.75	0:09	0.75	0:09
Reassembly	3	2.20	1:00	0.25	0:15	0.05	0:03	1.11	0:22
Total		3.05	1:14	1.08	0:29	0.88	0:17	1.94	0:36

[1] Test flight for helicopter 1 is included in reassembly time (1 man, 0:25 min.)

Table 4-8. Unloading Breakdown

Operation phase	Clock hours
Removal of three hatch covers	0:20
Removal of tiedowns from first helicopter unloaded	0:05
9 minutes per helicopter for unloading	1:12
Reassembly of last helicopter unloaded (helicopter 1)	2:35

c. Materials Required. (para 4–5c)

4-14. SEABEE Barge and OH–58 Helicopter Preparation

a. SEABEE Barge Preparation. Tiedown fittings are installed in the barge in accordance with figures 4–8 and 4–24.

b. Helicopter Preparation. Fourteen OH-58 helicopters can be loaded in the SEABEE barge in the following configuration:

Six helicopters require no disassembly.
Six helicopters require that doors be removed.
Two helicopters require removal of the horizontal stabilizer.

Minimum disassembly of the helicopter is desired so that the helicopter can be in a flyable configuration as soon as possible after arrival at destination. All hatch covers can be installed on a barge loaded with OH-58 helicopters.

4-15. Disassembly

All disassembly of OH-58 helicopters is accomplished after the helicopters are flown to the preparation or loading area. Each helicopter requires specific disassembly to be loaded in sequence indicated in figure 4-25. The horizontal stabilizers are removed from helicopters 7 and 14. The remaining 12 helicopters are flyable. Helicopters 1 and 8 have the right passenger doors removed. Helicopters 3 and 10 have both cargo doors removed. Helicopters 5 and 12 have the left passenger doors removed. The removed passenger doors from helicopters 1, 3, and 5 are secured in helicopters 2, 4, and 6. Passenger doors removed from helicopters 8, 10, and 12 are secured in helicopters 9, 11, and 13. The horizontal stabilizers removed from helicopters 7 and 14 are secured in their respective passenger compartments.

4-16. Preservation

a. Preserve and prepare the OH-58 for shipment in accordance with TM 55–1500–338-S and/or special instructions from TSARCOM for the type shipping being used.

b. Approximate times for the various stages of preparation are shown in table 4–9.

Table 4-9. OH-58 Man-Hour Breakdown

Operation	Personnel required	Helicopter (Number)			
		7 and 14		All Others	
		Man-hour	Clock hour	Man-hour	Clock hour
Preparation [1]	2	2:59	:52	1:34	:19
Loading [2]	5	1:33	:16	1:33	:16
Tiedown	2	1:00	:12	:60	:12

[1] Preparation includes preservation, installation of covers, stowing loose equipment, and attaching lifting clevis assembly.
[2] Loading involves rigging the helicopter and positioning it accurately inside the lighter.

4-17. Loading

a. Rigging the helicopter prior to loading must be done by qualified helicopter technicians. The lifting clevis is attached to the main rotor retaining nut and then attached to the crane hook. Tag lines (ropes) are attached to the skid toe and tail stinger to control the helicopter during crane movement (fig 4-7 and 4-12).

b. Helicopters are loaded in the sequence shown in figure 4–25. Helicopter 1 is loaded so that the left landing skid is two inches (5 cm) from the left bulkhead and the tail stinger is 2 inches (5 cm) from the end bulkhead; helicopters 3, 5, and 6 are loaded with no more than a 2-inch (5 cm) clearance between tail stinger and barge bulkhead.

c. Helicopters 2, 3, 4, 5, 9, 10, 11, and 12 require the most critical techniques for movement into position. The best method to load helicopter 2 is to lower it through the hatch opening until the skids are approximately 4 inches (10 cm) off the barge deck. The helicopter is then moved sideward by crane and hand movement until the horizontal stabilizer of helicopter 2 enters the passenger compartment door of helicopter 1 (fig 4-18). Correct lateral clearance is obtained by loading helicopter 2 so that approximately 4 inches (10 cm) of clearance remains between the FM homing antenna on helicopter 1 and the tail boom on helicopter 2. Repeat this technique for helicopters 3, 4, 5, 9, 10, 11, and 12. Helicopters 1, 6, 7, 8, 13, and 14 do not interlock and may be lowered almost directly into position.

d. Helicopters 6 and 13 are loaded with the right skid parallel and 2 inches (5 cm) from the barge bulkhead (fig 4-25). Dunnage cut-to-suit is required to separate skids of helicopter and barge bulkheads. Wood shoring or rubber sheeting is not required between helicopter skids and barge deck.

4-18. Tiedown

a. Tiedown devices will be installed according to figure 4-26. Tiedown of the helicopter will be accomplished with wire rope and turnbuckles.

CAUTION

Excessive tension on tiedown devices will result in damage to the helicopter tiedown points.

b. The rotor blades of all helicopters are tied both fore and aft in a level attitude to allow the barge hatch covers to be installed (fig 4-22 and 4-23). Space is available in the barge for two CONEX or similar containers to allow maintenance items to be transported with the helicopters, thus making the load self sufficient at-destination.

4-19. Unloading

Reverse loading procedures.

Section IV. TRANSPORT OF THE OH-58 HELICOPTER BY ROLL-ON/ROLL-OFF (RORO) AND SEATRAIN SHIPS

★ **4-20. General**

a. Operational Area. (Para 4-5.)

b. Ship Characteristics. (Para 1-6b&d)

4-21. Roll-On/Roll-Off Ship and Helicopter Preparation

a. Roll-on/Roll-off Ship Preparation. Tiedown fittings are installed on RORO ships as required (fig 4-8 and 4-30). The following must be taken into consideration when installing tiedowns.

(1) Desired restraint pattern.

★ (2) Load configuration. Helicopter loads should be planned to insure that all OH-58 helicopters are stowed below the ship's weather deck (fig 4-28). Helicopters stowed above the weather deck are subject to saltwater corrosion and require extensive and costly preservation.

NOTE

Although the 45°-45° restraint requirement is optimal, lesser or greater angles may be used in combination to achieve a safe tiedown arrangement. Seldom will it be possible to obtain optimal tiedown patterns when using roll-on/roll-off or seatrain ships.

★ *b. Helicopter Preparation.* Minimum disassembly of the helicopter is desired so that the helicopter, upon arrival at destination, will be as close as possible to fly away.

4-22. Disassembly

All disassembly of the OH-58 is done after the helicopters are flown to preparation or loading area. The ship-loading plan configuration may require specific disassembly. When loading plan requires removal of the main rotor blade assembly, it can be placed in the appropriate container or stowed under the helicopter as discussed in paragraph 4-9b, "Loading." The horizontal stabilizer, when removed, will be wrapped in cushioning material and stowed in the passenger compartment.

★ **CAUTION**

When the OH-58 main rotor head assembly is stowed, as described in paragraph 4-9b, caution must be taken to insure that sea water will not come in contact with the rotor head assembly. If the possibility exists of sea water entering this stowage area, it should not be used. The vessel master is the best consultant on stowage area for helicopter components.

4-23. Preservation

Preserve and prepare the OH-58 for shipment in accordance with TM 55-1500-338-S and/or special instructions provided by TSARCOM for the type of shipping being used.

4-24. Loading

a. See paragraph 4-17, Loading.

b. Optimal stowage of the OH-58 on RORO ships is considered to be nose-to-tail and side-by-side with the horizontal stabilizers placed in the cargo compartment from which doors have been removed. The only removed components are the cargo compartment doors that will be secured in the pilot's and copilot seats. The helicopters are flyable (fig 4-31 and 4-32).

c. Helicopters are loaded in a sequence determined by the loading plan.

★ *d.* Helicopters are positioned by positioning devices, such as castor wheels (local manufacturer) or roller conveyor sections (fig 4-33 and 4-34).

4-25. Tiedown

a. The tiedown diagram shown in figure 4-36 is the optimal tiedown configuration. Additional tiedown rings should be installed when this pattern cannot be approximated (NOTE, para 4-21a). The OH-58 will be tied down with standard light shipboard restraint devices, or wire rope and turnbuckles.

CAUTION

Excessive tension on tiedown devices will result in damage to the helicopter tiedown points.

b. The rotor blades of all helicopters are tied both fore and aft in a level attitude (fig 4-37).

NOTE

Blocking the main rotor hub is not required.

4-26. Unloading

Unloading sequence will be the reverse of the loading sequence.

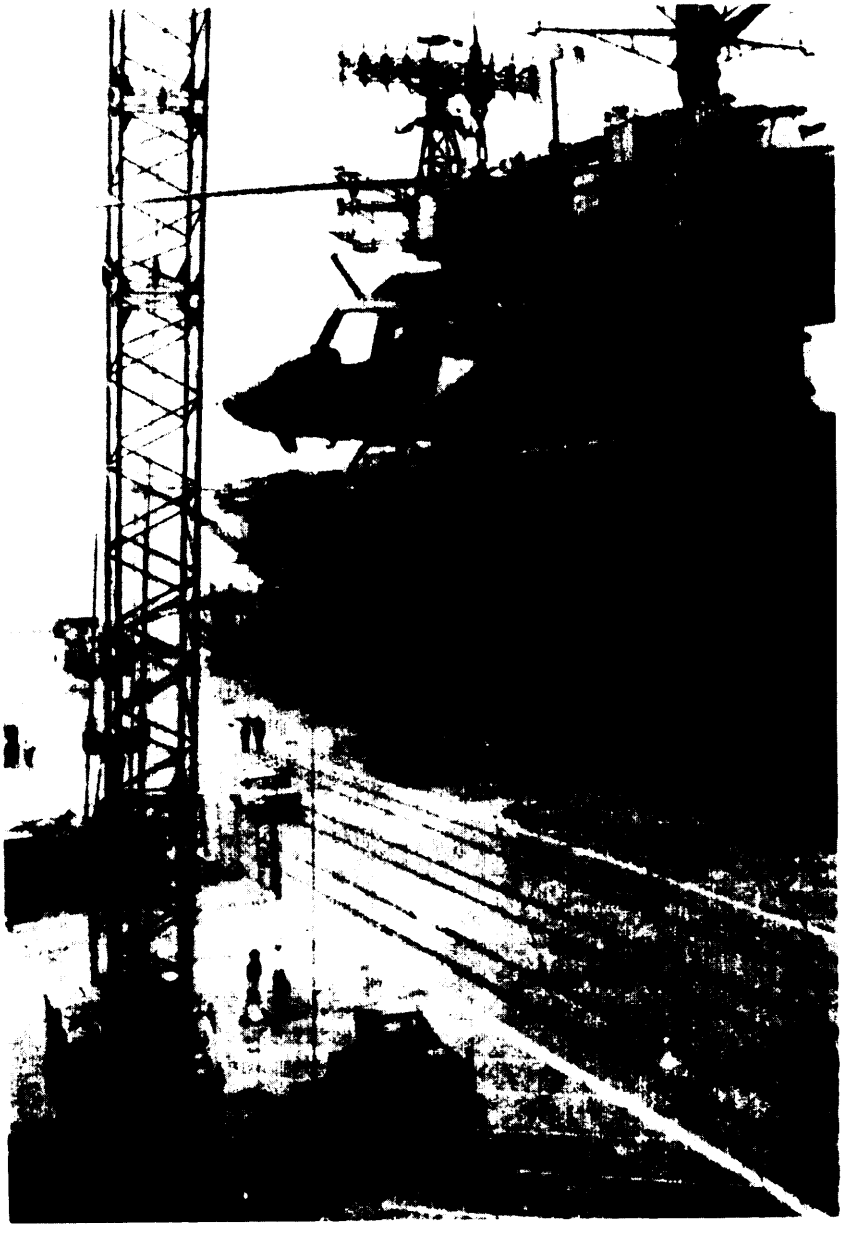


Figure 4-27. Mobile crone lifting OH-58.

Figure 4-28. OH-58 helicopter being lowered through hatch with no special handling.

Figure 4-29. Typical minimum disassembly layout for RORO and seatrain ships.

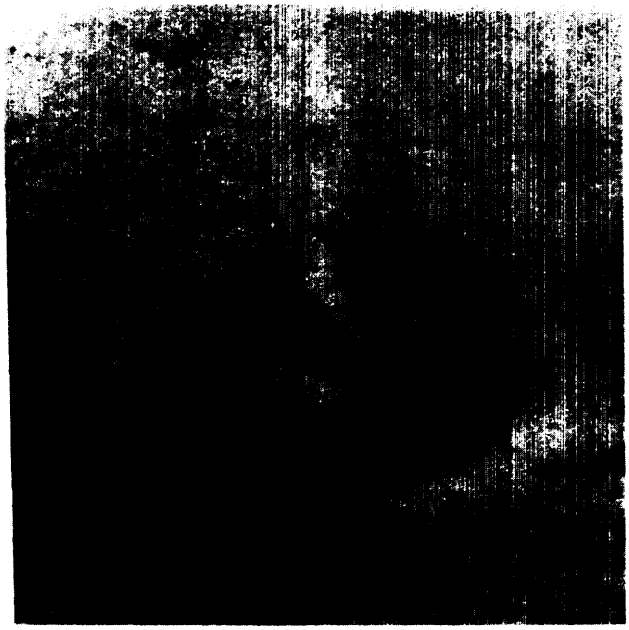


Figure 4-30. Extra tiedown rings are installed for helicopters on RORO ships to provide required securing points, in addition to the existing tiedown fitting grid pattern.

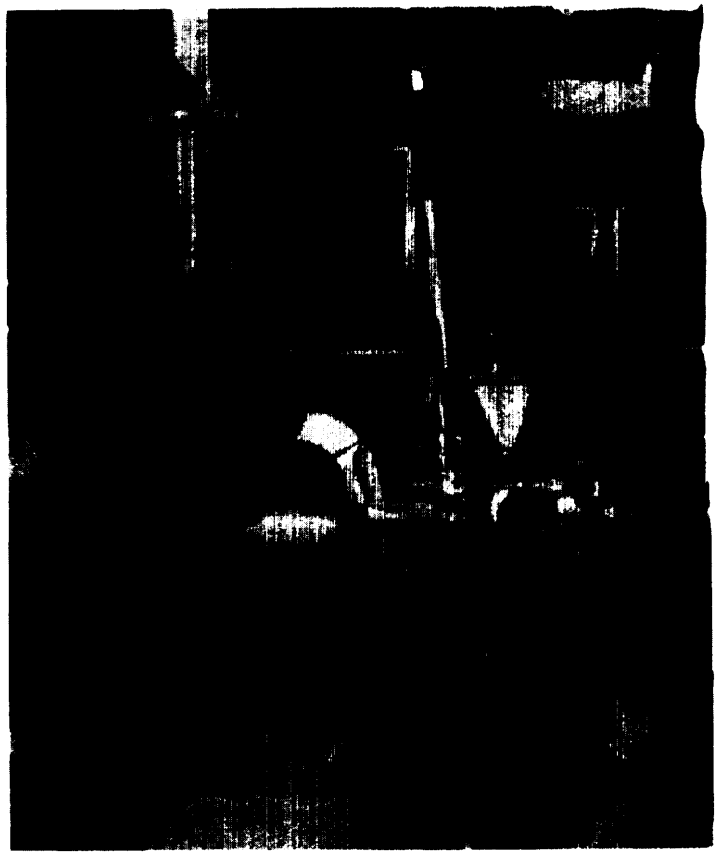


Figure 4-32. OH-58 horizontal stabilizer stowed in cargo compartment door of another OH-58.

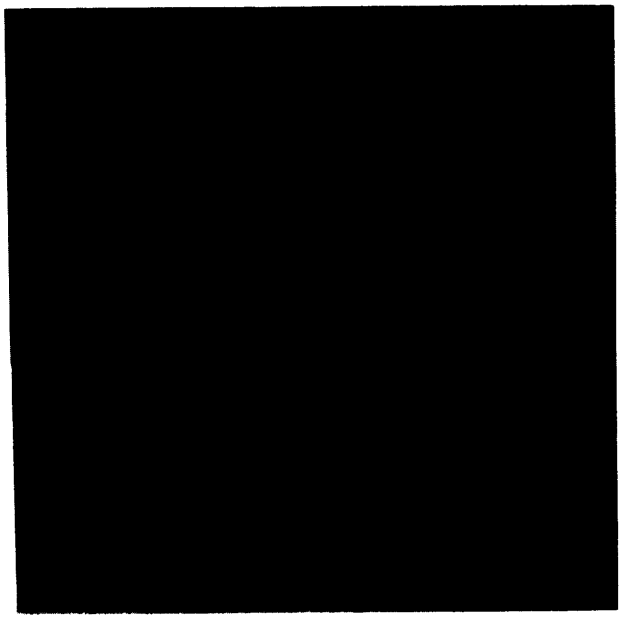


Figure 4-91. OH-58 helicopter in final stow position.

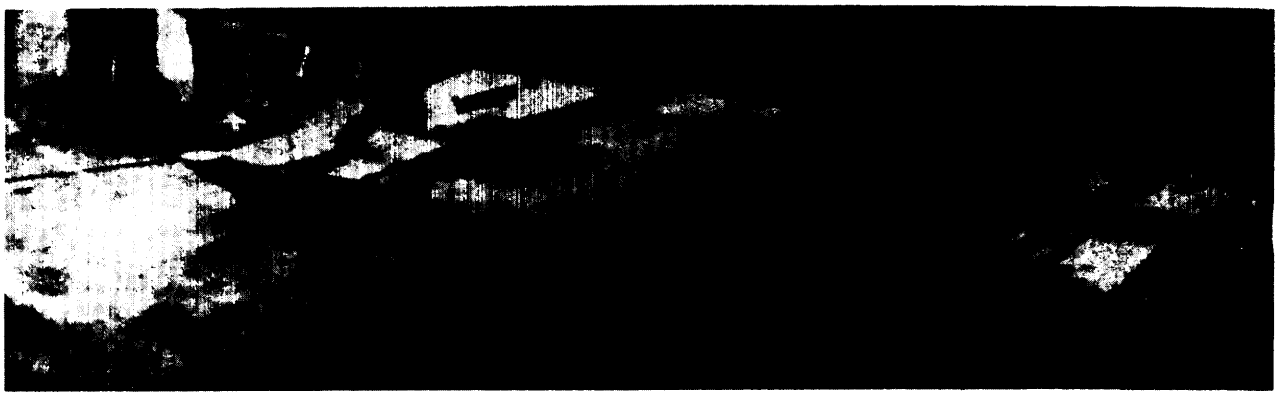


Figure 4-33. Caster wheels (local manufacture).

Figure 4-34. 10-foot roller conveyor section.

★ *Figure 4-35.*

(Deleted)

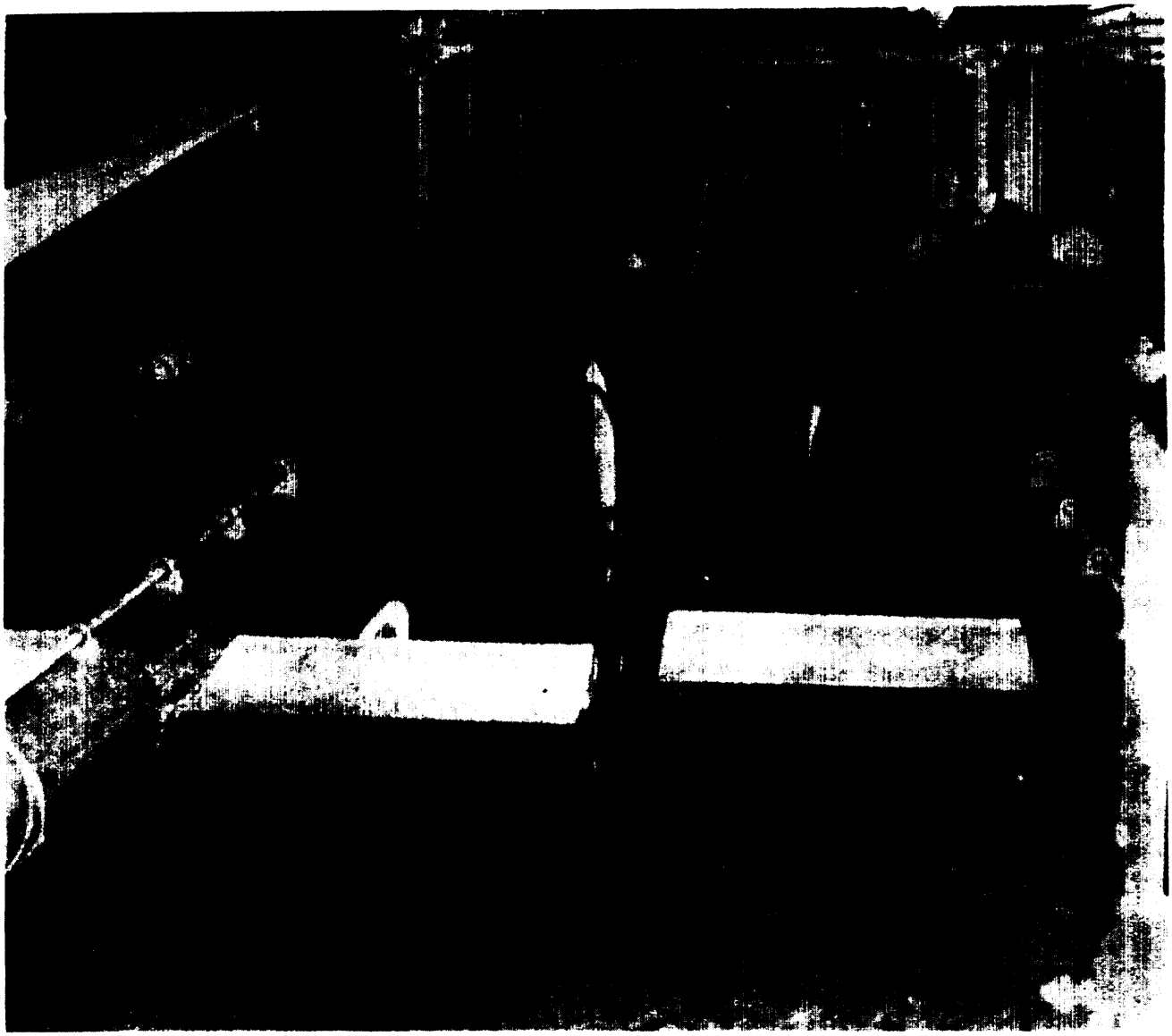


Figure 4-36. Below-deck stowage of OH-58 helicopters with rotor blades installed, tied down with 10K lashing devices.

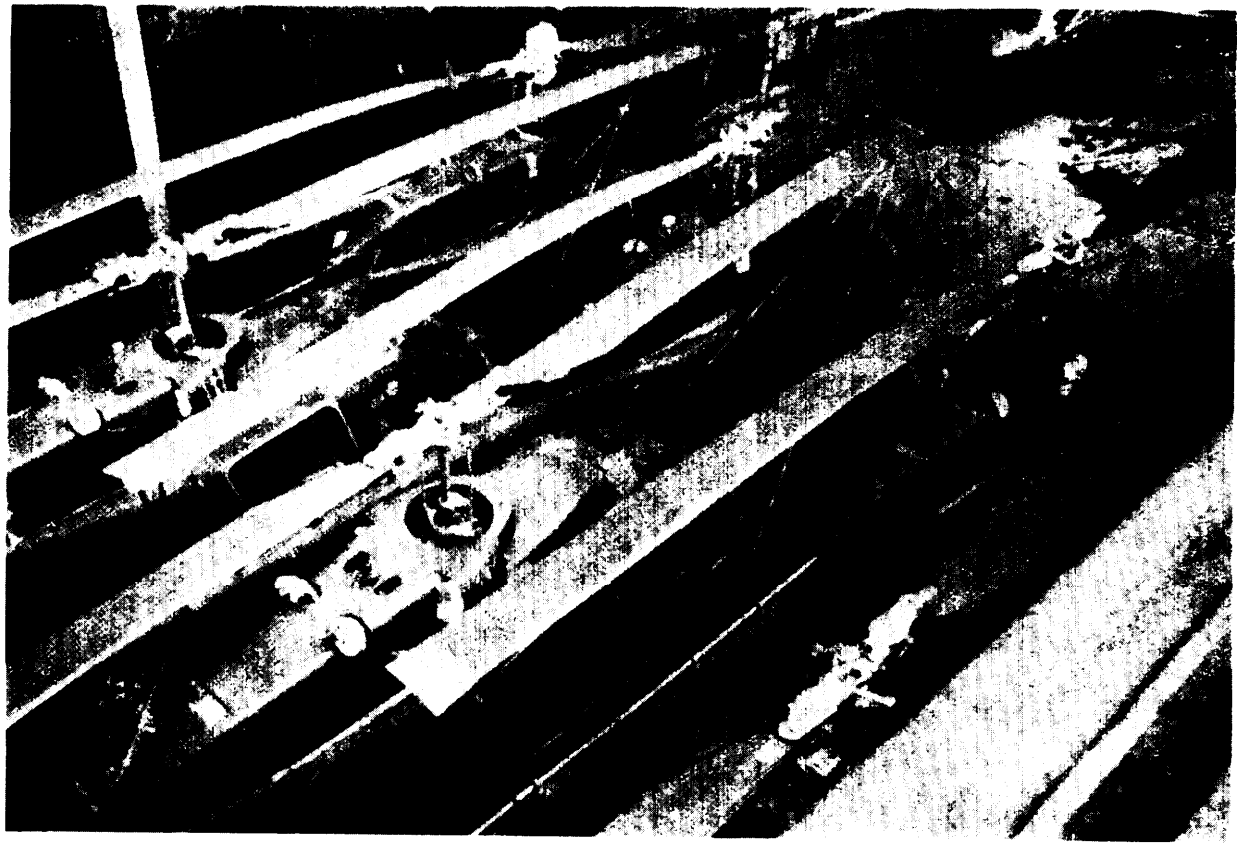
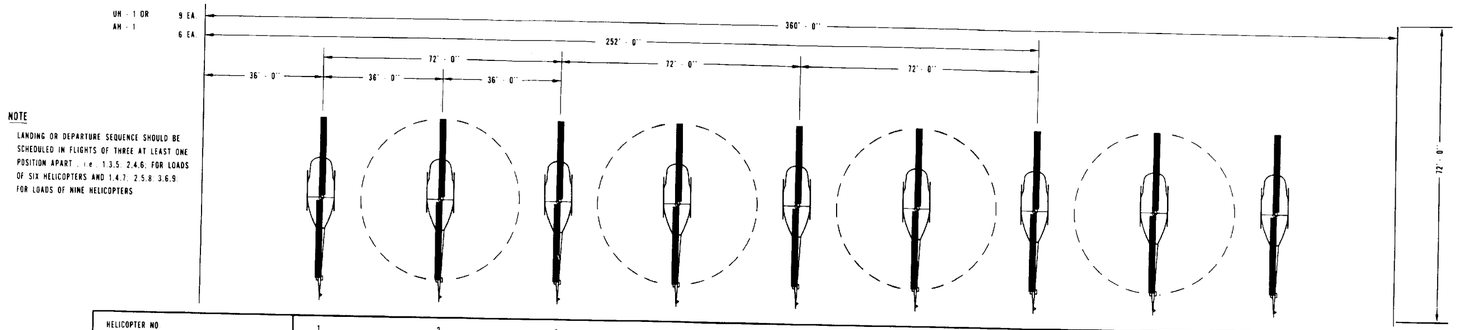


Figure 4-37. Typical "tight" stow required to insure that all helicopters are shipped as planned. Note specifically the clearance between helicopters. All OH-58 helicopters are flyable.

RECOMMENDED MINIMUM SPACING FOR LANDING/DEPARTURE IN A RESTRICTED AREA



NOTE

LANDING OR DEPARTURE SEQUENCE SHOULD BE SCHEDULED IN FLIGHTS OF THREE AT LEAST ONE POSITION APART . . i.e. 1.3.5. 2.4.6. FOR LOADS OF SIX HELICOPTERS AND 1.4.7. 2.5.8. 3.6.9. FOR LOADS OF NINE HELICOPTERS

HELICOPTER NO.		1	2	3	4	5	6	7	8	9
LANDING AND DEPARTURE SEQUENCE FOR 6 HELICOPTERS	FLT. NO. 1	①		③		⑤				
	FLT. NO. 2		②		④		⑥			
LANDING AND DEPARTURE SEQUENCE FOR 9 HELICOPTERS	FLT. NO. 1	①			④			⑦		
	FLT. NO. 2		②			⑤			⑧	
	FLT. NO. 3			③			⑥			⑨

Figure 5-1. UH-1D/H landing departure spacing minimums for fly-in to restricted area.

★ CHAPTER 5

TRANSPORTABILITY GUIDANCE UH-1H HELICOPTER

★ **NOTE**

The fuselage of the fully disassembled UH-1H helicopter exceeds allowable dimensions for containerization.

★ **CAUTION**

TM 55-1520-242-S will be consulted before any disassembly and preservation takes place.

★ Section I. TRANSPORT OF THE UH-1H HELICOPTER IN LASH LIGHTER

5-1. General

a. Operational Area. The operational area required is the same as that described in paragraph 4-5a, with the exception that the length of the landing area must be increased to 252 feet (77 m). Chalk mark surface at 36-foot (11-m) intervals to guide helicopters while landing, and to insure safe rotor clearance, The landing and departure sequence is shown in figure 5-1. Landing sequence is as follows: 1, 3, and 5; all three of these helicopters are landed, shut down, and blades tied down prior to the landing of the remainder of the helicopters. Helicopters 2, 4, and 6 are then landed.

★ *b.* **(Deleted)**

★ *c. Materials Required*

(1) Crane and boom requirements are the same as those described in paragraph 4-5c(1).

(2) Major items of equipment for preparation and reassembly of the UH-1H helicopters shipped in the LASH lighter are identified in table 5-1.

★ 5-2. LASH Lighter and UH-1H Helicopter Preparation

a. LASH Lighter Preparation. The interior of the lighter must be clear of dunnage, debris, water, and so forth. Tiedown fittings are installed in the lighter in accordance with figures 5-2 and 4-8.

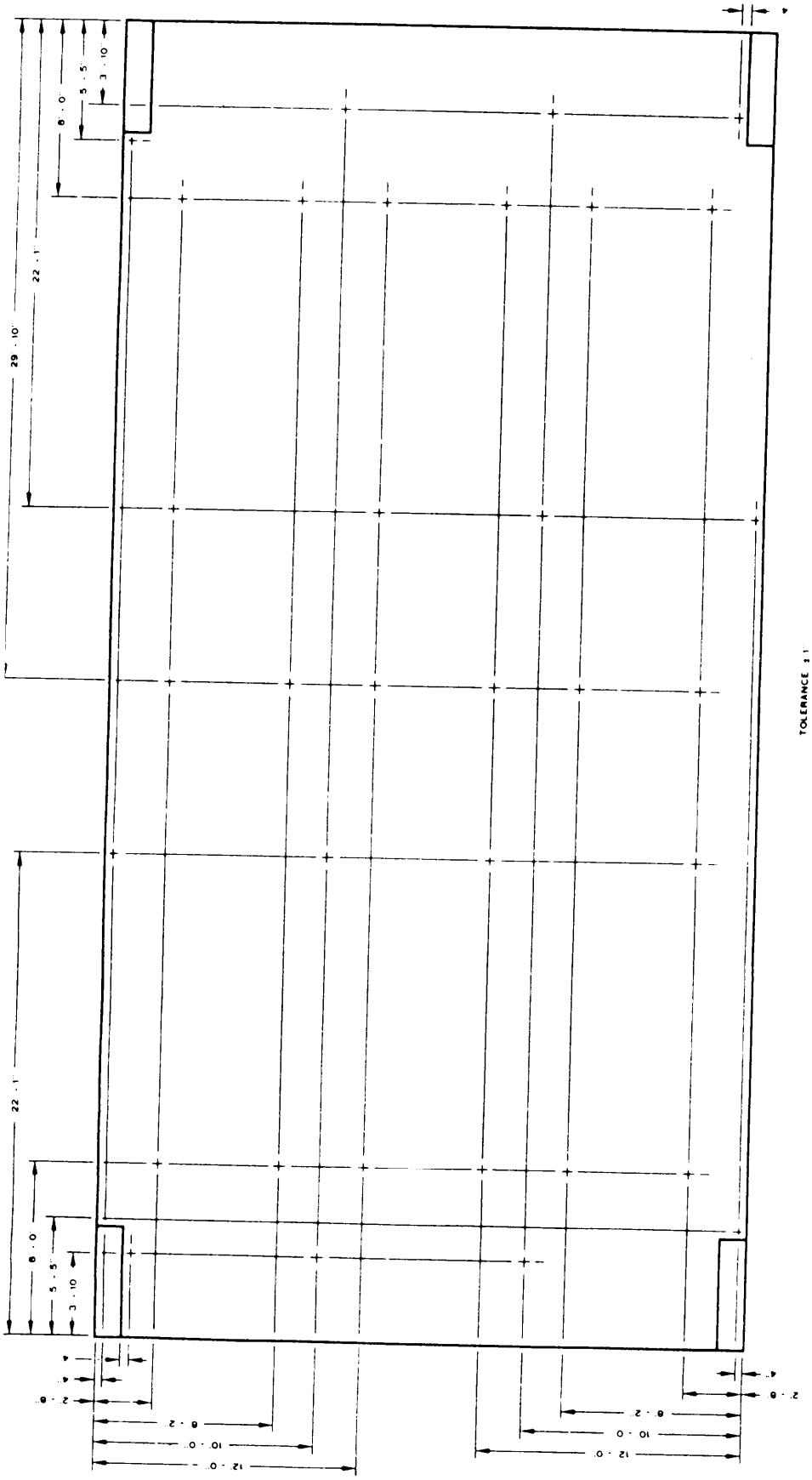
★ *b. Helicopter Preparation.* Preparation of the UH-1H helicopter for loading is accomplished with minimum disassembly configuration and reduced preservation requirements.

5-3. Disassembly

★ All disassembly of the helicopters is accomplished concurrently after the aircraft are flown to the loading sites. The six UH-1H helicopters require no special preparation for sequential loading. All six helicopters require the same disassembly and preservation.

★ *Table, 5-1. Major Items of Equipment for Preparation or Reassembly of UH-1H Helicopters for Loading and Unloading of a LASH Lighter*

Nomenclature	*NSN*	*Quality required for 6 helicopters*
Shackle adapter, mast nut	Local manufacturer	2
Ground-handling wheels	1730-00-980-9552	2
Tow bar, aircraft universal	1730-00-967-9556	2
Spanner wrench	5120-00-044-1426	1
Rebuild kit. common hardware	Unit hardware	1 per helicopter
Torque wrench, 600-/in-/lb	5120-00-288-8865	1
Torque wrench, 0-150 in-/lb	5120-00-542-4489	1
Adjustable wrench, 15-inch	5120-00-240-5328	1
Shoring, 2-in. x 2-in. x 8-ft	Local procurement	2 per helicopter
Preservative compound, M IL-C- 16173, grade 2	8030-00-244-1297	As required
Cleaning compound	6850-00-935-0996	5 gal
Barrier paper, MIL-B- 121	8135-00-753-4661	100-yd roll
Oil, lube, MIL-L-6081, grade 1010	9150-00-273-2388	10qt
Cushioning material, polypropylene foam, PPP-C-1797	8135-00-300-4905	100-ft roll
Cushioning material, polypropylene foam, PPP-C-1752	8135-00-180-5922	100-ft roll
Cushioning material, cellulosic	8135-00-584-3114	100-ft roll
Bag, packing, water, vaporproof, MIL-B-117	8105-00-274-2390	1 per helicopter
Rope, 3/8-in., grass	4020-00-231-2390	As required
Tape, 2-in., cloth	7510-00-266-5016	As required



★ *Figure 5-2. Tiedown positioning inside LASH lighter for six UH-1H helicopters.*

The main rotor blades and hub are removed as one assembly, as shown in figure 5-3, and placed in the lighter, a shown in figure 5-4. The stabilizer bar, one tail rotor blade, FM whip antenna, machine gun mounts and the synchronized elevators are removed, wrapped in cushioning material, and secured in the cargo compartment of the helicopter, as shown in figures 5-5 and 5-6. Pitot, inlet, and exhaust covers are installed. The battery is disconnected and terminals are taped to prevent accidental discharge.

5-4. Preservation

★ Preserve and prepare UH-1H helicopters for shipment in accordance with TM 55-1520-242-S and/or special instructions provided by TSARCOM for the type shipping being used.

5-5. Loading

★ Each helicopter is positioned for lifting within reach of the crane, in accordance with figure 5-7 and 5-8. The main rotor and hub assembly of two helicopters are loaded onto cushioning material, followed by the two component helicopters (fig 5-9 and 5-10) astride the blades. Use 4 inches of polyethylene foam sheeting, PPP-C-1752, ½ in. x 48 in. x 60 ft lapped to desired thickness for cushioning material. The natural cone angle of the blades is supported by packaging materials placed under the blade at approximately 10-foot intervals. The blades are padded both top and bottom at the blade-tip area and secured with a 5,000 pound GCU-1B tiedown strap (fig 5-9 and 5-10). The loading sequence diagram, figure 5-11, allows the tail rotor crosshead assemblies to be loaded inboard, thus eliminating the possibility of crosshead contact with the lighter wall. Helicopter and rotor blades are tied down as shown in figure 5-12. A lighter, completely loaded with six UH-1H helicopters, is shown in figure 5-13. Install only the center hatch cover on the LASH lighter. The height of the rotor mast prohibits installation of the end hatch covers. The end hatch, covers are stowed above deck, probably on the forward hold 1A of the LASH ship, depending on the loaded ship configuration. Loaded helicopter rotor masts extend above the center hatch cover. Each LASH lighter load will be measured as shown in figures 5-14 and 5-15 to assure that the 6-inch spacer identified in figure 5-16 will provide a 2-inch clearance above the masts to the underside of the LASH lighter stacked above it in the ship's hold. Measurements are taken by stretching nylon chalk line across the top of diagonally opposite lifting posts. Should the rotor mast extend more than 4 inches above the taut line, an equal amount will be added to the 6-inch space shown in figure 5-16.

5-6. Tiedown

a. All helicopters loaded in the LASH lighter will be tied down with wire rope and turnbuckles, in accordance with figure 5-12.

CAUTION

Excessive tensioning may cause damage to the helicopter tiedown fittings and fuselage frames.

★ *b.* The approximate man-hours and time required for loading are identified in table 5-2. It is reasonable to assume that an aviation unit, using concurrent disassembly and preparation, could load six UH-1H helicopters into the LASH lighter in the times shown.

★ *c.* **(Deleted)**

5-7. Unloading

★ Unloading the UH-1H is the reverse of the loading sequence. Time breakdown for the UH-1H unloading is shown at table 5-3.

★ *Table 5-2. UH-1H Man-Hour Breakdown by Phase per Helicopter*

Phase	*Man-hours*	*Men requircd*	*Clock hours*
Preparation[1]	2·58	3	0:52
Loading[2]	2.25	8[4]	0:17
Tiedown[3]	0.75	3	0:15
Subtotal	5.58	NA	1:24

[1] Preparation includes preparing and stowing of all removed components, installing of inlet, exhaust, and pitot covers; and rigging the main rotor assembly.

[2] Loading includes loading and positioning the main rotor system, and rigging and loading the helicopter.

[3] Tiedown includes restraint applied to both the rotor system and the helicopter.

[4] Additional men are required to lift rotor head for removal and installation of rigging materials.

★ *Table 5-3. UH-1H Man-Hour Breakdown by Phase per Helicopter*

Phase	*Man-hours*	*Men required*	*Clock hours*
Remove tiedowns	0.10	2	0.03
Unload[1]	1.36	8	0:10
Reassemble[2]	5.94	3	1:58
Subtotal	7.40	NA	2:11

[1] Unloading includes helicopter rigging and unloading and main rotor system rigging and unloading.

[2] Reassembly includes removal of all preservation materials, installation of all removed components, technical inspections, and test flight.

on cushioning material.

★ *Figure 5-3. UH-1H main rotor assembly being removed, using a truck-mounted crane.*

★ *Figure 5-4. Typical placement of UH-1H rotor blade assemblies in LASH light prior to loading helicopters that will straddle the blades. Note rotor head assemblies are placed on cushioning materials.*

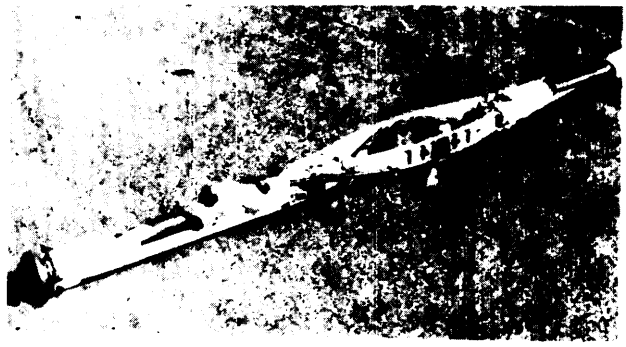
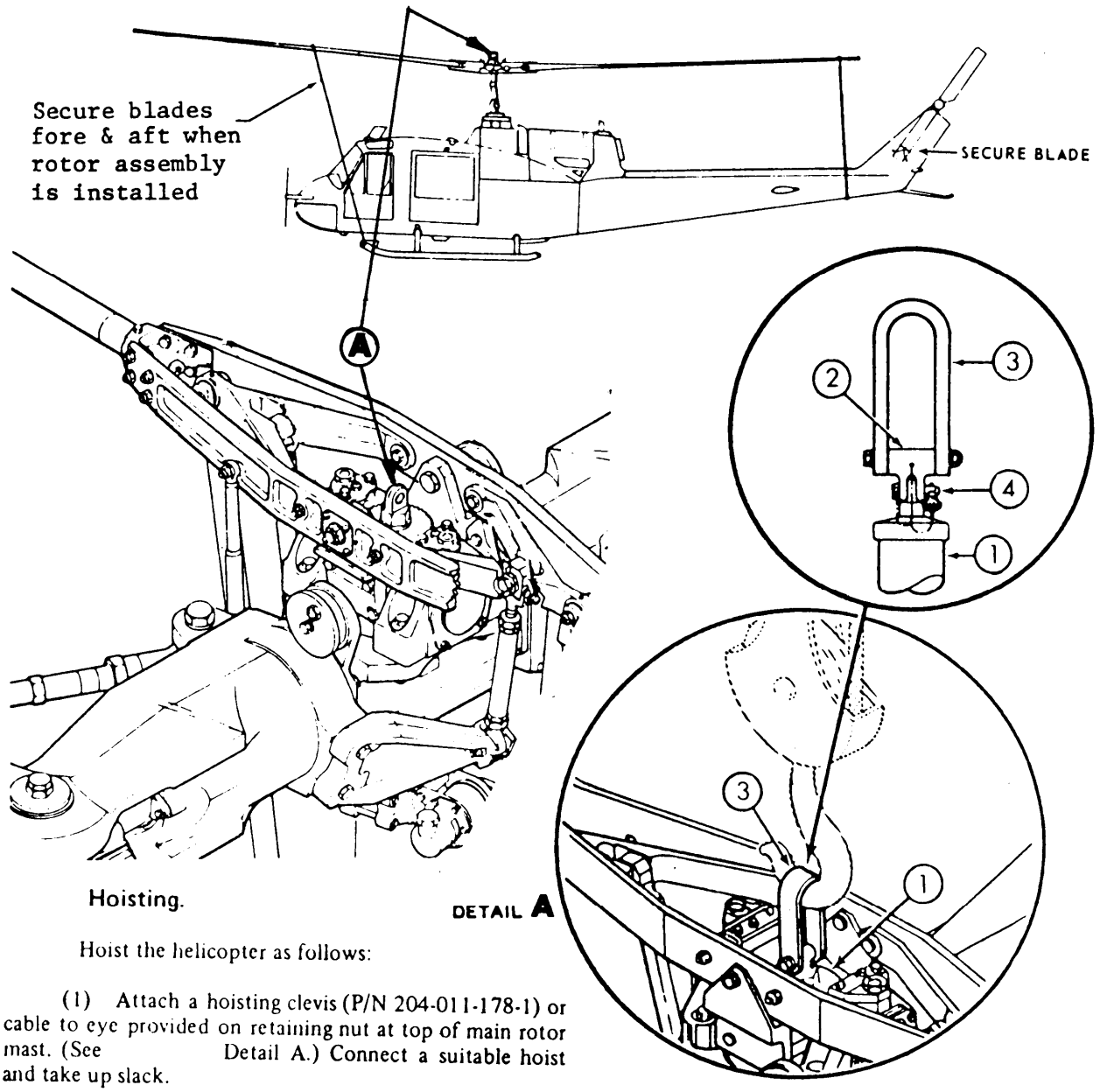


Figure 5-5. A good method of packaging the stabilizer bar is to leave control tubes attached, folding and taping them to the stabilizer

★ *Figure 5-6. Stabilizer bar and synchronized elevator wrapped in cushioning material and secured in the cargo compartment of the UH-1H helicopter from which they were removed.*



Hoisting.

Hoist the helicopter as follows:

(1) Attach a hoisting clevis (P/N 204-011-178-1) or cable to eye provided on retaining nut at top of main rotor mast. (See Detail A.) Connect a suitable hoist and take up slack.

NOTE

Maximum operating load of hoisting clevis is 10,000 pounds.

(2) Station a man at tail skid to steady helicopter when hoisted. If lifting beyond reach from ground, two men and two steadying ropes will be necessary.

(3) Hoist slowly with a steady lifting force.

1. **Mast Nut**
2. **Clevis**
3. **Strap**
4. **Pin**

NOTE

Main rotor assembly, stablizer bar and one tail rotor blade are removed for LASH lighter loading

Figure 5–7. Hoisting UH-1D/H helicopter.

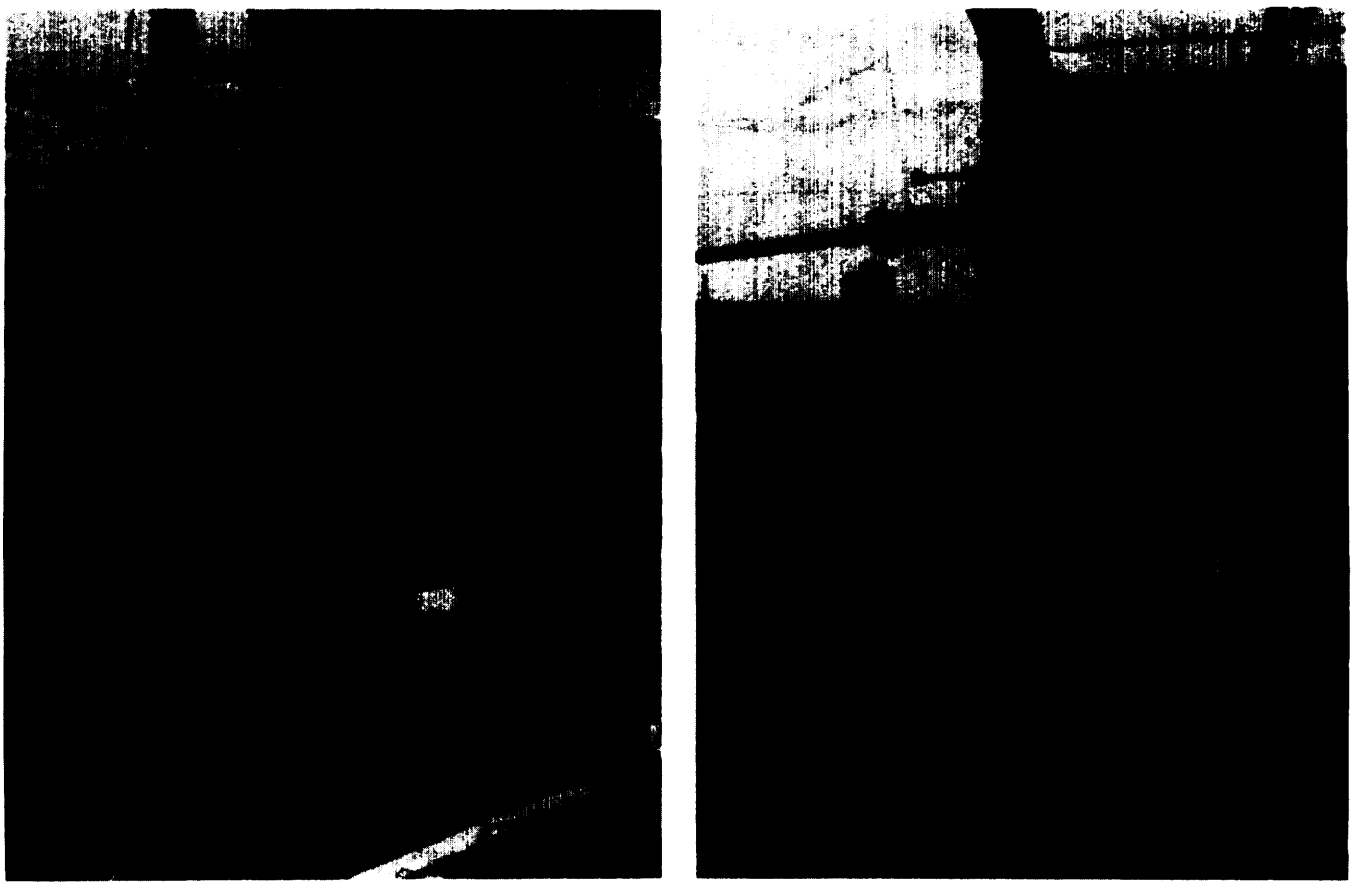


Figure 5-8. Open hook or closed clevis methods of lifting. Closed clevis is recommended method.

Figure 5-9. Tiedown applied to main rotor blade and head assembly. Note padding materials to support the normal "cone angle."

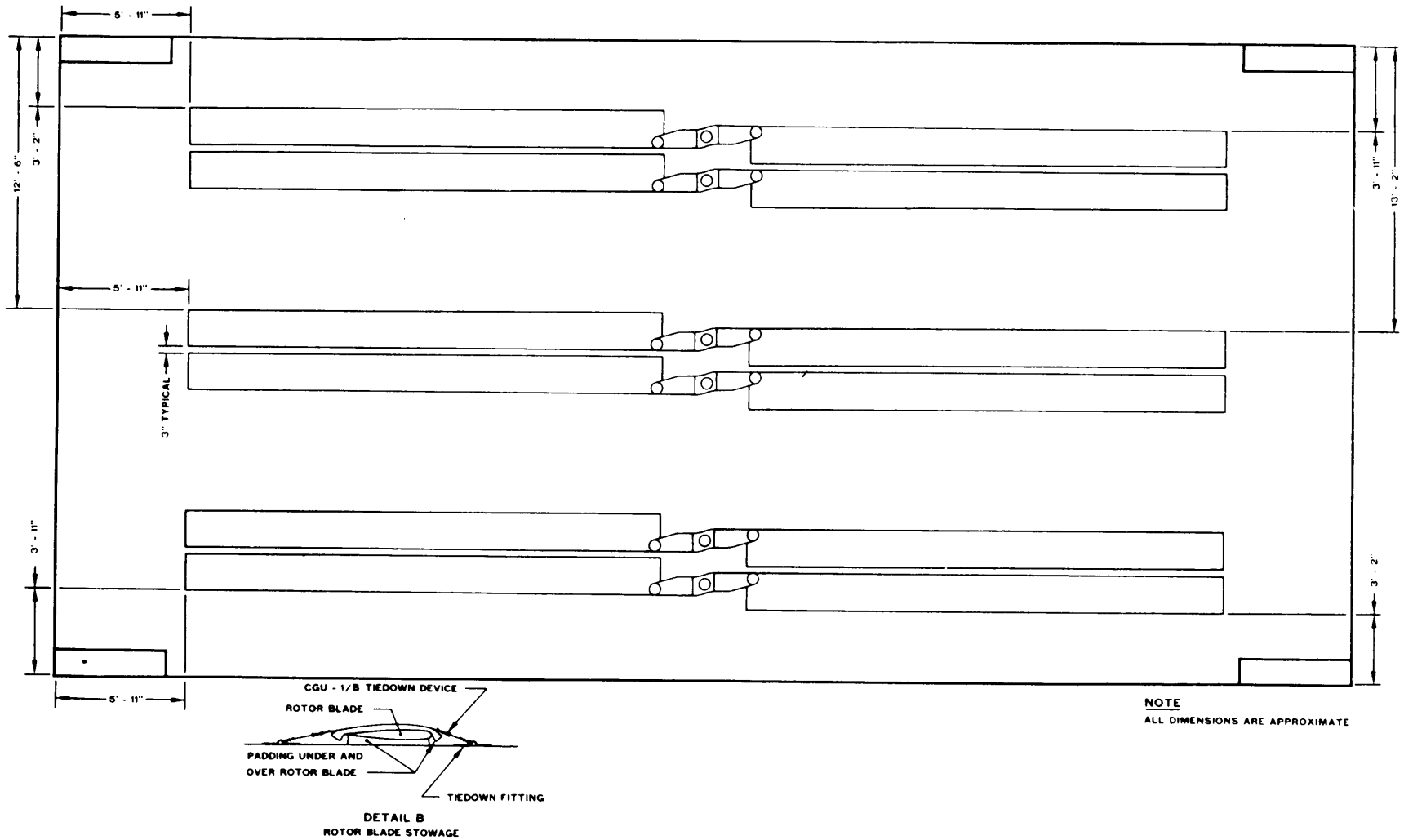


Figure 5–10. UH–1D/H rotor blade stowage in LASH lighter.

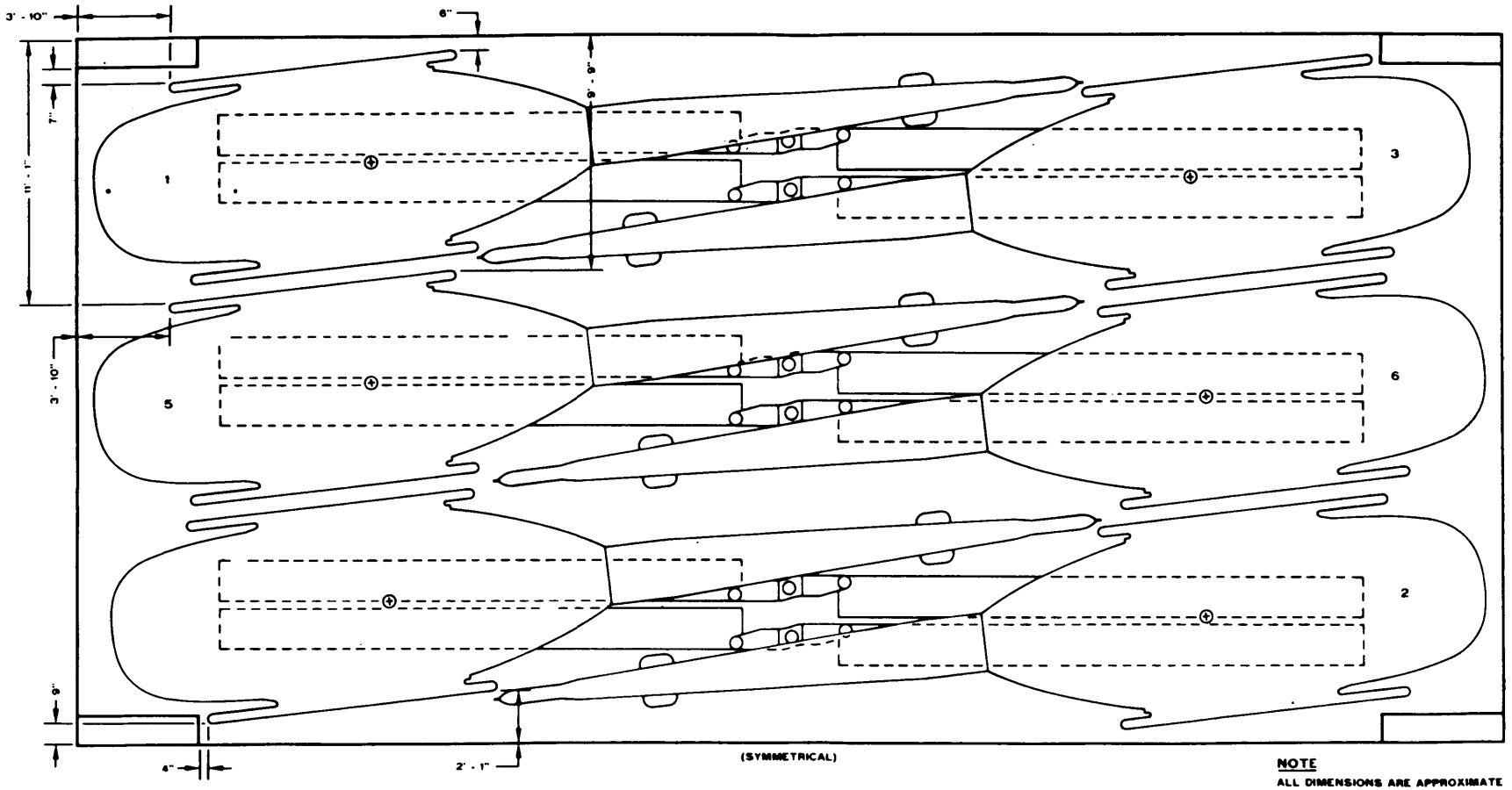


Figure 5–11. Loading sequence and tiedown diagram for six UH–1D/H helicopters in LASH lighter.

