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U. S. MARINE CORPS TECHNICAL MANUAL

ANTENNA

AS-2851/TR

FSN 5985-097-8802

OPERATION AND MAINTENANCE



AUGUST 1972

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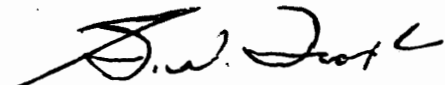
DEPARTMENT OF THE NAVY
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31 August 1972

1. This Manual is effective upon receipt and provides instructions for the operation and maintenance of Antenna, AS-2851/TR (FSN 5985-097-8802).
2. Notice of discrepancies and suggested changes to this Manual should be submitted direct to the Commandant of the Marine Corps (Code CSY), utilizing form NAVMC 10772 (Rev. 3-72) appended inside the back cover.

BY DIRECTION OF THE COMMANDANT OF THE MARINE CORPS

OFFICIAL



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SAFETY SUMMARY

The following Caution and Warning appear in the text in this volume and are repeated here for emphasis.

CAUTION

The Antenna AS-2851/TR is designed to operate in the 30 to 76 MHz range and should be used and operated in that frequency range only. The antenna should not be used for operation in any other region, for example 2 to 30 MHz frequency range, or with transceivers that transmit with high power such as AN/PRC-47, AN/MRC-83, AN/TRC-75 or the AN/TSC-15. Severe damage to the antenna or the radio set may result.

WARNING

Contact with power lines of any sort will cause serious injury or death to personnel.

ERECTION

Do not attempt to erect the antenna in a strong prevailing wind.

POWER OFF

Before attempting to make any adjustments to this system, all power leading to the antenna should be shut off.

OCCUPATIONAL SAFETY AND HEALTH ACT

This system is designed to meet applicable OSHA standards.

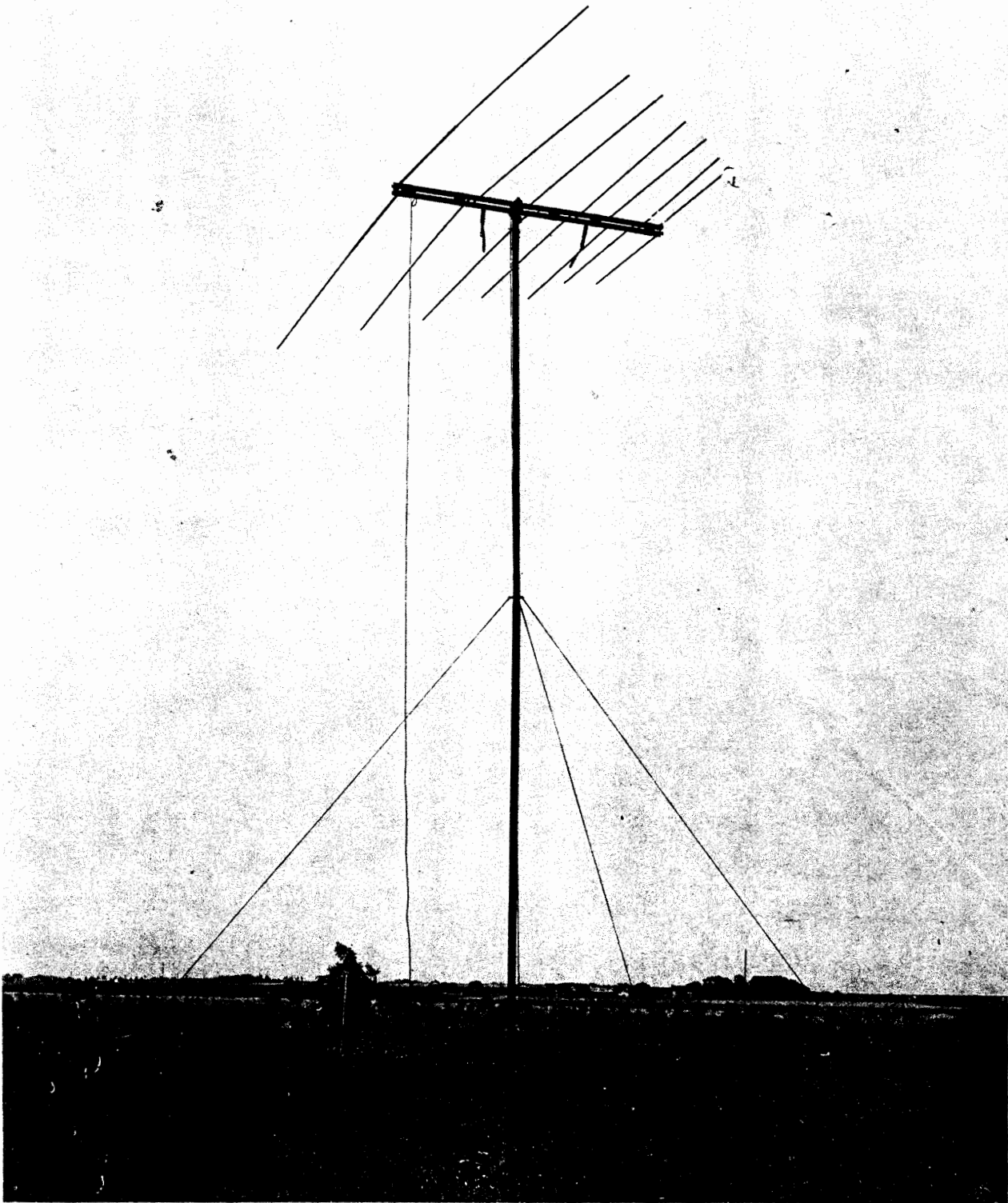


Figure 1-1 Overall View of AS-2851/TR Antenna System

CHAPTER 1

GENERAL INSTRUCTIONS

SECTION I

GENERAL DESCRIPTION AND SPECIFICATION DATA

1-1 SCOPE. This manual covers the description, operation instructions, overhaul instructions, preventive maintenance services, organizational maintenance and field maintenance for the Antenna AS-2851/TR.

1-2 DESCRIPTION, PHYSICAL AND FUNCTIONAL. The Antenna AS-2851/TR (Figure 1-1) is a man-transportable tactical log periodic antenna which provides transmission and reception capabilities over the 30 to 76 MHz frequency range. It can be assembled or disassembled by two men in less than 10 minutes. See Table 1-1 for reference data.

Table 1-1 Reference Data

| | |
|-----------------------------|--|
| Power Handling Capability | 65 watts average 135 PEP |
| Frequency Range | 30 to 76 MHz |
| Input Impedance | 50 ohms unbalanced |
| VSWR | 2 to 1 maximum |
| Forward Gain | 4dbi 30 to 35 MHz 4.5dbi 35 to 76 MHz |
| Front to Back Ratio | 4 db at 30 MHz 7.5 db at 50 MHz 10db at 76 MHz |
| Overall Height | 20 feet |
| Operating Temperature Range | -60 ^o to 150 ^o F |
| Humidity Limits | to 95% |
| Maximum Wind Survival | 60 knots no ice |
| Longest Element Tip to Tip | 16'-8" |
| Boom Length | 6'-0" |
| Weight | Approx. 30 lb. |
| Polarization | Vertical or Horizontal |

a. PHYSICAL DESCRIPTION. The following paragraphs describe the major components of the AS-2851/TR. See Table 1-2 for list of equipment supplied.

(1) Antenna Array Assembly. The antenna array assembly consists of a folding boom which supports a planar array of seven log periodic dipole elements. When collapsed and folded for storage, the antenna array assembly fits into a 48-inch-long by 8-inch-wide space. A polarization block and polarization change rope permit the polarization of the antenna to be changed without lowering or disassembling the mast.

(2) Mast Assembly. The mast assembly consists of six separate mast sections which support the antenna array assembly at its fully extended height of 20 feet. The upper metal mast section contains a collar bearing for attachment of the guy cable assembly. The upper two mast sections are constructed of fiberglass to prevent distortion of the antenna radiation pattern.

(3) Mast Base Assembly. The mast base assembly consists of a metal plate with a hinged mast base clamp to permit the mast to be assembled horizontally and tilted up into position. Two wing nuts on the base clamp permit azimuth adjustment. A metal tab is provided for attachment of the polarization change rope.

(4) Guy Ring Assembly. This assembly consists of a guy ring, three dielectric rope guy lines and tensioning devices of sufficient strength to hold the antenna upright in a 60-knot wind.

(5) Antenna Guy Holddowns. Five metal spike-shaped stakes, approximately 9 inches long, are provided to anchor the base plate and three guy lines.

(6) Hammer. A small machinist's type hammer with approximately 1-pound head weight is provided.

(7) Cable Assembly. The cable assembly consists of 75 feet of RG-58C/U coaxial cable terminated with UG-88 B/U connectors on each end. A strain relief snap on the upper end of the cable attaches to the antenna boom to eliminate strain on the connector caused by the weight of the dangling cable.

(8) Antenna Case. All components of the AS-2851/TR are packed in a roll-out type canvas case with straps to position components securely. (See Figure 1-3.) A weatherproof pictorial operating and assembly instruction plate is affixed to the inside of the case.

Table 1-2 Equipment Supplied

| Qty. | Description | Mfg's Part No. | F. S. N. Number |
|------|--------------------------------|----------------|-----------------|
| 5 | Antenna Guy Holddown | 180227 | 5985-069-3567 |
| 1 | Hammer | 350543 | ----- |
| 1 | Cable Assembly | 870357 | ----- |
| 1 | Mast Base Assembly | 870358 | ----- |
| 1 | Guy Ring Assembly | 870359 | ----- |
| 1 | Upper Mast Assembly | 870360 | ----- |
| 1 | Antenna Array Assembly | 870361 | ----- |
| 3 | Common Metal Mast Assembly | 870362 | ----- |
| 1 | Lower Fiberglass Mast Assembly | 870363 | ----- |
| 1 | Upper Fiberglass Mast Assembly | 870364 | ----- |
| 1 | Case, Antenna | 930006 | ----- |

b. FUNCTIONAL DESCRIPTION. This antenna is employed as a directional, lightweight, man-transportable antenna for use with tactical VHF FM radio equipment. It is a component of the Radio Terminal Set AN/TRC-166.



Figure 1-2 AS-2851/TR Packed in Case Antenna

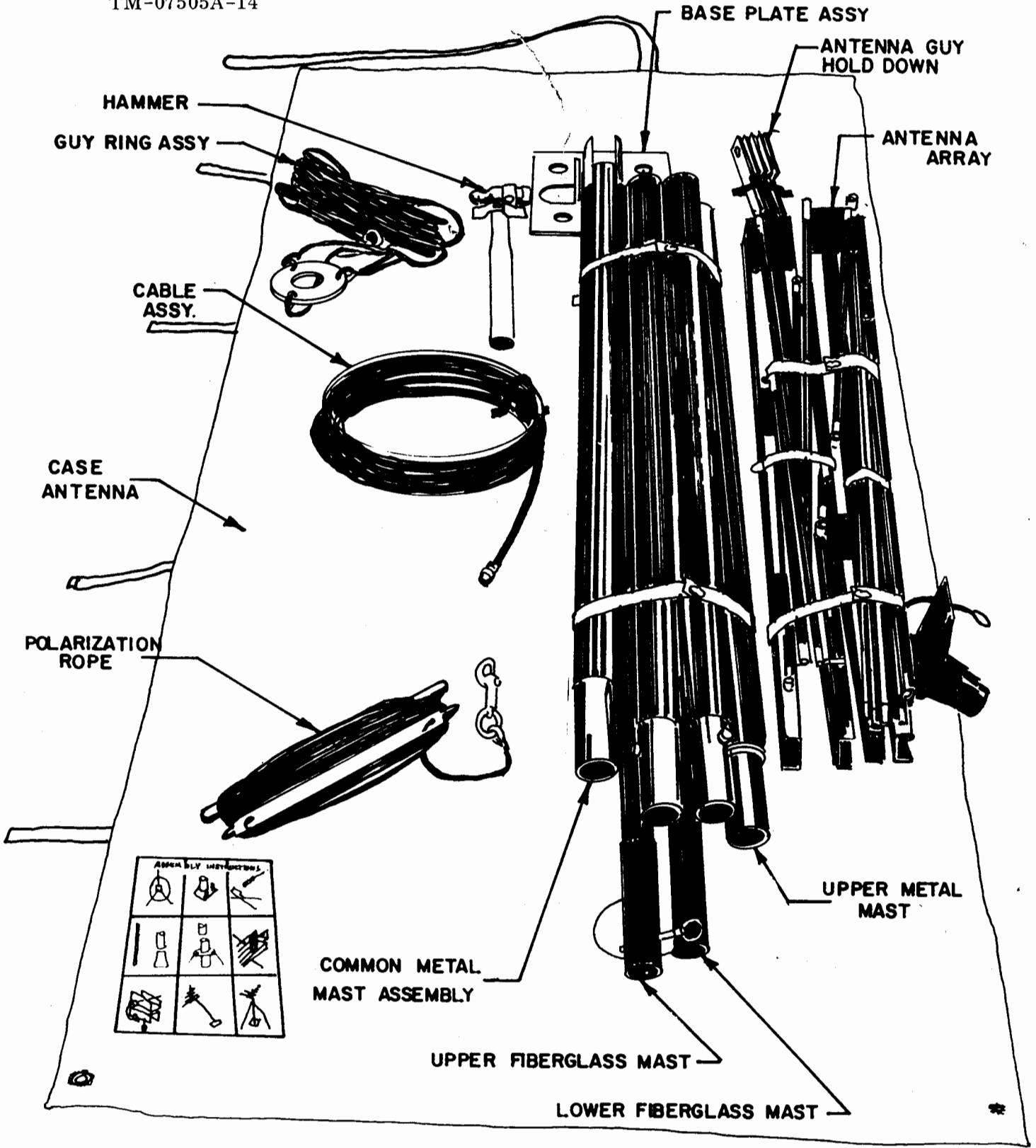


Figure 1-5 Antenna Case Open Exposing Antenna Components

SECTION II

PREPARATION FOR USE

1-3 HANDLING. Do not use hooks or other sharp items to handle the equipment, otherwise no special requirements need to be exercised when handling the equipment. When unloading, do not drop antenna system when packed in the antenna case.

