

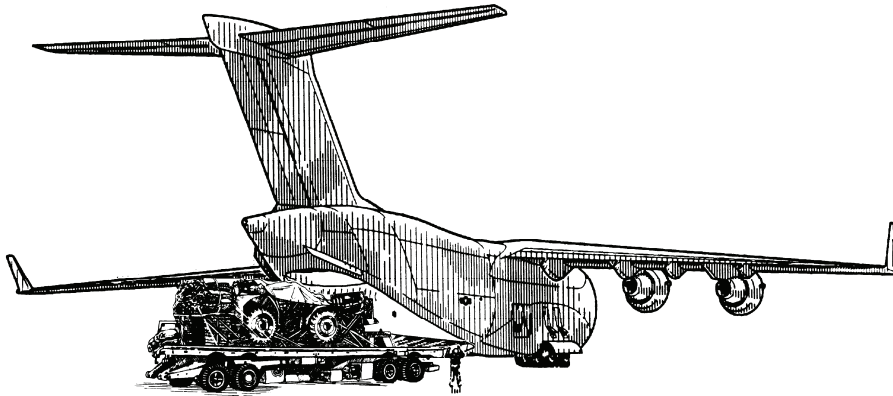
**FM 4-20.121**(FM 4-20.121  
and FM 10-539)  
**TO 13C7-6-21**

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## **Airdrop of Supplies and Equipment: Rigging Tractors and Tractor-Dozers**

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**September 2007**



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Field Manual  
No. 4-20.121  
Technical Order  
No. 13C7-6-21

Headquarters  
Department of the Army  
Department of the Air Force  
Washington, DC, 6 September 2007

# **AIRDROP OF SUPPLIES AND EQUIPMENT: RIGGING TRACTORS AND TRACTOR-DOZERS**

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**\*This publication supersedes FM 4-20.121/TO 13C7-6-21, 20 MARCH 2003 and FM 10-539/TO 13C7-1-17, 29 MAY 1984.**

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# Preface

## SCOPE

This manual tells and shows how to prepare and rig the D-5B (Type I) tractor-dozer, the John Deere 450G LT full-tracked commercial bulldozer, the Deployable Universal Combat Earthmover (DEUCE), the T-200 Bobcat Compact Track Loader, the 420D backhoe loader, the 410 backhoe loader, the Small Emplacement Excavator (SEE), the 277 multi-terrain loader (MTL), and the All-Purpose Remote Transporter II (ARTS II) which are rigged for low-velocity (LV) airdrop from a C-130 and C-17 aircraft.

This manual combines FM4-20.121 and FM 10-539 into one manual, as well as, adding the T-200 Bobcat Compact Track Loader, the 420D backhoe loader, the MTL, and the ARTS.

## APPLICABILITY

This publication applies to the Active Army, the Army National Guard/Army National Guard of the United States, and the United States Army Reserve unless otherwise stated.

## USER INFORMATION

The proponent of this publication is the United States Army Training and Doctrine Command (TRADOC). You are encouraged to report any errors or omissions and to suggest ways to make this a better manual. Army personnel, send your comments on DA Form 2028 directly to: Director

Aerial Delivery and Field Services Department  
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Unless this publication states otherwise, masculine nouns and pronouns do not refer exclusively to men.

# Chapter 1

## Introduction

### DESCRIPTION OF ITEMS

1-1. The description and unrigged data for the items covered in this manual are described below.

- **D-5B Tractor-Dozer.** D-5B, type I (nonsectionalized). The type I tractor-dozer weighs 31,350 pounds with 3/4 tank of fuel. The weight of the tractor-dozer is reducible to 30,105 pounds with the roll-over protection structure (ROPS) removed. The tractor-dozer is 225 inches in length. Its width is 104 inches with the blade angled, and its height is 121 inches (reducible to 82 inches).
- **John Deere 450G Lt Full-Track Commercial Bulldozer.** The John Deere 450G Lt bulldozer weighs 18,080 pounds. The dozer is 180 inches in length. Its width is 97 inches and its height is 108 inches (reducible to 77 inches with ROPS removed and the seat back lowered).
- **Deployable Universal Combat Earthmover (DEUCE):** The Deployable Universal Combat Earthmover weighs 35,000 pounds. The earthmover is 112 inches high (reducible to 90 inches in the kneeling position with the cab removed).
- **T-200 Bobcat Compact Track Loader.** The T-200 Bobcat compact track loader weighs 8,300 pounds. The track loader is 81 inches high, 77 inches wide and 105 inches long. The roller attachment weighs 1,880 pounds. The angled broom attachment weighs 880 pounds. The bucket loader attachment weighs 540 pounds. The hydraulic breaker attachment weighs 760 pounds.
- **420D Backhoe Loader:** The 420D backhoe loader is 140 inches in high (reducible to 99-inches), 91 inches in wide, 276 inches in long, and weighs 15,763 pounds. An accompanying load, which consists of a roll-over protection system (ROPS) and a hydraulic breaker (hammer), is also rigged with the load. The ROPS weighs 420 pounds and the hydraulic breaker weighs 1420 pounds.
- **277 Multi-Terrain Loader:** The 277 Multi-Terrain Loader is 82 inches high, 78 inches wide, 115 inches long, and weighs 9,052 pounds. An accompanying load which consists of a front-end bucket loader attachment, a drill attachment, and an equipment storage box with a minimum weight of 1,500 pounds and a maximum weight of 3,000 pounds is also rigged with the load. The drill attachment weighs 920 pounds and the front-end bucket loader attachment weighs 940 pounds.
- **All-Purpose Remote Transporter:** The All-Purpose Remote Transporter is 78 inches high, 64 inches wide, 146 inches long, and weighs 9,880 pounds

### SPECIAL INSTRUCTIONS

1-2. Special considerations for this manual are given below.

- The loads covered in this manual may include hazardous materials as defined in AFMAN 24-204(I)/TM 38-250/NAVSUP PUB 505/MCO P 4030.19I/DLAI4145.3. If included, the hazardous materials must be packaged, marked, and labeled as required by AFMAN 24-204(I)/TM 38-250/NAVSUP PUB 505/MCO P 4030.19I/DLAI4145.3. A copy of this manual must be available to the joint airdrop inspectors during the before- and after-loading inspection.

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## Chapter 2

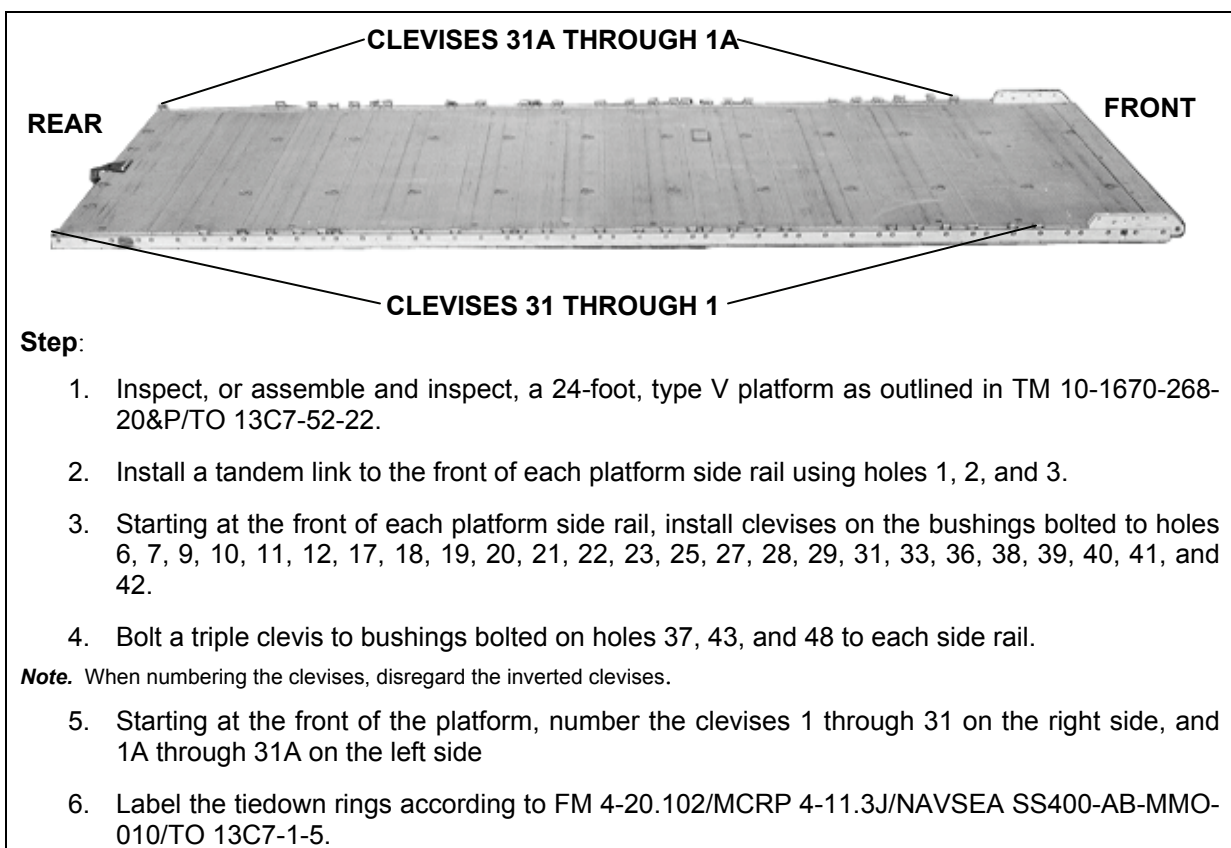
# Rigging the Type I, D-5B Tractor-Dozer for Low-Velocity Airdrop

### DESCRIPTION OF LOAD

2-1. The type I (nonsectional), D-5B tractor-dozer is rigged on a 24-foot, type V platform with eight G-11C cargo parachutes. This dozer may be delivered by low-velocity airdrop from C-130 and C-17 aircraft.

### PREPARING PLATFORM

2-2. Prepare a 24-foot, type V platform using two tandem links and 68 tiedown clevises as shown in Figure 2-1.

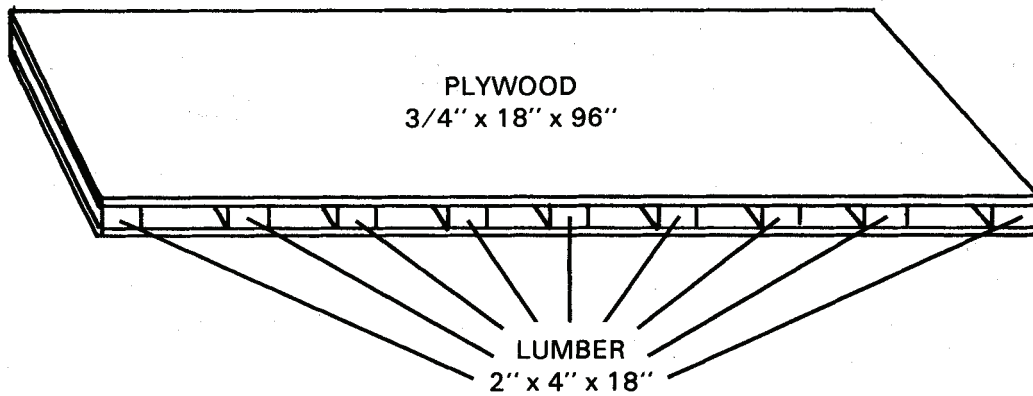


**Figure 2-1. Platform Prepared**

### BUILDING AND POSITIONING HONEYCOMB STACKS

2-3. Build the load spreader for the honeycomb stacks as shown in Figure 2-2. Build the honeycomb stacks as shown in Figures 2-3 through 2-8. Position the stacks as shown in Figures 2-9 through 2-13.

- Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



**Step:**

1. Use two 3/4- by 18- by 96-inch pieces of plywood and nine 2- by 4- by 18-inch pieces of lumber.
2. Nail one piece of lumber to each end of one piece of plywood. Space the other seven pieces evenly, and nail them in place.
3. Nail the other piece of plywood to the lumber.

**Note.** Use eightpenny nails.

**Figure 2-2. Load Spreader Prepared**

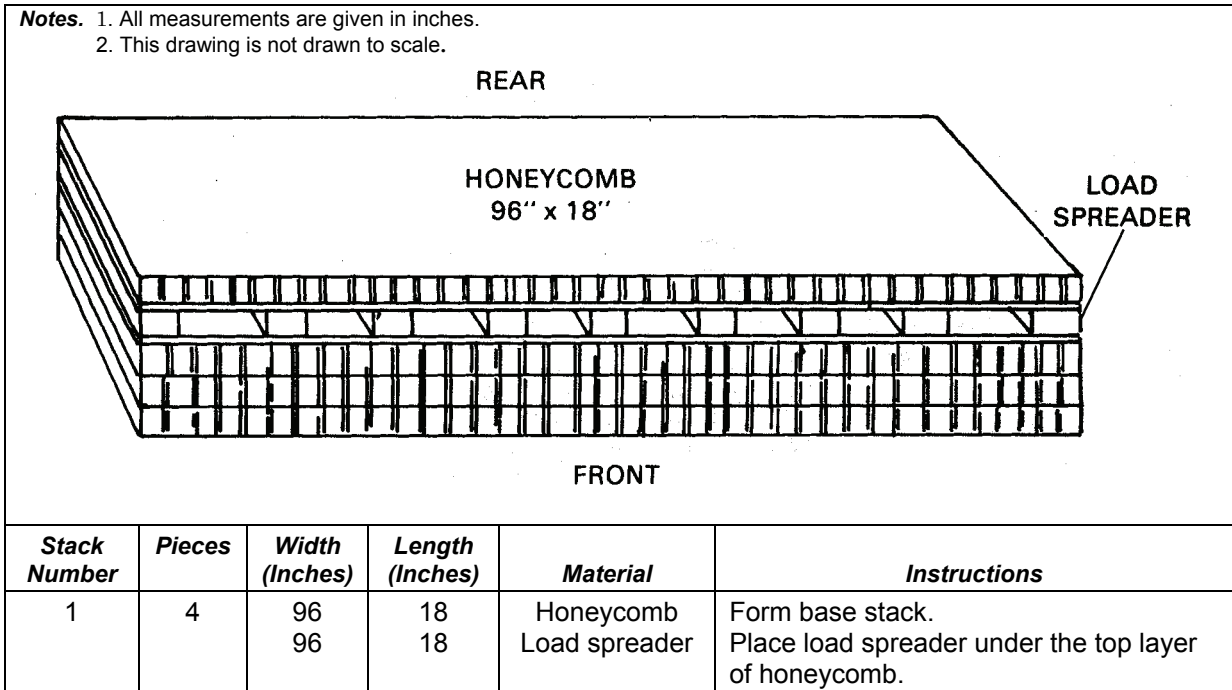


Figure 2-3. Honeycomb Stack Number 1 Prepared

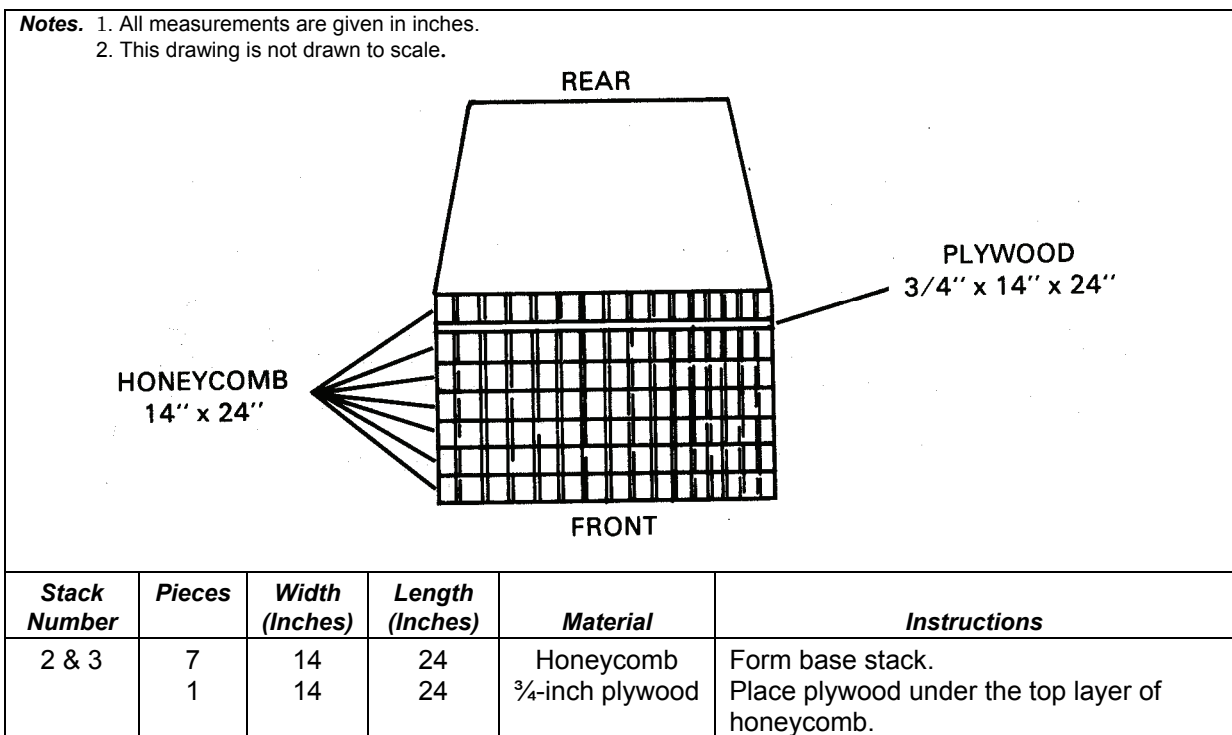
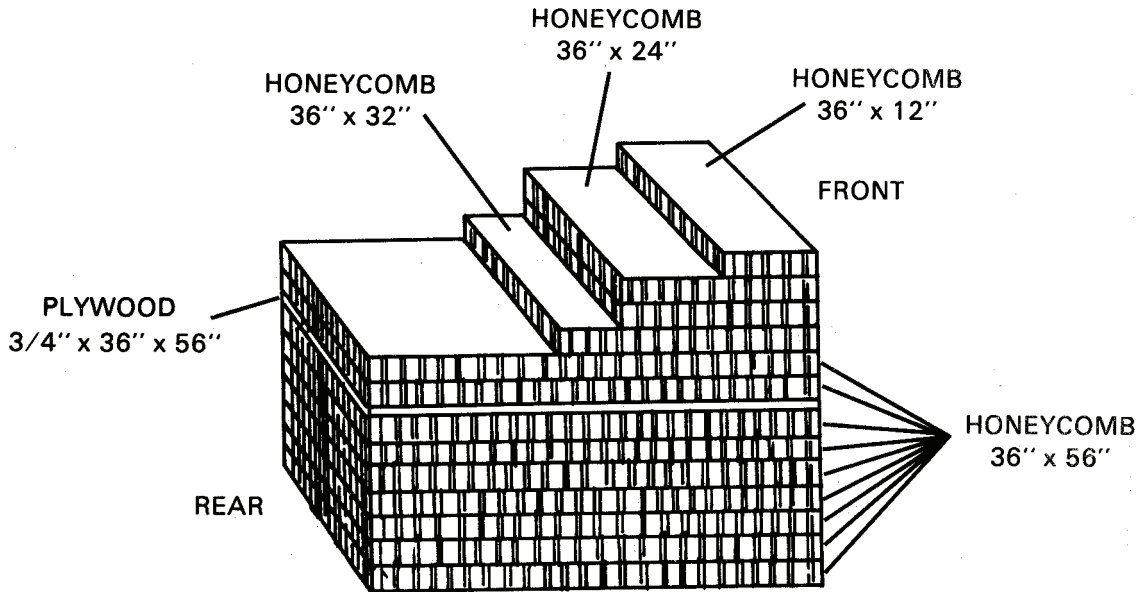


Figure 2-4. Honeycomb Stacks 2 and 3 Prepared

**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



Stack Number	Pieces	Width (Inches)	Length (Inches)	Material	Instructions
4	7	36	56	Honeycomb	Form base stack.
	1	36	56	$\frac{3}{4}$ -inch plywood	Place plywood on top of seven pieces of 36- by 56-inch honeycomb.
	2	36	56	Honeycomb	Place honeycomb on top of base.
	1	36	32	Honeycomb	Place honeycomb on top of base, flush with the front edge.
	2	36	24	Honeycomb	Place honeycomb on top of the 36- by 32-inch honeycomb, flush with the front edge.
1	36	12	Honeycomb	Place honeycomb on top of the 36- by 24-inch honeycomb, flush with the front edge.	

Figure 2-5. Honeycomb Stack 4 Prepared

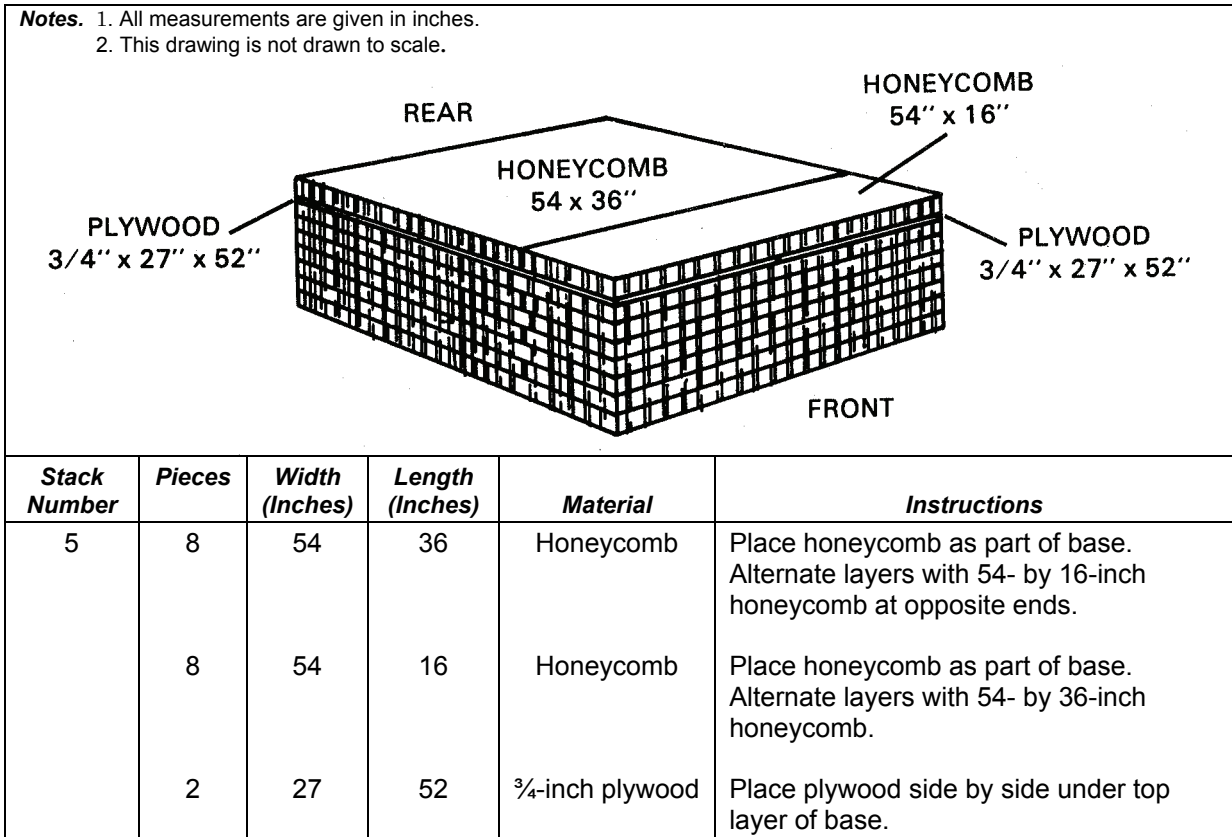


Figure 2-6. Honeycomb Stack 5 Prepared

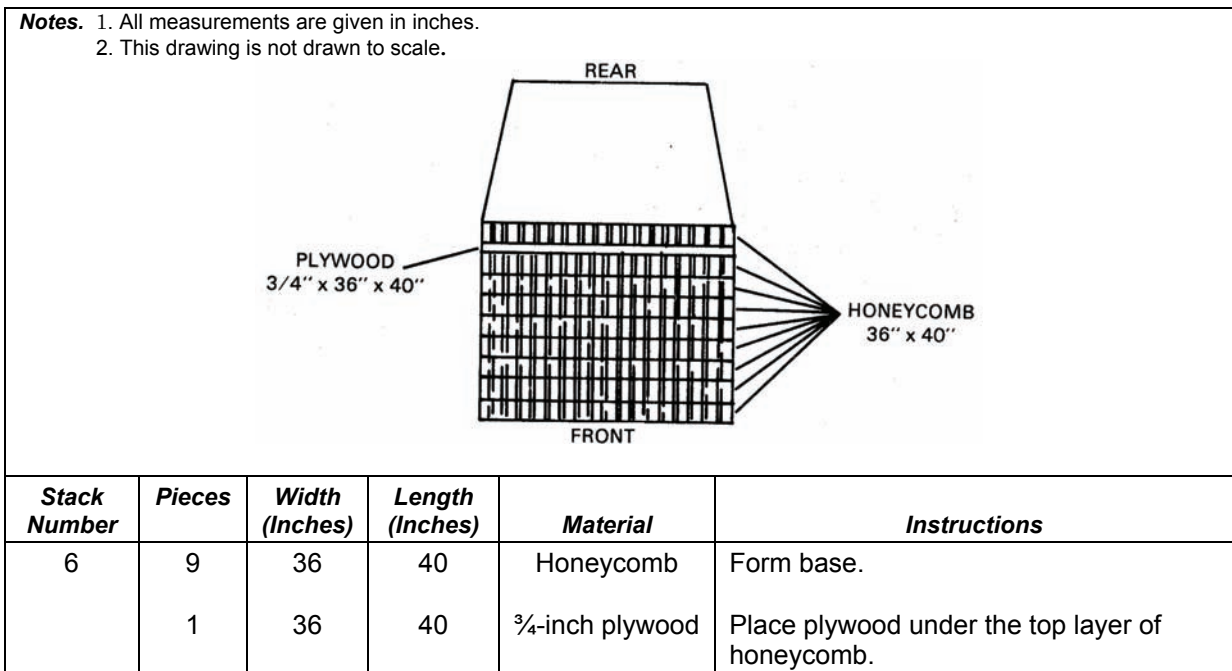
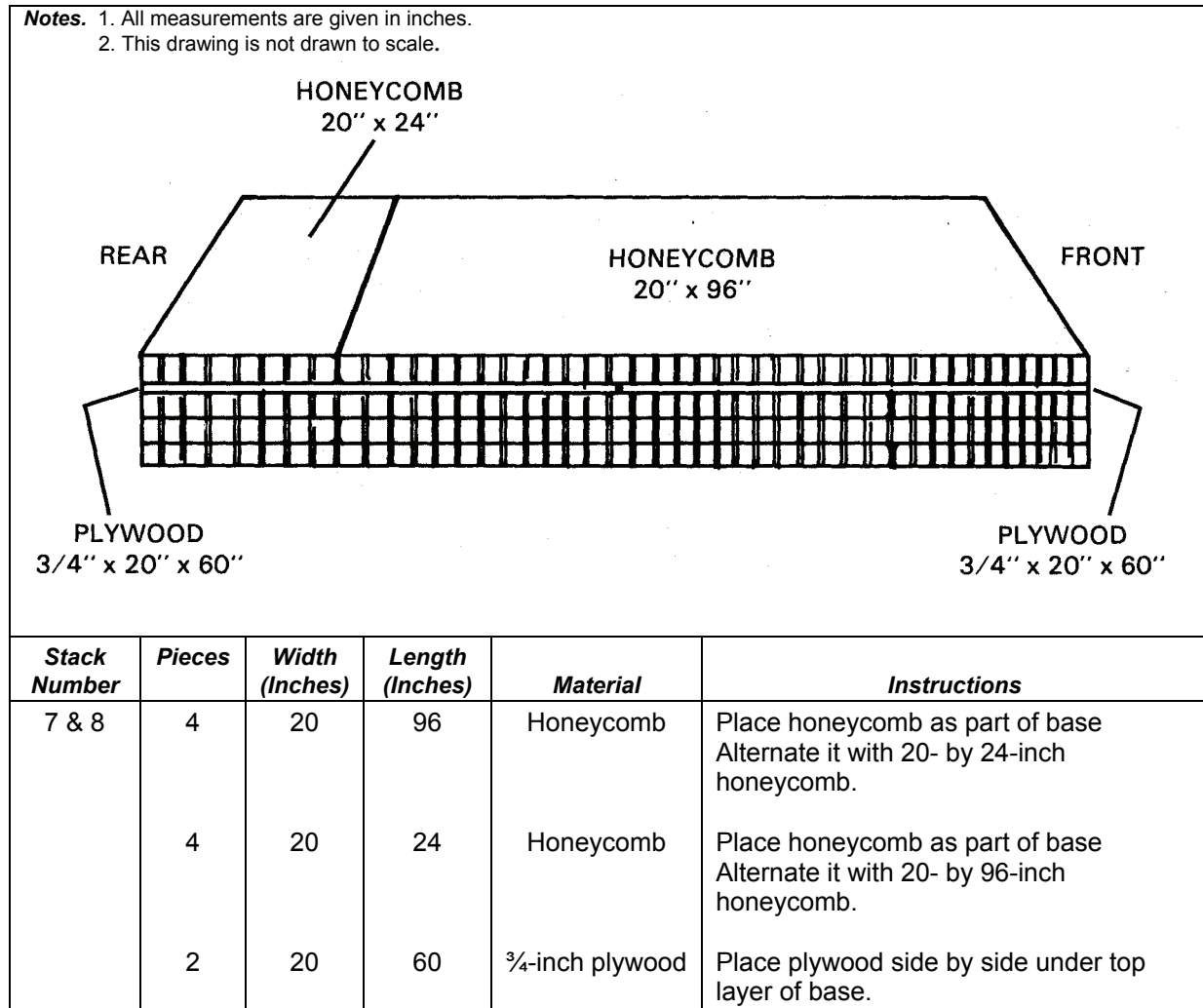


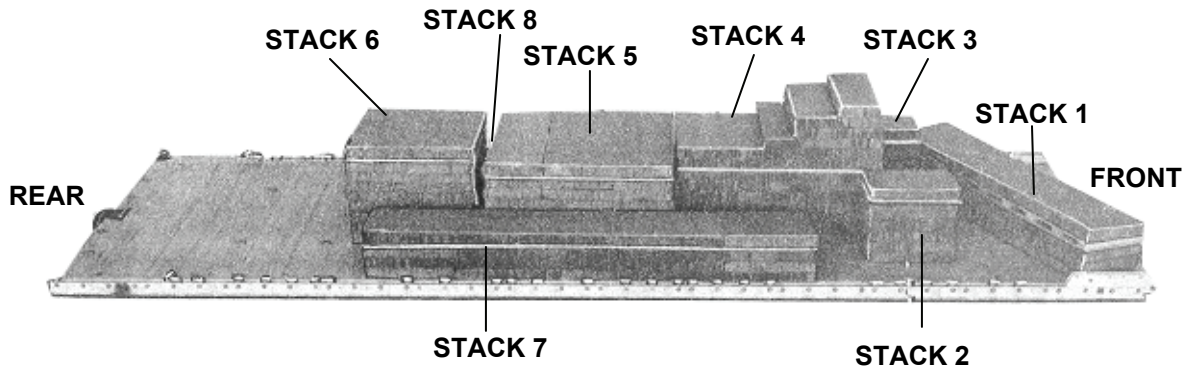
Figure 2-7. Honeycomb Stack 6 Prepared



**Figure 2-8. Honeycomb Stacks 7 and 8 Prepared**

**CAUTION**

The honeycomb stacks MUST be positioned in the following order: stacks 4, 7, 5, 8, and 3. This should be done before the other stacks are positioned.



<b>Stack Number</b>	<b>Position on Platform</b>
1	Angle the stack on the platform with the right front corner of the stack even with the front edge of the platform and the right rear corner against the right side rail. The left front corner is 31 inches from the front of the platform. The left rear edge of the stack is against stack 3.
2	Place the front edge of the stack 46 inches from the front edge of the platform. The left rear side of the stack is against stack 4. The stack extends 18 inches in front of stack 4.
3	Place the stack on the left side of the platform 46 inches from the front edge of the platform, with 6 inches of the right rear edge of the stack against stack 4. The stack extends 18 inches in front of stack 4.
4	Place the stack on the platform with the front edge of the stack 64 inches from the front edge of the platform. The left front side of the stack is 38 inches from the left side rail, and the left rear of the stack is 36 1/2 inches from the left rail.
5	Place the stack on the platform with the front of the stack against stack 4. The left front corner of the stack is 27 1/2 inches from the left rail, and the left rear corner of the stack is 26 inches from the left rail. The right side of the stack is against stack 7.
6	Place the stack on the platform with the front edge of the stack 4 inches from stack 5. The left front corner is 35 inches from the left side rail, and the left rear corner of the stack is 34 inches from the left side rail.
7	Place the right front corner of the stack on the platform 85 inches from the front edge of the platform. The right front corner of the stack is 2 1/2 inches from the right rail, and the right rear corner is 4 1/2 inches from the right rail.
8	Place the left front corner of the stack on the platform 85 inches from the front edge of the platform. The left front corner of the stack is 7 1/2 inches from the left rail, and the left rear corner of the stack is 4 1/2 inches from the left rail.

**Figure 2-9. Honeycomb Stacks Positioned on Platform**

**Notes.** 1. All measurements are given in inches.  
 2. This drawing is not drawn to scale.

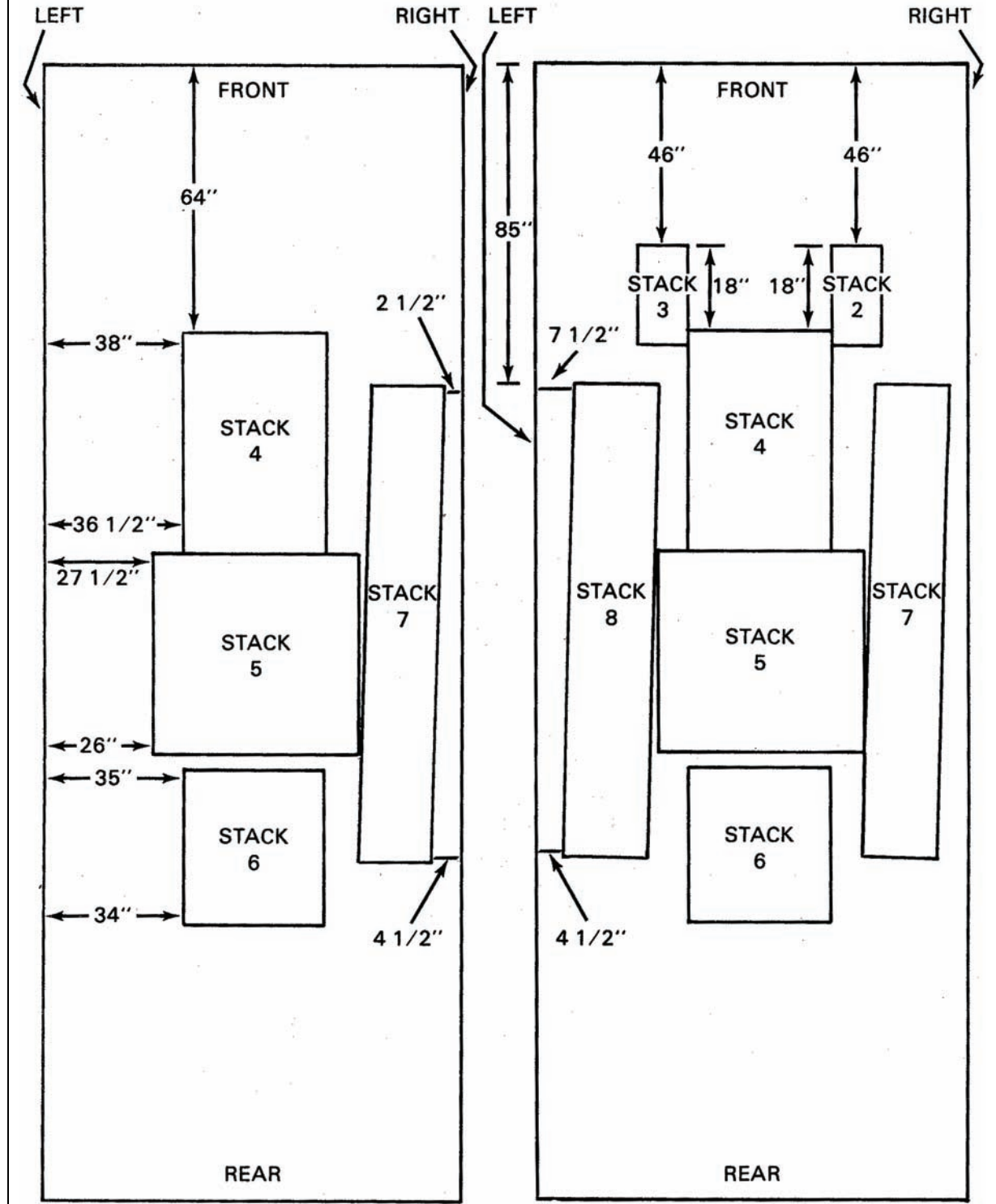


Figure 2-10. Line Drawings of Honeycomb Stacks 2, 3, 4, 5, 6, 7, and 8 Positioned on the Platform



- Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.

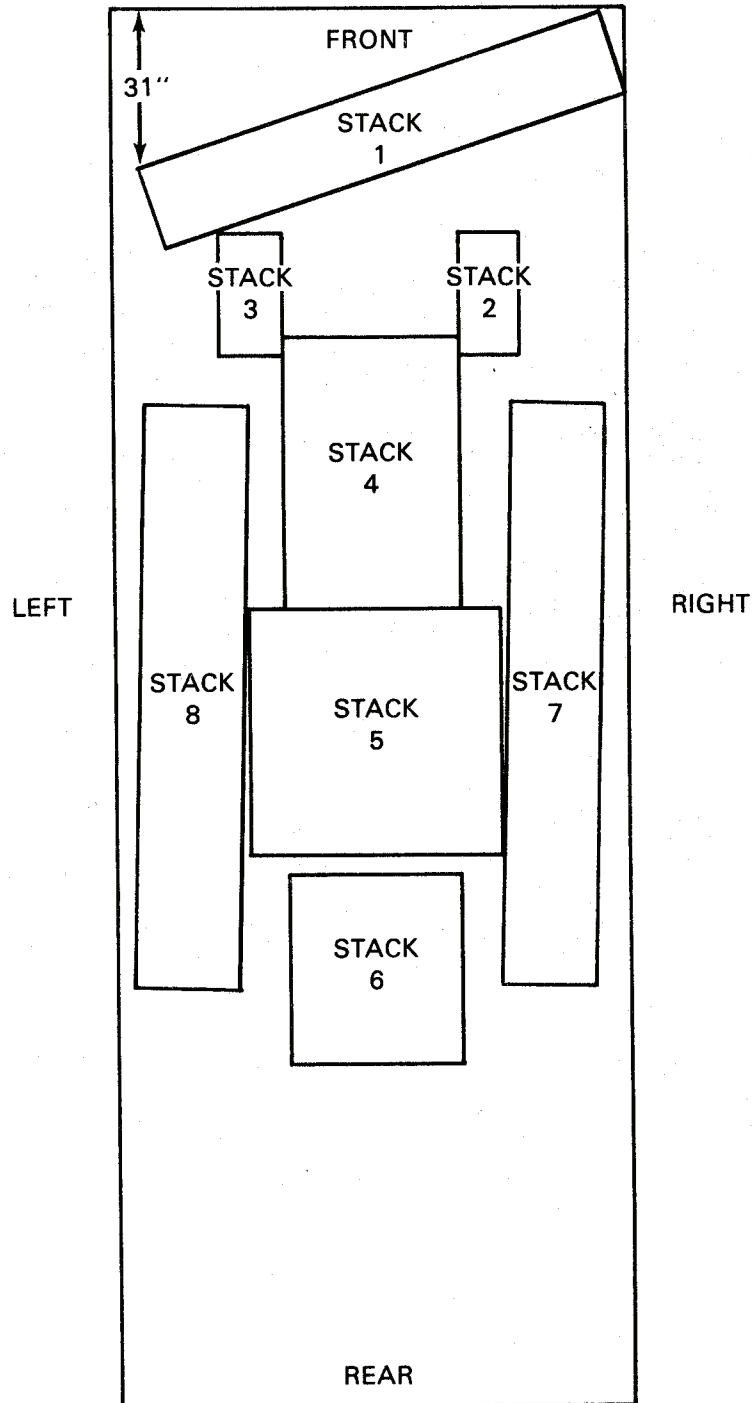


Figure 2-11. Line Drawing of Honeycomb Stacks 1 through 8 Positioned on the Platform

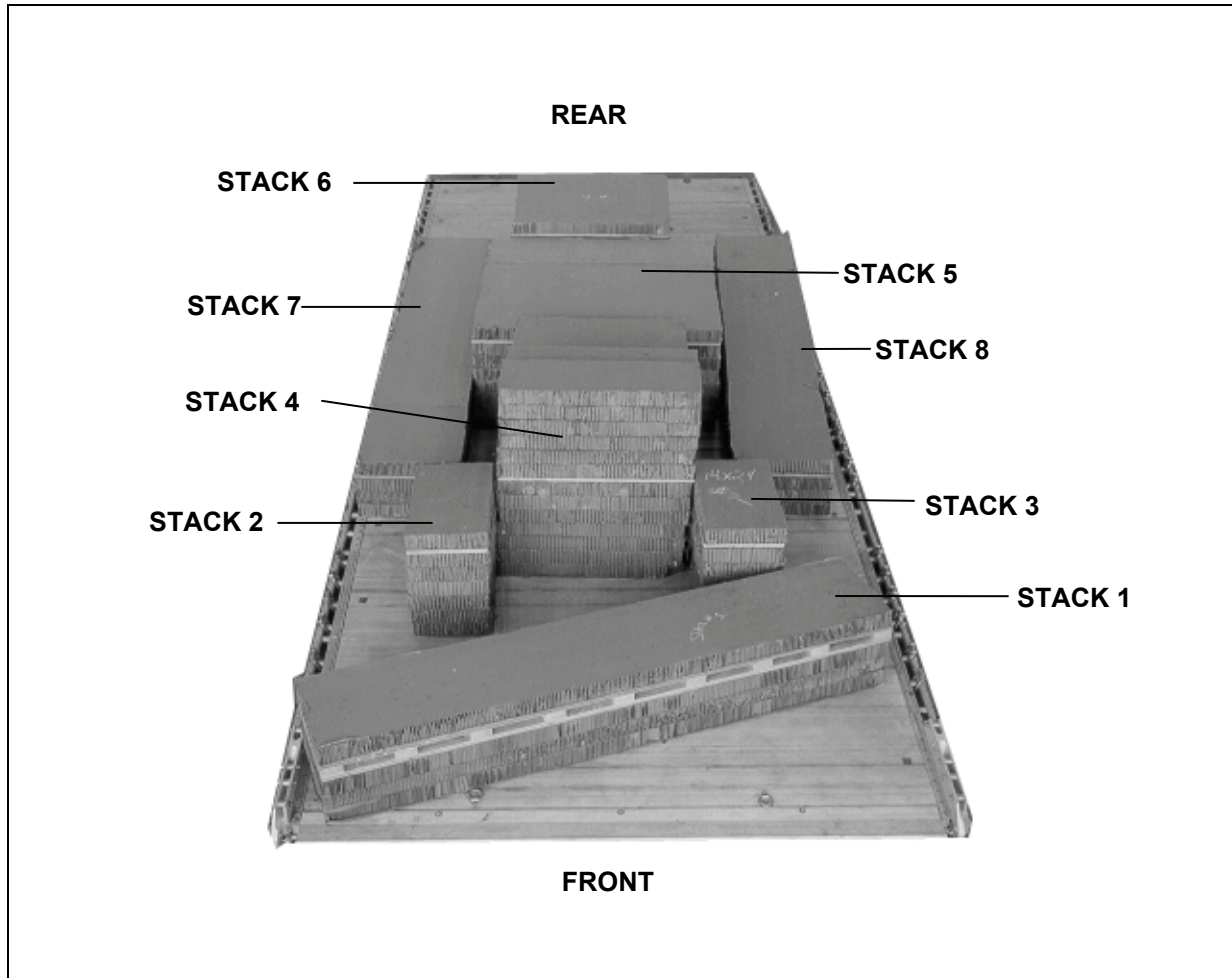


Figure 2-12. Front View of the Honeycomb Stacks Positioned on the Platform

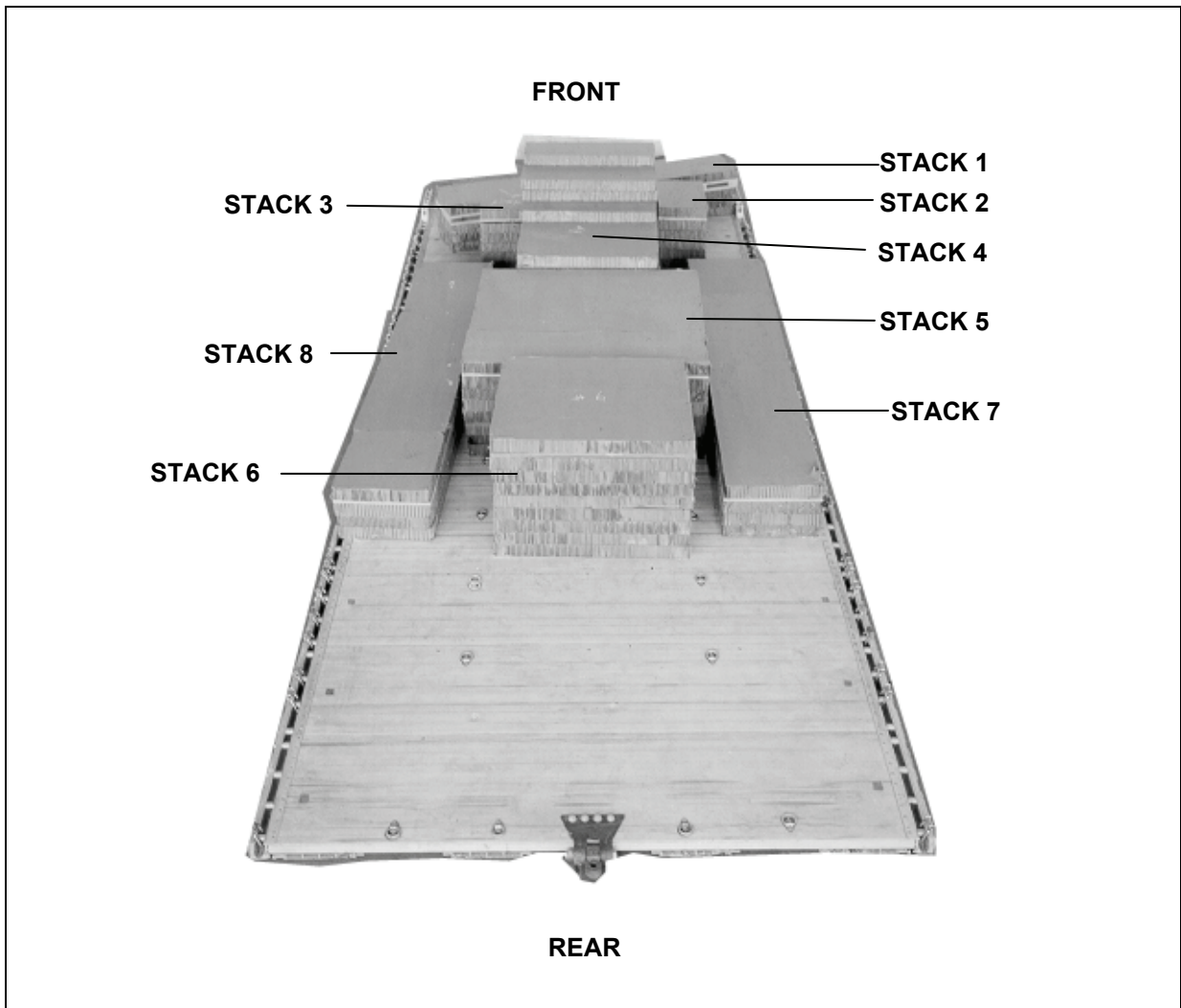


Figure 2-13. Rear View of the Honeycomb Stacks Positioned on the Platform

## PREPARING TRACTOR-DOZER

2-4. Personnel of the owning unit and rigging unit personnel will prepare the tractor-dozer as described below.

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*Note.* All of the preparations listed below may or may not apply to the tractor-dozer you are rigging. Use only the information that applies to your tractor-dozer. Use the appropriate chapter of this FM for the tractor-dozer you are preparing.

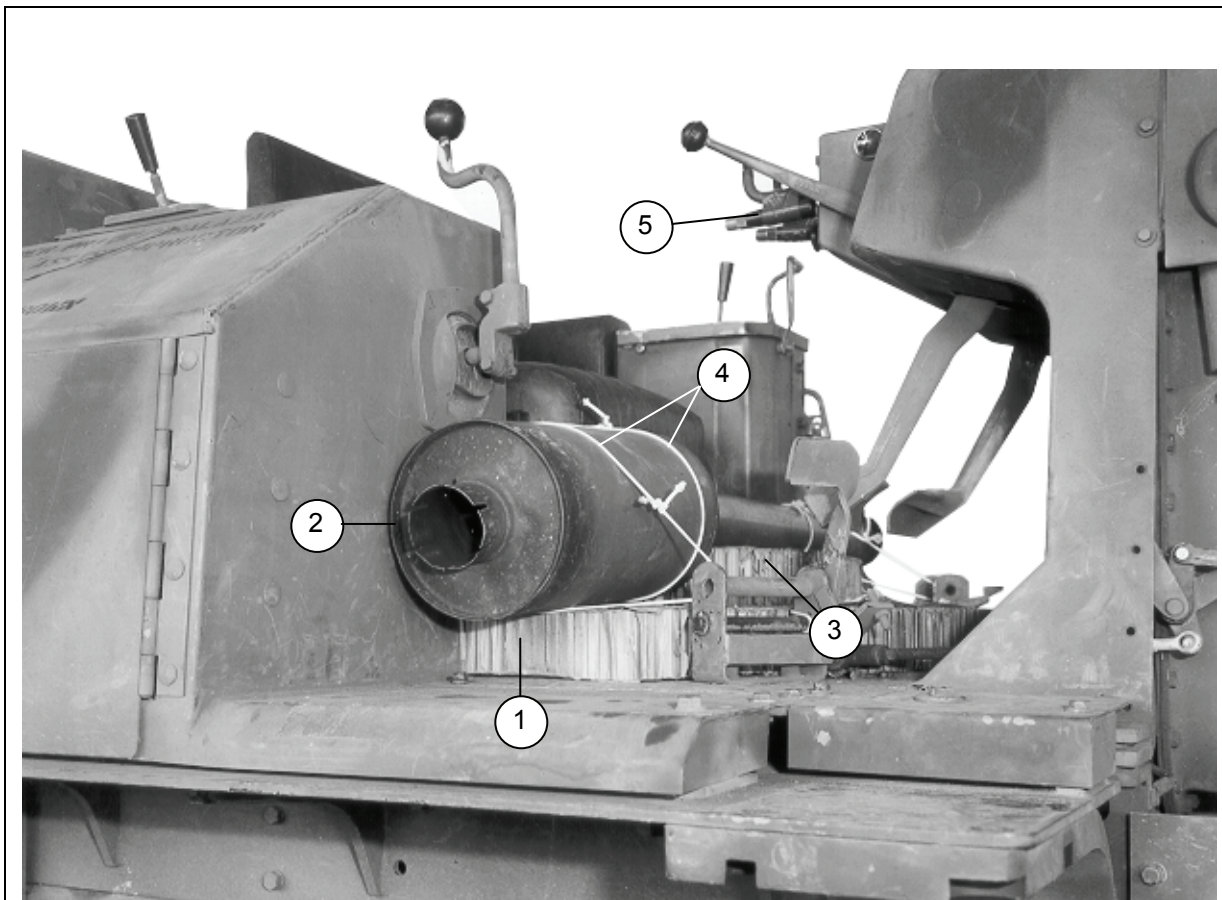
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- **Preparation at Unit.** The following checks and modifications **MUST** be done by the operator or by qualified maintenance personnel.
  - Check the batteries before turning the tractor-dozer over to the rigging unit. Cover all wet cell batteries in service with plastic or nonflammable material.
  - Check the fuel level before the tractor-dozer is turned over to the rigging unit. Make sure the fuel tank is not more than 3/4 full or not less than 1/2 full.
  - Remove the ROPS and the ROPS mounting brackets attached to the tractor-dozer. Remove the nose wheel and bracket and the pivot bracket before the tractor-dozer is delivered to the rigging site.
- **Preparation at Rigging Site.** The following preparations are made at the rigging site.
  - Check the fuel level. Make sure the fuel tank is not more than 3/4 full or not less than 1/2 full.
  - Pad the front ROPS mounting brackets with 1/2-inch felt, and tape the felt in place.
  - Prepare the tractor-dozer as shown in Figure 2-14.

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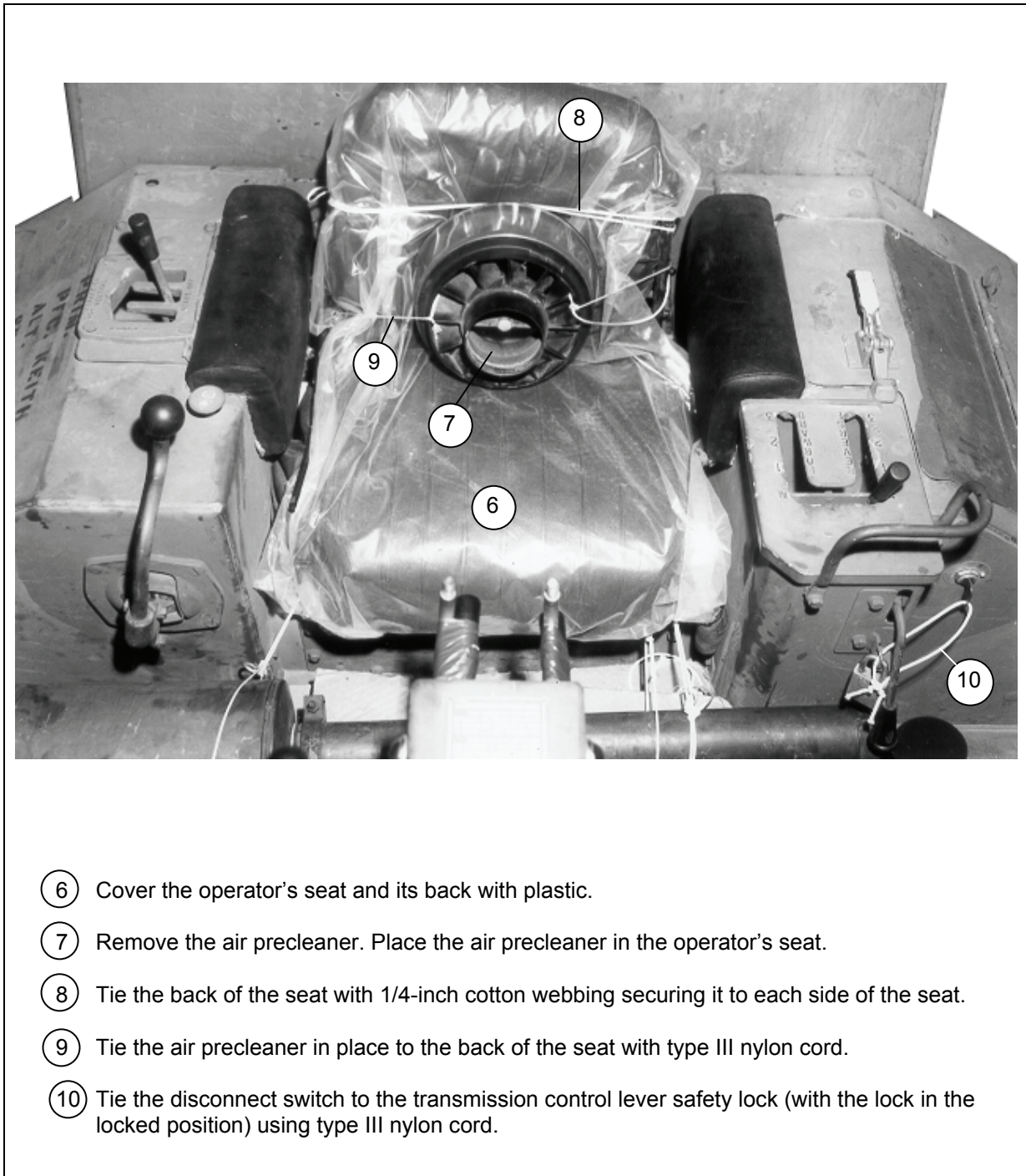
*Note.* A qualified tractor-dozer operator must be available at the rigging site when the tractor-dozer is rigged.

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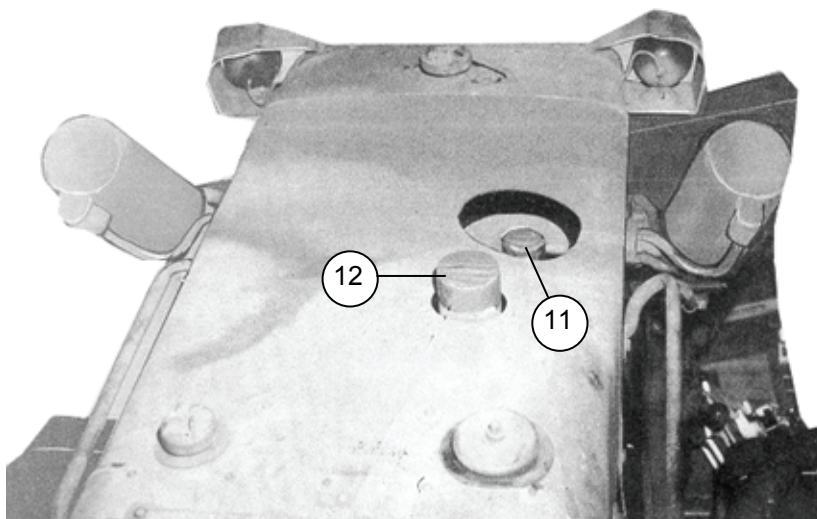
- ① Place a 16- by 36-inch piece of honeycomb on the floor of the operator's platform.
- ② Remove the exhaust stack, and place it on top of the 16- by 36-inch piece of honeycomb.
- ③ Place an 8- by 16-inch piece of honeycomb under the exhaust pipe.
- ④ Tie the exhaust stack, exhaust pipe, and honeycomb to the floor of the operator's platform with several turns of type III nylon cord.
- ⑤ Remove the control rod handles from the control rods. Tape the control rod handles to the control rods.

**Figure 2-14. Tractor-Dozer Prepared**



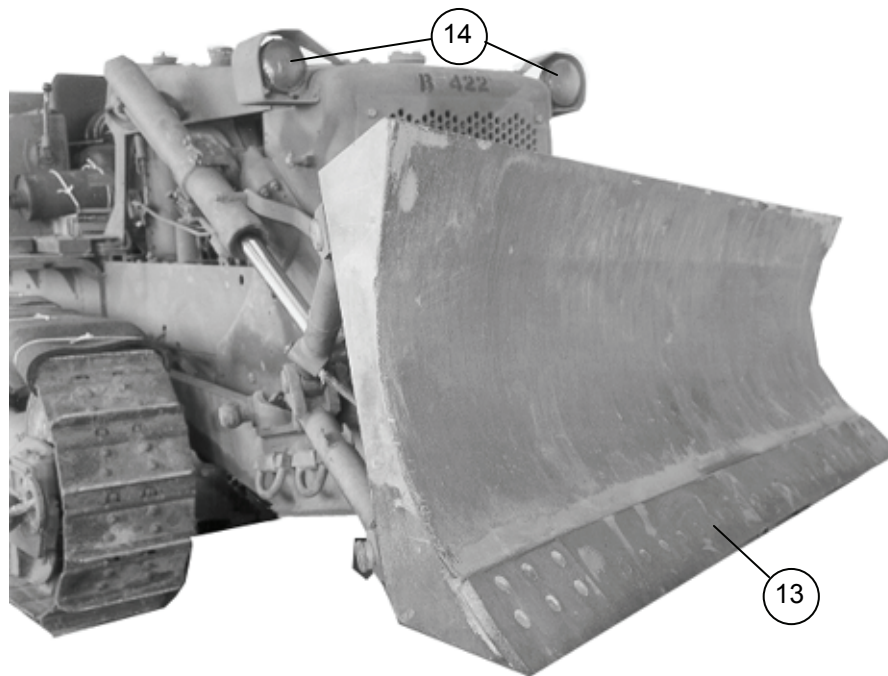
**Figure 2-14. Tractor-Dozer Prepared (Continued)**





11 Cover the exhaust stack opening with tape.

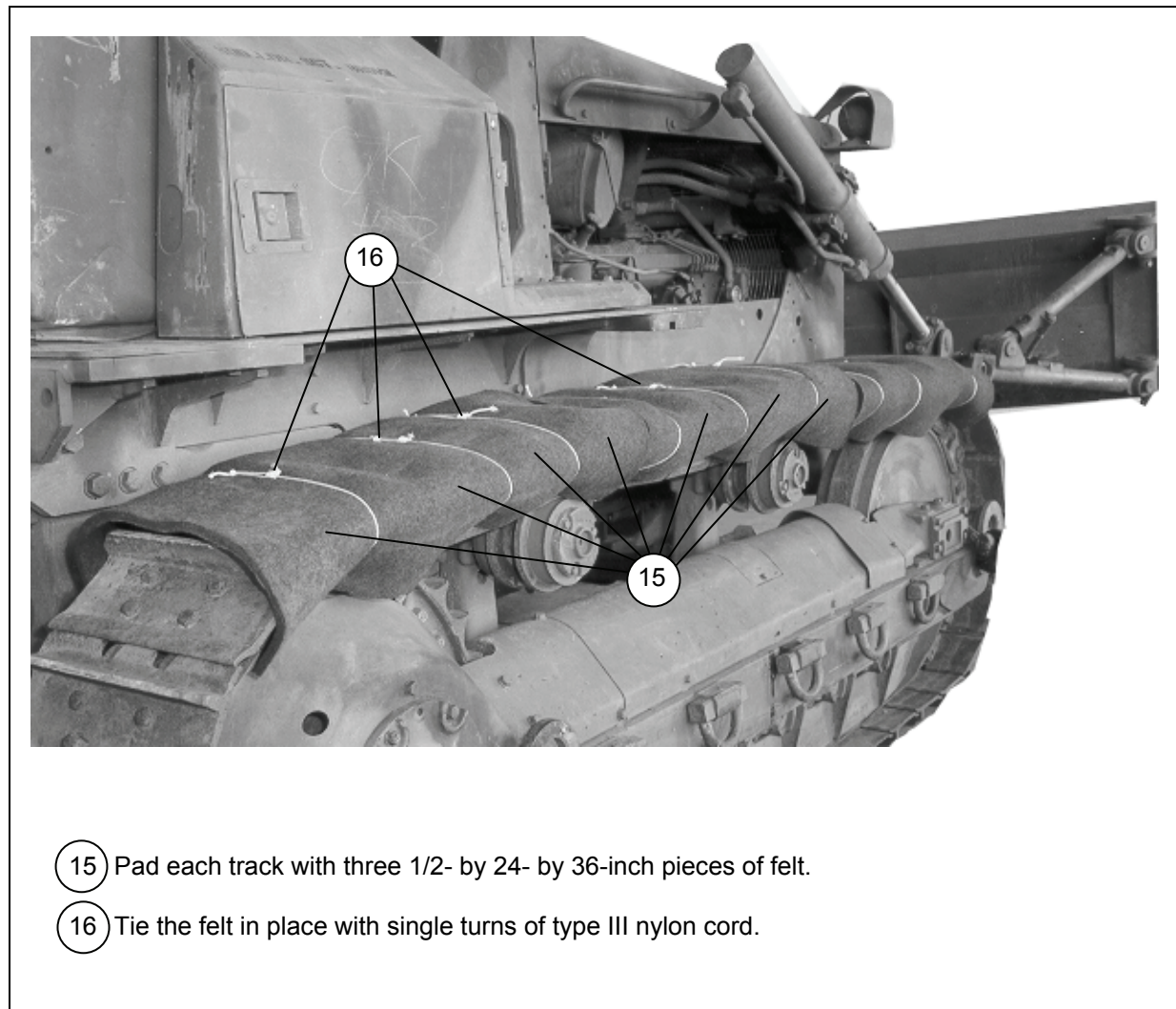
12 Cover the air pre-cleaner opening with tape.



13 Raise the blade 20 inches from the ground. Angle the blade to the left as far as it will go.

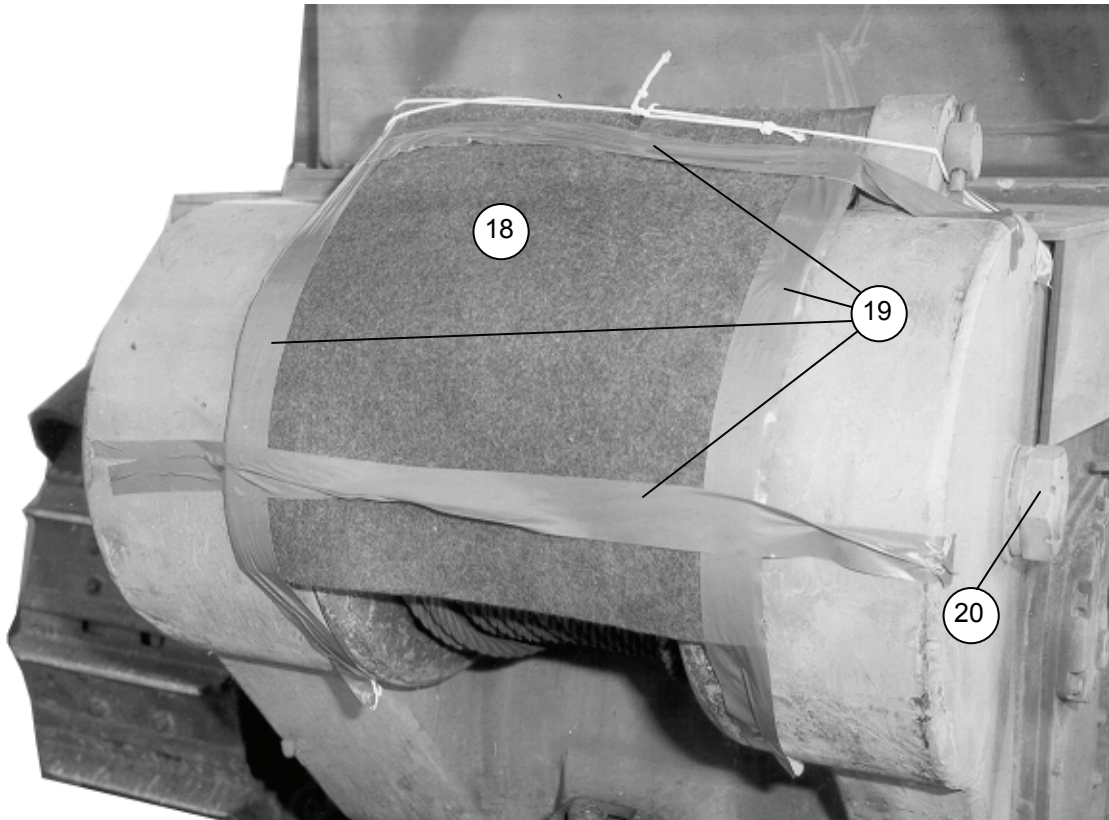
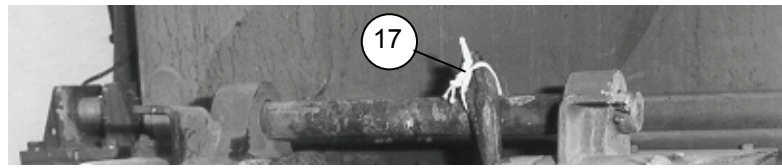
14 Cover the headlights with tape.

Figure 2-14. Tractor-Dozer Prepared (Continued)



**Figure 2-14. Tractor-Dozer Prepared (Continued)**





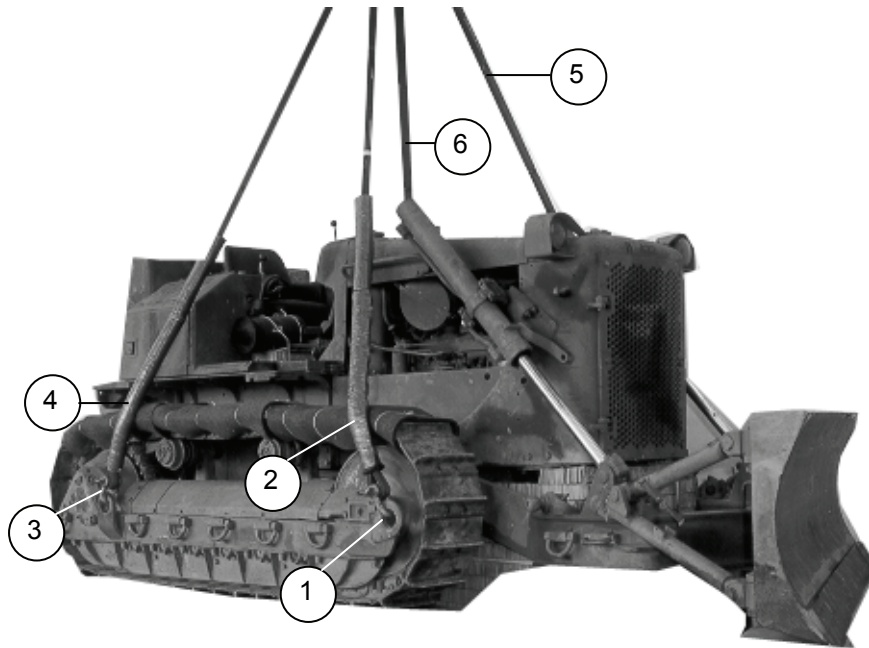
- 17 Secure the end of the winch cable and hook under slight tension. Tie the hook in place with type III nylon cord.
- 18 Cover the winch cable with a 1/2- by 20- by 31-inch piece of felt.
- 19 Tape the felt in place with cloth-backed adhesive tape.
- 20 Pad the nuts on each side of the winch with 1/2-inch felt. Tape the felt in place (not shown).

Figure 2-14. Tractor-Dozer Prepared (Continued)

## INSTALLING SUSPENSION SLINGS

2-5. Install four 12-foot (4-loop), type XXVI nylon webbing slings for suspension slings as outlined in Figure 2-15.

**Note.** Attach a large screw-pin clevis to each lifting point for suspension purposes.



- 1 Install a sling on the right front lifting point with a large screw-pin clevis and spacer.
- 2 Pad the sling with a 1/2- by 12- by 36-inch piece of felt. Adjust the felt on the sling as necessary to make sure the sling does not touch the track. Tape the felt in place.
- 3 Install a sling on the right rear lifting point with a large screw-pin clevis and spacer.
- 4 Pad the sling with a 1/2- by 12- by 36-inch piece of felt. Adjust the felt on the sling as necessary to make sure the sling does not touch the track. Tape the felt in place.
- 5 Install a sling on the left front lifting point adapting the procedures as described in steps 1 and 2 above.
- 6 Install a sling on the left rear lifting point adapting the procedures as described in steps 3 and 4 above.

**Figure 2-15. Suspension Slings Installed**

## LIFTING AND POSITIONING DOZER

2-6. Lift the dozer using the slings and position it on the honeycomb stacks as shown in Figure 2-16.

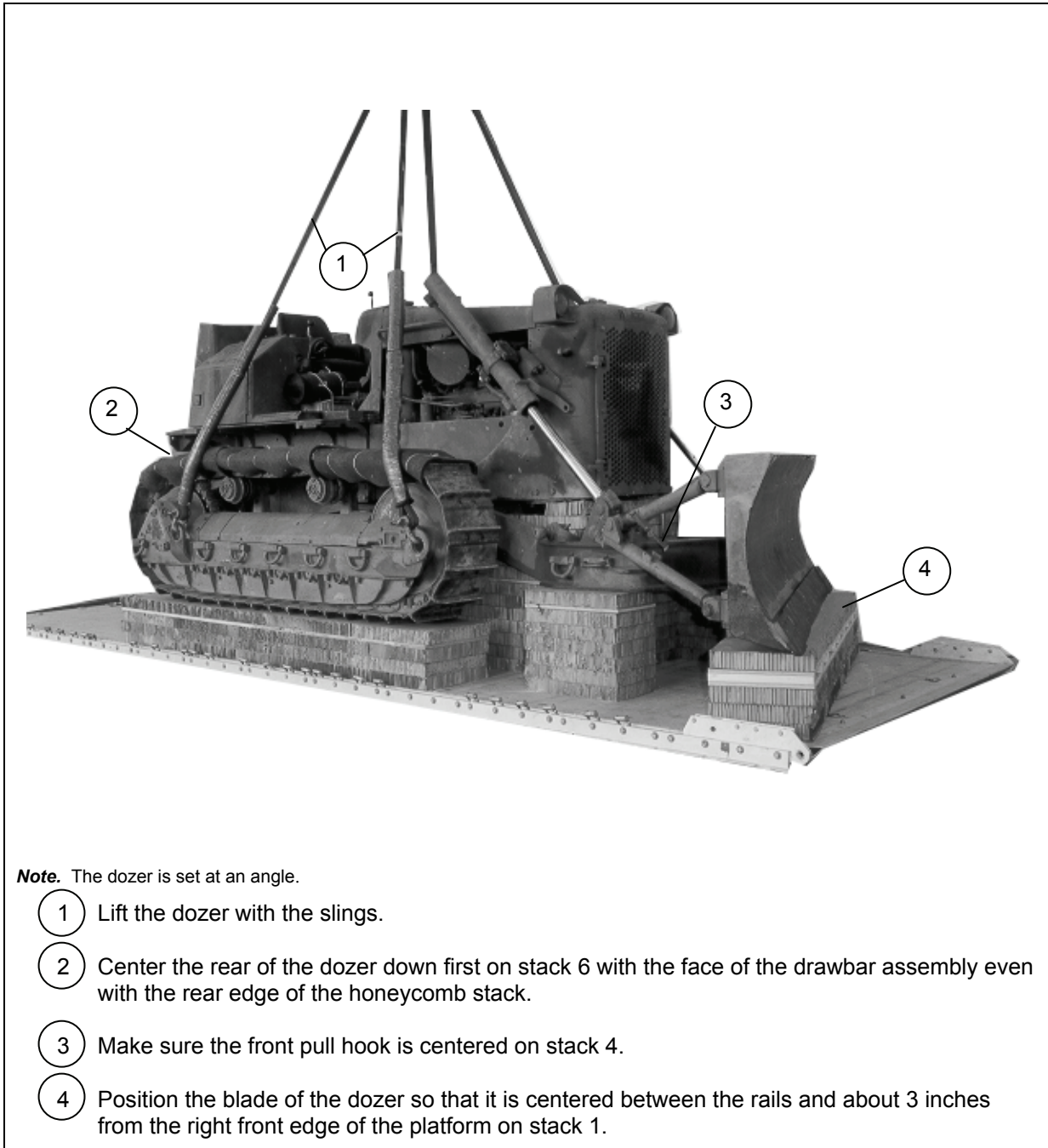
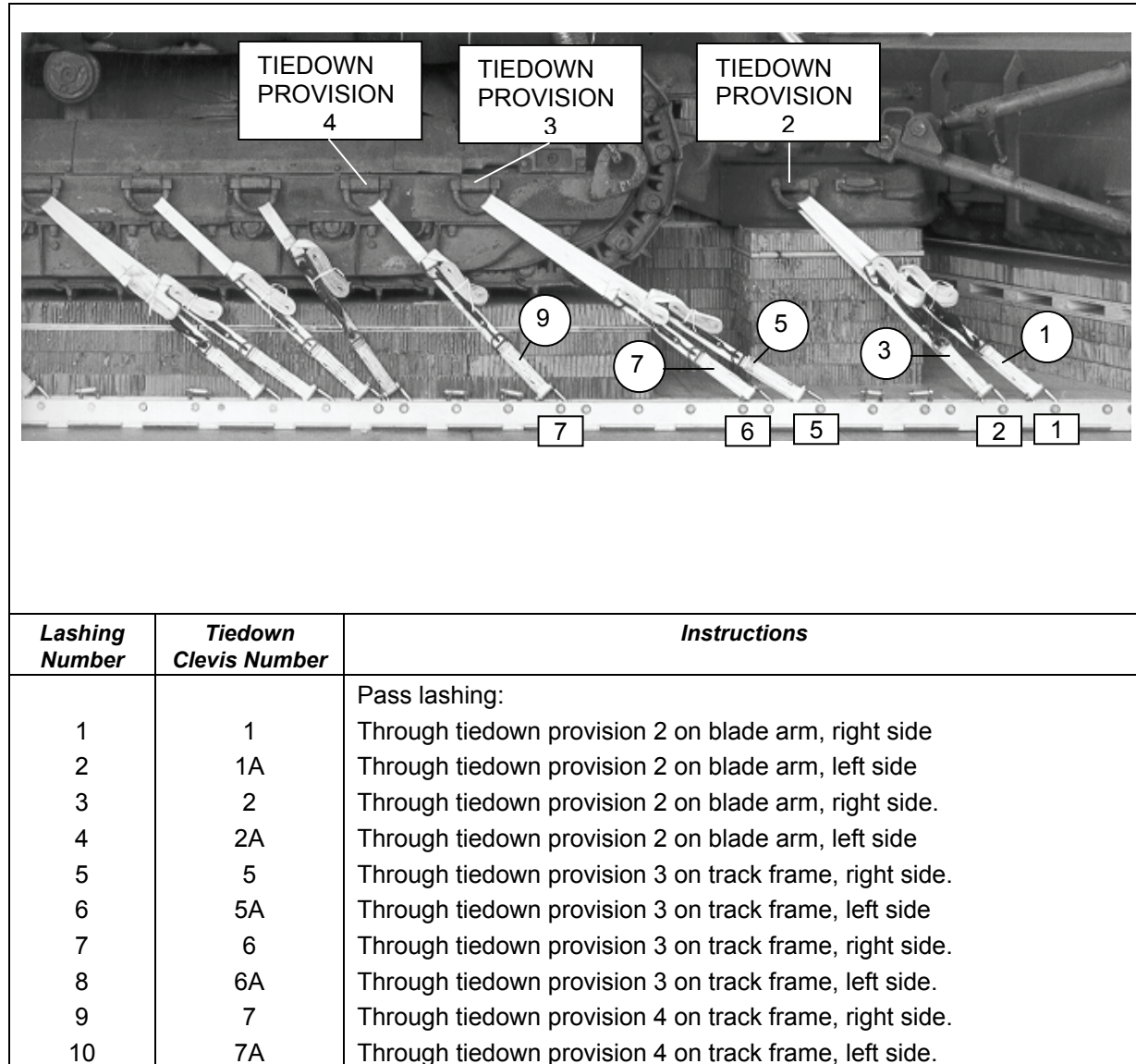


Figure 2-16. Dozer Positioned

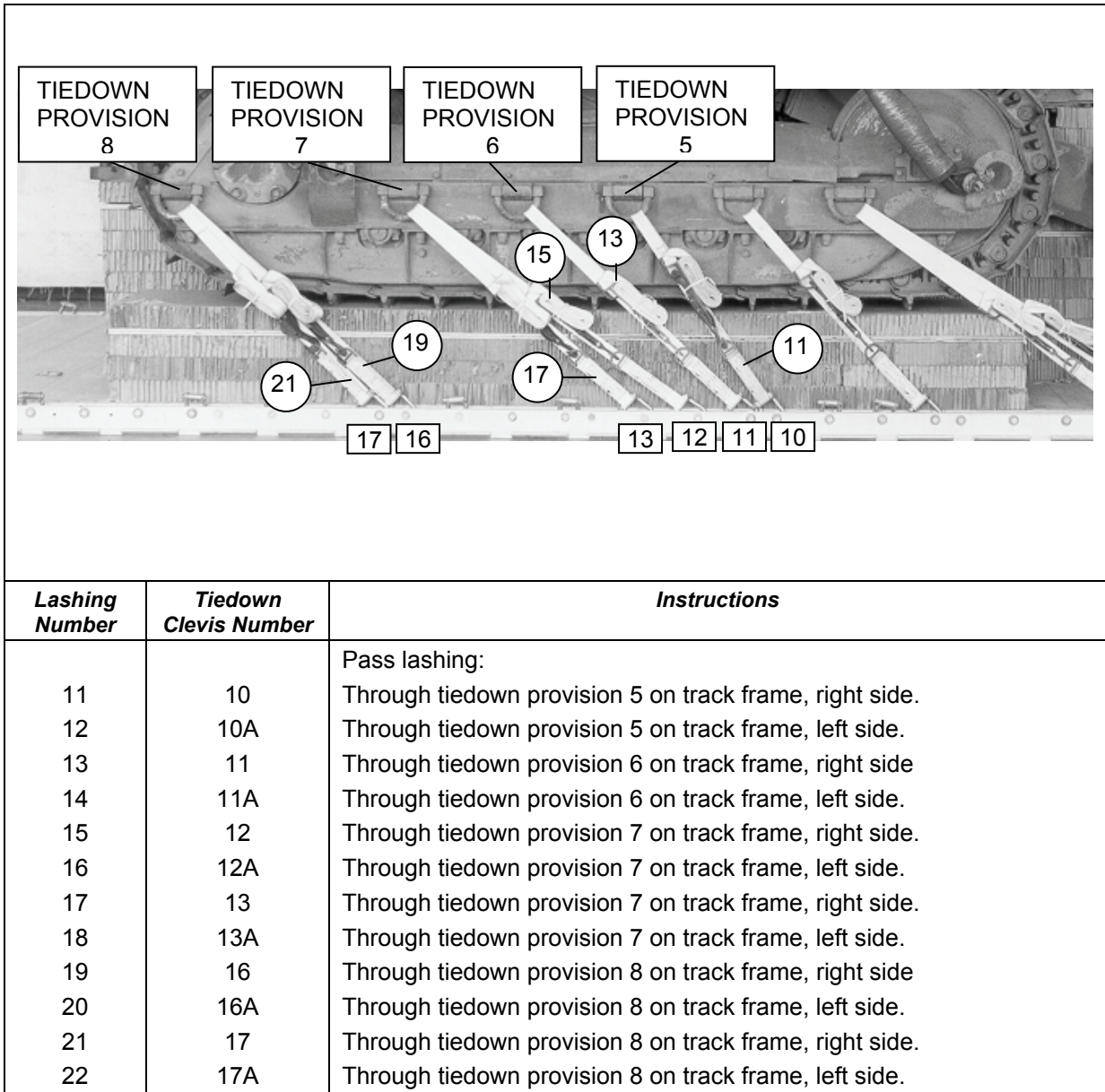
## LASHING DOZER

2-7. Lash the dozer to the platform with fifty-two 15-foot tiedown assemblies according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figures 2-17 through 2-21.

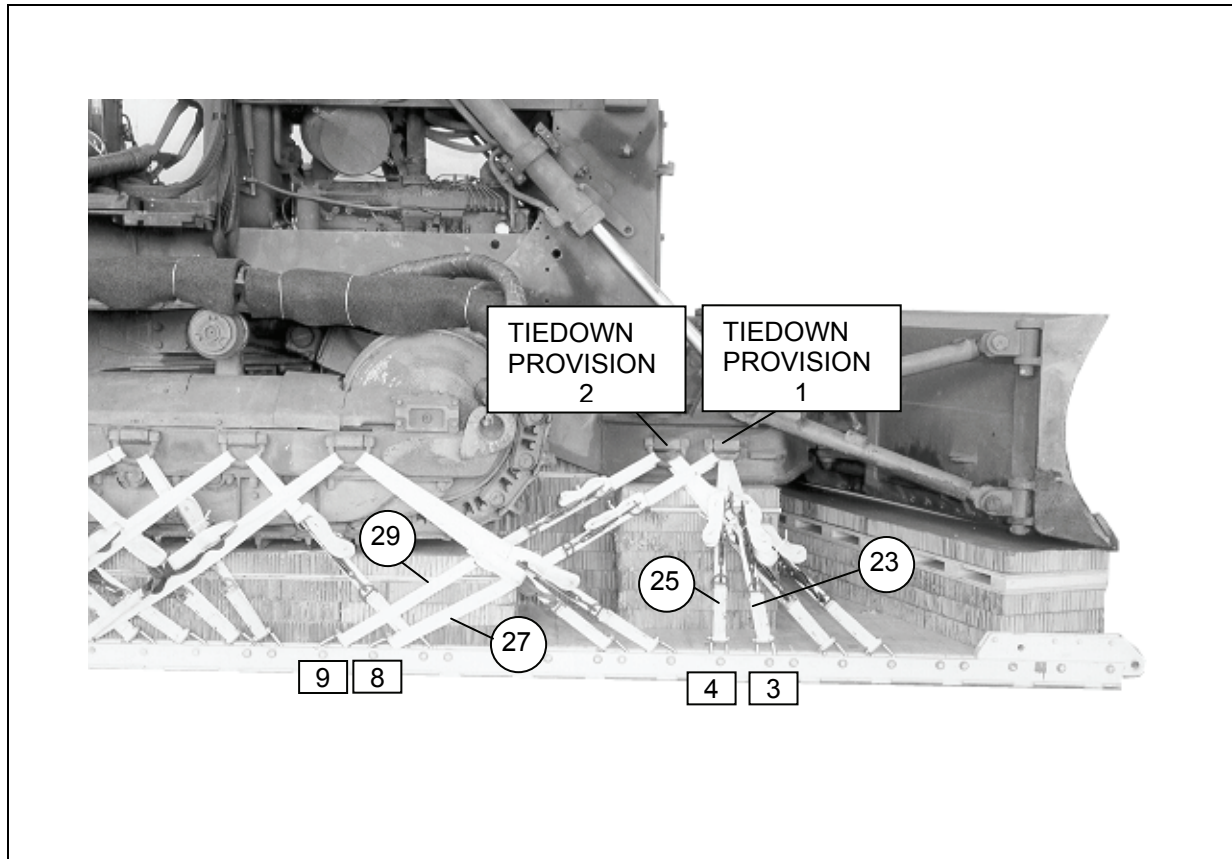


**Figure 2-17. Lashings 1 through 10 Installed**



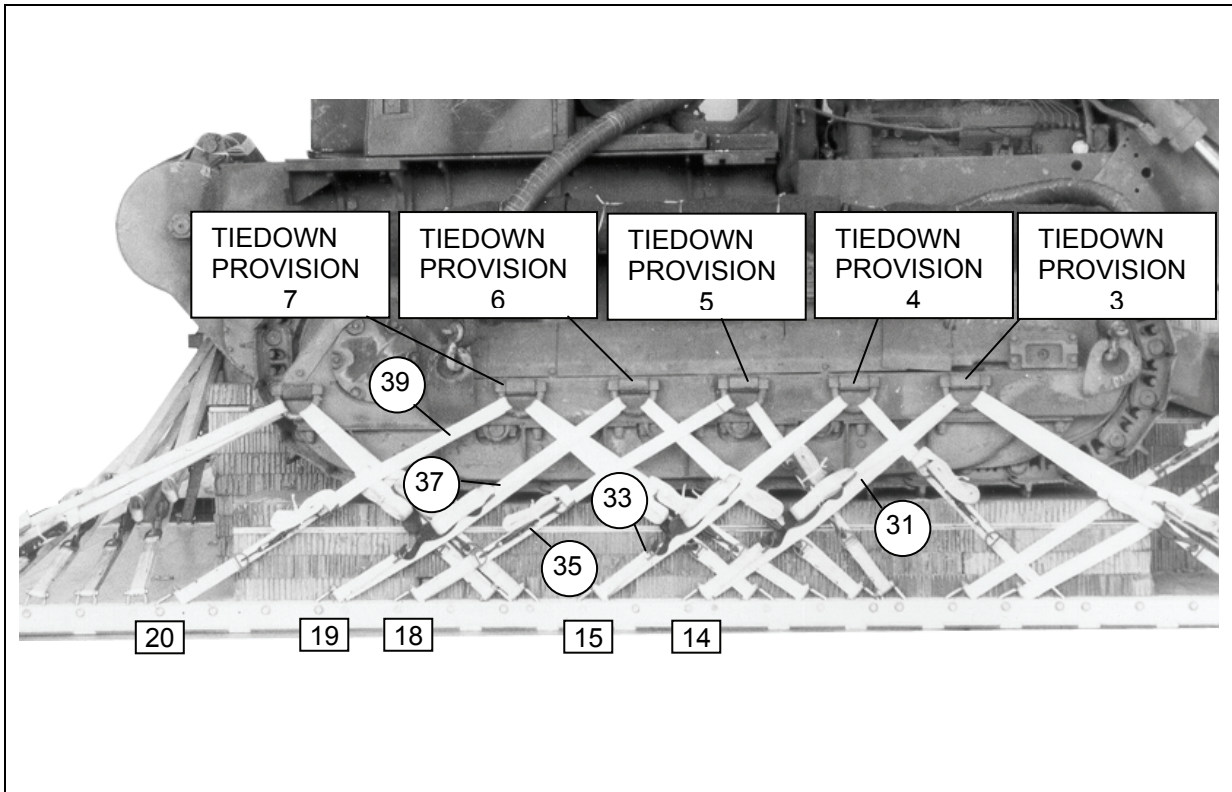


**Figure 2-18. Lashings 11 through 22 Installed**



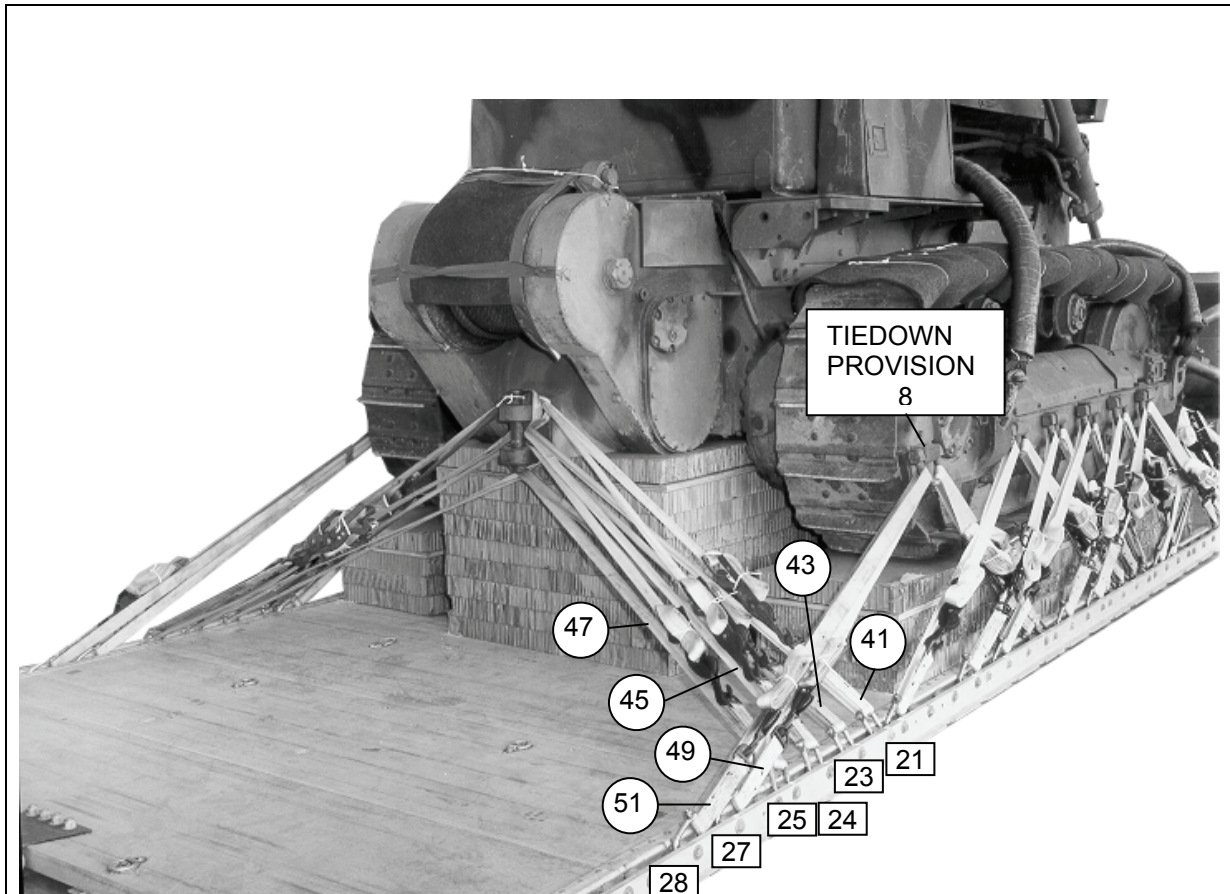
<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
23	3	Pass lashing: Through tiedown provision 1 on blade arm, right side.
24	3A	Through tiedown provision 1 on blade arm, left side.
25	4	Through tiedown provision 1 on blade arm, right side.
26	4A	Through tiedown provision 1 on blade arm, left side.
27	8	Through tiedown provision 1 on blade arm, right side.
28	8A	Through tiedown provision 1 on blade arm, left side.
29	9	Through tiedown provision 2 on blade arm, right side.
30	9A	Through tiedown provision 2 on blade arm, left side.

**Figure 2-19. Lashings 23 through 30 Installed**



<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
31	14	Pass lashing: Through tiedown provision 3 on track frame, right side.
32	14A	Through tiedown provision 3 on track frame, left side.
33	15	Through tiedown provision 4 on track frame, right side.
34	15A	Through tiedown provision 4 on track frame, left side.
35	18	Through tiedown provision 5 on track frame, right side.
36	18A	Through tiedown provision 5 on track frame, left side.
37	19	Through tiedown provision 6 on track frame, right side.
38	19A	Through tiedown provision 6 on track frame, left side.
39	20	Through tiedown provision 7 on track frame, right side.
40	20A	Through tiedown provision 7 on track frame, left side.

**Figure 2-20. Lashings 31 through 40 Installed**



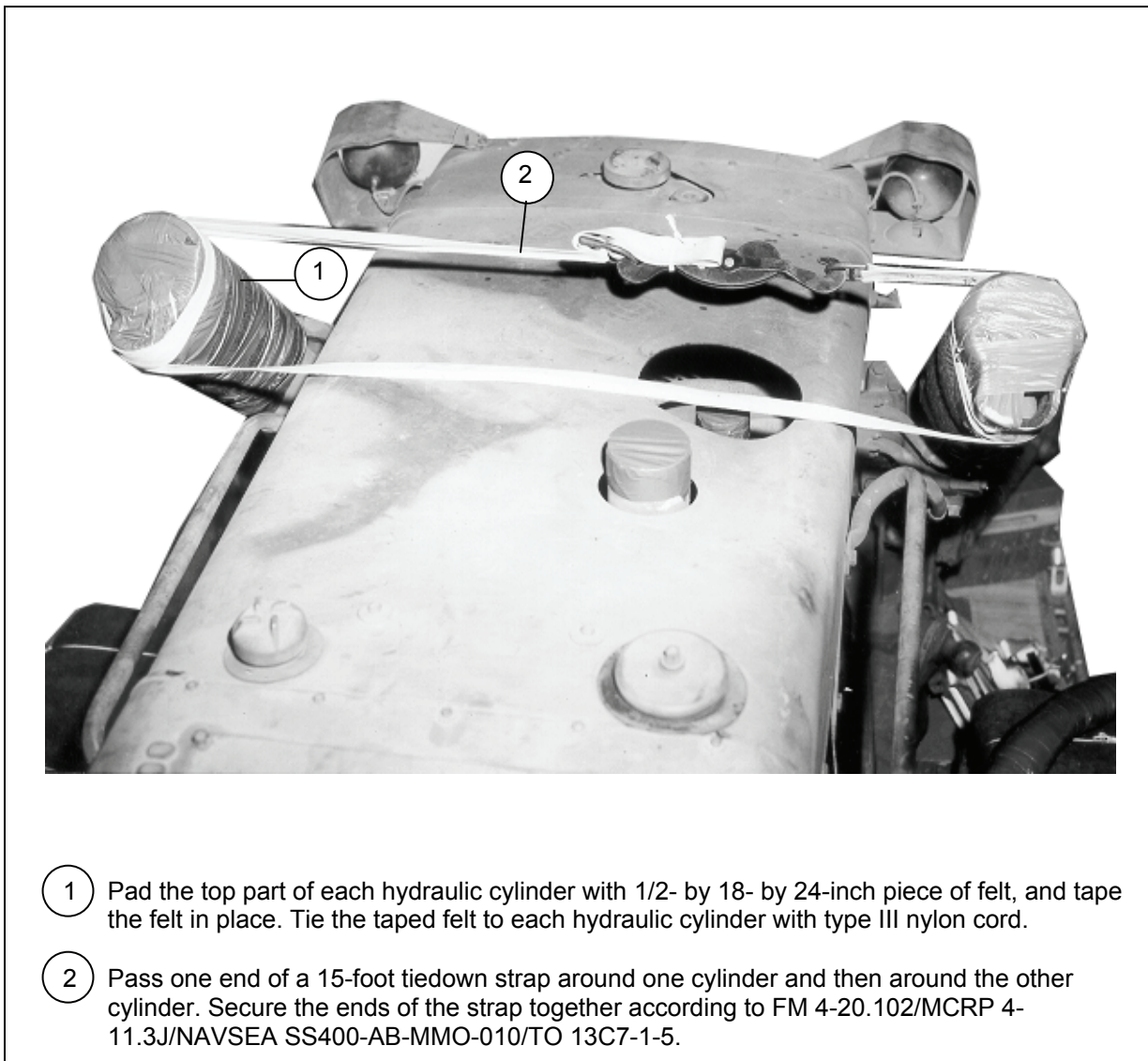
<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
41	21	Pass lashing: Around top lug of drawbar bracket.
42	21A	Around top lug of drawbar bracket.
43	23	Around bottom lug of drawbar bracket.
44	23A	Around bottom lug of drawbar bracket.
45	24	Around top lug of drawbar bracket.
46	24A	Around top lug of drawbar bracket.
47	25	Around bottom lug of drawbar bracket.
48	25A	Around bottom lug of drawbar bracket.
49	27	Through tiedown provision 8 on track frame, right side.
50	27A	Through tiedown provision 8 on track frame, left side.
51	28	Through tiedown provision 8 on track frame, right side.
52	28A	Through tiedown provision 8 on track frame, left side.

**Figure 2-21. Lashings 41 through 52 Installed**



## PADDING AND SECURING HYDRAULIC CYLINDERS

2-8. Pad and secure the hydraulic cylinders as shown in Figure 2-22.



**Figure 2-22. Hydraulic Cylinders Padded and Secured**

## INSTALLING LOAD COVER

2-9. Install the load cover as shown in Figure 2-23.

## INSTALLING DEADMAN'S TIE

### NOTICE OF EXCEPTION

The procedures in this paragraph are different from those in FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5. The deadman's tie is installed even with the top of the load. An exception to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 is granted.

2-10. Install the deadman's tie as shown in Figure 2-23.

## SAFETY TIEING SUSPENSION SLINGS

2-11. Install a safety tie on the suspension slings as shown in Figure 2-23.

## SAFETY TIEING LOAD SPREADER

2-12. Install a safety tie on the load spreader in honeycomb stack 1 as shown in Figure 2-23.

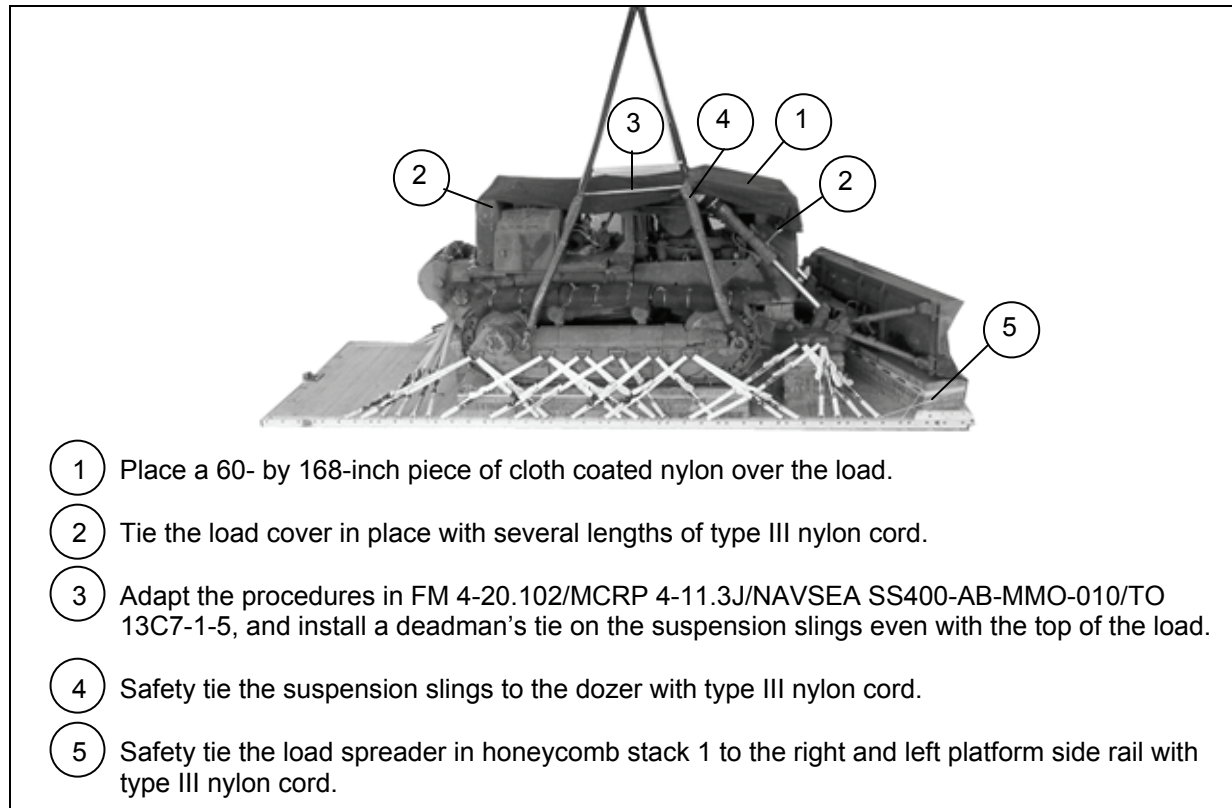


Figure 2-23. Load Cover, Deadman's Tie, and Safety Ties Installed

## STOWING CARGO PARACHUTES

2-13. Build a parachute stowage platform, and stow the cargo parachutes as described below.

- **Building Stowage Platform.** Build the stowage platform using the dimensions in Figure 2-24.

**Notes.** 1. All measurements are given in inches.

2. This drawing is not drawn to scale.

3. Platform is constructed by using one piece of  $\frac{3}{4}$ - by 48- by 96-inch plywood, two pieces of 2- by 6- by 37-inch lumber, and two pieces of 2- by 6- by 96-inch lumber.

4. Use eightpenny nails to nail the plywood to the lumber.

5. Drill six 2-inch diameter holes.

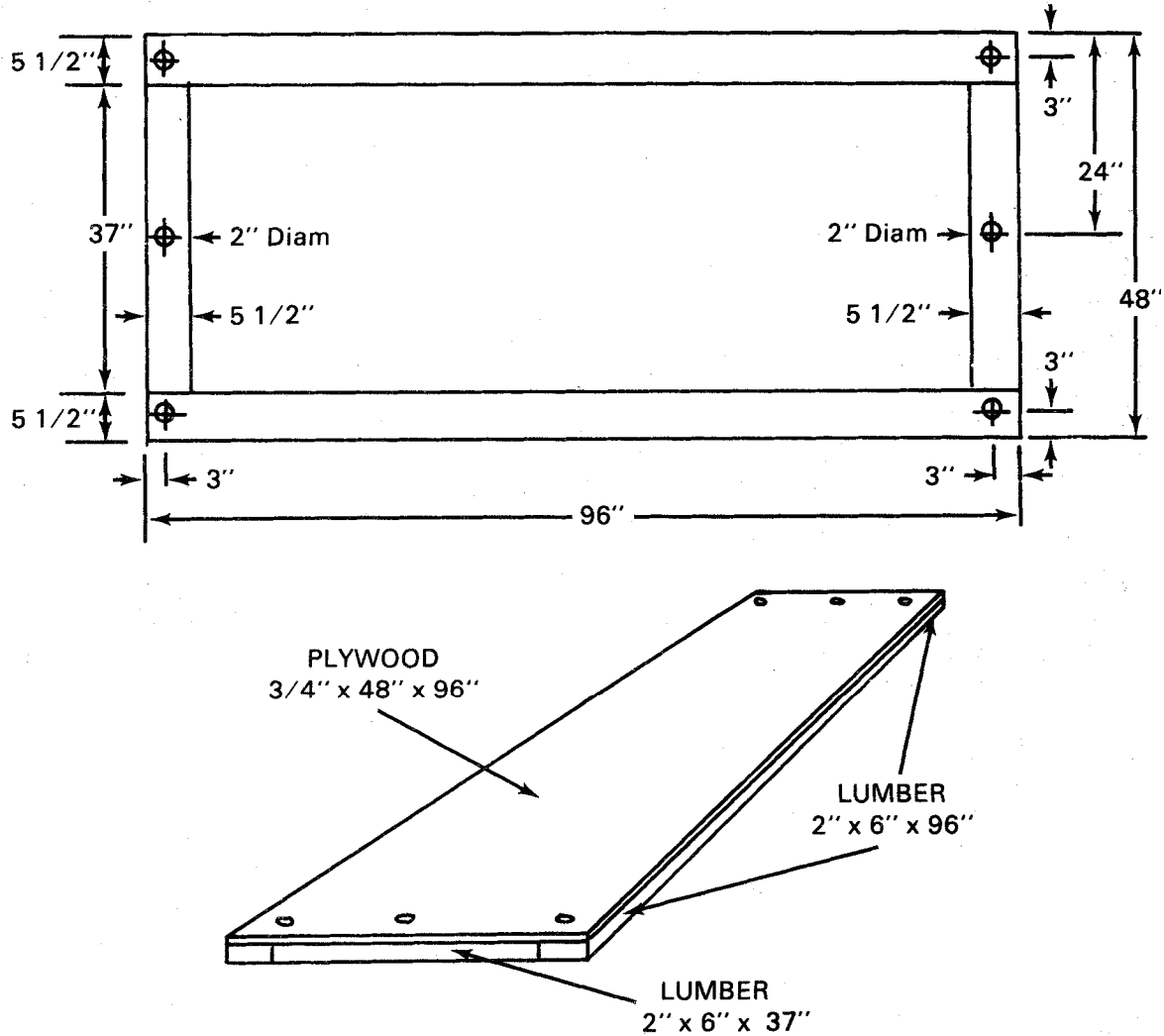
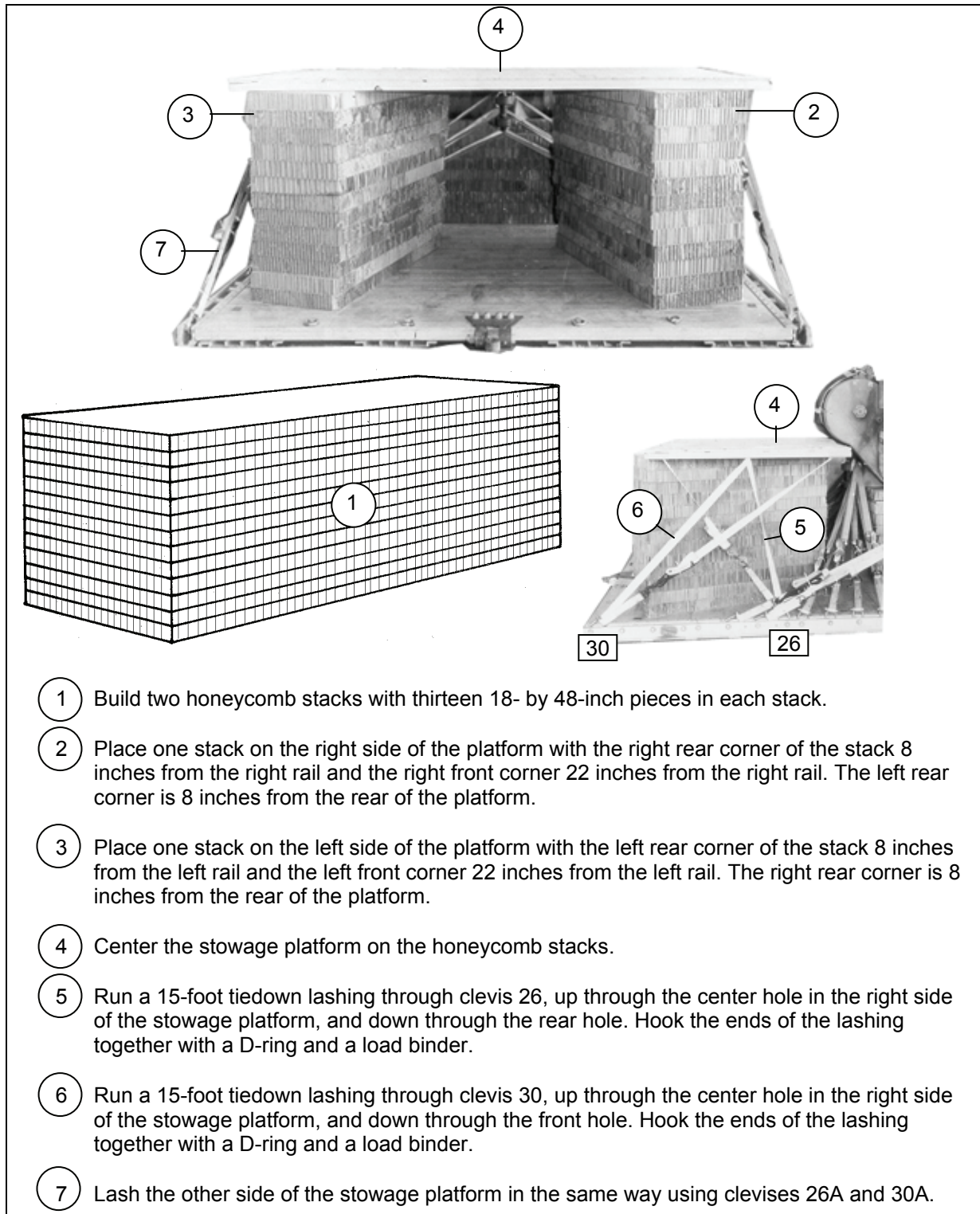


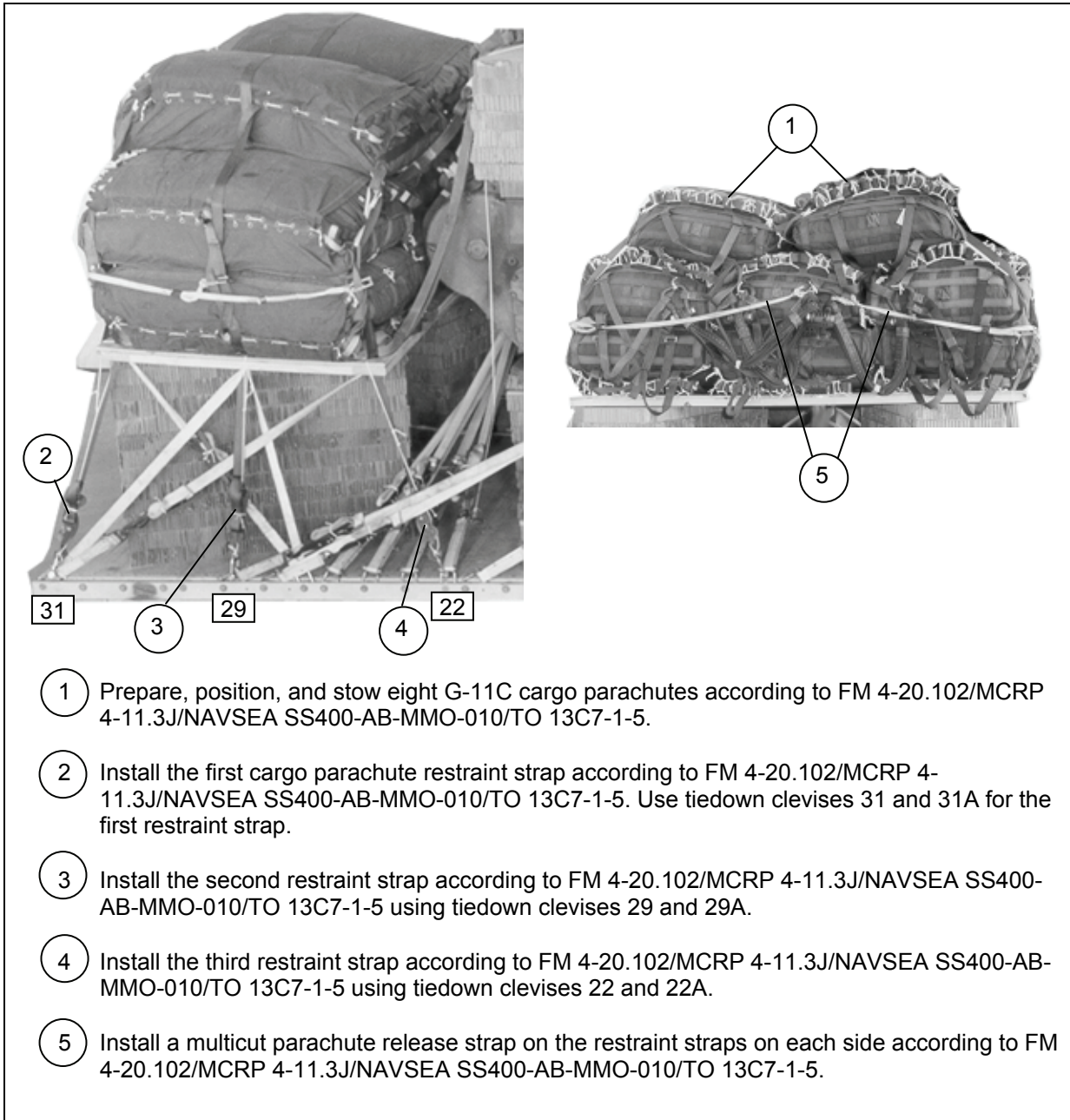
Figure 2-24. Construction Details for Parachute Stowage Platform

- **Securing Stowage Platform.** Position and secure the stowage platform as shown in Figure 2-25.



**Figure 2-25. Stowage Platform Positioned and Secured**

- **Stowing Parachutes.** Stow the parachutes as shown in Figure 2-26.

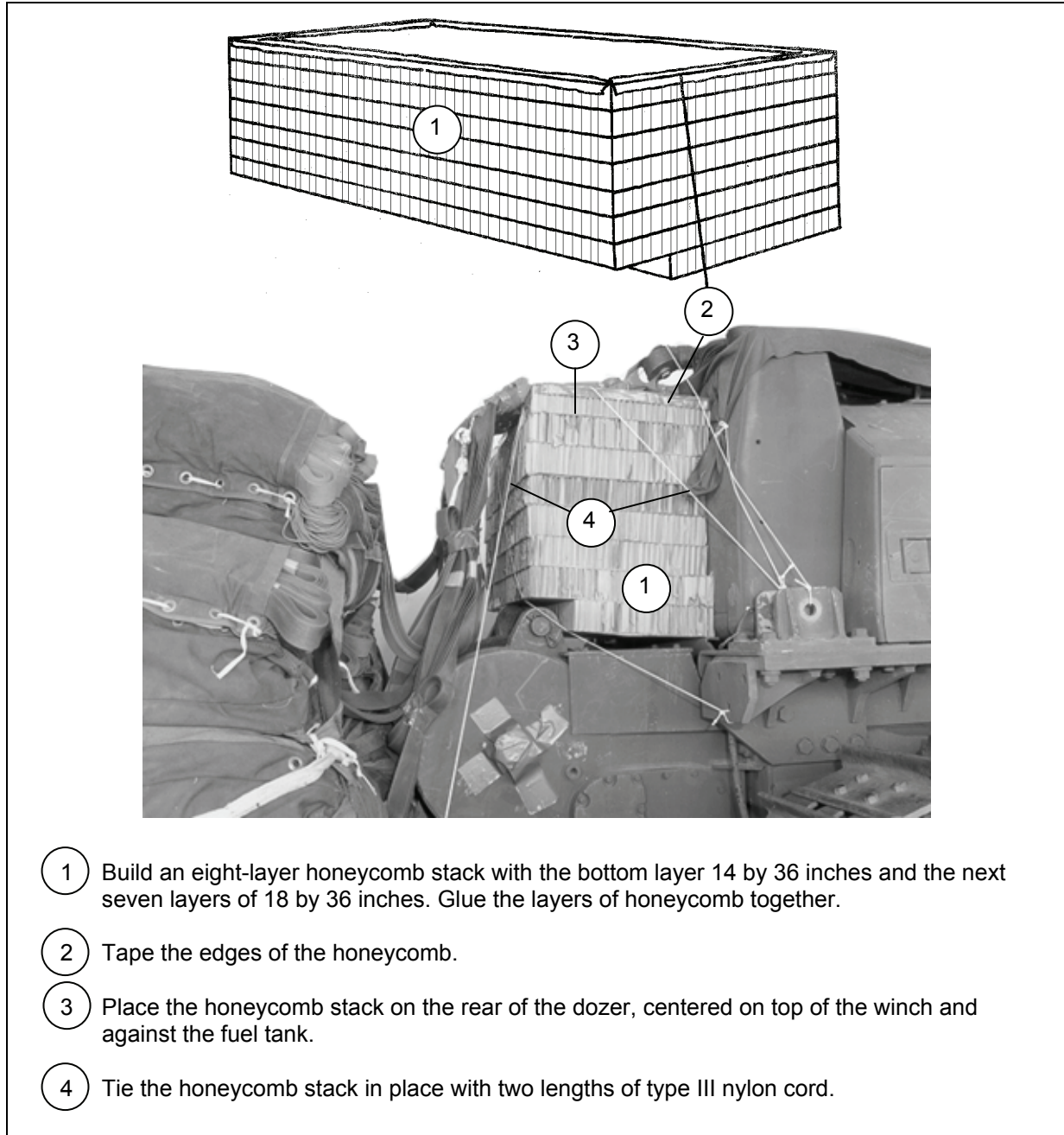


**Figure 2-26. Parachute Stowage Platform Positioned, Secured, and Stowed**

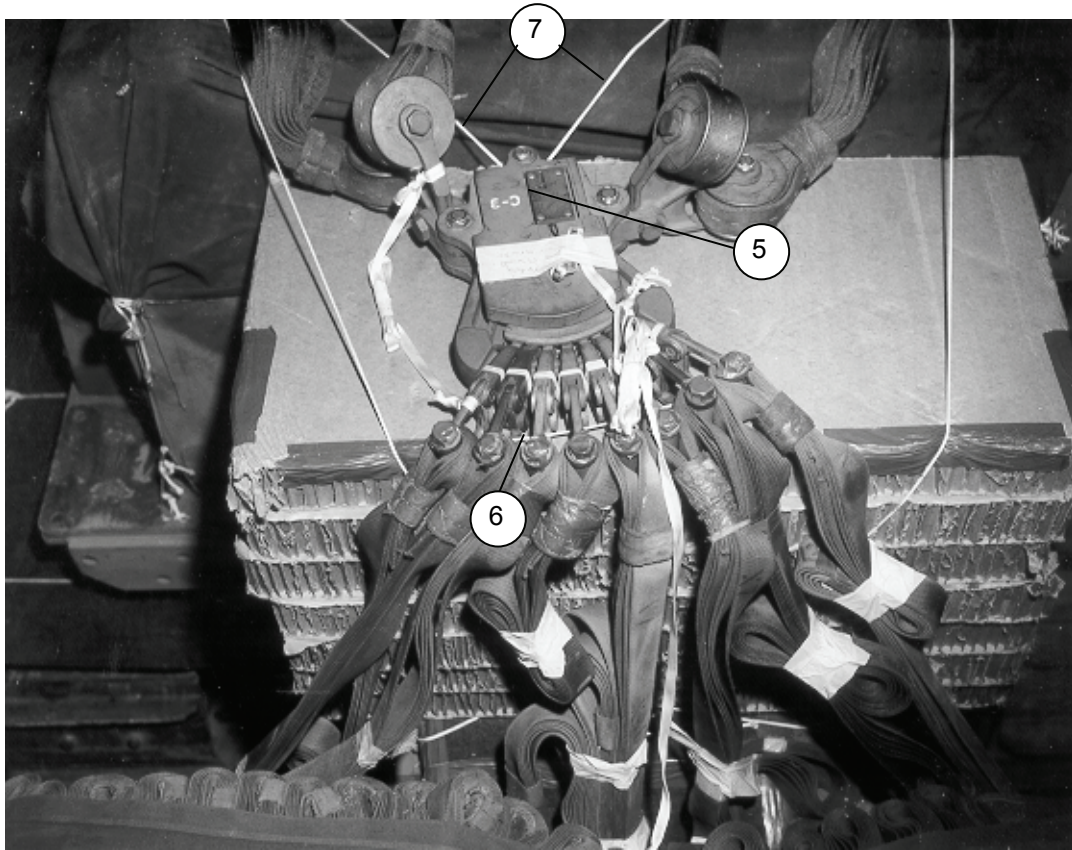


## INSTALLING THE RELEASE SYSTEM

2-14. Prepare the M-2 cargo parachute release assembly according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5. Install the release assembly as shown in Figure 2-27.



**Figure 2-27. M-2 Cargo Parachute Release Assembly Installed**



- 5 Place the M-2 cargo parachute release assembly on top of the honeycomb stack and install it according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.
- 6 Safety tie the top of the release assembly according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.
- 7 Safety tie the bottom of the release assembly according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.

**Figure 2-27. M-2 Cargo Parachute Release Assembly Installed (Continued)**

## INSTALLING THE EXTRACTION SYSTEM

2-15. Install the extraction force transfer coupling (EFTC) extraction system according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figure 2-28.

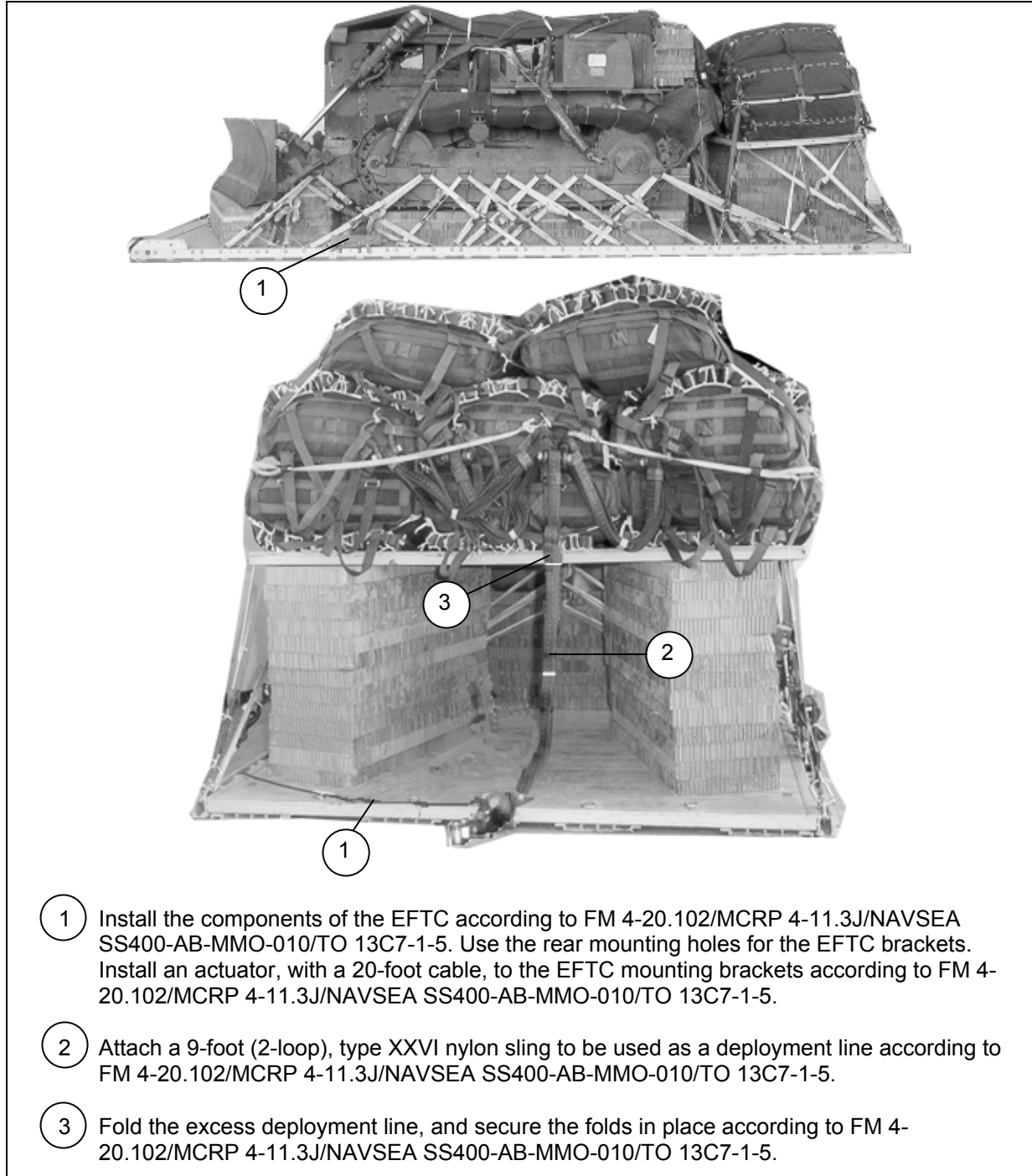


Figure 2-28. Extraction System Installed



## **INSTALLING PROVISIONS FOR EMERGENCY RESTRAINTS**

2-16. Install the provisions for emergency restraints on the load according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.

## **PLACING EXTRACTION PARACHUTE**

2-17. Select the extraction parachute and extraction line needed using the extraction line requirements table in FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5. Rig the extraction line in an extraction line bag according to TM 10-1670-286-20/TO 13C5-2-41. Place the extraction parachute and extraction line on the load for installation in the aircraft.

## **MARKING RIGGED LOAD**

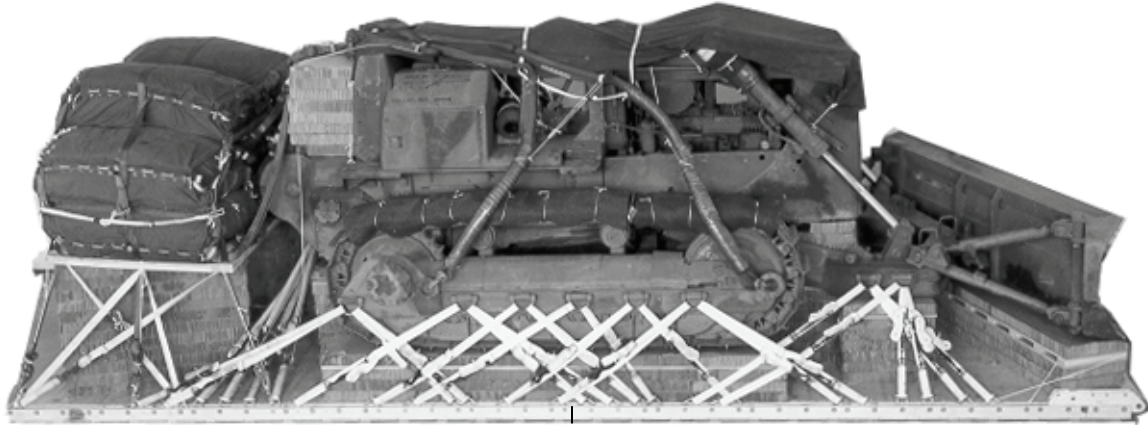
2-18. Mark the rigged load according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figure 2-29. Complete Shipper's Declaration for Dangerous Goods. If the load varies from the one shown, the weight, height, CB, and parachute requirements must be recomputed.

## **EQUIPMENT REQUIRED**

2-19. Use the equipment listed in Table 2-1 to rig this load.

**CAUTION**

Make the final rigger inspection required by AR 59-4 and FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 before the load leaves the rigging site.



C/B

**RIGGED LOAD DATA**

Weight: Load Shown.....	36,140 pounds
Maximum Allowed.....	37,100 pounds
Height.....	98 inches
Width.....	108 inches
Overall Length .....	288 inches
Overhang: Front.....	0
Rear.....	0
Center of Balance (CB) (from front edge of the platform).....	152 inches
Extraction System with 20-foot cable (adds 18 inches to the length of the load)	

**Figure 2-29. Type I, D-5B Tractor-Dozer Rigged for Low-Velocity Airdrop**

**Table 2-1. Equipment Required for Rigging the Type I, D-5B Tractor-Dozer for Low-Velocity Airdrop**

<i>National Stock Number</i>	<i>Item</i>	<i>Quantity</i>
8040-00-273-8713	Adhesive paste, 1-gal.	As required
4030-00-432-2516	Clevis, screw-pin, large	4
4030-00-090-5354	Clevis, suspension, 1-inch (large)	4
8305-00-880-8155	Cloth, coated (nylon, type II, 17.0 oz, green, 60-in)	As required
4020-00-240-2146	Cord, nylon, type III, 550-lb	As required
1670-00-434-5787	Coupling, airdrop extraction force transfer, w/20-ft. cable	1
1670-00-360-0328	Cover, clevis	8
8135-00-664-6958	Cushioning material (Cellulose wadding)	As required
8305-00-958-3685	Felt, 1/2-inch thick	As required
1670-01-183-2678	Leaf, extraction line (line bag) ( add 2 for C-17)	2
	Line extraction:	
1670-01-064-4454	60-foot (6-loop), type XXVI (for C-130)	1
1670-01-468-9178	140-foot (6-loop), type XXVI (for C-17)	1
1670-01-064-4452	60-foot (1-loop), type XXVI (for C-17), (drogue line)	1
1670-00-783-5988	Link assembly, type IV (C-17 only)	1
	Link assembly, two-point:	
5306-00-435-8994	Bolt, 1-inch diameter, 4-inches long	4
5310-00-232-5165	Nut, 1-inch	4
1670-00-003-1954	Plate, side, 5 1/2-inch	4
5365-00-007-3414	Spacer, large	4
1670-00-006-2752	Link, four-point	1
	Lumber:	
5510-00-220-6146	2- by 4- by 18-inch	9
5510-00-220-6148	2- by 6- by 96-inch	3
5315-00-753-3885	Nail, steel, common, 16D	As required
1670-00-753-3928	Pad, energy-dissipating (honeycomb)	28 sheets
1670-01-016-7841	Parachute, cargo, G-11C	8
	Parachute, cargo, extraction:	
1670-00-040-8135	28-foot	2
1670-01-063-3715	15-foot (C-17 only)	1
	Platform, airdrop, type V, 24-foot:	
1670-01-162-2372	Clevis assembly (type V)	68
1670-01-162-2376	Extraction bracket assembly	1
1670-01-162-2381	Tandem link assembly (Multipurpose link)	2
5530-00-128-4981	Plywood, 3/4-inch	5 sheets

**Table 2-1. Equipment Required for Rigging the Type I, D-5B Tractor-Dozer for Low-Velocity Airdrop (Continued)**

<i>National Stock Number</i>	<i>Item</i>	<i>Quantity</i>
1670-01-097-8817	Release, cargo parachute, M-2	1
	Sling, cargo, airdrop:	
1670-01-062-6306	3-foot (4-loop), type XXVI	5
1670-01-062-6304	9-foot (2-loop), type XXVI	1
1670-01-062-6307	12-foot (4-loop), type XXVI	4
5340-00-040-8219	Strap, parachute, release, multi-knife	2
7501-00-266-5016	Tape, adhesive, 2-inch	As required
1670-00-937-0271	Tiedown assembly, 15-foot	57
1670-01-483-8259	Towplate release mechanism (H-block) (C-17 only)	1
	Webbing:	
8305-00-268-2411	Cotton, 1/4-inch, type I	As required
8305-00-082-5752	Nylon, tubular, 1/2-inch	As required
8305-00-260-6890	Nylon, type X	As required
8305-00-268-2455	Nylon, tubular, 1-inch, OD 7	As required

## Chapter 3


# Rigging the John Deere 450G LT Tracked Commercial Bulldozer on a 16-Foot, Type V Platform for Low-Velocity Airdrop

## DESCRIPTION OF LOAD

3-1. The John Deere 450G Lt Full Tracked Commercial Bulldozer is rigged on a 16-foot, type V airdrop platform with four G-11 cargo parachutes. The unrigged dozer weighs 18,080 pounds reduced to 17,440 pounds with the rollover protection structure (ROPS) removed. It is 180 1/3 inches long. It is 97 inches wide and 108 inches high reducible to 77 inches with the ROPS removed and the back seat back lowered.

## PREPARING PLATFORM

3-2. Prepare a 16-foot, type V airdrop as shown in Figure 3-1.