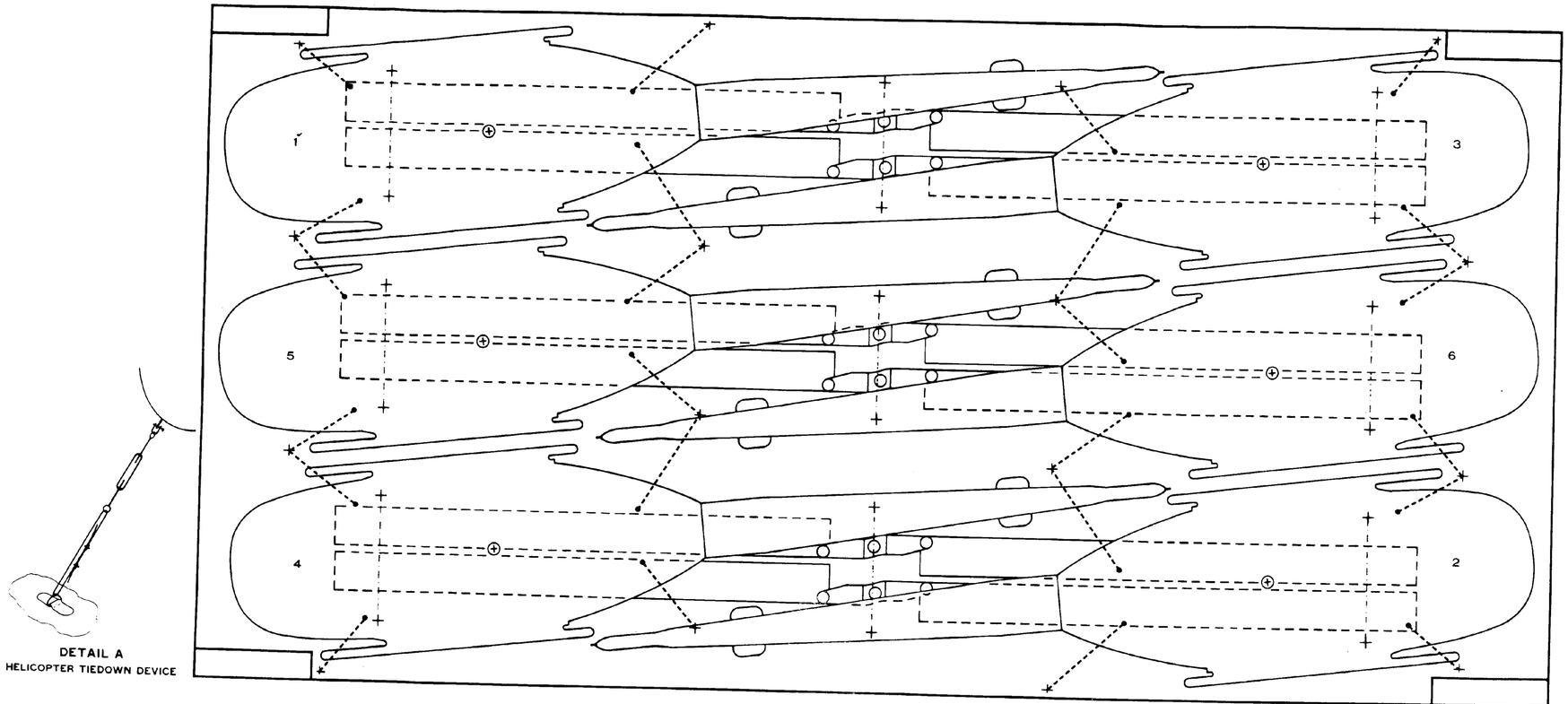


Figure 5-12. Tiedown diagram for six UH-1D/H helicopters in a LASH lighter.

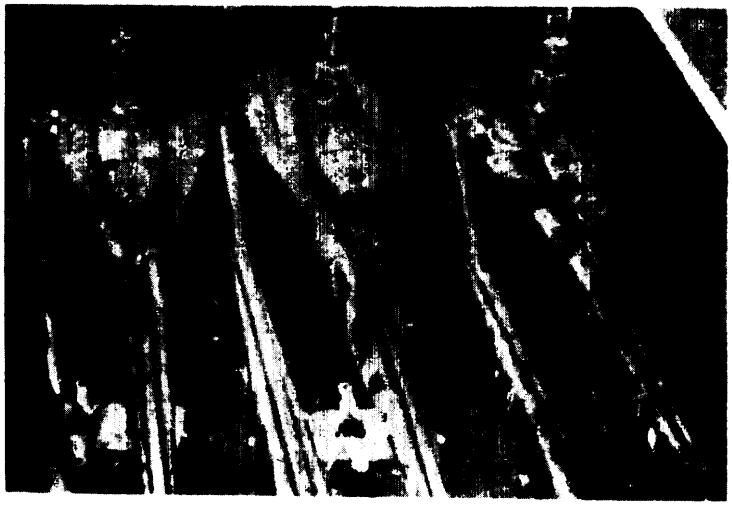


Figure 5-13. Six UH-1D/H helicopters loaded in LASH lighter.

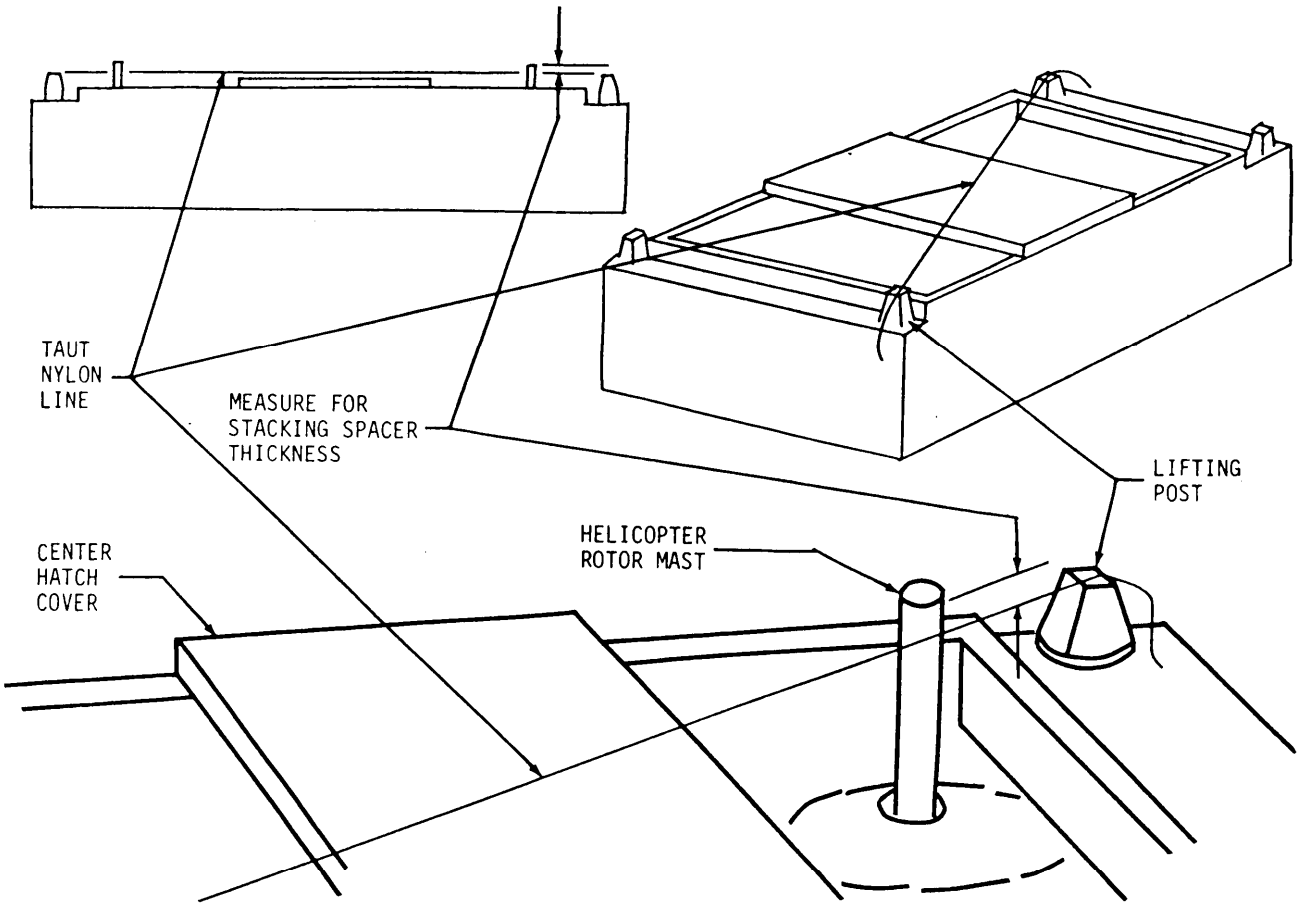


Figure 5–14. The center hatch cover installed with six UH–1D/H helicopters loaded in the LASH lighter, with a taut line over the top of the opposite corner posts.

Figure 5-15. Measurement for lighter-stacking clearance to assure that spacer blocks are adequate prior to stacking another LASH lighter atop a lighter containing UH–1D/H helicopters in hold of mother ship.

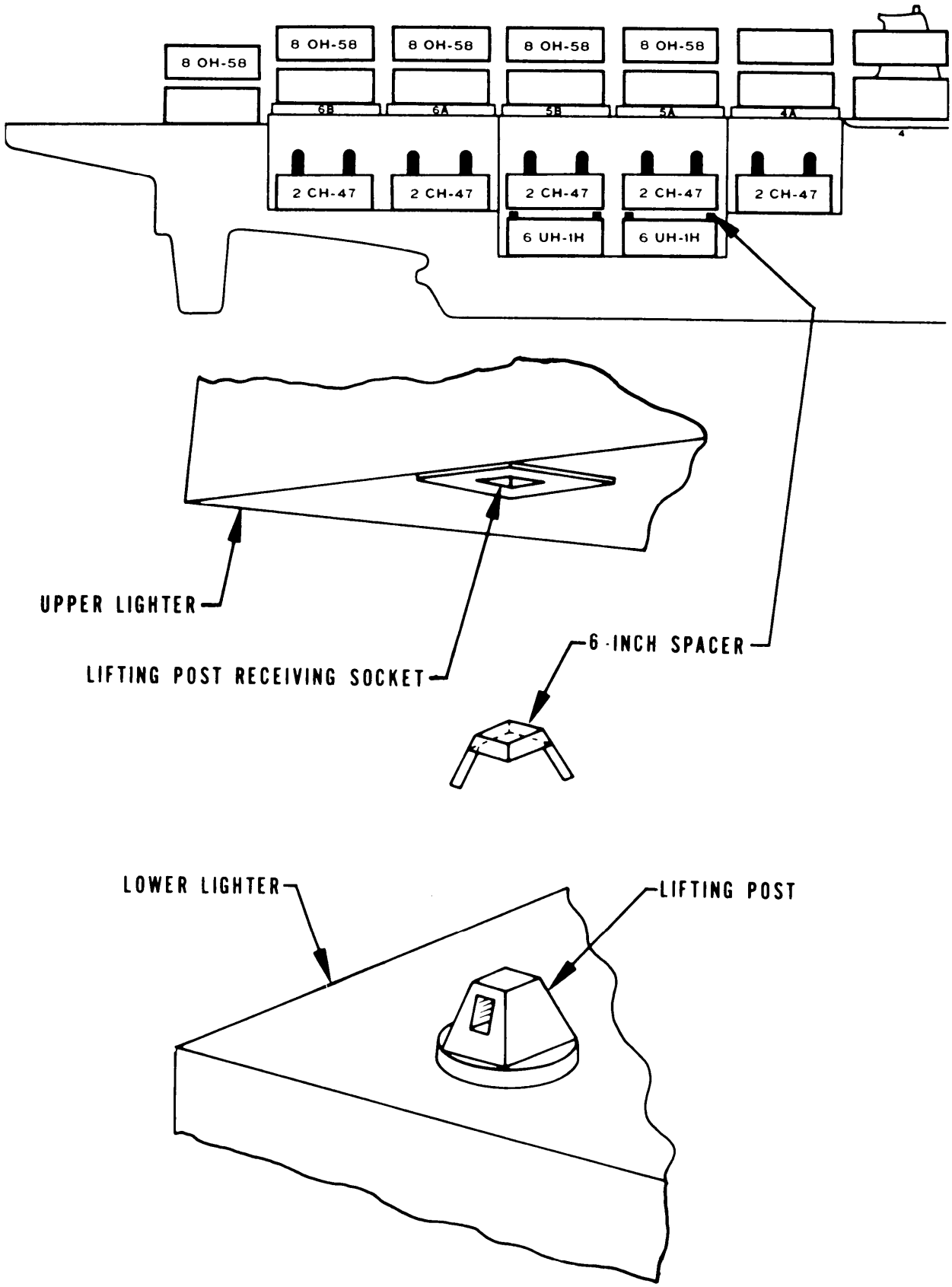
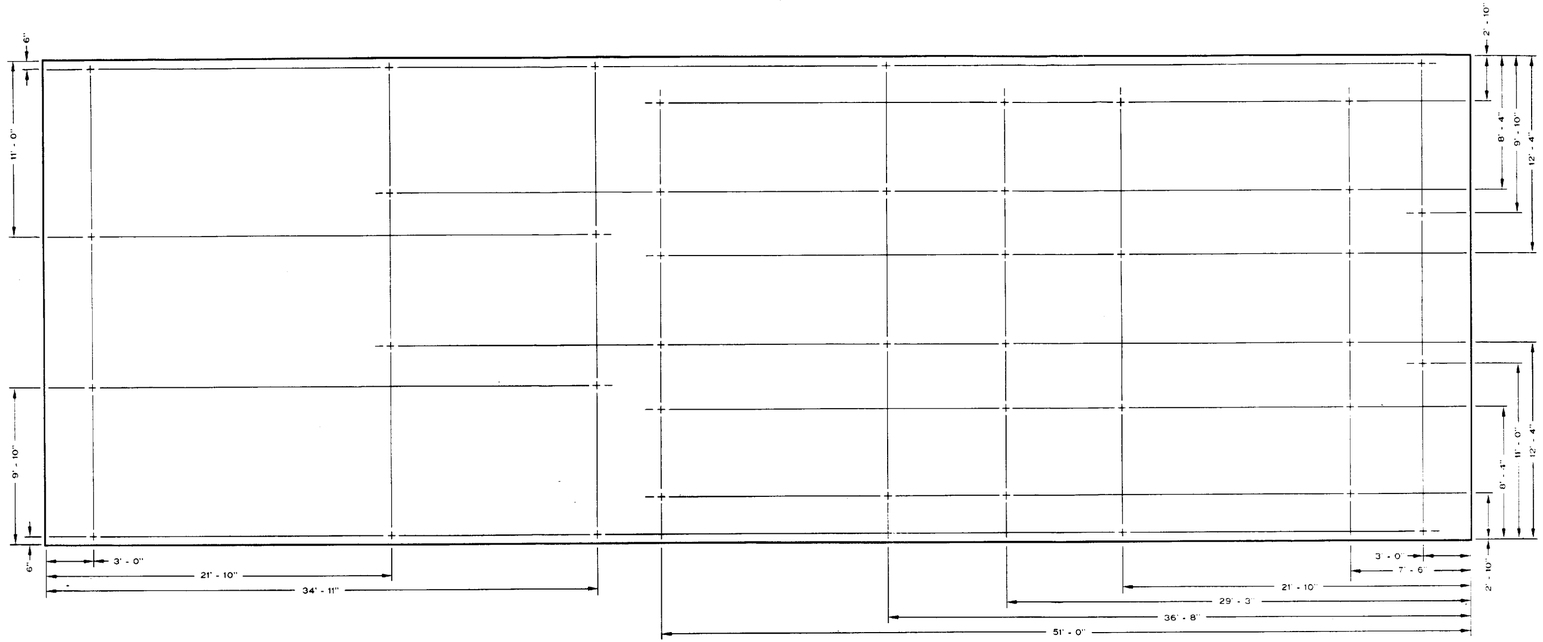


Figure 5-16. Typical placement of spacers.



TOLERANCE: ± 1"

Figure 5-17. Tiedown position in SEABEE barge for nine UH-1D/H helicopters.

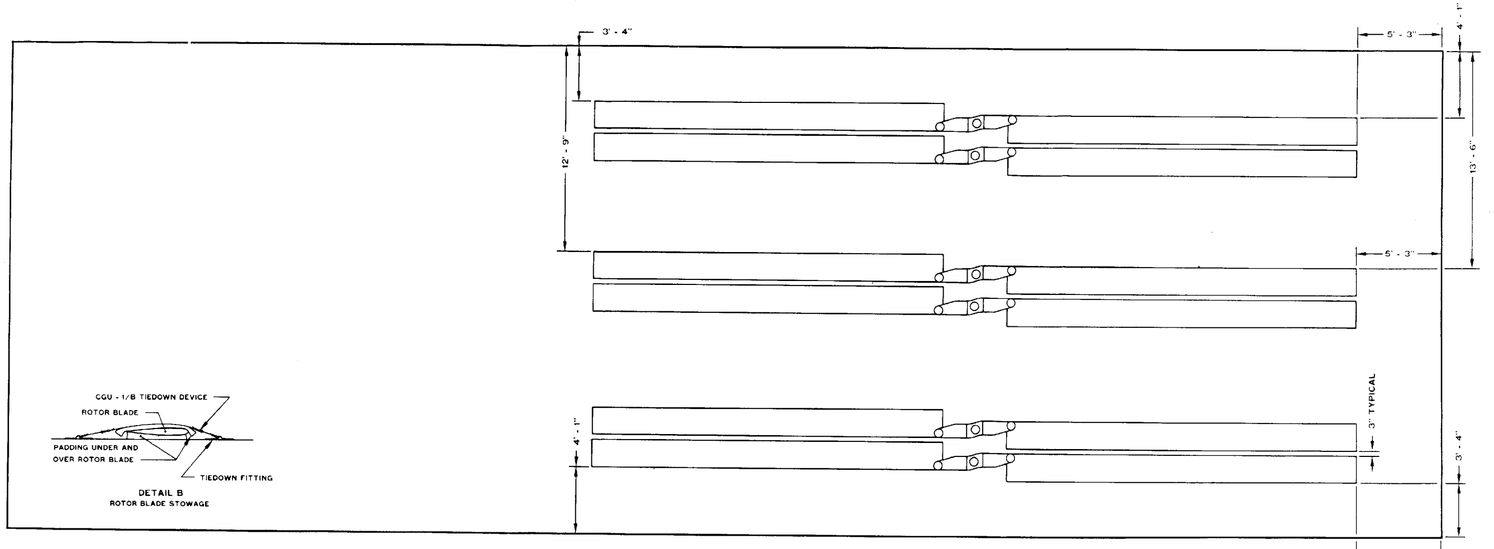


Figure 5-18. Rotor blade position diagram in SEABEE barge.

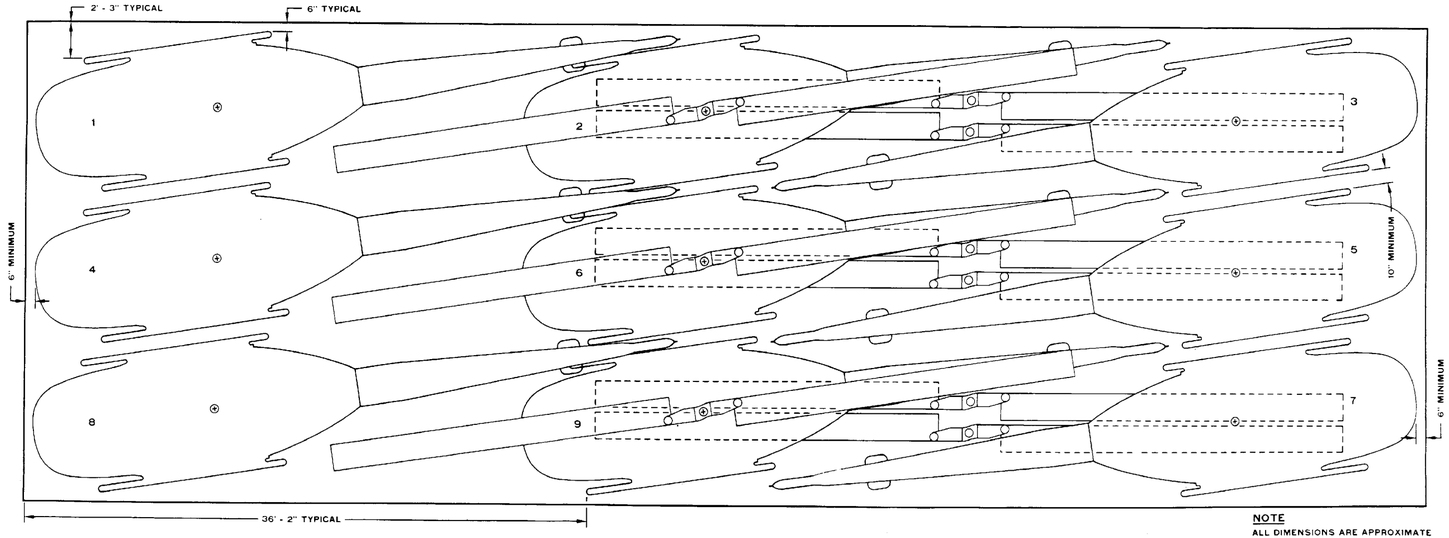
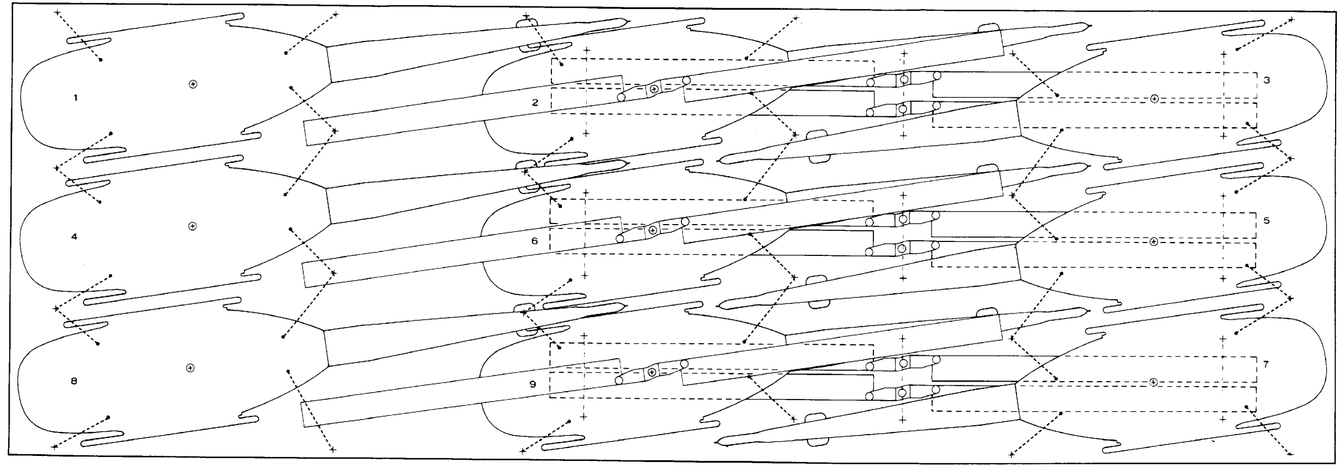


Figure 5-19. Helicopter position loading sequence of nine UH-1D/H helicopters in SEABEE barge.



DETAIL A
HELICOPTER TIEDOWN DEVICE

LEGEND

- • - TIEDOWN FITTING ON UH - 1H HELICOPTER
- + - TIEDOWN FITTING WELDED TO THE DECK OF BARGE
- – – - TIEDOWN DEVICE SECURING HELICOPTER TO BARGE
- –·– - TIEDOWN DEVICE SECURING ROTOR BLADE TO BARGE

*Section II. TRANSPORT OF THE UH-1H HELICOPTER IN THE SEABEE BARGE

5-8. General

★ *a. Operational Area.* The operational area required for nine UH-1H helicopters is the same as that described in paragraph 4-5a, with the exception that the length of the landing area must be increased to 360 feet, as shown in figure 5-1. Chalk mark surface at 36-foot (11-m) intervals to guide helicopters while landing, and to insure safe rotor clearance. The landing and departure sequence is shown in figure 5-1. By landing the first three helicopters at one time, sufficient clearance between rotor tips is available. Remaining approaches will have three helicopters in each flight. Each flight is landed, shut down, and blades tied down prior to landing another flight. Landing sequence is as follows: 1, 4, and 7:2, 5, and 8; 3, 6, and 9.

★ *b. Material Required.* (Para 5-1c.)

★ *c.* **Deleted.**

5-9. SEABEE Barge and Helicopter Preparation

a. SEABEE Barge Preparation. Tiedown fittings are installed in the barge in accordance with figure 5-17.

★ *b. Helicopter Preparation.* Preparation of the nine UH-1H helicopters for loading is accomplished with minimum disassembly and with reduced preservation. All helicopters are disassembled concurrently upon their arrival at the loading site. Six UH-1H helicopters require main rotor assembly to be removed. The main rotor blades and hub are removed as one assembly, as shown in figure 5-3, and placed in the SEABEE barge, as shown in figures 5-18 and 5-19. All nine UH-1H helicopters require removal of the synchronized elevators. The stablizer bar and synchronized elevators are wrapped in cushioning material and secured in the helicopter compartment, as shown in figure 5-5. (Also refer to para 5-3.)

5-10. Preservation

★ Preserve and prepare the UH-1H for shipment in accordance with TM 55-1520-242-S and/or special instructions provided by TSAR-COM for the type shipping being used.

5-11. Loading

Each helicopter is positioned within reach of the crane. The main rotor and hub assembly of helicopters 2 and 3 are loaded onto cushioning material, as shown in figure 5-4. Helicopters 1, 2, and 3 are loaded with helicopters 2 and 3 astride the main rotor and hub assemblies, as shown in figures 5-9 and 5-19. This procedure is repeated with helicopters 4, 5, and 6, and then with 7 and 8. Helicopter 9 is lowered directly into its tiedown position and very little maneuvering is required. Each set of blades is padded both top and bottom near the blade tips and secured with 5,000-pound-capacity CGU-1/B tiedown straps (one across each end of the blades and one across the hub area). The loading sequence diagram (fig 5-19) allows the tail rotor crosshead assemblies to be loaded inboard, thus eliminating the possibility of crosshead contact with barge bulkhead (wall) during shipment.

5-12. Tiedown

a. All helicopters loaded in the SEABEE barge shall be tied down with wire rope and turnbuckles for the helicopters and with nylon strap CGU-1B tiedown devices over the padding material to secure the main rotor blade and hub assemblies, in accordance with figure 5-20.

CAUTION

Excessive tensioning may cause damage to the helicopter tiedown fittings and fuselage frames.

★ *b.* Man-hours and time required for loading nine UH-1H helicopters in a SEABEE barge are identified in table 5-4.

★ *c.* Using concurrent disassembly and preparation functions, approximate times for loading are shown below. It is reasonable to assume that the times shown in table 5-4 can be expected for loading nine UH-1H helicopters in the SEABEE barge by an aviation unit.

5-13. Unloading

★ *a.* Unloading the UH-1H is accomplished in reverse order of the loading sequence. Time breakdown for unloading the UH-1H is shown in table 5-5.

★ *b.* Reassembly times are shown at table 5-5. The UH-1H main rotor head assemblies can be reinstalled by the shore crane or a 5-ton long boom wrecker.

★ *c.* **Deleted.**

★ *Table 5-4. UH-1H Man-Hour Breakdown by Phase per Helicopter*

Phase	6UH-1H w/rotor removed			3 UH-1H w/rotor		
	Man-hrs	Men rqr	Clock-hrs	Man-hrs	Men rqr	Clock-hrs
Preparation[1]	2.57	3	0:52	0.50	3	0:10
Loading[2]	2.25	8[4]	0:17	1.06	8[4]	0:08
Tiedown[3]	0.75	3	0:15	0.40	3	0:08
Subtotal	5.57	NA	1:24	1.96	NA	0:26

[1] Preparation includes preparation and stowage of all removed components, installation of inlet, exhaust, and pitot covers, and rigging the main rotor head assembly.

[2] Loading includes loading and positioning of main rotor system, and rigging.

[3] Tiedown includes restraint applied to both the rotor system and the helicopter.

[4] Additional men required to lift rotor head for removal and installation of rigging materials.

Section III. TRANSPORT OF THE UH-1D/H HELICOPTER BY ROLL-ON/ROLL-OFF (RORO) AND SEATRAIN SHIPS

★ 5-14. General

a. Operational Area (para 5-1a.)

b. Ship Characteristics. RORO ships will normally be operated from an improved port facility. Operations from midstream or unimproved ports are considered feasible only with self-sustaining RORO ships. Each RORO ship must be surveyed prior to loadout for tiedown fittings, hatches, holds, door clearances, ventilation systems, lifting capabilities and the capacities of installed lifting gear, and firefighting equipment. Ramp angles and ship construction must also be surveyed to determine if RORO operations are feasible. When roll-on/roll-off operations are not considered feasible, the helicopter must be lifted by ship's gear or shore-side crane (fig. 5-21) and lowered through a hatch (fig. 5-22, 5-23, 5-24, and 5-25) to a predetermined location. The helicopter is then moved to its final stow position by ground-handling wheels or by a helicopter-positioning device, or dolly (fig. 5-26). The main advantage of RORO ships is generally wide open decks. Helicopter loads should be planned to insure that as many UH-1D/H helicopters as practical are stowed below the ship's weather deck. Helicopters stowed above the weather deck are subject to salt water corrosion and may require extensive and costly preservation.

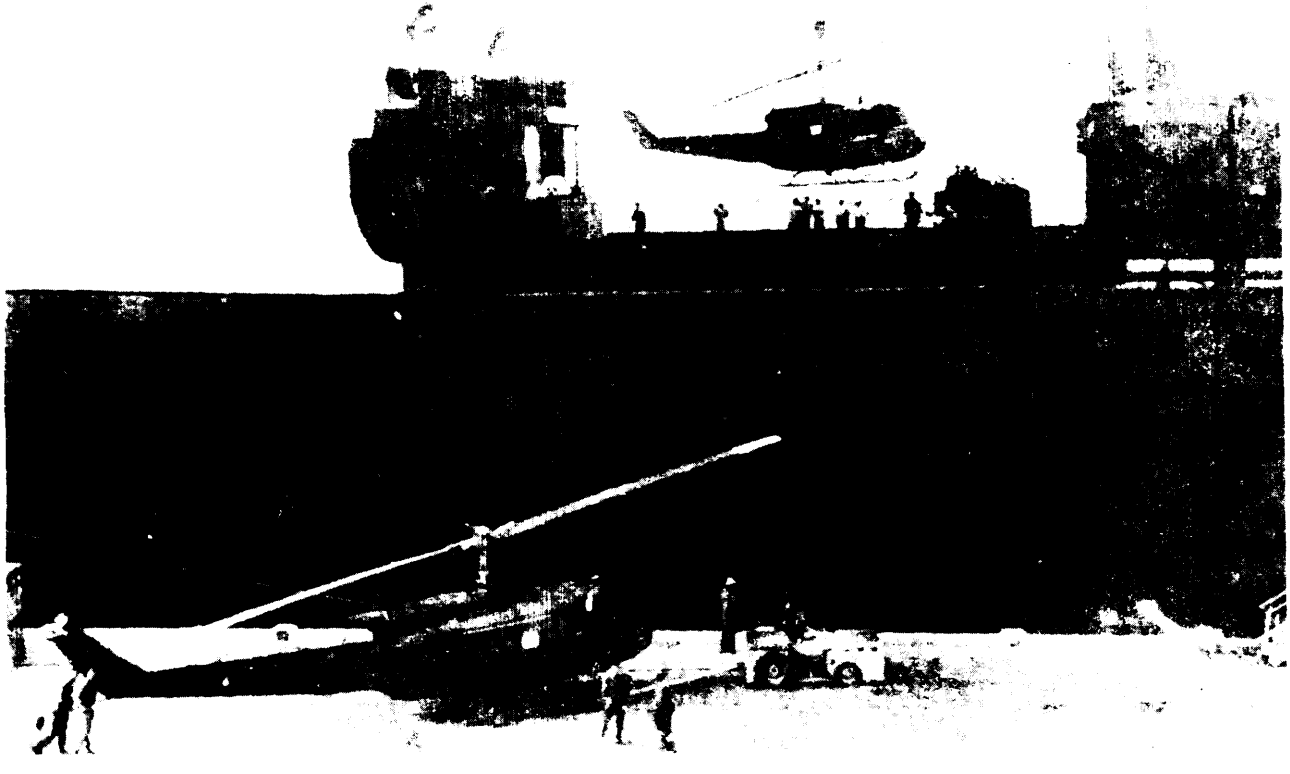


Figure 5-21. UH-1D/H being loaded through hatch by ship's gear as a second UH-1D/H is moved into position for lifting.

5-15. Roll-On/Roll-Off Ship and Helicopter Preparation

a. RORO Ship Preparation. All RORO ships have a tiedown fitting grid pattern on all decks. However, to obtain effective and efficient utilization of available hold space, the helicopters may require positioning where undesirable tiedown angles helicopter to deck exists. Should this occur, tiedown fittings as shown in figures 4-8 and 4-30, are installed on the deck of the RORO ship where they are required. When installing additional tiedown fittings, the load configuration and desired restraint pattern must be considered to achieve the most effective results.

NOTE

Although the 45º-45º angle for tiedown restraint devices are considered optimal, lesser or greater angles may be used in combination to achieve a safe tiedown arrangement. Seldom will it be possible to obtain optimum tiedown patterns for helicopters on RORO ships that are built primarily to transport trucks, semitrailers, and other wheeled and tracked vehicles.

★ *b. Helicopter Preparation.* Preserve and prepare the UH-1D/H for shipment in accordance with TM 55-1520-242-S and/or special instructions provided by TSARCOM for the type shipping being used. Specific disassembly requirements will be determined after the desired load configuration is determined. The two specific degrees of preparation and preservation required for UH-1D/H helicopters, dictated by the stowage location and load configuration for the RORO ship are as follows:

★ (1) *Minimum preservation and preparation.* Preserve and prepare the UH-1D/H for shipment in accordance with TM 55-1520-242-S and/or special instructions provided by TSARCOM for the type shipping being used.

(a) UH-1D/H helicopters facing away from a bulkhead and placed side-by-side in a hold of the RORO ship require removal of the whip antennas and synchronized elevators. The removed components are stowed in the cargo compartment of the helicopter from which they are removed. The helicopter is then stowed as shown in figures 5-26 and 5-27. A limited number of MTMC helicopter positioning devices, shown in figure 5-26, are available for marine vessel loadings. East coast devices are controlled by Military Traffic Management Command Eastern Area, ATTN: MTE-IT, Bayonne, NJ 07002. West coast devices are controlled by Military Traffic Management Western Area, ATTN: MTW-ITX, Oakland, CA 94626.

(b) UH-1D/H helicopters facing a bulkhead in a hold of the RORO whip require removal of the whip antennas, synchronized elevators, main rotor blades, and one tail rotor blade, as shown in figure 5-28 and 5-29.

(2) *Maximum preservation and preparation.* Installation of protective covering (rediscover) is required for transport above the weather deck, as shown in figure 5-30. UH-1D/H helicopters stowed on the weather deck or hatch covers of a RORO ship require removal of the whip antenna, synchronized elevators, main rotor blades, and tail rotor blades. Rotor blades are stowed in rotor blade containers and the rotor head is stowed in the cargo compartment with the synchronized elevators of the helicopter from which they were removed.

5-16. Loading

Lifting the UH-1D/H helicopters on board and into the hold of a RORO ship is described in paragraph 5-14b. The number of UH-1D/H helicopters to be positioned in any particular hold of a RORO is determined by the prestow plans to use effectively the available space on board the ship. To place the maximum possible number in a hold, the first helicopter is positioned next to the sweat boards (or side of the ship), generally with the tail toward the bulkhead, allowing the main rotor blades to remain installed on the helicopter. The second helicopter is positioned with its nose toward the bulkhead and is moved sideways as close as is practical to the first. The positioning requires that the main rotor blades of the second helicopter be removed. While using ground-handling wheels in confined areas, movement of the helicopter is restricted to fore and aft motion; therefore, a

★ *Table 5-5. Time Breakdown for the UH-1H Unloading*

Phase	6 UH-1H w/rotor removed			3 UH-1H w/rotor		
	Man-hrs	*Men rqr*	*Clock-hrs*	*Man-hrs*	*Men rqr*	*Clock-hrs*
Remove tiedowns	0.10	2	0:03	0.10	2	0:03
Unload	1.36	8[1]	0:10	1.06	8[1]	0:08
Reassemble[2]	5.94	3	1:58	0.17	2	0:05
Subtotal	7.50	NA	2:11	1.33	NA	0:16

[1] Unloading includes helicopter rigging and unloading, and main rotor system rigging and unloading.

[2] Reassembly times include removal of all preservation materials, installation of all removed components, technical inspections and test flight.

helicopter-positioning device that will allow lateral movement is required to place each helicopter close enough to the next helicopter to achieve an efficient stowage pattern. The square foot requirement for positioning seven UH-1D/H helicopters with only the fore-and-aft movement of the ground-handling wheels is 4,042 square feet (376 m^2). Using identical skid spacing distances, removing the synchronized, and using a helicopter-positioning device, 13 UH-1D/H helicopters can be stowed in the same 4,042 square feet (376.1 m^2) of deck space. The differences in stowage patterns are shown in the stowage diagrams in figure 5-31, and the actual load of minimum-disassembly high-density stowage is shown in figure 5-27.

5-17. Tiedown

In addition to the guidance of paragraph 5-15 for selection of existing tiedown fittings and for installation of tiedown fittings necessary to achieve effective restraint, standard ship's gear should be used to secure the helicopters and rotor blade containers, as shown in figure 5-20. Each ship carries on board, as part of its provisional equipment, quantities of 10K and 35K restraint devices. In general the appearance of both the 10K and 35K are identical, but the 35K is larger in diameter and weight. Generally, the load-rated capacity is imprinted on the over-center locking lever.

CAUTION

Only 10K restraint devices should. be used to secure UH-1D/H helicopters. Excessive tensioning may cause damage to the helicopter tiedown fittings and fuselage frames. The use of 35K will substantially increase the possibility of damage to the helicopter.

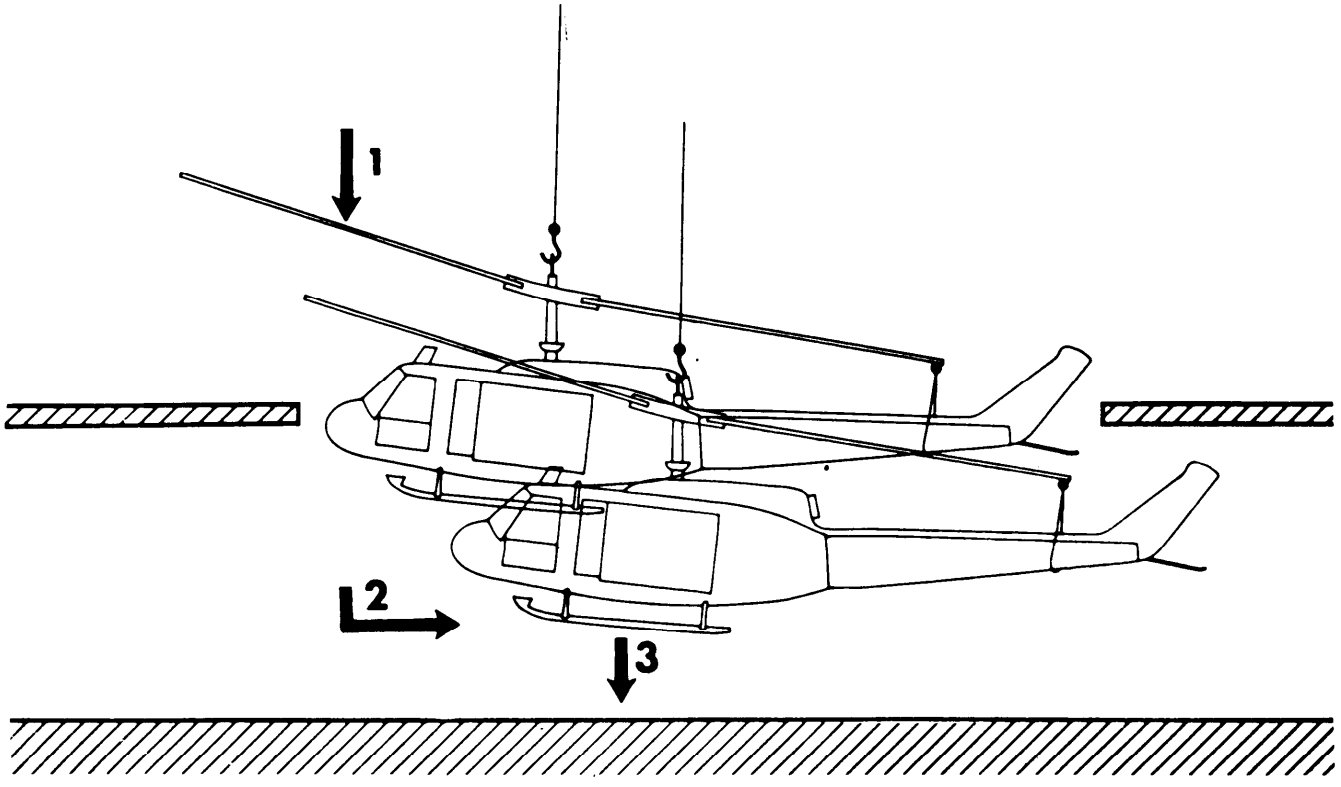


Figure 5-22. Three-step procedure for lowering UH-1D/H helicopters (with main rotor blades) through the ship's hatch.

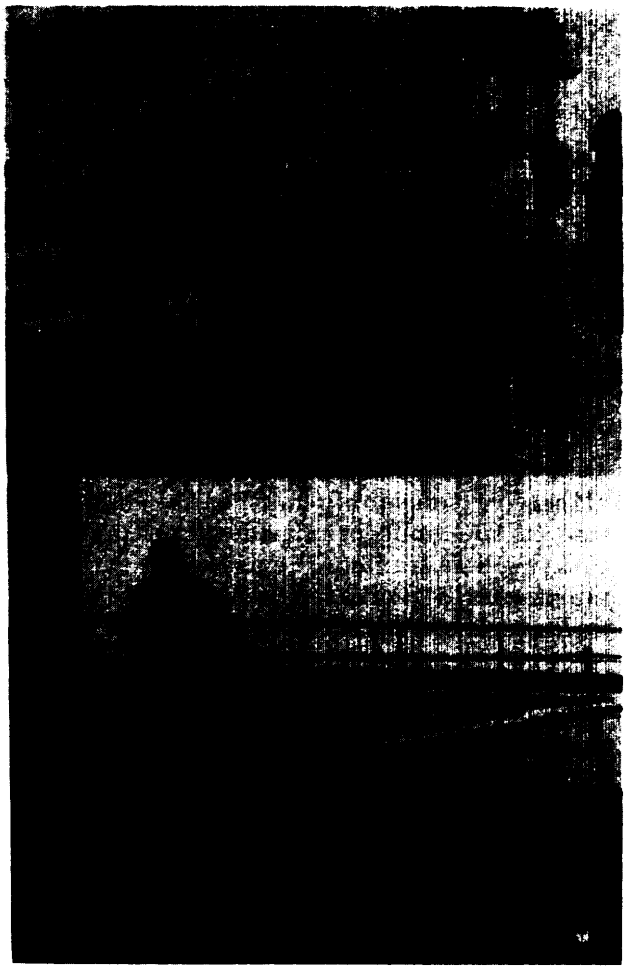


Figure 5-23. As UH-1D/H is lowered through ship's hatch, stevedores guide the nose and tail through the hatch opening to prevent contact with the hatch or hatch covers.

Figure 5-24. Once the tail is below the overhead structure of the hold, the helicopter is moved backwards into the wing until the main rotor (guided by the stevedores) is in the square of the hatch.

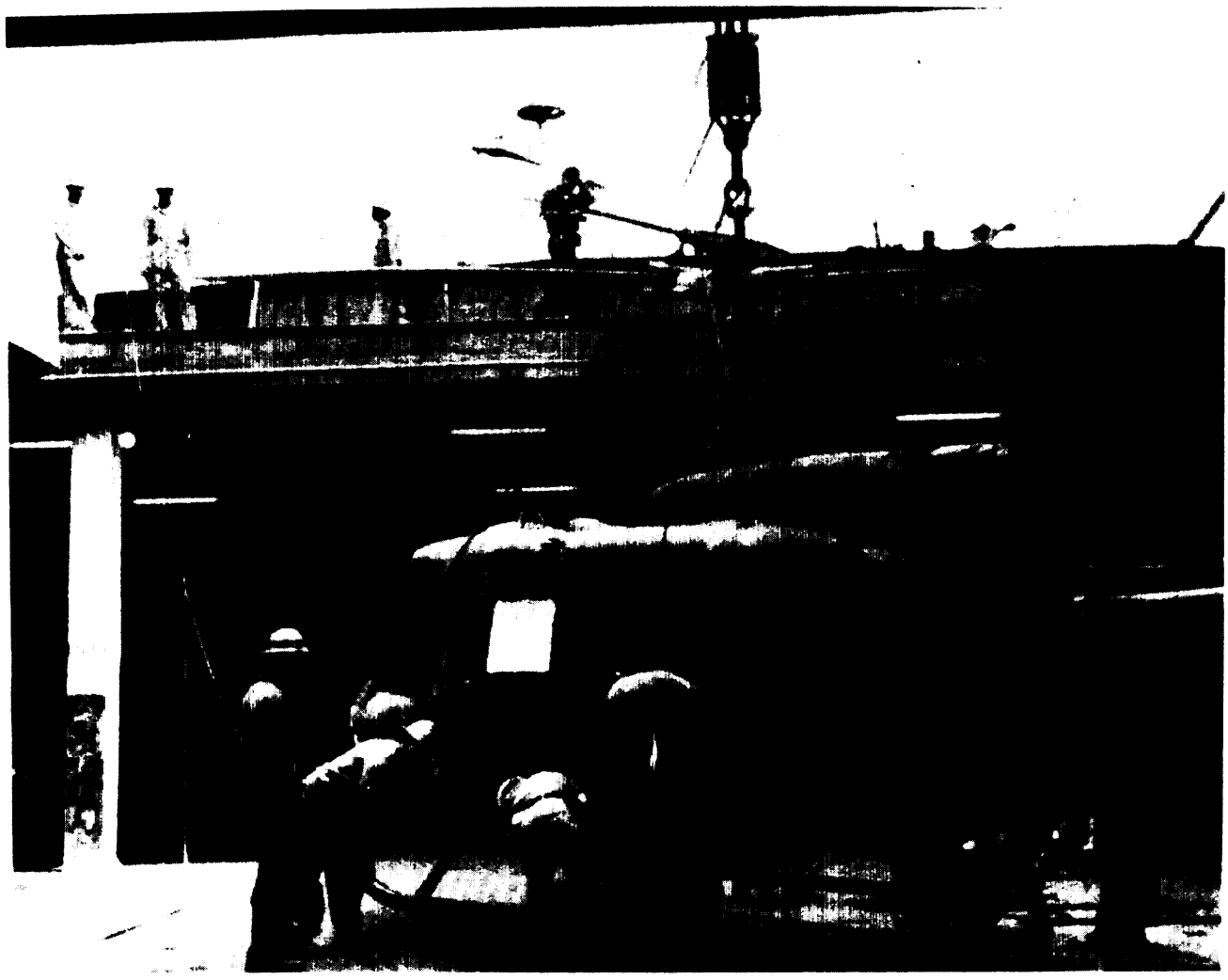


Figure 5-25. The helicopter is then lowered onto the deck, ground-handling wheels or helicopter-positioning device is installed and the helicopter is unhooked and moved to its storage position.

★ *Figure 5-26. MTMC Helicopter-positioning device attaches to skids and lifts the helicopter clear of the deck, allowing the helicopter to be moved in any direction.*

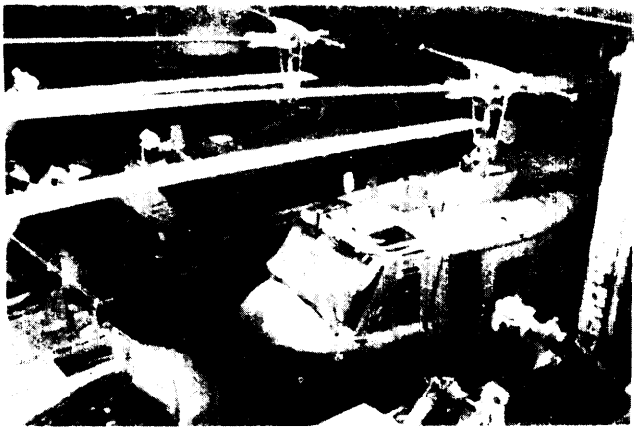


Figure 5-27. Minimum disassembled UH–1D/H helicopters stowed fore and aft in the hold of a RORO ship (removed synchronized elevator is stowed in the cargo compartment of the helicopter).

Figure 5-28. UH–1D/H helicopters with whip antennas, synchronized elevators, main rotor blades, and tail rotor blades removed and stowed in the hold of a RORO ship.

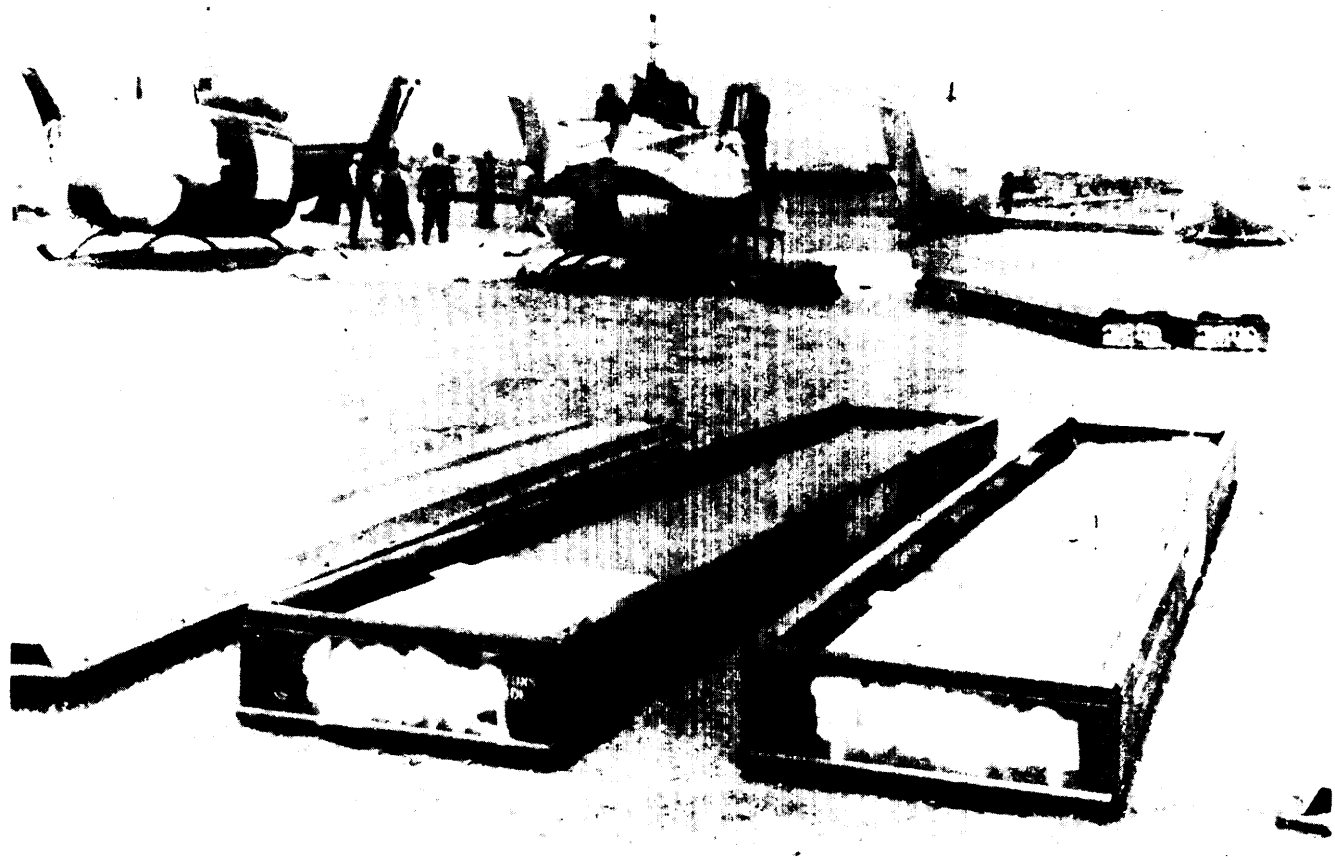


Figure 5–29. The two UH-1D/H helicopters at the upper left are minimum preserved. The two UH-1D/H helicopters at the upper might are maximum preserved with rediscovers installed. For both minimum and maximum preservation, the main rotor blades are placed in the rotor blade containers in the foreground.

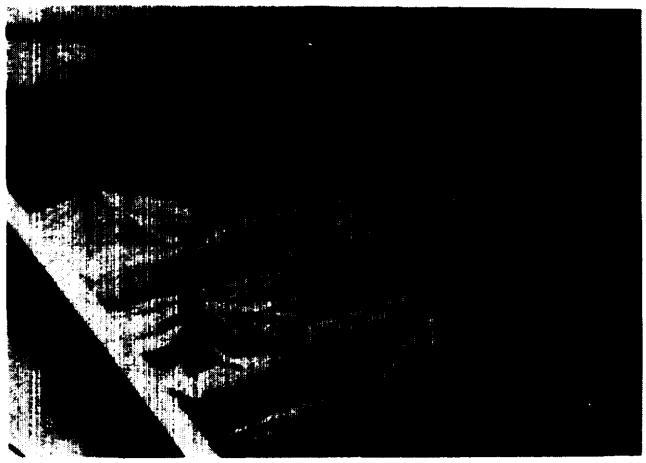


Figure 5-30. UH-1D/H helicopter in redi-covers stowed on hatch cover of a RORO ship.