1-4 UNPACKING. Care should be exercised when unpacking the various assemblies from the antenna case. Some of the assemblies are secured to the antenna case by small straps. See Figure 1-3.

NOTE

The antenna case, while affording some weather protection to the contents packed within, is NOT waterproof.

Repacking the contents into the antenna case shall follow no specific sequence but should be placed and strapped securely as shown in Figure 1-3.

Attached to the antenna case is a pictorial operating and assembly instruction sheet for reference use by field personnel.

1-5 INSTALLATION PROCEDURE.

a. Care should be exercised when determining the site to install this antenna system. The site selected should be as high as possible, relatively flat and free from surrounding objects such as trees, large rocks or power lines of any sort, which have a detrimental effect on the performance of the antenna. Terrain should allow access to the antenna during all weather conditions.

WARNING

Contact with power lines of any sort will cause serious injury or death to personnel.

b. The antenna system is shipped complete and requires no special tool or equipment for its assembly or installation.

c. Select appropriate site for best transmission and reception. Unroll antenna case exposing all parts and assembly instructions and check parts in case with parts shown in Figure 1-3.

d. Place mast base assembly at selected antenna location and drive antenna guy holddowns through the mast base assembly as shown in Figure 1-4. Refer to Figure 1-5, Plot Plan, and locate three antenna guy holddown points 120° apart about base plate at a radius of 3 normal paces (about 12 feet). Place antenna guy holddown #3 in line with rotation of mast. Install antenna guy holddown with hammer, driving them at a 30° angle from vertical tilted away from the mast base assembly as shown in Figure 1-6.

e. Refer to Figure 1-7 and assemble common metal mast assemblies by inserting tapered end into the bottom of the next tube. Rotate until the notch seats and antenna lock buttons extend through locking holes. Install guy ring over top of upper metal mast section as shown. Layout and assemble fiberglass mast sections making sure antenna locking pin is located at the top of the assembly and attach to upper metal mast assembly.

NOTE

Check to make sure all sections are locked.

f. Unfurl guy ropes and connect two guys to antenna guy holddowns 1 and 2.

NOTE

Make sure guy ropes are not twisted.

g. Erect the mast assembly (without the antenna) and connect the third guy to the antenna guy holddown #3. See Figure 1-6. Adjust all guy tensioning devices until the mast is in a vertical position and all guy ropes are snug. Disconnect the guy from antenna guy holddown #3 and carefully lower the mast to the ground. Select the antenna array assembly. Unhinge boom to full length and secure by fastening the latch tight with the catch. Refer to Figure 1-8.

h. Raise top of mast approximately three feet off ground as shown in Figure 1-9. Attach the antenna, locking in place with locking pin. Rotate mast in base tube clamp until rear end of boom rests on the ground. (Longest elements go nearest the ground.) Tighten wing nuts on base tube clamp at base to prevent mast from rotating.

j. Unwrap front boom element retaining strap and extend element sections outward, spring tension will pull these sections together, seating and extending them to their full length. Repeat procedure on rear boom strap.

k. Unroll polarization rope. Hook one end to the ring located on the polarization block. Attach the other end to the tab on the mast base assembly as shown in Figure 1-10. This will put the antenna into horizontally polarized mode when erected. Connect the cable assembly to the connector plug electrical at the rear of the antenna. See Figure 1-11. Fasten the strain relief snap to the hole in the lower boom. Unroll the cable assembly and lay it along the mast to prevent it from getting tangled in the antenna.