**Step:**

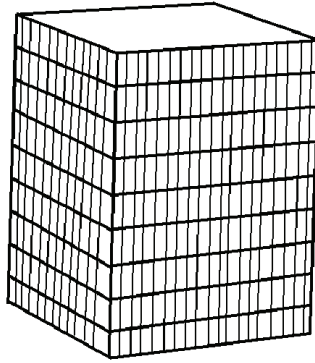
1. Inspect, or assemble and inspect, a 16-foot, type V airdrop platform as outlined in TM 10-1670-268-20&P/TO 13C7-52-22.
2. Install a tandem link to the front of each platform side rail using holes 1, 2, and 3.
3. Install a suspension link on bushings 6, 7, 8 for forward and 25, 26, and 27 for aft on each platform side rail.
4. Install a clevis on bushings 1, 2, and 3 on the tandem links.
5. Install a clevis on bushing 2 on the forward suspension links.
6. Install a clevis on bushing 3 on the aft suspension links.
7. Starting at the front of each platform side rail, install clevises on the bushings bolted on holes 5, 16, 17, 20, 21, 22, 23, 24, 29, and 32.
8. Starting at the front of the platform, number the clevises 1 through 15 on the right side and 1A through 15A on the left side.
9. Label the tiedown rings according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.

**Figure 3-1. Platform Prepared**

## BUILDING AND POSITIONING HONEYCOMB STACKS

3-3. Build the honeycomb stacks as shown in Figures 3-2 through 3-6. Position the stacks as shown in Figure 3-7.

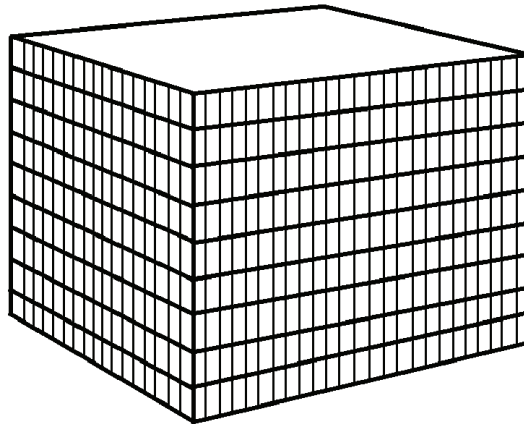
**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



<b>Stack Number</b>	<b>Pieces</b>	<b>Width (Inches)</b>	<b>Length (Inches)</b>	<b>Material</b>	<b>Instructions</b>
1	9	21	21	Honeycomb	Glue pieces together.

**Figure 3-2. Honeycomb Stack 1 Prepared**

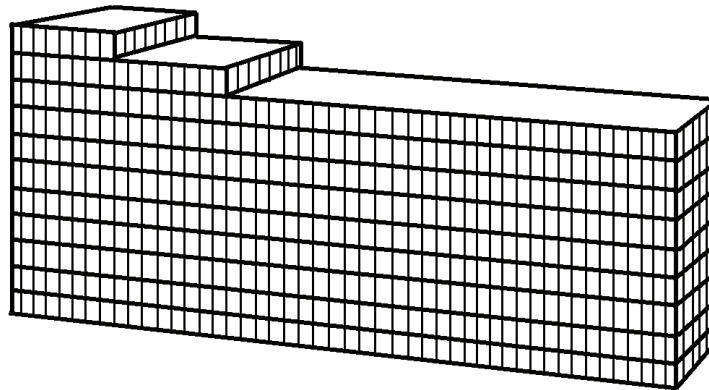
**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



<b>Stack Number</b>	<b>Pieces</b>	<b>Width (Inches)</b>	<b>Length (Inches)</b>	<b>Material</b>	<b>Instructions</b>
2	9	36	36	Honeycomb	Glue pieces together.

**Figure 3-3. Honeycomb Stack 2 Prepared**

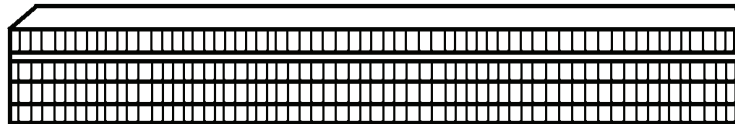
**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



<i>Stack Number</i>	<i>Pieces</i>	<i>Width (Inches)</i>	<i>Length (Inches)</i>	<i>Material</i>	<i>Instructions</i>
3	9	28	76	Honeycomb	Glue to form base.
	1	28	26	Honeycomb	Glue to base flush with rear edge.
	1	28	13	Honeycomb	Glue the 28-inch by 13-inch piece flush with the rear edge.

**Figure 3-4. Honeycomb Stack 3 Prepared**

**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.

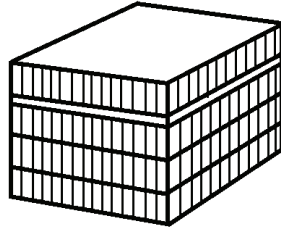


<i>Stack Number</i>	<i>Pieces</i>	<i>Width (Inches)</i>	<i>Length (Inches)</i>	<i>Material</i>	<i>Instructions</i>
4 and 5	3	18	96	Honeycomb	Glue to form base.
	1	18	96	3/4-inch plywood	Glue to base.
	1	18	96	Honeycomb	Glue to plywood.

**Figure 3-5. Honeycomb Stacks 4 and 5 Prepared**



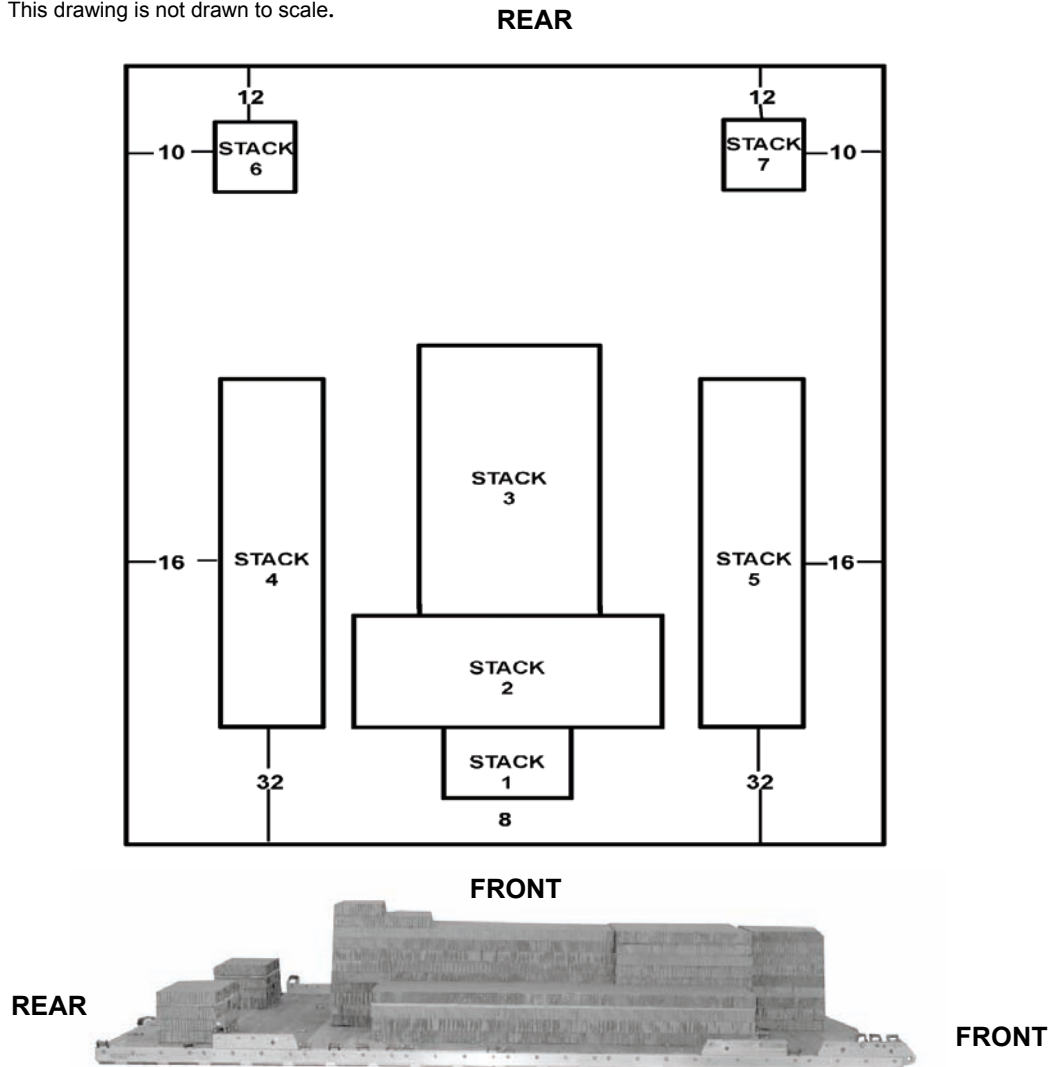
**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



<i>Stack Number</i>	<i>Pieces</i>	<i>Width (Inches)</i>	<i>Length (Inches)</i>	<i>Material</i>	<i>Instructions</i>
6 and 7	3	24	15	Honeycomb	Glue to form base.
	1	24	15	¾-inch plywood	Glue to base.
	1	24	15	Honeycomb	Glue to plywood.

**Figure 3-6. Honeycomb Stacks 6 and 7 Prepared**

**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



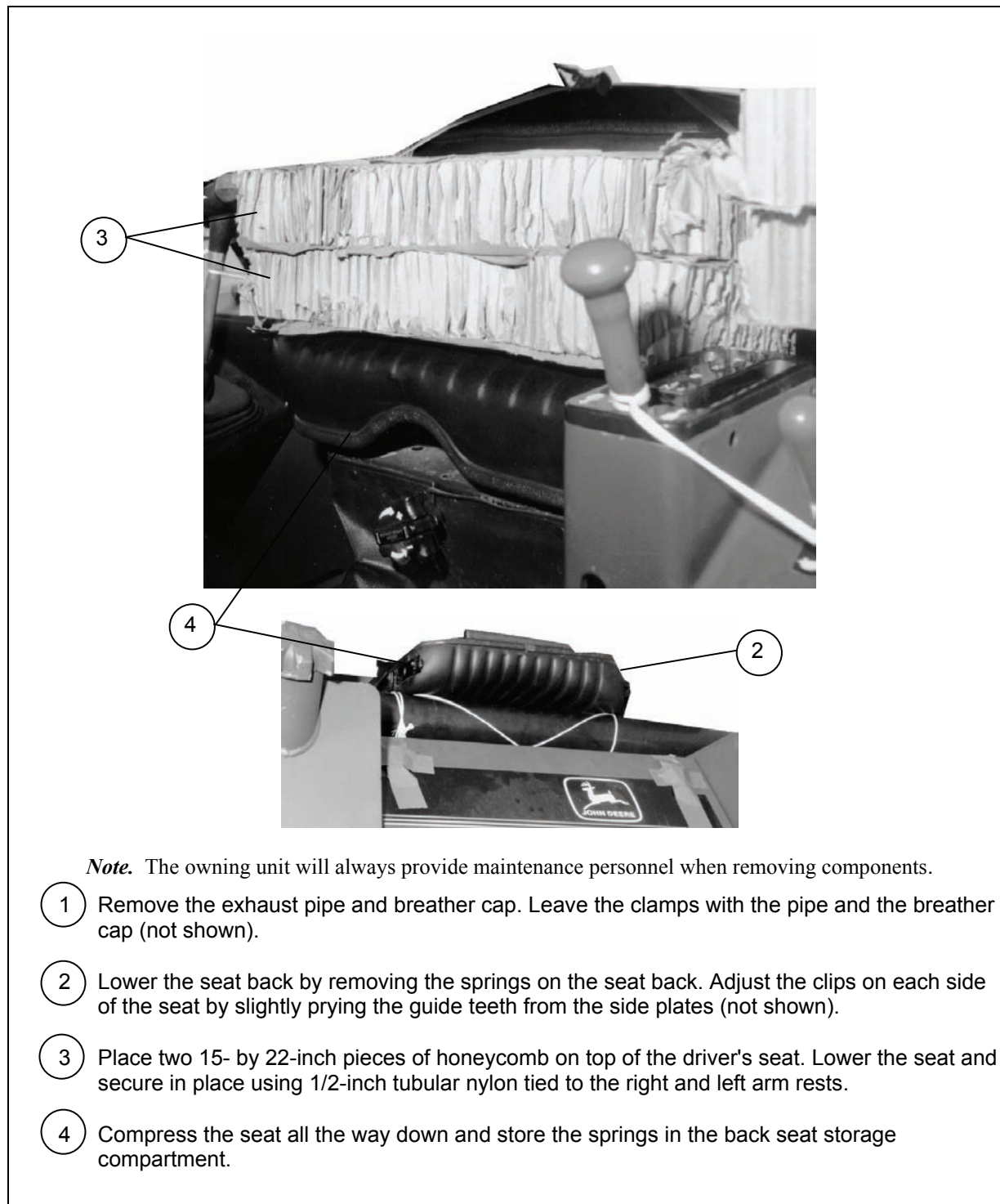
**Step:**

1. Position stack 1 centered and 8 inches from the front edge of the platform.
2. Position stack 2 centered and flush with the rear of stack 1.
3. Position stack 3 centered and flush with the rear of stack 2.
4. Position stacks 4 and 5 on each side of the platform 32 inches from the front edge of the platform and 16 inches from the sides of the platform.
5. Position stacks 6 and 7 on each side of the platform 12 inches from the rear edge of the platform and 10 inches from the sides of the platform.

**Figure 3-7. Honeycomb Stacks Positioned on Platform**

## PREPARING DOZER

3-4. Prepare the dozer as shown in Figure 3-8.

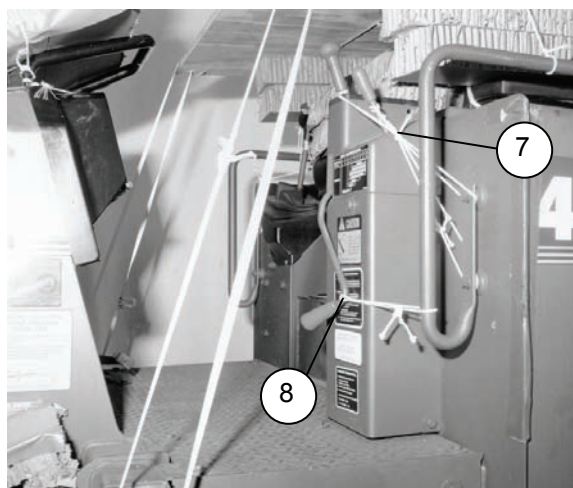
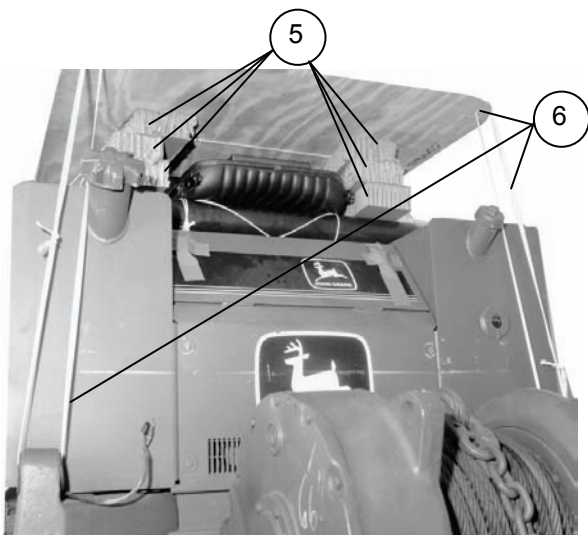
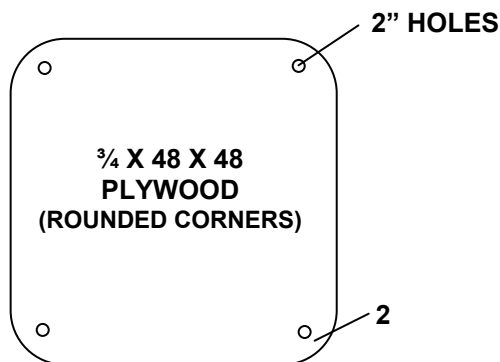


*Note.* The owning unit will always provide maintenance personnel when removing components.

- 1 Remove the exhaust pipe and breather cap. Leave the clamps with the pipe and the breather cap (not shown).
- 2 Lower the seat back by removing the springs on the seat back. Adjust the clips on each side of the seat by slightly prying the guide teeth from the side plates (not shown).
- 3 Place two 15- by 22-inch pieces of honeycomb on top of the driver's seat. Lower the seat and secure in place using 1/2-inch tubular nylon tied to the right and left arm rests.
- 4 Compress the seat all the way down and store the springs in the back seat storage compartment.

**Figure 3-8. Dozer Prepared**

- Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



- 5 Cut and glue six 6-inch by 26-inch pieces of honeycomb together forming two stacks with three layers on each stack. Place one stack of honeycomb on each side of the arm rests even with the rear edge of the seat back. Secure them to a convenient point with type III nylon cord.
- 6 Cut a piece of plywood with rounded corners as shown. Place it on top of the honeycomb extending to the rear to protect the fuel and hydraulic filler caps. Secure the plywood with 1/2-inch tubular nylon.
- 7 Secure the blade control arm to a convenient point on the rear most position with type III nylon cord.
- 8 Secure to a convenient point the break park lever, gear shift locking arm and the idle control lever in the down position with type III nylon cord.
- 9 Place the ignition keys in the seat back storage. (not shown)

**Figure 3-8. Dozer Prepared (Continued)**

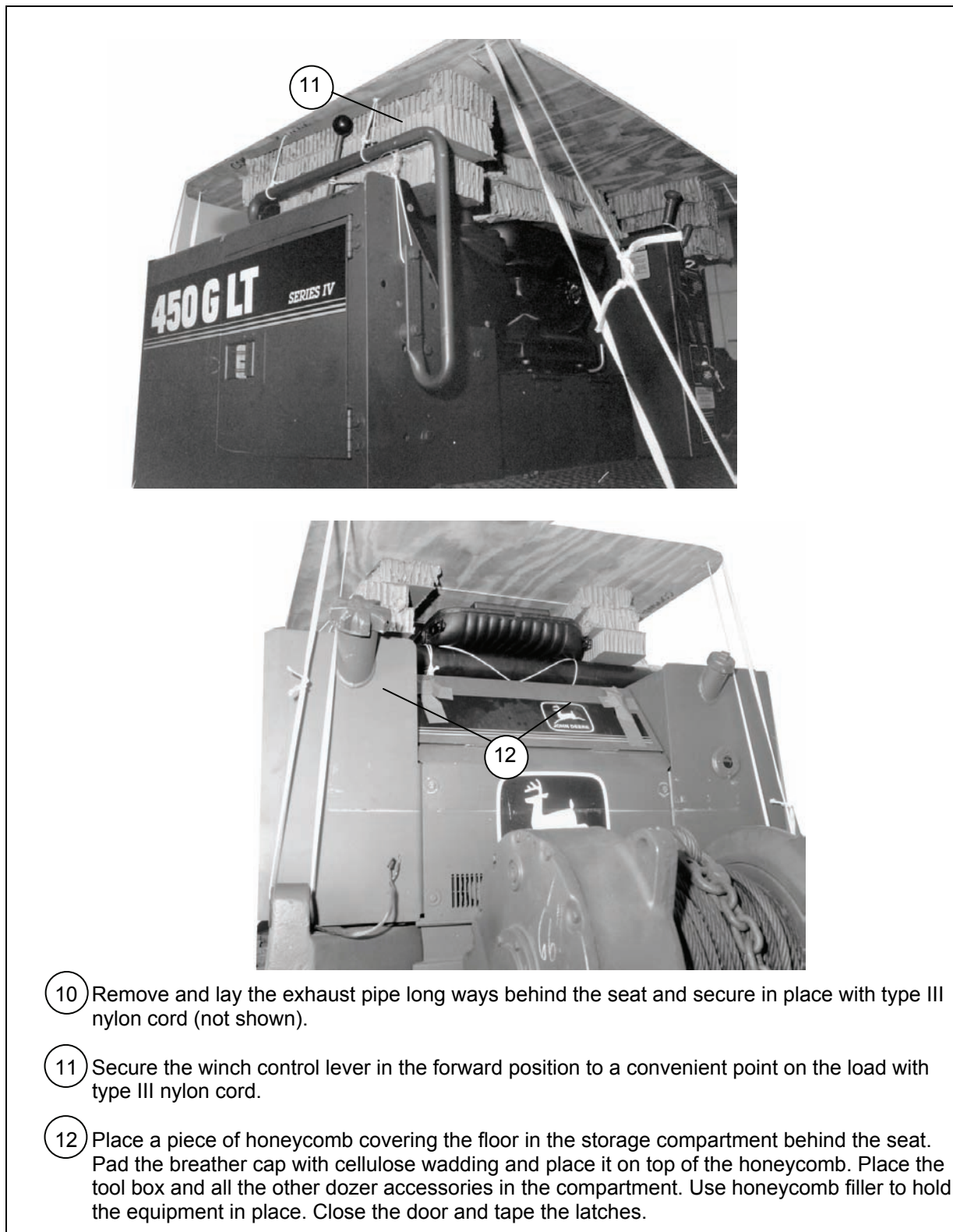


Figure 3-8. Dozer Prepared (Continued)



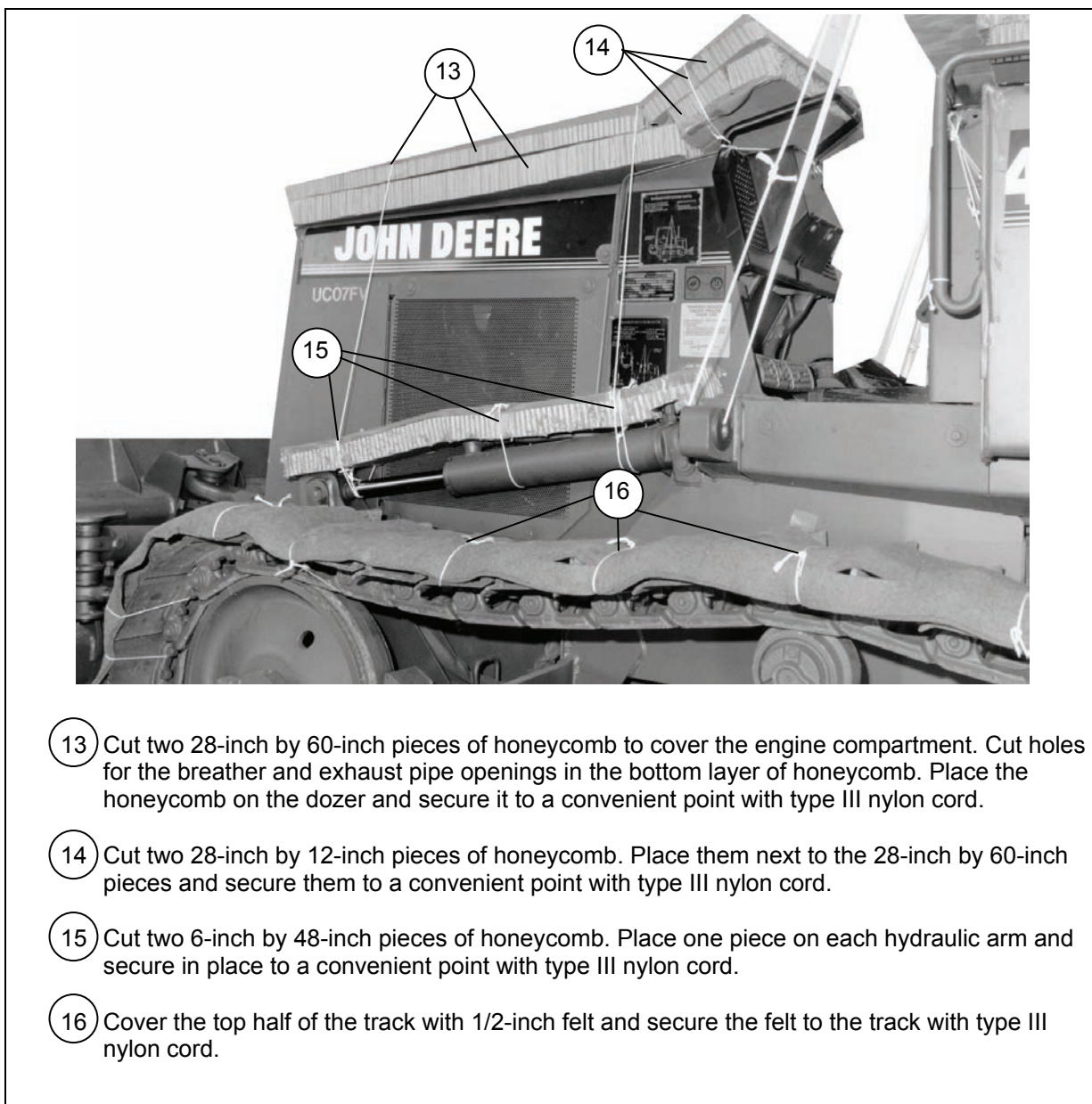
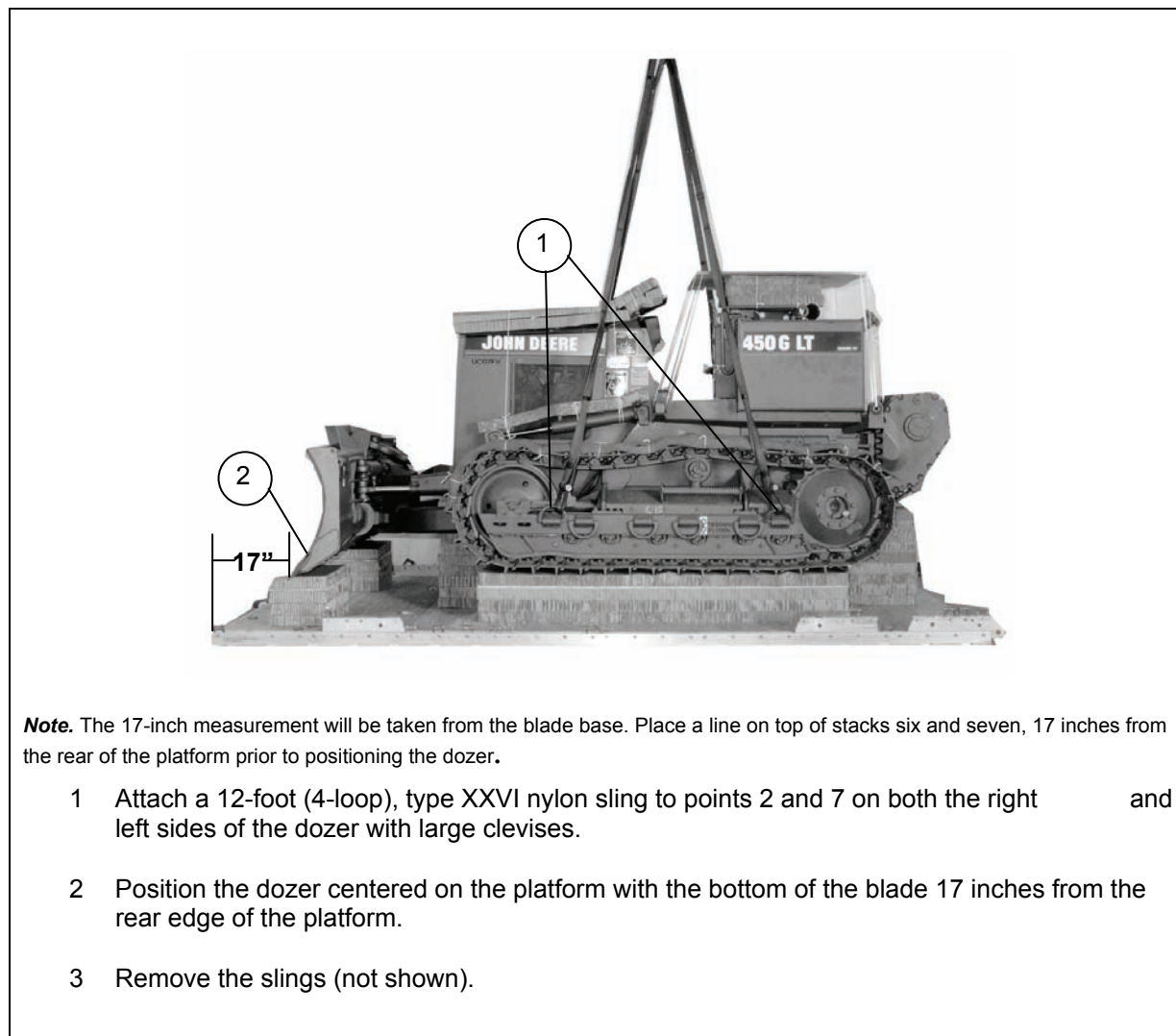


Figure 3-8. Dozer Prepared (Continued)



## LIFTING AND POSITIONING DOZER

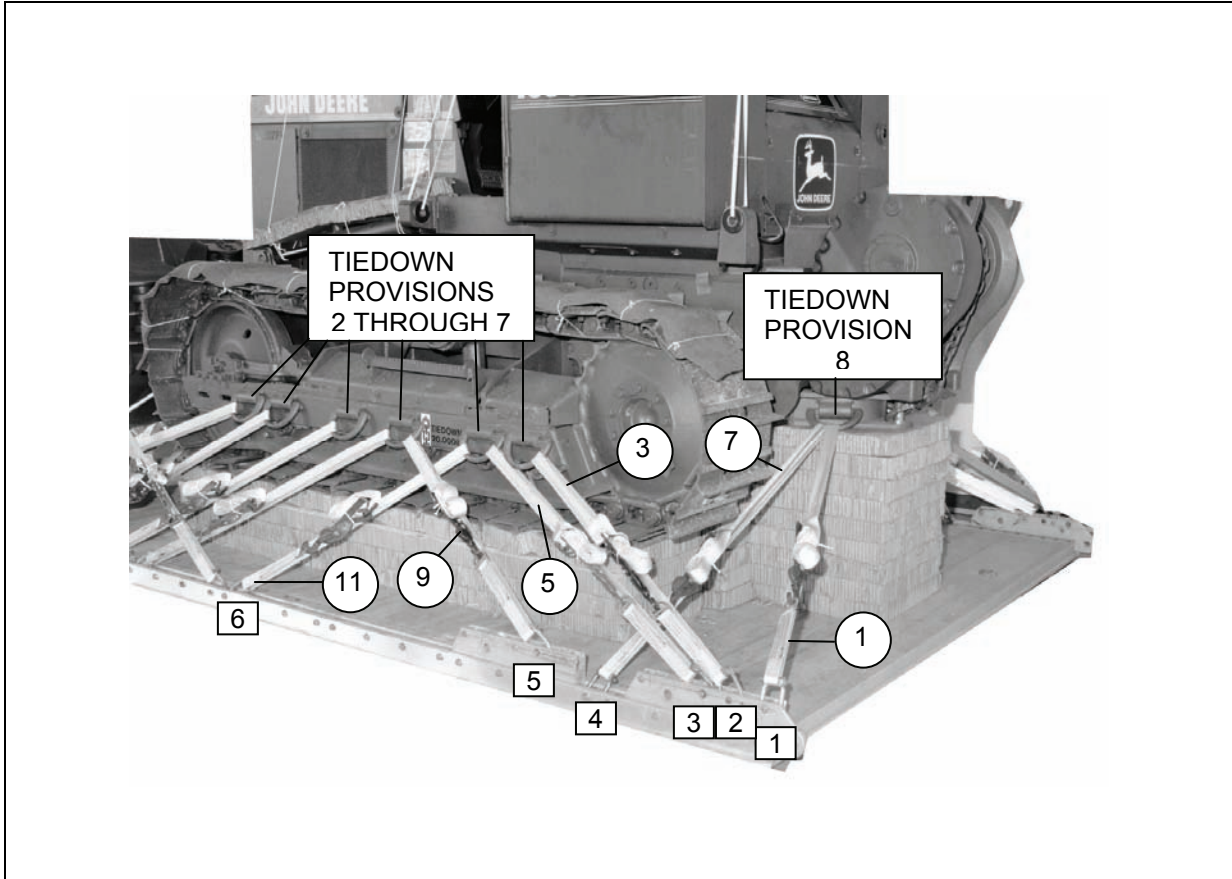
3-5. Lift and position the dozer as shown in Figure 3-9.



**Figure 3-9. Dozer Lifted and Positioned on Platform**

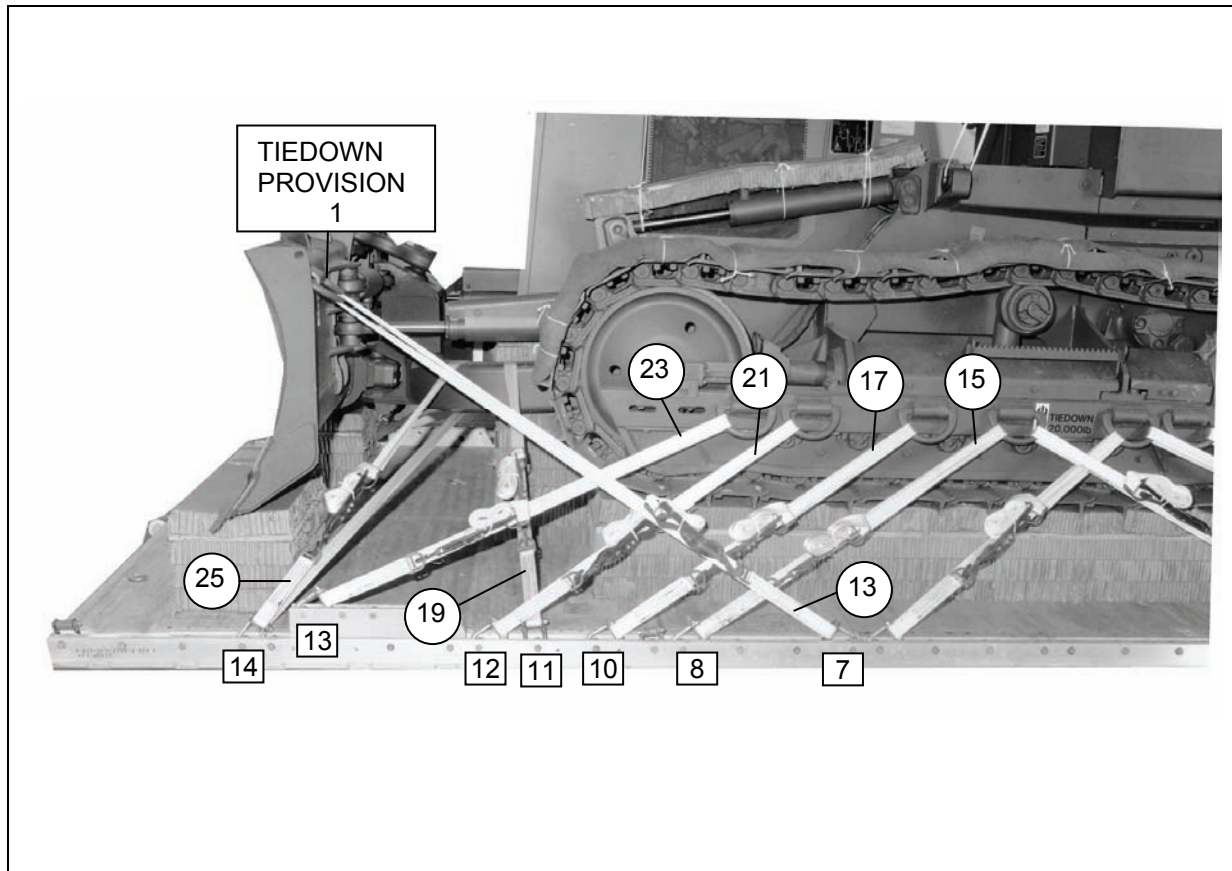
## LASHING DOZER TO PLATFORM

3-6. Lash the dozer to the platform as shown in Figure 3-10.



<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
1	1	Pass lashing through: Tiedown point 8, left side.
2	1A	Tiedown point 8, right side.
3	2	Tiedown point 7, left side
4	2A	Tiedown point 7, right side
5	3	Tiedown point 6, left side.
6	3A	Tiedown point 6, right side.
7	4	Tiedown point 8, left side.
8	4A	Tiedown point 8, right side.
9	5	Tiedown point 5, left side.
10	5A	Tiedown point 5, right side.
11	6	Tiedown point 6, left side.
12	6A	Tiedown point 6, right side.

**Figure 3-10. Dozer Lashed to Platform**

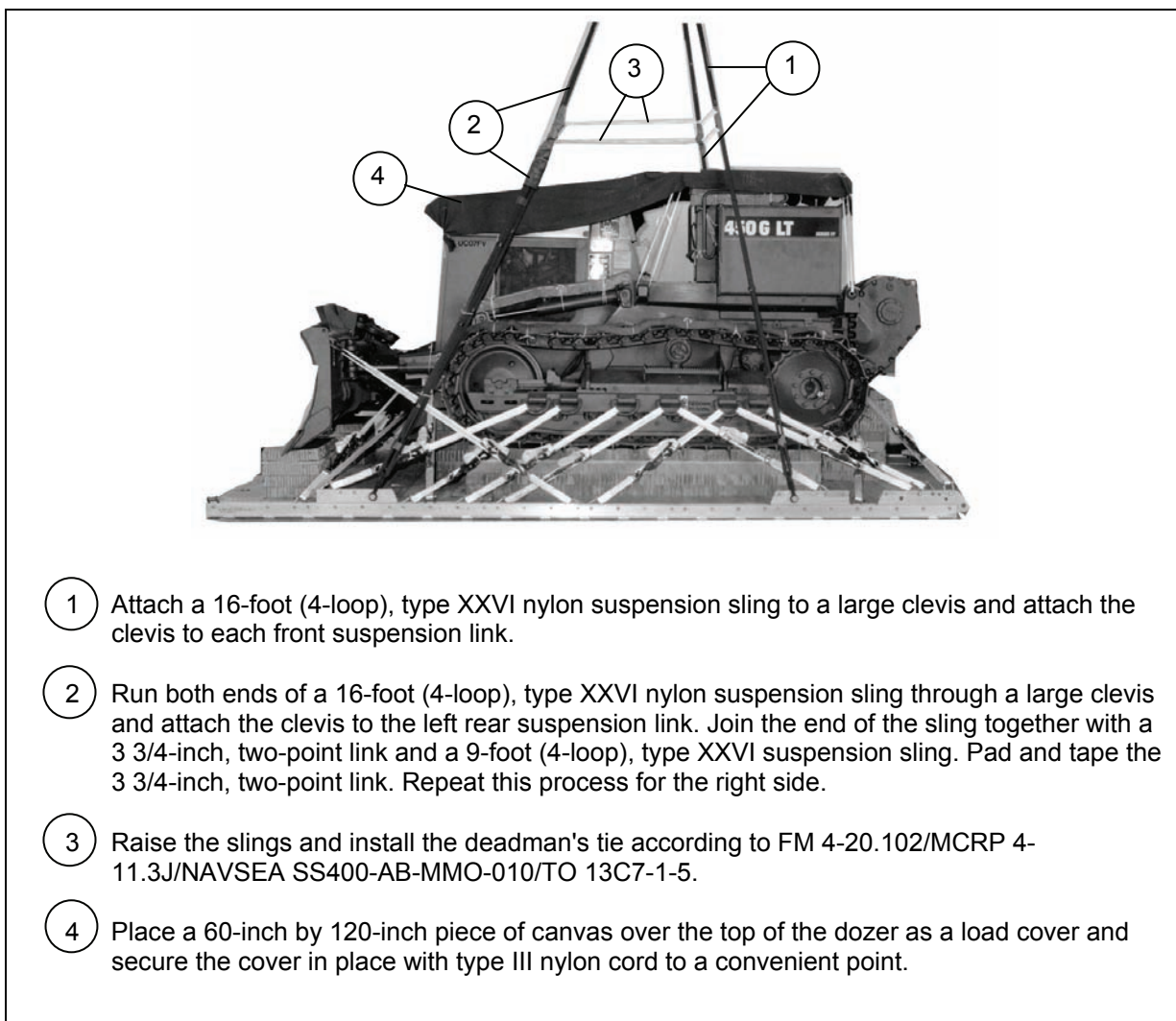


<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
13	7	Pass lashing: Through tiedown point 1, left side.
14	7A	Through tiedown point 1, right side.
15	8	Through tiedown point 5, left side.
16	8A	Through tiedown point 5, right side.
17	10	Through tiedown point 4, left side.
18	10A	Through tiedown point 4, right side.
19	11	Around yoke of blade support, left side.
20	11A	Around yoke of blade support, right side.
21	12	Through tiedown point 3, left side.
22	12A	Through tiedown point 3, right side.
23	13	Through tiedown point 2, left side.
24	13A	Through tiedown point 2, right side.
25	14	Around yoke of blade support, left side.
26	14A	Around yoke of blade support, right side.

**Figure 3-10. Dozer Lashed to Platform (Continued)**

## INSTALLING SUSPENSION SLINGS, DEADMAN'S TIE AND LOAD COVER

3-7. Install the suspension slings, deadman's tie and the load cover as shown in Figure 3-11.

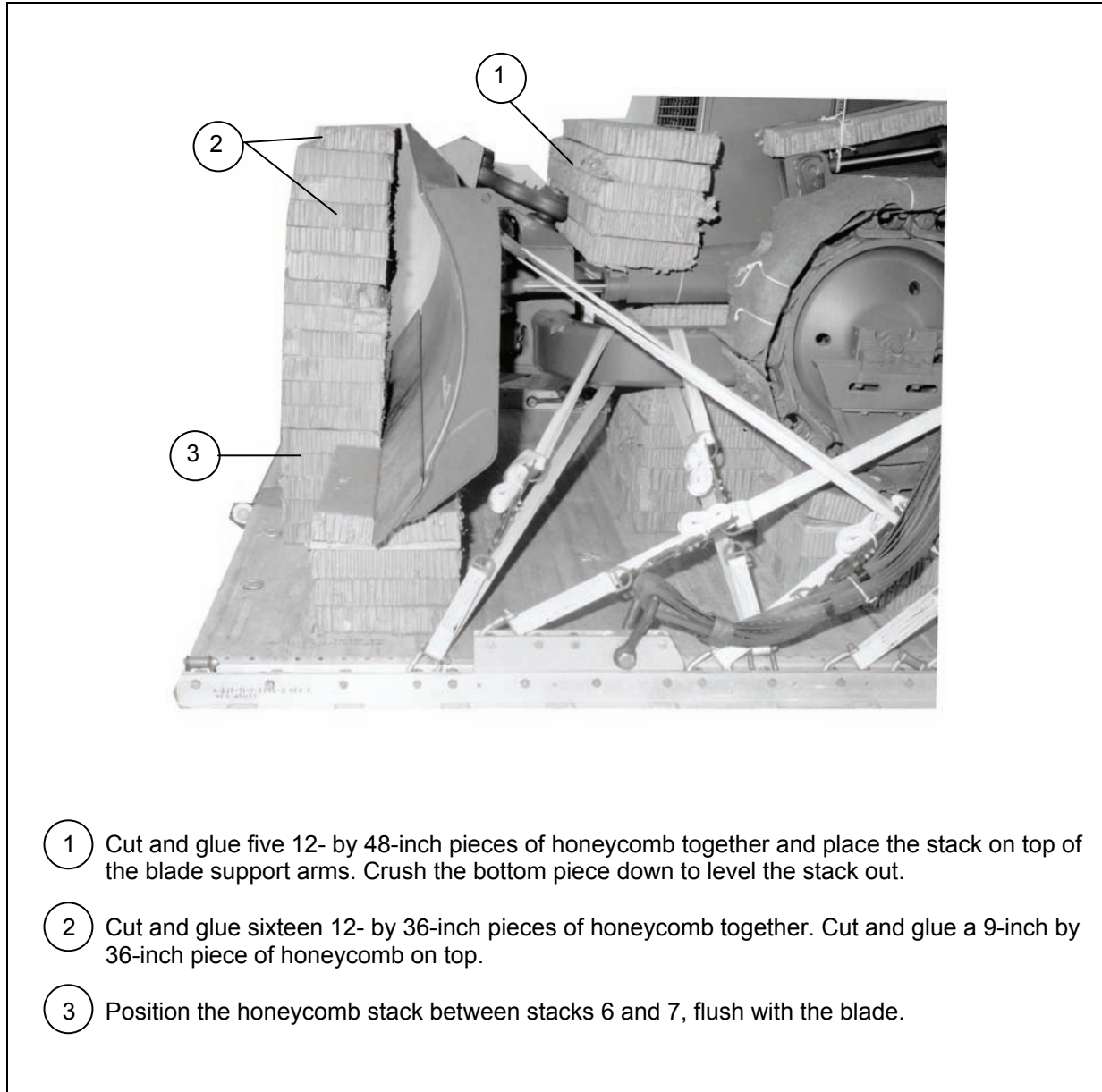


- ① Attach a 16-foot (4-loop), type XXVI nylon suspension sling to a large clevis and attach the clevis to each front suspension link.
- ② Run both ends of a 16-foot (4-loop), type XXVI nylon suspension sling through a large clevis and attach the clevis to the left rear suspension link. Join the end of the sling together with a 3 3/4-inch, two-point link and a 9-foot (4-loop), type XXVI suspension sling. Pad and tape the 3 3/4-inch, two-point link. Repeat this process for the right side.
- ③ Raise the slings and install the deadman's tie according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.
- ④ Place a 60-inch by 120-inch piece of canvas over the top of the dozer as a load cover and secure the cover in place with type III nylon cord to a convenient point.

**Figure 3-11. Suspension Slings, Deadman's Tie and Cover Installed**

## BUILDING AND POSITIONING PARACHUTE STOWAGE PLATFORM SUPPORT STACKS

3-8. Build and position two parachute stowage platform support stacks as shown in Figure 3-12.



**Figure 3-12. Parachute Stowage Platform Support Stacks Built and Positioned**

## BUILDING PARACHUTE STOWAGE PLATFORM

3-9. Build a parachute stowage platform as shown in Figure 3-13.

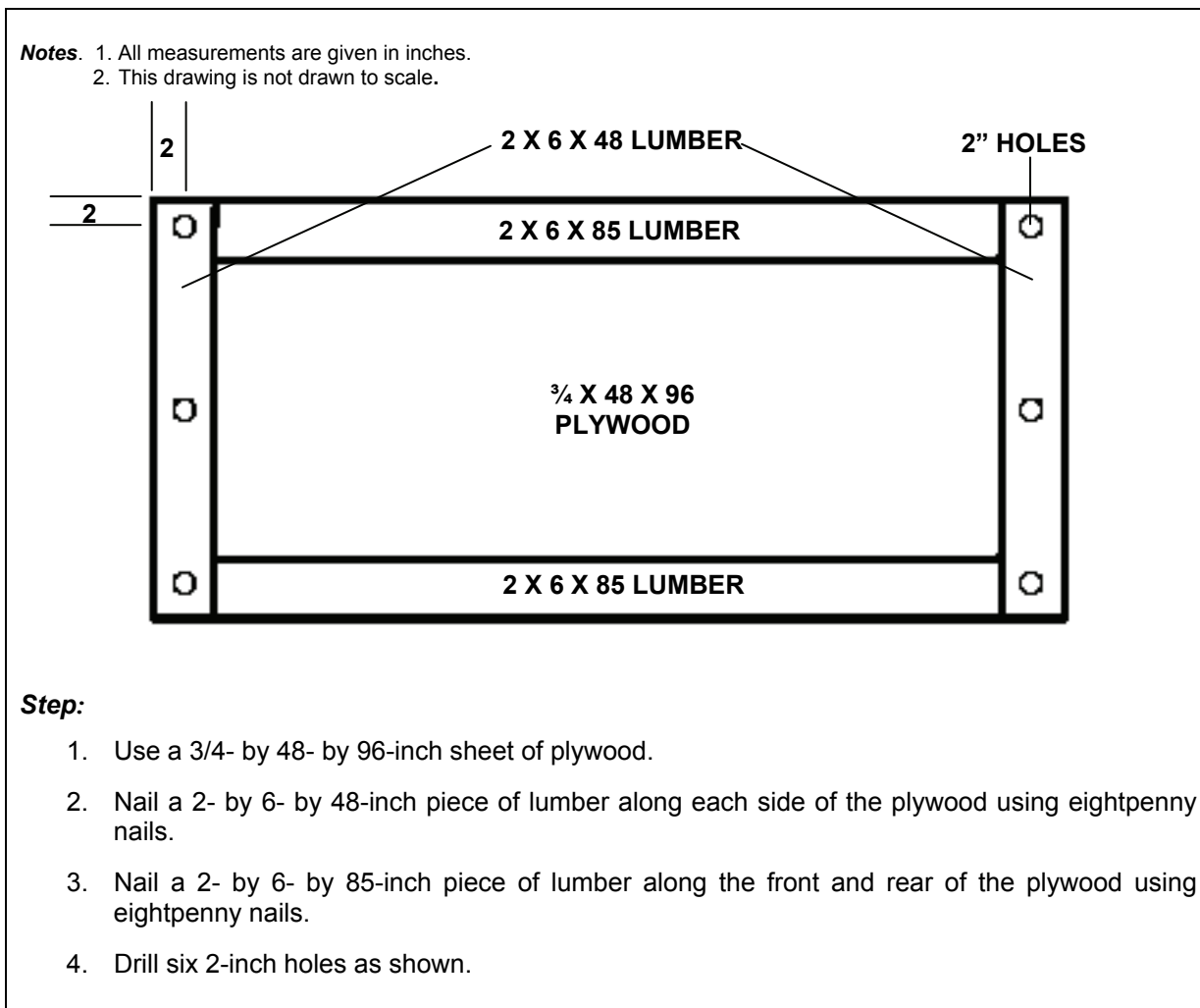
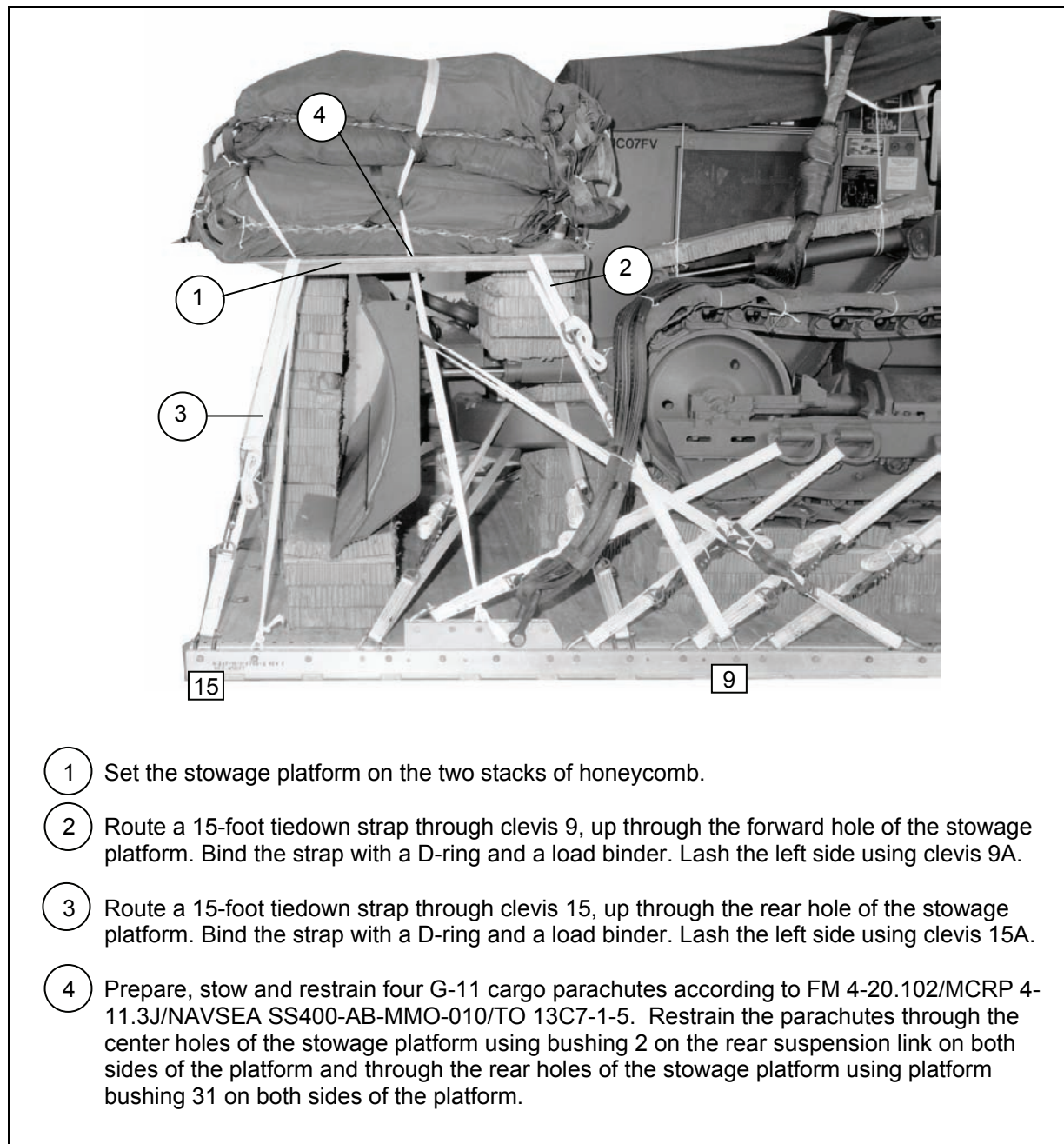


Figure 3-13. Parachute Stowage Platform Built



## INSTALLING PARACHUTE STOWAGE PLATFORM AND STOWING CARGO PARACHUTES

3-10. Install the parachute stowage platform on top of the support stacks. Prepare and stow the cargo parachutes as shown in Figure 3-14.



**Figure 3-14. Parachute Stowage Platform Installed and Parachutes Prepared and Stowed**

## INSTALLING EXTRACTION SYSTEM

3-11. Install the extraction force transfer coupling (EFTC) as shown in Figure 3-15.

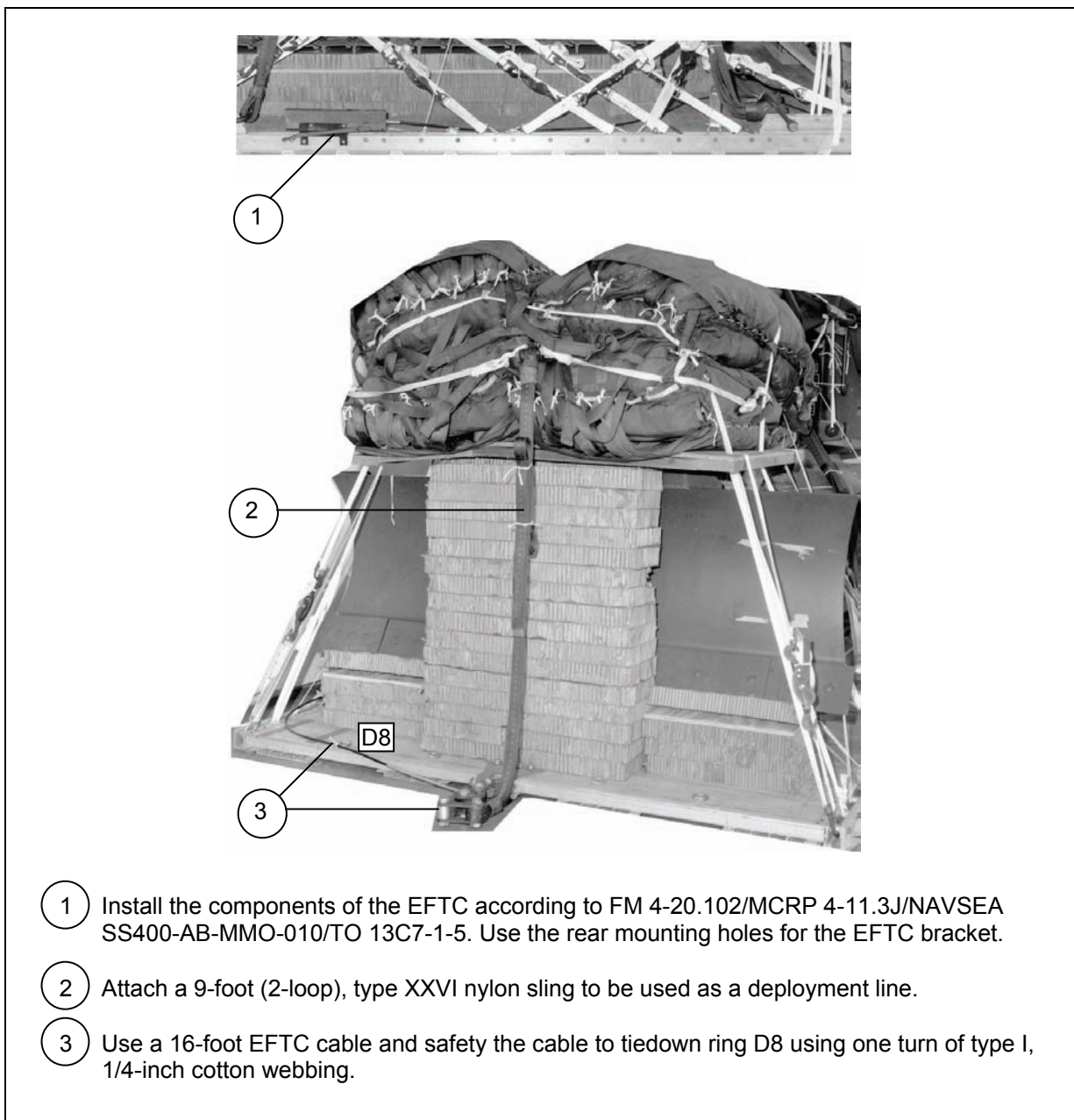
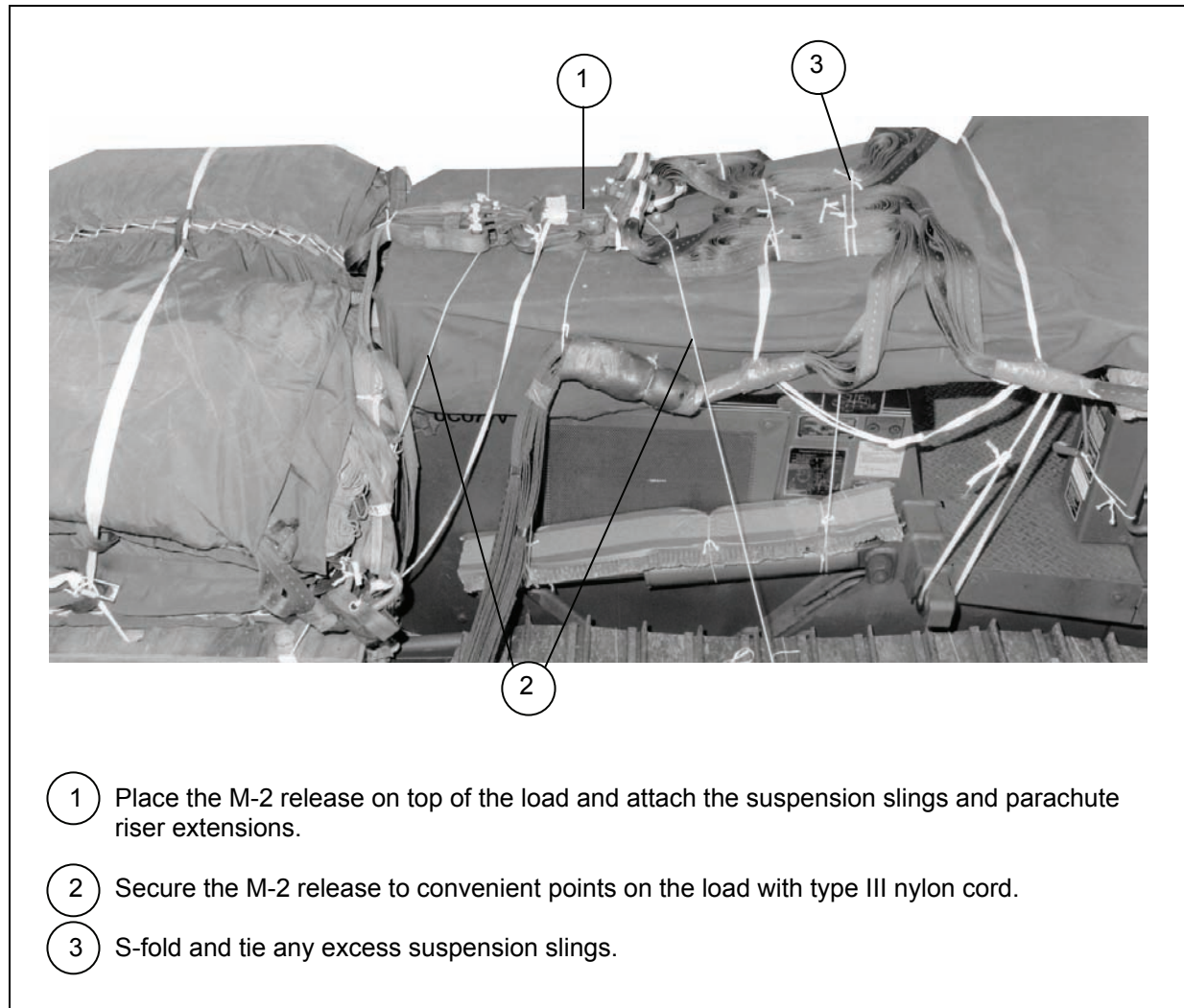


Figure 3-15. Extraction System Installed

## INSTALLING PARACHUTE RELEASE

3-12. Prepare, attach, and safety an M2 release according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figure 3-16.



**Figure 3-16. M-2 Cargo Release Installed**

## **PLACING EXTRACTION PARACHUTE**

3-13. Select the extraction parachute and extraction line needed using the extraction line requirements table in FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5. Place the extraction parachute and line on the load for installation in the aircraft.

## **INSTALLING PROVISIONS FOR EMERGENCY RESTRAINTS**

3-14. Select and install the provisions for the emergency aft restraints according to the emergency aft restraint requirements table in FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.

## **MARKING RIGGED LOAD**

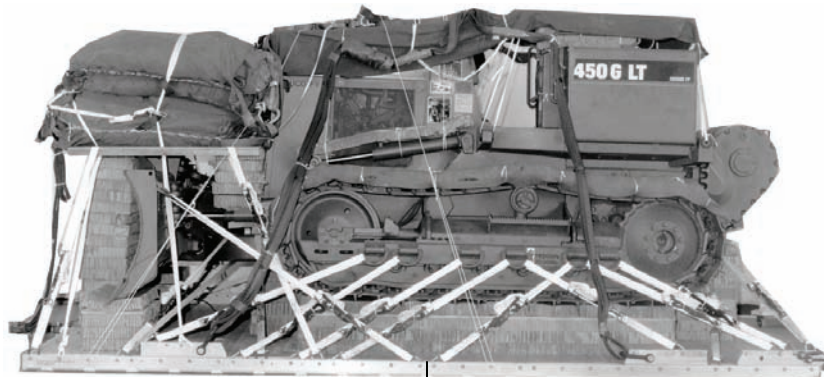
3-15. Mark the rigged load according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5, and as shown in Figure 3-17. Complete Shipper's Declaration for Dangerous Goods. If the load varies from the one shown, the weight, height, CB, and parachute requirements must be recomputed.

## **EQUIPMENT REQUIRED**

3-16. Use the equipment listed in Table 3-1 to rig this load.

**CAUTION**

Make the final rigger inspection required by AR 59-4 and FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 before the load leaves the rigging site.



C/B

**RIGGED LOAD DATA**

Weight: Load Shown.....	20,960 pounds
Height.....	94 inches
Width.....	108 inches
Overall Length .....	210 inches
Overhang: Front.....	0
Rear.....	0
Center of Balance (CB) (from front edge of the platform).....	84 inches
Extraction System with 16-foot cable (adds 18 inches to the length of the load)	

**Figure 3-17. John Deere 450G Lt Full-Track Bulldozer Rigged on a 16-Foot, Type V Platform for Low-Velocity Airdrop**

**Table 3-1. Equipment Required for Rigging the John Deere 450G Lt Full-Tracked Commercial Bulldozer for Low-Velocity Airdrop**

<i>National Stock Number</i>	<i>Item</i>	<i>Quantity</i>
8040-00-273-8713	Adhesive paste, 1-gal.	As required
4030-00-090-5354	Clevis, suspension, 1-inch (large)	5
8305-00-880-8155	Cloth, coated (nylon, type II, 17.0 oz, green, 60-in)	As required
4020-00-240-2146	Cord, nylon, type III, 550-lb	As required
1670-00-434-5785	Coupling, airdrop extraction force transfer, w/16-ft. cable	1
1670-00-360-0328	Cover, clevis	4
8305-00-958-3685	Felt, 1/2-inch thick	As required
1670-01-183-2678	Leaf, extraction line (line bag) ( add 2 for C-17)	2
	Line extraction:	
1670-01-064-4454	60-foot (6-loop), type XXVI (for C-130)	1
1670-01-468-9178	140-foot (6-loop), type XXVI (for C-17)	1
1670-01-064-4452	60-foot (1-loop), type XXVI (for C-17), (drogue line)	1
1670-00-783-5988	Link assembly, type IV (C-17 only)	1
	Link assembly, two-point:	
5306-00-435-8994	Bolt, 1-inch diameter, 4-inches long	6
5310-00-232-5165	Nut, 1-inch	6
1670-00-003-1953	Plate, side, 3 3/4-inch	4
1670-00-003-1954	Plate, side, 5 1/2-inch	2
5365-00-007-3414	Spacer, large	6
	Lumber:	
5510-00-220-6148	2- by 6- by 96-inch	3
5315-00-010-4659	Nail, steel, common, 8D	As required
1670-00-753-3928	Pad, energy-dissipating (honeycomb)	22 sheets
1670-01-016-7841	Parachute, cargo, G-11B	4
	Parachute, cargo, extraction:	
1670-00-040-8135	28-foot	1
1670-01-063-3715	15-foot (C-17 only)	1
	Platform, airdrop, type V, 16-foot:	
1670-01-162-2372	Clevis assembly (type V)	30
1670-01-162-2376	Extraction bracket assembly	1
1670-01-162-2381	Tandem link assembly (Multipurpose link)	2
5530-00-128-4981	Plywood, 3/4-inch	4 sheets

**Table 3-1. Equipment Required for Rigging the John Deere 450G Lt Full-Track Commercial Bulldozer for Low-Velocity Airdrop (Continued)**

<i>National Stock Number</i>	<i>Item</i>	<i>Quantity</i>
1670-01-097-8817	Release, cargo parachute, M-2	1
	Sling, cargo, airdrop:	
1670-01-062-6304	9-foot (2-loop), type XXVI	1
1670-01-062-6305	9-foot (4-loop), type XXVI	2
1670-01-062-6307	12-foot (4-loop), type XXVI	4
1670-01-062-6308	16-foot (4-loop), type XXVI	4
1670-01-062-6313	60-foot (3-loop), type XXVI	4
5340-00-040-8219	Strap, parachute, release, multi-knife	2
7501-00-266-5016	Tape, adhesive, 2-inch	As required
1670-00-937-0271	Tiedown assembly, 15-foot	30
1670-01-483-8259	Link, Parachute, Connector (H-block) (C-17 only)	1
	Webbing:	
8305-00-268-2411	Cotton, 1/4-inch, type I	As required
8305-00-082-5752	Nylon, tubular, 1/2-inch	As required



## Chapter 4

# Rigging the Deployable Universal Combat Earthmover (DEUCE) on a 24-Foot, Type V Platform for Low-Velocity Airdrop

### DESCRIPTION OF LOAD

**4-1.** The Deployable Universal Combat Earthmover (DEUCE), Figure 4-1, is rigged on a 24-foot, type V airdrop platform with eight G-11 cargo parachutes. The unrigged DEUCE weighs 35,000 pounds. It is 112 inches high reducible to 90 inches in the kneeling position for airdrop. The rigged load is 310 inches long, 101 1/2 inches high and 110 inches wide.

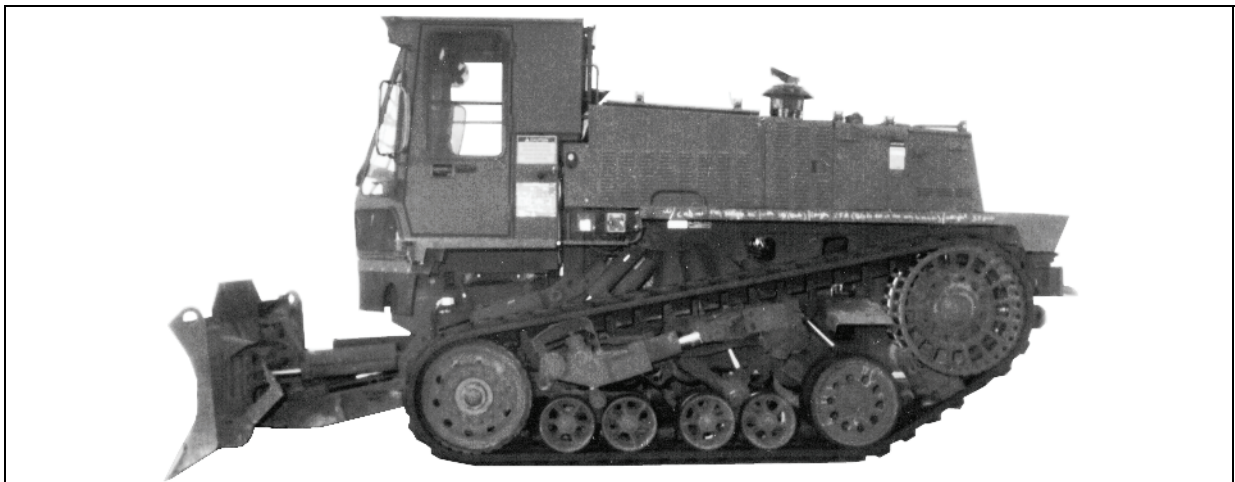
### PREPARING PLATFORM

4-2. Prepare a 24-foot, type V airdrop as shown in Figure 4-2.

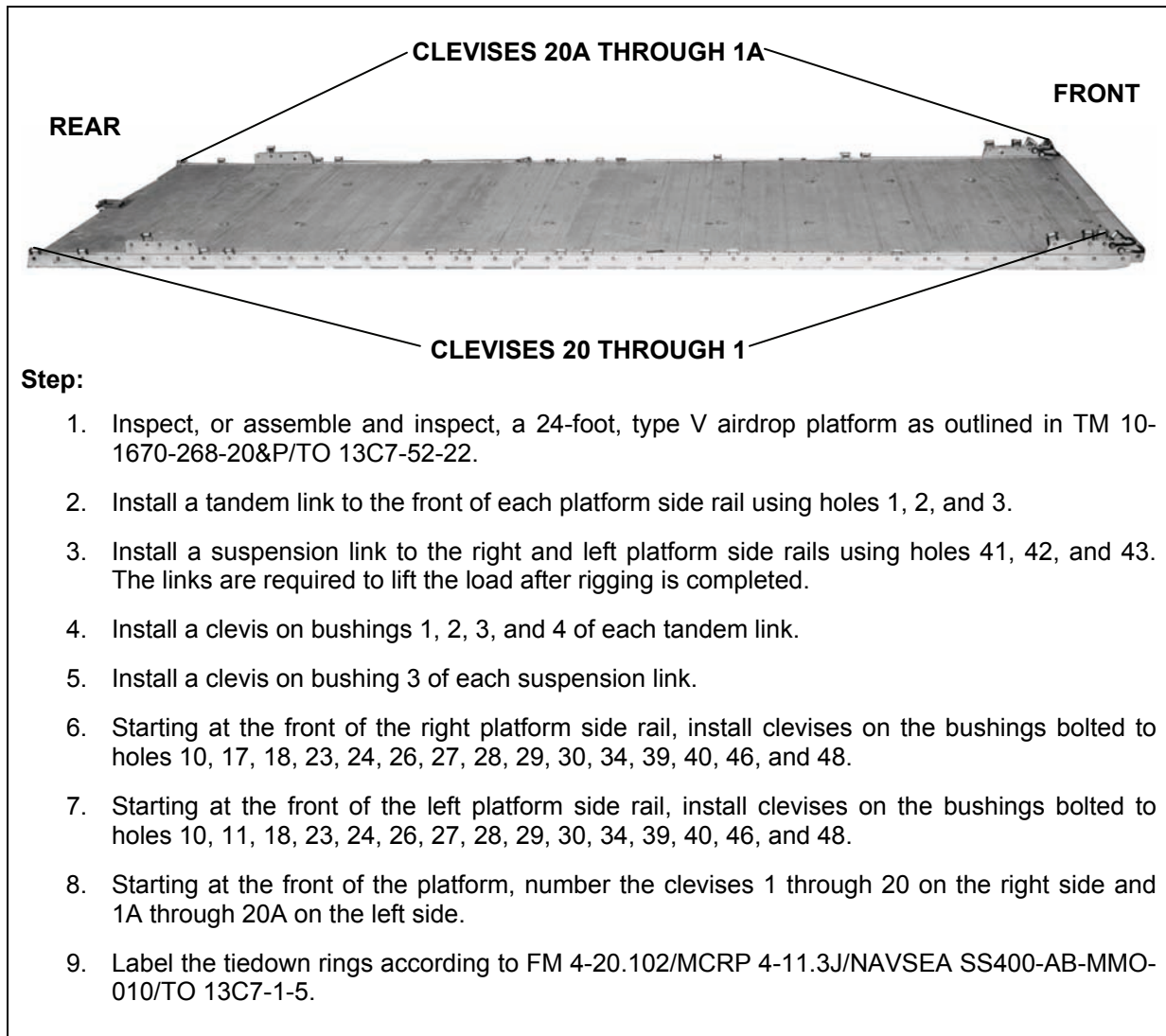
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*Note.* Remove the cab for airdrop.

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**Figure 4-1. Deployable Universal Combat Earthmover (DEUCE)**



**Figure 4-2. Platform Prepared**

## BUILDING AND POSITIONING HONEYCOMB STACKS

4-3. Build the honeycomb stacks as shown in Figures 4-3 through 4-6. Position the stacks as shown in Figure 4-7.

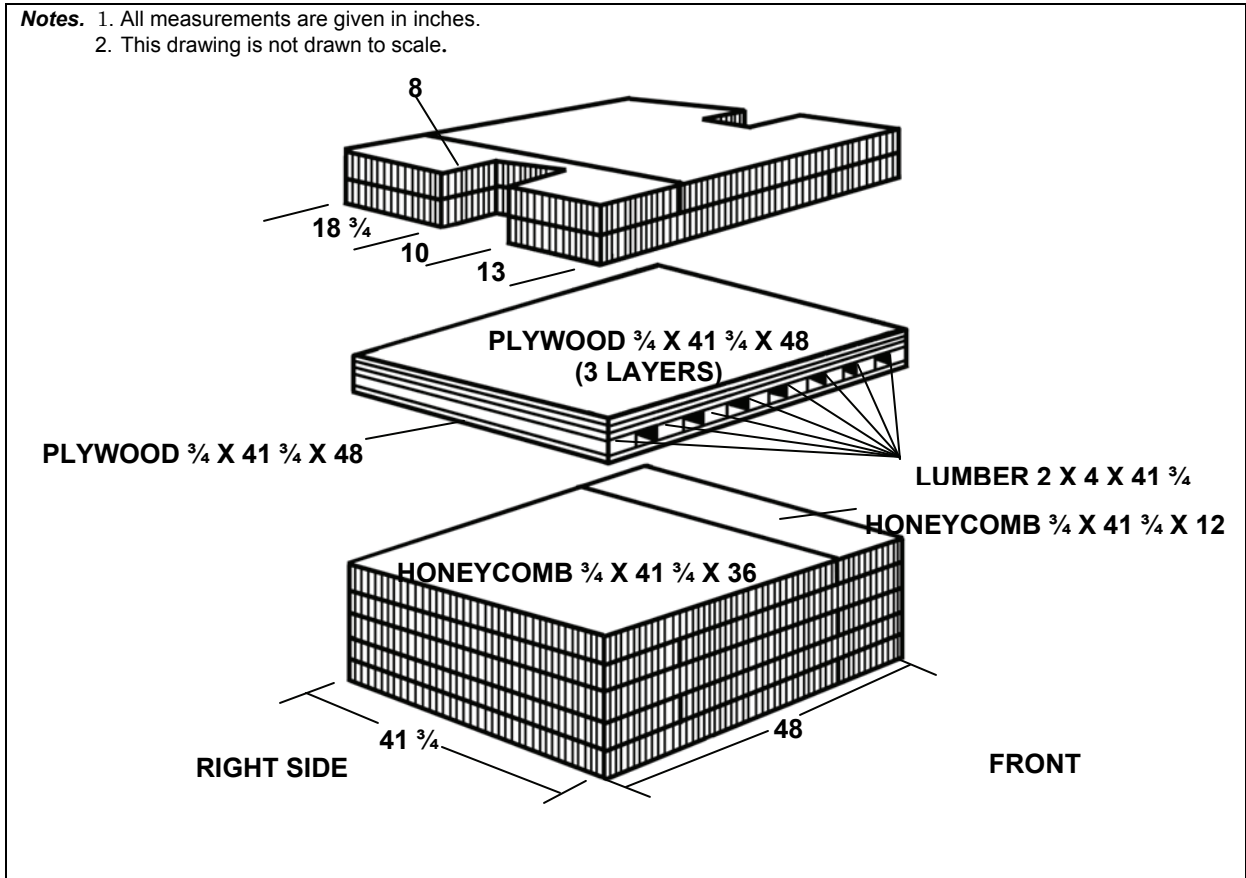


Figure 4-3. Honeycomb Stack 1 Prepared

<b>Stack Number</b>	<b>Pieces</b>	<b>Width (Inches)</b>	<b>Length (Inches)</b>	<b>Material</b>	<b>Instructions</b>
1	5	36	41 <sup>3</sup> / <sub>4</sub>	Honeycomb	<p>Alternate and glue the 41 3/4-inch by 36-inch piece with the 41 3/4-inch by 12-inch piece to form a base.</p> <p>Place and nail a 2-inch by 4-inch piece of lumber flush on each 41 <sup>3</sup>/<sub>4</sub> inch side of a piece of plywood. Place and nail the remaining six pieces of 2-inch by 4-inch lumber, 3 inches apart from each other, to the plywood. Place and nail the remaining three pieces of plywood on top of and flush with the 2-inch by 4-inch pieces of lumber. Glue the plywood and lumber on top of the honeycomb base.</p> <p>Alternate and glue the 41 3/4-inch by 36-inch pieces and the 41 3/4-inch by 12-inch pieces together. Make a 10-inch long by 8-inch deep cutout on each 41 3/4-inch side, 13 inches from the front edge. Glue the honeycomb on top of and flush with the plywood.</p>
	5	12	41 <sup>3</sup> / <sub>4</sub>	Honeycomb	
	4 8		41 <sup>3</sup> / <sub>4</sub> 41 <sup>3</sup> / <sub>4</sub>	<sup>3</sup> / <sub>4</sub> -inch Plywood 2-inch by 4-inch Lumber	
	2 2	36 12	41 <sup>3</sup> / <sub>4</sub> 41 <sup>3</sup> / <sub>4</sub>	Honeycomb Honeycomb	

**Figure 4-3. Honeycomb Stack 1 Prepared (Continued)**

- Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.

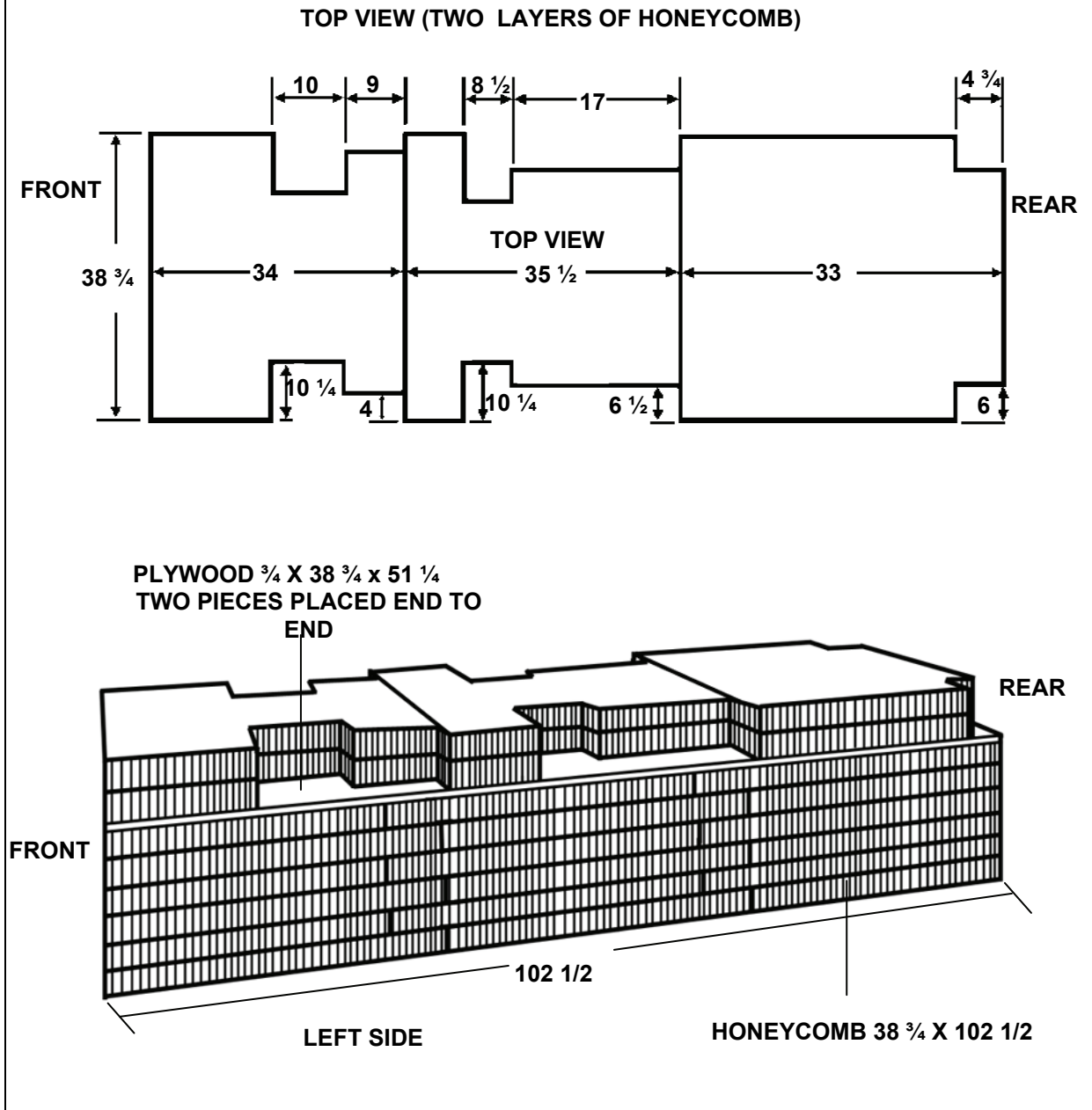


Figure 4-4. Honeycomb Stack 2 Prepared

<b>Stack Number</b>	<b>Pieces</b>	<b>Width (Inches)</b>	<b>Length (Inches)</b>	<b>Material</b>	<b>Instructions</b>	
2	12	38 <sup>3</sup> / <sub>4</sub>	36	Honeycomb	Place a 30 1/2-inch by 38 3/4-inch piece of honeycomb beside two pieces of 36-inch by 38 3/4-inch honeycomb forming a 38 3/4-inch by 102 1/2-inch layer. Alternate the pieces in the following layers to form a base six layers high. Glue all layers together.	
	6	38 <sup>3</sup> / <sub>4</sub>	30 1/2	Honeycomb		
	2	38 <sup>3</sup> / <sub>4</sub>	51 1/4	3/4-inch Plywood		Place and glue the plywood end to end on top of the honeycomb base.
	2	38 <sup>3</sup> / <sub>4</sub>	33	Honeycomb		Cut a notch 4 3/4 inches long by 6 inches deep on each corner of one 38 3/4-inch side of each piece of honeycomb. Align the notches and glue the layers together. Glue the honeycomb to the plywood with the notches facing rear.
	2	38 <sup>3</sup> / <sub>4</sub>	35 1/2	Honeycomb		Cut a notch 17 inches long by 6 1/2 inches deep along each 35 1/2-inch side of each piece of honeycomb measured from the rear. Cut a second notch 8 1/2 inches long by 10 1/4 inches deep on both sides of both pieces of honeycomb measured from the front of the first notch. Align the notches and glue the honeycomb pieces together. Glue the honeycomb to the plywood with the notches facing rear and against the previously placed stack.
2	38 <sup>3</sup> / <sub>4</sub>	34	Honeycomb	Cut a notch 9 inches long by 4 inches deep along each 34-inch side of each piece of honeycomb measured from the rear. Cut a second notch 10 inches long by 10 1/4 inches deep on both sides of both pieces of honeycomb measured from the front of the first notch. Align the notches and glue the honeycomb pieces together. Glue the honeycomb to the plywood with the notches facing rear and against the previously placed stack.		

Figure 4-4. Honeycomb Stack 2 Prepared (Continued)

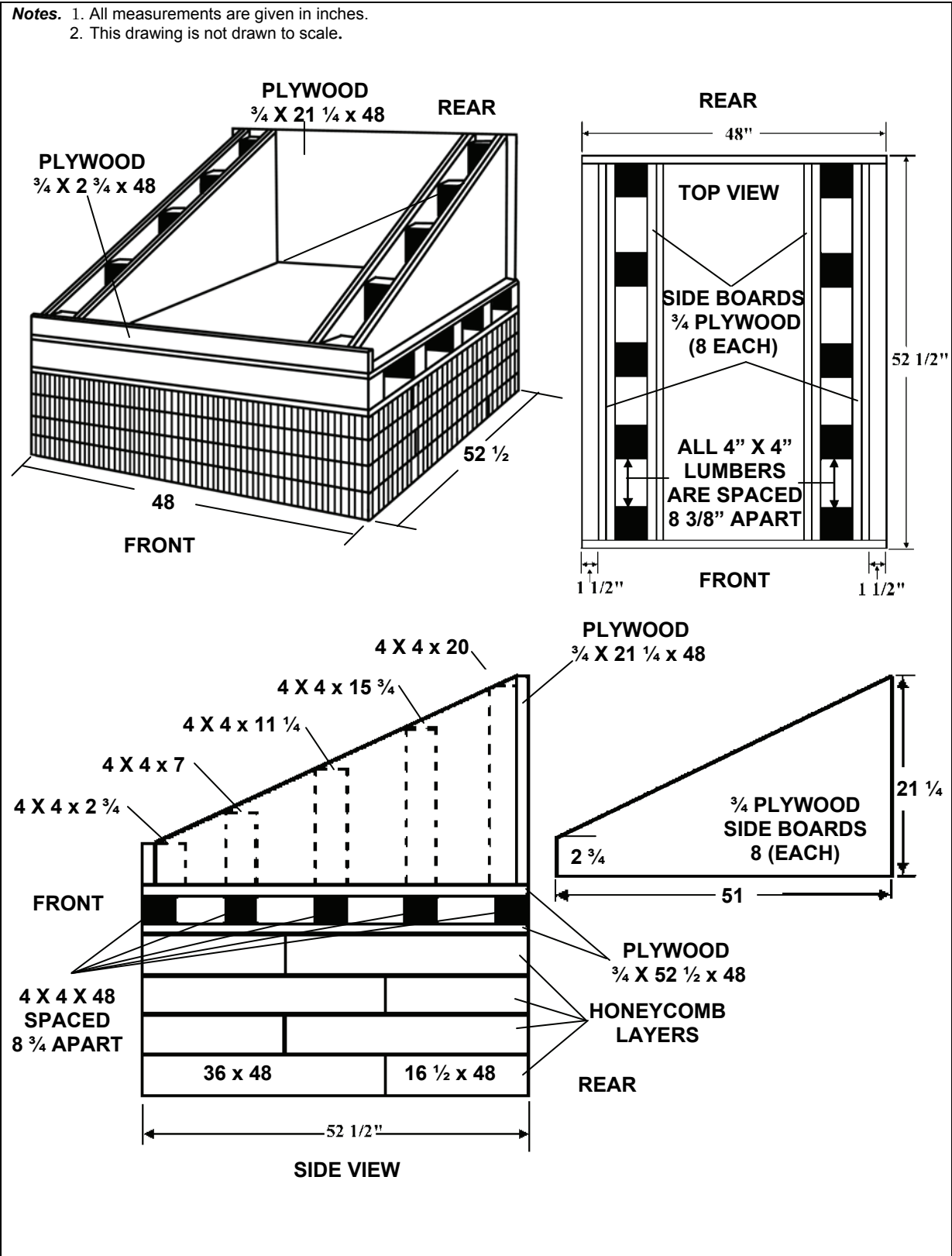


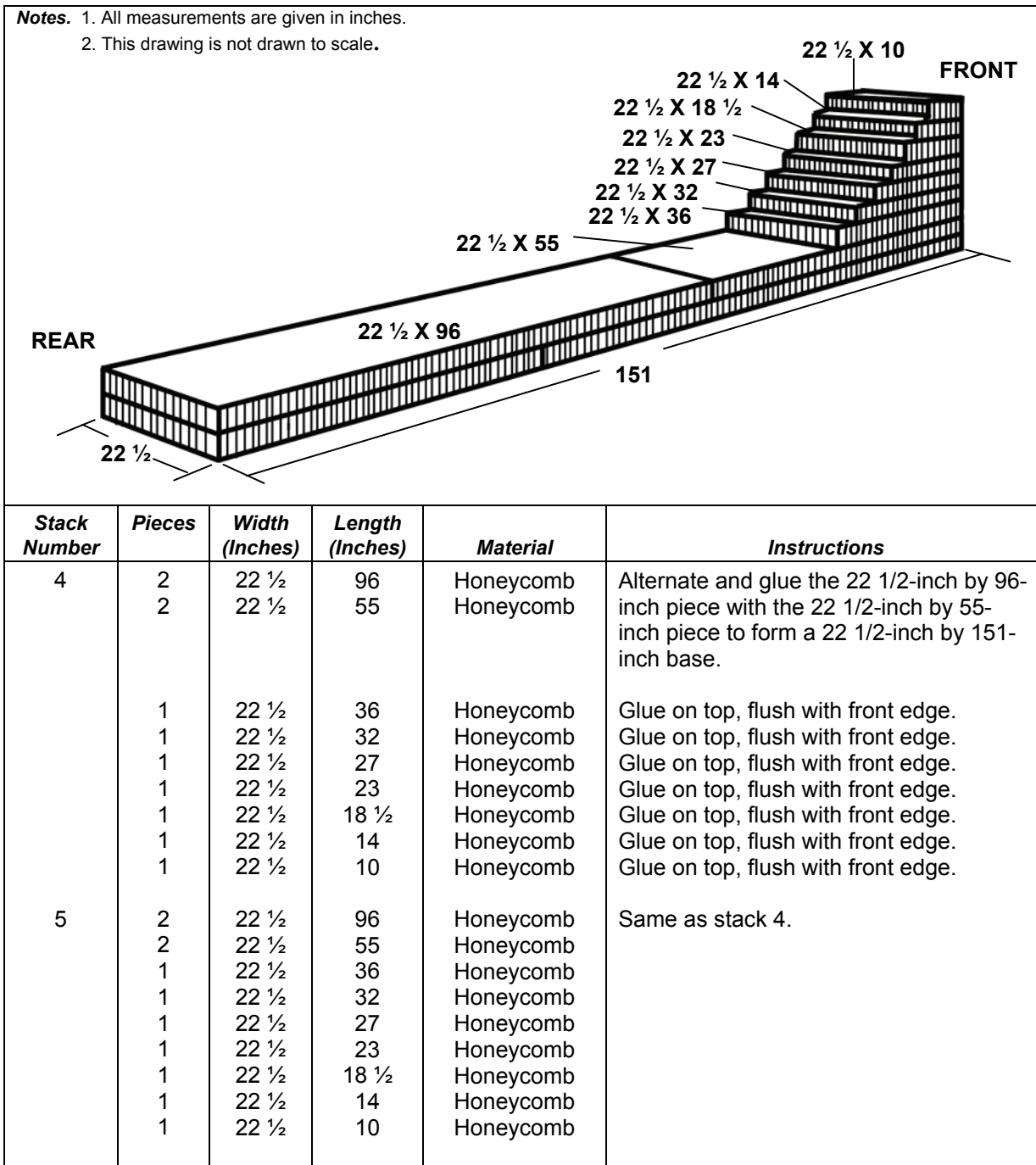
Figure 4-5. Honeycomb Stack 3 Prepared



<b>Stack Number</b>	<b>Pieces</b>	<b>Width (Inches)</b>	<b>Length (Inches)</b>	<b>Material</b>	<b>Instructions</b>	
3	4	48	16 ½	Honeycomb	Alternate and glue the 48-inch by 36-inch piece with the 48-inch by 16 1/2-inch piece to form a 48-inch by 52 1/2-inch base.	
	4	48	36	Honeycomb		
	2	48	52 ½	¾-inch Plywood 4 by 4 Lumber	Place and nail a 4 by 4 piece of lumber flush on each 48-inch side of a piece of plywood. Place and nail to the plywood the remaining three pieces of 4 by 4 lumber 8 ¾ inches apart.	
	5	48				
	8	51	2 ¾ to 21 ¼	¾-inch Plywood	Cut eight ¾-inch plywood sideboards as shown in Figure 4-5.	
	2		2 ¾			
	2		7	4 by 4 Lumber 4 by 4 Lumber 4 by 4 Lumber 4 by 4 Lumber	Nail the 4 by 4 piece of lumber to the sideboards using the dimensions shown in Figure 4-5. There are two layers of plywood on each side.	
	2		11 ¼			
	2		15 ¾			
	2		20			
	1			21 ¼	4 by 4 Lumber	Nail to the sideboards and 4 by 4 piece of lumber with a 1 1/2-inch overhang on each end.
	1	48		2 ¾	¾-inch Plywood	Nail to the sideboards and 4 by 4 lumber with a 1 ½ inch overhang on each end.
					¾-inch Plywood	Nail the remaining 48-inch x 52 ½-inch piece of plywood to the sideboards and 4 by 4 piece of lumber ensuring all sides are flush. Nail this assembly to the ¾-inch plywood with five 4 by 4 pieces of lumber built above. Glue the wooden assembly to the 48-inch by 52 1/2-inch honeycomb base.

Figure 4-5. Honeycomb Stack 3 Prepared (Continued)

**Rigging the Deployable Universal Combat Earthmover (DEUCE) on a 24-Foot, Type V Platform for Low-Velocity Airdrop**



**Figure 4-6. Honeycomb Stacks 4 and 5 Prepared**

- Notes.** 1. All measurements are given in inches.  
 2. This drawing is not drawn to scale.

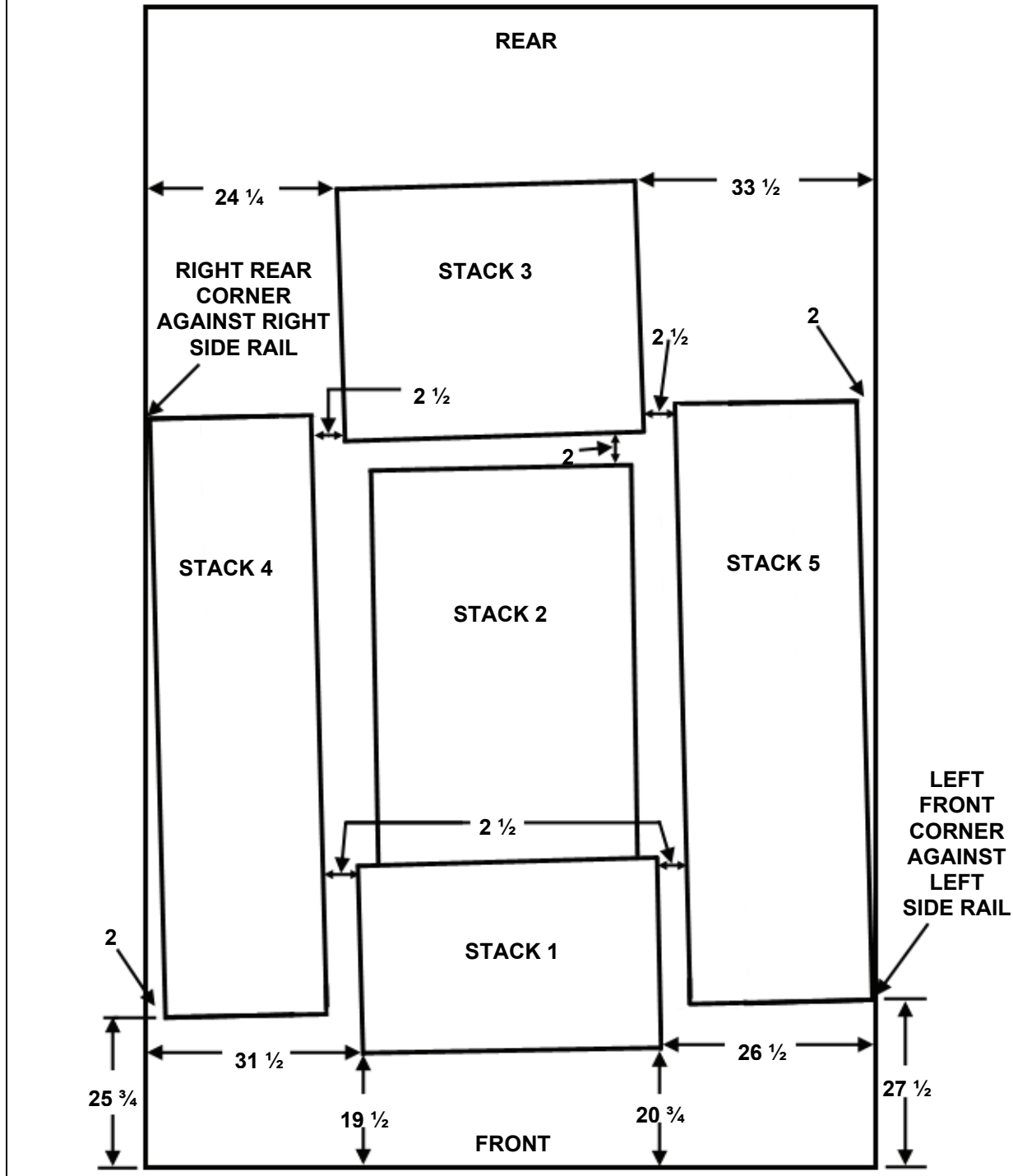


Figure 4-7. Honeycomb Stacks Positioned on Platform

**Step:**

1. Position stack 1 with the right front corner 19 1/2 inches from the front edge of the platform and 31 1/2 inches from the right side rail. The left front corner is 20 3/4 inches from the front of the platform and 26 1/2 inches from the left side rail.
2. Position stack 2 centered on and flush with stack 1 maintaining the same angle as stack 1.
3. Position stack 3 with the front edge 2 inches from the rear edge of stack 2. The right rear corner is 24 1/2 inches from the right side rail and the left rear corner is 33 1/2 inches from the left side rail.
4. Position stack 4 with the right front corner 25 3/4 inches from the front edge of the platform and the right rear corner against the right side rail. Maintain the same angle as stacks 1 and 2.
5. Position stack 5 with the left front corner 27 1/2 inches from the front edge of the platform and against the left side rail. Maintain the same angle as stacks 1 and 2.

**Figure 4-7. Honeycomb Stacks Positioned on Platform (Continued)**

## PREPARING THE DEUCE

- 4-4. Prepare the DEUCE as described below.
  - **Check the fuel level:** Make sure the fuel tank is no less than 1/2 and not more than 3/4 full.
  - **Prepare the DEUCE.**
    - Remove the cab.
    - Prepare the DEUCE as shown in Figure 4-8.

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*Note.* The owning unit must provide maintenance personnel operators to remove components at the rigging site.

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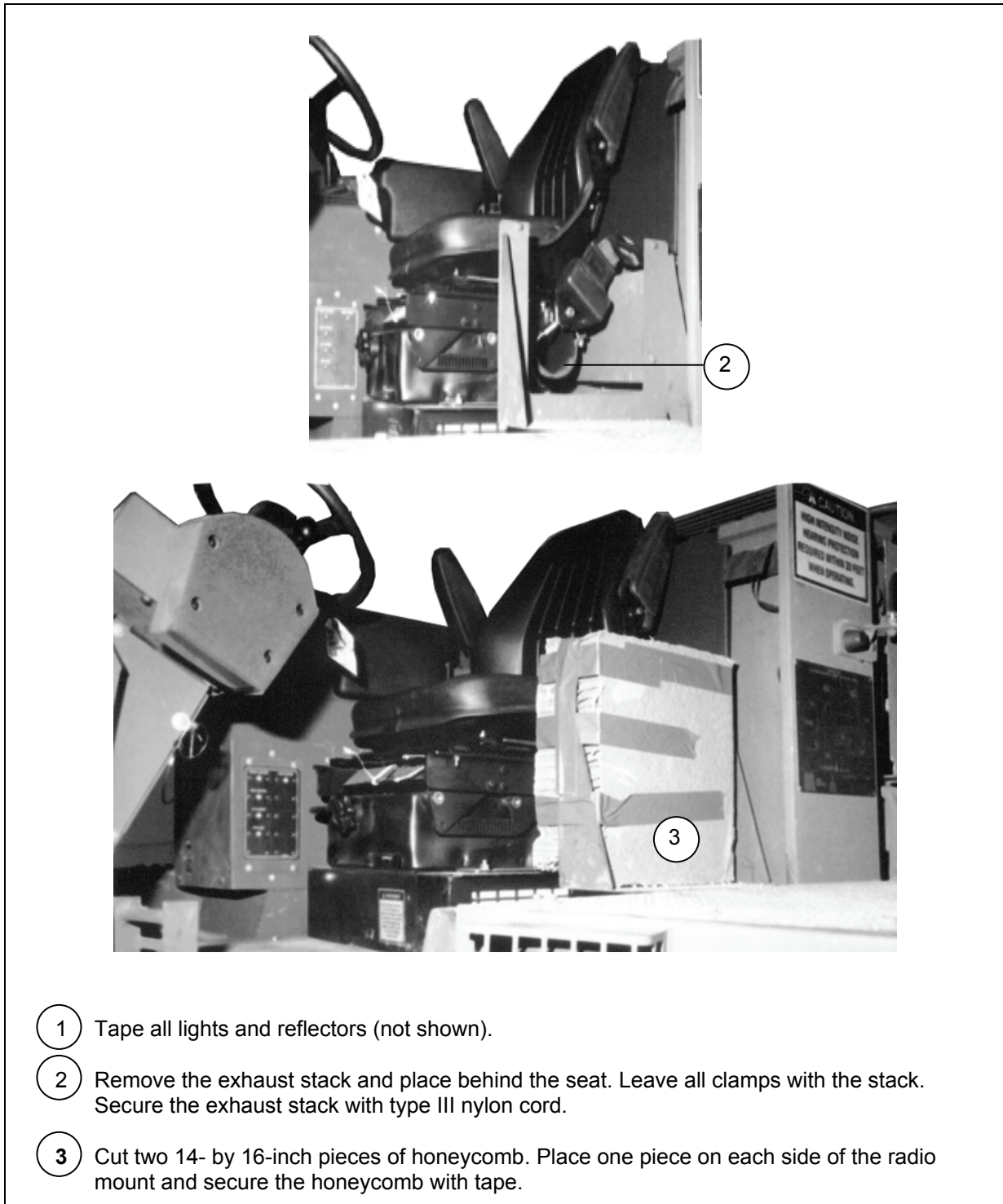


Figure 4-8. DEUCE Prepared

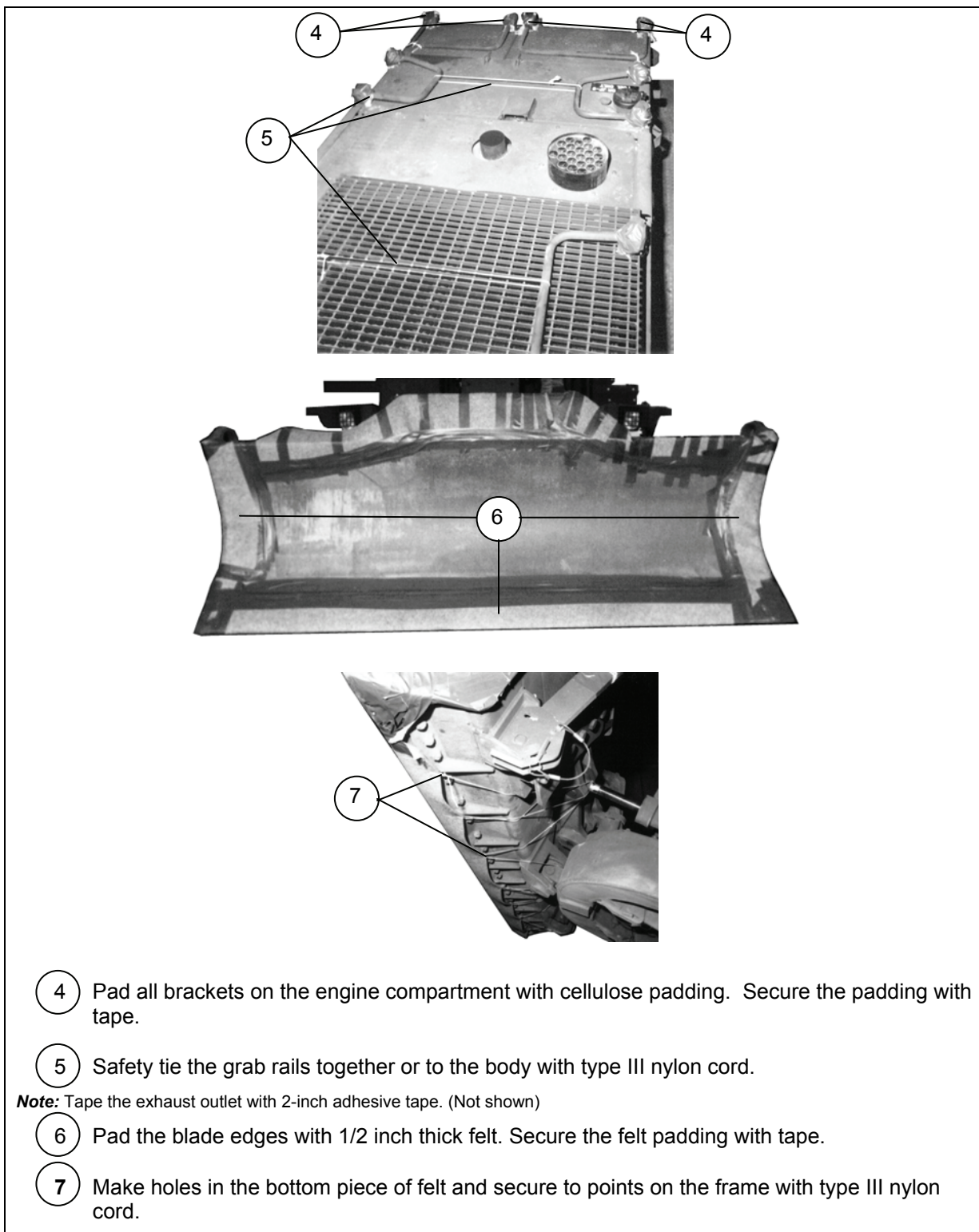
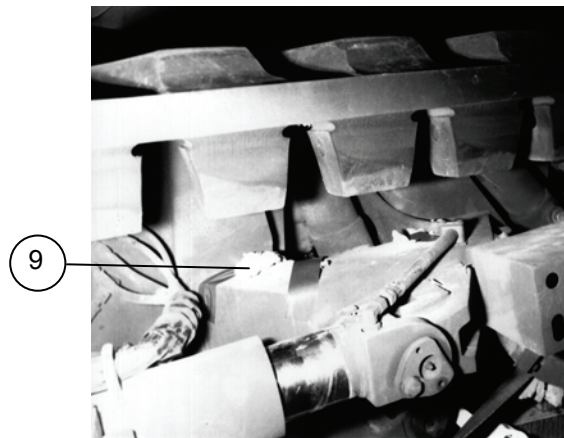
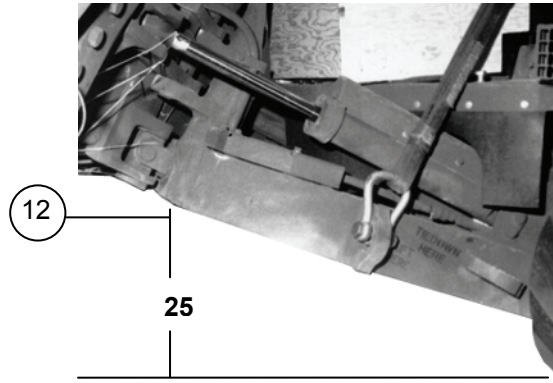
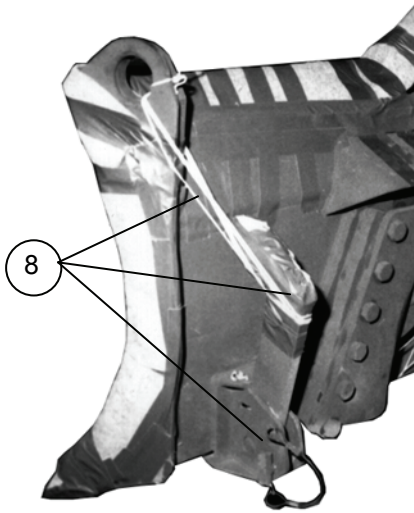


Figure 4-8. DEUCE Prepared (Continued)

**Note.** 1. All measurements are given in inches.



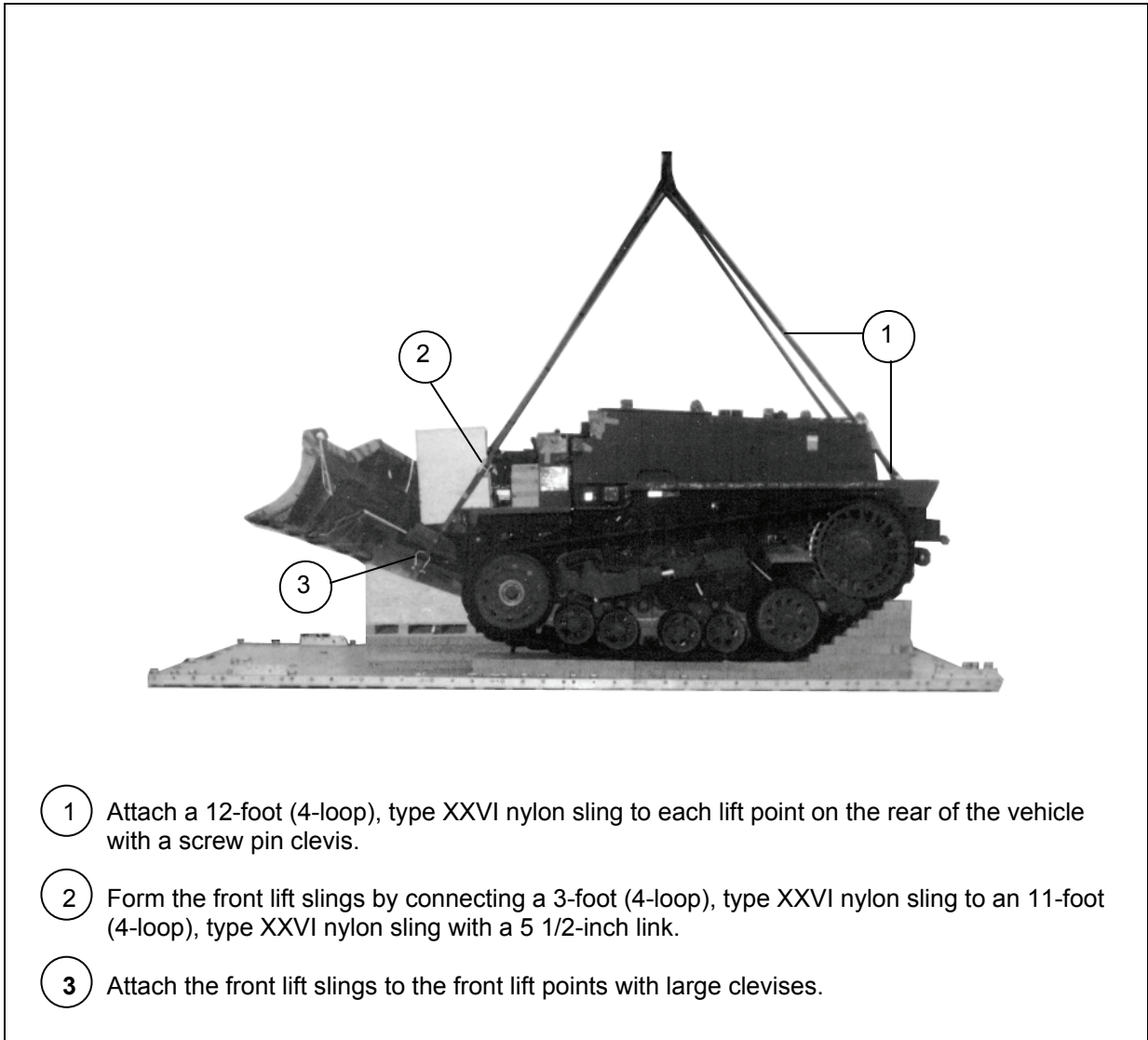
- 8 Pin the blade back rippers in the upright position. Pad the blade back rippers with 1/2-inch thick felt and secure with tape. Safety tie the rippers with type III nylon cord.
- 9 Pad all rough or sharp lashing point edges with cellulose padding and secure with tape.
- 10 Tie the winch hook to the pintle with type III nylon cord (not shown).
- 11 Raise the blade to it's limit. Level and angle the blade all the way to the right (not shown).
- 12 Kneel the DEUCE until the front bottom center of the C-frame is 25 inches above the ground.

**Figure 4-8. DEUCE Prepared (Continued)**



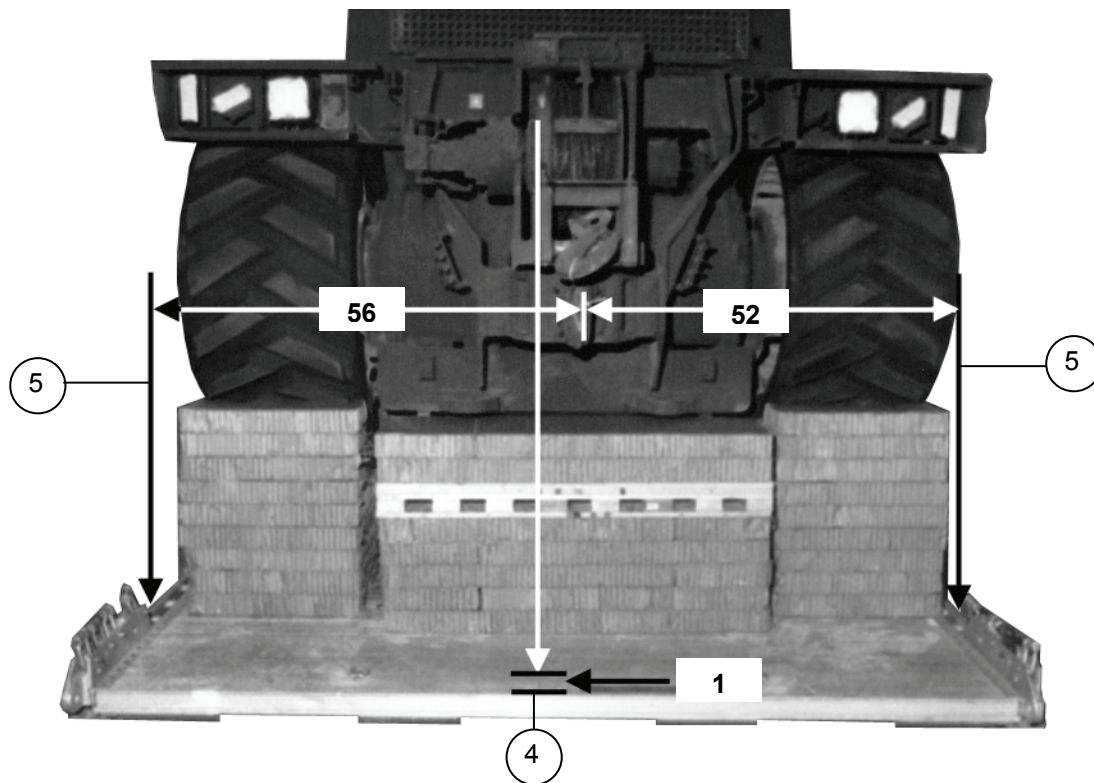
## LIFTING AND POSITIONING THE DEUCE

4-5. Lift and position the DEUCE as shown in Figure 4-9.



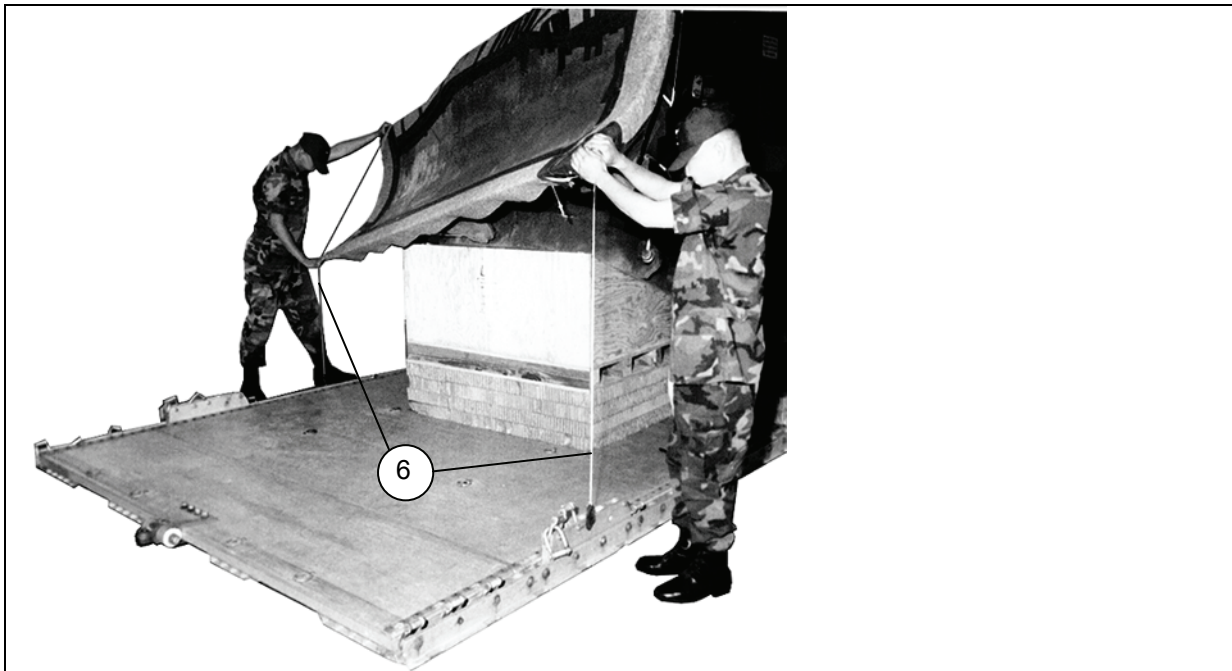
**Figure 4-9. DEUCE Lifted and Positioned on Platform**

**Note.** 1. All measurements are given in inches.



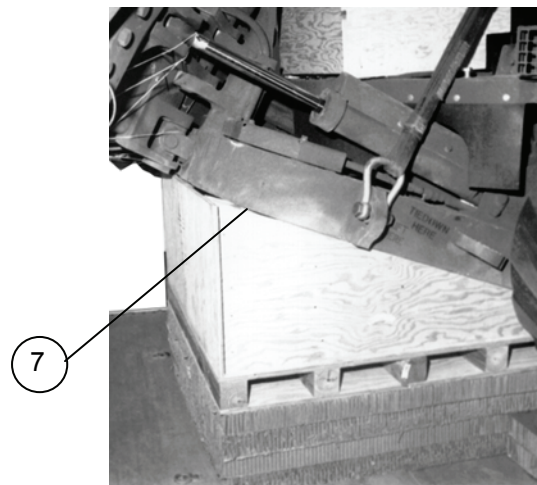
- ④ Position the rear edge of the winch roller 1-inch back from the front edge of the platform.
- ⑤ Align the center of the pintle 52 inches from the outside edge of the left side rail and 56 inches from the outside edge of the right side rail.

**Figure 4-9. DEUCE Lifted and Positioned on Platform (Continued)**



**CAUTION**

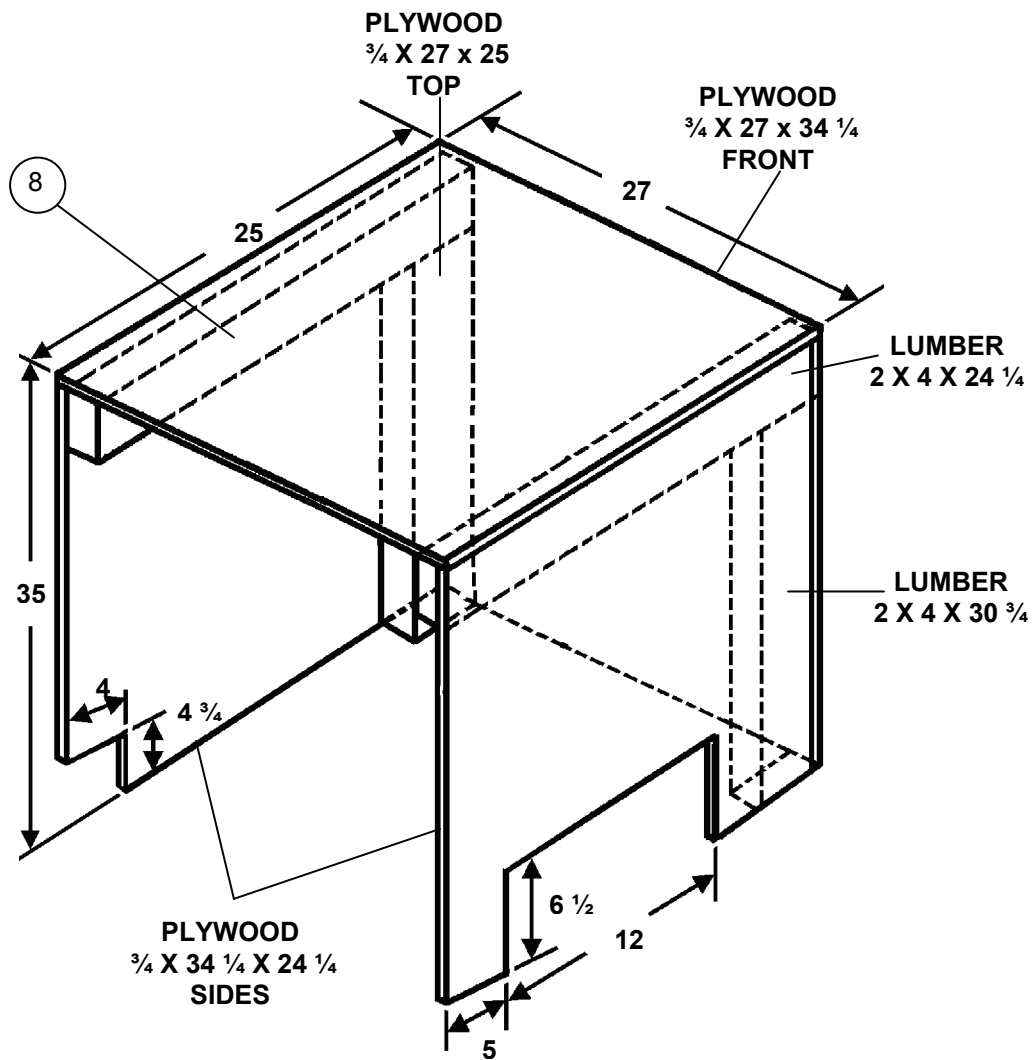
The blade overhang on each side must not exceed 1 inch beyond the platform.



- ⑥ Position two plumb bobs, one on each outside bottom point of the blade. Ensure the outside points do not extend more than 1-inch beyond the outside edge of the side rails.
- ⑦ Ensure the blade C-frame sits squarely on honeycomb stack 3.

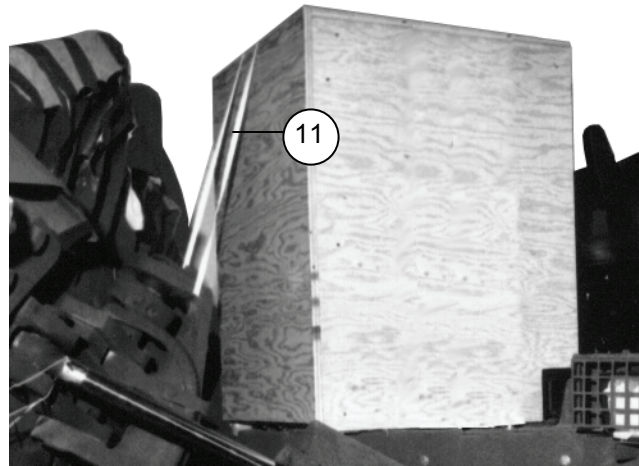
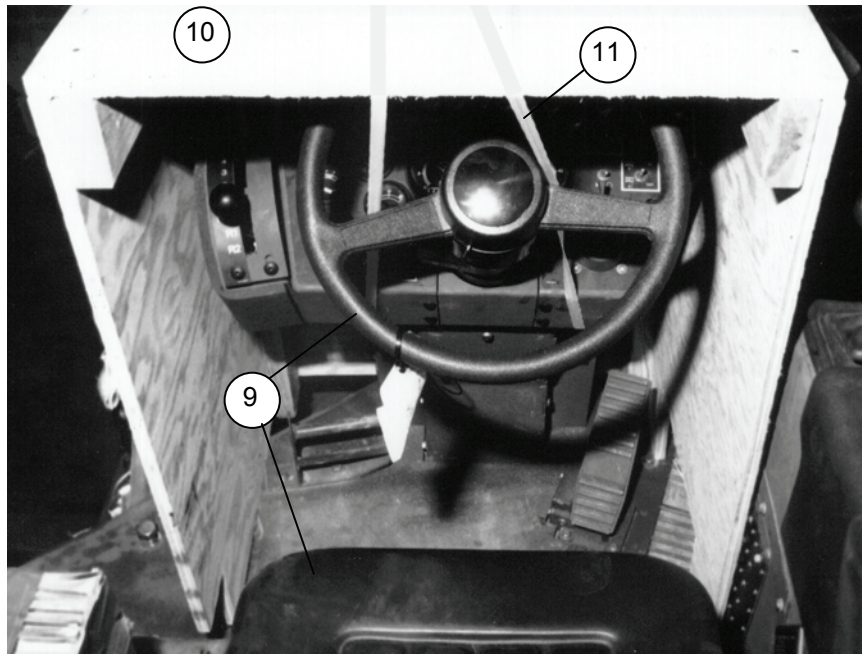
**Figure 4-9. DEUCE Lifted and Positioned on Platform (Continued)**

- Notes.** 1. All measurements are given in inches.  
 2. This drawing is not drawn to scale.



- 8 Construct and nail a box according to the diagram shown above.

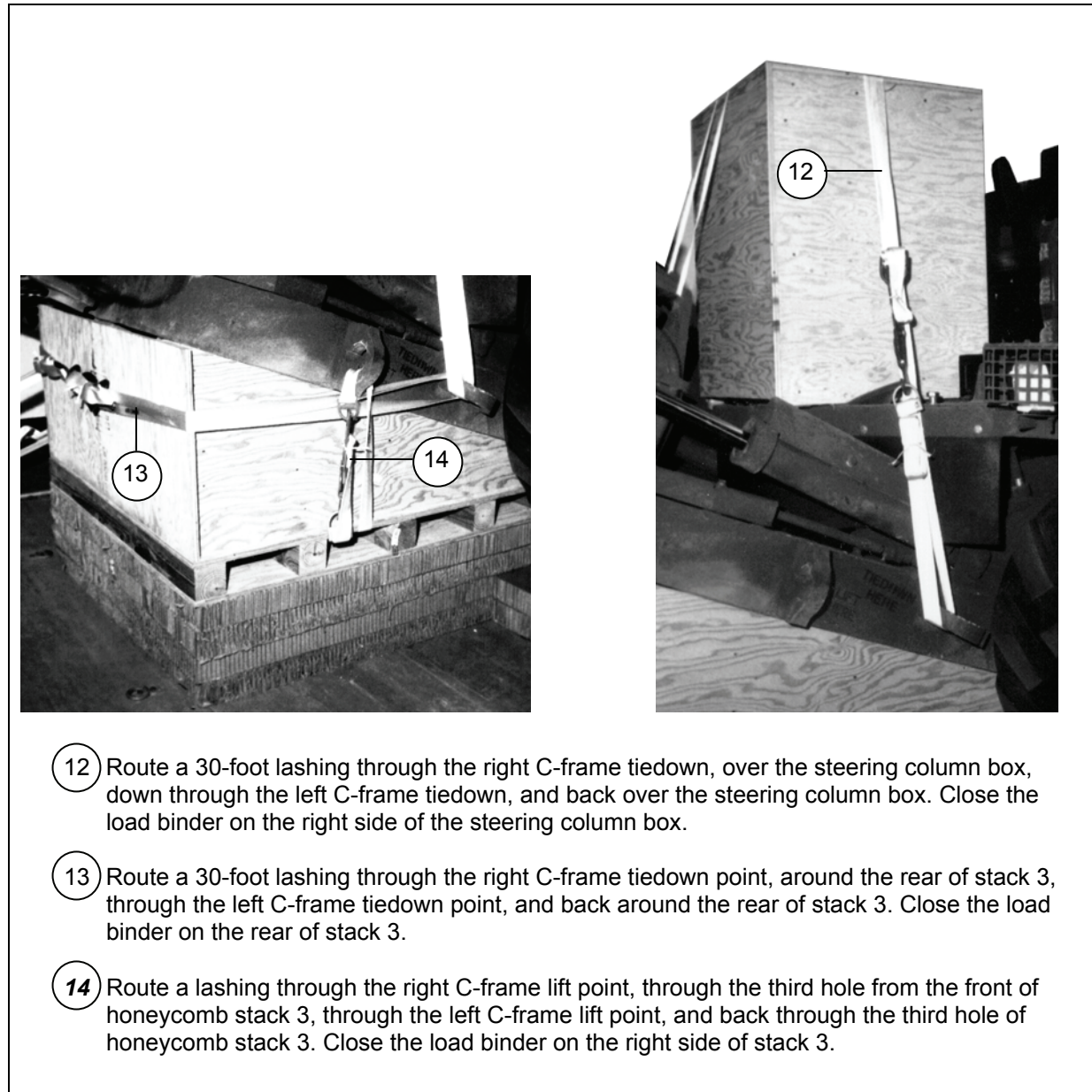
Figure 4-9. DEUCE Lifted and Positioned on Platform (Continued)



- 9 Tilt and lock the steering wheel and compress the seat in the down position.
- 10 Place the box over the steering wheel and column.
- 11 Secure the box with 1/2-inch tubular nylon routed around the steering wheel column, over the box, and tie to the blade pivot point.

Figure 4-9. DEUCE Lifted and Positioned on Platform (Continued)





- ⑫ Route a 30-foot lashing through the right C-frame tiedown, over the steering column box, down through the left C-frame tiedown, and back over the steering column box. Close the load binder on the right side of the steering column box.
- ⑬ Route a 30-foot lashing through the right C-frame tiedown point, around the rear of stack 3, through the left C-frame tiedown point, and back around the rear of stack 3. Close the load binder on the rear of stack 3.
- ⑭ Route a lashing through the right C-frame lift point, through the third hole from the front of honeycomb stack 3, through the left C-frame lift point, and back through the third hole of honeycomb stack 3. Close the load binder on the right side of stack 3.

