

TM 1-1500-250-23

**TECHNICAL MANUAL
AVIATION UNIT AND AVIATION INTERMEDIATE MAINTENANCE
FOR
GENERAL TIE-DOWN AND MOORING ON ALL SERIES
ARMY MODELS
AH-64, UH-60, CH/MH-47, UH-1 AND OH-58 HELICOPTERS**

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INTERMEDIATE MAINTENANCE
FOR
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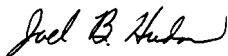
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FOR GENERAL TIE-DOWN AND MOORING ON ALL SERIES ARMY MODELS
AH-64, UH-60, CH-47, UH-1, AH-1 AND OH-58 HELICOPTERS

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FOR GENERAL TIE-DOWN AND MOORING ON ALL SERIES

ARMY MODELS AH-64 UH-60 CH-47 UH-1 AH-1 OH-58 HELICOPTERS

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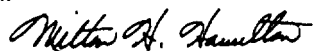
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FOR GENERAL TIE-DOWN AND MOORING ON ALL SERIES

ARMY MODELS AH-64 UH-60 CH-47 UH-1 AH-1 OH-58 HELICOPTERS

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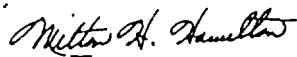
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**AVIATION UNIT AND AVIATION
INTERMEDIATE MAINTENANCE
FOR
GENERAL TIE-DOWN
AND MOORING ON ALL SERIES
ARMY MODELS
AH-64
UH-60
CH/MH-47
UH-1
OH-58
HELICOPTERS**

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can improve this manual. If you find mistakes or if you know of a way to improve these procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) located in the back of this manual, directly to: Commander, U.S. Army Aviation and Missile Command, ATTN: AMSAM-MMC-MA-NP, Redstone Arsenal, AL 35898-5000. A reply will be furnished to you. You may also provide DA Form 2028 information to AMCOM via email, fax, or the World Wide Web. Our fax number is: DSN 788-6546 or Commercial 256 842-6546. Our email address is: 2028@redstone.army.mil. Instructions for sending an electronic 2028 may be found at the back of this manual immediately preceding the hard copy 2028. For the World Wide Web use: <https://amcom2028.redstone.army.mil>.

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CHAPTER 1 INTRODUCTION

SECTION I GENERAL

1-1. SCOPE.

This manual supplements, clarifies, standardizes the tie-down and mooring procedures in the -23 Technical Manuals for all series AH-64, UH-60, CH/MH-47, UH-1, and OH-58 helicopters to the maximum extent practical.

1-2. MAINTENANCE FORMS AND RECORDS.

The maintenance forms and records which are required by personnel who perform the maintenance functions prescribed in this manual are listed in DA PAM 738-751.

1-3. REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS.

You can improve this manual. If you find mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) located in the back of this manual, directly to: Commander, U.S. Army Aviation and Missile Command, ATTN: AMSAM-MMC-MA-NP, Redstone Arsenal, AL 35898-5000. A reply will be furnished to you. You may also provide DA Form 2028 information to AMCOM via

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1-4. CONFLICTS BETWEEN TMS.

When a conflict exists between this General TM and the aircraft specific -23 TMs, the Tie-Down and Mooring procedures described in this General TM shall be followed. The following TMs will be affected by this General TM:

OH-58D	TM 1-1520-248-23
OH-58A/C	TM 55-1520-228-23
AH-64	TM 1-1520-238-23
UH-60	TM 1-1520-237-23
UH-1	TM 55-1520-210-23
CH/MH-47	TM 1-1520-240-23

SECTION II DESCRIPTION AND APPLICATION

1-5. NECESSITY OF TM.

This General TM became necessary because of the apparent ineffectiveness of past tie-down and mooring procedures. In the spring of 1989 Army aircraft at Ft. Hood and Ft. Polk experienced extensive and costly damage as a result of very high winds. In each instance, severe storm warnings had been issued and current procedures were followed within available time and capabilities. Despite these measures serious damage to aircraft and losses to the Army in combat readiness and resources occurred.

1-6. ARMY POLICY. The following Department of the Army policy has been established: when notified of the potential for severe windstorms in excess of 50 knots all Army aviation units will take the actions prescribed in this General TM.

- a. If unable to evacuate to a safe haven, aircraft will be placed in hangars in the following priority; OH-58D/C/A, AH-64A, UH-60A, AH-64D and UH-60L/Q, UH-IV/H, HH-60 and CH-47F/D/C. The priority for special operations aircraft is: MH/AH-6, MH-60, MH-47 and OH-6. For helicopter with more than two main rotor blades, if feasible, the blades will be removed or folded to maximize available hangar space.
- b. All aircraft remaining outside will be tied down and moored in accordance with appropriate procedures described in this General TM. When feasible, units will face the aircraft into the forecasted wind before mooring.
- c. Aviation units will also take additional protection measures to include use of all available shelters and/or artificial barriers such as revetments, berms, igloos, trucks, buses, tanks, armored carriers, etc.
- d. Army aircraft located in areas that experience severe windstorms will tie down blades after each flight and moor aircraft after the last flight of the day regardless of the weather forecast. If aircraft are not to be flown they shall be left tied down and moored.
- e. Every installation with Army aviation units will have secure mooring points for all assigned aircraft. Where points are not sufficient, installation engineers will take immediate action to install required mooring points.
- f. All units with assigned aircraft will ensure tie-down/mooring hardware, particular to each aircraft, is in good repair.
- g. The horizontal stabilator of the UH-60 and AH-64 aircraft are to be set in the neutral position (zero degrees).

NOTE

If unable to conform to the configurations shown, contact AMCOM Engineering (DSN 897-4905) or comm. 256-313-4905 for guidance.

CHAPTER 2

HARDWARE AND AIRCRAFT REQUIREMENTS

2-1. GRID PATTERN LAYOUT AND MOORING POINT STRENGTH. The grid pattern layout illustrating the 17 to 20 foot on center mooring points is depicted in figure 2-1.

- a. This pattern readily accommodates all the helicopters in the army fleet and should be used as the standard for new mooring installations.
- b. The strength of each mooring point should be capable of reacting to the design loads depicted in figure 2-2.

2-2. MOORING PAD MARKING. Marking the mooring pad to properly position the aircraft is recommended if the pad is to be used exclusively for one type of aircraft.

2-3. GENERAL TOOLS AND EQUIPMENT.

- a. All aircraft will use polyester rope for rotor blade tie-down. Refer to table 2-1.
 - (1) Tie-down OH-58D as specified in the appropriate aircraft Technical Manual.
 - (2) Tie-down OH-58A/C as specified in the appropriate Technical Manual, except that two main rotor blade tie-down boots are required.
 - (3) Tie-down AH-64 as specified in the appropriate Technical Manual. Ensure that the ropes are strong enough to allow the main rotor blades to be secured at the required locations.
 - (4) Tie-down UH-60 as specified in the appropriate Technical Manual.
 - (5) Deleted.

- (6) Tie-down UH-1 as specified in the appropriate Technical Manual, except that a forward main rotor blade tie-down strap is required.

- (7) Tie-down CH/MH-47 as specified in the appropriate Technical Manual.

- b. Tie-down and Mooring Equipment. Refer to table 2-1.

- (1) Acquisition and maintenance of all required tie-down and mooring equipment is the responsibility of the aviation units.

- (2) The identified chain and chain adjuster shall be used as the primary mooring equipment for all helicopters when parked at their home installation and Army policy (per paragraph 1-6) requires mooring. Exceptions to the use of mooring chains is only approved under special circumstances where chain has proven to be undesirable such as the crossover mooring on the CH/MH-47D.

- (3) Mooring chains and chain adjusters are not considered flyaway equipment. The 10,000 pound capacity polyester mooring strap with ratchet buckle, NSN 5340-01-233-3063, is the identified flyaway which may be used when aircraft deployed away from their home station require mooring and chains are not available. The CGU-1B, 5000 pound capacity nylon tie-down strap, NSN 1670-00-725-1437, is only authorized when hard stand mooring points are not available and the field mooring kit is used.

Table 2-1. Mooring Hardware and Consumables

ITEM	DESCRIPTION	P/N	NSN	QUANTITY PER AIRCRAFT				
				AH-64	CH/MH-47	UH-60	UH-1	OH-58
1	CHAIN ADJUSTER (See figure 2-3)	MB-1 MIL-T-25959	1670-00-212-1149	6	6	6	6	6
2	CHAIN W/HOOK (See figure 2-3)	FOR MB-1 627728A	1670-00-516-8405	12	16	12	12	12
3	LINK, CHAIN (See figures 4-3 and 4-4)	9/32 INCH 664228	4010-01-231-3388	6	4	4	4	4
4*	LINK, CHAIN (See figures 4-3 and 4-4)	3/8 INCH 577-0165	4010-01-193-9331	6	8	6	6	6
5**	CHAIN, ALLOY (See figure 4-3)	1/4 INCH RRC271	4010-00-988-3181 (100 FT DRUM)	6 EA 1 FT	4 EA 1 FT	4 EA 1 FT	4 EA 1 FT	4 EA 1 FT
6	SHACKLE (See figure 4-13)	204-031- 393-1	4030-00-977-6940				4	3
7	SHACKLE, ANCHOR (See figure 4-3)	RRC271	4030-00-185-0489	6	4	4	4	4
8	SHACKLE, ANCHOR (See figure 4-3)	NAS1042-8	4030-00-542-3180	6	4	4	4	4
9	BOLT (See figure 4-13)	AN5-22A AN5H22A	5306-00-151-2621 5306-00-180-2672					3 3

Table 2-1. Mooring Hardware and Consumables — Continued

ITEM	DESCRIPTION	P/N	NSN	QUANTITY PER AIRCRAFT					
				AH-64	CH/MH-47	UH-60	UH-1	OH-58	
10	BOLT, fig 4-13	AN5-23A	5306-00-151-2620					3	
		AN5H23A	5306-00-180-2673					3	
11	WASHER, fig 4-13	AN960PD516	5310-00-187-2399					6	
12	NUT, fig 4-13	MS21042L5	5310-00-807-1476					3	
13***	BUSHING, fig 4-14							3	■
14	PIN, QUICK RELEASE, fig 4-15	MS17985- 520	5315-00-702-3102					3	■
15	ROPE, 1/2 INCH POLYESTER	MIL-R-24537	4020-01-028-3843 (200 FT ROLL)						
16	ROPE, 1/2 INCH POLYESTER	MIL-R-24335	4020-00-765-3928 (1000 FT ROLL)						
17	ROPE, 1/2 INCH POLYESTER	MIL-R-30500	4020-00-630-4873 (1200 FT ROLL)						

Table 2-1. Mooring Hardware and Consumables — Continued

ITEM	DESCRIPTION	P/N	NSN	QUANTITY PER AIRCRAFT				
				AH-64	CH/MH-47	UH-60	UH-1	OH-58
18	ROPE, 3/8 INCH POLYESTER	700324R	4020-01-318-5428 (600 FT ROLL)					
19	PIN, RETAINING	AN416-2	5315-00-223-6112				2	
20****	CHAIN, WELDLESS	NAS1455B30 6P	4010-01-331-7273				2	
21*****	STRAP, WEBBING	B-D- 10000R/O- 234HH-24						
22*****	TIE DOWN		1730-00-075-1055		6			

* Optional, replaces items 3 and 5 if unavailable.

** Cut 1/4 inch chain to 1 ft sections (14 links).

*** If item 13 is unavailable, see figure 4-13 to make a replacement.

**** Cut chain to 6 inch sections.

***** Contact AMCOM engineering (DSN 897-4905) or comm. 256-313-4905, for approval to use webbing strap for mooring.

***** To be used on CH/MH-47 aircraft with main rotor blade P/N 114E5060-1.

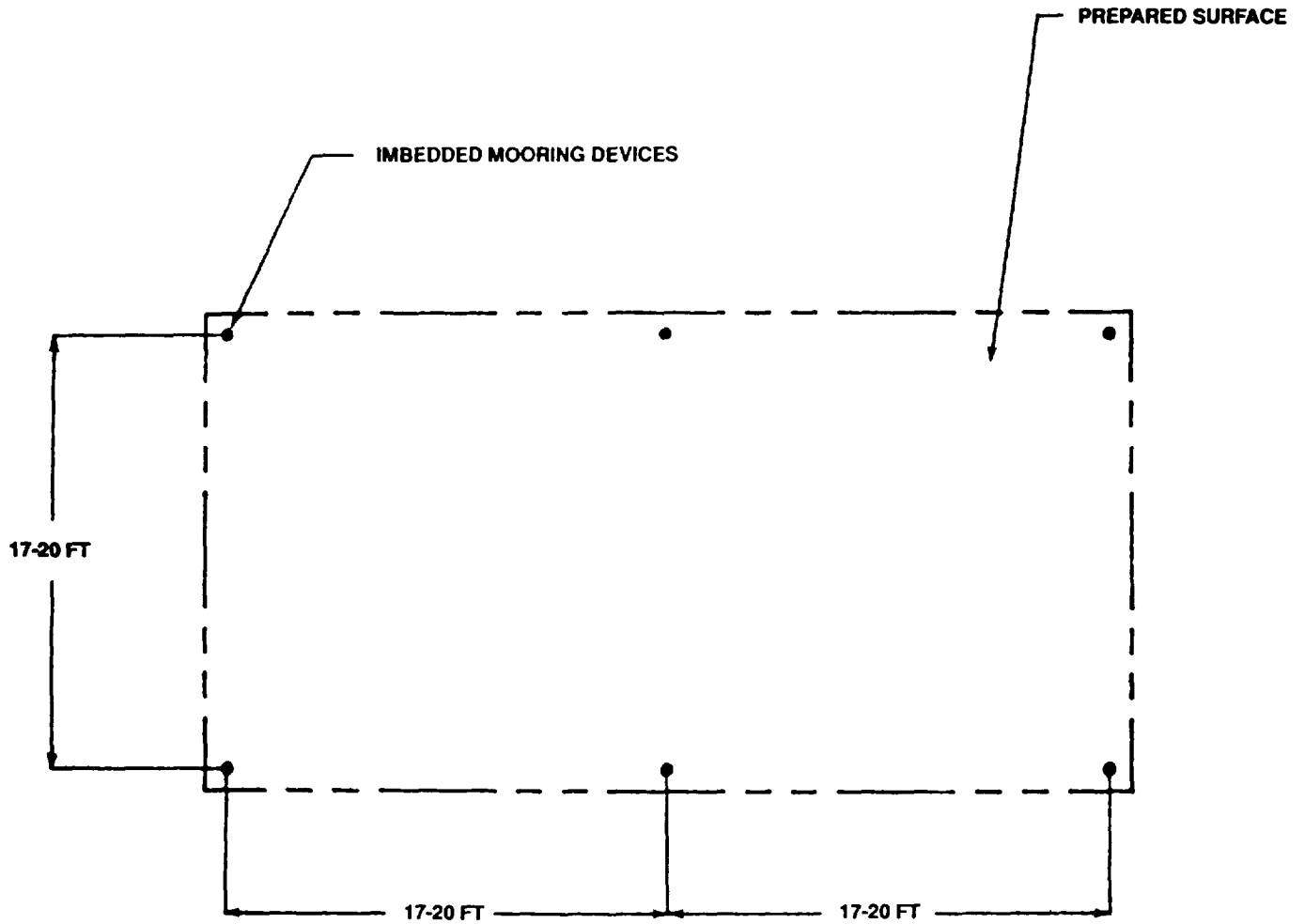


Figure 2-1. Mooring Pad Hardpoint Spacing

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THE LOADS SHOWN ARE THE MAXIMUMS CALCULATED TO MOOR ARMY HELICOPTERS IN 100 KNOT WINDS, IT IS RECOMMENDED THAT THE MOORING DEVICE BE CAPABLE OF WITHSTANDING THE MAXIMUM LOADS SHOWN.

