

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-47
UH-1
AH-1
OH-58
HELICOPTERS**

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INTERMEDIATE MAINTENANCE
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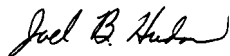
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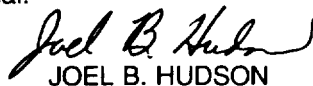
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FOR GENERAL TIE-DOWN AND MOORING ON ALL SERIES

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

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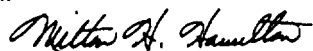
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FOR GENERAL TIE-DOWN AND MOORING ON ALL SERIES

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

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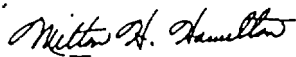
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TECHNICAL MANUAL

HEADQUARTERS
DEPARTMENT OF THE ARMY
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NO. 1-1500-250-23

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

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes, or if you know of a way to improve these procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual directly to: Commander, US Army Aviation and Missile Command, ATTN: AMSAM-MMC-LS-LP, Redstone Arsenal, AI 35898-5230. You may also submit your recommended changes by email directly to ls-lp@redstone.army or by fax 256-842-6546/DSN 788-6546. A reply will be furnished directly to you. Instructions for sending an electronic 2028 may be found at the back of this manual immediately preceding the hard copy 2028.

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TABLE OF CONTENTS

	Paragraph Table	Page
CHAPTER 1. INTRODUCTION		
Section I. GENERAL		
Scope	1-1	1-1
Maintenance Forms and Records	1-2	1-1
Reporting Errors and Recommending Improvements	1-3	1-1
Conflicts Between TMs	1-4	1-1
Section II. DESCRIPTION		
Necessity of TM	1-5	1-1
Army Policy	1-6	1-2
CHAPTER 2. HARDWARE AND AIRCRAFT REQUIREMENTS		
Grid Pattern Layout and Mooring Point Strength	2-1	2-1
Mooring Pad Marking	2-2	2-1
General Tools and Equipment	2-3	2-1
Mooring Hardware and Consumables	T2-1	2-2
CHAPTER 3. TIE-DOWN PROCEDURES		
General Tie-Down Procedures	3-1	3-1
Specific Aircraft Tie-Down	3-2	3-1
CHAPTER 4. MOORING PROCEDURES		
General Mooring	4-1	4-1
Specific Aircraft Mooring Procedures	4-2	4-1
Mooring on Non-Paved Surfaces	4-3	4-18

LIST OF ILLUSTRATIONS

NUMBER	TITLE	PAGE
2-1	Mooring Pad Hardpoint Spacing	2-4
2-2	Mooring Pad Maximum Load Conditions	2-5
2-3	MB-1 Chain Adjuster Assembly	2-6
3-1	OH-58D Tie-Down Configuration	3-2
3-2	OH-58A/C Tie-Down Configuration	3-2
3-3	AH-64 Tie-Down Configuration	3-3
3-3a	DELETED	
3-4	UH-60 Tie-Down Configuration	3-5
3-5	AH-1 Tie-Down Configuration	3-5
3-6	UH-1 Tie-Down Configuration	3-6
3-7	CH-47 Tie-Down Configuration	3-6
3-7a	CH-47 Tie-Down Configuration	3-7
4-1	Mooring Hardware Installation Assembly (Configuration 1)	4-5
4-2	Mooring Hardware Installation Assembly (Configuration 2)	4-5
4-3	Mooring Hardware, Details for Configuration 1 (Figure 4-1)	4-6
4-4	Link, Chain Detachable	4-7
4-5	Link, Chain Detachable, Installation	4-8
4-6	AH-64 Mooring Configuration	4-9
4-7	CH-47 Mooring Configuration	4-10
4-8	UH-60 Mooring Configuration	4-11
4-8a	UH-60 Mooring Configuration (When external tanks installed)	4-12
4-8b	EH-60 Mooring Configuration	4-12.1
4-8c	UH-60 Mooring Configuration Alternate #1	4-12.2
4-8d	UH-60 Mooring Configuration Alternate #2	4-12.3
4-9	AH-1 Mooring Configuration	4-13
4-10	UH-1 Mooring Configuration	4-14
4-11	OH-58A/C Mooring Configuration	4-15
4-12	OH-58D Mooring Configuration	4-15
4-13	Mooring Hardware for OH-58A/C and D	4-16
4-14	Bushing Detail for OH-58A/C and D	4-17
4-15	Pin, Quick Release for OH-58A/C and D	4-17
4-16	Ground Anchor Assembly (Mooring on Non-Paved Surfaces)	4-20
4-17	Ground Anchor with Wire Rope	4-21
4-18	Driving Rod	4-21
4-19	Drive Head	4-21
4-20	Holding Handle	4-21
4-21	Installation of the Ground Anchor Assembly	4-22
4-22	Polyester Rope and Webbing Binder	4-23

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-47, UH-1, AH-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 help improve this manual. If you find any mistakes or if you know of a way to improve the procedures please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms, or 2028-2 located in the back of this manual directly to: Commander, US Army Aviation and Missile Command, ATTN: AM-SAM-MMC-LC-LP, Redstone Arsenal, AL 35898-5230. A reply will be furnished to you.

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 55-1520-248-23
OH-58A/C	TM 55-1520-228-23
AH-64	TM 55-1520-238-23
UH-60	TM 55-1520-237-23
AH-1	TM 55-1520-236-23
AH-1	TM 55-1520-234-23
UH-1	TM 55-1520-210-23
CH-47	TM 55-1520-240-23

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-1 all series, UH-IV/H, and CH-47D/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) Tie-down AH-1 as specified in the appropriate Technical Manual.

(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-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-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-IB, 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.

MOORING HARDWARE AND CONSUMABLES CHART

ITEM	DESCRIPTION	P/N	NSN	QUANTITY PER AIRCRAFT					
				AH-64	AH-1	CH-7	UH-60	UH-1	OH-58
1	CHAIN ADJUSTER (See figure 2-3)	MB-1 MIL-T-25959	160-00-212-1149	6	6	8	6	6	6
2	CHAIN W/HOOK (See figure 2-3)	FOR MB-1 627728A	4010-00-516-8405	12	12	16	12	12	12
3	LINK, CHAIN DETACHABLE (See figures 4-3 and 4-4)	9/32 INCH 664228	4010-01-231-3388	6	4	4	4	4	4
4*	LINK, CHAIN DETACHABLE (See figures 4-3 and 4-4)	3/8 INCH 577-0615	4010-01-193-9331	6	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	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	4
8	SHACKLE, ANCHOR (See figure 4-3)	NAS1042-8	4030-00-542-3180	6	4	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.

ITEM	DESCRIPTION	P/N	NSN	QUANTITY PER AIRCRAFT					
				AH-64	AH-1	CH-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 4-13	NAS72-5E100	3120-01-245-2631						3

14	PIN, QUICK RELEASE, fig 4-15	MS17985-520	5340-00-702-1227						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	AH-1	CH-47	UH-60	UH-1
18	ROPE, 3/8 INCH POLYESTER	700324R	4020-01-318-5428 (600 FT ROLL)					
19	PIN,RETAINING	AN416-2	5315-00-223-6112		2			2
20 ****	CHAIN, WELD- LESS	NAS1455B30- 6P	4010-00-331-7273		2			2
21 *** **	STRAP,WEBBING	BD-10000R10- 234HH-24	5340-01-233-3063					

* 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 ATCOM engineering (DSN 693-1679) for approval to use webbing strap for mooring.

Table 2-1. Mooring Hardware and Consumables, Continued.

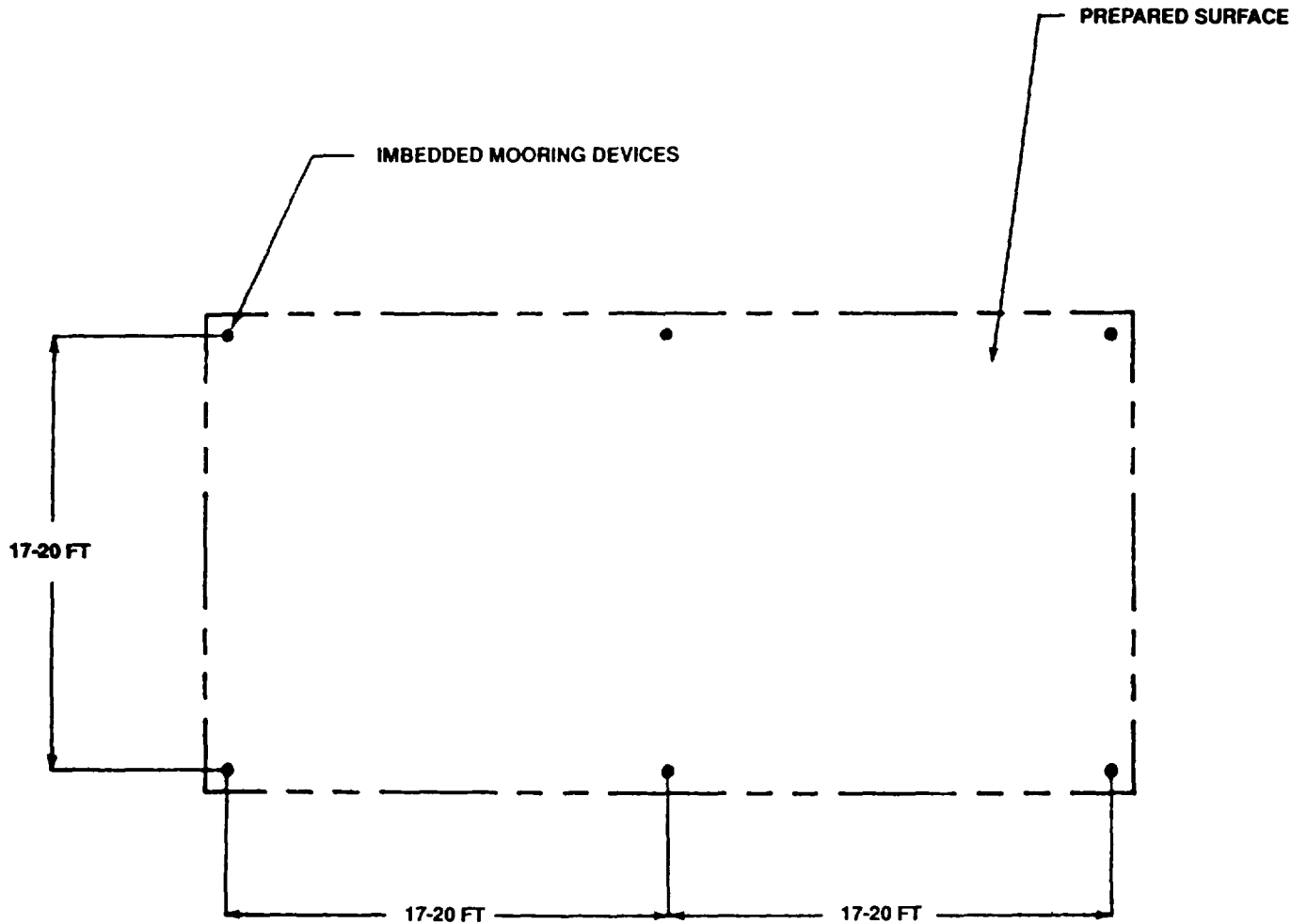


Figure 2-1. Mooring Pad Hardpoint Spacing

Change 3 2-4.1/(2-4.2 blank)

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.

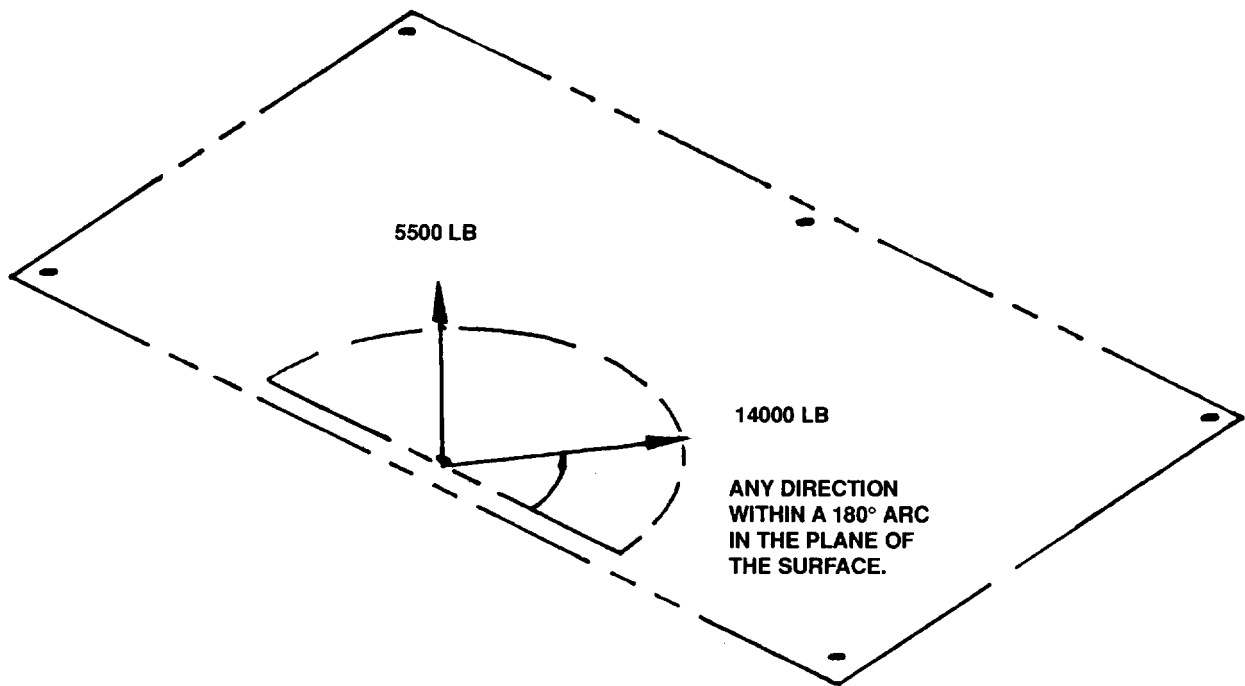
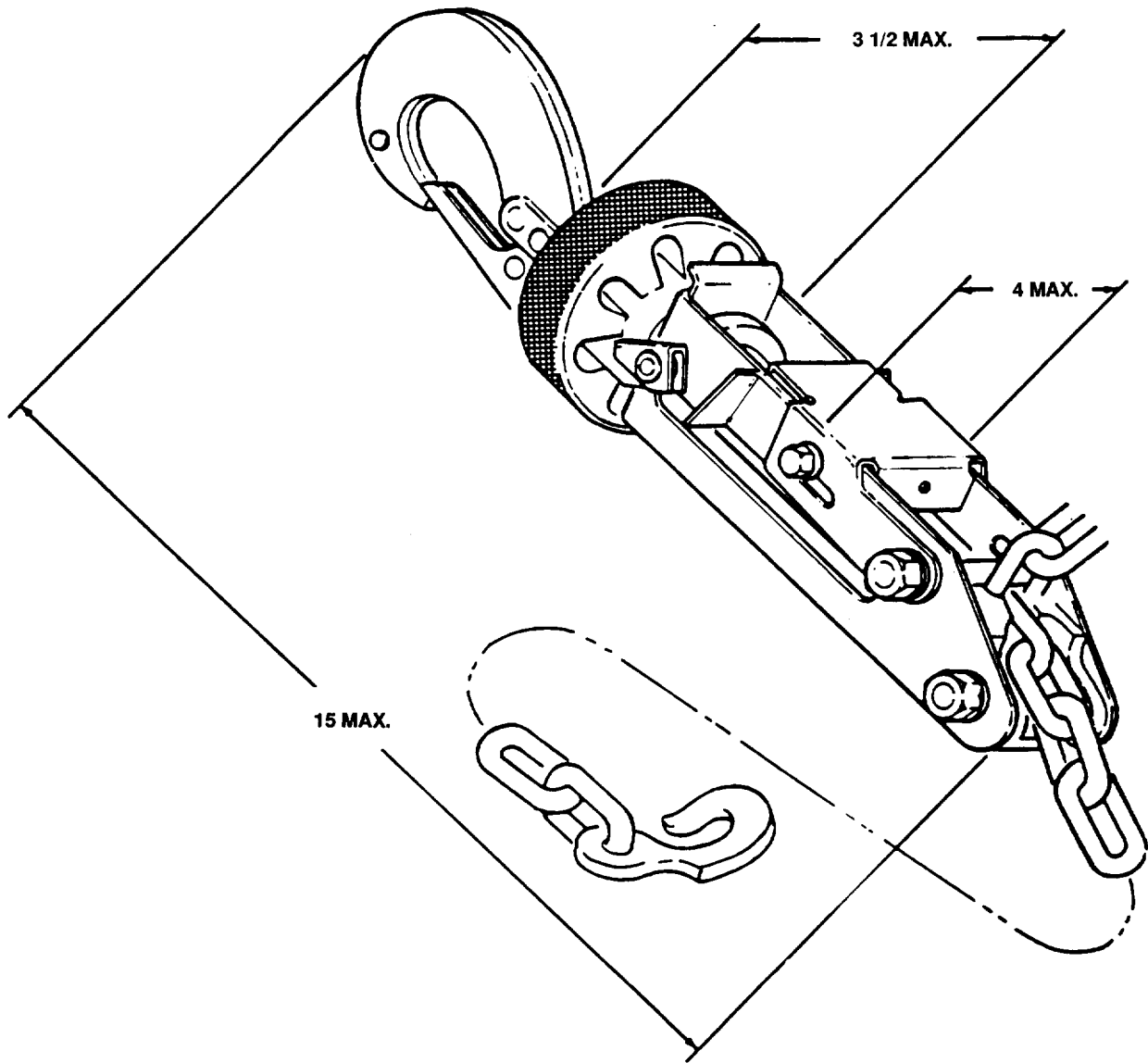


Figure 2-2. Mooring Pad Maximum Load Conditions



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 and AH-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 hardpoints. The right aft boot must have an additional length of rope to secure to the aft outboard wing pylon sway brace or to secure to the aft wing store suspension lug. The other rope attaches to the aft jacking fitting at FS 450. 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. AH-1 tie-down blades as specified in the -23 Technical Manual and as shown in figure 3-5 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 3-5. Tie forward tie-down rope to tow rings, as shown in figure 3-5, on landing gear skid. Additional security of main rotor tie-down 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 be in a level position.

