# TECHNICAL MANUAL

# OPERATOR'S AND UNIT MAINTENANCE MANUAL

# IMPROVED FLOAT BRIDGE (RIBBON BRIDGE) CONSISTING OF:

## TRANSPORTER

| | |
|---|---|
| CONDEC MODEL 2280 | NSN 5420-00-071-5321 |
| CONDEC MODEL 2305 | NSN 5420-01-173-2020 |
| PACAR MODEL 9999 | NSN 5420-01-175-6523 |
| SOUTHWEST MODEL RBT | NSN 5420-01-175-6524 |

### INTERIOR BAY

| | |
|---|---|
| CONDEC MODEL 2282 | NSN 5420-00-071-5322 |
| CONDEC MODEL 2307 | NSN 5420-01-173-2022 |
| SPACE MODEL 66981 | NSN 5420-01-175-6526 |

### RAMP BAY

| | |
|---|---|
| CONDEC MODEL 2281 | NSN 5420-00-497-5276 |
| CONDEC MODEL 2306 | NSN 5420-01-174-8084 |
| SPACE MODEL 6698R | NSN 5420-01-175-6525 |

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HEADQUARTERS, DEPARTMENT OF THE ARMY

SEPTEMBER 1993

**WARNING**

Stand clear of bays and winch cable during lifting and lowering operations. Ensure that roadway/bow foldlock latch is in good mechanical condition and securely latched before attempting to lift bays/pontons. Failure to comply may result in personnel injury or equipment damage.

**WARNING**

Do not sit, Iie or stand in front of boat push knees at anytime while riding on bays. Failure to comply may result in personnel injury or death.

**WARNING**

Do not launch or retrieve bays with transporter towing pintle in place. Remove and invert pintle (facing rear axles).

**WARNING**

When disconnecting any hydraulic line, open line slowly and protect face; hydraulic oil may spray out due to residual pressure in system.

**WARNING**

When using spare tire, ensure that area underneath tire carrier is clear. When pawl is released from the ratchet, tire and wheel will free fall. Injury to personnel may result.

**WARNING**

Always wear leather gloves when handling winch cable. Never allow cable to run through bare hands.

**WARNING**

Prior to working under or on boom, support boom by blocking or other suitable means.

**WARNING**

Dry cleaning solvent, PD-680, used in cleaning parts, is potentially dangerous to personnel. Avoid prolonged and repeated skin contact or inhalation. Use only in well ventilated area and wear rubber gloves. Do not use near open flame or excessive heat. Flash point of solvent is 100°F - 138°F (38°C - 59°C).

**WARNING**

Do not perform maintenance on equipment while it is being operated. Do not allow traffic on bridge or raft until lower lock drive pins and roadway to bow latches are secure and locked into position.

**WARNING**

Do not stand, sit, lie, or place hands and arms under pontons when installing attaching parts.

**WARNING**

Stand clear of bays during Iaunch/retrieval operations and while connecting bays. Bay may come together with considerable force. Severe personnel injury, death or equipment damage could result.

**WARNING**

Disengage PTO if bay is not to be launched immediately.

**Change No. 2**

**HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C. 15 NOVEMBER 2005**

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NO. 5-5420-209-12

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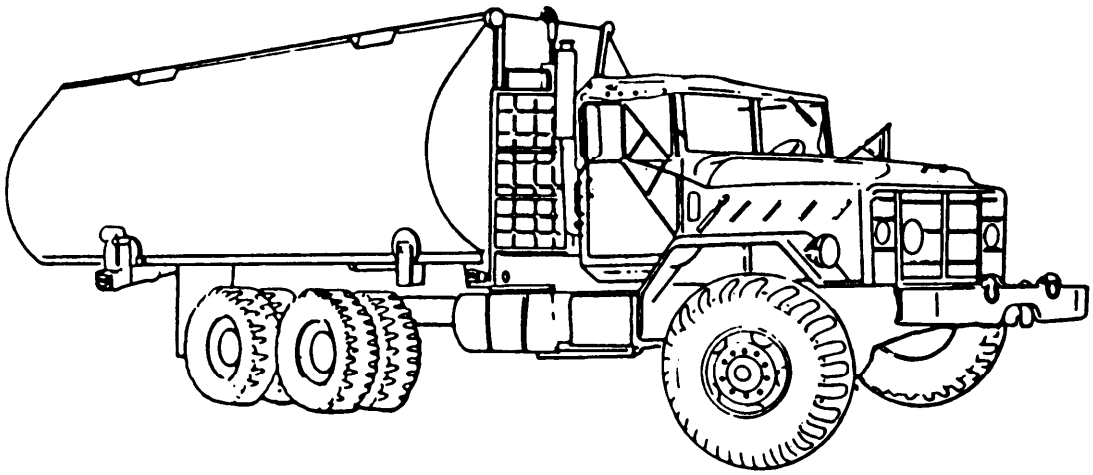

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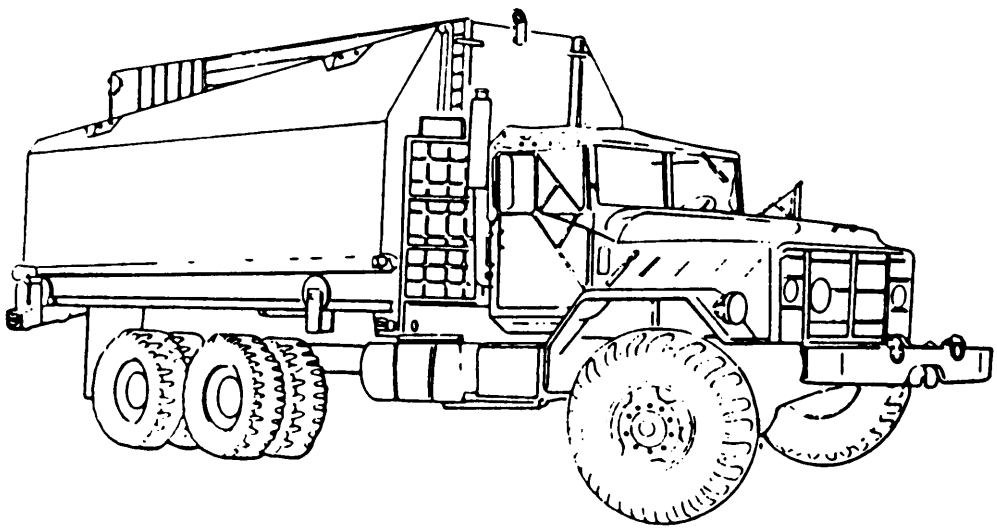

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INTERIOR BAY ON TRANSPORTER



RAMP BAY ON TRANSPORTER

*Figure 1-1. Improved Float Bridge (Ribbon Bridge).*

# CHAPTER 1

# INTRODUCTION

## OVERVIEW

This chapter contains an introduction and general information pertaining to the Improved Float Bridge (Ribbon Bridge) and its components (figure 1-1 ).


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## Section I. GENERAL


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1-1. **SCOPE.** Thechnical manual contains instructions for operating and maintaining the Improved Float Bridge (Ribbon Bridge), consisting of transporter, less chassis; Interior Bay, and Ramp Bay. Instructions provided cover operation, Iubrication, preventive maintenance checks and services, troubleshooting, and maintenance procedures as allocated by the Maintenance Allocation Chart. Descriptions of main components and their relationship to the end item are also included.

Instructions and information pertaining to the basic M812 truck components, used as part of the Ribbon Bridge Transporter, are contained in TM 9-2320-260-10 and TM 9-2320-260-20; and for the M945 truck components, TM 9-2320-272-10 and TM 9-2320-272-20. These manuals should be utilized when performing lubrication, preventive maintenance, and the maintenance on the truck components.

1-2. **Maintenance Forms and Records.**

a. DA Form 2402 (Exchange Tag).

b. DA Form 2404 (Equipment Maintenance and lnspection Worksheet).

c. DA Form 5504 (Maintenance Request Used for Requesting Support Maintenance).

d. For additional forms and records pertaining to your particular equipment refer to DA PAM 738-750 (The Army Maintenance Management Systems (TAMMS)).

1-3. **Hand Receipt (HR) Manuals.** This manual has a companion document with a TM number followed by "-HR" (which stands for "Hand Receipt"). The TM 5-5420-209-12-HR consists of preprinted hand receipts (DA Form 2062) and lists end item related equipment (i.e., COEI, BIIL, and AAL) you must account for. As an aid to property accountability, additional -HR manuals may be requisitioned from the U.S. Army Publications Distribution Center, 2800 Eastern Blvd., Baltimore, MD 21220-2896, in accordance with Chapter 12 of AR 25-30.

1-4. **Preparation for Storage or Shipment.** Refer to Chapter 4, Section VI for instructions to place Ribbon Bridge into storage.

1-5. **Destruction of Army Materiel to Prevent Enemy Use.**

*a. Authority.* The bridge will be destroyed if it is in danger of being captured and used by the enemy, and by order of the unit Commander.

*b. Methods.* The recommended method of rendering a floating bridge useless is to sink the pontons. Using heavy tools or weapons fire, puncture holes in as many pontons as possible. The use of explosive charges to sink pontons and destroy the more important bridge sections is also an effective way of destroying this type of bridge.

1-6. **Reporting of Equipment Improvement Recommendations.** If your ribbon bridge needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to us at: Commander, U.S. Army Aviation and Troop Command, Attn: AMSAT-I-MDO, 4300 Goodfellow Boulevard, St. Louis, MO 63120-1798. We will send you a reply.

1-7. **List of Abbreviations.**

| | |
|---|---|
| CL | Center Line |
| FPS | Feet Per Second |
| PTO | Power Take-Off |

## Section II. EQUIPMENT DESCRIPTION AND DATA


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1-8. **Equipment Characteristics and Features.**

*a. General.* The Ribbon Bridge is a floating, modular bridge with integral superstructure and floating supports. A complete ribbon bridge consists of a ramp bay at each bank and the required number of interior bays to complete the bridge between the ramp bays. The bridge has a roadway width of 13 ft 5 in. (408.9 cm). In addition, there are two 4-foot (121.9 cm) wide walkways on the bow pontons. The normal crossing capability is a class 70 load in currents up to 8 feet per second. Individual bays may be joined to form a raft for ferrying operations. Each bay is transported in a folded condition on a ribbon bridge transporter.

*b*. *Transporter.* The transporter (fig. 1-2) is a modified U.S. Army M812 truck chassis or a modified U.S. Army M945 truck chassis which provides a self-contained unit for transporting, launching, and retrieving the bays and the boats. An 11,000-pound capacity winch works in conjunction with the boom to provide loading and unloading capacity.

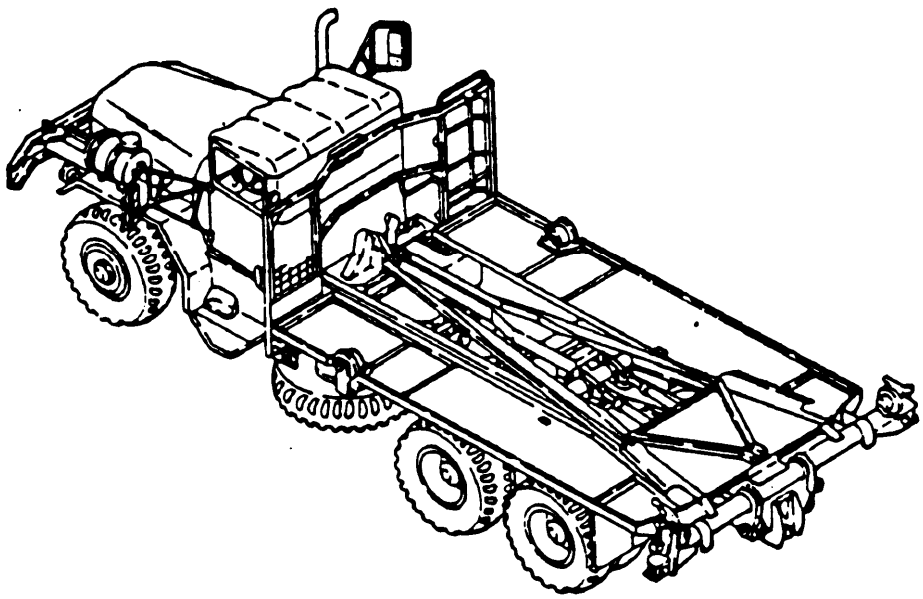


***Figure 1-2. Transporter.***

*c*. *Interior Bay.* Each bridge interior bay (fig. 1-3) is a 4-ponton folding module consisting of two roadway pontons and two bow pontons. The two interior roadway pontons are joined to each other and to the adjacent pontons by latches, hinges and pins. The roadway pontons are the main load carrying structure of the bridge. Each ponton is divided into two watertight compartments.

*d*. *Ramp Bay.* The construction of the ramp bay (fig. 1-4) is similar to that of the interior bay except that the shore end is tapered. The bridge hydraulic system permits ramp adjustments from 0 degrees up to 20 degrees, (0 to 0.349 radian) thus providing for various bank conditions.

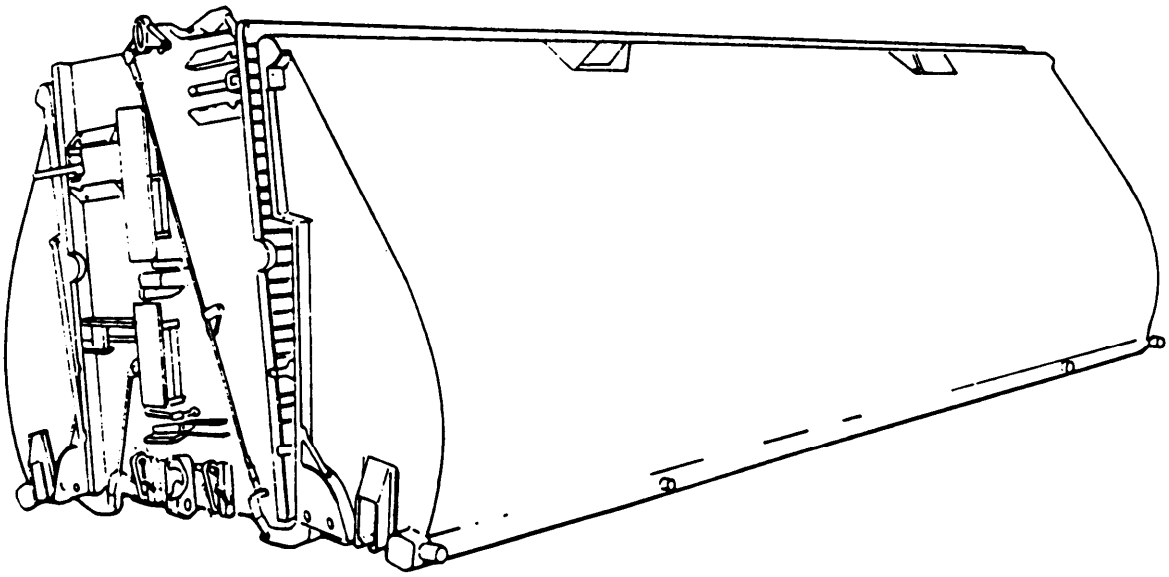


*Figure 1-3. Interior Bay.*

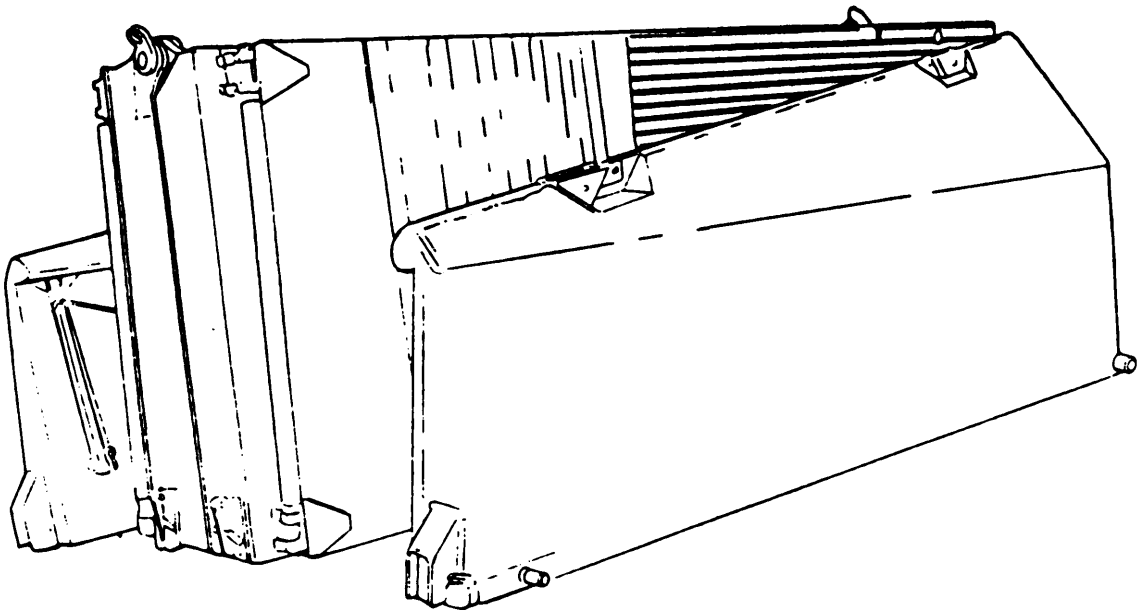


*Figure 1-4. Ramp Bay, Ramp End.*

## 1-9. **Location and Description of Major Components.**

*a. Transporter.* There are several different models of the transporter in operation, however the location and description of major components are similar to figure 1-5.

Operator's control stand (1). Platform from which operator controls loading and unloading.

Boom (2). When used in conjunction with hydraulic winch, provides loading and unloading capability.

Rollers (3). Helps center bays on the transporter, and provides a rolling surface for the bays to ride on during loading and unloading.

Aft tiedown hooks (4). Serve as tiedown locks for the aft end of bay during transport, and are stop/seat for front end of bay during loading and unloading of bays.

Hydraulic winch (5). Used in conjunction with boom for loading and unloading bays.

Walkways (6). Provides area for walking on transporter as needed when performing maintenance.

Cable Tensioner (7). (Model RBT only) Pays out and plays in winch cable under controlled tension.

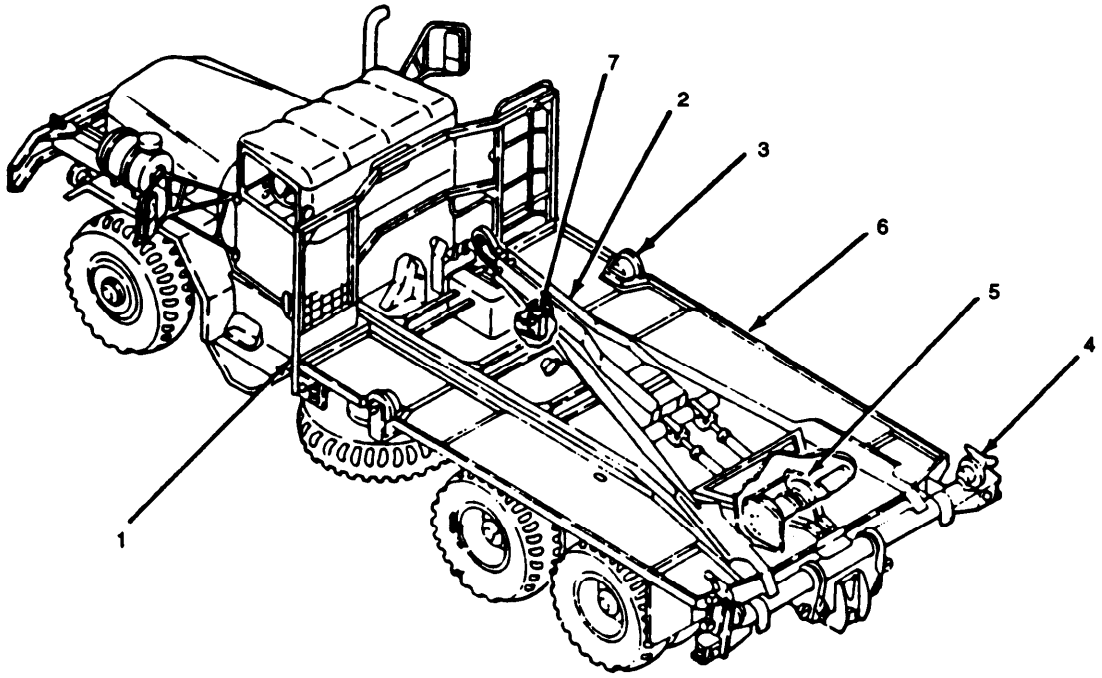



***Figure 1-5. Location and Description of Major Components, Transporter.***

*b*. *Interior Bay.* (figure 1-6)

Bay upper connectors (dogbones) (1). Connect to adjacent bays and helps prevent separation of bays during operation.

Roadway ponton upper connectors (dogbones) (2). Connect to opposite side roadway ponton to prevent separation of roadways during operation.

Roadway (3). Provides a flat road surface for vehicles using bridge.

Walkway (4). Provides a separate path for personnel to use when crossing the bridge.

Bow ponton (5). Provides additional flotation and personnel walkway.

Roadway ponton (6). Supports roadway and is the major load carrying member of the bay.

Lower lock drive (7). Secures bays to one another.

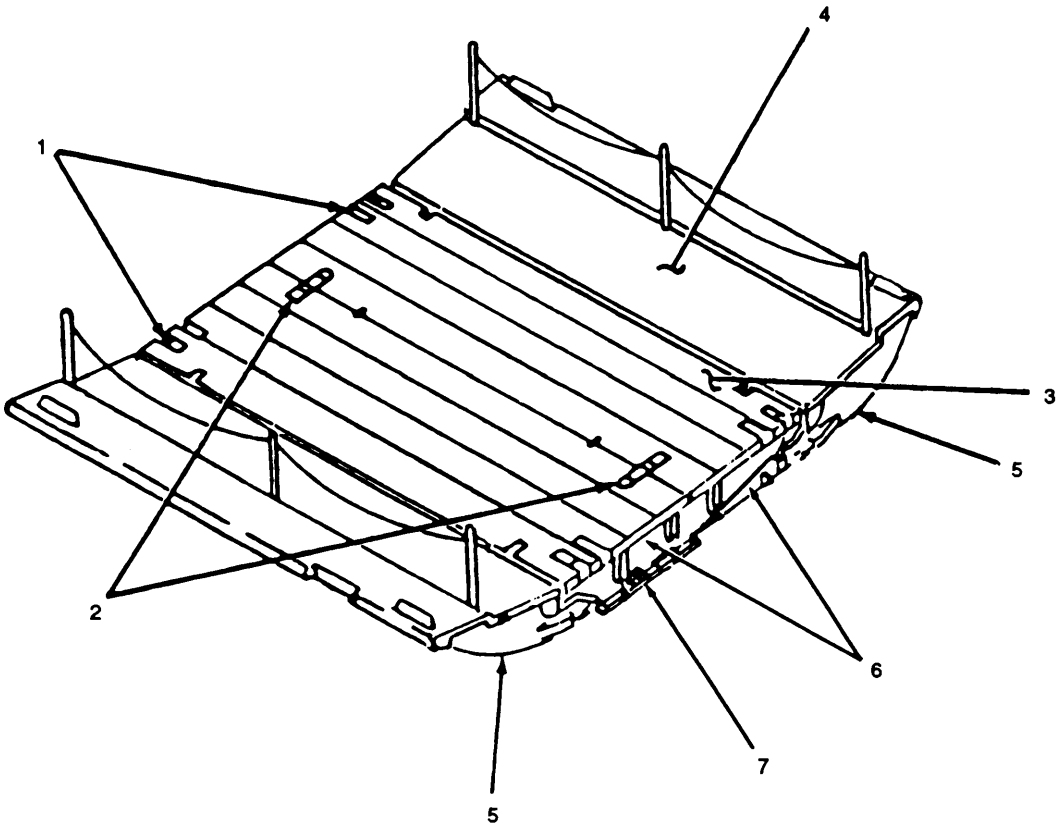



***Figure 1-6. Location and Description of Major Components, Interior Bay***

*c.* *Ramp Bay.* (figure 1-7)

Bay upper connectors (1). Connects to adjacent bays to prevent separation of bays during operation.

Roadway ponton upper connectors (2). Connects to opposite side roadway to prevent separation of roadwavs during operation.

Bow pontons (3). Provides additional flotation and personnel walkway.

Approach ramps (4). Provides access to various types of bank conditions.

Roadways (5). Provides a flat road surface for vehicles using bridge.

Walkways (6). Provides a separate path for personnel to use when crossing the bridge.

Hydraulic pumps (7). Provide pressure to hydraulic system to raise and lower the ramp bay.

Roadway pontons (8). Supports roadway and is the major load carrying member of the bay.

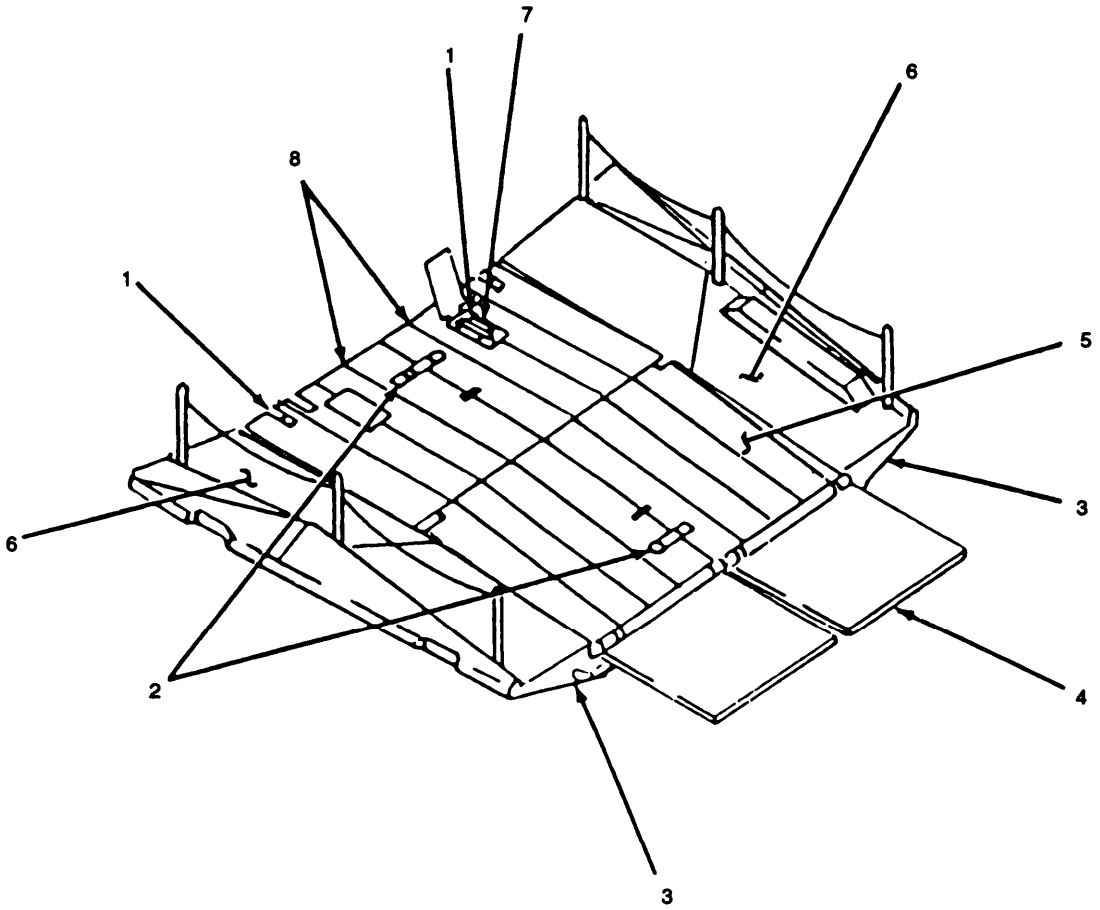



***Figure 1-7. Location and Description of Major Components Ramp Bay.***

1-10. **Equipment Data.**

*a. Transporter.*

| | |
|---|---|
| Length | 376 in. (9,400 mm) |
| Height (unloaded) | 116.6 in. (2,946 mm) |
| Height (bay loaded) | 154 in. (3,910 mm) |
| Height (loaded with ramp bay) | 210.7 in. (535.17 cm) |
| Height (loaded with interior bay) | 207.6 in. (527.30 cm) |
| Height (loaded with boat and cradle) | 212.9 in. (548.76 cm) |
| Wheelbase | 187 in. (4,750 mm) |
| Width | 135 in. (3,429 mm) |
| Weight (empty) | 27,400 lbs. (12,500 kg) |
| Ground clearance (under axle) | 14.5 in. (369 mm) |
| Ground clearance (under chassis) | |
| Front | 31.5 in. (800 mm) |
| Rear | 37.5 in. (952 mm) |
| Maximum towed loaded (pintle) | |
| Highway | 30,000 lbs. (13,620 kg) |
| Cross-country | 15,500 lbs. (6,810 kg) |
| Maximum payload | |
| Highway | 20,000 lbs. (9,072 kg) |
| Cross-country | 12,000 lbs. (5,443 kg) |
| Shipping cubage | 3,408 ft3 (96.5 m3) |
| Shipping tonage | 14.3 tons (12.9 metric tons) |

*b. Transporter & Model RBT.*

| | |
|---|---|
| Length | 360 in. (9,144 mm) |
| Height (unloaded) | 136.5 (346.7 cm) |
| Height (bay loaded) | |
| Height (loaded with ramp bay) | 337.1 in. (856.23 cm) |
| Height (loaded with interior bay) | 334.0 in. (848.36 cm) |
| Height (loaded with boat and cradle) | 339.3 in. (861.82) |
| Wheelbase | 243 in. (1,672 mm) |
| Width | 98 in. (2,489 mm) |
| Weight (empty) | 28,600 lb (12,984 kg) |
| Ground clearance (under axle) | 11.5 in. (292 mm) |
| Ground clearance (under chassis) | 10.5 in. (267 mm) |
| Maximum towed loaded (pintle) | |
| Highway | 20,000 lbs. (9.07 metric tons) |
| Cross-country | 12,000 lbs. (5,443 kg) |
| Maximum payload | |
| Highway | 20,000 lbs. (9,072 kg) |
| Cross-country | 12,000 lbs. (5,443 kg) |
| Shipping cubage | 2,780 ft3 (77.8 m3) |
| Shipping tonage | 14.7 tons (13.3 metric tons) |

*c. Interior Bay.*

| | |
|---|---|
| Length | 272.5 in. (6,920 mm) |

1-10. **Equipment Data - Continued**

| | |
|---|---|
| Width: | |
| Folded | 126.6 in. (3,220 mm) |
| Unfolded | 320 in. (8,130 mm) |
| Height | |
| Folded | 91 in. (2,310 mm) |
| Unfolded | 44 in. (1,120 mm) |
| Weight | 12,000 lbs. (5,579 kg) |
| Cubage | 1,817 ft3 (50.9 m3) |
| Center of Gravity (inboard of connecting lock pin) | 136.25 in.(346 cm) |

*d. Ramp Bay.*

| | |
|---|---|
| Length | 228.7 in. (5,810 mm) |
| Length (with approach ramps extended) | 304 in. (7,720 mm) |
| Width | |
| Folded | 128 in. (3,200 mm) |
| Unfolded | 320 in. (8,150 mm) |
| Height | |
| Folded | 94.1 in. (2,390 mm) |
| Unfolded | 43 in. (1,090 mm) |
| Weight | 11,700 lbs. (5,473 kg) |
| Cubage | 1,566 ft3 (43.8 m3) |
| Center of Gravity (inboard of connecting lock pin) | 96 in. (2,438 mm) |

*e. Fluid Capabilities.*

| | |
|---|---|
| Transporter Hydraulic Reservoir (OE/HDO-30) | 10 gal. (37.9 L) |
| Winch Oil (GO-90) | |
| ModeI 11-S-EC | 3 pt. (1.4 L) |
| Model PG 115-043R | 3 qt. (2.8 L) |
| Ramp Bay Hydraulic Pump Reservoirs (OE/HDO-30) | 1.25 gal. (5.7 L) |

1-11. **Differences Between Models.** There are no differences between models of the interior bays or ramp bays. There are minor differences between models of transporter as follows.

Transporter Model RBT is equipped with a cable tensioner mounted on the underside of the boom, a winch selector valve and an external throttle control, mounted on the hydraulic control console.

1-12. **Safety, Care and Handling.** Observe all WARNINGS, CAUTIONS, and NOTES in this manual. This equipment can be extremely dangeous if these instructions are not followed.

## Section III. TECHNICAL PRINCIPLES OF OPERATION


| Paragraph | | Page |
|---|---|---|
| 1-13 | General | 1-10 |
| 1-14 | Detailed Principles of Operation | 1-10 |


1-13. **General.** The Improved Float Bridge (Ribbon Bridge) is a modular bridge with an integral superstructure and floating supports. A complete ribbon bridge consists of a ramp bay at each bank and the required number of interior bays to complete the bridge between the two ramp bays. The bridge has a roadway width of 13 ft 5 in. (408.9 cm). The bridge is capable of crossing a class 70 load in currents up to 8 ft/sec (243 cm/sec). Individual bays may be joined to form a raft for ferrying operations.

1-14. **Detailed Principles of Operation.**

*a. Transporter.* The transporter is either a modified U.S. Army M812 or M945 truck chassis which provides a self-contained unit for transporting, launching, and retrieving the bays, boats, and cradles. A hydraulically operated boom mounted at the rear of the transporter works in conjunction with an 11,000 lb (4,994 kg) capacity winch to provide loading and unloading capabilities. An operator's control stand located at the left rear of cab contains all hydraulic controls the operator needs to unload and retrieve bays.

*b. Interior Bay.* Each interior bay is a four ponton folding section consisting of two roadway pontons and two bow pontons. All four pontons are joined together by hinges and pins along adjacent edges. Latches secure the bays in either the open or folded positions. Each roadway ponton is divided into two separate water tight compartments. The roadway pontons are the main Ioad carrying members of the bridge. The bow pontons provide additional floatation and a personnel walkway. When the interior bay is unloaded from the transporter into water and all the Iatches securing the bay in the folded position have been unlatched, the bay will automatically unfold. When recovering an interior bay Iifting from a single point, either the front or rear hinge pin lifting eye, will close the bay to the folded position and the latches will secure the bay in the folded position. The interior bay can be loaded onto the transporter either end first.

*c. Ramp Bay.* Each ramp bay is a four ponton folding section consisting of two roadway pontons and two bow pontons. All four pontons are joined together by hinges and pins along adjacent edges. Latches secure the bay in either the open or folded positions. Each roadway ponton is divided into two separate water tight compartments. The roadway pontons are the main load carrying members of the bridge. The bow pontons provide additional flotation and a personnel walkway. The shore end of the ramp bay is tapered and two approach ramps are hinged to the roadway pontons. Two hydraulic pumps and cylinders are mounted in the roadway pontons and permit the entire ramp bay to be raised from 0-20 degrees (0-0.349 radians) to accommodate various bank conditions. When the ramp bay is unloaded from the transporter into water and all the latches securing the bay in the folded position are unlatched, the bay will automatically unfold. When recovering a ramp bay, lifting from a single point, the hinge pin lifting eye will close the bay to the folded position and the latches will secure the bay in the folded position. The ramp bay must be loaded onto the transporter water end first or else the bay cannot be loaded onto or properly secured to the transporter.

# CHAPTER 2

# OPERATING INSTRUCTIONS

## OVERVIEW

This chapter contains instructions, procedures, and guidelines for deploying, constructing, recovering, and operating bays for both bridge and rafting operations.


| | | Page |
|---|---|---|
| Section I. | Description and Use of Operator's Controls and Indicators | 2-1 |
| Section II. | Operator's Preventive Maintenance Checks and Services (PMCS) | 2-17 |
| Section III. | Operation Under Usual Conditions | 2-23 |
| Section IV. | Operation Under Unusual Conditions | 2-109 |


## Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS


| Paragraph | | Page |
|---|---|---|
| 2-1 | General | 2-1 |
| 2-2 | Interior Bay | 2-2 |
| 2-3 | Ramp Bay | 2-6 |
| 2-4 | Transporter Operator Controls | 2-10 |
| 2-5 | Tools | 2-16 |


2-1. **General.** This section describes, locates, and illustrates the various controls, indicators, and tools used in the proper operation of the ribbon bridge and transporter.

2-2. **Interior Bay.** (figure 2-1, table 2-1, figure 2-2 and table 2-2).

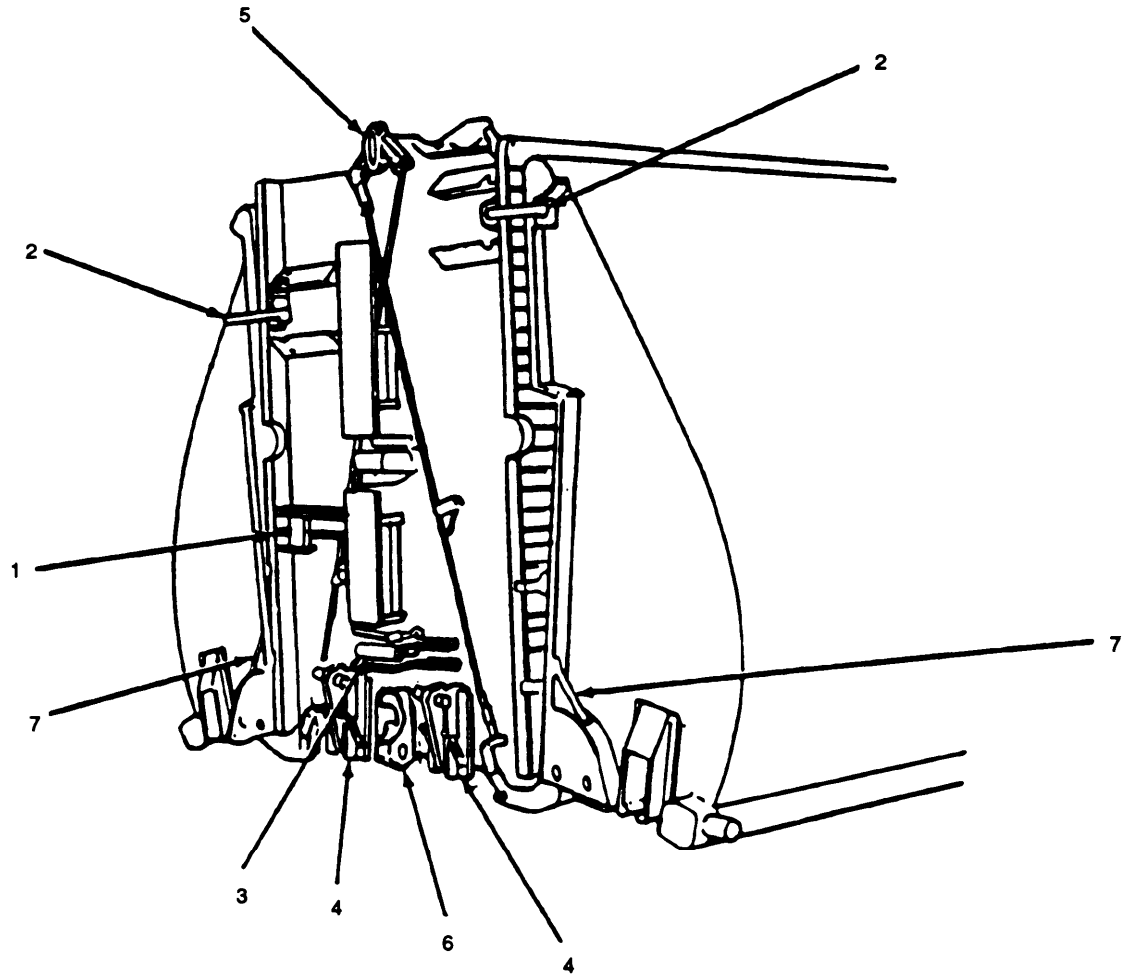



*Figure 2-1. Operator's Controls and indicators Interior Bay (Folded).*

*Table 2-1. Interior Bay Controls and Indicators lnterior Bay (Folded).*

| Key | Control or Indicator | Function |
|---|---|---|
| 1 | Lower Lock Drive | Engages the bay lower lock connecting pin with the bay lower-lock yoke and the eye of the mating bay when connecting bays together. |
| 2 | Roadway/Bow Ponton Foldlock Latch | Secures bow ponton to roadway ponton during folding operation and prevents accidental unfolding of bay during retrieval. |
| 3 | Roadway/Roadway Ponton Travel Latch | Secures the roadway pontons together during folding operations and prevents the unfolding of bay during retrieval and transportation. |
| 4 | Roadway-To-Bow Ponton Bridge Latch | Secures the bow ponton to the roadway ponton after bay has been launched and unfolded. Latch is manually engaged and connects to latch receptacle. |
| 5 | Lifting Eye | Point where bay should be lifted in order to achieve proper folding of bay and when loading bay onto transporter. |
| 6 | Cable Guide | Positions transporter winch cable and ensures the cable is in the proper position when either launching or retrieving bays. |
| 7 | Tagline Tieoff | Provides an area to connect a tagline to the bay. |

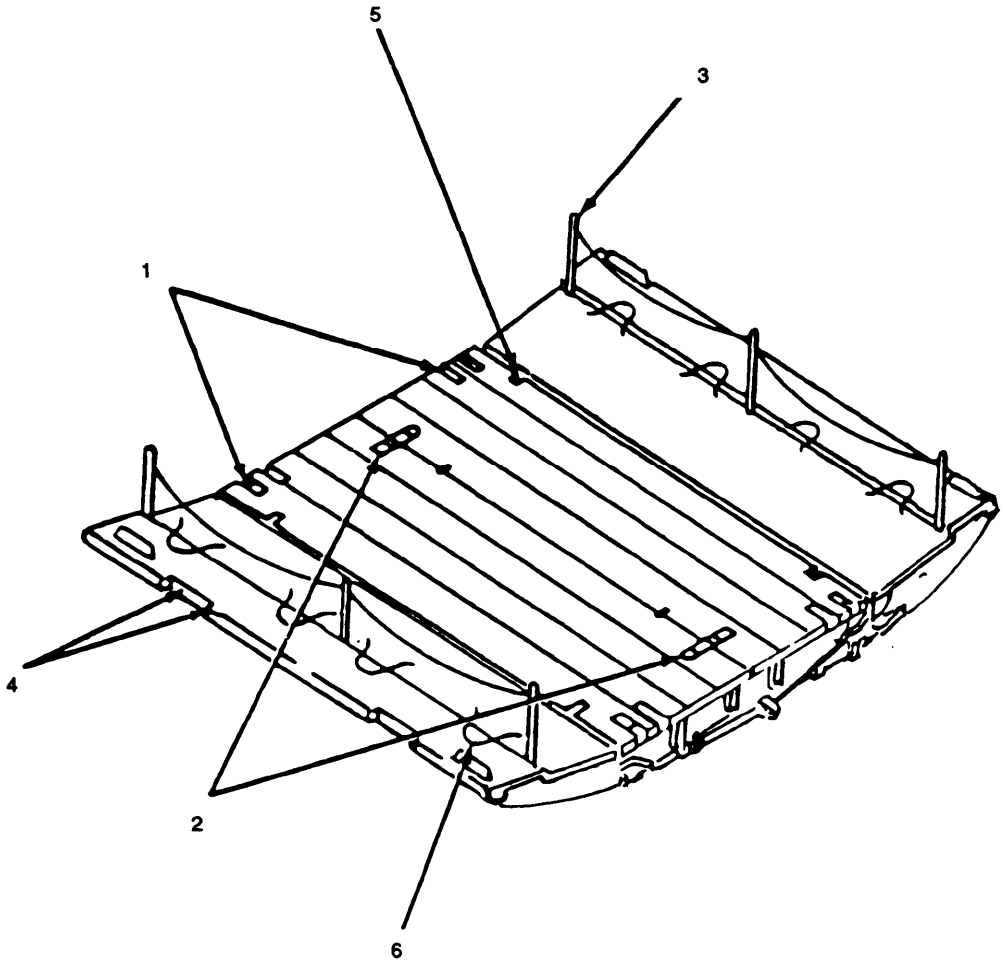



*Figure 2-2. Operator's Controls and Indicators Interior Bay Operator (Unfolded).*

Table 2-2. Interior Bay Controls and Indicators (Unfolded).

| Key | Control or Indicator | Function |
|---|---|---|
| 1 | Bay/Bay Connector | Dog bone shaped connector is moved from stored position to engaged position after bay has been unfolded to prevent bays from separating. |
| 2 | Roadway Ponton Connector | Dog bone shaped connector is moved from stored position to engaged position after bay has been unfolded to prevent roadway ponton from separating from bow ponton. |
| 3 | Handrail Posts and Safety Ropes | Stored flat to the walkway when not in use, handrail posts are raised when walkway is to be used. |
| 4 | Lifting and Anchoring Pins | Used in conjunction with lifting sling for either a high bank launch of bay or when moving a folded bay. Also used as anchoring points between bridge erection boat and bay or between bay and ground location. |
| 5 | Bilge Ports and Plugs | Used to access the pontons so that water in the pontons can be removed while bay is unfolded in water. Bilge ports are used to drain pontons after bay is loaded on the transporter. |
| 6 | Bay Rope Cleats | Tie off point for lines when securing bridge boat to bay. |

2-3. **Ramp Bay.** (figure 2-3, table 2-3, figure 2-4 and table 2-4).

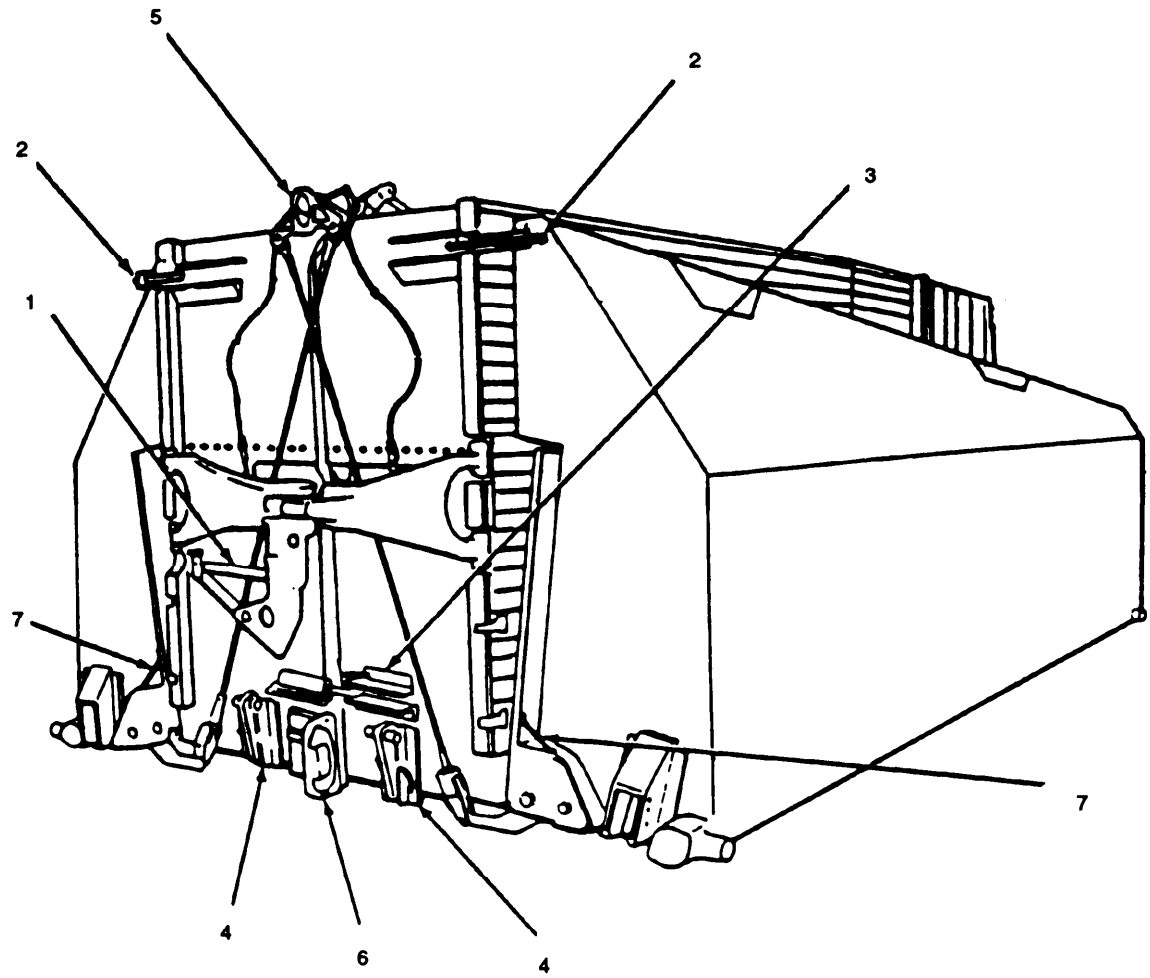



*Figure 2-3. Operator's Controls and Indicators Ramp Bay (Folded).*

*Table 2-3. Ramp Bay Controls and Indicators (Folded).*

| Key | Control or Indicator | Function |
|---|---|---|
| 1 | Lower Lock Drive | Engages the bay lower lock connecting pin with the bay lower lock yoke and eye of the mating bay when connecting bays together. |
| 2 | Roadway/Bow Ponton Foldlock Latch | Secures bow ponton to roadway ponton during folding operation and prevents accidental unfolding of bay during retrieval. |
| 3 | Roadway/Roadway Ponton Travel Latch | Secures roadway pontons together during folding operations and prevents accidental unfolding of bridge during retrieval and transportation. |
| 4 | Roadway-To-Bow Ponton Bridge Latch | Secures the bow ponton to the roadway ponton after bay has been launched and unfolded. Latch is manually engaged and connects to receptacle. |
| 5 | Lifting Eye | Point where bay should be lifted in order to achieve proper folding of bay and when loading bay onto transporter. |
| 6 | Cable Guide | Positions transporter winch cable and ensures the cable in the proper position when either launching or retrieving bays. |
| 7 | Tagline Tieoff | Provides an area to connect a tagline to the bay. |

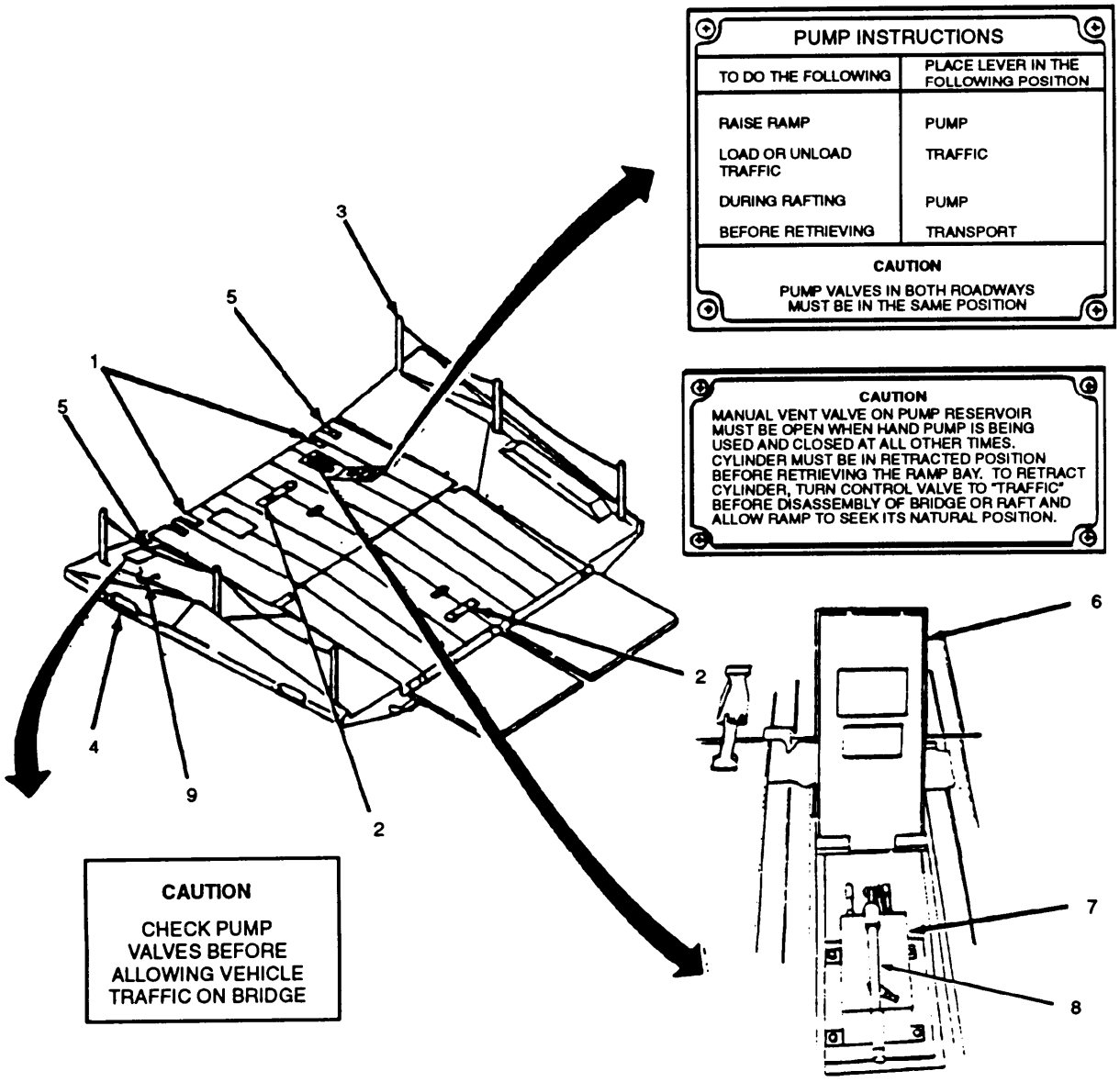



*Figure 2-4. Ramp Bay Operator's Controls (Unfolded).*

*Table 2-4. Ramp Bay Controls and Indicators (Unfolded).*

| Key | Control or Indicator | Function |
|---|---|---|
| 1 | Bay/Bay Connector | Dog bone shaped connector is moved from stored position to engaged position after bay has been unfolded to prevent bays from separating. |
| 2 | Roadway Ponton Connector | Dog bone shaped connector is moved from stored position to engaged position after bay has been unfolded to prevent roadway ponton from separating from bow ponton. |
| 3 | Handrail Posts and Safety Ropes | Stored flat to the walkway when not in use, handrail posts are raised when walkway is to be used. |
| 4 | Lifting and Anchoring Pins | Used in conjunction with lifting sling for either a high bank launch of bay or when moving a folded bay. Also used as anchoring points between bridge erection boat and bay or between bay and ground location. |
| 5 | Bilge Ports and Plugs | Used to access the pontons so that water in the pontons can be removed while bay is unfolded in water. Bilge ports are used to drain pontons after bay is loaded on the transporter. |
| 6 | Hydraulic Pump Access Cover | Allows access to hydraulic pump and protects pump from traffic. |
| 7 | Hydraulic Pump | Used to raise and lower ramp bay. |
| 8 | Hydraulic Pump Control Lever | Used to control the function of hydraulic pump. |
| 9 | Bay Rope Cleats | Tieoff point for lines when securing a bridge boat to bay. |

2-4. **Transporter Operators Controls.** (figure 2-5 and table 2-5 through figure 2-8 and table 2-8).

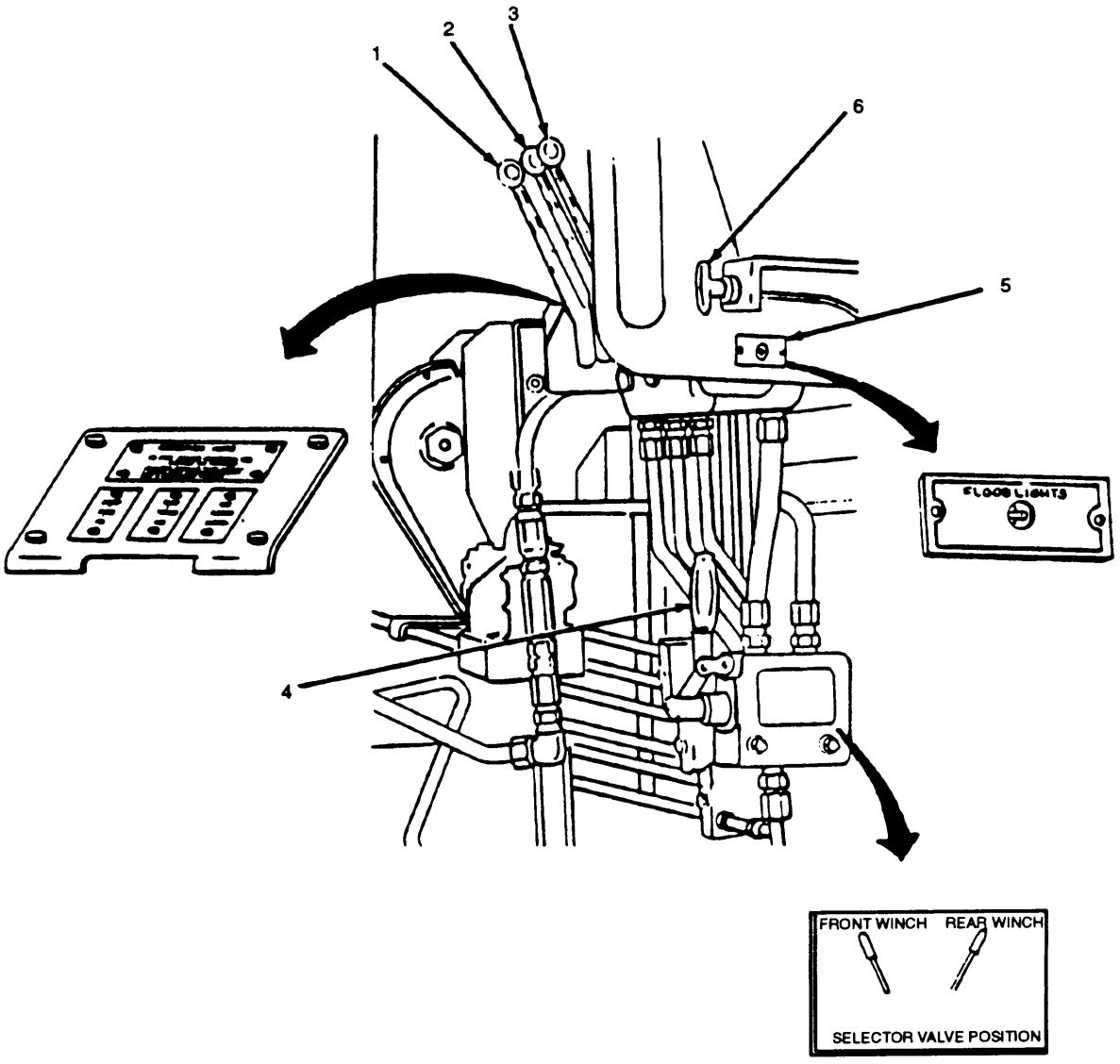



*Figure 2-5. Operator Controls and Indicators Hydraulic Control Console.*

*Table 2-5. Hydraulic Control Console Controls and Indicators.*

| Key | Control or Indicator | Function |
|---|---|---|
| 1 | Locking Pin Control Lever | Activates hydraulic locking cylinder that secures bay to transporter. |
| 2 | Winch Control Lever | Activates hydraulic winch and cable tensioner (model RBT only), and allows cable to winch in or out. |
| 3 | Boom Control Lever | Activates boom cylinders to raise or lower boom. |
| 4 | Selector Valve (Model RBT) | Allows the operator to operate either the front or rear winch. |
| 5 | Floodlight Switch | Activates both floodlights. |
| 6 | External Throttle Control (Model RBT) | Allows engine speed of transporter to be adjusted from hydraulic control console. |

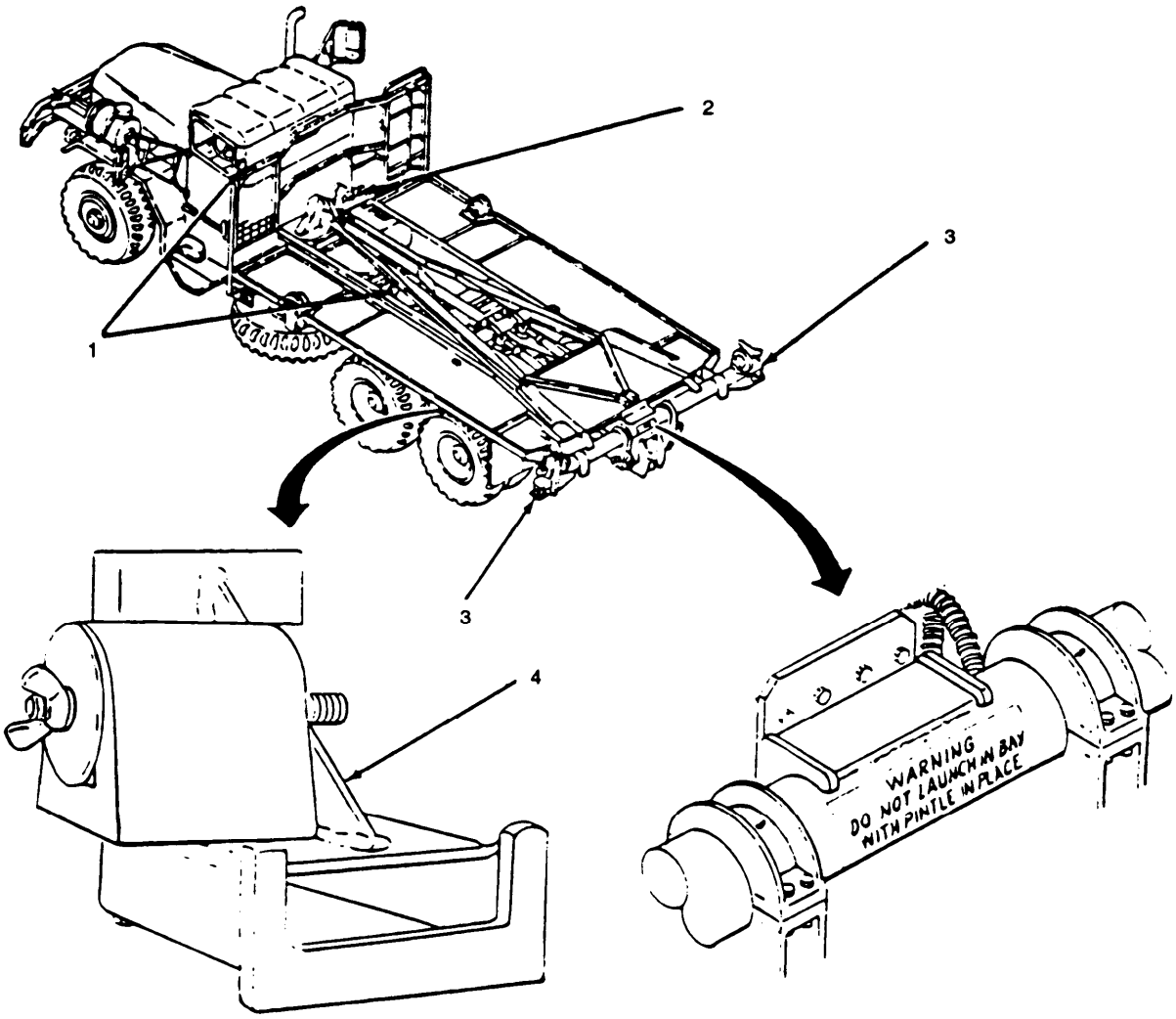



*Figure 2-6. Operator Controls and Indicators Transporter.*

*Table 2-6. Transporter Operator Controls and Indicators.*

| Key | Control or Indicator | Function |
|---|---|---|
| 1 | Floodlamps | Two adjustable floodlamps are mounted on transporter. Each lamp has a separate ON-OFF switch. When both switches are in the ON position, both lamps can be activated by a master switch on the hydraulic control console. |
| 2 | Locking Pin | Is actuated by locking pin control lever and secures the bay to the transporter. |
| 3 | Aft Tiedown Hooks | Two tiedown hooks are located at the rear of the transporter. The tiedown hooks engage with bay tiedown pins and secures bay to the transporter during transport. During controlled launch, high bank launch, unloading bay to ground location, or recovering a bay, the tiedown hooks serve as a stop/seat for the front end of bay. |
| 4 | Bogie Bracket | Used to stabilize transporter frame when performing either a high bank launch or retrieval. |

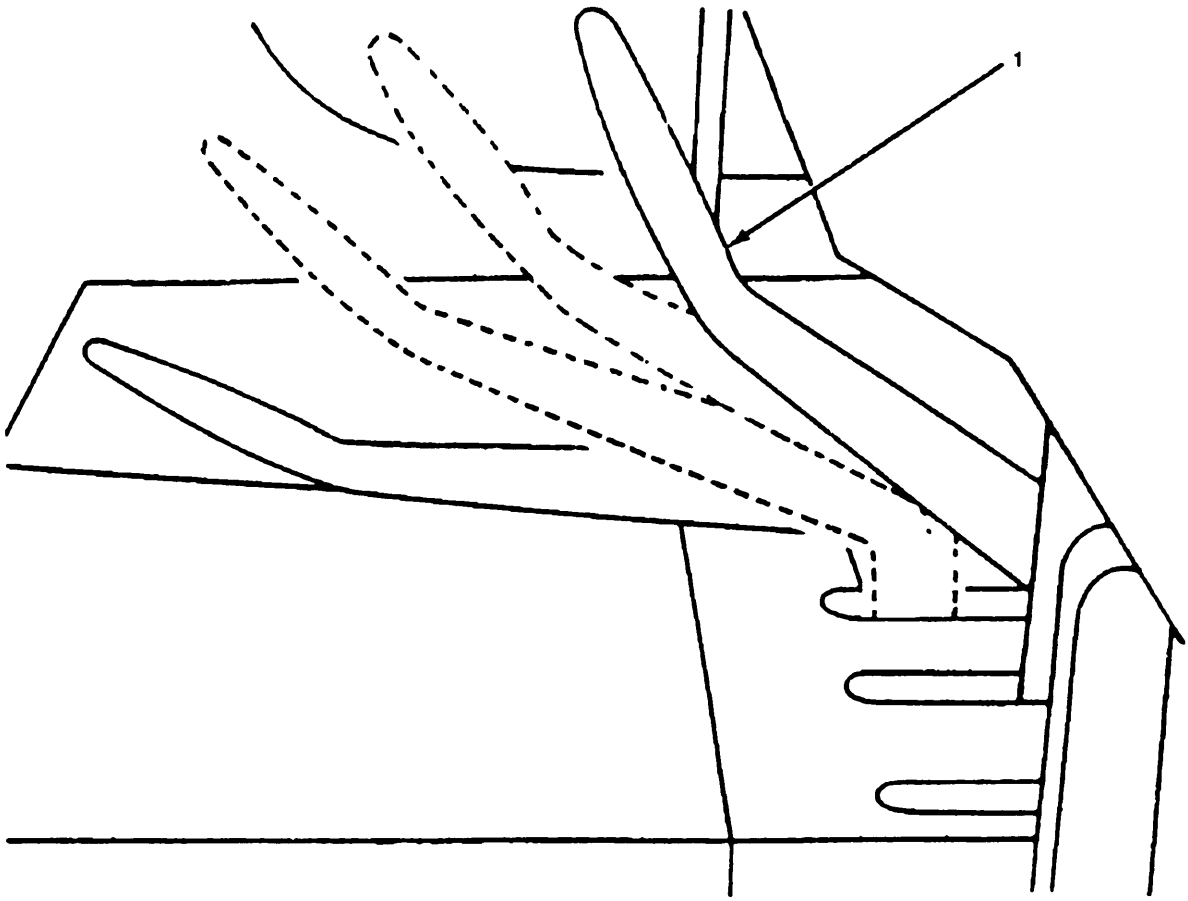



*Figure 2-7. Power Takeoff (PTO) Control Lever (Model 2280).*

*Table 2-7. Power Takeoff (PTO) Control Lever (Model 2280).*

| Key | Control or Indicator | Function |
|---|---|---|
| 1 | Power Takeoff (PTO) Control Lever | The PTO control lever engages the rear drive of the PTO unit through a drive shaft to the hydraulic system pump. |

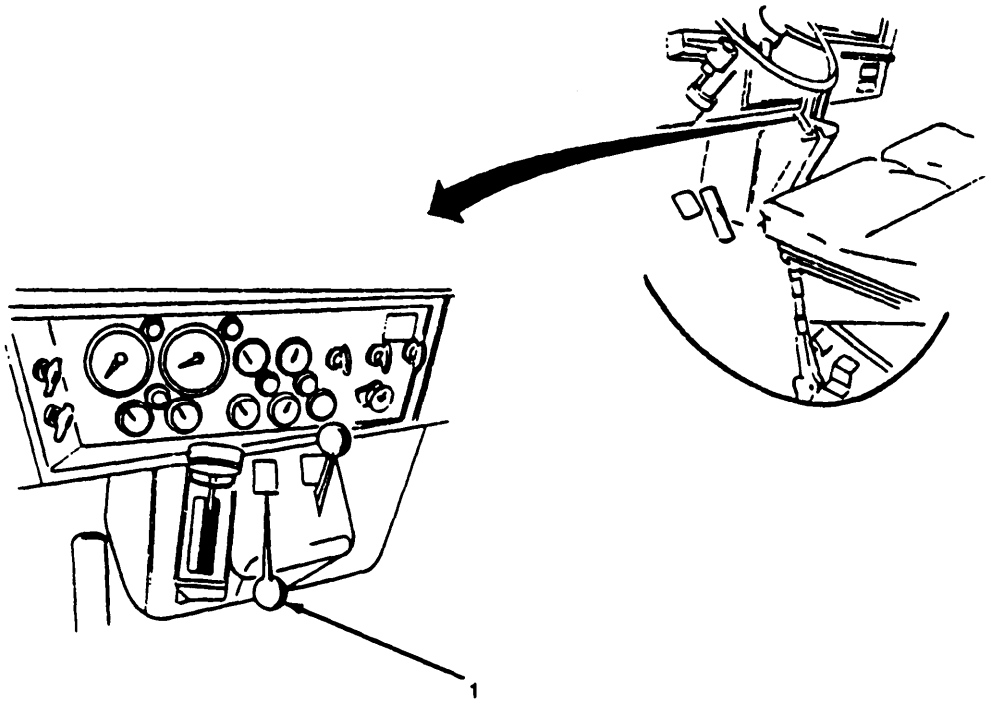



*Figure 2-8. Power Takeoff (PTO) Control Lever (Model RBT).*

*Table 2-8. Power Takeoff (PTO) Control Lever (model RBT)*

| Key | Control or Indicator | Function |
|---|---|---|
| 1 | Power Takeoff (PTO) Control Lever | The PTO control lever engages the rear drive of the PTO unit through a drive shaft to the hydraulic system pump. |

2–5. **TOOLS.** (figure 2-9 and table 2-9).

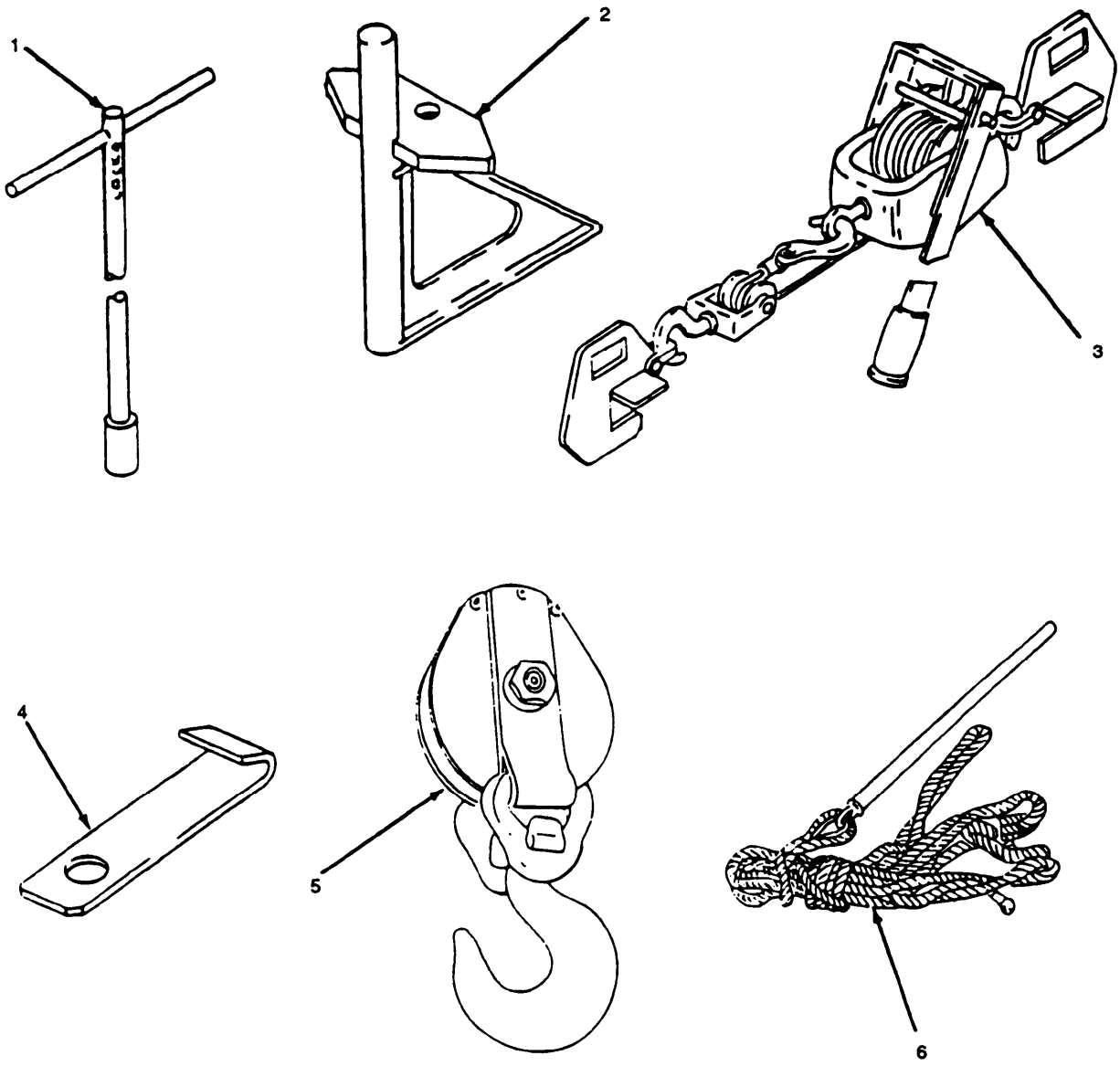



*Figure 2-9. Operator's Controls and Indicators, Tools.*

*Table 2-9. Operator Tools.*

| Key | Control or Indicator | Function |
|---|---|---|
| 1 | Bay Drive Pin Wrench | Used to engage and disengage lower lock drive pin. The wrench is stored on the curbside of transporter cab protector. |
| 2 | Rafting Bracket | Used during rafting operations, and install in the bow lifting and anchor pin holes. |
| 3 | Ramp Bay Connecting Tool | Used to pull ramp and interior bay together. |
| 4 | Ramp Connecting Tool | Is used in conjunction with crow bar to pull together the roadway pontons so that the roadway pontons connectors can be latched. Stored in ramp bay tool box. |
| 5 | Snatch Block | Attaches to winch cable and is used in conjunction with lifting sling when high bank launching or lifting bays. |
| 6 | Bay Latch Pin Assembly | Installs in travel latch on bay and when pulled in, it releases travel latch and initiates bay unfolding. |

## Section II. OPERATOR'S PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

2-6. **General.** Your operator's PMCS table 2-10 for the transporters, table 2-11 for the ramp bay and table 2-12 for the interior bay, lists inspections and care required to keep the improved float bridge equipment in good operating condition. Operator PMCS are performed to ensure that the equipment is ready for operation at all times. So that each piece of equipment can be thoroughly serviced, three seperate tables have been prepared, one for each major component.

a. Before you operate, perform your before (B) PMCS. Observe all CAUTIONS and WARNINGS.

b. While you operate, perform your during (D) PMCS. Observe all CAUTIONS and WARNINGS.

c. If your equipment fails to operate, refer to paragraph Chapter 3, Section II.

2-7. **Purpose of PMCS Table.** The purpose of the PMCS table is to provide a systematic method of inspection and servicing the equipment. In this way, small defects can be detected early before they become a major problem causing the equipment to fail to complete its mission. The PMCS table is arranged with the individual PMCS procedures listed in sequence under assigned intervals. The most logical time (before or during operation) to perform each procedure determines the interval to which it is assigned. Make a habit of doing the checks in the same order each time and anything wrong will be seen quickly. See paragraphs 2-6 and 2–9 for an explanation of the columns in tables 2-10, 2-11, and 2-12.

2-8. **Explanation of columns.** The following is a list of the PMCS table column headings with a description of the information found in each column.

a. **Item No.** This column shows the sequence in which the checks and services are to be performed, and is used to identify the equipment area on the Equipment Inspection and Maintenance Worksheet, DA Form 2404.

b. **Interval.** This column shows when each check is to be done.

*c.* *Item to be Inspected/Procedures.* This column identifies the general area or specific part where the check or service is to be done and explains how to do them.

*d.* *Equipments Not Ready/Available.* This column lists conditions that make the equipment unavailable for use because it is unableto perform its mission, or because it would represent a safety hazard. Do not accept or operate equipment with a condition in the "Equipment is Not Ready/Available If" column.

**NOTE**

The terms ready/available and mission capable refer to the same status: Equipment is on hand and is able to perform its combat mission. Refer to DA Pam 738-750.

2–9. **Reporting Deficiencies.** If any problem with the equipment is discovered during PMCS or while it is being operated that cannot be corrected at the operator/crew maintenance level, it must be reported. Refer to DA Pam 738-750 and report the deficiency using the proper forms.

2–10. **Special Instructions.** Preventive maintenance is not limited to performing the checks and services listed in the PMCS table.

**WARNING**

Drycleaning solvent PD-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F-138°F (38°C - 60°C).

*a.* *Keep It Clean.* Dirt, grease, oil, and debris get in the way and may cover up a serious problem. Clean as you work and as needed. Use drycleaning solvent on all metal surfaces. Use soap and water to clean rubber or plastic material.

*b.* *Bolts, Nuts, and Screws.* Check them all for obvious looseness, missing, bent, or broken condition. You can't try them all with a tool, but look for chipped paint, bare metal, or rust around boltheads. If you find one you think is loose, tighten it, or report it to unit maintenance if you can't tighten it.

*c.* *Electrical Wires and Cable Connectors.* Look for bare wires and loose or broken connectors. Report defects to unit maintenance.

*d.* *Fluid Lines.* Look for wear, damage, and leaks. Make sure clamps and fittings are tight. Wet spots and stains around a fitting or connector can mean a leak. If a leak comes from a loose connector, tighten it. If something is broken or worn out, report it to unit maintenance.

*e.* *Leakage Definitions.* It is necessary for you to know how fluid leakage affects the status of your equipment. The following are definitions of the types/classes of leakage you need to know to be able to determine the status of your equipment. Learn and be familiar with them. When in doubt, NOTIFY YOUR SUPERVISOR!

Leakage Definitions:

Class I Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.

Class II Leakage of fluid great enough to form drops but not enough to cause drops to drip from item being checked/Inspected.

Class III Leakage of fluid great enough to form drops that fall from the item being checked/inspected.

**CAUTION**

Equipment operation is allowable with minor leakage (Class I or II) of any fluid except fuel. Of course, consideration must be given to the fluid capacity in the item being checked/inspected. When in doubt, notify your supervisor.

When operating with Class I or II leaks, continue to check fluid level more often than required in the PMCS. Parts without fluid will stop working and/or cause equipment damage.

Class III leaks should be reported to your supervisor or Unit Maintennace.

2-11. **Painting.** Touch-up ribbon bridge and its components as needed. Refer to TM 43-0139 for specific painting procedures.

**CAUTION**

Inspect all associated components on each item for structural damage and proper installation. Incorrectly installed components may cause additional equipment damage.

**NOTE**

This PMCS use the one-look format, beginning with the Roadside (Driver's) mirror assembly, counter-clockwise, top to bottom.

Inspect all components for corrosion (Rust). Corrosion accumulation will degrade component/ equipment performance. Remove corrosion promptly.

Refer to Section III and LO 5-5420-209-12 for lubrication of Ribbon Bridge items.

Inspect all associated components on each item for structural damage and loose, broken or missing hardware.

Notify Unit Maintenance when noting any defect you are not authorized to correct.

*Table 2-10. Operator Preventive Maintenance Checks and Services (PMCS) for the Transporter.*

| Item No. | Interval | Location: Item to Service/Check | Item To be Inspected Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 1 | Before | Mirror Assembly | Check mirror configuration. (Should be dual highway type).<br>Inspect mirror for cracks and broken glass.<br>Inspect brace, bracket and support arm for cracks, broken welds, deformation and loose, broken, or missing hardware. | |
| 2 | Before | Cab Step Extension | Inspect for cracks, broken welds and jagged protrusions.<br>**CAUTION**<br>Filter indicator sight glass must be obstruction free and indicator must be visible in GREEN band. Do not proceed with PMCS if indicator is not in GREEN band. | |
| 3 | Before | Hydraulic Filter Assembly | Check filter indicator position. (Should be in GREEN band).<br>Inspect filter housing for cracks and leakage.<br>Inspect lines for cracks, compression and leakage. | Indicator is NOT in green band.<br>Class II or III leak noted.<br>Class II or III leak noted. |
| 4 | Before | Power Take Off (PTO) Levers | Check lever operation. (Should transfer power to gear pump easily).<br>Inspect for deformation. | Levers do not function properly. |
| 5 | Before | Hydraulic Console Control Valves | Check valve operation. (Valve should engage item indicated).<br>Inspect valves for cracks, leakage and loose, broken or missing hardware.<br>Inspect valves hydraulic lines for compression, leakage and cracks. | Any valve does NOT engage item indicated.<br>Class II or III leak noted.<br>Class II or III leak noted. |
| 6 | Before | Floodlight Master Switch | Check switch operation. (Should turn on both floodlights).<br>Inspect switch for loose or bare wires.<br>Inspect data plate for legibility. | |
| 7 | Before | Remote Throttle Assembly (M945) | Check throttle operation. (Should increase/decrease engine RPM easily).<br>Inspect throttle, cable and retaining clamps for compression, kinks, and deformation. | |

*Table 2-10. Operator Preventive Maintenance Checks and Services (PMCS) for the Transporter cont.*

| Item No. | Interval | Location<br>Item to Service/Check | Item To be Inspected<br>Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 8 | Before | Selector Valve Assembly (M945) | Check valve operation. (Should engage winch selected).<br>Inspect valve for cracks, leakage, and loose, broken or missing hardware. | Valve does not engage winch selected.<br>Class II or III leak noted. |
| 9 | Before | Crowbar and Holder | Inspect crowbar for deformation and cracks.<br>Inspect holder for cracks and broken welds at base. | |
| 10 | Before | Cab Protector | Inspect wire grids and frame for broken welds and jagged protrusions. | Defect presents personnel or equipment hazard. |
| 11 | Before | Light, Marker and Reflector | Check amber clearance light and blackout marker operation.<br>Inspect reflector, lenses and housing for cracks, loose, broken or missing hardware. Inspect wiring and connectors for cracks or bare wires. | |
| 12 | Before | Walkway (Front) | Inspect walkway for cracks, holes, broken welds and jagged protrusions. | Defect presents personnel or equipment hazard. |
| 13 | Before | Tire Carrier and Tire | Check tire inflation pressure. (Should be 50 PSI).<br>Inspect pawl and shaft for cracks and deformation and loose, broken or missing hardware.<br>Check carrier release. (Should lower tire and rim easily).<br>Inspect wire rope for kinks and broken strands. | |
| 14 | Before | Bay Roller Assembly | Check roller rotation. (Should rotate freely).<br>Inspect roller for gouges, nicks, and cuts to surface area and loose, broken, or missing hardware. | Roller damages bay. |
| 15 | Before | Walkway | Inspect walkway for cracks, holes, broken welds and jagged protrusions. | Defect presents personnel or equipment hazard. |
| 16 | Before | Bogie Lock and Bracket | Inspect rubber bumper and metal bracket for cracks, deformation, dry rot, and loose broken or missing hardware. | |
| 17 | Before | Boathook | Inspect for broken, cracked handle or tip. | |

*Table 2-10. Operator Preventive Maintenance Checks and Services (PMCS) for the Transporter cont.*

| Item No. | Interval | Location<br>Item to Service/Check | Item To be Inspected<br>Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 18 | Before | Splash Guards | Inspect guards for serviceability.<br>Inspect stiffener for deformation, loose, broken or missing hardware. | |
| 19 | Before | Light, Marker and Reflector | Check red clearance light and blackout marker operation.<br>Inspect reflector, lenses and housings for cracks, loose, broken or missing hardware. Inspect wiring and connectors for cracks or bare wires. | |
| 20 | Before | Tie Down Hook Assembly | Check hook operation. (Should retract and return easily).<br>Check locking operation. (Should lock hook against tie down pin easily).<br>Inspect for cracks, broken welds, deformation, and loose, broken, or missing hardware. | Hook does not retract or return properly.<br>Hook does not lock against tie down pin.<br>Cracks, broken welds or deformation noted. |
| 21 | Before | Walkway Clamp | Check clamp position. (Should be snug against walkway).<br>Inspect for deformation and loose, broken or missing hardware. | |
| 22 | Before | Cradle Clamp | Check clamp position. (Should be stowed beneath pivot bar if not being used for cradle operation).<br>Inspect for cracks, elongation and deformation and loose, broken, or missing hardware. | |
| 23 | Before | Pivot Clamp | Check clamp seating. (Should be tight against saddle).<br>Inspect for cracks.<br>**CAUTION**<br>Pintle is to be inverted (hook opening toward cab) prior to any transporter operations. | Clamp not tightly seated against saddle.<br>Cracks noted. |
| 24 | Before | Towing Pintle | Check pintle position.<br>Inspect tongue and hook for cracks, deformation and loose, broken or missing retaining pin and rope. | |
| 25 | Before | Pivot Clamp | Check clamp seating. (Should be tight against saddle).<br>Inspect for cracks. | CIamp not tightly seated against saddle.<br>Cracks noted. |

*Table 2-10. Operator Preventive Maintenance Checks and Services (PMCS) for the Transporter cont.*

| Item No. | Interval | Location<br>Item to Service/Check | Item To be Inspected<br>Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 26 | Before | Cradle Clamp | Check clamp position. (Should be stowed beneath pivot bar if not being used for cradle operation).<br>Inspect for cracks, elongation and deformation and loose, broken, or missing hardware. | |
| 27 | Before | Walkway Clamp | Check clamp position. (Should be snug against walkway).<br>Inspect for deformation and loose, broken or missing hardware. | |
| 28 | Before | Tie Down Hook Assembly | Check hook operation. (Should retract and return easily).<br>Check locking operation. (Should lock hook against tie down pin easily).<br>Inspect for cracks, broken welds, deformation, and loose, broken, or missing hardware. | Hook does not retract or return properly.<br>Hook does not lock against tie down pin. |
| 29 | Before | Bay Roller Assembly | Check roller rotation. (Should rotate freely).<br>Inspect roller for gouges, nicks, and cuts to surface area and loose, broken, or missing hardware. | Roller damages bay. |
| 30 | Before | Light, Marker and Reflector | Check red clearance light and blackout marker operation.<br>Inspect reflector, lenses and housings for cracks, loose, broken or missing hardware. Inspect wiring and connectors for cracks or bare wires. | |
| 31 | Before | Splash Guards | Inspect guards for serviceability.<br>Inspect stiffener for deformation, loose, broken or missing hardware. | |
| 32 | Before | Bogie Lock and Bracket | Inspect rubber bumper and metal bracket for cracks, deformation, dry rot, and loose broken or missing hardware. | |
| 33 | Before | Walkway | Inspect walkway for cracks, holes, broken welds and jagged protrusions. | Defect presents personnel or equipment hazard. |
| 34 | Before | Bay Roller Assembly | Check roller rotation. (Should rotate freely).<br>Inspect roller for gouges, nicks, and cuts to surface area and loose, broken, or missing hardware. | |

*Table 2-10. Operator Preventive Maintenance Checks and Services (PMCS) for the Transporter cont.*

| Item No. | Interval | Location<br>Item to Service/Check | Item To be Inspected<br>Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 35 | Before | Fuel Tank, Sending Unit and Brackets | Inspect brackets for broken welds at joints. | Either strap loose or has broken welds. |
| | | | Inspect sending unit for broken, bare or loose wires and leaking, compressed or cracked lines. | Any fuel leakage noted. |
| | | | Inspect tank for leaks. | Any fuel leakage noted. |
| 36 | Before | Walkway (Front) | Inspect walkway for cracks, holes, broken welds and jagged protrusions. | Defect presents personnel or equipment hazard. |
| 37 | Before | Light, Marker and Reflector | Check amber clearance light and blackout marker operation. | |
| | | | Inspect reflector, lenses and housings for cracks, loose, broken or missing hardware. Inspect wiring and connectors for cracks or bare wires. | |
| 38 | Before | Cab Step Extension | Inspect for cracks, broken welds and jagged protrusions. | |
| 39 | Before | Cab Data/ Information Plates | inspect for torn, secure, or illegible plates. | |
| 40 | Before | Mirror Assembly | Check mirror configuration. (Should be dual highway type). | |
| | | | Inspect mirrors for cracks and broken glass. | |
| | | | Inspect brace, bracket and support arm for cracks, broken welds, deformation and loose, broken, or missing hardware. | |
| 41 | Before | Transporter Step | Inspect for broken welds and deformation. | |
| 42 | Before | Cab Protector | Inspect wire grids and frame for broken welds and jagged protrusions. | Defect presents personnel or equipment hazard. |
| 43 | Before | Bay Wrench | Inspect for broken welds at "T" and elongation of socket. | |
| 44 | Before | Cab Support Bracket | Inspect for cracks and holes.<br>**NOTE**<br>Bracket welds at top and base must be carefully inspected. If in doubt, notify unit maintenance. | Any rib eroded more than 50%. |

*Table 2-10. Operator Preventive Maintenance Checks and Services (PMCS) for the Transporter cont.*

| Item No. | Interval | Location<br>Item to Service/Check | Item To be Inspected<br>Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 45 | Before | Locking Cylinder | Check cylinder operation. (Should engage front support bracket eye hole easily) | Cylinder does not extend or retract. |
| | | | Inspect cylinder for leakage, burrs, nicks and scratches. | Class II or III leak noted. |
| | | | Inspect hoses for compression and leakage. | Class II or III leak noted. |
| | | | Inspect cylinder bracket for cracks, broken welds and deformation. | Cracks, broken welds or deformation noted. |
| 46 | Before | Boom Sheave | Check sheave operation. (Should rotate freely). | |
| | | | Inspect for cracks, gouges, deformation, and loose, broken or missing hardware. | |
| 47 | Before | Boom | Check boom operation. (Should raise and lower without chatter or hesitation). | Boom does not function properly. |
| | | | Inspect for cracks, broken welds and deformation. | |
| 48 | Before | Cable Channel | Inspect for warping. | |
| 49 | Before | Cable Rollers | Check roller operation. (Should rotate freely). | |
| | | | Inspect for burrs, nicks and gouges. | |
| 50 | Before | Bay Guide Plate | Inspect for broken welds and deformation.<br>**NOTE**<br>Use of "U" clamps to secure cable is authorized only on emergency situations. | Broken welds noted or deformation damages bay. |
| 51 | Before | Winch Cable Assembly | broken strands. | Five or more strands broken in one turn of cable. |
| | | | Inspect hook for elongation and deformation. | Elongation/deformation noted. |
| | | | Inspect safety latch for serviceability. | Latch unserviceable. |
| 52 | Before | Boom Cylinders | Check cylinder operation. (Should raise and lower boom without chatter or hesitation). | Cylinders do not function properly. |
| | | | Inspect cylinders for leakage and warpage. | Cylinders warped or Class II or III leak noted. |
| | | | Inspect hoses for compression and leakage. | Class II or III leak noted. |

*Table* 2-10. *OperatorPreventive Maintenance Checks and Services (PMCS) for the Transporter cont.*

| Item No. | Interval | Location: Item to Service/Check | Item To be Inspected Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 53 | Before | Winch (Rear) | Check winch operation. (Should pay out and play in cable easily). | Winch does not operate properly. |
| | | | Inspect winch for leaks and loose, broken or missing hardware. | Class II or III leak noted. |
| | | | Inspect hoses for compression and leakage. | Class II or III leak noted. |
| | | | **NOTE**<br>Boom Pivot Assembly consists of round tube, butt plates and saddle. Pay particular attention to tube and butt plate welds. | |
| 54 | Before | Hydraulic Lines and Clamps | Inspect lines for compression, cracks, and leakage. | Class II or III leak noted. |
| | | | Inspect clamps and rubber grommets for dry rot and deformation. | |
| 55 | Before | Cable Tensioner Assembly (M945) | Check tensioner operation. (Should pay out or play in winch cable without binding or kinks). | Tensioner does not function properly. |
| | | | Inspect for leakage and loose, broken or missing hardware. | Class II or III leak noted. |
| | | | **NOTE**<br>Correct reservoir fluid level is with fluid visible at HIGH mark on sight gage with boom in horizontal position. | |
| 56 | Before | Hydraulic Reservoir | Inspect reservoir for leaks and proper fluid level. | Class II or III leak noted. |
| | | | Inspect lines for compression, cracks or leakage. | Class II or III leak noted. |
| 57 | Before | Gear Pump and Linkage | Check operation. (Should engage rear winch easily). | Pump does not function properly. |
| | | | Inspect pump for leakage. | Class II or III leak noted. |
| | | | Inspect linkage for deformation. | Linkage deformed. |
| 58 | During | Locking Cylinder | Check cylinder operation. (Should engage front support bracket eye hole easily). | Cylinder does not extend or retract. |
| 59 | After | Ribbon Bridge Components | After operation, clean all dirt, mud, and debris from ribbon bridge components and lubricate in accordance with LO 5-5420-209-12. | |

**CAUTION**

During PMCS, ensure that all components and assemblies are correctly installed. Incorrect installation may cause additional equipment damage or failure.

**NOTE**

**This PMCS use the one-look format, beginning with the Roadside Bow Ponton (RBP) as viewed from the rear of transporter, clockwise.**

Remove rust and accumulated corrosion during PMCS. Corrosion not removed promptly will degrade equipment performance.

Refer to Section III and LO 5-5420-209-12 for lubrication of Ribbon Bridge items.

Inspect all associated components on each item for structural damage and loose, broken or missing hardware.

Notify Unit Maintenance when noting any deficiency you are not authorized to correct.

*Table* 2-11. *Operator Preventive Maintenance Checks and Services (PMCS) for the Ramp Bay.*

| Item No. | Interval | Location<br>Item to Service/Check | Item To be Inspected<br>Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 1 | Before | Hinges and Pins | Inspect hinges and pins for cracks and elongation.<br>**NOTE**<br>To effectively perform the following steps, bay should be down loaded from transporter. | Any hinge cracked. |
| 2 | Before | Bridge Latch Receptacle (RBP Rear) | Inspect brackets, shims and strike catches for cracks, broken welds, binding and deformation. | Broken welds, binding or deformation prevents engaging latch noted. |
| 3 | Before | Tie Down Pin (RBP Rear) | Inspect for cracks, broken welds and erosion of pin surface area. | Broken welds noted or erosion of surface area prevents securing bay to transporter. |
| 4 | Before | Skin Surface (RBP) | Inspect for punctures, cracks, tears, dents, holes and broken welds. | Any damage which allows water into bay cavity. |
| 5 | Before | Tie Down Pin (RBP Front) | Inspect for cracks, broken welds and erosion of pin surface area. | Broken welds noted or erosion of surface area prevents securing bay to transporter. |
| 6 | Before | Skin Surface (RBP Front) | Inspect for punctures, cracks, tears, dents, holes and broken welds. | Any damage which allows water into bay cavity. |
| 7 | Before | Bridge Latch Receptacle (RBP Front) | Inspect brackets, shims and strike catches for cracks, broken welds, binding and deformation. | Broken welds, binding or deformation prevents engaging latch noted. |

*Table* 2-11. *Operator Preventive Maintenance Checks and Services (PMCS) for the Ramp Bay cont.*

| Item No. | Interval | Location: Item to Service/Check | Item To be Inspected Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 8 | Before | Tagline Bar | Inspect for broken welds and deformation. | |
| 9 | Before | Unfolding Mechanism | Inspect cover plate, spring pins, pins, lever, and link for cracks, broken welds and deformation.<br>**NOTE**<br>Cable, when adjusted correctly, will be taut NOT tight. | Broken welds noted or deformation prevents mechanism for functioning properly. |
| 10 | Before | Unfolding Cable | Inspect for kinks, compression, flat surfaces, and broken or frayed strands. | Cable kinked, compressed, flattened or strands broken. |
| 11 | Before | Lifting Eye (Front) | Inspect for cracks and elongation of eye. | Any cracks noted or eye elongation equals 25% of original circumference. |
| 12 | Before | Unfolding Cable | Inspect for kinks, compression, flat surfaces, and broken or frayed strands.<br>**NOTE**<br>Ensure latch and receptacle are adjusted properly (latch "T" rests snugly against strike catch of corresponding receptacle). | Cable kinked, compressed, flattened or strands broken. |
| 13 | Before | Bridge Latch | Inspect brackets, supports and pins for cracks, broken welds and deformation.<br>Inspect springs for deformation and stretching. | Cracks, broken welds noted or deformation causes binding.<br>Springs stretched. |
| 14 | Before | Travel Latch | Inspect brackets, supports and pins for cracks, broken welds and deformation.<br>Inspect springs for deformation and stretching. | Cracks, broken welds noted or deformation causes binding.<br>Springs stretched. |
| 15 | Before | Travel Latch Receptacle | Inspect brackets, shims and strike catches for cracks, broken welds, binding and deformation. | Broken welds, binding or deformation prevents engaging latch. |
| 16 | Before | Cable Guide | Inspect for cracks, gouges, jagged protrusions, erosion of surface area and elongation of eye. | Eye cracked, elongated more than 0.50 at upper arc or aluminum eroded to within .050. |

*Table* 2-11. *Operator Preventive Maintenance Checks and Services (PMCS) for the Ramp Bay cont.*

| Item No. | Interval | Location<br>Item to Service/Check | Item To be Inspected<br>Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 17 | Before | Bridge Latch | Inspect brackets, supports and pins for cracks, broken welds and deformation. | Cracks, broken welds noted or deformation causes binding. |
| | | | Inspect springs for deformation and stretching. | Springs stretched. |
| 18 | Before | Lower Lock Drive | Inspect screw and threads for cracks, burrs, nicks and deformation. | Screw will not extend or retract drive pin properly. |
| | | | Inspect trunions, and drive pin for cracks. | Cracks or broken welds noted. |
| | | | Inspect cover bumpers and supports for broken welds and deformation. | |
| | | | **NOTE**<br>Yokes are secured by headless pins, flat washers and cotter pins. Ensure yokes are secured properly. Severe equipment failure or personnel injury may result. | |
| 19 | Before | Male yoke | Inspect for cracks, deformation and elongation of eye. | Cracks noted or deformation/elongation prevent proper operation. |
| 20 | Before | Female Yoke | Inspect for cracks, deformation and elongation of eye. | Cracks noted or deformation/elongation prevent proper operation. |
| 21 | Before | Hydraulic Cylinder | Inspect cylinder, lines and fittings for cracks, compression, and leakage. | Class II or III leak noted. |
| 22 | Before | Hydraulic Line | Ensure line is properly secured at upper link and to roadway ponton. | Line is not secured properly. |
| | | | Inspect for cuts, chaffing and leakage. | Class II or III leak noted. |
| 23 | Before | Foldlock Latches | Inspect brackets, supports and pins for cracks, broken welds and deformation. | Cracks, broken welds noted or deformation causes binding. |
| | | | Inspect springs for deformation and stretching. | Springs stretched. |
| 24 | Before | Unfolding Mechanism | Inspect cover plate, spring pins, pins, lever, and link for cracks, broken welds and deformation. | Broken welds noted or deformation prevents mechanism from functioning properly. |
| 25 | Before | Tagline Bar | Inspect for broken welds and deformation. | |

*Table 2-11. Operator Preventive Maintenance Checks and Services (PMCS) for the Ramp Bay cont.*

| Item No. | Interval | Location<br>Item to Service/Check | Item To be Inspected<br>Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 26 | Before | Bridge Latch Receptacle (Curbside Bow Ponton (CBP Front)) | Inspect brackets, shims and strike catches for cracks, broken welds, binding and deformation. | Broken welds, binding or deformation prevents engaging latch noted. |
| 27 | Before | Skin Surface (CBP Front) | Inspect for punctures, cracks, tears, dents, holes and broken welds. | Any damage which allows water into bay cavity. |
| 28 | Before | Tie Down Pin (CBP Front) | Inspect for cracks, broken welds and erosion of pin surface area. | Broken welds noted or erosion of surface area prevents securing bay to transporter. |
| 29 | Before | Skin Surface (CBP) | Inspect for punctures, cracks, tears, dents, holes and broken welds. | Any damage which allows water into bay cavity. |
| 30 | Before | Tie Down Pin (CBP Rear) | Inspect for cracks, broken welds and erosion of pin surface area. | Broken welds noted or erosion of surface area prevents securing bay to transporter. |
| 31 | Before | Bridge Latch Receptacle (CBP Rear) | Inspect brackets, shims and strike catches for cracks, broken welds, binding and deformation. | Broken welds, binding or deformation prevents engaging latch noted. |
| 32 | Before | Bridge Latch | Inspect brackets, supports and pins for cracks, broken welds and deformation. | Cracks, broken welds noted or deformation causes binding. |
| | | | Inspect springs for deformation and stretching. | Springs stretched. |
| 33 | Before | Lifting Eye (Rear) | Inspect for cracks and elongation of eye.<br><br>**NOTE**<br><br>To inspect the following items properly, bay must be unfolded (on ground or in water). | Any cracks noted or eye elongation equals 25% of original circumference. |
| 34 | Before | Handlerail Posts and Rope (Curbside Bow Ponton (CBP) | Inspect posts for cracks at support base, cracks/elongation of bolt slots, broken or deformed rope ring and frayed or stretched rope. | Handrail posts and rope missing. |
| 35 | Before | Rope Cleats | Inspect for cracks, broken welds and severe deformation. | |

*Table 2-11. Operator Preventive Maintenance Checks and Services (PMCS) for the Ramp Bay cont.*

| Item No. | Interval | Location<br>Item to Service/Check | Item To be Inspected<br>Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 36 | Before | Lift Pockets and Quick Release Pin | Ensure pin functions properly.<br>Inspect pin for cracks and broken strands on retaining wire rope.<br>Inspect pockets for cracks and broken welds. | |
| 37 | Before | Deck Surface (CBP) | Inspect for punctures, cracks, tears, dents, holes and broken welds.<br>Check condition of non-skid coating. | Any damage which allows water into bay cavity. |
| 38 | Before | Bilge Plug | Ensure plug(s) are secured with wire rope to ponton.<br>Inspect rubber seal for cuts, elasticity and dry rot.<br>Check handle operation.<br>**NOTE**<br>Receptacle consists of entire housing (Block) in which connector is seated. | Any plug missing. |
| 39 | Before | Connector Receptacle | Inspect for cracks, broken welds, elongation and deformation.<br>**NOTE**<br>Proper connector has a narrow center bar (0.500 inch); older connectors have thicker (.69 in) center bar.<br>Loose or missing set screws will allow water into bay cavity. | Cracks or broken welds noted. Elongation or deformation prevents proper seating of connector. |
| 40 | Before | Roadway Connectors | Ensure connector is correct type.<br>Inspect connector, eye bracket, set screws, spring and spring pins for cracks and deformation. | Incorrect connector type.<br>Any defect which prevents proper seating of connector. |
| 41 | Before | Hydraulic Pump Access cover and Data Plates | Inspect covers for cracks and deformation.<br>Inspect plates for legibility. | Any cover missing. |
| 42 | Before | Hydraulic Pumps | Inspect for oil accumulation, leaks, hose connections, lever operation, and air vent operation. | Class II or III leak. Vent or lever does not function properly. |

*Table 2-11. Operator Preventive Maintenance Checks and Services (PMCS) for the Ramp Bay cont.*

| Item No. | Interval | Location<br>Item to Service/Check | Item To be Inspected<br>Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| | | | **NOTE**<br><br>Ramps are secured by pins, washers and cotter pins. Missing or deformed retaining hardware may cause severe equipment damage. | |
| 43 | Before | Approach Ramps | Inspect for cracks, ruptured seams, and broken welds. | Ramp retaining hardware missing or deformed. |
| 44 | During | Tagline Bar | Inspect for broken welds and deformation. | |
| | | | **NOTE**<br><br>Cable, when adjusted correctly, will be taut NOT tight. | |
| 45 | During | Unfolding Cable | Inspect for kink, compression, flat surfaces, and broken or frayed strands. | Cable kinked, compressed, flattened or strands broken. |
| 46 | During | Unfolding Cable | Inspect for kinks, compression, flat surfaces, and broken or frayed strands. | Cable kinked, compressed, flattened or strands broken. |
| | | | **NOTE**<br><br>Ensure latch and receptacle are adjusted properly (latch "T" rests snugly against strike catch of corresponding receptacle). | |
| 47 | During | Bridge Latch | Inspect brackets, supports and pins for cracks. broken welds and deformation. | Cracks, broken welds noted or deformation causes binding. |
| | | | Inspect springs for deformation and stretching. | Springs stretched. |
| 48 | During | Travel Latch | Inspect brackets, supports and pins for cracks, broken welds and deformation. | Cracks, broken welds noted or deformation causes binding. |
| | | | Inspect spings for deformation and stretching. | Springs stretched. |
| 49 | During | Bridge Latch | Inspect brackets, supports and pins for cracks, broken welds and deformation. | Cracks, broken welds noted or deformation causes binding. |
| | | | Inspect springs for deformation and stretching. | Springs stretched. |

*Table 2-11. Operator Preventive Maintenance Checks and Services* (PMCS) *for the Ramp Bay cont.*

| Item No. | Interval | Location<br>Item to Service/Check | Item To be Inspected<br>Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 50 | During | Lower Lock Drive | Inspect screw and threads for cracks, burrs, nicks and deformation. | Screw will not extend or retract drive pin properly. |
| | | | Inspect trunions, and drive pin for cracks. | Cracks or broken welds noted. |
| | | | Inspect cover bumpers and supports for broken welds and deformation. | |
| 51 | During | Tagline Bar | Inspect for broken welds and deformation. | |
| 52 | During | Bridge Latch | Inspect brackets, supports and pins for cracks, broken welds and deformation. | Cracks, broken welds noted or deformation causes binding. |
| | | | Inspect springs for deformation and stretching. | Springs stretched. |
| 53 | During | Deck Surface (CBP) | Inspect for punctures, cracks, tears, dents, holes and broken welds. | Any damage which allows water into bay cavity. |
| | | | Check condition of non-skid coating.<br>**NOTE**<br>Receptacle consists of entire housing (Block) in which connector is seated. | |
| 54 | During | Connector Receptacle | Inspect for cracks, broken welds, elongation and deformation. | Cracks or broken welds. noted. Elongation or deformation prevents proper seating of connector. |
| 55 | During | Roadway Connectors | Ensure connector is correct type. | Incorrect connector type. |
| | | | Inspect connector, eye bracket, set screws, spring and spring pins for cracks and deformation. | Any defect which prevents proper seating of connector. |
| 56 | During | Hydraulic Pumps | Inspect for oil accumulation, leaks, hose connections, lever operation, and air vent operation.<br>**NOTE**<br>Ramps are secured by pins, washers and cotter pins. Missing or deformed retaining hardware may cause severe equipment damage. | Class II or III leak. Vent or lever does not function properly. |

*Table 2-11. Operator Preventive Maintenance Checks and Services (PMCS) for the Ramp Bay cont.*

| Item No. | Interval | Location: Item to Service/Check | Item To be Inspected Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 57 | During | Approach Ramps | Inspect for cracks, ruptured seams, and broken welds. | Ramp retaining hardware missing or deformed. |
| *58* | After | Ribbon Bridge Components | After operation, clean all dirt, mud, and debris from ribbon bridge components and lubricate in accordance with LO 5-5420-209-12. | |

**CAUTION**

During PMCS, ensure that all components and assemblies are correctly installed. Incorrect installation may cause additional equipment damage or failure.

**NOTE**

**This PMCS use the one-look format, beginning with the Roadside Bow Ponton (RBP) as viewed from the rear of transporter, clockwise.**

Remove rust and accumulated corrosion during PMCS. corrosion not removed promptly will degrade equipment performance.

Refer to Section III and LO 5-5420-209-12 for lubrication of Ribbon Bridge items after operation, clean dirt, mud and debris from equipment and lubricate, when required, in accordance with.

Inspect all associated components on each item for structural damage and loose, broken or missing hardware.

Notify Unit Maintenance when noting any deficiency you are not authorized to correct.

*Table 2-12. Operator Preventive Maintenance Checks and Services (PMCS) for the Interior Bay.*

| Item No. | interval | Location: item to Service/Check | Item To be Inspected Procedure | Equipment is Not Ready/Available If |
|---|---|---|---|---|
| 1 | Before | Hinges and Pins | inspect hinges and pins for cracks and elongation.<br>**NOTE**<br>To effectively perform the following steps, bay should be down loaded from transporter. | Any hinge cracked. |
| 2 | Before | Unfolding Mechanism (Roadside Bow Ponton Rear (RBPR)) | inspect cover plate, spring pins, pins, lever, and link for cracks, broken welds and deformation. | Broken welds noted or deformation prevents mechanism for functioning property. |

*Table* 2-12. *Operator Preventive Maintenance Checks and Services (PMCS) for the Interior Bay cont.*

| Item No. | Interval | Location / Item to Service/Check | Item To be Inspected Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 3 | Before | Tagline Bar (RBPR) | Inspect for broken welds and deformation. | |
| 4 | Before | Bridge Latch Receptacle (RBPR) | Inspect brackets, shims and strike catches for cracks, broken welds, binding and deformation. | Broken welds, binding or deformation prevents engaging latch noted. |
| 5 | Before | Skin Surface (RBPR) | Inspect for punctures, cracks, tears, dents, holes and broken welds. | Any damage which allows water into bay cavity. |
| 6 | Before | TieDown Pin (RBPR) | Inspect for cracks, broken welds and erosion of pin surface area. | Broken welds noted or erosion of surface area prevents securing bay to transporter. |
| 7 | Before | Skin Surface (RBP Side) | Inspect for punctures, cracks, tears, dents, holes and broken welds. | Any damage which allows water into bay cavity. |
| 8 | Before | Tie Down Pin | Inspect for cracks, broken welds and erosion of pin surface area. | Broken welds noted or erosion of surface area prevents securing bay to transporter. |
| 9 | Before | Bridge Latch Receptacle (RBP Front) | Inspect brackets, shims and strike catches for cracks, broken welds, binding and deformation. | Broken welds, binding or deformation prevents engaging latch noted. |
| 10 | Before | Unfolding Mechanism (RBPF) | Inspect cover plate, spring pins, pins, lever, and link for cracks, broken welds and deformation. | Broken welds noted or deformation prevents mechanism for functioning properly. |
| 11 | Before | Skin Surface (RBPF) | Inspect for punctures, cracks, tears, dents, holes and broken welds. | Any damage which allows water into bay cavity. |
| 12 | Before | Foldlock Latch (RBPF) | Inspect brackets, supports and pins for cracks, broken welds and deformation. | Cracks, broken welds noted or deformation causes binding. |
| | | | Inspect springs for deformation and stretching. | Springs stretched. |
| 13 | Before | Lifting Eye (Front) | Inspect for cracks and elongation of eye. | Any cracks noted or eye elongation equals 25% of original circumference. |

*Table 2-12. Operator Preventive Maintenance Checks and Services (PMCS) for the Interior Bay cont.*

| Item No. | Interval | Location: Item to Service/Check | Item To be Inspected Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 14 | Before | Skin Surface (Roadway Ponton Front (RPF)) | Inspect for punctures, cracks, tears, dents, holes and broken welds.<br><br>**NOTE**<br><br>Ensure latch and receptacle are adjusted properly (latch 'T' rests snugly against strike catch of corresponding receptacle). | Any damage which allows water into bay cavity. |
| 15 | Before | Bridge Latch (RPF) | Inspect brackets, supports and pins for cracks, broken welds and deformation.<br><br>Inspect springs for deformation and stretching. | Cracks, broken welds noted or deformation causes binding.<br><br>Springs stretched. |
| 16 | Before | Travel Latch (RPF) | Inspect brackets, supports and pins for cracks, broken welds and deformation.<br><br>Inspect springs for deformation and stretching. | Cracks, broken welds noted or deformation causes binding.<br><br>Springs stretched. |
| 17 | Before | Travel Latch Receptacle | Inspect brackets, shims and strike catches for cracks, broken welds, binding and deformation. | Broken welds, binding or deformation prevents engaging latch noted. |
| 18 | Before | Cable Guide | Inspect for cracks, gouges, jagged protrusions, erosion or surface area and elongation of eye. | Eye cracked, elongated more than 0.50 at upper arc or aluminum eroded to within .050. |
| 19 | Before | Bridge Latch | Inspect brackets, supports and pins for cracks, broken welds and deformation.<br><br>Inspect springs for deformation and stretching. | Cracks, broken welds noted or deformation causes binding.<br><br>Springs stretched. |
| 20 | Before | Lower Lock Drive | Inspect screw and threads for cracks, burrs, nicks and deformation.<br><br>Inspect trunions, and drive pin for cracks.<br><br>Inspect cover bumpers and supports for broken welds and deformation. | Screw will not extend or retract drive pin properly.<br><br>Cracks or broken welds noted. |
| 21 | Before | Skin Surface | Inspect for punctures, cracks, tears, dents, holes and broken welds. | Any damage which allows water into bay cavity. |

*Table 2-12. Operator Preventive Maintenance Checks and Services (PMCS) for the Interior Bay cont.*

| Item No. | Interval | Location: Item to Service/Check | Item To be Inspected Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 22 | Before | Foldlock Latch | Inspect brackets, supports and pins for cracks, broken welds and deformation. | Cracks, broken welds noted or deformation causes binding. |
| | | | Inspect springs for deformation and stretching. | Springs stretched. |
| 23 | Before | Skin Surface (Crubside Bow Ponton Front (CBPF)) | Inspect for punctures, cracks, tears, dents, holes and broken welds. | Any damage which allows water into bay cavity. |
| 24 | Before | Tagline Bar | Inspect for broken welds and deformation. | |
| 25 | Before | Unfolding Mechanism | Inspect cover plate, spring pins, pins, lever, and link for cracks, broken welds and deformation. | Broken welds noted or deformation prevents mechanism for functioning properly. |
| 26 | Before | Bridge Latch Receptacle | Inspect brackets, shims and strike catches for cracks, broken welds, binding and deformation. | Broken welds, binding or deformation prevents engaging latch noted. |
| 27 | Before | Tie Down Pin | Inspect for cracks, broken welds and erosion of pin surface area. | Broken welds noted or erosion of surface area prevents securing bay to transporter. |
| 28 | Before | Skin Surface (CBP Side) | Inspect for punctures, cracks, tears, dents, holes and broken welds. | Any damage which allows water into bay cavity. |
| 29 | Before | Tie Down Pin | Inspect for cracks, broken welds and erosion of pin surface area. | Broken welds noted or erosion of surface area prevents securing bay to transporter. |
| 30 | Before | Bridge Latch Receptacle (CBP Rear) | Inspect brackets, shims and strike catches for cracks, broken welds, binding and deformation. | Broken welds, binding or deformation prevents engaging latch noted. |
| 31 | Before | Unfolding Mechanism | Inspect cover plate, spring pins, pins, lever, and link for cracks, broken welds and deformation. | Broken welds noted or deformation prevents mechanism for functioning properly. |
| 32 | Before | Skin Surface | Inspect for punctures, cracks, tears, dents, holes and broken welds. | Any damage which allows water into bay cavity. |

*Table 2-12. Operator Preventive Maintenance Checks and services (PMCS) for the Interior Bay cont.*

| Item No. | Interval | Location: Item to Service/Check | Item To be Inspected Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 33 | Before | Foldlock Latch | Inspect brackets, supports and pins for cracks, broken welds and deformation. | Cracks, broken welds noted or deformation causes binding. |
| | | | Inspect springs for deformation and stretching. | Springs stretched. |
| 34 | Before | Lifting Eye (Rear) | Inspect for cracks and elongation of eye. | Any cracks noted or eye elongation equals 25% of original circumference. |
| | | | **NOTE**<br>Cable is adjusted properly when taut NOT tight. | |
| 35 | Before | Unfolding Cable Assembly | Check cable adjustment. | Cable out of adjustment |
| | | | Inspect for kinks, frayed or broken strands, compressed or flat areas. | Kinks, frayed, broken, compressed of flat surface areas noted. |
| 36 | Before | Skin Surface | Inspect for punctures, cracks, tears, dents, holes and broken welds. | Any damage which allows water into bay cavity. |
| 37 | Before | Bridge Latch | Inspect brackets, supports and pins for cracks, broken welds and deformation. | Cracks, broken welds noted or deformation causes binding. |
| | | | Inspect springs for deformation and stretching. | Springs stretched. |
| 38 | Before | Travel Latch | Inspect brackets, supports and pins for cracks, broken welds and deformation. | Cracks, broken welds noted or deformation causes binding. |
| | | | Inspect springs for deformation and stretching. | Springs stretched. |
| 39 | Before | Travel Latch Receptacle | Inspect brackets, shims and strike catches or cracks, broken welds, binding and deformation. | Broken welds, binding or deformation prevents engaging latch noted. |
| 40 | Before | Cable Guide | Inspect for cracks, gouges, jagged protrusions, erosion for surface area and elongation of eye. | Eye cracked, elongated more than 0.50 at upper arc or aluminum eroded to within .050. |
| 41 | Before | Bridge Latch | Inspect brackets, supports and pins for cracks, broken welds and deformation. | Cracks, broken welds noted or deformation causes binding. |
| | | | Inspect springs for deformation and stretching. | Springs stretched. |

*Table 2-12. Operator Preventive Maintenance Checks and Services (PMCS) for the Interior Bay cont.*

| Item No. | Interval | Location<br>Item to Service/Check | Item To be Inspected<br>Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 42 | Before | Unfolding Cable Assembly | Check cable adjustment.<br>Inspect for kinks, frayed or broken strands, compressed or flat areas. | Cable out of adjustment<br>Kinks, frayed, broken, compressed of flat surface areas noted. |
| 43 | Before | Lower Lock Drive | Inspect screw and threads for cracks, burrs, nicks and deformation.<br>Inspect trunions, and drive pin for cracks.<br>Inspect cover bumpers and supports for broken welds and deformation. | Screw will not extend or retract drive pin properly.<br>Cracks or broken welds noted. |
| 44 | Before | Skin Surface | Inspect for punctures, cracks, tears, dents, holes and broken welds. | Any damage which allows water into bay cavity. |
| 45 | Before | Foldlock Latches | Inspect brackets, supports and pins for cracks, broken welds and deformation.<br>Inspect springs for deformation and stretching.<br>**NOTE**<br>To inspect the following items properly, bay must be unfolded (on ground or in water). | Cracks, broken welds noted or deformation causes binding.<br>Springs stretched. |
| 46 | Before | Handrail Posts and Rope (Roadside Bow Ponton) | Inspect posts for cracks at support base, cracks/elongation of bolt slats, broken or deformed rope ring and frayed or stretched rope. | Handrail posts and rope missing. |
| 47 | Before | Rope Cleats | Inspect for cracks, broken welds and severe deformation. | |
| 48 | Before | Lift Pockets and Quick Release Pin | Ensure pin functions properly.<br>Inspect pin for cracks and broken strands on retaining wire rope.<br>Inspect pockets for cracks and broken welds. | |
| 49 | Before | Deck Surface | Inspect for punctures, cracks, tears, dents, holes and broken welds.<br>Check condition of non-skid coating. | Any damage which allows water into bay cavity. |

*Table 2-12. Operator Preventive Maintenance Checks and Services (PMCS) for the Interior Bay cont.*

| Item No. | Interval | Location: Item to Service/Check | Item To be Inspected Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 50 | Before | Bilge Plugs | Ensure plugs are secured with wire rope to ponton.<br>Inspect rubber seal for cuts, elasticity and dry rot.<br>Check handle operation.<br>**NOTE**<br>Receptacle consists of entire housing (Block) in which connector is seated. | Any plug missing. |
| 51 | Before | Connector Receptacles | Inspect for cracks, broken welds, elongation and deformation.<br>**NOTE**<br>Proper connector has a narrow center bar (0.500 inch); older connectors have thicker (.69 in) center bar. Loose or missing set screws will allow water into bay cavity. | Cracks or broken welds noted. Elongation or deformation prevents proper seating of connector. |
| 52 | Before | Roadway Connectors | Ensure connector is correct type.<br>Inspect connector, eye bracket, set screws, spring and spring pins for cracks and deformation. | Incorrect connector type.<br>Any defect which prevents proper seating of connector. |
| 53 | Before | Roadway surface | Inspect for ruptured seams, holes punctures and cracked welds. | Any defect allowing water into bay cavities. |
| 54 | Before | Roadway Surface (Curbside Roadway Ponton) | Inspect for ruptured seams, holes punctures and cracked welds. | Any defect allowing water into bay cavities. |
| 55 | Before | Roadway Connectors | Ensure connector is correct type.<br>Inspect connector, eye bracket, set screws, spring and spring pins for cracks and deformation. | Incorrect connector type.<br>Any defect which prevents proper seating of connector. |
| 56 | Before | Connector Receptacles | Inspect for cracks, broken welds, elongation and deformation. | Cracks or broken welds noted. Elongation or deformation prevents proper seating of connector. |

*Table 2-12. Operator Preventive Maintenance Checks and Services (PMCS) for the Interior Bay cont.*

| Item No. | Interval | Location: Item to Service/Check | Item To be Inspected Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 57 | Before | Bilge Plugs | Ensure plugs are secured with wire rope to ponton.<br>Inspect rubber seal for cuts, elasticity and dry rot.<br>Check handle operation. | Any plug missing. |
| 58 | Before | Lift Pockets and Quick Release Pin | Ensure pin functions properly.<br>Inspect pin for cracks and broken strands on retaining wire rope.<br>Inspect pockets for cracks and broken welds. | |
| 59 | Before | Deck Surface | Inspect for punctures, cracks, tears, dents, holes and broken welds.<br>Check condition of non-skid coating. | Any damage which allows water into bay cavity. |
| 60 | Before | Rope Cleats | Inspect for cracks, broken welds and severe deformation. | |
| 61 | Before | Handrail Posts and Rope (Roadside Bow Ponton) | Inspect posts for cracks at support base, cracks/elongation of bolt slots, broken or deformed rope ring and frayed or stretched rope. | Handrail posts and rope missing. |
| 62 | During | Lower Lock Drive | Inspect screw and threads for cracks, burrs, nicks and deformation.<br>Inspect trunions, and drive pin for cracks.<br>Inspect cover bumpers and supports for broken welds and deformation. | Screw will not extend or retract drive pin properly.<br>Cracks or broken welds noted. |
| 63 | During | Deck Surface | Inspect for punctures, cracks, tears, dents, holes and broken welds.<br>Check condition of non-skid coating. | Any damage which allows water into bay cavity. |
| 64 | During | Connector Receptacles | Inspect for cracks, broken welds, elongation and deformation. | Cracks or broken welds noted. Elongation or deformation prevents proper seating of connector. |
| 65 | During | Roadway Connectors | Ensure connector is correct type.<br>Inspect connector, eye bracket, set screws, spring and spring pins for cracks and deformation. | Incorrect connector type.<br>Any defect which prevents proper seating of connector. |
| 66 | During | Roadway Surface | Inspect for ruptured seams, holes punctures and cracked welds. | Any defect allowing water into bay cavities. |

*Table 2-12. Operator Preventive Maintenance Checks and Services (PMCS) for the interior Bay cont.*

| Item No. | Interval | Location: Item to Service/Check | Item To be Inspected Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 67 | During | Roadway Surface (Curbside Ponton) | Inspect for ruptured seams, holes punctures and cracked welds. | Any defect allowing water into bay cavities. |
| 68 | During | Roadway Connectors | Ensure connector is correct type.<br>Inspect connector, eye bracket, set screws, spring and spring pins for cracks and deformation. | Incorrect connector type.<br>Any defect which prevents proper seating of connector. |
| 69 | During | Connector Receptacles | Inspect for cracks, broken welds, elongation and deformation. | Cracks or broken welds noted. Elongation or deformation prevents proper seating of connector. |
| 70 | During | Deck Surface | Inspect for punctures, cracks, tears, dents, holes and broken welds.<br>Check condition of non-skid coating. | Any damage which allows water into bay cavity. |
| 71 | After | Ribbon Bridge Components | After operation, clean all dirt, mud, and debris from ribbon bridge components and lubricate in accordance with LO 5-5420-209-12. | |

## Section III. OPERATION UNDER USUAL CONDITIONS

**2-12. General.** This section contains requirements and procedures for Launching and retrieving bays, assembling bays to form either a bridge or raft, procedures for constructing or retrieving a bridge or raft, and guidelines for operating a bridge or raft under normal operations.

**2-13. Site Requirements.** In order to launch bays and erect either a bridge or raft, the following technical site requirements are needed. Refer to figures 2-10 through 2-13 for typical site layouts and table 2-2 for bridge assembly requirements.

a. A water depth of at least 40 in. (102 cm) in main body of water for operation of bridge erection boats.

b. Launching area near planned bridge erection site for launching of bridge erection boats.

c. A bank height of less than 48 in. (112 cm) to accommodate ramp bay approach ramps.

d. A bank height of less than 60 in. (152 cm) with a water depth of at least 72 in. (178 cm) for free launch, or a bank height of less than 28 ft. (8.53 m) for high bank launch.

e. Down stream launching site from planned center line of bridge for launching of bays.

f. Good access road from bay launch area to staging area.

g. A 15 ft. (4.58 m) bank width for maneuvering transporter.

h. A minimum down stream floating area of 100ft. (30.50m) in areas wher ewater is flowing more than 1 ft./see. (0.30 m/sec.).

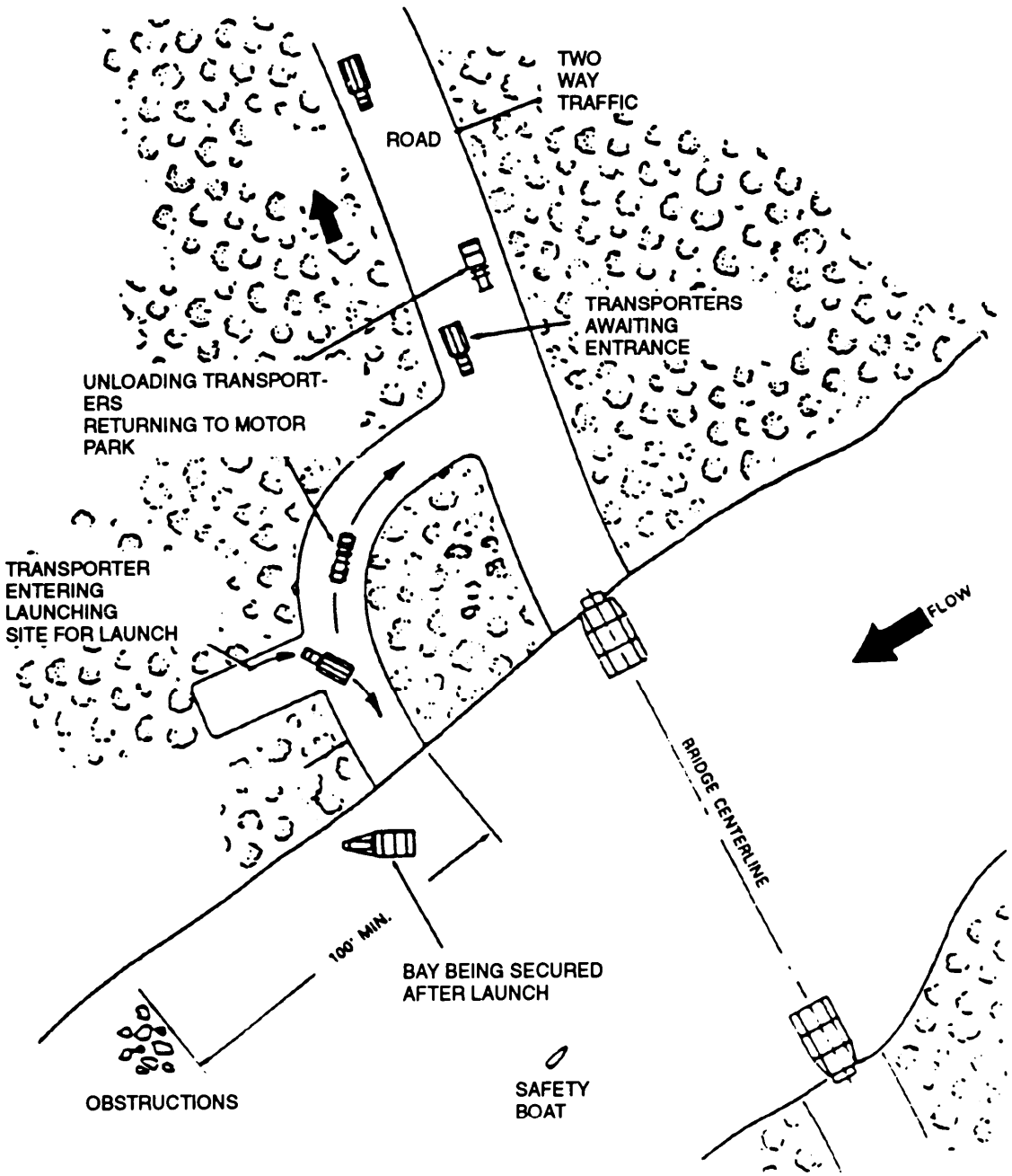



*Figure 2-10. Bridge Assembly Site Layout for Single Launch Site (Successive Bay Assembly).*

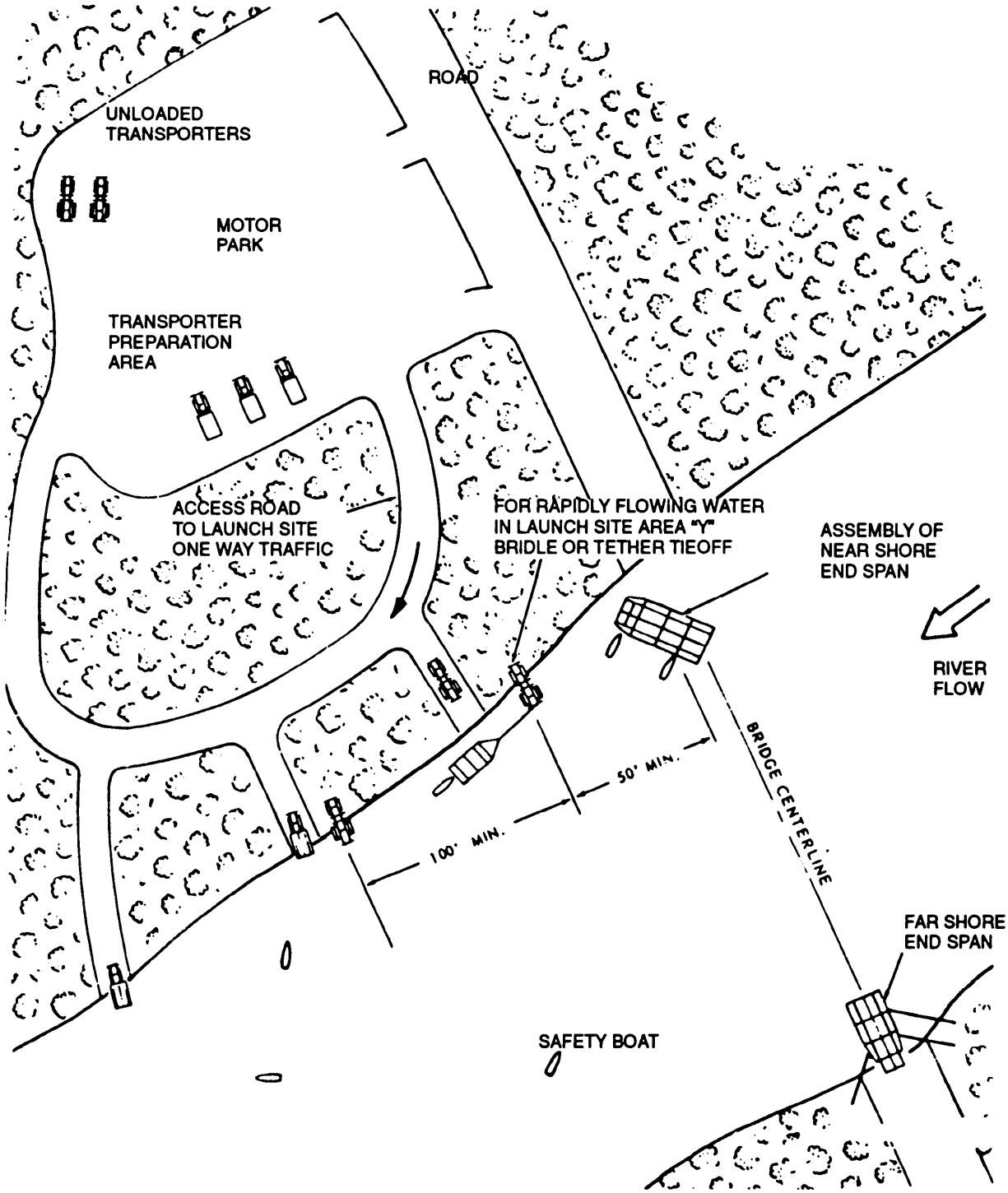



*Figure 2-11. Bridge Assembly Site Layout for Multilaunch Site (Successive Bay Assembly).*

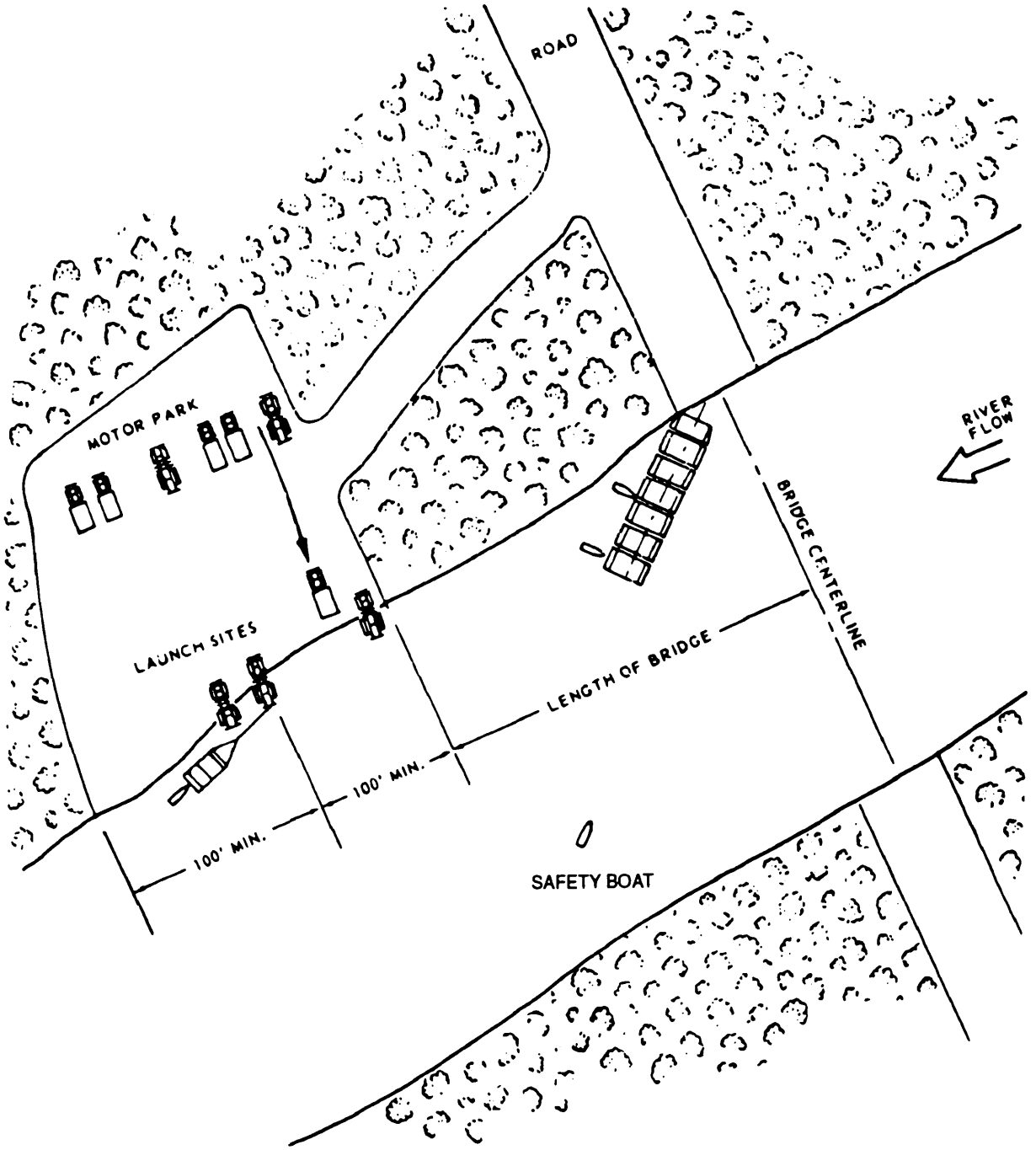



*Figure 2-12. Bridge Assembly Site Layout for Multilaunch Site (Swinging Bridge Assembly).*

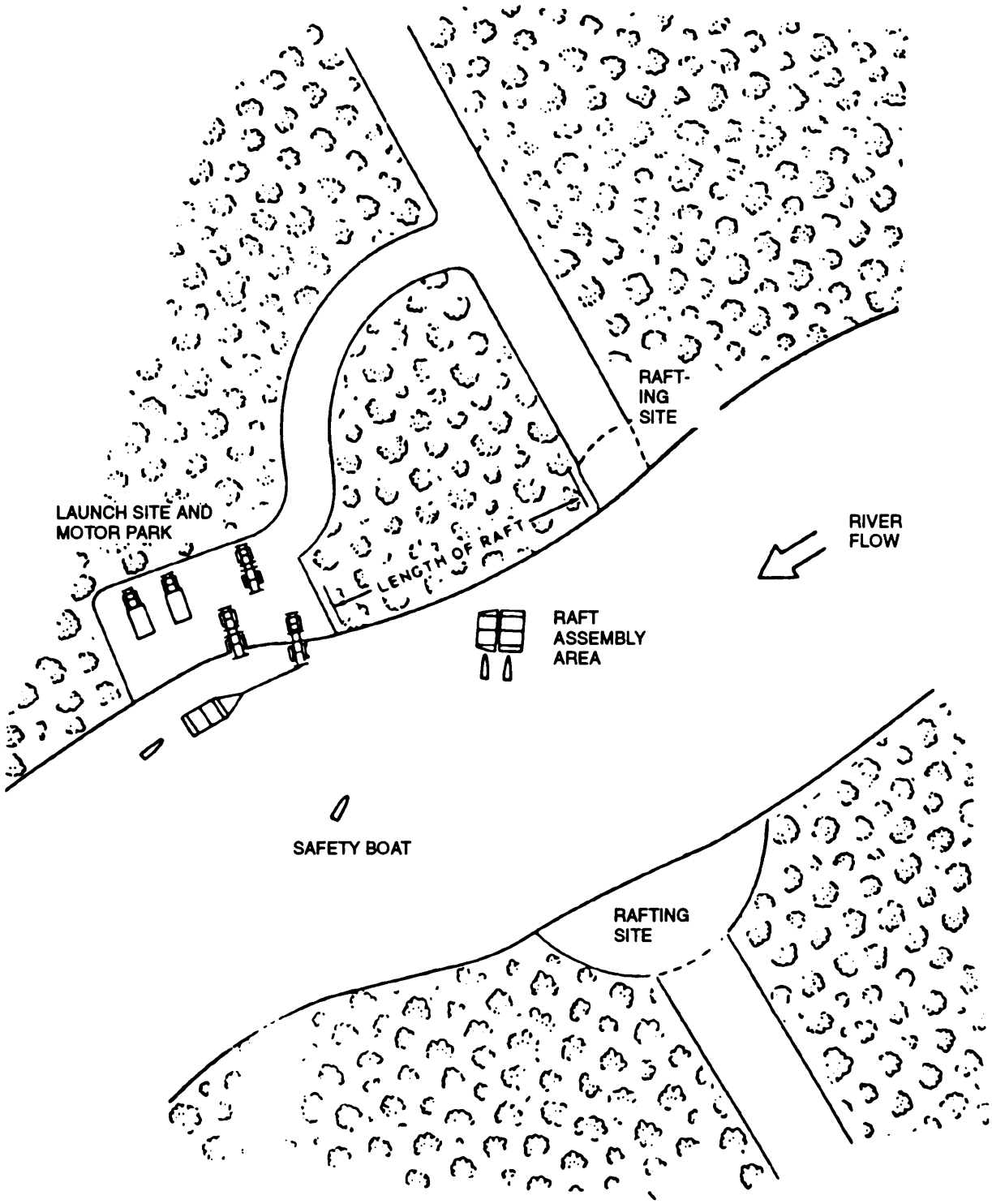



*Figure 2-13. Raft Assembly Layout.*

*Table* 2-13. *Bridge Assembly Requirements.*

| Bridge Length (Feet/Meters) | Bays | | Launch Sites Desired | Boats | |
|---|---|---|---|---|---|
| | Ramp | Interior | | Need | Desired |
| 80 (24.38) | 2 | 2 | 2 | 3 | 4 |
| 102 (31 .1) | 2 | 3 | 2 | 4 | 4 |
| 124 (37.8) | 2 | 4 | 2 | 4 | 5 |
| 146 (44.5) | 2 | 5 | 2 | 5 | 5 |
| 168 (51 .20) | 2 | 6 | 3 | 5 | 6 |
| 190 (57.9) | 2 | 7 | 3 | 6 | 6 |
| 212 (64.6) | 2 | 8 | 3 | 6 | 7 |
| 234 (71 .3) | 2 | 9 | 3 | 6 | 7 |
| 256 (78) | 2 | 10 | 3 | 7 | 7 |
| additional (Note 1) | | | | | |
| 0-66 (20) | · | 1-3 | · | 1 | 1 |
| additional (Note 2) | | | | | |
| 0-88 (26.8) | | 1-3 | · | 1 | 1 |
| additional (Note 3) | | | | | |
| 0-132 (40) | · | 1-6 | · | 1 | 1 |

Notes:

1. In currents of 6 to 8 feet per second for each additional bridge length increase of 0 to 66 feet add the indicated number of boats.

2. In currents of 3 to 6 feet per second for each additional bridge length increase of 0 to 88 feet add the indicated number of boats.

3. In currents up to 3 feet per second for each additional bridge length increase of 0 to 132 feet add the indicated number of boats. (Includes the safety boat but not the backup boats.)

**2–14. Bay Free Launch.** (figure 2-14) Where conditions permit, a bay maybe free launched. This method allows the bay to roll off the transporter and unfold in the water. The water depth required varies with slope and position of transporter in water. A maximum slope of 30 percent with a minimum water depth of 36 inches (44 inches for ramp bay) is allowed for safe free launch (transporter on a 10 percent slope and backed into the water until the rear wheels are hub deep in the water). When free launching on a 5-10 degree sideslope, in heavy winds and/or fast water, adjust boom and winch cable hook to maximum height before paying out. This is to permit maximum range of motion for the tiedown hook mechanism. The crew required for a free launch consists of an operator and an assistant. When an assistant is not assigned to stay with the transporter, a temporary assistant maybe designated from the staging area crew or shuttle crew for duties to be performed in the staging area, or the launch site guide for duties to be performed at the launch site. This will generally be the case in rapid bridge construction. The operator will drive and be responsible for the safe launching of the bay. The assistant will help prepare bay and transport for launch. The free launch procedures are the same for either a ramp bay or interior bay.

**WARNING**

Death or severe injury to personnel and damage to equipment may result if personnel fail to observe safety precautions. Do not launch bay with transporter pintle in place. Remove and replace with pintle facing rear axle.

**CAUTION**

No personnel or equipment will be allowed to operate upstream of the ribbon bridge. All launching of bays and boat operation will be downstream of the bridge centerline.

**NOTE**

A safety boat will be used during all water operations. Steps (1) through (5) can be performed at staging area to reduce launch time.

(1) Ensure all bilge plugs are installed.

(2) Unlatch (interior bay only) rear travel latch (1).

(3) Unlatch (interior bay only) two rear roadway/bow foldlock latches (2).

(4) Unlatch two front roadway/bow foldlock latches (3).

(5) Pay out cable and remove cable (4) from lifting eye (5).

(6) Remove cable (4) from cable guide (6) and place cable (4) on transporter cab (7).

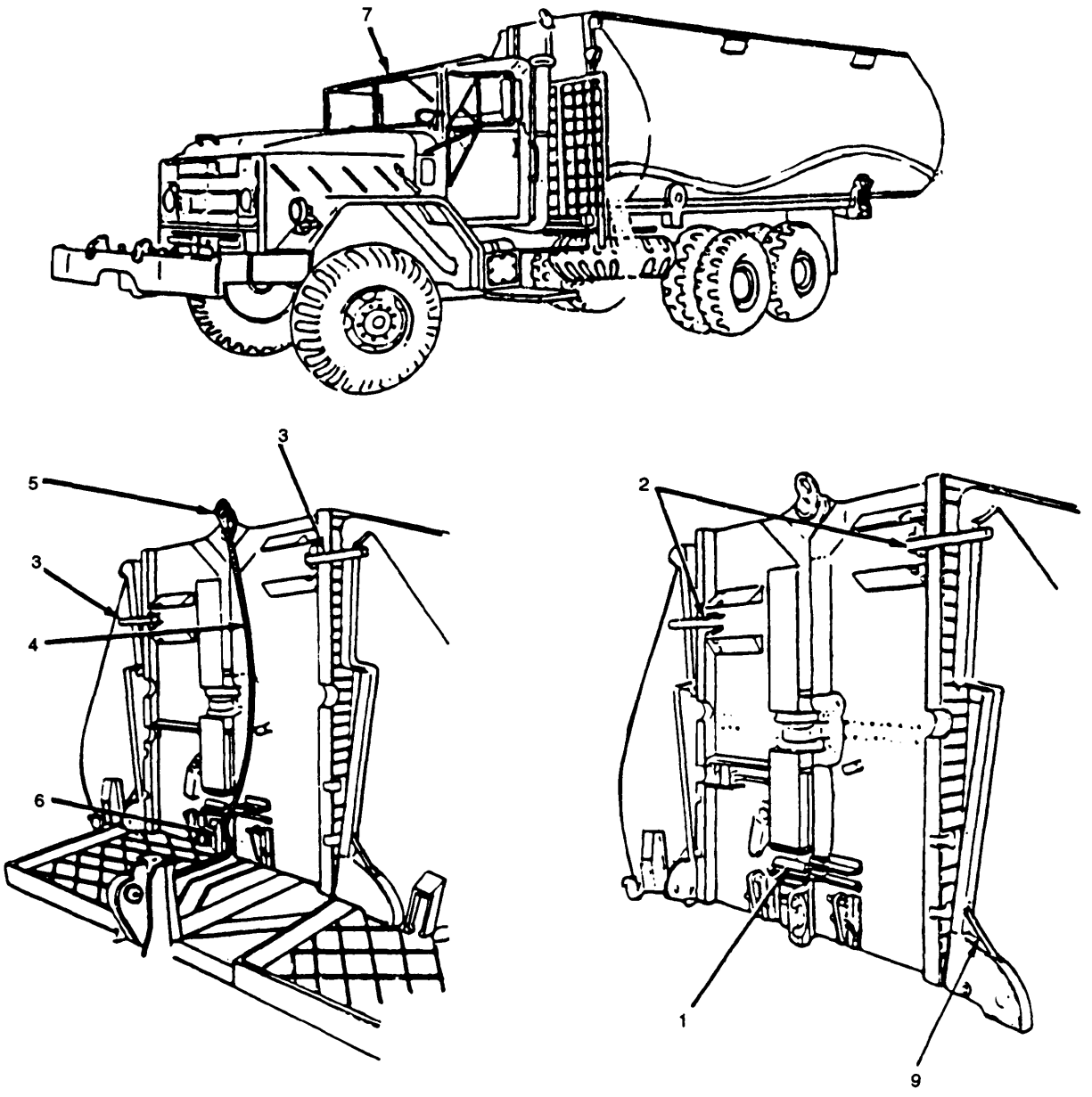



*Figure 2-14. Bay Free Launch (Sheet 1 of 5).*

*(7)* Attach tag line *(8)* between tie off point *(9)* and rear lifting shackle (10).

(8) Unlatch front travel latch (11).

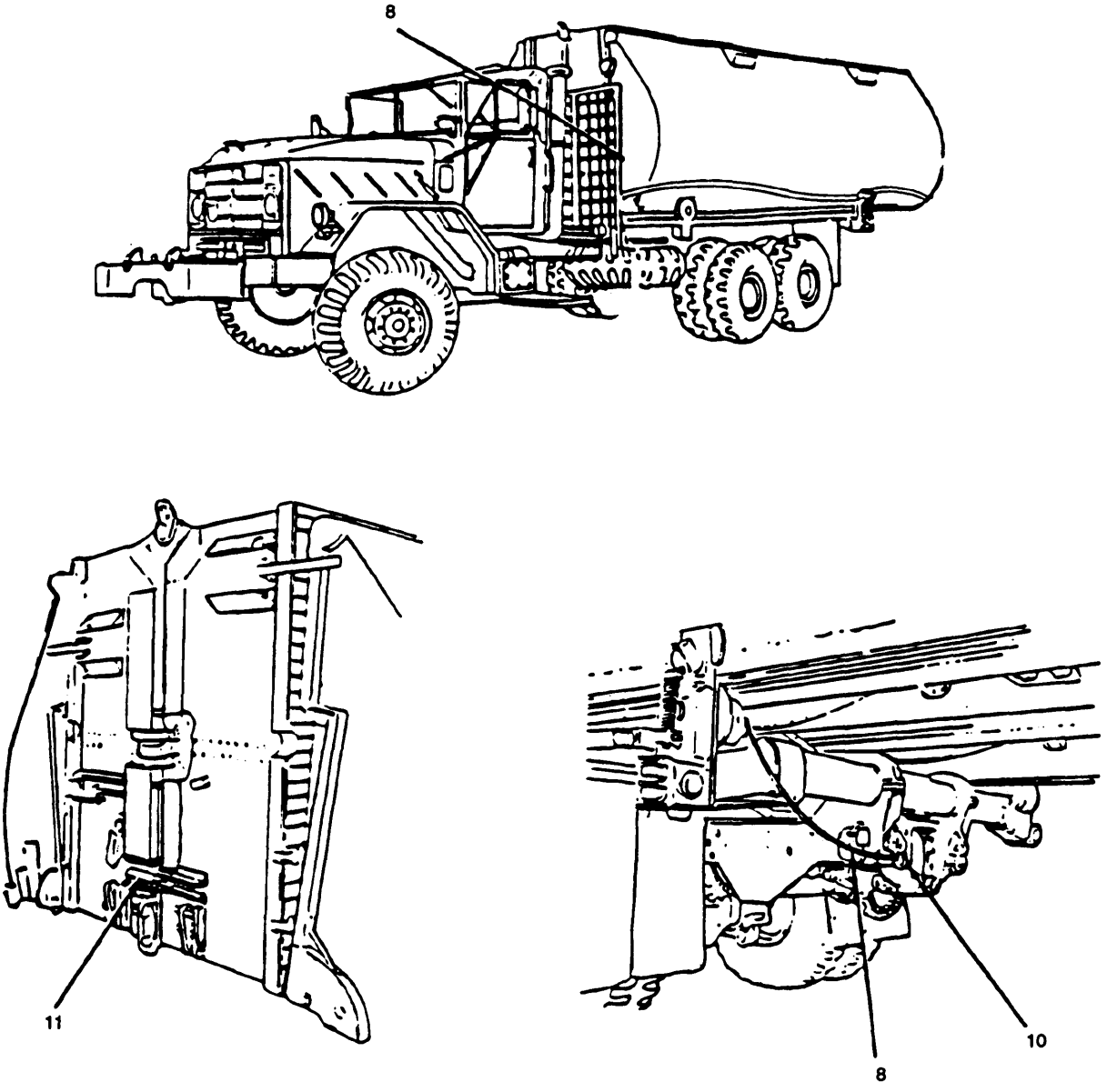



*Figure 2-14. Bay Free Launch (Sheet 2 of 5).*

Loosen bolt (12) and release aft tiedown hook (13).

Install crow bar (14) in aft tiedown hook (13) and move aft tiedown hook (13) to launch position and secure with tiedown pin (15) and remove crow bar (14).

Repeat Step (10) for remaining aft tiedown hook.

**CAUTION**

Never launch bay against current, always launch bay perpendicular to or with current.

(12) Move transporter to launch site, and back transporter into water until rear wheels are hub deep in water.

(13) Set parking brake and electric brake.

(14) Engage Power Takeoff (PTO).

(15) Remove quick release pin (16) and store.

**WARNING**

Before retracting locking cylinder pin be sure all personnel and equipment are clear of unfolding area otherwise, serious injury, death, or damage to equipment may result.

**NOTE**

If bay does not roll off transporter when locking cylinder pin is retracted, raise boom slightly to start bay moving then lower boom.

(16) Retract (PIN OUT) locking cylinder pin (17).

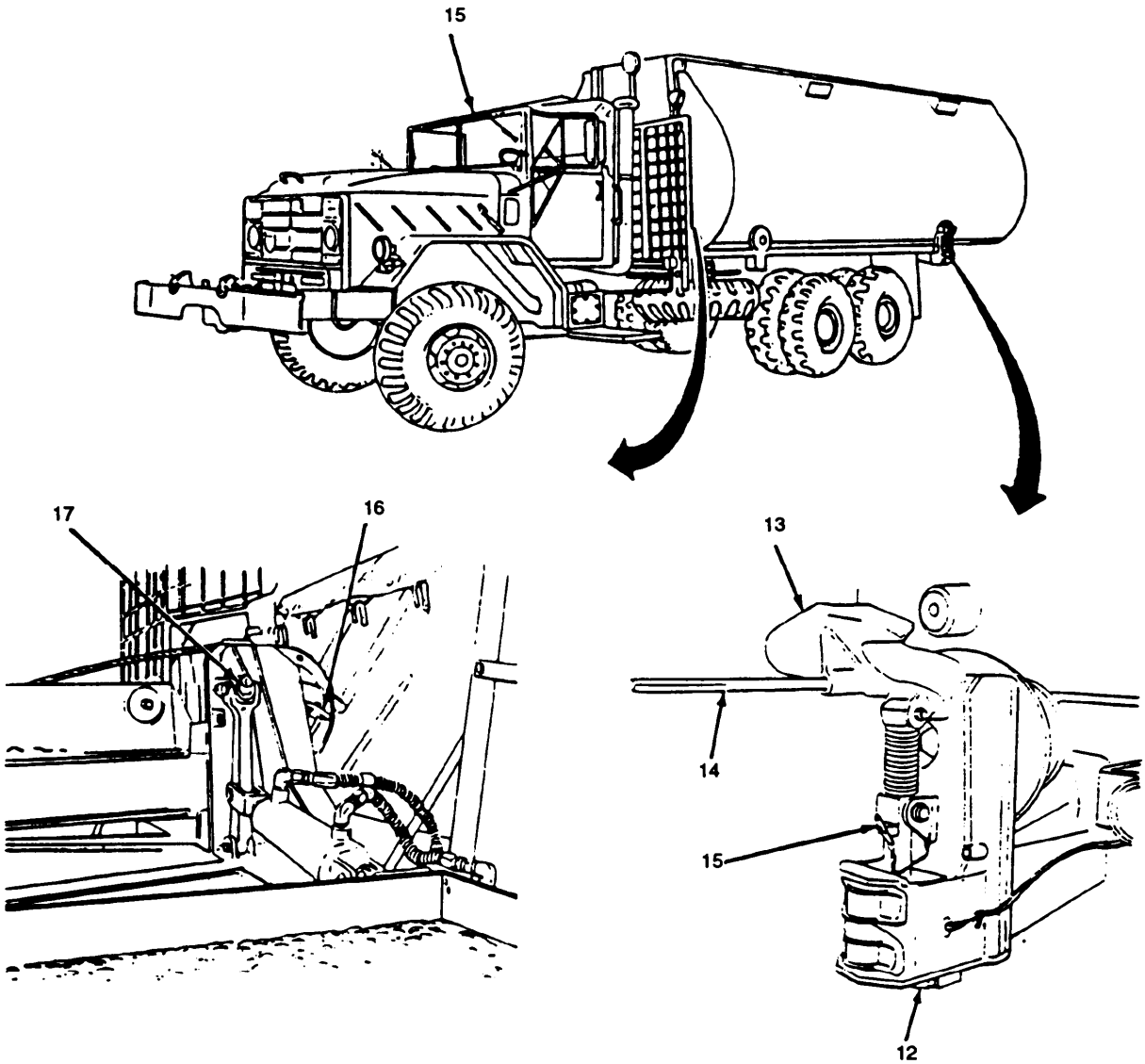



*Figure 2-14. Bay Free Launch (Sheet 3 of 5).*

*(17)* After boat crew secures boat to bay, have them remove tether line, and retrieve and store line.

*(18)* Disengage PTO, release parking brake and electric brake, and move transporter to staging area.

(19) Boat crew will connect boat to bay.

*(20)* After boat connects to bay, secure bay as follows:

**NOTE**

Use bay connecting tool and crow bar to assist in engaging connectors.

*(a)* Position bay connecting tool (17) on roadway (18).

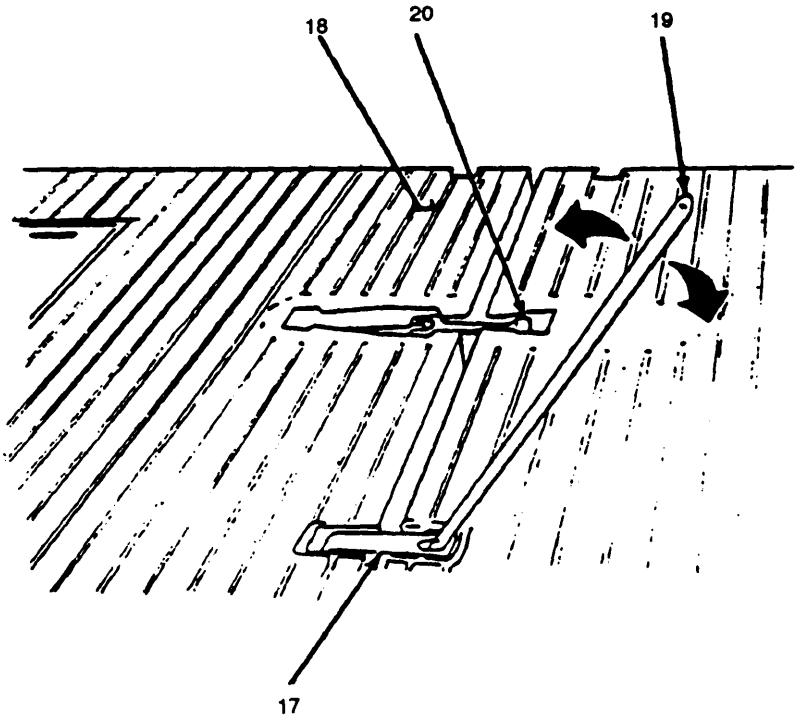



*Figure 2-14 Bay Free Launch (Sheet 4 of 5).*

(b) Install crow bar (19) and move crow bar back and forth until connectors (20) are engaged.

**WARNING**

If roadway-to-bow ponton latches are not engaged, the bow ponton will fold up when vehicle crosses the bridge. This may cause serious injury or death to any personnel standing on the bay.

**NOTE**

The backs of the roadway-to-bow ponton latches are painted yellow to allow a quick, visual check to ensure latches are engaged.

*(c)* Engage four roadway-to-bow Ponton bridge batches.

*(d)* Ensure lower lockpin drive screw (22) moves freely and pin (23) is fully retracted.

