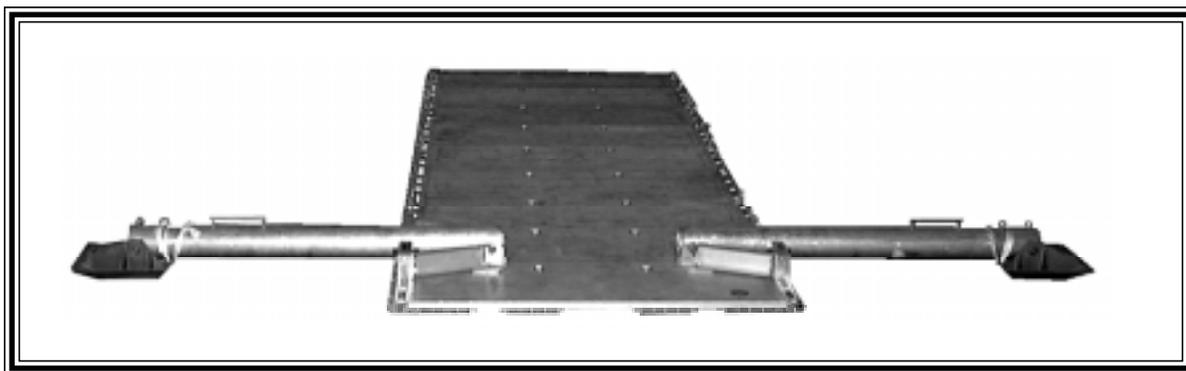




AIRDROP OF SUPPLIES AND EQUIPMENT:

DUAL ROW AIRDROP SYSTEMS



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**HEADQUARTERS
DEPARTMENT OF THE ARMY
DEPARTMENT OF THE AIR FORCE**

Field Manual
No 4-20.105
Technical Order
No 13C7-1-51

Headquarters
Department of the Army
and the Air Force
Washington, DC, [Pending Date]

Airdrop of Supplies and Equipment: Dual Row Airdrop Systems

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PREFACE

SCOPE

The purpose of this manual is to provide the latest approved procedures for rigging Dual Row Airdrop System (DRAS) airdrop platforms. This manual is written for use by the parachute rigger.

The procedures contained in this manual are typical and serve as the standard from which all DRAS platform rigging is derived. Due to the uniqueness of some equipment and items, **the procedures in a specific rigging chapter may be different from those in chapters 1 through 3. When procedures are different, those in the specific chapter will be followed. When an item of equipment is specified to be used for which its minimum or maximum capacity is exceeded, a notice of exception will be printed at the beginning of each paragraph in each rigging chapter where the exception is authorized.**

Chapters 1 and 2 contain specific limitations and general information about the rigging of DRAS airdrop platform loads for low-velocity airdrop from the C-17 (Globemaster) aircraft.

Chapter 3 shows and tells how to prepare, attach, and safety tie some of the components and systems used in the specific rigging chapters of the FM 4-20.105/TO 13C7-1-51.

USER INFORMATION

The proponent of this publication is HQ TRADOC. You are encouraged to report any errors or omissions and to suggest ways of making this a better manual.

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Chapter 1

Airdrop Information

RESPONSIBILITIES

1-1. US Air Force personnel are responsible for loading rigged Dual Row Airdrop System (DRAS) platform loads into the C-17 (Globemaster) aircraft and installing and operating the airdrop system.

TYPE AND METHOD OF AIRDROP

1-2. As used in this manual, DRAS allows platforms to be loaded side-by-side inside C-17 aircraft. DRAS airdrop is designed to supplement the usual surface methods of delivering supplies and equipment to forces in the field.

a. Type of Airdrop. Currently the only type of airdrop used to deliver platform loads is low-velocity airdrop. DRAS low-velocity airdrop delivers platform loads from C-17 aircraft. The G-11D cargo parachutes are used to slow the descent of the loads to ensure minimum landing shock. The number of cargo parachutes can vary as shown in Table 1-1. Loads with different quantities of the same type parachute may be airdropped from the same aircraft or element provided the following conditions are met:

- (1) Airdrop altitude for the aircraft or element will be determined by the type and number of parachutes on the load requiring the highest airdrop altitude.
- (2) Aircraft or elements with lower airdrop altitudes will drop before aircraft or elements with higher airdrop altitudes.
- (3) The transported force accepts strike report responsibility for loads other than the first platform to exit the aircraft or element lead for formation airdrops.

Table 1-1. Type and Number of Parachutes for Low-Velocity Airdrop

MINIMUM DROP ALTITUDE (FEET AGL)	PARACHUTES
1,000	G-11D 2 to 4

CAUTION
Drop altitudes reflect MINIMUM drop altitudes.

b. Method of Airdrop. The gravity method is used for DRAS platform loads delivered by low-velocity airdrop. The aircraft flies at an incline of approximately 4 degrees, the locks holding the platforms are removed, and the loads roll out of the aircraft by gravitational pull.

MAXIMUM RIGGED WEIGHT

1-3. The weight cited in the rigged load data for each specific load is typical for the load as shown. Some amount of overweight is allowed as long as load dimensions and rigging procedures are not changed. The maximum rigged weight for a DRAS platform is 14,500 pounds.

NOTE: When a maximum allowable rigged weight is specified in the rigged load data, this weight is the absolute maximum and will not be exceeded.

ACCOMPANYING LOADS

1-4. Accompanying loads are items of supplies and equipment that may be added to a primary load. Each airdrop chapter states whether an accompanying load is authorized.

CENTER OF BALANCE

1-5. The center of balance (CB) of a DRAS airdrop platform load is based on the total rigged weight and is given in the rigging chapter for a particular item. The CB must fall between 85 and 99 inches from the front of the platform. The CB of each load must be verified.
Methods for computing the CB are in Appendix A.

ITEMS AND LOADS DROPPED IN COLD CLIMATES

1-6. Some items to be dropped may have been modified for use in cold climates by the installation of extra equipment. Special rigging procedures may be needed when the drop item has been so modified. When loads are to be dropped in cold climates, all excess webbing of suspension slings and tie-down straps must be folded and tied with type I, 1/4-inch cotton webbing.

SAFETY PRECAUTIONS

1-7. Safety precautions **MUST** be closely followed when airdrop platform loads are rigged. Failure to follow the precautions could result in serious injury to personnel or damage to the drop item or aircraft. The following safety precautions shall be taken by the rigger:

- a.** Make sure that when lifting heavy items, the lifting device has a rated lifting capacity that exceeds the weight of the item to be lifted.
- b.** Be sure that items being lifted are secured to the lifting device.
- c.** Avoid working under equipment suspended above a DRAS airdrop platform unless absolutely necessary.
- d.** Cover all wet cell batteries in service with plastic or nonflammable material.

- e.* Check fuel tanks to ensure that they do not exceed the fuel level of the specific rigging chapter. Check fuel tanks of small engines to make sure they are drained. Check fuel cans to make sure they are performance-oriented packaging approved. When stowing fuel cans, use cellulose wadding or other suitable material to prevent metal-to-metal contact.
- f.* Package, mark, and label hazardous materials according to AFJMAN 24-204/TM 38-250.

CAUTION

Only ammunition listed in FM 10-500-53/MCRP 4-3.8/
TO 13C7-18-41 may be airdropped.

KNOTS

1-8. Some of the knots used for rigging platform loads are shown in Figure 1-1.

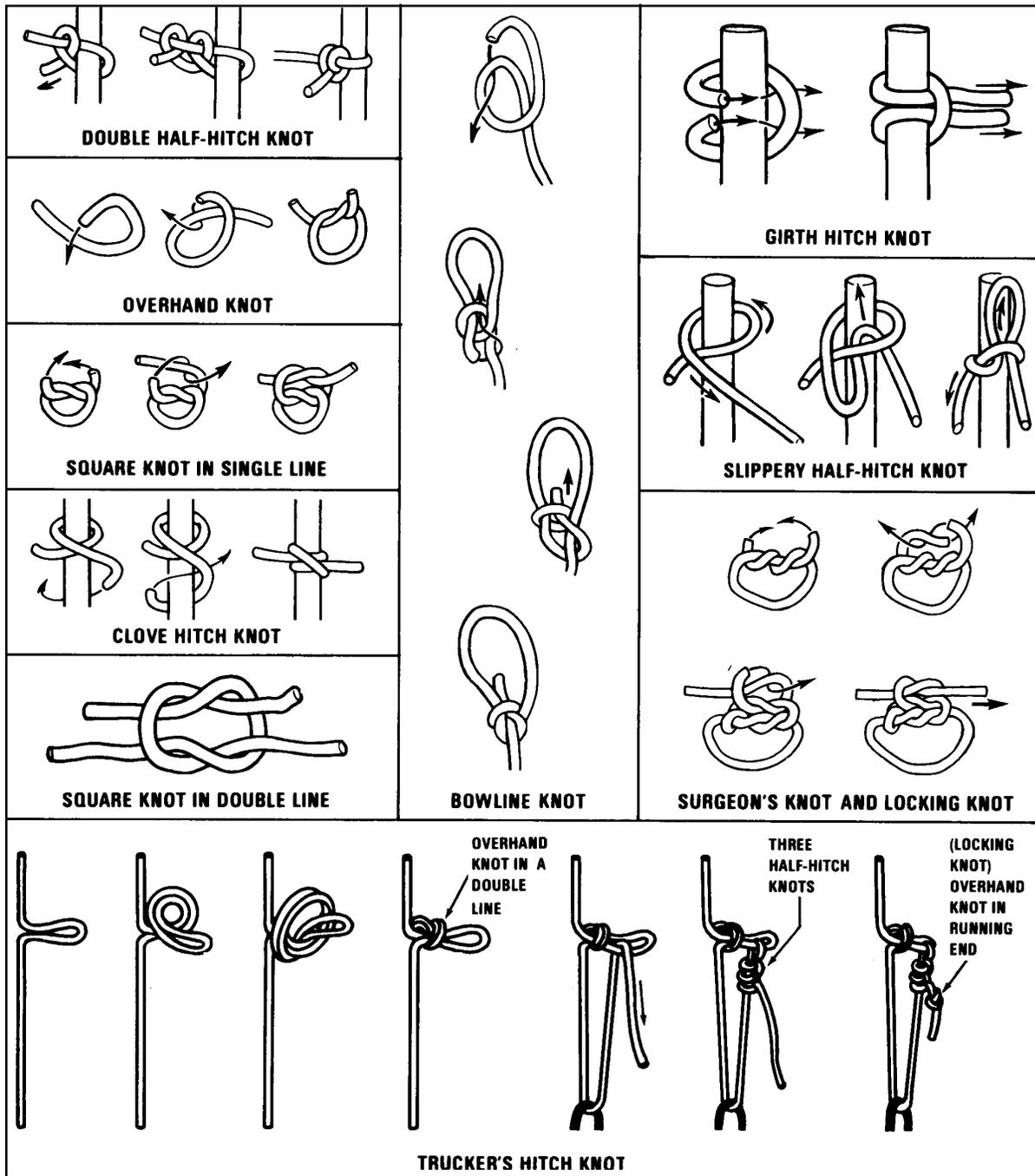
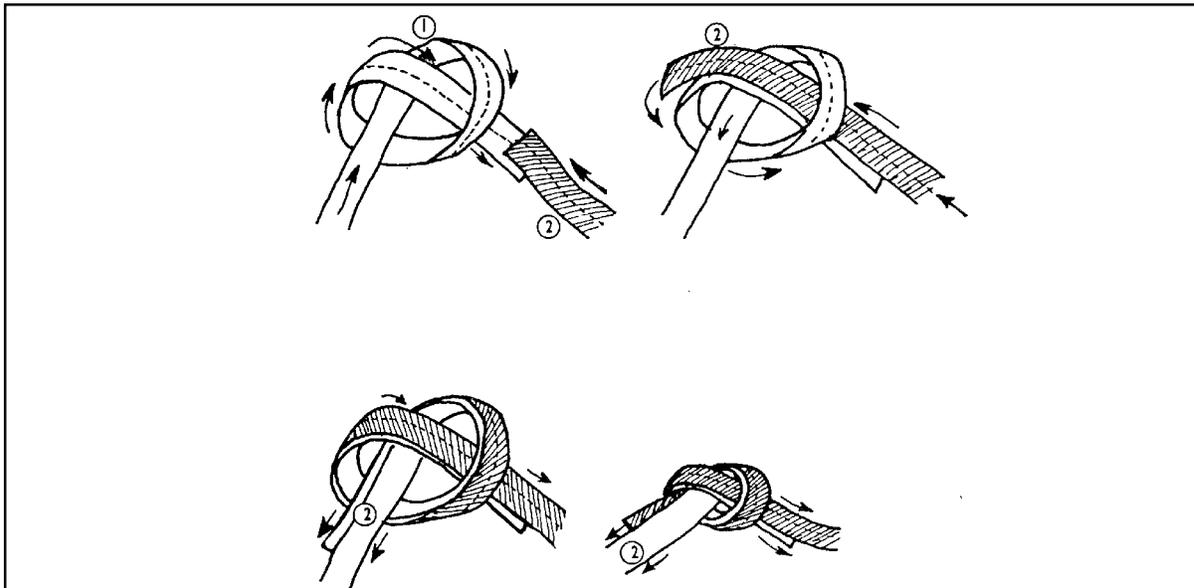


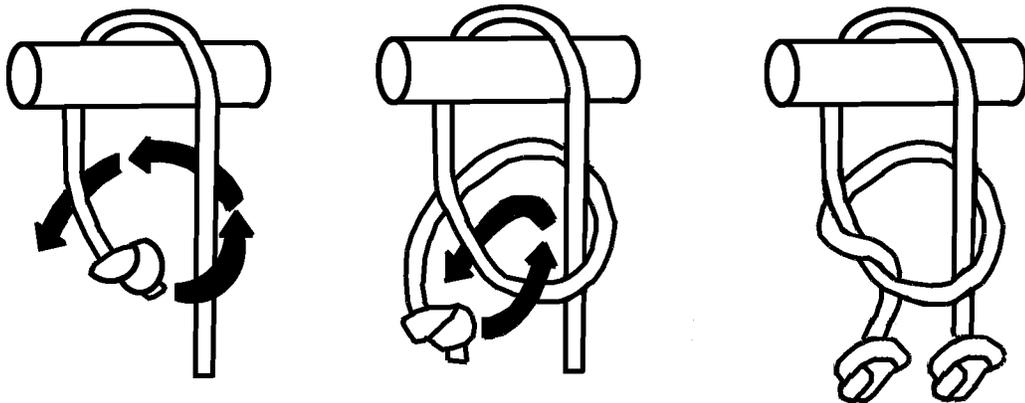
Figure 1-1. Knots Used During Rigging



- ① Make an overhand knot in one end.
- ② Follow the curve back in the reverse direction with the other end.

NOTES: 1. There is no need to safety tie the ends when webbing is used.
 2. Be sure the knot is neat, so as to tell if it is tied correctly.
 3. This knot will jam after heavy loading.

Ring Bend Knot used on the Drive-off Aid



SLIP KNOT

Note: Draw knots tight.

Figure 1-1. Knots Used During Rigging (Continued)

Chapter 2

Rigging Information

SECTION I - DUAL ROW AIRDROP SYSTEM PLATFORM

USE

2-1. The DRAS platform, as shown in Figure 2-1, serves as the base on which supplies and equipment are restrained. This platform also supports the load during the extraction, parachute deployment, suspension, and recovery phases. The DRAS platform is used for low-velocity airdrop. The DRAS platform is 18 feet long. The assembled platform is 88 inches wide. A detailed description of this platform is in TM 10-1670-268-20&P/TO 13C7-52-22. The DRAS platform spreads the shock of ground impact. The outrigger assembly helps to prevent the platform from rolling over. Limitations for the DRAS platform are listed in Table 2-1.

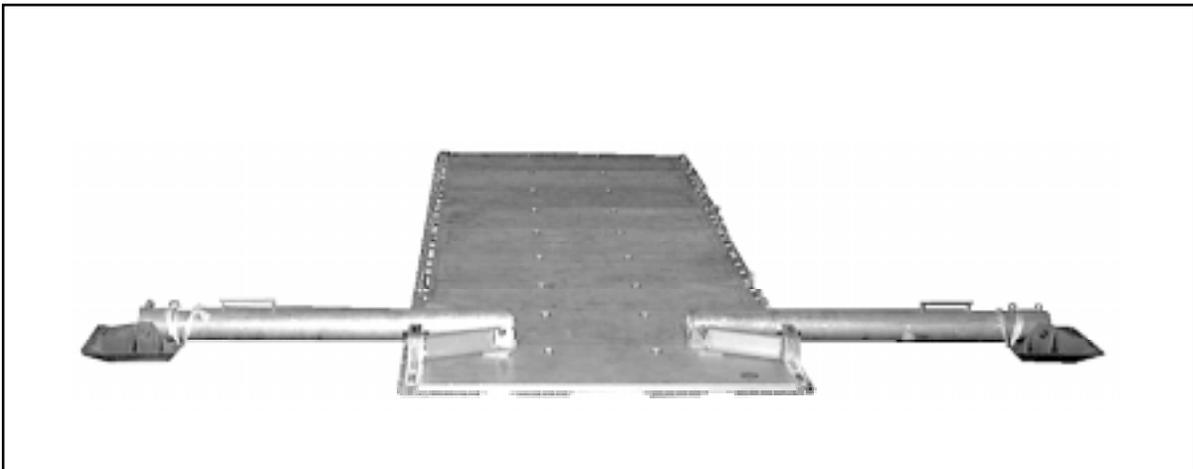


Figure 2-1. Dual Row Airdrop System Platform

Table 2-1. Limitations for DRAS Platform when Dropping from a C-17 Aircraft

Length (Feet)	Width (Inches)	Weight (Pounds)	Platform Surface (Square Feet)	Minimum Rigged Weight (Pounds)	Maximum Rigged Weight (Pounds)
18	88	1,590 w/o outriggers	132	7,500	14,500
18	88	1,942 w/ outriggers	132	7,500	14,500

PLATFORM LIMITATIONS

2-2. The C-17 (Globemaster) aircraft is specifically designed to deliver supplies and equipment using the DRAS during airborne operations. Platform loads are generally restricted to a height of 118 inches. Platform loads are generally restricted to a weight of 14,500 pounds. For multiple platforms, up to 116,000 pounds of airdrop load may be airdropped. The aircraft has a capability of eight DRAS platforms, six on the floor and two on the ramp.

SECTION II - AIRDROP SUPPLIES AND EQUIPMENT

COMMONLY USED ITEMS

2-3. Items commonly used for rigging DRAS platform loads are described in this section. Each rigging chapter in FM 4-20.105/TO 13C7-1-51 contains one or more tables of equipment required. These tables list the NSN, item, and quantity of each item needed to prepare and rig the load covered in that chapter. Standard DRAS hardware items are shown in Figure 2-2. Standard DRAS straps and canvas items are shown in Figure 2-3. Some textile, wood, and miscellaneous items are described below.

a. Textile Items. The most common textile items and their uses are as follows:

- (1) **Type III nylon cord** is used to make safety ties and to hold items in place. It has a tensile strength of 550 pounds.
- (2) **1/2-inch tubular nylon webbing** is used to secure items during airdrop. It has a tensile strength of 1,000 pounds.
- (3) **5/8-inch or 9/16-inch tubular nylon webbing** may be used for parachute clustering ties in place of 1/2-inch tubular nylon webbing. Five eighths inch tubular nylon webbing has a tensile strength of 2,250 pounds and 9/16-inch tubular nylon webbing has a tensile strength of 1,500 pounds.
- (4) **3/4-inch tubular nylon webbing** is used to secure items during airdrop. It has a tensile strength of 2,300 pounds.
- (5) **Type VIII nylon webbing** is used for parachute restraint and to safety tie the outrigger foot assembly. It has a tensile strength of 3,600 pounds.
- (6) **Type I 1/4-inch cotton webbing** is used to make safety ties and to hold items in place. It has a tensile strength of 80 pounds.

- b. Wood Items.** Wood items used when DRAS loads are rigged for specific airdrop are made locally. Details for building these wood items are in the rigging chapter.

NOTE: Plywood will be grade AC or AD.

- c. Miscellaneous Items.** Miscellaneous items that may be used when a platform load is rigged are discussed below. The proper use of these items will be covered in detail in the specific rigging chapter for the load.

- (1) **Adhesive tape (masking tape), 2 inches wide**, is used to secure folds of excess webbing. It is also used to protect honeycomb from being cut by type III nylon cord and to hold padding in place. It can be used for other tasks also.
- (2) **Type IV, cloth-backed adhesive tape, 2 inches wide**, is used to protect honeycomb from being cut by type III nylon cord and to hold padding in place. It can be used for other tasks also.

CAUTION

The type IV, cloth-backed adhesive tape, will not be used to secure folds of deployment lines.

- (3) **Cellulose wadding and felt sheets** have many uses. They may be used to pad fragile items, to prevent sharp edges from cutting, and to protect slings during airdrop.
- (4) **Energy-dissipating pads (honeycomb)** are used to absorb the landing shock. Honeycomb is also used to level, pad, and fill empty spaces.

INSPECTION OF ITEMS

2-4. Canvas, metal, webbing, and wood items are inspected according to TM 10-1670-296-20&P/TO 13C7-49-2.

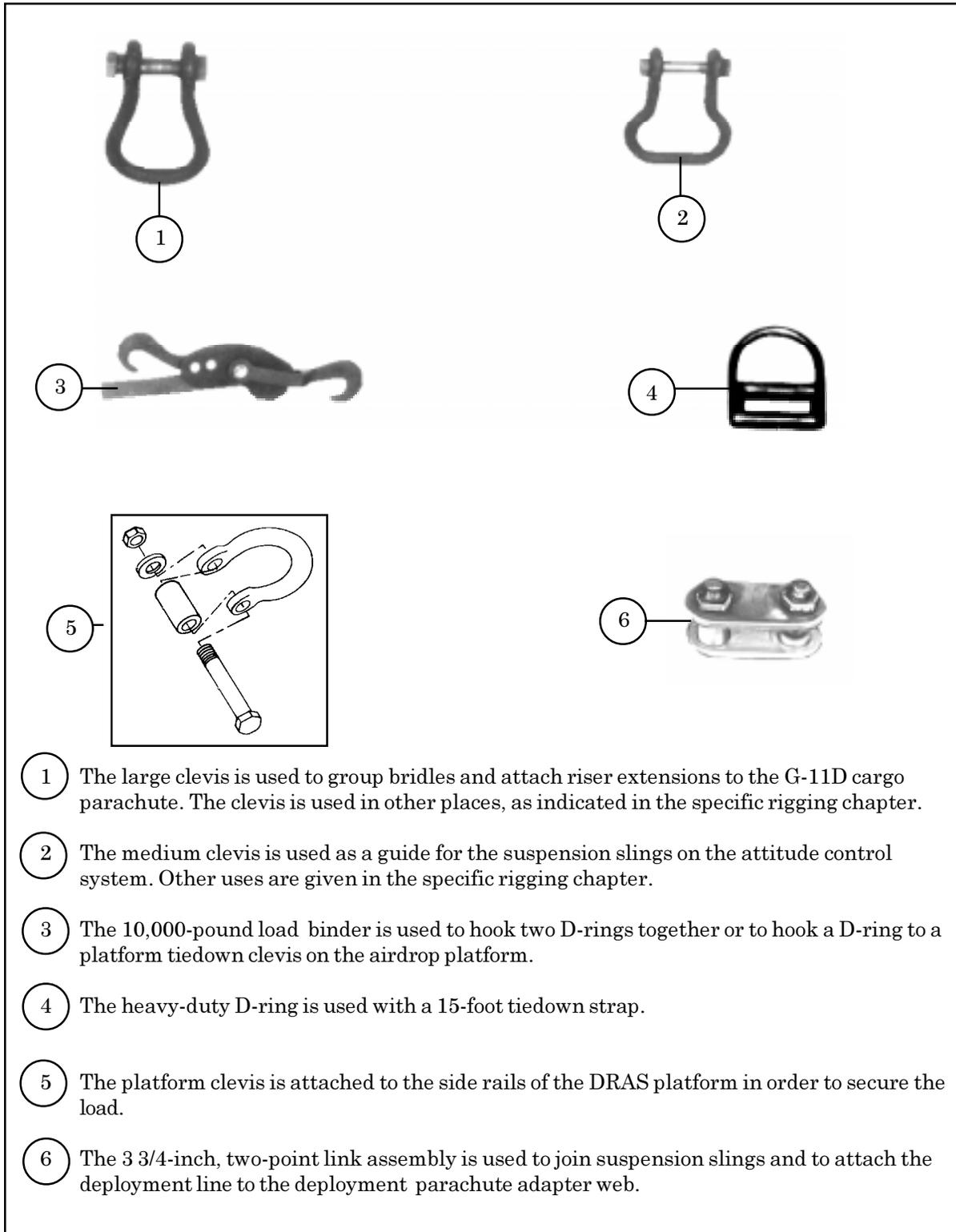
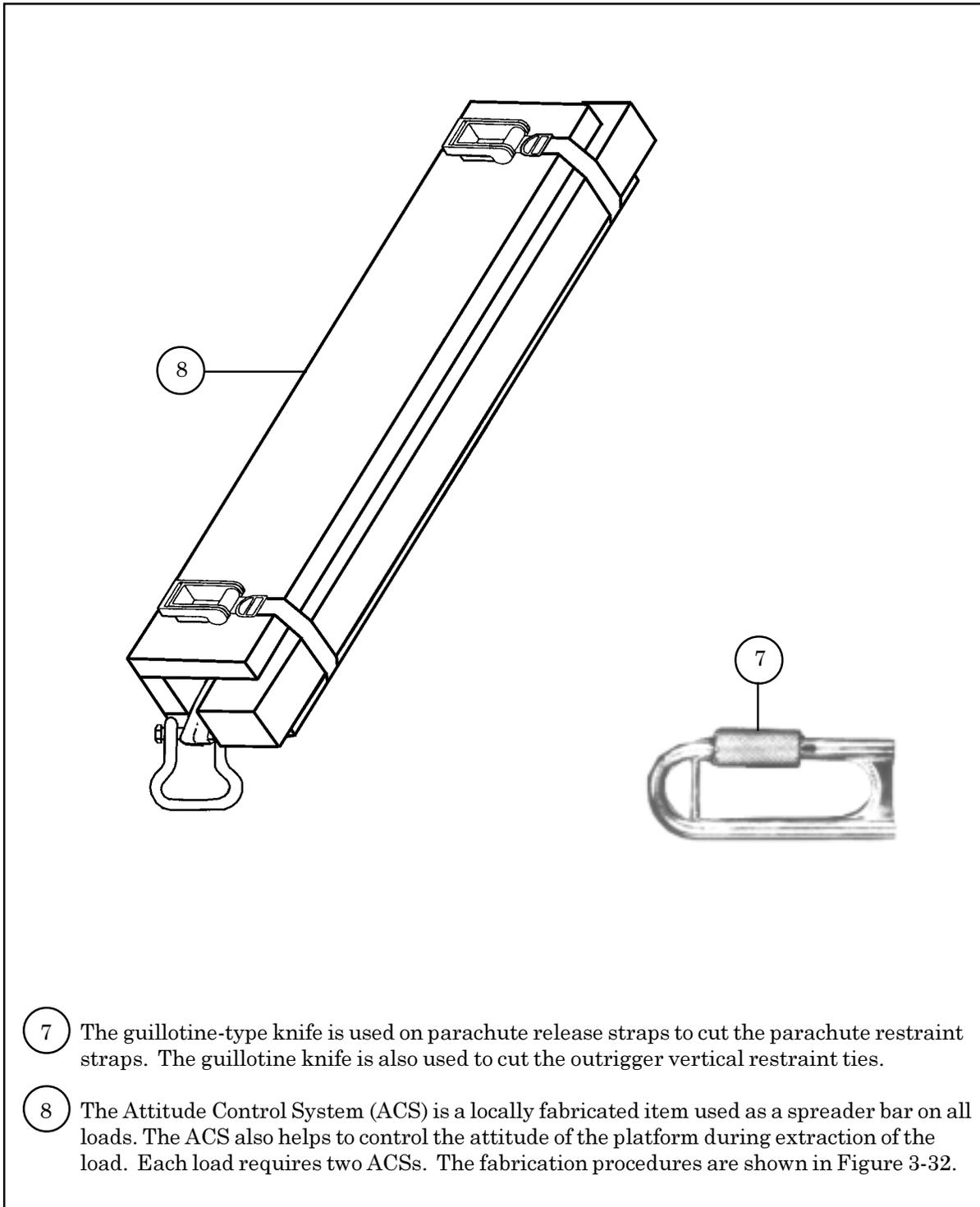


Figure 2-2. Hardware Items Used for Rigging DRAS Loads



- 7 The guillotine-type knife is used on parachute release straps to cut the parachute restraint straps. The guillotine knife is also used to cut the outrigger vertical restraint ties.
- 8 The Attitude Control System (ACS) is a locally fabricated item used as a spreader bar on all loads. The ACS also helps to control the attitude of the platform during extraction of the load. Each load requires two ACSs. The fabrication procedures are shown in Figure 3-32.