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-47 tie-down blades as specified in -23 Technical Manual and figures 3-7 or 3-7a of this general TM. Use figure 3-7 for normal aircraft tie-down. As an option, the CH-47 blades may be secured to the mooring pad hardpoints, as shown in figure 3-7a, provided the aircraft is secured using the mooring procedures in this TM.

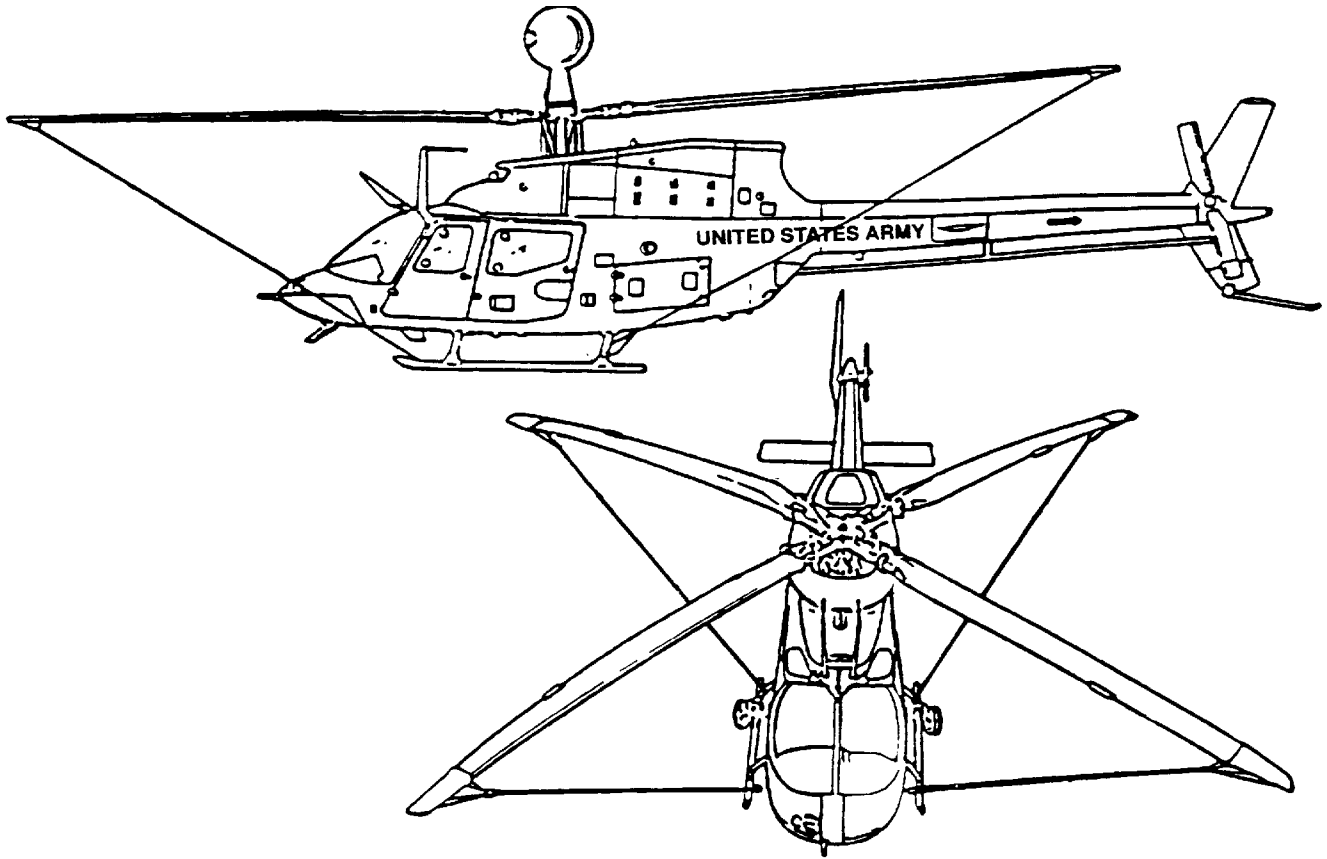


Figure 3-1. OH-58D Tie-Down Configuration

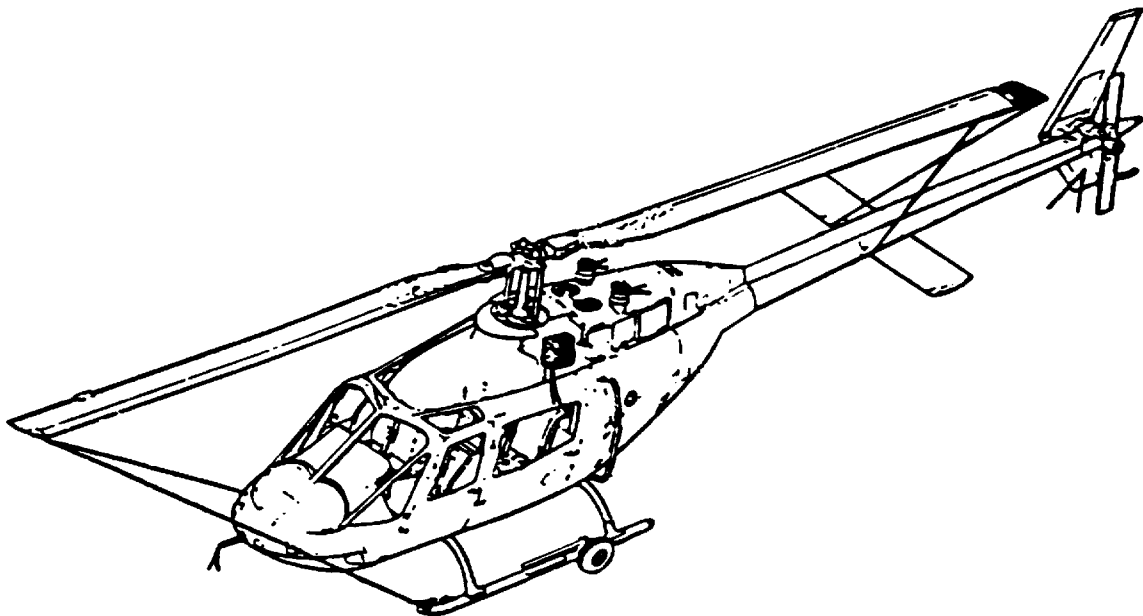


Figure 3-2. OH-58A/C Tie-Down Configuration

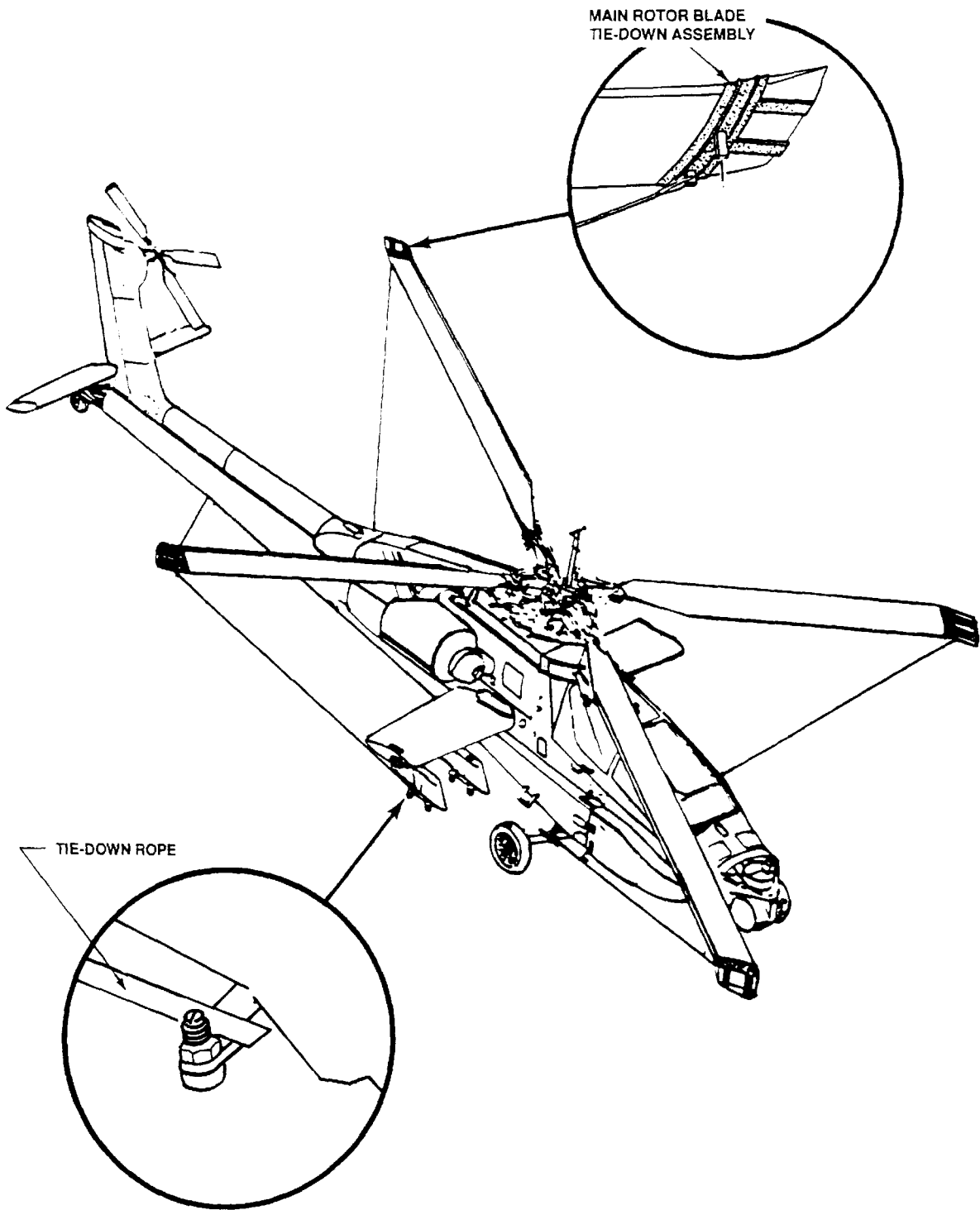


Figure 3-3. AH-64 Tie-Down Configuration

Figure 3-3a. DELETED

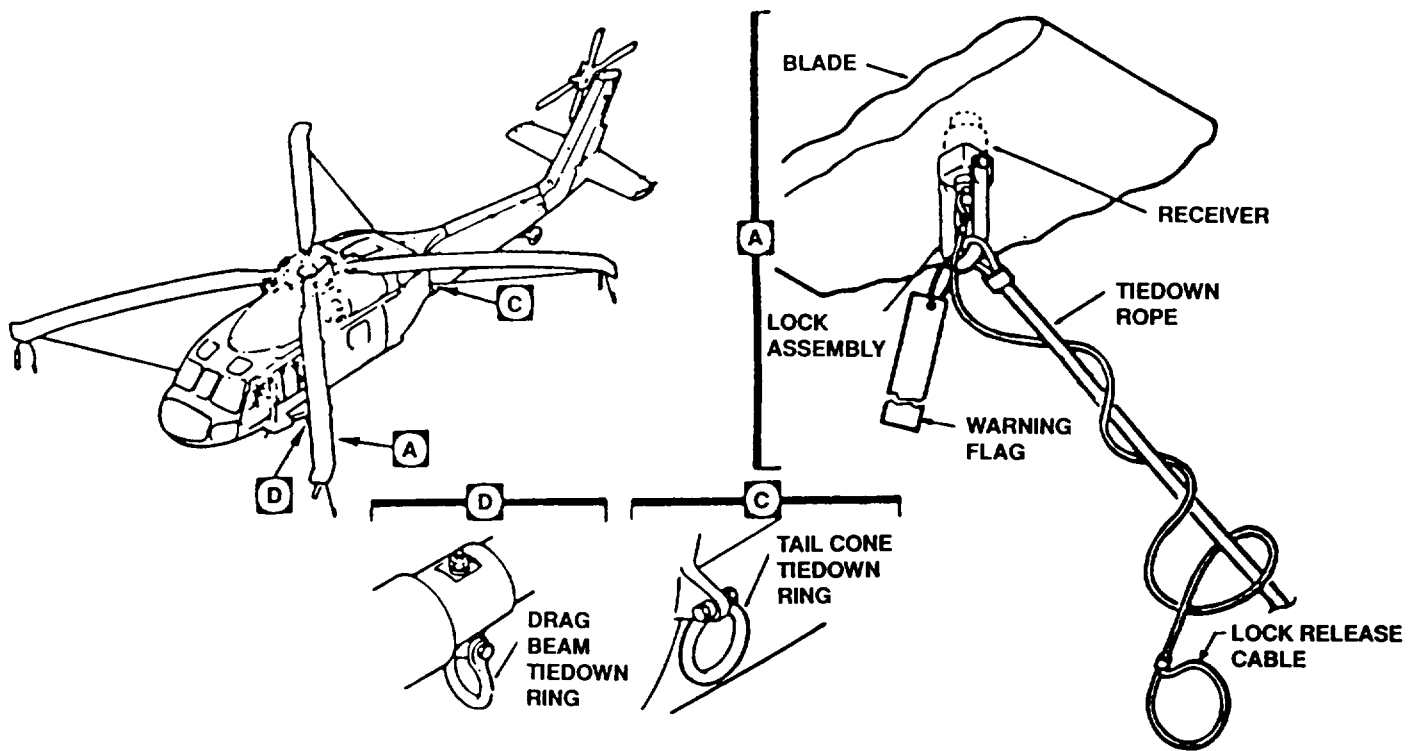


Figure 3-4. UH-60 Tie-Down Configuration

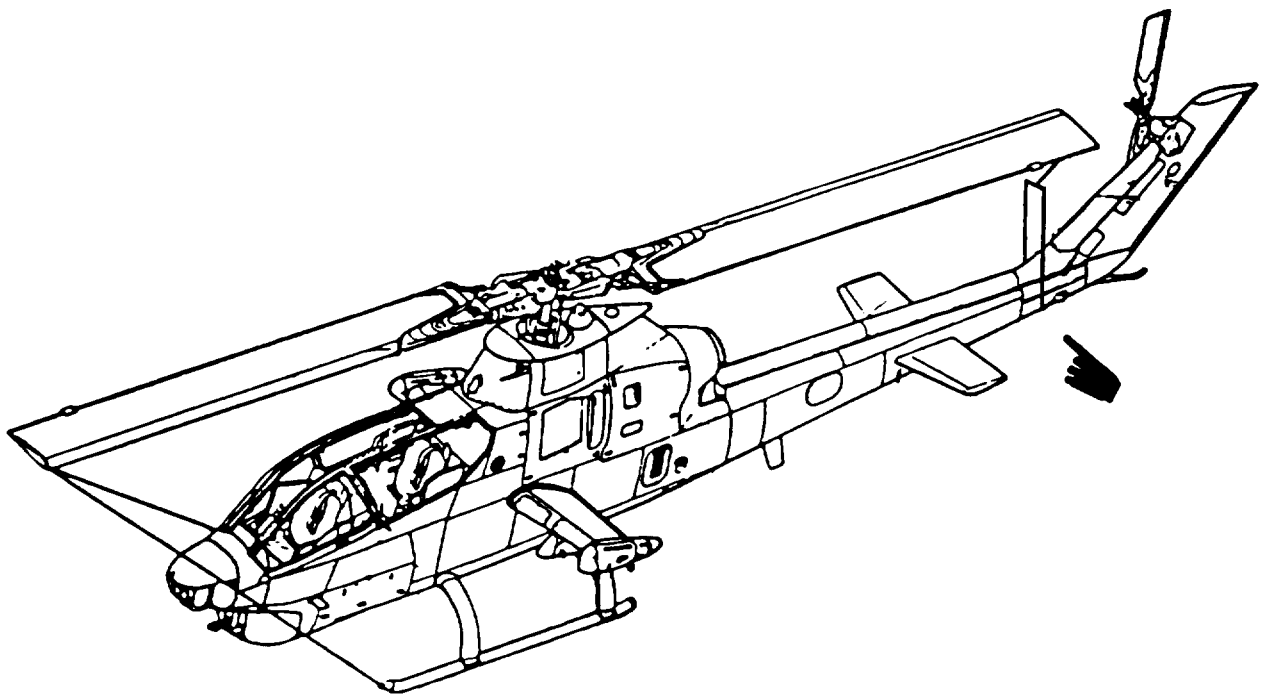


Figure 3-5. AH-1 Tie-Down Configuration

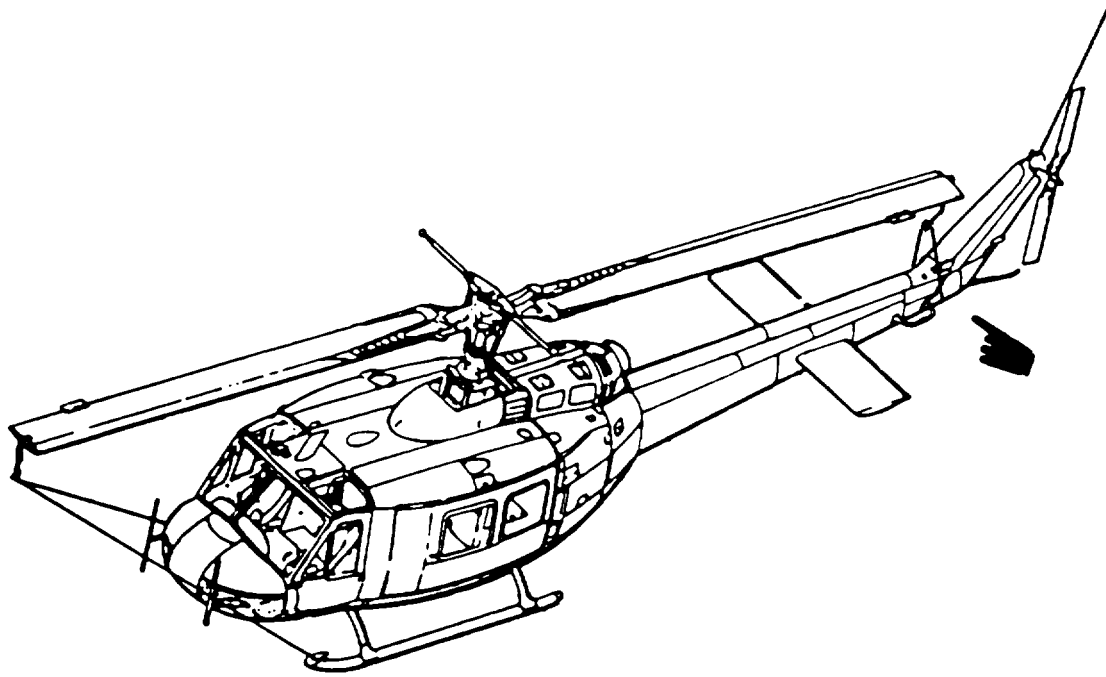


Figure 3-6. UH-1 Tie-Down Configuration

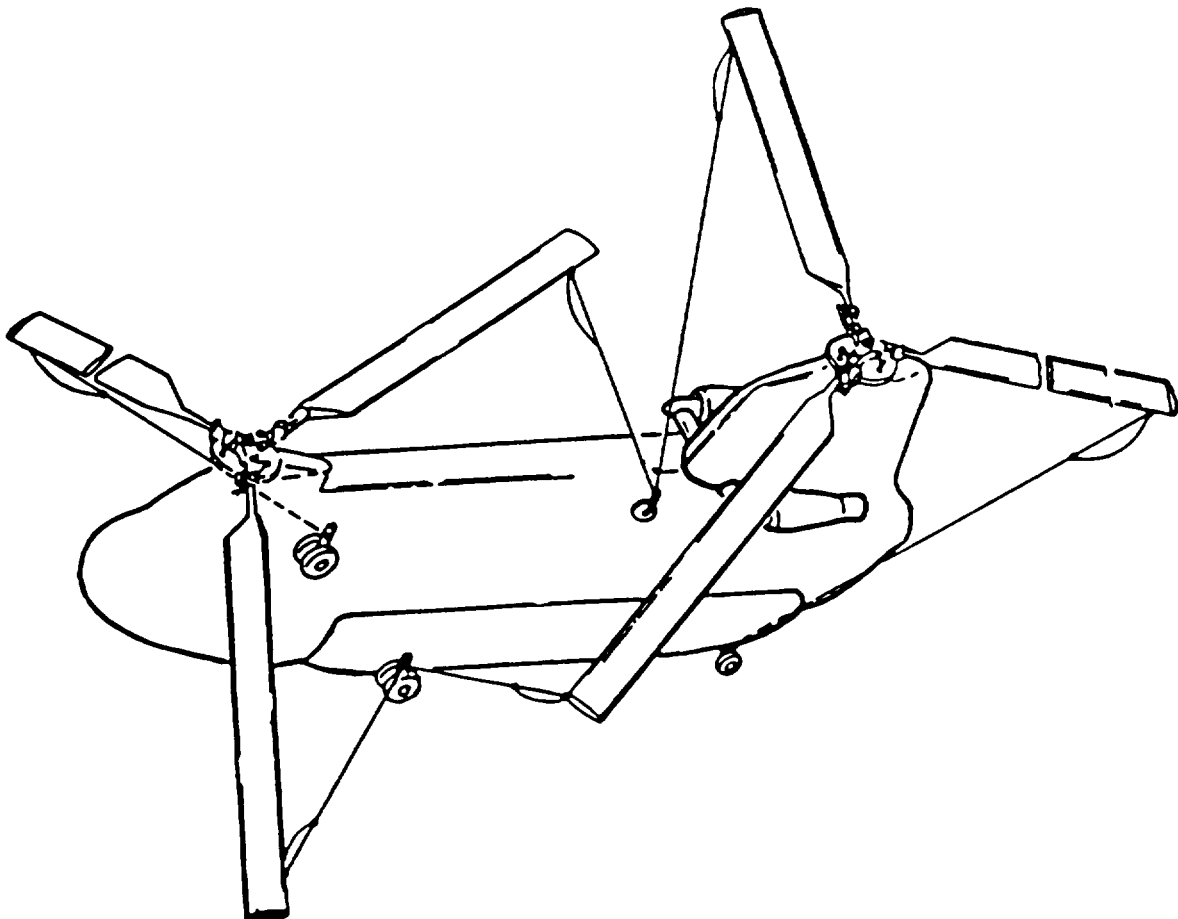


Figure 3-7. CH-47 Tie-Down Configuration

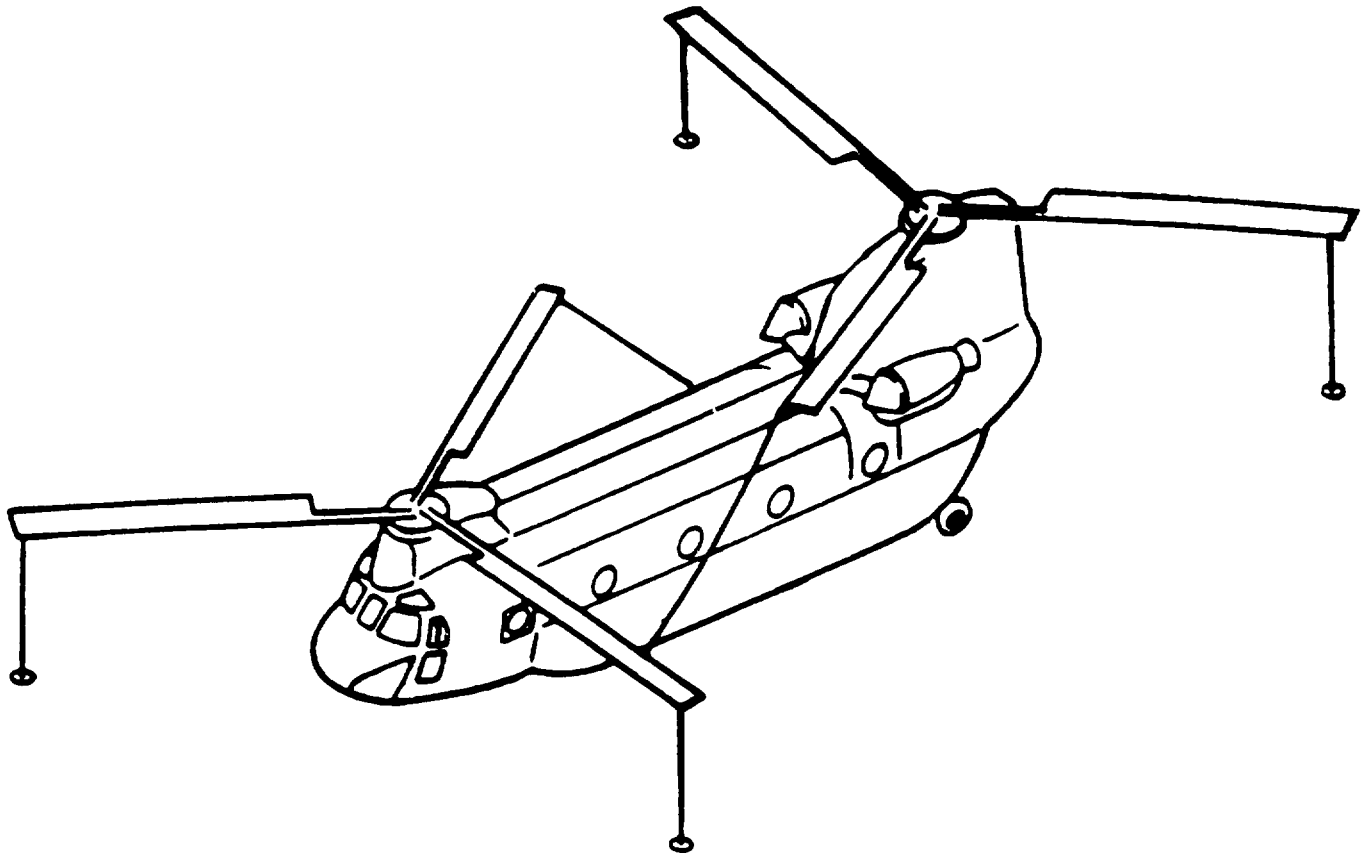


Figure 3-7a. CH-47 Tie-Down Configuration (Optional)

CHAPTER 4 MOORING PROCEDURES

4-1. General Mooring.

a. Aircraft Placement. Position the aircraft on the mooring pad as shown in figures 4-6 thru 4-12. Essentially, parallel to the centerline of the pad and located fore and aft per the dimension in the figure for that aircraft.

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 Table 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.

(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-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

Configurations at some installations may cause chafing of the forward landing gear or the rear cargo ramp. To prevent damage to the aircraft, mask the crossing chains in the chafing areas with duct tape.