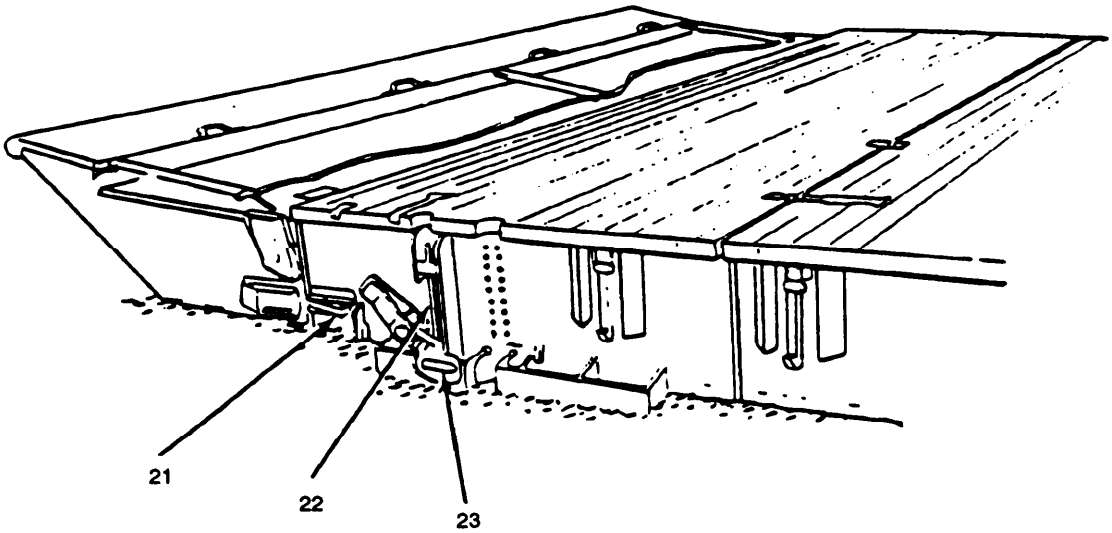



*Figure 2-14. Bay Free Launch (Sheet 5 of 5).*

2-15. **Controlled bunch of Bay.** (figure 2-15) Controlled launch (off-loading) of either the ramp or interior bay into water is performed as detailed in the following steps. The crew required will consist of an operator and an assistant. When an assistant is not assigned to stay with the transporter, a temporary assistant maybe designated from the staging area crew or shuttle crew for duties to be performed at the launch site. This will generally be the case in rapid bridge construction. The operator will drive and be responsible for operation of the boom and winch. The assistant duties will be to handle the winch cable and give hand signals to the operator during controlled launch. Both operator and assistant will prepare the bay and transporter for launch, with the operator responsible for the completion of the tasks. Steps ((l)) through ((9)) may be accomplished at staging area site to reduce launch time. A minimum depth of 30 in. (76.2 cm) of water is desired for launching a bay, but a bay can be launched in 17 in. (43.2 cm) of water if care is taken.

**CAUTION**

No personnel or equipment will be allowed to operate upstream of the ribbon bridge. All launching of bays and boat operation will be downstream of the bridge line.

**NOTE**

A safety boat will be used during all water operations.

(1) Ensure all bilge plugs are installed.

(2) Unlatch (interior bay only) rear travel lock(1).

(3) Unlatch (interior bay only) two rear roadway/bow foldlock latches (2).

(4) Unlatch two front roadway/bow ponton foldlock latches (3).

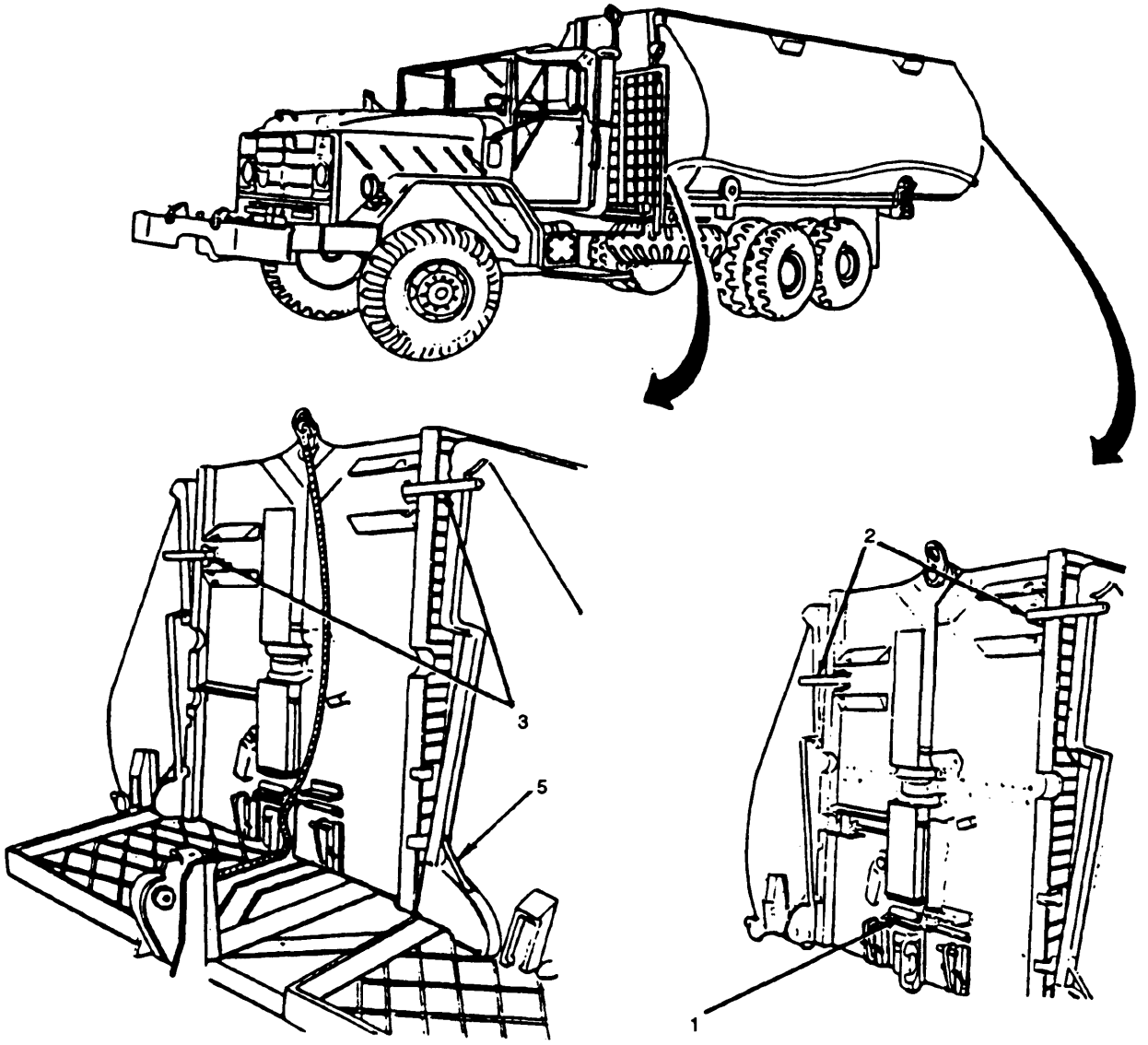



*Figure 2-15. Bay Controlled Launch (Sheet 1 of 6).*

(5) Attach tag line (4) between tieoff point (5) and rear lifting shackle (6) of transporter.

(6) Loosen bolt (7) and release aft tiedown hook (8).

(7) install crow bar(7) in aft tiedown hook (8) and move aft tiedown hook (8) to launch position and secure with quick release pin (10). Remove crow bar (9) and repeat Steps (6) and (7) for remaining aft tiedown hook.

(8) Secure latch pin lanyard (11) to rear clevis (6).

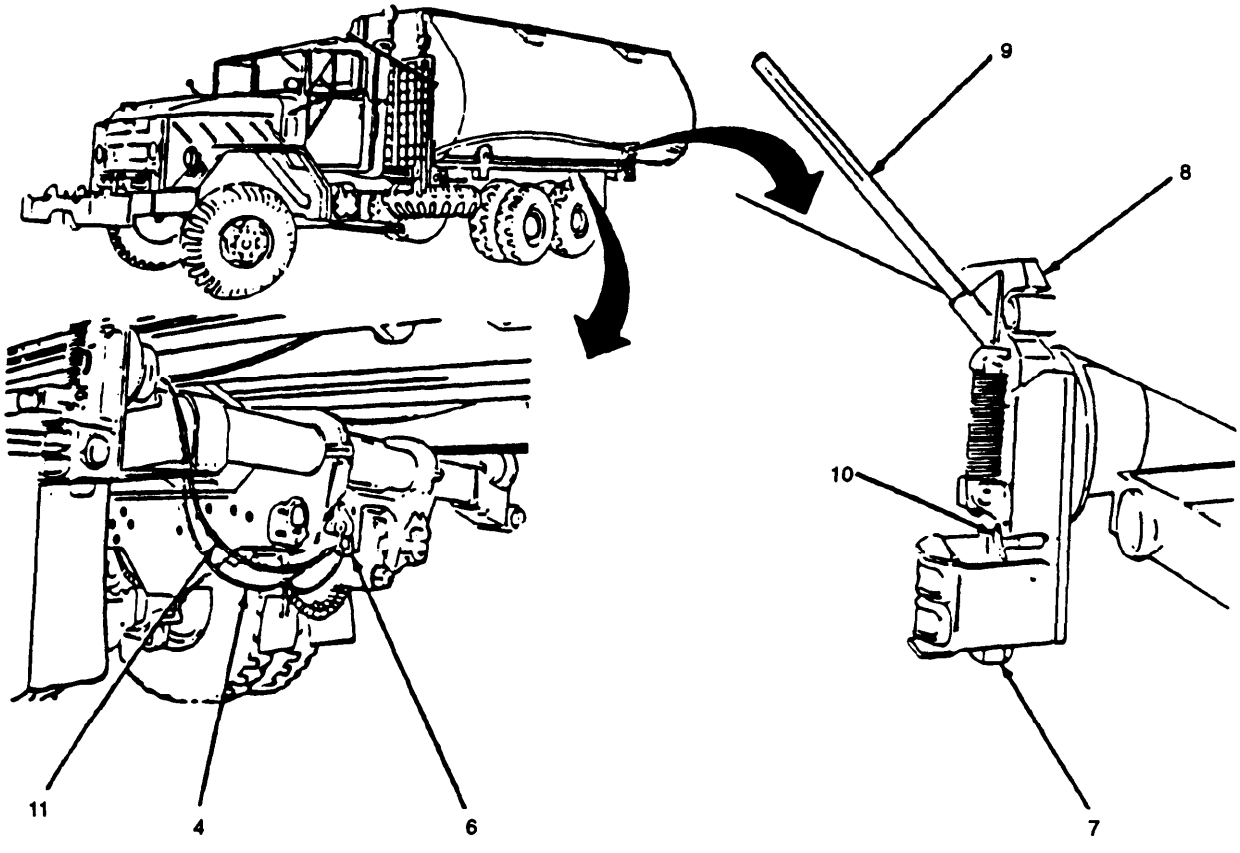



*Figure 2-15. Bay Controlled Launch (Sheet 2 of 6).*

**WARNING**

Never launch bay against current, always launch bay perpendicular to or with current.

(9) Move transporter to launch site, and back transporter into water until gearwheels are hub deep.

(10) Set Parking brake and electric brake, and place transporter in neutral.

(11) Engage Power Takeoff (PTO) lever.

(12) Remove quick release pin (12) and store.

**NOTE**

If bay does not roll off transporter when cylinder locking pin is retracted, raise boom slightly to start bay moving.

(13) Retract cylinder locking pin (PIN-OUT) and pay out cable.

(14) Pay out cable until bay tiedown pins (13) are approximately 2 ft (0.60 m) from aft tiedown hooks (8).

(15) Install crow bar (9) into aft tiedown receptacle and retract aft tiedown hook.

(16) Remove quick release pin (10) and store, and raise tiedown hook (8) to vertical position.

(17) Pay out cable until bay tiedown pins (13) are seated in tiedown hooks (8).

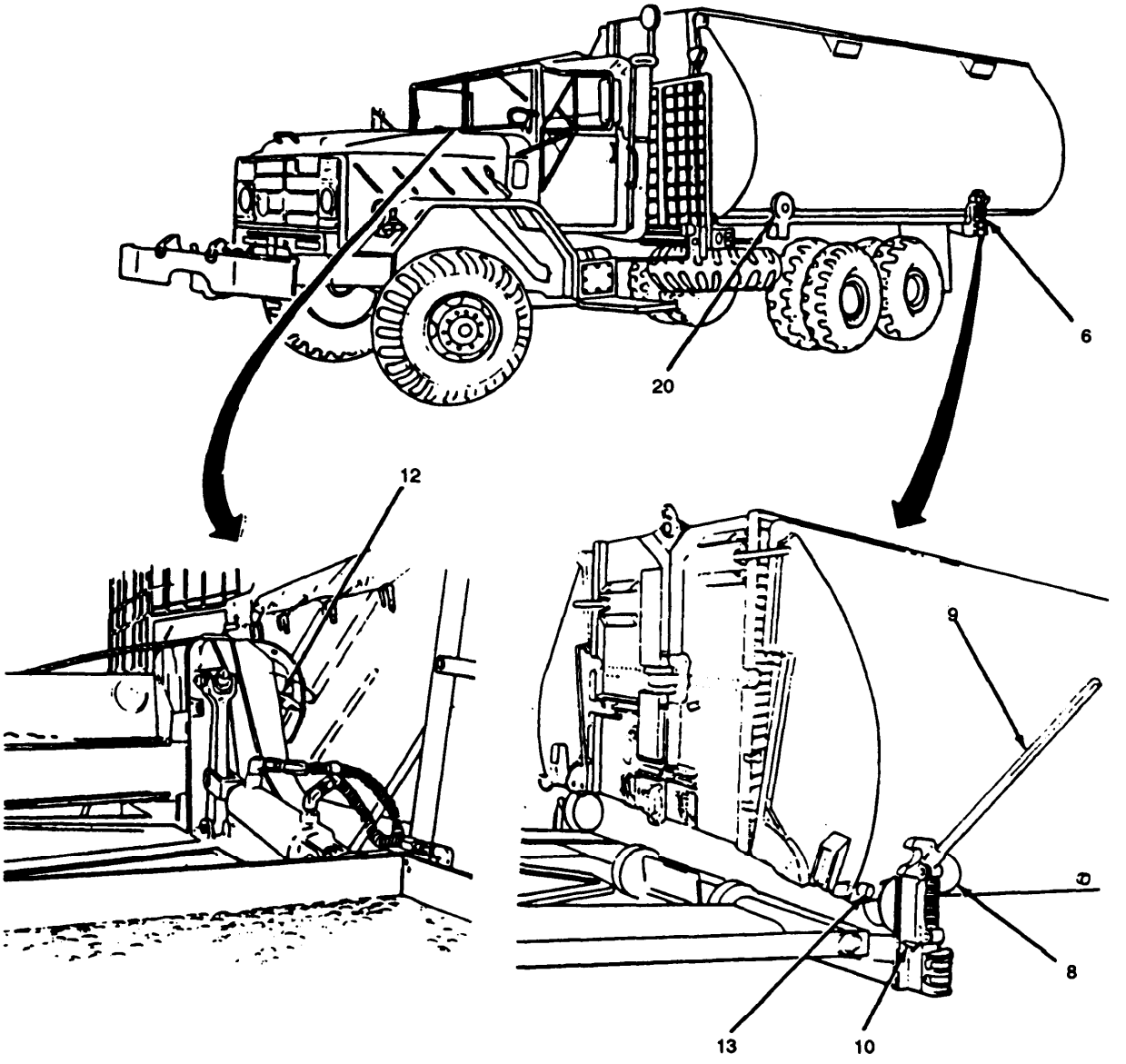



*Figure 2-15. Bay Controlled Launch (Sheet 3 of 6).*

*(18)* Payout cable and remove cable (14) from cable guide (15).

**NOTE**

Ensure travel latch pin lanyard is longer than tether line to prevent accidental opening of bay.

(19) Install travel latch pin (16) in front travel latch (17).

(20) Raise boom (18) to vertical position.

(21) Ensure hook (19) improperly installed in lifting eye (20) and play in cable until bay is approximately 2 ft (0.60 m) above aft tiedown hooks (8).

(22) Raise boom (18) to full aft position and pay out cable (14) until bay (21) is floating in water.

(23) Remove Cable (14) from lifting eye (20).

**WARNING**

Ensure all personnel and equipment are clear of bay unfolding area. Severe injury, death, or damage to equipment may result.

(24) Retrieve latch pin lanyard (11) and unlatch travel latch (17) allowing bay (21) to unfold and store latch pin.

(25) Bridge boat will connect to bay.

(26) Lower boom (18) fully, secure cable (14) to boom (18) and take in slack.

(27) Disengage PTO, release parking brake and electric brake, and move transporter to staging area.

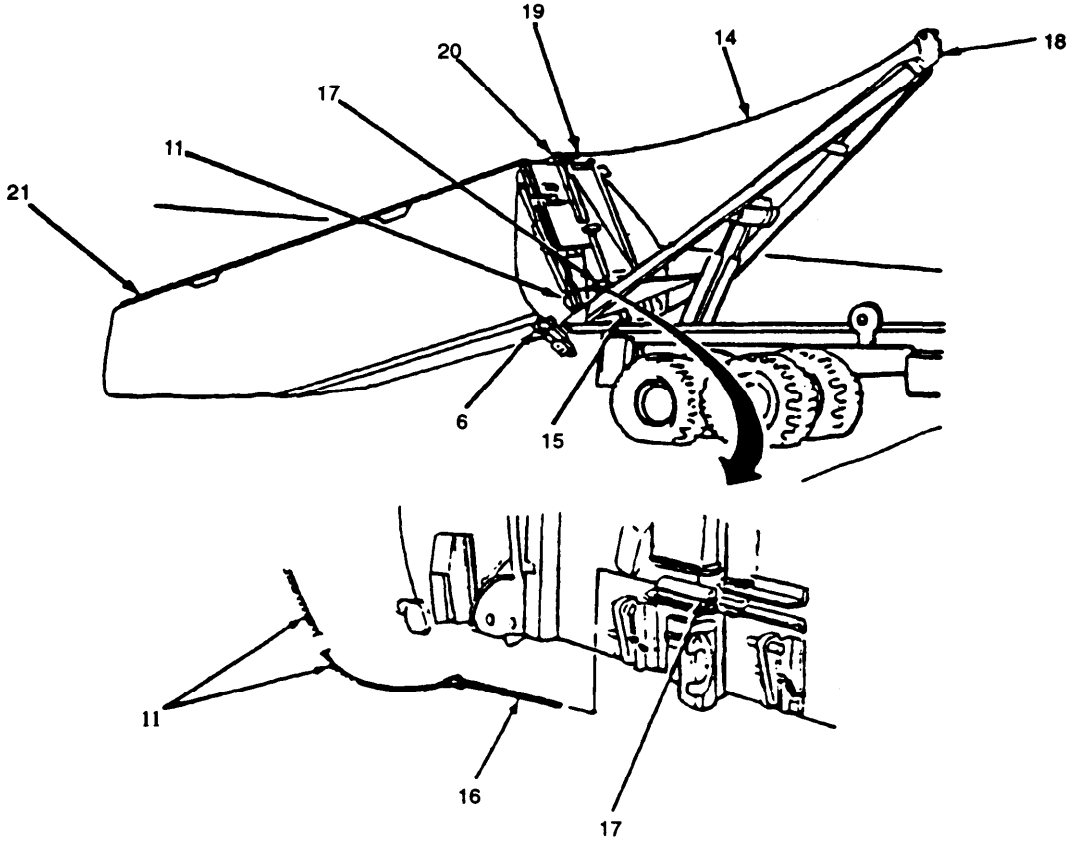



*Figure 2-15. Bay Controlled Launch (Sheet 4 of 6).*

(28) After boat connects to bay, secure bay as follows.

**NOTE**

Use bay connecting tool and crow bar to assist in engaging connectors.

*(a)* Position bay connecting tool (22) on roadway (23).

*(b)* Install crowbar (9) and move crowbar back and forth until connectors (24) are engaged.

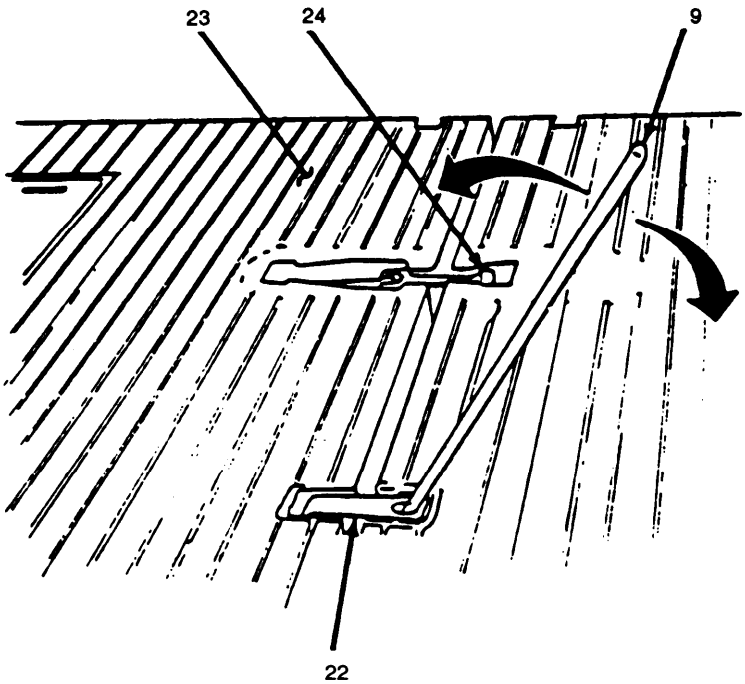



*Figure* 2-15. *Bay Controlled Launch (Sheet 5 of 6).*

**WARNING**

If roadway-to-bow ponton latches are not engaged, the bow ponton will fold up when a vehicle crosses the bridge. This may cause serious injury or death to personnel on the bridge.

**NOTE**

The backs of the roadway-to-bow ponton latches are painted yellow to allow a quick, visual check to ensure latches are engaged.

*(c)* Engage four roadway-to-bow ponton bridge latches (25).

*(d)* Ensure lower lockpin drive screw (26) moves freely and pin (27) is fully retracted.

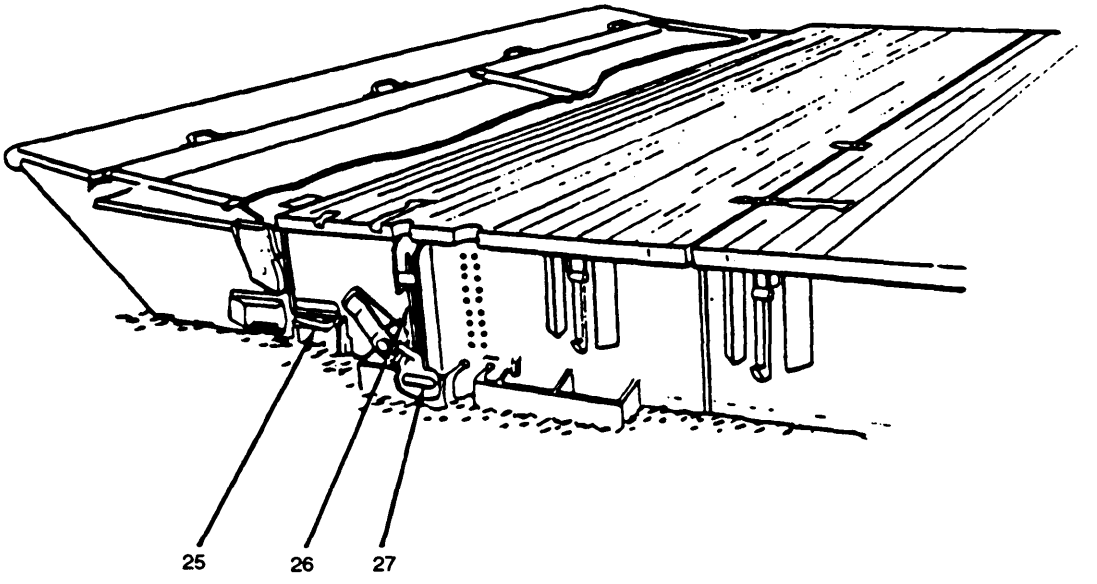



*Figure 2-15. Bay Controlled launch (Sheet 6 of 6).*

**2–16. High Bank Launch of Bay.** A high-bank launch of a bay may be necessary at various times. This method makes possible the launching of a bay from up to a 28 ft (8.5 m) vertical riverbank. This method should only be used if no other method of launching can be performed. Prior to launch, a thorough inspection of the area should be made to ensure the bank will support the transporter and bay to permit safe operation. The crew required for a high-bank launch will consist of an operator and an assistant. The operator will drive and be responsible for the operation of the boom and winch. The assistant's duties will be to handle the winch cable and give signals to the operator during launch. Both operator and assistant will prepare the bay for launch, with the operator responsible for the completion of the tasks. A minimum of 17 in. *(43.2* cm) of water is required for unfolding a bay. The entire operation will generally take place at the launch site.

**NOTE**

A high-bank launch consists of two distinct phases. The first being the off load onto the ground and the second the actual launching.

(1) Position transpoter parallel to river bank allowing enough room, at least 25 ft (7.62 m) for ramp bay or 28 ft (8.54 m) for interior bay, to maneuver transporter and place transpoter in neutral.

*(2)* Model (RBT) install bogie bracket (1) between rear axle housing (2) and frame rails (3), and install rubber bumpers (4) on aft tiedown hooks (5).

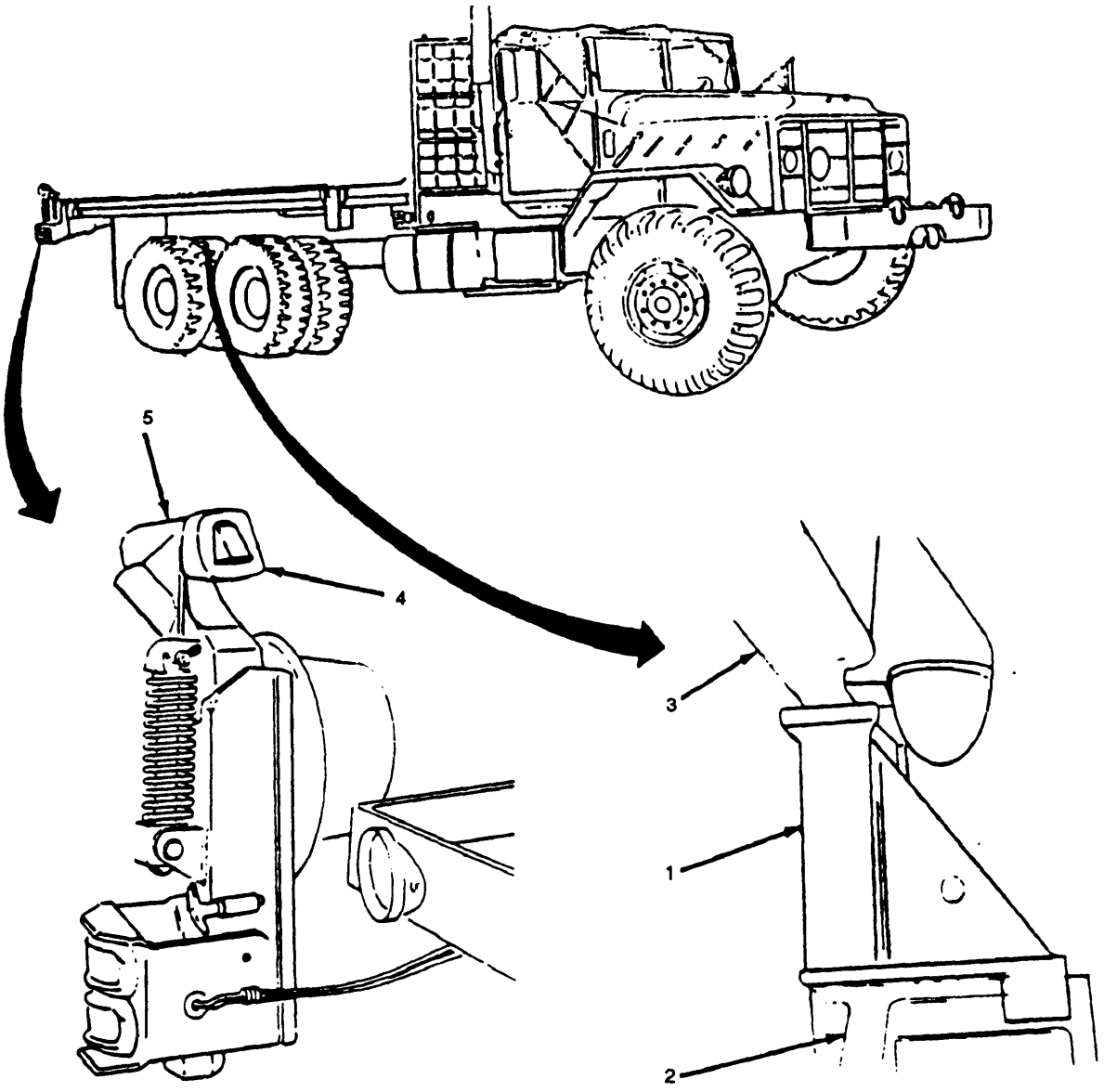



*Figure 2-16. High Bank Launch of Bay (Sheet 1 of 12).*

*(3)* Ensure winch cable (6) is properly installed in lifting eye (7), cable guide (8) and around boom sheeve (9).

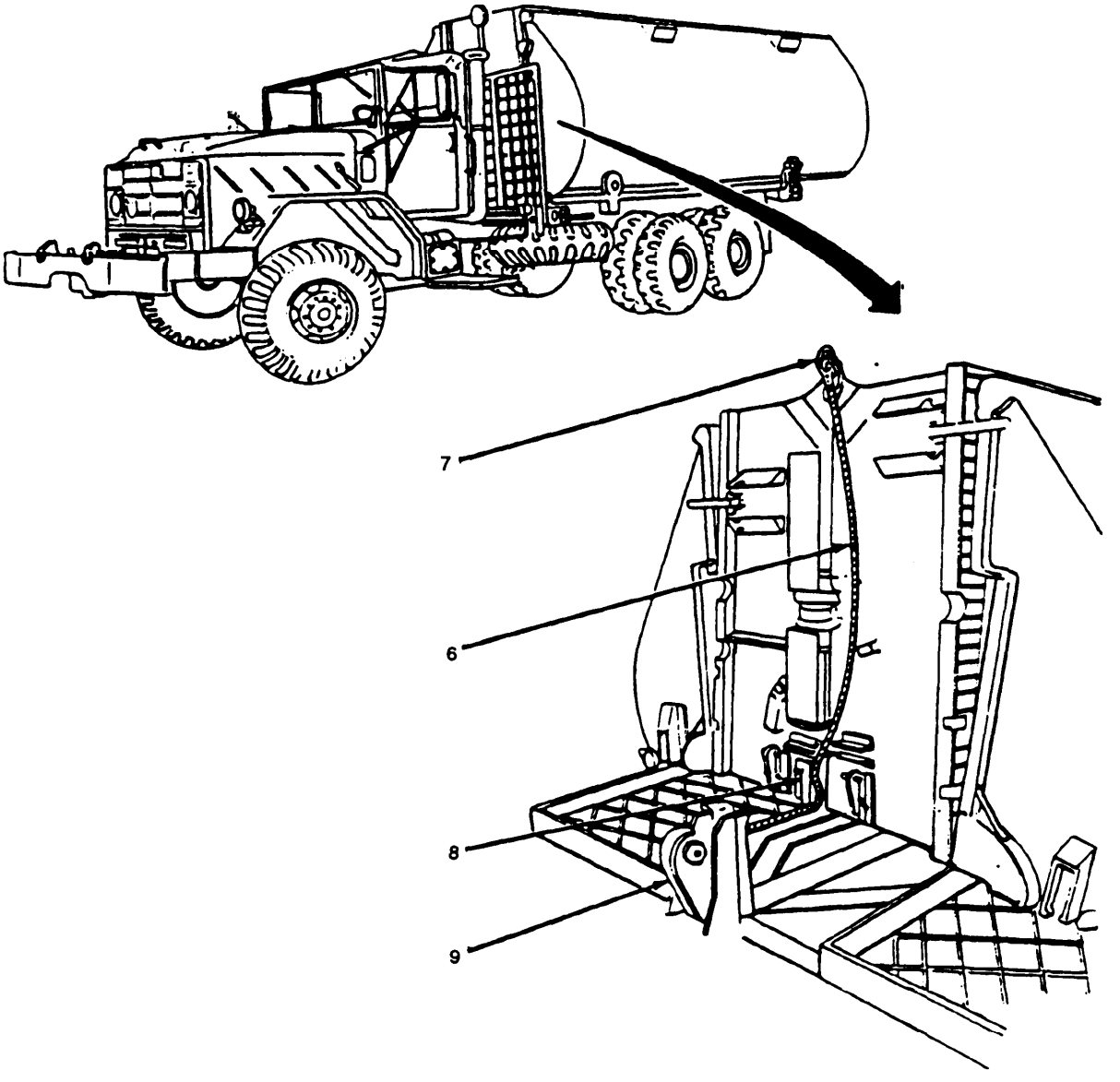



*Figure 2-16. High Bank Launch of Bay (Sheet 2 of* 12).

(4) Loosen nut (10)and release tiedown hook (5).

(5) Install crow bar (11) and move tiedown hook (5) to launch position and secure with quick release pin (12).

(6) Repeat Steps (3) and (4) for remaining tiedown hook.

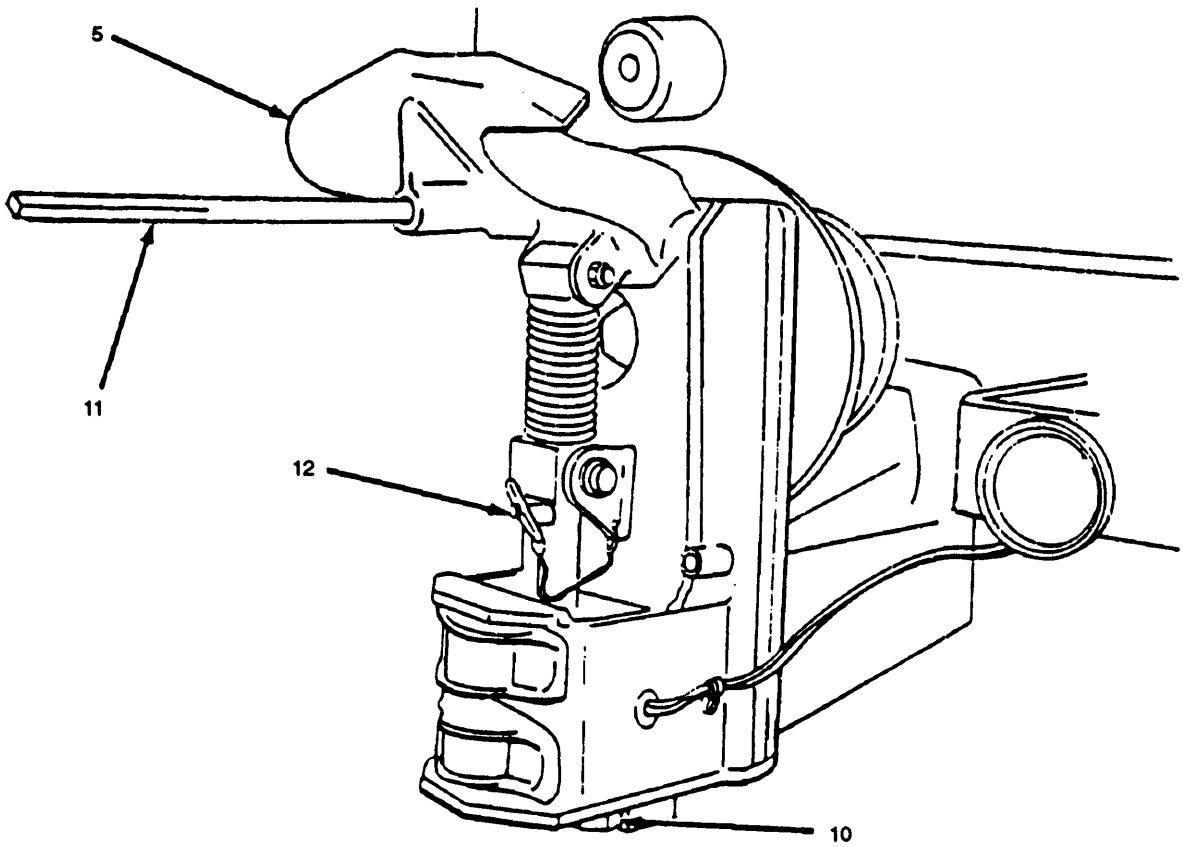



*Figure 2-16. High Bank Launch of Bay (Sheet 3 of 12).*

*(7)* Engage PTO.

(8) Remove quick release pin (13) and store.

(9) Raise boom (14) approximately 15° and pay out cable.

**NOTE**

Cribbing should be placed on ground to protect bay from damage. When bay touches ground the transporter should roll forward. If transporter does not, raise boom slightly. If raising boom does not help, slowly drive transporter forward as cable is payed out.

(10) Pay out cable until bay tiedown pins (15) are approximately 2 ft (0.60 m) from aft tiedown hook (5).

(11) Install crowbar (16) in tiedown hook (5).

(12) Pull down on crowbar (16) and remove quick release pin (17) and move tiedown hook (5) to vertical (lock) position, and store quick release pin (17).

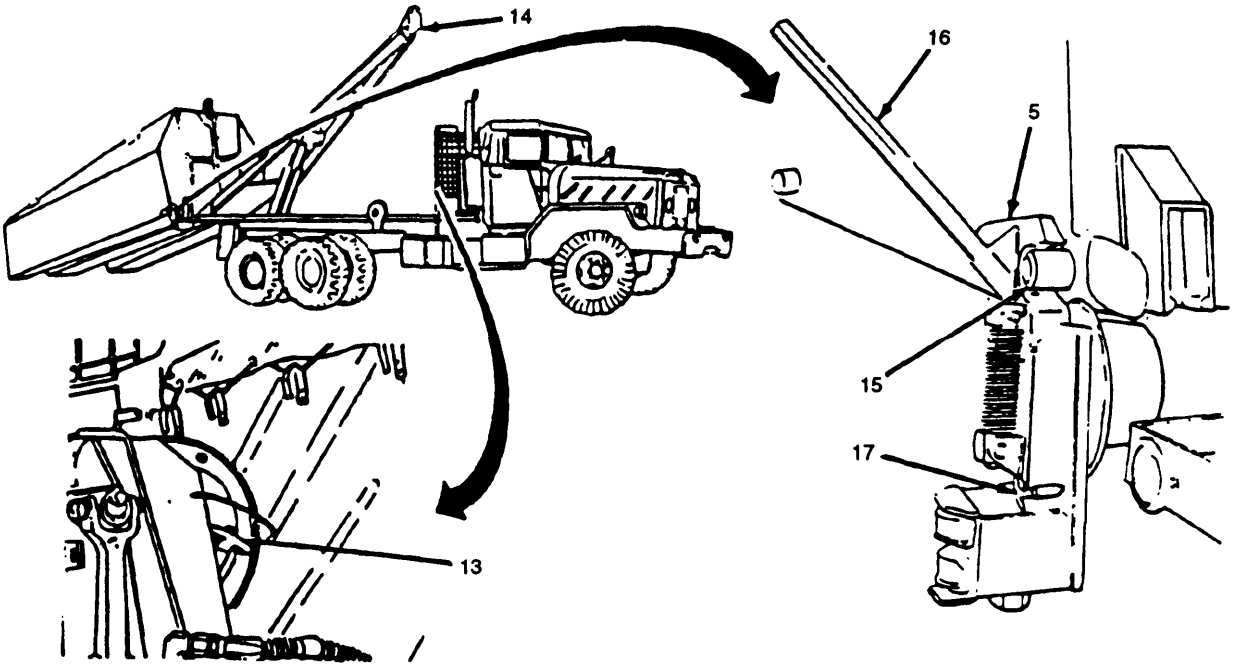



Figure 2-16. *High Bank Launch of Bay (Sheet 4 of* 12).

(13) Pay out cable until bay tiedown pins (15) are seated in tiedown hook (5).

(14) Pay out cable and remove cable (6) from cable guide (8).

(15) Raise boom (14)tovertical position and play in cable until bay tiedown pins (15) areapproximateiy 2 ft (0.60 m) above tiedown hooks (5).

(16) Raise boom (14) to full aft position and pay out cable and lower bay (18) to ground.

(17) Remove cable (6) from lifting eye (7).

(18) Lower boom (14) fully.

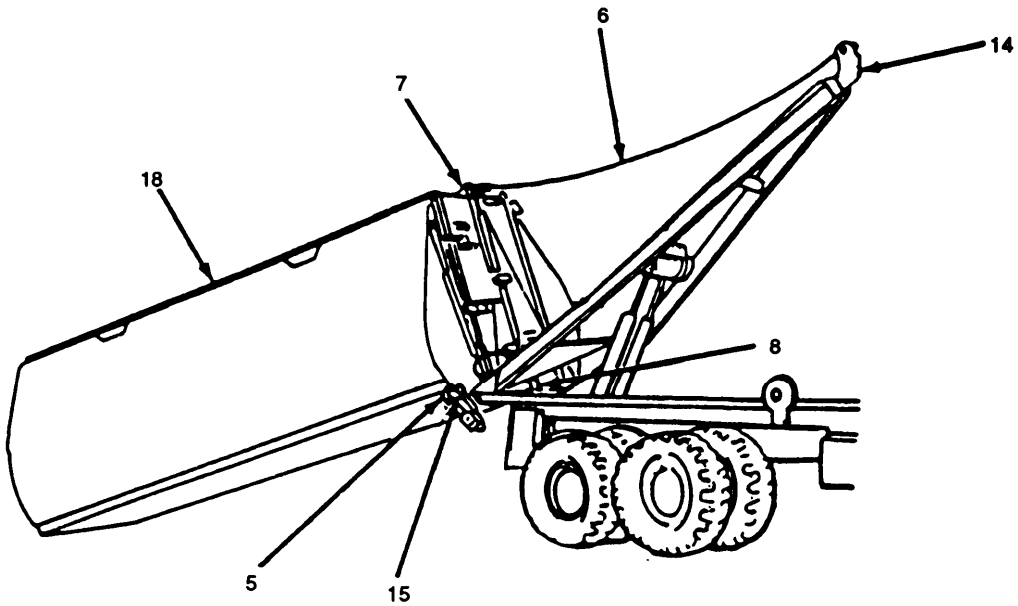



*Figure 2-16. High Bank Launch of Bay (Sheet 5 of 12).*

**NOTE**

If several bays are to be high bank launched, one transporter is positioned perpendicular to the water. All bays are launched from this transporter. The bays on the other transporters are off-loading parallel to the water behind the launching transporter.

(19) Disengage PTO and position transporter (19) centered with and perpendicular to bay (18) and set parking brake and electric brake.

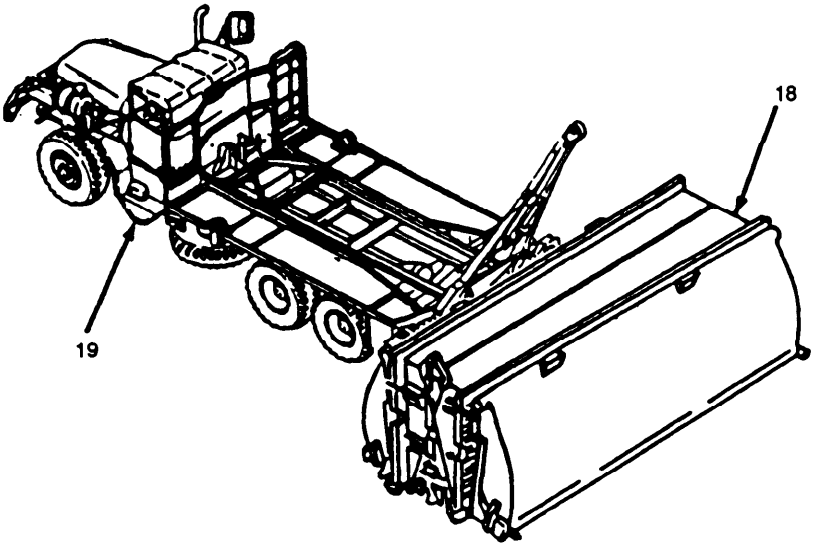



*Figure 2-16. High Bank Launch of Bay (Sheet 6 of 12).*

(20) Place transmission in neutral and engage PTO.

(21) Install cable hook *(20)* in boom anchor (21).

(22) Raise boom (14) fully and pay out cable.

(23) Install snatch block (22) on cable (6).

(24) Connect lifting sling (23) to snatch block (22).

**NOTE**

If a ramp bay is being launched, connect the longer two lines of the lifting sling to the ramp end bow lift points. When launching an interior bay, all four lines should be of equal length.

(25) Connect four lifting sling lines (24) to bay lifting and anchoring pins (25).

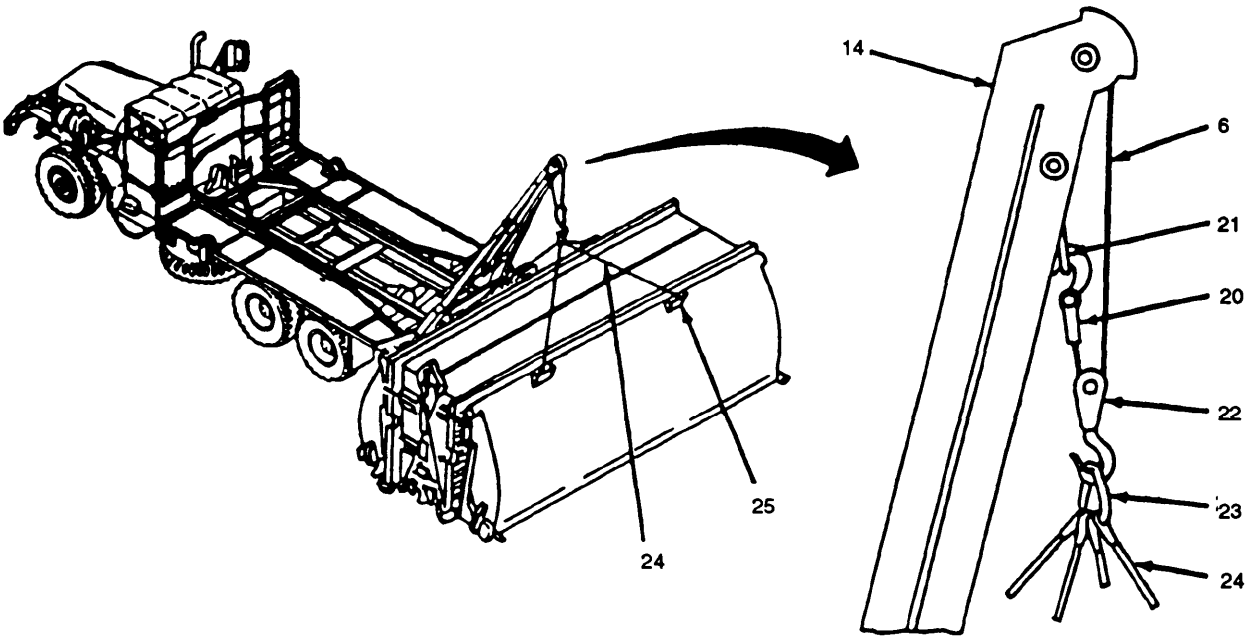



*Figure 2-16. High Bank Launch of Bay (Sheet 7 of 12).*

(26) Connect two lines, one at each end of bay, for bay stability while moving transporter.

(27) Unlatch four (only two on ramp bay) roadway/bow ponton foldlock latches (26) on both ends of bay (18).

(28) Unlatch down stream end (interior bay only) travel latch (27).

(29) Install latch pin (28) and secure lanyard (29) to bay (18).

**WARNING**

Do not attempt to launch bay if slope is more than 25 percent to edge of bank. On slopes over10 percent, the front end of the transporter should be held down using the front winch of another transporter.

(30) Raise bay 8 to 12 in. (20 to 31 cm) off ground.

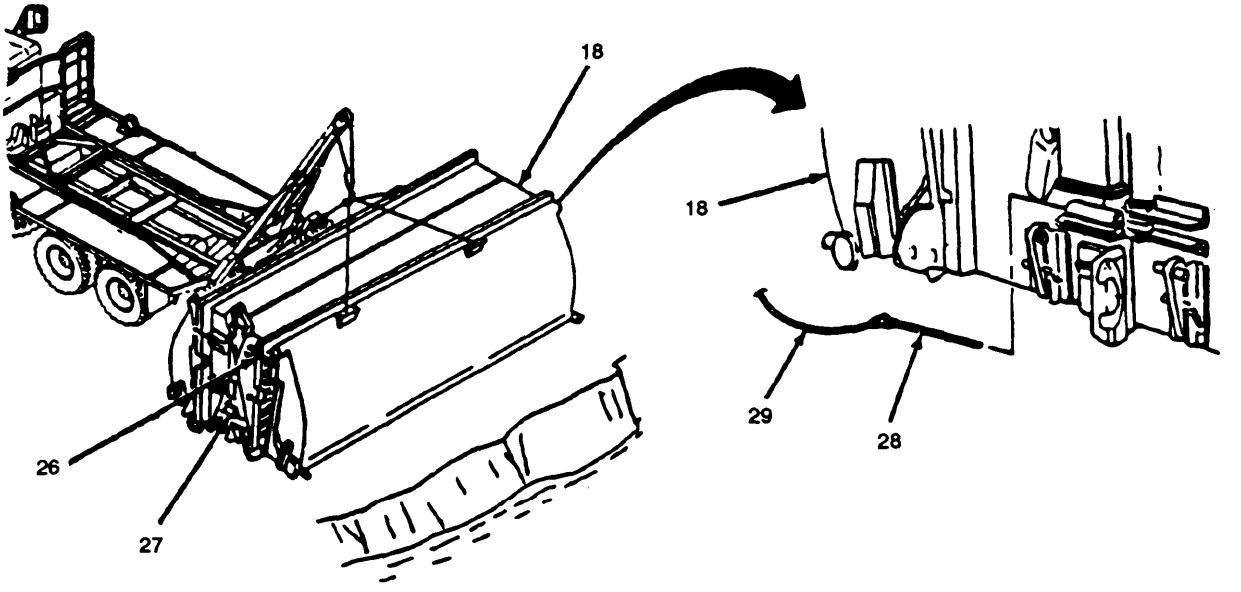



*Figure 2-16. High Bank Launch of Bay (Sheet 8 of 12).*

(31) Release parking brake and electric brake, and back transporter (19) to edge of bank and set parking brake and electric brake.

(32) Connect upstream line to upstream anchor point or bridge erection boat.

(33) Use second line to keep bay (18) in proper position, parallel to bank, during launching of bay.

(34) Pay out cable and lower bay into water. Bridge boat will secure to bay.

(35) Pay out cable and have boat crew remove lifting sling lines (24) from bay (18).

(36) Pay in cable and lower boom (14) fully.

(37) Remove lifting sling (23) from snatch block (22) and store.

(38) Remove snatch block (22) from cable (6) and store.

(39) Remove cable hook (20) from boom anchor (21).

(40) Secure cable hook (20) to boom (14) and play in cable until tight.

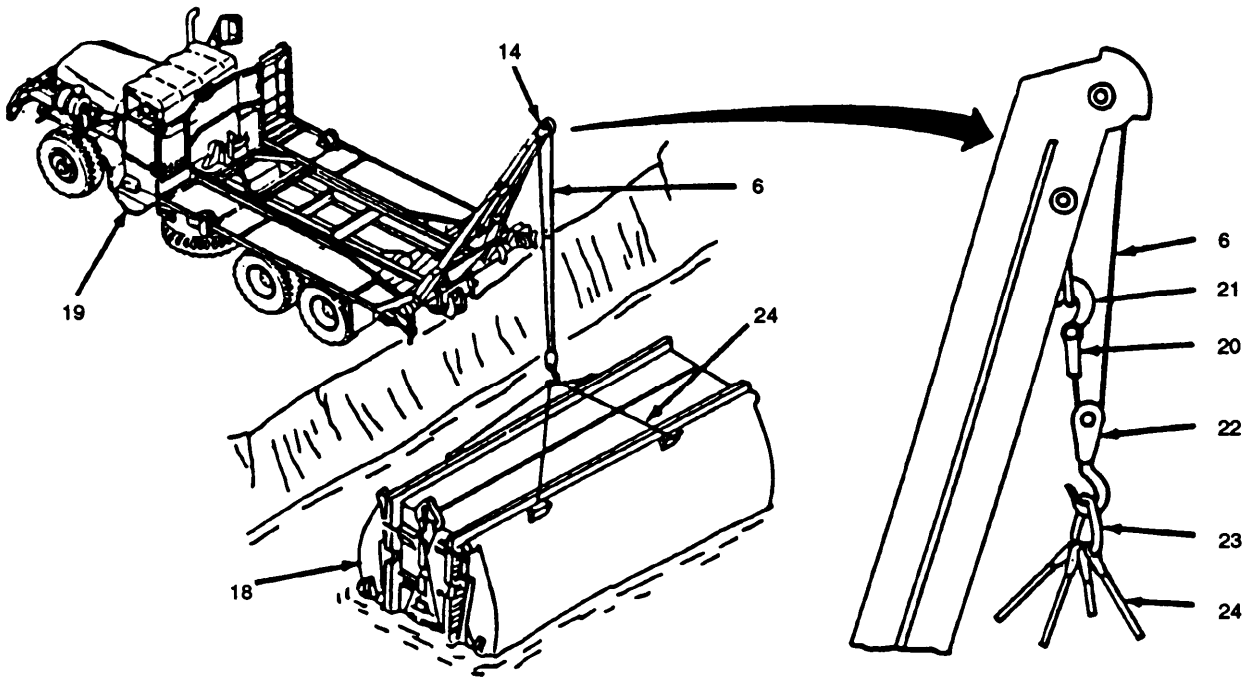



*Figure 2-16. High Bank Launch of Bay( Sheet 9 of 12).*

Have bridge boats move clear of unfolding area.

Man lanyard (29) and activate bay unfolding, retrieve lanyard (29) and latch handle (28).

Bridge boat will secure to down stream side of bay (18).

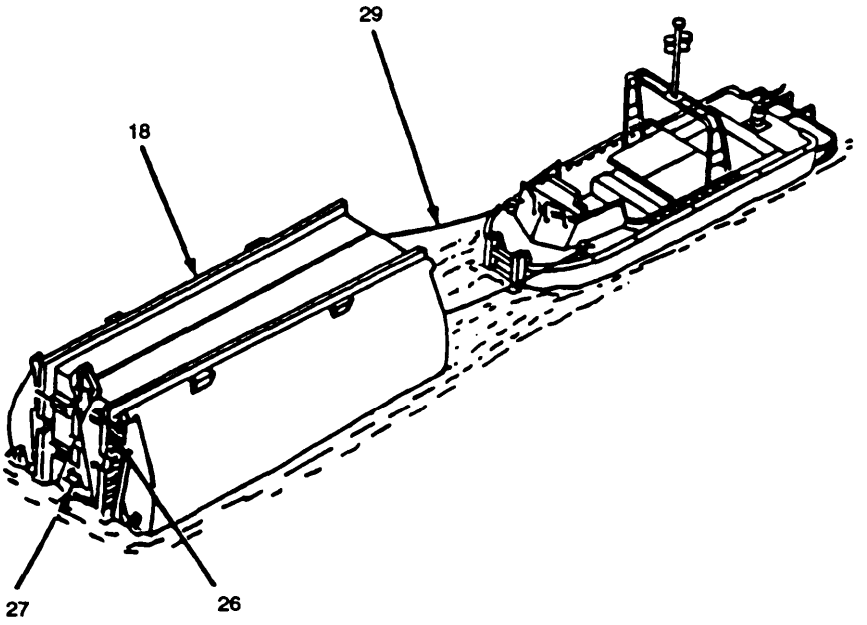



*Figure* 2-16. *High Bank Launch of Bay (Sheet 10 of* 12).

(44) After bridge boat secures to bay, secure bay as follows:

**NOTE**

Use ramp bay connecting tool and crow bar to assist in engaging connectors.

*(a)* Position ramp bay connecting tool (30) on roadway (29).

*(b)* Install crow bar (30) and move crowbar back and forth until dogbones (31) are engaged.

**WARNING**

If roadway-to-bow ponton latches are not engaged the bow pontons will fold up when a vehicle *crosses* the bridge. This may cause serious injury or death to personnel on the bridge.

**NOTE**

The backs of the roadway-to-bow ponton latches are painted yellow to allow a quick, visual check to ensure latches are engaged.

(c) Engage four roadway-to-bow ponton latches (33).

*(d)* Ensure lower lockpin drive screw (34) moves freely and pin (35) is fully retracted.

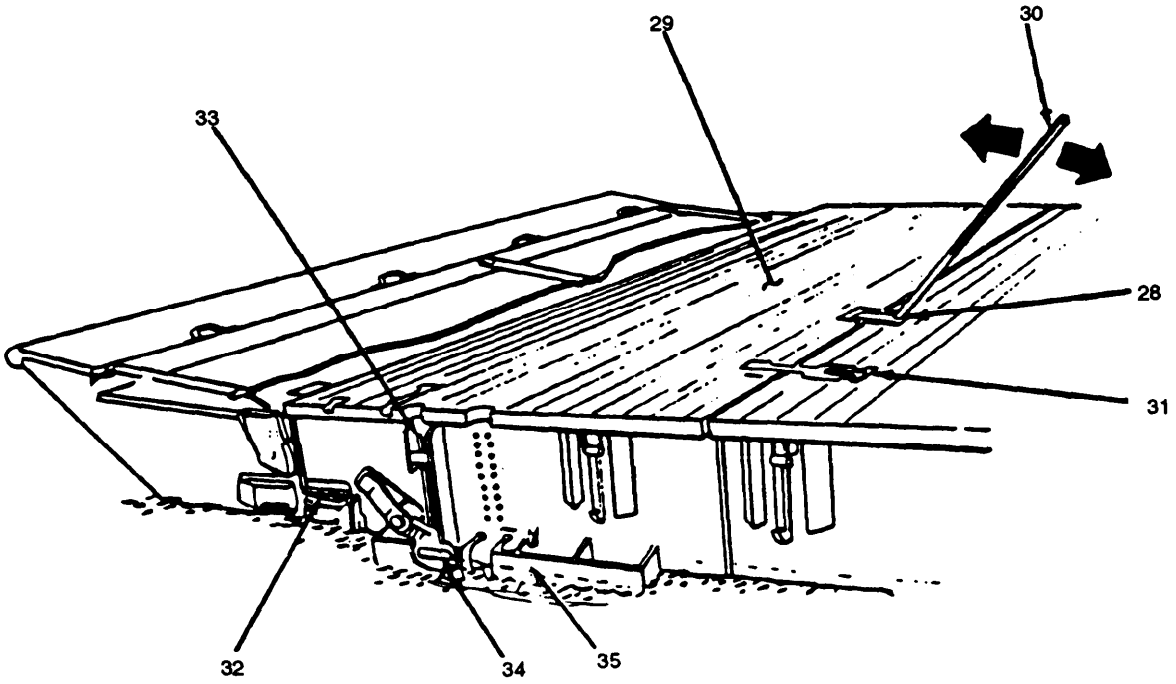



*Figure 2-16.* High *Bank Launch of Bay (Sheet 11 of 12).*

(45) Remove bogie bracket and rubber bumpers and store.

(46) Disengage PTO and move transporter to staging area.

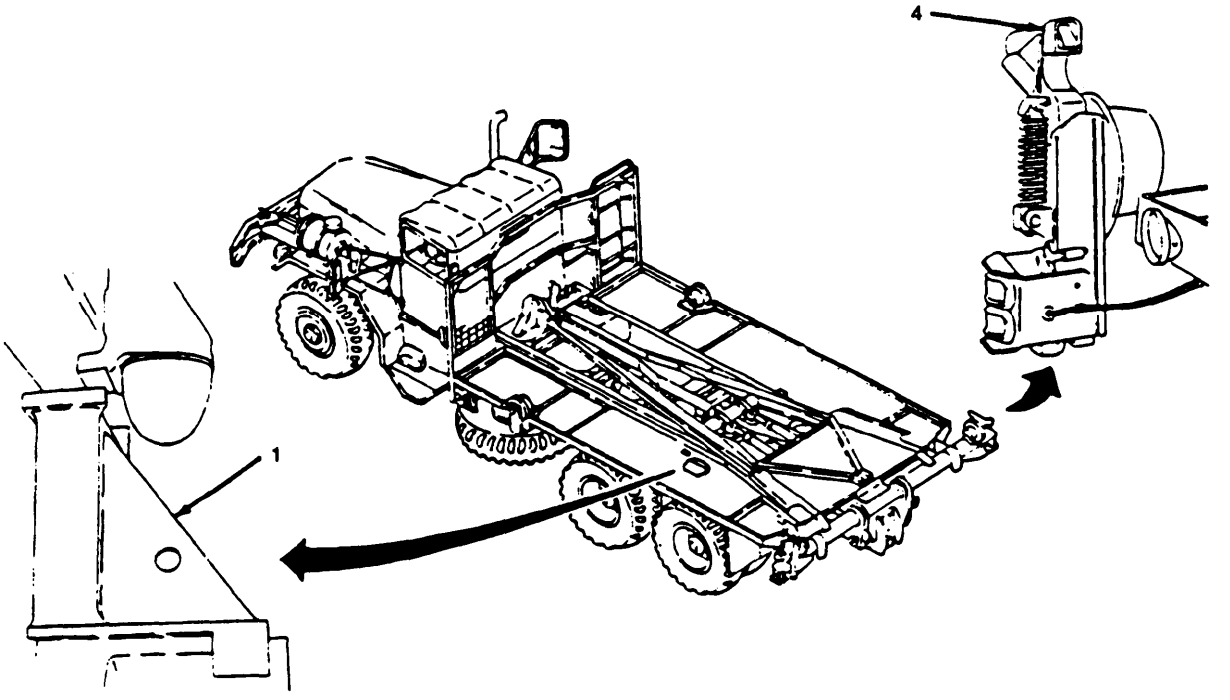



*Figure 2-16. High Bank Launch of Bay (Sheet 12 of 12).*

**2-17. Deployment By Helicopter.** Under certain conditions it may be advantageous to use helicopters to transport bays. The lifting sling and shackles provided in the supplementary set are to be used to enable four-point suspension. When transporting in interior bay at an air speed greater then *40* knots, a *15* foot diameter drogue parachute, (NSN 1670-01-063-3715), Type *4* links (NSN 1670-00-783-5988) and 36 foot multi loop extraction line (NSN 1670-01 -064-4451) are required to provide stability. Safe airlift speed is determined by wind speed and direction, type and condition of aircraft as well as pilot proficiency in transporting bays.

**CAUTION**

Unit Commanders are cautioned of the necessity to anticipate requirements for an airlift operation and arrange for timely delivery. The drogue parachute is ready available from GM Rigging Unit (Parachute Maintenance), and Area Resupply Co., all Airborne units and all Air Force Cargo Wings. The drogue parachutes will not be issued with the Supplementary Set SC5420-97-CL-E51.

(1) Perform Steps (1) through (16) of high bank launch para. 2-16 in area specified by unit commander.

**NOTE**

For interior bays, lifting sling legs must be equal in length with sling eye centered over bay. For ramp bays, sling legs connected to lower lock drive end of bay will be longer than those connected to approach ramp end, however sling eye must still be centered over bay.

(2) Connect sling (1) to lift/anchor points (2) on bay with hook face outward.

(3) Signal helicopter to position directly above bay (3).

(4) Signal helicopter to lower lifting cable (4) and place sling eye (1) over cable hook (4).

**NOTE**

Signal helicopter to tack in cable and sling slack and verify that sling eye is centered over bay.

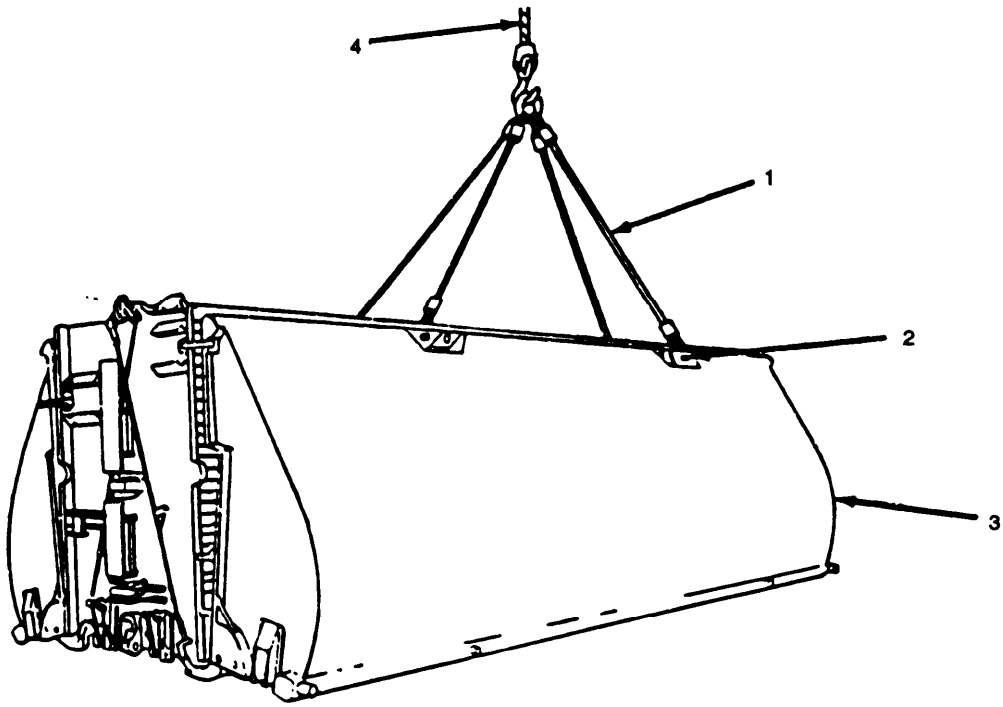



*Figure 2-17. Deployment By Helicopter (Sheet 1 of 3).*

(5) Signal helicopter to tension lifting cable, lift bay and transport deployment area.

**NOTE**

Safety and workboats, along with bridge crews must be on the water prior to lowering bay into the water.

(6) Signal helicopter to begin lowering bay (3) into water.

**WARNING**

Ensure foldlock and travel latches are latched before approaching bay. Personal injury can be caused from bay unfolding.

(7) Signal helicopter to lower bay into water, connect boat to bay, and remove sling eye (1) from cable hook (4).

(8) Second boat (6) will secure taglines to upstream end of bay (3).

(9) Using boathook, unlatch four (two on ramp bay) foldlock latches (7) and downstream travel latch on interior bay only.

(10) Install latch pin assembly handle into remaining travel latch (10) and secure rope (11) to bow bollart on boat (6).

(11) Position boat out of unfolding area.

(12) Man rope and activate bay unfolding sequence, retrieve latch pin assembly handle (9) and rope (11) and stow.

(13) Secure bay to boat, then prepare bay as follows:

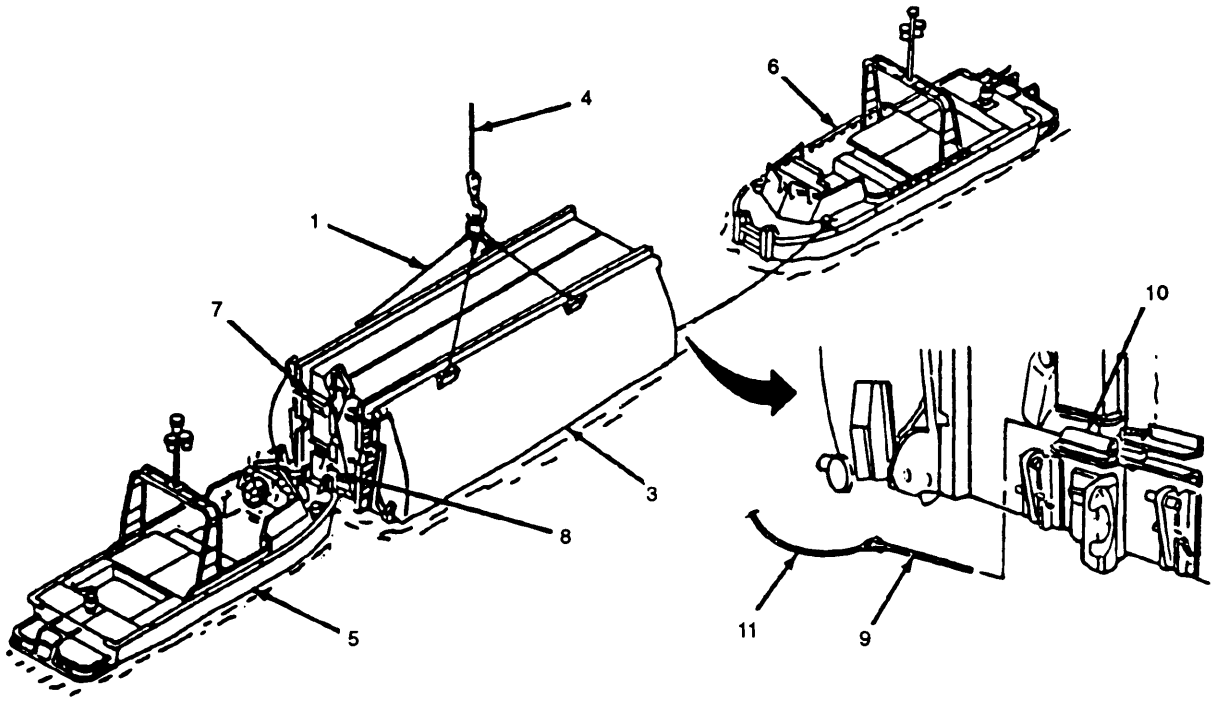



*Figure 2-17. Deployment By Helicopter (Sheet 2 of 3).*

**NOTE**

Use ramp bay connecting tool and crow bar to assist in engaging connectors.

*(a)* Position ramp bay connecting tool (12) on roadway (13).

*(b)* Install crow bar (14) and move crow bar back and forth until connectors (15) are engaged.

**WARNING**

If roadway-to-bow ponton bridge latches are not engaged, the bow pontons will fold up when a vehicle crosses the bridge. This may cause serious injury or death to personnel on this bridge.

**NOTE**

The backs of the roadway-to-bow bridge ponton latches are painted yellow to allow a quick, visual check to ensure latches are engaged.

*(c)* Engage four roadway-to-bow bridge ponton latches (16).

*(d)* Ensure low lockpin drive screw (17) moves freely and pin (18) is fully retracted.

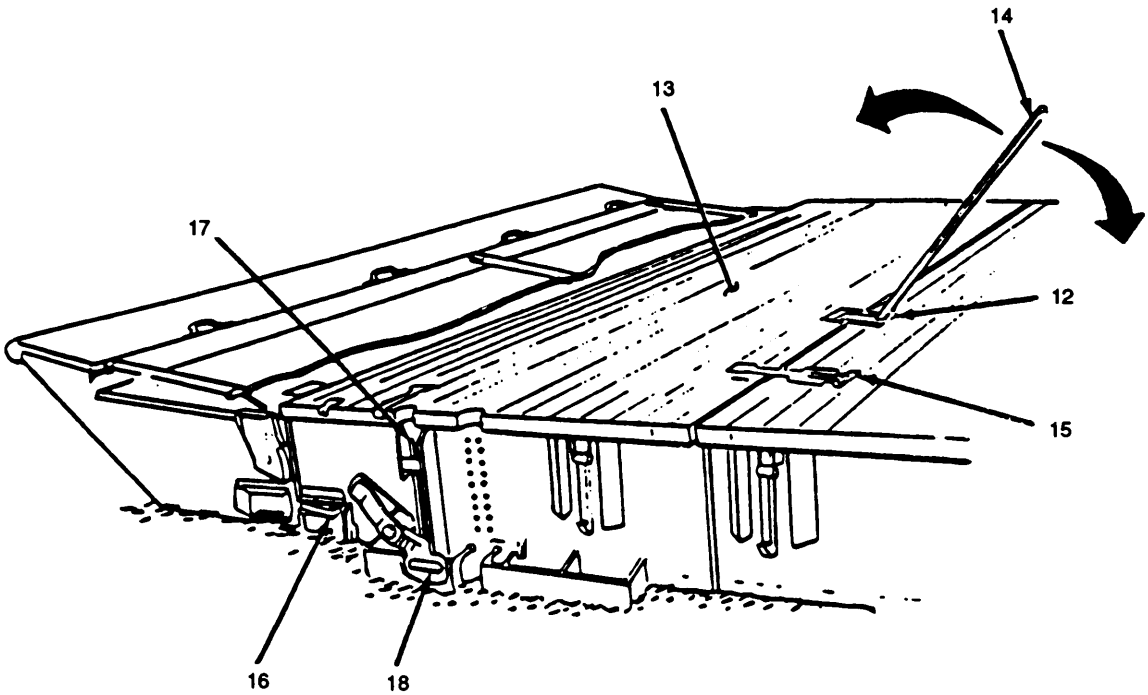



*Figure 2-17. Deployment By Helicopter (Sheet 3 of 3).*

2-18. **Ramp Bay to Interior Bay Connection.** After two interior bays have been connected and all latches and connectors have been engaged the ramp bay is then ready for connection with an interior bay.

**WARNING**

Extreme caution should be taken when connecting bays. Bays come together with extreme force and personnel injury or death may result.

(1) Approach interior bay (1) from downstream.

*(2)* Bring ramp bay (2) as close to interior bay (1) using lines and boat hooks to help guide ramp bay (2).

(3) Install ramp connection tool (3) and connect hooks (4) to roadway/roadway connectors (5).

(4) Install crow bar (6) in ramp bay pry hole (7) and raise ramp bay (2) by applying downward force at end of crow bar (6).

(5) Tighten ramp bay connection tool (3) and draw bays together.

(6) When bays are together, engage bay/bay connectors (8).

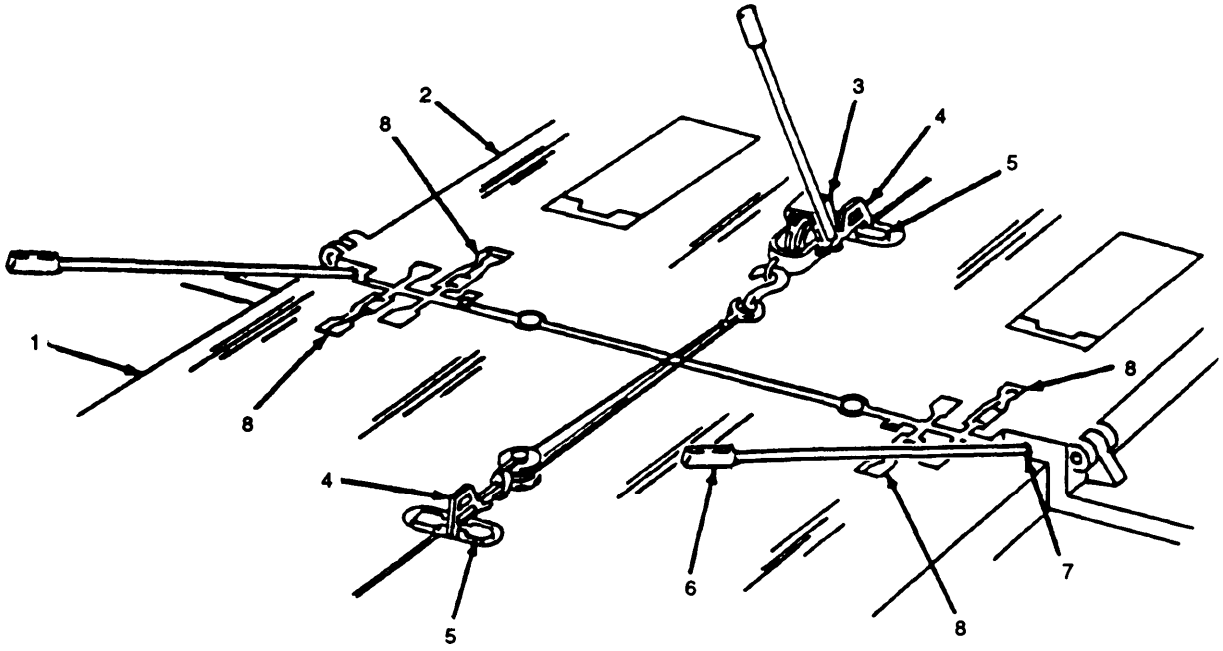



*Figure 2-18. Ramp Bay To Interior Bay Connection (Sheet 1 of 2).*

**NOTE**

The top of lock drive pin screw will be 3/4 in. (1.9 cm) below roadway when lower lock drive pin is fully engaged.

If it is difficult to engage lockpin it may be necessary to raise connector yoke on ramp bay, see Step *(8).*

(7) Install T wrench (9) on lower lockpin screw (10) and turn wrench clockwise to engage pin.

**NOTE**

Perform Step (8) only if the lower lock pin cannot be engaged.

Operate both pumps simutaneously and in unison or damage to pumps and cylinder may occur.

(8) Open pump access covers (11), set pump control lever (12) to PUMP position, open vent valve (13) and operate pumps (14) while turning T wrench (9) to engage pin.

(9) Close vent valves (13), set pump control levers (12) to TRAFFIC positions, close pump access covers (11).

(10) Repeat Steps (8) and (9) to engage remaining lower lockpin drive screw (15), (if applicable).

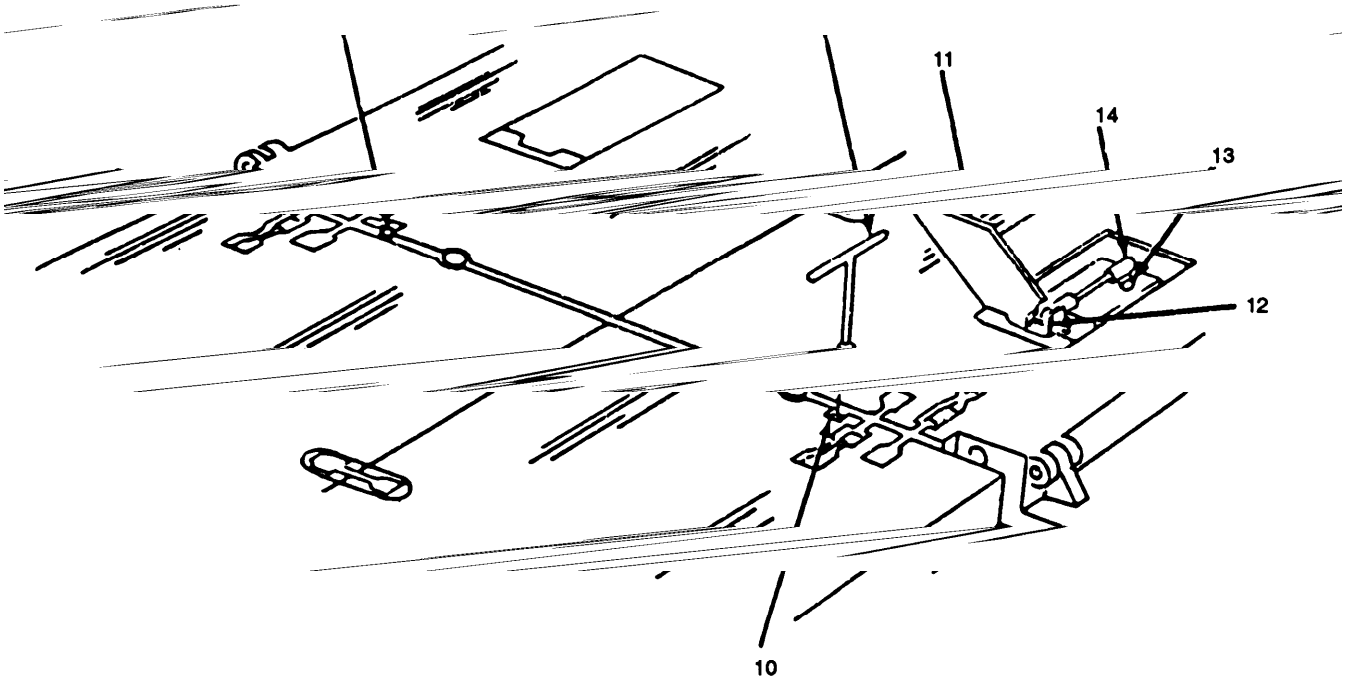



*Figure 2-18. Ramp Bay To Interior Bay Connection (Sheet 2 of 2).*

2-19. **Ramp Bay to Interior Bay Connection (Alternate Method).** In this method a ramp bay can be connected to an interior bay that is not connected to another bay or anchored. The interior bay has been launched, all roadway/roadway connectors have been engaged and all roadway-to-bow ponton travel latches have been latched. The interior bay is positioned part way on land at the launch site. The ramp bay is launched and all roadway/roadway connectors are engaged and all roadway-to-bow ponton travel latches are latched.

**WARNING**

Extreme caution should be taken when connecting bays. Bays come together with extreme force and personal injury or death may result.

(1) Position interior bay (1) partially grounded.

(2) Position ramp bay (2) outboard of interior bay (1).

(3) Install hook (3) in ramp bay roadway connector (4).

(4) Back transporter (5) up to bay (2) and raise boom (6) fully.

(5) Pay out cable (7) and connect cable hook (8) to hook (3).

(6) Play in cable (7) and pull ramp bay (1) up to interior bay (2).

(7) Engage roadway/roadway connectors (9).

(8) Install T wrench (10) on lower lockpin screw (11) and turn counterclockwise and engage lower lockpin.

(9) Repeat Step (8) on remaining lower lockpin screw.

(10) Pay out cable and remove cable hook (8) from hook (3).

(11) Remove hook (3) and store.

(12) Lower boom (6) fully, secure cable hook (8) to boom (6) and play in cable.

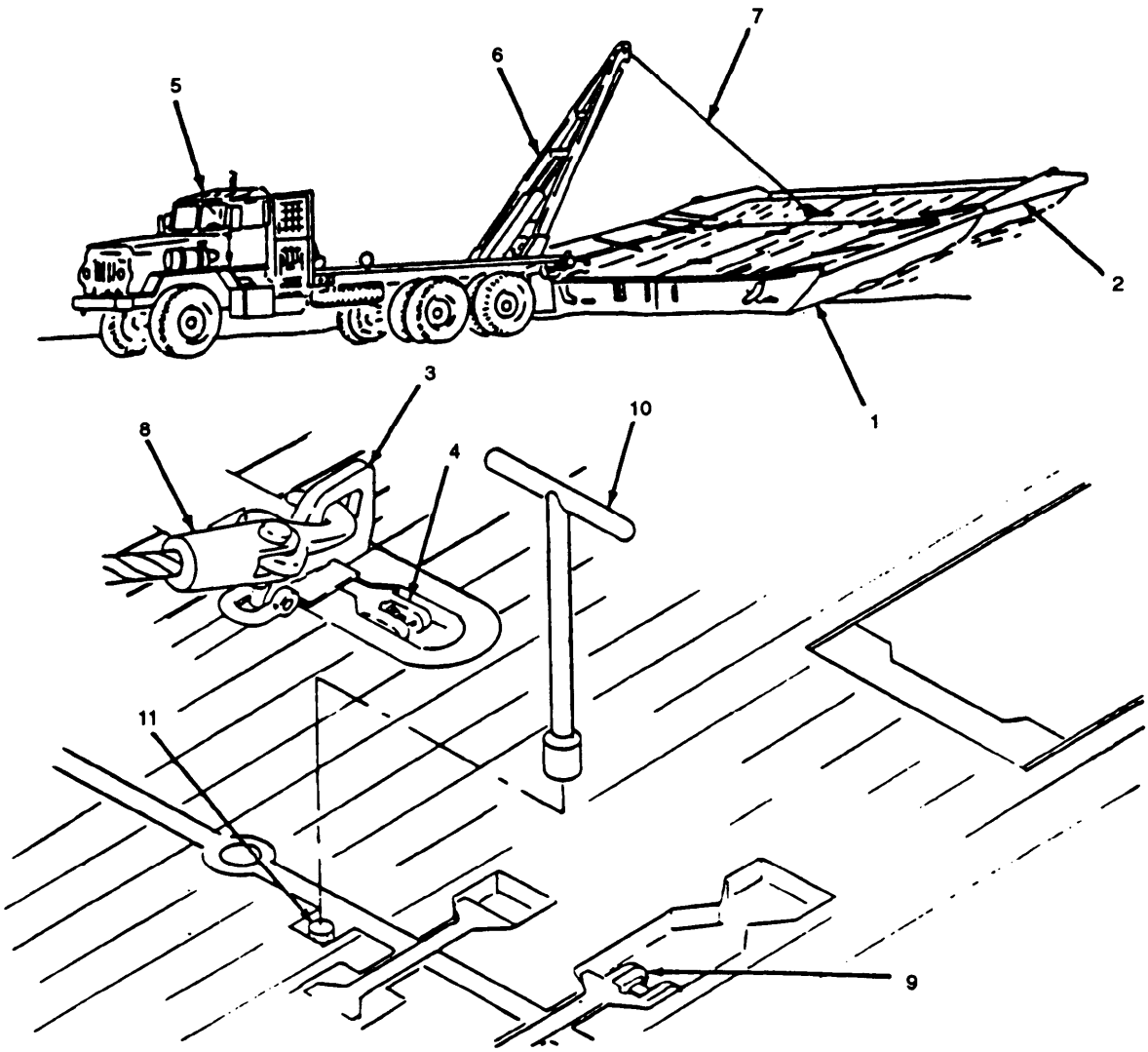



*Figure 2-19. Ramp Bay To Interior Bay Connection (Alternate Method).*

2–20. **Interior Bay to Interior Bay Connection.** When connecting two interior bays the location of the stationary, or anchored, bay could be in one of several different configurations. The procedures for connecting two interior bays together will be the same no matter what configuration the bays are in. The bay being connected will always approach from downstream. All roadway/roadway connectors will be engaged, and all roadway-to-bow ponton travel latches will be latched. The bridge boat will be secured to bay and will approach connection site from downstream. When connecting the first two bays one bay must be anchored to shore prior to connection of the second bay.

**NOTE**

Check bays before connecting to ensure that the lower lockpin is fully retracted. Roadway-to-bow ponton bridge latches are engaged and roadway/roadway pontons travel latch is rotated down.

**WARNING**

Extreme caution should be taken when connecting bays. Bays come together with extreme force and personal injury or death may result.

(1) Position bay (1) as close to adjoining bay (2) as possible.

(2) Connect lines (ropes) (3) to bay rope cleats (4) and have bridg centerline crew pull bays (1) and (2) together.

(3) Engage roadway/roadway connectors (5).

(4) Have bridge boat keep bay (2) in position.

**NOTE**

If engagement of lower lockpin is difficult, have bridge boat apply power forward or reverse and use crowbar to raise or lower bay as needed.

(5) Position crow bar (6) under roadway (7) and on top of bow ponton (8) and apply downward force to level bays.

(6) Use T wrench (9) and turn lower lockpin (10) clockwise and engage lower lockpin.

(7) Repeat Steps (6) and (7) for remaining lower lockpin (11).

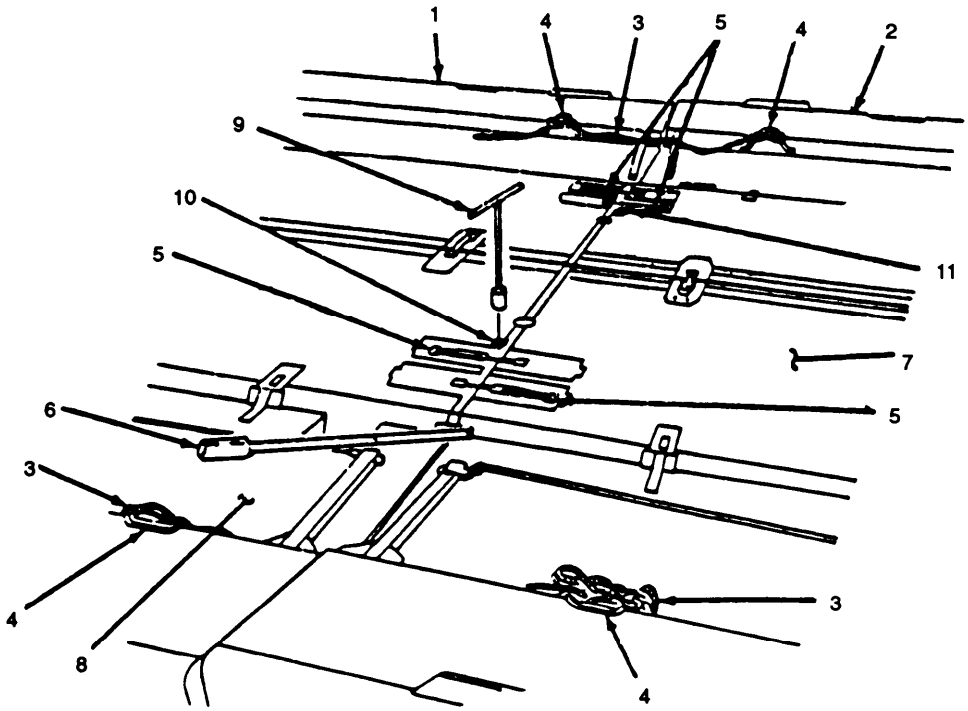



*Figure 2-20. Interior Bay To Interior Bay Connection.*

2-21. **Bridge Assembly Successive Bay Method.** The assembly of a bridge by successive bays is accomplished by the consecutive addition of bays along the bridge centerline. When the body of water to be spanned contains obstacles, has rapidly flowing water (over *6* feet per second), or much floating debris, the successive bay method is the most effective. The method of deployment and connection depends on environmental factors and should already have been established.

(1) Launch all bridge boats.

(2) Deploy two interior bays (1) and *(2)* and one ramp bay (3).

(3) Connect two interior bays (1) and (2) (para. 2-20).

(4) Connect ramp bay (3) to interior bay (2) (para. 2-18).

**NOTE**

In some cases, depending on the far shore conditions, it may be necessary to deploy two additional interior bays and assemble a five bay raft. This raft can then be used to transport two transporters to far end shore to be used for anchorages.

(5) Anchor far shore end span to temporary anchorage, holdfast, or natural deadman, (para.2-23), along bridge centerline (CL).

**NOTE**

It maybe necessary to leave one bridge boat connected to help with grounding far shore end span.

(6) Untie bridge boats from end span and have boats return to launch site.

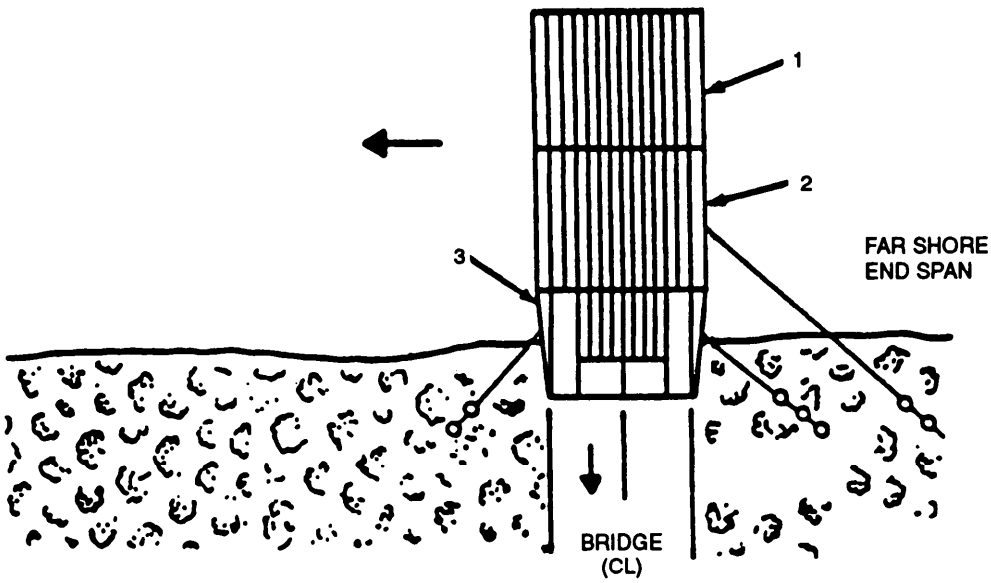



*Figure 2-21. Bridge Assembly Successive Bay Method (Sheet 1 of 4).*

(7) Bridge centerline crew should adjust ramp bay to allow desired grounding of ramp bay as follows:

*(a)* Open hydraulic pump access covers *(4).*

*(b)* Set pump control levers (5) to PUMP position, open vent valves (6) and operate pump using pump handle (7).

*(c)* Raise ramp sufficiently to allow proper grounding.

*(d)* When ramp (3) is raised sufficiently, the bridge centerline crew pulls the bays shoreward, and tightens anchoring lines and lowers ramp bay.

*(e)* Set pump control levers (5) to traffic position; close vent valves (6), and close covers (4).

**NOTE**

When installing near shore end span use transporter to pull near shore end span an additional 10 ft (3 m) onto shore to allow bridge closure.

(8) Repeat Steps (1) through (7) for near shore end span.

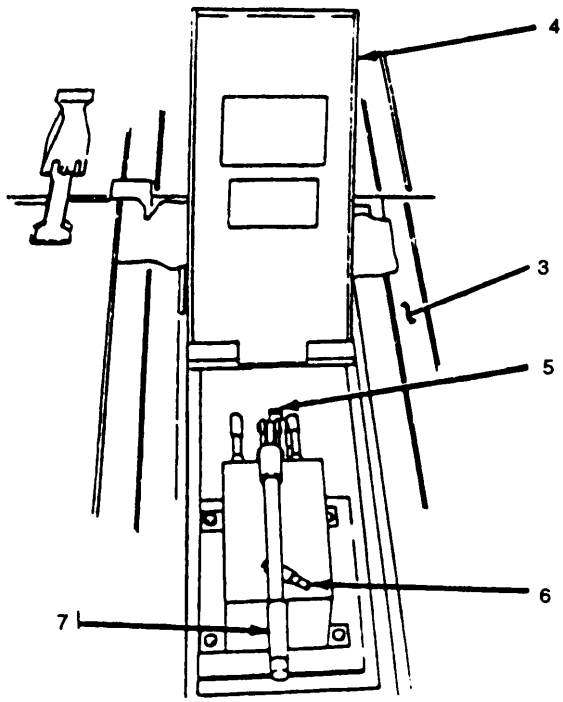



*Figure 2-21. Bridge Assembly Successive Bay Method (Sheet 2 of 4).*

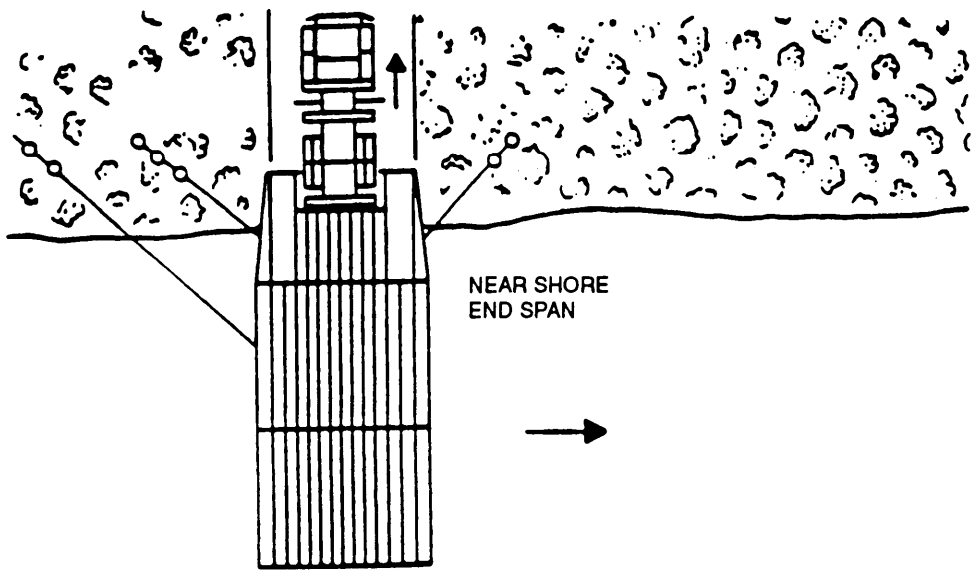



*Figure 2-21. Bridge Assembly Successive Bay Method (Sheet 3 of 4).*

(9) Launch additional interior bays and move to far shore end span and connect bays (para. 2-20).

*Table 2-14. Bridge Boats Required for Anchorage.*

| Water Velocity | Number of Bays | Boats Required for Anchorage |
|---|---|---|
| 0-3 FPS (0-.9 MPS) | 6 | 1 |
| 3-6 FPS (.9-1.8 MPS) | 4 | 1 |
| 6-8 FPS (1.8-2.4 MPS) | 3 | 1 |

(10) When connecting the last interior bay to bridge centerline, connect bay to far shore ramp bay first. Loosen anchoring lines on both shores, and connect bays. Transporter boom and winch cable or man power may be required to achieve connection.

**WARNING**

Do not allow traffic on bridge until bridge NCO has verified that all appropriate latches, connectors, and lower lock pins are properly engage. Severe personal injury or equipment damage could occur. Lower lockpins are in locked position.

(11) Refer to para. 2-23 and add additional anchorage.

(12) Lower approach ramp (8).

(13) Repeat Step (11) for remaining approach ramps.

(14) Open hydraulic pump cover (4) and set pump control lever (5) to TRAFFIC position, close vent valve (6), and close cover (4).

(15) Raise all handrails (9).

**CAUTION**

Do not unlatch bay/bay connectors between ramp bays and interior bays. Equipment damage will occur.

(16) Unlatch bay upper connectors (10) between interior bays.

(17) Refer to para. 2-24 for bridge operation guideline.

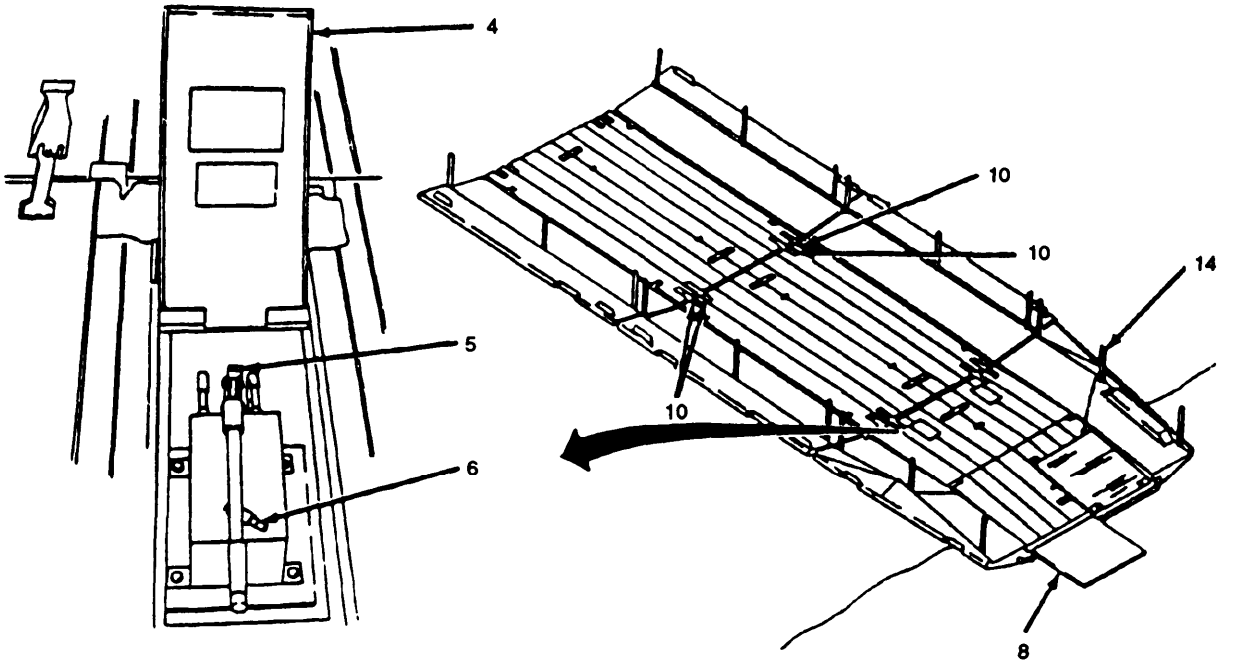



*Figure 2-21. Bridge Assembly Successive Bay Method (Sheet 4 of 4).*

2–22. **Bridge Assembly Swinging Bridge Method.** The purpose of the swinging bridge method is to allow connection of the bays along or near the shore where the current will be considerably slower than in the main flow, therefore making bay-to-bay connection easier. The bridge is then swung into place. The assembly procedure is similar to the successive bay method. Although this may be the most rapid method of construction, it has certain limitations. For example: the exact length of the bridge must be known; the path for swinging the bridge must be free of protruding rocks, sand bars or other constructions; there should be no floating debris in water; and launch site must be length of bridge. When constructing abridge using this method the bridge must always be swung upstream. Prior to constructing the bridge, the method for launching and site should have already been established.

**NOTE**

Transporters can be used for temporary anchorage.

(1) Launch two interior bays (1) and (2) and connect (para. 2-20) and anchor bays just downstream of bridge line.

(2) Launch ramp bay *(3)* and connect to interior bay (para. 2-18).

**NOTE**

Bridge boats can be used to hold bridge assembly in place.

(3) Launch remaining interior bays and connect (para. 2-20) to existing assembly along near shore. Add anchorage as needed.

(4) Launch and secure ramp bay (4) to last interior bay (para. 2-18).

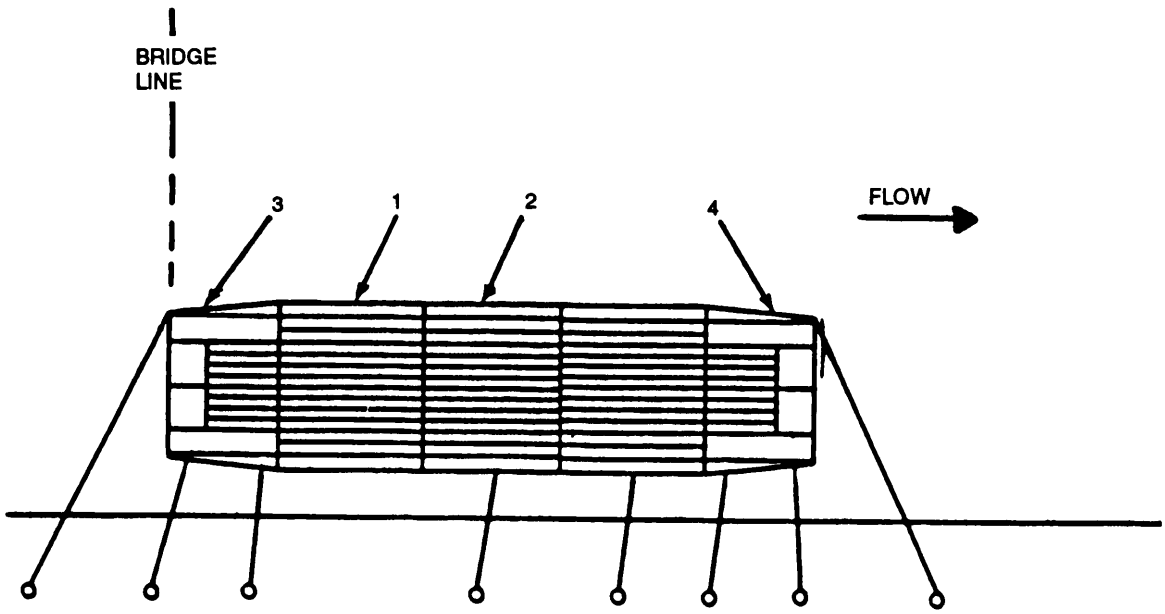



*Figure 2-22. Bridge Assembly Swinging Bridge Method (Sheet 1 of 3).*

(5) After last ramp bay is connected, ramp bay must be raised. Procedures for raising ramps are as follows:

**CAUTION**

Hydraulic pumps must be operated simultaneously and in unison to prevent damage to both pump and cylinders.

(a) Open pump access covers (5).

*(b)* Open Vent valves (6).

*(c)* Set pump control levers (7) to PUMP.

*(d)* Activate pump handles (8) and raise ramp bay.

*(e)* Close pump access covers (5).

*(f)* Repeat Steps a through e for remaining ramp bay.

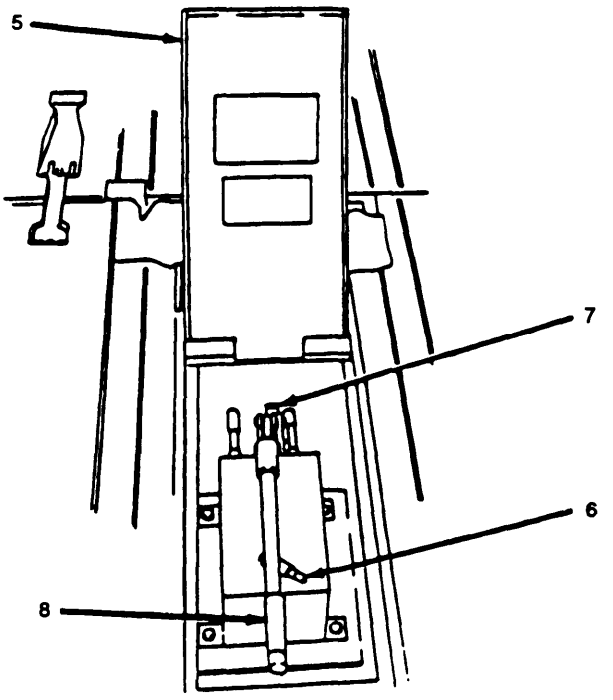



*Figure* 2-22. *Bridge Assembly Swinging Bridge Method (Sheet 2 of 3).*

**CAUTION**

Do not swing the bridge downstream. Do not operate boats upstream of bridge or in path of swing.

**NOTE**

To initiate swinging of bridge connect boat to downstream ramp bay and swing bridge assembly upstream until additional bridge boats can be connected to downstream side of bridge.

(6) Finish swinging bridge, adjusting anchorage as needed, and anchor to far shore (para. 2-23).

(7) Lower approach ramp (9).

(8) Repeat Step (7) for remaining approach ramps.

(9) Open hydraulic pump access covers (5), set pump control levers (7) to TRAFFIC, close vent valves (6) and close covers (5).

(10) Repeat Step (9) for remaining ramp bay,

**WARNING**

Do not permit any traffic on bridge until bridge NCO has verified that all appropriate latches, connectors, and lower lock pins are properly engaged. Do not unlatch bay/bay connectors between ramp bay and interior bays. Severe personal injury or equipment darmage could occur.

(11) Unlatch all bay connectors (11) between interior bays.

(12) Raise handrails (12).

(13) Refer to para. 2-24 for bridge operation guidelines.

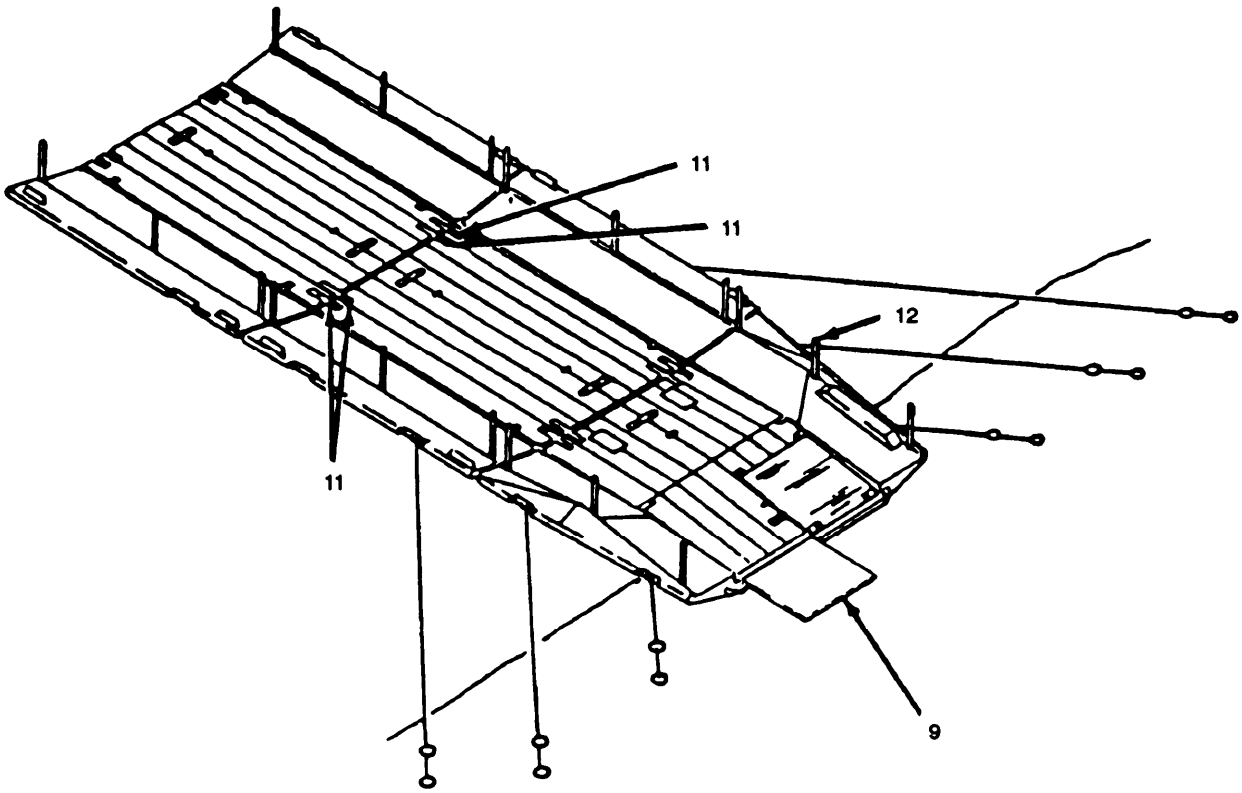



*Figure 2-22. Bridge Assembly Swinging Bridge Method (Sheet 3 of 3).*

## 2-23. **Bridge Anchorage.**

*a.* General. The anchorage system used will depend on the following factors; stream velocity, length of bridge, time available for bridge assembly, length of time bridge will be in place, and bank conditions. In conjunction with methods of anchoring, approach guys secured to material or chain hold posts should be used to keep the bridge from creeping along its centerline. The approach guys should be connected to ramp bay lifting and anchoring pins.

*b. Fixed Anchorage.* If the ribbon bridge is to remain in place for long periods of time, it is desirable to anchor the bridge using a fixed-type anchorage system. The most common type is an overhead cable with bridle lines and approach guys. Refer to TM 5-210 for assembly and installation instructions for various types of fixed anchorage configuration. Refer to figure 2-23, for typical bridle line connection to bow lifting and anchoring pins. The components necessary to erect the standard overhead cable system are supplied in the ribbon bridge supplemental set SC-5420-97-CL-E51.

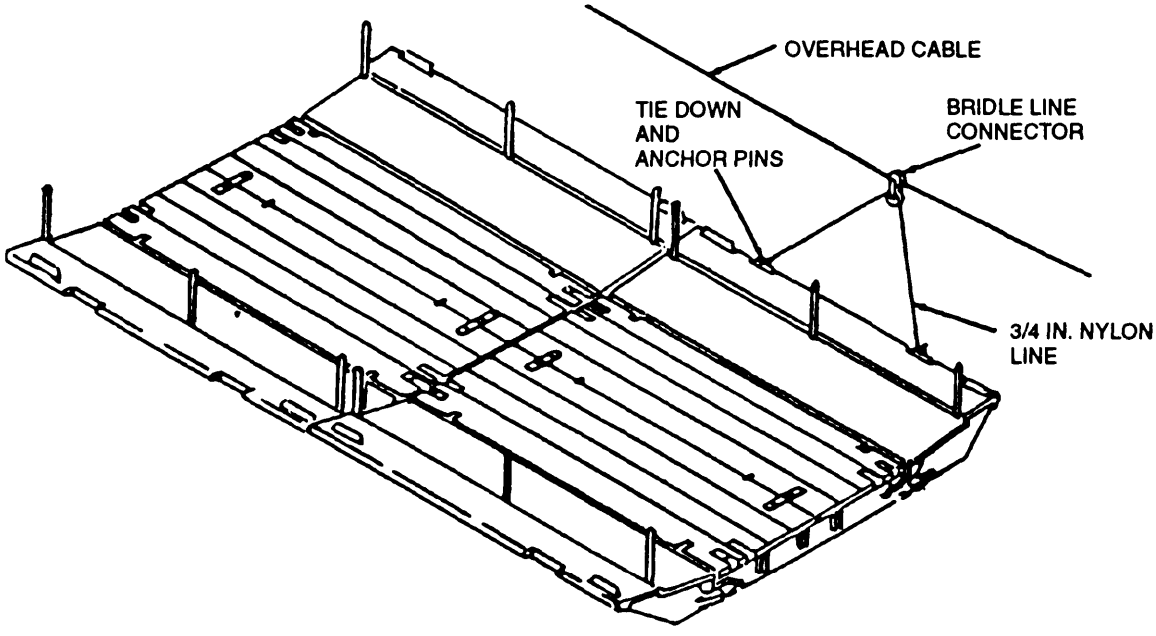



*Figure 2-23. Typical Bridle Line Connection.*

c. *Short Term Anchorage.* The rapid assembly charactetistics of the ribbon bridge requires that bridge boats be used to hold the bridge in place (fig. 2-24). The length of time the bridge is to remain will determine whether a fixed anchorage system will be installed later. The number of bridge boats required to anchor the bridge is shown in table 2-15. Boats must be checked for fuel consumption every two hours and refueled as necessary. At least two standby boats must be available for replacing disabled boats.

**CAUTION**

Stop bridge traffic while replacing boats.

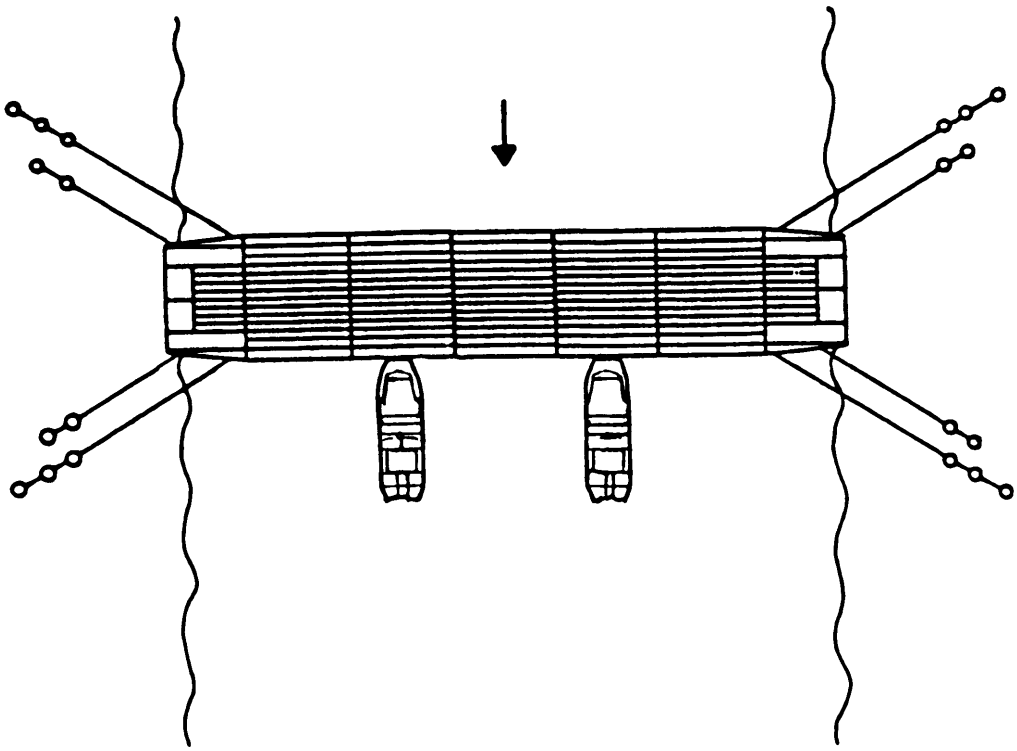


*Figure 2-24. Typical Configuration Bridge Boat Anchoring.*

Table 2-15. Bridge Boats Required for Anchoring.

| Water Speed | Boat Spacing | * Boats per Bays |
|---|---|---|
| F.P.M (MPS) | ft (m) | |
| 0-3 (0.-0.92 | 132 (40.3) | 1 per 6 |
| 3-6 (0.92) | 88 (26.8) | 1 per 4 |
| 6-8 (1.83- 2.44) | 66 (20) | 1 per 3 |
| 8-9 (2.44 - 2.75) | 44 (13.4) | 1 per 2 |
| Over 9 (2.75) | 44 (13.4) | 1 per 2 |

*Notes:

1. Table does not include safety or backup boats.

2. Backup boats must be added as required by the conditions such as water velocity or chance of loss of boat in anchorage line due to enemy action debris, or mechanical failure. These boats maybe positioned in back of bridge line or attached to bridge line.

d. *End Span Anchorage.* To avoid longitudinal movement of ribbon bridge, install suitable end span anchorage. Transporters parked at each end can provide adequate anchorage for short periods. The transporters should be replaced by fixed shore guys if H bridge is to remain for extended periods of time. Refer to TM 5-210, for methods of installing fixed anchorage. Position four transporters at each end of the bridge with front winches used for shore guys. See figure 2-25 for transporter positioning. Engage parking brake, chock wheels, and engage front winch PTO. Pay out cable to attach bow lifting and anchoring pins and take up slack in cable.

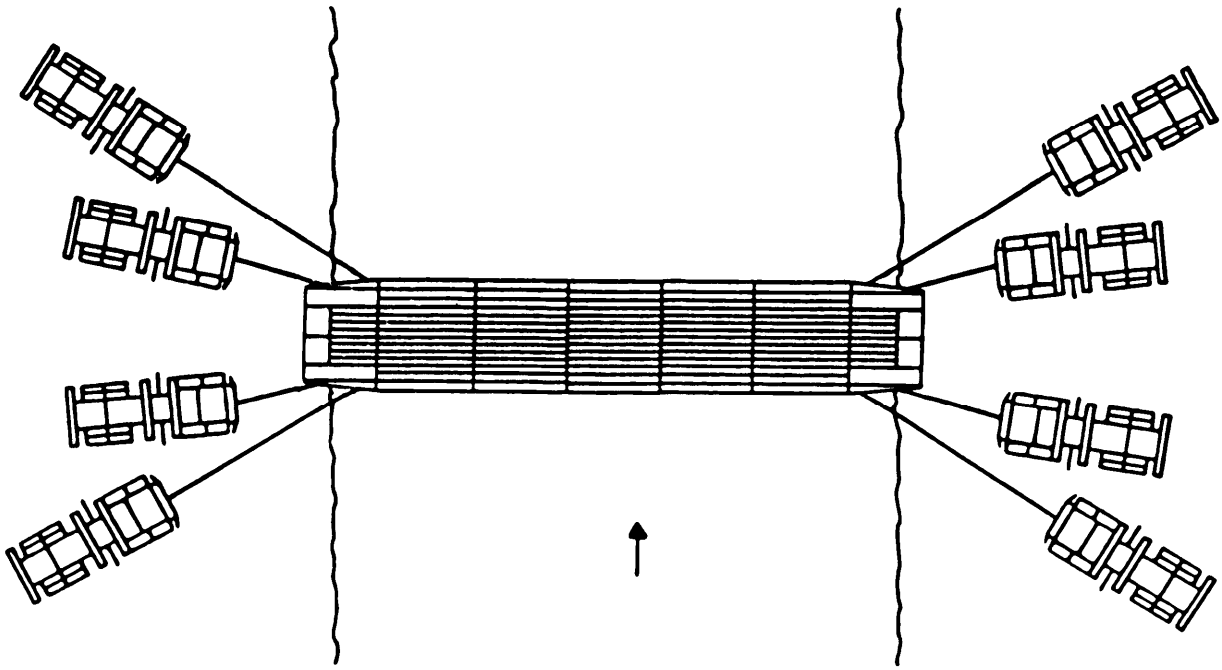


*Figure 2-25. Transporter End Span Anchorage.*

## 2-24. **Bridge Operation.**

*a. General.* The ribbon bridge, is a floating bridge which has a Class 70 normal crossing capability in currents Up to 8 fps.

*b. Traffic.* The capacities of the floating bridge at various stream velocities are found in table 2-16. Vehicles may travel anywhere on the roadway in normal crossings at reasonable speeds. In caution crossings, the vehicle is restricted to centerline of the bridge and to speeds up to 8 mph (12.87 kilometers per hour). A 150 ft (45.72 m) tail-to-head spacing is required for caution crossings, while a 100 ft (30.48 m) spacing is required for normal crossings. Risk crossings require the following; the vehicle must be on the roadway centerline; it must travel at less than 3 mph (4.83 kilometers per hour); only one vehicle on the bridge at a time.

**CAUTION**

Stopping, accelerating, turning, and shifting of gears on the bridge is not permitted during caution or risk crossings and should be kept at a minimum during normal crossings.

*Table* 2-16. *Ribbon Bridge Capacities.*

| Rating | Velocity (ft/sec) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (0-3) | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| NORMAL | 75 | 75 | 70 | 70 | 70 | 60 | 45 | 30 |
| (Track | 96 | 96 | 96 | 96 | 82 | 65 | 45 | 30 |
| Wheel) | | | | | | | | |
| CAUTION | 85 | 85 | 80 | 80 | 80 | 65 | 40 | 35 |
| Track | 105 | 105 | 100 | 100 | 96 | 75 | 50 | 35 |
| Wheel) | | | | | | | | |
| RISK | 100 | 95 | 90 | 90 | 90 | 75 | 65 | 40 |
| (Track | 110 | 110 | 105 | 105 | 100 | 82 | 65 | 40 |
| Wheel) | | | | | | | | |

*Notes:

1. These ratings apply for a bridge held in place with bridge erection boats. In current up to 5 ft/sec, one boat is required per four bays. In 8 ft/sec, one boat is required every three bays. In 9 ft/sec, one boat is required every two bays. In currents above 9 ft/sec, or if the bridge is to remain in place for long periods of time, bridge lines should be used (150° vertical angle).

2. Vehicle spacing criteria:

| Rating | |
|---|---|
| Normal | 100 feet (Front-To-Back) |
| Caution | 150 feet (Front-To-Back) |
| Risk | One vehicle only on bridge |

3. Maximum Speeds for Normal Crossings:

| | |
|---|---|
| On Ramps | Class 0 to Class 40-15 mph<br>Over Class 40-5 mph |
| On Bridge | Class 0 to Class 40-25 mph<br>Over Class 40-15 mph |

*c. Ramp Bay Controls.* Prior to allowing vehicle traffic on bridge, the bridge NCO checks the ramp cylinder controls. The ramp cylinder pump lever will be placed in the TRAFFIC position. This condition will allow the ramp bay to automatically adjust to any rise in water level. To compensate for falling water level, the pump lever must be placed in the PUMP position until the ramp bay obtains the lower water level. When the ramp bay obtains the proper water level, place the lever in TRAFFIC position before allowing traffic on bridge. The maximum angle the ramp bay can raise is 20 degrees. Some vehicles, such as Armored Vehicle Launched Bridge (AVLB), must be guided onto the bridge because of the interference of vehicle equipment with bridge deck.

*d. Shore Erosion.* During periods of heavy traffic, wave action at each ramp may cause the shore to be eroded. The end span anchorage system (shore guys) must be taut to keep bridge movement to a minimum. If the erosion continues, the ramps should be raised and sand bags or other suitable fill material be placed under ramp roadways. Ramps should be lowered. This condition can often be eliminated by adding an interior bay and pulling the ramps farther onto shore.

*e. Leakage.* At three hour intervals during heavy traffic inspect the pontons for leakage. If significant water is discovered, pump it out as described in para. 2-25, bilge pump operation.

f. *Water Debris.* Do not allow debris to build up against upstream side of bridge. Remove debris as needed to prevent damage to the bridge.

g. *Roadway Debris.* During periods of heavy traffic dirt and foreign materials may accumulate on roadway surface. Wash down roadway surface using pressure pump as described in para. 2-25, pressure pump operation.

## 2-25. **Operation of Auxiliary Equipment.**

*a. General.* A gasoline engine driven 2 in. self-priming centrifugal pump is supplied for use in pumping the bay bilges (pontons). A nozzle is provided enabling use of the pump to supply water under pressure for washing down the bays.

*b. Bilge Pump Operation*

(1) Connect suction hose (1) to pump (2).

(2) Remove bilge plug (3), and insert hose (1) to bottom of bilge.

(3) Connect discharge hose (4) to pump (2) and place hose (4) overboard.

(4) Start and operate pump (2) in accordance with TM 5-4320-200-13&P.

(5) When bilge has been pumped dry stop engine in accordance with TM 5-4320-200-13&P.

(6) Remove hose (1) from bilge and install bilge plug (3).

**NOTE**

Perform Steps (1) through (6) for remaining bilges to be pumped. Perform Steps (7) through (9) after all bilges have been pumped.

(7) Disconnect discharge hose (4) from pump (2).

(8) Disconnect suction hose (1) from pump (2).

(9) Storehouses and (4) and pump (2).

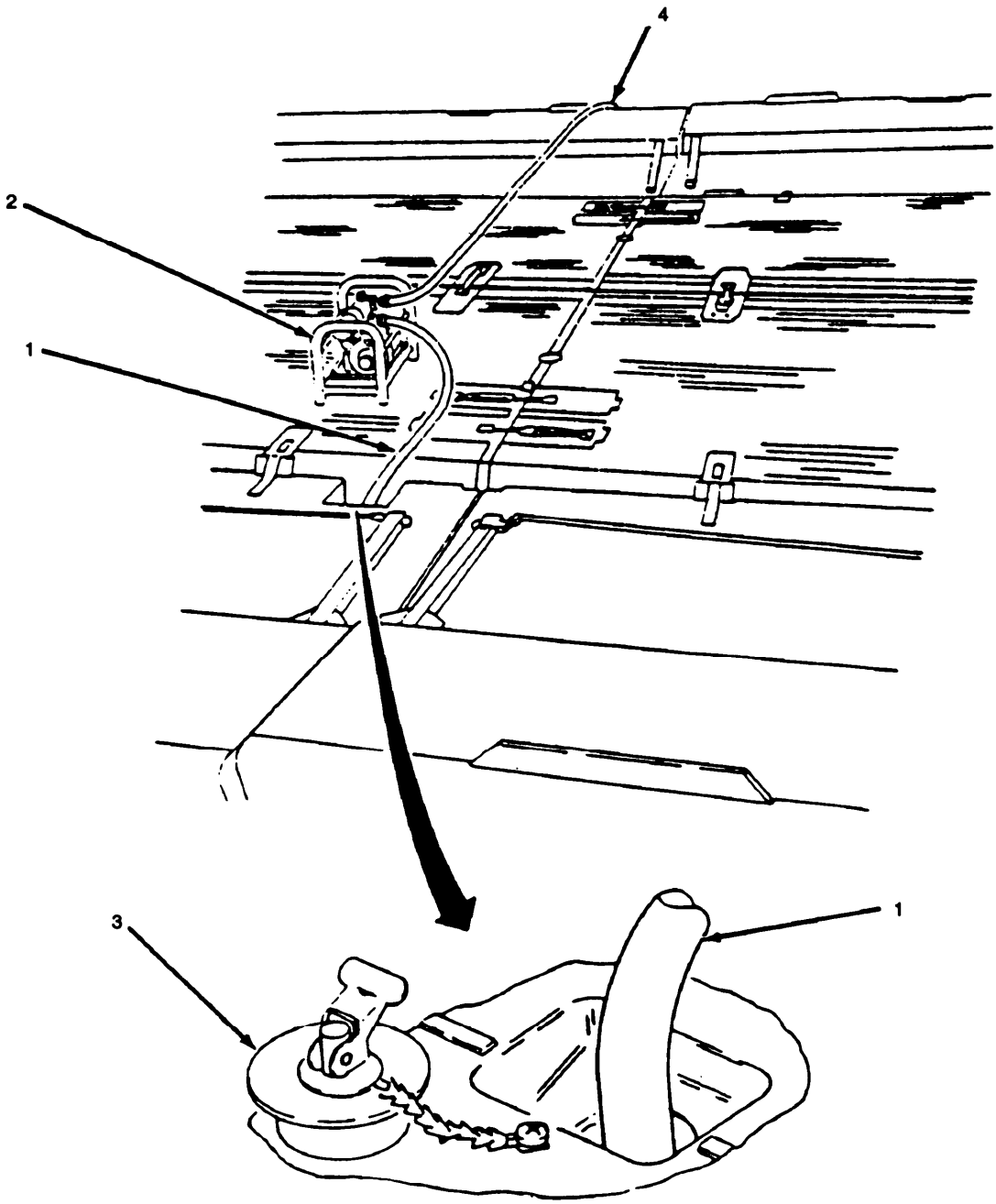



*Figure 2-26. Bilge Pump Operation.*

*c. Pressure Pump Operation.*

(1) Connect suction hose (1) to pump (2).

(2) Connect discharge hose (3) to pump (2).

(3) Connect nozzle (4) to end of hose (3).

**NOTE**

Do not allow suction hose to touch bottom. Dirt and debris sucked into pump may damage pump.

(4) Place suction hose (1) overboard into water.

(5) Operate pump (2) in accordance with TM 5-4320-200-13&P and wash off dirt and debris from roadway and walkway.

(6) Stop pump (2) in accordance with TM 5-4320-200-13&P.

(7) Remove nozzle (4) from hose (3).

(8) Remove hose (3) from pump (2).

(9) Remove hose (1) from pump (2).

(lo) Store hoses (1) and (3), nozzle (4), and pump (2).

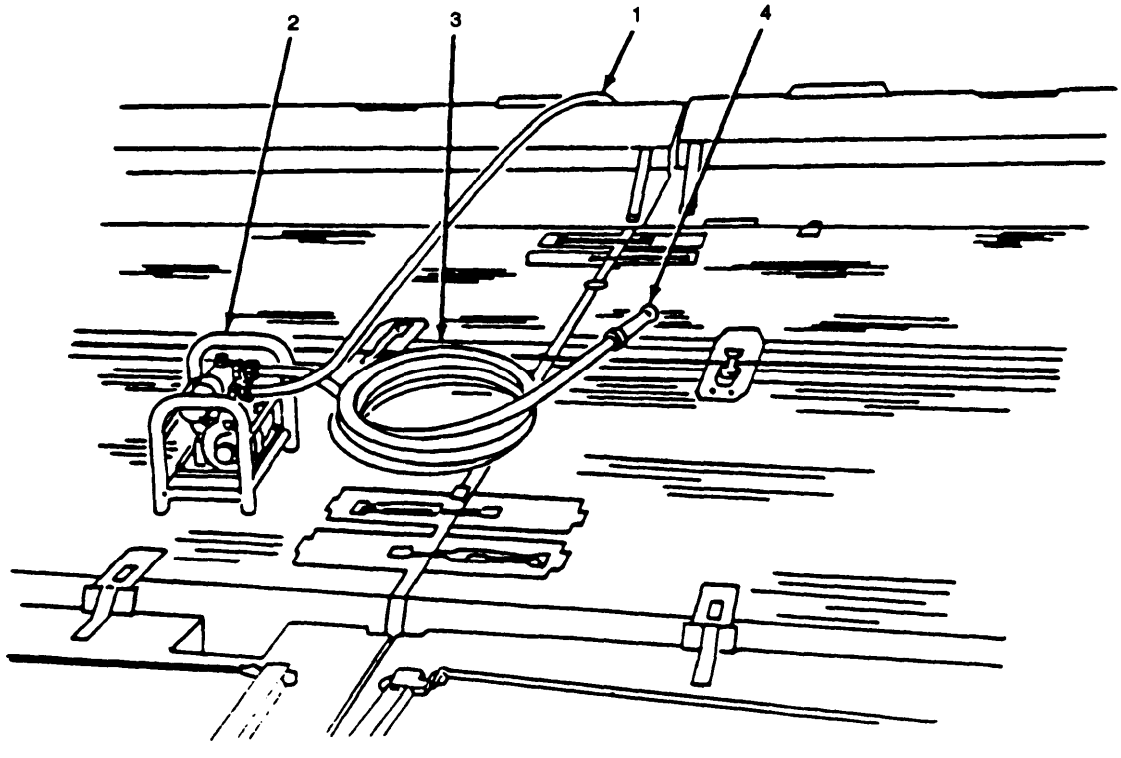



*Figure 2-27. Pressure Pump Operation.*

## 2-26. **Bridge Recovery.**

*a. General.* Disassembly procedures of the ribbon bays are generally reverse of the assembly procedures. Either the successive bay method of disassembly along the bridge line or swinging of the bridge upstream prior to disassembly may be used.

*b. Disassembly By Successive Bay Method* In the successive bay method, a bay-to-bay connection must first be opened near either shore (depending on where the retrieval equipment is available) and the shoreward bays pulled up onshore approximately 5 ft (15 m). This creates the space required to maneuver the first by after adjacent bay disconnection has been performed.

(1) Unlatch roadway connector (1).

(2) Retract approach ramps (2).

(3) Open hydraulic pump access covers (3), set pump control levers (4) to PUMP, open vent valves (5) and operate pumps using handles (6) to relieve grounding. Close vent valves (5), set control lever (4) to TRAFFIC and close pump access covers (3).

(4) Install T wrench (7) on lower lockpin screw (8) and turn counterclockwise to retract lower lockpin.

(5) Repeat Step (4) for remaining lower lockpin.

(6) Have anchorage crew pull shoreward bays partially on shore and adjust anchorage as needed.

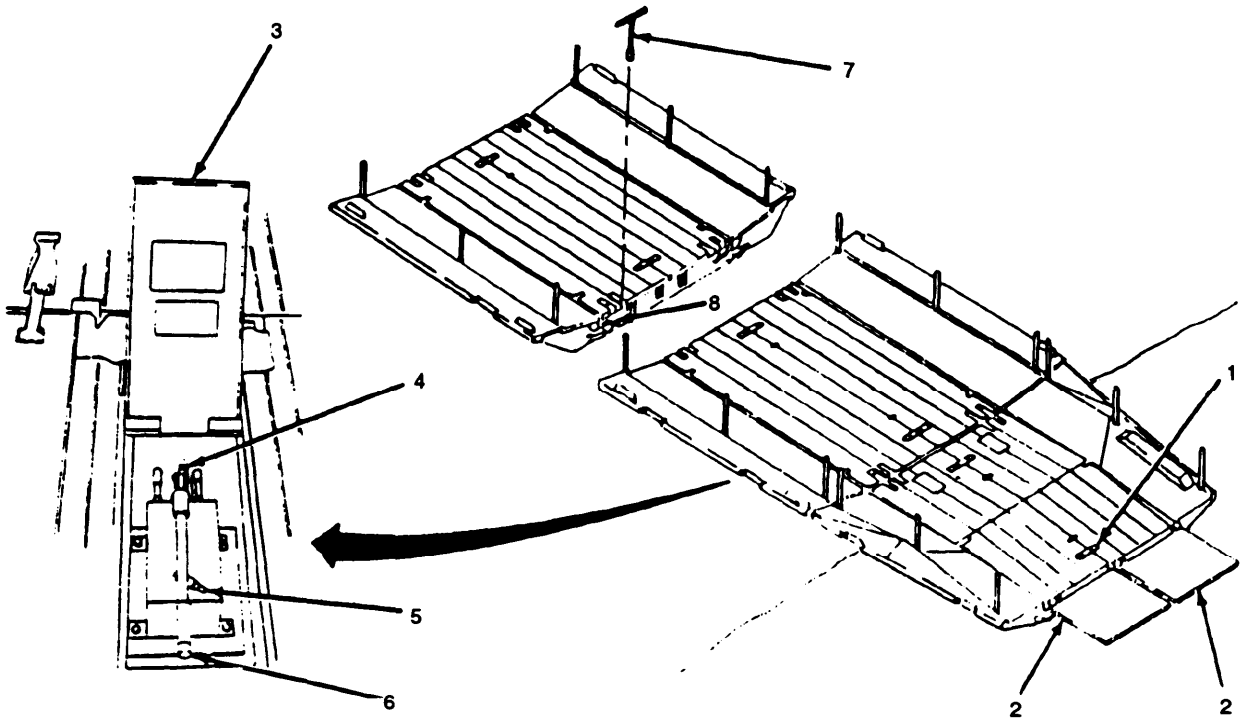



*Figure 2-28. Bridge Recovery, Successive Bay Method (Sheet 1 of 2).*

(7) Have bridge boat secure to bay being removed.

(8) Unlatch two (only one on ramp bay) roadway/roadway connectors (9).

(9) Ensure four bay/bay connectors (10) are unlatched.

(10) Lower handrails (11).

(11) Install T wrench (7) on lower lockpin screw (12) and turn counterclockwise to retract lower lockpin.

(12) Repeat Step (11) for remaining lower lockpin and remove bay.

(13) Engage (toward roadway) four (only two on ramp bay) roadway-to-bow ponton foldlock latches (13).

(14) Engage (away from roadway) two (only one on ramp bay) travel latches (14).

(15) Move bay to retrieval site.

(16) Repeat Step (1) through (15) as applicable for remaining bays.

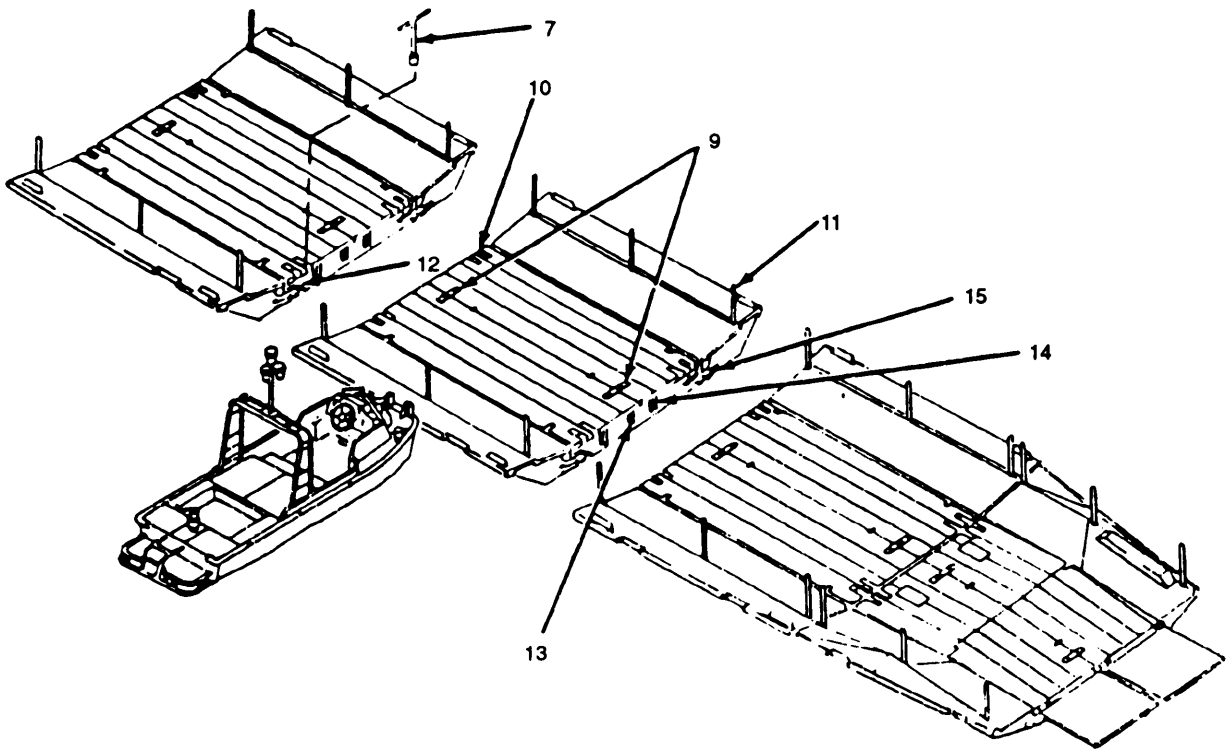



*Figure 2-28. Bridge Recovery Successive Bay Method (Sheet 2 of 2).*

*c. Disassembly Swinging Bridge Method*

**CAUTION**

Never swing bridge downstream, always swing bridge upstream to far shore.

Hydraulic pumps must be operated simultaneously and in unison to prevent damage to both pumps and cylinders.

**NOTE**

Perform Steps (1) through (3) on both ramp bays.

(1) Unlatch roadway/roadway connector (1) on approach ramp side of bay.

(2) Retract approach ramps (2).

(3) Open hydraulic pump access covers (3), set pump control levers (4) to PUMP open vent valves (5) and operate pumps using handles (6) to relieve grounding. Close vent valves (5), set control lever (4) to TRAFFIC and close pump access covers (3).

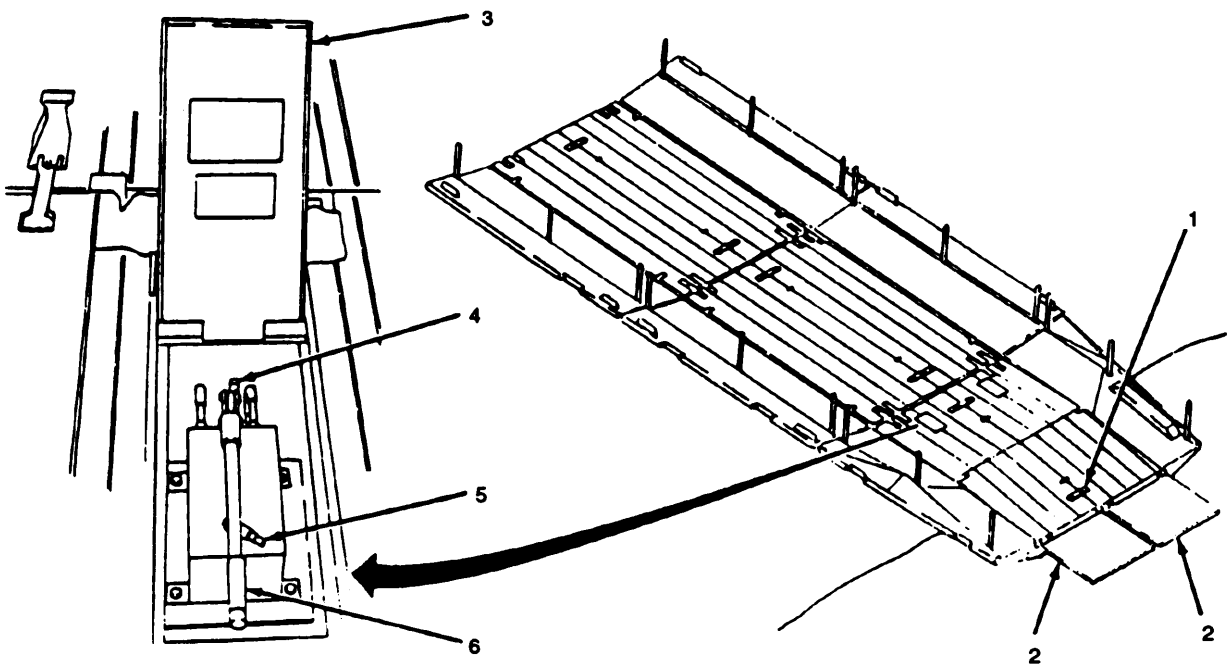



*Figure 2-29. Bridge Recovery Swinging Bridge Method (Sheet 1 of 3).*

(4) Have appropriate number of bridge boats connect to bridge for anchorage (table 2-15).

(5) Remove anchorage from bridge end being swung and swing bride upstream adjusting anchoring a needed.

(6) Anchorage crew will temporarily anchor bridge to shore.

**NOTE**

Start disassembly from downstream end of bridge.

(7) Have boat secure to bay being removed.

(8) Ensure four bay/bay connectors (7) are unlatched.

(9) Unlatch two (only one on ramp bay) roadway/roadway connectors (8).

(10) Lower handrails (8).

(11) Open hydraulic pump access covers (10), close manual vent valves (11), set pump control levers (12) to TRANSPORT position, and close covers (10).

(12) Install T wrench (13) on lower lockpin screw (14), turn counterclockwise, and retract lower lockpin.

(13) Repeat Step (12) for remaining lower lockpin screw and move bay to retrieval site.

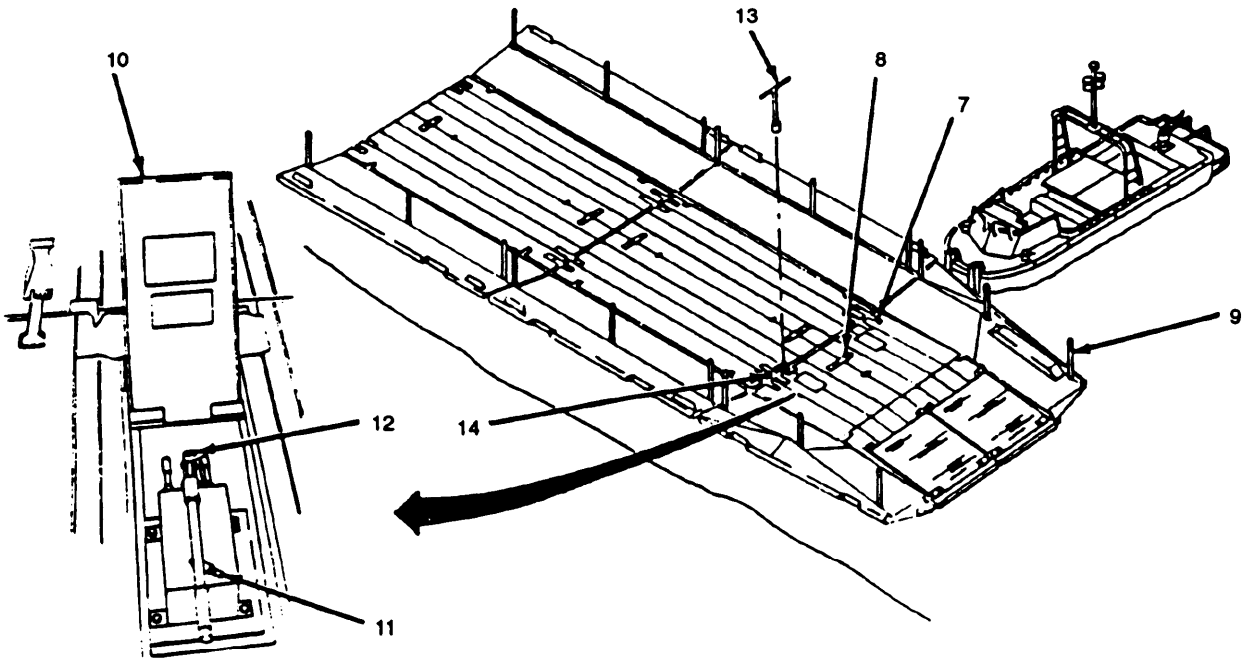



*Figure 2-29. Bridge Recovery Swinging Bridge Method (Sheet 2 of 3).*

(14) Engage (toward roadway) four (only two on ramp bay) roadway/bow ponton foldlock latches (16).

(15) Unlatch four roadway-to-bow ponton bridge latches (17).

(16) Engage two (only one on ramp bay) travel latches (18).

(17) Move bay to retrieval site.

(18) Repeat Steps (7) through (17) as applicable for remaining bays.

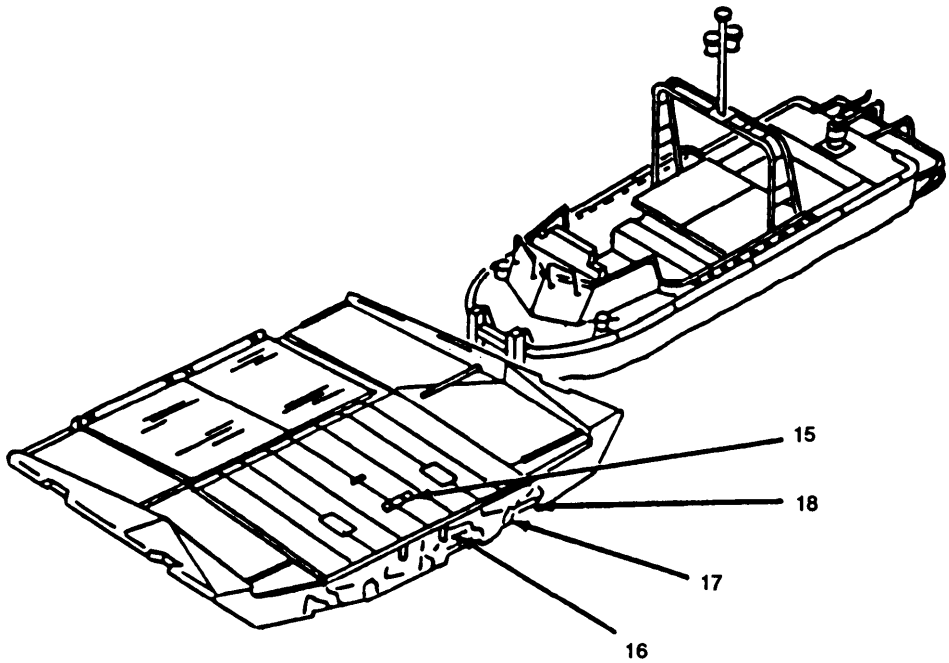



*Figure 2-29. Bridge Recovery Swinging Bridge Method (Sheet 3 of 3).*

## *2–27.* **Bay Recovery.**

a. *Water Recovery* Retrieval of either the ramp bay or interior bay onto the transporter from water is performed as detailed in the following steps. The crew required consists of an operator and an assistant. The operator will drive and be responsible for operation of the boom and winch. The assistant's duties are to handle the winch cable and give hand signals to the operator during retrieval and tiedown on the bay after retrieval, with the operator responsible for the completion of the tasks. A minimum of 30 in. (76.2 cm) of water is required for retrieval to allow the bay to close and lock properly. Steps (20) through (24) may be completed at the staging area or another area so as not to interfere with retrieval operation.

(1) Ensure aft tiedown hooks (1) are in the vertical position.

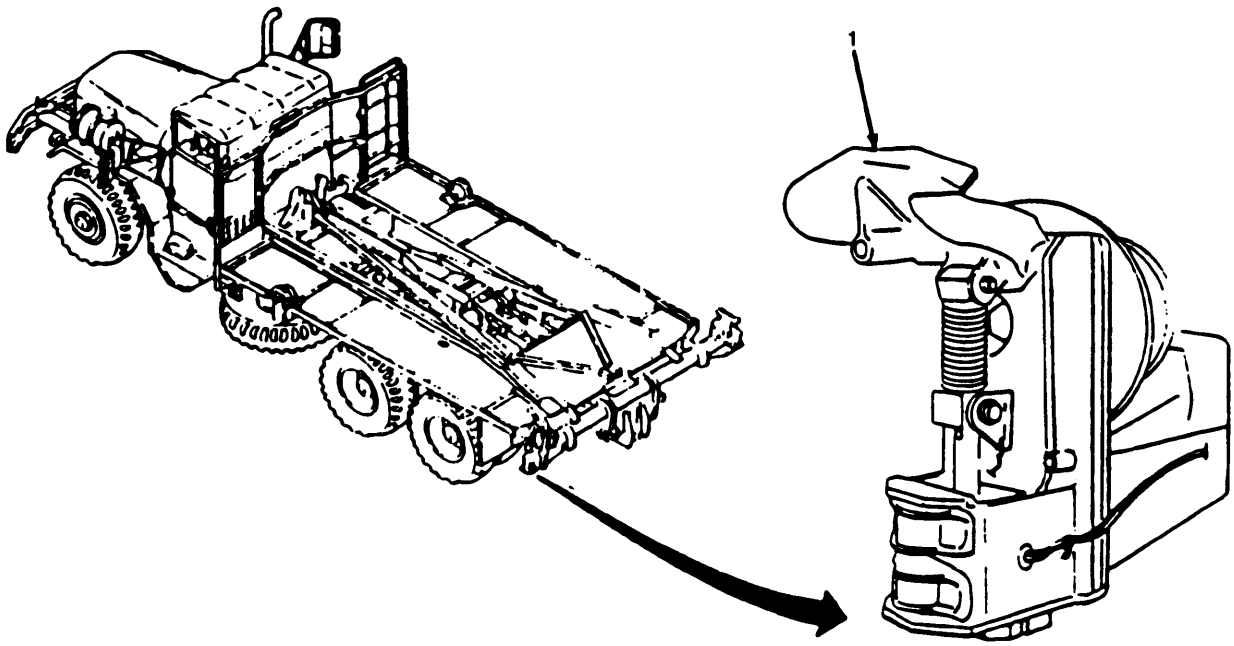



*Figure 2-30. Bay Water Recovery (Sheet 1 of 5).*

**NOTE**

Rear support of transporter must be kept parallel to surface of water. If the rear support is not, recovery is only possible with assistance from bridge boat.

(2) Back transponder into water until rear wheels are hub deep.

(3) Set parking brake and electric brake and place transporter in neutral.

(4) Engage PTO.

(5) Remove quick release pin (2) and install in holder (3).

(6) Retract (pin out) locking cylinder pin (4).

(7) Ensure cable (5) is properly routed around boom sheave (6).

(8) Raise boom (7) to full aft position and pay out cable until hook (8) is approximately 1-2 ft (.3 -.6 m) below surface of water.

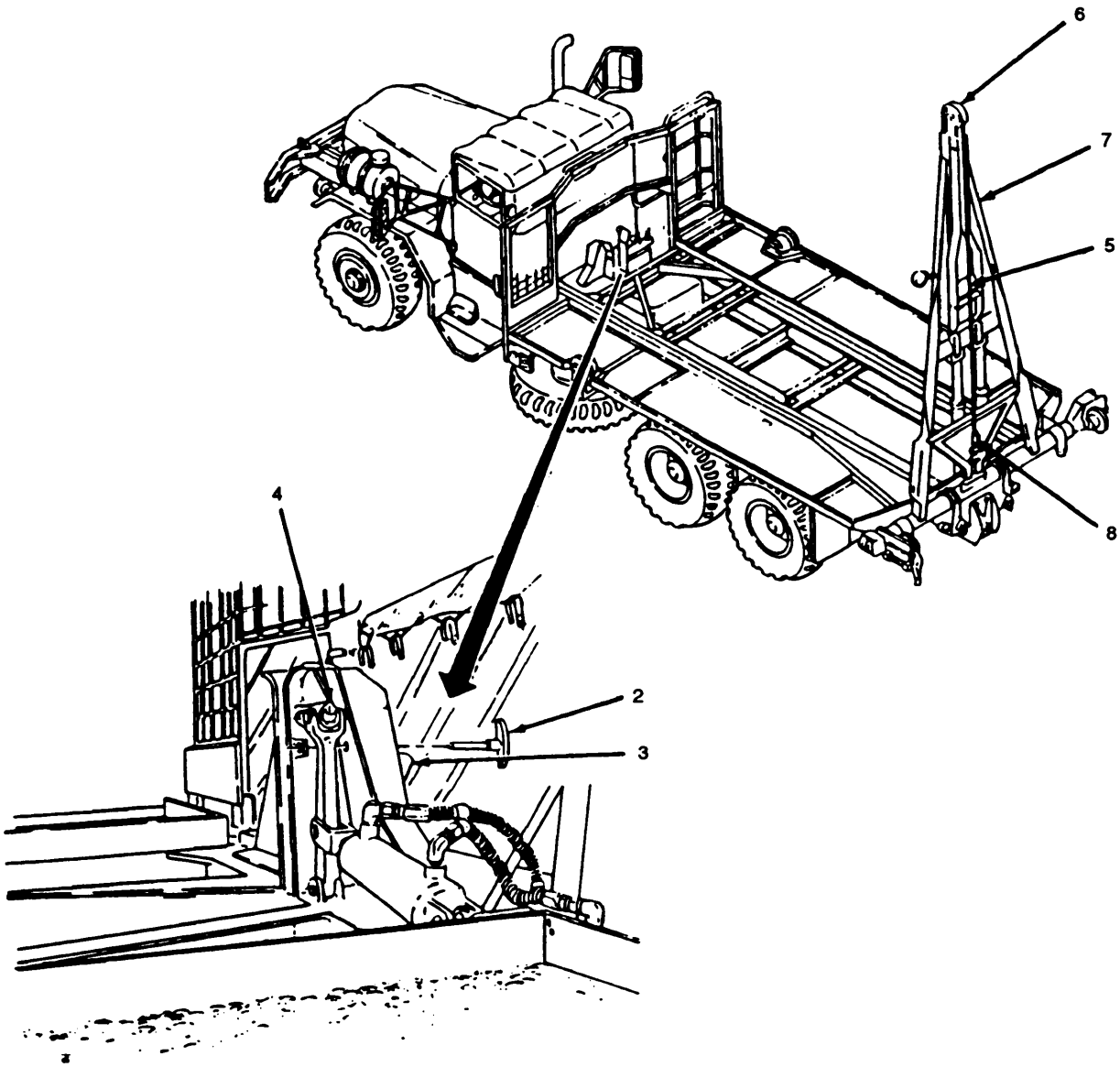



*Figure 2-30. Bay Water Recover (Sheet 2 of 5).*

**WARNING**

Ensure all lines between bridge boat and bay are removed and all personnel are off bay before initiating folding of bay. Death or serious injury could result.

**NOTE**

The bay must be in direct line with the transporter in order for the bay to be retrieved. In strong winds, or fast moving currents, the bridge boat should be directed to maneuver bow of bay to keep bay alined with transporter.

(9) Bridge boat will position bay (9) at rear of transporter and boat crew member will install hook (8) in lifting eye (10).

(10) Once crew member has returned to boat, play in cable at a steady rate until bay is completely folded and latched.

(11) Play in cable and lift bay (9) out of water until tiedown pins (11) are 1-2 ft (.3 -.6 m) above aft tiedown hooks (1).

(12) Retract boom (boom down) (7) until tiedown pins (11) are directly above aft tiedown hooks (1).

(13) Pay out cable and lower bay (9) until bay tiedown pins (11) are seated in aft tiedown hooks (1).

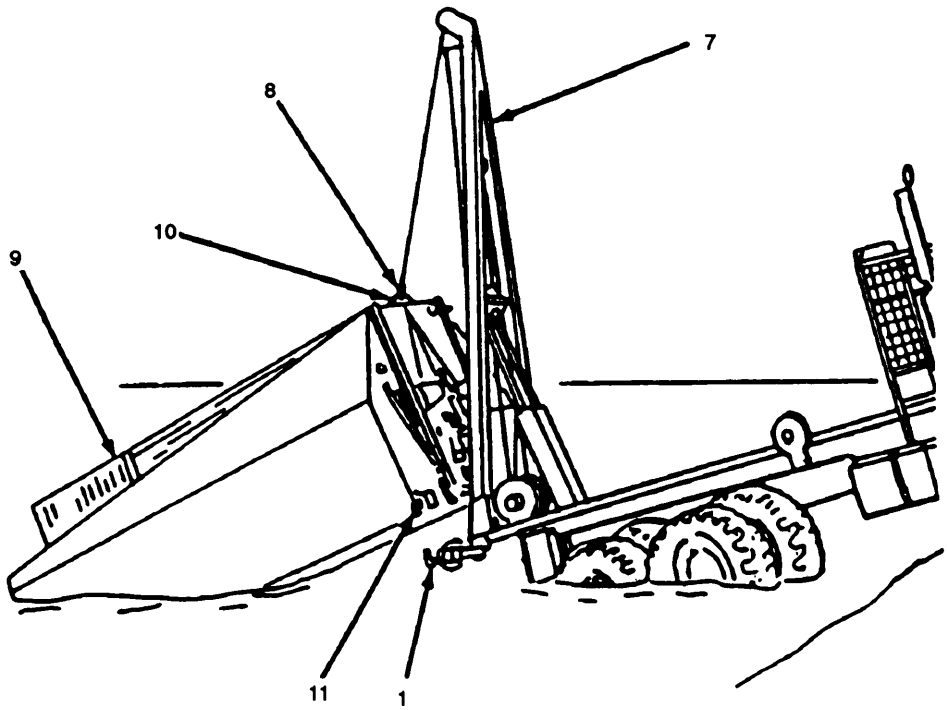



*Figure 2-30. Bay Water Recovery (Sheet 3 of 5).*

**CAUTION**

If bay is not parallel to boom, damage to bay/boom can occur.

(14) Lower boom (7) until it is parallel with bottom surface of bay (9).

**NOTE**

Ensure cable hook is properly positioned in lift eye, with opening facing transporter, and cable is not caught on bay.

(15) Payout cable and have assistant route cable (5) through cable guide (12).

**NOTE**

When bay center of gravity passes over rear support of transporter, the bay will tip forward on rear support rollers.

(16) Play in cable and pull bay (9) onto transporter until bay tips forward onto rear support rollers (13).

(17) Lower boom (7) until bay (9) is just above front support rollers.

(18) Continue to play in cable until rear (intermediate on interior bay) bay tiedown pins (15) are engaged by aft tiedown hooks (1).

(19) Lower boom (7) completely.