Figure 2-2. Hardware Items Used for Rigging DRAS Loads (continued)

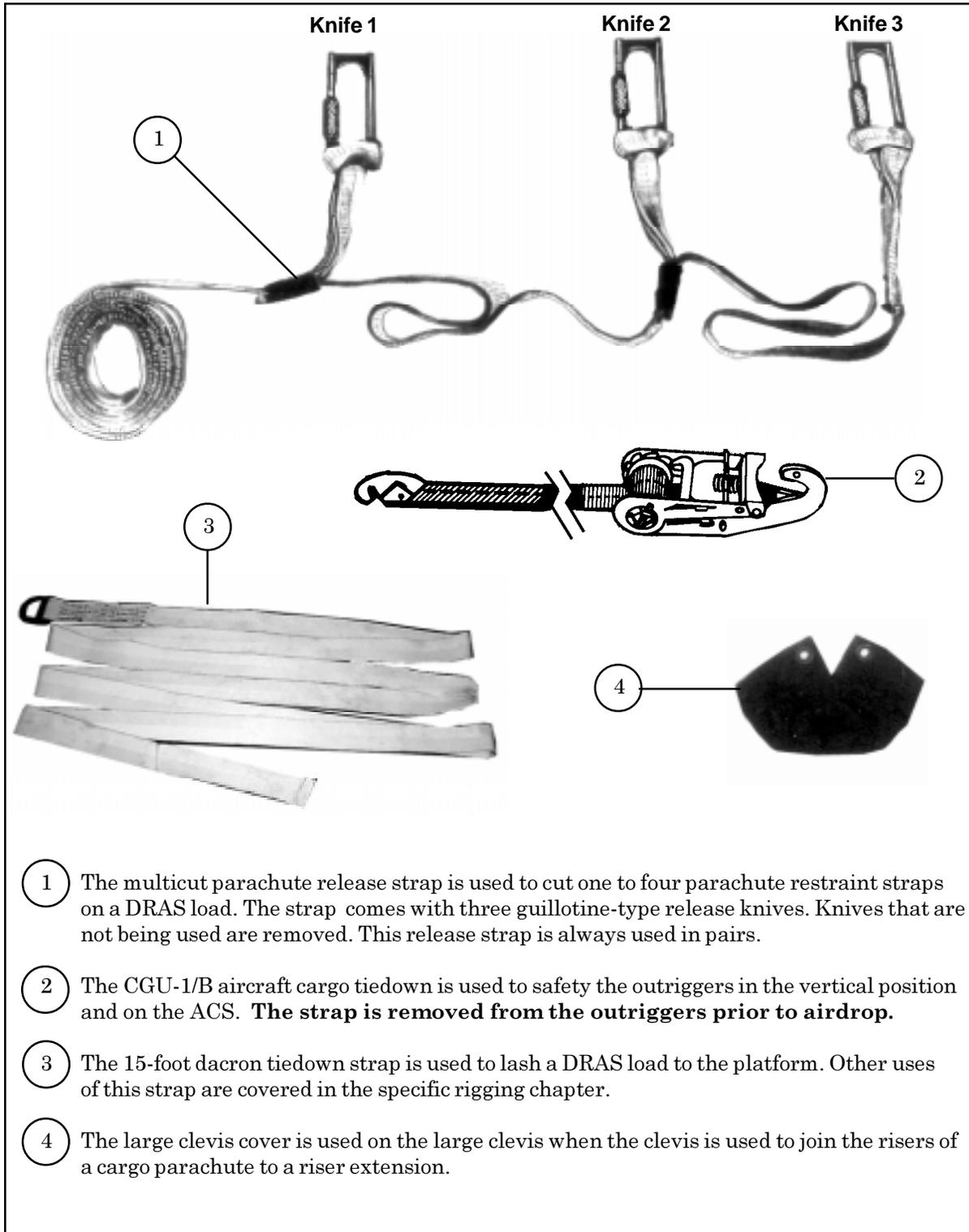


Figure 2-3. Straps and Canvas Items Used for Rigging DRAS Loads

SECTION III - SUSPENSION SLINGS

CARGO SLINGS

2-5. Cargo slings (Figure 2-4) are used as suspension slings on DRAS loads. These slings suspend the load under the cargo parachutes during descent. Suspension slings connect the cargo parachute to the load using a parachute release assembly. Cargo slings may also be used as deployment lines and to extend the risers of cargo parachutes. Cargo slings are also used in the fabrication of the ACS.

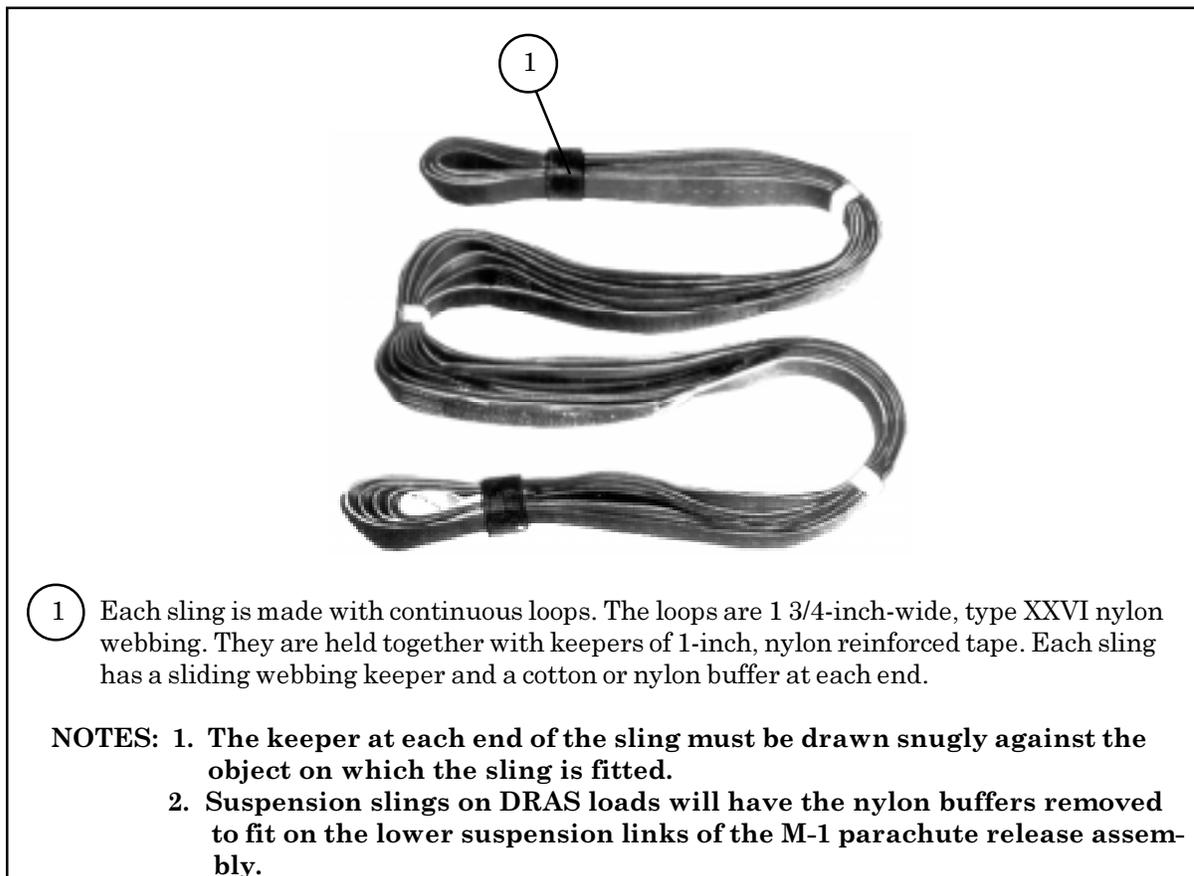


Figure 2-4. Cargo Slings

REQUIREMENTS

2-6. Loads rigged for use on the DRAS **require** 4-loop, type XXVI nylon suspension slings. The type and length of cargo slings authorized for use on a DRAS load are listed in Table 2-2.

Table 2-2. Cargo Slings for DRAS Airdrop

National Stock Number	Length (feet)	Number of Loops	Type of Nylon Webbing
1670-01-062-6306	3	4	XXVI
1670-01-062-6310	11	4	XXVI
1670-01-063-7761	16	2	XXVI
1670-01-062-6302	20	2	XXVI
1670-01-062-6313	60	3	XXVI

SECTION IV - LASHINGS

USE

2-7. The drop item and the accompanying load are lashed to the platform to prevent damage to the load or to the aircraft during airdrop. The accompanying load is lashed to the platform to withstand the same force as the drop item.

COMPONENTS AND STRENGTHS

2-8. The components of the lashings used on DRAS loads are shown in Figure 2-5. The maximum strengths of the various forms of lashings are given in Figure 2-6.

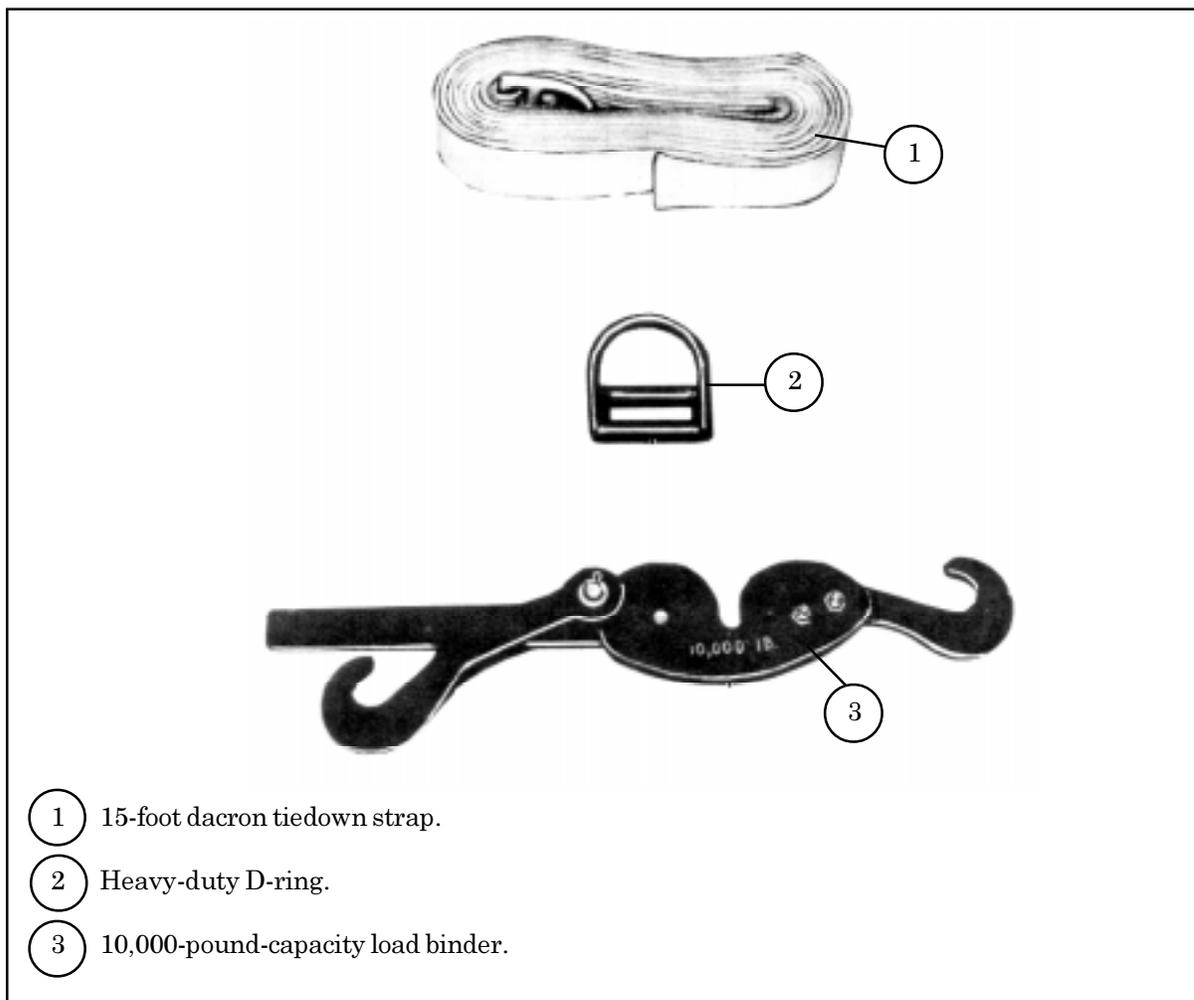


Figure 2-5. Components of a Tiedown Assembly

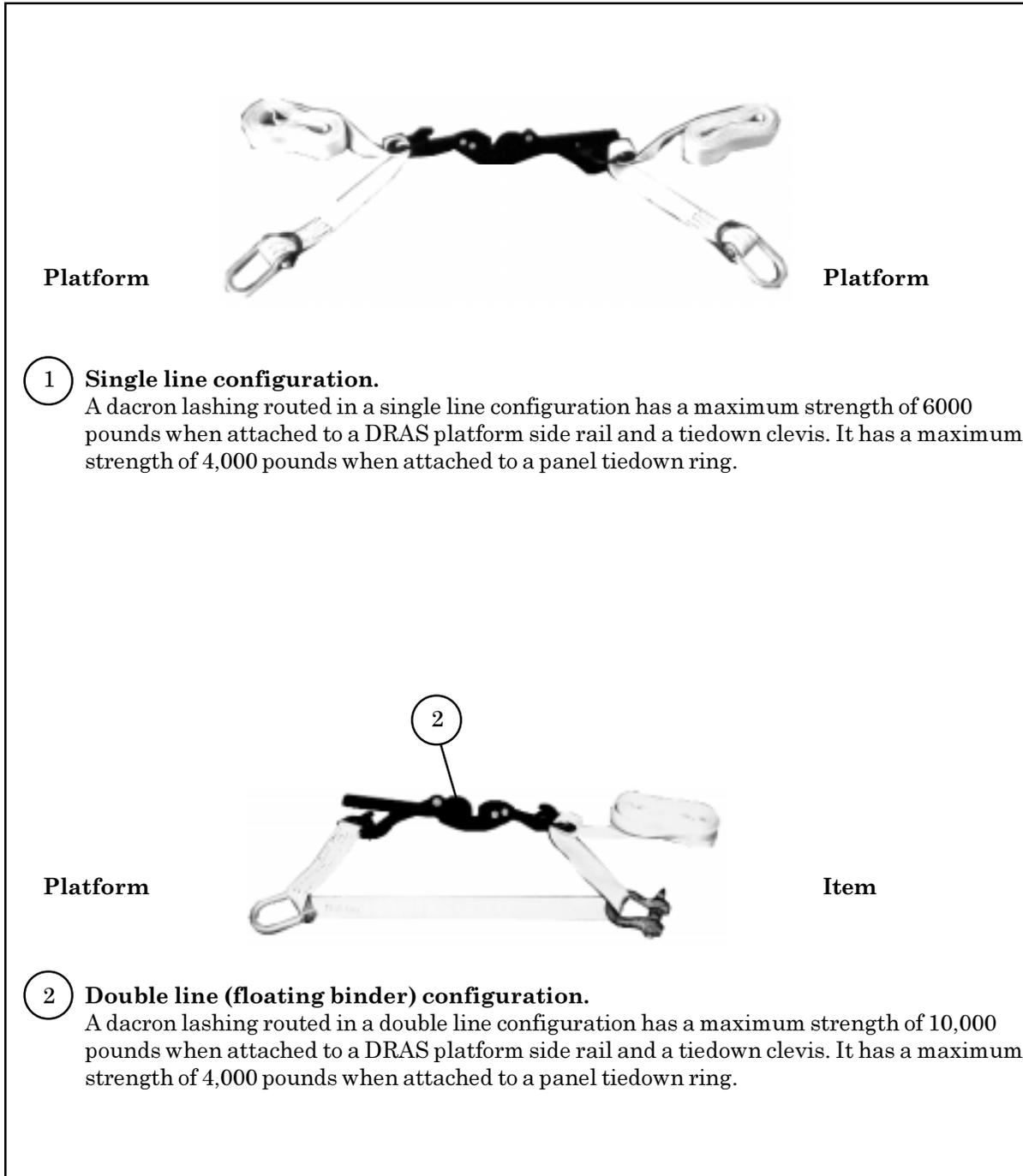


Figure 2-6. Strengths of Dacron Lashings

SECTION V - CARGO PARACHUTES

USE

2-9. Cargo parachutes, also called recovery parachutes, are used to slow the descent of a DRAS platform load. Table 2-3 lists the weight limitations for cargo parachutes used with DRAS platform loads.

Table 2-3. General Weight Limitations for Cargo Parachutes
*Suspended Weight in Pounds

Parachutes	Minimum	Maximum
G-11D		
2	6,950	8,499
3	8,500	12,799
4	12,750	13,400

***Suspended weight in pounds is the total rigged weight less the weight of the cargo parachutes.**

TYPES

2-10. The G-11D cargo parachute is used when loads are rigged for DRAS. The parachute has a 100-foot-diameter canopy. It has 120 suspension lines (35-foot, type III nylon cord). The parachute has four 2-second cutters and four 12-foot reusable reefing lines. When packed, the assembly weighs 250 pounds.

RISER EXTENSIONS

2-11. Cargo parachutes are used in a cluster. When parachutes are used in a cluster, the risers of each parachute are lengthened so the canopies remain almost vertical as they descend to increase the effectiveness of each canopy. The length of a riser extension and the number of stows used in stowing the extensions are given in Table 2-4.

Table 2-4. Riser Requirements for G-11D Cargo Parachute Clusters

Number of Parachutes in Cluster	Length of Riser Extension (feet)	Number of Extension Stows	Type XXVI Nylon Webbing Slings
2	20	2	20-foot (2-loop)
3 or 4	60	8	60-foot (3-loop)

NOTES:

1. All riser extensions must be continuous type XXVI nylon slings and have identical riser extensions and each must be of the same length.
2. For proper stowing procedures for G-11D, see Chapter 3 .

SECTION VI - PARACHUTE RESTRAINT SYSTEM

USE

2-12. A parachute restraint system, consisting of one or two restraint straps and two multicut parachute release straps, is used on all DRAS platform loads rigged with two or more cargo parachutes.

DESCRIPTION

2-13. When the force is transferred from the deployment parachute to the deployment line, it pulls on the clevis to which the release straps are secured. This pull causes the knives on the release straps to cut the restraint straps and allows the cargo parachutes to deploy. Parachute restraint straps are made from lengths of type VIII nylon webbing as shown in Figure 2-7.

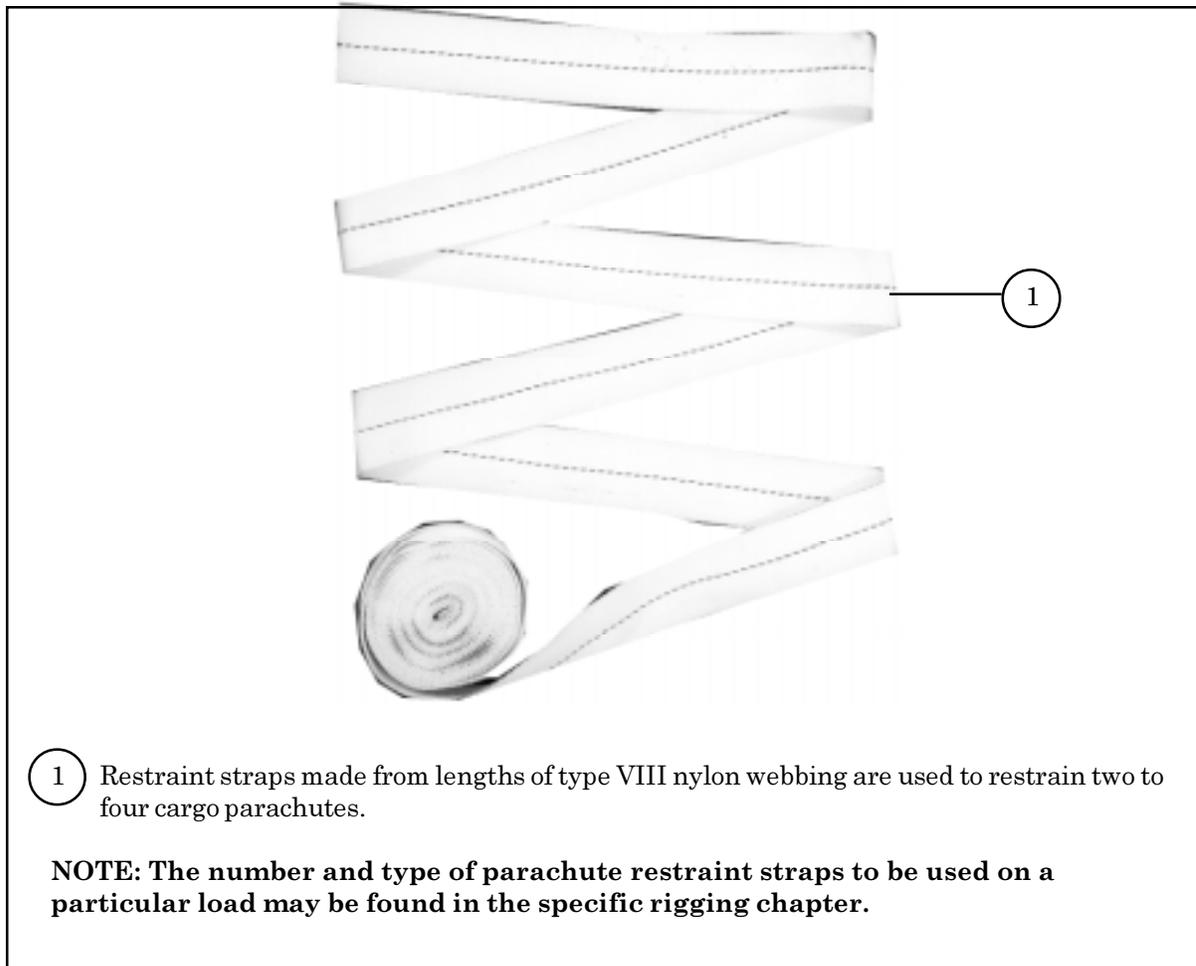


Figure 2-7. Webbing Used for Parachute Restraint Straps

SECTION VII - RELEASE ASSEMBLIES

USE

2-14. The cargo parachute release assembly separates the parachutes from the load when the load touches the ground. The separation reduces the chance of the wind dragging or overturning the load.

DESCRIPTION

2-15. The M-1 release is used when a DRAS load is rigged for airdrop. This release is used with DRAS rigged loads weighing up to 13,400 pounds suspended.

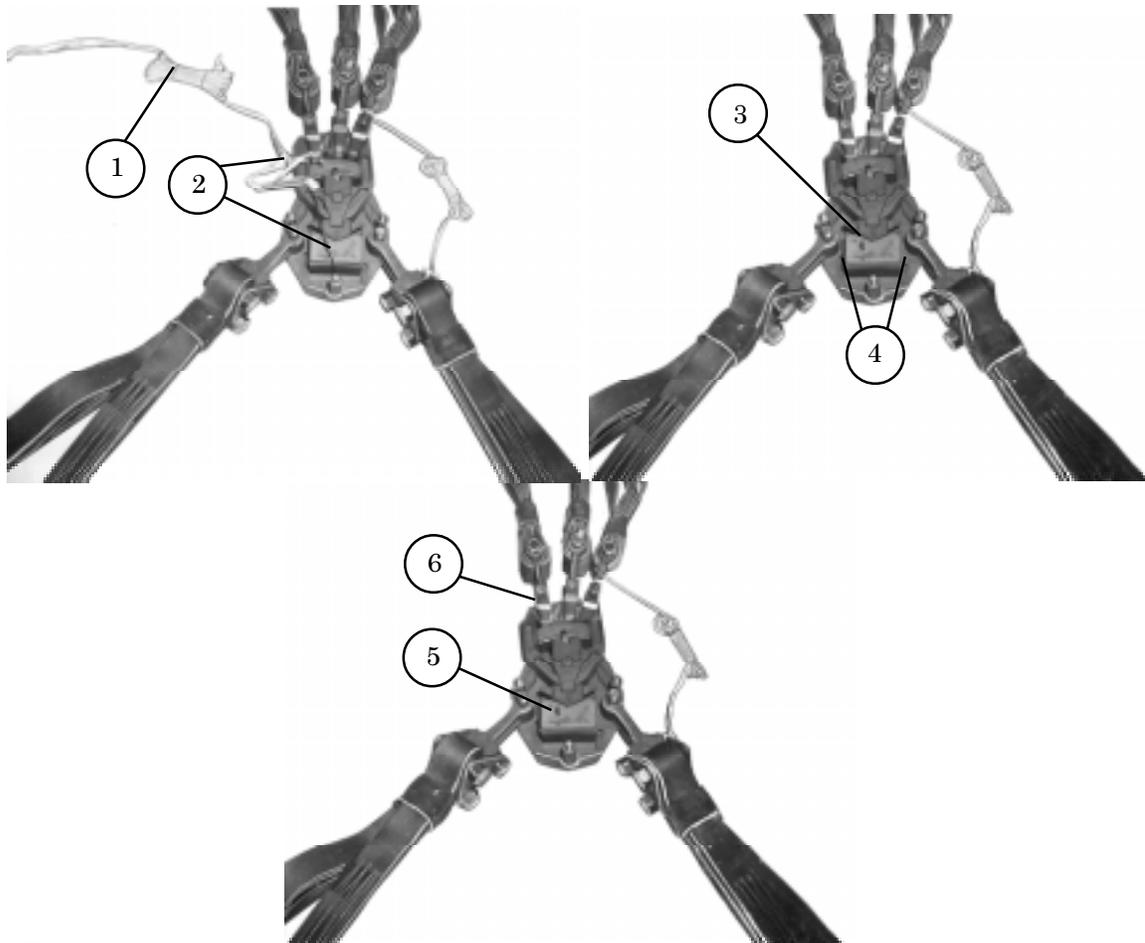
INSPECTING AND MAINTAINING

2-16. The M-1 release is inspected and maintained as outlined in TM 10-1670-296-20&P/TO 13C7-49-2. See the TM for specifics on inspection and maintenance.