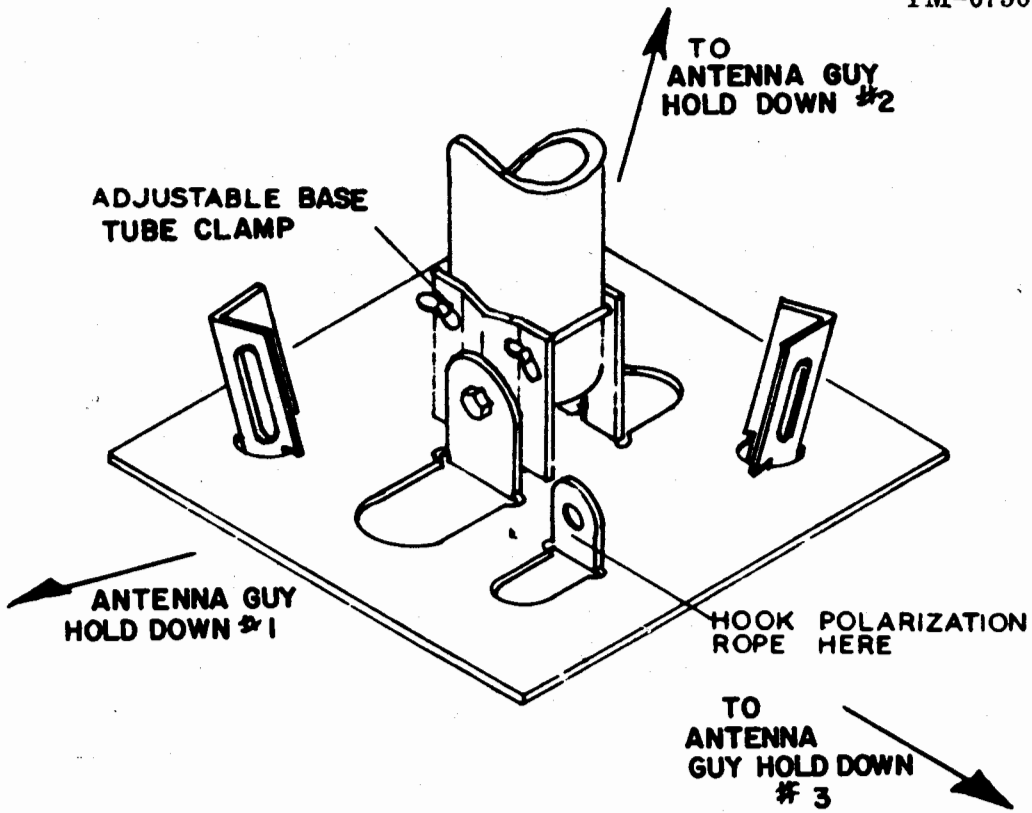


Figure 1-4 Base Plate Installation

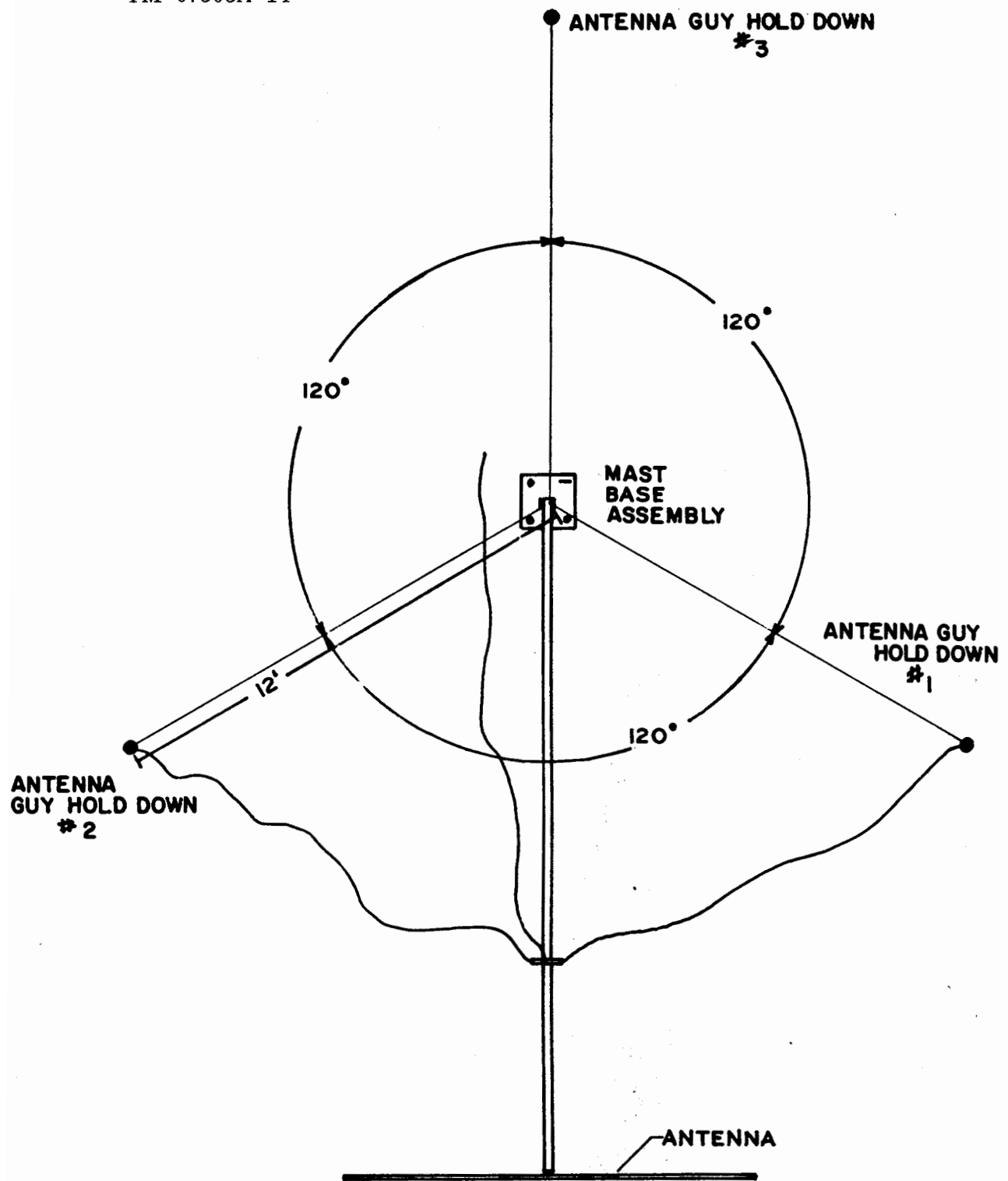


Figure 1-5 Plot Plan

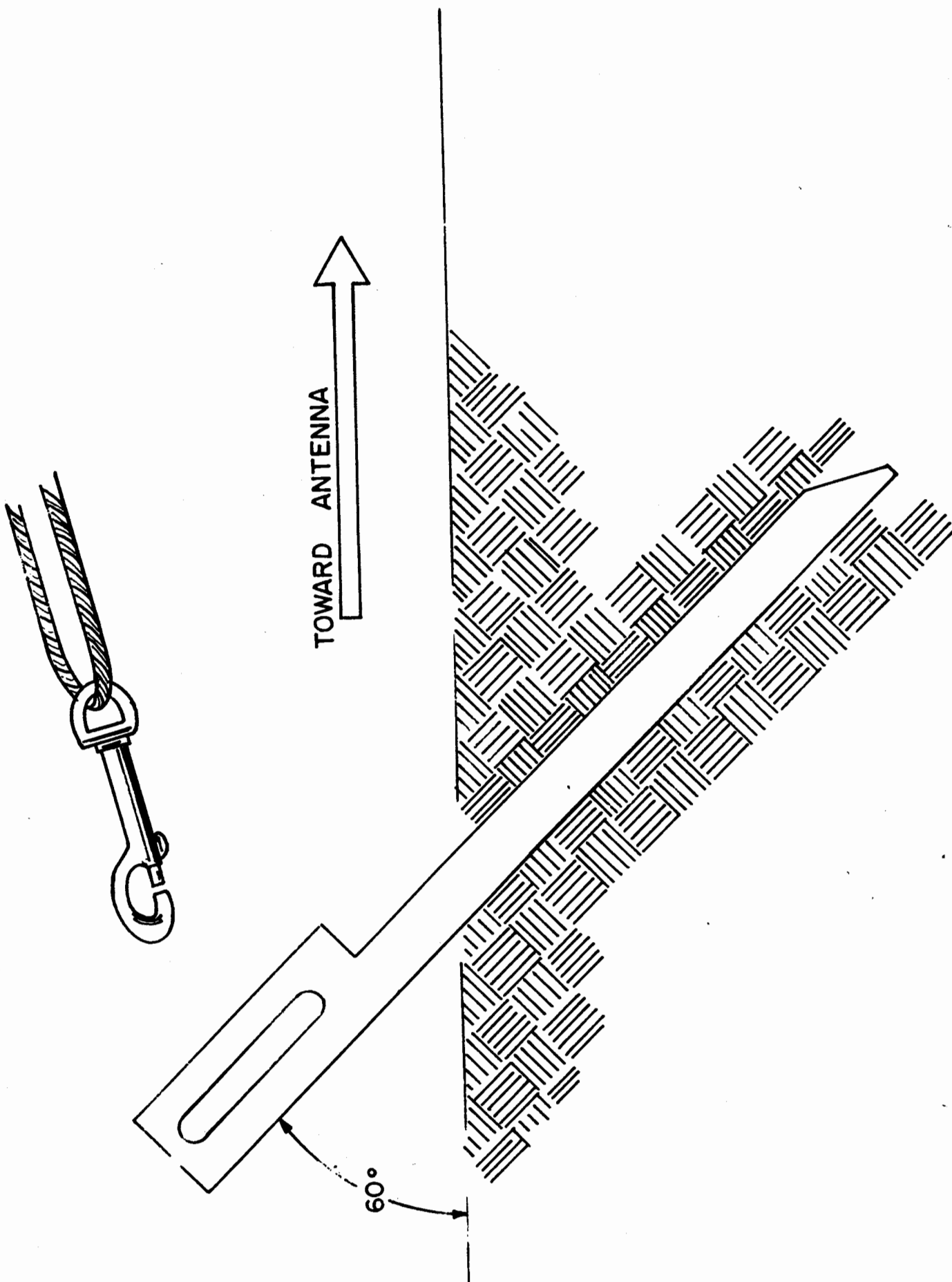


Figure 1-6 Antenna Guy Hold down Installation

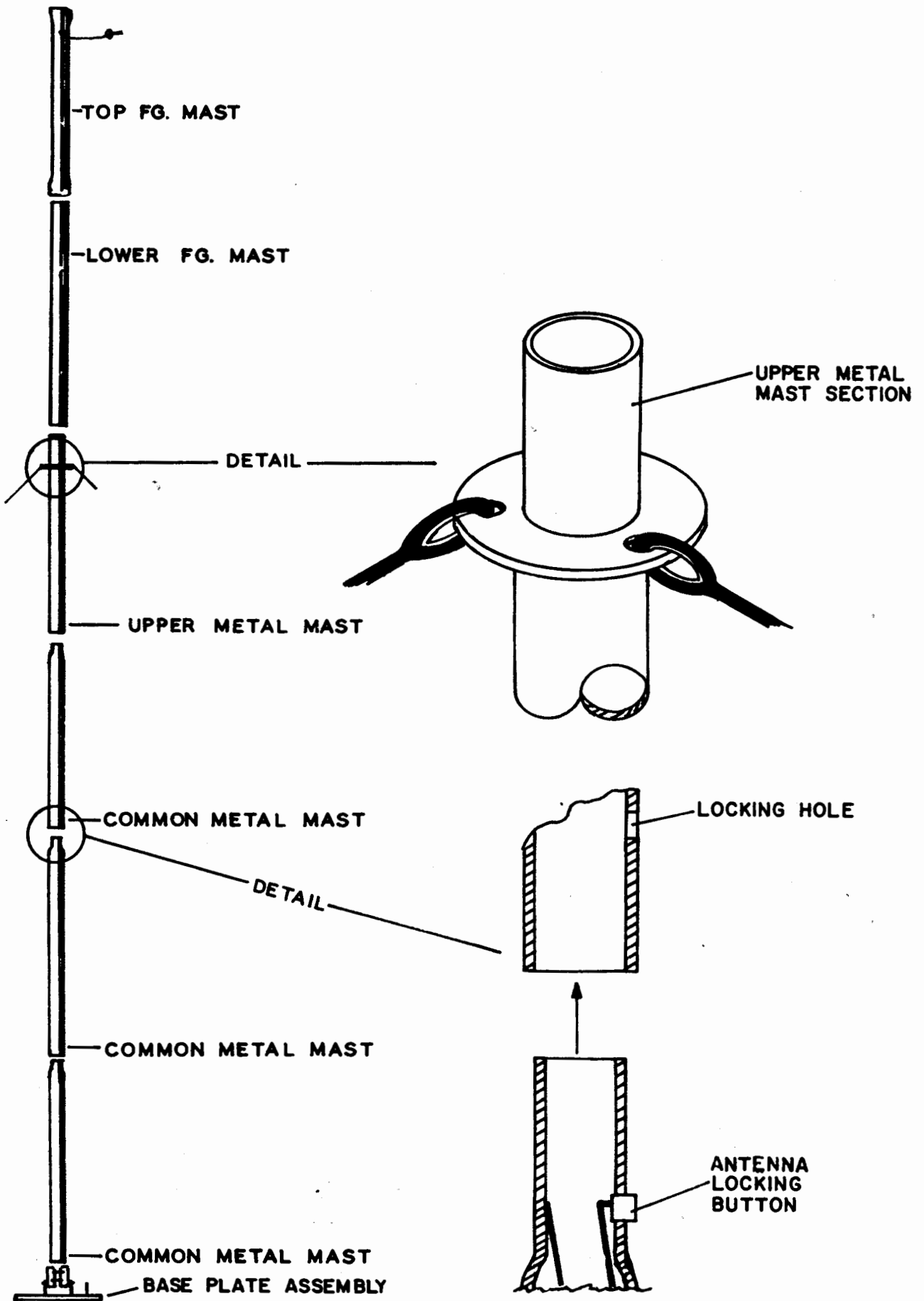


Figure 1-7 Mast Assembly

1. One man stands on the mast base assembly, holding the loose guy rope. The second man lifts up the mast just below the antenna assembly and walks toward the first man, pushing the mast into the vertical position as he goes. As the mast approaches vertical, the first man aids erection by keeping tension on the loose guy rope, until he can attach guy to antenna guy holddown #3. Readjust guy ropes for vertical alignment of mast. Rotate the antenna to the direction of propagation by loosening wing nut at base and rotating the mast. When the antenna is properly positioned, tighten the wing nut. Refer to Figure 1-12.

m. Connect the cable assembly to the transceiver. The antenna is now ready for use in horizontally polarized mode. If vertical polarization is required, release polarization rope at mast base assembly, and allow the antenna to rotate into vertical position. Refer to Figure 1-13.