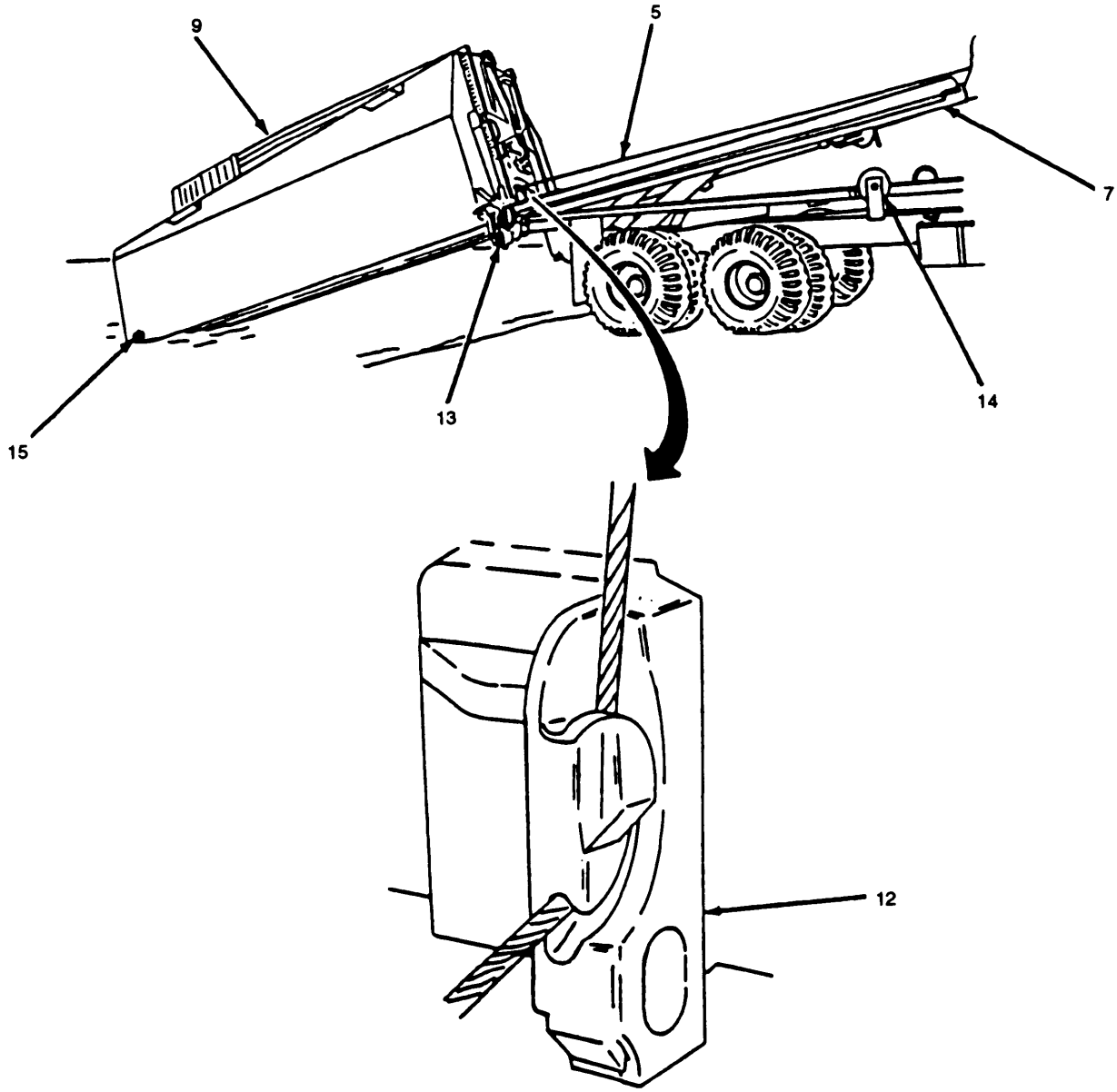



*Figure 2-30. Bay Water Recovery (Sheet 4 of 5).*

**NOTE**

If bay cable guide hole does not aline with locking cylinder pin, raise or lower boom, as needed or move transporter to level ground and retry.

(20) Engage (PIN IN) cylinder pin (4).

**NOTE**

Ensure both aft tiedown pins (9) are seated in aft tiedown hooks (1).

(21) Install quick release pin (2).

(22) Ensure all latches are engaged.

(23) Disengage PTO, release parking brake and electric brake, and move transporter to staging area.

(24) Tighten bolt (16) on aft tiedown hook (1) to secure bay (9). Repeat for remaining tiedown hook.

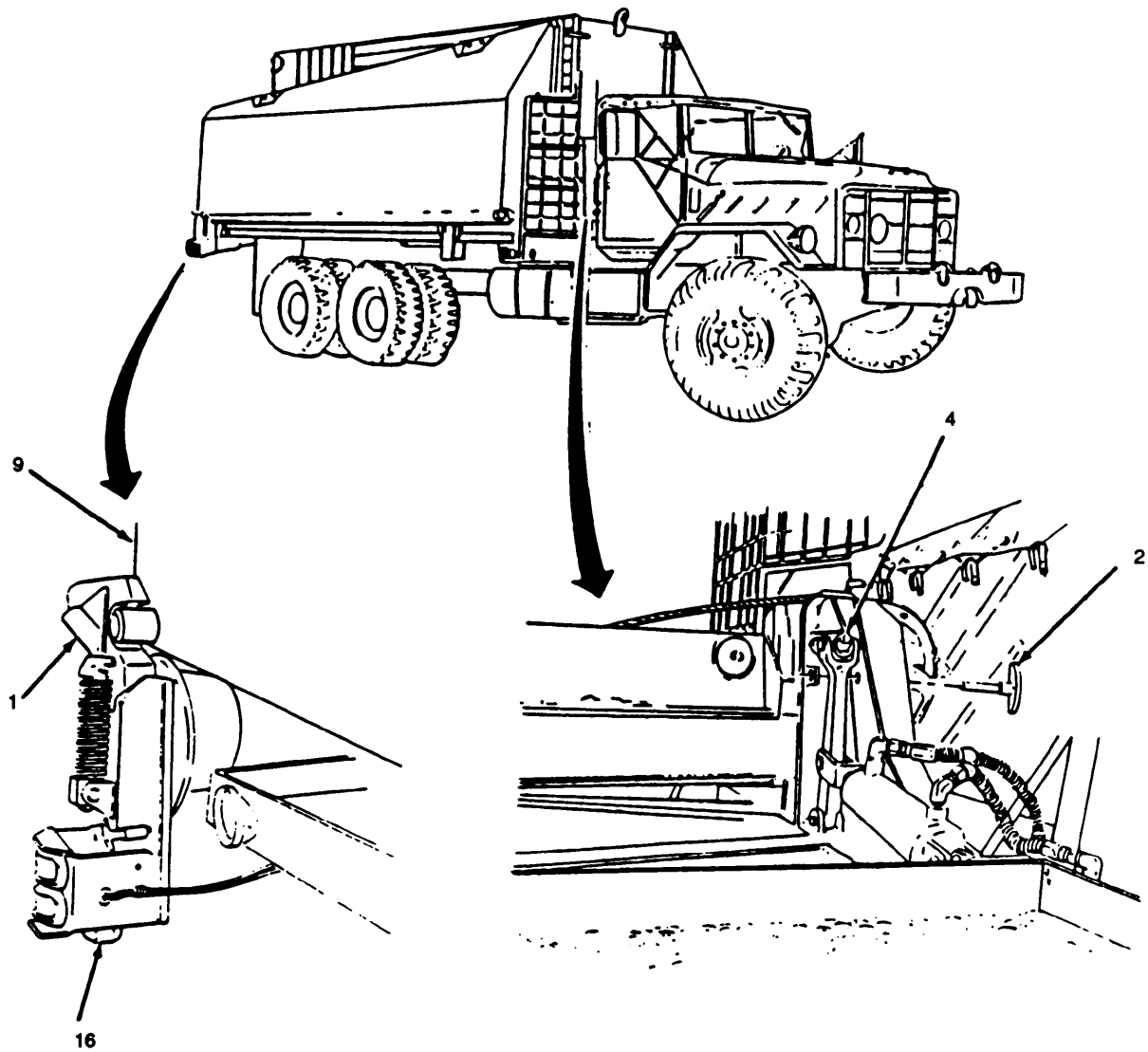



*Figure 2-30. Bay Water Recovery (Sheet 5 of 5).*

*b*. Ground Recovery. When recovering a bay from a ground location, the bay has already been folded, with foldlock and travel latches latched and bay on suitable dunnage.

**NOTE**

When loading a ramp bay onto the transporter, back transporter up to lower lock drive end of bay. Even though the interior bay can be loaded from either end, the preferred method of loading is to back transporter up to end without unfolding cables.

(1) Position transporter (1) so that rear of tranporter is parallel with and approximately 3ft (1 m) away from end of bay (2).

(2) Loosen bolt (3) and release aft tiedown hook (4).

(3) Repeat for remaining tiedown hook.

(4) Ensure cable (5) is properly routed around boom sheave (6).

(5) Remove quick release pin (7) and store in holder (8).

(6) Retract (PIN OUT) cylinder pin (9).

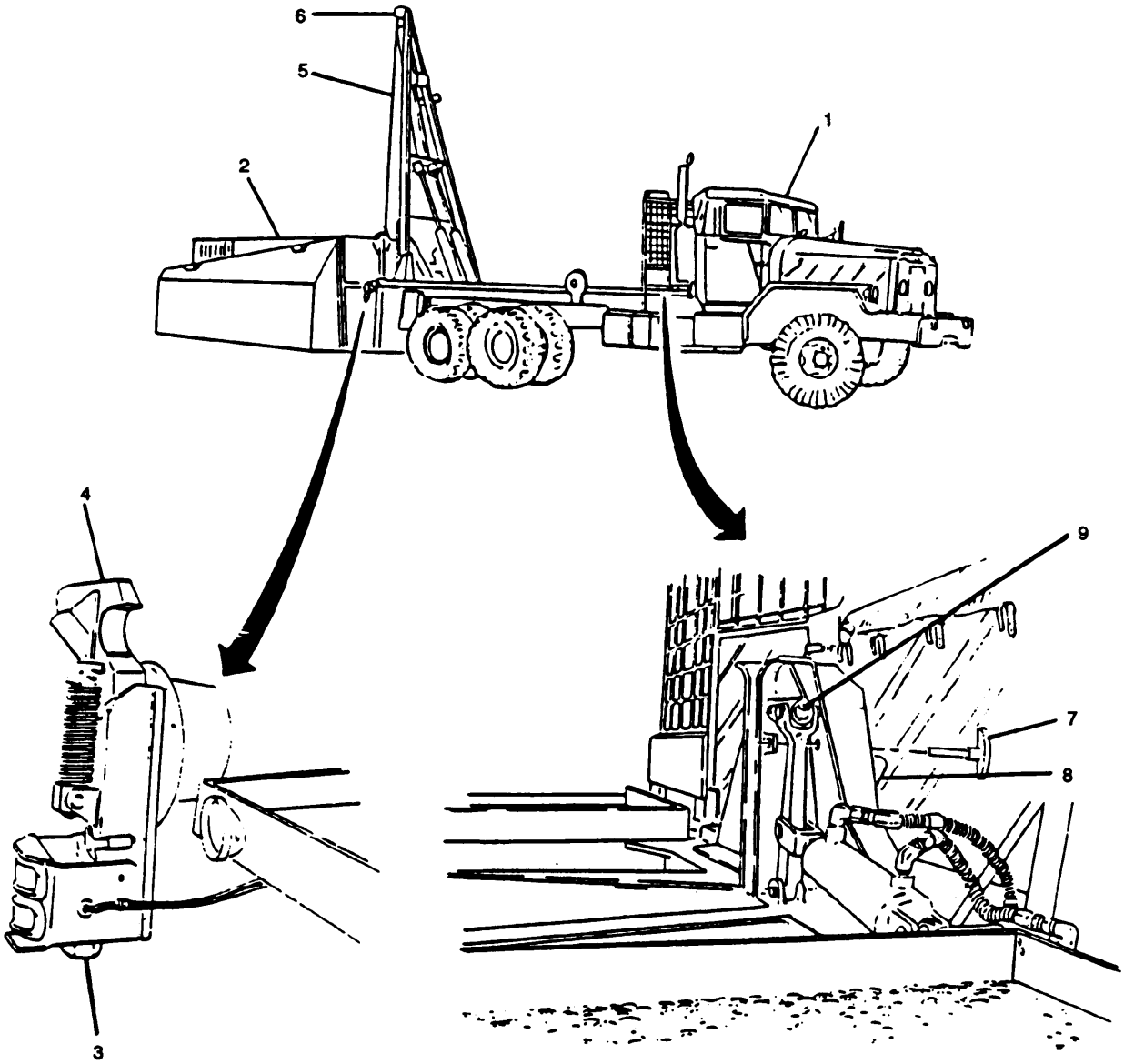



*Figure 2-31. Bay Ground Recovery (Sheet 1 of 4).*

(7) Raise boom (10) to full aft position.

(8) Pay out cable (5) until hook (11) is 1-2 ft (.3 -.6 m) below lifting eye (12).

(9) Install hook (11) in lifting eye (12) with opening in hook facing transporter (2).

(10) Play in cable until tiedown pins (13) are 1-2 ft (.3 -.6 m) above tiedown hooks (4).

(11) Lower boom (10) until bay tiedown pins (13) are directly above tiedown hooks (4).

(12) Pay out cable and lower bay (2) until bay tiedown pins (13) engage with aft tiedown hooks (4).

**CAUTION**

If boom is not parallel to bottom of bay, damage to bay can occur.

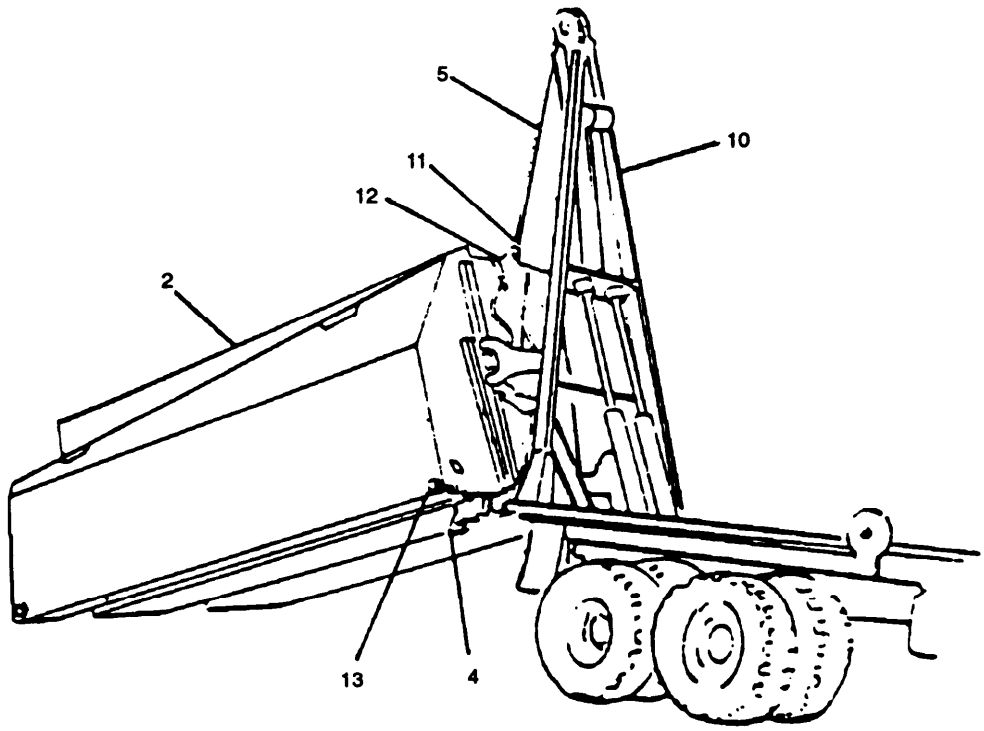



*Figure 2-31. Bay Ground Recovery (Sheet 2 of 4).*

(13) Lower boom (10) until parallel with bottom of bay (2).

(14) Payout cable and have assistant route cable (5) through cable guide (14).

(15) Play in cable until bay (2) tips forward onto boom (10).

(16) Lower boom (10) until bottom of bay (2) is just above front support rollers (17).

(17) Pay in cable until rear (intermediate on interior bay) tiedown pins (18) are engaged by tiedown hooks (4).

(18) Lower boom (10) completely.

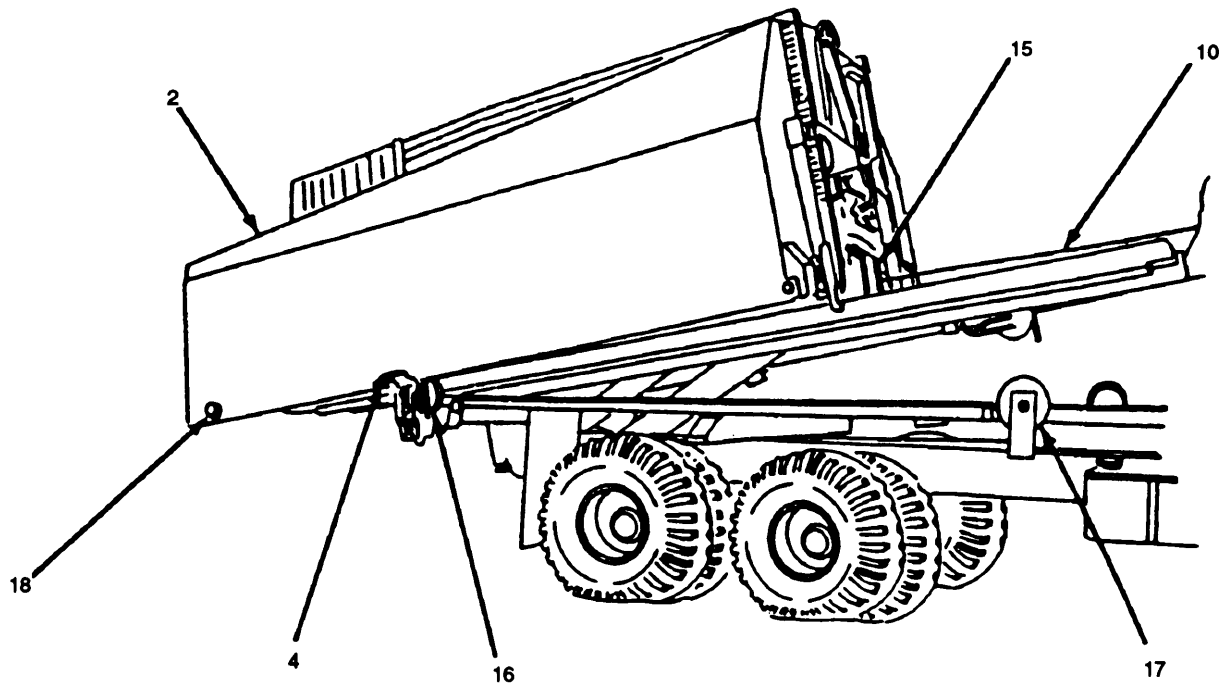



*Figure 2-31. Bay Ground Recovery (Sheet 3 of 4).*

**NOTE**

If cable guide hole does not aline with locking cylinder pin, raise or lower boom as needed or move transporter to level ground and try again.

(19) Engage (PIN IN) cylinder pin (8).

**CAUTION**

Before moving transporter ensure aft tiedown hooks are engaged with bay tiedown pins.

(20) Install quick release pin (7).

(21) Ensure all travel and foldlock latches on bay are secured (latched).

(22) Tighten bolt (3) on tiedown hook (4). Repeat for remaining tiedown hook (4).

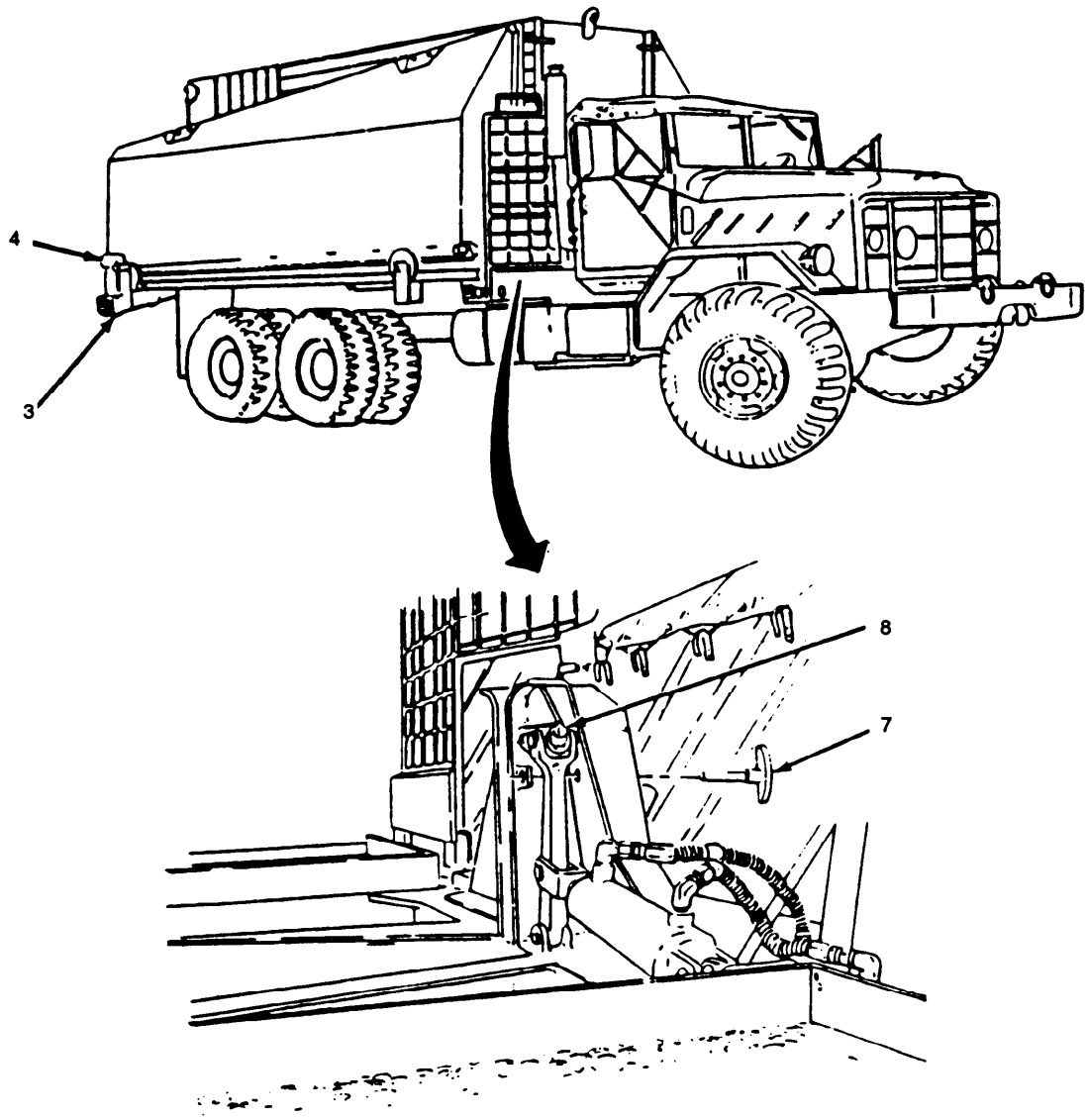



*Figure 2-31. Bay Ground Recovery (Sheet 4 of 4).*

c. *Recovery by Helicopter.* Retrieval by helicopter consists of four phases: (1) closing bay, (2) lifting bay (3) grounding bay (at recovery site), (4) loading bay onto transporter. In order to provide a fixed reference point for the helicopter pilot, the bay must first be held in a fixed position against the shore or some other stable object. Use of a bridge erection boat for stabilization is not feasible due to rotor wash induced drifting. Once the bay is held in place, it must first be closed by a single point lift at the lifting eye. After the bay is closed it can be lifted for transport by using the airlift sling and four-point suspension. The airlift sling and shackles provided in the supplemental set are to be used to provide four-point suspension. When suspended by the sling, the ramp bay can be transported at airspeed of up to 100 knots. In order to transport the interior bay at air speeds above 40 knots, a drogue parachute, (NSN 1670-00-052-1548), 15 foot diameter ribbon bridge type with a 60 foot extraction line and 3 foot adapter are required to provide stability. Safe airlift speed is determined by wind speed and direction, type and condition of aircraft as well as pilot proficiency in hauling the bridge. The helicopter will transport the bay to the recovery site where it will be loaded onto a transporter.

**CAUTION**

Unit Commanders are cautioned of the necessity to anticipate requirements for an airlift operation and arrange for timely delivery. The drogue parachute is readily available from GM Rigging Unit (Parachute Maintenance), an Area Resupply Co. all Airborne units and all Air Force Cargo Wings. The drogue parachutes are not issued with the Supplementary Set SC 5420-97-CL-E51.

(1) Boat crew will position and secure bay to stationary object.

(2) Signal helicopter to hover over bay (6), and lower lifting cable (1).

(3) Connect hook (2) into bay lifting eye (3).

**WARNING**

Ensure boat and crew are positioned away from folding operation, equipment damage, personnel injury or death could result.

(4) Signal helicopter to raise cable (1) and fold bay (4).

**CAUTION**

Ensure foldlock latches and travel latches are latched prior to connecting lifting sling.

(5) Disconnect lifting cables (1) from bay (4) and signal helicopter to raise cable (1) above bay (4).

**NOTE**

For interior bays, all four sling legs must be of equal length; for ramp bay, sling legs on approach ramp end of bay will be shorter than those on lower lock drive end.

(6) Connect lifting sling (5) to lift/anchor points (6) on bay.

(7) Connect sling (5) to hook (2) and ensure cable lifting eye is centered over bay.

(8) Signal helicopter to take in lifting sling (5) cable slack.

(9) Remove all anchoring lines attached to bay (4) and position boat and crew away from lifting operation.

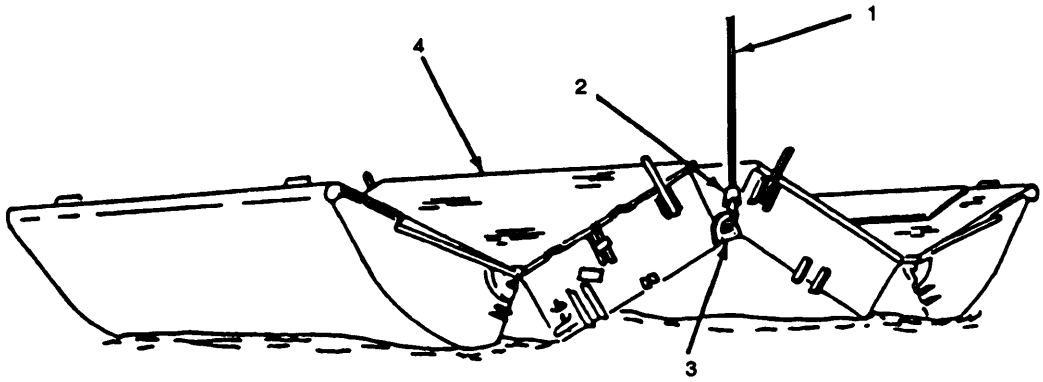



*Figure 2-32. Bay Helicopter Recovery (Sheet 1 of 3).*

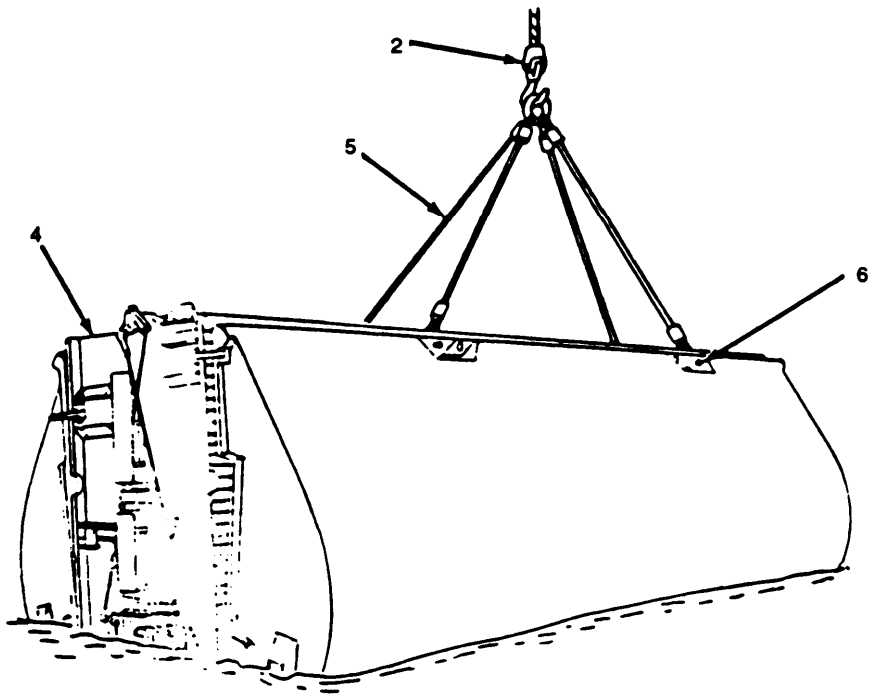



*Figure 2-32. Bay Helicopter Recovery (Sheet 2 of 3).*

(10) Signal helicopter to lift bay (4) to recovery area.

**CAUTION**

Ensure dunnage is places under bay to prevent damage to unfolding arm mechanism.

(11) Signal helicopter to lower bay (4) and maneuver bay onto dunnage.

(12) Remove sling eye (5) from cable hook (2) and signal helicopter to raise cable and clear recovery area.

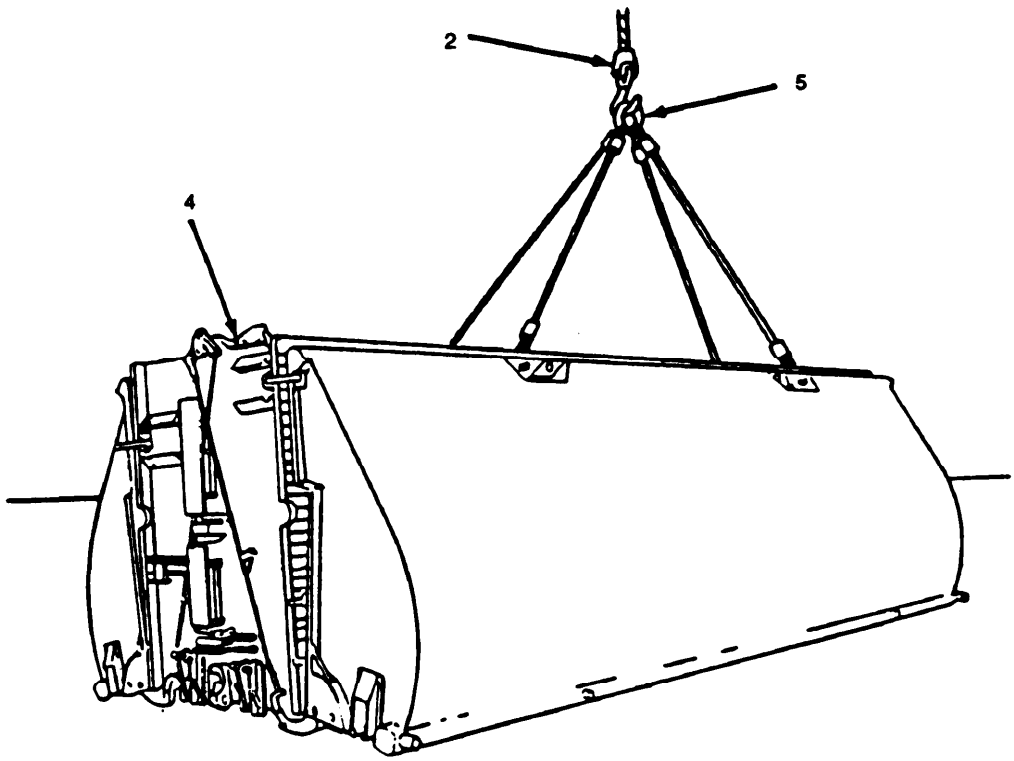



*Figure 2-32. Bay Helicopter Recovery (Sheet 3 of 3).*

(13) Remove lifting sling (5) from bay (4) and stow.

**NOTE**

When loading a rarmp bay onto transporter, back transporter up to lower lock drive end of bay. When loading an interior bay, back transporter up to bay end without unfolding cables.

(14) Follow procedures for ground recovery of bay (para. 2-26b).

## 2-28. **Raft Assembly.**

*a. General.* Ramp bays and interior bays may be joined to construct a raft for transporting personnel and equipment across bodies of water. The number of bays required for rafting is dependent upon the class of the traffic to be transported, dimensions of equipment, and the velocity of the river. The number of boats required for safe operation of a particular raft depends upon the type of raft, the class of the load, and the velocity of the river. Consult rafting charts (table 2-17 or 2-18) for minimum raft size and boat requirements to ensure safe operation. A raft uses two ramp bays so that the raft may be loaded and unloaded from either end. In addition to two men in each boat, the raft carries a minimum crew of three men (one raft commander and two assistants). The raft commander directs the raft by use of hand signals to the boat operators. He is responsible for loading and unloading the raft, checking levers on the pumps, and safety of the raft. The assistants are responsible for handling the approach ramps, operating the hydraulic pumps, watching for underwater obstructions during crossings, and any other necessary duties for safe operation.

b. *Raft Assembly Procedure.*

(1) Launch two interior bays (1) and (2) and connect (para. 2-20), and anchor upstream from launch site.

(2) Launch ramp bay (3) and connect to interior bay (1) (para. 2-18), and secure ramp bay and interior bay perpendicular to shore.

**NOTE**

Add anchorage as needed.

(3) Launch remaining interior bays (as required by raft size) and connect to raft assembly.

(4) Launch ramp bay (4) and connect to interior bay (para. 2-18).

*c. Longitudinal Rafting Procedure*

(1) Install four rafting brackets adjacent to centerline of raft as follows:

*(a)* Remove pin (1) and install rafting bracket (2) and secure with pin (1).

*(b)* Repeat Step a. for remaining rafting brackets.

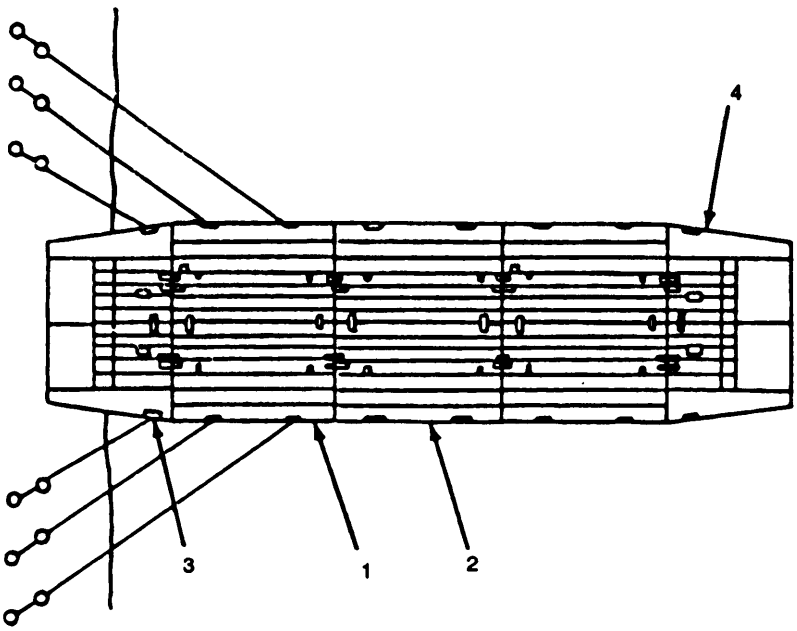



*Figure 2-33. Typical Raft Configuration.*

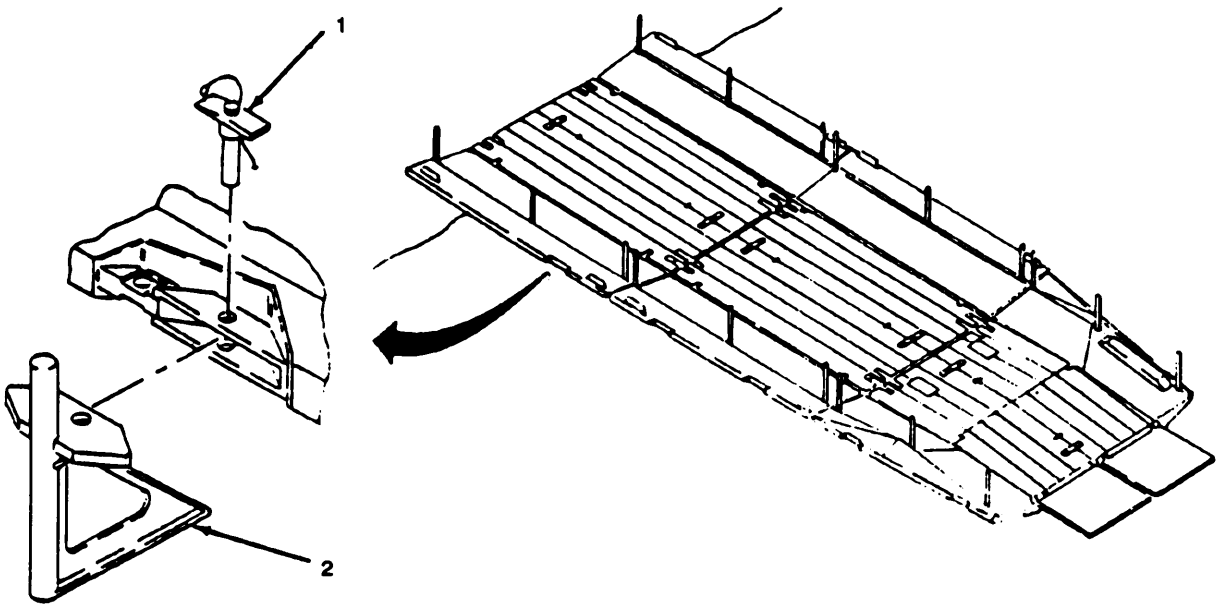



*Figure 2-34. Longitudinal Rafting Procedures (Sheet 1 of 6).*

(2) Downstream boat (3) will hold raft (4) in position.

(3) Upstream boat (5) will move into position next to upstream end of raft (4) with bow facing away from shore.

**NOTE**

Use 1 in. (2.54 cm) manila/nylon line for all lines. When bow line is secured place boat controls in neutral.

(4) Upstream boat (5) connects bow line (6) to interior bay anchor pin (7) closest to ramp bay (8), and secures line to port side bollard.

(5) Upstream boat (5) connects stern line (9) to interior bay anchor pin (10) closest to ramp bay (11).

(6) Secure stem line (9) to capstan and take up slack in stem line (9).

(7) Tie off free end of stern line (9) to stern bollard.

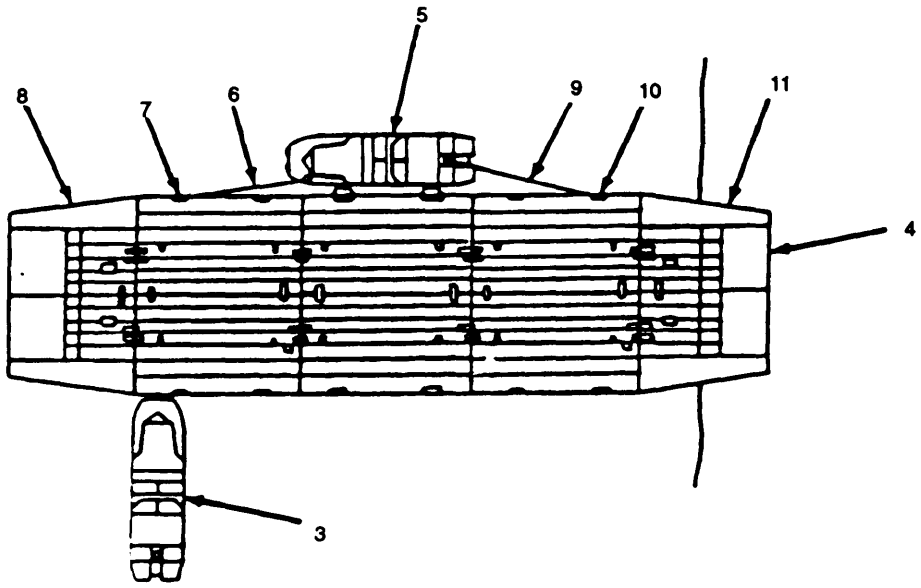



*Figure 2-34. Longitudinal Rafting Procedures (Sheet 2 of 6).*

**NOTE**

Before grounding raft, raise ramp to allow raft to be grounded.

(8) Upstream boat (5) will hold raft (5) against shore.

(9) Downstream boat (3) will move into position along side of raft (4) with bow facing away from shore.

(10) Connect bow line (12) to interior bay anchor pin (13) closest to ramp bay (8).

(11) Connect bow line (12) to bow bollard on starboard side of boat (3).

(12) Connect stem line (14) to interior bay anchor pin (15), closest to ramp bay (11) and connect line (14) to stern capstan and take up slack in stern line (14).

(13) Connect free end of stem line to stern bollard.

(14) Downstream boat (3) operate boat to hold raft (4) to shore.

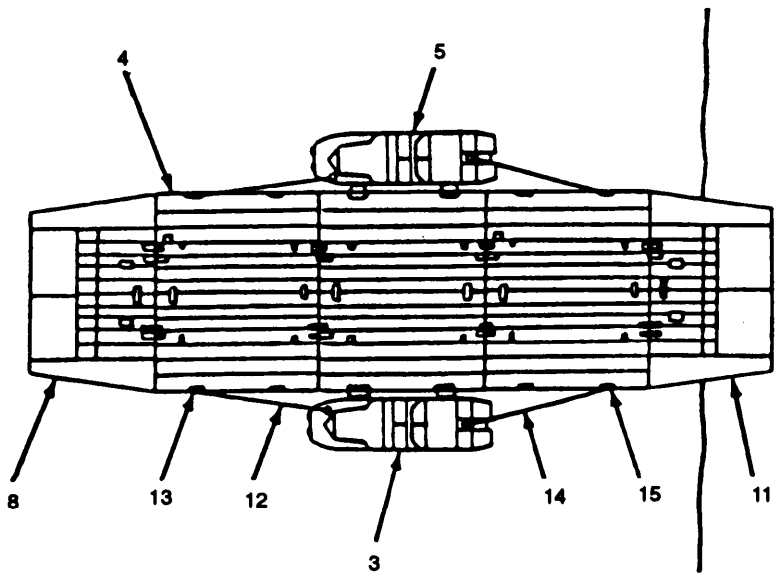



*Figure 2-34. Longitudinal Rafting Procedures (Sheet 3 of 6).*

**CAUTION**

Always position scoop control levers in reverse so that boats push raft against the shore during loading and off loading traffic. Bridge or equipment damage could result.

**NOTE**

Rafting operations in a river crossing with more than one raft using same loading and unloading sites will follow a figure eight traffic pattern.

(15) Operate raft as follows:

*(a)* Open pump access covers (16) and set control levers (17) to PUMP position, and close vent valve (18).

**CAUTION**

When operating hydraulic pumps, both pumps must be operated in unison to prevent damage to pumps and cylinder.

*(b)* Use pump handle to lower ramp to desired position, and set end approach ramps (10). Refer to table 2-17 for loading capabilities.

*(c)* Open pump access covers (16), set control levers (17) to TRAFFIC position, and close vent valves (18).

*(d)* Load traffic and retract approach ramps (10).

**CAUTION**

When operating hydraulic pumps, both pumps must be operated in unison to prevent damage to pumps and cylinder.

*(e)* Open pump access covers (16), set control levers (17) to PUMP, and open vent valves (18) and raise ramp to desired level.

**NOTE**

Both hydraulic pump control valves must be opened simultaneously. If ramp does not come out of water, manual pumping is required to achieve desired ramp position.

*(f)* Open pump access covers (20), set hydraulic pump control levers (21) to PUMP position, open vent valve (22), and close pump access covers (20).

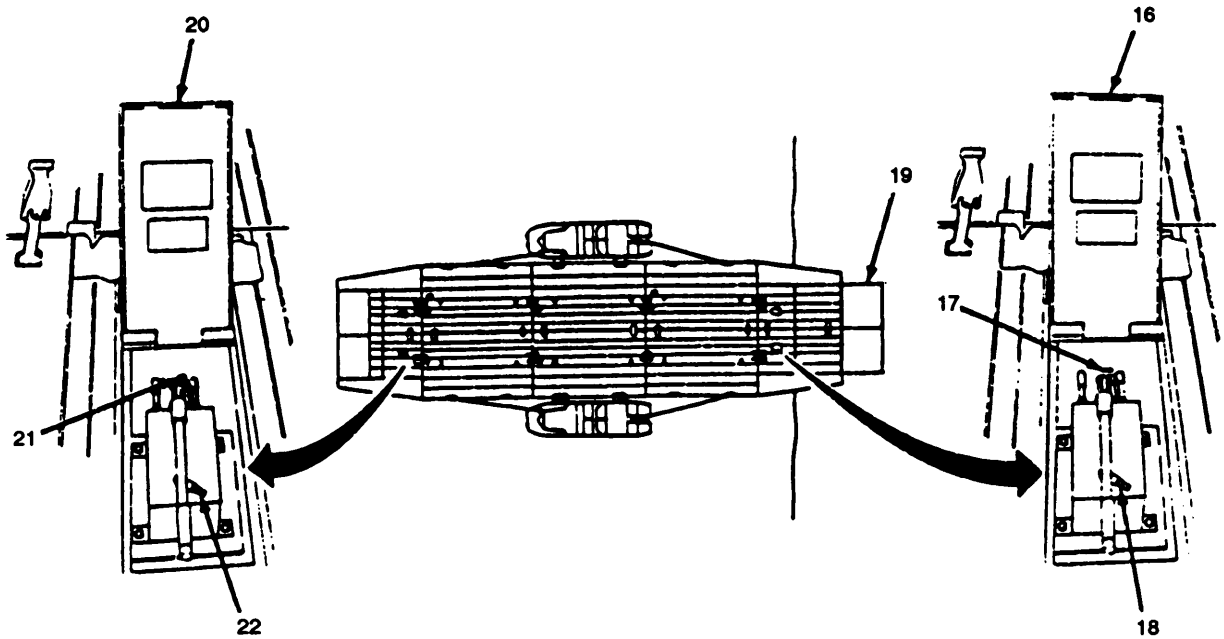



*Figure 2-34. Longitudinal Rafting Procedures (Sheet 4 of 6).*

*(g)* Cast off guy lines, if used, maneuver boats in accordance with signals from raft commander and propel raft to far shore to unload.

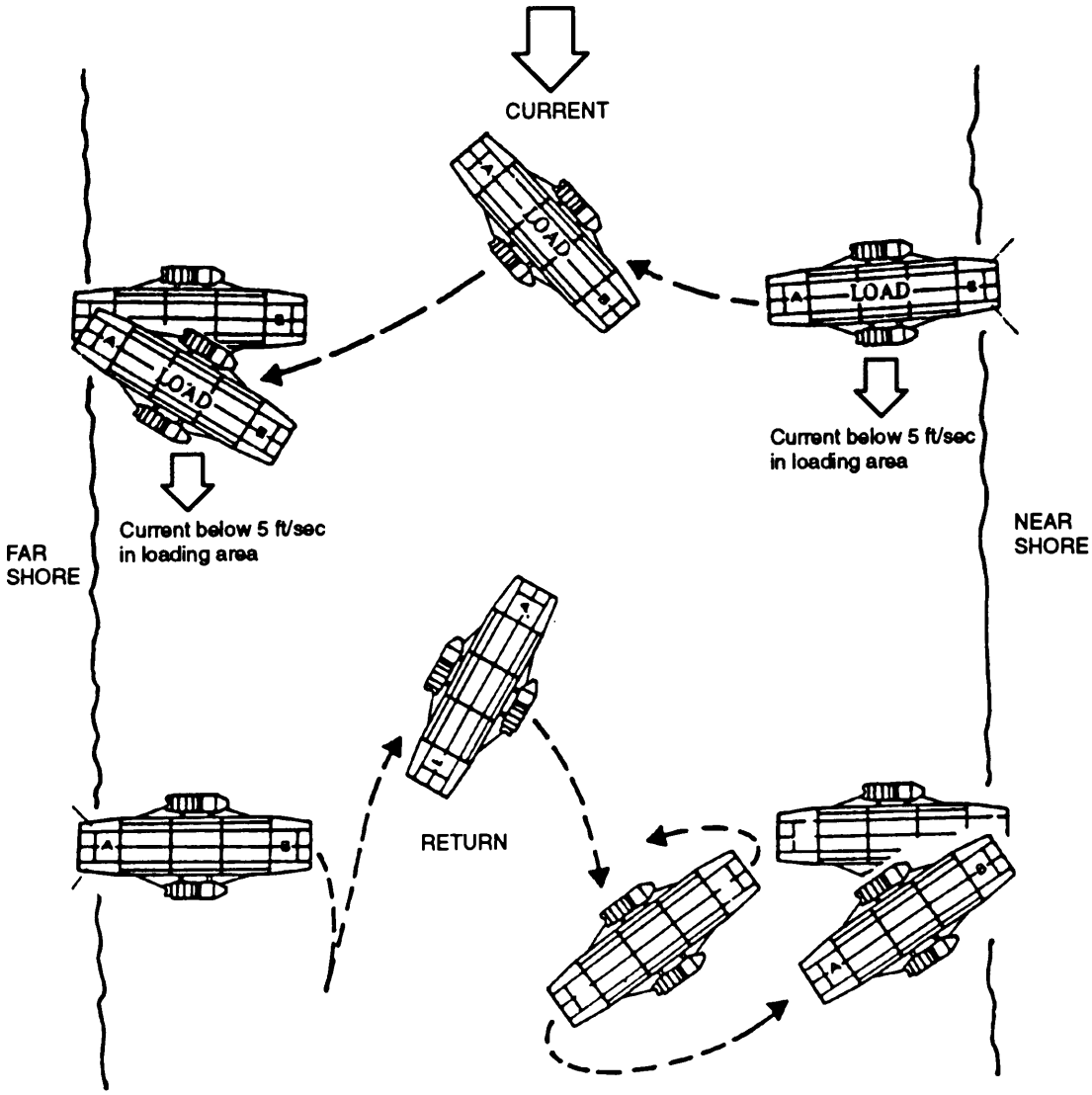



*Figure 2-34. Longitudinal Rafting Procedures (Sheet 5 of 6).*

*Table 2-17. Longitudinal Railing Capacities.*

| Raft Size | Rating Velocity (ft/see) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 0-3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 3-bay | 45 | 45 | 45 | 40 | 40 | 35 | 30 | 25 |
| 4-bay | 70 | 70 | 70 | 60 | 60 | 60 | 55 | 45 |
| 5-bay | 75 | 75 | 75 | 70 | 70 | 70 | 60 | 60 |
| 6-bay (Track) | 80 | 80 | 80 | 70 | 70 | 70 | 70 | 70 |
| 6-bay (wheel) | 96 | 96 | 96 | 96 | 96 | 96 | 70 | 70 |

Notes:

1. Table shows load (MLC) capacity based on one vehicle positioned on the raft centerline and centered on the deck. The values shown for 3-/4-/5 bay rafts apply for wheeled or tracked vehicles. The values shown for a 6-bay raft apply for track/wheel vehicles as shown.
2. Two bridge boats are required for propulsion with any raft in the table.
3. This configuration is to be used only where current velocities in loading and unloading areas are 5 fps or less.
4. Ratings apply only with bottom of ramp ends raised 1 foot clear of water. Ramps raised for loading must be lowered before raft is underway.

*(h)* Secure raft to shore.

*(i)* Open pump access cover (20) and set pump control valve (21) to TRAFFIC position, close vent valve (22), and close cover (20).

*(j)* Repeat Step (i) for remaining pump.

*(k)* Lower approach ramps (23) and unload vehicles.

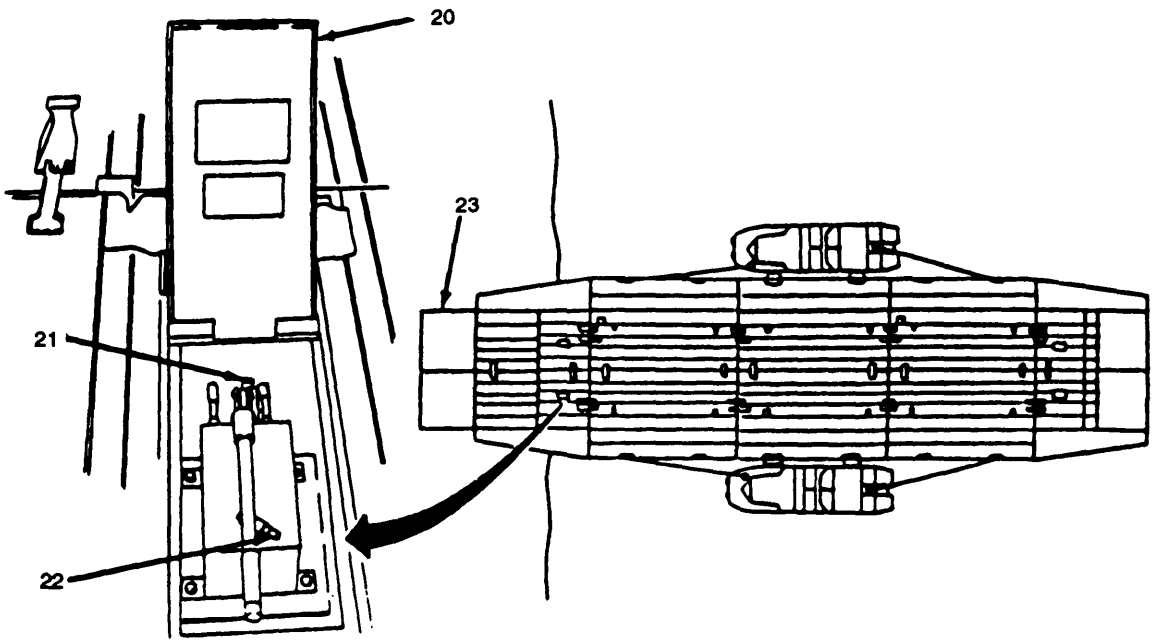



*Figure 2-34. Longitudinal Rafting Procedures (Sheet 6 of 6).*

*d.* *Conventional Rafting Procedure*

**NOTE**

The following steps are the same for both boats. The procedures can be performed simultaneously or for one boat at a time.

(1) Position boat (1) on downstream side and centered on interior bay (2).

(2) Secure steering lines (3) between anchor pins (4) and bow bollards at front of boat.

(3) Secure stem lines (5) between anchor pins (6) and aft bollards.

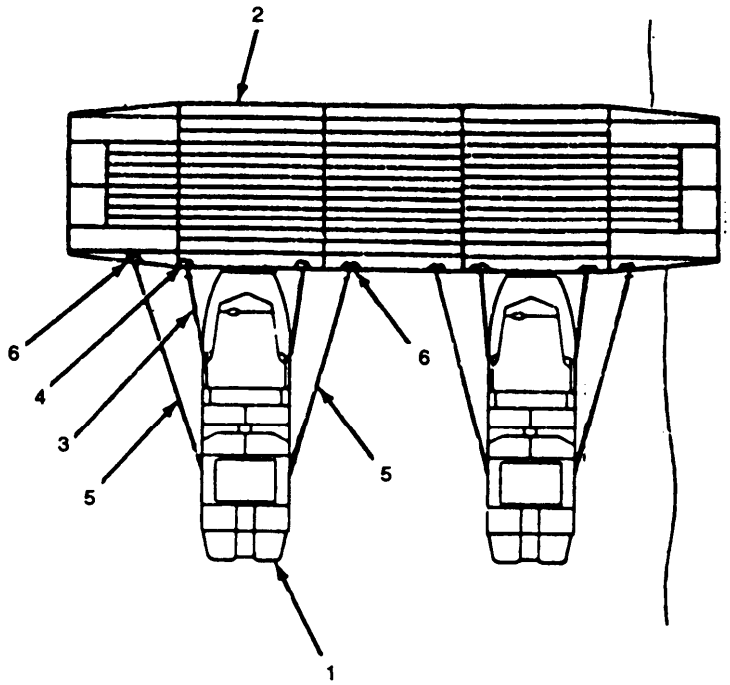



*Figure* 2-35. *Conventional Rafting Procedures (Sheet 1 of 4).*

(4) Operate raft (10) as follows:

**CAUTION**

Always position scoop control levers so that boats push raft against the shore during loading and offloading traffic.

**NOTE**

Rafts operating in a river crossing with more than one raft using same loading and unloading sites will follow a figure eight traffic pattern.

*(a)* Open hydraulic pump access cover (7) and set pump control lever(8) to TRAFFIC position, close vent valve (9) and close cover (7).

*(b)* Repeat step (a) for remaining hydraulic pump.

*(c)* Lower approach ramps (10).

*(d)* Load vehicles on raft. Refer to table 2-7 for raft loading capabilities.

*(e)* Raise approach ramps (10).

*(f)* Open shore end hydraulic pump access covers (7) and set pump control valves (8) to PUMP position open vent valves (13), pump up ramp and close covers (7).

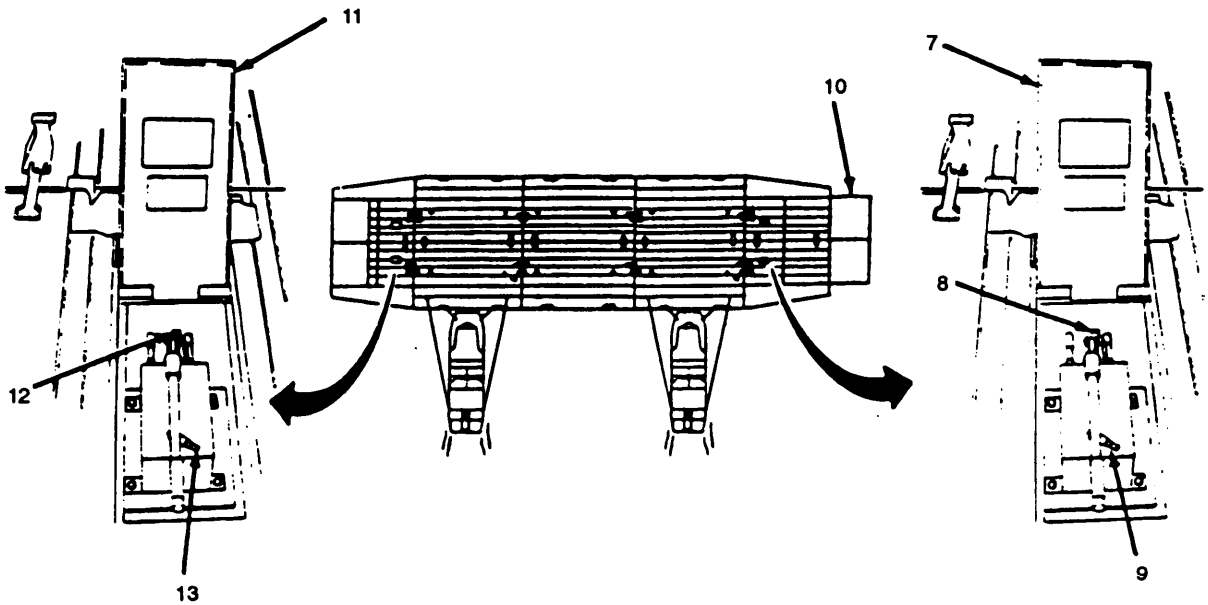



*Figure 2-35. Conventional Rafting Procedures (Sheet 2 of 4).*

(g) Cast offshore guy lines, maneuver boats in accordance with signals from raft commander and propel raft to far shore and unload.

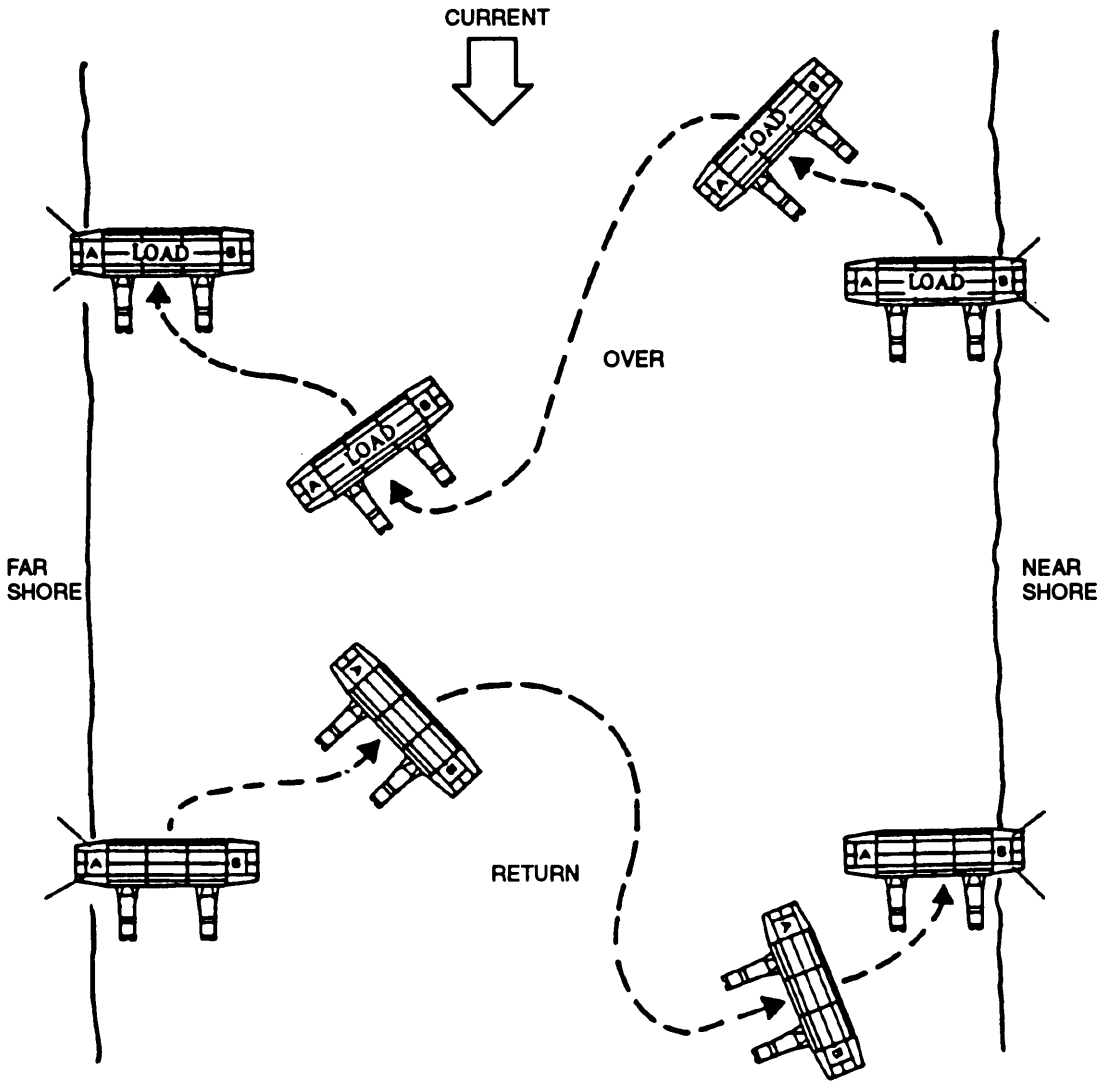



*Figure 2-35. Conventional Rafting Procedures (Sheet 3 of 4).*

*(h)* Secure raft to shore.

*(i)* Open pump access cover (11) and set pump control valve (12) to TRAFFIC position, close vent valve (13) and close cover (11).

*(j)* Repeat Step i for remaining pump.

*(k)* Lower approach ramps (14) and unload vehicles.

(1) Repeat Steps a through k, as applicable, to return to far shore.

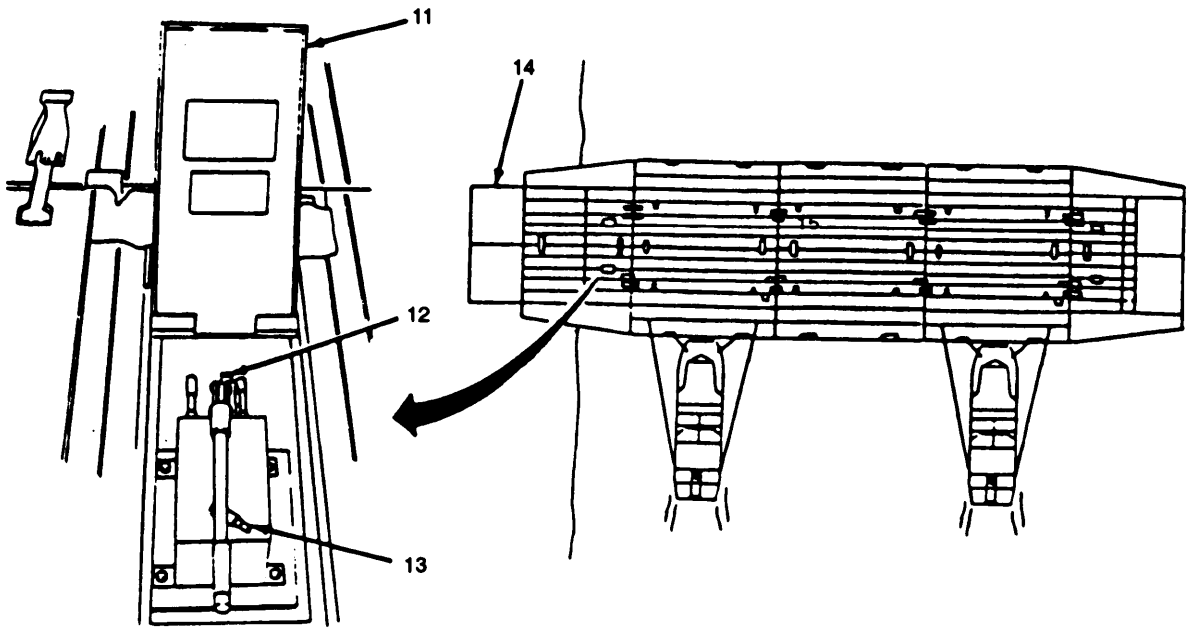



*Figure 2-35. Conventional Rafting Procedures ( Sheet 4 of 4).*

*Table 2-18. Conventional Rafting* Capacities.

| | Rating Velocity (ft/sec) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Raft Size | 0-3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 3-bay | 45 | 45 | 35 | 25 | 15 | 10 | 0 | 0 |
| 4-bay | 60 | 60 | 60 | 55 | 40 | 3 | 15 | 0 |
| 5-bay | 75 | 70 | 70 | 70 | 65 | 50 | 25 | 0 |
| 6-bay (Track) | 75 | 70 | 70 | 70 | 70 | 55 | 30 | 0 |
| 6-bay (wheel) | 96 | 96 | 96 | 70 | 96 | 55 | 30 | 0 |

Notes:

1. Table shows load (MLC) capacity based on one vehicle positioned on the raft centerline and centered on the deck. The values shown for centered on the deck. The values shown for 3-/4-/5- bay rafts apply for wheeled or tracked vehicles. The values shown shown for a 6-bay raft apply for track/wheel vehicles as shown.
2. Ratings apply only with bottom of ramp ends raised 1 foot clear of water. Ramps raised for loading must be lowered before raft is underway.
3. Raft commander must observe leading edge of raft and decrease speed or halt operations, as necessary if water coming over bow exceeds 1 inch.

## Section IV. OPERATION UNDER UNUSUAL CONDITIONS


| Paragraph | | Page |
|---|---|---|
| 2-29 | General | 2-129 |
| 2-30 | Operation of Bridge in Icy and Snowy Conditions | 2-129 |
| 2-31 | Operation of Bridge in Rainy Conditions | 2-130 |
| 2-32 | Operation of Bridge in High Wind Conditions. | 2-130 |
| 2-33 | Operation of Bridge in Hot and Dry Conditions | 2-130 |


2-29. **General.** This section contains special instructions for bridge operations in unusual conditions. The standard guidelines for bridge operation should be followed along with the following precautions for various weather conditions.

2-30. **Operation of Bridge in Icy and Snowy Conditions.** During bridge construction/operation/recovery, follow all procedures for operation during normal conditions and the following special instructions:

*a.* Remove any snow or ice from bridge equipment before it accumulates.

*b.* Continually check upstream side of bridge for ice buildup or ice flows.

*c.* Monitor river flow and adjust anchorage according.

*d*. Wear gloves when operating or handling metallic equipment.

*e*. Check fluid levels for proper levels.

2-31. **Operation of Bridge in Rainy Conditions.** Follow all procedures for operation during normal conditions and the following special instructions:

*a*. Monitor river flow frequently and adjust anchorage accordingly.

*b*. Add additional interior bays as required.

*c*. Check bilges frequently for water accumulation in pontons.

2-32. **Operation of Bridge in High Wind Conditions.** Follow all procedures for operation during normal conditions and the following special instructions:

*a*. Monitor river flow and add additional anchorage as required.

*b*. Monitor bridge centerline movement and add additional anchorage as required.

*c*. Remove large debris from upstream side of bridge.

*d*. Ensure deck roadway connections remain engaged.

2-33. **Operation of Bridge in Hot and Dry Conditions.** Follow all procedures for operation during normal conditions and the following special instructions:

a. Check fluid and coolant levels frequently for proper levels.

b. Check filter frequently for contamination.

c. Keep moving parts clean and well lubricated.

*d*. Avoid excessive handling of metallic surfaces.

*e*. Vent bilges periodically.

*f*. Remove buildup of sand or debris from working surfaces.

# CHAPTER 3

# OPERATOR'S MAINTENANCE INSTRUCTIONS

## OVERVIEW

This chapter contains operator level maintenance procedures as authorized by the Maintenance Allocation Chart (MAC) in Appendix B of this manual.


| | | Page |
|---|---|---|
| OVERVIEW | | 3-1 |
| Section I. | Lubrication Instructions | 3-1 |
| Section II. | Operator Troublesbting Procedures. | 3-1 |
| Section III. | Operator Maintenance Procedures. | 3-6 |


### Section I. LUBRICATION INSTRUCTIONS


| Paragraph | | Page |
|---|---|---|
| 3-1 | General | 3-1 |
| 3-2 | Detailed Lubrication Instructions | 3-1 |


3-1. **General.** This section contains lubrication procedures as they pertain to ribbon bridge and its components.

3-2. **Detailed Lubrication Instructions.**

*a.* Keep all lubricants in closed containers and store in a clean, dry away from external heat. Allow no dust dirt, or, other foreign material to mix with the lubricants. Keep all lubrication equipment clean ready for use.

*b.* Keep all external parts not requiring lubrication clean of lubricants. Before lubricating the equipment, wipe all lubrication points free of dirt and grease. Clean all lubrication points after lubricating to prevent accumulation of foreign matter.

*c.* Refer to LO 5-5420-209-12 and perform operator level lubrication on the ribbon bridge and is components.

### Section II. OPERATOR TROUBLESHOOTING PROCEDURES


| Paragraph | | Page |
|---|---|---|
| 3-3 | General. | 3-1 |
| 3-4 | Troubleshooting Procedures | 3-2 |


3-3. **General.** This section contains troubleshooting information for locating and correcting most of the operating troubles which may develop in the ribbon bridge system. Inspections are provided to isolate the faulty item and corrective actions are provided to eliminate the malfunctions.

3-4. **Troubleshooting Procedures.** Refer to symptom index for the troubleshooting Procedure of the observed malfunction.

a. Table 3-1 lists the common malfunctions which you may encounter during operation of the ribbon bridge and its components.

b. This manual cannot list all malfunctions that may occur, nor all test or inspections and corrective actions, notify your supervisor.

SYMPTOM INDEX


| Symptom | Page |
|---|---|
| Floodlights Inoperative | 3-2 |
| Clearance and Marker Lights Inoperative | 3-2 |
| Boom Inoperative | 3-3 |
| Boom will not Elevate with Bay Installed | 3-3 |
| Winch Develops Insufficient Power to Retrieve Bay/or Lift Bay for Bank Launch | 3-4 |
| Winch Noisy | 3-4 |
| Cable Tensioner Noisy (RBT only) | 3-4 |
| Locking Cylinder Inoperative | 3-4 |
| Hydraulic Pump Inoperative or Noisy | 3-5 |
| Ramp does not Articulate when Pump Handle is Pumped | 3-5 |


*Table 3-1. Direct Support Troubleshooting Procedures.*

| Malfunction | Test or Inspection | Corrective Action |
|---|---|---|
| 1. FLOODLIGHTS INOPERATIVE | | |
| | Step 1. Check to see if floodlight switch on hydraulic consoles in the ON position. | Position floodlight switch to ON. |
| | Step 2. Check to see if switch on floodlight is in the ON position. | Position floodlight switch to ON. |
| | Step 3. Inspect for loose or damaged leads and connectors. Secure loose connections. | Notify unit maintenance if floodlight is still inoperative. |
| 2. CLEARANCE AND MARKER LIGHTS INOPERATIVE | | |
| | Step 1. Check to see if vehicle light switch is in the proper position. | Position vehicle light switch to proper position. |

*Table 3-1. Direct Support Troubleshooting Procedures. - Continued*

| Malfunction<br>Test or Inspection<br>Corrective Action |
|---|
| 2. CLEARANCE AND MARKER LIGHTS INOPERATIVE - Continued |
| Step 2. Inspect for loose or damaged leads and connectors. |
| a. Secure loose connectors. |
| b. Notify unit maintenance if lights are still inoperative. |
| 3. BOOM INOPERATIVE |
| Step 1. Check to see if PTO is engaged. |
| Engage PTO and follow instructions on hydraulic console. |
| Step 2. Model RBT check hydraulic selector valve. |
| Set hydraulic selector to REAR HYDR position. |
| Step 3. Check that bay locking cylinder pin is retracted. |
| Remove quick release pin, operate pin control lever on hydraulic console. |
| Step 4. Check hydraulic oil level in hydraulic reservoir. |
| Add oil as specified in LO 5-5420-209-12. |
| Step 5. Check hydraulic lines and connections for leaks. |
| a. Tighten loose connections. |
| b. If leaks persist, or if boom is still inoperative, notify unit maintenance personnel. |
| 4. BOOM WILL NOT ELEVATE WITH BAY INSTALLED |
| Step 1. Check engine speed of transporter. |
| Adjust engine speed to about 1700 rpm on Model 2280, about 2000 rpm on Model RBT. |
| Step 2. Check hydraulic oil level in hydraulic reservoir. |
| Add oil as specified in LO 5-5420-209-12. |
| Step 3. Inspect hydraulic lines and connections for leaks. |
| a. Tighten loose connections. If leaks persist, notify unit maintenance personnel. |
| b. Operate boom several times to purge air from system. If boom will still not lift heavy loads notify unit maintenance personnel. |

*Table 3-1. Direct Support Troubleshooting Procedures. - Continued*

| Malfunction<br>Test or Inspection<br>Corrective Action |
|---|

5. WINCH DEVELOPS INSUFFICIENT POWER TO RETRIEVE BAY/OR LIFT BAY FOR BANK LAUNCH

Step 1. Check engine speed of transporter.

Adjust engine speed to about 1,700 rpm on Model 2280, about 2,000 rpm on Model RBT.

Step 2. Check hydraulic oil level in hydraulic resewoir.

Add oil as specified in LO 5-5420-209-12.

Step 3. Check hydraulic lines and connections for leaks.

a. Tighten loose connections.

b. If leaks persist, or winch is not performing properly, notify unit maintenance personnel.

6. WINCH NOISY

Step 1. Check for oil leakage around lube oil filler plug and lube oil drain plug.

Tighten plugs.

Step 2. Check oil level of final drive assembly.

a. Add oil as specified in LO 5-5420-209-12.

b. If noise persists, notify unit maintenance personnel.

7. CABLE TENSlONER NOISY (RBT ONLY)

Step 1. Check for oil leakage around lube oil filler plug and lube oil drain plug.

lighten plugs.

Step 2. Check oil level of tensioner drive assembly.

a. Add oil as specified in LO 5-5420-209-12.

b. If noise persists, notify unit maintenance personnel.

8. LOCKING CYLINDER INOPERATIVE

Step 1. Check that quick release pin is removed,

Remove quick release pin.

*Table 3-1. Direct Support Troubleshooting Procedures. - Continued*

| Malfunction<br>Test or Inspection<br>Corrective Action |
|---|

8. LOCKING CYLINDER INOPERATIVE - Continued

Step *2*. Check hydraulic oil level in hydraulic reservoir.

Add oil as specified in LO 5-5420-209-12.

Step *3*. Check hydraulic oil lines and connections for leakage.

a. Tighten loose connections.

b. If leaks persists, or cylinder is still inoperative, notify unit maintenance personnel.

9. HYDRAULIC PUMP INOPERATIVE OR NOISY

Step 1. Check to see if PTO is engaged.

Engage PTO and follow instructions on hydraulic console.

Step 2. Check hydraulic oil level in hydraulic reservoir.

a. Add oil as specified in LO 5-5420-209-12.

b. If noise persists or pump remains inoperative, notify unit maintenance personnel.

10. RAMP DOES NOT ARTICULATE WHEN PUMP HANDLE IS PUMPED

Step 1. Check position of pump lever.

Position lever to PUMP position and open vent valves.

Step *2*. Check hydraulic oil level in pump reservoir.

Add oil as specified in LO 5-5420-209-12.

Step *3*. Check hydraulic lines and connections for leaks.

a. Tighten loose connections.

b. If leaks persist, or pump remains inoperative, notify unit maintenance personnel.

## Section III. OPERATOR MAINTENANCE PROCEDURES


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3-5. **General.** This section contains operator level maintenance procedures as authorized by the MAC in Appendix B of this manual. Some maintenance procedures may require more than one person. Ensure adequate numberof personnel are available before performing maintenance procedure.

### 3-6. Mirrors (Right Hand and Left Hand)

This task covers: Replace

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit
(Item 1, Appendix B)

**NOTE**

The following procedures are the same for both mirrors.

*a. Replace.* (figure 3-1)

(1) Remove two nuts (1) and lockwashers (2) and remove mirror(3).

(2) Install mirror (3) and secure with two nuts (1) and lockwashers (2).

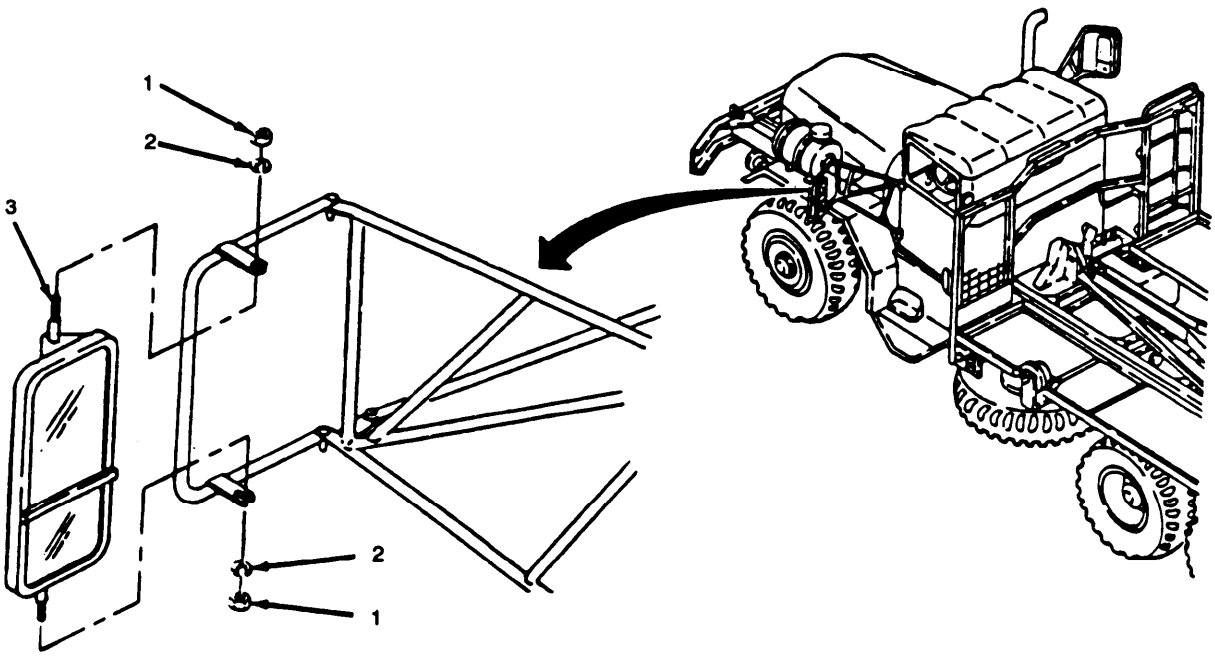



*Figure 3-1. Mirror.*

## 3-7. **Bracket Assembly Left and Right Hand.**

This task covers: Replace

INITIAL SETUP

| *Tool* | *Equipment Condition:* |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix B) | Mirror removed (para. 3-6). |

*a. Replace* (figure 3-2)

**NOTE**

Discard used lockwashers after removal.

(1) Remove nuts, lockwashers, and screws, securing brace bracket (8) and bracket (7) to cowl.

(2) Remove nut (2), lockwasher (3), screw (4), and remove mirror braces (6) from bracket (7).

(3) Install minor brace (6) by securing with screw (4), lockwasher 3), and nut (2) to bracket (7).

(4) Secure brace bracket (8) and bracket (7) to cowl with screws, lockwashers and nuts.

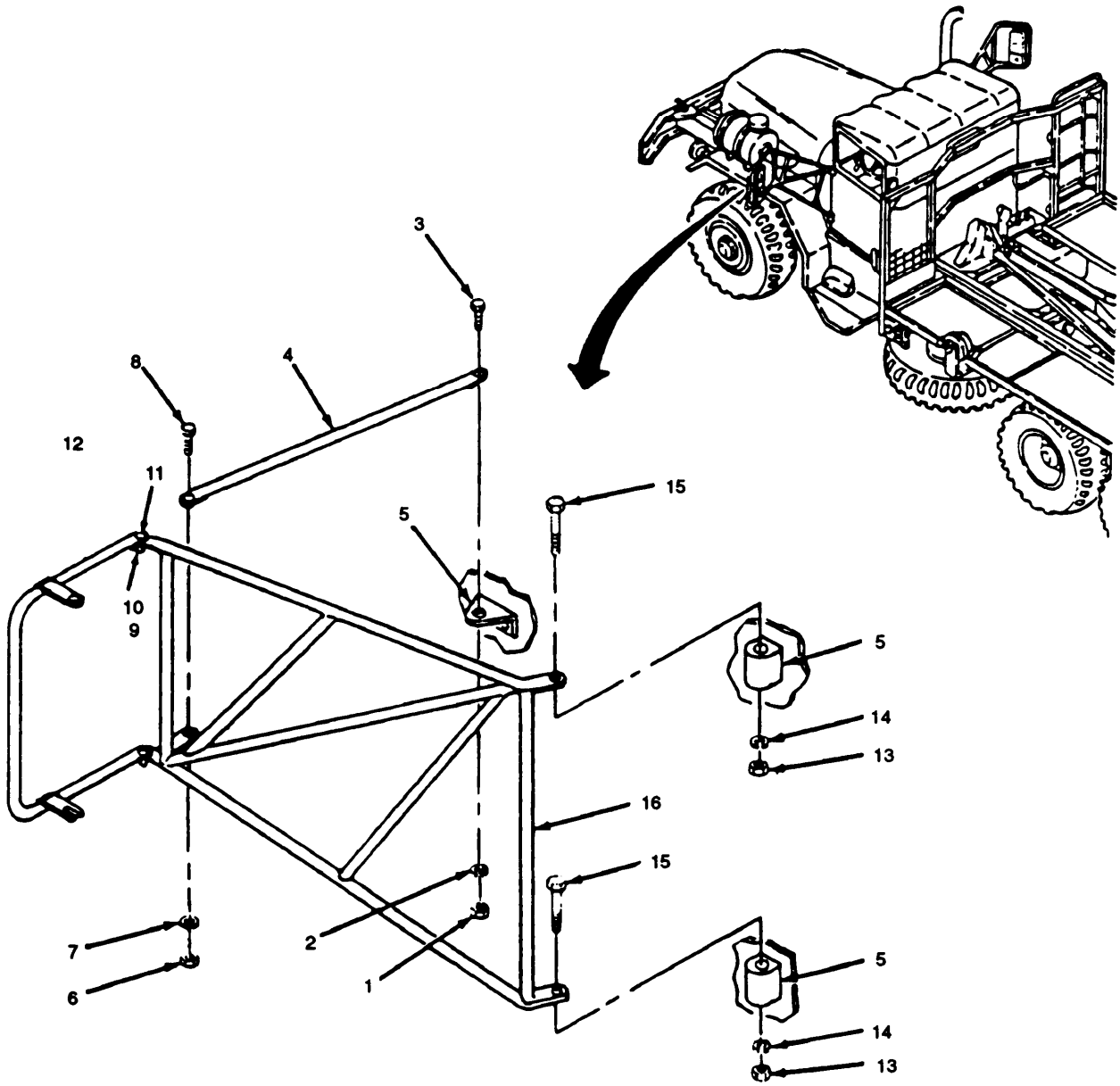



*Figure 3-2. Bracket Assembly*

FOLLOW-ON MAINTENANCE: Install mirror (para. 3-6).

## 3-8. **Wheel Splash Guards Right and Left Hand.**

This task covers: Replace

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit
(Item 1, Appendix B)

*a. Replace.* (figure 3-3)

(1) Remove eight nuts (1), lockwashers (2), screws (3), and remove stiffener (4), wheel splash guard (5).

(2) Install splash guard (5) and stiffener (4) with eight screws (3), lockwashers (2), and nuts (1).

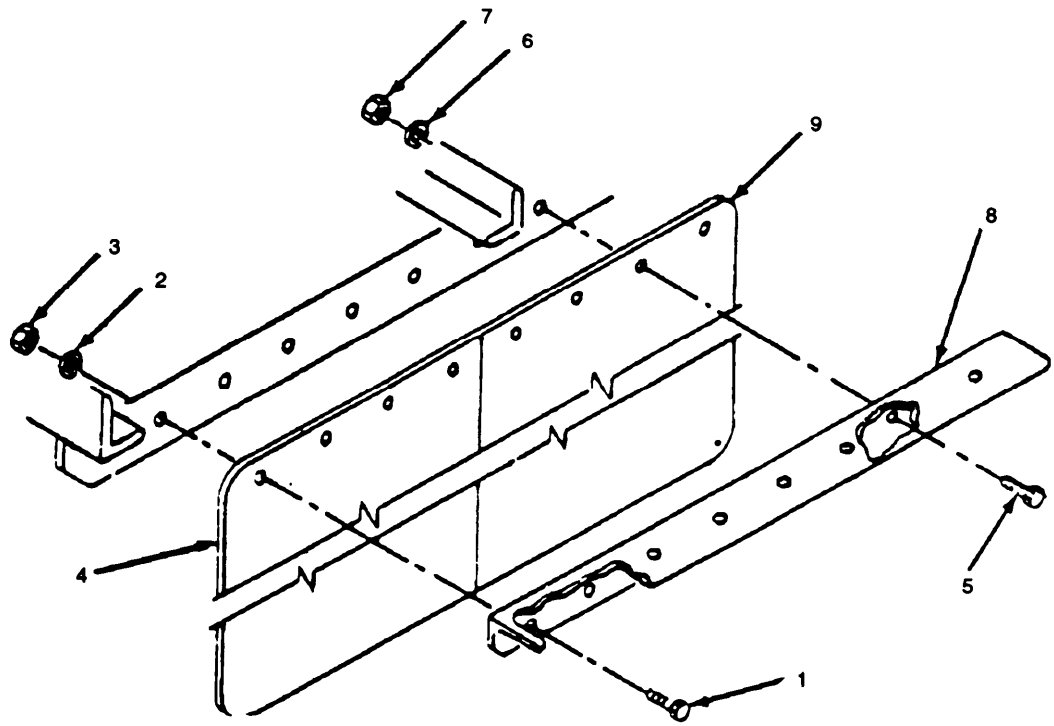



*Figure* 3-3. *Wheel Splash Guards.*

3-9. **Bay Latch Pin and Rope Assembly.**

This task covers: Replace

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit
(Item 1, Appendix B)

*a. Replace* (figure 3-4)

(1) Open storage compartment door (1).

(2) Remove bay latch pin and rope assembly (2), from storage compartment (3).

(3) Install bay latch pin and rope assembly (2) and close storage compartment door (1).

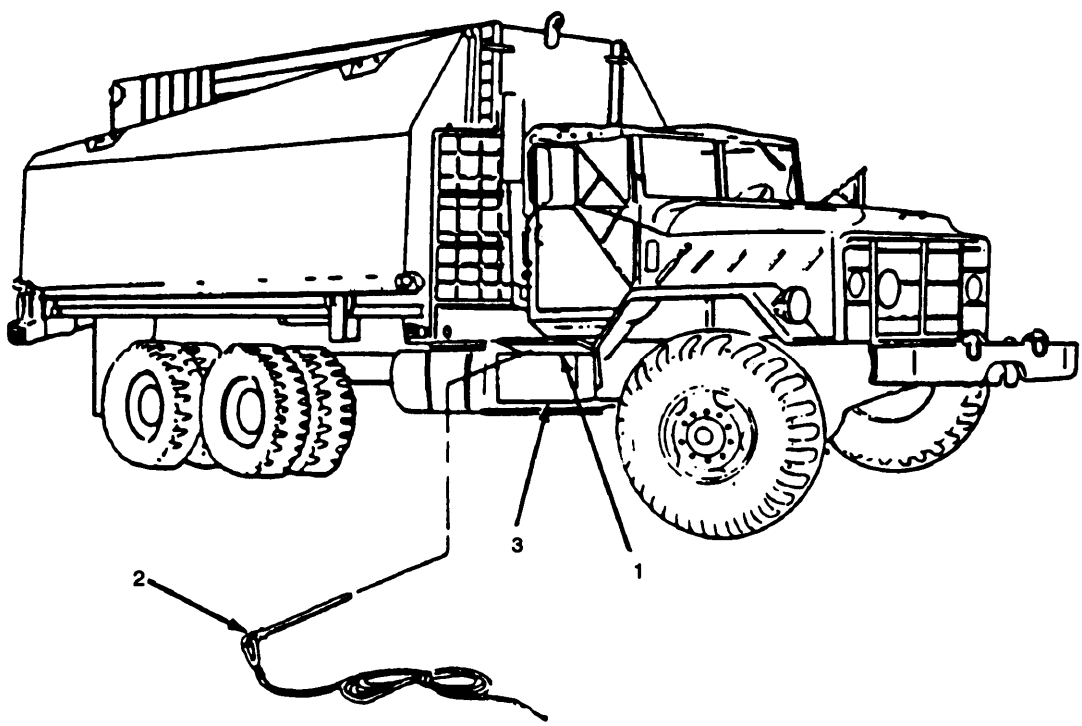



*Figure 3-4. Bay Latch Pin and Rope Assembly*

## 3-10. **Roller and Axle Assembly.**

This task covers: Service

INITIAL SETUP

*Tools*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)
Grease Gun

*Equipment Condition:*

*Bay* removed (para. 2-16).

*a. Service.* (figure 3-5)

(1) Install grease gun on lubefining (1).

(2) Deliver grease until clean grease flows from area between roller (2) and axle (3).

(3) Wipe away excess grease.

(4) Repeat Steps (1) through (3) for remaining rollers.

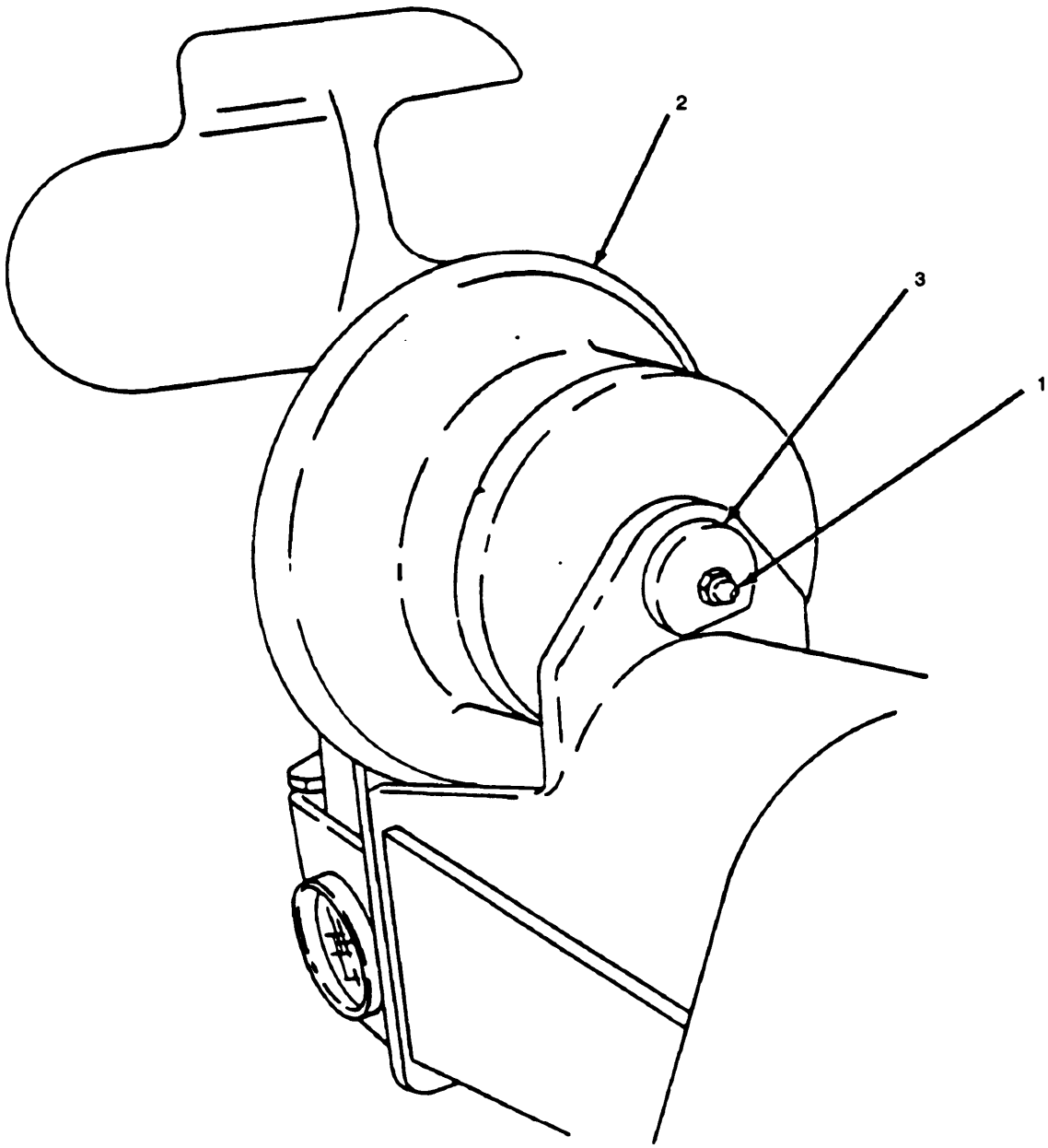



*Figure* 3-5. *Roller and Axle Assembly*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

3-11. **Rear Winch Assembly and Motor.**

This task covers: a. Service (Model 11-S-EL) b. Service (Model P6115-043R)

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Materials/Parts*

Oil, Lubricating OE/HDO 10 (Item 8, Appendix E)
Rags, Wiping (Item 12, Appendix E)

*Equipment Condition:*

Bay removed (para. 2-16).

*a. Service (Model 11-S-EL).* (figure 3-6)

**WARNING**

When working under boom, support boom by blocking or other suitable means.

(1) Raise boom (1) to vertical position and block in place.

(2) Remove fill plug (2) and check fluid level. Fluid level should be up to bottom of fill hole. Add fluid as needed.

(3) Install fill plug (2).

*(4)* Removal blocking and lower boom (1).

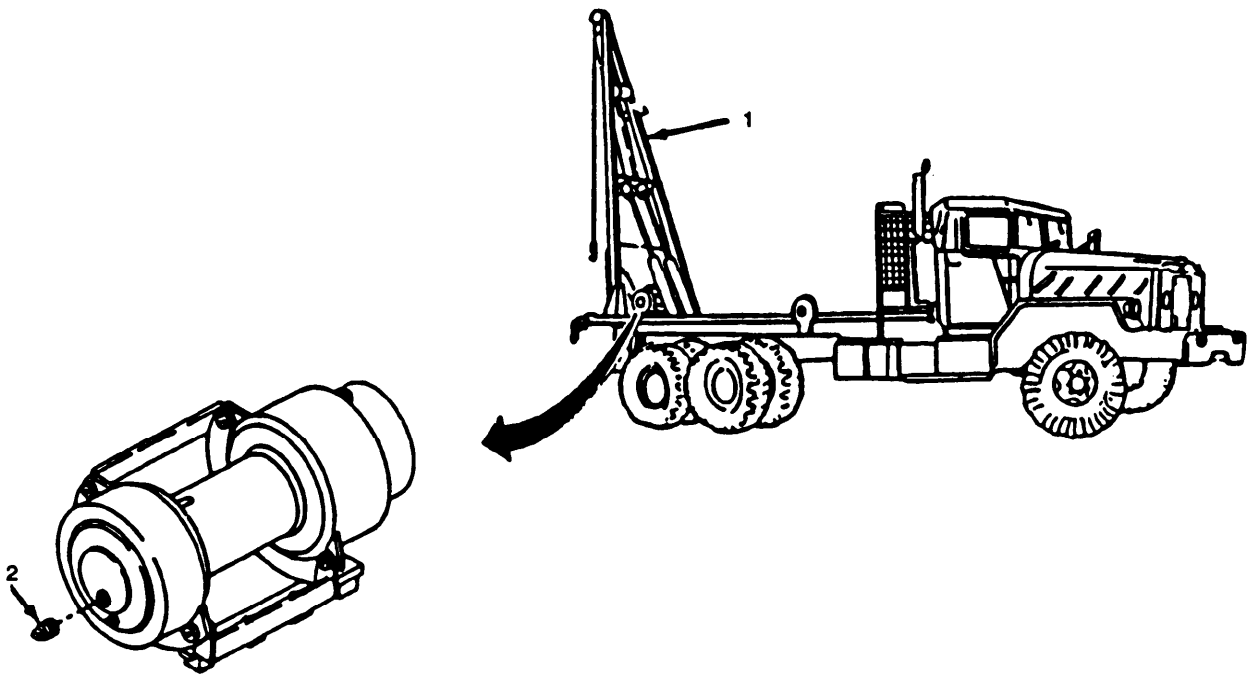



*Figure 3-6. Rear Winch Assembly and Motor Model 11-S-EL.*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

3-11. **Rear Winch Assembly and Motor. - Continued**

*b.* *Service (Model PG 115-043R* (figure 3-7)

**WARNING**

When working under boom, support boom by blocking or other suitable means.

(1) Raise boom (1) to vertical position.

**WARNING**

Always wear leather gloves when handling winch cable. Never allow cable to run through hands.

**CAUTION**

Failure to maintain tension on cable while winch drum is turning will cause cable to become snarled on winch drum.

(2) Pay out winch cable (1) until fill plug (2) is exposed on winch drum (3) and pointed at front of transporter.

(3) Remove fill plug (2) and check hydraulic fluid level. Level should be to bottom of fill hole. Add hydraulic fluid as needed.

(4) Install fill plug (2), play in cable (1) making sure it winds properly around winch drum (3).

(5) Remove blocking and lower and secure boom (1).

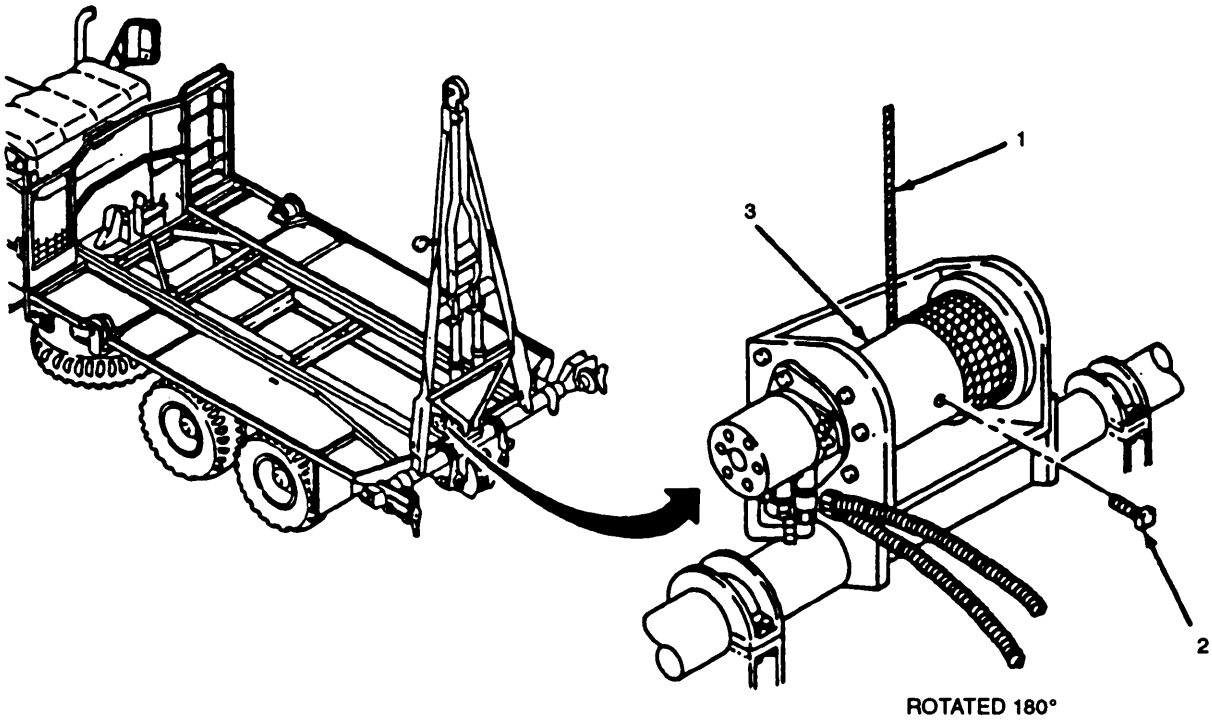



*Figure* 3-7. *Rear Winch Assemnbly and Motor PG 115-043R.*

FOLLOW-ON MAINTENANCE: Install bay (pa. *2-27).*

## 3-12. **Rear Winch Cable Assembly.**

This task covers: Service

INITIAL SETUP

*Tools*

*Equipment Condition:*

Bay removed (para. 2-16).

*Materials/Parts*

Exposed Wire Lubricant (Item 5, Appendix E)
Solvent, Dry Cleaning (Item 18, Appendix E)

*a. Service.* (figure 3-8)

**WARNING**

Always wear leather gloves when handling winch cable. Never allow cable to run through hands.

**CAUTION**

Failure to maintain tension on cable while winch drum is turning will cause cable to become snarled on winch drum.

(1) Payout Cable (1) fully.

**WARNING**

Dry cleaning solvent, PD-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100-138 °F (39-59 °C).

(2) Clean Cable (1) with dry cleaning solvent, and dry thoroughly.

(3) Inspect cable (1) and notify supervisor if there are broken strands, kinks, fraying or pinched areas.

(4) Coat cable (1) and drum (2) with exposed wire lubricant.

(5) Pay in cable (1) and ensure cable winds properly around winch drum (2).

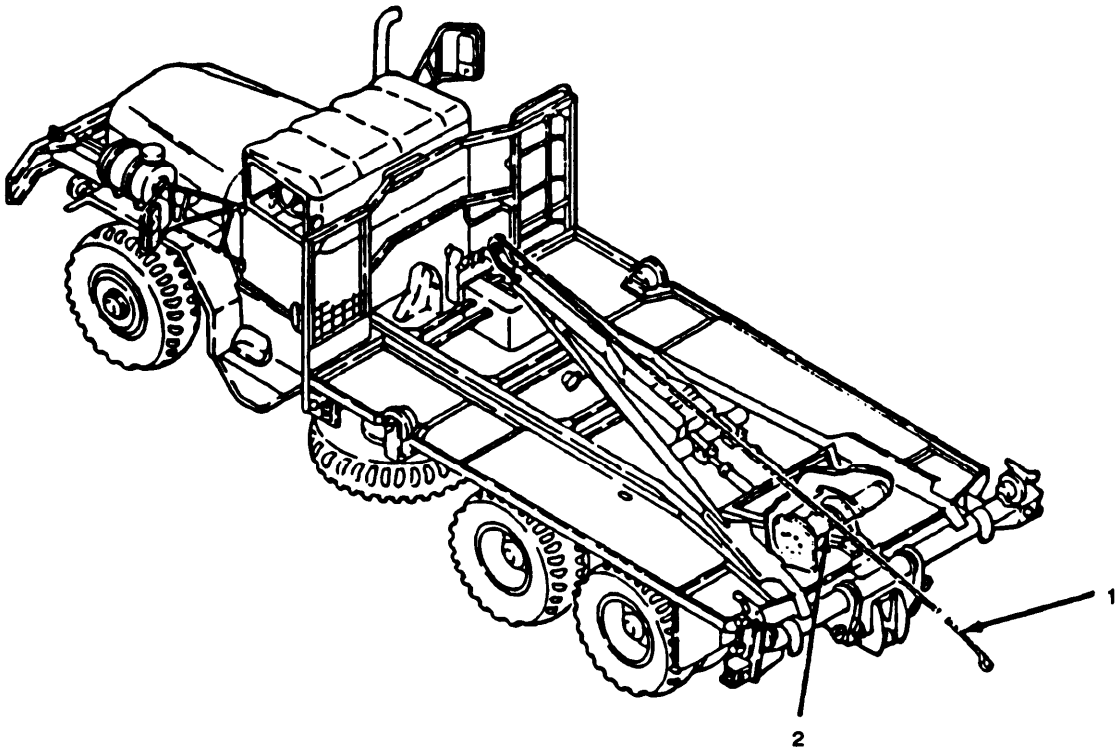



*Figure 3-8. Winch Cable.*

FOLLOW-ON MAINTENANCE: Load bay (para. *2-27).*

## 3-13. **Cable Tensioner Assembly.**

This task covers: Service

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Materials/Parts*

Oil, Lubricating OE/HDO 10 (Item 8, Appendix E)
Rags, Wiping (Item 12, Appendix E)

*Equipment Condition:*

Bay removed (para. 2-16).

*a. Service.* (figure 3-9)

**WARNING**

When working under boom, support boom by blocking or other suitable means.

(1) Raise boom (1) to vertical position and block in place.

(2) Remove fill plug (2) and check hydraulic fluid level. Level should be up to bottom of fill hole. Add hydraulic fluid as needed.

(3) Install fill plug (2). Remove blocking and lower and secure boom (1).

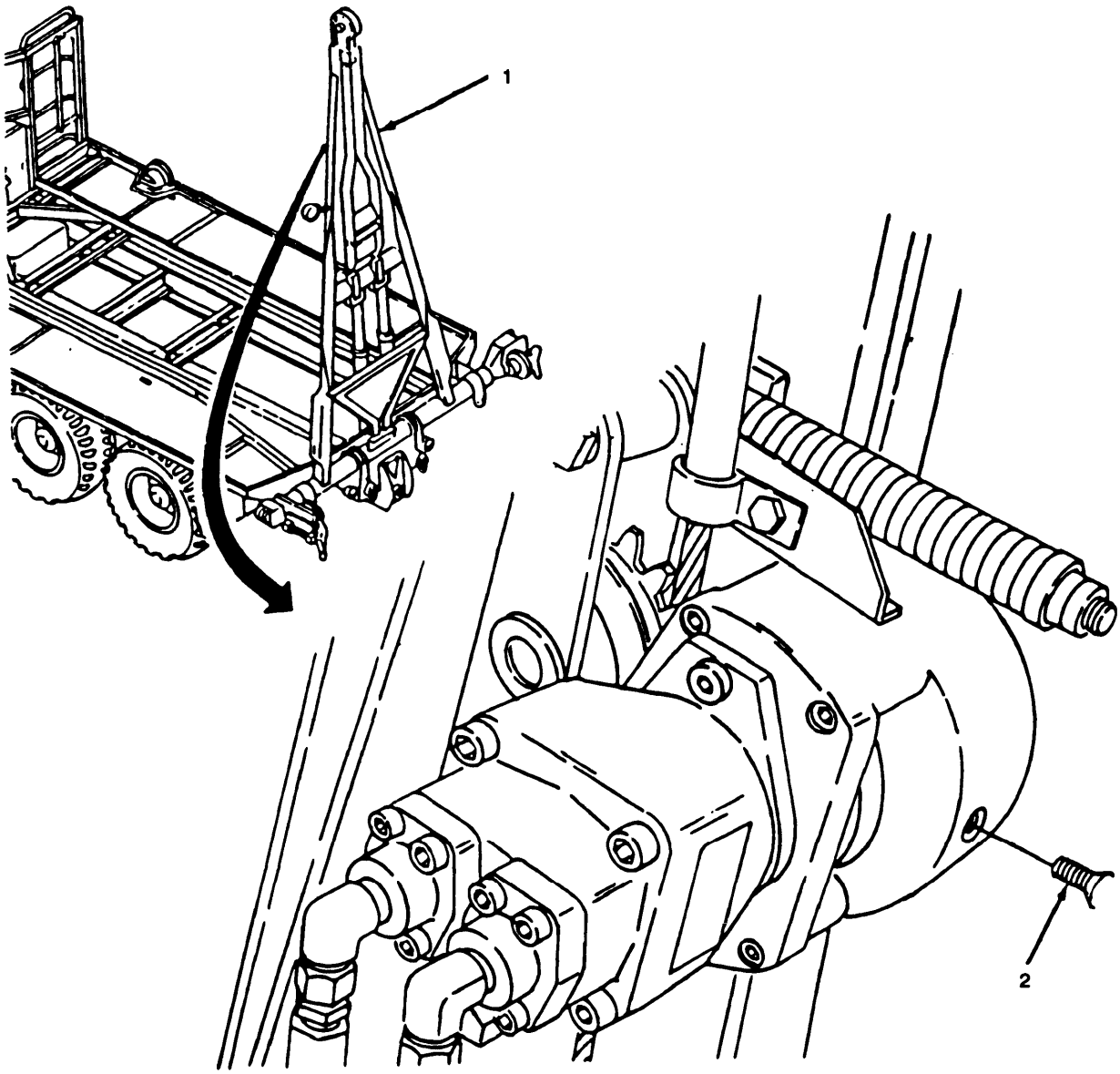



*Figure* 3-9. *Cable Tensioner Assembly*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

3-14. **Boom Assembly.**

This task covers: Service

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)
Grease Gun

*Materials/Parts*

Rags, Wiping (Item 12, Appendix E)
Grease, Automotive and Artillery (Item 2, Appendix E)

*Equipment Condition:*

Bay removed (para. 2-16).

*a. Service.* (figure 3-10)

(1) Install grease gun on lubefitting (1) and install grease until clean grease appears between boom (2) and support (3), and remove excess grease.

(2) Repeat step (1) for remaining lube fittings.

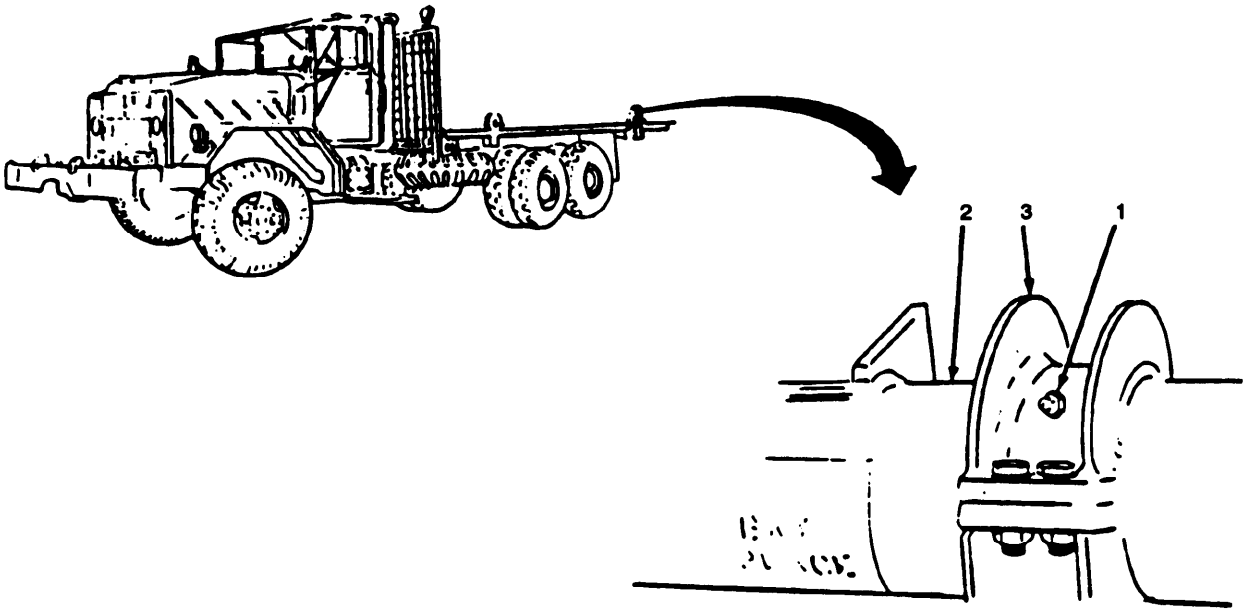



*Figure 3-10. Boom Assembly*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

3-15. **Sheave and Pin.**

This task covers: Service

INITIAL SETUP

*Tools*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)
Grease Gun

*Equipment Condition:*

Bay removed (para. 2-16).

*Materials/Parts*

Rags, Wiping (Item 12, Appendix E)
Grease, Automotive and Artillery (Item 2, Appendix E)

a. *Service.* (figure 3-11)

(1) Install grease gun on lubefitting (1) and inject grease until clean grease appears between sheave (2) and pin (3).

(2) Clean off excess grease.

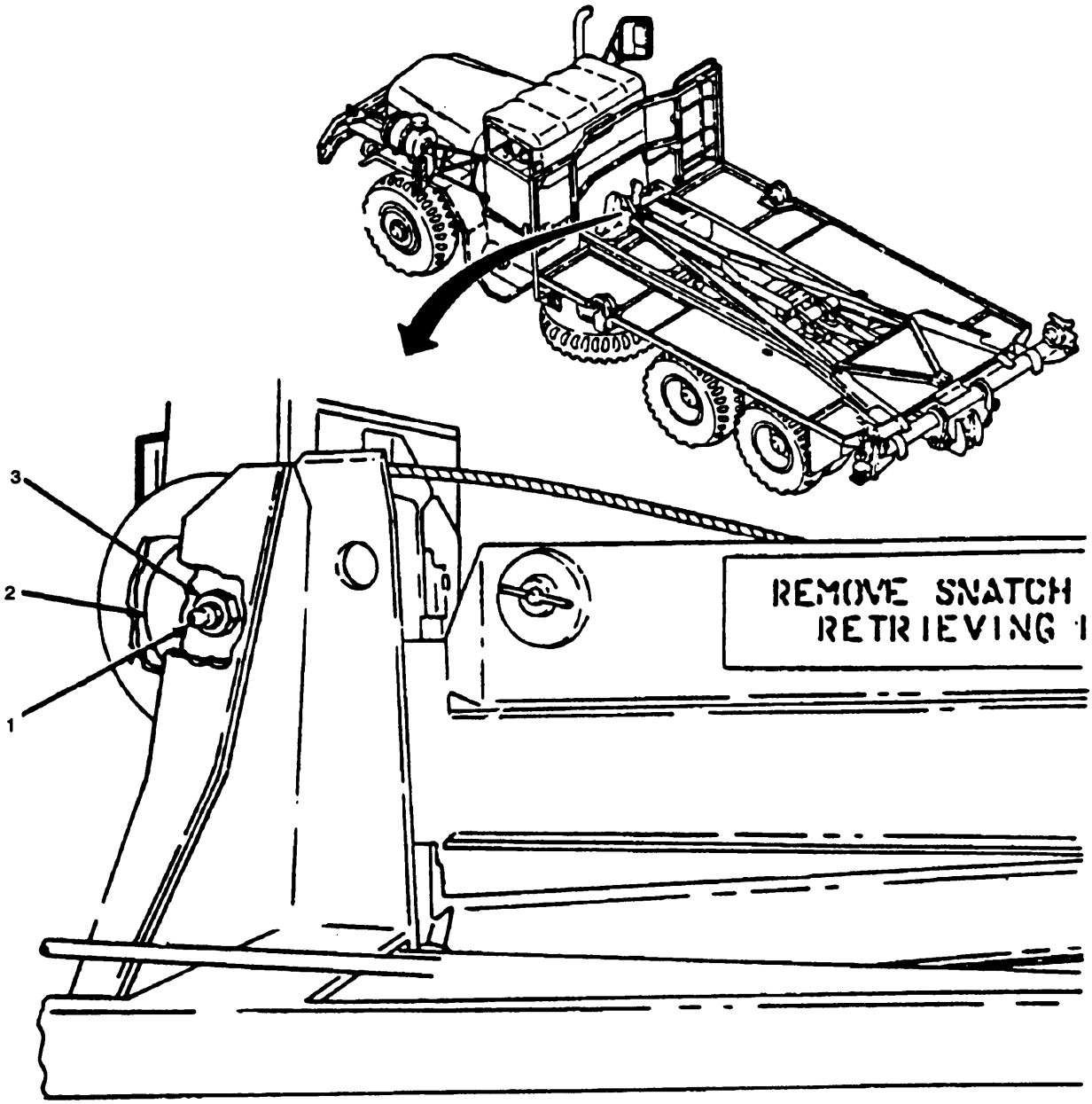



*Figure* 3-11. *Sheave and Pin.*

FOLLOW-ON MAINTENANCE: Install bay (para. 2–27).

## 3-16. **Snatch Block Anchor and Pin.**

This task covers: Service

INITIAL SETUP

*Tools*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)
Grease Gun

*Materials/Parts*

Rags, Wiping (Item 12, Appendix E)
Grease, Automotive and Artillery (Item 2, Appendix E)

*Equipment Condition:*

Bay removed (para. 2-16).

*a. Service.* (figure 3-12)

(1) Remove quick release pin (1) and anchor (2).

(2) Apply grease to quick release pin (1) and anchor (2).

(3) Wipe off excess grease.

(4) install anchor(2) and quick release pin (1).

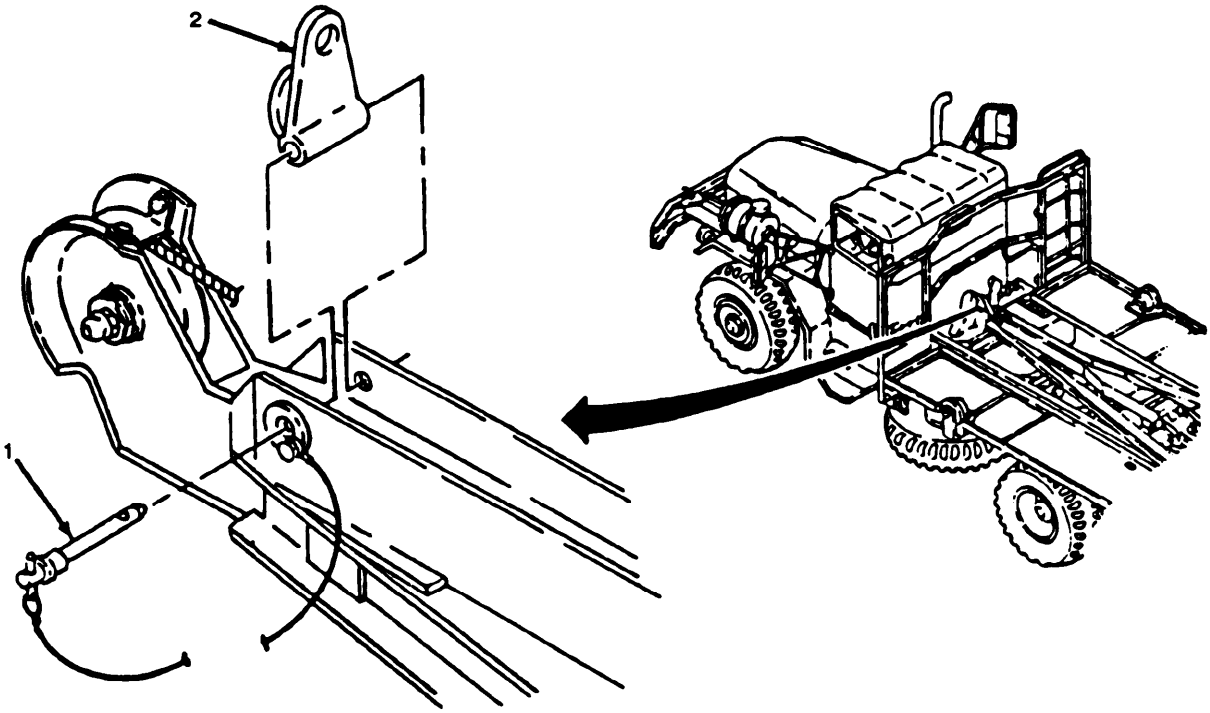



*Figure 3-12. Snatch Block Anchor.*

FOLLOW-ON MAINTENANCE: Install bay (para. *2–27).*

3-17. **Rollers and Pins.**

This task covers: a. Service (Bay Roller) b. Service (Winch Cable Roller)

INITIAL SETUP

*Tools*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Materials/Parts*

Rags, Wiping (Item 12, Appendix E)
Grease, Automotive and Artillery (Item 2, Appendix E)

*Equipment Condition:*

Bay removed (para. 2-16).

*a. Service Bay Power*(figure 3-13)

(1) Install grease gun on lube fitting (1) and inject grease until clean grease appears between bay roller (2) and pin (3).

(2) Remove excess grease.

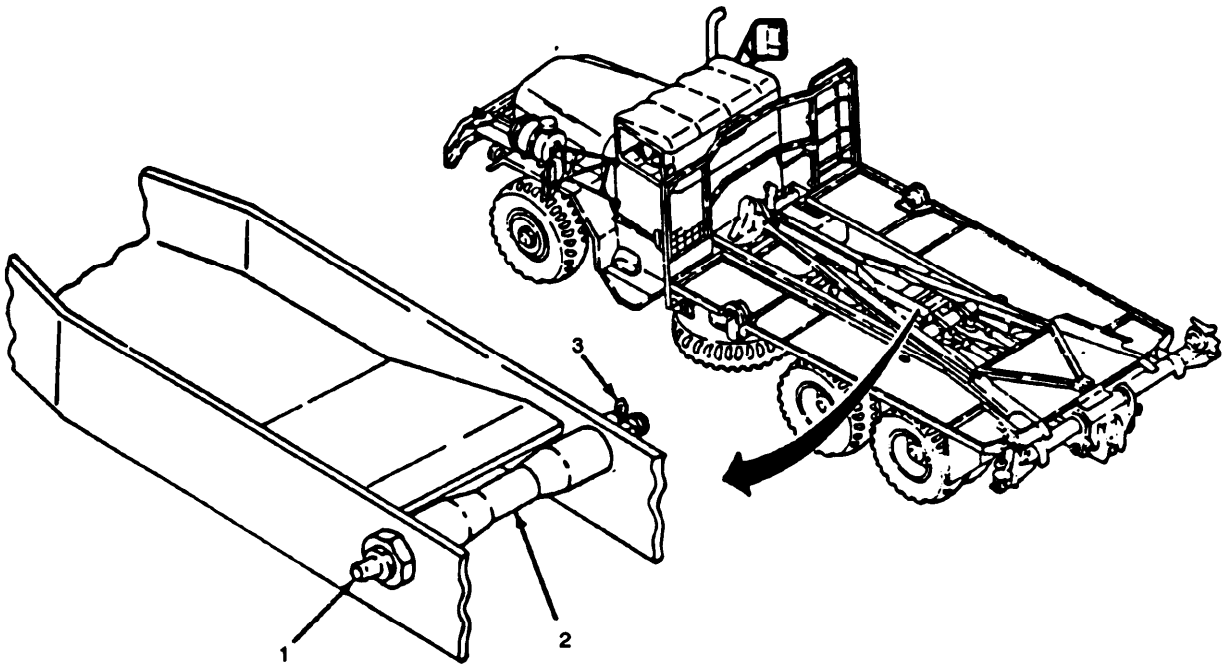



*Figure* 3-13. Bay *Roller and Pin.*

FOLLOW-ON MAINTENANCE: Install bay (para 2-27).

3-17. **Rollers and Pins. - Continued**

*b. Service Winch Cable Roller.* (figure 3-14)

(1) Remove cotter pin (1), washer(2), and remove pin(3), and roller(4).

(2) Apply grease to pin (3) and roller(4).

(3) Install roller (4) and pin (3) and secure with washer(2) and cotter pin (1).

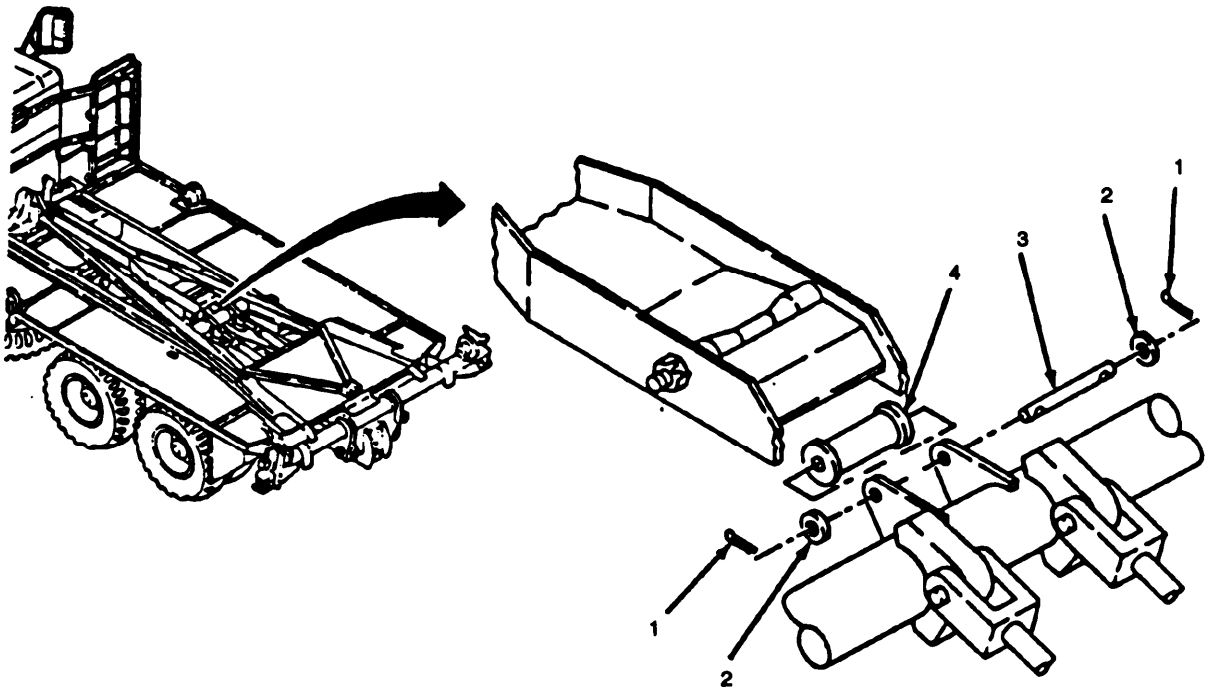



*Figure 3-14. Winch Cable Roller Pin, Service.*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

## 3-18. **Aft Tiedown Hook.**

This task covers: Service

INITIAL SETUP

| *Tool* | *Materials/Parts* |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix B) | Oil, Lubricating (Item 8, Appendix E)<br>Grease, Automotive and Artillery (Item 2, Appendix E) |

*a. Service.*. (figure 3-15)

(1) Loosen nut (1) and release tiedown hook (2).

(2) Install crow bar (3) in tiedown hook (2) and move tiedown hook (2) to launch position and install quick release pin (4) in rod (5), and remove crow bar (3).

(3) Apply grease to rod (5).

(4) Install crow bar (3) in tiedown hook (2), remove quick release pin (4) move tiedown hook (2) to vertical position and install quick release pin (4) in holder (6), and remove crow bar (3).

(5) Lubricate rod spring and all pivot points with lubrication oil.

(6) Apply grease to quick release pin.

(7) Wipe off excess grease and oil.

(8) Tighten nut(1) and secure tiedown hook (2).

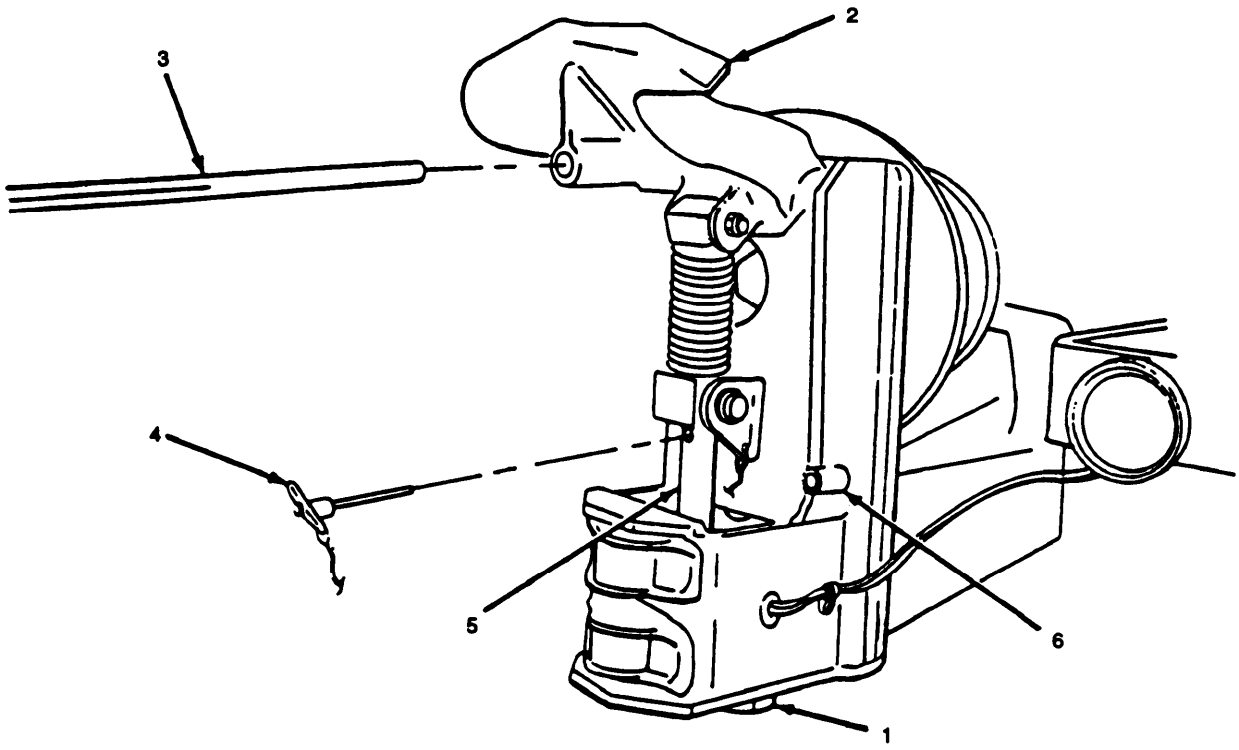



*Figure 3-15. Aft Tiedown Hook, Service.*

3-19. **Pins and Clevis.**

This task covers: Service

INITIAL SETUP

*Tools*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)
Grease Gun

*Materials/Parts*

Rags, Wiping (Item 12, Appendix E)
Grease, Automotive and Artillery (Item 2, Appendix E)

*Equipment Condition:*

*Bay* removed (para. 2-16).

*a. Service.* (figure 3-16)

(1) Install grease gun on lubefitting (1) and inject grease until clean grease appears between pin (2) and clevis (3).

(2) Clean off excess grease.

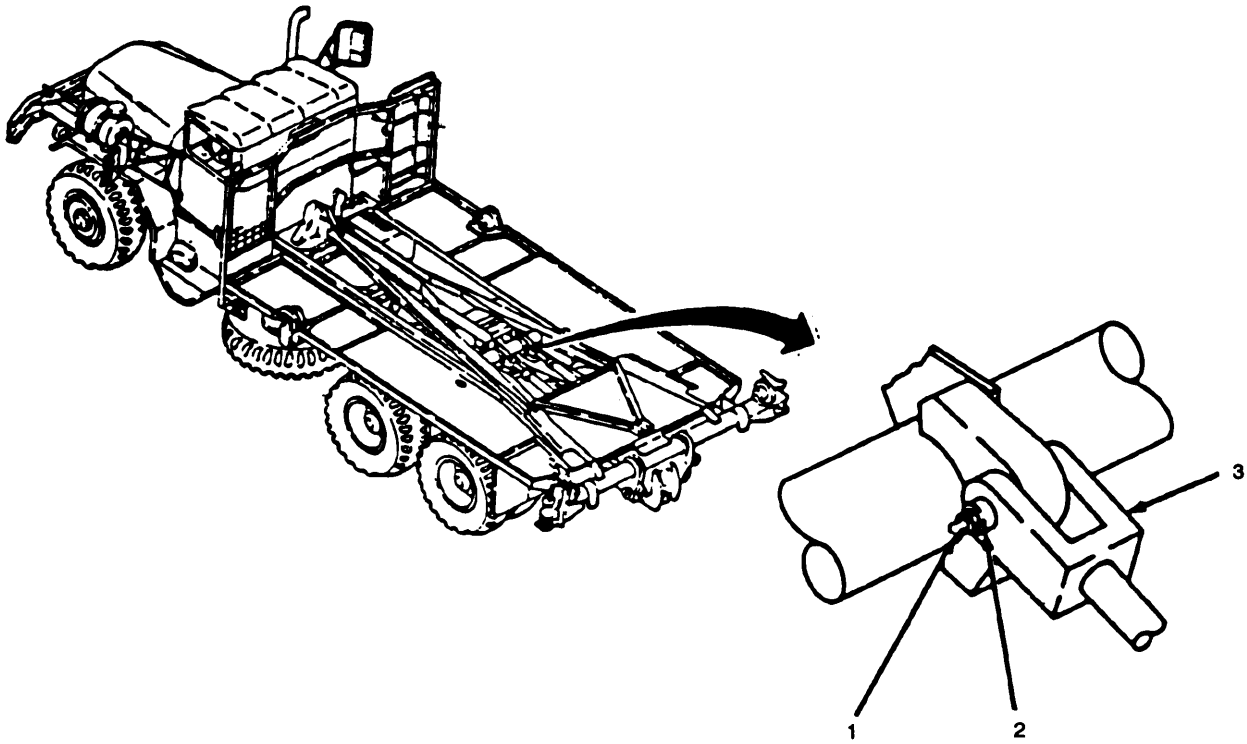



*Figure 3-16. Pins and Clevis, Service.*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

3-20. **Pin and Arm.**

This task covers: Service

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Equipment Condition:*

Bay removed (para. 2-16).

*Materials/Parts*

Grease, Automotive and Artillery (Item 2, Appendix E)
Oil, Lubricating (Item 8, Appendix E)
Rags, Wiping (Item 12, Appendix E)

*a. Service.* (figure 3-17)

(1) Remove quick release pin (1).

(2) Apply grease to pin (2) and store in holder (2).

(3) Retract (PIN OUT) cylinder pin.

(4) Apply grease to locking cylinder pin (3).

(5) Lubricate all pivot points with lubricating oil.

(6) Wipe off excess oil and grease.

(7) Engage (PIN-IN) cylinder pin.

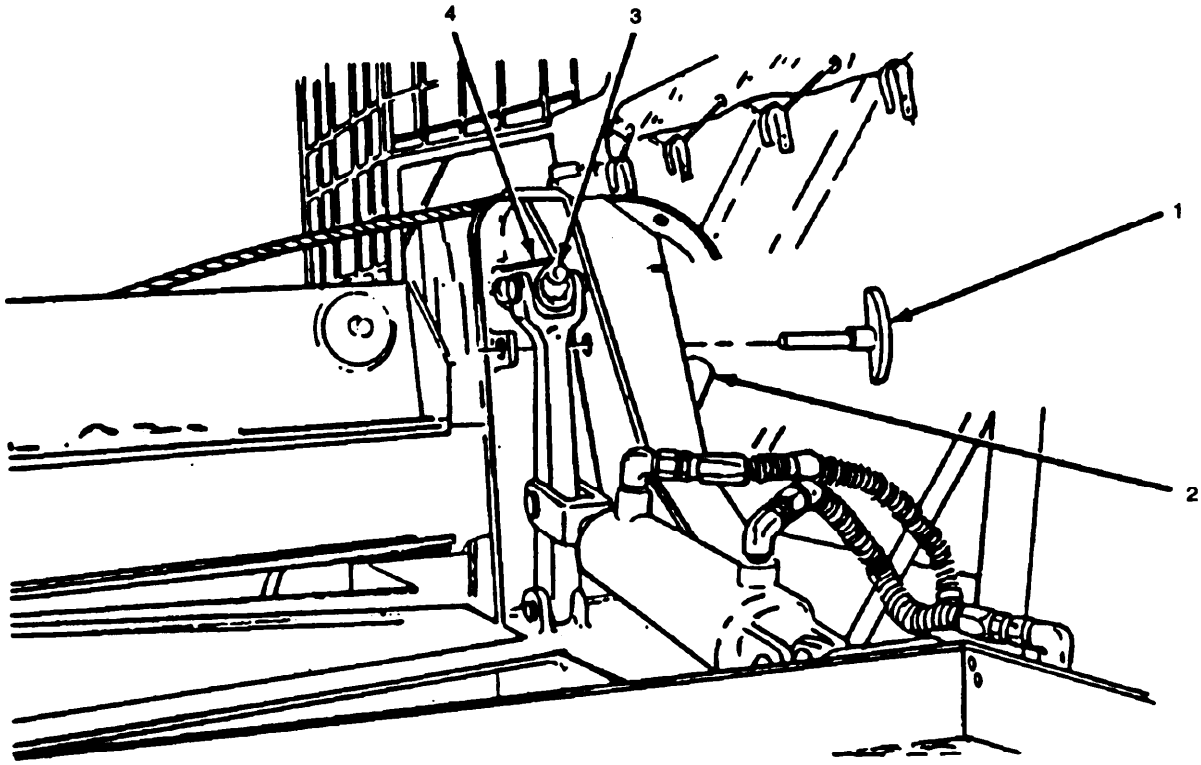



*Figure* 3-17. *Pins and Arm, Service.*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

3-21. **Hydraulic Filter Assembly.**

This task covers: Service

INITIAL SETUP

| *Tool* | *Materials/Parts* |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix B) | Packing, Preformed (P/N 576366-7)<br>Hydraulic Filter Element (P/N 576366-5110)<br>Solvent, Dry Cleaning (Item 18, Appendix E)<br>Rags, Wiping (Item 12, Appendix E) |

*a. Service.* (figure 3-18)

(1) Remove plug (1) and drain hydraulic fluid into suitable container.

(2) Remove four screws (2), washers (3), and remove lower housing (4), element (5), seal (6), and packing (7).

(3) Remove element (5) from lower housing (4).

**WARNING**

Dry cleaning solvent PD-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100-138°F (38-60 °C).

(4) Discard seal (6) and packing (7).

(5) Clean lower housing (4) with dry cleaning solvent and air dry thoroughly.

(6) Install packing (7), seal (6), and element (5) in lower housing (4).

(7) Install lower housing (4) and secure with four washers (3) and screws (2).

(8) Install plug (1) and tighten to snug plus one quarter turn.

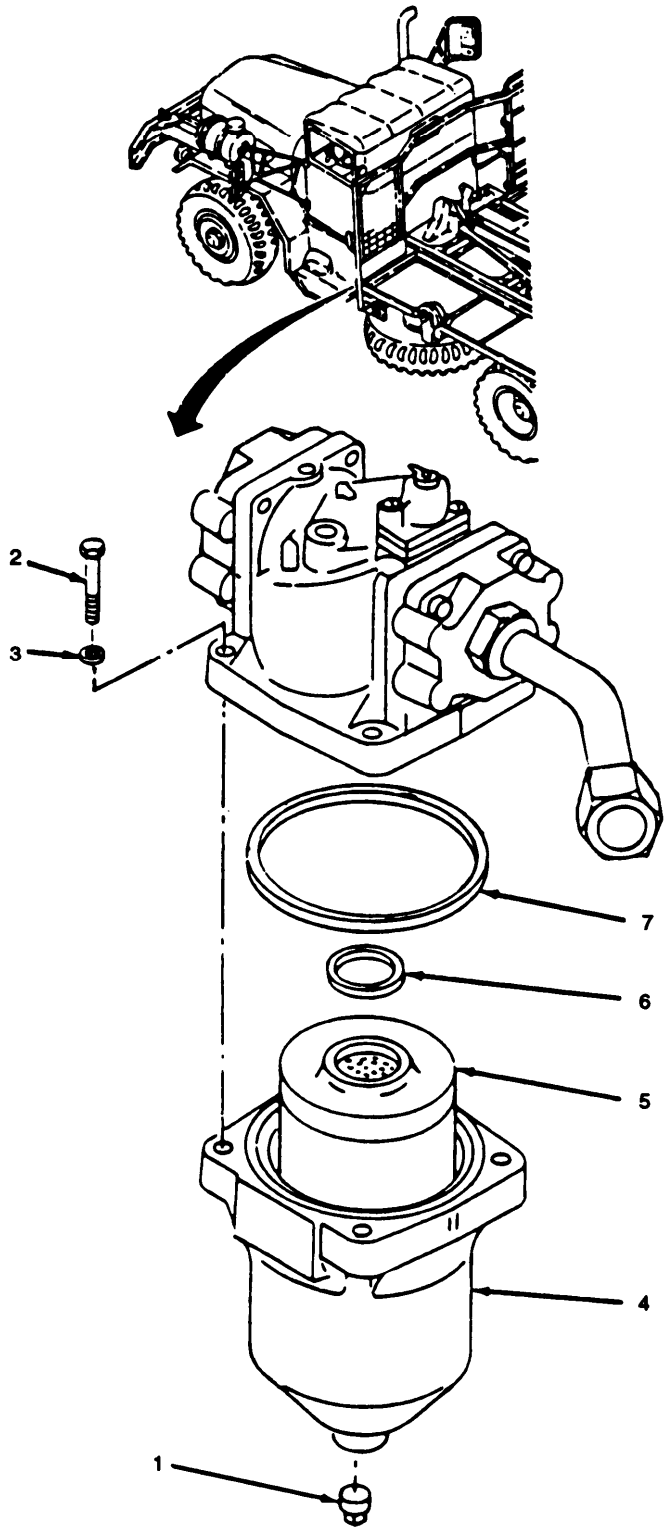



*Figure* 3-18. *Hydraulic Filter Assembly Service.*

3-22. **Drive Shaft Gear Pump.**

This task covers: Service

INITIAL SETUP

| *Tool* | *Materials/Parts* |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix B) | Grease, Automotive and Artillery (Item 2, Appendix E)<br>Rags, Wiping (Item 12, Appendix E) |

*a. Service.* (figure 3-19)

(1) Apply grease to lube fitting (1) until clean grease appears between yoke (2) and shaft (3).

(2) Wipe off excess grease.

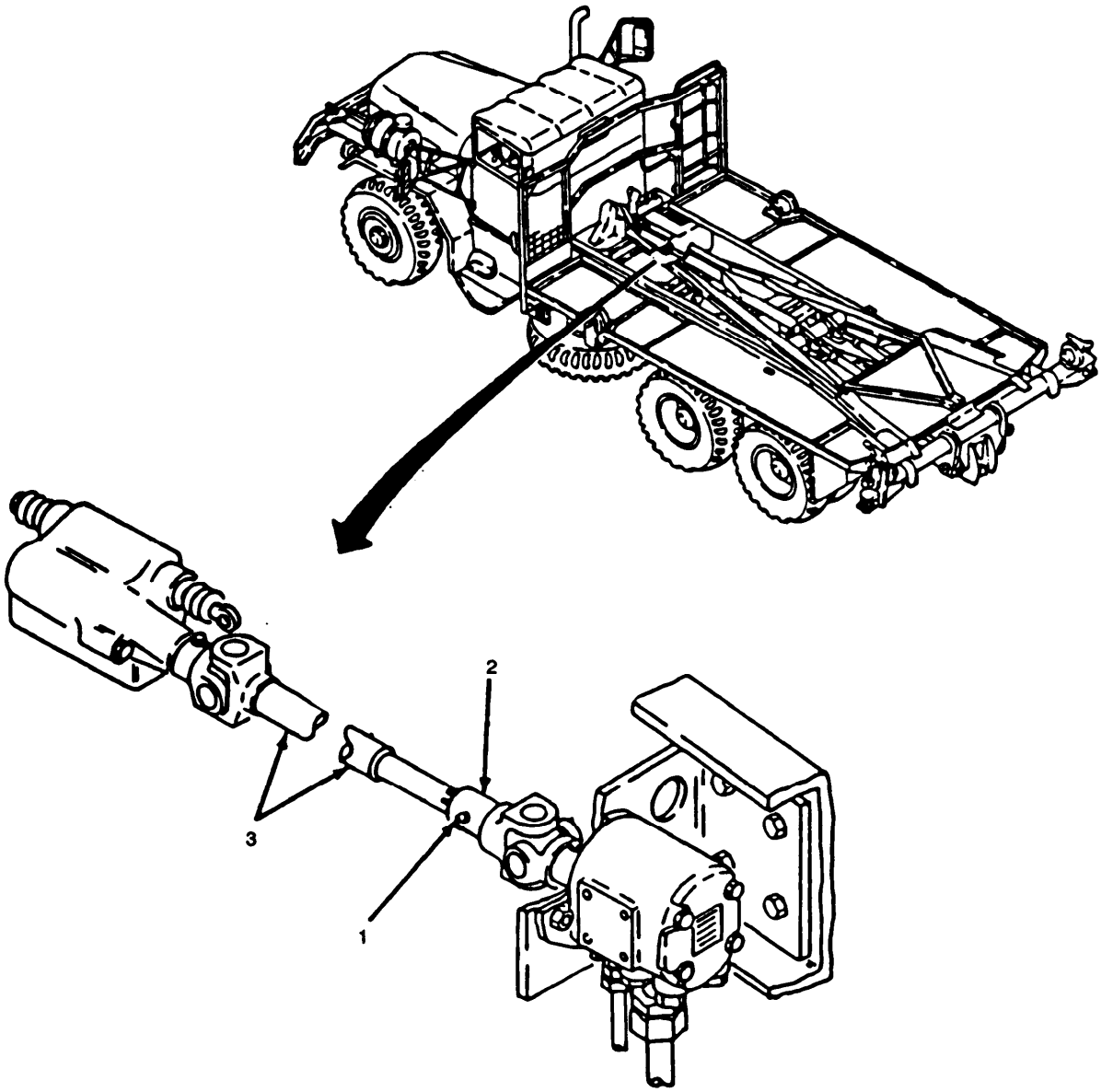



Figure 3-19. *Drive Shaft Gear Pump, Service.*

## 3-23. **Cable Assembly, Ramp Bay.**

This task covers: Service

INITIAL SETUP

*Materials/Parts*

Oil, Lubricating (Item 8, Appendix E)
Solvent, Dry Cleaning (Item 18, Appendix E)
Rags, Wiping (Item 12, Appendix B)
Lubricant, Exposed Wire (Item 6, Appendix E)

*a. Service.* (figure 3-20)

**WARNING**

Dry cleaning solvent PD-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100-138 °F (38-60 °C).

(1) Clean cable assembly (1) with dry cleaning solvent, and dry thoroughly.

(2) Lubricate cable assembly (1) with oil, and remove excess.

(3) Coat cable assembly (1) with exposed wire lubricant, and remove excess.

(4) Repeat Steps (1) through (3) for cable assembly (2).

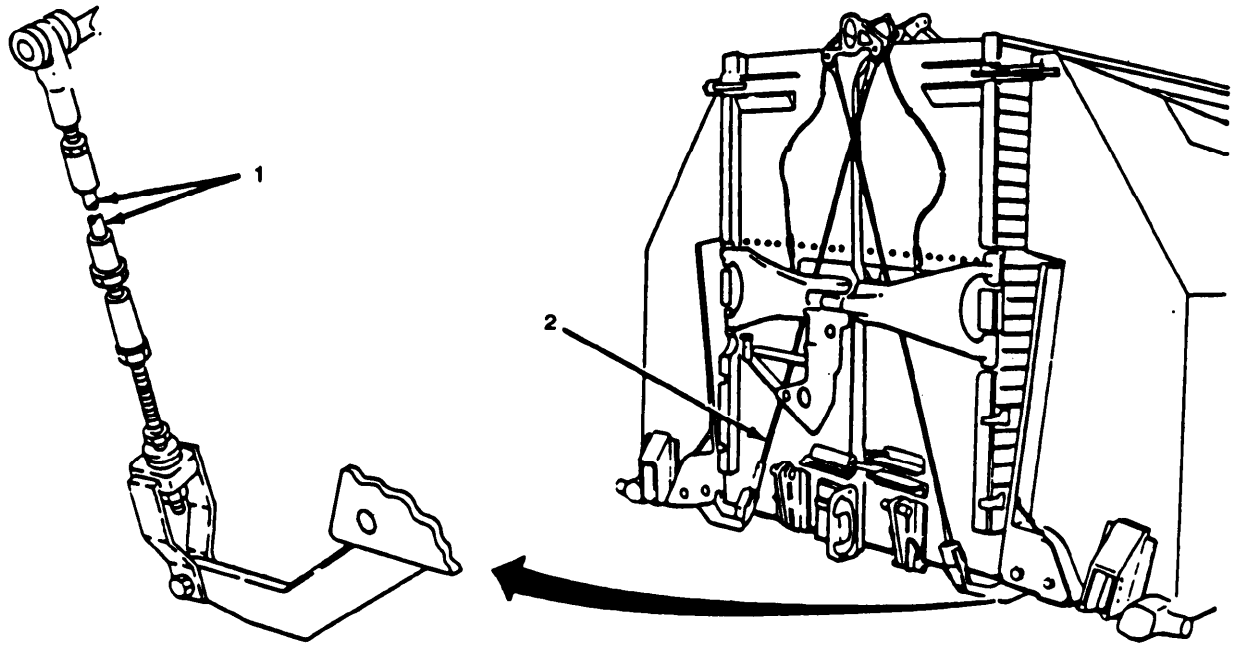



*Figure 3-20. Cable Assembly Service.*

3-24. **Hinge Pins, Link and Hardware, Ramp Bay.**

This task covers: Service

INITIAL SETUP

*Materials/Parts*

Oil, Lubricating (Item 8, Appendix E)
Rags, Wiping (Item 12, Appendix B)

a. *Service.* (figure 3-21)

(1) Lubricate front hinge pin (1), lever (2), and link (3), and link (4) pivot points with oil, and remove excess.

(2) Lubricate rear hinge pin (5) pivot point with oil, and remove excess.

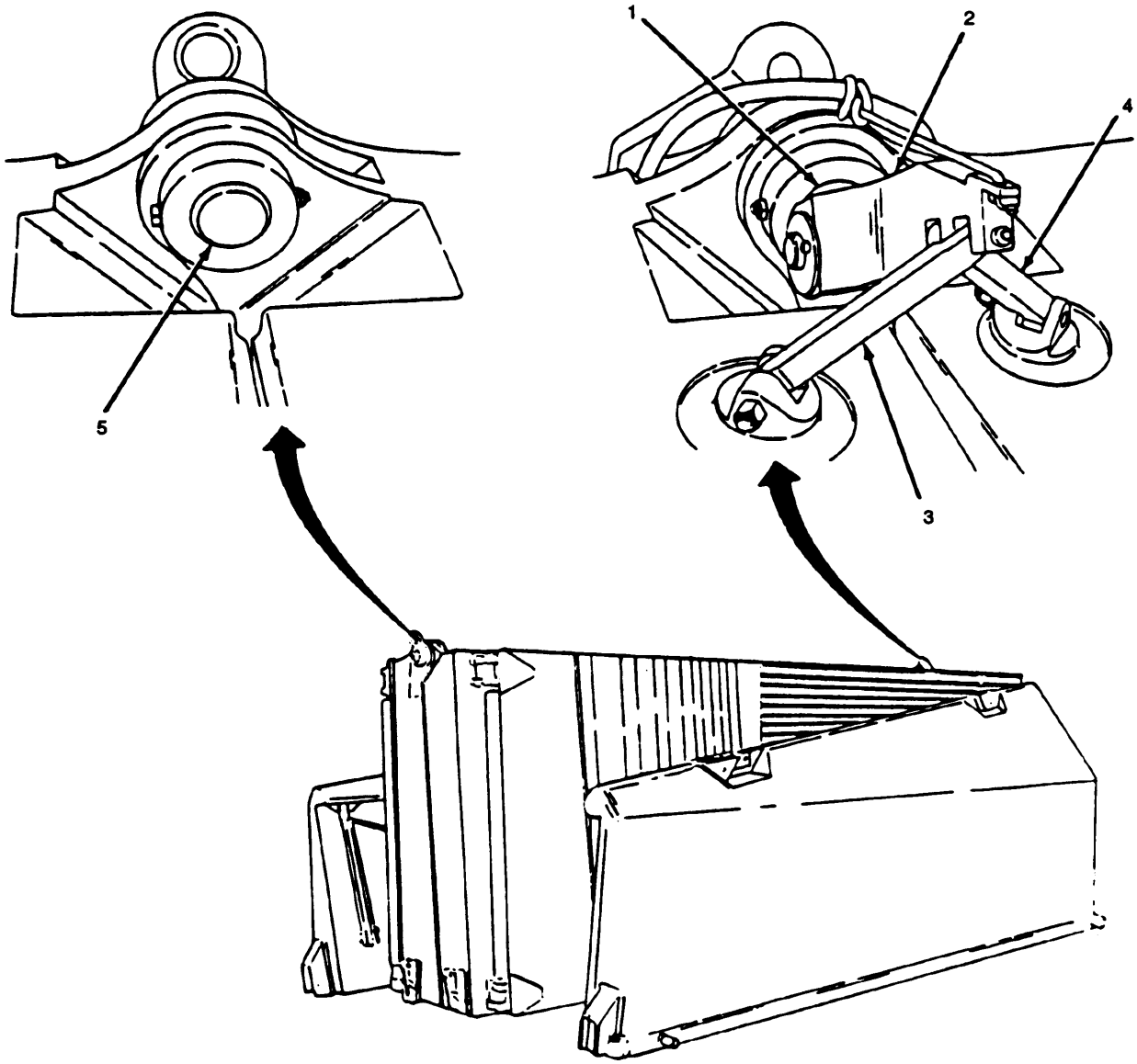



*Figure 3-21. Hinge Pins, Link and Hardware, Service.*

## 3-25. **Connecting Pin Trunions and Lever, Ramp Bay.**

This task covers: Service

INITIAL SETUP

| *Tool* | *Materials/Parts* |
|---|---|
| Grease Gun | Oil, Lubricating (Item 8, Appendix E)<br>Rags, Wiping (Item 12, Appendix B) |

*a*. *Service.* (figure 3-22)

(1) Install grease gun on lube fitting (1) and inject grease until clean grease appears between pin (2) and lever (3), and remove excess.

(2) Lubricate pivot points with oil and remove excess.

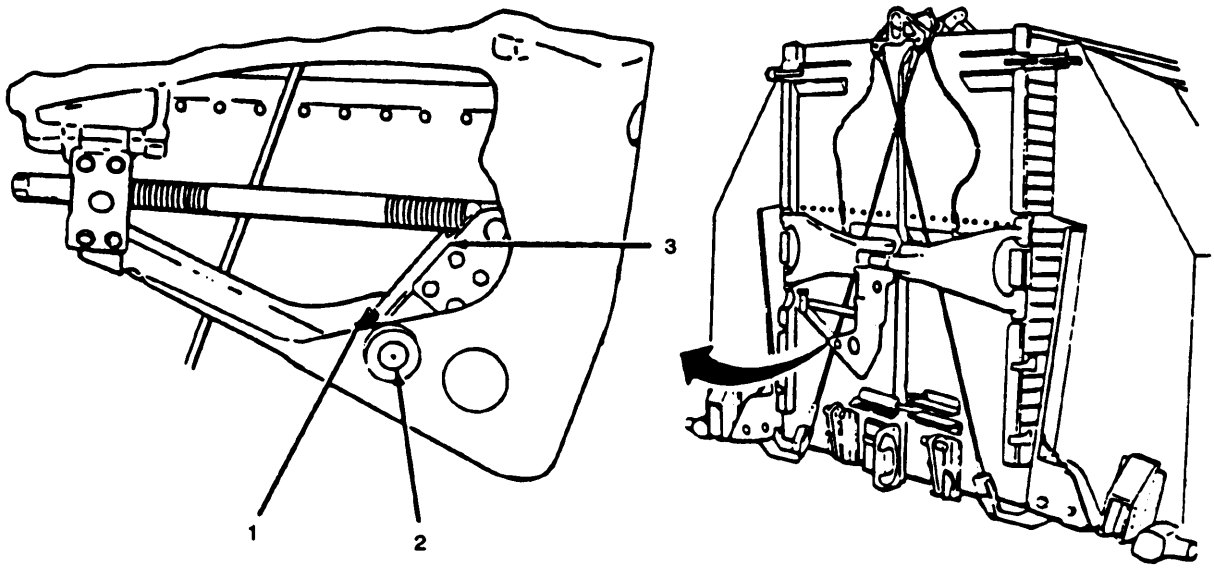



*Figure 3-22. Connecting Pin Trunnions and Lever, Service.*

3-26. **Cable Assembly, Interior Bay.**

This task covers: Service

INITIAL SETUP

Materials/Parts

Oil, Lubricating (Item 8, Appendix E)
Solvent, Dry cleaning (Item 18, Appendix E)
Rags, Wiping (Item 12, Appendix B)

a. *Service.* (figure 3-23)

**WARNING**

Dry cleaning solvent PD-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100-138 °F (38-60 °C).

(1) Clean cable assembly (1) with dry cleaning solvent, and dry thoroughly.

(2) Lubricate cable assembly (1) with oil, and remove excess.

(3) Coat cable assembly (1) with exposed wire lubricant, and remove excess.

(4) Repeat steps (1) through (3) for remaining cable assemblies.

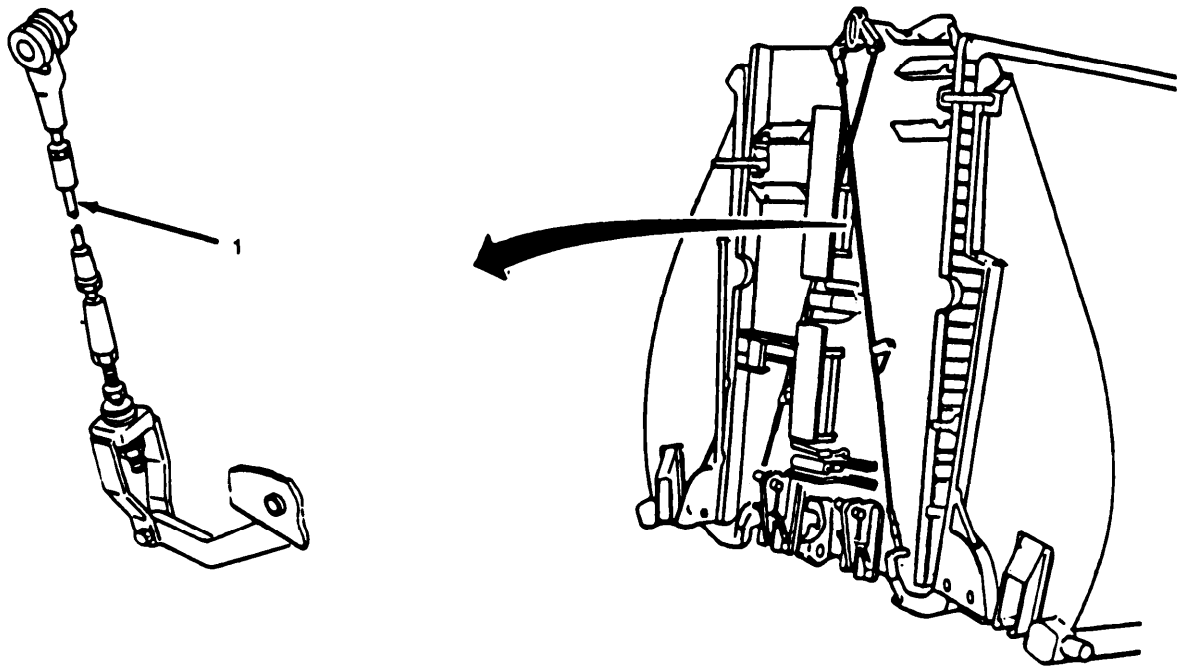



*Figure 3-23. Cable Assembly Service.*

3-27. **Connecting Pin Trunions and Lever, Interior Bay.**

This task covers: Service

INITIAL SETUP

| *Tool* | *Materials/Parts* |
|---|---|
| Grease Gun | Oil, Lubricating OE/HDO (Item 8, Appendix E)<br>Rags, Wiping (Item 12, Appendix B) |

a. *Service.* (figure 3-24)

(1) Install grease gun on lube fitting (1) and inject grease until clean grease appears between pin (2) and lever (3), and remove excess.