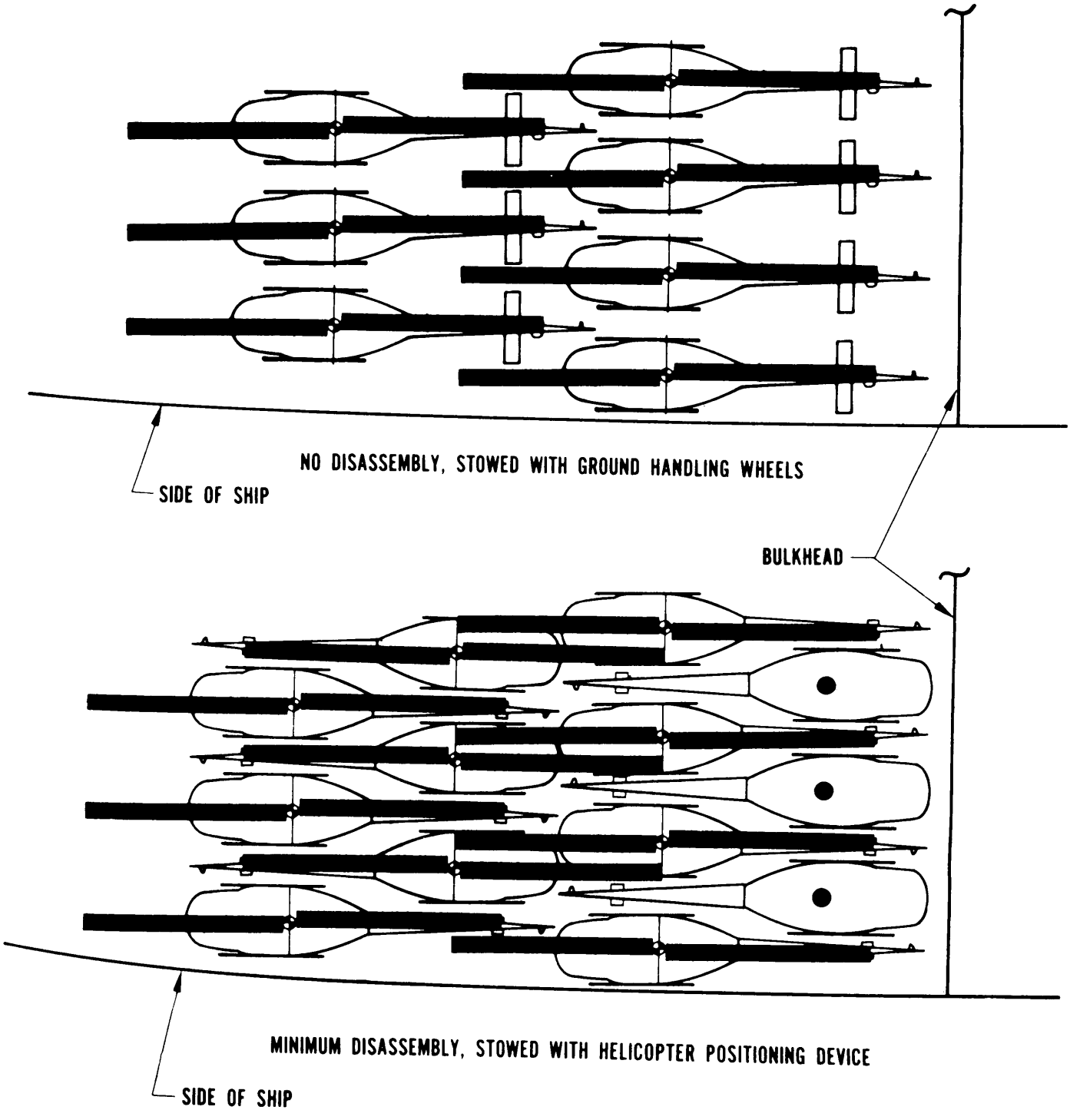


Figure 5-31. Stowage space requirement comparison without disassembly using ground-handling wheels, us opposed to minimum disassembly using a helicopter-positioning device.

CHAPTER 6

TRANSPORTABILITY GUIDANCE, AH-1G/Q/S HELICOPTERS

CAUTION

TM 55-1500-339-S will be consulted before any disassembly and loading takes place.

★ **NOTE**

Although AH-4 helicopters can be sectionalized to be shipped in 35- and 40-foot (10.6- and 12-meter) containers, it is not considered practical to do so. The degree of sectionalization and support equipment required offsets the advantages of container transport.

★ Section I. TRANSPORT OF EIGHT AH-1 HELICOPTERS IN LASH LIGHTER WITH WINGS REMOVED

6-1. General

a. Operational Area. The operational area required for helicopter disassembly and loading is the same as that discussed in paragraph 5-12 and as shown in figure 5-1.

★ *b.* **(Deleted)**

c. Materials Required.

(1) Crane and boom requirements are the same as those discussed in paragraph 4- 5c(1).

★ (2) Major items of equipment and material for preparation and reassembly of the AH-1 helicopter for loading the LASH lighters are identified in table 6-1.

6-2. LASH Lighter and Helicopter Preparation

a. LASH Lighter Preparation. Tiedown fittings (fig 4-8) must be welded to the deck of the LASH lighter prior to loading, as indicated in figure 6-1 (eight AH-1 helicopters with wings, rotor blades, and elevators removed). Interior of the lighter must be clear of dunnage, debris, water, and so forth.

★ *b. Helicopter Preparation.* The AH-1 helicopter requires no special preparation other than disassembly and preservation, discussed in paragraph 6-3 and 6-4. Helicopter fuel tanks must be approximately three-quarters full. Batteries must be disconnected and terminals taped to prevent accidental discharge of the battery.

WARNING

Refer to TM 55-1520-221-10 and -20 for jettison system for AH-1 armament subsystems.

Table 6-1. Major Items of Equipment for Preparation and Reassembly Of AH-1 Helicopters for Loading in LASH Lighter

Nomenclature	*NSN*	*Quantity per 5 helicopters* ★
Stand, maintenance	4920-00-435-7838	As required
Ladder, step	Not applicable	As required
Wheels, ground-handling	1730-00-980-9552	1 set
Bar, tow	1730-00-967-9556	1
Fitting, air transportability tiedown	1730-00-157-0810	2 per aircraft
Flag, tracking	Local manufacture	1
Gauge, trim tab	5120-00-919-2374	1
Hammer, rubber	Unknown	1
Toolkit, aircraft mechanic, general	5180-00-323-4692	1
★ Wrench	5120-00-044-1426	1
Puller, main rotor pin	Local manufacture	1
Socket, drag bolt	5120-00-035-7429	1
Socket, wing bolt	5120-00-549-5853	1
Wrench, box end, 15/16-inch	5120-00-204-2670	1
Socket, 15/16-inch	5120-00-935-7425	1

Table 6-1. Major Items of Equipment for Preparation and Reassembly Of AH-1 Helicopters for Loading in LASH Lighter–Continued

Nomenclature	NSN	Quantity per 5 helicopters*
Socket, 1 ¼-inch	5120-00-935-7429	1
Wrench, box end, 1_-inch	5120-00-184-8676	1
Ratchet, 2_-inch	Not applicable	1
Breaker bar 1 ½ -inch	Not applicable	1
Wrench, torque 150/600/750/1600 in-lb	Not applicable	1 ea
Blocks, rotor head	Local fabrication	2
★ Compound, preservative, MI L-C-16173, grade 2	8030-00-244-1297	1-gal
★ Compound, cleaning	6850-00-935-0996	5-gal
★ Paper Barrier, MTL-B-121	8135-00-753-4661	100-yd roll
★ Oil, lube, MIL-L-6081, grade 1010	9150-00-273-2388	qt
★ Compound, corrosion preventive, MI L-C- 11796, class 3	8330-00-231-2353	5-lb can
★ Bag, packing, water, vaporproof, MIL-B-117	8105-00-274-2390	8
★ Rope, grass, 3/8-inch	4020-00-231-9021	As required
★ Tape, cloth, 2-inch	7510-00-074-5124	roll
★ Cushioning material, polypropylene foam, PPP-C-1747	8135-00-4905	100-ft roll
★ Cushioning material, polyethylene foam, PPP-C-1752	8135-00-180-5922	100-ft roll

**Quantities are approximate and will be adjusted to meet local requirements of the moving unit, port, and ship system used.*

6-3. Disassembly

★ NOTE

Shipping the AH-1 helicopter with wing stores in place significantly reduces the preparation for shipment and reassembly times. Planners should consider shipping the AH-1 helicopter with wing stores installed when rapid tactical employment is required. Section II of this chapter addresses the shipment of AH-1 helicopters with wings on.

a. Eight AH-1 Helicopters. Loading of eight AH-1 helicopters in a LASH lighter requires concurrent common disassembly after their arrival at the preparation site. Disassembly includes removal of main rotor blades, stub wings, one tail rotor blade, synchronized elevator, and armament subsystems, if installed. Main rotor head and blades are removed as one assembly and placed in the lighter as shown in figures 6-2, 6-3, and 6-4. Preserve and cushion removed components in accordance with TM 55-1500-339-S. AH-1 tiedown points are shown in figure 6-5.

b. Tiedown fittings on AH-1 helicopters. Fittings are identified in figure 6-5.

6-4. Preservation

Preserve and prepare the AH-1 for shipment in accordance with TM 55-1500-339-S and/for special instructions provided by TSARCOM for the type shipping being used.

8-5. Loading

a. Lowering the 45-foot-2.2-inch helicopter through the 44-foot-lighter hatch opening requires special rigging of the AH-1 helicopter. The helicopter must be rigged in a nose-low attitude to allow the nose to be "tucked" under the lighter coaming. The necessary nose-low attitude is achieved by attaching a nylon strap (or equivalent) through the hold in the tail boom, made available by removing the synchronized elevator, and by attaching the rigging strap to the crane hook as shown in figure 6-6. The helicopter need only be 5- to 10-degree nose-low to provide the necessary clearance for loading. This rigging technique places little stress on the tail boom or transmission mount deflection.

b. The loading and positioning sequence shown in figures 6-7 and 6-8 must be followed exactly. The first items loaded are the CONEX or other containers. The next items loaded are the main rotor blade assemblies of helicopters 1 and 2 followed by the helicopters 1 and 2, which are placed astride their respective main rotor blade assemblies. The rotor blade/helicopter sequence is followed throughout the loading process. The right landing skid of helicopter 3 is interlaced with the left skid of helicopter 1 (fig 6-9) astride the rotor blades for helicopter 3 and 4. Helicopters 3 and 7 are loaded astride rotor blades, and when the landing skids come to rest on deck, the tail boom rigging for nose-low attitude is removed. The helicopter is then lifted 6 inches (15 cm), and the tail rotor pylon is tucked beneath the lighter coaming as it is swung aft (fig 6-10). Clearances and positions must be maintained as described in figure 6-11. Rotor blades for helicopters 4 and 5 are loaded; then the helicopters are loaded astride the blades. Rotor blades for helicopters 7 and 8 are loaded. The right landing skid of helicopter 7 is interlaced with the left skid of helicopter 5. Helicopter 7 is loaded astride the rotor blades for helicopters 7 and 8. Helicopter 8 is the

last item loaded, and it is placed astride the rotor blades. Tail booms of helicopters 4 and 7 may be positioned within 2 inches (5 cm) of helicopters 3 and 6 to provide greater clearance for loading helicopter 8. After helicopter 8 is loaded, tail booms of 4 and 7 are relocated to positions shown in figure 6-8.

6-6. Tiedown

NOTE

There are significant differences in AH-1 series tiedown points, especially the fuselage tiedown points. Each helicopter must be surveyed prior to loading to insure that the necessary panels and armament systems are removed and tiedown fittings are installed. Failure to survey for tiedown installation could result in unnecessary slowdown during loading and/or improper tiedown of the helicopter.

The eight AH-1 helicopters and main rotor blade assemblies are tied down as shown in figures 6-7 and 6-12. The center lighter hatch cover may be installed. Polyurethane is used to cover each open end of the lighter. Spacers, discussed in paragraph 5-5, are required for stacking lighters on board the LASH ship.

CAUTION

Excessive tension of tiedown devices will result in damage to the helicopter tiedown points.

★ *Table 6-2*

(Deleted.)

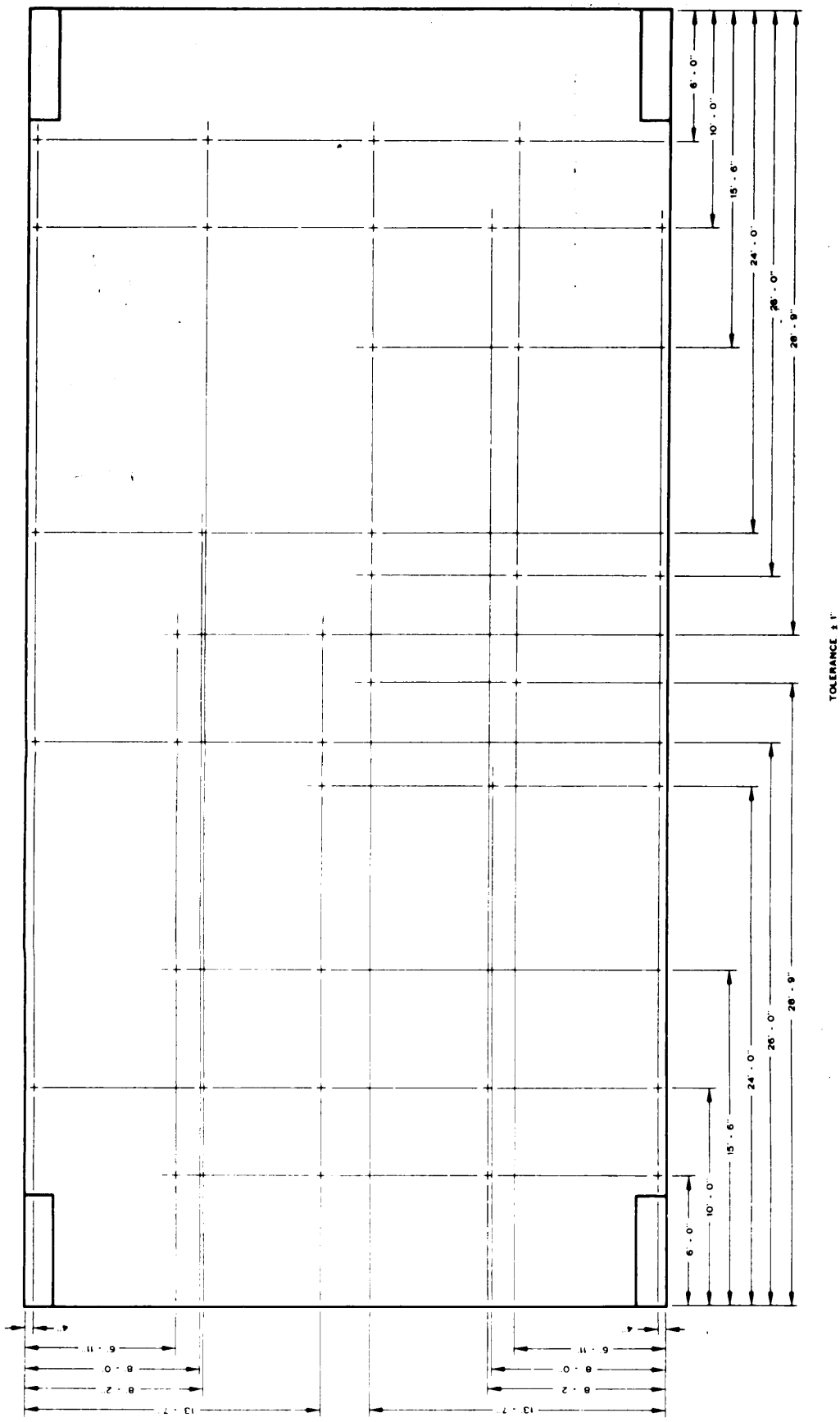


Figure 6-1. Tiedown positioning in LASH lighter for eight AH-1G helicopters.

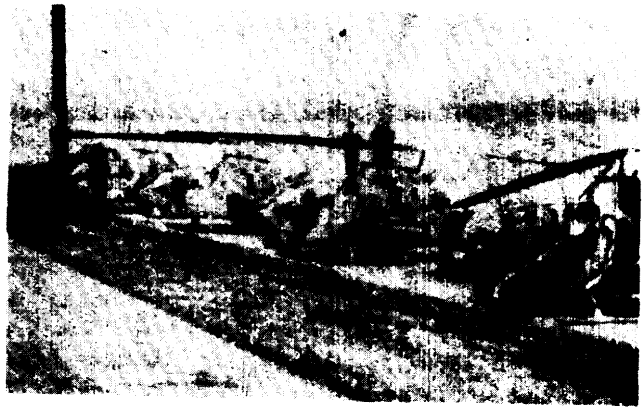
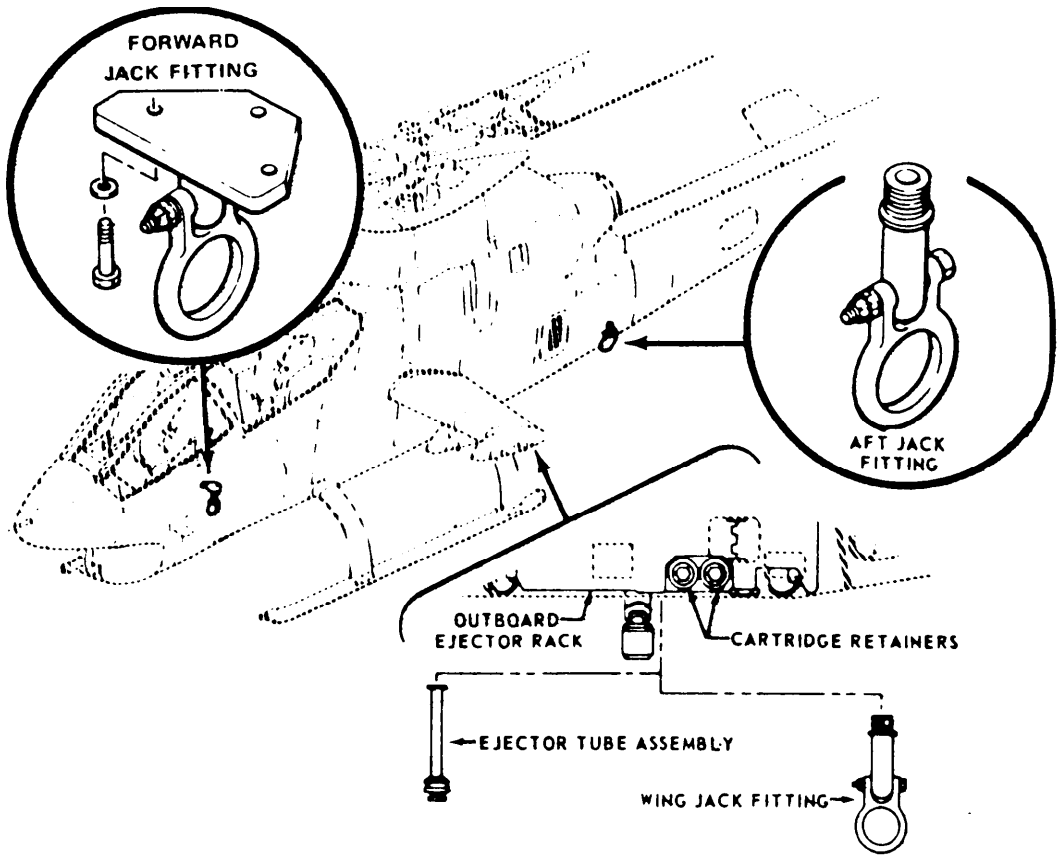


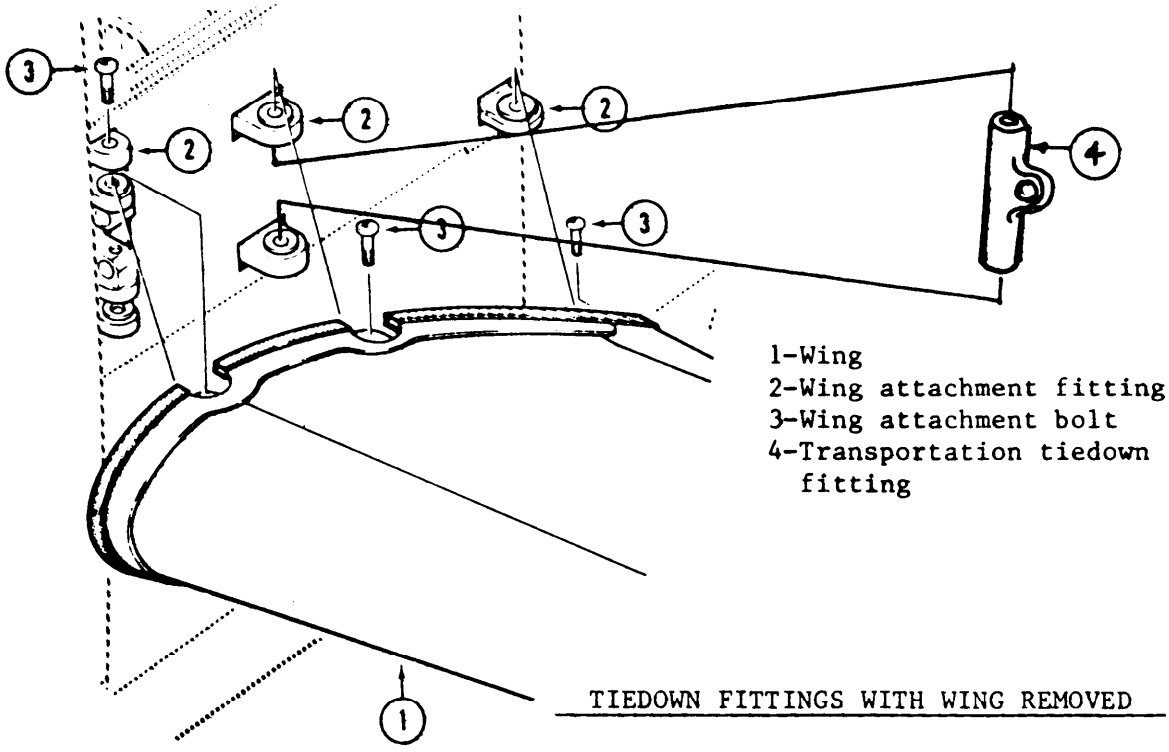
Figure 6-2. AH-1G helicopters on landing and disassembly area.

Figure 6-3. AH-1 main rotor system removed from helicopter being lifted to lighter. Note tag lines on rotor system and items stowed in cockpit.

Figure 6-4. AH-1G main rotor system loaded in lighter.



TIEDOWN FITTINGS WITH WING INSTALLED.



1-Wing
2-Wing attachment fitting
3-Wing attachment bolt
4-Transportation tiedown fitting

TIEDOWN FITTINGS WITH WING REMOVED

Figure 6-5. AH-1 tiedown fittings.

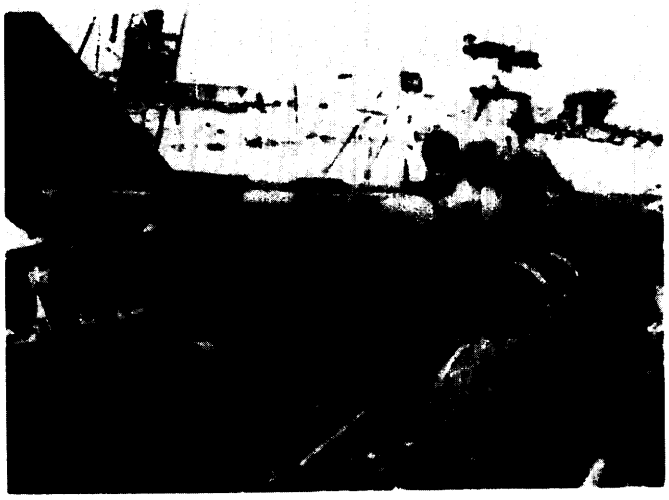


Figure 6-6. Placing nylon strap through synchronized elevator mounting hole and attaching to crane hook together with main lifting sling to provide eight-degree nose-low attitude.

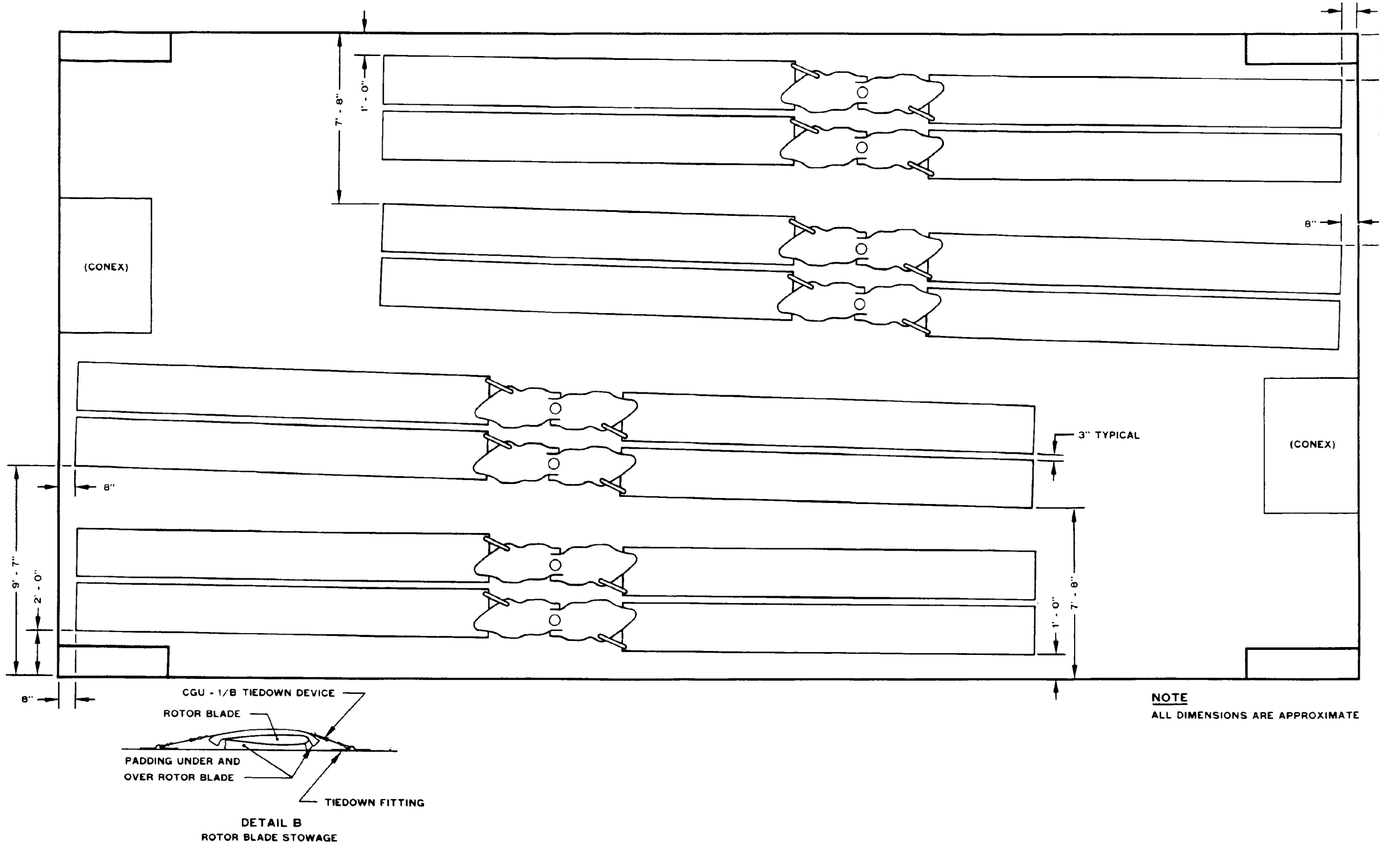
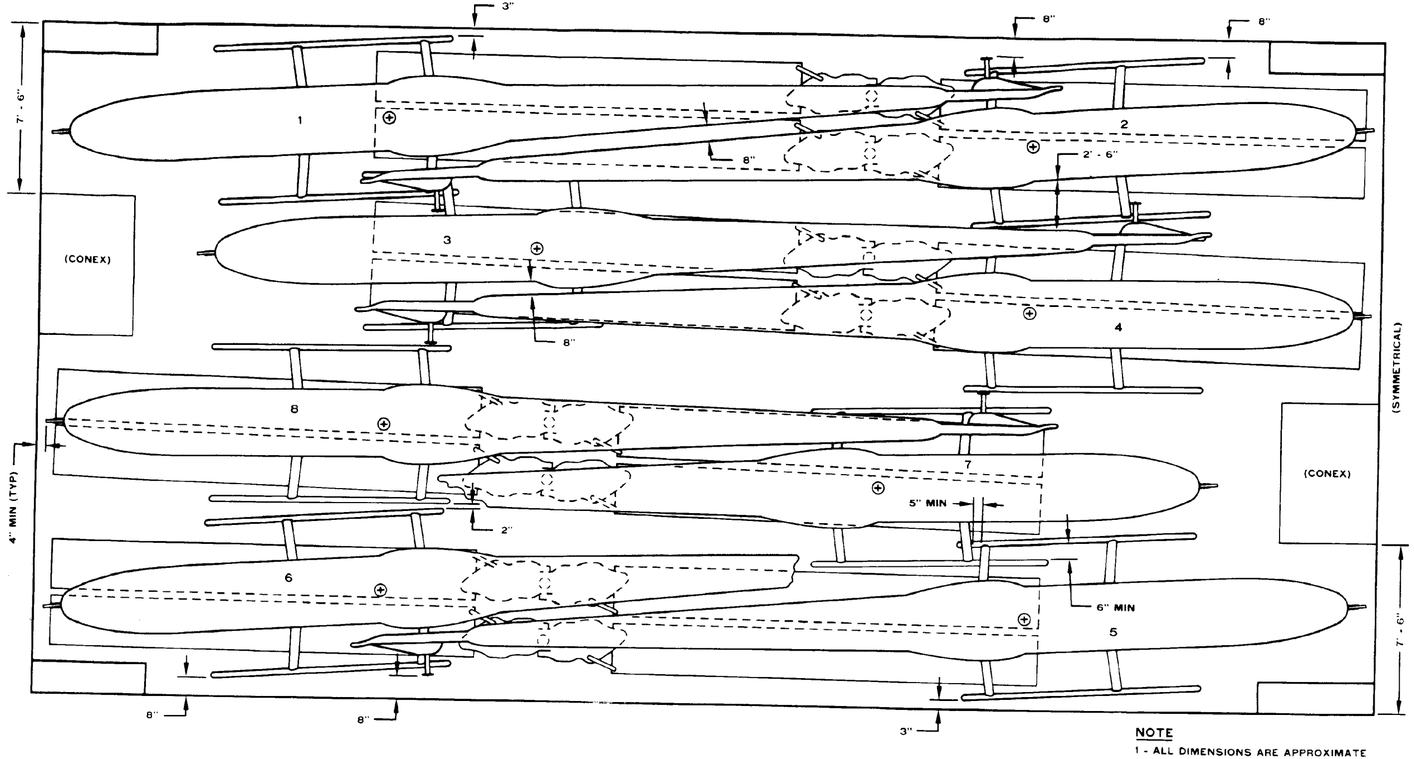


Figure 6-7. Positioning and tiedown diagram for main rotor assemblies for eight AH-1 helicopters in a LASH lighter.



NOTE

1 - ALL DIMENSIONS ARE APPROXIMATE

2 - THE TAIL BOOMS ON HELICOPTERS 6 AND 7 ARE NOT SHOWN TO PROVIDE CLARITY. NOTE SPECIFICALLY THE INTERLOCKING OF SKIDS ON HELICOPTERS 5 AND 7 (1 AND 3) AND SKID CLEARANCE BETWEEN HELICOPTERS 6 AND 8 (2 AND 4)

Figure 6-8. Loading sequence diagram for eight AH-1G helicopters in a LASH lighter.

Figure 6-9. Interlacing landing gear skids of AH-1 helicopters 3 and 1 or 7 and 5.

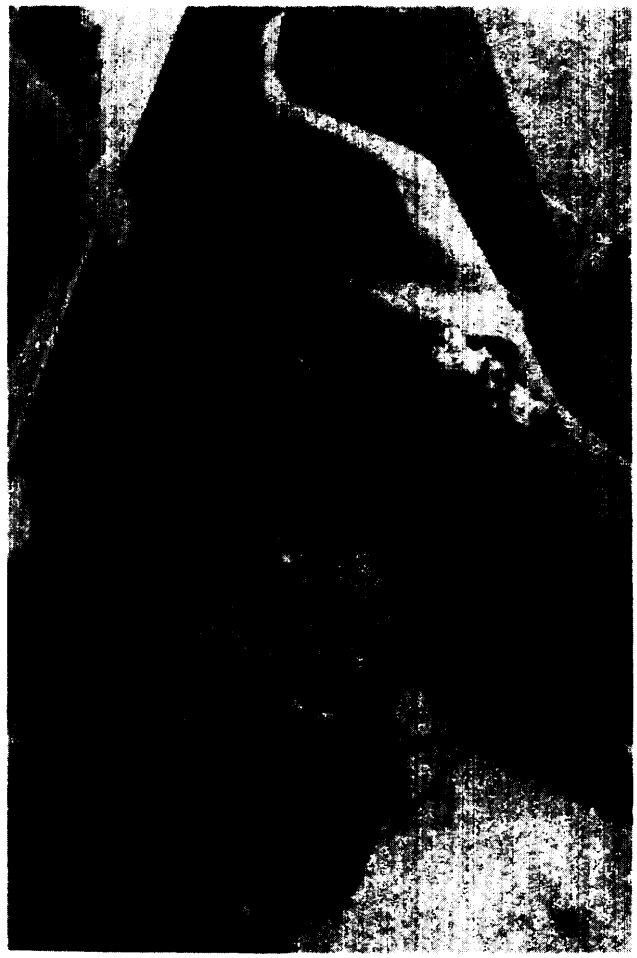


Figure 6-10. Tucking the tail fin of AH-1 helicopters 3 and 7 under the coaming girder.

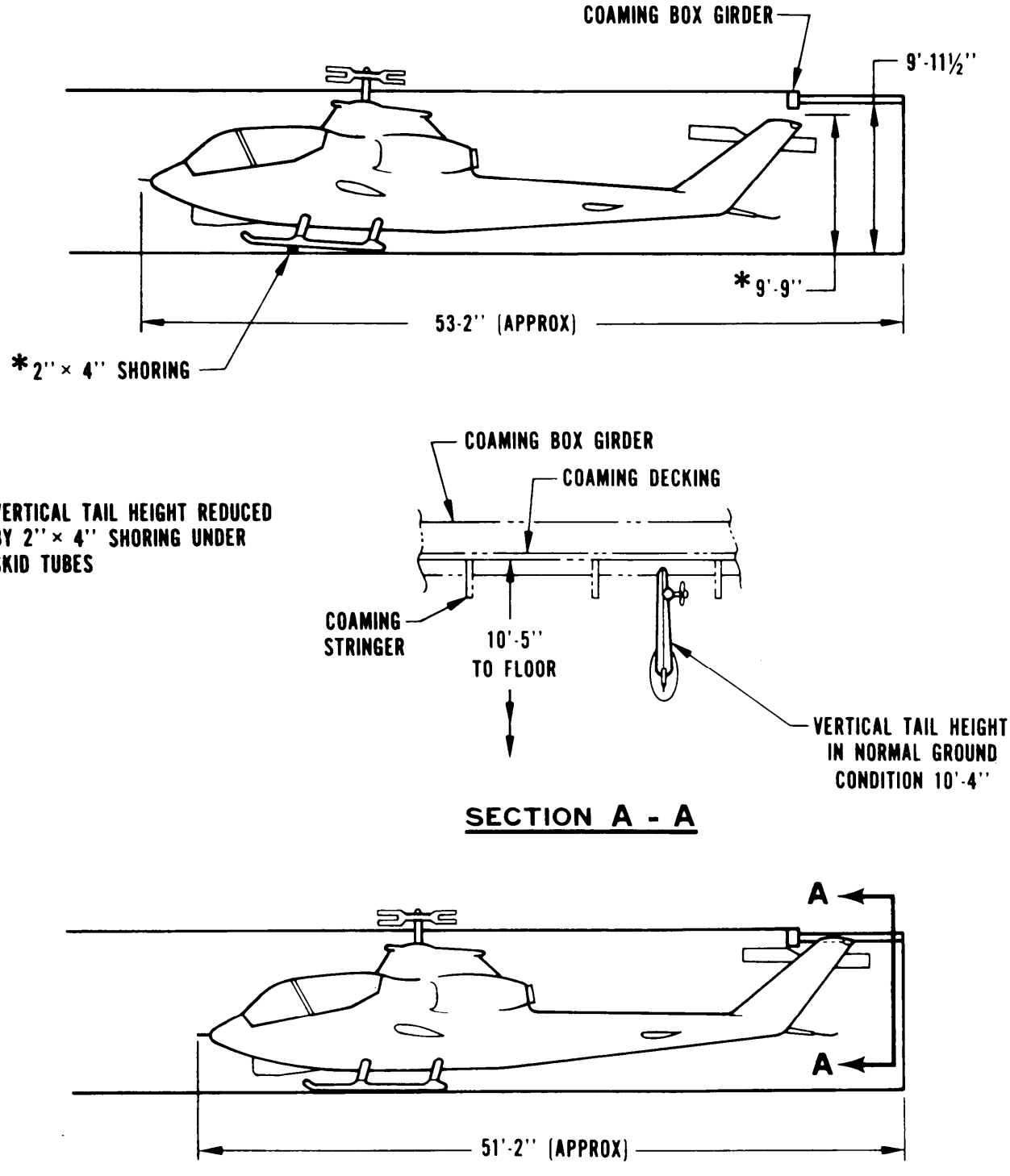
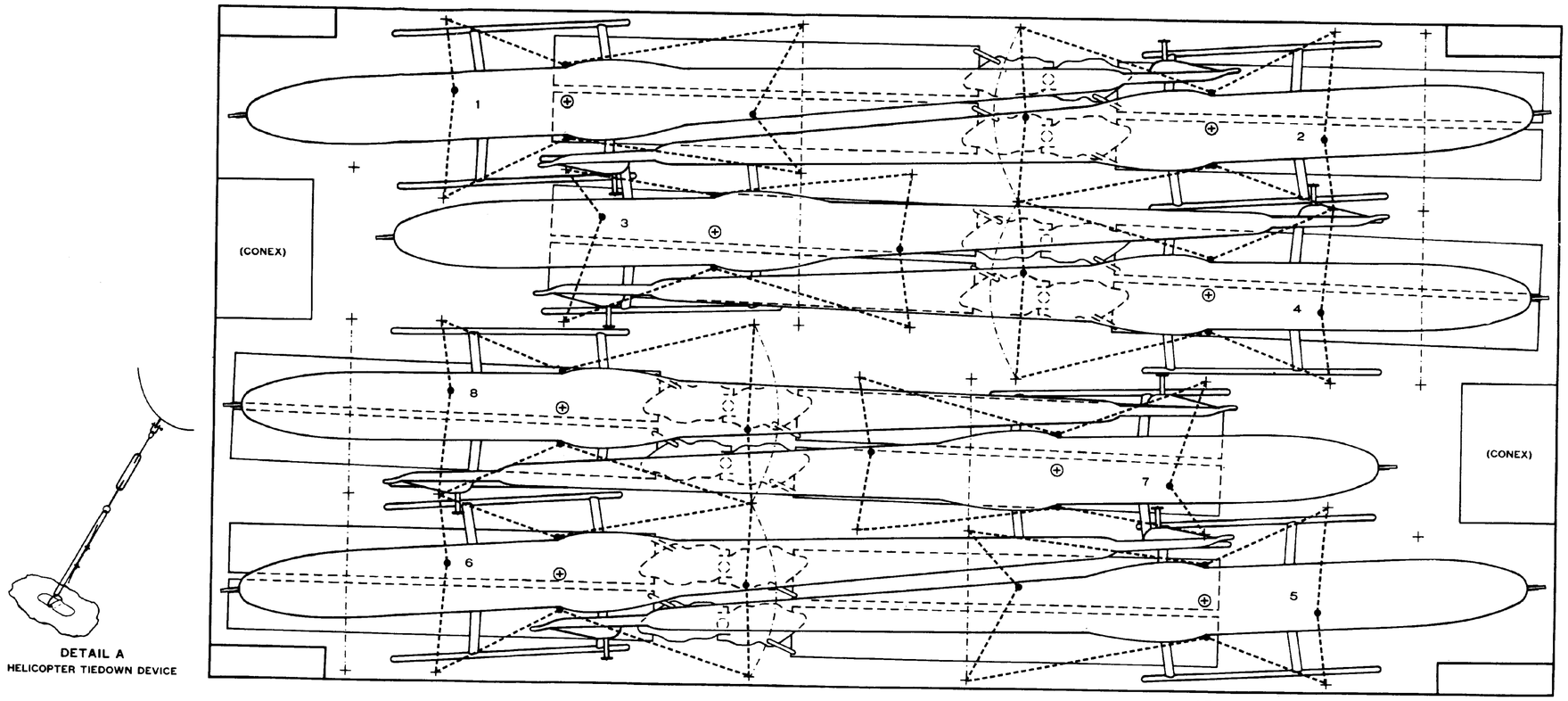


Figure 6–11. Diagram showing critical clearances for positioning AH-1 helicopters 3 and 7 in final stow location.



DETAIL A
HELICOPTER TIEDOWN DEVICE

LEGEND

- ● - TIEDOWN FITTING ON AH-1 HELICOPTER
- + - TIEDOWN FITTING WELDED TO THE DECK OF BARGE
- – – - TIEDOWN DEVICE SECURING HELICOPTER TO BARGE
- –·– - TIEDOWN DEVICE SECURING ROTOR BLADE TO BARGE

Figure 6-12. Tiedown diagram for eight AH-1 helicopters and main rotor blade assemblies in a LASH lighter.

Section II. TRANSPORT OF FIVE AH-1 HELICOPTERS IN LASH LIGHTER

6-7. General

Preparation and loading for five AH-1 helicopters, with wings installed in a LASH lighter, basically are the same as detailed in paragraphs 6-1 through 6-6, with the following changes:

a. Landing area may be reduced in length to 216 feet (65.8 m).

b. Major items of equipment required are reduced by those items for removal and installation of the wings.

c. Installation of tiedown fittings in accordance with figure 6-13 and loading sequence figures 6-14 and 6-15. The nylon strap described in paragraph 6-6a is attached to the tail skid using a double half-hitch knot to achieve a 5-to-10 degree nose-low attitude for loading the fifth helicopter through the hatch opening.

d. Disassembly, as described in paragraph 6-3a, is required for all five helicopters except that the stub wings are not removed.

e. Tiedown of the five AH-1 helicopters is in accordance with figure 6-16.

6-8. Preservation

Preserve and prepare the AH-1 helicopter in accordance with TM 55-1500-339-S and/or special instructions provided by TSARCOM for the type shipping being used.

Section III. TRANSPORT OF THE AH-1 HELICOPTER IN SEABEE BARGE

6-9. General

a. Operational Area. The operational area required for helicopter disassembly and loading is the same as that discussed in paragraph 5-1a and shown in figure 5-1. Extend the distance of the landing and departure sequence diagram shown in figure 6-1, to accommodate 14 helicopters. By landing the first four helicopters at one time, sufficient clearance between rotor tips is available to allow four helicopters simultaneously on final approach. The first two approaches will have four helicopters in each flight. The last two will have three helicopters in each flight. The landing sequence is as follows: 1, 5, 9, and 13; 3, 7, 11, and 14; all eight of these helicopters are landed, shut down, and blades are tied down prior to landing the remainder of the helicopters. Helicopters 2, 6, and 12 make their approach followed by 4, 8, and 10.

b. Disassembly. The AH-1 helicopters are disassembled as described in paragraph 6-3a except that the main rotor assembly is not removed from the six helicopters loaded facing the centerline of the barge and from helicopter 12 facing the end of the barge.

6-10. Preservation

All AH-1 helicopters are preserved as described in paragraph 6-4 “Preservation.” Tiedown fittings, figure 4-8, are welded to the deck of the SEABEE barge as shown in figure 6-17.

6-11. Loading

The AH-1 helicopters are loaded in accordance with figures 6-18 and 6-19. Main rotor blade assemblies removed from helicopters 2, 4, 6, 9, 11, 13, and 14 are loaded in the barge, as indicated in figure 6–18, and padded as in figure 6-4. The helicopters are then loaded in the sequence identified in figure 6-19. All installed main rotor blades are tied down fore and aft in a level position.

6-12. Tiedown

The 14 AH-1 helicopters and main rotor blade assemblies are tied down as shown in figure 6-20.

6-13. Unloading

Unloading is the reverse of the loading procedure sequence.

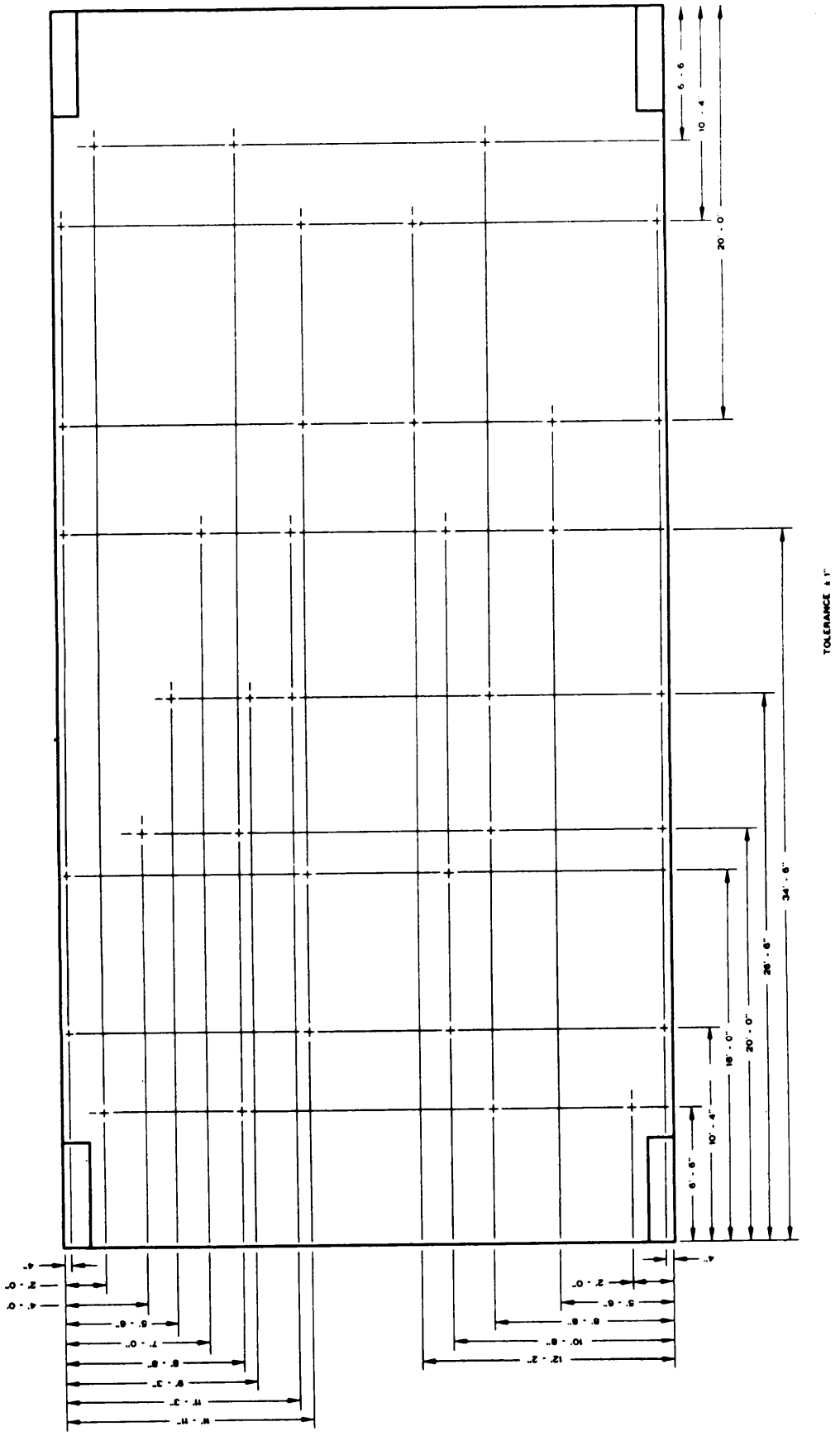


Figure 6–13. Tiedown position in LASH lighter for five AH–1 helicopters with wings.

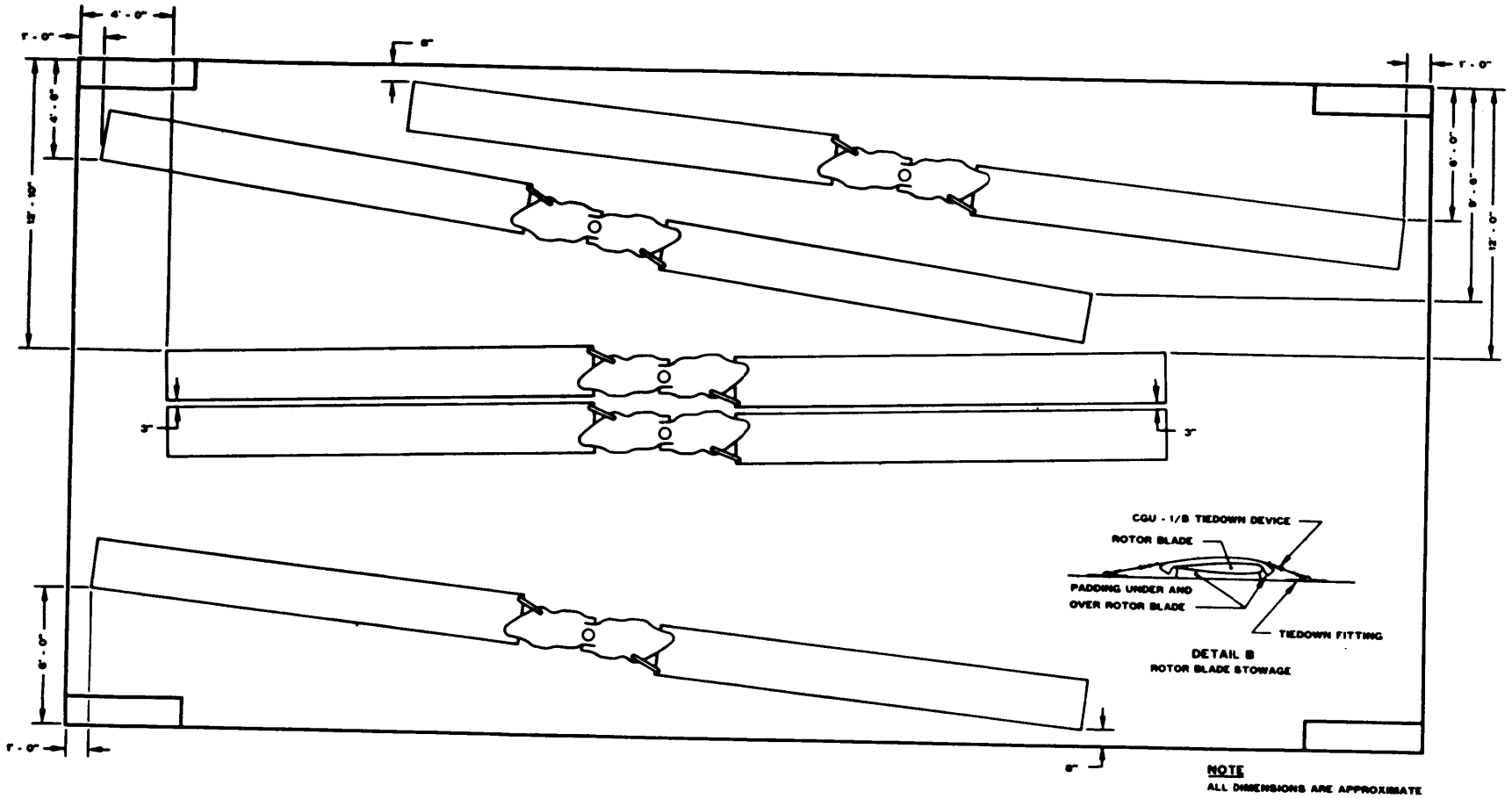


Figure 6–14. Positioning and tiedown diagram for main rotor assemblies for five AH–1 helicopters in a LASH lighter.