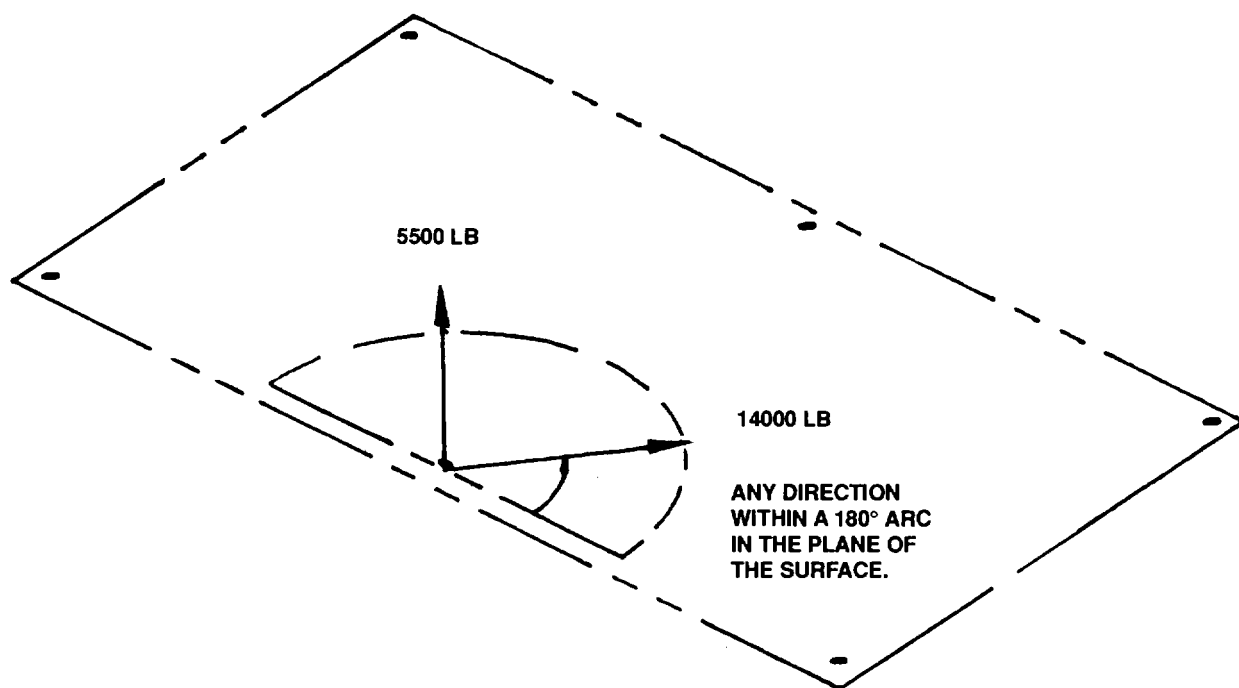
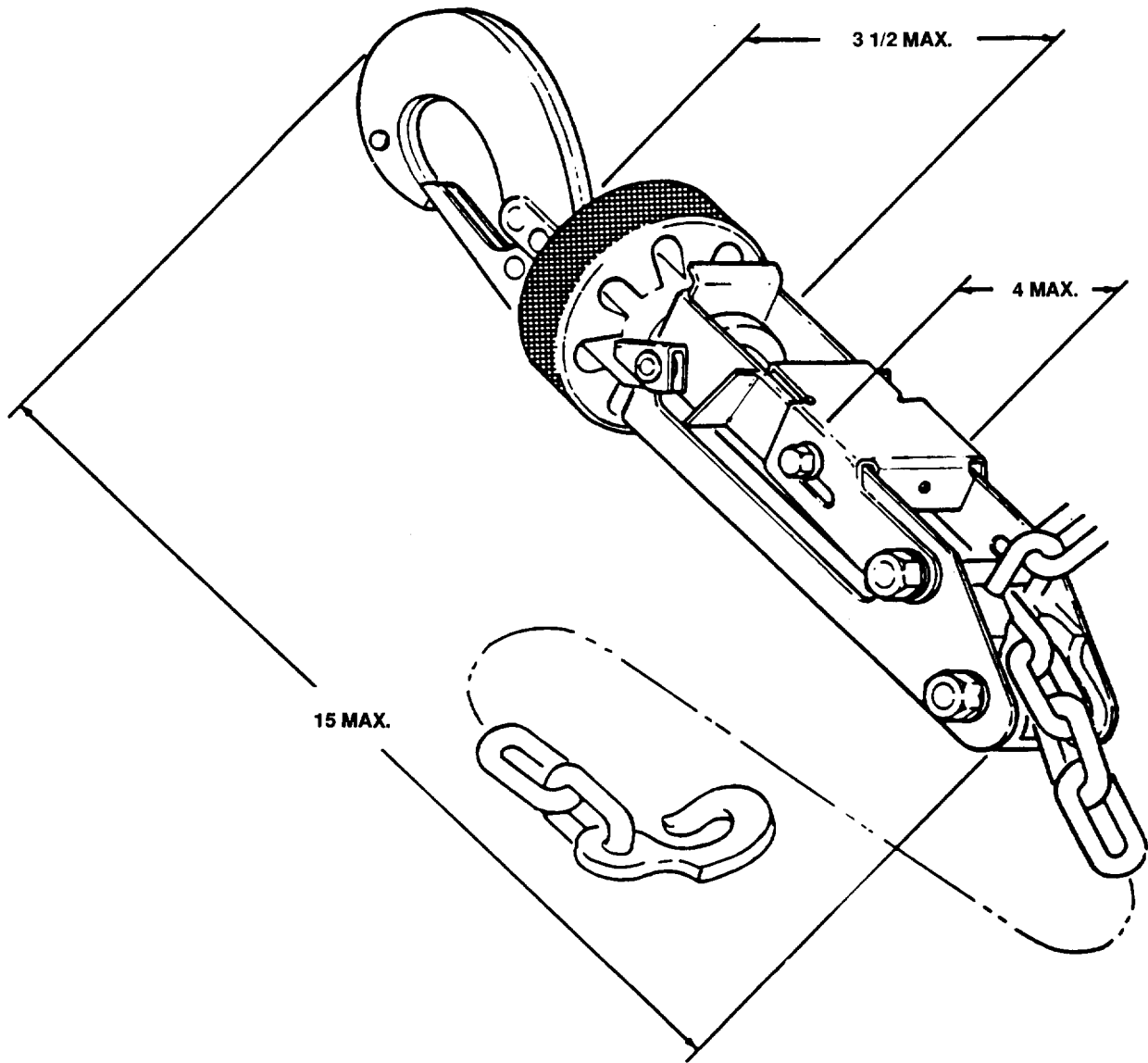


Figure 2-2. Mooring Pad Maximum Load Conditions



MB-1 CHAIN ADJUSTER ASSEMBLY

EASY LOADING
POSITIVE LOCK
ULTIMATE LOAD — 14,100 LBS.
MEETS REQ. OF SPECIFICATION -
MIL-T-25959 TYPE MB-1
TO BE USED WITH TYPE 1 CHAIN
ASSEMBLY PER MIL-C-6458

QUICK RELEASE AT 10,000 LB. LOAD
ADJUSTMENT TO ANY CHAIN LINK -
PLUS 3-1/2" OF SCREW ADJUSTMENT.
WEIGHT — 3-1/2 LBS. MAXIMUM
HOOK — THROAT /8"
STEEL PARTS CADMIUM PLATED

Figure 2-3. MB-1 Chain Adjuster Assembly

CHAPTER 3

TIE-DOWN PROCEDURES

3-1. GENERAL TIE-DOWN PROCEDURES. Line tension tie-down lines from all main rotor blades shall be taut, but care must be taken to ensure excessive deflection of blades below the static jacking, droop position, as stated in the specific aircraft -23 TMs, is not exceeded.

3-2. SPECIFIC AIRCRAFT TIE-DOWN.

- a. OH-58D tie-down blades as specified in the -23 Technical Manual and as shown in figure 3-1 of this general TM. Use the polyester rope referenced in this manual.
- b. OH-58A/C tie-down blades as specified in the -23 Technical Manual and as shown in figure 3-2 of this general TM. Securely tie the straps of the boot to the polyester rope near the boot. Ensure the ropes are long enough to cross and tie in the position illustrated. The forward blade shall be tied down using the same boot strap/rope arrangement device. The ropes shall be tied to the forward eyebolts of the landing skid. The ropes, as an option, can be secured to the forward eyebolts of the landing skid by either tying or using a self closing hook that is the same strength or as strong as the polyester rope, to anchor tie-down rope to the skid rings.

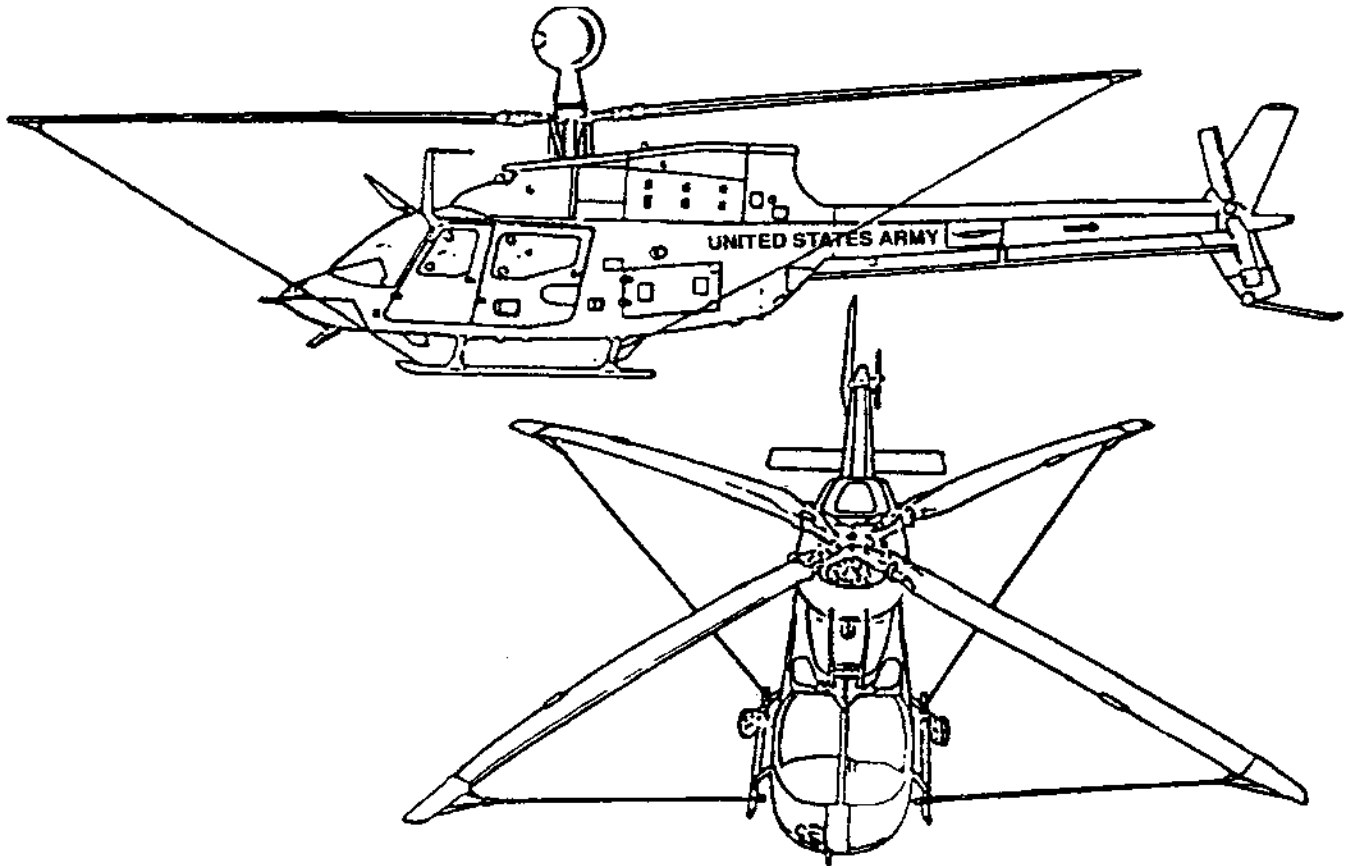
NOTE

Optional tie-down procedure for the OH-58A/C is applicable also to the UH-1 aircraft.

- c. AH-64 tie-down blades as specified in the -23 Technical Manual and as shown in figure 3-3 of this general TM. Ensure that the main rotor blade tie-down boot is in good repair and that the two nylon end straps are securely attached (refer to figure 3-3, blow-up). Replace the 3/8 inch nylon rope with polyester rope. 3/8 inch diameter standard polyester rope can be substituted directly. 1/2 inch diameter standard polyester rope can be secured to the boot by forming a small loop with the existing nylon rope and tying the polyester rope to the loop. Ensure that the rope is long enough to reach the proper aircraft hard points. The right aft boot must have an additional length of rope to secure to the aft outboard wing pylons way

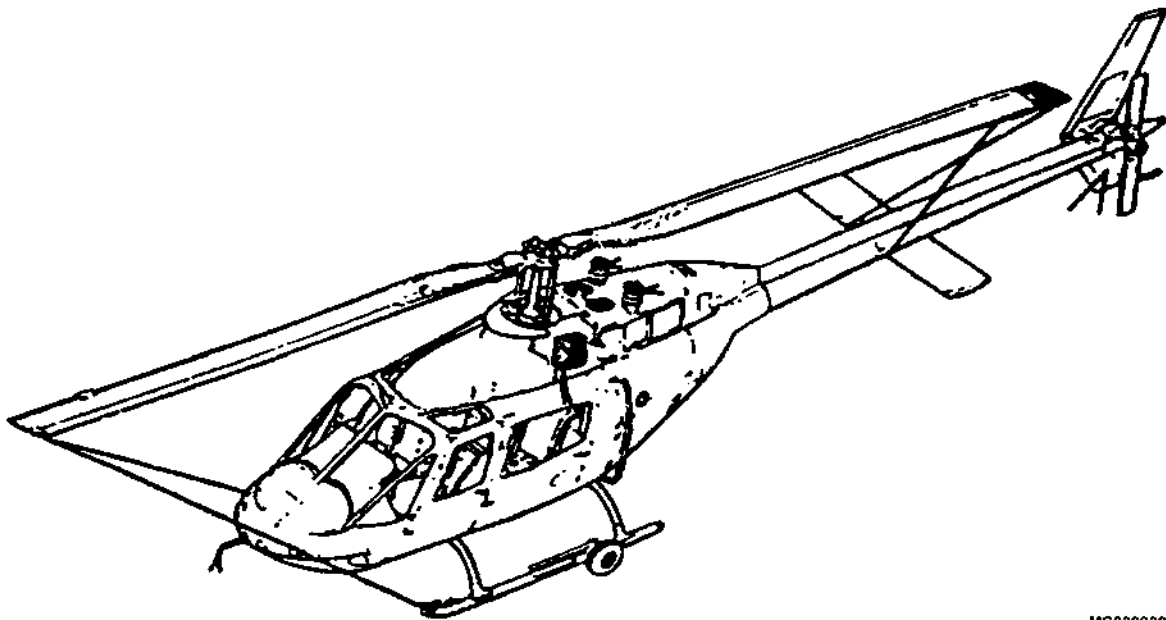
brace or to secure to the aft wing store suspension lug. The other rope attaches to the aft jacking fitting at FS450. This configuration will prevent the boot from slipping off.

- d. UH-60 tie-down blades as specified in the -23 Technical Manual and as shown in figure 3-4 of this general TM. To prevent damage from the lock release cable in strong winds, wrap the cable several times around the tie-down rope and slip the end loop through one of the cable wraps.
- e. Deleted.
- f. UH-1 tie-down aft blades as specified in the -23 Technical Manual and as shown in figure 3-6 of this general TM. Engage hook of main rotor tie-down in hole of fitting on each rotor blade and position blade above tailboom. Pull on tie-down to remove spanwise slack from the rotor system and secure rotor blade by wrapping the tie-down rope firmly around tailboom as shown in figure 3-6. Tie forward rope tie-down rope to tow rings, as shown in figure 3-6, on landing gear skid. Additional security of main rotor can be accomplished by inserting an AN416-2 safety retaining pin through a 0.060 inch hole drilled through the hook of the main rotor tie-down. The hole is drilled perpendicular to the plane of the handle, 0.25 inch from the insertion end of the hook. Secure the safety retaining pin to the hook handle with a 6-inch piece of NAS1455B30-6P chain and safety wire. Insert the safety retaining pin through the hook after inserting the hook through the rotor blade fitting. In the final tie-down position, the blades must not exceed 6 inches of additional droop from having been pulled down. This applies to both metal and composite blades.
- g. CH/MH-47 tie-down blades as specified in -23 Technical Manual and figures 3-7 or 3-8 of this general TM. Use figure 3-7 for normal aircraft tie-down. As an option, the CH/MH-47 blades may be secured to the mooring pad hard points, as shown in figure 3-8, provided the aircraft is secured using the mooring procedures in this TM.



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Figure 3-1. OH-58D Tie-Down Configuration