(2) Lubricate pivot points with oil and remove excess.

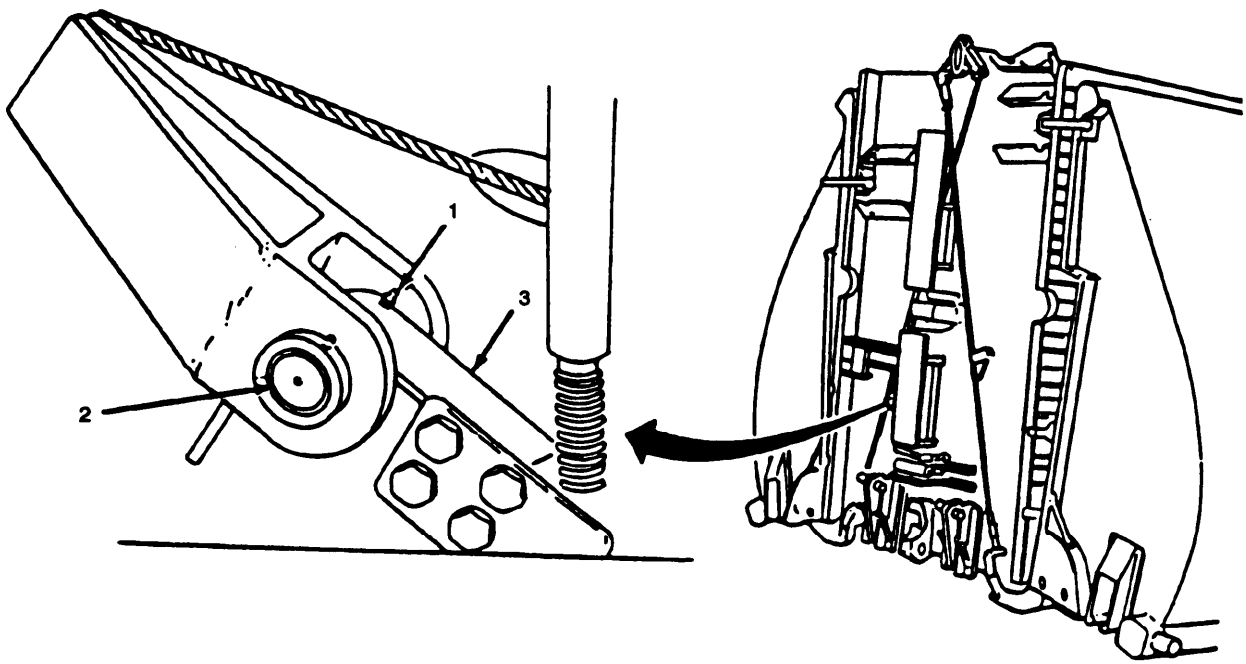



*Figure 3-24. Connecting Pin Trunnions and Lever, Service.*

3-28. **Hinge Pins, Link and Hardware Interior Bay.**

This task covers: Service

INITIAL SETUP

*Materials/Parts*

Oil, Lubricating OE/HDO (Item 11, Appendix E)
Rags, Wiping (Item 14, Appendix E)

a. *Service.* (figure 3-25)

(1) Lubricate front hinge pin (1), lever (2), link (3), and link (4) pivot points with oil, and remove excess.

(2) Lubricate rear hinge pin (5) pivot point with oil, and remove excess.

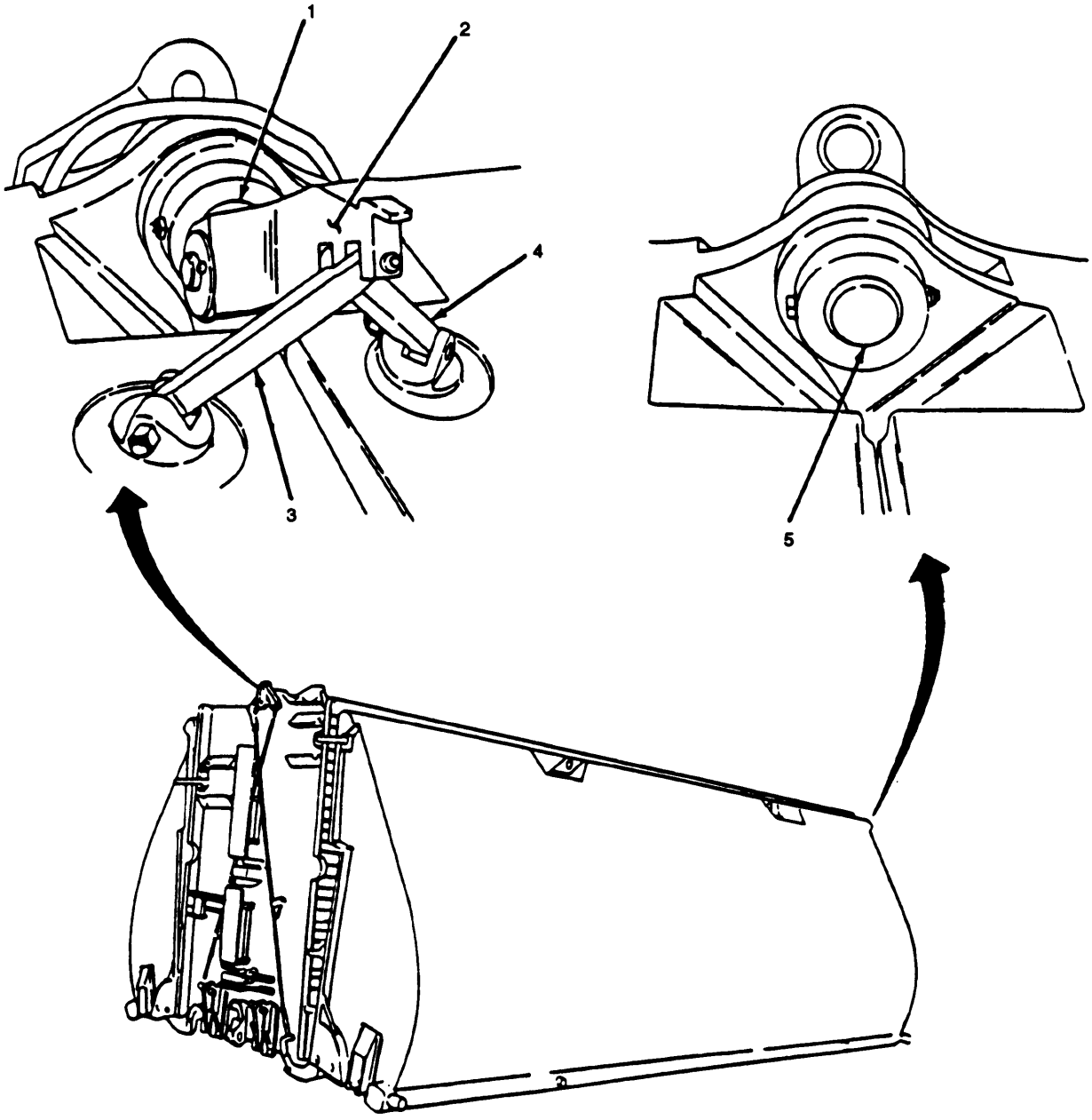



*Figure 3-25. Hinge Pins, Link and Hardware, Service.*

# CHAPTER 4

# UNIT MAINTENANCE

## OVERVIEW

This chapter contains those maintenance instructions that unit level maintenance is authorized to perform.


Page

OVERVIEW ..... 4-1
Section I. Repair Parts; Special Tools; Test, Measurement, Diagnostic Equipment (TMDE); and Support Equipment ..... 4-1
Section II. Service Upon Receipt ..... 4-2
Section III. Unit Preventive Maintenance Checks and Services ..... 4-2
Section IV. Unit Troubleshooting ..... 4-12
Section V. Unit Maintenance ..... 4-20
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## Section I. REPAIR PARTS; SPECIAL TOOLS; TEST, MEASURMENT, DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT


Paragraph Page

4-1. Common Tools and Equipment ..... 4-1
4-2. Special Tools, TMDE and Support Equipment ..... 4-1
4-3. Repair Parts. ..... 4-1


4-1. **Common Tools and Equipment.** For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable for your unit.

4-2. **Special Tools, TMDE and Support Equipment.** For a listing of special tools, TMDE, and support equipment authorized for use on Ribbon Bridge Interior Bay and Ramp Bay, refer to the Repair Parts and Special Tools List TM 5-5420-209-20, and Maintenance Allocation Chart (MAC), Appendix B of this manual. Special tools for the maintenance of transporter are listed in TM 9-2320-260-20 for Model 2280 and TM 9-2320-272-20 for Model RBT.

4-3. **Repair Parts.** Unit level maintenance repair parts listed and illustrated in TM 5-5420-209-20P. Maintenance repair parts for the truck chassis are provided in TM 9-2320-260-20P for Model 2280. Refer to TM 9-2320-272-20P for Model RBT.

## Section II. SERVICE UPON RECEIPT


| Paragraph | | Page |
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| 4-5 | Inspection | 4-2 |
| 4-6 | Service | 4-2 |


4-4. **General.** When a transporter or bay is received, check all items for damage that may have occurred during shipping or setting-up operations. Particular attention should be directed toward loose or missing nuts, bolts, screws, drain plugs, draincock, oil plugs, assemblies, subassemblies, or components that may be easily lost or broken in transit. The bay drivepin wrench, ramp connecting tool, bogie lockout bracket, crowbar, and all other on board equipment should be inspected and all discrepancies carefully noted. Refer to Chapter 2 for procedures to load and unload bridge bays.

4-5. **Inspection.** Perform preventive maintenance checks and services as outlined in IV of this chapter. Refer to TM 9-2320-260-20 for inspection of truck chassis of transporter Model 2280 or TM 9-2320-272-20 for Model RBT.

4-6. **Service.** Lubricate transporter and bays in accordance with LO 5-5420-209-12. Lubricate truck chassis in accordance with LO 9-2320-272-12 on Model 2280. On Model RBT, refer to LO 9-2320-272-12. Refer to IV of this chapter for additional service information.

## Section III. UNIT PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)


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| 4-8. | Purpose of PMCS Table | 4-2 |
| 4-9. | Explanation of Columns | 4-2 |
| 4-10. | Reporting Deficiencies | 4-3 |
| 4-11. | Special Instructions | 4-3 |
| 4-12. | Painting | 4-4 |


4-7. **General.** Your unit PMCS for the transporter (table 4-1), for the ramp bay (table4-2), and for the interior bay (table 4-3), lists inspections and care required to keep the improved float bridge equipment in good operating condition. Unit PMCS are performed to ensure that the equipment is ready for operation at all times. So that each piece of equipment can be throughly serviced, three separate tables have been prepared, one for each major component.

4-8. **Purpose of PMCS Table.** The purpose of the PMCS table is to provide a systematic method of inspection and servicing the equipment. In this way, small defects can be detected early before they become a major problem causing the equipment to fail to complete its mission. The PMCS table is arranged with the individual PMCS procedures listed in sequence under assigned intervals. The most logical time (before or during operation) to perform each procedure determines the interval to which it is assigned. Make a habit of doing the checks in the same order each time and anything wrong will be seen quickly. See paragraphs 4-9 and 4-10 for an explanation of the columns in tables 4-1, 4-2, and 4-3.

4-9. **Explanation of Columns.** The following is a list of the PMCS table column headings with a description of the information found in each column.

a. *Item No.* This column shows the sequence in which the checks and services are to be performed, and is used to identify the equipment area on the Equipment Inspection and Maintenance Worksheet, DA Form 2404.

b. *Interval.* This column shows when each check is to be done.

*c. Item to be Inspected/Procedures.* This column identifies the general area or specific part where the check or service is to be done and explains how to do them.

*d. Equipment is Not Ready/Available If.* This column lists conditions that make the equipment unavailable for use because it is unable to perform its mission, or because it would represent a safety hazard. Do not accept or operate equipment with a condition in the "Equipment is Not Ready/Available If" column.

**NOTE**

The terms ready/available and mission capable refer to the same status: Equipment is on hand and is able to perform its combat mission. Refer to DA Pam 738-750.

4-10. **Reporting Deficiencies.** If any problem with the equipment is discovered during PMCS or while it is being operated that cannot be corrected at the unit maintenance level, it must be reported. Refer to DA Pam 738-750 and report the deficiency using the proper forms.

4-11. **Special Instructions.** Preventive maintenance is not limited to performing the checks and services listed in the PMCS table.

**WARNING**

Dry cleaning solvent PD-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F-138°F (38°C - 60°C).

*a. Keep It Clean.* Dirt, grease, oil, and debris get in the way and may cover up a serious problem. Clean as you work and as needed. Use drycleaning solvent on all metal surfaces. Use soap and water to clean rubber or plastic material.

*b. Bolts, Nuts, and Screws.* Check them all for obvious looseness, missing, bent, or broken condition. You can't try them all with a tool, but look for chipped paint, bare metal, or rust around boneheads. If you find one you think is loose, tighten it, or report it to unit maintenance if you can't tighten it.

*c. Electrical Wires and Cable Connectors.* Look for bare wires and loose or broken connectors. Report defects to unit maintenance.

*d. Fluid Lines.* Look for wear, damage, and leaks. Make sure clamps and fittings are tight. Wet spots and stains around a fitting or connector can mean a leak. If a leak comes from a loose connector, tighten it. If something is broken or worn out, report it to unit maintenance.

e. *Leakage Definitions.* It is necessary for you to know how fluid leakage affects the status of your equipment. The following are definitions of the types/classes of leakage you need to know to be able to determine the status of your equipment. Learn and be familiar with them. When in doubt, NOTIFY YOUR SUPERVISOR!

Leakage Definitions:

Class I Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.

Class II Leakage of fluid great enough to form drops but not enough to cause drops to drip from item being checked/inspected.

Class III Leakage of fluid great enough to form drops that fall from the item being checke/inspected.

**CAUTION**

Equipment operation is allowable with minor leakage (Class I or II) of any fluid except fuel. Of course, consideration must be given to the fluid capacity in the item being checked/inspected. When in doubt, notify your supervisor.

When operating with Class I or II leaks, continue to check fluid level more often than required in the PMCS. Parts without fluid will stop working and or cause equipment damage.

Class III leaks should be reported to your supervisor or unit maintenance

4-12. **Painting.** Touch-up ribbon bridge and its components as needed. Refer to TM 43-0139 for specific painting procedures.

**NOTE**

This PMCS use the one-look format, beginning with the Roadside Bow Ponton as viewed from the rear of bay with unfolding cables, clockwise.

During PMCS, ensure that ALL components and assemblies are correctly installed. Incorrect installation may cause additional equipment damage or failure.

When checking or inspecting an item, also inspect all associated components for structural damage and loose, broken or missing hardware.

Remove rust and accumulated corrosion during PMCS. Corrosion not removed promptly will degrade equipment performance.

*Table* 4-1. *Unit Preventive Maintenance Checks and Services (PMCS) for the Transporter.*

| Item No. | Interval | Location<br>Item to Service/Check | Item To Be Inspected<br>Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| | | | **CAUTION**<br>Filter indicator sight glass must be obstruction free and indicator must be visible in GREEN band. Do not proceed with PMCS if indicator is not in GREEN band. | |

*Table 4-1. Unit Preventive Maintenance Checks and Services (PMCS) for the Transporter cont.*

| Item No. | Interval | Location<br>Item to Service/Check | Item To Be Inspected<br>Procedure | Equipment Is Not Ready/Available |
|---|---|---|---|---|
| 1 | Weekly | Hydraulic Filter Assembly | Ensure filter indicator is visible and in GREEN band. Remove cap, drain contaminated fluid from cap, filter and reservoir and reset. | Indicator is NOT in green band. |
| | | | Check filter housing for cracks and leakage. | Class II or Ill leak noted. |
| | | | Ensure input/output lines are connected property. | Lines incorrectly positioned. |
| | | | Check lines for cracks, compression and leakage. | Class II or Ill leak noted. |
| | | | Check clamps for dry rot and deformation. Replace as necessary. | |
| 2 | Weekly | Power Take Off (PTO) Levers | Ensure Transfer Case levers engage Gear Pump and PTO. | Levers do not function properly. |
| | | | Inspect for deformation. | |
| 3 | Weekly | Hydraulic Console Control Valves | Ensure each valve engages item indicated and in correct mode. | Any valve does NOT engage item indicated. |
| | | | Inspect valves for cracks and leakage. | Class II or III leak noted. |
| | | | Inspect valve hydraulic lines, fittings and clamps for compression, leakage, cracks and dry rot. | Class II or III leak noted. |
| 4 | Weekly | Remote Throttle Assembly (M945) | Ensure throttle operation increases and decreases engine RPM easily. | |
| | | | Check throttle, cable, retaining clamps and accelerator connection for compression, kinks, and deformation and correct mounting. | |
| 5 | Weekly | Selector Valve Assembly (M945) | Ensure valve engages winch indicated. | Valve does not engage winch selected. |
| | | | Inspect valve, lines and clamps for cracks, leakage, compression and dry rot. | A Class II or Ill leak noted. |
| 6 | Weekly | Tie Down Hook Assembly | Ensure hook functions properly. | Hook does not retract or return properly. |
| | | | Ensure hook locking mechanism functions properly. | Hook does not lock against tie down pin. |
| | | | Check for cracks, broken welds, deformation, and quick release pin serviceability. | Cracks, broken welds or deformation noted. |
| 7 | Weekly | Towing Pintle | Ensure pintle is in proper position for intended operation. | Pintle stowed incorrectly. |
| | | | Inspect tongue and hook for cracks, deformation. | |
| | | | Ensure cotter pin and wire rope are serviceable. | |

*Table 4-1. Unit Preventive Maintenance Checks and Services (PMCS) for the Transporter cont.*

| Item No. | Interval | Location: Item to Service/Check | Item To Be Inspected Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 8 | Weekly | Tie Down Hook Assembly | Ensure hook functions properly. | Hook does not retract or return properly. |
| | | | Ensure hook locking mechanism functions properly. | Hook does not lock against tie down pin. |
| | | | Check for cracks, broken welds, deformation, and quick release pin serviceability. | Cracks, broken welds or deformation noted. |
| 9 | Weekly | Fuel Tank, Sending Unit and Brackets | Ensure support brackets are secured tightly to transporter. | Either strap loose or has broken welds. |
| | | | Check sending unit for broken, bare or loose wires and connections. | Any fuel leakage noted. |
| | | | Check lines for leakage, compression or cracks. | Any fuel leakage noted. |
| | | | Inspect tank for leaks. | |
| 10 | Weekly | Winch Cable Assembly | Check cable for kinks, compression and broken strands. | Five or more strands broken in one turn of cable. |
| | | | Check hook for elongation and deformation. | Elongation/deformation noted. |
| | | | Check safety latch for serviceability. | Latch unserviceable. |
| | | | Check clevis for deformation. | |
| 11 | Weekly | Hydraulic Reservoir | Ensure reservoir fluid level is correct. | Reservoir is not at proper fluid level. |
| | | | Ensure bracket properly secures reservoir to transporter | |
| | | | Check reservoir, line and fittings for leaks, compression and deformation. | Class II and III leak noted. |
| | | | Inspect filter and cap for cleanliness. | Class II and III leak noted. |
| 12 | Weekly | Cab Protector and Support Bracket | Inspect grid wires for jagged protrusions. | Defect presents personnel or equipment hazard. |
| | | | Inspect mounting at front support carefully for broken welds. | Broken welds noted. |
| | | | Inspect cab support bracket for corrosion. | More than 50% of either rib corroded. |
| | | | Insure bracket is securely mounted to cab and rent support. | Bracket loose. |

*Table 4-1. Unit Preventive Maintenance Checks and Services (PMCS) for the Transporter cont.*

| Item No. | Interval | Location<br>Item to Service/Check | Item To Be Inspected<br>Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 13 | Monthly | Floodlight Master Switch | Ensure switch turns on both floodlights simultaneously.<br>Check wiring for loose/bare wires and proper connections.<br>Check data plate legibility, and proper mounting. | |
| 14 | Monthly | Light, Marker and Reflector | Ensure both amber clearance light and blackout marker are functional.<br>Ensure amber reflector is serviceable.<br>Check lenses and housings for cracks.<br>Check wire harness for loose/bare wiring and connector integrity. | |
| 15 | Monthly | Walkway (Front) | Ensure walkway is mounted securely to front support.<br>Check walkway treadplate for cracks, holes, broken welds, jagged protrusions and deformation. | Defect presents personnel or equipment hazard. |
| 16 | Monthly | Tire Carrier and Tire | Ensure tire and rim can be safely lowered to ground.<br>Check pawl, ratchet and handle for cracks and deformation.<br>Check wire rope and 'U" clamps for kinks, broken strands and serviceability. | |
| 17 | Monthly | Bay Roller Assembly | Ensure roller rotates freely.<br>Check roller for gouges, nicks, and cuts to surface area.<br>Ensure grease fitting is serviceable.<br>Check axle, bearing and thrust washer serviceability. | Roller damages bay. |
| 18 | Monthly | Walkway | Ensure walkway is mounted securely to front support.<br>Check walkway treadplate for cracks, holes, broken welds, jagged protrusions and deformation.<br>Check condition of non-skid surface. | Defect presents personnel or equipment hazard. |
| 19 | Monthly | Bogie Lock and Bracket | Ensure rubber bumper and bracket are secure to walkway stud with washer and wingnut.<br>Check rubber bumper and metal bracket for cracks, deformation, and dry rot. | |

*Table 4-1. Unit Preventive Maintenance Checks and Services (PMCS) for the Transporter cont.*

| Item No. | Interval | Location<br>Item to Service/Check | Item To Be Inspected<br>Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 20 | Monthly | Light, Marker and Reflector | Ensure both red clearance light and blackout marker are functional.<br>Ensure red reflector is serviceable.<br>Check lenses and housings for cracks.<br>Check wire harness for loose/bare wiring and connector integrity. | |
| 21 | Monthly | Walkway Clamp | Ensure clamp is secured property to walkway.<br>Check for deformation. | Clamp not secured property. |
| 22 | Monthly | Cradle Clamp | Ensure clamp position is in proper position for intended operation.<br>Check for deformation of cradle retaining hook.<br>Ensure clamp alignment hole alines with support tube. | |
| 23 | Monthly | Pivot clamp | Ensure clamp is properly seated against saddle.<br>Check grease fitting for serviceability.<br>Inspect for cracks. | Clamp not tightly seated against saddle.<br><br>Cracks noted. |
| 24 | Monthly | Pivot clamp | Ensure clamp is properly seated against saddle.<br>Check grease fitting for serviceability.<br>Inspect for cracks. | Clamp not tightly seated against saddle.<br><br>Cracks noted. |
| 25 | Monthly | Cradle Clamp | Ensure clamp position is in proper position for intended operation.<br>Check for deformation of cradle retaining hook.<br>Ensure clamp alignment hole alines with support tube. | |
| 26 | Monthly | Walkway Clamp | Check clamp position. (Should be snug against walkway).<br>Inspect for deformation and loose, broken or missing hardware. | |
| 27 | Monthly | Bay Roller Assembly | Ensure roller rotates freely.<br>Check roller for gouges, nicks, and cuts to surface area.<br>Ensure grease fitting is serviceable.<br>Check axle, bearing and thrust washer serviceability. | Roller damages bay. |

*Table 4-1. Unit Preventive Maintenance Checks and Services (PMCS) for the Transporter cont.*

| Item No. | Interval | Location / Item to Service/Check | Item To Be Inspected Procedure | Equiment Is Not Ready/Available If |
|---|---|---|---|---|
| 28 | Monthly | Light, Marker and Reflector | Ensure both red clearance light and blackout marker are functional.<br>Ensure red reflector is serviceable.<br>Check lenses and housings for crocks.<br>Check wire harness for loose/bare wiring and connector integrity. | |
| 29 | Monthly | Bogie Lock and Bracket | Ensure rubber bumper and bracket are secure to walkway stud with washer and wingnut.<br>Check rubber bumper and metal bracket for cracks, deformation, and dry rot. | |
| 30 | Monthly | Walkway | Ensure walkway is mounted securely to center support.<br>Check walkway treadplate for cracks, holes, broken welds, jagged protrusions.<br>Check condition of non-skid surface. | Defect presents personnel or equipment hazard. |
| 31 | Monthly | Bay Roller Assembly | Ensure roller rotates freely.<br>Check roller for gouges, nicks, and cuts to surface area.<br>Ensure grease fitting is serviceable.<br>Check axle, bearing and thrust washer serviceability. | Roller damages bay. |
| 32 | Monthly | Walkway (Front) | Ensure walkway is mounted securely to front support.<br>Check walkway treadplate for cracks, holes, broken welds, and jagged protrusions. | Defect presents personnel or equipment hazard. |
| 33 | Monthly | Light, Marker and Reflector | Ensure both amber clearance light and blackout marker are functional.<br>Ensure amber reflector is serviceable.<br>Check lenses and housings for cracks.<br>Check wire harness for loose/bare wiring and connector integrity.<br>**NOTE**<br>Bracket welds at top and base must be carefully inspected. If in doubt, notify unit maintenance. | |

*Table 4-1. Unit Preventive Maintenanee Checks and Services (PMCS) for the Transporter cont.*

| Item No. | Interval | Location<br>Item to Service/Check | Item To Be Inspected<br>Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 34 | Monthly | Cab Protector Bracket | Inspect for cracks and holes. | Either rib eroded more than 50%. |
| 35 | Monthly | Locking Cylinder Assembly | Ensure cylinder engages front support bracket eye hole without binding or twisting bracket. | Cylinder does not extend or retract or twists bracket. |
| | | | Check cylinder shaft, lines and connectors for leakage, burrs, nicks compression and scratches. | Class II or III leak noted. |
| | | | Inspect hoses for compression and leakage. | |
| | | | Inspect cylinder bracket for cracks, broken welds and deformation. | |
| 36 | Monthly | Front Support | Ensure front support is properly secured to transporter. | Support is incorrectly secured. |
| | | | Check seams and adjoining plates for cracks, broken welds and deformation. | Cracks or broken welds, or deformation noted. |
| 37 | Monthly | Boom Sheave | Ensure sheave rotates with cables. | |
| | | | Inspect for cracks, gouges, erosion and deformation. | |
| 38 | Monthly | Boom | Ensure boom can be fully raised and lowered. | Boom does not function properly. |
| | | | Check for cracks, broken welds, warping and deformation. | Cracks or broken welds noted. |
| 39 | Monthly | Cable Channel | Inspect for warping or deformation. | |
| 40 | Monthly | Cable Rollers | Ensure roller rotates with cable. | |
| | | | Inspect for burrs, nicks and gouges. | |
| 41 | Monthly | Center Support | Ensure center support is properly secured to transporter. | Support is incorrectly secured. |
| | | | Check seams and adjoining plates for cracks, broken welds and deformation. | Cracks or broken welds, or deformation noted. |
| 42 | Monthly | Bay Guide Plate | Check plate for broken welds and deformation. | Broken welds noted or deformation damages bays. |
| | | | **NOTE**<br>Use of "U" clamps to secure cable is authorized only in emergency situation | |

*Table 4-1. Unit Preventive Maintenance Checks and Services (PMCS) for the Transporter cont.*

| Item No. | Interval | Location: Item to Service/Check | Item To Be Inspected Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 43 | Monthly | Boom Cylinders | Ensure cylinders operate in tandem and fully raise or lower boom without chatter or hesitation. | Cylinders do not function properly. |
| | | | Check cylinders for leakage and warpage. | Cylinders warped or Class II or III leak noted. |
| | | | Inspect cylinder shaft for nicks, burrs, scratches, scoring or warping. | Cylinder severely scored or deformed. |
| | | | Inspect hoses for compression and leakage. | Class II or III leak noted. |
| 44 | Monthly | Winch (Rear) | Ensure winch pays out and plays in cable properly. | Winch does not operate properly. |
| | | | Check winch for leaks. | Class II or III leak noted. |
| | | | Check hoses for compression and leakage. | Class II or III leak noted. |
| | | | **NOTE**<br>Boom Pivot Assembly consists of round tube, butt plates and saddle. Pay particular attention to tube and butt plate welds. | |
| 45 | Monthly | Boom Pivot Assembly | Inspect for cracks, broken welds, unauthorized holes or plate reinforcement. | Cracks or broken welds noted. |
| 46 | Monthly | Dual Over Center Valve | Check for leakage. | Class II or III leak noted. |
| 47 | Monthly | Single Over Center Valve | Check for leakage. | Class II or III leak noted. |
| 48 | Monthly | Hydraulic Lines and Clamps | Check lines for compression, cracks, and leakage. | Class II or III leak noted. |
| | | | Inspect clamps and rubber grommets for dry rot and deformation. | |
| 49 | Monthly | Cable Tensioner Assembly (M945) | Ensure tensioner pays out and plays in cable under controlled tension. | Tensioner does not function properly. |
| | | | Inspect tensioner, lines and fittings for leakage. | Class II or III leak noted. |
| 50 | Monthly | Tensioner Valve | Check for leakage. | Class II or III leak noted. |
| 51 | Monthly | Gear Pump and Linkage | Ensure pump and linkage engage properly. | Pump does not function properly. |
| | | | Inspect pump for leakage. | Class II or III leak noted. |
| | | | Inspect linkage for deformation. | Linkage deformed. |

**NOTE**

This PMCS use the one-look format, beginning with the Roadside Bow Ponton as viewed from the rear of bay with unfolding cables, clockwise.

During PMCS, ensure that ALL components and assemblies are correctly installed. Incorrect installation may cause additional equipment damage or failure.

When checking or inspecting an item, also inspect all associated components for structural damage and loose, broken or missing hardware.

Remove rust and accumulated corrosion during PMCS. Corrosion not removed promptly will degrade equipment performance.

*Table 4-2. Unit Preventive Maintenance Checks and Services (PMCS) for the Ramp Bay.*

| Item No. | Interval | Location<br>Item to Service/Check | Item To Be Inspected<br>Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| | | | **NOTE**<br>To effectively perform the following steps, bay should be down loaded from transporter.<br>**NOTE**<br>Receptacle, when properly adjusted, will allow latch to seat snugly in strike catches. | |
| 1 | Weekly | Bridge Latch Receptacle | Ensure latch is adjusted properly.<br>Inspect brackets, shims and strike catches for cracks, broken welds, binding and deformation. | Broken welds, binding or deformation prevents engaging latch noted. |
| 2 | Weekly | Tie Down Pin and Wear Cap | Check wear cap for cracks and that cap rotates freely.<br>Inspect pin weld seams for broken welds.<br>Inspect pin for erosion of pin surface. | Broken welds noted or erosion of surface area prevents securing bay to transporter. |
| 3 | Weekly | Skin Surface | Inspect surface area for punctures, holes and dents exposing interior ribs.<br>Inspect seams for cracked/broken welds. | Any damage which allow water into bay interior (If in doubt, perform soap bubble test).<br>Cracked/broken welds noted. |
| 4 | Weekly | Tie Down Pin and Wear Cap | Check wear cap for cracks and that cap rotates freely.<br>Inspect pin weld seams for broken welds.<br>Inspect pin for erosion of pin surface. | Broken welds noted or erosion of surface area prevents securing bay to transporter. |

*Table 4-2. Unit Preventive Maintenance Checks and Services (PMCS) for the Ramp Bay cont.*

| Item No. | Interval | Location<br>Item to Service/Check | Item To B. Inspected<br>Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 5 | Weekly | Skin Surface | Inspect surface area for punctures, holes and dents exposing interior ribs. | Any darnage which allow water into bay interior (If in doubt, perform soap bubble test). |
| | | | Inspect seams for cracked/broken welds. | Cracked/broken welds noted. |
| 6 | Weekly | Bridge Latch Receptacle | Inspect brackets, shims and strike catches for cracks, broken welds, binding and deformation. | Broken welds, binding or deformation prevents engaging latch noted. |
| 7 | Weekly | Unfolding Mechanism | Ensure unfolding mechanism functions properly.<br>Inspect cover plate, spring pins, pins, lever, and connecting link for cracks, broken welds and deformation.<br>**NOTE**<br>Cable, when adjusted correctly, will be taut NOT tight. | Broken welds noted or deformation prevents mechanism for functioning properly. |
| 8 | Weekly | Unfolding Cable | Inspect for kinks, compression, flat surfaces, and broken or frayed strands. | Cable kinked, compressed, flattened or any strands broken. |
| 9 | Weekly | Support Links | Inspect for broken welds, cracks and deformation. | Broken welds noted. |
| 10 | Weekly | Lifting Eye | Inspect for cracks and elongation of eye. | Any cracks noted or eye elongation equals 25% of original circumference. |
| 11 | Weekly | Unfolding Cable | Inspect for kinks, compression, flat surfaces, and broken or frayed strands.<br>**NOTE**<br>Ensure latch and receptacle are adjusted properly (latch "T" rests snugly against strike catch of corresponding receptacle). | Cable kinked, compressed, flattened or any strands broken. |
| 12 | Weekly | Bridge Latch | Inspect brackets, supports and pins for cracks, broken welds and deformation. | Cracks, broken welds noted or deformation causes binding. |
| | | | Inspect springs for deformation and stretching. | Springs stretched. |

*Table 4-2. Unit Prventive Maintenance Checks and Services (PMCS) for the Ramp Bay cont.*

| Item No. | Interval | Location: Item to Service/Check | Item To Be Inspected Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 13 | Weekly | Travel Latch | Inspect brackets, supports and pins for cracks, broken welds and deformation. | Cracks, broken welds noted or deformation causes binding. |
| | | | Inspect springs for deformation and stretching. | Springs stretched. |
| 14 | Weekly | Travel Latch Receptacle | Inspect brackets, shims and strike catches for cracks, broken welds, binding and deformation. | Broken welds, binding or deformation prevents engaging latch noted. |
| 15 | Weekly | Cable Guide | Inspect for cracks, gouges, jagged protrusions, erosion or surface area and elongation of eye. | Eye cracked, elongated more than 0.50 at upper arc or aluminum eroded to within .050. |
| 16 | Weekly | Bridge Latch | Inspect brackets, supports and pins for cracks, broken welds and deformation. | Cracks, broken welds noted or deformation causes binding. |
| | | | Inspect springs for deformation and stretching. | Springs stretched. |
| 17 | Weekly | Lower Lock Drive | Inspect screw and threads for cracks, burrs, nicks and deformation. | Screw will not extend or retract drive pin properly. |
| | | | Inspect trunions, and drive pin for cracks. | Cracks or broken welds noted. |
| | | | Inspect cover bumpers and supports for broken welds and deformation. | |
| | | | **NOTE**<br>Yokes are secured by headless pins, flat washers and cotter pins. Ensure yokes are secured properly. Severe equipment failure or personnel injury may result. | |
| 18 | Weekly | Male yoke | Inspect for cracks, deformation and elongation of eye. | Cracks noted or deformation/elongation prevent proper operation. |
| 19 | Weekly | Female Yoke | Inspect for cracks, deformation and elongation of eye. | Cracks noted or deformation/elongation prevent proper operation. |
| *20* | Weekly | Hydraulic Cylinder | Ensure cylinder functions properly in conjunction with hand pump. | Cylinder does not function properly. |
| | | | Inspect cylinder for leaks. | Class II or Ill leak noted. |
| | | | Inspect lines and fittings for cracks, compression, and leakage. | Class II or Ill leak noted. |

*Table 4-2. Unit Preventive Maintenance Checks and Services (PMCS) for the Ramp Bay cont.*

| Item No. | Interval | Location<br>Item to Service/Check | Item To Be Inspected<br>Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 21 | Weekly | Hydraulic Line | Ensure line is properly secured at support link and to roadway ponton.<br>Inspect for cuts, chaffing and leakage and damp serviceability. | Line is not secured properly.<br>Class II or Ill leak noted. |
| 22 | Weekly | Unfolding Mechanism | Ensure unfolding mechanism functions properly.<br>Inspect cover plate, spring pins, pins, lever, and connecting link for cracks, broken welds and deformation. | Broken welds noted or deformation prevents mechanism from functioning properly. |
| 23 | Weekly | Bridge Latch Receptacle | Inspect brackets, shims and strike catches for cracks, broken welds, binding and deformation. | Broken welds, binding or deformation prevents engaging latch noted. |
| 24 | Weekly | Skin Surface | Inspect surface area for punctures, holes and dents exposing interior ribs.<br>Inspect seams for cracked/broken welds. | Any damage which might allow water into bay interior (If in doubt, perform soap bubble test).<br>Cracked/broken welds noted. |
| 25 | Weekly | Tie Down Pin | Inspect for cracks, broken welds and erosion of pin surface area. | Broken welds noted or erosion of surface area prevents securing bay to transporter. |
| 26 | Weekly | Skin Surface | lnspect surface area for punctures, holes and dents exposing interior ribs.<br>Inspect seams for cracked/broken welds. | Any damage which might allow water into bay interior (If in doubt, perform soap bubble test).<br>Cracked/broken welds noted. |
| 27 | Weekly | Tie Down Pin | lnspect for cracks, broken welds and erosion of pin surface area. | Broken welds noted or erosion of surface area prevents securing bay to transporter. |
| 28 | Weekly | Bridge Latch Receptacle | Inspect brackets, shims and strike catches for cracks, broken welds, binding and defomation. | Broken welds, binding or deformation prevents engaging latch noted. |
| 29 | Weekly | Bridge Latch | Inspect brackets, supports and pins for cracks, broken welds and deformations.<br>Inspect springs for deformation and stretching. | Cracks, broken welds noted or deformation causes binding.<br>Springs stretched. |

*Table 4-2. Unit Preventive Maintenance Checks and Services (PMCS) for the Ramp Bay cont.*

| Item No. | Interval | Location<br>Item to Service/Check | Item To Be Inspected<br>Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 30 | Weekly | Lifting Eye (Rear) | Inspect for cracks and elongation of eye. | Any cracks noted or eye elongation equals 25% of original circumference. |
| 31 | Weekly | Deck Surface | Inspect for punctures, cracks, tears, dents, holes and broken welds.<br>Check condition of non-skid coating. | Any damage which allows water into bay cavity. |
| 32 | Weekly | Bilge Plug | Ensure plug(s) are secured with wire rope to ponton.<br>Inspect rubber seal for cuts, elasticity and dry rot.<br>Check handle operation.<br>**NOTE**<br>Receptacle consists of entire housing (Block) in which connector is seated. | Any plug missing.<br>Ensure plug(s) are secured with wire rope to ponton. |
| 33 | Weekly | Connector Receptacle | Inspect seams for broken welds.<br>Inspect receptacle area for cracks, broken welds, elongation and deformation.<br>**NOTE**<br>Proper connector has a narrow canter bar (0.500 inch); older connectors have thicker (.69) in center bar. Loose or missing set screws will allow water into bay cavity. | Cracks or broken welds noted. Elongation or deformation prevents proper seating of connector. |
| 34 | Weekly | Roadway Connectors | Ensure connector is correct type.<br>Inspect connector, eye bracket, set screws, spring and spring pins for cracks and deformation. | Incorrect connector type.<br>Any defect which prevents proper seating of connector. |
| 35 | Weekly | Hydraulic Pump Access cover and Data Plates | Inspect covers for cracks and deformation.<br>Inspect plates for legibility. | Any cover missing. |


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*Table 4-2. Unit Preventive Maintenance Checks and Services (PMCS) for the Ramp Bay cont.*

| Item No. | Interval | Location<br>Item to Service/Check | Item To Be Inspected<br>Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 36 | Weekly | Hydraulic Pumps | Inspect pump well for evidence of oil accumulation.<br>Inspect hoses for compression, cuts or leakage.<br>Inspect pump for leakage.<br>Ensure directional lever and air vent function properly. | Class II or III leak. Vent or lever does not function properly. |
| 37 | Monthly | Hinges and Pins | Inspect bow to roadway ponton connecting hinge brackets and pins for cracks and elongation.<br>**NOTE**<br>To inspect the following items properly, bay must be unfolded (on ground or in water). | Any hinge cracked or elongation allows pinto move freely. |
| 38 | Monthly | Handlerail Posts and Rope | Inspect posts for cracks at support base, cracks/elongation of bolt slots, broken or deformed rope ring and frayed or stretched rope. | Handrail posts and rope missing. |
| 39 | Monthly | Lift Pockets and Quick Release Pin | Ensure pin functions properly.<br>Inspect pin for cracks and broken strands on retaining wire rope.<br>Inspect pockets for cracks and broken welds.<br>**NOTE**<br>Ramps are secured by headless pins, washers and cotter pins. Missing or deformed retaining hardware may cause severe equipment damage. | |
| 40 | Monthly | Approach Ramps | Inspect for cracks, ruptured seams, and broken welds. | Ramp retaining hardware missing or deformed. |

**NOTE**

**This PMCS use the one-look format, beginning with the Roadside Bow Ponton as viewed from the rear of bay with unfolding cables, clockwise.**

During PMCS, ensure that ALL components and assemblies are correctly installed. Incorrect installation may cause additional equipment damage or failure.

When checking or inspecting an item, also inspect all associated components for structural timage and loose, broken or missing hardware.

Remove rust and accumulated corrosion during PMCS. Corrosion not removed promptly will degrade equipment performance.

*Table 4-3. Unit Preventive Maintenance Checks and Services (PMCS) for the Interior Bay.*

| Item No. | Interval | Location / Item to Service/Check | Item To Be Inspected Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| | | | **NOTE**<br>To effectively perform the following steps, bay should be down loaded from transporter. | |
| 1 | Weekly | Unfolding Mechanism | Ensure unfolding mechanism functions properly.<br>Inspect cover plate, spring pins, pins, lever, and connecting link for cracks, broken welds and deformation. | Broken welds noted or deformation prevents mechanism for functioning properly. |
| | | | **NOTE**<br>**Receptacle, when properly adjusted, will allow latch to seat snugly in strike catches.** | |
| **2** | **Weekly** | Bridge Latch Receptacle | Ensure latch is adjusted properly.<br>Inspect brackets, shims and strike catches for cracks, broken welds, binding and deformation. | Broken welds, binding or deformation prevents engaging latch noted. |
| 3 | Weekly | Skin Surface | Inspect surface area for punctures, holes and dents exposing interior ribs. | Any damage which allow water into bay interior (If in doubt, perform soap bubble test). |
| | | | Inspect seams for cracked broken welds. | Cracked/broken welds noted. |
| 4 | Weekly | Tie Down Pin | Inspect pin weld seams for broken welds.<br>Inspect pin for erosion of pin surface. | Broken welds noted or erosion of surface area prevents securing bay to transporter. |

*Table 4-3. Unit Preventive Maintenance Checks and services (PMCS) for the Inteterior Bay cont.*

| Item No. | Interval | Location<br>Item to Service/Check | Item To B. Inspected<br>Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 5 | weekly | Skin Surface | Inspect surface area for punctures, holes and dents exposing interior ribs. | Any damage which allow water into bay interior (If in doubt, perform soap bubble test). |
| | | | Inspect seams for cracked/broken welds. | Cracked/broken welds noted. |
| 6 | Weekly | Tie Down Pin | Inspect pin weld seams for broken welds.<br>Inspect pin for erosion of pin surface. | Broken welds noted or erosion of surface area prevents securing bay to transporter. |
| 7 | Weekly | Bridge Latch Receptacle | Inspect brackets, shims and strike catches for cracks, broken welds, binding and deformation. | Broken welds, binding or deformation prevents engaging latch noted. |
| 8 | Weekly | Unfolding Mechanism | Ensure unfolding mechanism functions properly.<br>Inspected cover plate, spring pins, pins, lever, and connecting link for cracks, broken welds and deformation. | Broken welds noted or deformation prevents mechanism for functioning properly. |
| 9 | Weekly | Skin Surface | Inspect surface area for punctures, holes and dents exposing interior ribs. | Any damage which allow water into bay interior (If in doubt, perform soap bubble test). |
| | | | Inspect seams for cracked/broken welds. | Cracked/broken welds noted. |
| 10 | Weekly | Foldlock Latch | Inspect brackets, supports and pins for cracks, broken welds and deformation. | Cracks, broken welds noted or deformation causes binding. |
| | | | Inspect springs for deformation and stretching. | Springs stretched. |
| 11 | Weekly | Skin Surface | Inspect surface area for punctures, holes and dents exposing interior ribs. | Any damage which allow water into bay interior (If in doubt, perform soap bubble test). |
| | | | Inspect seams for cracked/broken welds. | Cracked/broken welds noted. |
| | | | **NOTE**<br>Ensure latch and receptacle are adjusted property (latch "T" rests snugly against strike catch of corresponding receptacle). | |

*Table 4-3. Unit Preventive Maintenance Checks and Services (PMCS) for the Interior Bay Cont.*

| Item No. | Interval | Location<br>Item to Sewice/Check | Item To Be Inspected<br>Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 12 | Weekly | Bridge Latch | Inspect brackets, supports and pins for cracks, broken welds and deformation. | Cracks, broken welds noted or deformation causes binding. |
| | | | Inspect springs for deformation and stretching. | Springs stretched. |
| 13 | Weekly | Travel Latch | Inspect brackets, supports and pins for cracks, broken welds and deformation. | Cracks, broken welds noted or deformation causes binding. |
| | | | Inspect springs for deformation and stretching. | Springs stretched. |
| 14 | Weekly | Travel Latch Receptacle | Inspect brackets, shims and strike catches or cracks, broken welds, binding and deformation. | Broken welds, binding or deformation prevents engaging latch noted. |
| 15 | Weekly | Bridge Latch | Inspect brackets, supports and pins for cracks, broken welds and deformation. | Cracks, broken welds noted or deformation causes binding. |
| | | | Inspect springs for deformation and stretching. | Springs stretched. |
| 16 | Weekly | Skin Surface | Inspect surface area for punctures, holes and dents exposing interior ribs. | Any damage which allow water into bay interior (If in doubt, perform soap bubble test). |
| | | | Inspect seams for cracked/broken welds. | Cracked/broken welds noted. |
| 17 | Weekly | Foldlock Latch | Inspect brackets, supports and pins for cracks, broken welds and deformation. | Cracks, broken welds noted or deformation causes binding. |
| | | | Inspect springs for deformation and stretching. | Springs stretched. |
| 18 | Weekly | Skin Surface | Inspect surface area for punctures, holes and dents exposing interior ribs. | Any damage which allow water into bay interior (If in doubt, perform soap bubble test). |
| | | | Inspect seams for cracked/broken welds. | Cracked/broken welds noted. |
| 19 | Weekly | Unfolding Mechanism | Ensure unfolding mechanism functions properly.<br>Inspect cover plate, spring pins, pins, lever, and connecting link for cracks, broken welds and deformation. | Broken welds noted or deformation prevents mechanism for functioning properly. |
| 20 | Weekly | Bridge Latch Receptacle | Inspect brackets, shims and strike catches for cracks, broken welds, binding and deformation. | Broken welds, binding or deformation prevents engaging latch noted. |

*Table 4-3. Unit Preventive Maintenance Checks and Services (PMCS) for the interior Bay cont.*

| Item No. | Interval | Location<br>Item to Service/Check | Item To Be Inspected<br>Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 21 | Weekly | Tie Down Pin | Inspect pin weld seams for broken welds.<br>Inspect pin for erosion of pin surface. | Broken welds noted or erosion of surface area prevents securing bay to transponder. |
| 22 | Weekly | Skin Surface | Inspect surface area for punctures, holes and dents exposing interior ribs. | Any damage which allow water into bay interior (If in doubt, perform soap bubble test). |
| | | | Inspect seams for cracked/broken welds. | Cracked/broken welds noted. |
| 23 | Weekly | Tie Down Pin | Inspect pin weld seams for broken welds.<br>Inspect pin for erosion of pin surface. | Broken welds noted or erosion of surface area prevents securing bay to transporter. |
| 24 | Weekly | Bridge Latch Receptacle | Inspect brackets, shims and strike catches for cracks, broken welds, binding and deformation. | Broken welds, binding or deformation prevents engaging latch noted. |
| 25 | Weekly | Unfolding Mechanism | Ensure unfolding mechanism functions properly.<br>Inspect cover plate, spring pins, pins, lever, and connecting link for cracks, broken welds and deformation. | Broken welds noted or deformation prevents mechanism for functioning properly. |
| 26 | Weekly | Skin Surface | Inspect surface area for punctures, holes and dents exposing interior ribs. | Any damage which allow water into bay interior (If in doubt, perform soap bubble test). |
| | | | Inspect seams for cracked/broken welds. | Cracked/broken welds noted. |
| 27 | Weekly | Foldlock Latch | Inspect brackets, supports and pins for cracks, broken welds and deformation. | Cracks, broken welds noted or deformation causes binding. |
| | | | Inspect springs for deformation and stretching. | Springs stretched. |
| 28 | Weekly | Skin Surface | Inspect surface area for punctures, holes and dents exposing interior ribs. | Any damage which allow water into bay interior (If in doubt, perform soap bubble test). |
| | | | Inspect seams for cracked/broken welds. | Cracked/broken welds noted. |

*Table 4-3. Unit Preventive Maintenance Checks and Services (PMCS) for the interior Bay cont.*

| Item No. | Interval | Location<br>Item to Service/Check | Item To Be Inspected<br>Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 29 | Weekly | Bridge Latch | Inspect brackets, supports and pins for cracks, broken welds and deformation. | Cracks, broken welds noted or deformation causes binding. |
| | | | Inspect springs for deformation and stretching. | Springs stretched. |
| 30 | Weekly | Travel Latch | Inspect brackets, supports and pins for cracks, broken welds and deformation. | Cracks, broken welds noted or deformation causes binding. |
| | | | Inspect springs for deformation and stretching. | Springs stretched. |
| 31 | Weekly | Travel Latch Receptacle | Inspect brackets, shims and strike catches or cracks, broken welds, binding and deformation. | Broken welds, binding or deformation prevents engaging latch noted. |
| 32 | Weekly | Bridge Latch | Inspect brackets, supports and pins for cracks, broken welds and deformation. | Cracks, broken welds noted or deformation causes binding. |
| | | | Inspect springs for deformation and stretching. | Springs stretched. |
| 33 | Weekly | Skin Surface | Inspect surface area for punctures, holes and dents exposing interior ribs. | Any damage which allow water into bay interior (If in doubt, perform soap bubble test). |
| | | | Inspect seams for cracked/broken welds. | Cracked/broken welds noted. |
| 34 | Weekly | Foldlock Latch | Inspect brackets, supports and pins for cracks, broken welds and deformation. | Cracks, broken welds noted or deformation causes binding. |
| | | | Inspect springs for deformation and stretching. | Springs stretched. |
| 35 | Monthly | Hinges and Pins | Inspect bow to roadway ponton hinge brackets and pins for cracks and elongation. | Any hinge cracked or elongation allows pin to move freely. |
| 36 | Monthly | Support Links | Inspect for broken welds, cracks and deformation. | Broken welds noted. |
| 37 | Monthly | Lifting Eye | Inspect for cracks and elongation of eye. | Any cracks noted or eye elongation equals 25% of original circumference. |
| 38 | Monthly | Cable Guide | Inspect for cracks, gouges, jagged protrusions, erosion or surface area and elongation of eye. | Eye cracked, elongated more than 0.50 at upper arc or aluminum eroded to within .050. |

*Table 4-3. Unit Preventive Maintenance Checks and services (PMCS) for the interior Bay cont.*

| Item No. | Interval | Location<br>Item to Service/Check | Item To Be Inspected<br>Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 39 | Monthly | Lower Lock Drive | Inspect screw and threads for cracks, burrs, nicks and deformation.<br>Inspect trunions, and drive pin for cracks.<br>Inspect cover bumpers and supports for broken welds and deformation. | Screw will not extend or retract drive pin properly.<br>Cracks or broken welds noted. |
| 40 | Monthly | Support Links | Inspect for broken welds, cracks and deformation. | Broken welds noted. |
| 41 | Monthly | Lifting Eye (Rear) | Inspect for cracks and elongation of eye.<br>NOTE<br>Cable, when adjusted correctly, will be taut NOT tight. | Any cracks noted or eye elongation equals 25% of original circumference. |
| 42 | Monthly | Unfolding Cable Assembly | Check cable adjustment.<br>Inspect for kinks, frayed or broken strands, compressed or flat areas. | Cable out of adjustment.<br>Kinks frayed, broken, compressed of flat surface areas noted. |
| 43 | Monthly | Cable Guide | Inspect for cracks, gouges, jagged protrusions, erosion or surface area and elongation of eye. | Eye cracked, elongated more than 0.50 at upper arc or aluminum eroded to within .050. |
| 44 | Monthly | Unfolding Cable Assembly | Check cable adjustment.<br>Inspect for kinks, frayed or broken strands, compressed or flat areas. | Cable out of adjustment.<br>Kinks frayed, broken, compressed of flat surface areas noted. |
| 45 | Monthly | Lower Lock Drive | Inspect screw and threads for cracks, burrs, nicks and deformation.<br>Inspect trunions, and drive pin for cracks.<br>Inspect cover bumpers and supports for broken welds and deformation.<br>**NOTE**<br>To inspect the following items properly, bay must be unfolded (on ground or in water). | Screw will not extend or retract drive pin properly.<br>Cracks or broken welds noted. |

*Table 4-3. Unit Preventive Maintenance Checks and Services (PMCS) for the Interior Bay cont.*

| Item No. | Interval | Location<br>Item to Service/Check | Item To Be Inspected<br>Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 46 | Monthly | Handlerail Posts and Rope | Inspect posts for cracks at support base, cracks/elongation of bolt slots, broken or deformed rope ring | Broken welds allowing water into bay cavity. |
| | | | Inspect rope for frayed or stretched strands. | Posts and rope missing. |
| 47 | Monthly | Lift Pockets and Quick Release Pin | Ensure pin functions properly.<br>Inspect pin for cracks and broken strands on retaining wire rope.<br>Inspect pockets for cracks and broken welds. | |
| 48 | Monthly | Deck Surface | Inspect for punctures, cracks, tears, dents, holes and broken welds. | Any damage which allows water into bay cavity. |
| | | | Check condition of non-skid coating. | |
| 49 | Monthly | Bilge Plug | Ensure plug(s) are secured with wire rope to ponton.<br>Inspect rubber seal for cuts, elasticity and dry rot.<br>Check handle operation.<br>**NOTE**<br>Receptacle consists of entire housing (Block) in which connector is seated. | Any plug missing. |
| 50 | Monthly | Connector Receptacle | Inspect for cracks, broken welds, elongation and deformation.<br>**NOTE**<br>Proper connector has a narrow center bar (0.69 inch); older connectors have thicker (.500) in center bar.<br>Loose or missing set screws will allow water into bay cavity. | Cracks or broken welds noted. Elongation or deformation prevents proper seating of connector. |
| 51 | Monthly | Roadway Connectors | Ensure connector is correct type.<br>Inspect connector, eye bracket, set screws, spring and spring pins for cracks and deformation. | Incorrect connector type.<br>Any defect which prevents proper seating of connector. |
| 52 | Monthly | Roadway Surface | Inspect for ruptured seams, holes punctures and cracked welds. | Any defect allowing water into bay cavities. |

*Table 4-3. Unit Preventive Maintenance Checks and Services (PMCS) for the Interior Bay cont.*

| Item No. | Interval | Location / Item to Service/Check | Item To Be Inspected Procedure | Equipment Is Not Ready/Available If |
|---|---|---|---|---|
| 53 | Monthly | Roadway | Inspect for ruptured seams, holes punctures and cracked welds. | Any defect allowing water into bay cavities. |
| 54 | Monthly | Roadway Connectors | Ensure connector is correct type. | Incorrect connector type. |
| | | | Inspect connector, eye bracket, set screws, spring and spring pins for cracks and deformation. | Any defect which prevents proper seating of connector. |
| 55 | Monthly | Connector Receptacle | Inspect for cracks, broken welds, elongation and deformation. | Cracks or broken welds noted. Elongation or deformation prevents proper seating of connector. |
| 58 | Monthly | Bilge Plug | Ensure plug(s) are secured with wire rope to ponton. | Any plug missing. |
| | | | Inspect rubber seal for cuts, elasticity and dry rot. | |
| | | | Check handle operation. | |
| 57 | Monthly | Lift Pockets and Quick Release Pin | Ensure pin functions property. | |
| | | | Inspect pin for cracks and broken strands on retaining wire rope. | |
| | | | Inspect pockets for cracks and broken welds. | |
| 58 | Monthly | Handlerail Posts and Rope | Inspect posts for cracks at support base, cracks/elongation of bolt slots, broken or deformed rope ring | Broken welds allowing water into bay cavity. |
| | | | Inspect rope for frayed or stretched strands. | Posts and rope missing. |
| 59 | Monthly | Deck Surface | Inspect for punctures, cracks, tears, dents, holes and broken welds. | Any damage which allows water into bay cavity. |
| | | | Check condition of non-skid coating. | |

## Section IV. UNIT TROUBLESHOOTING


| Paragraph | | Page |
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| 4-14. | Unit Troubleshooting procedures | 4-26 |


4-13. **General.** This section contains troubleshooting procedures to determine the probable cause of observed equipment malfunctions. Tests or inspections are provided to isolate the faulty component and corrective actions are provided to eliminate the malfunction.

### 4-14. Unit Troubleshooting Procedures.

*a.* The inspections made while the component(s) is mounted on the equipment are, for the most part, visual. For thorough inspections, equipment must be down-loaded and components actually operated.

*b.* The appearance of a component or assembly will indicate its general condition. Examine closely for dented or cracked surfaces; bent, pinched or broken lines or parts; fungus growth, moisture, corrosion, dirt or other foreign matter; wear, oil leakage, tampering, or other evidence of misuse that might indicate the source of trouble.

c. Refer to the symptom index to locate the troubleshooting procedure for the observed malfunction. The table lists the common malfunctions that may occur during the operation or maintenance of the engine. Perform the test or inspection, and the recommended corrective action in the order listed in the troubleshooting table. If the malfunction is corrected by a specific corrective action, do not continue with the remaining steps, if any, of the troubleshooting procedure. If the malfunction is not corrected by the listed corrective actions notify your supervisor.

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*Table 4-4. Unit Troubleshooting.*

| Malfunction<br>Test or Inspection<br>Corrective Action |
|---|
| ELECTRICAL |
| 1. FLOODLIGHTS INOPERATIVE |
| step 1. Verify switch position on individual lights and at control console. |
| Turn switches to ON position. |
| Step 2. Inspect each floodlight for defective lamp. |
| Replace faulty lamp. |
| Step 3. Inspect for damaged leads and connectors. |
| Repair or replace damaged leads and connectors. |
| step 4. Test switch on each floodlight for proper operation. |
| Replace faulty switch. |
| 2. CLEARANCE AND MARKER LIGHTS INOPERATIVE |
| Step 1. Inspect each light/marker for faulty lamp. |
| Replace faulty lamp. |
| Step 2. Inspect for damaged or loose leads and connectors. |
| Repair or replace damaged leads and connectors. |
| step 3. Inspect light/marker for proper operation. |
| Replace faulty light/marker. |
| 3. BOOM INOPERATIVE |
| WARNING<br>When disconnecting any hydraulic line, open line slowly and protect face, as hydraulic oil may spray out due to residual pressure in system. |

*Table 4-4. Unit Troubleshooting. - Continued*

| Malfunction<br>Test or Inspection<br>Corrective Action |
|---|

*3.* BOOM INOPERATIVE - Continued

**NOTE**

On Model RBT ensure the selector valve is in the REAR HYDRAULICS position.

Step 1. Check that bridge bay locking pin is retracted.

Position control valve to PIN OUT.

*Step 2.* *Inspect* all hydraulic lines and hoses for evidence of external damage.

Replace tubes or hoses that are dented, ruptured, pinched or crimped.

*Step 3.* Test boom cylinders for internal damage.

a. Disconnect upper hose from one cylinder. Momentarily position control valve to RAISE, and check for oil from open port.

b. If oil flows from open port, connect hose and disconnect lower hose and check for oil flow.

c. If there is no oil flow from the upper port, or there is oil flow from the lower port, the cylinder is defective.

d. Replace faulty cylinder.

4. WINCH DOES NOT OPERATE

WARNING

When disconnecting any hydraulic line, open line slowly and protect face, as hydraulic oil may spray out due to residual pressure in system.

Step 1. Inspect hydraulic lines and hoses for external damage and security.

Replace tubes or hoses that are dented, pinched, crimped, or ruptured.

Step 2. Check oil level of winch.

Service winch assembly as necessary.

*Table 4-4. Unit Troubleshooting. - Continued*

| Malfunction<br>Test Inspection<br>Corrective Action |
|---|

4. WINCH DOES NOT OPERATE - Continued

Step 3. Test winch for internal damage.

a. Disconnect lower hose from winch, momentarily position control valve to PAY OUT, and check for oil flow.

b. If there is no oil flow, refer to Step *4.* If oil flow is present, reconnect lower hose and disconnect upper hose. Momentarily position control valve to PAY OUT.

c. If oil flow is present, and winch operates, refer to Step 4.

d. If no oil flow is present, winch is faulty. Notify direct support maintenance personnel.

Step 4. Test for faulty single overcenter valve. Disconnect line from tee at valve, momentarily position control valve to PAY OUT, and check for oil flow.

a. If no oil flow is present, replace single overcenter valve.

b. If oil flow is present, reconnect line, then disconnect return line (V) from valve. Momentarily position control valve to PAY OUT and check for oil flow.

c. If no oil flow is present, single overcenter valve is faulty.

d. Replace faulty single overcenter valve (FIGURE *4-16).*

*5.* CABLE TENSIONER INOPERATIVE, (MODEL RBT)

WARNING

When disconnecting any hydraulic line, open line slowly and protect face, as hydraulic oil may spray out due to residual pressure in system.

Step 1. Inspect hydraulic lines and hoses for external damage and security.

Replace tubes or hoses that are dented, pinched, crimped, or ruptured.

Step 2. Check adjustment and sheaves for binding and ensure winch is operating.

Adjust cable tensioner.

*Table* 4-4. *Unit Troubleshooting. - Continued*

| Malfunction<br>Test Inspection<br>Corrective Action |
|---|

5. CABLE TENSIONER INOPERATIVE, (MODEL RBT) - Continued

step 3. Test cable tensioner for internal damage.

a. Disconnect hose attaching to (Cl) on cable tensioner valve, momentarily position control valve to WINCH OUT, and check for oil flow.

b. If oil flow was present, replace cable tensioner.

6. CABLE TENSIONER CONTROL VALVE INOPERATIVE, (MODEL RBT)

WARNING

When disconnecting any hydraulic line, open line slowly and protect face, as hydraulic oil may spray out due to residual pressure in system.

Step 1. Disconnect line attaching to (VI) on cable tensioner valve, momentarily position control valve to WINCH OUT, and check for oil flow.

Step 2. If oil flows from line, replace cable tensioner valve.

7. LOCKING CYLINDER INOPERATIVE

WARNING

When disconnecting any hydraulic line, open line slowly and protect face, as hydraulic oil may spray out due to residual pressure in system.

Step 1. Inspect hydraulic lines and hoses for external damage.

Replace tubes or hoses that are dented, pinched, crimped, or ruptured.

Step 2. Check pin and arm for binding and ensure that quick release pin is not preventing operation.

Replace damaged parts.

*Table 4-4. Unit Troubleshooting. - Continued*

| Malfunction<br>Test or Inspection<br>Corrective Action |
|---|

7. LOCKING CYLINDER INOPERATIVE - Continued

Step 3. Test cylinder for internal damage. Disconnect upper (rod end) hose from cylinder port, momentarily position control valve to PIN-OUT, and check for oil flow from open port.

a. If oil discharges from open port (cylinder operates), stop, connect upper hose and refer to Step 4.

b. If no oil flows from open port, reconnect upper hose and disconnect lower hose. Momentarily position control valve to PIN-OUT and check for oil flow from lower port.

c. If there is no oil flow from lower part, stop, connect hose and refer to Step 4.

d. If oil flow is present from lower port, cylinder is faulty. Replace defective cylinder.

Step 4. Test for faulty dual overcenter valve. Disconnect input line (Port V1) to dual overcenter valve, momentarily position control valve to PIN, and check for oil flow.

a. If there is no oil from line, refer to Step 5.

b. If there is oil flow, reconnect input line, disconnect return line (Port Cl), momentarily position control valve to PIN, and check for oil flow.

c. If there is no oil flow, replace dual overcenter valve.

Step 5. Test for faulty control valve. Disengage PTO, disconnect input line (fitter) to control valves, engage PTO momentarily, and check for oil flow.

a. If oil flow is not present, refer to malfunctions 9 and 10.

b. If oil flow is present, reconnect input line and disconnect output line of valve section. Momentarily position control valve to PIN and check for oil flow.

c. If no oil flow is present, reconnect output line and disconnect return line to reservoir. Momentarily position control valve to PIN and check for oil flow.

d. If no oil flow is present, replace control valve.

*Table 4-4. Unit Troubleshooting. - Continued*

| Malfunction<br>Test or Inspection<br>Corrective Action |
|---|

8. PRESSURE INDICATOR IN TRIPPED (UP) POSITION

Step 1. Check for crimped, ruptured, or pinched lines.

Replace damaged line.

Step 2. Check for correct input/output line hookup.

Correct lines property.

Step 3. Inspect for clogged element.

a. Replace element.

b. If indicator continues to trip, replace hydraulic filter assembly.

9. HYDRAULIC PUMP FAILS TO DELIVER OIL (MODEL 2280) For hydraulic pump failure on Model RBT, refer to TM 9-2320-272-20. (Hydraulic pump is part of M945 chassis.)

Step 1. Check for crimped, dented, or pinched hydraulic lines.

Replace damaged lines.

Step 2. Check for loose or damaged PTO shaft assembly.

Secure loose shaft or replace damaged shaft assembly.

10. HYDRAULIC RESERVOIR DOES NOT DELIVER SUFFICIENT OIL

Step 1. Inspect for clogged filter.

Clean or replace fitter assembly.

step 2. Check for crimped, ruptured, or pinched hydraulic lines.

Replace damaged lines.

Step 3. Inspect for clogged strainer.

Replace or clean strainers.

Step 4. Inspect service reservoir.

11. BAY DOES NOT OPEN PROPERLY

Step 1. Check unfolding lever and pins for binding.

Clean, lubricate, repair or replace defective components.

*Table 4-4. Unit Troubleshooting. - Continued*

| Malfunction<br>Test or Inspection<br>Corrective Action |
|---|

11. BAY DOES NOT OPEN PROPERLY - Continued

Step 2. Check cable adjustment.

Adjust cables.

12. RAMP DOES NOT ACTIVATE WHEN PUMP HANDLE IS PUMPED

Step 1. Check position of control and vent valves.

Position valves correctly.

Step 2. Inspect reservoir for proper oil level.

Service reservoir.

Step 3. Check for crimped, ruptured, pinched or hydraulic lines.

Replace damaged lines and tighten loose fittings.

Step 4. Test cylinder and pump for internal damage.

a. Disconnect line at lower end of cylinder, operate pump in PUMP mode, and check for oil flow.

b. If no oil flow is present, replace pump.

c. If oil flow is present, reconnect lower line, disconnect upper line, and operate pump again.

d. If oil flow is present, and cylinder extends, replace pump.

e. If no oil flows from the cylinder, cylinder is defective.

13. BAY LOWER LOCK DRIVE SCREW DOES NOT MOVE FREELY

WARNING

Dry cleaning solvent, PD-680, used to clean parts is potentiality dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100-138ʻF (39-59 °C).

Step 1. Check drive screw for freedom of movement and binding.

Apply grease per MIL-G-21164 to screw threads.

Step 2. Check condition of threads and adjustment of lower lock drive.

Replace damaged lower lock drive.

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4-15. **General.** This section contains unit level Maintenance Procedures as authorized by the MAC in Appendix B of this manual. Some maintenance procedures may require more than one person. Ensure adequate number of personnel are available before performing maintenance procedure.

4-16. **Painting.** General instructions for painting the ribbon bridge transporter interior bay, and ramp bay are included in TM 9-213, AR 746-5, and TB 746-93-1.

## 4-17. Floodlights.

This task covers: a. Replace b. Repair

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Materials/Parts*

Solvent, Dry Cleaning (Item 18, Appendix E)
Rags, Wiping (Item 12, Appendix E)

*Equipment Condition:*

Floodlight switch in OFF position.

**NOTE**

There are two floodlights on the transporter. The maintenance procedures are the same for both.

*a. Replace.* (figure 4-1)

(1) Tag and disconnect wiring from floodlight (1).

(2) Remove two nuts (2) and washer (3).

(3) Remove floodlight (1) and washer (4).

(4) Install washer (4) on new floodlight (1).

(5) Install floodlight (1) and secure with washer (3) and two nuts (2).

(6) Connect wiring as tagged to floodlight (1).

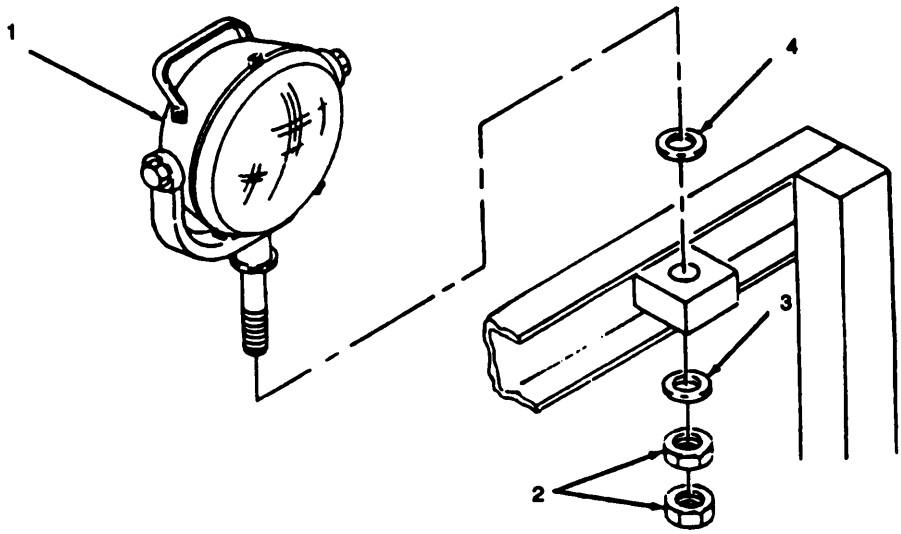



*Figure 4-1. Floodlights, Replace.*

## 4-17. **Floodlights. - Continued**

*b.* *Repair.* (figure 4-2)

(1) Loosen three screws (1) and remove door (2).

(2) Remove four springs (3) and pull lamp (4) partially out of body (5).

(3) Tag and disconnect wiring from lamp (4) and remove.

(4) Remove two screws (6) and remove switch retainer (7).

(5) Remove two screws (8) and washers (9) and remove switch (10) and holder (11).

(6) Tag and remove wiring (12) from body (5).

(7) Remove two bolts (13), six washers (14), four spring washers (15), two washers (16), two spacers (17), two lockwashers (18), and two nuts (19), and separate body (5) from bracket (20).

(8) Remove two grommets (21).

(9) Remove two connector adapters (22).

(10) Remove two grommets (23).

**WARNING**

Dry cleaning solvent PD-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100-138° F (38-60 °C).

(11) Clean all items, except wiring and grommets, with dry cleaning solvent, and dry thoroughly.

(12) Inspect all items and replace all items that are cracked, torn or othenwise damaged.

(13) Install two grommets (23).

(14) Install two connector adapters (22).

(15) Install two grommets (21).

(16) Position body (5) in bracket (20) and secure with two bolts (13), six washers (14), four spring washers (15), two washers (16), two spacers (17), two lockwashers (18), and two nuts (19).

(17) Install holder (11), switch (10) and secure with two screws (8) and washers (9).

(18) Install switch retainer (7) and secure with two screws (6).

(19) Connect wiring as tagged to body (5).

(20) Connect wiring to lamp (4) as tagged and install lamp (4) and Secure with four springs (3).

(21) Install door (2) and secure with three screws (1).

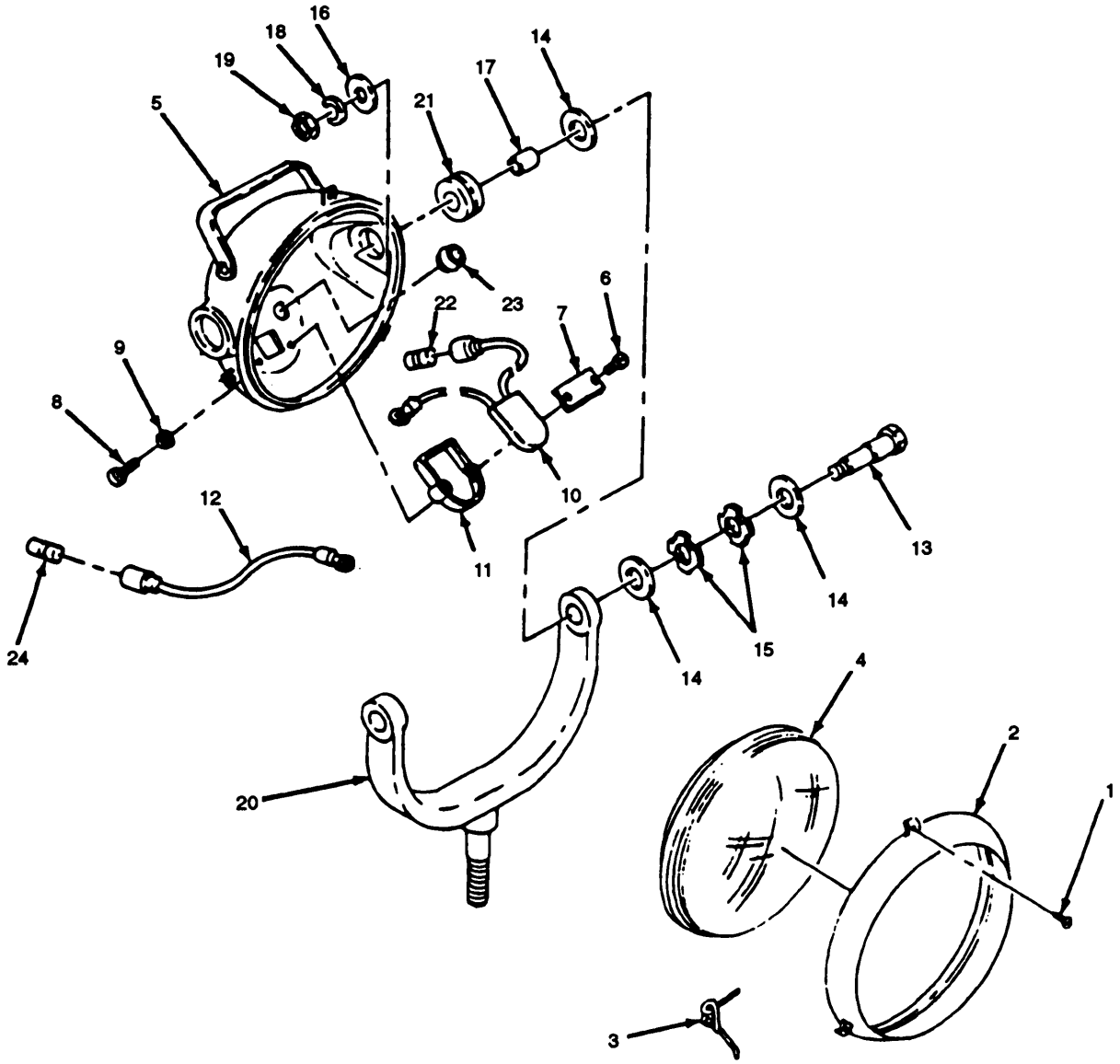



*Figure 4-2. Floodlight, Repair.*

## 4-18. **Floodlight Switch.**

This task covers: Replace

INITIAL SETUP

| *Tool* | *Equipment Condition:* |
|---|---|
| General Mechanic's Automotive Tool Kit | Electrical system circuit breaker set to OFF. |

*a*. *Replace.* (figure 4-3)

(1) Tag and remove wiring from floodlight switch (l).

(2) Remove two screws(2) and washers(3) and remove identification plate (4) and switch (1).

(3) Inspect switch (1) and replace if damaged.

(4) Install switch (1) and identification plate (4) and secure with two screws (2) and washers (3).

(5) Connect wiring as tagged to switch (1).

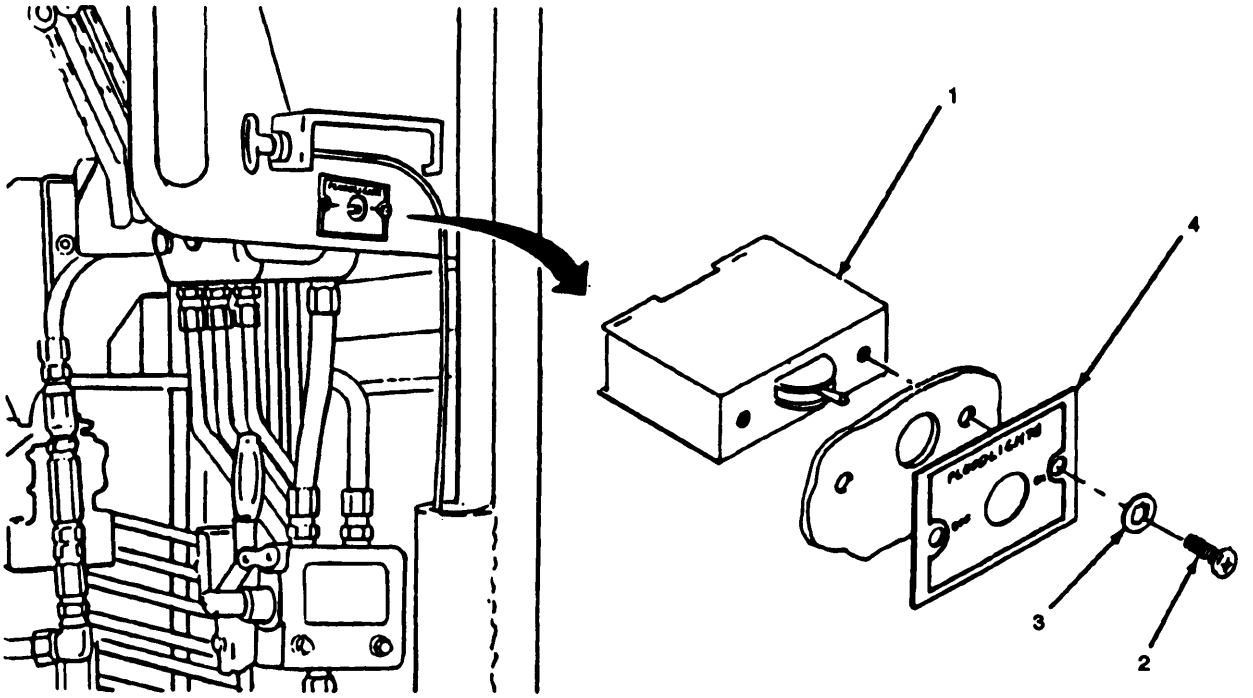



*Figure 4-3. Floodlight Switch, Replace.*

## 4-19. **Floodlight Electrical Leads and Clamps.**

This task covers: a. Replace b. Repair

INITIAL SETUP

| *Tool* | *Equipment Conditions* |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix B) | Bay unloaded (para. 2-16).<br>Electric system circuit breaker set to OFF. |

**NOTE**

The maintenance procedures are the same for all floodlight electrical leads and clamps.

*a. Replace.* (figure 44)

(1) Tag and remove electrical leads (1) from floodlight (2).

(2) Tag and remove electrical lead (1) from floodlight switch.

(3) Tag and remove electrical lead (1) from floodlight (3).

(4) Remove screw (4), washer (5) and cable clamp (6) securing electrical lead (1).

(5) Repeat Step (4). for all remaining cable clamps securing electrical lead (1) and remove.

(6) Install electrical lead (1).

(7) Secure electrical lead (1) with cable clamp (6), screw (4), and washer (5).

(8) Repeat Step (7). for remaining cable clamps.

(9) Connect electrical lead (1) to floodlight switch and floodlights (2) and (3).

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

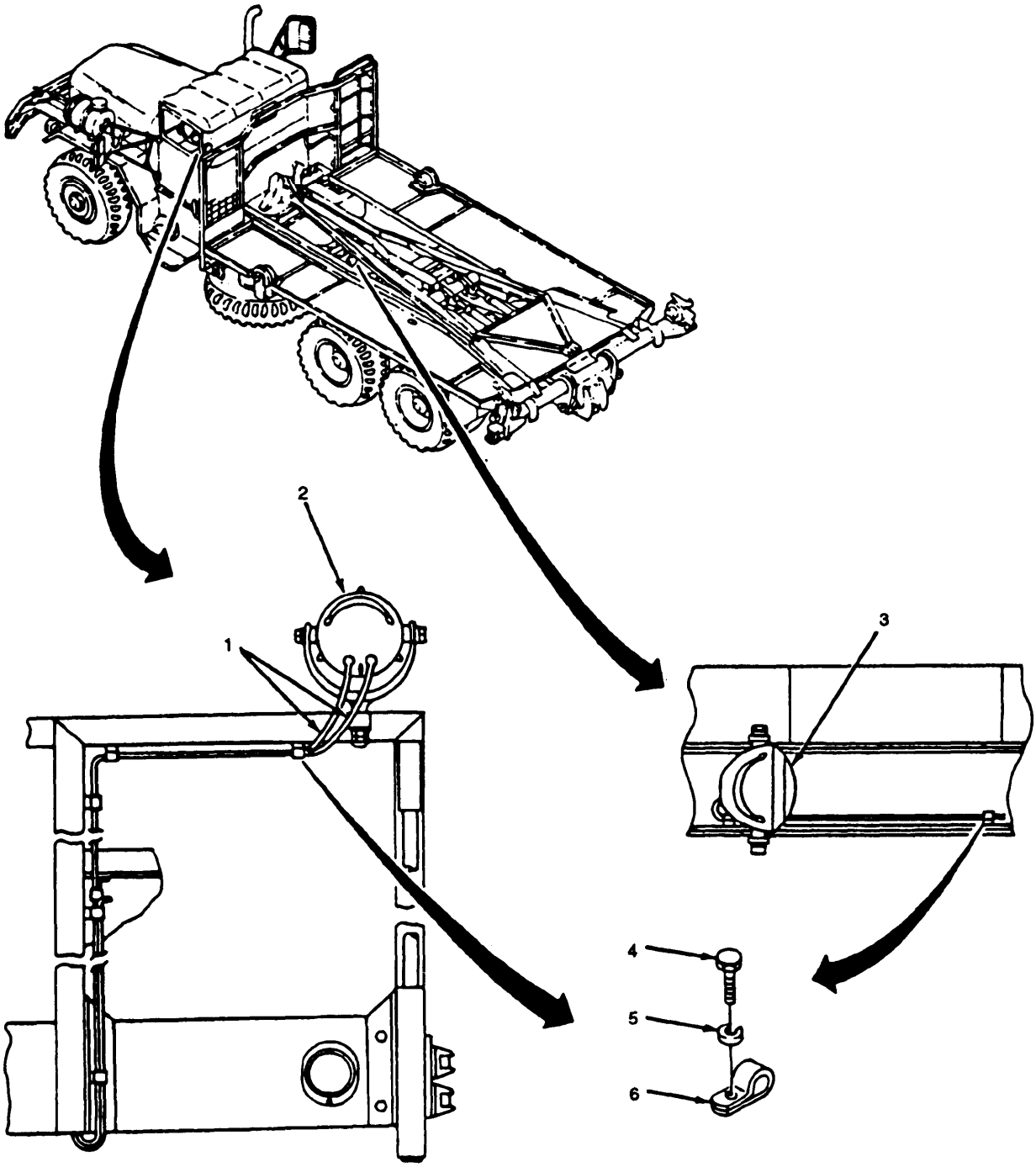



*Figure 4-4. Floodlight Electrical Leads and Clamps, Replace.*

4-19. **Floodlight Electrical Leads and Clamps. - Continued**

*b. Repair.* (figure 4-5)

(1) Inspect floodlight wiring and connectors.

(2) Replace damaged or missing connectors.

(3) Replace wiring if insulation is cracked, burnt, or otherwise damaged.

(4) When replacing wiring or connectors, observe the following:

*(a)* Ensure power to floodlights is removed.

*(b)* Remove all cable clamps securing wiring to be replaced.

*(c)* Tag wiring to ensure proper installation of new wiring or connectors.

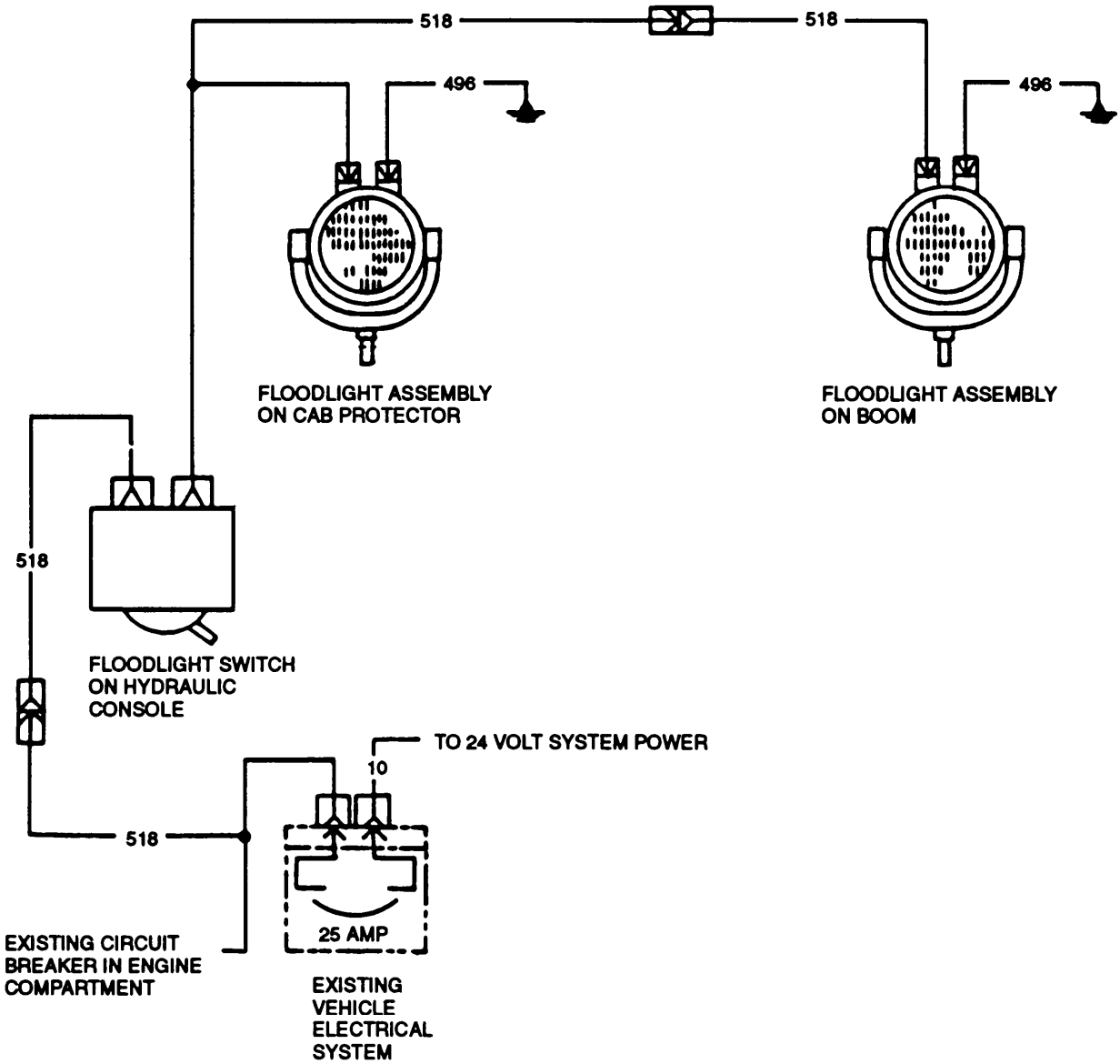



*Figure 4-5. Floodlight Electrical Leads and Clamps, Repair.*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

## 4-20. **Clearance and Marker Lights.**

This task covers: a. Removal b. Repair c. Installation

INITIAL SETUP

| *Tool* | *Equipment Condition* |
|---|---|
| General Mechanic's Automotive TooI Kit (Item 1, Appendix B) | Electric system circuit breaker set to OFF. |

**NOTE**

The maintenance procedures are the same for all.

*a. Removal.* (figure44

(1) Tag and remove electrical leads from clearance and marker light.

(2) Remove two screws (1) and remove door (2) and lens (3).

(3) Remove lamp (4) from base (5).

(4) Remove four screws (6) and locknuts (7) and remove base (5).

*b. Repair.* (figure 4-6)

Inspect all items for wear and replace all items that are worn or otherwise damaged.

c. *Installation.* (figure 4-6)

(1) Install base (5) and secure with four screws (6) and locknuts (7).

(2) Install lamp (4) in base (5).

(3) Install lens (3) and door (2) and secure with two screws (1).

(4) Connect electrical leads, as tagged to clearance and marker light.

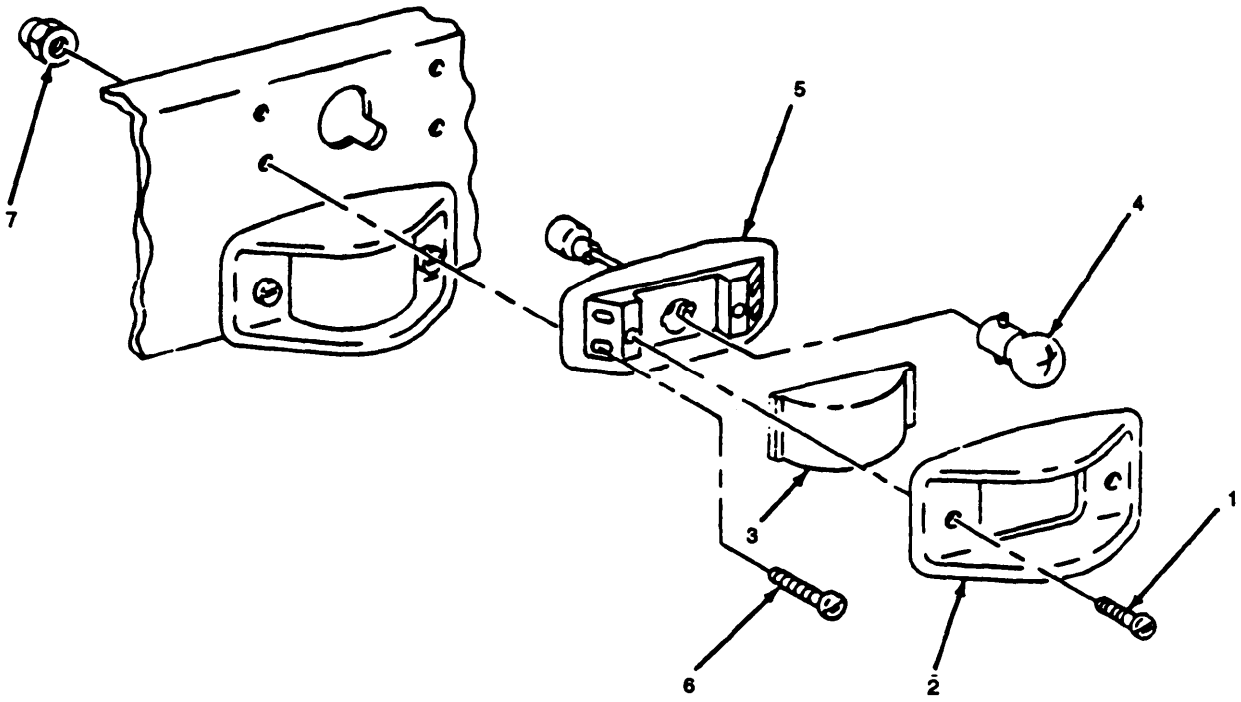



*Figure 4-6. Clearance and Marker Lights, Removal, Repair and Installation.*

## 4-21. Clearance and Marker Lights Electrical Leads and Clamps.

This task covers: a. Removal b. Repair

INITIAL SETUP

*Tool*

*General Mechanic's* Automotive Tool Kit (Item 1, Appendix B)

*Equipment Condition:*

Electric system circuit breaker set to OFF,

**NOTE**

The maintenance procedures are the same for all clearance and marker lights, electrical leads, and clamps.

*a.* Replace. (figure 4-7)

(1) Tag and remove electrical leads (1) from clearance and marker lights (2).

(2) Tag and remove electrical leads (1) from vehicle wiring.

(3) Remove screw (3), washer (4), and remove cable clamp (5) securing electrical leads (1).

(4) Repeat Step (3) for remaining cable clamps and remove electrical leads (1).

(5) Inspect electrical leads (1) and cable clamps and replace all items that are worn or otherwise damaged.

(6) Secure electrical leads (1) with cable clamp (5), screw (3), and washer (4).

(7) Repeat Step (6) for remaining cable clamps.

(8) Connect electrical leads (1), as tagged to clearance and marker lights (2).

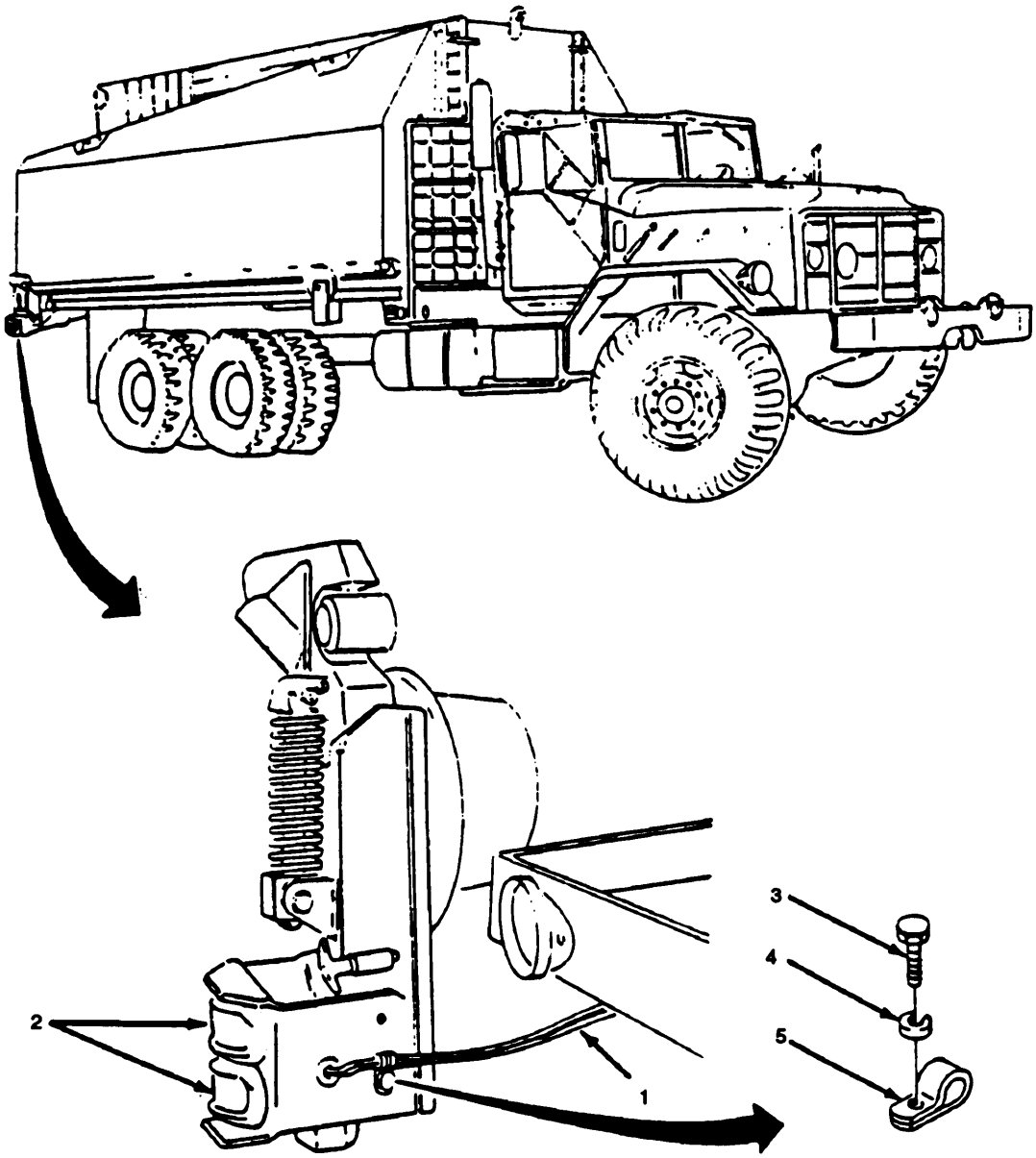



*Figure 4-7. Clearance and Marker Lights Electrical Leads and Clamps, Replacement.*

## 4-21. Clearance and Marker Lights Electrical Leads and Clamps. - Continued

*b. Repair.* (figure 4-8)

(1) Inspect clearance and marker light wiring and connectors.

(2) Replace damaged or missing connectors.

(3) Replace wiring if insulation is cracked, burnt, oro therwise damaged.

(4) When replacing wiring, observe the following:

*(a)* Ensure power to clearance and marker lights is removed.

*(b)* Remove all cable clamps securing wiring to be replaced.

*(c)* Tag wiring to ensure proper installation of new wiring or connectors.

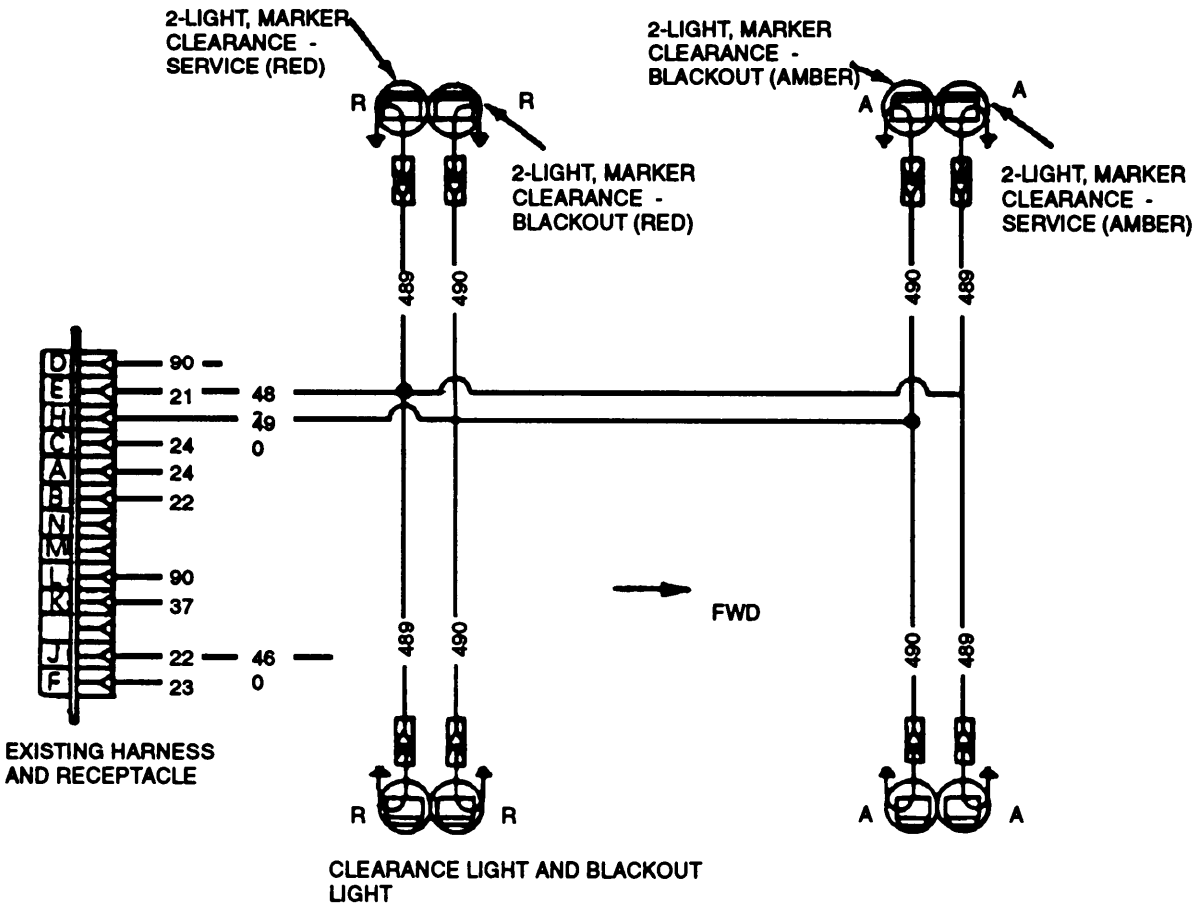



*Figure 4-8. Clearance and Marker Lights Electrical Leads and Clamps, Repair.*

4-22. **Reflectors.**

This task covers: Replace

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit
(Item 1, Appendix B)

**NOTE**

The following procedures are the same for all reflectors.

*a*. *Repair.* (figure 4-9)

(1) Remove two screws (1), lockwashers (2), nuts (3) and remove reflector (4).

(2) Install reflector (4) and secure with two screws (1), lockwashers (2), and nuts (3).

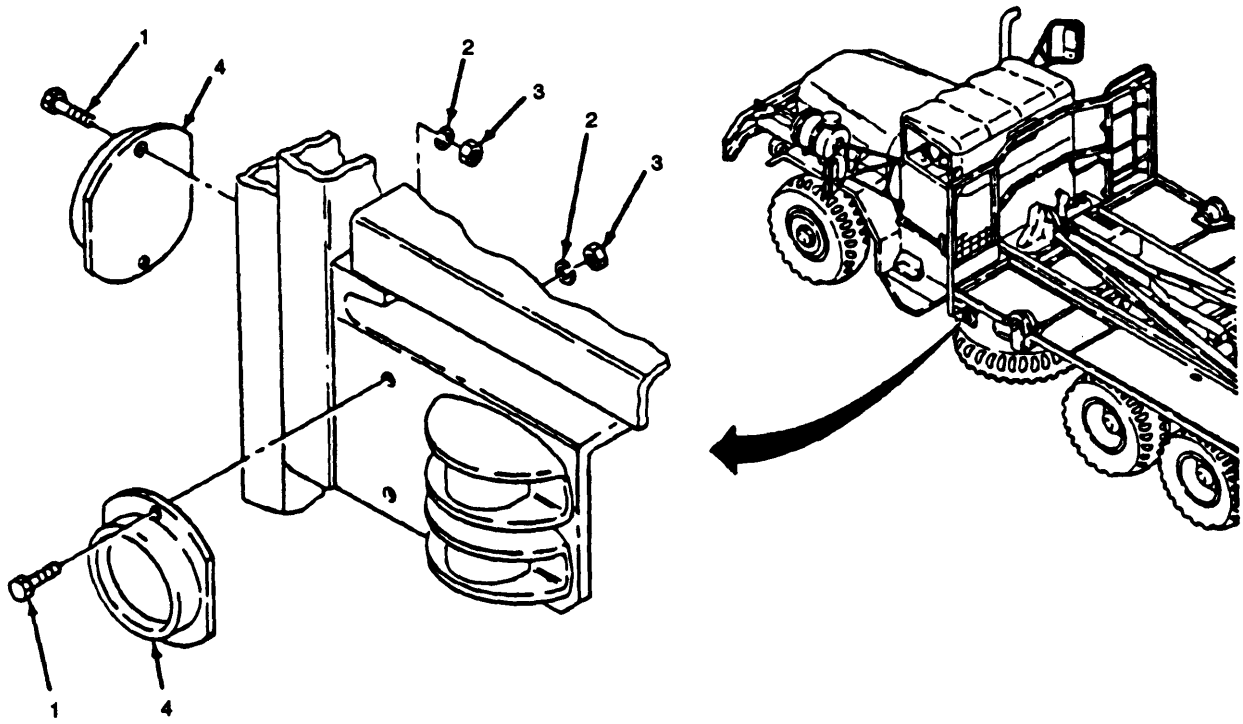



*Figure 4-9. Reflectors, Replace.*

4-23. **Throttle Control.**

This task covers: Replace

INITIAL SETUP

*Tools*

General Mechanic's Automotive Tool Kit
(Item 1, Appendix B)

*a. Replace.* (figure 4-10)

(1) Trace throttle control (1) from cab protector (2) to engine compartment of transporter and remove all clamps securing throttle control (1).

(2) Loosen screw (3) and remove connector (4) from throttle control (1).

(3) Remove nut (5), lockwasher (6), and remove throttle control (1) from cab protector (2).

(4) Install throttle control (1) in cab protector (2).

(5) Install nut (5) and lockwasher (6) on throttle control (1) and tighten nut (5).

(6) Route throttle control (1) to engine compartment and secure with clamps to transporter.

(7) Install throttle control (1) through bracket (7) and install connector (4) on throttle control (1) and tighten screw (3).

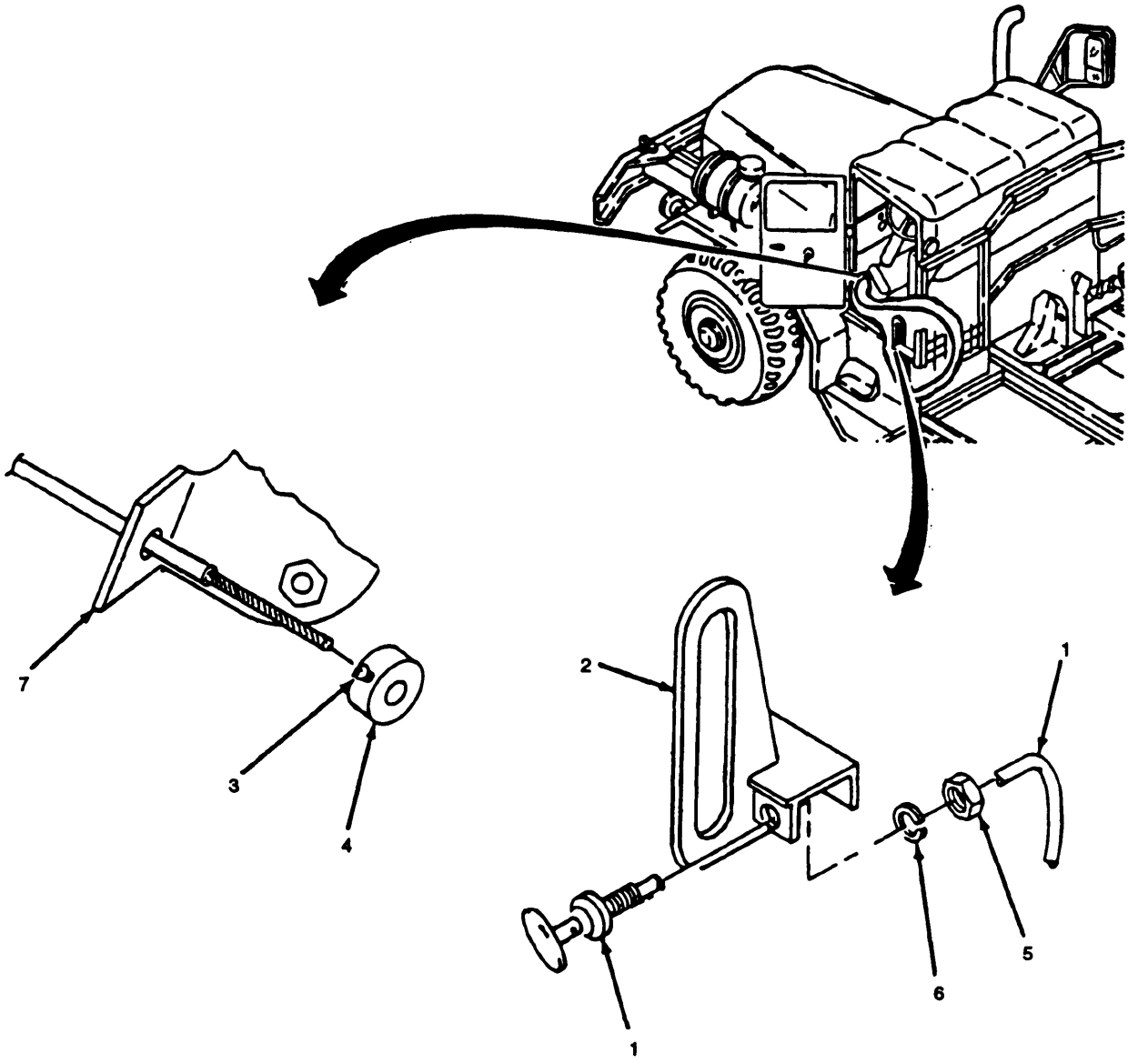



*Figure 4-10. Thrvttle Control, Replace.*

## 4-24. **Mirror and Bracket Assemblies.**

This task covers: Repair

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Materials/Parts*

Solvent, Dry Cleaning (Item 18, Appendix E)
Rags, Wiping (Item 12, Appendix E)

*Equipment Condition:*

Bracket assembly removed (para. 3-7).

**NOTE**

The maintenance procedures are the same for the left and right side mirror and bracket assemblies.

*a. Repair.* (figure 4-11)

**WARNING**

Dry cleaning solvent PD-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100-138°F (38-80 °C).

(1) Clean all parts with dry cleaning solvent, and dry thomughly.

(2) Inspect bracket assembly (1), brace bracket (2), and mirror brace (3), for distortions, broken welds, or other damage.

(3) Repair by straightening or welding as needed.

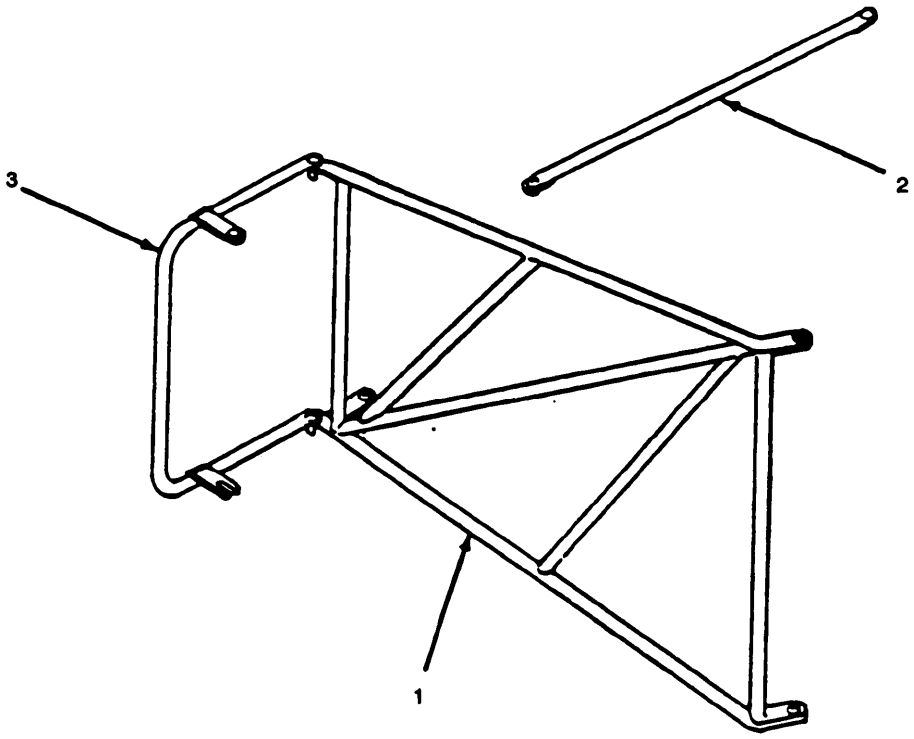



*Figure 4-11. Mirror and Bracket Assemblies, Repair.*

FOLLOW-ON MAINTENANCE: Install bracket assembly (para. 3-7).

## 4-25. Bay Latch Pin and Rope Assembly.

This task covers: Repair

INITIAL SETUP

| *Tool* | *Materials/parts:* |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix B) | Rope, Fibrous (P/N MIL-R-17343) |

*a.* *Repair.* (figure 4-12)

**NOTE**

Protect nylon rope from excessive heat when welding pin.

(1) Repair pin (1) by welding if cracked, or straightening if bent.

(2) Cut a frayed or otherwise damaged rope (2) from pin (1) and remove thimble (3).

(3) Install thimble (3), and splice 25ft. (7.62 m) of rope (2) onto thimble (3).

(4) Sear rope ends at splice and at end of rope.

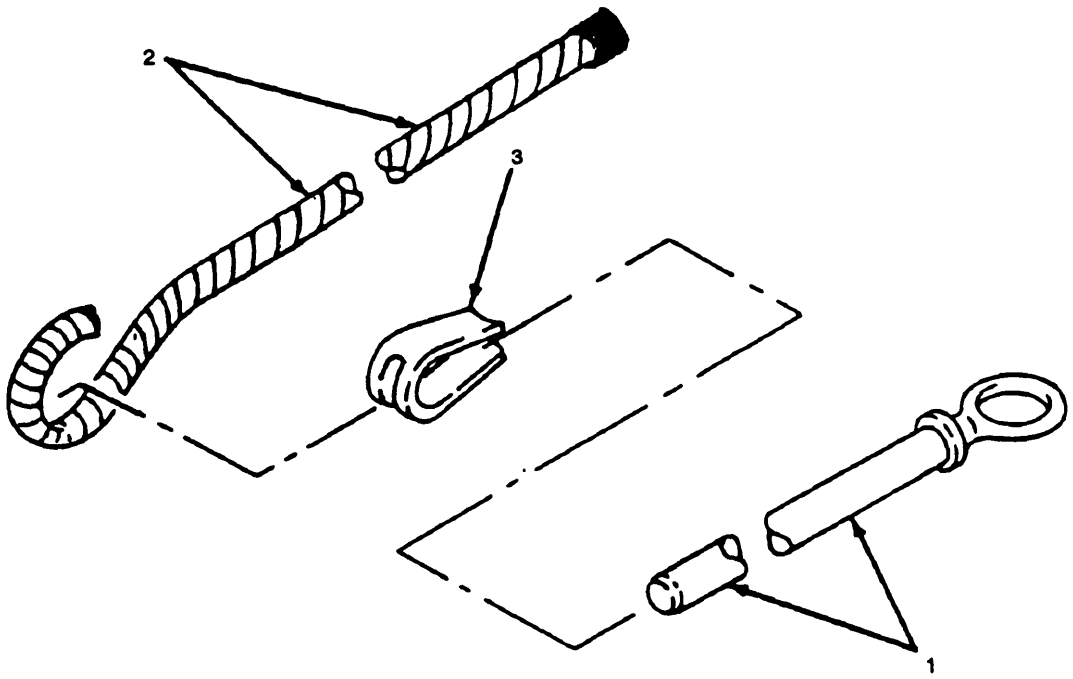



*Figure 4-12. Bay Latch Pin and Rope Assembly, Repair.*

4-26. **Walkways.**

This task covers: a. Replace b. Repair

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit
(Item 1, Appendix B)

*Materials/Parts*

Solvent, Dry Cleaning (Item 18, Appendix E)
Rag, Wiping (Item 12, Appendix E)
Grease, Automotive and Artillery (Item 2, Appendix E)

*Equipment Conditions*

Bay removed (para. 2-16).
Wheel splash guards removed (para. 3-8).
Reflectors removed (para. 4-22).

*a. Replace.* (figure 4-13)

(1) Remove wing nut (1), washer (2), and remove hook or bolt (3).

**NOTE**

Step (2) is for left hand walkway only.

(2) Remove boat hook (4).

**WARNING**

When working under boom, support boom by blocking or other suitable means.

(3) Raise boom (5) approximately 10 ft (3.83 m) and block in place.

(4) Remove 12 screws (6), washers (7), and nuts (8) securing walkway (9).

(5) Remove four screws (10), washers (11), and nuts (12) securing clamp (13) and remove walkway (9).

(6) Apply grease to clamp (13) and walkway (9) at boom pivot point.

(7) Install walkway (9) and secure to boom (5) with clamp (13), four screws (10), washers (11), and nuts (12).

(8) Secure walkway with 12 screws (6), washers (7), and nuts (8).

(9) Remove blocking and lower and secure boom (5).

(lo) Install hook or bolt (3) and secure with washer (2) and wing nut (1).

(11) Install boat hook (4).

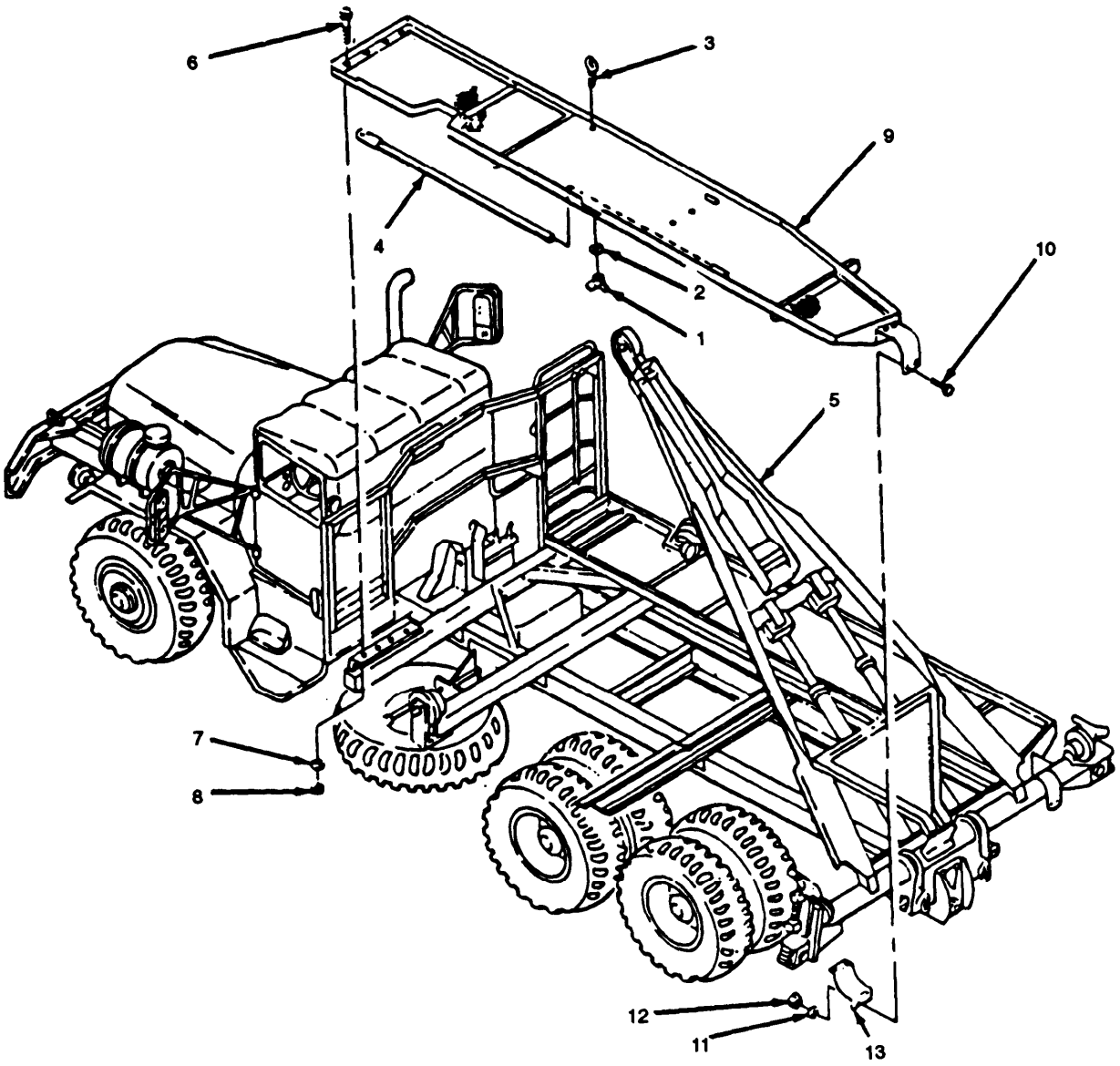



*Figure 4-13. Walkways, Replace.*

FOLLOW-ON MAINTENANCE:
(1) Install wheel splash guards (para. 3-8).
(2) Install reflectors (para. 4-22).
(3) Install bay (para. 2-27).
(4) Install boat hook.

## 4-26. Walkways.-Continued

**NOTE**

Walkways removed for repair. See para. a above.

b. *Repair.* (figure 4-14)

**WARNING**

Dry cleaning solvent PD-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100-138°F (38-60°C).

(1) Clean walkway (1) with dry cleaning solvent, and dry thoroughly.

(2) Inspect walkway (1) and repair all cracks, tears, holes or broken welds by welding.

(3) Straighten walkway using an approved sheet metal maintenance procedure.

(4) Apply non-slip deck covering as required.

(5) Spot paint as required.

(6) Install walkway (para. a above).

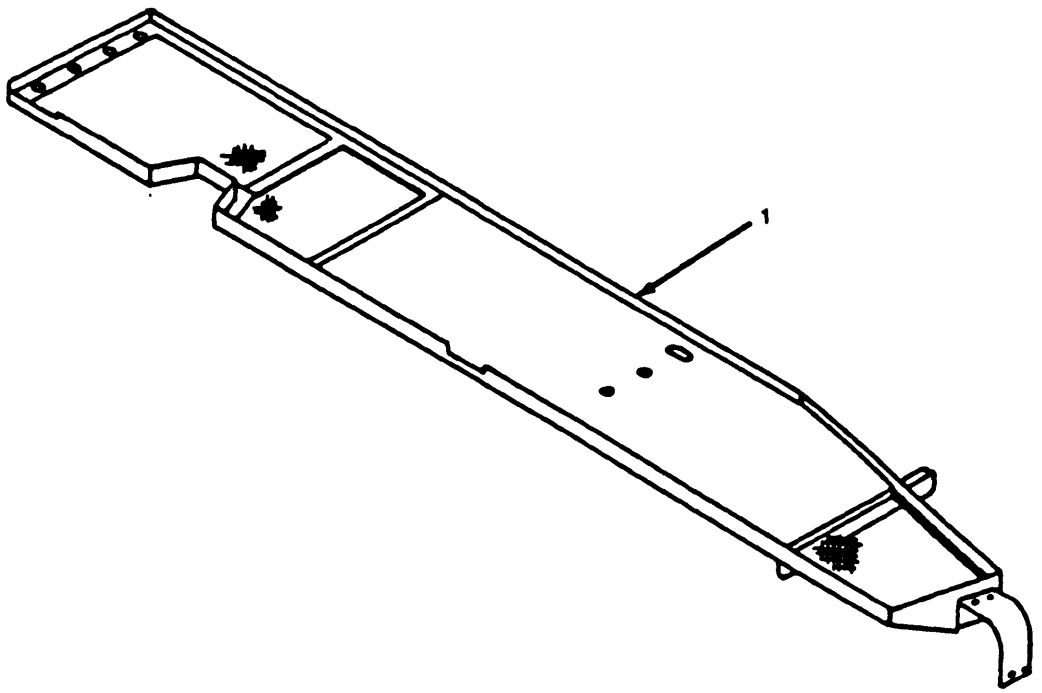



*Figure 4-14. WalkWays, Repair.*

4-27. **Tire Carrier Assembly.**

This task covers: a. Removal b. Repair c. Installation

INITIAL SETUP

| *Tool* | *Materials/parts:* |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix B) | Grease, Automotive and Artillery (Item 2, Appendix E)<br>Solvent, Dry Cleaning (Item 18, Appendix E)<br>Rag, Wiping (Item 12, Appendix E) |

*a. Repair.* (figure 4-15

(1) Remove two nuts (1) securing wheel (2) to wheel support (3) to tire carrier bracket (4).

**WARNING**

When pawl is released from the ratchet the weight of the wheel is free to fall. Do not allow wheel to free fall from stowed position.

(2) Using suitable wrench, turn shaft (5) clockwise enough to remove pressure from pawl (6) and move pawl (6) away from ratchet (7) on shaft (5), and lower wheel (2).

(3) Remove wheel support (3) from wheel (2).

(4) Remove four locknuts (8) and screws (9) and remove tire carrier bracket (4).

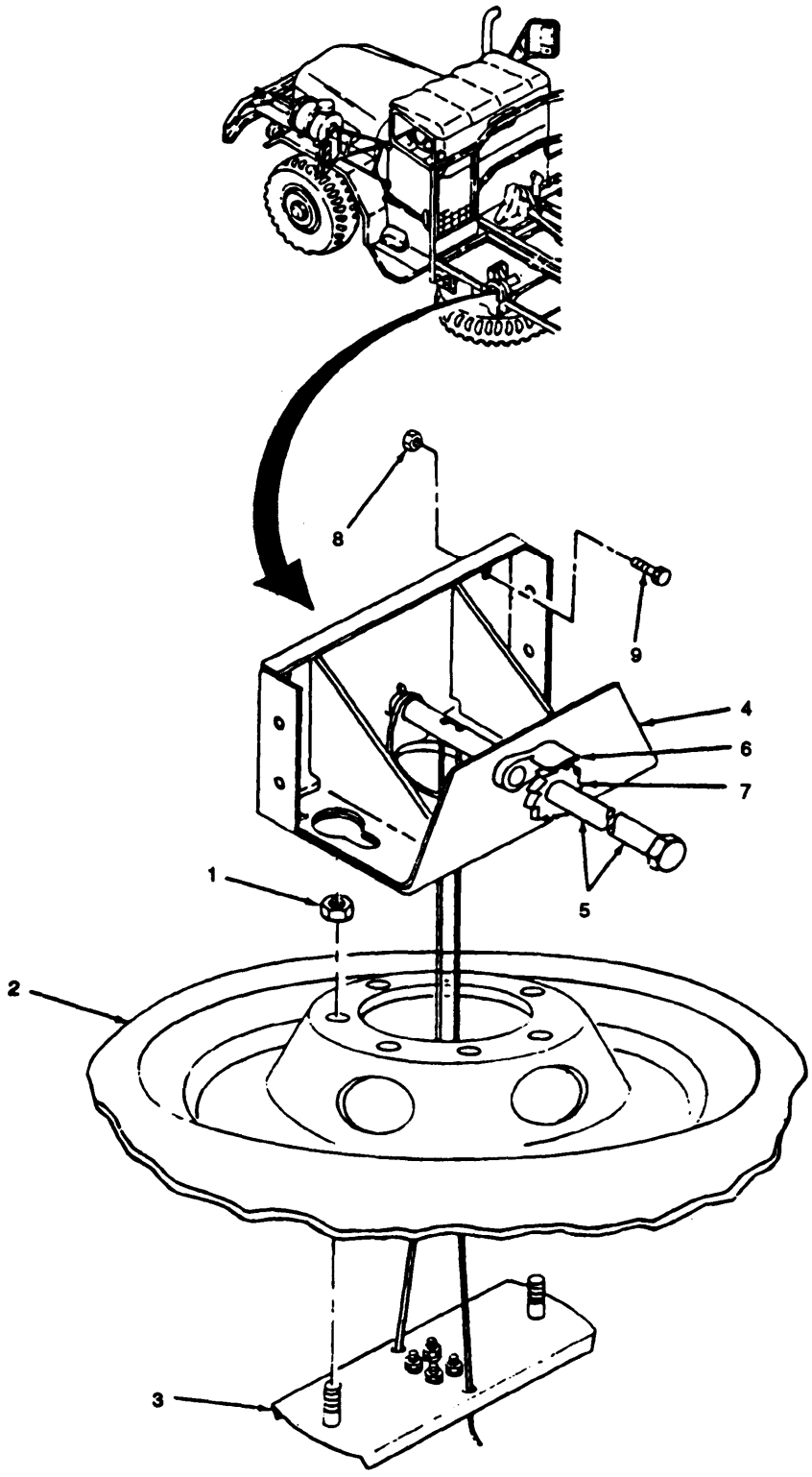



*Figure 4-15. Tire Carrier Assembly, Removal.*

4-27. **Tire Carrier Assembly. - Continued**

*b*. *Repair.* (figure 4-16)

**WARNING**

Always wear leather gloves when handling wire rope. Never allow ire rope to run through bare hands.

(1) Loosen four nuts (1) and lockwashers (2) and remove two U-bolts (3) and wire rope (4) from wheel support (5).

(2) Remove tubes (6) from ends of wire rope (4).

(3) Remove Wire rope (4) from shaft (7).

(4) Remove cotter pin (8) and remove shaft (7) from tire carrier bracket (9).

**WARNING**

Dry cleaning solvent PD-680 used to clean pads is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100-138 °F (38-60 °C).

(5) Clean all items with dry cleaning solvent, and dry thoroughly.

(6) Inspect wire rope (4) and replace if frayed or kinked.

(7) Inspect tire carrier bracket (9) and replace if cracked or otherwise damaged.

(8) Inspect shaft (7) and replace if cracked or if ratchet (10) is missing teeth.

(9) Apply grease to shaft (7) and tire carrier bracket (9) where they contact each other.

(10) Install shaft (7) and secure with cotter pin (8).

(11) Install wire rope (4) in shaft (7).

(12) Install tubes (6) on ends of wire rope (4).

(13) Install wire rope (4) through wheel support (5) and secure with two U-bolts (3), nuts (1) and lockwashers (2).

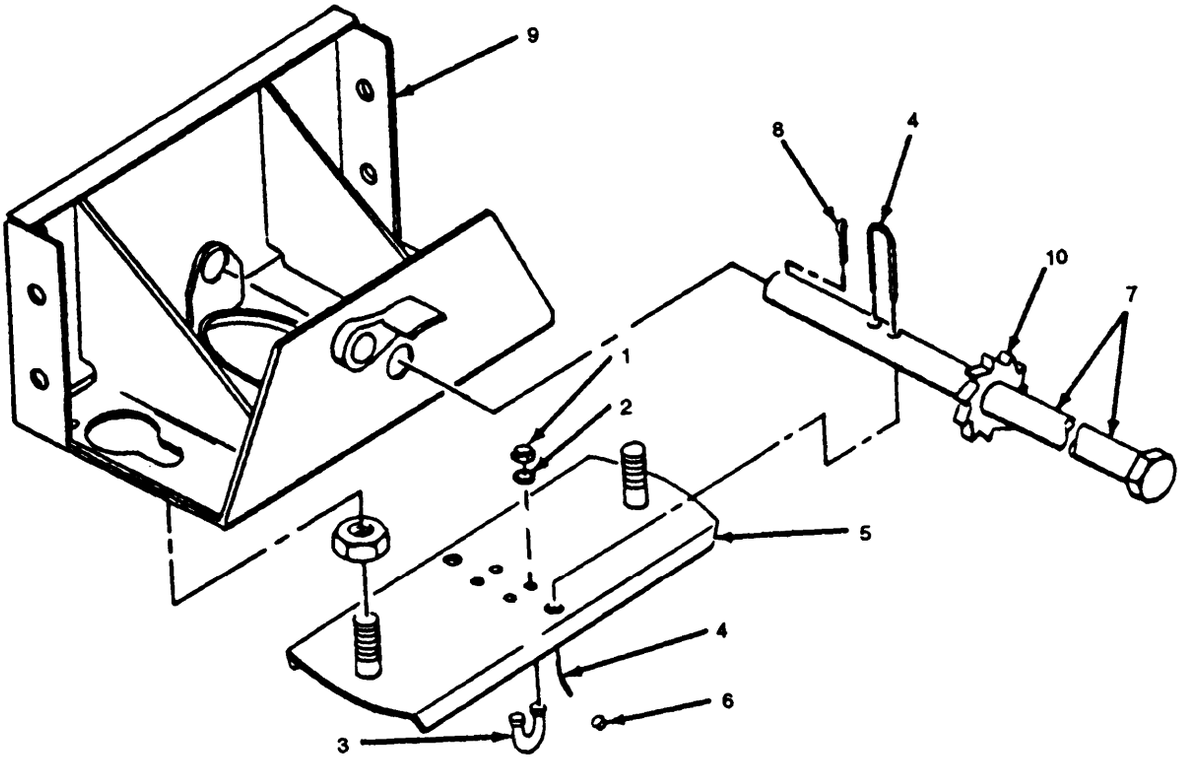



*Figure 4-16. Tire Carrier, Repair.*

4-27. **Tire Carrier Assembly. - Continued**

*c.* *Installation.* (figure 4-17)

(1) Install tire carrier bracket (1) and secure with four screws (2) and locknuts (3).

(2) Install wheel support (4) in wheel (5).

(3) Position pad (6) against ratchet (7).

(4) Turn shaft (8) clockwise and raise wheel (5) making sure studs (9) aline with holes in tire carrier bracket (1).

(5) Service wheel (5) with two nuts (10).

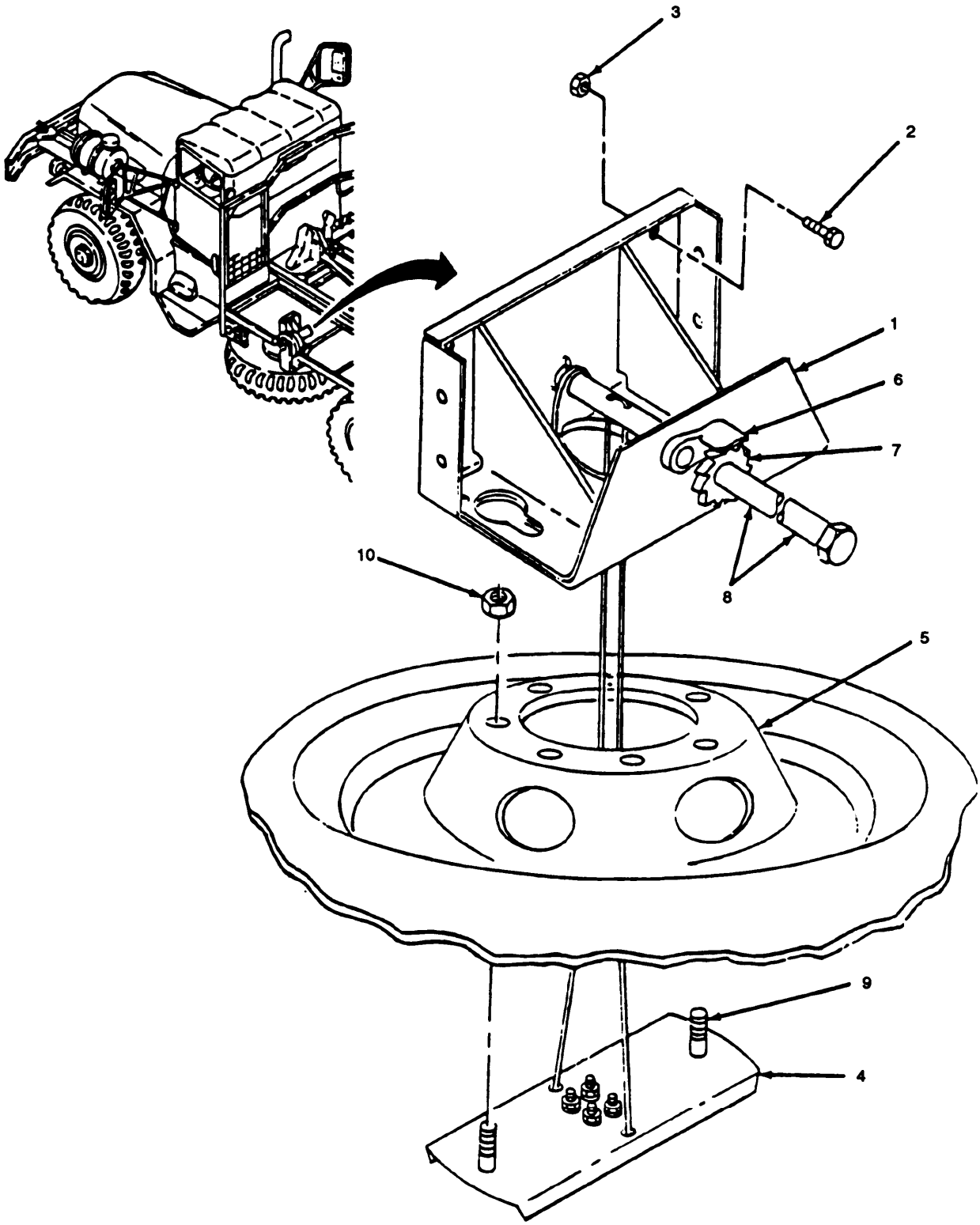



*Figure 4-17. Tire Carrier Assembly, Installation.*

4-28. **Roller and Axle Assembly.**

This task covers: a. Replace (Front) b. Replace (Rear)

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (item 1, Appendix B)
Common No. 1 (Item 5, Appendix B)

*Equipment Condition*

Bay removed (para. 2-16).

*Materials/Parts*

Grease, Automotive and Artillery (Item 2, Appendix E)
Solvent, Dry Cleaning (Item 18, Appendix E)
Rags, Wiping (Item 12, Appendix E)

*a. Replace*. (figure 4-18

(1) Remove cotter pin (1).

(2) Remove nut (2) and remove axle (3), washer (4), and roller (5).

(3) Remove grease fitting (6) from axle (3).

**WARNING**

Dry cleaning solvent PD-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100-138 °F (38-60 °C).

(4) Clean all items with dry cleaning solvent, and dry thoroughly.

(5) Replace all items that are excessively worn or other wise damaged.

(6) Install grease fitting (6) in axle (3).

(7) Apply grease to axle (3).

(8) Install axle (3), roller (5), washer (4) and secure with nut (2).

(9) Install cotter pin (1).

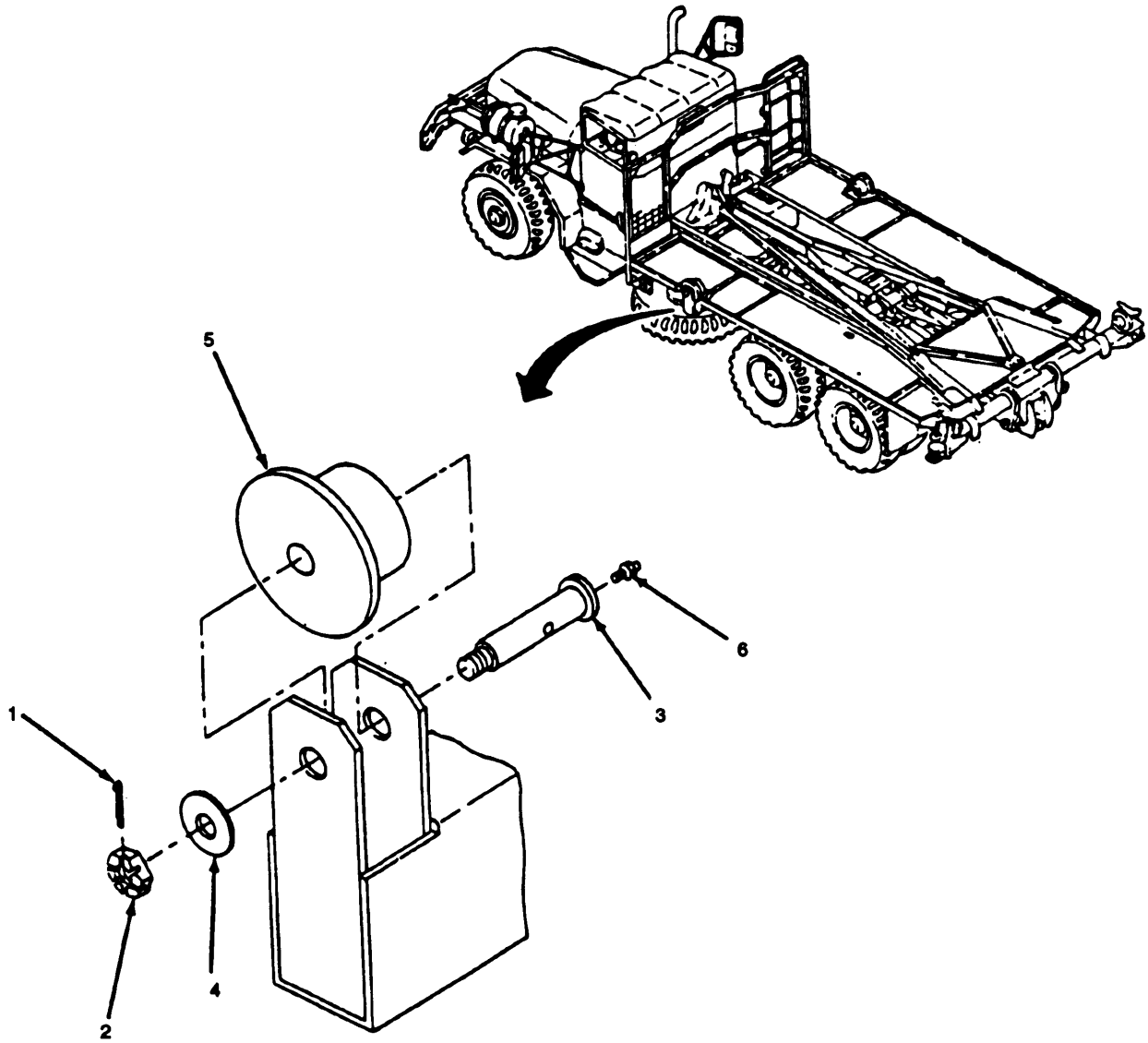



*Figure 4-18. Roller and Axle Assembly (Front), Replace.*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

4-28. **Roller and Axle Assembly. - Continued**

*b.* *Replace(Rear).* (figure 4-19)

(1) Remove two screws (1), washers (2), spacers (3) and remove trunion (4) and spring (5).

(2) Swing rod (6) out of way.

(3) Remove cotter pin (7).

(4) Remove nut (8), and remove axle (9), washer, two thrust washers (11), and roller.

(5) Remove grease fitting (12) from axle (9).

WARNING

Dry cleaning solvent PD-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100-138 °F (38-60 °C).

(6) Clean all items in dry cleaning solvent, and dry thoroughly.

(7) Replace all items that are excessively worn or otherwise damaged.

(8) Install grease fitting (12) in axle (9).

(9) Apply grease to axle (9).

(10) Mall axle (9), two thrust washers (11), roller (13), washer (10) and secure with nut (8).

(11) Install cotter pin (7).

(12) Swing bar (6) into position and install spring (5) and trunion (4) and secure with two screws (1), washers (2) and spacers (3).

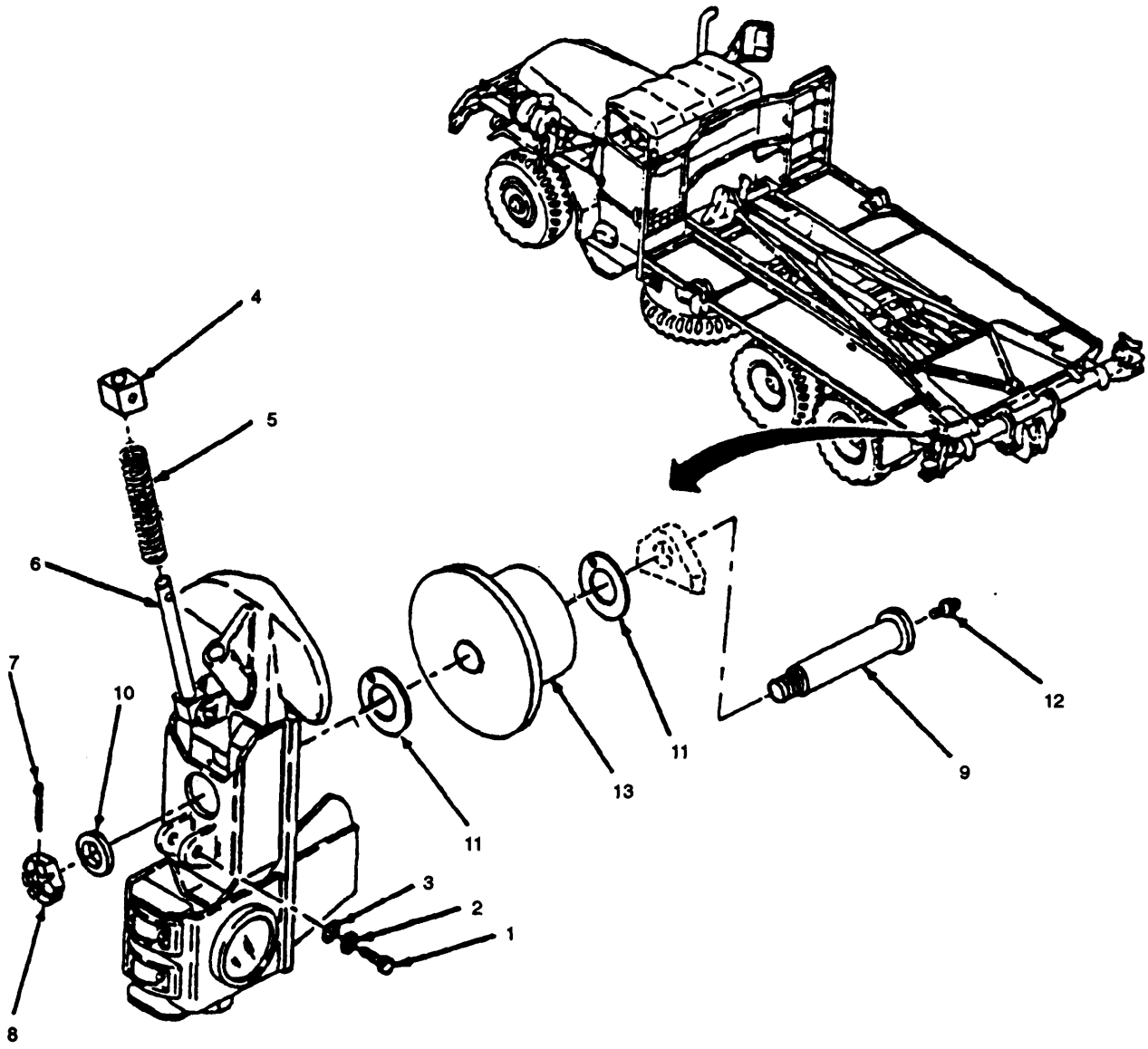



*Figure 4-19. Roller and Axle Assembly (Rear), Replace.*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

## 4-29. **Rear Winch Assembly.**

This task covers:
a. Removal
b. Disassembly (Model 11~-S-EC)
c. Repair (Model 11-S-EC)
d. Reassembly (Model 11-S-EC)
e. Disassembly (PG-115-043R)
f. Repair (Model PG-115-043R)
g. Reassembly (Model PG-115-043R)
h. Installation

INITIAL SETUP

*Tools*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)
Common No. 1 (Item 5, Appendix B)

*Personnel Required*

Two

*Materials/Parts*

Grease, Automotive and Artillery (Item 2, Appendix E)
Solvent, Dry Cleaning (Item 18, Appendix E)
Rags, Wiping (Item 12, Appendix E)
Teflon Tape, Pipe Threads (Item 19, Appendix E)

*Equipment Conditions*

Whinch cable removed (Para. 4-30).
Bay removed (Para. 2-16).

*a. Removal.* (figure 4-20)

**WARNING**

When working under boom, support boom by blocking or other suitable means.

(1) Raise boom (1) approximately 10 ft (3.83 m) and block in position.

**WARNING**

When disconnecting any hydraulic line, open line slowly and protect face, as hydraulic oil may spiny out due to residual pressure in system.

**NOTE**

When removing hoses, have a suitable container to drain oil from hoses. Cap all hoses and ports immediately to prevent dirt and foreign matter from entering the system.

(2) Tag and disconnect hydraulic lines (2) and (3) from winch assembly (4).

(3) Secure winch assembly (4) to suitable lifting device.

(4) Remove eight screws (5) and washers (6) and remove winch assembly (4).

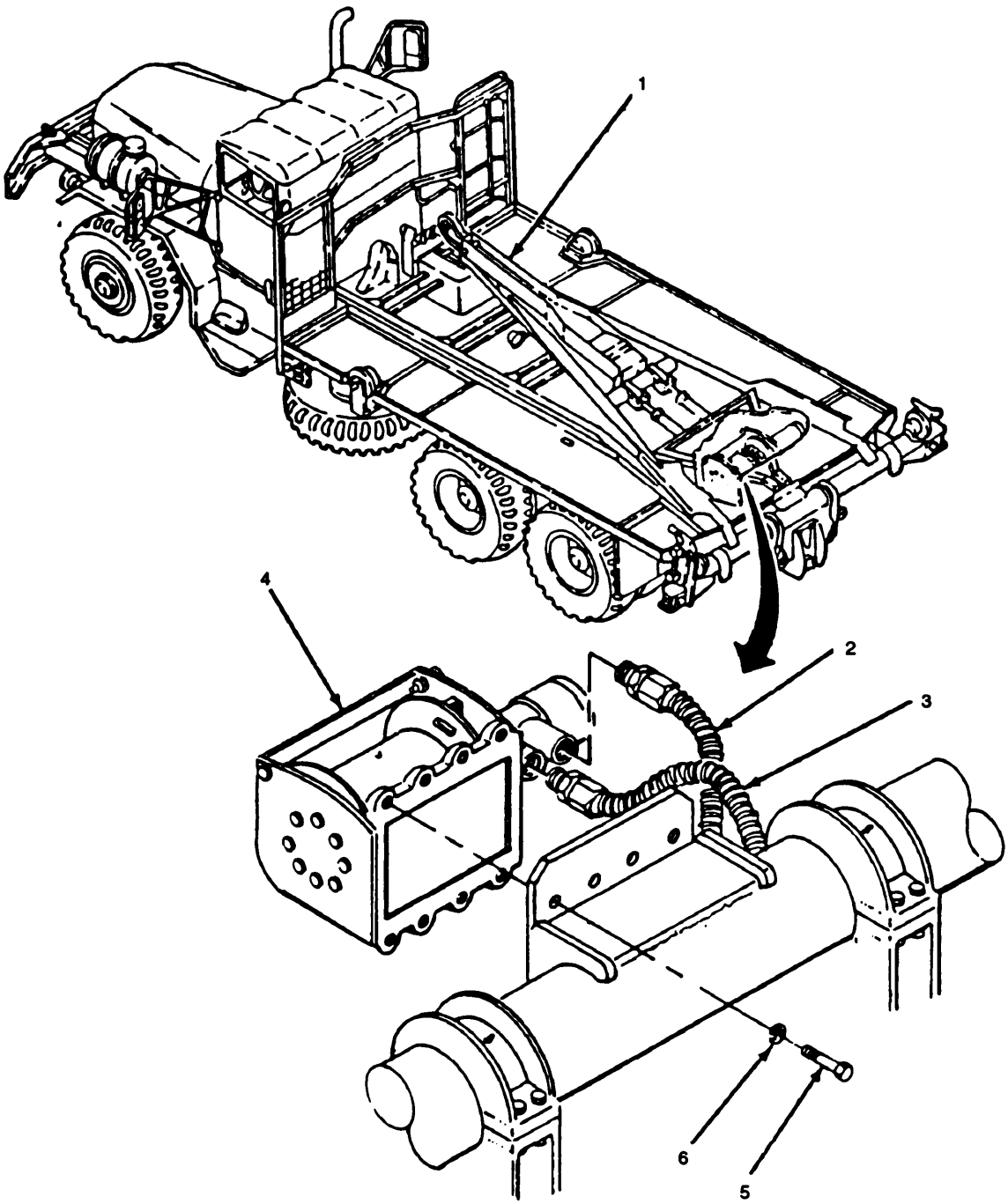



*Figure 4-20. Winch Assembly, Removal.*

4-29. **Rear Winch Assembly. - Continued**

*b.* *Disaasembly ( Model 11-S-EC)* (figure 4-21)

(1) Remove two pipe plugs (1) and (2).

(2) Remove snap ring (3) and remove end cover (4) and preformed packing (5).

(3) Remove thrust plate (6).

(4) Remove final planet assembly (7) from final drive housing (8).

(5) Drive pin (9) into shaft (10) and remove shaft (10) and gear (11) from hub (12).

(6) Press bearing (13) out of gear (11).

(7) Repeat Steps (5) and (6) for remaining gears.

(8) Use blocks and support drum (14).

(9) Remove four screws (15), washers (16), and nuts (17) and remove final drive housing (8).

(10) Remove shaft (18).

(11) Remove retaining ring (19), preformed packing (20) and taper seal ring (21 ) from drum (14).

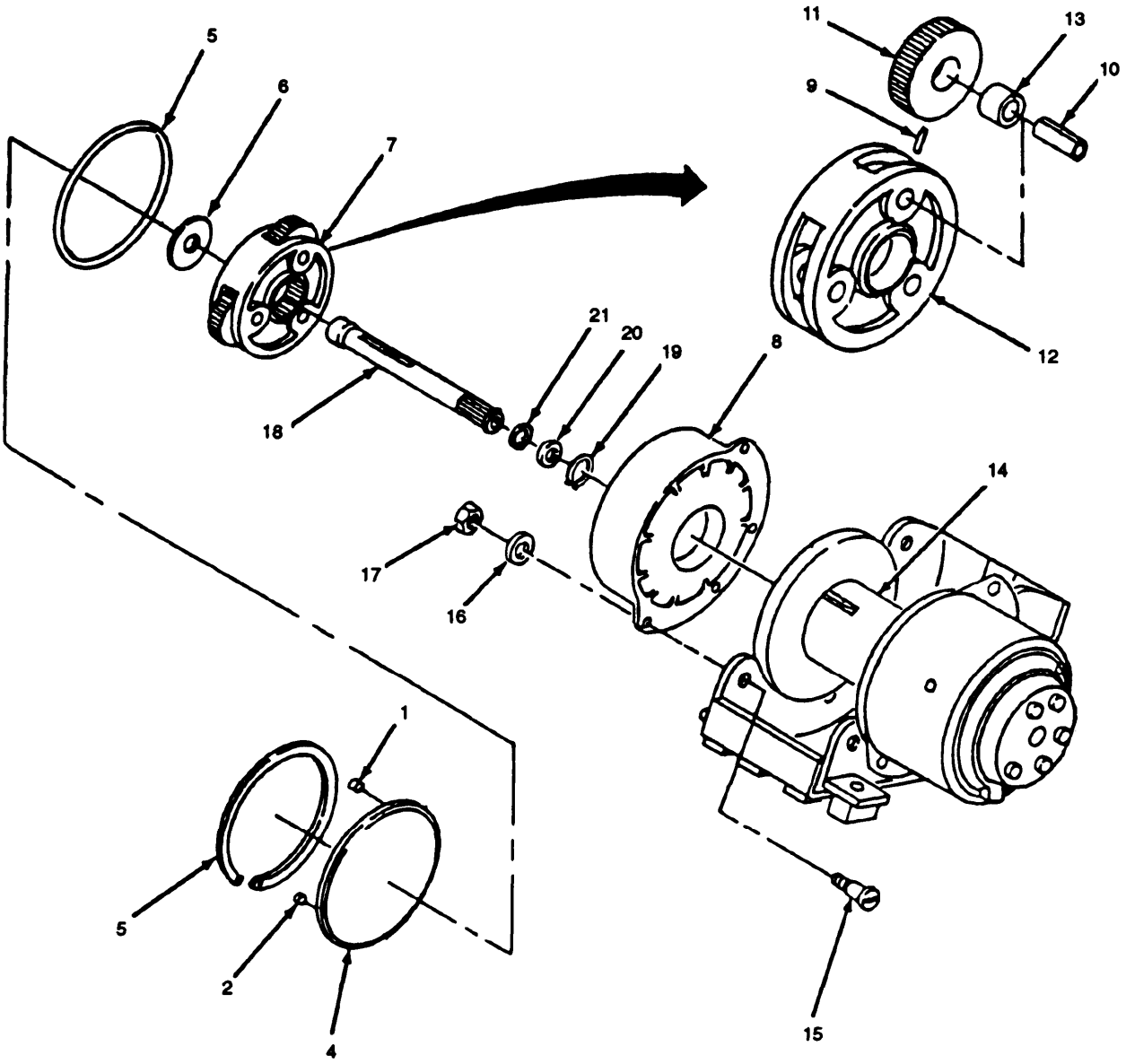



*Figure 4-21. Winch Assembly Model 11-S-EC, Disassembly (Sheet 1 of 3).*

4-29. **Rear Winch Assembly. - Continued**

(12) Remove two pipe plugs (22).

(13) Mark spring cover (23), primary drive housing (24) and motor (25) to ensure proper orientation during reassembly.

**NOTE**

Care must be used to ensure that the spring cover (23) is removed evenly.

(14) Loosen, but do not remove 12 screws (26).

(15) Mark location of 12 brake springs (27).

(16) Remove l2screws (26) and washers (28) and remove spring cover (23), springs (27), packing (29), ring (30), packing (31), motor (25), and spacer (32).

(17) Remove brake subassembly (33).

(18) Remove primary sun gear (34) and roller bearing (35).

(19) Remove garter spring (36), sixteen cam locks (37), and one cam lock (38), and garter spring (39).

(20) Remove retaining ring (40) and brake hub (41).

(21) Remove retaining ring (42), roller bearing (43), and spacer (44).

(22) Remove retaining ring (45) and brake ring (46).

(23) Remove retaining ring (47) and brake plate (48).

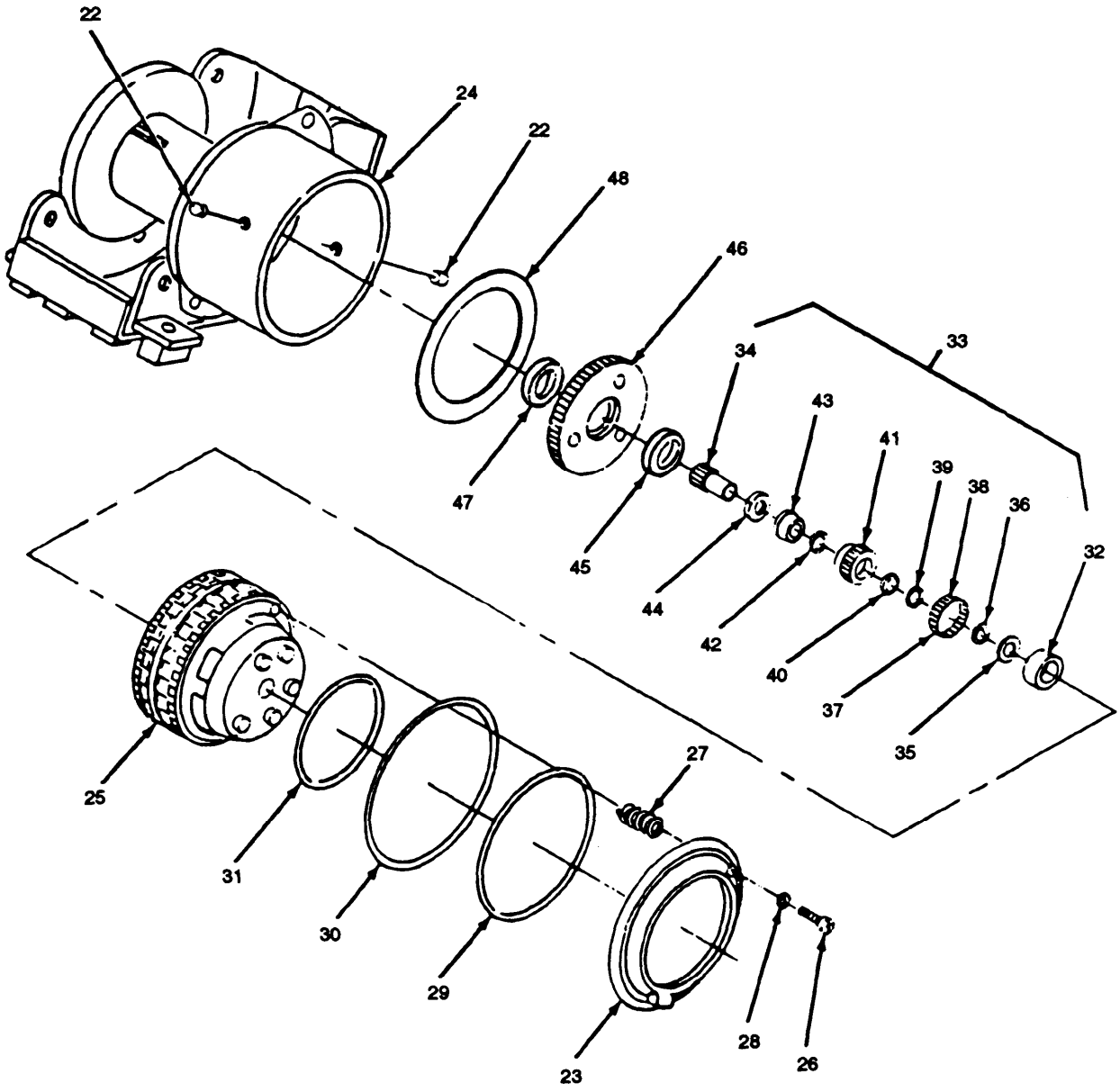



**Figure 4-21. Winch Assembly Model 11-S-EC, Disassembly (Sheet 2 of 3).**

4-29. **Rear Winch Assembly. - Continued**

(24) Remove primary planet assembly (49).