OPERATION

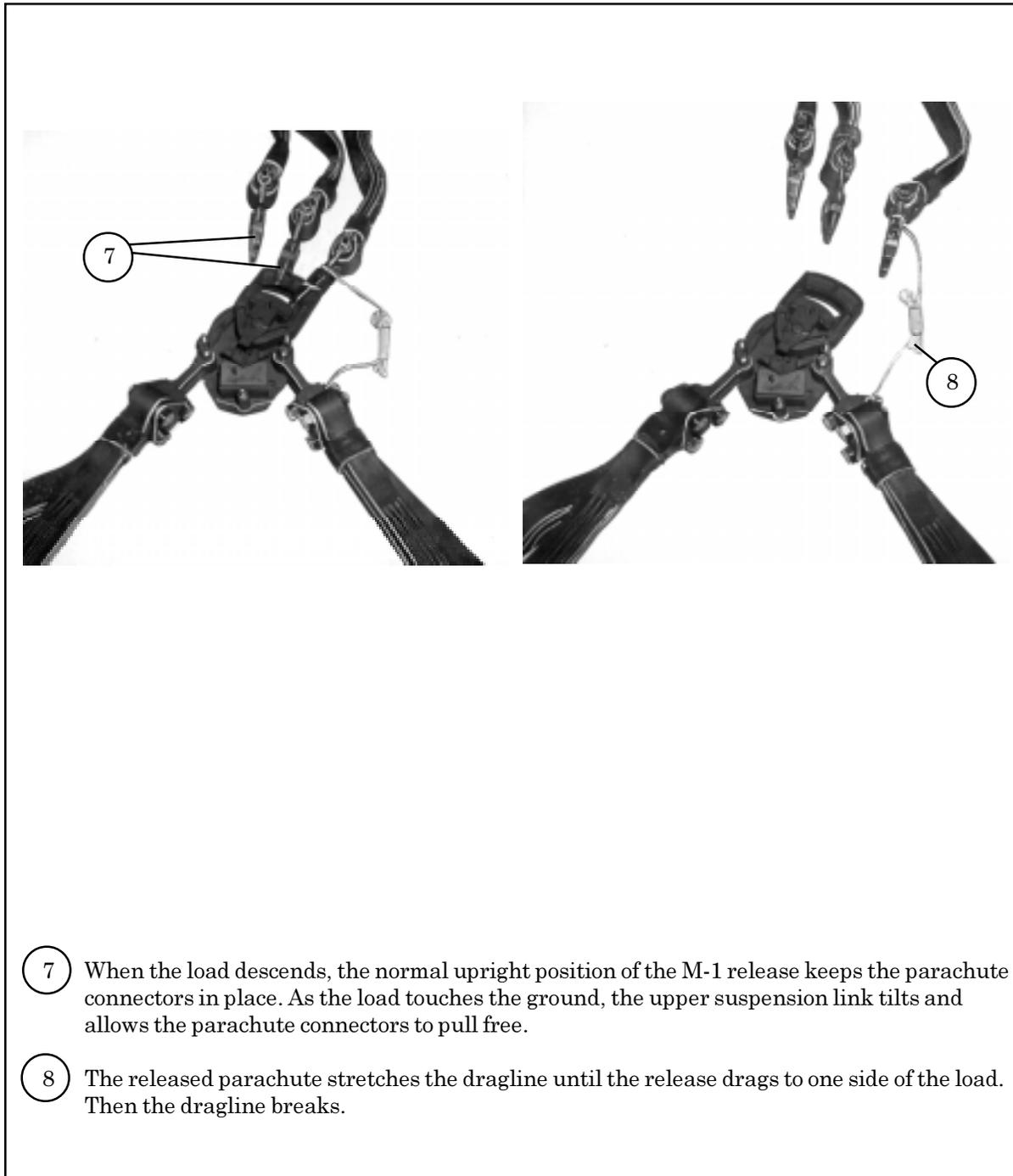
2-17. The operation of the airdrop cargo parachute release is given below. The release works when the load touches the ground and upper suspension link tilts or moves to the side. When the release tilts, the parachutes are released from the load. Figure 2-8 shows how the release operates.

NOTE: The face plate has been removed to aid in identification.



- ① As the cargo parachute deploys, the arming wire lanyard is pulled.
- ② The safety tie is broken and the arming wire is pulled from the timer.
- ③ The timer delays from 12 to 16 seconds. This delay allows the load to stabilize itself under the parachute.
- ④ When the timer winds down, it retracts its keys from the slots in the release.
- ⑤ When the keys are retracted from their slots, the timer is free to fall within the release.
- ⑥ As the timer falls, it frees the toggle and upper suspension link.

Figure 2-8. Typical Operation of the M-1 Cargo Parachute Release



- 7 When the load descends, the normal upright position of the M-1 release keeps the parachute connectors in place. As the load touches the ground, the upper suspension link tilts and allows the parachute connectors to pull free.
- 8 The released parachute stretches the dragline until the release drags to one side of the load. Then the dragline breaks.

Figure 2-8. Typical Operation of the M-1 Cargo Parachute Release (Continued)

SECTION VIII - OUTRIGGER ASSEMBLY

USE

2-18. An outrigger assembly is used on every DRAS load to help prevent the load from turning over after landing on the ground. The assembly is attached to the DRAS platform and is deployed from the vertical to the horizontal position after the load clears the ramp of the aircraft. The component parts of the outrigger assembly are shown in Figure 2-9.

INSPECTING AND MAINTAINING

2-19. Outriggers are inspected and maintained as outlined in TM 10-1670-268-20&P/TO 13C7-52-22. See the specific TM for more information on inspecting and maintaining the outrigger assembly.

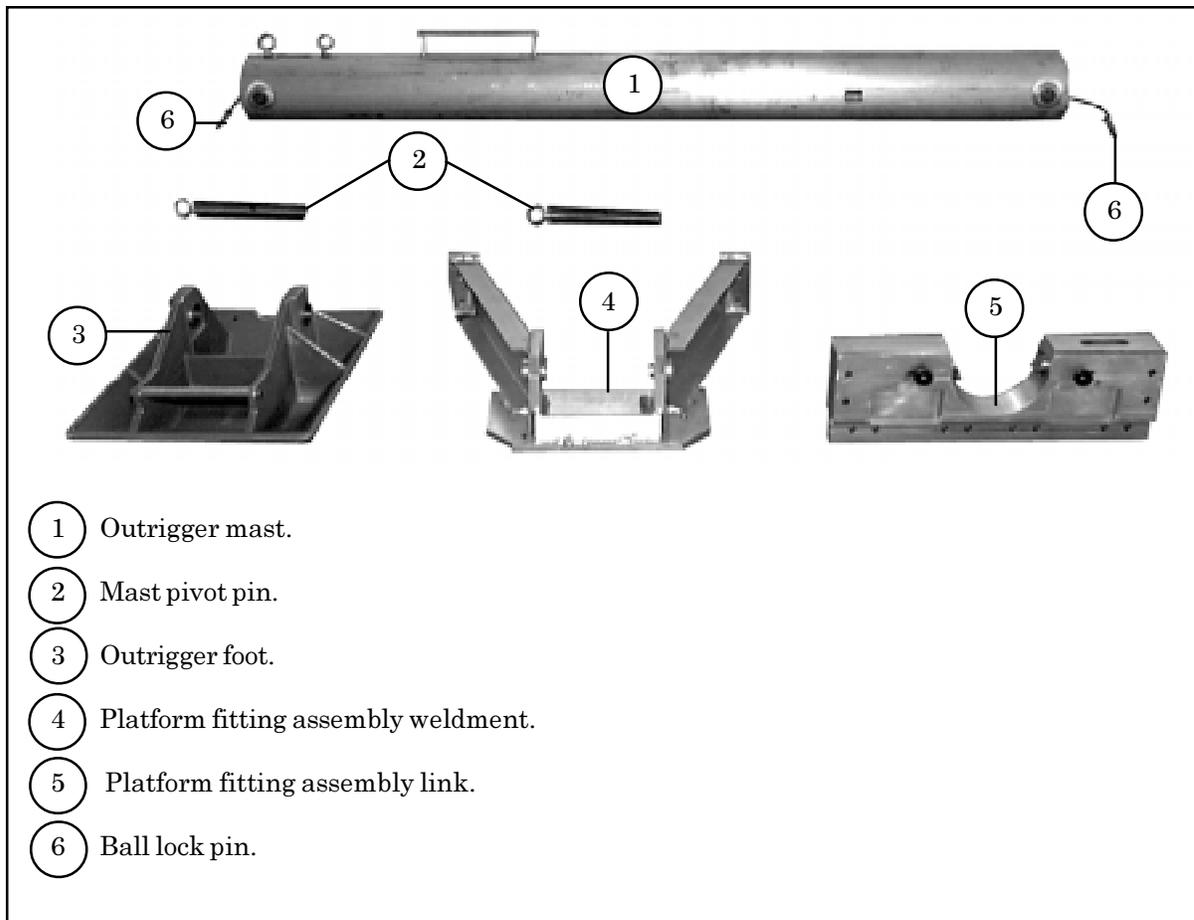


Figure 2-9. Deployable Outrigger Assembly

SECTION IX - DEPLOYMENT PARACHUTE AND DEPLOYMENT LINE

USE

2-20. A deployment parachute is used on every DRAS load to deploy the G-11D cargo parachutes as the load leaves the aircraft. The deployment parachute is a 28-foot extraction parachute packed in a deployment bag and rigged with a release-away static line assembly.

INSPECTING AND MAINTAINING

2-21. Deployment parachutes are inspected, maintained, and packed as outlined in TM 10-1670-277-23&P/TO 13C5-28-2. See the specific TM for more information on inspecting, maintaining, and packing these parachutes. The 28-foot extraction parachute deployment bag modification procedures are located in TM 10-1670-277-23&P. The release-away static line assembly is inspected and maintained as outlined in TM 10-1670-277-23&P/TO 13C5-28-2.

SECTION X - TRANSPORTATION OF RIGGED LOADS

RESPONSIBILITIES

2-22. The using unit is responsible for coordinating transportation of the rigged load from the rigging site to the aircraft. To prevent damage, loads must be lashed to the transporting vehicle and protected during transport. The transporting force must ensure that the off-loading equipment is compatible with the aircraft to be used.

TYPICAL LOADING AND TRANSPORTING EQUIPMENT

2-23. Some of the equipment that may be used to load and transport rigged loads is listed below.

a. *Materials-Handling Equipment.* If a loading ramp is not available to use in loading the rigged load onto the transporting vehicle, the load is hoisted aboard the vehicle. The materials-handling equipment used to hoist the loads may include but are not limited to the 5-ton wrecker, the 10,000- or 15,000-pound-capacity warehouse crane, or the 10,000- or 15,000-pound-capacity forklift truck.

b. *Transporting Vehicle.* Any standard military truck or semitrailer with sufficient cargo space and payload capacity can be modified to transport a rigged load from the loading area to the cargo aircraft. However, not all military trucks are compatible with the cargo-loading system of all types of cargo aircraft now in use. Rigged platform loads require straight-in loading over a horizontally positioned ramp from a truck, a forklift, a flatbed, or a cargo loader. Consequently, this may require transfer of the rigged load at the aircraft site before it is off-loaded into the cargo aircraft. The following types of materials-handling equipment can be used to transport and/or off-load platform loads:

(1) The 6- or 10-ton cargo semitrailer can transport loads rigged on airdrop platforms.

(2) The 25,000-pound-capacity cargo loader can move the maximum weight of 25,000 pounds up a 3-percent incline at 15 miles per hour. It can be used for loading all aircraft.

(3) The 40,000-pound-capacity cargo loader can move the maximum weight of 40,000 pounds up a 3-percent incline at 15 miles per hour.

(4) The 60,000-pound-capacity cargo loader (the Tunner) can move the maximum weight of 60,000 pounds up a 3-percent incline at 15 miles per hour.

- NOTES:**
1. **The DRAS platform must be loaded centerline on the 25,000- and 60,000-pound capacity loaders.**
 2. **The 40,000-pound capacity loader requires the right side loads to be against the loader's right side rails and left side loads must be against the loader's left side rails.**

Chapter 3

Procedural Information

SECTION I - PLATFORM AND HONEYCOMB PREPARATION

INSPECTING PLATFORM

3-1. The DRAS platform is inspected, or assembled and inspected, as outlined in TM 10-1670-268-20&P/TO 13C7-52-22.

PREPARING THE PLATFORM

3-2. The platform must be prepared by attaching outrigger link assemblies and the outrigger platform support weldments according to TM 10-1670-268-20&P/TO 13C7-52-22 . Install the clevises according to the specific rigging chapter. Figure 3-1 gives an example of how to bolt the clevises to the bushings in the platform side rails and how to number them.

SUSPENDING DRAS PLATFORM LOADS AND SAFETY TIEING SUSPENSION SLINGS

3-3. The DRAS platform is suspended using 3-foot and 11-foot (4-loop), type XXVI nylon slings as shown in Figure 3-2. The clevis positions will be given in the specific chapter for the load being rigged. Safety tie the suspension slings as shown in Figure 3-2.

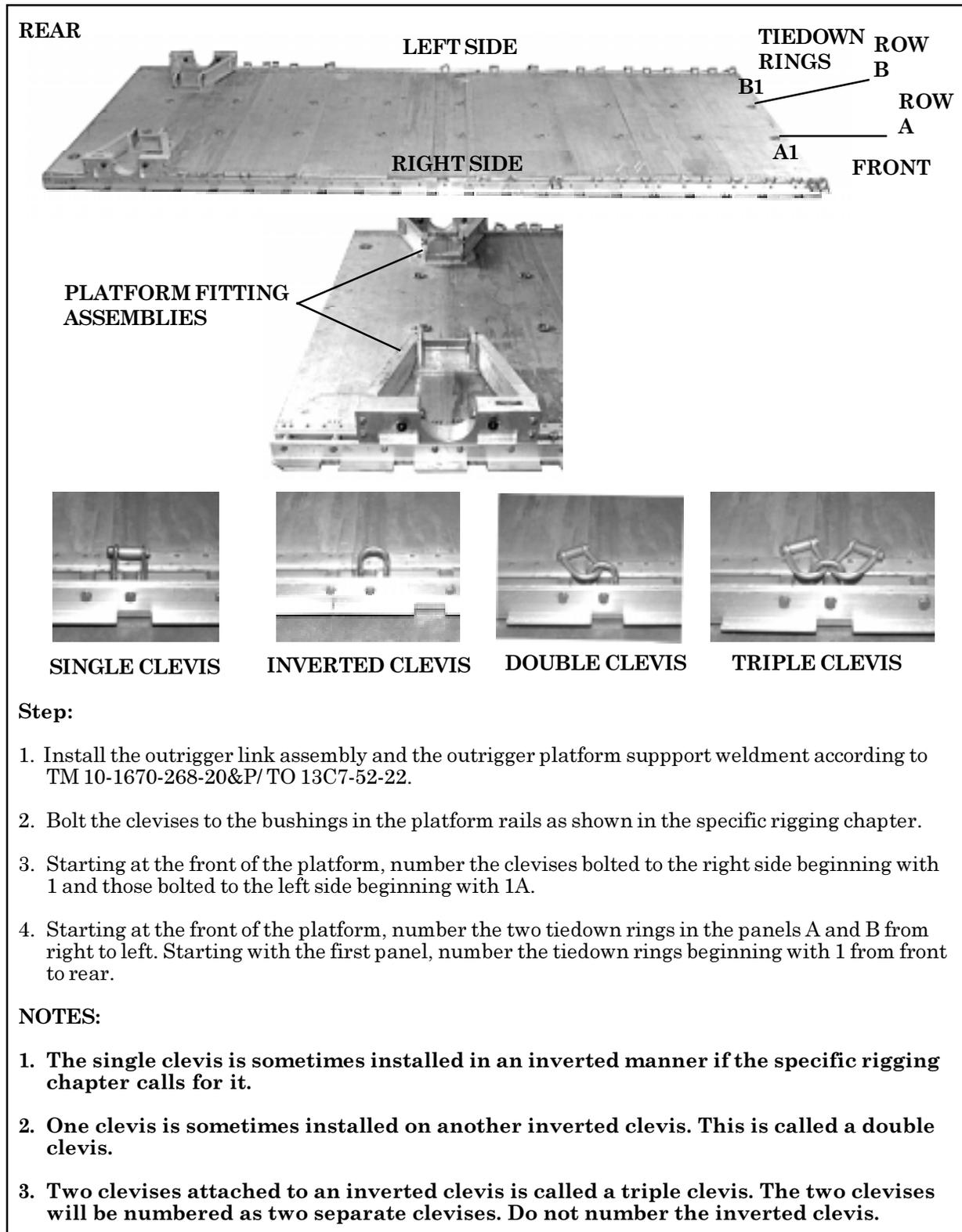
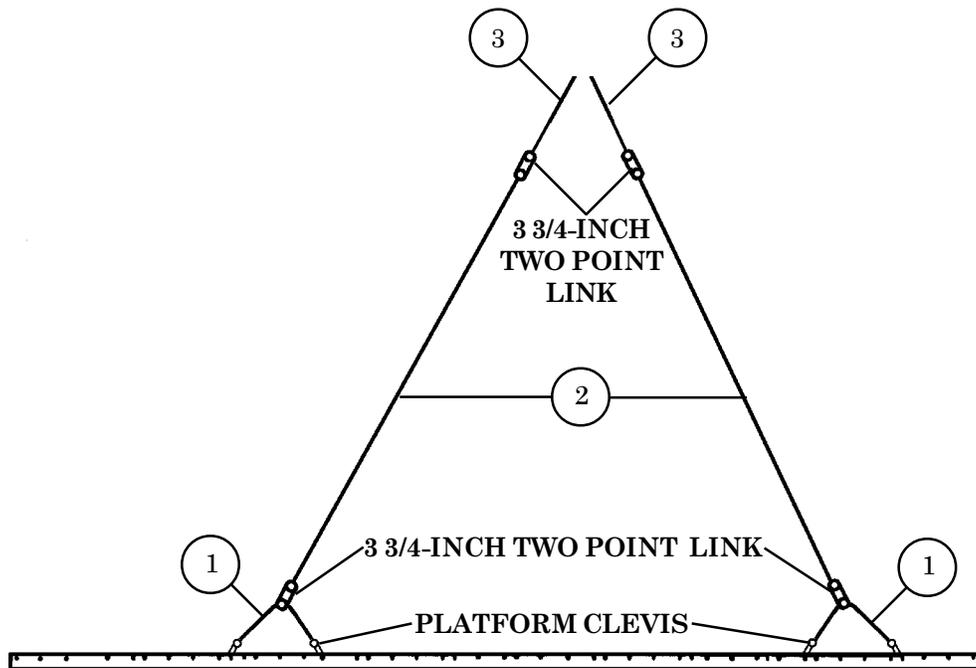


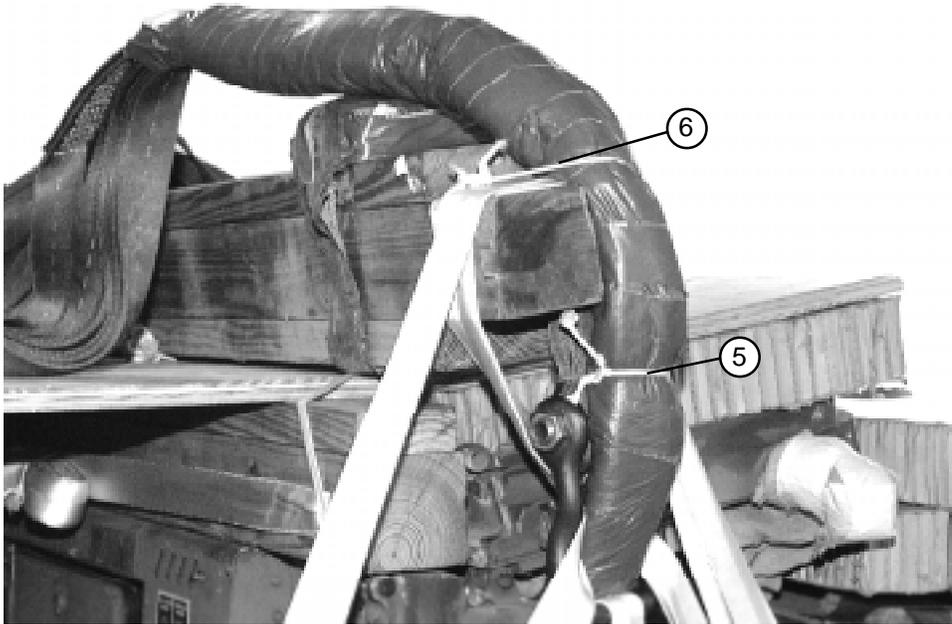
Figure 3-1. DRAS Platform Prepared

NOTE: This drawing is not drawn to scale.



- 1 Attach a 3-foot (4-loop), type XXVI nylon sling to the platform clevises listed in the specific rigging chapter.
- 2 Connect an 11-foot (4-loop), type XXVI nylon sling to the center of each 3-foot sling with a 3 3/4-inch two point link.
- 3 Connect an additional 3-foot (4-loop), type XXVI nylon sling to the end of each 11-foot sling with a 3 3/4-inch two point link.
- 4 Pad the top 3 3/4-inch two point links with felt and secure the felt with cloth backed tape (not shown).

Figure 3-2. Suspension System and Safety Ties Installed



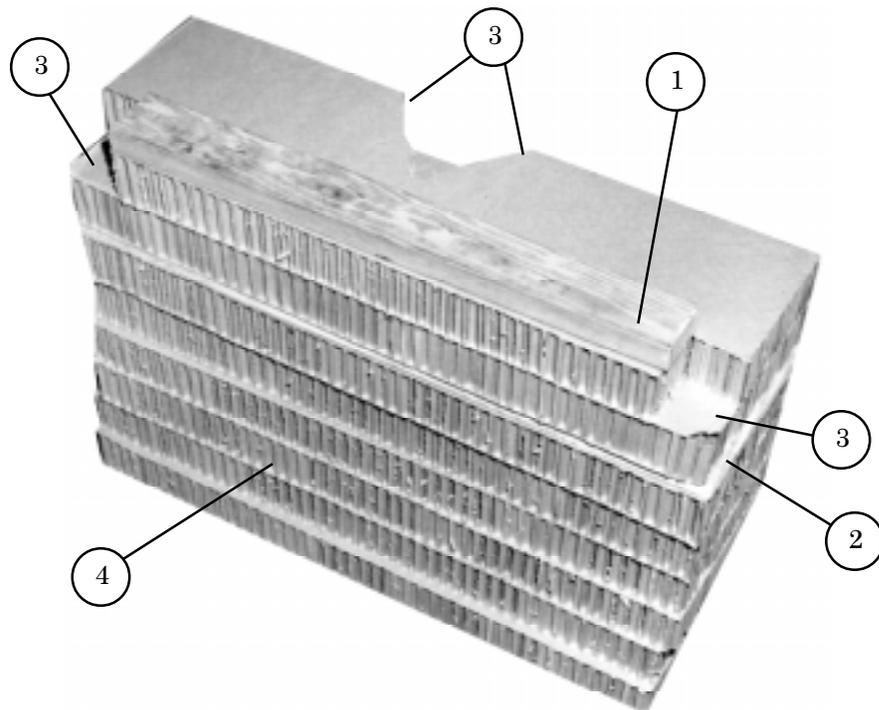
- ⑤ Remove all slack from the slings. Tie a length of type III nylon cord around the 11-foot sling and the ACS sling.
- ⑥ Tie a length of type III nylon cord around the 11-foot nylon sling, behind all lashings, and the 4 by 4-inch lumber of the ACS and tie the ends together.
- ⑦ Repeat steps 5 and 6 on all slings (not shown).

Figure 3-2. Suspension System and Safety Ties Installed (continued)

BUILDING HONEYCOMB STACKS

3-4. Honeycomb stacks must be prepared according to the specific rigging chapter. Honeycomb is used to absorb the landing shock. Figure 3-3 shows a typical honeycomb stack.

NOTE: When honeycomb stacks are longer than 96 inches or wider than 36 inches, alternate the layers to build a solid, cohesive stack.



- ① Lumber
- ② Plywood
- ③ Cutouts or notches
- ④ Layers of honeycomb

Note: Glue the layers of the stack together.

Figure 3-3. Typical Honeycomb Stack

PLACING HONEYCOMB STACKS

3-5. Honeycomb stacks must be set on the platform according to instructions in the specific rigging chapter. Figure 3-4 shows a typical placement of honeycomb stacks on a DRAS platform.