**Figure 4-9. DEUCE Lifted and Positioned on Platform (Continued)**

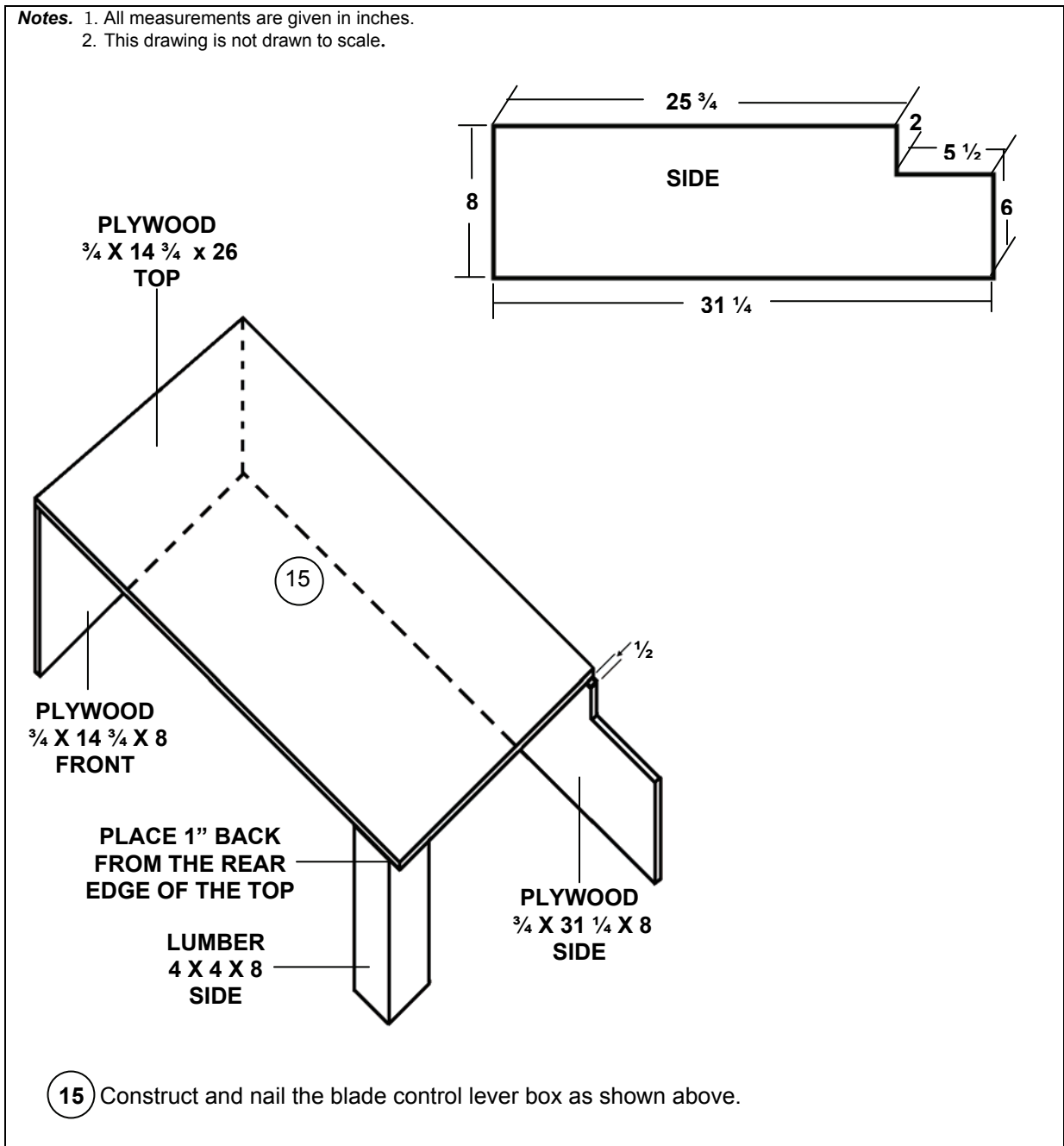
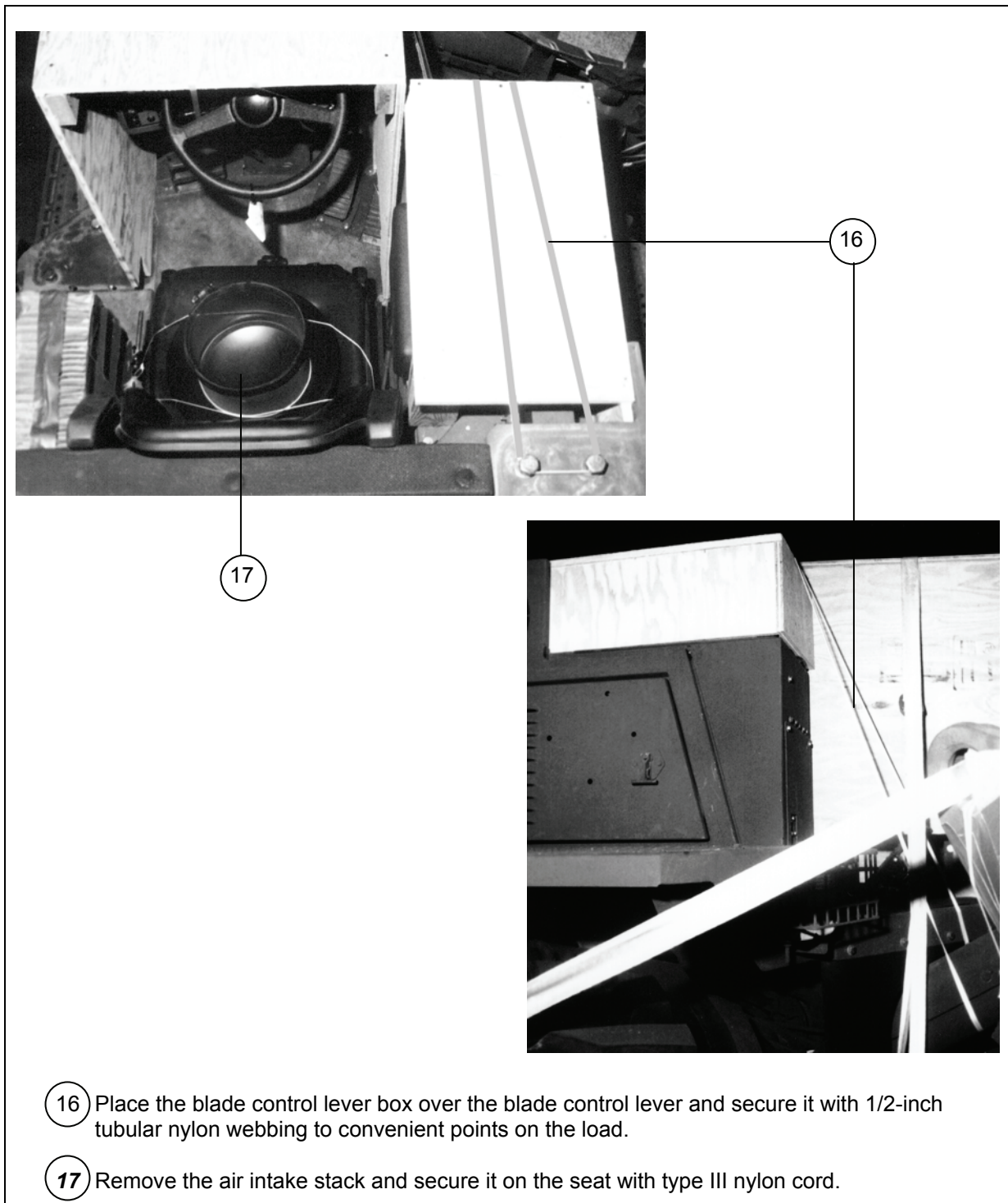


Figure 4-9. DEUCE Lifted and Positioned on Platform (Continued)





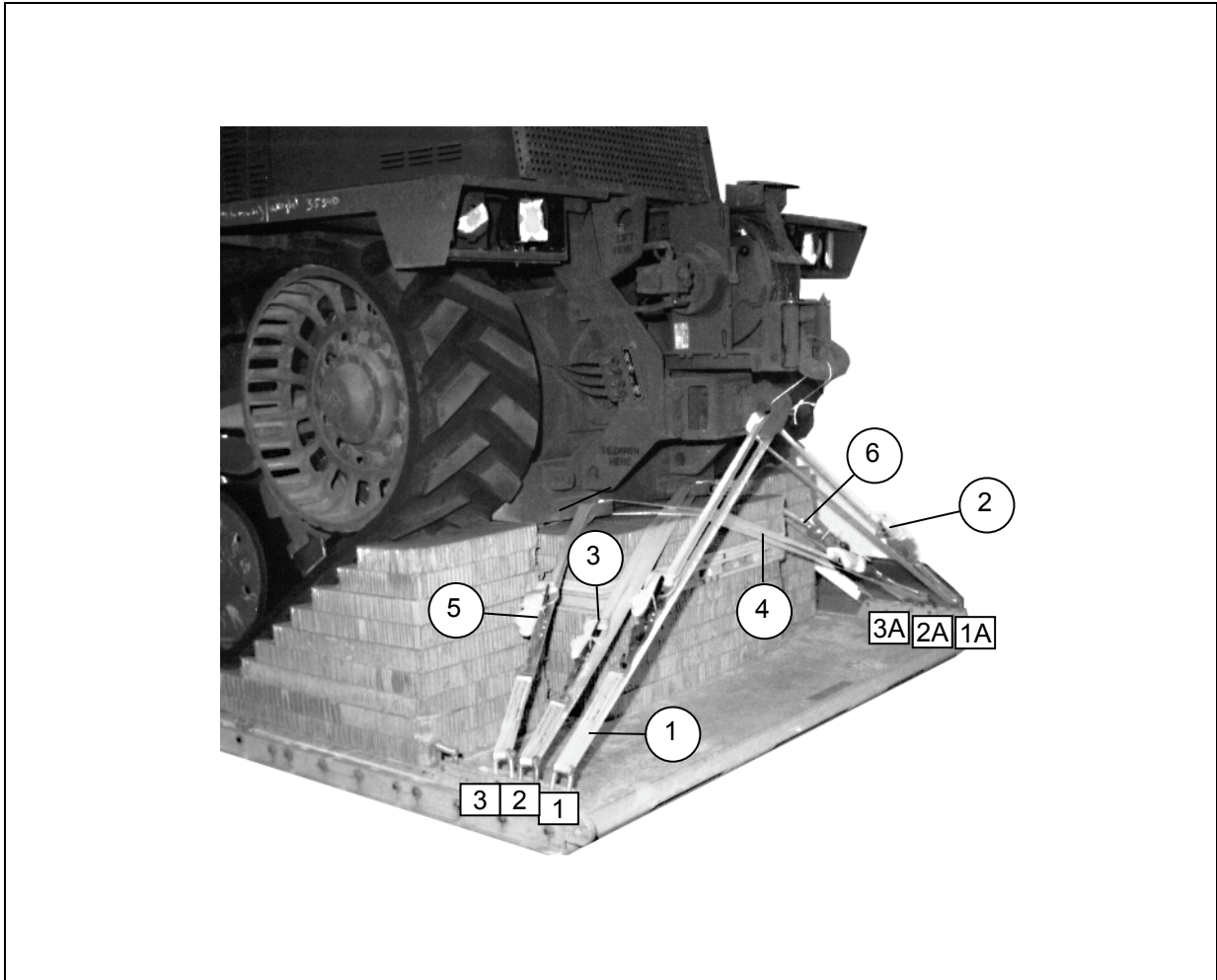
16 Place the blade control lever box over the blade control lever and secure it with 1/2-inch tubular nylon webbing to convenient points on the load.

17 Remove the air intake stack and secure it on the seat with type III nylon cord.

**Figure 4-9. DEUCE Lifted and Positioned on Platform (Continued)**

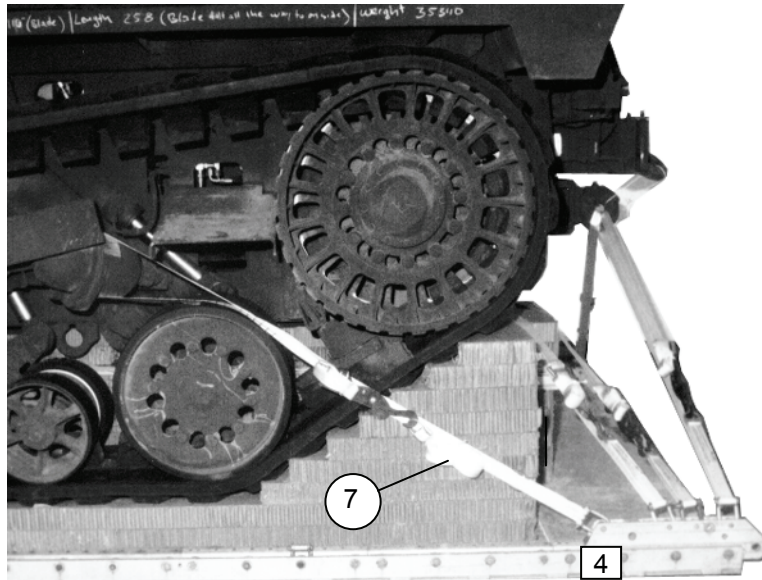
## LASHING LOAD TO PLATFORM

4-6. Lash the DEUCE to the platform as shown in Figure 4-10.

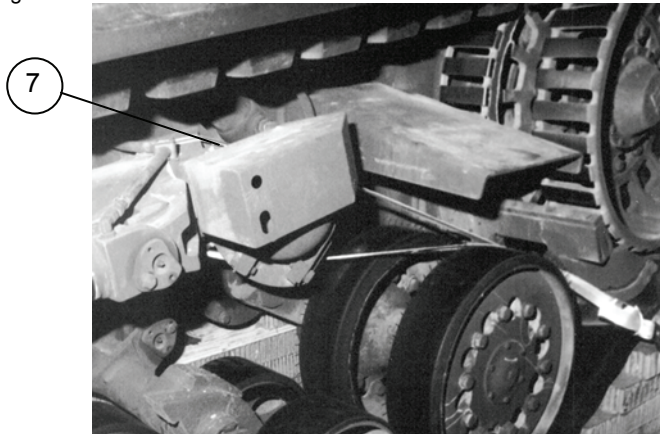


<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
1	1	Pass lashing through: Tow pintle, left side.
2	1A	Tow pintle, right side.
3	2	Right rear tiedown.
4	2A	Left rear tiedown.
5	3	Left rear tiedown.
6	3A	Right rear tiedown.

Figure 4-10. DEUCE Lashed to Platform

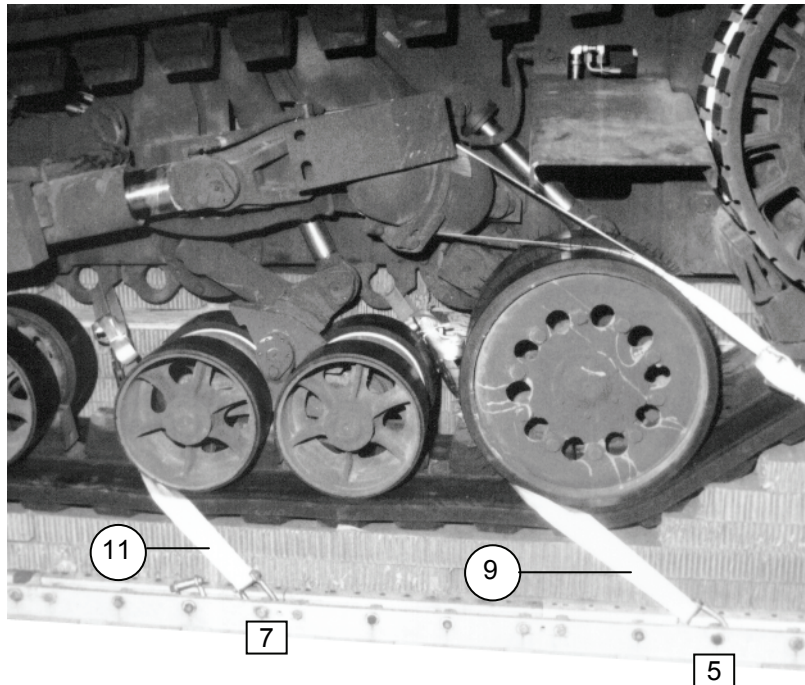


**Note.** Ensure the lashings are routed under all hoses.



<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
7	4	Route a 30-foot lashing over the left rear idler wheel, through the left rear portion of the recoil cylinder mount.
8	4A	Route a 30-foot lashing over the right rear idler wheel, through the right rear portion of the recoil cylinder mount.

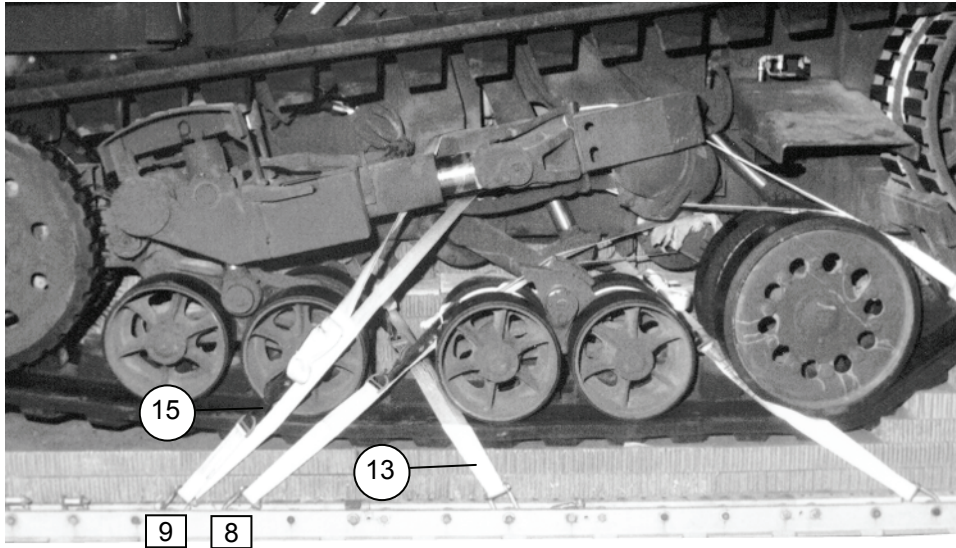
**Figure 4-10. DEUCE Lashed to Platform (Continued)**



<i>Lashing Number</i>	<i>Tiedown Clevis Number</i>	<i>Instructions</i>
9	5	Pass lashing through: Rear frame tiedown, left side.
10	5A	Rear frame tiedown, right side.
11	7	Front frame tiedown, left side.
12	7A	Front frame tiedown, right side.

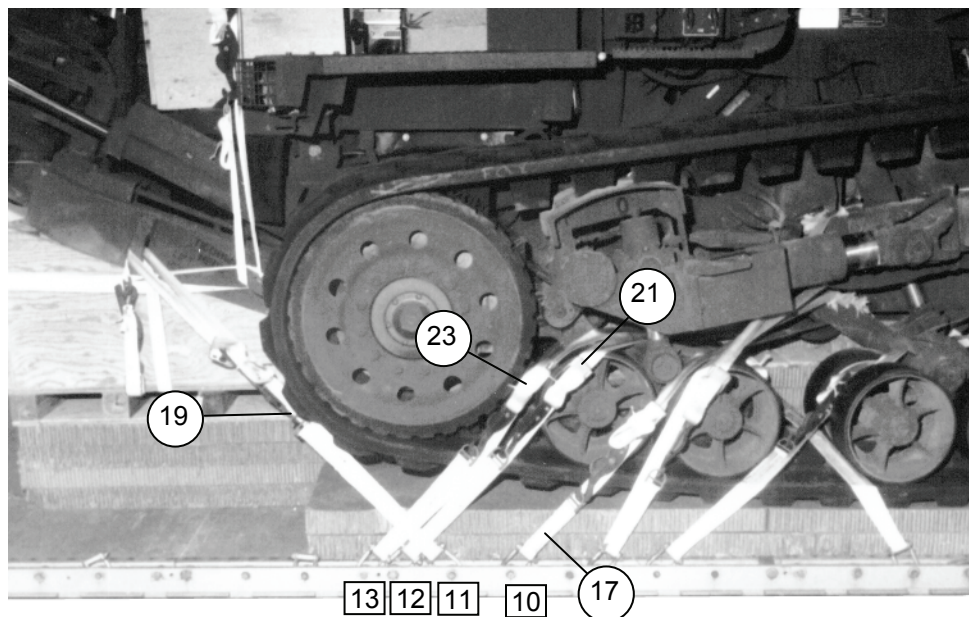
**Figure 4-10. DEUCE Lashed to Platform (Continued)**





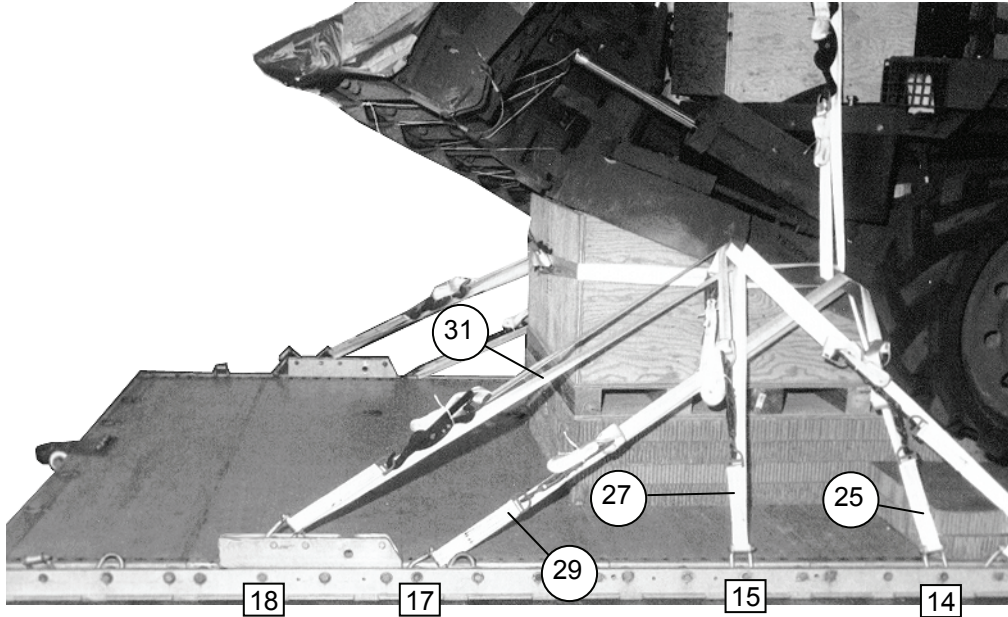
<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
13	8	Pass lashing through: Rear axle mount, left side.
14	8A	Rear axle mount, right side.
15	9	Front portion of the recoil cylinder mount, left side.
16	9A	Front portion of the recoil cylinder mount, right side.

**Figure 4-10. DEUCE Lashed to Platform (Continued)**



<i>Lashing Number</i>	<i>Tiedown Clevis Number</i>	<i>Instructions</i>
17	10	Pass lashing through: Center axle mount, left side.
18	10A	Center axle mount, right side.
19	11	C-frame lift point, left side.
20	11A	C-frame lift point, right side.
21	12	Center frame tiedown, left side.
22	12A	Center frame tiedown, right side.
23	13	Front frame tiedown, left side.
24	13A	Front frame tiedown, right side.

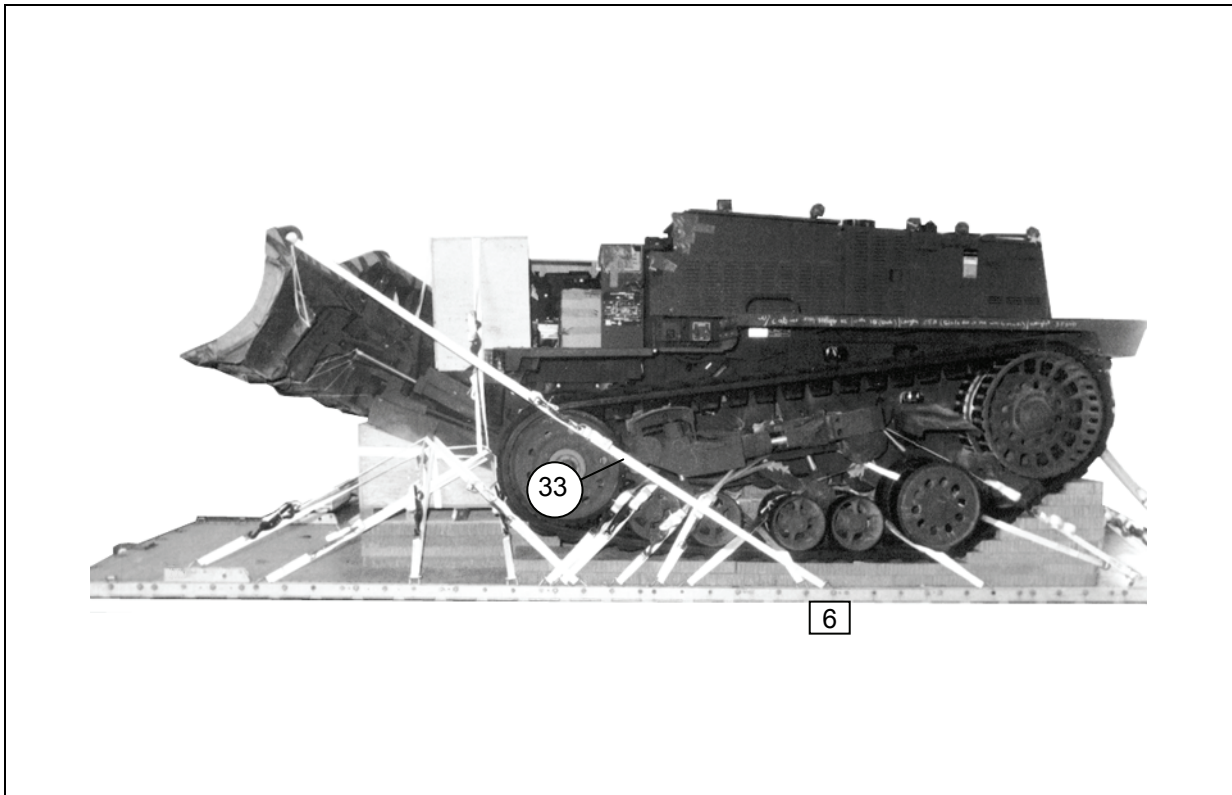
**Figure 4-10. DEUCE Lashed to Platform (Continued)**



<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
25	14	Pass lashing through: C-frame tiedown, left side.
26	14A	C-frame tiedown, right side.
27	15	C-frame lift point, left side.
28	15A	C-frame lift point, right side.
29	17	C-frame tiedown, left side
30	17A	C-frame tiedown, right side.
31	18	C-frame lift point, left side.
32	18A	C-frame lift point, right side.

**Figure 4-10. DEUCE Lashed to Platform (Continued)**





<i>Lashing Number</i>	<i>Tiedown Clevis Number</i>	<i>Instructions</i>
33	6	Route a 30-foot lashing through the blade lift point, left side.
34	6A	Route a 30-foot lashing through the blade lift point, right side.

**Figure 4-10. DEUCE Lashed to Platform (Continued)**

## INSTALLING THE REAR STEP BOX AND LOAD COVER

4-7. Install the rear step box and load cover as shown in Figure 4-11.

**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.

The technical drawing shows a side view of the rear step box assembly. The materials and dimensions are as follows:

- PLYWOOD**  $\frac{3}{4}$  X 3  $\frac{1}{2}$  X 19 (Left side panel)
- FELT**  $\frac{1}{2}$  X 55  $\frac{3}{4}$  X 10 (Middle padding)
- PLYWOOD**  $\frac{3}{4}$  X 3  $\frac{1}{2}$  X 11 (Right side panel)
- PLYWOOD**  $\frac{3}{4}$  X 3  $\frac{1}{2}$  X 19 (Right end panel)
- LUMBER** 4 X 4 X 19 (Left support)
- LUMBER** 2 X 4 X 11 (Middle support)
- PLYWOOD**  $\frac{3}{4}$  X 55  $\frac{3}{4}$  X 19 (Bottom base)
- LUMBER** 4 X 4 X 19 (Right support)

Dimensions shown in the drawing:

- 12  $\frac{1}{4}$  (Distance from left support to first felt panel)
- 10  $\frac{1}{2}$  (Distance between felt panels)
- 10  $\frac{1}{2}$  (Distance between felt panels)
- 4 (Thickness of the middle support)

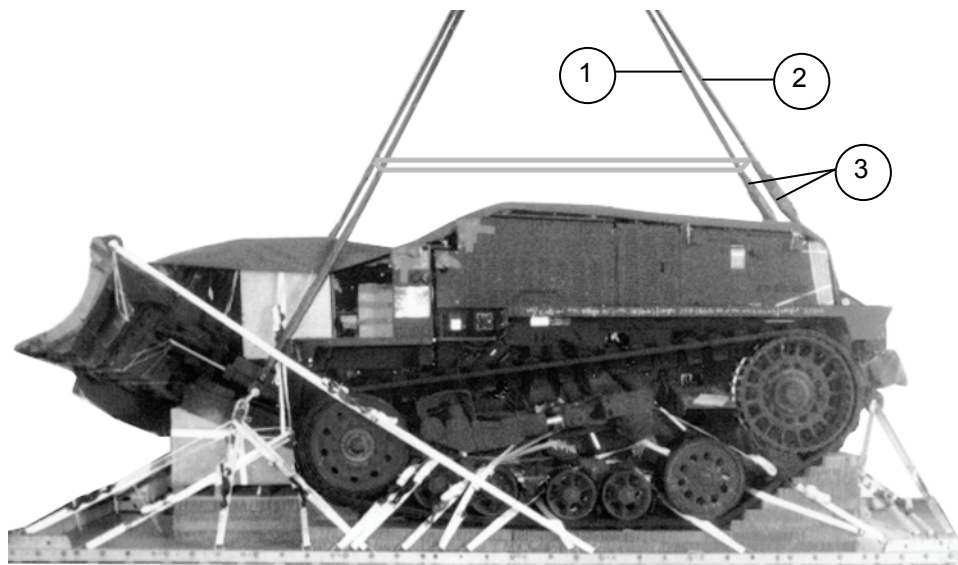
The photographs show the assembly process:

- Build the rear step box as shown above. Nail all components together.
- Raise the rear step and place the step box over the step. Secure the step box with 1/2-inch tubular nylon webbing.
- Cover the load with a 60-inch by 25-foot piece of canvas. Secure the canvas with type III nylon cord.

Figure 4-11. Rear Step Box Placed and Load Covered

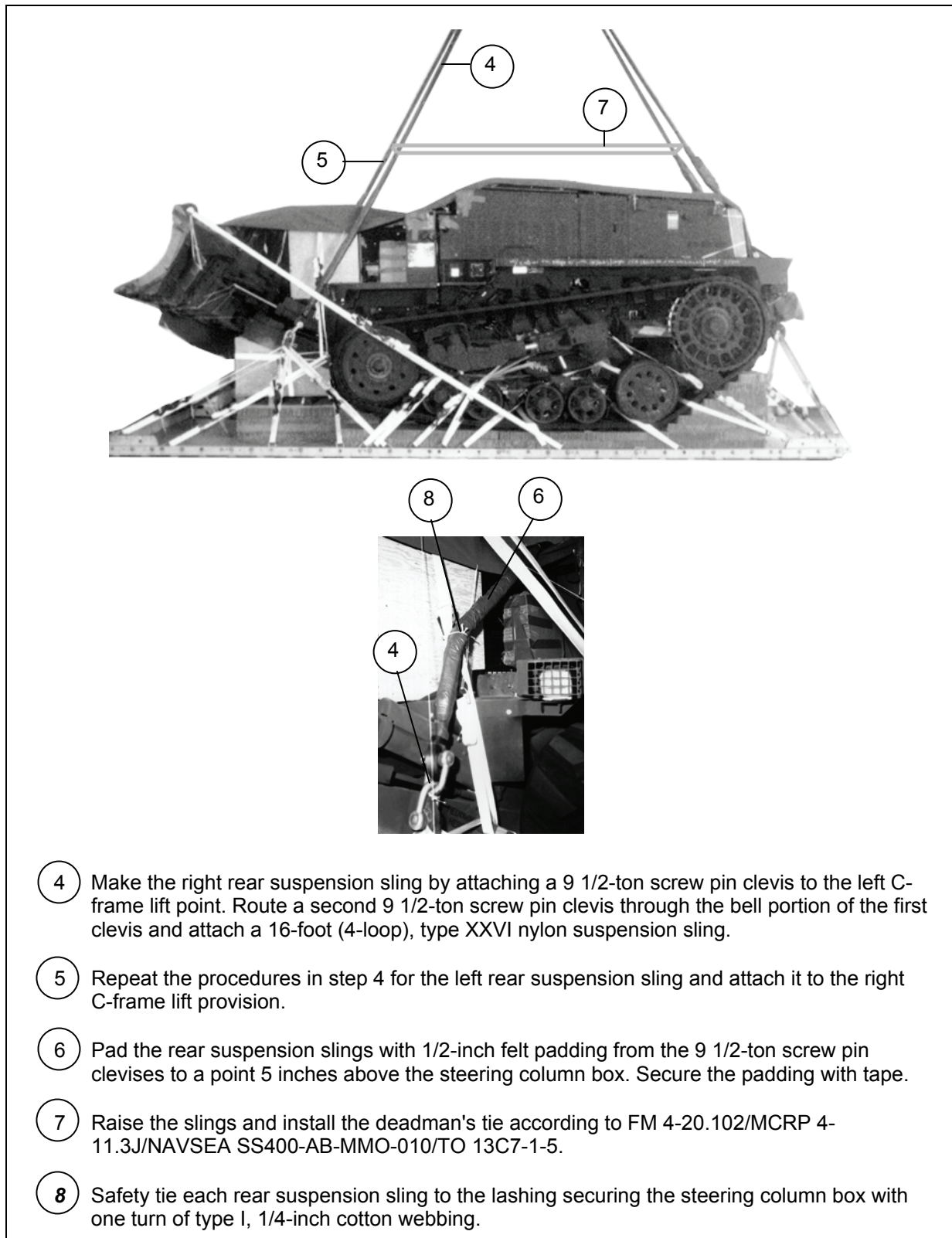
## INSTALLING SUSPENSION SLINGS AND DEADMAN'S TIE

4-8. Install the suspension slings and deadman's tie as shown in Figure 4-12.



- 1 Make the left front suspension sling by connecting an 11-foot (4-loop), type XXVI nylon suspension sling to a 3-foot (4-loop), type XXVI nylon suspension sling with a 5 1/2-inch link. Route a 9 1/2-ton screw pin clevis through the end of the 3-foot suspension sling and attach the clevis to the right rear lift point on the DEUCE.
- 2 Repeat the procedures in step 1 for the right front suspension sling and attach it to the left rear lift point on the DEUCE.
- 3 Pad the 5 1/2-inch links with 1/2-inch felt padding. Secure the padding with tape.

Figure 4-12. Suspension Slings and Deadman's Tie Installed

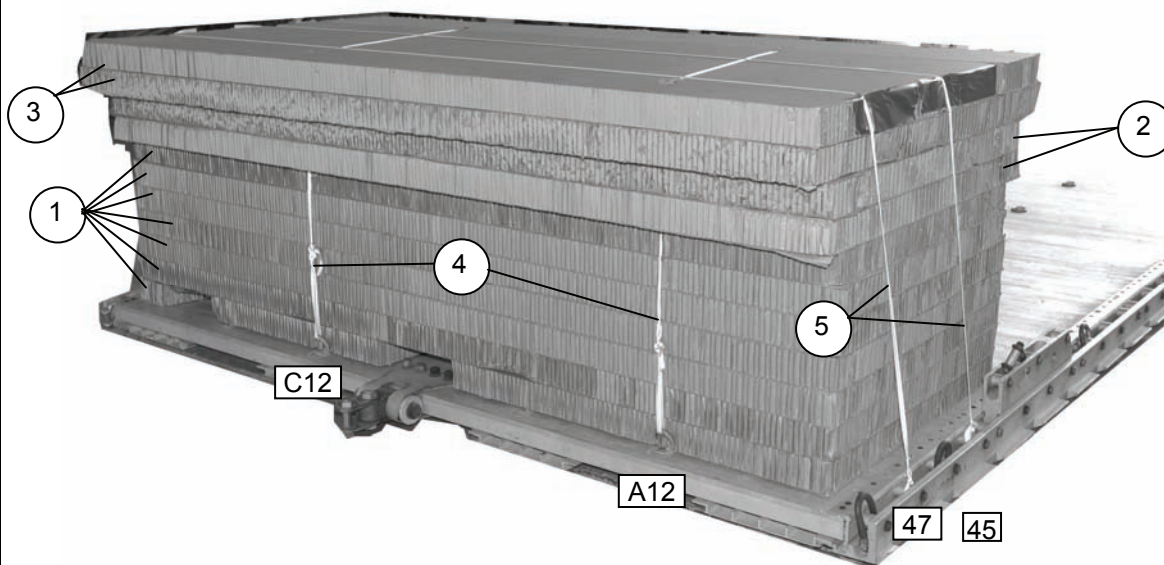


**Figure 4-12. Suspension Slings and Deadman's Tie Installed (Continued)**

## BUILDING AND POSITIONING PARACHUTE STOWAGE PLATFORM

4-9. Build and position the parachute stowage platform as shown in Figure 4-13.

**Note.** Cut channels in the bottom layer of honeycomb for the extraction bracket and the extraction cable.



- 1 Glue seven pieces of 96-inch by 36-inch honeycomb together to form a base. Center the base 2 inches forward of the rear edge of the platform. Cut channels in the bottom layer of honeycomb for the extraction bracket and the extraction cable.
- 2 Cut two pieces of 96-inch by 5-inch honeycomb and two pieces of 96-inch by 36-inch honeycomb. Position and glue the pieces on top of the honeycomb base, centered forming two 96-inch by 41-inch layers.
- 3 Cut two pieces of 96-inch by 11-inch honeycomb and two pieces of 96-inch by 36-inch honeycomb. Position and glue the pieces on top of the 96-inch by 41-inch layers, centered forming two 96-inch by 47-inch layers.
- 4 Make a hole through the top four layers of honeycomb directly above deck rings A11, B11, A12 and C12. Tie one end of a length of 1/2-inch tubular nylon webbing to deck ring A11. Route the running end through the hole above A11 over the top of the stowage platform, down through the hole and secure the webbing to deck ring A12. Repeat the procedure with a second length of 1/2-inch tubular nylon webbing using deck rings B11 and C12. Tape the edges of the holes and the front edge of the top layer of honeycomb.
- 5 Tape the side edges of the top layer of honeycomb. Route a length of 1/2-inch tubular nylon webbing from bushing 45 over the top of the platform and secure on bushing 45A. Repeat the procedure with another length of 1/2-inch tubular nylon and bushings 47 and 47A.

Figure 4-13. Parachute Stowage Platform Built and Positioned



## PREPARING AND STOWING CARGO PARACHUTES

4-10. Prepare and stow the cargo parachutes as shown in Figure 4-14.

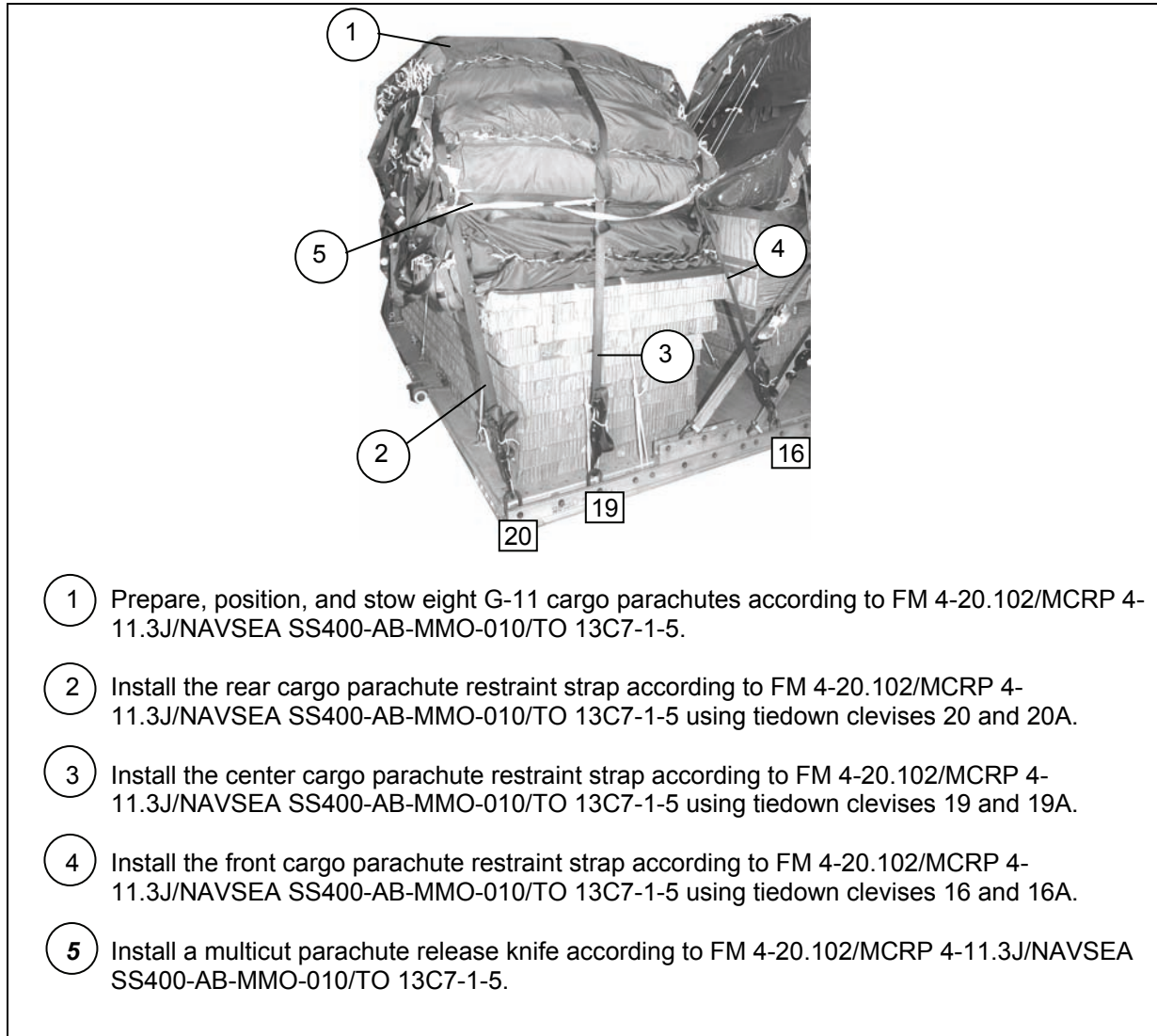


Figure 4-14. Cargo Parachutes Prepared and Stowed

## INSTALLING EXTRACTION SYSTEM

4-11. Install the extraction system as shown in Figure 4-15.

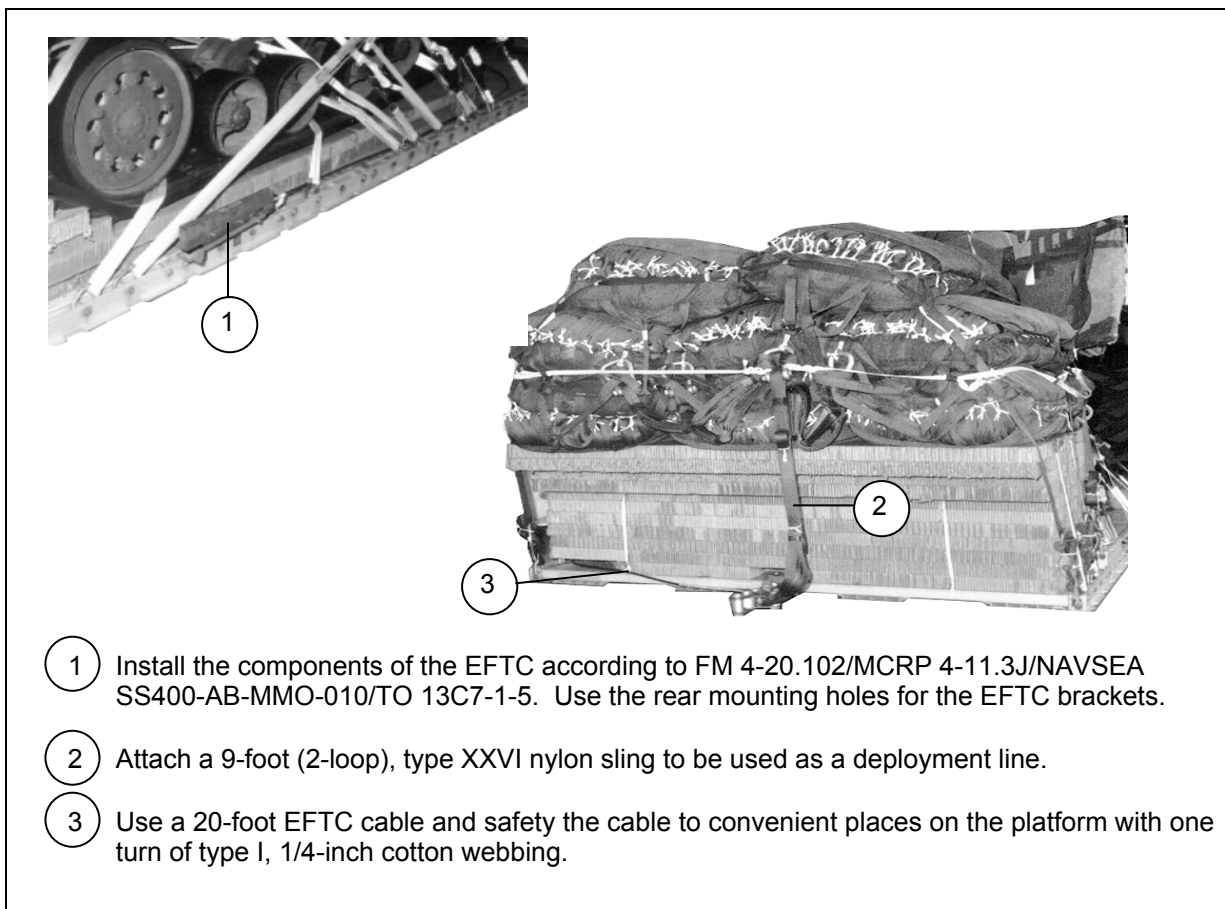
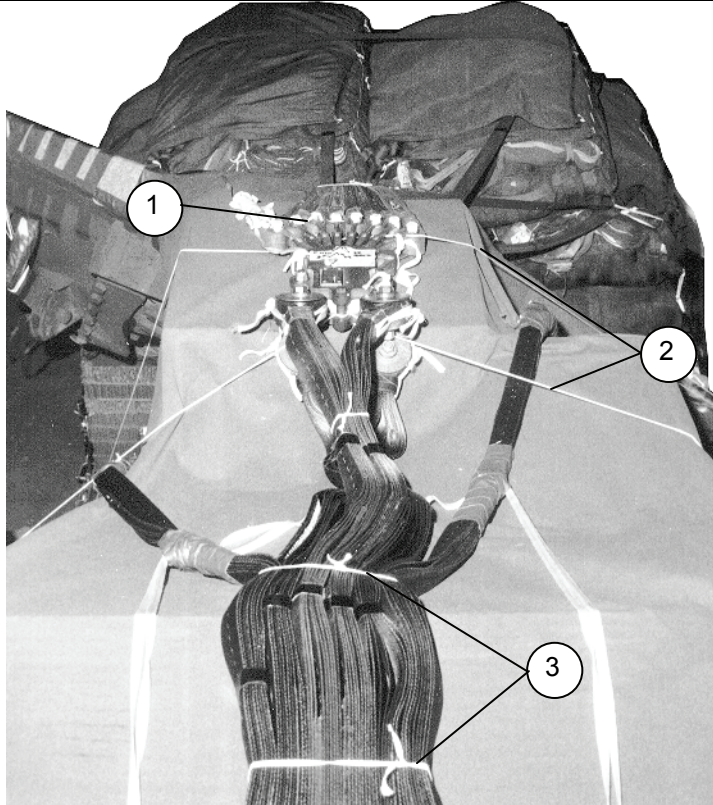


Figure 4-15. Extraction System Installed



## INSTALLING PARACHUTE RELEASE

4-12. Prepare, attach, and safety an M-2 cargo parachute release according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figure 4-16.



- 1 Place the M-2 cargo parachute release on top of the steering column box and attach the suspension slings and riser extensions.
- 2 Safety the top and bottom of the release to convenient places on the load with type III nylon cord according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.
- 3 S-fold and tie any excess suspension slings with one turn of type I, 1/4-inch cotton webbing.

**Figure 4-16. M-2 Cargo Parachute Release Installed**

## **PLACING EXTRACTION PARACHUTE**

4-13. Select the extraction parachute and extraction line needed using the extraction line requirements table in FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5. Place the extraction parachute and line on the load for installation in the aircraft.

## **INSTALLING PROVISIONS FOR EMERGENCY RESTRAINTS**

4-14. Select and install the provisions for the emergency aft restraints according to the emergency aft restraint requirements table in FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.

## **MARKING RIGGED LOAD**

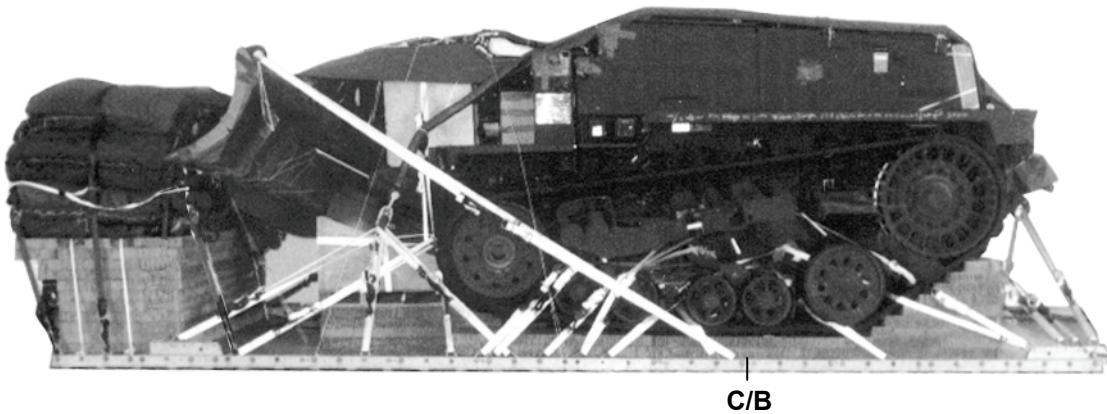
4-15. Mark the rigged load according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5, and as shown in Figure 4-17. Complete Shipper's Declaration for Dangerous Goods. If the load varies from the one shown, the weight, height, CB, and parachute requirements must be recomputed.

## **EQUIPMENT REQUIRED**

4-16. Use the equipment listed in Table 4-1 to rig this load.

**CAUTIONS**

1. Make the final rigger inspection required by AR 59-4 and FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 before the load leaves the rigging site.
2. Remeasure the width of the load after the load is placed on the 60K-Loader. Make sure the load has not shifted.
3. Prior to movement make sure all lashing are taut to prevent vehicle movement.



**RIGGED LOAD DATA**

Weight: Load Shown.....	40,340 pounds
Maximum Weight.....	40,800 pounds
Height.....	101 ½ inches
Width.....	110 inches
Overall Length .....	310 inches
Overhang: Front.....	0
Rear (Parachute stowage platform).....	22-inches
Center of Balance (CB) (from front edge of the platform).....	122 inches

**Figure 4-17. Deployable Universal Combat Earthmover (DEUCE), Rigged on a 24-Foot, Type V Platform for Low-Velocity Airdrop**

**Table 4-1. Equipment Required for Rigging the Deployable Universal Combat Earthmover on a 24-Foot, Type V Platform for Low-Velocity Airdrop**

<i>National Stock Number</i>	<i>Item</i>	<i>Quantity</i>
8040-00-273-8713	Adhesive paste, 1-gal.	As required
4030-00-432-2516	Clevis, screw-pin, large	6
4030-00-090-5354	Clevis, suspension, 1-inch (large)	6
8305-00-880-8155	Cloth, coated (nylon, type II, 17.0 oz, green, 60-in)	As required
4020-00-240-2146	Cord, nylon, type III, 550-lb	As required
1670-00-434-5787	Coupling, airdrop extraction force transfer, w/20-ft. cable	1
1670-00-360-0328	Cover, clevis	8
8135-00-664-6958	Cushioning material (Cellulose padding)	As required
8305-00-958-3685	Felt, 1/2-inch thick	As required
1670-01-183-2678	Leaf, extraction line (line bag) ( add 2 for C-17)	2
	Line extraction:	
1670-01-064-4454	60-foot (6-loop), type XXVI (for C-130)	1
1670-01-468-9178	140-foot (6-loop), type XXVI (for C-17)	1
1670-01-064-4452	60-foot (1-loop), type XXVI (for C-17), (drogue line)	1
1670-00-783-5988	Link assembly, type IV (C-17 only)	1
	Link assembly, two-point:	
5306-00-435-8994	Bolt, 1-inch diameter, 4-inches long	4
5310-00-232-5165	Nut, 1-inch	4
1670-00-003-1954	Plate, side, 5 1/2-inch	4
5365-00-007-3414	Spacer, large	4
1670-00-006-2752	Link, four-point	1
	Lumber:	
5510-00-220-6146	2- by 4- by 96-inch	10
5315-00-010-4659	Nail, steel, common, 8D	As required
5315-00-753-3885	Nail, steel, common, 16D	As required
1670-00-753-3928	Pad, energy-dissipating (honeycomb)	35 sheets
1670-01-016-7841	Parachute, cargo, G-11C	8
	Parachute, cargo, extraction:	
1670-00-040-8135	28-foot	2
1670-01-063-3715	15-foot (C-17 only)	1
	Platform, airdrop, type V, 24-foot:	
1670-01-162-2372	Clevis assembly (type V)	42
1670-01-162-2376	Extraction bracket assembly	1
1670-01-247-2389	Link, suspension bracket, type V	2
1670-01-162-2381	Tandem link assembly (Multipurpose link)	2
5530-00-128-4981	Plywood, 3/4-inch	9 sheets

**Table 4-1. Equipment Required for Rigging the Deployable Universal Combat Earthmover on a 24-Foot, Type V Platform for Low-Velocity Airdrop (Continued)**

<i>National Stock Number</i>	<i>Item</i>	<i>Quantity</i>
1670-01-097-8817	Release, cargo parachute, M-2	1
	Sling, cargo, airdrop:	
1670-01-062-6306	3-foot (4-loop), type XXVI	5
1670-01-062-6304	9-foot (2-loop), type XXVI	1
1670-01-062-6310	11-foot (4-loop), type XXVI	2
1670-01-062-6307	12-foot (4-loop), type XXVI	2
1670-01-062-6308	16-foot (4-loop), type XXVI	6
1670-01-062-6311	120-foot (2-loop), type XXVI	8
5340-00-040-8219	Strap, parachute, release, multi-knife	2
7501-00-266-5016	Tape, adhesive, 2-inch	As required
1670-00-937-0271	Tiedown assembly, 15-foot	49
1670-01-483-8259	Link, Parachute, Connector (H-block) (C-17 only)	1
	Webbing:	
8305-00-268-2411	Cotton, 1/4-inch, type I	As required
8305-00-082-5752	Nylon, tubular, 1/2-inch	As required
8305-00-260-6890	Nylon, type X	As required
8305-00-268-2455	Nylon, tubular, 1-inch, OD 7	As required

## Chapter 5

# Rigging the T200 Bobcat Compact Track Loader on a 28-Foot, Type V Platform for Low-Velocity Airdrop

### DESCRIPTION OF THE LOAD

5-1. The T-200 Bobcat compact track loader (Figure 5-1) is rigged on a 28-foot, type V airdrop platform using four G-11 cargo parachutes. The T-200 Bobcat compact track loader is 81 inches high, 77 inches wide, 105 inches long, and weighs 8,300 pounds. An accompanying load which consists of a roller attachment, an angle broom (sweeper) attachment, a front-end bucket loader attachment and a hydraulic breaker (hammer) attachment is also rigged with the load. The roller attachment weighs 1,880 pounds, the angle broom (sweeper) attachment weighs 880 pounds, the front-end bucket loader attachment weighs 540 pounds and the hydraulic breaker (hammer) attachment weighs 760 pounds.

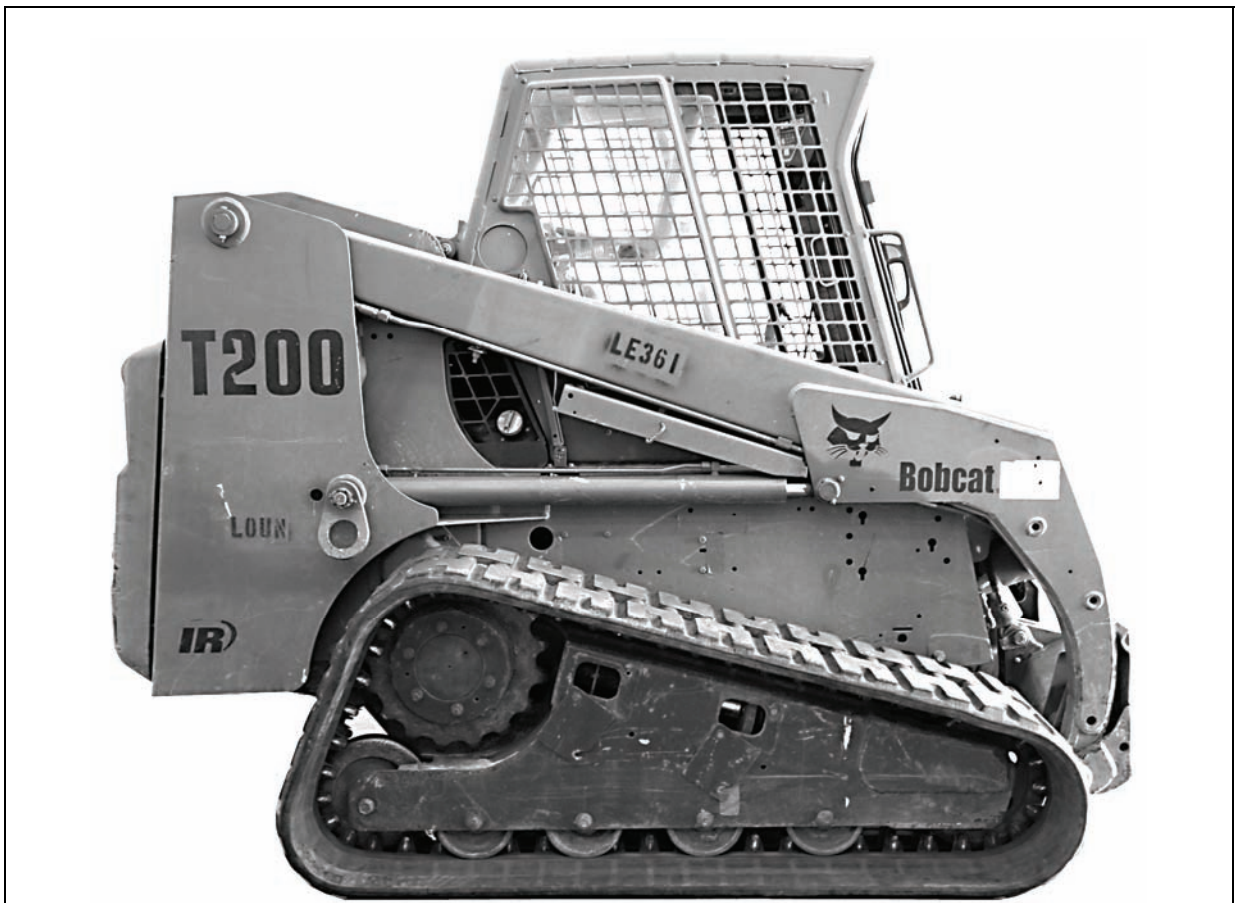
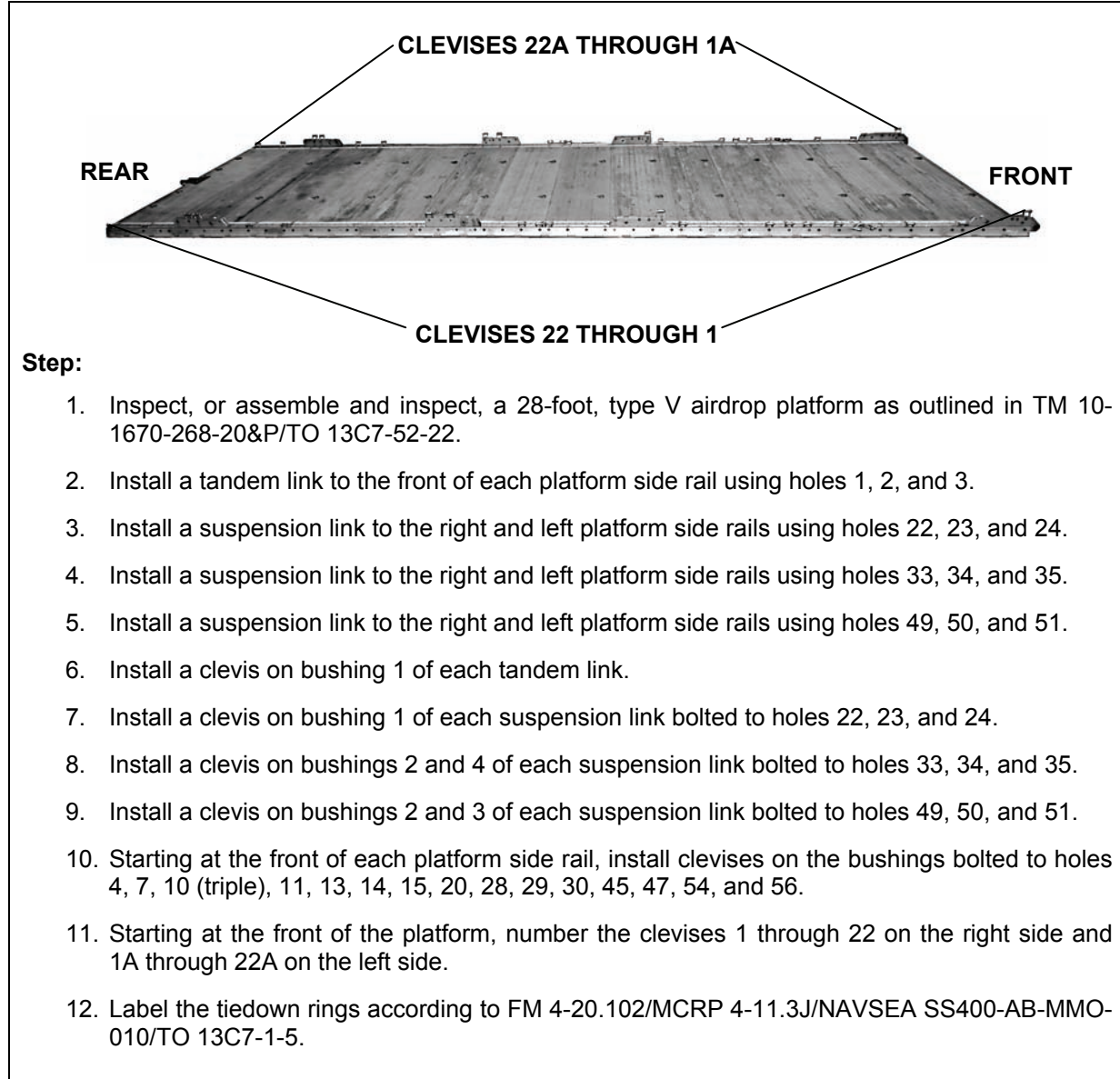


Figure 5-1. T200 Bobcat Compact Track Loader

## PREPARING PLATFORM

5-2. Prepare a 28-foot, type V airdrop as shown in Figure 5-2.



**Step:**

1. Inspect, or assemble and inspect, a 28-foot, type V airdrop platform as outlined in TM 10-1670-268-20&P/TO 13C7-52-22.
2. Install a tandem link to the front of each platform side rail using holes 1, 2, and 3.
3. Install a suspension link to the right and left platform side rails using holes 22, 23, and 24.
4. Install a suspension link to the right and left platform side rails using holes 33, 34, and 35.
5. Install a suspension link to the right and left platform side rails using holes 49, 50, and 51.
6. Install a clevis on bushing 1 of each tandem link.
7. Install a clevis on bushing 1 of each suspension link bolted to holes 22, 23, and 24.
8. Install a clevis on bushings 2 and 4 of each suspension link bolted to holes 33, 34, and 35.
9. Install a clevis on bushings 2 and 3 of each suspension link bolted to holes 49, 50, and 51.
10. Starting at the front of each platform side rail, install clevises on the bushings bolted to holes 4, 7, 10 (triple), 11, 13, 14, 15, 20, 28, 29, 30, 45, 47, 54, and 56.
11. Starting at the front of the platform, number the clevises 1 through 22 on the right side and 1A through 22A on the left side.
12. Label the tiedown rings according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.

**Figure 5-2. Platform Prepared**



## BUILDING AND POSITIONING HONEYCOMB STACKS

5-3. Build the honeycomb stacks as shown in Figures 5-3 through 5-10. Position the stacks as shown in Figure 5-11.

**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.

**HONEYCOMB 6 X 23**

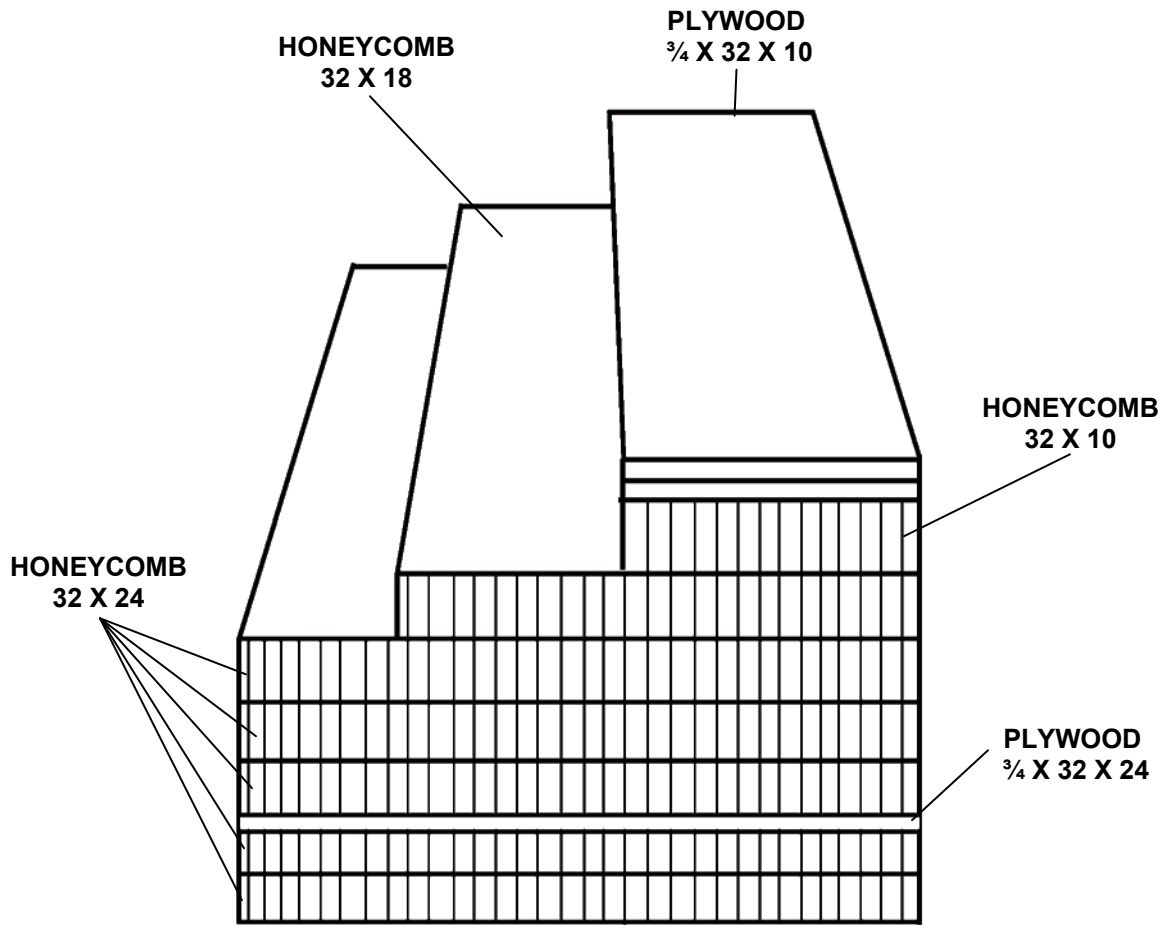
**PLYWOOD 3/4 X 72 X 30**

**HONEYCOMB 72 X 30**

Stack Number	Pieces	Width (Inches)	Length (Inches)	Material	Instructions
1	1	72	30	Honeycomb	This is the base.
	1	72	30	3/4 -inch Plywood	Center and glue to base.
	2	72	30	Honeycomb	Glue pieces together. Center and glue on top of 72-inch by 30-inch plywood.
	4	23	6	Honeycomb	Glue one piece flush on each corner of the base.

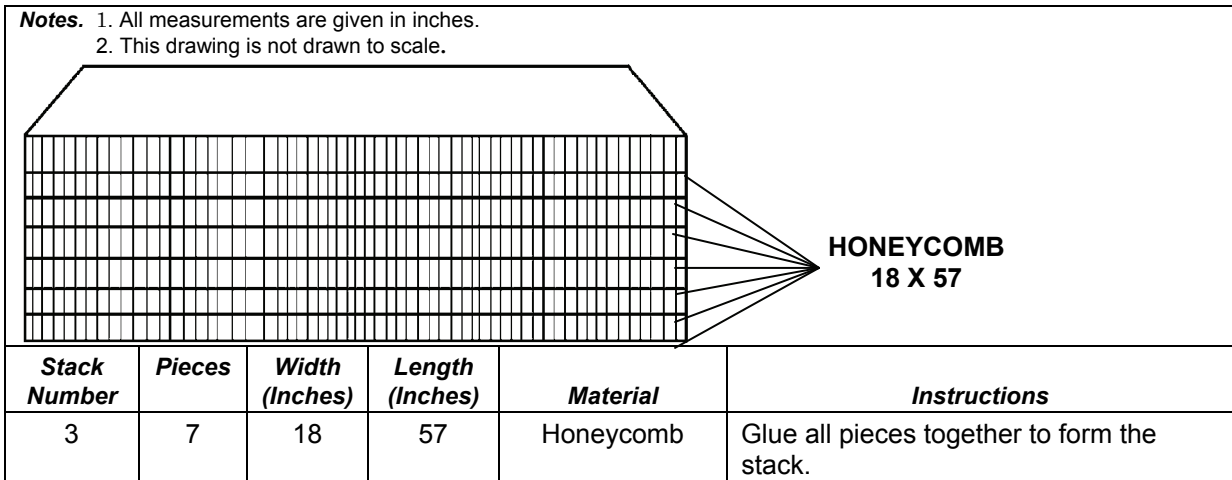
Figure 5-3. Honeycomb Stack 1 Prepared

**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.

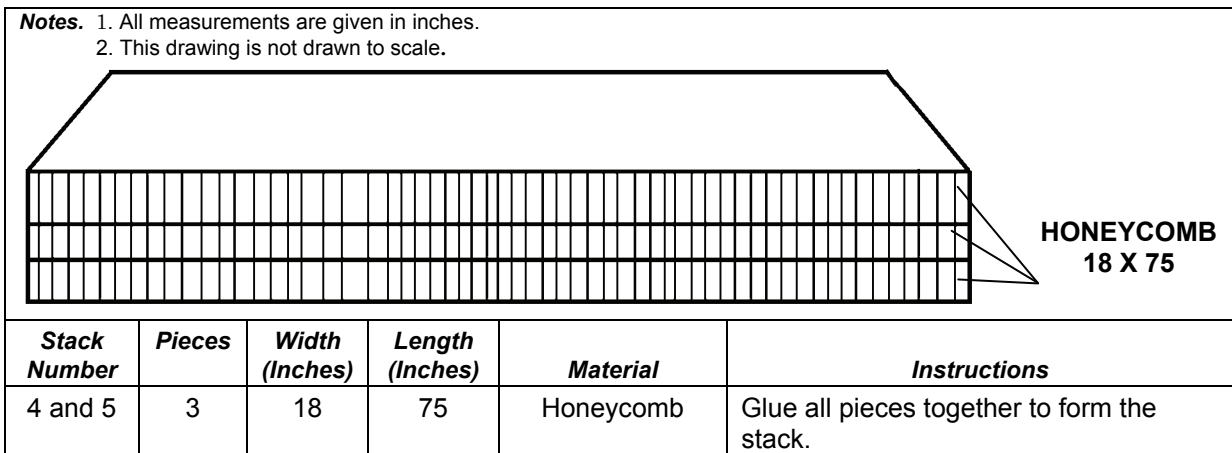


<b>Stack Number</b>	<b>Pieces</b>	<b>Width (Inches)</b>	<b>Length (Inches)</b>	<b>Material</b>	<b>Instructions</b>
2	2	32	24	Honeycomb	This is the base.
	1	32	24	3/4 -inch Plywood	Center and glue to base.
	3	32	24	Honeycomb	Glue pieces together. Center and glue on top of 32-inch by 24-inch plywood.
	1	32	18	Honeycomb	Glue piece flush on rear of base.
	1	32	10	Honeycomb	Glue piece flush on rear of 32-inch by 18-inch honeycomb.
	2	32	10	3/4 -inch Plywood	Glue pieces flush on rear of 32-inch by 10-inch honeycomb.

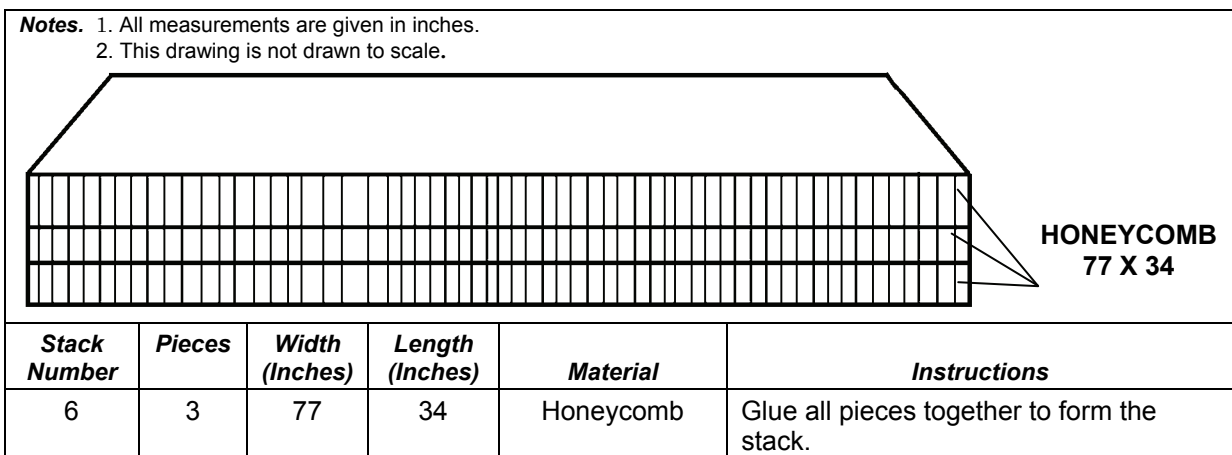
**Figure 5-4. Honeycomb Stack 2 Prepared**



**Figure 5-5. Honeycomb Stack 3 Prepared**

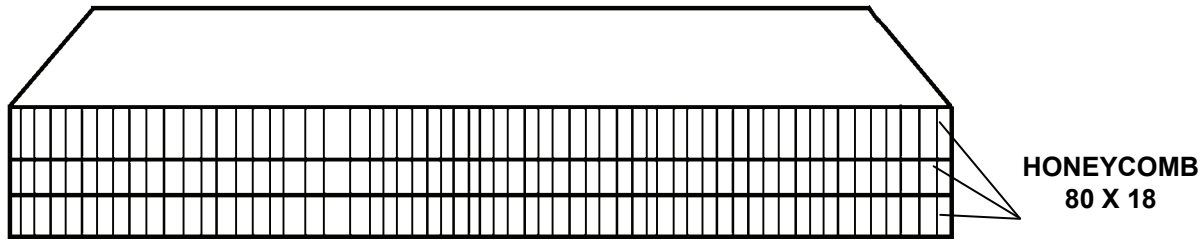


**Figure 5-6. Honeycomb Stacks 4 and 5 Prepared**



**Figure 5-7. Honeycomb Stack 6 Prepared**

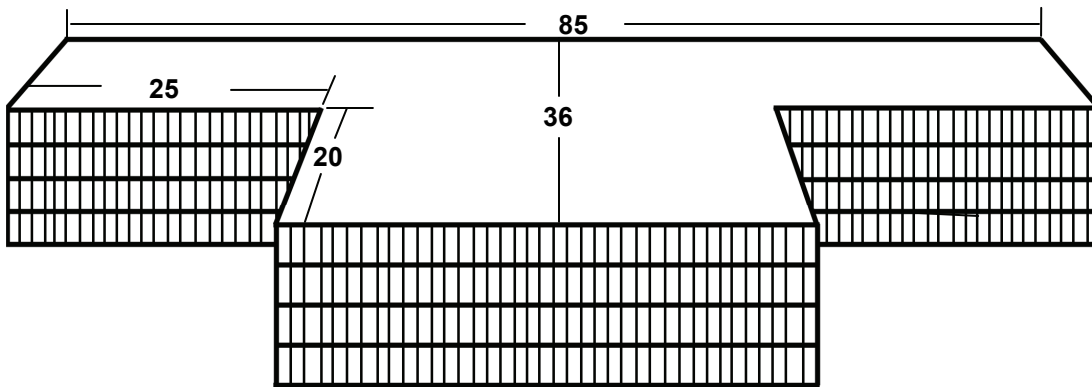
**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



<b>Stack Number</b>	<b>Pieces</b>	<b>Width (Inches)</b>	<b>Length (Inches)</b>	<b>Material</b>	<b>Instructions</b>
7	3	80	18	Honeycomb	Glue all pieces together to form the stack.

**Figure 5-8. Honeycomb Stack 7 Prepared**

**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



<b>Stack Number</b>	<b>Pieces</b>	<b>Width (Inches)</b>	<b>Length (Inches)</b>	<b>Material</b>	<b>Instructions</b>
8	4	85	36	Honeycomb	Glue all pieces together to form the stack. Make a 25- by 20-inch cutout at each front corner with the 25-inch length along the 85-inch edge.

**Figure 5-9. Honeycomb Stack 8 Prepared**

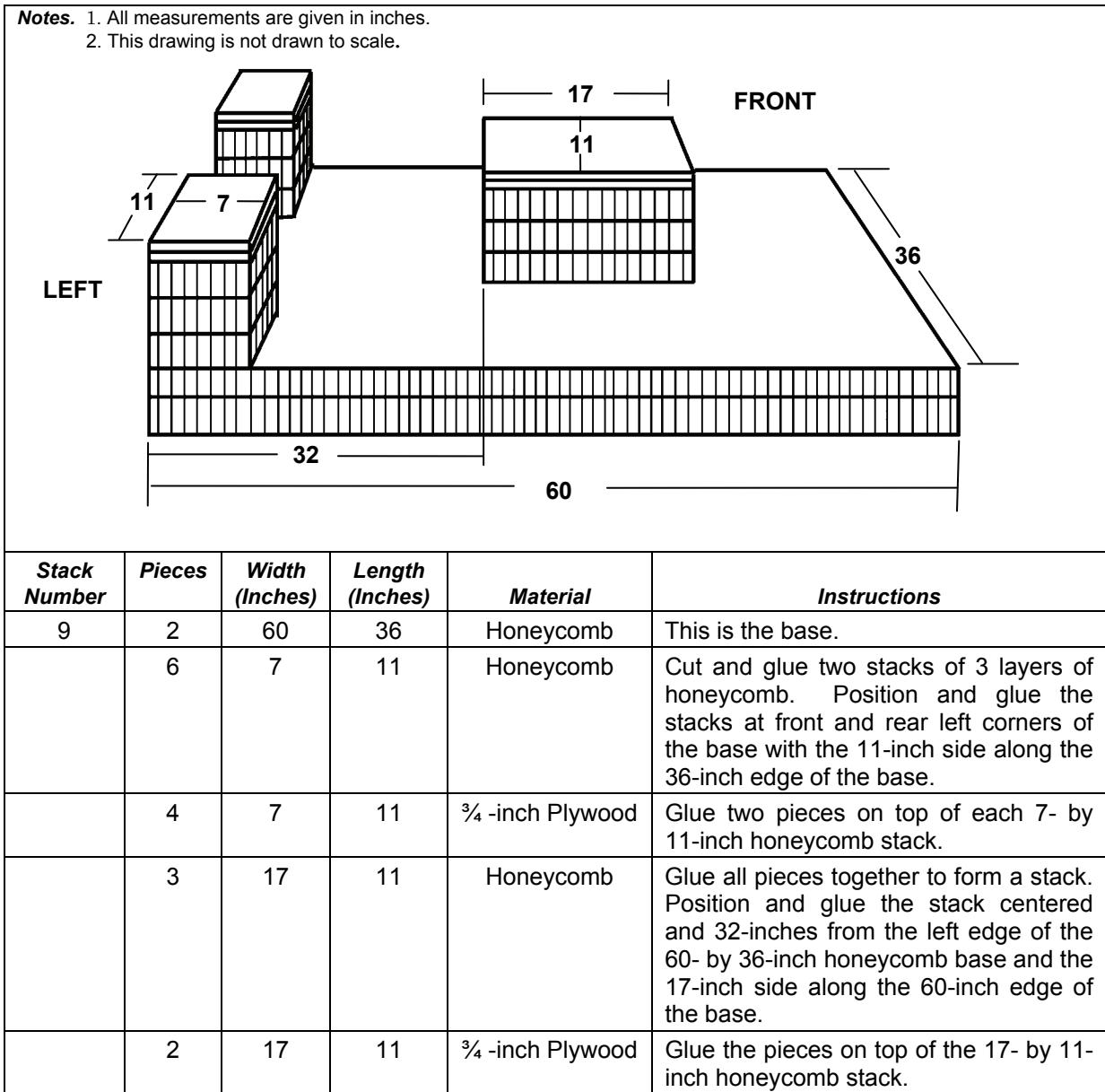
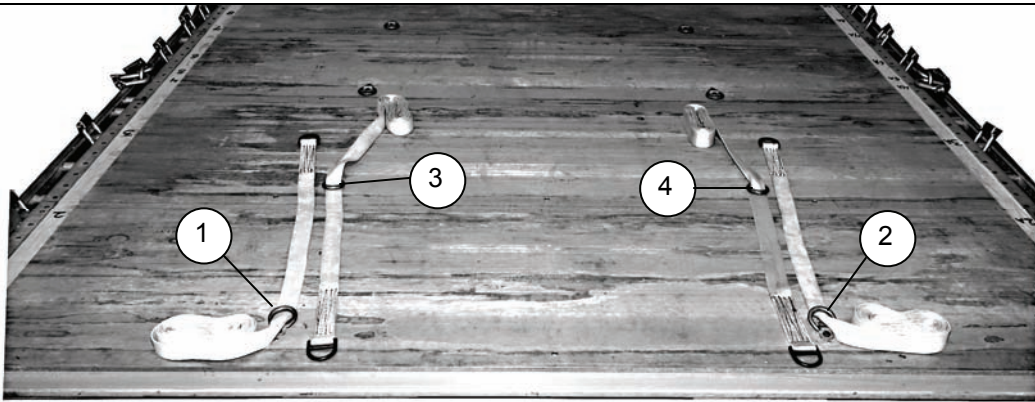
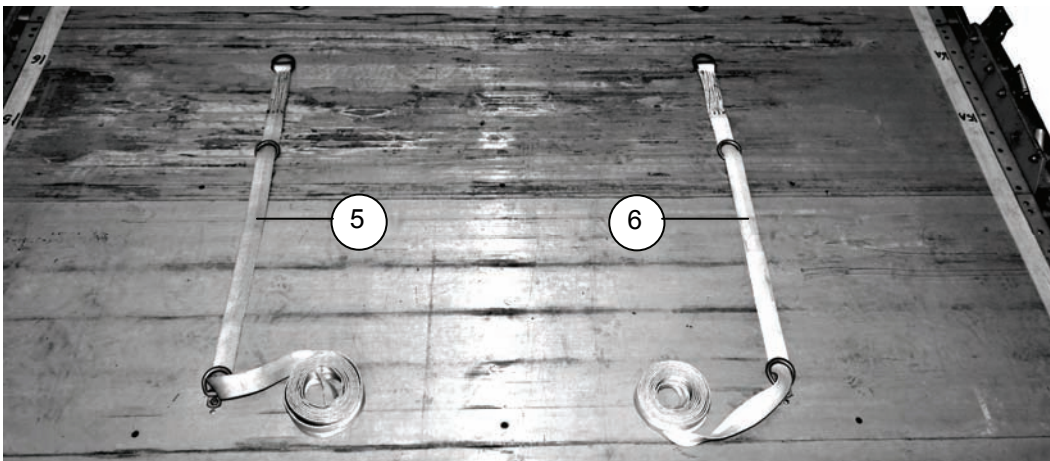


Figure 5-10. Honeycomb Stack 9 Prepared



- 1 Route a 15-foot lashing through tie down ring A1 from rear to front. Position the D-ring 18 inches from tie down ring A2.
- 2 Route a 15-foot lashing through tie down ring B1 from rear to front. Position the D-ring 18 inches from tie down ring B2.
- 3 Route a 15-foot lashing through tie down ring A2 from front to rear. Position the D-ring flush with the front of the platform.
- 4 Route a 15-foot lashing through tie down ring B2 from front to rear. Position the D-ring flush with the front of the platform.

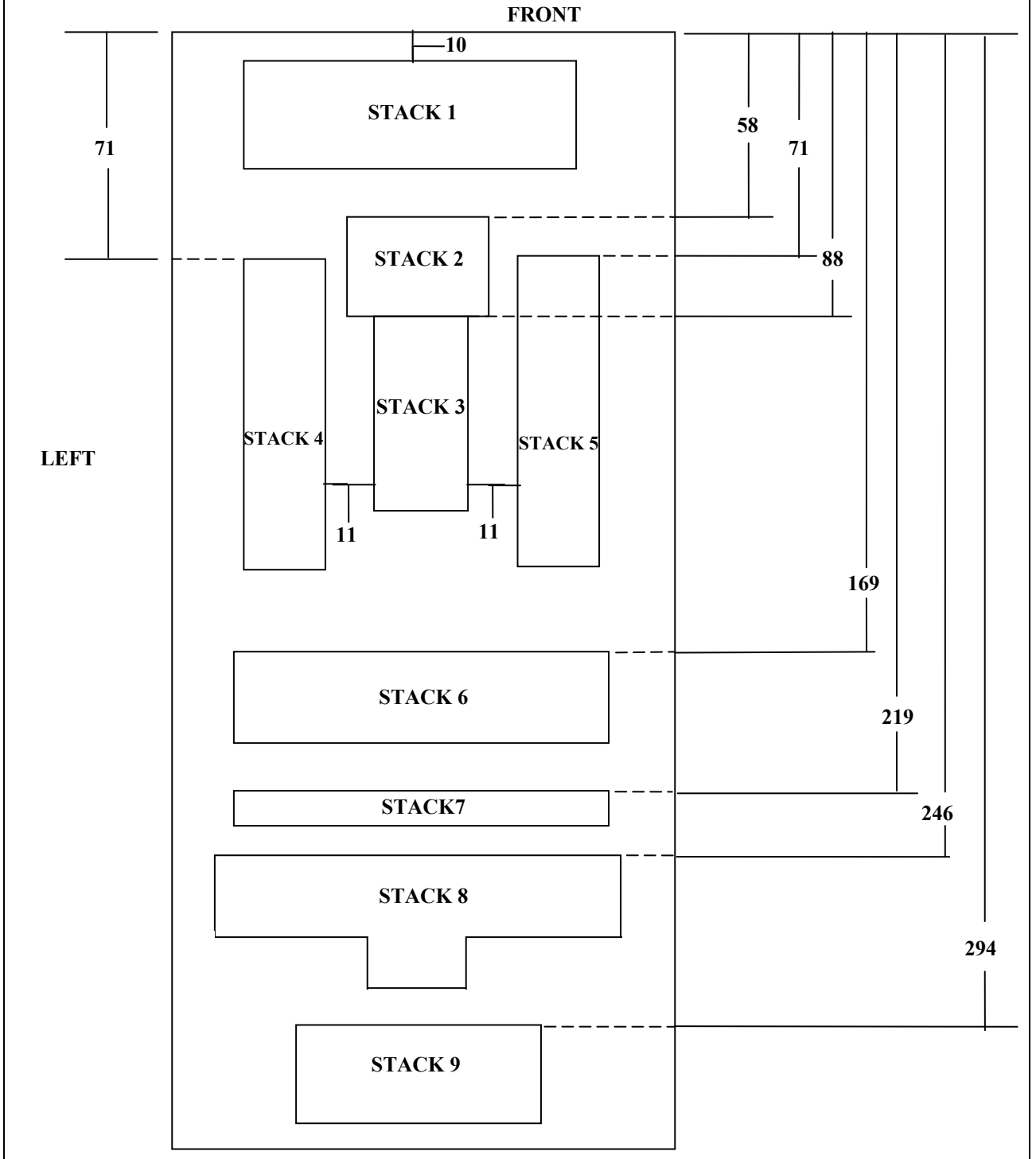


- 5 Route a 15-foot lashing through tie down ring A9 and A8 from rear to front. Position the D-ring 18 inches from tiedown ring A9.
- 6 Route a 15-foot lashing through tie down ring B9 and B8 from rear to front. Position the D-ring 18 inches from tiedown ring B9.

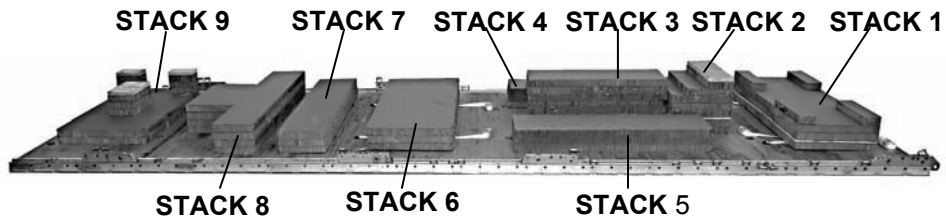
**Figure 5-11. Honeycomb Stacks Positioned on Platform**



- Notes.** 1. All measurements are given in inches.  
 2. This drawing is not drawn to scale.  
 3. Do not cover the pre-positioned lashings.



**Figure 5-11. Honeycomb Stacks Positioned on Platform (Continued)**



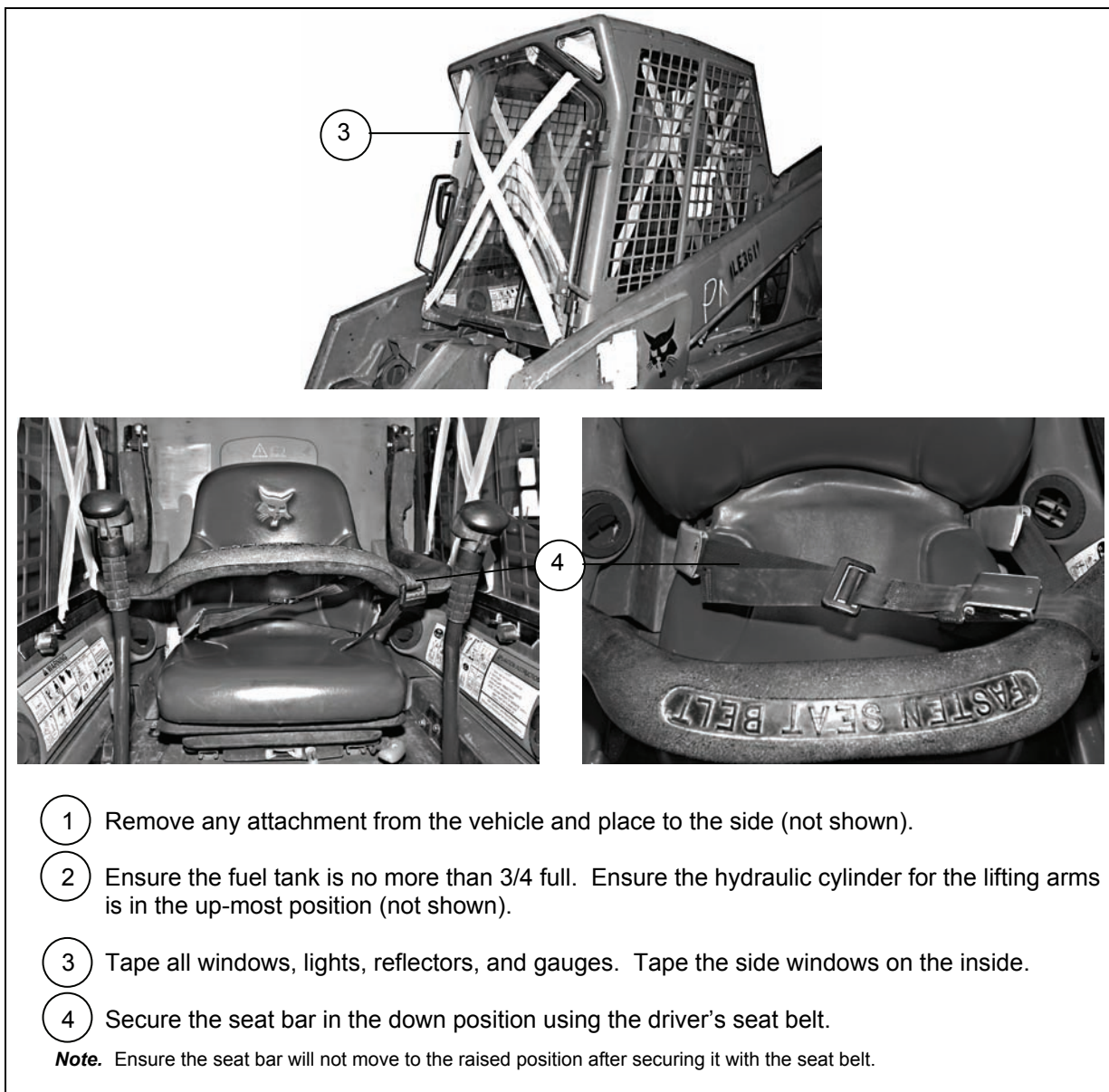
**Step:**

1. Position stack 1 on top of the pre-positioned lashings and centered, 10 inches from the front edge of the platform.
2. Position stack 2 centered, 58 inches from the front edge of the platform.
3. Position stack 3 centered, 88 inches from the front edge of the platform.
4. Position stack four 71 inches from the front edge of the platform and 11 inches from the left edge of stack 3.
5. Position stack five 71 inches from the front edge of the platform and 11 inches from the right edge of stack 3.
6. Position stack 6 on top of the pre-positioned lashings and centered, 169 inches from the front edge of the platform.
7. Position stack 7 centered, 219 inches from the front edge of the platform.
8. Position stack 8 centered, 246 inches from the front edge of the platform.
9. Position stack 9 centered, 294 inches from the front edge of the platform.

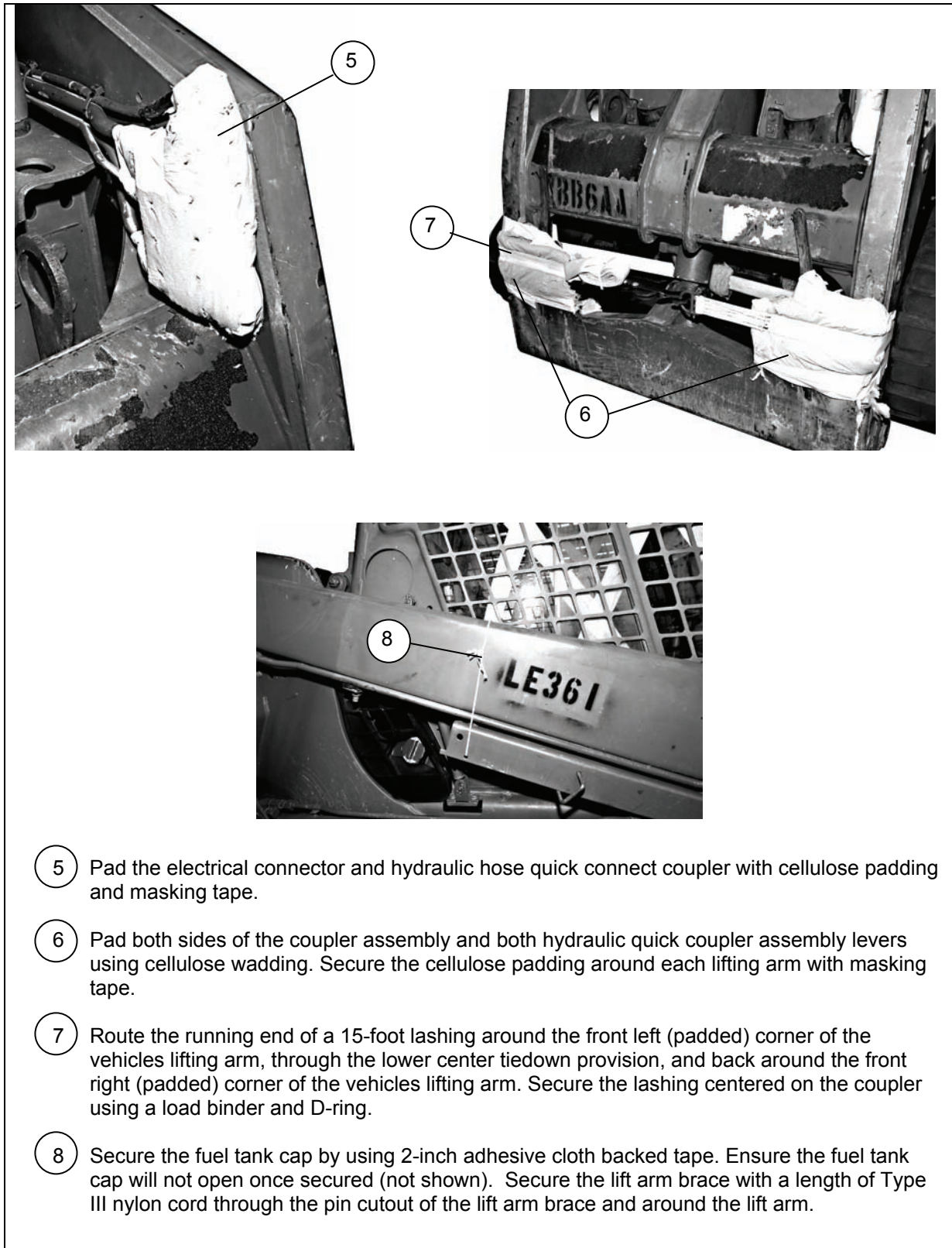
**Figure 5-11. Honeycomb Stacks Positioned on Platform (Continued)**

## PREPARING THE LOADER

5-4. Prepare the loader as shown in Figure 5-12.

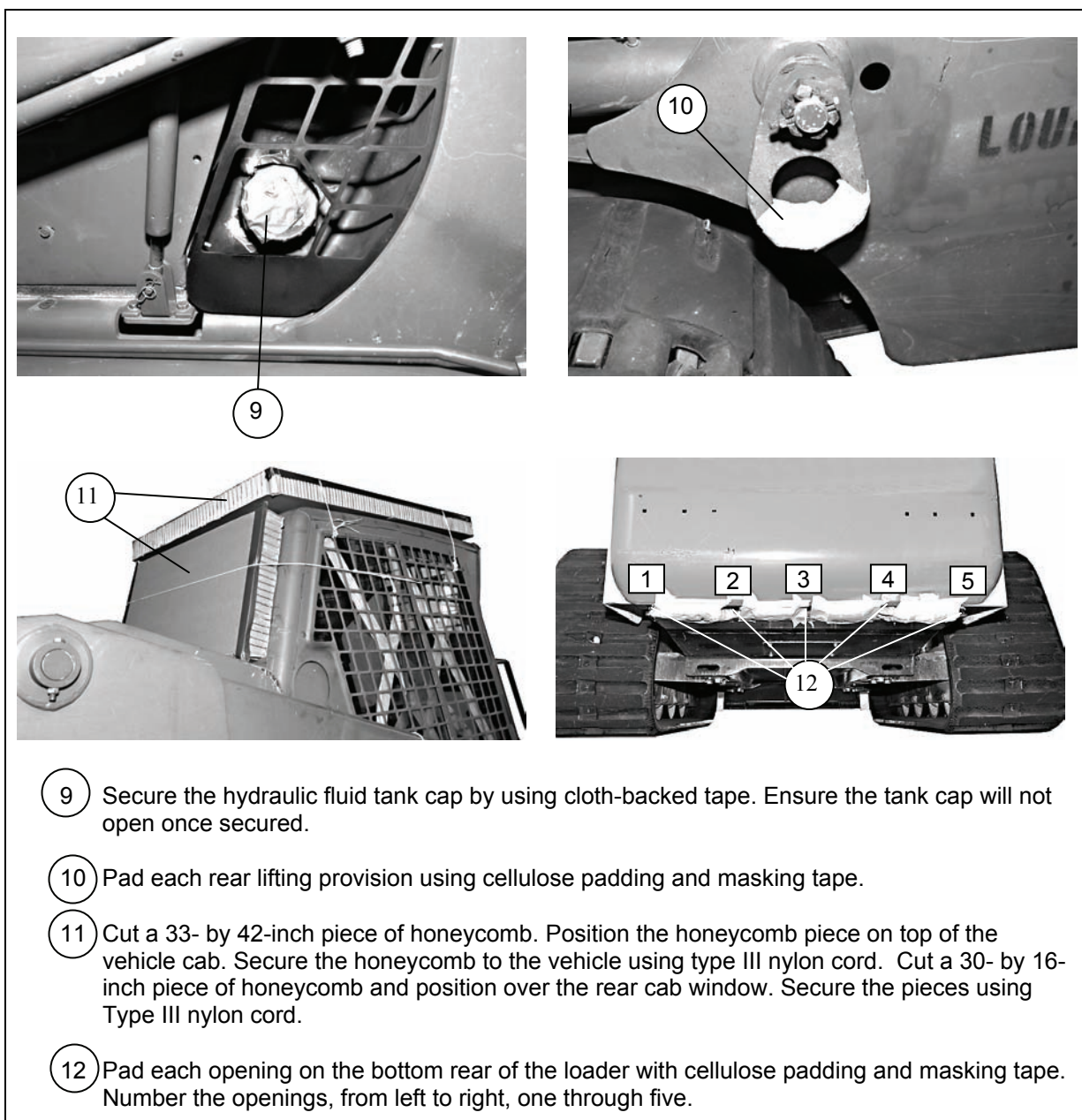


**Figure 5-12. Loader Prepared**



- 5 Pad the electrical connector and hydraulic hose quick connect coupler with cellulose padding and masking tape.
- 6 Pad both sides of the coupler assembly and both hydraulic quick coupler assembly levers using cellulose wadding. Secure the cellulose padding around each lifting arm with masking tape.
- 7 Route the running end of a 15-foot lashing around the front left (padded) corner of the vehicles lifting arm, through the lower center tiedown provision, and back around the front right (padded) corner of the vehicles lifting arm. Secure the lashing centered on the coupler using a load binder and D-ring.
- 8 Secure the fuel tank cap by using 2-inch adhesive cloth backed tape. Ensure the fuel tank cap will not open once secured (not shown). Secure the lift arm brace with a length of Type III nylon cord through the pin cutout of the lift arm brace and around the lift arm.

**Figure 5-12. Loader Prepared (Continued)**

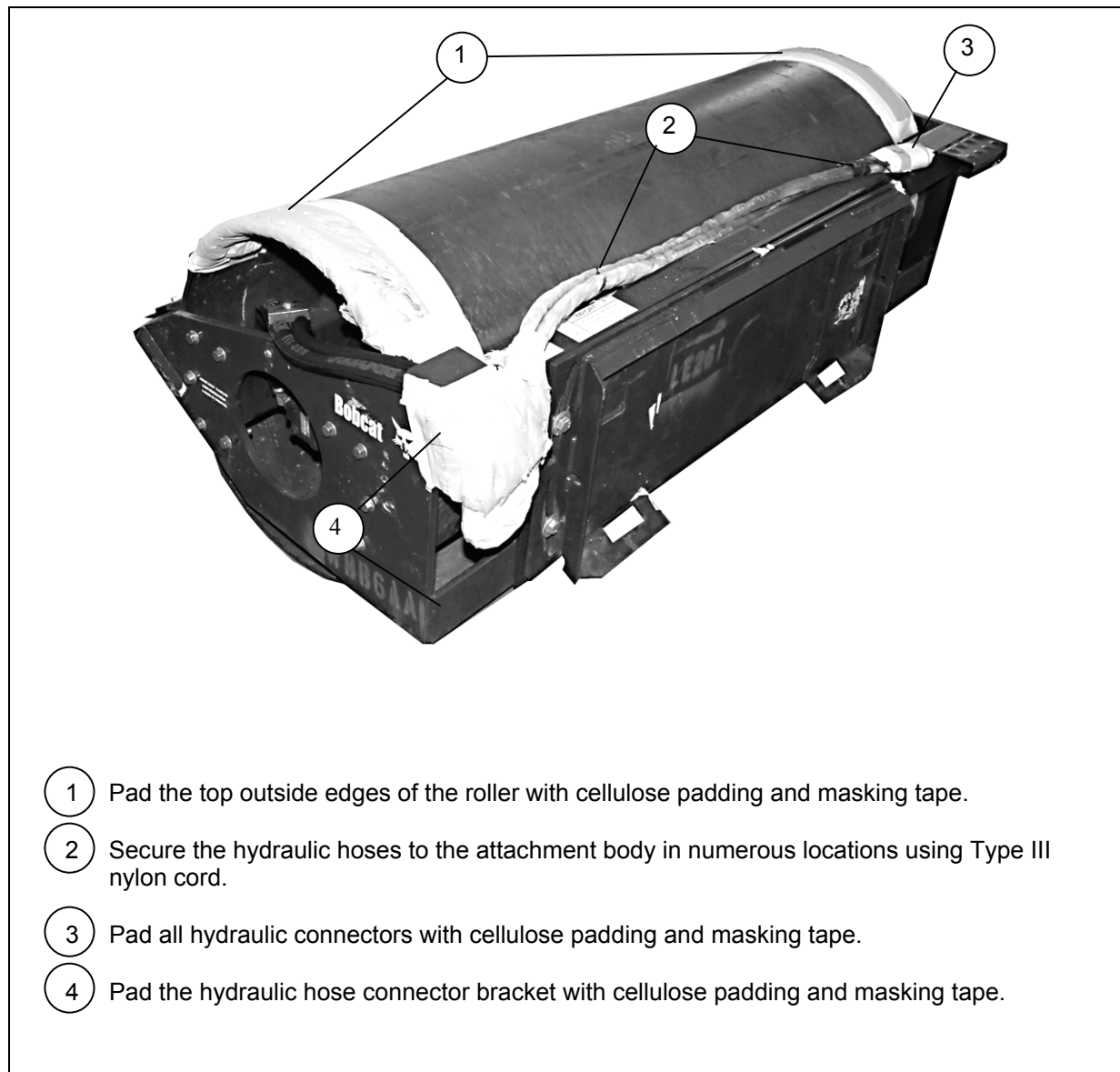


**Figure 5-12. Loader Prepared (Continued)**



## PREPARING THE ROLLER ATTACHMENT

5-5. Prepare the roller attachment as shown in Figure 5-13.

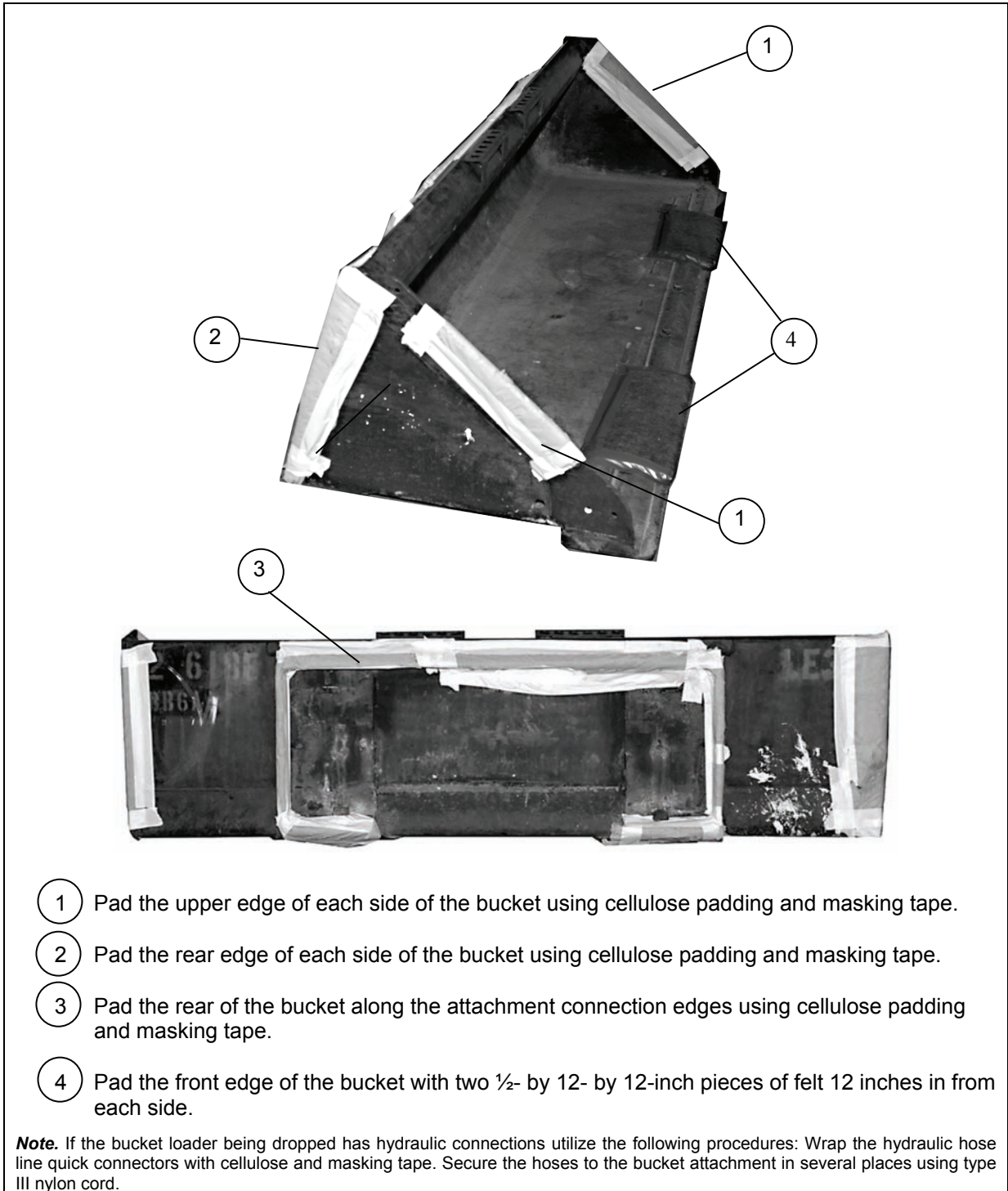


**Figure 5-13. Roller Attachment Prepared**



## PREPARING THE BUCKET ATTACHMENT

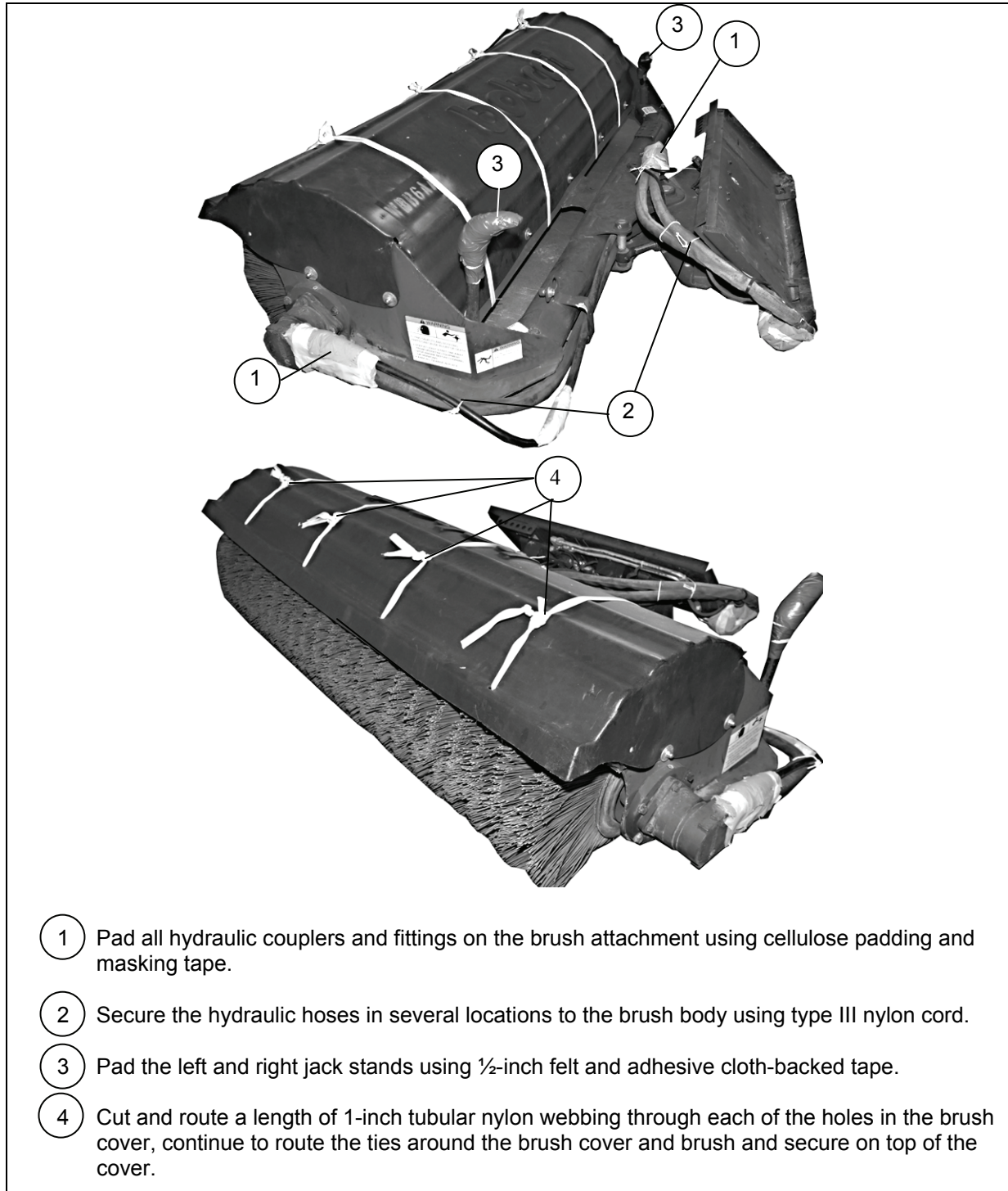
5-6. Prepare the bucket attachment as shown in Figure 5-14.



**Figure 5-14. Roller Attachment Prepared**

## PREPARING THE ANGLE BROOM (SWEEPER) ATTACHMENT

5-7. Prepare the angle broom attachment as shown in Figure 5-15.



**Figure 5-15. Angle Broom Attachment Prepared**

## PREPARING THE HYDRAULIC BREAKER (HAMMER) ATTACHMENT

5-8. Prepare the hydraulic breaker attachment as shown in Figure 5-16.

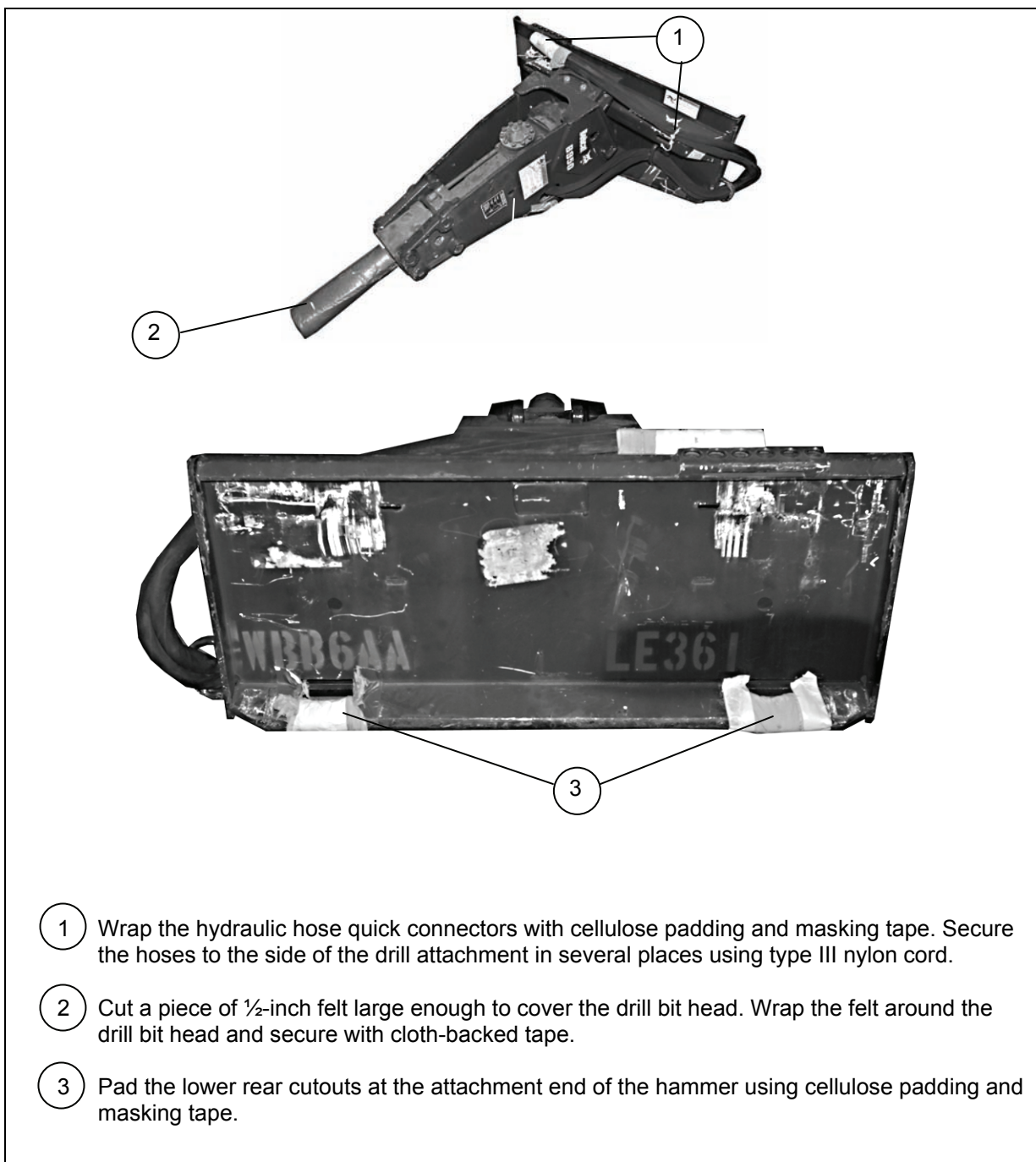
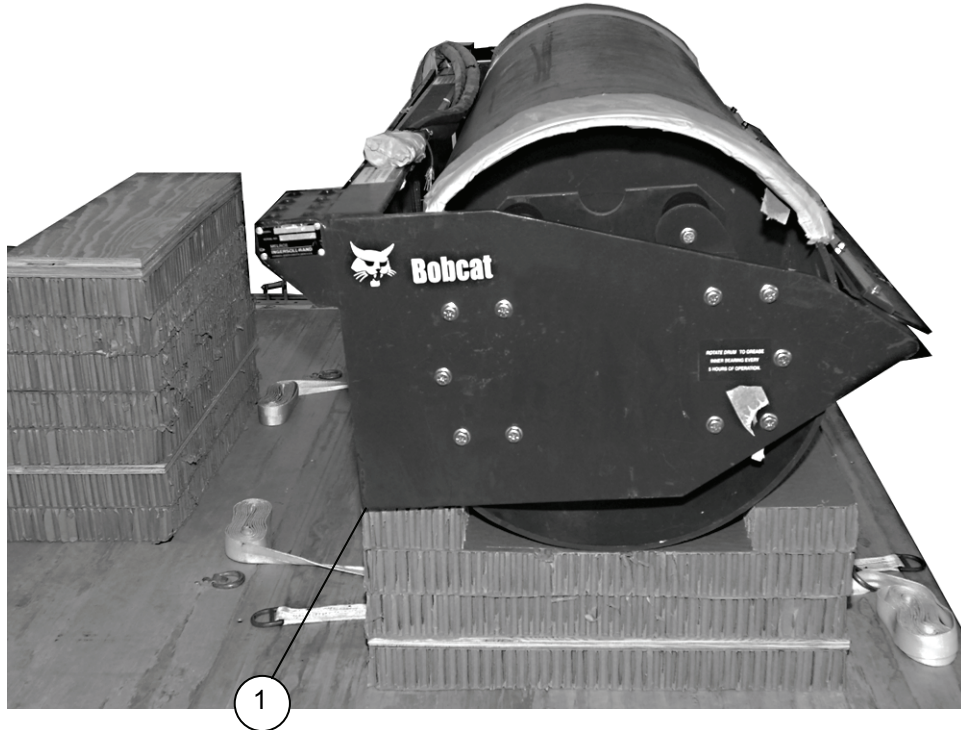


Figure 5-16. Hydraulic Breaker Attachment Prepared

## LIFTING AND POSITIONING THE LOADER AND ATTACHMENTS

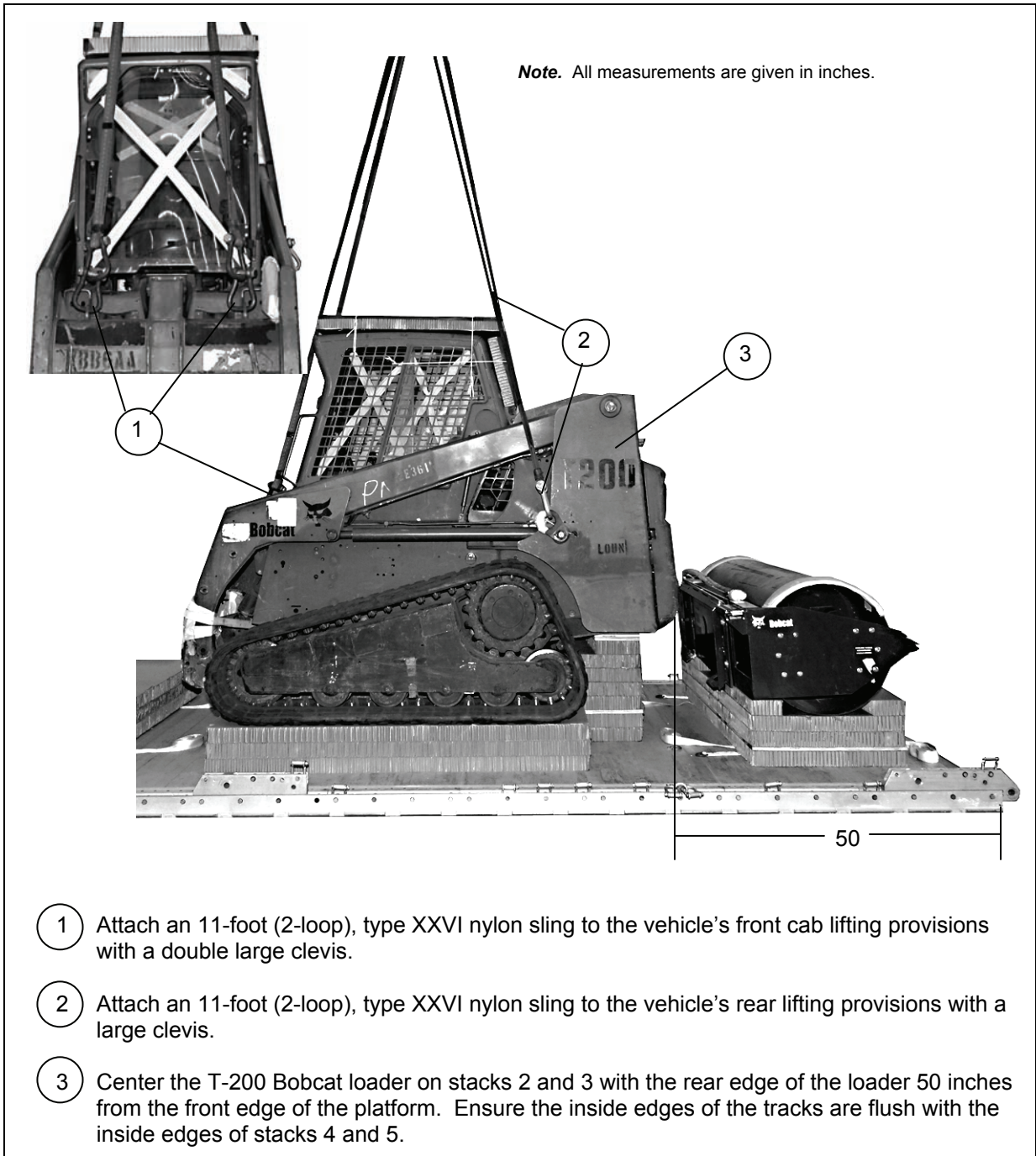
5-9. Install the lifting slings and position the loader and attachments as shown in Figures 5-17 through 5-21.



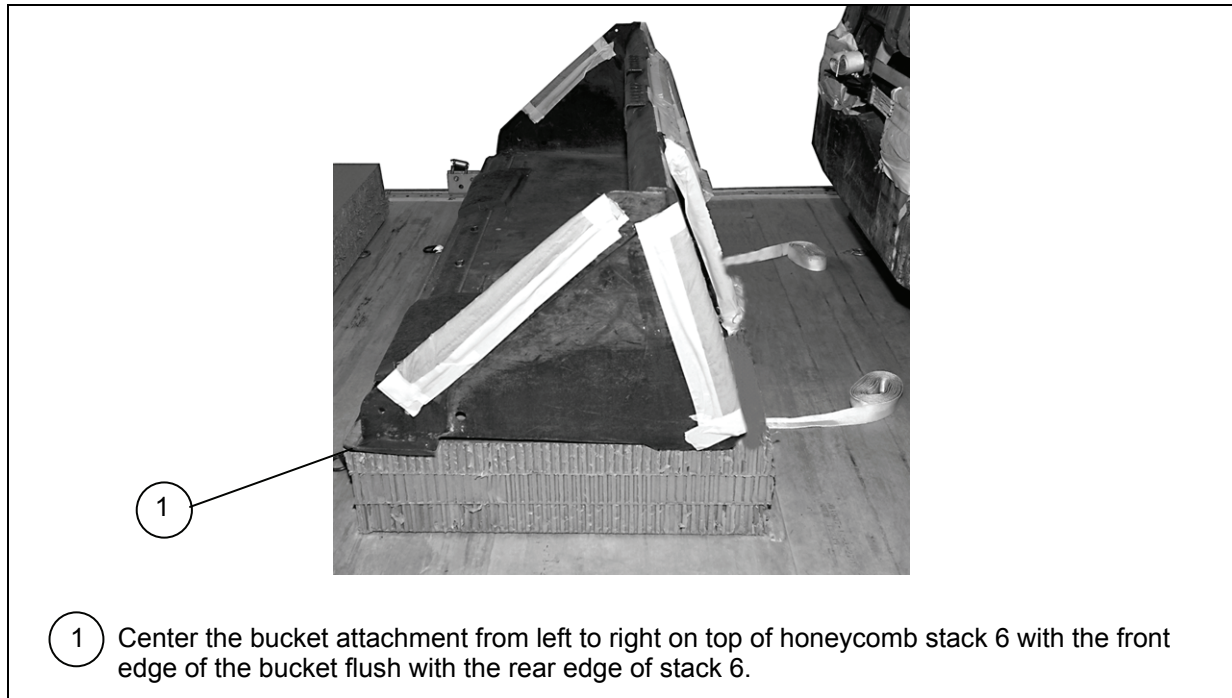
- ① Center the roller attachment from left to right on top of honeycomb stack 1 with the rear corner edges of the roller body flush with the rear edge of stack 1.