(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 mooring 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 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 mooring 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 4-8, 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 mooring 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 mooring 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. AH-1 Helicopter Mooring Procedures.

(1) Position aircraft on mooring pad with longitudinal centerline of aircraft directly above and parallel to the longitudinal axis of pad, shown in figure 4-9. The aft mooring ring is to be located 2 feet forward of the center mooring pad points.

(2) Connect two chain assemblies from the front mooring pad points to the forward aircraft mooring rings located under the aircraft wings.

(3) Remove the fairing covering from the aft jack-point. Four flush head bolts must be removed. With the fairing removed install the jack-point in the uncovered recess and install the aft mooring clevis on the jack-point as described in the specific aircraft -23 Technical Manual.

(4) Connect two chain assemblies to the aft mooring rings located under the wings to the center mooring pad points.

(5) Connect two chain assemblies from the aft aircraft mooring ring (previously installed) to the center mooring pad points.

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

NOTE

It is highly recommended that AH-1 helicopters be flown with the mooring hardware installed at all times to permit a rapid response to weather emergencies, unless it is the commanders decision that to fly without the fairings would significantly impact the mission.

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 aircrafts' 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.

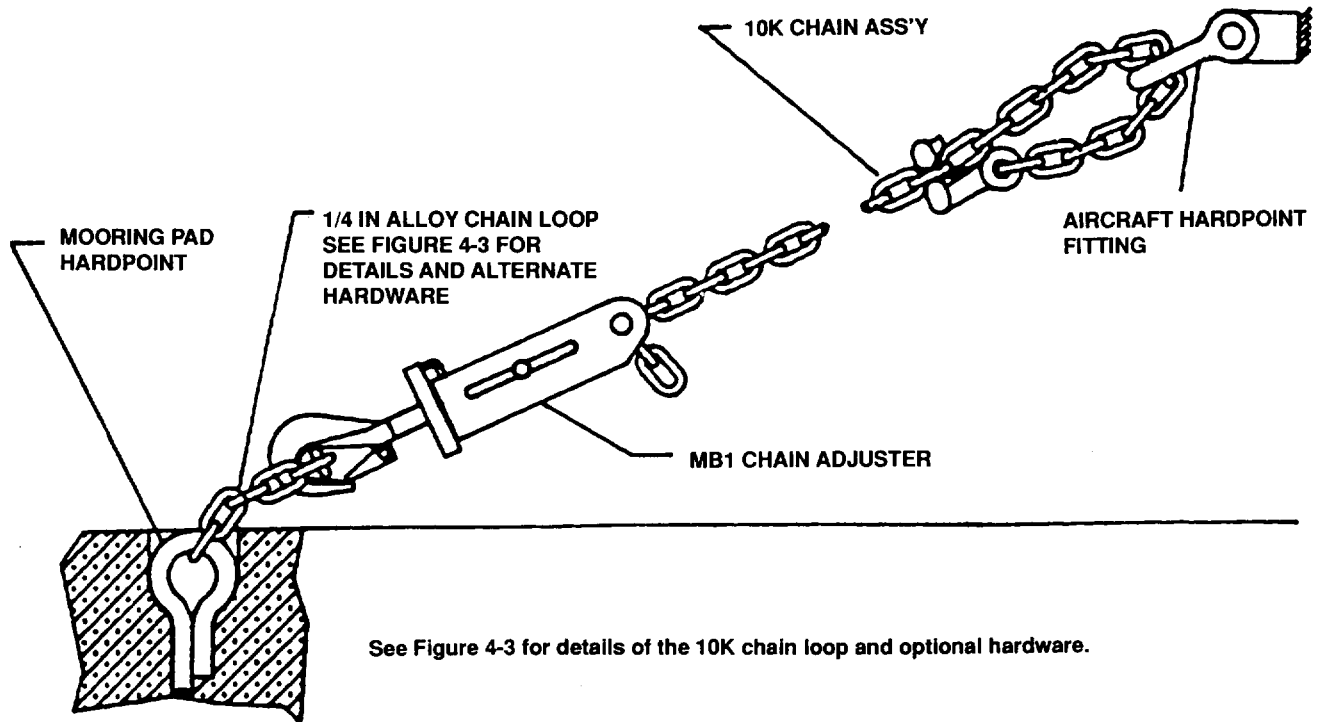
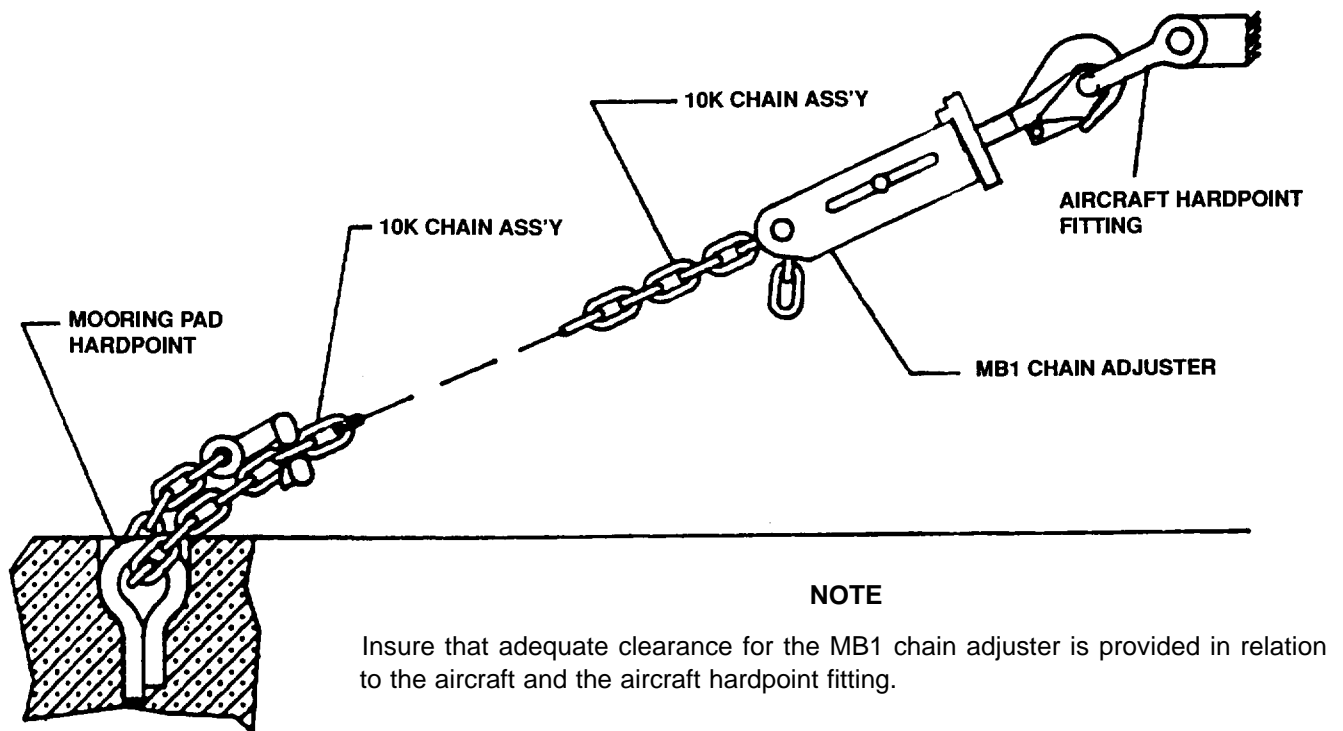