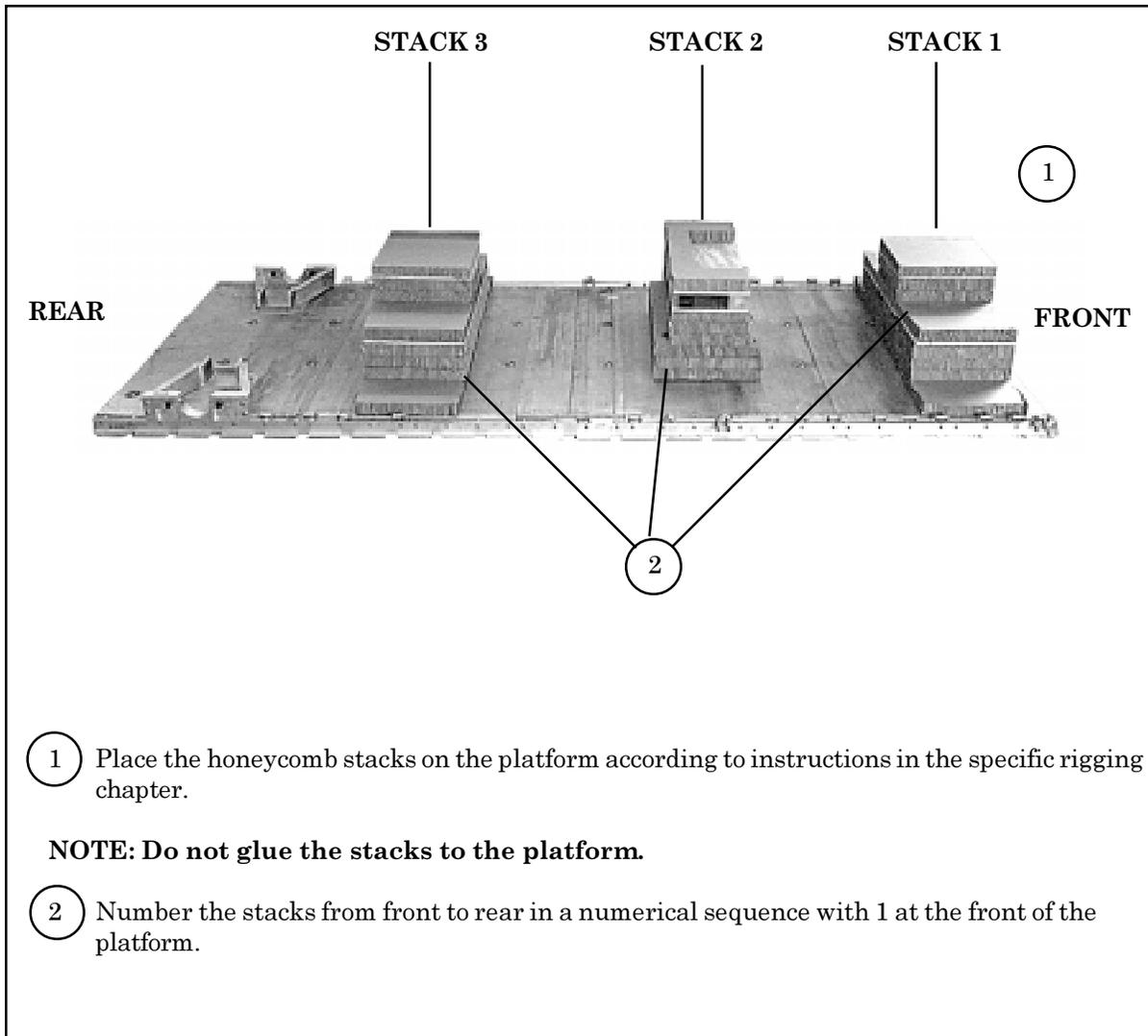


Figure 3-4. Typical Placement of Honeycomb Stacks on DRAS Platform

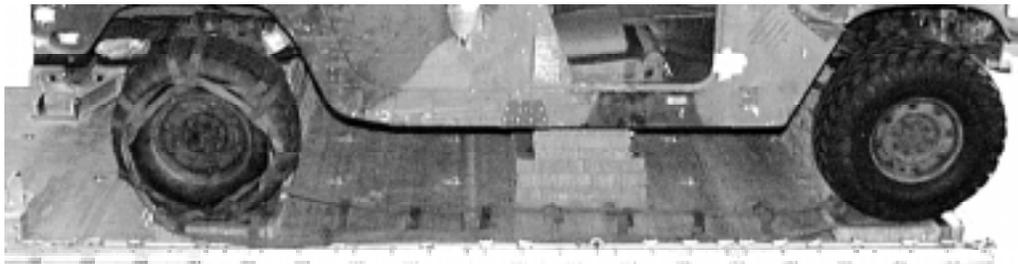
DRIVE-OFF AID AIRDROP

3-6. The drive-off aid may be used with the HMMWV truck. The drive-off aid, showing the front platform attachment (Figure 3-5), consists of a fabric track constructed of type X webbing sewn into a ladder-type configuration. The system is placed on two of the identified vehicle's tires and attached to the DRAS platform with type V webbing or 1-inch tubular nylon webbing. There are two tracks to each system. Each track is 30 feet long and 22 inches wide and weighs 21 pounds. When powered up, the vehicle (with tiedown assemblies removed), will progressively wrap the webbed ladder around the two tires (using the platform for leverage) and pull itself clear of the honeycomb and platform.



FRONT PLATFORM ATTACHMENT

NOTE: If the vehicle is to be driven off the front of the platform, tie a length of type V nylon webbing or 1-inch tubular nylon webbing from the first bushing through the end loop of the drive-off aid, and through the nearest tie-down ring. When attaching the drive-off aid to the platform using type V or 1-inch tubular webbing, tie the free ends with a ring bend knot as shown in Figure 1-1. Tie the drive-off aid to tie-down rings or platform bushings with type I, 1/4-inch cotton webbing.



NOTE: Wrap the drive-off aid around the wheel of the vehicle on each side as shown. Tie the end loop of each drive-off aid to the nearest cross piece with a doubled length of type I, 1/4-inch cotton webbing. Wrap the drive-off aid around the wheel until the webbing lays flat on the platform, but is not under tension. Tie the drive-off aid to adjacent tie-down rings or platform bushings on each side with type I, 1/4-inch cotton webbing.

Figure 3-5. Drive-off Aids Installed on Platform

SECTION II - ACCOMPANYING LOAD AND DROP ITEMS

STOWING ACCOMPANYING LOADS

3-7. Each specific rigging chapter contains the weight limitations, placement, and any additional restrictions on accompanying loads.

CAUTIONS

1. Accompanying loads may vary, however, accompanying load locations will not.
2. Only ammunition listed in FM 10-500-53/MCRP 4-3.8/TO 13C7-18-41 may be rigged for airdrop.
3. Hazardous materials must be packaged, marked, and labeled as required by AFJMAN 24-204/TM 38-250.
4. At least two layers of honeycomb must be placed under all ammunition rigged for airdrop unless the specific rigging chapter states differently.

PREPARING DROP ITEMS

3-8. Some items need to be prepared for rigging. This preparation can include removing, reinforcing, stowing, and securing components. Detailed preparation instructions will be included in the specific rigging chapter.

COVERING LOAD

3-9. Covers may be needed to protect the load and keep the suspension slings from fouling. To keep the load from being damaged by falling hardware such as parachute releases, it may be necessary to cover portions of the load with honeycomb or cloth protectors. If a cover is needed, the specific rigging chapter will include this information and the procedures for its installation.

FITTING D-RINGS

3-10. Fit a D-ring to the end of each tiedown strap as shown in Figure 3-6.

LASHING LOAD

3-11. Lash a DRAS load to the platform according to the instructions in the specific rigging chapter. Install the lashings as shown in Figures 3-7 and 3-8.

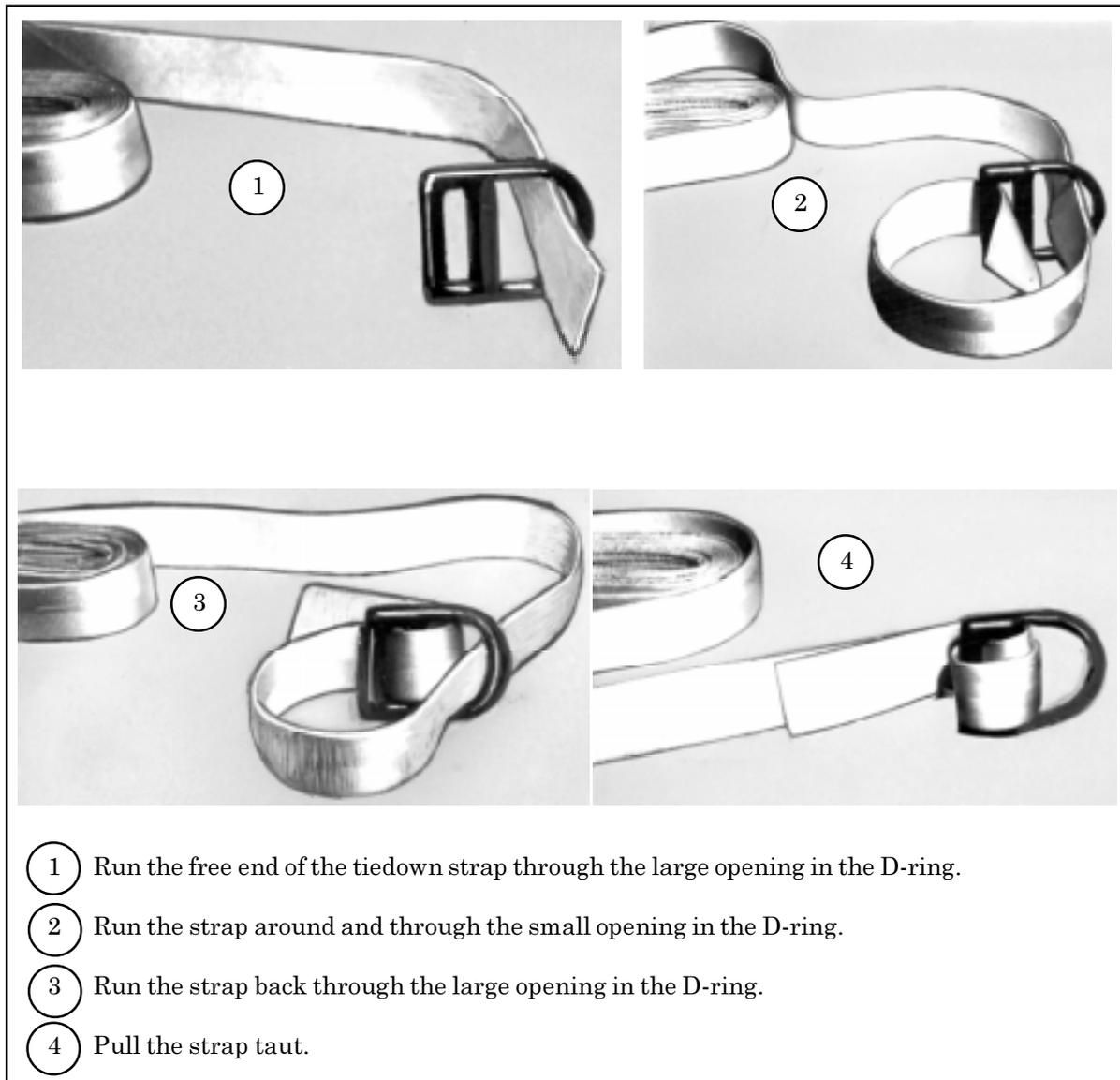
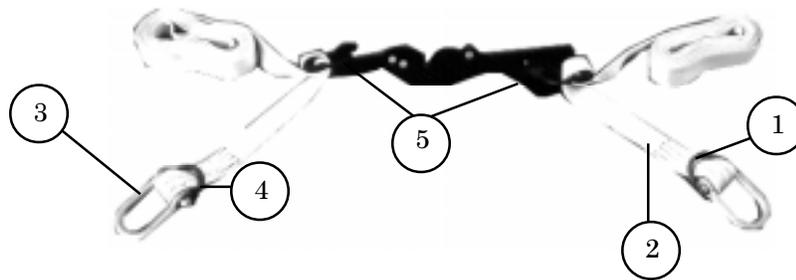
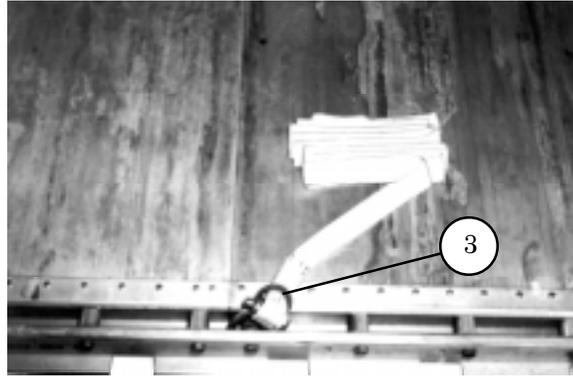
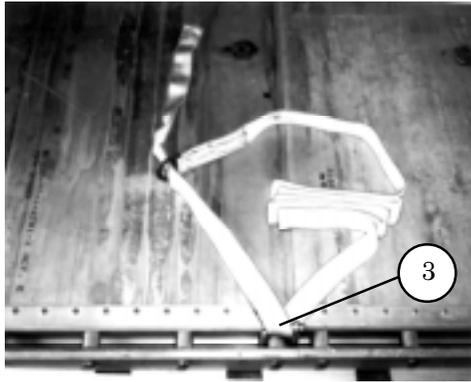


Figure 3-6. D-Ring Fitted to Tiedown Strap

CAUTION

Do not tighten the lashings so tight that they cause the platform to bow especially in the aircraft.



- 1 Pass the free end of one tiedown strap through a clevis on the right rail and through its own D-ring. Pull the strap taut.
- 2 Run the free end of the strap up over the load.
- 3 Pass the free end of a second tiedown strap through a clevis on the left rail and through its own D-ring. Pull the strap taut.
- 4 Run the free end of the strap up over the load.
- 5 Fit a D-ring on the free end of each strap as described in Figure 3-6, and place the D-rings on the hooks of a load binder. Safety the binder handle closed as shown in Figure 3-9.

NOTES:

1. When the tiedown strap length is not a factor, it is permissible to use a single tiedown strap and D-ring with a load binder attached directly to a side rail clevis or tiedown ring.
2. Pad all sharp edges that may touch the strap with cellulose wadding or other suitable material.

Figure 3-7. Single Line Lashing

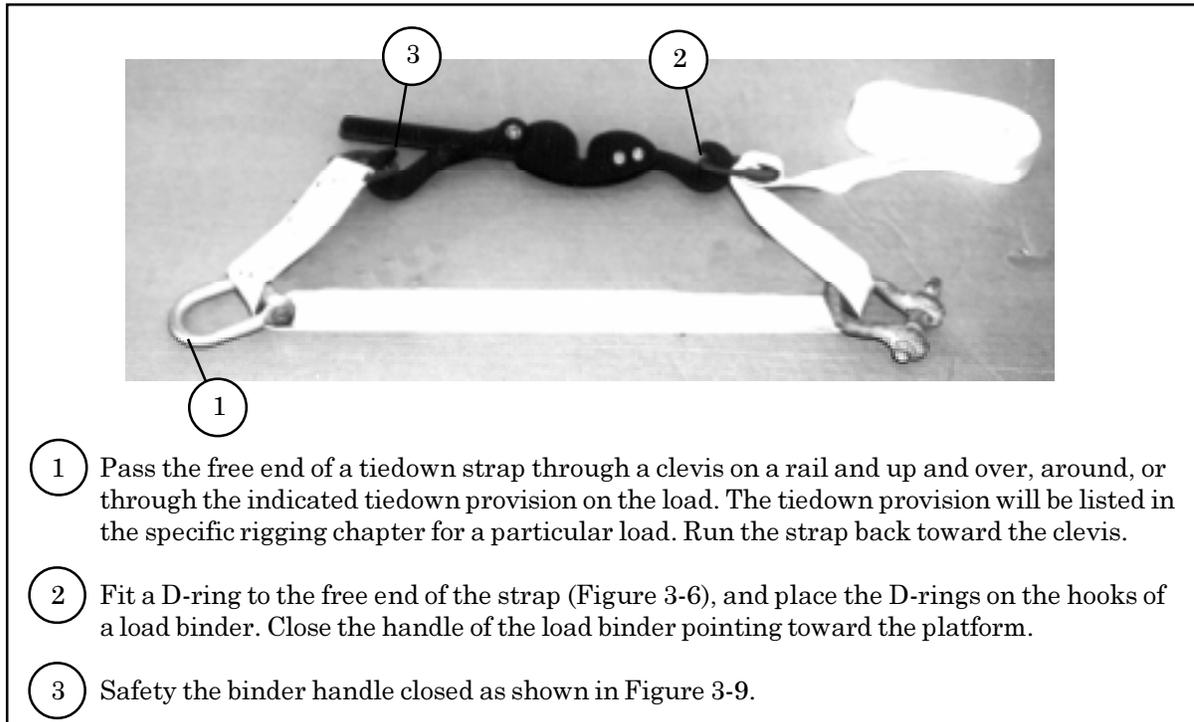


Figure 3-8. A Looped (Floating Binder) Lashing

SAFETY TIEING LOAD BINDER HANDLES

3-12. Fold the excess tiedown strap, and place the folds alongside the load binder handle. Safety tie the load binder handle closed as shown in Figure 3-9.

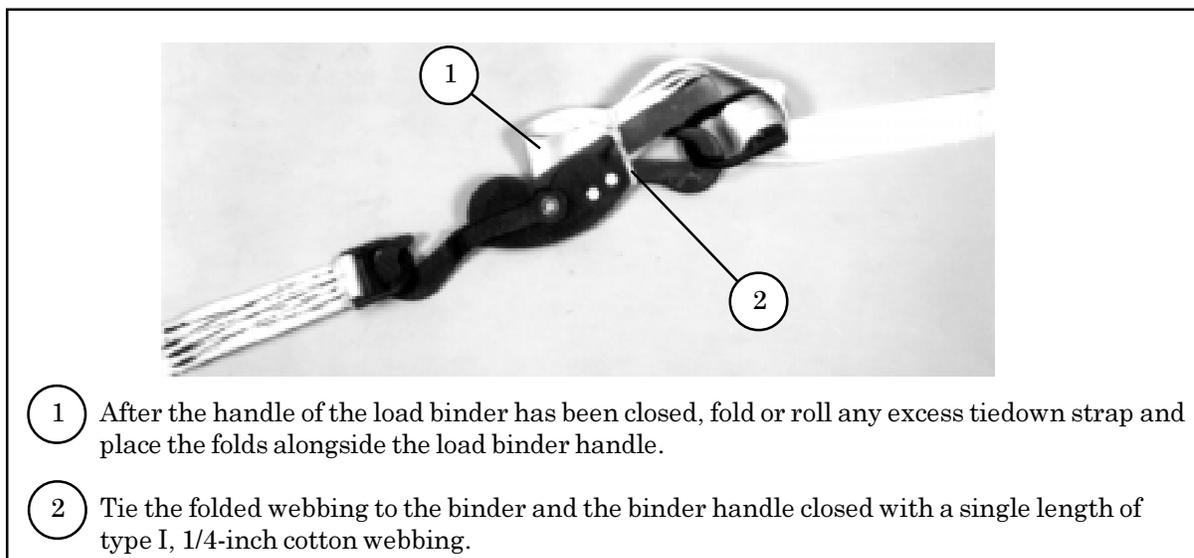


Figure 3-9. Load Binder Handle and Excess Webbing Safety Tied

FORMING A 30-FOOT, 45-FOOT, OR GREATER LENGTH TIEDOWN STRAP

3-13. When needed, attach 15-foot tiedown straps together to form a 30-foot, 45-foot, or greater length tiedown strap as shown in Figure 3-10.

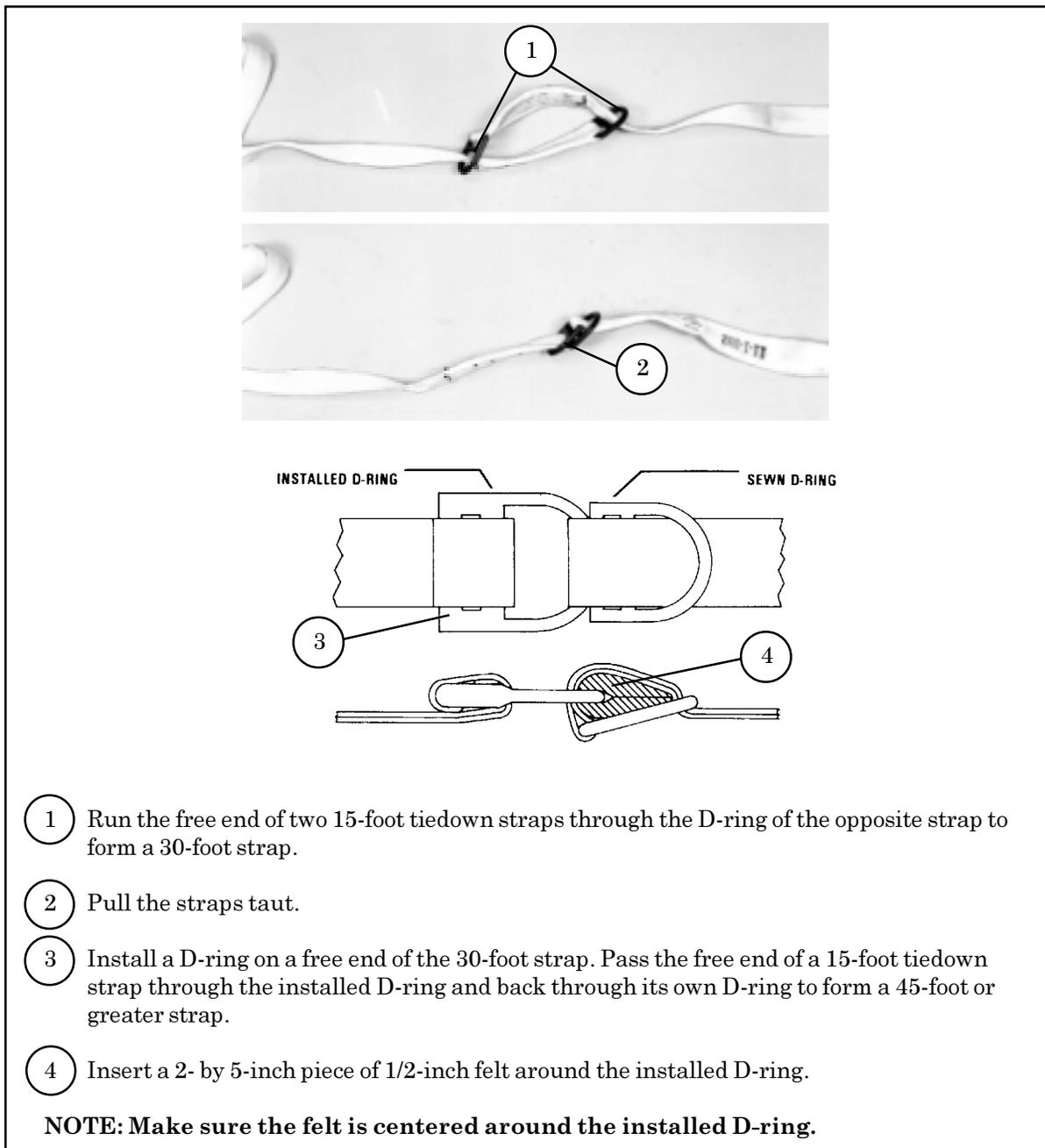


Figure 3-10. A 30-Foot, 45-Foot, or Greater Length Tiedown Strap Formed

SECTION III - CARGO PARACHUTES

RISER EXTENSIONS

3-14. The risers of a cluster of G-11D cargo parachutes used on DRAS loads must be extended (lengthened). The length of the extension needed for the cluster is given in Table 2-4.

- a. Forming Extensions.* Only continuous riser extensions may be used.
- b. Bolting Extensions to Risers.* Bolt the riser extension to the risers of a cargo parachute as shown in Figure 3-11.

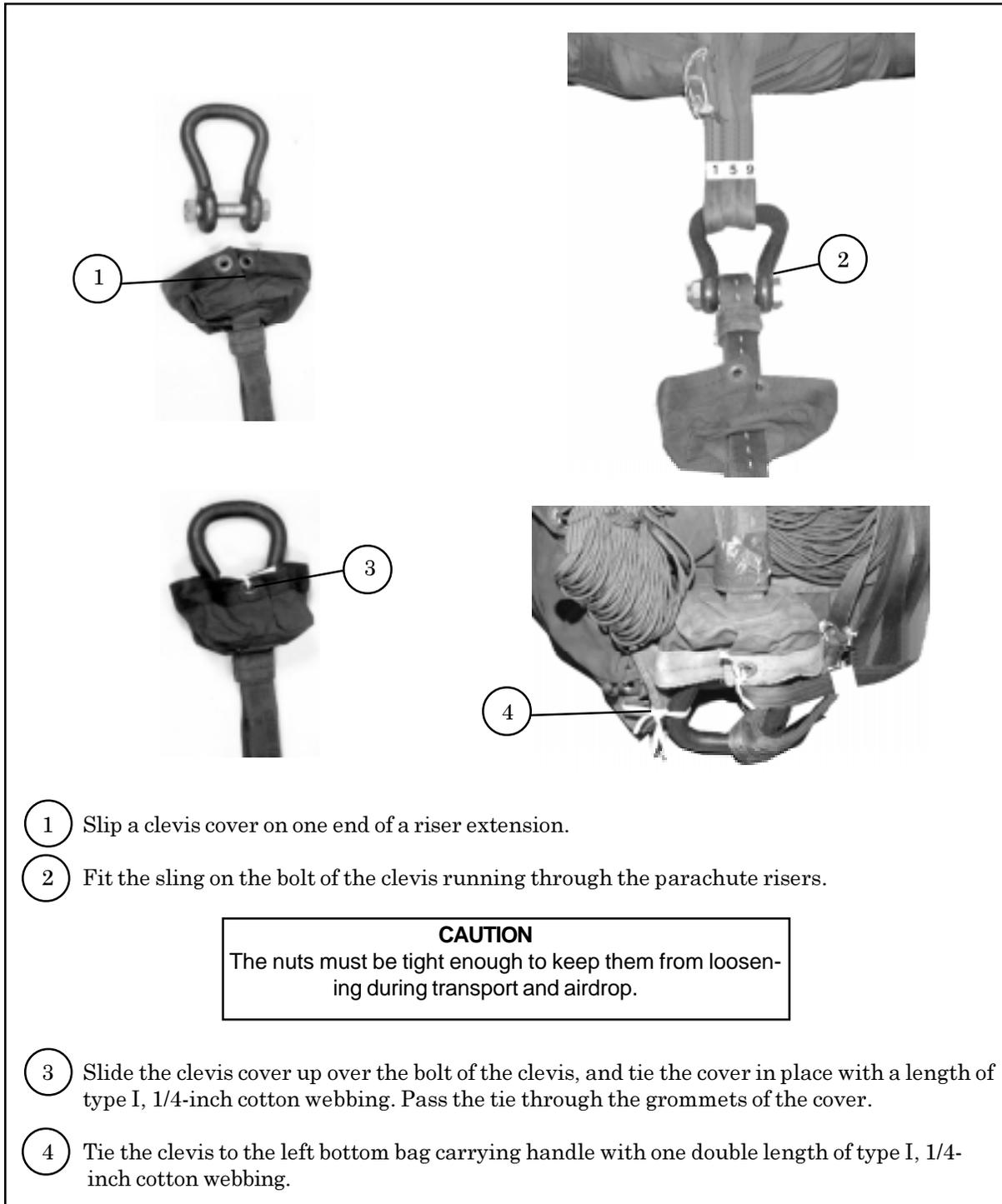


Figure 3-11. Riser Extension Bolted to Risers

STOWING RISER EXTENSIONS

3-15. The riser extensions for the G-11D cargo parachutes must be stowed as shown in Figures 3-12 and 3-13.