**Figure 5-17. Roller Attachment Positioned on Platform**

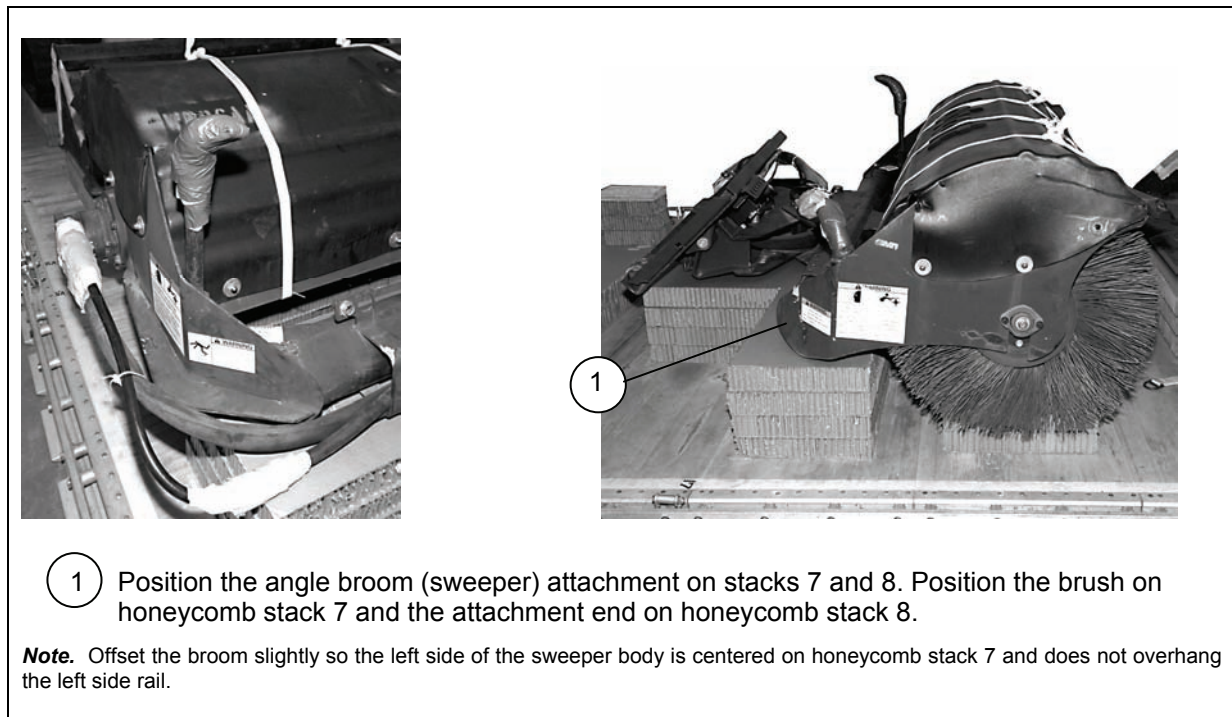




**Figure 5-18. T-200 Bobcat Loader Positioned on Platform**

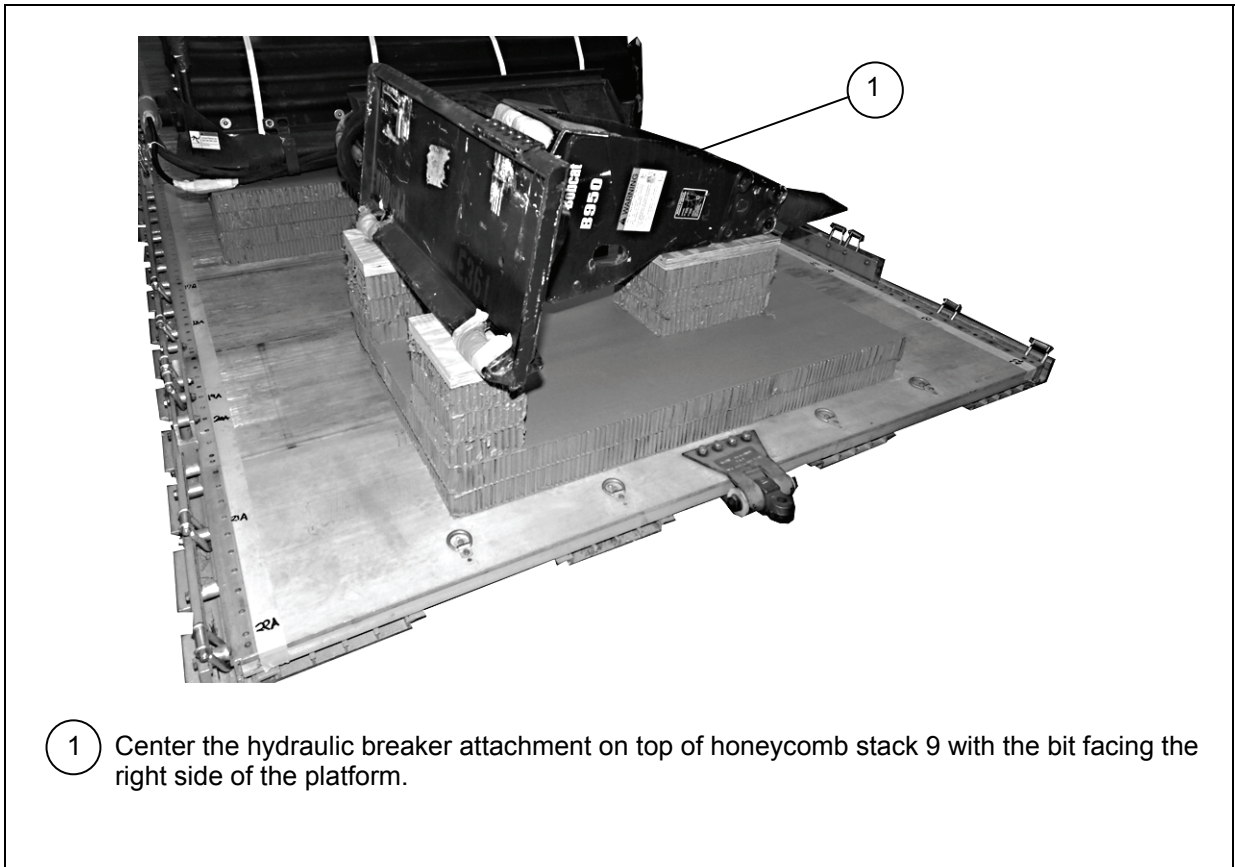


**Figure 5-19. Bucket Attachment Positioned on Platform**



**Figure 5-20. Angle Broom Attachment Positioned on Platform**



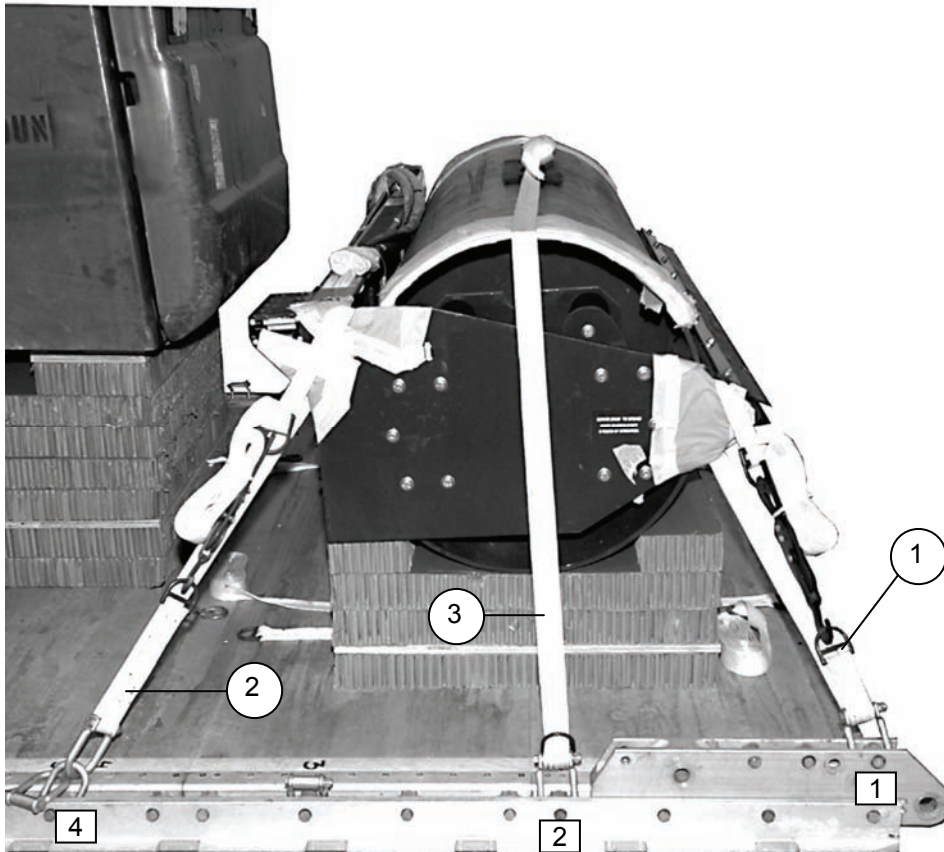


**Figure 5-21. Hydraulic Breaker Attachment Positioned on Platform**

## LASHING LOAD TO PLATFORM

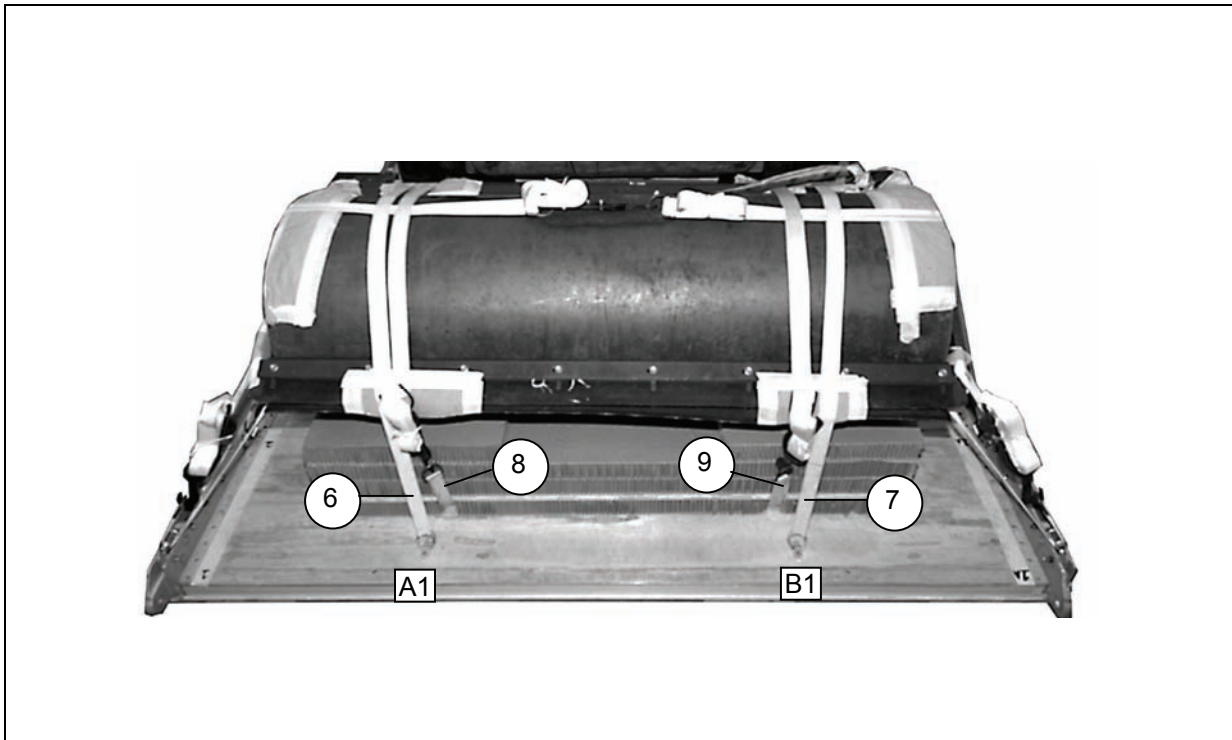
5-10. Lash the T-200 Bobcat loader and attachments to the platform as shown in Figure 5-22.

*Note.* Pad any sharp edges on the load where a lashing may pass. Use cellulose padding and masking tape.



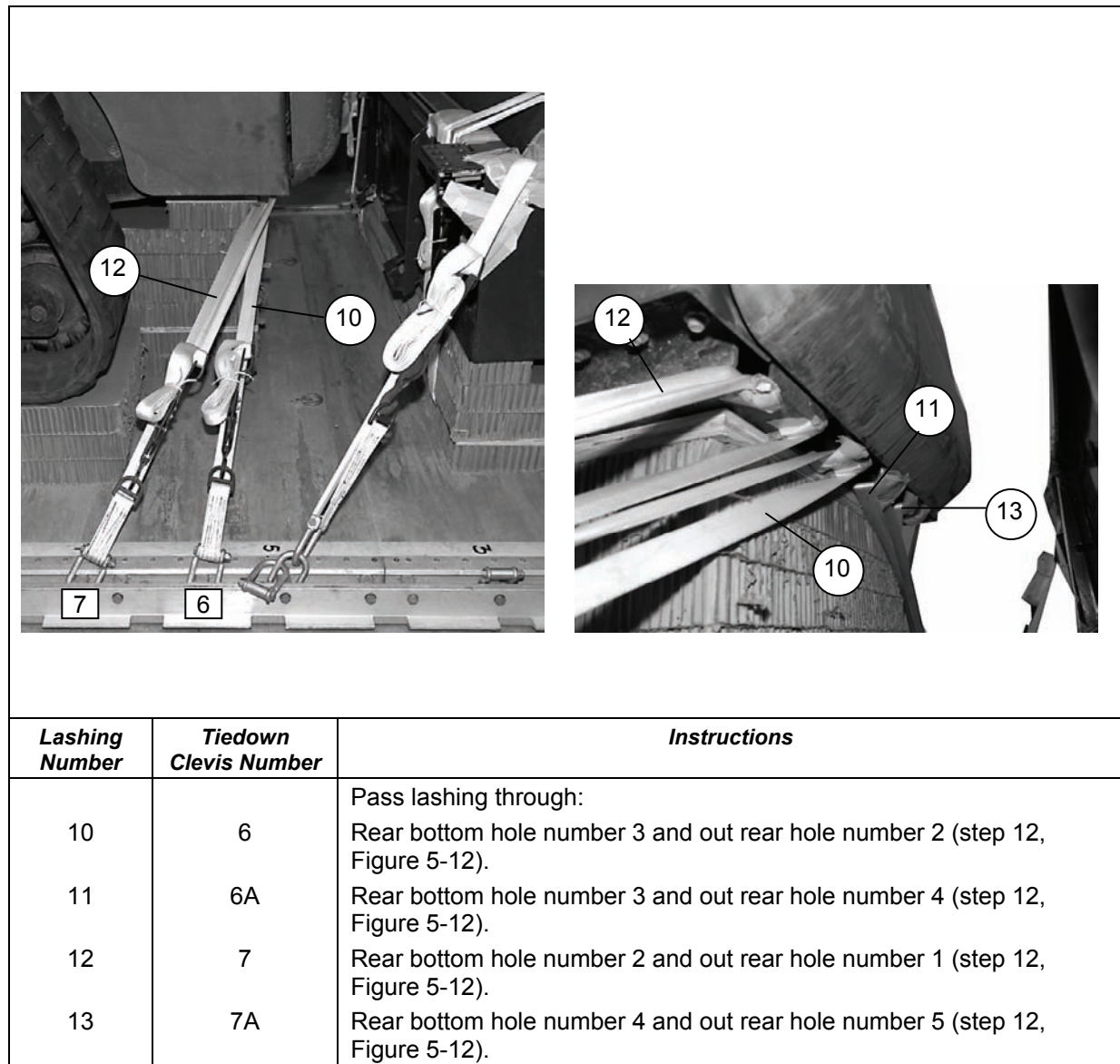
<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
1	1	Pass lashing through: Front roller brace, right side.
2	1A	Front roller brace, left side.
3	2 and 2A	Clevis 2 and through its own D-ring. Pass a second lashing through clevis 2A and through its own D-ring. Fasten the two lashings on top of the roller with D-rings and a load binder.
4	4	Rear roller brace, right side.
5	4A	Rear roller brace, left side.

**Figure 5-22. T-200 Bobcat Lashed to Platform**



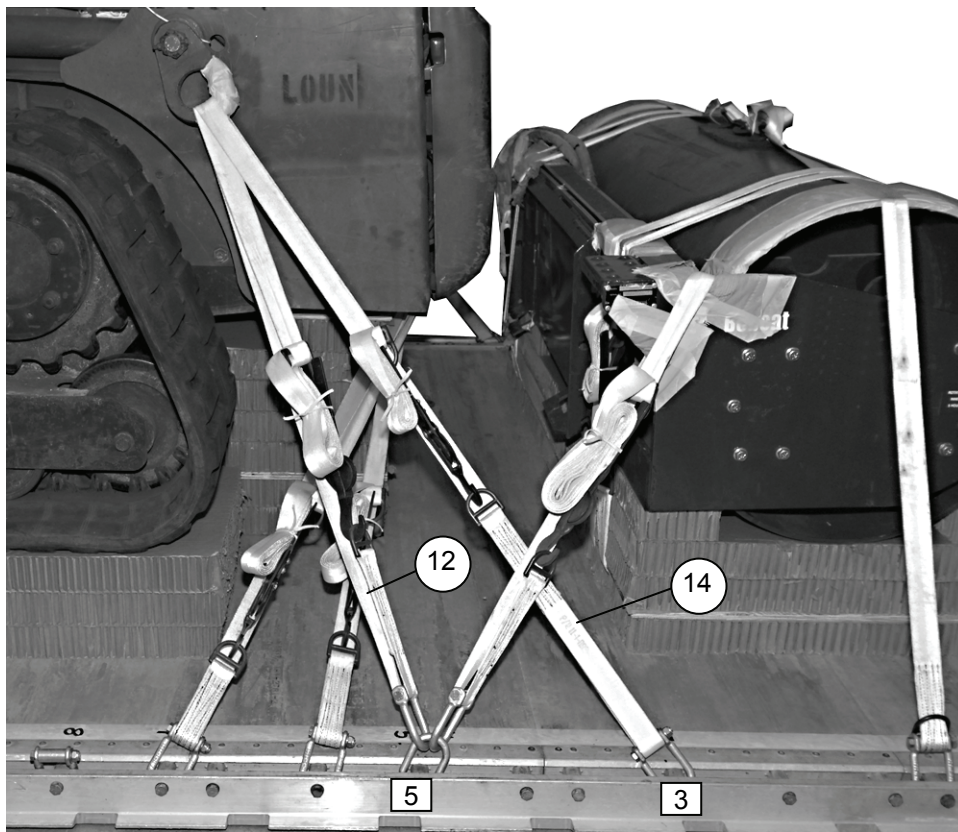
<b>Lashing Number</b>	<b>Tiedown Ring Number</b>	<b>Instructions</b>
6	A1	Route the pre-positioned lashing around the roller attachment and secure to itself with a D-ring and load binder.
7	B1	Route the pre-positioned lashing around the roller attachment and secure to itself with a D-ring and load binder.
8	A2	Route the pre-positioned lashing around the roller attachment and secure to itself with a D-ring and load binder.
9	B2	Route the pre-positioned lashing around the roller attachment and secure to itself with a D-ring and load binder.

**Figure 5-22. T-200 Bobcat Lashed to Platform (Continued)**



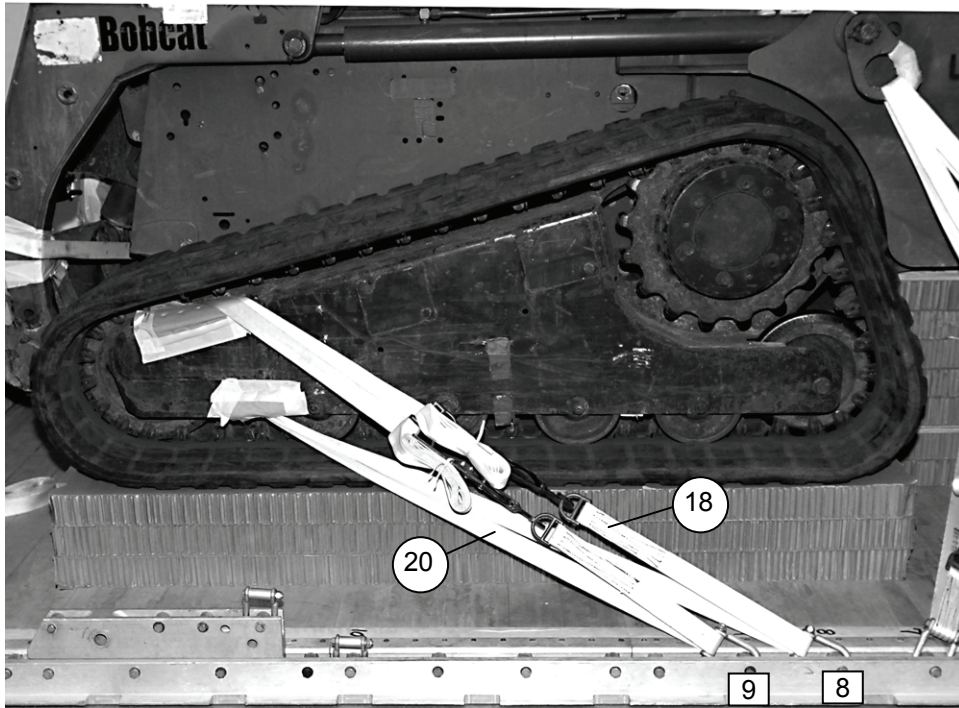
**Figure 5-22. T-200 Bobcat Lashed to Platform (Continued)**





<b><i>Lashing Number</i></b>	<b><i>Tiedown Clevis Number</i></b>	<b><i>Instructions</i></b>
14	3	Pass lashing through: Left rear lift provision.
15	3A	Right rear lift provision.
16	5	Left rear lift provision.
17	5A	Right rear lift provision.

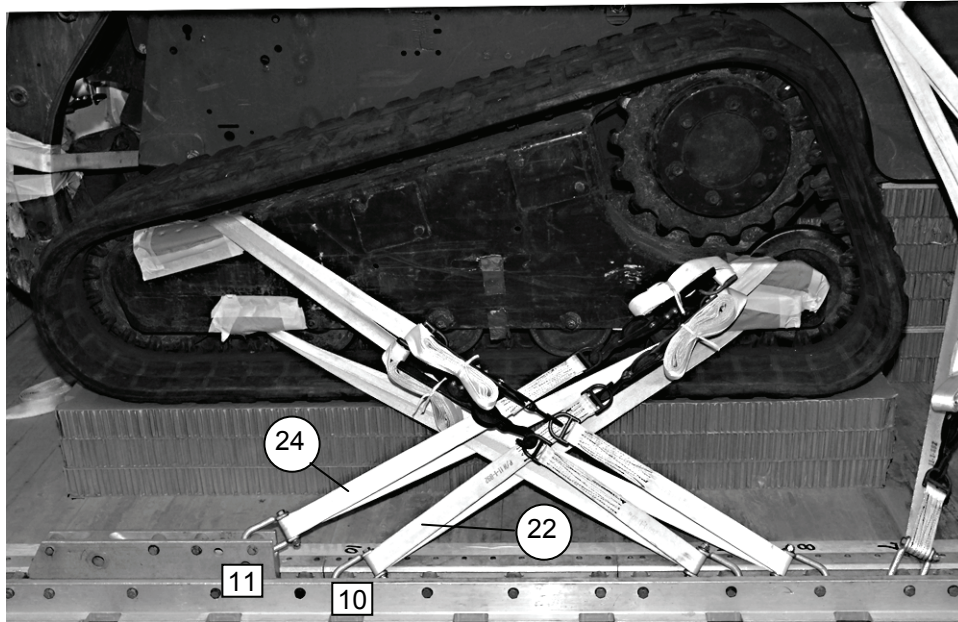
**Figure 5-22. T-200 Bobcat Lashed to Platform (Continued)**



<i>Lashing Number</i>	<i>Tiedown Clevis Number</i>	<i>Instructions</i>
18	8	Pass lashing through: Left front track guard.
19	8A	Right front track guard.
20	9	Left front track guard.
21	9A	Right front track guard.

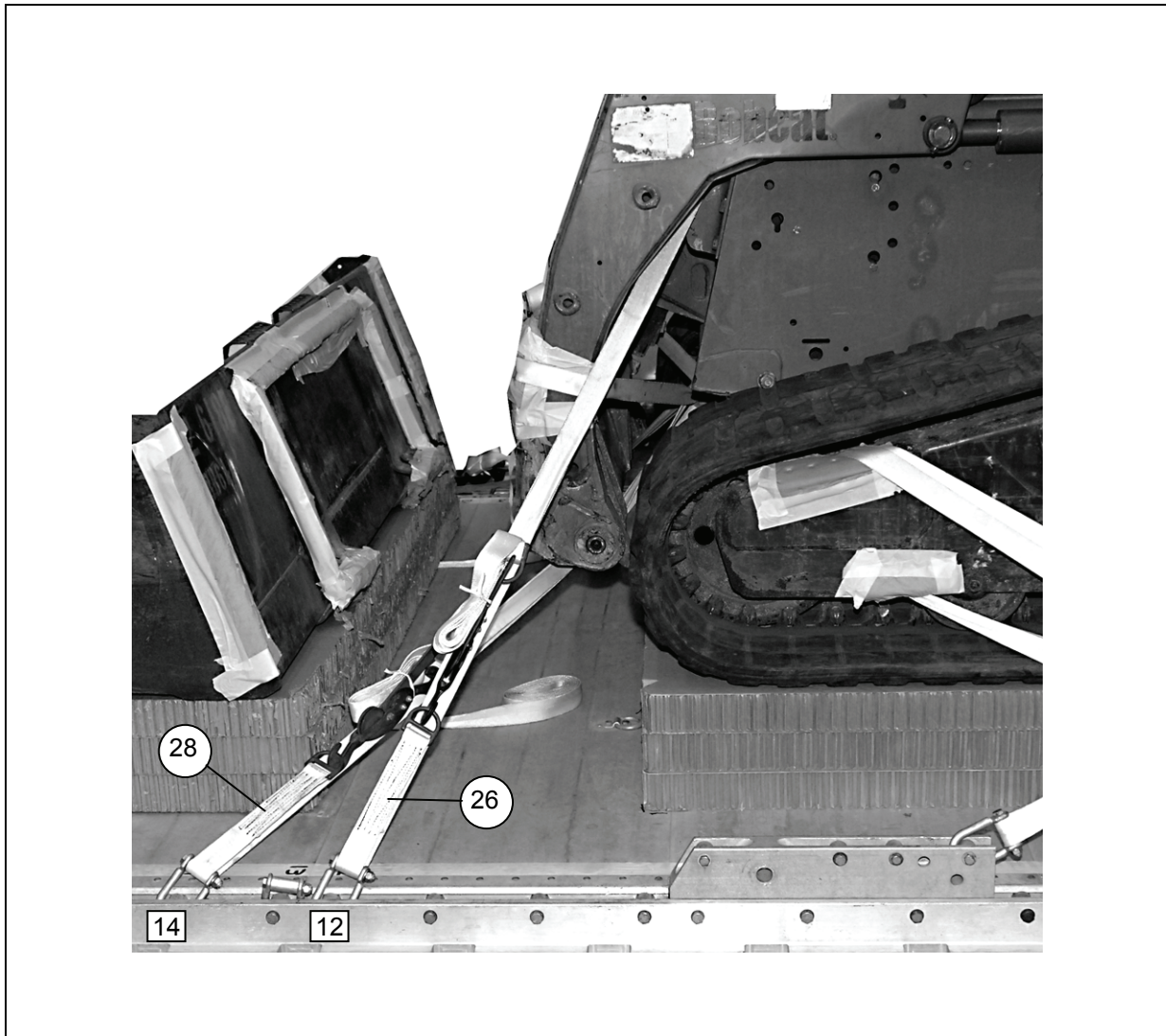
**Figure 5-22. T-200 Bobcat Lashed to Platform (Continued)**





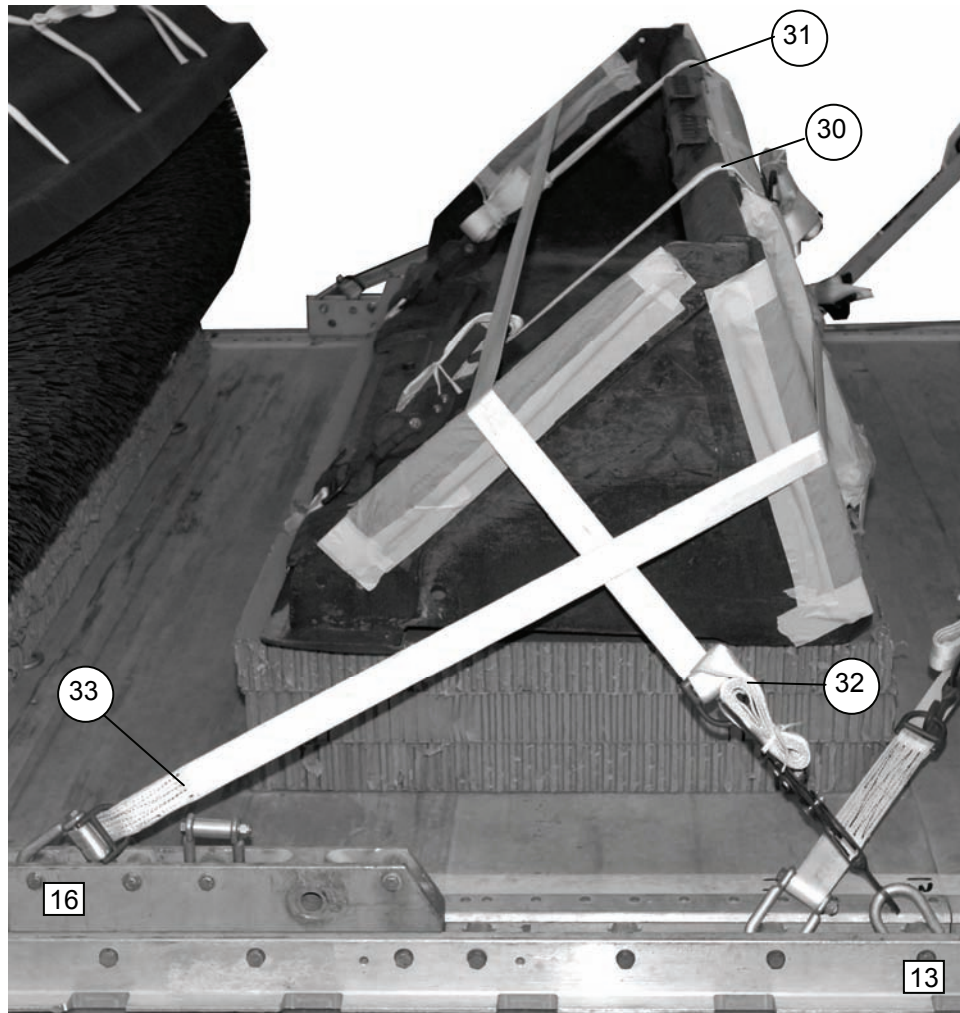
<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
22	10	Pass lashing through: Left rear track guard.
23	10A	Right rear track guard.
24	11	Left rear track guard.
25	11A	Right rear track guard.

**Figure 5-22. T-200 Bobcat Lashed to Platform (Continued)**



<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
26	12	Pass lashing through: Top left front lift provision.
27	12A	Top right front lift provision.
28	14	Bottom left front tiedown provision.
29	14A	Bottom right front tiedown provision.

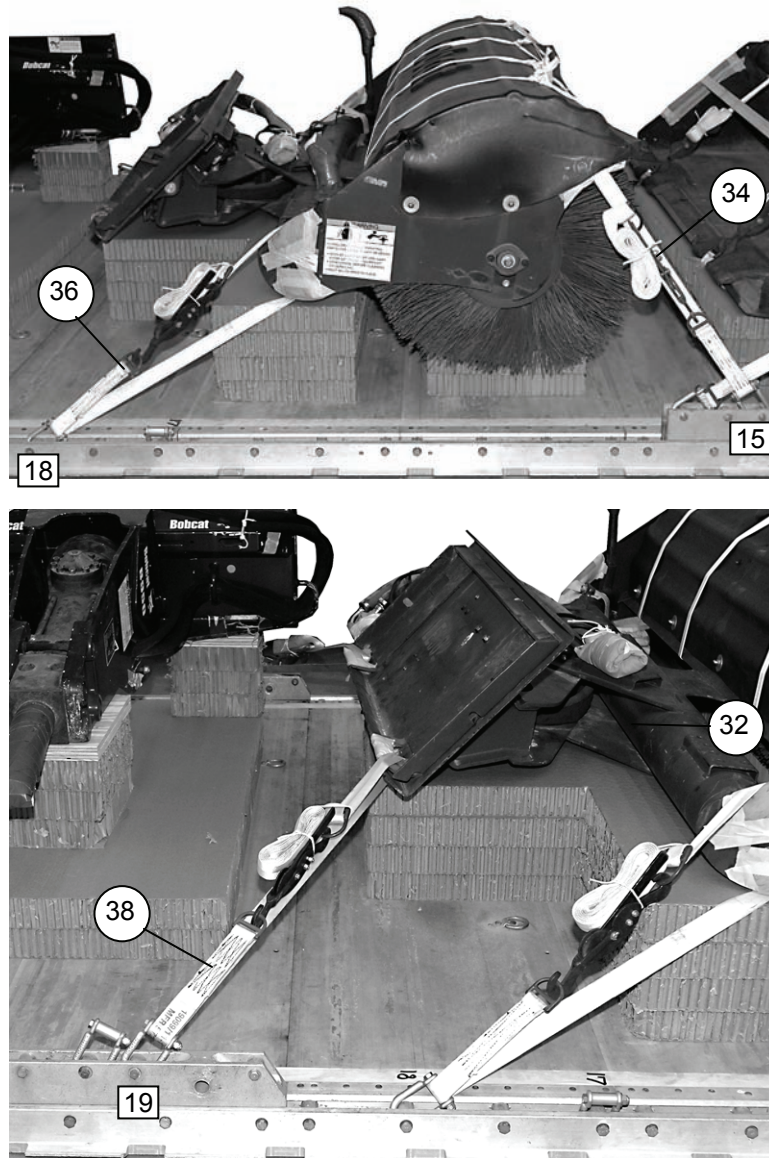
**Figure 5-22. T-200 Bobcat Lashed to Platform (Continued)**



<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
30	A8 and A9	Route the pre-positioned lashing around the bucket attachment and secure to itself with a D-ring and load binder.
31	B8 and B9	Route the pre-positioned lashing around the bucket attachment and secure to itself with a D-ring and load binder.
32	13 and 13A	Pass lashing through: Clevis 13A and through its own D-ring. Pass the lashing over the front of the bucket and secure to clevis 13. <b>Note.</b> Invert clevis 13 before attaching the load binder.
33	16 and 16A	Clevis 16 and through its own D-ring. Pass a second lashing through clevis 16A and through its own D-ring. Fasten the two lashings on the back of the bucket attachment with D-rings and a load binder.

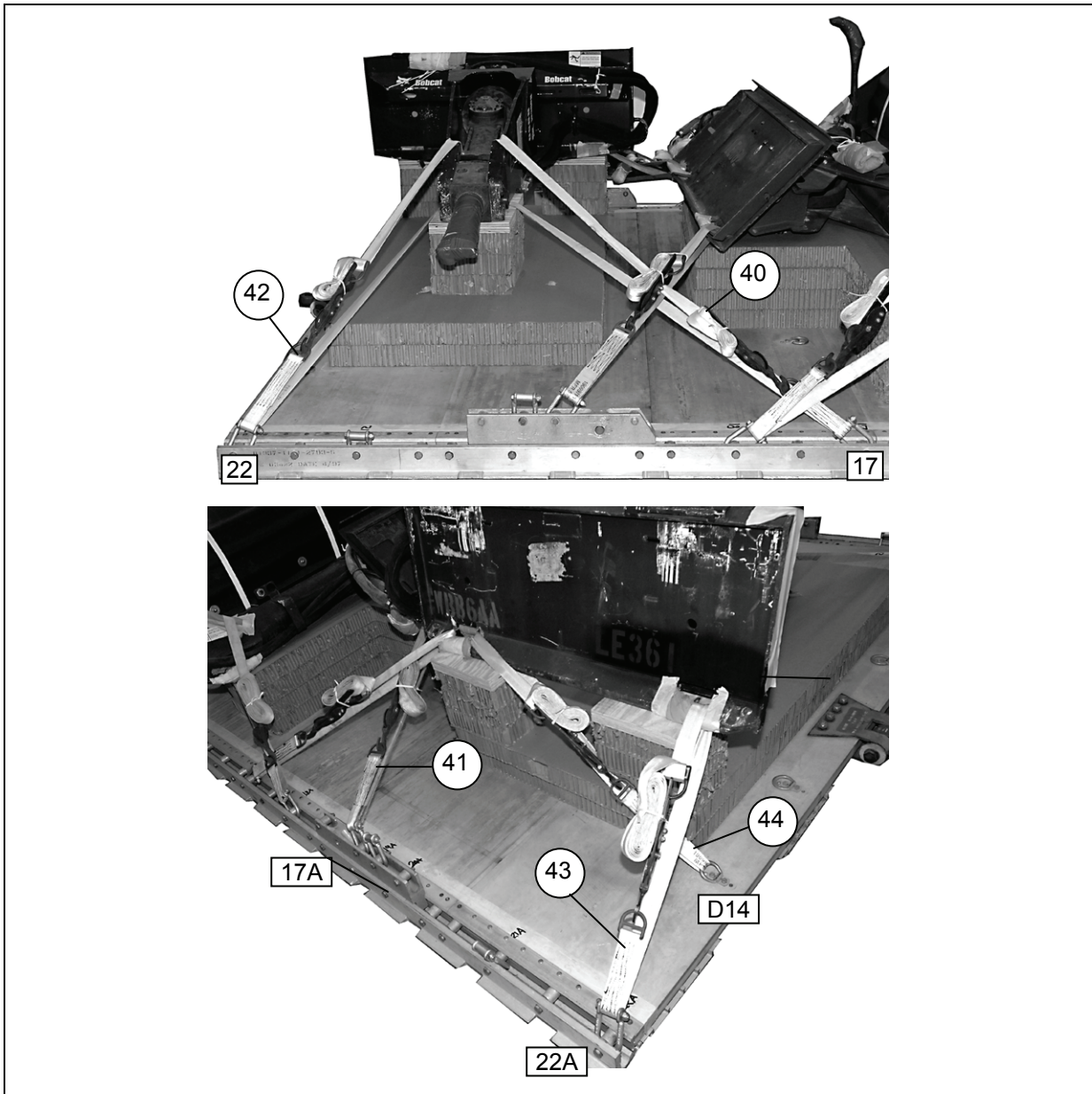
**Figure 5-22. T-200 Bobcat Lashed to Platform (Continued)**





<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
34	15	Pass lashing through: Right front portion of the sweeper's frame and under the cover.
35	15A	Left front portion of the sweeper's frame and under the cover.
36	18	Right rear portion of the sweeper's frame.
37	18A	Left rear portion of the sweeper's frame.
38	19	Lower right rear portion of the attaching plate.
39	19A	Lower left rear portion of the attaching plate.

**Figure 5-22. T-200 Bobcat Lashed to Platform (Continued)**



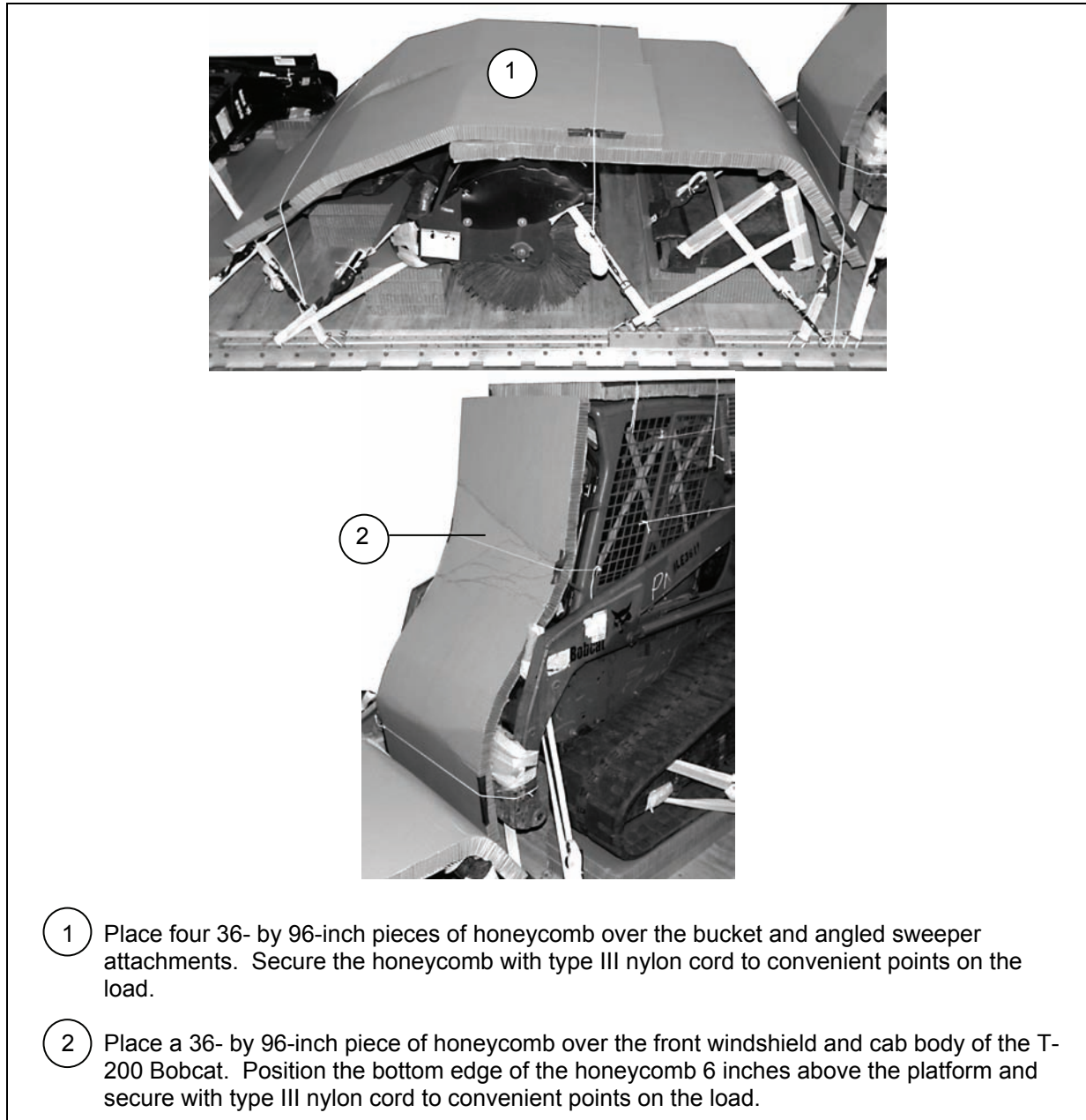
<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
40	17	Pass lashing through: Lower front portion of the hydraulic breaker's frame.
41	17A	Lower front cutout of the hydraulic breaker's attaching plate.
42	22	Lower rear portion of the hydraulic breaker's frame.
43	22A	Lower rear cutout of the hydraulic breaker's attaching plate.
44	D14	Lower front cutout of the hydraulic breaker's attaching plate.

Figure 5-22. T-200 Bobcat Lashed to Platform (Continued)

## PREPARING THE LOAD FOR SUSPENSION SYSTEMS

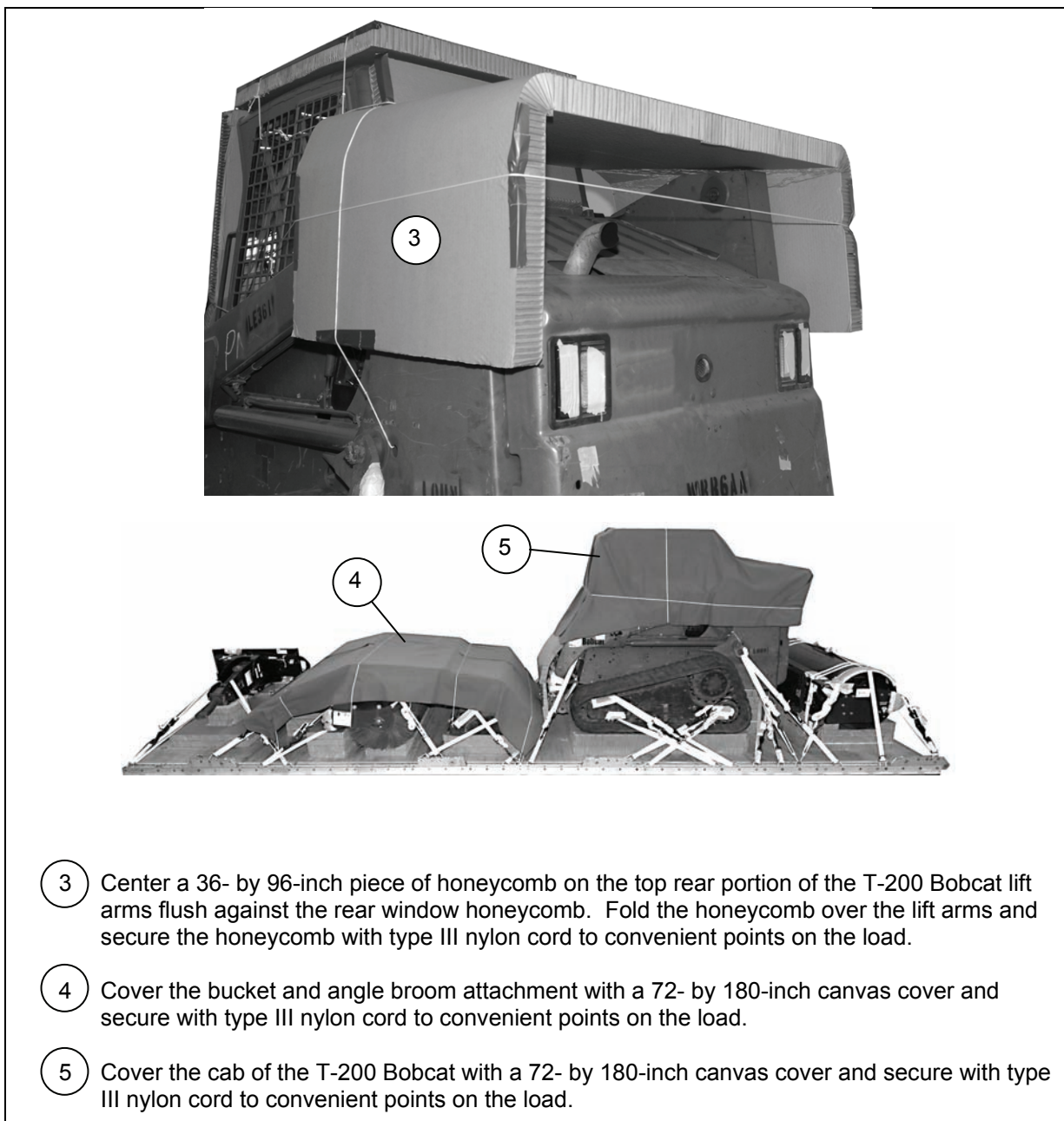
5-11. Prepare the load for the suspension system as shown in Figure 5-23.

*Note.* Pad any sharp edges on the load where a lashing may pass. Use cellulose padding and masking tape.



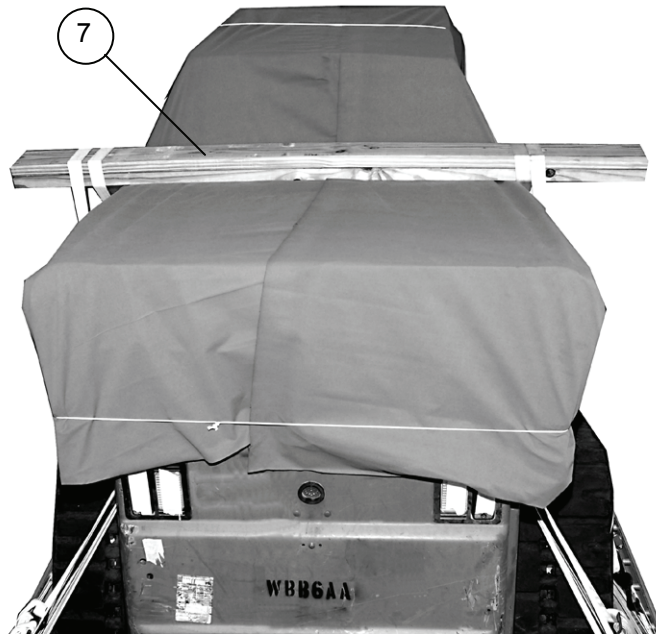
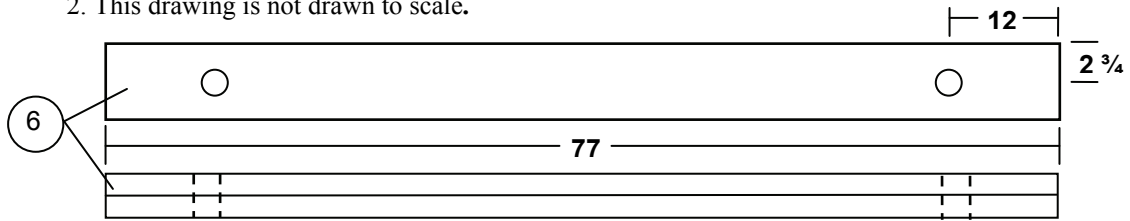
**Figure 5-23. Load Prepared for Suspension**





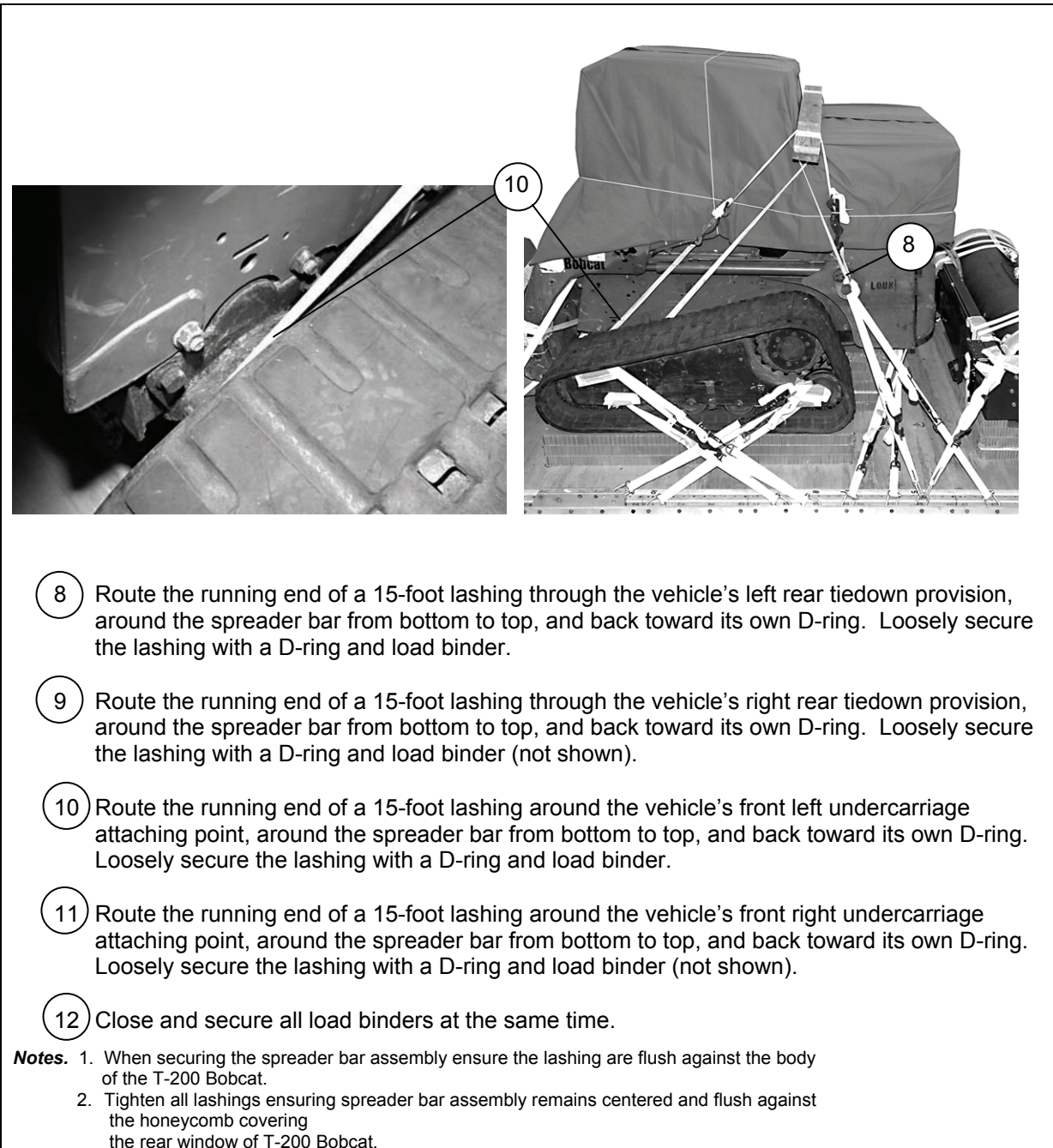
**Figure 5-23. Load Prepared for Suspension (Continued)**

- Notes.** 1. All measurements are given in inches.  
 2. This drawing is not drawn to scale.



- 6 Build a spreader bar assembly by cutting two 2- by 6- by 77-inch pieces of lumber. Stack the two pieces and nail with 8d nails. Drill a 2-inch diameter hole centered, 12 inches from each end.
- 7 Center the spreader bar assembly flush against the rear window honeycomb.

**Figure 5-23. Load Prepared for Suspension (Continued)**



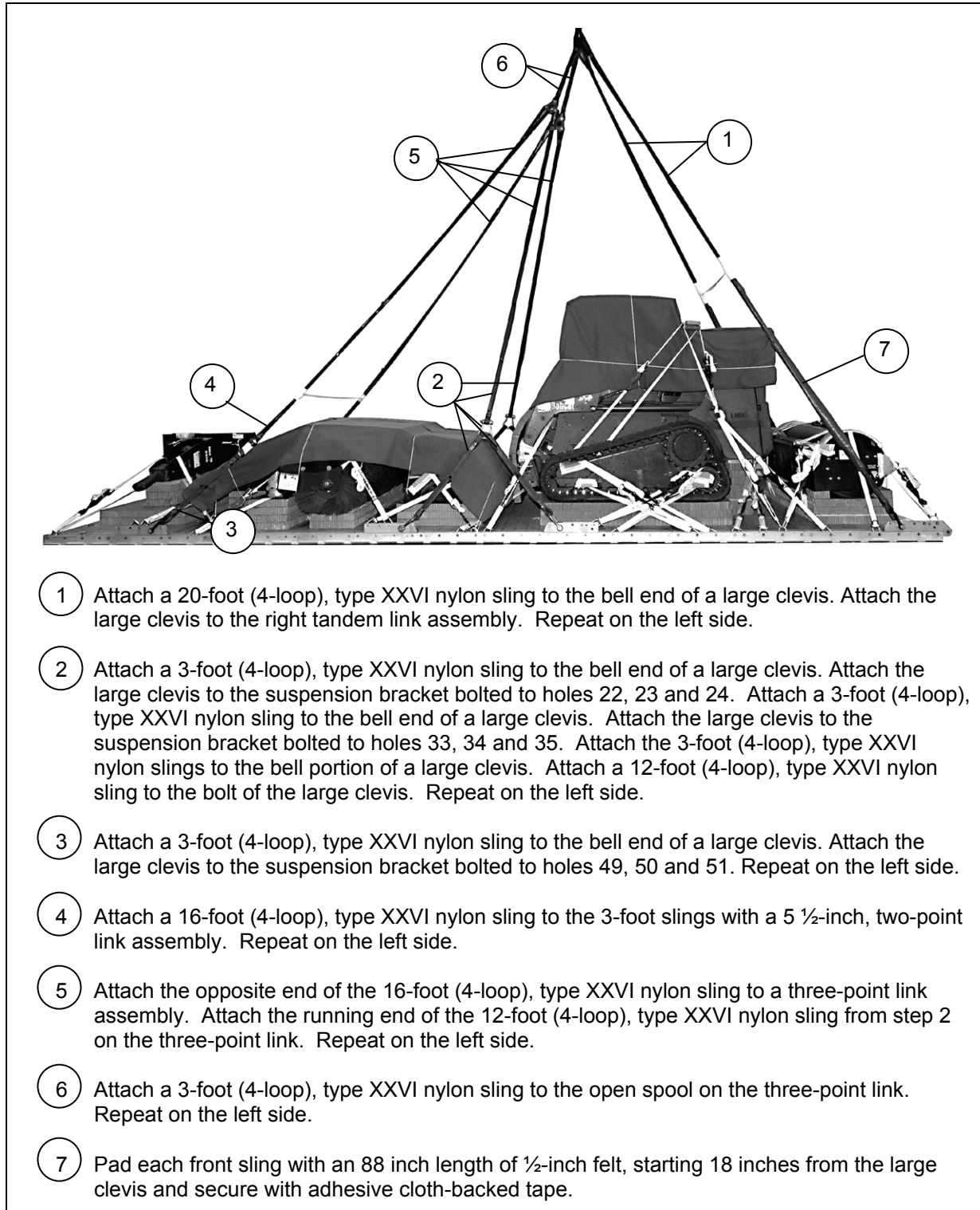
- 8 Route the running end of a 15-foot lashing through the vehicle's left rear tiedown provision, around the spreader bar from bottom to top, and back toward its own D-ring. Loosely secure the lashing with a D-ring and load binder.
- 9 Route the running end of a 15-foot lashing through the vehicle's right rear tiedown provision, around the spreader bar from bottom to top, and back toward its own D-ring. Loosely secure the lashing with a D-ring and load binder (not shown).
- 10 Route the running end of a 15-foot lashing around the vehicle's front left undercarriage attaching point, around the spreader bar from bottom to top, and back toward its own D-ring. Loosely secure the lashing with a D-ring and load binder.
- 11 Route the running end of a 15-foot lashing around the vehicle's front right undercarriage attaching point, around the spreader bar from bottom to top, and back toward its own D-ring. Loosely secure the lashing with a D-ring and load binder (not shown).
- 12 Close and secure all load binders at the same time.

**Notes.** 1. When securing the spreader bar assembly ensure the lashing are flush against the body of the T-200 Bobcat.  
2. Tighten all lashings ensuring spreader bar assembly remains centered and flush against the honeycomb covering the rear window of T-200 Bobcat.

**Figure 5-23. Load Prepared for Suspension (Continued)**

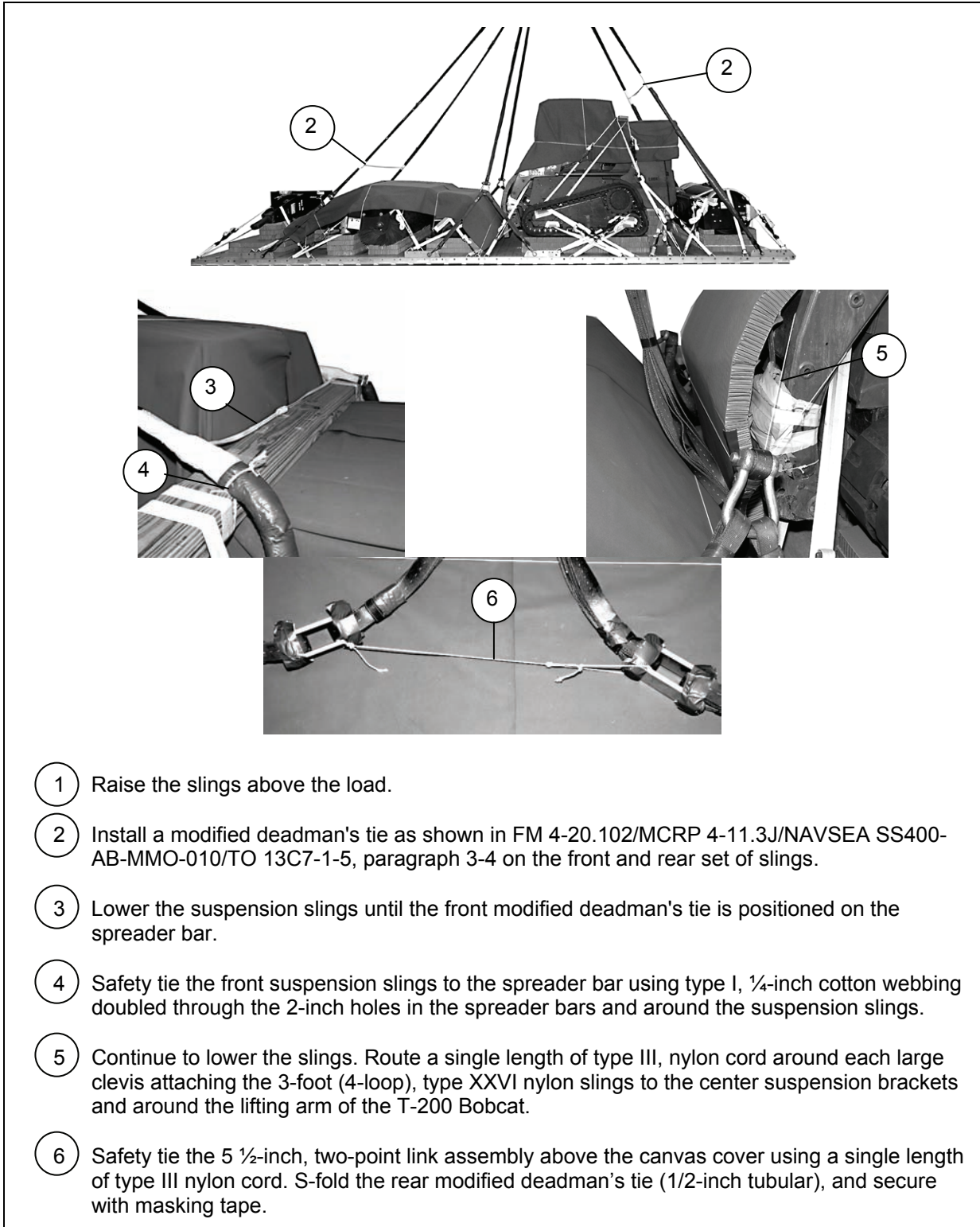
## INSTALLING AND SAFETY TIEING THE SUSPENSION SLINGS

5-12. Install and safety tie the suspension slings as shown in Figures 5-24 and 5-25.



- 1 Attach a 20-foot (4-loop), type XXVI nylon sling to the bell end of a large clevis. Attach the large clevis to the right tandem link assembly. Repeat on the left side.
- 2 Attach a 3-foot (4-loop), type XXVI nylon sling to the bell end of a large clevis. Attach the large clevis to the suspension bracket bolted to holes 22, 23 and 24. Attach a 3-foot (4-loop), type XXVI nylon sling to the bell end of a large clevis. Attach the large clevis to the suspension bracket bolted to holes 33, 34 and 35. Attach the 3-foot (4-loop), type XXVI nylon slings to the bell portion of a large clevis. Attach a 12-foot (4-loop), type XXVI nylon sling to the bolt of the large clevis. Repeat on the left side.
- 3 Attach a 3-foot (4-loop), type XXVI nylon sling to the bell end of a large clevis. Attach the large clevis to the suspension bracket bolted to holes 49, 50 and 51. Repeat on the left side.
- 4 Attach a 16-foot (4-loop), type XXVI nylon sling to the 3-foot slings with a 5 ½-inch, two-point link assembly. Repeat on the left side.
- 5 Attach the opposite end of the 16-foot (4-loop), type XXVI nylon sling to a three-point link assembly. Attach the running end of the 12-foot (4-loop), type XXVI nylon sling from step 2 on the three-point link. Repeat on the left side.
- 6 Attach a 3-foot (4-loop), type XXVI nylon sling to the open spool on the three-point link. Repeat on the left side.
- 7 Pad each front sling with an 88 inch length of ½-inch felt, starting 18 inches from the large clevis and secure with adhesive cloth-backed tape.

**Figure 5-24. Suspension Slings Installed**



**Figure 5-25. Modified Deadman's Tie Installed**



## STOWING CARGO PARACHUTES

5-13. Construct the parachute support stack and stowage platform as shown in Figure 5-26. Prepare, stow, and restrain four G-11B cargo parachutes according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figures 5-27 through 5-29.

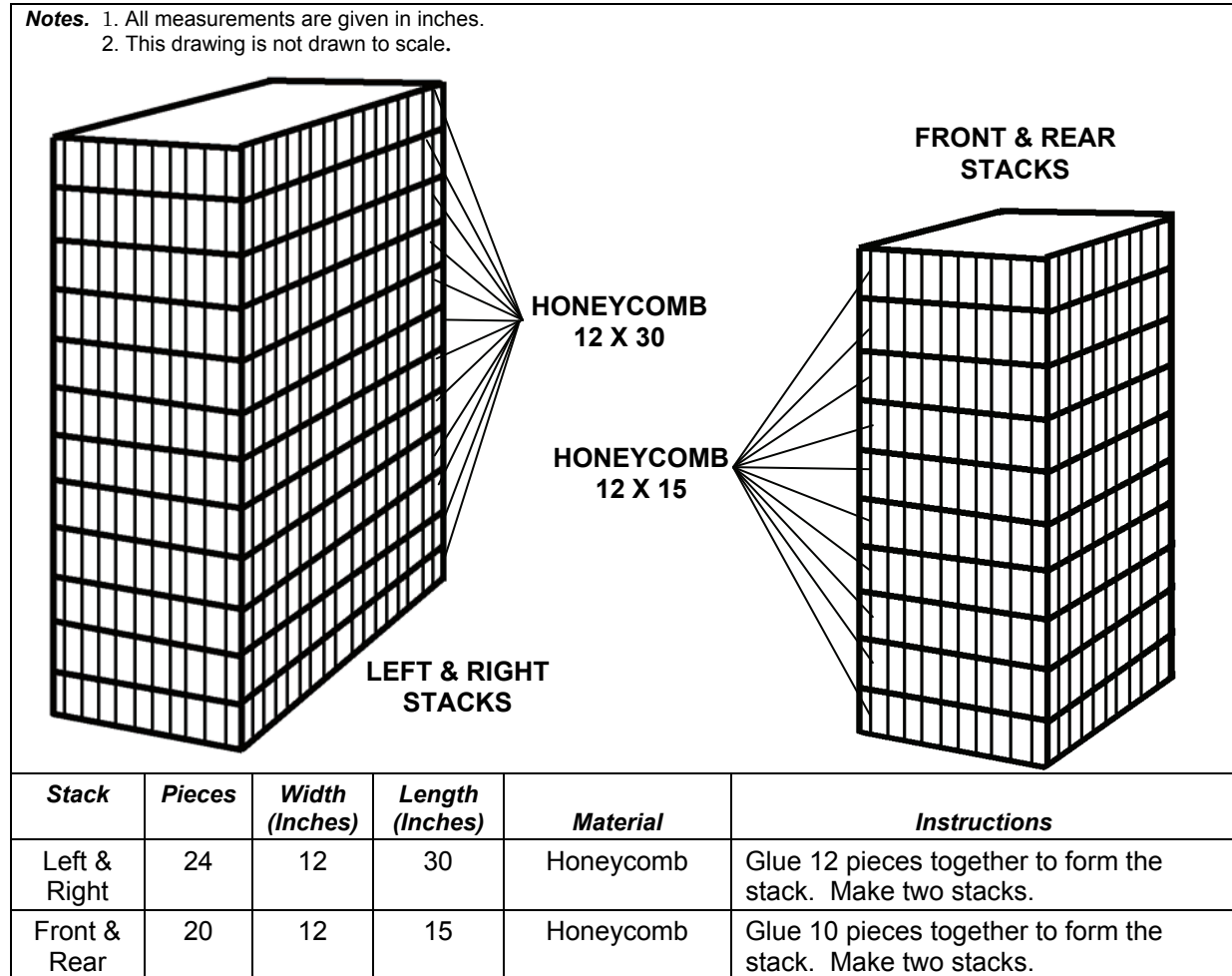
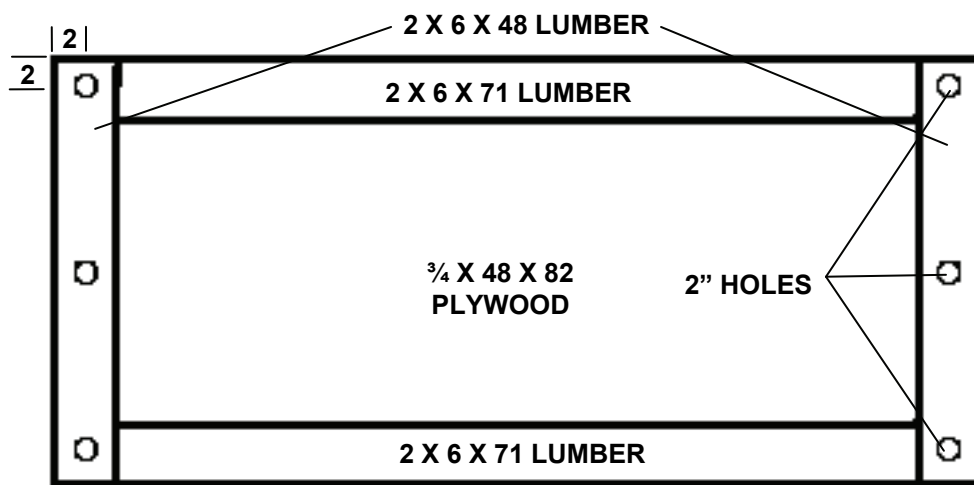


Figure 5-26. Parachute Support Stacks and Stowage Platform Built



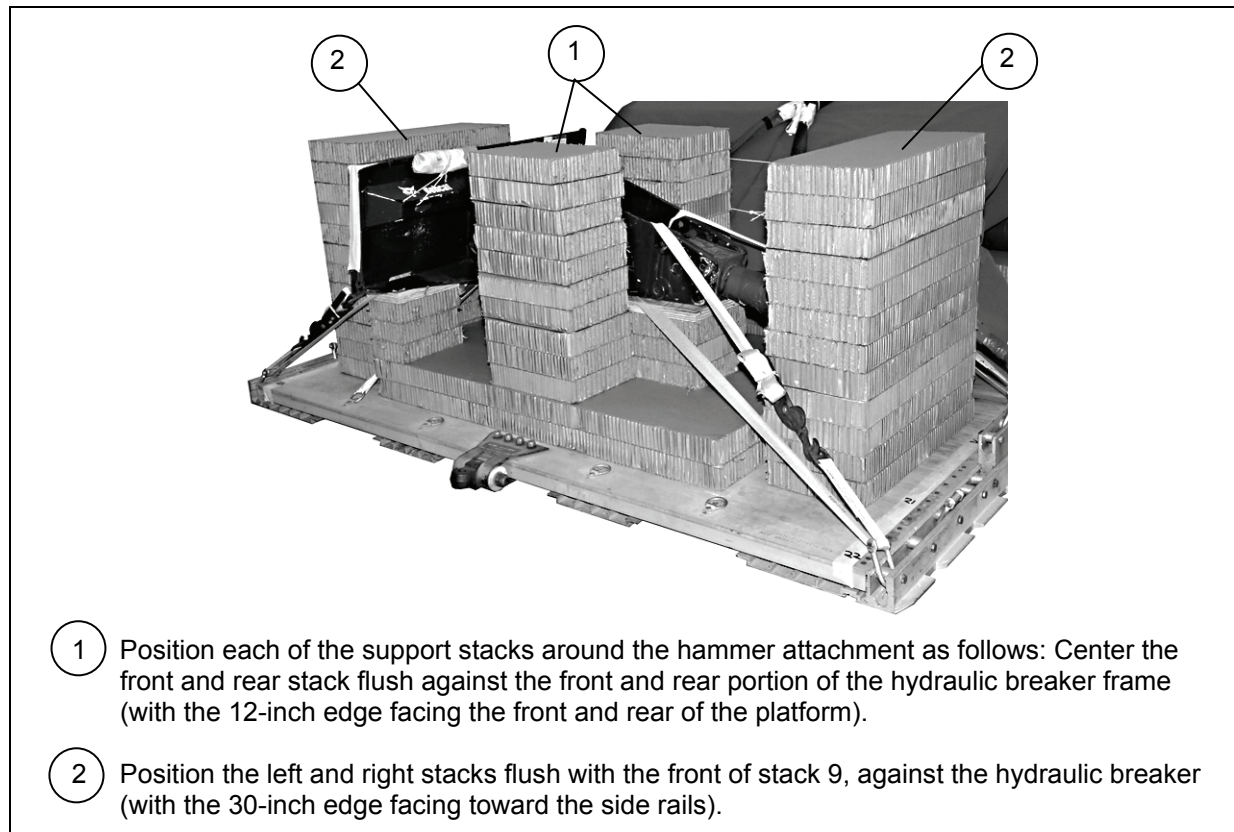
- Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



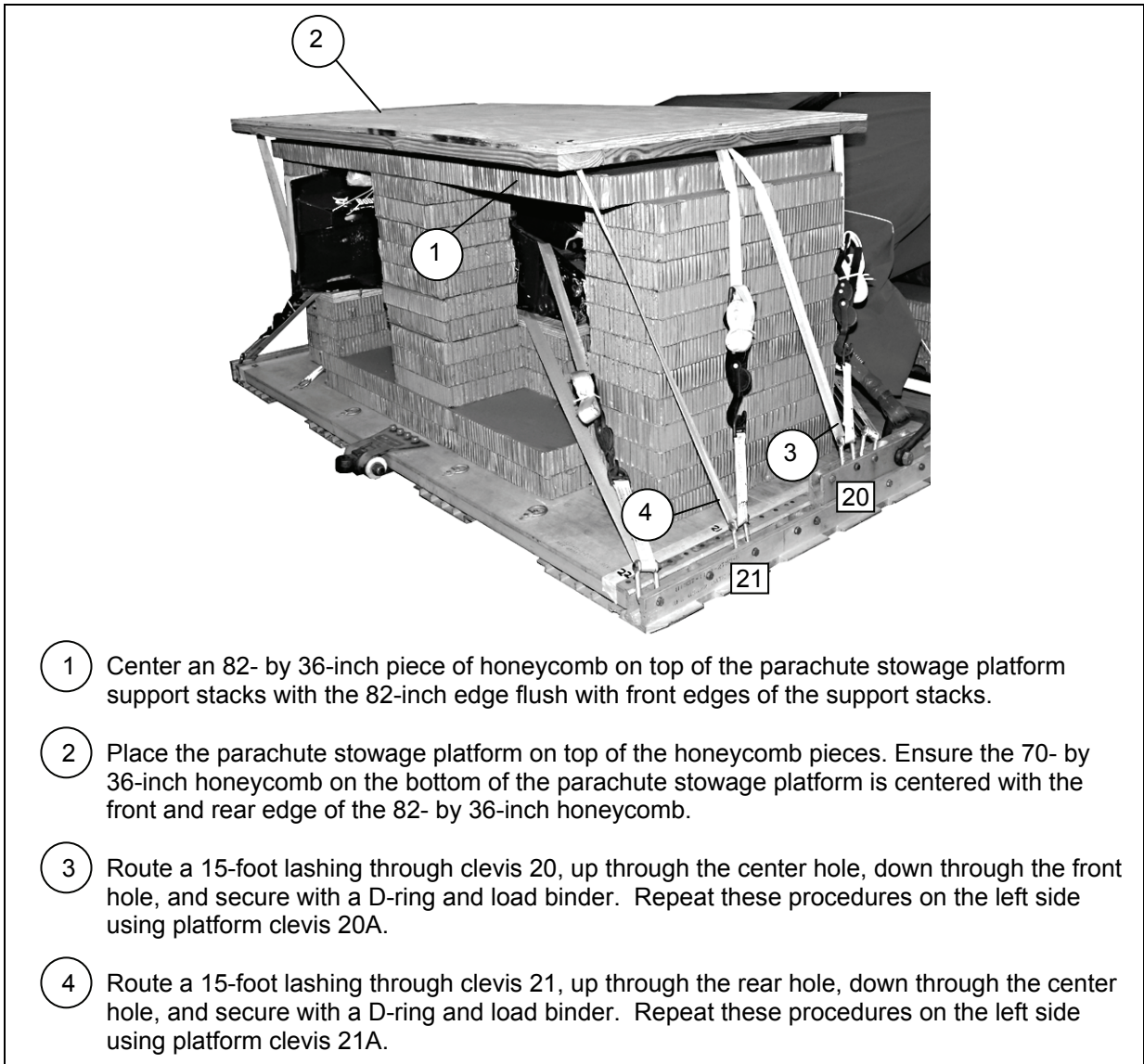
**Steps:**

1. Use a 3/4- by 48- by 82-inch sheet of plywood.
2. Nail a 2- by 6- by 48-inch piece of lumber along each side of the plywood using eightpenny nails.
3. Nail a 2- by 6- by 71-inch piece of lumber along the front and rear of the plywood using eightpenny nails.
4. Drill six 2-inch holes as shown.
5. Glue a 70- by 36-inch piece of honeycomb to the inside of the parachute stowage platform (not shown).

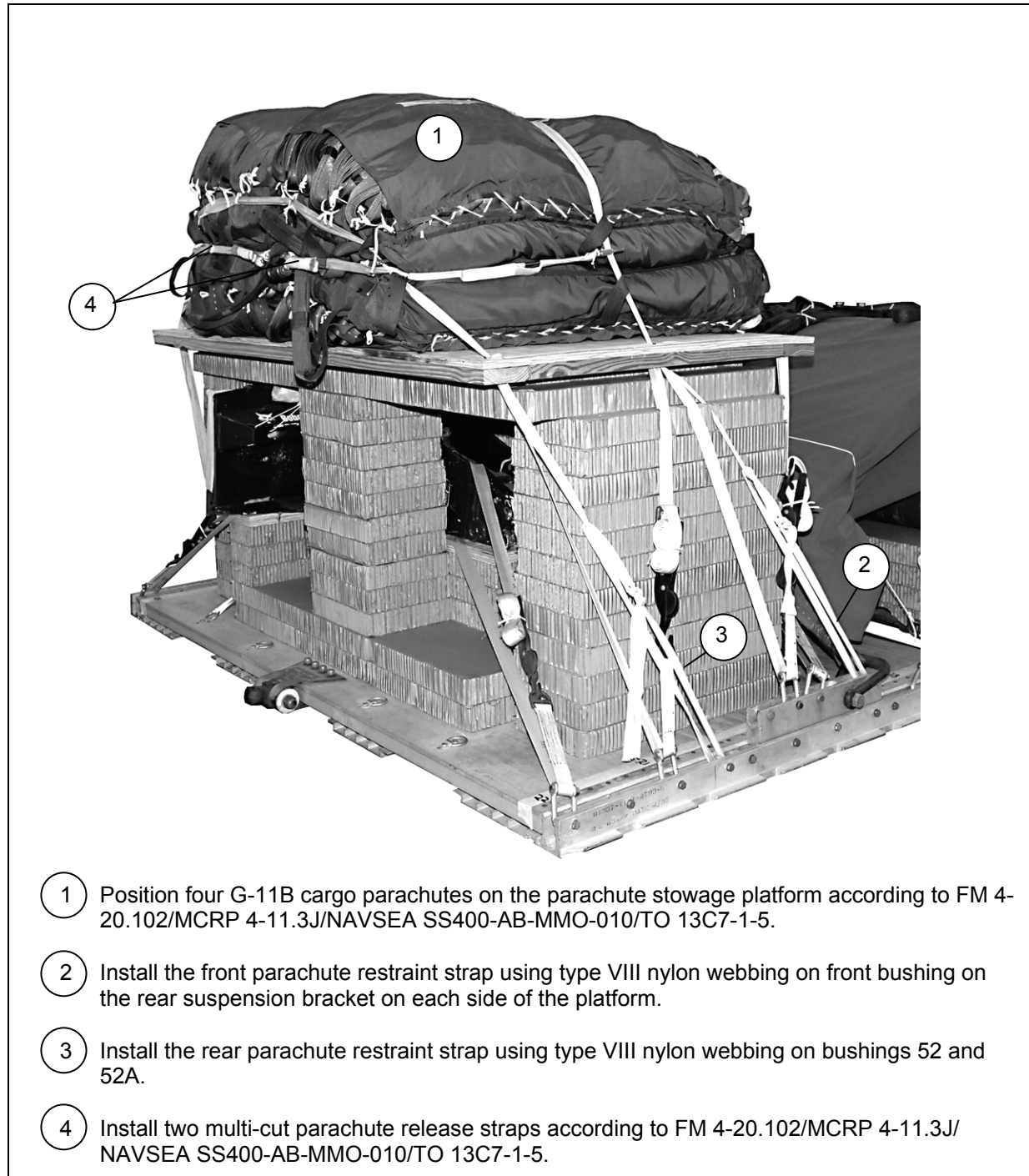
**Figure 5-26. Parachute Support Stacks and Stowage Platform Built (Continued)**



**Figure 5-27. Parachute Stowage Platform Support Stacks Positioned**



**Figure 5-28. Parachute Stowage Platform Positioned**

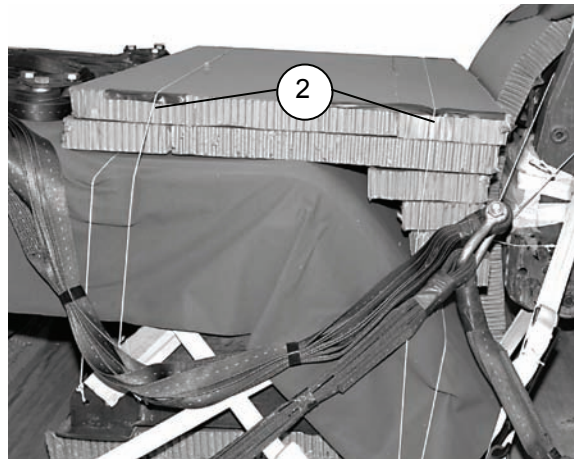
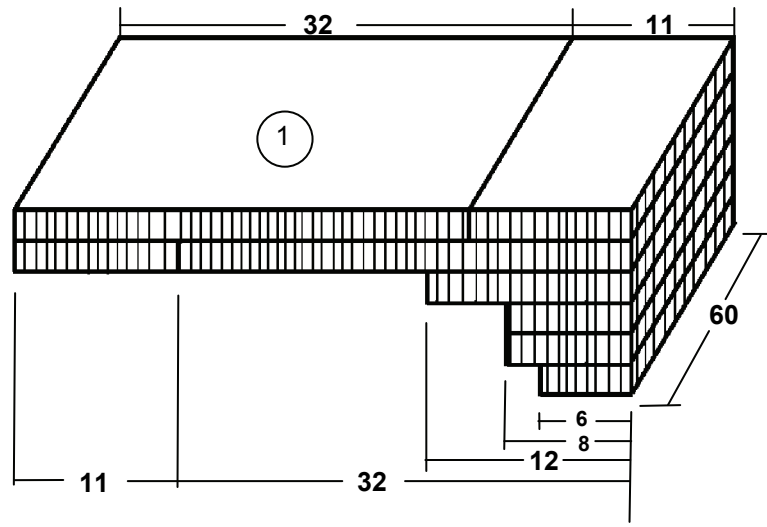


**Figure 5-29. Cargo Parachutes Positioned and Restrained**

## INSTALLING PARACHUTE RELEASE SYSTEM

5-14. Build an M2 parachute release platform as shown in Figure 5-30. Prepare and install an M-2 parachute release system according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figure 5-31.

- Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



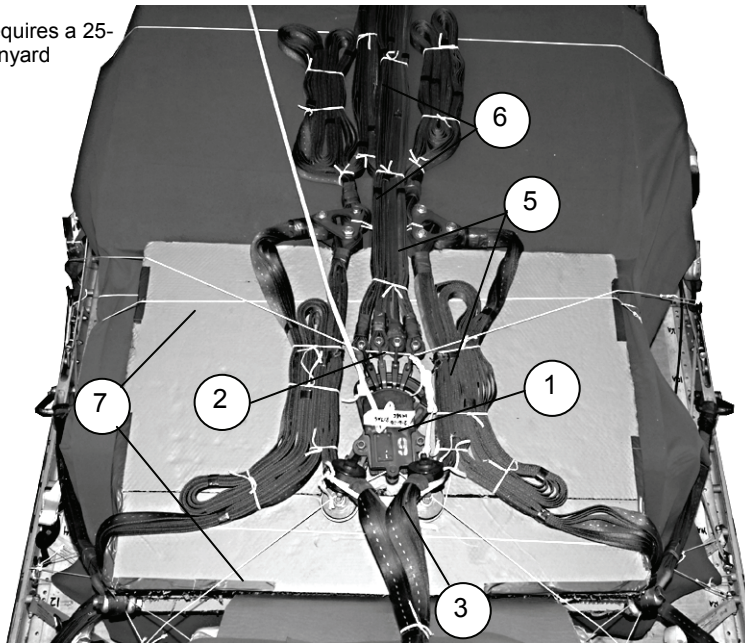
- 1 Prepare a parachute release platform out of honeycomb as shown above. The honeycomb does not have to be glued together.
- 2 Center the front edge of the release platform flush against the honeycomb covering the front edge of the T-200 Bobcat. Secure the release platform to convenient points on the load using type III, nylon cord. Tape the edges of the honeycomb that the type III nylon cord contacts.

**Note.** It may be necessary to adjust the dimensions of the release platform to ensure that a level surface is achieved and the platform fits snugly against the Bobcat.

**Figure 5-30. M2 Parachute Release Platform Installed**



**Note:** This load requires a 25-foot arming wire lanyard



- 1 Center an M-2 parachute release assembly on the release platform.
- 2 Attach the parachute riser extensions to the parachute release connectors.
- 3 Attach the suspension slings to the lower suspension links.
- 4 Route the front suspension slings over the top of the T-200 Bobcat cab and safety tie the slings at 2-foot intervals using type I, 1/4-inch cotton webbing (not shown)
- 5 Fold the excess center and rear suspension slings and safety tie with type I, 1/4-inch cotton webbing. Position and safety tie each three-point link assembly using a single length of type I, 1/4-inch cotton webbing.

**Note.** Ensure that the type I, 1/4-inch cotton webbing tie securing the three-point links is below the riser extensions.

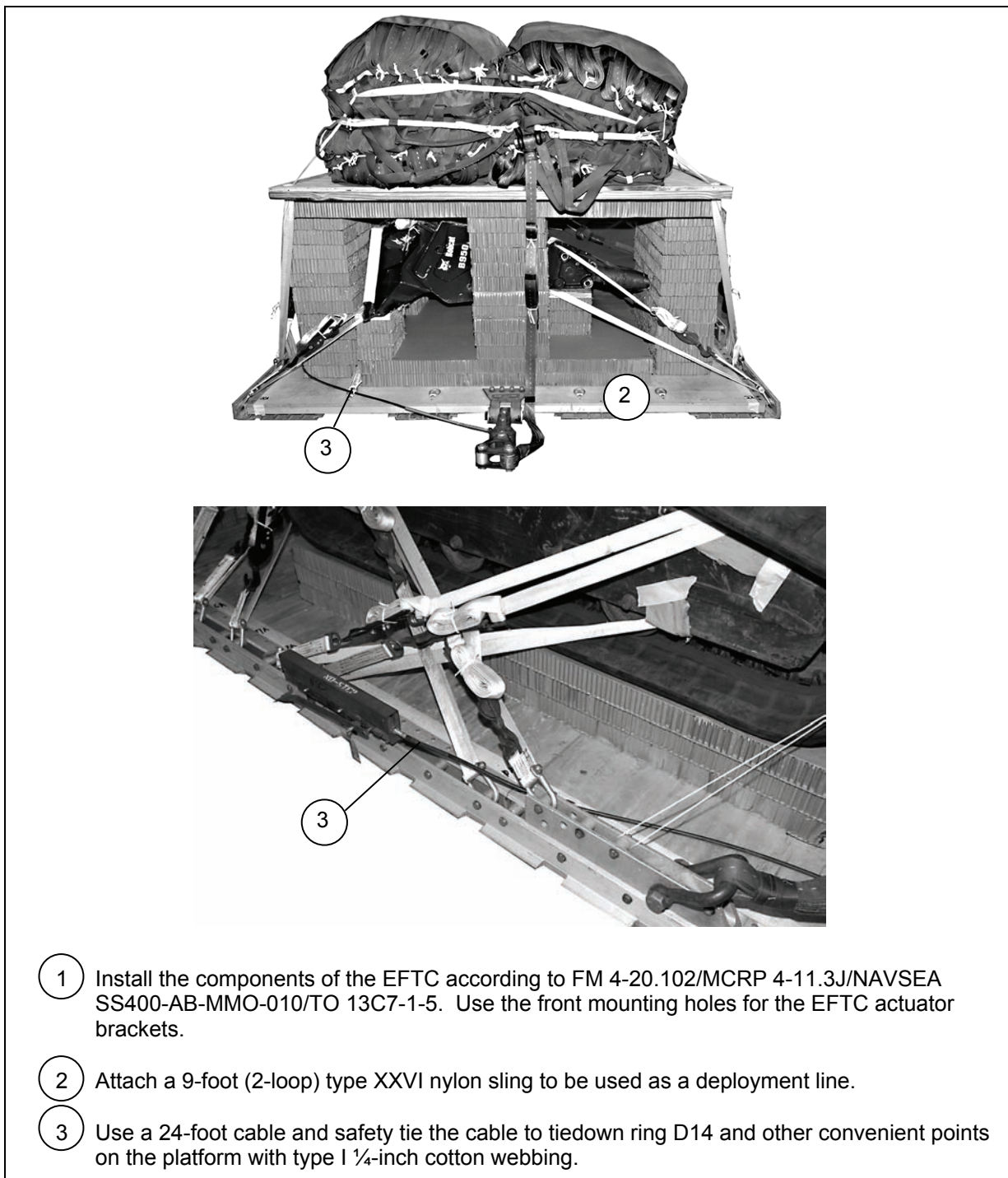
- 6 Fold and safety tie any slack in the riser extensions at 2-foot intervals using type I, 1/4-inch cotton webbing.
- 7 Tie the front and rear M-2 parachute release safety tie to convenient points on the load with type III nylon cord.

**Figure 5-31. M2 Parachute Release Installed**



## INSTALLING EXTRACTION SYSTEM

5-15. Install the extraction system as shown in Figure 5-32.



**Figure 5-32. Extraction System Installed**

## **PLACING EXTRACTION PARACHUTE**

5-16. Select the extraction parachute and extraction line needed using the extraction line requirements table in FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5. Place the extraction parachute and line on the load for installation in the aircraft.

## **INSTALLING PROVISIONS FOR EMERGENCY RESTRAINTS**

5-17. Select and install the provisions for the emergency aft restraints according to the emergency aft restraint requirements table in FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.

## **MARKING RIGGED LOAD**

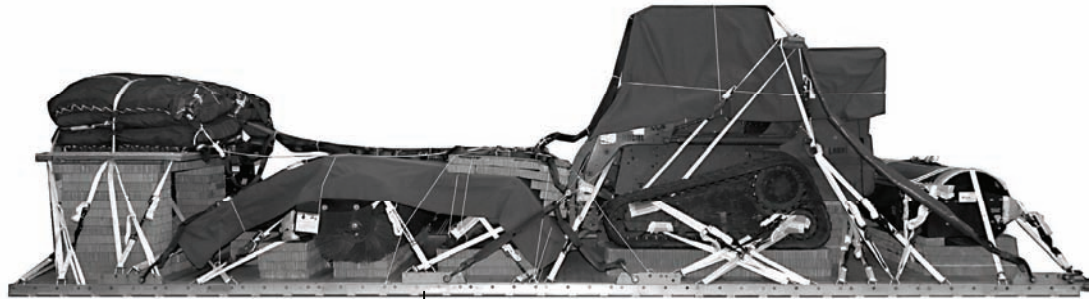
5-18. Mark the rigged load according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5, and as shown in Figure 5-33. Complete Shipper's Declaration for Dangerous Goods. If the load varies from the one shown, the weight, height, CB, and parachute requirements must be recomputed.

## **EQUIPMENT REQUIRED**

5-19. Use the equipment listed in Table 5-1 to rig this load.

**CAUTIONS**

Make the final rigger inspection required by AR 59-4 and FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 before the load leaves the rigging site



**C/B  
RIGGED LOAD DATA**

Weight; Load Shown.....	17,000 pounds
Height.....	99 inches
Width.....	108 inches
Overall Length .....	336 inches
Overhang: Front.....	0
Rear.....	0
Center of Balance (CB) (from front edge of the platform).....	144 inches

- Extraction System with 24-foot cable (adds 18 inches to the length of the load)

**Figure 5-33. T-200 Bobcat Compact Track Loader Rigged on a 28-Foot, Type V Platform for Low-Velocity Airdrop**

**Table 5-1. Equipment Required for Rigging the T-200 Bobcat Compact Track Loader on a 28-Foot, Type V Platform for Low-Velocity Airdrop**

<i>National Stock Number</i>	<i>Item</i>	<i>Quantity</i>
8040-00-273-8713	Adhesive paste, 1-gal.	As required
4030-00-090-5354	Clevis, suspension, 1-inch (large)	11
8305-00-880-8155	Cloth, coated (nylon, type II, 17.0 oz, green, 60-in)	As required
4020-00-240-2146	Cord, nylon, type III, 550-lb	As required
1670-00-434-5787	Coupling, airdrop extraction force transfer, w/24-ft. cable	1
1670-00-360-0328	Cover, clevis	4
8135-00-664-6958	Cushioning material (Cellulose padding)	As required
8305-00-958-3685	Felt, 1/2-inch thick	As required
1670-01-183-2678	Leaf, extraction line (line bag) ( add 2 for C-17)	2
	Line extraction:	
1670-01-064-4454	60-foot (6-loop), type XXVI (for C-130)	1
1670-01-468-9178	140-foot (6-loop), type XXVI (for C-17)	1
1670-01-064-4452	60-foot (1-loop), type XXVI (for C-17), (drogue line)	1
1670-00-783-5988	Link assembly, type IV (C-17 only)	1
	Link assembly, two-point:	
5306-00-435-8994	Bolt, 1-inch diameter, 4-inches long	6
5310-00-232-5165	Nut, 1-inch	6
1670-00-003-1954	Plate, side, 5 1/2-inch	6
5365-00-007-3414	Spacer, large	6
1670-01-307-0155	Link assembly, coupling, three-point	2
	Lumber:	
5510-00-220-6148	2- by 6- by 96-inch	5
5315-00-010-4659	Nail, steel, common, 8D	As required
1670-00-753-3928	Pad, energy-dissipating (honeycomb)	36 sheets
1670-01-016-7841	Parachute, cargo, G-11B	4
	Parachute, cargo, extraction:	
1670-00-040-8135	28-foot	1
1670-01-063-3715	15-foot (C-17 only)	1
	Platform, airdrop, type V, 28-foot:	
1670-01-162-2372	Clevis assembly (type V)	46
1670-01-162-2376	Extraction bracket assembly	1
1670-01-247-2389	Link, suspension bracket, type V	6
1670-01-162-2381	Tandem link assembly (Multipurpose link)	2
5530-00-128-4981	Plywood, 3/4-inch	3 Sheets

**Table 5-1. Equipment Required for Rigging the T-200 Bobcat Compact Track Loader on a 28-Foot, Type V Platform for Low-Velocity Airdrop (Continued)**

<i>National Stock Number</i>	<i>Item</i>	<i>Quantity</i>
1670-01-097-8817	Release, cargo parachute, M-2	1
	Sling, cargo, airdrop:	
1670-01-062-6306	3-foot (4-loop), type XXVI	8
1670-01-0637760	11-foot (2-loop), type XXVI	4
1670-01-062-6307	12-foot (4-loop), type XXVI	2
1670-01-062-6308	16-foot (4-loop), type XXVI	2
1670-01-064-4452	60-foot (1-loop), type XXVI	4
5340-00-040-8219	Strap, parachute, release, multi-knife	2
7501-00-266-5016	Tape, adhesive, 2-inch	As required
1670-00-937-0271	Tiedown assembly, 15-foot	59
1670-01-483-8259	Link, Parachute, Connector (H-block) (C-17 only)	1
	Webbing:	
8305-00-268-2411	Cotton, 1/4-inch, type I	As required
8305-00-082-5752	Nylon, tubular, 1/2-inch	As required
8305-00-261-8585	Nylon, type VIII	As required
8305-00-268-2455	Nylon, tubular, 1-inch	As required

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## Chapter 6

### **RIGGING THE 420D BACKHOE LOADER ON A 32-FOOT, TYPE V PLATFORM FOR LOW-VELOCITY AIRDROP**

#### **DESCRIPTION OF THE LOAD**

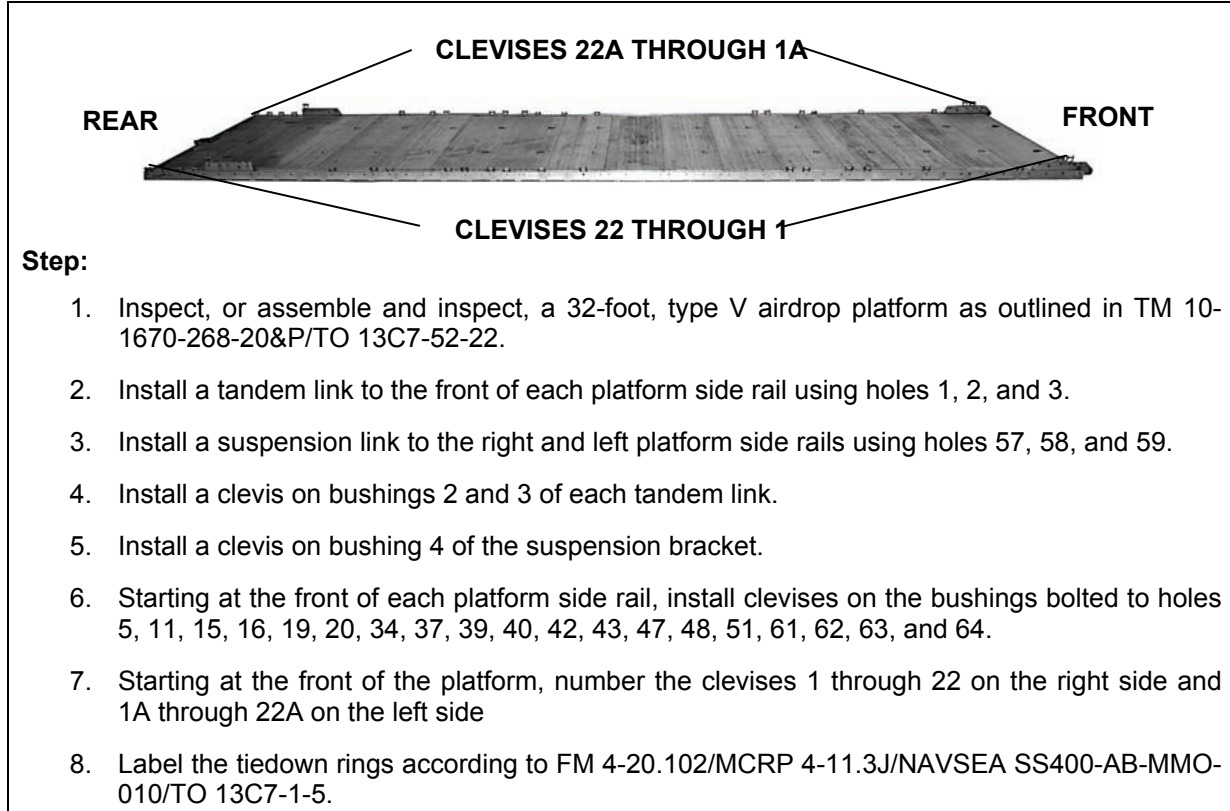
6-1. The 420D backhoe loader (Figure 6-1) is rigged on a 32-foot, type V airdrop platform using five G-11 cargo parachutes. The 420D backhoe loader is 140 inches high (reducible to 99 inches), 91 inches wide, 276 inches long, and weighs 15,763 pounds. An accompanying load, which consists of a roll-over protection system (ROPS) and a hydraulic breaker (hammer) is also rigged with the load. The ROPS weighs 420 pounds and the hydraulic breaker weighs 1420 pounds.



**Figure 6-1. 420D Backhoe Loader**

## PREPARING PLATFORM

6-2. Prepare a 32-foot, type V airdrop platform as shown in Figure 6-2.

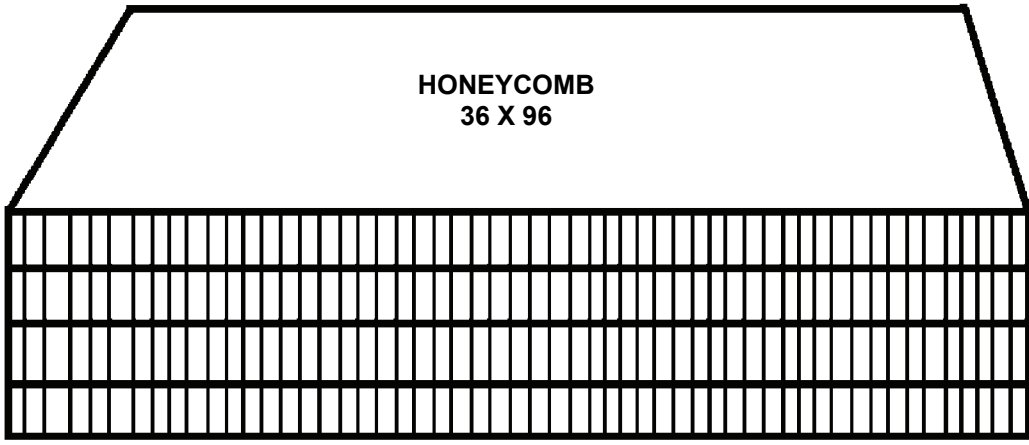


**Figure 6-2. Platform Prepared**

## BUILDING AND POSITIONING HONEYCOMB STACKS

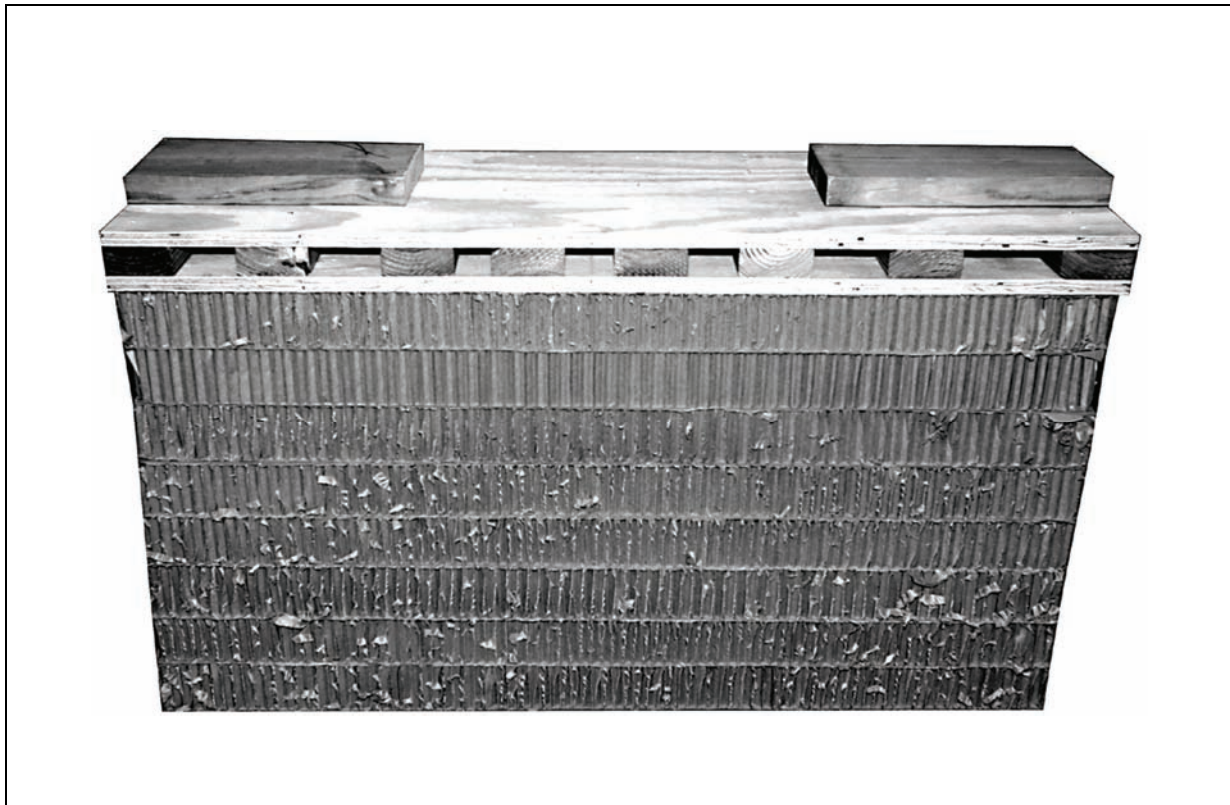
**6-3.** Build the honeycomb stacks as shown in Figures 6-3 through 6-11. Position the stacks as shown in Figure 6-12.

**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



<i>Stack Number</i>	<i>Pieces</i>	<i>Width (Inches)</i>	<i>Length (Inches)</i>	<i>Material</i>	<i>Instructions</i>
1	4	96	36	Honeycomb	Glue to form stack.

**Figure 6-3. Honeycomb Stack 1 Prepared**



<b>Stack Number</b>	<b>Pieces</b>	<b>Width (Inches)</b>	<b>Length (Inches)</b>	<b>Material</b>	<b>Instructions</b>
2	8	49	16	Honeycomb	Glue to form a base.
	2	49	16	$\frac{3}{4}$ inch Plywood	
	8	2 X 4	16	Lumber	Evenly space and nail the eight 2- by 4- by 16-inch pieces of lumber, to the $\frac{3}{4}$ -inch pieces of plywood. The outside pieces of lumber will be flush with the edges of the plywood.
	2	14	2 X 8	Lumber	Center the 8-inch side of the lumber flush with the 16-inch side of the plywood. Nail one 2- by 8- by 14- inch piece to the plywood. Repeat on opposite side.

**Figure 6-4. Honeycomb Stack 2 Prepared**

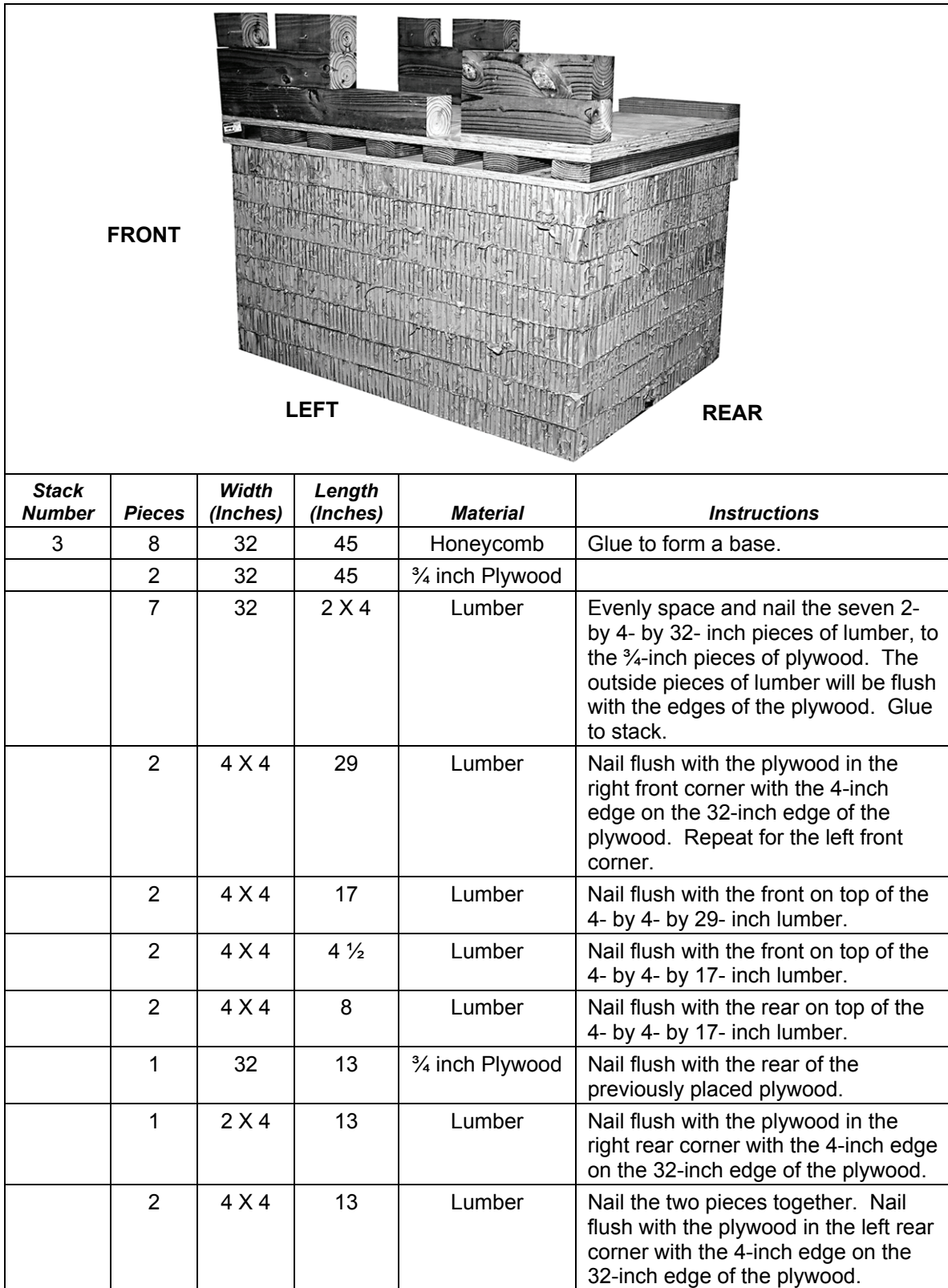
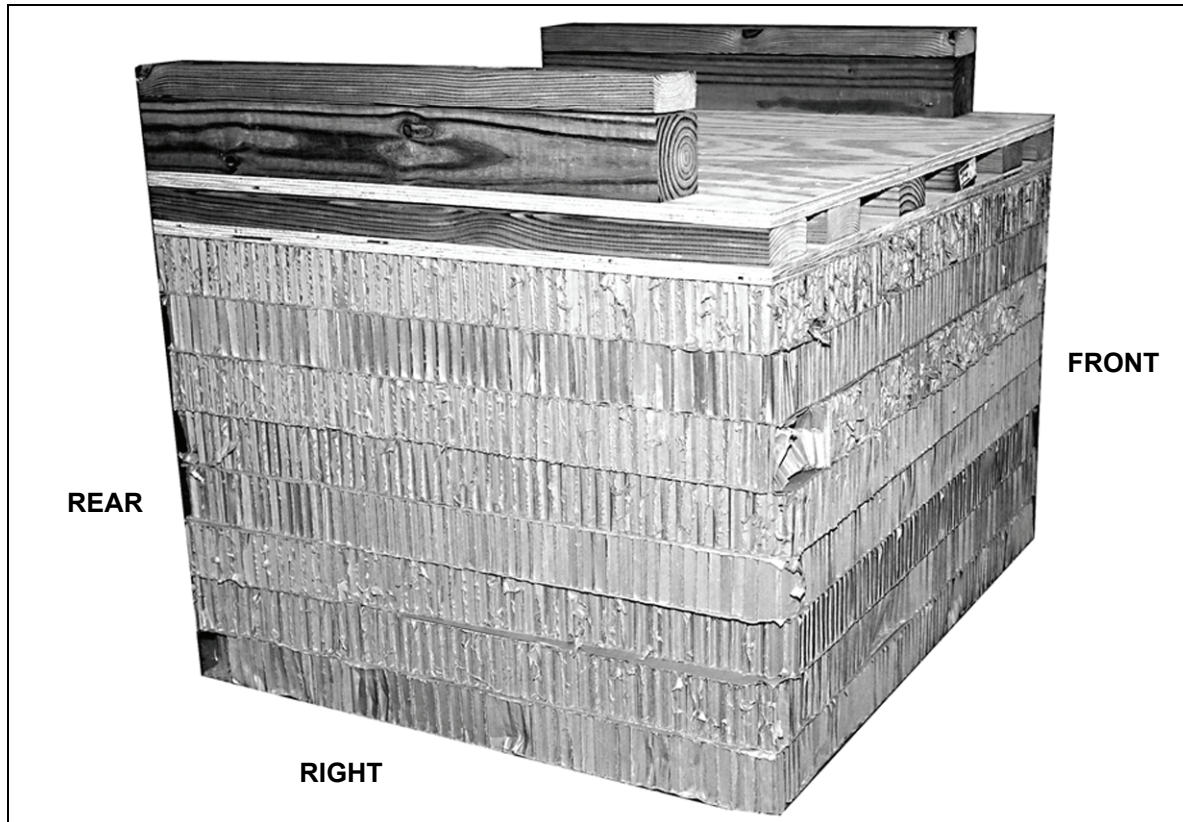


Figure 6-5. Honeycomb Stack 3 Prepared



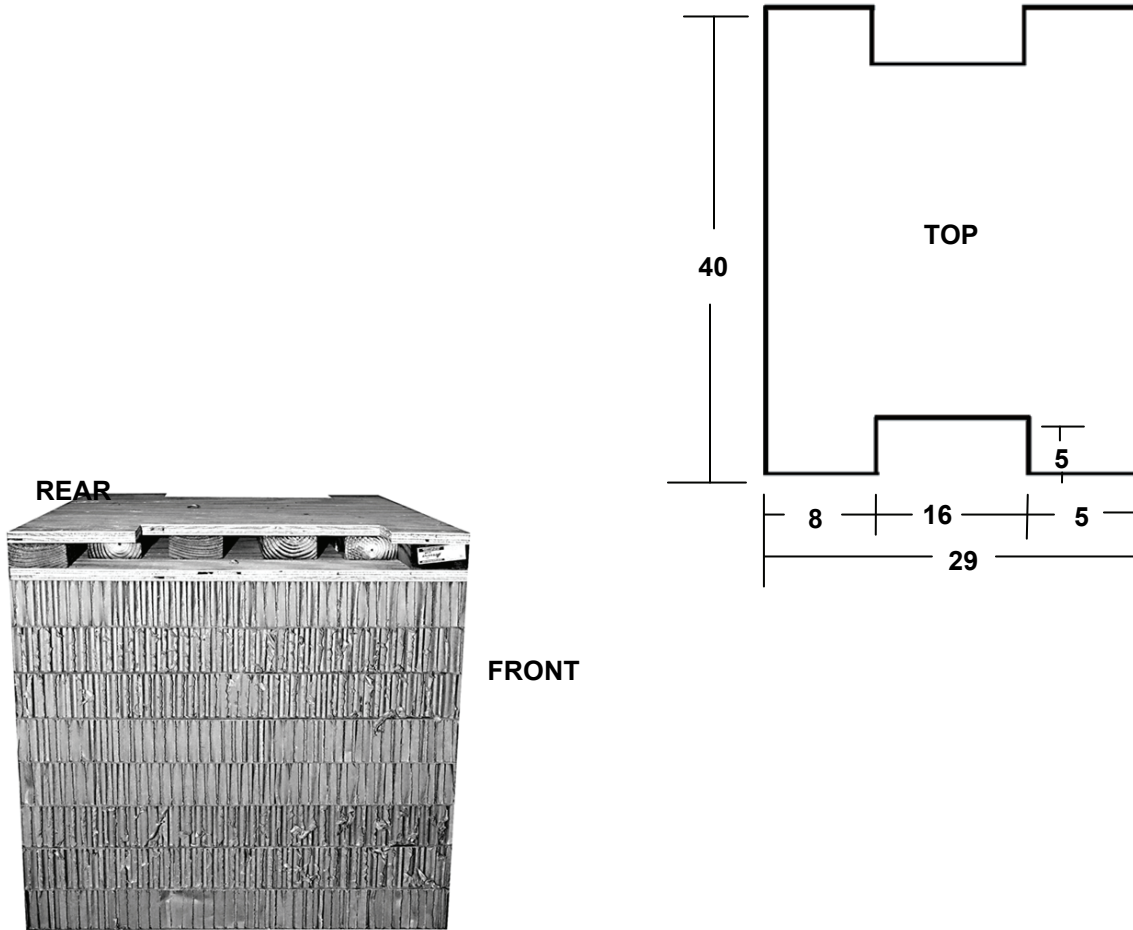


<i>Stack Number</i>	<i>Pieces</i>	<i>Width (Inches)</i>	<i>Length (Inches)</i>	<i>Material</i>	<i>Instructions</i>
4	8	40	34	Honeycomb	Glue to form a base.
	2	40	34	¾ inch Plywood	
	6	2 X 4	34	Lumber	Evenly space and nail the six 2- by 4- by 34-inch pieces of lumber, to the ¾-inch pieces of plywood. The outside pieces of lumber will be flush with the edges of the plywood. Glue to stack.
	2	4 X 4	29	Lumber	Nail flush with the plywood in the right rear corner with the 4-inch edge on the 34-inch edge of the plywood. Repeat for the left rear corner.
	2	2 X 4	29	Lumber	Nail flush with the front on top of 4- by 4- by 29-inch lumber.

**Figure 6-6. Honeycomb Stack 4 Prepared**



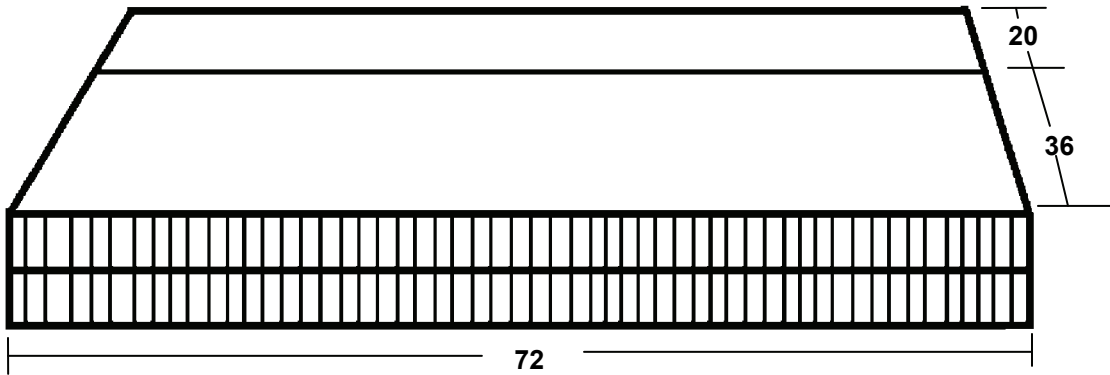
**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



<b>Stack Number</b>	<b>Pieces</b>	<b>Width (Inches)</b>	<b>Length (Inches)</b>	<b>Material</b>	<b>Instructions</b>
5	8	40	29	Honeycomb	Glue to form a base.
	2	40	29	¾ inch Plywood	Cut one piece as shown in the TOP drawing.
	2	2 X 4	40	Lumber	Nail the two 2- by 4- by 40-inch pieces of lumber flush on each side of the bottom piece of plywood.
	4	2 X 4	30	Lumber	Nail one 2- by 4- by 30-inch piece of lumber against the front 2- by 4- by 40-inch piece of lumber and centered on the plywood. Evenly space, center and nail the remaining three pieces of lumber between the 2- by 4-inch lumber. Place and nail the top piece of plywood to the 2- by 4-inch pieces of lumber. Glue to stack.

Figure 6-7. Honeycomb Stack 5 Prepared

**Notes.** 1. All measurements are given in inches.  
 2. This drawing is not drawn to scale.



<i>Stack Number</i>	<i>Pieces</i>	<i>Width (Inches)</i>	<i>Length (Inches)</i>	<i>Material</i>	<i>Instructions</i>
6	2	36	72	Honeycomb	Glue to form a base.
	2	20	72	Honeycomb	Place one 36- by 72-inch and one 20- by 72-inch piece of honeycomb side by side to form bottom layer. Alternate the remaining two pieces of honeycomb and glue to the first layer.

**Figure 6-8. Honeycomb Stack 6 Prepared**

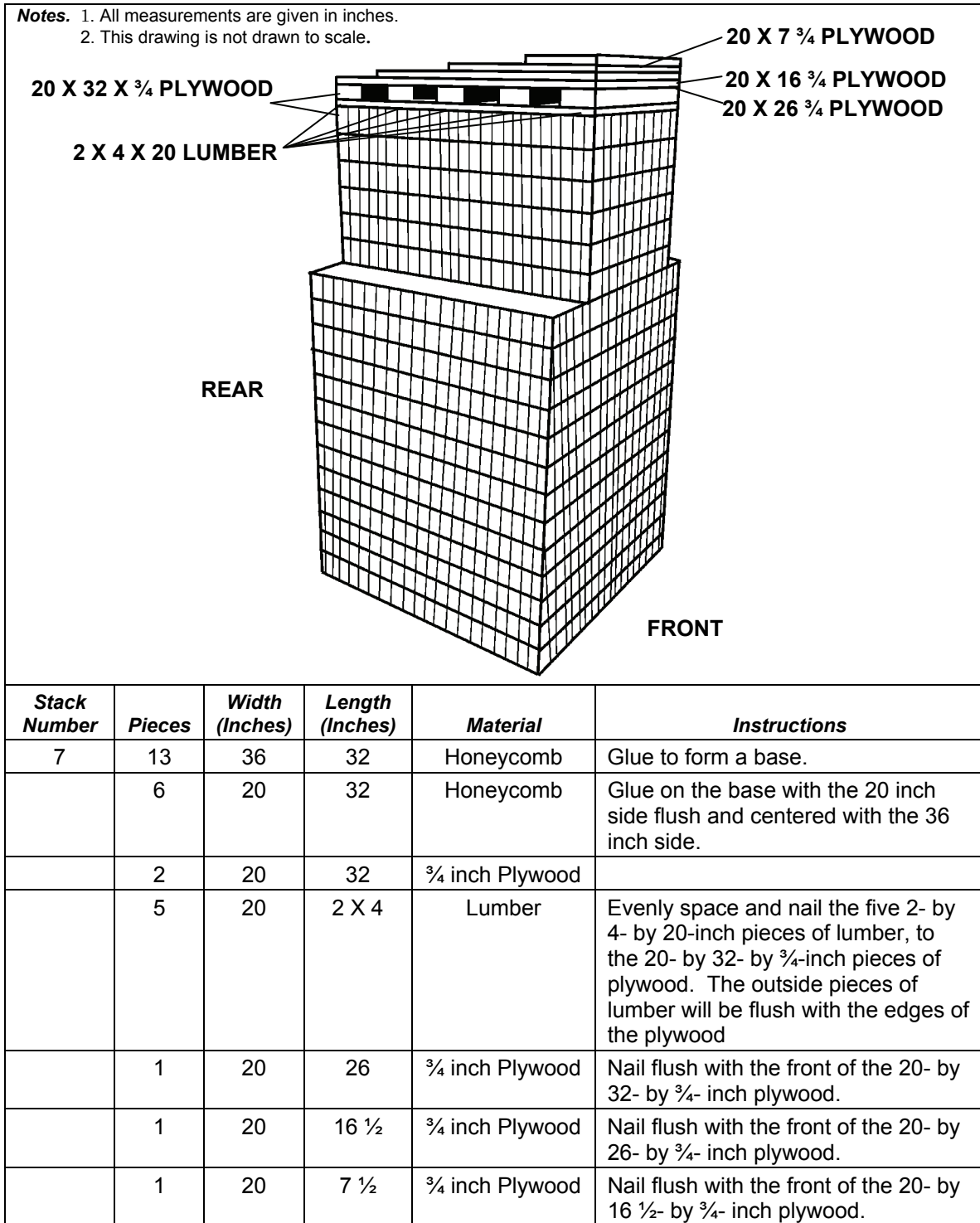
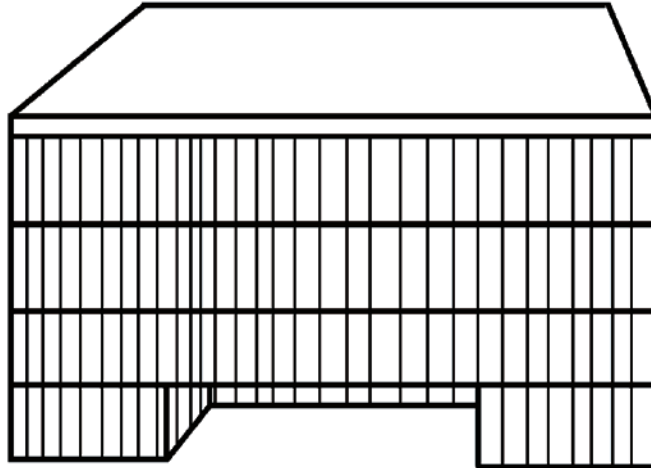


Figure 6-9. Honeycomb Stack 7 Prepared

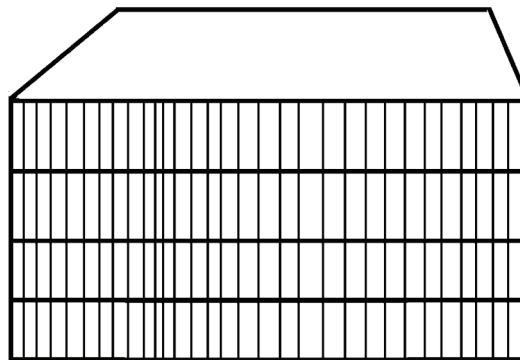
**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



<i>Stack Number</i>	<i>Pieces</i>	<i>Width (Inches)</i>	<i>Length (Inches)</i>	<i>Material</i>	<i>Instructions</i>
8	4	21	21	Honeycomb	Glue to form a base. Cut a 5-inch deep by 10-inch wide cutout, centered on one edge of the bottom layer.
	1	21	21	¾ inch Plywood	Glue on top of the honeycomb stack.

**Figure 6-10. Honeycomb Stack 8 Prepared**

**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



<i>Stack Number</i>	<i>Pieces</i>	<i>Width (Inches)</i>	<i>Length (Inches)</i>	<i>Material</i>	<i>Instructions</i>
9 and 10	8	13	24	Honeycomb	Glue four pieces together to form a stack. Form two stacks.
11 and 12	8	19	36	Honeycomb	Glue four pieces together to form a stack. Form two stacks.

**Figure 6-11. Honeycomb Stacks 9, 10, 11, and 12 Prepared**

- Notes.** 1. All measurements are given in inches.  
 2. This drawing is not drawn to scale.  
 3. Stacks 9, 10, 11, and 12 will be adjusted during vehicle positioning.

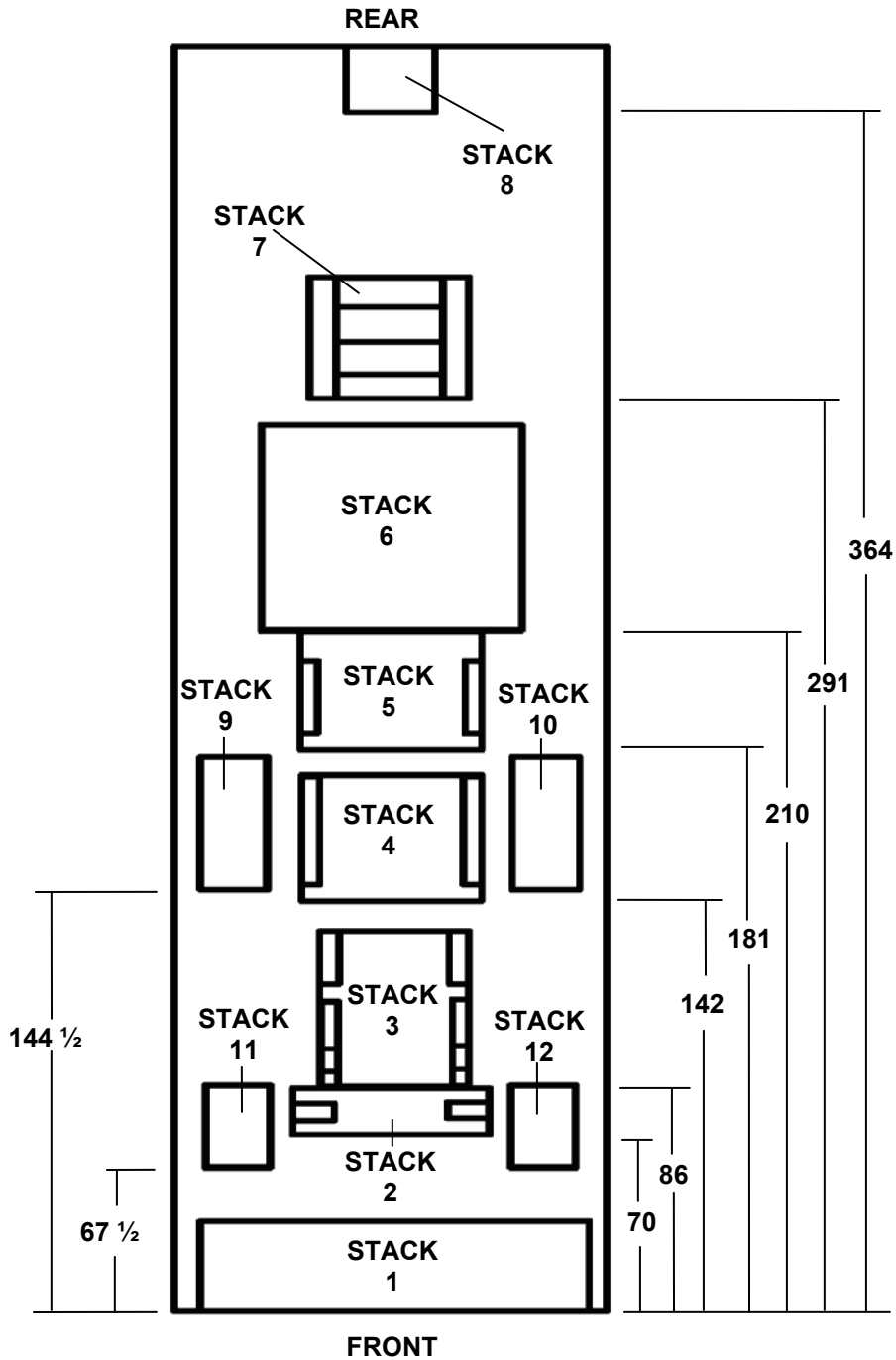
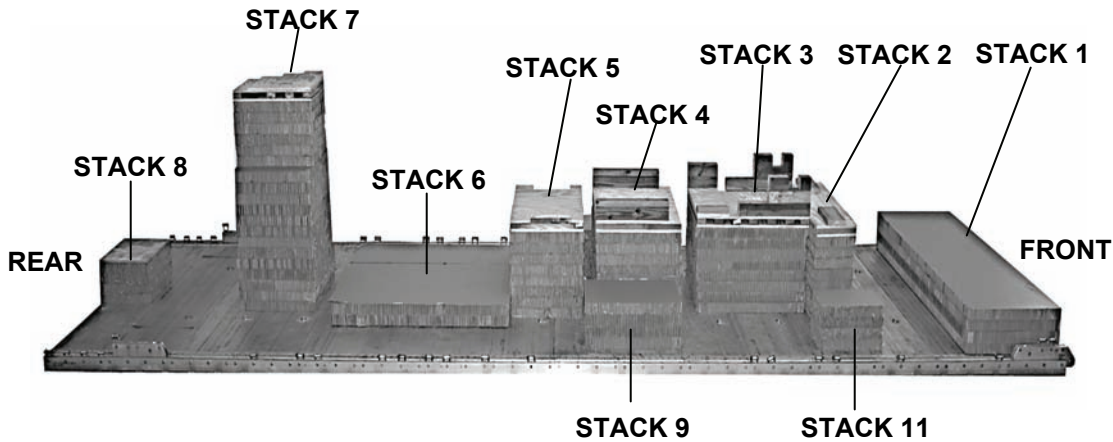


Figure 6-12. Honeycomb Stacks Positioned on Platform

**Note.** Stacks 9, 10, 11, and 12 will be adjusted during vehicle positioning.



**Step:**

1. Position stack 1 centered and flush with the front edge of the platform.
2. Position stack 2 centered and 70 inches from the front edge of the platform.
3. Position stack 3 centered and flush with the rear of stack two, 86 inches from the front edge of the platform.
4. Position stack 4 centered and 142 inches from the front edge of the platform.
5. Position stack 5 centered and 181 inches from the front edge of the platform.
6. Position stack 6 centered and flush with the rear of stack five, 210 inches from the front edge of the platform.
7. Position stack 7 centered and 291 inches from the front edge of the platform.
8. Position stack 8 centered and flush with the rear of stack seven, 364 inches from the front edge of the platform.
9. Position stack 9 to the right of the positioned stacks and 67 ½ inches from the front of the platform. Position stack 10 in the same place on the left side of the platform.
10. Position stack 11 to the right of the positioned stacks and 144 ½ inches from the front of the platform. Position stack 12 in the same place on the left side of the platform.

**Figure 6-12. Honeycomb Stacks Positioned on Platform (Continued)**



## PREPARING THE BACKHOE LOADER

6-4. Prepare the loader as shown in Figure 6-13.