(25) Remove bushing (50).

(26) Remove plug (51).

(27) Drive pin (52) into planet pin (53) and remove planet pin (53), and gear (54) from hub (55).

(28) Press bearing (56) from gear (54).

(29) Repeat Steps (26) through (28) for remaining gears.

(30) Remove thrust pad (57) and preformed packing (58).

(31) Remove preformed packing (59), oil seal (60), ring seal (61), and retaining ring (62).

(32) Remove four screws (63), washers (64), and nuts (65) and remove primary drive housing (66).

(33) Remove drum (14) from base (67).

(34) Remove bearing (68), seal ring (69), oil seal (70), and preformed packing (71).

**NOTE**

Perform Step (35) only if drum bearing (72) is to be removed.

(35) Remove drum bearing (72).

(36) Remove retaining ring (73) and bearing (74).

(37) Remove seal ring (75), oil seal (76), and preformed packing (77).

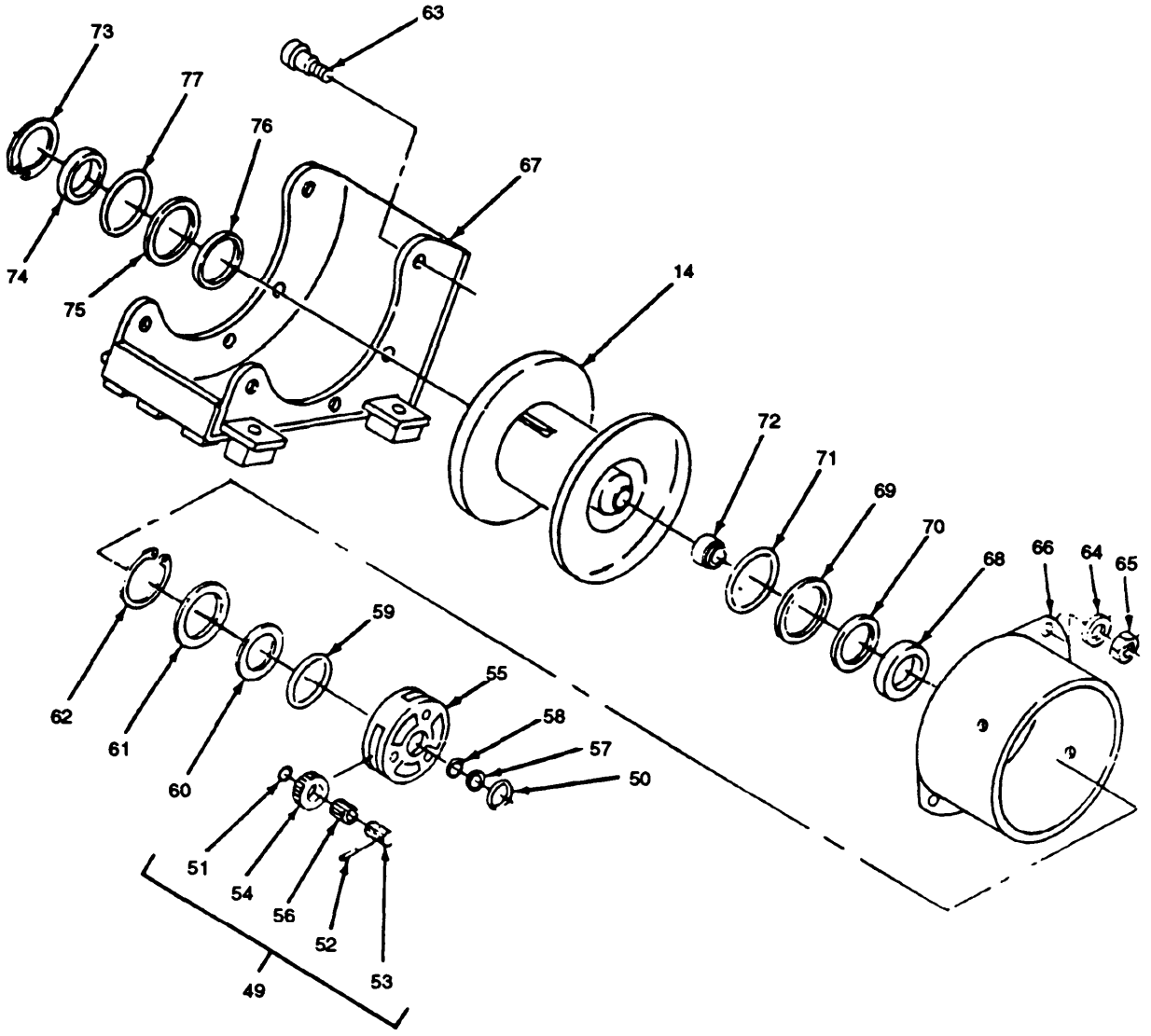



*Figure 4-21. Winch Assembly Model 11-S-EC, Disassembly (Sheet 3 of 3).*

4-29. **Rear Winch Assembly. - Continued**

*c.* *Repair.* Model 11-S-EC.

**WARNING**

Dry cleaning solvent PD-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100-138 °F (38-60 °C).

**CAUTION**

Do not dry or spin bearings with compressed air. Allow bearings to air dry.

(1) Clean all items, except seals and preformed packings, with dry cleaning solvent, and dry thomughly.

(2) Inspect all items for cracks and replace as needed.

**NOTE**

Replace worn gears, shafts, or bearings as a set. Minor Scoring, roughness, and rust from finished surfaces can be removed.

*d.* *Reassembly (Model 11-S-EC ).* (figure 4-22)

(1) Install oil seal (70) in seal ring (69).

(2) Lubricate preformed packing (71) with grease and install it on the outside of seal ring (69).

(3) Lubricate oil seal (70), seal ring (69), and preformed packing (71) with grease.

(4) Install assembled items into non splined end of drum (14) with the lip of the oil seal (70) toward drum (14).

(5) Install oil seal (76) in seal ring (75).

(6) Lubricate preformed packing (77) with grease and install it on the outside of seal ring (75).

(7) Lubricate oil seal (76), seal ring (75), and preformed packing (77) with grease.

(8) Install assembled items into splined end of drum (14) with the lip of the oil seal (76) toward drum (14).

(9) Install bearing (68) with groove on outside of bearing toward drum (14).

(10) Install drum bearing (72).

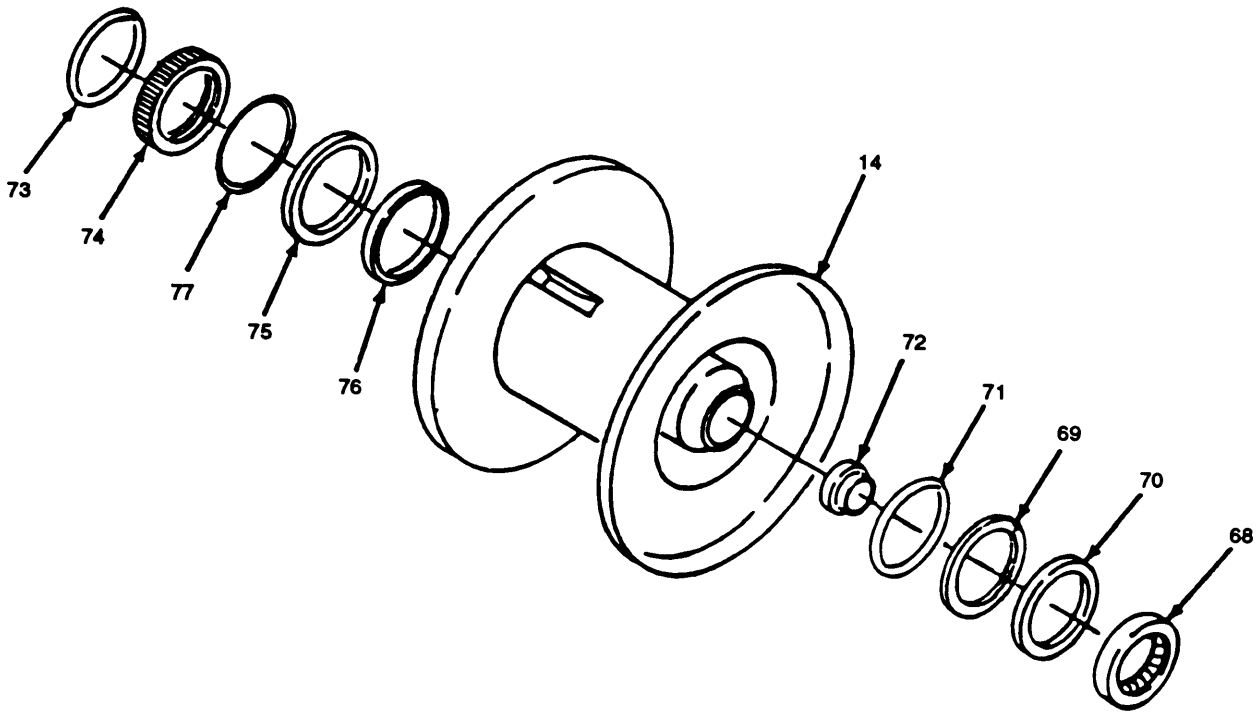



*Figure 4-22. Winch Assembly Model 11-S-EC, Reassembly (Sheet 1 of 10).*

4-29. **Rear Winch Assembly. - Continued**

(11) Install final drive housing (8) and secure with four screws (15), washers, and nuts (17). Torque nuts to 75 lb-ft (101.6 Nm).

(12) Turn base (67) on its side.

**NOTE**

There should be approximately 0.0625 in. (0.1587 cm) of clearance between drum (14) and final drive housing (8) when drum is properly seated.

(13) Mall drum (14) with splined end toward final drive housing (8) and gently tap drum until the retaining ring on bearing is properly seated.

(14) Install retaining ring (62) in first ring groove in primary drive housing (66).

(15) Install primary drive housing (66) and secure with four screws (63), washers (64), and nuts (65). Tor que screws to75 lb-ft (101.6 Nm).

(16) Lubricate preformed packing (59) and oil seal (60) and install in ring seal (61) with lip of oil seal (60) facing away from center bore of ring seal (61).

(17) Install assembled items in primary drive housing (66) and gently tap seal ring (61) until seated against retaining ring (62).

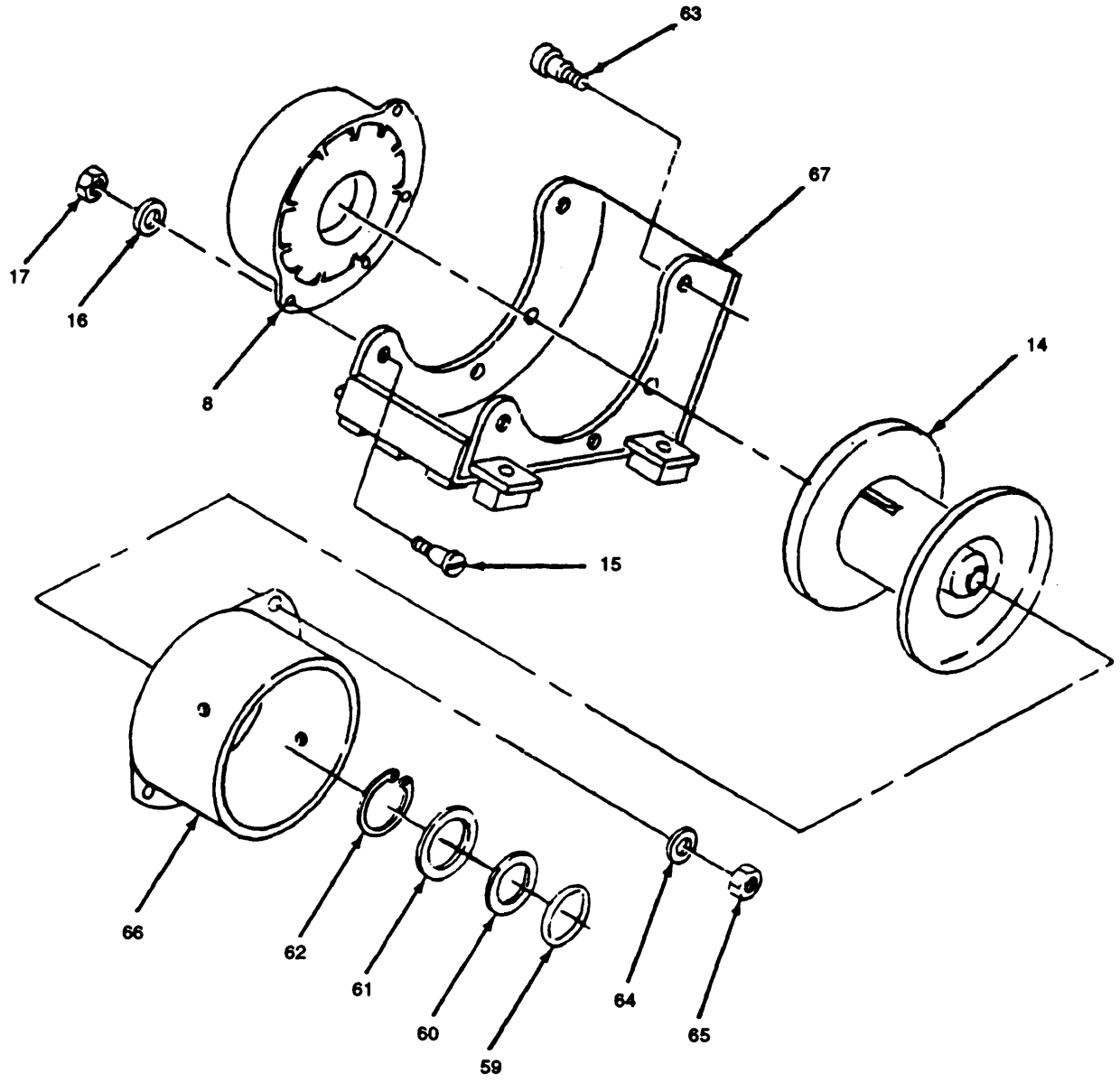



*Figure 4-22. Winch Assembly Model 11-S-EC, Reassembly (Sheet 2 of 10).*

4-29. **Rear Winch Assembly. - Continued**

(18) Lubricate preformed packing (58) and install in thrust pad (57).

(19) Install thrust pad (57) in planet hub (55) with the slotted face of thrust pad (57) facing out.

(20) Install plug (51) in end of planet pin (53).

(21) Press bearing (56) into gear (54).

(22) Install gear (54) in planet hub (55) and install planet pin (53).

(23) Aline hole in planet pin (53) with hole in planet hub (55) and install pin (52) until pin (52) is 0.1875 in. (0.4762 cm) below surface of planet hub (55).

(24) Repeat Steps (20). through (23). for remaining gears.

(25) Check that all three gears rotate freely.

(26) Install primary drive assembly (49) in primary drive housing (66).

(27) Ensure primary drive assembly (49) is fully sealed and turns freely.

(28) Install busing (50).

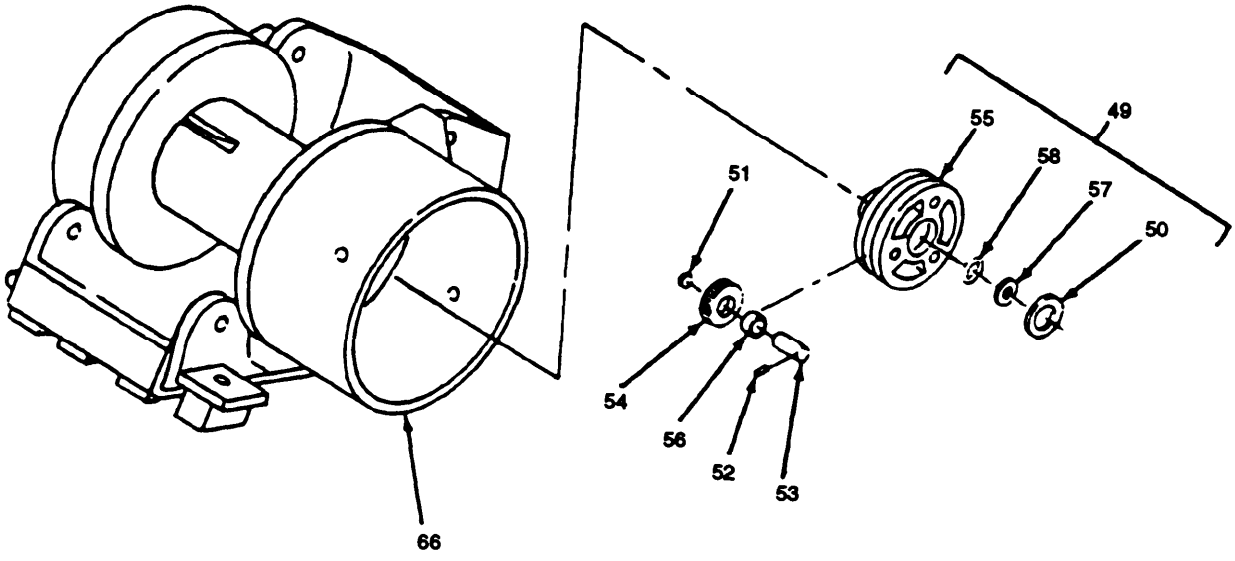



*Figure 4-22. Winch Assembly Model 11-S-EC, Reassembly (Sheet 3 of 10).*

4-29. **Rear Winch Assembly. - Continued**

(29) Install gear spacer (44) on primary sun gear (34) with slotted end away from gear on prirnary sun gear (34).

(30) Install roller bearing (43), flange down, over primary sun gear (34) until it rests against gear spacer (44).

(31) Install retaining ring (42) in brake hub (41).

(32) Install brake hub (41) on primary sun gear (34) and seat on roller bearing (43).

**NOTE**

When cam locks are properly installed, the brake hub (41) will only rotate freely in the clockwise direction.

(33) Install sixteen cam locks (37) and one brass cam lock (38) between primary sun gear (34) and bore of brake hub (41).

(34) Install garter spring (39).

(35) Install retaining ring (40).

(36) Install roller bearing (35) and seat it on brake hub (41) flange.

(37) Remove sun gear (34) with twisting motion.

(38) Remove roller bearing (43).

(39) Install garter spring (36), roller bearing (43), and sun gear (34).

(40) Check rotation of brake hub (41). The brake hub (41) should rotate freely in the clockwise direction, and lock-up in the counter clockwise rotation. If brake hub (41) does not operate properly, the cam locks are incorrectly installed.

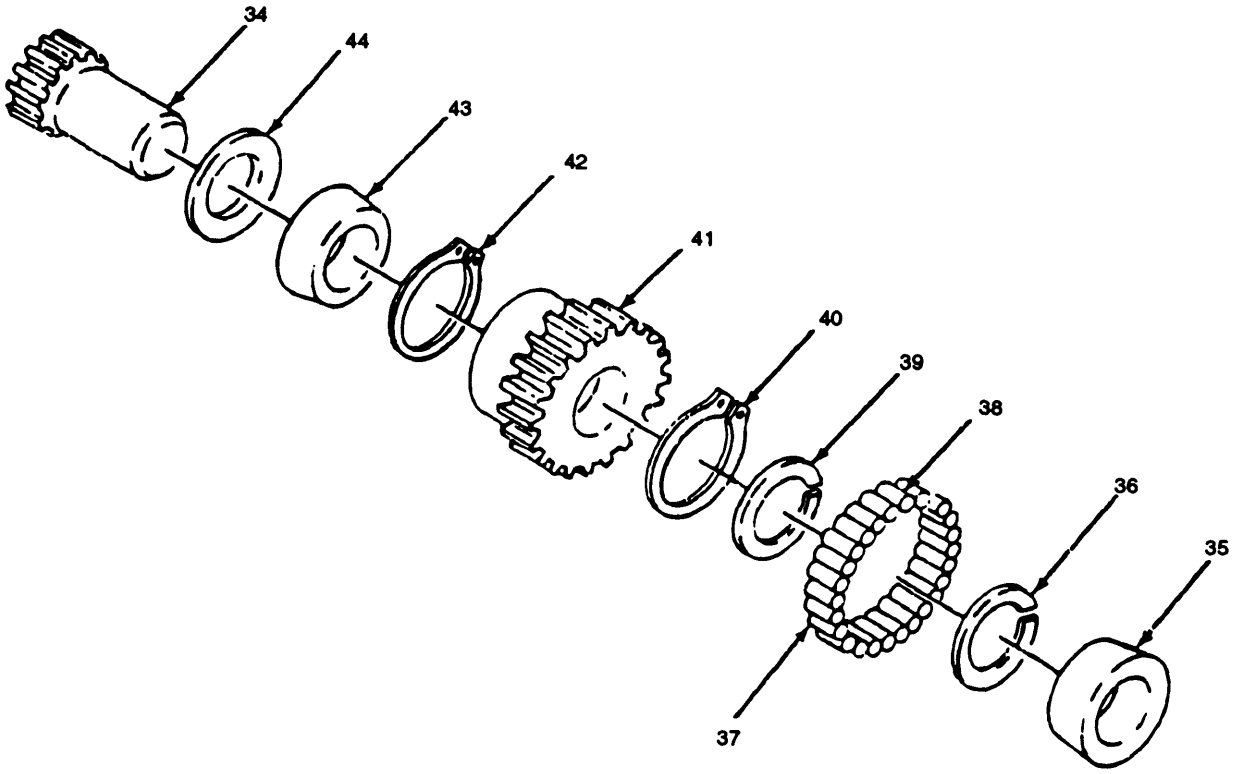



*Figure 4-22. Winch Assembly Model 11-S-EC, Reassembly (Sheet 4 of 10).*

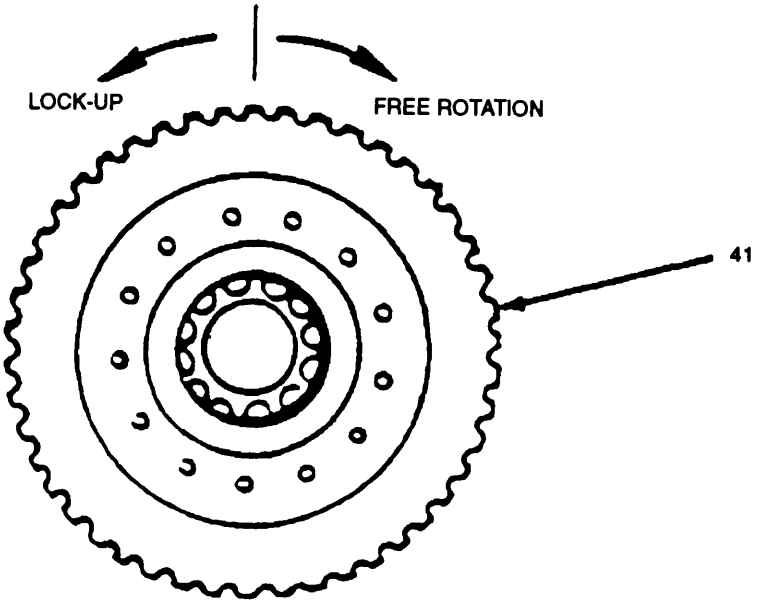



*Figure 4-22. Winch Assembly Model 11-S-EC, Reassembly (Sheet 5 of 10 )*

4-29. **Rear Winch Assembly. - Continued**

(41) Install brake ring (48) in primary drive housing (66).

(42) Install retaining ring (47) on brake hub (41).

(43) Install brake subassembly (33) in brake ring (46) and install retaining ring (45).

(44) Install assembled items into primary drive housing (66) making sure primary sun gear (34) engages with primary planet assembly.

**CAUTION**

Do not force motor assembly into housing. If resistance is felt, remove motor and investigate the cause of resistance.

(45) Install spacer (32) and motor (23) in primary drive housing (66).

(46) Mall retaining ring (30).

(47) Aline mark on motor (23) with mark on primary drive housing (66).

(48) Lubricate preformed packing (31) with grease and install on motor (23) and relubricate preformed packing (31) with grease.

(49) Install brake springs (27) in same pattern as they were removed.

(50) Lubricate preformed packing (29) with grease and install on spring cover (23) and relubricate preformed packing (29) with grease.

(51) Install 12 screws (26) and washers (28) and finger tighten.

(52) lighten each screw (26) one half turn each in either a clockwise or counterclockwise sequence until all 12 screws are torqued to 35 lb-ft (47.4 Nm).

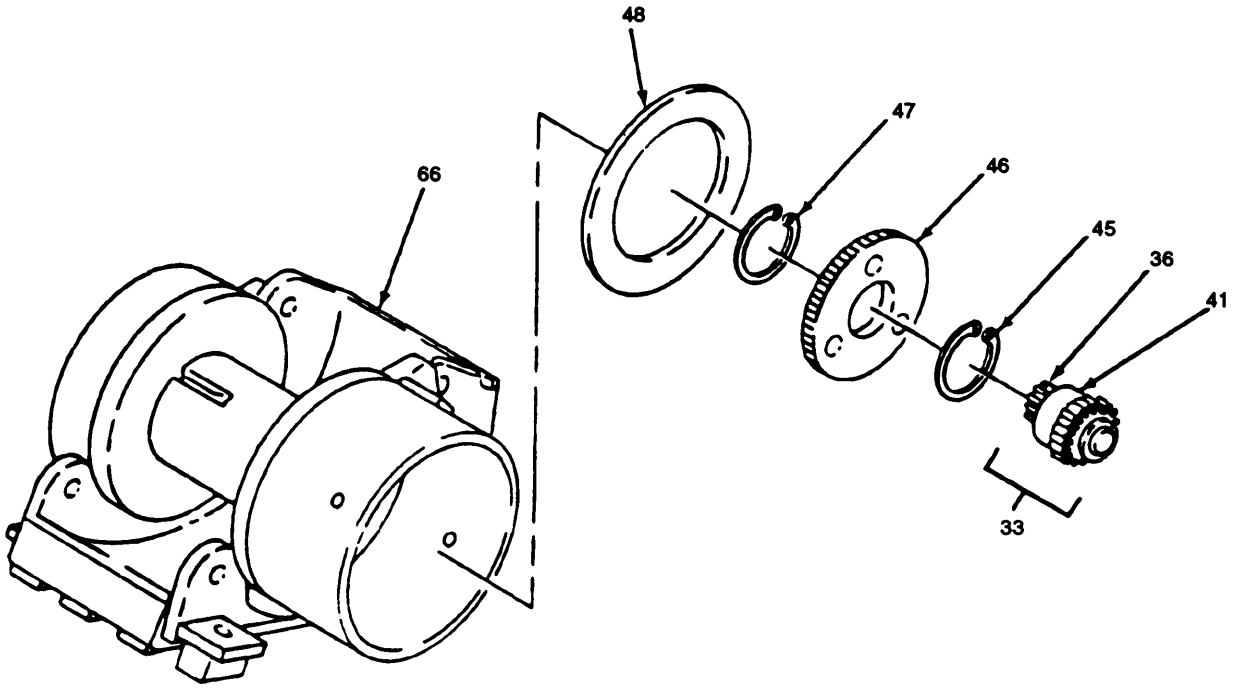



*Figure 4-22. Winch Assembly Model 11-S-EC, Reassembly (Sheet 6 of 10).*

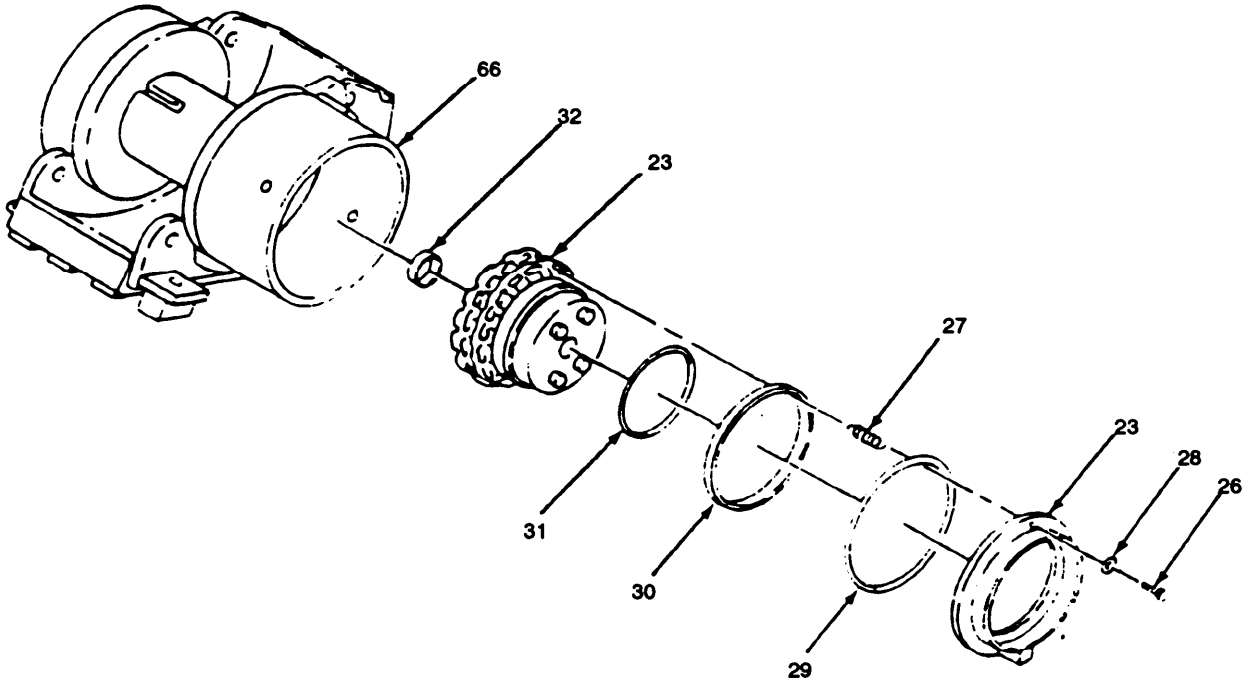



*Figure 4-22. Winch Assembly Model 11-S-EC, Reassembly (Sheet 7 of 10).*

## 4-29. Rear Winch Assembly. - Continued

(53) Install seal ring (21) on sun gear shaft (18).

(54) Lubricate preformed packing (20) and install on seal ring (21).

(55) Install retaining ring (19).

(56) Install sun gear shaft (18).

(57) Press bearing (13) into gear (11) until just below face of gear (11).

(58) Install gear (11) in final planet hub (12) and install shaft (10).

(59) Aline holes in shaft (10) and final planet hub (12).

(60) Install pin (9) in final planet hub (12) and shaft (10) until pin (9) is 0.4375 in. (1.1112 cm) below surface of final planet hub (12).

(61) Repeat Steps (57) through (60) for remaining gears.

(62) Ensure gears rotate freely.

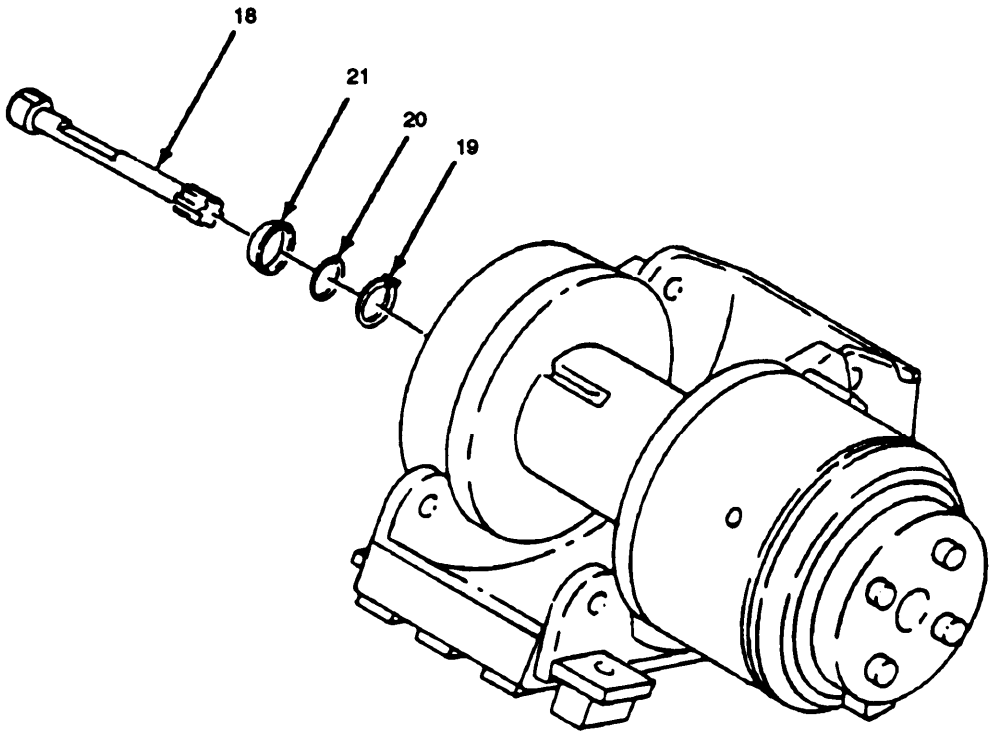



*Figure 4-22. Winch Assembly Model 11-S-EC, Reassembly (Sheet 8 of 10).*

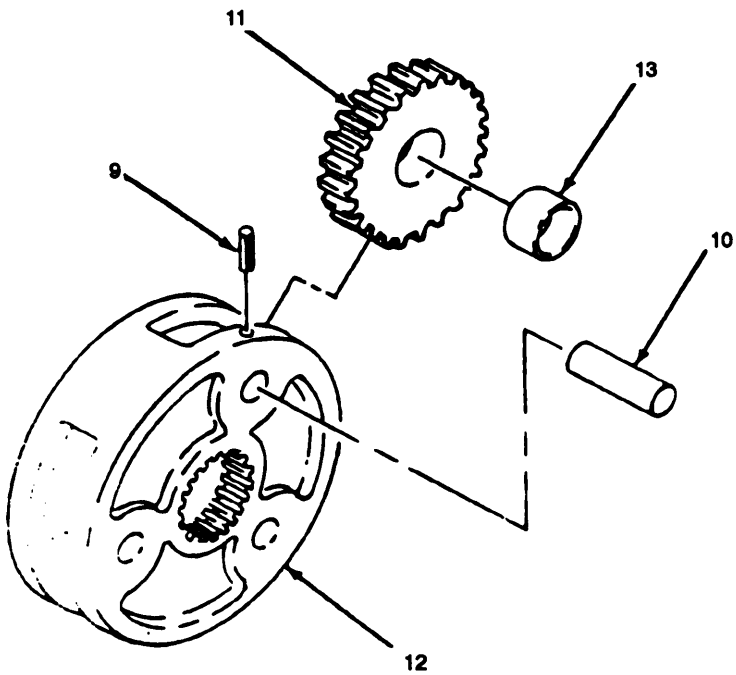



*Figure 4-22. Winch Assembly Model 11-S-EC, Reassembly (Sheet 9 of 10).*

## 4-29. Rear Winch Assembly. - Continued

(63) Install final planet assembly (7) in final drive housing (8).

(64) Install thrust plate (6).

(65) Lubricate preformed packing (5) and install in final drive housing (8) and relubricate preformed packing (5) with grease.

(66) Install end cover (4) with filler boss located at top of final drive housing (8).

(67) Install snap ring (3) and ensure it is property seated.

(68) Install two pipe plugs (1) and (2).

(69) Check clearance of primary drive housing to drum at two locations 180° (3.14 radians) apart. Clearance should be equal to within 0.005 in. (0.0127 cm).

(70) Check clearance of final drive housing to drum at two locations 180° (3.14 radians) apart. Clearance should be equal to within 0.005 in. (0.0127 cm).

(71) Lubricate winch assembly in accordance with LO 5-5420-209-12-1.

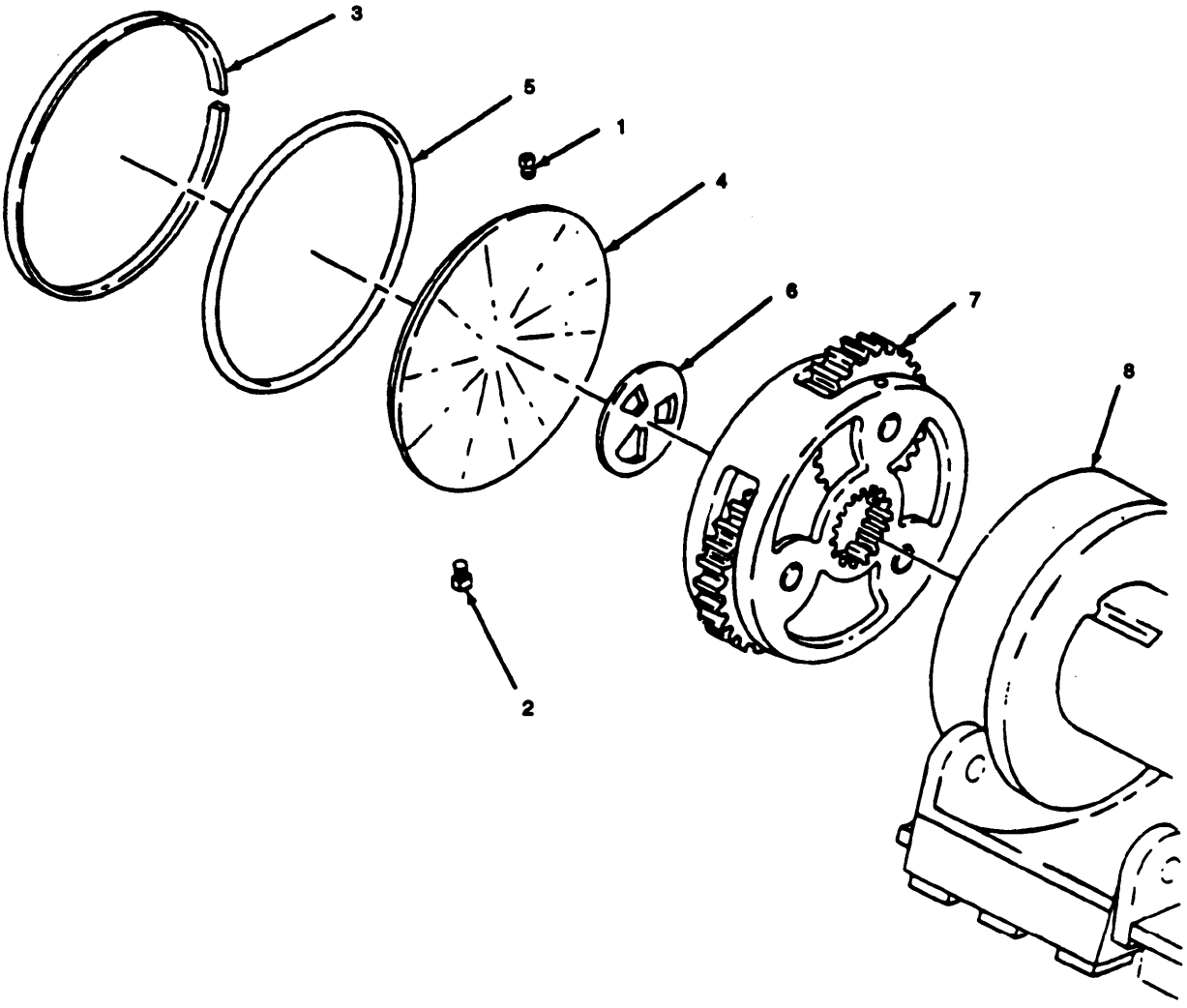



*Figure 4-22. Winch Assembly Model 11-S-EC, Reassembly (Sheet 10 of 10).*

## 4-29. Rear Winch Assembly. - Continued

*e.* *Disassembly (Model PG-115-043R).* (figure 4-23)

(1) Remove four screws (1) and washers (2) and remove motor (3) and gasket (4) andshim (5).

(2) Remove two screws (6) and washers (7) and remove motor adapter(8).

(3) Remove input gear assembly (9).

(4) Remove snap ring (10) and retainer ring (11).

**NOTE**

Springs (12), plungers (13), and rollers (14) will fall free when brake race (15) is removed from input shaft (16).

(5) Remove brake mce (15), springs (12), plungers (13), and rollers (14) from input gear (16).

(6) Remove retaining ring (17) and snap ring (18) from input gear (16).

(7) Note location of brake port nipple (19) and remove.

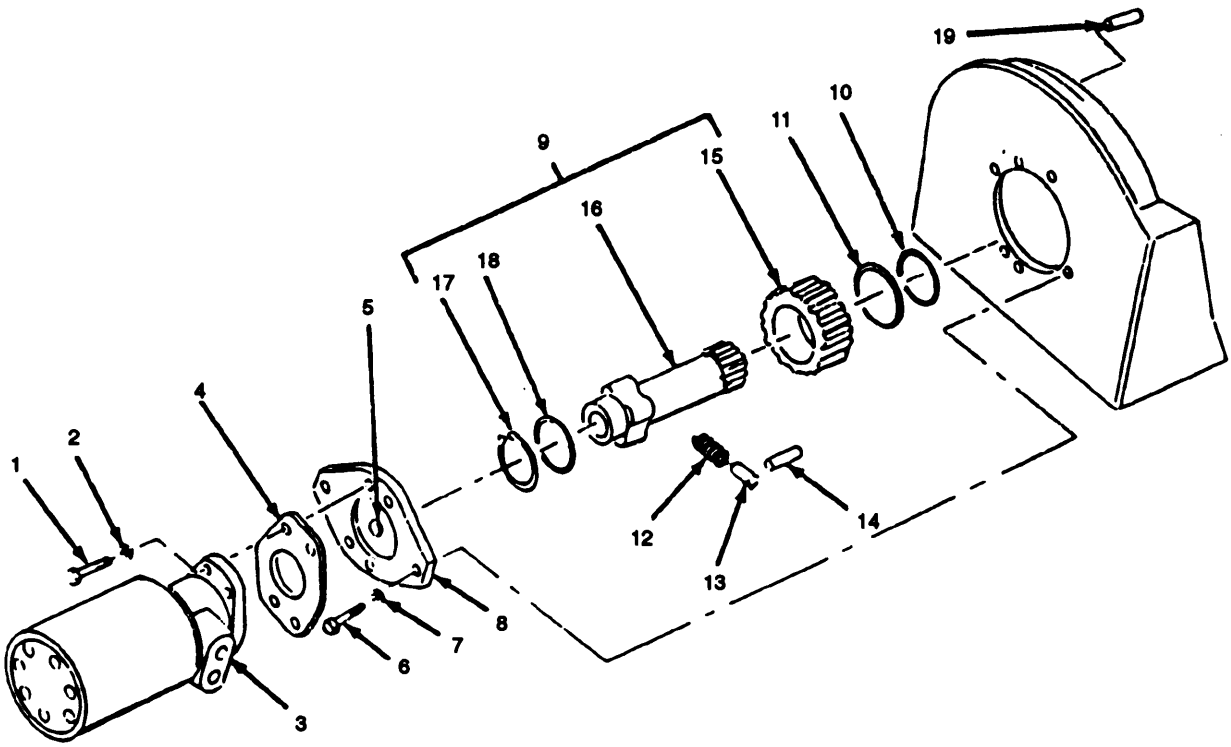



*Figure 4-23. Winch Assembly Model PG-115-043R, Disassembly (Sheet 1 of 5).*

## 4-29. Rear Winch Assembly. - Continued

(8) Remove six screws (20) and washers (21).

(9) Remove 10 screws (22) and washers (23).

(10) Remove screw (24), lockwasher (25), and nut (26) and remove side plate (27).

(11) Remove 10 screws (28) and washer's (29) and remove side plate (30) with bearing support (31).

(12) Remove screw (32), lockwasher (33), and nut (34) and remove tie bar (35).

(13) Remove eight screws (36) and washers (37) and remove bearing support (31) and shims (38).

(14) Remove bearing (39) from drum support (40).

(15) Remove drum (41) from base (42).

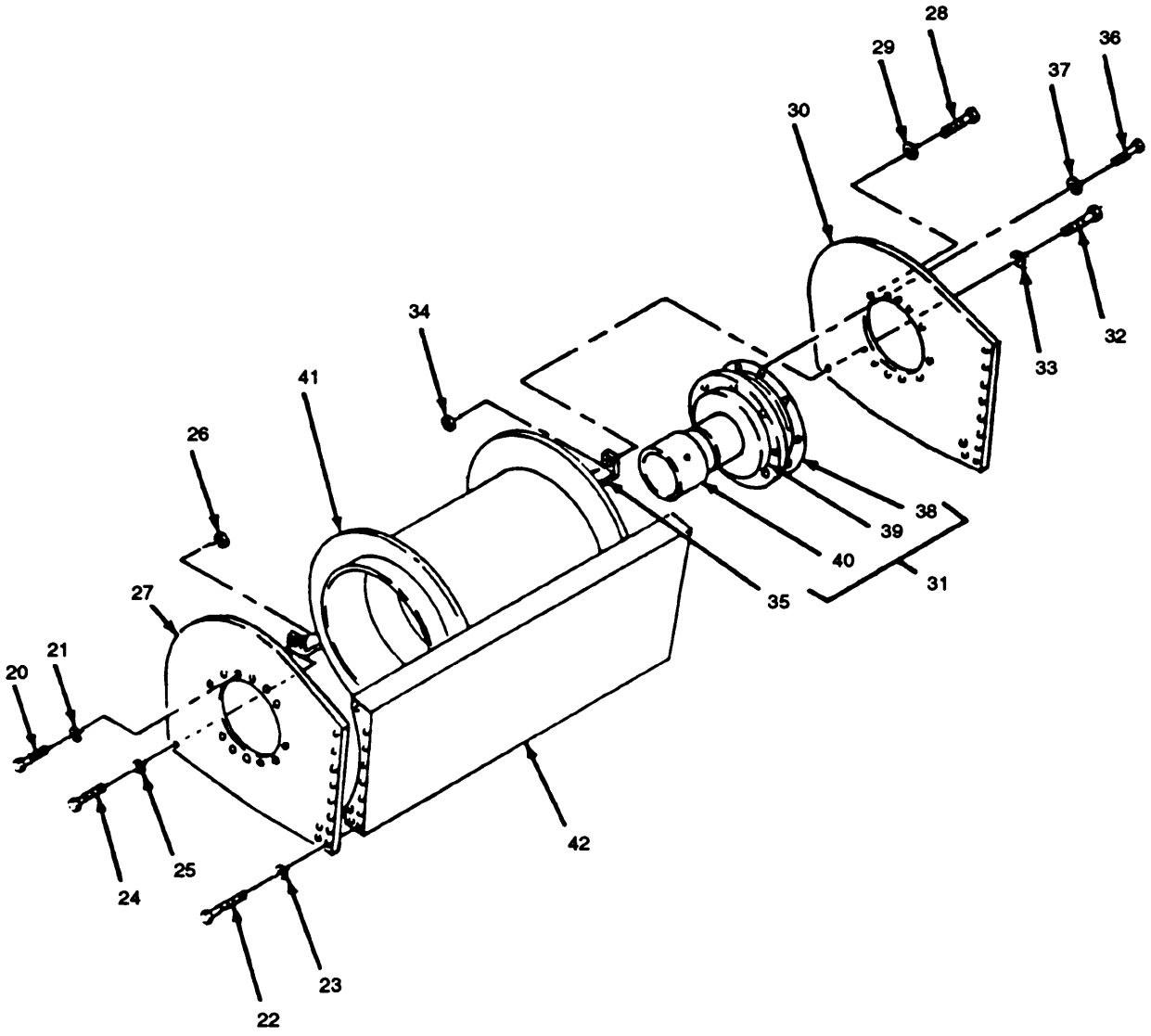



*Figure 4-23. Winch Assembly Model PG-115-043R, Disassembly (Sheet 2 of 5).*

## 4-29. Rear Winch Assembly. - Continued

(16) Remove secondary planet carrier assembly (43) from drum (41) by alternately hitting three drive bosses.

(17) Drive pin (44) into shaft (45) and remove shaft (45) from planet carrier (46) and remove gear (47).

(18) Repeat Step (16) for remaining gears.

(19) Press bearing (48) from planet carrier (46).

(20) Remove seal (49) from planet carrier (46).

(21) Remove spacer (50).

(22) Remove preformed packing (51).

(23) Remove primary planet carrier assembly (52) from drum (41).

(24) Drive pin (53) into shaft (54) and remove shaft (54) and gear (55) from planet carrier (56).

(25) Repeat Step (21) for remaining gears.

(26) Remove inner (57) and outer (58) retaining rings from gear (59).

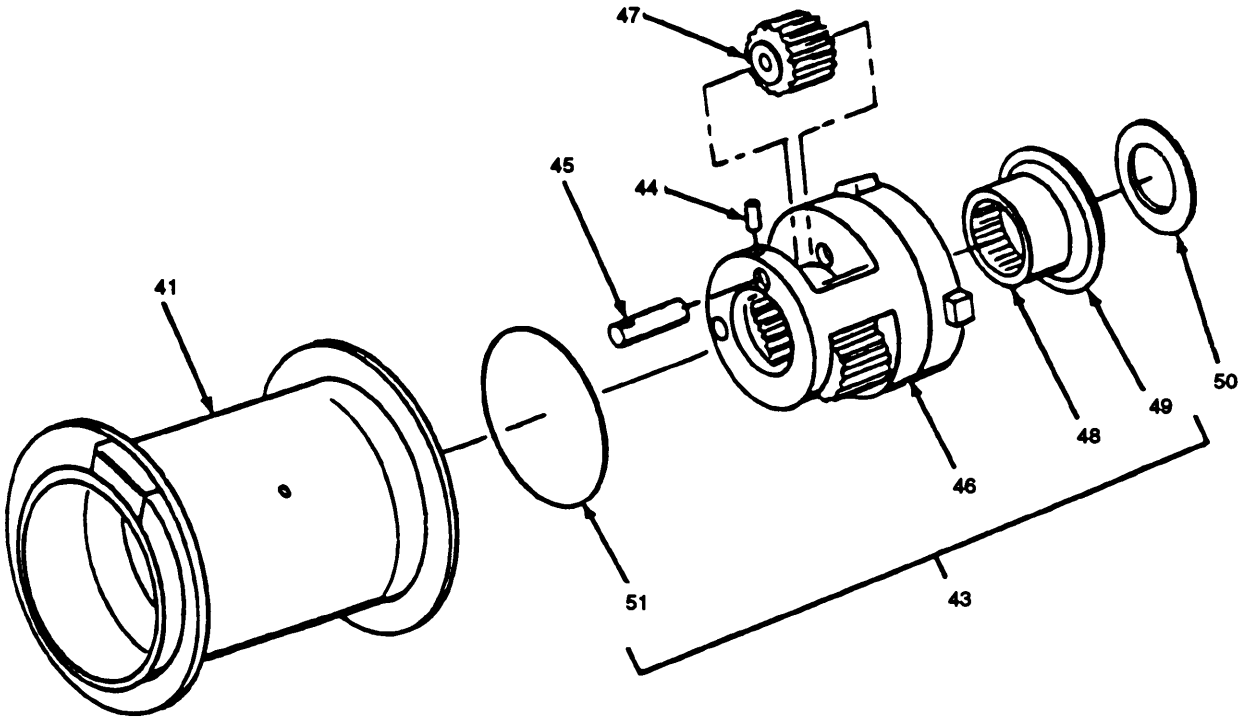



*Figure 4-23. Winch Assembly Model PG-115-043R, Disassembly (Sheet 3 of 5).*

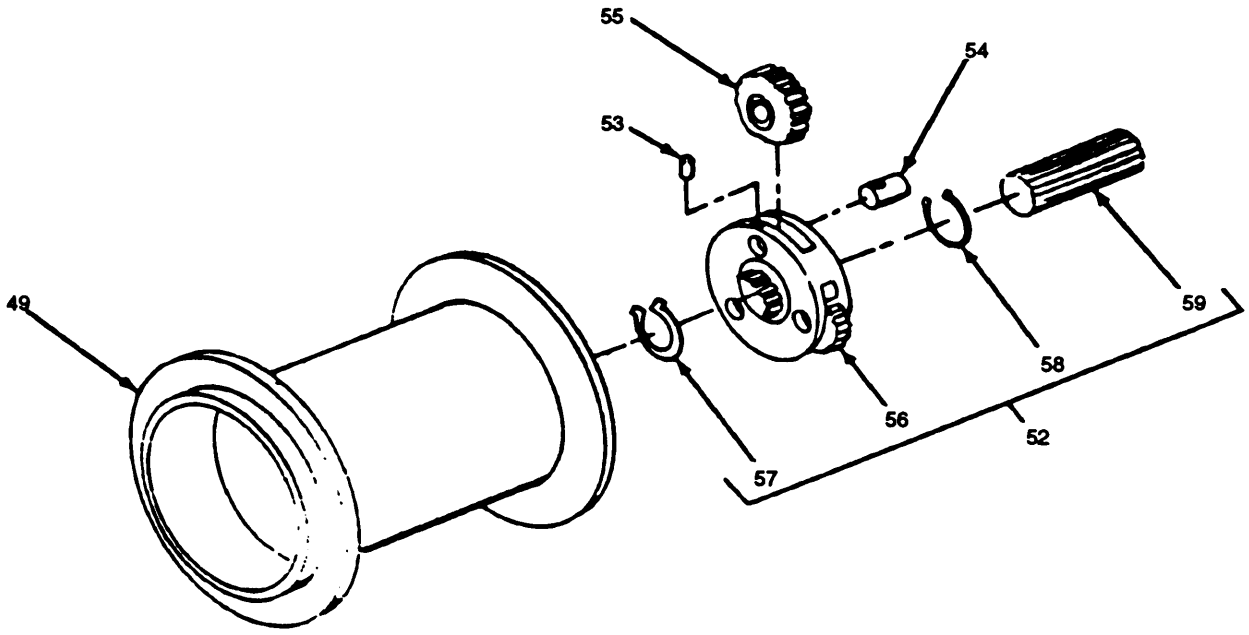



*Figure 4-23. Winch Assembly Model PG-115-043R, Disassembly (Sheet 4 of 5).*

## 4-29. Rear Winch Assembly. - Continued

(27) Remove brake cylinder assembly (60) from drum (41).

(28) Remove ring gear (61) from drum (41).

(29) Remove seal (62) and drum bushing (63).

**WARNING**

Spring plate (64) is under pressure from several springs and can be dangerous if not restrained while disassembling.

(30) Using suitable press, depress spring plate (62).

(31) Remove snap ring (65) and slowly release press until springs (66) are relaxed.

(32) Remove spring plate (64) and 16 springs (66).

(33) Press piston (67) out of brake cylinder (68).

(34) Remove backup ring (69).

(35) Remove preformed packings (70) and (71).

(36) Remove backup ring (72), eight brake discs (71), eight brake discs (74), and backup plate (75).

(37) Remove spacer (76).

(38) Remove preformed packing (77).

(39) Remove pipe plug (78).

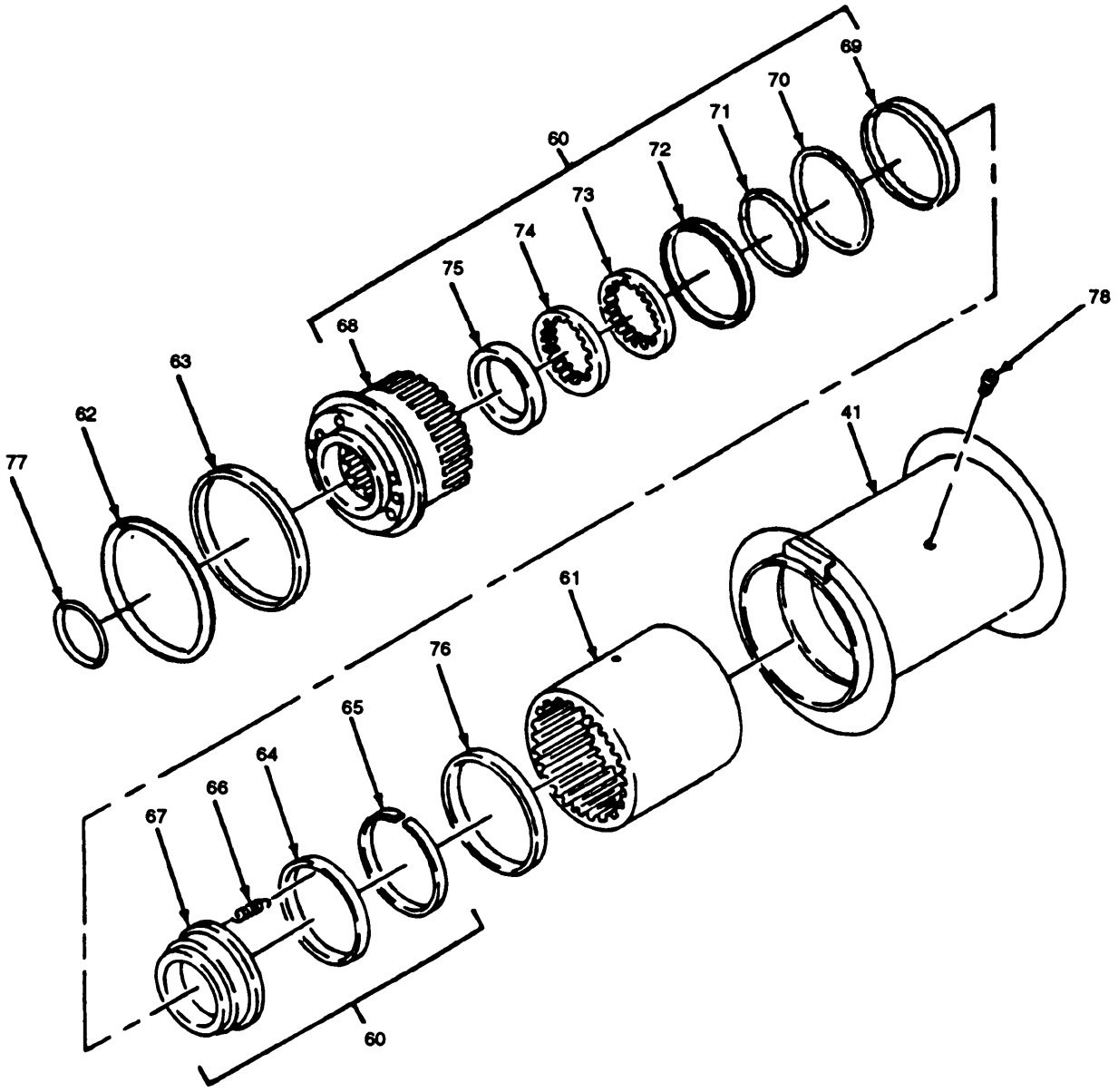



*Figure 4-23. Winch Assembly Model PG-115-043R, Disassembly (Sheet 5 of 5).*

## 4-29. Rear Winch Assembly. - Continued

f. *Repair.* Model PG-115-043R

**WARNING**

Dry cleaning solvent PD-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100-138 °F (38-60 °C).

**CAUTION**

Do not dry or spin bearings with compressed air. Allow bearings to air dry after cleaning.

(1) Clean all items, except seals and preformed packings, with dry cleaning solvent, and dry thoroughly.

(2) Inspect all items for cracks and replace as needed.

**NOTE**

Replace worn gears and shafts as a set. Minor Scratches, surface roughness, and rust can be removed from finished surfaces.

(3) Inspect all items for wear, refer to table 4-4 for repair and replacement limits, and replace all items that are worn or otherwise damaged.

g. *Reassembly.* Model PG-115-043R. (figure 4-23)

(1) Install backup plate (75) in brake cylinder (68).

(2) Alternately install brake discs (73) and (74) making sure all teeth line up, and metal brake disc (74) is last installed.

**NOTE**

Backup rings are installed away from pressure cavity.

(3) install packing (71) and backup ring (72) in brake cylinder (68).

(4) Install packing (70) and backup ring (69) in brake cylinder (68).

(5) Install brake piston (67) in brake cylinder (68).

**NOTE**

There are 24 holes in brake piston but only 16 springs. Install springs in an even pattern to prevent uneven pressure on brake piston.

(6) Install 16 springs (66) in brake cylinder (68).

**WARNING**

Employ proper precautions when installing the retaining ring. The spring plates are compressed under approximately 1 ton load and could cause severe injury or death if control is lost.

(7) lnstall spring plate (64) and using a suitable press of 1 ton capacity or more, compress spring plate (64) and springs (66).

(8) Install snap ring (65).

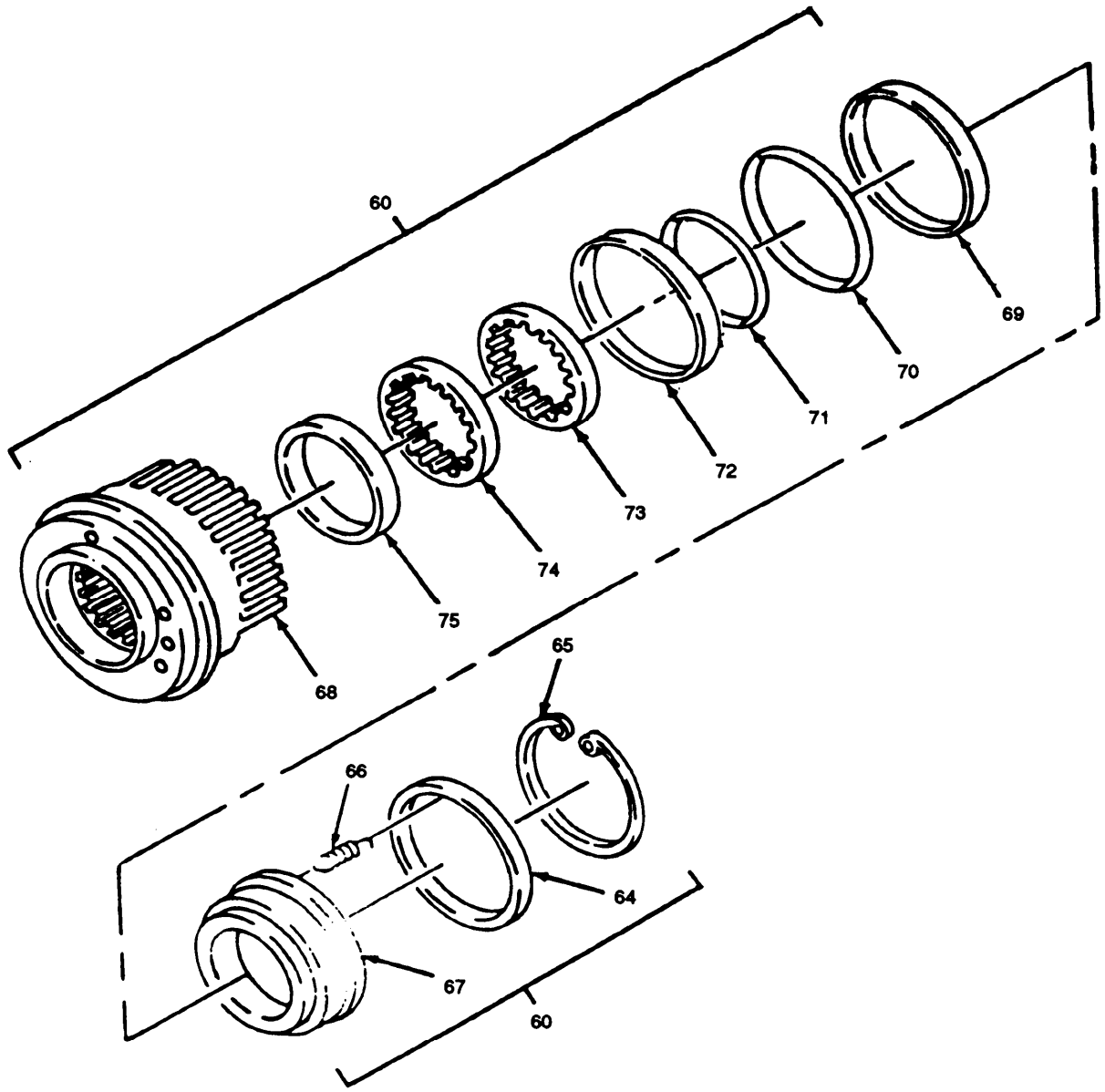



*Figure 4-24. Winch Assembly Model PG-115-043R, Reassembly (Sheet 1 of 7).*

## 4-29. Rear Winch Assembly. - Continued

**NOTE**

Brake cylinder assembly must be pressure tested to ensure proper piston movement and oil tight seals.

(9) Test brake cylinder assembly (60) as follows:

*(a)* Using suitable air pressure source, apply 2,500 psi of air pressure to cylinder assembly (60) and release pressure.

*(b)* Piston should move approximately 1/8 in. (0.318 cm).

*(c)* Repeat Steps (a) and (b) three times to ensure proper operation of piston.

*(d)* Apply 2,500 psi of air pressure and hold pressure in cylinder assembly (6) for 10 minutes. If cylinder assembly does not hold pressure, disassemble and check piston, packings, and back-up rings for nicks or scratches.

*(e)* Repair or replace components as needed, reassemble and retest cylinder assembly (60).

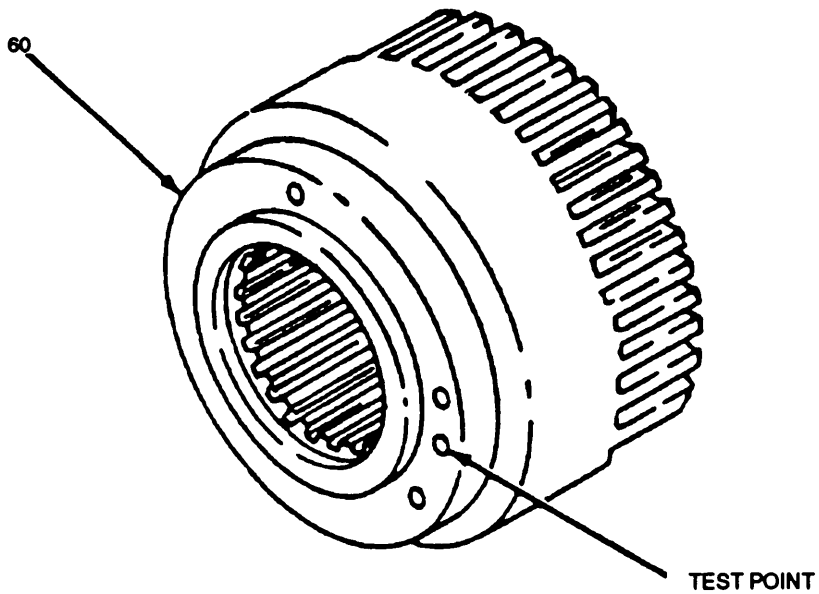



***Figure 4-24. Winch Assembly Model PG-115-043R, Reassembly (Sheet 2 of 7).***

(10) Install gear (55) in planet carrier (56).

(11) Install shaft (54) in planet carrier (56) and ensure hole in shaft (54) aligns with hole in planet carrier (56).

(12) Install pin (53) until flush with planet carrier (56).

(13) Repeat Steps (10) and (11) for remaining gears.

(14) Check that all gears spin freely.

(15) Install inner retaining ring (57) on gear (58).

(16) Install gear (58) in planet carrier (56) and install outer retaining ring (59).

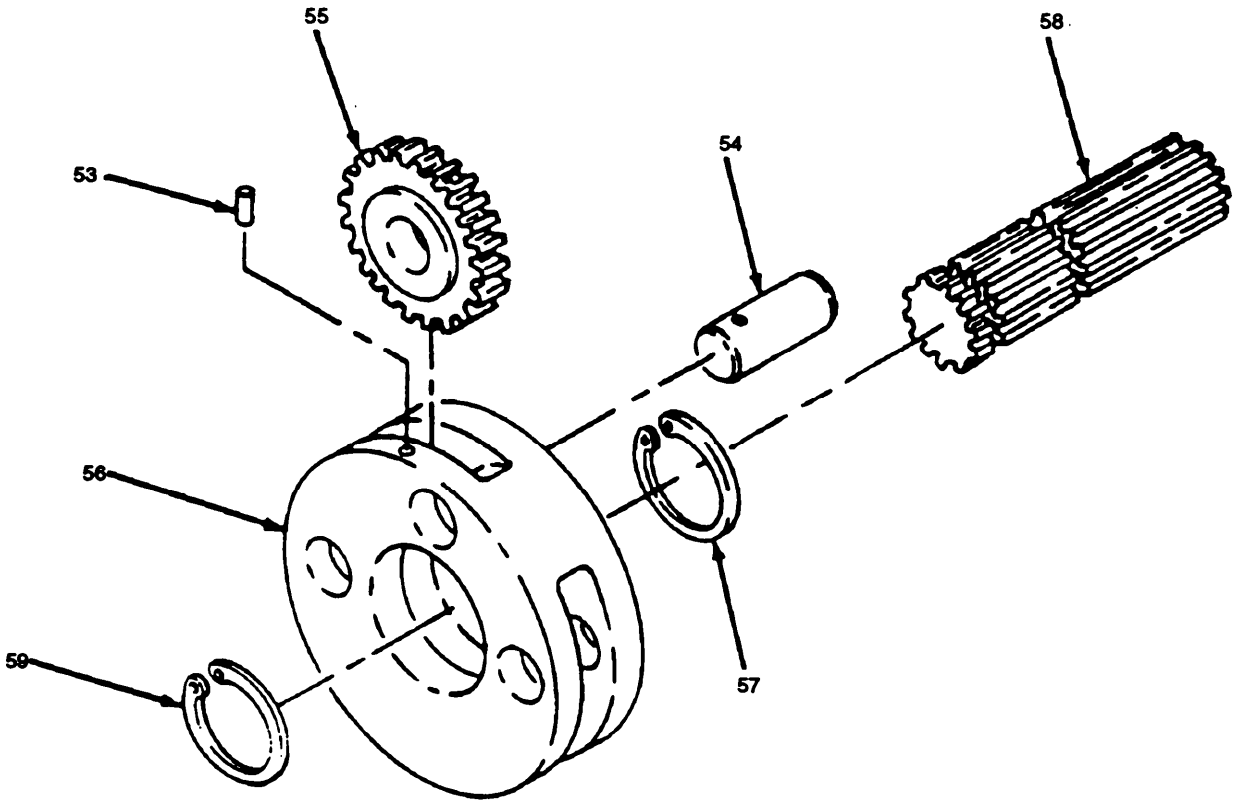



*Figure 4-24. Winch Assembly Model PG-115-043R, Reassembly (Sheet 3 of 7).*

## 4-29. Rear Winch Assembly. - Continued

(17) Install gear (47) in planet carrier (46).

(18) Install shaft (45) in planet carrier (46) and ensure hole in shaft (45) aligns with hole in planet carrier (44).

(19) Install pin (44) until flush with planet carrier (46).

(20) Repeat Steps (17) and (18) for remaining gears.

(21) After all three gears are installed, ensure all gears spin freely.

(22) Install roller bearing (48).

(23) Install seal (19).

(24) Lubricate preformed packing (51) with grease and install.

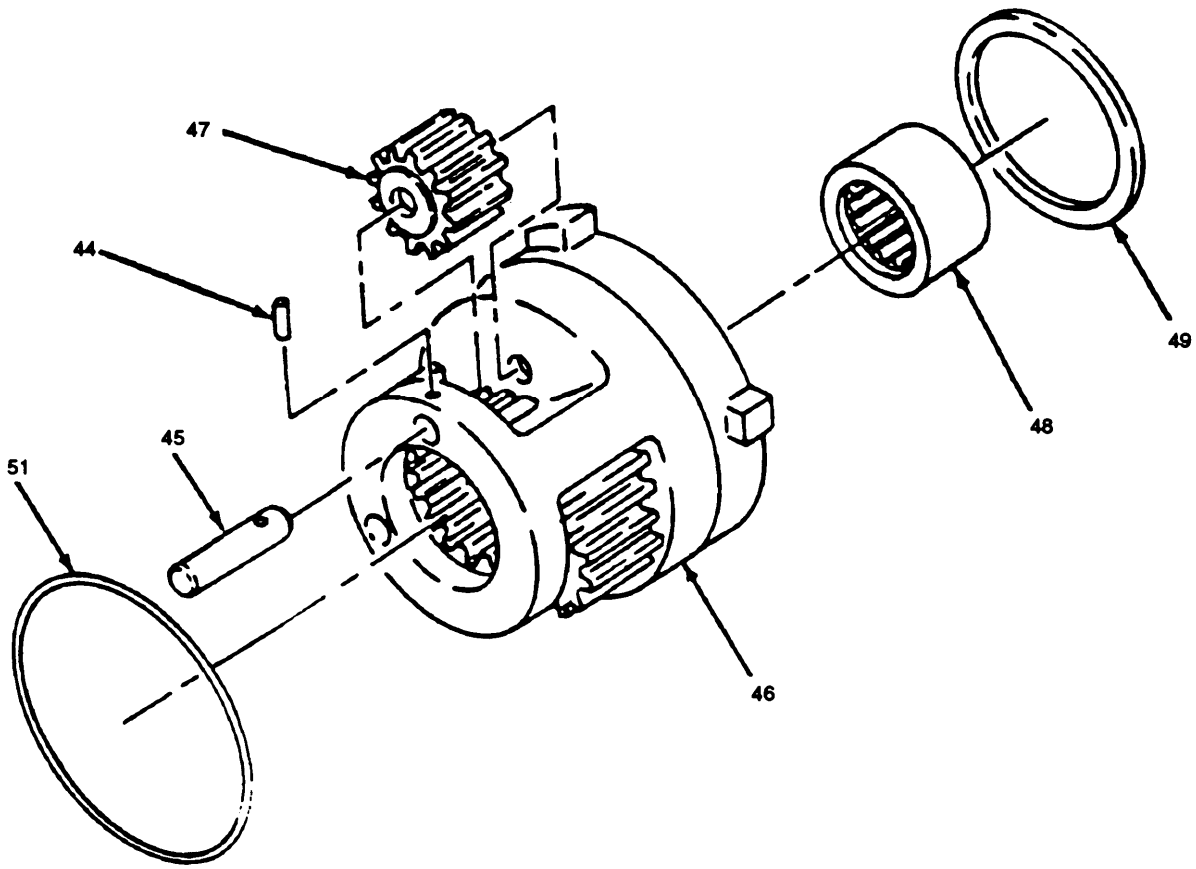



*Figure 4-24. Winch Assembly Model PG-115-043R, Reassembly (Sheet 4 of 7).*

(25) Install snap ring (10) in brake race (15).

(26) Install retaining ring (11) in brake race (15).

(27) Install input gear (16) in brake race (15).

(28) Install spring (12) and plunger (13) and secure with roller.

(29) Repeat Step (31) for remaining springs.

(30) Slide brake race (15) over rollers (14).

(31) Install snap ring (18) and retaining ring (17).

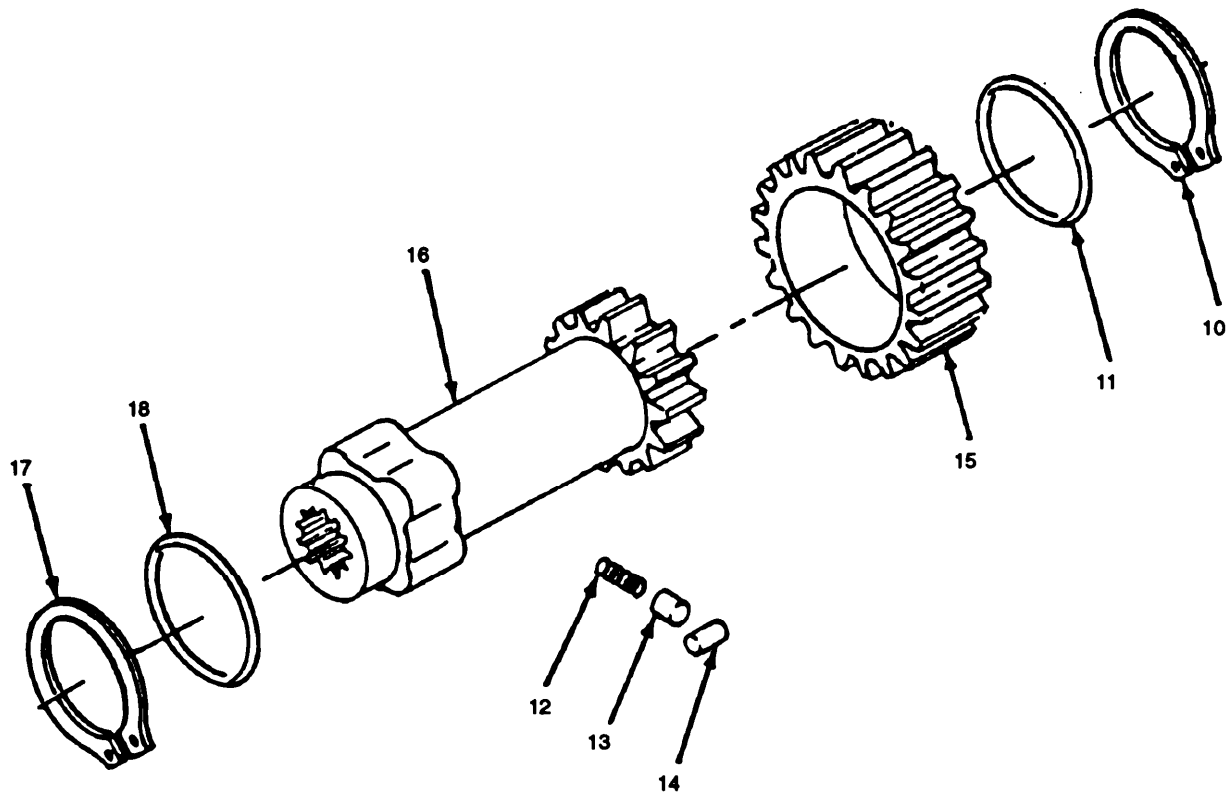



*Figure 4-24. Winch Assembly Model PG-115-043R, Reassembly (Sheet 5 of 7).*

## 4.-29. Rear Winch Assembly. - Continued

(32) Install brake cylinder assembly (60) in drum (41).

(33) Install seal (62).

(34) Install ring gear (61 ) ensuring gear (61) engages brake cylinder assembly (60) spline.

(35) Install primary planet carrier assembly (52) in drum (41). Ensure planet carrier assembly (52) engages with ring gear (61 ) and is seated against brake cylinder assembly (60).

(36) Install secondary planet carrier assembly (42) in drum (41).

(37) Install spacer (50) and bearing (39) on drum support (40).

(38) Install bearing support assembly (31) in drum (41).

(39) Install brake port nipple (19).

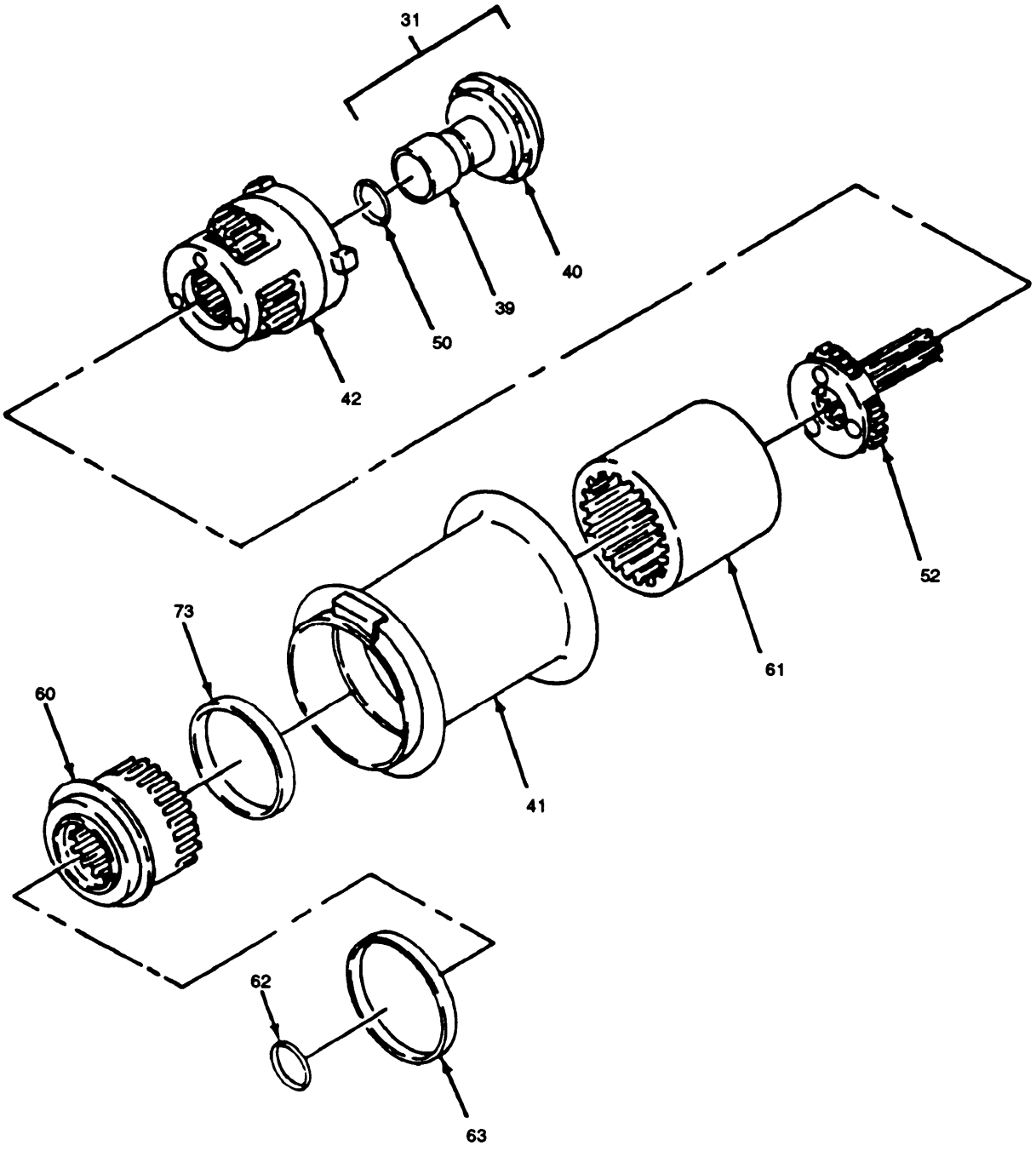



*Figure 4-24. Winch Assembly Model PG-115-043R, Reassembly (Sheet 6 of 7).*

## 4-29. Rear Winch Assembly. - Continued

(40) Position side plate (27) on base (42) and secure with 10 screws (22) and washers (23).

(41) Install winch drum (41).

(42) Aline position of brake port vent as noted during disassembly and secure with six screws (20) and washers (21).

(43) Install tie bar (35) and secure with screw (24), lockwasher (25), and nut (26).

**NOTE**

Winch assembly should be positioned on motor drive end for next procedure.

(44) Place straight edge between tie bar (35) and base (42) and install as many shims(5) as will fit between bearing support (31) and straight edge.

(45) Install side plate (30) and secure with ten screws (28) and washers (29).

(46) Install eight screws (36) and lockwashers (37).

(47) Install screw (32), lockwasher (33), and nut (34).

(48) Install input gear assembly (9) and ensure it engages the sun gear of primary planet carrier assembly.

(49) Install motor adapter (8) and secure with two screws (6) and washers (7).

(50) Install shim (5), gasket (4), motor (3), and secure with four screws (1) and washers (2).

(51) Refer to LO 5-5420-209-12-1 and lubricate winch.

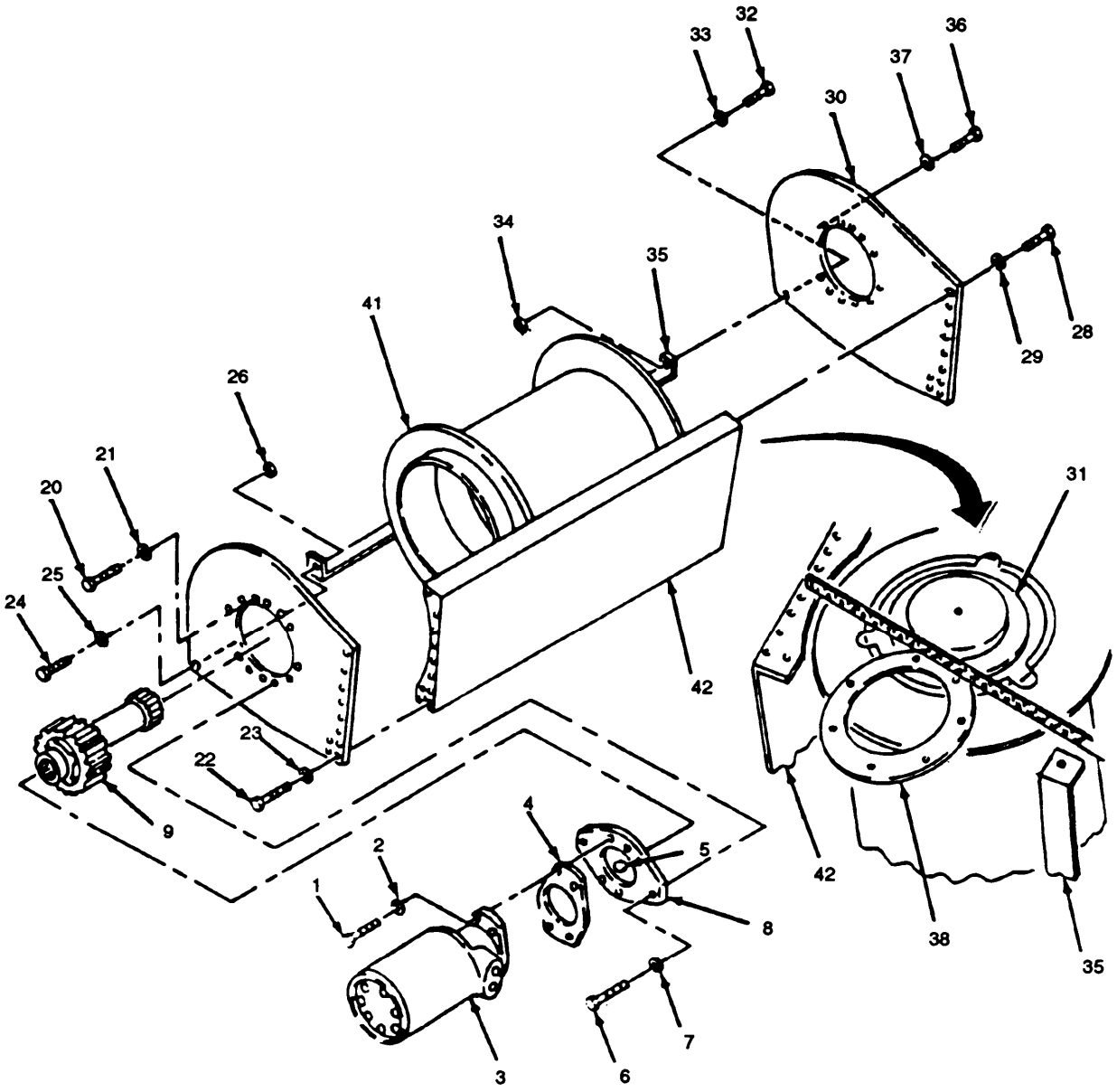



*Figure 4-24. Winch Assembly Model PG-115-043R, Reassembly (Sheet 7 of 7).*

## 4-29. Rear Winch Assembly. - Continued

h. *Installation.* (figure 4-25)

(1) Install winch assembly (1) and secure with eight screws (2) and washers (3).

(2) Apply teflon tape to hydraulic line fitting sand connect hydraulic lines (4) and (5), as tagged, to winch assembly (1).

(3) Remove blocking and lower and secure boom (6).

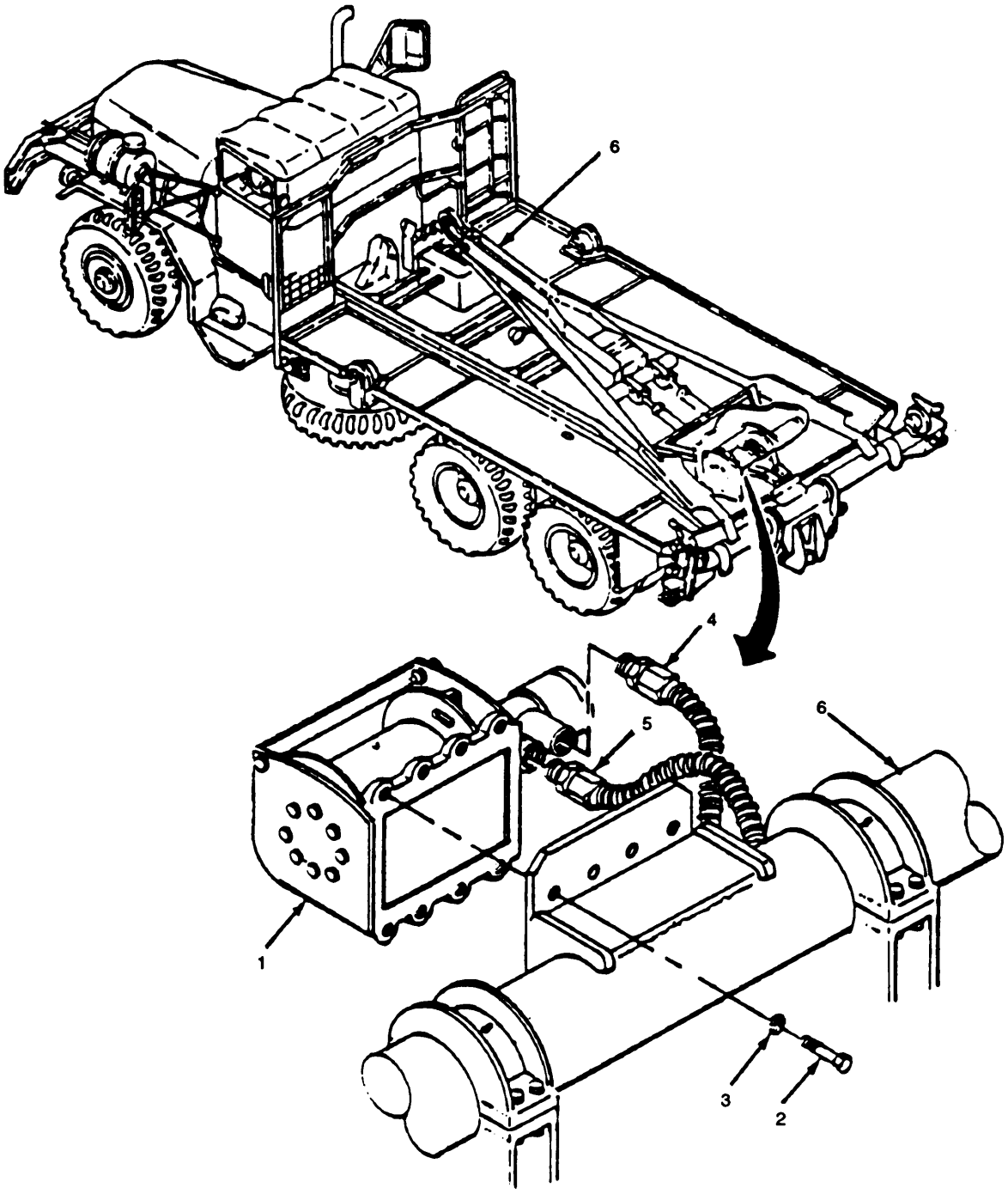



*Figure 4-25. Winch Assembly Installation.*

FOLLOW-ON MAINTENANCE:
(1) Install winch cable (para. 4-30).
(2) Install bay (para. 2-27).

## 4-30. Winch Motor Assembly (Used On Winch Model 11-S-EC).

This task covers:
a. Replace
b. Disassembly
c. Repair
d. Reassembly
e. Installation

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Materials/Parts*

Solvent, Dry Cleaning (Item 18, Appendix E)
Grease, Automotive and Artillery (Item 2, Appendix E)
Rags, Wiping (Item 12, Appendix E)

Equipment Condition

Winch assembly removed (para. 4-28).

a. *Removal.* (figure 4-26)

(1) Remove pipe plugs (1) and (2) and drain hydraulic fluid into a suitable container.

(2) Mark orientation of cover(3) with respect to motor (4) and housing (5).

**CAUTION**

Spring cover must be removed evenly to prevent damage to cover. Remove screws securing cover in an even pattern.

(3) Loosen but do not remove 11 screws (6) and washers (7) securing cover(3).

(4) Note placement of springs (8) before removing cover(3).

(5) Remove 12 screws (6), washers(7), and remove cover (3), springs (8), packing (9), ring (10), packing (11), and motor (4).

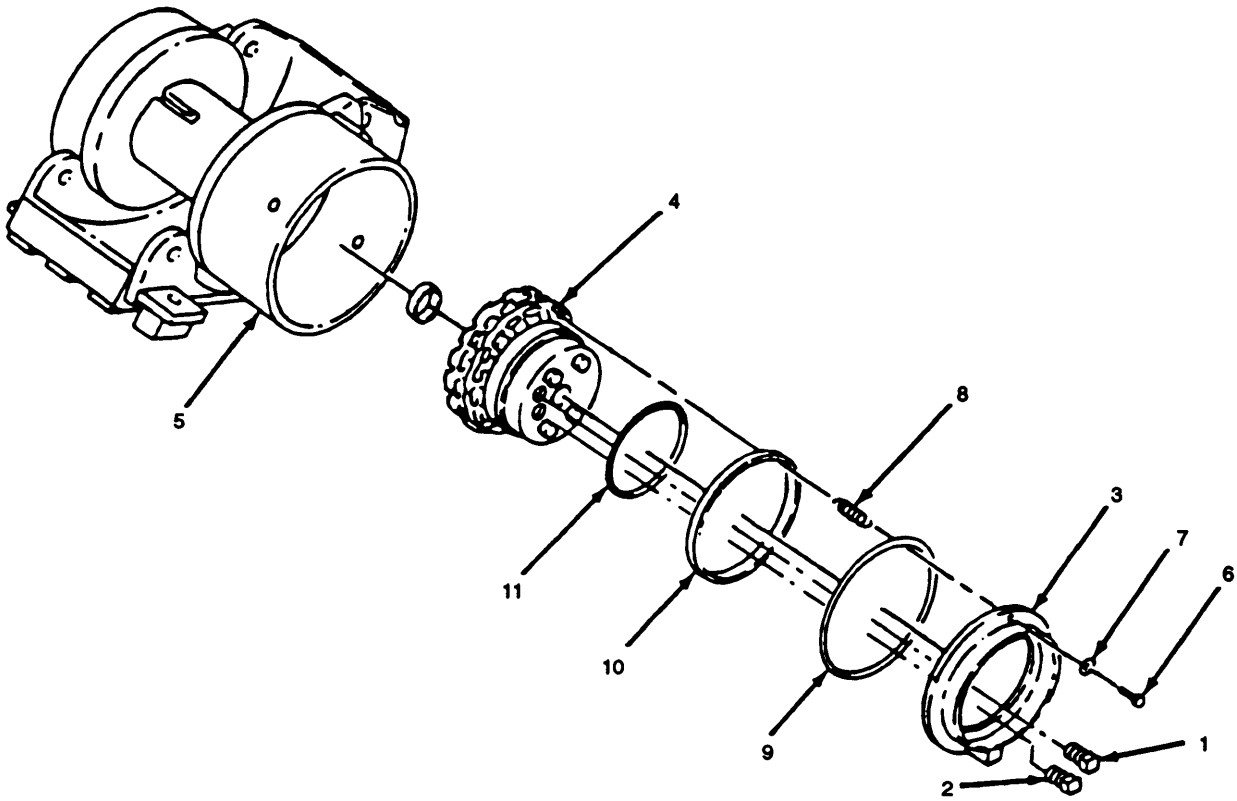



*Figure 4-26. Winch Motor, Removal.*

## 4-30. Winch Motor Assembly (Used on Winch Model 11-S-EC). - Continued

*b.* Disassembly. (figure 4-27)

**NOTE**

The winch motor assembly should be disassembled only on a clean, dirt-free work bench.

(1) Remove five screws (1) and remove port end cover (2).

(2) Remove thrust plate (3), and remove seals (4) and (5).

**NOTE**

Perform Step (3) only if bearings are to be removed.

(3) Remove needle bearings (6).

(4) Remove preformed packing (7) and two washers (8).

(5) Remove short bushing (9), preformed packing (10) and backup washer (11).

(6) Remove retaining ring (12) and sleeve (13).

(7) Remove two cap screws (14).

(8) Remove preformed packing (15).

**NOTE**

Keep gear set together and note orientation before removing.

(9) Remove gear set (16).

(10) Remove key (17).

(11) Remove gear housing (18).

(12) Remove preformed packing (19).

(13) Remove motor shaft (20).

(14) Remove preformed packing (21 ).

(15) Remove brake piston (22), preformed packings (23) and (24) and backup washers (25) and (26).

**NOTE**

Perform Step (17) only if pins are to be replaced.

(16) Remove pins (27).

(17) Remove thrust plate (28) and seals (29) and (30) from end cover (31).

**NOTE**

Perform Step (19) onlv if needle bearings are to be replaced.

## 4-30. Winch Motor Assembly (Used on Winch Model 11-S-EC). - Continued

(18) Remove needle bearings (32).

(19) Remove preformed packing (33).

(20) Remove washer (34), bushing (35), packing (36), and washer (37).

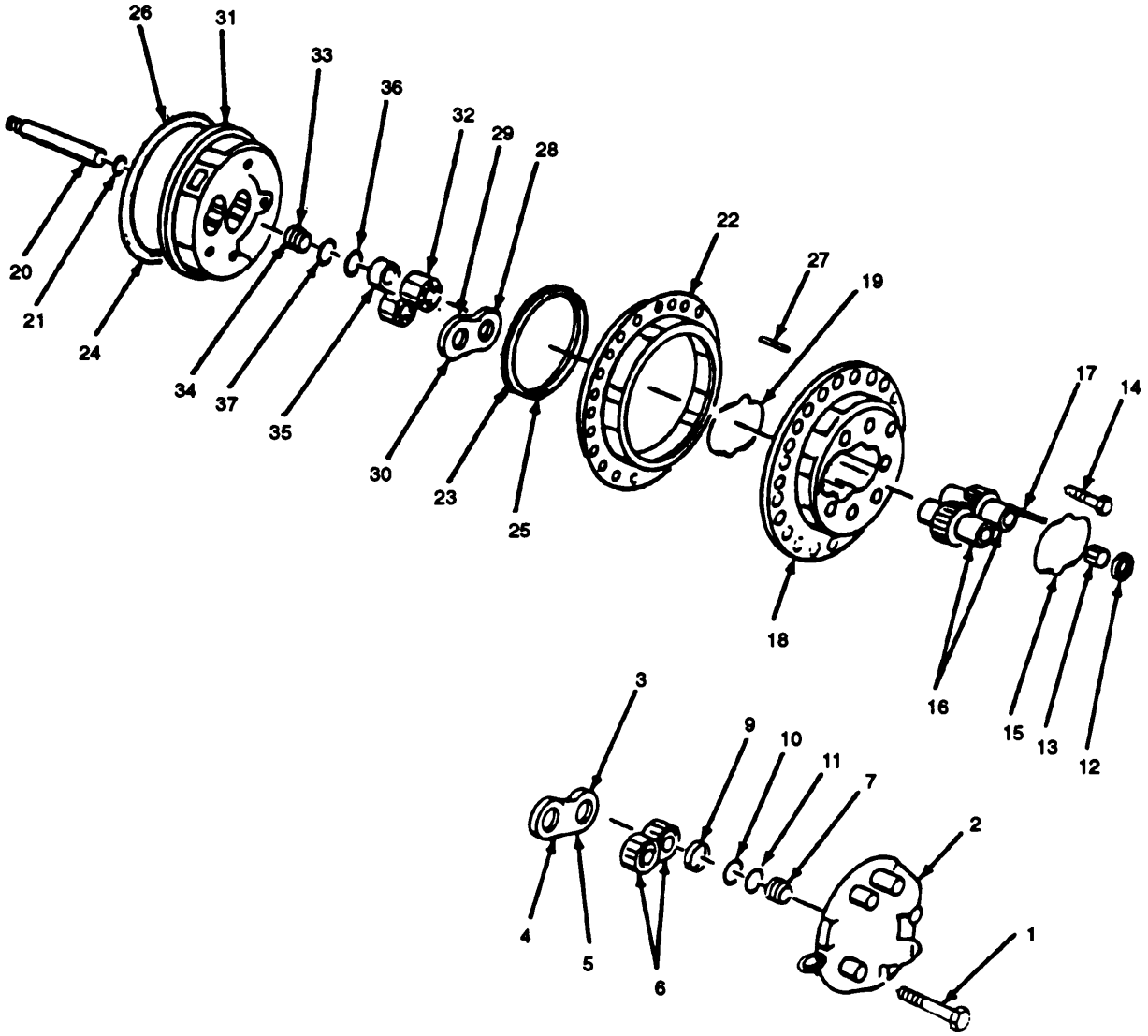



*Figure 4-27. Winch Motor, Disassembly*

## 4-30. Winch Motor Assembly (Used on Winch Model 11-S-EC). - Continued

*c. Repair.*

**WARNING**

Dry cleaning solvent PD-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100-138 °F (38-60 °C).

(1) Clean all items, except seals and preformed packings, with dry cleaning solvent, and dry thoroughly.

(2) Inspect all items for wear and replace worn or otherwise damaged items.

(3) Gear sets and needle bearings are matched sets and should be replaced as sets.

*d. Reassembly.* (figure 4-28)

(1) Install washer (37) in long bushing (35).

(2) Install washer (34) in long bushing (35).

(3) Lubricate and install preformed packings (33) and (36) in long bushing (35) and lubricate preformed packings (33) and (36) in long bushing (35) and lubricate preformed packings (33) and (36) again.

(4) Install long bushing (35) in end cover (31) until seated.

(5) Install needle bearings (32).

(6) Place small amount of grease in middle slot of thrust plate (28).

(7) Install seal (29) in thrust plate (28) and lubricate with grease.

(8) Install thrust plate (28) over needle bearings (32) in end cover (31) until 0.03125 in. (0.07937 cm) clearance remains between thrust plate and end cover (31).

(9) Install seals (30) and finish installing thrust plate (28) until flush with surface of end cover (31).

(10) Trim away any excess seal (30).

(11) Install backup washer (26) on end cover (31).

(12) Lubricate preformed packing (23) with grease and install on inboard side of backup washer (26) and relubricate with grease.

(13) Install backup washer (25) in brake piston (22).

(14) Lubricate packing (24) with grease and install in brake piston (22) next to backup washer (25) and relubricate with grease.

(15) Install pins (27) in brake piston (22).

## 4-30. Winch Motor Assembly (Used on Winch Model 11-S-EC). - Continued

(16) Install end cover (31) in brake piston (22), ensure packings (24) and (23) do not get pinched, and backup washers (26) and (25) do not protrude.

(17) Install washer (11) in outside groove of short bushing (9).

(18) Install two washers (8) in inside groove of short bushing (9).

(19) Lubricate packing (7) with grease and install in short bushing (9).

(20) Lubricate packing (10) with grease and install in short bushing (9).

(21) Install short bushing (9) in center bore of port end cover (2) with thick walled end of short bushing (9) entering first.

(22) Install needle bearings (6) in port end cover (2).

(23) Install seal (4) in thrust plate (3) and lubricate with grease.

(24) Install thrust plate (3) over needle bearings (6) in port end cover (2) until 0.0375 in. (0.07937 cm) clearance remains between thrust plate (3) and port end cover (2).

(25) Install four seals (5) and finish installing thrust plate (3) until flush with service of port end cover (2).

(26) Trim away any excess seal (5).

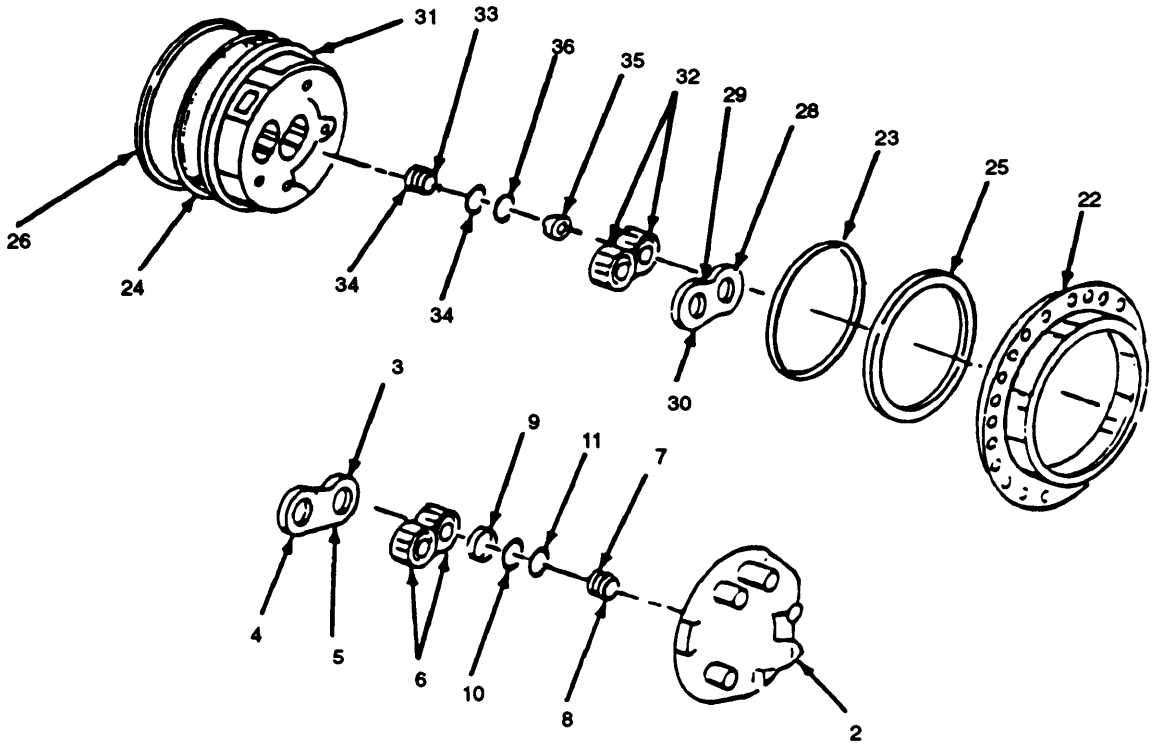



*Figure 4-28. Winch Motor, Reassembly (Sheet 1 of 2).*

## 4-30. Winch Motor Assembly (Used on Winch Model 11-S-EC). - Continued

(27) Install motor shaft (20).

(28) Lubricate packings (15) and (19) with grease and install in gear housing (18).

(29) Install gear housing (18) on brake piston (22) ensure packing (19) does not get pinched during assembly.

(30) Install key (17) in motor shaft (20).

(31) Install gear set (16).

(32) Install packing (21) on end of motor shaft (21).

(33) Install sleeve (13) over packing (21) on motor shaft (20).

(34) Install two cap screws (14) and torque to 265 ft-lbs (359 Nm).

**NOTE**

Tighten port end cover screws evenly to ensure proper installation.

(35) Install port end cover(2) and secure with five screws (1). Torque screws to 265 ft-lbs (359 Nm).

(36) Ensure motor shaft (20) turns freely.

(37) Measure distance between brake piston (22) and gear housing (18). The distance should be 0.2812 in. (0.7143 cm). Either gently tape brake piston (22) in, if distance is too large, or pry it out if distance is too small.

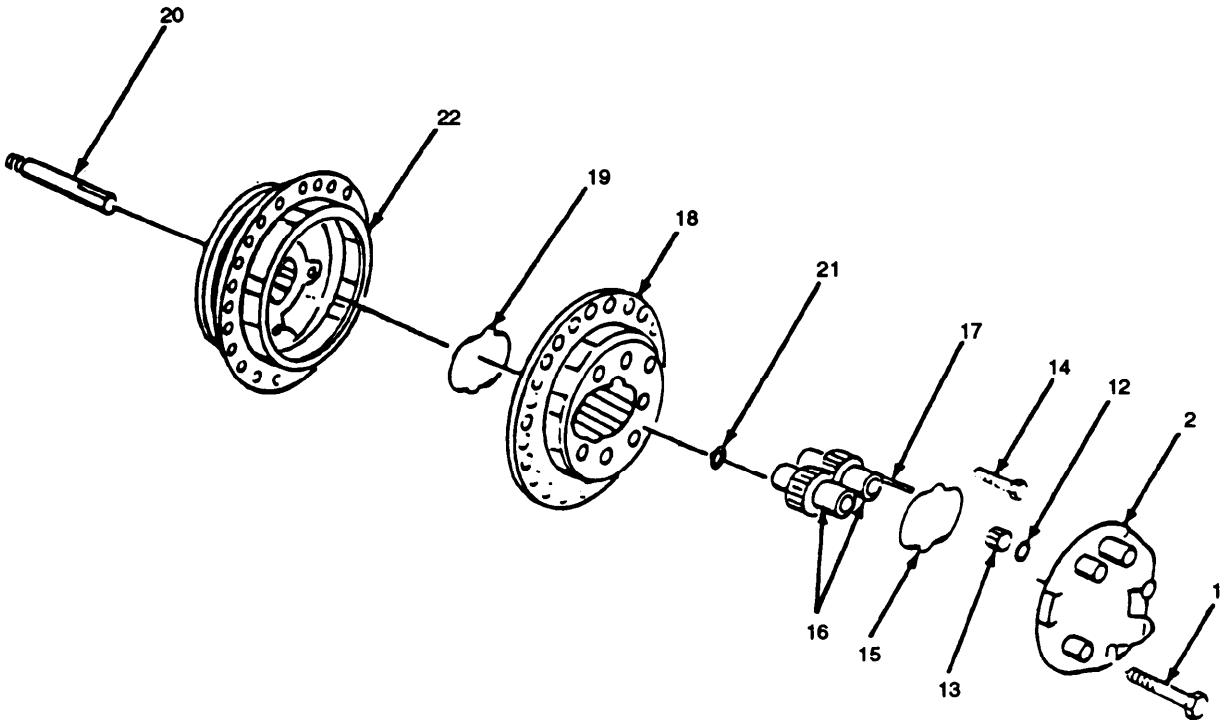



*Figure 4-28 Winch Motor, Reassembly (Sheet 2 of 2).*

## 4-30. Winch Motor Assembly (Used on Winch Model 11-S-EC). - Continued

*e.* *Installation.* (figure 4-29)

(1) Install motor (1) in housing (2) and aline marks on housing (2) and motor (1).

(2) Install retaining ring (3).

(3) Lubricate packing (4) with grease and install on motor (1) and relubricate with grease.

(4) Install brake springs (5) as noted during disassembly.

(5) Lubricate packing (6) with grease and install on motor (1) and relubricate with grease.

(6) lnstall cover (7) and aline marks on cover (7) and motor (4).

(7) Install 12 screws (8) and washers (9) and tighten scews in either a clockwise or counterclockwise sequence until all screws are torqued to 35 ft-lbs (4.8 mkg).

(8) Install two pipe lugs (10) and (11).

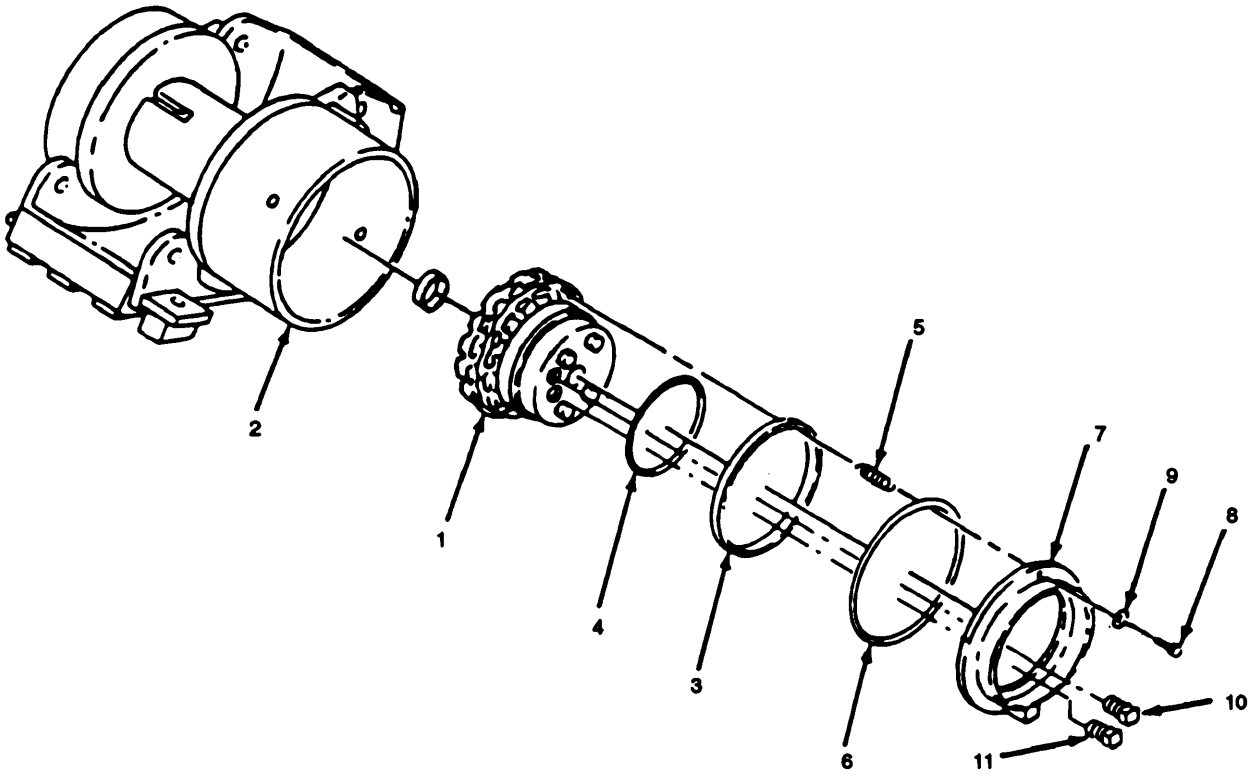



*Figure 4-29. Winch Motor, Installation.*

## 4-31. Winch Motor Assembly (Used on Winch Model PG-115-043R).

This task covers:
a. Replace
b. Disassembly
c. Repair
d. Reassembly
e. Installation

INITIAL SETUP

*Tools*

General Mechanic's Automotive Tool Kit (Item 2, Appendix E)
Seal Compression Ring (Item 5, Appendix B)
Seal Thimble (Item 6, Appendix B)
Seal Driver (Item 7, Appendix B)

*Equipment Condition*

Bay removed (para. 2-16)

*Materials/Parts*

Grease, Automotive and Artillery
Solvent, Dry Cleaning (Item 18, Appendix E)
Rags, Wiping (Item 12, Appendix E)
Gasket, Winch Motor (P/N 008-10056-1)

*a. Removal.* (figure 4-30)

**WARNING**

When disconnecting any hydraulic line, open line slowly and protect face, as hydraulic oil may spray out due to residual pressure in system.

(1) Tag and disconnect hydraulic lines (1) and (2) from winch motor (3).

(2) Remove four screws (4) and washers (5) and remove winch motor (3) and gasket (6).

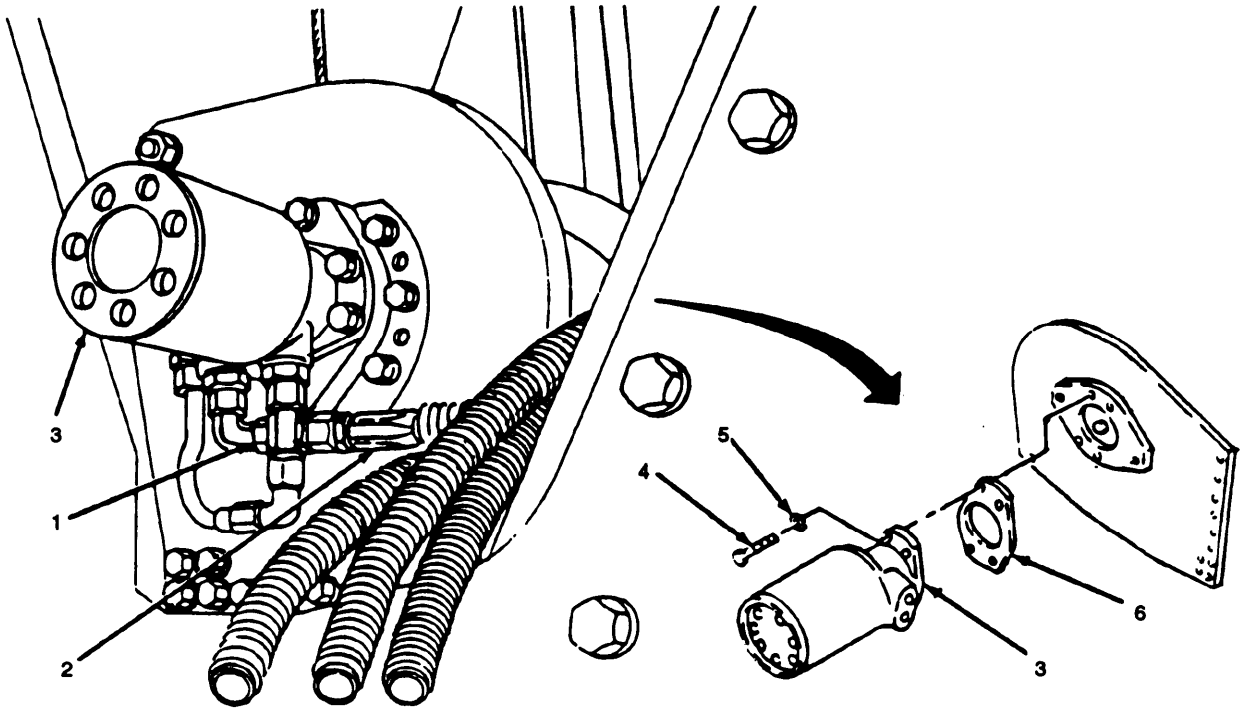



*Figure 4-30. Winch Motor, Removal.*

## 4-31. Winch Motor Assembly (Used on Winch Model PG-115-043R). - Continued

*b.* Disassembly. (figure 4-31)

(1) Remove 7 srews (1) and remove cover (2) and seal (3).

(2) Remove commutator ring (4), commutator (5), and manifold (6).

(3) Remove seal ring (7) from manifold (6).

(4) Remove manifold plate (8).

**NOTE**

The mtor assembly is a matched set. After removal, mark end of assembly to ensure proper orientation during reassembly.

(5) Remove rotor assembly (9).

(6) Remove wear plate (10).

(7) Remove drive link (11).

(8) Remove bearing (12) and coupling shaft (13).

(9) Remove housing (14) and seal ring (15).

(10) Remove seal (16), ring (17), washer, (18) washer (19) and seal (20).

**NOTE**

Perform next step only if items are to be replaced due to wear or other damage.

(11) Remove bearing (21), washer (22), bearing (23), washer (24), and washer (25) from housing (26).

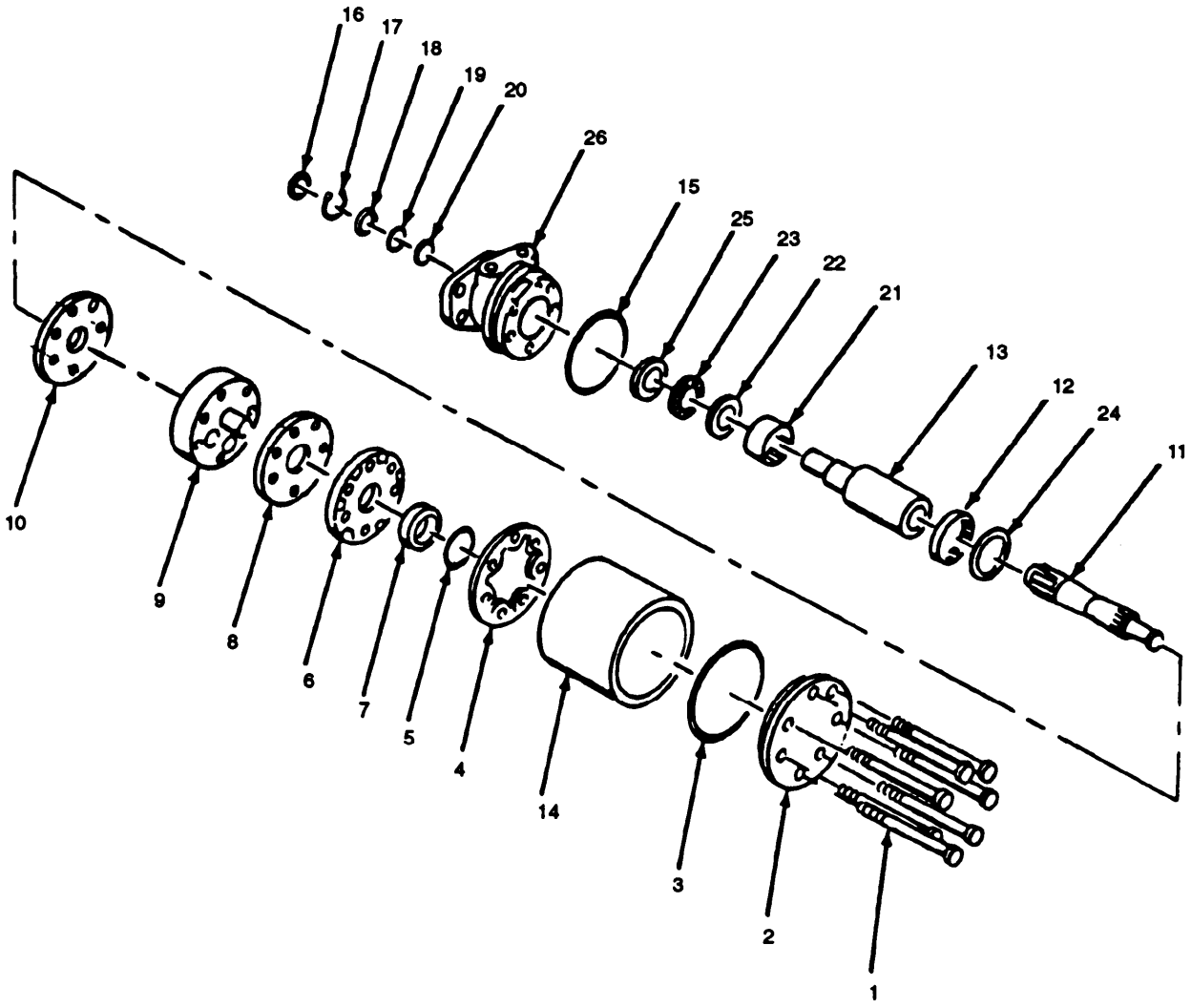



*Figure 4-31. Winch Motor, Disassembly.*

## 4-31. Winch Motor Assembly (Used on Winch Model PG-115-043R). - Continued

*c. Repair.*

**WARNING**

Dry cleaning solvent PD-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100-138 °F (38-60 °C).

(1) Clean all items, except seals and packings, with dry cleaning solvent and dry thorouhly.

(2) Inspect all items for wear and replace any worn or othewise damaged item. Refer to table 4<#106>4 for repair and replacement limits.

(3) Replace all seals, gaskets, and preformed packings.

(4) Rotor assembly is a matched set, if any excessive wear is found, the entire assembly should be replaced.

(5) Commutator ring, seal ring, and commutator must be replaced as a matched set.

*d. Reassembly.* (figure 4-32)

(1) Position seal compression ring (Item 5, Appendix B) in housing (26) with tapered end inward into housing (26) until it bottoms out.

(2) Position seal thimble (Item 6, Appendix B) on coupling shaft (13) and install seal thimble in seal compression ring.

(3) Lubricate seal (20) with grease, and install using seal driver (Item 7, Appendix B) with lip side of seal inward.

(4) Remove seal thimble from coupling shaft (13) and remove seal compression ring from housing (26).

(5) Install washer (19), backup ring (18) and retaining ring (17) with rounded face inward.

(6) Lubricate back side of seal (16) and install.

(7) Install washer (24), bearing (23), and washer (22).

(8) Install bearing (21) in housing (26) to a depth of 2.335-2.395 in. (5.9309-6.0833 cm).

(9) Install bearing (23) in housing (26) to a depth of 0.15-0.21 in. (0.3810-0.5334 cm).

**NOTE**

Splines on coupling shaft should be covered with tape to prevent damage to seal (20).

(10) Install coupling shaft (13).

(11) Install bearing (12).

(12) Install drive link (11).

(13) Install wear plate (10), rotor assembly (9) with counter bore in rotor down.

(14) Install manifold plate (6), commutator ring (4), commutator (5), and seal ring (7) with flat side out.

(15) Install seal ring (15) on housing (26).

(16) Install seal ring (3) on cover (2).

(17) Apply a generous amount of oil to both ends of sleeve (14) and install.

(18) lnstall cover (2) and secure with seven screws (1). Torque screws to 45-50 in.-lbs (5-5.6 Nm).

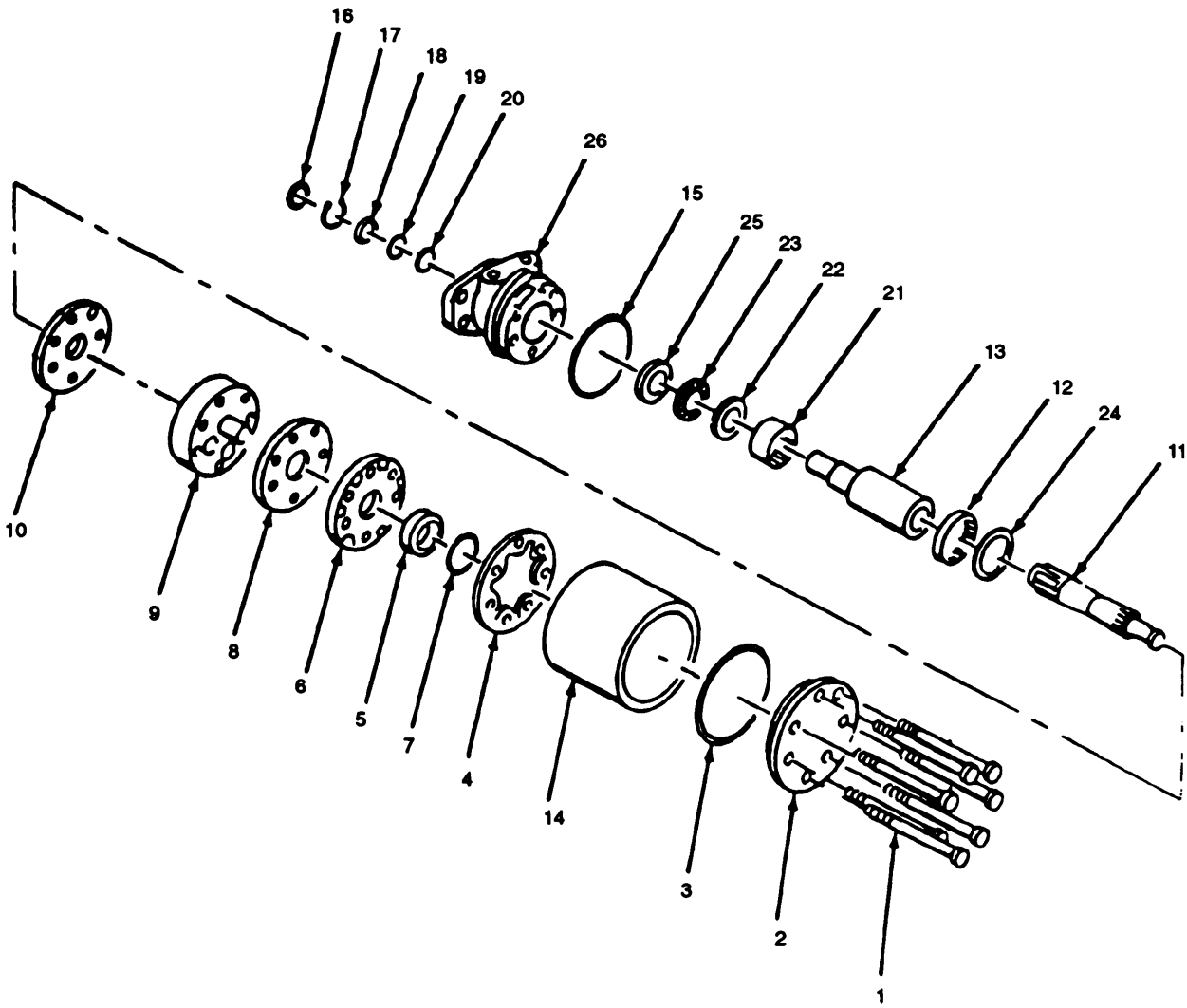



*Figure 4-32. Winch Motor, Reassembly.*

## 4-31. Winch Motor Assembly (Used on Winch Model PG-115-043R). - Continued

*e.* *Installation.* (figure 4-33)

(1) Install winch motor (1), and gasket (2) and secure with four screws (3) and washers (4).

(2) Apply teflon tape to hydraulic line fittings and connect hydraulic lines (5) and (6) to winch motor (1) as tagged.

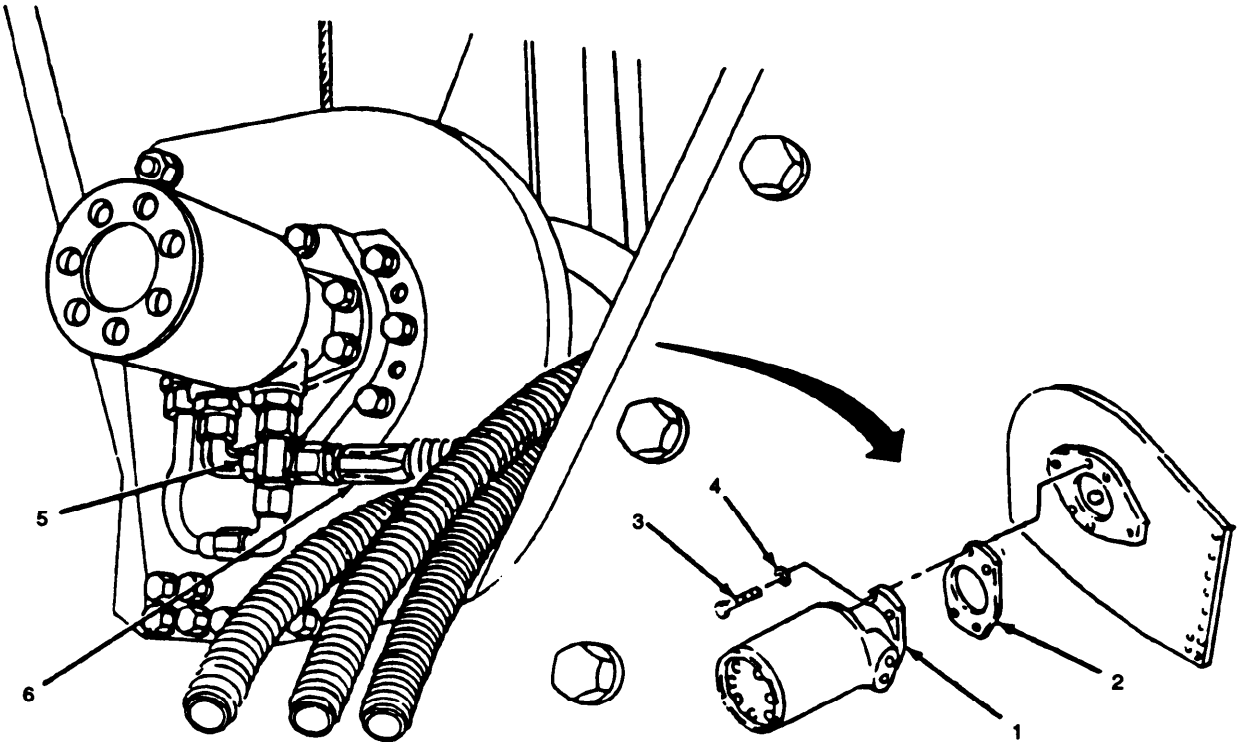



*Figure 4-33. Winch Motor, Installation.*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

## 4-32. Rear Winch Cable Assembly.

This task covers: a. Replace (Winch Model 11-S-EC) b. Replace (Winch Model PG-115-043R)

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Equipment Condition:*

Bay removed (para. 2-16).

Materials/Parts

Lubricant, Exposed Wire (Item 6, Appendix E)
Wire Rope, 100 ft (30.48 m); and Rags, Wiping (Item 12, Appendix E)

*a.* *Replace (Winch Model 11-S-EC).* (figure 4-34)

(1) Raise boom (1) approximately 5 ft (1.53 m) and block in position.

**WARNING**

Always wear leather gloves when handling winch cable. Never allow cable to run through hands.

**CAUTION**

Failure to maintain tension on cable while winch drum is turning will cause cable to become snarled on winch drum.

(2) Pay out cable (2) fully until cable anchor (3) is exposed.

(3) Press cable anchor (3) out of drum (4) and remove cable (2) from drum (4) and boom (1).

(4) Unscrew sleeve (5) from clevis (6) and remove cable (2) from clevis (6).

(5) Remove plug (7) and remove cable (2) from sleeve (5).

(6) Inspect clevis (6) hook (8) and safety latch on hook for cracks and deformities and replace any damaged item.

(7) Refer to Appendix F for procedures to manufacture a new cable assembly.

(8) Insert cable (2) in sleeve (5) with approximate 1.50 in. (3.8 cm) extending through sleeve (5).

(9) Spread strands of cable (2) and insert plug (7) and drive plug to solid seat.

**NOTE**

Wire rope should be visible through inspection hole on top of clevis.

(10) Install sleeve (5) in clevis (6) and tighten sleeve (5).

**NOTE**

To ensure proper installation of the clevis, lift a test load after the winch cable is assembled. The wire will not be visible through the inspection hole after the test load is lifted.

(11) Coat cable assembly (2) with preservative, grade 1, in accordance with MIL-C-16173.

(12) Route cable assembly (2) around boom sheeve (9) and down between cable roller (10) and boom (1),

(13) Insert cable (2) through slot in winch drum (4) and loop cable.

(14) lnsert cable anchor (3) in bolt and pull on cable (2) until firmly secured between drum (4) and anchor (3).

(15) Pay in cable (2) until fully wound around drum (NO TAG) and secure cable (2) and hook (8).

(16) Raise boom (1), remove blocking and lower and secure boom (1).

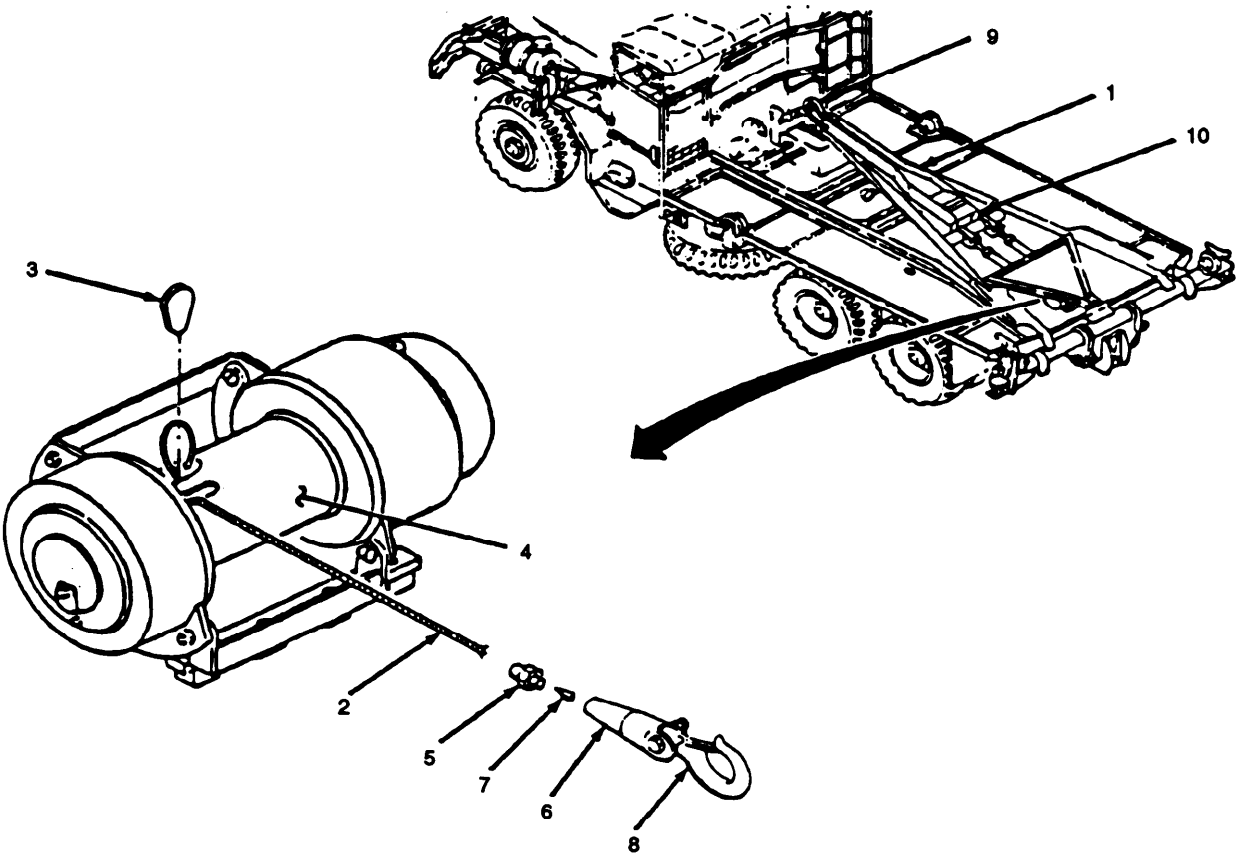



***Figure 4-34. Winch Cable Assembly (Winch Model 11-S-EC), Replace.***

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

## 4-32. Rear Winch Cable Assembly. - Continued

*b. Replace Winch Model PG-115-043R).* (figure 4-35)

**WARNING**

When working under boom, support boom by blocking or other suitable means.

(1) Raise boom (1) approximately 5 ft (1.53 m) and block in position.

**WARNING**

Always wear leather gloves when handling winch cable. Never allow cable to run through hands.

**CAUTION**

Failure to maintain tension on cable while winch drum is turning will cause cable to become snarled on winch drum.

(2) Pay out cable (2) until cable is completely unwound from winch drum (3) and cable anchor (4) is exposed.

(3) Press cable anchor (4) out of drum (3) and remove cable (2) from drum (3), cable tensioner (5) and boom (1).

(4) Unscrew sleeve (6) from clevis (7).

(5) Remove plug (8) and remove cable (2) from sleeve (6).

(6) Inspect clevis (7), hook (9) and safety latch on hook for cracks and deformities and replace any damaged item.

(7) Insert cable (2) in sleeve (6) with approximate 1.50 in. (3.80 cm) exposed through sleeve (6).

(8) Spread strands of cable (2) and insert plug (8) and drive to a solid seat.

**NOTE**

Wire rope should be visible through inspection hole on top of clevis.

(9) Install sleeve (6) in clevis (7) and tighten.

(10) Coat cable assembly (2) with preservative, grade 1, in accordance with ML-C-16173.

(11) Loosen two locknuts (10) and (11) until cable (2) can be routed through cable tensioner (5).

(12) Route cable assembly (2) around boom sheeve (12), through guide tube (13), cable tensioner (5), guide pulley (14) and down between cable roller (15) and boom (1) to winch drum (3).

(13) Route cable (2) through seat in drum (3) and anchor point (16).

(14) Loop cable (2) and install anchor(4) in loop and install anchor (4) with cable (2) in anchor point (16) and pull cable (2) until secured.

(15) Play in cable until fully wound on drum (3).

**NOTE**

To ensure proper installation of the clevis, lift a test load after the winch cable is assembled. The wire will not be visible through the inspection hole after the test load is lifted.

(16) Adjust cable tensioner (5) as follows:

*(a)* Pay out cable and tighten nut (11) until cable (2) in passing through cable tensioner (5) without slippage.

*(b)* Tighten nut (11) one half turn more and tighten nut (10).

*(c)* Verify proper operation of cable tensioner in both directions.

(17) Secure cable assembly (2) to boom (1) and pay in cable.

(18) Raise boom (1), remove blocking and lower and secure boom (1).

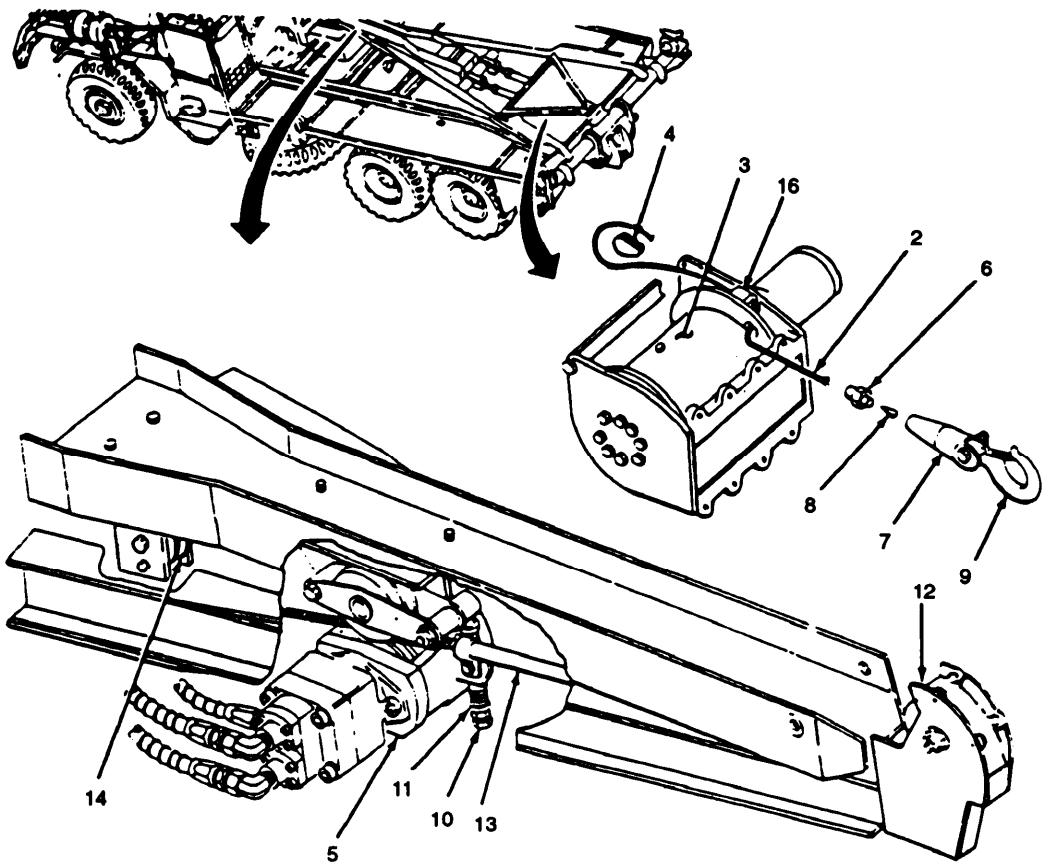



***Figure 4-35. Winch Cable Assembly (Winch Model PG-115-043R), Replace.***

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

## 4-33. Cable Tensioner Assembly (RBT Model Only).

This task covers: a. Adjust b. Replace

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Equipment Condition:*

Bay removed (para. 2-16).

Personnel Required

Three

*a. Adjust.* (figure 4-36)

**WARNING**

When working under boom, support boom by blocking or other suitable means.

(1) Raise boom (1) approximately 5 ft (1.53 m) and block in position.

(2) Loosen locknuts (2) and (3).

**WARNING**

Always wear leather gloves when handling winch cable. Never allow cable to run through hands.

**CAUTION**

Failure to maintain tension on cable while winch drum is turning will cause cable to become snarled on winch drum.

(3) Payout cable (4) and tighten nut (3) until cable (4) passes through cable tensioner (5) without slippage, and tighten nut (3) 1/2 turn more.

(4) Tighten nut (2).

(5) Verify proper operation of cable tensioner in both directions.

(6) Secure cable (4) to boom (1) and play in cable.

(7) Raise boom (1), remove blocking and lower boom (1) and secure.

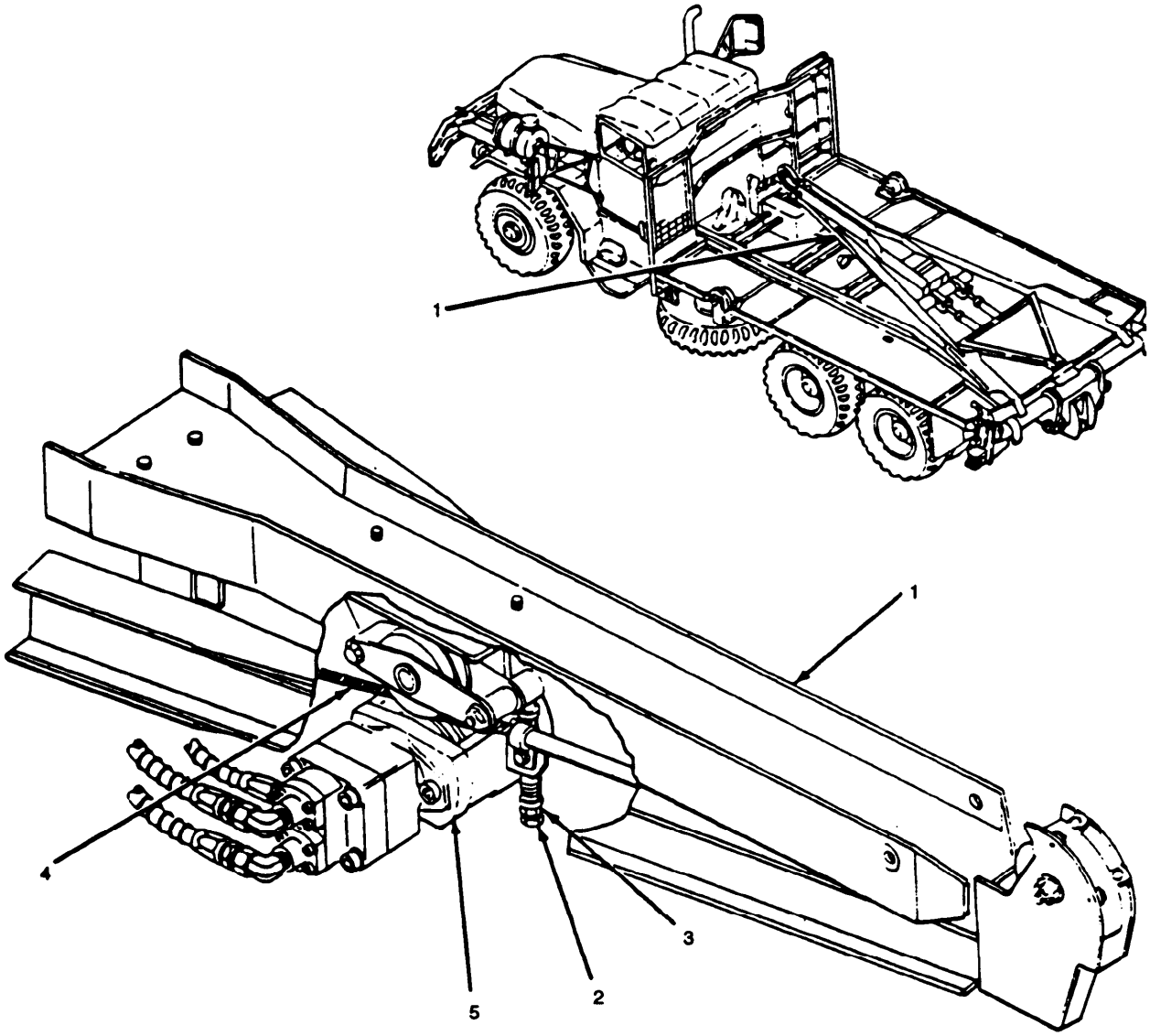



***Figure 4-36. Cable Tensioner Adjust.***

FOLLOW-ON MAINTENANCE: Install bay (para. *2-27).*

## 4-33. Cable Tensioner Assembly. - Continued

*b.* *Replace.* (figure 4-37)

**WARNING**

When working under boom, support boom by blocking or other suitable means.

(1) Raise boom (1) approximately 5 ft (1.38 m) and block in position.

**WARNING**

When disconnecting any hydraulic lines, open slowly and protect face as hydraulic fluid may spray out due to residual pressure in system.

**NOTE**

When removing hoses, have a suitable container to drain oil from hoses. Also cap all hoses and ports immediately to prevent dirt or foreign matter from entering the system.

(2) Tag, disconnect and cap three hydraulic lines (2), (3), and (4) from cable tensioner(5).

(3) Remove nut (8), washer(7), and bolt (6).

(4) Loosen locknuts (9) and (10), raise arm (11) and remove cable (12) from cable tensioner (5).

**WARNING**

Cable tensioner weighs approximately 134 lbs (61 kg). To avoid personnel injury, three personnel are required for this procedure.

(5) Remove screw (13) and clamp (14) securing cable guide (15).

(6) Support cable tensioner (5) and remove four screws (16), washers (17), and lockwashers (18) and remove cable tensioner (5).

(7) Install cable tensioner (5) and secure with four screws (16), washers (17), and lockwashers (18).

(8) Install clamp (14) and secure with screw (13).

(9) Position cable (12) in cable tensioner (5).

(10) Install bolt (6), washer (7), and nut (8).

(11) Apply teflon tape to hydraulic line fittings and connect three hydraulic lines (2), (3), and (4) to cable tensioner (5).

(12) Adjust cable tensioner.

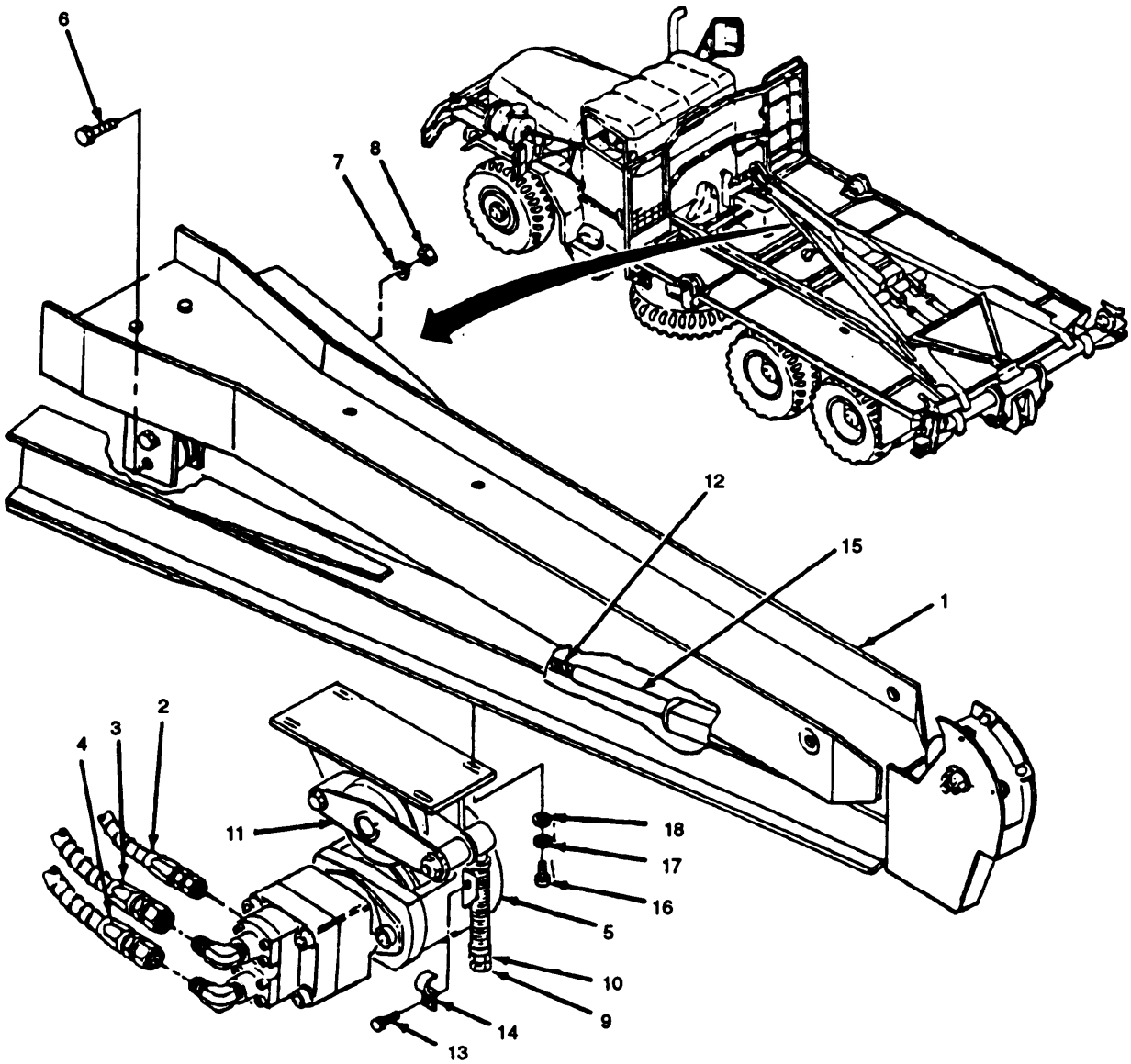



*Figure 4-37. Cable Tensioner Assembly, Replace.*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

## 4-34. **Boom Assembly.**

This task covers: Replace

INITIAL SETUP

| *Tools* | *Personnel Required* |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix B)<br>Lifting device, web straps/chain | Minimum of two |
| *Materials/Parts* | *Equipment Conditions* |
| Grease, Automotive and Artillery (Item 2, Appendix E)<br>Grease, Graphite (Item 3, Appendix E)<br>Compound, Deck, Non-Slip (Item 1, Appendix E) | Winch and cable removed (para. 4-27).<br>Walkways removed (para. 4-26). |

*a*. *Replace.* (figure 4-38)

**WARNING**

When disconnecting any hydraulic line, open line slowly and protect your face. Hydraulic oil can spray out due to residual pressure in the system.

**CAUTION**

Cap all hydraulic connections to prevent contamination from entering the hydraulic system.

NOTE

When removing hoses, have a suitable container to drain oil from hoses. Also cap all hoses and ports immediately to prevent dirt or foreign matter from entering the system.

(1) Tag and disconnect hydraulic lines from boom assembly (1).

(2) Tag and disconnect electrical leads from boom assembly (1).

(3) Block boom cylinders (2) in position.

(4) Remove retaining ring (3), clevis pin (4), securing cylinders (5) to boom assembly (1).

(5) Secure suitable lifting device to boom (1).

(6) Remove eight nuts (6), lockwashers (8), and two caps (9).

(7) Remove boom assembly (1).

(8) Remove eight screws (6), lockwashers (7), nuts (8), and two caps (9) and remove boom assembly (1).

(9) Install boom assembly (1).

(10) Apply graphite grease and install caps (9) and secure with screws (8), lockwashers (7), and nuts (6).

(11) Apply grease to clevis pins (4), install and secure to cylinders (5) and boom (1) with retaining rings (3).

(12) Apply anti seize tape to hydraulic line fittings and connect lines as tagged.

(13) Connect electrical leads as tagged.

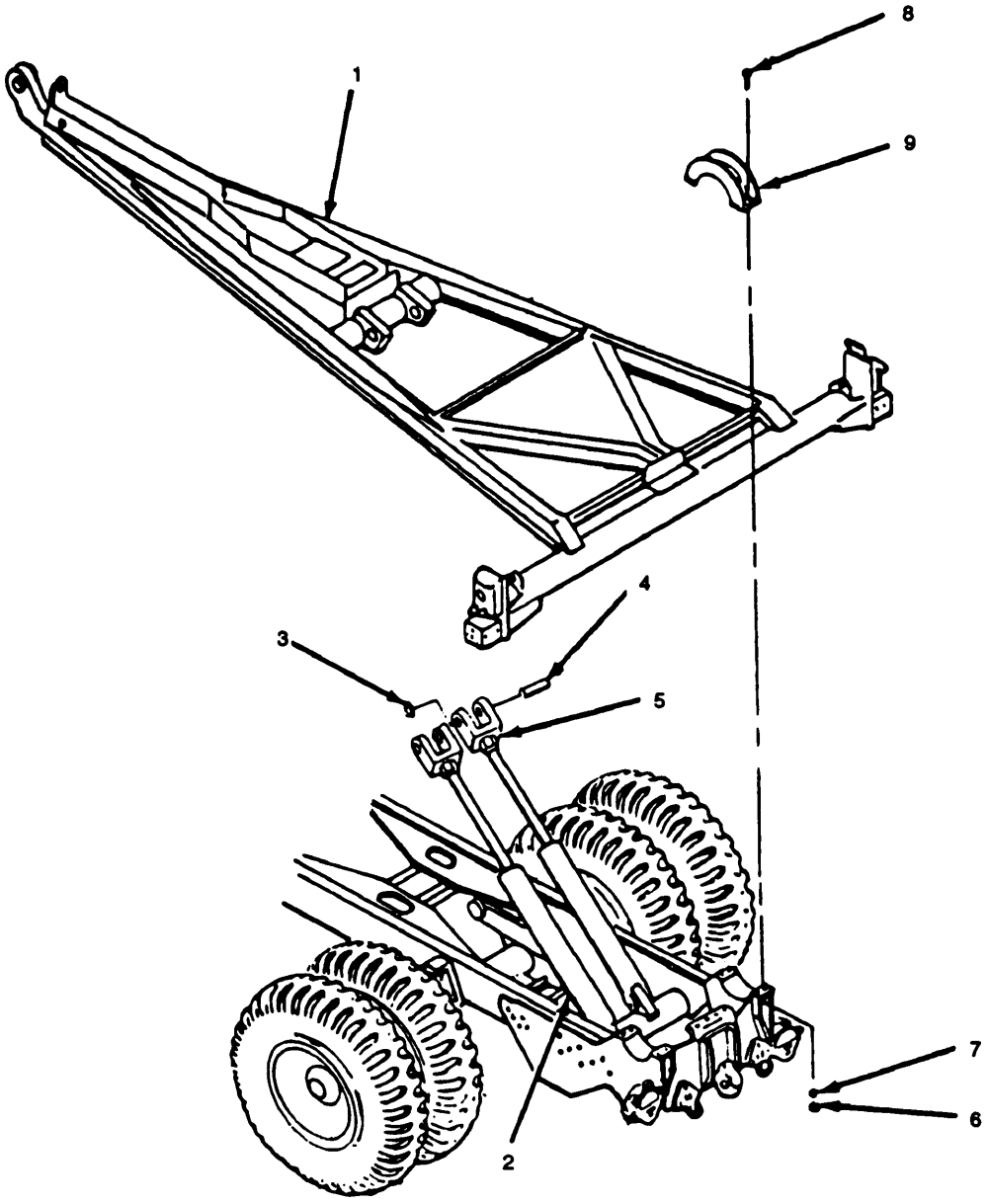



*Figure 4-38. Boom Assembly Replace.*

## 4-35. **Sheave and Pin.**

This task covers: Replace

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Materials/Parts*

Grease, Automotive and Artillery (Item 2, Appendix E)
Rags, Wiping (Item 12, Appendix E)

*Equipment Condition:*

Bay removed (para. 2-16).

*a*. *Replace.* (figure 4-39)

**NOTE**

Step (1) is for transport model RBT only.

(1) Remove four nuts (1), lockwashers (2), washers (3) and screws (4) and remove guard (5).

(2) Payout winch cable, remove cotter pin (6), nut (7), washer (8), and sheave pin (9) and remove sheave (10).

(3) Position sheave (10) in boom (11).

(4) Apply grease to sheave pin (9) and install through sheave (10).

(5) Secure sheave pin (9) with washer (8), cotter pin (6), and nut (7).

**NOTE**

Step (6) is for transporter model RBT.

(6) Install guard (5) and secure with four screws (4), washers (3), lockwashers (2), and nuts (1).