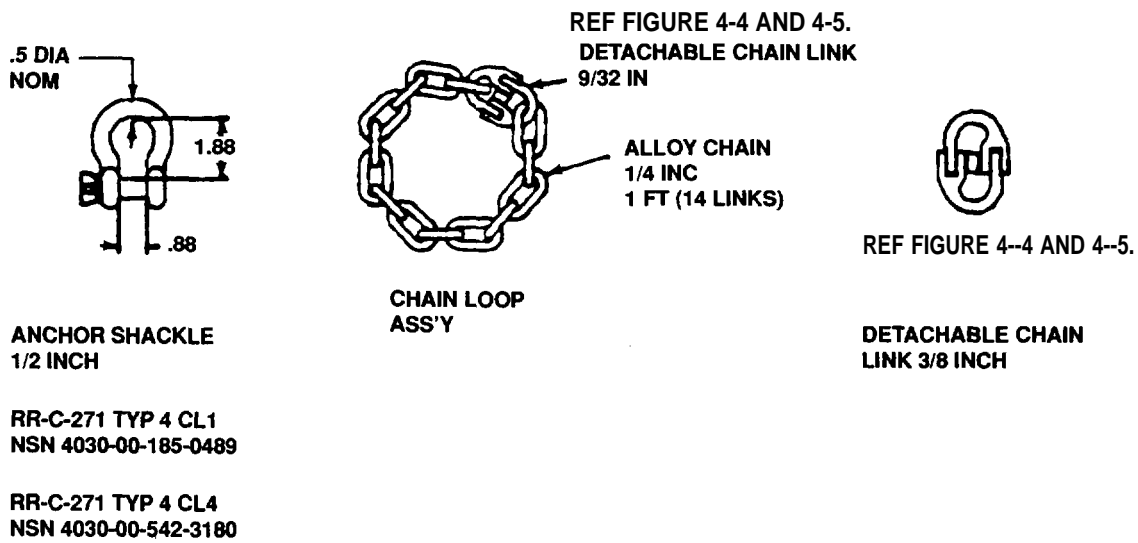
Figure 4-1. Mooring Hardware Installation Assembly Details - Configuration 1



NOTE

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

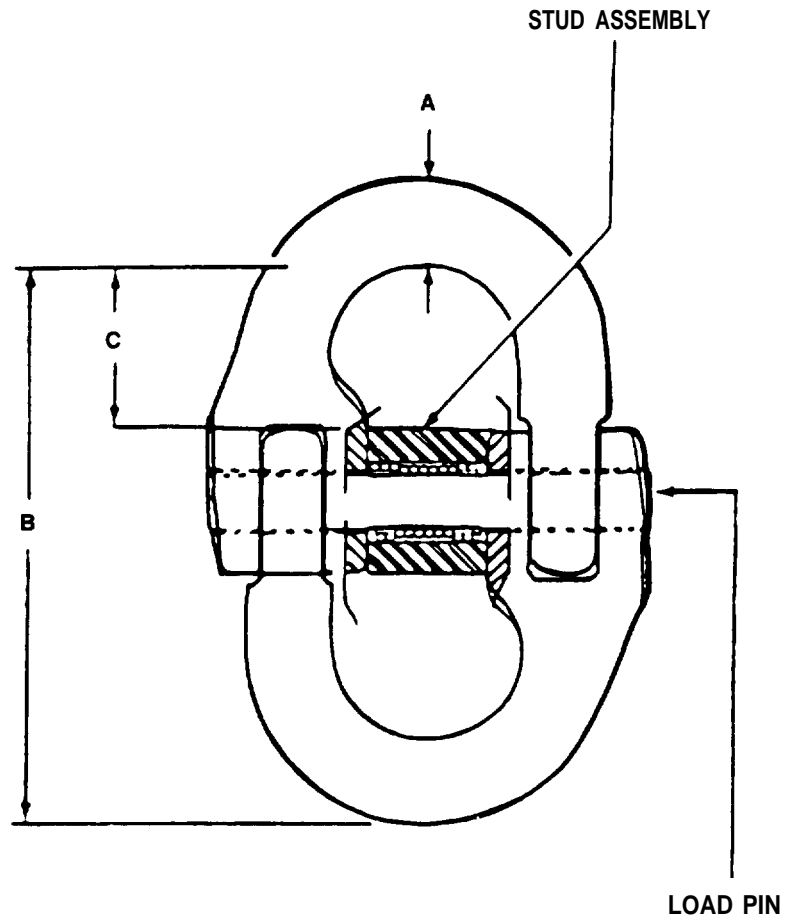
Figure 4-2. Mooring Hardware Installation Assembly Details - Configuration 2



NOTE

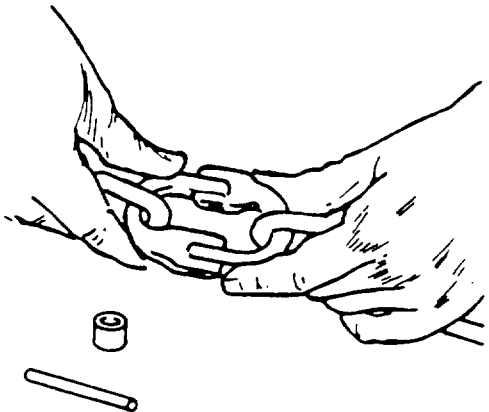
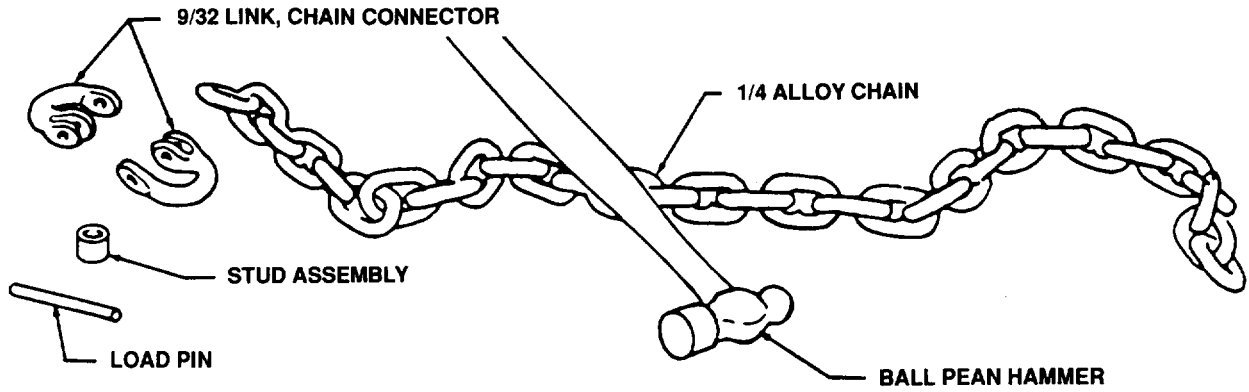
All hardware shown can be used to connect the MB1 chain adjuster to the mooring pad hardpoint fitting in figure 4-1.

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

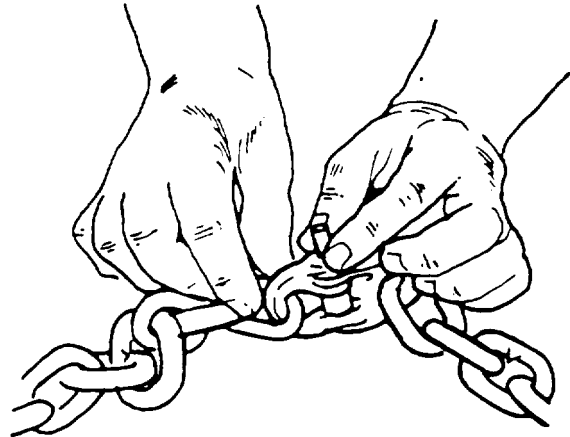


	SIZE	9/32	3/8
	A	5/16	7/16
	B	1 13/16	2 13/32
Dimensions (Inches)	C	5/8	53/64
	Max. width	1 11/16	27/32
	Dia. hole to accept male leg	35/64	47/64
	Weight each (lbs.)	.23	.59

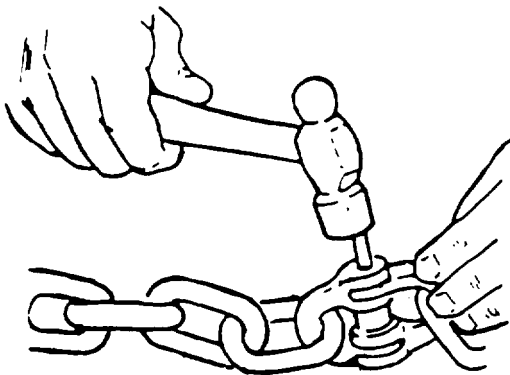
Figure 4-4. Link, Chain Detachable



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

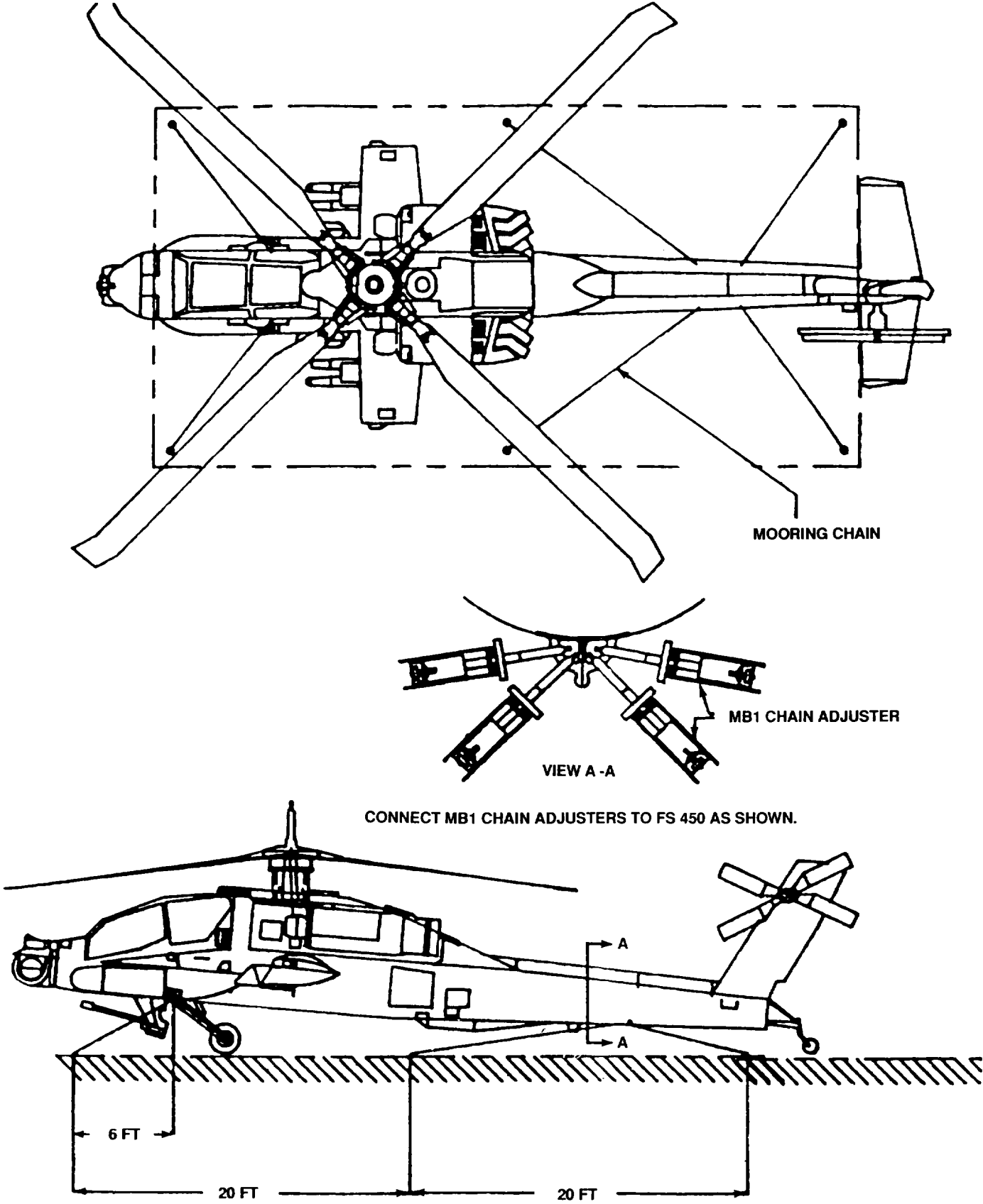
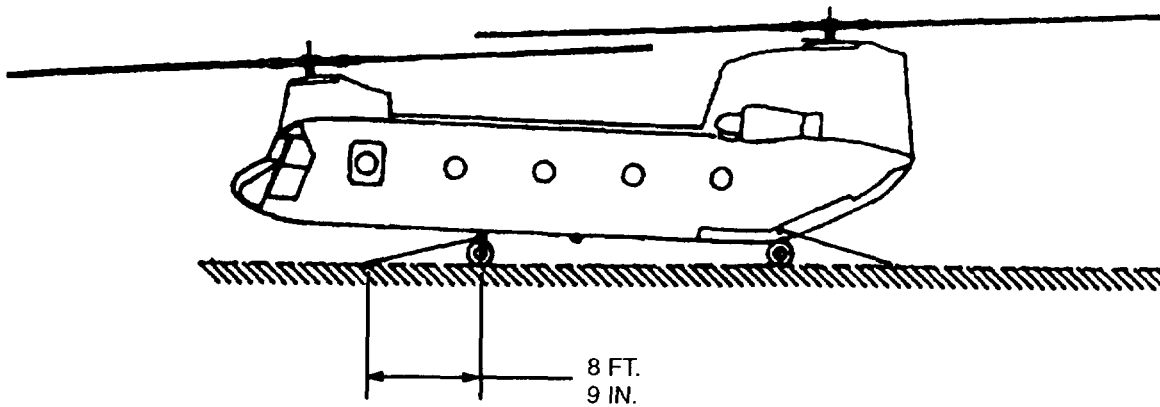
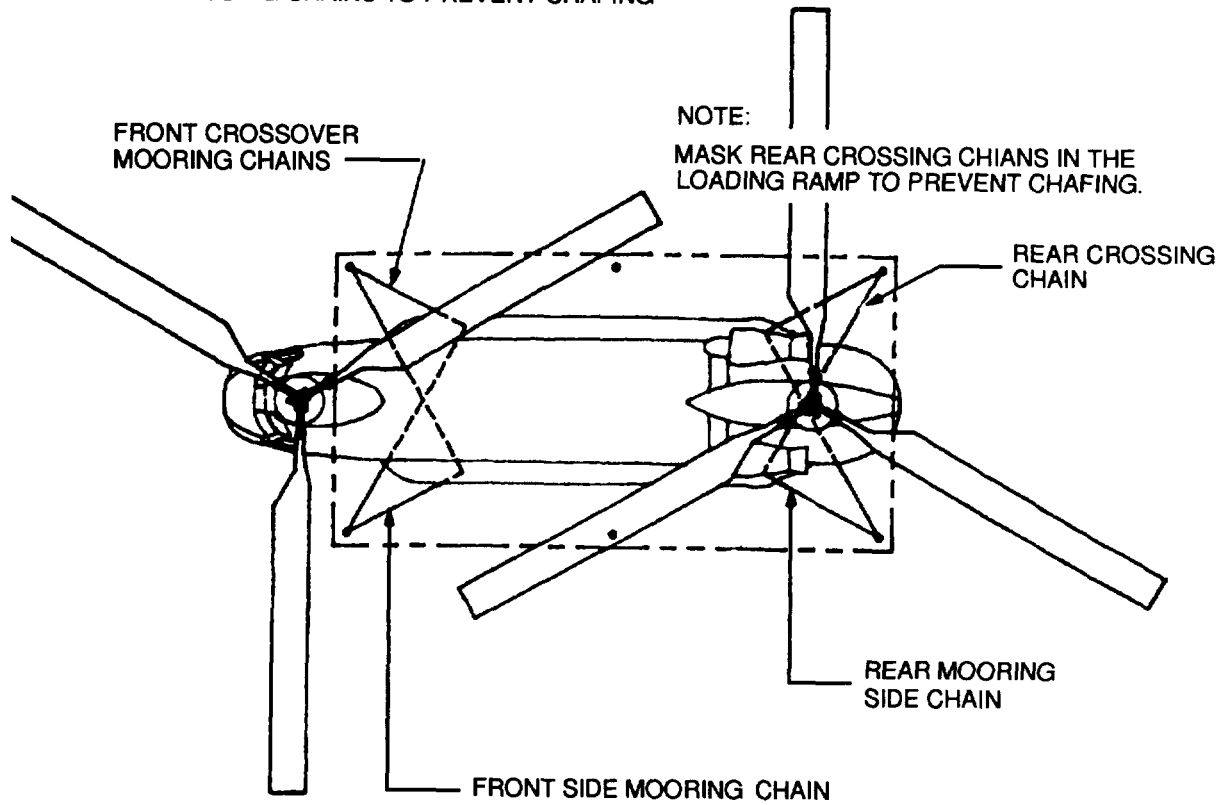