MS030838

Figure 3-2. OH-58A/C Tie-Down Configuration

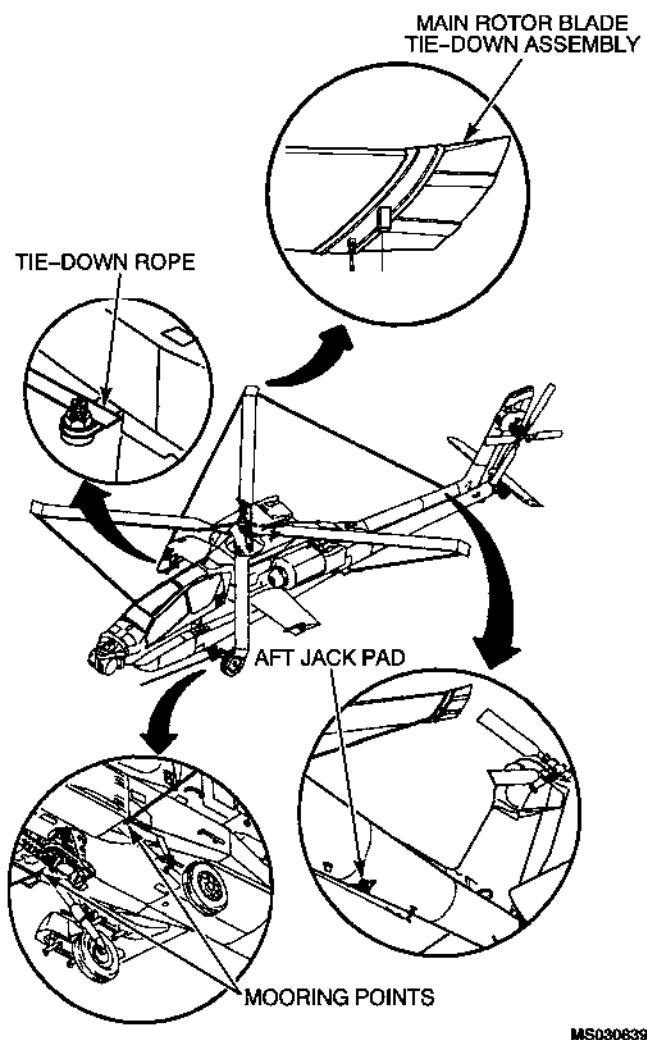


Figure 3-3. AH-64 Tie-Down Configuration

■ Figure 3-3a. Deleted

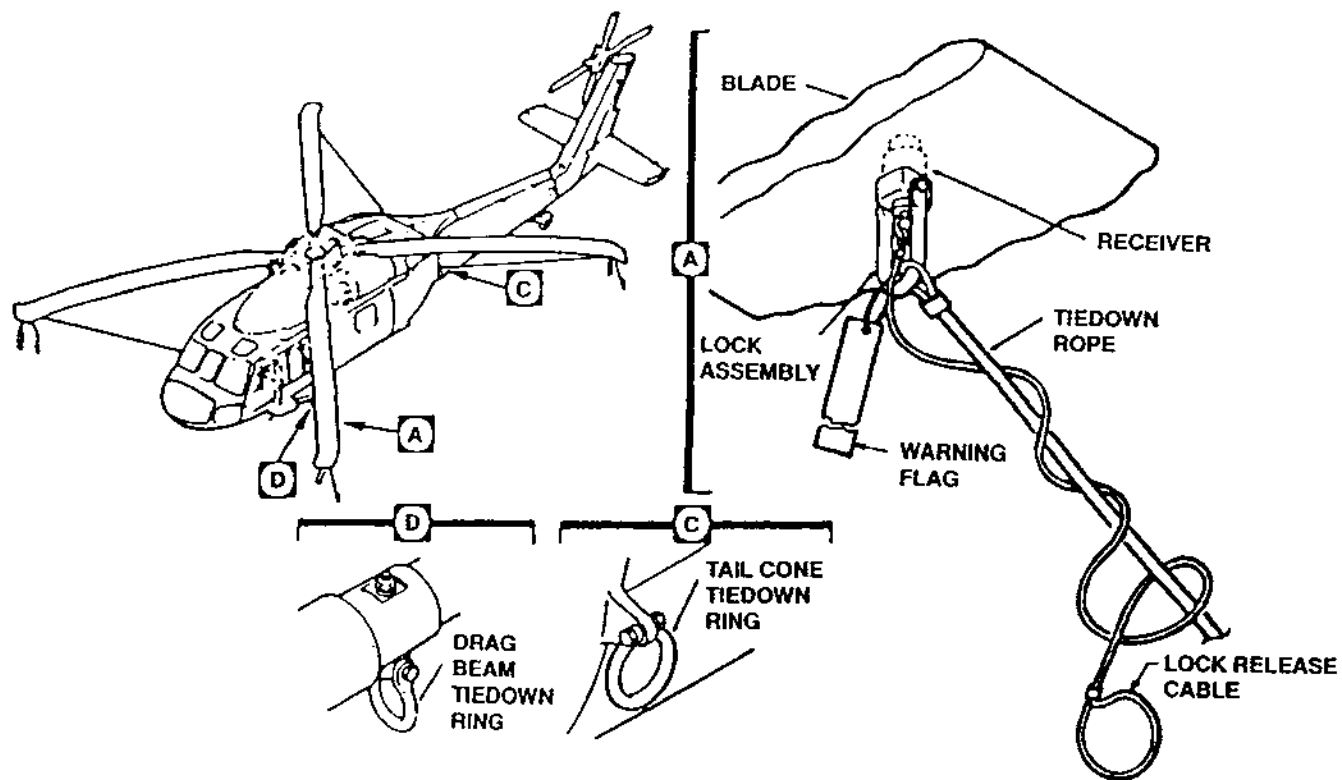
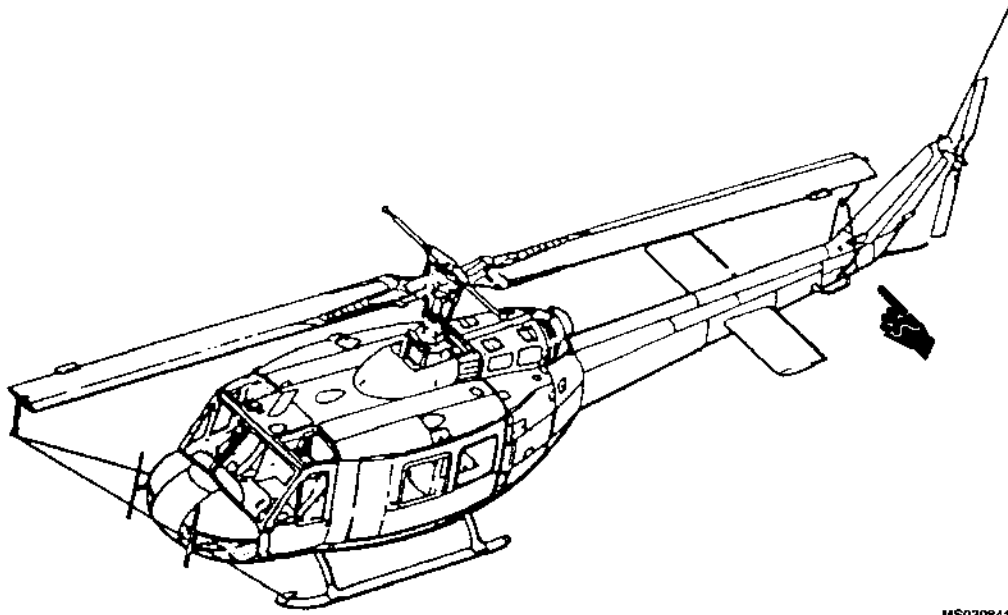


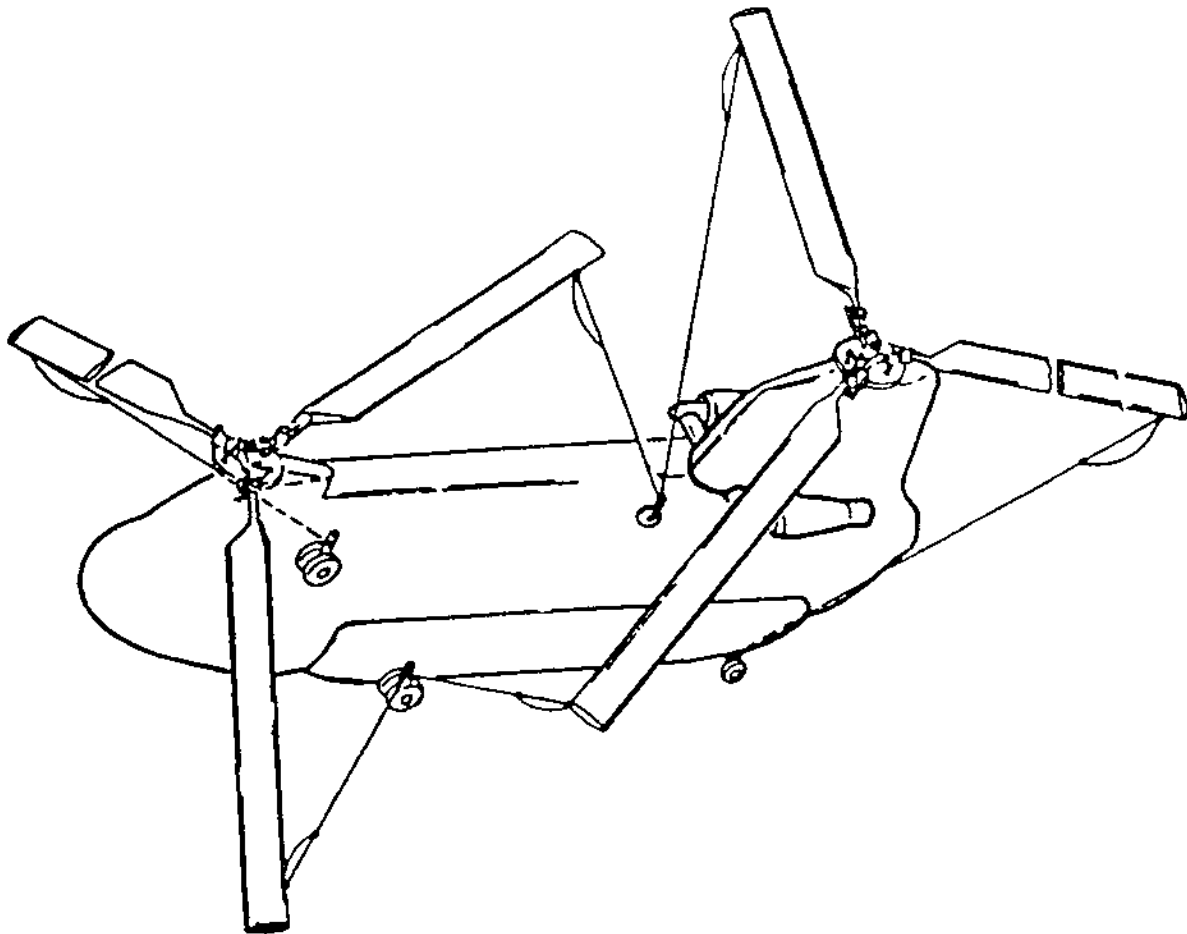
Figure 3-4. UH-60 Tie-Down Configuration

Figure 3-5. Deleted



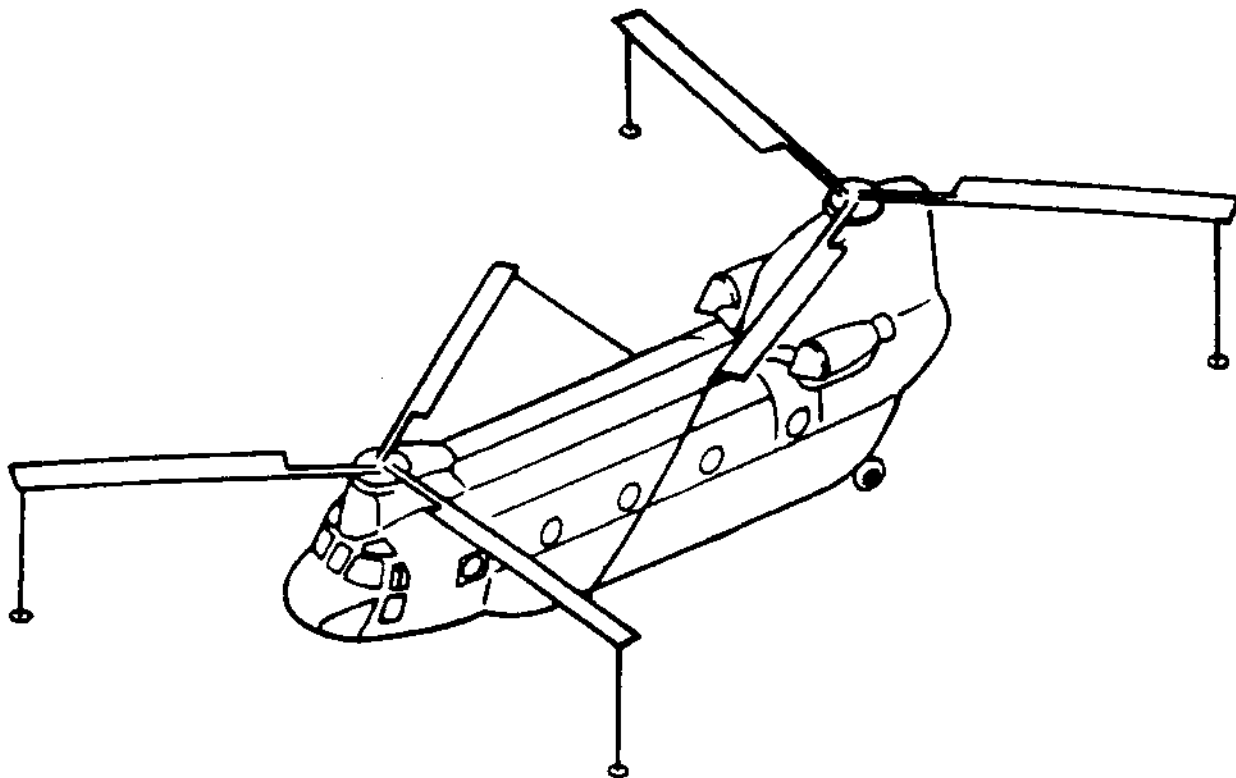
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Figure 3-6. UH-1 Tie-Down Configuration



MS030842

Figure 3-7. CH/MH-47 Tie-Down Configuration



MS030843

Figure 3-8. CH/MH-47 Tie-Down Configuration (Optional)

CHAPTER 4

MOORING PROCEDURES

4-1. GENERAL MOORING.

- a. Aircraft Placement. Position the aircraft on the mooring pad parallel to the centerline of the pad and located fore and aft per the dimension in the figure for that aircraft as shown in figures 4-6 through 4-12.
- b. Adjusters. Ensure that adjusters are fully extended.
- c. Securing Aircraft, secure aircraft to the pad using the chains and adjusting device provided at each of the pad mooring points. The chains are to be attached to the aircraft as illustrated in that aircraft figure and are to be adjusted to remove slack in the chain. During installation manually make the chains as taut as possible prior to using adjuster. The adjuster has a limited travel capacity.
- d. Position Variance. The position of the aircraft with respect to the pad and the pad dimension may vary up to 12 inches.

CAUTION

Ensure chain links are inserted into the MBI chain adjuster as shown in figure 4-2. Incorrect insertion may cause the MBI adjuster to fail and compromise the mooring system.

NOTE

All deviations from the nominal position degrade the wind resistance of the mooring scheme. The tolerance suggested will degrade the scheme by an acceptably small amount.

- e. Mooring Hardware. The hardware to be furnished with the mooring pad is defined in 2-1 and figures 4-1 thru 4-5. Use configuration 1 (fig. 4-1) and a 1/2-inch anchor shackle or configuration 2 (fig. 4-2) to meet requirements which do not allow the mooring pad hardware shown in figure 4-3 to be permanently installed. A ball peen hammer is required to install the link, chain detachable. Cut the chain link to the correct length (See figures 4-4 and 4-5).

4-2. SPECIFIC AIRCRAFT MOORING PROCEDURES.

- a. AH-64 Helicopter Mooring Procedures.

WARNING

The aircraft's tail rotor is in very close proximity to the aft tie-down point. The aft fuselage mooring point should not be used or approached any time the rotor is turning. For initial shipboard mooring configuration (four chains), attach two chains to each forward tie-down fitting, or the mooring lug on each main landing gear trailing arm if the forward fuselage tie-down fittings are not installed

- (1) Position the aircraft on the mooring pad with the longitudinal centerline of the aircraft directly above and parallel to the longitude line of the pad as shown in figure 4-6. Position the forward mooring rings located on main landing gear struts, 6-feet aft of the forward mooring points on the pad as shown in figure 4-6 of this general TM.

NOTE

It will be necessary to open the fairings which shield the forward mooring rings, before final aircraft positioning. A Frearson screwdriver will be required.

- (2) Connect two chain assemblies from the aircraft mooring rings to the forward mooring pad points.
 - (3) Connect two chain assemblies from the center mooring pad points to the mooring ring located on the lower surface of the tailboom at F.S. 450.
 - (4) Connect two chain assemblies from the rear mooring pad points to the mooring ring located on the lower surface of the tailboom at F.S. 450.
 - (5) Tighten the MB-1 chain adjusters to remove the slack from all mooring chains. No tools are required.
- b. CH/MH-47 Helicopter Mooring Procedures.
 - (1) Position the aircraft on the mooring pad with longitudinal centerline of the aircraft directly above and parallel to the longitudinal axis of the pad as shown in figure 4-7. Position the aircraft forward landing gear mooring rings 8-feet-9 inches aft of

the forward mooring points on the pad as shown in figure 4-7 of this general TM.

CAUTION

- (2) Connect two crossing chain assemblies from the forward landing gear mooring rings diagonally to the forward mooring pad points.
- (3) Connect two side chain assemblies from the forward landing gear mooring rings to the forward mooring pad points.
- (4) Connect two crossing chain assemblies diagonally from the aft aircraft landing gear mooring rings to the rear mooring pad points.
- (5) Connect two side chain assemblies from the aft aircraft landing gear mooring rings to the rear mooring pad points.
- (6) Tighten the MB-1 adjusters to remove the slack from all mooring chains. No tools are required.

c. UH-60 Helicopter Mooring Procedures.

- (1) Position the aircraft on the mooring pad with the longitudinal centerline of the aircraft directly above and parallel to the longitudinal axis of the pad as shown in figures 4-8, 4-8a, 4-8b, 4-8c and 4-8d. Figures 4-8, 4-8c and 4-8d are to be used for aircraft that do not have external tanks installed. Figure 4-8a is to be used when aircraft have external tanks installed. Figure 4-8b is to be used for the EH-60 aircraft.
- (2) For mooring of the UH-60 per figure 4-8:
 - (a) Position the aircraft front rooming rings directly in-line with the front mooring pad points.
 - (b) Connect two chain assemblies from the forward aircraft mooring rings at F.S. 308 to the front rooming pad points.
 - (c) Connect two chain assemblies from the front mooring pad points to the aft aircraft mooring rings at F.S.485.
 - (d) Connect two chain assemblies from the aft aircraft mooring rings to the center rooming pad points.

- (e) Tighten the MB-1 chain adjusters to remove the slack from all mooring chains. No tools are required.

(3) For mooring the UH-60 per figure 4-8a:

- (a) Position the aircraft cargo hook directly in-line with the center mooring pad points.
- (b) Connect two lateral chain assemblies from the aircraft cargo hook to the center mooring pad points (Ref. figure 4-8a, view A-A).
- (c) Connect two chain assemblies from the center mooring pad points to the aft aircraft mooring rings at F.S.485.
- (d) Connect two chain assemblies from the aft aircraft mooring rings to the rear mooring pad points.
- (e) Tighten the MB-1 chain adjusters to remove the slack from all mooring chains. No tools are required.

(4) For mooring the EH-60 per figure 4-8b:

- (a) Position the aircraft front rooming rings directly in-line with the front mooring pad points.
- (b) Connect two chain assemblies from the forward aircraft mooring rings at F.S. 308 to the front mooring pad points.
- (c) Connect two chain assemblies from the center mooring pad points to the forward aircraft rooming rings at F.S. 308.
- (d) Connect two chain assemblies from the aft aircraft mooring rings at F.S. 485 to the center mooring pad points.
- (e) Tighten the MB-1 chain adjusters to remove the slack from all mooring chains. No tools are required.

(5) For alternate mooring of UH-60 per figure 4-8c:

- (a) Position the aircraft front mooring rings directly in-line with the center mooring pad points as shown in figure 4-8c.

- (b) Connect two chain assemblies from the forward aircraft mooring rings at F.S. 308 to center mooring pad points as shown in figure 4-8c.
 - (c) Connect two chain assemblies from the center mooring pad points to the aft aircraft mooring rings at F.S.485 as shown in figure 4-8c.
 - (d) Connect two chain assemblies from the aft aircraft mooring rings at F.S. 485 to the rear mooring pad points as shown in figure 4-8c.
 - (e) Tighten the MB-1 chain adjusters to remove the slack from all mooring chains. No tools are required.
- (6) For alternate mooring UH-60 per figure 4-8d.
- (a) Position the aircraft on the mooring pad with longitudinal centerline of the aircraft directly above and parallel to the longitudinal axis of the pad as shown in figure 4-8d. Position the aircraft front mooring rings, at F.S. 308.10 feet aft of the forward mooring pad points as shown in figure 4-8d.
 - (b) Connect two chain assemblies from the front mooring rings at F.S. 308 to the forward mooring pad points as shown in figure 4-8d.
 - (c) Connect two chain assemblies from the front mooring rings at F.S. 308 to the center mooring pad points as shown in figure 4-8d.
 - (d) Connect two chain assemblies from the aft aircraft mooring rings at F.S. 308 to the center mooring pad points as shown in figure 4-8d.
 - (e) Connect two chain assemblies from the aircraft mooring rings at F.S. 485 to the rear mooring pad points.
 - (f) Tighten the MB-1 chain adjusters to remove the slack from all mooring chains. No tools are required.
- d. Deleted.
 - e. UH-1 Helicopter Mooring Procedures.
 - (1) Position the aircraft on the mooring pad with the longitudinal centerline of the aircraft directly above and parallel to the longitudinal axis of the pad as shown in figure 4-10. The forward jack-points, located at F.S. 61.96, should be located approximately 2 feet aft of the forward mooring points as dimensioned in figure 4-10. The aft mooring points are located at F.S. 211.58.
 - (2) Before mooring the aircraft will be necessary to install a mooring clevis at each of the four jacking points. A mechanics tool kit will be required.