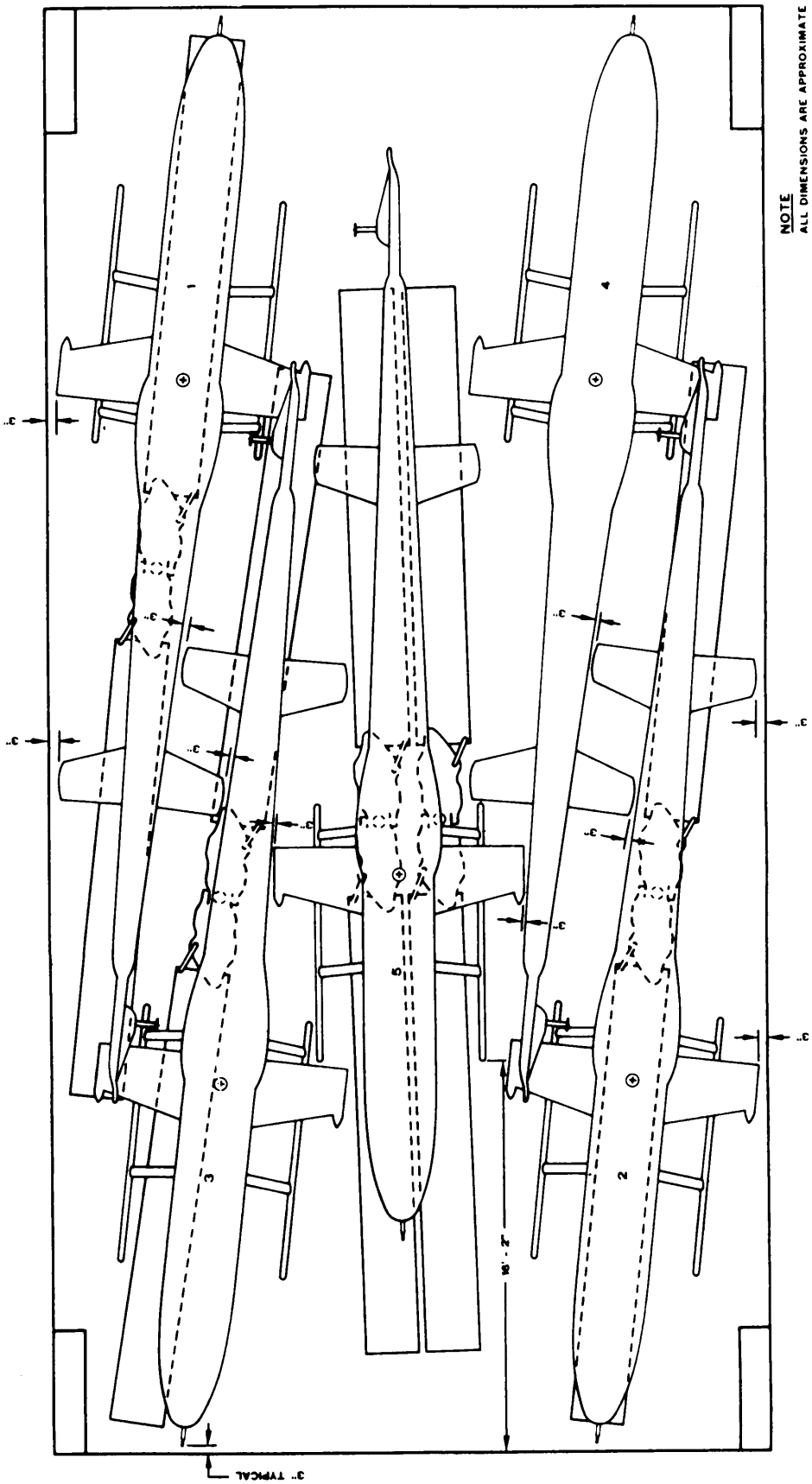
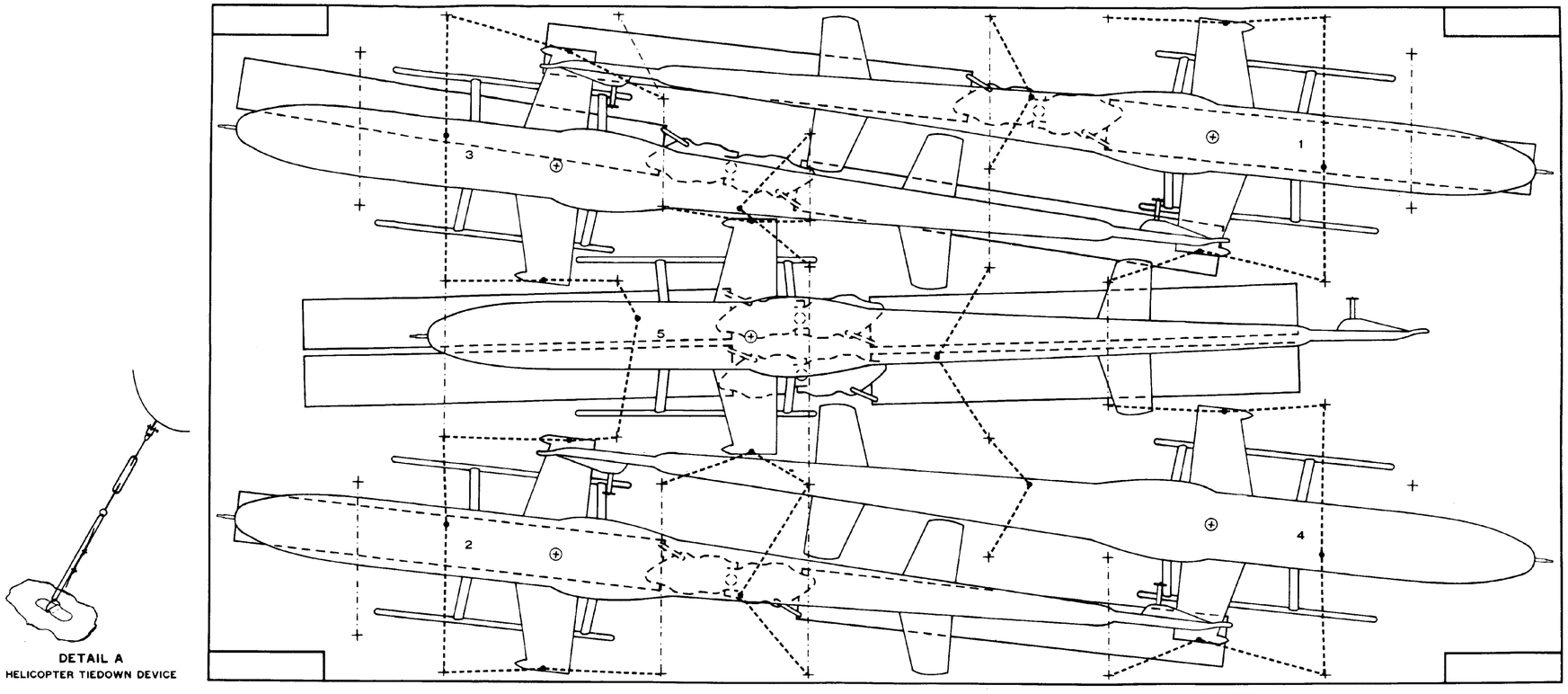


Figure 6–15. Loading sequence diagram for five AH–1 helicopters and main rotor blade assemblies in a LASH lighter.

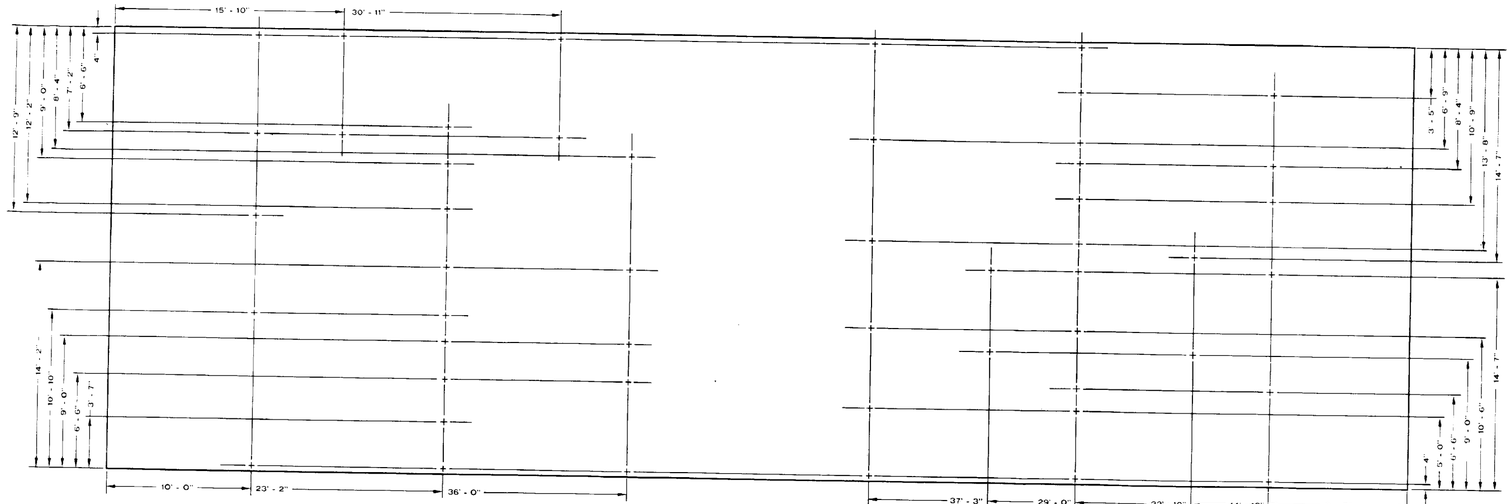


DETAIL A
HELICOPTER TIEDOWN DEVICE

LEGEND

- ● - TIEDOWN FITTING ON AH - 1 HELICOPTER
- + - TIEDOWN FITTING WELDED TO THE DECK OF BARGE
- – – - TIEDOWN DEVICE SECURING HELICOPTER TO BARGE
- –·– - TIEDOWN DEVICE SECURING ROTOR BLADE TO BARGE

Figure 6-16. Tiedown diagram for five AH-1 with wings and main rotor blades in a LASH lighter.



TOLERANCE: ± 1".

Figure 6-17. Placement of tiedown fittings in SEABEE barge for 14 AH-1 helicopters.

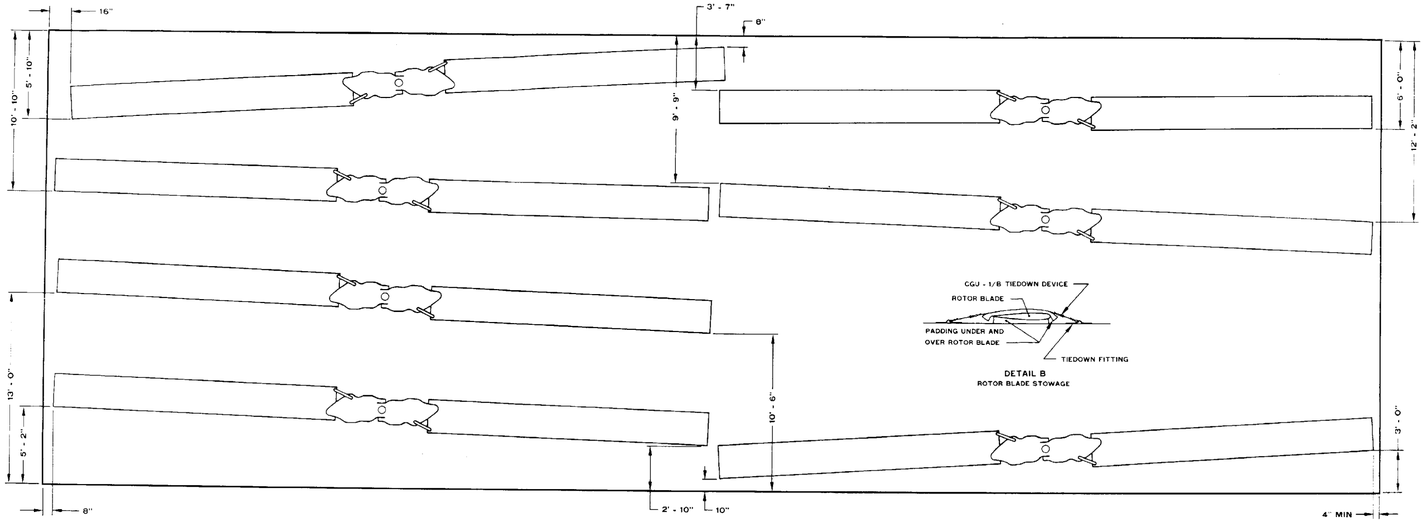
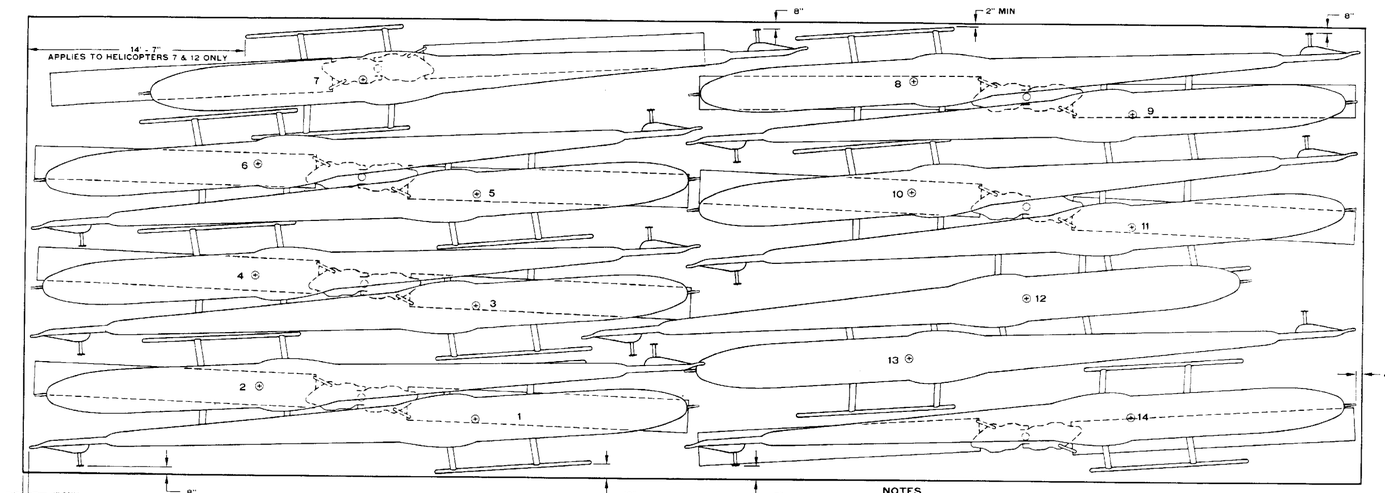


Figure 6-18. Loading of AH-1 helicopter rotor blade assemblies in SEABEE barge.



NOTES

1. MIN CLEARANCE BETWEEN HELICOPTERS 8"
2. MIN CLEARANCE BETWEEN HELICOPTER SKIDS 4"
3. HELICOPTERS 1,3,5,7,8,10&13 HAVE ROTOR BLADES INSTALLED (BLADES NOT SHOWN FOR CLARITY)
4. ALL DIMENSIONS ARE APPROXIMATE
5. LARGE NUMBERS INDICATE HELICOPTER LOADING SEQUENCE
6. ROTOR BLADES SHOWN ARE STOWED ON FLOOR OF BARGE.

Figure 6-19. Sequential loading of AH-1 helicopters in a SEABEE barge.

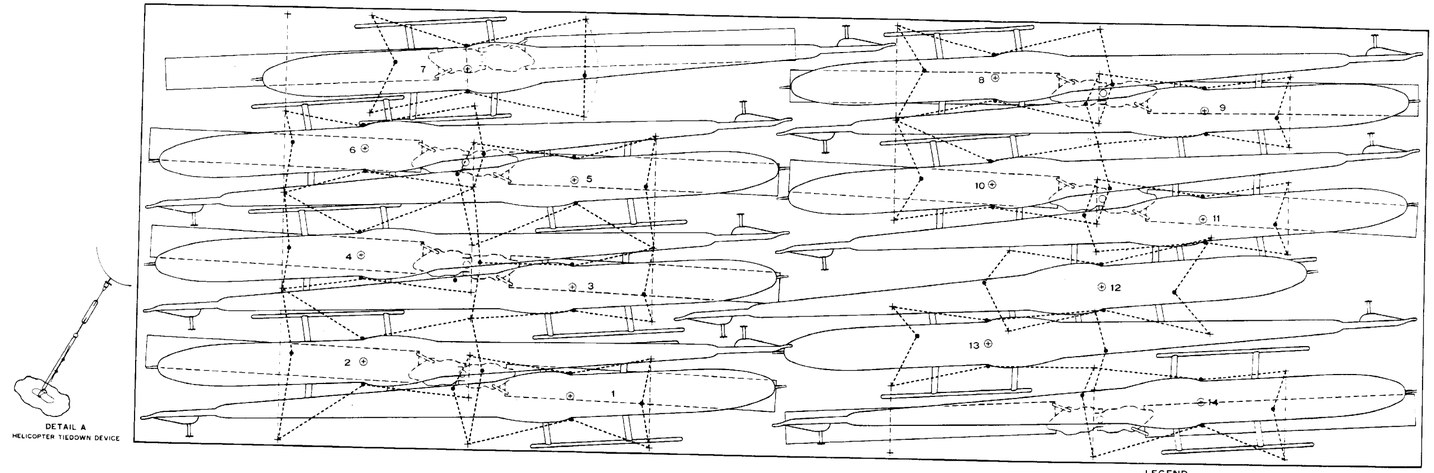
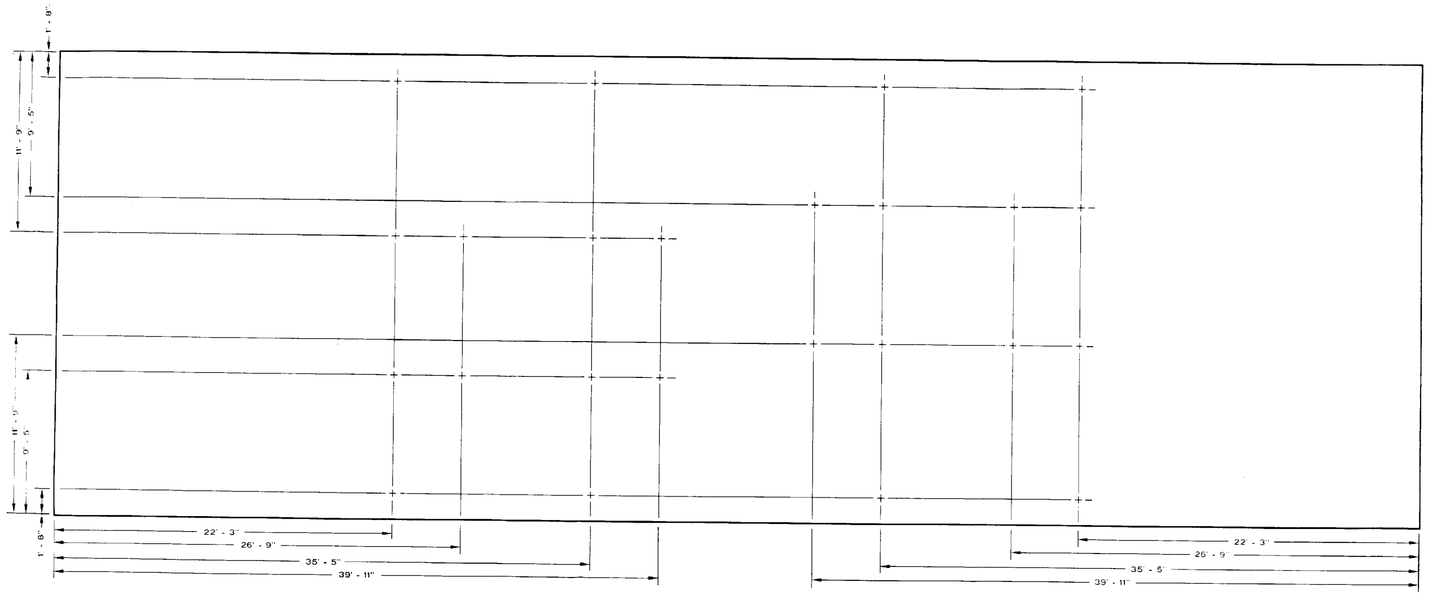
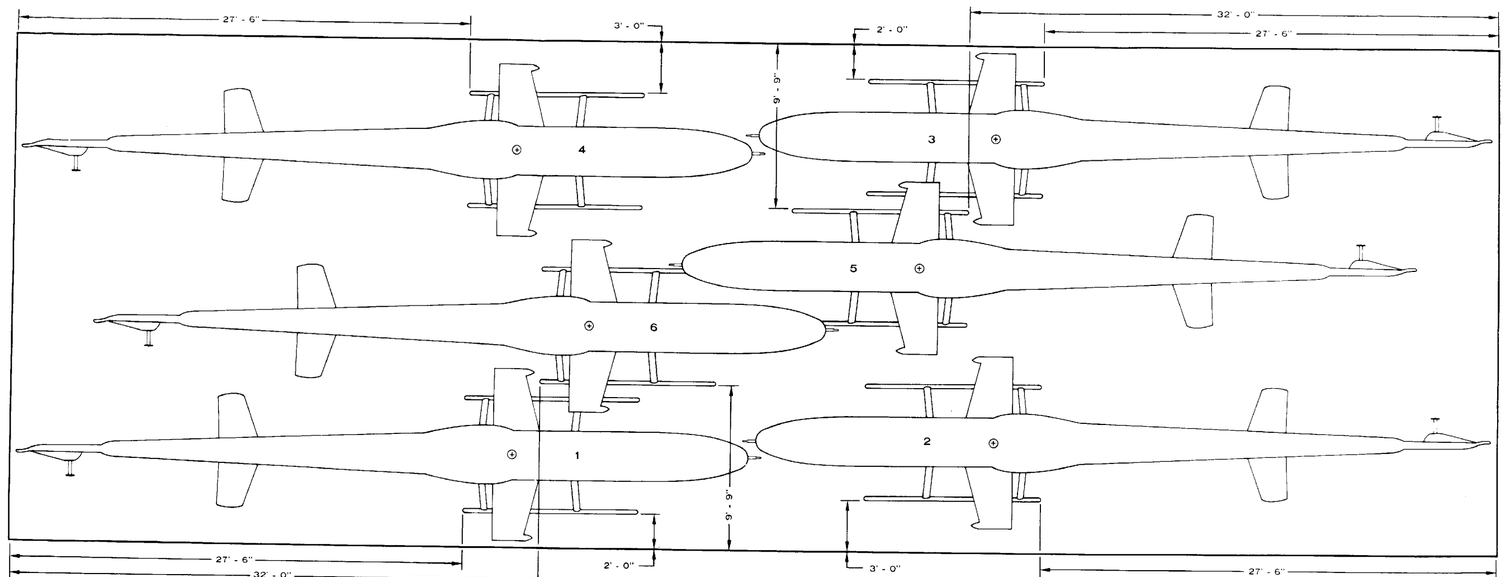


Figure 6-20. Tiedown diagram for 14 helicopter and rotor blade assemblies in a SEABEE barge.



TOLERANCE: ± 1"

Figure 6-21. Tiedown positioning in SEABEE barge for loading six AH-1 helicopters with wings.



NOTES

1 - ALL ROTOR BLADES ARE INSTALLED
2 - ALL DIMENSIONS ARE APPROXIMATE

Figure 6-22. Loading sequence diagram for six AH-1 helicopters with wings and main rotor blades in SEABEE barge.

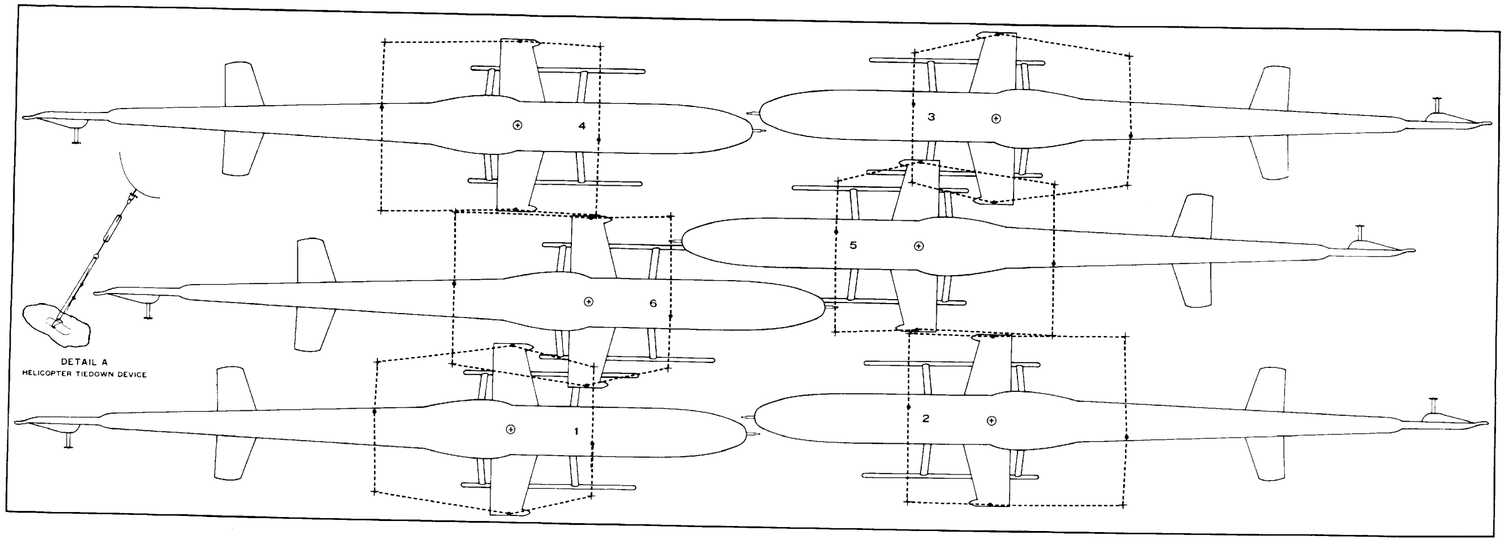


Figure 6-23. Tiedown diagram for six AH-1 helicopters with wings and main rotor blades in a SEABEE barge.

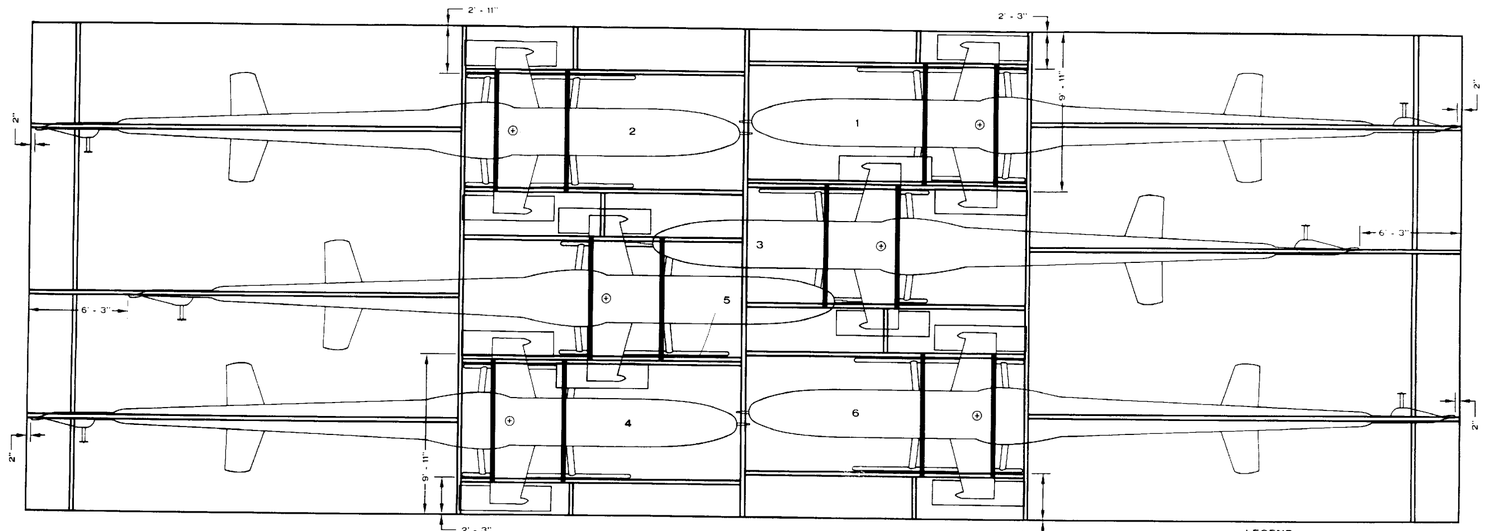


Figure 6-24. Placement of dunnage for securing six AH-1 helicopters with armament pods installed on wing tips. Dunnage is used only with tiedown devices attached to fuselage tiedown fittings.

★ Section IV. TRANSPORT OF SIX AH-1 HELICOPTERS BY SEABEE BARGE

6-14. General

★ Preparation and loading of six AH-1 helicopters, with wings installed, in a SEABEE barge basically are the same as covered in paragraph 6-7, with the following changes.

a. Minimum length landing area required is 252 feet (76.8 m).

b. Major items of equipment required are reduced by those items for removal and installation of the wings and main rotor assembly.

c. Disassembly, as described in paragraph 6-3a, is required for all six helicopters except that the stub wings and main rotor assembly are not removed.

★ *d.* Installation of tiedown fittings will be in accordance with figures 4-8 and 6-21 and loading sequence and tiedown figures 6-22 and 6-23.

★*e.* When AH-1 helicopters are transported in SEABEE barges with the armament pods installed on the wings, delete the wing tiedown point. Dunnage shown in figure 6-24 will be used with tiedown devices attached to fuselage tiedown points only.

6-15. Preservation

Reserve and prepare the AH-1 helicopter in accordance with TM 55-1500-339-S and/or special instructions provided by TSARCOM for the type shipping being used.

Section V. TRANSPORT OF THE AH-1 HELICOPTER ON ROLL-ON/ROLL-OFF (RORO) AND SEATRAIN SHIPS

★ 6-16. General

a. Operational Area. Refer to paragraph 5-1a.

★ *b. Ship Characteristics.* Refer to paragraph 1-16b.

6-17. Roll-on/Roll-off Ship, and Helicopter Preparation

a. RORO Ship Preparation Refer to paragraph 5-15.

b. Helicopter Preparation. Minimum disassembly of the AH-1 helicopter is desired so that it is in as close to flyaway configuration as possible after arrival at destination. Specific disassembly requirements will be determined after the desired load configuration is determined. Two specific degrees of preparation and preservation are required for AH-1 helicopters, dictated by the stowage location and load configuration for the RORO ship.

(1) *Minimum preservation and preparation.* Preserve and prepare the AH-1 for shipment in accordance with TM 55-1500-339-S and/or special instructions provided by TSARCOM for the type shipping being used.

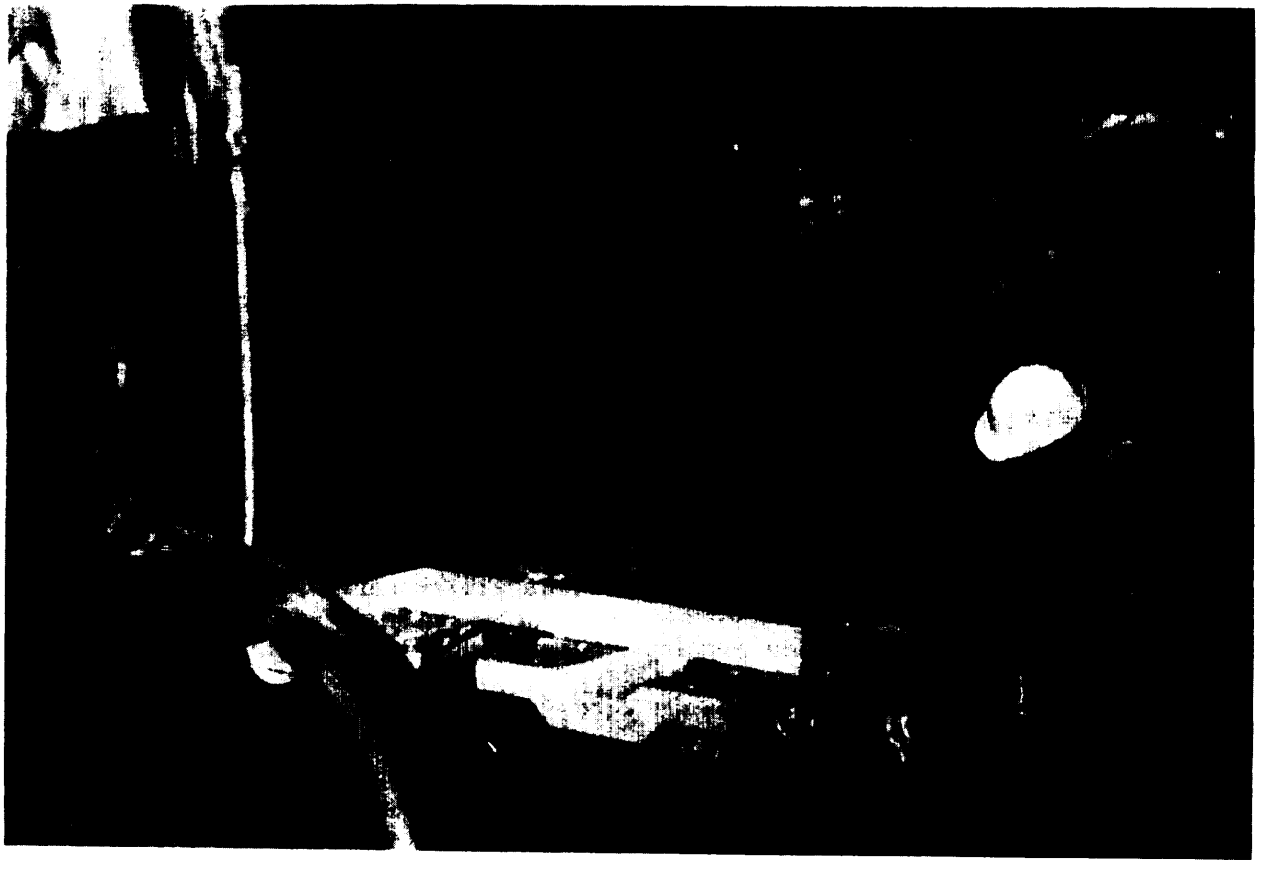
(a) AH-1 helicopters facing away from a bulkhead and placed side by side in the hold of a RORO ship require removal of stub wings, one tail rotor blade, and synchronized elevators for minimum disassembly and maximum utilization of stowage space. If desired, the helicopter may be shipped in flyable condition.

★ *(b)* AH-1 helicopters facing a bulkhead in the hold of a RORO ship require removal of the main rotor blade, synchronized elevators, one tail rotor blade, and stub wings for maximum stowage space utilization.

★ (2) *Maximum preservation.* The TSARCOM-provided shipping cover is required when the AH-1 is loaded on the ship's weather deck. Depending on the shipping cover configuration, removal and stowage of the main rotor head, blades, stub wings, and tail rotor assembly in the appropriate container may be required.

6-18. Loading

★ The AH-1 helicopter is loaded and stowed in identically the same manner as the UH-1 helicopter. Refer to paragraphs 5-14, 5-15, and 5-16 for detailed loading and stowing procedures. Figure 6-25 depicts the MTMC helicopter-positioning device being installed. This device allows the loading crew to move the helicopter laterally enabling them to maximize the space available (para 5-15b(1) *(a)).*



★ *Figure 6-25. MTMC helicopter-positioning device being installed on an AH-1S helicopter.*

6-19. Tiedown

★ Refer to paragraph 5-15 for selection of existing fittings and installation of additional tiedown fittings necessar to achieve effective restraint. When the stub wings are removed, the air transportability tiedown fitting will be installed on the fuselage stub wing attaching point (figs 6-5, 6-26, and 6-27). If the air transportability tiedown is not available, helicopter is secured as depicted in figures 6-28 and 6-29. When the wings are not removed, additional tiedown rings will be installed on the outboard portion of the wing.

★ CAUTION

When installing a tiedown device on the air transportability tiedown fittings, insure that the tiedown device does not chafe the helicopter's delicate surface.

CAUTION

Only standard, light tiedown devices should be used to secure the AH-1 helicopter. The use of heavy devices substantially increases the possibility of damage to the helicopter. Excessive tensioning may cause damage to the helicopter tiedown fittings and fuselage frames.

Above: Air transportability tiedown fitting installed on wing mounting fitting of AH-1 helicopter.

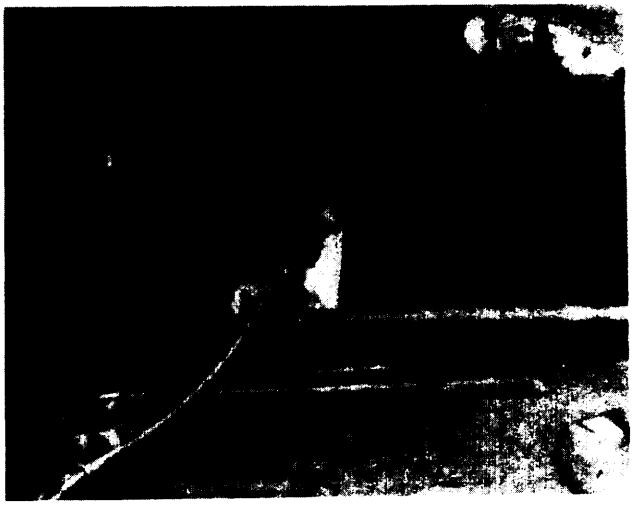


Figure 6-26. Standard heavy tiedown devices attached to air transportability tiedown fitting on AH-1 wing mounting fitting for tiedown point.

Figure 6-27. Typical tight stow of AH-1 helicopters on a RORO or seatrain ship.

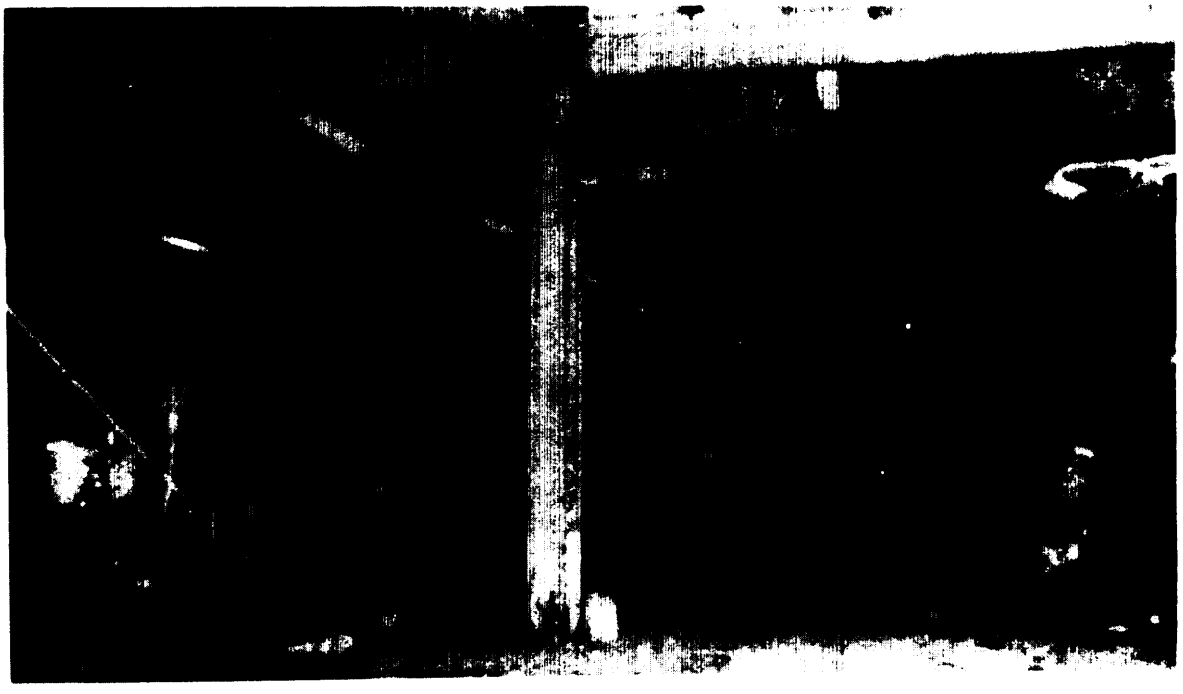


Figure 6-28. AH-1S tiedown without air transportability fittings.

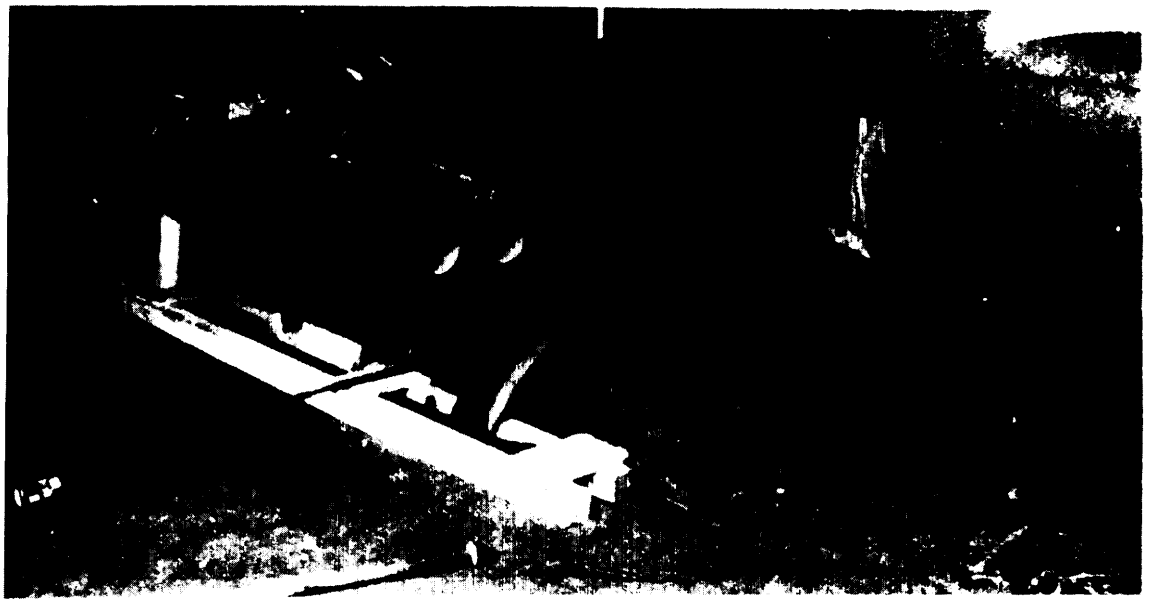


Figure 6-29. Close up of AH-1S tiedown using dunnage and Peck and Hale.

★ CHAPTER 7

TRANSPORTABILITY GUIDANCE, CH-47 HELICOPTER

NOTE

The reduced configuration of the CH-47 helicopter exceeds allowable dimensions for containerization.

Section I. TRANSPORT OF THE CH-47 HELICOPTER IN LASH LIGHTER

7-1. General

a. Operational Area. The operational area required for two CH-47 helicopters is the same as that discussed in paragraph 4-5a.

★*b.* **(Deleted)**

c. Material Required.

(1) Crane and boom requirements are the same as those discussed in paragraph 4-5c.

(2) Major items of equipment for preparation and reassembly of the CH-47 helicopter for loading the LASH lighter are identified in table 7-1.

7-2. LASH Lighter and Helicopter Preparation

a. LASH Lighter Preparation. Prior to loading the CH-47 helicopter in the LASH lighter, an 8-by 26-foot (2.4-by 7.9-meter) section must be cut from one end of the LASH lighter, and tiedown fittings installed as indicated in figures 4-8, 7-1, and 7-2. Removal of the 8- by 26-foot (2.4- by 7.9-meter) section from the LASH lighter will not weaken the structural integrity of the lighter for loading two CH-47 helicopters. The removed section will be stowed below the cutout and secured in the lighter (fig 7-1). The cutout section will be welded back in place after the CH-47 has been discharged. The interior of the lighter must be cleared of all dunnage, debris, water, and so forth.

Table 7-1. Major Items of Equipment for Preparation and Reassembly of CH-47 Helicopters for Loading into LASH Lighter

Nomenclature	NSN	Quantity Required*
Sling, rotor blade	1730-00-181-4136	1
Wrench, vertical hinge pin (small)	5120-00-755-6697	1
Wrench, vertical hinge pin (large)	5120-00-755-6697	1
Pin puller, hydraulic, vertical	5120-00-958-2742	1
Breaker bar, 3/4-in. drive	5120-00-221-7959	1
Ratchet adapter, 3/4-in. drive	5120-00-243-7323	1
Tool kit, aircraft mechanic	5180-00-323-4692	2 per helicopter
Lifting eye		
Prior to SN 76-18465 & 67-18495	4920-00-821-2767	
Subsequent to SN 67-184864 &67-184949	1730-00-010-7462	
Sling aircraft	1730-00-CH-47-00-1	1
Bar, tow for CH-47		1
Adaptor, aft jack point	1730-00-157-6023	2 per helicopter
Rack, folding blade complete or internal blade storage	1730-00-878-4858	1 per helicopter
Compound, preservative, MIL-C-16173, grade 2	8030-00-244-1297	gal
Oil, Lube, MIL-L-6081, grade 1010	9150-00-273-2388	qt
Compound, cleaning	6830-00-935-0996	5 gal
★ Barrier paper, MIL-B-121	8135-00-735-4661	100-ft roll
Bag, packing, water, vaporproof, MIL-B-117	8105-00-274-2390	per ft
Tape, cloth, 2-in.	7510-00-266-5016	roll

* Quantity will vary with the number of helicopters to be shipped.

b. Helicopter Preparation. Preparation of the CH-47 helicopter for loading is accomplished with minimum disassembly and reduced preservation requirements. Disassembly of the two helicopters is accomplished concurrently after the aircraft are flown to the loading site. The two CH-47 helicopters require no special preparation for sequential loading. Both helicopters require the same disassembly and preservation. The six main rotor blades are folded as shown in figures 7-3 and 7-4 or removed and stowed inside the helicopter. The installation of tiedown fittings at the aft jack pad, removal of nose mounted pitot tubes, and securing of all items in the cargo compartment are the remaining preparation steps required.

7-3. Preservation

★ Preserve and prepare the CH-47 for shipment in accordance with TM 55-1520-241-S and/or special instructions provided by TSARCOM for the type of shipping being used.

7-4. Loading

★ *a.* The CH-47 helicopter is rigged with the "spreader bar," which will be obtained from TSARCOM (fig 7-10). Each helicopter is loaded with approximately three-quarters fuel capacity and at an approximate weight of 28,009 pounds (12,705.6 kg). The spreader bar and riggings weigh approximately 2,300 pounds (1,044 kg). Total lifting weight of the rigged helicopter is approximately 30,000 pounds (13,620 kg).

★ *b.* Total fore-and-aft clearance between the helicopter and lighter (fig 7-6) is approximately 15 inches (38 cm). Lateral clearance for the first helicopter is not critical, however, the second helicopter is laterally limited to 20 inches (51 cm) on each side of the fuel pods (fig. 7-7 and 7-8).

CAUTION

Wind strongly affects the CH-47 once it is suspended from the crane. "Tag" ropes will be used from the forward and aft tiedown points (fig. 7-9). Loading should not be attempted if wind velocity exceeds 15 knots.

★ *c.* Polyurethane film will be placed over the hatch opening to prevent contamination from the salt air environment. The TSARCOM-provided helicopter shipping cover NSN 1730-00-138-5338 (fig. 7-10) can be used in lieu of the film. The CH-47 loaded lighter can be lifted aboard the LASH ship using the extender posts (fig 7-11) normally found aboard LASH ships and stowed below the ship weather deck (fig 7-12).

7-5. Tiedown

a. The two CH-47 helicopters loaded in the LASH lighter will be tied down in accordance with figures 7-13 and 7-14 using wire rope and turnbuckles.

CAUTION

Excessive tensioning may cause damage to the helicopter tiedown fittings and fuselage frames.

b. Approximate manhours and time required for preparation, loading, and tiedown are identified in table 7-2.

Table 7-2. Loading-CH-47 Man-Hour Breakdown by Helicopter

	Rotor blades removal		Rotor blades folded	
Phase	Man-Hour	Clock-Hour	Man-Hour	Clock-Hour
Prepare[1]	29.07	4:50	18.41	3:04
Load[2]	2.16	0.25	2.16	0:26
Tiedown	0.50	0:15	0.50	0:15
Total	31.73	5:30	21.07	3:44

[1]Preparation time includes disassembly and preservation as required.

[2]Loading includes rigging and attaching of spreader bar to helicopter.

c. Six-man maintenance teams should be used to prepare and load each helicopter. Two additional men should be used inside the lighter during the loading.

7-6. Unloading

Unloading the CH-47 from the LASH lighter is accomplished by reversing the loading sequence. Time breakdown for the CH-47 unloading is shown in table 7-3.

Table 7-3. Unloading-CH-47 Man-Hour Breakdown by Helicopter

	Rotor blades removed		Rotor blades folded	
Phase	Man-Hour	Clock-Hour	Man-Hour	Clock-Hour
Release tiedowns	0.60	0:18	0.60	0:18
Unload[1]	1.40	0:22	1.40	0:22
Reassemble[2]	19.76	3:17	8.06	1:20
Total	21.36	3.57	9.66	2:00

[1]Unloading includes rigging, lifting helicopter to work area, and unrigging.

[2]Reassembly includes removal of preservation materials, all covers, technical inspections, and test flight.

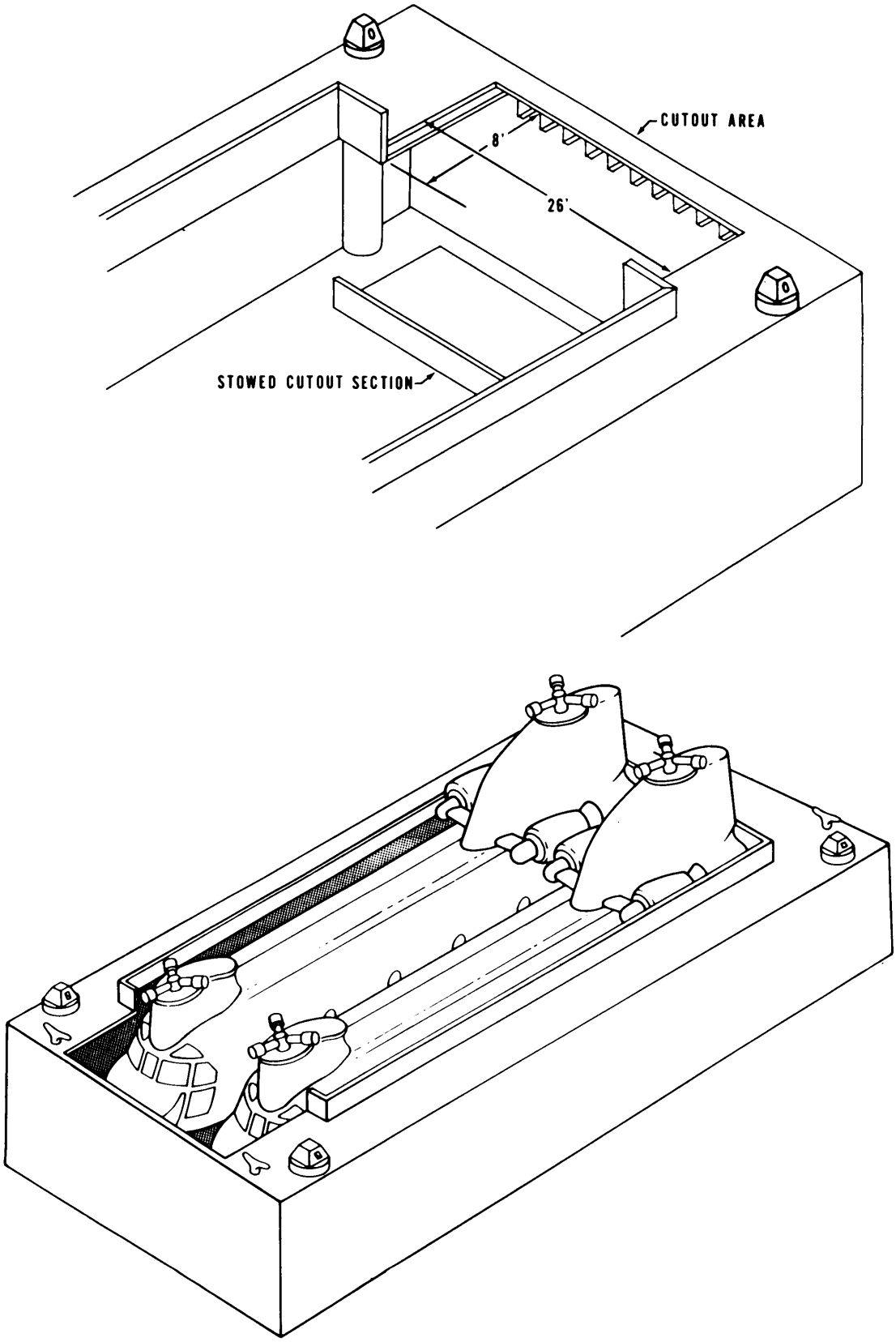


Figure 7-1. LASH lighter cutout required for two CH-47 helicopter.

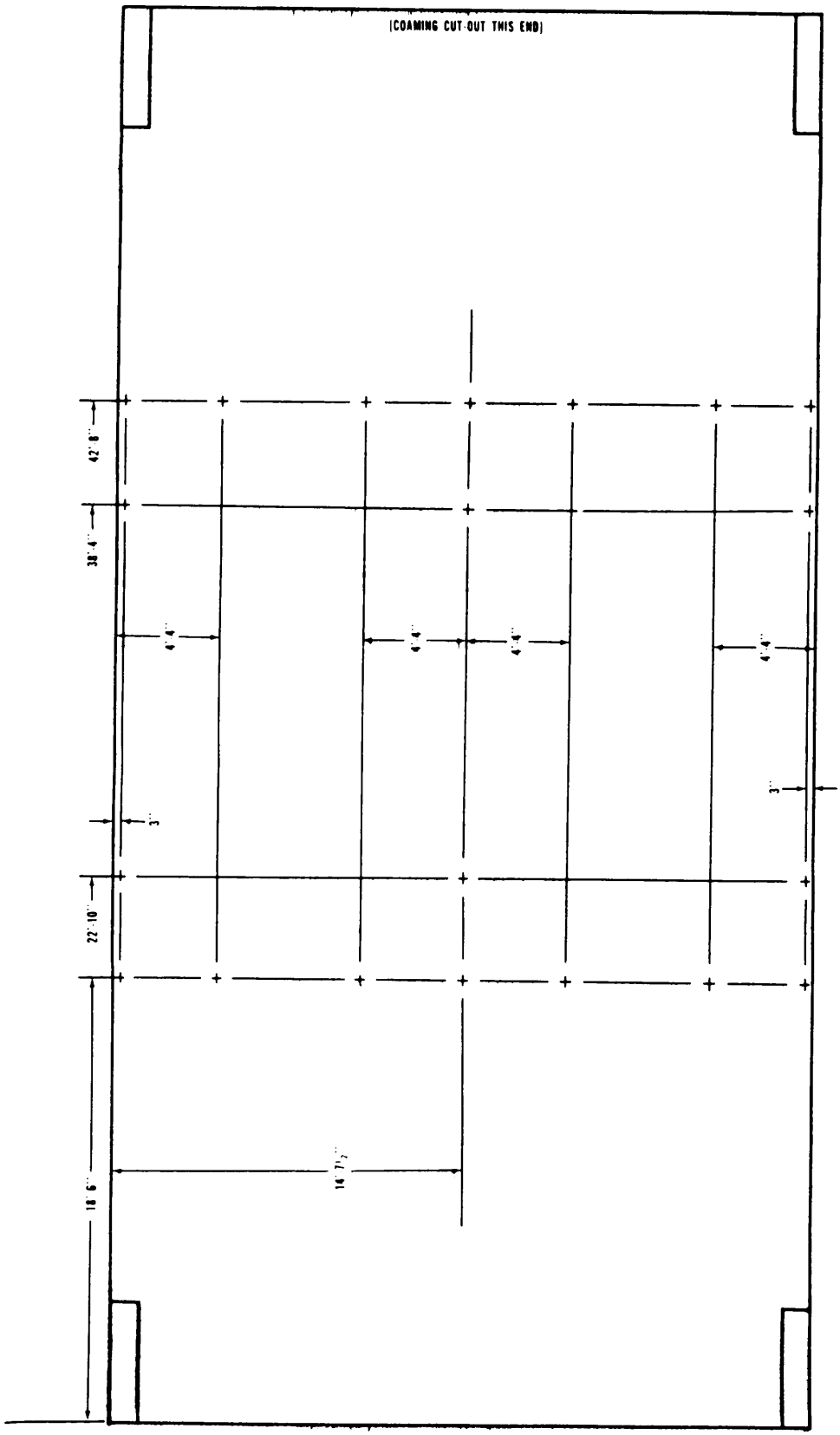


Figure 7-2. Tiedown positioning inside LASH lighter for CH-47 helicopters.

Figure 7-3. CH-47 loaded with rotor blades folded.

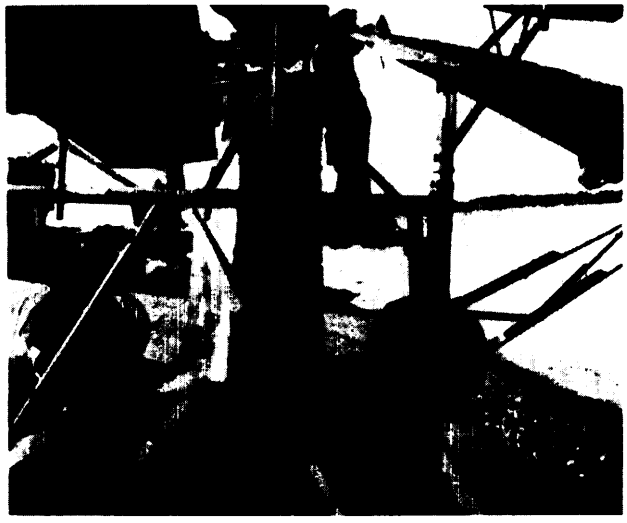


Figure 7-4. CH-47 rotor blades folded into blade rack mounted atop cabin.