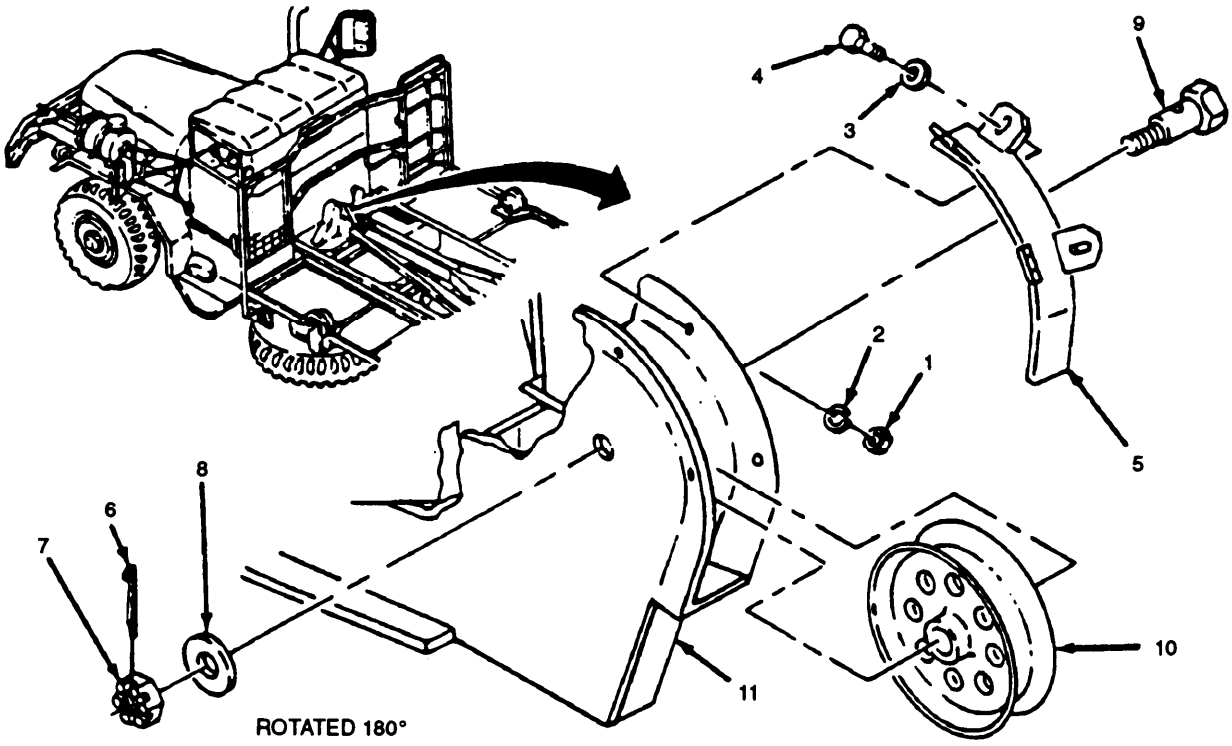



*Figure 4-39. Sheave and Pin, Replace.*

FOLLOW-ON MAINTENANCE: Install bay (para. *2-27).*

## 4-36. Guide Sheave, Pin, and Mounting Bracket (Transporter Model RBT).

This task covers: Replace

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Materials/Parts*

Grease, Automotive and Artillery (Item 2, Appendix E)

*Equipment Condition:*

Bay removed (para. 2-16).

*a. Replace.* (figure 4-40)

**WARNING**

When working under boom, support boom by blocking or other suitable means.

(1) Raise boom (1) 5 ft (1.90 m) and block in position.

(2) Remove nut (2), lockwasher (3), and screw (4).

(3) Remove nut (5), washer (6), screw (7), and remove guide sheave (8).

(4) Remove two nuts (9), screws (10), and remove bracket (11).

(5) Install bracket (11) and secure with two screws (9) and nuts (10).

(6) Apply grease to screw (5).

(7) Ensure winch cable (12) is on outside half of guide sheave (8) and secure guide sheave (8) with screw (5), washer (6), and nut (7).

(8) Install screw (4), lockwasher (3), and nut (2).

(9) Remove blocking and lower and secure boom (1).

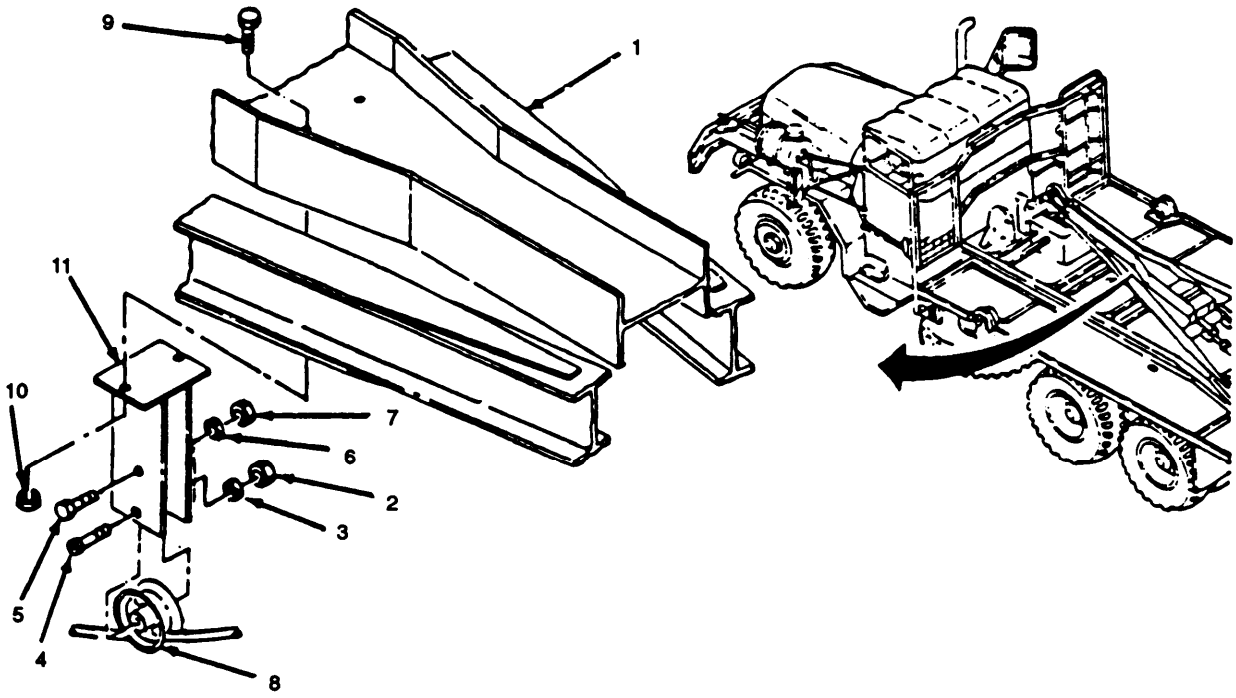



*Figure 4-40. Guide Sheave, Pin, and Mounting Bracket, Replace.*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

## 4-37. **Snatch Block Anchor and Pin.**

This task covers: Replace

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Materials/Parts*

Grease, Automotive and Artillery (Item 2, Appendix E)

*Equipment Condition:*

Bay removed (para. 2-16).

*a*. *Replace.* (figure 4-41)

(1) Remove pin (1) and anchor (2).

(2) Remove screw (3) and washer (4) securing wire rope (5).

(3) Install wire rope (5) and secure with screw (3) and washer (4).

(4) Apply grease to pin (1).

(5) Install anchor (2) and secure with pin (1).

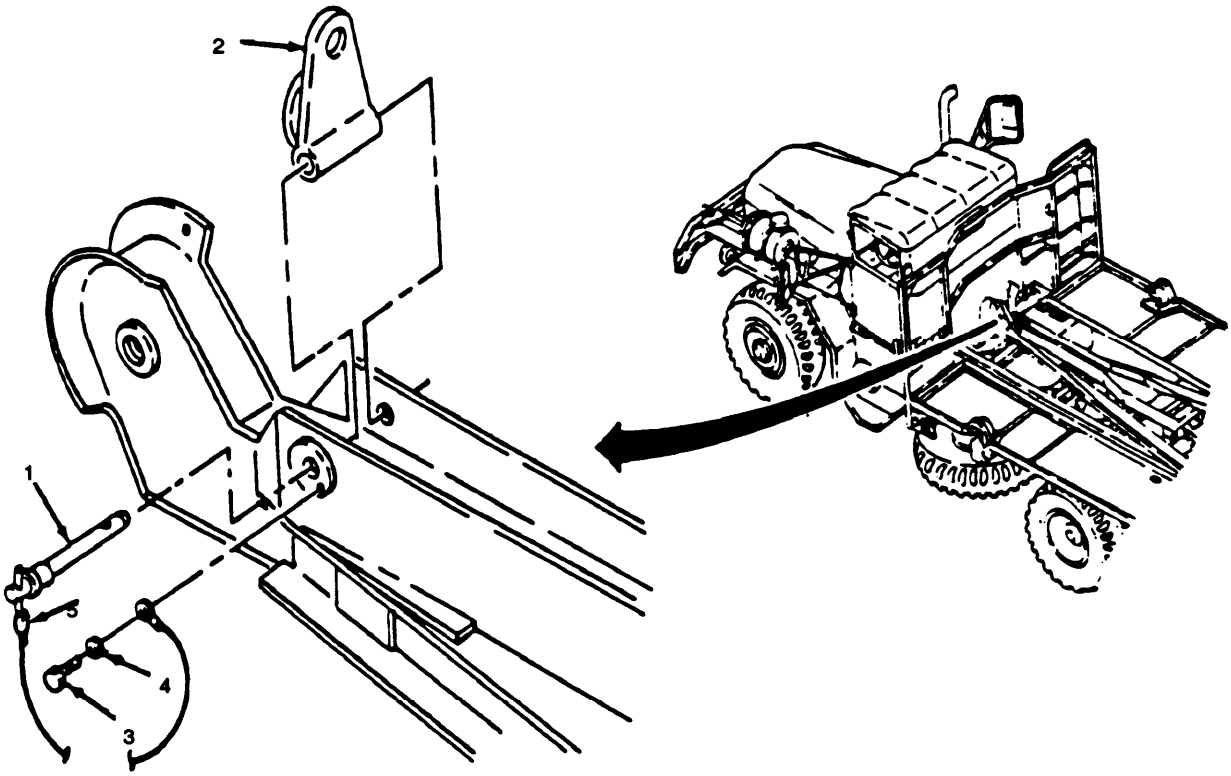



*Figure 4-41. Snatch Block and Anchor Pin, Replace.*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

4-38. **Rollers and Pins.**

This task covers: Replace

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Materials/Parts*

Grease, Automotive and Artillery (Item 2, Appendix E)
Rags, Wiping (Item 12, Appendix E)

*Equipment Condition:*

Bay removed (para. 2-16).

*a*. Replace. (figure 4-42)

**NOTE**

Maintenance procedures are for both the winch cable roller and pin, and bay roller and pin.

(1) Remove cotter pin (1), nut (2), pin (3) and bay roller (4).

(2) Remove two cotter pins (5), washers (6), pin (7), and roller (8).

(3) Remove grease fitting (9) from pin (3).

(4) Install grease fitting (9) in pin (3).

(5) Apply grease to fitting (9) until clean grease appears from pin *(3)*. Wipe off excess grease.

(6) Position bay roller (4) in channel and install pin (3).

(7) Secure pin (3) with nut (2) and cotter pin (1).

(8) Apply grease to pin (7).

(9) Position winch cable roller (8) in channel and install pin (7).

(10) Secure pin (7) with two washers (6) and cotter pins (5).

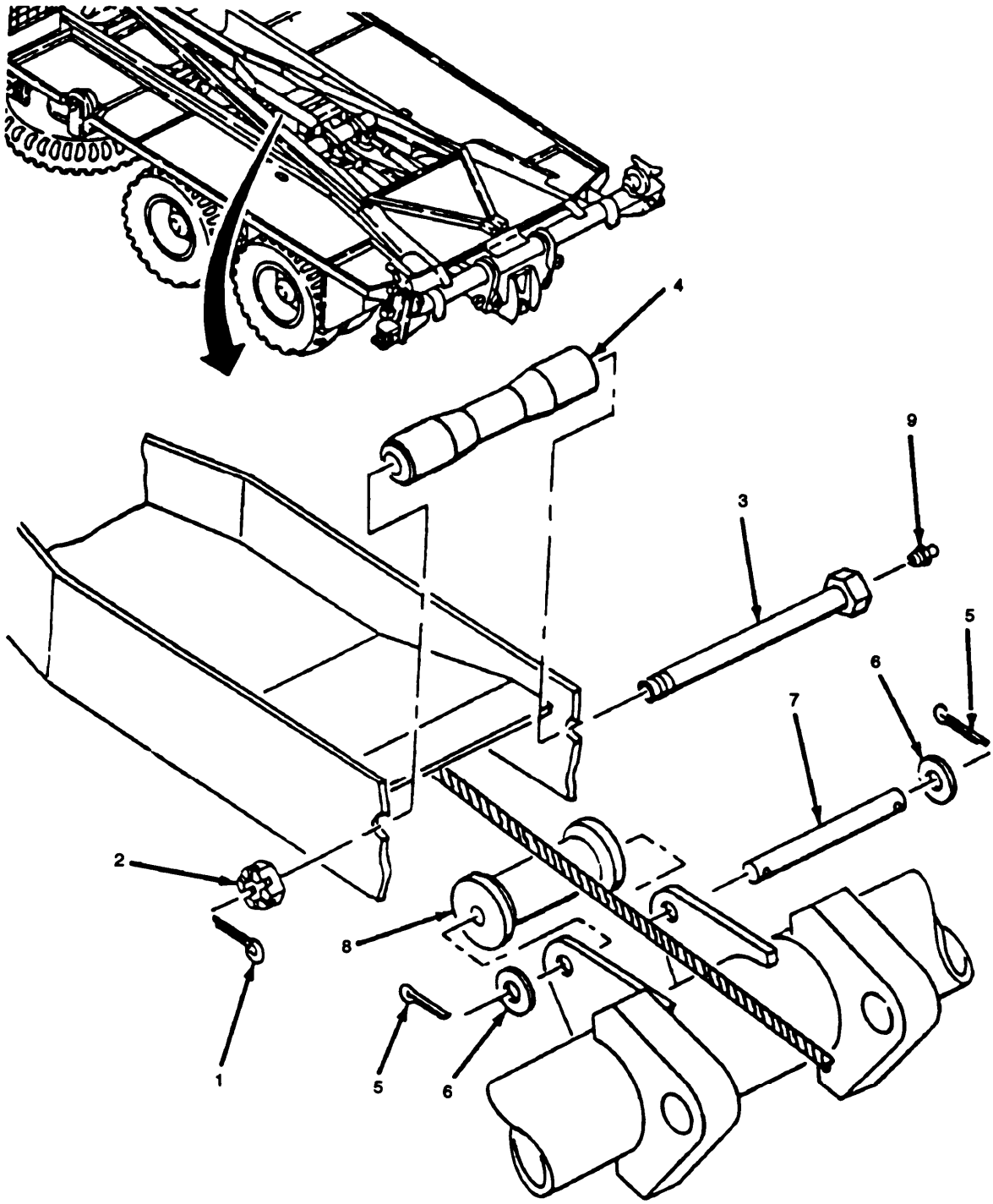



*Figure 4-42. Rollers and Pins, Replace.*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

## 4-49. **Tiedown Hook and Attaching Hardware.**

This task covers: a. Replace b. Repair

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Materials/Parts*

Solvent, Dry Cleaning (Item 18, Appendix E)
Rags, Wiping (Item 12, Appendix E)

*Equipment Condition:*

Rear roller and axle assembly removed.

*a*. *Replace.* (figure 4-43)

(1) Remove two cotter pins (1), pin (2), and remove rod (3).

(2) Unscrew bolt (4) from yoke (5) and remove yoke (5) and tiedown hook (6).

(3) Press out pin (7) securing tiedown hook (6) to yoke (5).

**NOTE**

Gain access to spring pin (8) through spring pin access hole (9).

(4) Using suitable punch, remove spring pin (8).

(5) Hold nut (10) and remove bolt (4), and nut (10).

(6) Remove quick release pin (11) from holder (12).

**NOTE**

Perform Step (8) only if quick release pin is to be replaced.

(7) Cut wire rope (13) and remove quick release pin (11 ).

(8) Install quick release pin (11 ) in holder (12).

(9) Secure wire rope (13) to frame (14).

(10) Install nut (10) and bolt (4) and tighten bolt (4) until hole in nut (10) aligns with hole in bolt (4).

(11) Install spring pin (8) in nut (10) and bolt (4).

(12) Position tiedown hook (6) in yoke (5) and secure with pin (7).

(13) Install yoke (5) and tiedown hook (6) and screw bolt (4) into yoke (5).

(14) Install rod (3) and secure with pin (2), and two cotter pins (1).

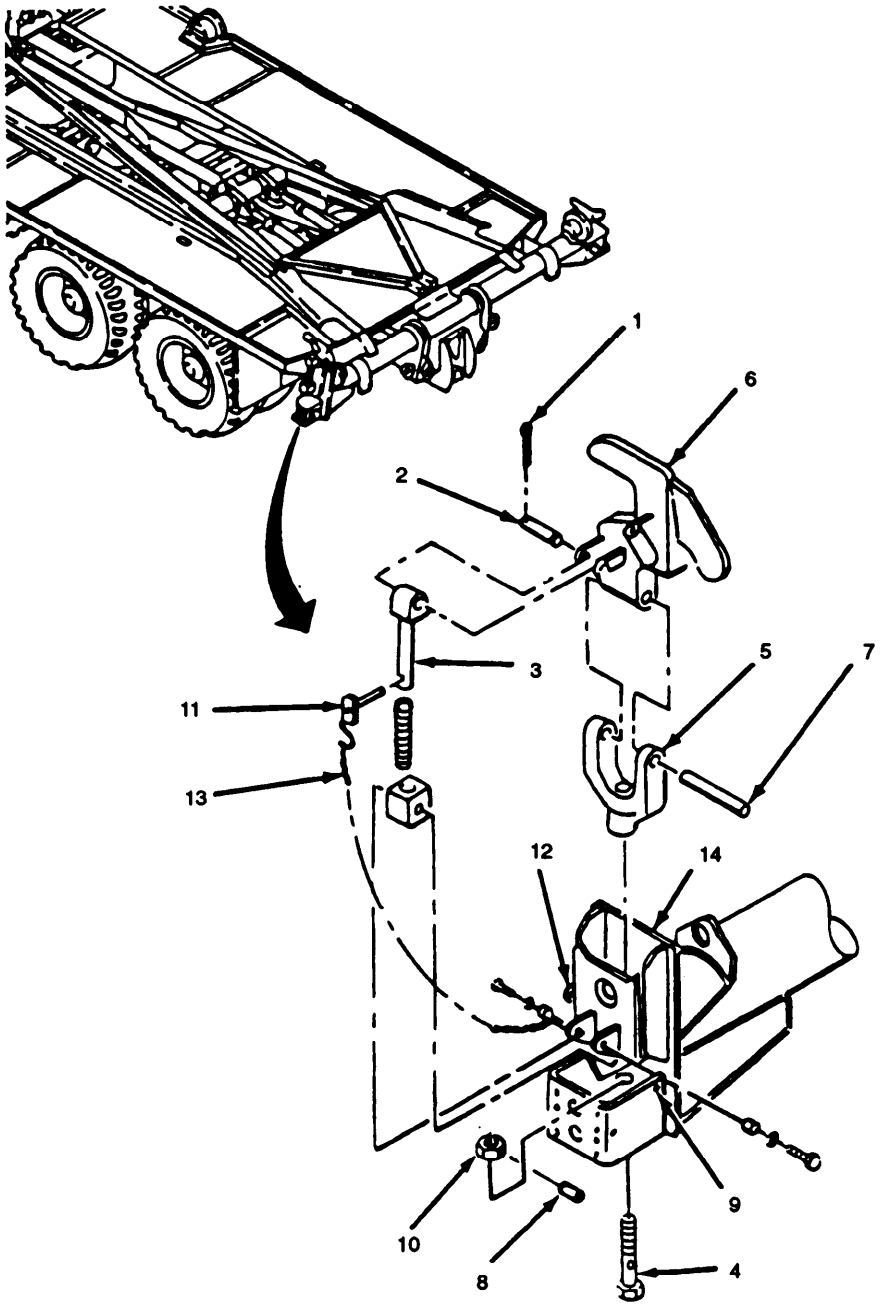



*Figure 4-43. Tiedown Hook and Attaching Hardware, Replace.*

FOLLOW-ON MAINTENANCE: Install rear roller and axle assembly (para. 4-26).

## 4-39. Tiedown Hook and Attaching Hardware. - Continued

*b.* *Repair.* (figure 4-44)

**NOTE**

Tiedown hook removed for repair. See para. a. above.

**WARNING**

Dry cleaning solvent PD-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100-138 °F (38-60 °C).

(1) Clean all items with dry cleaning solvent and dry thoroughly.

(2) Inspect tiedown hook (1) and yoke (2) for cracks or broken welds and replace a damaged item.

(3) Inspect rod (3), trunion (4), spring (5), bolt (6), and nut (7) for signs of excessive wearer stripped threads and replace worn or otherwise damaged items.

(4) Inspect pin (8), pin (9), spring pin (10), spacers (11), and bolts (12) for signs of excessive wearer stripped threads and replace a worn or otherwise damaged item.

(5) Inspect quick release pin (13) and replace if bent or otherwise damaged.

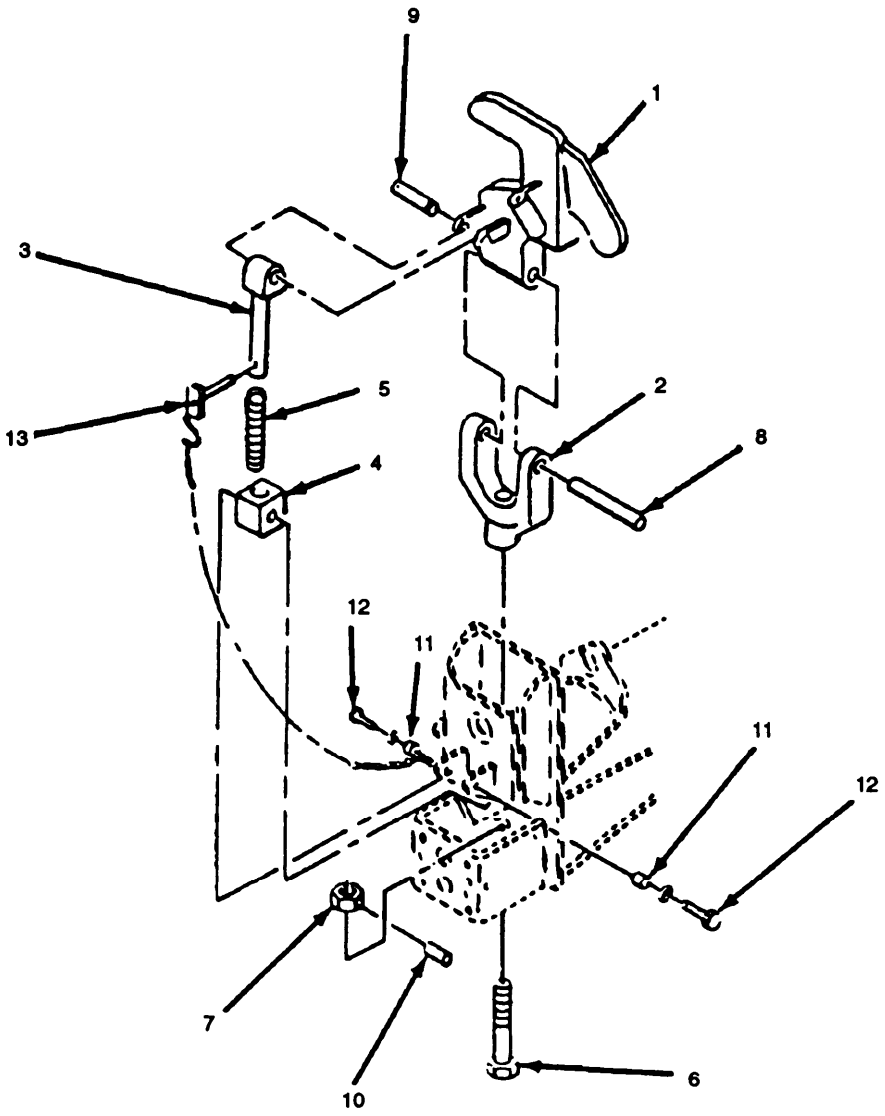



*Figure 4-44. Tiedown Hook and Attaching Hardware, Repair.*

FOLLOW-ON MAINTENANCE: Install tiedown hook (para. a.).

4-40. **Pins and Clevis.**

This task covers: Replace

INITIAL SETUP

| *Tools* | *Equipment Condition:* |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix B)<br>Wrench, Torque (NSN 5120-00-640-6364) (Item 2, Appendix B) | Bay removed (para. 2-16). |

*a. Replace.* (figure 4-45)

**NOTE**

Boom should be fully lowered.

**CAUTION**

Secure hydraulic cylinder by blocking or other suitable means before removing pin.

(1) Remove retaining rings (1) and clevis pin (2).

(2) Tilt piston (3) away from boom (4) and unscrew clevis (5) from piston rod (6).

(3) Screw clevis (5) onto piston rod (6). Torque clevis to 100-150 ft-lbs (135-203 Nm).

(4) Align piston (3) and clevis (5) with struts or boom (4) and secure with clevis pin (2) and retaining rings (1).

(5) Repeat Steps (4) and (5) for remaining clevis.

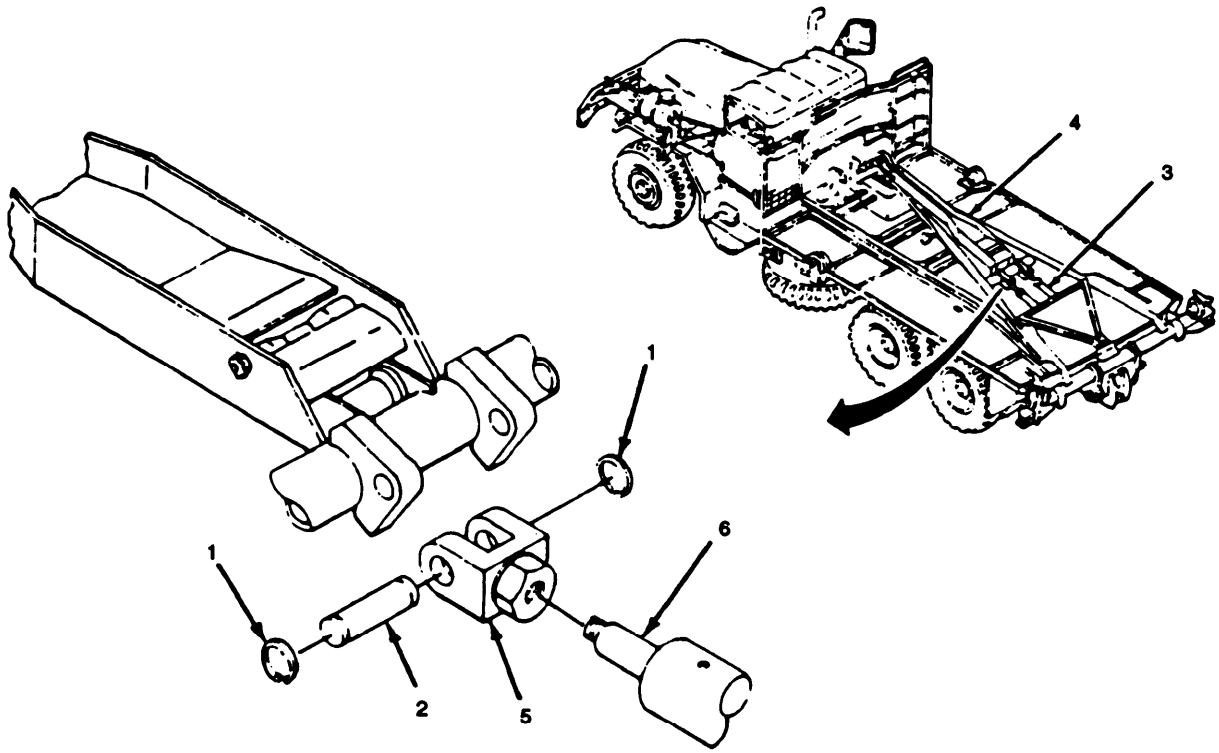



***Figure 4-45. Pins and Clevis, Replace.***

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

4-41. **Cylinder Assembly.**

This task covers: Replace

INITIAL SETUP

*Tools*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)
Tape, Antiseize (Item 19, Appendix E)
Lifting Device

*Equipment Condition:*

Bay removed (para. 2-16).

NOTE

There are several models of cylinders. Replacement procedures are similar for all models.

*a*. *Replace.* (figure 4-46)

**WARNING**

When working under boom, support boom by blocking or other suitable means.

(1) Raise boom (1) approximately 1 ft (30.48 cm) and block in position.

**WARNING**

When disconnecting any hydraulic line, open line slowly and protect face, as hydraulic oil may spray out due to residual pressure in system.

**NOTE**

When removing hoses, have a suitable container to drain oil from hoses. Also cap all hoses and ports immediately to prevent dirt or foreign matter from entering the system.

(2) Remove two clamps (5) and support blocks (3) from cylinder (4).

(3) Tag and remove two hydraulic lines (5) and (6) from cylinder (4).

(4) Attach suitable lifting device to cylinder (4).

(5) Remove two retaining rings (7) and clevis pin (8).

(6) Remove two retaining rings (9), clevis pin (10), and cylinder (4).

(7) Unscrew clevis (11) from cylinder (4).

(8) Install clevis (11) on cylinder (4).

(9) Align tube end of cylinder (4) with boom pivot struts and secure with pin (10) and retaining rings (9).

(10) Align rod end of cylinder (4) with boom struts and secure with pin (8) and retaining rings (7).

(11) Apply antiseize tape to hydraulic fitting and connect hydraulic lines (2) as tagged to cylinder (4).

(12) Secure support blocks (3), clamps (2), hoses (5) and (6) to cylinder (4).

(13) Raise boom (1) and remove blocking and lower and secure boom.

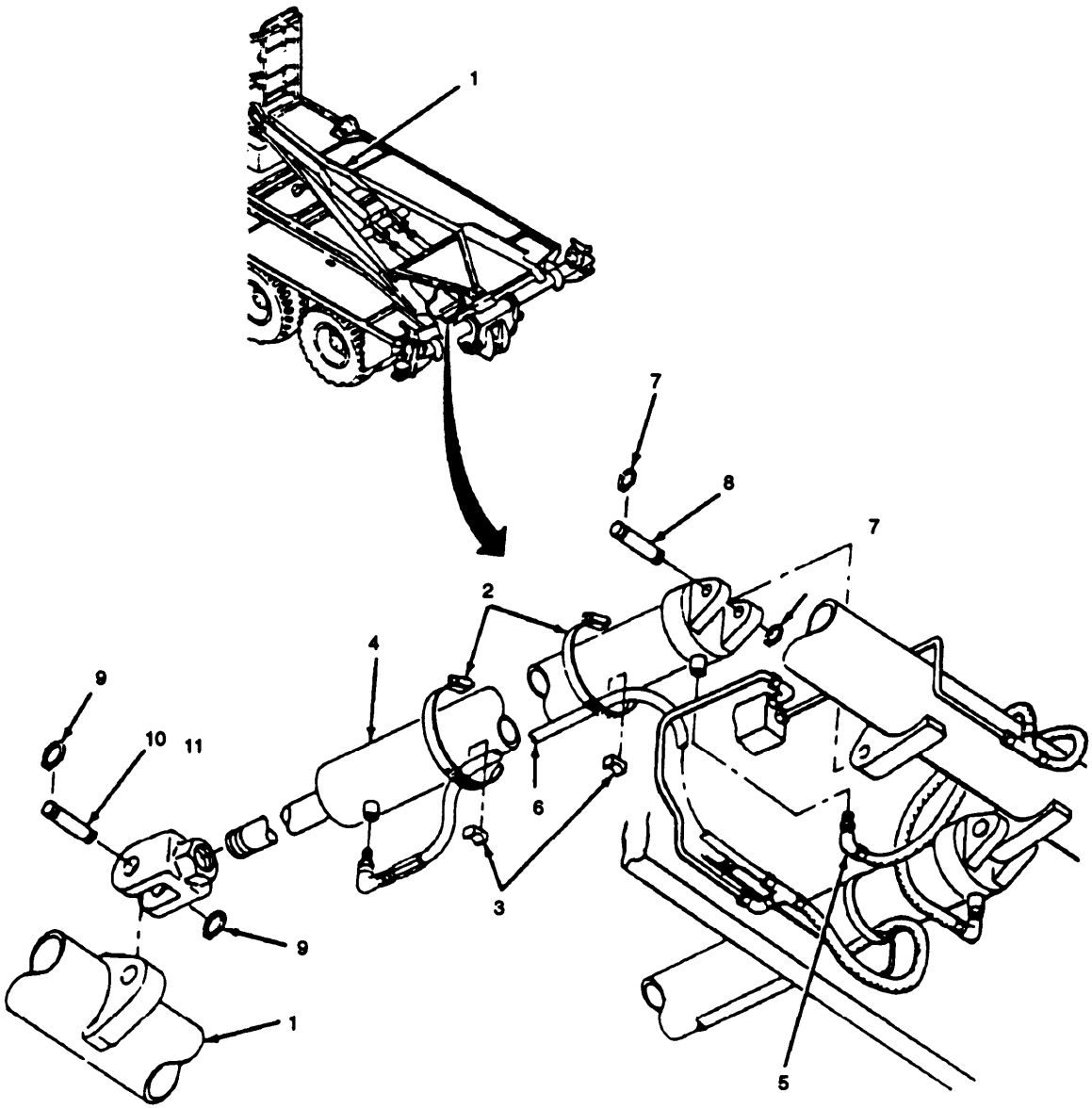



*Figure 4-46. Cylinder Assembly, Replace.*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

4-42. **Pins and Arm.**

This task covers: Replace

INITIAL SETUP

| *Tools* | *Equipment Condition:* |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix B) | Bay removed (para. 2-16). |

*a.* Replace. (figure 4-47)

(1) Remove cotter pin (1) and remove pin (2) and cylinder locking pin (3).

(2) Support cylinder (4), remove cotter pin (5) and pin (6) from clevis (11).

(3) Remove cotter pin (7) and remove pin (8) and arm (9).

(4) Install arm (9) in support (10) and secure with pin (8) and cotter pin (7).

(5) Align arm (9) with clevis (11) and secure with pin (6) and cotter pin (5).

(6) Install locking pin (3) and secure with pin (2) and cotter pin (1).

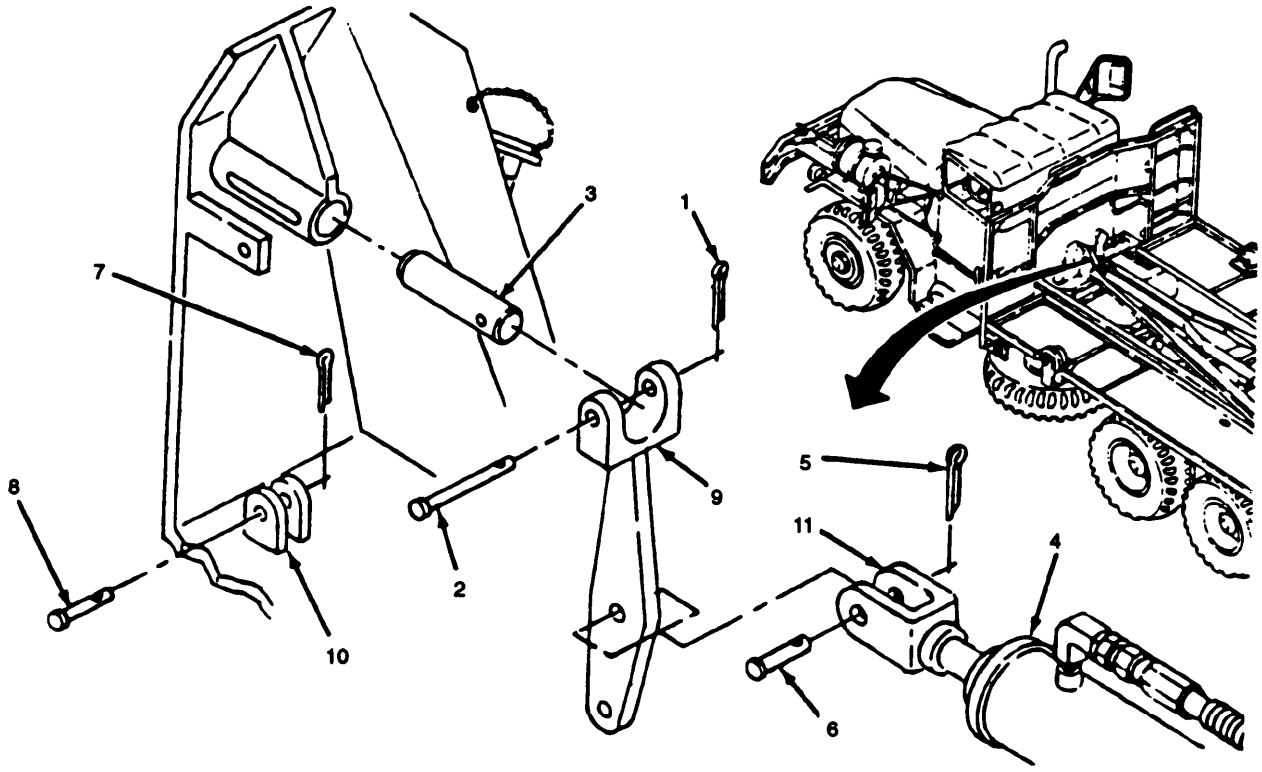



*Figure 4-47. Pins and Arm, Replace.*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

## 4-43. Cylinder Assembly.

This task covers: Replace

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Materials/Parts*

Antiseize Tape (Item 19, Appendix E)

*Equipment Condition:*

Bay removed (para. 2-16).

*a*. *Replace.* (figure 4-48)

**WARNING**

When disconnecting any hydraulic lines, open slowly and protect face as hydraulic fluid may spray out due to residual pressure in system.

**NOTE**

When removing hoses, have a suitable container to drain oil from hoses. Also cap all hoses and ports immediately to prevent dirt or foreign matter from entering the system.

(1) Tag and disconnect two hydraulic lines (1) and (2) from cylinder (3).

(2) Support cylinder (3).

(3) Remove cotter pin (4) and pin (5) securing clevis (6) to arm (10).

(4) Remove cotter pin (7), pin (8) and cylinder (3).

(5) Position cylinder (3) and front support (9) and secure with pin (8) and cotter pin (7).

(6) Align clevis (6) with arm (10) and secure with pin (5) and cotter pin (4).

(7) Apply antiseize tape to hydraulic, fittings on cylinder (3) and connect two hydraulic lines (1) and (2) to cylinder (3) as tagged.

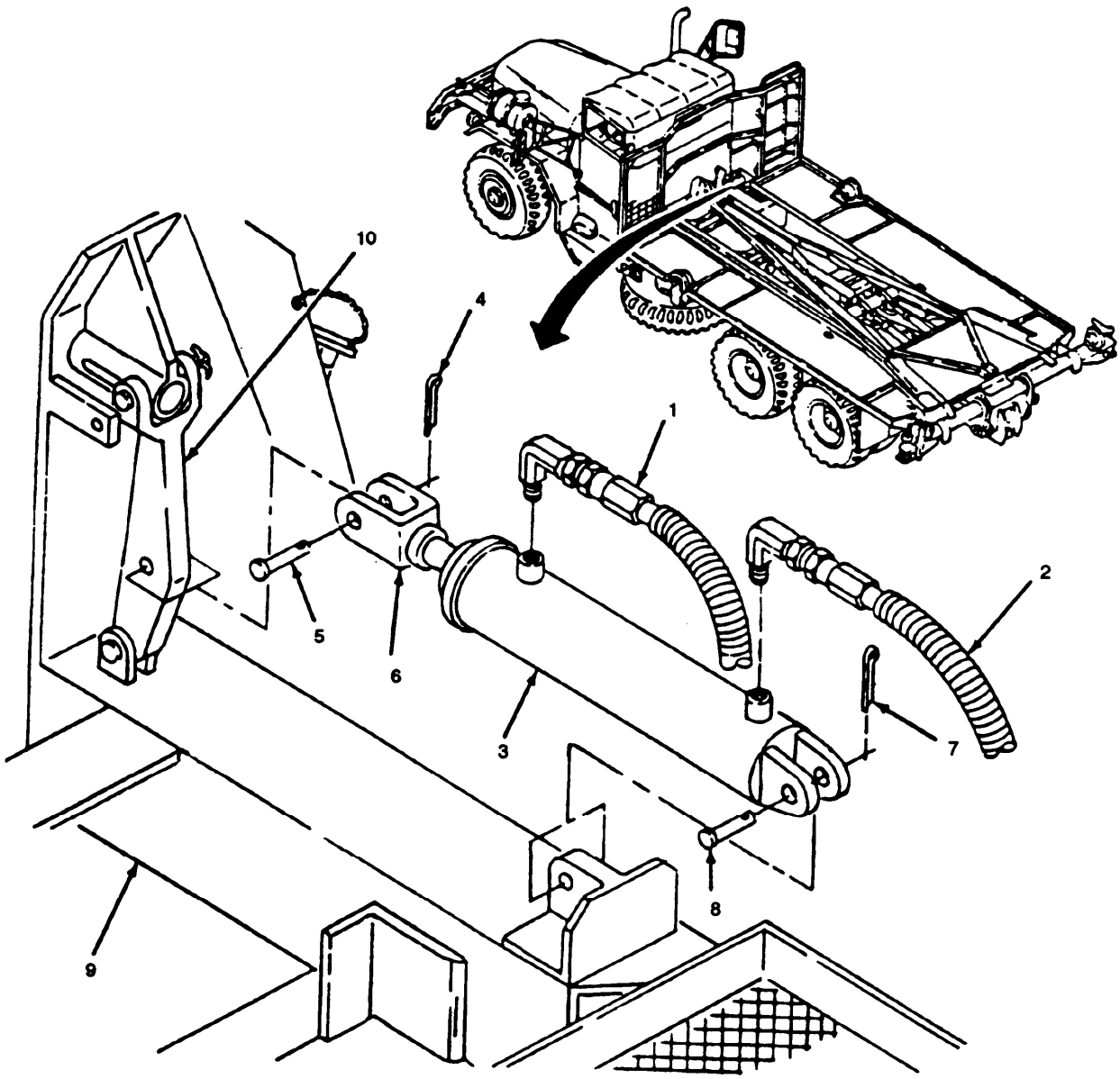



*Figure 4-48. Cylinder Assembly, Replace.*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

## 4-44. **Control Valve Assembly.**

This task covers: Replace

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Materials/Parts*

Antiseize Tape (Item 19, Appendix E)

*Equipment Condition:*

Bay removed (para. 2-16).

*a.* Replace. (figure 4-49)

**WARNING**

When disconnecting any hydraulic lines, open slowly and protect face as hydraulic fluid may spray out due to residual pressure in system.

**NOTE**

When removing hoses, have a suitable container to drain oil from hoses. Also cap all hoses and ports immediately to prevent dirt or foreign matter from entering the system.

(1) Tag and disconnect eight hydraulic lines (1) from control valve assembly (2).

(2) Remove three nuts (3), lockwashers (4), clamp (5), screws (6), and remove control valve assembly (2).

(3) Install control valve assembly (2), and secure with three screws (6), clamp (5), lockwashers (4), and nuts (3).

(4) Apply antiseize tape to hydraulic fittings and connect hydraulic lines (1) to control valve assembly (2) as tagged.

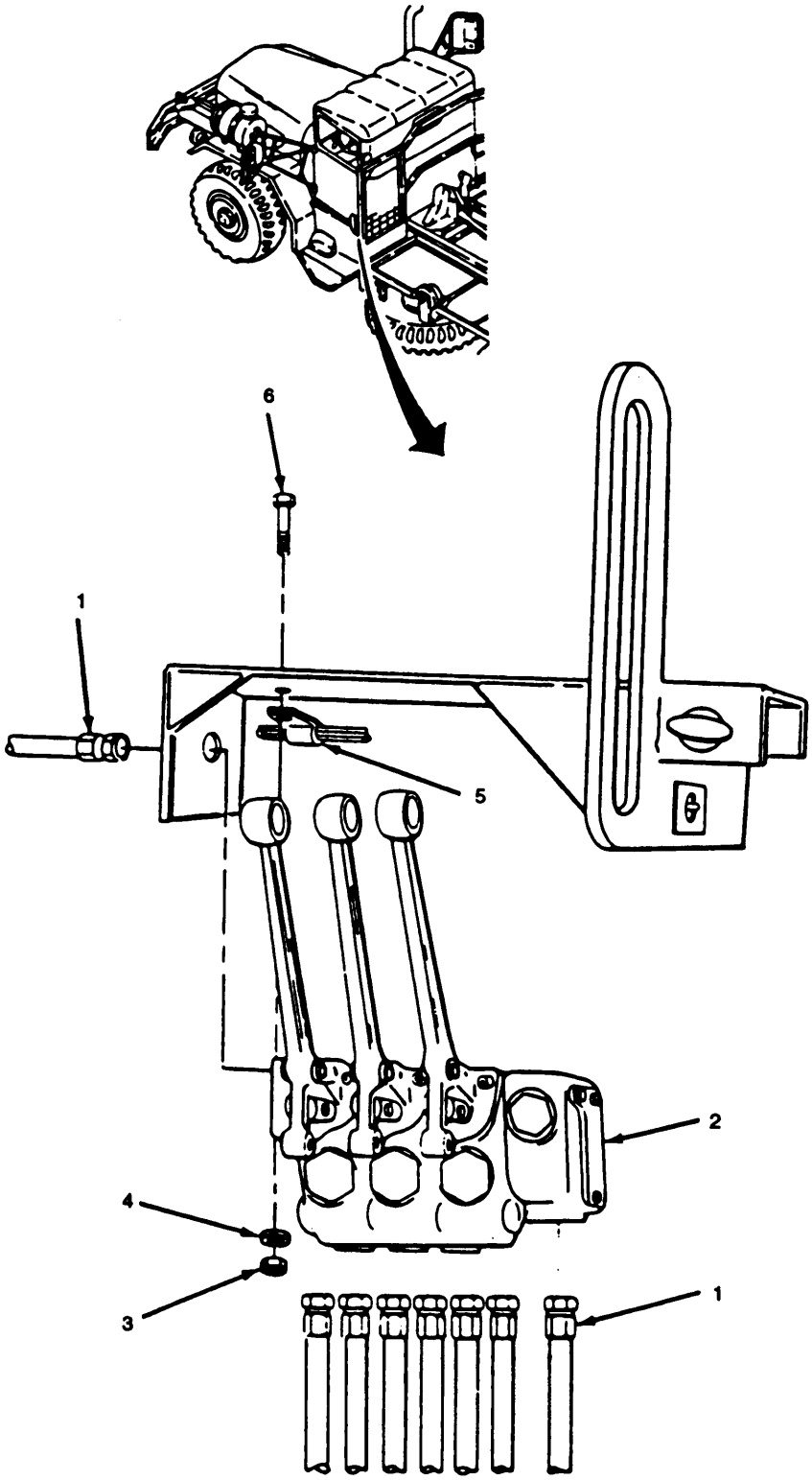



*Figure 4-49. Control Valve Assembly, Replace.*

## 4-45. **Selector Valve.**

This task covers: Replace

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Equipment Condition:*

Bay removed (para. 2-16).

Materials/Parts

Tape, Antiseize (Item 19, Appendix E)

*a.* *Replace.* (figure 4-50)

**WARNING**

When disconnecting any hydraulic lines, open slowly and protect face as hydraulic fluid may spray out due to residual pressure in system.

**NOTE**

When removing hoses, have a suitable container to drain oil from hoses. Also cap all hoses and ports immediately to prevent dirt or foreign matter from entering the system.

(1) Tag and disconnect three hydraulic lines (1) from selector valve (2).

(2) Remove two nuts (3), lockwashers (4), screws (5), and selector valve (2).

(3) Install selector valve (2) and secure with two screws (5), lockwashers (4), and nuts (3).

(4) Apply antiseize tape to hydraulic fittings on selector valve (2) and connect three hydraulic lines (1).

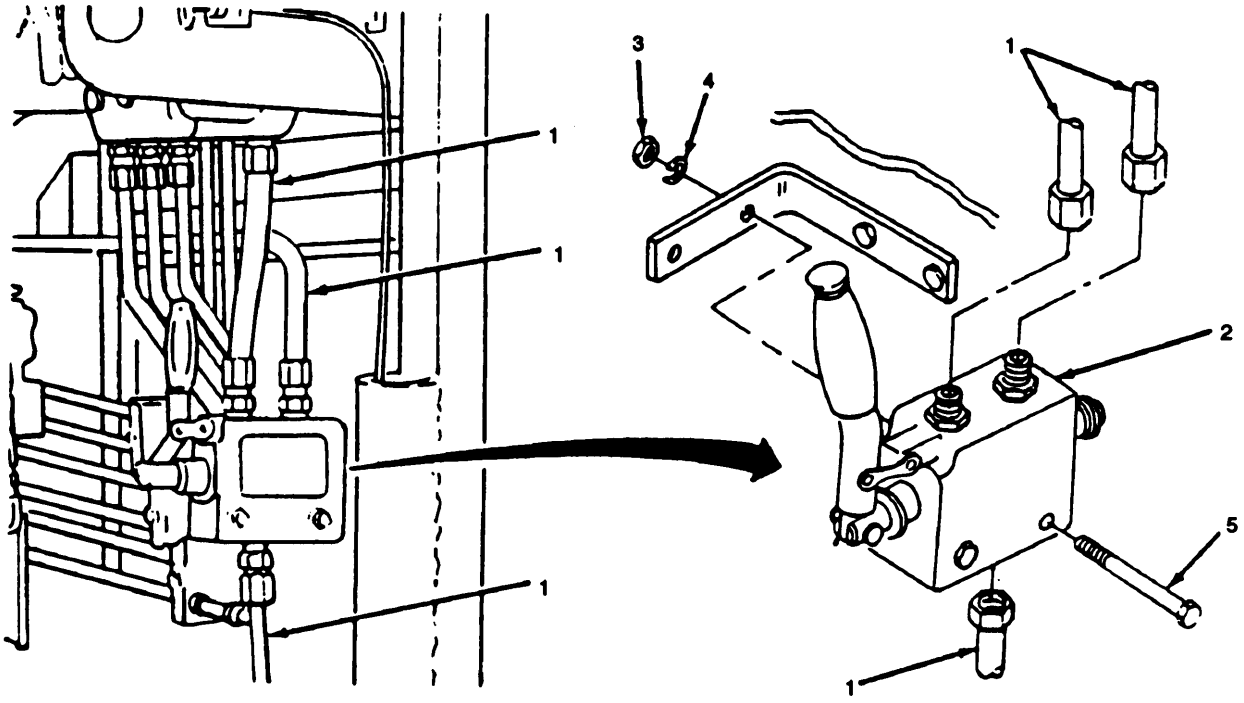



*Figure 4-50. Selector Valve, Replace.*

## 4-46. **Dual Over Center Valve.**

This task covers: a. Test b. Adjust c. Replace

INITIAL SETUP

*Tools*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)
Hydraulic Test Equipment

*Equipment Condition:*

Bay removed (para. 2-16).

*Materials/Parts*

Antiseize Tape (Item 19, Appendix E)

**NOTE**

There are two dual over center valves on transporter. The maintenance procedures are the same for both.

*a. Test.* (figures 4-51 and 4-52)

**NOTE**

Dual over center valve removed for test. See para. c. below.

(1) Connect a 0-6,000 psi (0-41,307 kpa) hydraulic pressure source and gage to a cylinder port 2.

(2) Connect a 0-300 psi (0-2,068 kpa) hydraulic pressure source and gage to cylinder port 1.

(3) Connect valve port 2 to hydraulic reservoir and 0-30 GPM flow meter.

(4) Plug valve port 1.

(5) Set pressure at cylinder port 2 to 0 psi (0 kpa).

(6) Increase cylinder port 1 pressure in 50 psi (345 kpa) and record the pressure at which flow occurs between cylinder port 2 to valve port 2.

(7) Increase cylinder port 1 pressure up to 250 psi (1,705 kpa) or until flow occurs between cylinder port 2 and valve port 2 at 0 psi (0 kpa).

(8) Adjust valve (see para. b. below) if valve does not perform within tolerances.

(9) Reduce all pressures to 0 psi (0 kpa) and disconnect connections.

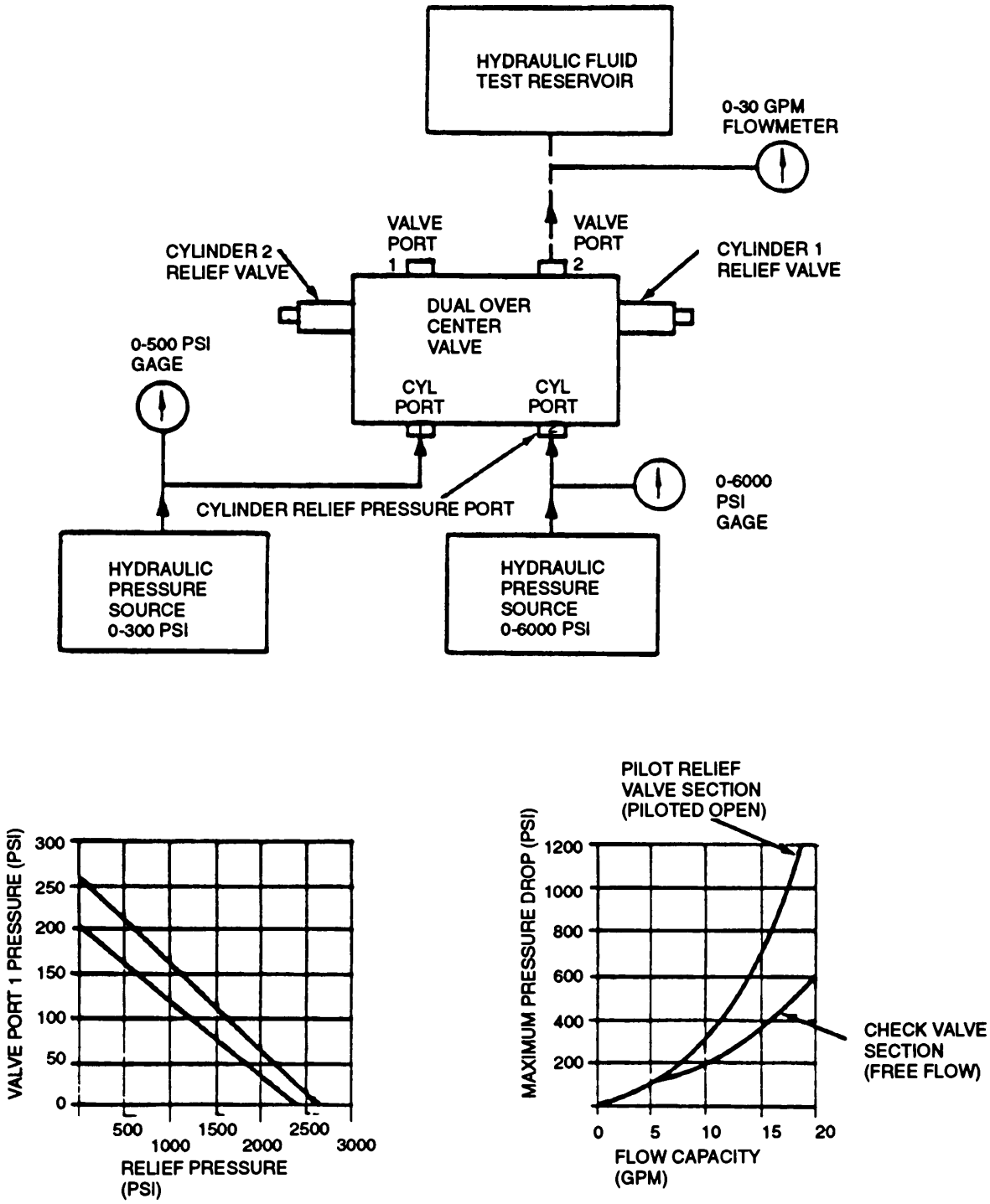



*Figure 4-51. Dual Over Center Valve Cylinder and Valve Port 2 Section, Test.*

446. **Dual Over Center Valve. - Continued**

(10) Connect a 0-6,000 psi (0-41,307 kpa) hydraulic pressure source and gage to cylinder port 1.

(11) Connect a 0-300 psi (0-2,068 kpa) hydraulic pressure source and gage to cylinder port 2.

(12) Connect valve port 1 to hydraulic fluid reservoir.

(13) Plug valve port 2.

(14) Increase pressure at cylinder 1 port and record the pressure at which flow occurs between cylinder port 1 and valve port 1.

(15) Increase cylinder port 2 pressure to 50 psi (345 kpa) and record pressure at which flow occurs between cylinder port 1 to valve port 1.

(16) Increase cylinder port 2 pressure up to 250 psi (1 ,705 kpa) or until flow occurs between cylinder port 1 and valve port 1 at 0 psi (0 kpa).

(17) Adjust valve (see para. b below) if valve does not perform within tolerances.

(18) Reduce all pressures to 0 psi (0 kpa) and disconnect connections.

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

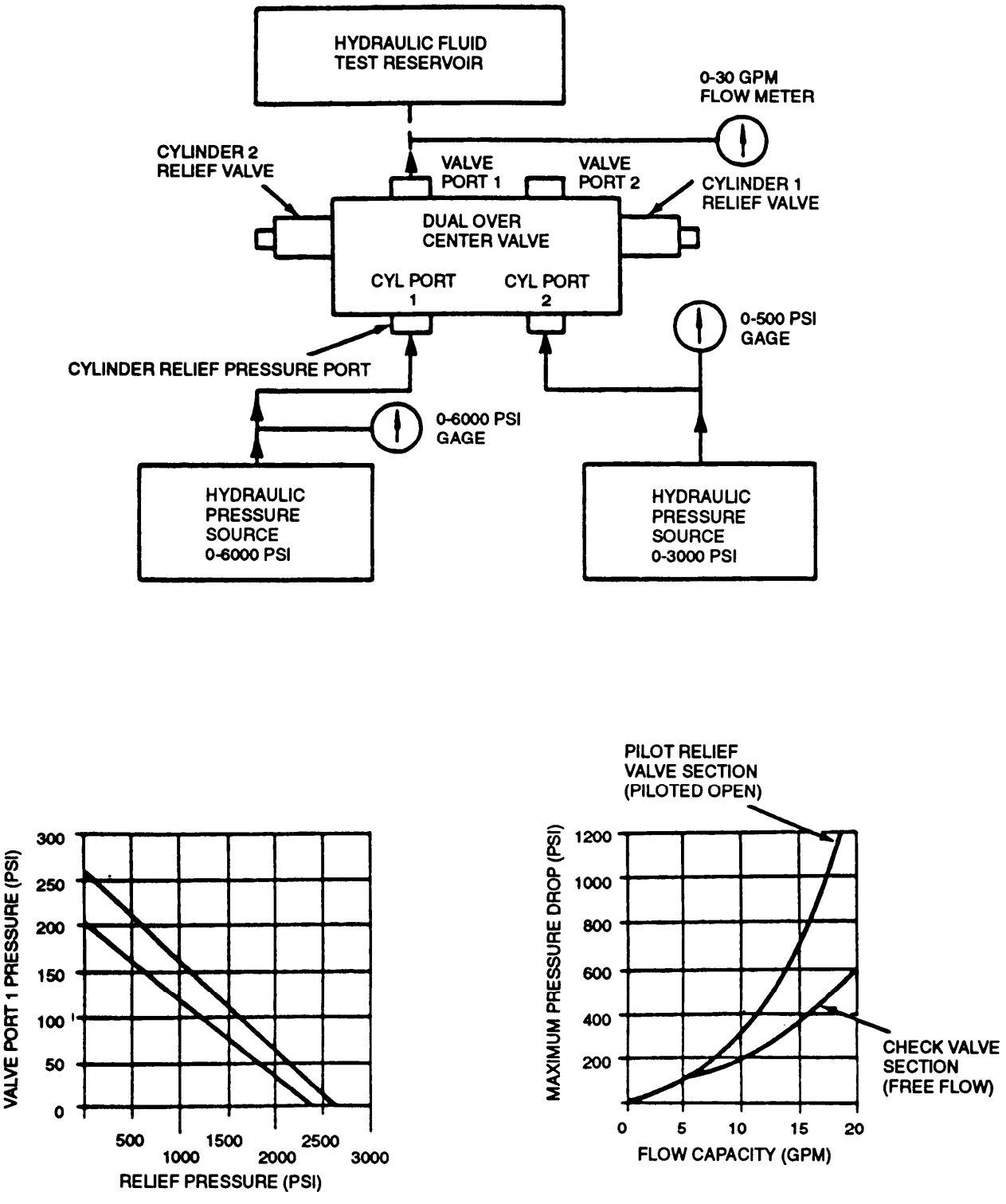



*Figure 4-52. Dual Over Center Valve Cylinder and Valve Port 1 Section, Test.*

4-46. **Dual Over Center Valve. - Continued**

*b.* Adjust. (figures 4-53 and 4-54)

(1) Adjust dual over center valve cylinder 1 relief valve as follows: Adjust cylinder 1 relief valve so that flow from cylinder port 1 to valve port 1 begins at a differential pressure of 2,400 psi (25,548 kpa). Full flow 20 gpm.

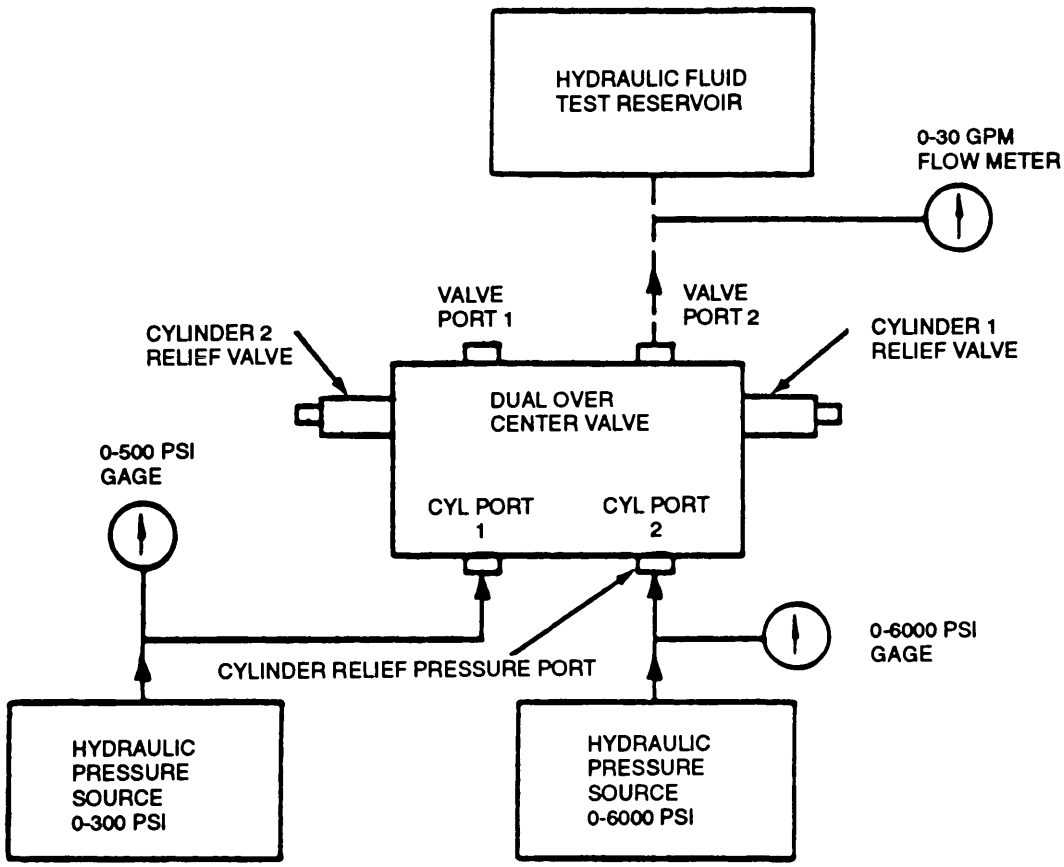



***Figure 4-53. Dual Over Center Valve Cylinder 1 Relief Valve, Adjust.***

*(2)* Adjust dual over center valve cylinder 2 relief valve as follows: Adjust cylinder 2 relief valve so that flow from cylinder port *2* to valve port *2* begins at a differential pressure of 2,400 psi (25,548 kpa). Full flow 20 gpm (76 Ipm) should be obtained at 2,600 psi (17,927 kpa).

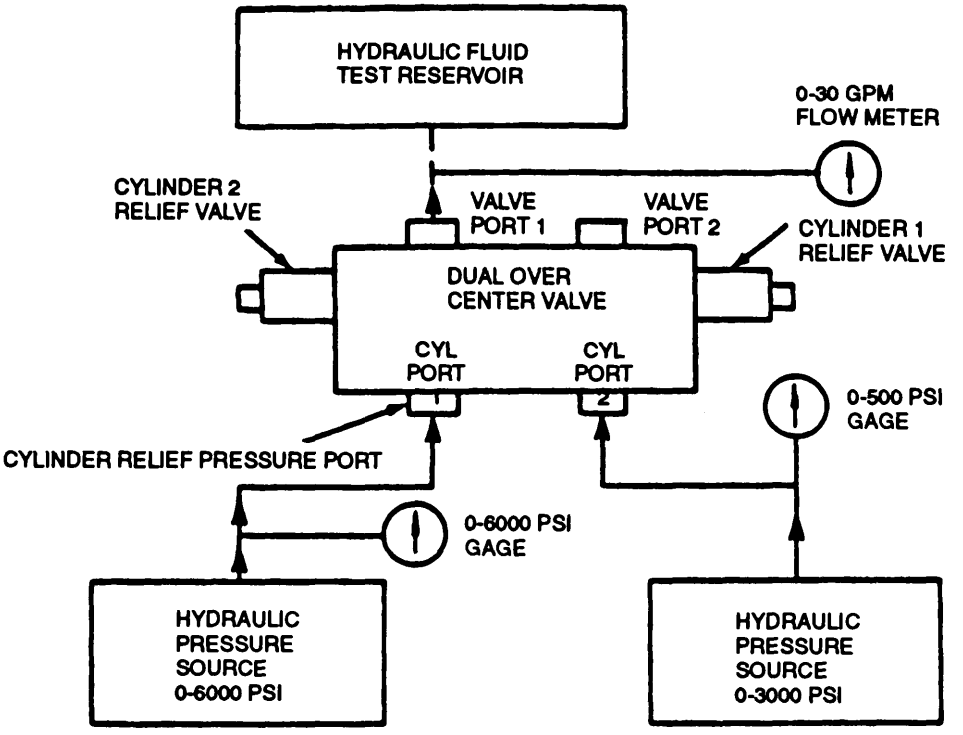



*Figure 4-54. Dual Over Center Valve Cylinder 2 Relief Valve, Adjust.*

**NOTE**

The transporter is equipped with dual over center valves. The replacement procedures are the same for both.

4-46. **Dual Over Center Valve. - Continued**

*c. Replace.* (figure 4-55)

**WARNING**

When disconnecting any hydraulic lines, open slowly and protect face as hydraulic fluid may spray out due to residual pressure in system.

**NOTE**

When removing hoses, have a suitable container to drain oil from hoses. Also cap all hoses and ports immediately to prevent dirt or foreign matter from entering the system.

(1) Tag and disconnect four hydraulic lines (1) from dual over center valve (2).

(2) Remove two nuts (3), lockwashers (4) and screws (5) and dual over center valve (2).

(3) Remove two elbows (6), straight adapters (7), and reducers (8).

(4) Apply antiseize tape to all pipe threads.

(5) Install two reducers (8), elbows (6), and straight adapters (7).

(6) Install dual over center valve (2) and secure with two screws (3), lockwashers (4), and nuts (5).

(7) Connect hydraulic lines (1) to dual over center valve (2) as tagged.

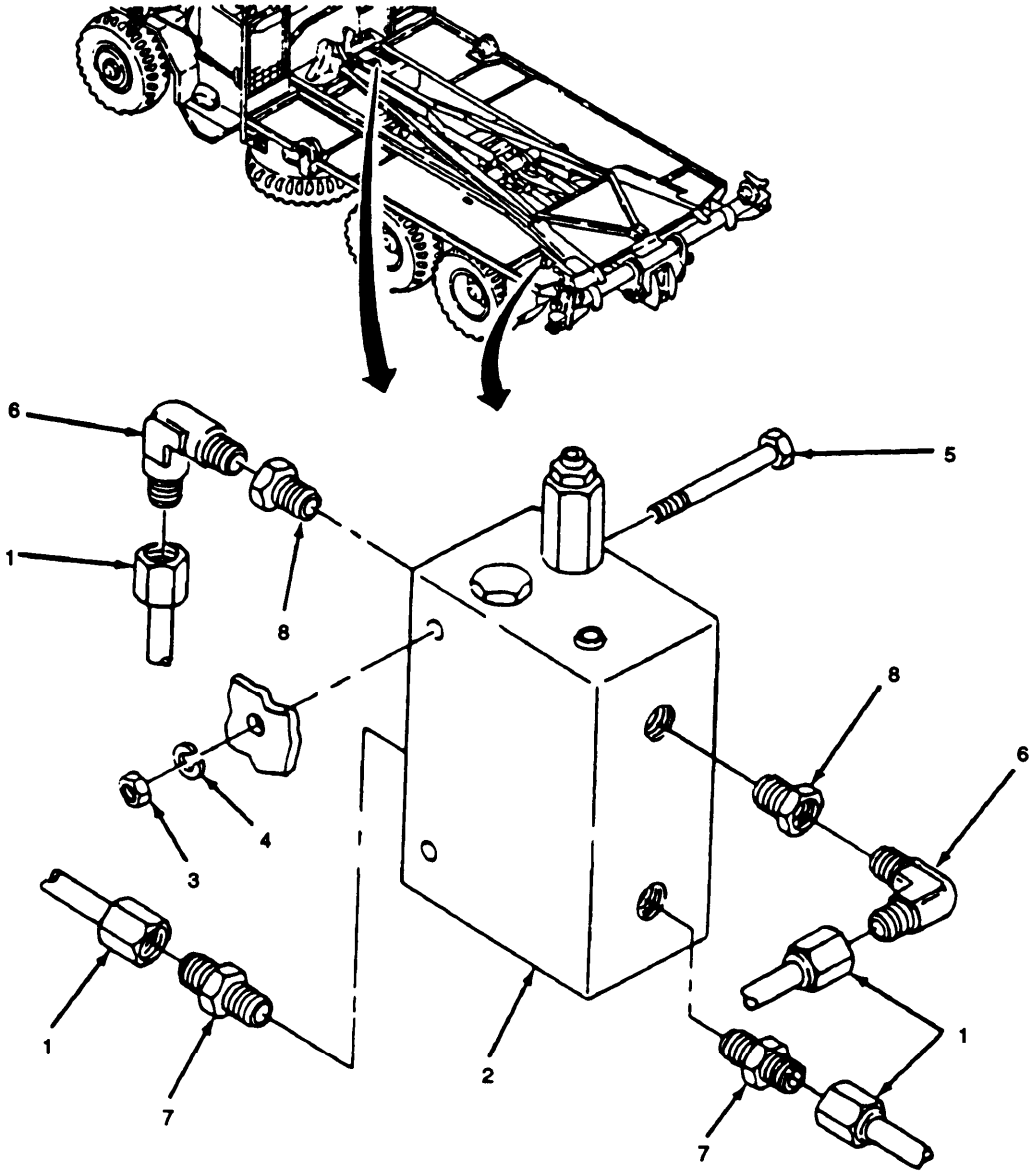



*Figure 4-55. Dual Over Center Valve, Replace.*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

## 4-47. **Single Over Center Valve.**

This task covers: a. Test b. Adjust c. Replace

INITIAL SETUP

*Tools*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)
Hydraulic Test Equipment

*Equipment Condition:*

Bay removed (para. 2-16).

*Materials/Parts*

Teflon tape (Item 19, Appendix E)

*a. Test.* (figure 4-56)

**NOTE**

Single over center valve removed for test. See para. c. below.

(1) Connect a 0-6,000 psi (0-41,307 kpa) pressure source and gage to cylinder relief pressure port.

(2) Connect a 0-300psi(0-2,068 kpa) pressure source and a 0-500 psi (0-3,448 kpa) gage to pilot pressure port.

(3) Connect hydraulic fluid reservoir and 0-30 gpm (0-144 Lpm) to valve port.

(4) Set pilot port pressure to 0 psi (0 kpa).

(5) Apply pressure to cylinder relief pressure port and record the pressure at which flow occurs between cylinder relief pressure and port valve port.

(6) Increase pilot pressure, port pressure in 50 psi (345 kpa) increments and record pressure at which flow occurs between cylinder relief pressure port and valve port.

(7) Increase pilot pressure port pressure up to 250 psi (1 ,705 kpa) or until pressure at which flow between cylinder relief pressure port and cylinder port is 0 psi (0 kpa).

(8) Adjust single over center valve, see para. b. below, if performance is not within tolerances.

(9) Reduce all pressure to 0 psi (0 kpa) and disconnect connectors.

FOLLOW-ON MAINTENANCE: Install single over center valve (para. c.).

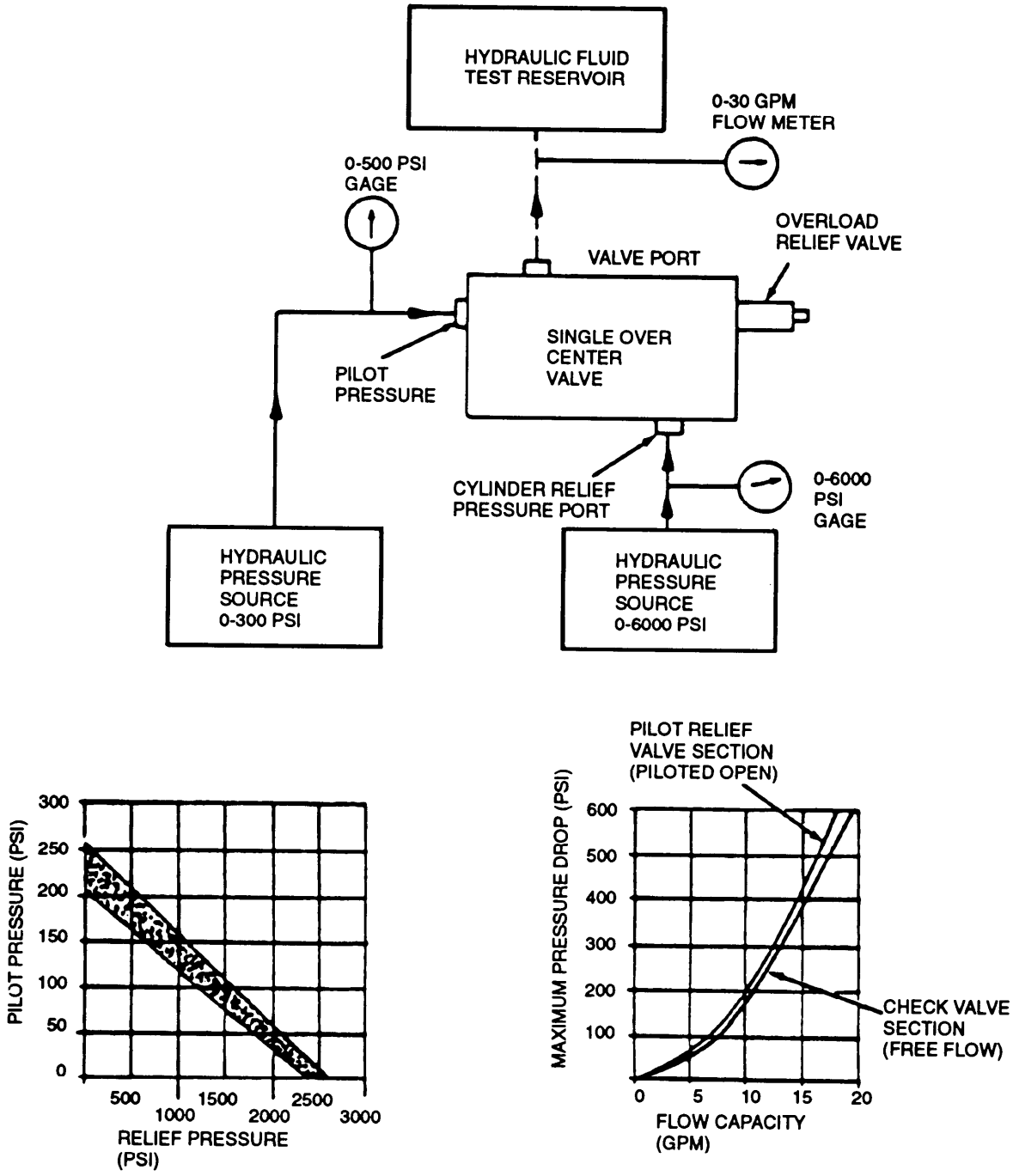



*Figure 4-56. Single Over Center Valve, Test.*

447. **Single Over Center Valve. - Continued**

*b*. *Adjust.* (figure 4-57)

Adjust Single over center valve as follows: Adjust overload relief valve so that hydraulic flow between cylinder relief pressure port and valve port is at 2,400 psi (25,548 kpa). Full flow 20 gpm (75.6 pm) should occur at 2,600 psi (182,980 kpa).

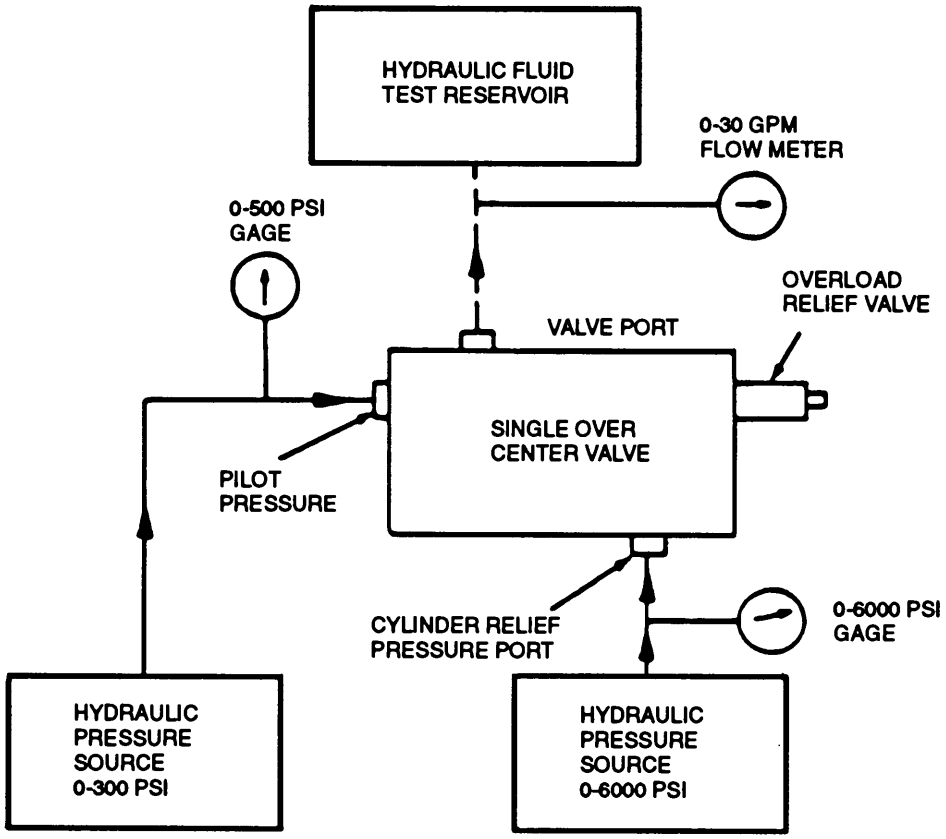



*Figure 4-57. Single Over Center Valve, Adjust.*

4-47. **Single Over Center Valve. - Continued**

*c.* *Replace.* (figure 4-58)

**WARNING**

When disconnecting any hydraulic lines, open slowly and protect face as hydraulic fluid may spiny out due to residual pressure in system.

**NOTE**

When removing hoses, have a suitable container to drain oil from hoses. Also cap all hoses and ports immediately to prevent dirt or foreign matter from entering the system.

(1) Tag and disconnect two hydraulic lines (1) from two (2).

(2) Tag and disconnect hydraulic line (3) from elbow (4).

**NOTE**

Transporter model 2280 has an elbow instead of a straight fitting on the valve.

(3) Tag and disconnect hydraulic line (5) from fitting (6).

(4) Remove two screws (7), lockwashers (8), and nuts (9) and remove single over center valve (10).

(5) Remove two (2), elbow (4), and fitting (6) from single over center valve (10).

(6) Apply teflon tape to all pipe threads.

(7) Install two (2), elbow (4), and fittings (6).

(8) Install single over center valve (10) and secure with two screws (7), lockwashers (8), and nuts (9).

(9) Connect hydraulic lines (1), (3), and (5) to single over center valve (10) as tagged.

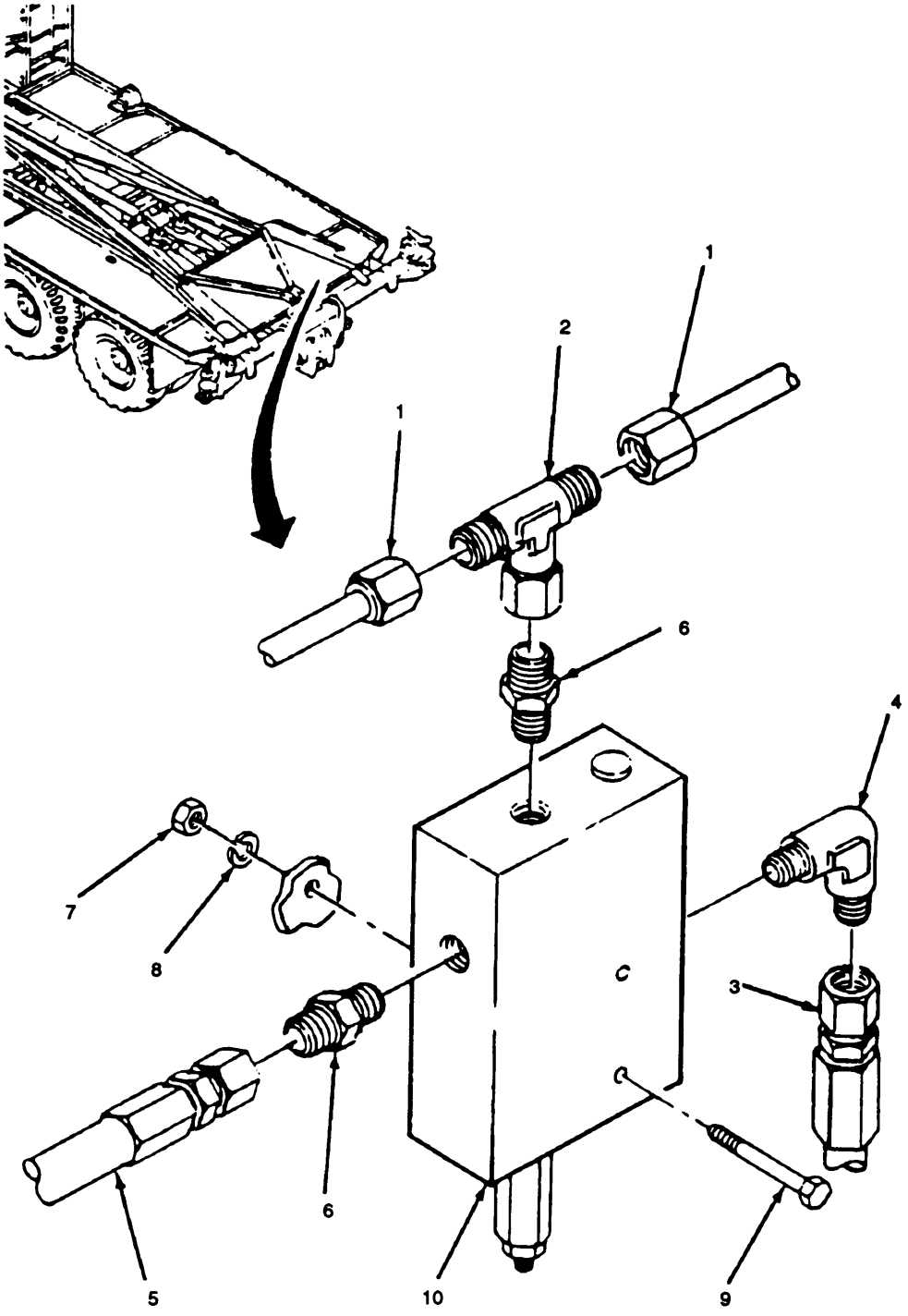



*Figure 4-58. Single Over Center Valve, Replacement.*

FOLLOW-ON MAINTENANcE: Install bay (para. 2-27).

## 4-48. Cable Tensioner Valve (Transporter Model RBT).

This task covers: a. Test b. Adjust c. Replace

INITIAL SETUP

*Tools*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)
Hydraulic Test Equipment

*Materials/Parts*

Sealing Compound (Item 16, Appendix E)

*Equipment Condition:*

Bay removed (para. 2-16).

*a. Test.* (figures 4-59 and 4-60)

**NOTE**

Cable tensioner valve removed for test. See para. c. below.

(1) Connect a 0-400 psi (0-2,758 *kpa)* hydraulic pressure source to S1.

(2) Connect hydraulic fluid reservoir to M1.

(3) Connect a 0-400 psi (0-2,758 kpa) pressure gage to G.

**NOTE**

Temperature of hydraulic oil should be 86-1 04°F (30-40°C).

(4) Adjust fluid flow through valve to 8 gpm *(31* Lpm).

(5) Check pressure reading at G, reading should be between 217-363 psi (1,496-2,503 kpa). If reading is not between limits, adjust Valve B, see para. c below.

(6) Set all pressures to 0 psi (0 kpa) and disconnect connections.

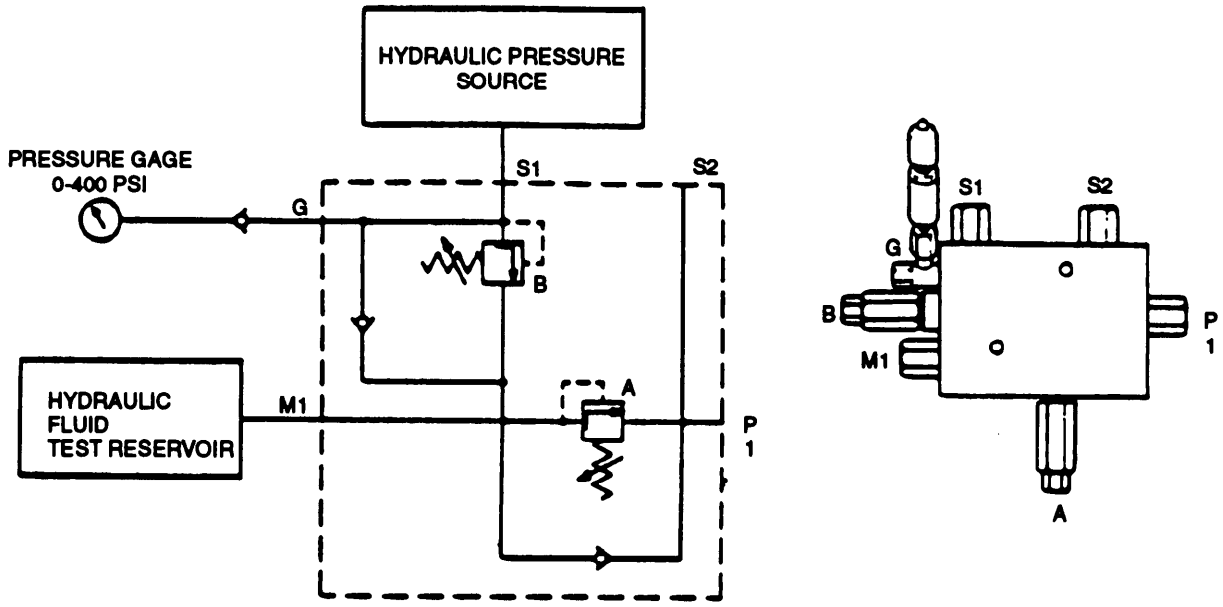



*Figure 4-59. Cable Tensioner Valve, Valve B, Test.*

4-48. **Cable Tensioner Valve (Transporter Model RBT). - Continued**

(7) Connect 0-1,000 psi (0-6,895 kpa) hydraulic pressure source to M1.

(8) Connect hydraulic fluid reservoir to P1.

(9) Plug S1 and S2.

**NOTE**

Temperature of hydraulic oil should be 86-104°F (30-40 °C).

(10) Adjust fluid flow to 13 gpm (49 Lpm).

(11) Check gage at G and verify that valve A opens between 580-726 psi (3,999-4,986 kpa). Adjust valve A if valve does not open within limits, see Pam. b. below.

(12) Set all pressures to 0 psi (0 kpa) and disconnect all connections.

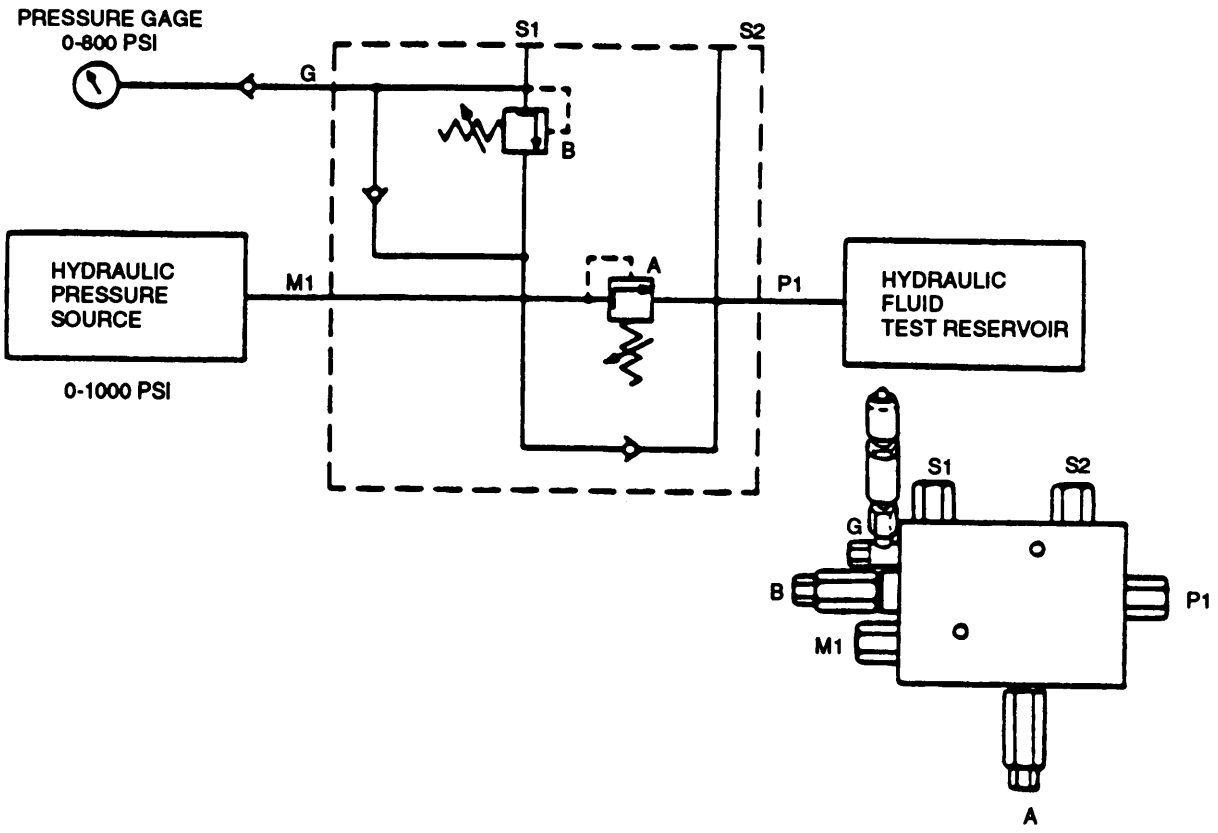



*Figure 4-60. Cable Tensioner Valve, Valve A, Test.*

4-48. **Cable Tensioner Valve (Transporter Model RBT). - Continued**

*b.* *Adjust.* (figures 4-61 and 4-62)

(1) Adjust valve B as follows:

Turn valve B clockwise to increase or counterclockwise to decrease pressure and set pressure at G to 217-363 psi (1,496-2,503 kpa).

(2) Adjust valve A as follows:

Turn valve A clockwise to increase or counterclockwise to decrease pressure and adjust valve A until valve A opens between 580-726 psi (3,999-4,986 kpa).

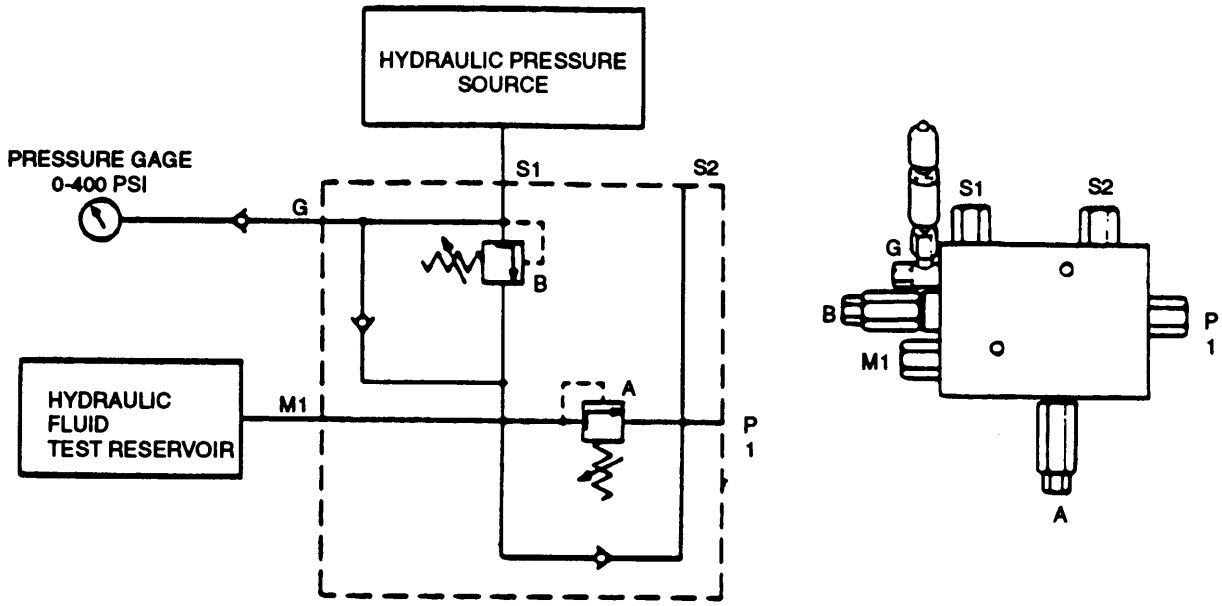



*Figure 4-61. Cable Tensioner Valve Valve A, Adjust.*

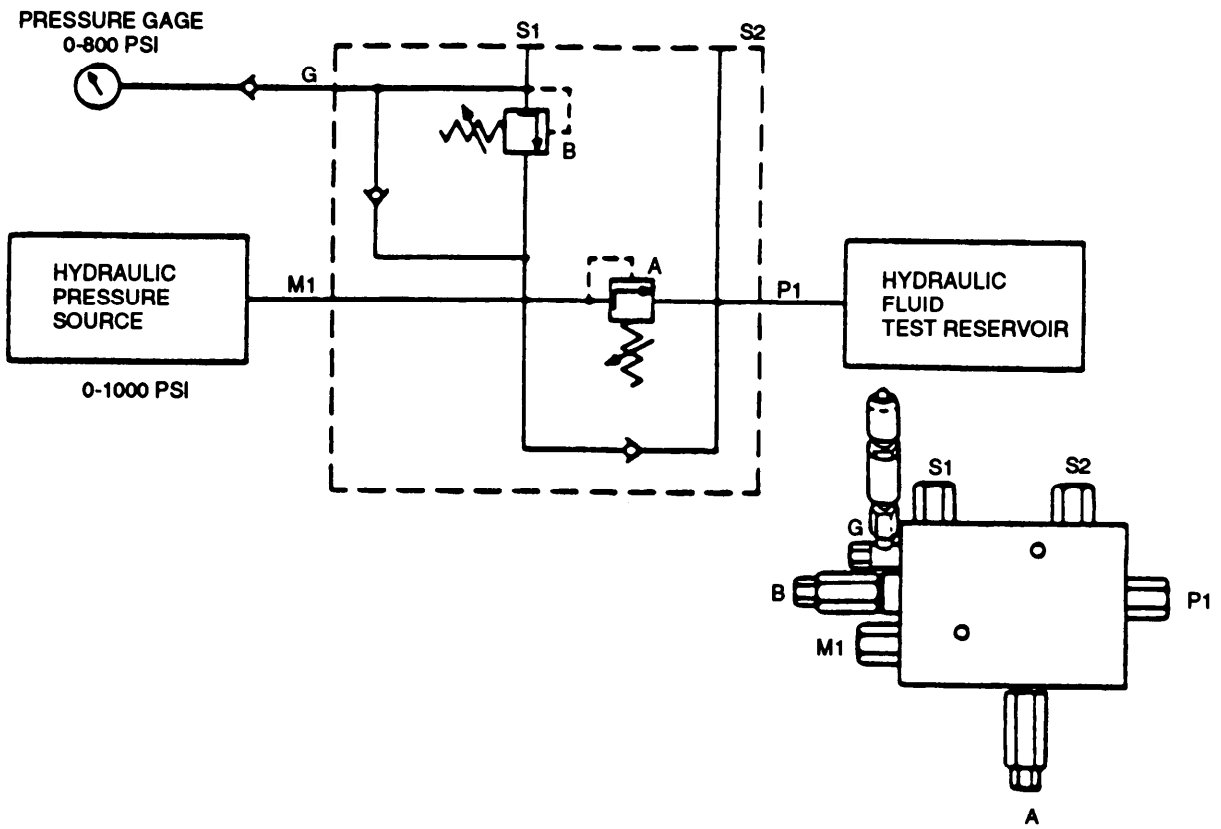



*Figure 4-62. Cable Tensioner Valve Valve A, Adjust.*

4-48. **Cable Tensioner Valve (Transporter Model RBT). - Continued**

*c.* *Replace.* (figure 4-63)

**WARNING**

When disconnecting any hydraulic line, open line slowly and protect face, as hydraulic oil may spray out due to residual pressure in system.

**NOTE**

When removing hoses, have a suitable container to drain oil from hoses. Also cap all hoses and ports immediately to prevent dirt or foreign matter from entering the system.

(1) Tag and disconnect four hydraulic lines (1) from cable tensioner valve (2).

(2) Remove two screws (3), lockwashers (4) and nuts (5) and remove cable tensioner valve (2).

(3) Remove elbow (6) and three adapters (7).

(4) Apply sealing compound to all pipe threads.

(5) Install three adapters (7) and elbow (6).

(6) Install cable tensioner valve (2) and secure with two screws (5), lockwashers (4), and nuts (3).

(7) Connect four hydraulic lines (1) to cable tensioner valve (2) as tagged.

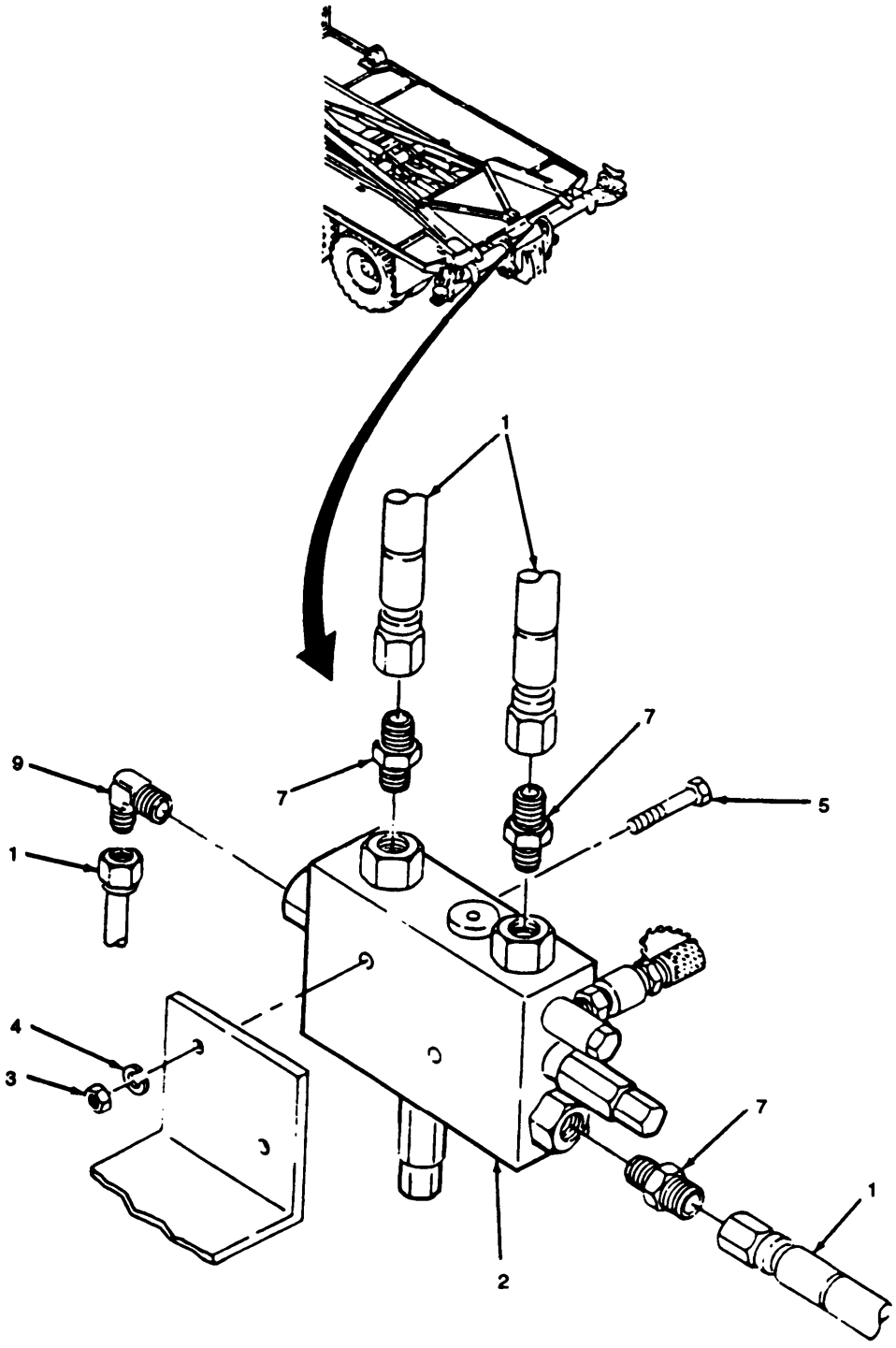



*Figure 4-63. Cable Tensioner Valve, Replace.*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

4-49. **Hydraulic Filter Assembly.**

This task covers: Replace

INITIAL SETUP

| *Tool* | *Materials/Parts* |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix B) | Sealing compound (Item 16, Appendix E) |

*a*. *Replace.* (figure 4-64)

**WARNING**

When disconnecting any hydraulic line, open line slowly and protect face, as hydraulic oil may spray out due to residual pressure in system.

**NOTE**

When removing hoses, have a suitable container to drain oil from hoses. Also cap all hoses and ports immediately to prevent dirt or foreign matter from entering the system.

(1) Tag and disconnect two hydraulic lines (1) from hydraulic filter assembly (2).

(2) Remove two screws (3) and lockwashers (4) and remove hydraulic fitter assembly (2).

(3) Apply sealing compound to all pipe threads.

(4) Install hydraulic filter assembly (2) and secure with two screws (3) and lockwashers (4).

(5) Connect two hydraulic lines (1) to hydraulic filter assembly (2) as tagged.

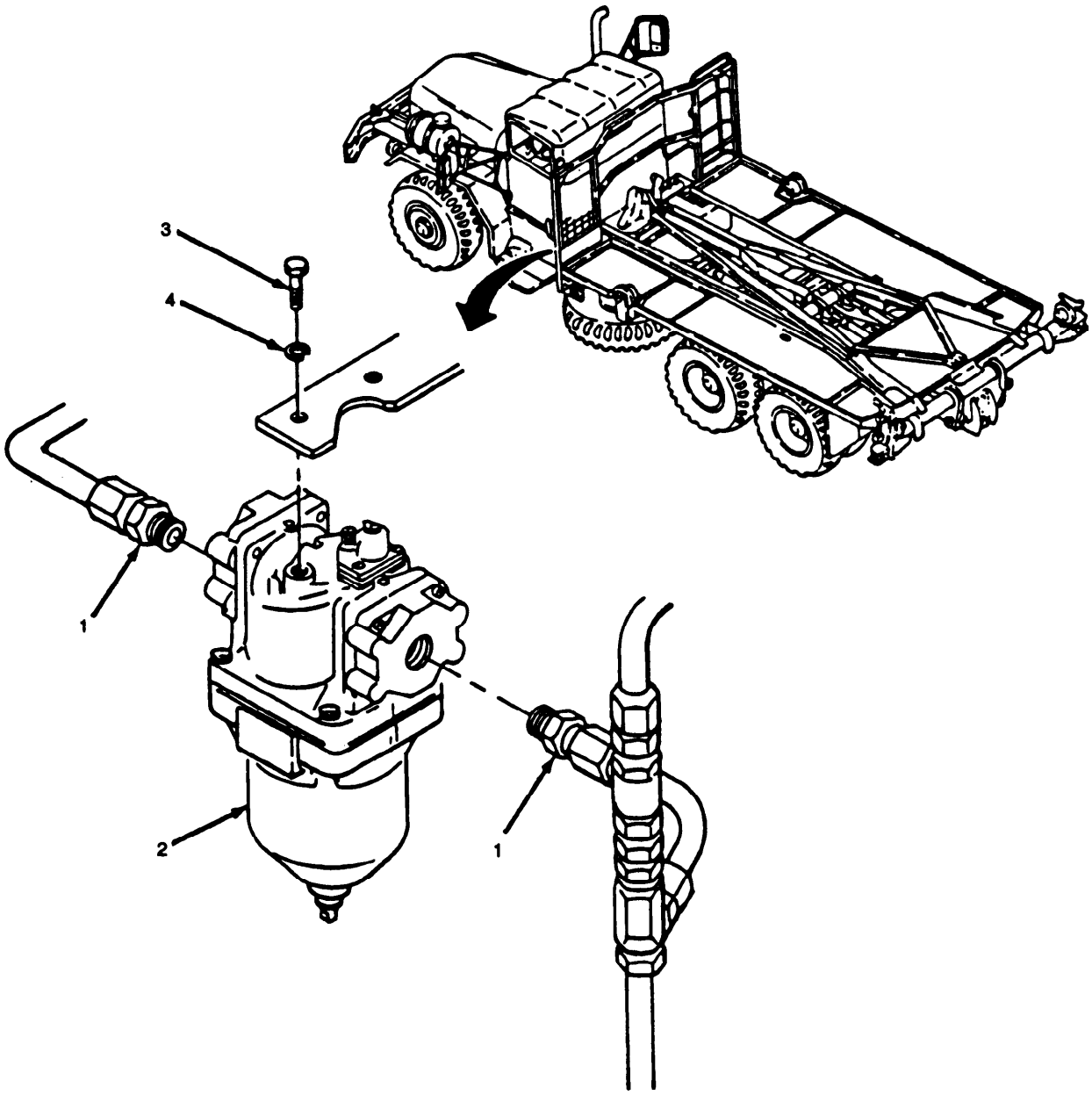



*Figure 4-64. Hydraulic Filter Assembly Replace.*

## 4-50. Hydraulic Reservoir Assembly.

This task covers: a. Service b. Replace c. Repair

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Equipment Condition:*

Bay removed (para. 2-16).

*Materials/Paris*

Oil, Lubricating OE/HDO (Item 8, Appendix E)
Antiseize Tape (Item 19, Appendix B)

*a. Service.* (figure 4-65)

**WARNING**

When working under boom, support boom by blocking or other suitable means.

(1) Raise boom (1) fully and block in position.

(2) Open filler cap (2).

(3) Open drain plug (3) and drain fluid into suitable container.

(4) Remove six screws (4), flange (5), gasket (6), strainer (7), and gasket (8).

(5) Tag and disconnect hydraulic line (9) from hydraulic reservoir assembly (10).

(6) Remove four screws (11), lockwashers (12), cover (13) and gasket (14).

(7) Unscrew strainer (15) and remove.

**WARNING**

Dry cleaning solvent PD-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100-138 °F (38-60 °C).

(8) Clean strainers (7) and (15) in dry cleaning solvent and dry thoroughly.

(9) Replace strainers (7) or (15) if ripped or otherwise damaged.

(10) install strainer (15).

(11) Install gasket (14), cover (13) and secure with four screws (11) and lockwashers (12).

(12) Apply antiseize tape to hydraulic line fitting and connect hydraulic line (9) as tagged.

(13) Install gasket (8), strainer (7), gasket (6), and flange (5) and secure with six screws (4).

(14) Close drain plug (3).

**NOTE**

Over filling reservoir will cause overflow when boom is lowered.

(15) Add hydraulic fluid until level is halfway between upper and lower marks on level gage (16).

(16) Install filler cap (2).

(17) Lower and raise boom (1) several times and recheck level with boom (1) in full vertical position. Add hydraulic fluid as needed.

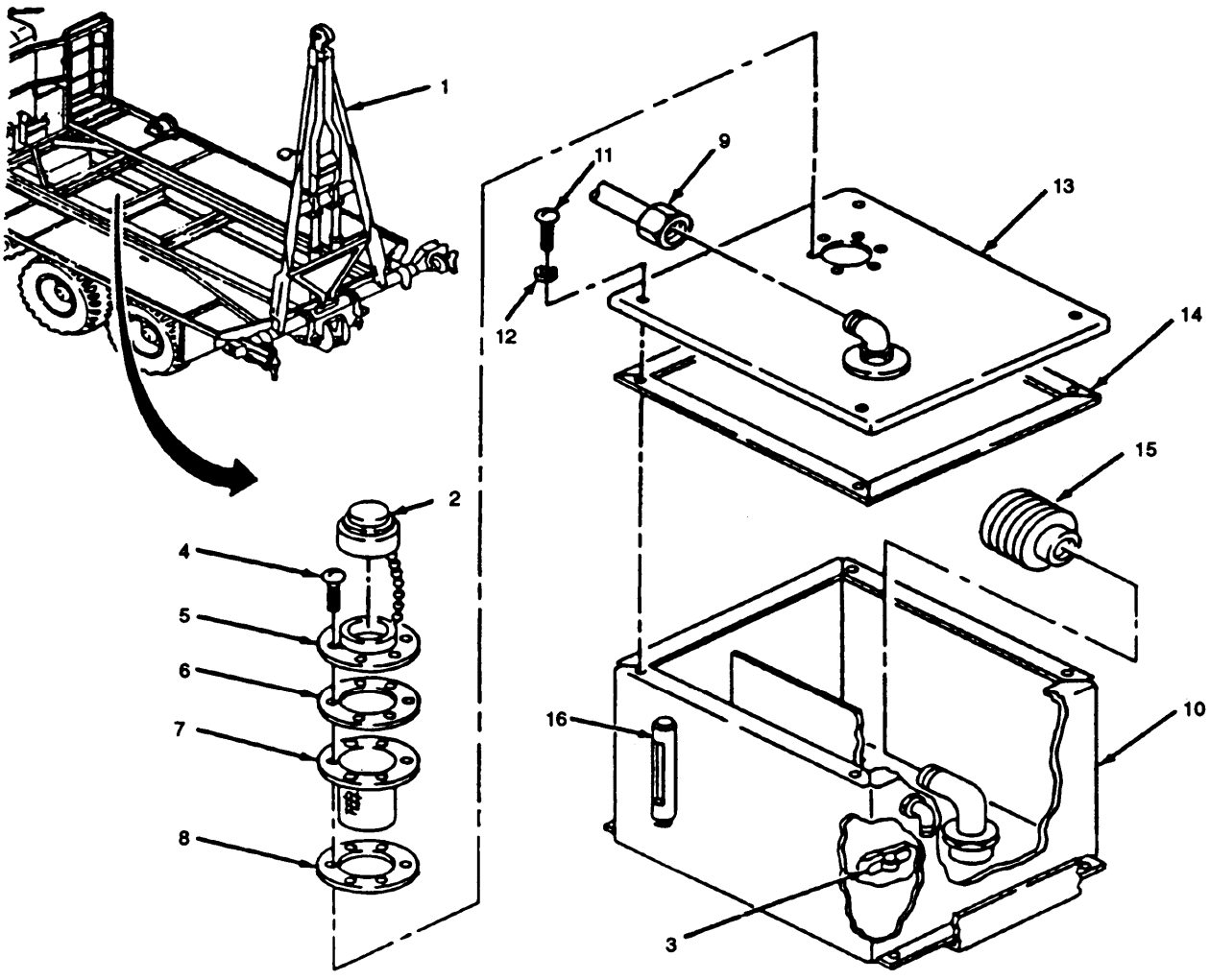



*Figure 4-65. Hydraulic Reservoir, Service.*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

## 4-50. Hydraulic Reservoir Assembly. - Continued

*b Replace.* (figure 4-66)

**WARNING**

When working under boom, support boom by blocking or other suitable means.

(1) Raise boom (1) fully and block in position.

(2) Remove filler cap (2).

(3) Open drain plug (3) and drain fluid into suitable container.

**WARNING**

When disconnecting any hydraulic line, open line slowly and protect face, as hydraulic oil may spray out due to residual pressure in system.

**NOTE**

When removing hoses, have a suitable container to drain oil from hoses. Also cap all hoses and ports immediately to prevent dirt or foreign matter from entering the system.

(4) Tag and disconnect three hydraulic lines (4) from hydraulic reservoir assembly (5).

(5) Connect hydraulic reservoir assembly (5) to a suitable lifting device.

(6) Remove four nuts (6), lockwashers (7) and bolts (8) and hydraulic reservoir assembly (5).

(7) Install hydraulic reservoir assembly (5) and secure with four bolts (8), lockwashers (7), and nuts (6).

(8) Apply antiseize tape to hydraulic lines fitting and connect three hydraulic lines (4) to hydraulic reservoir assembly (5).

(9) Close drain plug (2).

**NOTE**

Over filling reservoir will cause overflow when boom is lowered.

(10) Fill reservoir with hydraulic fluid until level is halfway between upper and lower marks on level gage (9).

(11) Close filler cap (2).

(12) Raise and lower boom (1) several times. Raise boom (1) to full vertical position and recheck level, and add fluid as needed.

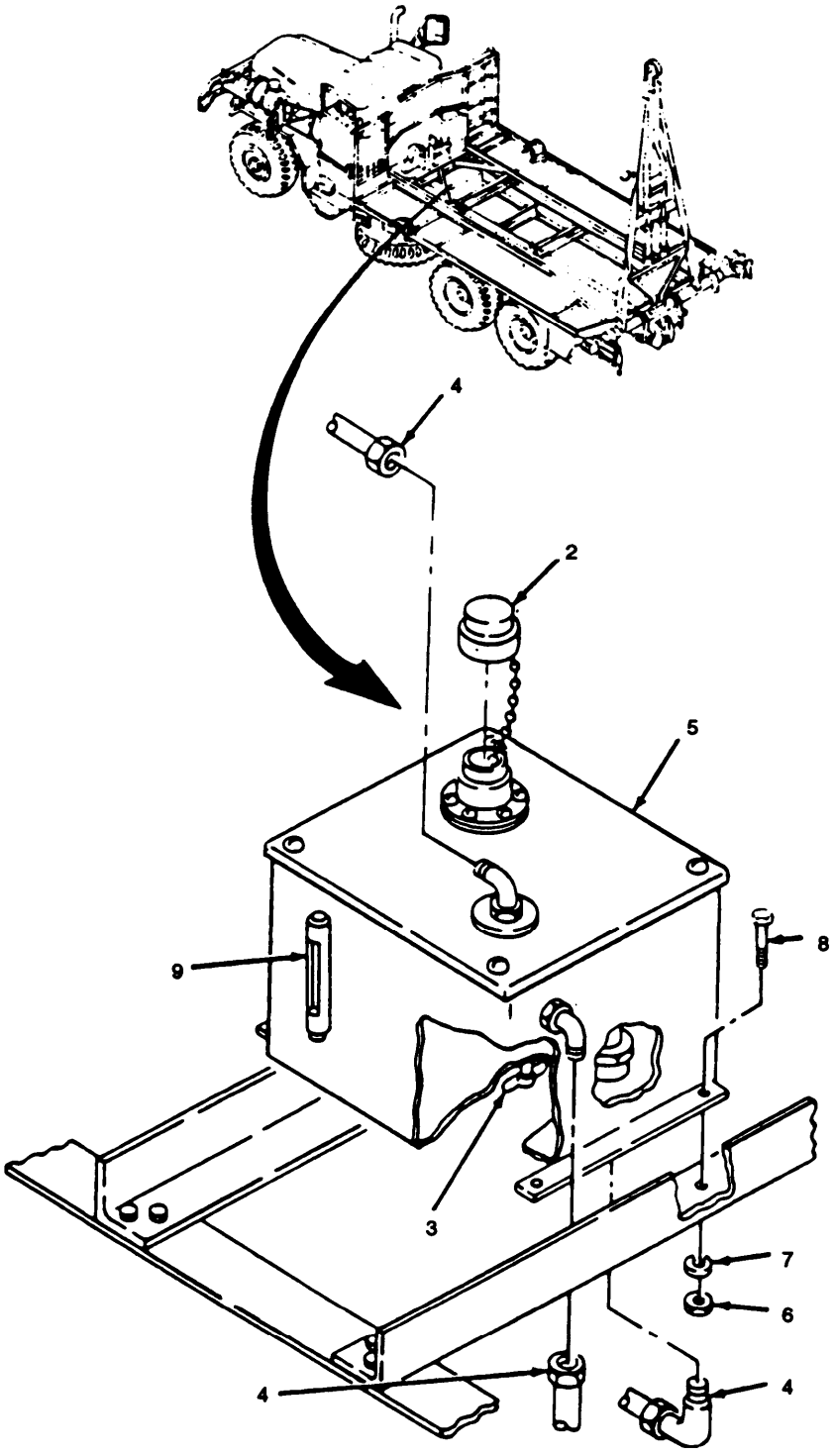



*Figure 4-66. Hydraulic Reservoir Assembly Replace.*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

## 4-50. Hydraulic Reservoir Assembly. - Continued

*c. Repair.* (figure 4-67)

**NOTE**

Hydraulic reservoir removed for repair. Discard lockwashers, preformed packings and gaskets.

(1) Remove six screws (1), flange (2), gasket (3), strainer (4), and gasket (5).

(2) Remove four screws (6), lockwashers (7), cover (8) and gasket (9).

(3) Remove strainer.

(4) Remove two nuts (11), preformed packings (12) and remove fluid level gage (13).

(5) Loosen nut (14) and remove elbow (15), and remove nut (14).

(6) Remove nut (16), preformed packing (17) and elbow (18).

(7) Remove nut (19), tube (20), clinch sleeve (21) and fitting (22).

**WARNING**

Dry cleaning solvent PD-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100-138 °F (38-60 °C).

(8) Clean all items, except gaskets and preformed packings, with dry cleaning solvent and dry thoroughly.

(9) Inspect all components and replace if damaged.

(10) Install fitting (22), tube (20), clinch sleeve (21) and nut (19).

(11) Install preformed packing (17), elbow (18), and secure with nut (16).

(12) Install nut (14) on elbow (15) and install elbow (15) and tighten nut (14).

(13) Install level gage (13) and secure with two nuts (11) and preformed packings.

(14) Install strainer (10).

(15) Install gasket (9) and cover (8) and secure with four screws (6) and lockwashers (7).

FOLLOW-ON MAINTENANCE: Install bay (para 2-27).

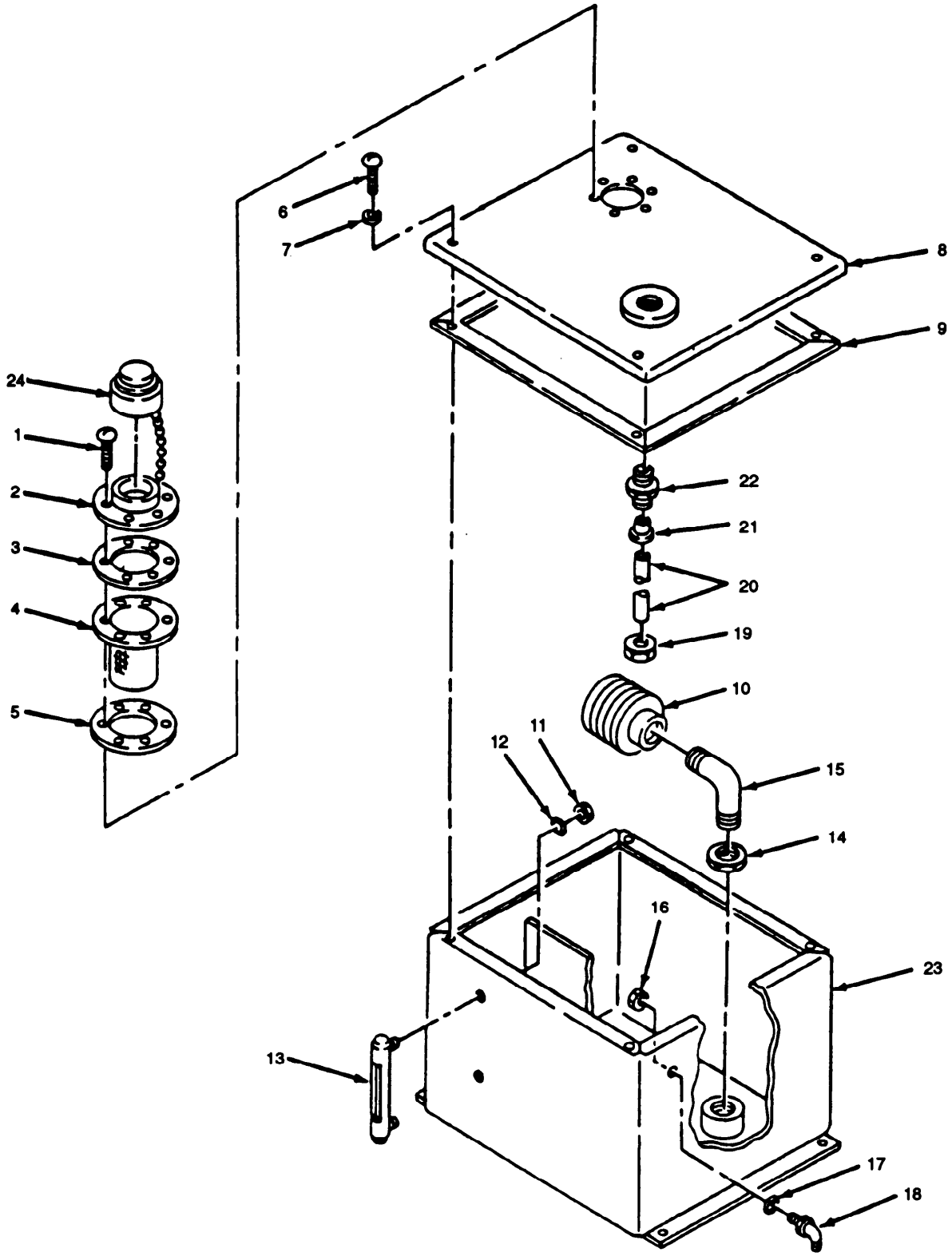



*Figure 4-67. Hydraulic Reservoir Assembly Repair.*

## 4-51. Reservoir Bracket.

This task covers: Replace

INITIAL SETUP

| *Tool* | *Equipment Condition:* |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix B) | Hydraulic reservoir assembly removed (para. 4-50). |

*a*. *Replace.* (figure 4-68)

(1) Remove eight nuts (1), lockwashers (2), bolts (3) and remove bracket (4).

(2) Install bracket (4) and secure with four bolts (3), lockwashers (2), and nuts (1).

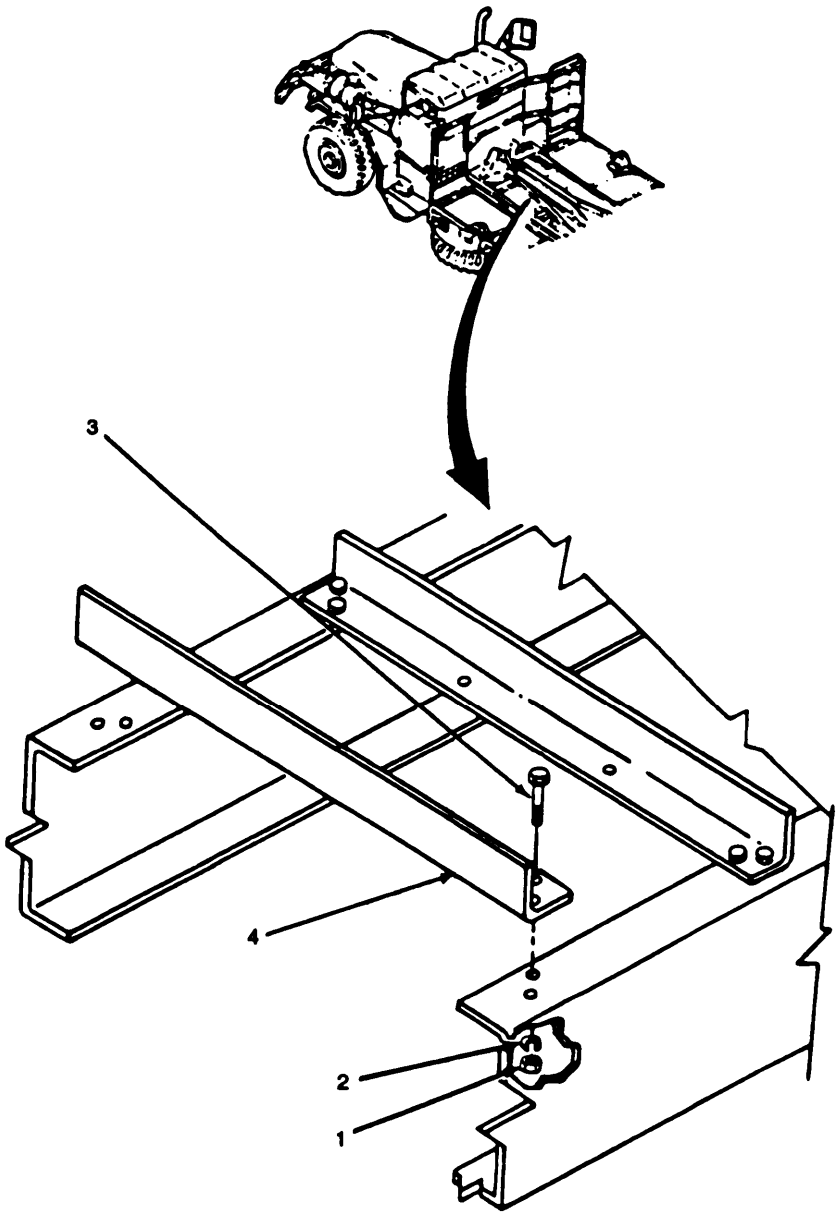



*Figure 4-68. Reservoir Bracket, Replace.*

FOLLOW-ON MAINTENANCE: Install hydraulic reservoir assembly (para. 4-50).

## 4-52. Hydraulic System Pump and Bracket.

This task covers: a. Test b. Replace

INITIAL SETUP

*Tools*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)
Hydraulic Testing Equipment

*Equipment Condition:*

Bay removed (para. 2-16).

*Materials/Parts*

Antiseize Tape (Item 19, Appendix E)

*a. Test.* (figure 4-69)

**NOTE**

Hydraulic pump removed for test, see pare. b below. Shaft rotation is counterclockwise as viewed from shaft end of pump.

(1) Connect hydraulic pump to test equipment.

(2) Run pump at least 3 min. at each level to verify proper pump operation.

**WARNING**

When disconnecting any hydraulic line, open line slowly and protect face, as hydraulic oil may spiny out due to residual pressure in system.

**NOTE**

When removing hoses, have a suitable container to drain oil from hoses. Also cap all hoses and ports immediately to prevent dirt or foreign matter from entering the system.

(3) Disconnect hydmulic pump from test equipment. Replace a hydraulic pump that does not meet performance specifications.

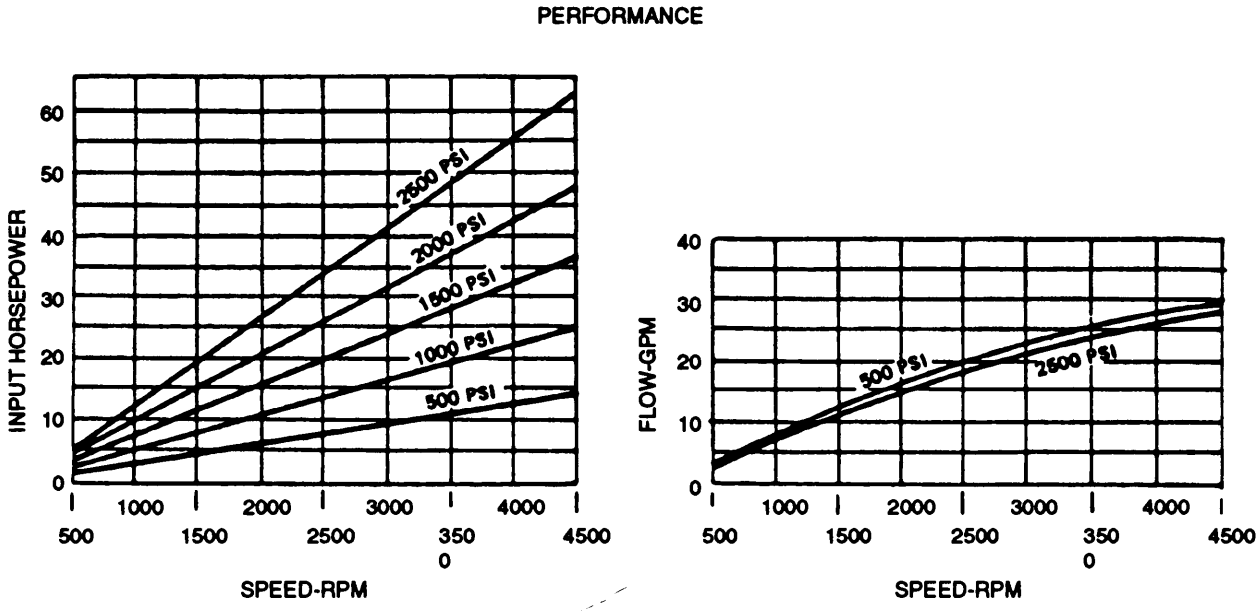



*Figure 4-69. Hydraulic Pump, Test.*

## 4-52. Hydraulic System Pump and Bracket. - Continued

*b.* Replace. (figure 4-70)

**WARNING**

When disconnecting any hydraulic line, open line slowly and protect face, as hydraulic oil may spray out due to residual pressure in system.

**NOTE**

When removing hoses, have a suitable container to drain oil from hoses. Also cap all hoses and ports immediately to prevent dirt or foreign matter from entering the system.

There are two different pump models used. The replacement procedures are the same for both models. The location of hydraulic lines are different between models.

(1) Tag and disconnect two hydraulic lines (1) from hydraulic pump (2).

(2) Loosen set screw (3).

(3) Support hydraulic pump (2) and drive shaft (5).

(4) Remove two nuts (6), washers (7), screws (8), and hydraulic pump (2).

(5) Remove key (10) from pump shaft (11).

(6) Remove four nuts (12), washers (13), screws (14), and bracket (9).

(7) Inspect bracket (8) and replace if cracked or other wise damaged.

(8) Install bracket (9) and secure with four screws (14), washers (13), and nuts (12).

(9) Install key (10) onto pump shaft (11).

(10) Aline key (10) with slot in yoke (15).

(11) Install pump (2) and secure with two screws (8), washers (7), and nuts (6).

(12) Tighten set screw (3).

(13) Apply antiseize tape to hydraulic lines fittings and connect two hydraulic lines (1) hydraulic pump (2) as tagged.

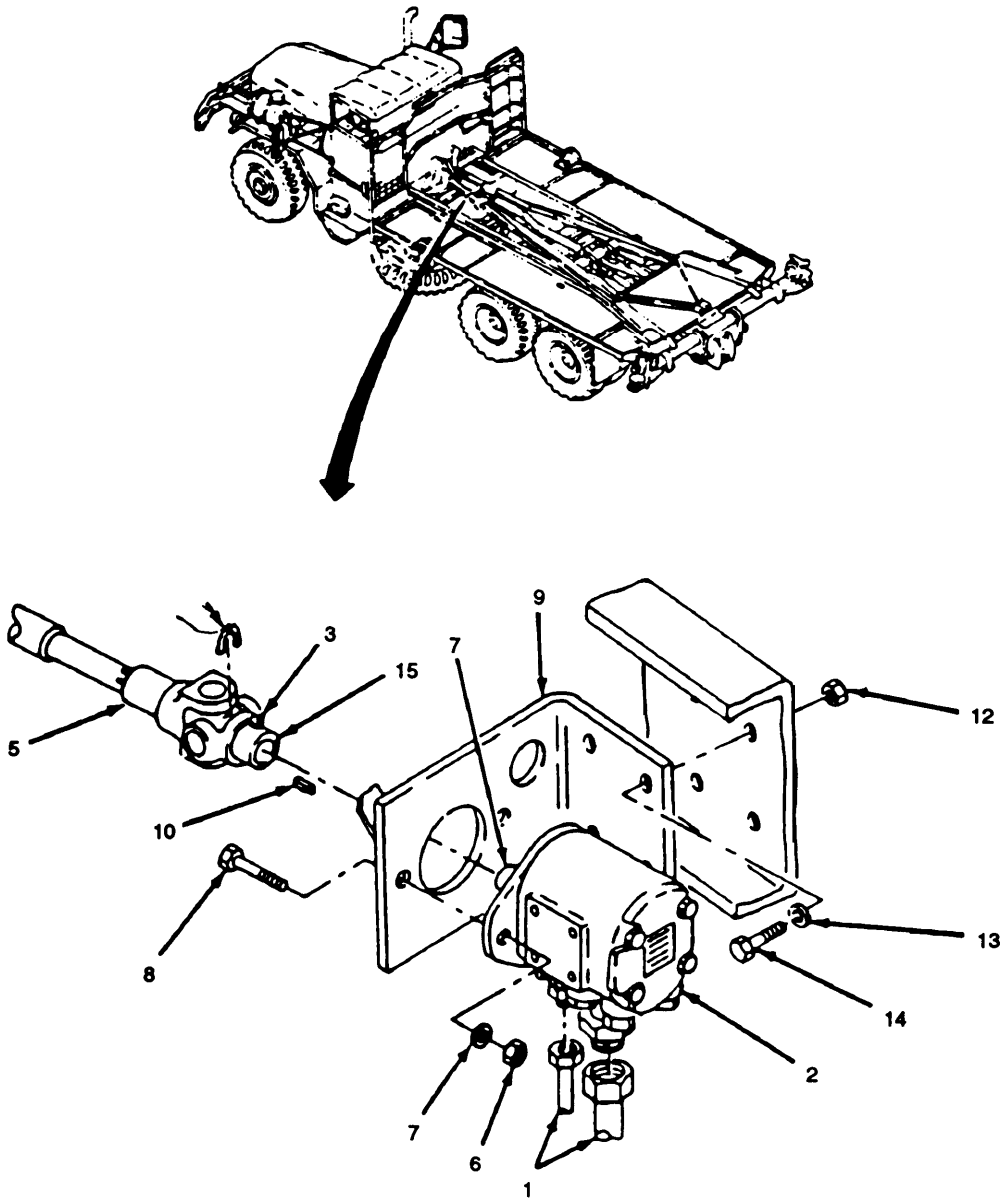



*Figure 4-70. Hydraulic Pump, Replace.*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

## 4-53. Drive Shaft Gear Pump.

This task covers: a. Replace b. Repair

INITIAL SETUP

| *Tool* | *Materials/Parts* |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix B) | Grease, Automotive and Artillery (Item 2, Appendix E)<br>Oil, Engine (Item 7, Appendix E) |

*a. Replace.* (figure 4-71)

(1) Remove retaining ring (1).

(2) Loosen set screw (2).

(3) Loosen set screw (3) and remove drive shaft (4), key (5), and key (6).

(4) Install key (6) and key (5).

(5) Install drive shaft (4) and tighten set screws (3) and (2).

(6) Install retaining ring (1).

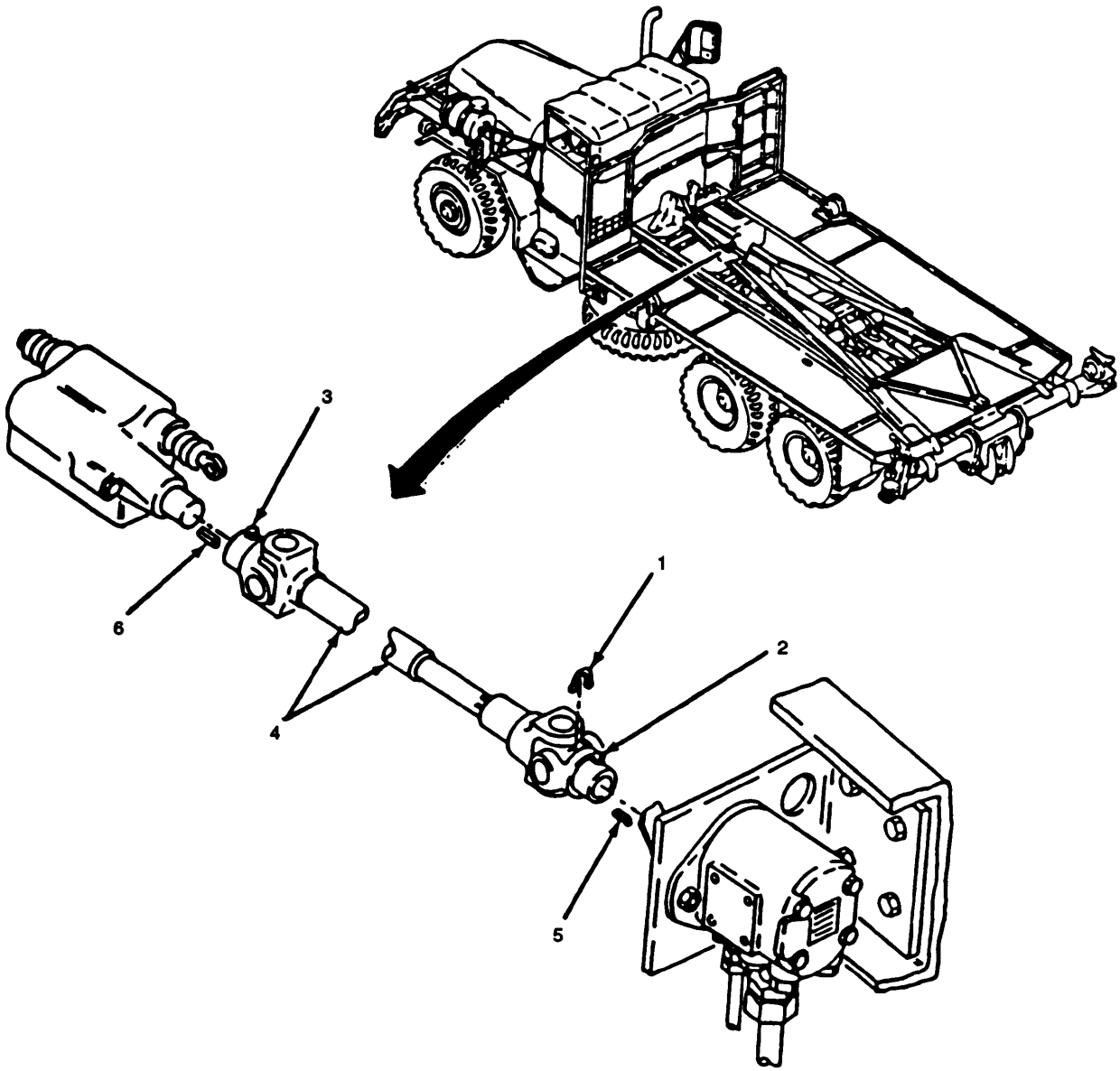



*Figure 4-71. Drive Shaft Gear Pump, Replace.*

## 4-53. Drive Shaft Gear Pump. - Continued

*b. Repair.* (figure 4-72)

**NOTE**

Drive shaft removed for repair. See para. a above.

(1) Remove slip yoke (1) from drive shaft (2).

(2) Remove four retaining rings (3).

(3) Remove U-joint (4) from slip yoke (1) and yoke (5).

(4) Remove four retaining rings (6) and remove U-joint (7) from yoke (8) and drive shaft (2).

**WARNING**

Dry cleaning solvent PD-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100-138 °F (38-60 °C).

(5) Clean all items with dry cleaning solvent, and dry thoroughly.

(6) Inspect all items for excessive wear and replace if worn or otherwise damaged.

(7) Inspect slip yoke (1), drive shaft (2), and yokes (5) and (8) and replace if retaining ring grooves are damaged or if U-joint bores are damaged.

(8) Inspect U-joints and replace if end caps, seals or needle bearings are worn or otherwise damaged.

(9) Inspect retaining rings (3) and (6) and replace if bent or otherwise damaged.

(10) Pack U-joint end caps with grease and install.

(11) Lubricate U-joint bores and retaining ring grooves with oil and install U-joint (7) in yoke (8) and drive shaft (2), and install four retaining rings (6).

(12) Lubricate U-joint bores and retaining ring grooves with oil and install U-joint in slip yoke (1) and yoke (5) and install four retaining rings (6).

(13) Panel slip yoke spline with grease and install slip yoke (1) on drive shaft (2).

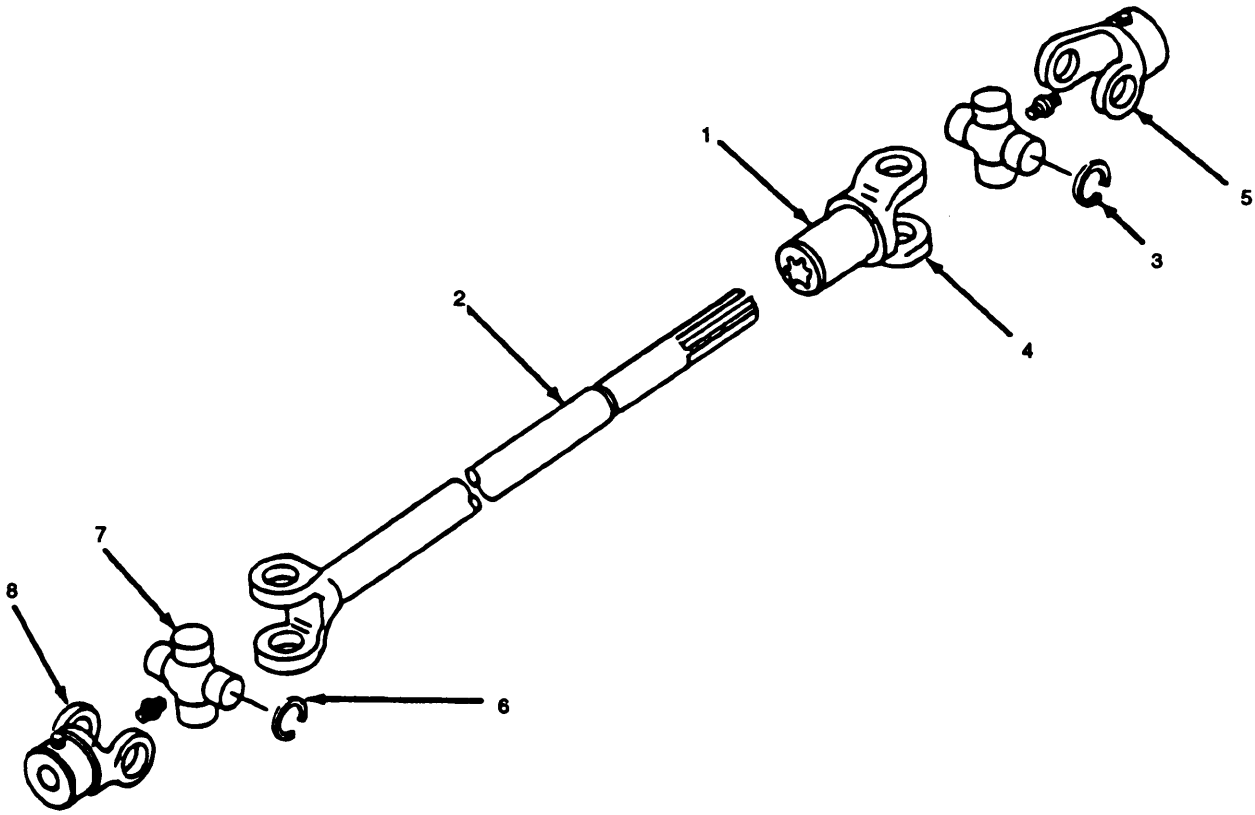



*Figure 4-72. Drive Shaft Gear Pump, Repair.*

FOLLOW-ON MAINTENANCE: Install hydraulic pump drive shaft (para. a).

## 4-54. Power Takeoff Control Lever and Linkage (Model 2280).

This task covers: a. Replace b. Repair

INITIAL SETUP

| *Tools* | *Materials/Parts* |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix B)<br>Hydraulic Testing Equipment | Solvent, Dry Cleaning (Item 19, Appendix E)<br>Rags, Wiping (Item 13, Appendix E) |

*a. Replace.* (figure 4-73)

(1) Remove two nuts (1), screws (2), and lockplate (3).

(2) Remove cotter pin (4), pin (5), and separate link (6) from lever (7).

**NOTE**

Front winch control lever and transfer selector levers are also installed on hand control shaft.

(3) Remove two cotter pins (8), washers (9), hand control shaft (10), spacer (11), and lever (7).

(4) Remove two cotter pins (13), and remove link (13).

(5) Remove cotter pin (14), pin (15), and link (6).

(6) Remove two nuts (16), screws (17) and remove control assembly (18).

(7) Install control assembly (18) and secure with two screws (17) and nuts (16).

(8) Install link (13) and secure with two cotter pins (12).

(9) Install link (6) and secure with pin (15) and cotter pin (14).

**NOTE**

Front winch control lever and transfer selector levers are also installed on hand control shaft.

(10) Install lever (7) and secure with hand control shaft (10), spacer (11), two washers (9), and two cotter pins (8).

(11) Install link (6) on lever (7) and secure with pin (5) and cotter pin (4).

(12) Install lockplate (3) and secure with two screws (2) and nuts (1).

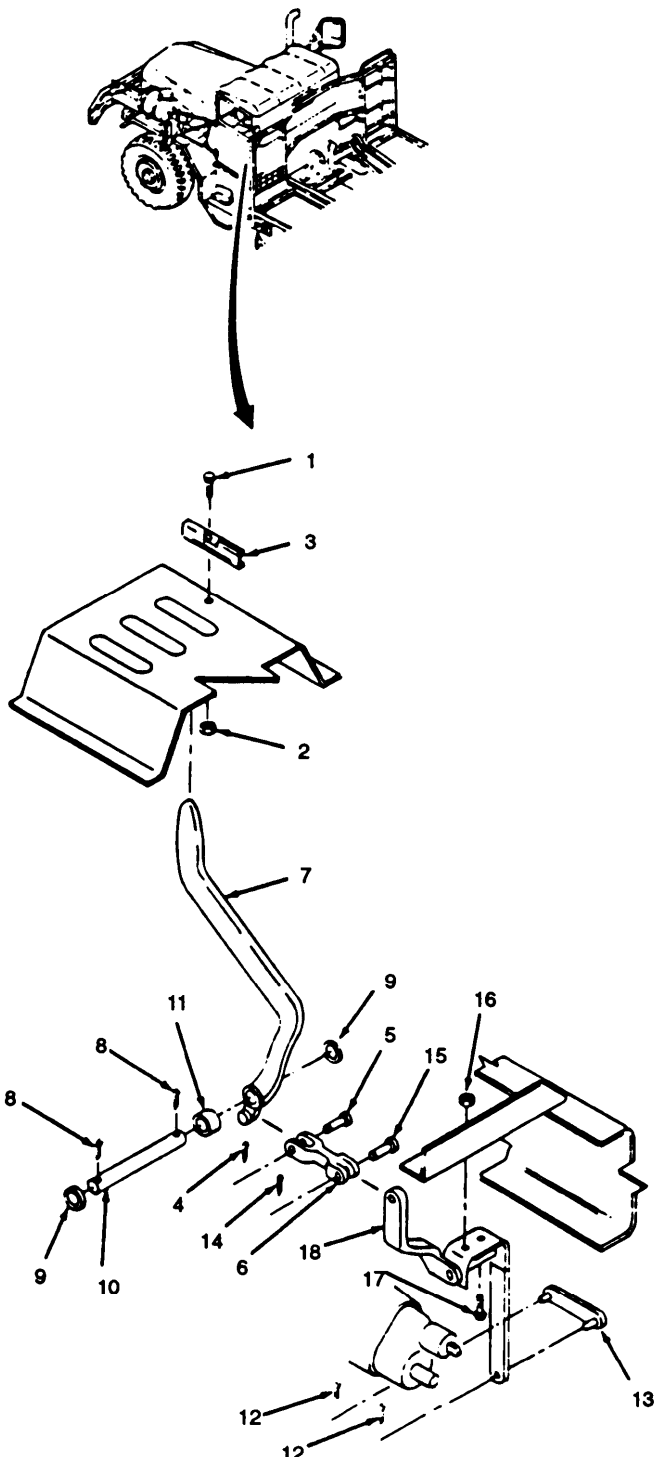



*Figure 4-73. PTO Control Lever and Linkage, Replace.*

*b*. *Repair.* (figure 4-74)

**WARNING**

Dry cleaning solvent PD-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100-138 °F (38-60 °C).

(1) Clean all items with dry cleaning solvent, and dry thoroughly.

(2) Inspect all components for wear, hole elongation, or damage. Replace if damaged.

(3) Inspect link (2) and replace if bent, cracked, pin holes are excessively worn or link (2) is other wise damaged.

(4) Inspect link (3) and replace if bent, or pin holes are excessively worn or link (3) is otherwise damaged.

(5) inspect lever (4) and bushing (5). Replace bushing (5) if cracked, or excessively worn. Replace lever if bent, cracked, or otherwise damaged.

(6) Inspect hand control shaft (6) and replace if bent, excessively worn, or otherwise damaged.

(7) Inspect pins (7) and replace if excessively worn or otherwise damaged.

(8) Inspect spacer (8) and replace if cracked, excessively worn, or otherwise damaged.

(9) Inspect control assembly (9) and replace if bent, excessively worn, or otherwise damaged.

(10) Inspect all remaining items and replace all items that are worn or otherwise damaged.

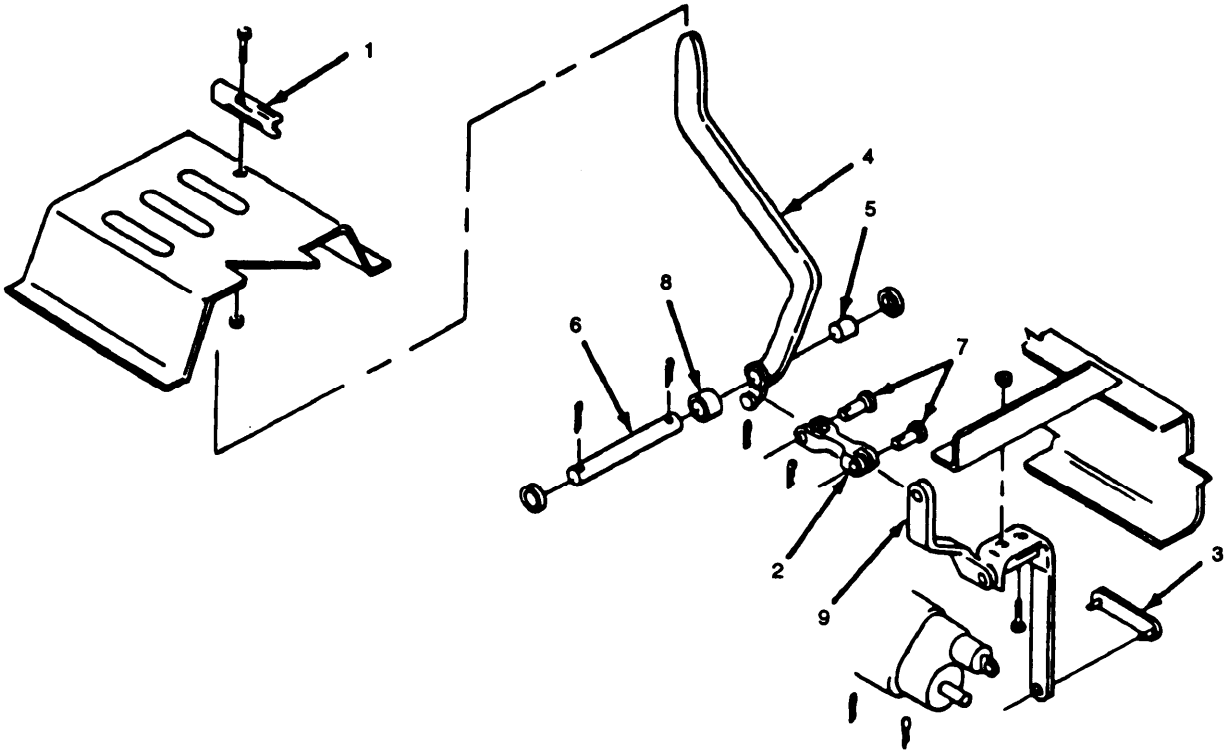



*Figure 4-74. PTO Control Lever and Linkage.*

FOLLOW-ON MAINTENANCE: Install PTO control lever and linkage (para. a).

## 4-55. Hydraulic System Lines and Fittings.

This task covers: Replace

INITIAL SETUP

*Tools*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Materials/Parts*

Sealing Compound (Item 16, Appendix E)
Tape, Antiseize (Item 19, Appendix E)

*Equipment Condition:*

Bay removed (para. 2-16).

**NOTE**

The length and location of hydraulic lines varies between models of transporter. The following maintenance procedures are general procedures for replacing both flexible and rigid lines. Perform those steps as applicable for line being replaced.

*a*. Replace. (figures 4-75 and 4-76)

**WARNING**

When disconnecting any hydraulic line, open line slowly and protect face, as hydraulic oil may spray out due to residual pressure in system.

**NOTE**

When removing hoses, have a suitable container to drain oil from hoses. Also cap all hoses and ports immediately to prevent dirt or foreign matter from entering the system.

(1) Inspect transporter hydraulic system lines and fittings.

(2) Transporter lines and fittings are not repairable and if damaged, must be replaced.

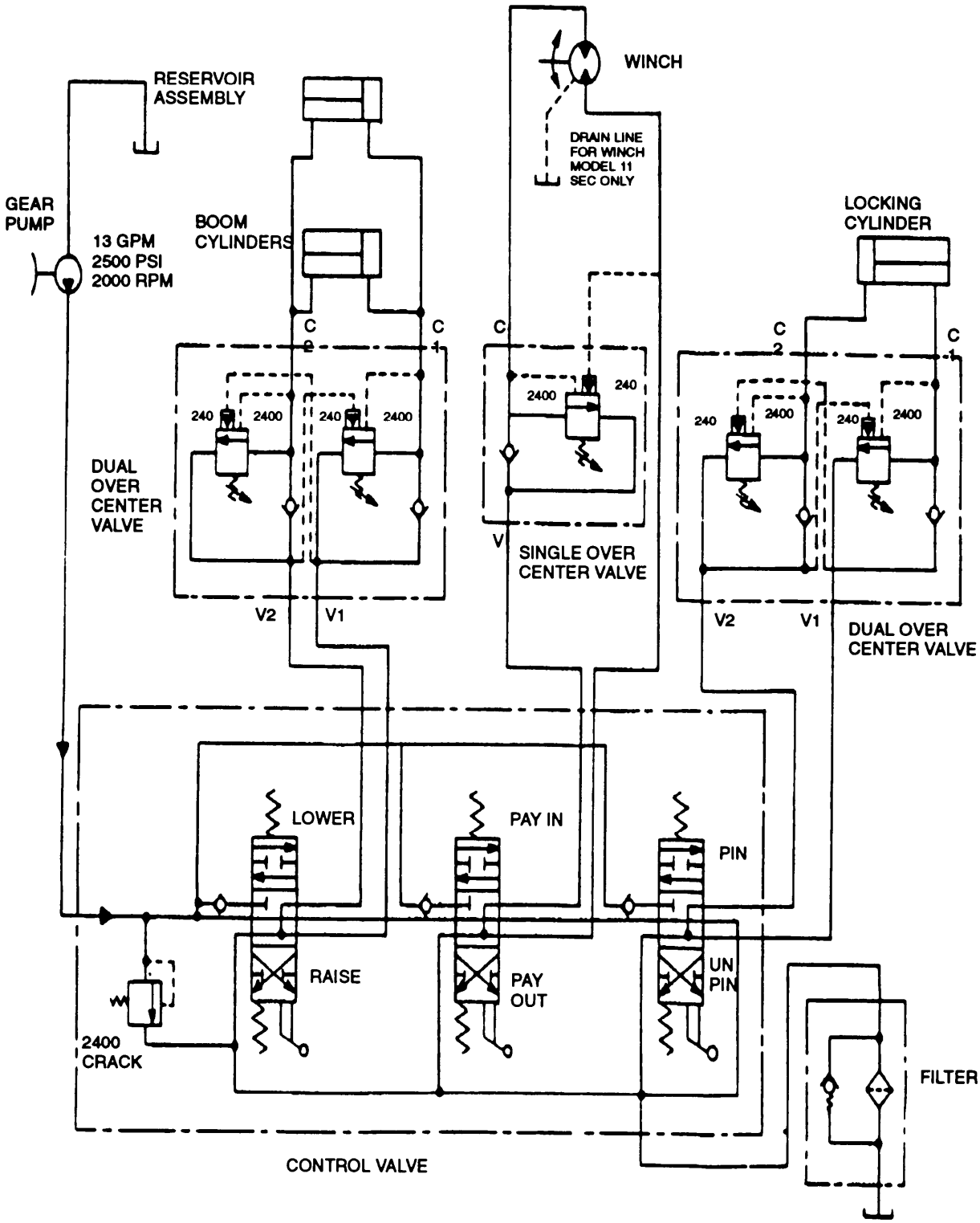



*Figure 4-75. Hydraulic System Lines and Fittings, Transporter Model 2280.*

## 4-55. Hydraulic System Lines and Fittings. - Continued

(3) If hydraulic Iine or fitting must be replaced, observe the following:

*(a)* Locate the damaged line or fitting.

**WARNING**

When disconnecting any hydraulic line, open line slowly and protect face, as hydraulic oil may spray out due to residual pressure in system.

**NOTE**

When removing hoses, have a suitable container to drain oil from hoses. Also cap all hoses and ports immediately to prevent dirt or foreign matter from entering the system.

*(b)* Trace line to nearest fitting and loosen connection.

*(c)* Trace line to back to other end and loosen connection.

*(d)* Remove all clamps securing damaged line to transporter and remove line.

*(e)* Apply antiseize tape to all pipe threads and install and tighten fittings.

*(f)* Install all clamps that were removed.

*(g)* Service hydraulic reservoir (para. 4-50).