NOTE

Older UH-1 aircraft have jack points with a nominal bolt hole size of .25 inches compared with .312 inches on newer UH-1 aircraft. On the older UH-1 aircraft the existing .25 inch hole will need to be enlarged to .312 inches to accommodate the current bolt and shackle configuration.

- (3) Connect two chain assemblies from the forward jack-points to the forward mooring pad points.
- (4) Connect two chain assemblies from the forward mooring pad points to the rear jack-points.
- (5) Connect two chain assemblies from the rear jack-points to the center mooring pad points.

NOTE

It is highly recommended that UH-1 helicopters be flown with the mooring hardware installed at all times to permit a rapid response to weather emergencies.

- f. OH-58 Helicopter Mooring Procedures.

CAUTION

The mooring hardware is to be carried in the flyaway kit. Flying the OH-58 with the mooring hardware installed may result in damage to the aircraft's honeycomb surface. Retain all hardware together for each specific installation: due to wear, the bushings may not be interchangeable.

- (1) Position the aircraft on the mooring pad with the longitudinal centerline of the aircraft directly above and parallel to the longitudinal axis of the pad as shown in figures 4-11 and 4-12. The forward jack-points are to be located 4 feet aft of the forward mooring pad points as dimensioned in figure 4-11 and 4-12.
- (2) Before mooring the aircraft it will be necessary to attach a mooring clevis to each of the three jackpoints. The clevis provided will not be large enough to accept the hooks on the mooring chains provided with mooring pad. Mooring rings are to be installed on the aircraft as shown in figure 4-13.

NOTE

For local fabrication of Bushing, P/N NAS72-5E100, see figure 4-14. Aircraft with oversize holes may adjust outside diameter to fit.

NOTE

Bolt, nut and washer may be eliminated by using a Quick Release Pin as shown in figure 4-15.

- (3) Connect two chain assemblies from the forward jack-points to forward mooring pad points.
- (4) Connect two chain assemblies from the forward mooring pad points to the rear jack-point.
- (5) Connect two chain assemblies from the rear jack-point to the center mooring pad points.
- (6) Tighten the MB-1 chain adjusters to remove the slack for all mooring chains.

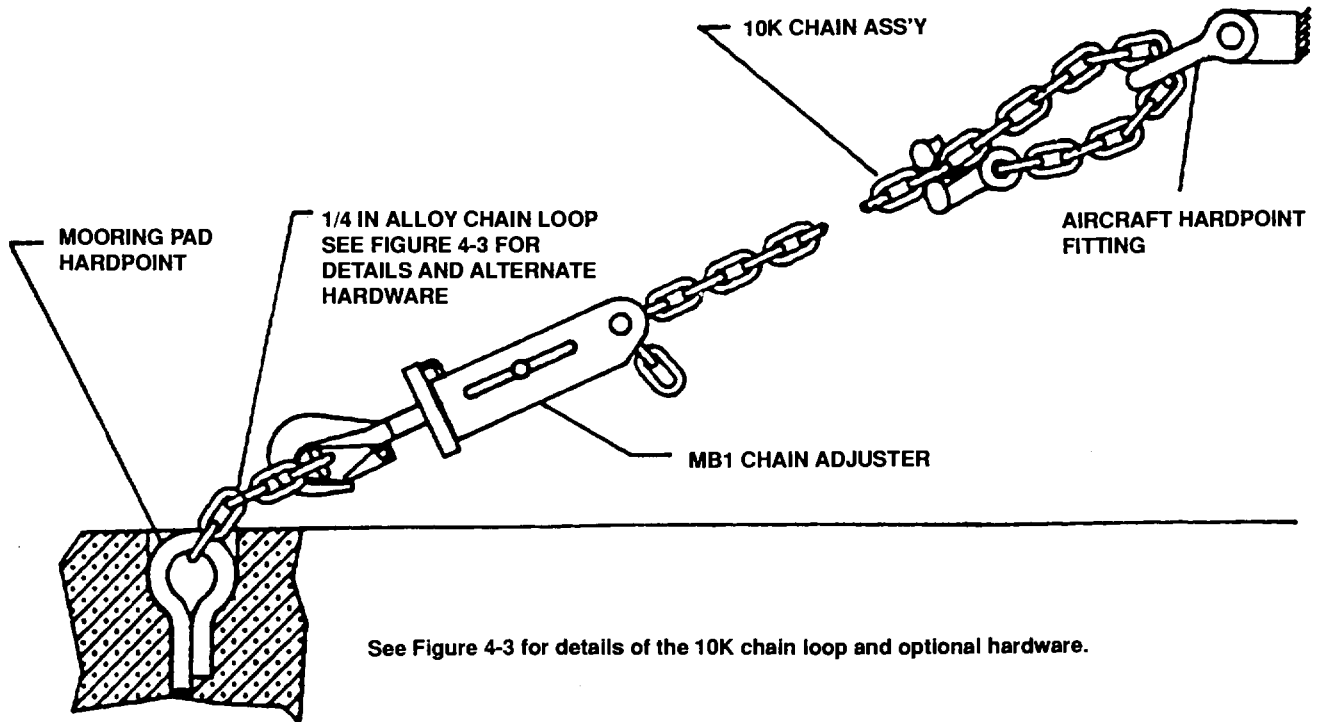
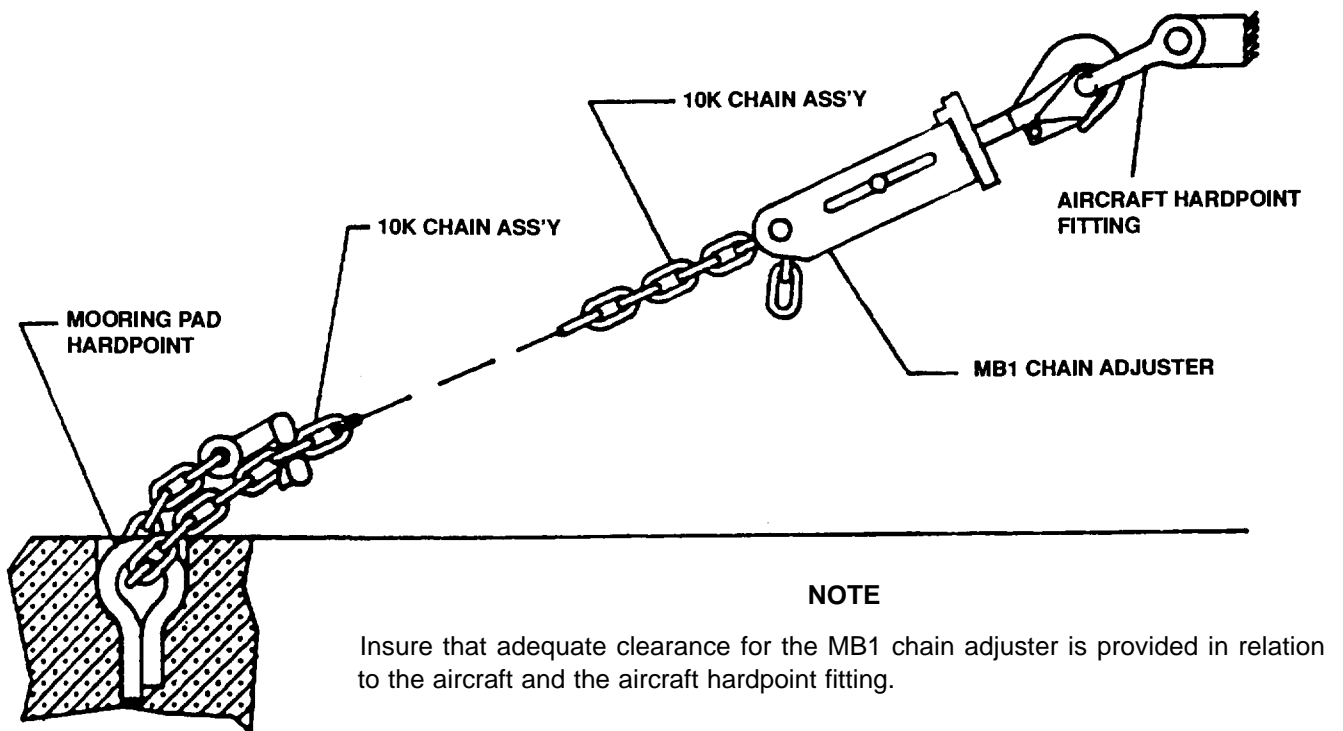


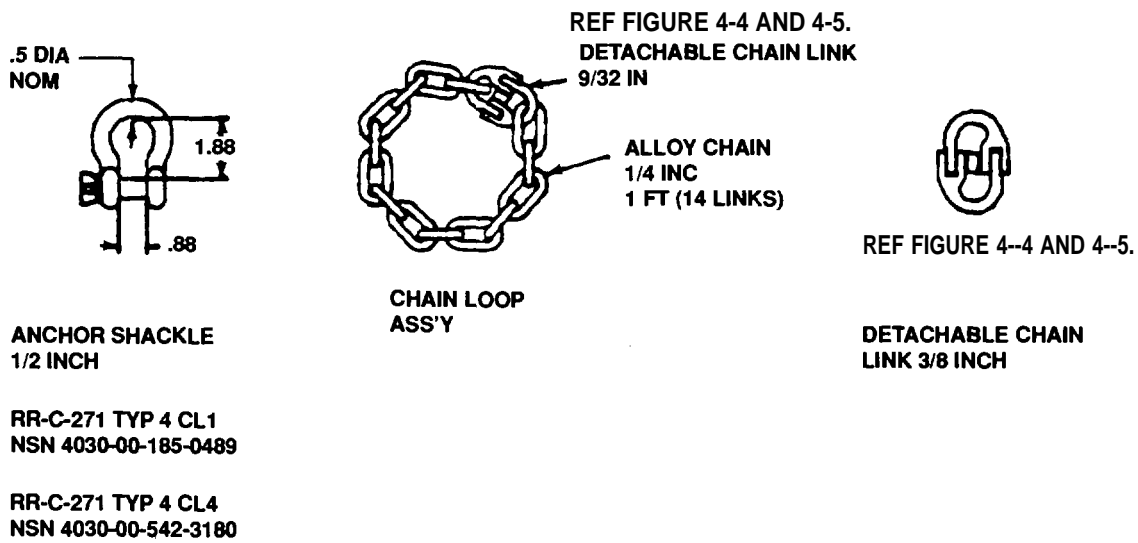
Figure 4-1. Mooring Hardware Installation Assembly Details - Configuration 1



NOTE

Either of the configurations shown can be used to secure the aircraft to the mooring pad.

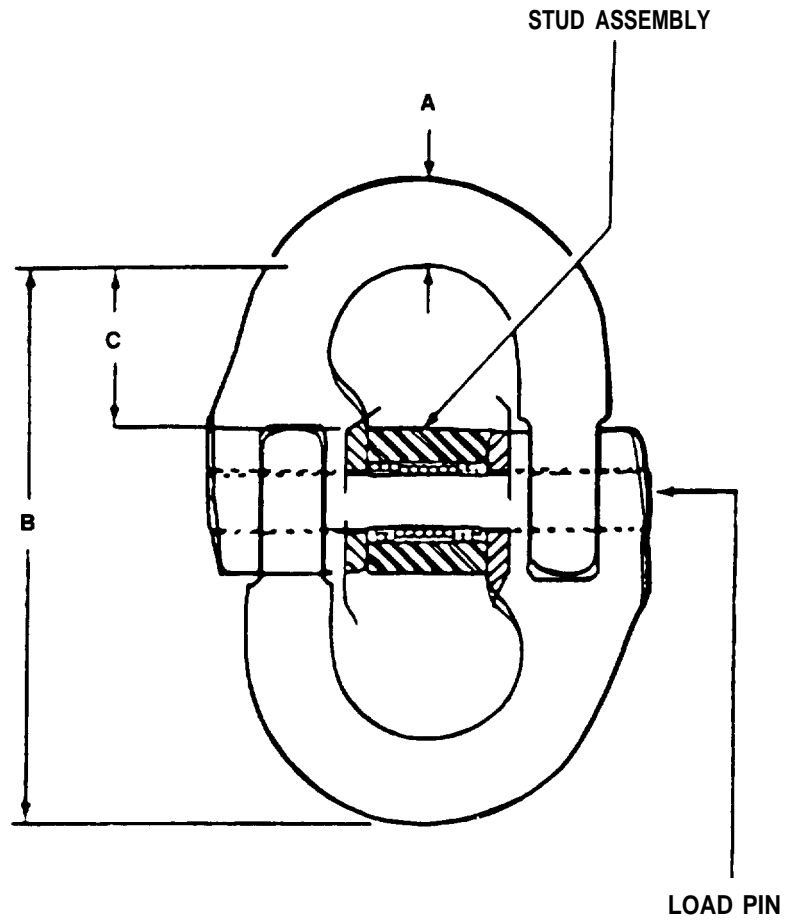
Figure 4-2. Mooring Hardware Installation Assembly Details - Configuration 2



NOTE

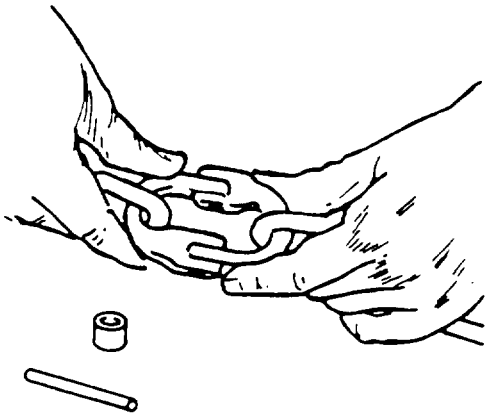
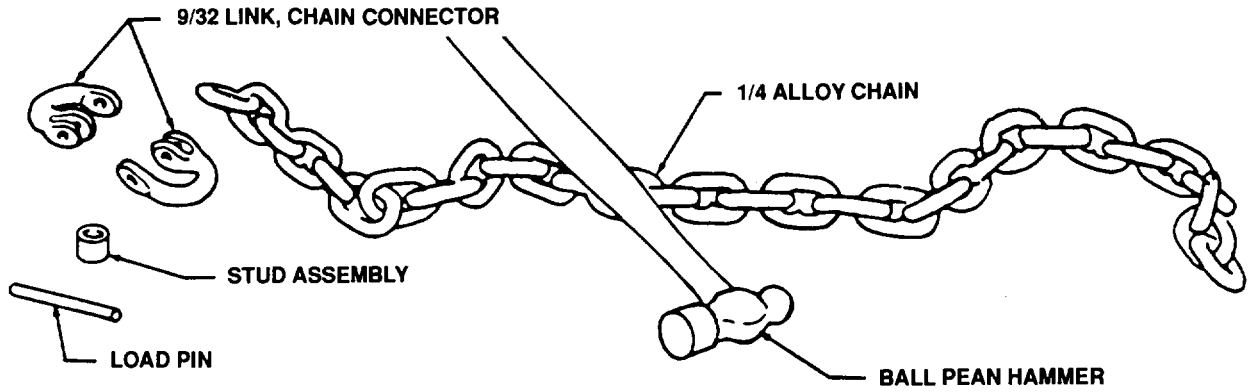
All hardware shown can be used to connect the MB1 chain adjuster to the mooring pad hardpoint fitting in figure 4-1.

Figure 4-3. Mooring Hardware Details in Configuration 1 (Figure 4-1)

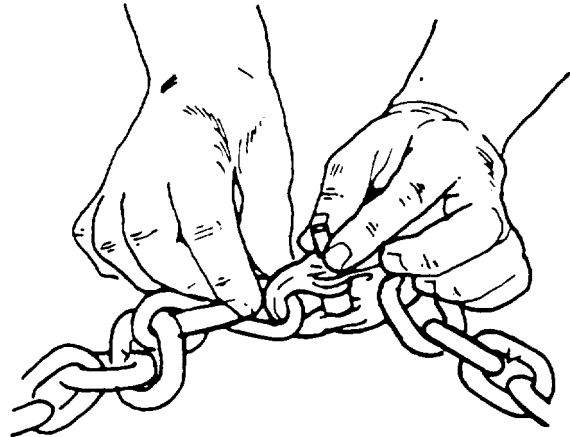


	SIZE	9/32	3/8
	A	5/16	7/16
	B	1 13/16	2 13/32
Dimensions (Inches)	C	5/8	53/64
	Max. width	1 11/16	27/32
	Dia. hole to accept male leg	35/64	47/64
	Weight each (lbs.)	.23	.59