Figure 4-6. AH-64 Mooring Configuration

NOTE:
MASK FRONT CROSSING CHAINS TO PREVENT CHAFING



NOTE: ← 7 FT. → FOR MH-47E Aircraft

Figure 4-7. CH-47 Mooring Configuration

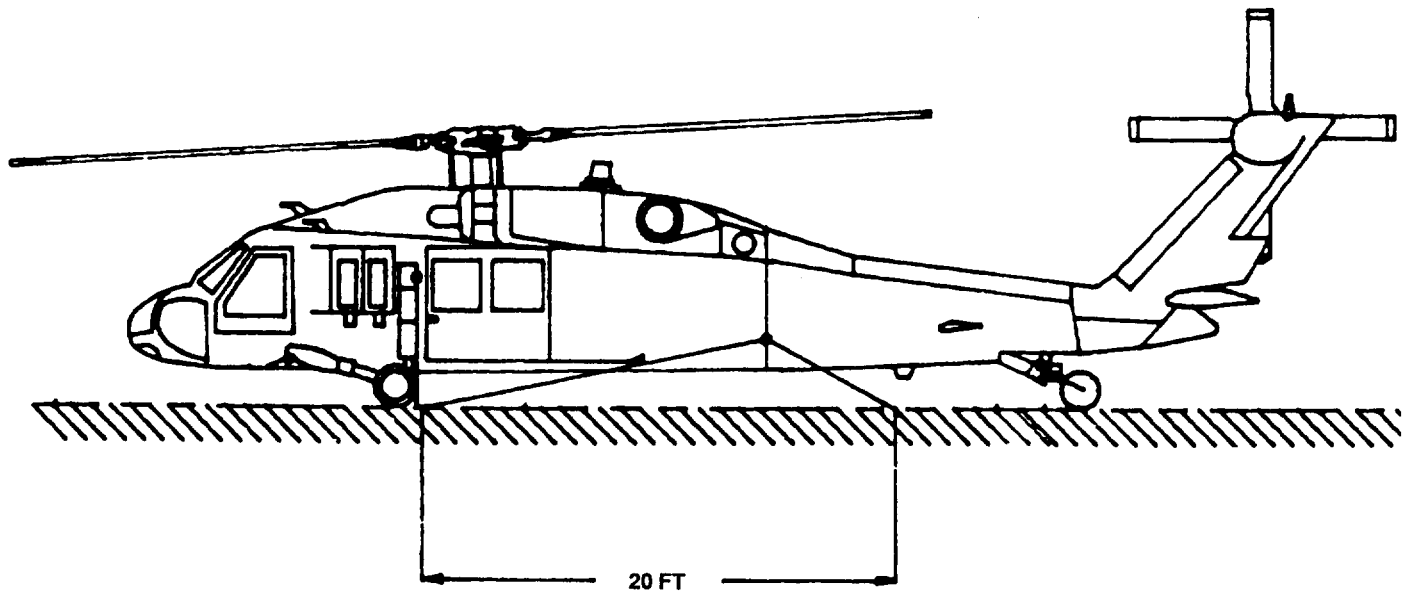
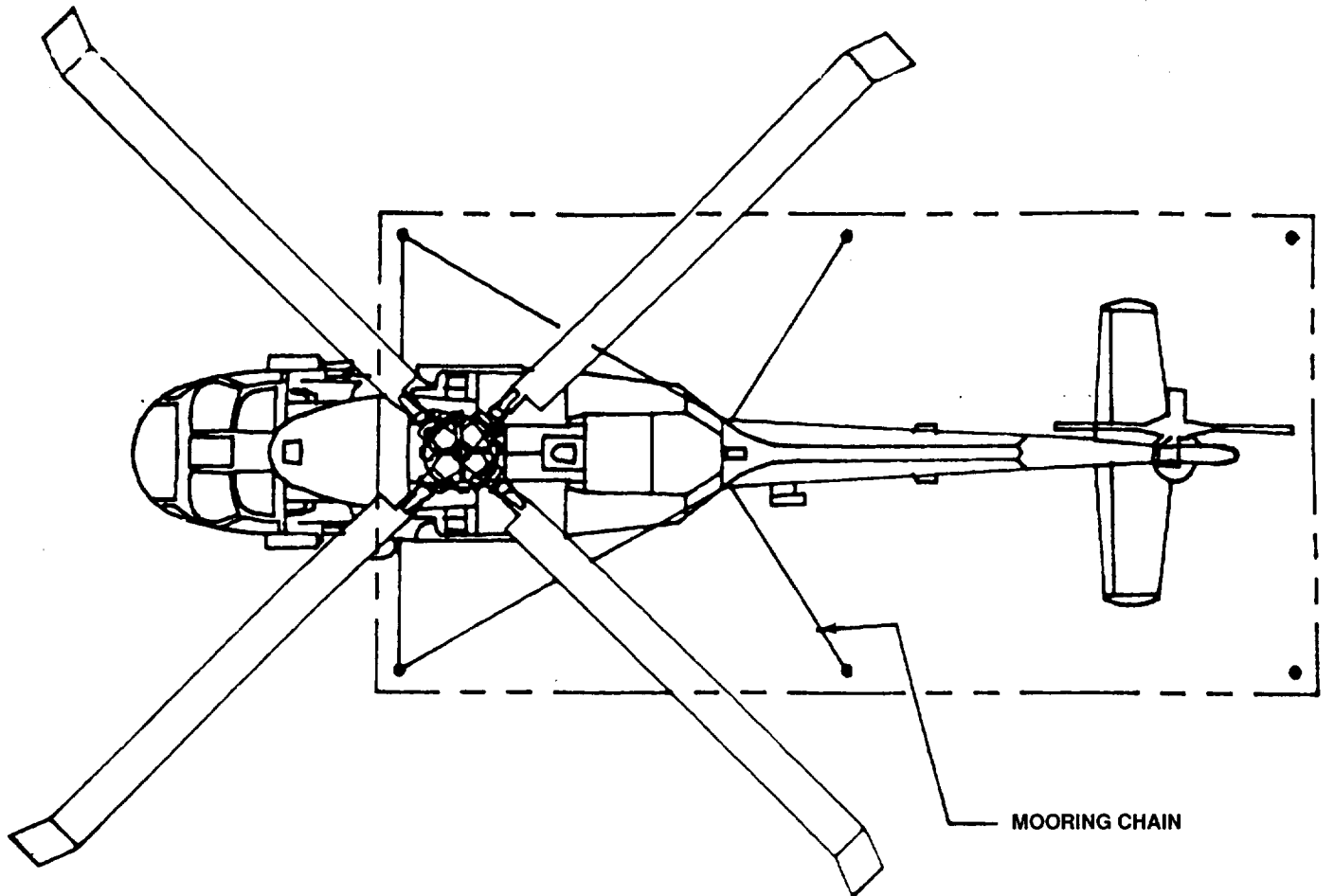


Figure 4-8. UH-60 Mooring Configuration

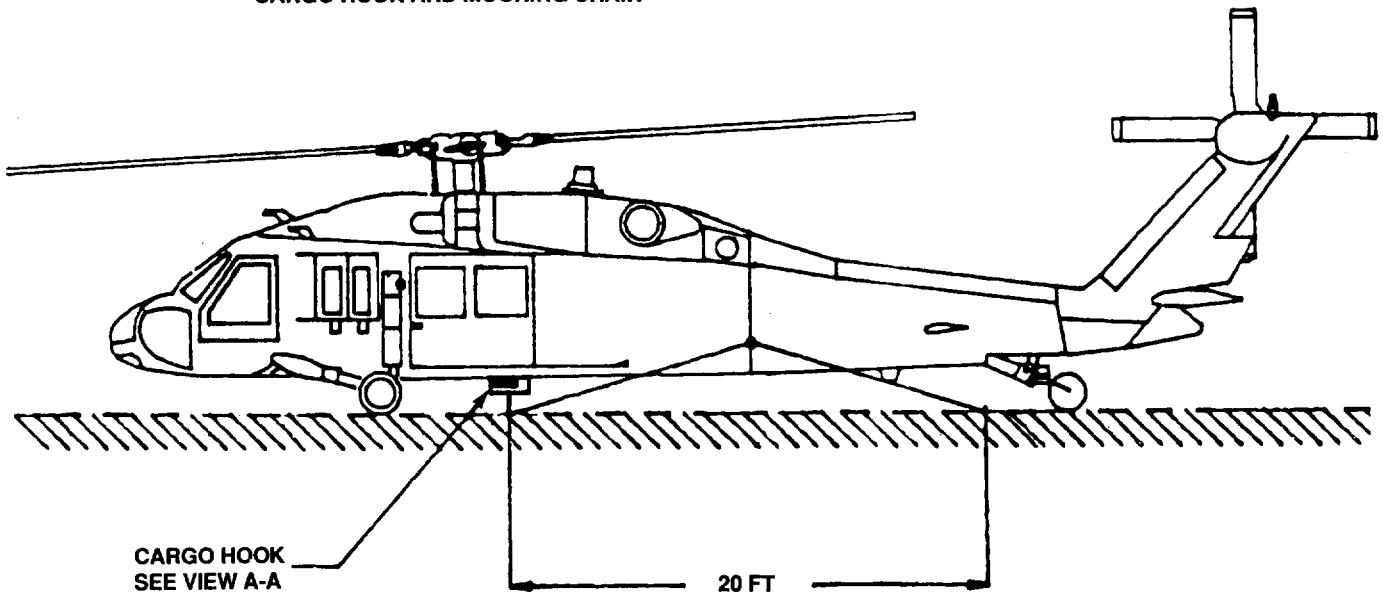
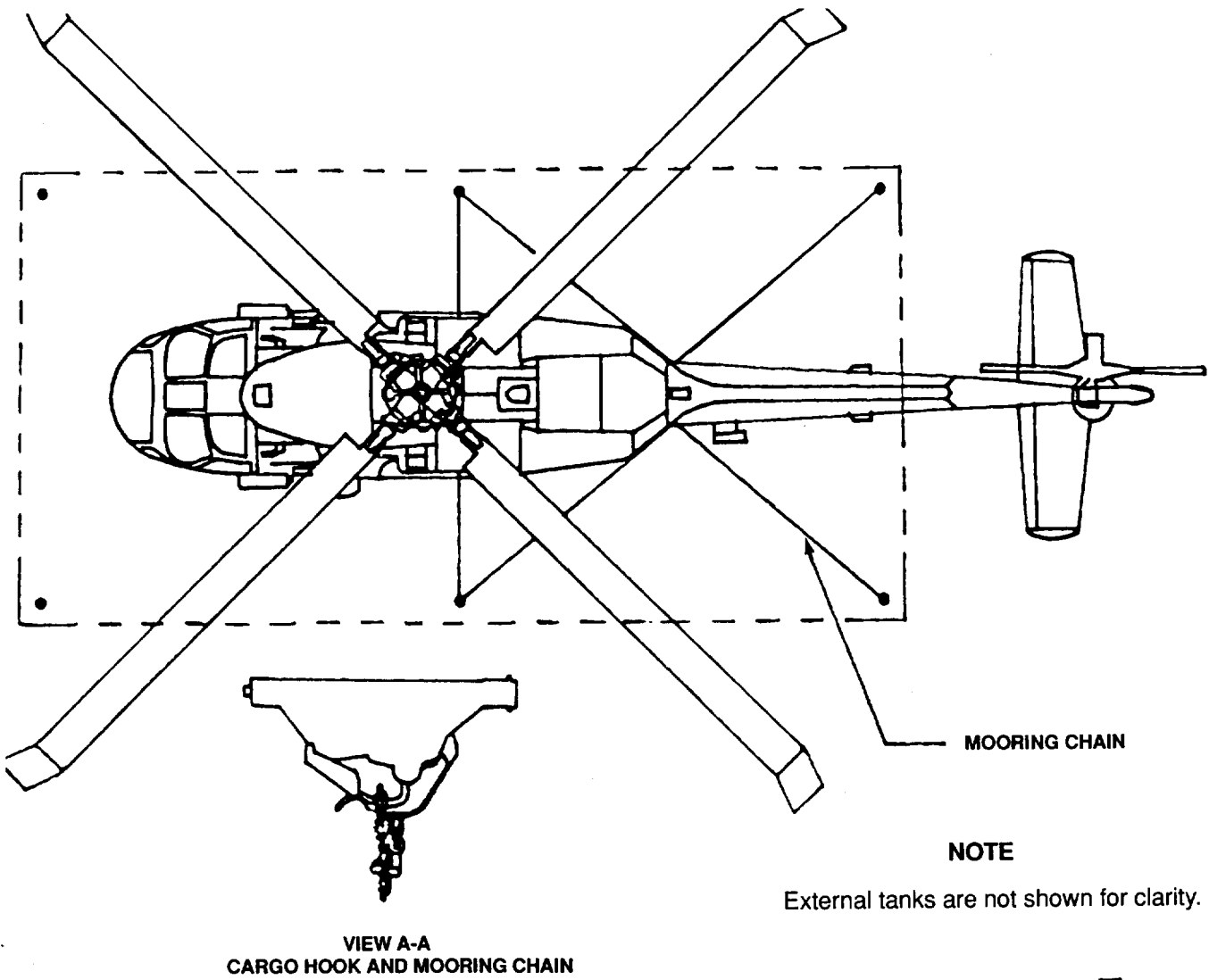


Figure 4-8a. UH-60 Mooring Configuration (When external tanks are installed).