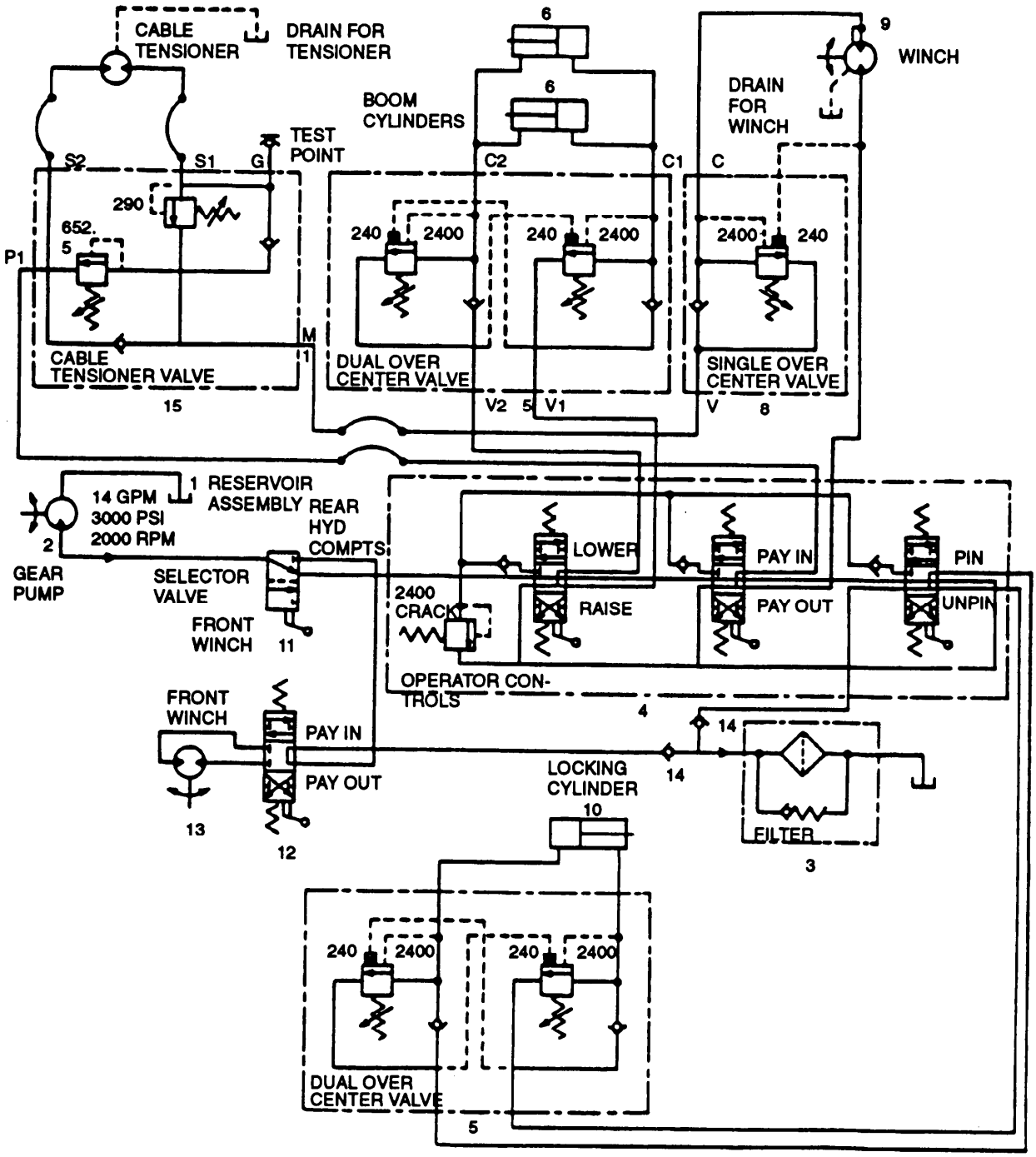



*Figure 4-76. Hydraulic System Lines and Fittings, Transporter Model RBT.*

## 4-56. Lines, Clamps, and Fittings.

This task covers: Replace

INITIAL SETUP

*Tools*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Equipment Condition:*

Bay removed (para. 2-16).

*Materials/Parts*

Antiseize Tape (Item 19, Appendix E)

*a. Replace.* (figure 4-77)

**NOTE**

The location of clamps varies between models of transporter.

(1) Remove screw (1) and lockwasher (2) securing clamps (3) and remove clamps (3) from fuel lines (4) and (5).

(2) Tag and disconnect fuel line (4) and (5).

(3) Refer to Appendix F in procedures to manufacture fuel lines.

(4) Apply antiseize tape to fuel line fittings.

(5) Install fuel line (5) and (4) as tagged.

(6) Install clamps (3) and secure with screw (1) and lockwasher (2).

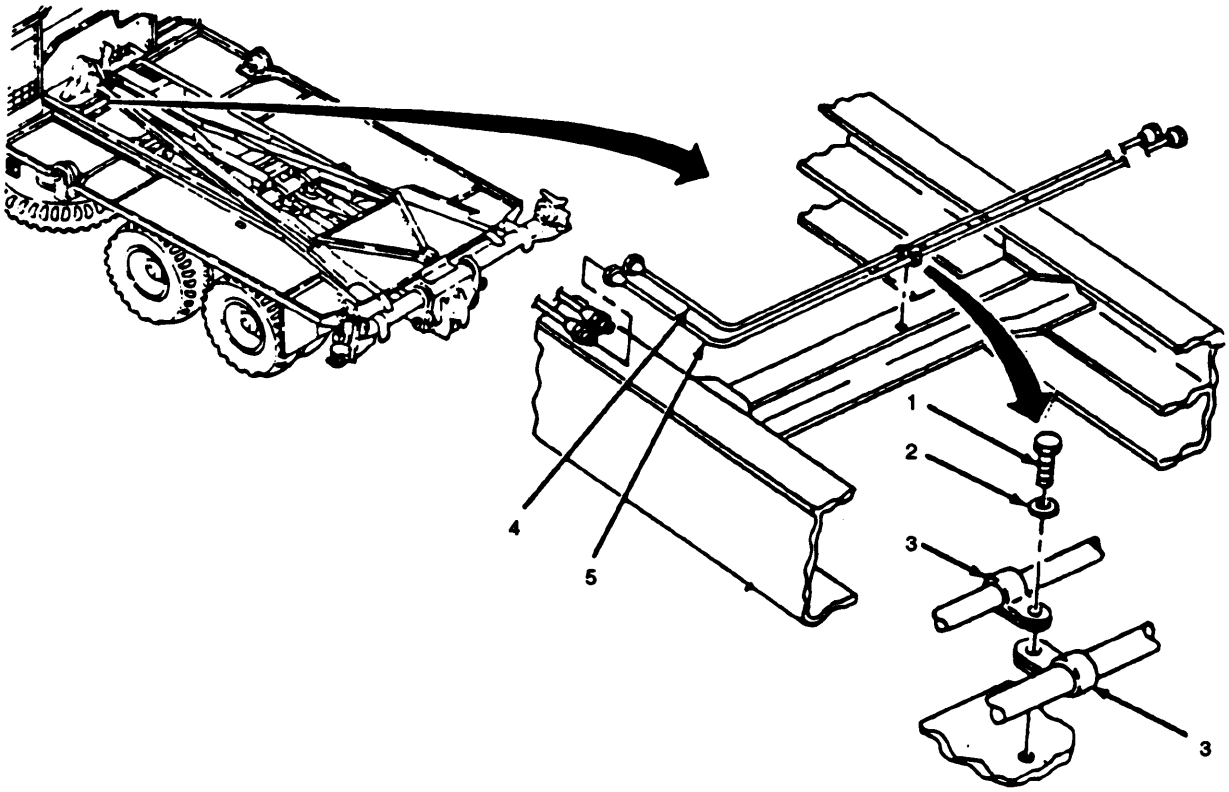



*Figure 4-77. Lines, Clamps and Fittings, Replace.*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

## 4-57. Mounting Bracket.

This task covers: Replace

INITIAL SETUP

| *Tool* | *Equipment Condition:* |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix B) | Fuel tank removed (refer to TM 9-2320-260-20 or TM 9-2320-272-20 as applicable). |

*a. Replace.* (figure 4-78)

(1) Remove six screws (2), nuts (1), and remove fuel tank bracket (3) and spacer (4).

(2) Remove six screws (5), nuts (6) and remove fuel tank bracket (7) and bracket (8).

(3) Install bracket (4), bracket (7) and secure with six screws (5) and nuts (6).

(4) Install spacer(4), bracket (3) and secure with six screws (2) and nuts (1).

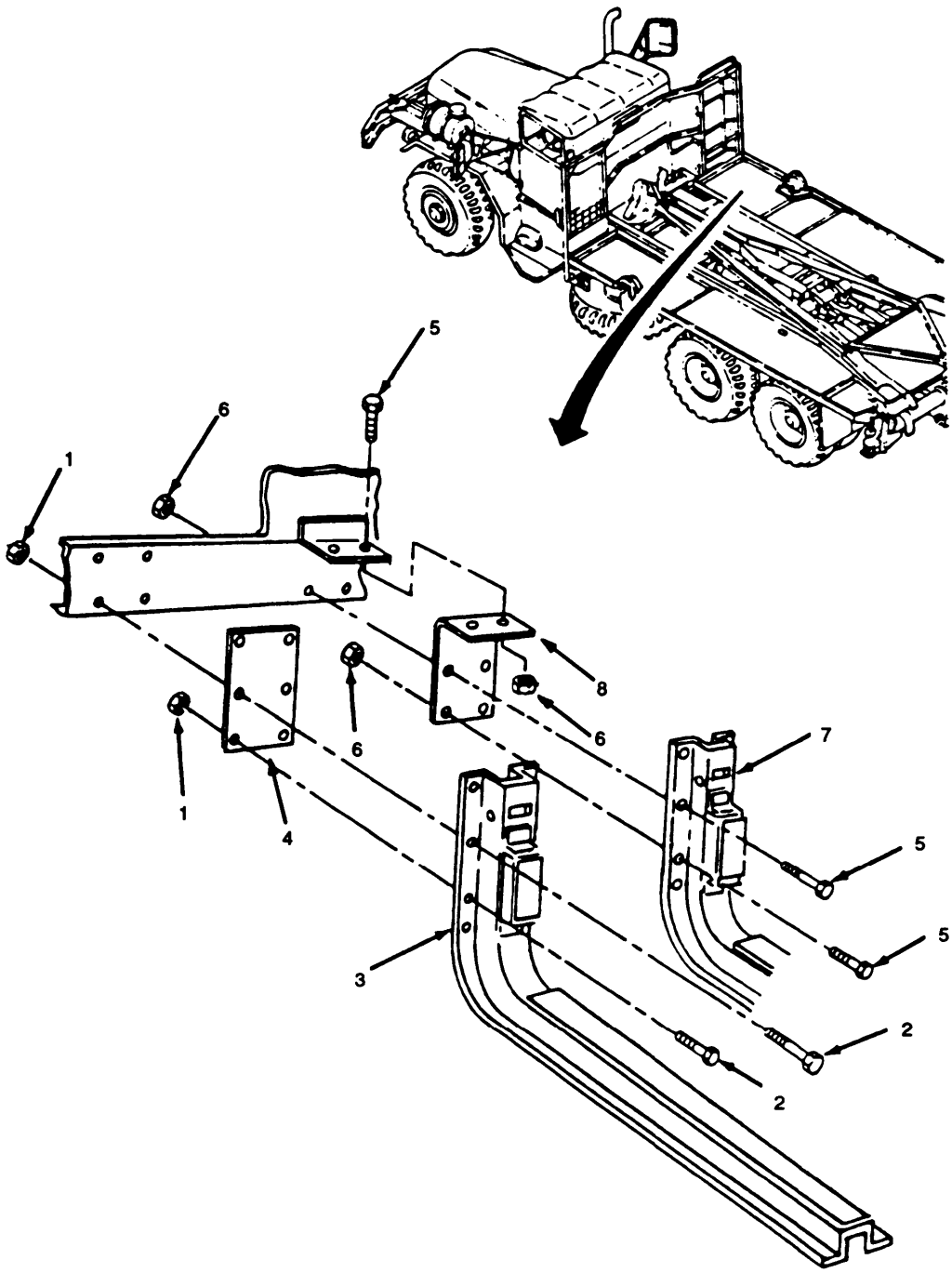



*Figure 4-78. Mounting Bracket, Replace.*

FOLLOW-ON MAINTENANCE: Install fuel tank. (Refer to TM 9-2320-260-20 or TM 9-2320-272-20 as applicable).

## 4-58. Bogie Bracket Retainer and Chain.

This task covers: Replace

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit
(Item 1, Appendix B)

*a*. *Replace.* (figure 4-79)

(1) Remove retainer (1), screw (2), lockwasher (3), chain (4), and washer (5).

(2) Remove bolt (6).

(3) Remove two nuts (7), lockwashers (8), and nuts (9).

(4) Remove screw (10) and lockwasher (11).

(5) Remove nut (12), lockwasher (13), screw (14), and bracket (15).

(6) Install bracket (15) and secure with screw (14), lockwasher (13), and nut (12).

(7) Install screw (10) and lockwasher (11).

(8) Install two screws (9), lockwashers (8), and nuts (7).

(9) Install bolt (6).

(10) Install chain (4) and secure with washer (5), chain (4), lockwasher (3), retainer (1), and screw (2).

(11) Install retainer (1) in bolt (6).

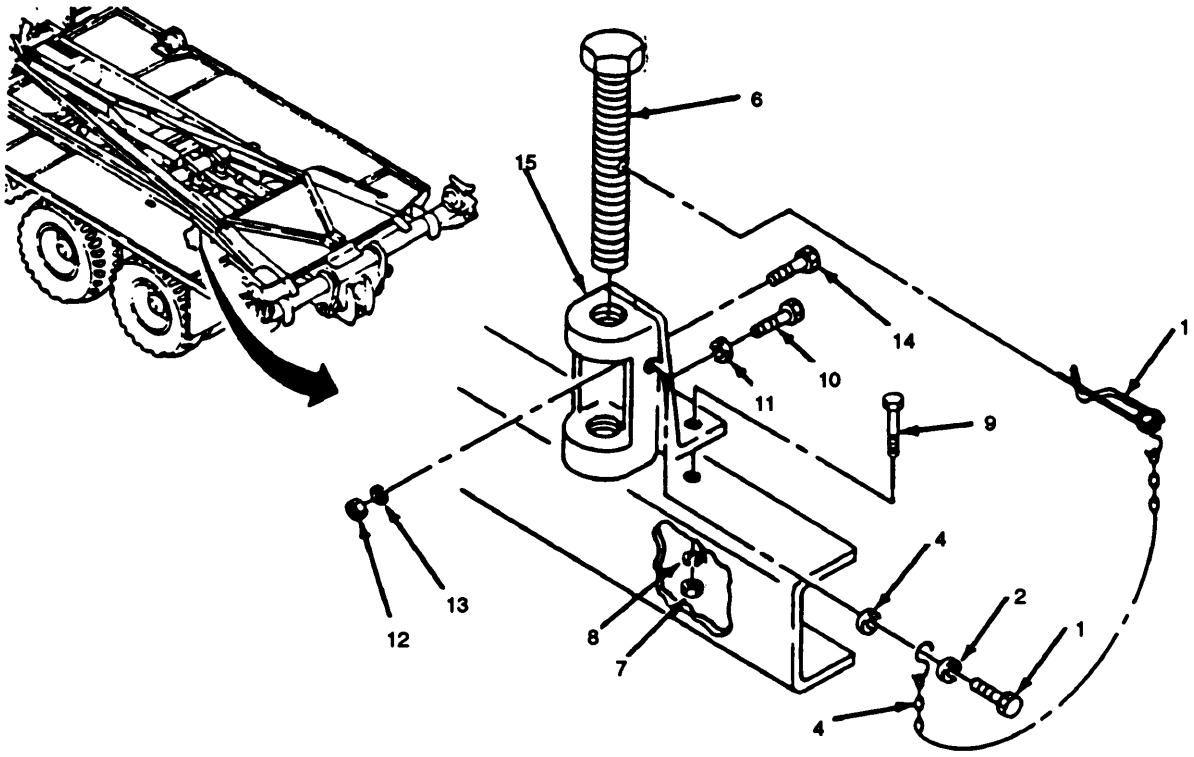



*Figure 4-79. Bogie Bracket Retainer and Chain, Replace.*

## 4-59. Cab Protector.

This task covers: Replace

INITIAL SETUP

*Tools*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)
Lifting device

Equipment Conditions:

Floodlight removed (para. 4-17)
Floodlight switch removed (para. 4-18)

*Equipment Conditions: - Continued*

Floodlight electrical leads and clamps removed (para. 4-18)
Throttle control removed (para. 4-23)
Control valve assembly removed (para. 4-44)
Selector valve assembly removed (para. 4-45)

*a*. *Replace.* (figure 4-80)

(1) Remove bay drive pin wrench (1) and crowbar(2).

(2) Connect suitable lifting device to cab protector(3).

(3) Remove eight nuts (4), washers (5), screws (6) and remove cab protector (3).

(4) Install cab protector(3) and secure with eight screws (6), washers (5), and nuts (4).

(5) Install crowbar (2) and drive pin wrench (1).

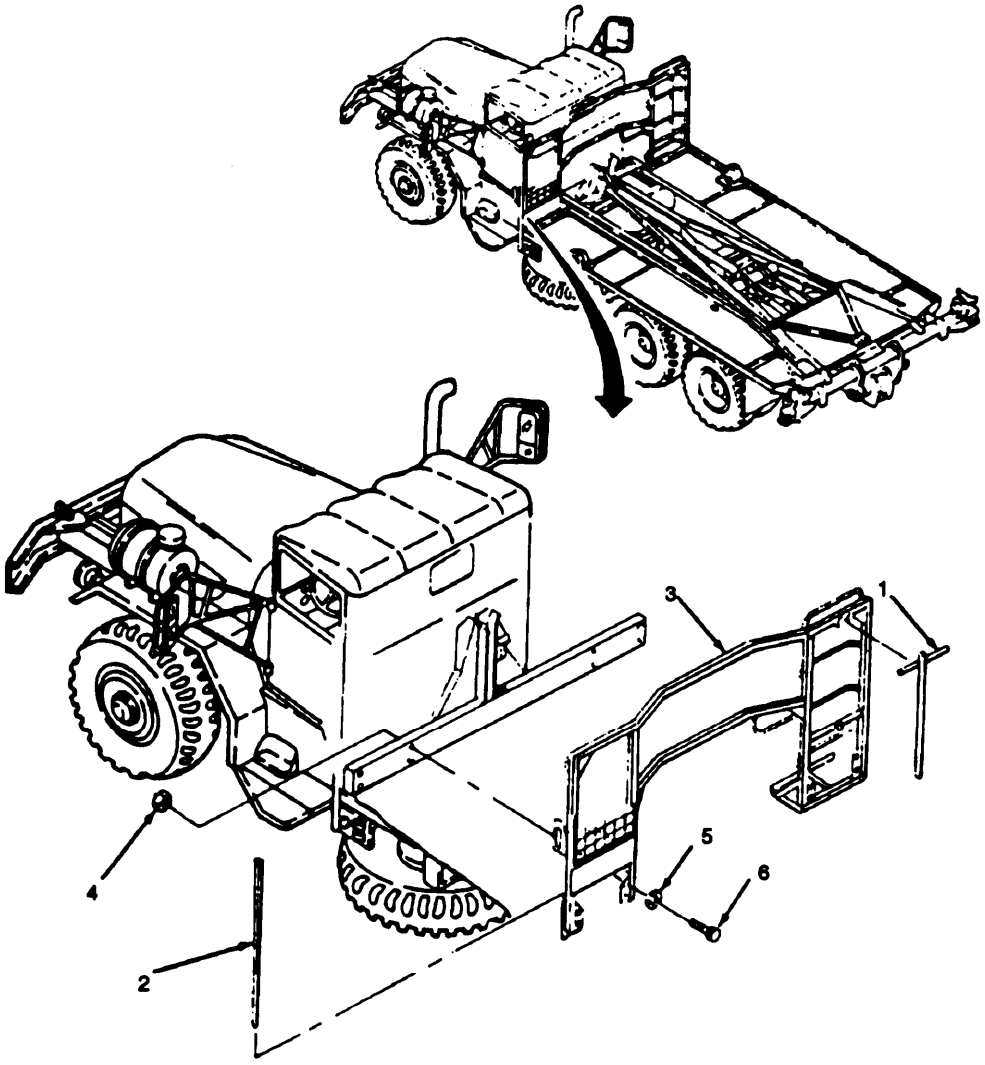



*Figure 4-80. Cab Protector, Replace.*

FOLLOW-ON MAINTENANCE:
(1) Install floodlight (para. 4-17).
(2) Install floodlight electrical leads and clamps (para. 4-19).
(3) Install floodlight switch (para. 4-18).
(4) Install throttle control (para. 4-23).
(5) Install control valve assembly (para. 4-44).

## 4-60. Bogie Lock and Brackets.

This task covers: Replace

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit
(Item 1, Appendix B)

*a. Replace.* (figure 4-81)

(1) Remove wing nut (1), lockwasher (2), washer (3), bumper (4) and bracket (5).

(2) Install bracket (5) and bumper (4), and secure with wing nut (1), lockwasher (2), and washer (3).

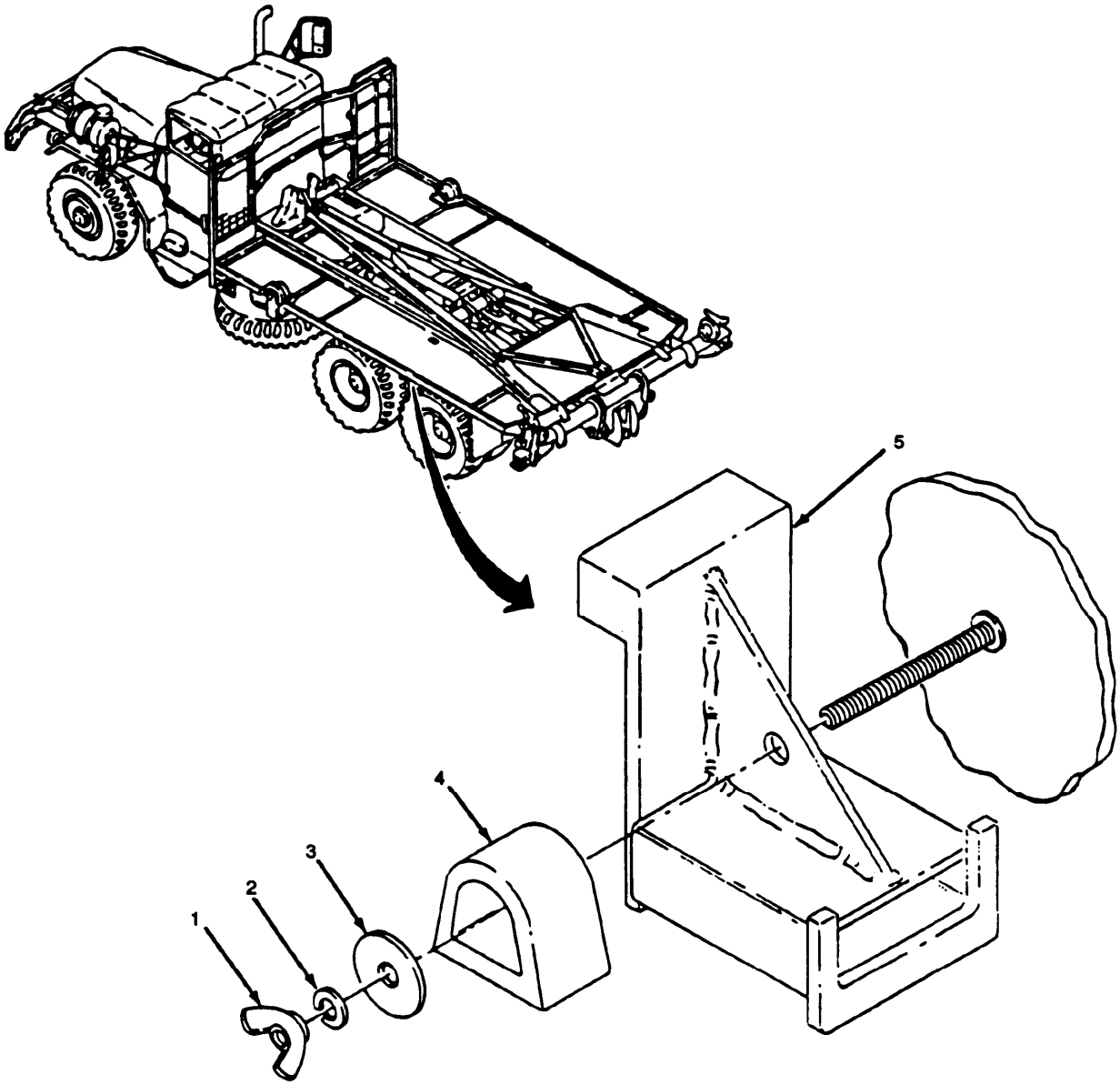



*Figure 4-81. Bogie Lock and Brackets, Replace.*

## 4-61. Front Support.

This task covers: Replace

INITIAL SETUP

*Tools*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)
Lifting Device

Equipment Conditions:

Cab protector removed (para. 4-58).
Selector valve removed (para. 4-45).
Throttle control removed (para. 4-39).
Front rollers removed (para. 4-28).

*Equipment Conditions: - Continued*

Dual over center valve (front) removed.
Walkways removed (para. 4-26).
Locking cylinder pin, arm and quick release pin removed (para. 4-42).
Tire carrier assembly removed (para. 4-27).
Locking cylinder removed (para. 4-43).
Hydraulic filter assembly removed (para. 4-49).
Control valve removed (para. 4-44) (para. 4-58).

a. *Replace.* (figure 4-82)

**WARNING**

When working under boom, support boom by blocking or other suitable means.

(1) Remove two nuts (2) and screws (3) securing front support (4) to fuel tank mounting bracket (5).

(2) Remove eight nuts (6), screws (7) and spacer plates (8).

(3) Remove six nuts (9), screws (10), and spacer plates (11).

(4) Remove three nuts (12), screws (13), and spacer plates (14).

**CAUTION**

Ensure all hydraulic lines, fuel lines, and electrical leads are removed from front support, or damage to the equipment could result.

(5) Connect suitable lifting device to front support (4) and remove front support (4) from chassis (16).

(6) Install front support (4) on chassis (16).

(7) Install spacer plates (14) and secure with screws (13) and nuts (12). Torque screws to 85-95 ft-lbs (115-129 Nm).

(8) Install spacer plates (11) and secure with screws (10) and nuts (9). Torque screws to 85-95ft-lbs (115-129 Nm).

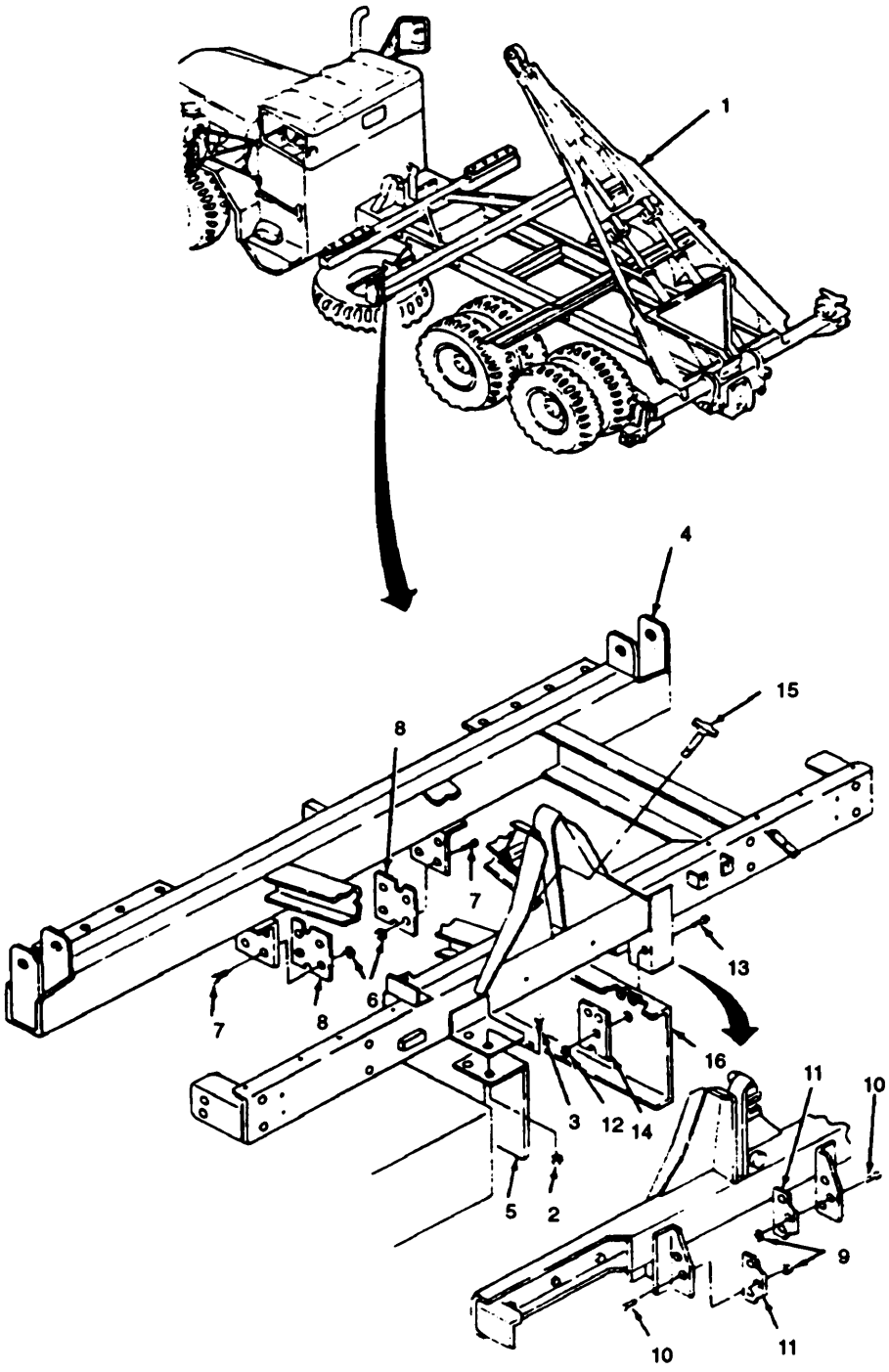



*Figure 4-82 Front Support, Replace.*

## 4-61. Front Support. - Continued

(9) Install spacer plates (8) and secure with screws (7) and nuts (6). Torque screws to 85-95 ft-lbs (115-129 Nm).

(10) Install screws (3) and nuts (2) securing fuel tank mounting bracket (5) to front support (4).

FOLLOW-ON MAINTENANCE:
(1) Install cab protector (para. 4-58).
(2) Install dual over center valve (para. 4-45).
(3) Install hydraulic fitter assembly (para. 4-9).
(4) Install control valve (para. 4-44).
(5) Install select or valve (para. 4-5).
(6) Install throttle control (para. 4-39).
(7) Install locking cylinder, pin, arm, and quick release pin (para. 4-42).
(8) Install walkways (para. 4-26).
(9) Install front rollers (para. 4-28).
(10) Install tire carrier assembly (para. 4-27).
(11) Lower and secure boom.
(12) Service hydraulic reservoir (para. 4-50).

## 4-62. Center Support.

This task covers: Replace

INITIAL SETUP

| *Tools* | *Equipment Conditions:* |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix B)<br>Lifting Device | Walkways removed (para. 4-26).<br>Bogie brackets removed (para. 4-58). |

*a*. *Replace.* (figure 4-83)

(1) Raise boom fully and block in position.

(2) Remove eight nuts (1) and screws (2).

(3) Connect center support (3) to suitable lifting device and remove center support (3) and shims (4).

(4) Install center support (3), and shims (4) and secure with eight screws (2) and nuts (1).

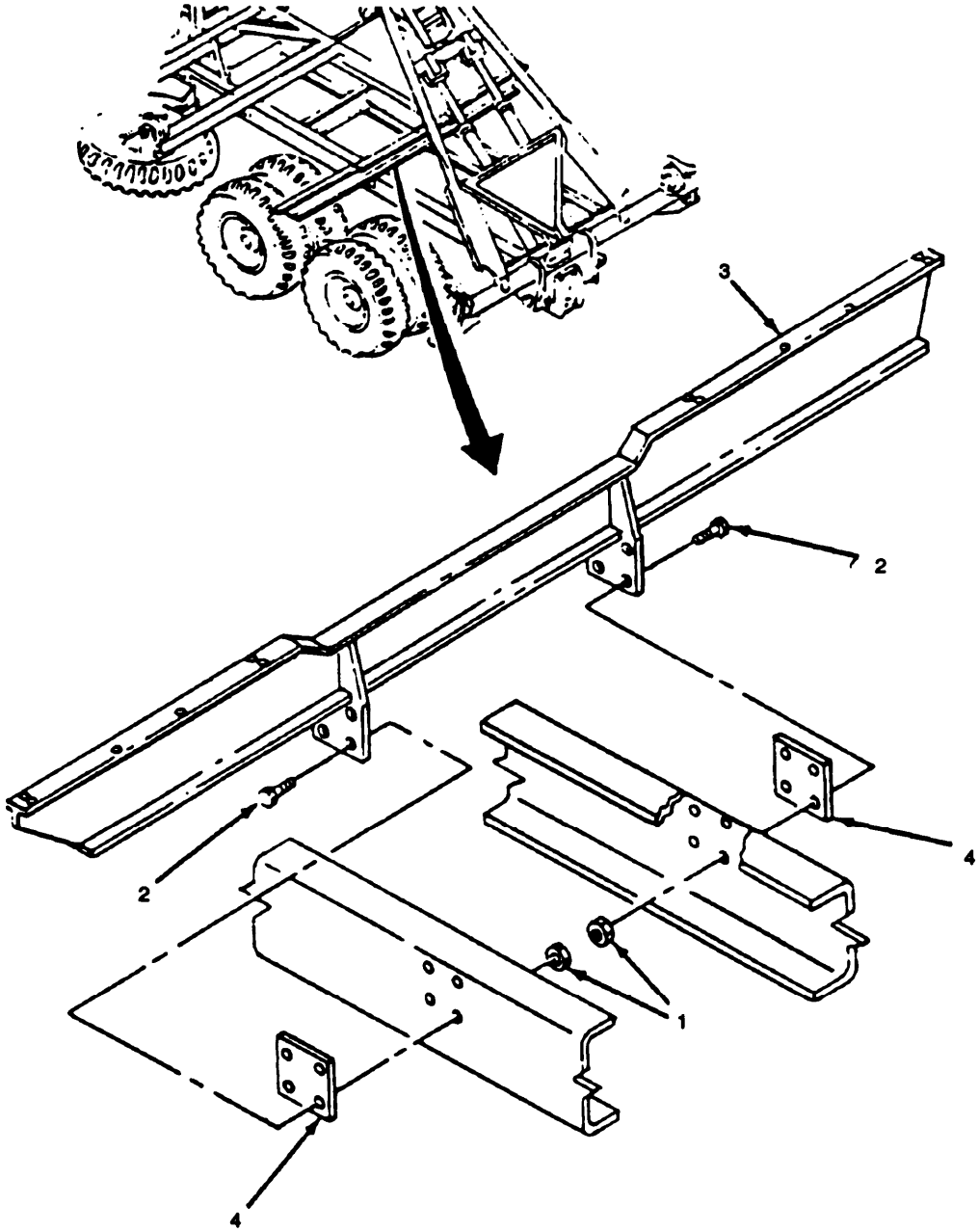



*Figure 4-83. Center Support, Replace.*

FOLLOW-ON MAINTENANCE:
(1) Install walkways (para. 4-26).
(2) Install bogie brackets (para. 4-58).

## 4-63. Boom Pivot Support.

This task covers: Replace

INITIAL SETUP

| *Tool* | *Equipment Condition:* |
|---|---|
| General Mechanic's Automotive Tool Kit | Boom assembly removed (para. 4-34). |

*a*. *Replace.* (figure 4-84)

(1) Tag and disconnect electrical leads from tail light (1).

(2) Remove two screws (2) and lockwashers (3) and remove tail lights (1).

(3) Remove retaining clips (4), pins (5), and lifting shackles (6).

(4) Remove three nuts (7), screws (8) and eye bracket (9).

(5) Connect suitable lifting device to boom support (10).

**CAUTION**

Ensure all electrical leads, and hydraulic lines are disconnected from boom support before removing. Damage to equipment could result.

(6) Remove 37 nuts (11), screws (12), boom pivot support (10) and shim (13).

(7) Install pivot support (10), and shim (13) and secure with 37 screws (12) and nuts (11).

(8) Install eye bracket (9) and secure with three screws (8) and nuts (7).

(9) Install lifting shackles (6), pins (5), and retaining clips (4).

(10) Install tail light (1) and secure with lockwashers (3) and screws (2).

(11) Connect electrical leads as tagged to tail lights (1).

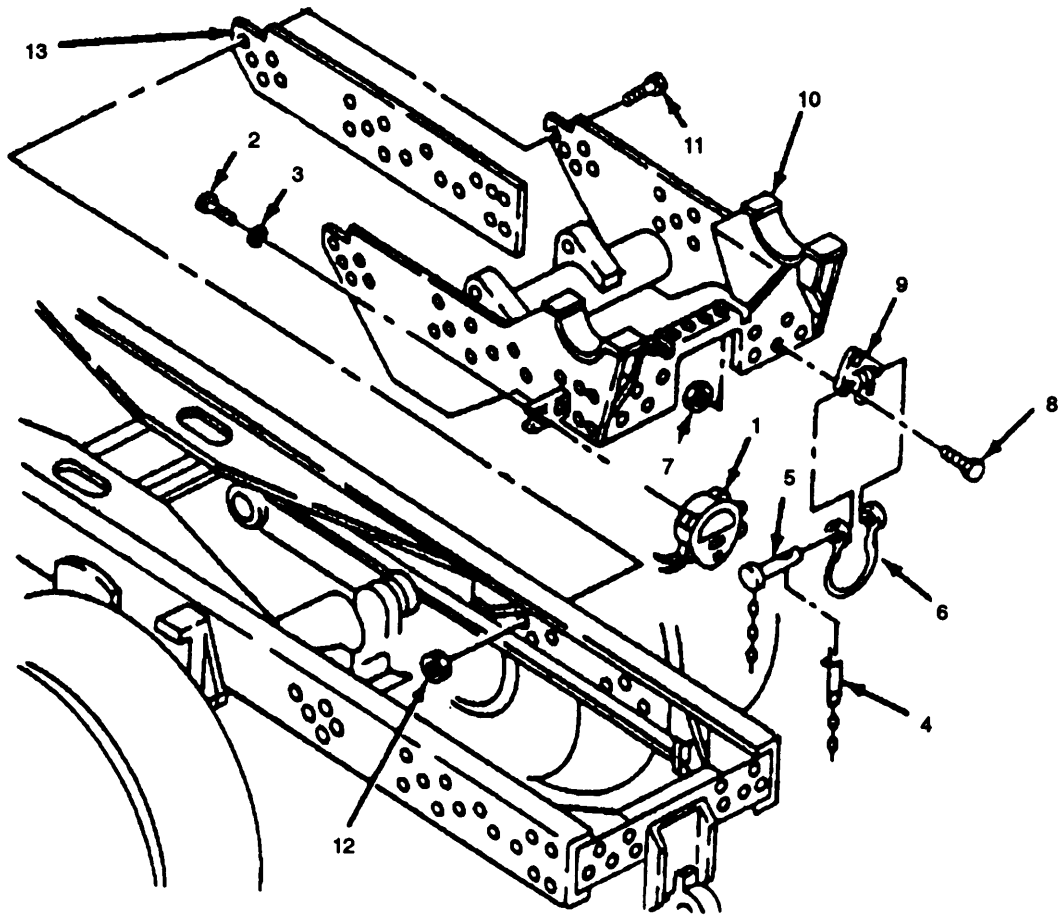



*Figure 4-84. Boom Pivot Support, Replace.*

FOLLOW-ON MAINTENANCE: Install boom assembly (para. 4-34).

## 4-64. Data Plates.

This task covers: Replace

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit
(Item 1, Appendix B)

**NOTE**

The following are general procedures for replacing all data plates.

*a.* Replace. (figure 4-85)

(1) Remove four screws (1) and lockwashers (2) and remove data plate (3).

(2) Install data plate (3) and secure with two screws (1) and lockwashers (2).

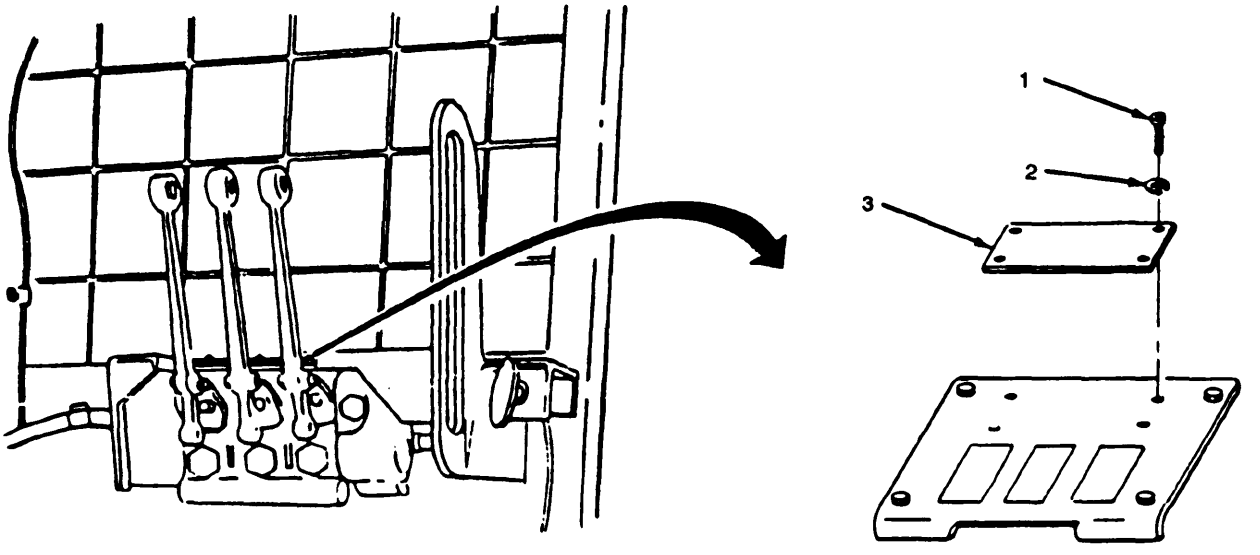



***Figure 4-85. Data Plates, Replace.***

## 4-65. Instruction Plates.

This task covers: Replace

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit
(Item 1, Appendix B)

**NOTE**

The following are general procedures for replacing all instruction plates.

*a. Replace.* (figure 4-86)

(1) Remove four screws (1), lockwashers (2) and remove instruction plate (3).

(2) Install instruction plate (3) and secure with four screws (1) and lockwashers (2).

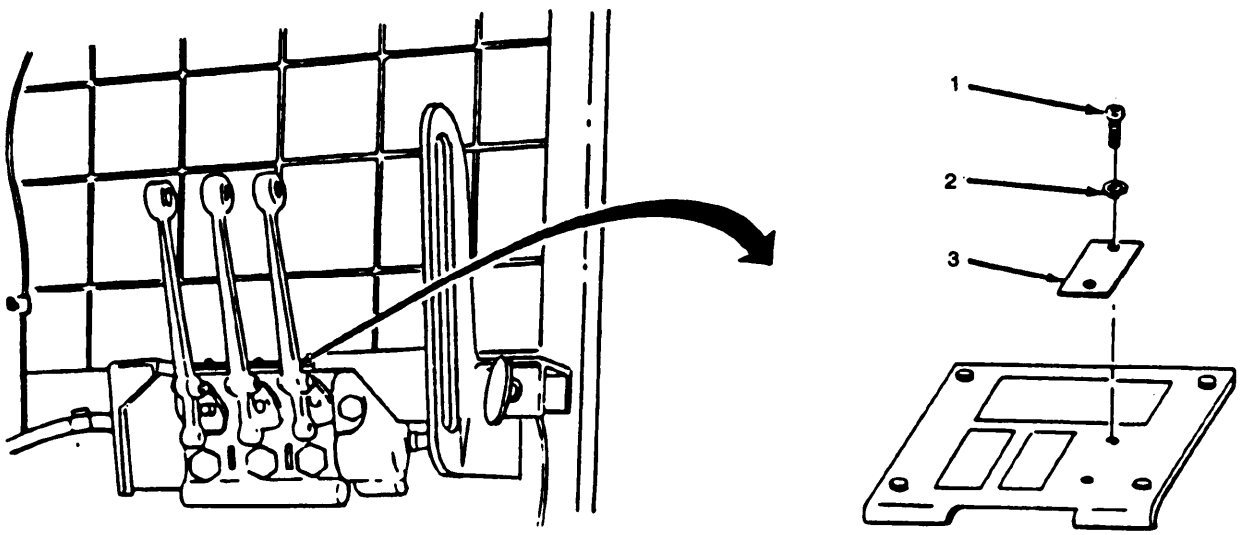



***Figure 4-86. Instruction Plates, Replace.***

## 4-66. Cable Assembly.

This task covers: a. Adjust b. Replace

INITIAL SETUP

*Tools*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)
Cable, Adjusting Spring Scale (Item 2, Appendix B)

*Equipment Condition:*

Bay removed (para. 2-16).

*Materials/Parts*

Grease, Automotive and Artillery (Item 2, Appendix E)

*a.* *Adjust.* (figure 4-87)

**NOTE**

Bay must be in the folded position and yokes fully retracted to adjust cable assembly.

(1) Position cable adjusting spring scale on cable (1) 19-21 in. (48.26-53.34 cm) from upper cable pin (2).

(2) Apply a 45-55 lb (30.41-34.95 kg) force to scale and measure cable deflection. Cable deflection should be 0.19-0.31 in. (0.44-0.76 cm).

(3) Loosen nut (3) and loosen or tighten nut (4) until proper deflection of cable (1) is obtained and tighten nut (3).

(4) Recheck cable deflection.

(5) Remove cable adjusting spring scale and repeat Steps (1) through (4) for remaining cable.

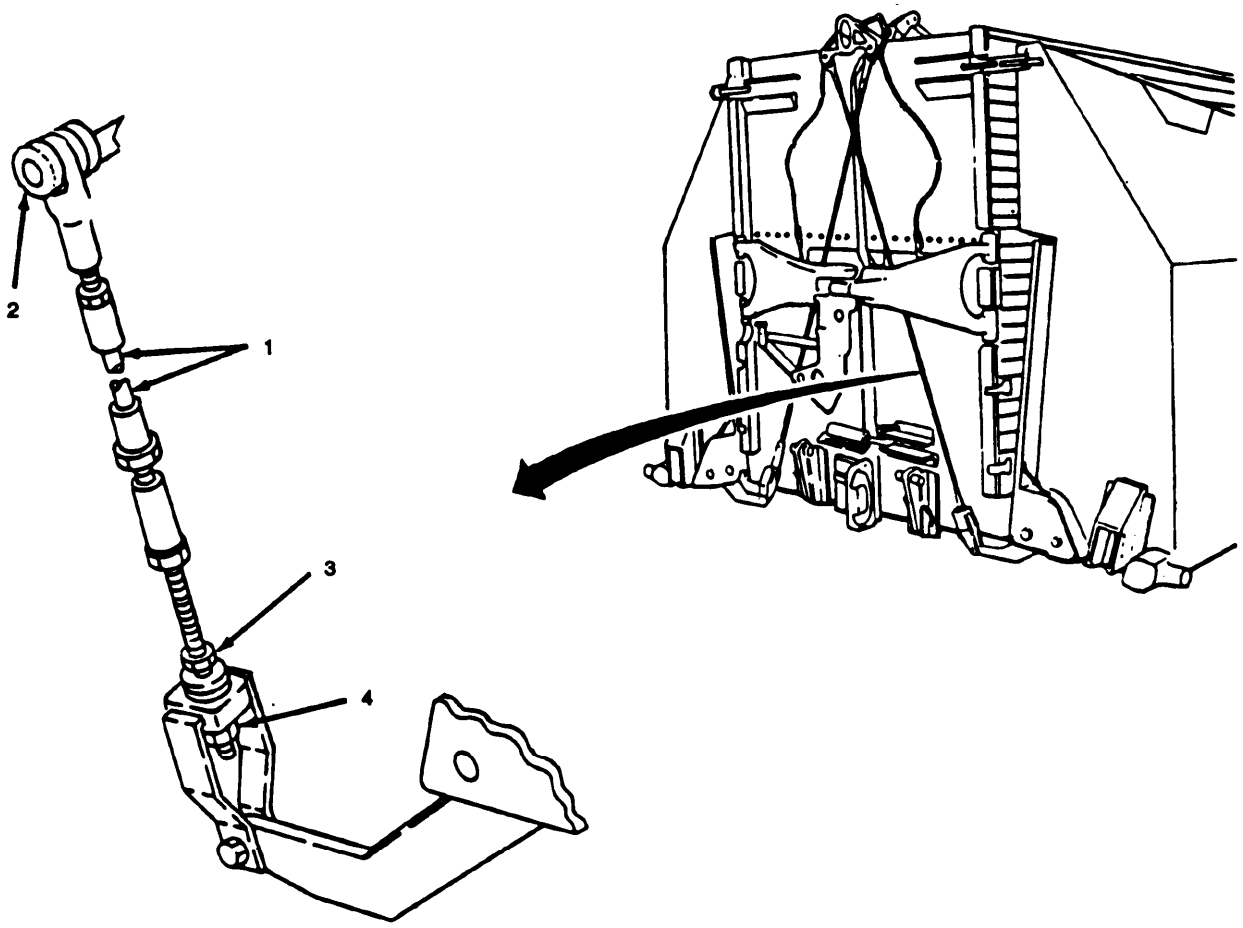



*Figure 4-87. Cable Assembly Adjust.*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

## 4-66. Cable Assembly. - Continued

*b. Replace.* (figure 4-88)

**NOTE**

Bay must be in the folded position to replace cable assembly.

(1) Remove nut (1) and washer (2) and remove cable assembly (3) from cable link (4).

(2) Remove spring pin (5) and remove pin (6) and upper end of cable assembly (3) from hinge pin (7).

(3) Apply grease to eye loop (8) and pin (6).

(4) Install upper end of cable assembly (3) and secure with pin (6) and spring pin (5).

(5) Install cable assembly (3) in cable link (4) and install washer (2) and nut (7).

(6) Adjust cable assembly.

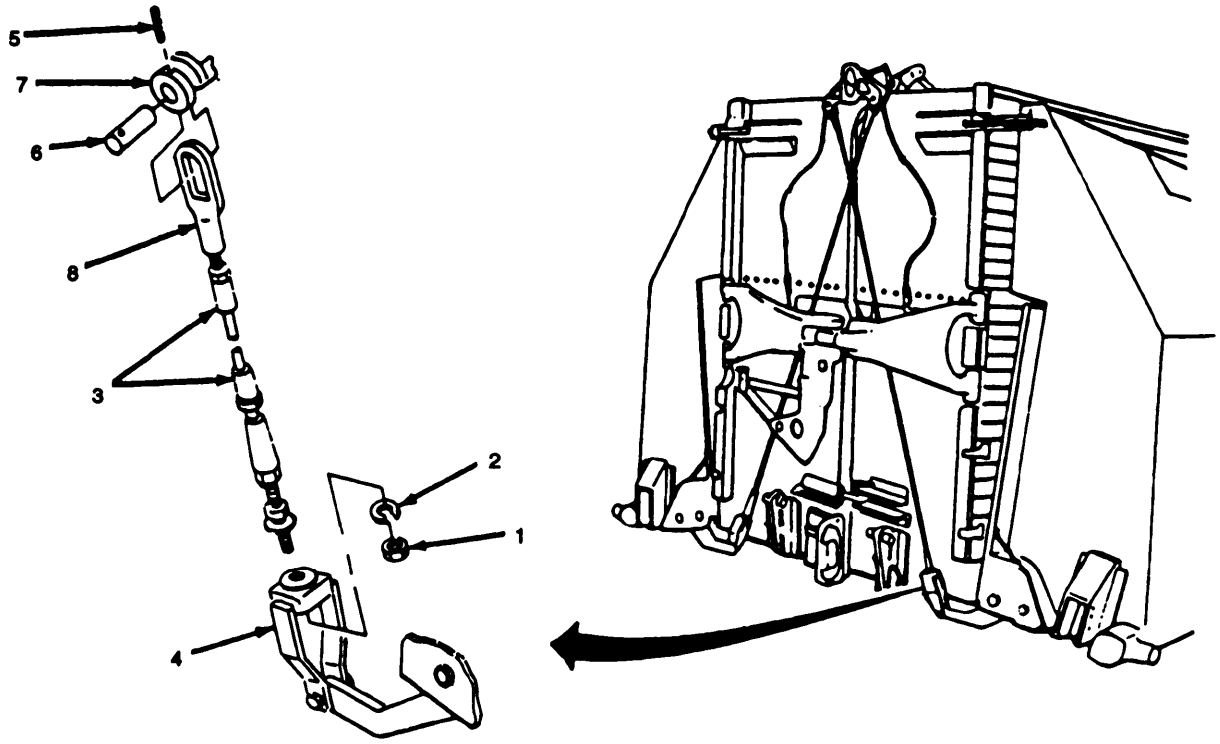



*Figure 4-88. Cable Assembly Replace.*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

## 4-67. Cable Link, Pin and Hardware.

This task covers: Replace

INITIAL SETUP

| *Tools* | *Materials/Parts* |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix B) | Grease, Automotive and Artillery (Item 2, Appendix E) |

*a*. *Replace.* (figure 4-89)

(1) Remove nut (1) and washer (2), and remove cable assembly (3) from cable link (4).

(2) Remove cotter pin (5), nut (6), washer (7), bolt (8), and remove cable link (4) from unfolding lever (9).

(3) Apply grease to cable link (4).

(4) Install cable link (4) on unfolding lever (9) and secure with bolt (8), washer (7), nut (6), and rotter pin (5).

(5) Install cable assembly (3) in cable link (4), and secure with nut (1) and washer (2).

(6) Adjust cable assembly (para. 4-64).

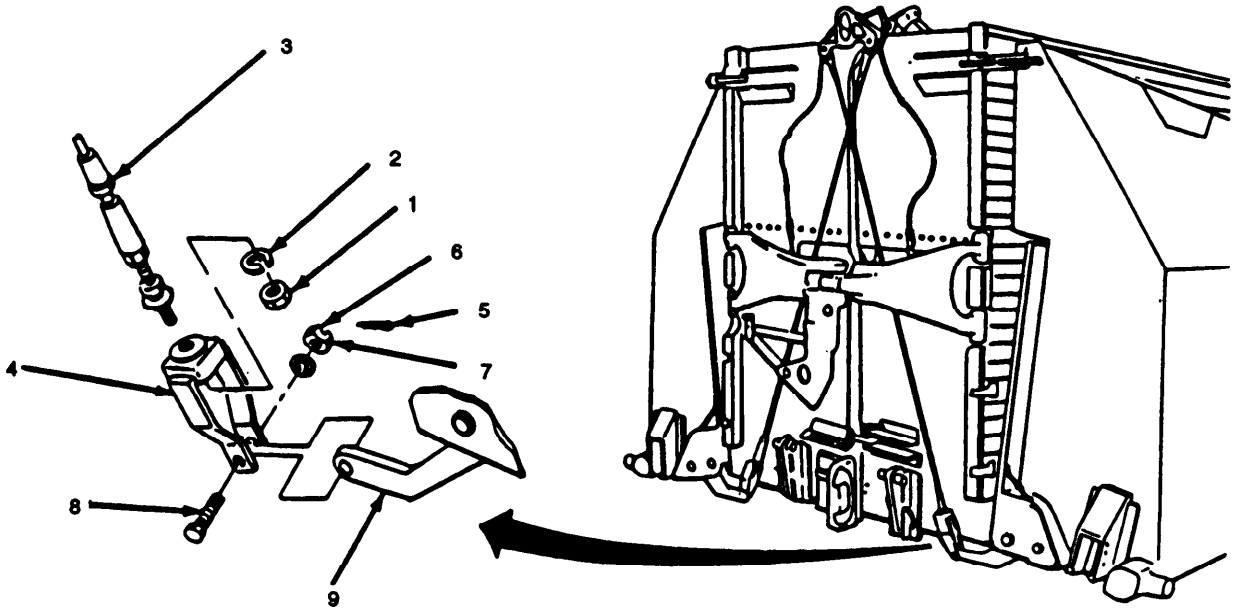



*Figure 4-89. Cable Link, Pin, and Hardware, Replace.*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

## 4-68. Unfolding Lever.

This task covers: Replace

INITIAL SETUP

*Tools*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Equipment Condition:*

Cable link, pin, and hardware removed (para. 4-66).

*Materials/Parts*

Grease, Automotive and Artillery (Item 2, Appendix E)

*a.* *Replace.* (figure 4-90)

(1) Remove spring pin (1), pin (2) and remove unfolding lever (3).

(2) Apply grease to pin (2).

(3) Install unfolding lever (3) and secure with pin (2) and spring pin (1).

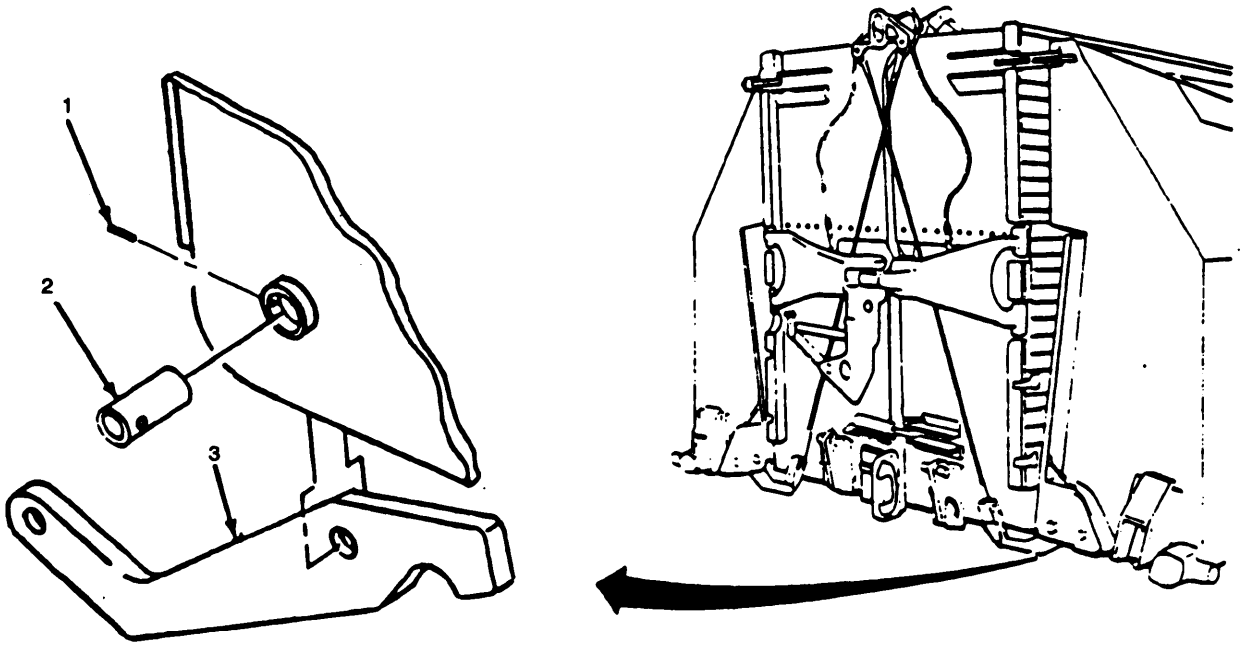



*Figure 4-90. Unfolding Lever Replace.*

FOLLOW-ON MAINTENANCE: Install cable link, pin, and hardware (para. 4-67).

4-69. **Wear Cap.**

This task covers: Replace

INITIAL SETUP

| *Tool* | *Materials/Parts* |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix B) | Sealing Compound, Brown (Item 15, Appendix E) |

*a*. *Replace.* (figure 4-91)

(1) Remove Allen screw (1) and wear cap (2).

**NOTE**

The wear cap will turn when bolt is fully tightened.

(2) Replace wear cap (2) if cracked or damaged.

(3) Apply sealing compound to Screw threads.

(4) Install wear cap (2) and secure with screw (1).

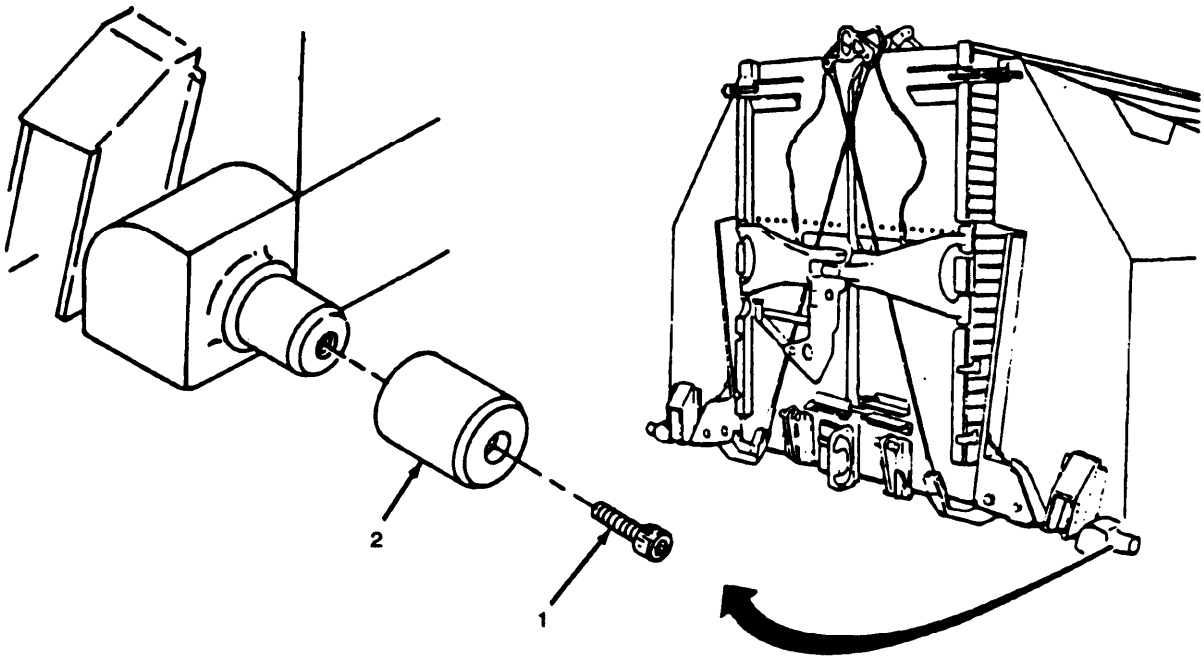



*Figure 4-91. Wear Cap, Replace.*

4-70. **Support Link and Hinge Pin.**

This task covers: Replace

INITIAL SETUP

Tool

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Materials/Parts*

Grease, Automotive and Artillery (Item 2, Appendix E)

*Equipment Condition:*

*Bay* removed (para. 2-16).

*a*. *Replace.* (figure 4-92)

**WARNING**

Bow ponton must be securely blocked in position. Injury or death my result.

NOTE

Hinge pin can be replaced with bay in folded or unfolded position. Replace one hinge pin at a time.

(1) Remove two spring pins (1) and remove hinge pin (2).

(2) Apply grease to hinge pin (2).

(3) Install hinge pin (2) and secure with two spring pins (1).

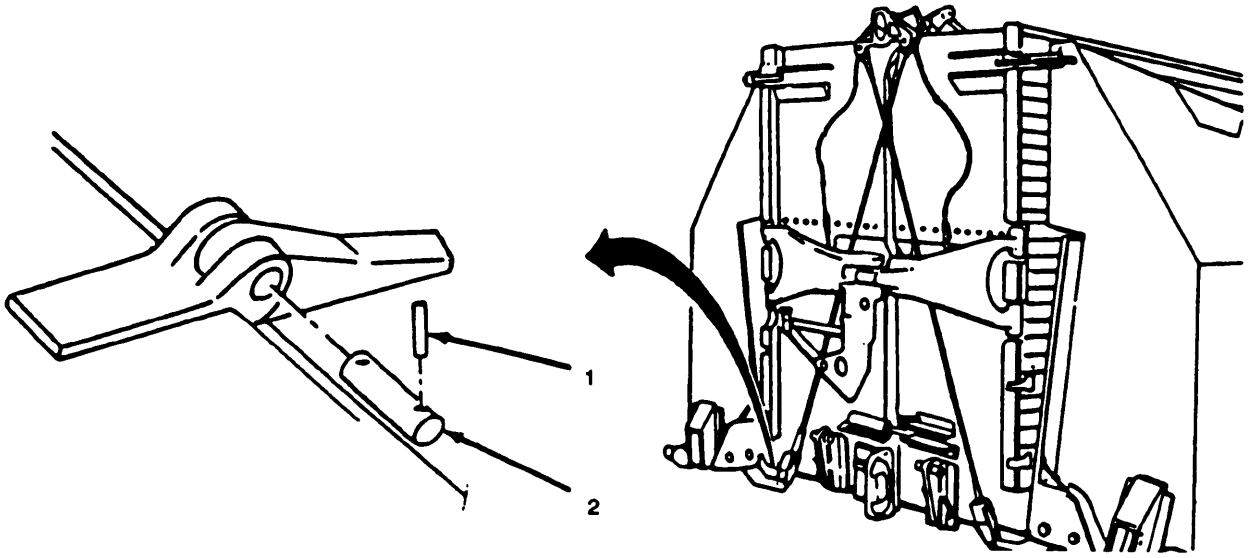



*Figure* **4-92.** ***Hinge Pin, Replace.***

FOLLOW-ON MAINTENANcE: Install bay (para. 2-27).

4-71. **Bow Pontons.**

This task covers: a. Replace b. Repair

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)
Ponton Leak Detector (Item 3, Appendix B)

*Materials/Parts*

Lifting Sling (NSN 1670-00-907-3080)
Four Chocks 6 x 6 x 24 in. (15x15x 60 cm)

*Materials/Parts - Continued*

Sealing Compound (Item 14, Appendix E)
Grease, Automotive and Artillery (Item 2, Appendix E)
Compound, Deck Covering (Item 1, Appendix E)

*Equipment Condition*

Unfolding lever removed (para. 4-47).

**NOTE**

There are two bow pontons on each bay. The following procedures are the same for both.

*a.* Replace. (figure 4-93)

(1) connect bay (1) to suitable lifting device and raise bay enough to place four chocks (2) under roadway pontons (3) and lower bay.

(2) Connect bow ponton (4) to suitable lifting device.

**WARNING**

Stand clear of pontons and cable during lowering operations. Do not stand on, or place hands or arms under, ramp bay pontons when removing attaching parts.

(3) Unlatch roadway/bow ponton foldlock latch (5) and slowly lower bow ponton (4).

(4) Remove four spring pins (6), two hinge pins (7) and remove bow ponton (4).

(5) Apply grease to hinge pins (7).

**WARNING**

Do not stand on, or place hands or arms under, ramp bay pontons when installing attaching parts. Stand clear of pontons and cable during lifting operations.

(6) Install bow ponton (4) and secure with two hinge pins (7) and spring pins (6).

(7) Raise bow ponton (4) and latch roadway bow ponton foldlock latch (5).

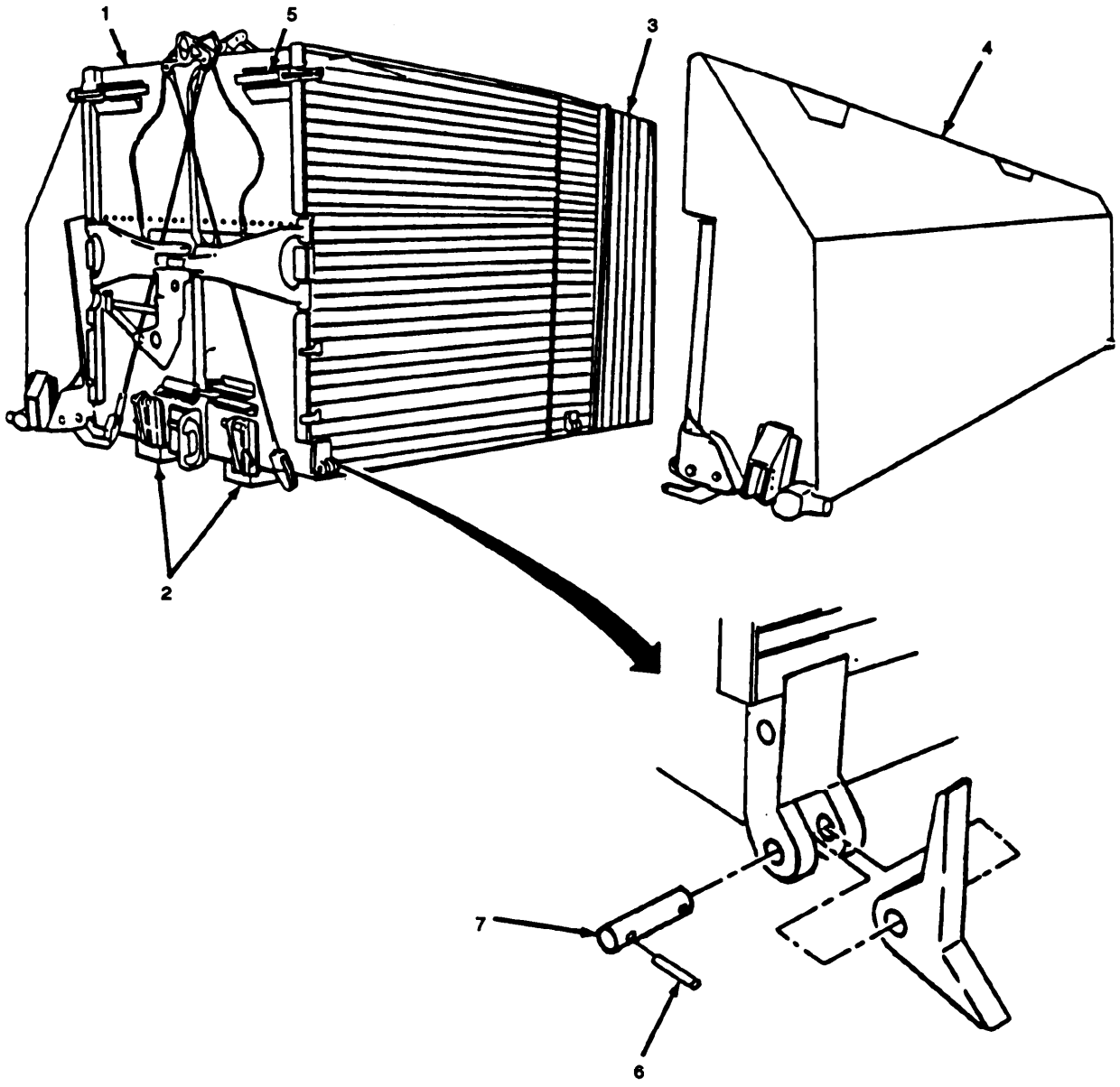



*Figure 4-93. Bow Pontons, Replace.*

FOLLOW-ON MAINTENANCE: Install bay (para. *2-27*).

4-71. **Bow Pontons. - Continued**

*b.* Repair. (figure 4-94)

**NOTE**

Bow ponton removed for repair, see para. a above.

(1) Lift lever (1) and remove bilge plug (2).

(2) Install ponton leak detector and pressurize ponton (3) to 1.4-1.6 psi (9.6-11.0 kpa.

(3) Apply soapy solution to ponton surface and check for leaks.

(4) Mark leaks and relieve pressure.

(5) Repair leaks by welding, except at riveted and betted seams.

(6) Repair leaks at riveted and bolted seams with sealing compound.

(7) Repaint repaired areas in accordance with MIL-T-704, Type B or local directives.

(8) Apply nonskid compound to walkways.

(9) Remove ponton leak detector, and install bilge plug (2) and secure.

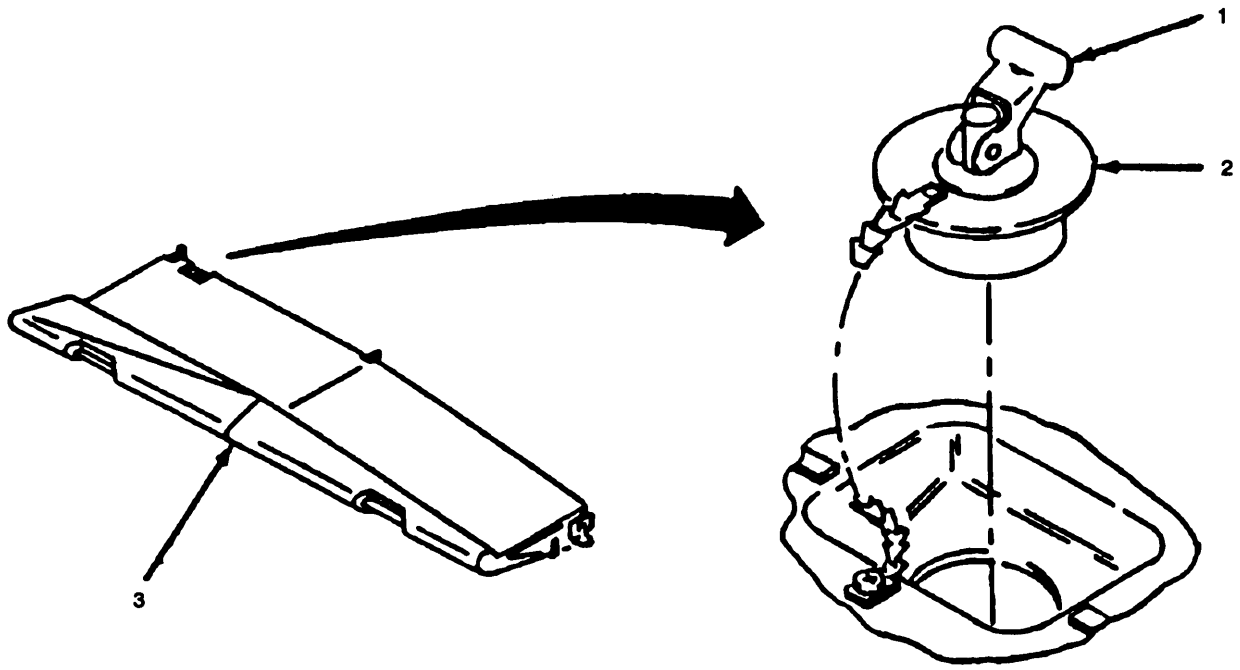



*Figure 4-94. Bow Ponton, Repair*

FOLLOW-ON MAINTENANCE: Install bow ponton (para. a).

4-72. **Handrail Post.**

This task covers: Replace

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

Materials/Parts

Grease, Automotive and Artillery (Item 2, Appendix E)

*Equipment Condition:*

*Bay* unfolded (para. 2-14).

*a. Repair.* (figure 4-95)

(1) Untie rope (1) from handrail (2).

(2) Remove two cotter pins(3), washers (4), pin (5), and handrail (2).

(3) Apply grease to pin (5).

(4) Install handrail (2) and secure with pin (5), washers (4), and cotter pins (3).

(5) Secure rope (1) to handrail (2).

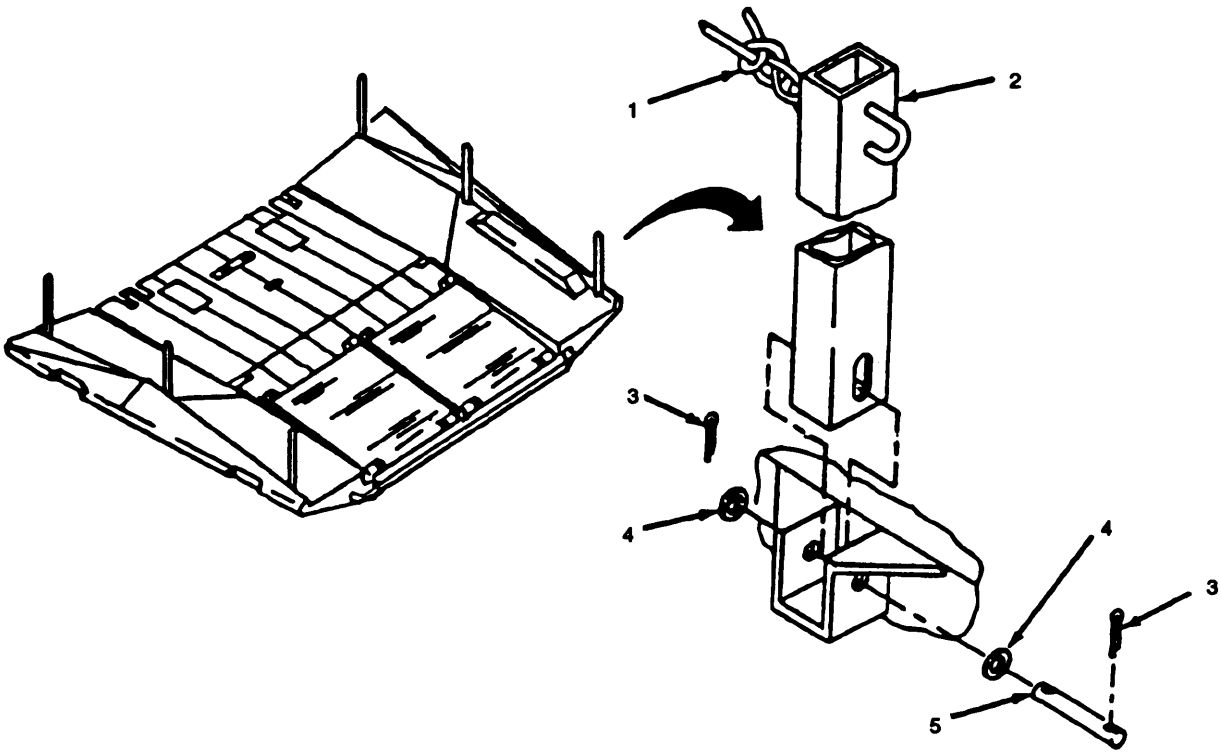



*Figure 4-95. Handrail Post, Replace.*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

4-73. **Bilge Plug.**

This task covers: Replace

INITIAL SETUP

*Tools*

General Mechanic's Automotive Tool Kit
(Item 1, Appendix B)
Grease, Automotive and Artillery (Item 2, Appendix E)

**NOTE**

Bilge plugs can be accessed with bay installed on transporter or with bay unfolded.

*a*. *Replace.* (figure 4-96)

(1) Raise lever(1) on bilge plug (2) and remove plug (2).

(2) Remove screw(3) securing chain (4) and remove plug (2).

(3) Position chain (4) and secure with screw (3).

(4) Install bilge plug (2) and lower lever (1).

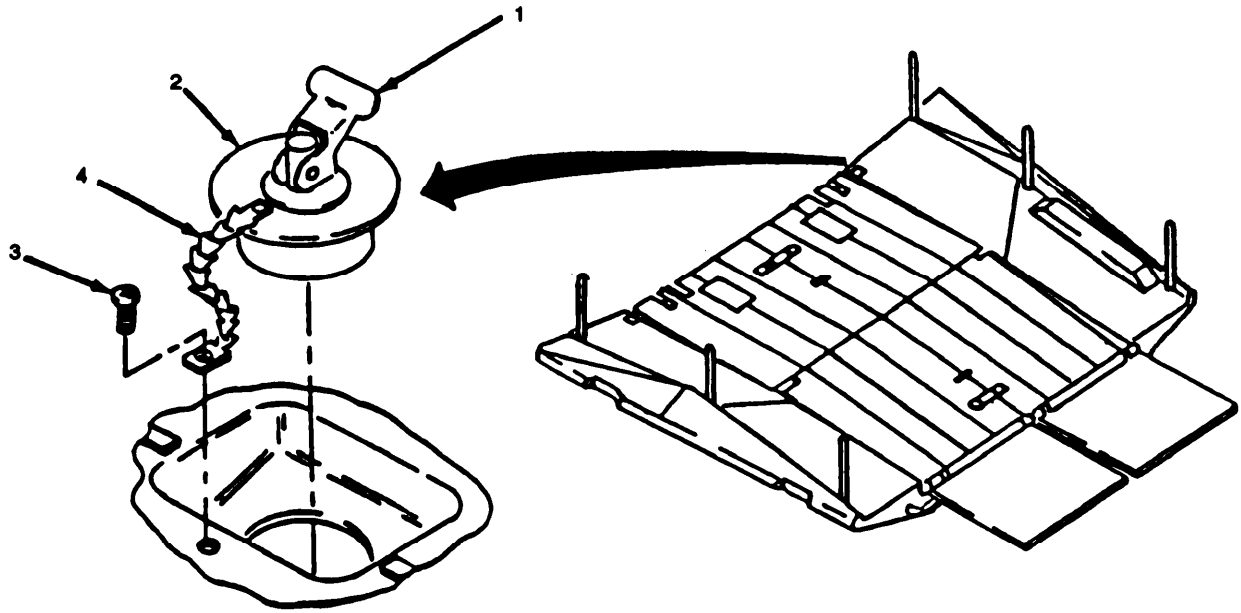



*Figure 4-96. Bilge Plug, Replace.*

4-74. **Pins.**

This task covers: Replace

INITIAL SETUP

| *Tools* | *Equipment Condition:* |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix B) | Bay unfolded for adjustment (Para. 2-14). |

**NOTE**

Pins can be replaced with bay folded or unfolded.

*a.* *Replace.* (figure 4-97)

(1) Remove quick release pin (1).

(2) Remove screw(2), wire rope (3) and quick release pin (1).

(3) Secure wire rope (3) to pin (1) and install with screw (2).

(4) Install quick release pin (1).

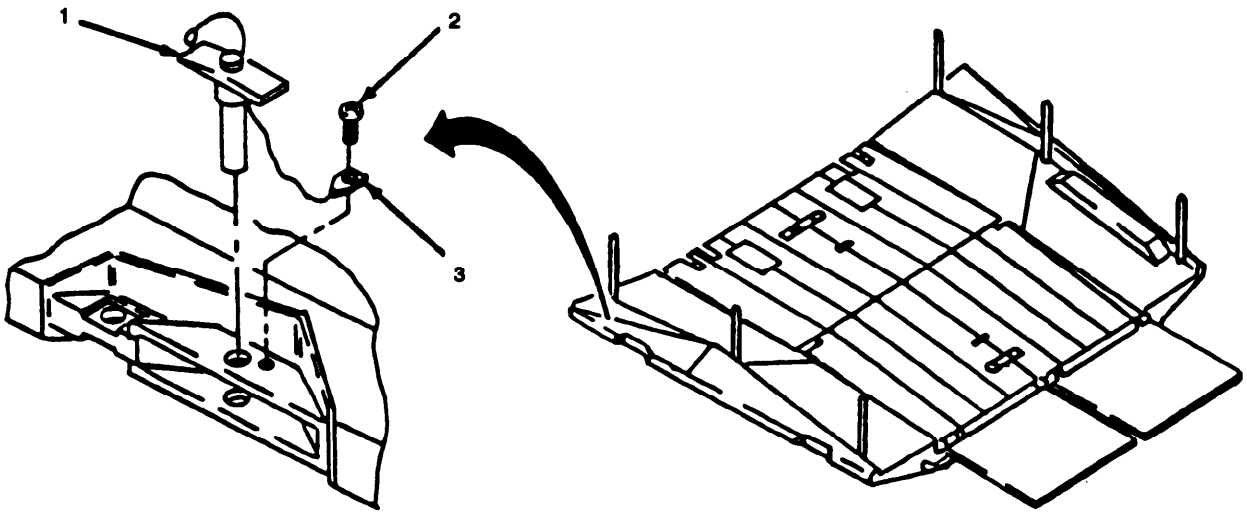



*Figure 4-97. Quick Release Pin, Replace.*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-7).

## 4-75. Latch Receptacle and Strike Catch.

This task covers: a. Adjust b. Replace

INITIAL SETUP

| *Tool* | *Equipment Condition:* |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix B) | Bay unfolded for adjustment (para. 2-14). |

*a. Adjust.* (figure 4-98)

**WARNING**

To avoid drowning, make final adjustments with flotation vest on, bay secured and unfolded.

(1) Rotate roadway to bow ponton bridge latch (1) to latched position.

(2) Measure the distance between pins (2) and top of receptacles (3). Clearance should be approximately 1/16 in. (1.5 mm).

(3) Loosen eight screws (4) and adjust receptacles (3). Torque screws to 31-34 ft-lbs (42-46 Nm).

(4) Ensure pins (2) contact both receptacles (3) when fully engaged. Re-adjust receptacles as needed.

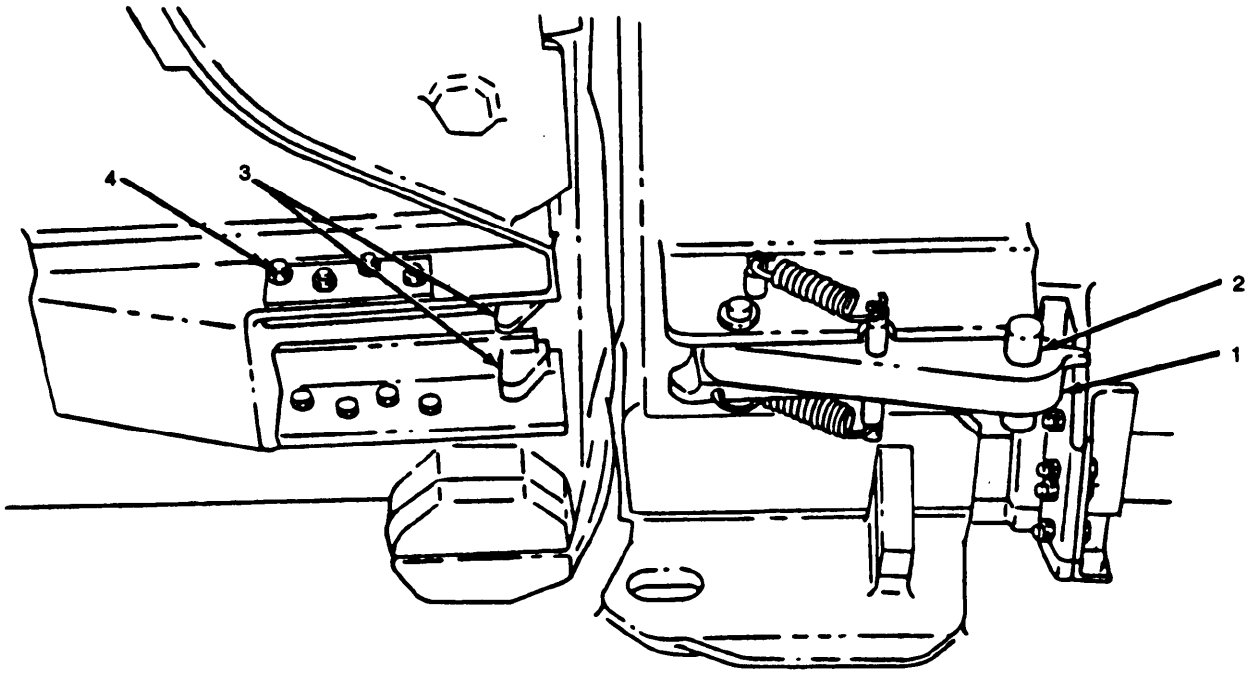



*Figure 4-98. Latch Receptacles, Adjust.*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

4-75. **Latch Receptacle and Strike Catch. - Continued**

*b.* *Replace.* (figure 4-99)

**NOTE**

The replace procedures are the same for all latch receptacles.

(1) Remove four nuts (1), lockwashers (2), screws(3), latch receptacle (4) and shim (5).

(2) Remove four nuts (6), lockwashers (7), screws (8), strike catch (9) and shim (10).

(3) Install shim (10), strike latch (9), and secure with fourscrews (8), lockwashers (7), and nuts (6).

(4) Install shim (5) and receptacle (4), and secure with four screws(3), lockwasher (2), and nuts (1).

(5) Adjust receptacles.

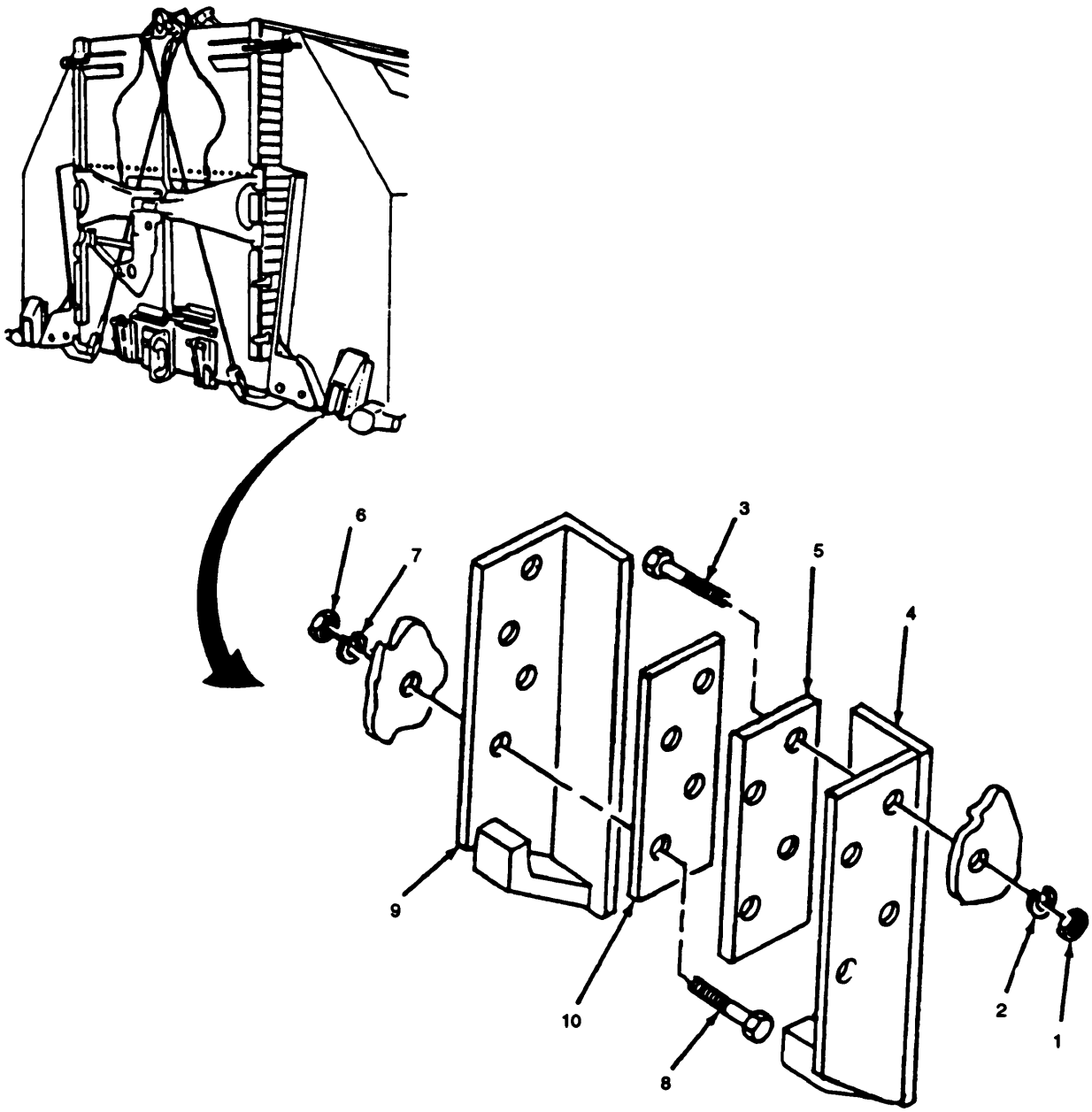



*Figure 4-99. Latch Receptacle and Strike Catch, Replace.*

4-76. **Roadway Pontons.**

This task covers: a. Replace b. Repair

INITIAL SETUP

*Tools*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)
Ponton Leak Detector (Item 3, Appendix B)

*Equipment Condition:*

Bow ponton removed (para. 4-69).

*a. Replace.* (figure 4-100)

**WARNING**

When disconnecting any hydraulic line, open line slowly and protect face, as hydraulic oil may spray out due to residual pressure in system.

(1) Tag and disconnect hydraulic line (1) at quick disconnect (2).

(2) Tag and disconnect hydraulic line (1) at quick disconnect (3).

(3) Remove screw (4) and lockwasher (5) and remove clamp (6).

(4) Repeat Step (3) for remaining clamps.

(5) Untie rope (7) and remove hydraulic line (1).

(6) Connect suitable lifting device to roadway ponton lift points (8).

(7) Remove two cotter pins (9), washers (10), and remove pin (11).

(8) Remove two nuts (12), screws (13), and links and lever (14).

(9) Remove nut (15), screw (16), collar (17), washers (18), and front hinge pin (19).

(10) Remove nut (20), screw (21), collar (22), and rear hinge pin (23).

**WARNING**

The weight distribution of load will result in the bottom of the ponton to swing in the direction of lifting points. All personnel should stand clear of ponton during lifting.

(11) Unlatch travel latch (24) and remove roadway ponton (25).

**WARNING**

The weight distribution of load will result in the bottom of the ponton to swing in the direction of lifting points. All personnel should stand clear of ponton during lifting.

(12) Position roadway ponton (25) adjacent to roadway ponton (26) and aline hinges.

(13) install rear hinge pin (23) and collar (22) and secure with screw (21) and nut (20). Torque screw to 120-132 ft-bs (162-179 Nm).

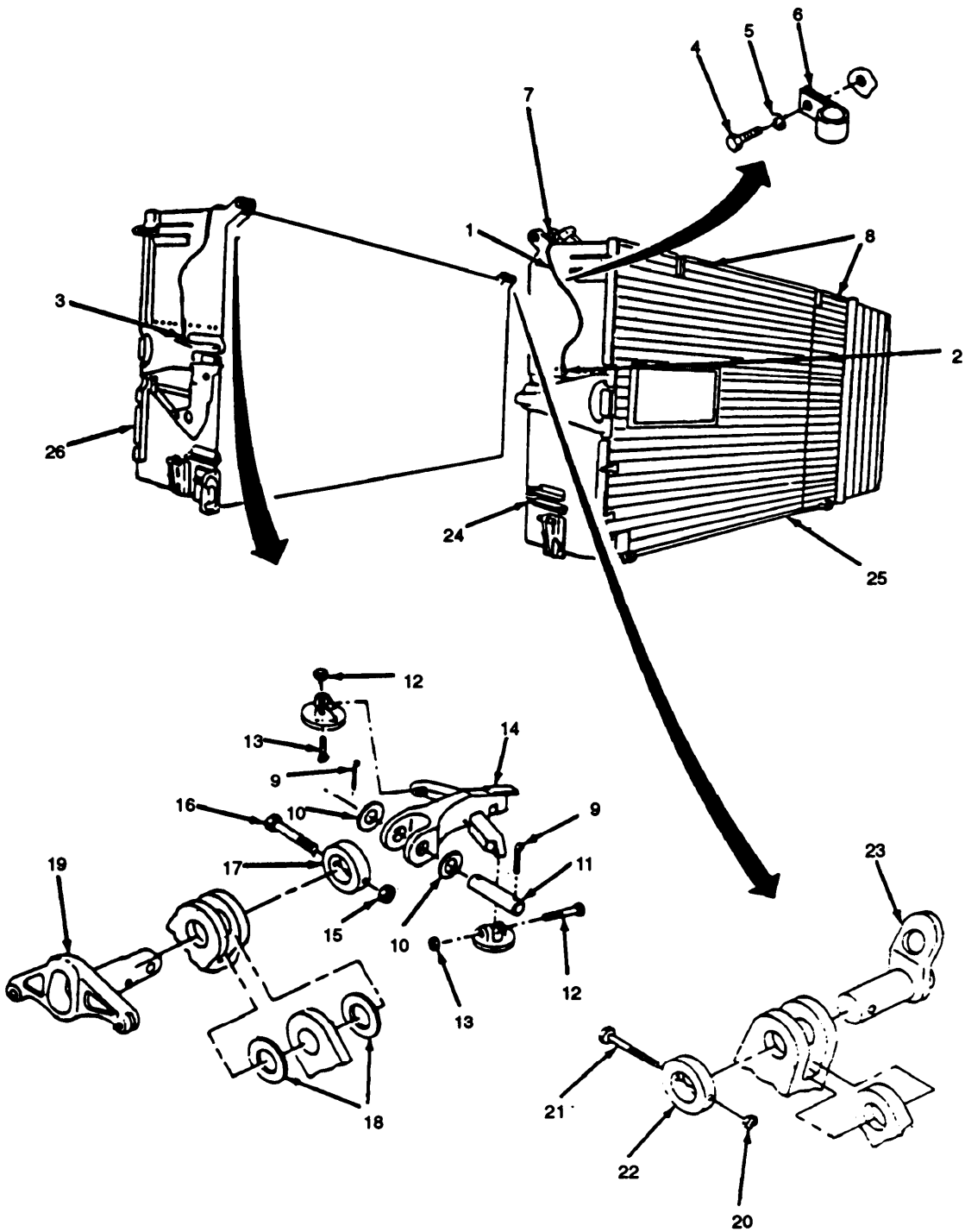



*Figure 4-100. Roadway Pontons, Replace.*

4-76. **Roadway Pontons. - Continued**

(14) Install front hinge pin (19), washers (18), collar, and secure with screw (16) and nut (15). Torque screw to 120-132 ft-lbs (162-179 Nm).

(15) Install links and lever (14) and secure with two screws (13) and nuts (12). Torque screw to 120-132 ft-lbs (1162-179 Nm).

(16) Install pin (11) and washers (10) and secure with two cotter pins (9).

(17) Connect lifting device to front(18) and rear (22) hinge pins and raise roadway pontons and latch travel latch (23) and lower roadway pontons.

(18) Connect hydraulic line (1) to quick disconnects (2) and (3) as tagged.

(19) Install clamp (6) and secure with screw (4) and washers (5).

(20) Repeat Step (19) for remaining clamps.

(21) Secure rope (7) to hydraulic line (1) and lever (14).

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

*b.* *Repair.* (figure 4-101)

**NOTE**

Roadway ponton removed for repair. See para. a above.

(1) Raise lever (1) and remove bilge plug (2).

(2) Install ponton leak detector and pressurize ponton (3) to 1.4-1.6 psi (9.85-11.25 kg/sq cm).

(3) Apply soapy solution to surface of ponton and check for leaks.

(4) Mark leaks and relieve pressure in ponton (3).

(5) Repair leaks, except on riveted or bolted seams, by welding.

(6) Repair leaks at riveted and betted seams with sealing compound.

(7) Repaint repaired areas in accordance with MIL-T-704 or local directives.

(8) Apply nonskid compound to walkways.

(9) Remove ponton leak detector and install bilge plug (2) and secure.

(10) Repeat Steps (1) and (9) for remaining ponton.

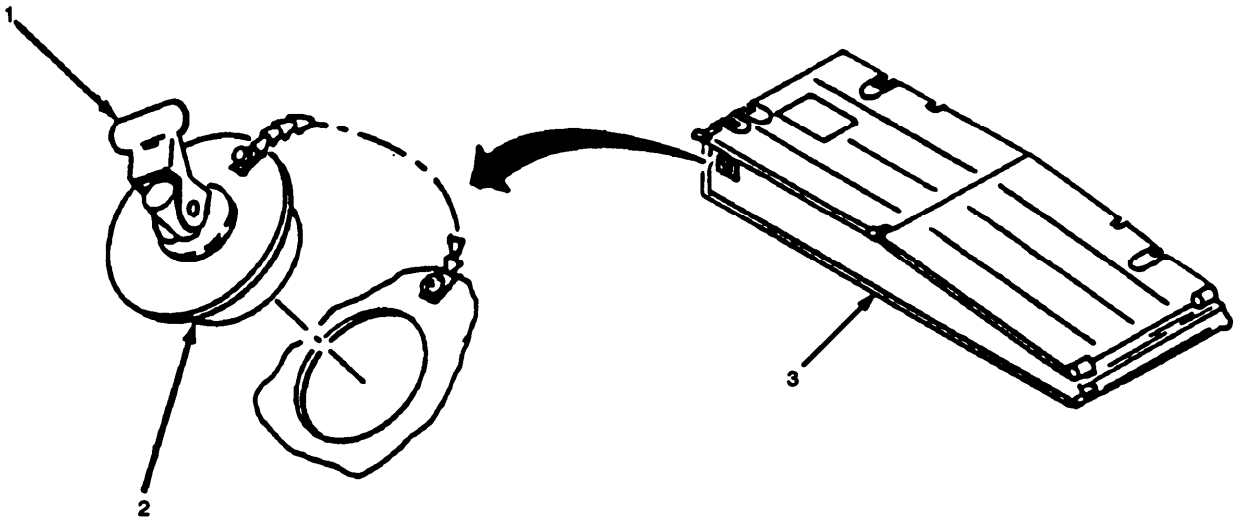



*Figure 4-101. Roadway Ponton, Repair.*

4-77. **Roadway Approach Ramps.**

This task covers: Replace

INITIAL SETUP

*Tool*

*General* Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Materials/Parts*

Grease, Automotive and Artillery (Item 2, Appendix E)

*Equipment Condition:*

Bay unfolded (para. 2-14).

*a*. *Replace.* (figure 4-102)

**NOTE**

There are two approach ramps on each ramp bay. The replace procedures are the same for both.

(1) Remove two cotter pins (1), washers (2), and remove pin (3) securing link (4) to approach ramp (5).

(2) Remove two cotter pins (6), washers (7), pin (8) and remove link (4).

(3) Remove two cotter pins (9), washers (10), and remove pin (11) securing link (12) to approach ramp (5).

(4) Remove two cotter pins (13), washers (14), pin (15) and remove link (12).

(5) Attach suitable lifting device to approach ramp (5) and remove.

(6) Install approach ramp (5).

(7) Apply grease to pins (3), (8), (11), and (15).

(8) Install link (12) and secure with pin (15), two washers (14) and cotter pins (13).

(9) Install link (4) and secure with pin (8), two washers (7) and cotter pins (6).

(10) Install link (12) and secure with pin (15), two washers (14) and cotter pins (13).

(11) Install link (4) and secure with pin (3), two washers (2) and cotter pins (1).

(12) Install pin (2) and secure with retainer pin (1).

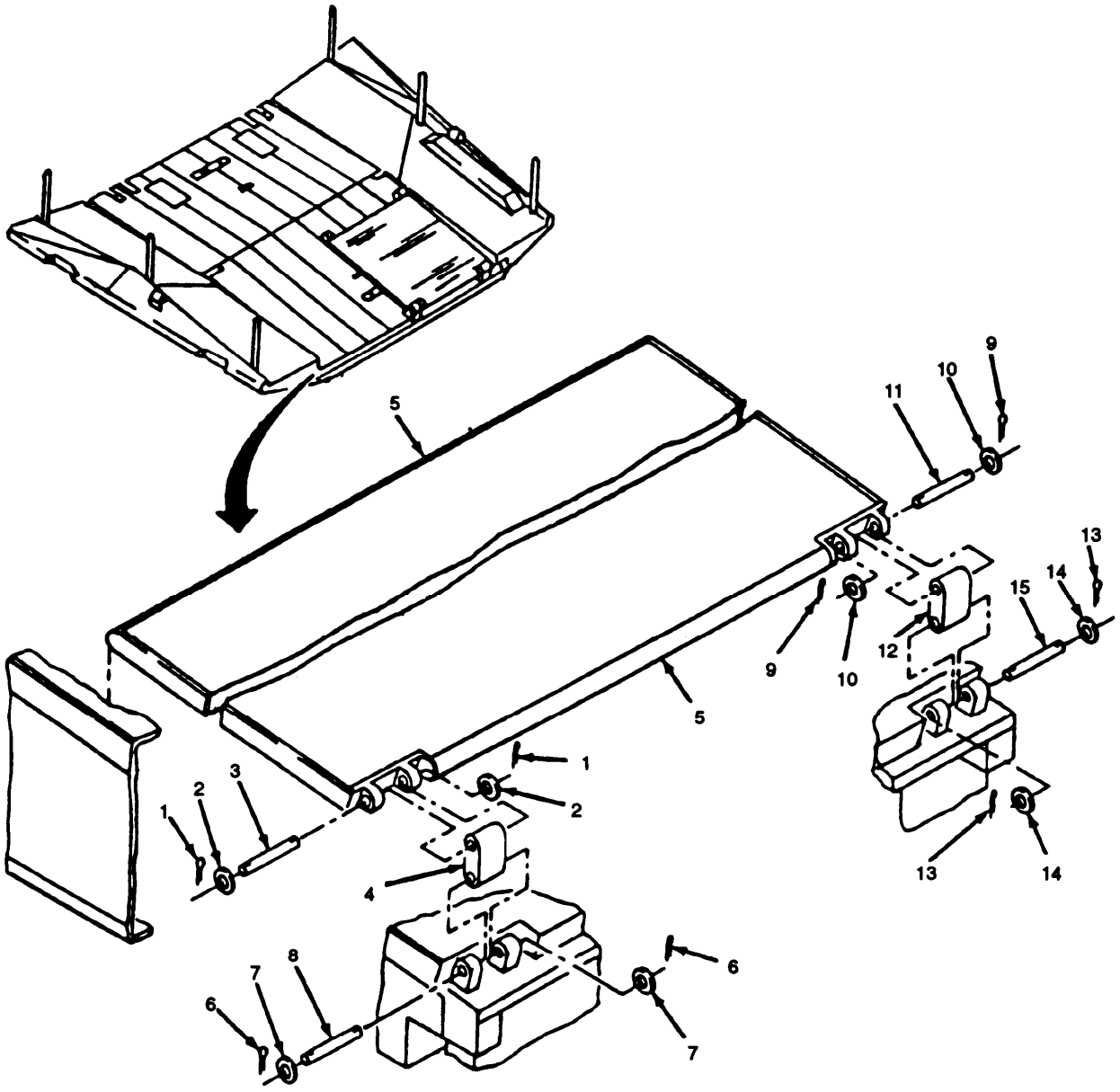



*Figure 4-102. Approach Bay, Replace.*

FOLLOW-ON MAINTENANCE:Install bay ( para. 2-27).

4-78. **Rubber Bumper.**

This task covers: Replace

INITIAL SETUP

| *Tool* | *Equipment Condition:* |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix B) | Bay unfolded (Pam. 2-14). |

*a*. *Replace.* (figure 4-103)

**NOTE**

There are two rubber bumpers on each ramp bay. The replace procedures are the same for both.

(1) Remove two nuts (10), washers (2), lockwashers (3), screws(4), and remove rubber bumper(5).

(2) Install rubber bumper(s) and secure with two screws (4), lockwashers (3), washers (2), and nuts (1).

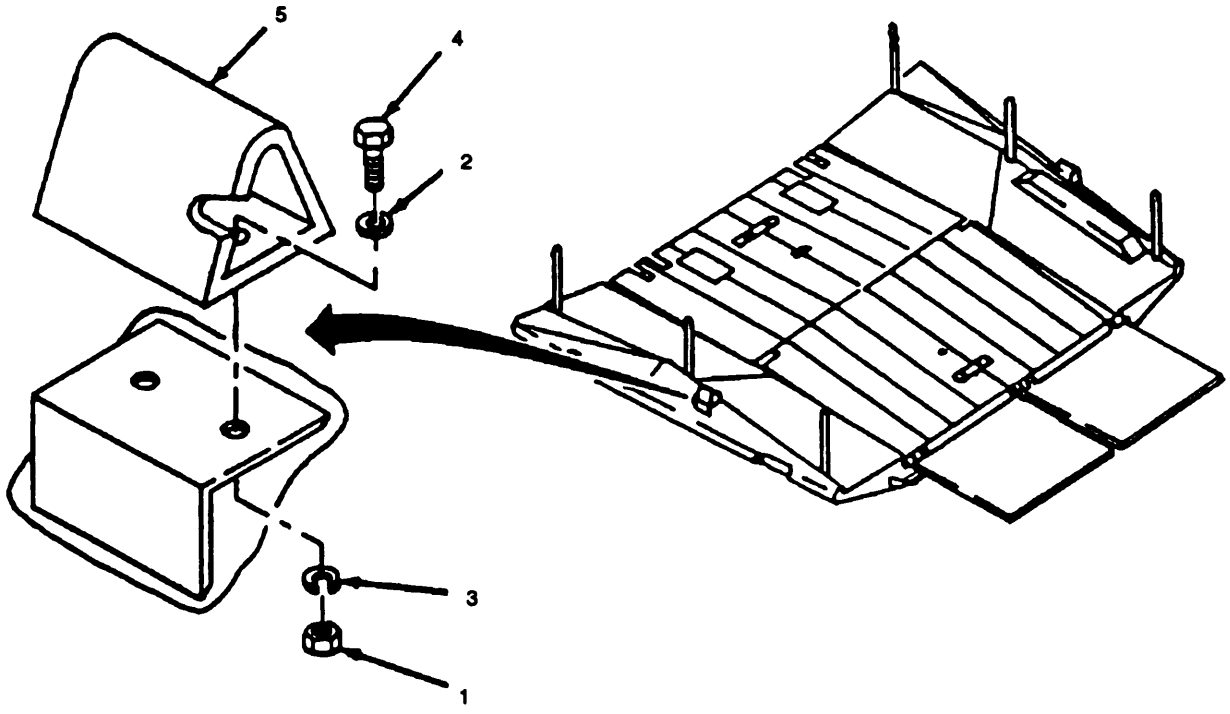



*Figure 4-103. Rubber Bumper Replace.*

FOLLOW-ON MAINTENANCE: Install bay (para. *2-27).*

4-79. **Hinge Pins, Link and Hardware.**

This task covers: a. Replace (Front) b. Replace (Rear)

INITIAL SETUP

| *Tool* | Materials/parts |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix B) | Grease, Automotive and Artillery (Item 2, Appendix E) |

*a. Replace.* (figure 4-104)

**NOTE**

Hinge pins can be replaced with the bays in folded position.

(1) Loosen nut (1) to relieve tension on cable (2).

(2) Remove spring pin (3), pin (4) and remove cable (2) from hinge pin (5).

(3) Repeat Steps (1) and (2) for remaining cable.

(4) Remove two cotter pins (6), washers (7), and remove pin (8) securing lever (9) to hinge pin (5).

(5) Remove nut (10), bolt (11), collar (12), washers (13), and hinge pin (5).

(6) Untie rope (14) from hydraulic line (15) and remove rope (14) from lever (9).

(7) Remove spring pin (16), pin (17), and remove lever (9).

(8) Remove nut (18), bolt (19), and long link (20).

(9) Remove nut (21 ), bolt (22), and short link (23).

(10) Install short link (23) and secure with bolt (22) and nut (21). Torque bolts to 120-132 ft-lbs (162-178 Nm).

(11) Install long link (20) and secure with bolt (19) and nut (18). Torque bolts to 120-132 ft-lbs (162-178 Nm).

(12) Apply grease to pin (17).

(13) Install lever (9) on both links (20) and (23) and secure with pin (17) and spring pin (16).

(14) Install rope (14) in lever (9) and tie to hydraulic line (15).

(15) Apply grease to hinge pin (5).

(16) Install hinge pin (5), washers (13), collar, and secure with bolt (11) and nut (10). Torque bolts to 120-132 ft-lbs (162-178 Nm).

(17) Install pin (8) and secure with two washers (7) and cotter pins (6).

(18) Apply grease to pin (4).

(19) Installable (2) in hinge pin (5) and secure with pin (4) and spring pin (2).

(20) Repeat Steps (17) and (18) for remaining cable.

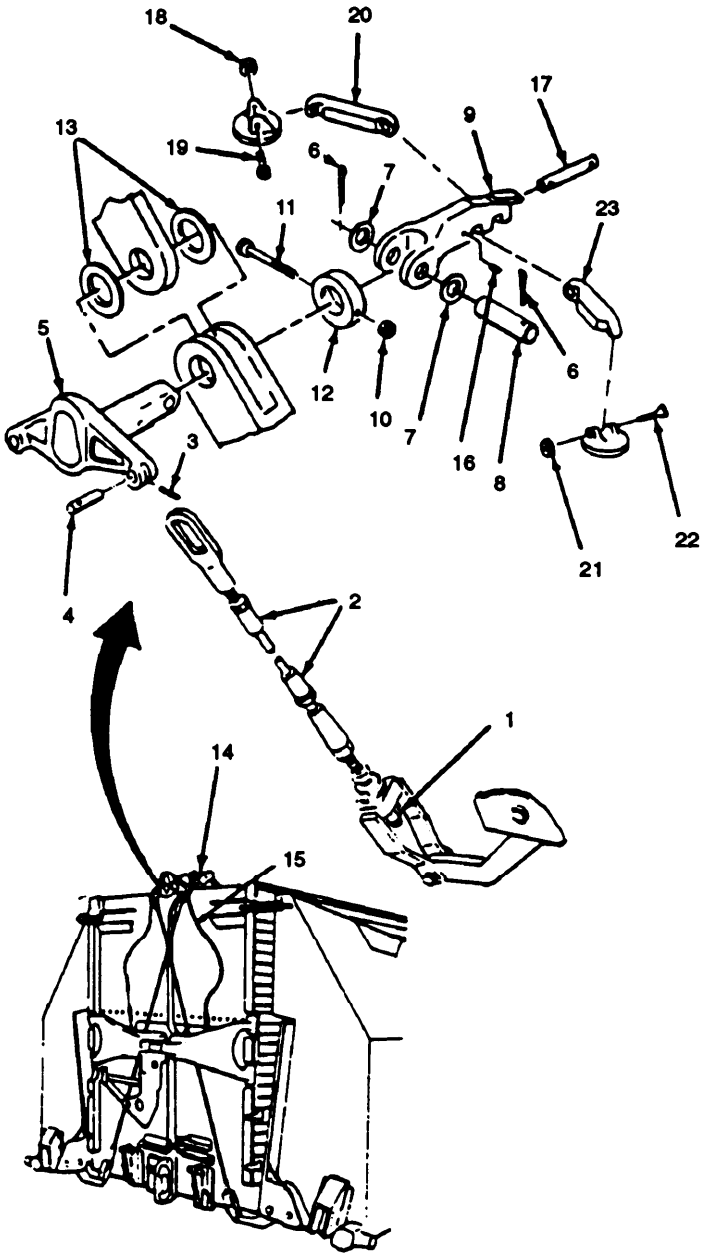



*Figure 4-104. Front Hinge Pin, Link and Hardware, Replace.*

4-79. **Hinge Pins, Link and Hardware. - Continued**

*b*. *Replace ( Rear).* (figure 4-105)

(1) Remove nut (1), bolt (2), and remove collar (3).

(2) Remove hinge pin(4).

(3) Apply grease to hinge pin (4).

(4) Install hinge pin (4) and secure with collar (3), bolt (2), and nut (1). Torque bolt 120-132 ft-lbs (162-178 Nm).

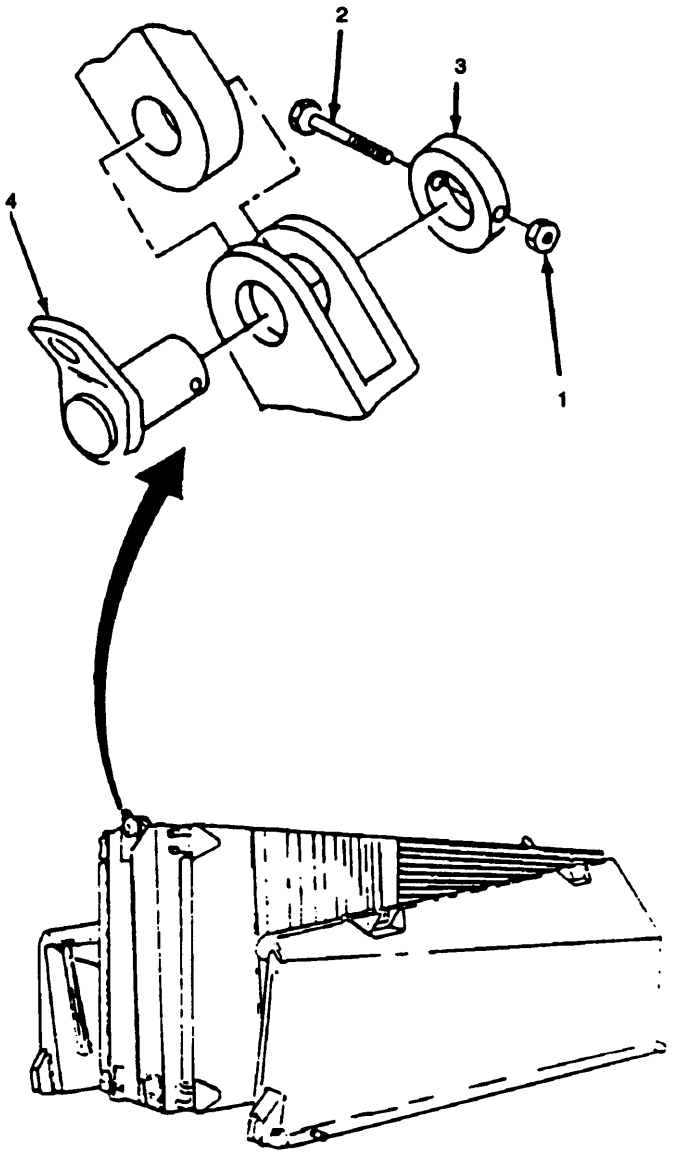



*Figure 4-105. Rear Hinge Pin, Replace.*

4-80. **Foldlock.**

This task covers: Replace

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Equipment Condition:*

Bay removed (para. 2-16).

*Materials/Parts*

Grease, Automotive and Artillery (Item 2, Appendix E)

**NOTE**

The bay has two foldlocks. The maintenance procedures are the same for both.

*a.* *Replace.* (figure 4-106)

(1) Unlatch (open) foldlock (1).

(2) Remove cotter pin (2) and remove pin (3).

(3) Remove spring support (4), washer (5), outside spring (5), inside spring (7), washer (8), pin (9), and foldlock (1).

(4) Remove two cotter pins (10), washers (11), and remove pin (12).

(5) Apply grease to pins (3) and (12).

(6) Install foldlock (1) and secure with pin (12), two washers (11), and cotter pins (10).

(7) Install pin (9) in foldlock (1).

(8) Install washer (8), inside spring (7), outside spring (6), and washer (5) on spring support(4) and install spring Support (4).

(9) Install spring support (4) and secure with pin (3) and cotter pin (2).

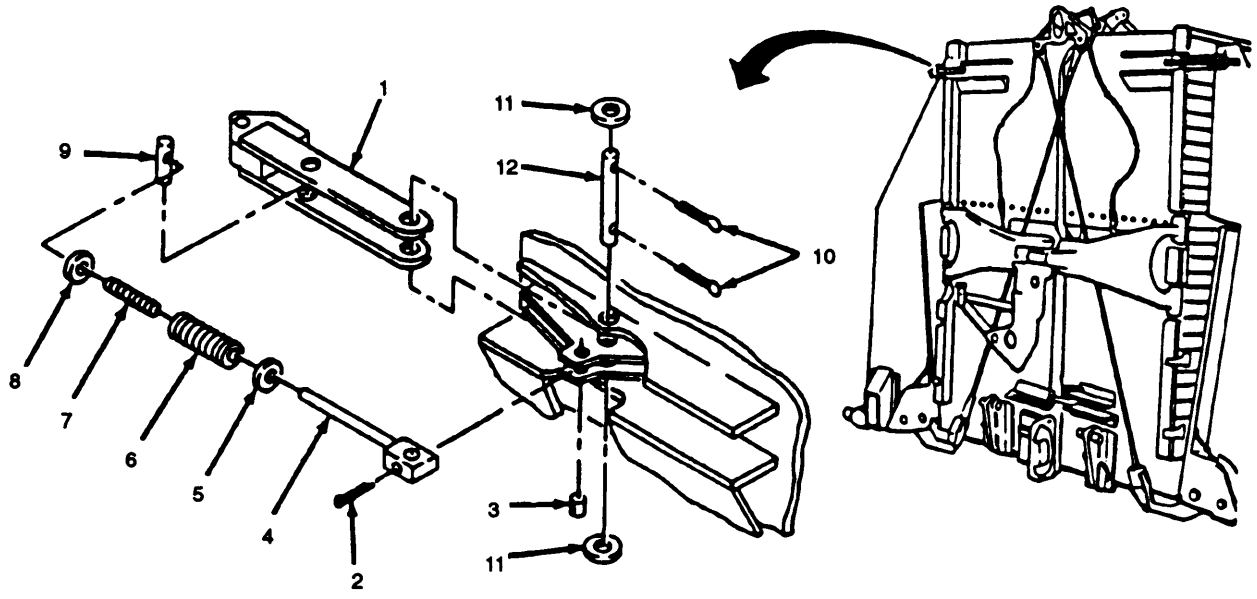



*Figure 4-106. Foldlock, Replace.*

FOLLOW-ON MAINTENANCE: Install bay (para. *2-27*).

## 4-81. **Tee Latch and Travel Latch.**

This task covers: Replace

INITIAL SETUP

| *Tool* | *Materials/Parts* |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix B) | Grease, Automotive and Artillery (Item 2, Appendix E) |

**NOTE**

The following procedures are for the roadway-to-bow ponton latches and travel latch.

*a*. *Replace.* (figure 4-107)

(1) Remove two springs (1), spacers (2), and remove pin (3).

(2) Remove two cotter pins (4), washers (5), pin (6), and remove tee latch (7).

(3) Remove two spring pins (8) and remove pin (9).

(4) Apply grease to pins (3), (6), and (8).

(5) Install pin (9) in tee latch (7) and secure with two spring pins (8).

(6) Install tee latch (7) and secure with pin (6), two washers (5) and cotter pins (4).

(7) Install pin (3), two spacers (2), and connect two springs (1) to pin (3).

(8) Check clearance between travel latch pin (tee) (11) and top of latch receptacle (12). Clearance should be 1/16-3/16 in. (1.58-4.76 mm). Adjust clearance by turning screw (13) on travel latch.

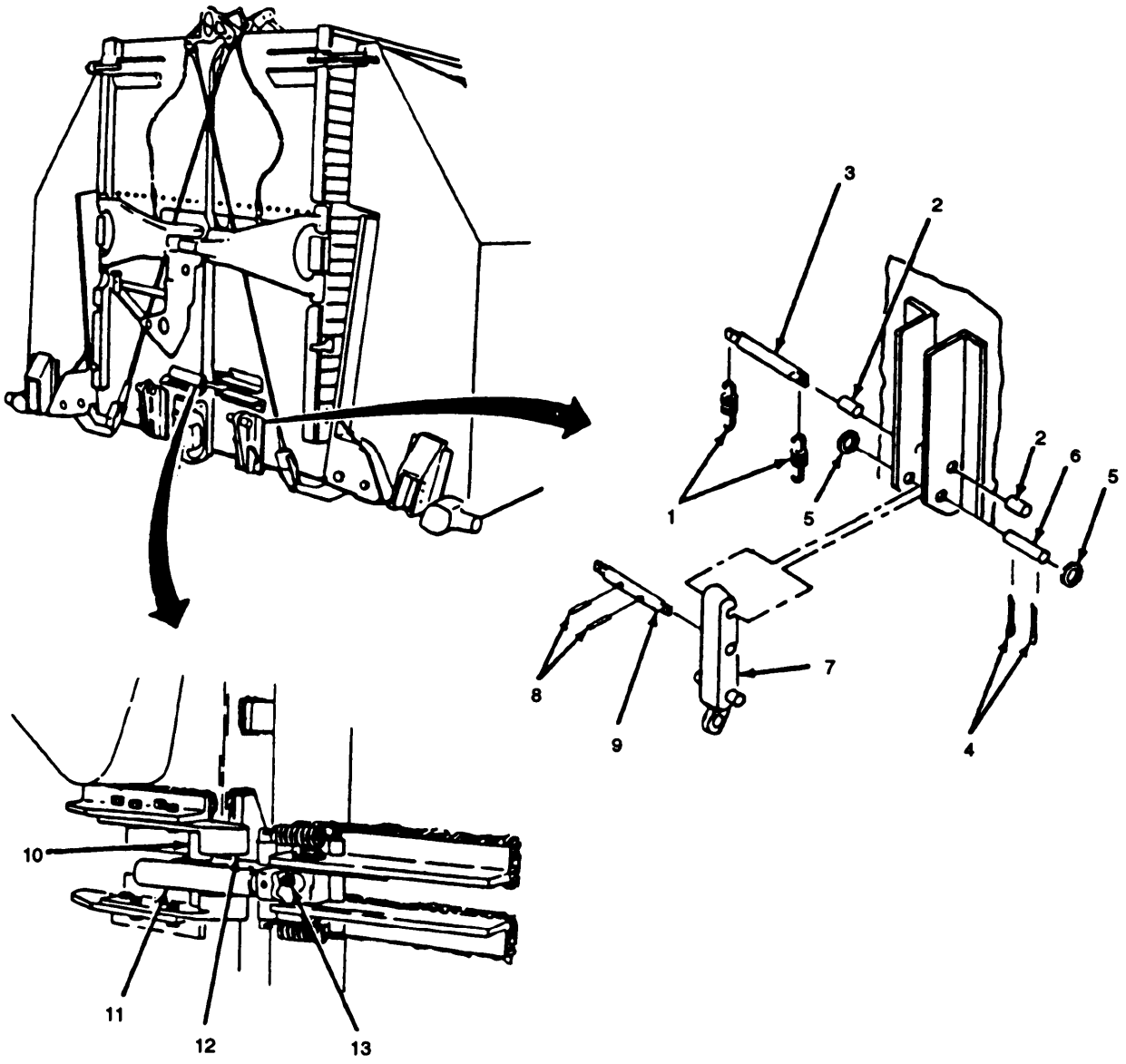



*Figure 4-107. Tee Latch, Replace.*

4-82. **Cable Guide.**

This tad covers: Replace

INITIAL SETUP

| *Tool* | *Equipment Condition:* |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix B)<br>Aluminum Welding Equipment | *Bay* removed (para. 2-16). |

*a*. *Replace.* (figure 4-108)

(1) Remove cable guide (1) in accordance withTM 9-237.

(2) Install cable guide (1) and weld in place in accordance with TM 9-237.

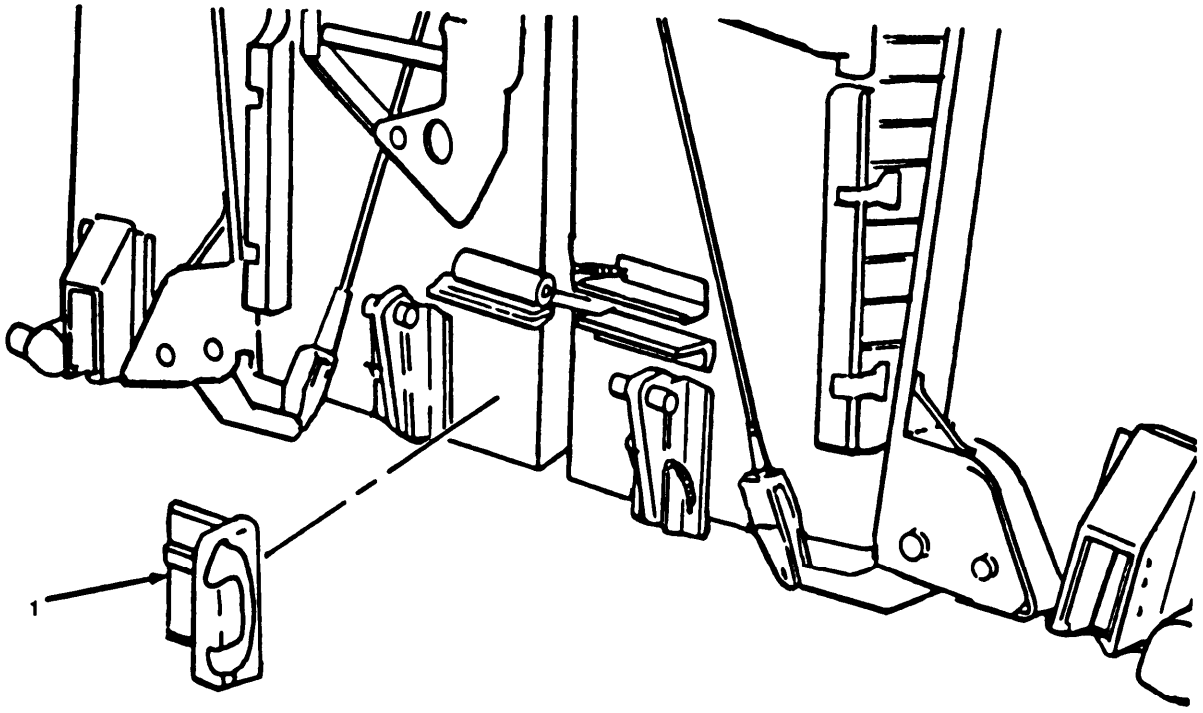



*Figure 4-108. Cable Guide, Replace.*

FOLLOW-ON MAINTENANCE: Install bay (para. *2-27*).

4-83. **Receptacles.**

This task covers: Replace

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit
(Item 1, Appendix B)

Equipment Condition:

*a*. *Replace.* (figure 4-109)

(1) Unlatch (Open) travel latch (1).

(2) Remove four bolts (2), lockwasher (3), nuts (4), strike catch (5) and shim (6).

(3) Remove four bolts (7), lockwasher (8), nuts (9), latch receptacle (10) and shim (11).

**NOTE**

Do not fully tighten nuts at this point.

(4) Install shim (11), latch receptacle (10), and Secure with four bolts (9), lockwasher (8), and nuts (7).

(5) Install shim (6), strike latch (5), and secure with four bolts (4), lockwasher (3), and nuts (2).

(6) Close travel latch (1) and check clearance between pins (tee) (12) of travel latch and receptacle (10) and strike catch (5). Clearance should be approximatly.1/16 in. (0.158 cm).

(7) Adjust strike catch (5) and latch receptacle (10) as needed and torque nuts to 31-34 ft-lbs (42-46 Nm).

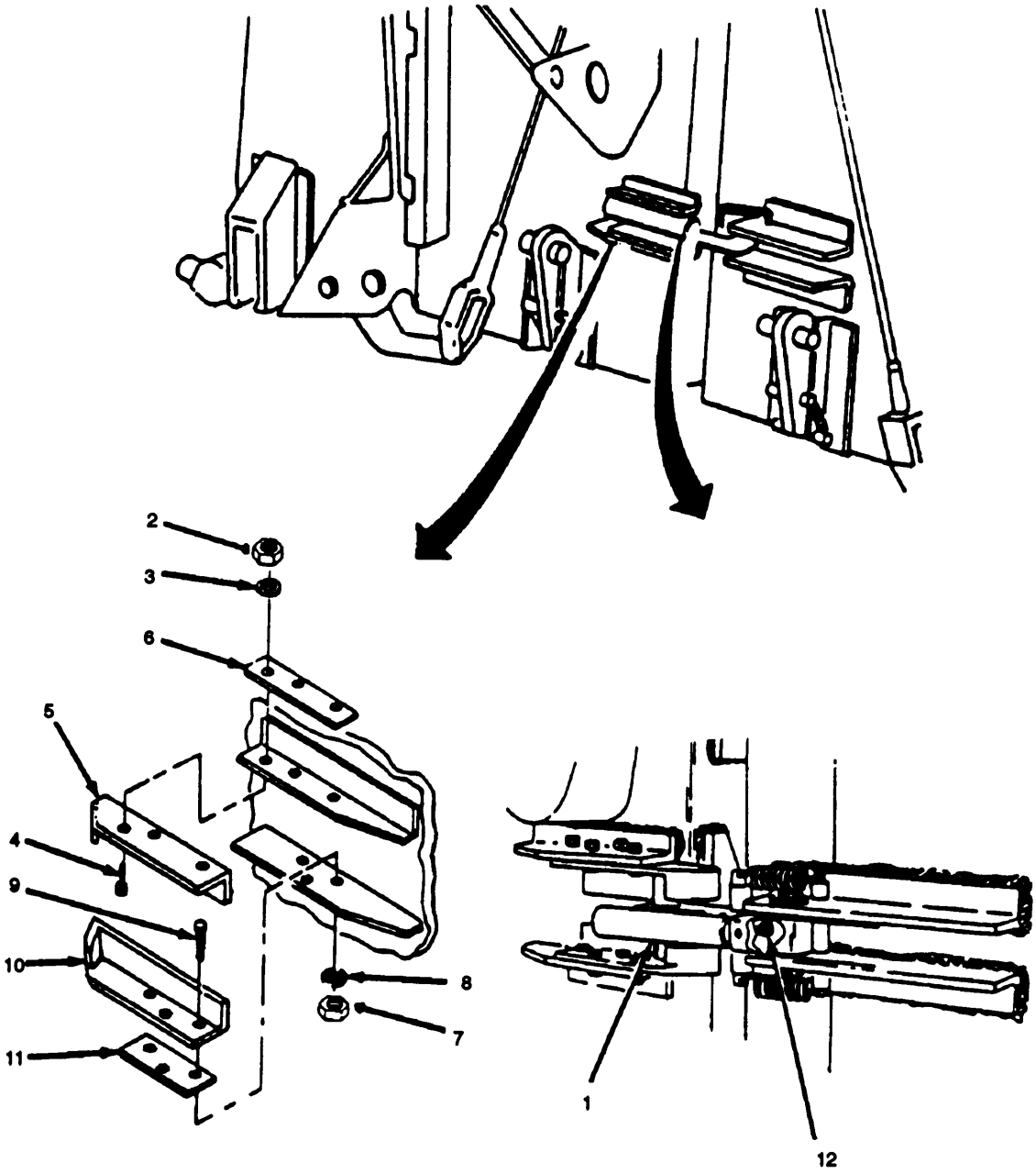



*Figure 4-109. Receptacles, Replace.*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

## 4-84. Connector and Hardware.

This task covers: Replace

INITIAL SETUP

*Tools*

General Mechanic's Automotive Tool Kit (item 1, Appendix B)

*Equipment Condition:*

Bay unfolded (para. 2-14).

*a. Replace.* (figure 4-110)

**NOTE**

The procedures to replace connector are the same for all connectors.

(1) Remove spring (1) from connector (2) and eye bracket (3).

(2) Remove two screws (4), eye bracket (3) and connector(2).

(3) Remove pin (5) and remove connector(2).

(4) Position connector(2) with eye bracket (3) and secure with pin (5).

(5) Install eye bracket (3), connector (2) and secure with two screws (4).

(6) Install spring (1) between eye bracket (3) and connector (2).

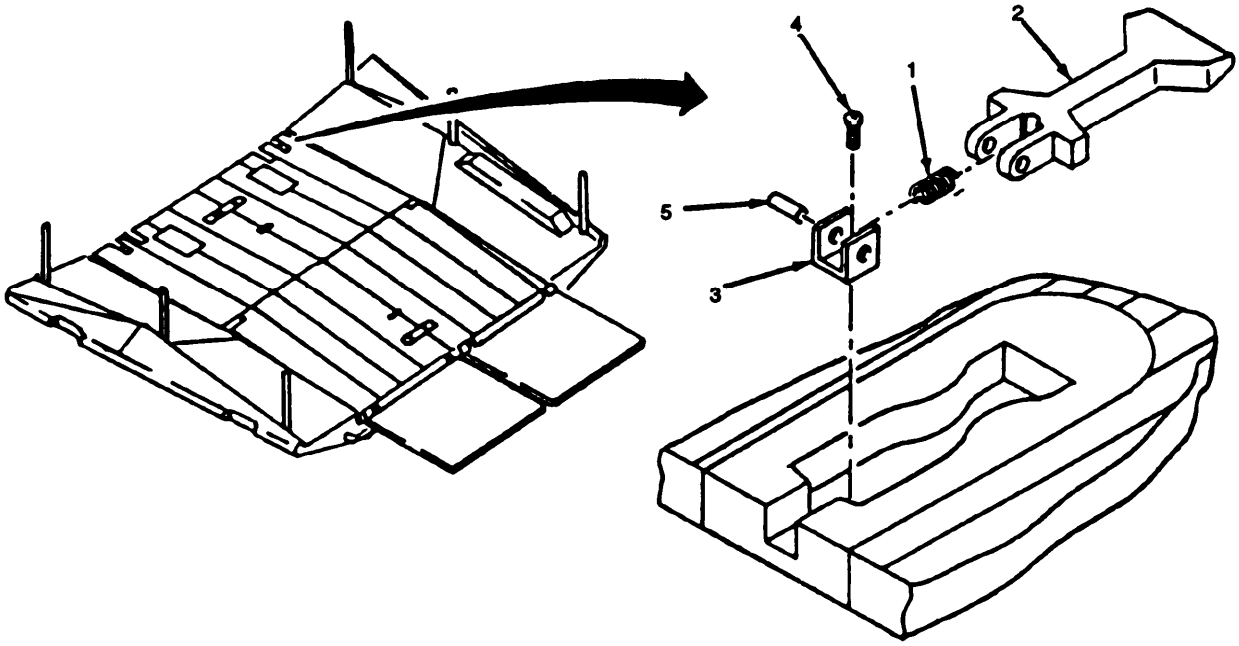



*Figure 4-110. Connectors and Hardware, Replace.*

FOLLOW-ON MAINTENANCE: Install bay (pm. 2-27).

## 4-85. **Connecting Pin, Trunions and Lever.**

This task covers: Replace

INITIAL SETUP

| *Tool* | *Materials/Parts* |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix B) | Grease, Automotive and Artillery (Item 2, Appendix E) |

*a.* Replace. *(figure* 4-111)

(1) Remove four screws (1), lockwashers (2), and retainer (3).

(2) Remove four screws (4), lockwashers (5), lever (6), and drive screw (7).

(3) Remove upper trunion nut (8) and lower trunion nut (9) from drive screw (7).

(4) Remove spring pin (10) securing pin (11).

(5) Remove pin (11).

(6) Remove spring pin (12), pin (13), and remove link (14) from bell crank (15) and remove bell crank (15).

(7) Remove lube fitting (16).

(8) Remove spring pin (17), pin (18) and remove link (14) from connecting pin (19).

(9) Remove connecting pin (19) from yoke (20).

(10) Position connecting pin (19) in yoke (20).

(11) Apply grease to pin (18), and position link (14) in connecting pin (19), and secure with pin (18) and spring pin (17).

(12) Install lube fitting (16) in bell crank (15).

(13) Apply grease to pin (11), install bell crank (15) and screw with pin (11) and spring pin (10).

(14) Apply grease to pin (13), position link (14) in bell crank (15) and secure with pin (13) and spring pin (12).

(15) Apply grease to upper trunion nut (8), lower trunion nut (9), and drive screw (7).

(16) Install lower trunion nut (9) on drive screw(7) until drive screw(7) is flush with bottom of trunion nut (9) then back off nut one complete turn.

(17) Install upper trunion nut (8) on drive screen (7) until one complete thread is showing.

(18) Install lower trunion nut (9) in bellcrank (15), install lever (6) and secur ewith four screws (4), and lockwashers (5). Torque screws to 106-l17 ft-lb (143-158 Nm).

(19) Adjust upper trunion nut (8) until it alines with upper bracket hole (21), and install retainer (3), and secure with four screws (1) and nuts (2). Torque screws to 31-34 ft-lb (42-46 Nm).

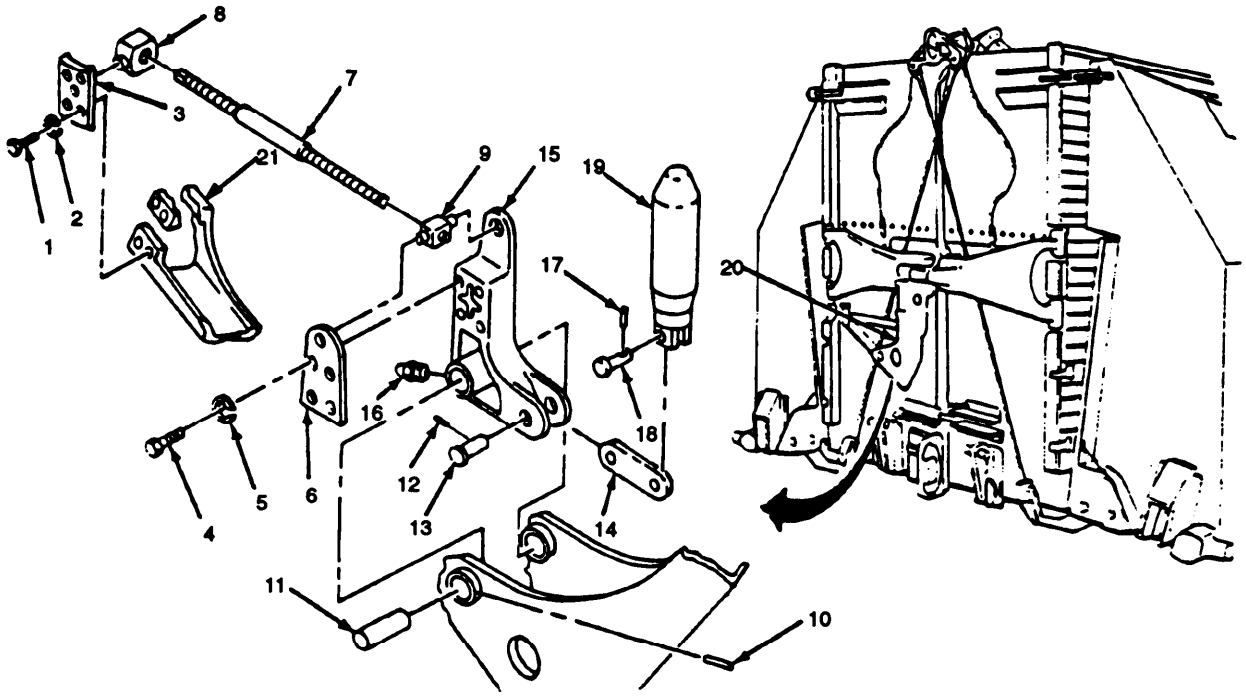



*Figure 4-111. Connecting Pin, Trunions and LeverReplace*

## 4-86. **Yokes, Pins, and Washers.**

This task covers: Replace

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Materials/Parts*

Grease, Automotive and Artillery (Item 2, Appendix E)

*Equipment Condition:*

Bay unfolded on blocks (para. 2-14).

*a*. Replace. (figure 4-112)

**NOTE**

The replace procedures are the same for both yokes.

(1) Remove six screws (1) and access cover (2).

(2) Install 1/2 INCH x 20 UNC thread eye bolt or equivalent into top of cylinder retaining pin (3).

(3) Remove cylinder retaining pin (3) using suitable lifting device.

(4) Pull yoke (4) partially open.

(5) Remove two cotter pins (5), washers (6), and pin (7).

(6) Connect suitable lifting device to yoke (4).

(7) Remove cotter pin (8), washer (9), and pin (10).

(8) Remove cotter pin (11), washer (12), pin (13) and yoke (4).

(9) Apply grease to pins (7), (10), and (13).

(10) Install yoke (4), pin (13), washer (12), and cotter pin (11 ).

(11) Install pin (10), washer (9), and cotter pin (8).

(12) Close yoke (4) partially and install pin (7), two washers (6) and cotter pins (5).

(13) Close yoke (4) fully.

(14) Install cylinder retaining pin (3) and remove eye bolt.

(15) Install access cover(z) and Secure with six screws (1).

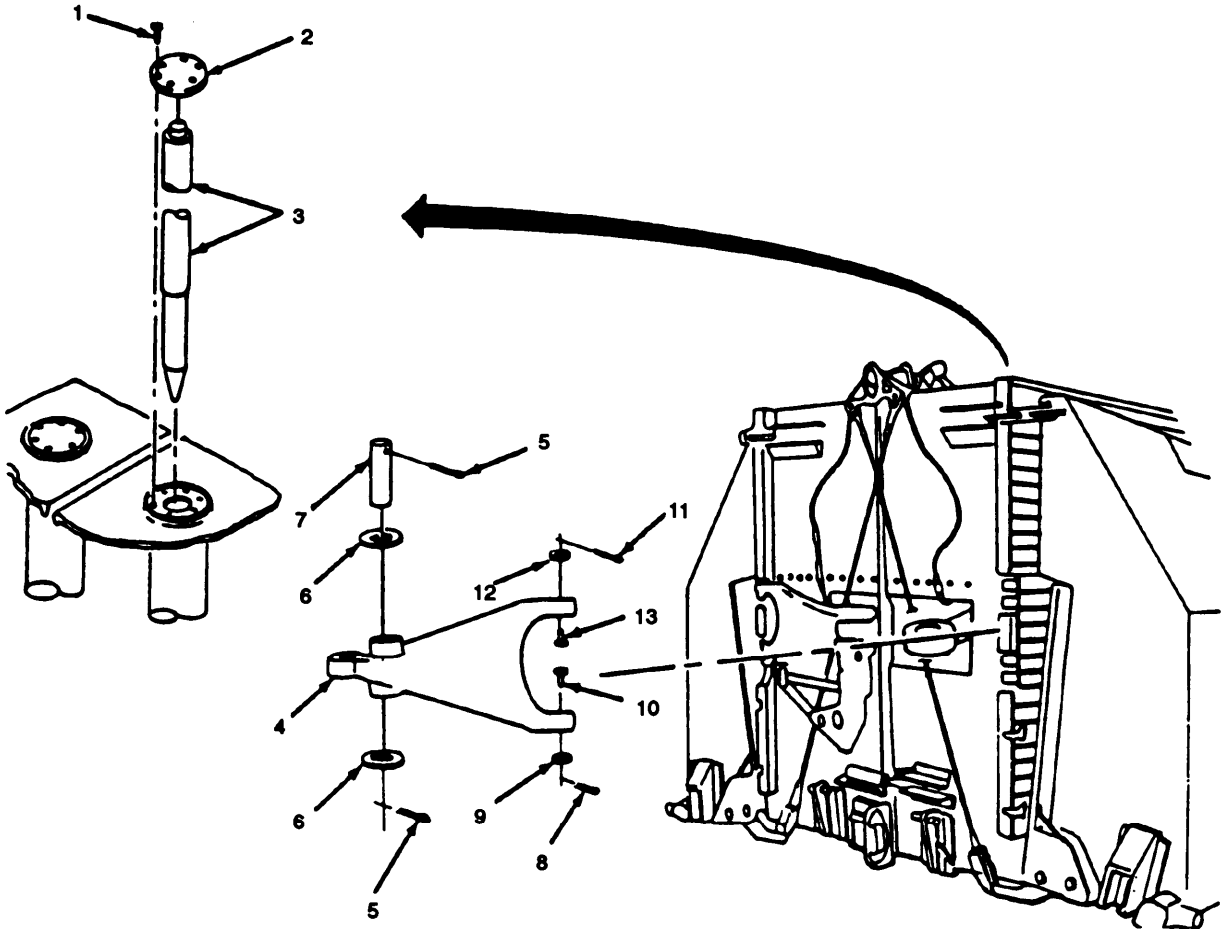



*Figure 4-112. Yokes, Pins, and Washers, Replace.*

## 4-87. **Hose Assemblies, Connectors, Clamps, Fittings and Rope.**

This task covers: Replace

INITIAL SETUP

| *Tool* | *Materials/Parts* |
|---|---|
| General Mechanic's Automotive Tool Kit | Tape, Antiseize (Item 19, Appendix E) |

**NOTE**

The hose assemblies can be replaced with the bay in either the folded or unfolded condition.

*a*. *Replace.* (figure 4-113)

**WARNING**

When disconnecting any hydraulic line, open line slowly and protect face, as hydraulic oil may spray out due to residual pressure in system.

**NOTE**

When removing hoses, have suitable container to drain oil from hoses. AIso Cap all hoses and ports immediately to prevent dirt or foreign matter from entering the system.

(1) Remove all cable clamps and or other attaching hardware securing hydraulic line.

(2) Tag and loosen fittings at both ends of hydraulic line to be replaced.

(3) Apply antiseize tape to all hydraulic lines and fittings threads.

(4) Install line, tighten fittings, and secure with cable clamp and other attaching hardware removed.

(5) Service hydraulic cylinder and piston (para. 4-87).

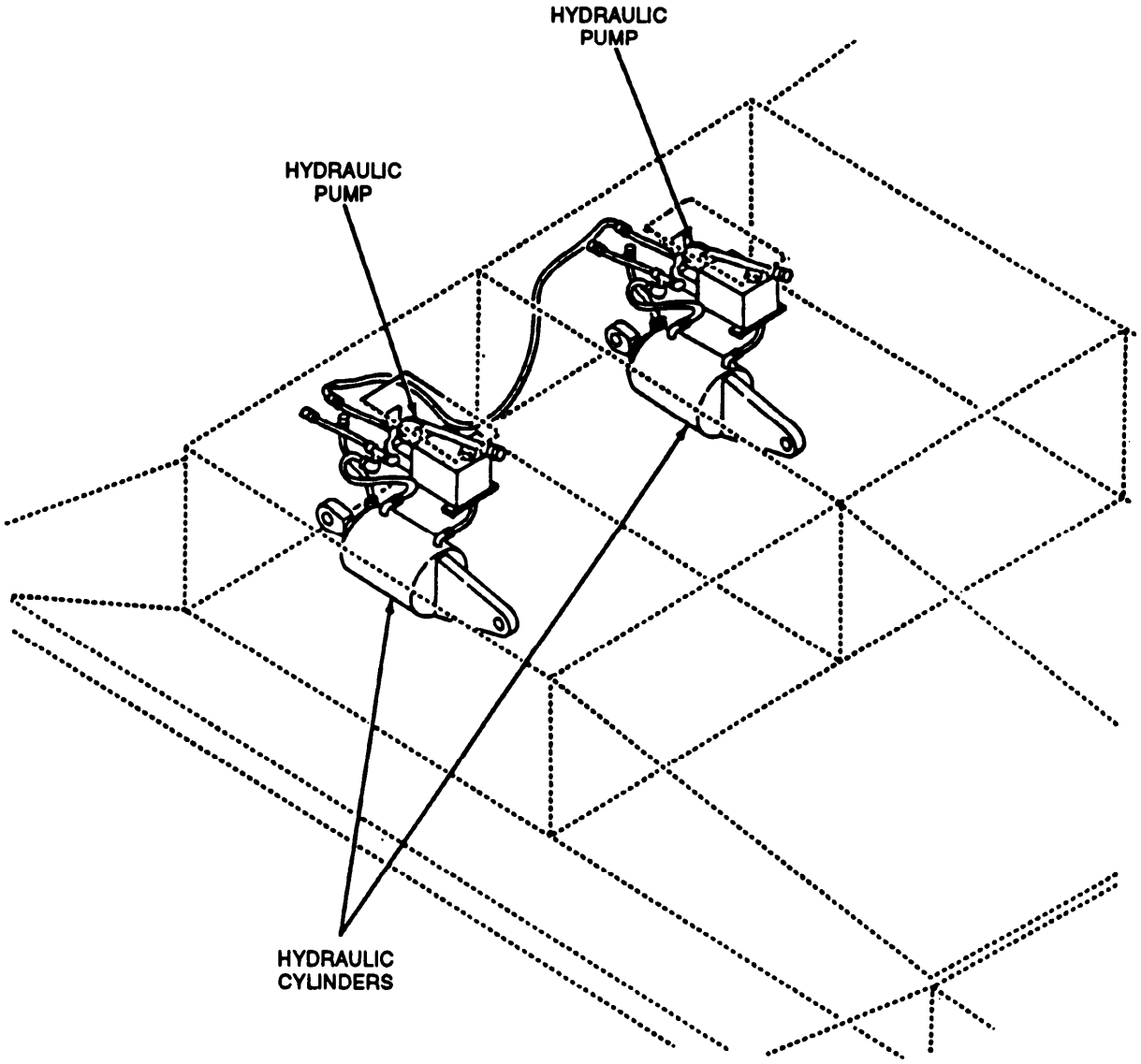



*Figure 4-113. Hose Assembly Connectors, Clamps, Fittings and Rope, Replace.*

4-88. **Hydraulic Cylinder and Piston.**

This task covers: a. Test b. Service

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Materials/Parts*

Grease, Automotive and Artillery (Item 2, Appendix E)

*Equipment Condition:*

Bay unfolded (para. 2-14).

*a. Test.* (figure 4-114)

**NOTE**

The following procedures are the same for both hydraulic cylinders.

(1) Open vent valve (1).

(2) Set pump control lever (2) to PUMP position.

(3) Pump handle (3) and ensure cylinder (4) extends freely.

(4) Close vent valve (1), and set pump control lever (2) to TRAFFIC and ensure cylinder(4) retracts handle (3) is pumped.

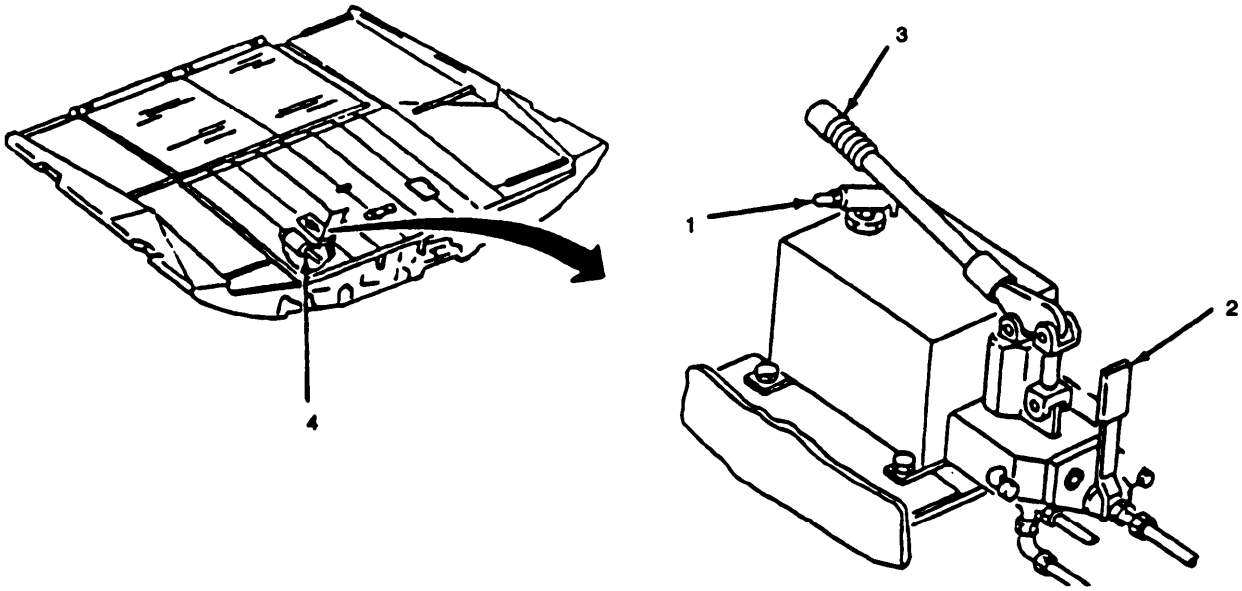



*Figure 4-114. Hydraulic Cylinder and Piston, Test.*

4-88. **Hydraulic Cylinder and Piston. - Continued**

*b.* *Service.* (figure 4-115)

(1) Retract cylinder (1) fully.

(2) Service hydraulic pump reservoir (para. 4-88).

(3) Remove plug (2) from quick disconnect (3) and connect drain line.

(4) Disconnect crossover line (4).

(5) Fully extend cylinder (1) to drain oil.

(6) Replenish hydraulic pump reservoir.

(7) Disconnect drain hose.

(8) Operate cylinder (1) several times to purge air.

(9) Reconnect crossover line (4).

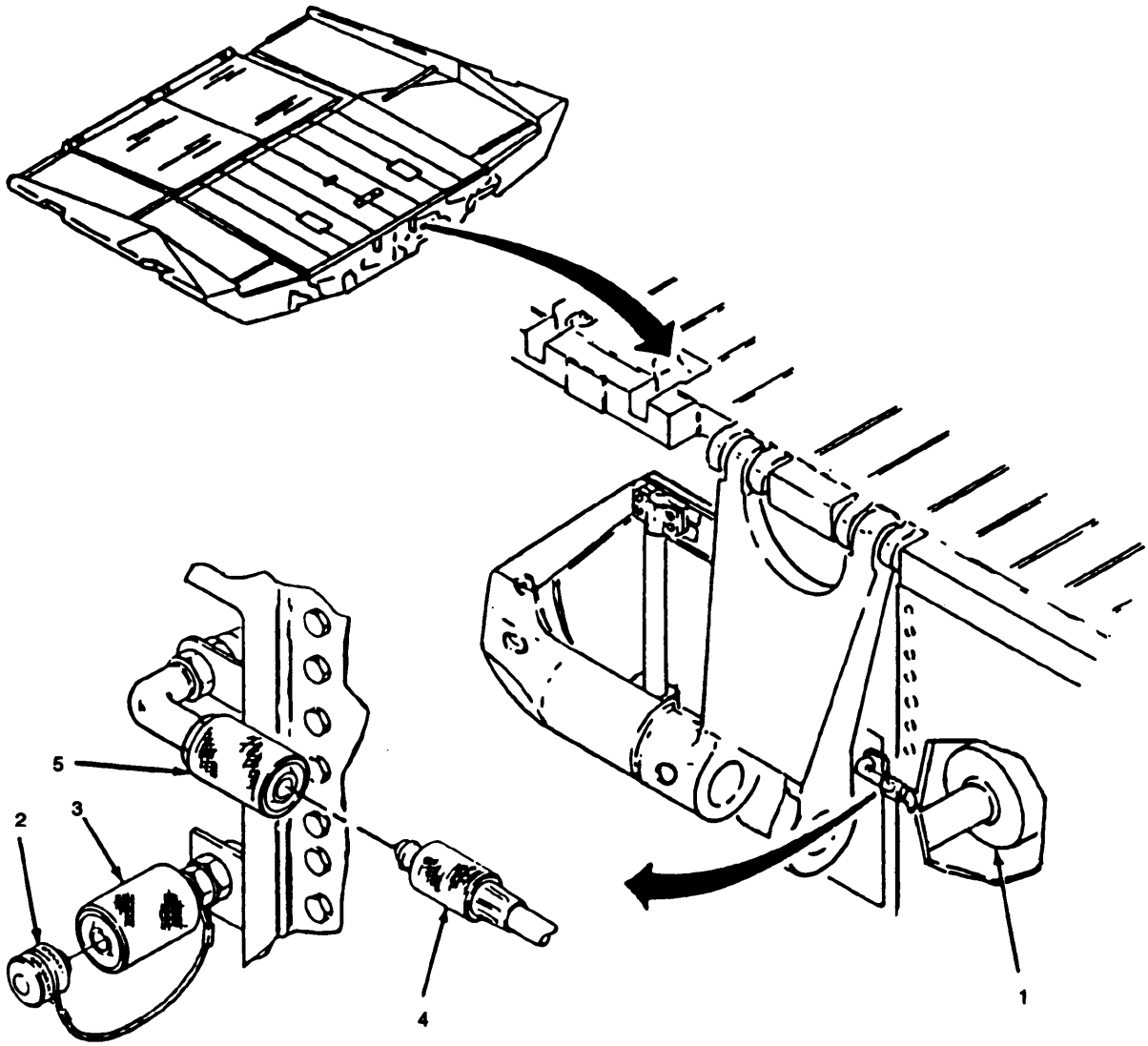



*Figure 4-115. Hydraulic Cylinder and Piston, Service.*

## 4-89. Cylinder Retaining Pin and Cover.

This task covers: Replace

INITIAL SETUP

| *Tool* | *Materials/Parts* |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix B) | Grease, Automotive and Artillery (Item 2, Appendix E) |

a. *Replace.* (figure 4-116)

**NOTE**

Bay must be in folded position to remove cover and cylinder retaining pin. Yokes may have to be exercised to remove cylinder pin.

(1) Remove six screws (1), and cover (2).

**CAUTION**

Support hydraulic cylinder to prevent damage when cylinder retaining pin is removed.

(2) Screw 1/2 in. eyebolt in to top of cylinder retaining pin (3).

(3) Connect suitable lifting device to eyebolt and remove cylinder retaining pin (3).

(4) Apply grease to cylinder retaining pin (3).

(5) Install cylinder retaining pin (3).

(6) Install cover (2) and secure with six screws (1).

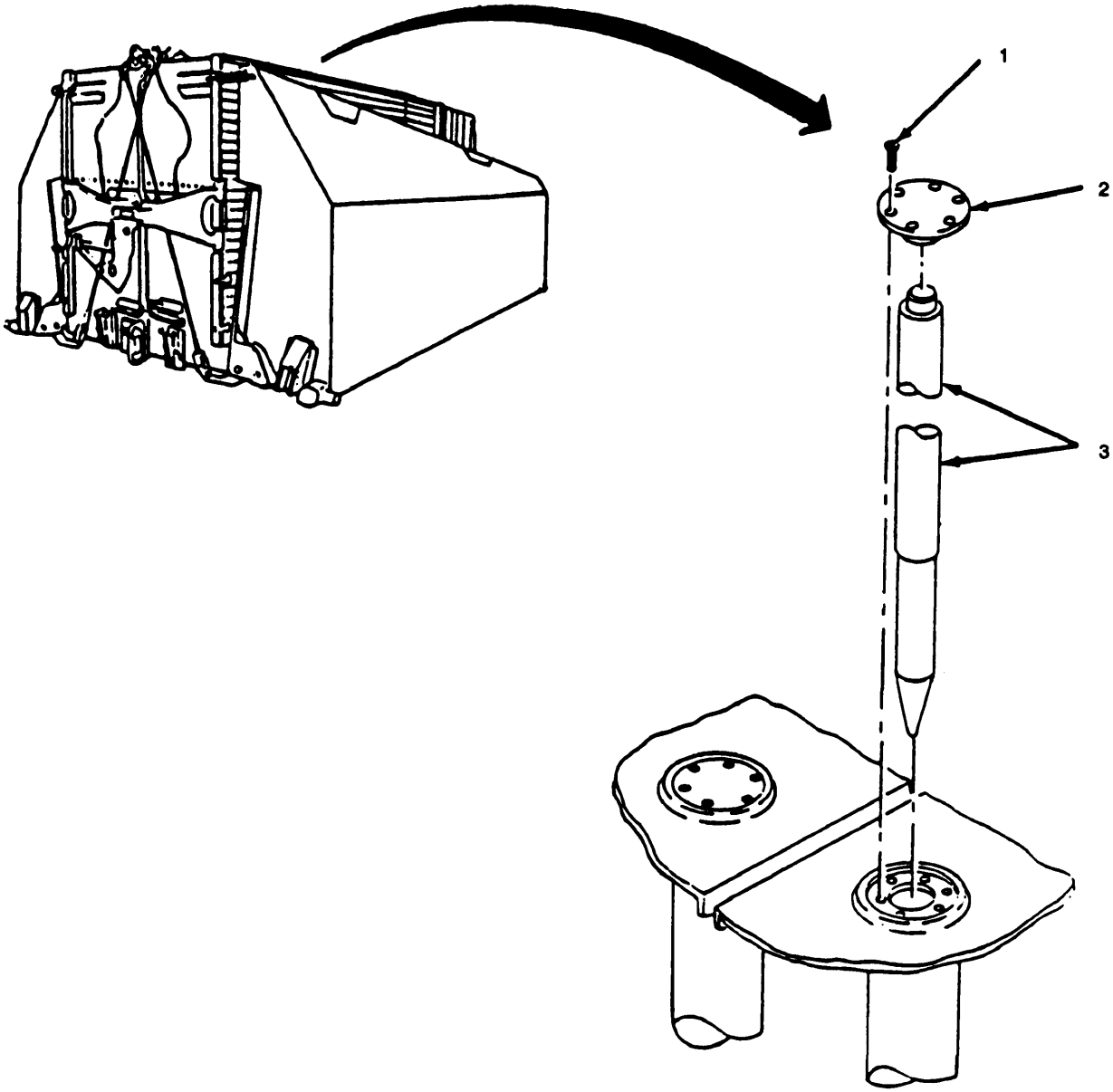



*Figure 4-116. Cylinder Retaining Pin and Cover, Replace.*

4-90. **Hydraulic Pumps.**

This task covers: a. Service b. Replace

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Materials/Parts*

Oil, Lubricating OE/HDO (Item 8, Appendix E)
Tape, Antiseize (Item 19, Appendix E)

*Equipment Condition:*

Bay unfolded (para. 2-14).