1-6 INITIAL CHECKOUT AND ADJUSTMENT. This antenna may be used with any one of several different transceivers. For check-out of the equipment, refer to the appropriate section in the TM publication for the transceiver you are using.

1-7 MOVEMENT TO NEW SITE.

- a. Disconnect power to the unit.
- b. To disassemble, reverse the steps outlined in paragraph 1-5.
- c. Pack in antenna case as shown in Figure 1-3.
- d. Care should again be taken when selecting a new site. Refer to paragraph 1-5 a.

1-8 PREPARATION FOR LIMITED STORAGE AND RESHIPMENT. There are no special preparations to be taken for reshipment or for limited storage conditions.

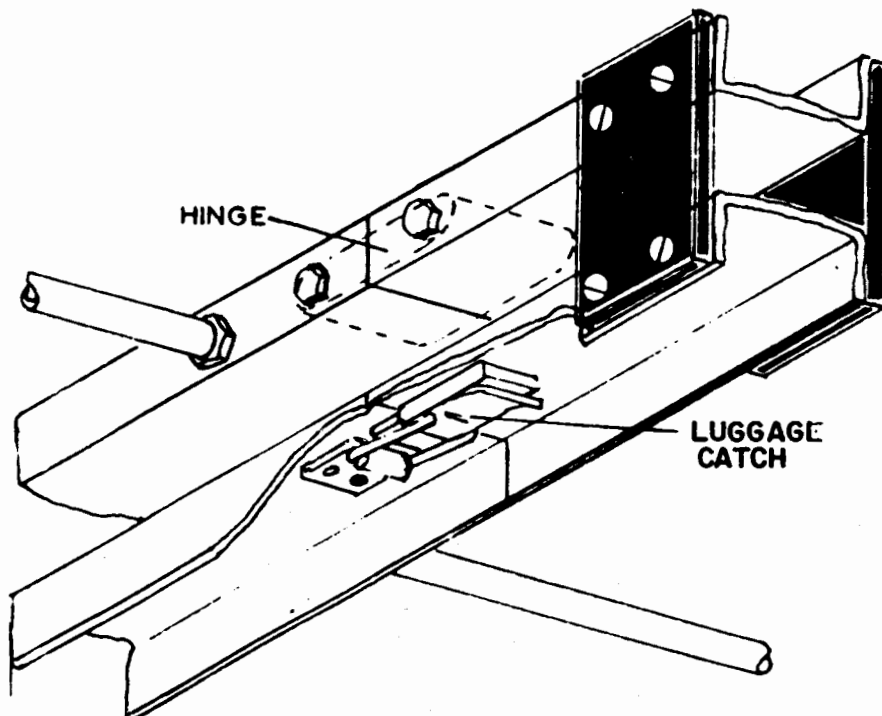


Figure 1-8 Locking Boom Sections in Place

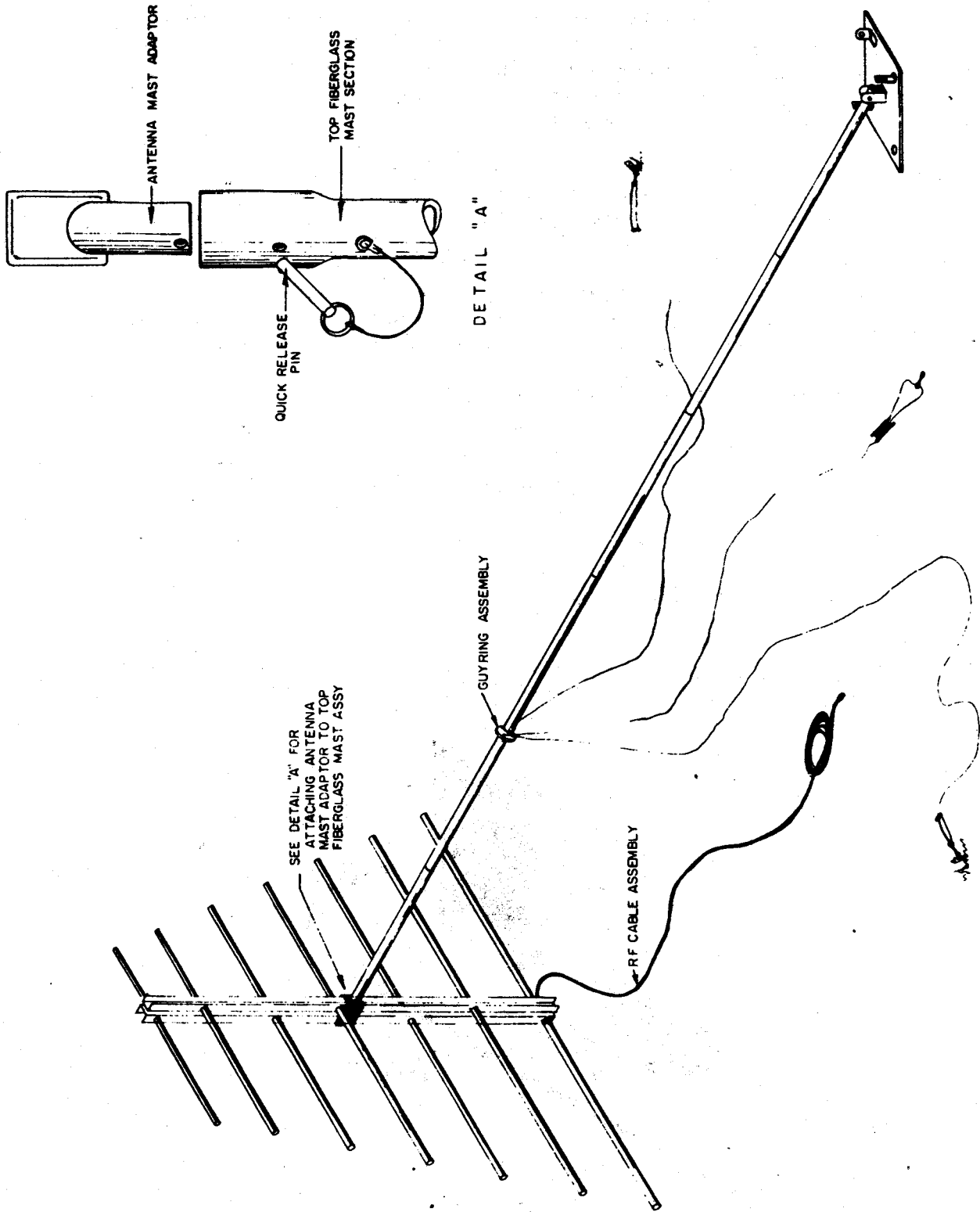
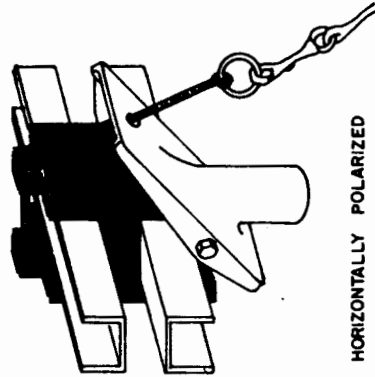
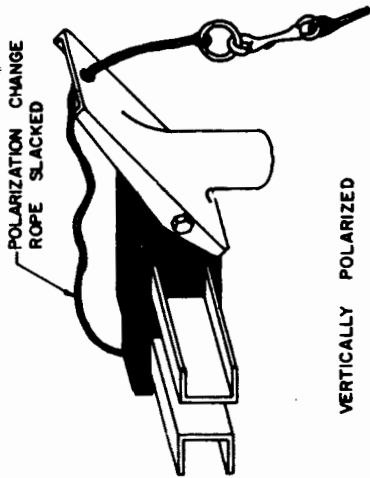
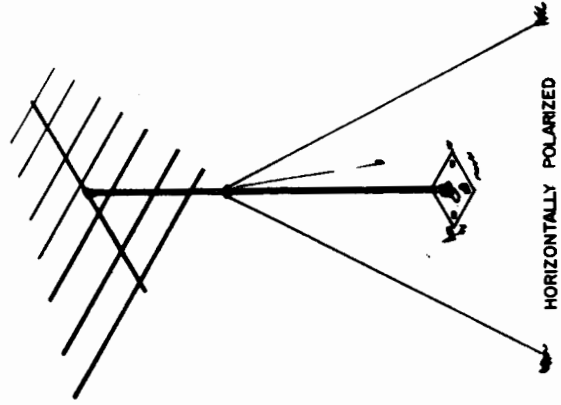
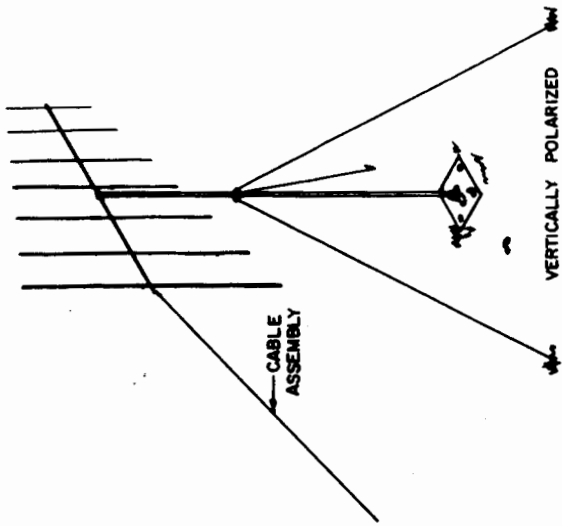