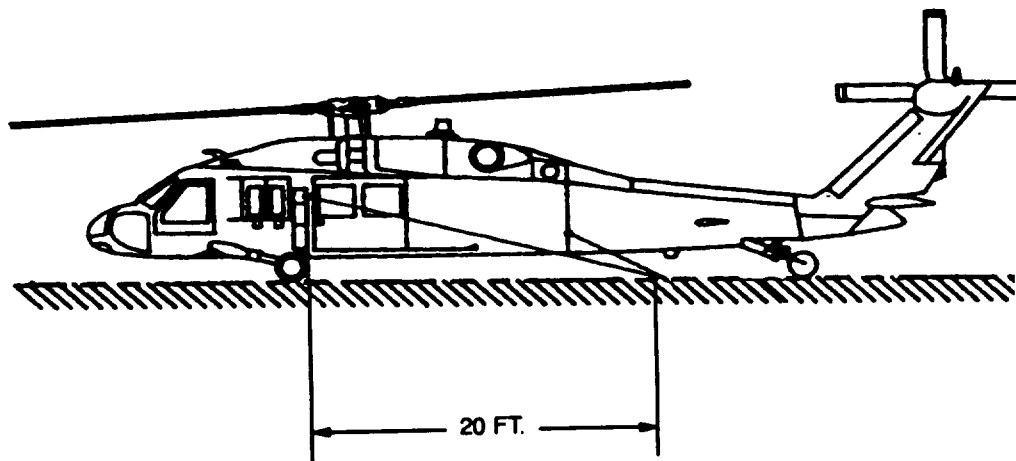
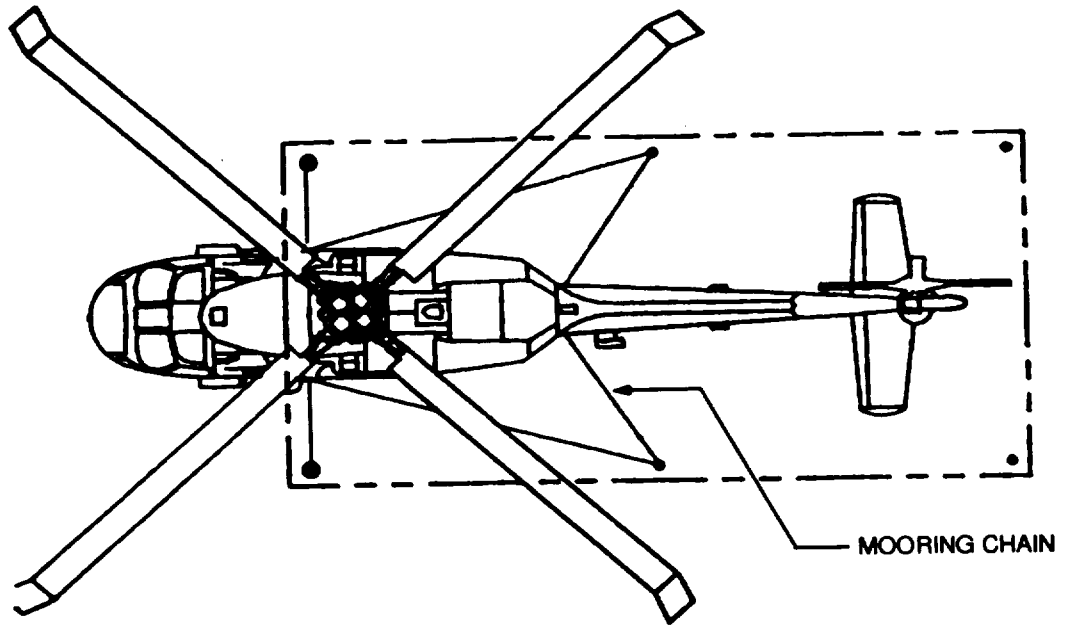


Figure 4-8b. EH-60 Mooring Configuration.

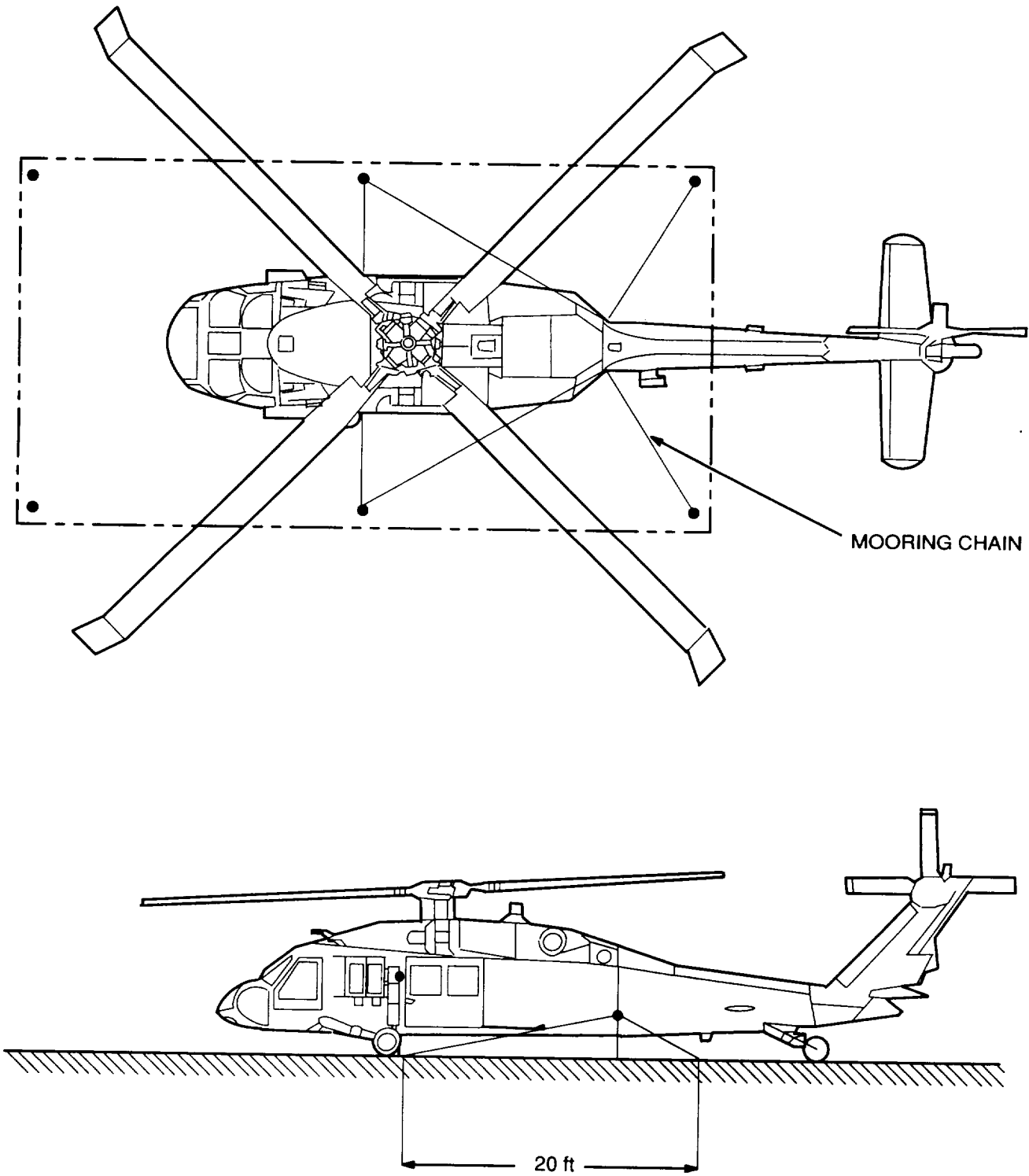


Figure 4-8c. UH60 Mooring Configuration Alternate # 1.

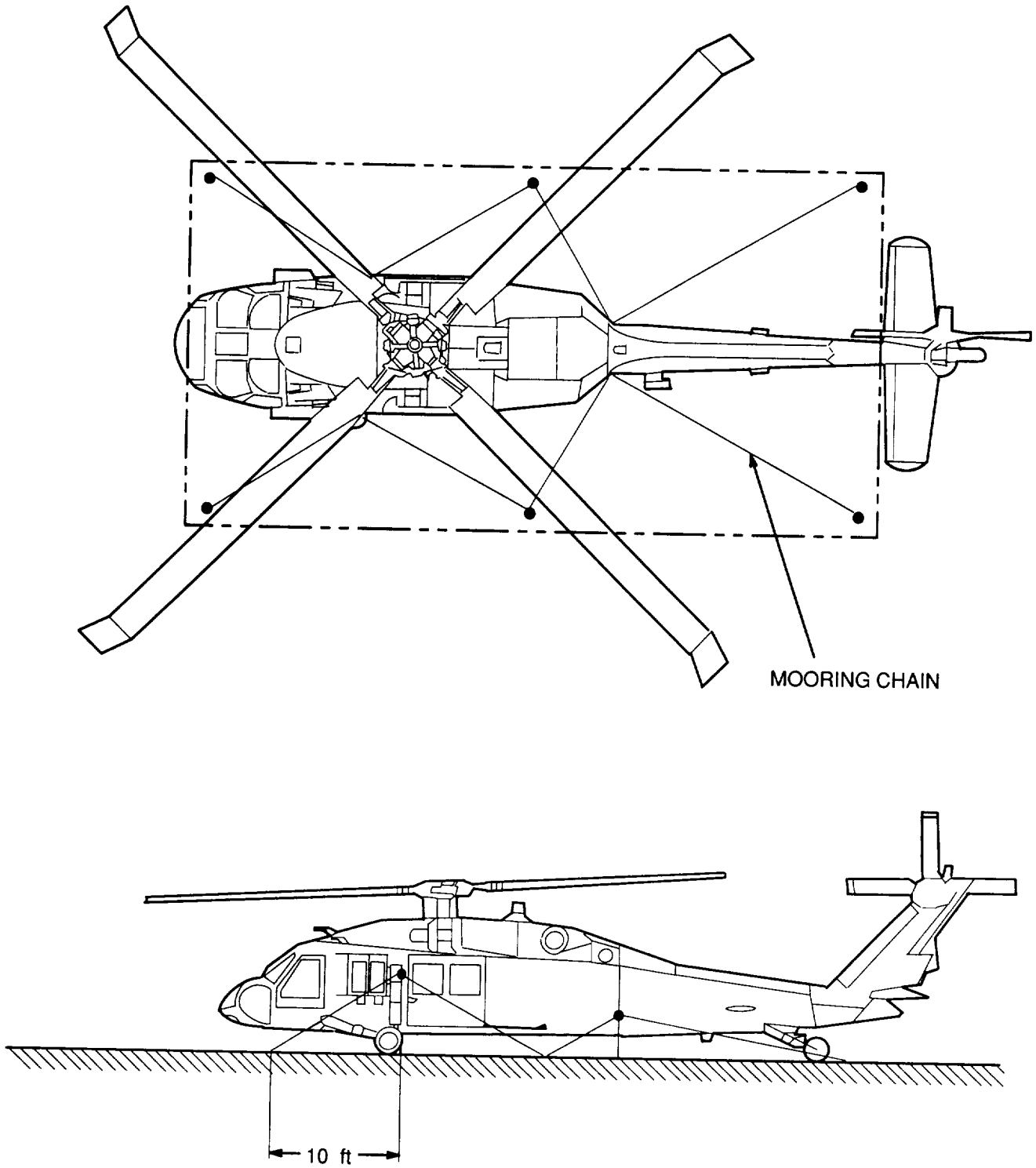


Figure 4-8d. UH60 Mooring Configuration Alternate # 2.

Change 3 4-12.3/(4-12.4 blank)

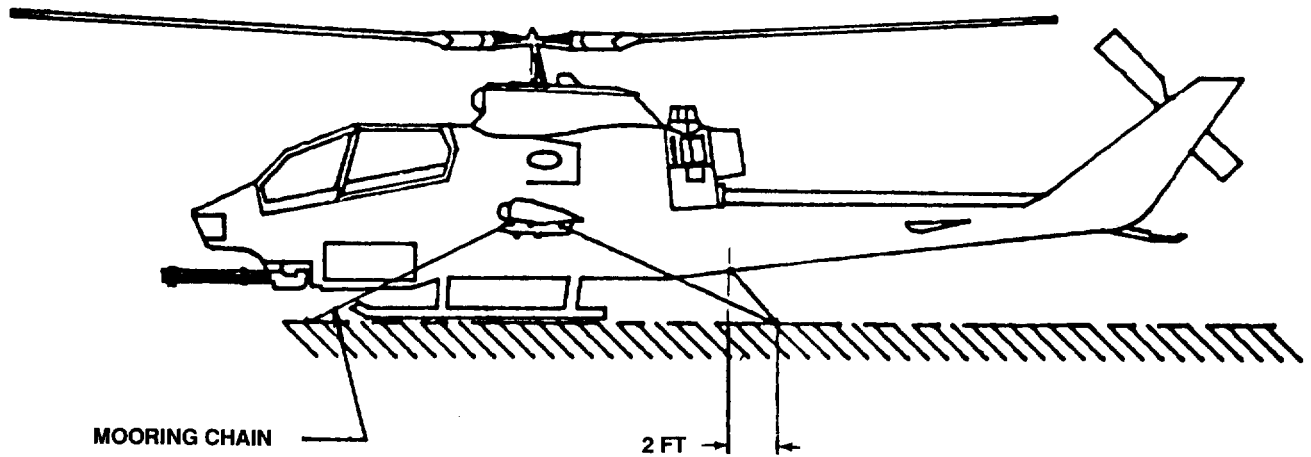
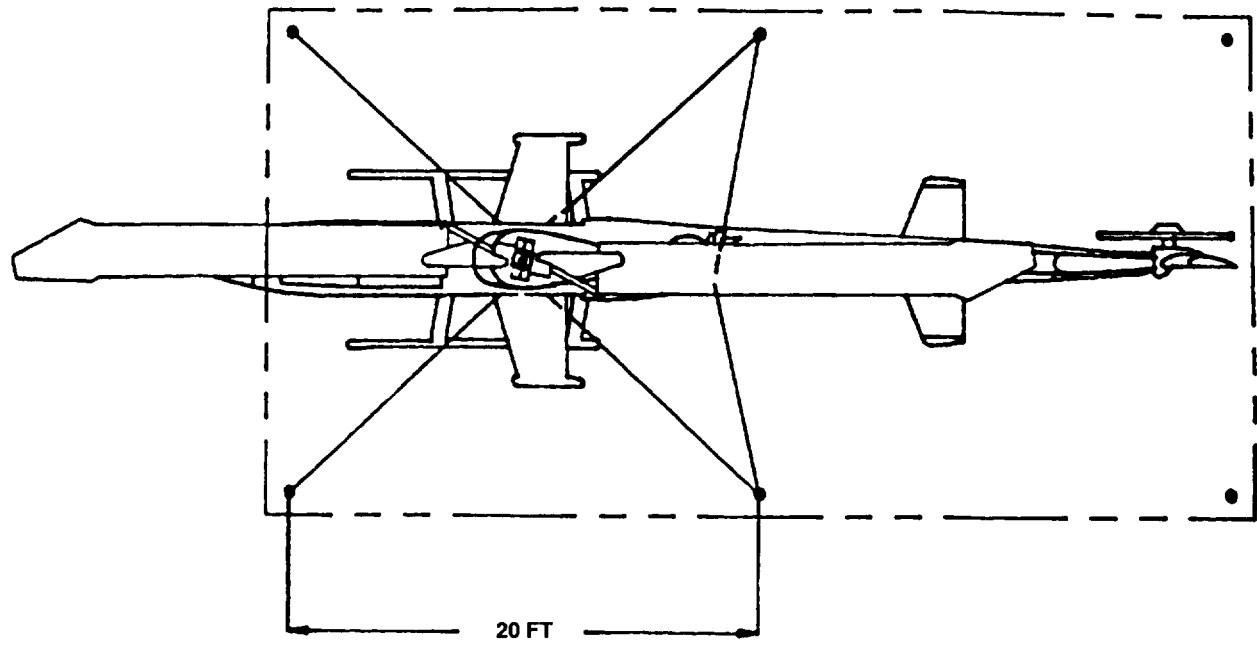