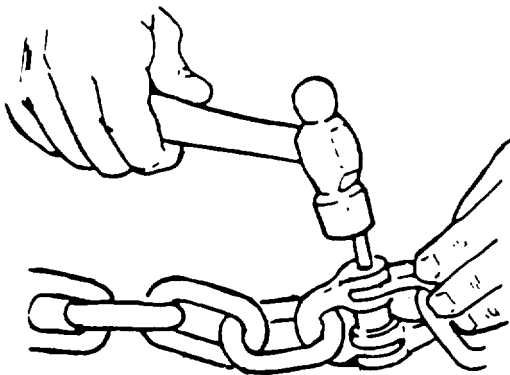
Figure 4-4. Link, Chain Detachable



1. Bring the two Hammerlok coupling link body halves together as shown.

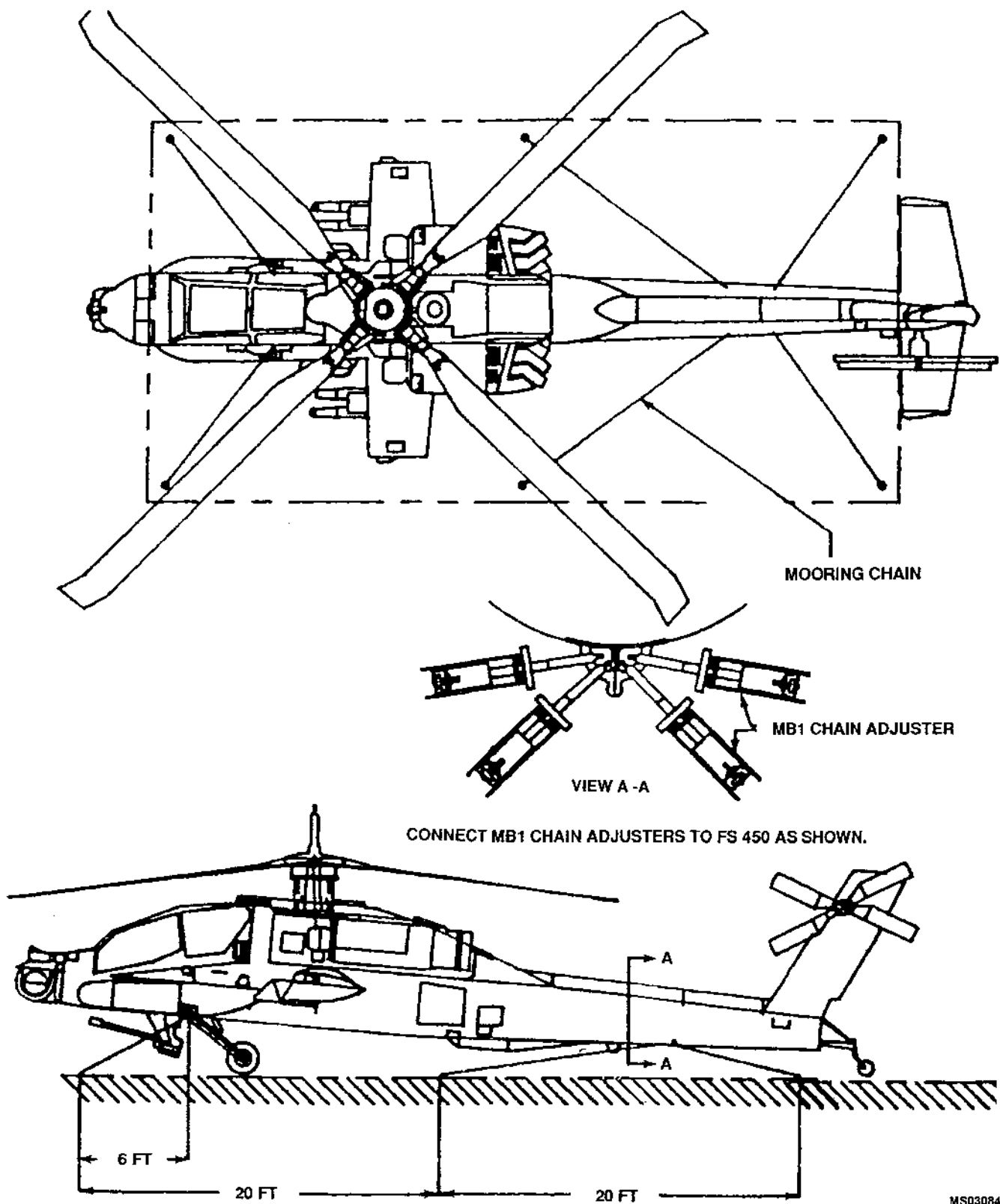


2. Place the stud assembly and the special load pin made from hardened alloy steel in place as shown.



3. Drive the load pin in until the end of the pin is flush with the surface of the body forging.

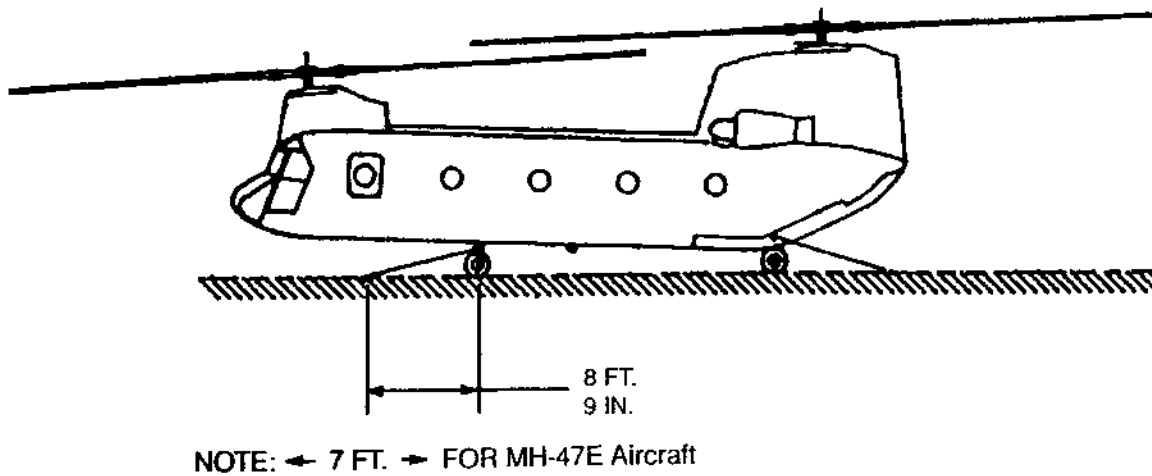
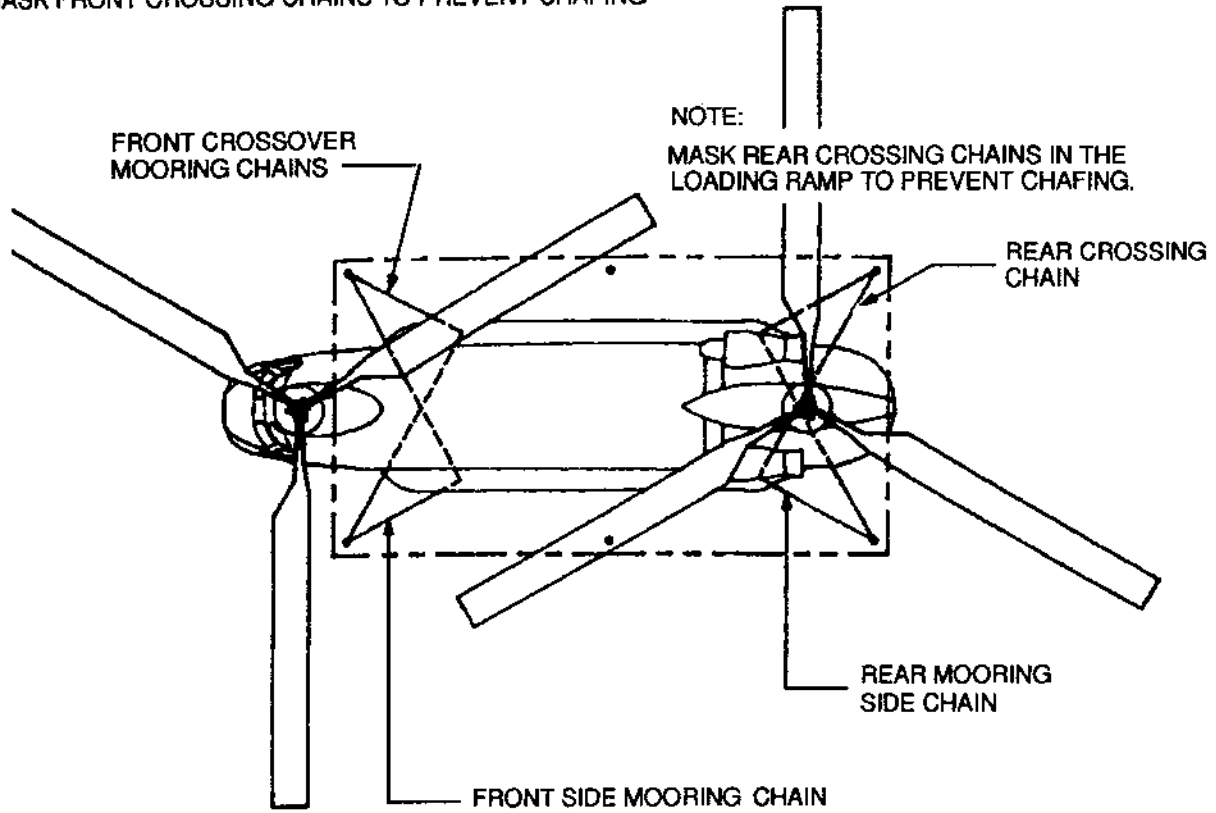
Figure 4-5. Link, Chain, Detachable Installation



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Figure 4-6. AH-64 Mooring Configuration

NOTE:
MASK FRONT CROSSING CHAINS TO PREVENT CHAFING



MS030849

Figure 4-7. CH/MH47 Mooring Configuration

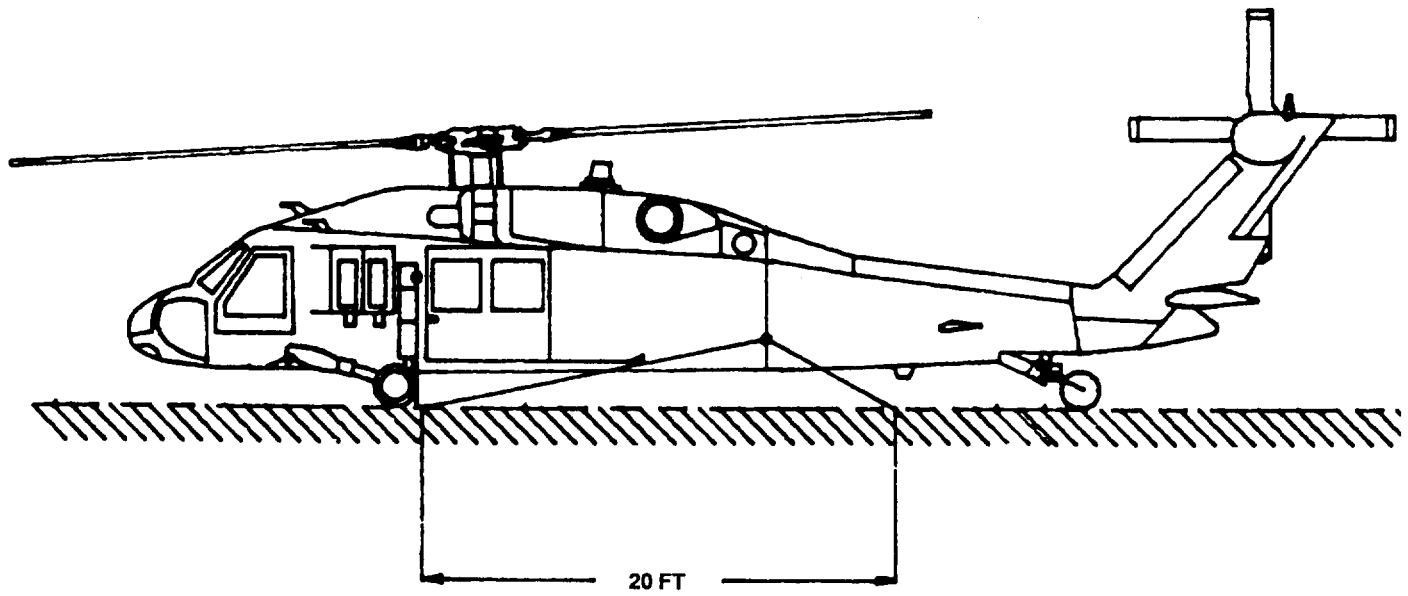
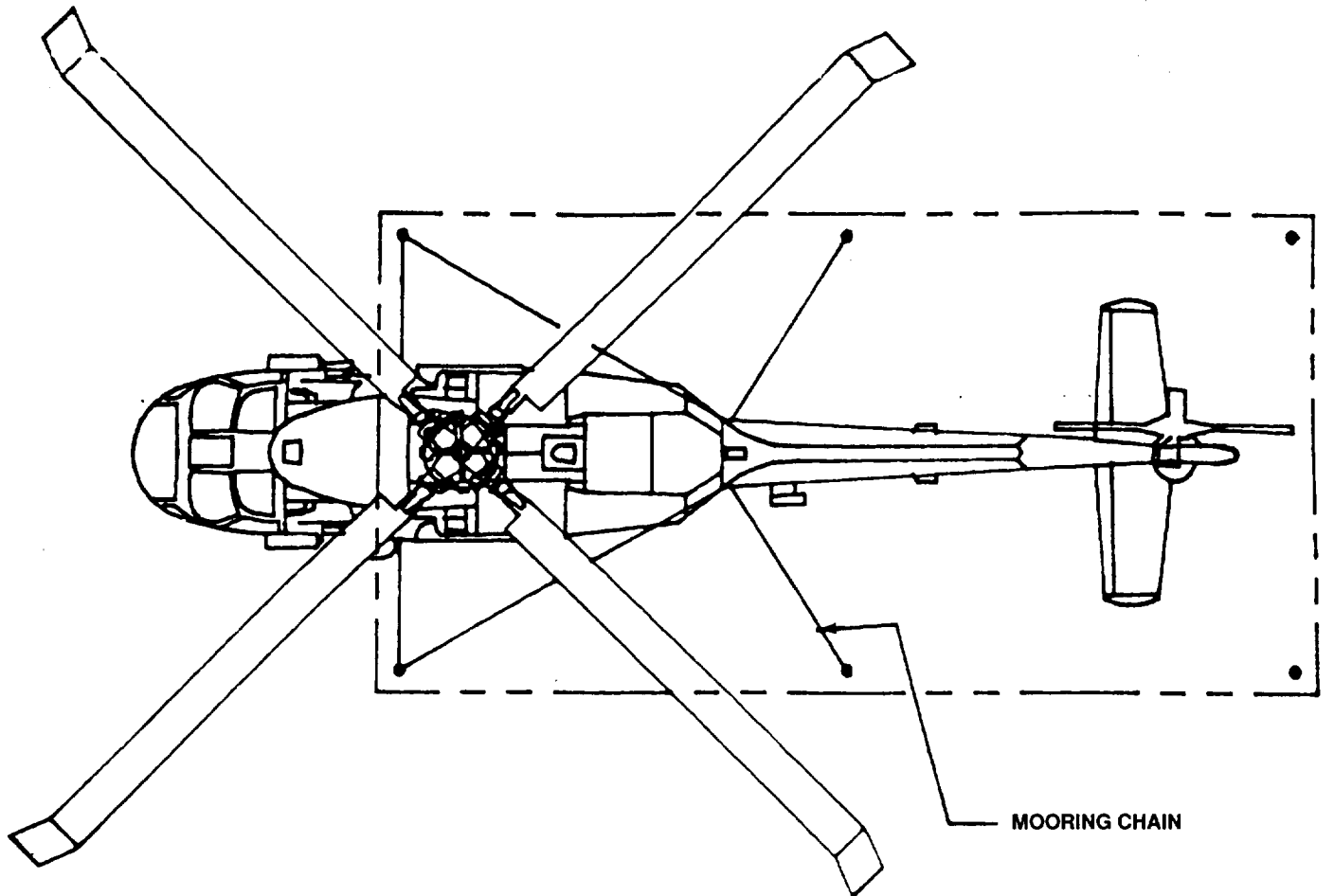


Figure 4-8. UH-60 Mooring Configuration

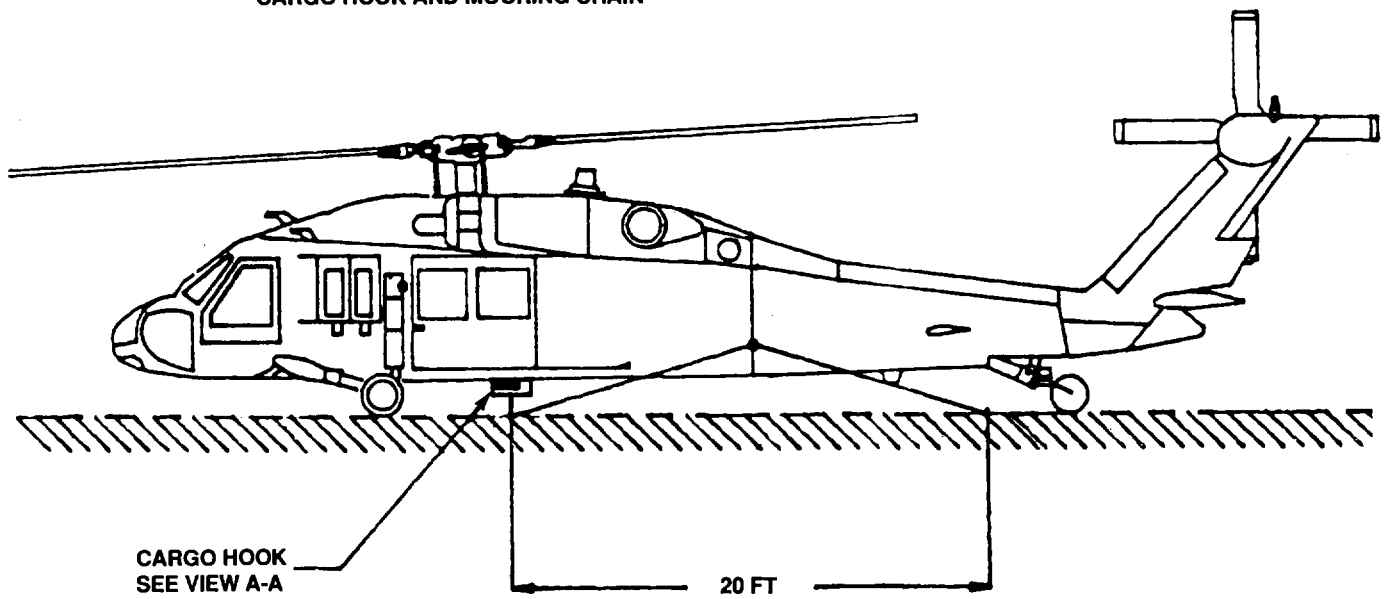
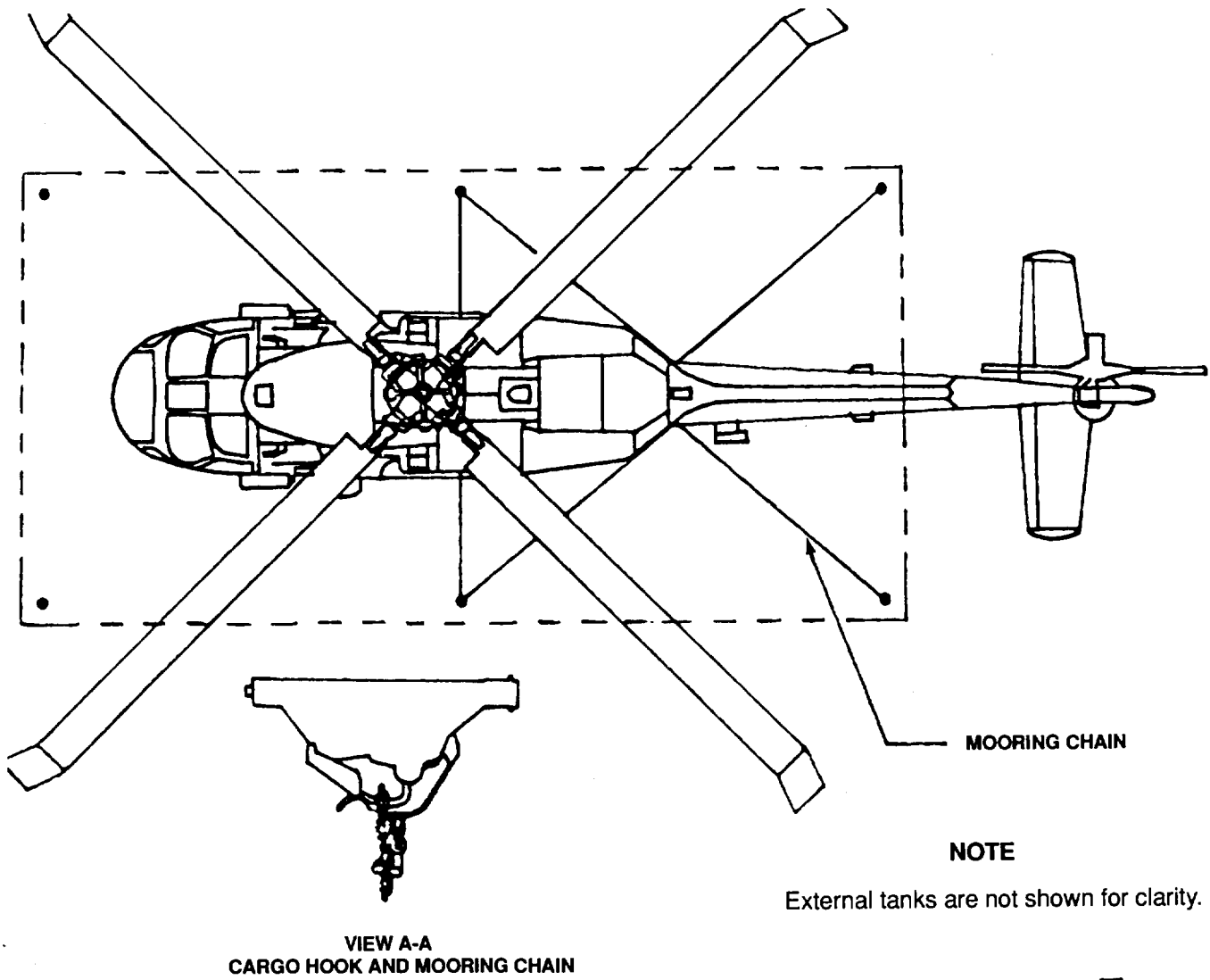


Figure 4-8a. UH-60 Mooring Configuration (When external tanks are installed).