Figure 1-9 Initial Raising of Mast and Attaching Antenna



NOTE: WHEN POLARIZATION CHANGE ROPE IS SLACKED, THE WEIGHT AND OFF CENTER PIVOT POSITION OF THE ANTENNA WILL ALLOW THE ANTENNA ARRAY TO CHANGE FROM HORIZONTAL TO VERTICAL POLARITY.

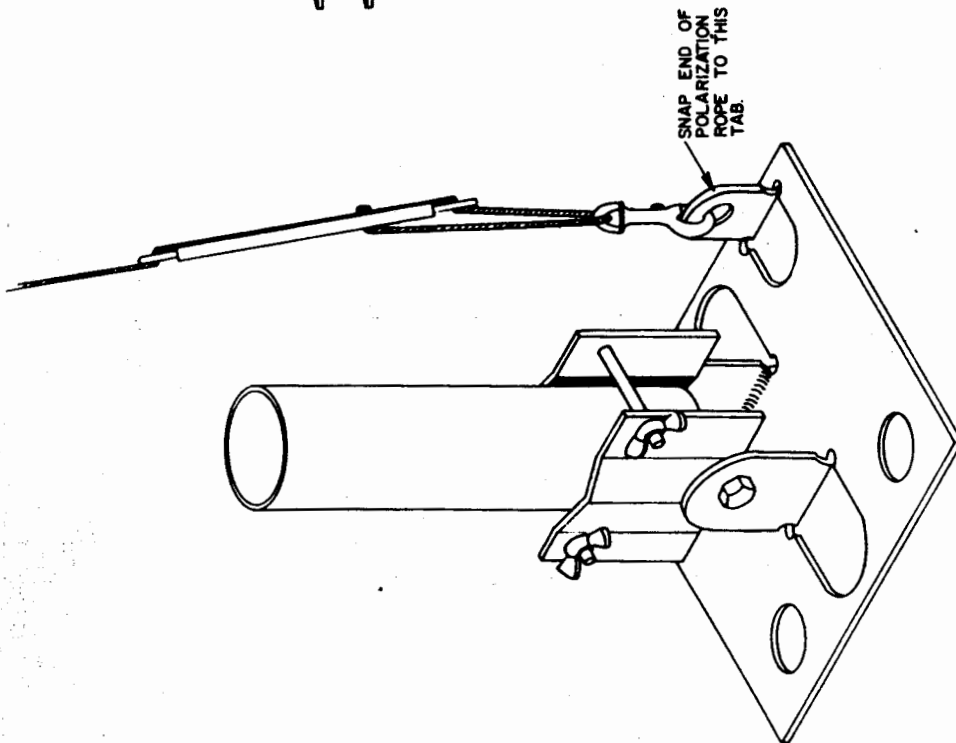


Figure 1-10 Attaching Polarization Rope

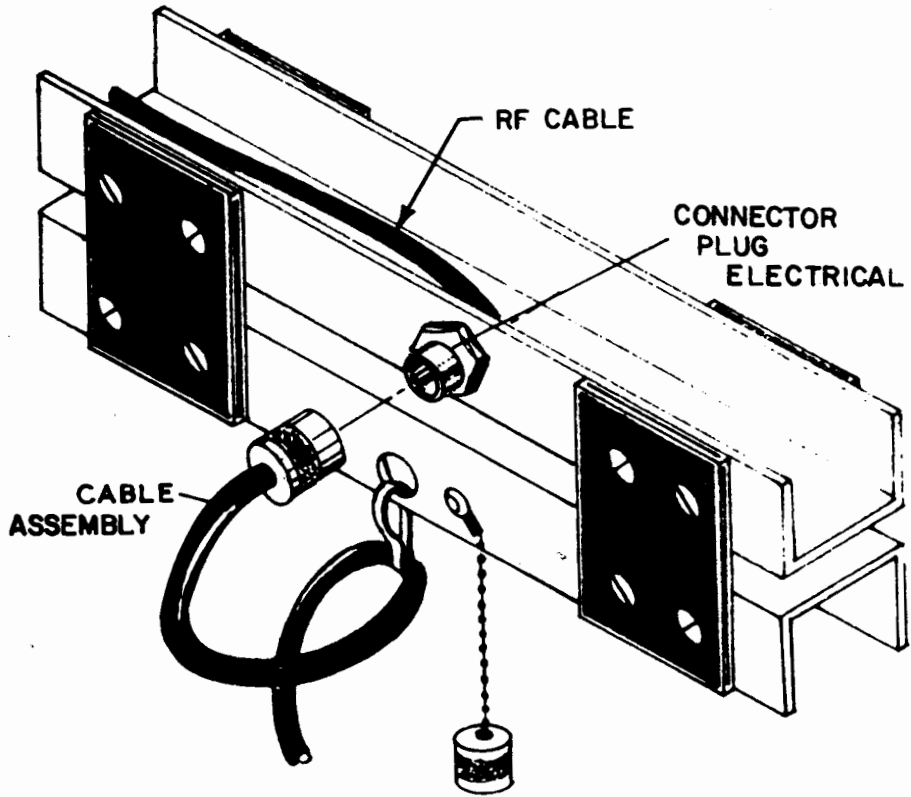


Figure 1-11 Connecting Cable Assembly to Rear Boom of Antenna

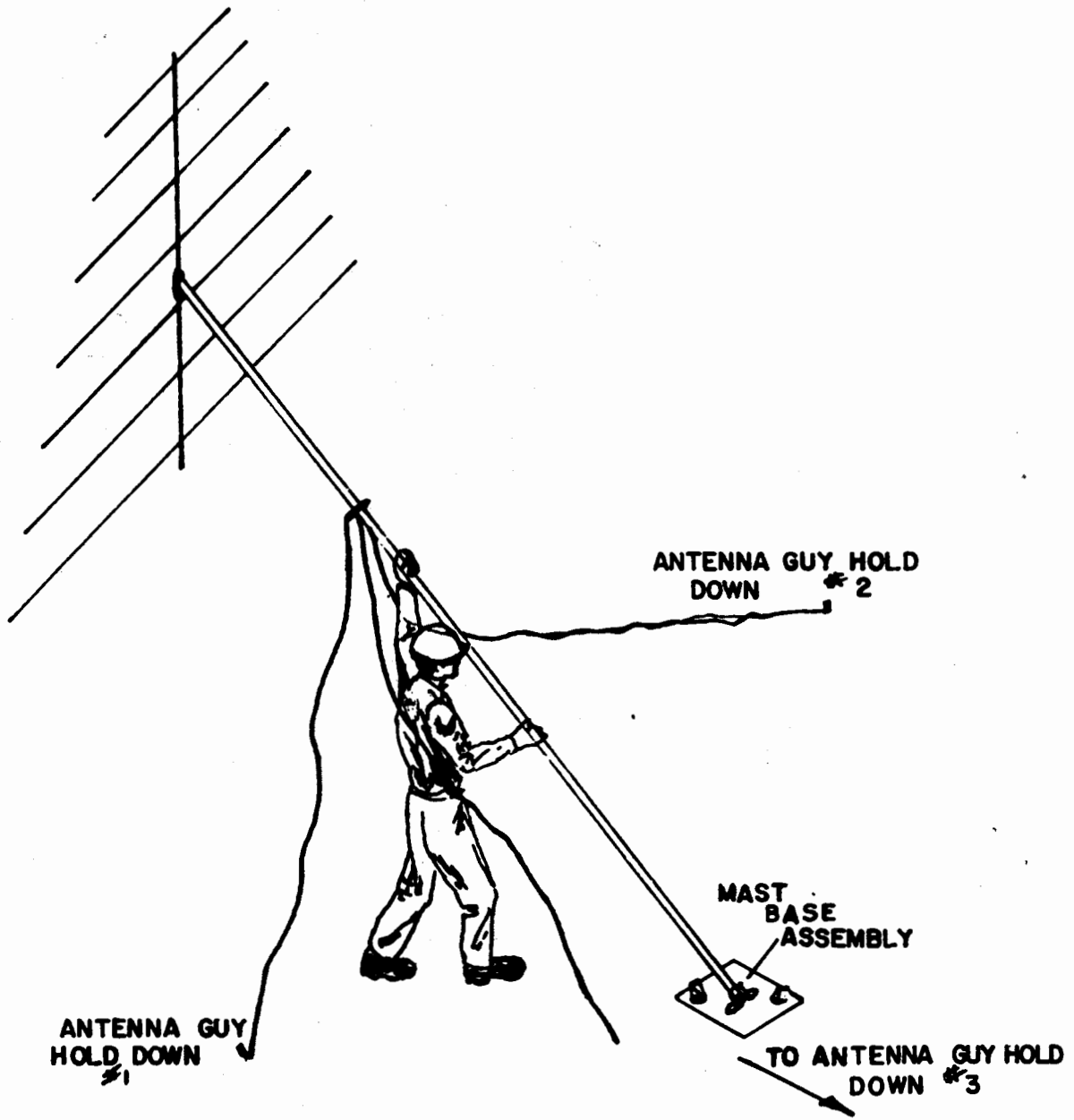


Figure 1-12 Raising of Antenna

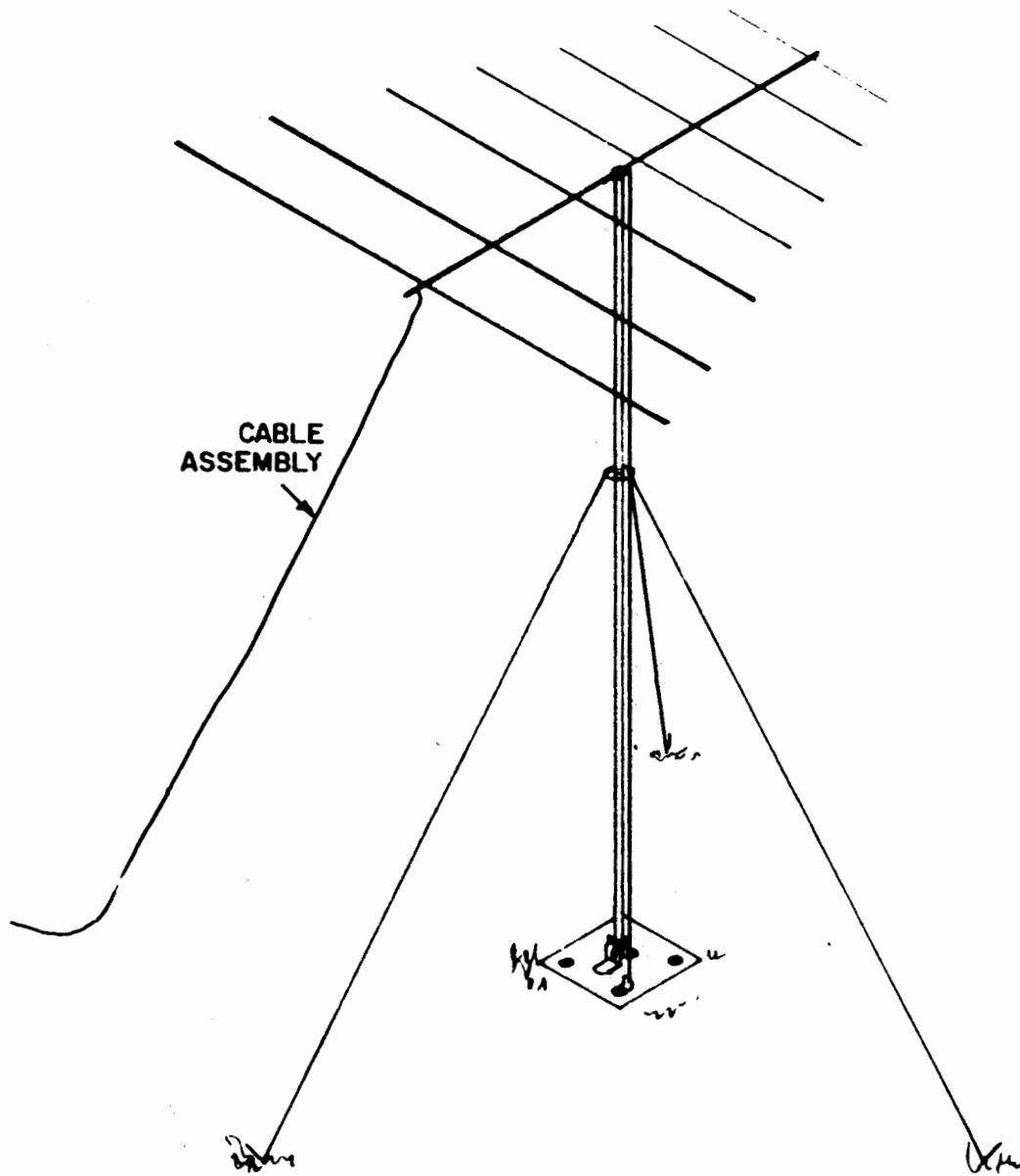


Figure 1-13 Antenna in Raised Position

SECTION III

DEMOLITION TO PREVENT ENEMY USE

1-9 GENERAL. When capture or abandonment of the Antenna AS-2851/TR to an enemy is imminent, the responsible unit commander must make the decision to either destroy the equipment or to render it inoperative. Based on this decision, orders are issued which cover the desired extent of destruction.

1-10 DEMOLITION TO RENDER THE ANTENNA AS-2851/TR INOPERATIVE.

- a. DEMOLITION BY MECHANICAL MEANS. Use hammers, crowbars, picks or other tools which may be available to destroy the elements, boom termination coil and cable connectors.
 - b. CUT. Cut the power cord into small sections with axes, picks or machetes.
 - c. BURN. Burn cords, technical manuals and antenna case; use gasoline, kerosene, oil, flame throwers or incendiary grenades.
 - d. DISPOSE. Bury or scatter the destroyed parts in slit trenches, fox holes, or throw them into streams.
- e. A priority for the destruction of the various components of the equipment, in the event the completed action cannot be taken in the time available, shall be as follows: antenna array elements, technical manual, antenna boom RF cable, mast sections and antenna case.

CHAPTER 2

OPERATING INSTRUCTIONS

SECTION I

THEORY OF OPERATION

2-1 ELECTRICAL AND ELECTRONIC THEORY. The Antenna, AS-2851/TR is a planar array of dipoles assembled in accordance with logarithmically periodic antenna design and principles. This design affords an antenna whose characteristics remain essentially constant over 30 to 76 MHz band. The parameters of the antenna are defined only by angles and ratios. The operating frequency of the antenna is limited only by its structural characteristics. The successive dipoles are connected alternately to opposite sides of a transmission line, called the feeder, to produce the required element phasing. See Figure 2-1. RF energy, at a given frequency, travels along the feeder until it reaches a section of the structure where the electrical length of the elements and the phase relationships are such as to produce radiation. The resulting beam from this "active region" is directed toward the end of shortest elements so the beam always shoots through elements which are shorter than one-half wavelength at the operating frequency. Moreover, these small closely spaced elements are oppositely connected so that the field produced by currents in adjacent elements ahead of the active region tend to cancel.

2-2 MECHANICAL THEORY. This antenna is designed to allow field personnel to quickly and easily move the system from one location to another. Therefore, mechanical means have been adapted into the design to provide for collapsible elements as well as a hinged boom. Therefore, the theory of this system's mechanics is relatively elementary.

SECTION II

SERVICE REQUIREMENTS OF OPERATOR

2-3 SERVICE UPON RECEIPT OF EQUIPMENT. The Antenna, AS-2851/TR is shipped complete and requires no service instruction or duties that the operator needs to perform prior to installation.

a. INSPECTION. A visual check should be made to make certain all components are supplied. Refer to Figure 1-3 for equipment component check, and Table 1-2.

b. LUBRICATION. This equipment does not require lubrication.

2-4 SERVICE REQUIREMENTS PRIOR TO, DURING AND AFTER OPERATION. To insure that the equipment is ready for operation at all times, it must be inspected systematically before operation, during operation, and after operation, so that defects may be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance services will be performed before operation. Defects discovered during operation of the unit will be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noted during operation which would damage the equipment if operating were con-

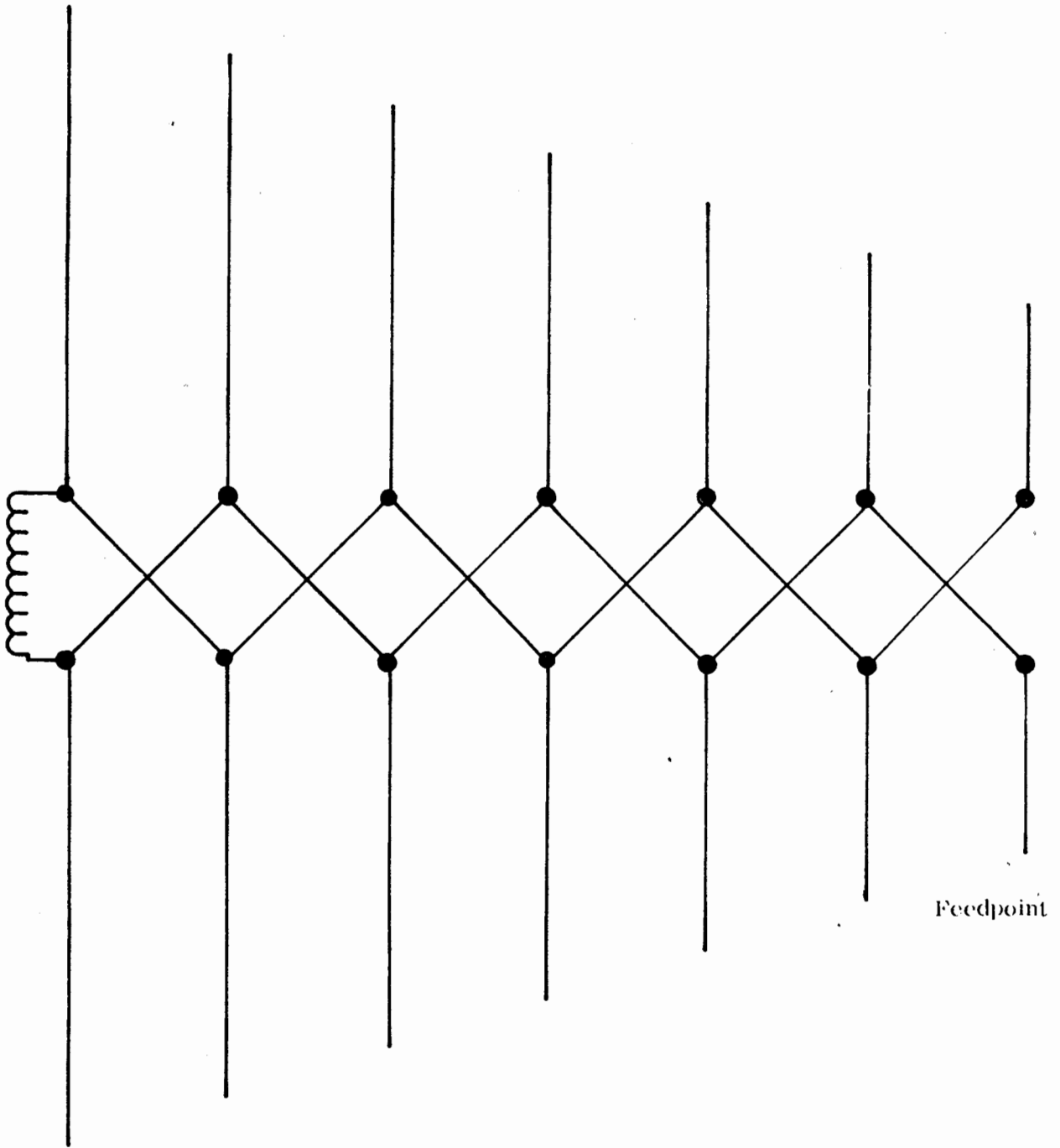


Figure 2-1 Schematic Diagram of the Log Periodic Dipole Antenna,
AS-2851/TR

tinued. After-operation-services shall be performed by the operator after every operating period. After-operation-services will be performed at intervals based on the normal operations of the equipment. Reduce interval to compensate for abnormal conditions. Defects or unsatisfactory operating characteristics beyond the scope of the operator to correct must be reported at the earliest opportunity to organizational maintenance. The following table contains inspection procedures which the operator should follow.

2-5 OPERATOR'S DAILY SERVICES.

Table 2-1 Operator's Daily Service

| Intervals | | | Procedure |
|------------------|------------------|-----------------|--|
| Before Operation | During Operation | After Operation | |
| X | | X | ELEMENTS. Inspect the elements. See that the elements are not bent or broken. |
| X | | | RF CABLE. Inspect both the antenna RF cable and the 75' cable assembly for broken connections or cut or broken cover. Repair if necessary. |
| X | X | X | BOOM. Inspect the boom for proper latching. |
| X | X | X | POLARIZATION BLOCK. Inspect for proper polarization change operation. Correct all deficiencies noticed or report them to organizational maintenance. |
| X | X | | VISUAL INSPECTION. Inspect all guy assemblies, antenna guy holddowns and mast base assembly for secure mounting. |

SECTION III

CONTROLS AND INSTRUMENTS

2-6 LOCATION OF CONTROLS. The controls are as follows:

a. The polarization change from Vertical to Horizontal polarization is made by a polarization change rope which is attached to a POLARIZATION BLOCK and controls the polarization desired for the operator's particular application.

b. Azimuth control of this antenna system is accomplished by a BASE TUBE CLAMP on the mast base assembly.

SECTION IV

OPERATIONS UNDER SPECIFIC CONDITIONS

2-7 Operating the Antenna AS-2851/TR under specific conditions is performed in the same manner as operating under normal conditions. Refer to paragraph 2-11 for Operation Instructions.

2-8 OPERATION UNDER NORMAL CONDITIONS. The antenna system has no indicators. Therefore, the operator should be familiar with only the operating procedure for the transceiver he will use with this system.

2-9 OPERATION UNDER EMERGENCY CONDITIONS. When the antenna is to be operated under emergency conditions such as atmospheric disturbances, care should be taken to not allow any personnel to walk or stand near the antenna, as this may cause serious injury or even death.

2-10 OPERATION UNDER UNUSUAL CONDITIONS. This antenna system may be operated in areas of extreme cold or heat, high humidity, sand, snow, mud, salt-water areas, high altitudes, or other conditions not normally encountered. However, field modifications must be made to properly secure the antenna guy holddowns. Use of sand bags for securing the antenna in sand or mud would be permissible. Large blocks of ice may be used in areas of extreme cold or snow where the terrain is such that would not allow the penetration of the antenna guy holddowns. At no time should the antenna guys be anchored to a vehicle.