Figure 4-9. AH-1 Mooring Configuration

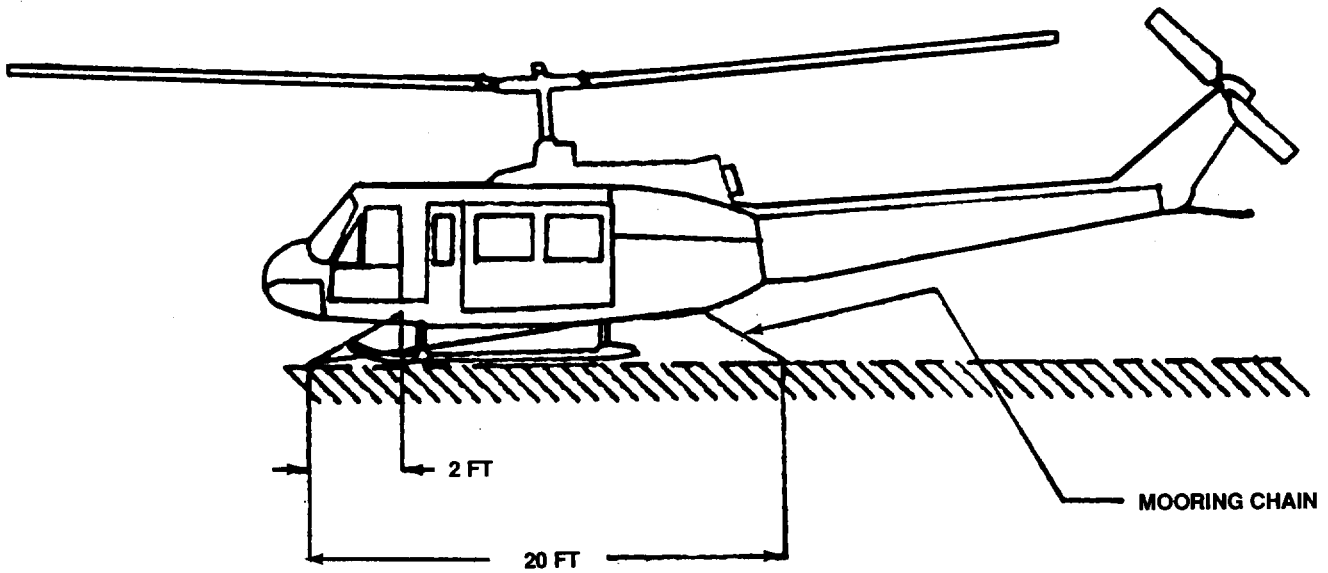
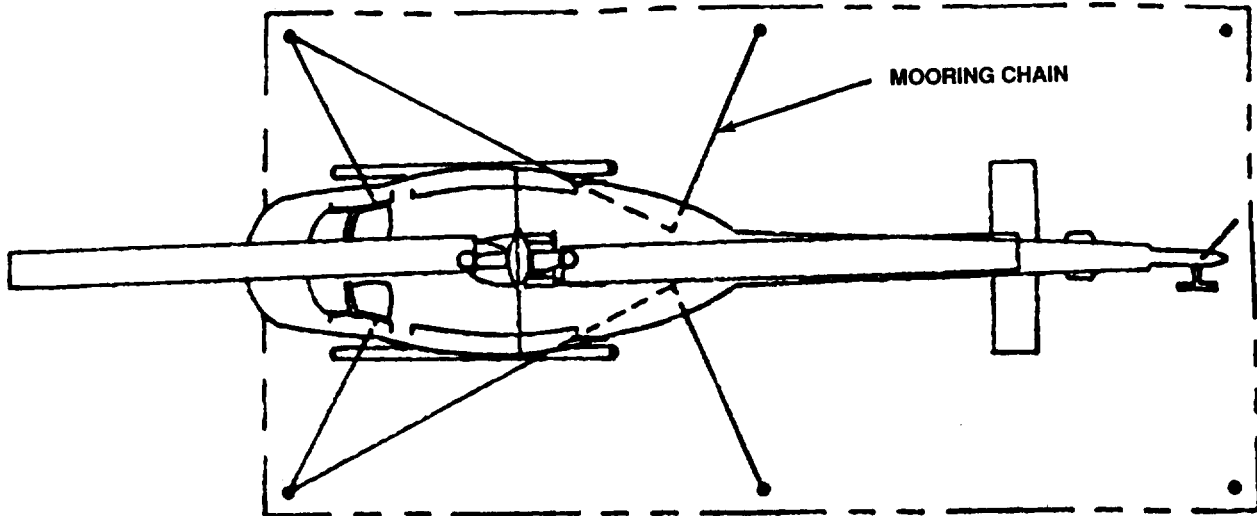


Figure 4-10. UH-1 Mooring Configuration

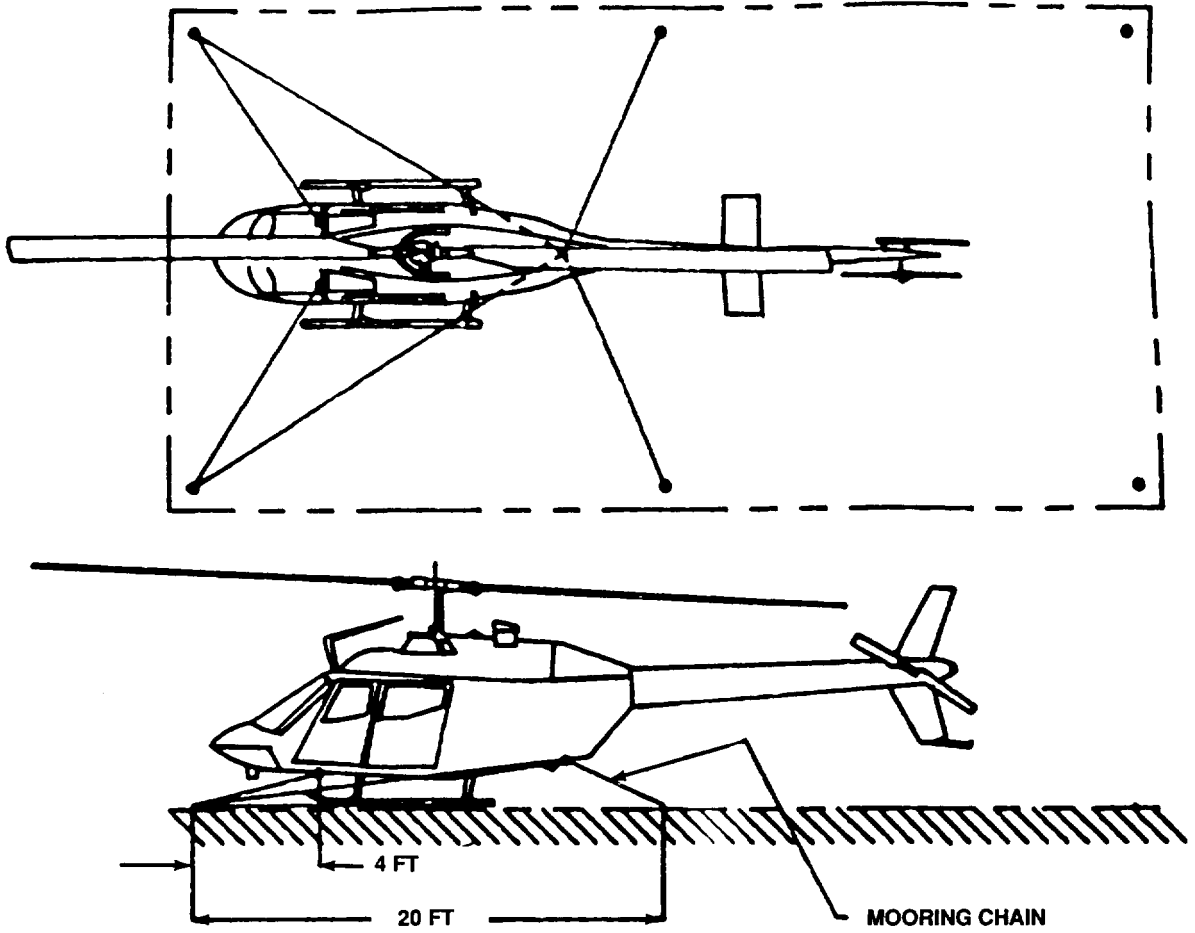


Figure 4-11. OH-58 A&C Mooring Configuration

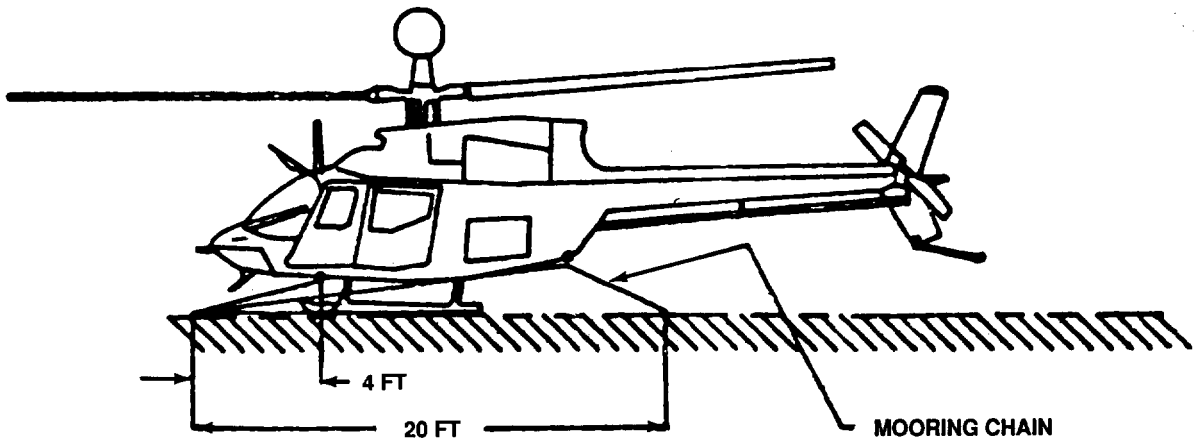


Figure 4-12. OH-58D Mooring Configuration

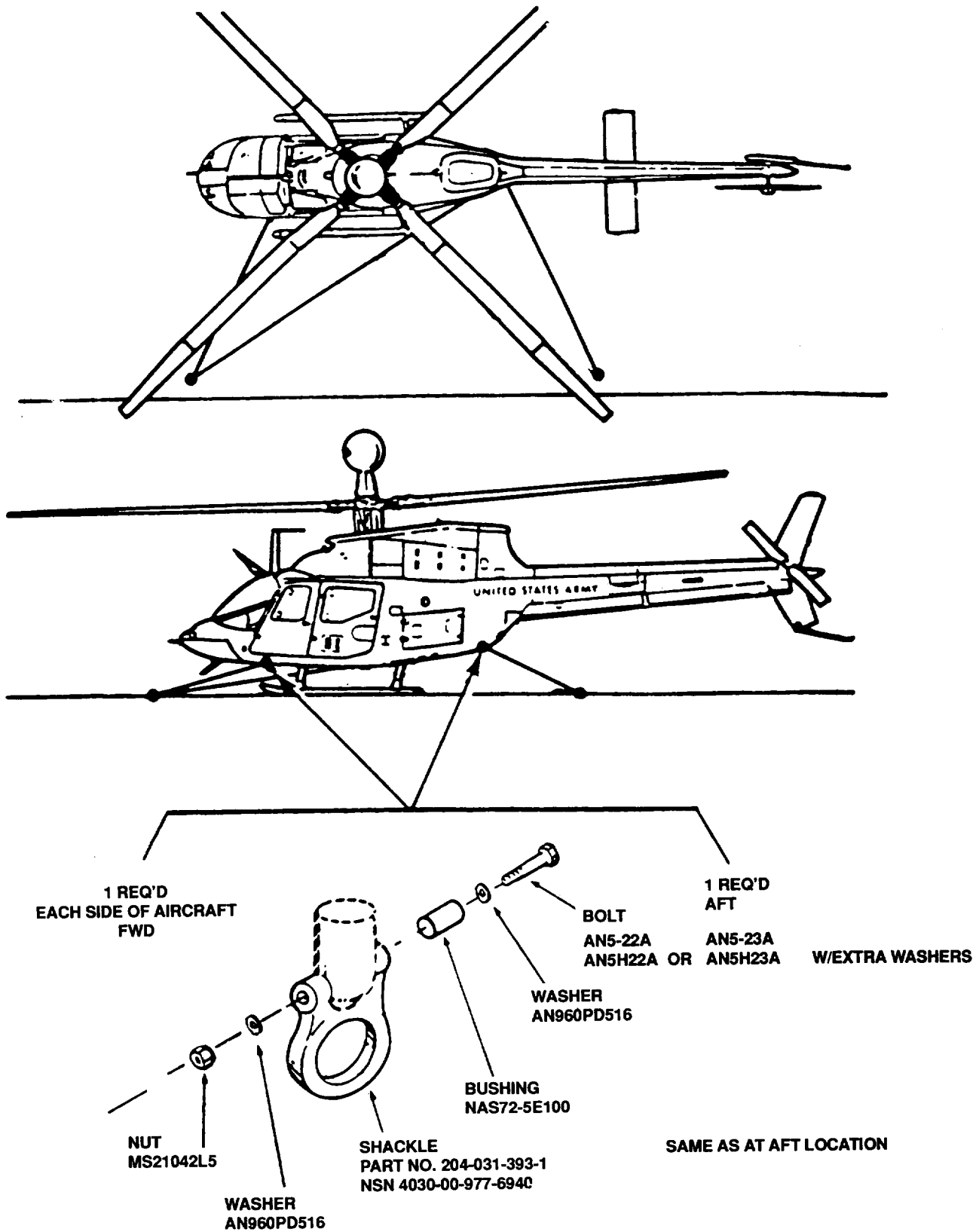
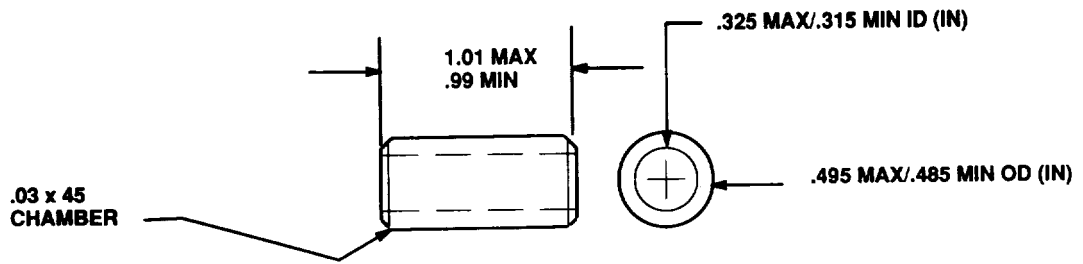


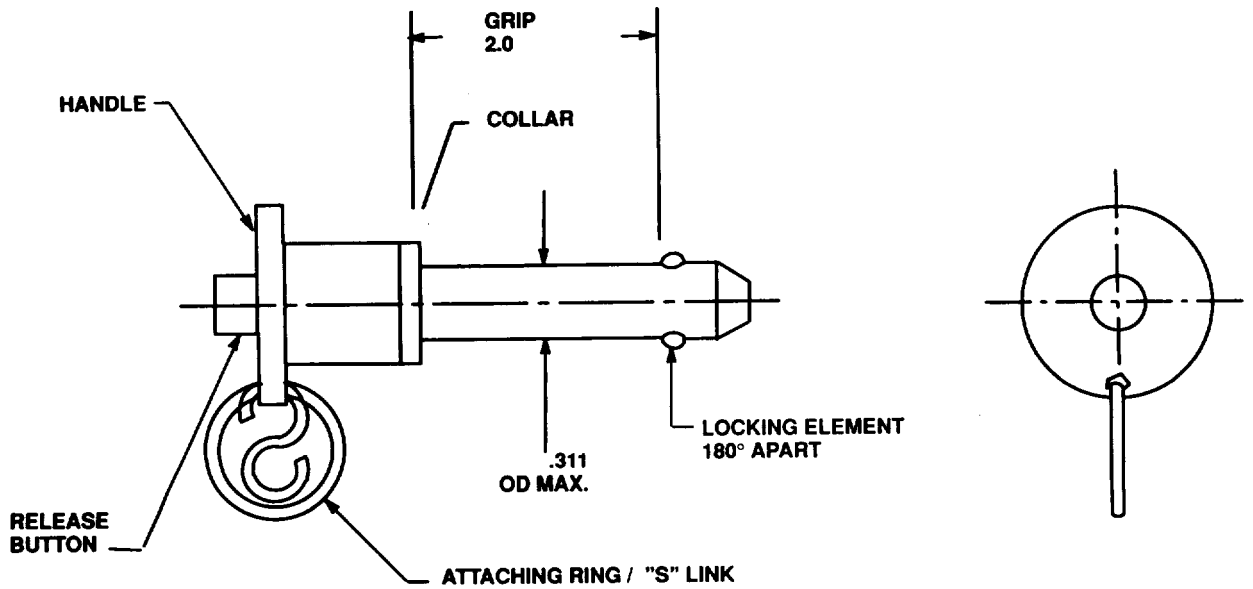
Figure 4-13. Mooring Hardware For OH-58 A/C & D



**BUSHING DETAIL FOR OH-58A/C & D
REPLACEMENT FOR NAS72-5E100 FIGURE 4-13.**

MATERIAL : ANY CORROSION RESISTANT STEEL

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.