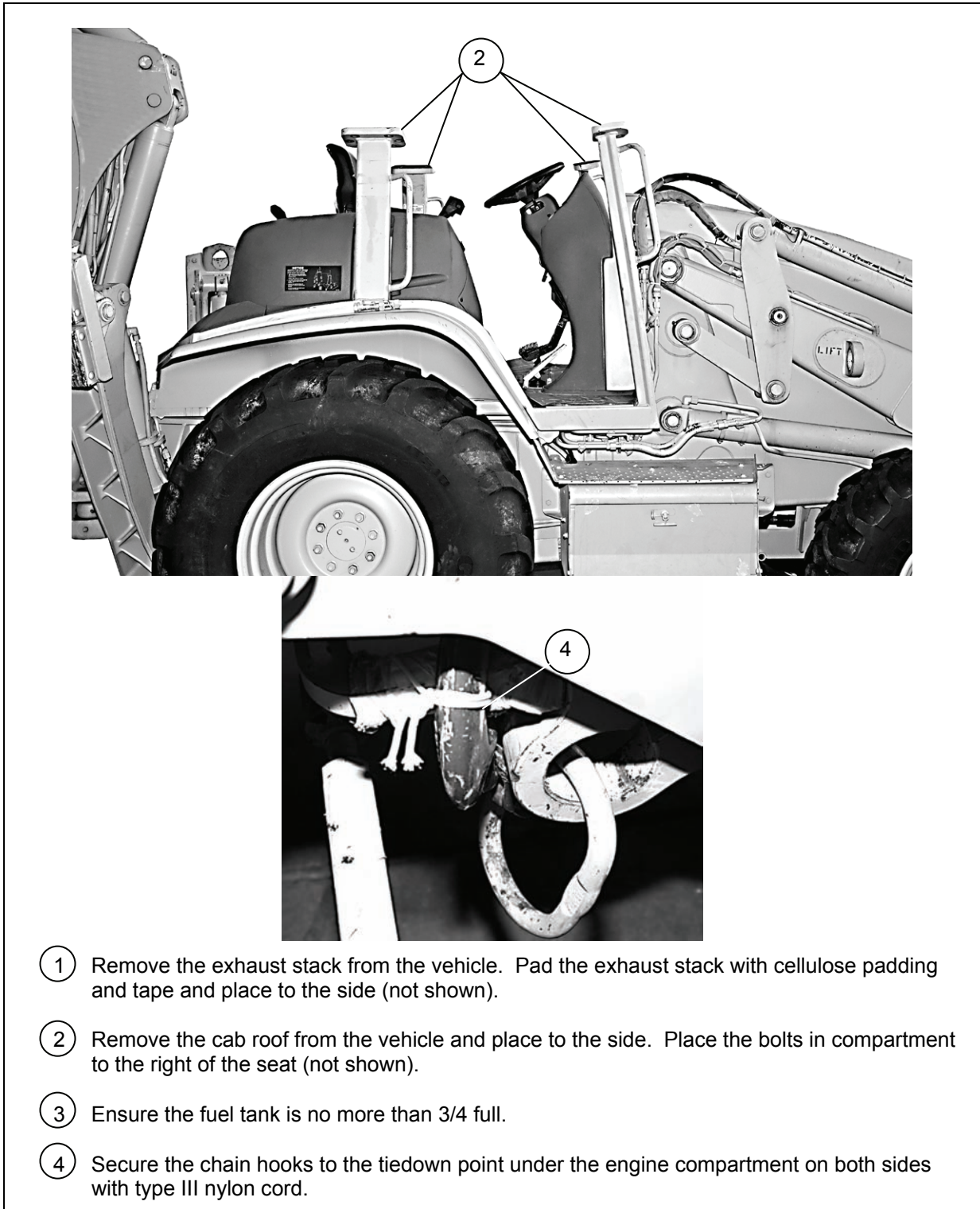


Figure 6-13. Backhoe Loader Prepared

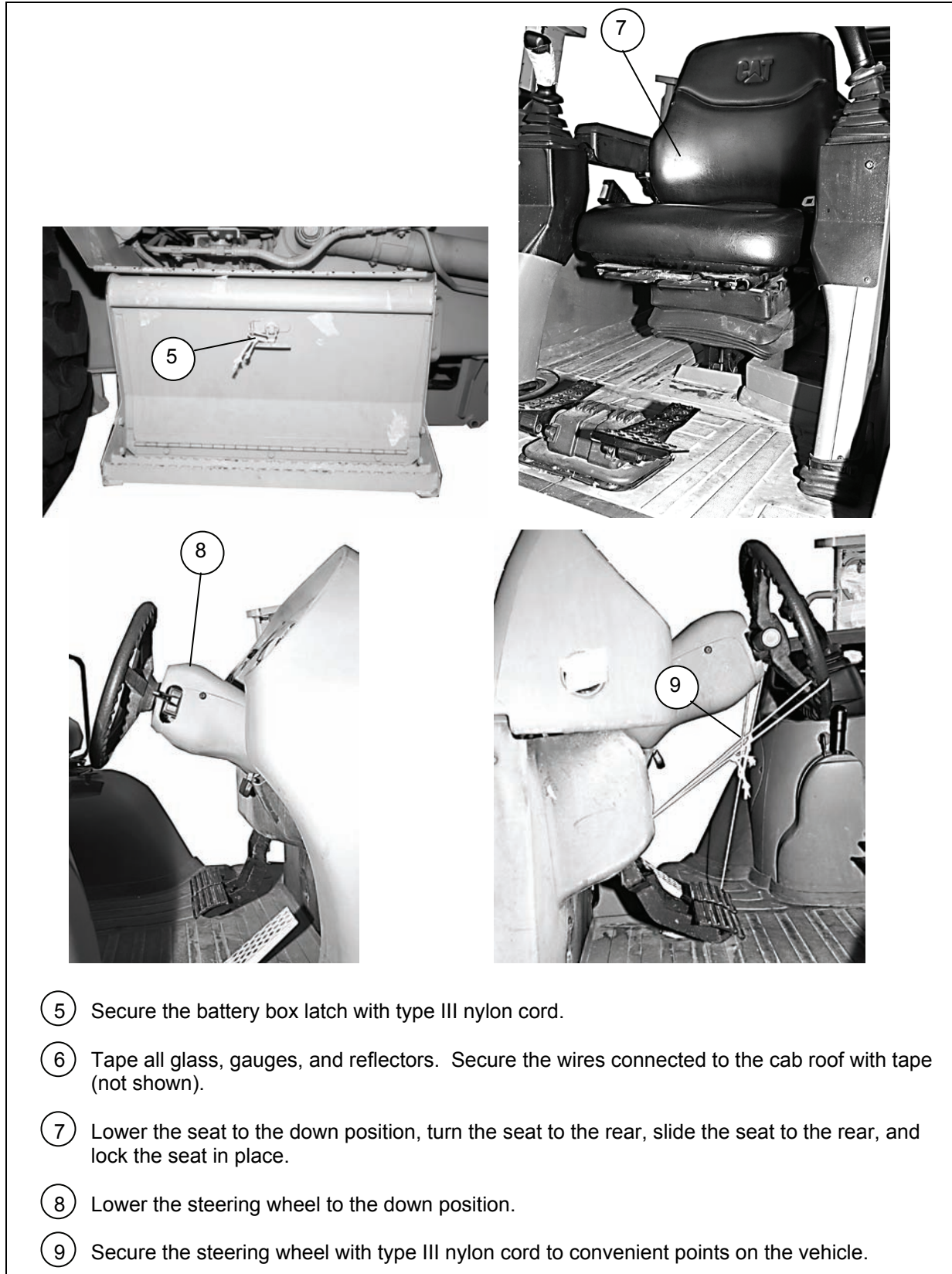
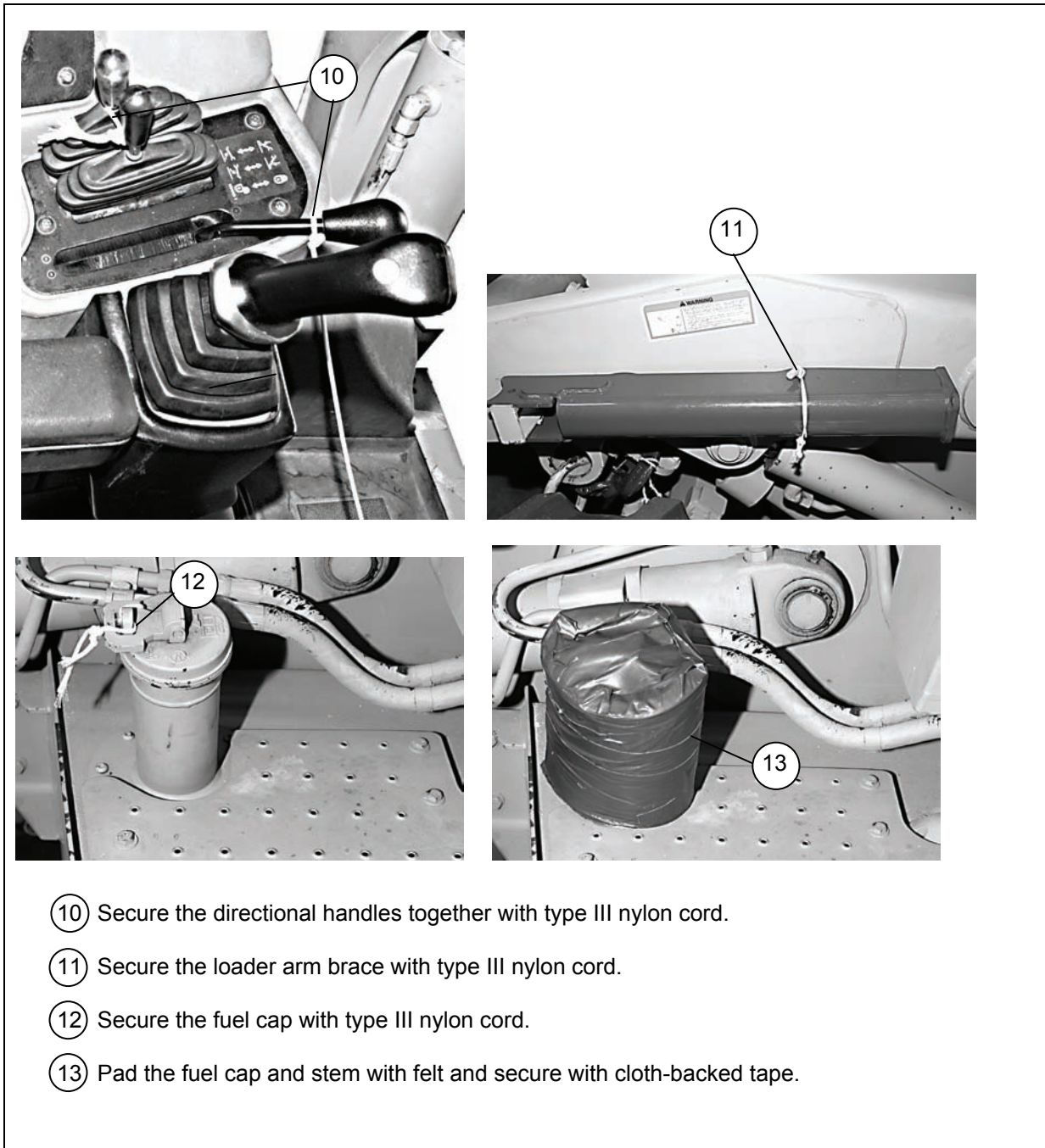


Figure 6-13. Backhoe Loader Prepared (Continued)

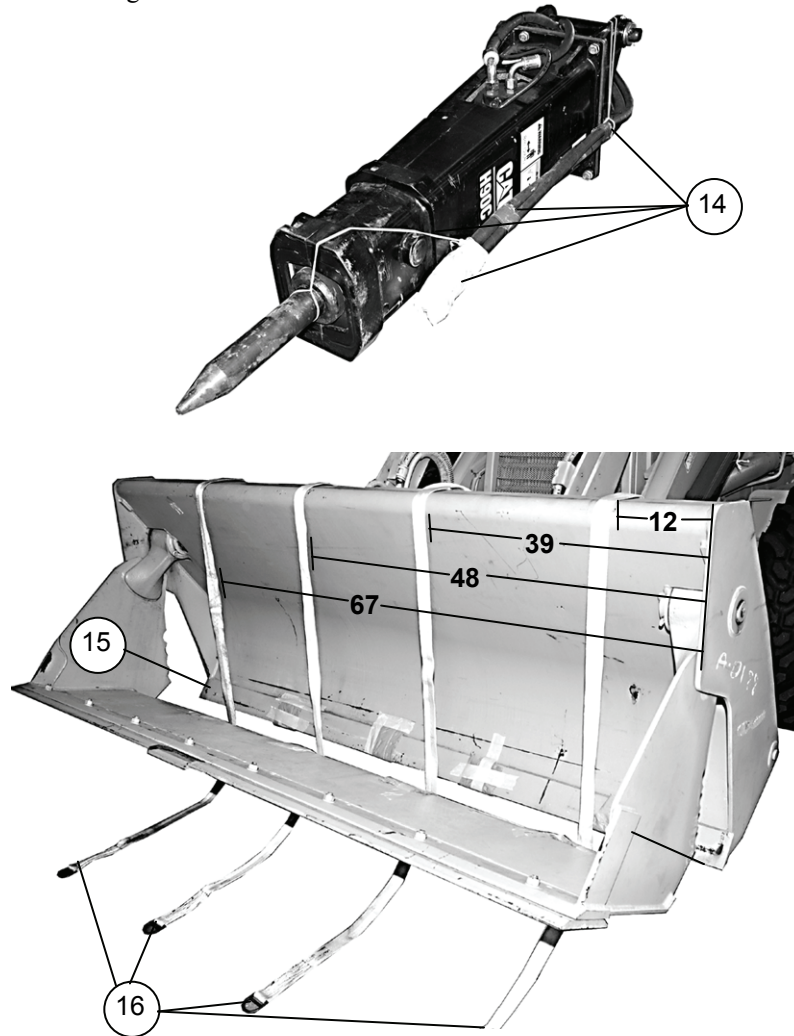


- ⑩ Secure the directional handles together with type III nylon cord.
- ⑪ Secure the loader arm brace with type III nylon cord.
- ⑫ Secure the fuel cap with type III nylon cord.
- ⑬ Pad the fuel cap and stem with felt and secure with cloth-backed tape.

**Figure 6-13. Backhoe Loader Prepared (Continued)**

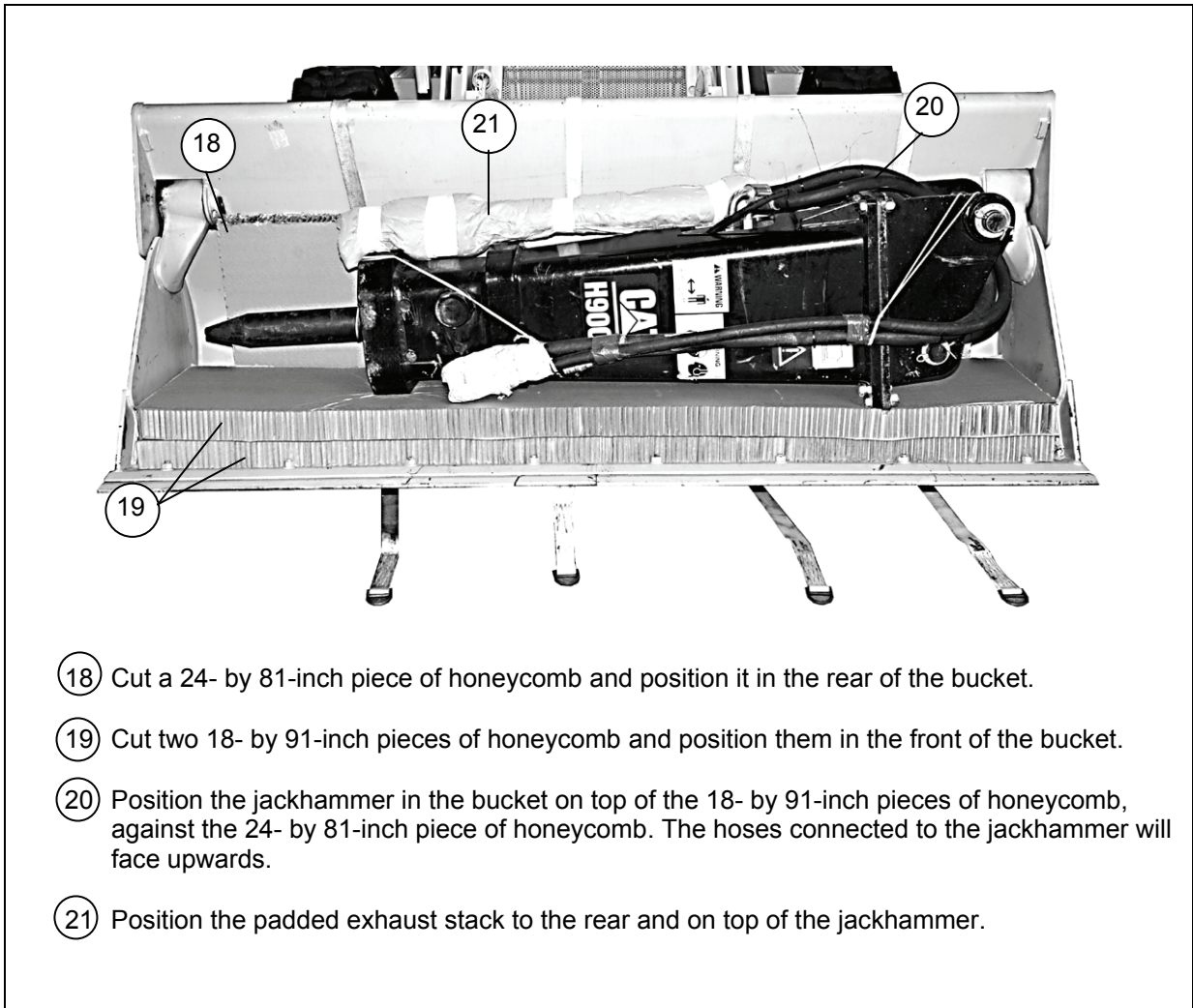


*Note.* All measurements are given in inches.



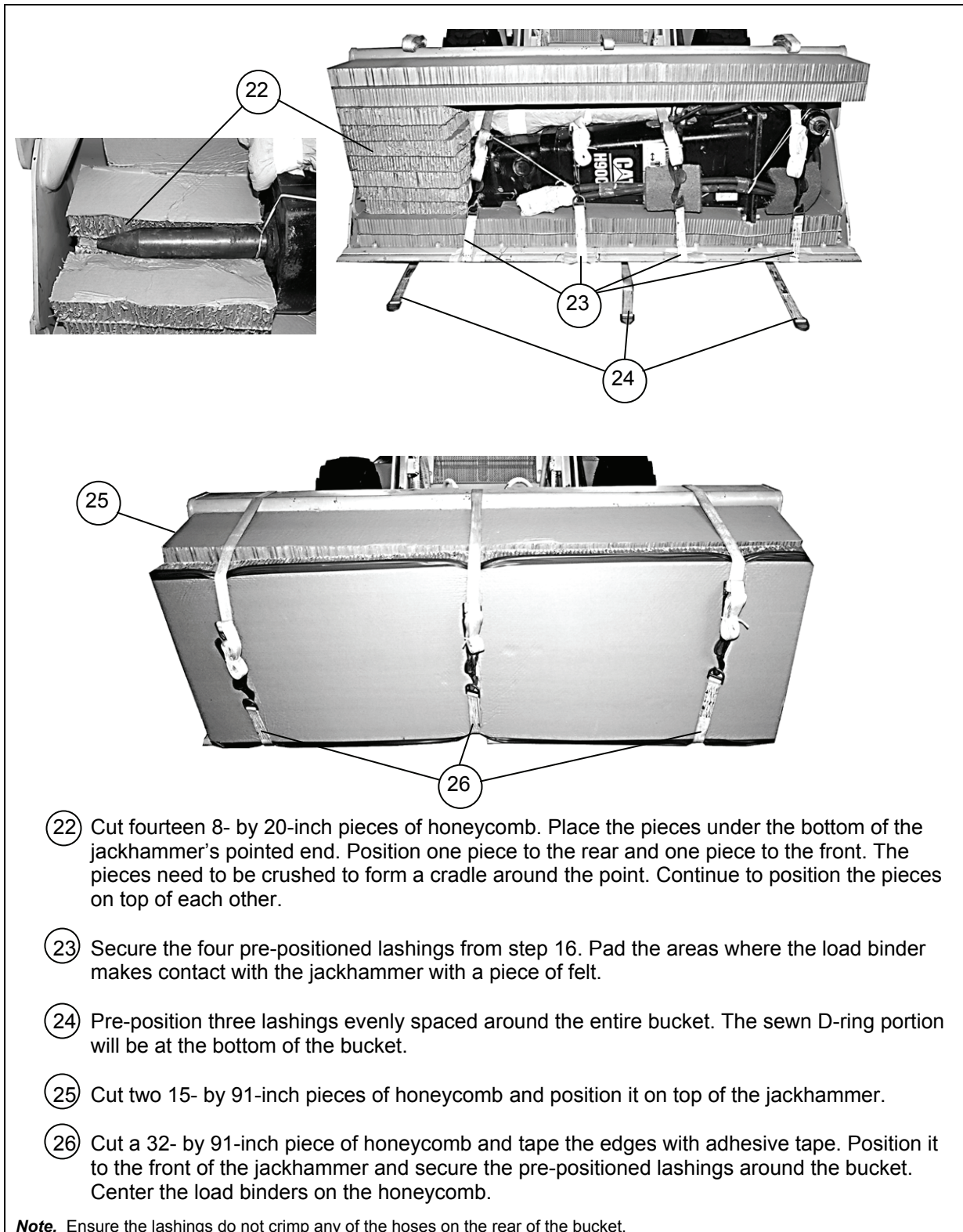
- ①④ Pad and tape the hydraulic connectors on the jackhammer. Tape the hydraulic hoses together in several places. Secure the hoses against the jackhammer body with type III nylon cord.
- ①⑤ Raise and open the front end bucket.
- ①⑥ Pre-position four lashings in the bucket. Space the lashings as shown. Pad the bucket openings with cellulose padding and tape where the lashings touch the bucket. Route the running end of the lashings through the opening in the bucket.
- ①⑦ Close the bucket and tilt it toward the rear (not shown).

**Figure 6-13. Backhoe Loader Prepared (Continued)**



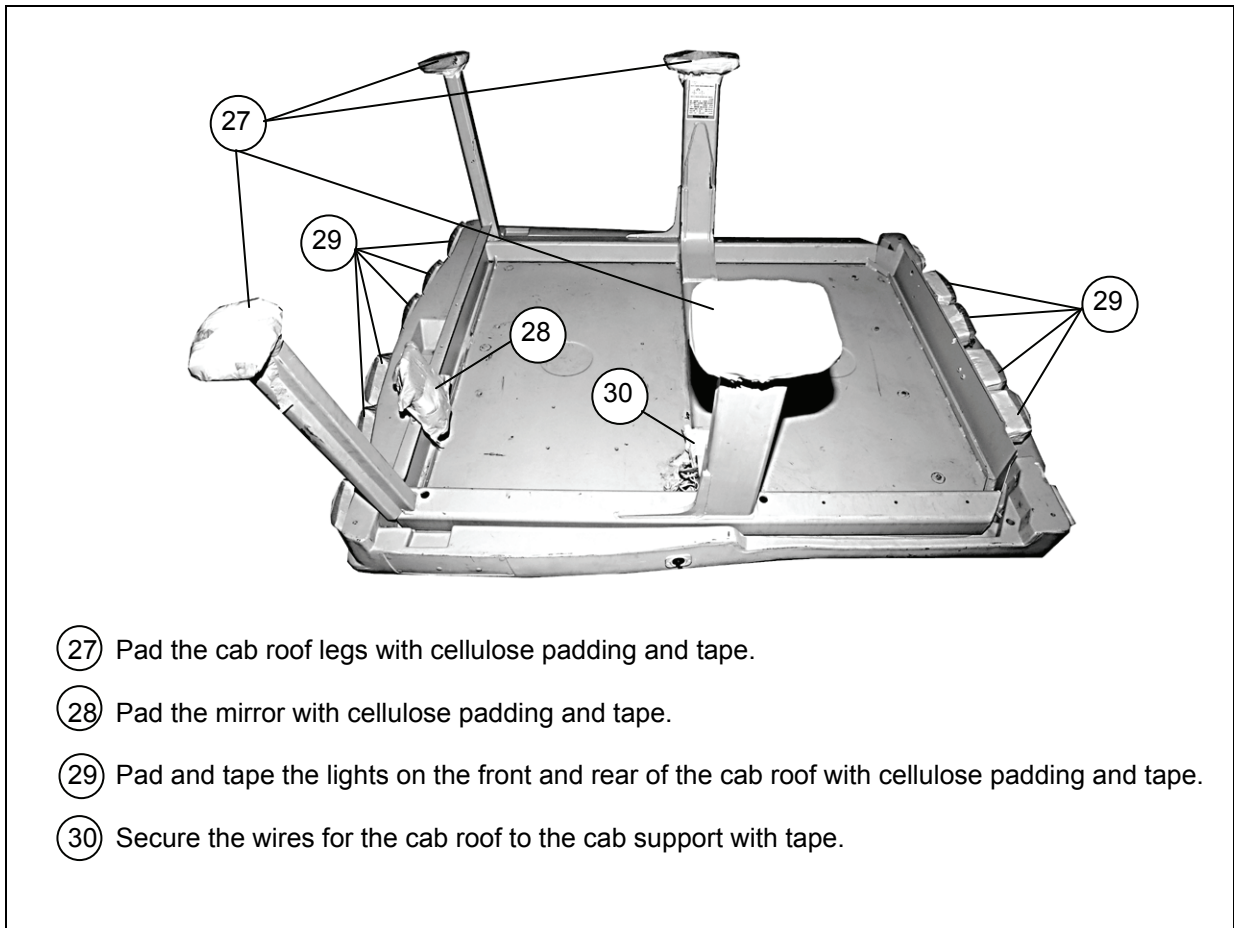
- 18 Cut a 24- by 81-inch piece of honeycomb and position it in the rear of the bucket.
- 19 Cut two 18- by 91-inch pieces of honeycomb and position them in the front of the bucket.
- 20 Position the jackhammer in the bucket on top of the 18- by 91-inch pieces of honeycomb, against the 24- by 81-inch piece of honeycomb. The hoses connected to the jackhammer will face upwards.
- 21 Position the padded exhaust stack to the rear and on top of the jackhammer.

**Figure 6-13. Backhoe Loader Prepared (Continued)**



**Figure 6-13. Backhoe Loader Prepared (Continued)**



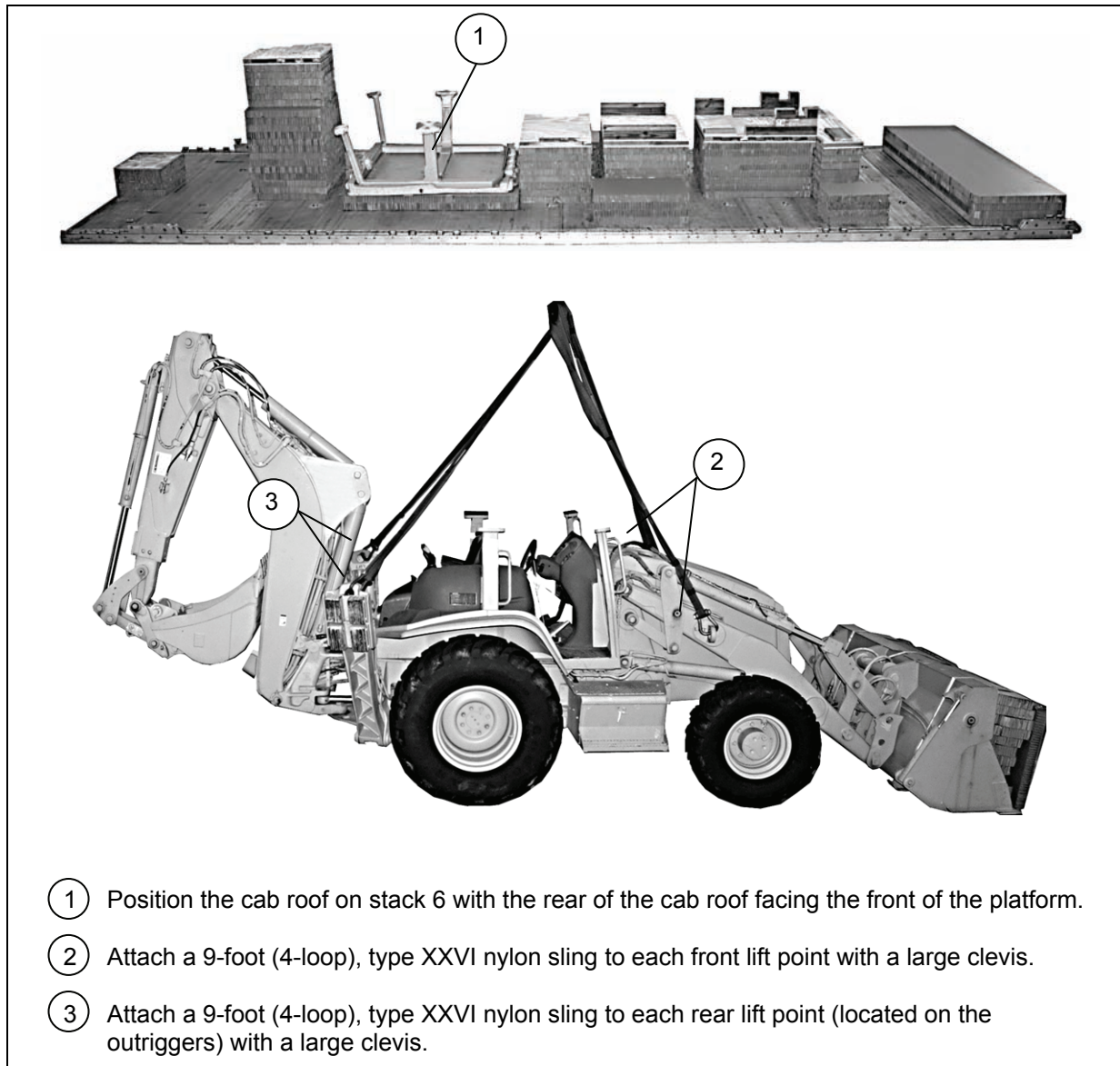


- ②7 Pad the cab roof legs with cellulose padding and tape.
- ②8 Pad the mirror with cellulose padding and tape.
- ②9 Pad and tape the lights on the front and rear of the cab roof with cellulose padding and tape.
- ③0 Secure the wires for the cab roof to the cab support with tape.

**Figure 6-13. Backhoe Loader Prepared (Continued)**

## LIFTING AND POSITIONING THE BACKHOE LOADER

6-5. Install the lifting slings and position the backhoe loader as shown in Figures 6-14 and 6-15.



**Figure 6-14. Backhoe Loader Cab Roof Positioned and Lift Slings Installed**

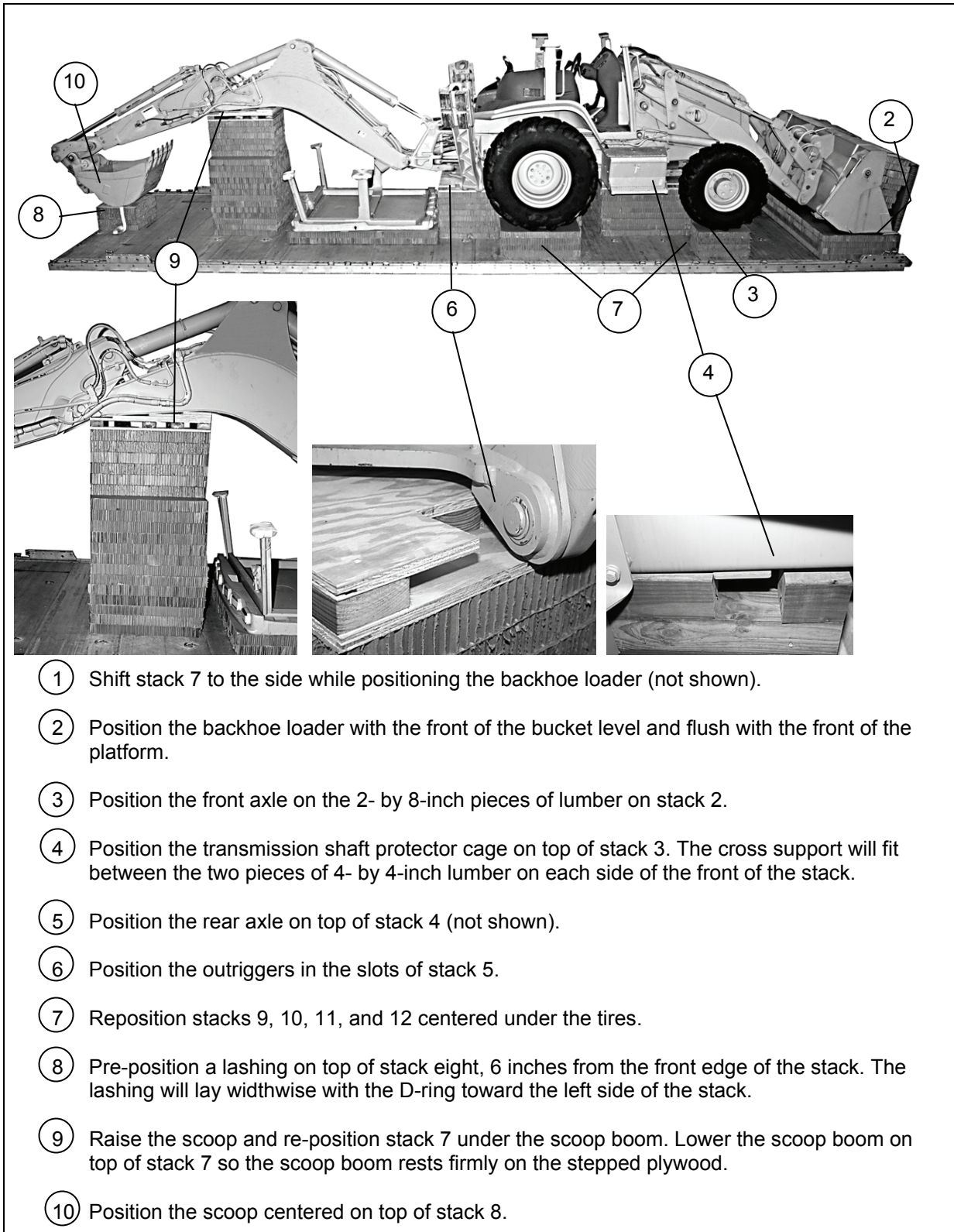
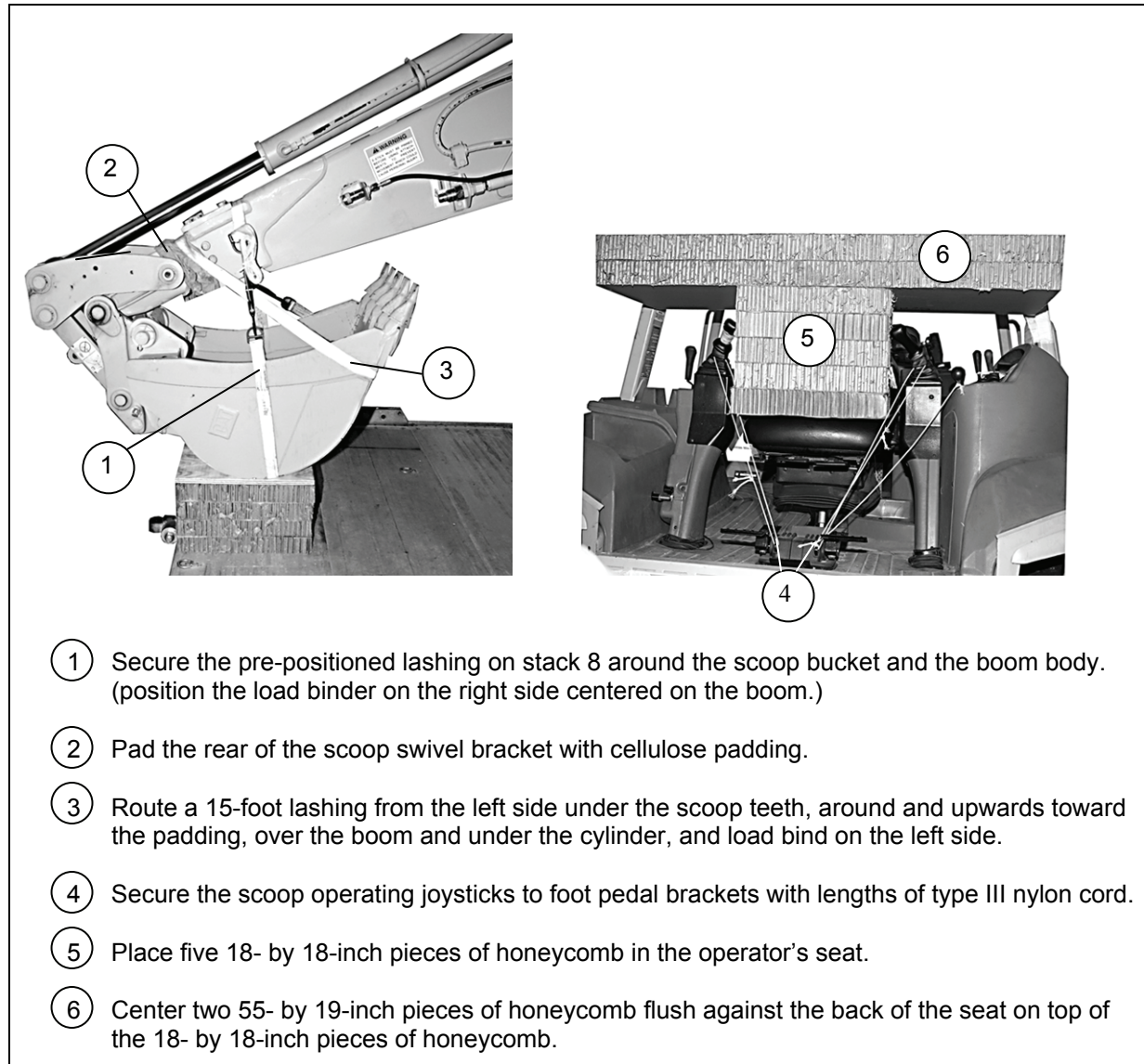


Figure 6-15. Backhoe Loader Positioned

## PREPARING AND BUILDING THE PARACHUTE RELEASE PLATFORM AND CAB BOARD

6-6. Prepare and build the parachute release platform and cab board as shown in Figures 6-16 through 6-18.



**Figure 6-16. Backhoe Scoop Secured**



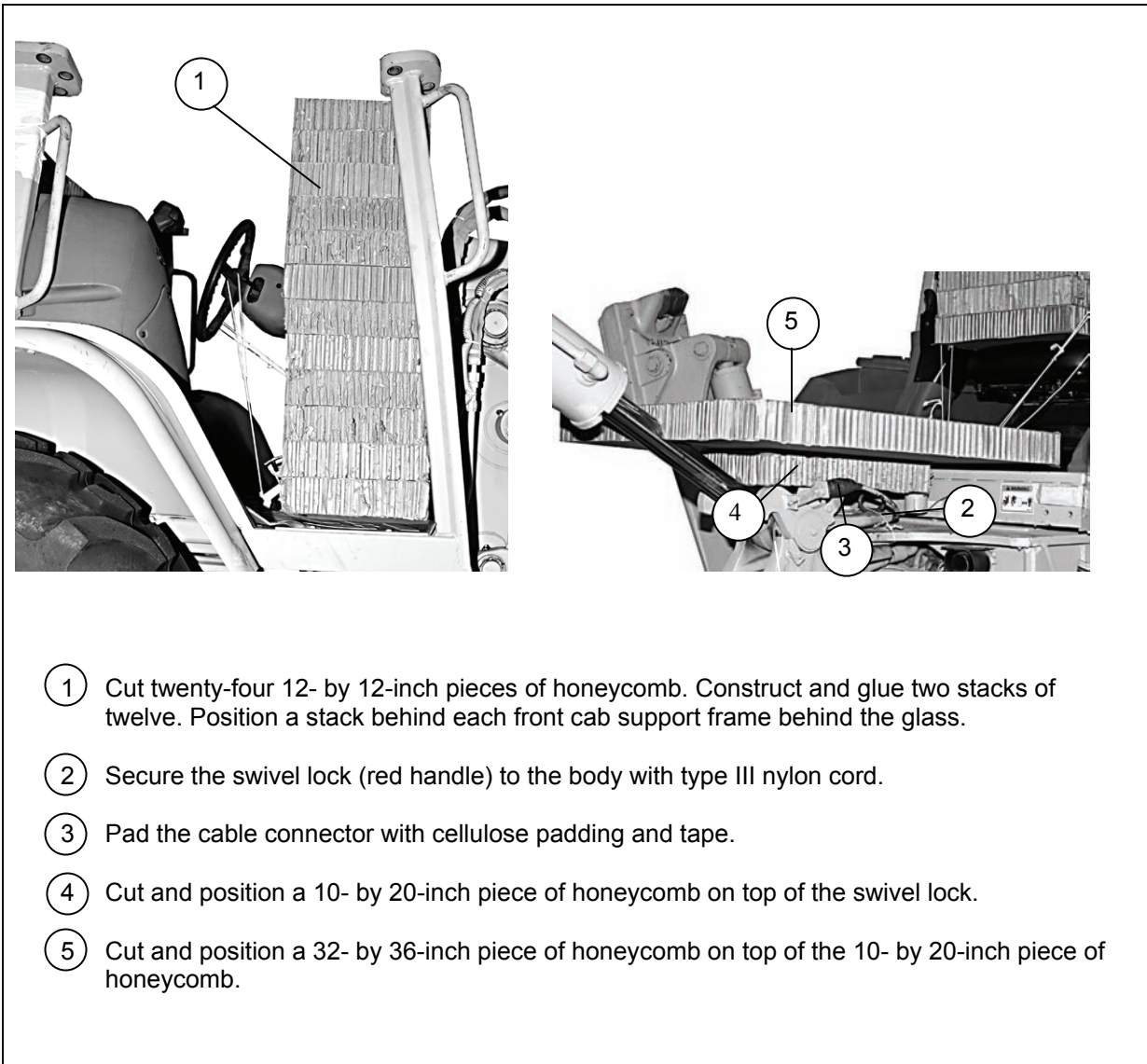
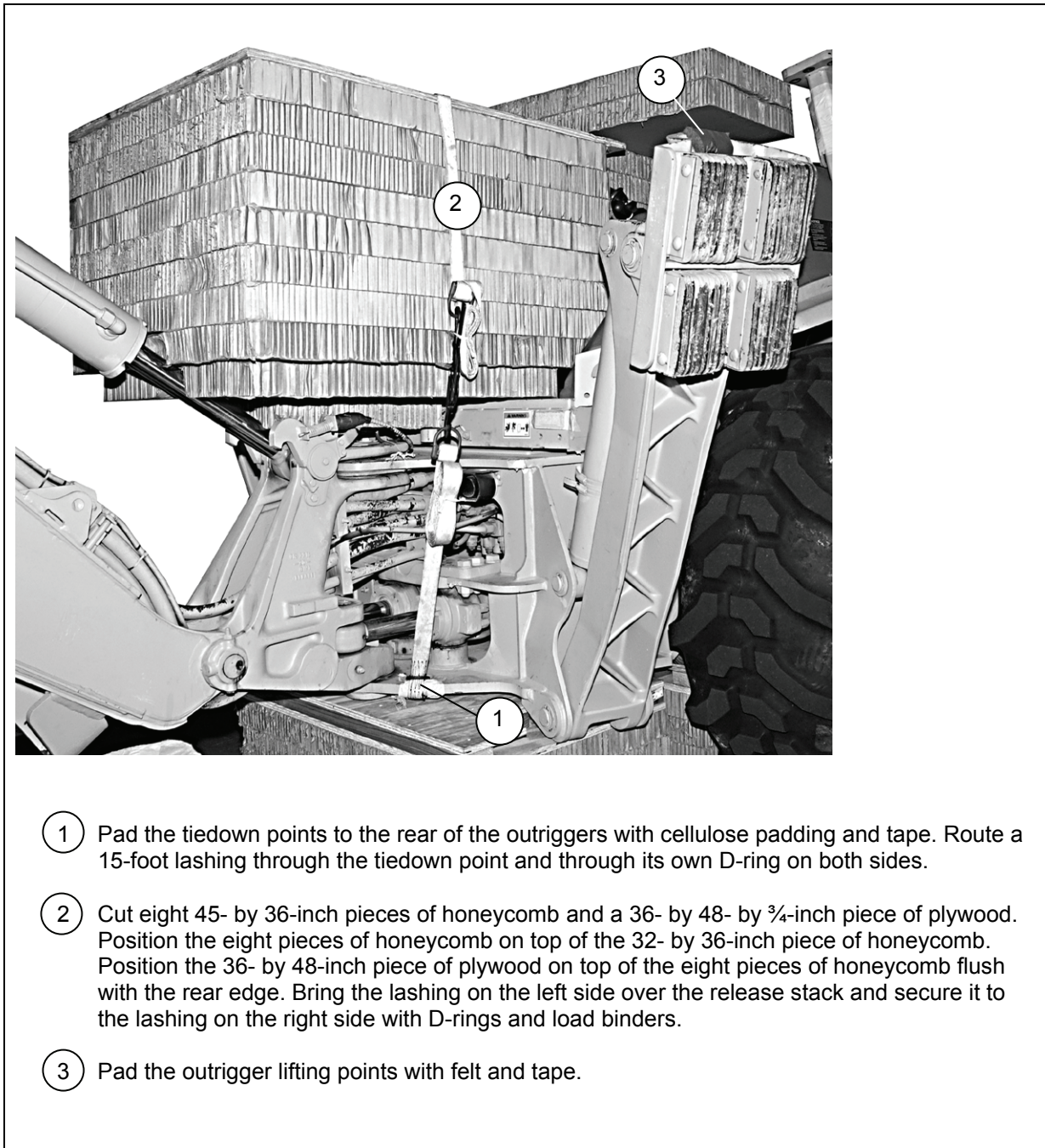
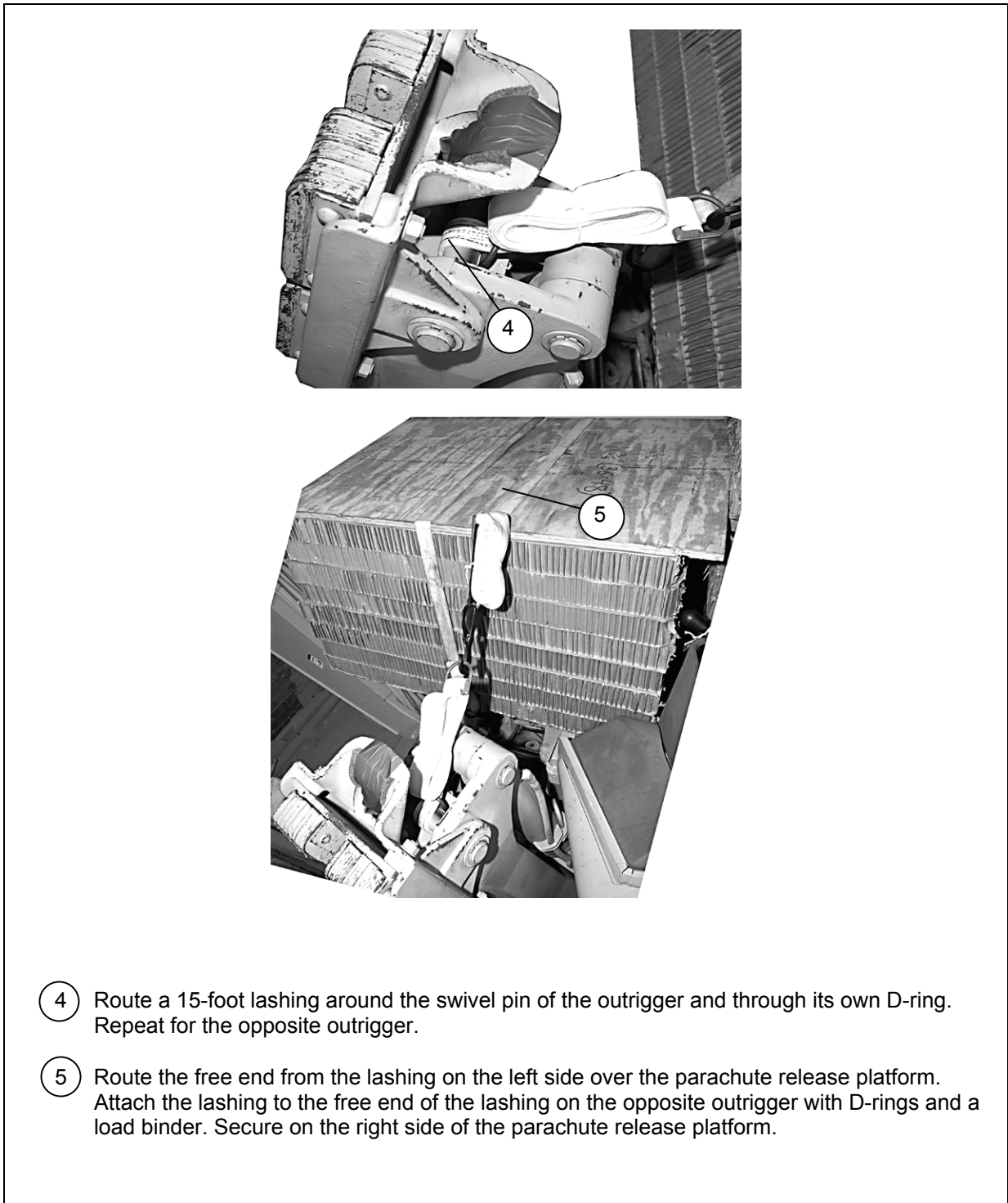


Figure 6-17. Cab Board Support Stacks Prepared



**Figure 6-18. Parachute Release Platform Installed**

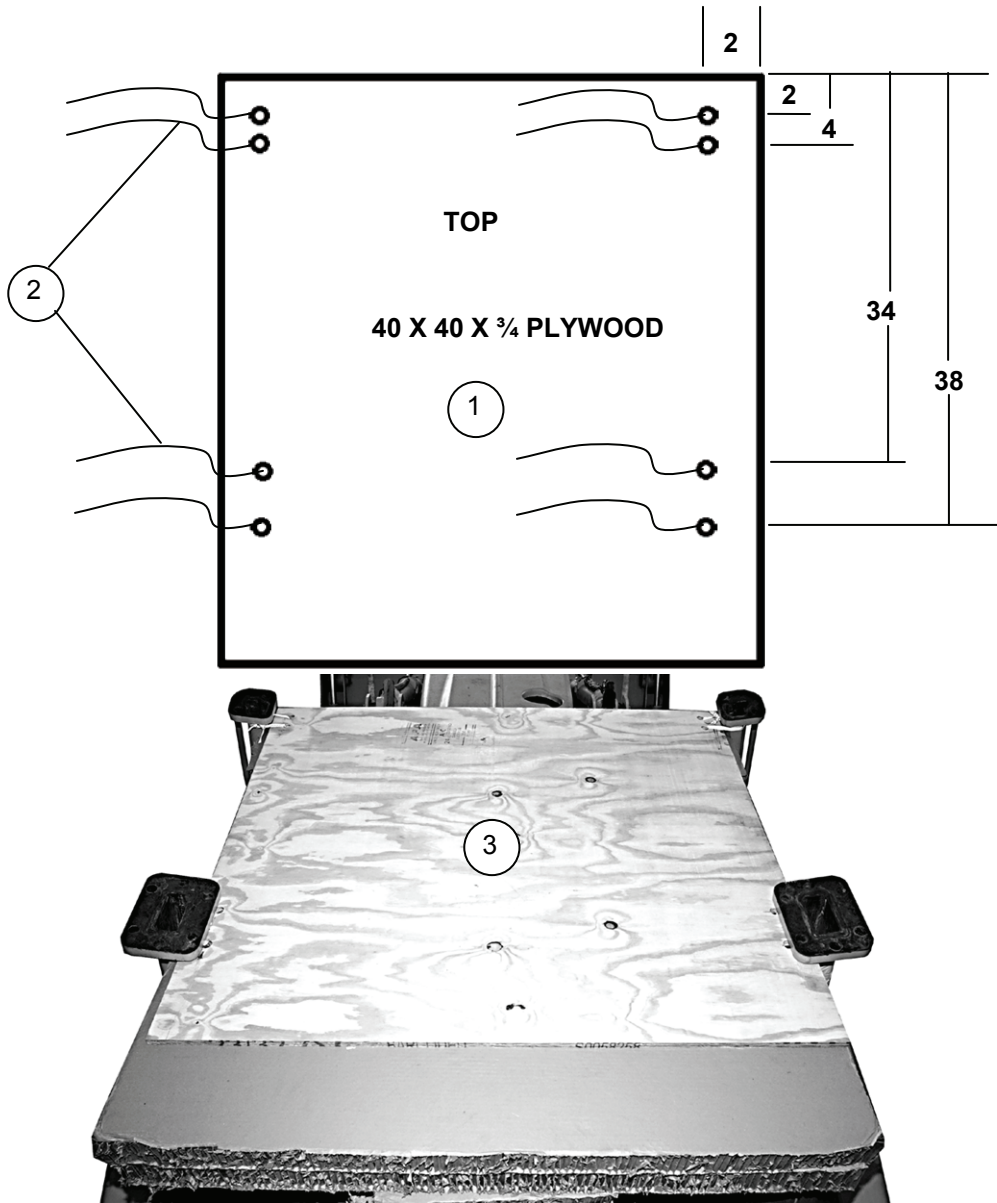




- ④ Route a 15-foot lashing around the swivel pin of the outrigger and through its own D-ring. Repeat for the opposite outrigger.
- ⑤ Route the free end from the lashing on the left side over the parachute release platform. Attach the lashing to the free end of the lashing on the opposite outrigger with D-rings and a load binder. Secure on the right side of the parachute release platform.

**Figure 6-18. Parachute Release Platform Installed (Continued)**

- Notes.** 1. All measurements are given in inches.  
 2. This drawing is not drawn to scale.  
 3. All holes are 1 inch in diameter.



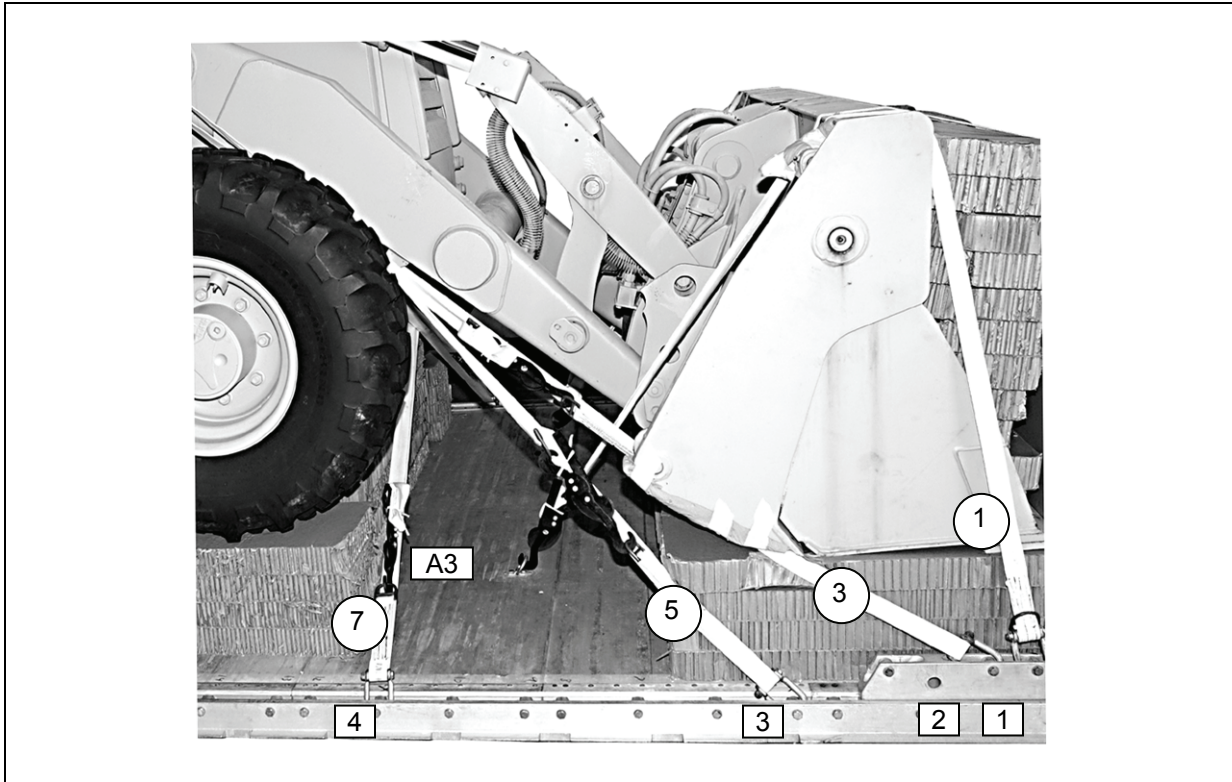
- ① Build a cab board as shown using  $\frac{3}{4}$ -inch plywood.
- ② Route four lengths of  $\frac{1}{2}$ -inch tubular nylon webbing through each set of holes.
- ③ Slide the cab board from the rear to the front under the lips of the cab roof support with the  $\frac{1}{2}$ -inch free ends facing upwards. Slide the board forward until the holes are lined up with the cab roof supports. Secure the  $\frac{1}{2}$ -inch tubular nylon around the cab roof supports.

**Figure 6-19. Cab Board Installed**

## LASHING LOAD TO PLATFORM

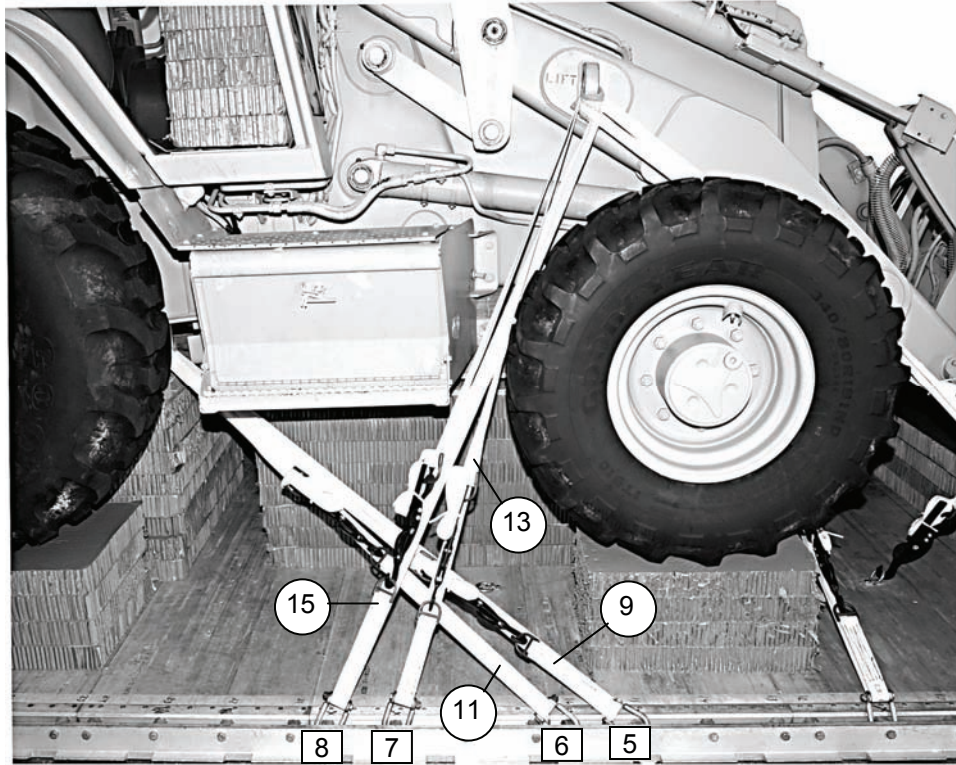
6-7. Lash the backhoe loader to the platform as shown in Figure 6-20.

*Note.* Pad any sharp edges on the load where a lashing may pass. Use cellulose padding and masking tape.



<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
1	1 to A3	Pass lashing: Through its own D-ring, over the right front of the bucket, to the rear right inside of the cylinder and attach it to platform tiedown ring A3.
2	1A to B3	Through its own D-ring, over the left front of the bucket, to the rear left inside of the cylinder, and attach it to platform tiedown ring B3.
3	2	Under the right bottom of the bucket to the vehicle's right lower tiedown point. Secure the load binder to the rear of the bucket.
4	2A	Under the left bottom of the bucket to the vehicle's left lower tiedown point. Secure the load binder to the rear of the bucket.
5	3	Behind the front right tire to the bucket lifting arm's right lift point.
6	3A	Behind the front left tire to the bucket lifting arm's left lift point.
7	4	Through the bucket lifting arm's left lower tiedown point.
8	4A	Through the bucket lifting arm's right lower tiedown point.

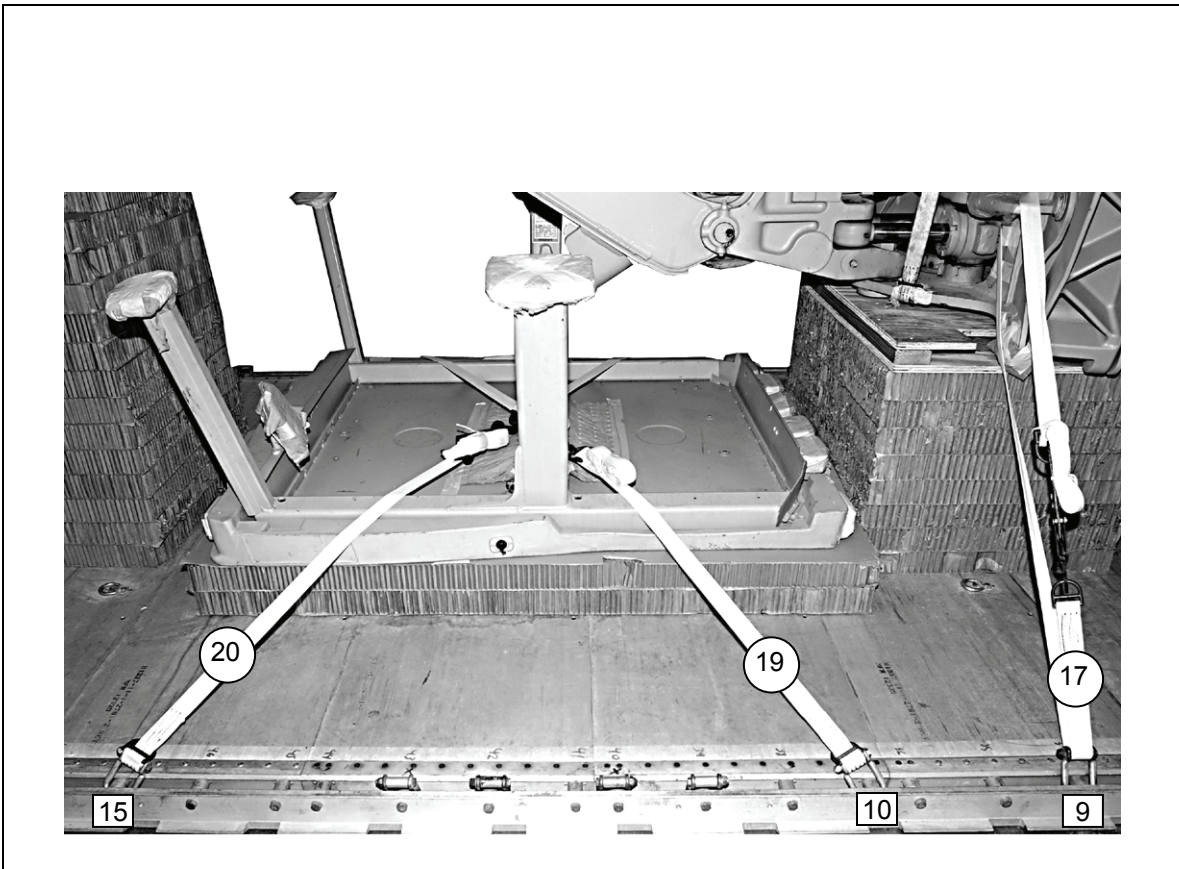
Figure 6-20. 420D Backhoe Loader Lashed to Platform



<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
9	5	Pass lashing:
10	5A	Through the tiedown point on the front right side of the right rear tire.
11	6	Through the tiedown point on the front left side of the left rear tire.
12	6A	Through the tiedown point on the front right side of the right rear tire.
13	7	Through the tiedown point on the front left side of the left rear tire.
14	7A	Through the bucket lifting arm's right lift point.
15	8	Through the bucket lifting arm's left lift point.
16	8A	Through the bucket lifting arm's right lift point.

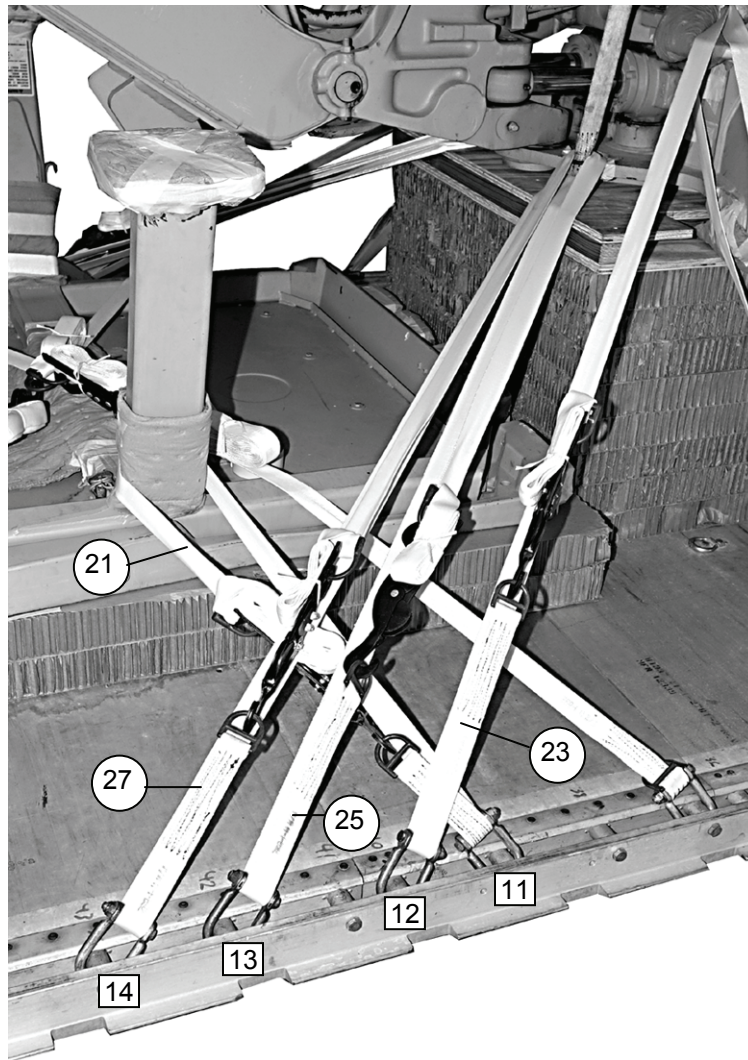
**Figure 6-20. 420D Backhoe Loader Lashed to Platform (Continued)**





<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
17	9	Pass lashing:
18	9A	Through the bucket lifting arm's right lift point.
19	10 to 15A	Through the bucket lifting arm's left lift point.
		Through its own D-ring. Route a 15-foot lashing through clevis 15A and through its own D-ring. Pad the center of the ROPS in the center with cellulose padding. Secure the lashings from clevis 10 and 15A in the center of the ROPS.
20	10A to 15	Through its own D-ring. Route a 15-foot lashing through clevis 15 and through its own D-ring. Secure the lashings from clevis 10A and 15 in the center of the ROPS.

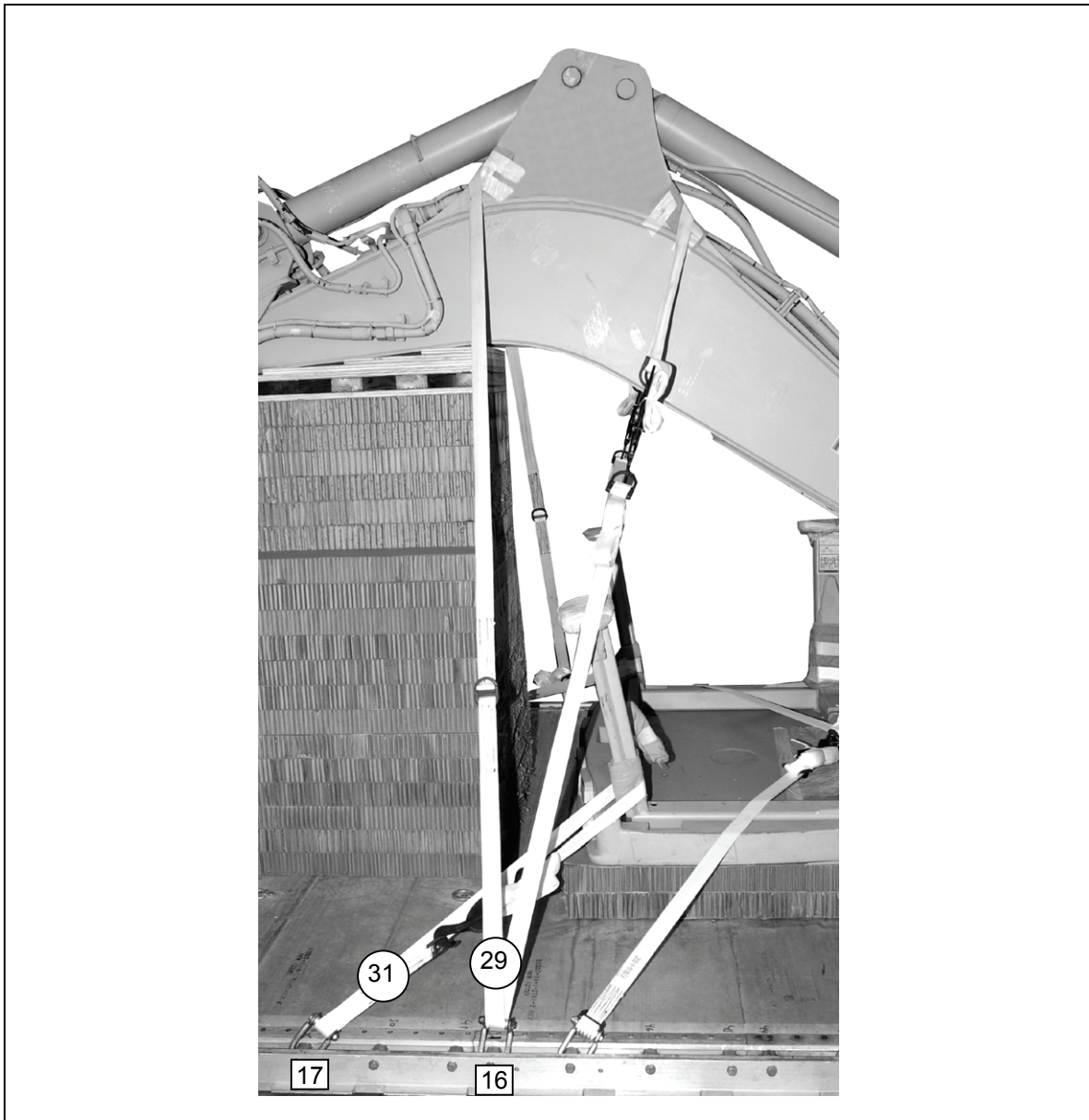
Figure 6-20. 420D Backhoe Loader Lashed to Platform (Continued)



<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
21	11	Pass lashing:
22	11A	Around the cab's right rear roof support.
23	12	Around the cab's left rear roof support.
24	12A	Through the right rear tiedown point on the outrigger.
25	13	Through the left rear tiedown point on the outrigger.
26	13A	Through the right side scoop boom mount.
27	14	Through the left side scoop boom mount.
28	14A	Through the right side scoop boom mount.

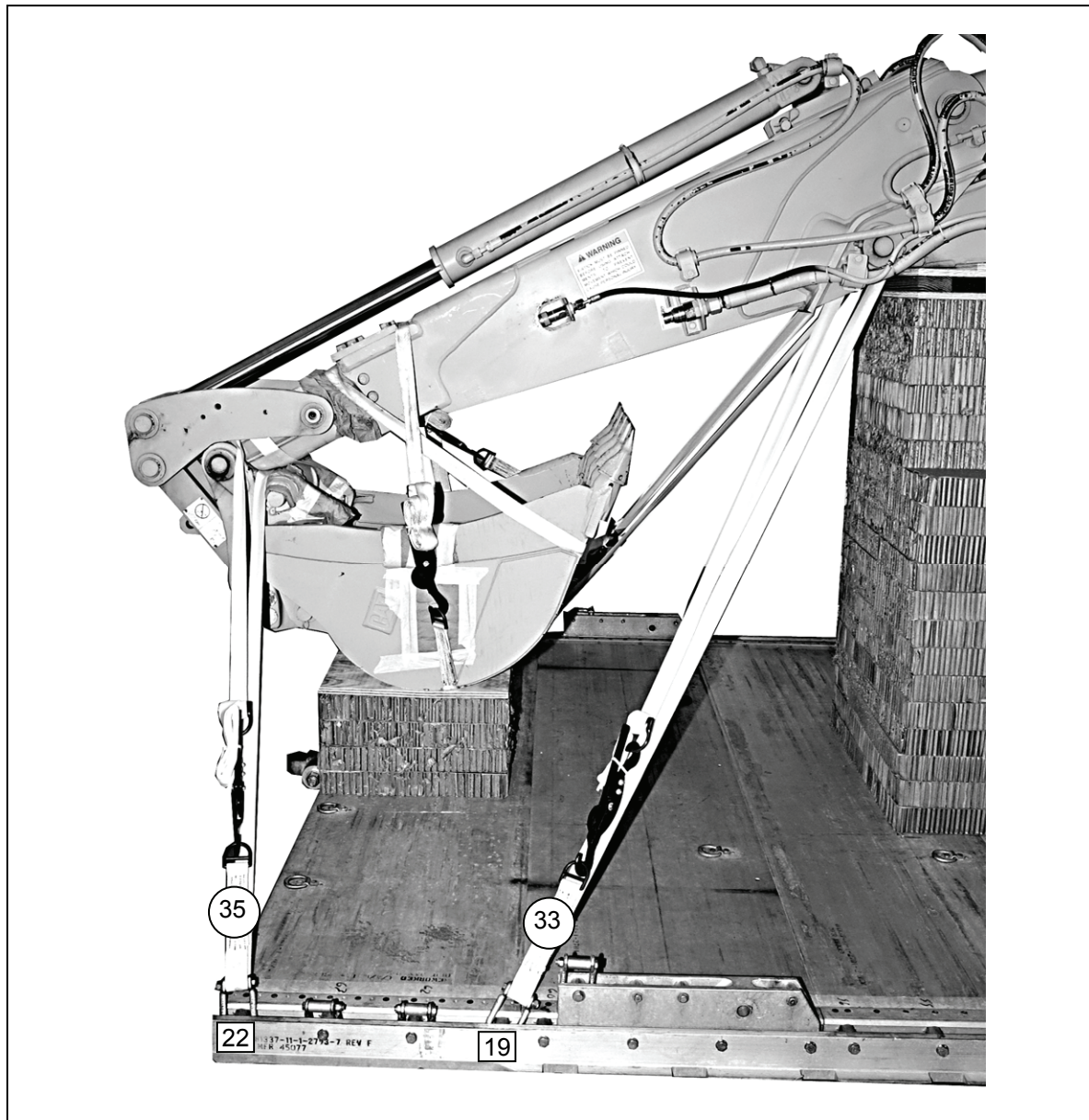
**Figure 6-20. 420D Backhoe Loader Lashed to Platform (Continued)**





<i>Lashing Number</i>	<i>Tiedown Clevis Number</i>	<i>Instructions</i>
29	16	Route a 30-foot lashing to the right rear of the boom cylinder bracket, around to the front right side, and secure to the other free end.
30	16A	Route a 30-foot lashing to the left rear of the boom cylinder bracket, around to the front left side, and secure to the other free end.
31	17	Route a 15-foot lashing from clevis 17 around the cab's right front roof support.
32	17A	Route a 15-foot lashing from clevis 17A around the cab's left front roof support.

Figure 6-20. 420D Backhoe Loader Lashed to Platform (Continued)

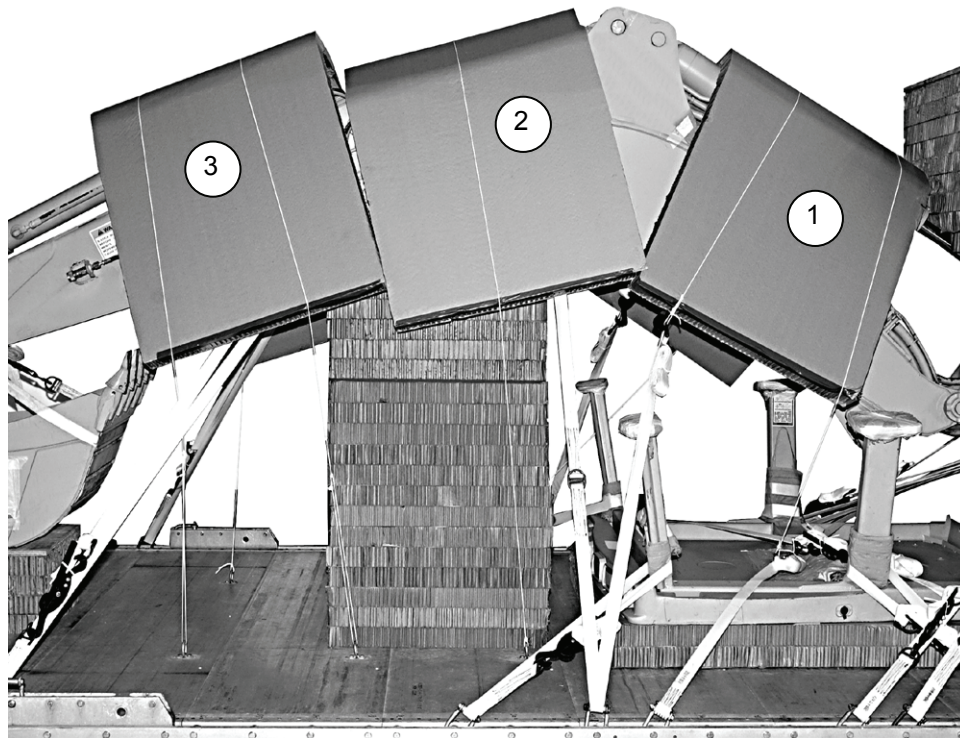


<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
33	19	Pass lashing: Around the grease point on the boom's bottom right side behind the rear of stack 7.
34	19A	Around the grease point on the boom's bottom left side behind the rear of stack 7.
35	22	Around the rear of the boom by the scoop.
36	22A	Around the rear of the boom by the scoop.

**Figure 6-20. 420D Backhoe Loader Lashed to Platform (Continued)**

## COVERING THE LOAD

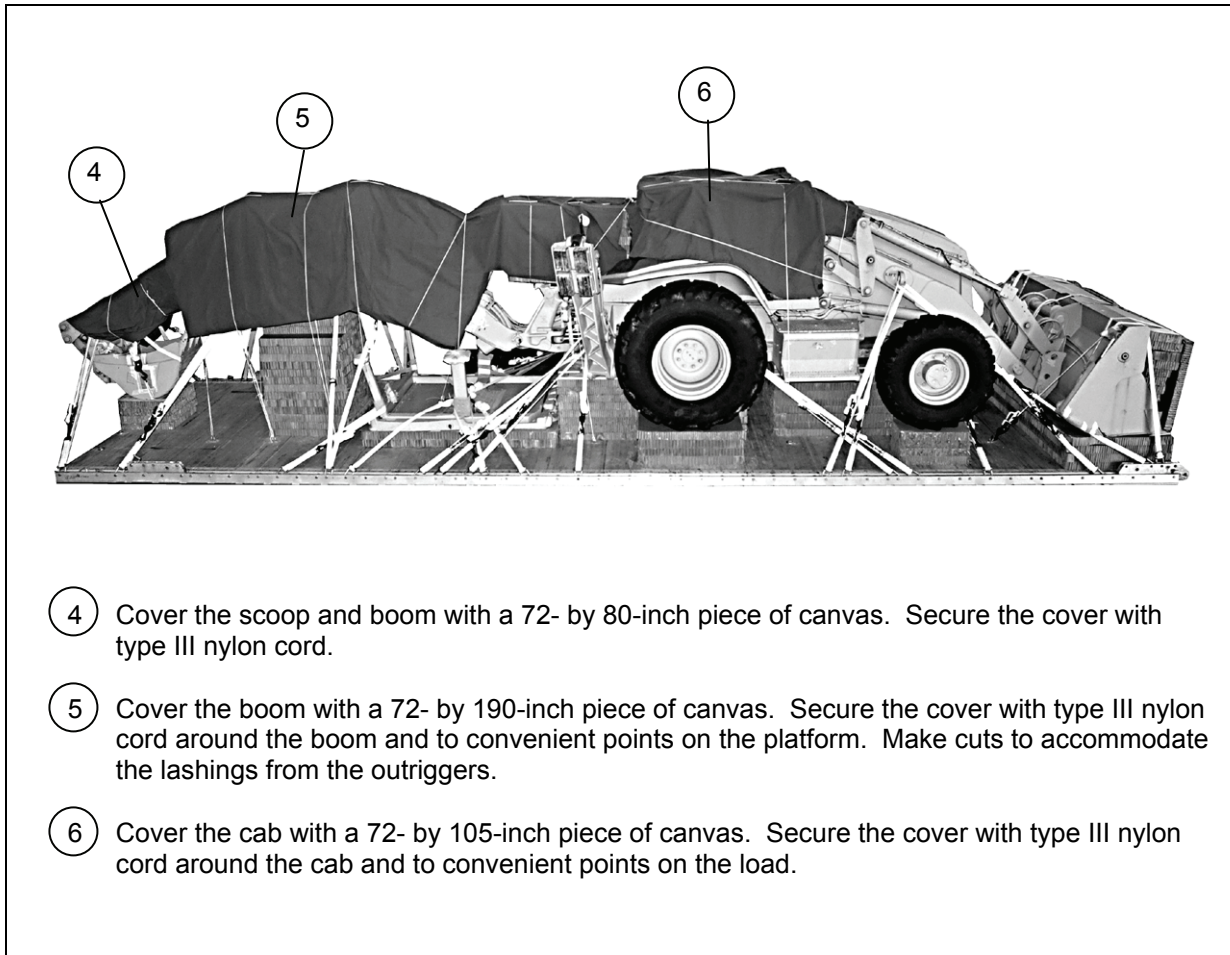
6-8. Cover the backhoe loader as shown in Figure 6-21.



- ① Fold a 36- by 96-inch piece of honeycomb over the boom closest to the release platform. Secure the piece to convenient points on the load with type III nylon cord.
- ② Fold a second 36- by 96-inch piece of honeycomb over the boom to the rear of the previous piece. Secure the piece to convenient points on the load with type III nylon cord.
- ③ Fold a third 36- by 96-inch piece of honeycomb over the boom to the rear of the previous piece. Secure the piece to convenient points on the load with type III nylon cord.

**Figure 6-21. 420D Backhoe Loader Covered**



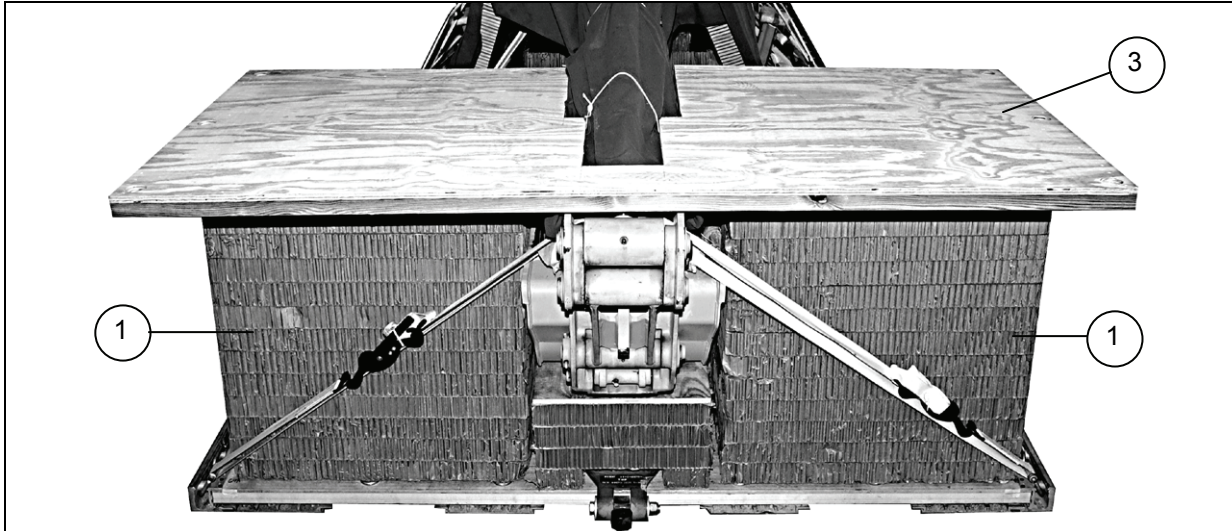


- ④ Cover the scoop and boom with a 72- by 80-inch piece of canvas. Secure the cover with type III nylon cord.
- ⑤ Cover the boom with a 72- by 190-inch piece of canvas. Secure the cover with type III nylon cord around the boom and to convenient points on the platform. Make cuts to accommodate the lashings from the outriggers.
- ⑥ Cover the cab with a 72- by 105-inch piece of canvas. Secure the cover with type III nylon cord around the cab and to convenient points on the load.

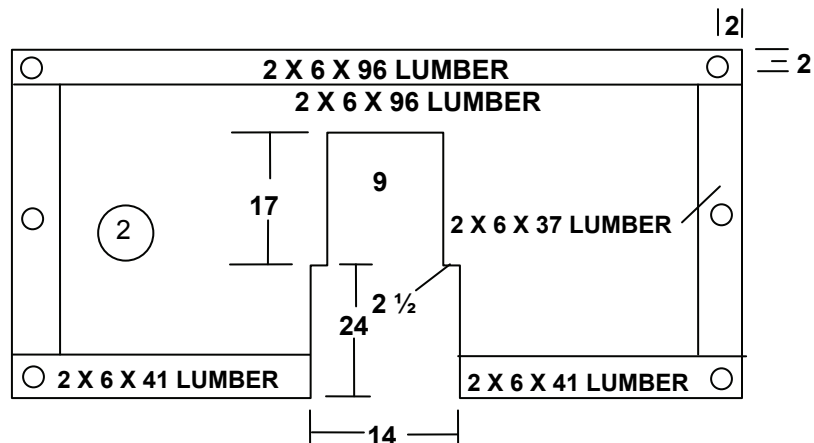
**Figure 6-21. 420D Backhoe Loader Covered (Continued)**

## PREPARING PARACHUTE STOWAGE PLATFORM

6-9. Construct the parachute support stack and stowage platform as shown in Figure 6-22.

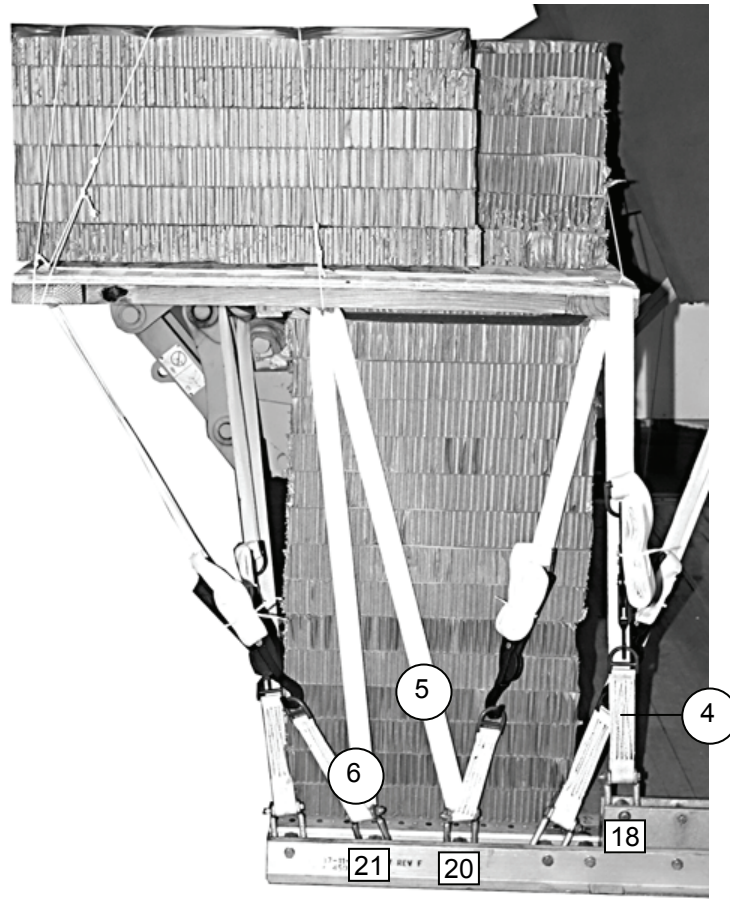


- Notes.**
1. All measurements are given in inches.
  2. This drawing is not drawn to scale.
  3. All holes are 2 inches in diameter.



- ① Cut twenty-eight 24- by 36-inch pieces of honeycomb. Form and glue two stacks of 14 pieces of honeycomb and position the stacks behind lashings 22 and 22A.
- ② Construct the parachute platform as shown. Cut two 24- by 36-inch pieces of honeycomb and glue to the parachute platform with the 36-inch edge against the 41-inch piece of lumber (not shown).
- ③ Position the parachute platform on top of the two 24- by 36-inch stacks with the scoop boom in the cutout. Pad the holes of the parachute stowage platform with cellulose padding and tape.

Figure 6-22. Parachute Stowage Platform Positioned

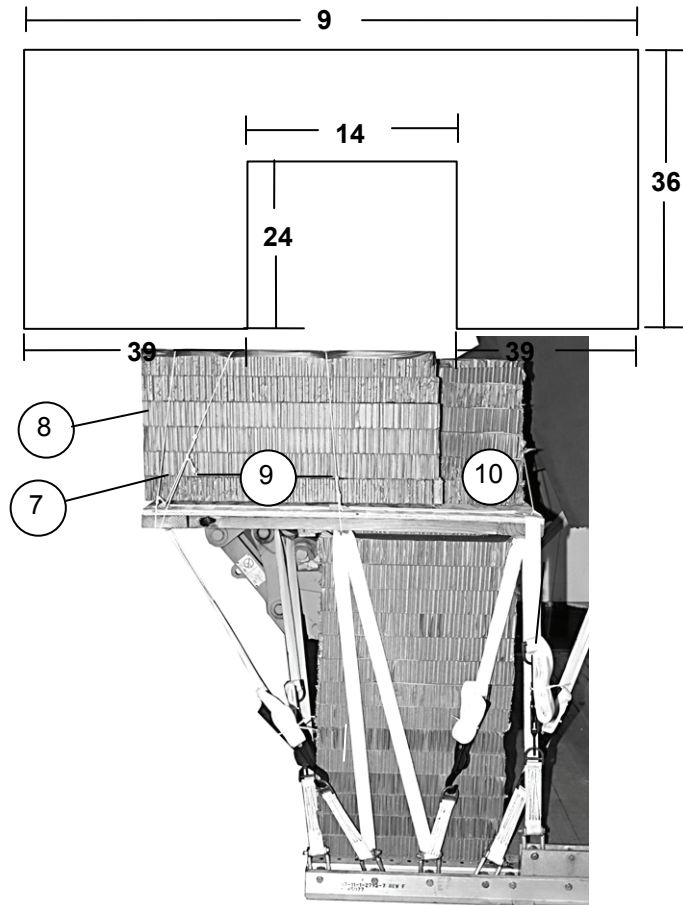


- ④ Route a 15-foot lashing through clevis 18, up through the front hole, and secure the lashing. Repeat for the left side with clevis 18A.
- ⑤ Route a 15-foot lashing through clevis 20, up through the center hole, and down through the front hole. Repeat for the left side with clevis 20A.
- ⑥ Route a 15-foot lashing through clevis 21, up through the center hole, and down through the rear hole. Repeat for the left side with clevis 21A.

**Figure 6-22. Parachute Stowage Platform Positioned (Continued)**



- Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.

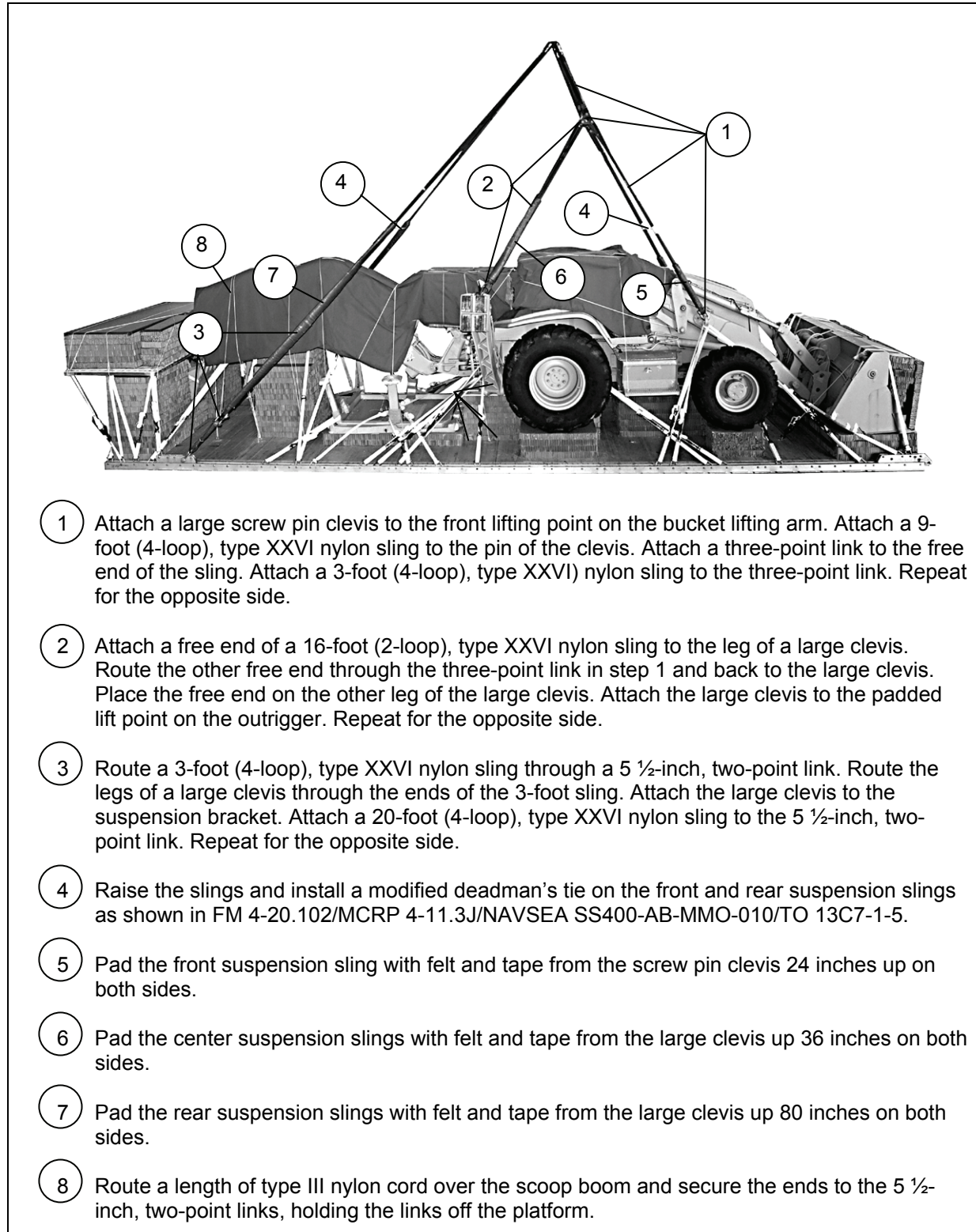


- 7 Cut six 36- by 92-inch pieces of honeycomb. Make cutouts in five pieces as shown and glue together.
- 8 Place a full 36- by 96-inch piece of honeycomb on top of the five pieces of honeycomb in step 7 and tape the edges.
- 9 Position the stack constructed in step 7 on top of the parachute platform with the scoop boom in the cutout portion of the stack. Position the rear of the stack flush with the rear of the parachute platform. Secure the stack to the parachute platform with lengths of type III nylon cord.
- 10 Cut twelve 11- by 34-inch pieces of honeycomb. Form and glue two stacks of six pieces each. Position a stack to the front of the stack positioned in step 9 on each side of the scoop boom. Secure the stacks down to the parachute platform with lengths of type III nylon cord.

**Figure 6-22. Parachute Stowage Platform Positioned (Continued)**

## INSTALLING AND SAFETY TIEING THE SUSPENSION SLINGS

6-10. Install and safety tie the suspension slings as shown in Figure 6-23.

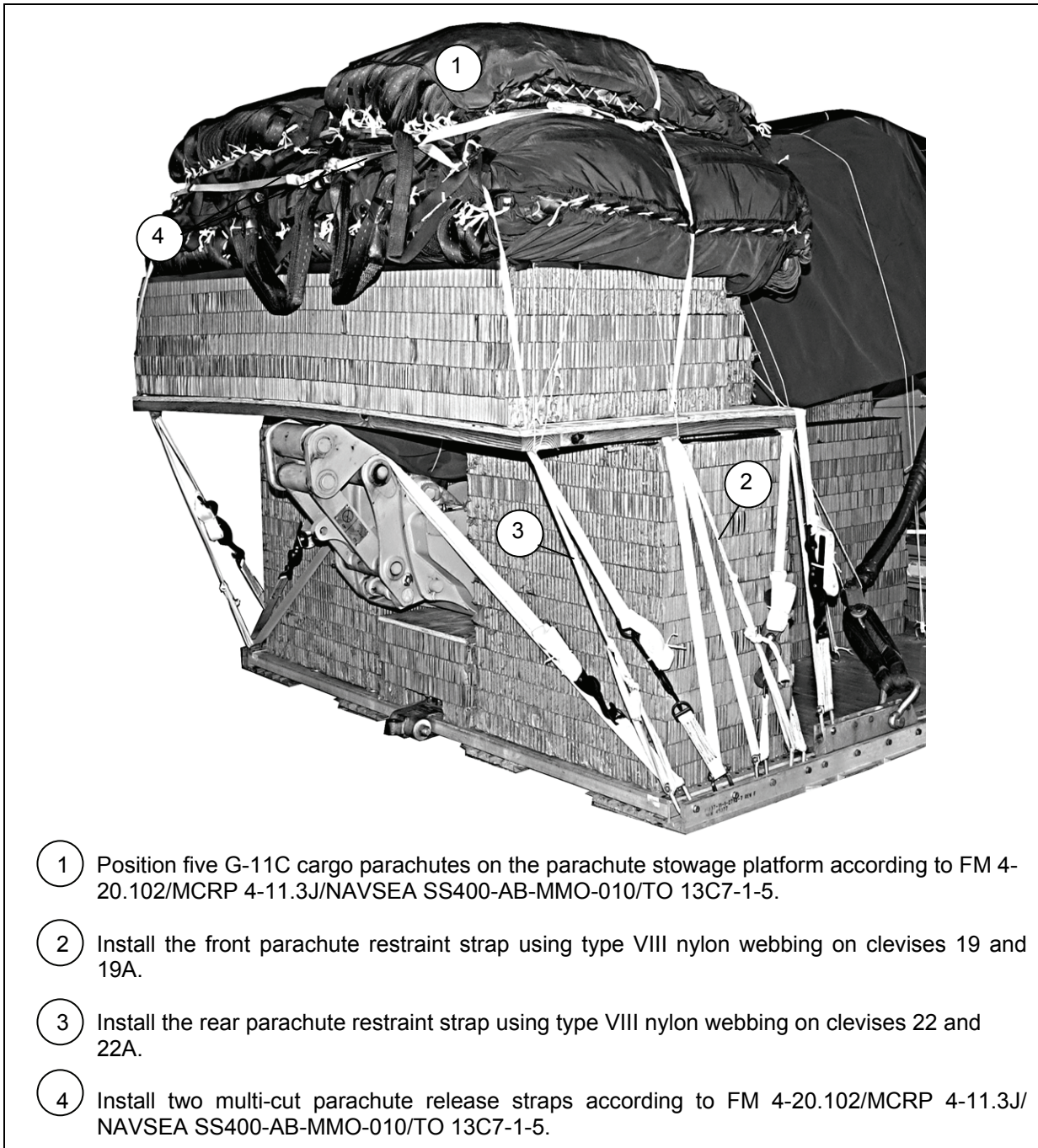


- 1 Attach a large screw pin clevis to the front lifting point on the bucket lifting arm. Attach a 9-foot (4-loop), type XXVI nylon sling to the pin of the clevis. Attach a three-point link to the free end of the sling. Attach a 3-foot (4-loop), type XXVI nylon sling to the three-point link. Repeat for the opposite side.
- 2 Attach a free end of a 16-foot (2-loop), type XXVI nylon sling to the leg of a large clevis. Route the other free end through the three-point link in step 1 and back to the large clevis. Place the free end on the other leg of the large clevis. Attach the large clevis to the padded lift point on the outrigger. Repeat for the opposite side.
- 3 Route a 3-foot (4-loop), type XXVI nylon sling through a 5 ½-inch, two-point link. Route the legs of a large clevis through the ends of the 3-foot sling. Attach the large clevis to the suspension bracket. Attach a 20-foot (4-loop), type XXVI nylon sling to the 5 ½-inch, two-point link. Repeat for the opposite side.
- 4 Raise the slings and install a modified deadman's tie on the front and rear suspension slings as shown in FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.
- 5 Pad the front suspension sling with felt and tape from the screw pin clevis 24 inches up on both sides.
- 6 Pad the center suspension slings with felt and tape from the large clevis up 36 inches on both sides.
- 7 Pad the rear suspension slings with felt and tape from the large clevis up 80 inches on both sides.
- 8 Route a length of type III nylon cord over the scoop boom and secure the ends to the 5 ½-inch, two-point links, holding the links off the platform.

**Figure 6-23. Suspension Slings Installed**

## STOWING CARGO PARACHUTES

6-11. Prepare, stow, and restrain five G-11C cargo parachutes according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figure 6-24.

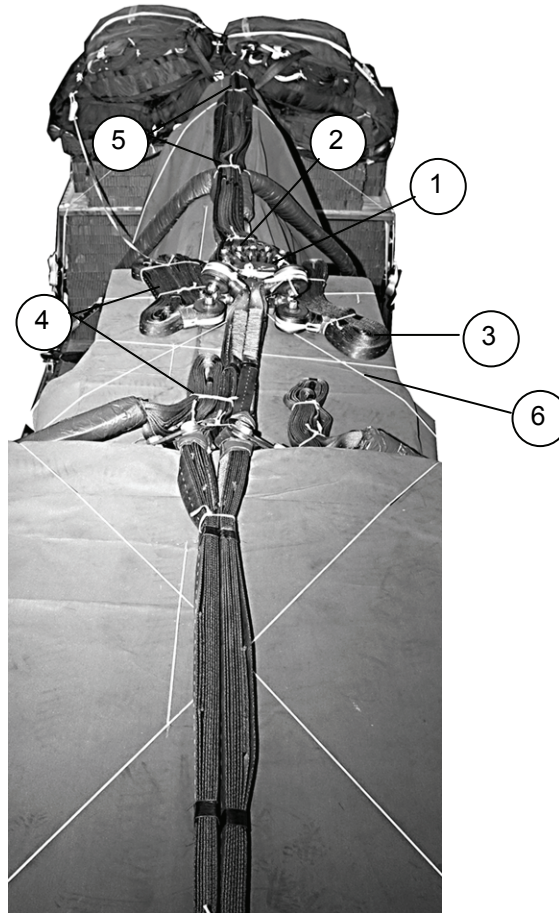


**Figure 6-24. Cargo Parachutes Positioned and Restrained**

## INSTALLING PARACHUTE RELEASE SYSTEM

6-12. Prepare and install an M-2 parachute release system according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figure 6-25.

**Note.** This load requires a 25-foot arming wire lanyard.



- ① Center an M-2 parachute release assembly on the release platform.
- ② Attach the parachute riser extensions to the parachute release connectors.
- ③ Attach the suspension slings to the lower suspension links.
- ④ Fold the excess center and rear suspension slings and safety tie with type I, ¼-inch cotton webbing. Position and safety tie each three-point link assembly using a single length of type I, ¼-inch cotton webbing.
- ⑤ Fold and safety tie any slack in the riser extensions at 2 foot intervals using type I, ¼-inch cotton webbing.
- ⑥ Tie the front and rear M-2 parachute release safety ties to convenient points on the load with type III nylon cord.

**Figure 6-25. M2 Parachute Release Installed**



## INSTALLING EXTRACTION SYSTEM

6-13. Install the extraction system as shown in Figure 6-26.

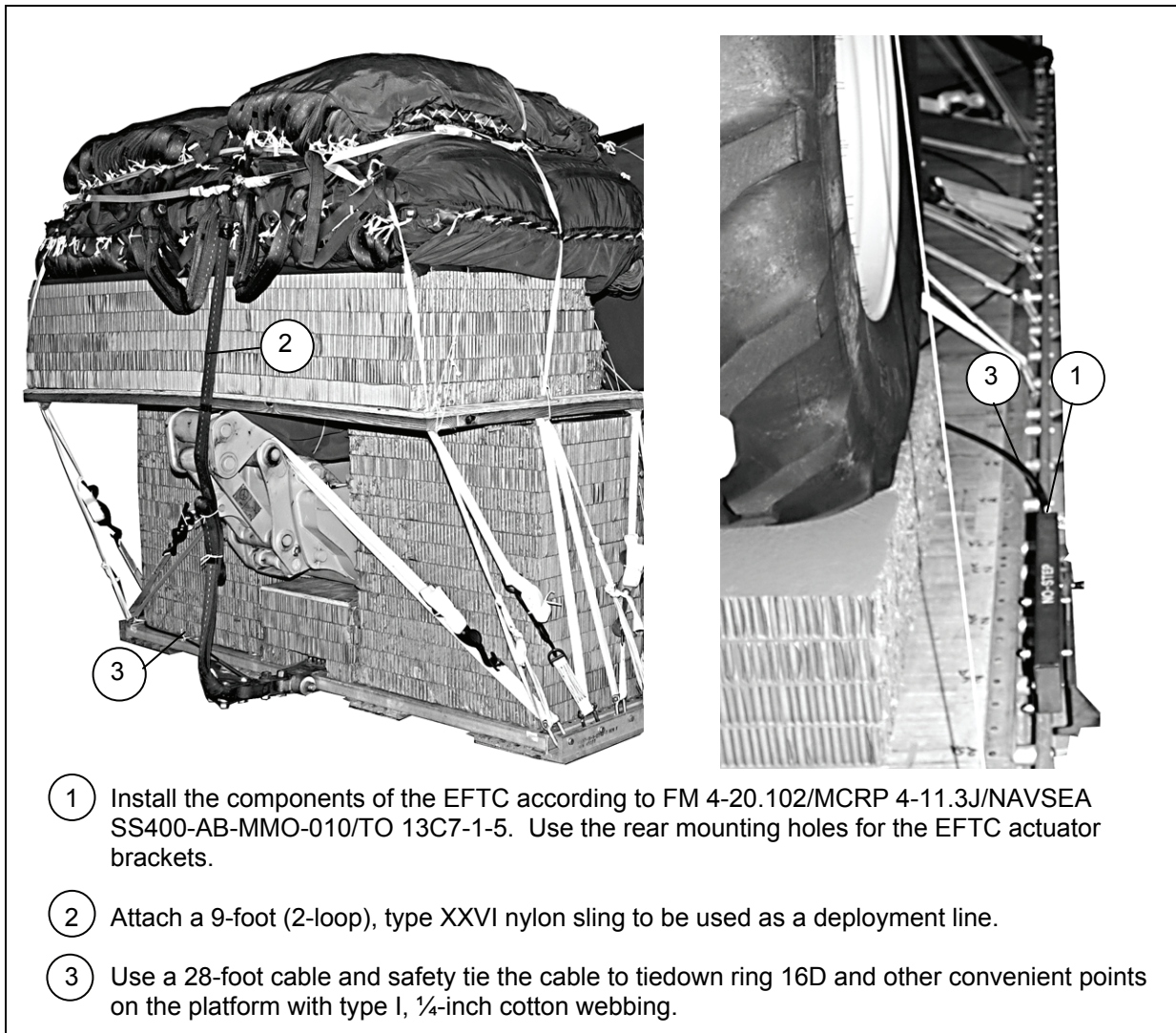


Figure 6-26. Extraction System Installed



## **PLACING EXTRACTION PARACHUTE**

6-14. Select the extraction parachute and extraction line needed using the extraction line requirements table in FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5. Place the extraction parachute and line on the load for installation in the aircraft.

## **INSTALLING PROVISIONS FOR EMERGENCY RESTRAINTS**

6-15. Select and install the provisions for the emergency aft restraints according to the emergency aft restraint requirements table in FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.

## **MARKING RIGGED LOAD**

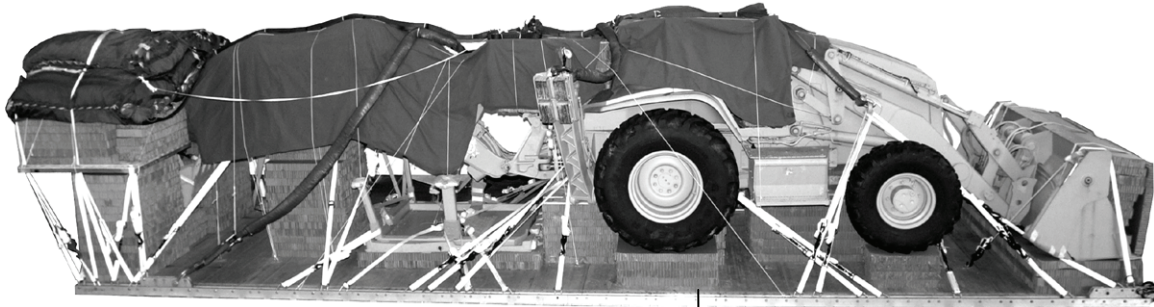
6-16. Mark the rigged load according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5, and as shown in Figure 6-27. Complete Shipper's Declaration for Dangerous Goods. If the load varies from the one shown, the weight, height, CB, and parachute requirements must be recomputed.

## **EQUIPMENT REQUIRED**

6-17. Use the equipment listed in Table 6-1 to rig this load.

**CAUTION**

Make the final rigger inspection required by AR 59-4 and FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 before the load leaves the rigging site



C/B

**RIGGED LOAD DATA**

Weight: Load Shown.....	25,620 pounds
Height.....	99 inches
Width.....	108 inches
Overall Length .....	409 inches
Overhang: Front.....	0
Rear (parachute platform).....	25 inches
Center of Balance (CB) (from front edge of the platform).....	171 inches

**Figure 6-27. 420 D Backhoe Loader Rigged on a 32-Foot, Type V Platform for Low-Velocity Airdrop**

**Table 6-1. Equipment Required for Rigging the 420D Backhoe Loader on a 32-Foot, Type V Platform for Low-Velocity Airdrop**

<i>National Stock Number</i>	<i>Item</i>	<i>Quantity</i>
8040-00-273-8713	Adhesive paste, 1-gal.	As required
4030-00-678-8562	Clevis, suspension, 3/4-inch (medium)	6
4030-00-090-5354	Clevis, suspension, 1-inch (large)	9
4030-00-432-2516	Clevis, screw-pin, large	2
8305-00-880-8155	Cloth, coated (nylon, type II, 17.0 oz, green, 60-in)	As required
4020-00-240-2146	Cord, nylon, type III, 550-lb	As required
1670-00-434-5785	Coupling, airdrop extraction force transfer, w/28-ft. cable	1
1670-00-360-0328	Cover, clevis	5
8135-00-664-6958	Cushioning material (Cellulose padding)	As required
8305-00-958-3685	Felt, 1/2-inch thick	As required
1670-01-183-2678	Leaf, extraction line (line bag) ( add 2 for C-17)	2
	Line extraction:	
1670-01-064-4454	60-foot (6-loop), type XXVI (for C-130)	1
1670-01-468-9178	140-foot (6-loop), type XXVI (for C-17)	1
1670-01-064-4452	60-foot (1-loop), type XXVI (for C-17), (drogue line)	1
1670-00-783-5988	Link assembly, type IV (C-17 only)	1
	Link assembly, two-point:	
5306-00-435-8994	Bolt, 1-inch diameter, 4-inches long	6
5310-00-232-5165	Nut, 1-inch	6
1670-00-003-1954	Plate, side, 5 1/2-inch	6
5365-00-007-3414	Spacer, large	6
1670-01-307-0155	Link assembly, coupling, three-point	2
	Lumber:	
5510-00-220-6146	2- by 4- by 96-inch	10
5510-00-220-6148	2- by 6- by 96-inch	3
5510-00-220-6150	2- by 8- by 96-inch	1
5510-00-220-6274	4- by 4- by 96-inch	3
5315-00-010-4659	Nail, steel, common, 8D	As required
1670-00-753-3928	Pad, energy-dissipating (honeycomb)	60 sheets
1670-01-016-7841	Parachute, cargo, G-11C	5
	Parachute, cargo, extraction:	
1670-00-040-8135	28-foot	1
1670-01-063-3715	15-foot (C-17 only)	1
	Platform, airdrop, type V, 32-foot:	
1670-01-162-2372	Clevis assembly (type V)	44
1670-01-162-2376	Extraction bracket assembly	1
1670-01-247-2389	Link, suspension bracket, type V	2
1670-01-162-2381	Tandem link assembly (Multipurpose link)	2
5530-00-128-4981	Plywood, 3/4-inch	7 Sheets

**Table 6-1. Equipment Required for Rigging the 420D Backhoe Loader on a 32-Foot, Type V Platform for Low-Velocity Airdrop (Continued)**

<i>National Stock Number</i>	<i>Item</i>	<i>Quantity</i>
1670-01-097-8817	Release, cargo parachute, M-2	1
	Sling, cargo, airdrop:	
1670-01-062-6306	3-foot (4-loop), type XXVI	4
1670-01-062-6305	9-foot (4-loop), type XXVI	2
1670-01-063-7761	16-foot (2-loop), type XXVI	2
1670-01-064-4453	20-foot (4-loop), type XXVI	2
1670-01-062-6312	120-foot (2-loop), type XXVI	5
5340-00-040-8219	Strap, parachute, release, multi-knife	2
7501-00-266-5016	Tape, adhesive, 2-inch	As required
1670-00-937-0271	Tiedown assembly, 15-foot	57
1670-01-483-8259	Link, Parachute, Connector (H-block) (C-17 only)	1
	Webbing:	
8305-00-268-2411	Cotton, 1/4-inch, type I	As required
8305-00-082-5752	Nylon, tubular, 1/2-inch	As required
8305-00-261-8585	Nylon, type VIII	As required

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## Chapter 7

### RIGGING THE 410 BACKHOE LOADER ON A 24-FOOT, TYPE V PLATFORM FOR LOW-VELOCITY AIRDROP

#### DESCRIPTION OF THE LOAD

7-1. The 410 backhoe loader (Figure 7-1) is rigged on a 24-foot, type V airdrop platform using four G-11B cargo parachutes. The 410 backhoe loader is 104 inches high (reducible to 75 inches), 126 inches wide (reducible to 95 inches), the rigging length of the vehicle is 336 inches, and weighs 15,670 pounds with  $\frac{1}{2}$  tank of fuel.

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*Note.* The tractor must be equipped with an extraction yoke assembly to be airdropped.

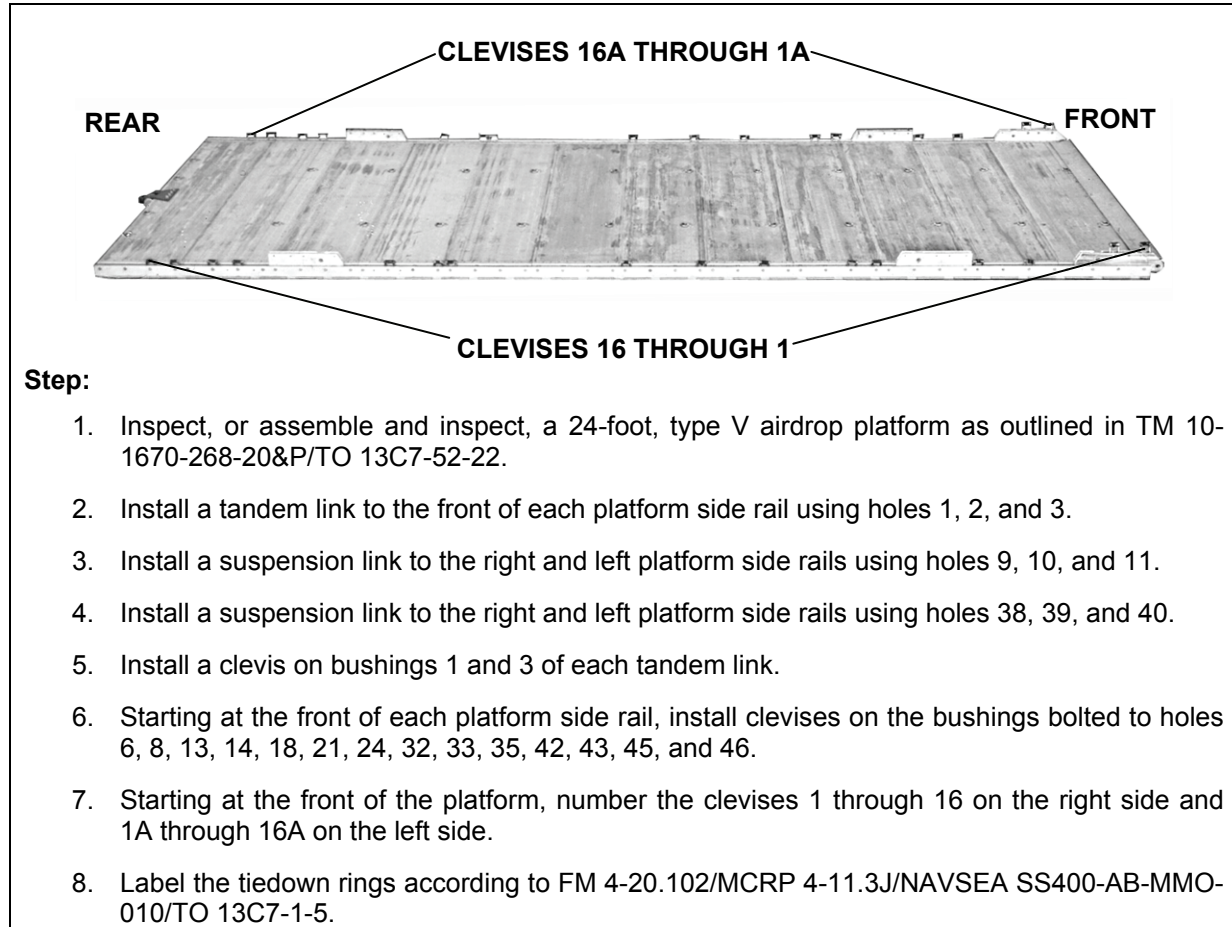
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Figure 7-1. 410 Backhoe Loader

## PREPARING PLATFORM

7-2. Prepare a 24-foot, type V airdrop platform as shown in Figure 7-2.

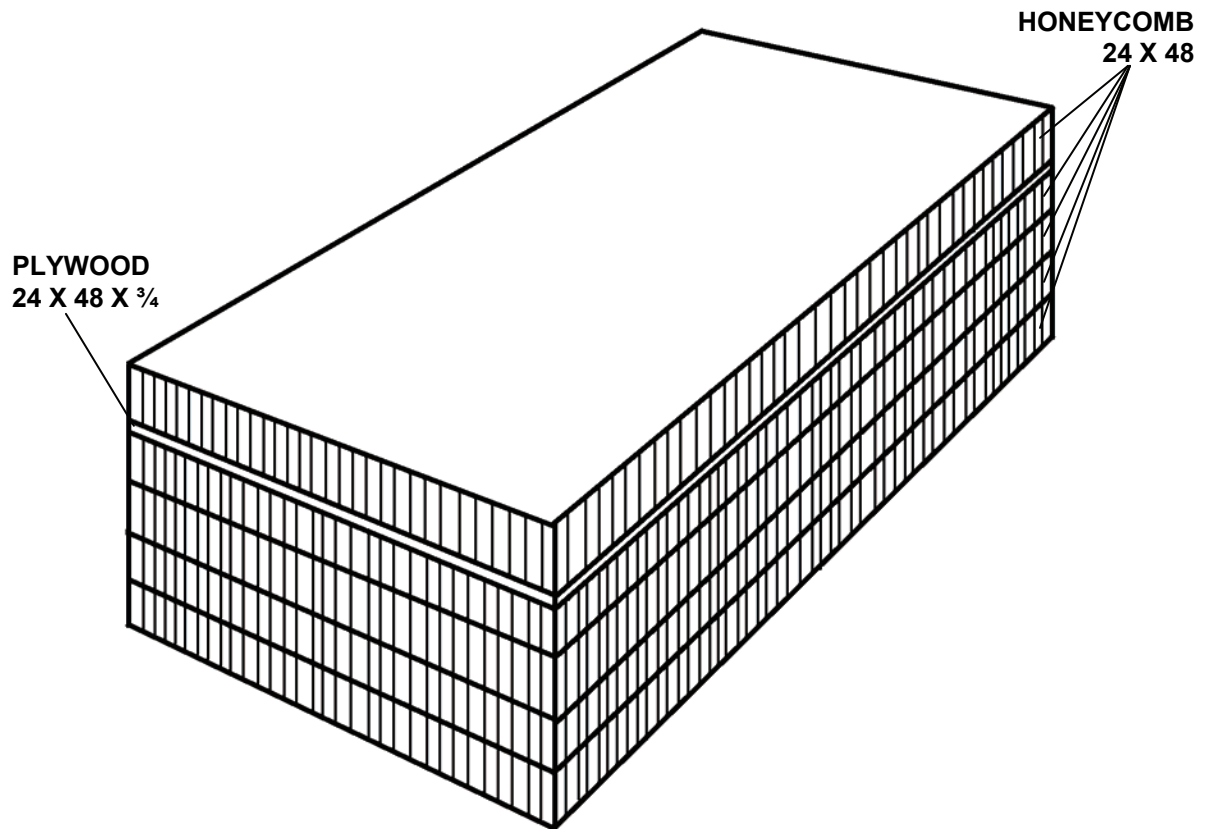


**Figure 7-2. Platform Prepared**

## BUILDING AND POSITIONING HONEYCOMB STACKS

7-3. Build the honeycomb stacks as shown in Figures 7-3 through 7-10. Position the stacks as shown in Figure 7-11.

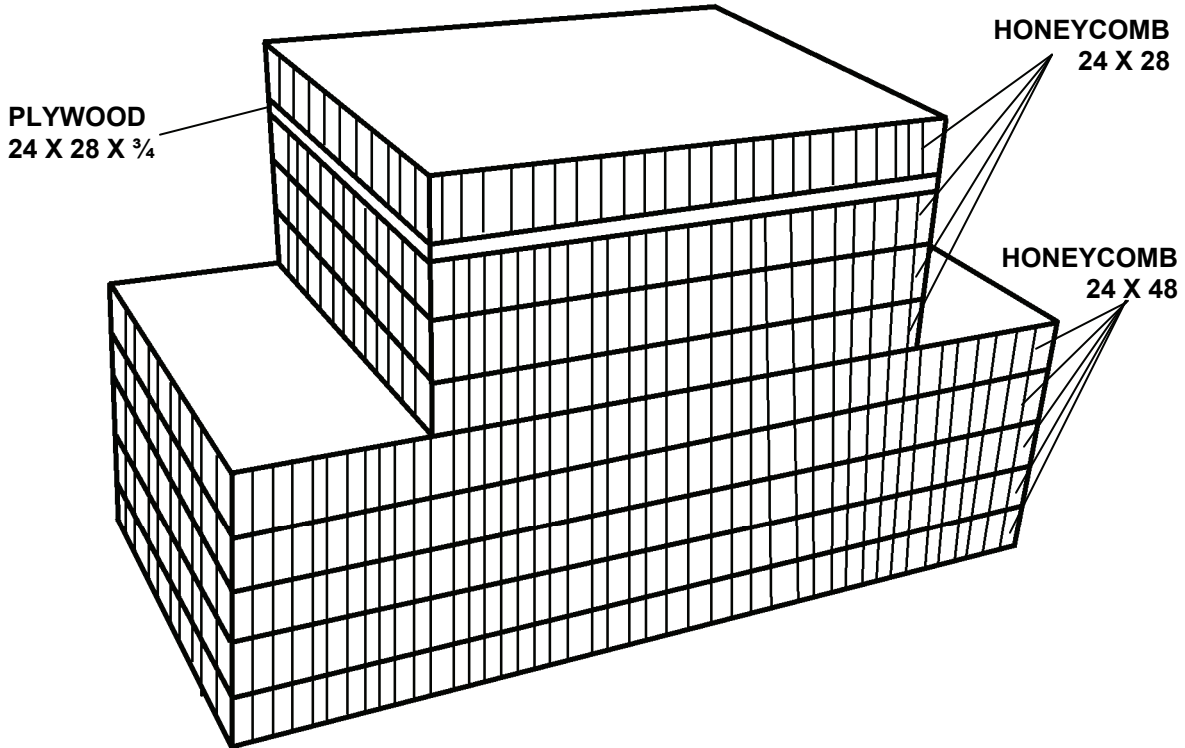
**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



<i>Stack Number</i>	<i>Pieces</i>	<i>Width (Inches)</i>	<i>Length (Inches)</i>	<i>Material</i>	<i>Instructions</i>
1	4	48	24	Honeycomb	Glue to form base.
	1	48	24	$\frac{3}{4}$ inch Plywood	Glue on top of base.
	1	48	24	Honeycomb	Glue on top of $\frac{3}{4}$ -inch plywood.

**Figure 7-3. Honeycomb Stack 1 Prepared**

**Notes.** 1. All measurements are given in inches.  
 2. This drawing is not drawn to scale.



<i>Stack Number</i>	<i>Pieces</i>	<i>Width (Inches)</i>	<i>Length (Inches)</i>	<i>Material</i>	<i>Instructions</i>
2	5	48	24	Honeycomb	Glue to form base.
	3	28	24	Honeycomb	Center and glue to base.
	1	28	24	$\frac{3}{4}$ inch Plywood	Glue on top of honeycomb.
	1	28	24	Honeycomb	Glue on top of $\frac{3}{4}$ -inch plywood.

**Figure 7-4. Honeycomb Stack 2 Prepared**

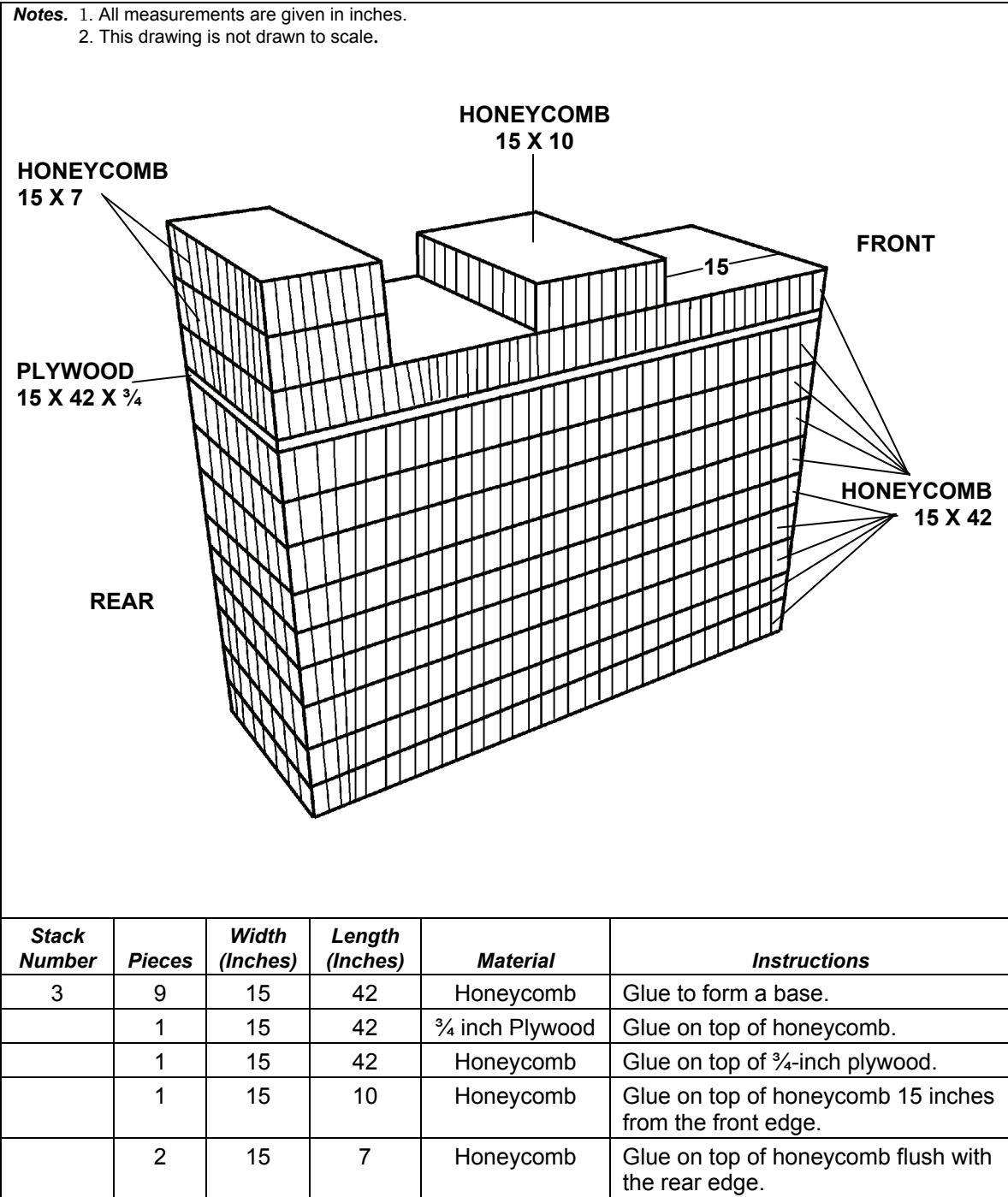
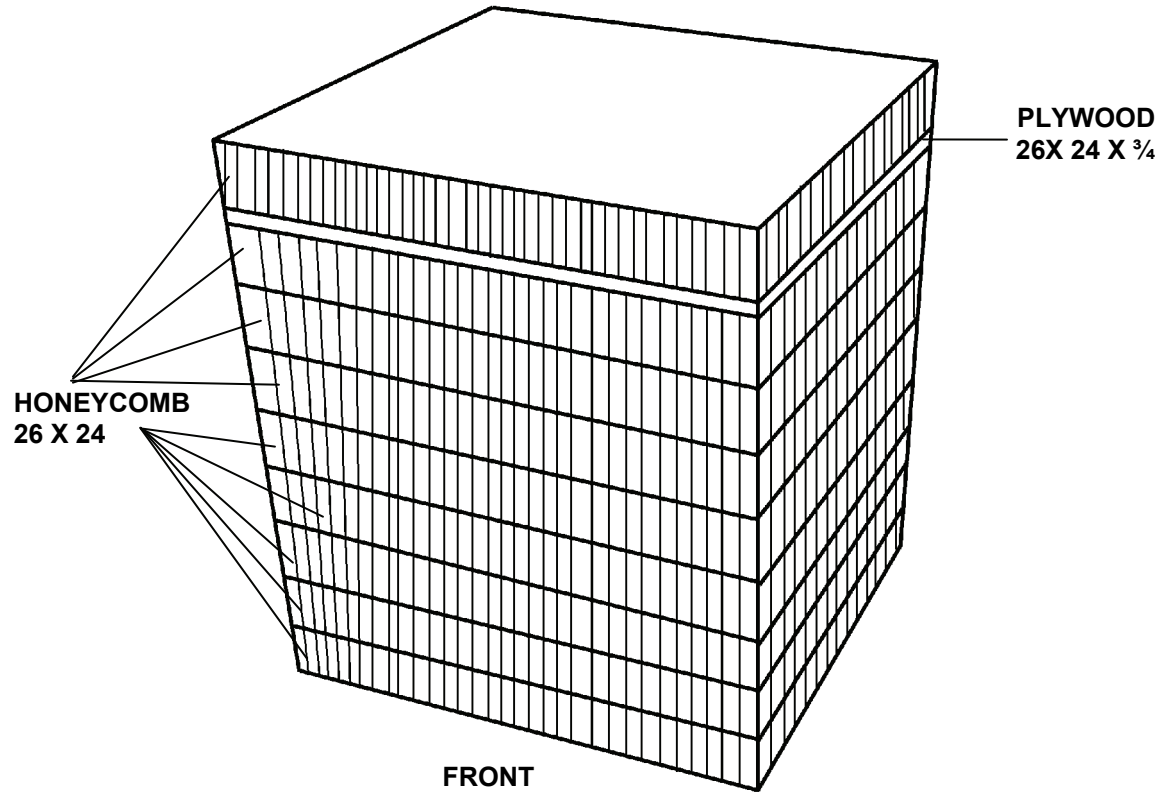


Figure 7-5. Honeycomb Stack 3 Prepared

**Notes.** 1. All measurements are given in inches.  
 2. This drawing is not drawn to scale.



<i>Stack Number</i>	<i>Pieces</i>	<i>Width (Inches)</i>	<i>Length (Inches)</i>	<i>Material</i>	<i>Instructions</i>
4	8	26	24	Honeycomb	Glue to form a base.
	1	26	24	$\frac{3}{4}$ inch Plywood	Glue on top of honeycomb.
	1	26	24	Honeycomb	Glue on top of $\frac{3}{4}$ -inch plywood edges of the plywood. Glue to stack.

**Figure 7-6. Honeycomb Stack 4 Prepared**



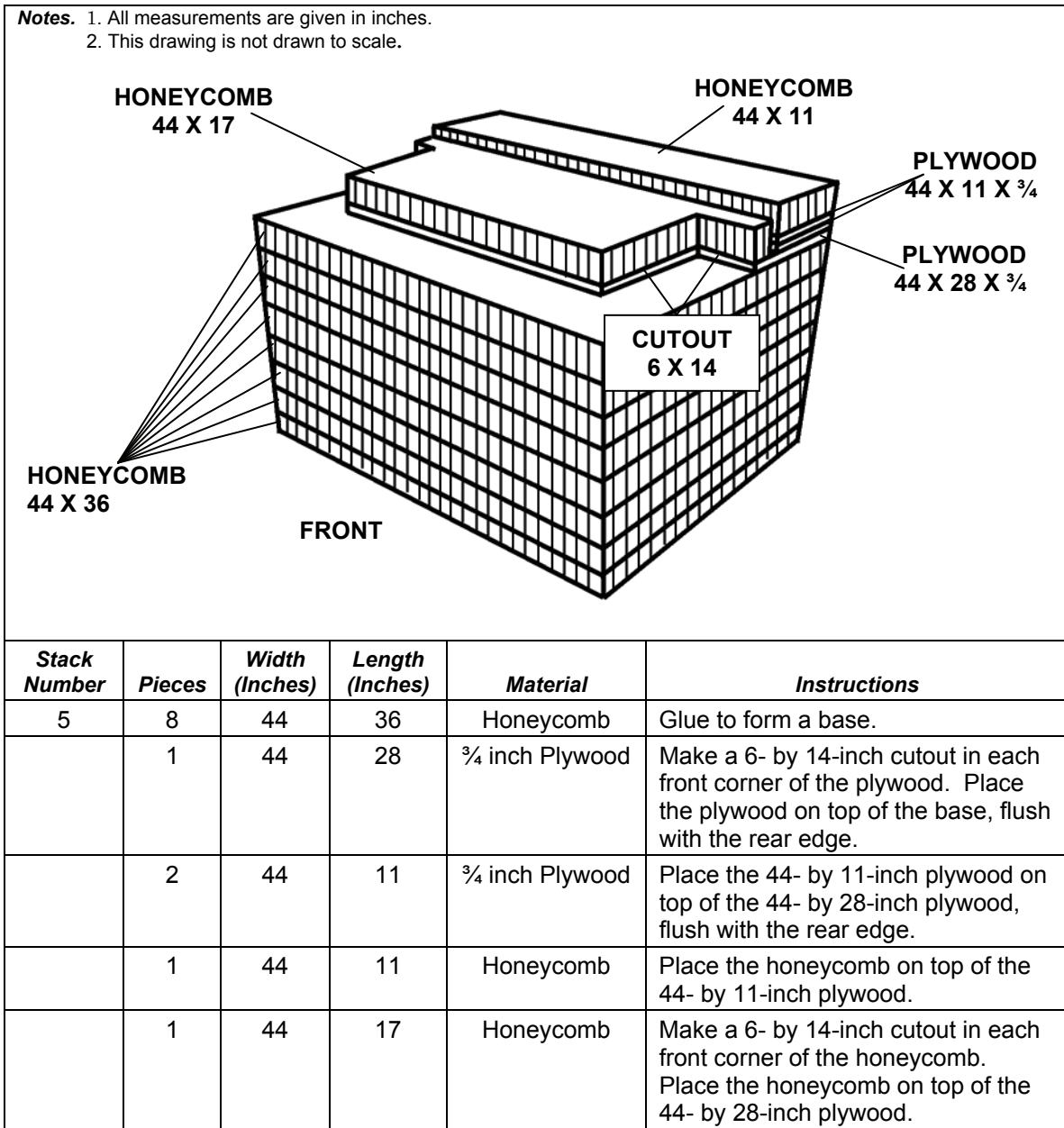
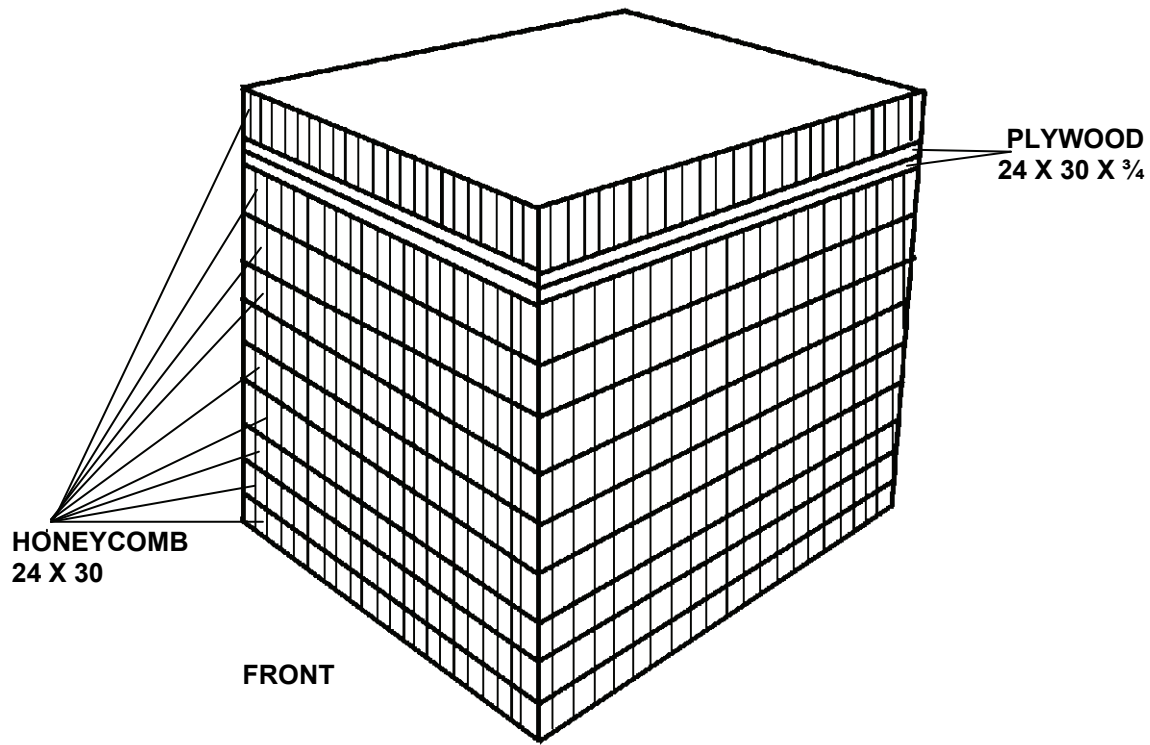


Figure 7-7. Honeycomb Stack 5 Prepared

- Notes.** 1. All measurements are given in inches.  
 2. This drawing is not drawn to scale.