NYLON BAG

NOTE: The nylon deployment bags have the riser extension securing line permanently attached.

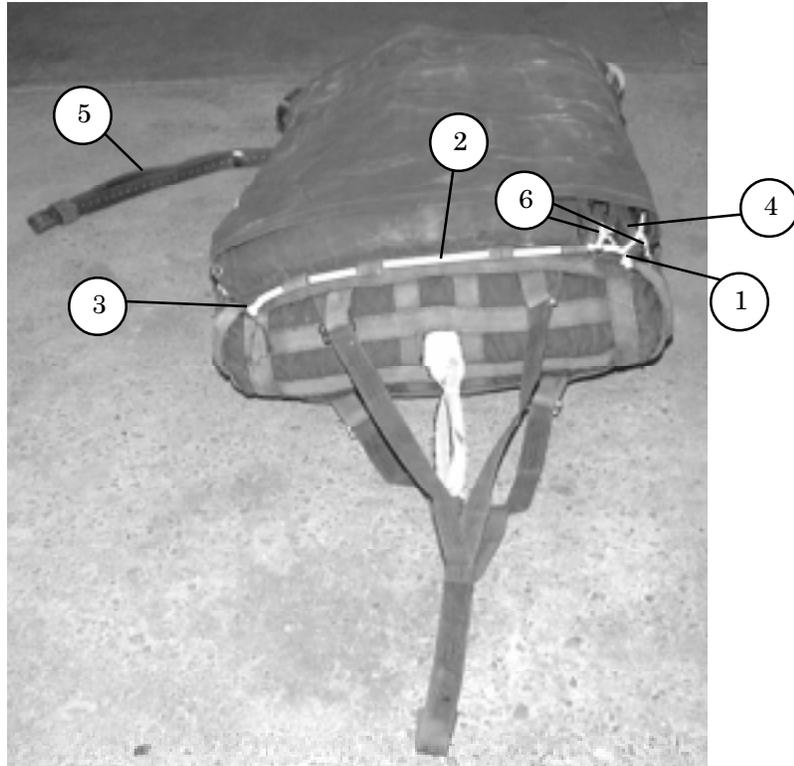
- 1 Open the riser extension flap which is attached with type I, 1/4-inch cotton webbing.
- 2 Start at the end of the riser extension fitted to the clevis and S-fold the extension into the riser extension compartment.
- 3 Leave approximately 3 feet of the free end of the extension outside the riser end of the compartment. (Not shown)
- 4 Tie each stow to the riser extension securing line with one turn double, type I, 1/4-inch cotton webbing.

CAUTION
Do not girth hitch the type I, 1/4-inch cotton webbing ties to the riser extension securing line.

- 5 Close the riser flap according to TM 10-1670-280-23&P/TO 13C5-31-2.

Figure 3-12. Riser Extension Securing Line Installed and Riser Extension Stowed

COTTON BAG



- 1 Fold an 8-foot length of 1/2-inch tubular nylon webbing in half lengthwise. Run the loop in the folded end through the left carrying handle. Run the free ends of the webbing through this loop, and pull the webbing taut.
- 2 Run the webbing across the parachute, passing it through the riser extension retaining loops (end tabs).

NOTE: Do not pull the webbing tight across the parachute.

- 3 Tie the webbing to the right top carrying handle with three alternating half hitches and an overhand knot in each free running end.
- 4 Start at the end of the riser extension fitted to the clevis and S-fold the 20-foot extension into the riser extension compartment.
- 5 Leave about 3 feet of the free end of the extension outside the riser end of the compartment.
- 6 Tie each stow to the riser extension securing line with ties of one turn double type I, 1/4-inch cotton webbing.

CAUTION

Do not girth hitch the type I, 1/4-inch cotton webbing ties to the riser extension securing line.

Figure 3-12. Riser Extension Securing Line Installed and Riser Extension Stowed (Continued)

NYLON BAG



20-FOOT RISER EXTENSION STOWED



60-FOOT RISER EXTENSION STOWED



60-FOOT RISER EXTENSION STOWED

Figure 3-13. The 20- and 60-Footer Riser Extensions Stowed

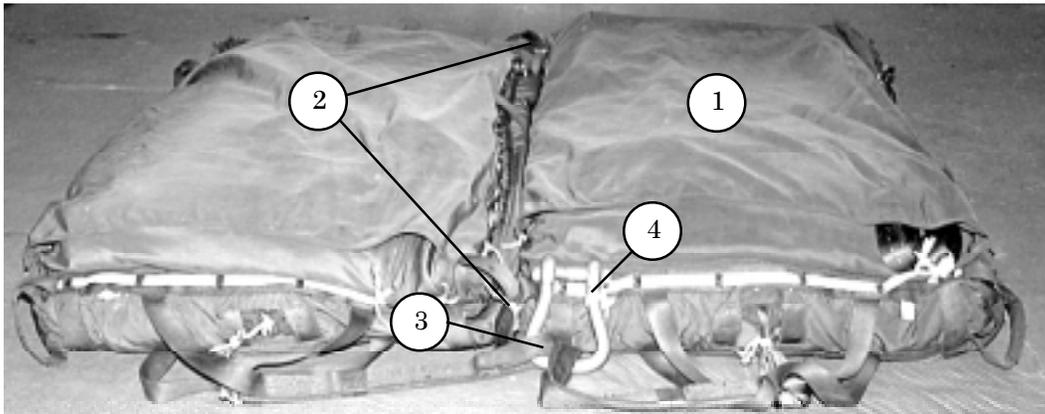
STOWING CARGO PARACHUTES

3-16. When referring to cargo parachutes, stowing consists of three steps. First, place the cargo parachutes on the load or on a parachute stowage platform. Second, cluster the parachutes by tying their deployment bags handles together. Third, group the bridles on a large clevis. Stow the parachutes as shown in Figures 3-14 through 3-16.

Note: Nylon and cotton bags may be mixed on the same load.

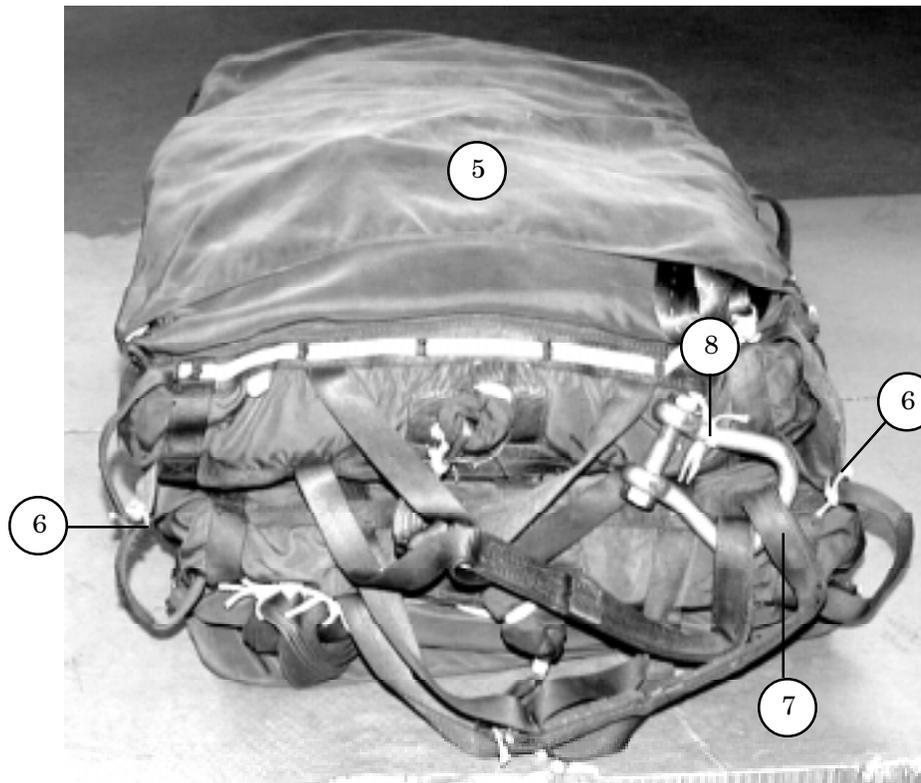
USING DEPLOYMENT LINES

3-17. The deployment line for DRAS loads is a 3-foot (4-loop), type XXVI nylon webbing sling. One end of the deployment line is fitted on a 3 3/4-inch two point link attached to the adapter web of the deployment parachute. The other end of the line is fitted to the bolt of the large clevis grouping the bridles of a cluster of parachutes.



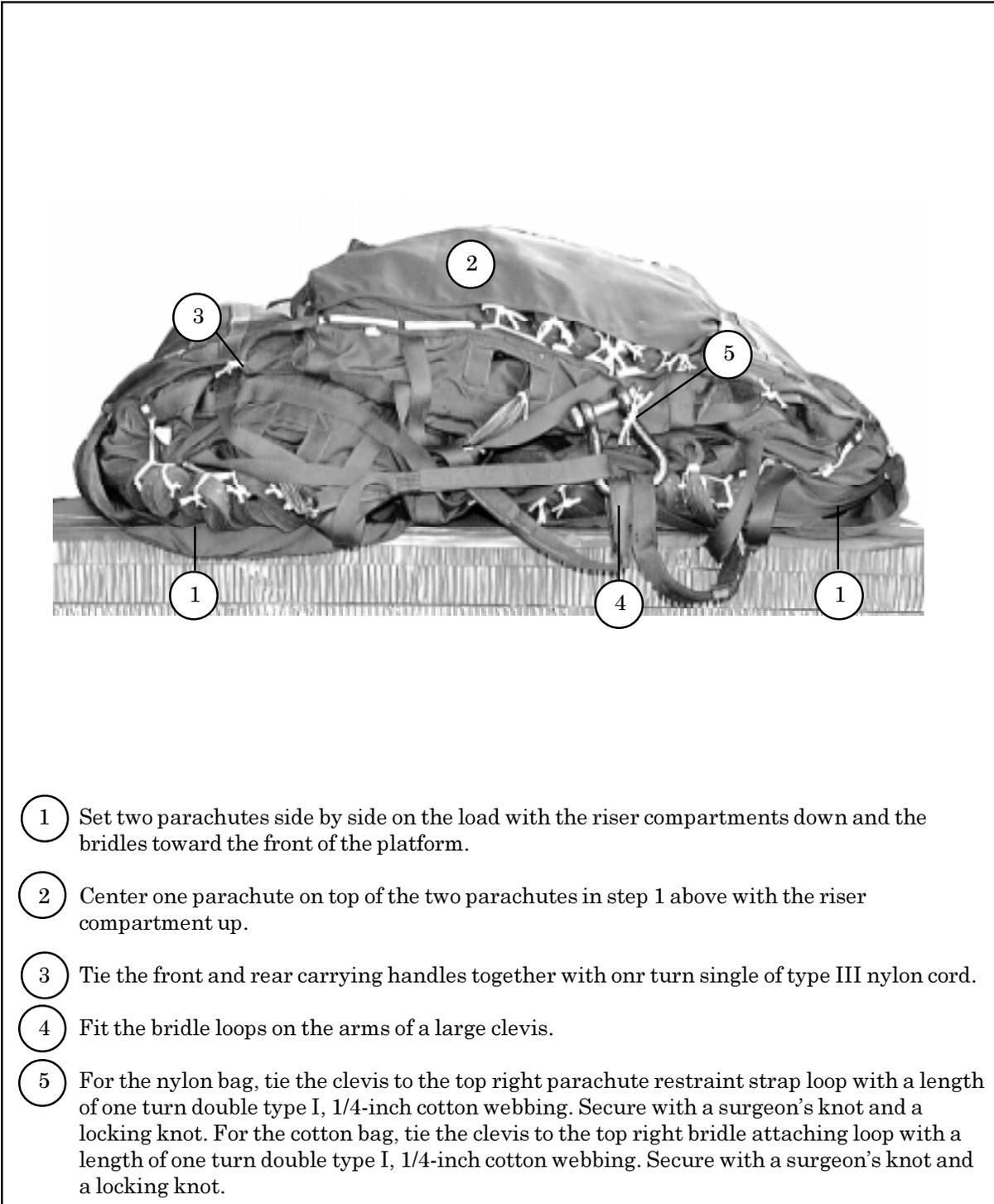
- 1 Set two parachutes side by side on the load with the riser compartments up and the bridles toward the front of the platform.
- 2 Tie the inside front and rear cluster attaching loops (hereafter called carrying handles) together with one turn single type III nylon cord.
- 3 Fit the bridle loops on the arms of a large clevis. Ensure the bolt of the clevis faces up.
- 4 For the nylon bag, tie the clevis to the right parachute restraint strap loop with a length of doubled type I, 1/4-inch cotton webbing. Secure with a surgeon's knot and a locking knot. For the cotton bag, tie the clevis to the right bridle attaching loop with a length of one turn double type I, 1/4-inch cotton webbing. Secure with a surgeon's knot and a locking knot.

Figure 3-14. Two Parachutes Stowed



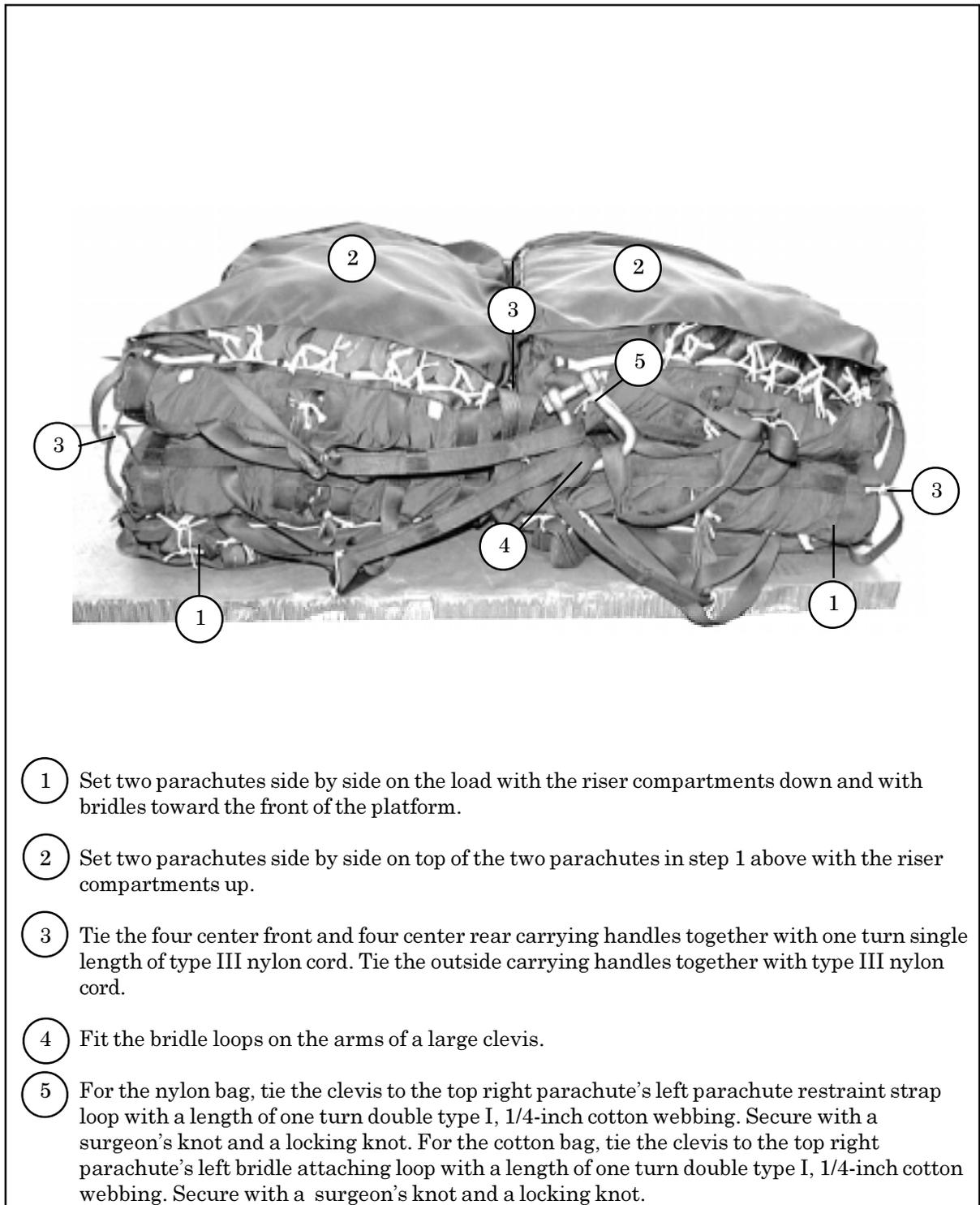
- 5 Stack two parachutes with the riser compartment of the bottom parachute down and the riser compartment of the top parachute up.
- 6 Tie the outside front and rear cluster carrying handles together with one turn single type III nylon cord.
- 7 Fit the bridle loops on the arms of a large clevis. Ensure the bolt of the clevis faces up.
- 8 For the nylon bag, tie the clevis to the right parachute restraint strap loop with a length of one turn double type I, 1/4-inch cotton webbing. Secure with a surgeon's knot and a locking knot. For the cotton bag, tie the clevis to the right bridle attaching loop with a length of one turn double type I, 1/4-inch cotton webbing. Secure with a surgeon's knot and a locking knot.

Figure 3-14. Two Parachutes Stowed (continued)



- 1 Set two parachutes side by side on the load with the riser compartments down and the bridles toward the front of the platform.
- 2 Center one parachute on top of the two parachutes in step 1 above with the riser compartment up.
- 3 Tie the front and rear carrying handles together with one turn single of type III nylon cord.
- 4 Fit the bridle loops on the arms of a large clevis.
- 5 For the nylon bag, tie the clevis to the top right parachute restraint strap loop with a length of one turn double type I, 1/4-inch cotton webbing. Secure with a surgeon's knot and a locking knot. For the cotton bag, tie the clevis to the top right bridle attaching loop with a length of one turn double type I, 1/4-inch cotton webbing. Secure with a surgeon's knot and a locking knot.

Figure 3-15. Three Parachutes Stowed



- 1 Set two parachutes side by side on the load with the riser compartments down and with bridles toward the front of the platform.
- 2 Set two parachutes side by side on top of the two parachutes in step 1 above with the riser compartments up.
- 3 Tie the four center front and four center rear carrying handles together with one turn single length of type III nylon cord. Tie the outside carrying handles together with type III nylon cord.
- 4 Fit the bridle loops on the arms of a large clevis.
- 5 For the nylon bag, tie the clevis to the top right parachute's left parachute restraint strap loop with a length of one turn double type I, 1/4-inch cotton webbing. Secure with a surgeon's knot and a locking knot. For the cotton bag, tie the clevis to the top right parachute's left bridle attaching loop with a length of one turn double type I, 1/4-inch cotton webbing. Secure with a surgeon's knot and a locking knot.

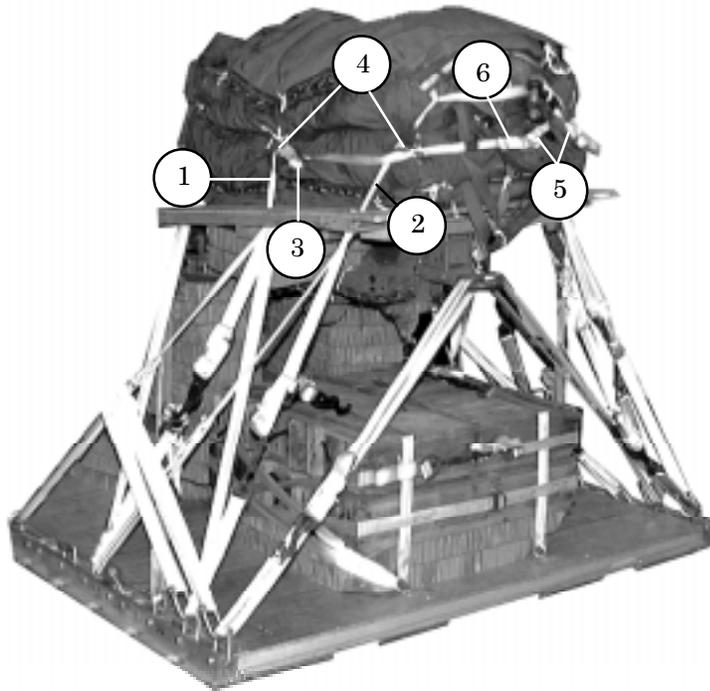
Figure 3-16. Four Parachutes Stowed

RESTRAINING TWO TO FOUR PARACHUTES

3-18. The following parachute restraint systems are used to restrain two to four cargo parachutes.

a. Two Parachutes. The restraint system for two cargo parachutes consists of two lengths of type VIII nylon webbing (restraint straps) and two multicut parachute release straps for the stacked configuration and one length of type VIII nylon webbing (restraint strap) and two multicut parachute release straps for the side by side configuration as shown in Figures 3-17 through 3-19.

NOTE: When a stowage platform is used, the restraint strap runs through the platform. Always use multicut parachute release straps in pairs.



- 1 Run the restraint strap through the center carrying handles on the left side of the parachutes, up to the top of the parachutes, and down through the center carrying handles on the right side of the parachutes. Tie the ends of the restraint strap to the load as described in Figure 3-22.
- 2 Run the second restraint strap through the front carrying handles of the left parachutes. Run the restraint strap through the bridle attaching loops of the top parachute for the cotton bags or through the parachute restraint strap loops for the nylon bag, and down through the front carrying handles of the right parachutes. Tie the ends of the restraint strap to the load as described in Figure 3-22.
- 3 Remove guillotine knives number 3 (Figure 2-3) from each multicut parachute release strap. Fold the unused loops, and tape the folds in place.

Figure 3-17. Multicut Parachute Release Straps Installed on Two Stacked Parachutes

- 4 Close each knife around the restraint strap, with the knurled nut out between the top and bottom carrying handles. Safety tie the guillotine knife as shown in Figure 3-18.
- 5 Tie the free end of each release strap to the large clevis grouping the bridles. Use three alternating half hitches and an overhand knot in each running end. Make sure that the parachute release straps are not routed under the parachute restraint or parachute bridles. Make sure that the release straps are shorter than the parachute bridles to ensure that the deployment force is applied to the strap before the bridles.
- 6 Fold or roll any excess strap, and tape the folds in place.

Figure 3-17. Multicut Parachute Release Straps Installed on Two Stacked Parachutes (continued)

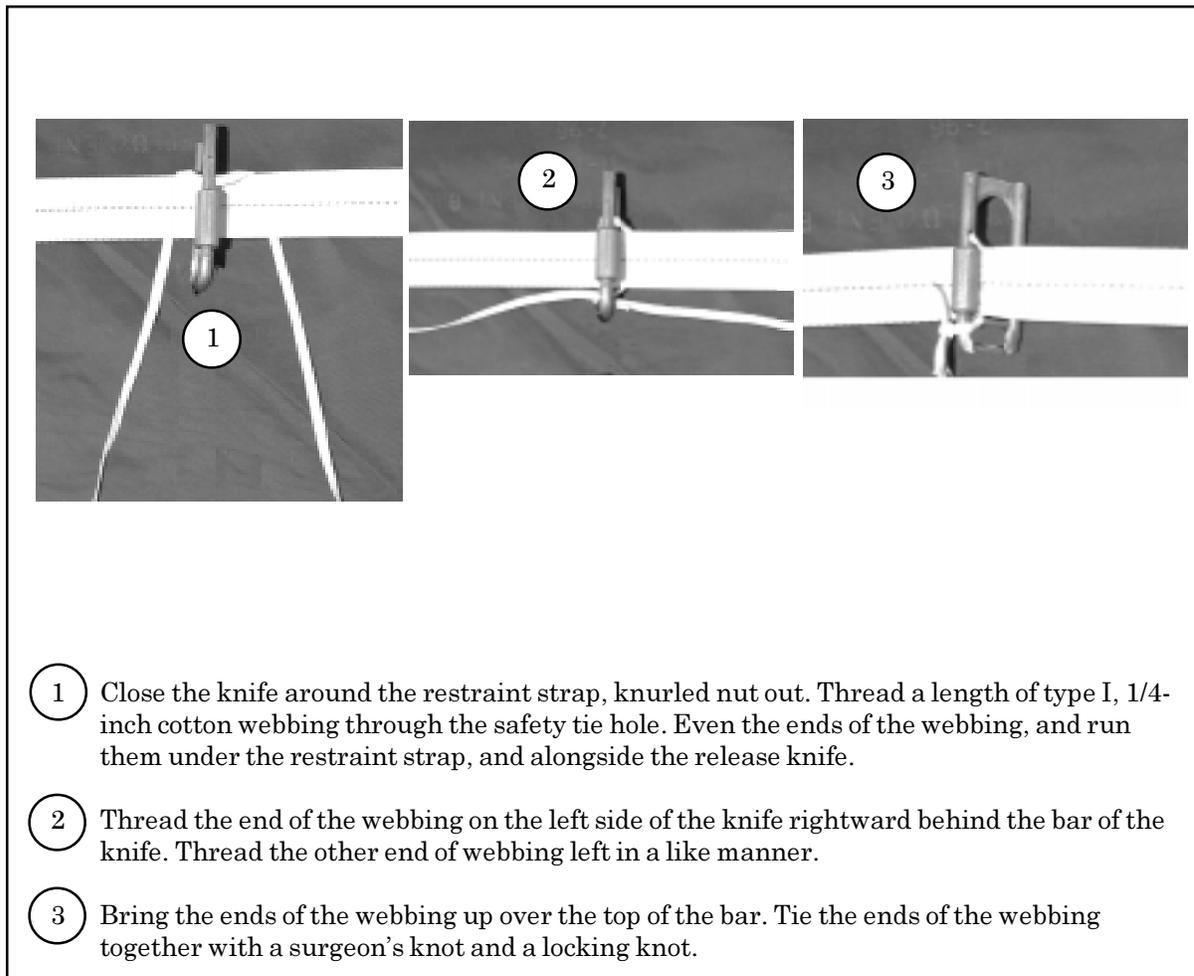
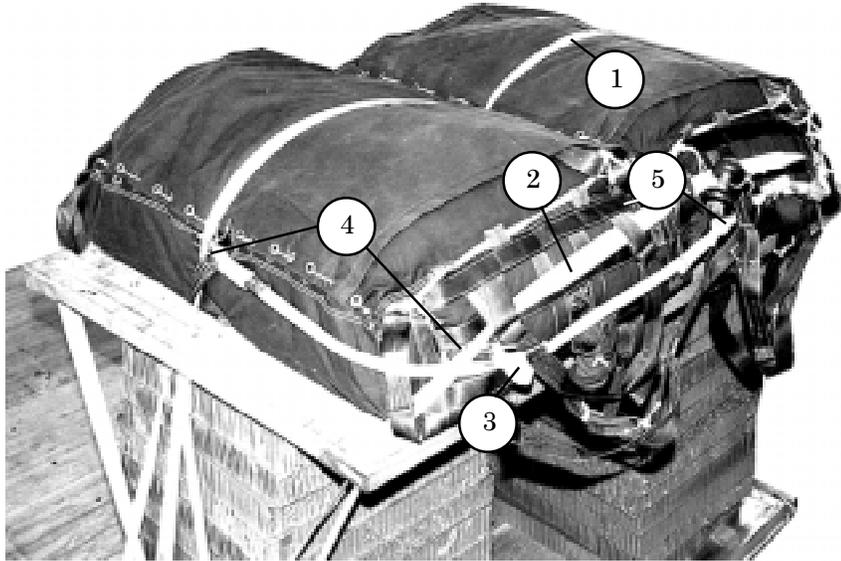


Figure 3-18. Guillotine Knife Safety Tied

NOTE: When a stowage platform is used, the restraint strap runs through the platform. Always use multicut parachute release straps in pairs.