Figure 4-15. Pin, Quick Release For OH-58 A/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:

- (1) Polyester Rope 4030-01-028-3843
(1/2 inch diameter) 4020-00-765-3928
4020-00-630-4873

- (2) Tiedown, Cargo, Aircraft 1670-00-725-1437
(Webbing Binder)

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	5120-00-051-8641
Handle, Holding Tool	2	4-20	5120-00-134-4725
Rod, Steel, Driving	2	4-18	5120-00-970-6412

(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

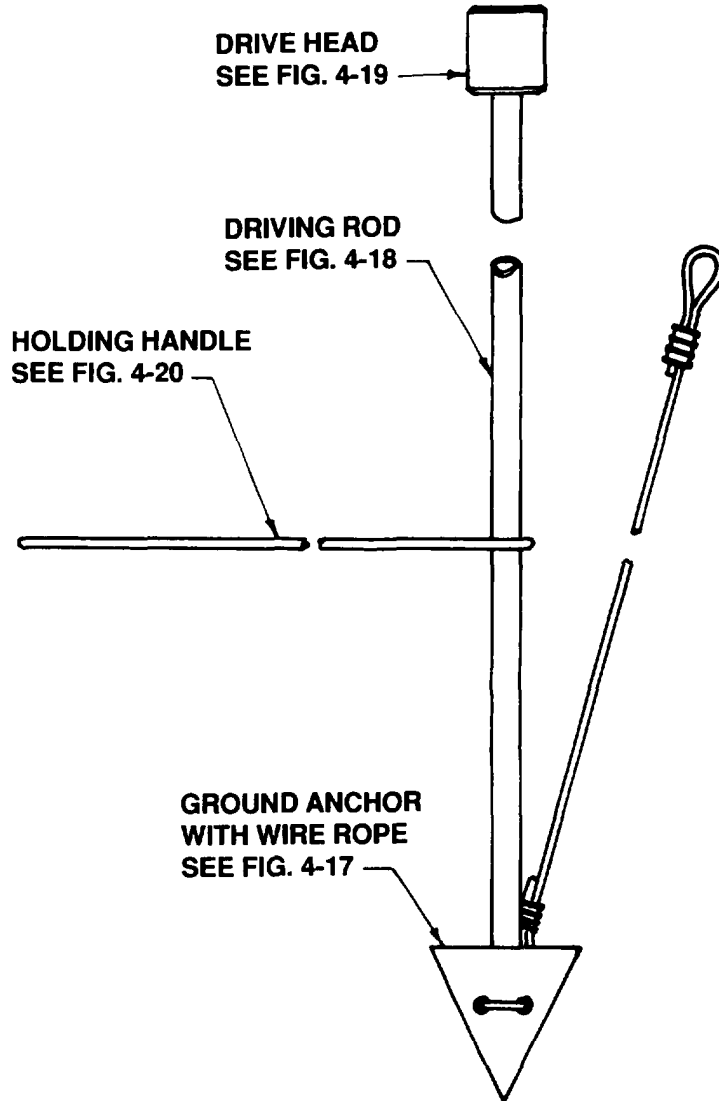


Figure 4-16. Ground Anchor Assembly (For Mooring on Nonpaved Surfaces)

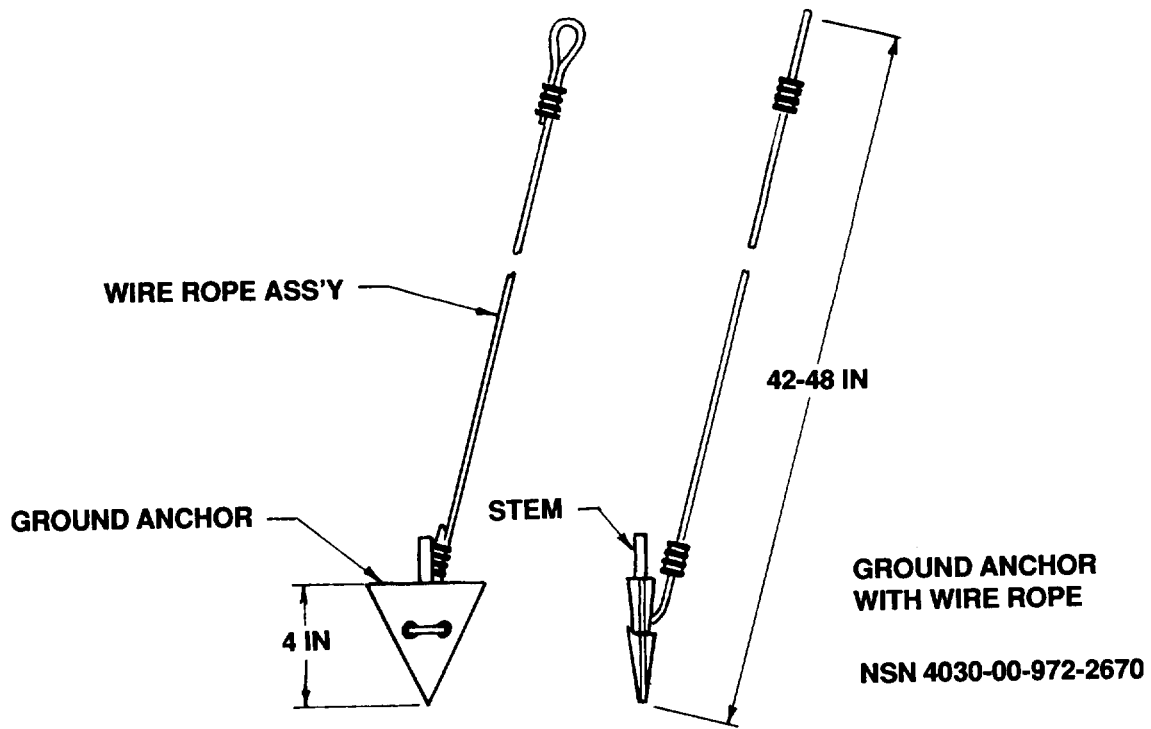


Figure 4-17. Ground Anchor with Wire Rope



Figure 4-18. Driving Rod

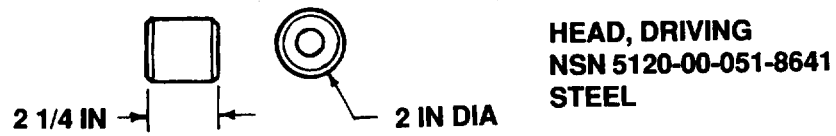


Figure 4-19. Drive Head

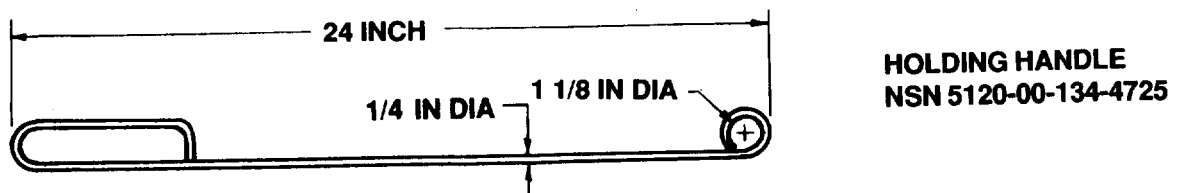


Figure 4-20. Holding Handle

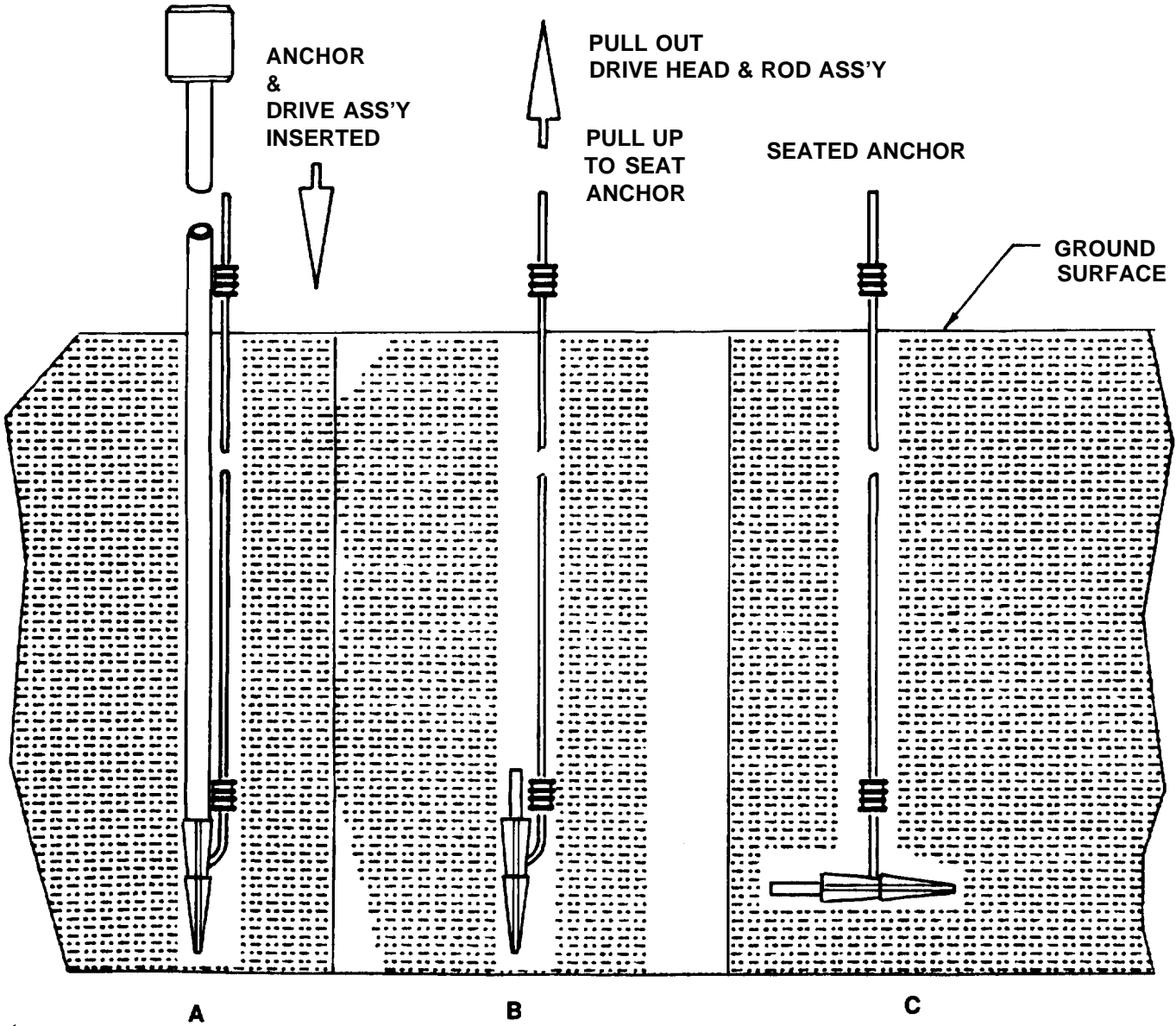


Figure 4-21. Installation of the Ground Anchor Assembly

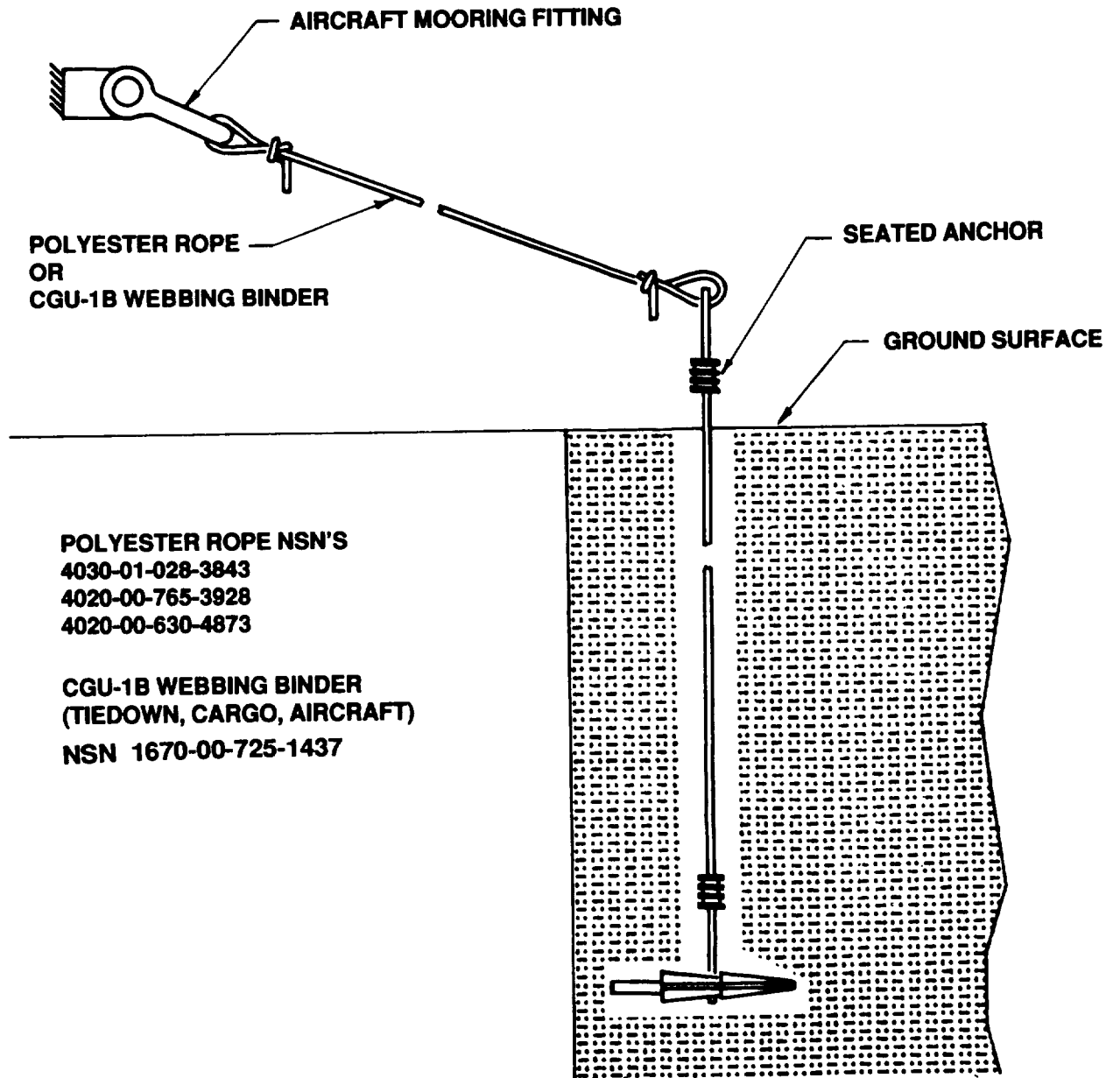


Figure 4-22. Polyester Rope and Webbing Binder

Change 3 4-23/(4-24 blank)

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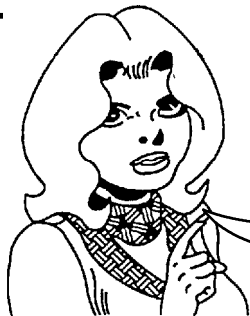
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PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO
6	2-1 a		
B1		4-3	

In line 6 of paragraph 2-1a the manual states the engine has 6 cylinders. The engine on my set only has 4 cylinders. Change the manual to show 4 cylinders.

Callout 16 on figure 4-3 is pointed at a bolt. In key to figure 4-3, item 16 is called a shim. Please correct one or the other

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