★ *Figure 7-5.*

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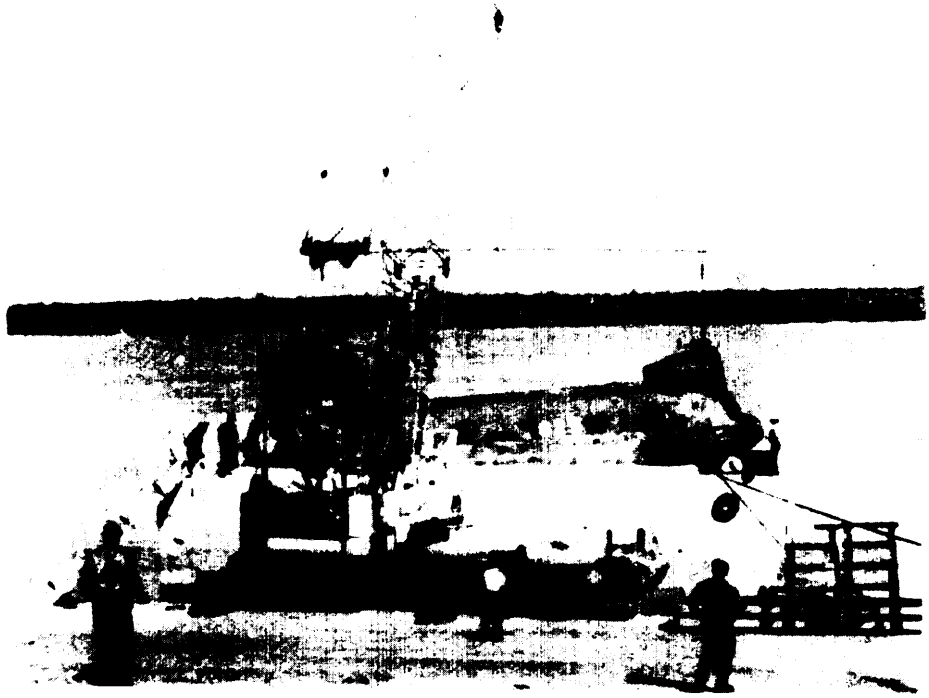


★ *Figure 7-6. Fore and aft clearance is critical. Fifteen-inch (36-cm) total clearance allows 7½ inches (19 cm) for nose and tail clearance, respectively.*

Figure 7-7. Fuel-pod-to-wall clearance, approximately 20 inches (51 cm).

Figure 7-8. Clearance between fuel pods on CH-47 load.

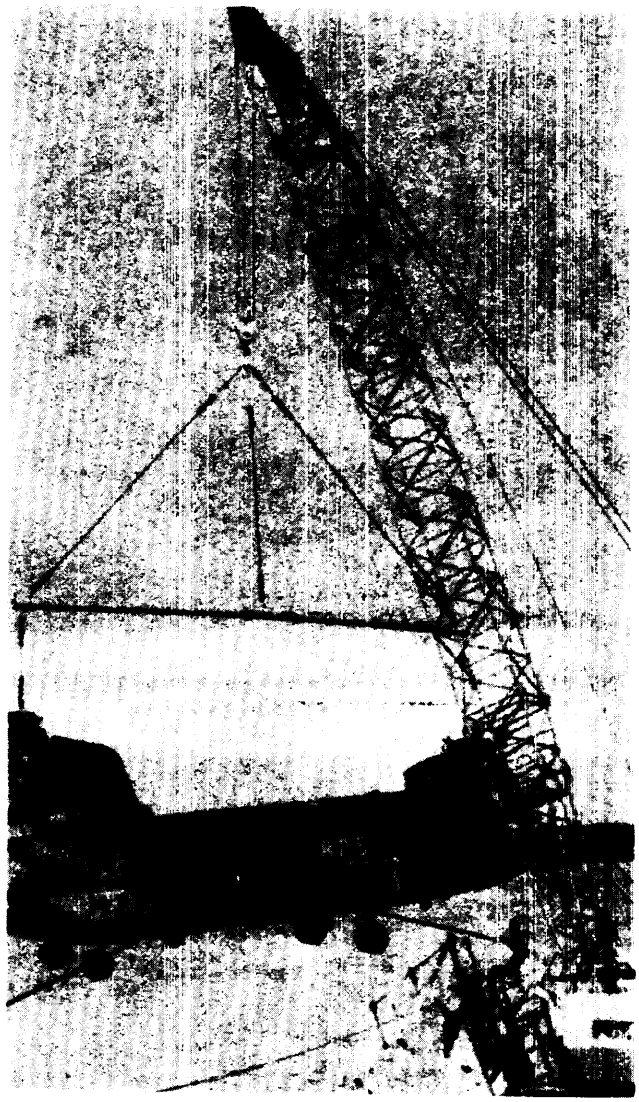


Figure 7-9. "Tag" ropes to control CH-47 during loading.

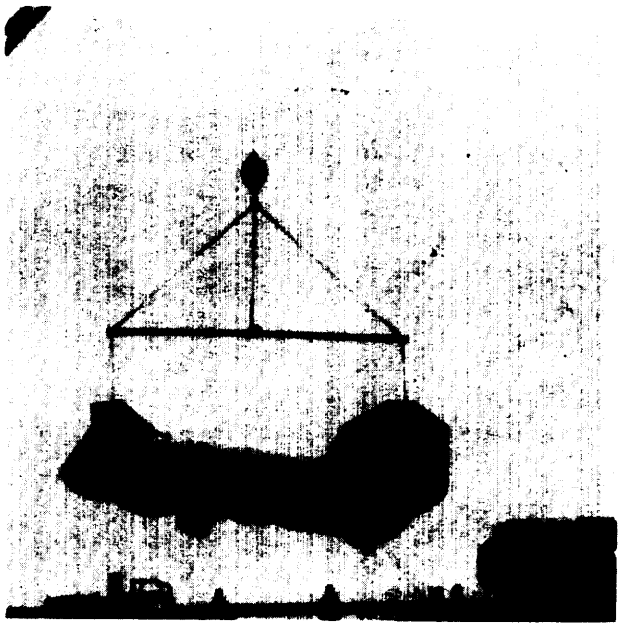


Figure 7-10. CH-47 with shipping cover installed and CH-47 spreader bar being installed.

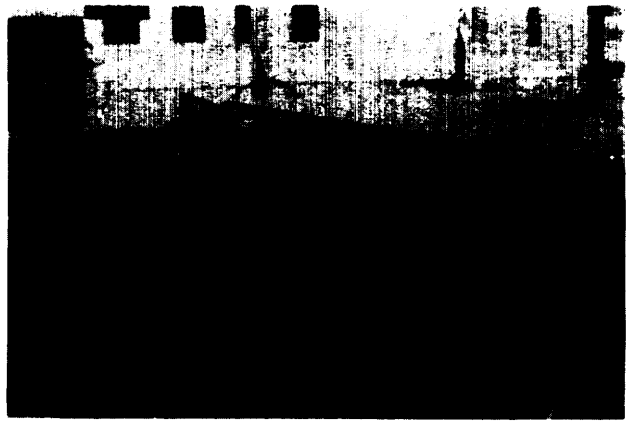


Figure 7-11. Lighter extension posts.

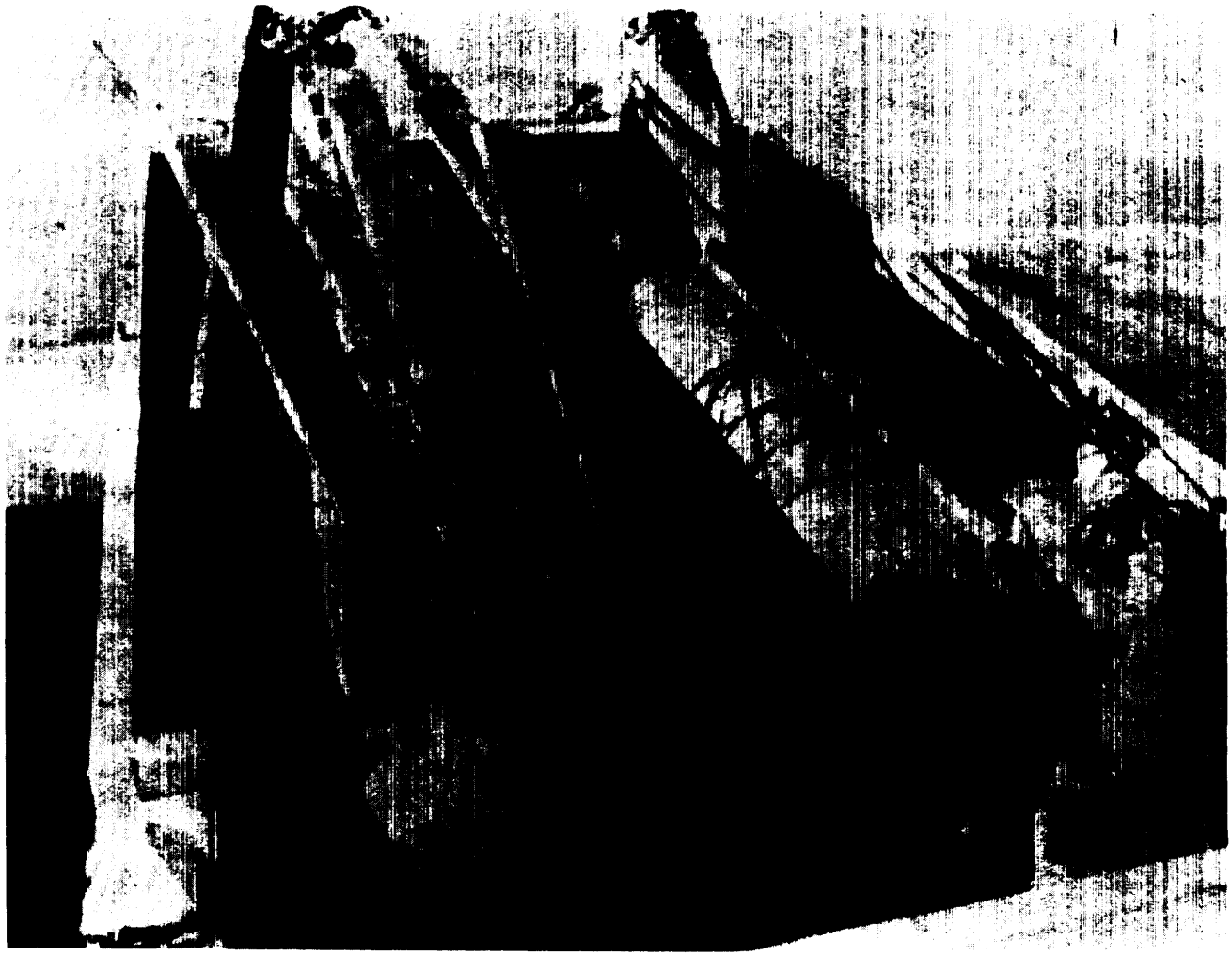


Figure 7-12. Two CH-47 helicopters loaded in LASH lighter ready for loading on mother ship.

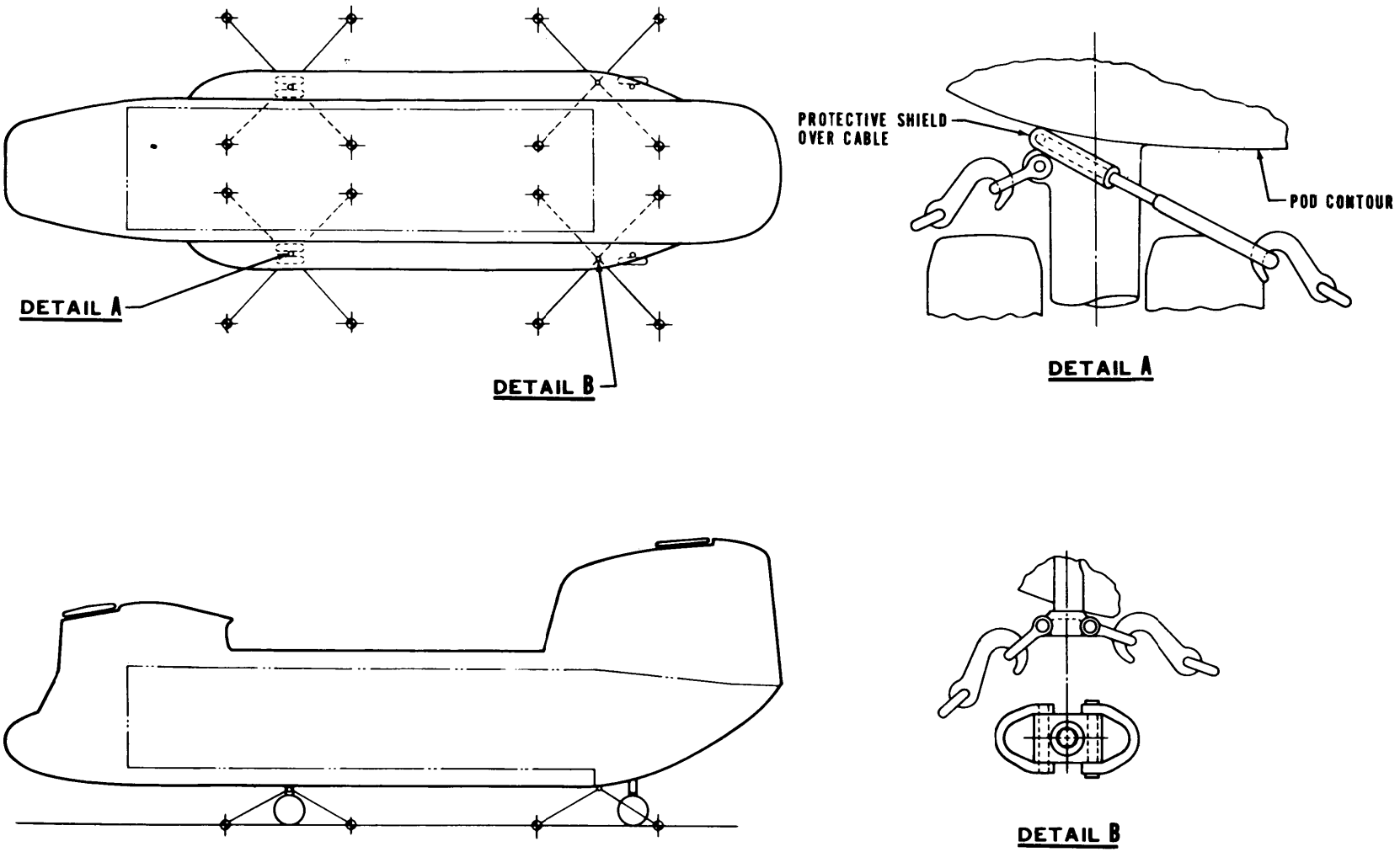


Figure 7-13. Tiedown diagram for CH-47 helicopters.

Figure 7-14. CH–47 helicopter tiedown points.

Section II. TRANSPORT OF THE CH-47 HELICOPTER ABOARD THE SEABEE SHIP

7-7. SEABEE Bargeloading

Loading the CH-47 helicopter in the SEABEE barge is not considered practical because of poor space utilization, and stowage is restricted to the top deck only.

7-8. Preparation for SEABEE Shiploading

a. Operational Area. The operational area required for two CH-47 helicopters is the same as that discussed in paragraph 4-5a.

b. SEABEE Ship Characteristics. See paragraph 1-6b(2). Loading the CH-47 on the lower deck of the SEABEE is illustrated in figures 7-15, 7-16, and 7-17. Stowage of the CH-47 on the second deck is not considered since the aircraft would be exposed to the sea air during transit. A total of 48 CH-47 helicopters can be stowed on the lower deck in four rows of 12 helicopters each, with flyable UH-1 series or AH-1 series helicopters stowed between two columns of the CH-47 helicopters.

c. Materials Required.

★ (1) Gantry cranes or container cranes may be used in lieu of mobile cranes, however, clearances must be checked to insure the CH-47 can be lifted through the legs of the crane to the ship (figs 7-18 and 7-19). Mobile cranes, truck- or crawler-mounted, of an 85-ton capacity with a 120-foot boom, are considered minimum requirements for loading CH-47 helicopters aboard SEABEE ships (fig. 7-18).

(2) Major items of equipment for preparation and reassembly of the CH-47 helicopter for loading aboard the SEABEE ship are identified in table 7-1 for LASH lighter loading.

7-9. SEABEE Ship and Helicopter Preparation

a. SEABEE Ship Preparation. Stow barge transporter on second deck prior to loading CH-47 in lower deck.

b. Helicopter Preparation. CH-47 preparation requires minimal or no disassembly. The rotor blades either can be folded into the blade rack mounted atop the cargo compartment or removed and stowed inside the helicopter. All flyaway covers are installed, center cargo hook stowed, aft cargo hook removed, and forward landing gear struts inflated to full extension. The aft landing gear struts will be inflated to provide 23 inches (58 cm) minimum ground clearance under the ramp hinge with the ramp in the raised position. Tires are inflated to 88 psi. A high pressure air compressor is required for inflation of landing struts and tires. Blade folding will be accomplished as prescribed in TM 55-1520-227-20-1 or -2. If flap restraints are not available for use on the aft rotary wing heads, CGU-1/B tiedown straps can be used to reduce the height by limiting the upward travel of the two outboard pitch-varying housings on the aft head (fig 7-20). Figure 7-21 is a view of the forward flap restrainer, normally a component part of the blade folding kit. The CGU-1/B nylon tiedown straps can also be used on the forward head of the helicopter. Mast cover plates will be removed, and the mast sockets prepared to receive the threaded lifting eye. Approximate man hours and time required for preparation of the helicopter are the same as those identified in table 7-3 for LASH preparation.

7-10. Preservation

★ Refer to paragraph 7-3 for preservation requirements.

7-11. Loading

CAUTION

Lifting the helicopter should not be attempted when the wind velocity exceeds 15 knots.

CAUTION

A large clevis assembly is used to attach the gantry crane hook to the CH-47 lifting sling as shown in figure 7-22.

The CH-47 can be loaded on the SEABEE ship lower deck by three methods: (1) lift-on, (2) roll-on, and (3) fly-on.

a. Positioning to the Stern Elevator.

(1) *Lift-on.* The CH-47 will be lifted to the stern elevator either by gantry or mobile crane. The rigging sling assembly will be attached to the lifting eyes in the mast of the CH-47 and "tag lines" installed to prevent the helicopter from rotating into the lifting crane's superstructure or boom (fig 7-19). The helicopter and rigging, when suspended from a crane hook, are approximately 45 feet (13.7 m) in height at the point where the aft of the aircraft is lifted clear of the ground. The aircraft is lifted to the ship's stern elevator astride the barge pedestals (fig 7-15, and 7-23, and 7-24).

NOTE

The CH-47 should be loaded from the

outboard side in rows across the ship, rather than in columns from bow to stern. This procedure will allow proper time for moving the helicopters and provide a tailored ship load.

(2) *Roll-on.* The CH-47 can be rolled onto the stem elevator if a suitable bridge span can be constructed to span the distance between the dock and the stem elevator. The span must be constructed to allow the helicopter to clear the barge transporter stops. A suitable dry span can be constructed from a standard M4T6 floating bridge (fig 7-25).

NOTE

The stern elevator can be moved up and down to match up to the dock for roll-on operations. The helicopter is to be rolled from the dock to the stern elevator astride the barge pedestals.

(3) *Fly-on.* The landing point on the deck will be as near the exact lower deck positioning as possible. Lateral on-deck movement of the helicopter is restricted by the barge pedestals and transporter rails. A position forward of the stacks and aft of the lifeboat station is the only position on the outboard row of pedestals that allows safe blade clearance (fig 7-26). Paint marks will be made for wheel positioning on landing. A nose pivot point will be established in the center of the ship, forward of the stacks and aft of the bridge. The approach to the ship deck is made at 90 degrees to the length of the ship (fig 7-27). Once at a hover over the deck, the pilot turns the helicopter about the pivot point to align the aircraft with the longitudinal axis of the ship. A sideward hover is performed to "straddle" the barge pedestals (fig 7-28). Following directions of the flight engineer, the pilot positions the helicopter landing gear on the painted reference lines (fig 7-29). Once positioned firmly on the deck, adequate clearance exists under the ramp hinge (fig 7-30). After the helicopter is shut down, the main rotor blades are folded or removed, and the helicopter is towed to the stern elevator.

b. Positioning the CH-47 from the Stern Elevator to the Lower Deck.

CAUTION

The barge transporter may leak, resulting in large amounts of hydraulic fluid on the ship's deck. Any hydraulic fluid on the ship's deck must be removed prior to loading aircraft.

CAUTION

During all movement of the CH-47 aboard ship, one man should be in the cockpit to apply the brakes if necessary.

(1) Once aboard ship, the helicopter will be rigged with a towing bridle of MB-1 chains (or suitable substitute) (fig 7-31) and fitted with a tow bar at each rear wheel for steering. Moving the helicopter astride the inboard barge pedestals requires the forward dual wheels to bypass the ship's rudder bearing housing cover (fig 7-32). Four-inch (10-cm) clearance will remain as the forward gear passes between the dome cover and the barge pedestal (fig 7-33). Once past the bearing housing, the helicopter is maneuvered to place the right or left landing gear between the barge transporter rails. This maneuver must be done very carefully as the folded blades come within 6 inches (15 cm) of the ship's centerline catwalk rails. Steering control is difficult because of limited clearance around the barge pedestals (fig 7-34). While the helicopter is being positioned with the landing gear between the transporter rails, the aft rotary wing head enters the doorway (fig 7-35), the most critical area for overhead clearance. Three-inch (7.6 cm) clearance exists at the door frame; 2-inch (5-cm) clearance exists from below the ramp hinge to the barge pedestal. Once inside the doorway, the overhead clearance increases to 5 inches (12.7 cm) (fig 7-36).

(2) Towing the helicopter from the stern elevator into the ship can be done best with a four-part line block and tackle attached to the tow bridle on the helicopter and then to a deck tiedown fitting in the ship. Six men can easily "walk" the helicopter into position. Once the helicopter is properly aligned astride the barge pedestal, there is a straight forward tow into final position (fig 7-37 and 7-38).

(3) UH-1 or AH-1 helicopters, with only synchronized elevators removed can be easily stowed between CH-47s (fig 7-39 and 7-40).

7-12. Flight Operations

The fly-on/fly-off is the least desirable method of loading and discharging the SEABEE ship. The number of helicopters that can be prepared for loading or unloading for flight operations is very limited. The fly-on & fly-off method of loading & unloading of the SEABEE ship should be used only when adequate port facilities are not available.

WARNING

When hovering the CH-47 over either of the outboard barge pedestals, approximately one-third of the rotor system is out of ground effect.

WARNING

Flight operations on the deck of the SEABEE ship are difficult, but not unsafe, if proper flight operations and safety procedures are followed. Approaches to and departures from the SEABEE ship should be treated the same as a pinnacle.

7-13. Tiedown

a. CH-47 and UH-1 or AH-1 helicopters loaded in the lower deck of the SEABEE ship will be tied down in accordance with figures 7-13 and 7-14 (fig 5-20 for UH-1 and fig 6-13 for AH-1) using wire rope and turnbuckles.

b. Present deck tiedown fittings are adequate and correctly placed to restrain the helicopters during shipment (fig 7-41, 7-42, and 7-43). Cribbing must be placed under the aft jack-pad tiedown fitting to eliminate the possibility of fuselage contact with the barge pedestal in the event of a flat tire or deflated strut during transit (fig 7-43).

c. Cribbing is toenailed together, and the top piece is shim wedged firmly in place against the helicopter jack and tiedown point. A nail is three quarters driven through the wedge and crib blocking to retain position and facilitate removal of the nail (fig 7-42).

CAUTION

Excessive tension may cause damage to the helicopter tiedown fittings and fuselage frames.

CAUTION

CGU-1/B nylon tiedown straps shown in figures 7-41, 7-42, and 7-43 were used for illustration only and will not be used for securing the helicopter.

d. Approximate man-hours and time for preparation are identified in table 7-4.

Table 7-4. Preparation and Reassembly Data

Type	*Men rqr*	★ *Clock-hours*	*Man-hours*
CH-47	6	1:30	9.00
UH-1/AH-1	3	0:15	0.75

7-14. Unloading

a. Unloading the CH-47 is done in reverse of the loading sequence.

★ *b.* Approximate man-hours and time required for reassembly are the same as those for preparation, shown at table 7-4.

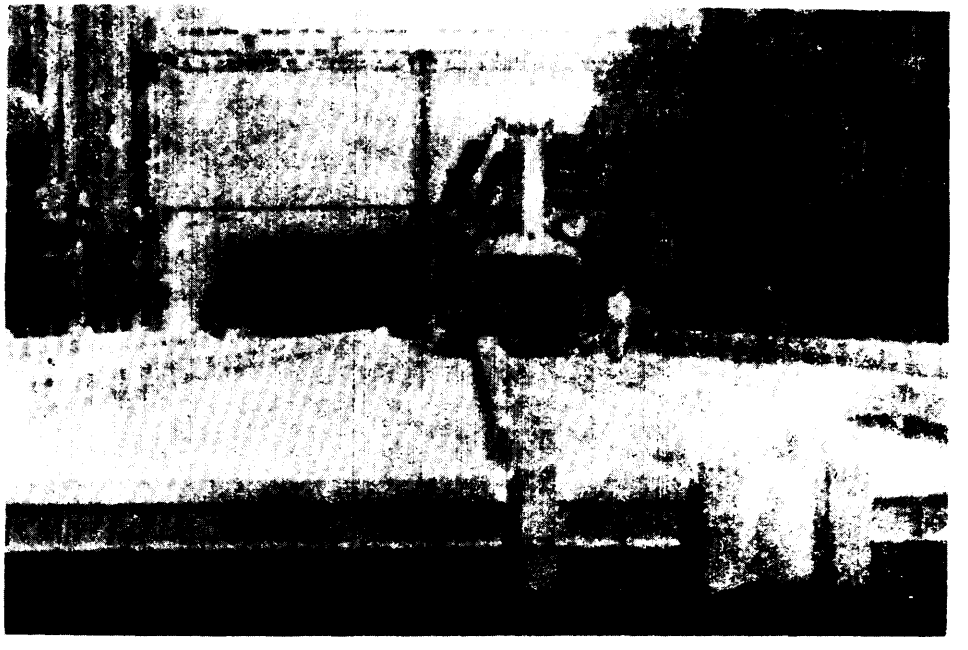


Figure 7-15. The CH-47 helicopter loaded on the stem elevator of SEABEE ship.

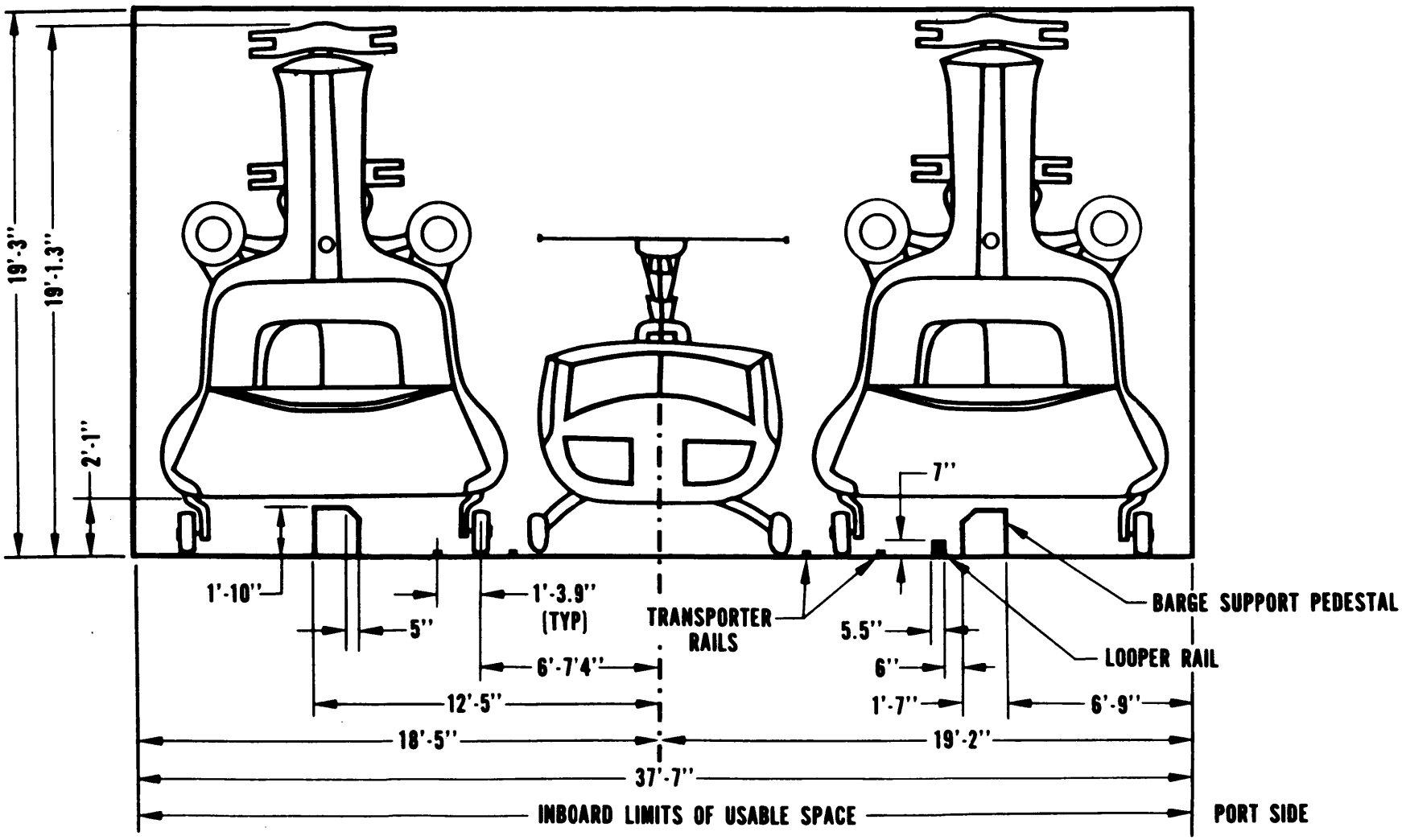


Figure 7-16. Detailed helicopter loading on lower deck of SEABEE ship.

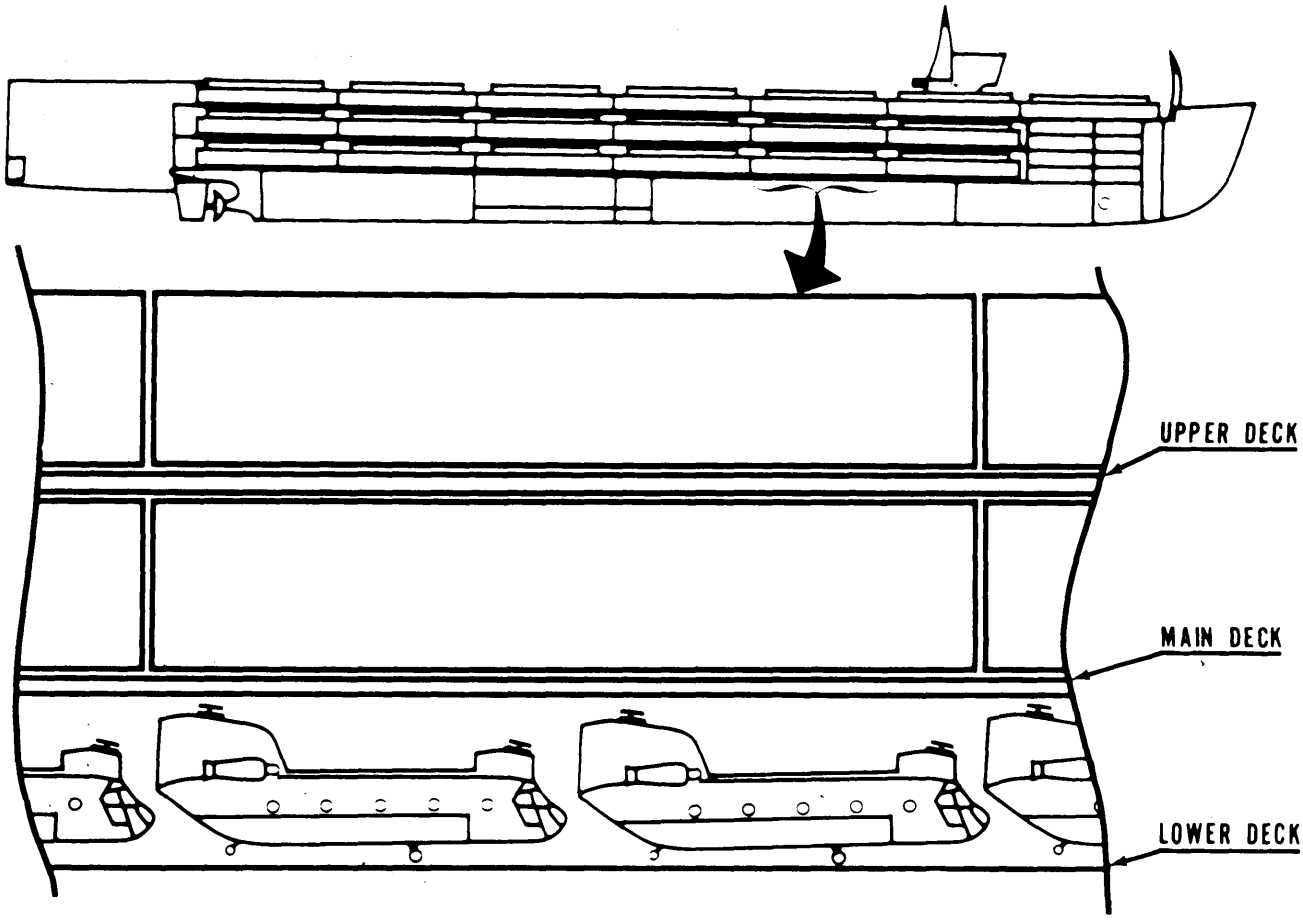


Figure 7-17. CH-47 helicopter stowed in SEABEE ships.

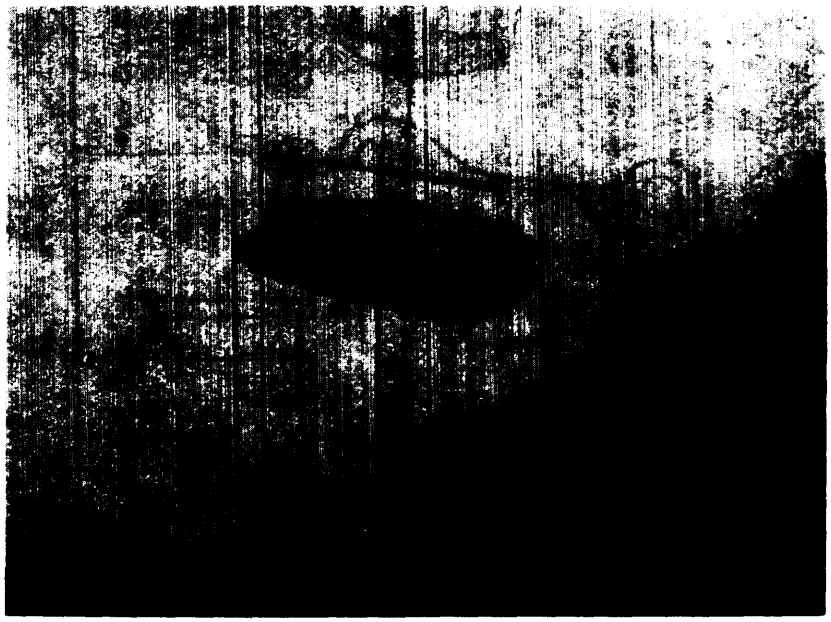


Figure 7-18. CH-47 helicopter being loaded with mobile crane.

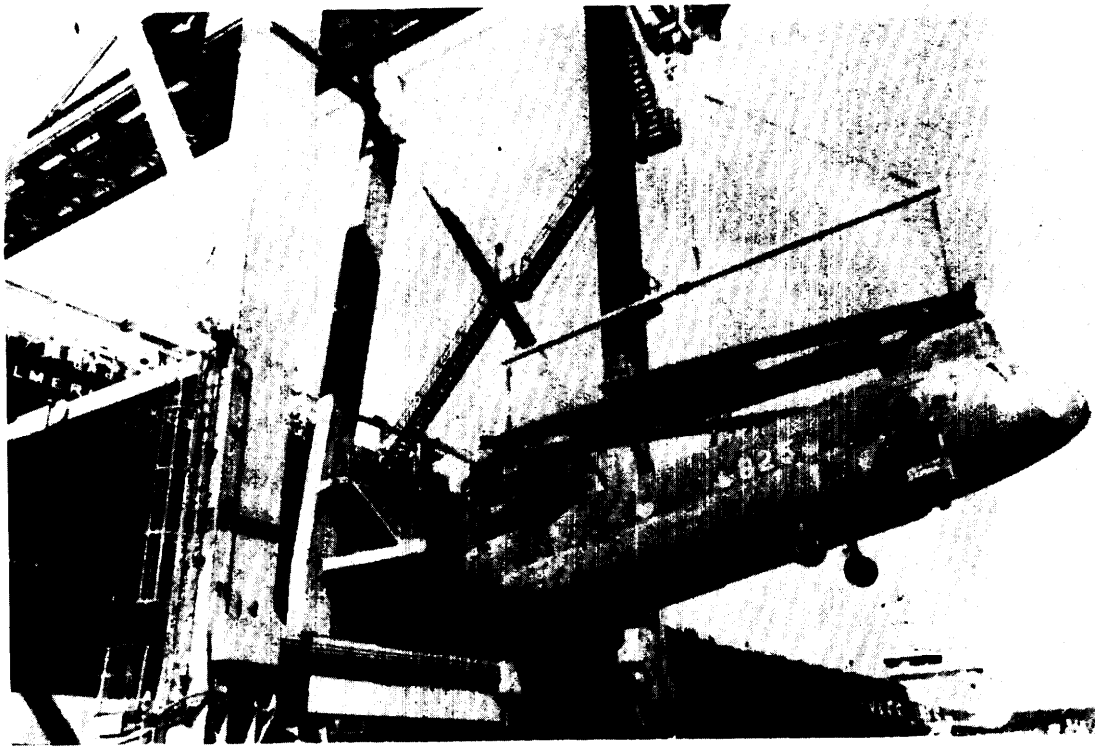


Figure 7-19. CH-47 helicopter being loaded with gantry crane with "tag" lines attached to helicopter to control the aircraft during loading.

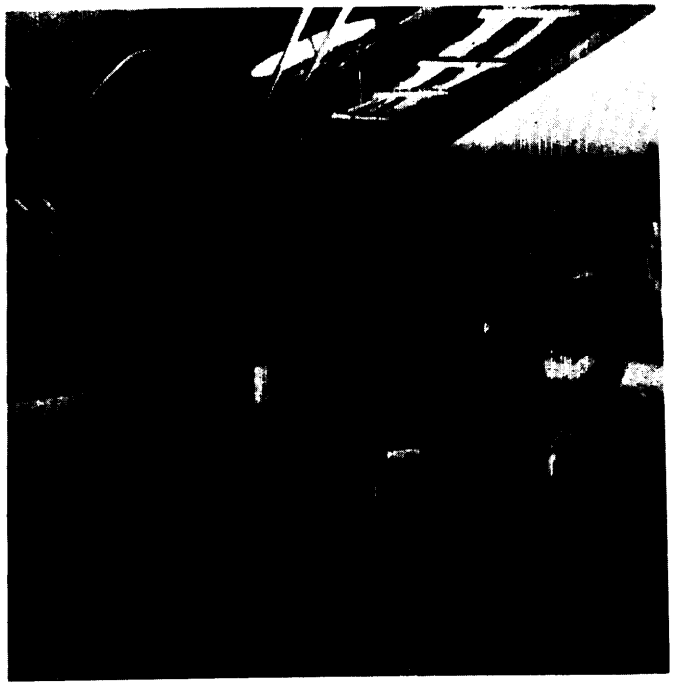


Figure 7-20. CGU-1/B nylon cargo strap used as flap restrainer on aft head pitch varying housing.

Figure 7-21. Forward flap restrainer properly installed on CH-47 helicopter rotary wing head.

Figure 7-22. Large clevis assembly is used to attach the gantry crane hook to the CH-47 lifting sling. As shown in the lower part of the photo the crane hook will not fit the apex ring of the CH-47 lifting sling.

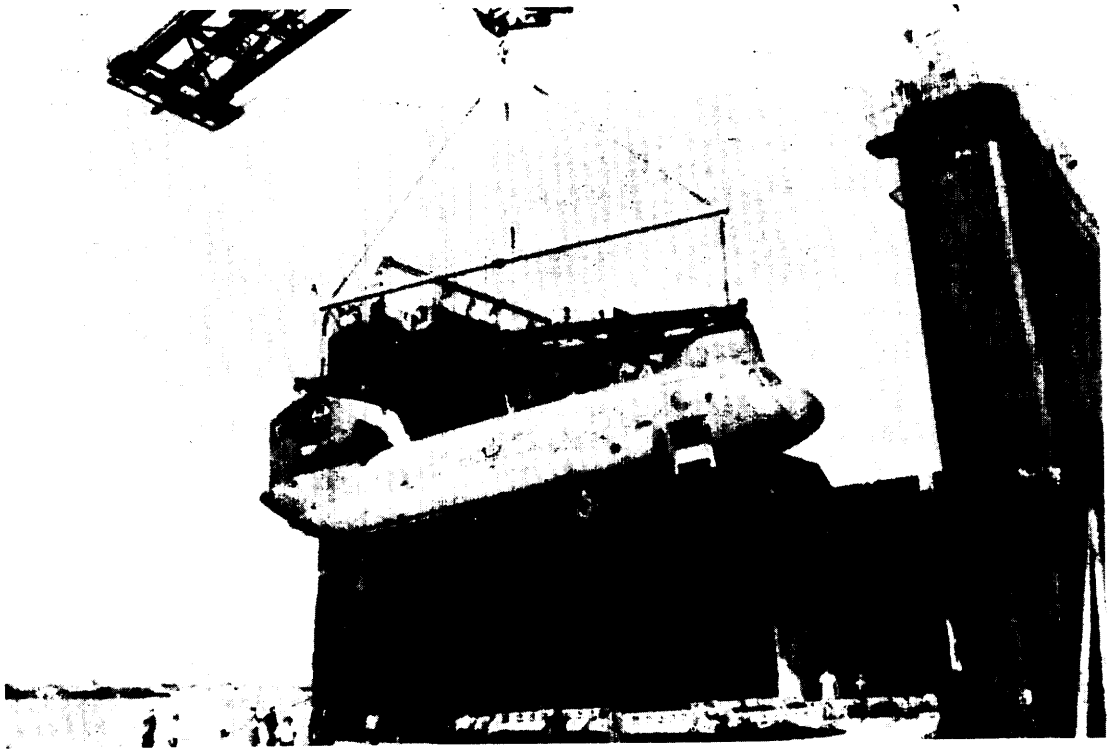


Figure 7-23. CH-47 ready to be placed astride barge pedestals on stern elevator of SEABEE ship

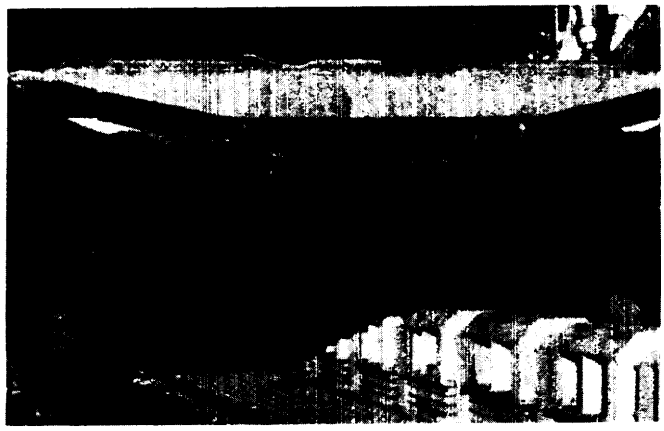


Figure 7-24. Two-inch clearance under ramp hinge when helicopter is positioned astride barge pedestals.

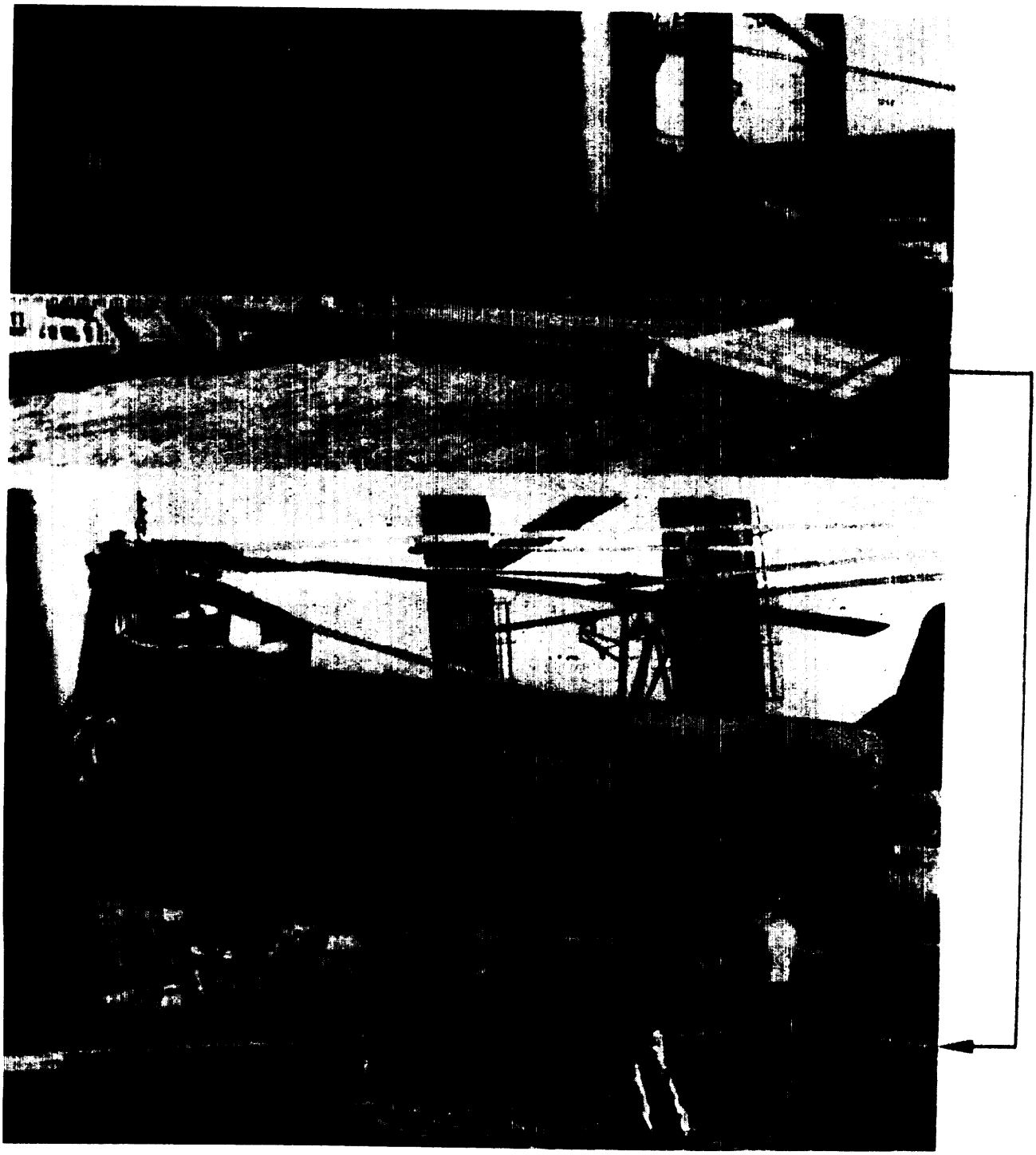


Figure 7-25. Dry span from dock to stern elevator.

Figure 7–26. The SEABEE ship main deck as viewed from the bridge

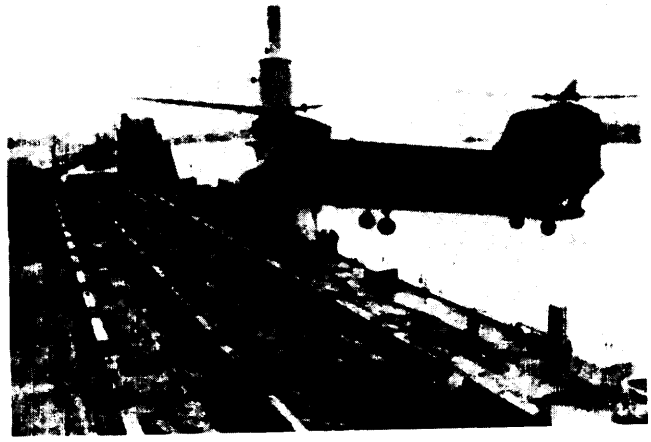


Figure 7-27. The CH-47 fly-on approach is made at 90 degrees to the ship.

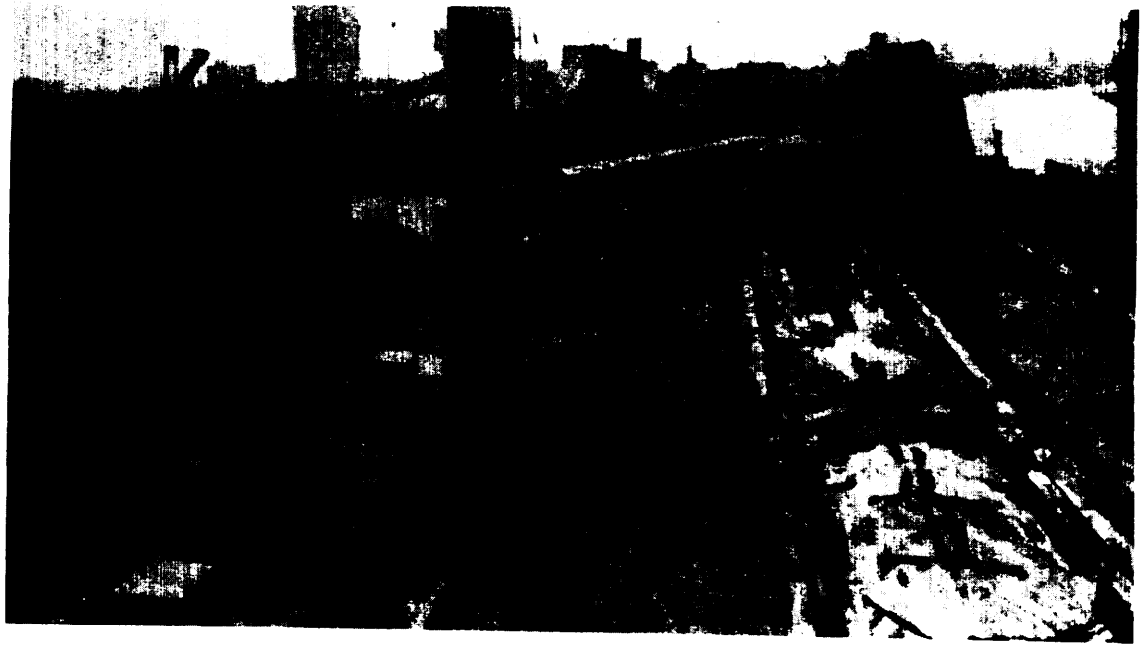


Figure 7-28. Once aligned with the axis of the ship, the CH-47 is hovered sideward into position.

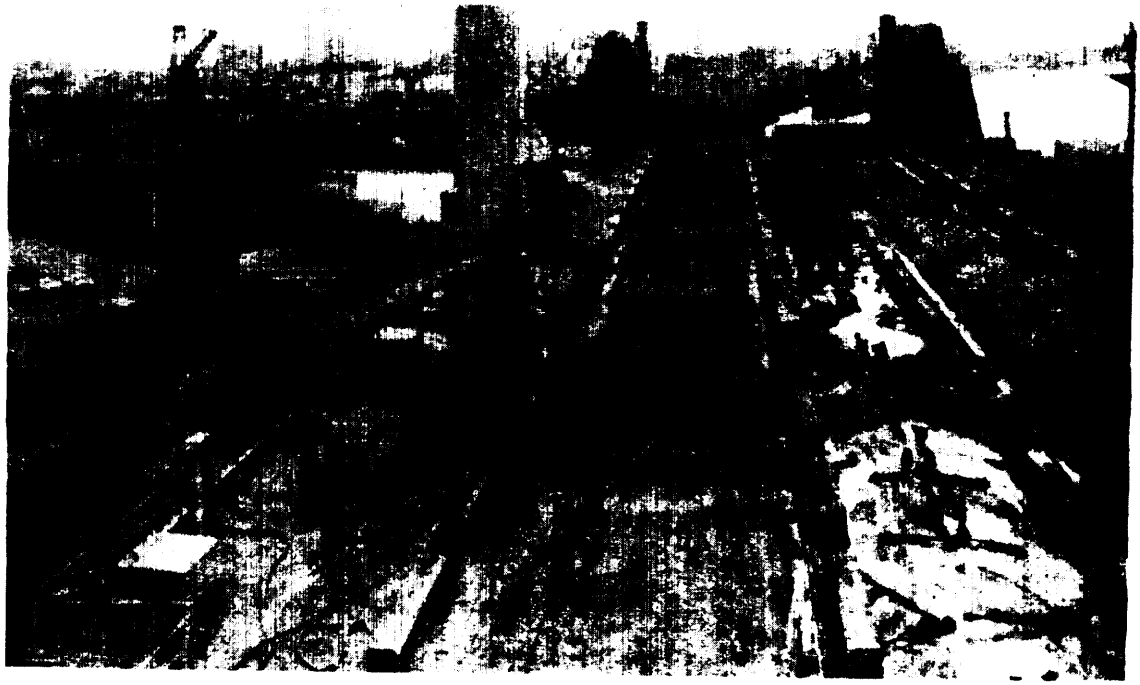


Figure 7-29. Following directions from the flight engineer, the pilot positions the landing gear on the premarked reference points.

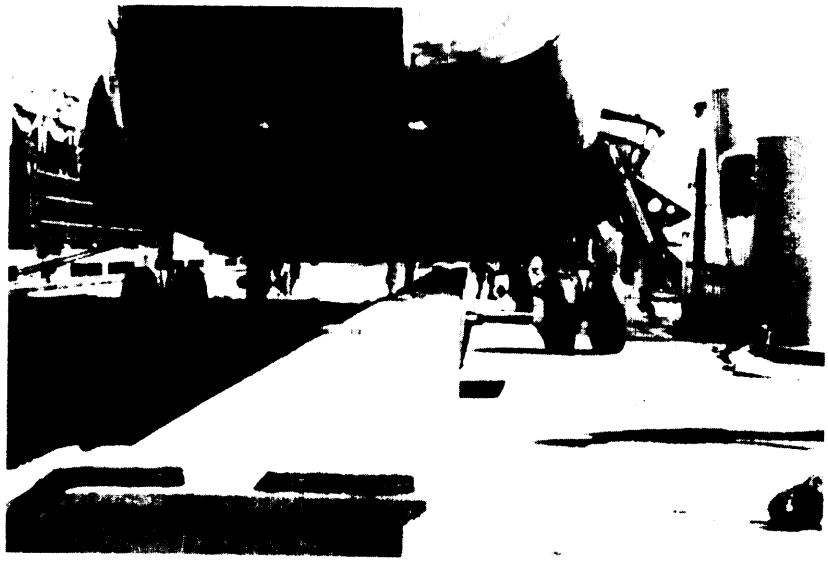


Figure 7-30. Fuselage clearance over the main deck barge pedestals is adequate, 2 inches (5 cm) at the ramp hinge.

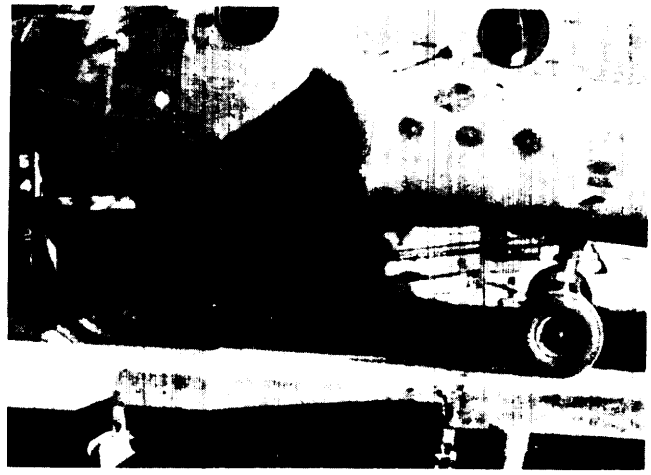


Figure 7–31. An MB-1 chain tow bridle is attached to the forward landing gear mooring rings.