SECTION V

OPERATION OF EQUIPMENT USED IN CONJUNCTION WITH THE MAJOR ITEM

2-11 This system is complete and only needs to be connected to a transceiver that operates in the 30 to 76 MHz range.

2-12 Refer to the Operation chapter of the appropriate TM publication for operation procedures of the transceiver you are using with the Antenna AS-2851/TR.

CAUTION

The Antenna AS-2851/TR is designed to operate in the 30 to 76 MHz range and should be used and operated in that frequency range only. The antenna should not be used for operation in any other region, for example 2 to 30 MHz frequency range, or with transceivers that transmit with high power such as AN/PRC-47, AN/MRC-83, AN/TRC-75 or the AN/TSC-15. Severe damage to the antenna or the radio set may result.

CHAPTER 3
 MAINTENANCE INSTRUCTIONS

SECTION I

INTRODUCTION

3-1 This chapter will describe the maintenance procedures to be performed on the Antenna AS-2851/TR.

3-2 SERVICE. Care should be taken when either using or carrying the system to keep the unit as clean as possible. Performing this service will insure maximum efficiency from the equipment.

3-3 ADJUST. No adjustments other than polarization changing or tightening of loose guy lines are required on this system.

3-4 INSPECT. Before assembly of the antenna begins, inspect the system carefully to detect imminent mechanical failure by scrutiny.

3-5 MAINTENANCE RECORD AND REPORT FORMS. All record and report forms which are required by current directives to be maintained by maintenance facilities shall be carefully processed in accordance with such directives.

SECTION II

TOOLS AND EQUIPMENT

3-6 Tools required for repair and replacing parts of the Antenna AS-2851/TR will be a small box of hand tools. Below is a list of tools or items needed to perform needed repair or in the replacement of a part or assembly.

Table 3-1 Tools and Equipment

| Tools and Equipment | Function |
|---|--|
| clean, dry cloth soft 1" paint brush WD 40 lubricant spray (or equal) Dow Corning Silicone Compound (or equal) electrical insulating tape | Antenna up-keep and maintenance. |
| hand tools | Antenna repair or assembly or part replacement |

SECTION III

PREVENTIVE MAINTENANCE SERVICES

3-7 PREVENTIVE MAINTENANCE. The service requirements performed prior to, during, and after operation of the system is all the preventive maintenance required to insure proper operation of the Antenna AS-2851/TR. Refer to Table 2-1 for daily servicing.

SECTION IV

TROUBLESHOOTING

3-8 GENERAL. This chapter contains information to aid in finding trouble or malfunction of the Antenna AS-2851/TR only. Also refer to TM publication on Troubleshooting for the transceiver you are using with this antenna system.

TROUBLESHOOTING INDEX

| Symptoms | Probable Cause | Correction |
|---|---|---|
| (1) Antenna array will not change polarization | (a) Polarization rope is binding or caught | (a) Lower antenna and untangle |
| | (b) Dirt or debris in polarization block | (b) Lower antenna and clean area of dirt, rocks or other debris |
| | (c) Swivel pin is adjusted too tightly in polarization block | (c) Lower antenna and loosen swivel pin slightly |
| (2) Antenna will not rotate to desired azimuth | (a) Adjusting screws in base tube clamp are too tight | (a) Loosen the two wing nuts on adjustment screws until mast will rotate freely |
| | (b) Antenna guys are too tight, thus not allow mast section to rotate freely inside guy ring assembly | (b) Loosen guy ropes slightly |
| | (c) Antenna array is binding against low hanging trees or other object | (c) Lower antenna and relocate in a clear area free from low overhanging branches or Trim low branches to allow the antenna to rotate without obstruction |
| (3) When transceiver is in operating order but no signal is received from antenna | (a) Cable assembly is not connected to antenna | (a) Lower antenna and tighten cable connector securely to antenna boom. Tighten all cable connections securely. |
| | (b) Dirt, debris, or Silicone Compound in connectors | (b) Clean connectors thoroughly |

| Symptoms | Probable Cause | Correction |
|---|---|--|
| (4) Elements do not snap in place | (c) Break in cable, causing short | (c) Check with ohm meter. If this check shows a break in the cable, replace the cable. |
| | (a) Dirt, rocks or debris are lodged in female end of element joint | (a) Clean joint thoroughly with clean cloth or soft brush |
| | (b) Flattened tube on female end of joint | (b) If damage is only slight, insert male end of joint and slowly bend the flattened edges into the original round shape or If damage is severe, replace entire element assembly |
| (5) Antenna sections do not lock together | (c) Broken cable in element section | (c) Replace entire element assembly |
| | (a) Dirt or debris in either the hinge and/or the latch | (a) Clean area thoroughly |
| | (b) Alignment plate in latch is bent | (b) Straighten plate to allow the latch to fasten securely |

SECTION V

ORGANIZATIONAL MAINTENANCE

3-9 GENERAL. This section contains first and second echelons maintenance procedures to be performed on the Antenna AS-2851/TR.

3-10 ORGANIZATION MAINTENANCE OF MECHANICAL PARTS. Organizational preventive maintenance shall be limited to the following:

a. Cleaning the electrical connectors on the RF cable using a clean, dry cloth or soft brush, and lubricating threads of connectors using a light spray of WD 40 lubricant.

b. Tightening loose cable connectors using fingers only: Do not use any hand tools.

c. Inspection of cable assemblies for torn jackets, abrasions, exposed braid, partially severed cables, or crushed cables.

(1) If jacket is severely abraided but braid not exposed, wrap abraided area with a layer of electrical insulating tape and apply very light coat of Dow Corning Sealing Compound or equal.

(2) If braid is exposed but not damaged, wrap the exposed braid plus six inches of cable on both ends of the exposure tightly with electrical insulating tape. Again apply a light coat of Dow Corning Sealing Compound or equal.

NOTE

If operation of the Antenna AS-2851/TR is in an area with heavy rainfall, a coating of Silicone Compound should be applied to the exterior of the connectors making sure that none is applied to the inside of the connectors.

(3) If the cable is crushed or partially severed, notify technical personnel for replacement.

- d. Inspect element connections at boom and if loose tighten using hand tools.
- e. Remove dirt and/or vegetation from joints on mast sections, antenna element sections and hinge. using a clean cloth or brush.
- f. Remove dirt and debris from antenna snap buttons and detent pins and inspect retaining leads on each pin for fraying or other signs of wear.
- g. Inspect guys and polarization rope for cuts, breaks, fraying, kinks, or deterioration. If any evidence of the above is found, the item should be replaced.
- h. Check tension of guys and condition of antenna guy holddowns after system is erected.
- j. All metal parts subject to corrosion shall be given a light coat of WD 40 spray or equal to deter corrosion.

3-11 REPLACEMENT OF PARTS OR ASSEMBLIES.

a. Replacing extensively damaged elements. Refer to Figure 3-1.

(1) Replace the entire damaged element by removing the 3/8" nut located on the inside wall of the boom section;

- (2) Insert a new element;
- (3) Tighten the 3/8" nut securely.

b. Replacing the front boom assembly.

(1) Remove the RF cable.

- (a) Refer to Figure 3-1 and cut away plastic cover over feedpoint.
- (b) Loosen the #4-40 x 1/8" set screw at the front end of the boom.
- (c) Loosen the 3/8" jam nut to free the braid.
- (d) Pull the end of the RF cable thru the hole in the upper boom section of the rear boom assembly.
- (e) Remove the #6 screw holding each of the two cable clips to the boom.

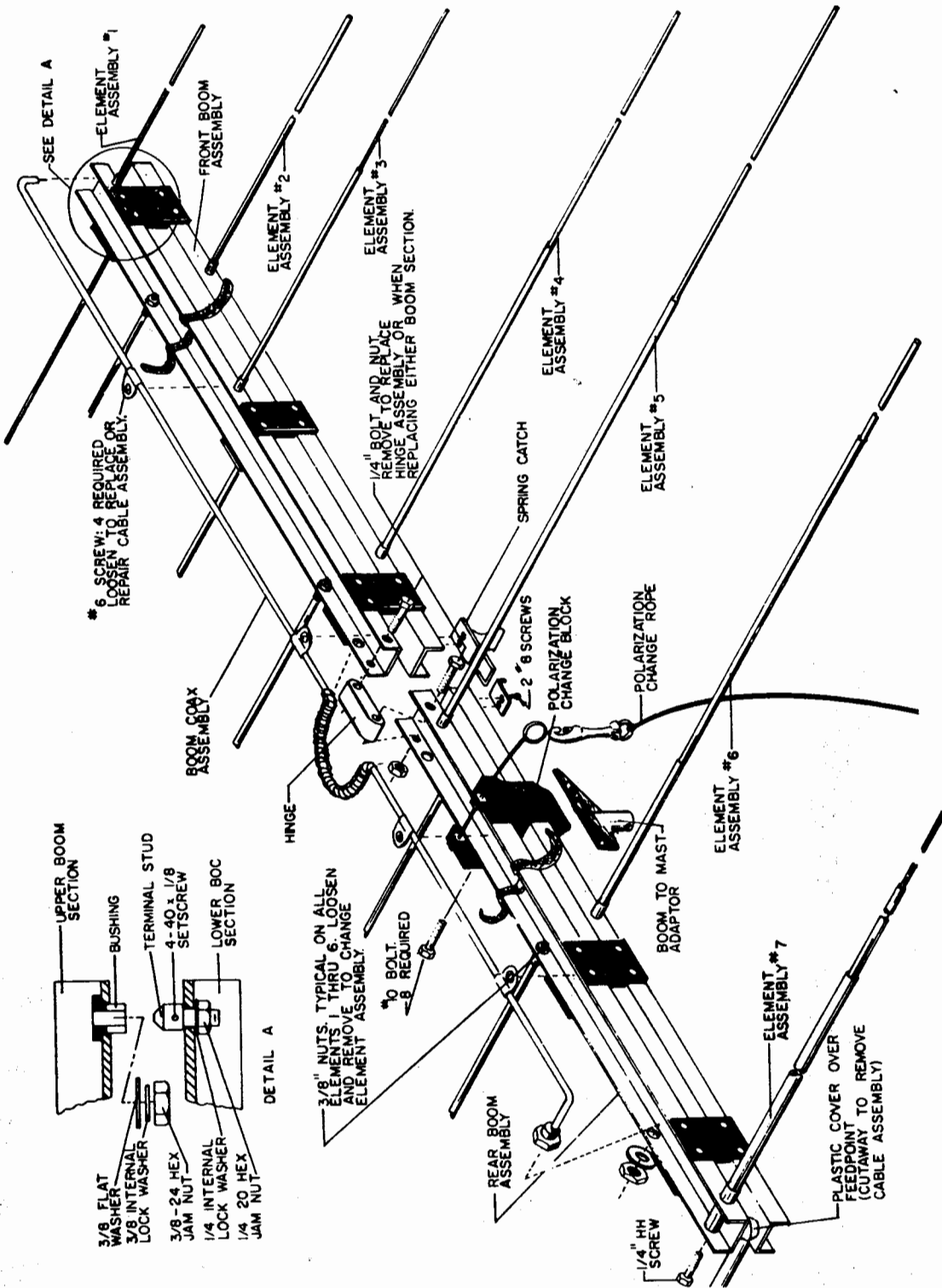


Figure 3-1 Detail View of Antenna Array

(2) Remove the 1/4" bolt from the hinge in the top boom section of the front and rear boom assemblies.

(3) Remove the two #8 screws holding the luggage catch to the lower boom section of the rear boom assembly.

(4) Remove the elements from the damaged boom assembly by removing the 3/8" nuts located on the inside wall of the boom section.

(5) Replace damaged boom section with new section.

(6) Reassemble elements, hinge, luggage catch and RF cable by reversing the procedures listed in steps a. through d. above.

c. REPLACING BROKEN OR DAMAGED RF CABLE.

(1) Repeat the procedure in paragraph 3-11 b., step 1.

(2) Remove the remaining two clips on the upper section of the rear boom assembly.

(3) Remove the nut from the RF cable connector and pull connector back out thru hole.

(4) Replace new RF cable making sure the spring and RF cable are inserted in the holes as shown in Figure 3-1.

(5) Fasten the new RF cable securely to the boom by reversing steps a. thru c. above.

d. REPLACING DAMAGED REAR BOOM ASSEMBLY.

(1) Remove the RF cable from the rear boom assembly.

(2) Remove the 1/4" bolt at the boom hinge.

(3) Remove bolt from hinge assembly.

(4) Loosen and remove the two #8 screws from the luggage catch.

(5) Remove the eight #10 bolts holding the polarization block to the rear boom assembly.

(6) Unscrew the #5, 6 and 7 elements from the rear boom assembly.

(7) Replace damaged rear boom assembly with new assembly.

(8) Replace any damaged elements with new ones.

(9) Reattach the RF cable, the hinge and the luggage catch assemblies.