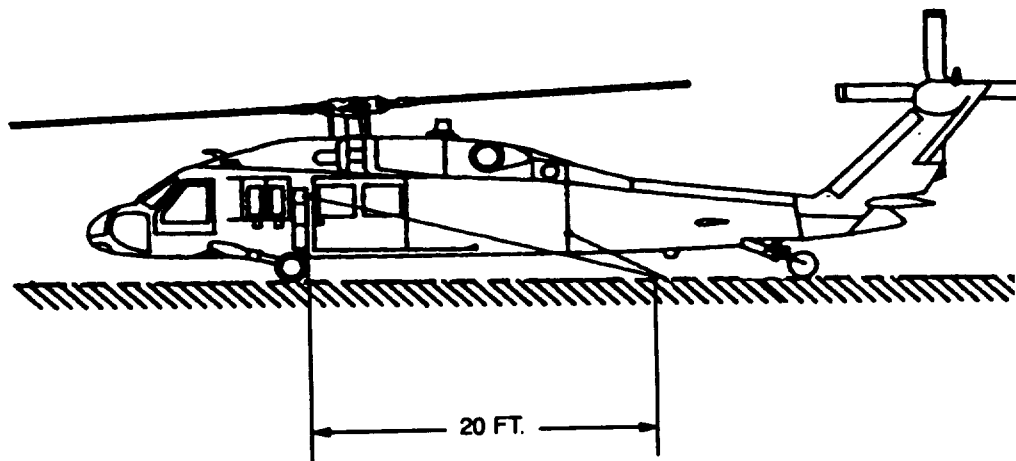
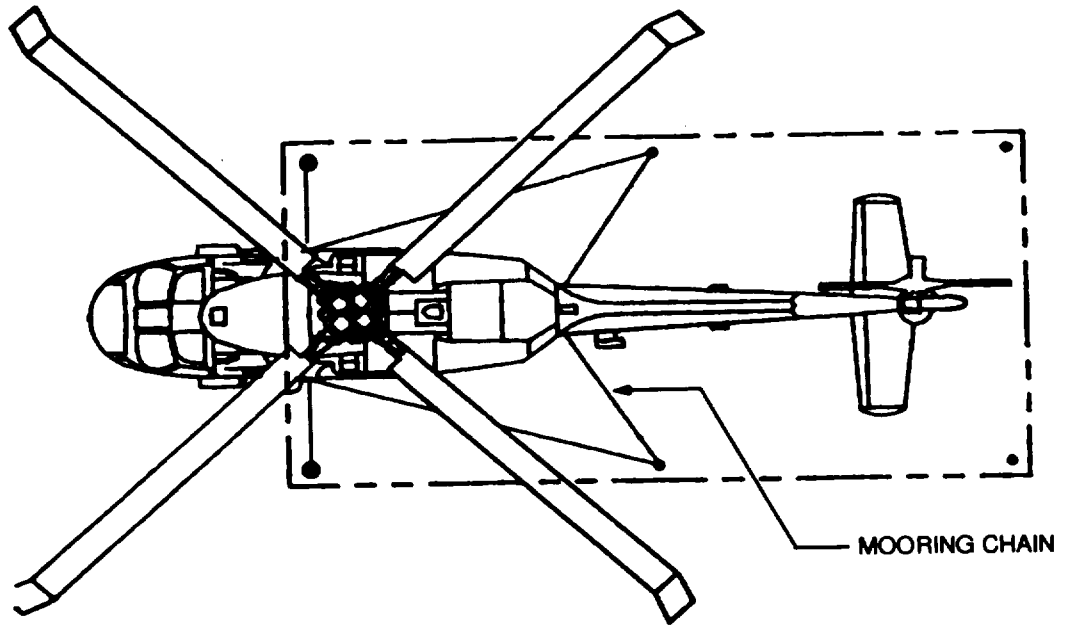


Figure 4-8b. EH-60 Mooring Configuration.

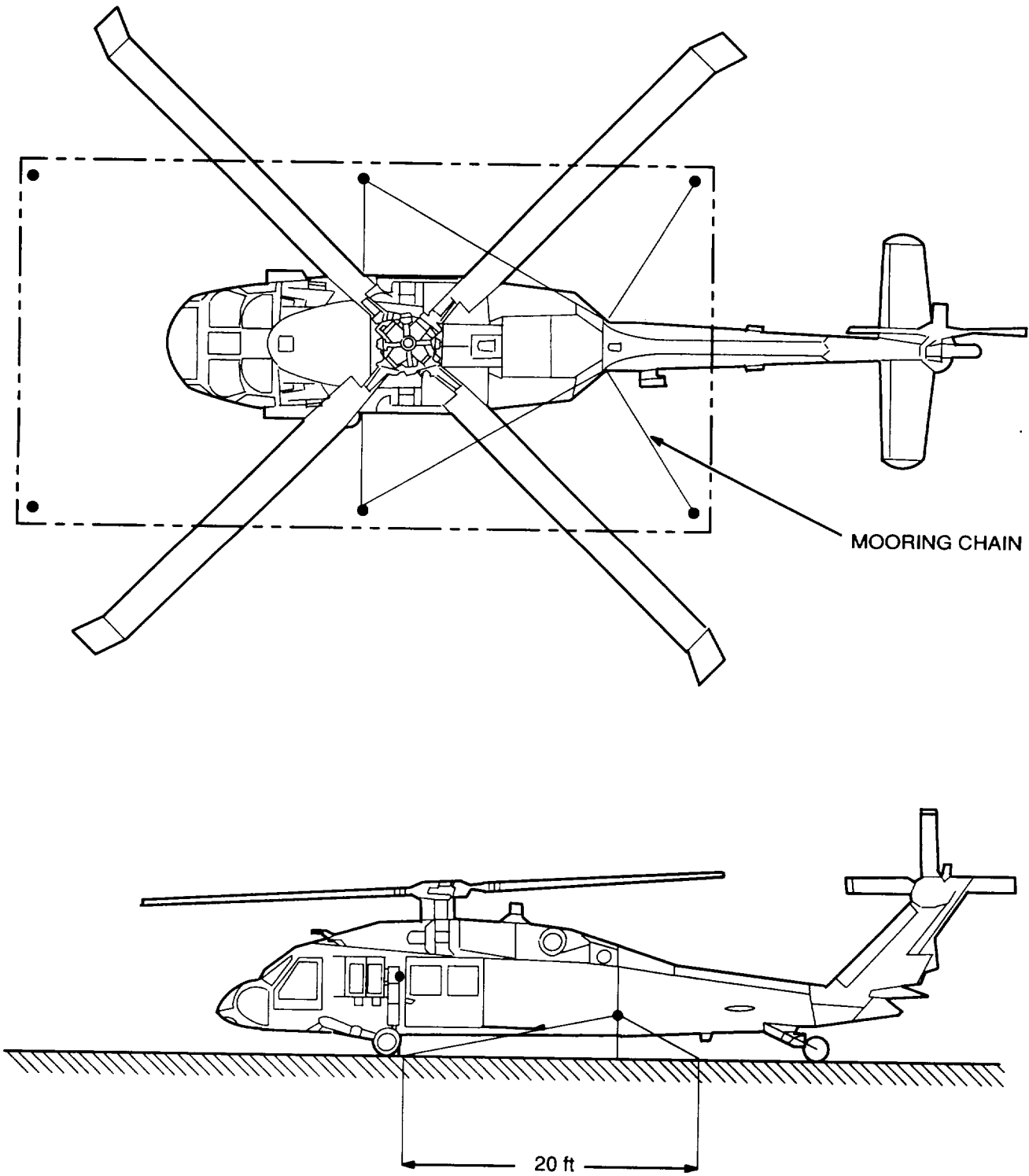


Figure 4-8c. UH60 Mooring Configuration Alternate # 1.

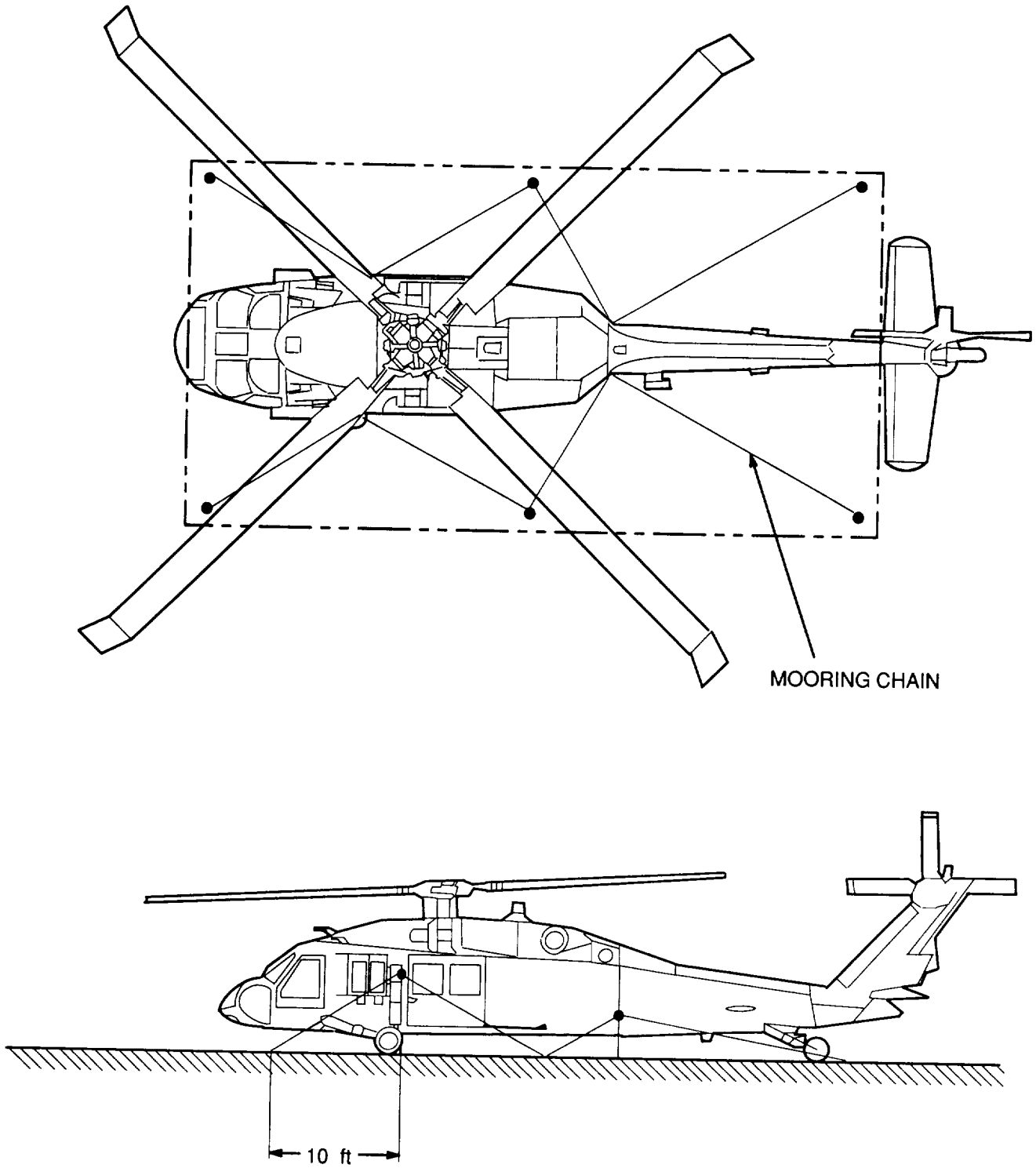
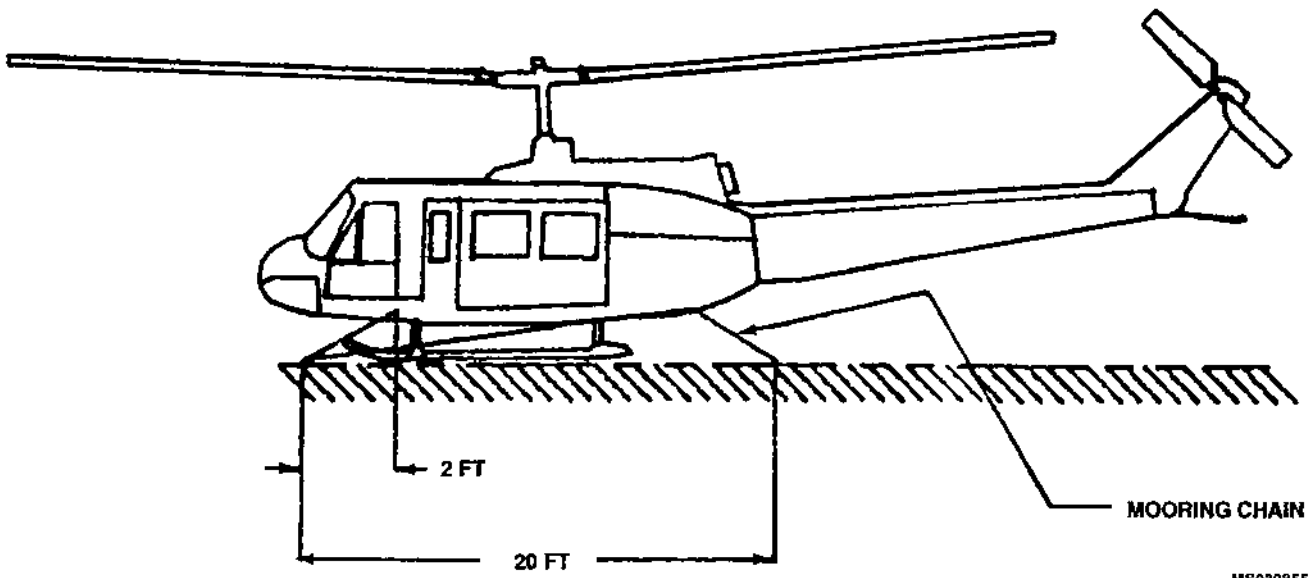
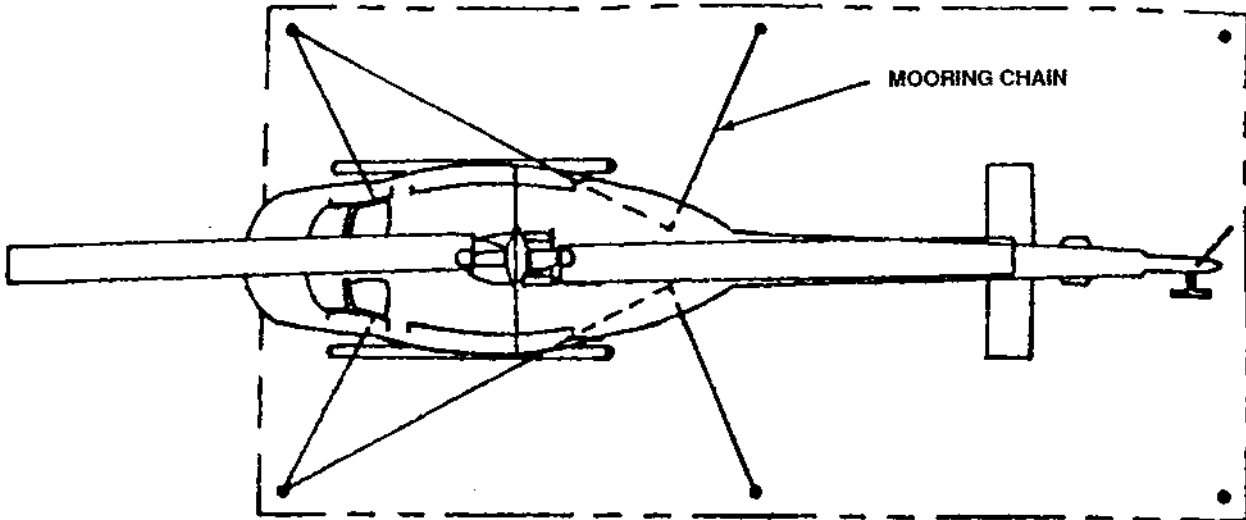


Figure 4-8d. UH60 Mooring Configuration Alternate # 2.