<b>Stack Number</b>	<b>Pieces</b>	<b>Width (Inches)</b>	<b>Length (Inches)</b>	<b>Material</b>	<b>Instructions</b>
6	9	24	30	Honeycomb	Glue to form a base.
	2	24	30	3/4 inch Plywood	Glue on top of honeycomb.
	1	24	30	Honeycomb	Glue on top of 3/4-inch plywood.

**Figure 7-8. Honeycomb Stack 6 Prepared**

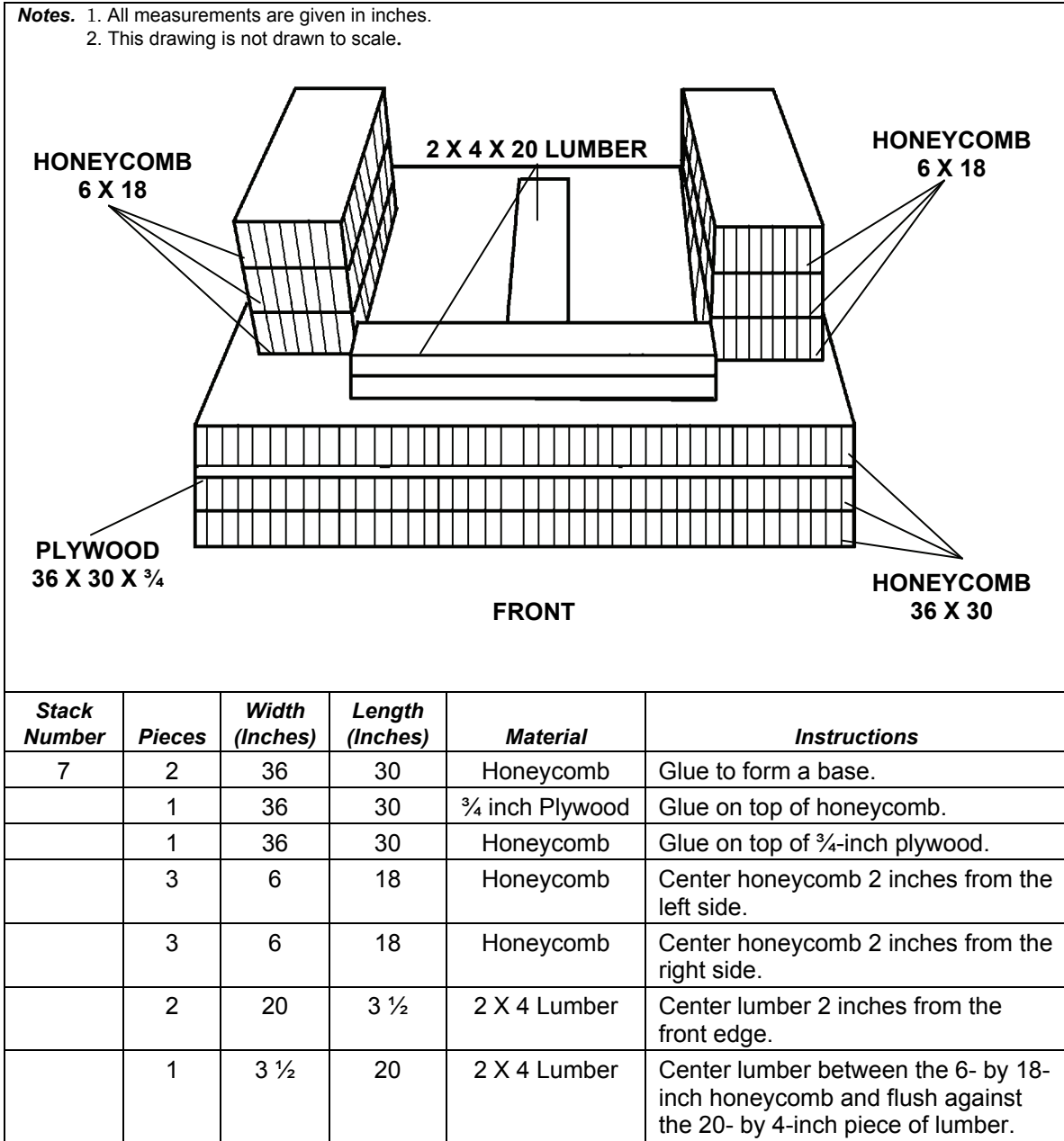
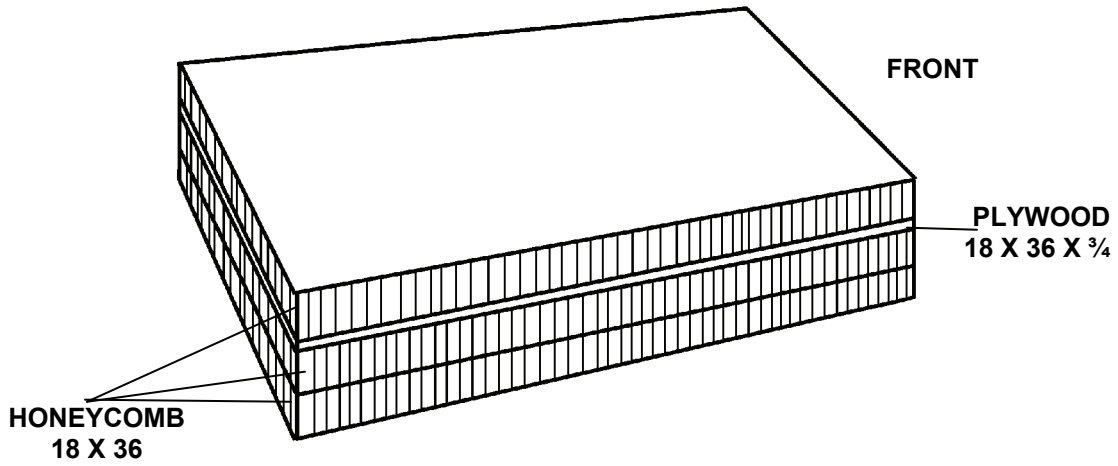


Figure 7-9. Honeycomb Stack 7 Prepared

**Notes.** 1. All measurements are given in inches.  
 2. This drawing is not drawn to scale.



<i>Stack Number</i>	<i>Pieces</i>	<i>Width (Inches)</i>	<i>Length (Inches)</i>	<i>Material</i>	<i>Instructions</i>
8 and 9	2	18	36	Honeycomb	Glue to form a base.
	1	18	36	3/4 inch Plywood	Glue on top of the honeycomb.
	1	18	36	Honeycomb	Glue on top of 3/4-inch plywood.

**Figure 7-10. Honeycomb Stacks 8 and 9 Prepared**

**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.

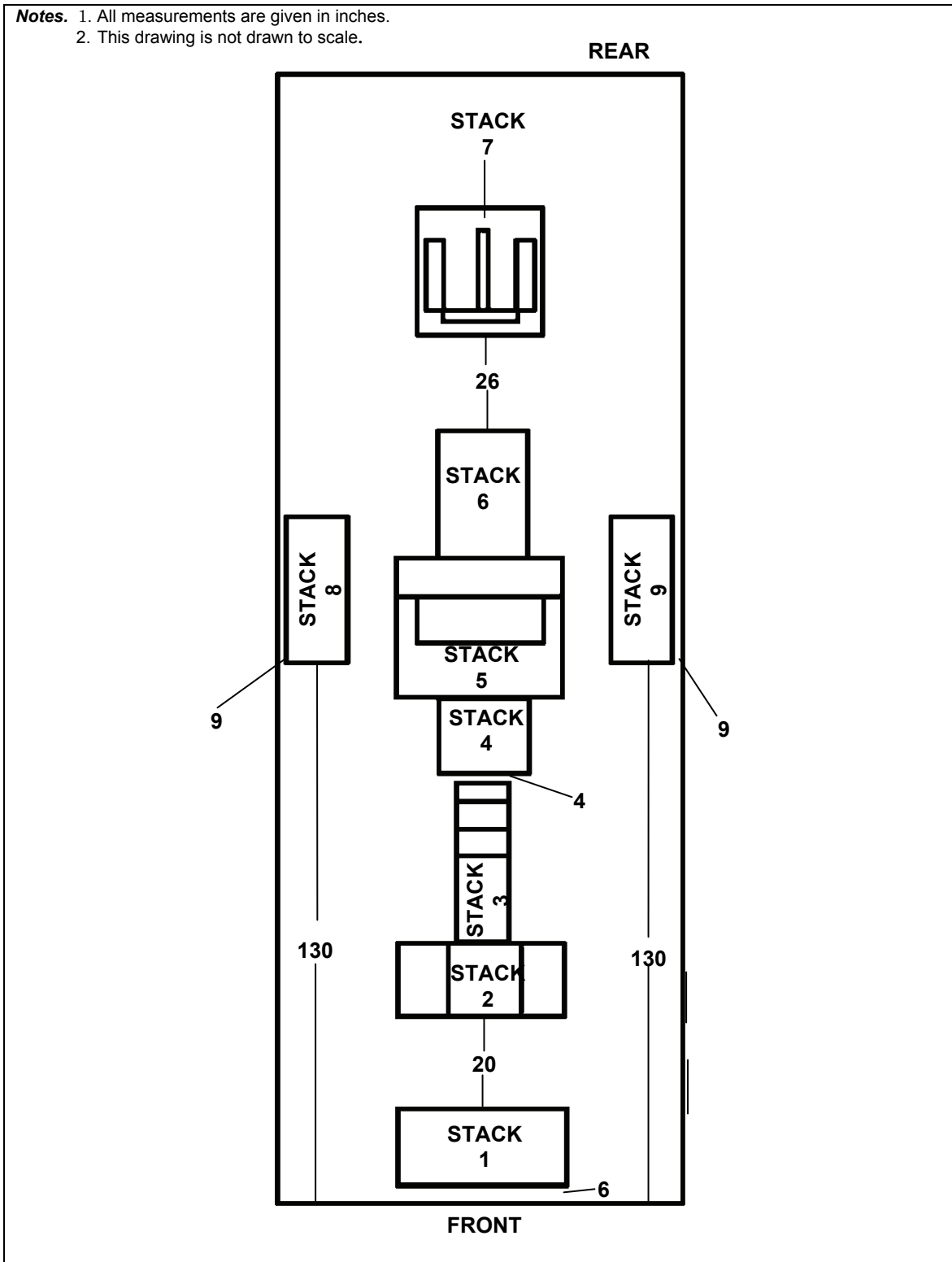
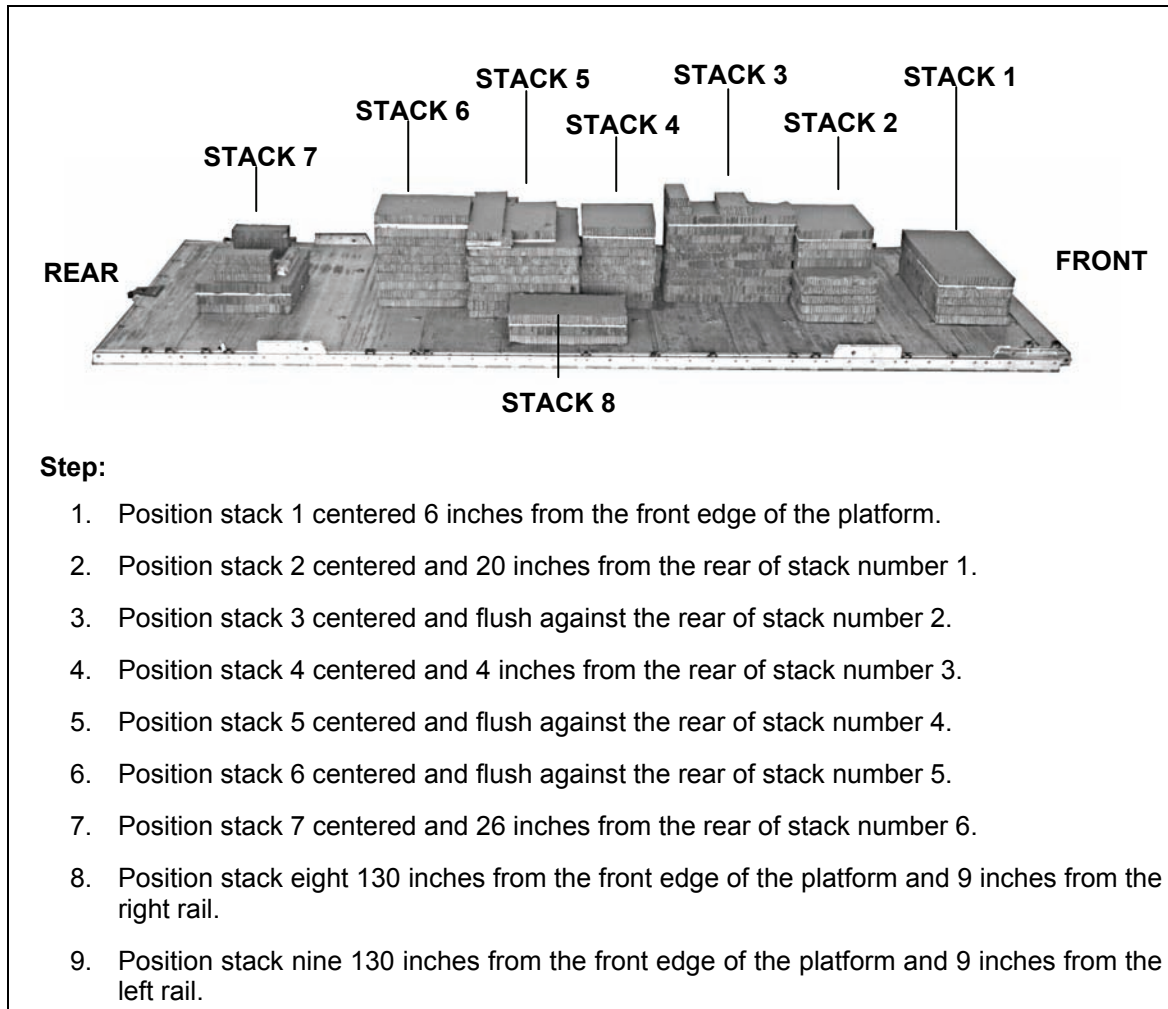


Figure 7-11. Honeycomb Stacks Positioned on Platform



**Step:**

1. Position stack 1 centered 6 inches from the front edge of the platform.
2. Position stack 2 centered and 20 inches from the rear of stack number 1.
3. Position stack 3 centered and flush against the rear of stack number 2.
4. Position stack 4 centered and 4 inches from the rear of stack number 3.
5. Position stack 5 centered and flush against the rear of stack number 4.
6. Position stack 6 centered and flush against the rear of stack number 5.
7. Position stack 7 centered and 26 inches from the rear of stack number 6.
8. Position stack eight 130 inches from the front edge of the platform and 9 inches from the right rail.
9. Position stack nine 130 inches from the front edge of the platform and 9 inches from the left rail.

**Figure 7-11. Honeycomb Stacks Positioned on Platform (Continued)**

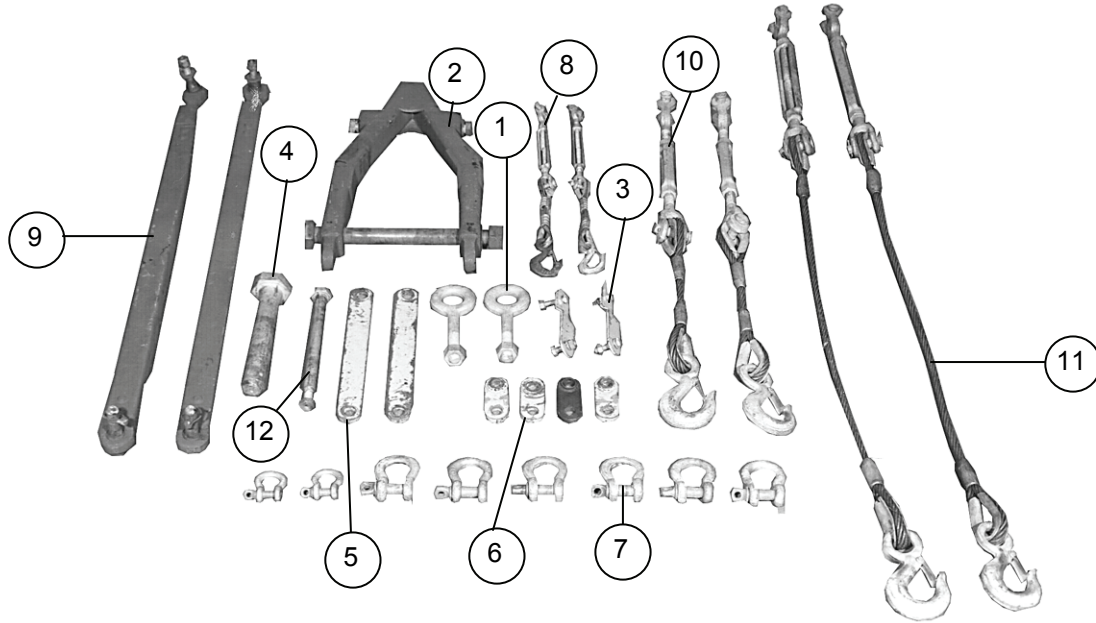


## PREPARING THE BACKHOE LOADER

7-4. Prepare the backhoe loader as shown in Figure 7-12.

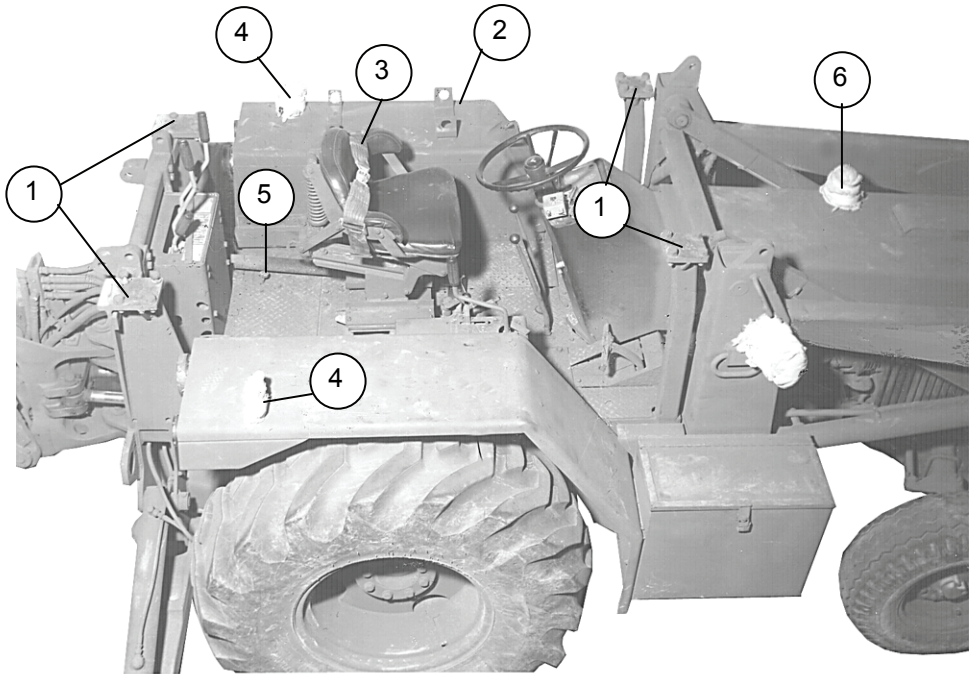
**Note.** Ensure the fuel tank is no more than  $\frac{1}{2}$  full.

**Note.** The backhoe loader must be equipped with an extraction yoke assembly.



- ① Eye bolts (2).
- ② Extraction yoke (1).
- ③ Jaw braces (2).
- ④ Large bolt (1).
- ⑤ Extraction yoke braces (2).
- ⑥ Small extraction yoke braces (4).
- ⑦ Screw-pin clevises (2 small, 6 medium).
- ⑧ Bracket cables (2).
- ⑨ Upper cable braces (2).
- ⑩ Upper cable assemblies (2).
- ⑪ Lower cable assemblies (2).
- ⑫ Small bolt (1).

Figure 7-12. Backhoe Loader Prepared



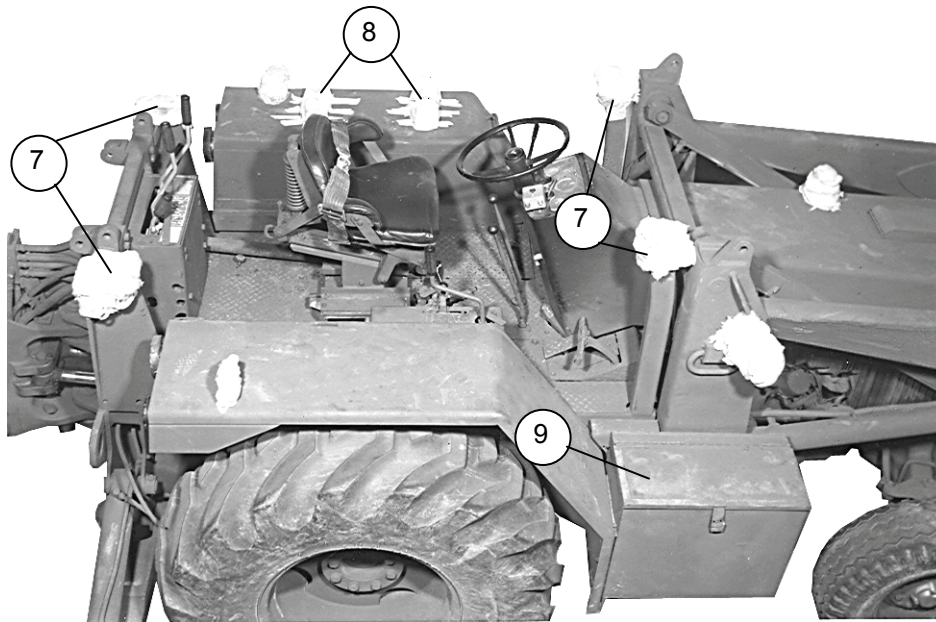
- ① Remove the roll over protection system (ROPS) and replace the bolts.

**Note.** The ROPS is not airdropped.

- ② Remove the extraction yoke from the fender box.
- ③ Lower the seat and lock it in the forward position. Attach the seat belt above the seat
- ④ Fold the lights down. Pad the lights with cellulose padding and tape.
- ⑤ Remove the exhaust pipe and place it behind the driver's seat. Secure the exhaust pipe in place with Type III nylon cord.
- ⑥ Pad the exhaust port with cellulose padding and tape.

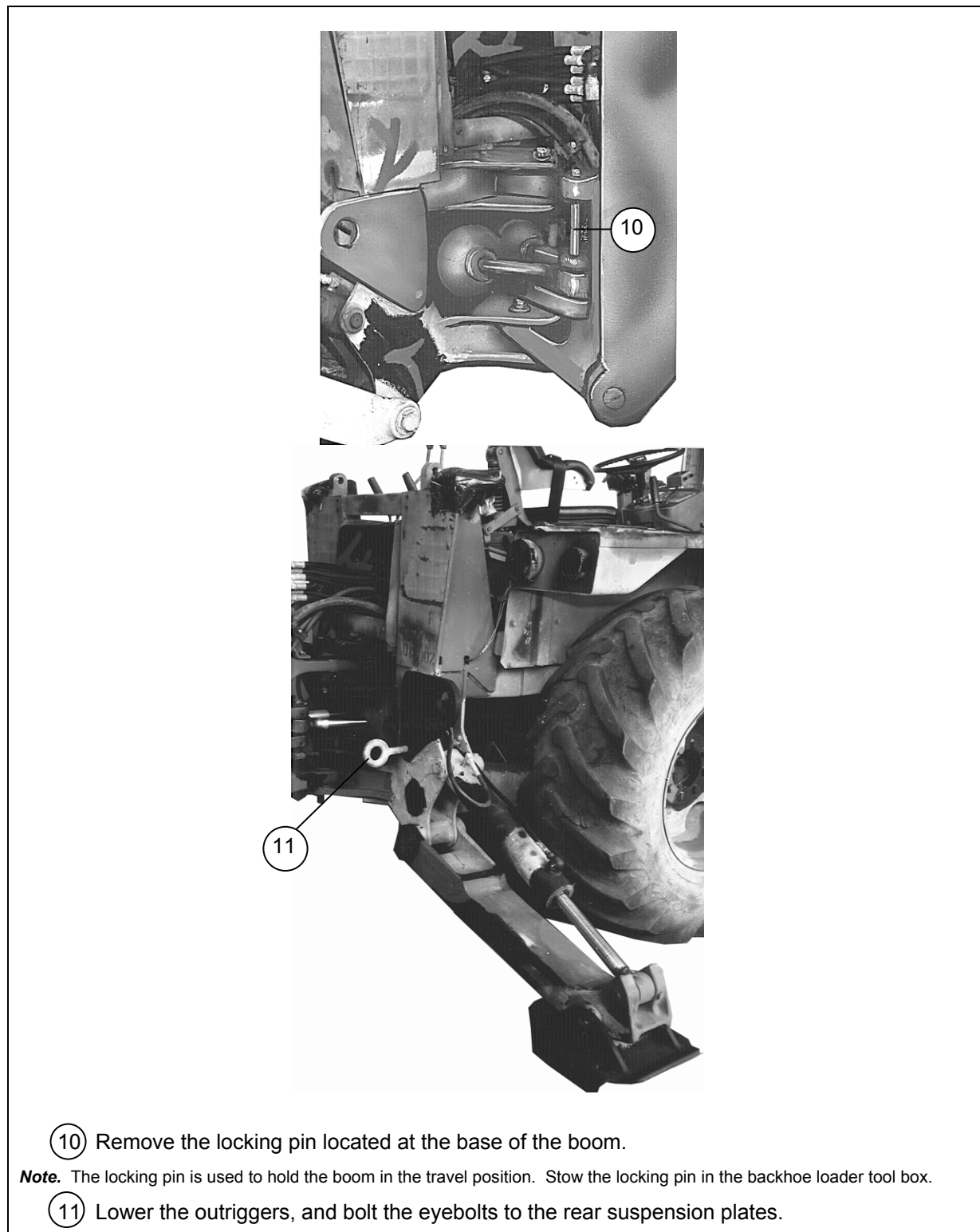
**Note.** Remove the cellulose padding and tape prior to operating the backhoe loader.

**Figure 7-12. Backhoe Loader Prepared (Continued)**

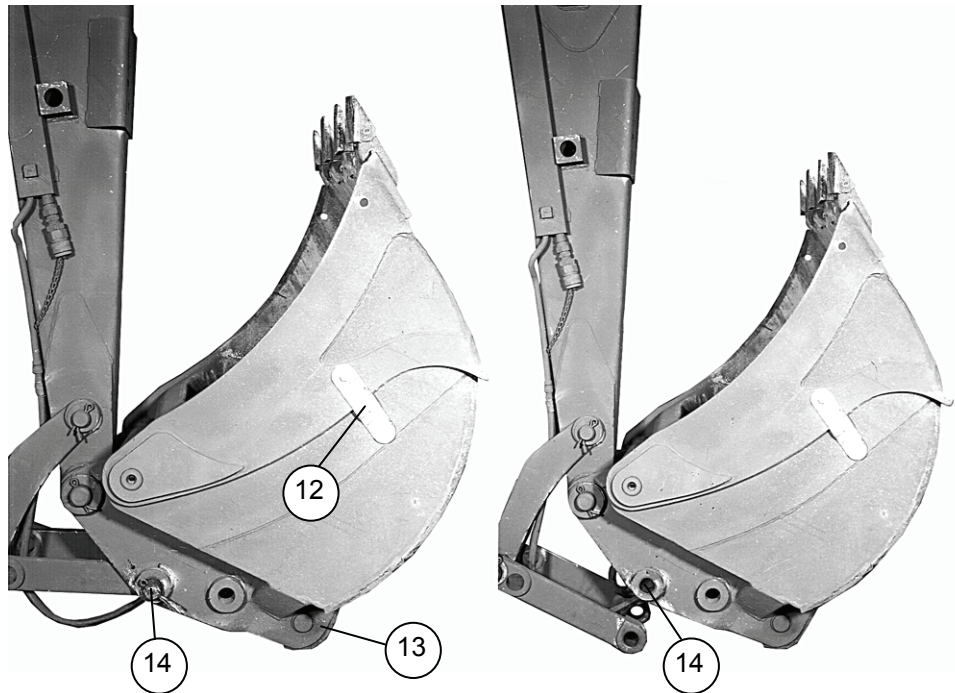


- ⑦ Pad the ROPS brackets with cellulose padding and tape.
- ⑧ Pad the fender brackets with cellulose padding and tape.
- ⑨ Remove the extraction yoke assembly components which are stowed in the tool box.

**Figure 7-12. Backhoe Loader Prepared (Continued)**



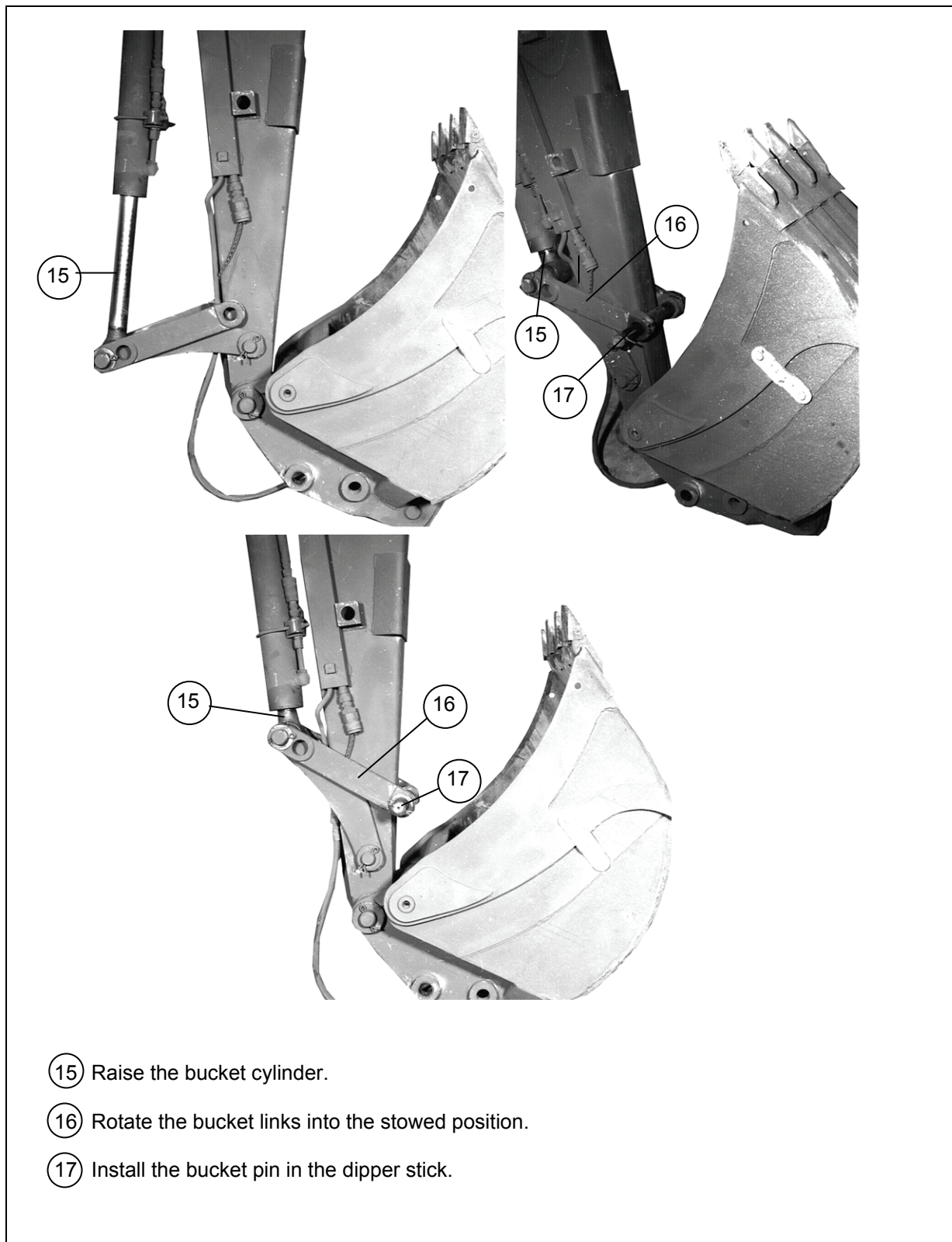
**Figure 7-12. Backhoe Loader Prepared (Continued)**



- ⑫ Bolt a jaw brace on each side of the bucket.
- ⑬ Lower the bucket and the dipper stick into the full-tucked position.
- ⑭ Remove the bucket pin from the base of the bucket.

**Figure 7-12. Backhoe Loader Prepared (Continued)**

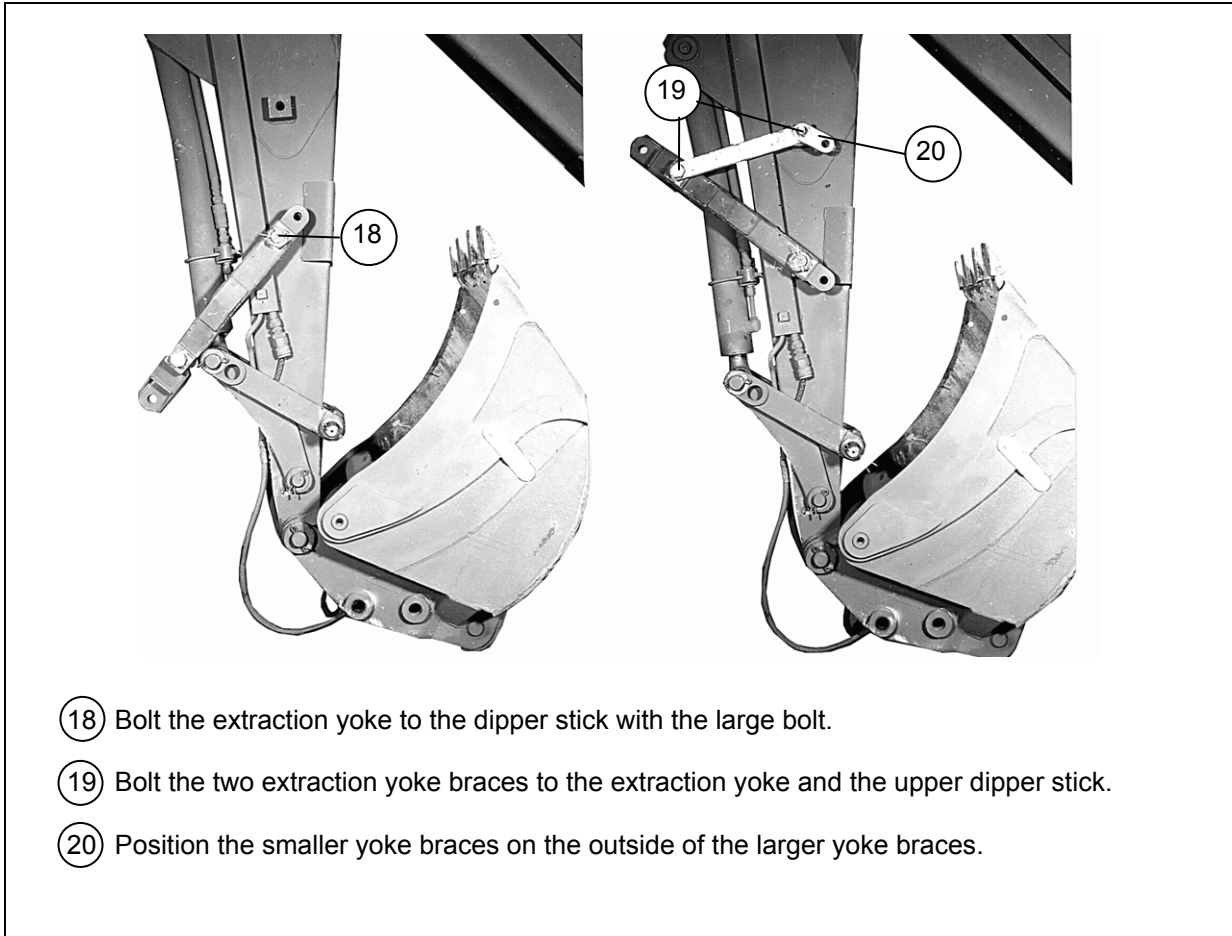




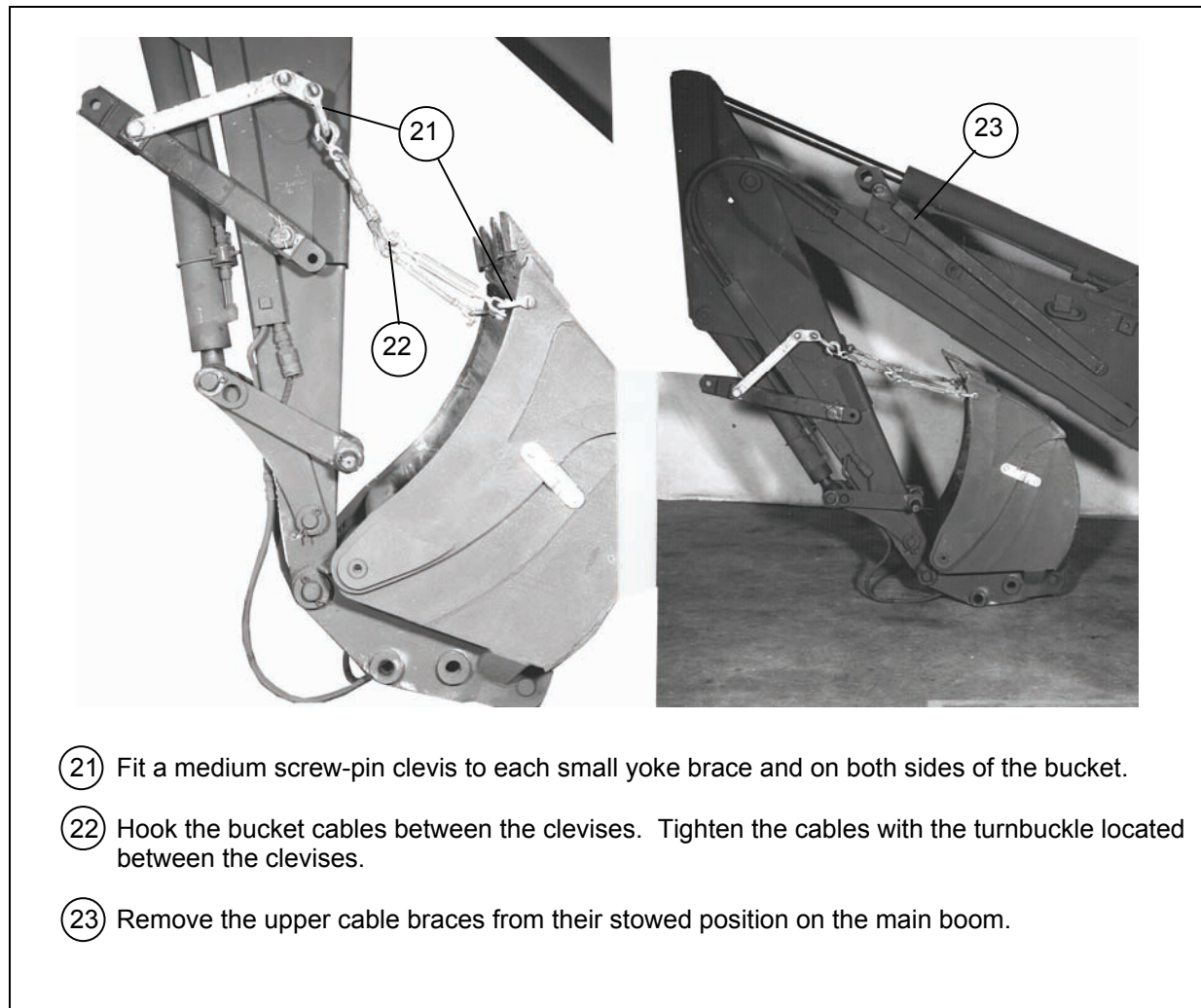
- ⑮ Raise the bucket cylinder.
- ⑯ Rotate the bucket links into the stowed position.
- ⑰ Install the bucket pin in the dipper stick.

Figure 7-12. Backhoe Loader Prepared (Continued)

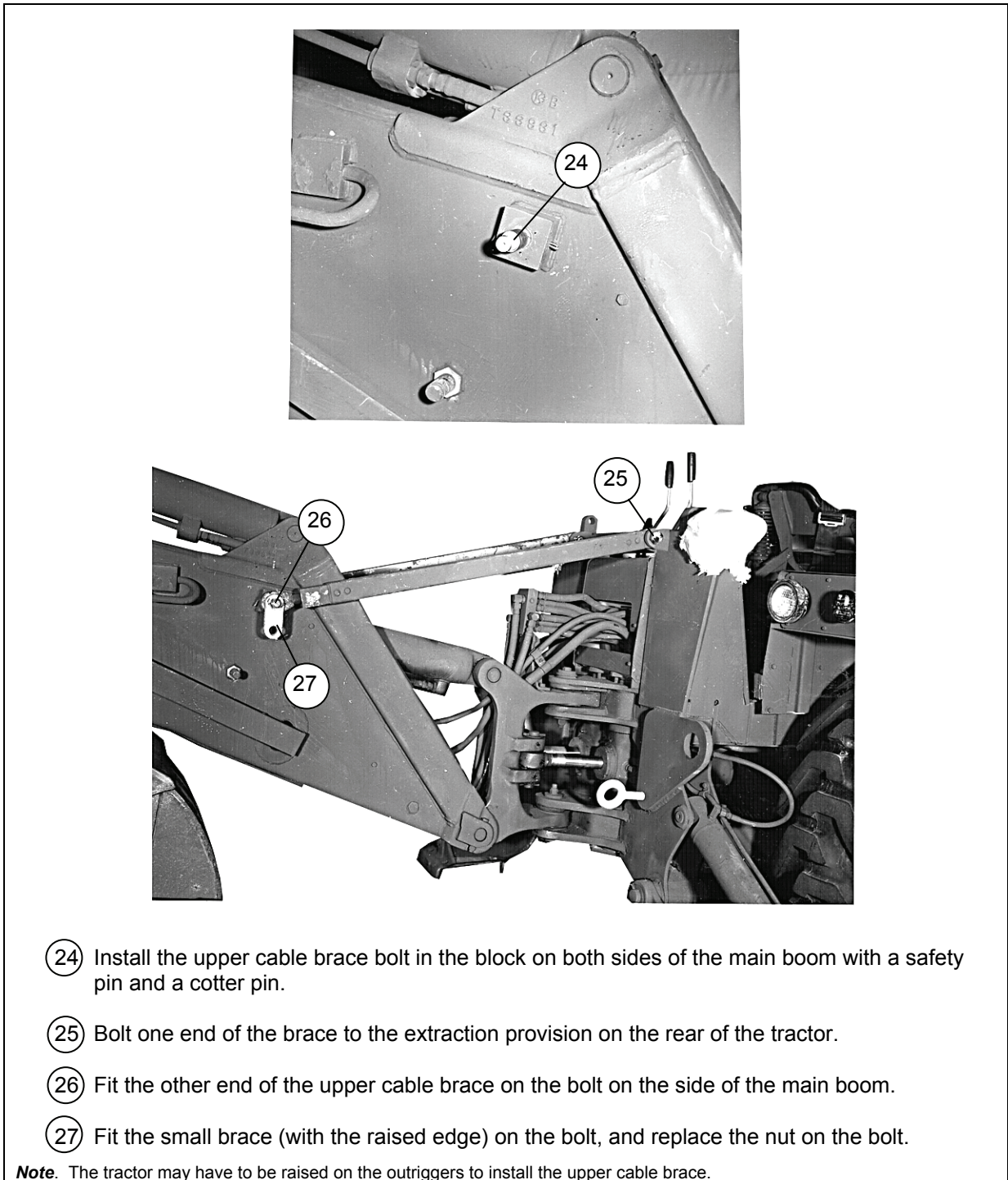




**Figure 7-12. Backhoe Loader Prepared (Continued)**



**Figure 7-12. Backhoe Loader Prepared (Continued)**



**Figure 7-12. Backhoe Loader Prepared (Continued)**

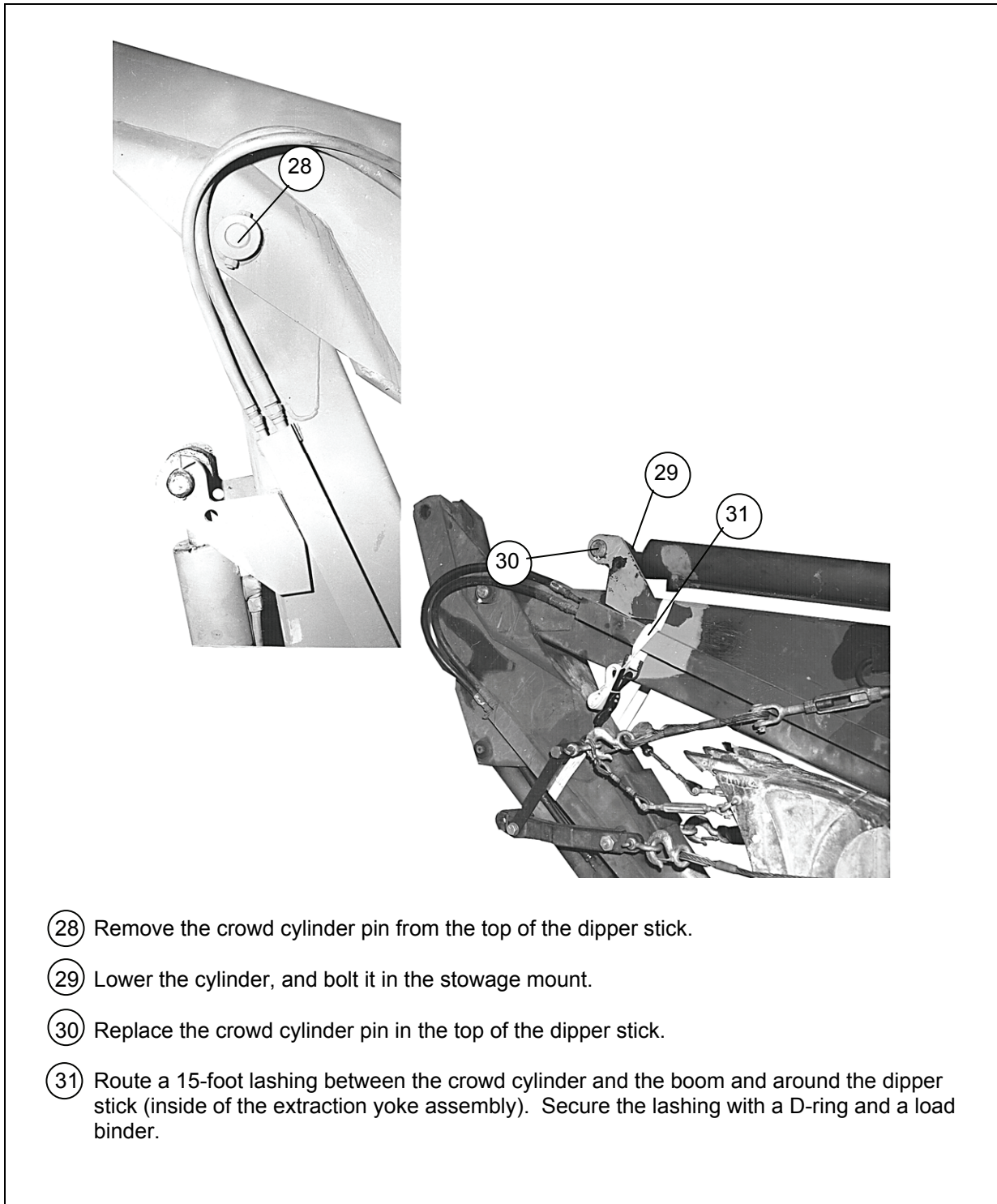
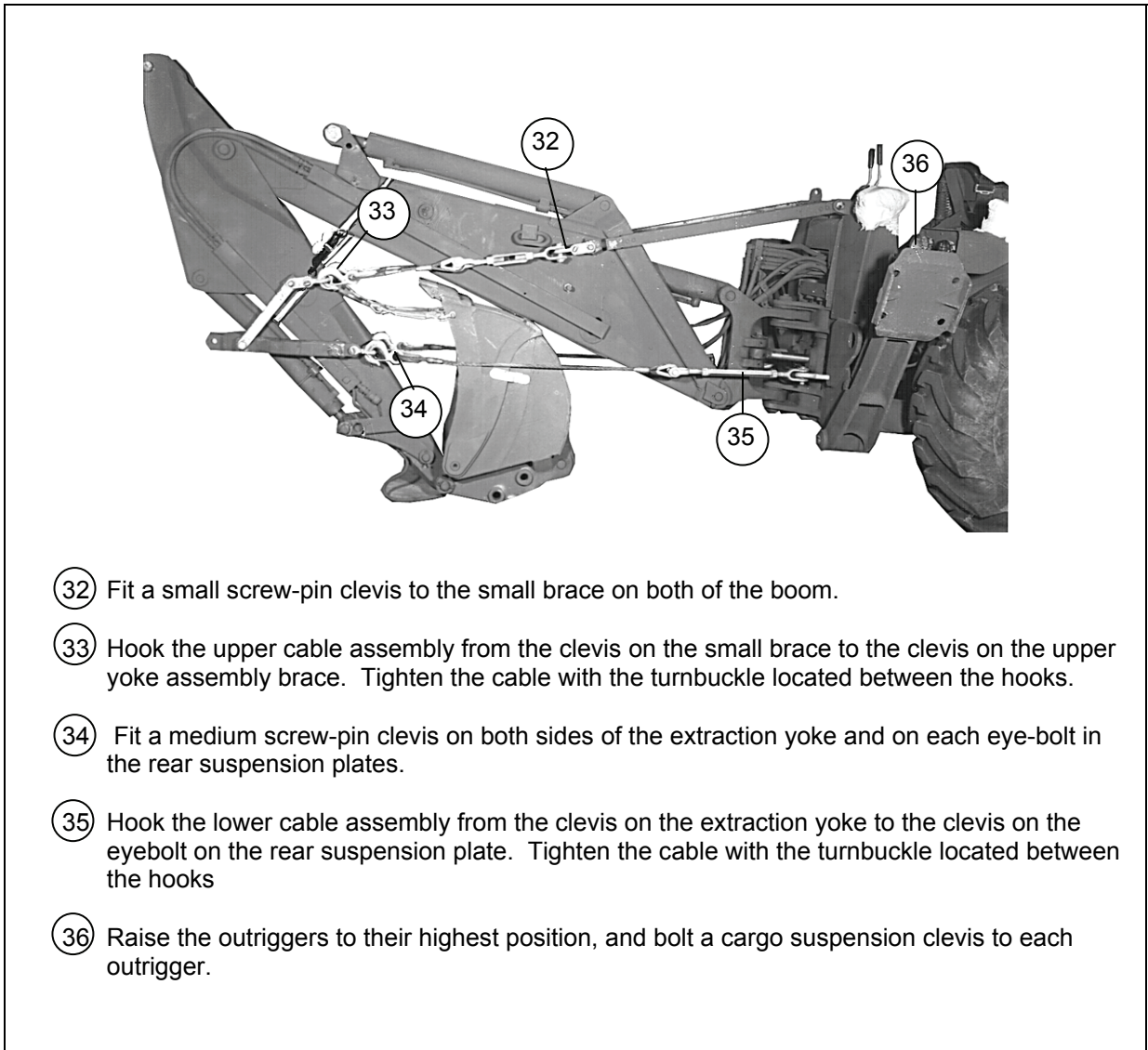


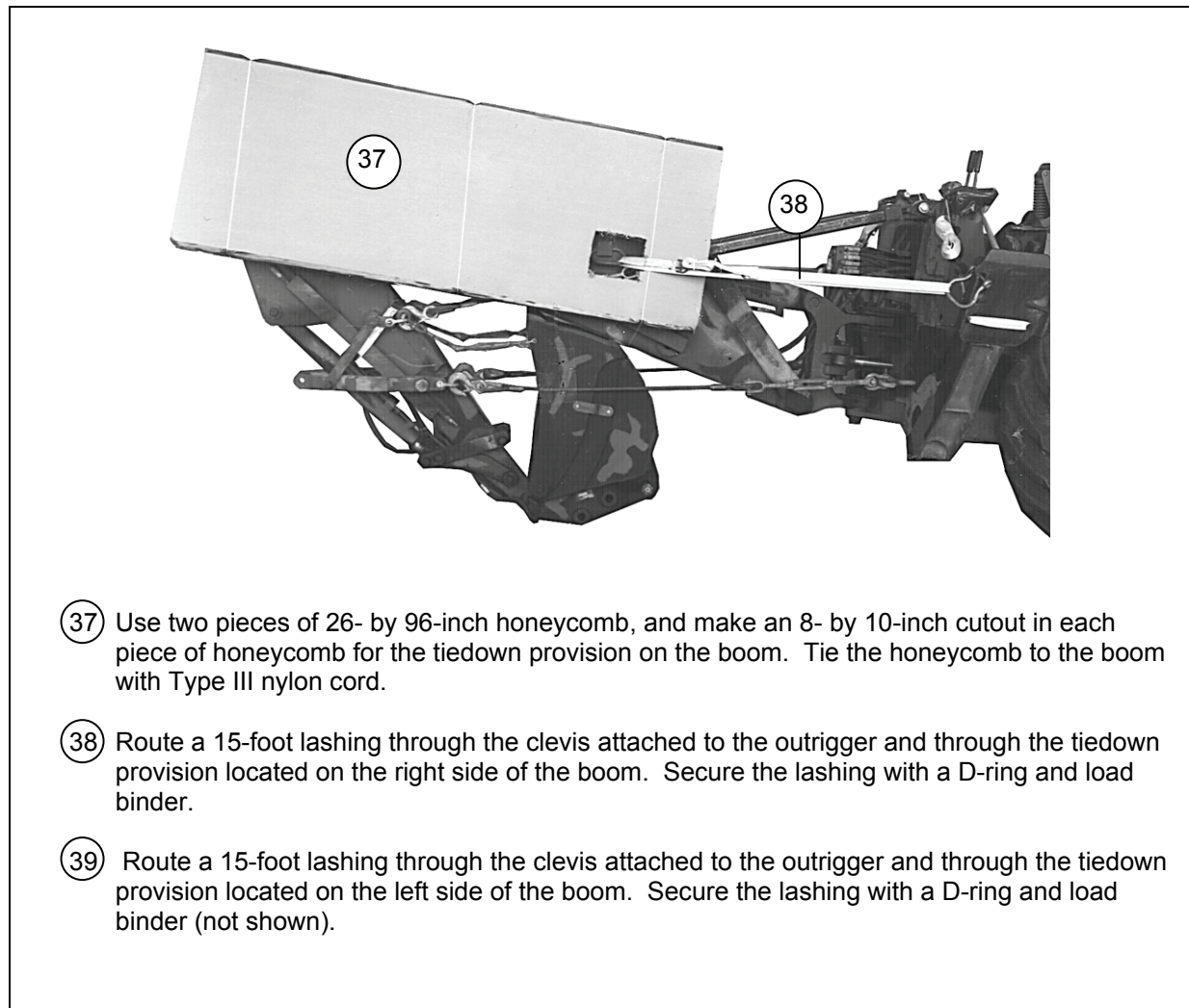
Figure 7-12. Backhoe Loader Prepared (Continued)



- ③② Fit a small screw-pin clevis to the small brace on both of the boom.
- ③③ Hook the upper cable assembly from the clevis on the small brace to the clevis on the upper yoke assembly brace. Tighten the cable with the turnbuckle located between the hooks.
- ③④ Fit a medium screw-pin clevis on both sides of the extraction yoke and on each eye-bolt in the rear suspension plates.
- ③⑤ Hook the lower cable assembly from the clevis on the extraction yoke to the clevis on the eyebolt on the rear suspension plate. Tighten the cable with the turnbuckle located between the hooks.
- ③⑥ Raise the outriggers to their highest position, and bolt a cargo suspension clevis to each outrigger.

**Figure 7-12. Backhoe Loader Prepared (Continued)**

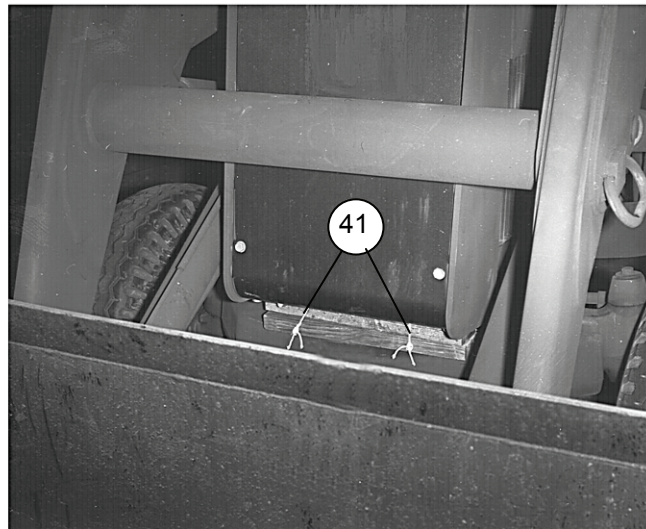
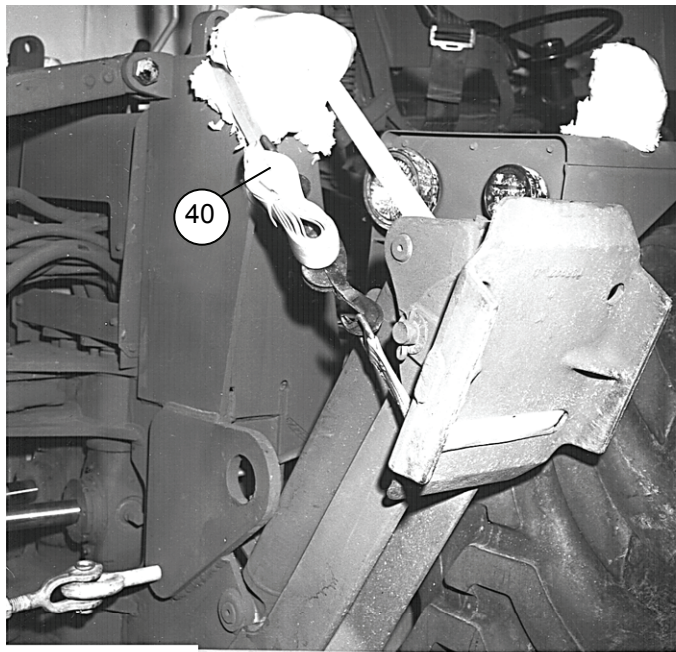




- ③⑦ Use two pieces of 26- by 96-inch honeycomb, and make an 8- by 10-inch cutout in each piece of honeycomb for the tiedown provision on the boom. Tie the honeycomb to the boom with Type III nylon cord.
- ③⑧ Route a 15-foot lashing through the clevis attached to the outrigger and through the tiedown provision located on the right side of the boom. Secure the lashing with a D-ring and load binder.
- ③⑨ Route a 15-foot lashing through the clevis attached to the outrigger and through the tiedown provision located on the left side of the boom. Secure the lashing with a D-ring and load binder (not shown).

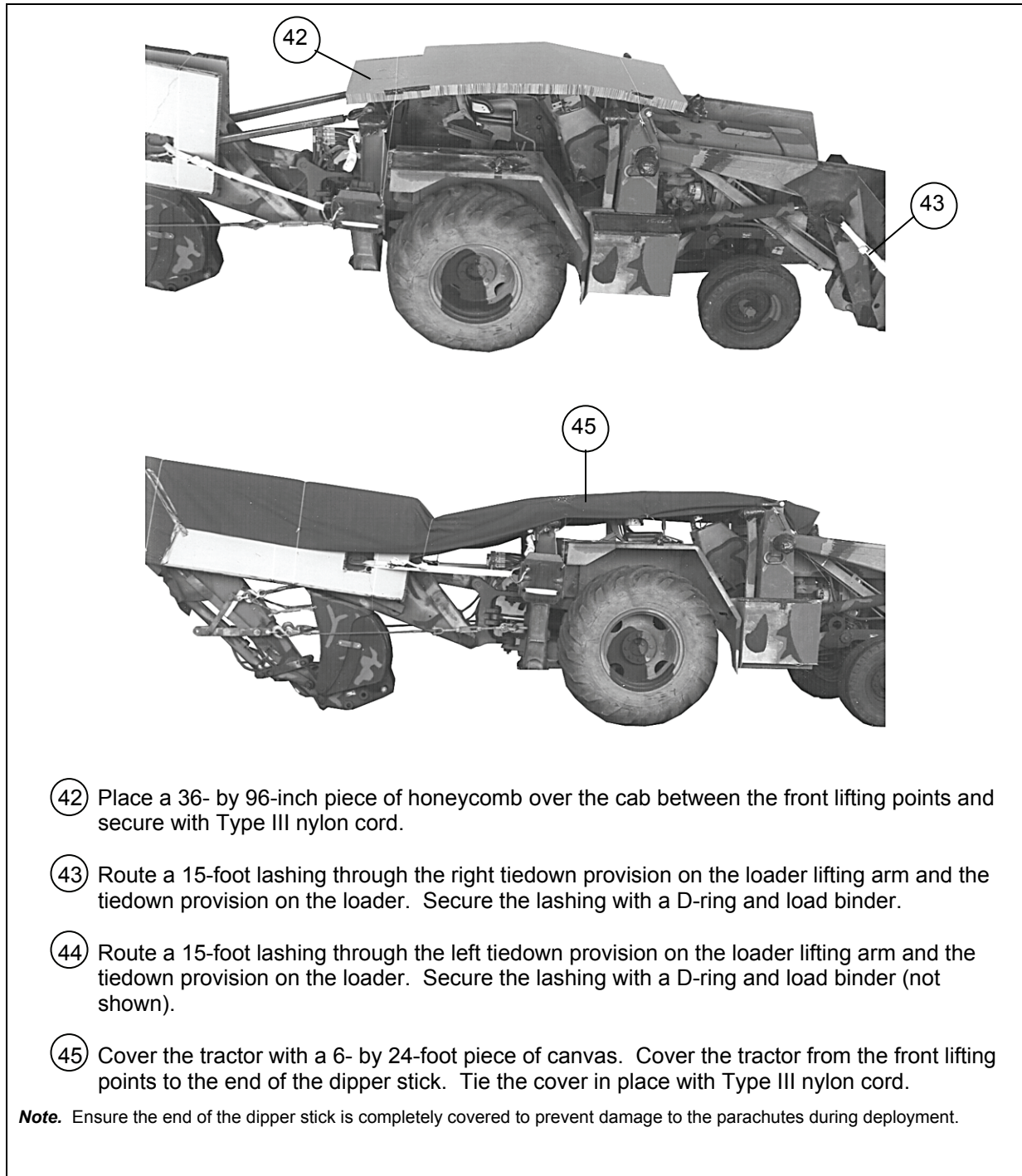
**Figure 7-12. Backhoe Loader Prepared (Continued)**





- ④⑩ Route a 15-foot lashing around the ROPS bracket and through the foot of the outrigger. Secure the lashing with a D-ring and load binder. Stow the other outrigger in the same manner.
- ④⑪ Tie two 2- by 4- by 20-inch pieces of lumber between the front axle and the frame using Type III nylon cord.

Figure 7-12. Backhoe Loader Prepared (Continued)

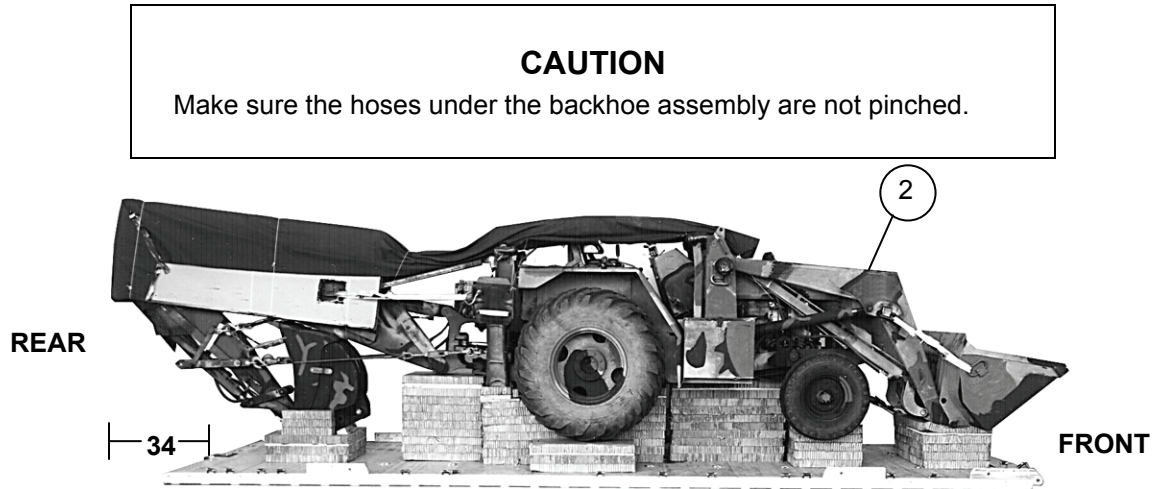


**Figure 7-12. Backhoe Loader Prepared (Continued)**

## LIFTING AND POSITIONING THE BACKHOE LOADER

7-5. Install the lifting slings and position the backhoe loader as shown in Figure 7-13.

**Note.** . All measurements are given in inches.



### CAUTION

Make sure the hoses under the backhoe assembly are not pinched.

### CAUTION

Make sure the overhang on the rear of the platform is no less than 34 inches and no more than 35 inches.

- ① Lift the backhoe loader using four 9-foot (2 loop), type XXVI nylon slings and four large suspension clevises attached to each suspension point (not shown).
- ② Position the backhoe loader on the platform with the rear of the backhoe loader overhanging the rear of the platform 34 inches.
- ③ Remove the lifting slings and clevises from the backhoe loader (not shown).

**Figure 7-13. Backhoe Loader Positioned on Platform**

## LASHING LOAD TO PLATFORM

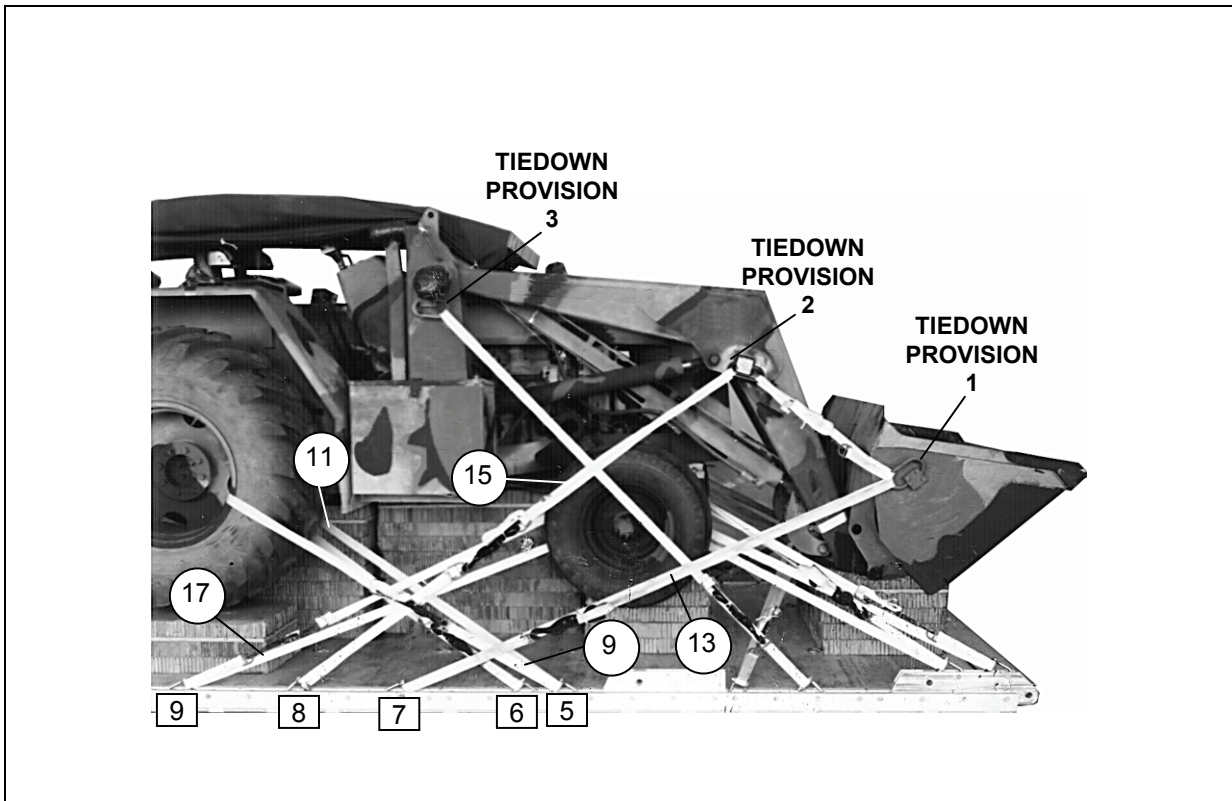
7-6. Lash the backhoe loader to the platform as shown in Figure 7-14.

*Note.* Pad any sharp edges on the load where a lashing may pass. Use cellulose padding and masking tape.

<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
1	1	Pass lashing: Around the front axle, right side.
2	1A	Around the front axle, left side.
3	2	Around the front axle, right side.
4	2A	Around the front axle, left side.
5	3	Through tiedown provision 3, right side.
6	3A	Through tiedown provision 3, left side.
7	4	Around the left loader arm.
8	4A	Around the right loader arm.

**Figure 7-14. 410 Backhoe Loader Lashed to Platform**





<i>Lashing Number</i>	<i>Tiedown Clevis Number</i>	<i>Instructions</i>
9	5	Pass lashing: Through the rear wheel, right side.
10	5A	Through the rear wheel, left side.
11	6	Around the rear axle, right side.
12	6A	Around the rear axle, left side.
13	7	Through tiedown provision 1, right side.
14	7A	Through tiedown provision 1, left side.
*15	8	Through tiedown provision 2, right side
*16	8A	Through tiedown provision 2, left side.
17	9	Around the front axle, right side.
18	9A	Around the front axle, left side.

\*30-foot lashing

Figure 7-14. 410 Backhoe Loader Lashed to Platform (Continued)

<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
19	10	Pass lashing: Through tiedown provision 4, right side.
20	10A	Through tiedown provision 4, left side.
21	11	Through tiedown provision 4, right side
22	11A	Through tiedown provision 4, left side.
23	12	Around lower swivel joint.
24	12A	Around lower swivel joint.
*25	13	Through rear wheel, right side.
*26	13A	Through rear wheel, left side.
*27	15	Through rear suspension plate, right side.
*28	15A	Through rear suspension plate, left side.

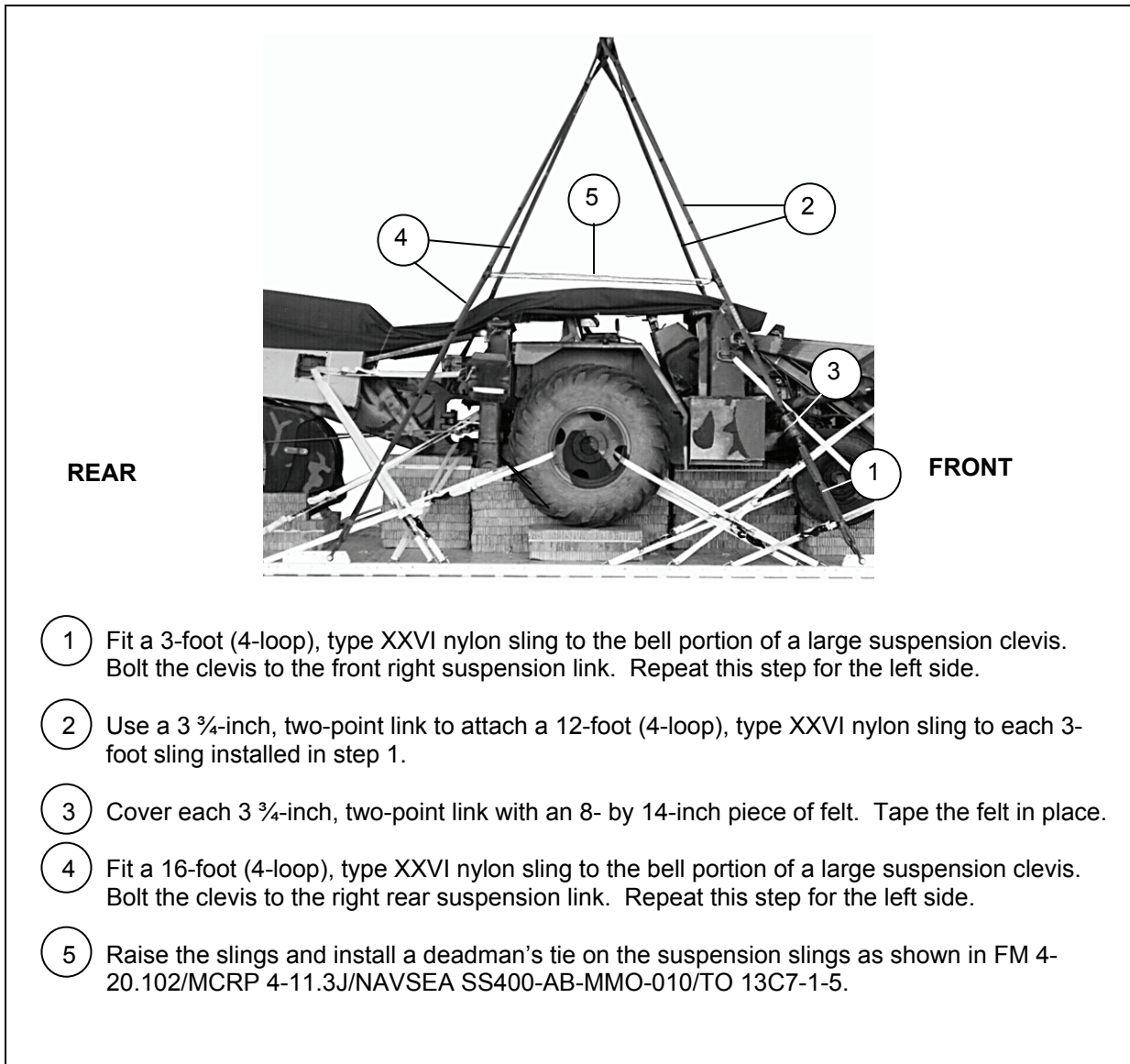
\*30-foot lashing

**Figure 7-14. 410 Backhoe Loader Lashed to Platform (Continued)**



## INSTALLING AND SAFETY TIEING THE SUSPENSION SLINGS

7-7. Install and safety tie the suspension slings as shown in Figure 7-15.



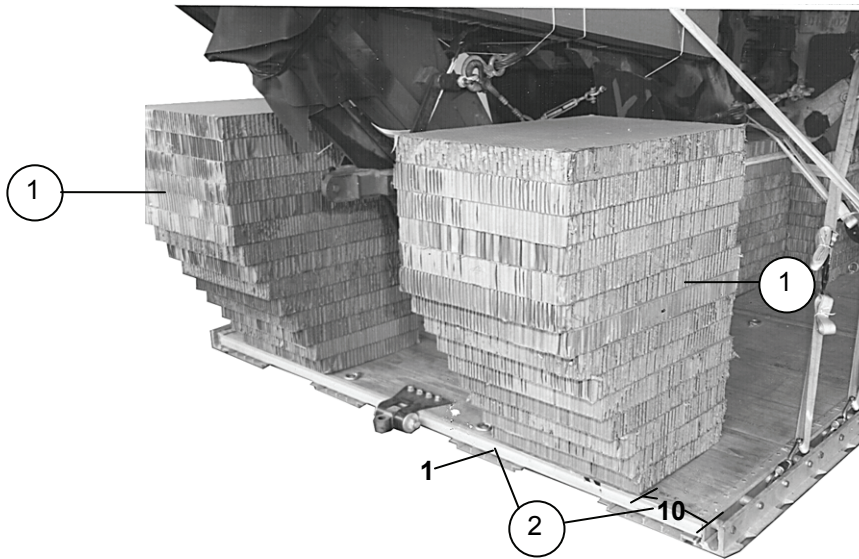
- 1 Fit a 3-foot (4-loop), type XXVI nylon sling to the bell portion of a large suspension clevis. Bolt the clevis to the front right suspension link. Repeat this step for the left side.
- 2 Use a 3 3/4-inch, two-point link to attach a 12-foot (4-loop), type XXVI nylon sling to each 3-foot sling installed in step 1.
- 3 Cover each 3 3/4-inch, two-point link with an 8- by 14-inch piece of felt. Tape the felt in place.
- 4 Fit a 16-foot (4-loop), type XXVI nylon sling to the bell portion of a large suspension clevis. Bolt the clevis to the right rear suspension link. Repeat this step for the left side.
- 5 Raise the slings and install a deadman's tie on the suspension slings as shown in FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.

Figure 7-15. Suspension Slings and Deadman's Tie Installed

## PREPARING, POSITIONING, AND SECURING THE PARACHUTE STOWAGE PLATFORM

7-8. Construct the parachute support stack as shown in Figure 7-16. Construct the stowage platform as shown in Figure 7-17. Secure the parachute stowage platform as shown in Figure 7-18.

- Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.

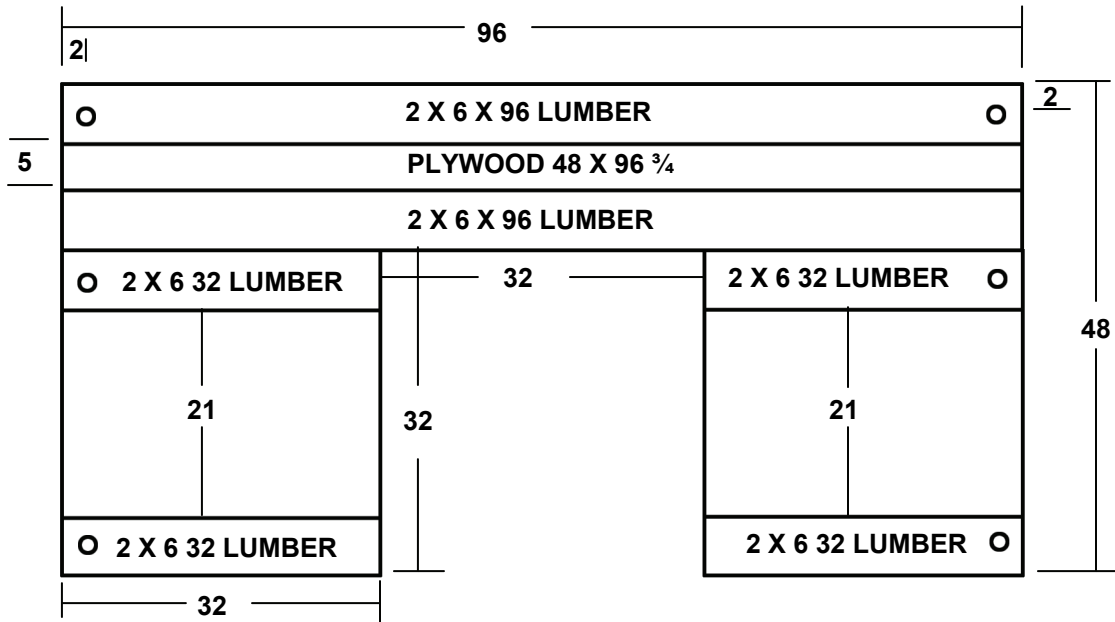


- ① Build two honeycomb stacks using the dimensions given below. Use 14 pieces of honeycomb in each stack.
- ② Place each honeycomb stack 1 inch from the rear edge of the platform and 10 inches from each side rail.

<i>Honeycomb Layer</i>	<i>Width (Inches)</i>	<i>Length (Inches)</i>	<i>Honeycomb Layer</i>	<i>Width (Inches)</i>	<i>Length (Inches)</i>
1	24	20	8	24	34
2	24	22	9	24	36
3	24	24	10	24	36
4	24	26	11	24	36
5	24	28	12	24	36
6	24	30	13	24	36
7	24	32	14	24	36

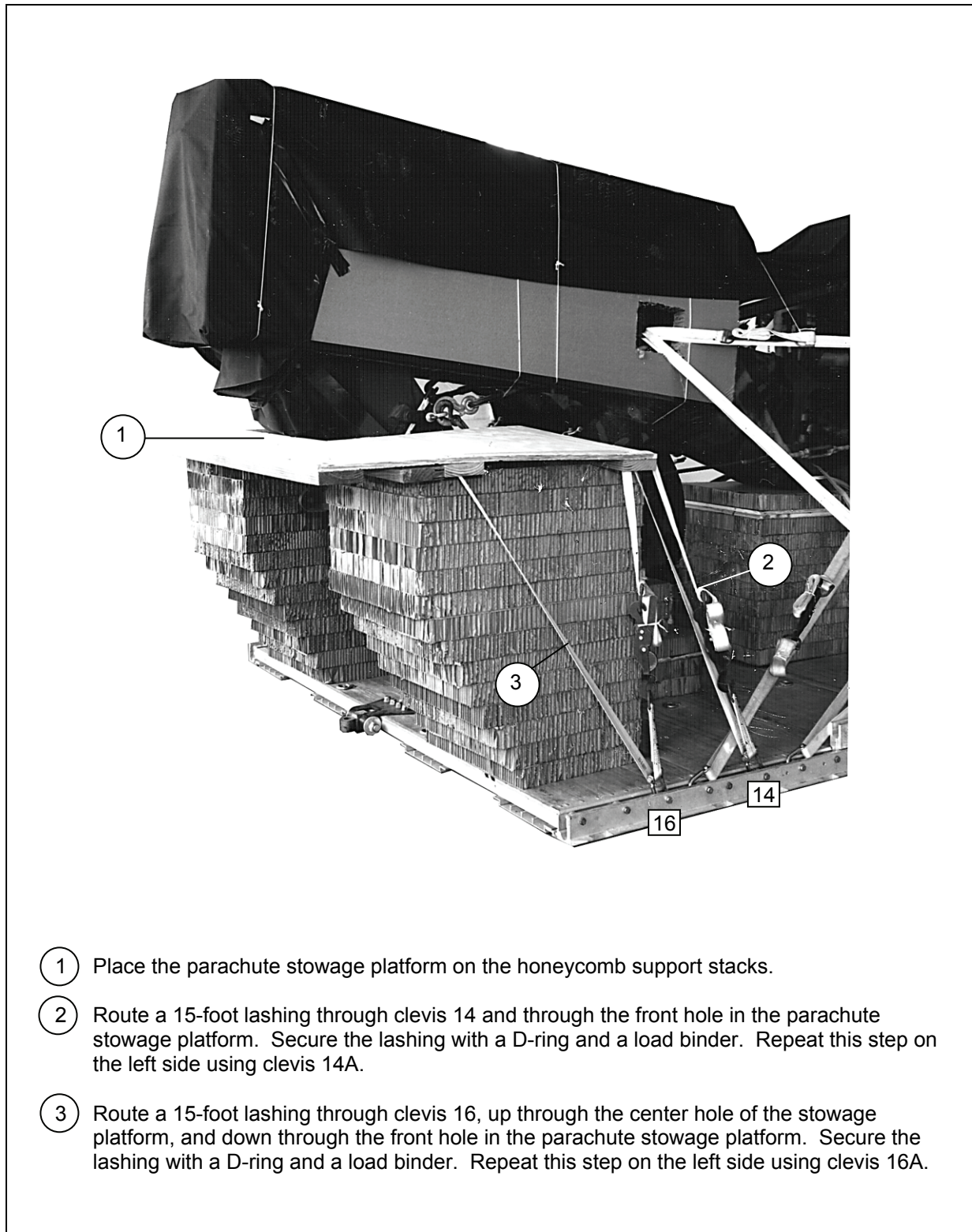
**Figure 7-16. Parachute Stowage Platform Support Stacks Positioned**

- Notes.** 1. All measurements are given in inches.  
 2. This drawing is not drawn to scale.  
 3. All drilled holes are 2 inches in diameter.



- ① Build the parachute stowage platform as shown. Nail the plywood to the lumber with 8d nails.

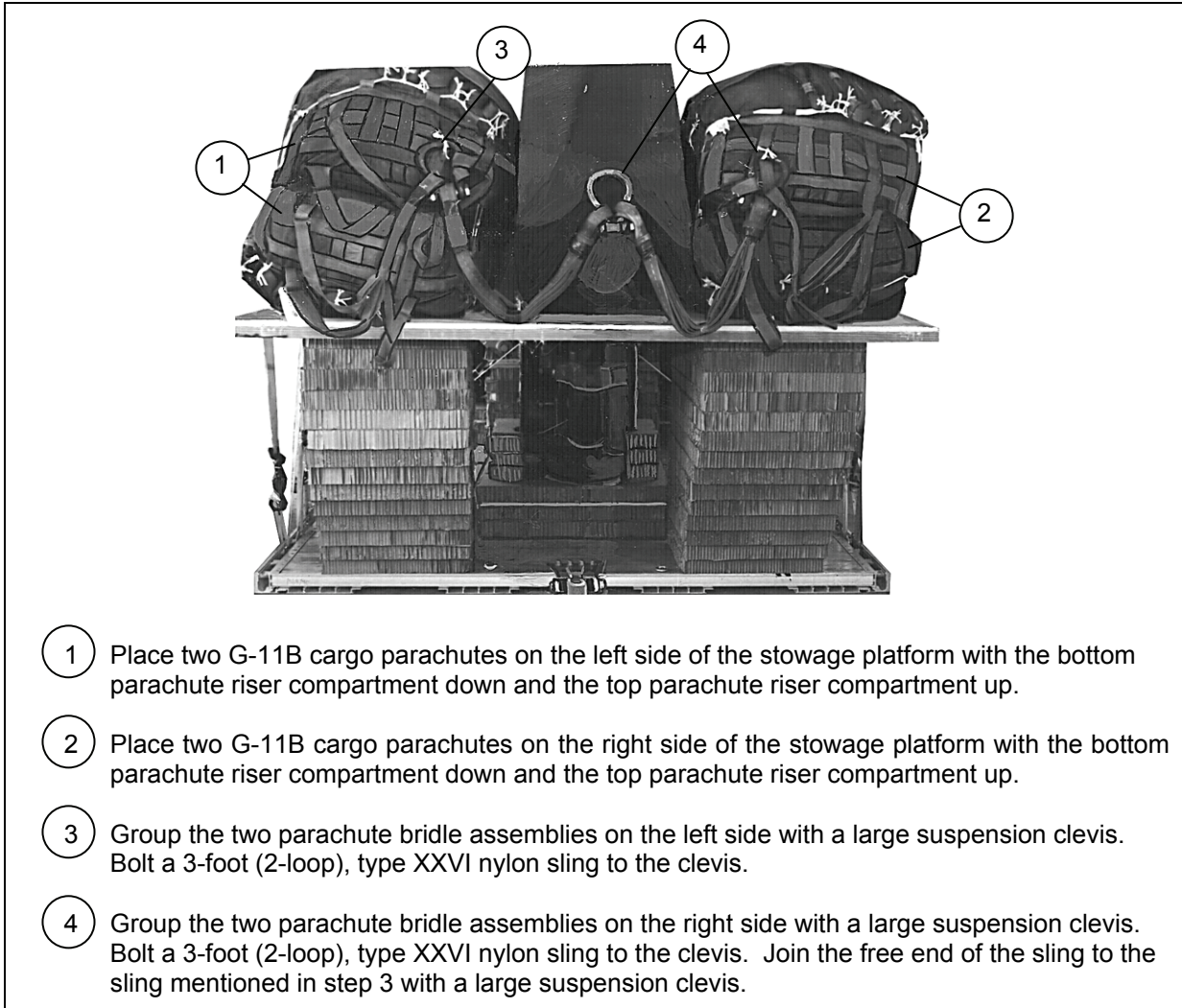
Figure 7-17. Parachute Stowage Platform Built



**Figure 7-18. Parachute Stowage Platform Secured**

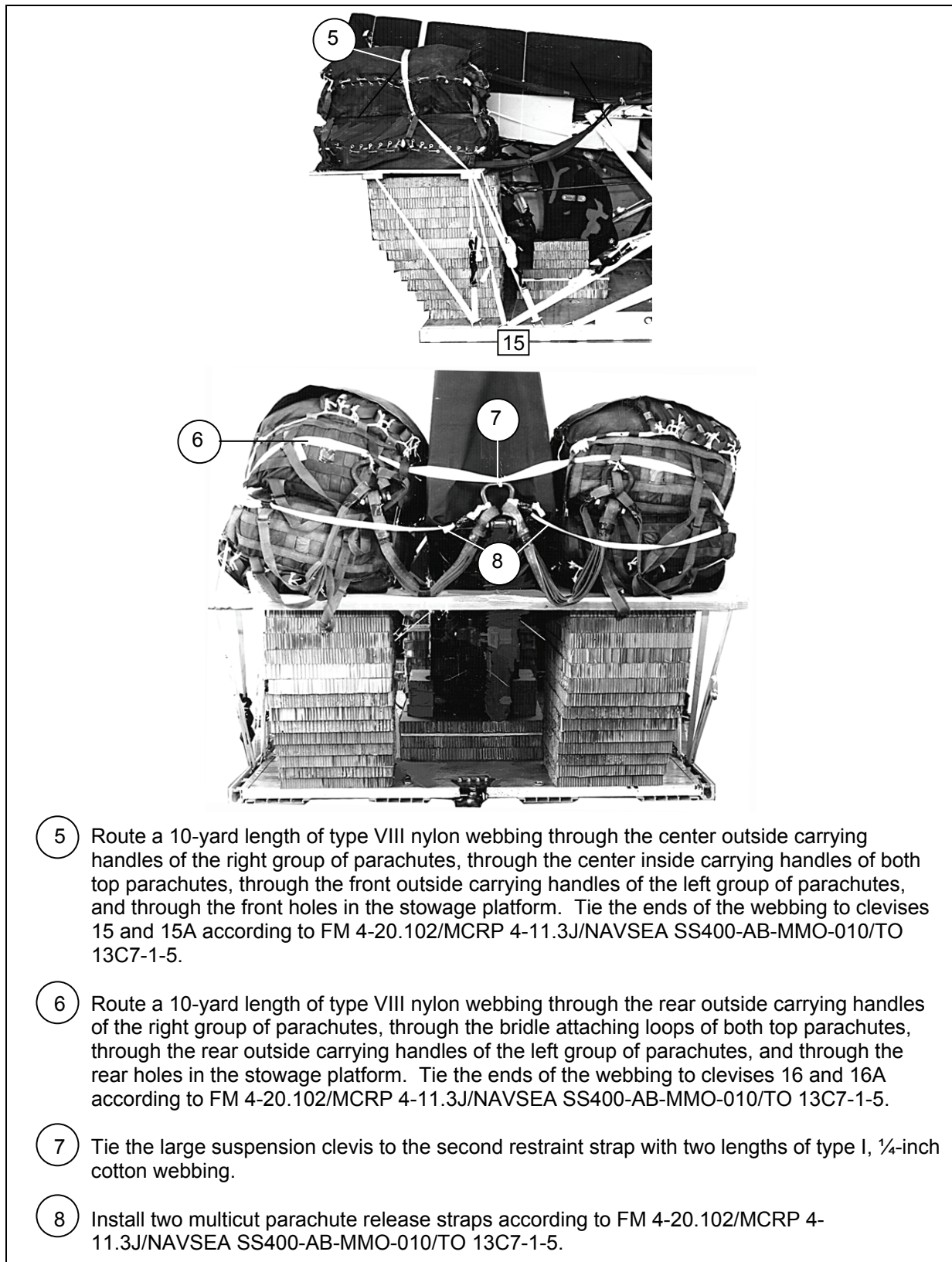
## STOWING CARGO PARACHUTES

7-9. Prepare, stow, and restrain four G-11B cargo parachutes according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figure 7-19.



**Figure 7-19. Cargo Parachutes Positioned and Restrained**





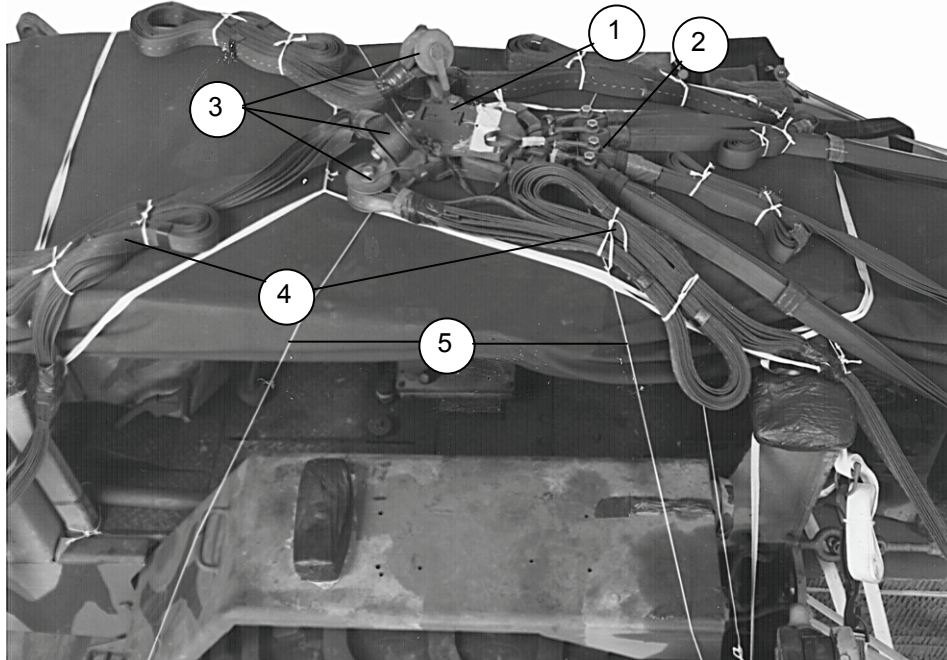
**Figure 7-19. Cargo Parachutes Positioned and Restrained (Continued)**



### Installing Parachute Release System

7-10. Prepare and install an M-2 parachute release system according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figure 7-20.

**Note.** This load requires a 25-foot arming wire lanyard.



- ① Center an M-2 parachute release assembly on the backhoe loader cab.
- ② Attach the parachute riser extensions to the parachute release connectors.

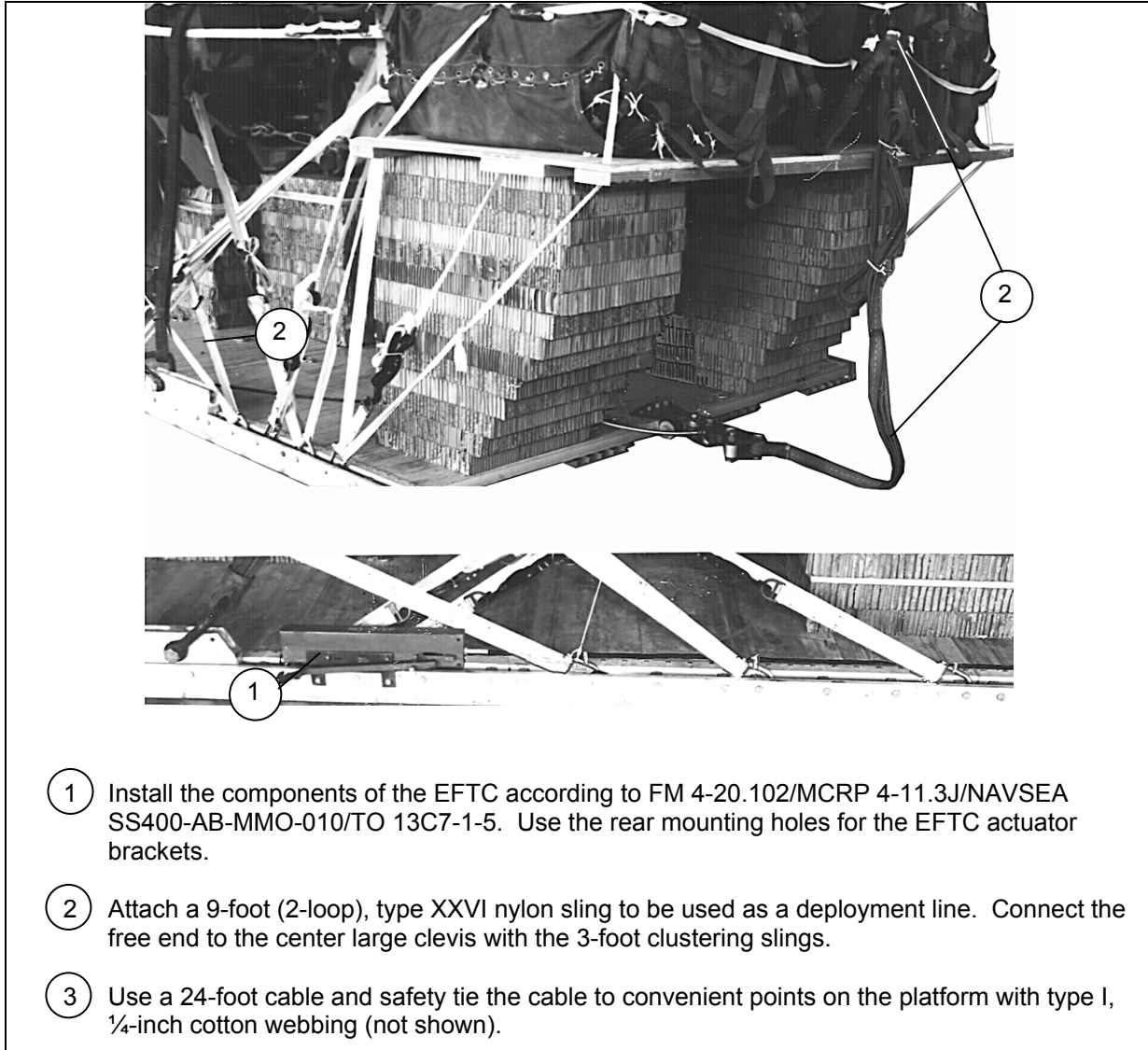
**Note.** The riser extension stows may have to be cut to allow the extensions to reach the release assembly.

- ③ Attach the suspension slings to the lower suspension links.
- ④ Fold suspension slings and safety tie with type I, 1/4-inch cotton webbing
- ⑤ Tie the front and rear M-2 parachute release safety ties to convenient points on the load with type III nylon cord.

**Figure 7-20. M2 Parachute Release Installed**

## INSTALLING EXTRACTION SYSTEM

7-11. Install the extraction system as shown in Figure 7-21.



**Figure 7-21. Extraction System Installed**

## **PLACING EXTRACTION PARACHUTE**

7-12. Select the extraction parachute and extraction line needed using the extraction line requirements table in FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5. Place the extraction parachute and line on the load for installation in the aircraft.

## **INSTALLING PROVISIONS FOR EMERGENCY RESTRAINTS**

7-13. Select and install the provisions for the emergency aft restraints according to the emergency aft restraint requirements table in FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.

## **MARKING RIGGED LOAD**

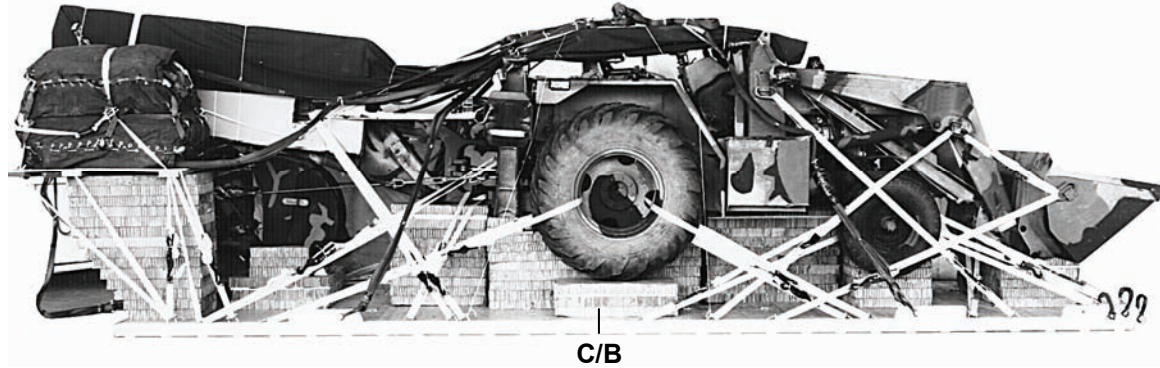
7-14. Mark the rigged load according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5, and as shown in Figure 7-22. Complete Shipper's Declaration for Dangerous Goods. If the load varies from the one shown, the weight, height, CB, and parachute requirements must be recomputed.

## **EQUIPMENT REQUIRED**

7-15. Use the equipment listed in Table 7-1 to rig this load.

**CAUTION**

Make the final rigger inspection required by AR 59-4 and FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 before the load leaves the rigging site.



**RIGGED LOAD DATA**

Weight: Load Shown.....	19,690 pounds
Maximum Load Allowed.....	21,000 pounds
Height.....	95 inches
Width.....	108 inches
Overall Length .....	336 inches
Overhang: Front (bucket).....	14 inches
Rear (dipper stick).....	34 inches
Center of Balance (CB) (from front edge of the platform).....	149 inches

**Figure 7-22. 410 Backhoe Loader Rigged on a 24-Foot, Type V Platform for Low-Velocity Airdrop**

**Table 7-1. Equipment Required for Rigging the 410 Backhoe Loader on a 24-Foot, Type V Platform for Low-Velocity Airdrop**

<i>National Stock Number</i>	<i>Item</i>	<i>Quantity</i>
8040-00-273-8713	Adhesive paste, 1-gal.	As required
4030-00-678-8562	Clevis, suspension, 3/4-inch (medium)	6
4030-00-090-5354	Clevis, suspension, 1-inch (large)	6
4030-00-432-2516	Clevis, screw-pin, large	2
8305-00-880-8155	Cloth, coated (nylon, type II, 17.0 oz, green, 60-in)	As required
4020-00-240-2146	Cord, nylon, type III, 550-lb	As required
1670-00-434-5782	Coupling, airdrop extraction force transfer, w/24-ft. cable	1
8135-00-664-6958	Cushioning material (Cellulose padding)	As required
8305-00-958-3685	Felt, 1/2-inch thick	As required
1670-01-183-2678	Leaf, extraction line (line bag) ( add 2 for C-17)	2
	Line extraction:	
1670-01-062-6313	60-foot (3-loop), type XXVI (for C-130)	1
1670-01-107-7561	140-foot (3-loop), type XXVI (for C-17)	1
1670-01-064-4452	60-foot (1-loop), type XXVI (for C-17), (drogue line)	1
1670-00-783-5988	Link assembly, type IV (C-17 only)	1
	Link assembly, two-point:	
5306-00-435-8994	Bolt, 1-inch diameter, 4-inches long	6
5310-00-232-5165	Nut, 1-inch	6
1670-00-003-1953	Plate, side, 3 3/4 -inch	6
5365-00-007-3414	Spacer, large	6
	Lumber:	
5510-00-220-6146	2- by 4- by 96-inch	2
5510-00-220-6148	2- by 6- by 96-inch	4
5315-00-010-4659	Nail, steel, common, 8D	As required
1670-00-753-3928	Pad, energy-dissipating (honeycomb)	30 sheets
1670-01-016-7841	Parachute, cargo, G-11B	4
	Parachute, cargo, extraction:	
1670-00-040-8135	28-foot	1
1670-01-063-3715	15-foot (C-17 only)	1
	Platform, airdrop, type V, 24 foot:	
1670-01-162-2372	Clevis assembly (type V)	32
1670-01-162-2376	Extraction bracket assembly	1
1670-01-247-2389	Link, suspension bracket, type V	4
1670-01-162-2381	Tandem link assembly (Multipurpose link)	2
5530-00-128-4981	Plywood, 3/4-inch	5 Sheets

**Table 7-1. Equipment Required for Rigging the 410 Backhoe Loader on a 24-Foot, Type V Platform for Low-Velocity Airdrop (Continued)**

<i>National Stock Number</i>	<i>Item</i>	<i>Quantity</i>
1670-01-097-8817	Release, cargo parachute, M-2	1
	Sling, cargo, airdrop:	
1670-01-062-6301	3-foot (2-loop), type XXVI	2
1670-01-062-6306	3-foot (4-loop), type XXVI	2
1670-01-062-6304	9-foot (2-loop), type XXVI	4
1670-01-062-6307	12-foot (4-loop), type XXVI	2
1670-01-062-6308	16-foot (4-loop), type XXVI	2
1670-01-062-6313	60-foot (3-loop), type XXVI	4
1670-01-062-6312	120-foot (2-loop), type XXVI	5
5340-00-040-8219	Strap, parachute, release, multi-knife	2
7501-00-266-5016	Tape, adhesive, 2-inch	As required
1670-00-937-0271	Tiedown assembly, 15-foot	44
1670-01-483-8259	Link, Parachute, Connector (H-block) (C-17 only)	1
	Webbing:	
8305-00-268-2411	Cotton, 1/4-inch, type I	As required
8305-00-082-5752	Nylon, tubular, 1/2-inch	As required
8305-00-261-8585	Nylon, type VIII	As required

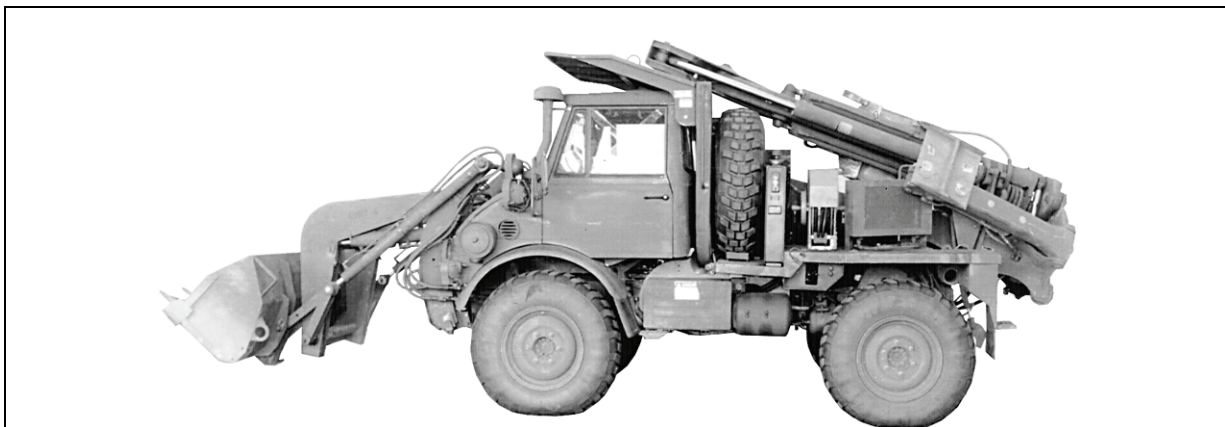


## Chapter 8

# Rigging the Small Emplacement Excavator (SEE) on a 28-Foot, Type V Platform for Low-Velocity Airdrop

### DESCRIPTION OF THE LOAD

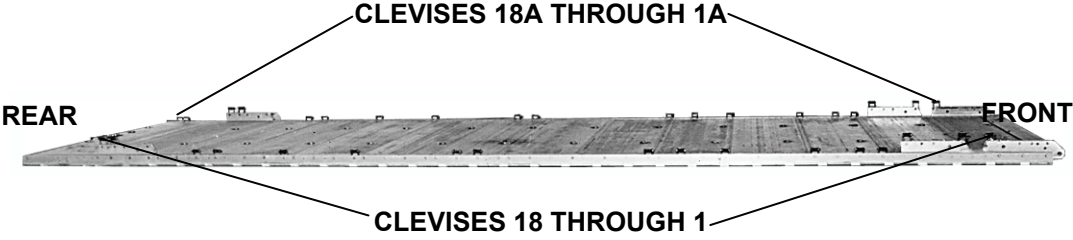
8-1. The SEE (Figure 8-1) is rigged on a 28-foot, type V airdrop platform using five G-11C cargo parachutes. The SEE is 102 inches high (reducible to 91-inches), 95 inches wide, 261 inches long but the rigging length of the vehicle is 374 inches, and weighs 15,944 pounds with  $\frac{3}{4}$  tank of fuel.



**Figure 8-1. Small Emplacement Excavator (SEE)**

## PREPARING PLATFORM

8-2. Prepare a 28-foot, type V airdrop platform as shown in Figure 8-2.



The diagram shows a top-down view of a long, narrow, V-shaped airdrop platform. The left end is labeled 'REAR' and the right end is labeled 'FRONT'. Two lines from the top center point to the rear and front ends, with the label 'CLEAVISES 18A THROUGH 1A' above them. Two lines from the bottom center point to the rear and front ends, with the label 'CLEAVISES 18 THROUGH 1' below them. The platform surface is covered with numerous small rectangular components, likely tie-down rings or clevises, arranged in a regular pattern.

**Step:**

1. Inspect, or assemble and inspect, a 28-foot, type V airdrop platform as outlined in TM 10-1670-268-20&P/TO 13C7-52-22.
2. Install a tandem link to the front of each platform side rail using holes 1, 2, and 3.
3. Install a suspension link to the right and left platform side rails using holes 5, 6, and 7.
4. Install a suspension link to the right and left platform side rails using holes 49, 50, and 51.
5. Install a clevis on bushing 4 of each tandem link.
6. Install a clevis on bushings 1 and 4 of each front suspension link.
7. Install a clevis on bushings 3 and 4 of each rear suspension link.
8. Starting at the front of each platform side rail, install clevises on the bushings bolted to holes 9, 10, 12, 17, 19, 21, 30, 31, 37, 41, 45, 46 and 55.
9. Starting at the front of the platform, number the clevises 1 through 18 on the right side and 1A through 18A on the left side
10. Label the tiedown rings according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.

**Figure 8-2. Platform Prepared**

## BUILDING AND POSITIONING HONEYCOMB STACKS

8-3. Build the honeycomb stacks as shown in Figures 8-3 through 8-11. Position the stacks as shown in Figure 8-18.

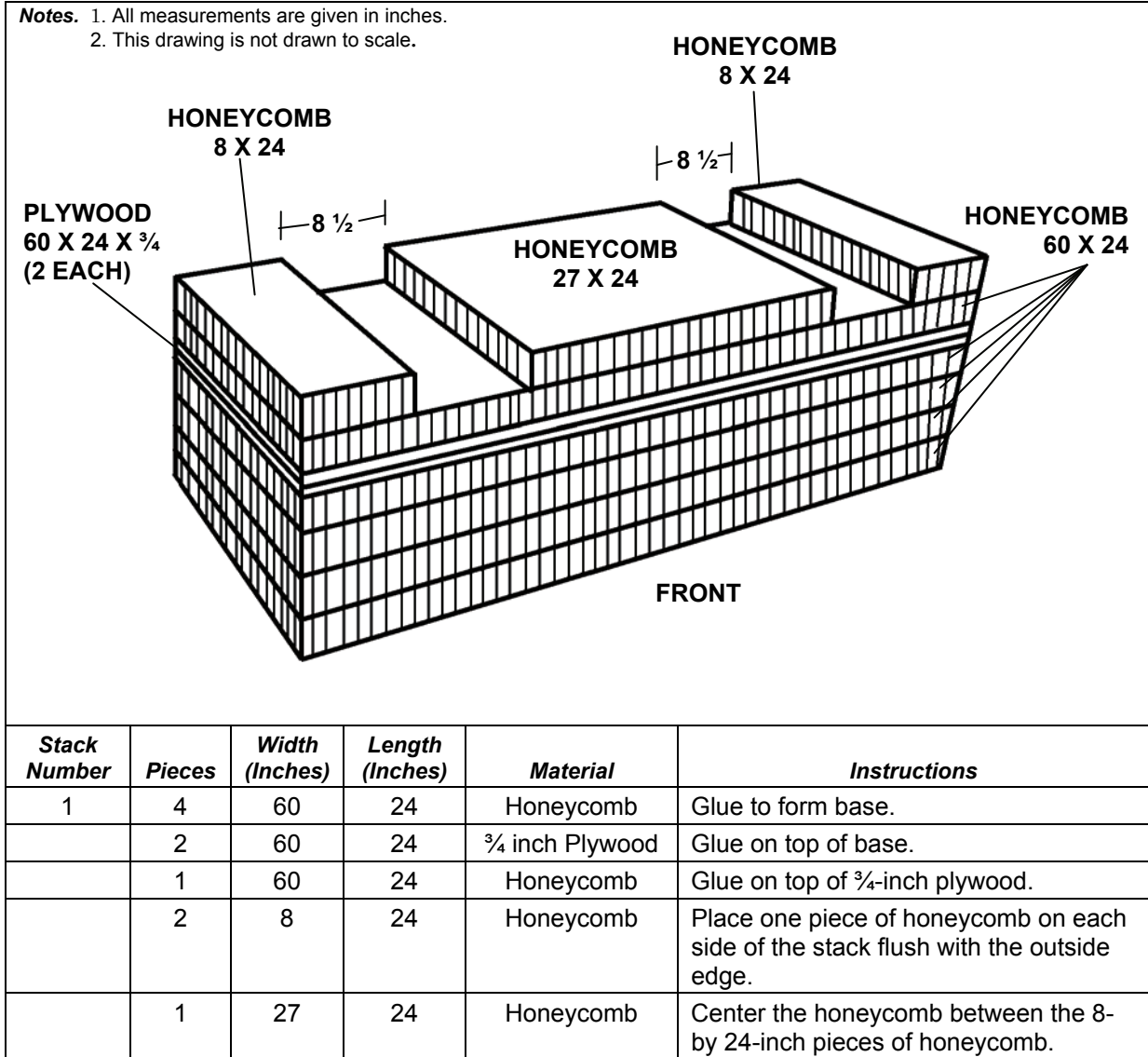
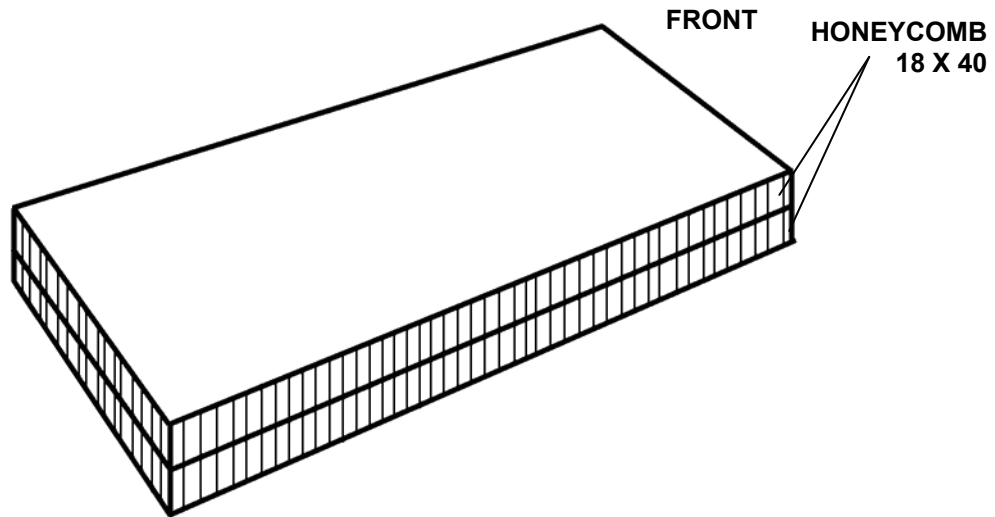


Figure 8-3. Honeycomb Stack 1 Prepared

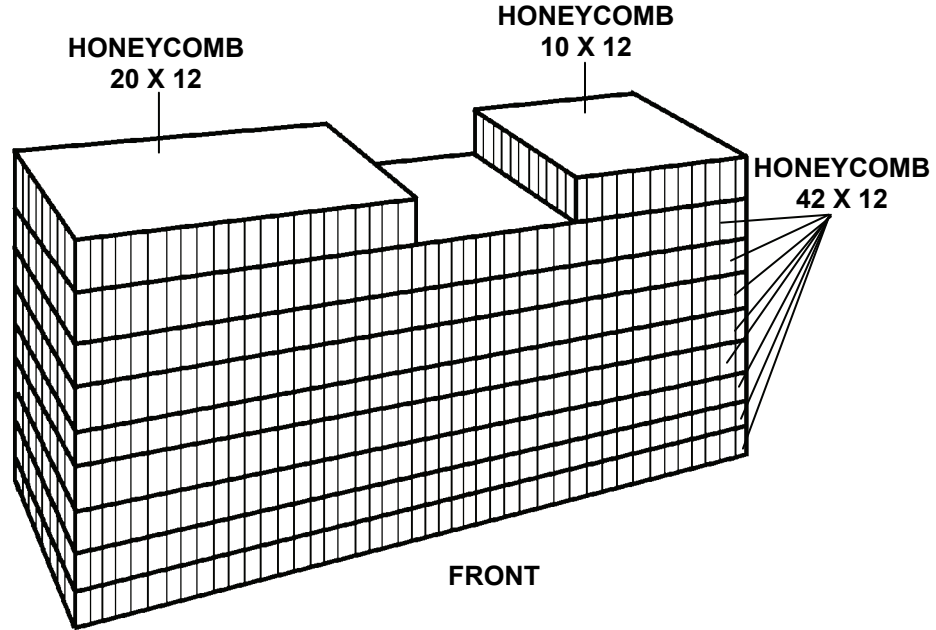
- Notes.** 1. All measurements are given in inches.  
 2. This drawing is not drawn to scale.



<b>Stack Numbers</b>	<b>Pieces</b>	<b>Width (Inches)</b>	<b>Length (Inches)</b>	<b>Material</b>	<b>Instructions</b>
2	2	18	40	Honeycomb	Glue to form stack.
4	2	18	40	Honeycomb	Glue to form stack.
6	2	18	40	Honeycomb	Glue to form stack.
8	2	18	40	Honeycomb	Glue to form stack.

**Figure 8-4. Honeycomb Stacks 2, 4, 6, and 8 Prepared**

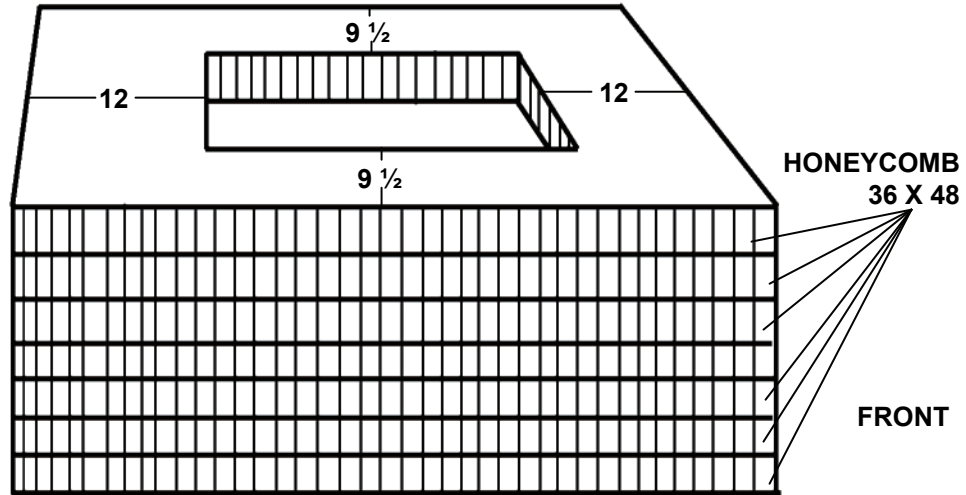
**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



<i>Stack Number</i>	<i>Pieces</i>	<i>Width (Inches)</i>	<i>Length (Inches)</i>	<i>Material</i>	<i>Instructions</i>
3	8	42	12	Honeycomb	Glue to form a base.
	1	10	12	Honeycomb	Glue honeycomb flush with left side of base.
	1	20	12	Honeycomb	Glue honeycomb flush with right side of base

**Figure 8-5. Honeycomb Stack 3 Prepared**

- Notes.** 1. All measurements are given in inches.  
 2. This drawing is not drawn to scale.

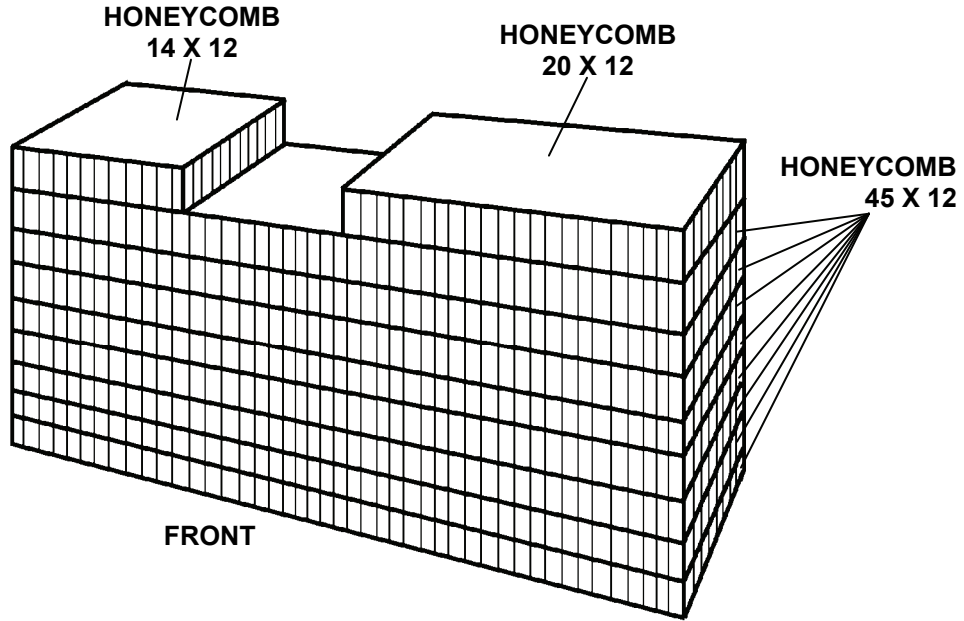


<b>Stack Number</b>	<b>Pieces</b>	<b>Width (Inches)</b>	<b>Length (Inches)</b>	<b>Material</b>	<b>Instructions</b>
5	6	36	48	Honeycomb	Glue to form a base.
	1	36	48	Honeycomb	Center a 17- by 24-inch cutout in honeycomb and glue on top of base.

**Figure 8-6. Honeycomb Stack 5 Prepared**



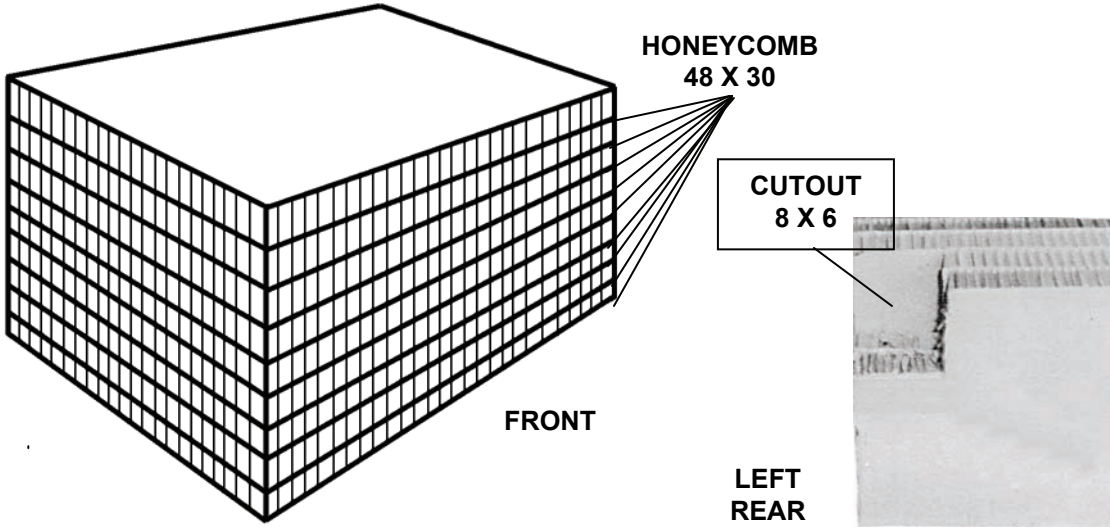
**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



<i>Stack Number</i>	<i>Pieces</i>	<i>Width (Inches)</i>	<i>Length (Inches)</i>	<i>Material</i>	<i>Instructions</i>
7	8	45	12	Honeycomb	Glue to form a base.
	1	14	12	Honeycomb	Glue honeycomb flush with right side of base.
	1	20	12	Honeycomb	Glue honeycomb flush with left side of base

**Figure 8-7. Honeycomb Stack 7 Prepared**

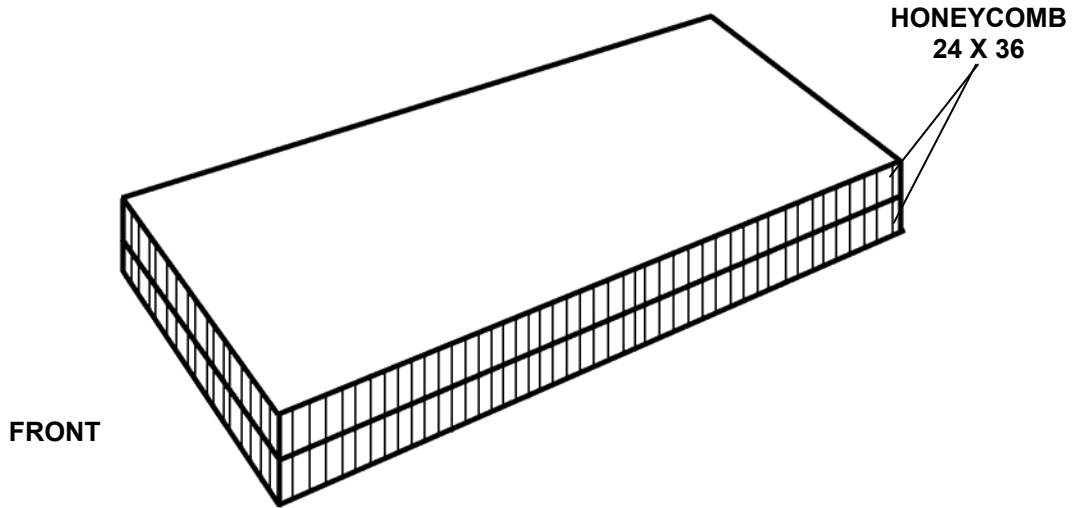
**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



<i>Stack Number</i>	<i>Pieces</i>	<i>Width (Inches)</i>	<i>Length (Inches)</i>	<i>Material</i>	<i>Instructions</i>
9	2	48	30	Honeycomb	Make an 8-inch wide by 6-inch long cutout on the left rear corner. Glue pieces together to form a base.
	7	48	30	Honeycomb	Glue on top of base.

**Figure 8-8. Honeycomb Stack 9 Prepared**

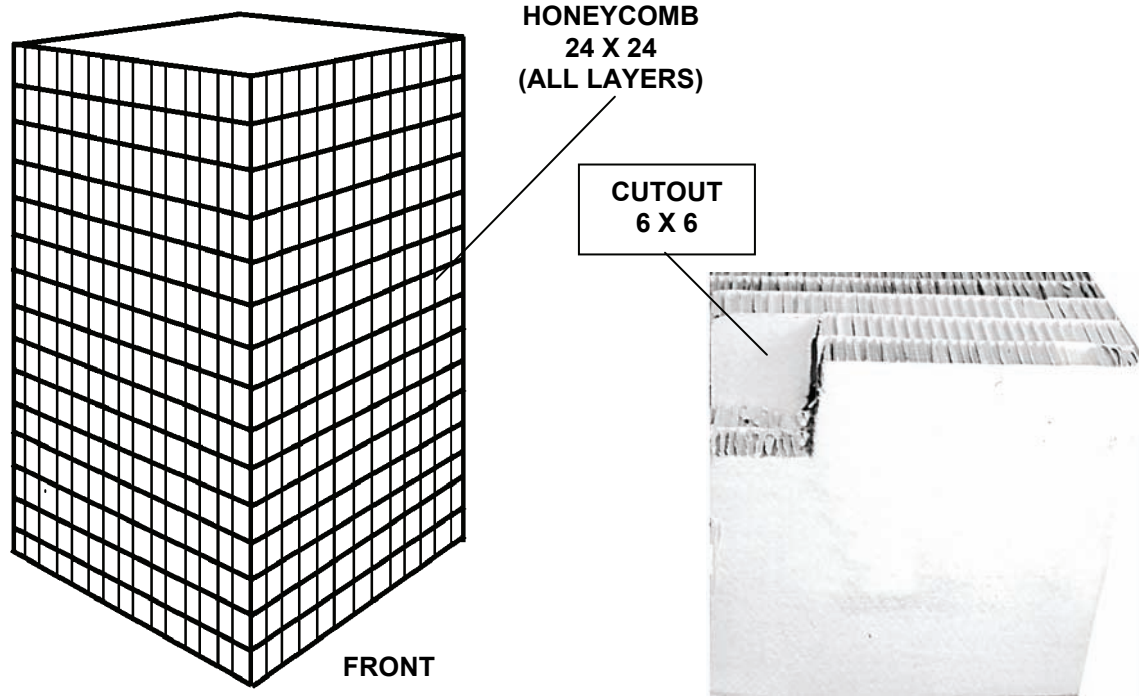
**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



<b>Stack Number</b>	<b>Pieces</b>	<b>Width (Inches)</b>	<b>Length (Inches)</b>	<b>Material</b>	<b>Instructions</b>
10	2	24	36	Honeycomb	Glue to form a stack.

**Figure 8-9. Honeycomb Stack 10 Prepared**

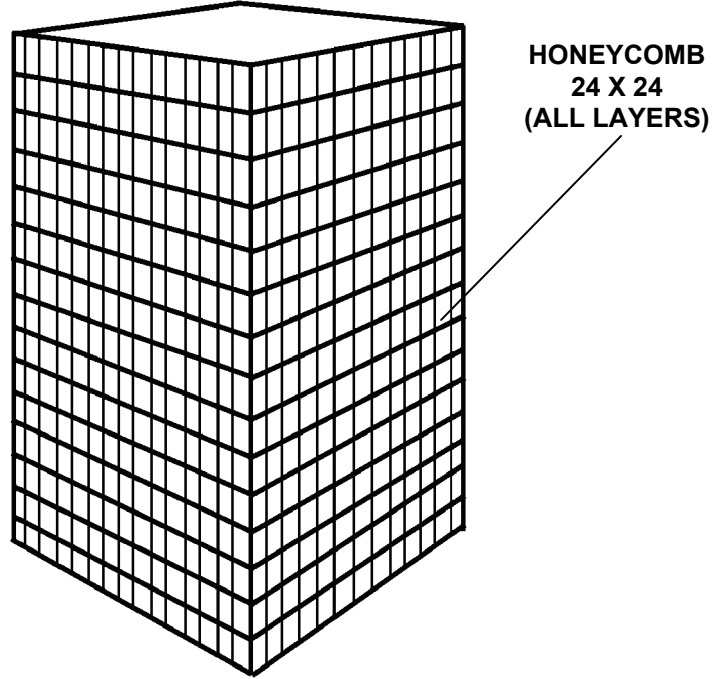
**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



<i>Stack Number</i>	<i>Pieces</i>	<i>Width (Inches)</i>	<i>Length (Inches)</i>	<i>Material</i>	<i>Instructions</i>
11	2	24	24	Honeycomb	Make a 6-inch wide by 6-inch long cutout on the left rear corner. Glue pieces together to form a base.
	13	24	24	Honeycomb	Glue on top of base.