(10) Attach the polarization block to the new rear boom assembly.

(11) Check to make sure all connections are tight.

e. **REPLACEMENT OF CONNECTORS ON RF CABLE.** Install the connectors in accordance with manufacturer's specifications and instructions on RF cable preparation.

f. **REPLACEMENT OF LOCKING PIN ASSEMBLY.**

(1) If the small cable on the locking pin assembly should break, or if the ring or pin is bent or severely damaged, the entire assembly should be replaced with a new locking pin assembly.

g. Replacing either the antenna snap button or antenna snap ring can be accomplished by:

(1) Pushing antenna snap button completely thru the wall of the mast section.

(2) With pair of thin nosed pliers, reach down the end of the tube and pull both the antenna snap ring and antenna snap button from the tube.

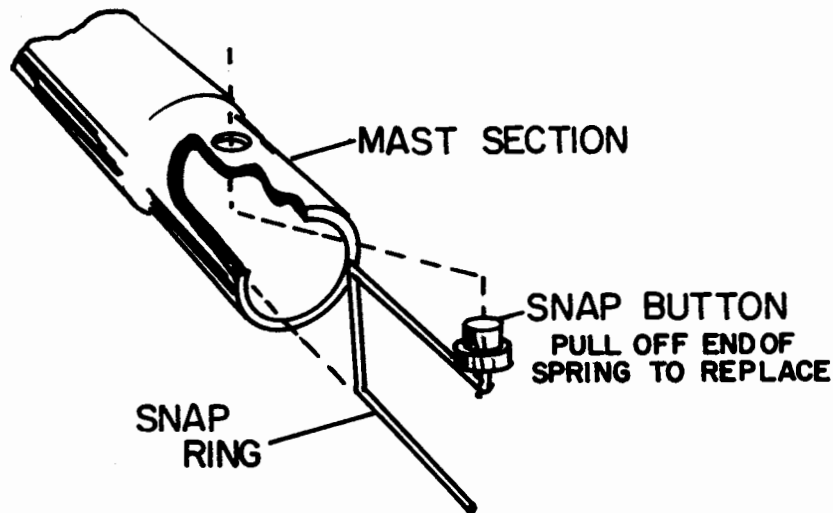


Figure 3-2 Repair of Antenna Snap Button or Antenna Snap Ring

(3) Remove the antenna snap button from the antenna snap ring and replace defective part.

(4) Push the antenna snap ring and antenna snap button into tube. Align the hole with antenna snap button and allow the antenna snap button to reseat back in the hole. Refer to Figure 3-2.

h. **REPLACING ROPE WINDER.**

(1) Loosen braid holding end of rope. Push the loosened portion toward the loop. The inner rope then can be pulled free from the outer braid.

(2) Slide rope snap and winder off rope.

(3) Insert one end of winder on rope.

(4) Replace snap and opposite end of winder on rope winder.

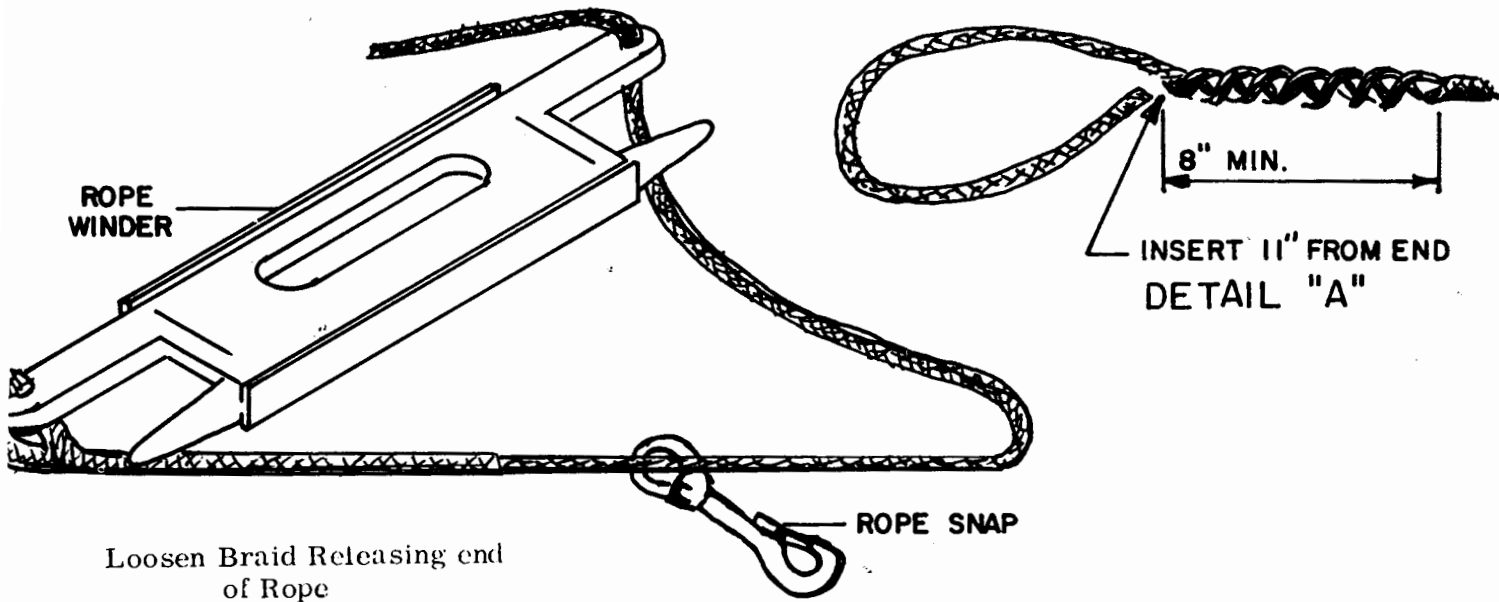


Figure 3-3 Replacing Rope Winder

(5) Terminate by opening braid of rope and inserting end a distance of 8" and pull tight. Refer to Figure 3-3.

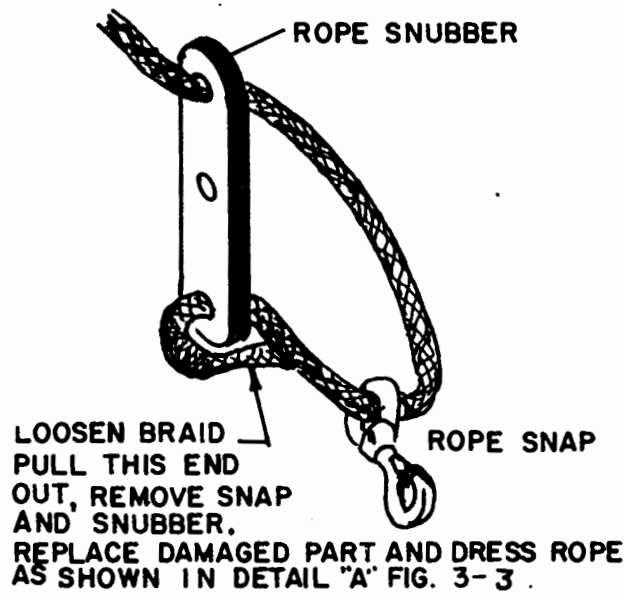


Figure 3-4 Replacing Rope Snubber

j. REPLACING ROPE SNUBBER.

(1) Cut rope 10" from lower end as shown in Figure 3-4.

(2) Remove rope snap and rope snubber.

(3) Replace defective rope snubber and reinsert rope snap.

(4) Insert rope thru opposite end of rope snubber and fasten by opening braid of rope, insert end a distance of at least 8", pull tight.

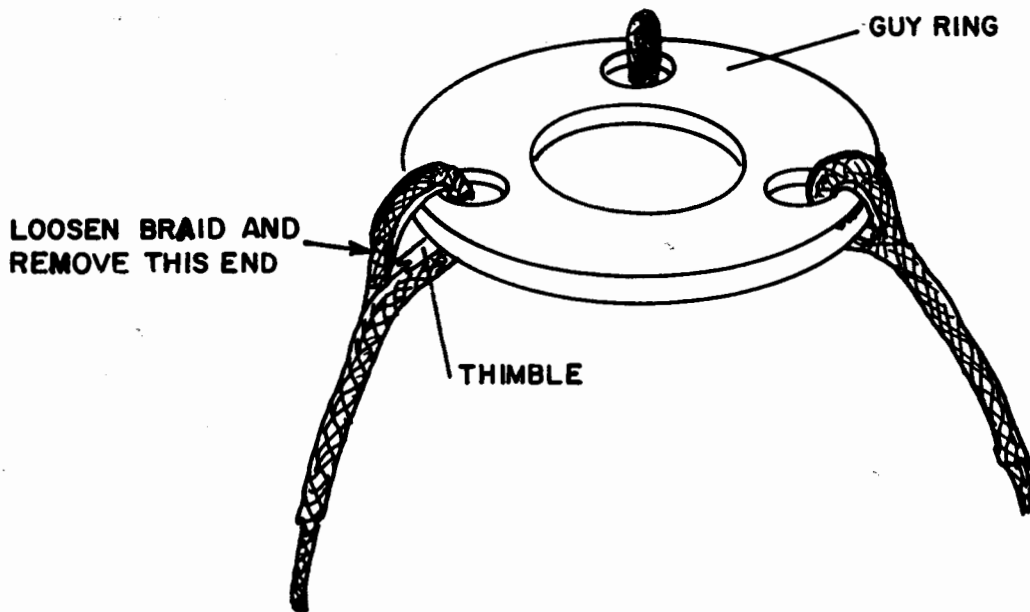


Figure 3-5 Replacing Guy Ring

k. REPLACING ANTENNA GUY RING.

(1) Loosen braid holding end of rope. Push the loosened portion toward the loop. The inner rope then can be pulled free from the outer braid.

(2) Pull rope and thimble from guy ring being careful not to damage any of the thimbles.

(3) Replace broken guy ring.

(4) Reinsert the three thimbles and guy ropes in the holes of the guy ring.

(5) Allowing for a 2" diameter loop in the rope, open the braid and insert the end of the rope at least 8" and pull tight.

l. REPLACING MAST CLAMP.

(1) After the antenna has been lowered, remove lower metal mast section from base tube clamp by removing the two wing nuts. Refer to Figure 3-6.

- (2) Remove the 1/4" lock nut from the lower 1/4" x 3" bolt.
- (3) Pull 3" bolt back thru base tube clamps and tabs on mast base assembly.
- (4) Replace the damaged base tube clamp and reassemble the clamps with the 1/4" hardware making sure the 3" bolt is assembled in the bottom hole.
- (5) Insert the lower mast section and tighten all hardware securely.

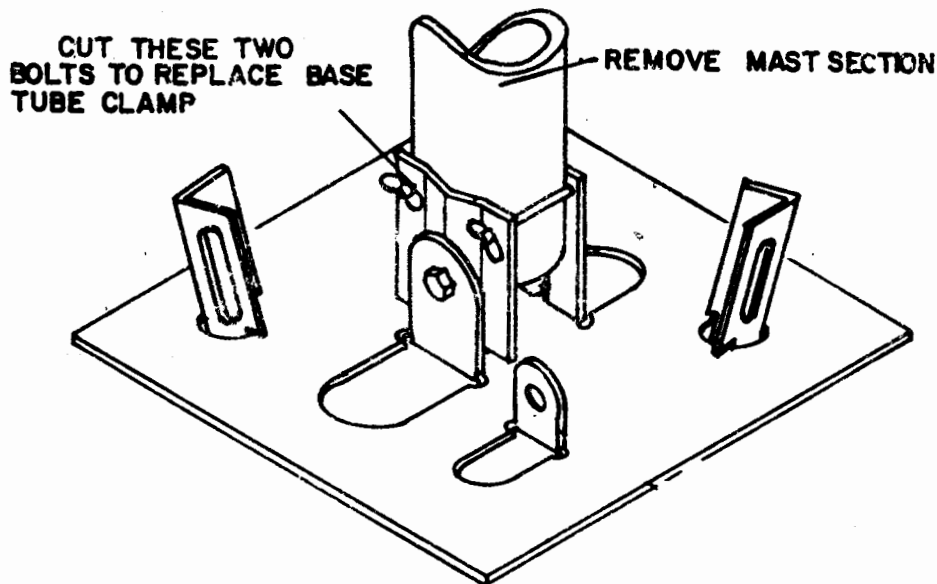


Figure 3-6 Replacing Base Tube Clamp

m. REPLACING BOOM TO MAST ADAPTER.

- (1) Refer to Figure 3-7 and remove boom to mast adapter from upper fiber-glass mast assembly by removing the retaining pin.
- (2) Remove the bolt holding the adapter to the polarization block.
- (3) Replace the damaged boom to mast adapter.

n. REPAIRING OR REPLACING MAST BASE ASSEMBLY.

- (1) Lower antenna and remove mast assembly from base tube clamp.
- (2) Remove antenna guy holddown holding mast base assembly securely to ground.
- (3) Unsnap polarization change rope from tab on mast base assembly.
- (4) Remove 1/4 x 3" bolt holding base tube clamp to the two larger tabs on mast base assembly.