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Figure 4-9. Deleted





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Figure 4-10. UH-1 Mooring Configuration

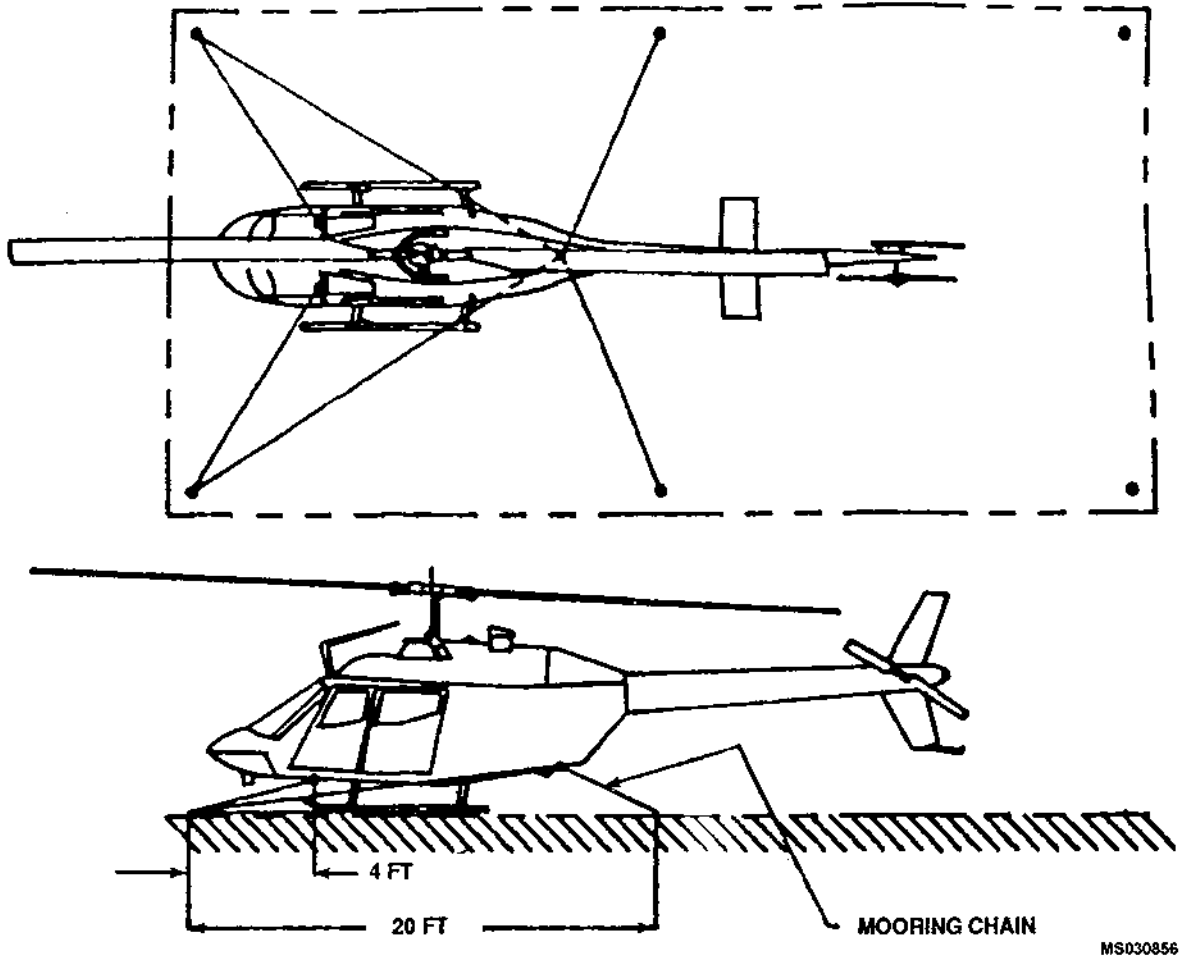


Figure 4-11. OH-58A&C Mooring Configuration

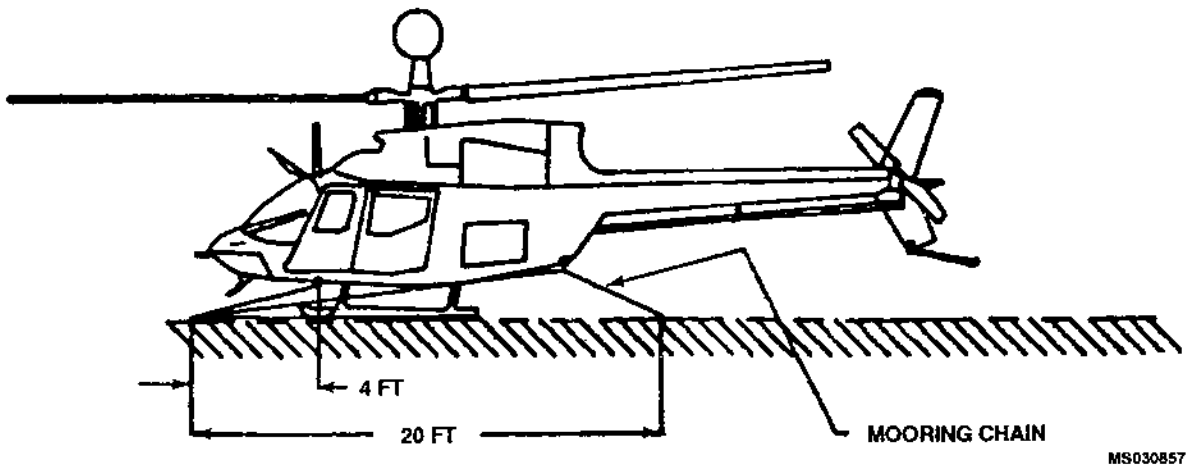


Figure 4-12. OH-58D Mooring Configuration

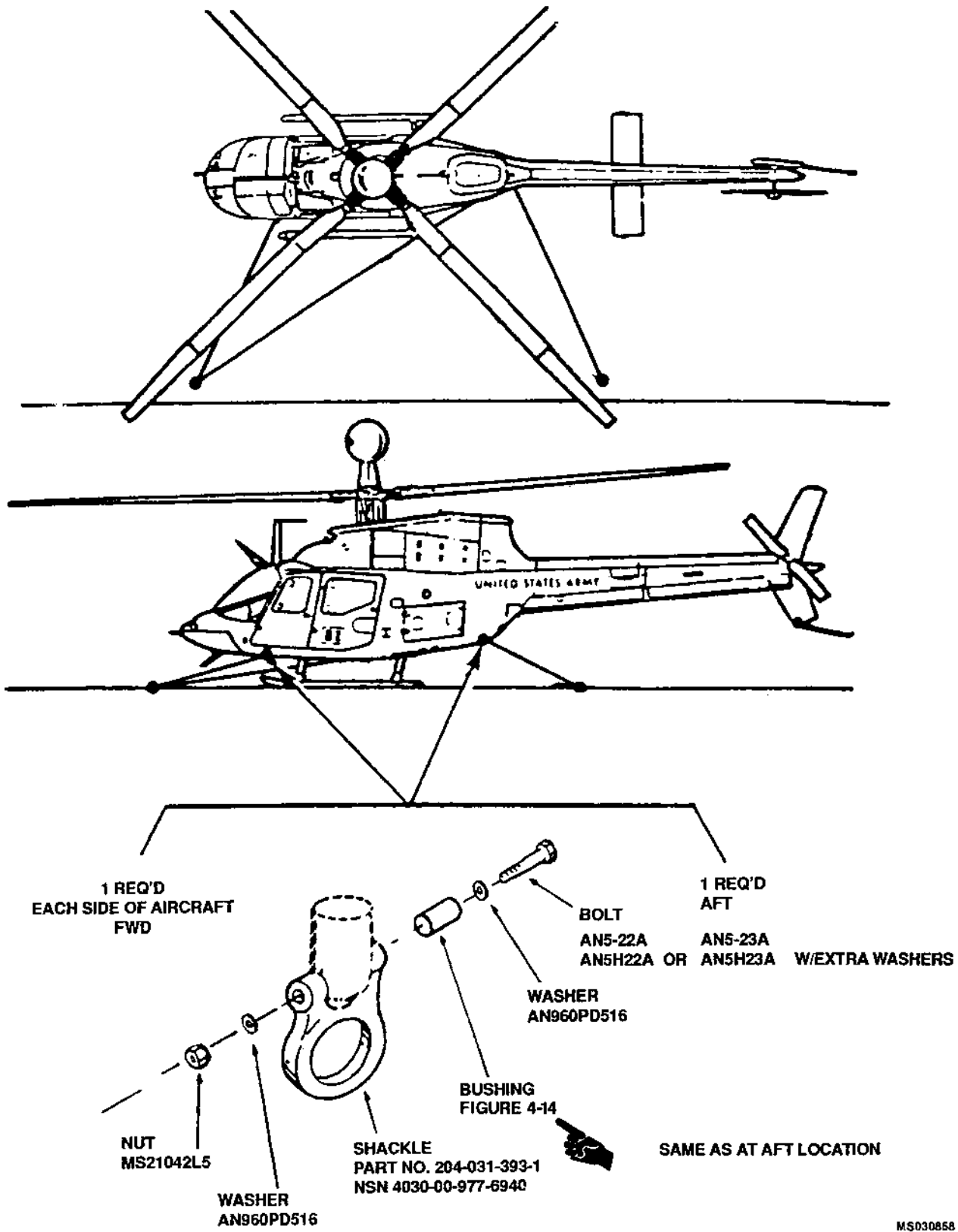
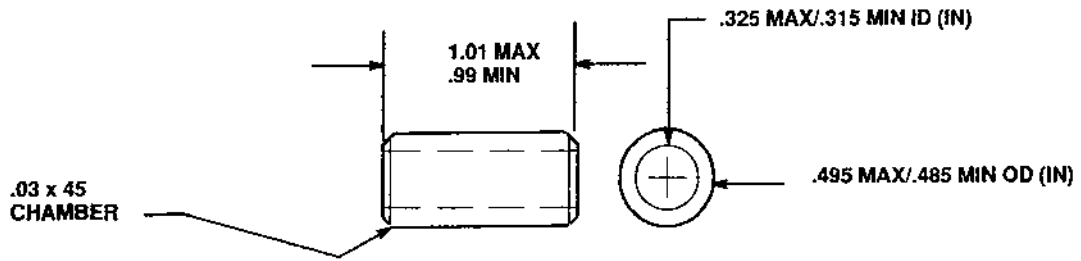


Figure 4-13. Mooring Hardware For OH-58A/C&D

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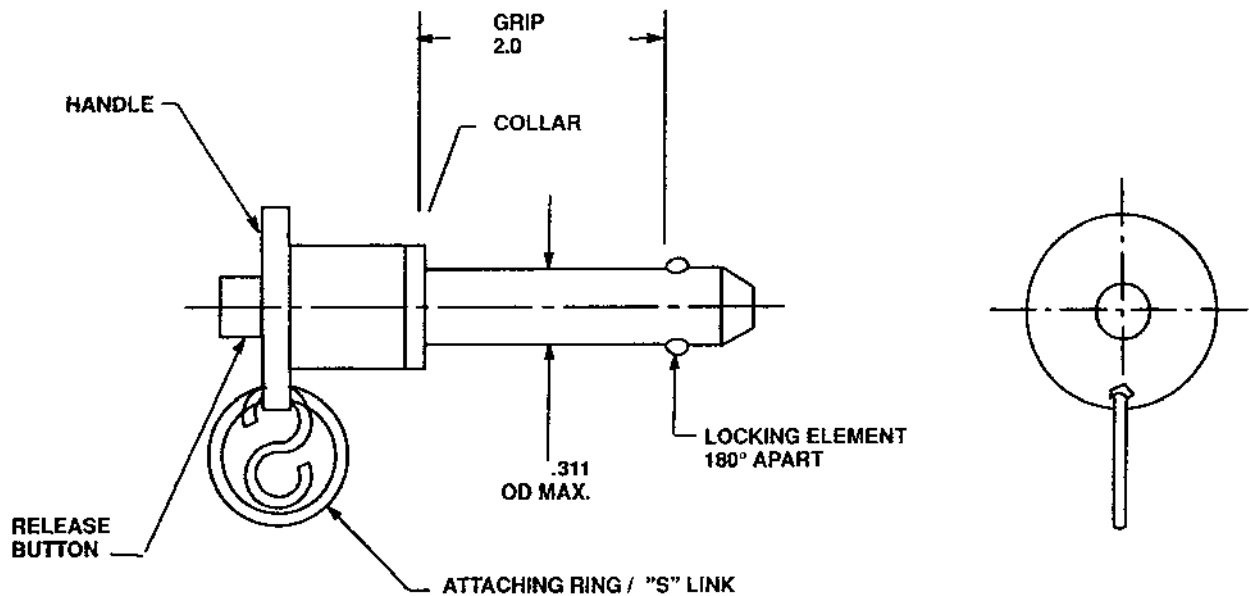



BUSHING REPLACEMENT DETAIL FOR OH-58A/C & D

MATERIAL : ANY CORROSION RESISTANT STEEL

MS030859

Figure 4-14. Bushing Detail for OH-58A/C and D



PIN, QUICK RELEASE (MS 17984C530)
 NSN 5315 - 01 - 137 - 7191

THIS ITEM CAN BE SUBSTITUTED FOR BOLT ,WASHER,
 AND NUT ASSEMBLY FIGURE 4 - 13.
 WHERE ASSEMBLY TOOLS ARE UNAVAILABLE.

WHEN EMPLOYED, THIS ITEM IS CONSIDERED FLYAWAY GEAR.

MS030860

Figure 4-15. Pin, Quick Release For OH-58A/C and D

4-3. MOORING ON NON-PAVED SURFACES.

- a. Ground Anchor Kit (NSN 8340-00-951-6423). Refer to table 4-1 for kit contents and figures 4-16 through 4-22 for component breakout.

NOTE

The Ground Anchor Kit for mooring on non-paved surfaces is recommended for all tactical environments (non-paved surfaces).

- b. Function and Description of each kit component.

- (1) **Ground Anchor.** The assembly is composed of a metal arrowhead with approximately three feet of wire rope attached at the center (figure 4-17). The anchor is driven into the ground and provides the mooring base.
- (2) **Steel Driving Rod.** The rod's outside diameter is 3/4 inch x 3 feet long (figure 4-18). It holds the ground anchor and is used to drive the anchor into the ground.
- (3) **Driving Head.** Size is 2 1/4 inches outside diameter x 2 3/4 inches long. The steel driving head fits over the top of the driving rod and provides the contact surface on which to hammer the assembly (figure 4-19).
- (4) **Holding Tool Handle. (Figure 4-20).** Size is 24 inches long. It is made from 1/4 inch diameter steel rod and slips over the steel driving rod to hold the unit while driving the ground anchor arrowhead into the ground. It allows the assembly to be held safely while driving.

- c. Connecting the ground anchors to the aircraft. The kit does not contain rope to connect the

ground anchors to the aircraft. The following items are recommended for securing the aircraft:

Tiedown, Cargo, Aircraft (Webbing Binder)	1670-00-725-1437
Tiedown, Cargo, Aircraft (Webbing Binder)	5340-01-233-3063
Polyester Rope (1/2 inch diameter)	4020-01-028-3843 4020-00-765-3928 4020-00-630-4873

- d. Installation.

NOTE

Refer to the applicable -23 Technical Manual, under Mooring, to determine the number of anchors required per aircraft. One anchor is required per mooring line.

- (1) Refer to figures 4-16 and 4-17 and insert the ground anchor (arrowhead) stem into the bottom of the driving rod.
- (2) Refer to figures 4-16 and 4-20 and slip the holding handle over the driving rod while driving into the ground.
- (3) Refer to figures 4-16, 4-18 and 4-19 and insert the driving head onto the top of the driving rod.
- (4) Refer to figure 4-16 and drive the anchor head/driving rod assembly into the ground, hammering on the drive head, and holding the assembly with the holding handle.

Table 4-1. Ground Anchor Kit.

<u>ITEM</u>	<u>QUANTITY</u>	<u>FIG</u>	<u>NSN</u>
Anchor, Ground (4 inch arrowhead with anchoring wire)	50	4-17	4030-00-972-2670
Head, Driving	2	4-19	4030-00-051-8641
Handle, Holding Tool	2	4-20	4030-00-134-4725
Rod, Steel, Driving	2	4-18	4030-00-970-6412

(5) Refer to figure 4-21, View A, and drive the assembly approximately 3 to 3 1/2 feet until only the thimble of the wire rope portion of the ground anchor is above ground.

(6) Refer to figure 4-21, View B, and pull out the drive rod.

(7) Refer to figure 4-21, View C, and pull up vertically on the wire rope assembly to seat the anchor. This will rotate the arrowhead into a horizontal position and provide a rigid anchor.

(8) Refer to figure 4-22 and attach the polyester rope or the CGU-1B webbing binder to the ground anchor and connect it to the aircraft mooring fitting (remove ail slack).

(9) Ground anchors will be left in the ground when the aircraft is moved.