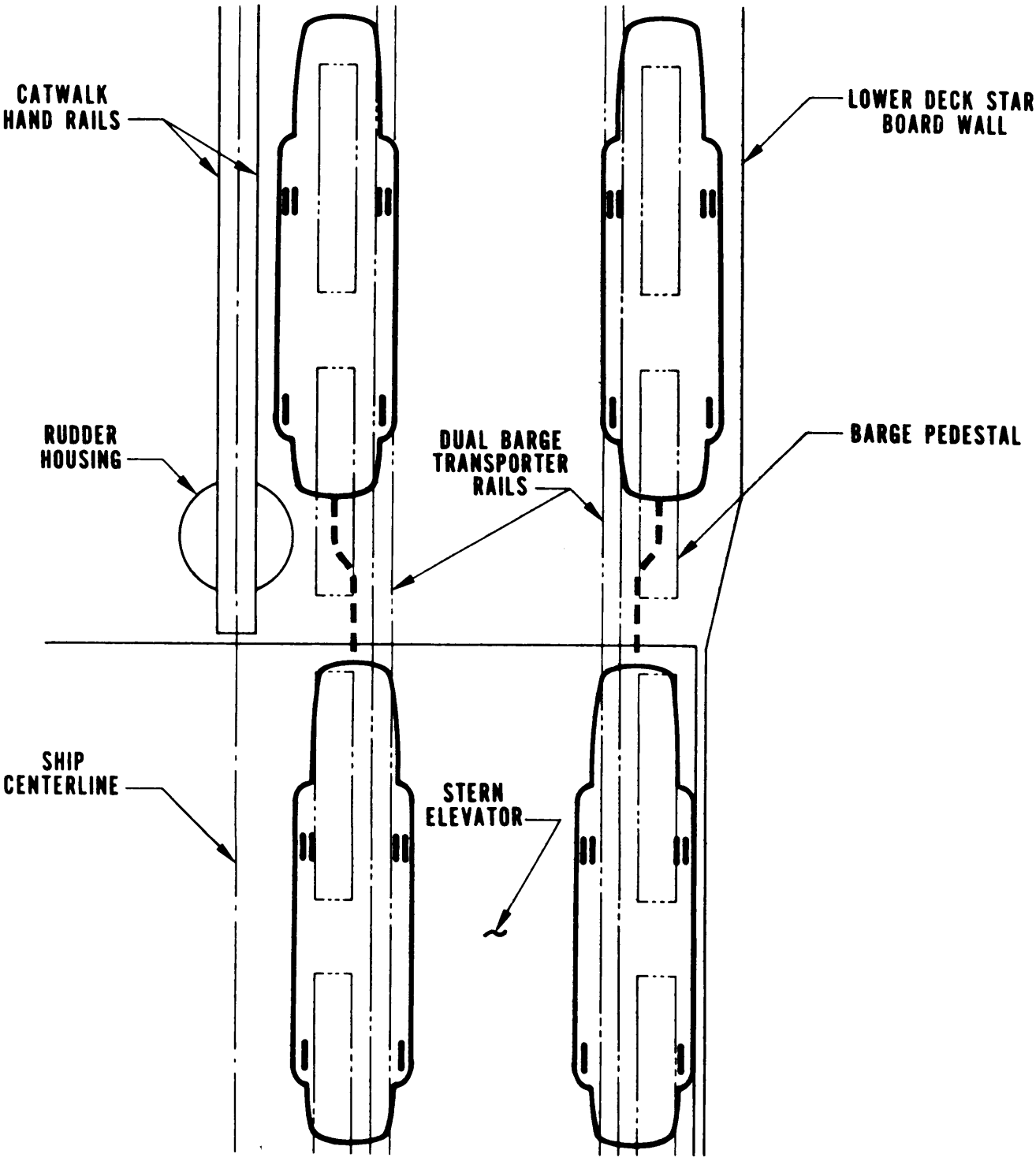


Figure 7-32. CH-47 repositioning diagram showing helicopter movement from stern elevator into the lower deck.

Figure 7–33. Four-inch (10-cm) clearance as dual wheels pass bearing housing.

Figure 7–34. Steering is limited by barge pedestals.

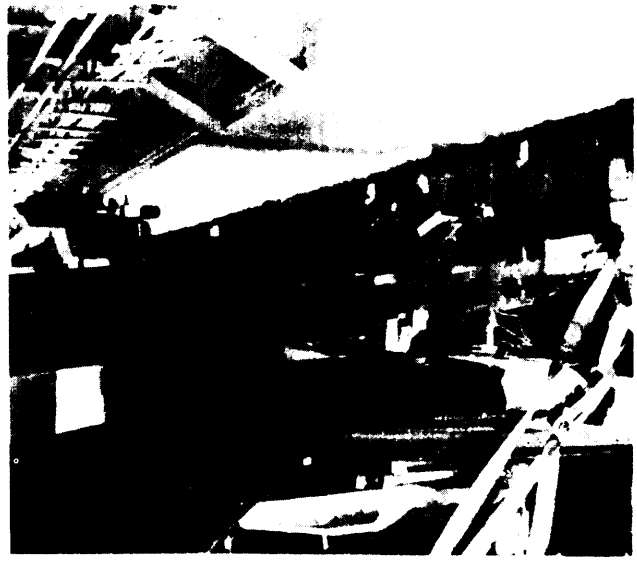


Figure 7-35. Three-inch (7.6-cm) clearance overhead as aft rotary wing head passes through stern door.

Figure 7-36. Overhead clearance is 5 inches (12.7 cm) between the pitch-varying housing on the aft head of the CH-47 and the steel support beams for the deck above.

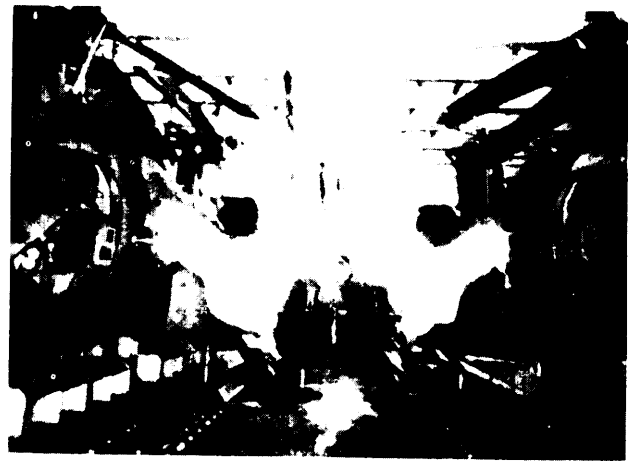


Figure 7-37. Positioning of two CH-47s and one UH-1 in the lower deck, front view.

Figure 7–38. Positioning of two CH-47s and one UH-1 in the lower deck, rear view.

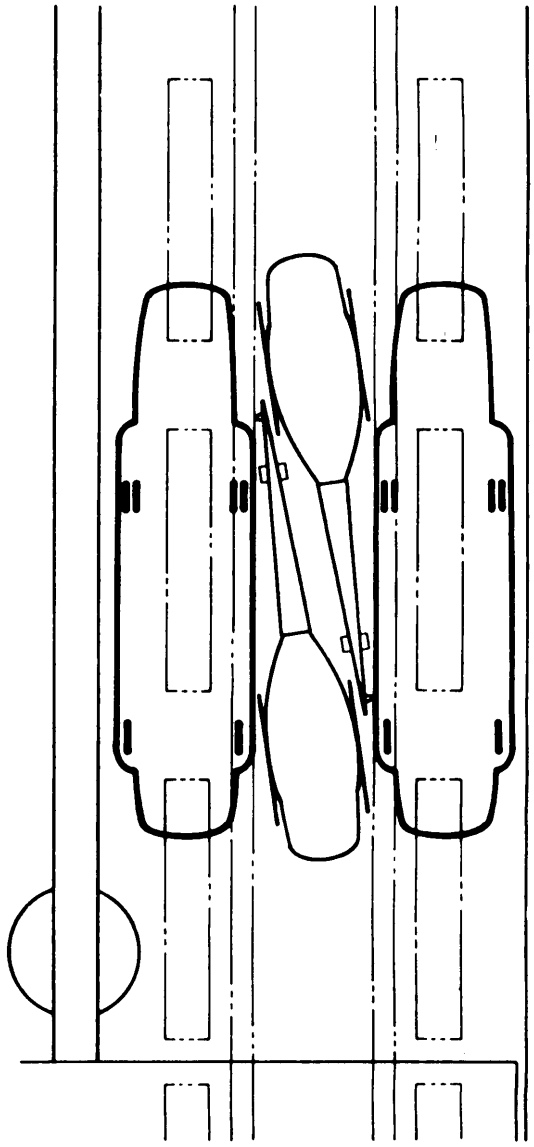


Figure 7-39. UH-1 loading plan in lower deck of SEA BEE ship; synchronized elevator removed.

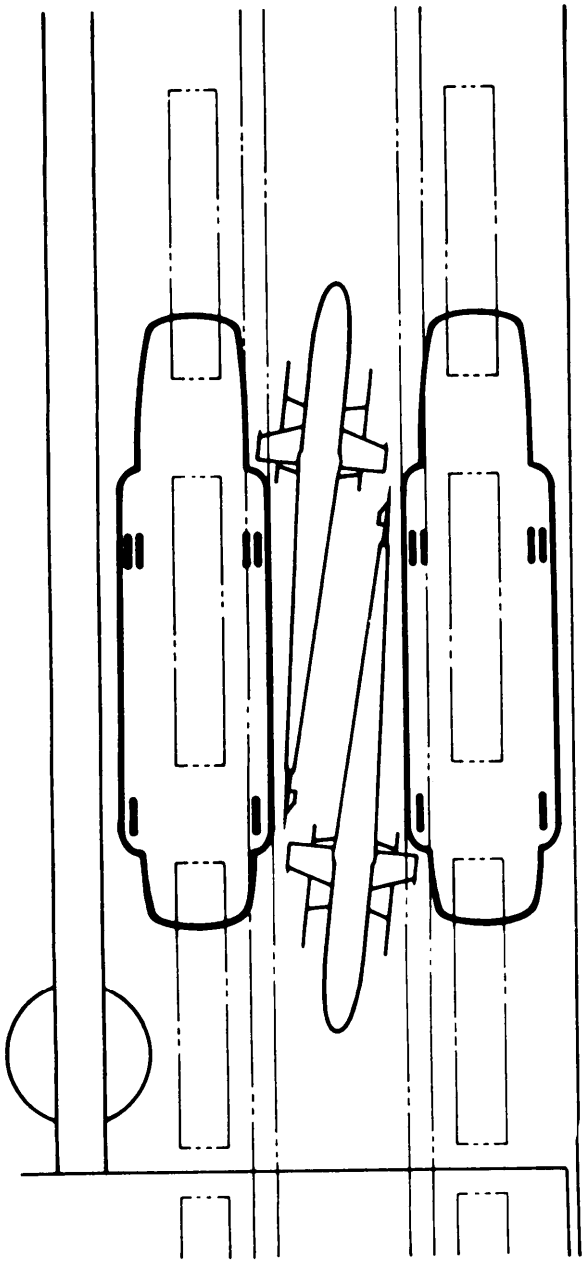


Figure 7-40. AH-1 loading plan in lower deck of SEABEE ship; synchronized elevator removed.

Figure 7-41. Forward tiedown applied to CH-47.

Figure 7-42. Wood cribbing placed beneath the aft jack-pad tiedown adapter to prevent fuselage contact with barge pedestals.

Figure 7-43. Aft tiedowns applied to jack-pad adapter.

Section III. TRANSPORT OF CH-47 HELICOPTERS ABOARD RORO OR SEATRAIN SHIPS

★ 7-15. General

a. Operational Area. The operational area required for two CH-47 helicopters is the same as that discussed in paragraph 4-5a.

★ *b. Ship Characteristics.* Refer to paragraph 1-6.

7-16. Ship and Helicopter Preparation

a. Ship Preparation. Refer to paragraph 4-21a for ship preparation.

b. Helicopter Preparation. Refer to paragraph 7-2b for preparation of the CH-47. Installation of fly-away covers and the TSARCOM provided shipping cover NSN 1730-00-138-5338 is required.

7-17. Preservation

See paragraph 7-3 for preservation requirements.

7-18. Loading

a. Refer to paragraph 7-4.

b. Optimal stowage of the CH-47 is nose-to-tail (fig 7-44) and side-by-side (fig 7-45).

c. Helicopters are loaded in the sequence determined by the loading plan.

d. The CH-47 helicopter is lifted directly to its final stow location. Positioning of the helicopter with an aircraft tractor is difficult because of the deck construction.

e. A lifting weight of 30,000 pounds (13,620 kg) is sufficient to insure safe lift of the CH-47 (three-quarters full of fuel), spreader bar, and cover.

7-19. Tiedown

The tiedown pattern shown in figure 7-46 is the optimal tiedown configuration. Additional tiedown rings should be installed when this pattern cannot be approximated; see note, paragraph 4-21a. The CH-47 wheels should be blocked to prevent the helicopter from rolling before it is tied down (fig 7-47). Tiedown of the CH-47 will be done with standard heavy shipboard restraint devices or wire rope and turnbuckles.

CAUTION

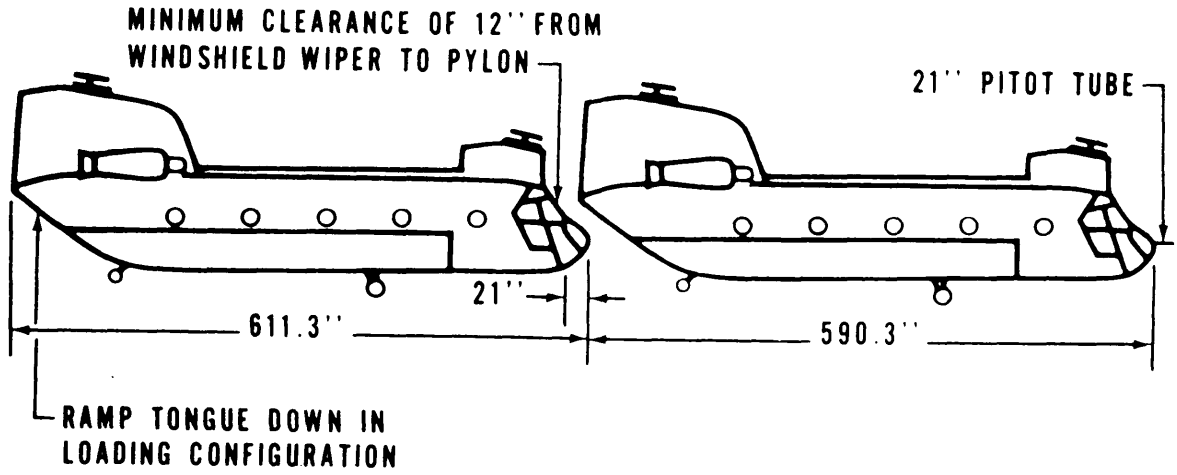
Excessive tension on tiedown devices will result in damage to the helicopter tiedown points.

7-20. Unloading

Unloading sequence will be the reverse of the loading sequence.

CAUTION

Do not remove wooden frames from around wheels until the helicopter is stabilized by the lifting device.



Fiugre 7-44. Side view of nose-to-tail overlap of CH-47 helicopters.

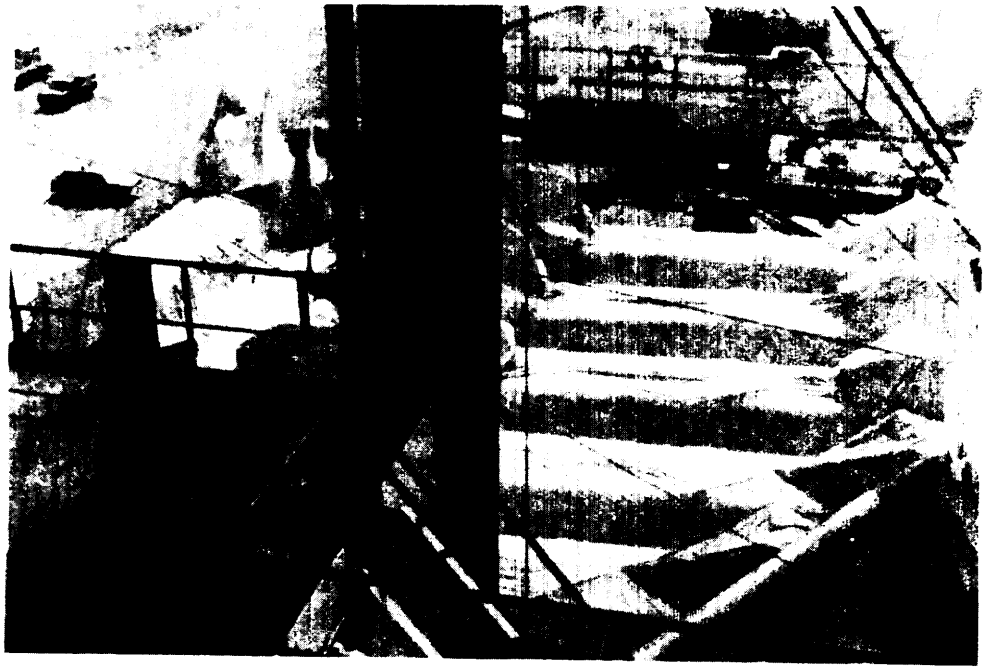


Figure 7-45. CH-47 helicopter stowed side-by-side on RORO ship.

Figure 7-46. CH-47 helicopter tiedown technique using standate heavy tiedown devices.

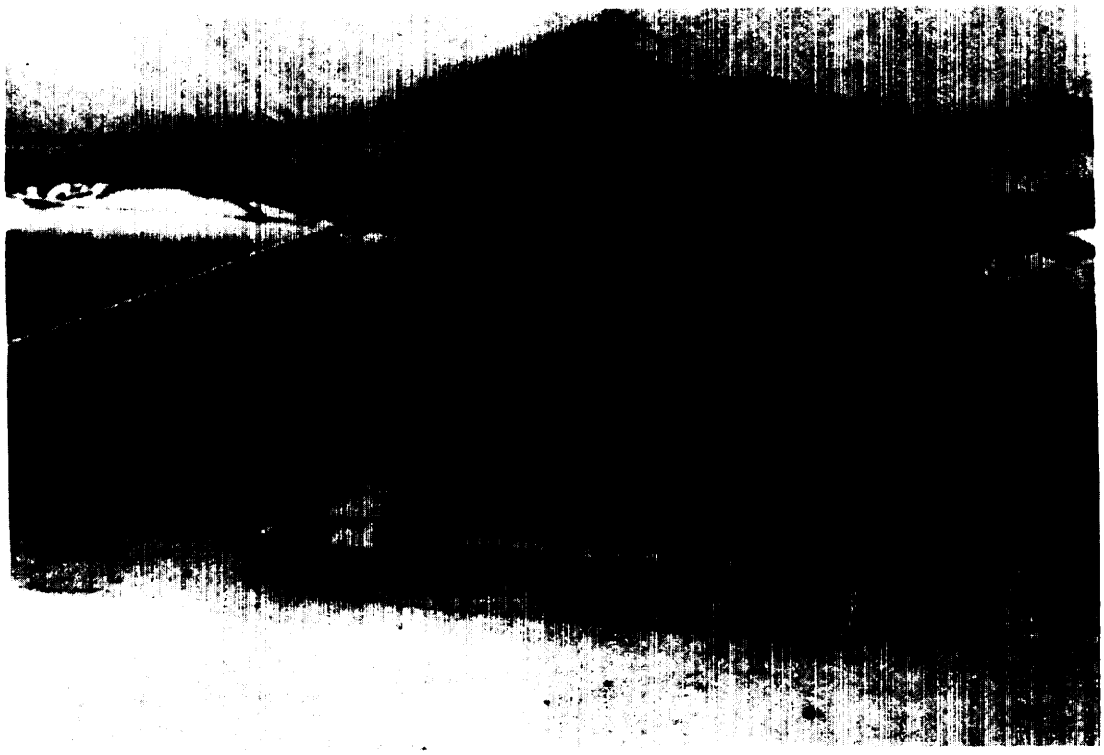


Figure 7-47. CH-47 wheels are stabilized by placing a wooden frame around each wheel.

★ CHAPTER 8

TRANSPORTABILITY GUIDANCE, OH-6 HELICOPTER

★ Section I. TRANSPORT OF THE OH-6 HELICOPTER IN CONTAINER

NOTE

Minimum disassembly applicable to all surface modes is removal of main rotor blades and horizontal stabilizer.

★ CAUTION

TM 55-1520-214-S will be consulted before any disassembly and loading takes place.

CAUTION

Only container chassis trailers equipped with soft ride suspension system will be used to transport the container by highway to the port. The use of soft ride suspension chassis trailers within the port is not necessary. Deviations from the procedure will be authorized only by Commander. TSARCOM. Stuffing the container at locations other than the port is not recommended.

8-1. Preparation

★ Disassembly, preservation, and packaging are accomplished in accordance with TM 55-1520-214-S. Additional guidance may be obtained through contact with personnel of the US Army Troop Support and Aviation Material Readiness Command, St. Louis, MO. To reduce congestion in the vicinity of the loading area, the main rotor blades, vertical and horizontal stabilizers, tail rotor, and mast and rotor head are removed prior to positioning the helicopter at the loading site. The main rotor blades are packed in a plywood container; the mast and rotor head secured to a skin-mounted base; the horizontal stabilizer is placed in a fiberboard carton; that is secured to the prefabricated metal spreader bar (para 8-4a): and the tail rotor and vertical stabilizer are wrapped in a protective material and secured in the helicopter cabin.

NOTE

Remove antennas as necessary; wrap, identify, and stow in cargo compartment, as required.

8-2. Positioning For Loading

★ The loading site should be a loading platform equal in height to the height of the container floor. The helicopter can be moved short distances over smooth surfaces by means of ground-handling wheels, tow bar, and warehouse tractor. Maneuver the helicopter (with the aid of the ground-handling wheels) to the rear of the container and align the container door for loading.

8-3. Loading

CAUTION

Extreme care must be taken in loading and unloading helicopters to prevent gouging, scratching, or tearing the airframe skin.

★ *a. General.* Bridging material is to be placed directly in front of the landing skids. It consists of ½-inch (1.2 cm) thick plywood or ¼-inch (.6 cm-) thick steel plate sufficiently wide to accommodate the ground-handling wheels and landing skids and long enough to span the distance between the loading platform and the inside of the container; extending beyond the rear door header. When safety requirements do not restrict, paste soap or grease may be applied on the bridging material to facilitate skidding the helicopter through the container door. The ground-handling wheels are removed and reinstalled after the high point of the helicopter clears the container door header. To help reduce the height of the helicopter, the landing skid struts may have to be extended to their maximum position and secured in the extended position, this is done with prefabricated spreader bars or with notched and cushioned 4- by 4-inch (10- by 10-cm) lumber spreader tiedown pieces. Approximate measurements of major removed and packaged components for each helicopter are as follows:

Main rotor blades:	144- x 10- x 17 in. (366- x 25- x 43-cm)
Mast and rotor head:	30- x 30- x 30-in. (76 x 76- x 76-cm)

Horizontal stabilizer: 70- x 18- x 4 in. (178- x 46- x 10-cm)

★ *b. Two Helicopters in a Container.* The first helicopter is moved into the container nose first, positioned 12 inches (30.5 cm) from the front of container with the tail boom 24 inches (61 cm) from the side. The ground-handling wheels are removed, lowering the helicopter to rest on its landing skids. The main rotor blade boxes for both helicopters are positioned at the center of the container, one along each side. The skid-mounted masts and rotor heads for both helicopters are next placed in the center of the container under the helicopter boom side by side. Securement of the helicopter packaged component parts is in accordance with table 8-1. The second helicopter is moved into position, boom first, and is secured using the same method as for the first helicopter.

c. One Helicopter in a Container. When loading only one helicopter in a container, the identical preparation and loading procedures used for two helicopters are applicable, with the exception of placement within the container. For one helicopter in a container the fuselage is to be located in the center of the container with the main rotor blade box along one side wall and the skid-mounted mast and rotor head along the opposite wall.

★ 8-4. Blocking and Restraining Helicopters in Container

a. Bill of Material (table 8-1).

b. Application of material (table 8-2).

Table 8-1. Bill of Materials for Blocking and Restraining Item on Landing Skids in Container

Item	Description	Approximate quantity
Lumber	Douglas-fir or comparable lumber such as long-leaf dense southern yellow pine or western larch, straight grain, free from material defects, 2- x 4-inch (5- x 10-cm); federal specification MM-L-751c	51 linear ft (15.5 m)
Securing devices	Preferred. Lag screw, 7/16- x 3-inch (1.1- x 7.5-cm)	26 ea
	Alternate. Nails, common or cement coated, doublehead, or suitable substitute, 10d; federal specification FF-N-105a	227
★ Cushioning material	Polypropylene foam, PPP-C-1797, NSN 8135-00-300-4905	100 ft roll
	Polyethylene foam, PPP-C-1752 NSN 8135-00-180-5422	100 ft roll
Eyebolt assembly	7/16-inch (1.1-cm) eyebolt, 1.812-inch (4.6-cm) diameter washer, and 7/16-inch (1.1-cm) hexagon nut. Eyebolt, MS51937-4; washers, MS63040-7; nut MS16285-4; or equal	22 ea
Tiedown devices	CGU-1/B	20 ea
Shackles	3/8-inch (.95-cm)	4 ea
Spreader bar	Prefabricated metal with tiedown shackles	4 each
Cushioning material	Rubber, felt, or suitable substitute, 1/4-inch (1.2-cm) thick	as required
Tape	Filament reinforced, 1-inch (2.5-cm) wide, FSN PPP-T-97	as required
Plywood	1/4- x 3 5/8-inch (1.2- x 9.2-cm); federal specification NN-P-515	46 linear feet (14 m)

NOTE

The carrier must be consulted before any holes are drilled in the container floor. If the carrier will not permit the drilling of holes in the container floor to accommodate the securing bolts, then the alternate method (nailing) of securing the tiedown fixtures may be used.

Table 8-2. Application of Materials for Blocking and Tiedown of Helicopters in Container figures 8-1, 8-2, 8-3, 8-4, 8-5, 8-6, 8-7, and 8-8

Item	No. required	Application
A	4	Cushioning material, locate under and extend entire length of landing skids.
B	as required	Cushioning material, locate between blocking, spreader bars, and landing skids.
C	4	Shackles (fig 8-2). Attach to jacking pads, one on each side of helicopters.
D	4	Spreader bar tiedowns, prefabricated metal (fig 8-3). Use to secure landing skids in fixed position and to afford tiedown positions identified in Item F.
E	as required	Tape, filament reinforced. Tie boxed horizontal stabilizer to spreader bars.
F	16	Tiedown devices, CGU-1/B. Secure to eyebolt tiedown fittings (Item N) and shackles on spreader bars (Item c) and helicopter tiedown pads (Item B); pull tight and lock in place.

Table 8-2. Application of Materials for Blocking and Tiedown of Helicopters in Container figures 8-1, 8-2, 8-3, 8-4, 8-5, 8-6, 8-7, and 8-8–Continued

Item	No. required	Application
G	2	Tiedown devices, CGU-1/B. Secure to eyebolt tiedown fitting, pass over top of cased rotor blades, secure to eyebolt tiedown fittings, pull tight, and lock in place.
H	2	Tiedown devices, CGU-1/B. Secure to eyebolt tiedown fitting and pass over skid-mounted rotor head and static masts, forming an "X". Secure to second eyebolt tiedown fitting, pull tight, and lock in place.
I	4	Blockings, each to consist of one piece of 2- x 4- x 24-in. (5- x 10- x 61-cm) lumber and one piece of 1/4- x 3 5/8- x 22-in. (.6 x 9.2- x 56-cm) plywood. Place 1/4-in. (.6-cm) plywood under 2- x 4-in. (5- x 10-cm) lumber with ends of plywood 1 inch (2.5 cm) from ends of 2- x 4-in. (5- x 10-cm) lumber. Place against cushioned landing skids, as indicated in figure 8-1, and secure (nail) each of container floor with four 7/16-in. lag screws (ten 10d nails).
J	4	Tiedown fixtures, each to consist of one piece of 2- x 4- x 15-in. (5- x 10- x 37.5-cm) lumber with eyebolt assembly and one piece of 1/4- x 3 5/8- x 13-in. (.6- x 9.2- x 32.5-cm) plywood. Place 1/4-inch (.6-cm) plywood under 2- x 4-in. (5- x 10-cm) lumber. Place against cushioned landing skids, as indicated in figure 8-1, and secure (nail) each to container floor with four 7/16-in. lag screws (eight 10d nails (fig 8-4).
K	4	Blocks, each to consist of one piece of 2 x 4- x 21-in. (5- x 10- x 53-cm) lumber and one piece of 1/4- x 3 5/8- x 19-in. (.6- x 9.2- x 48-cm) plywood. Place 1/4-in. (.6-cm) plywood under 2- x 4-in. (5- x 10-cm) lumber. Place one under each end of cased rotor blades against skids, and secure (nail) each to container floor with two 7/16-in. lag screws (three 10d nails).
L	4	Tiedown fixtures, each to consist of one piece of 2- x 4- x 315-in. (5- x 10- x 38-cm) lumber with eyebolt assembly and one piece of 1/4- x 3 5/8- x 13-in. (.6- x 9.2- x 32.5-cm) plywood. Place 1/4-in. (.6-cm) plywood under 2- x 4-in. (5- x 10-cm) lumber with ends of plywood 1 inch (2.5-cm) from ends of 2- x 4-in. (5- x 10-cm) lumber. Place one piece at each end and one at side of cased rotor blades, and secure (nail) each to container floor with four 7/16-in. lag screws (six 10d nails) (fig 8-4).
M	4	Tiedown fixtures, each to consist of one piece of 2- x 4- x 15-in. (5- x 10- x 38-cm) lumber, with eyebolt assembly, and one piece of 1/4- x 3 5/8- x 13-in. (.6- x 9.2- x 33-cm) plywood. Place 1/4-in. (.6-cm) plywood under 2- x 4-in. lumber with ends of plywood 1 inch (2.5-cm) from ends of 2- x 4-in. (5- x 10-cm) lumber. Place two in front and rear of skid-mounted rotor heads, and secure (nail) each to container floor with four 7/16-in. lag screws (six 10d nails) (fig 8-4).
N	6	Blocks, each to consist of one piece of 2- x 4- x 15-in. (5- x 10- x 37.5-cm) lumber and one piece of 1/4- x 3 5/8- x 15-in. (.6- x 9.2- x 37.5-cm) plywood. Place 1/4-in (.6-cm) plywood under 2- x 4-in. (5- x 10-cm) lumber with ends of plywood 1 inch (2.5-cm) from ends of 2- x 4-in. (5- x 10-cm) lumber. Place two pieces on each side of skid-mounted rotor heads and one at side of main rotor box. Secure each to container floor with four 7/16-in. lag screws (six 10d nails).
O	8	Tiedown fixtures, each to consist of one piece of 2- x 4- x 15-in. (5- x 10- x 37.5-cm) lumber with eyebolt assembly and one piece of 1/4- x 3 5/8- x 13-in. (.6- x 9.2- x 32.5-cm) plywood. Place 1/4-in. (.6-cm) plywood under 2- x 4-in. (5- x 10-cm) lumber with ends of plywood 1 inch (2.5-cm) from ends of 2- x 4-in. (5- x 10-cm) lumber. Place two in front of and two in rear of each helicopter, and secure each to container floor with four 7/16-in. lag screws (six 10d nails (fig 8-4).

CAUTION

Do not drive double-headed nails below first head.

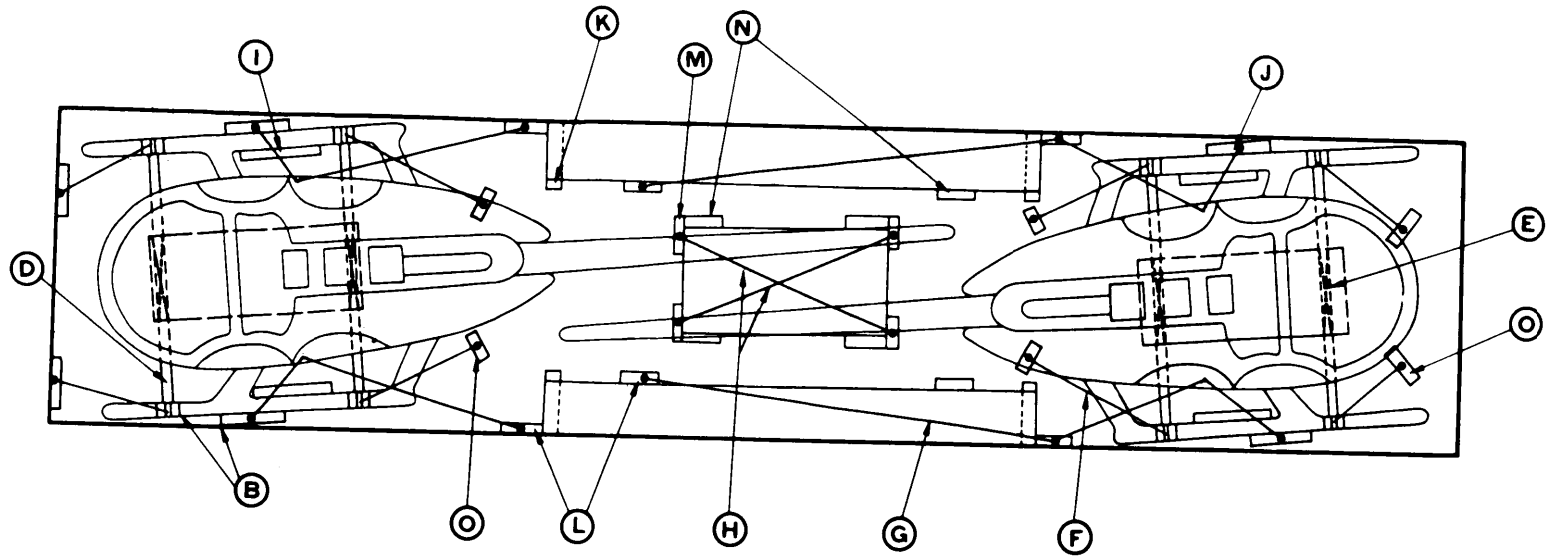
NOTE

If prefabricated spreader tiedowns (fig 8-3) are not available, 2- x 4-inch (5- x 10-cm) lumber cut to suit (fig 8-5) and 8-6) with 3/8- x 3-inch (.95- x 15-cm) eyebolts, or 4- x 5-inch (10- x 10-cm) lumber cut and notched to suit with eyebolts (fig 8-7 and 8-8) may be substituted.

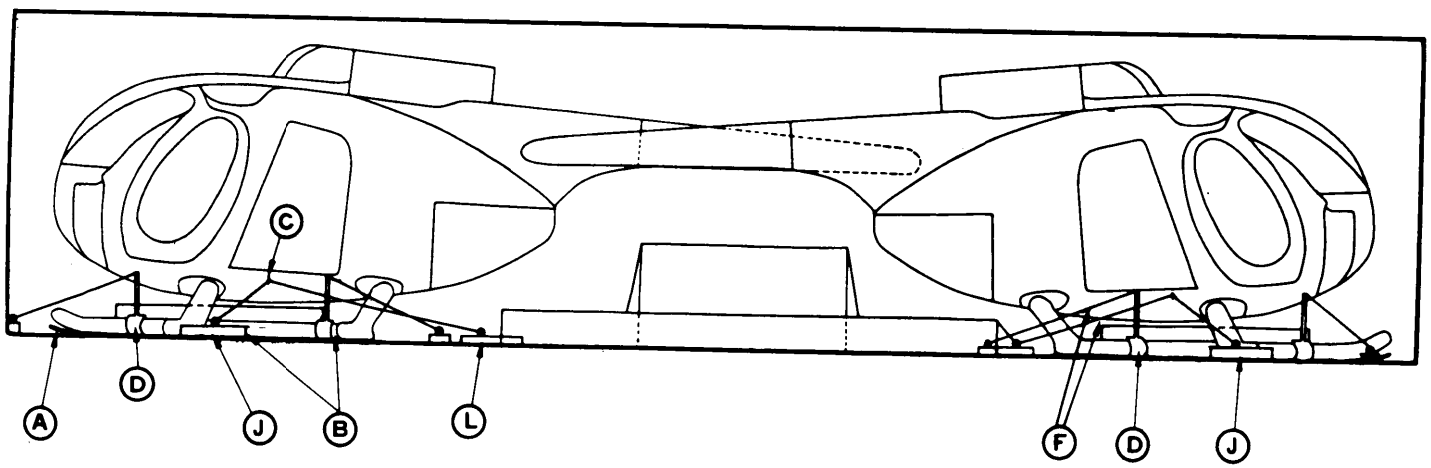
If substitution is made with 2- x 4-inch (5- x 10-cm) lumber for the prefabricated spreader bars, additional material will be required as follows: 54 feet (16.5 m) of 2- x 4-inch (5- x 10-cm) lumber, forty-eight 10d nails, eight 3/8- x 3-inch (.95- x 15-cm) eyebolts, and 1/4-inch (.6-cm) cushioning material, as required. MC-1 tiedown device may be substituted for the CGU-1B tiedown device.

When 10d nails are used, a piece of 1/4-inch (.6-cm) plywood must be used under the 2- x 4-inch (5- x 10-cm) lumber to prevent 10d nails from penetrating through the container's wooden floor. The 1/4-inch (.6-cm) plywood is stepped in under the 2- x 4-inch (5- x 10-cm) lumber to facilitate the removal of the blocking and tiedowns from the van floor.

Doubleheader 10d nails are also recommended to facilitate removal of the blocking and tiedown from the container floor.



PLAN



SIDE

Figure 8-1. Blocking and restraining diagram.

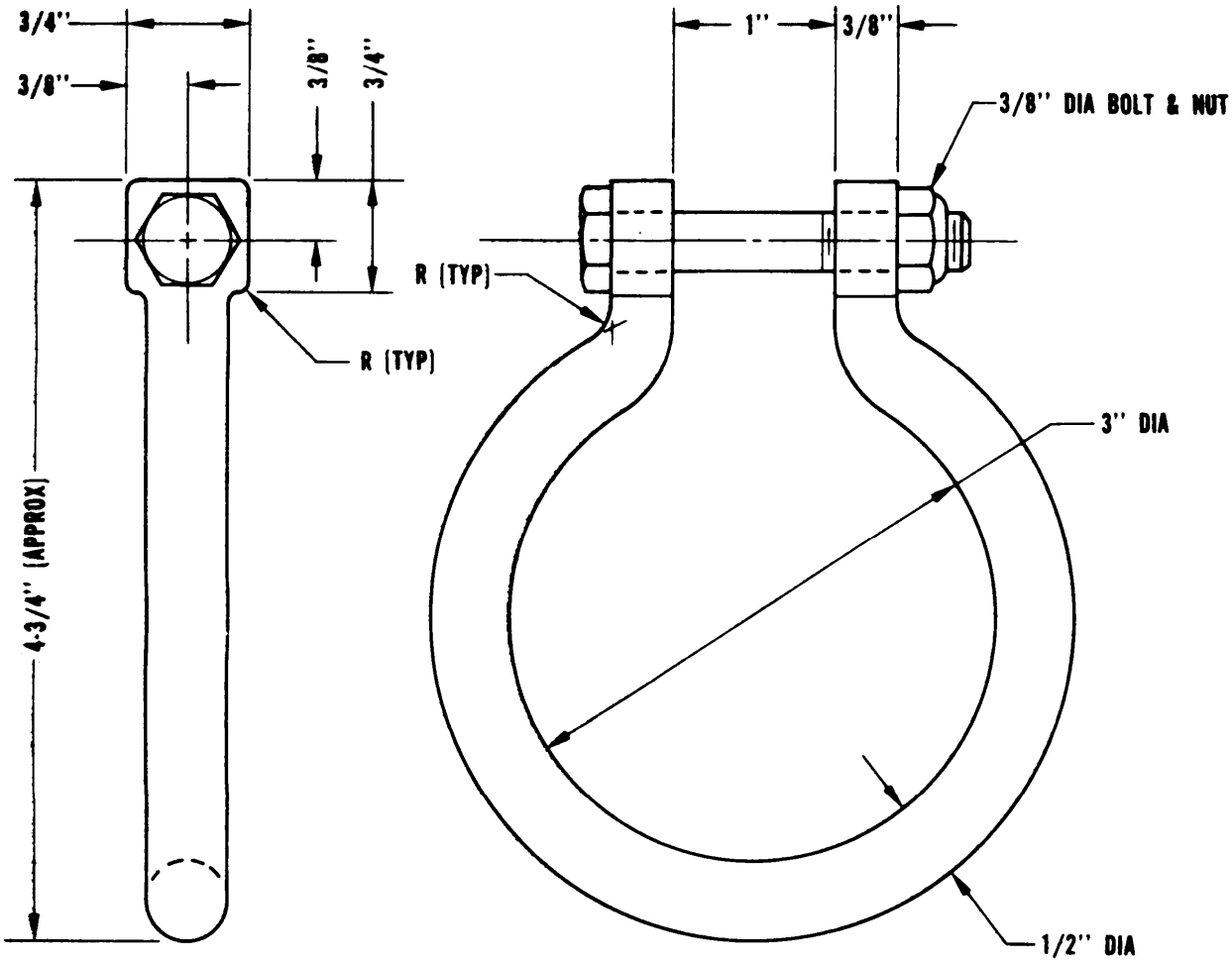
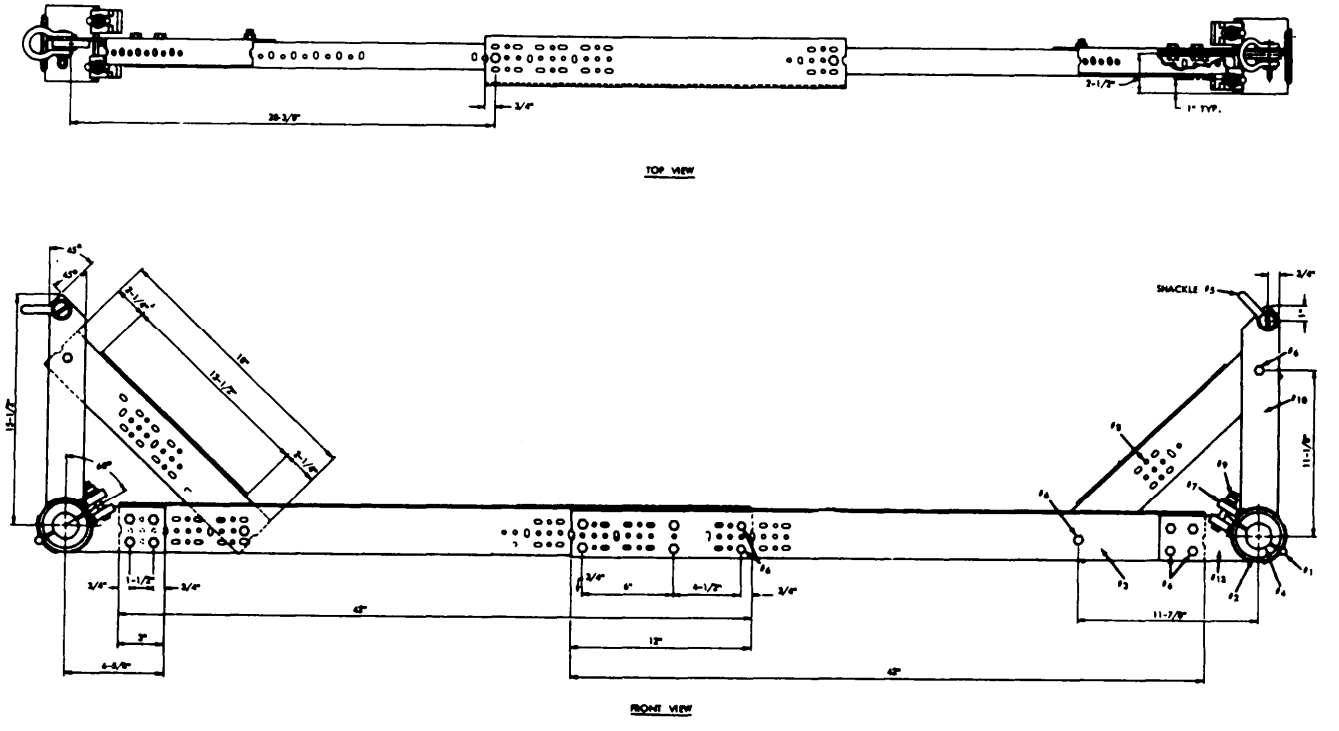


Figure 8-2. Shackles for jacking pad.



BILL OF MATERIALS ⚠

ITEM	QTY	DESCRIPTION	DIMENSIONS	SPECIFICATIONS	NOTES
1	4	HINGE, COMMON BUTT	3-1/2 X 3-1/2	MS 27968-6	WELD TO COLLAR ASSEMBLY (-2)
2	4	COLLAR ASSEMBLY (STANDARD BLACK PIPE)	3(OD) X 5	A S T M A 120	SPLIT PIPE LENGTHWISE
3	4	SPREADER BAR (SLOTTED ANGLE IRON)	3 X 1-1/2 X .106 X 42	MIL-S-21041	
4	8	PADDING (FELT)	2 X 4 X 1/2	C-F-206	BOND TO ITEM -2
5	4	SHACKLE	1/2 INCH	AN 116-10	ATTACH TO -10 BRACE (TYP)
6	36	BOLTS	3/8 X 3/4	AN 6-5 OR EQUAL	
7	8	BRACES	1-4/8 X 1-1/2 X 1/2	10 20 STEEL (COMM) OR EQUAL	BUTT WELD TO COLLAR ASSEMBLY (-2)
8	4	BRACES (SLOTTED ANGLE IRON)	3 X 1-1/2 X .106X 17	MIL-S-21041	
9	8	BOLTS	3/8 X 3-1/2	AN 6-27A OR EQUAL	
10	4	BRACES	14 X 3-1/2 X 1/2	10 20 STEEL (COMM) OR EQUAL	BUTT WELD TO COLLAR ASSEMBLY (-2)
12	4	BRACES	6 X 3 X 1/4	10 20 STEEL (COMM) OR EQUAL	BUTT WELD TO COLLAR ASSEMBLY (-2)

NOTES:

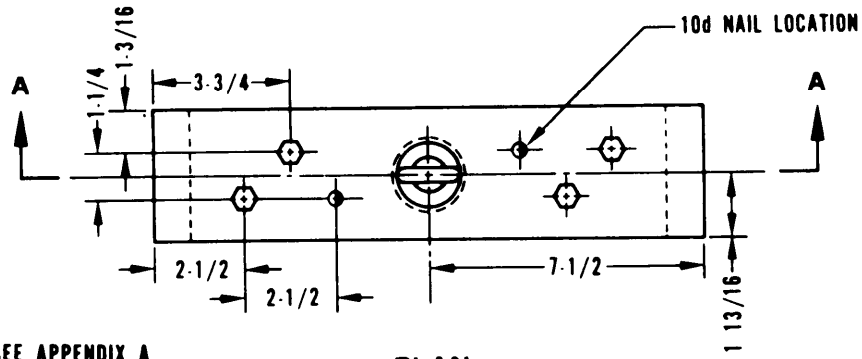
⚠ Contact Depot to Item 10 (4 places) "OH-6A SPREADER BAR, Return To SHARPE ARMY DEPOT, LATHROP, CALIFORNIA."

⚠ Designed purpose of OH-6A SPREADER BAR IS To prevent excessive vibration to the Sling Cable.

⚠ Fixture to be painted yellow.

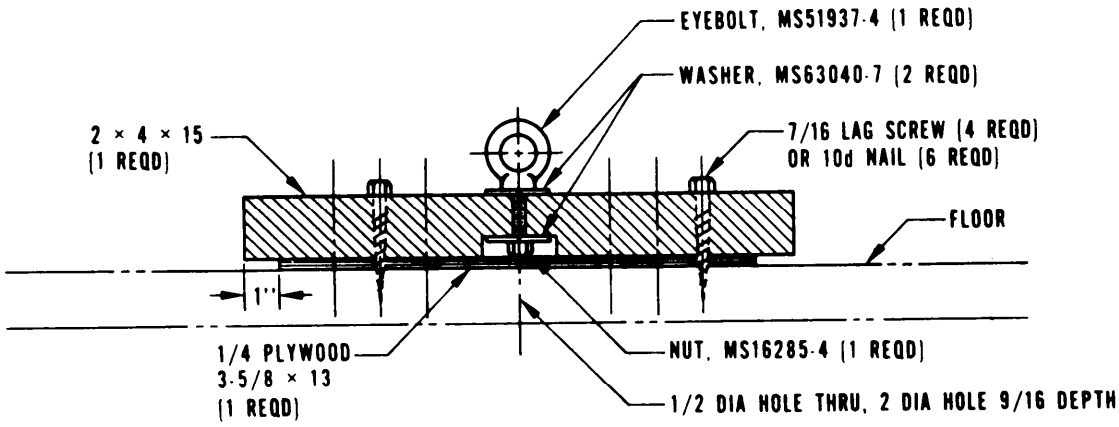
⚠ Quantities shown are for two assemblies. Two assemblies required per aircraft.

Figure 8-3. Prefabricated metal spreader bar.



NOTE:
FOR METRIC CONVERSION, SEE APPENDIX A.

PLAN



SECTION A-A

Figure 8-4. Tiedown fixture.

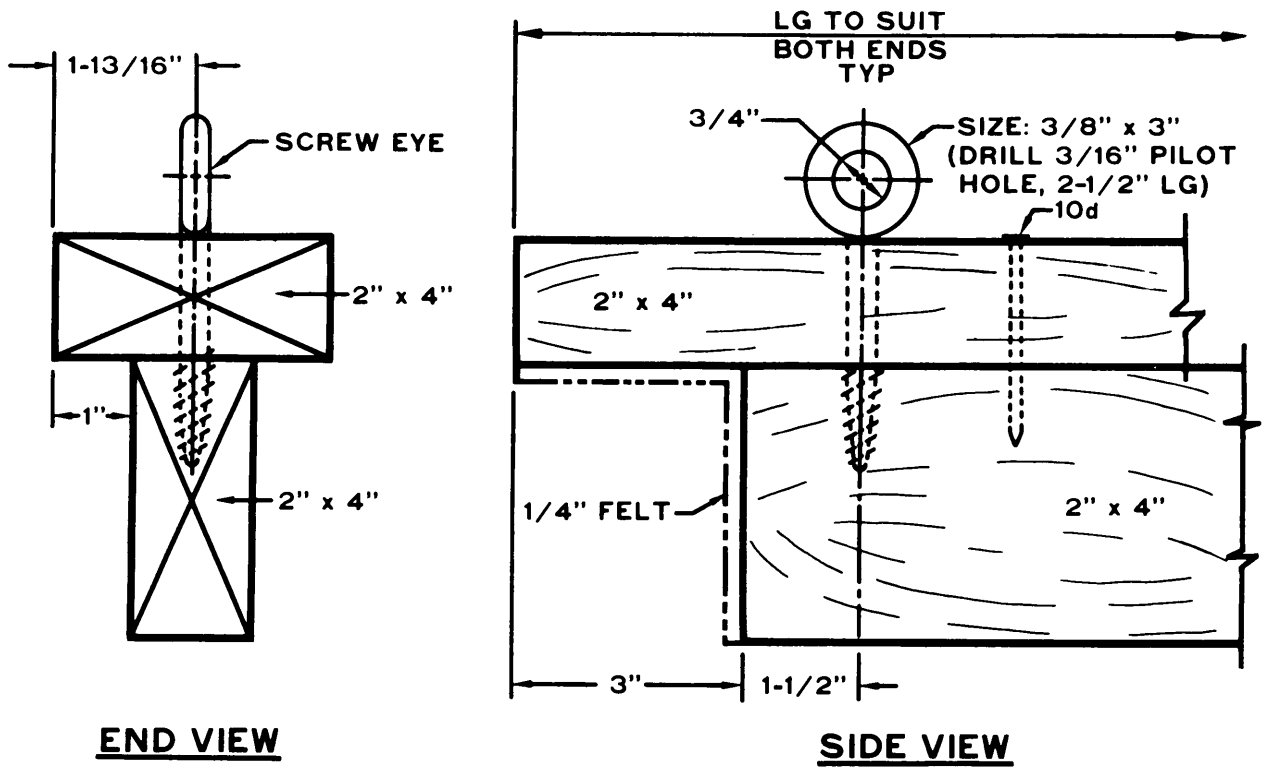


Figure 8-5, Detail alternate, 2- x 4-inch (5- x 10-cm) lumber spreader bar.

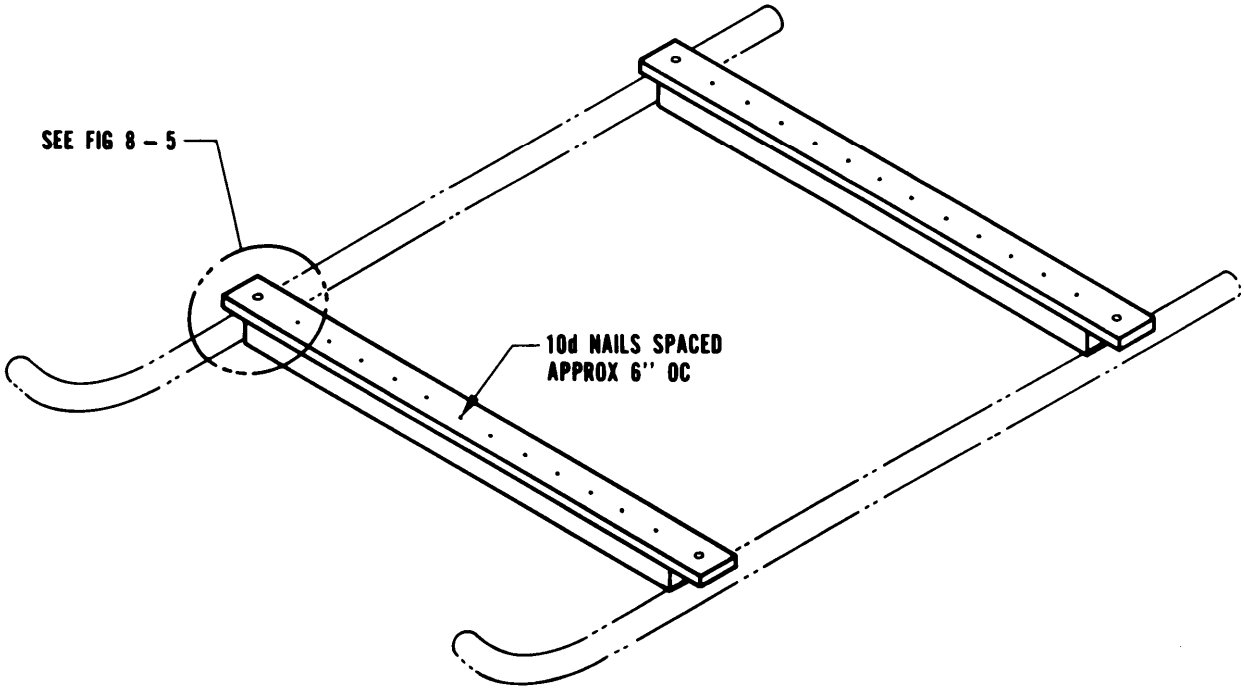


Figure 8-6. Schematic sketch, 2- x 4-inch (5- x 10-cm) lumber spreader bar.