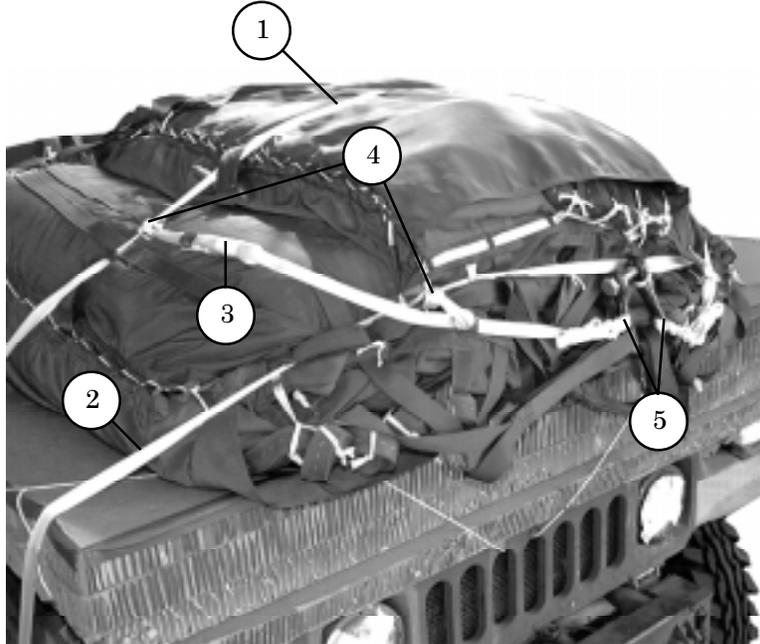


- 1 Run the restraint strap through the center carrying handle on the left side of the parachute. Run the restraint strap over the top of the parachute, and down through the left center carrying handle. Continue to run the restraint strap up through the right inside carrying handle. Run the restraint strap over the right parachute and down through the right outside carrying handle. Tie the ends of the restraint strap to the load as described in Figure 3-22.
- 2 Run the second restraint strap through the outside front carrying handle of the bottom left parachute, up through the top left front carrying handle and both bridle attaching loops of the top parachute for the cotton bags or through the parachute restraint strap loops for the nylon bag, and down through the outside front carrying handles of the top and bottom right parachute. Tie the restraint strap to the load as described in Figure 3-22.
- 3 Remove guillotine knife number 3 (Figure 2-3) from each of two multicut parachute release straps. Fold the unused loops, and tape the folds in place.
- 4 Close and safety tie the guillotine knives as shown in Figure 3-18.
- 5 Tie the free end of each release strap to the large clevis grouping the bridles. Use three alternating half hitches and an overhand knot in each running end. Make sure that the parachute release straps are not routed under the parachute restraint or parachute bridles. Make sure that the release straps are shorter than the parachute bridles to ensure that the deployment force is applied to the strap before the bridles.
- 6 Fold or roll any excess strap, and tape the folds in place.

Figure 3-19. Multicut Parachute Release Straps Installed on Two Side-by-Side Parachutes

b. Three and Four Parachutes. The restraint system for three and four cargo parachutes consists of two lengths of type VIII nylon webbing (restraint straps) and two multicut parachute release straps. Restrain three and four cargo parachutes as shown in Figures 3-20 and 3-21.

Note: Always use multicut parachute release straps in pairs.

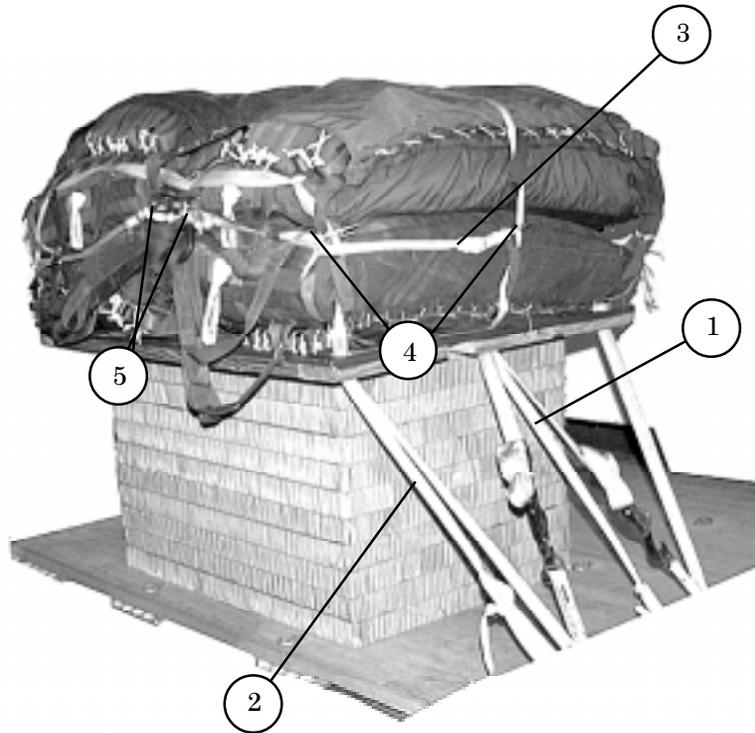


- 1 Run the first restraint strap through the center carrying handles on the left side of the parachutes. Run the restraint strap over the top of the parachute and down through the right carrying handles. Tie the ends of the restraint strap to the load as described in Figure 3-22.
- 2 Run the second restraint strap through the outside front carrying handle of the bottom left parachute, up through the top left front carrying handle and both bridle attaching loops of the top parachute for the cotton bags or through the parachute restraint strap loops for the nylon bag, and down through the outside front carrying handles of the top and bottom right parachute. Tie the restraint strap to the load as described in Figure 3-22.
- 3 Remove guillotine knife number 3 (Figure 2-3) from each of two multicut parachute release straps. Fold the unused loops, and tape the folds in place.
- 4 Close and safety tie the guillotine knives as shown in Figure 3-18.
- 5 Tie the release straps to the large clevis as in step 4, Figure 3-19.

NOTE: Place the knives around the restraint straps between the carrying handles of the top and bottom parachutes.

Figure 3-20. Three Parachutes Restrained Using Multicut Parachute Release Straps

Note: Always use multicut parachute release straps in pairs.



- 1 Run the restraint strap through the center carrying handles on the left side of the parachutes. Run the restraint strap over the top of the parachute, and down through the left inside center carrying handle. Continue to run the restraint strap up through the right inside center carrying handle. Run the restraint strap over the right parachute and down to the right outside carrying handles. Tie the ends of the restraint strap to the load as described in Figure 3-22.
- 2 Run the second restraint strap through the outside front carrying handles of the left parachutes. Run the restraint strap through the bridle attaching loops of the top parachutes for the cotton bags or through the parachute restraint strap loops for the nylon bag, and down through the outside front carrying handles of the right parachutes. Tie the ends of the restraint strap to the load as described in Figure 3-22.
- 3 Remove guillotine knife number 3 (Figure 2-3) from each of two multicut parachute release straps. Fold the unused loops, and tape the folds in place.
- 4 Close and safety tie the guillotine knives as shown in Figure 3-18.
- 5 Tie the release straps to the large clevis as in step 4, Figure 3-19.

NOTE: Place the knives around the restraint straps between the carrying handles of the top and bottom parachutes.

Figure 3-21. Four Parachutes Restrained Using Multicut Parachute Release Straps

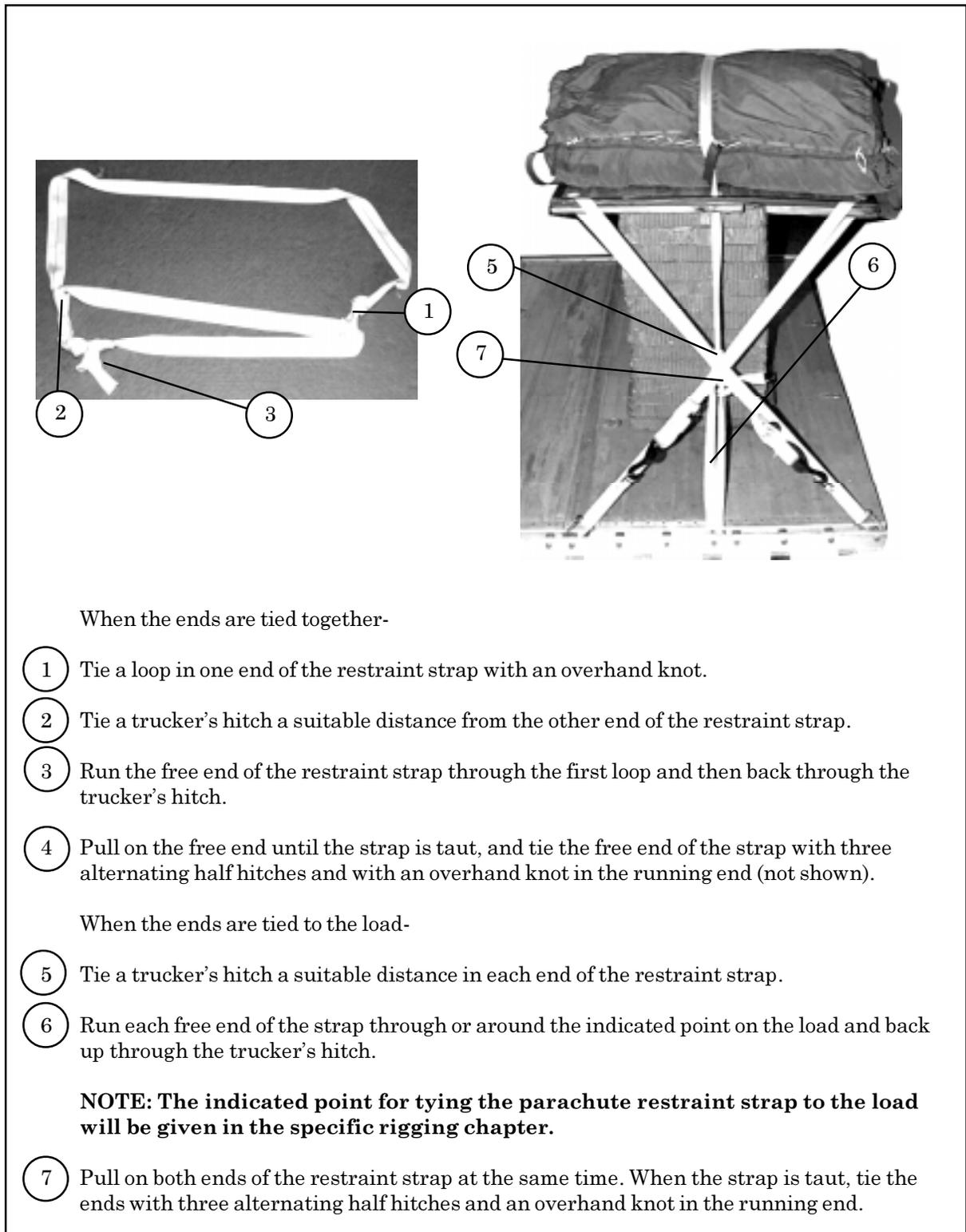


Figure 3-22. Restraint Strap Tied

SECTION IV - DEPLOYMENT LINE AND PARACHUTE

DEPLOYMENT LINE

3-19. The 3-foot (4-loop), type XXVI nylon webbing sling is used as the deployment line for DRAS airdrop and connects the deployment parachute to the cargo parachutes. Adapt the procedures as shown in Figure 3-23 to connect the deployment line.

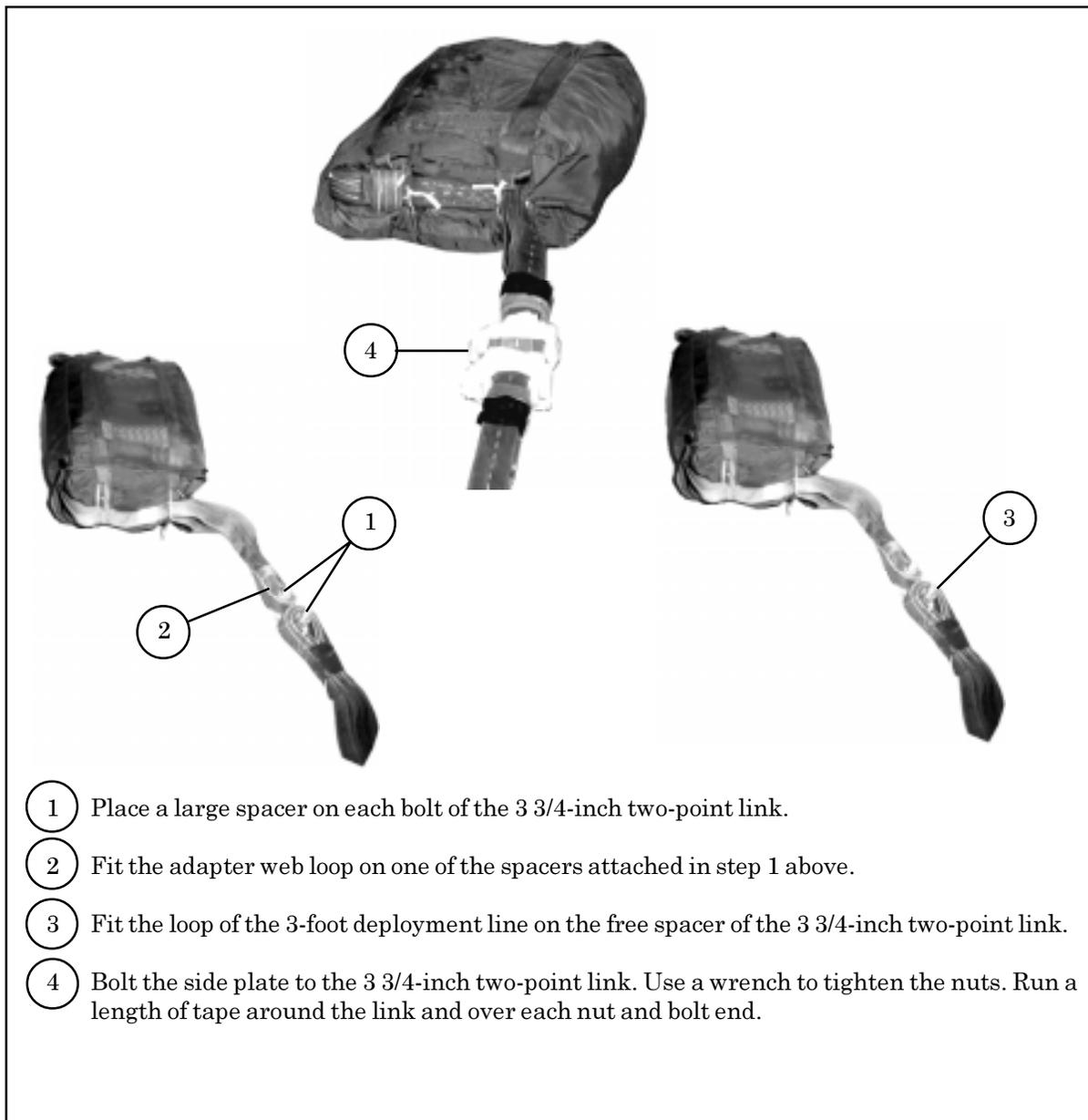
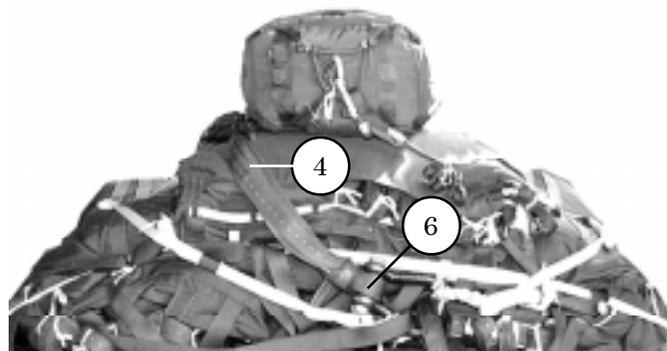
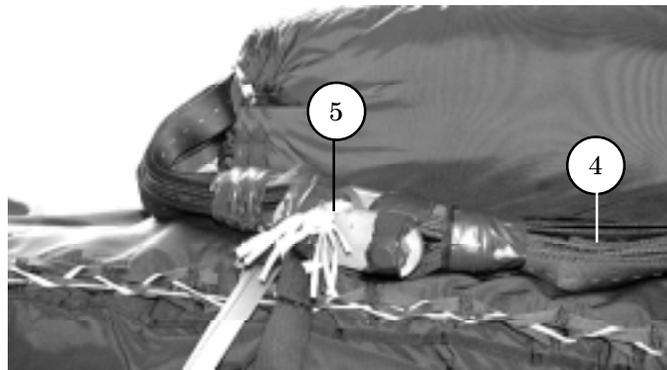


Figure 3-23. Deployment Line Attached

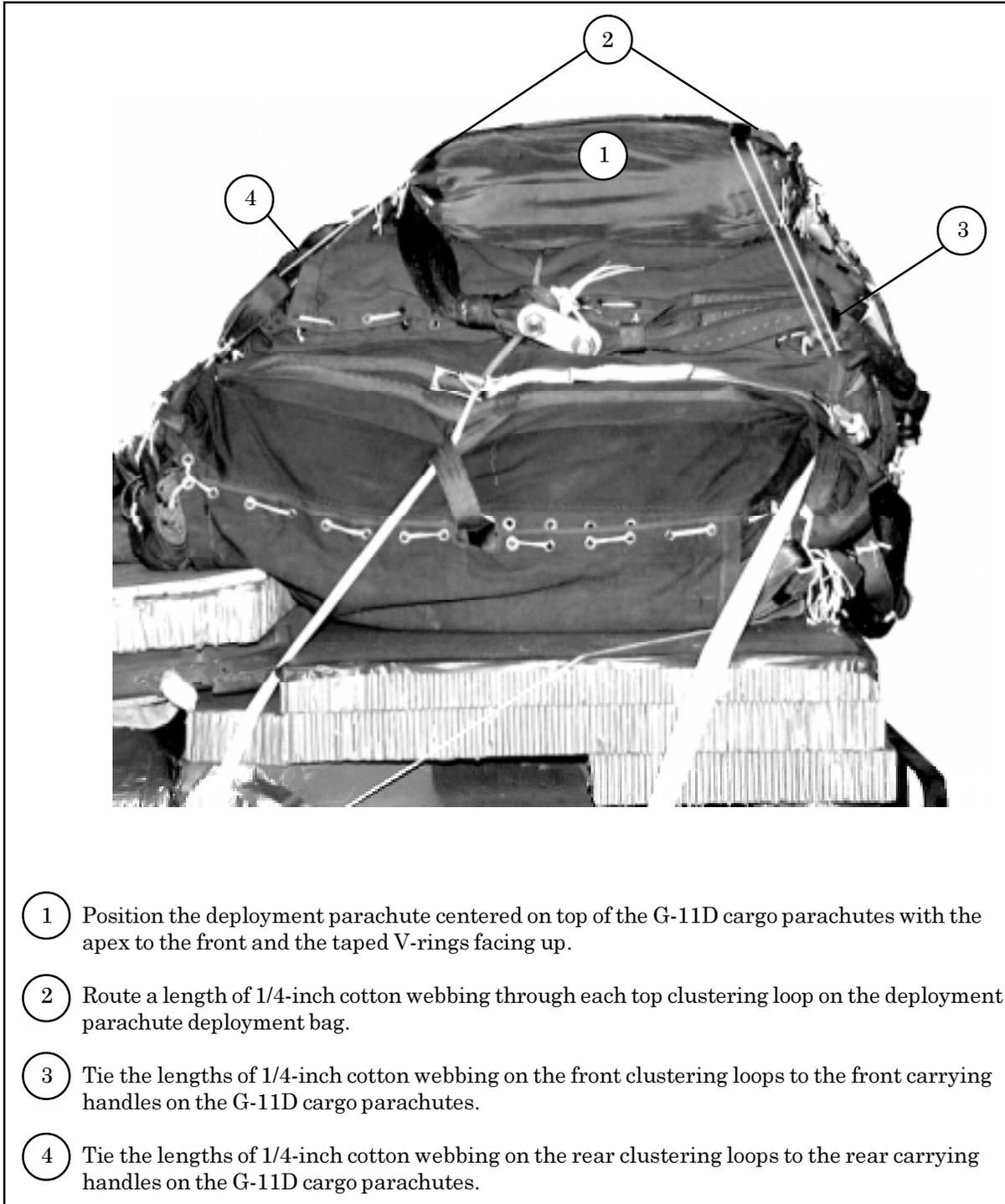


- ④ Route the deployment line around the right side of the deployment parachute.
- ⑤ Safety tie the 3 3/4-inch two-point link to the right center carrying handle of the G-11D parachute with five lengths of type I 1/4-inch cotton webbing.
- ⑥ Connect the other end of the deployment line to the bolt of the large clevis that groups the cargo parachute bridles together.

Figure 3-23. Deployment Line Attached (continued)

POSITIONING AND SECURING THE DEPLOYMENT PARACHUTE

3-20. Position and secure the deployment parachute as shown in Figure 3-24.



- 1 Position the deployment parachute centered on top of the G-11D cargo parachutes with the apex to the front and the taped V-rings facing up.
- 2 Route a length of 1/4-inch cotton webbing through each top clustering loop on the deployment parachute deployment bag.
- 3 Tie the lengths of 1/4-inch cotton webbing on the front clustering loops to the front carrying handles on the G-11D cargo parachutes.
- 4 Tie the lengths of 1/4-inch cotton webbing on the rear clustering loops to the rear carrying handles on the G-11D cargo parachutes.

Figure 3-24. Deployment Parachute Positioned and Secured

SECTION V- RELEASE ASSEMBLIES

M-1 CARGO PARACHUTE RELEASE

3-21. Test, attach, and safety the M-1 cargo parachute release as follows:

- a. **Testing Timer.** Before each use, seat, arm, and test the delay timer as shown in Figures 3-25 through 3-27.

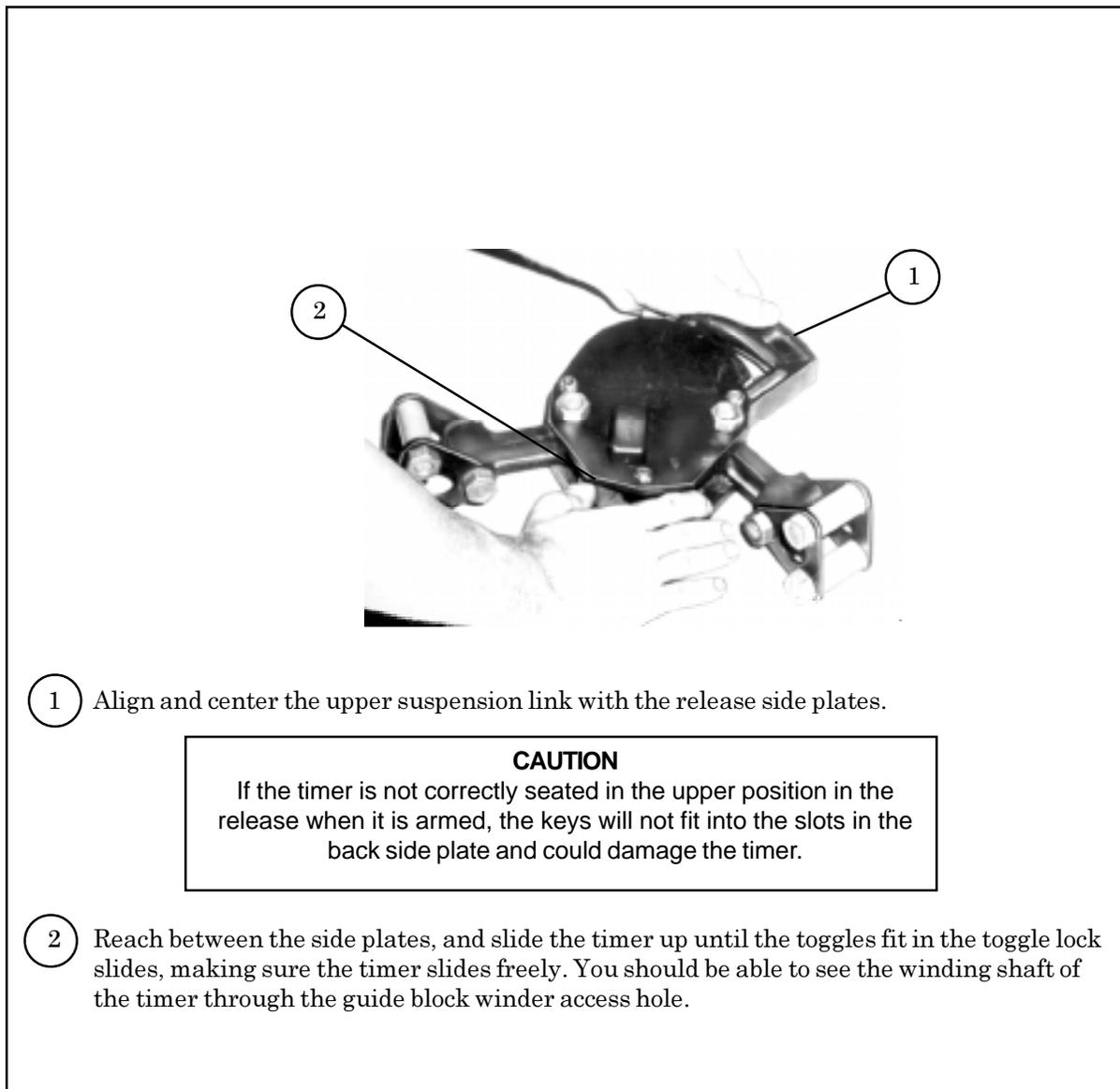
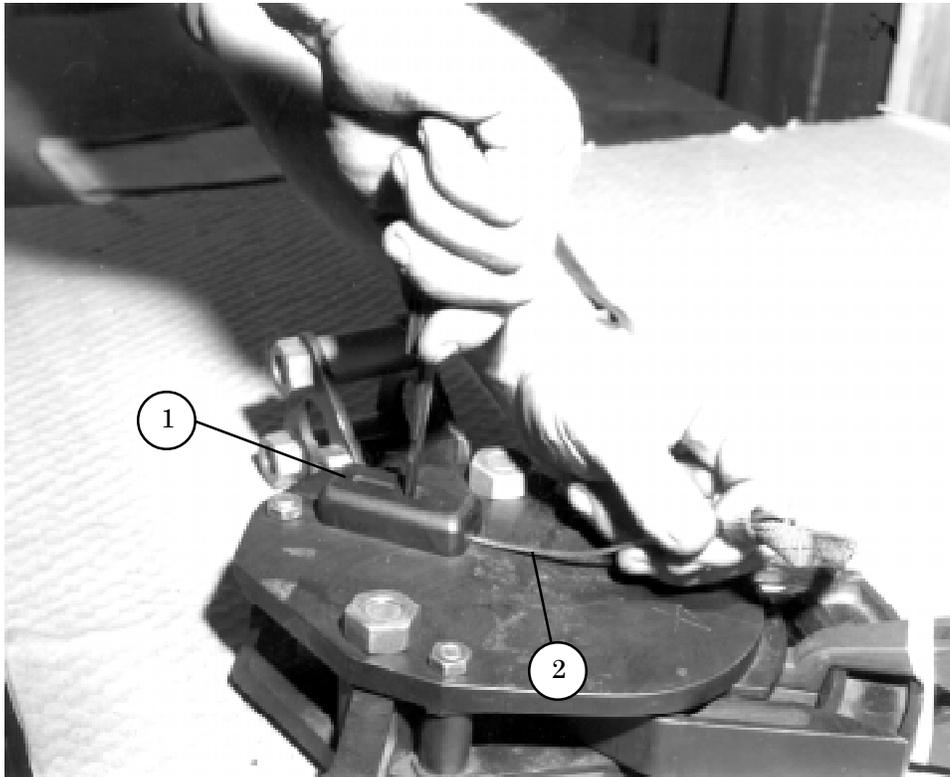


Figure 3-25. Delay Release Timer Seated



- 1 Put the tip of a flat-tip screwdriver through the guide block winder access hole and into the slot in the timer winding shaft. Gently turn the shaft one-quarter turn to the right and stop, holding the shaft with the screwdriver.