(10) Replacement ground anchors are available.

e. Larger Ground Anchor for Extreme Sand Conditions. In extreme sand conditions, a larger ground anchor may be required. An 8-inch ground anchor is available for increased holding power. It uses components similar to the 4-inch ground anchor kit, but larger in size. The 8-inch ground anchor and its drive components are as follows:

<u>I T E M</u>	<u>N S N</u>
Ground Anchor (8 inch aluminum)	4030-00-580-8287
Ground Anchor (8 inch iron)	4030-01-150-4896
Ground Anchor (8 inch iron)	4030-00-580-8307
NOTE: All these items are one anchor with wire rope assembled.	
Rod, Driving (48 inches long)	4030-00-541-4081
Head, Driving (2 inches outside diameter x 2 1/4 inches long)	4030-01-008-8053

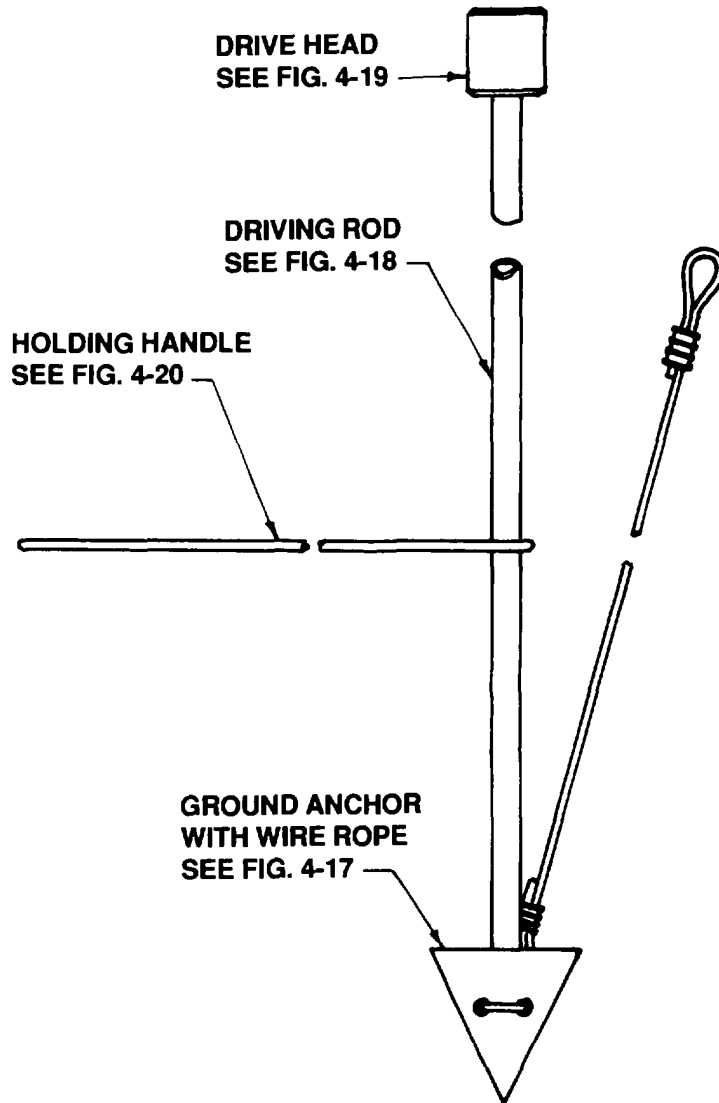
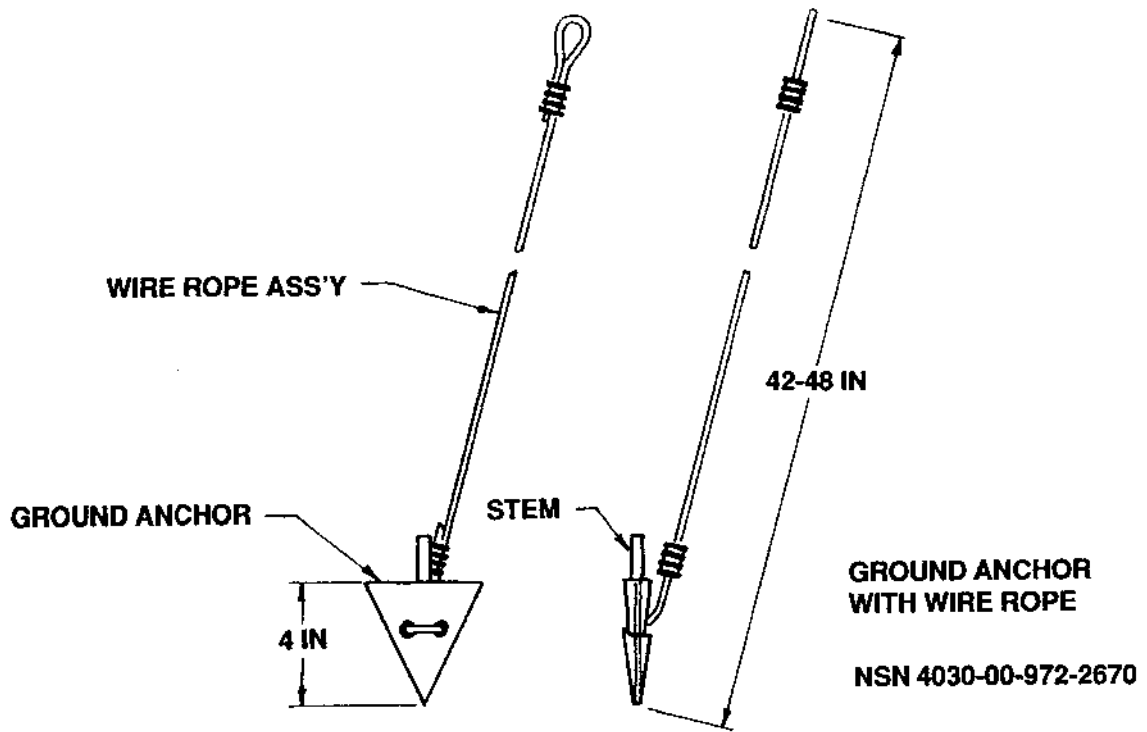
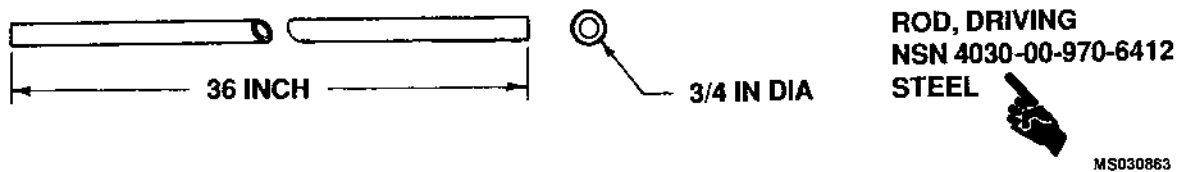


Figure 4-16. Ground Anchor Assembly (For Mooring on Nonpaved Surfaces)



MS030862

Figure 4-17. Ground Anchor with Wire Rope



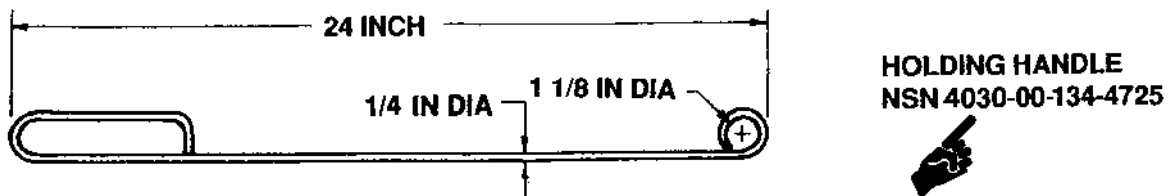
MS030863

Figure 4-18. Driving Rod



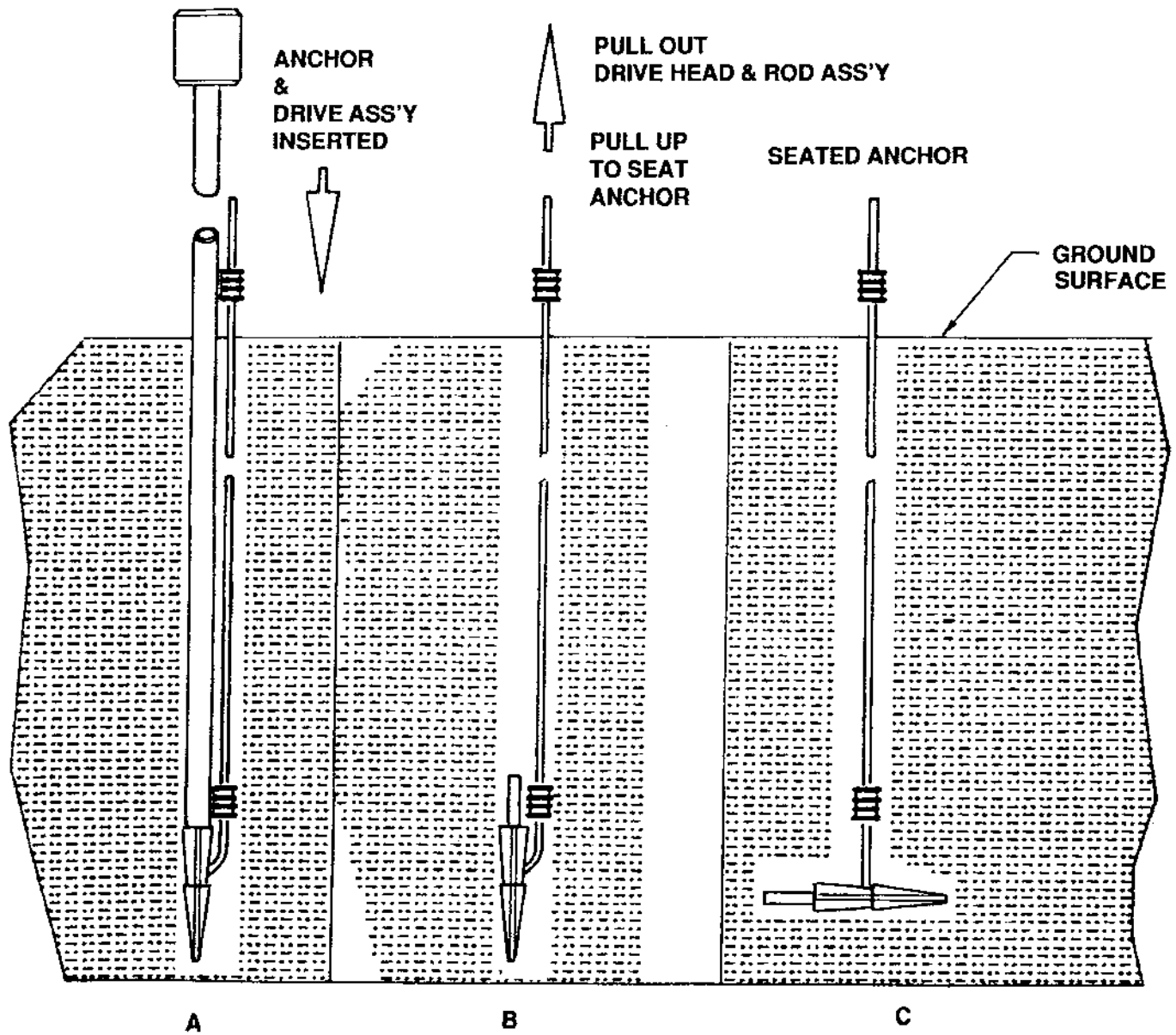
MS030864

Figure 4-19. Drive Head



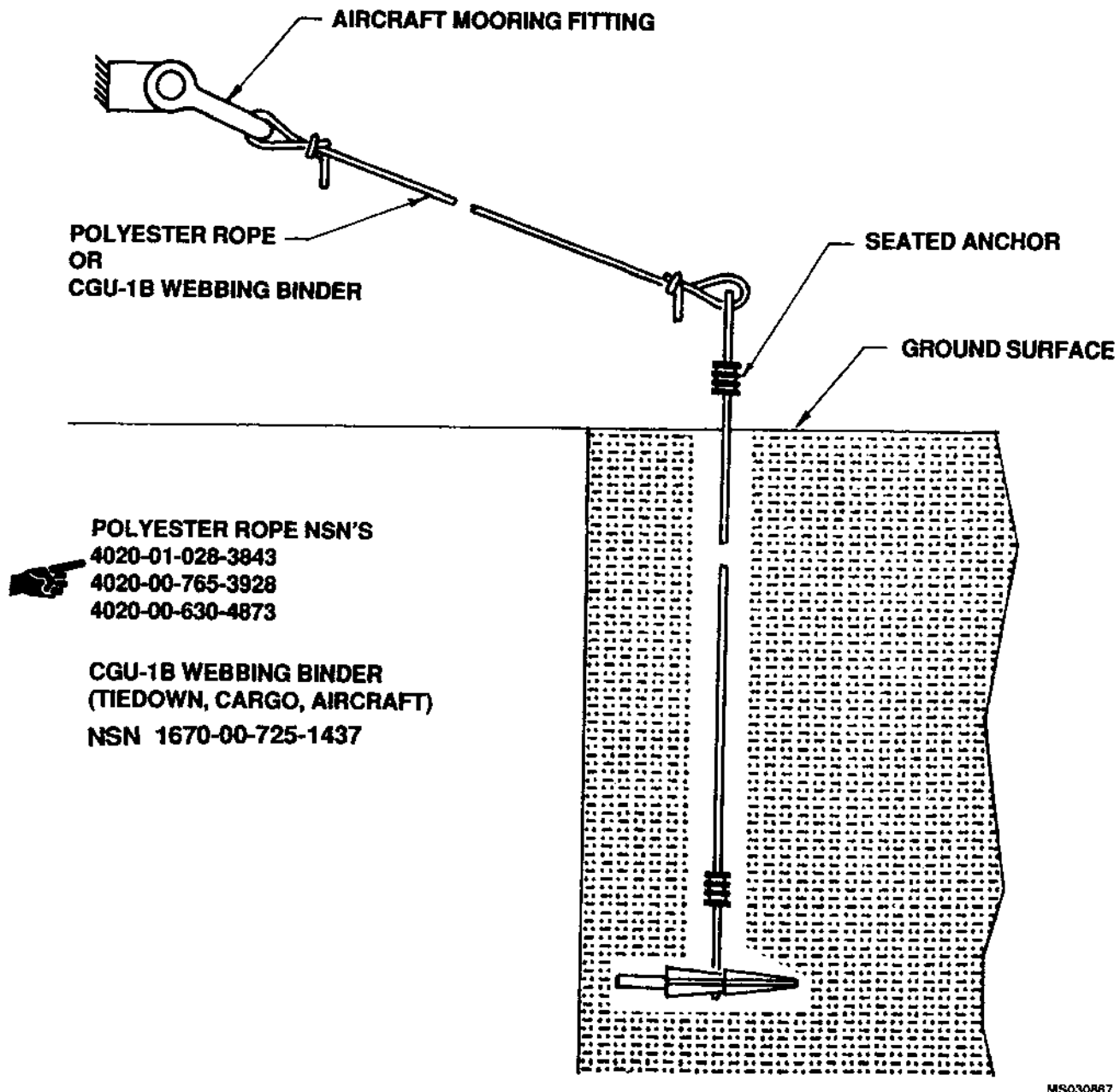
MS030865

Figure 4-20. Holding Handle



MS030866

Figure 4-21. Installation of the Ground Anchor Assembly



MS030887

Figure 4-22. Polyester Rope and Webbing Binder

APPENDIX A REFERENCES

DA Form 2028	Recommended Change to Publications and Blank Forms
DA PAM 738-751	The Functional User's Manual for the Army Maintenance Management System – Aviation (TAMMS-A)
TM 1-1520-237-23	Aviation Unit and Intermediate Maintenance for Army UH-60A and EH-60A
TM 1-1520-238-23	Aviation Unit and Intermediate Maintenance for Army AH-64A Helicopter
TM 1-1520-240-23	Aviation Unit and Aviation Intermediate Maintenance Manual Containing National Repair Standards for CH-47D Helicopter
TM 1-1520-248-23	Aviation Unit And Intermediate Maintenance Manual For Army Model, OH-58D Helicopter
TM 55-1520-210-23	Aviation Unit And Intermediate Maintenance Instructions For Army Model UH-1H/V/EH-1H/X Helicopters
TM 55-1520-228-23	Aviation Unit And Intermediate Maintenance Manual For Army Model OH-58A And OH-58C Helicopters

By Order of the Secretary of the Army:

Official:

THOMAS F. SIKORA
Brigadier General, United States Army
The Adjutant General

CARL E. VUONO
General, United States Army
Chief of Staff

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These are the instructions for sending an electronic 2028

The following format must be used if submitting an electronic 2028. The subject line must be exactly the same and all fields must be included; however only the following fields are mandatory: 1, 3, 4, 5, 6, 7, 8, 9, 10, 13, 15, 16, 17, and 27.

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To: 2028@redstone.army.mil

Subject: DA Form 2028

1 ***From: Joe Smith***
2 ***Unit: home***
3 ***Address: 4300 Park***
4 ***City: Hometown***
5 ***St: MO***
6 ***Zip: 77777***
7 ***Date Sent: 19--OCT--93***
8 ***Pub no: 55--2840--229--23***
9 ***Pub Title: TM***
10 ***Publication Date: 04--JUL--85***
11 ***Change Number: 7***
12 ***Submitter Rank: MSG***
13 ***Submitter FName: Joe***
14 ***Submitter MName: T***
15 ***Submitter LName: Smith***
16 ***Submitter Phone: 123--123--1234***
17 ***Problem: 1***
18 ***Page: 2***
19 ***Paragraph: 3***
20 ***Line: 4***
21 ***NSN: 5***
22 ***Reference: 6***
23 ***Figure: 7***
24 ***Table: 8***
25 ***Item: 9***
26 ***Total: 123***

27 ***Text:***

This is the text for the problem below line 27.

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS For use of this form, see AR 25-30; the proponent agency is ODISC4.						Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/ Supply Manuals (SC/SM)	DATE 8/30/02
TO: (Forward to proponent of publication or form)(Include ZIP Code) Commander, U.S. Army Aviation and Missile Command ATTN: AMSAM--MMC--MA--NP Redstone Arsenal, AL 35898						FROM: (Activity and location)(Include ZIP Code) MSG, Jane Q. Doe 1234 Any Street Nowhere Town, AL 34565	
PART 1 - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS							
PUBLICATION/FORM NUMBER TM 9-1005-433-24						DATE 16 Sep 2002	TITLE Organizational, Direct Support, And General Support Maintenance Manual for Machine Gun, .50 Caliber M3P and M3P Machine Gun Electrical Test Set Used On Avenger Air Defense Weapon System
ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON	
1	WP0005 PG 3		2			Test or Corrective Action column should identify a different WP number.	
EXAMPLE							
* Reference to line numbers within the paragraph or subparagraph.							
TYPED NAME, GRADE OR TITLE MSG, Jane Q. Doe, SFC				TELEPHONE EXCHANGE/ AUTOVON, PLUS EXTENSION 788-1234		SIGNATURE	

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PART II - REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION NUMBER			DATE	TITLE				
PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION
<div style="font-size: 100px; opacity: 0.5; transform: rotate(-30deg); pointer-events: none;"> EXAMPLE </div>								

PART III - REMARKS (Any general remarks or recommendations or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)

EXAMPLE

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ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON	
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PART 1 --ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS							
PUBLICATION/FORM NUMBER						DATE	TITLE
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* Reference to line numbers within the paragraph or subparagraph.							
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