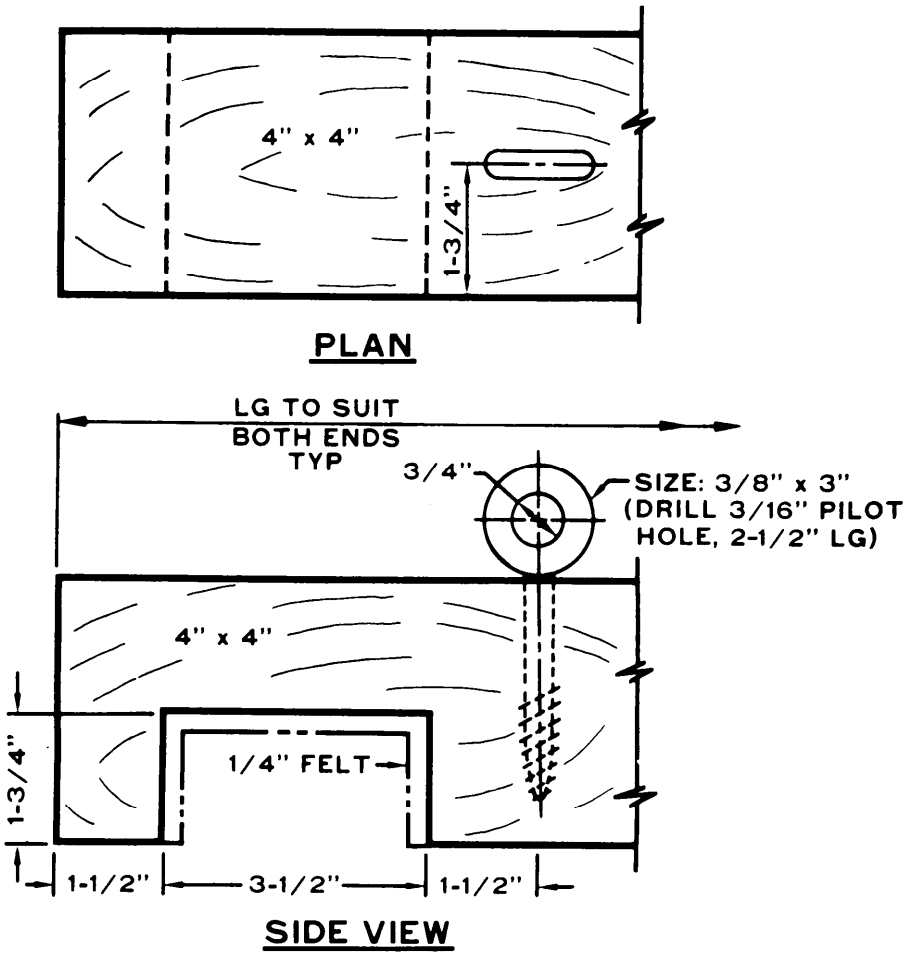


Figure 8–7. Detail alternate, 4- x 4-inch lumber spreader bar.

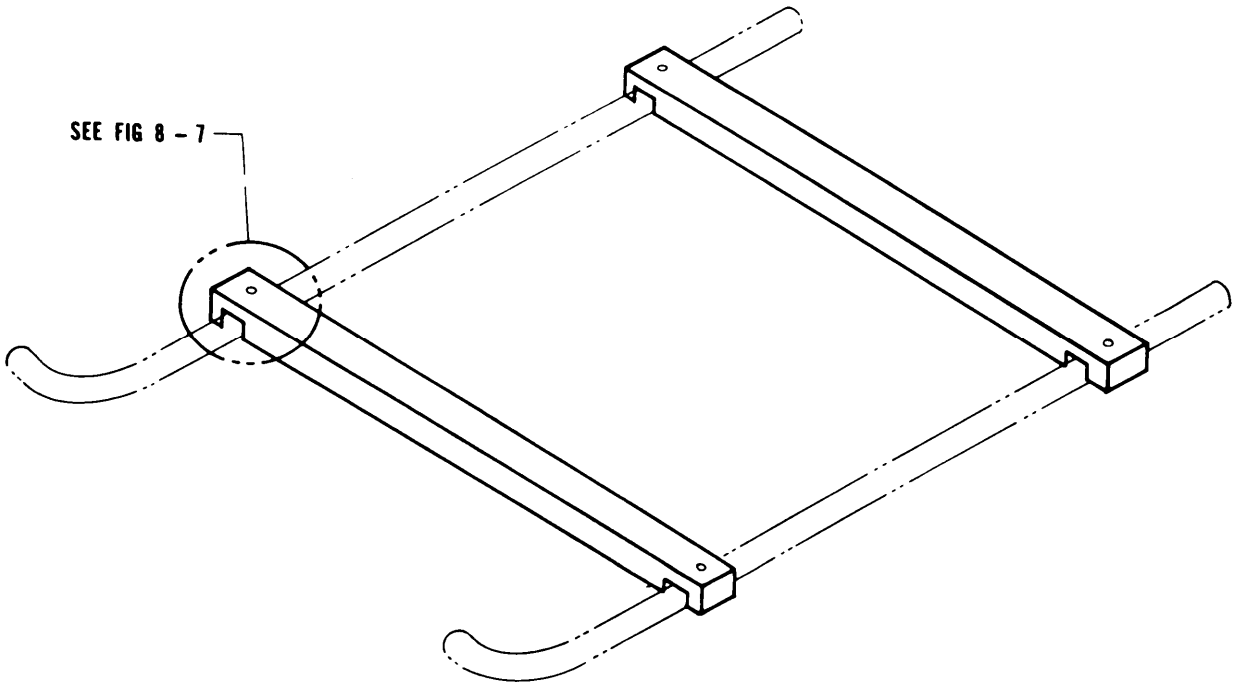
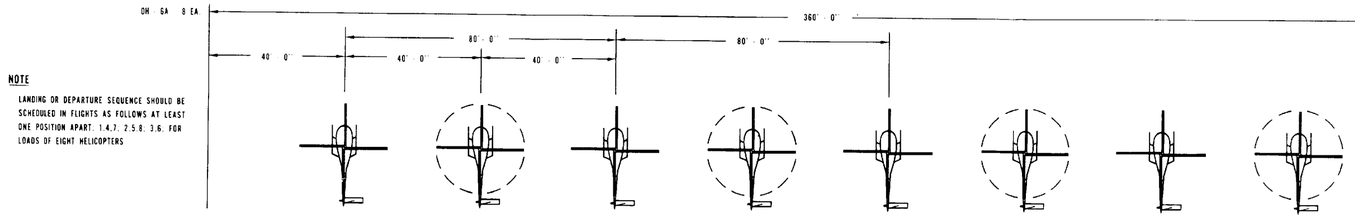


Figure 8-8. Schematic sketch, 4- x 4-inch lumber spreader bar.

RECOMMENDED MINIMUM SPACING FOR LANDING/DEPARTURE IN A RESTRICTED AREA



NOTE

LANDING OR DEPARTURE SEQUENCE SHOULD BE SCHEDULED IN FLIGHTS AS FOLLOWS AT LEAST ONE POSITION APART: 1,4,7. 2,5,8. 3,6. FOR LOADS OF EIGHT HELICOPTERS

HELICOPTER NO		1	2	3	4	5	6	7	8
LANDING AND DEPARTURE SEQUENCE FOR 8 HELICOPTERS	FLT NO. 1	①			④			⑦	
	FLT NO. 2		②			⑤			⑧
	FLT NO. 3			③			⑥		

Figure 8-9. Landing and departure sequence for OH-6 helicopters.

★ Section II. TRANSPORT OF THE OH-6A HELICOPTER BY LASH LIGHTER

8-5. General

a. Operational Area. The area used to disassemble and load the helicopters at a port or river bank normally is a congested area. Level ground is desirable; however, an area sloped toward the river 1 foot (30 cm) in 27 feet (8.1 m) is acceptable. A reasonably level portion of usable surface 360 feet (110 m) long and 110 feet (33.5 m) wide can accommodate 15 OH-6 helicopters landing in two flights, eight in the first and seven in the second flight. Chalk mark surfaces at 40-foot (13-m) intervals to guide helicopters while landing to insure safe rotor clearance. The landing and departure sequence is shown at figure 8-9. Landing OH-6 helicopters 1 through 6, 7 through 11, and 12 through 15 will insure adequate distance between rotor blades and aircraft to permit safe flight operation. Each flight is landed, engines shut down, and rotor blades tied down before the next flight is landed.

★ *b.* **(Deleted)**

c. Materials Required

(1) See paragraph 4-5c.

(2) Major items of equipment for preparation and reassembly of OH-6 helicopters for loading in LASH lighter are identified in table 8-3.

8-6. LASH Lighter and OH-6A Helicopter Preparation

a. LASH Lighter Preparation. Tiedown fittings are installed in the lighter in accordance with figure 4-8 and 8-10.

b. Helicopter Preparation. Fifteen OH-6 helicopters can be loaded in the LASH Lighter in the following configuration:

(1) *Removal of main rotor blades.*

(2) *Removal of tail rotor blades.*

(3) *Removal of the horizontal stabilizer.*

c. *Minimum Disassembly.* Minimum disassembly of the helicopter is desired so that the helicopter can. be in a flyable configuration as soon as possible after arrival at destination. All hatch panels can be installed on a lighter loaded with OH-6 helicopters.

8-7. Disassembly

All of the 15 OH-6 helicopters are disassembled concurrently after they are flown to the preparation area. Preparation of the OH-6 helicopter is accomplished as follows:

a. Remove all main rotor blades.

b. Remove tail rotor blades; wrap and stow in helicopter.

c. Remove horizontal stabilizer and place on shipping filture (fig 8-3).

d. Install shipping fixture.

e. Install main rotor blades on blade rack (fig 8-11) for placement and securing on shipping fixture (fig 8-3).

Table 8-3. Major Items of Equipment for Preparation and Reassembly of OH-6 Helicopters for Loading in LASH Lighter

Nomenclature	NSN	Quantity per Helicopter	Remarks
Tool kit, aircraft mechanic, general	5180-00-323-4693	1	Helicopter 1 only
Wrench, torque 700-1600 in-lb	6120-00-270-3124	1	
★Adapter, hoisting, aircraft	4920-00-270-3124	1	
Wheels, ground-handling	1730-00-877-4959	1 set	
Portable APU	6115-00-074-6396	1	
Shoring 2- X 4-in X 8-ft (6- X 10-cm X 2.5-cm		2	
4- X 18- X 18-in. (10- X 46- X 61-cm)		2	Helicopter 1 only
4- X 12- X 18-in. (10- X 30.5- X 46-cm)		2	Helicopter 1 only
★ Tiedown Shackle	4030-00-542-3181	3	See figure 8-2
Spreader bar	local manufacture	1	See figure 8-3
Compound, preservative MIL-C-16173, grade 2	8030-00-244-1297	1 gal	
Compound, cleaning	6850-00-935-0996	5 gal	
Oil, lube, MIL-L-6081 grade 1010	9150-00-273-2388	10 qt	
★ Material, cushioning polypropylene foam PPP-C-1797	8135-00-300-4905	100 ft roll	(unit of issue)

Table 8-3. Major Items of Equipment for Preparation and Reassembly of OH-6 Helicopters for Loading in LASH Lighter–Continued

Nomenclature	NSN	Quantity per Helicopter	Remarks
Bag, packing, water, vaporproof, MIL-B-117	8105-00-274-2390	100 ea	(Unit of issue)
Rope, grass, 3/8-in (1 cm)	4020-00-231-9021	ft	As required
Tape	7510-00-274-5124	roll	As required

★ 8-8. Preservation

Preserve and prepare removed components in accordance with TM 55-1520-214-S.

8-9. Loading.

a. Refer to paragraph 4-9.

★ *b*. Load OH-6 helicopters in accordance with the sequence shown in figure 8-12. Approximate loading times are shown in table 8-4.

8-10. Tiedown

a. The diagram shown in figure 8-13 is the tiedown positioning diagram. Tiedown rings will be installed on the helicopter according to figure 8-2. Tiedown of the helicopter will be accomplished with wire rope and turnbuckles as shown in figure 8-13.

CAUTION

Excessive tension on tiedown devices will result in damage to helicopter tiedown points.

b. Space is available in the lighter for additional small containers to transport maintenance items with the helicopters.

8-11. Unloading

Unloading is done in the reverse of the loading sequence. The time breakdown for unloading and reassembly is shown in table 8-5.

8-12. Reassembly

Reassembly includes removal of all preservation material, installation of removed components, technical inspection, and test flight.

Table 8-4. Approximate Time Requirements of Loading Phase for One OH-6 Helicopter

Phase	Hours
Preparation	8 man-hours
Loading	15 minutes
Tiedown	10 minutes

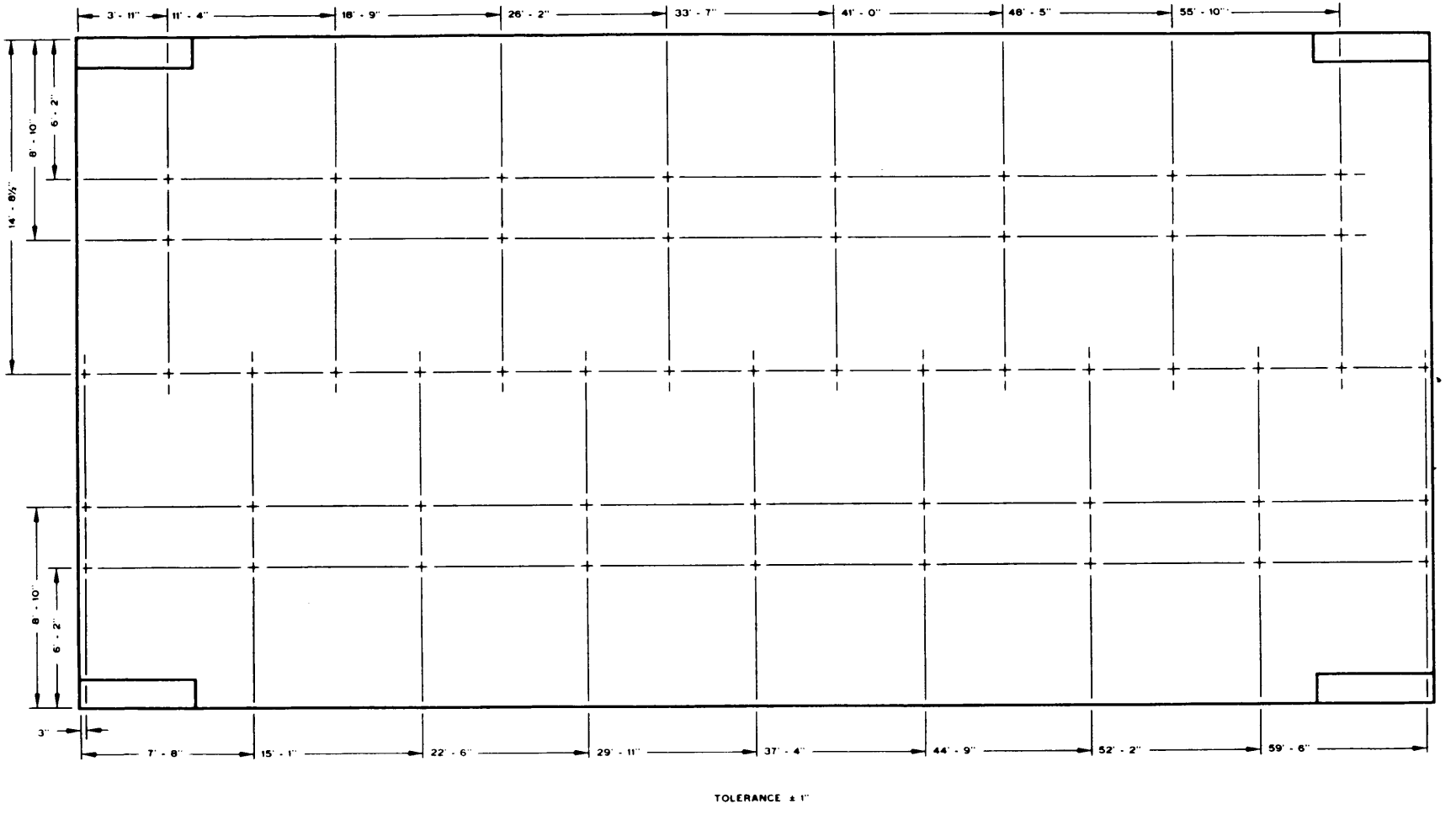
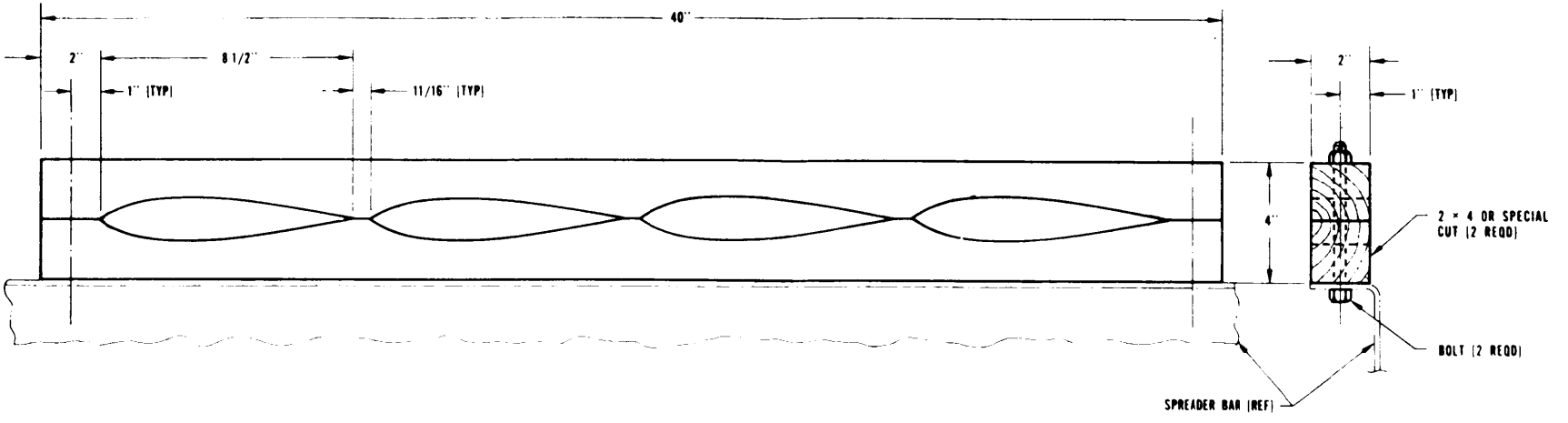
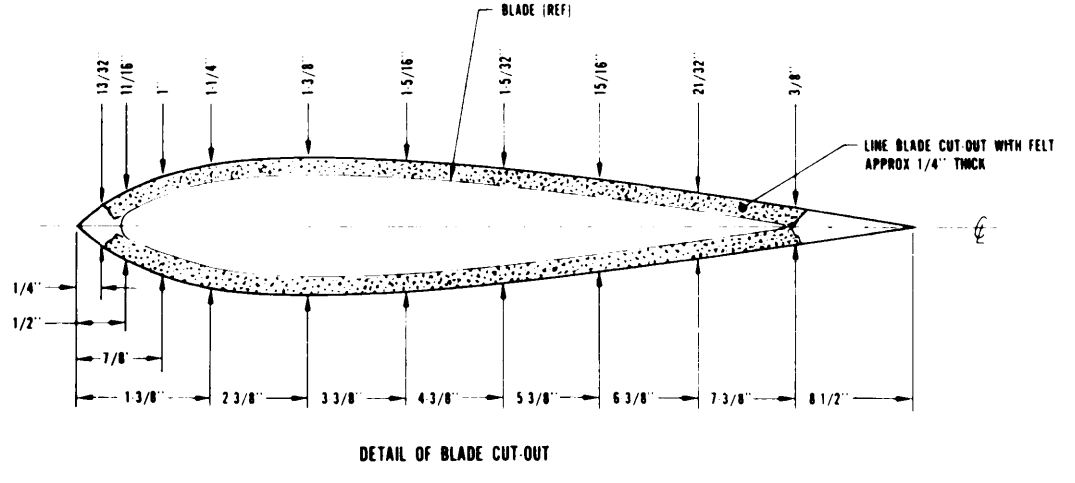


Figure 8–10. Tiedown positioning inside LASH lighter for 15 OH–6 helicopters.





DETAIL OF BLADE CUT-OUT

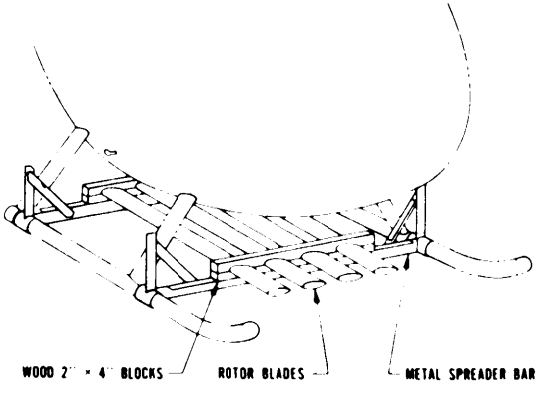


Figure 8–11. Main rotor blade rack installed on spreader bar.

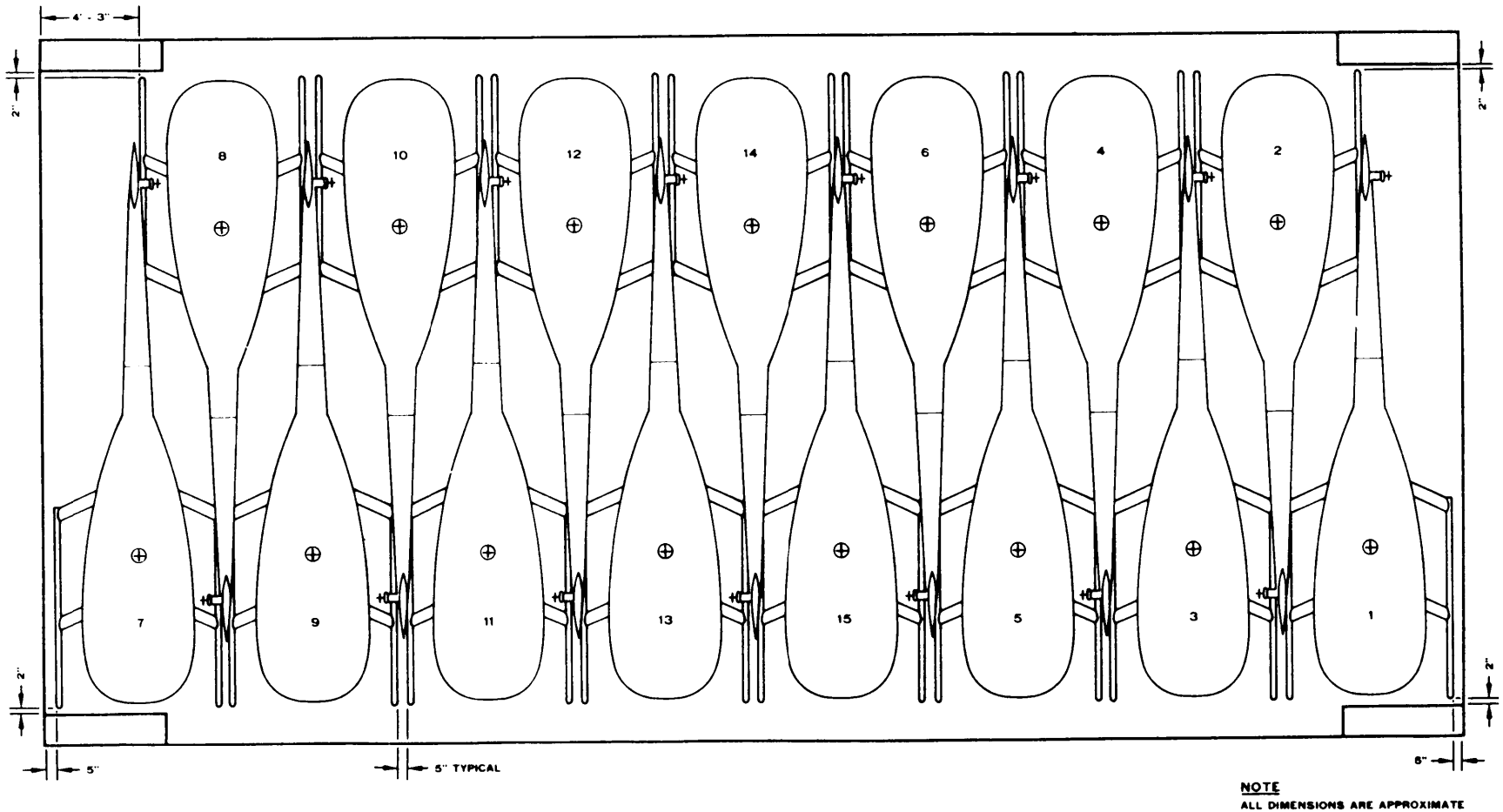


Figure 8-12. Sequential loading diagram for 15 OH-6 helicopters.

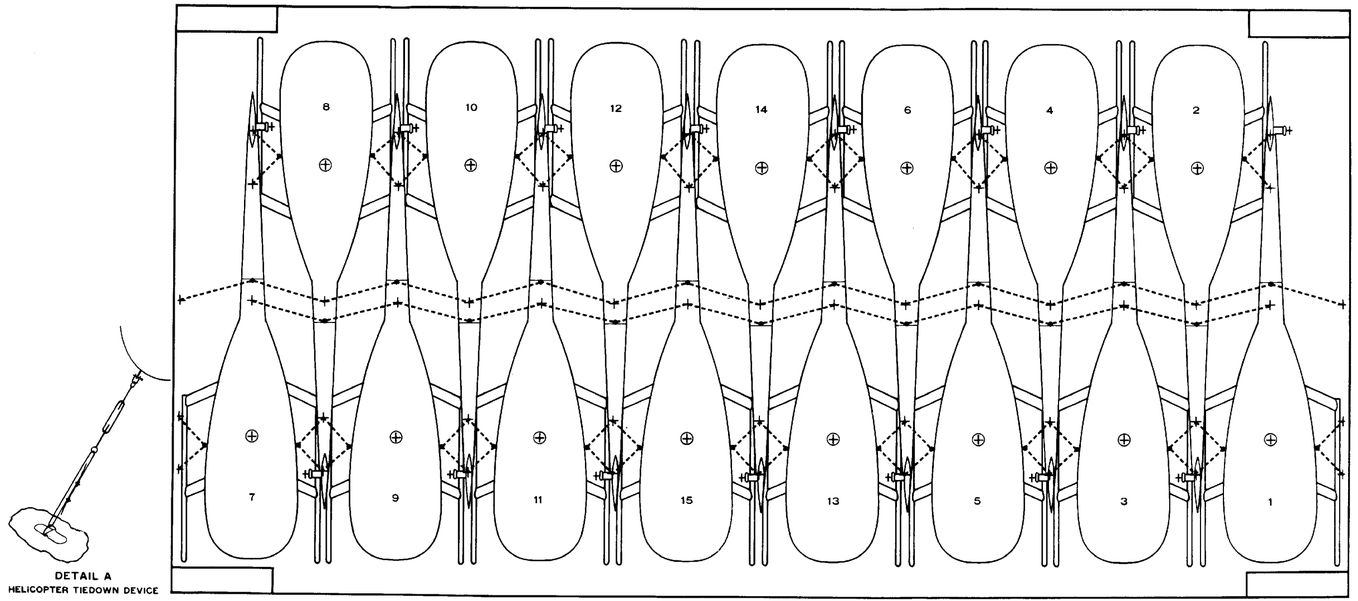
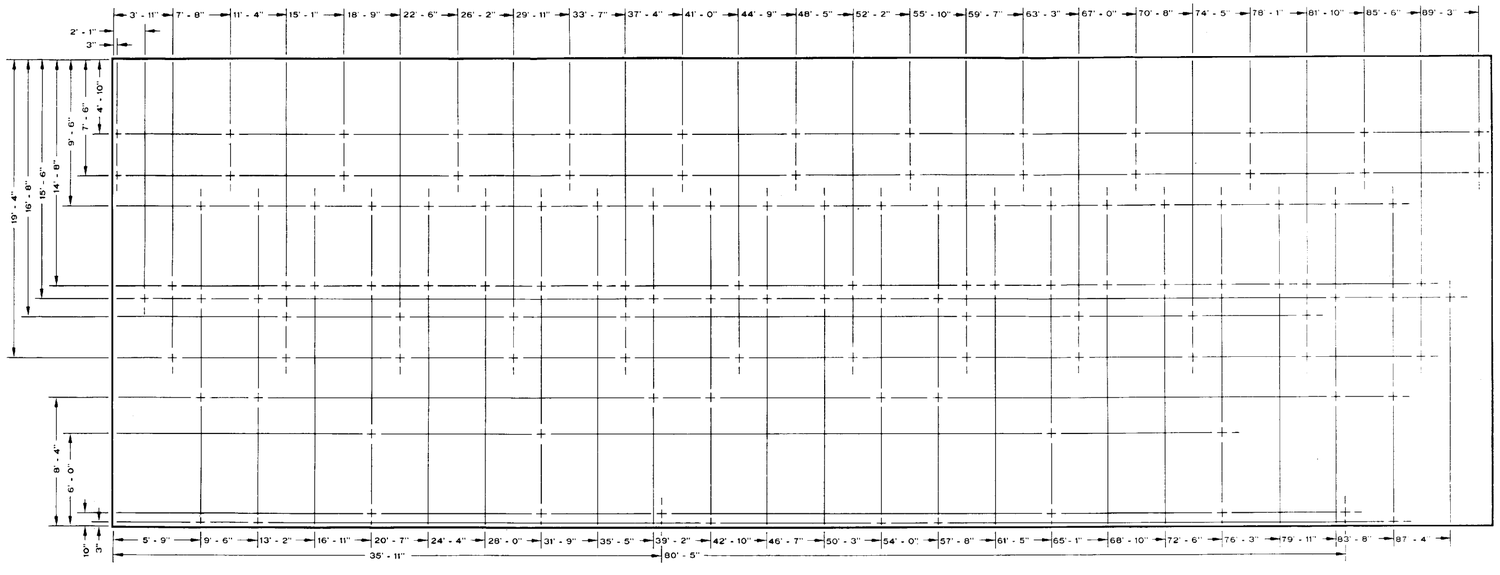
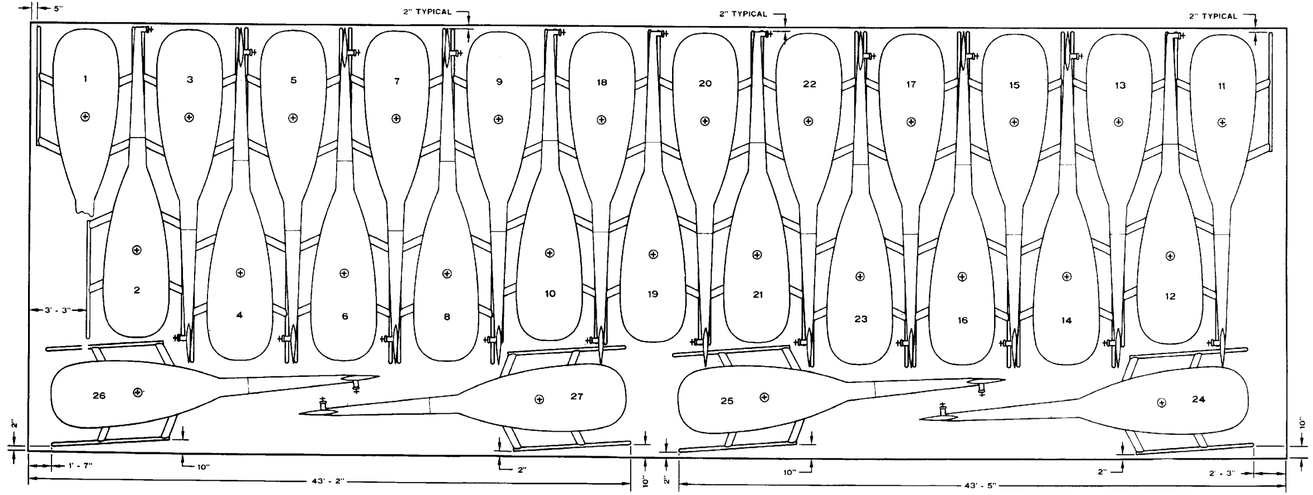


Figure 8-13. Tiedown positioning diagram.



TOLERANCE: ± 1"

Figure 8-14. Tiedown positioning inside SEABEE barge for 27 OH-6 helicopters.



NOTES

1 - MIN CLEARANCE BETWEEN HELICOPTER SKIDS 5"
2 - HELICOPTER NOS. 2,10,12,19,21 HAVE VERTICAL STABLIZER REMOVED AND PLACED WITH ROTOR BLADES
3 - ALL DIMENSIONS ARE APPROXIMATE

Figure 8-15. Sequential loading diagram for 27 OH-6 helicopters.

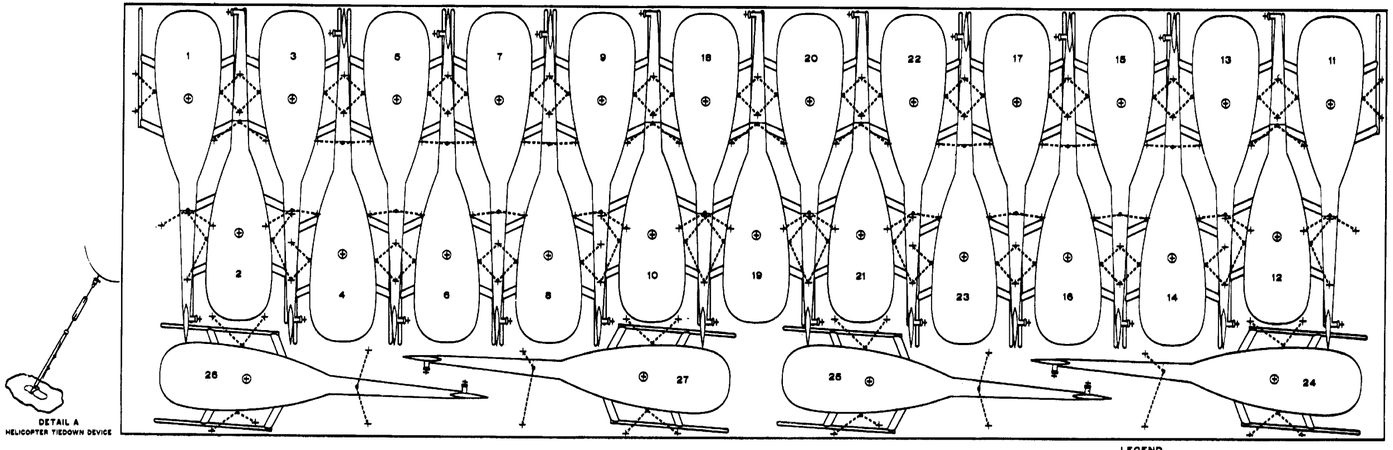


Figure 5-16. SEABEE tiedown diagram.

Section III. TRANSPORT OF THE OH-6 HELICOPTER IN SEABEE BARGE

8-13. General

a. Operational Area. Refer to paragraph 8-5. Increase the size of the landing preparation area to 640 square feet (59.5 m^2).

★ *b.* **(Deleted)**

a. Materials Required. See paragraph 8-5c.

8-14. SEABEE Barge and OH-6A Helicopter Preparation

a. SEABEE Barge Preparation. Tiedown fittings are installed in the barge in accordance with figure 4-8,8-14, and 8-15.

b. Helicopter Preparation. Twenty-seven OH-6 helicopters can be loaded in the SEABEE barge in the same configuration as in the LASH lighter except that vertical stabilizers of helicopters 2, 10, 12, 19, and 21 are removed and secured on blade racks. Refer to paragraph 8-6b for detailed preparation.

Table 8-5. Approximate Time Requirements of Unloading Phase for One OH-6 Helicopter

Phase	Hours
Release tiedowns	3 minutes
Unload	15 minutes
Reassemble	8 man-hours
Test fly	30 minutes

8-15. Disassembly

See paragraph 8-7.

8-16. Preservation

See paragraph 8-8.

8-17. Loading

See paragraph 4-9 and figure 8-15.

8-18. Tiedown

See paragraph 8-10. Figure 8-16 is the SEABEE tiedown diagram for OH-6.

8-19. Unloading

Unloading sequence for the OH-6 from the SEABEE barge is the reverse of the loading sequence. Approximate times for unloading and reassembly are shown in table 8-5.

8-20. Reassembly

See paragraph 8-12.

Section IV. TRANSPORT OF OH-6A HELICOPTER ON ROLL-ON/ROLL-OFF (RORO) AND SEATRAIN SHIPS

8-21. Preparation, Loading, and Tiedown of OH-6 Helicopters on RORO and Seatrain Ships

Preparation, loading, and tiedown of OH-6 helicopters on RORO and seatrain ships is identical to that of the OH-58. Refer to chapter 4, section IV, for detailed techniques for loading the OH-6 on RORO and seatrain ships and to paragraph 8-7 for disassembly requirements.

8-22. Preservation

★ Preserve and prepare the OH-6 in accordance with TM 55-1520-214-S, and/or special instructions from TSARCOM for the type shipping being used.

★ CHAPTER 9

TRANSPORTABILITY GUIDANCE, CH-54A/B HELICOPTER

NOTE

The reduced dimensions of the CH-54 exceed the dimensions of 20-, 35-, and 40- foot (6-, 10.6-, and 12-m) containers, LASH lighters, and SEABEE barges. The CH-54 is transportable in the lower deck of the SEABEE ship, but because of poor space utilization and difficulty encountered in loading, this is considered an impractical method of transporting the CH-54.

TRANSPORT OF THE CH-54A/B HELICOPTER ABOARD ROLL-ON/ROLL-OFF OR SEATRAIN SHIPS

9-1. General

a. Operational Area. The area used for disassembling and loading the helicopter at a port is normally congested. A reasonably level surface 170 by 170 feet (51.8 by 58.8 m) is adequate to prepare the CH-54 for shipment.

★ *b.* **(Deleted)**

9-2. Roll-On/Roll-Off Ship and Helicopter Preparation

Refer to paragraph 4-21 and to TM 1-CH54-S.

CAUTION

Improper installation of the TSARCOM shipping cover will result in salt water damage to the helicopter.

9-3. Disassembly

Refer to TM 1-CH54-S.

9-4. Preservation

Refer to TM 1-CH54-S.

9-5. Loading

a. Refer to paragraph 4-17a.

b. Optimal stowage of the CH-54 on RORO ships is considered to be nose-to-tail and side-by-side (fig.9-1 and 9-2).

c. Helicopters are loaded in the sequence determined by the loading plan.

d. The CH-54 helicopter must be spotted exactly. Random positioning of the CH-54 on the deck is not feasible because of size and weight of helicopter and deck construction.

9-6. Tiedown

Refer to TM 1-CH54-S for tiedown pattern of the CH-54. Tiedown of the CH-54 will be accomplished using the standard heavy, shipboard restraint device or wire rope and turnbuckles (fig 9-3 and 9-4).

CAUTION

Excessive tension of tiedown devices will result in damage to helicopter tiedown points.

9-7. Unloading

Unloading will be the reverse of the loading sequence.

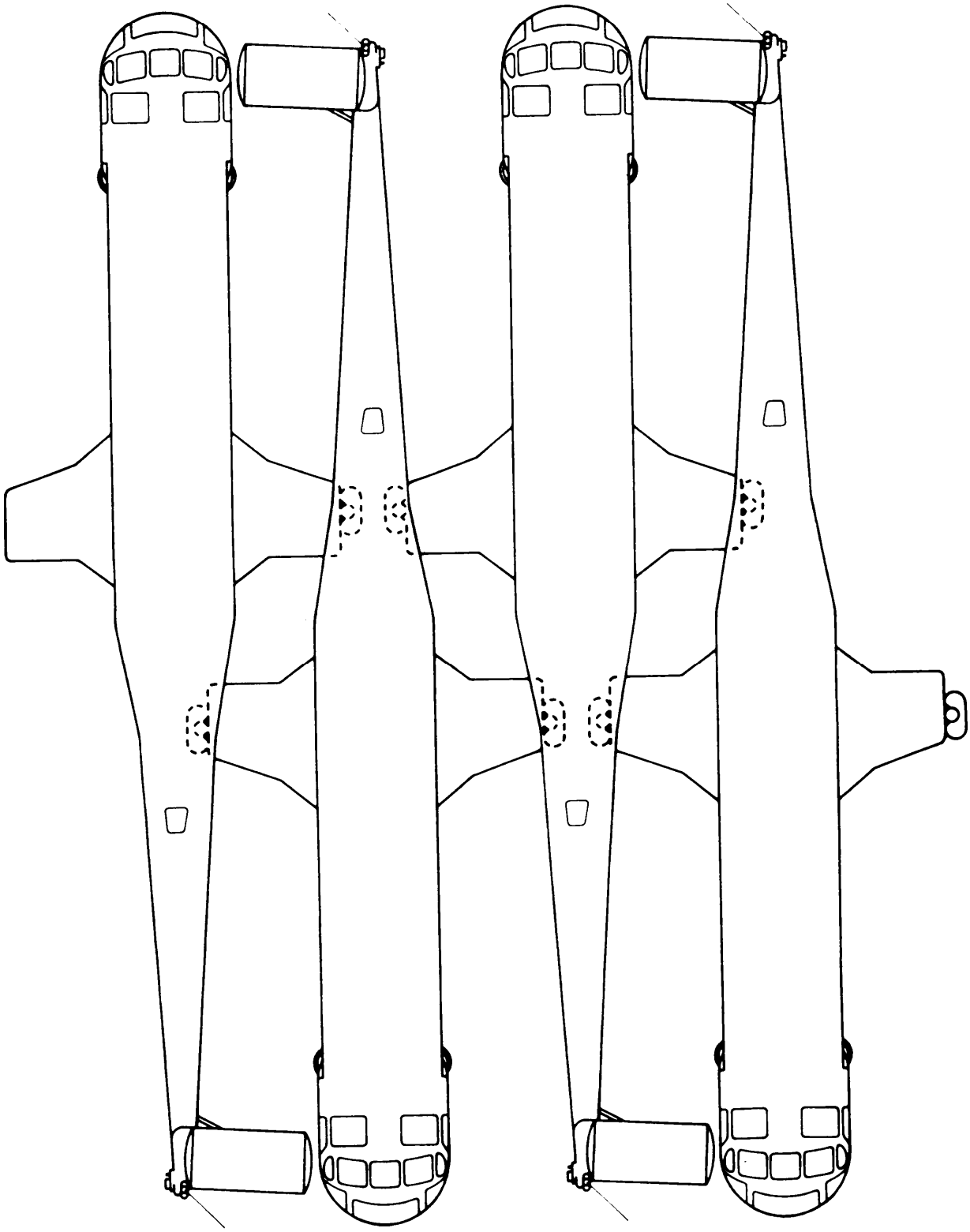


Figure 9-1. Positioning CH-54 helicopters on RORO ships.

Figure 9-2. CH-54 with shipping cover installed being lifted aboard a RORO ship.

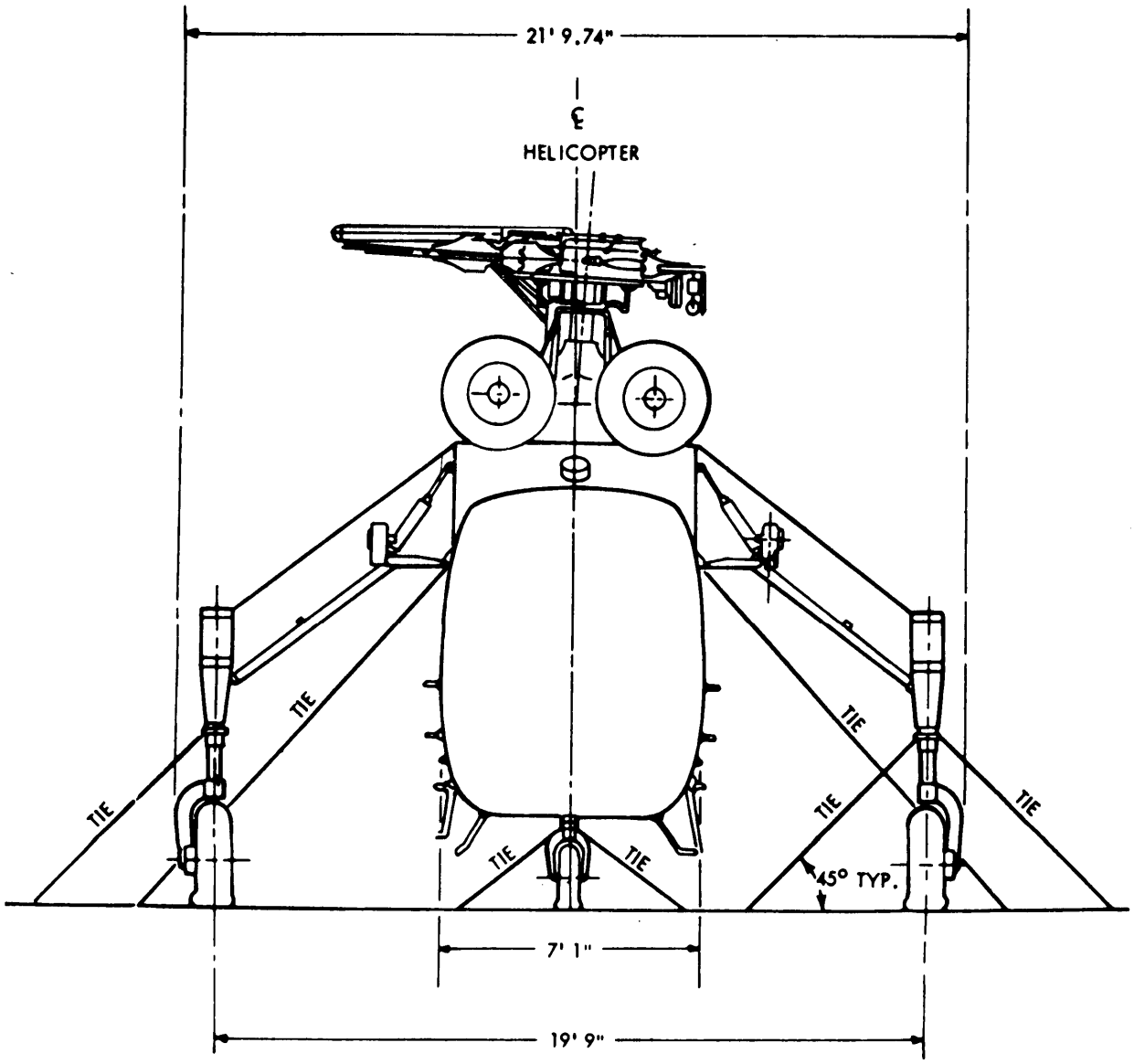


Figure 9-3. CH–54 front view, tiedown diagram.

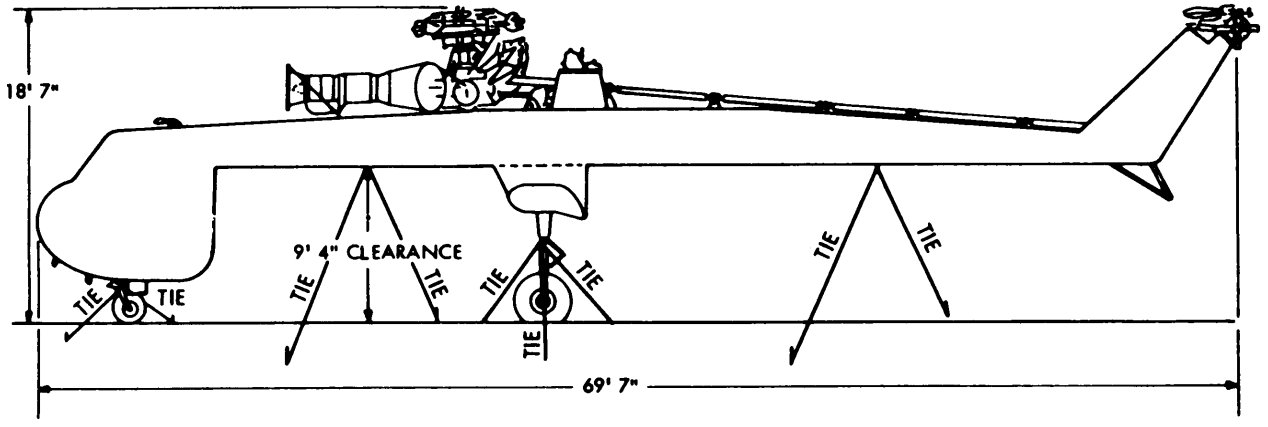


Figure 9-4. CH-54 side view, tiedown diagram.

CHAPTER 10

TRANSPORTABILITY GUIDANCE, UH-60 HELICOPTER

NOTE

The fuselage of the fully disassembled UH-60 helicopter exceeds allowable loading dimensions for containerization.

CAUTION

TM 55-1520-237-23-4 will be consulted before any disassembly or loading takes place.

Section I. TRANSPORT OF UH-60 HELICOPTER BY LASH LIGHTER

10-1. General

a. Operational Area. The operational area required is the same as that described in paragraph 4-5a with the exception that the criteria for slope of the landing area must not exceed limitations stated in the TM 55-1520-237-10 operator's manual. The landing area required to accommodate four UH-60 helicopters for fly-in/fly-out operations is 420 feet (128.1 m) long and 100 feet (30.5 m) wide. Chalk mark surface at 84-foot (25.6 m) intervals to guide helicopters while landing, and to insure safe rotor clearance. The landing and departure sequences for four and six helicopters are shown in figure 10-1. Landing sequence is as follows: helicopters 1 and 3 are landed, shut down, and their blades are tied down before helicopters 2 and 4 are landed. Departure is in the same order as that for landing. All helicopters are prepared for flight. Helicopters 1 and 3 depart, and the remaining helicopters follow.

b. Materials Required.

(1) Crane and boom requirements are described in paragraph 4-5c(1).

(2) Major items of equipment required for preparation and reassembly of UH-60 helicopters are shown in table 10-1.

10-2. LASH Lighter and UH-60 Helicopter Preparation

a. LASH Lighter Preparation. The interior of the lighter must be clear of dunnage, debris, and water. Tiedown fittings (fig 4-8) must be welded to the deck of the lighter prior to loading as indicated in figure 10-2.

b. UH-60 Preparation. Preparation of the UH-60 helicopter for loading is accomplished with minimum disassembly configuration and reduced preservation requirements after it is flown to the loading site. Disassembly is kept to the minimum necessary to successfully achieve the planned load. Each of the helicopters to be loaded into the LASH lighter requires that the IR suppressors and fairings be removed, main rotor blades and tail pylon be folded. The tail rotor blades must be folded horizontally. The anti-collison light on the vertical fin and the stabilator is removed. Protruding avionics antennas are removed and wrapped in cushioning material and secured in the cargo compartment of the helicopter. The UH-60 may have to be partially kneeled to provide a 2-1/2 inch rotor head clearance when the lighter covers are installed. The main landing gear lower strut fairings and tail cone covers are removed. Measurements of existing extension of all three struts are made, recorded, and taped to the struts prior to kneeling. The battery is disconnected and the terminals taped. The pitot, inlet, and exhaust covers are installed. Fuel tanks are filled to 600 pounds below maximum capacity. Time breakdown for disassembly is shown at table 10-2.

★ *Table 10-1. Major Items of Equipment for Preparation of UH-60 Helicopters for Loading into or Unloading from Marine Vessels and for Reassembly*

Nomenclature	NSN	Quantity required per helicopter
Spreader bar (UH-60 w/IRS) 125 in. length	Local manufacture from 5 in. dia x 0.25 in. wall, aluminum tubing	1
Spreader bar (UH-60 W/O IRS) 85 in. length	1670-EG-051A1-1	1
Sealing Compound	MIL-6-8802	as required
Blade fold set	70700-20412-011	1
Blade handling pole	70700-20395-041	1
Maintenance platform, low level	1730-00-624-0684	1
Maintenance platform	1730-00-390-5618	1

★ *Table 10-1. Major Items of Equipment for Preparation of UH-60 Helicopters for Loading into or Unloading from Marine Vessels and for Reassembly-Continued*

Nomenclature	NSN	Quantity required per helicopter
Torque wrench	5120-00-270-3121	1
Torque wrench	5120-00-542-4489	1
Torque wrench	5120-00-821-3441	1
Tow bar	1730-00-967-9556	1
Webbing	1670E-9109A	as required
Barrier material	8135-00-282-0565	as required
Corrosion-preventive compound	8030-00-244-1297	as required
Solvent	6850-00-285-8011	as required
Tape, 2-in., cloth	7510-00-266-5016	as required
Pylon lock strut	70700-20385-041	1
Spacer	70700-20320-043	1
Stabilator cradle	70700-20435-041	1
Strut assembly	1560-01-H62-3736	1
Spacer assembly	1560-01-H62-3740	2
Support assembly, pylon	70700-20455-041	1
Block assembly, tail rotor servo	70700-20463-041	1
Wrench assembly, M/R pins	70700-200210-101	1
Bar assembly, tail wheel steering	1560-01-H62-3703	1
Fitting assembly, towing	1560-01-H62-3720	2
Cart assembly, air transport, Hydraulic	1560-01-H62-3728	1
Primary lifting (sling:		
Sling, assembly, 25,000 lbs	1670-01-027-2900	1
Apex fitting assembly	4030-01-048-4044	1
Rope assembly	1670-01-047-6815	4
Grab hook assembly	4030-0-1-048-4047	4
chain	4010-01-048-4771	8
Alternate lifting sling.		
Bellyband straps	1670EG056-1	2
Nylon ring	1670EG070B-1	1
Sling leg	1670EG069	2
Coupling link	1570EG079	2
Chain leg	1670EG078-B1	2
Shackle	1670EG053B	2
Strap	1670EG034	4
Antichafe Pad	1670EG044	2

10-3. Preservation

Preservation of the UH-60 helicopter will be in accordance with TM 55-1520-237-23-4 and/or special instructions provided by TSARCOM for below deck protection during marine transport.

10-4. Loading

a. The UH-60 is disassembled to the extent necessary for the stow plan. The helicopter is kneeled to an overall height of not more than 11 feet 5 inches prior to loading into the lighter. A height of 11 feet 5 inches insures a 2-1/2-inch clearance between cover ribs and the rotor head. The 28-VDC power required for the hydraulic cart to conduct the kneeling operation must be provided for from unit power-generation equipment. Each helicopter is positioned on the shore or wharf within the reach of shoreside crane. The UH-60 is then lifted, using the air retrieval sling and spreader bar described in TM 55-1520-237-23-4 and figure 10-3. Tag lines are attached to the main cabin area and the tail empennage. The tag lines allow the personnel in the lighter to control the swing and movement of the helicopter as it is being lowered into the lighter. To achieve the planned load of four UH-60 helicopters in a LASH lighter, helicopters 1 and 2 must be loaded in their tiedown position close to the lighter's side bulkhead. Maintain a minimum of 3 inches clearance between helicopter components and lighter. Helicopter number three is lowered and placed into position maintaining a minimum nose clearance of 12 inches from end bulkhead and 3 inches to helicopter number one. Helicopter number four is the most difficult to load. Sling legs must be adjusted to achieve a 20-degree nose down attitude. As the helicopter is lowered through the hatch and the nose is below the coaming, swing the helicopter forward as it is lowered. Maintain clearance between the top area of the helicopter nose and cabin and the under side of the lighter coaming.

CAUTION

Assure the parking brakes are set so the helicopter will not roll forward as the empennage is lowered to rest on the tail wheel.

b. The infrared suppression components and stabilators are loaded in the area between the cabins of helicopters one and two. Tiedown fittings installed for the helicopters are used to secure components in place. Figure 10-4 depicts the planned stow position of the four UH-60 helicopters. Once the helicopters are in their tiedown position, tiedowns are installed and chock blocks are placed for and aft of all three wheels. Chocks are held in position by nailing a piece of wood to fore and aft blocks on both sides of the wheels. Barrier material will be placed between main rotor blades and helicopter components to eliminate possible contact during shipment.

c. The approximate man-hours and time required for loading are identified in table 10-2.