**Figure 8-10. Honeycomb Stack 11 Prepared**

**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



<i>Stack Number</i>	<i>Pieces</i>	<i>Width (Inches)</i>	<i>Length (Inches)</i>	<i>Material</i>	<i>Instructions</i>
12	15	24	24	Honeycomb	Glue pieces together to form a stack.

**Figure 8-11. Honeycomb Stack 12 Prepared**

## BUILDING AND POSITIONING LOAD SPREADERS

8-4. The SEE can be rigged with either the bucket or the tamper installed. If the bucket is installed, build a load spreader for honeycomb stack 10 as shown in Figures 8-12 and 8-13. If the tamper is installed, build a load spreader for honeycomb stack 10 as shown in Figures 8-14 and 8-15. Build the center frame load spreader as shown in Figures 8-16 and 8-17. Position the load spreaders as shown in Figure 8-19.

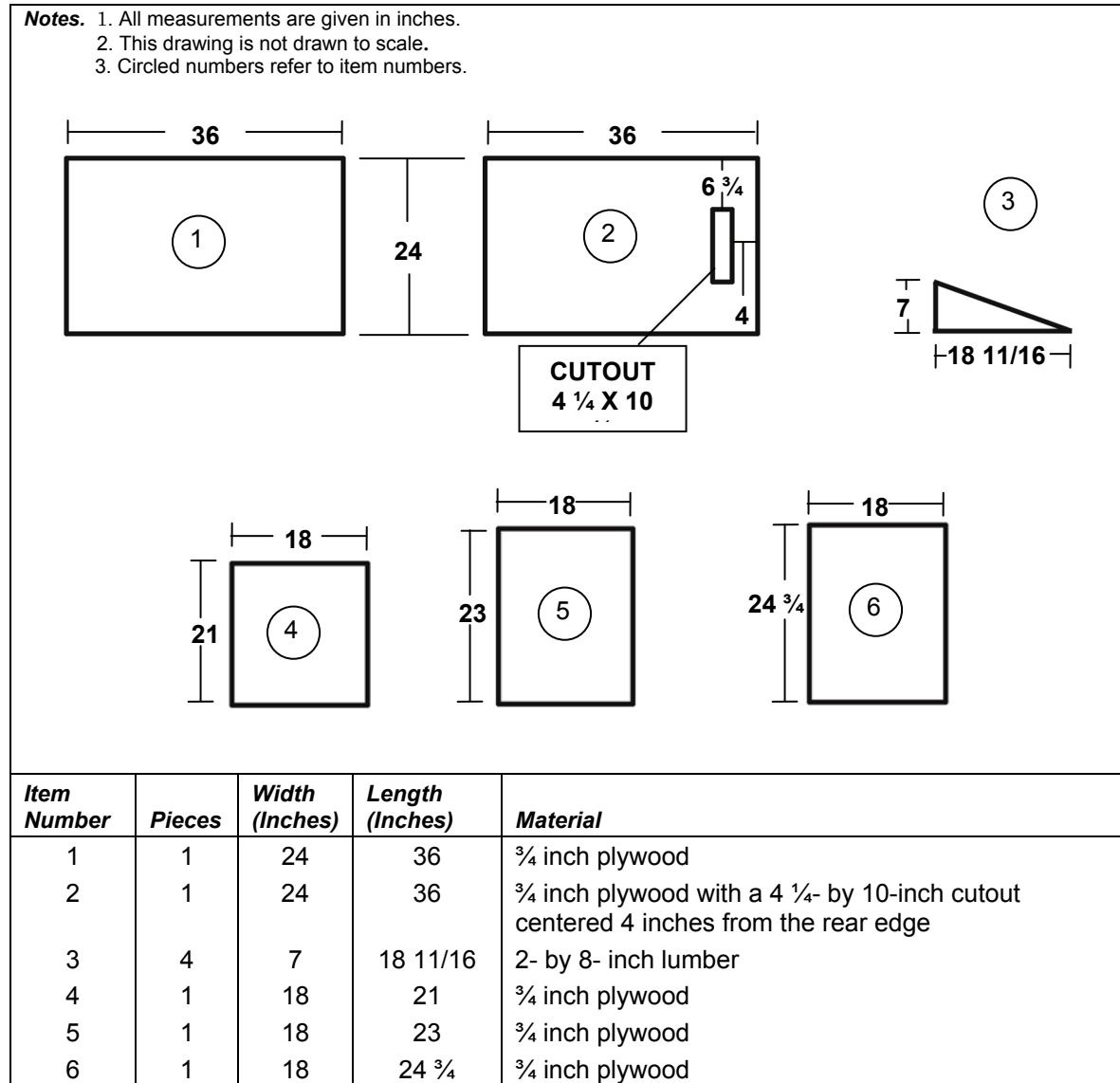
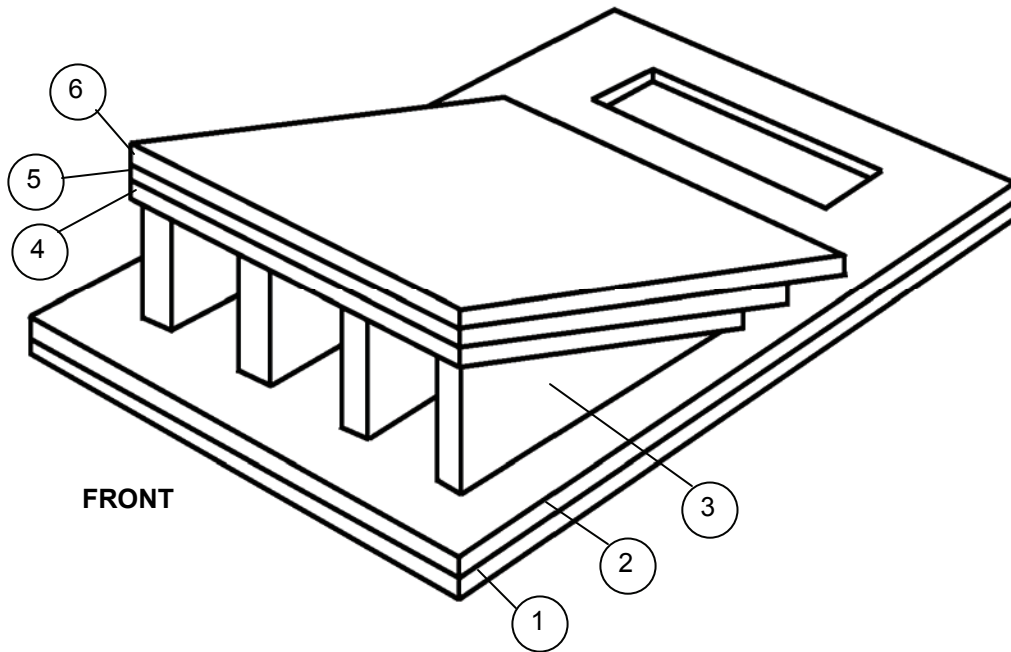


Figure 8-12. Materials Required to Build the Load Spreader for Bucket Installation



**Notes.** 1. This drawing is not drawn to scale.

2. Circled numbers refer to item numbers in Figure 8-12.

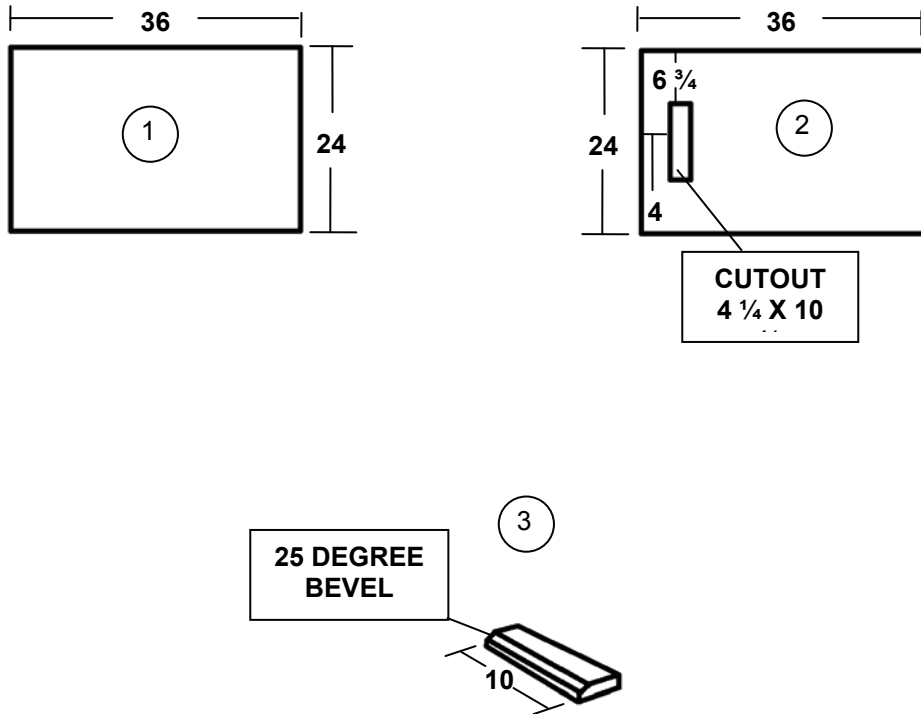


**Step:**

1. Build the load spreader as shown using the materials given in Figure 8-12.
2. Secure the lumber and plywood in place as shown with 4d nails.

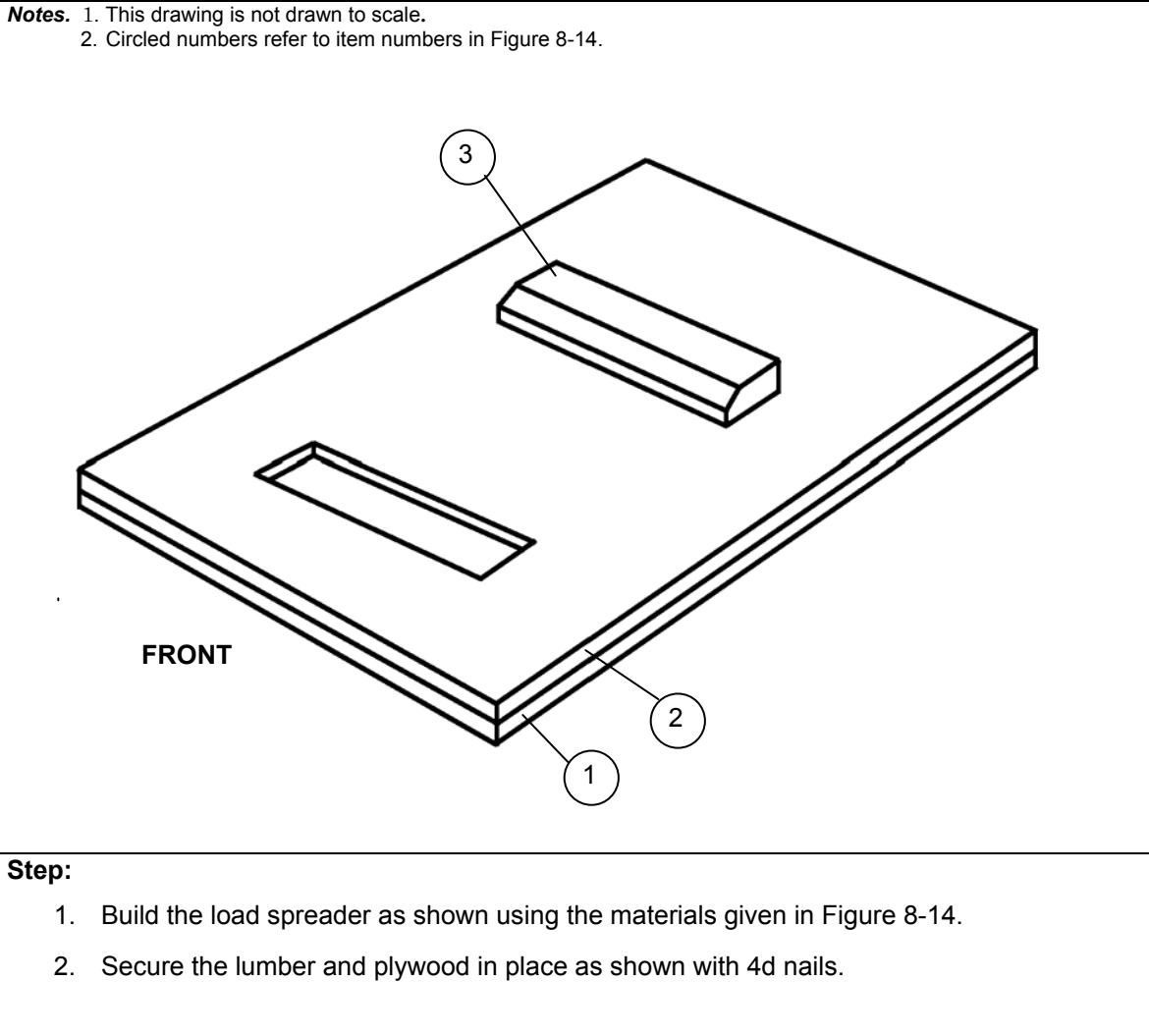
**Figure 8-13. Load Spreader Built for Bucket Installation**

- Notes.** 1. All measurements are given in inches.  
 2. This drawing is not drawn to scale.  
 3. Circled numbers refer to item numbers.



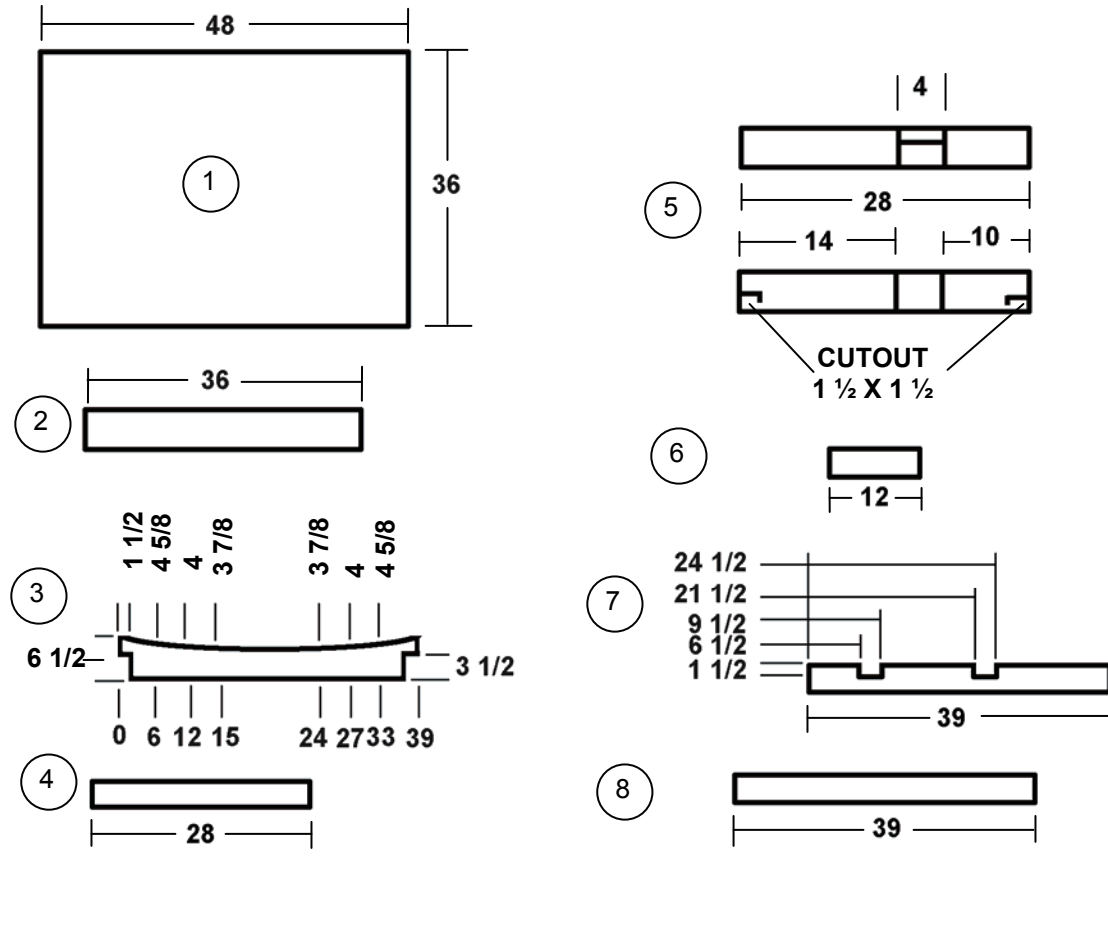
Item Number	Pieces	Width (Inches)	Length (Inches)	Material
1	1	24	36	3/4 inch plywood
2	1	24	36	3/4 inch plywood with a 4 1/4- by 10-inch cutout centered 4 inches from the rear edge
3	1	4	10	2- by 4- inch lumber with a 25 degree bevel on rear edge

Figure 8-14. Materials Required to Build the Load Spreader for Tamper Installation



**Figure 8-15. Load Spreader Built for Tamper Installation**

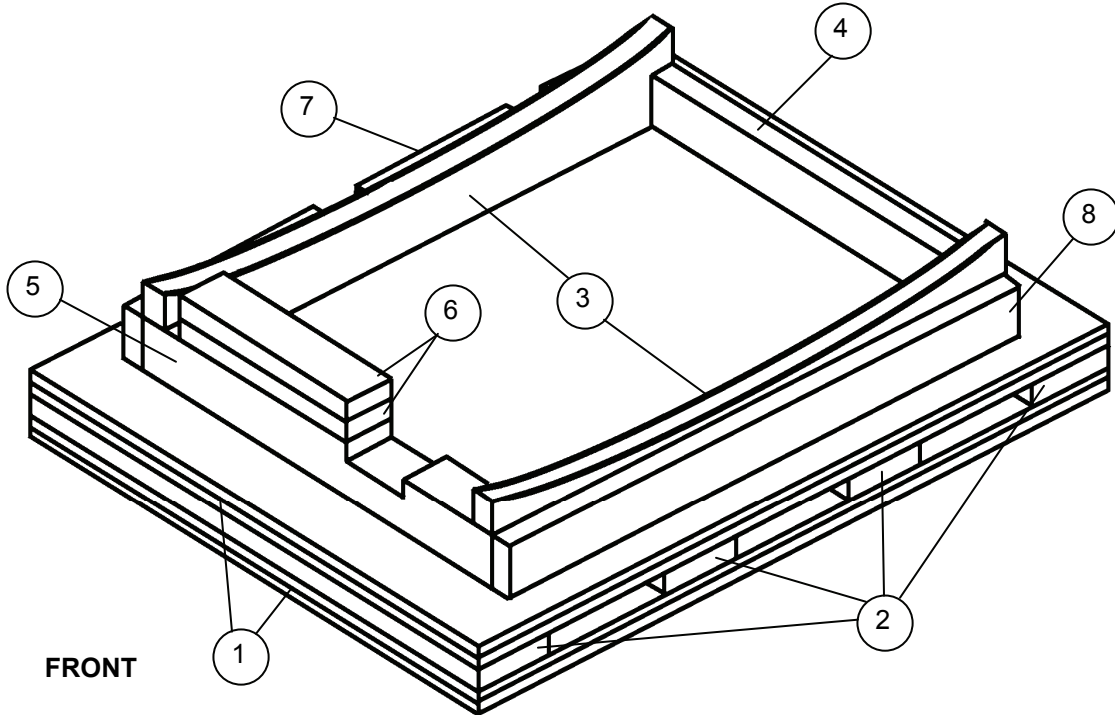
- Notes.** 1. All measurements are given in inches.  
 2. This drawing is not drawn to scale.  
 3. Circled numbers refer to item numbers.



Item Number	Pieces	Width (Inches)	Length (Inches)	Material
1	4	36	48	3/4 inch plywood
2	4	6	36	2- by 6-inch lumber
3	2	8	39	2- by 8- inch lumber
4	1	4	28	2- by 4-inch lumber
5	1	4	28	4- by 4-inch lumber
6	2	4	12	2- by 4-inch lumber
7	1	4	39	2- by 4-inch lumber
8	1	4	39	2- by 4-inch lumber

Figure 8-16. Materials Required to Build the Center Frame Load Spreader

**Notes.** 1. This drawing is not drawn to scale.  
2. Circled numbers refer to item numbers in Figure 8-14.



**Step:**

1. Build the load spreader as shown using the materials given in Figure 8-16.
2. Secure the lumber and plywood in place as shown with 4d nails.

**Figure 8-17. Center Frame Load Spreader Built**

- Notes.** 1. All measurements are given in inches.  
 2. This drawing is not drawn to scale.

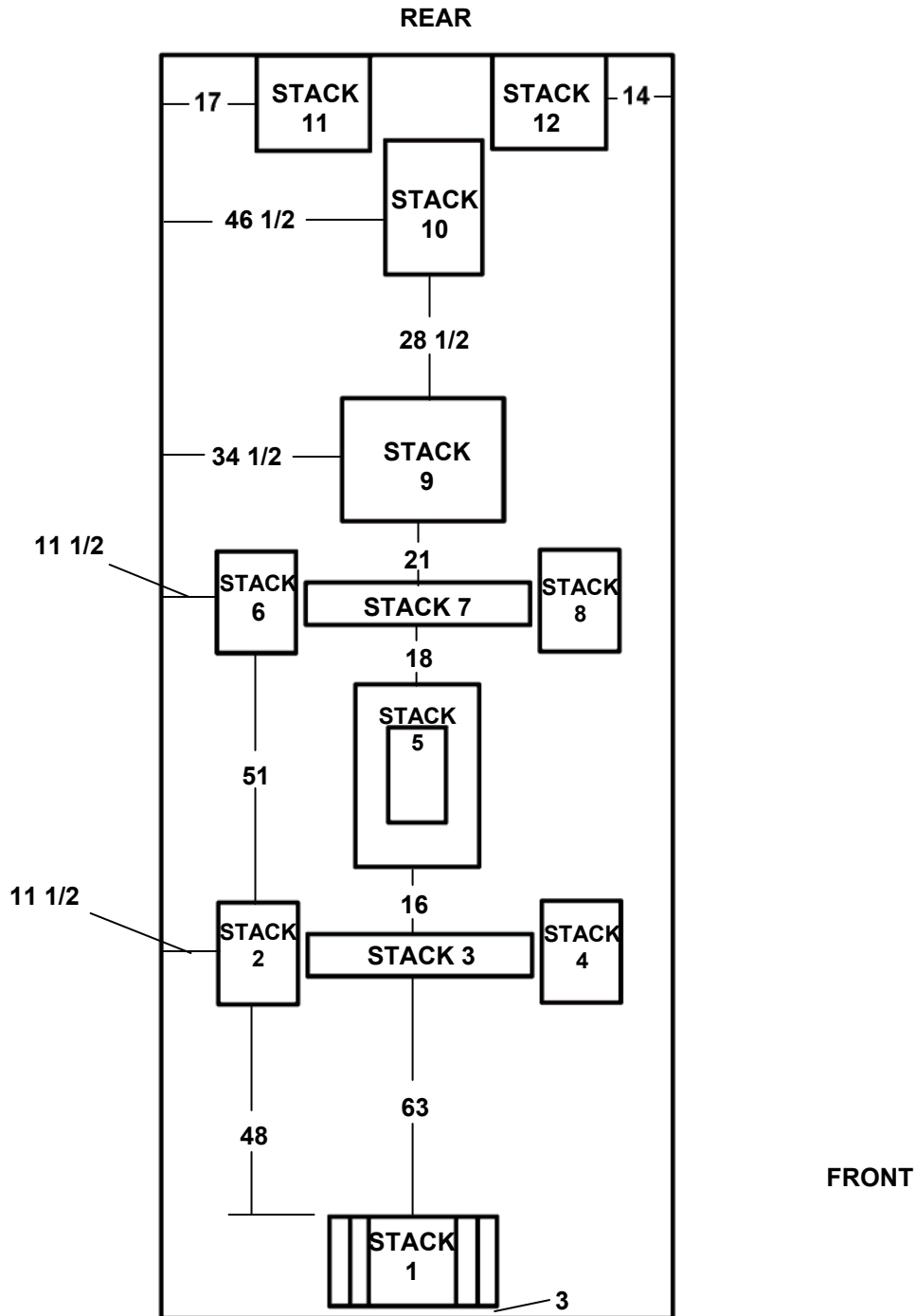
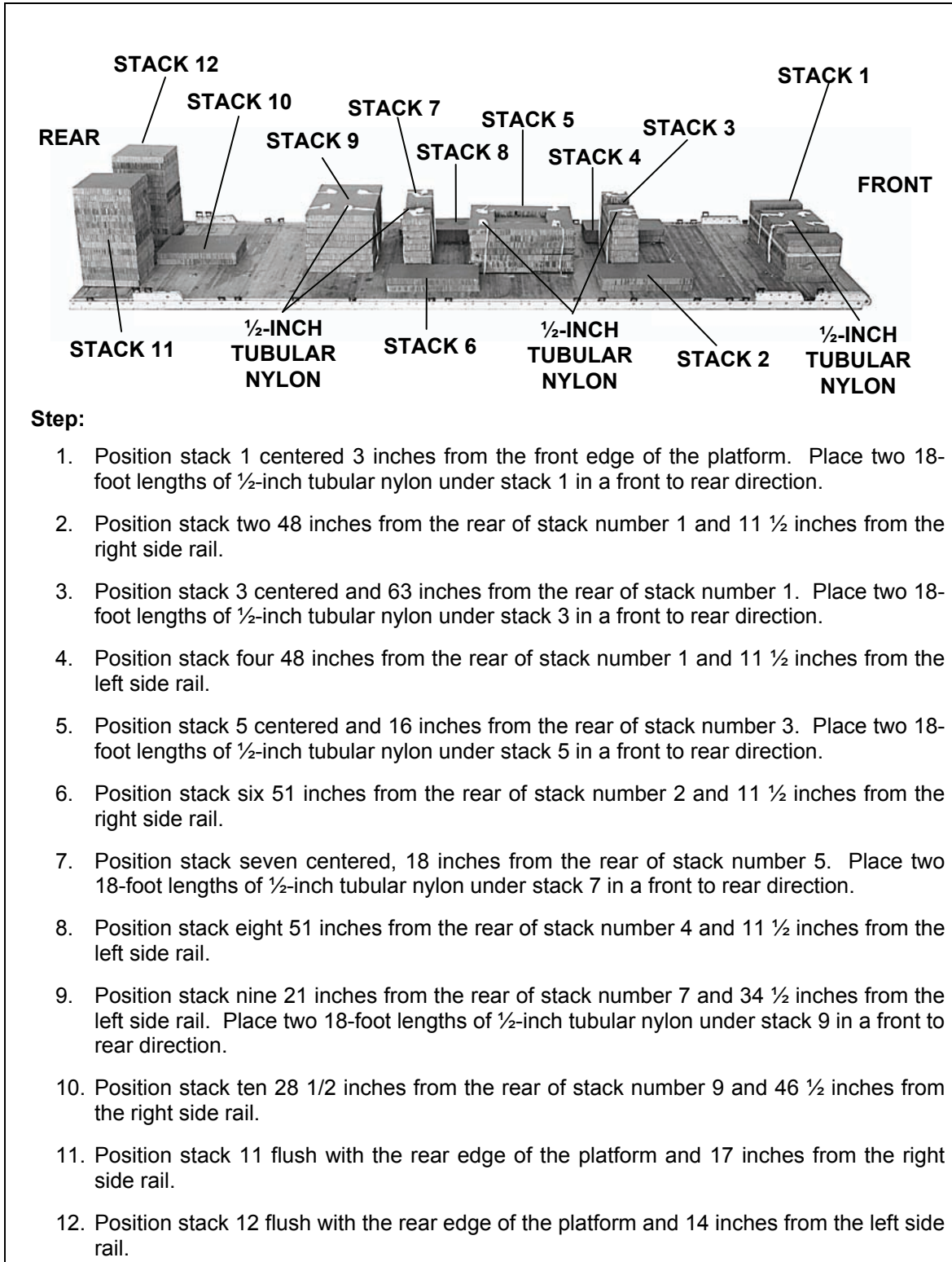
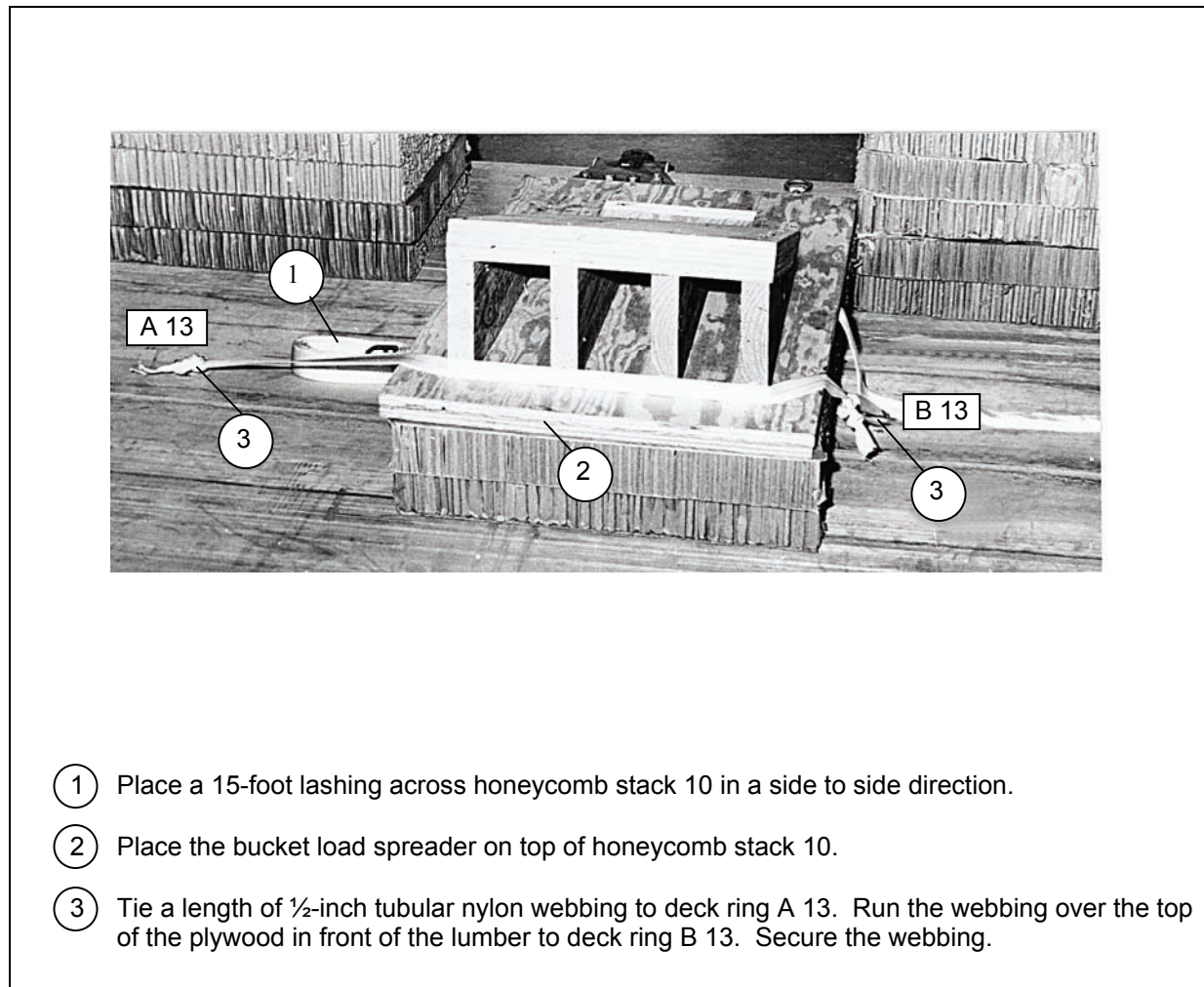


Figure 8-18. Honeycomb Stacks Positioned on Platform





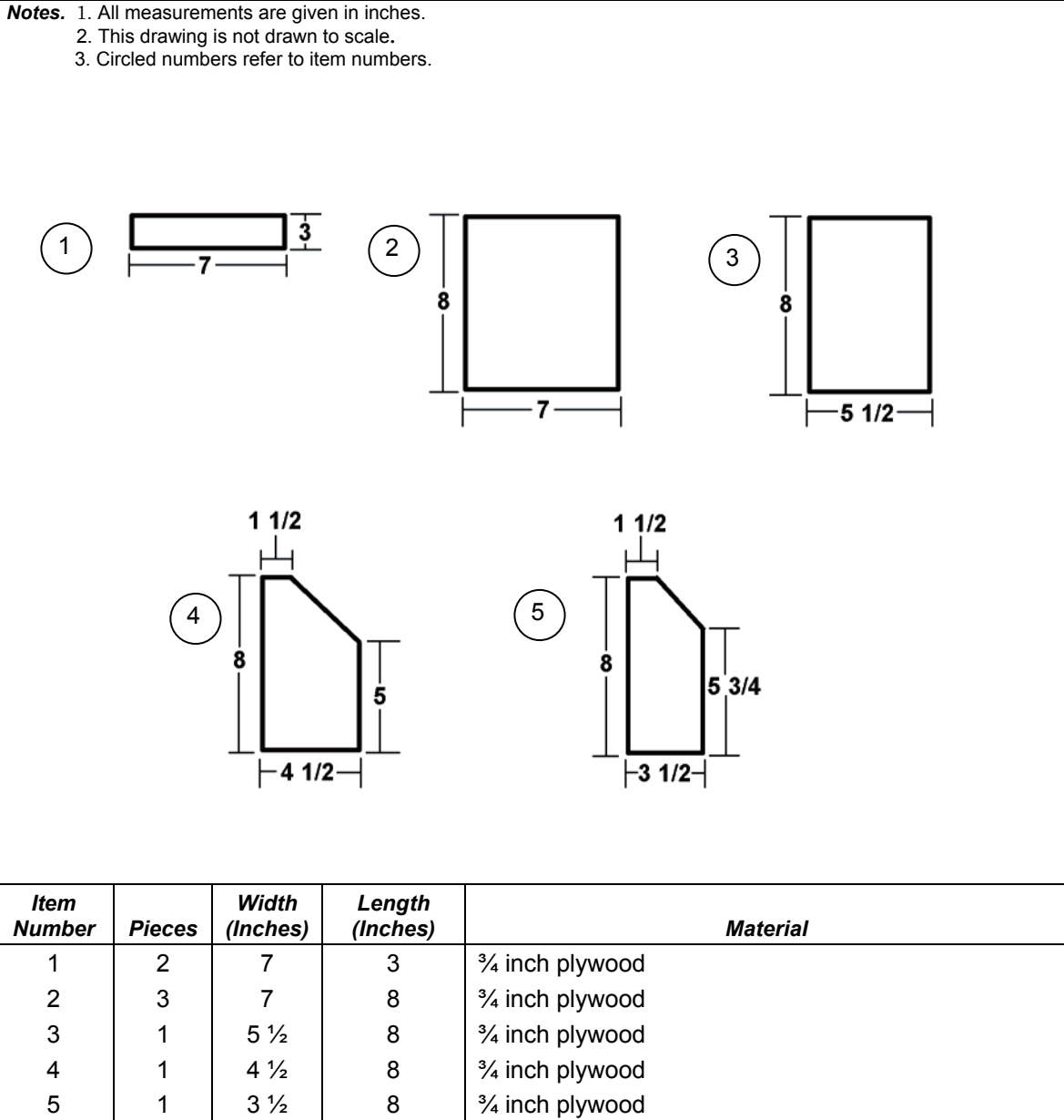
**Figure 8-18. Honeycomb Stacks Positioned on Platform (Continued)**



**Figure 8-19. Bucket Load Spreader Positioned on Platform**

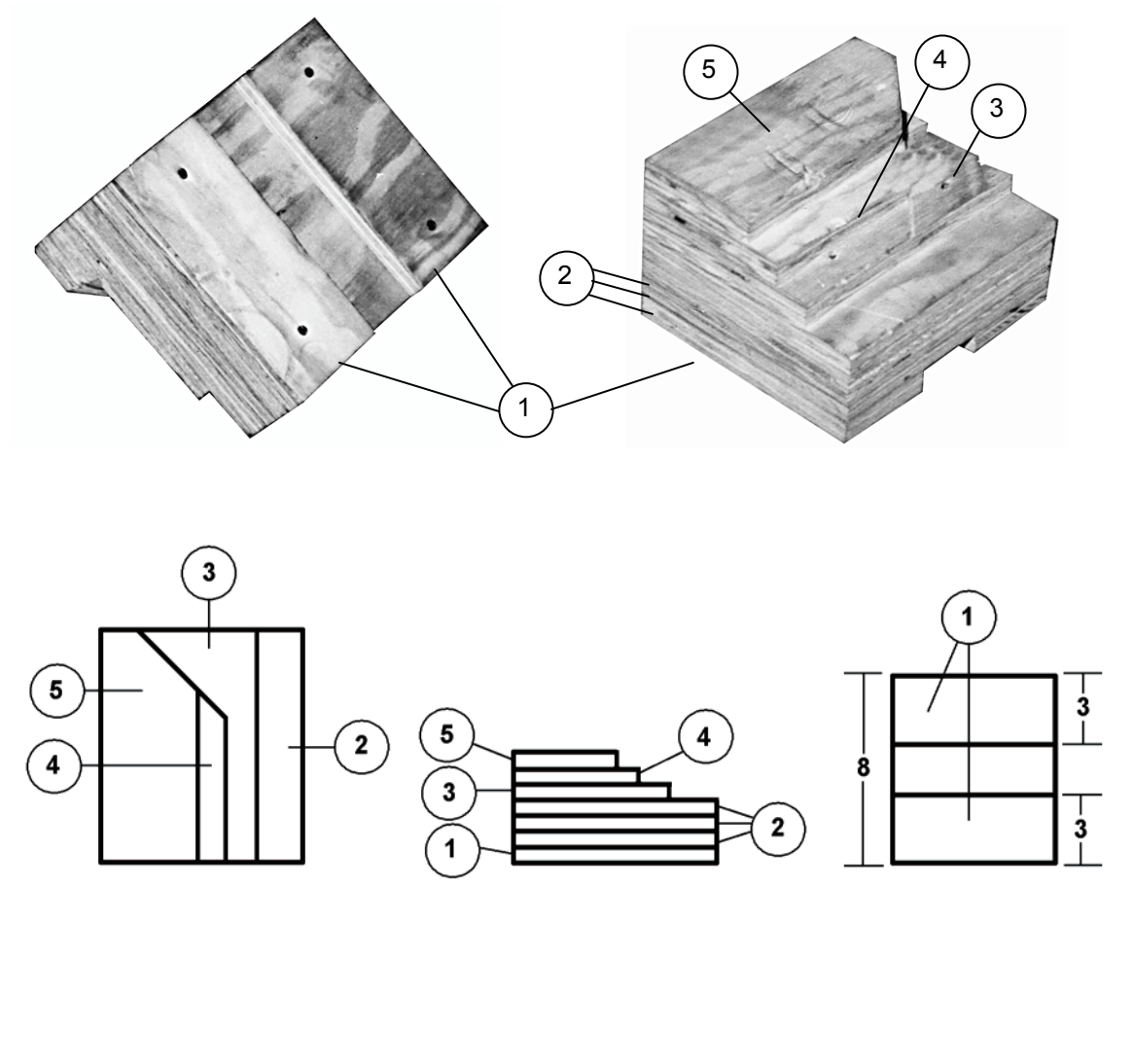
## BUILDING THE BELL HOUSING SUPPORT BLOCK

8-5. Build the bell housing support block as shown in Figures 8-20 and 8-21.



**Figure 8-20. Materials Required to Build the Bell Housing Support Block**

- Notes.** 1. This drawing is not drawn to scale.  
 2. Circled numbers refer to item numbers in Figure 8-20  
 3. The bell housing support block is positioned during the vehicle preparation.



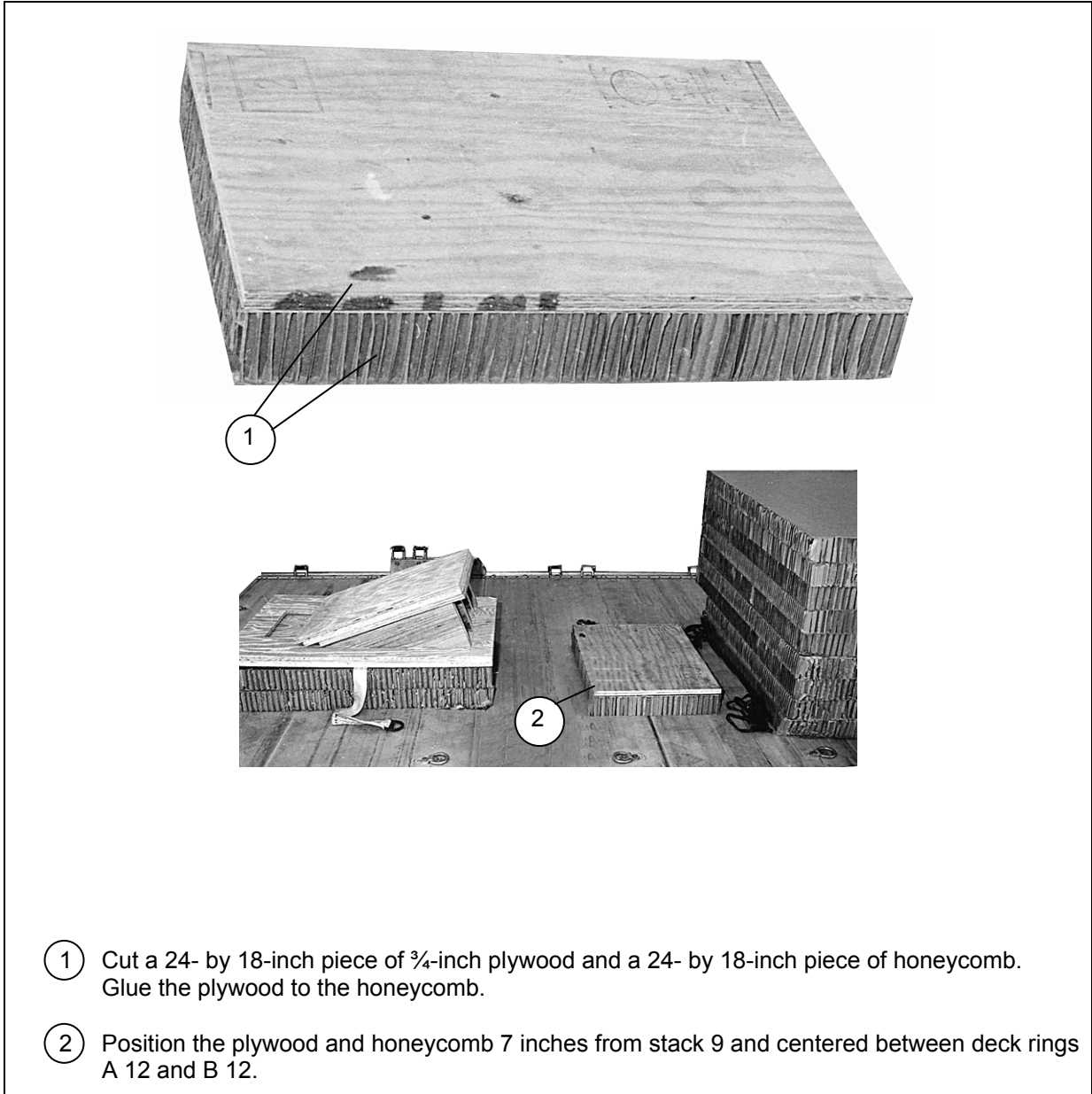
**Step:**

1. Build the bell housing support block as shown using the materials given in Figure 8-20.
2. Secure the plywood in place as shown with 4d nails.

**Figure 8-21. Bell Housing Support Block Built**

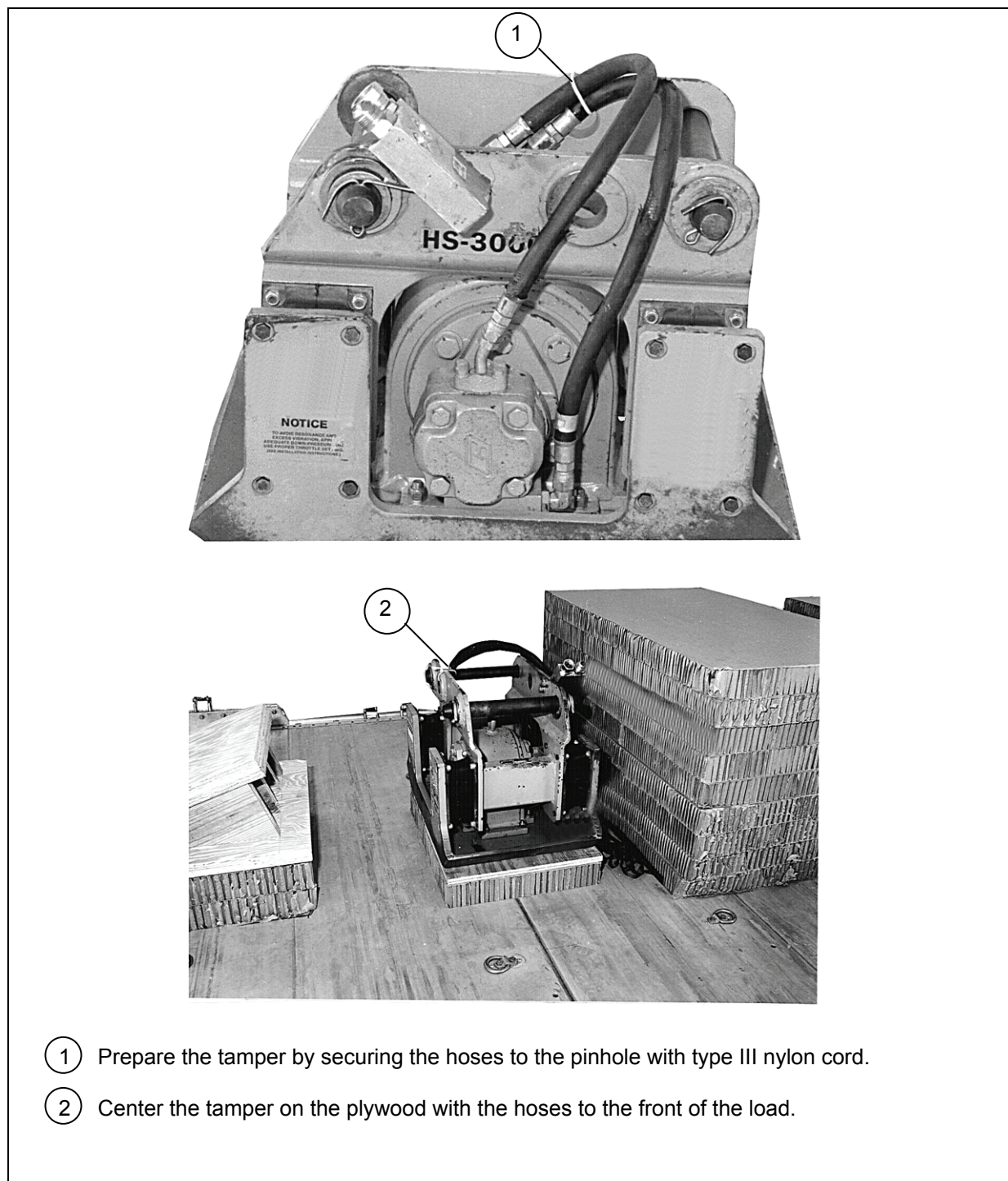
## **RIGGING THE TAMPER AS AN ACCOMPANYING LOAD**

8-6. The procedures shown in Figures 8-22 through 8-24 deal with rigging the tamper as an accompanying load with the SEE on a 28-foot , type V platform.



**Figure 8-22. Honeycomb Stack Prepared and Positioned on Platform**

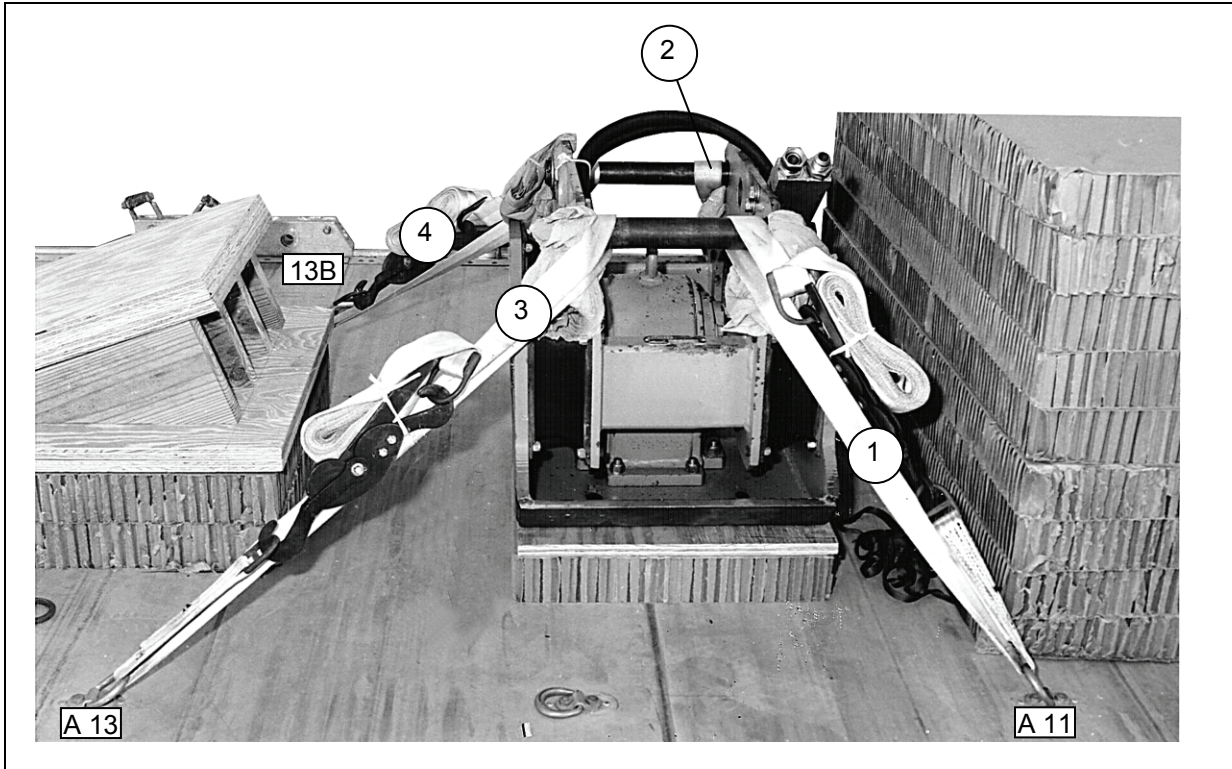




- ① Prepare the tamper by securing the hoses to the pinhole with type III nylon cord.
- ② Center the tamper on the plywood with the hoses to the front of the load.

**Figure 8-23. Tamper Prepared and Positioned on Platform**





<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
1	A 11	Pass lashing: Through tiedown ring, around front end of mounting pin on the right side and secure.
2	B 11	Through tiedown ring, around front end of mounting pin on the left side and secure.
3	A 13	Through tiedown ring, around rear end of mounting pin on the right side and secure.
4	B 13	Through tiedown ring, around rear end of mounting pin on the left side and secure.

**Figure 8-24. Tamper Lashed to Platform**

## PREPARING THE SEE

- 8-7. Prepare the SEE without accompanying loads and attachments as shown in Figures 8-25 through 8-41. Prepare the SEE with accompanying loads and attachments as shown in Figures 8-42 through 8-45.

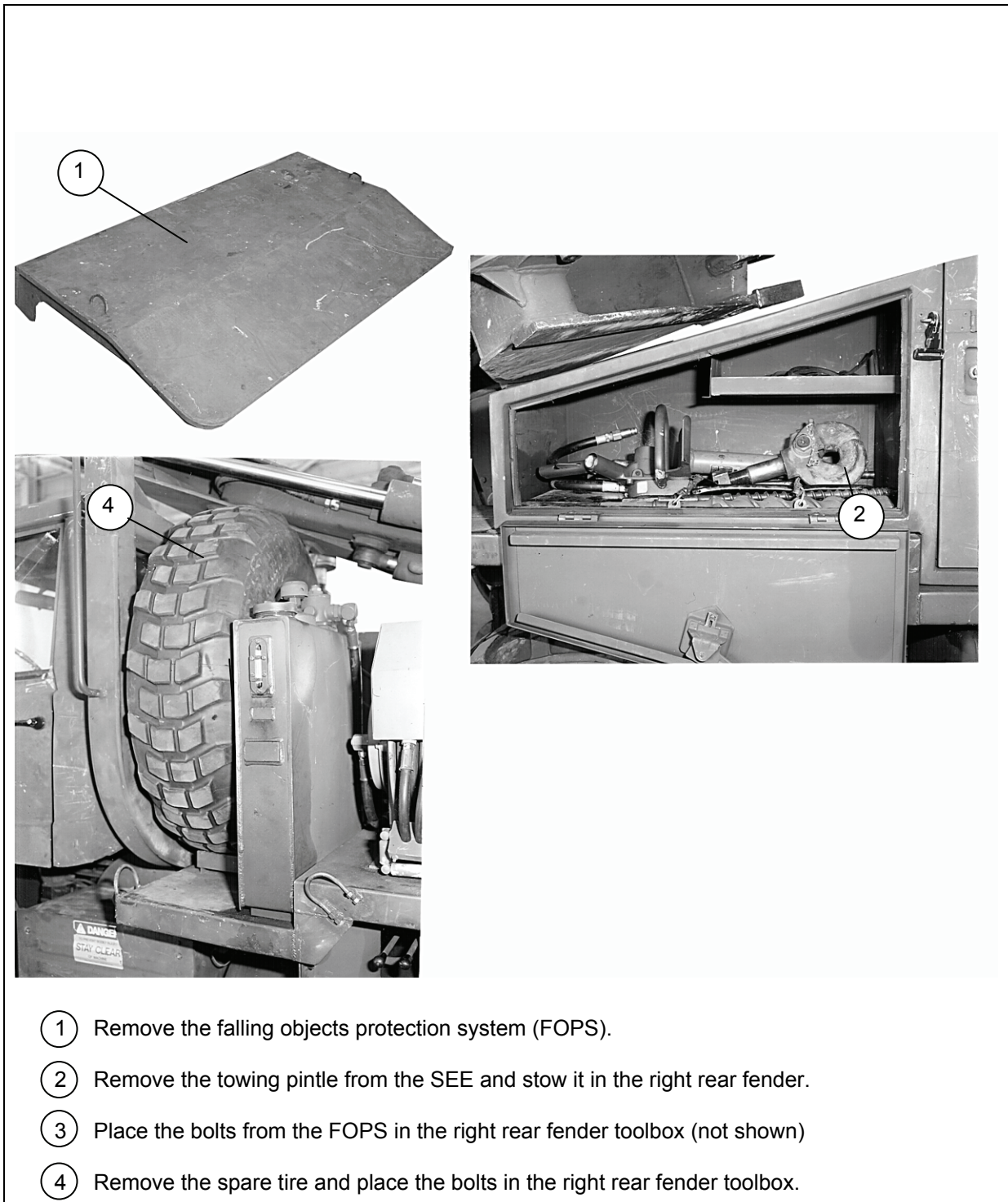
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*Note.* Ensure the fuel tank is no more than  $\frac{3}{4}$  full.

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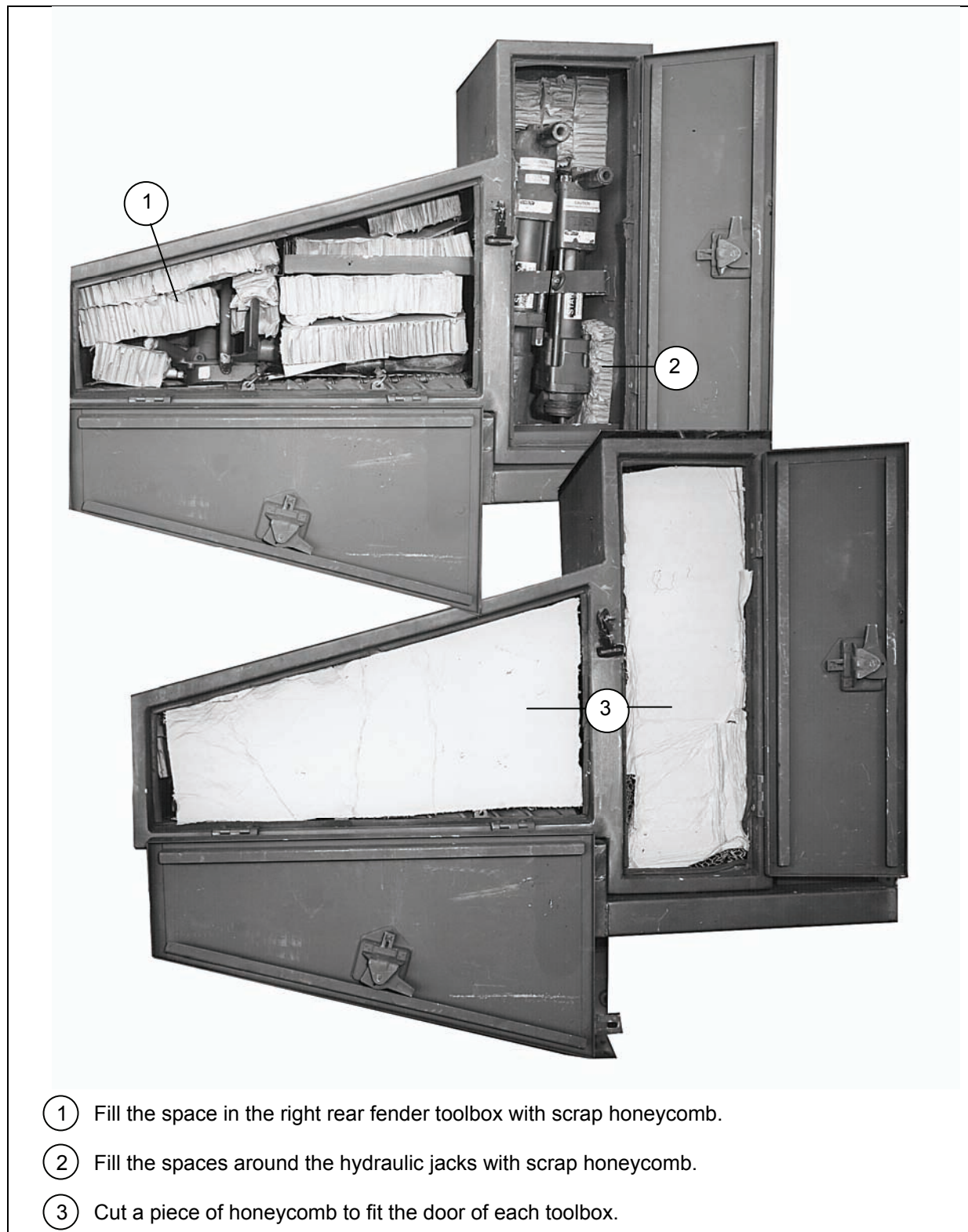


**Figure 8-25. SEE in Travel Position**

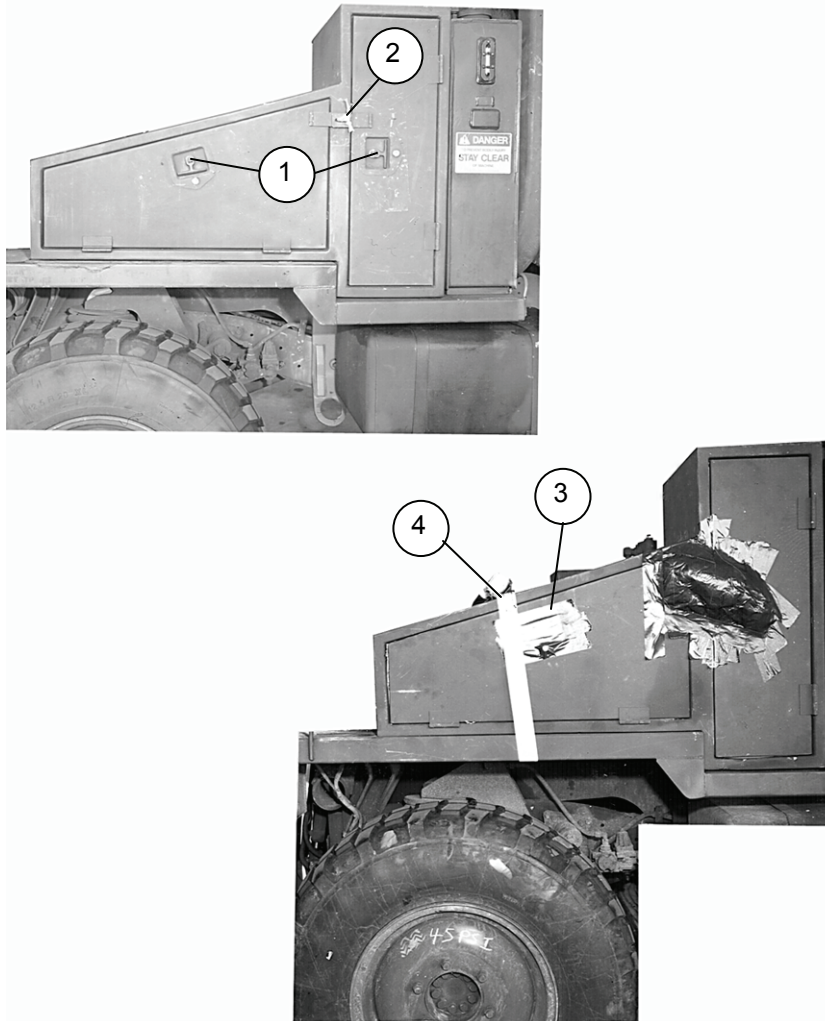


**Figure 8-26. FOPS, Spare Tire, and Towing Pintle Removed**



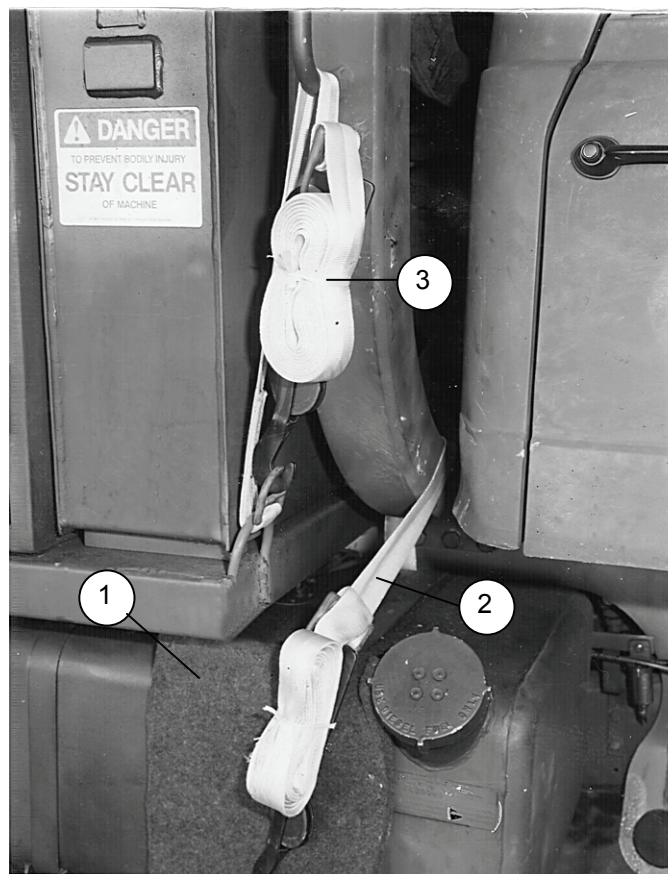


**Figure 8-27. Toolboxes Filled with Honeycomb**



- ① Close the doors and latches on the toolboxes.
- ② Secure the latches with ½-inch tubular nylon webbing.
- ③ Pad the door and latches on the toolboxes with cellulose padding and tape.
- ④ Route a 15-foot lashing around the right rear fender toolbox. Secure the lashing with a D-ring and a load binder.

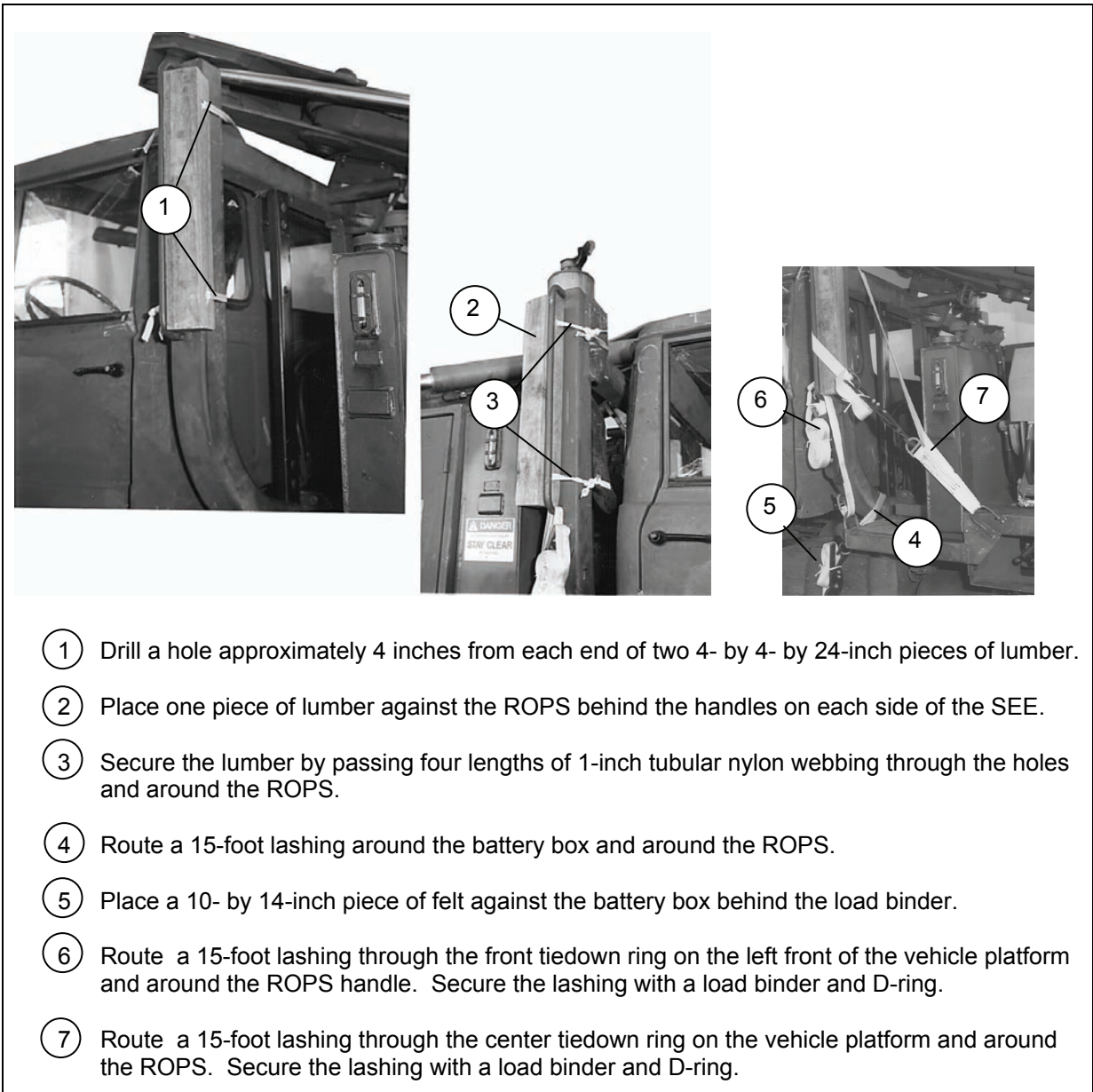
**Figure 8-28. Toolbox Doors and Latches Secured**



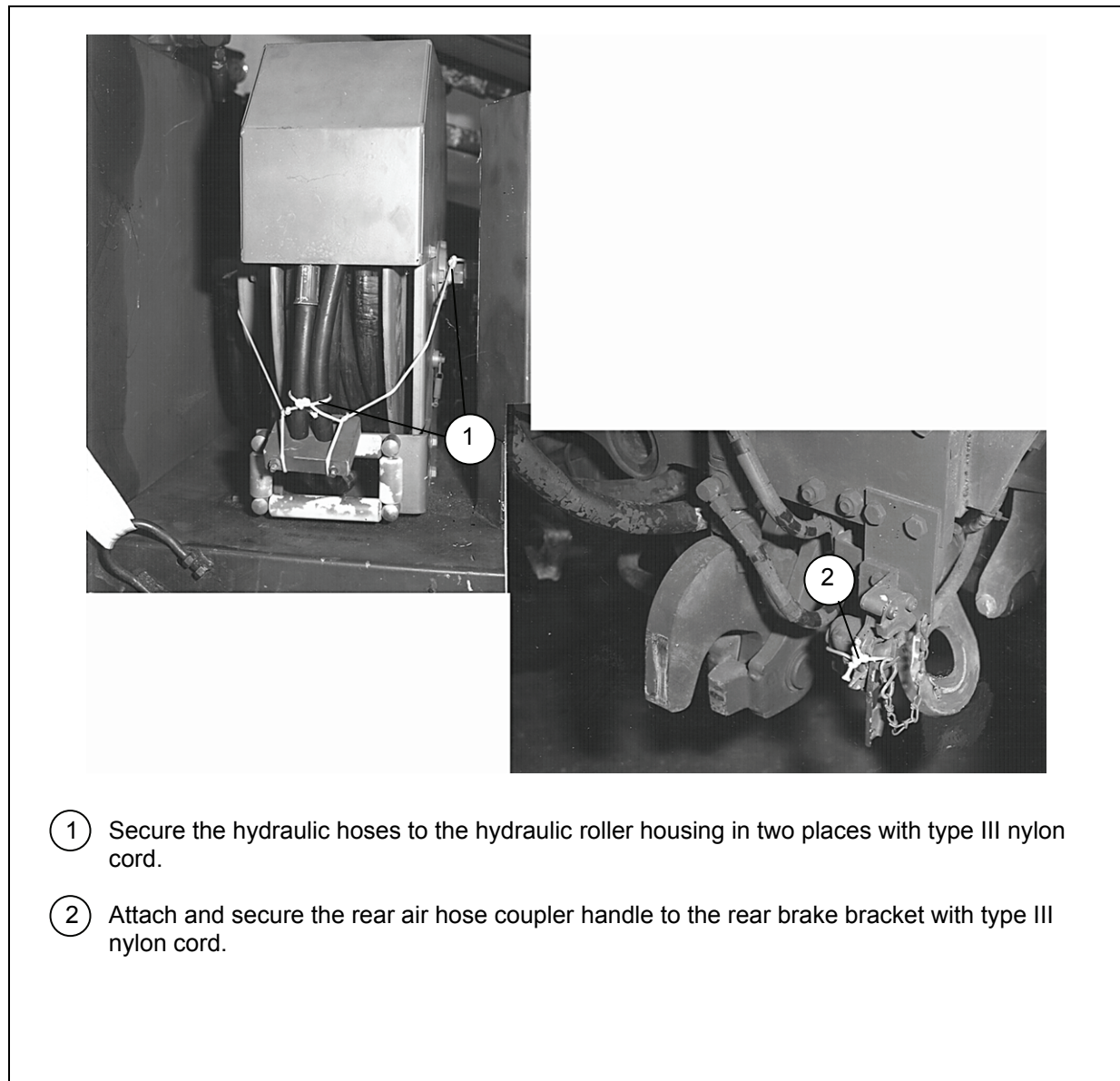
- ① Place a 10- by 14-inch piece of felt against the fuel tank.
- ② Route a 15-foot lashing around the fuel tank and around the ROPS.
- ③ Route a 15-foot lashing through the front tiedown ring on the right front of the vehicle platform and through the ROPS handle.

**Figure 8-29. Fuel Tank Secured**

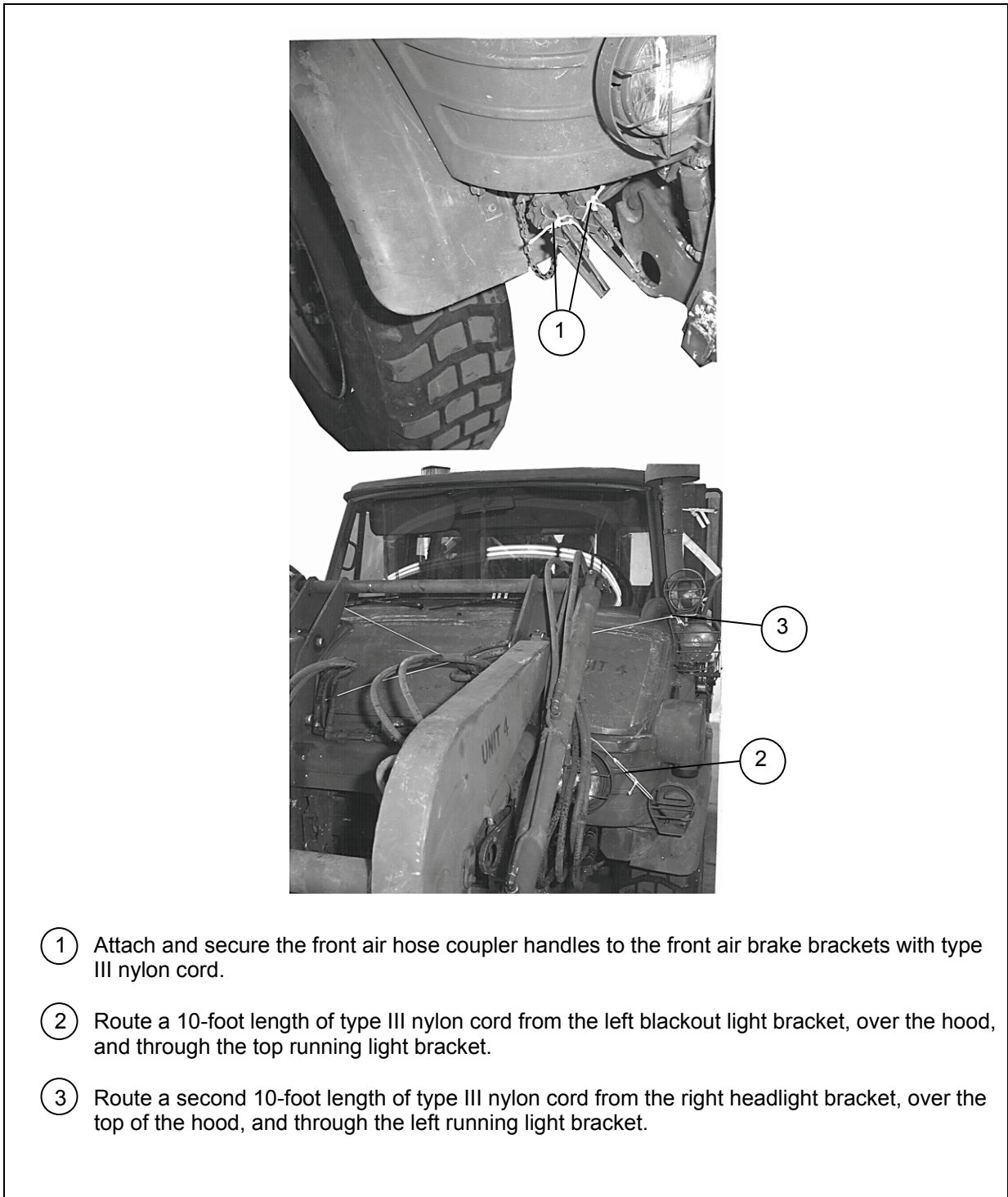




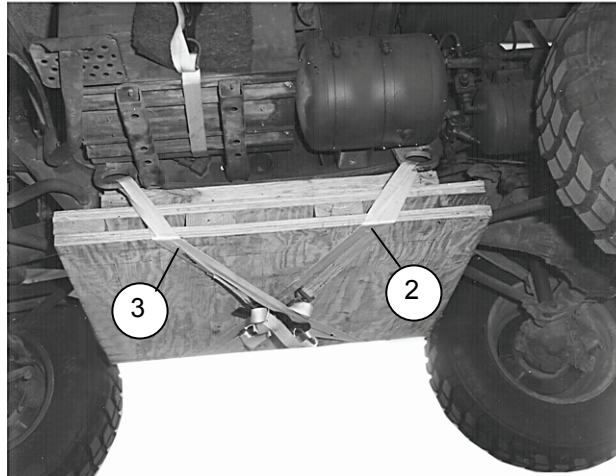
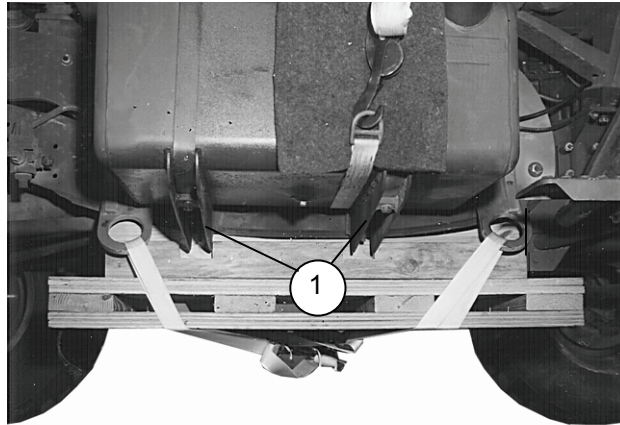
**Figure 8-30. Lumber Placed Against ROPS**



**Figure 8-31. Hydraulic Hoses Secured**



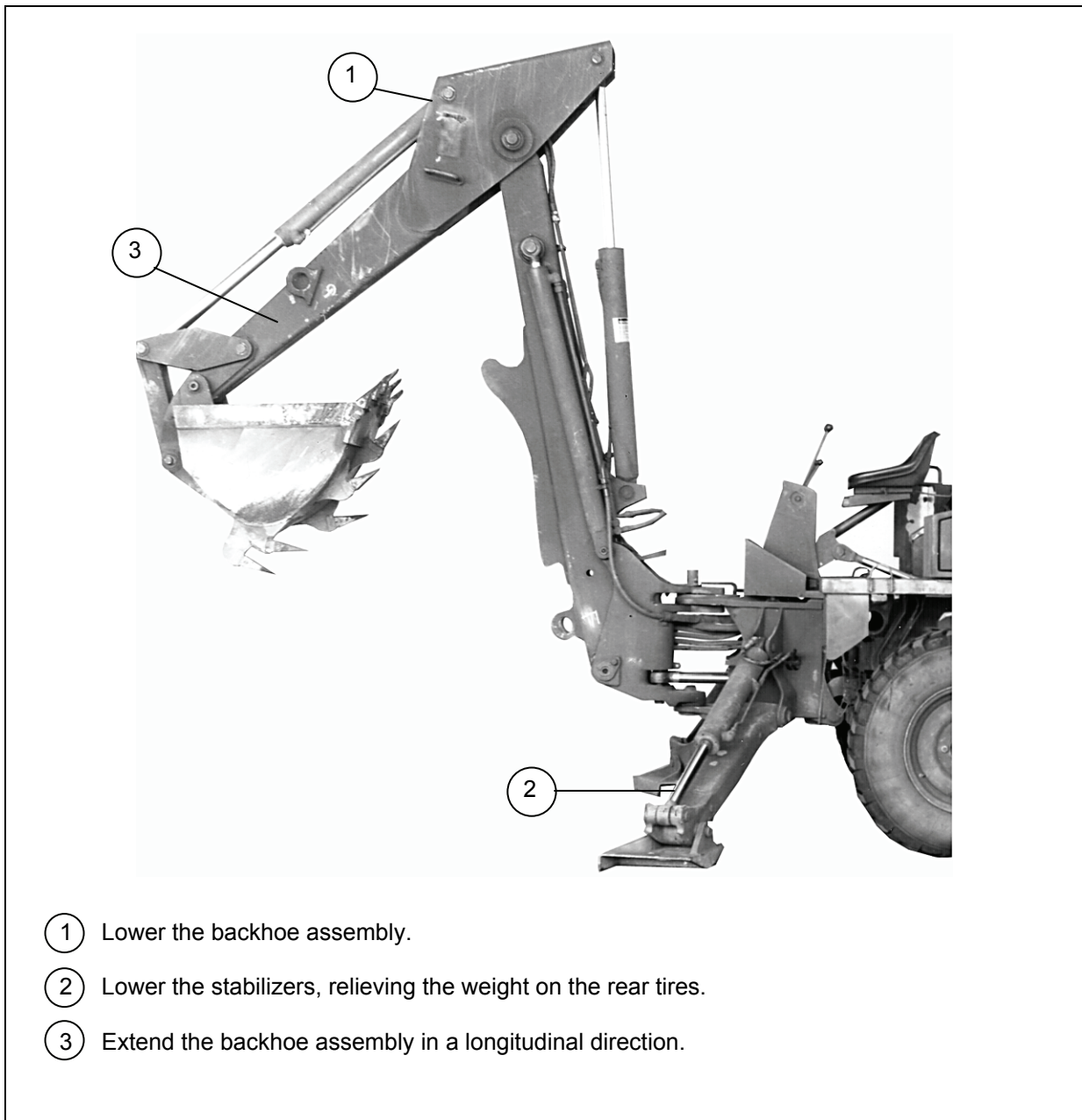
**Figure 8-32. Hood of SEE Secured**



- ① Place the center frame load spreader under the frame of the SEE, ensuring the two notches match the brackets on the frame.
- ② Route a 15-foot lashing from the right front tiedown ring on the frame to the left rear tiedown ring on the frame.
- ③ Route a second 15-foot lashing from the left front tiedown ring on the frame to the right rear tiedown ring on the frame.

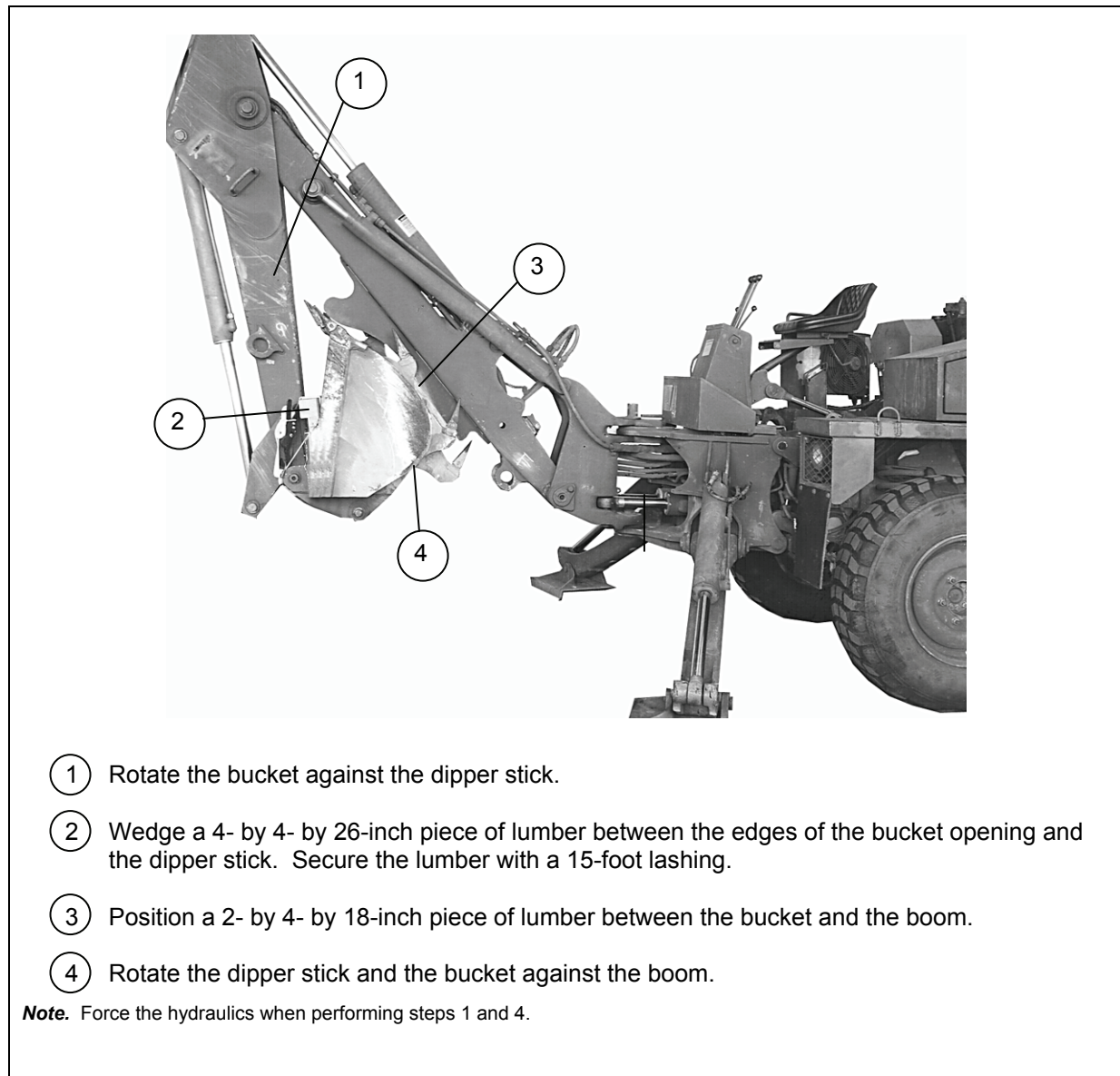
**Note.** When closing the load binders, ensure they are centered on the load spreader.

**Figure 8-33. Center Frame Load Spreader Positioned and Secured**



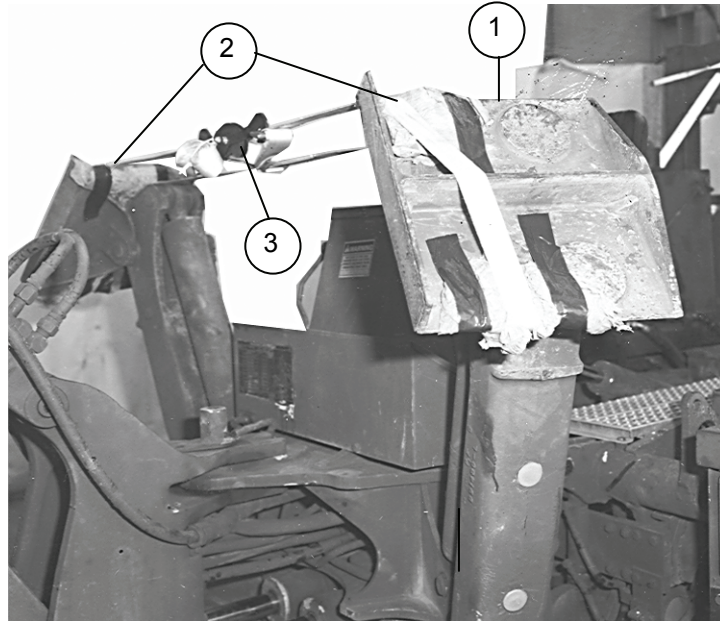
**Figure 8-34. Backhoe Assembly Extended**





**Figure 8-35. Backhoe Assembly Prepared**



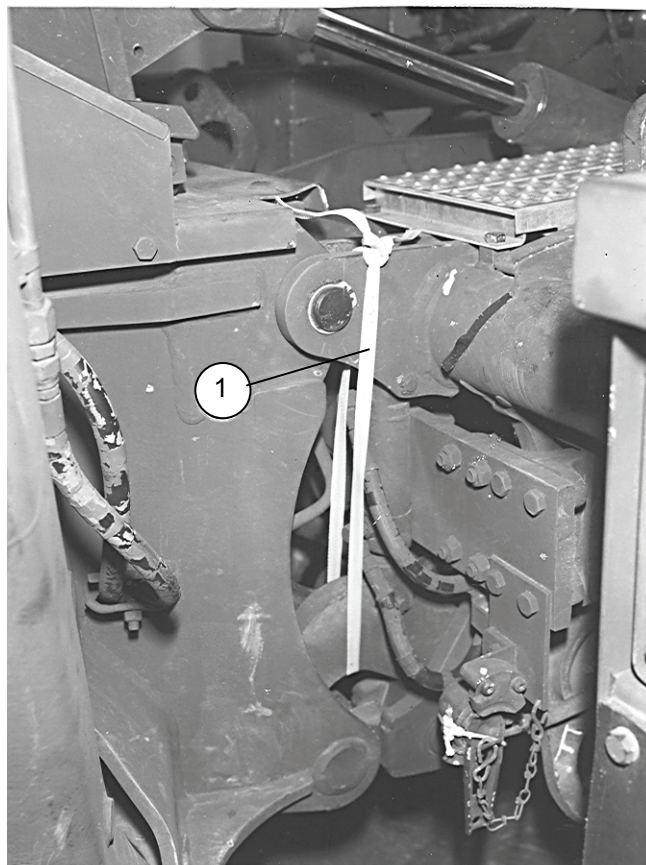


- ① Fully retract the stabilizers and pad each foot using cellulose padding and tape.
- ② Route a 30-foot lashing around the foot of both stabilizers.
- ③ Center the ends of the lashing between the stabilizers and secure the lashing with two D-rings and a load binder.

**Figure 8-36. Stabilizers Secured**

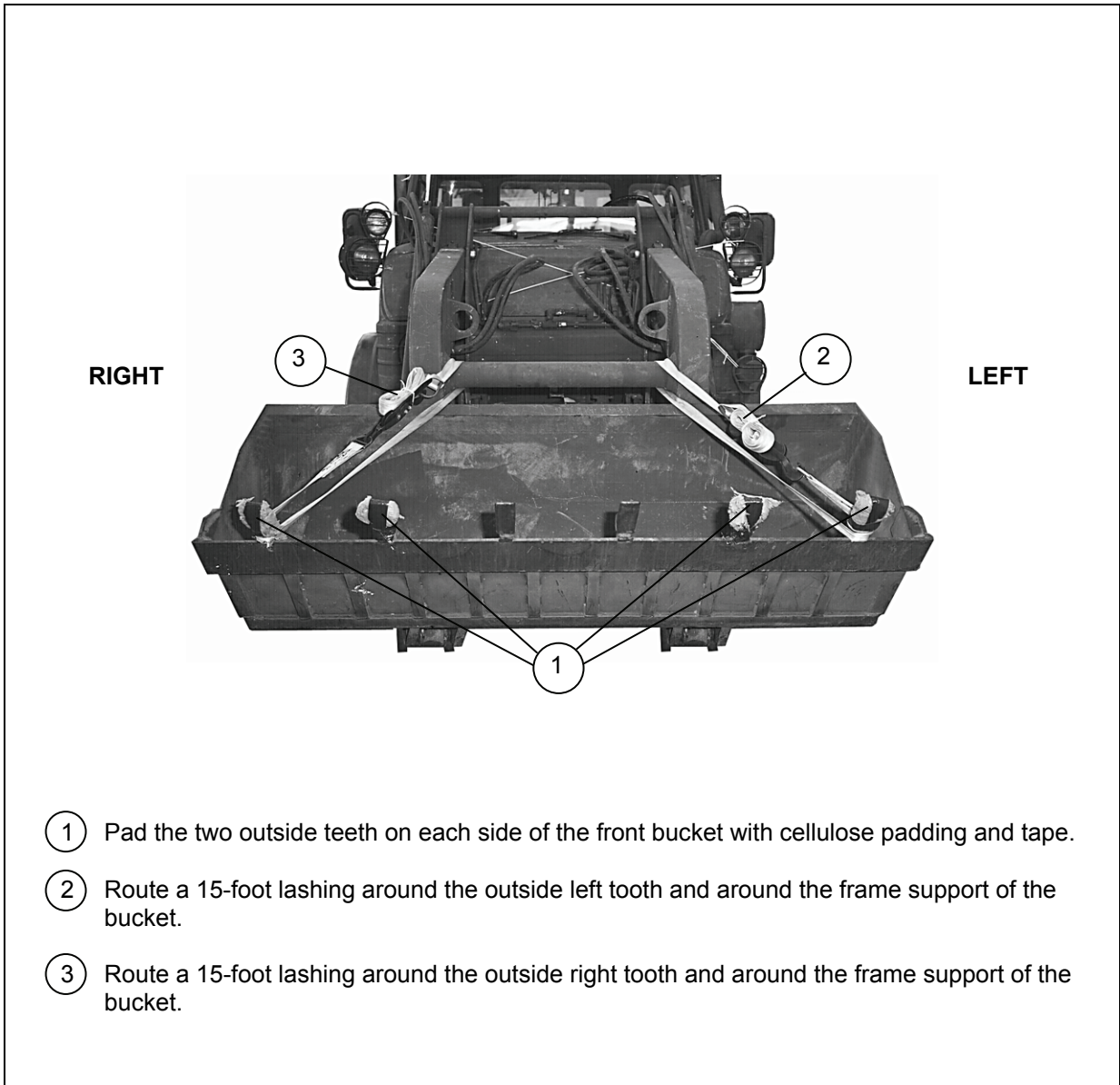
**CAUTION**

Ensure the hydraulic operation locks are in the open position using the backhoe lock lever. This is an operator function.



- ① Secure the operation locks with ½-inch nylon tubular webbing.

**Figure 8-37. Operation Locks Opened and Secured**



**Figure 8-38. Front Bucket Secured**

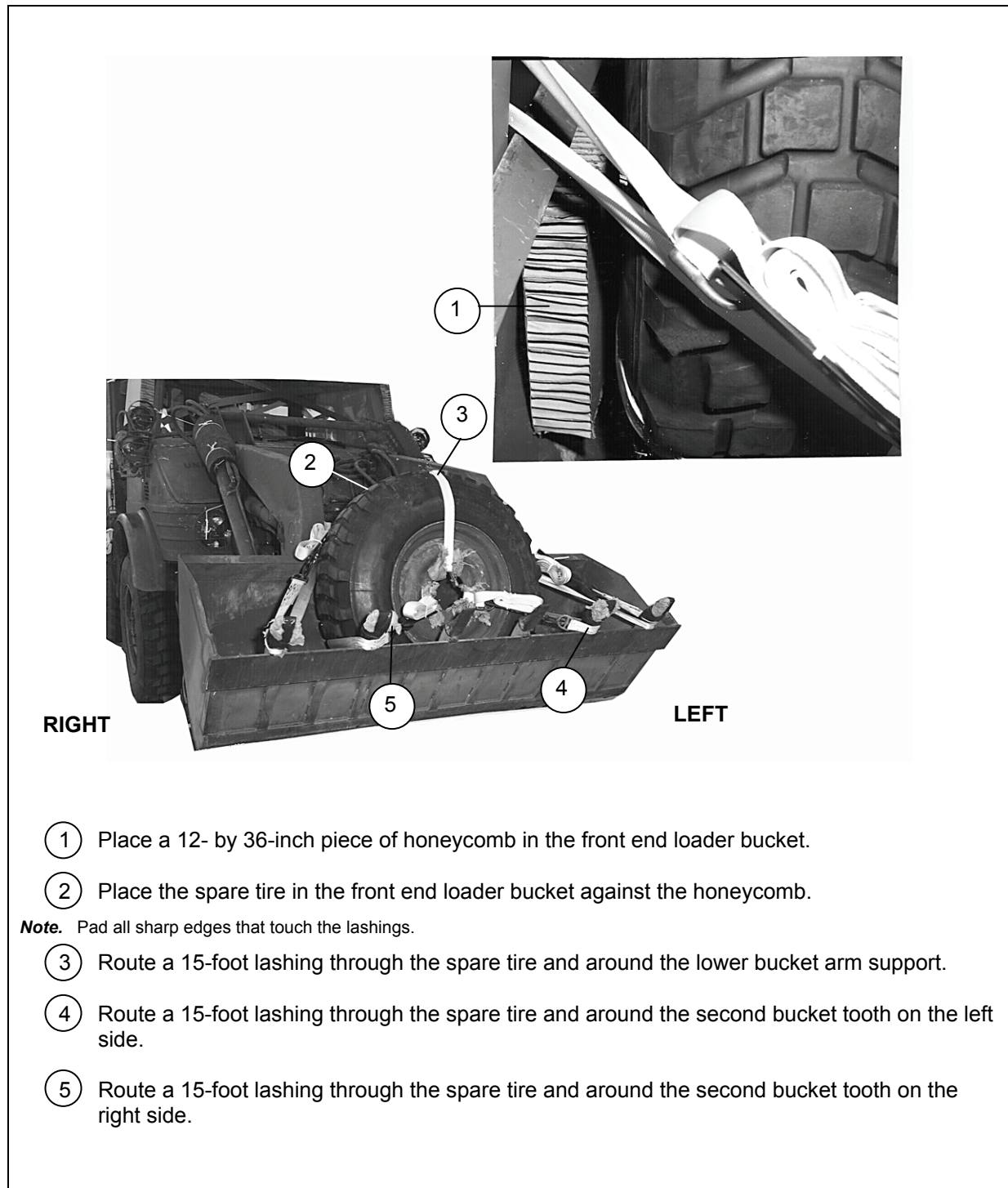
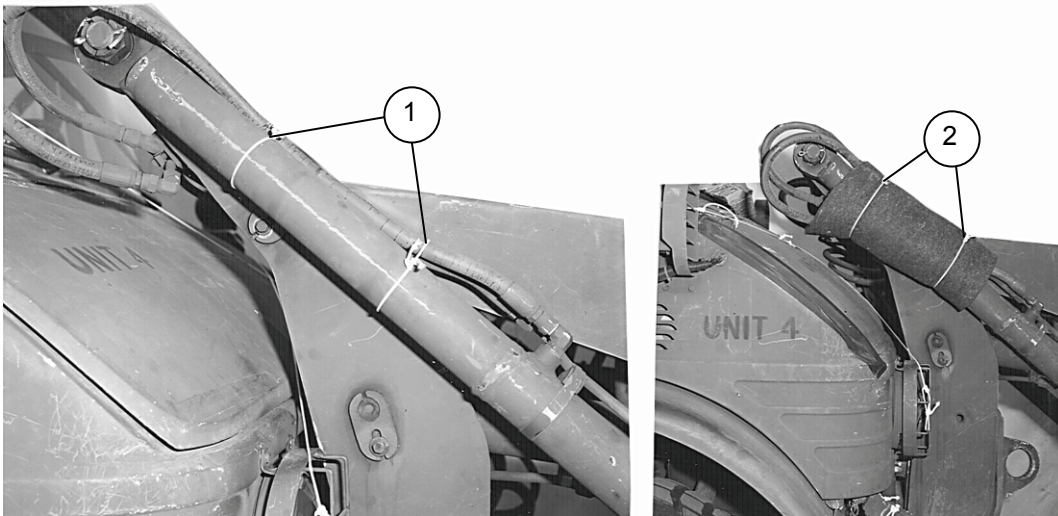


Figure 8-39. Spare Tire Placed and Secured





- ① Secure the hydraulic lines to the cylinder with type III nylon cord in two places.
- ② Wrap a 14- by 15-inch piece of felt around the hydraulic lines and cylinders 5 inches from the top of the cylinders. Secure the felt with type III nylon cord or tape.



- ③ Tape the hydraulic tank gages on each side of the vehicle.

**Figure 8-40. Hydraulic Lines and Tank Secured**

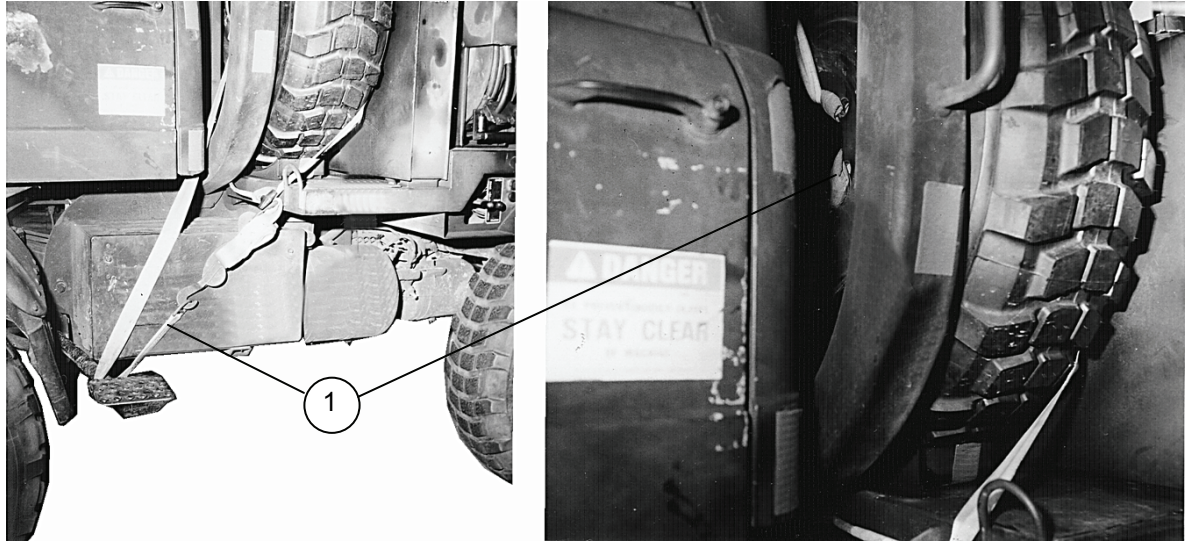


- ① Route a 15-foot lashing from the right tiedown ring on the rear of the vehicle platform around the stabilizer on the right side of the vehicle.
- ② Route a 15-foot lashing from the left tiedown ring on the rear of the vehicle platform around the stabilizer on the left side of the vehicle.

**Figure 8-41. Stabilizers Secured to Vehicle Platform**

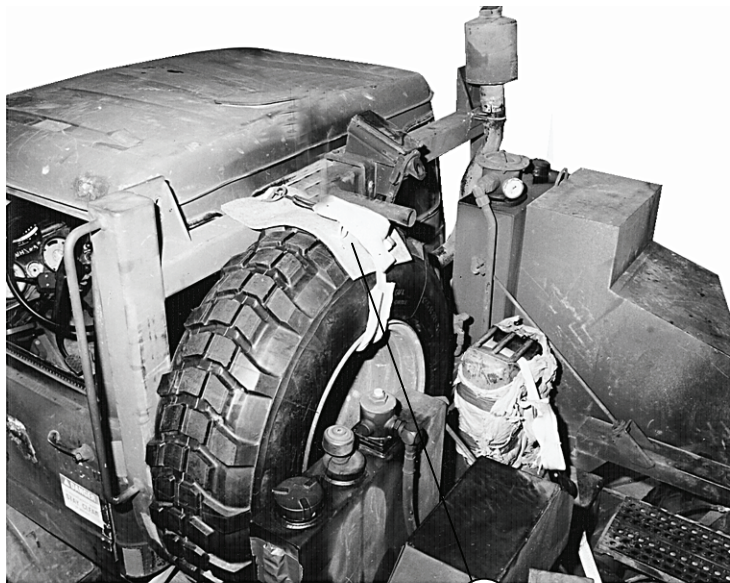


**Note.** The following procedures deal with rigging the SEE's spare tire in place and using the front bucket to carry the following attachments as an accompanying load: Sump pump and hose, picket puller and pounder, circular saw and blades, and impact wrench.



- ① Leave the spare tire in place. Route a 15-foot lashing around the driver's step and in front of the ROPS and through the spare tire's rim. Place padding between the metal of the rim and lashing.

**Figure 8-42. Spare Tire Secured**

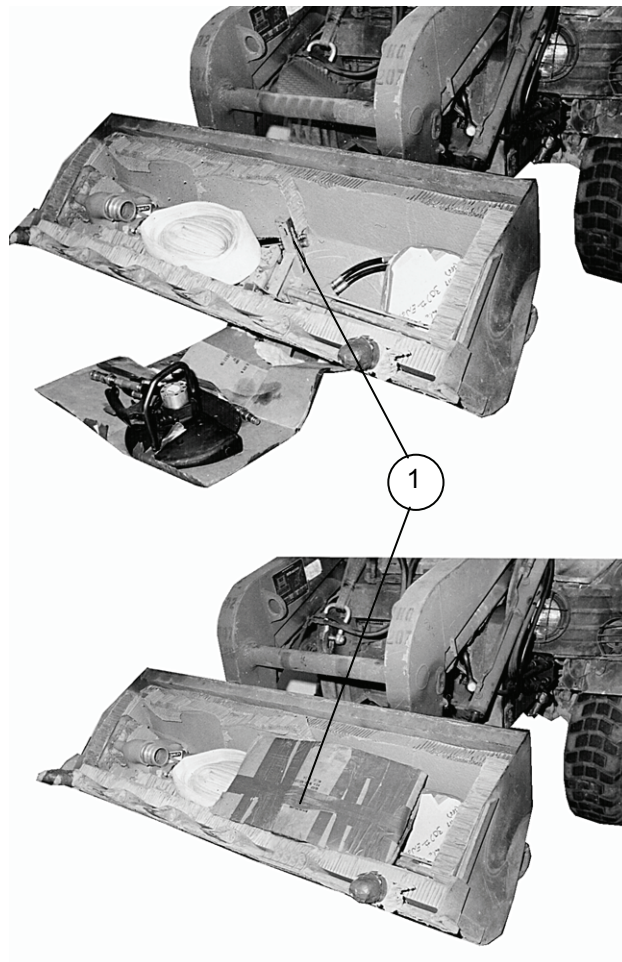


2



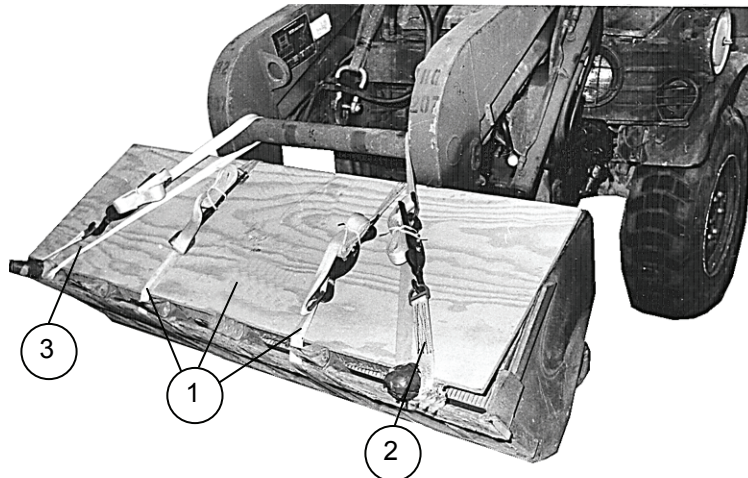
- ② Route a 15-foot lashing around the top bar of the ROPS one time and down through the spare tire's rim. Place padding between the metal of the rim and the lashing. Place a piece of felt on top of the tire and secure the lashing with a load binder and D-ring.

**Figure 8-42. Spare Tire Secured (Continued)**



- ① Line the front bucket with honeycomb and evenly place the listed attachments in the bucket. Ensure the circular saw and blades are covered with cardboard and secure with tape. Fill in any empty space between the attachments with honeycomb.

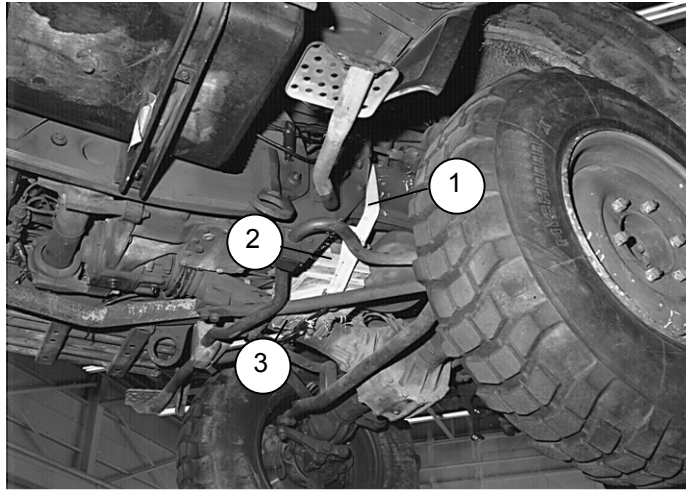
**Figure 8-43. Attachments Placed in Front End Loader Bucket**



- ① Cut a piece of 26- by 78- by  $\frac{3}{4}$ -inch plywood and place it on top of the attachments in the bucket. Secure the plywood in place with four 15-foot lashings. Route two lashings completely around the bucket between the bucket frame supports.
- ② Route a 15-foot lashing around the outside left tooth and around the frame support of the bucket.
- ③ Route a 15-foot lashing around the outside right tooth and around the frame support of the bucket.

**Figure 8-44. Front Bucket and Attachments Secured**



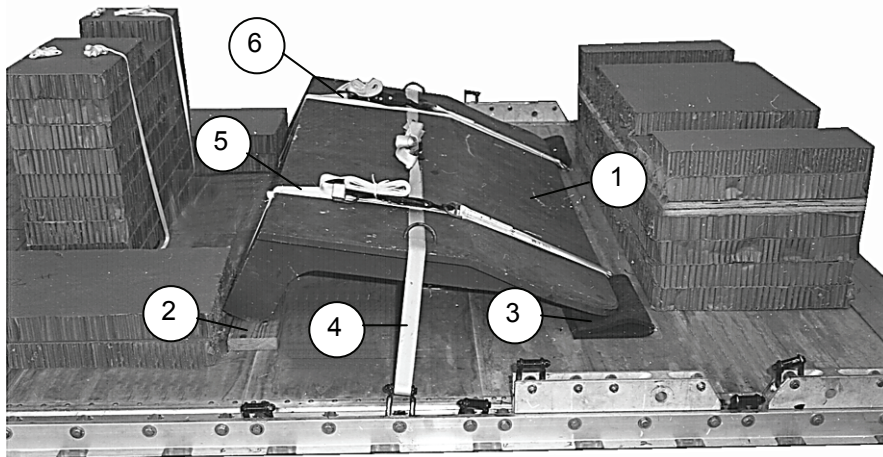


- ① Route the running end of a 15-foot lashing over the right side of the frame of the SEE at the point where the bell housing is located. Take the running end under the bell housing to the left side of the SEE. Leave the lashing slack so the support block fits between the lashing and the bell housing.
- ② Cut a 9- by 10-inch piece of felt and position it on the bottom of the support block. Place the support block and felt against the bell housing of the SEE. The beveled side of the block will face to the rear of the SEE.
- ③ Cut a 5- by 6-inch piece of honeycomb and place it between the drive shaft and the support block.
- ④ Take the slack out of the lashing and secure the lashing on the support stack.

**Figure 8-45. Bell Housing Support Block Positioned**

## POSITIONING AND LASHING FOPS

8-8. Position and lash the FOPS as shown in Figure 8-46.



- ① Position the front of the FOPS, 31 inches from the front edge of the platform between tiedown rings A2 and A4 and between B2 and B4.
- ② Place two 2- by 8- by 12-inch pieces of lumber under the rear mounting brackets of the FOPS.
- ③ Cut two 12- by 18-inch pieces of felt. Fold the felt in half and place them under the front edge of the FOPS.
- ④ Route a 15-foot lashing from tiedown clevis 5, through the rings on top of the FOPS, and through tiedown clevis 5A. Secure the lashing on top of the FOPS with a D-ring and a load binder.
- ⑤ Route a 15-foot lashing from tiedown ring A2, over the top of the FOPS, and through tiedown ring A4. Secure the lashing on top of the FOPS with a D-ring and a load binder.
- ⑥ Route a 15-foot lashing from tiedown ring B2, over the top of the FOPS, and through tiedown ring B4. Secure the lashing on top of the FOPS with a D-ring and a load binder.

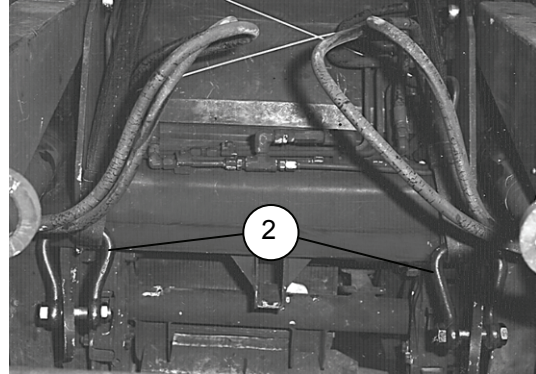
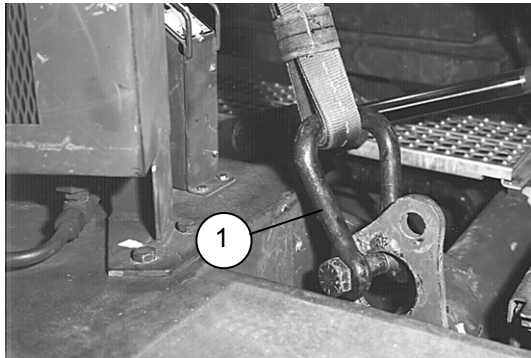
**Figure 8-46. FOPS Positioned and Secured**



## LIFTING AND POSITIONING THE SEE

8-9. Install the lifting slings and position the SEE as shown in Figures 8-47 and 8-48.

**Note.** All measurements are given in inches.



- ① Attach a 9-foot (4-loop), type XXVI nylon sling to a large suspension clevis, and attach the clevis to the right rear lifting provision. Repeat this step for the left rear lifting provision.
- ② Attach a 12-foot (4-loop), type XXVI nylon sling to a large suspension clevis, and attach the clevis to the right front lifting provision. Repeat this step for the left front lifting provision.

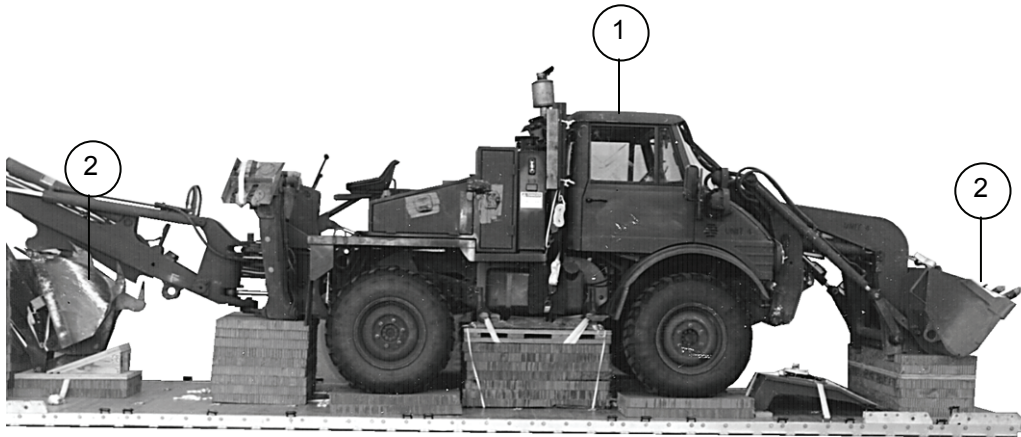
**Notes.** 1. Twist the left front and rear slings as necessary to ensure the SEE lifts level.  
2. Setting the brakes, raising the front end loader and the backhoe assemblies are operator functions.

- ③ Raise the front end loader assembly 18 inches to avoid crushing the honeycomb stacks.
- ④ Raise the backhoe assembly 12 inches to avoid crushing the honeycomb stacks.

**Figure 8-47. Lifting Slings Attached**

**CAUTION**

The honeycomb stacks may require slight adjustments when the truck is positioned on the stacks.



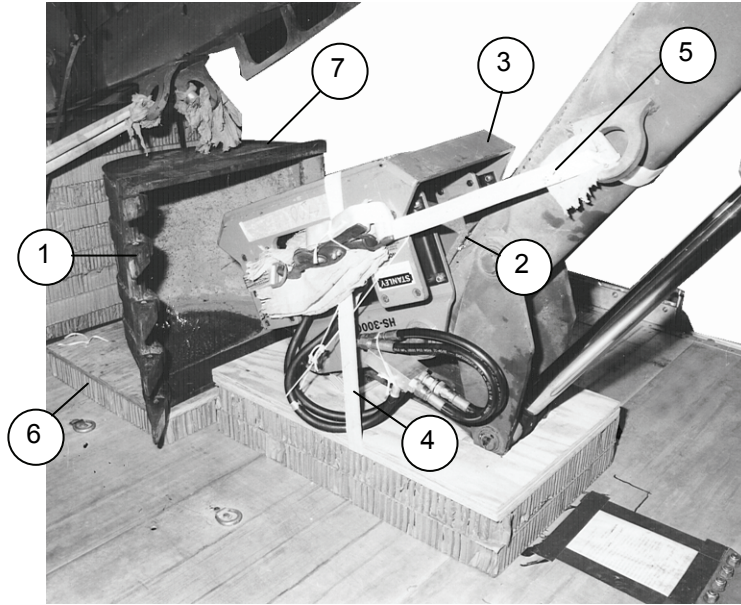
**Note.** After the slings are attached to the truck and the lifting device, place the transmission lever in neutral and release the brakes.

- ① Position the SEE on the platform with the front of the vehicle overhanging the front edge of the platform 6 inches and the rear of the vehicle overhanging the platform 22 inches.
- ② Lower the front bucket onto honeycomb stack 1 and the backhoe assembly onto honeycomb stack 10.
- ③ Remove the lifting slings from the vehicle (not shown).

**Figure 8-48. Vehicle Positioned on Platform**

## **POSITIONING AND LASHING THE TAMPER AS AN ATTACHMENT AND THE BACKHOE BUCKET AS AN ACCOMPANYING LOAD**

8-10. When rigging the tamper as an attachment to the SEE and the backhoe bucket as an accompanying load, position and lash the tamper and backhoe bucket as shown in Figures 8-49 and 8-50.



- ① Remove the backhoe bucket and attach the tamper to the SEE.
- ② Place a 6- by 10-inch piece of felt between the tamper and the dipper stick.
- ③ Rotate the tamper against the dipper stick.
- ④ Secure the 15-foot lashing on honeycomb stack 10 over the tamper.
- ⑤ Install a 15-foot lashing through tiedown provision 8 and around the front of the tamper.
- ⑥ Cut a piece of 36- by 24- by  $\frac{3}{4}$ -inch plywood and glue it to a 36- by 24-inch piece of honeycomb. Position the plywood and honeycomb centered and 7 inches from stack 9 between deck rings 12A and 12B.
- ⑦ Position the bucket on the plywood with the bottom of the bucket facing the front of the load and the teeth facing to the left of the load.

**Figure 8-49. Tamper Secured and Bucket Positioned**

<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
*1	A 11to B 11	Center joined D-rings on the rear of the bucket. Run the left side lashing between the first and second bucket teeth and through B 11. Run the right side lashing on top of the pin bracket and through A 11 and back to the left side and secure.
2	A 12 to B 12	Run lashing through A 12, up over top of bucket, through 12B back to A 12 and secure on the right side.
*3	A 13 to B 13	Center joined D-rings on the front of the bucket. Run the left side lashing between the second and third bucket tooth and through B 13 and back to the right side. Run the right side lashing over the pin bracket, through A 13 and secure.

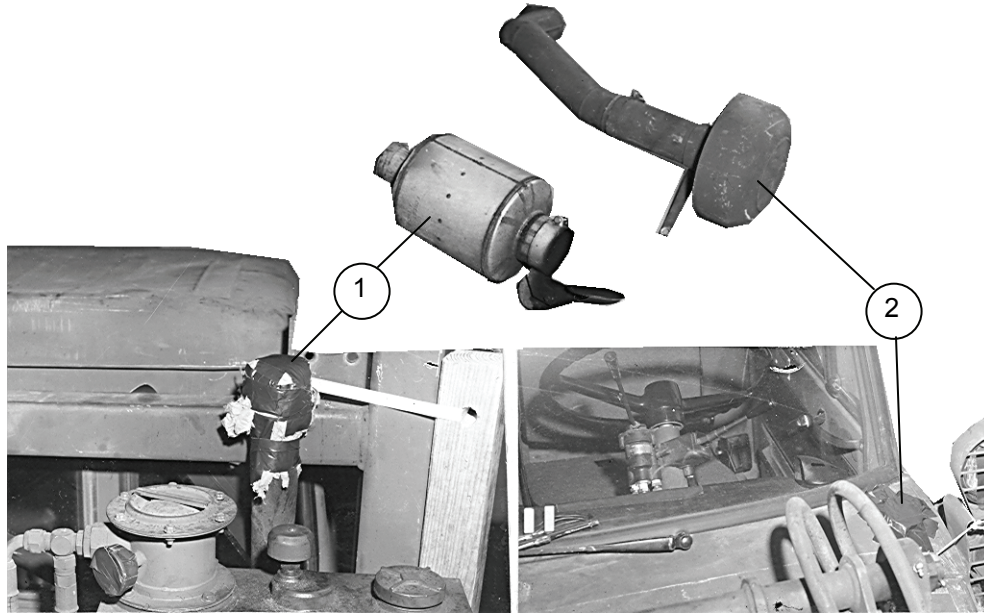
\* 30-foot lashings

**Figure 8-50. Bucket Secured**

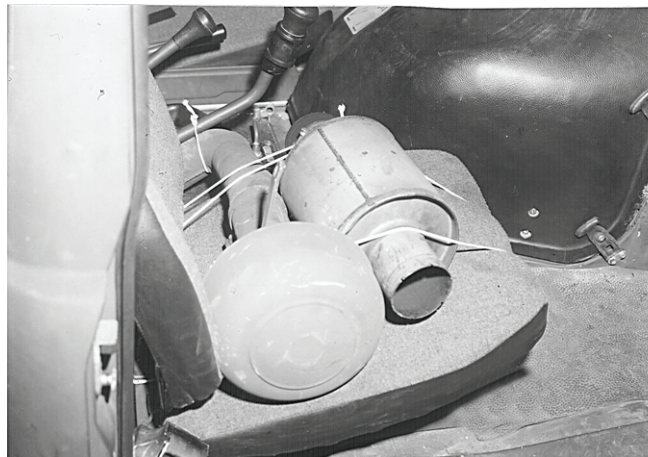


## **PREPARING THE SEE AFTER POSITIONING**

8-11. Prepare the SEE after positioning as shown in Figures 8-51 through 8-53.

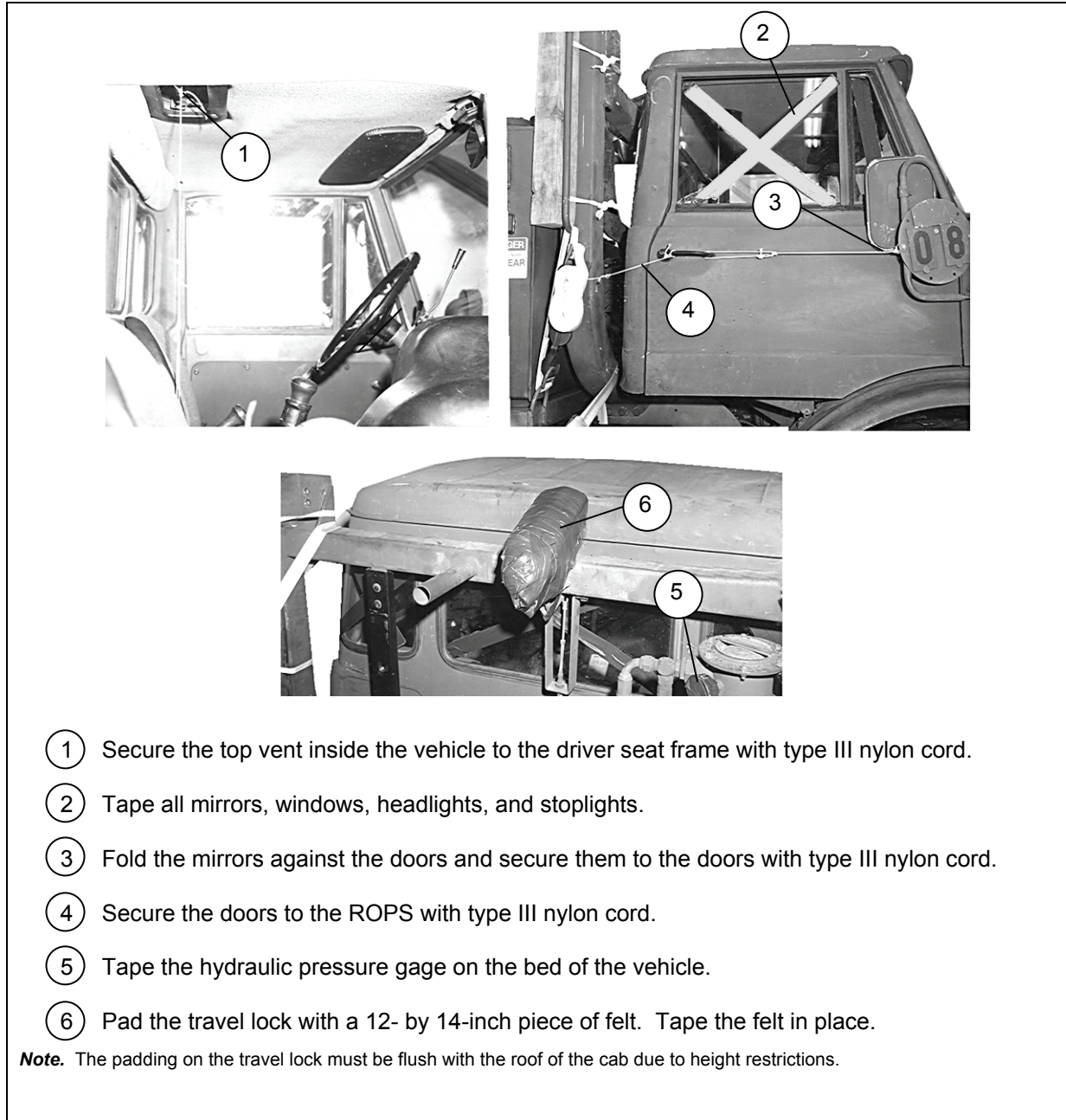


- ① Remove the spark arrester and pad the stack with cellulose padding and tape.
- ② Remove the air breather with the tube assembly and reinstall the bolts. Place tape over the hole.



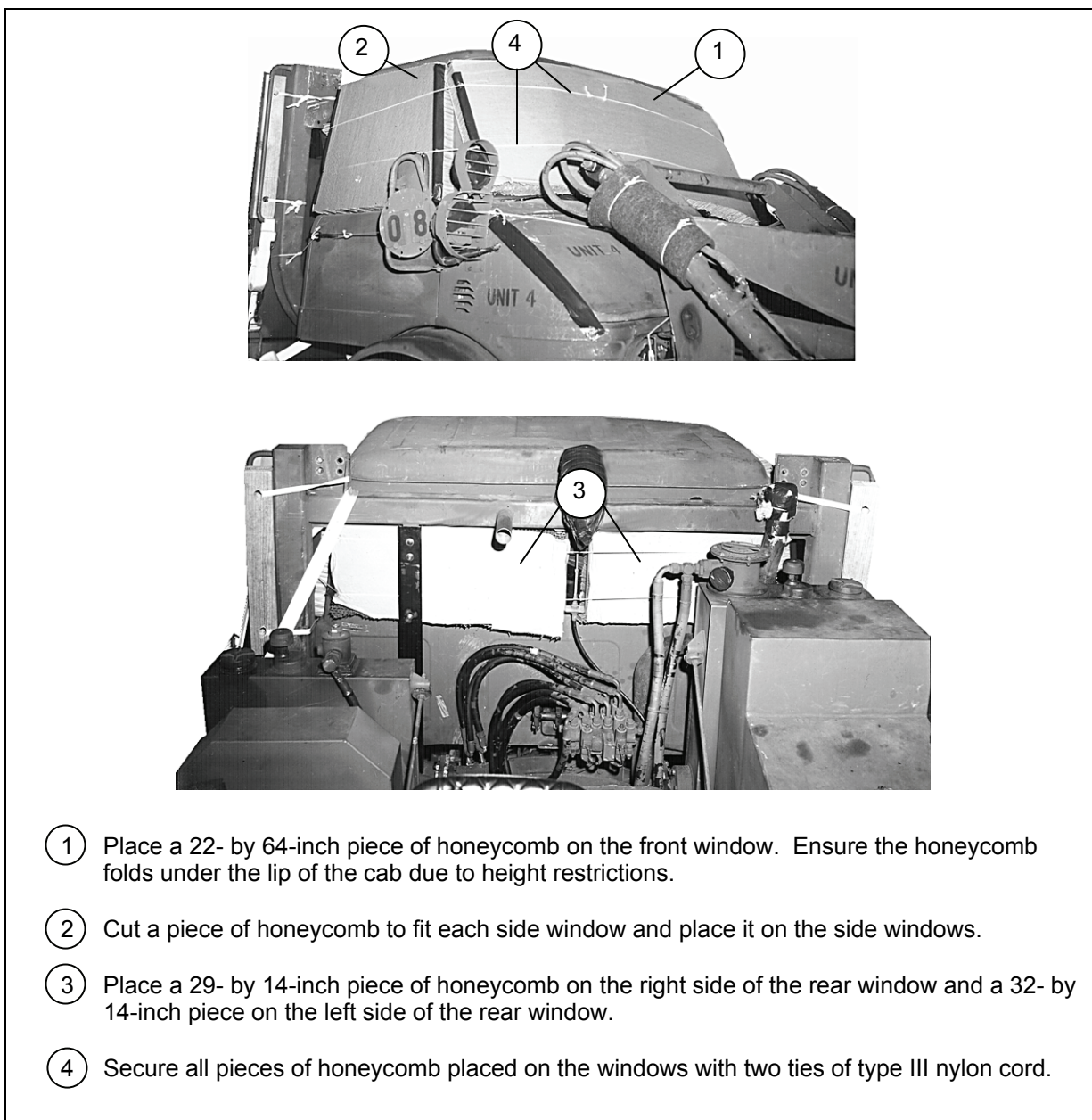
- ③ Place the spark arrester and air breather on the passenger seat of the vehicle and secure with type III nylon cord.