**NOTE**

The following procedures are the same for both hydraulic pumps.

a. *Service.* (figure 4-117)

(1) Open pump access cover (1).

(2) Remove vent and fill cap (2) and check level of hydraulic fluid. Fluid level should be approximately 2 in. (5.18 cm) below top outside surface of pump (3).

(3) Install vent and fill cap (3).

(4) Close pump access cover (1).

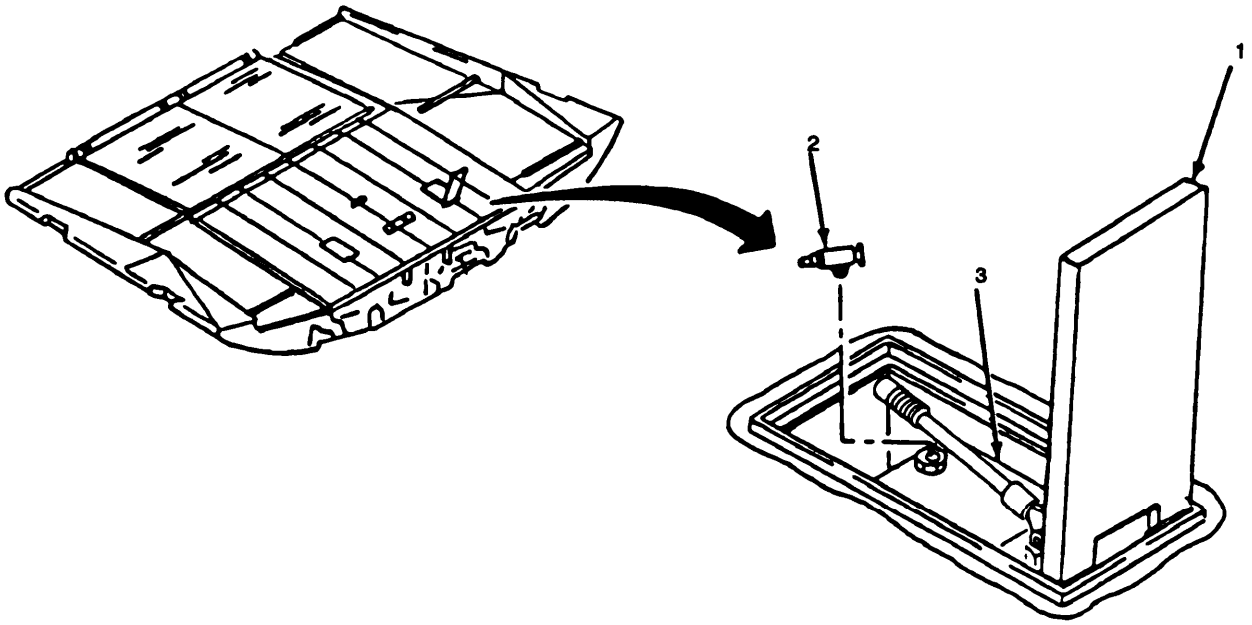



*Figure 4-117. Hydraulic Pumps, Service.*

**FOLLOW-ON MAINTENANCE:** Install bay (para. 2-27).

4-90. **Hydraulic Pumps. - Continued**

*b.* *Replace.* (figure 4-118)

(1) Open pump access cover (1).

**WARNING**

When disconnecting any hydraulic line, open slowly and protect face, as hydraulic oil may spray out due to residual pressure in system.

**NOTE**

When removing hoses, have a suitable container to drain oil from hoses. Also cap all hoses and ports immediately to prevent dirt or foreign matter from entering the system.

(2) Tag and disconnect hydraulic lines (2) from hydraulic pump (3).

(3) Remove four screws (4), washers (5), lockwashers (6) and hydralic pump (3).

(4) Install hydraulic pump (3) and secure with four screws (4), washers (5), and lockwashers (6).

(5) Apply antiseize tap eto hydraulic lines fittings and connect hydraulic lines (2) to hydraulic pump (3) as tagged.

(6) Service hydraulic pump. See para. a. above.

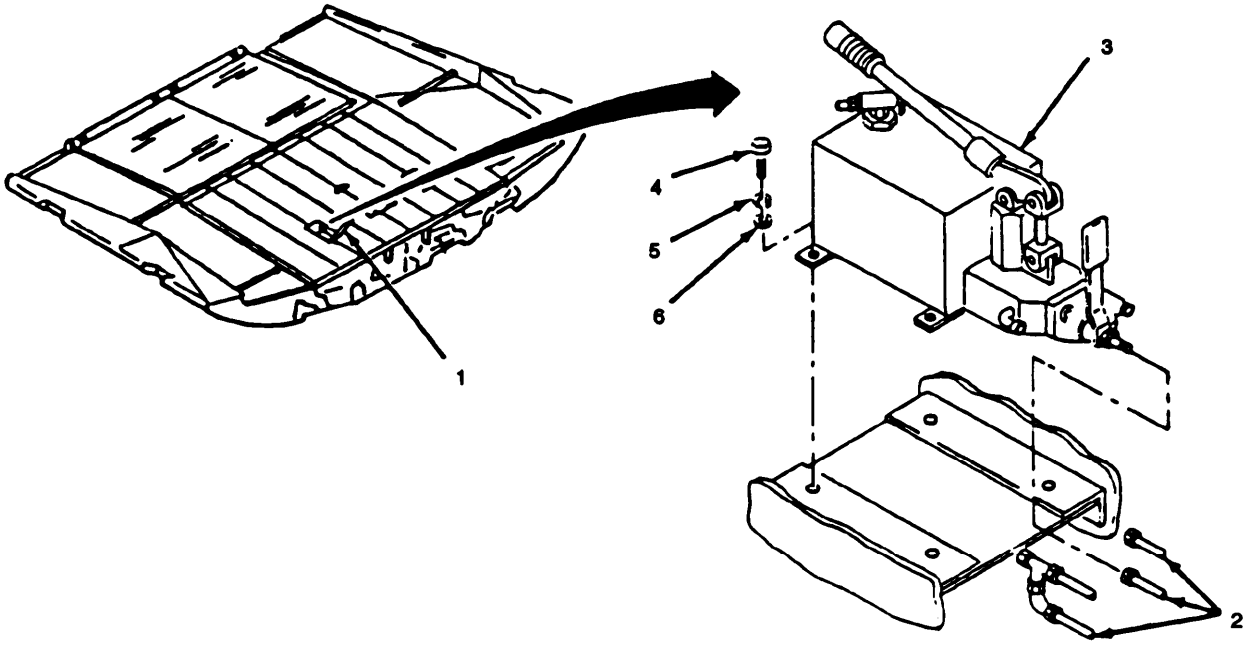



*Figure 4-118. Hydraulic Punp, Replace.*

**FOLLOW-ON MAINTENANCE:** Install bay (para. 2-27).

## 4-91. **Pump Access Cover.**

This task covers: Replace

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Equipment Condition:*

Bay unfolded (para. 2-14).

*Materials/Parts*

Grease, Automotive and Atrillery (Item 2, Appendix E)

*a.* Replace. (figure 4-119)

(1) Remove three screws (1), lockwashers (2), and pump access cover (3).

(2) Remove hinge pin (4) and separate pump access cover (3) from hinge (5).

(3) Apply grease to hinge pin (4), aline pump access cover (3) and hinge (5) and install hinge pin (4).

(4) Install pump access cover (3), and secure with three screws (1) and lockwashers (2).

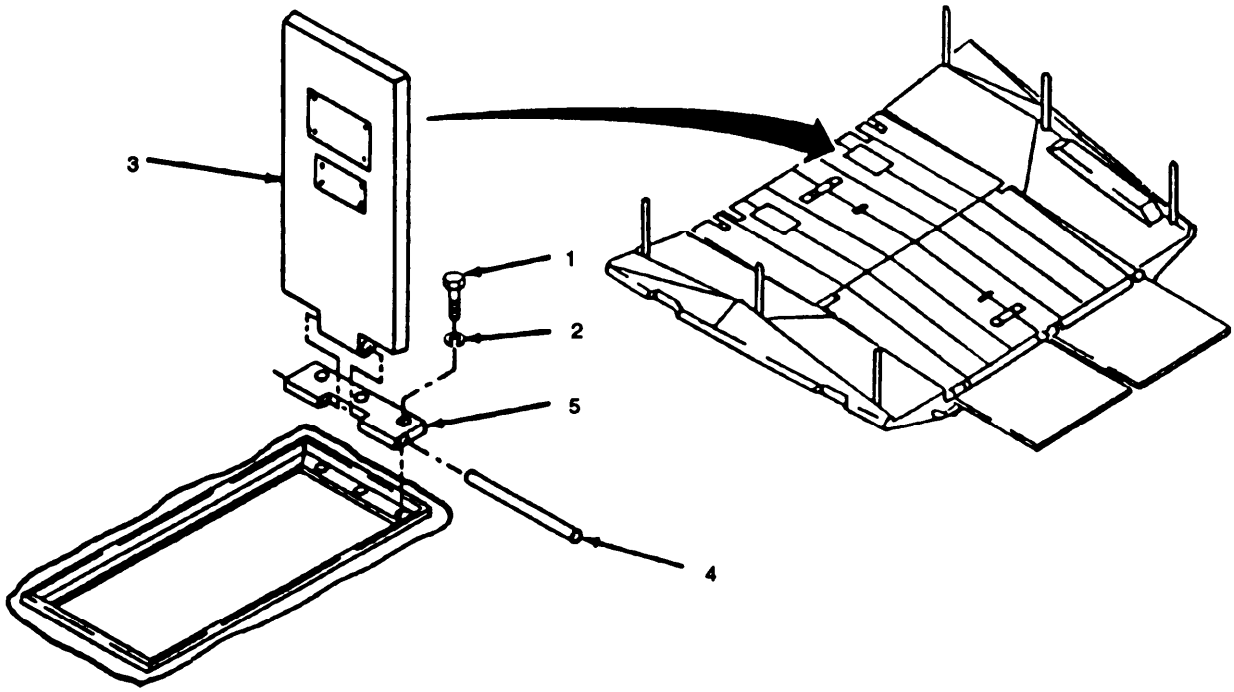



*Figure 4-119. Pump Access Cover, Replace.*

**FOLLOW-ON MAINTENANCE:** Install bay (para. 2-27).

4-92. **Cable Assembly.**

This task covers: a. Adjust b. Replace

INITIAL SETUP

*Tools*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)
Cable Adjusting Spring Scale (Item 2, Appendix B)

*Materials/Parts*

Grease, Automotive and Artillery (Item 2, Appendix E)

*Equipment Condition:*

Bay unfolded (para. 2-14).

*a.* *Adjust.* (figure 4-120)

**NOTE**

Bay must be in the folded position to adjust cable assembly.

(1) Position cable adjusting spring scale (1) on cable (1) 19-21 in. (48.26-53.34 cm) from upper cable pin (2).

(2) Apply a 45-55 lb (30.41-34.95 kg) force to scale and measure cable deflection. Cable deflection should be 0.19-0.31 in. (0.44-0.76 cm).

(3) Loosen nut (3) and loosen or tighten nut (4) until proper deflection of cable (1) is obtained and tighten nut (3).

(4) Recheck cable deflection and repeat Steps (1) through (3) as needed.

(5) Remove cable adjusting spring scale and repeat Steps (1) through (4) for remaining cable.

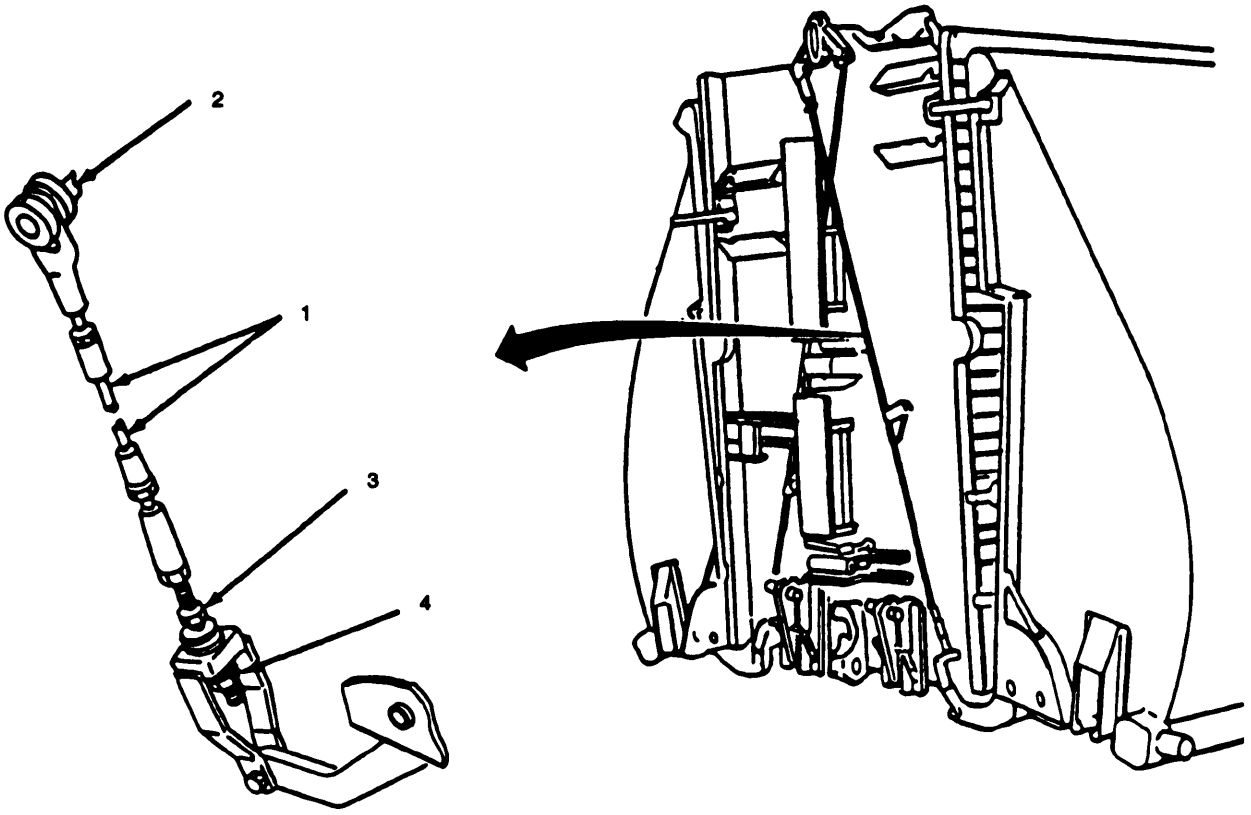



*Figure 4-120. Cable Assembly, Adjustment.*

**FOLLOW-ON MAINTENANCE:** Install bay (para. 2-27).

4-92. **Cable Assembly. - Continued**

*b.* *Replace.* (figure 4-121)

**NOTE**

Bay must be in the folded position to replace cable assembly.

(1) Remove nut (1) and washers (2) and remove cable assembly (3) from cable link (4).

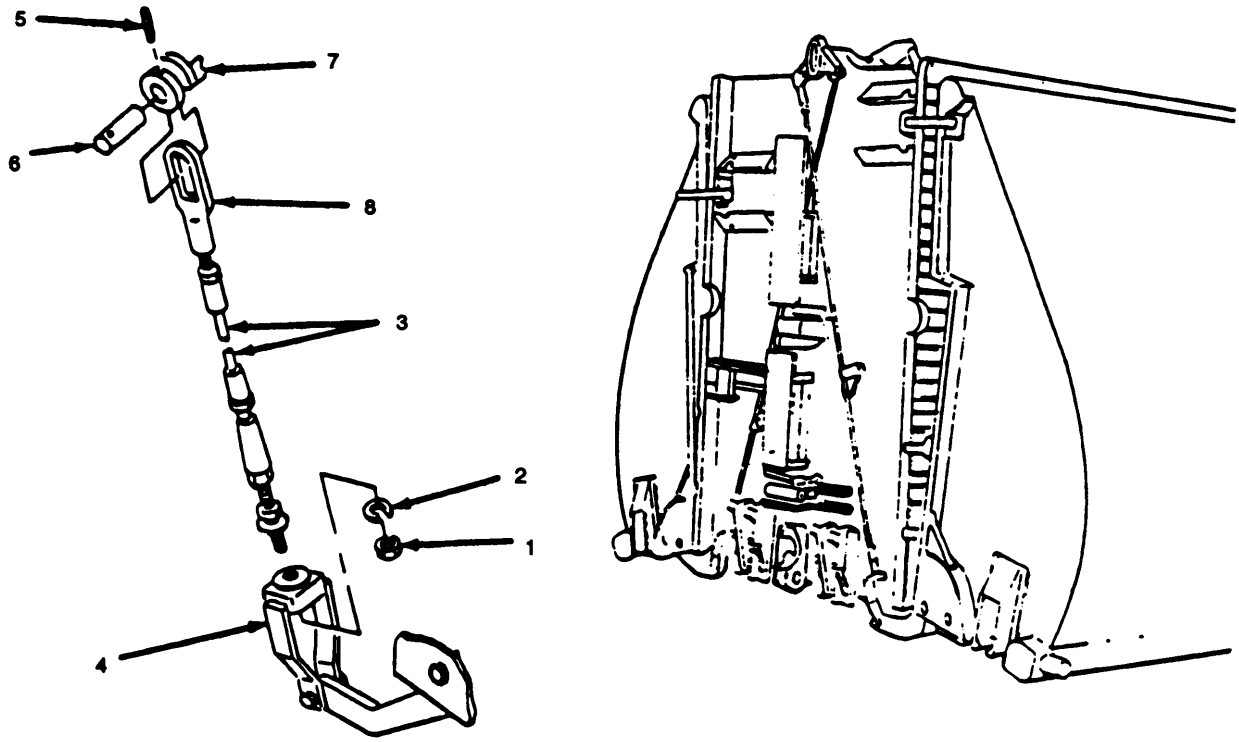
(2) Remove spring pin (5), and pin (6) and remove upper end of cable assembly (3) from hinge pin (4).

(3) Apply grease to eye loop (8) and pin (6).

(4) Install upper end of cable assembly (3) and secure with pin (6) and spring pin (5).

(5) Install cable assembly (3) in cable link (4) and install washer (2) and nut (1).

(6) Adjust cable assembly.




*Flgure 4-121. Cable Assembly, Replace.*

**FOLLOW-ON MAINTENANCE:** Install bay (para. 2-27).

## 4-93. **Cable Link, Pin and Hardware.**

This task covers: Replace

INITIAL SETUP

| *Tool* | *Equipment Condition:* |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix B) | Bay removed (para. 2-16). |
| *Materials/Parts* | |
| Grease, Automotive and Artillery (Item 2, Appendix E) | |

*a*. *Replace.* (figure 4-122)

(1) Remove nut (1) and washer (2) and remove cable assembly (3) from cable link (4).

(2) Remove cotter pin (5), nut (6), washer (7), bolt (8), and remove cable link (4) from unfolding lever (9).

(3) Apply grease to cable link (4).

(4) Install cable link (4) on unfolding lever (9) and secure with bolt (8), washer (7), nut (6) and cotter pin (5).

(5) Install cable assembly (3) in cable link (4), and secure with nut (1) and washer (2).

(6) Adjust cable assembly (para. 4-90).

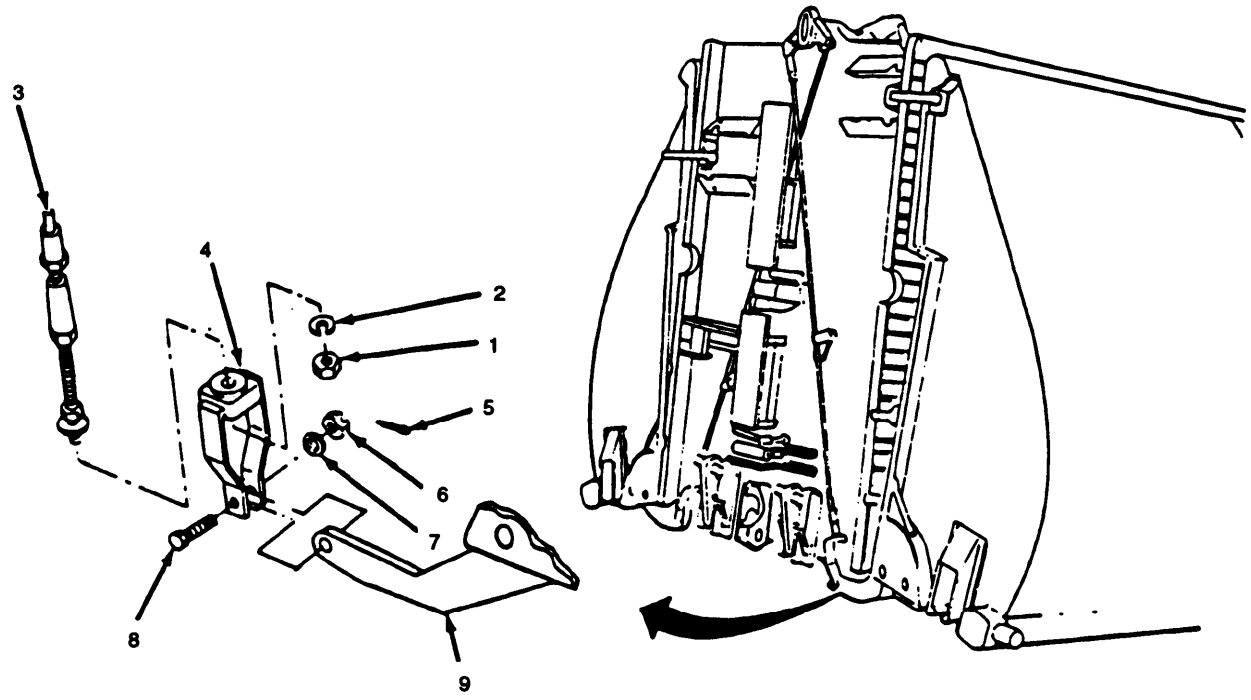



*Figure 4-122. Cable Link, Pin, and Hardware, Replace.*

**FOLLOW-ON MAINTENANCE:** Install bay (para. 2-27).

4-94. **Unfolding Lever.**

This task covers: Replace

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Equipment Condition:*

Bay removed (para. 2-16).

*Materials/Parts*

Grease, Automotive and Artillery (Item 2, Appendix E)

*a.* *Replace.* (figure 4-123)

(1) Remove spring pin (1), pin (2), and remove unfolding lever (3).

(2) Apply grease to unfolding lever (3).

(3) Install unfolding lever (3) and secure with pin (2) and spring pin (1).

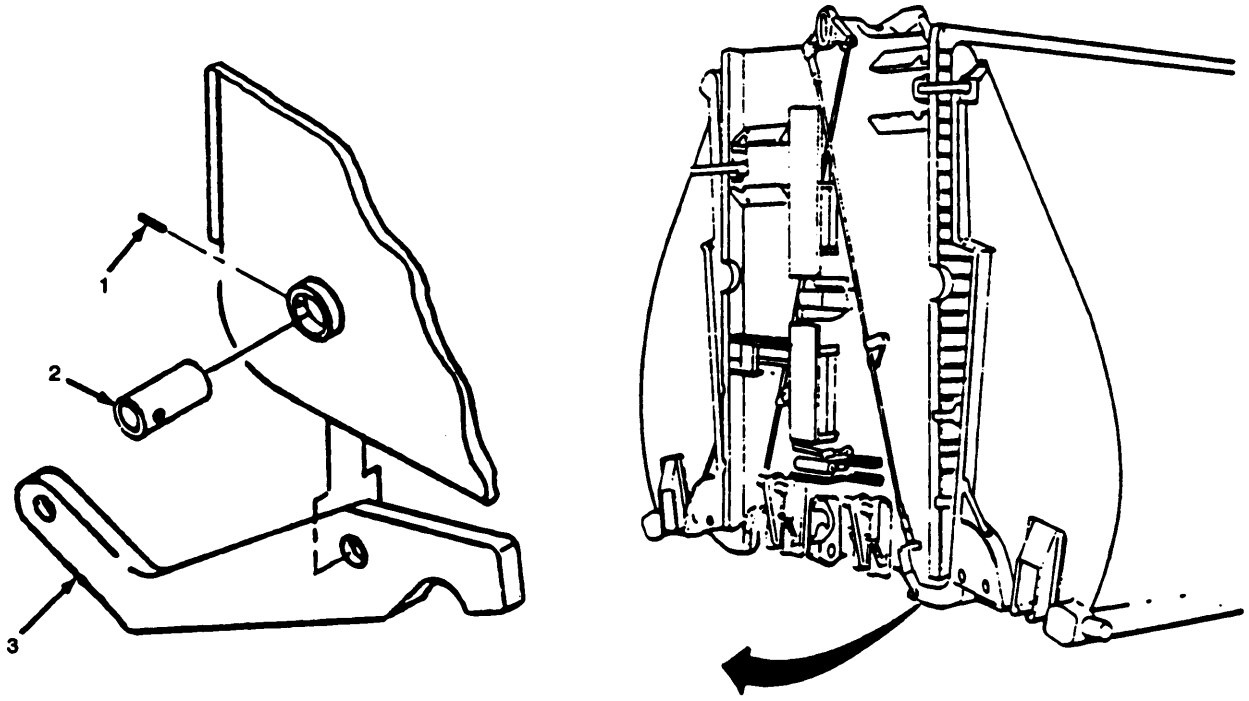



*Figure 4-123. Unfolding Lever, Replace.*

**FOLLOW-ON MAINTENANCE:** Install bay (para. 2-27).

4-95. **Support Link and Hinge Pin.**

This task covers: Replace

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Equipment Condition:*

Bay removed (para. 2-16).

*Materials/Parts*

Grease, Automotive and Artillery (Item 2, Appendix E)

*a*. *Replace.* (figure 4-124)

**WARNING**

Bow ponton must be securely blocked in position, injury or death may result.

**NOTE**

Hinge pin can be replaced with bay in folded or unfolded position. Replace one hinge pin at a time.

(1) Remove two spring pins (1) and remove hinge pin (2).

(2) Apply grease to hinge pin (2).

(3) Install hinge pin (2) and secure with two spring pins (1).

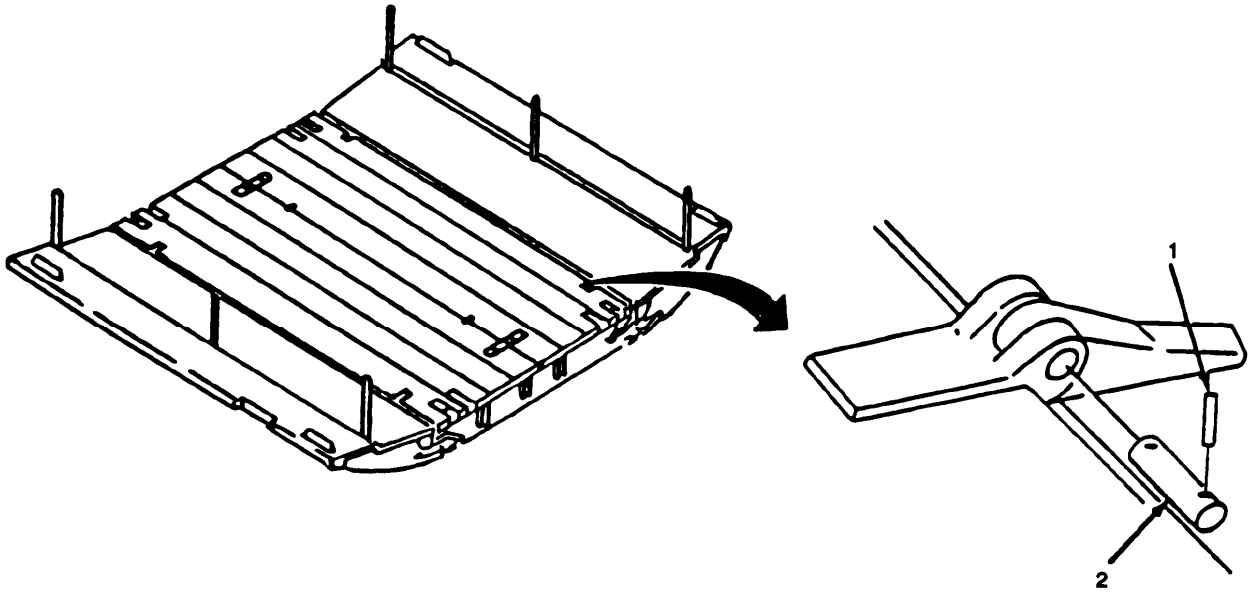



*Figure 4-124. Hinge Pin, Replace.*

**FOLLOW-ON MAINTENANCE:** Install bay (para. 2-27).

4-96. **Bow Pontons.**

This task covers: a. Replace b. Repair

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)
Ponton Leak Detector (Item 3, Appendix B)

*Materials/Parts*

Lifting Sling (NSN 1670-00-907-3080)
Four Chocks 6 x 6 x 24 in. (15 x 15 x 60 cm)
Sealing Compound (Item 14, Appendix E)

*Materials/Parts - Continued*

Grease, Automotive and Artillery (Item 2, Appendix E)
Compound, Deck Covering (Item 1, Appendix E)

*Equipment Condition:*

Unfolding lever removed (para. 4-92).

**NOTE**

There are two bow pontons on each bay. The following procedures are the same for both.

*a. Replace.* (figure 4-125)

(1) Connect bay (1) to suitable lifting device and raise bay enough to place four chocks (2) under roadway pontons (3) and lower bay.

(2) Connect bow ponton (4) to suitable lifting device.

WARNING

Stand clear of pontons and cable during lowering operations. Do not stand on, or place hands or arms under, interior bay pontons when removing attaching parts.

(3) Unlatch roadway/bow ponton foldlock latch (5) and slowly lower bow ponton (4).

(4) Remove four spring pins (6), two hinge pins (7) and remove bow ponton (4).

(5) Apply grease to hinge pins (7).

**WARNING**

Do not stand on, or place hands or arms under, interior bay pontons when installing attaching parts. Stand clear of pontons and cable during lifting operations.

(6) Install bow ponton (4) and secure with two hinge pins (7) and spring pins (6).

(7) Raise bow ponton (4) and latch roadway/bow ponton foldlock latch (5).

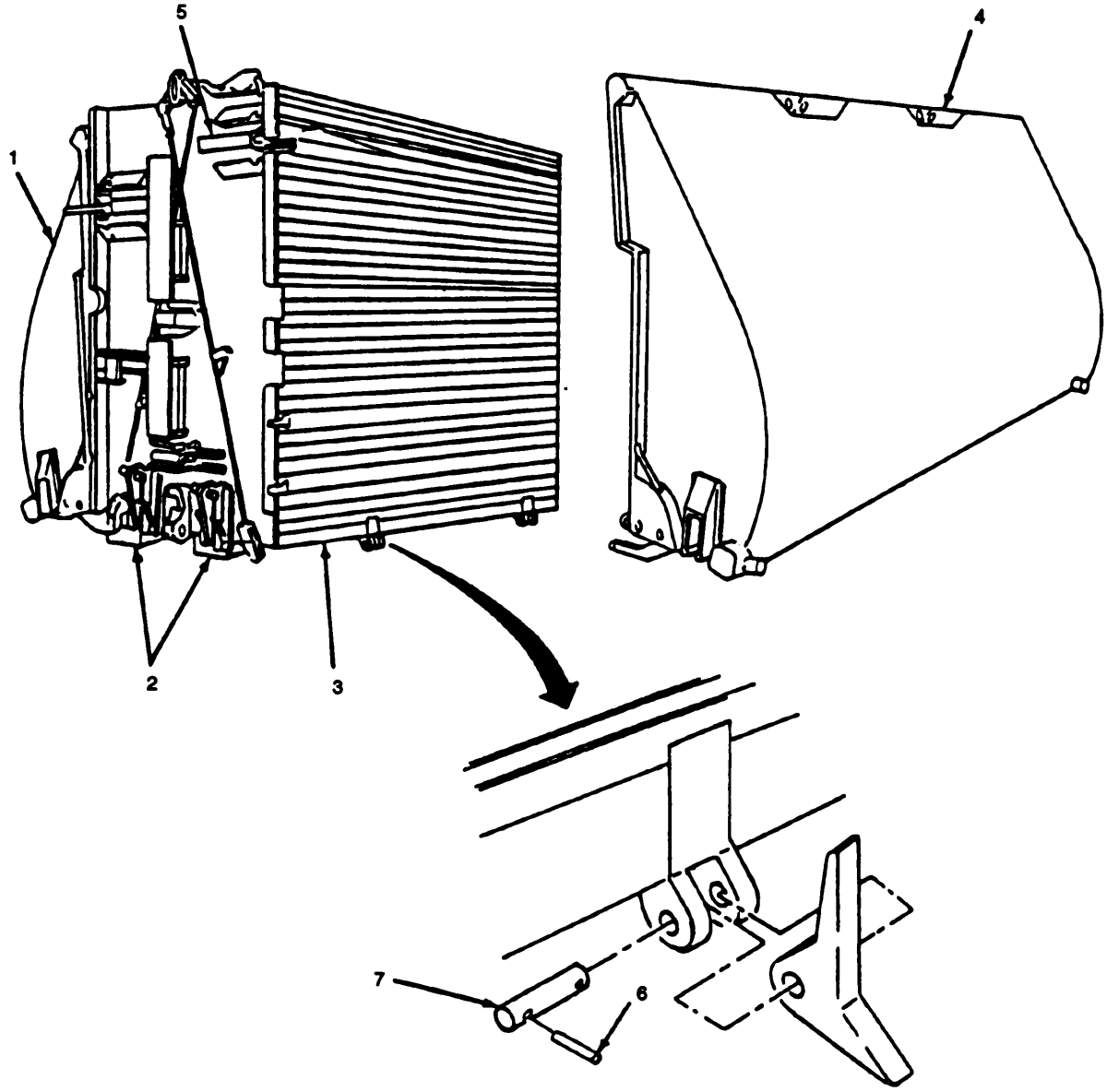



*Figure 4-125. Bow Pontons, Replace.*

**FOLLOW-ON MAINTENANCE:** Install unfolding lever (para. 4-92).

## 4-96. **Bow Pontons. - Continued**

*b.* *Repair.* (figure 4-126)

**NOTE**

Bow ponton removed for repair. See para. a. above.

(1) Lift lever (1) and remove bilge plug (2).

(2) Install ponton leak detector and pressurize ponton (3) to 1.4-1.6 psi (0.10-0.12 kg/sq cm).

(3) Apply soapy solution to ponton surface and check for leaks.

(4) Mark leaks and remove pressure.

(5) Repair leaks by welding, except at riveted and bolted seams.

(6) Repair leaks at riveted and bolted seams with sealing compound.

(7) Repaint repaired areas in accordance with MIL-T-704 Type B or local directives.

(8) Apply nonskid compound to walkways.

(9) Remove ponton leak detector, and install bilge plug (2) and secure.

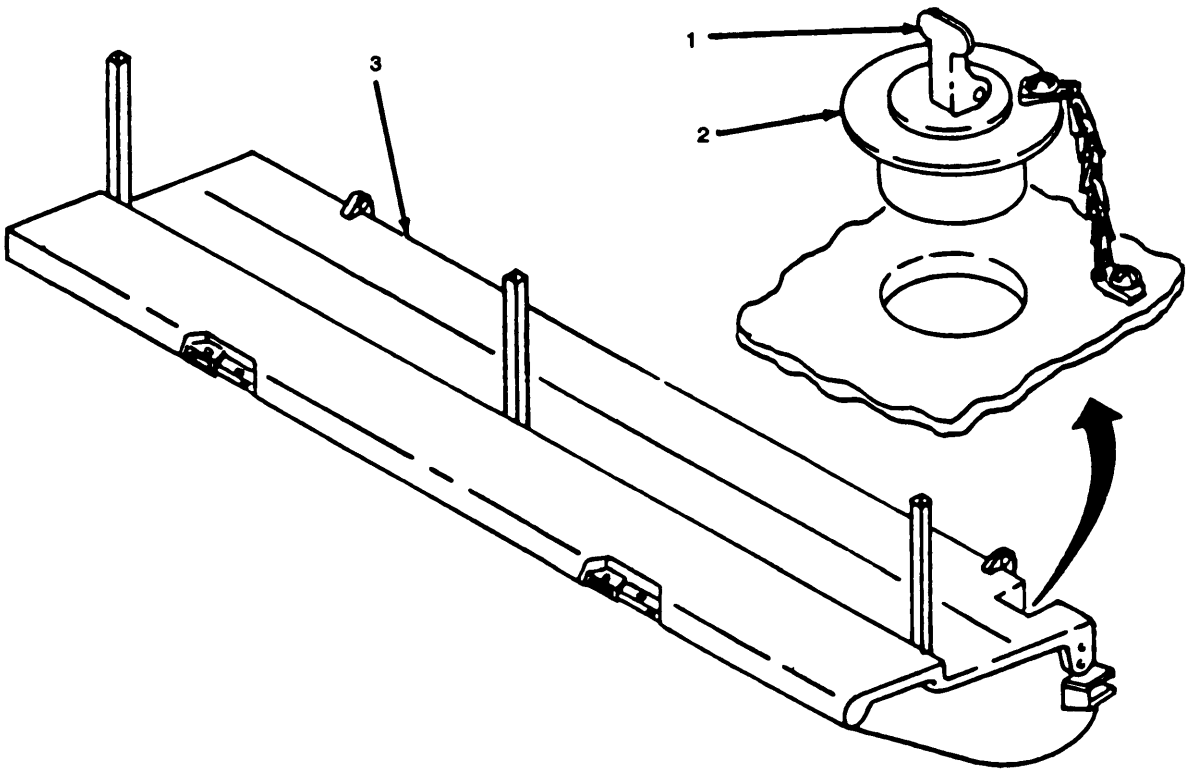



*Figure 4-126. Bow Ponton, Repair.*

**FOLLOW-ON MAINTENANCE:** Install bow ponton. See para. a. above.

4-97. **Handrail Post.**

This task covers: Replace

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Equipment Condition:*

Bay unfolded (para. 2-14).

*Meterials/Parts*

Grease, Automotive and Artillery (Item 2, Appendix E)

*a*. Replace. (figure 4-127)

(1) Untie rope (1) from handrail (2).

(2) Remove two cotter pins (3), washers (4), pin (5), and handrail (2).

(3) Apply grease to pin (5).

(4) Install handrail (2) and secure with pin (5), washers (4), and cotter pins (3).

(5) Secure rope (1) to handrail (2).

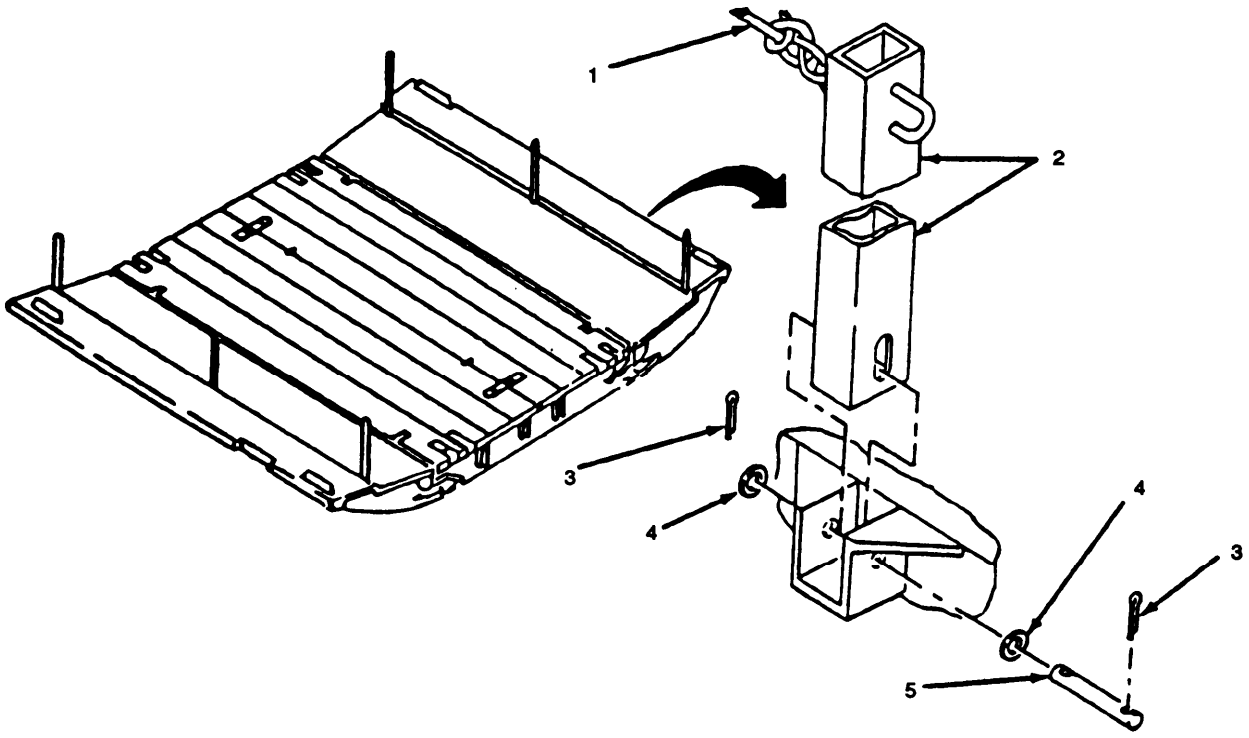



*Figure 4-127. Handrail Post, Replace.*

**FOLLOW-ON MAINTENANCE:** Install bay (para. 2-27).

4-98. **Bilge Plug.**

This task covers: Replace

INITIAL SETUP

*Tools*

General Mechanic's Automotive Tool Kit
(Item 1, Appendix B)
Grease, Automotive and Artillery (Item 2, Appendix E)

**NOTE**

Bilge plugs can be accessed with bay installed on transporter or with bay unfolded.

*a*. *Replace.* (figure 4-128)

(1) Lift lever (1) on bilge plug (2) and remove plug (2).

(2) Remove screw (3) securing chain (4) and remove plug (2).

(3) Position chain (4) and secure with screw (3).

(4) Install bilge plug (2) and close lever (1).

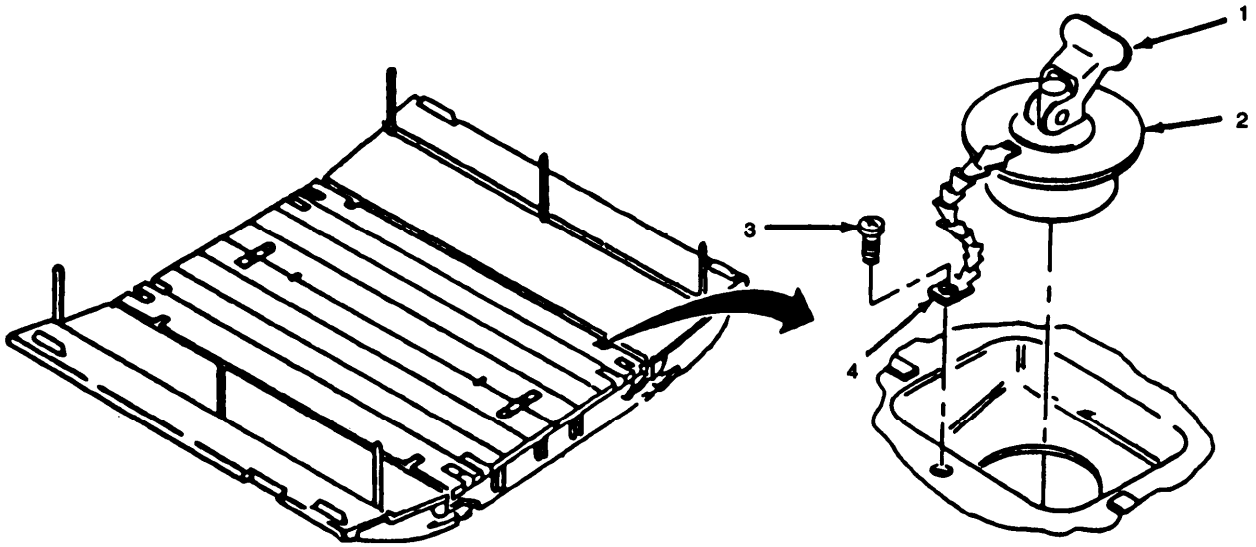



*Figure 4-128. Bilge Plug, Replace.*

4-99. **Pins.**

This task covers: Replace

INITIAL SETUP

| *Tool* | *Equipment Condition:* |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix) | Bay unfolded (para. 2-14). |

*a.* Replace. (figure 4-129)

(1) Remove quick release pin (1).

(2) Remove screw (2), wire rope (3) and quick release pin (1).

(3) Position wire rope (3), to pin (1) and install with screw (2).

(4) Install quick release pin (1).

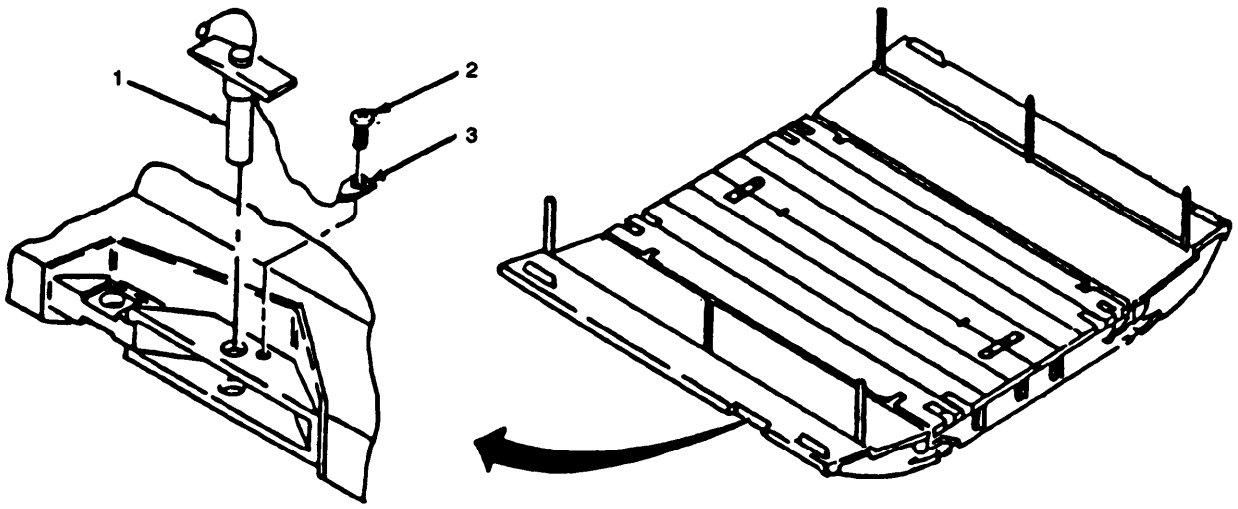



*Figure 4-129. Quick Release Pin, Replace.*

4-100. **Latch Receptacle and Strike Catch.**

This task covers: a. Adjust b. Replace

INITIAL SETUP

| *Tool* | *Equipment Condition:* |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix B) | Bay unfolded for adjustment (para. 2-14). |

*a.* *Adjust.* (figure 4-130)

**WARNING**

To avoid drowning, make final adjustments with flotation vest on, bay secured and unfolded.

(1) Rotate roadway-to-bow ponton bridge latch (1) to latched position.

(2) Measure the distance between pins (2) and top of receptacles (3). Clearance should be approximately 1/16 in. (1.58 cm).

(3) Loosen eight screws (4) and adjust receptacles (3). Torque screws to 31-34 ft-lbs (42-46 Nm).

(4) Ensure pins (2) contact both receptacles (3) when fully engaged. Re-adjust receptacles as needed.

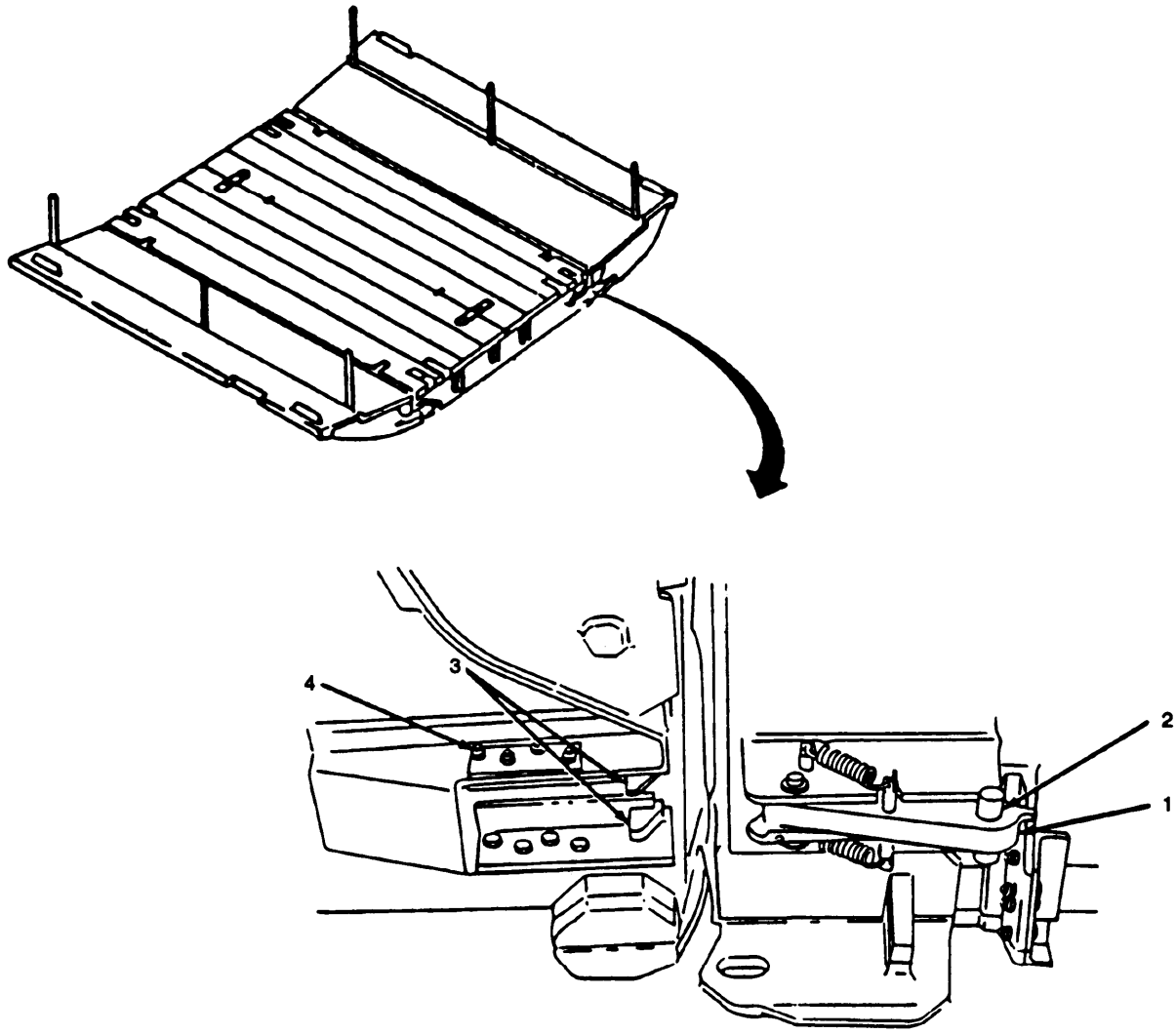



*Figure 4-130. Latch Receptacles, Adjust.*

**FOLLOW-ON MAINTENANCE:** Install bay (para. 2-27).

4-100. **Latch Receptacle and Strike Catch. - Continued**

*b.* *Replace.* (figure 4-131)

**NOTE**

The replace procedures are the same for all latch receptacles.

(1) Remove four nuts (1), lockwashers (2), screws (3), latch receptacle (4) and shim (5).

(2) Remove four nuts (6) lockwashers (7), screws (8), strike catch (9) and shim (10).

(3) Install shim (10), strike latch (9), and secure with four screws (8), lockwashers (7), and nuts (6).

(4) Install shim (5), latch receptacle (4), and secure with four screws (3), lockwashers (2), and nuts (1).

(5) Adjust receptacles.

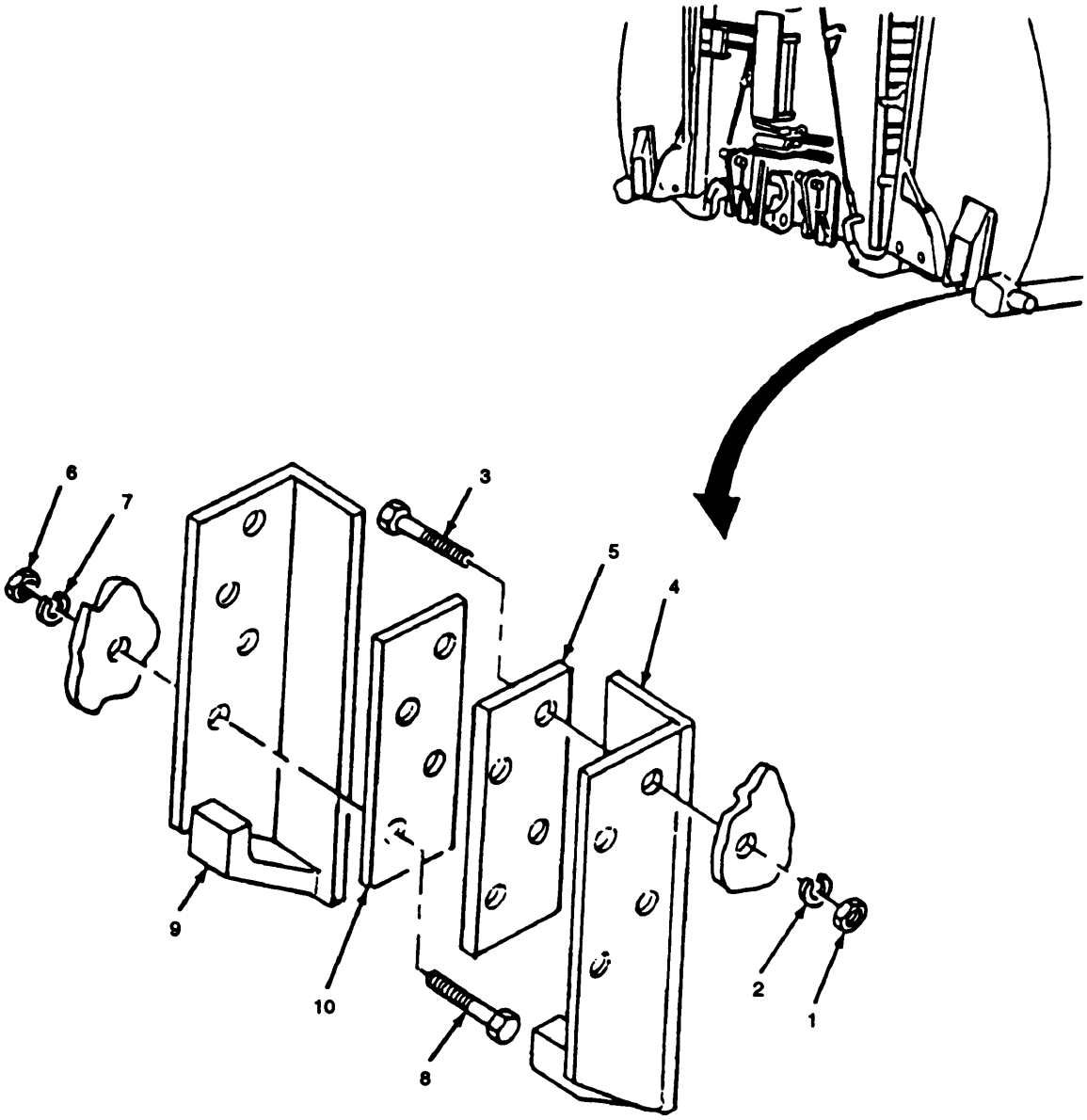



*Figure 4-131. Latch Receptacle and Strike Catch, Replace.*

4-101. **Roadway Pontons.**

This task covers: a. Replace b. Repair

INITIAL SETUP

*Tools*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)
Ponton Leak Detector (Item 3, Appendix B)

*Equipment Conditions:*

Bow ponton removed (para. 4-94).
Cable assembly removed (para. 4-90).

*Materials/Parts*

Lifting Slings (NSN 1670-00-907-3080)
Sealing Compound (Item 14, Appendix E)
Compound, Deck Covering (Item 1, Appendix E)

*a. Replace.* (figure 4-132)

(1) Connect suitable lifting device to roadway ponton lift points (1) and take in slack.

(2) Remove two cotter pins (2), washers (3), and remove pin (4).

(3) Remove nut (5), screw (6), collar (7), hinge pin (8) and washers (9).

(4) Remove two nuts (10), screws (11) and Iinks and lever (12).

(5) Remove nut (13), screw (14), collar, and hinge pin (16).

**WARNING**

Weight of ponton will shift in direction of lift points during lifting.

(6) Unlatch front and rear travel latches (17) and remove roadway ponton (18).

**WARNING**

The weight distribution of load will result in the bottom of the ponton to swing in the direction of lift point.

(7) Position roadway ponton (17) adjacent to roadway ponton (18) and aline hinges.

(8) Install rear hinge pin (16), collar (15) and secure with screw (14) and nut (13). Torque screw to120-132 ft-lbs (162-179 Nm).

(9) Install links and lever (12), and secure with two screws (11) and nuts (10). Torque screws to 120-132 ft-lbs (162-179 Nm).

(10) Install front hinge pin (8), washers (9), collar (7), and secure with screw (5) and washer (6). Torque screw to 120-132 ft-lbs (162-179 Nm).

(11) Install pin (4) and secure with two washers (3) and cotter pins (2).

(12) Connect suitable lifting device to front (8) and rear (16) hinge pins and raise roadway pontons (18) and latch front and rear travel latches (17) and lower roadway pontons.

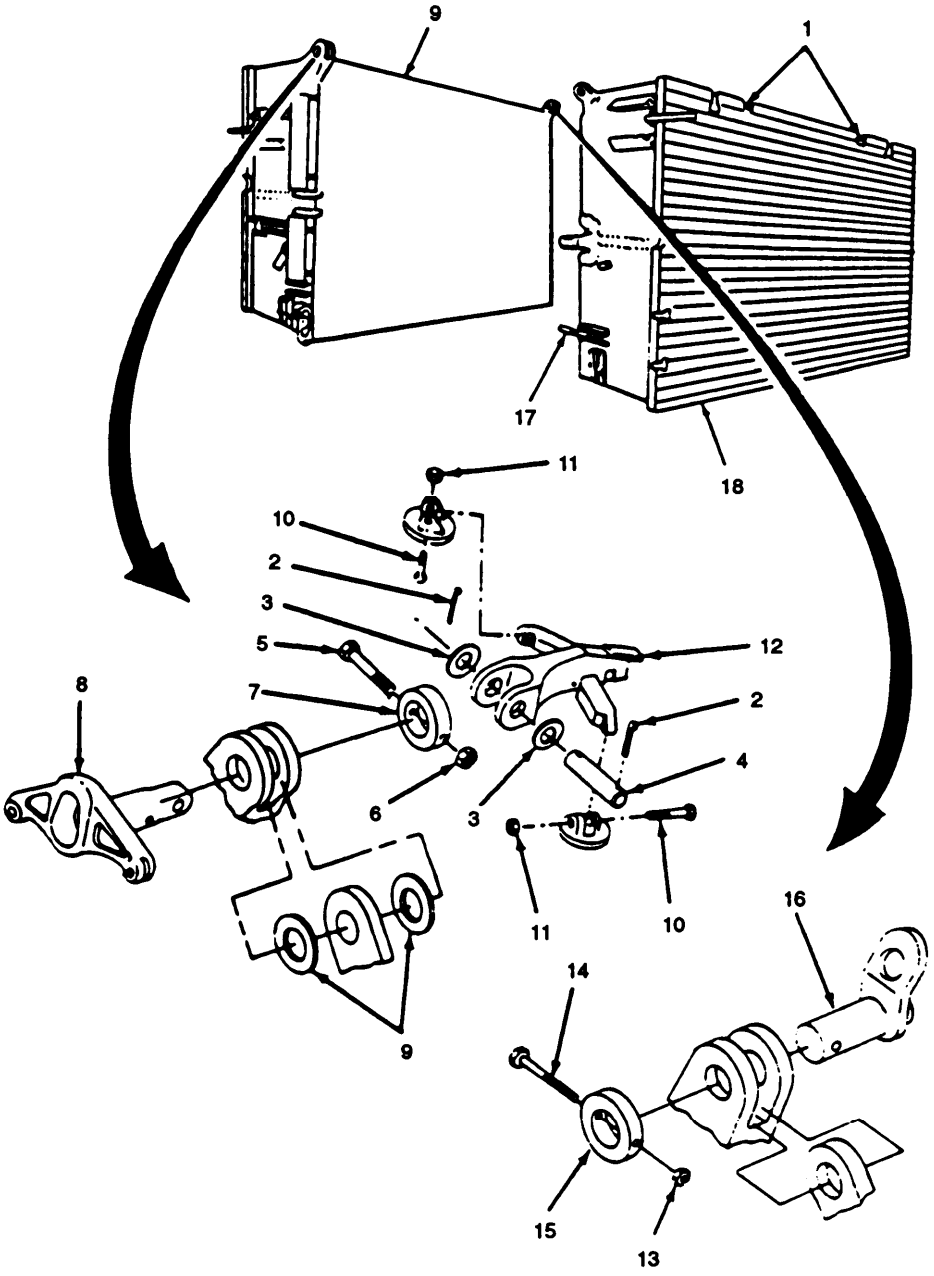



*Figure 4-132. Roadway Pontons, Replace.*

**FOLLOW-ON MAINTENANCE:**
(1) Install bow pontons (para. 4-94).
(2) Install cable assembly (para. 4-91).

## 4-101. Roadway Pontons. - Continued

*b.* *Repair.* (figure 4-133)

**NOTE**

Roadway ponton removed for repair. See para. a above.

(1) Raise lever (1) and remove bilge plug (2).

(2) Install ponton leak detector and pressurize ponton (3) to 1.4-1.6 psi (9.85-11.25 kg/sq cm).

(3) Apply soapy solution to surface of ponton and check for leaks.

(4) Mark leaks and relieve pressure in ponton (3).

(5) Repair leaks, except on riveted or bolted seams, by welding.

(6) Repair leaks at riveted and bolted seams with sealing compound.

(7) Repaint repaired areas in accordance with MIL-T-704 Type B or local directives.

(8) Apply nonskid compound to walkways.

(9) Remove ponton leak detector and install bilge plug (2) and secure.

(10) Repeat Steps (1) through (9) for remaining ponton.

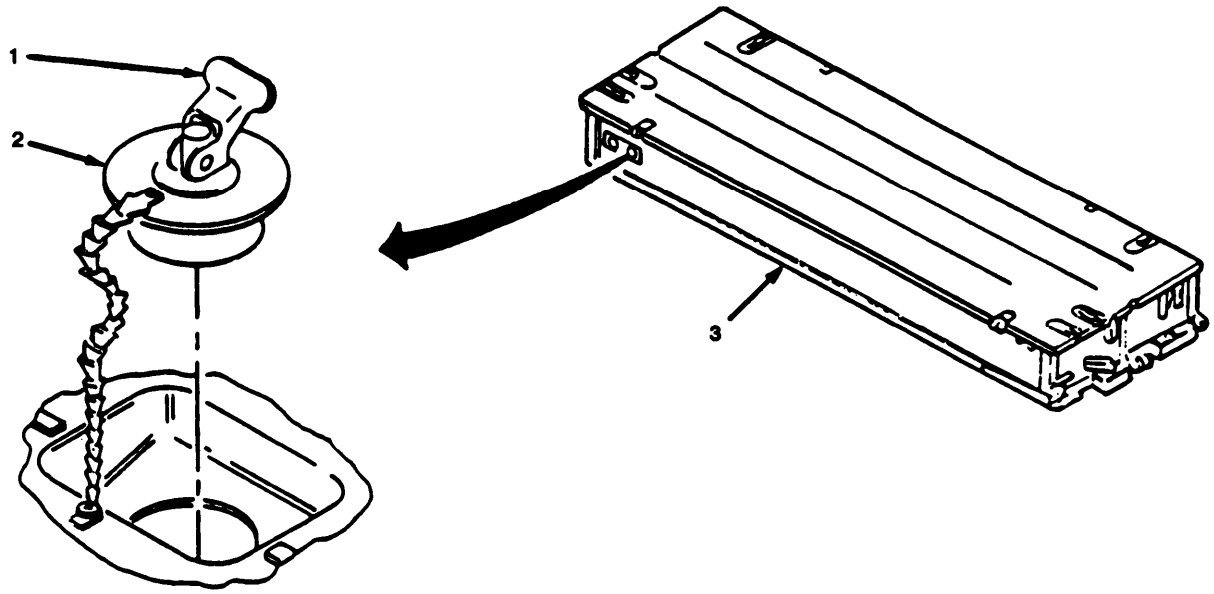



*Figure 4-133. Roadway Ponton, Repair.*

4-102. **Hinge Pins, Link and Hardware.**

This task covers: a. Replace (Front) b. Replace (Rear)

INITIAL SETUP

| *Tool* | *Materials/Parts* |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix B) | Grease, Automotive and Artillery (Item 2, Appendix E) |

*a*. *Replace (Front).* (figure 4-134)

**NOTE**

Hinge pins can be replaced with the bays in folded position.

(1) Loosen nut (1) to relieve tension on cable (2).

(2) Remove spring pin (3), pin (4) and remove cable (2) from hinge pin (5).

(3) Repeat Steps (1) and (2) for remaining cable.

(4) Remove two cotter pins (6), washers (7), and remove pin (8) securing lever (9) to hinge pin (5).

(5) Remove nut (10), bolt (11), collar (12), washers (13), and hinge pin (5).

(6) Remove spring pin (14), pin (15), and remove lever (9).

(7) Remove bolt (16), nut (17), and remove long link (18).

(8) Remove bolt (19), nut (20), and remove short link (21).

(9) Install short link (21) and secure with bolt (19) and nut (20). Torque bolts to 120-132 ft-lbs (162-179 Nm).

(10) Install long link (18) and secure with bolt (16) and nut (17). Torque bolts to 120-132 ft-lbs (162-179 Nm).

(11) Apply grease to pin (15).

(12) Install cover (9) on both links (18) and (21) and secure with pin (15) and spring pin (14).

(13) Apply grease to pin (5).

(14) Install hinge pin (5), two washers (13), collar (12), and secure with bolt (11) and nut (10). Torque bolts to 120-132 ft-lbs (162-179 Nm).

(15) Install pin (8) and secure with two washers (7) and cotter pins (6).

(16) Apply grease to pin (4).

(17) Install cable (2) in hinge pin (5) and secure with pin (4) and spring pin (3).

(18) Repeat Steps (17) and (18) for remaining cable.

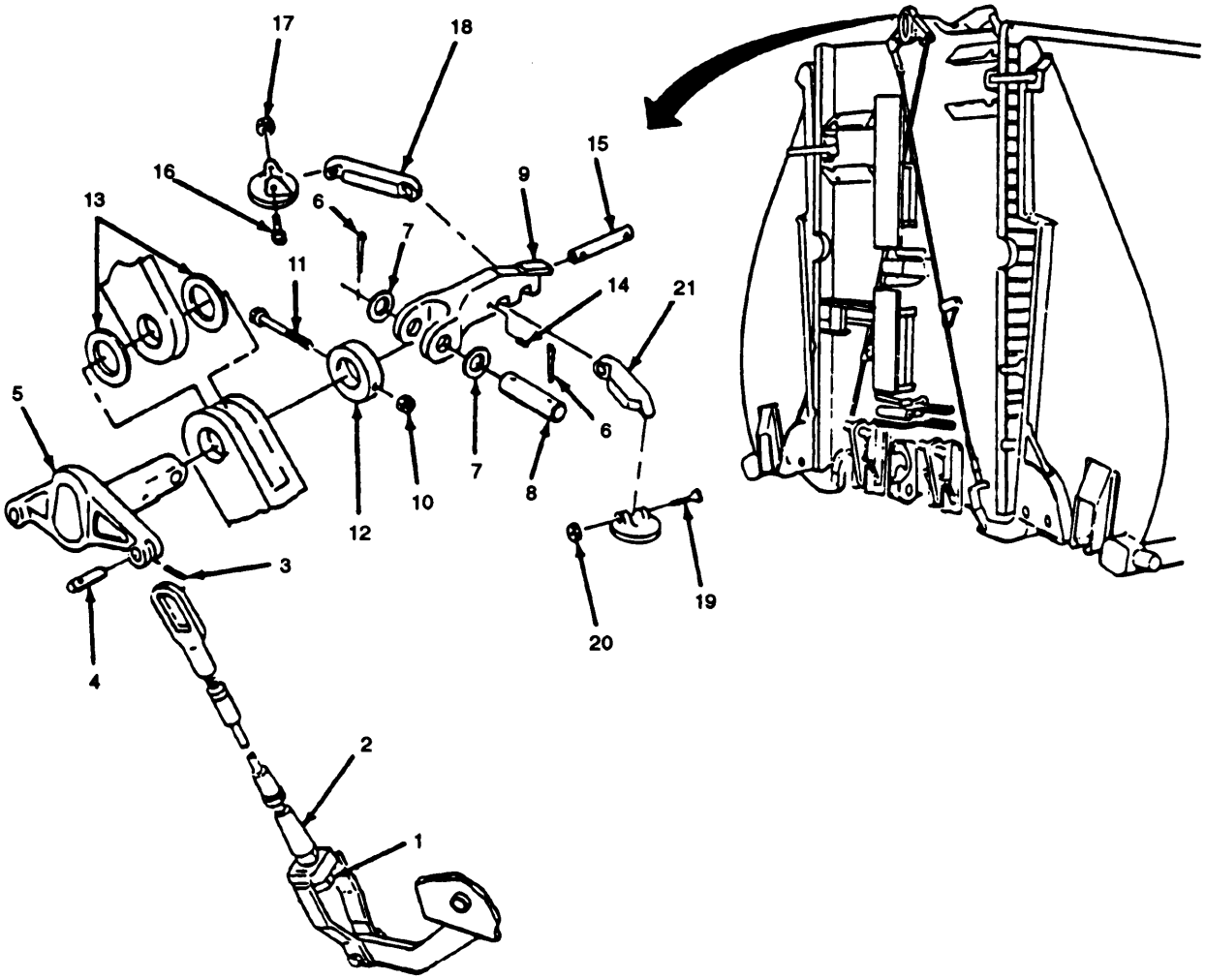



*Figure 4-134. Front Hinge Pin, Link and Hardware, Replace.*

4-102. **Hinge Pins, Link and Hardware. - Continued**

*b.* *Replace (Rear).* (figure 4-135)

(1) Remove bolt (1), nut (2), and remove collar (3).

(2) Remove hinge pin (4).

(3) Apply grease to hinge pin (4).

(4) Install hinge pin (4) and secure with collar (3), bolt (1), and nut (2). Torque bolt to 120-132 ft-lbs (162-179 Nm).

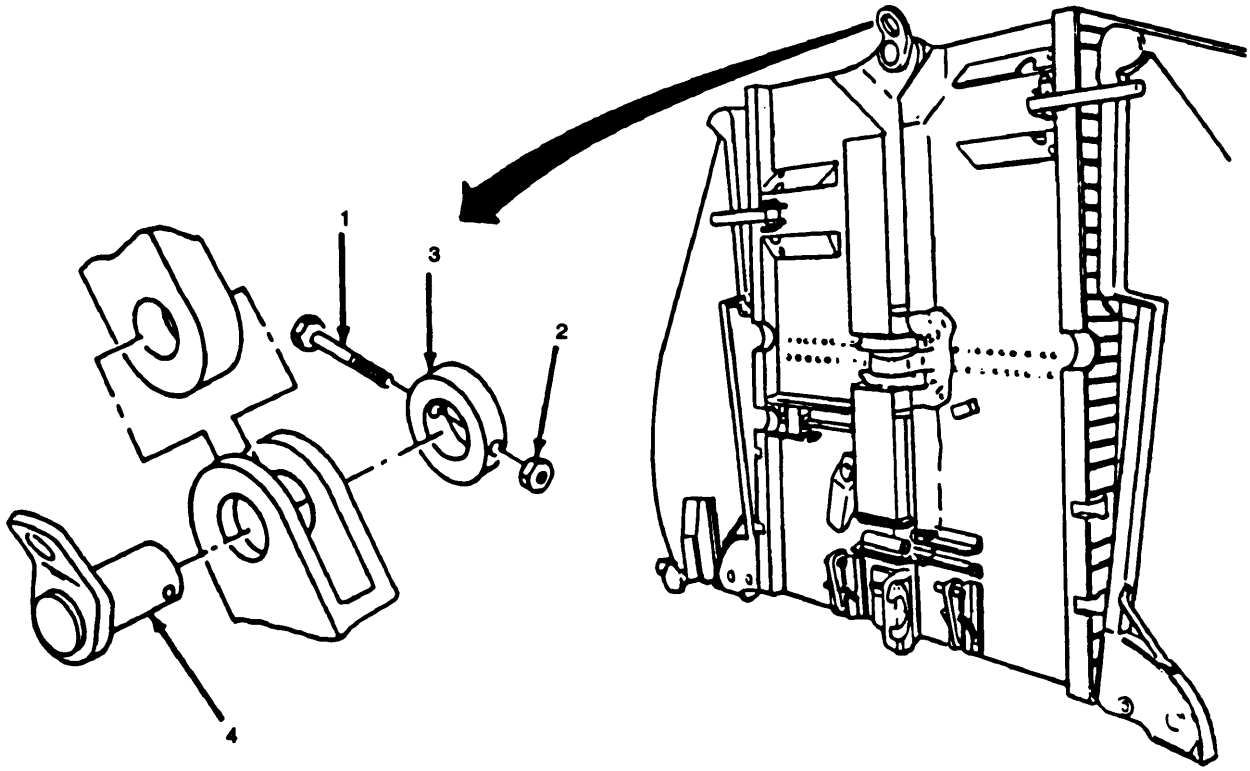



*Figure 4-135. Rear Hinge Pin, Replace.*

4-103. **Foldlock.**

This task covers: Replace

INITIAL SETUP

*Tools*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)
Cable, Adjusting Spring Scale (Item 2, Appendix B)

*Equipment Condition:*

Bay removed (para. 2-16).

*Materials/Parts*

Grease, Automotive and Artillery (Item 2, Appendix E)

*a.* Replace. (figure 4-136)

(1) Unlatch (open) foldlock (1).

(2) Remove two springs (2) and remove two spacers (3) and pin (4).

(3) Remove two cotter pins (5), washers (6), pin (7), and remove foldlock (1).

(4) Remove two springs pins (8) and remove pin (9) from foldlock (1).

(5) Apply grease to pins (4), (7), and (9).

(6) Install pin (9) in foldlock (1) and secure with two spring pins (8).

(7) Install foldlock (1) and secure with pin (7), two washers (6) and cotter pins (5).

(8) Install pin (4), two spacers (3) and springs (2).

(9) Latch (close) foldlock (1).

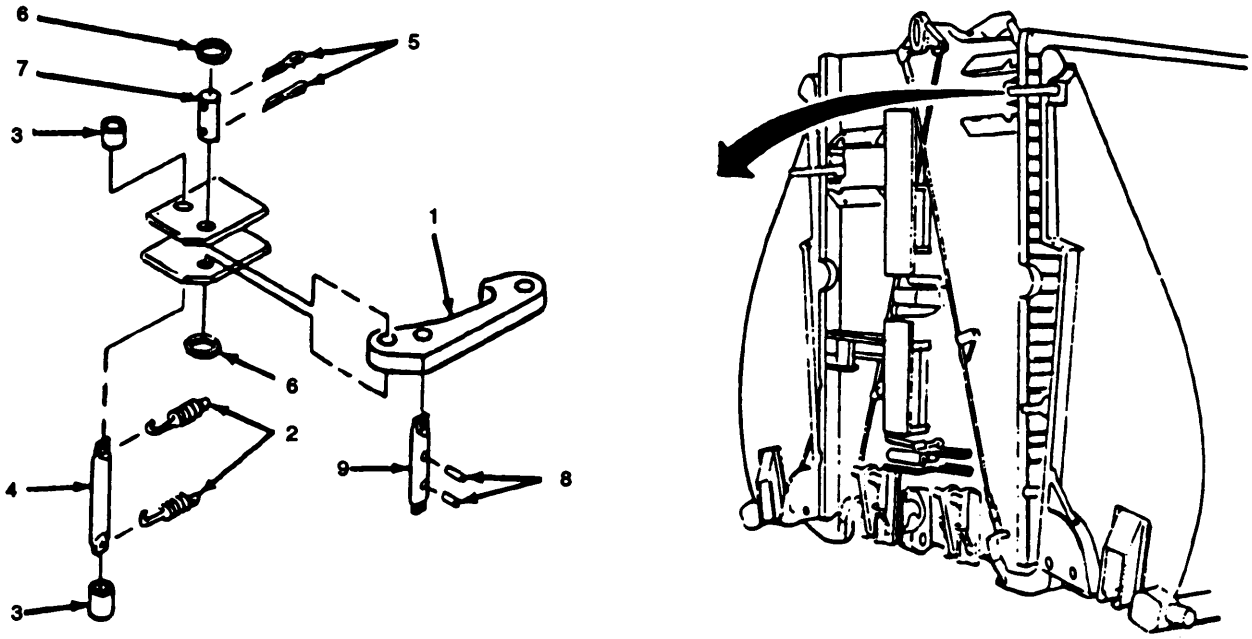



*Figure 4-136. Foldlock, Replace.*

**FOLLOW-ON MAINTENANCE:** Install bay (para. 2-27).

4-104. **Tee Latch and Travel Latch.**

This task covers: a. Replace b. Adjust

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Equipment Condition:*

Bay removed (para. 2-16).

*Materials/Parts*

Grease, Automotive and Artillery (Item 2, Appendix E)

**NOTE**

The following procedures are for roadway-to-bow ponton latches and travel latch.

*a.* Replace. (figure 4-137)

(1) Remove two springs (1), spacers (2), and remove pin (3).

(2) Remove two cotter pins (4), washers (5), pin (6), and remove tee latch (7).

(3) Remove two spring pins (8) and remove pin (9).

(4) Apply grease to pins (3), (6), and (8).

(5) Install pin (9) in tee latch (7) and secure with two spring pins (8).

(6) Install tee latch (7) and secure with pin (6), two washers (5) and cotter pins (4).

(7) Install pin (3), two spacers (2), and two springs (1).

*b.* Adjust. (figure 4-137)

(1) Check clearance between top of pin (10) on travel latch (11) and top of latch receptacle (12). Clearance should be 1/16-3/16 in. (1.58-4.760 cm). Adjust clearance by turning screw (13).

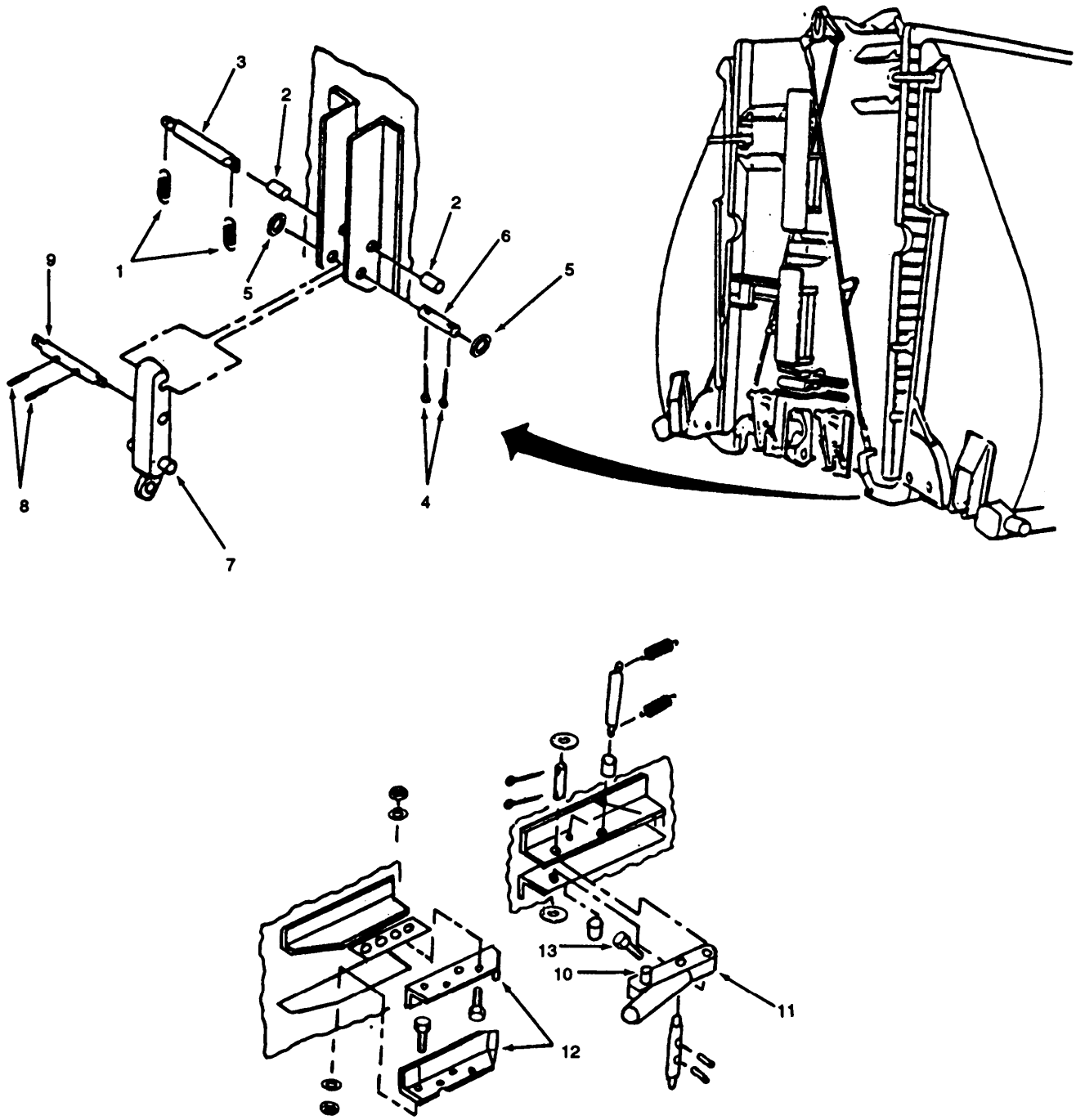



*Figure 4-137. Tee Latch Replace.*

**FOLLOW-ON MAINTENANCE:** Install bay (para. 2-27).

4-105. **Cable Guide.**

This task covers: Replace

INITIAL SETUP

| *Tools* | *Equipment Condition* |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix B)<br>Aluminum Welding Equipment | Bay removed (para. 2-16). |

*a*. *Replace.* (figure 4-138)

(1) Remove Cable guide (1) in accordance with TM 9-237.

(2) Install cable guide (1) and weld in place in accordance with TM 9-237.

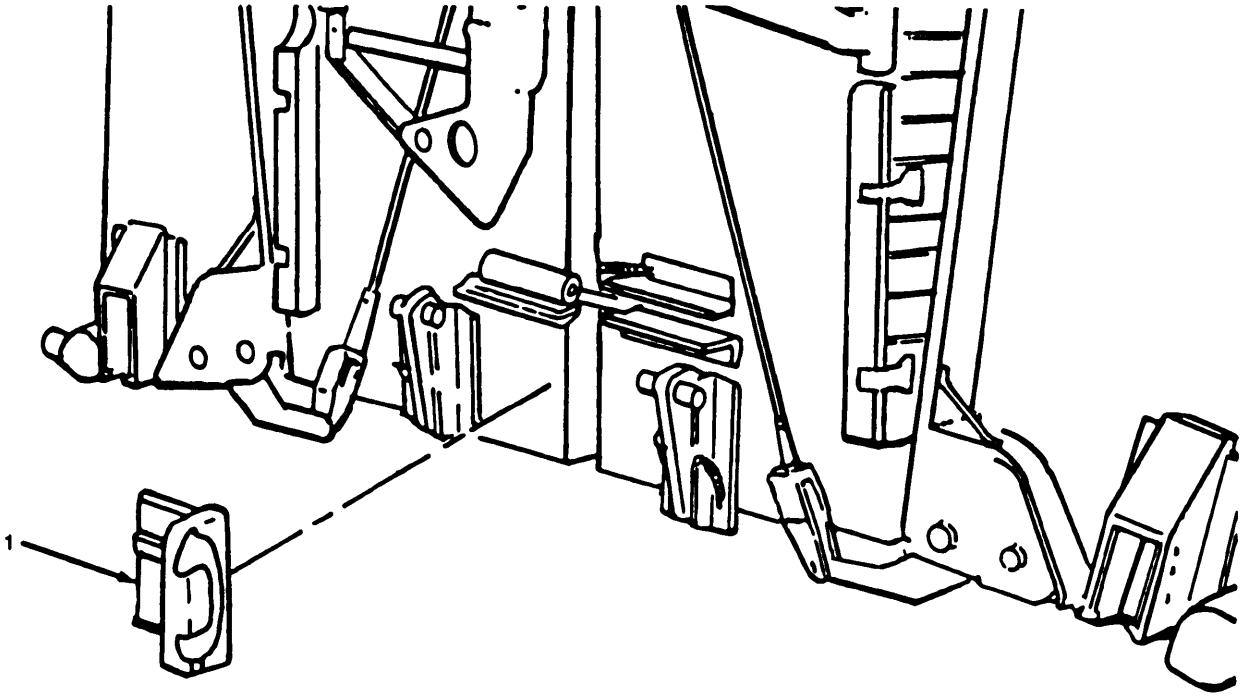



*Figure 4-138. Cable Guide, Replace.*

**FOLLOW-ON MAINTENANCE:** Install bay (para. 2-27).

4-106. **Receptacles.**

This task covers: Replace

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Equipment Condition:*

Bay removed (para. 2-16).

*a*. *Replace.* (figure 4-139)

(1) Unlatch (open) travel latch (1).

(2) Remove four bolts (2), lockwashers (3), nuts (4), and remove strike catch (5) and shim (6).

(3) Remove four bolts (7), lockwashers (8), nuts (9), and remove latch receptacle (10), and shim (11).

**NOTE**

Do not fully tighten nuts at this point.

(4) Install latch receptacle (10) and shim (11), and secure with four bolts (7), lockwashers (8), and nuts (9).

(5) Install strike catch (5) and shim (6), and secure with four bolts (2), lockwashers (3), and nuts (4).

(6) Latch (close) travel latch (1) and check clearance between pins (12) of travel latch (1) and latch receptacle (9) and strike catch (5). Clearance should be approximately 0.0625 in. (0.1587 cm).

(7) Adjust strike catch (5) and latch receptacle (10) as needed and torque nuts to 31-34 ft-lbs (42-46 Nm).

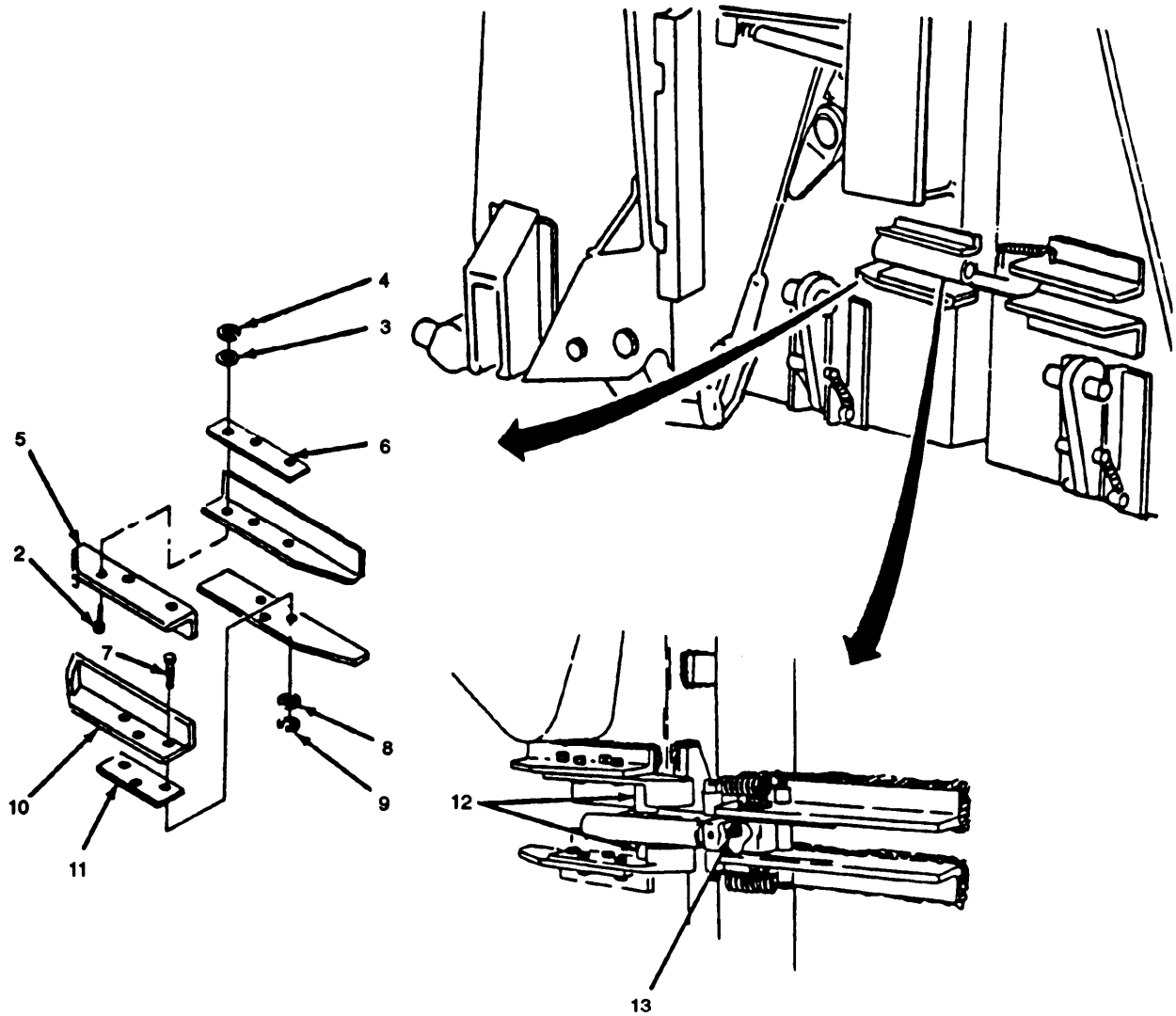



*Figure 4-139. Receptacles, Replace.*

**FOLLOW-ON MAINTENANCE:** Install bay (para. 2-27).

4-107. **Connectors and Hardware.**

This task covers: Replace

INITIAL SETUP

| *Tool* | *Equipment Condition:* |
|---|---|
| General Mechanic's Automotive Tool Kit (Item 1, Appendix B) | Bay unfolded (para. 2-14). |

*a. Replace.* (figure 4-140)

**NOTE**

The procedures to replace connector are the same for all connectors.

(1) Remove spring (1) from connector (2) and eye bracket (3).

(2) Remove two screw (4) and remove eye bracket (3) and connector (2).

(3) Remove pin (5) and remove connector (2).

(4) Position connector (2) on eye bracket (3) and secure with pin (5).

(5) Install eye bracket (3) and connector (2) and secure with two screw (4). Torque screws (4) to 120-132 in. (162-178 Nm).

(6) Install spring (1) on eye bracket (3) and connector (2).

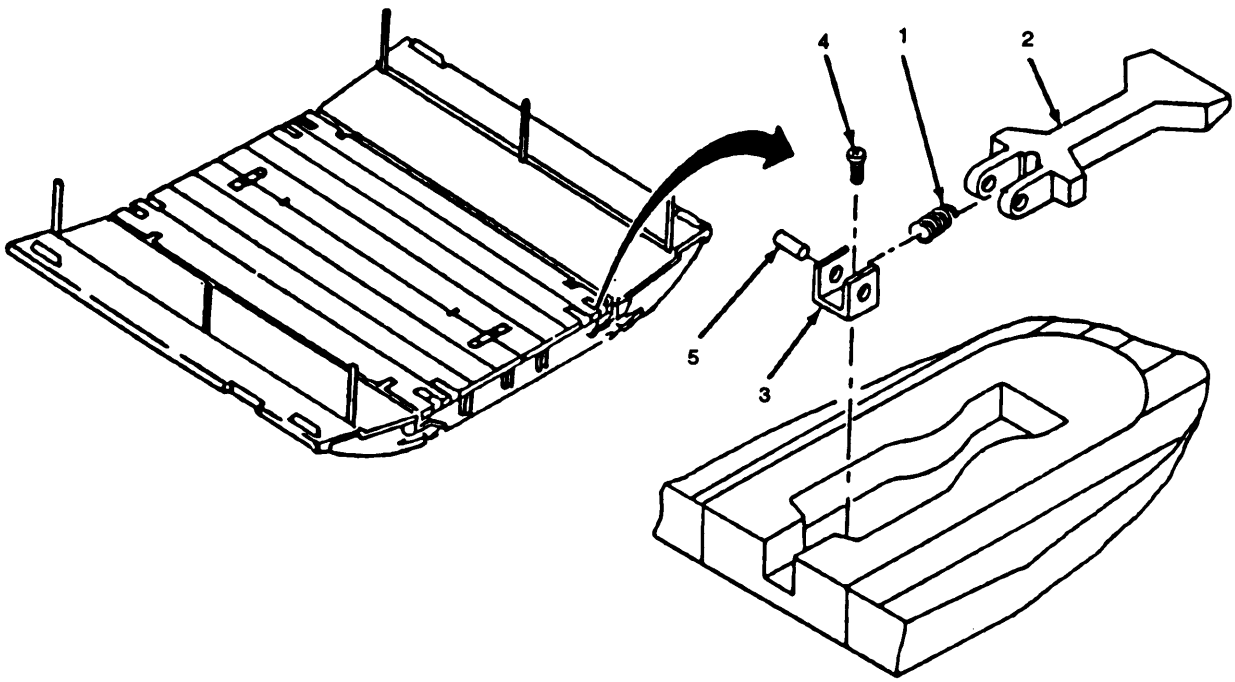



*Figure 4-140. Connectors and Hardware, Replace.*

FOLLOW-ON MAINTENANCE: Install bay (para. 2-27).

4-108. **Connecting Pin, Trunions, and Lever.**

This task covers: Replace

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit (Item 1, Appendix B)

*Equipment Condition:*

Bay removed (para. 2-16).

*Materials/Parts*

Grease, Automotive and Artillery (Item 2, Appendix E)

*a*. *Replace.* (figure 4-141)

(1) Remove four screws (1) and remove bumper (2).

(2) Remove four screws (3), lockwashers (4), and remove trunion retainer (5).

(3) Remove four screws (6), lockwashers (7), and remove cover (8), and remove drive screw (9).

(4) Remove upper trunion nut (10) and lower trunion nut (11) from drive screw (9).

(5) Remove spring pin (12) and pin (13) securing link (14) to bell crank (15).

(6) Remove spring pin (16) securing pin (17).

(7) Remove pin (17).

(8) Remove lube fitting (19).

(9) Remove spring pin (20), pin (21), link (14) and remove connecting pin (22).

(10) Apply grease to pin (21), position link (14) in connecting pin (22), and secure with pin (21) and spring pin (20).

(11) Install lube fitting (19).

(12) Apply grease to pin (17) install bell crank (15) and two washers (16) and secure with pin (17) and spring pin (16).

(13) Apply grease to pin (13) position link (14) in bell crank (15) and secure with pin (13) and spring pin (12).

(14) Apply grease to upper trunion nut (10), lower trunion nut (11) and drive screw (9).

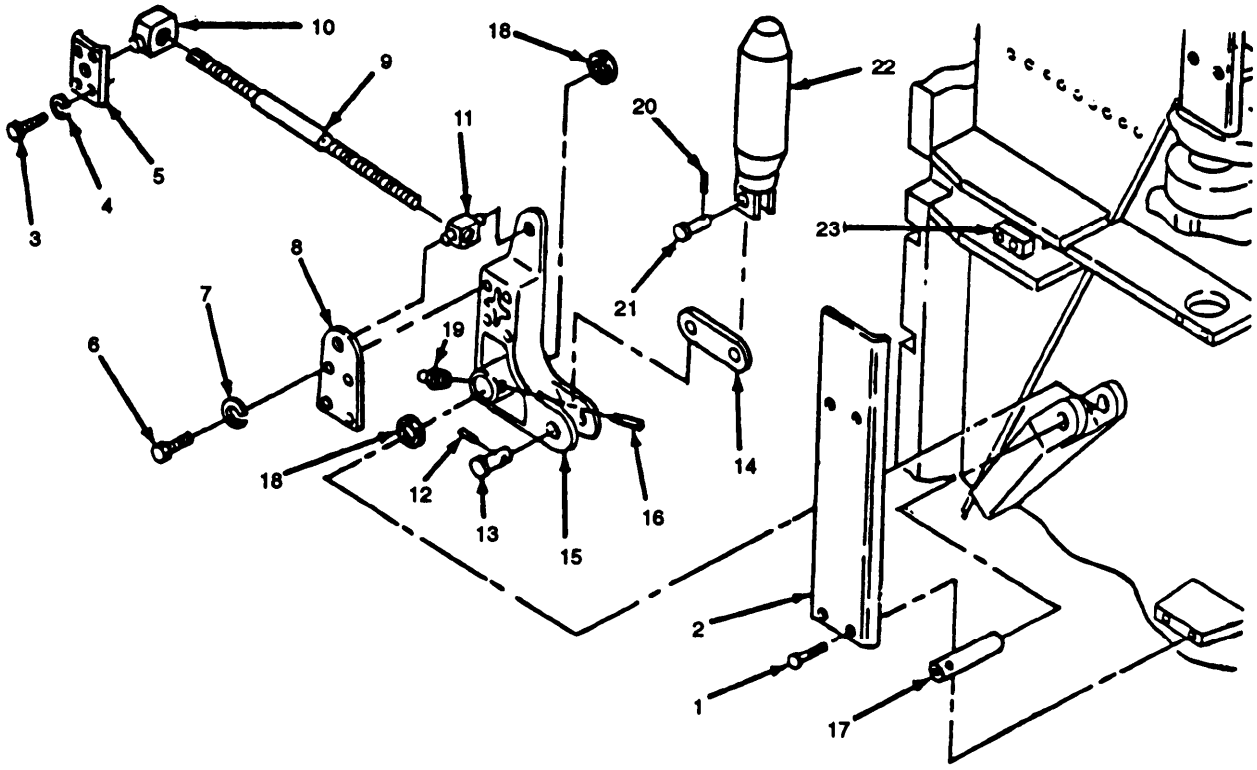
(15) Install upper trunion nut (10) on drive screw (9) until one pull thread is visible.

(16) Install lower trunion nut (11) on drive screw (9) until nut (11) is flush with drive screw (9) then back nut (11) off drive screw (9) one complete turn.

(17) Install lower trunion nut (11) on bell crank (15) and secure with cover (8) four screws (6), and lockwashers (7). Torque screws to 106-117 ft-163 (143-158 Nm).

(18) Adjust upper trunion nut (10) until it alines with hole in upper bracket (23) and secure with trunion retainer (5), four screws (3) and lockwashers (4). Torque screws to 31-34 ft.-lbs (42-46 Nm).

(19) Install bumper (2) and secure with four screws (1).




*Flgure 4-141. Connecting Pin, Trunions, and Levers, Replace.*

4-109. **Bumpers.** This task covers replace.

This task covers: Replace

INITIAL SETUP

*Tool*

General Mechanic's Automotive Tool Kit
(Item 1, Appendix B)

*a.* Replace. (figure 4-142)

(1) Remove six screws (1) and remove bumper (2).

(2) Remove four screws (3) and remove bumper (4).

(3) Install bumper (4) and secure with four screws (3).

(4) Install bumper (2) and secure with six screws (1).

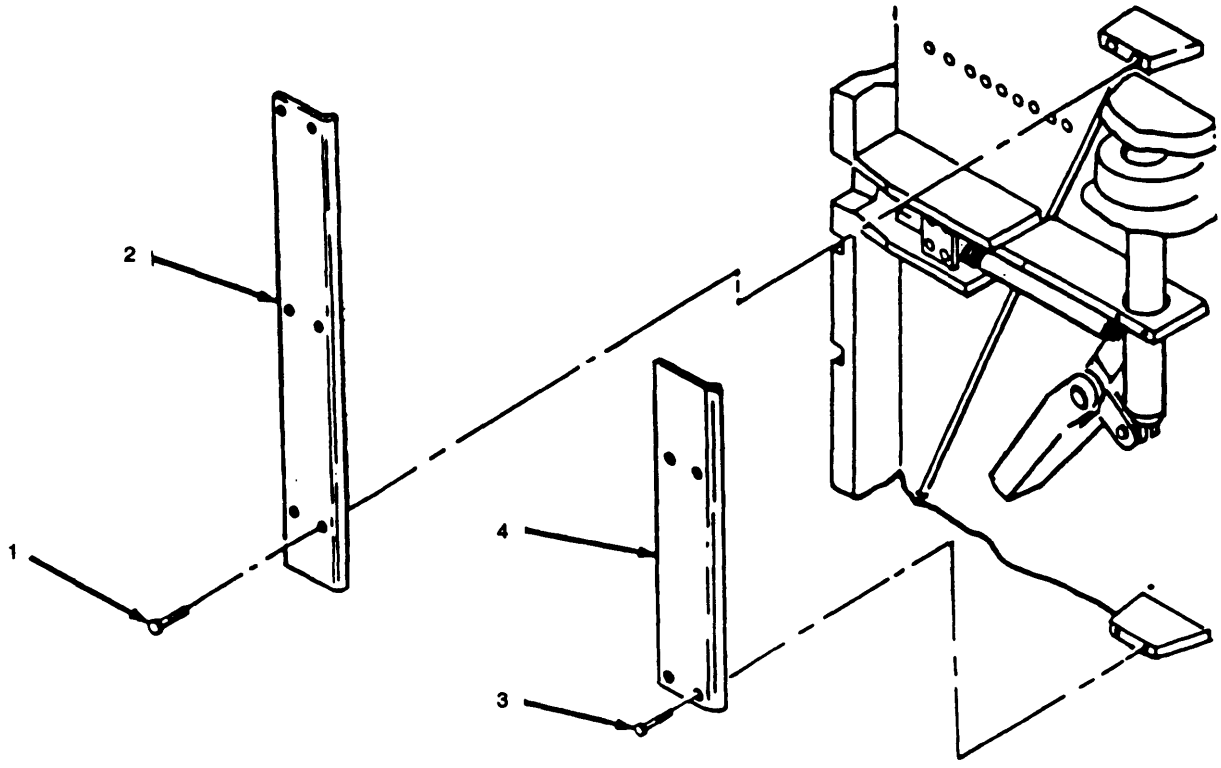



*Figure 4-142. Bumpers, Replace.*

## Section VI. PREPARATION FOR SHIPMENT OR STORAGE

Page

4-110 General . . . . . 4-345

4-111 Administrative Storage.. . . . . 4-345

4-110. **General.** This section contains instructions for placing the ribbon bridge transporter, ramp bay, and interior bay into administrative storage.

4-111. **Administrative Storage.**

*a*. Placement of equipment in administrative storage should be for short periods of time when a shortage of maintenance effort exists. Items should be in mission readiness within 24 hours or within the time factors as determined by the directing authorized. During the storage period appropriate maintenance records will be kept.

*b*. Before placing equipment in administrative storage, current maintenance services and equipment serviceable criteria (ESC) evaluations should be completed, shortcomings and deficiencies should be corrected, and all modification work orders (MWO's) should be applied.

c. Storage site selection. Inside storage is preferred for items selected for administrative storage. If inside storage is not available, trucks, vans, conex containers and other containers may be used.

# APPENDIX A

# REFERENCES

A-1 . **Scope.** This appendix contains all forms, lubrication orders, pamphlets and technical manuals referenced in this manual.

## A-2. Forms.

Recommended Changes to Publications and Blank Forms . . . . . DA Form 2028

Exchange Tag . . . . . DA Form 2402

Equipment Maintenance and Inspection Worksheet . . . . . DA Form 2404

Maintenance Request (used for requesting support maintenance) . . . . . DA Form 5504

Product Quality Deficiency Report . . . . . SF 368

## A-3. Lubrication Order.

Lubrication Order - Ribbon Bridge Transporter, Interior Bay and Ramp Bay . . . . . LO 5-5420-209-12

Lubrication Order - Truck, 5-Ton, 6 x 6, M812 Series . . . . . LO 9-2320-260-12

Lubrication Order - Truck, 5-Ton, 6 x 6, M939 and M939A1 Series . . . . . LO 9-2320-272-12

## A-4. Pamphlets.

The Army Maintenance Management Systems (TAMMS) . . . . . DA Pam 738-750

## A-5. Technical Manuals.

Operator and Unit Maintenance Manual with Parts Breakdown-
Cradle, Boat, 27 ft Bridge Erection Boat . . . . . TM 5-2090-200-12P

Operator, Unit, DS, GS and Depot Maintenance Manual Including
Repair Parts and Special Tools Lists for Pump, Centrifugal . . . . . TM 5-4320-200-15P

Unit, Direct Support and General Support Repair Parts and
Special Tools List for Improved Float Bridge (Ribbon Bridge) . . . . . TM 5-5420-209-24P

Painting Instructions for Field Use . . . . . TM 9-213

Welding Procedures . . . . . TM 9-237

Operator's Manual-Truck, 5-Ton, 6 x 6 M812 Series . . . . . TM 9-2320-260-10

Unit Maintenance-Truck, 5-Ton 6 x 6, M812 Series . . . . . TM 9-2320-260-20

Unit Parts-Ttuck, 5-Ton, 6 x 6, M812 Series . . . . . TM 9-2320-260-20P

Operator's Manual-Truck, 5-Ton, 6 x 6, M939 and M939A1 Series (diesel) . . . . . TM 9-2320-272-10

Unit Maintenance-Truck, 5-Ton, 6 x 6, M939 and M939A1 Series (diesel) . . . . . TM 9-2320-272-20P

Painting instructions for Army Materiel . . . . . TM 43-0139

Procedures for Destructions of Equipment to Prevent Enemy Use . . . . . TM 740-244-3

Procedures for Rapid Deployment, Redeployment and Retrograde for Military Bridging . . . . . TM 746-185

A-6. **Army Regulations.**

Cover and Marking of Vehicles and Equipment . . . . . AR 746-5

A-7. **Supply Catalog.**

Supplementary Set, Bridge . . . . . SC 5420-97-CL-E51

A-8. **Technical Bulletin.**

Color and Marking of Vehicles and Equipment . . . . . TB 746-93-1

A-9. **Hand Receipt.**

Hand Receipt Manual for Improved Float Bridge (Ribbon Bridge) . . . . . TM 5-5420-209-12-HR

# APPENDIX B
# MAINTENANCE ALLOCATION CHART

## Section I. INTRODUCTION

### THE ARMY MAINTENANCE SYSTEM (AMS)

This introduction provides a general explanation of all maintenance and repair functions authorized at the two maintenance levels under the Two-Level Maintenance System concept.

The MAC (immediately following the introduction) designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component shall be consistent with the capacities and capabilities of the designated maintenance levels, which are shown on the MAC in column 4 as:

Field - includes two subcolumns, Unit C (operator/crew) and O (unit/organizational maintenance) and Direct Support (F) maintenance

Sustainment - includes two subcolumns, general support (H) and depot (D).

The tools and test equipment requirements (immediately following the MAC) list the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from the MAC.

The remarks (immediately following the tools and test equipment requirements) contain supplemental instructions and explanatory notes for a particular maintenance function.

### MAINTENANCE FUNCTIONS

Maintenance functions are limited to and defined as follows:

1. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel).

2. Test. To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards on a scheduled basis, i.e., load testing of lift devices and hydrostatic testing of pressure hoses.

3. Service. Operations required periodically to keep an item in proper operating condition: e.g., to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.

4. Adjust. To maintain or regulate, within prescribed limits, by bringing into proper position, or by setting the operating characteristics to specified parameters.

5. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

**MAINTENANCE FUNCTIONS - Continued**

6. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments of test, measuring, and diagnostic equipment used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

7. Remove/Install. To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

8. Replace. To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and assigned maintenance level is shown as the third position code of the Source, Maintenance and Recoverability (SMR) code.

**NOTE**

The following definitions are applicable to the "repair" maintenance function:

Services. Inspect, test, service, adjust, align, calibrate, and/or replace.

Fault location/troubleshooting. The process of investigating and detecting the cause of equipment malfunctioning: the act of isolating a fault within a system or Unit Under Test (UUT).

Disassembly/assembly. The step-by-step breakdown (taking apart) of a spare/functional group coded item to the level of its least component, that is assigned an SMR code for the level of maintenance under consideration (i.e., identified as maintenance significant).

Actions. Welding, grinding, riveting, straightening, facing, machining, and/or resurfacing.

9. Repair. The application of maintenance services, including fault location/troubleshooting, removal/installation, disassembly/assembly procedures, and maintenance actions to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

10. Overhaul. That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

11. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of material maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (e.g., hours/miles) considered in classifying Army equipment/components.

**EXPLANATION OF COLUMNS IN THE MAC**

**Column 1, Group Number.** Column 1 lists FGC numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the Next Higher Assembly (NHA).

**Column 2, Component/Assembly.** Column 2 contains the item names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

**Column 3, Maintenance Function.** Column 3 lists the functions to be performed on the item listed in Column 2. (For a detailed explanation of these functions, refer to "Maintenance Functions" outlined above.)

**EXPLANATION OF COLUMNS IN THE MAC - Continued**

**Column 4, Maintenance Level.** Column 4 specifies each level of maintenance authorized to perform each function listed in Column 3, by indicating work time required (expressed as manhours in whole hours or decimals) in the appropriate subcolumn. This work time figure represents the active time required to perform that maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function varies at different maintenance levels, appropriate work time figures are to be shown for each level. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the MAC. The symbol designations for the various maintenance levels are as follows:

**Field:**
C Operator or crew maintenance
O Unit maintenace
F Direct support maintenance

**Sustainment:**
H General support maintenance
D Depot maintenance

## NOTE

The “L” maintenance level is not included in Column 4 of the MAC. Functions to this level of maintenance are identified by a work time figure in the “H” column of Column 4, and an associated reference code is used in the REMARKS Column 6. This code is keyed to the remarks and the SRA complete repair application is explained there.

**Column 5, Tools and Equipment Reference Code.** Column 5 specifies, by code, those common tool sets (not individual tools), common Test, Measurement and Diagnostic Equipment (TMDE), and special tools, special TMDE and special support equipment required to perform the designated function. Codes are keyed to the entries in the tools and test equipment table.

**Column 6, Remarks Code.** When applicable, this column contains a letter code, in alphabetical order, which is keyed to the remarks table entries.

**EXPLANATION OF COLUMNS IN THE TOOLS AND TEST EQUIPMENT REQUIPMENTS**

**Column 1, Tool or Test Equipment Reference Code.** The tool or test equipment reference code correlates with a code used in Column 5 of the MAC.

**Column 2, Maintenance Level.** The lowest level of maintenance authorized to use the tool or test equipment.

**Column 3, Nomenclature.** Name or identification of the tool or test equipment.

**Column 4, National Stock Number (NSN).** The NSN of the tool or test equipment.

**Column 5, Tool Number.** The manufacturer's part number, model number, or type number.

**Explanation of Columns in the Remarks**

**Column 1, Remarks Code.** The code recorded in Column 6 of the MAC.

**Column 2, Remarks.** This column lists information pertinent to the maintenance function being performed as indicated in the MAC.

## Section II. MAINTENANCE ALLOCATION CHART

| (1) Group Number | (2) Component/ Assembly | (3) Maintenance Function | (4) Maintenance Level | | | | | (5) Tools and Equipment | (6) Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | | Field | | | Sustainment | | | |
| | | | Unit | | DS | GS | Depot | | |
| | | | C | O | F | H | D | | |
| 01 | Transporter Lights and Reflectors | | | | | | | | |
| 0101 | Floodlights | Inspect<br>Replace<br>Repair | 0.1 | <br>0.5<br>0.3 | | | | | |
| 0102 | Floodlight Switch | Inspect<br>Replace | 0.1 | <br>0.3 | | | | | |
| 0103 | Floodlight Electrical Leads and Clamps | Inspect<br>Replace<br>Repair | | 0.1<br>0.2<br>0.3 | | | | | |
| 0104 | Clearance and Marker Lights | Inspect<br>Replace<br>Repair | 0.1 | <br>0.2<br>0.2 | | | | | |
| 0105 | Clearance and Marker Lights Electrical Leads and Clamps | Inspect<br>Replace<br>Repair | 0.1 | <br>0.3<br>0.5 | | | | | |
| 0106 | Reflectors | Inspect<br>Replace | 0.1 | <br>0.2 | | | | | |
| 0107 | Throttle Control Assembly | Inspect<br>Replace | 0.1 | <br>0.2 | | | | | |
| 02 | Mirrors and Brackets | | | | | | | | |
| 0201 | Mirror Bracket Assembly RH | Inspect<br>Replace<br>Repair | 0.1<br>0.2 | <br><br>0.2 | | | | | |
| 0202 | Mirror Bracket Assembly LH | Inspect<br>Replace<br>Repair | 0.1<br>0.2 | <br><br>0.2 | | | | | |
| 03 | Wheel Splash Guard | Inspect<br>Replace | 0.1<br>0.3 | | | | | | |
| 04 | Bay Latch Pin and Rope Assembly | Inspect<br>Replace<br>Repair | 0.1<br>0.1 | <br><br>0.5 | | | | | |

## Section II. MAINTENANCE ALLOCATION CHART (continued)

| (1) Group Number | (2) Component/ Assembly | (3) Maintenance Function | (4) Maintenance Level | | | | | (5) Tools and Equipment | (6) Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | | Field | | | Sustainment | | | |
| | | | Unit | | DS | GS | Depot | | |
| | | | C | O | F | H | D | | |
| 05 | Walkways | Inspect | 0.1 | | | | | | |
| | | Replace | | 1.5 | | | | | |
| | | Repair | | 2.0 | | | | | A |
| 06 | Tire Carrier Assembly | Inspect | 0.1 | | | | | | |
| | | Replace | | 0.5 | | | | | |
| | | Repair | | 0.7 | | | | | |
| 07 | Roller and Axle Assembly | Inspect | 0.1 | | | | | | |
| | | Service | 0.2 | | | | | | |
| | | Replace | | 0.3 | | | | | |
| 08 | Rear Winch Assembly and Motor | Inspect | 0.3 | | | | | | |
| | | Service | 0.5 | | | | | | |
| | | Replace | | 1.0 | | | | | |
| | | Repair | | 1.3 | | | | | |
| | | Overhaul | | | | | 4.0 | | |
| 0801 | Rear Winch Cable Assembly | Inspect | 0.4 | | | | | | |
| | | Service | 0.2 | | | | | | |
| | | Replace | | 1.0 | | | | | B |
| 09 | Cable Tensioner Assembly | Inspect | 0.1 | | | | | | |
| | | Test | | 0.4 | | | | | C |
| | | Service | 0.3 | | | | | | |
| | | Adjust | | 0.5 | | | | | |
| | | Replace | | 1.5 | | | | | |
| | | Repair | | | 4.0 | | | | |
| 0901 | Tensioner Motor | Test | | 0.5 | | | | | |
| | | Replace | | | 1.0 | | | | |
| 10 | Transporter Boom Assembly | | | | | | | | |
| 1001 | Boom Assembly | Inspect | 0.2 | | | | | | |
| | | Service | 0.2 | | | | | | |
| | | Replace | | 2.6 | | | | | |
| | | Repair | | | 0.9 | | | | |
| 1002 | Sheave and Pin | Inspect | 0.1 | | | | | | |
| | | Service | 0.1 | | | | | | |
| | | Replace | | 0.3 | | | | | |

## Section II. MAINTENANCE ALLOCATION CHART (continued)

| (1) Group Number | (2) Component/ Assembly | (3) Maintenance Function | (4) Maintenance Level | | | | | (5) Tools and Equipment | (6) Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | | Field | | | Sustainment | | | |
| | | | Unit | | DS | GS | Depot | | |
| | | | C | O | F | H | D | | |
| 1003 | Guide Sheave, Pin, and Mounting Bracket | Inspect<br>Service<br>Replace | 0.1<br>0.1 | <br><br>0.4 | | | | | |
| 1004 | Snatch Block, Anchor and Pin | Inspect<br>Service<br>Replace | 0.1<br>0.1 | <br><br>0.2 | | | | | |
| 1005 | Rollers and Pin | Inspect<br>Service<br>Replace | 0.1<br>0.1 | <br><br>0.4 | | | | | |
| 1006 | Tiedown Lock and Attaching Hardware | Inspect<br>Service<br>Replace<br>Repair | 0.1<br>0.1 | <br><br>1.5<br>0.4 | | | | | |
| 11 | Boom 5 Inch Hydraulic Cylinder Assembly | | | | | | | | |
| 1101 | Pins and Clevis | Inspect<br>Service<br>Replace | 0.1<br>0.1 | <br><br>0.4 | | | | | |
| 1102 | Cylinder Assembly | Inspect<br>Test<br>Replace<br>Repair<br>Overhaul | 0.1 | <br><br>0.3 | | <br>1.0<br><br>2.0 | <br><br><br><br>6.0 | | |
| 12 | Locking Cylinder 3 Inch Bore | | | | | | | | |
| 1201 | Pin and Arm | Inspect<br>Service<br>Replace | 0.1<br>0.1 | <br><br>0.4 | | | | | |
| 1202 | Cylinder Assembly | Inspect<br>Test<br>Replace<br>Repair<br>Overhaul | 0.1 | <br><br>0.4 | | <br>1.0<br><br>1.5 | <br><br><br><br>4.0 | | |

## Section II. MAINTENANCE ALLOCATION CHART (continued)

| (1) Group Number | (2) Component/ Assembly | (3) Maintenance Function | (4) Maintenance Level | | | | | (5) Tools and Equipment | (6) Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | | Field | | | Sustainment | | | |
| | | | Unit | | DS | GS | Depot | | |
| | | | C | O | F | H | D | | |
| 13 | Hydraulic System Valves | | | | | | | | |
| 1301 | Control Valve Assembly | Inspect<br>Replace | 0.1 | <br>1.4 | | | | | |
| 1302 | Selector Valve | Inspect<br>Test<br>Replace<br>Repair | 0.1 | <br><br>0.5<br> | | <br>0.5<br><br>1.0 | | | |
| 1303 | Dual Over Center Valve | Inspect<br>Test<br>Adjust<br>Replace | 0.1 | <br>0.3<br>0.3<br>0.4 | | | | | |
| 1304 | Single Over Center Valve | Inspect<br>Test<br>Adjust<br>Replace | 0.1 | <br>0.3<br>0.5<br>0.4 | | | | | |
| 1305 | Cable Tensioner Valve | Inspect<br>Test<br>Adjust<br>Replace | 0.1 | <br>0.3<br>0.5<br>0.5 | | | | | |
| 14 | Hydraulic Filter Assembly | Inspect<br>Service<br>Replace | 0.1<br>0.3 | <br><br>0.4 | | | | | |
| 15 | Hydraulic Reservoir Assembly | Inspect<br>Service<br>Replace<br>Repair | 0.1 | <br>1.0<br>2.5<br>2.0 | | | | | |
| 1501 | Reservoir Bracket | Inspect<br>Replace | 0.1 | <br>1.0 | | | | | |
| 16 | Hydraulic System Pump and Bracket | Inspect<br>Test<br>Replace | 0.1 | <br>0.5<br>1.0 | | | | | |
| 17 | Drive Shaft Gear Pump | Inspect<br>Service<br>Replace<br>Repair | 0.1<br>0.1 | <br><br>0.5<br>1.0 | | | | | |

## Section II. MAINTENANCE ALLOCATION CHART (continued)

| (1) Group Number | (2) Component/ Assembly | (3) Maintenance Function | (4) Maintenance Level | | | | | (5) Tools and Equipment | (6) Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | | Field | | | Sustainment | | | |
| | | | Unit | | DS | GS | Depot | | |
| | | | C | O | F | H | D | | |
| 18 | Control Lever and Linkage (PTO) | Inspect<br>Replace<br>Repair | 0.1 | <br>2.0<br>0.8 | | | | | |
| 19 | Hydraulic System Lines and Fittings | Inspect<br>Replace | 0.3 | <br>1.0 | | | | | |
| 20 | Fuel Tank | | | | | | | | |
| 2001 | Lines, Clamps and Fittings | Inspect<br>Replace | 0.1 | <br>1.0 | | | | | |
| 2002 | Mounting Bracket | Inspect<br>Replace | | 0.1<br>0.6 | | | | | |
| 21 | Boggie Bracket Retainer and Chain | Inspect<br>Replace | | 0.1<br>0.4 | | | | | |
| 22 | Cab Protector | Inspect<br>Replace | 0.1 | <br>4.0 | | | | | |
| 23 | Boggie Lock and Brackets | Inspect<br>Replace | | 0.1<br>0.4 | | | | | |
| 24 | Cross Member Supports | | | | | | | | |
| 2401 | Front Support | Inspect<br>Replace | | 0.1<br>4.0 | | | | | |
| 2402 | Center Support | Inspect<br>Replace | | 0.1<br>4.0 | | | | | |
| 2403 | Boom Pivot Support | Inspect<br>Replace | | 0.1<br>1.5 | | | | | |
| 25 | Accessory Items | | | | | | | | |
| 2501 | Data Plates | Inspect<br>Replace | 0.1 | <br>0.1 | | | | | |
| 2502 | Instruction Plates | Inspect<br>Replace | 0.1 | <br>0.1 | | | | | |

## Section II. MAINTENANCE ALLOCATION CHART (continued)

| (1) Group Number | (2) Component/ Assembly | (3) Maintenance Function | (4) Maintenance Level | | | | | (5) Tools and Equipment | (6) Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | | Field | | | Sustainment | | | |
| | | | Unit | | DS | GS | Depot | | |
| | | | C | O | F | H | D | | |
| 26 | Ramp Bay Unfolding Mechanism | | | | | | | | |
| 2601 | Cable Assembly | Inspect | 0.1 | | | | | | |
| | | Service | 0.1 | | | | | | |
| | | Adjust | | 0.6 | | | | | |
| | | Replace | | 0.8 | | | | | |
| 2602 | Cable Link, Pin and Hardware | Inspect | 0.1 | | | | | | |
| | | Replace | | 0.4 | | | | | |
| 2603 | Unfolding Lever | Inspect | 0.1 | | | | | | |
| | | Replace | | 0.5 | | | | | |
| 2604 | Wear Caps | Inspect | 0.1 | | | | | | |
| | | Replace | | 0.1 | | | | | |
| 27 | Ramp Bay Bow Pontons | | | | | | | | |
| 2701 | Support Link and Hinge Pins | Inspect | 0.1 | | | | | | |
| | | Replace | | 1.0 | | 6.0 | | | |
| 2702 | Bow Pontons | Inspect | 0.1 | | | | | | |
| | | Test | | 1.0 | | | | | |
| | | Replace | | 3.0 | | | | | |
| | | Repair | | 1.0 | 4.0 | | | | |
| | | Overhaul | | | | 8.0 | | | |
| 2703 | Handrail Post, Bilge Plug and Pins | Inspect | 0.1 | | | | | | |
| | | Replace | | 0.2 | | | | | |
| 2704 | Latch Receptacle and Strike Catch | Inspect | 0.1 | | | | | | |
| | | Adjust | | 0.3 | | | | | |
| | | Replace | | 0.4 | | | | | |
| 28 | Ramp Bay Roadway Pontons | | | | | | | | |
| 2801 | Roadway Pontons | Inspect | 0.1 | | | | | | |
| | | Test | | 1.0 | | | | | |
| | | Replace | | 3.0 | | | | | |
| | | Repair | | 1.0 | 4.0 | | | | |
| | | Overhaul | | | | 8.0 | | | |

## Section II. MAINTENANCE ALLOCATION CHART (continued)

| (1) Group Number | (2) Component/ Assembly | (3) Maintenance Function | (4) Maintenance Level | | | | | (5) Tools and Equipment | (6) Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | | Field | | | Sustainment | | | |
| | | | Unit | | DS | GS | Depot | | |
| | | | C | O | F | H | D | | |
| 2802 | Roadway Approach Ramps | Inspect<br>Replace | 0.1 | <br>0.5 | | | | | |
| 2803 | Rubber Bumpers | Inspect<br>Replace | 0.1 | <br>0.3 | | | | | |
| 2804 | Hinge Pins, Link and Hardware | Inspect<br>Service<br>Replace | 0.1<br>0.1 | <br><br>1.0 | | | | | |
| 2805 | Folding, Tee Latch, Cable Guide and Receptacles | Inspect<br>Adjust<br>Replace<br>Repair | 0.1 | <br>0.4<br>1.0<br>0.5 | | | | | |
| 2806 | Connectors and Hardware | Inspect<br>Adjust<br>Replace | 0.1 | <br>0.3<br>0.2 | <br><br>2.0 | | | | |
| 29 | Yokes and Lower Lock Drive Assembly | | | | | | | | |
| 2901 | Connecting Pin Trunnions, and Lever | Inspect<br>Service<br>Replace | 0.1<br>0.1 | <br><br>1.8 | | | | | |
| 2902 | Yokes, Pin and Washers | Inspect<br>Replace | 0.1 | <br>1.5 | | | | | |
| 30 | Ramp Bay Hydraulic System | | | | | | | | |
| 3001 | Hose Assemblies, Connectors, Clamps, Fittings and Rope | Inspect<br>Replace | 0.1 | <br>1.0 | | | | | |
| 3002 | Hydraulic Cylinder and Piston | Inspect<br>Test<br>Service<br>Replace<br>Repair/ Overhaul | | 0.1<br>0.5<br>0.5 | | <br><br><br>1.4<br><br>6.0 | | | |

## Section II. MAINTENANCE ALLOCATION CHART (continued)

| (1) Group Number | (2) Component/ Assembly | (3) Maintenance Function | (4) Maintenance Level | | | | | (5) Tools and Equipment | (6) Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | | Field | | | Sustainment | | | |
| | | | Unit | | DS | GS | Depot | | |
| | | | C | O | F | H | D | | |
| 3003 | Cylinder Retaining Pin and Cover | Inspect<br>Replace | 0.1 | <br>1.0 | | | | | |
| 3004 | Hydraulic Pumps | Inspect<br>Service<br>Replace<br>Repair | 0.1 | <br>3.0<br>1.0 | | <br><br><br>2.5 | | | |
| 3005 | Pump Access Cover | Inspect<br>Replace | 0.1 | <br>0.3 | | | | | |
| 31 | Interior Bay Unfolding Mechanism | | | | | | | | |
| 3101 | Cable Assembly | Inspect<br>Service<br>Adjust<br>Replace | 0.1<br>0.1 | <br><br>0.6<br>0.8 | | | | | |
| 3102 | Cable Link, Pin and Hardware | Inspect<br>Replace | 0.1 | <br>0.4 | | | | | |
| 3103 | Unfolding Lever | Inspect<br>Replace | 0.1 | <br>0.5 | | | | | |
| 32 | Interior Bay Bow Pontons | | | | | | | | |
| 3201 | Support Link and Hinge Pins | Inspect<br>Replace | 0.1 | <br>1.0 | | <br>6.0 | | | |
| 3202 | Bow Pontons | Inspect<br>Replace<br>Repair<br>Overhaul | 0.1 | <br>3.0<br>1.0 | <br><br>4.0 | <br><br><br>8.0 | | | |
| 3203 | Handrail Post, Bilge Plug and Pins | Inspect<br>Replace | 0.1 | <br>0.2 | | | | | |
| 3204 | Latch Receptacle and Strike Catch | Inspect<br>Adjust<br>Replace | 0.1 | <br>0.3<br>0.4 | | | | | |

## Section II. MAINTENANCE ALLOCATION CHART (continued)

| (1) Group Number | (2) Component/ Assembly | (3) Maintenance Function | (4) Maintenance Level | | | | | (5) Tools and Equipment | (6) Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | | Field | | | Sustainment | | | |
| | | | Unit | | DS | GS | Depot | | |
| | | | C | O | F | H | D | | |
| 33 | Interior Bay Roadway Pontons | Inspect<br>Replace<br>Repair<br>Overhaul | 0.1 | <br>3.0<br>1.0 | <br><br>4.0 | <br><br><br>8.0 | | | |
| 3301 | Hinge Pins, Link and Hardware | Inspect<br>Service<br>Replace | 0.1<br>0.1 | <br><br>1.0 | | | | | |
| 3302 | Foldlock Tee Latch, Cable Guide and Receptacles | Inspect<br>Adjust<br>Replace<br>Repair | 0.1 | <br>0.4<br>0.5<br>1.0 | | | | | |
| 3303 | Connectors and Hardware | Inspect<br>Adjust<br>Replace | 0.1 | <br>0.3<br>0.2 | <br><br>2.0 | | | | |
| 34 | Lower Lock Drive Assembly | | | | | | | | |
| 3401 | Connecting Pin, Trunnions, and Lever | Inspect<br>Service<br>Replace | 0.1<br>0.1 | <br><br>1.8 | | | | | |
| 3402 | Bumpers | Inspect<br>Replace | 0.1 | <br>0.1 | | | | | |

## Section III. TOOLS AND TEST EQUIPMENT FOR IMPROVED FLOAT BRIDGE (RIBBON BRIDGE)

| (1) Tools or Test Equipment Reference Code | (2) Maintenance Level | (3) Nomenclature | (4) National Stock Number | (5) Tool Number |
|---|---|---|---|---|
| 1 | C | Tool Kit, General Mechanic's Automotive | 5180-00-177-7033 | SC 5180-90-N26 |
| 2 | O | Scale: Spring, Cable, Adjusting | 6670-01-010-5906 | 13220E4354 |
| 3 | O | Ponton, Leak Detector | | |
| 4 | O | Hydraulic Pump, Hand Operated Portable | 4320-01-499-0811 | 13219E4301 |
| 5 | O | Shop Equipment, Automotive Maintenance and Repair: Organizational Maintenance, Common No. 1, Less Power | 4910-00-754-0654 | |

## Section IV. REMARKS

| Reference Code | Remarks |
|---|---|
| **A** | Repair by straightening and spot welding cracks. |
| **B** | Replace entire cable if kinked or frayed. Use only specified cable. |
| **C** | Use only specified cable with cable tensioner. |

# APPENDIX C

# COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS

## Section I. INTRODUCTION

C-1 . **Scope.** This appendix lists components of end item and basic issue items for the Improved Float Bridge (Ribbon Bridge) to help you inventory items required for safe and efficient operation.

C-2. **General.** The Components of End Item and Basic Issue Items Lists are divided into the following sections.

*a.* *Section II. Component of End Items.* This listing is for information purposes only, and is not authority to requisition replacements. The items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Illustrations are furnished to assist you in identifying the items.

*b.* *Section III. Basic Issue Items* These are the minimum essential items required to place the Improved Float Bridge (Ribbon Bridge) in operation. The illustrations will assist you with hard-to-identify items. This manual is your authority to request/requisition replacement Bll, based on TOE/MTOE authorization of the end item.

C-3. **Explanation of Columns.** The following provides an explanation of columns found in the tabular listings:

*a.* *Column (1). Illustration Number (Illus. Number).* This column indicates the number of the illustration in which the item is shown.

*b.* *Column (2). National Stock Number.* Indicates the National Stock Number assigned to the item and will be used for requisitioning purposes.

*c.* *Column (3). Description.* Indicates the Federal item name, and, if required, a minimum description to identify and locate the item. The last line for each item indicates the FSCM (in parentheses) followed by the part number.

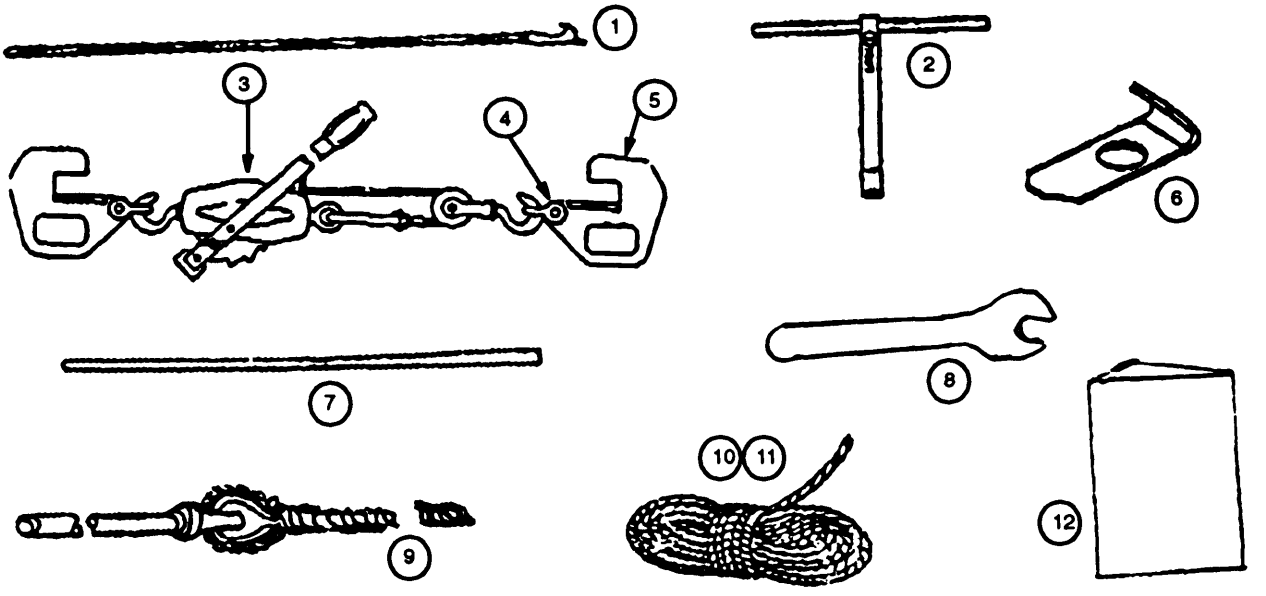
*d.* *Column (4). Unit of Measure (U/M).* Indicates the measure used in performing the actual operation maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in., pr).

e Column (5). Quantity Required (Qty./Rqr.). Indicates the quantity of the item authorized to be used with/on the

## Section II. COMPONENTS OF END ITEMS

Not Applicable

## Section III. BASIC ISSUE ITEMS




| (1) Illus. Number | (2) National Stock Number | (3) Description FSCM and Part Number / Usable On Code | (4) U/M | (5) Qty. Rqr. |
|---|---|---|---|---|
| 1 | 2040-00-255-6071 | Boat Hook (81349) MIL-H-3496 | ea | 1 |
| 2 | 5420-01-030-5815 | Wrench, Bay Drive Pin (97403) 12218E43474 | | |
| 3,4,5 | 399040-552-7653 | Tool, Ramp Connecting (97403) 13220E4370<br>Consisting of:<br>(3) Hoist Portable 1 ea. (97403) 13221E7749<br>(4) Shackle, 2.5 in. 2 ea. (81349) RR-C-271TY4CL4<br>(5) Hook, Ramp Connecting 2 ea. (97403) 13219E4253 | ea | 1 |
| 6 | 5120-01-014-6298 | Tool, Roadway (97403) 13220E4370 | ea | 1 |
| 7 | 5120-00-224-1390 | Crow Bar (81348) GGG-B-101 | ea | 1 |
| 8 | 5120-00-277-1236 | Wrench, Open (81348) GGG-W-636 | ea | 1 |
| 9 | 5420-01-045-1770 | Pin, Latch (97403) 13218E4360 | ea | 1 |
| 10 | 4020-00-968-1357 | Rope, Fibrous (Nylon) MIL-R-17343 | rl | 1 |
| 11 | 4020-00-106-9361 | Rope, Fibrous, Manila (81349) MIL-R-24050 | rl | 1 |
| 12 | 7510-00-889-3494 | Publications Binder Looseleaf MIL-B-43064 | ea | 1 |

# APPENDIX D

# ADDITIONAL AUTHORIZATION LIST

## Section I. INTRODUCTION

D-1. **Scope.** This appendix Iists additional items you are authorized for the support of the Improved Float Bridge (Ribbon Bridge) .

D-2. **General.** This list identifies items that do not have to accompany the unit and that do not have to be turned in with it. These items are authorized to you by CTA, MTOE, TDA or JTA.

D-3. **Explanation of Listing.** National stock number, descriptions, and quantities are provided to help you identify and request the additional items you require to support this equipment.

## Section II. ADDITIONAL AUTHORIZATION LIST

| (1) National Stock Number | (2) Description Part Number & FSCM | Usable On Code | (3) U/M | (4) Qty Auth |
|---|---|---|---|---|
| 4930-00-288-1511 | Adapter: Grease Gun, MIL-L-4387, TY IV, CL 2 (81349) | | Ea | 1 |
| 4930-00-253-2476 | Grease Gun Type 1 MIL-G-3859 (81349) uses 14 OZ Cartridge NSN 9150-00-935-1017 | | Ea | 1 |
| 5140-00-772-4142 | Bag: Tool, Cotton Duck, 10 in. X 20 in. w/flap 2-3-170 (81337) | | Ea | 1 |
| 5120-00-316-9217 | Wrench: Whl Stud Nut Str Dbl Socket Type 11, Size 1 No. 2 Length MIL-W-43105 (81349) | | Ea | 1 |
| 5120-00-223-7298 | Pliers: Comb, Slip-Joint, Str Nose w/cutter 10” Lg MS15382-2 (96906) | | Ea | 1 |
| 5120-00-222-8852 | Screwdriver: Flap Tip, Hvy Duty, Plastic Hall,. 1/4 in. Wd. Tip, 4 in. blade, 7-3/4 in. Lg. MS15219-1 (96906) | | Ea | 1 |
| 5120-00-227-7338 | Screwdriver: Flat Tip, Hvy Duty, Steel Hdl w/wood inserts, Sq Blade, 1/2 in. Wd. Tip, 5 in. Blade, 9-1/2 in. Lg. MS15220-5 (96906) | | Ea | 1 |

## SECTION II. ADDITIONAL AUTHORIZATION LIST - Continued

| (1) National Stock Number | (2) Description Part Number & FSCM | Usable On Code | (3) U/M | (4) Qty Auth |
|---|---|---|---|---|
| 5120-00-34-8912 | Screwdriver: Cross Tip, Phillips, Plastic Hall. Pt. No. 3, 6 in. blade, 10-1/8 IOA Lg MS15224-6 (96906) | | Ea | 1 |
| 5120-00-449-8083 | Wrench: Adjustable, Open End, Hvy Duty, 1.135 in. Jaw Opng. 9-1/2 in. TO 10-1/2 in. Lg., Type 1, Class 1, GGW-W-631 (81348) | | Ea | 1 |
| 5315-00-782-1019 | Wrench: (Key), Drain Plug, Str Bar, 1/2 in. Sq, 2-1/2 in. Lg. MS20066-543 (96906) | | Ea | 1 |
| 5120-00-224-4047 | Hammer: Hand, Machinist's Ball-Peen 2 lb, Ty II, CL1 , Sty A GGG-H-86 (81348) | | Ea | 1 |
| | Bogie Bracket, 13219 E4284 (97403) | | Ea | 2 |
| | Rubber Bumper, 13219 E4299 (97403) | | Ea | 2 |

# APPENDIX E

# EXPENDABLE SUPPLIES AND MATERIALS LIST

## Section I. INTRODUCTION

E-1. **Scope.** This listing is for Informational purposes only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable/Durable Items (except medical, class V, repair parts, and heraldic items)

E-2. **Explanation of Columns.**

a. *Column 1. Item Number.* This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use cleaning compound, Item 5, App. D.").

b. *Column 2. Level.* This column identifies the lowest level of maintenance that requires the listed item.
C - Operator/Crew
O- Unit Maintenance

c. *Column 3. National Stock Number.* This is the National stock number assigned to the item, use it to request or requisition the item.

*d. Column 4. Description.* Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the Federal Supply Code for Manufacturer (FSCM) in parentheses followed by the part number.

*e. Column 5. Unit of Measure (U/M).* Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two character alphabetical abbreviation (e.g., ea., in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

## Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST

| (1) Item Number | (2) Level | (3) National Stock Number | (4) Description | (5) U/M |
|---|---|---|---|---|
| 1 | | | Compound, Deck Covering, Non-Slip MIL-C-81346 Grade 1 (81349) 1 Gal Can | Ea |
| | | 5610-00-141-7838 | Walkway Compound, JY22, Rough, Olive Drab, MIL-W-5044 (81349), 1 Gal can | Ea |
| 2 | | | GAA, Grease, Automotive and Artillery MIL-G-10924 (81349) | |
| | C | 9150-00-065-0029 | 2 1/4 Oz per Tube | Ea |
| | C | 9150-00-935-1017 | 14 Oz Cartridge | Ea |
| | C | 9150-00-190-0904 | 1 Lb Can | Ea |
| | C | 9150-00-190-0905 | 5 Lb Can | Ea |
| | C | 9150-00-190-0907 | 35 Lb Pail | Ea |
| | C | 9150-00-190-7369 | 120 Lb per Drum | Ea |
| 3 | | | Grease, Graphite VV-G-671 (81349) | |
| | C | 9150-00-257-5370 | 1 Lb Can | Ea |
| | C | 9150-00-235-5568 | 5 Lb Can | Ea |
| 4 | | | Grease, Molybdenum Disulfide: MIL-G-21164 (81349) | |
| | O | 9150-00-754-3595 | 1 Lb Can | Ea |
| | O | 9150-00-223-4004 | 5 Lb Can | Ea |
| | O | 9150-00-965-2003 | 35 Lb Can | Ea |
| 5 | | | Insulation Tape, Black H H-1-595 (81349) | |
| | O | 5970-00-644-2636 | 3/4 Wide x 66 Ft. Lg. | Ea |
| 6 | | | Lubricant, Exposed Wire Grd 1 Cw W-L-751 (81349) | |
| | C | 9150-00-234-5197 | 5 Pt Can | Ea |
| | C | 9150-00-261-7891 | 35 Pt Pail | Ea |
| | C | 9150-00-530-7293 | 50 Gal Drum | Ea |
| 7 | | | Oil, Lubricating, OEA MIL-L-46167 (81349) | |
| | C | 9150-00-402-4778 | 1 Qt Can | Ea |
| | C | 9150-00-402-2372 | 5 Gal Drum | Ea |
| | C | 9150-00-265-7197 | 55 Gal Drum | Ea |

## Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST - Continued

| (1) Item Number | (2) Level | (3) National StoCk Number | (4) Description | (5) U/M |
|---|---|---|---|---|
| 8 | | | Oil, Lubricating, OE/HDO 10 MIL-L-2104 (81349) | |
| | C | 9150-00-265-9425 | 1 Qt Can | Ea |
| | C | 9150-00-265-9428 | 5 Gal Drum | Ea |
| | C | 9150-00-265-9429 | 55 Gal Drum, 16 Gage | Ea |
| | C | 9150-00-265-9430 | 55 Gal Drum, 18 Gage | Ea |
| 9 | | | Oil, Lubricating, Gear Go 80 MIL-L-2105 (81349) | |
| | C | 9150-00-905-9100 | 1 Gal Can | Ea |
| | C | 9150-00-577-5841 | 5 Gal Drum | Ea |
| | C | 9150-00-577-5842 | 55 Gal Drum, 16 Gage | Ea |
| | C | 9150-00-577-5843 | 55 Gal Drum, 18 Gage | Ea |
| 10 | | | Oil, Lubricating, Gear Go 90 MIL-L-2105 (81349) | |
| | C | 9150-00-754-2635 | 1 Qt can | Ea |
| | C | 9150-00-577-5844 | 5 Gal Drum | Ea |
| | C | 9150-00-577-5845 | 55 Gal Drum, 16 Gage | Ea |
| | C | 9150-00-577-5846 | 55 Gal Drum, 16 Gage | Ea |
| 11 | | | Oil, Lubricating, Gear, Go S MIL-L-10324 (81349) | |
| | C | 9150-00-261-7904 | 1 Qt Can | Ea |
| | C | 9150-00-257-5440 | 5 Gal Drum | Ea |
| | C | 9150-00-257-5443 | 55 Gal Drum, 18 Gage | Ea |
| 12 | | | Rags, Wiping | |
| | O | 7920-00-205-1711 | 50/BA-A-531 (58536) | |
| 13 | O | 8030-00-753-4599 | Sealing Compound: Gun or Spatula Bas w/ catalyst Kit MIL-S-8802cL B-2 (81349) 1/2 Pt can | Ea |
| 14 | O | 8030-00-456-1038 | Sealing Compound: Sealing and Ret Metal MIL-S-22473 GA-B (81349) 1 Pt can | Ea |
| 15 | O | 8030-00-133-3164 | Brown 50 CC Bottle Sealing compound: Sealing and Ret | Ea |

## Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST - Continued

| (1) Item Number | (2) Level | (3) National Stock Number | (4) Description | (5) U/M |
|---|---|---|---|---|
| 16 | O | 8030-00-133-3164 | Sealing, Locking and Retaining Compounds, Single-Component MIL-S-22473 Grade HVV (81349) 1 Qt Can, 50 cc Bottle | Ea |
| 17 | C | 8030-01-025-1692 | Sealing Compound: Type II, Grade N MIL-S-46163 (80244) | Ea |
| 18 | C | | Solvent, Dty Cleaning: Liquid PD-680 (81349) | |
| | | 6850-00-281-1985 | 1 Gal Can | Ea |
| | | 6850-00-264-9038 | 5 Gal Pail | Ea |
| | | 6850-00-264-9037 | 55 Gal Drum, 16 Gage | Ea |
| 19 | O | 8030-00-889-3534 | Teflon Tape, Pipe Thread, MIL-T-27730-TY 1 1/2 in. Wide WI Dispenser 24 Ft. Roll | Ea |
| 20 | O | 5680-00-857-8623 | Metal, Expanded (treadway), TY1, CL1 MIL-M-17194, 8 Ft. | Ea |
| 21 | O | | Aluminum Sheet, ASTM-B209/5083, 13218E00-99 (6V251), 4x8x.190 | SH |

# APPENDIX F

## ILLUSTRATED LIST OF MANUFACTURED ITEMS

This appendix includes complete instructions for making items authorized to be manufactured or fabricated at unit maintenance.

A part number index in alphanumeric order is provided for cross-referencing the part number of the item to be manufactured to the figure which covers fabrication criteria.

All bulk material needed for manufacture of an item are listed by part number or specification number in a tabular list on the illustration.

**Index**


| Item | | Figure |
|---|---|---|
| 8739552 | Wire Assembly | F-1 |
| 13219 E4184 | Winch Cable Assembly | F-2 |
| 13219 E4210 | Return Fuel Line | F-3 |
| 13219 E4211 | Supply Fuel Line | F-4 |

Parts Needed: Wire (1, M14386/1-5) Terminal Lug (P/N 13217E6704-10) 2 ea.

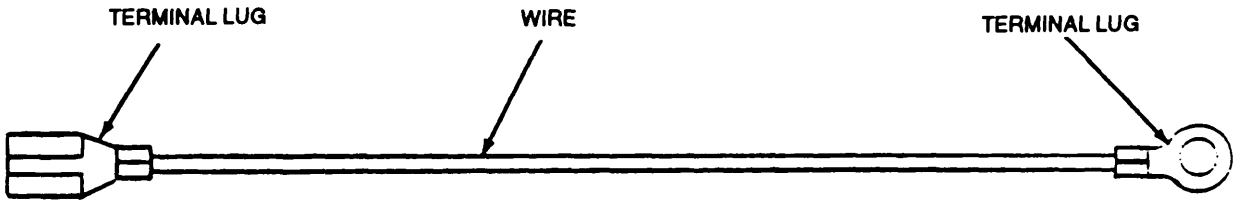



Figure F-1. Wire Assembly (8739552).

**NOTE**

(1) All dimensions in inches.
(2) Assemble as shown in illustration.

Parts Needed: Cotter Pin (P/N LS-6), Hoist Hook(P/N 13218E4325), Castled Nut (P/N LD-554V), Clevis Socket Assembly (P/N 13218E4326), Sleeve Plug (P/N MU 1950), Sleeve Plug (P/N ID-950V), Shoulder Bolt (P/N GD-1350 V), Wire Rope (P/N RR-W-410) 100 ft.

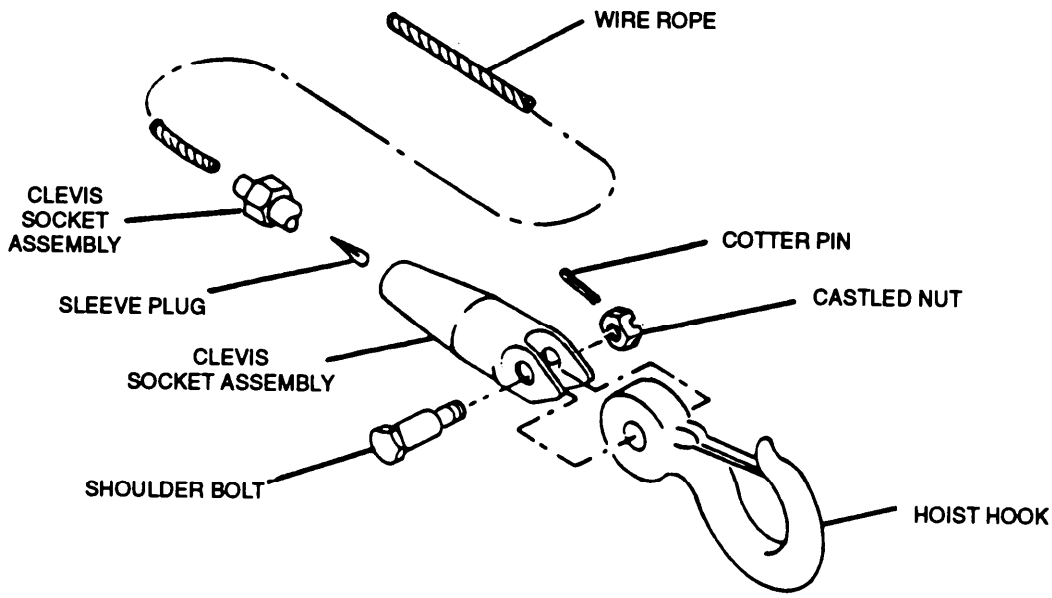



Figure F-2. Winch Cable Assembly.

**NOTE**

(1) All dimensions in inches.
(2) Assemble as shown in illustration.

Parts Needed: Nut Tube Coupling (P/N MS39166-7) 1 ea, Nut Inverted Flare (P/N SAE-J512), Tube Seamless (P/NASTM B68/B75)

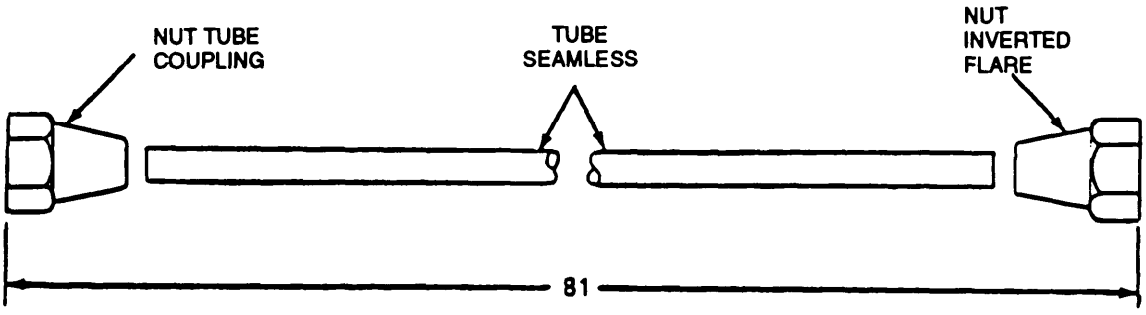



Figure F-3. Fuel Line.

**NOTE**

(1) All dimensions in inches.
(2) Assemble as shown in illustration.
(3) Bend to fit.

Parts Needed: Nut Inverted Flare (P/N SAE-J512), Nut Tube Coupling (P/N MS39166-7), Tube Seamless (P/N ASTM B68/B75)

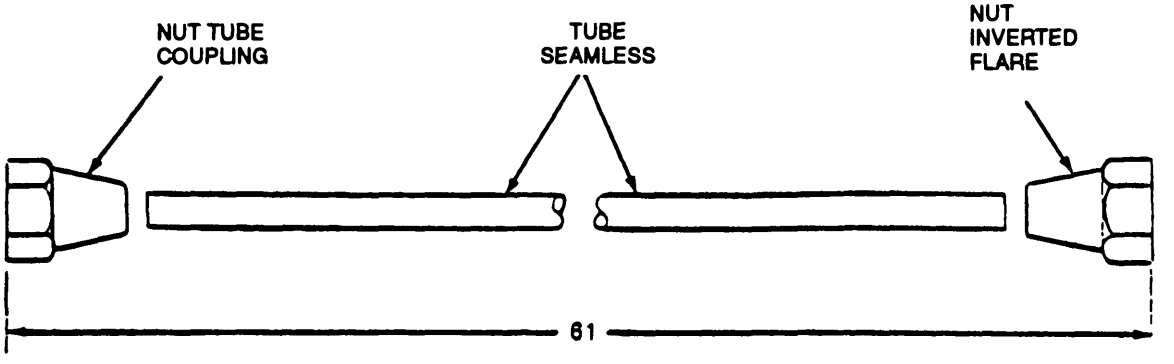
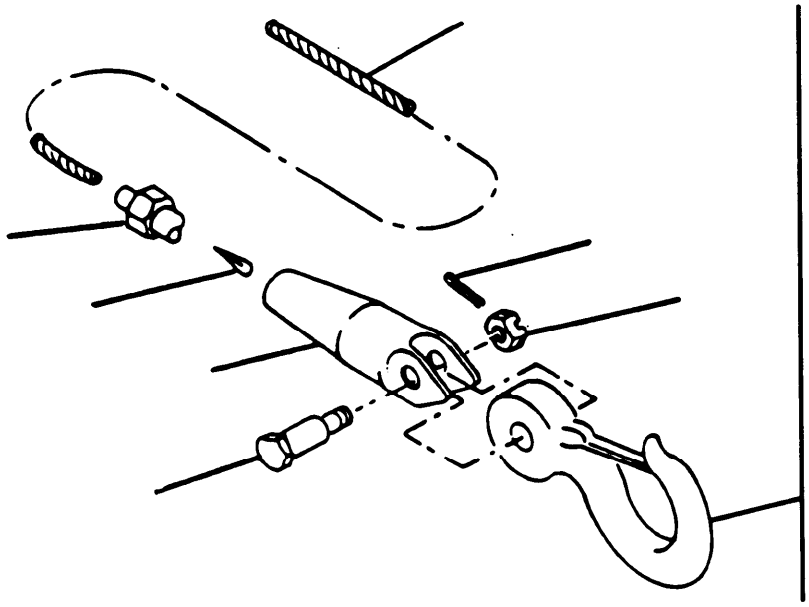



Figure F-4. Fuel Line.

**NOTE**

(1) All dimensions in inches.
(2) Assemble as shown in illustration.
(3) Bend to fit.



# APPENDIX G

## TORQUE LIMITS

G-1 . **General.** Table G-1 provides torque Iimits to be observed when installing and attaching hardware.

*Table G-1. Torque Limits.*

| Attaching Part | Range |
|---|---|
| Final Drive Housing Screws | 75 ft-lb (101.6 Nm) |
| Primary Drive Housing Screws | 75 ft-lb (101.6 Nm) |
| Spring Cover Screws | 35 ft-lb (47.4 Nm) |
| Rear Hinge Pin Screw | 120-132 ft-lb (162-179 Nm) |
| Front Hinge Pin Screw | 120-132 ft-lb (162-179 Nm) |
| Hinge Pin Links Screws | 120-132 ft-lb (162-179 Nm) |
| Latch Receptacle Screws | 31-34 ft-lb (4246 Nm) |
| Roadway Connector Screws | 120-132 in-lb |
| Lower Trunnion Nut Screws | 106-117 ft-lb (144-159 Nm) |
| Upper Trunnion Nut Screws | 31-34 ft-lb (4246 Nm) |
| Hydraulic Motor Gear Housing Screws | 265 ft-lb (359 Nm) |
| Hydraulic Motor Cover Screw | 45-50 in-lb (5-5.6 Nm) |

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SAMPLE

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| Pat Smith | AV272-4162 | Pat Smith |

DA FORM 2028, FEB 74 REPLACES DA FORM 2028, 1 DEC 68, WHICH WILL BE USED. USAPPC V3.00

| **RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS**<br>For use of this form, see AR 25-30; the proponent agency is ODISC4. | Use Part II (reverse) for Repair Parts and Special Tools Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM). | **DATE:** |
|---|---|---|

| **TO:** *(Forward to proponent of publication or form) (include ZIP code)*<br>AMSTA-LC-CI Tech Pubs, TACOM-RI<br>1 Rock Island Arsenal<br>Rock Island, IL 61299-7630 | **FROM:** *(Activity and location) (include ZIP code)* |
|---|---|

**PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS**

| PUBLICATION/FORM NUMBER | DATE | TITLE |
|---|---|---|
| **TM 5-5420-209-12** | **Sept 1993** | **IMPROVED FLOAT BRIDGE (IFB)** |

| ITEM NO. | PAGE NO. | PARA-GRAPH | LINE NO.* | FIGURE NO. | TABLE NO. | RECOMMENDED CHANGES AND REASON<br>*(Provide exact wording of recommended changes, if possible).* |
|---|---|---|---|---|---|---|
| | | | | | | |

**Reference to line numbers within the paragraph or subparagraph.*

| TYPED NAME, GRADE, OR TITLE | TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION | SIGNATURE |
|---|---|---|
| | | |

| **TO:** *(Forward direct to addressee listed in publication)* | **FROM:** *(Activity and location)* *(include ZIP code)* | **DATE:** |
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| AMSTA-LC-CI Tech Pubs, TACOM-RI<br>1 Rock Island Arsenal<br>Rock Island, IL 61299-7630 | | |

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

| PUBLICATION/FORM NUMBER | DATE | TITLE |
|---|---|---|
| **TM 5-5420-209-12** | | **IMPROVED FLOAT BRIDGE (IFB)** |

| PAGE NO. | COLM NO. | LINE NO. | NATIONAL STOCK NUMBER | REFERENCE NO. | FIGURE NO. | ITEM NO. | TOTAL NO. OF MAJOR ITEMS SUPPORTED | RECOMMENDED ACTION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

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

| TYPED NAME, GRADE, OR TITLE | TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION | SIGNATURE |
|---|---|---|
| | | |

USAPPC V3.00

# The Metric System and Equivalents

### *Linear Measure*

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

### *Weights*

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

### *Liquid Measure*

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

### *Square Measure*

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

### *Cubic Measure*

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

# Approximate Conversion Factors

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

# Temperature (Exact)

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

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