★ *Table 10-2*
UH-60 Man-Hour Breakdown for Loading per Helicopter

Phase	Man-hours	Men required	Clock-hours
Preparation[1]	9:00	6	1:30
Loading[2]	1:20	4	0:20
Tiedown	0:30	2	0:15
Subtotal	10:50	NA	2:05

[1] Preparation phase includes partial kneeling of the helicopter, removing IR suppression components and stabilator, folding the main rotor blades, tail rotor blades, and tail pylon.

[2] Installation of the sling assembly and positioning of the helicopter into LASH lighter.

10-5. Tiedown

a. The UH-60 helicopter is secured at four tiedown points with eight lashings. All helicopters loaded in the LASH lighter will be secured with MB-1 devices; 1/2" diameter wire rope and turnbuckles; or 10K Peck and Hale devices equipped with hook for attaching to "D" rings welded in lighter.

CAUTION

Excessive tensioning may cause damage to the helicopter tiedown fittings and fuselage structure.

b. Chock blocks will be used on main landing gear wheels and tail wheel. The UH-60 helicopter's internal parking brake system will be set before loading to prevent rolling during lighter attitude changes during the loading operation.

10-6. Unloading

Unloading the UH-60 is the reverse of the loading sequence. Time breakdown is shown at table 10-3.

★ *Table 10-3*
UH-60 Man-Hour Breakdown for Unloading per Helicopter

Phase	Man-hours	Men required	Clock-hours
Reassemble[1]	9:00	N6	1:30
Unloading	1:20	4	0:30
Remove tiedowns	0:30	2	0:15
Totals	10:50	NA	2:05

[1] Reassembly times shown include removal of all preservation materials and unfolding the main rotor blades, tail pylon, and tail rotor blades.

Section II. TRANSPORT OF UH-6O HELICOPTER BY SEABEE BARGE

10-7. General

a. Operational Area. The operational area restrictions noted in paragraph 10-1 are the same. The landing area length must be increased to accommodate the loading of six UH-60 helicopters into a SEABEE barge. The landing and departure sequence for six UH-60 helicopters is shown in figure 10-1.

b. Materials Required. The major items of equipment and tools necessary to disassemble and load UH-60 helicopters into the SEABEE barge are shown in table 10-1. The same materials used for loading a LASH lighter are required for loading a SEABEE barge.

10-8. SEABEE Barge and Helicopter Preparation

a. SEABEE Barge Preparation. The interior of the barge must be clear of dunnage, debris, and water. Tiedown fittings are welded to the deck of the barge in accordance with figure 10-5, prior to actual loading.

b. UH-60 Preparation. Preparation of the UH-60 helicopter is accomplished after it is flown to the loading site. Disassembly is kept to the minimum necessary to achieve the planned load. Each of the six helicopters to be loaded into the SEABEE barge requires that the main rotor blades and the tail pylon be folded. The tail rotor blades must be folded horizontally. The stabilator and protruding avonics antennas are removed and wrapped in cushioning material and secured in the cargo compartment of the helicopter. The battery is disconnected and the terminals taped. The pitot, inlet, and exhaust covers are installed. Fuel tanks are filled to 600 pounds below maximum capacity.

10-9. Preservation.

Preservation of the UH-60 helicopter will be in accordance with TM 55-1520-237-23-4 and/or special instructions provided by TSARCOM for below deck protection for marine transport.

10-10. Loading

The UH-60 helicopter is disassembled to the extent necessary for the stow plan. The height clearance of the SEABEE barge is sufficient to load the UH-60 helicopter without having to kneel the helicopter. Each helicopter is positioned on the shore or wharf within the reach of shoreside crane. The UH-60 helicopter is then lifted, using the air retrieval sling and spreader bar, described in TM 55-1520-237-23-4 and figure 10-3.

Figure 10-3 depicts the hoisting of the UH-60 with the air retrieval sling installed. Tag lines are attached to the main cabin area and the tail empennage. The tag lines allow the personnel in the barge to control the swing and movement of the helicopter as it is being lowered into the barge. To achieve the planned load of six UH-60 helicopters in a SEABEE barge, helicopters 1, 2, 3, and 4 must be lowered close to the barge's side bulkhead. Maintain a minimum of 3 inches clearance between helicopter components and barge, and 16 inches between end of. helicopter and end of barge. Helicopters numbered 5 and 6 are lowered into the mid portion of the barge. Figure 10-6 depicts the planned stow position of the six UH-60 helicopters. Once the helicopter is in the depicted stow pattern, chock blocks are placed at the main wheels and tail wheel assembly to prevent helicopter movement. Barrier material will be placed between main rotor blades and other helicopter components to eliminate contact during shipment.

10-11. Tiedown

a. Tiedown devices will be installed according to figure 10-6. All helicopters loaded into SEABEE barge will be secured with MB-1 tiedown devices; ½-inch wire rope, and turnbuckles; or with 10K Peck and Hale securing devices equipped with hook to attach to "D" ring tiedown fittings welded in the barge.

b. Chock blocks will be used on main wheels and tail wheel assemblies. Chocks are held in position by nailing a piece of wood to the fore and aft blocks on both sides of the wheels. The UH-60 helicopter's internal braking system will also be set.

CAUTION

Excessive tensioning may cause damage to the helicopter tiedown fittings and fuselage structures.

10-12. Unloading

Unloading the UH-60 is reverse of the loading sequence. Time breakdown is shown at table 10-3.

Section III. TRANSPORT OF UH-60 HELICOPTER BY SEABEE SHIPLOADING

10-13. General

a. Operational Area. The operational area required for UH-60 helicopters is the same as discussed in paragraph 10-4.

b. Materials Required. Major items of equipment for the preparation and disassembly of the UH-60 helicopter are identified in table 10-1.

10-14. SEABEE Ship and Helicopter Preparation

a. *SEABEE Ship Preparation*. Removal of barges from the lower deck allows the UH-60 to be loaded onto the lower deck using the same technique as for RORO. Stowage on the second deck is not considered since the helicopter would be exposed to sea air during transit.

b. Helicopter Preparation. UH-60 requires minimal or no disassembly. The main rotor blades and tail rotor blades are folded. The tail pylon may be folded, depending on the stowage plan used. The landing gear struts are extended to provide an underside clearance of 23 inches to clear the barge support pedestal. To prevent damage in the event an air hydraulic failure should occur in the strut, the cribbing depicted in figure 7-42 will be installed.

10-15. Preservation

Refer to paragraph 10-3.

10-16. Loading

The UH-60 helicopter can be loaded on the SEABEE ship's lower deck by three methods (1) lift-on, (2) roll-on, and (3) fly-on.

a. Positioning to the Stern Elevator.

(1) *Lift-on*. The UH-60 will be lifted to the stern elevator by either gantry crane (container) or an 85-ton mobile crane with a 120-foot boom. The sling will be attached to sling points on the UH-60 helicopter as shown in figure 10-3. Tag lines are installed to prevent the helicopter from rotating during the lift. The helicopter is lifted to the ship's stern elevator, astride the barge pedestals.

(2) *Roll-on*. The UH-60 helicopter can be rolled onto the stem elevator if a suitable bridge is constructed to span the distance between the dock and the stem elevator. The span must allow the helicopter to clear the barge transporter stops. A suitable dry span can be constructed from a standard M4T6 floating bridge (fig 7-25).

NOTE

The stern elevator can be moved up and down to match the dock for roll-on operations. The helicopter is rolled from the dock to the stern elevator astride the barge pedestals. The stern elevator can then be moved up or down to match lower deck.

(3) *Fly-on*. The fly-on/fly-off is the least desirable method of loading or discharging the SEABEE ship. The number of helicopters that can be prepared for loading or unloading is very limited. The procedures identified in paragraph 7-11a(3) for CH-47 helicopter fly-on/fly-off operations apply.

b. Positioning from the stern elevator to the SEABEE ship's lower deck. Once the UH-60 has been loaded on the elevator, the elevator is raised or lowered to match the lower deck. The helicopter is fitted with a towing bridle and is maneuvered into the ship to its tiedown position.

CAUTION

The barge transporter may leak, resulting in large amounts of hydraulic fluid on the ship's deck. Any hydraulic fluid on the ship's deck must be removed before loading aircraft.

CAUTION

During movement on board the ship, a crewmember must be in the cockpit to apply brakes if necessary.

10-17. Tiedown

The UH-60 helicopter is secured at four tiedown points with eight lashings. All helicopters loaded into the SEABEE ship will be secured with MB-1 tiedown devices; or 1/2-inch wire rope and turnbuckles; or with 10K Peck and Hale securing devices equipped with hook for attaching to recessed SEABEE crossbar fittings.

CAUTION

Excessive tensioning may cause damage to the helicopter tiedown fittings and fuselage structures.

10-18. Unloading

Unloading the UH-60 is the reverse of the loading sequence. Time breakdown is shown at table 10-3.

Section IV. TRANSPORT OF UH-60 HELICOPTER BY ROLL-ON/ROLL-OFF (RORO) OR SEATRAIN SHIP

NOTE

The following procedures also apply to the Seatrain ship.

10-19. General

a. Operational Area (Para 10-1a)

b. Materials Required. The major items of equipment for RORO preparation are listed in table 10-1. Sling assembly listed is required if the ramp angles from the wharf to the ship are not negotiable.

10-20. Roll-on/Roll-off Ship and Helicopter Preparation

a. RORO Ship Preparation. All RORO ships have a tiedown fitting grid pattern on all decks. However, to obtain effective and efficient use of available hold space, the helicopters may require positioning where undesirable tiedown angles, helicopter to deck, exist. Should this occur, tiedown fittings, as shown in figure 4-8 are installed on the deck of the RORO ship where they are required. When installing additional tiedown fittings, the load configuration and desired restraint pattern must be considered to achieve the most effective results.

NOTE

Although the 45°-45° angle for tiedown restraint devices is considered optimal, lesser or greater angles may be used in combination to achieve safe tiedown arrangement. Seldom will it be possible to obtain optimum tiedown patterns for helicopters on RORO ships which are built primarily to transport trucks, semitrailers, and other wheeled and tracked vehicles.

b. UH-60 Preparation. Disassembly is kept to the minimum necessary to achieve the planned load. Helicopters to be loaded require the main rotor blades and the tail pylon to be folded. The tail rotor blades must be folded horizontally. The stabilator and protruding avonics antennas are removed and wrapped in cushioning material and secured in the cargo compartment of the helicopter. The battery is

disconnected and the terminals taped. Pitot, inlet and exhaust covers are installed. Fuel tanks are filled to 600 pounds below maximum capacity.

c. Ship stowage plans must insure that UH-60 helicopters are stowed below the ship's weather deck. Helicopters stowed above the weather deck are subject to salt water corrosion and require extensive and costly preservation. TSARCOM would have to be contacted to develop those procedures for stowing UH-60 helicopters on the main deck.

10-21. Preservation

Preservation of UH-60 helicopter will be in accordance with TM 55-1520-237-23-4 and/or special instructions provided by TSARCOM.

10-22. Loading

a. The number of helicopters to be loaded is determined by the prestow plan. The helicopter is lifted from the wharf by either ship's gear or shoreside crane and placed diagonally over receiving hatch. The tag lines are passed from the on deck longshoremen loading gang to the loading gang in ship's hatch. The helicopter is then lowered through the hatch. Once in the hatch, the helicopter is moved into its final stowage location. When lateral movement is needed to achieve a tight stow, the MTMC helicopter positioning device, modified for the UH-60, is required. Figure 10-7 shows the device installed. The helicopter positioning device can move the helicopter laterally for short distances and can successfully negotiate medium-size deck obstructions. The positioning device raises the main landing wheels off the ground, while the castor wheels of the positioning device provide omnidirectional movement.

b. Some RORO ships do not have hatches, they have internal and external ramps, which allow the cargo to move directly from the wharf into the ship and to its final stow location. Ramp angles, however, may be excessive for towing the UH-60 helicopter. Remedies to these problems depend on the severity of the problem. The UH-60 helicopter can extend its main and tail-landing struts to alleviate approach and breakover angle problems. Additional ramp sections can be installed to lessen the severity of the angle. In the worst case, both techniques may be required.

c. The approximate man-hours and clock-hours required for loading are in table 10-2.

10-23. Tiedown

In addition to the guidance in paragraph 10-21 for selecting existing tiedown fittings and for installing tiedown fittings necessary to achieve effective restraint, standard ship's gear should be used to secure the helicopters and removed components. Each ship carries, as part of its provisional equipment, quantities of 10K restraint devices.

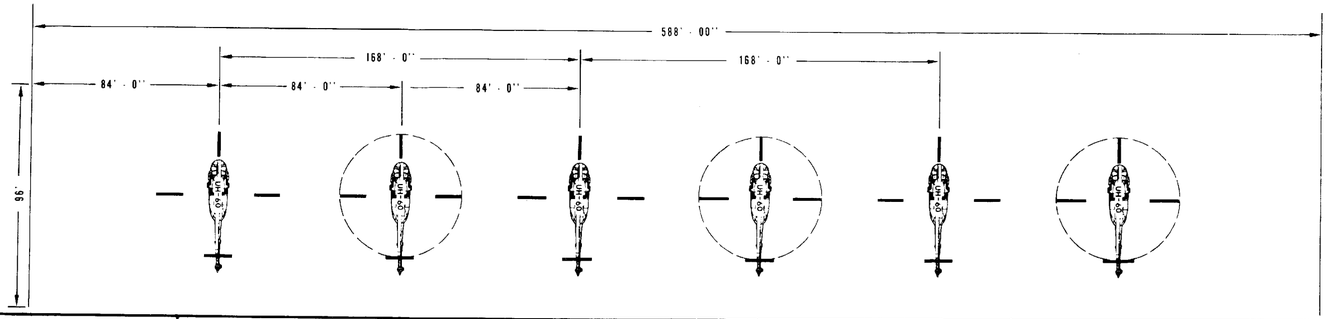
CAUTION

Only 10K restraining devices should be used to secure UH-60 helicopters. Excessive tensioning may cause damage to the helicopter tiedown fittings and fuselage frames.

10-24. Unloading

Unloading the UH-60 is the reverse of the loading sequence. Time breakdown is shown in table 10-3.

RECOMMENDED MINIMUM SPACING FOR LANDING/DEPARTURE IN A RESTRICTED AREA



HELICOPTER NO.		1	2	3	4	5	6
LANDING AND DEPARTURE SEQUENCE FOR 4 HELICOPTERS	FLT. NO. 1	①		③			
	FLT. NO. 2		②		④		
LANDING AND DEPARTURE SEQUENCE FOR 6 HELICOPTERS	FLT. NO. 1	①			④		
	FLT. NO. 2		②			⑤	
	FLT. NO. 3			③			⑥

* *Figure 10-1. Landing and departure sequence for UH-60A helicopters.*

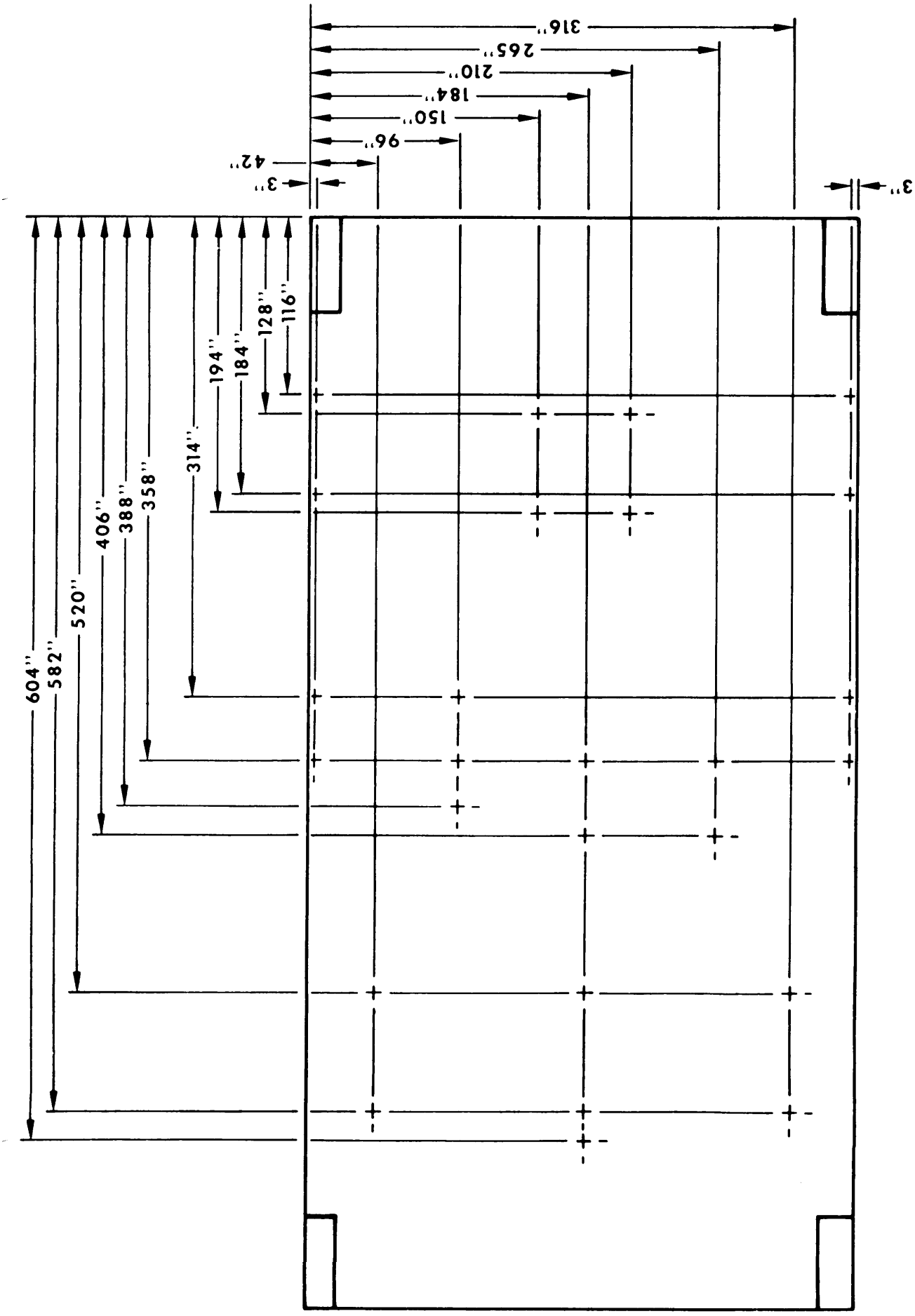


Figure 10–2. Tiedown positioning inside LASH lighter for four UH-60A helicopters.

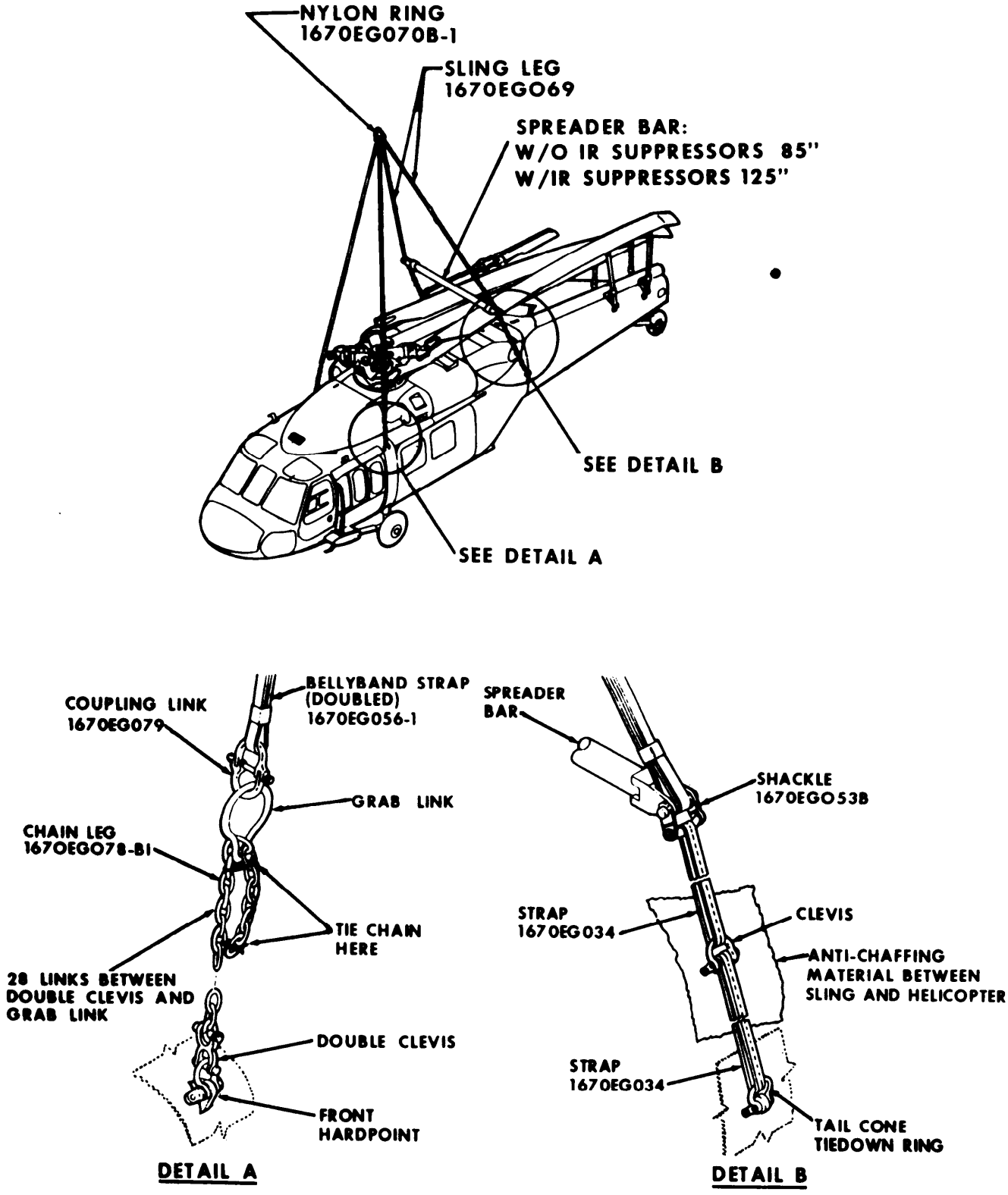


Figure 10-3. Sling diagram for UH-60A helicopter depicting sling legs and spreader bar arrangement.

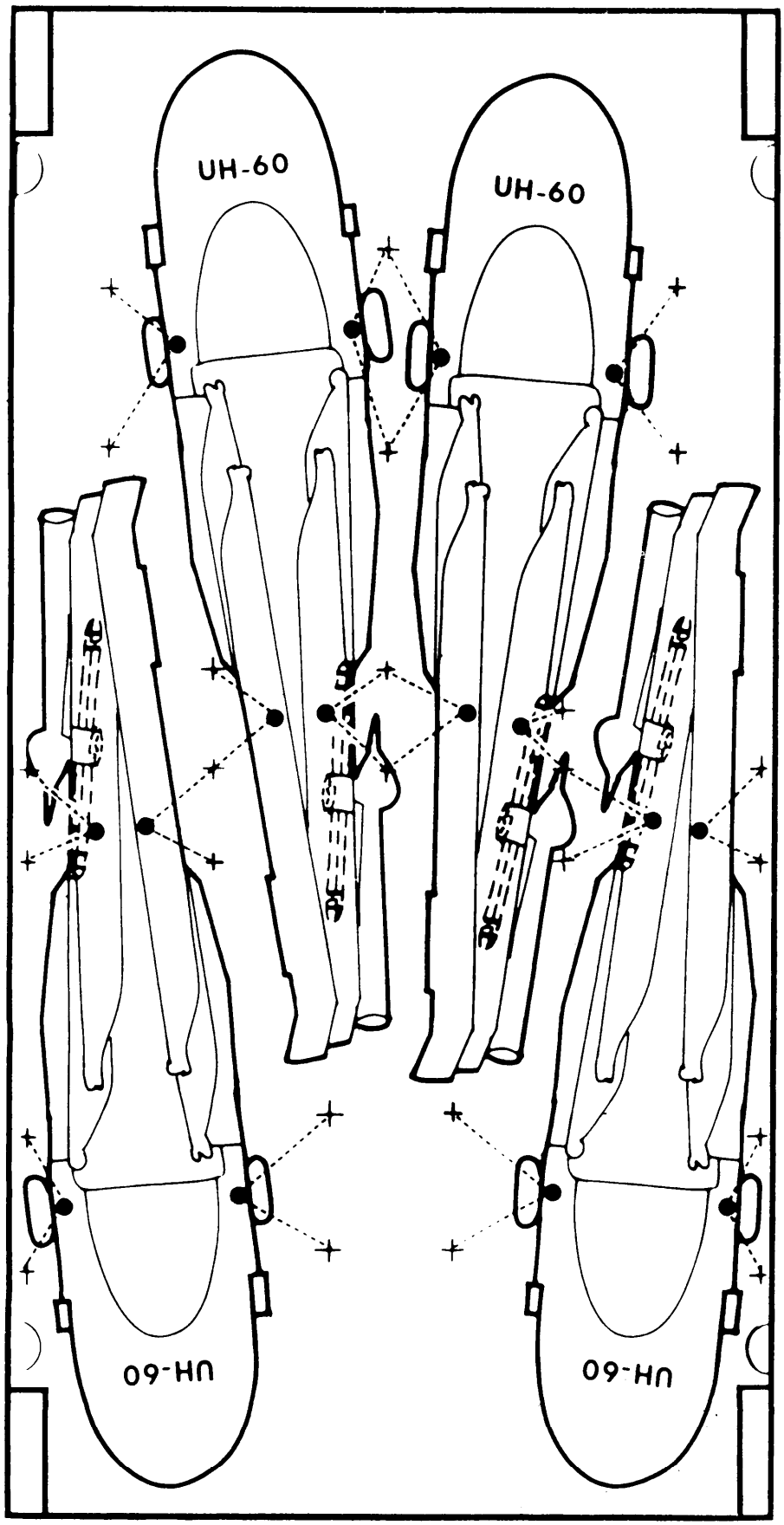
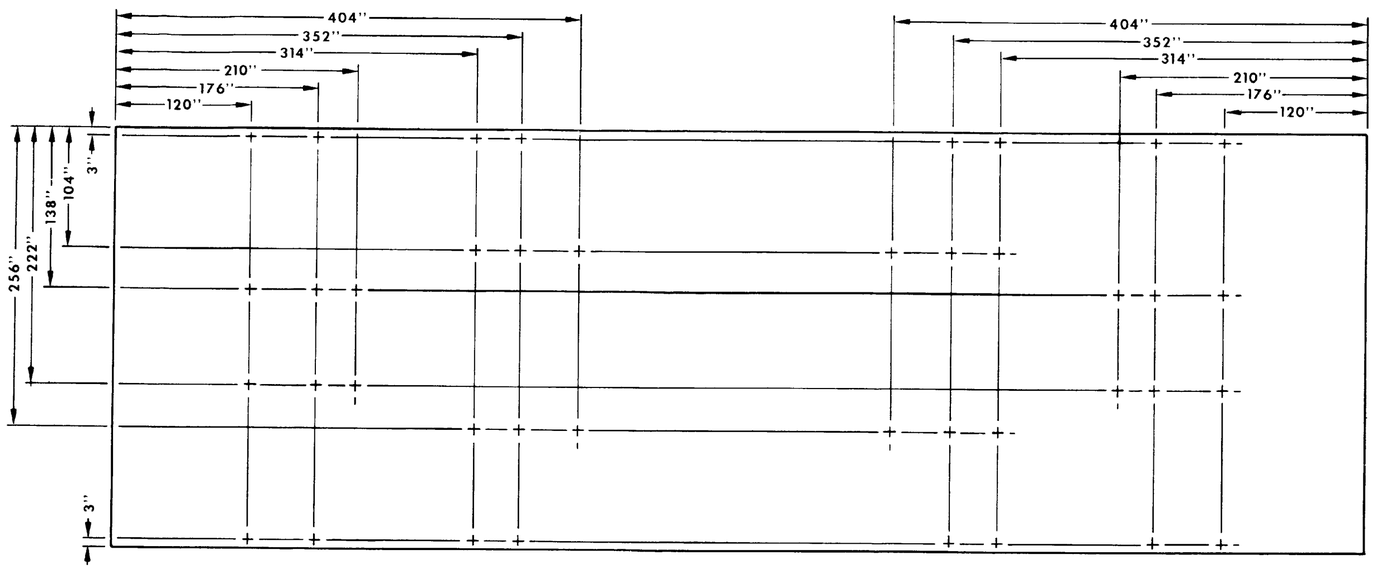
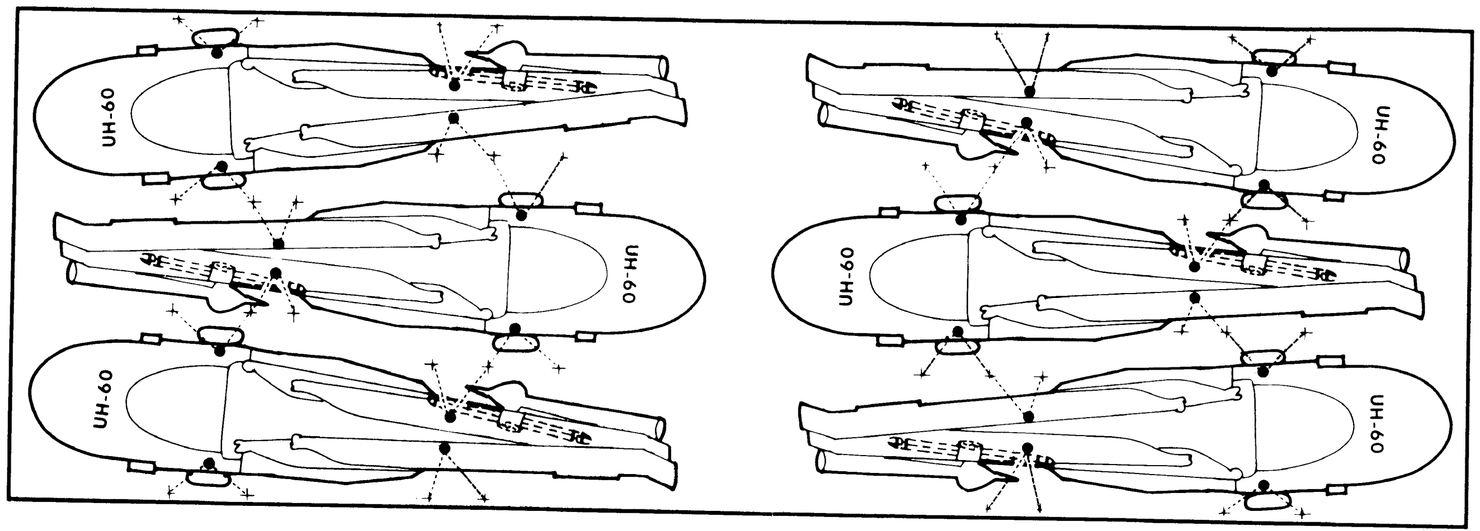


Figure 10-4. Loading sequence and tiedown diagram for four UH-60A helicopters in LASH lighter.



★ *Figure 10-5. Tiedown positioning inside SEABEE barge for six UH-60A helicopters.*



★ *Figure 10-6. Loading sequence and tiedown diagram for six UH-60A helicopters in SEABEE barge.*

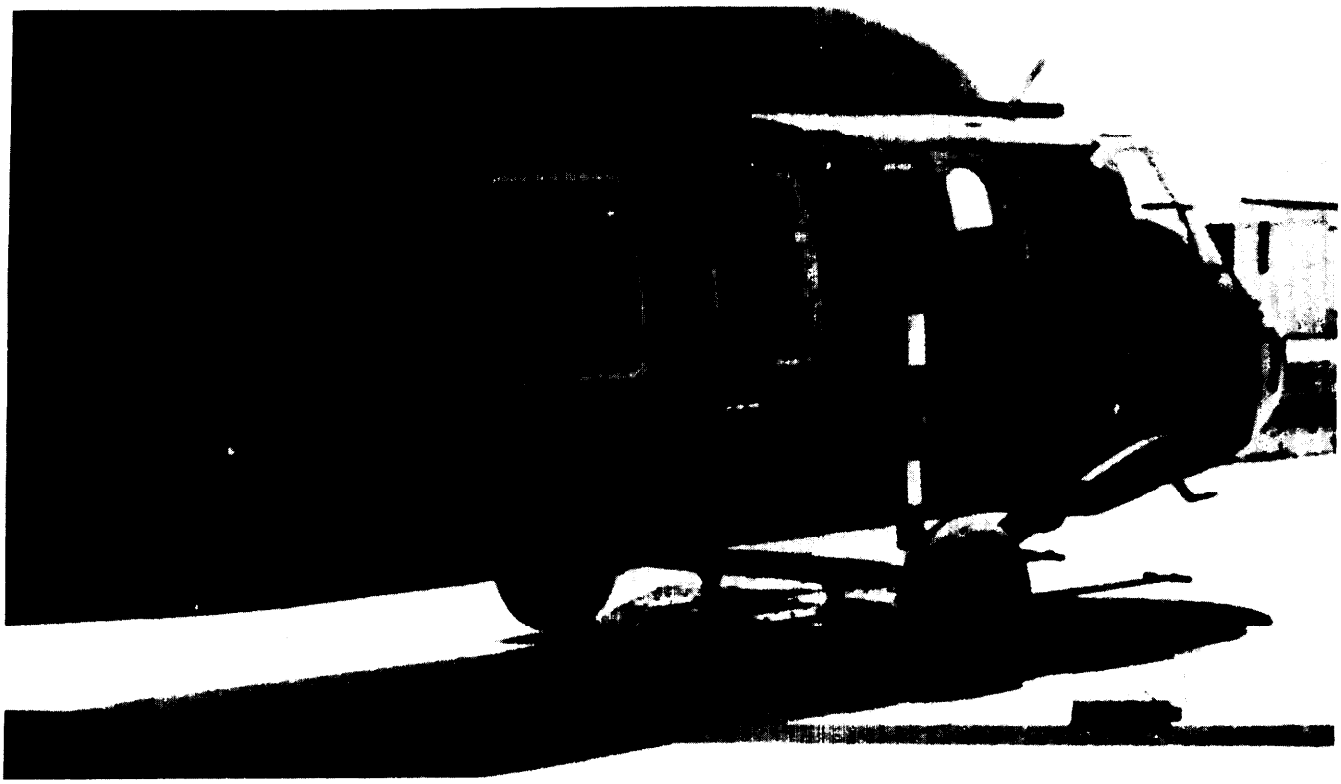


Figure 10-7. MTMC helicopter positioning device installed underneath an UH-60A helicopter,

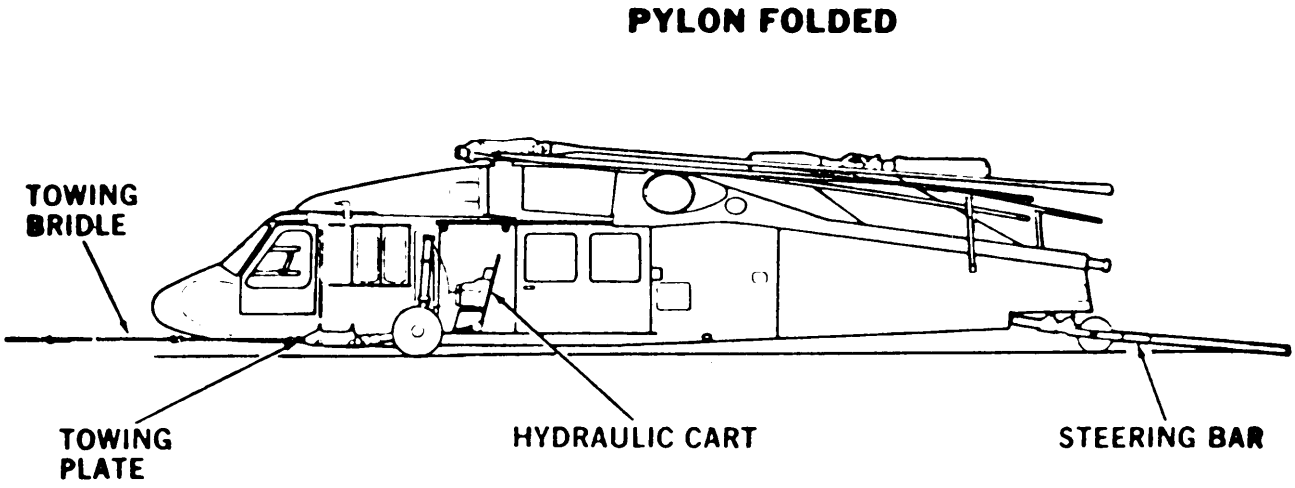


Figure 10-8. UH-60A helicopter prepared for RORO operations.

APPENDIX A

CONVERSION TABLES

Linear Measure

1 kilometer	=	0.6214	mile.	1 mile	=	1.609	kilometer.
1 meter	=	39.37	inches.	1 yard	=	0.9144	meter.
	=	3.2808	feet.	1 foot	=	0.3048	meter.
	=	1.0936	yard.	1 foot	=	304.8	millimeters.
1 centimeter	=	0.3937	inch.	1 inch	=	25.4	millimeters.
				1 inch	=	2.54	centimeters.

Square Measure

1 square kilometer	=	0.3861	square mile	=	247.1	acres.
1 hectare	=	2.471	acre	=	107,640	square feet.
1 are	=	0.0247	acre	=	1,076.4	square feet.
1 square meter	=	10.764	square feet	=	1.196	square yard.
1 square centimeter	=	0.155	square inch.			
1 square millimeter	=	0.00155	square inch.			
1 square mile	=	2.5899	square kilometer.			
1 acre	=	0.4047	hectare	=	40.47	acres.
1 square yard	=	0.836	square meter.			
1 square foot	=	0.0929	square meter	=	929	square centimeters.
1 square inch	=	6.452	square centimeters	=	645.2	square millimeters.

Cubic Measure

1 cubic meter	=	35.314	cubic feet	=	1.308	cubic yard.
1 cubic meter	=	264.2	U.S. gallons.			
1 cubic centimeter	=	0.061	cubic inch.			
1 liter (cubic decimeter)	=	0.0353	cubic foot	=	71.023	cubic inches.
1 liter	=	0.2642	U.S. gallons.	=	1.0567	U.S. quart.
1 cubic yard	=	0.7645	cubic meter			
1 cubic foot	=	0.02832	cubic meter	=	28.317	liters.
1 cubic inch	=	16.38716	cubic centimeters.			
1 U.S. gallon	=	3.785	liters.			
1 U.S. quart	=	0.946	liter.			

Weight

1 metric ton	=	0.9842	gross ton (2240 pounds)	=	1.1023	net ton (of 2000 pounds).
1 kilogram	=	2.2046	pounds	=	35.247	ounces avoirdupois.
1 gram	=	0.03215	ounce troy	=	0.3527	ounce avoirdupois.
1 gram	=	15.432	grains.			
1 net ton (of 2000 pounds)	=	.9072	metric ton	=	97.2	kilograms
1 gross ton (2240 pounds)	=	1.016	metric ton	=	1016	kilograms
1 pound	=	0.4536	kilogram	=	453.6	grams.
1 ounce avoirdupois	=	28.35	grams.			
1 ounce troy	=	31.103	grams.			
1 grain	=	0.0648	gram.			

Liquid Measure

1 centiliter	=	10 milliliters	=	.34 fl. ounce
1 deciliter	=	10 centiliters	=	3.38 fl. ounces
1 liter	=	10 deciliters	=	33.82 fl. ounces
1 dekaliter	=	10 liters	=	2.64 gallons
1 hectoliter	=	10 dekaliters	=	26.42 gallons
1 kiloliter	=	10 hectoliters	=	264.18 gallons

Approximate Conversion Factors

To change	To	Multiply by	To change	To	Multiply by
inches	centimeters	2.540	centimeters	inches	.394
feet	meters	.305	meters	feet	3.280
yards	meters	.914	meters	yards	1.094
miles	kilometers	1.609	kilometers	miles	.621
square inches	square centimeters	6.451	square centimeters	square inches	.155
square feet	square meters	.093	square meters	square feet	10.764
square yards	square meters	.836	square meters	square yards	1.196
square miles	square kilometers	2.590	square kilometers	square miles	.386
acres	square hectometers	.405	square hectometers	acres	2.471
cubic feet	cubic meters	.028	cubic meters	cubic feet	35.315
cubic yards	cubic meters	.765	cubic meters	cubic yards	1.308
fluid ounces	milliliters	29.573	milliliters	fluid ounces	.034
pints	liters	.473	liters	pints	2.113
quarts	liters	.946	liters	quarts	1.057
gallons	liters	3.785	liters	gallons	.264
ounces	grams	28.349	grams	ounces	.035
pounds	kilograms	.454	kilograms	pounds	2.205
short tons	metric tons	.907	metric tons	short tons	1.102

Common Metric Abbreviations

m	=	meter	kg	=	kilogram
dm	=	decimeter	km	=	kilometer
cm	=	centimeter	MT	=	metric ton
mm	=	millimeter			

Conversions for Lumber, Wire Rope, or Wire

The following conversions are provided for guidance when procuring lumber, wire rope, or wire in areas that use the metric system. Lumber sizes are rounded off to the nearest 1/2 cm.

a. Lumber.

2-in. x 4-in. x desired length = 5 -cm x 10-cm x desired length
1-in. x 6-in. x desired length = 2.5 -cm x 15-cm x desired length
6-in. x 8-in. x desired length = 15 -cm x 20-cm x desired length
1-in. x 12-in. x desired length = 2.5 -cm x 30-cm x desired length
(length normally expressed in ft or m)

b. Wire rope

3/8-in. dia = 9.5-mm dia
1/2-in. dia = 12.7-mm dia
5/8-in. dia = 15.8-mm dia
3/4-in. dia = 19.0-mm dia
7/8-in. dia = 22.2-mm dia
1-in. dia = 25.4-mm dia
1-1/4-in. dia = 31.7-mm dia
1-1/2-in. dia = 38.1-mm dia

Decimal Equivalents-Inch-Millimeter Conversion *Table*

1/2	*1/4*	*1/8*	*1/16*	*1/32*	*1/64*	Decimals	Millimeters
					1	.015625	.396875
				1		.031250	.793750
					3	.046875	1.190625
			1			.062500	1.587500
					5	.078125	1.984375
				3		.093750	2.381250
					7	.109375	2.778125
		1				.125000	3.175000
					9	.140625	3.571875
				5		.156250	3.968750
					11	.171875	4.365625
			3			.187500	4.762500
					13	.203125	5.159375
				7		.218750	5.556250
					15	.234375	5.953125
	1					.250000	6.350000
					17	.265625	6.746875
				9		.281250	7.143750
					19	.296875	7.540625
			5			.312500	7.937500
					21	.328125	8.334375
				11		.343750	8.731250
					23	.359375	9.128125
		3				.375000	9.525000
					25	.390625	9.921875
				13		.406250	10.318750
					27	.421875	10.715625
			7			.437500	11.112500
					29	.453125	11.509375
				15		.468750	11.906250
					31	.484375	12.303126
1						.500000	12.700000
					33	.515625	13.096875
				17		.531250	13.493750
					35	.546875	13.890625
			9			.562500	14.287500
					37	.578125	14.684375
				19		.593750	15.081250
					39	.609375	15.478125
		5				.625000	15.875000

Decimal Equivalents–Inch-Millimeter Conversion Table-Continued

1/2	1/4	1/8	1/16	1/32	1/64	Decimals	Millimeters
					41	.640625	16.271876
				21		.656250	16.668750
					43	.671875	17.065625
			11			.687600	17.462500
					45	.703125	17.859375
				23		.718750	18.256250
					47	.734375	18.653125
	3					.750000	19.050000
					49	.765625	19.446875
				25		.781250	19.843750
					51	.796875	20.240625
			13			.812500	20.637500
					53	.828125	21.034375
				27		.843750	21.431250
					55	.859375	21.828125
		7				.875000	22.225000
					57	.890625	22.621875
				29		.908250	23.018750
					59	.921875	23.415626
			15			.937500	23.812500
					61	.963126	24.209375
				31		.968750	24.606250
					63	.984375	25.003125
2	4	8	16	32	64	1.000000	25.400000

Inches to millimeters

in.	mm.	in.	mm.	in.	mm.	in.	mm.
1	25.4	26	660.4	51	1295.4	76	1930.4
2	50.8	27	685.8	52	1320.8	77	1955.8
3	76.2	28	711.2	53	1346.2	78	1981.2
4	101.6	29	736.6	54	1371.6	79	2006.6
5	127.0	30	762.0	55	1397.0	80	2032.0
6	152.4	31	787.5	56	1422.4	81	2057.4
7	177.8	32	812.8	57	1447.8	82	2082.8
8	203.2	33	838.2	58	1473.2	83	2108.2
9	228.6	34	863.6	59	1498.6	84	2133.6
10	254.0	35	889.0	60	1524.0	85	2159.0
11	279.4	36	914.4	61	1549.4	86	2184.4
12	304.8	37	939.8	62	1574.8	87	2209.8
13	330.2	38	965.2	63	1600.2	88	2235.2
14	355.6	39	990.6	64	1625.6	89	2260.6
15	381.0	40	1016.0	65	1651.0	90	2286.0
16	406.4	41	1041.4	66	1676.4	91	2311.4
17	431.8	42	1066.8	67	1701.8	92	2336.8
18	457.2	43	1092.2	68	1727.2	93	2362.2
19	482.6	44	1117.6	69	1752.6	94	2387.6
20	508.0	45	1143.0	70	1778.0	95	2413.0
21	533.4	46	1168.4	71	1803.4	96	2438.4
22	558.8	47	1193.8	72	1828.8	97	2463.8
23	584.2	48	1219.2	73	1854.2	98	2489.2
24	600.6	49	1244.6	74	1879.6	99	2514.6
25	635.0	50	1270.0	75	1905.0	100	2540.0

The above table is exact on the basis: 1 in = 25.4 mm.

Millimeters to inches

mm.	in	mm.	in	mm.	in.	mm.	in.
1	0.039370	26	1.023622	51	2.007874	76	2.992126
2	0.078740	27	1.062992	52	2.047244	77	3.031496
3	0.118110	28	1.102362	53	2.086614	78	3.070866
4	0.157480	29	1.141732	54	2.125984	79	3.110236
5	0.196850	30	1.181102	55	2.165354	80	3.149606
6	0.236220	31	1.220472	56	2.204724	81	3.188976.
7	0.275591	32	1.259843	57	2.244094	82	3.228346
8	0.314961	33	1.299213	58	2.283465	83	3.267717
9	0.354331	34	1.338583	59	2.322835	84	3.307087
10	0.393701	35	1.377953	60	2.362205	85	3.346456
11	0.433071	36	1.417323	61	2.401575	86	3.385827
12	0.472441	37	1.456693	62	2.440945	87	3.425197
13	0.511811	38	1.496063	63	2.480315	88	3.464567
14	0.551181	39	1.535433	64	2.519685	89	3.503937
15	0.590551	40	1.574803	65	2.559055	90	3.543307
16	0.629921	41	1.614173	66	2.598425	91	3.582677
17	0.669391	42	1.653543	67	2.637795	92	3.622047
18	0.708661	43	1.692913	68	2.677165	93	3.661417
19	0.748031	44	1.732283	69	2.716535	94	3.700787
20	0.787402	45	1.771654	70	2.755906	95	3.740157
21	0.826772	46	1.811024	71	2.795276	96	3.779528
22	0.866142	47	1.850394	72	2.834646	97	3.818898
23	0.905512	48	1.889764	73	2.874016	98	3.858268
24	0.944882	49	1.929134	74	2.913386	99	3.897638
25	0.984252	50	1.968504	75	2.952756	100	3.937008

The above table is approximate on the basis: 1 in. = 25.4 mm
1/25.4 = 0.039370078740+

APPENDIX B

REFERENCES

1. Army Regulations (AR)

55-228	Transportation by Water of Explosives and Hazardous Cargo
55-355	Military Traffic Management Regulations
385-40	Accident Reporting and Records

2. Army Field Manuals (FM)

55-15	Transportation Reference Data
101-20	United States Army Aviation Planning Manual

3. Army Supply Bulletins (SB)

700-20	Army Adopted/Other Items Selected For Authorization/List of Reportable Items

4. Army Technical Bulletins (TB)

55-46-1	Standard Characteristics (Dimensions, Weight, and Cube) For Transportability of Military Vehicles and Other Outsize/Overweight Equipment (in TOE Line Item Number Sequence)

5. Technical Manuals (TM)

1-CH-54-S	Preparation for Shipment of CH-54 Helicopters
55-1500-338-S	Preparation for Shipment of OH-58 Helicopters
55-1500-339-S	Preparation for Shipment of AH-1 Helicopters
55-1520-210-10	Operator's Manual: UH-1D/H and EH-1H Helicopters
★ 55-1520-210-23-1	Aviation Unit and Intermediate Maintenance Instructions: Army Model UH-1D/H and EH-1H Helicopters
★ 55-1520-210-23-2	Aviation Unit and Intermediate Maintenance Instructions: Army Model UH-1D/H and EH-1H Helicopters
★ 55-1520-210-23-3	Aviation Unit and Intermediate Maintenance Instructions: Army Model UH-1D/H and EH-1H Helicopters
55-1520-214-10	Operator's Manual: Helicopter, Observation OH-6A (Hughes)
55-1520-214-23	Aviation Unit and Intermediate Maintenance Manual: Helicopter, Observation OH-6A
★ 55-1520-214-S	Preparation for Shipment of OH6-A Helicopters
55-1520-217-10-1	Operator's Manual: Army Model CH-54A Helicopters
55-1520-217-10-2	Operator's Manual: Army Model CH-54B Helicopters
55-1520-217-23-1-3	Aviation Unit and Intermediate Maintenance Manual: Army Model CH-54A Helicopter
55-1520-217-23-2-2	Aviation Unit and Intermediate Maintenance Manual: Army Model CH-54B Helicopter
55-1520-217-23-2-3	Aviation Unit and Intermediate Maintenance Manual: Army Model CH-54B Helicopter
55-1520-220-10	Operator's Manual: Army Model UH-1C/M Helicopter
★ 55-1520-220-23-1	Aviation Unit and Intermediate Maintenance Instructions
★ 55-1520-220-23-2	Aviation Unit and Intermediate Maintenance Instructions
★ 55-1520-220-23-3	Aviation Unit and Intermediate Maintenance Instructions
55-1520-221-10	Operator's Manual: Army Model AH-1G/TH-1G Helicopter
★ 55-1520-221-23-1	Aviation Unit and Aviation Intermediate Maintenance

★ 55-1520-221-23-2	Aviation Unit and Aviation Intermediate Maintenance
★ 55-1520-227-10-1	Operator's Manual: Army Model CH-47B Helicopter
★ 55-1520-227-10-2	Operator's Manual: Army Model CH-47C Helicopter
★ 55-1520-227-23-2	Aviation Unit and Aviation intermediate Maintenance Manual, Army Model CH-47 Band CH-47C Helicopters
★ 55-1520-227-23-3	Aviation Unit and Aviation Intermediate Maintenance Manual, Army Model CH-47B and CH-47C Helicopters
★ 55-1520-227-23-5	Aviation Unit and Aviation Intermediate Maintenance Manual, Army Model CH-47B and CH-47C Helicopters
55-1520-228-10	Operator's Manual: Army Model OH-58A Helicopters
★ 55-1520-228-23-1	Aviation Unit and Intermediate Maintenance Manual: Army Model OH-58A and OH-58C Helicopters
★ 55-1520-228-23-2	Aviation Unit and Intermediate Maintenance Manual: Army Model OH-58A and OH-58C Helicopters
★ 55-1520-236-10	Operator's Manual: Army Model AH-1S (PROD), AH-1S (ECAS), and AH-1S (Modernized Cobra) Helicopters
★ 55-1520-236-23-1	Aviation Unit and Intermediate Maintenance Manual: Army Model AH-1S (PROD), AH-1S (ECAS), and AH-1S (Modernized Cobra) Helicopters
★ 55-1520-236-23-2	Aviation Unit and Intermediate Maintenance Manual: Army Model AH-1S (PROD), AH-1 (ECAS), and AH-1 (Modernized Cobra) Helicopters
★ 55-1520-236-23-3	Aviation Unit and Intermediate Maintenance Manual: Army Model AH-1S (PROD), AH-1S (ECAS), and AH-1S (Modernized Cobra) Helicopters
★ 55-1520-236-23-4	Aviation Unit and Intermediate Maintenance Manual: Army Model AH-1S (PROD), AH-1S (ECAS), and AH-1S (Modernized Cobra) Helicopters
★ 55-1520-237-10	Operator's Manual: UH-60A Helicopter
★ 55-1520-237-23-2	Aviation Unit and Intermediate Maintenance Aircraft General Information Manual, UH-60A Helicopter
★ 55-1520-237-23-4	Aviation Unit and Intermediate Maintenance Servicing, Ground Handling, Air Transportability, and General Maintenance Task Manual, UH-60A Helicopter
★ 55-1520-241-S	Preparation for Shipment of CH-47 Helicopter
★ 55-1520-242-S	Preparation for Shipment of UH-1/EH-1 Helicopters

6. Other Publications and Sources of Procurement

American Trucking Associations Hazardous Materials Tariff 111-C or reissues thereof -*Department of Transportation Regulations Governing Transportation of Hazardous Materials by Air, Motor, Rail, and Water, Including Specifications for Shipping Containers*

Available from: James C. Harkins, Issuing Officer
1616 P Street N.W.
Washington, DC 20036

US Coast Guard, CG 108, Part 146.29-100– *Rules and Regulations for Military Explosives and Hazardous Munitions*

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QUESTIONNAIRE

TM 55-1520-400-14

1. The purpose of this questionnaire is to determine the use of this manual and to obtain suggestions for its improvement.

2. As a user you are asked to complete and mail the questionnaire within 6 months of the manual publication date. Remove the page, fold and fasten it. The questionnaire is preaddressed on the reverse and requires no postage. Your cooperation is appreciated.

Please circle the appropriate answer or provide comment to the following questions:

1. Show your name (optional), grade, organization, address, and job title.

2. Manual was received 0 - 1 - 2 - 3 - 4 - 5 - 6 months after publication date.

3. How often is the manual used: Daily, weekly, monthly, never.

4. For what purpose was manual used?

   a. Dimensional and characteristics information.

   b. Loading guidance.

   c. Tiedown procedures.

   d. Other (identify).

5. Are the manual appendices adequate? Yes No

6. Are the tables and figures comprehensible and easy to follow? Yes No

7. Is the manual of any assistance to you or your organization? Yes No

8. Does the manual provide practical guidance to personnel responsible for loading and shipping of the identified item? Yes No

DEPARTMENT OF THE ARMY
Military Traffic Management Command
Transportation Engineering Agency
P.O. Box 6276
Newport News, Virginia 23606
OFFICIAL BUSINESS

MTT-OAS

Director
Military Traffic Management Command
Transportation Engineering Agency
ATTN: MTT-OAS, PO Box 6276
Newport News, Virginia 23606

- - - - - - - - - - - - - Fold here - then fasten at top - - - - - - - - - - -

9. Are the loading and tiedown procedures used by:

a. Your organization	Yes	No
b. Commercial carriers	Yes	No
c. Other military carriers	Yes	No

10. The manual:

a. Provides information not previously available?	Yes	No
b. Supplements related manuals?	Yes	No

11. Does this manual contradict other published manuals? Yes No
If answer is Yes, which manuals?

12. What additional transportability guidance manuals are needed? (Specify)

13. What would like to see added, improved, deleted, or changed in the manual?

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Signature (optional)