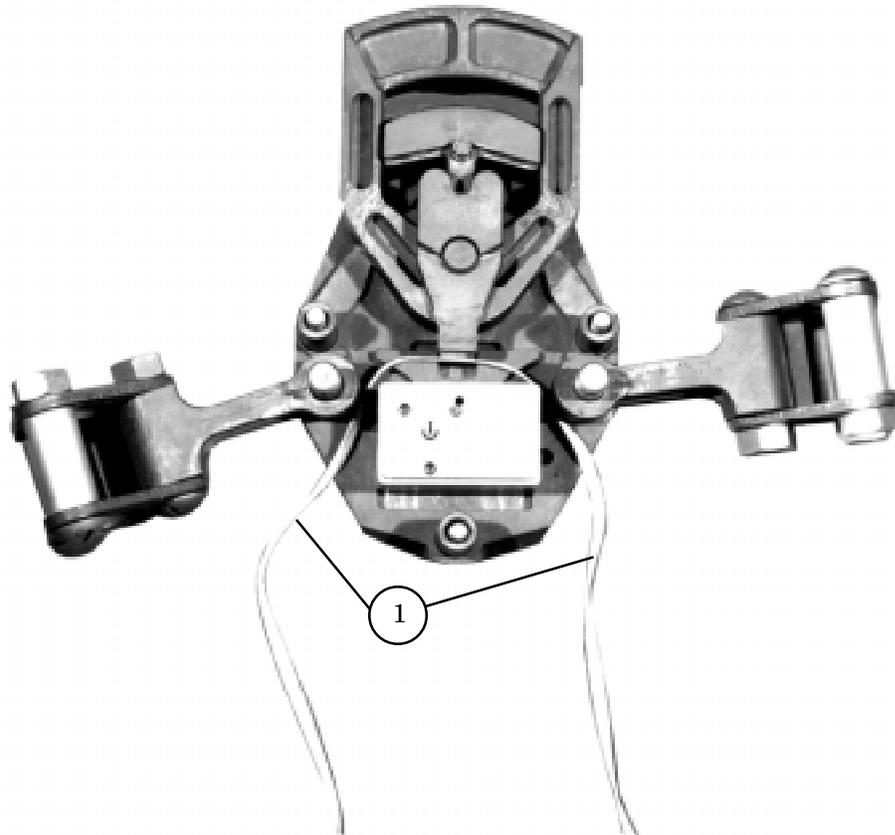
NOTE: If the winding shaft is hard to turn, hold the shaft with the screwdriver and move the timer around until the keys align with the slots in the back plate.

- 2 Hold the shaft, and push the arming wire down through the hole in the guide block and the hole in the winding shaft.

NOTE: When the timer is correctly armed, about 1/2 inch of the arming wire can be seen through the slot below the guide block winder access hole.

Figure 3-26. Timer Armed

NOTE: A delay release timer will be tested before each use.

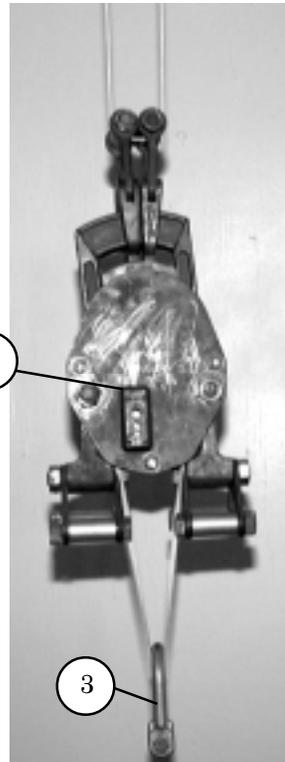
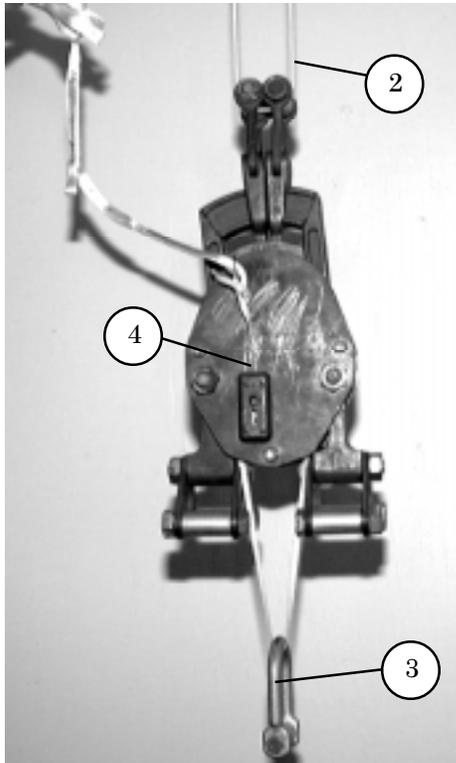


- 1 Pass a length of type I, 1/4-inch cotton webbing up between the release side plates, over and around the center of the timer, and back down between the side plates. The side plate and a toggle lock slide have been removed to show how the webbing passes around the timer. You may use a length of wire to help you pass the webbing around the timer.

Figure 3-27. Timer Tested

CAUTION

Do not over tighten the face side plate. Make sure the bolts are tightened in an alternating sequence.



- 2 Hang the release in a straight, level position.
- 3 Tie a 10-ounce weight, such as a platform clevis with bolt or a parachute release connector, without the nut and bolt, to the type I, 1/4-inch cotton webbing.
- 4 Pull the arming wire from the timer. Count the seconds from the time the wire is pulled until the timer falls within the release.

NOTE: If the timer fails to fall after the allotted time (12 to 16 seconds), remove the side plate and check the four screws holding the arming wire guide block to the side plate for burrs. If the screw heads are burred, remove the burrs by filing or replace the screws. Retest the timer. If there is a second failure, remove and replace the timer.

Figure 3-27. Timer Tested (Continued)

- b. **Preparing, Attaching, and Safety Tying Release.** Prepare, attach, and safety tie the M-1 cargo parachute release as shown in Figures 3-28 through 3-30.

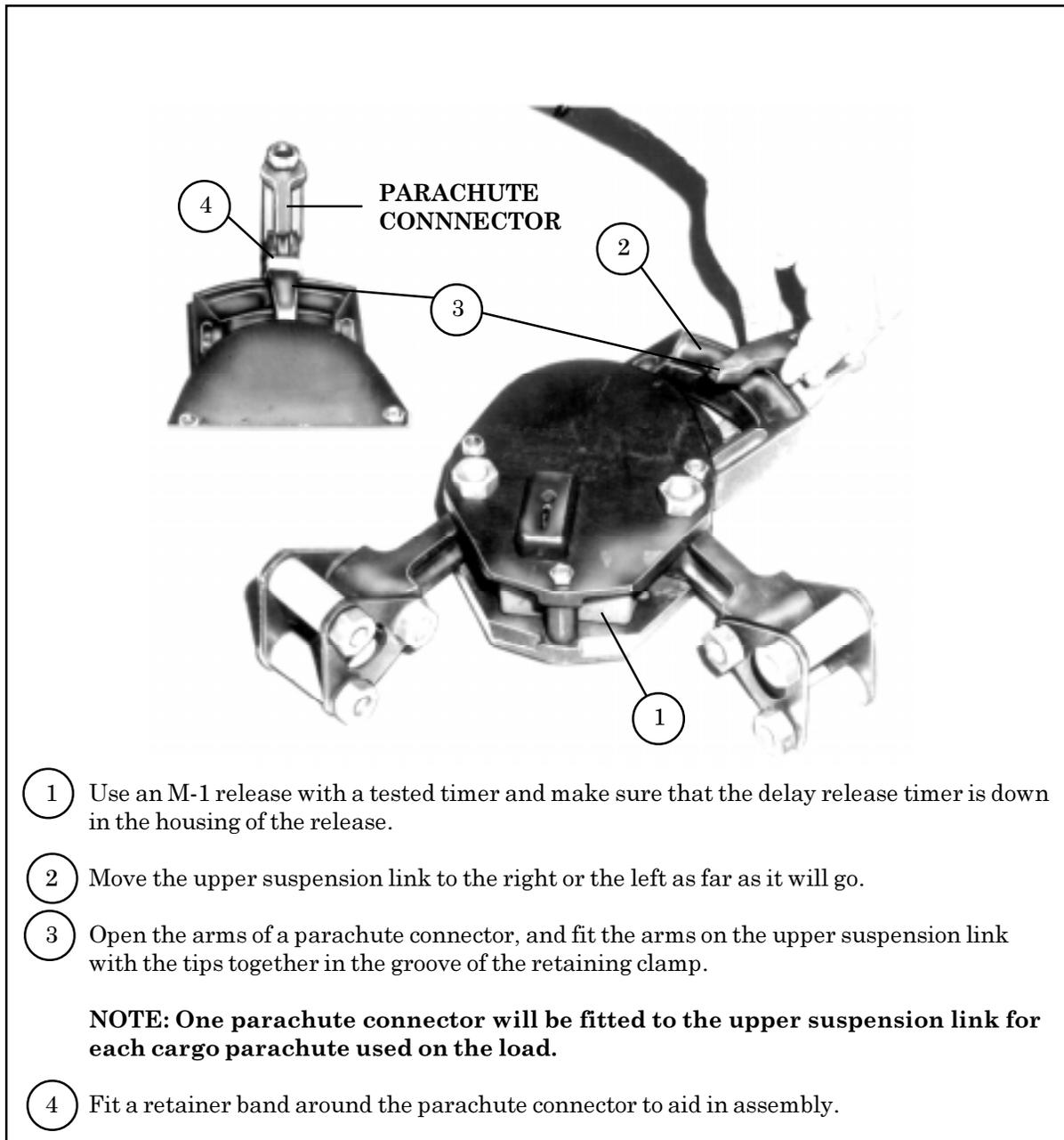
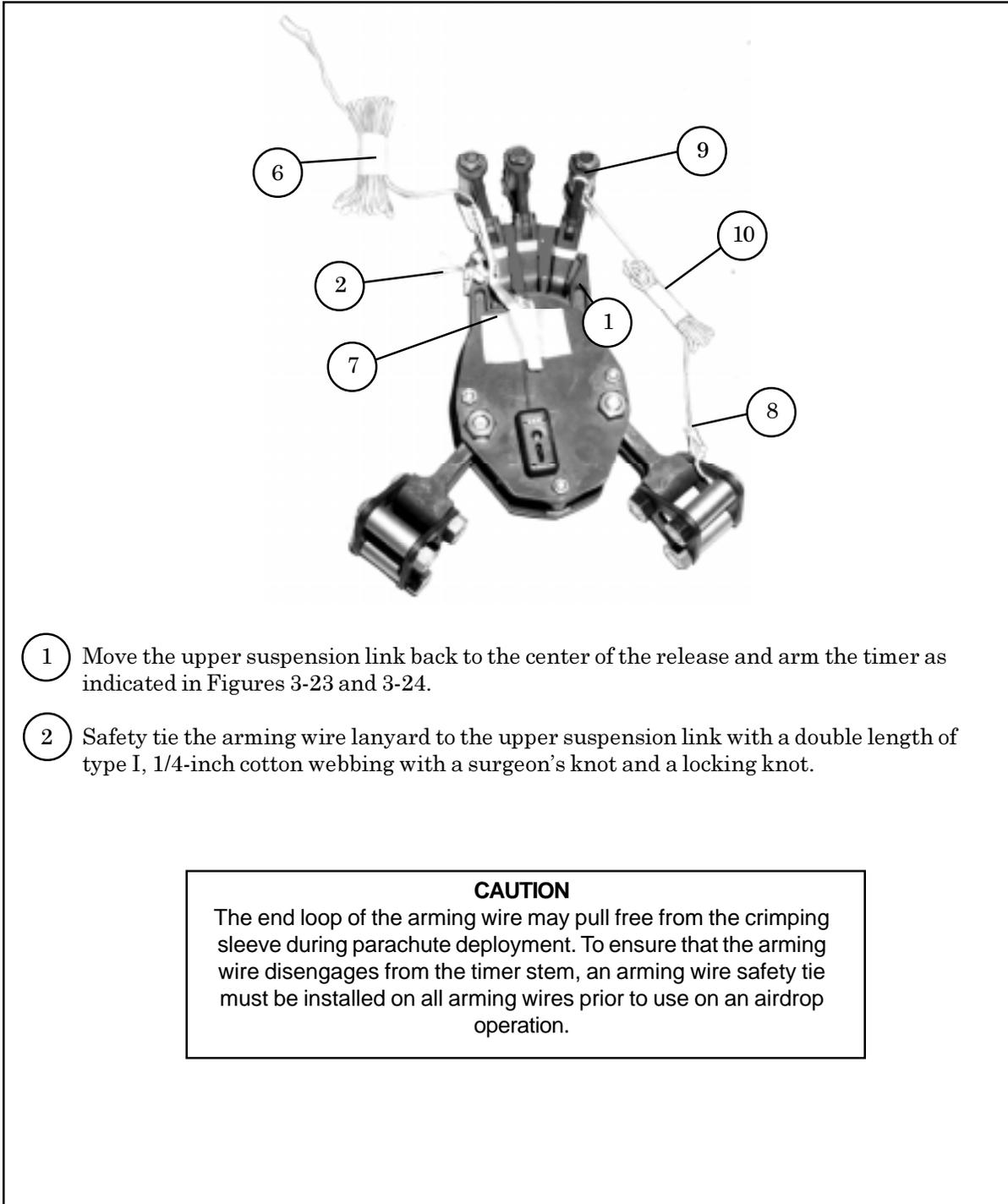


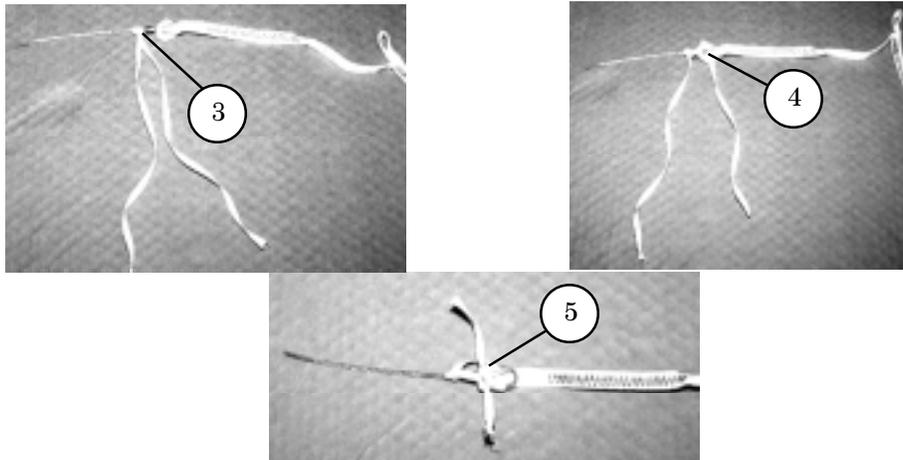
Figure 3-28. Parachute Connector Fitted to Upper Suspension Link of M-1 Release



- 1 Move the upper suspension link back to the center of the release and arm the timer as indicated in Figures 3-23 and 3-24.
- 2 Safety tie the arming wire lanyard to the upper suspension link with a double length of type I, 1/4-inch cotton webbing with a surgeon's knot and a locking knot.

CAUTION
The end loop of the arming wire may pull free from the crimping sleeve during parachute deployment. To ensure that the arming wire disengages from the timer stem, an arming wire safety tie must be installed on all arming wires prior to use on an airdrop operation.

Figure 3-29. M-1 Release Prepared



NOTE: With the arming wire lanyard attached to the arming wire loop, the arming wire loop shall be designated as the top. Install the safety tie as follows:

This safety tie should be inspected at the joint airdrop load inspection, before and after loading.

- 3 Girth hitch a 12-inch length of 1/4-inch cotton webbing on the safety wire just below the metal fastener.
- 4 Route one running end of the 1/4-inch cotton webbing through the looped ends of the arming wire and lanyard.
- 5 After ensuring there is 1/2 inch to 1 inch of slack in both running ends, tie a surgeon's knot and locking knot in the 1/4-inch cotton webbing.
- 6 Fold the slack in the lanyard, and tape the folds in place with one turn of masking tape.
- 7 Fold the slack in the lanyard, between the safety tie and the arming wire, and tape the fold to the face side plate with one piece of masking tape.

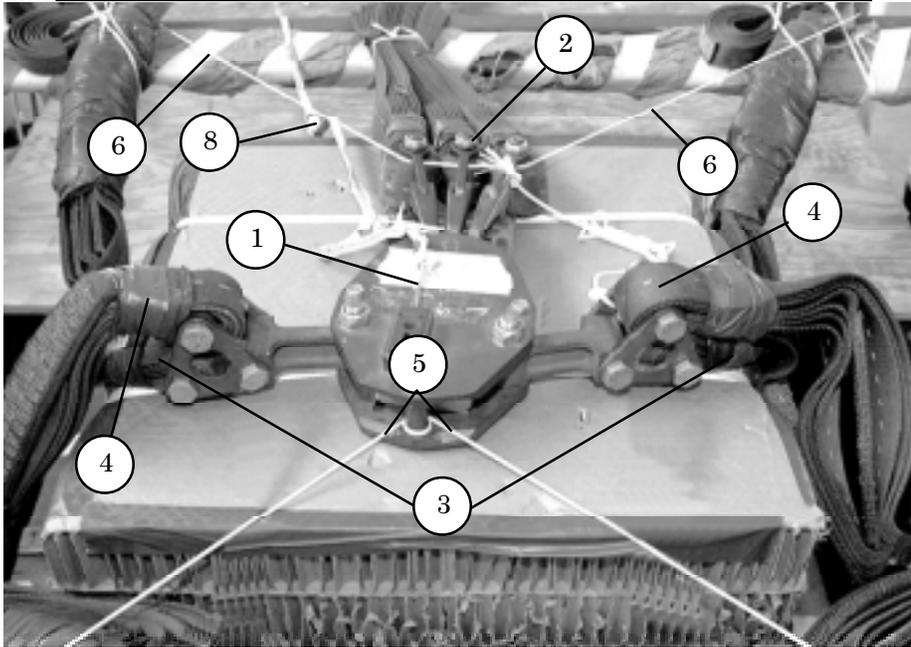
NOTE: Include the following data on the masking tape: name, date, and timer seconds.

- 8 Tie one end of a 5-foot length of type III nylon cord (dragline) to one side of the lower suspension link.
- 9 Tie the other end of the dragline to a parachute connector.
- 10 Fold the slack in the dragline and tape the folds in place with one turn of masking tape.

Figure 3-29. M-1 Release Prepared (Continued)

CAUTION

Place the release on the load with the parachute connectors toward the front of the platform and with the guide block up. Bolt the suspension slings to the lower suspension links so that they will not change position when the load is suspended. Make sure the arming wire lanyard is routed over all items.



- 1 Put the release on the load as instructed in the specific rigging chapter for the load.
- 2 Bolt the riser extensions of the G-11D cargo parachutes to the parachute connectors already fitted to the release.
- 3 Attach the front suspension slings to the lower bolts of the lower suspension link. The front slings will have a half twist towards the parachutes.
- 4 Attach the rear suspension slings to the top bolts of the lower suspension link.

NOTES: 1. The keeper at each end of the sling must be drawn snugly against the object on which the sling is fitted.
 2. Suspension slings on DRAS loads will have the nylon buffers removed to fit on the lower suspension links of the M-1 parachute release assembly.

- 5 Run a length of type III nylon cord to encircle the lower spacer, and tie the ends of the cord to points on the rear of the load or platform.
- 6 Run a length of type III nylon cord through the parachute connectors, and tie the ends of the cord to points on the front of the load or platform.
- 7 Tie the lanyard to a carrying handle of a parachute with three alternating half hitches and an overhand knot in the running end (not shown).
- 8 Fold the slack in the lanyard, and tape the folds in place with one turn of masking tape.

Figure 3-30. M-1 Release Attached and Safetied to Load

ATTACHING PARACHUTE RISERS TO THE PARACHUTE RELEASE

3-22. Lay the parachute release on top of the load with the bolt end of the parachute connectors toward the cargo parachutes. Bolt the parachute riser extensions to the parachute connectors of the M-1 parachute release as shown in Figure 3-31.

NOTE: Bolt the parachute riser extensions to the parachute connectors from rigger's left to right. They must be in the numerical order given for four parachute loads.

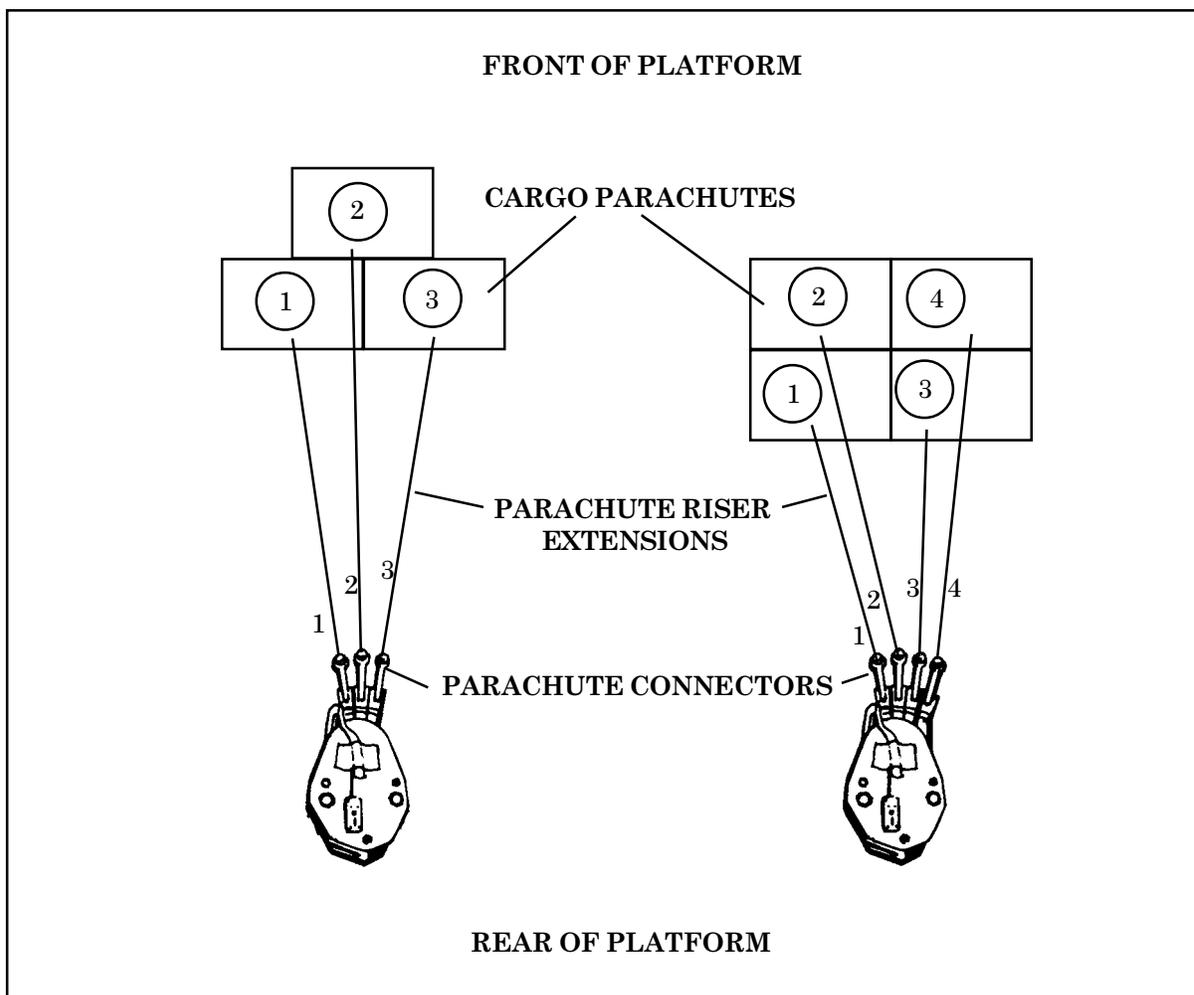


Figure 3-31. Three and Four Parachute Riser Extensions Attached to the Parachute

SECTION VI - ATTITUDE CONTROL SYSTEM (ACS)

ATTITUDE CONTROL SYSTEM

3-23. Assemble and inspect two attitude control systems for each load as follows:

a. *Assembling the ACS.* Assemble the ACS as shown in Figure 3-32.