(5) Replace damaged mast base assembly and reassemble polarization rope, base tube clamps, etc. as required.

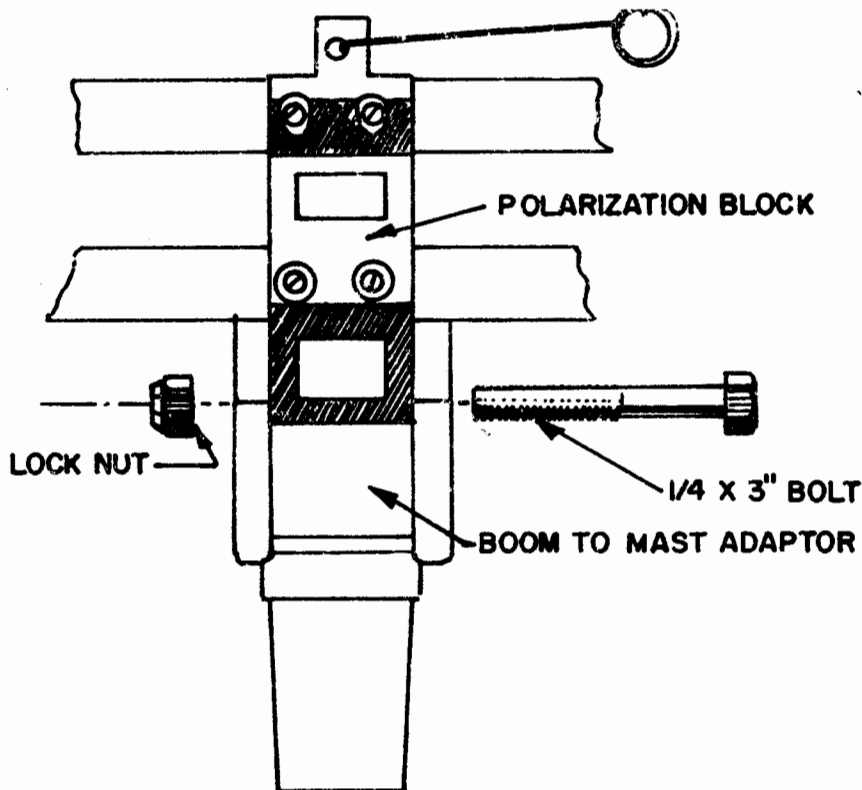


Figure 3-7 Replacing Boom to Mast Adapter

o. REPAIR OF 75' CABLE ASSEMBLY. Repair of severely damaged cable assembly can be accomplished by replacement.

(1) Disconnect the connector on the cable assembly at the antenna boom.

(2) Disconnect the cable connector from the transmitter and install replacement.

p. REPAIR OF DAMAGED ELEMENTS.

(1) If the end of one of the joints is flattened slightly, insert the male end of the joint into the flattened portion. Slight pressure in most cases will repair the end to allow the male end to snap into place correctly.

(2) A tube slightly flattened a distance from the end will not cause a problem, unless it is flattened severely and binds the small cable or spring located in the tube. If damage is this extensive, replace.

SECTION VI

FIELD MAINTENANCE

3-12 MAINTENANCE PROCEDURES. Maintenance to be performed by third or fourth echelon maintenance personnel on this system are repair and replacement of the front or rear boom sections, mast sections, element assemblies, guy ring, mast base assembly. Field maintenance personnel will also be responsible for continuity testing on antenna.

3-13 TESTING. For testing and electrical check-out of antenna, refer to the following paragraph and the appropriate TM for the transceiver equipment you are using.

a. Remove termination coil assembly by unscrewing the two pan head screws at the rear end of the boom assembly allowing the termination coil to be slid out as shown in Figure 3-8. Using an ohm meter, check termination coil for continuity. Replace with new coil if continuity does not exist.

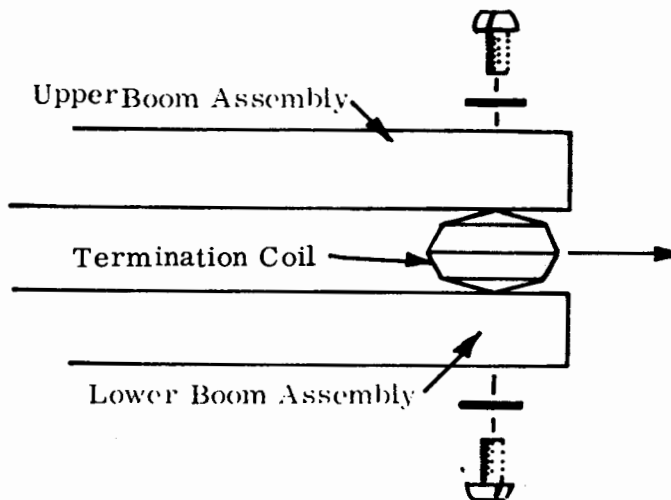


Figure 3-8 Removing and Checking Termination Coil

With termination coil removed, continuity should not be present between upper boom and lower boom. If continuity exists between booms either the RF cable in the antenna is damaged or the antenna feedpoint is dirty.

b.- Check circuit between center conductor of input connector of antenna and lower boom section. Continuity should be present, if not check for broken coax center conductor.

c. Check circuit between center conductor of input connector of antenna and upper boom section. No continuity should be present. If continuity exists, check for dirt or debris in feedpoint cover or short in coaxial feedline. If feedline is shorted, replace.

d. Check circuit between outer conductor of input connector of antenna and top boom. Input connector of antenna must be removed and isolated from antenna boom. This check should show continuity. If not, coaxial feedline is damaged and should be repaired or replaced.

e. Reconnect termination coil assembly and connect to boom as shown in Figure 3-8. Check 75' coaxial cable assembly.

f. Check the 75' RF cable by attaching a lead of the ohm meter to the center conductor pin and the outer conductor. Continuity should not exist. Check circuit between outer conductor of the connectors on the 75' RF cable and the circuit between the center conductor pins of the two connectors on the RF cable. These two checks should show continuity.

3-14 OVERHAUL. If the responsible commanding officer determines that the antenna ring stop or the mast plug can be overhauled rather than replaced, perform the following steps.

a. Overhaul of the antenna ring stop on top metal mast section.

(1) Grind off the remains of the antenna ring stop from the mast section. This should leave the mast section clean and smooth.

(2) Replace antenna ring stop by inserting over end and sliding down mast section as far as possible.

(3) Fasten in place by applying epoxy hardener and epoxy resin. Allow to set until mixture becomes hard. Refer to Figure 3-9.

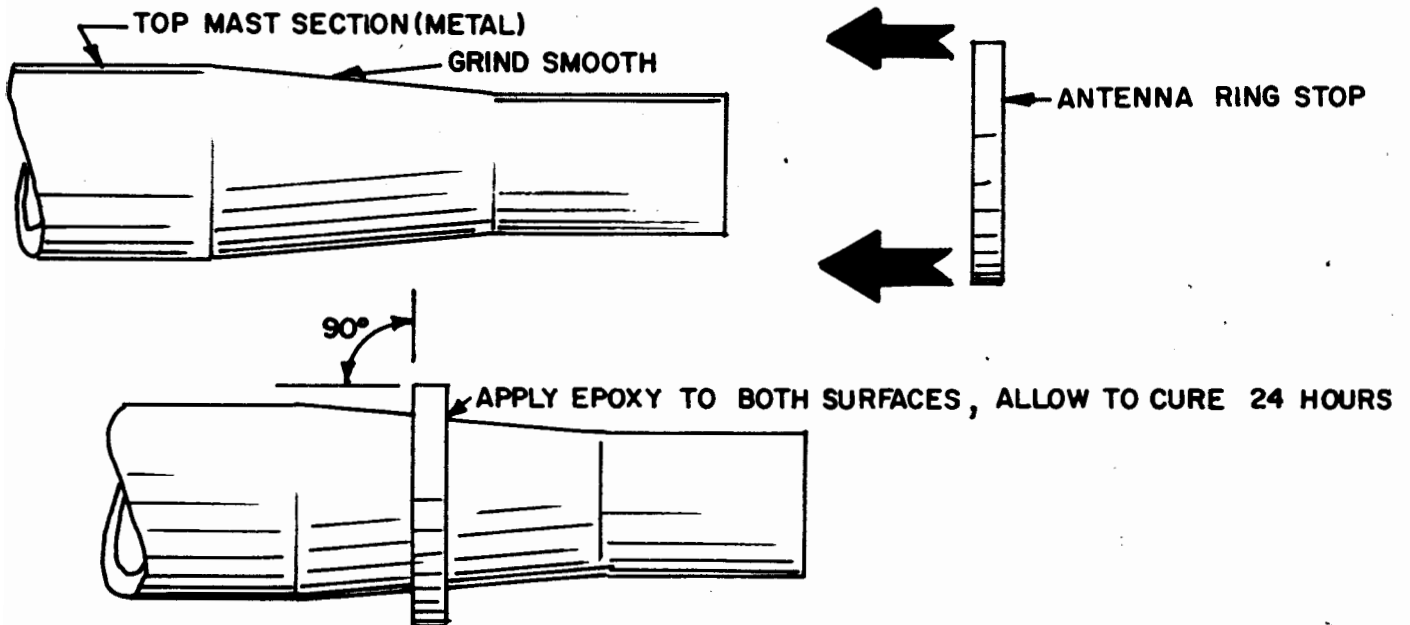


Figure 3-9 Replacing Antenna Ring Stop

b. Overhaul procedures for replacing mast plug.

(1) Using a barrel sander or a 1 1/2" reamer, remove excess pieces of mast plug and epoxy from inside wall of upper fiberglass mast section. The reamer or sander whichever is used, must be allowed to penetrate a minimum of 5" into the mast section.

(2) After all pieces of the plug and epoxy have been removed, epoxy outside wall of new mast plug 6" from end by following instructions on epoxy kit (not supplied with this product). Epoxy should be applied to both surfaces. Refer to Figure 3-10.

(3) The new mast plug should then be inserted to a depth of 6".

(4) Once the mast plug is in place allow epoxy to dry and cure undisturbed for a period of 24 hours.

c. If mast plug rotates in mast section but will not pull out of mast section.

(1) Crush the mast plug by putting into vice or smashing with hammer.

(2) Remove the loose pieces from the mast section.

(3) Ream or sand inside wall of mast and replace with new mast plug as described in paragraph 3-14, b, steps 1 thru 4.

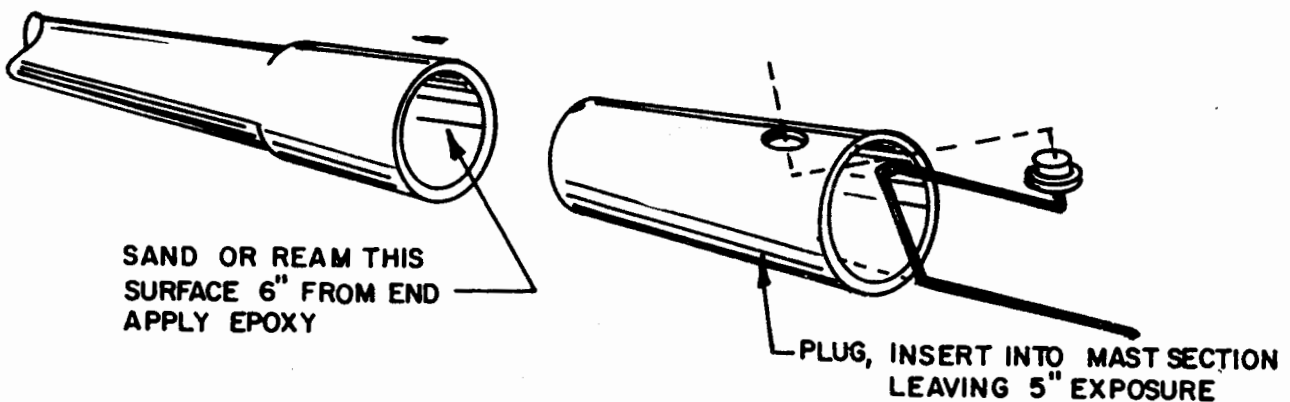


Figure 3-10 Replacing Mast Plug

SECTION VII

CARE AND PREPARATION FOR STORAGE

3-15 LONG TERM STORAGE. This Antenna AS-2851/TR is protected from adverse weather conditions when new by corrosive inhibitor and then painted. Storage up to 3 months under any weather conditions when this system is new, will not affect the efficiency or mechanical parts. If the system has been used to the point that some of the paint has been chipped or worn, repainting or touch-up work on these areas with a good epoxy enamel paint such as TTE-485 or any paint meeting Federal Standard 535 would be advisable if the antenna will be stored in a tropical region or subject to wet or humid conditions. The antenna is packed in a canvas bag and while affording some weather protection to the antenna, is not waterproof.