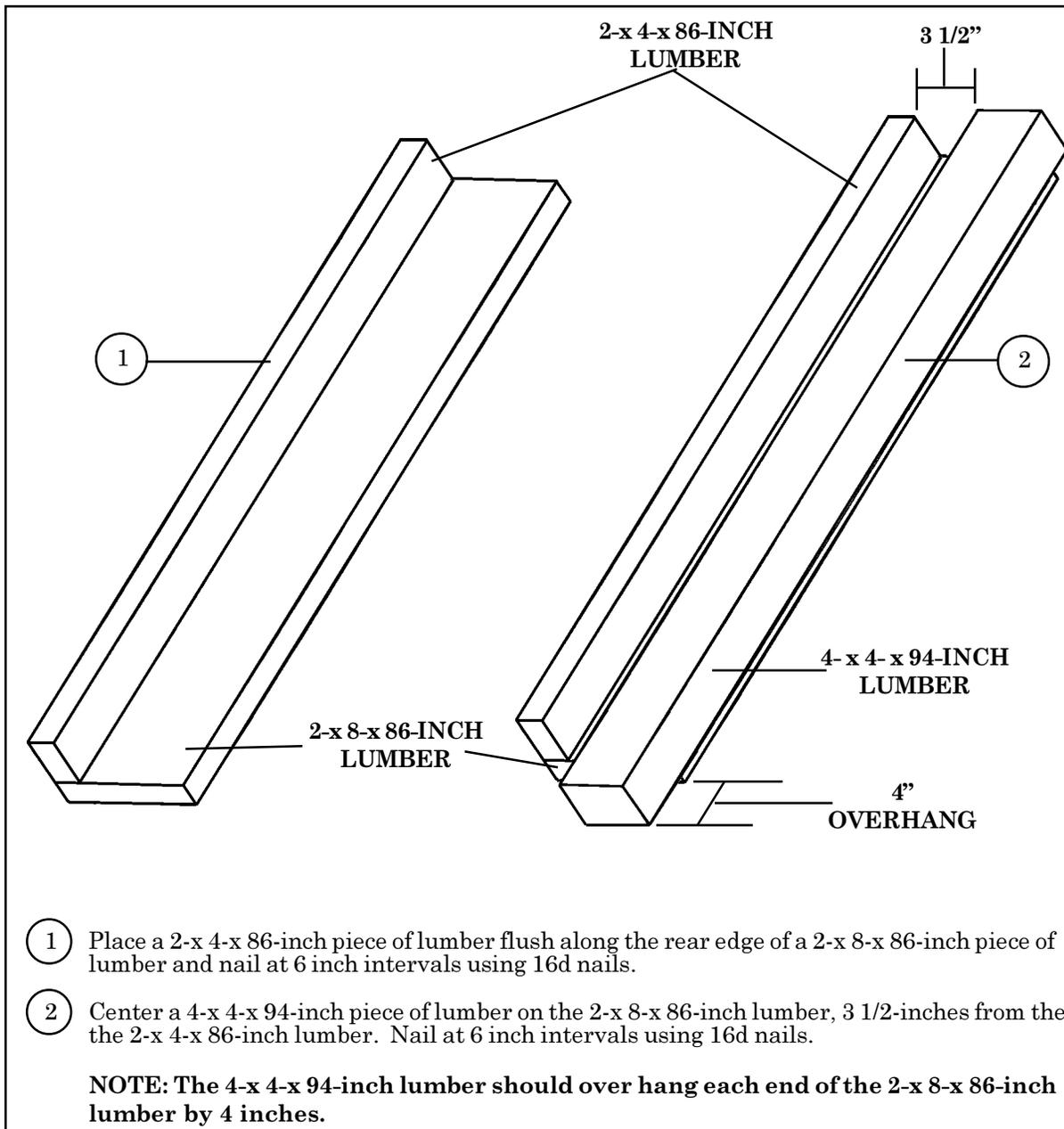


Figure 3-32. Attitude Control System Assembled

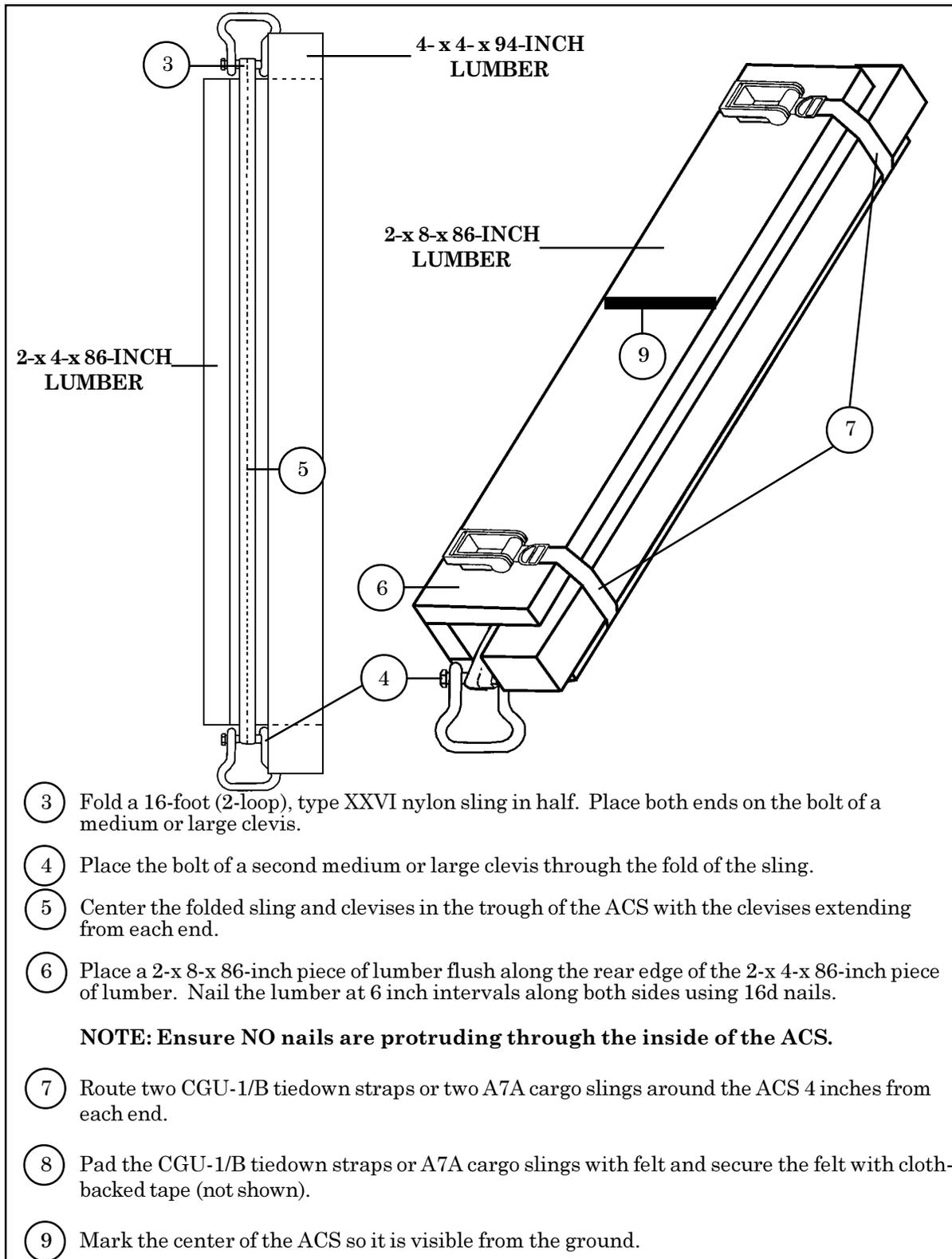


Figure 3-32. Attitude Control System Assembled (continued)

b. *Inspecting the ACS.* Inspect the ACS for the following items:

- (1) Lumber. Inspect the lumber for splits or excess damage. If the damage interferes with the proper functioning of the ACS, discard and use a new ACS.
- (2) Slings. Inspect the slings according to TM 10-1670-296-20&P/ TO 13C7-49-2. Ensure the slings move freely through the ACS.
- (3) Clevises. Inspect the clevises according to TM 10-1670-296-20&P/ TO 13C7-49-2.
- (4) Servicable slings and clevises may be used on another ACS.

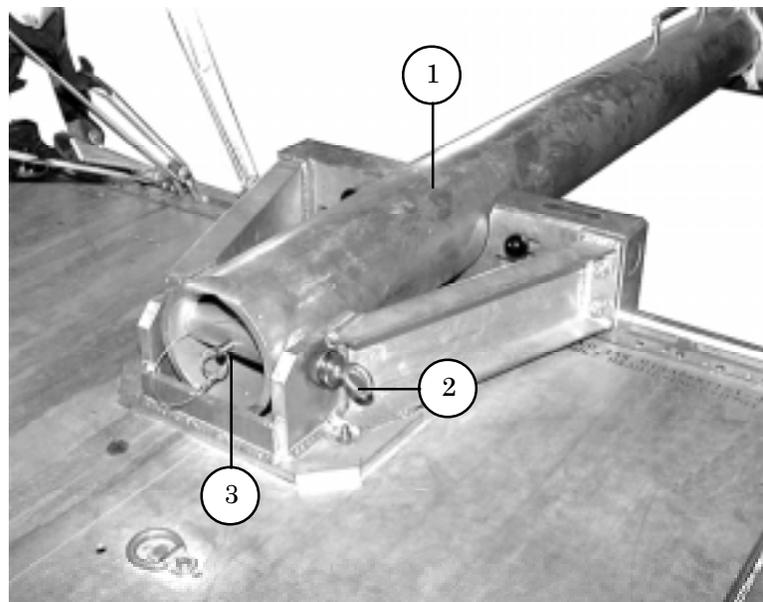
SECTION VII - INSTALLING OUTRIGGER ASSEMBLY

PLATFORM FITTING ASSEMBLY (PFA) WELDMENT AND LINK ASSEMBLIES

3-24. The PFA weldment and the link assembly are designed to be installed on either platform siderail. Assemble and install the PFA weldment and the link assembly on the DRAS platform according to TM 10-1670-268-20&P/TO13C7-52-22.

OUTRIGGER MAST AND FOOT

3-25. The outrigger mast and foot are interchangeable and may be used on either side of the platform. Assemble, install, and safety the mast and foot on the DRAS platform according to TM 10-1670-268-20&P/TO13C7-52-22 and as shown in Figures 3-33 through 3-36.



- ① Place the mast in the PFA weldment in the horizontal position aligning the shaft hole in the mast with the sleeve bearings in the PFA weldment.
- ② Insert the mast pivot pin through the bearing and the mast from rear to front.
- ③ Looking inside the bottom of the mast, align the hole in the mast pivot pin with the hole in the mast and insert the ball-lock pin.

Figure 3-33. Mast Installed

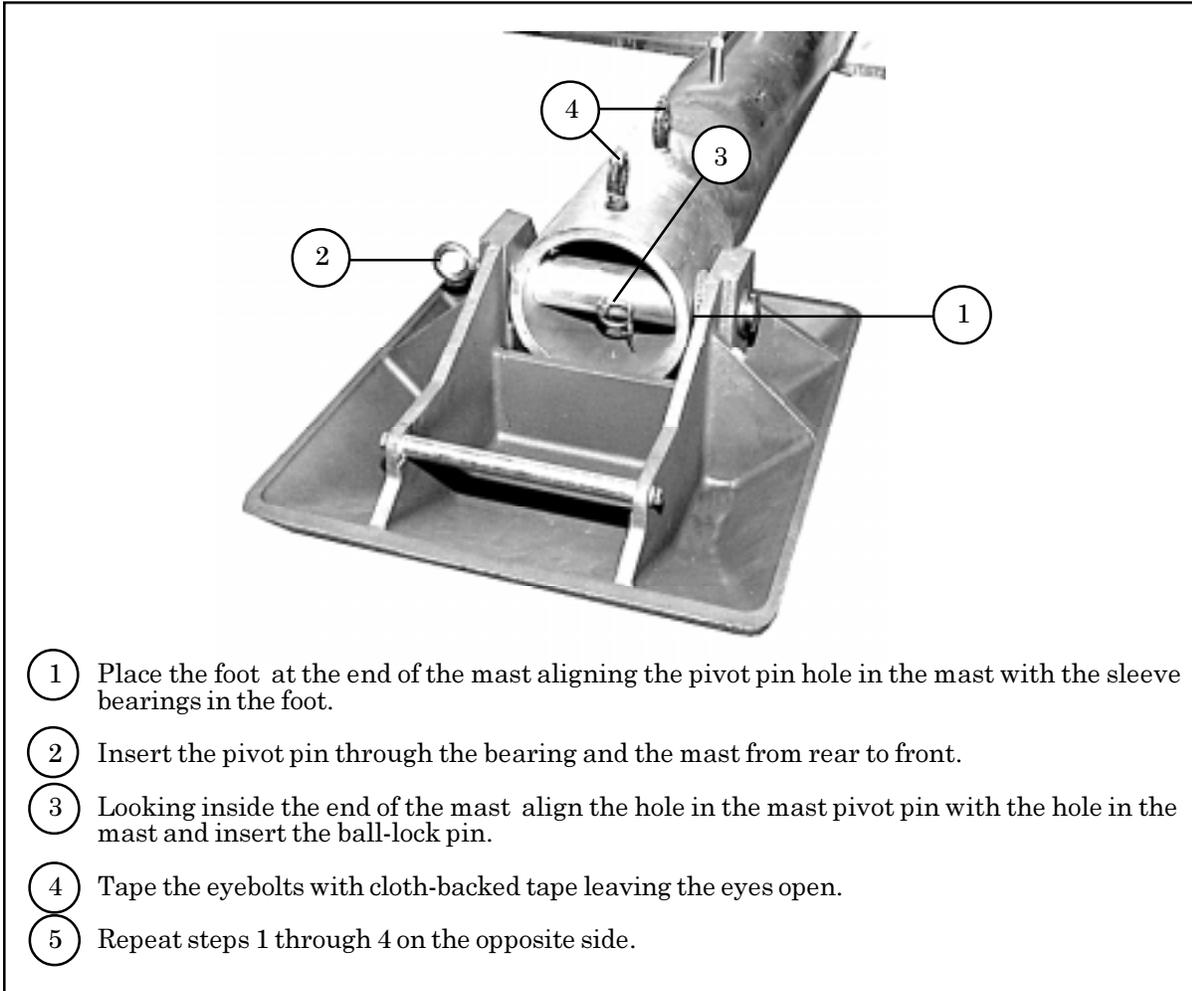


Figure 3-34. Foot Installed

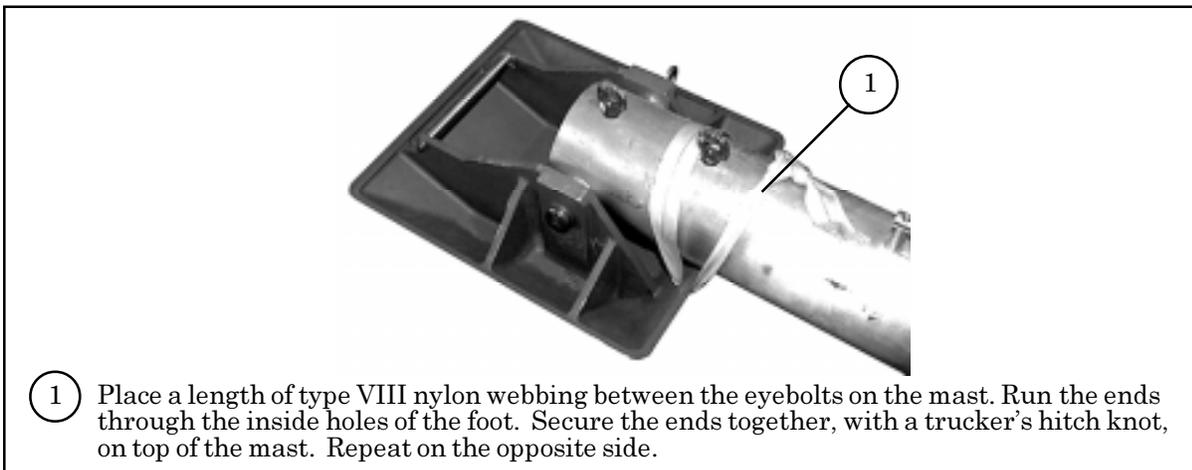
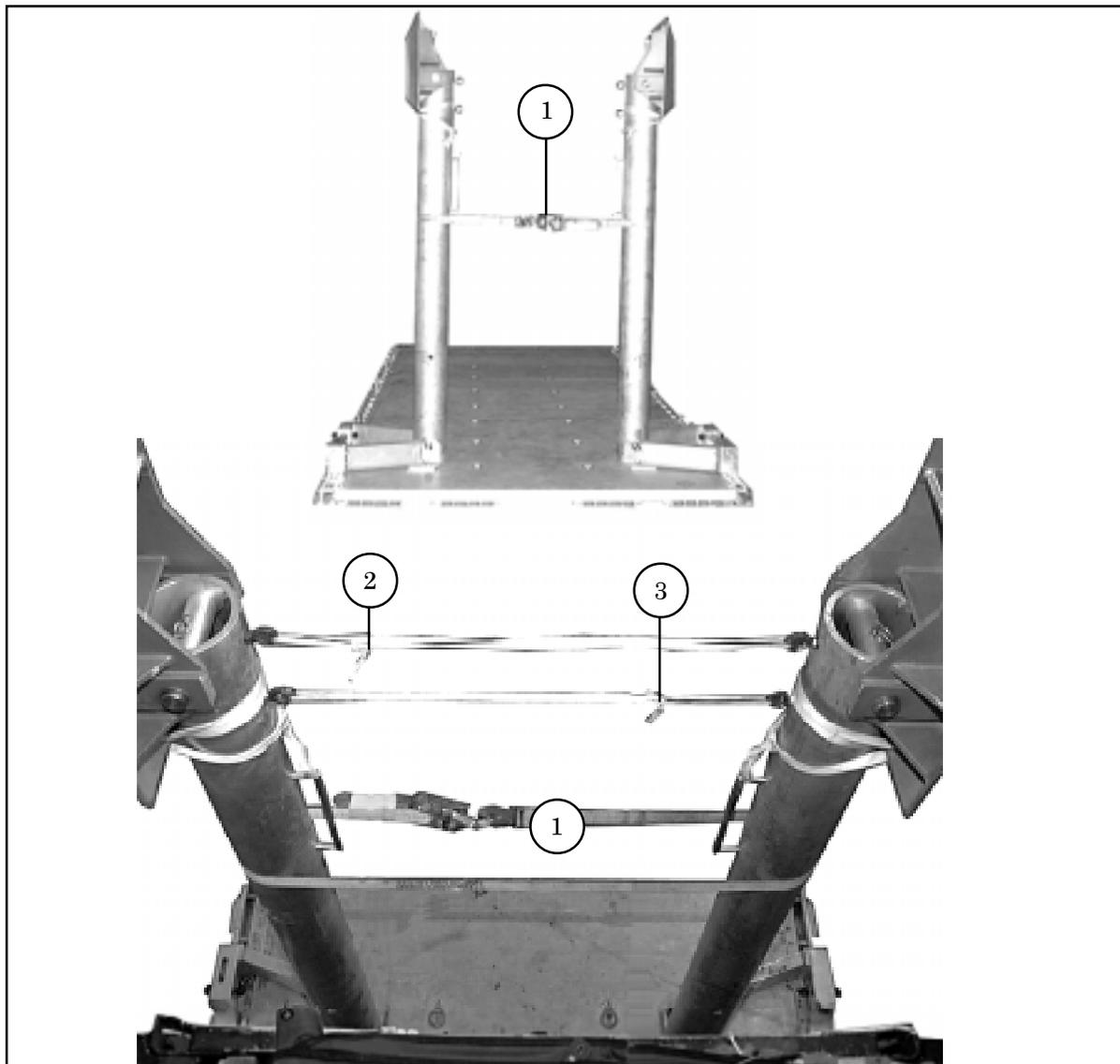


Figure 3-35. Foot Safety Tied

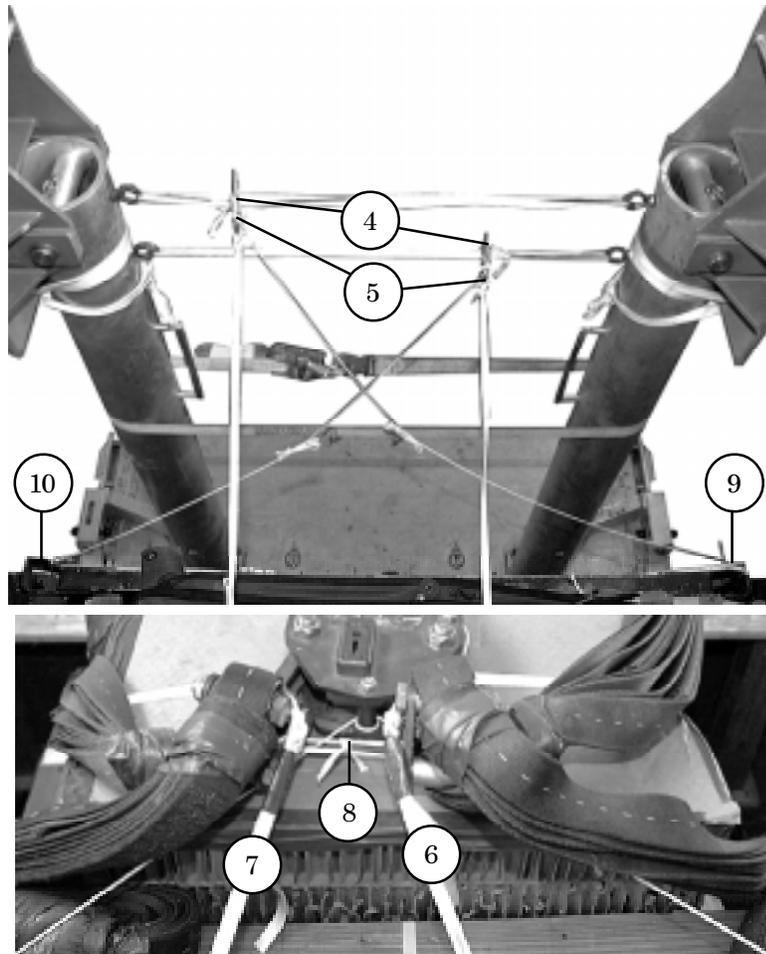


- ① Raise both outriggers to the vertical position and route a CGU-1B tiedown assembly around both masts.

NOTE: The CGU-1B tiedown assembly must be removed by the aircrew prior to airdrop.

- ② Form an outrigger vertical restraint tie by routing a length of 1/2-inch tubular nylon webbing through the top eyebolt on both masts. Tie the ends together 6 inches from the right mast eyebolt using a trucker's hitch.
- ③ Form a second outrigger vertical restraint tie by routing a length of 1/2-inch tubular nylon webbing through the bottom eyebolt on both masts. Tie the ends together 6 inches from the left mast eyebolt using a trucker's hitch.

Figure 3-36. Masts Safety Tied



- ④ Install and safety tie a guillotine knife around each outrigger vertical restraint tie as shown in Figure 3-18. Ensure the knives are installed against the knots.
- ⑤ Tie a length of 1/2-inch tubular nylon webbing to the body of each guillotine knife. The length of the webbing is given in the specific chapter for the item being rigged.
- ⑥ Tie the webbing from the right guillotine knife to the right lower suspension link of the M-1 parachute release assembly with three alternating half hitches and an overhand knot. Tape the running end to the 1/2-inch tubular nylon webbing.
- ⑦ Repeat step 6 using the left guillotine release knife and the left lower suspension link.
- ⑧ Tie the lower suspension links together as close as possible with one turn single, type I 1/4-inch cotton webbing. Ensure the tie is under the 1/2-inch tubular nylon webbing ties.
- ⑨ Tie a length of type III nylon cord to the left point indicated in the specific rigging chapter. Tie the other end of the type III nylon cord to the body of the top guillotine knife. The length of the cord is given in the specific chapter for the item being rigged. S-fold the slack in the type III nylon cord and secure with masking tape.
- ⑩ Repeat step 9 using the right point indicated in the specific rigging chapter and the bottom guillotine knife.

Figure 3-36. Mast Safety Tied (continued)

SECTION VIII - LOAD MARKING AND INSPECTION

MARKING RIGGED LOAD

3-26. Each rigged load must have a data tag prepared for it, and some rigged loads may require a Shipper's Declaration for Dangerous Goods. The center of balance must also be clearly marked on both sides of the platform.

a. Data Tag. A data tag is prepared and secured on the rear of each platform load. Entries on the tag are used by the Army and Air Force in making inspections and in finding causes for malfunctions. The entries are also used to help the loadmaster determine where to place the load in the aircraft. Use a ballpoint pen or other waterproof marking device to record the following information on the tag:

- (1) Total rigged weight.
- (2) Height, including parachutes.
- (3) Width.
- (4) Overall length.
- (5) Overhang (specify front, rear, or side of load).
- (6) Longitudinal center of balance (measured from the front edge of the platform).

b. Shipper's Declaration for Dangerous Goods. This form is prepared and secured on each load that has any type of hazardous material such as fuel, ammunition, or a battery.

c. Center of Balance. In addition to being included on the data tag, the longitudinal center of balance must also be marked on the platform. The vertical line of the symbol CB is placed at the center of balance on both sides of the platform.

TYPES OF INSPECTIONS

3-27. The types of inspections performed on a rigged load are the final rigger inspection, the before-loading inspection, and the after-loading inspection. All rigged DRAS loads must be inspected at prescribed intervals to make sure that the loads and the equipment used on the loads are assembled and installed to meet the criteria outlined in the specific rigging chapter.

- a. *Final Rigger Inspection (Shop Final).*** After the load has been completely rigged, a certified Transported Force Rigger Inspector performs the final rigger inspection. This inspection is accomplished before the rigged load leaves the rigging site to make sure it is rigged according to the specific chapter for that particular load. This inspection should be conducted by an inspector other than the rigger supervising the installation of parachutes and deployment system. It is not necessary to use the DD Form 1748-series inspection forms for this inspection.
- b. *Before-Loading Inspection.*** A before-loading inspection must be performed on a rigged load before it is loaded into the aircraft. This inspection is conducted jointly by a certified Transported Force Rigger Inspector and a certified Air Force Joint Airdrop Inspector. The inspectors use the proper joint airdrop inspection record, and both sign the appropriate blocks to certify correct rigging of the load. When the rigged load is delivered to the aircraft, the aircraft loadmaster checks the inspection form for completion and necessary signatures before accepting the load.
- c. *After-Loading Inspection.*** After the loadmaster completes the loading and in-aircraft rigging, the after-loading inspection is performed. This inspection is conducted jointly by a certified Transported Force Rigger Inspector, a certified Air Force Joint Airdrop Inspector, and the aircrew loadmaster. After the inspection is completed, the three inspectors certify, by signing the form, that the load is ready to airdrop.