**Figure 8-51a. Tamper Secured and Bucket Positioned**

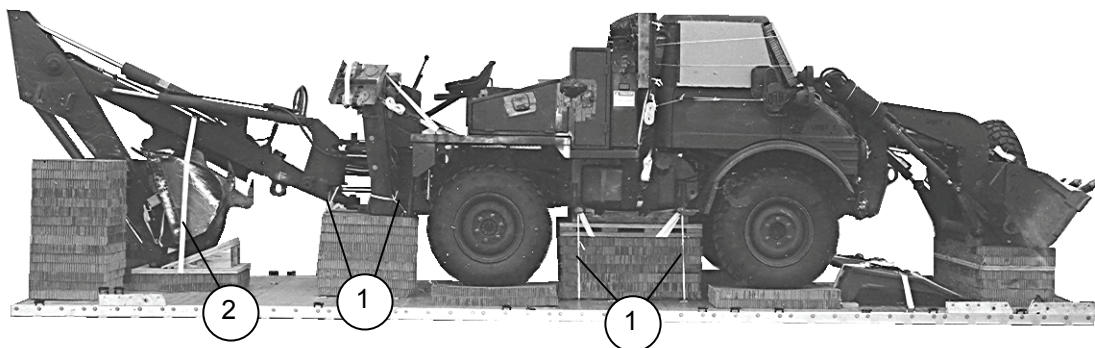


**Figure 8-51b. Components of the SEE Secured**





**Figure 8-52. Honeycomb Placed and Secured on Windows of the SEE**



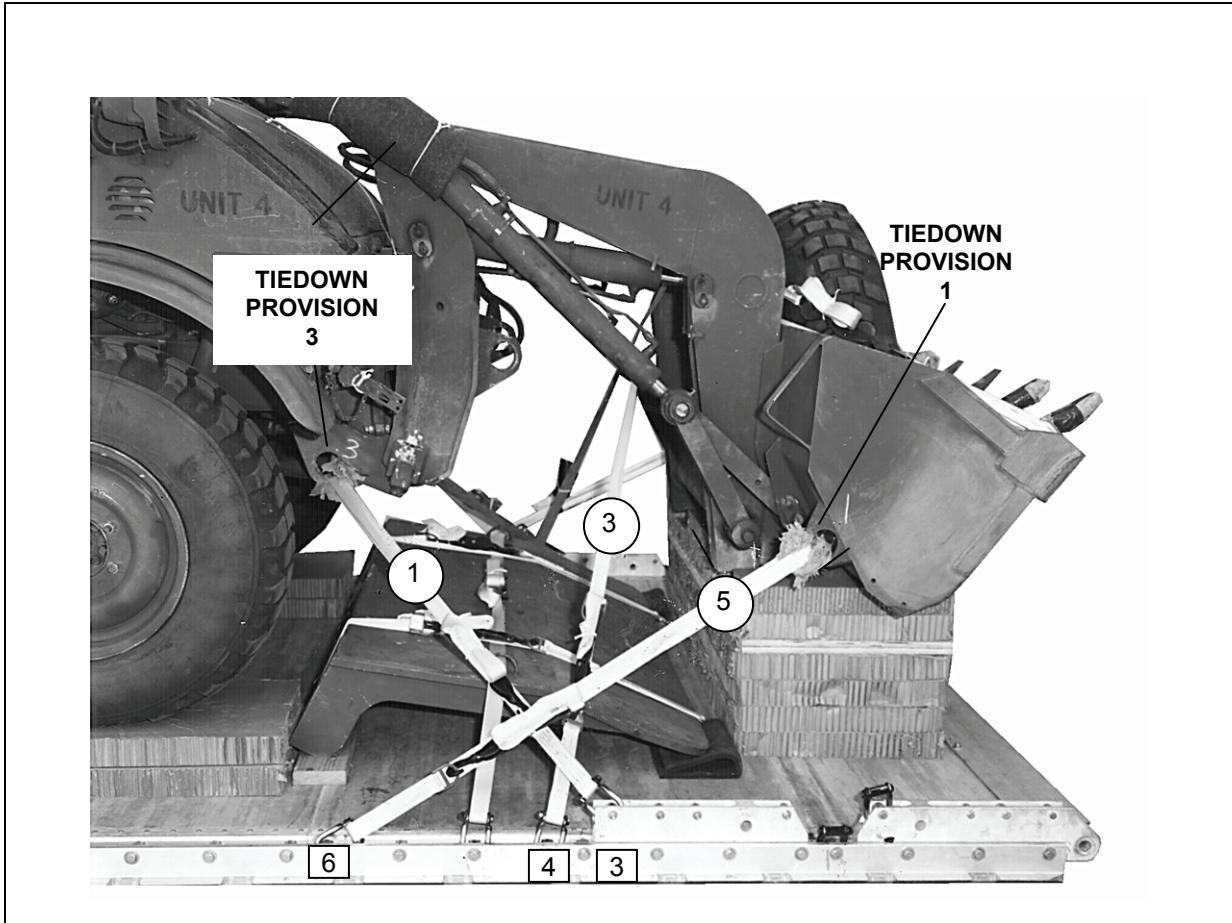
- ① Secure the ½-inch tubular nylon webbing ties on honeycomb stacks 1, 3, 5, 7, and 9 to the vehicle.
- ② Secure the 15-foot lashing on honeycomb stack 10 to the boom, running the lashing between the boom and hydraulic lines. Secure with a D-ring and load binder.

**Figure 8-53. Vehicle Secured to Honeycomb Stacks**

## LASHING LOAD TO PLATFORM

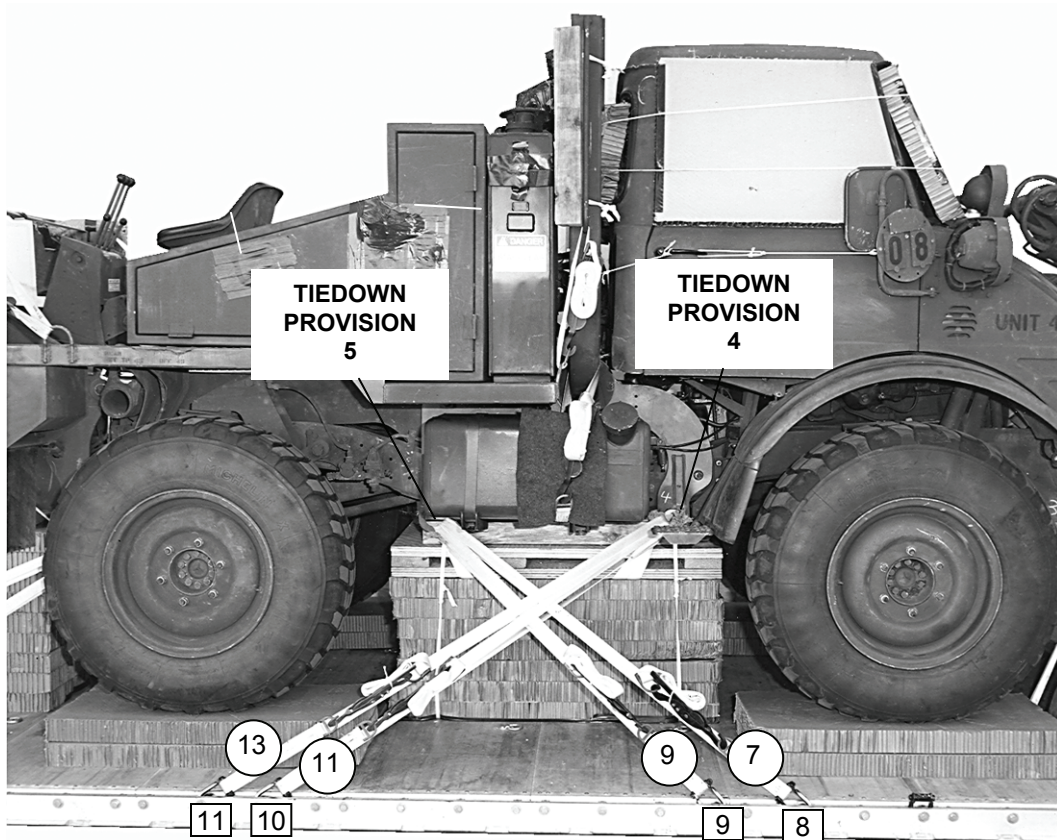
8-12. Lash the SEE to the platform as shown in Figures 8-54 through 8-57.

*Note.* Pad any sharp edges on the load where a lashing may pass. Use cellulose padding and masking tape.



<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
1	3	Pass lashing: Through tiedown provision 3, right side.
2	3A	Through tiedown provision 3, left side.
3	4	Through tiedown provision 2, left side.
4	4A	Through tiedown provision 2, right side.
5	6	Through tiedown provision 1, right side.
6	6A	Through tiedown provision 1, left side.

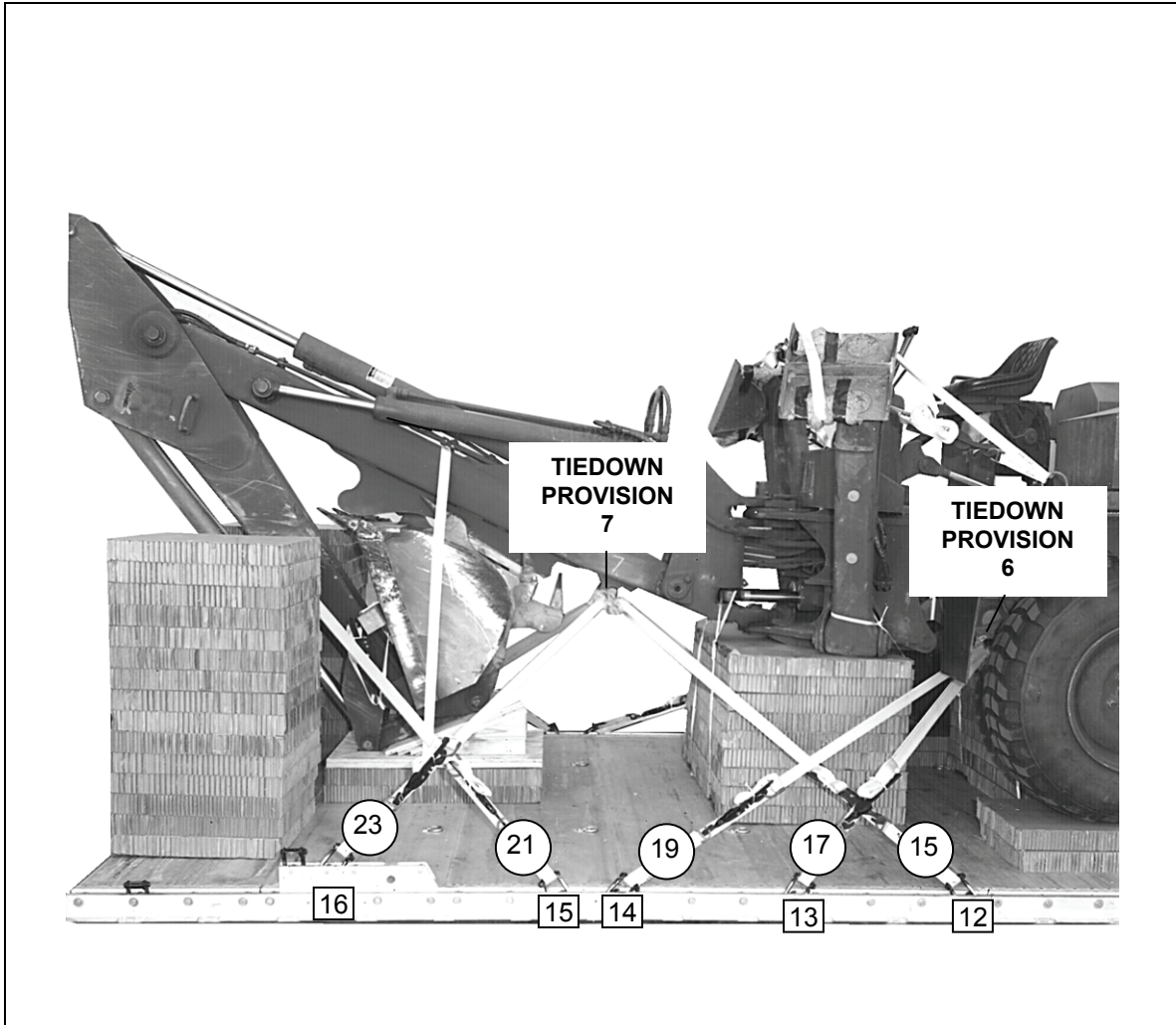
**Figure 8-54. Lashings 1 Through 6 Installed**



<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
7	8	Pass lashing: Through tiedown provision 5, right side.
8	8A	Through tiedown provision 5, left side.
9	9	Through tiedown provision 5, right side.
10	9A	Through tiedown provision 5, left side.
11	10	Through tiedown provision 4, right side.
12	10A	Through tiedown provision 4, left side.
13	11	Through tiedown provision 4, right side.
14	11A	Through tiedown provision 4, left side.

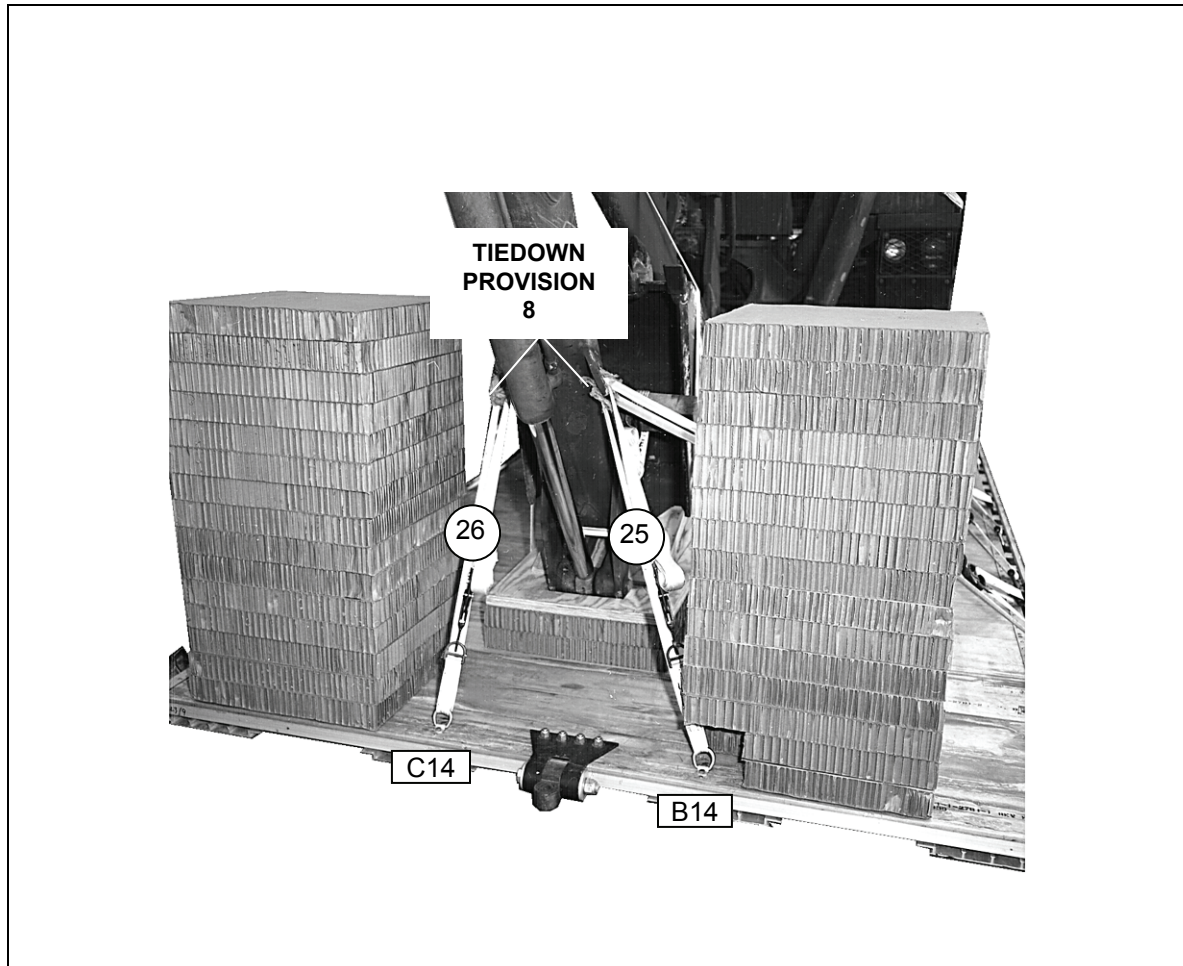
**Figure 8-55. Lashings 7 Through 14 Installed**





<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
15	12	Pass lashing: Through tiedown provision 7, right side.
16	12A	Through tiedown provision 7, left side.
17	13	Through tiedown provision 6, right side
18	13A	Through tiedown provision 6, left side.
19	14	Through tiedown provision 6, right side
20	14A	Through tiedown provision 6, left side.
21	15	Through tiedown provision 8, right side.
22	15A	Through tiedown provision 8, left side.
23	16	Through tiedown provision 7, right side.
24	16A	Through tiedown provision 7, left side.

**Figure 8-56. Lashings 15 Through 24 Installed**



<i>Lashing Number</i>	<i>Tiedown Ring Number</i>	<i>Instructions</i>
25	B14	Pass lashing: Through tiedown provision 8, right side.
26	C14	Through tiedown provision 8, left side.

**Figure 8-57. Lashings 25 and 26 Installed**



## PREPARING AND SECURING THE PARACHUTE STOWAGE PLATFORM

8-13. Construct the stowage platform as shown in Figure 8-58. Secure the parachute stowage platform as shown in Figure 8-59.

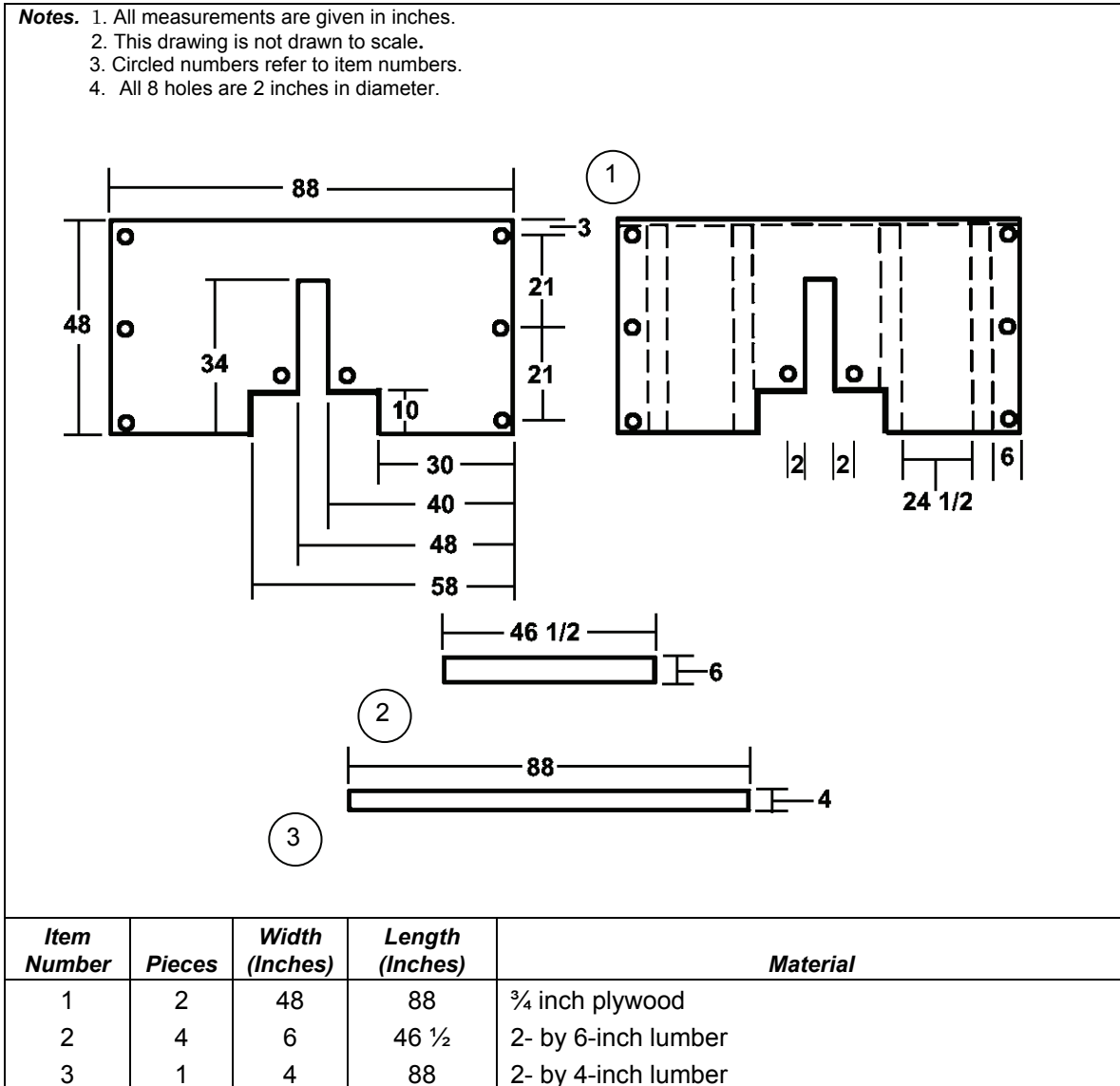
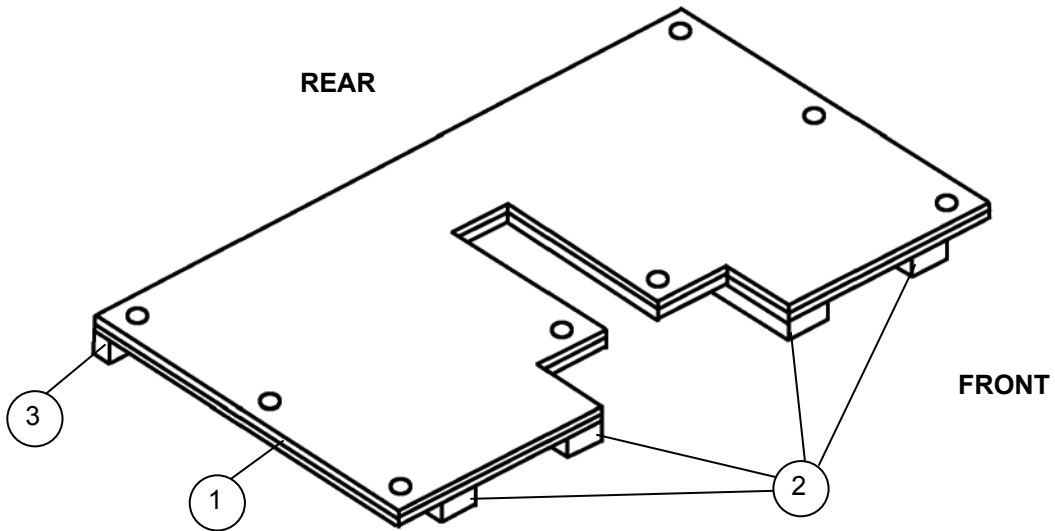


Figure 8-58. Parachute Stowage Platform Prepared

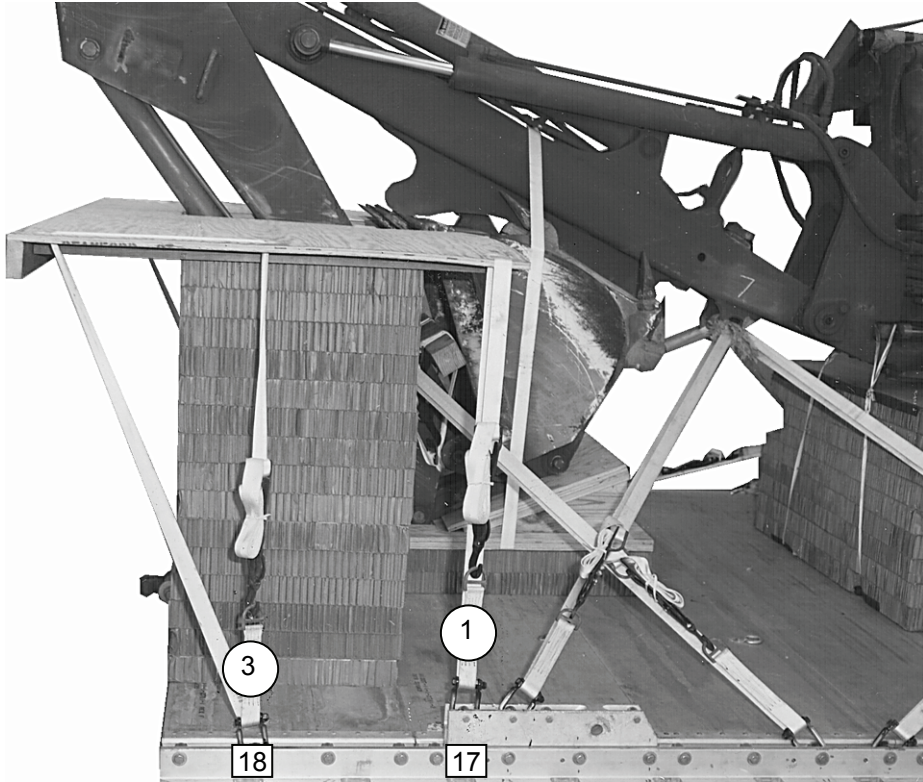
- Notes.** 1. This drawing is not drawn to scale.  
2. Circled numbers refer to item numbers on previous page.



**Step:**

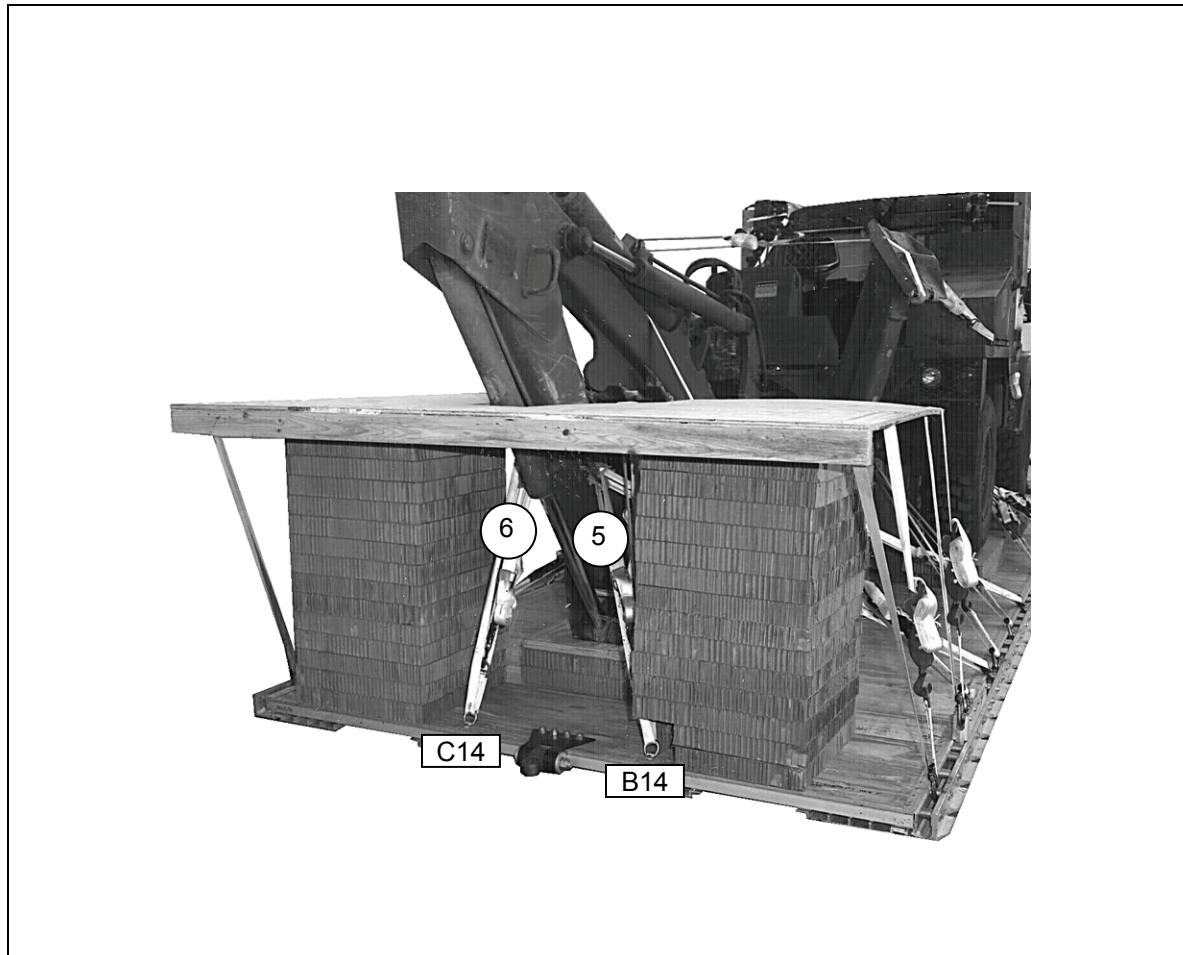
1. Build the parachute stowage platform as shown using the materials given in Figure 8-58 on previous page.
2. Secure the lumber and plywood in place as shown with 4d nails.

**Figure 8-58. Parachute Stowage Platform Prepared (Continued)**



<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
1	17	Pass lashing: Through the front hole in the stowage platform on the right side.
2	17A	Through the front hole in the stowage platform on the left side.
3	18	Through the rear and center holes on the right side.
4	18A	Through the rear and center holes on the left side.

**Figure 8-59. Parachute Stowage Platform Secured**

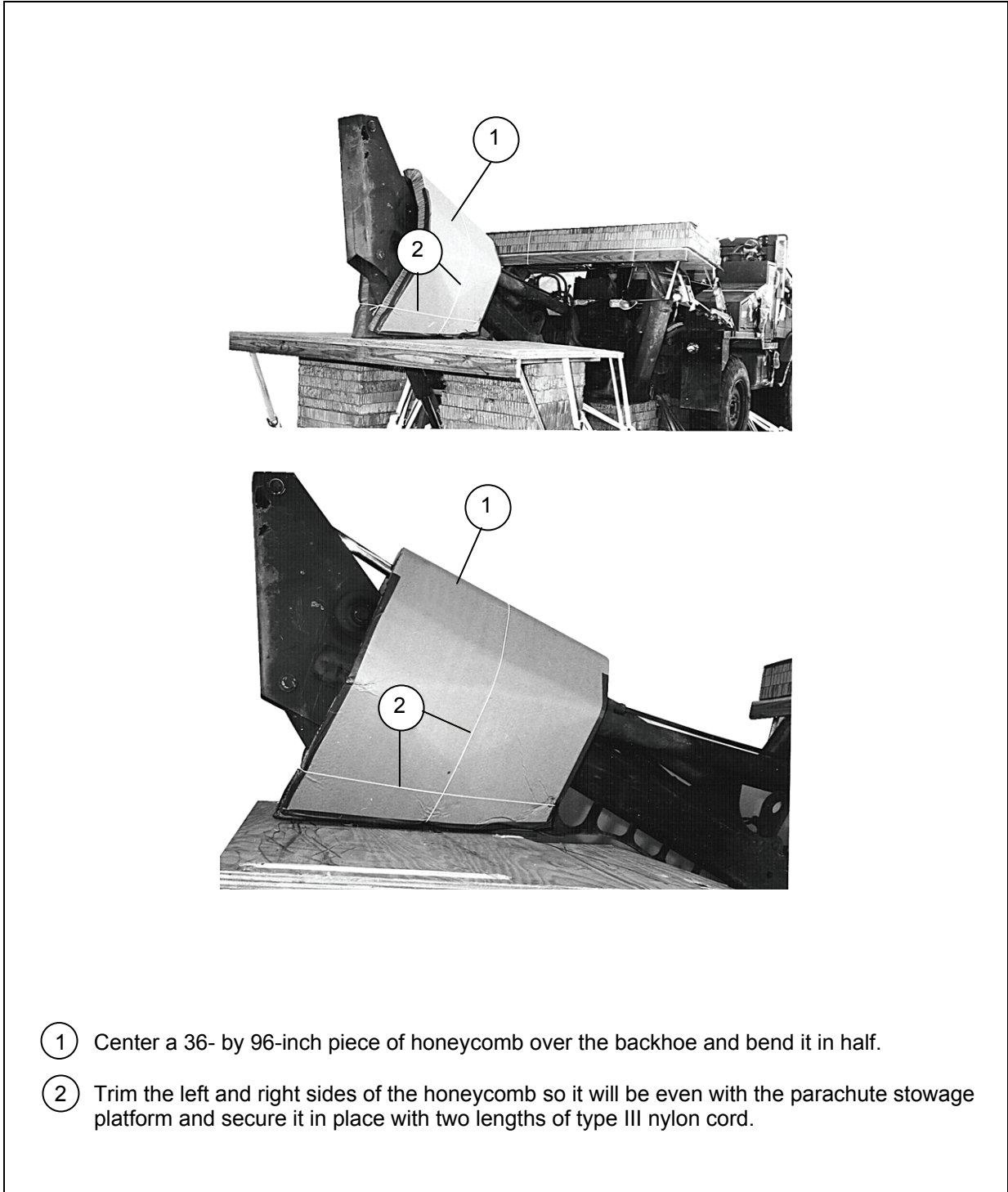


<b>Lashing Number</b>	<b>Tiedown Ring Number</b>	<b>Instructions</b>
5	B14	Pass lashing: Through the center front hole on the inner right side of the stowage platform.
6	C14	Through the center front hole on the inner left side of the stowage platform.
7	A13	Through the center front hole on the inner right side of the stowage platform (not shown).
8	B13	Through the center front hole on the inner left side of the stowage platform (not shown).

**Figure 8-59. Parachute Stowage Platform Secured (Continued)**

## INSTALLING BOOM COVER

8-14. Install the boom cover as shown in Figure 8-60.



**Figure 8-60. Boom Cover Installed**



## BUILDING, POSITIONING, AND SECURING PARACHUTE RELEASE TRAY

8-15. Build the parachute release tray as shown in Figure 8-61. Position and secure the release tray as shown in Figure 8-62.

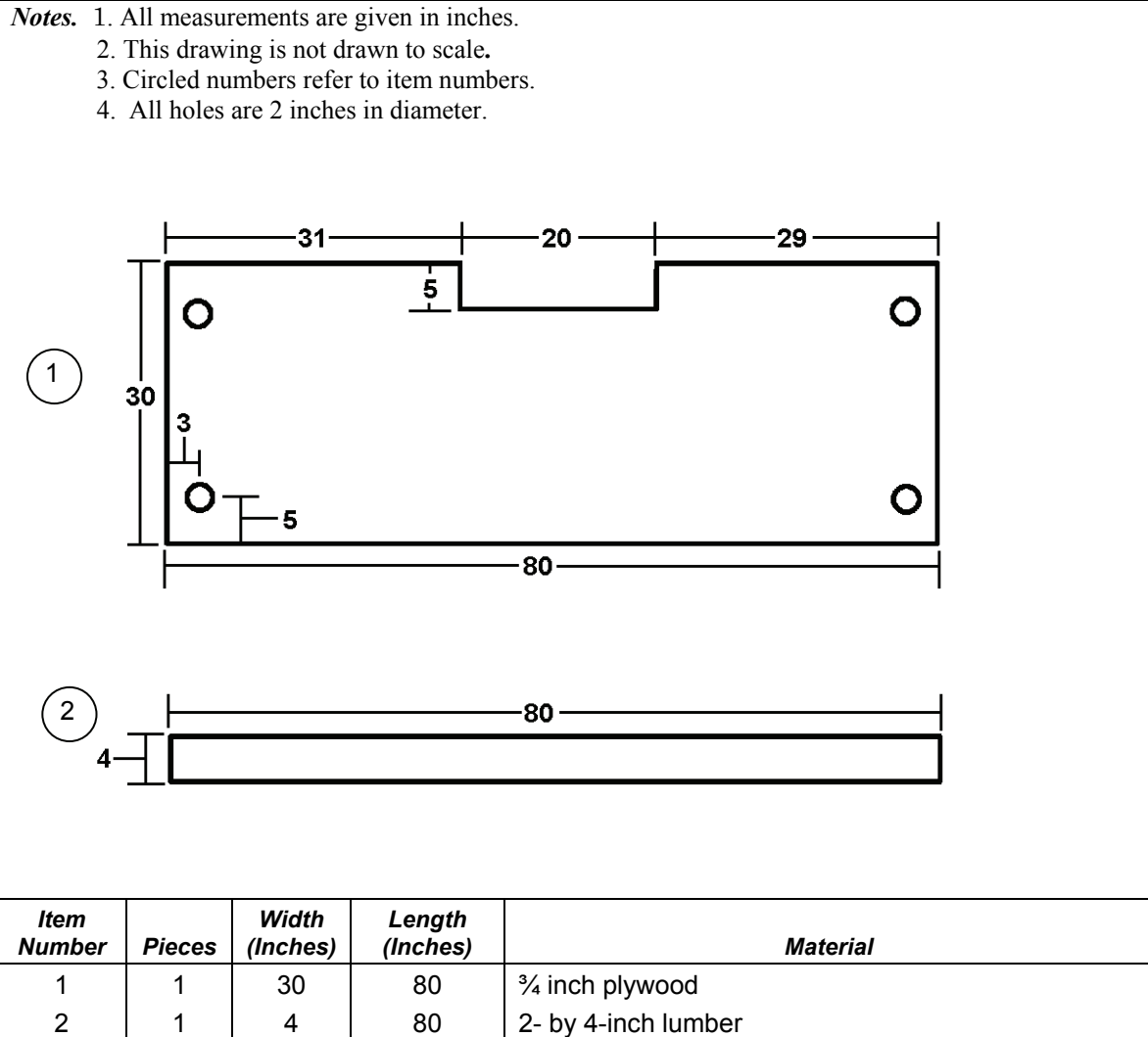
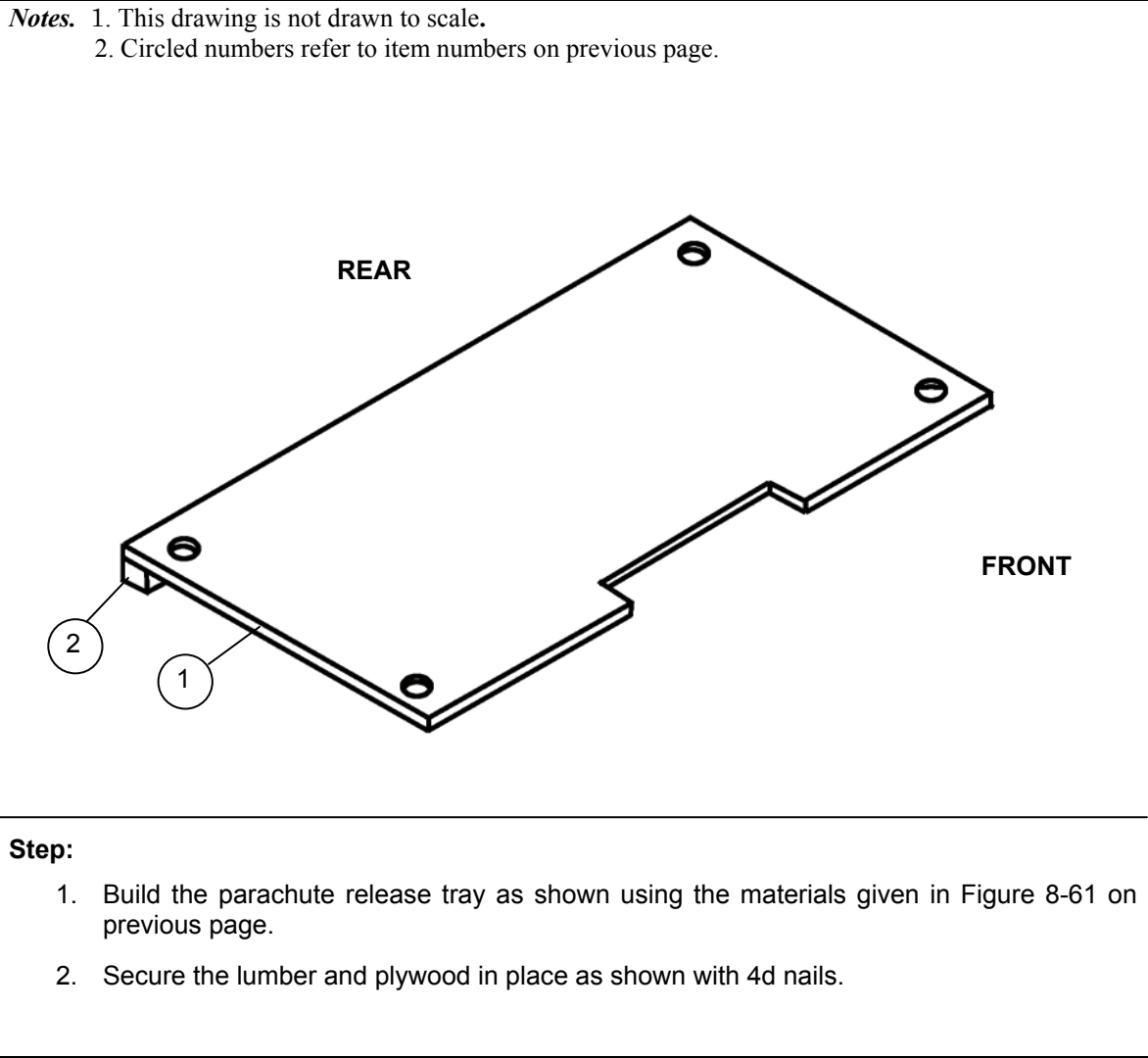
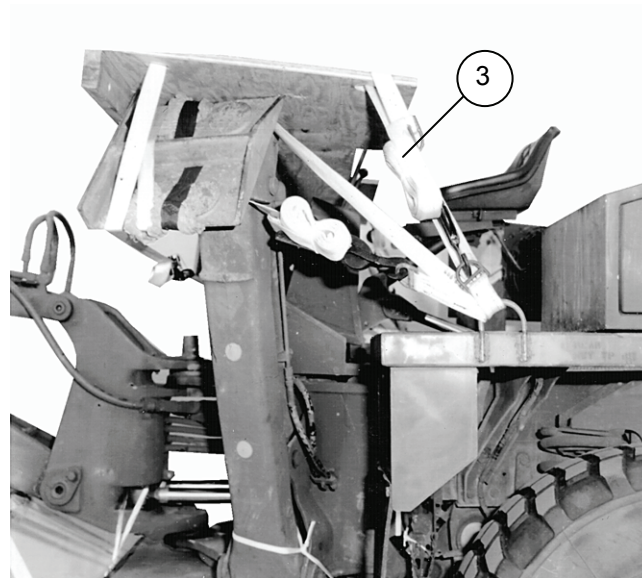
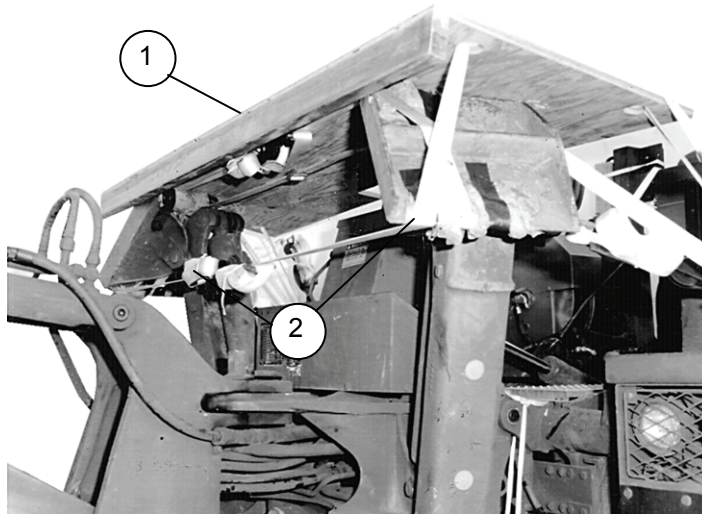


Figure 8-61. Parachute Release Tray Prepared

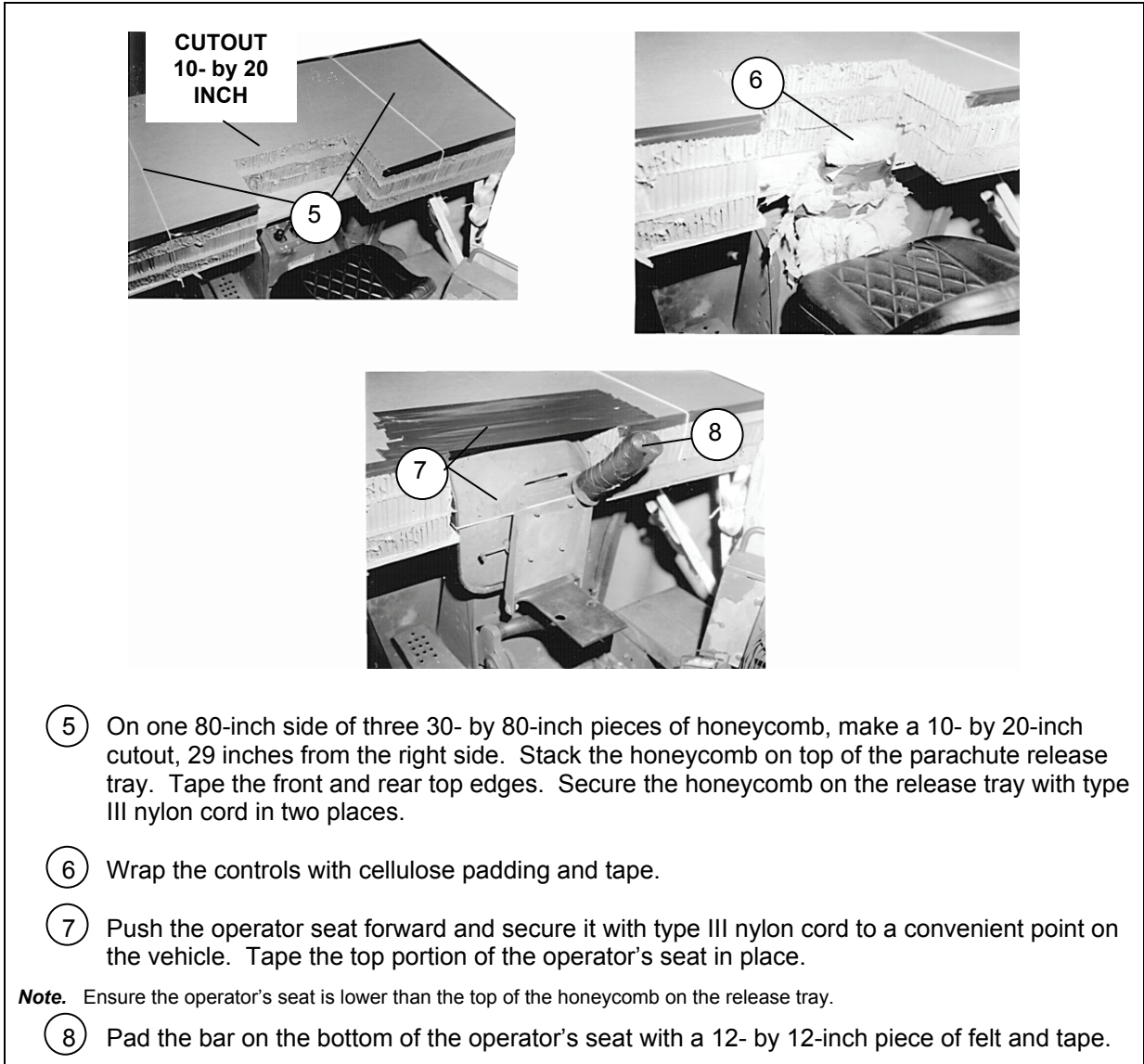


**Figure 8-61. Parachute Release Tray Prepared (Continued)**



- ① Position the parachute release tray on the stabilizers with the cutout facing the front of the vehicle and flush against the backhoe controls.
- ② Form a 30-foot lashing according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5. Run the 30-foot lashing through the rear holes of the release tray and under the stabilizers. Secure the lashing with two D-rings and a load binder.
- ③ Run a 15-foot lashing from the right rear fender tiedown ring through the front hole on the right side of the release tray.
- ④ Run a 15-foot lashing from the left rear fender tiedown ring through the front hole on the right side of the release tray (not shown).

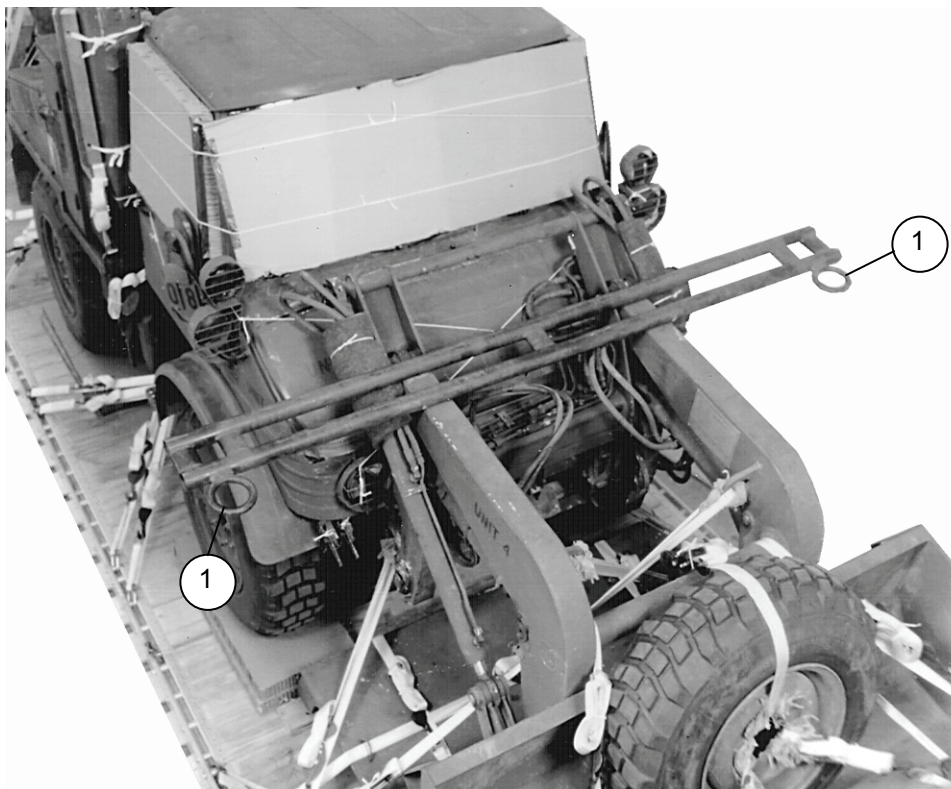
**Figure 8-62. Parachute Release Tray Positioned and Secured**



**Figure 8-62. Parachute Release Tray Positioned and Secured (Continued)**

## INSTALLING ATTITUDE CONTROL BAR (ACB)

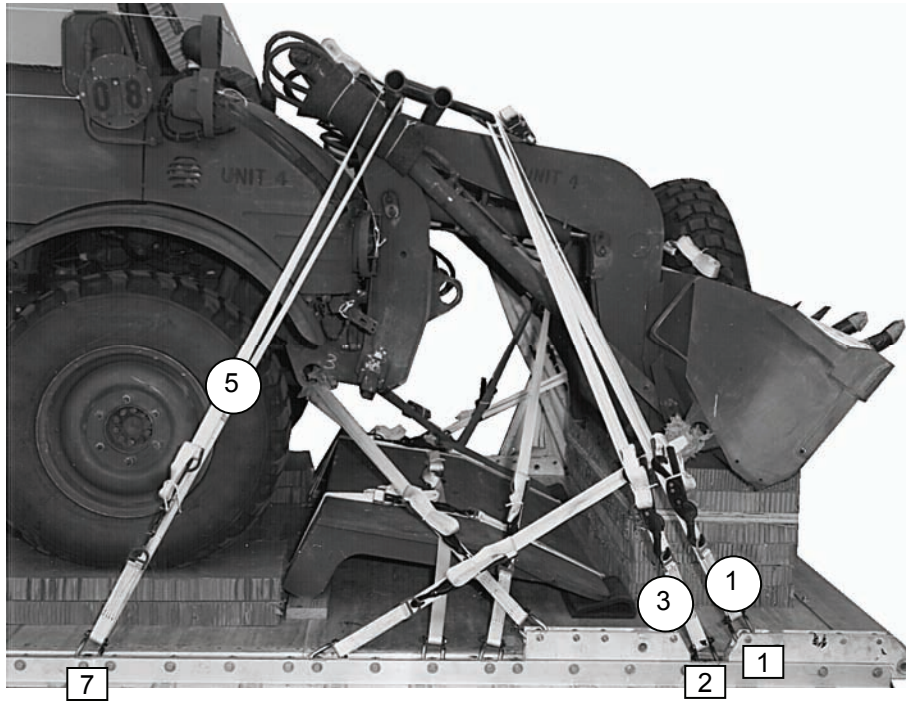
8-16. Install the ACB as shown in Figures 8-63 through 8-64.



- 1 Install the ACB on the front loader arms flush against the felt on the cylinder arms, with the ACB rings pointing toward the front of the platform.

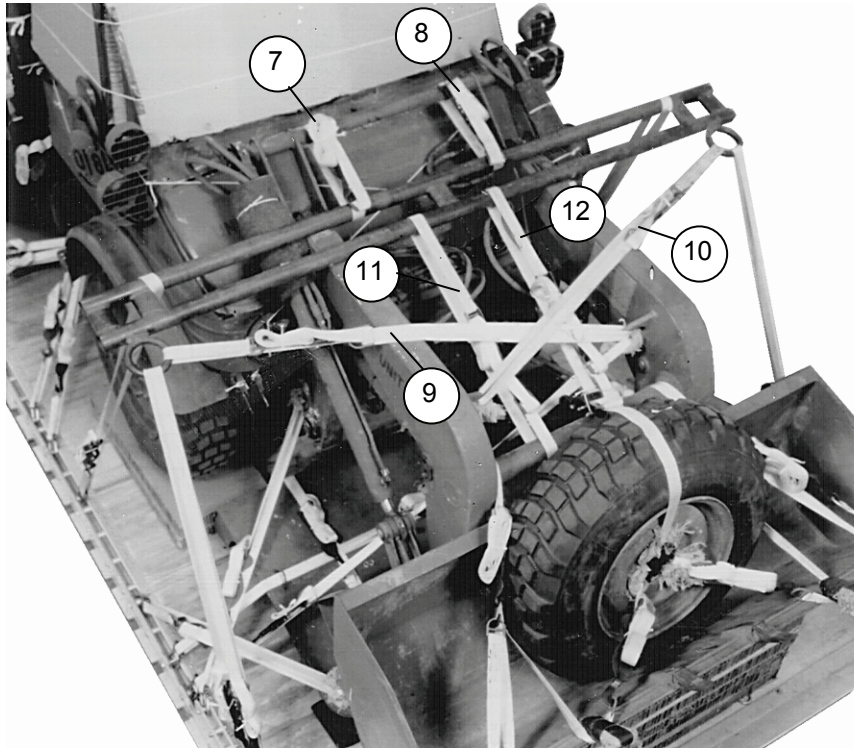
**Figure 8-63. ACB Installed**





<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
1	1	Pass lashing: Through right ring of ACB.
2	1A	Through left ring of ACB.
3	2	Through right ring of ACB.
4	2A	Through left ring of ACB.
5	7	Around top bar on right side of the ACB.
6	7A	Around top bar on left side of the ACB.

**Figure 8-64. Lashings 1 Through 6 Installed on ACB**

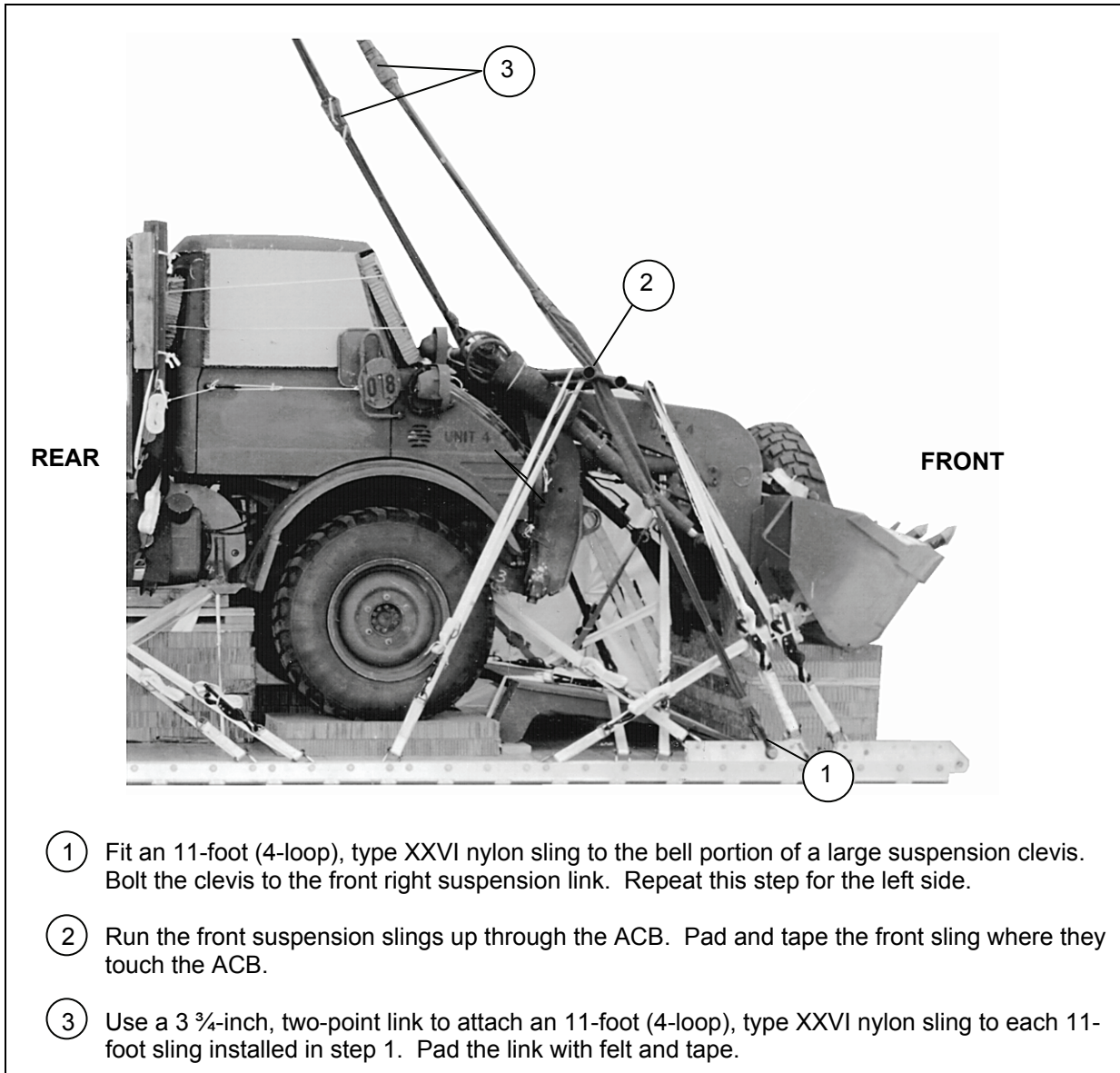


<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
7		Pass lashing: Around top hydraulic arm support and around top bar of the ACB, right side.
8		Around top hydraulic arm support and around top bar of the ACB, left side.
9		Through tiedown provision 2 on the left side and through right ring of the ACB.
10		Through tiedown provision 2 on the right side and through left ring of the ACB.
11		From the lower frame support arm of the bucket around the lower bar of the ACB, right side.
12		From the lower frame support arm of the bucket around the lower bar of the ACB, left side.

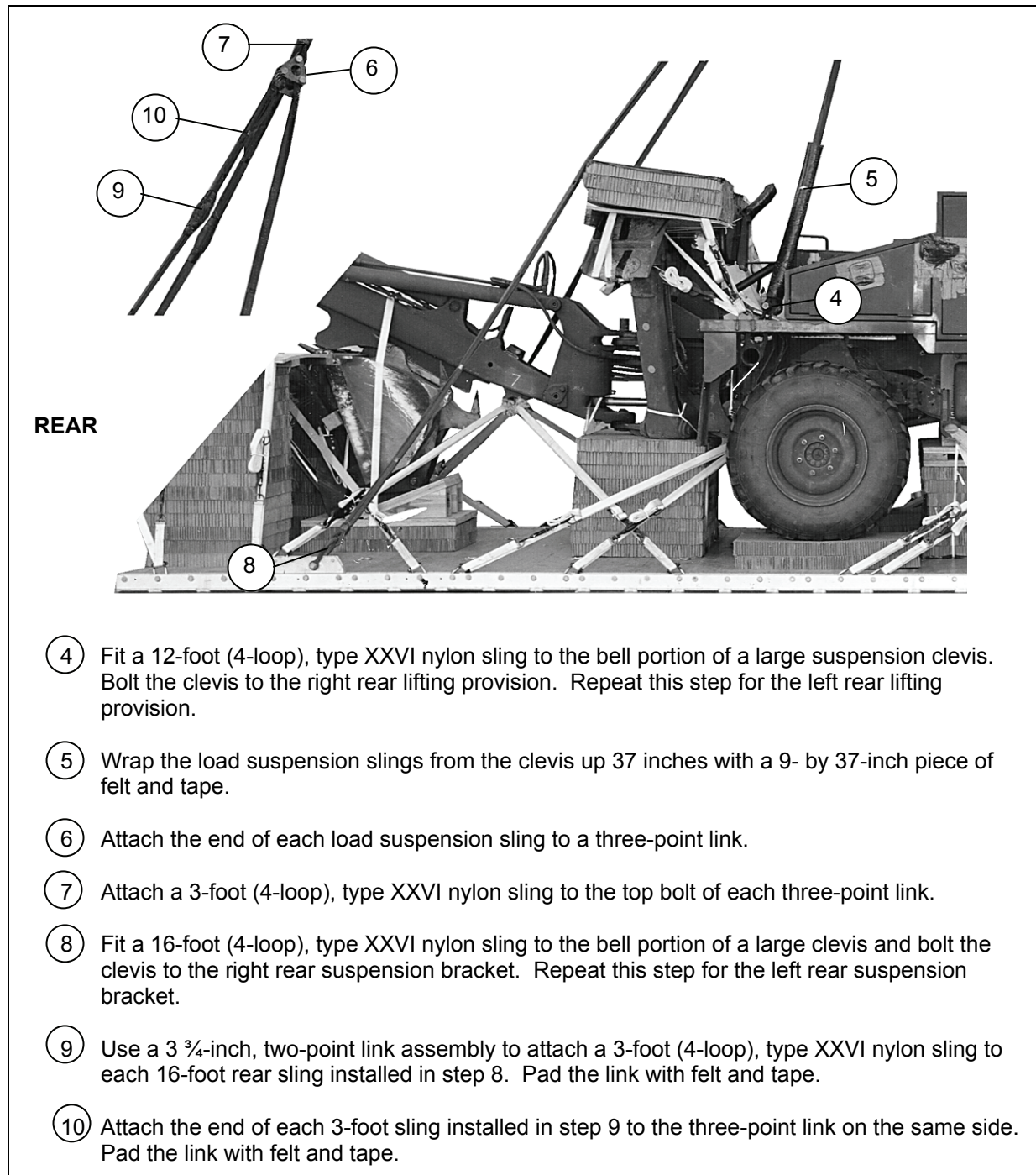
**Figure 8-64 Continued. Lashings 7 Through 12 Installed on ACB**

## **INSTALLING AND SAFETY TIEING THE SUSPENSION SLINGS**

8-17. Install and safety tie the suspension slings according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figure 8-65.



**Figure 8-65. Suspension Slings and Deadman's Tie Installed**



**Figure 8-65. Suspension Slings and Deadman's Tie Installed (Continued)**

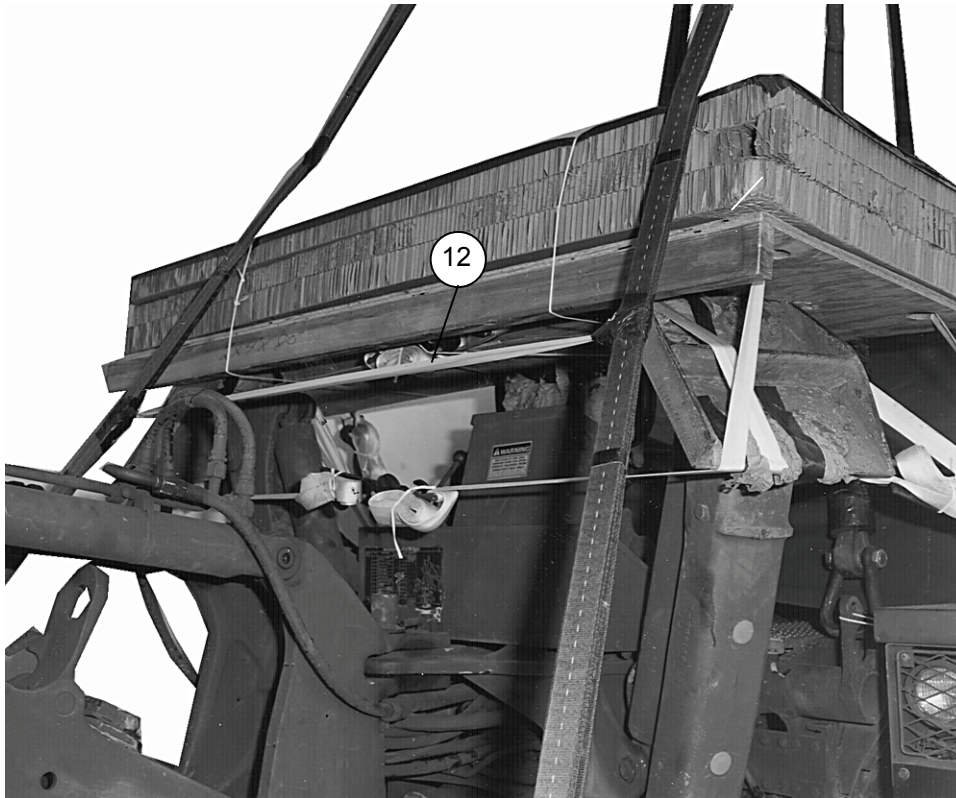




- ① Install a modified deadman's tie according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5, three inches above the taped felt on the center suspension slings using ½-inch tubular nylon webbing.

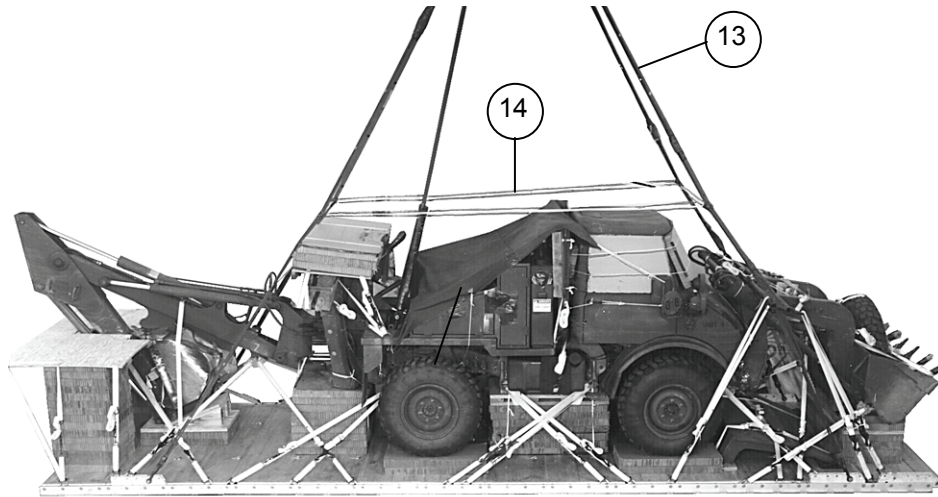
**Figure 8-65. Suspension Slings and Deadman's Tie Installed (Continued)**





- ⑫ Install a modified deadman's tie according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5, eighty inches above the clevises on the rear suspension slings using ½-inch tubular nylon webbing.

**Figure 8-65. Suspension Slings and Deadman's Tie Installed (Continued)**



- ⑬ Raise the suspension slings until they are tight.
- ⑭ Install a deadman's tie according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5, four inches above the cab on the front and rear suspension slings using ½-inch tubular nylon webbing.

**Figure 8-65. Suspension Slings and Deadman's Tie Installed (Continued)**

## INSTALLING LOAD COVERS

8-18. Install the load covers as shown in Figure 8-66.

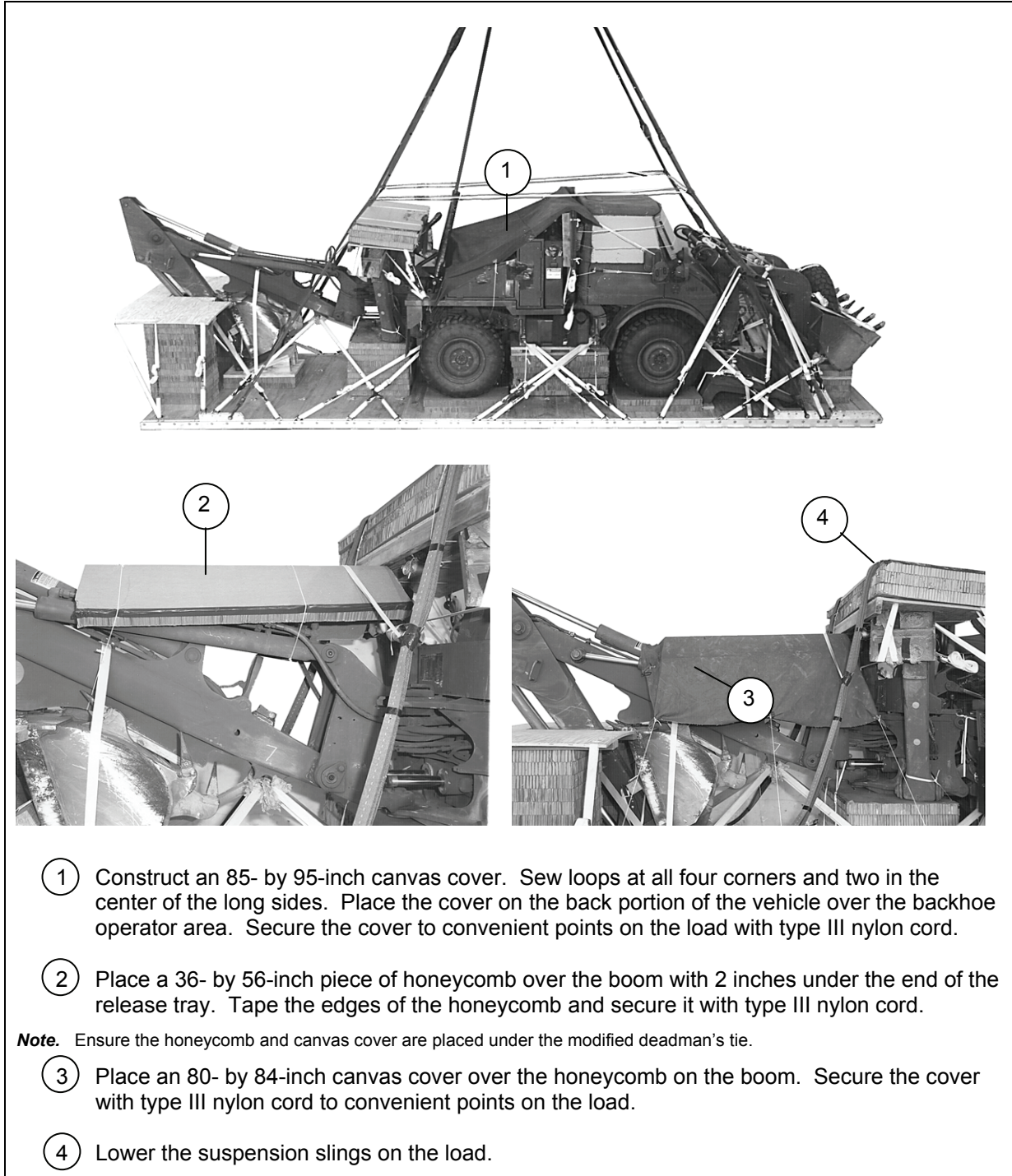
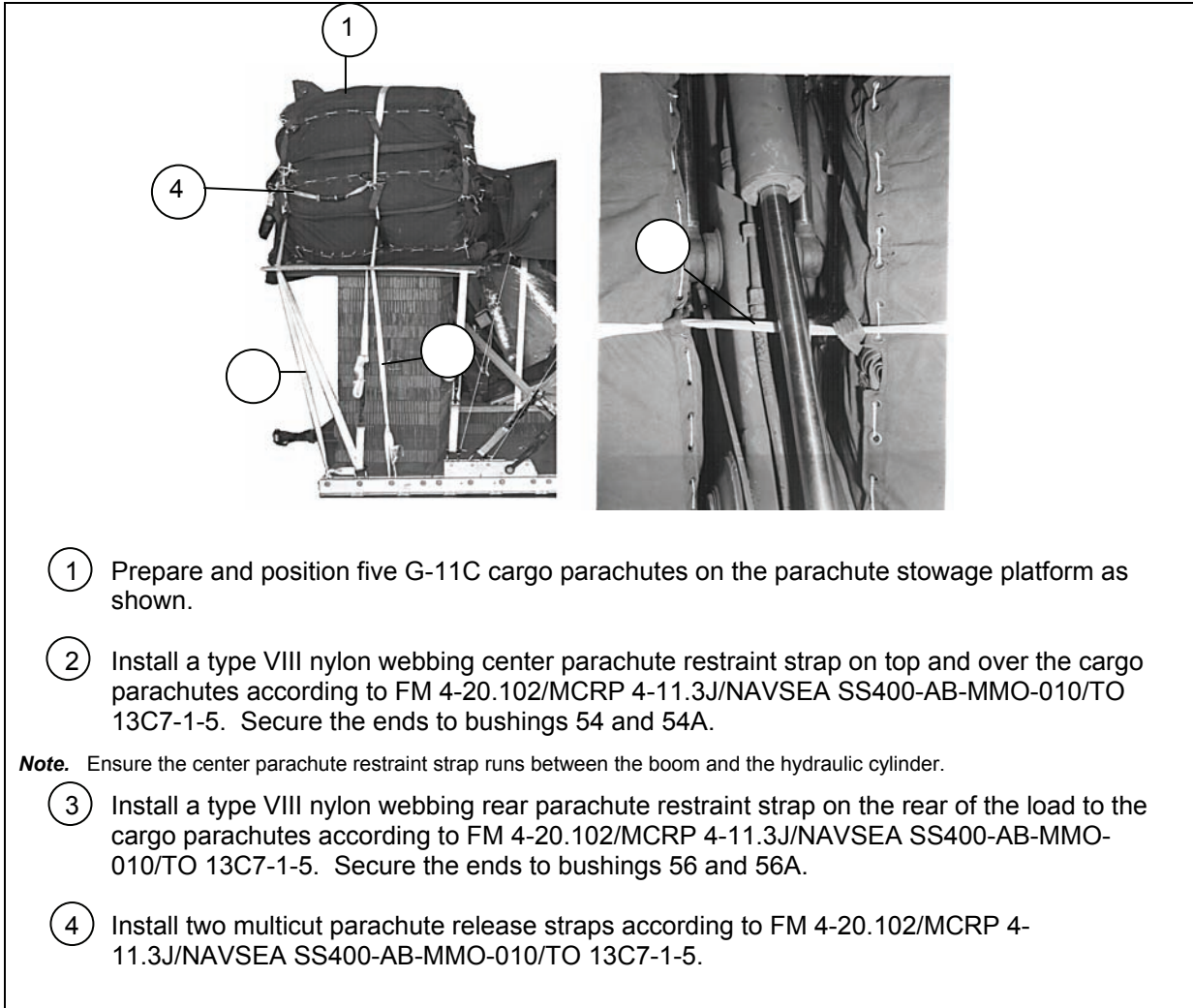


Figure 8-66. Load Cover Installed

## **STOWING CARGO PARACHUTES**

8-19. Prepare, stow, and restrain five G-11C cargo parachutes according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figure 8-67.

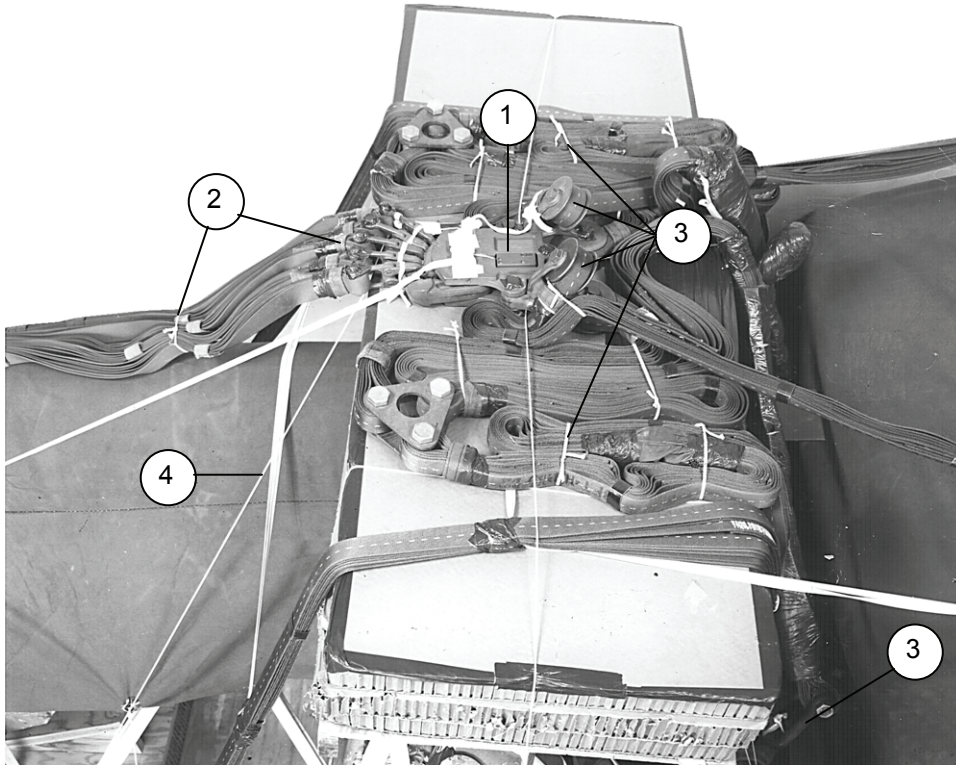


**Figure 8-67. Cargo Parachutes Positioned and Restrained**



## INSTALLING PARACHUTE RELEASE SYSTEM

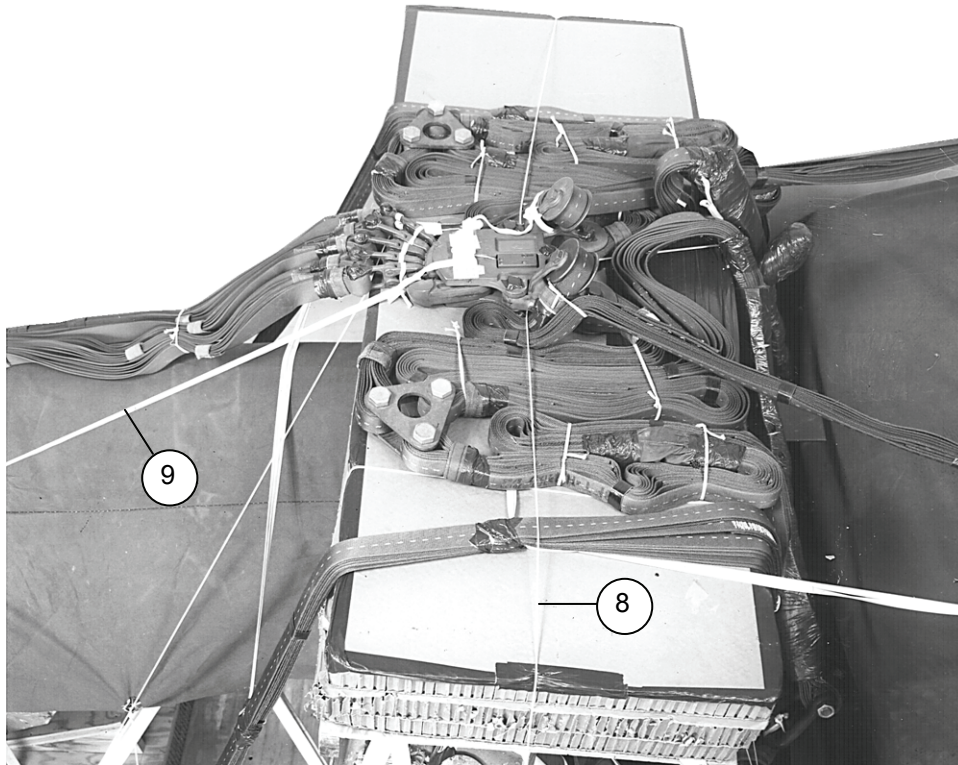
8-20. Prepare and install an M-2 parachute release system according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figure 8-68.



- ① Center an M-2 parachute release assembly on the parachute release tray.
- ② Attach the parachute riser extensions to the parachute release connectors. Safety tie the risers in two places with type I, ¼-inch cotton webbing.
- ③ Attach the suspension slings to the lower suspension links. Fold the suspension slings and secure the folds with type I, ¼-inch cotton webbing. Bring the large clevises from the rear lifting provision up tight against the load and secure them with ½-inch tubular nylon webbing.
- ④ Tie the front M-2 parachute release safety tie to bushing 2 of the rear suspension brackets with type III nylon cord.
- ⑤ Tie the rear M-2 parachute release safety tie to the rear lifting provisions on the SEE with type III nylon cord (not shown).

**Figure 8-68. M2 Parachute Release Installed**





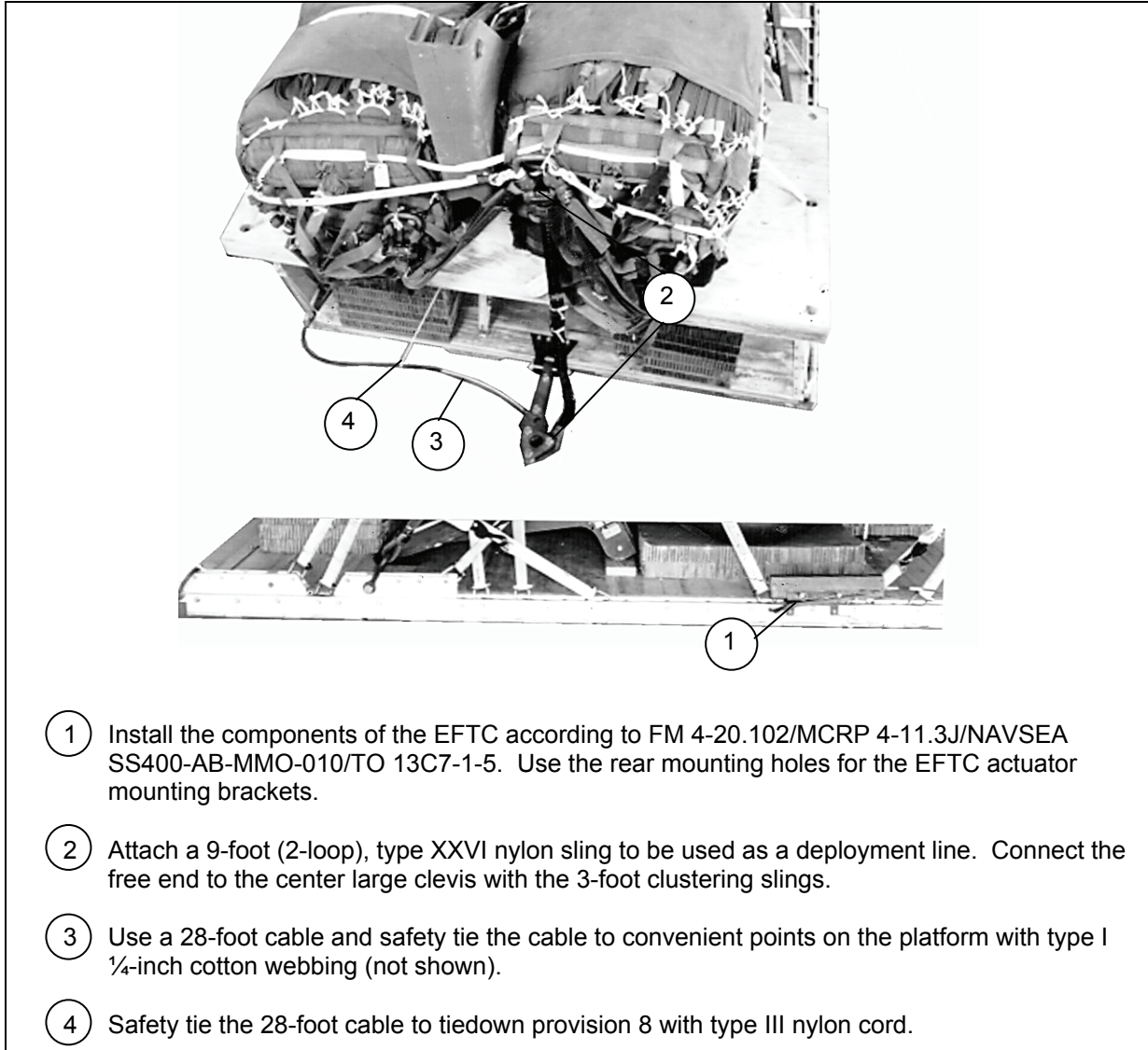
- ⑥ Safety the front suspension slings to the ROPS handle with type III nylon cord. Take all the slack out of the slings and secure them to the ROPS handle with type I, 1/4-inch cotton webbing (not shown).
- ⑦ Pull the rear slings up and over the release tray. Safety tie the slings with type III nylon cord (not shown).
- ⑧ Make a safety tie using type III nylon cord. Run the tie from bushing 39, over the top of the suspension slings, and under the release assembly. Secure the tie to bushing 39A.
- ⑨ Install the arming wire lanyard according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.

**Note.** Tape the suspension slings where the type III nylon cord safety ties touch the slings.

**Figure 8-68. M2 Parachute Release Installed (Continued)**

## INSTALLING EXTRACTION SYSTEM

8-21. Install the extraction system as shown in Figure 8-69.



**Figure 8-69. Extraction System Installed**

## **PLACING EXTRACTION PARACHUTE**

8-22. Select the extraction parachute and extraction line needed using the extraction line requirements table in FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5. Place the extraction parachute and line on the load for installation in the aircraft.

## **INSTALLING PROVISIONS FOR EMERGENCY RESTRAINTS**

8-23. Select and install the provisions for the emergency aft restraints according to the emergency aft restraint requirements table in FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.

## **MARKING RIGGED LOAD**

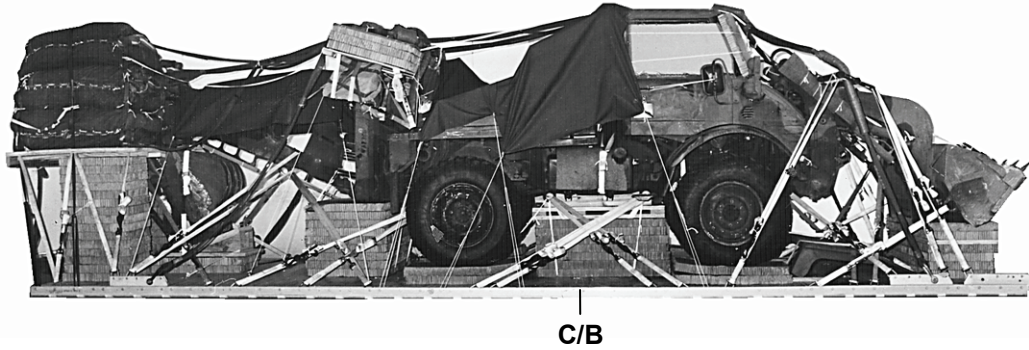
8-24. Mark the rigged load according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5, and as shown in Figure 8-70. Complete Shipper's Declaration for Dangerous Goods. If the load varies from the one shown, the weight, height, CB, and parachute requirements must be recomputed.

## **EQUIPMENT REQUIRED**

8-25. Use the equipment listed in Table 8-1 to rig this load.

**CAUTION**

Make the final rigger inspection required by AR 59-4 and FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 before the load leaves the rigging site.



**RIGGED LOAD DATA**

Weight: Load Shown.....	21,624 pounds
Maximum Load Allowed.....	21,944 pounds
Height.....	99 ¾ inches
Width.....	108 inches
Overall Length .....	374 inches
Overhang: Front (bucket).....	6 inches
Rear (boom).....	22 inches
Center of Balance (CB) (from front edge of the platform).....	165 inches

**Figure 8-70. SEE Rigged on a 28-Foot, Type V Platform for Low-Velocity Airdrop**

**Table 8-1. Equipment Required for Rigging the See on a 28-Foot, Type V Platform for Low-Velocity Airdrop**

<i>National Stock Number</i>	<i>Item</i>	<i>Quantity</i>
8040-00-273-8713	Adhesive paste, 1-gal.	As required
1670-00-003-4389	Bar, attitude control	1
1670-01-035-6054	Bridle, extraction line bag	1
4030-00-678-8562	Clevis, suspension, 3/4-inch (medium)	2
4030-00-090-5354	Clevis, suspension, 1-inch (large)	10
8305-00-880-8155	Cloth, coated (nylon, type II, 17.0 oz, green, 60-in)	As required
4020-00-240-2146	Cord, nylon, type III, 550-lb	As required
1670-00-326-7309	Coupling, airdrop extraction force transfer, w/28-ft. cable	1
8135-00-664-6958	Cushioning material (Cellulose padding)	As required
8305-00-958-3685	Felt, 1/2-inch thick	As required
1670-01-183-2678	Leaf, extraction line (line bag) ( add 2 for C-17)	2
	Line extraction:	
1670-01-062-6313	60-foot (3-loop), type XXVI (for C-130)	1
1670-01-107-7561	140-foot (3-loop), type XXVI (for C-17)	1
1670-01-064-4452	60-foot (1-loop), type XXVI (for C-17), (drogue line)	1
1670-00-783-5988	Link assembly, type IV (C-17 only)	1
	Link assembly, two-point:	
5306-00-435-8994	Bolt, 1-inch diameter, 4-inches long	8
5310-00-232-5165	Nut, 1-inch	8
1670-00-003-1953	Plate, side, 3 3/4 -inch	8
5365-00-007-3414	Spacer, large	8
	Lumber:	
5510-00-220-6146	2- by 4- by 96-inch	4
5510-00-220-6148	2- by 6- by 96-inch	4
5510-00-220-6246	2- by 8- by 96-inch	2
5510-00-220-6274	4- by 4- by 120-inch	1
5315-00-162-3151	Nail, steel, common, 4d	As required
1670-00-753-3928	Pad, energy-dissipating (honeycomb)	30 sheets
1670-01-016-7841	Parachute, cargo, G-11C	5
	Parachute, cargo, extraction:	
1670-00-040-8135	28-foot	1
1670-01-063-3715	15-foot (C-17 only)	1
	Platform, airdrop, type V, 28 foot:	
1670-01-162-2372	Clevis assembly (type V)	38
1670-01-162-2376	Extraction bracket assembly	1
1670-01-247-2389	Link, suspension bracket, type V	4
1670-01-162-2381	Tandem link assembly (Multipurpose link)	2
5530-00-128-4981	Plywood, 3/4-inch	9 Sheets



**Table 8-1. Equipment Required for Rigging the SEE on a 28-Foot, Type V Platform for Low-Velocity Airdrop (Continued)**

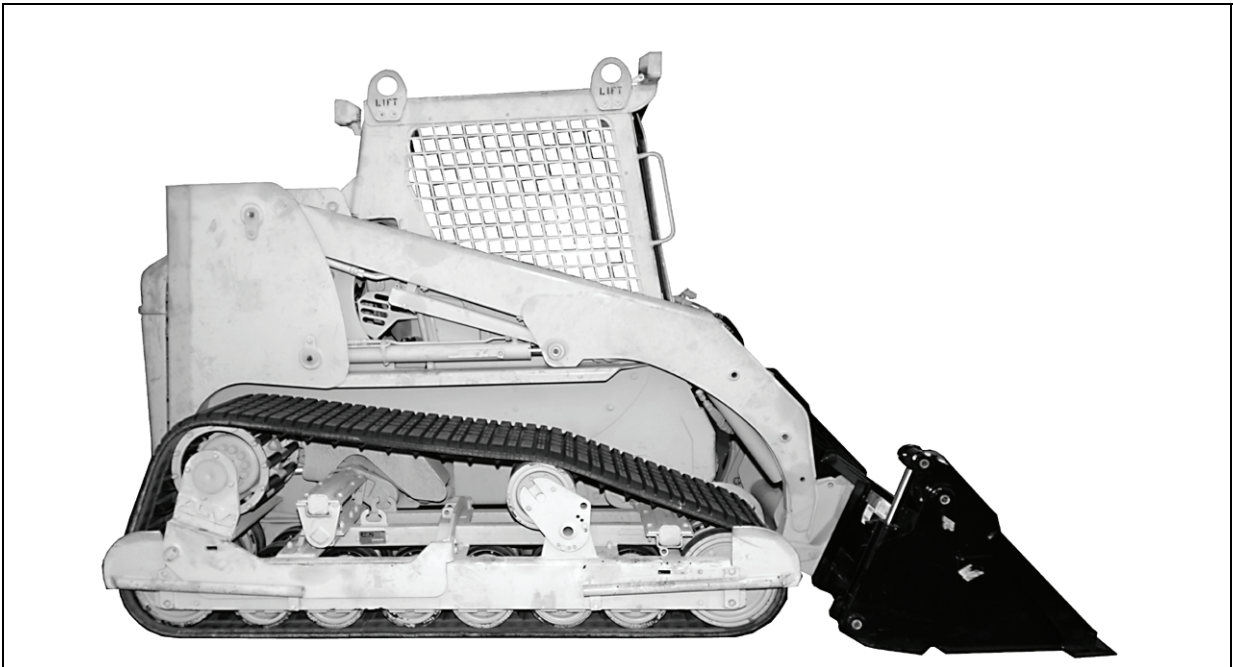
<i>National Stock Number</i>	<i>Item</i>	<i>Quantity</i>
1670-01-097-8817	Release, cargo parachute, M-2	1
	Sling, cargo, airdrop:	
1670-01-062-6306	3-foot (4-loop), type XXVI	4
1670-01-062-6304	9-foot (2-loop), type XXVI	1
1670-01-062-6305	9-foot (4-loop), type XXVI	2
1670-01-062-6310	11-foot (4-loop), type XXVI	4
1670-01-062-6307	12-foot (4-loop), type XXVI	4
1670-01-062-6308	16-foot (4-loop), type XXVI	2
1670-01-062-6312	120-foot (2-loop), type XXVI	5
5340-00-040-8219	Strap, parachute, release, multi-knife	2
7501-00-266-5016	Tape, adhesive, 2-inch	As required
1670-00-937-0271	Tiedown assembly, 15-foot	70
1670-01-483-8259	Link, Parachute, Connector (H-block) (C-17 only)	1
	Webbing:	
8305-00-268-2411	Cotton, 1/4-inch, type I	As required
8305-00-082-5752	Nylon, tubular, 1/2-inch	As required
8305-00-268-2455	Nylon, tubular 1-inch	As required
8305-00-261-8585	Nylon, type VIII	As required

## Chapter 9

# Rigging the 277 Multi-Terrain Loader (MTL) on a 20-Foot, Type V Platform for Low-Velocity Airdrop

### DESCRIPTION OF THE LOAD

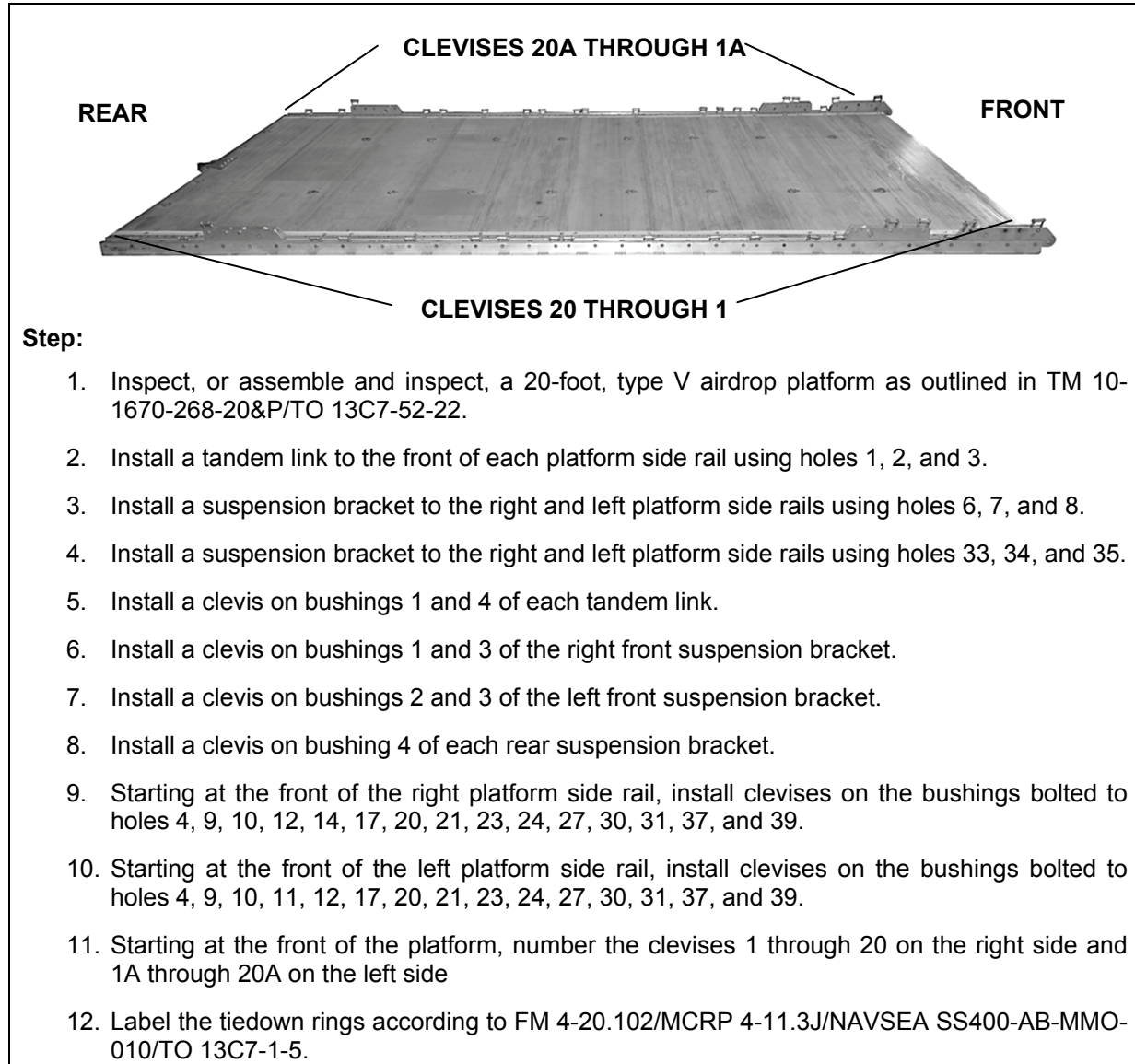
*9-1.* The 277 Multi-Terrain Loader (MTL) (Figure 9-1) is rigged on a 20-foot, type V airdrop platform using four G-11 cargo parachutes. The 277 MTL is 82 inches high, 78 inches wide, 115 inches long, and weighs 9,052 pounds. An accompanying load which consists of a front-end bucket loader attachment, a drill attachment, and an equipment storage box with a minimum weight of 1,500 pounds and a maximum weight of 3,000 pounds is also rigged with the load. The drill attachment weighs 920 pounds and the front-end bucket loader attachment weighs 940 pounds.



**Figure 9-1. 277 Multi-Terrain Loader**

## PREPARING PLATFORM

9-2. Prepare a 20-foot, type V airdrop platform as shown in Figure 9-2.

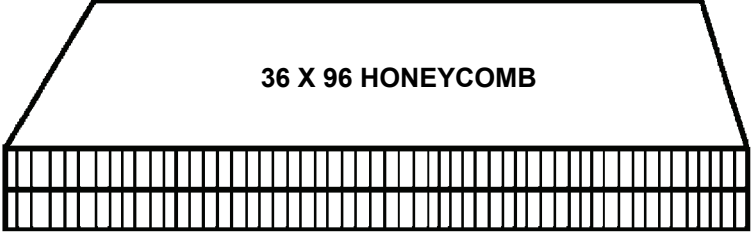


**Figure 9-2. Platform Prepared**

## BUILDING AND POSITIONING HONEYCOMB STACKS

9-3. Build the honeycomb stacks as shown in Figures 9-3 through 9-6. Position the stacks as shown in Figure 9-7.

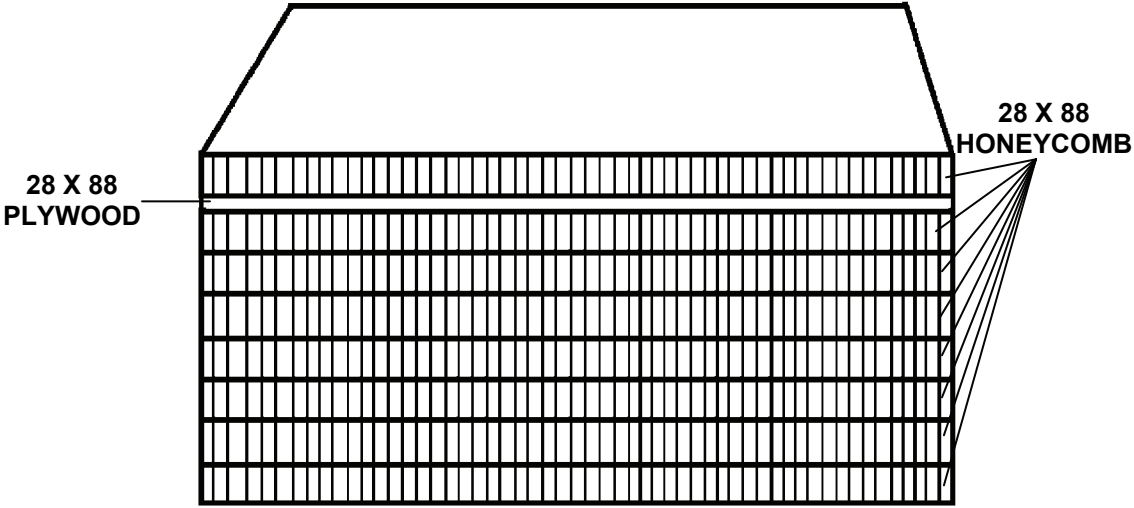
**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



Stack Number	Pieces	Width (Inches)	Length (Inches)	Material	Instructions
1	2	96	36	Honeycomb	Glue two pieces together to form a stack.

Figure 9-3. Honeycomb Stack 1 Prepared

**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



Stack Number	Pieces	Width (Inches)	Length (Inches)	Material	Instructions
2	7	28	88	Honeycomb	Glue together to form a base.
	1	28	88	3/4-inch Plywood	Glue flush on top of the base.
	1	28	88	Honeycomb	Glue flush on top of the plywood.

Figure 9-4. Honeycomb Stack 2 Prepared

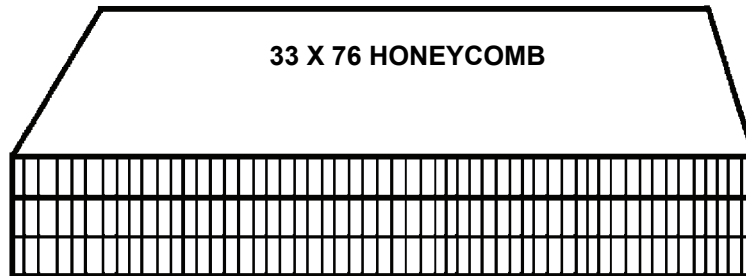
**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



<i>Stack Number</i>	<i>Pieces</i>	<i>Width (Inches)</i>	<i>Length (Inches)</i>	<i>Material</i>	<i>Instructions</i>
3 and 4	2	18	96	Honeycomb	Glue together to form a base.
	1	18	96	¾-inch Plywood	Glue flush on top of the base.
	1	18	96	Honeycomb	Glue flush on top of the plywood.

**Figure 9-5. Honeycomb Stacks 3 and 4 Prepared**

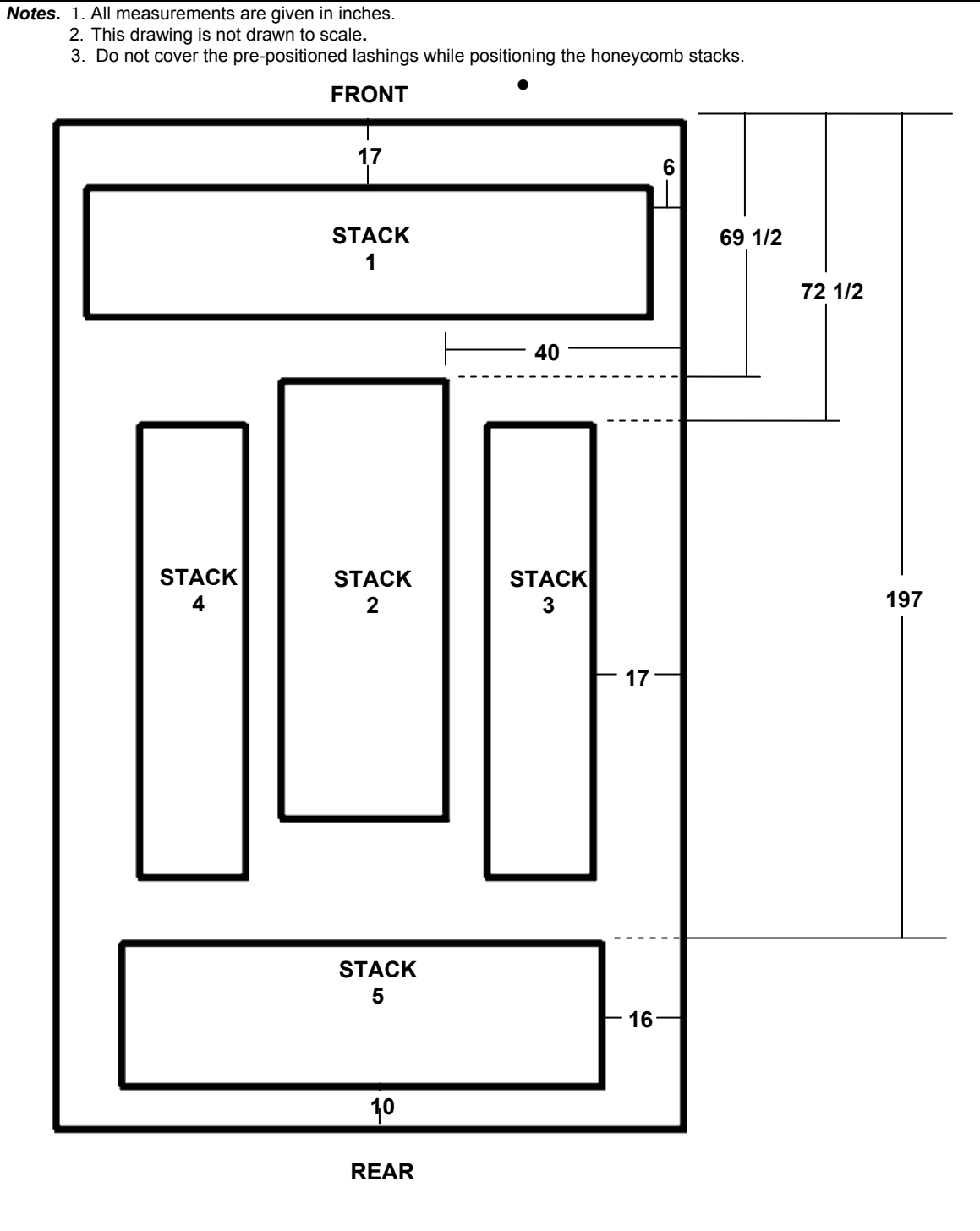
**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



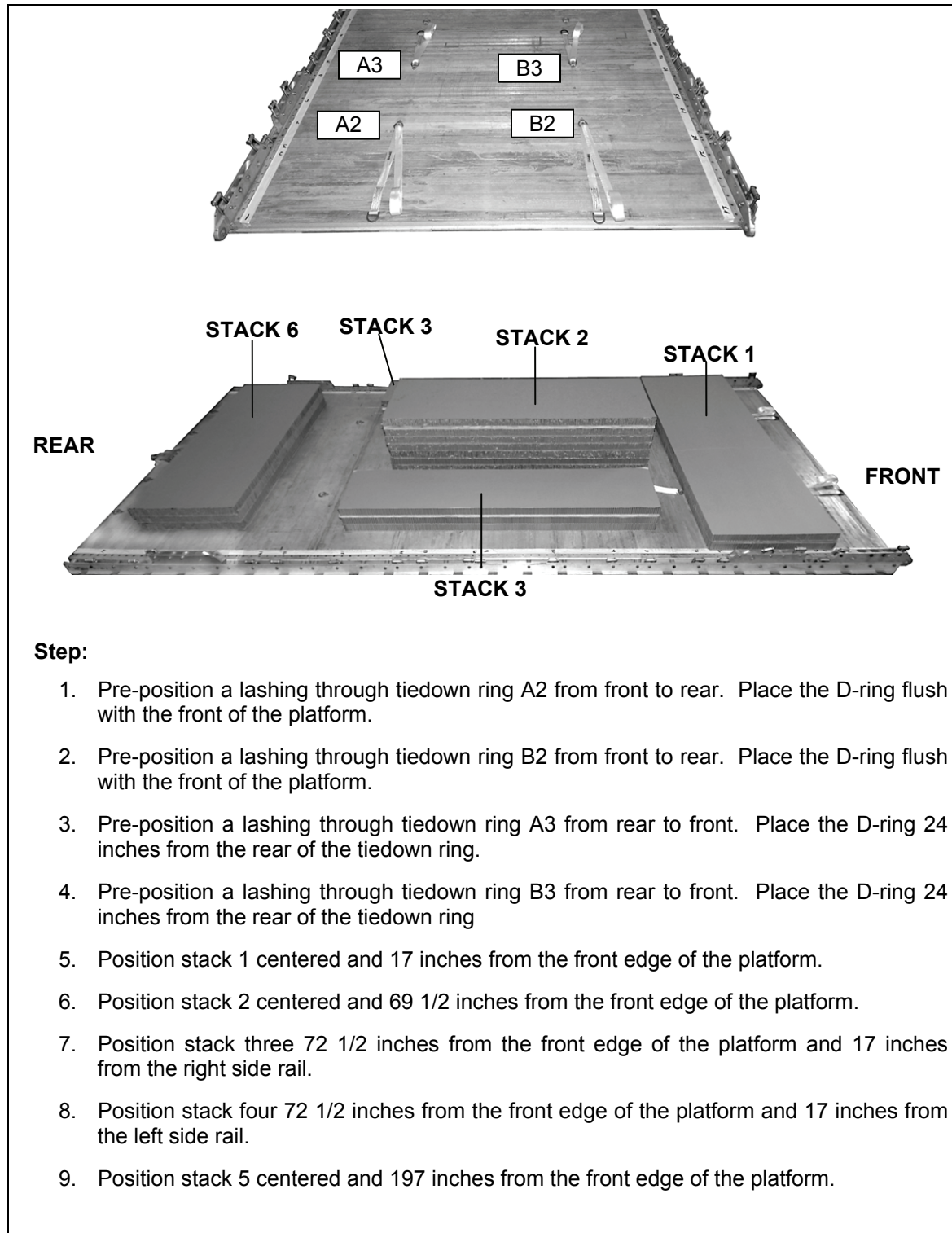
<i>Stack Number</i>	<i>Pieces</i>	<i>Width (Inches)</i>	<i>Length (Inches)</i>	<i>Material</i>	<i>Instructions</i>
5	3	76	33	Honeycomb	Glue two pieces together to form a stack.

**Figure 9-6. Honeycomb Stack 5 Prepared**





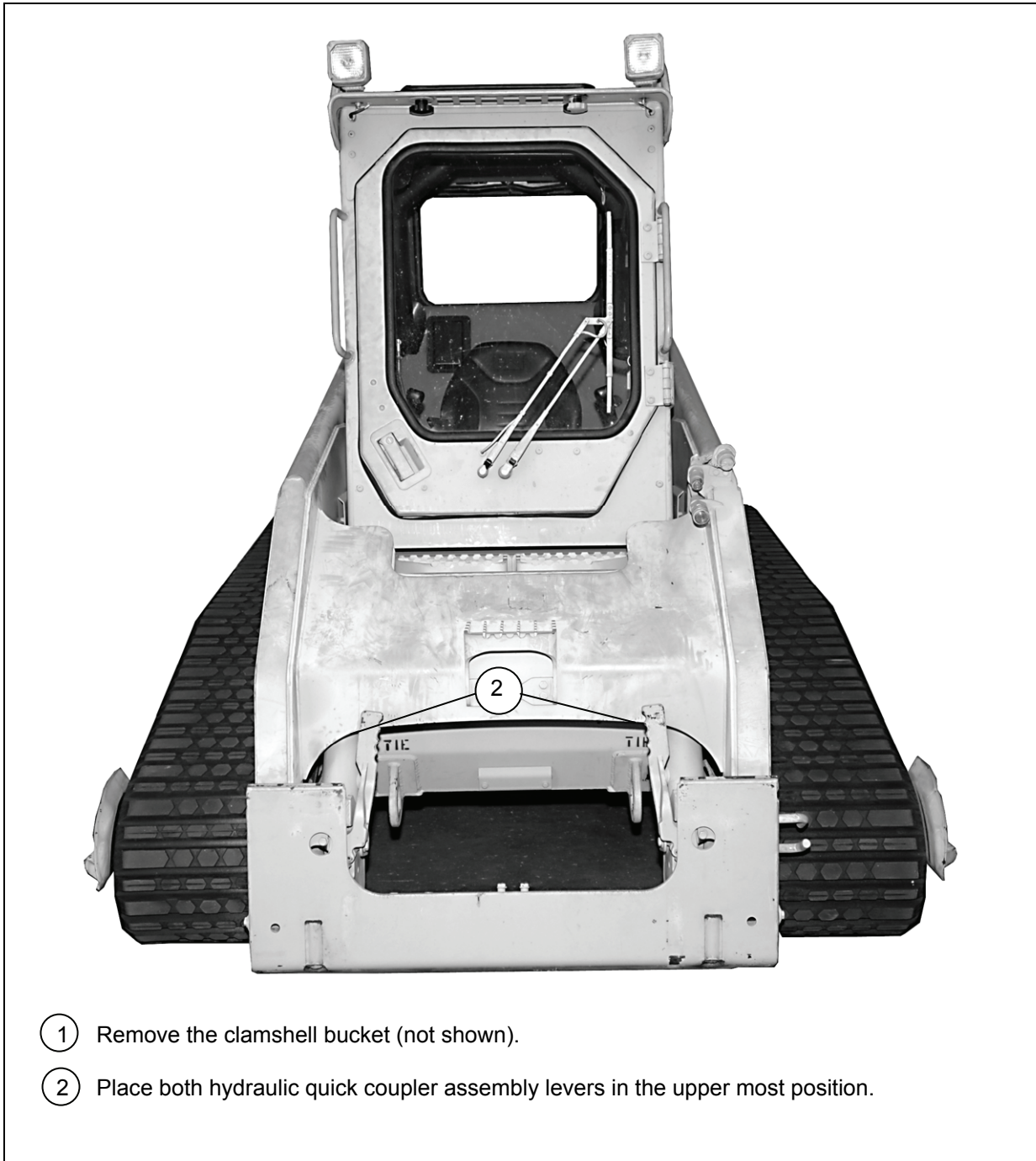
**Figure 9-7. Honeycomb Stacks Positioned on Platform**



**Figure 9-7. Honeycomb Stacks Positioned on Platform (Continued)**

## PREPARING THE 277 MULTI-TERRAIN LOADER

9-4. Prepare the MTL as shown in Figure 9-8.



**Figure 9-8. Multi-Terrain Loader Prepared**

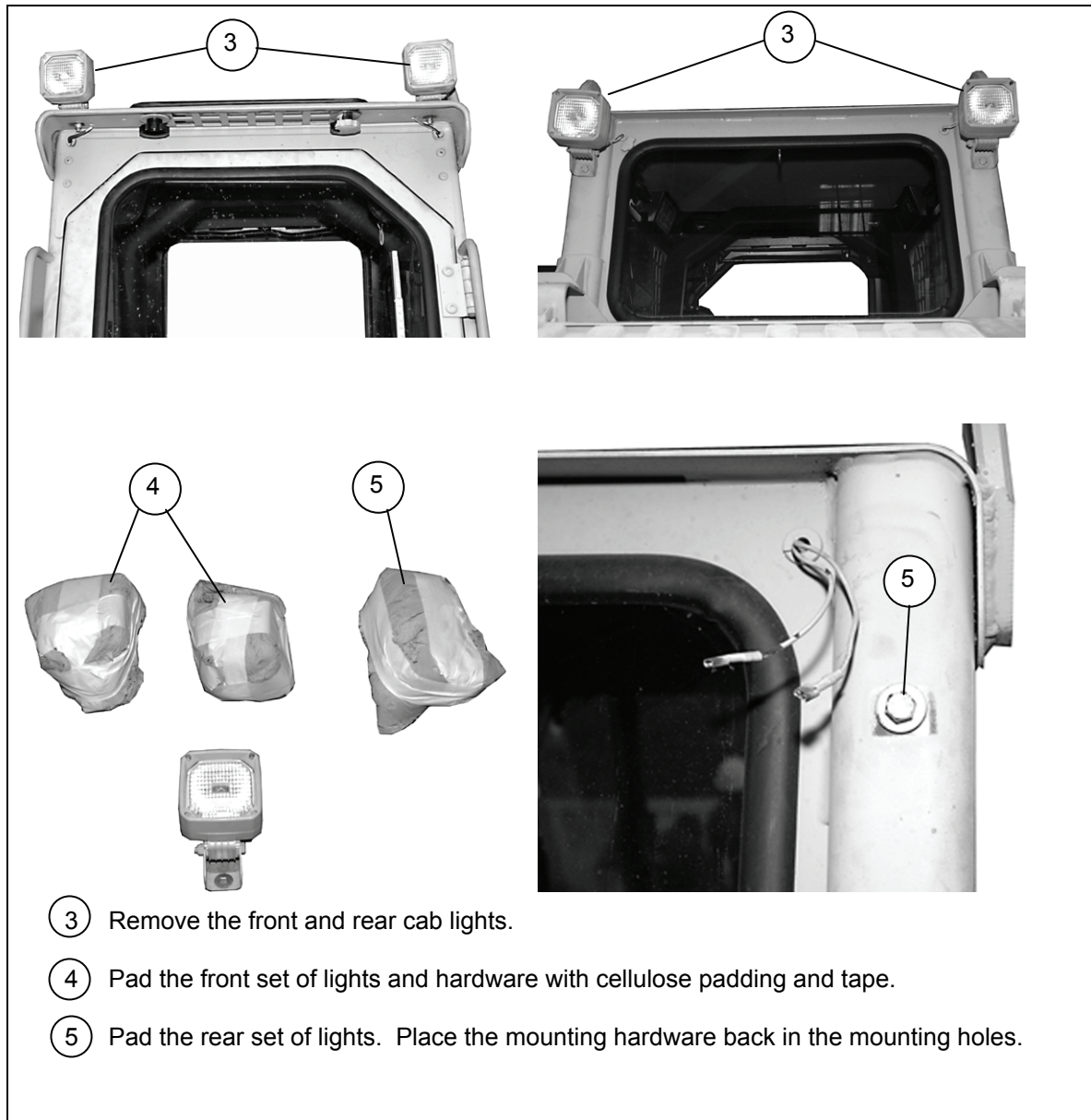


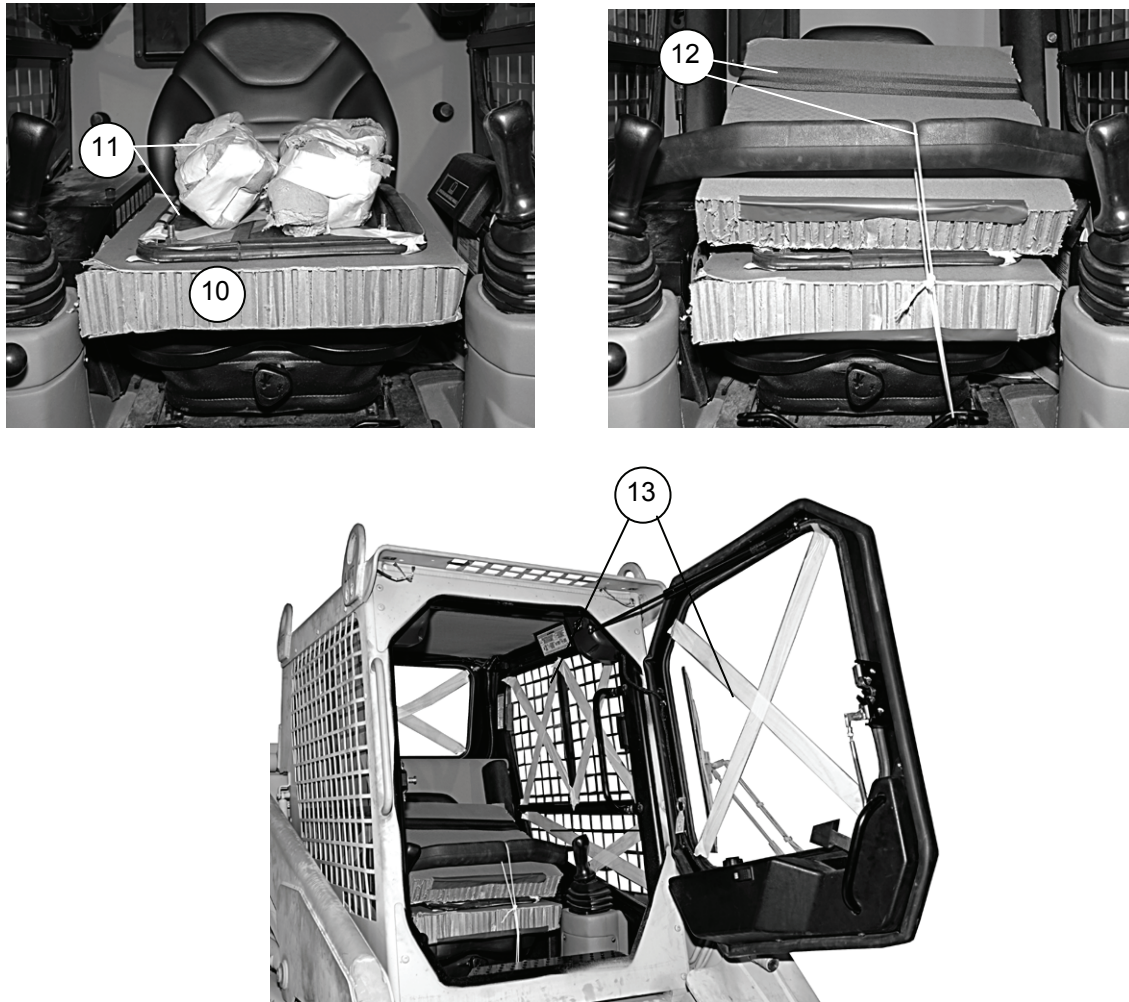
Figure 9-8. Multi-Terrain Loader Prepared (Continued)



- ⑥ Ensure the fuel tank is no more than 3/4 full (not shown).
- ⑦ Safety tie the fuel tank cap with type III nylon cord so it will not open.
- ⑧ Remove the window from the cab roof and secure the hardware on the window. Tape the window on both sides with masking tape.

**Figure 9-8. Multi- Terrain Loader Prepared (Continued)**





- ⑨ Raise the armrest to the upper most position (not shown).
- ⑩ Place a 19- by 19-inch piece of honeycomb on the driver's seat.
- ⑪ Place the cab roof window on the honeycomb. Place the front and rear lights on top of the window.
- ⑫ Place a second 19- by 19-inch piece of honeycomb on top of the lights and window. Route the seat belt over the honeycomb and secure it in its latch. Lower the arm rest and secure it with type III nylon cord to a convenient place in the cab.
- ⑬ Tape the front and rear windows on both sides with masking tape. Tape the side windows on the inside only.

**Figure 9-8. Multi-Terrain Loader Prepared (Continued)**

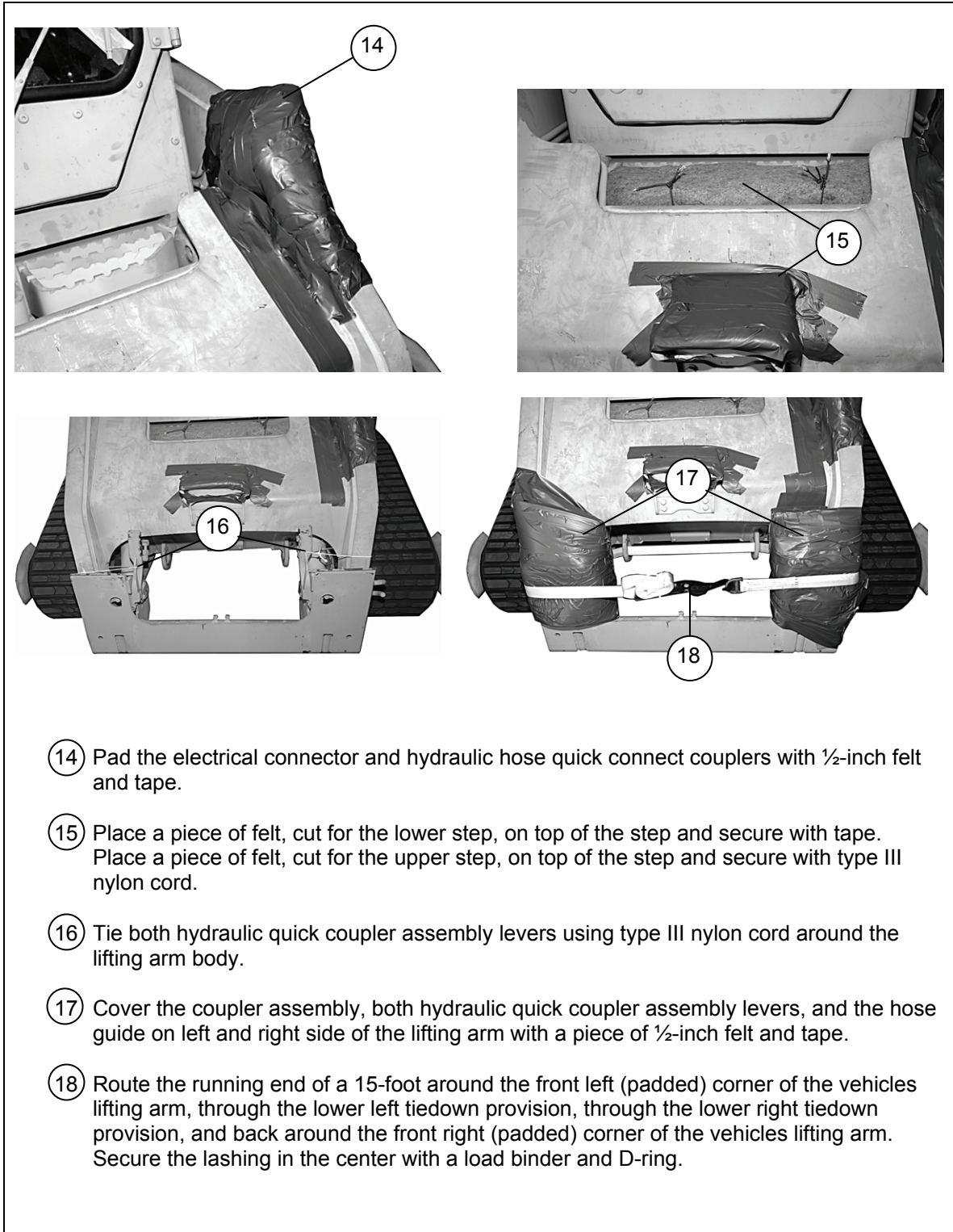
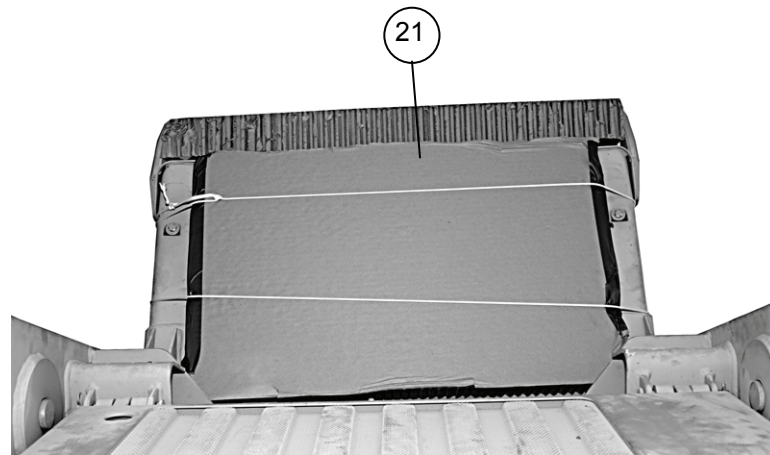
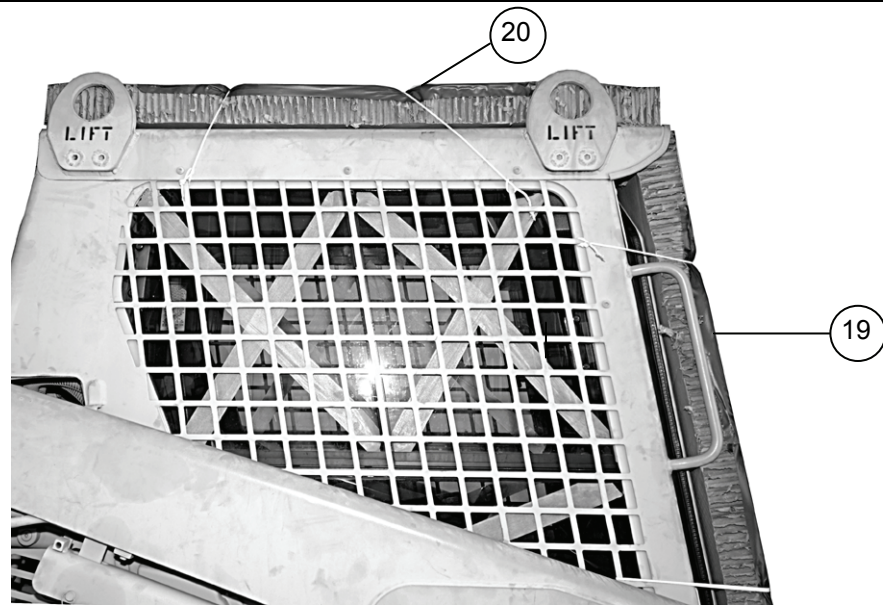


Figure 9-8. Multi-Terrain Loader Prepared (Continued)



- ①9 Place a 44- by 31-inch piece of honeycomb on top of the cab door window. Form an indentation for the windshield wiper. Tape the edges and secure the honeycomb with type III nylon cord.
- ②0 Place a 32- by 46-inch piece of honeycomb on top of the cab. Tape the edges and secure the honeycomb with type III nylon cord.
- ②1 Place a 27- by 19-inch piece of honeycomb over the cab rear window. Tape the edges and secure the honeycomb with type III nylon cord.

**Figure 9-8. Multi- Terrain Loader Prepared (Continued)**



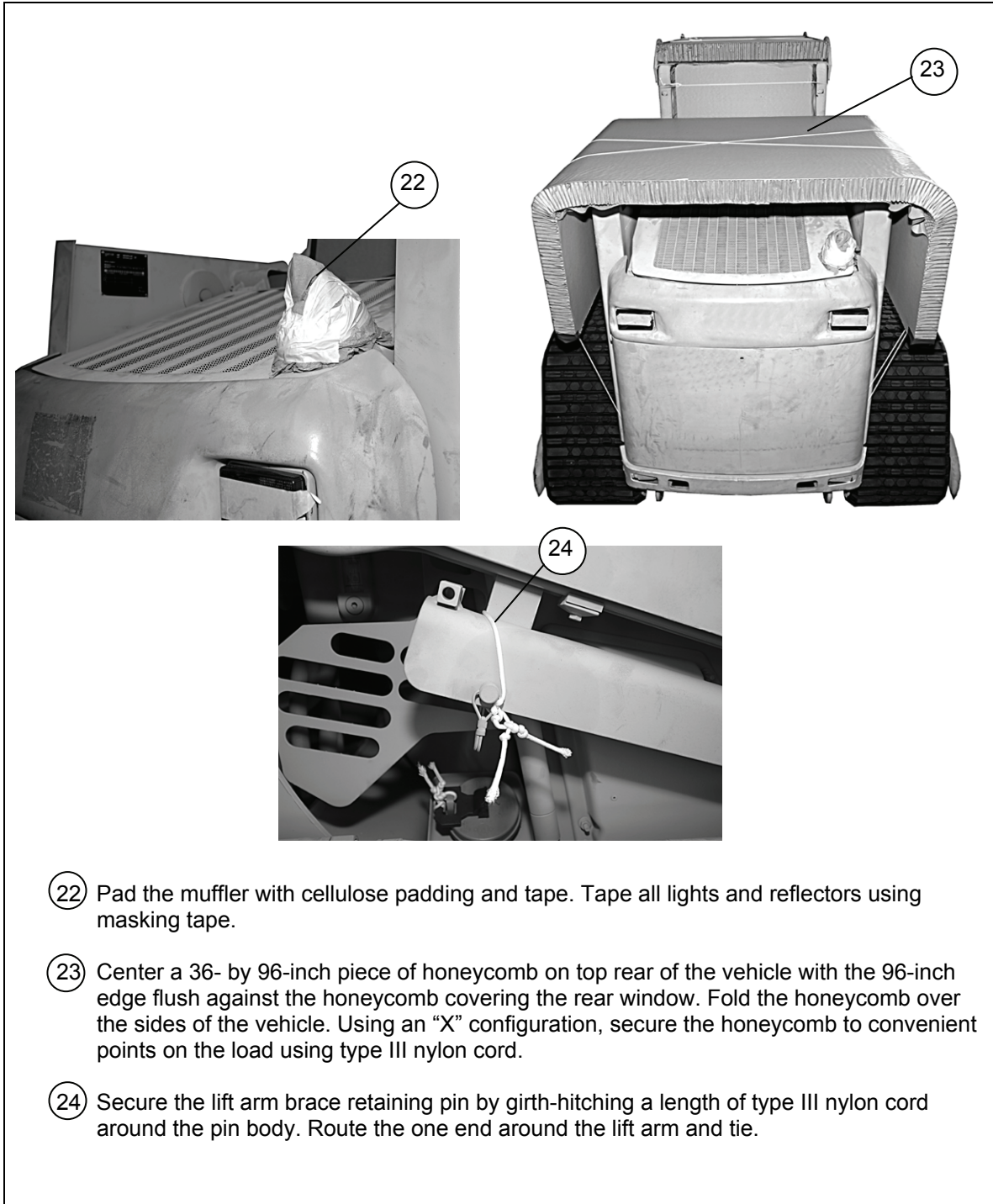
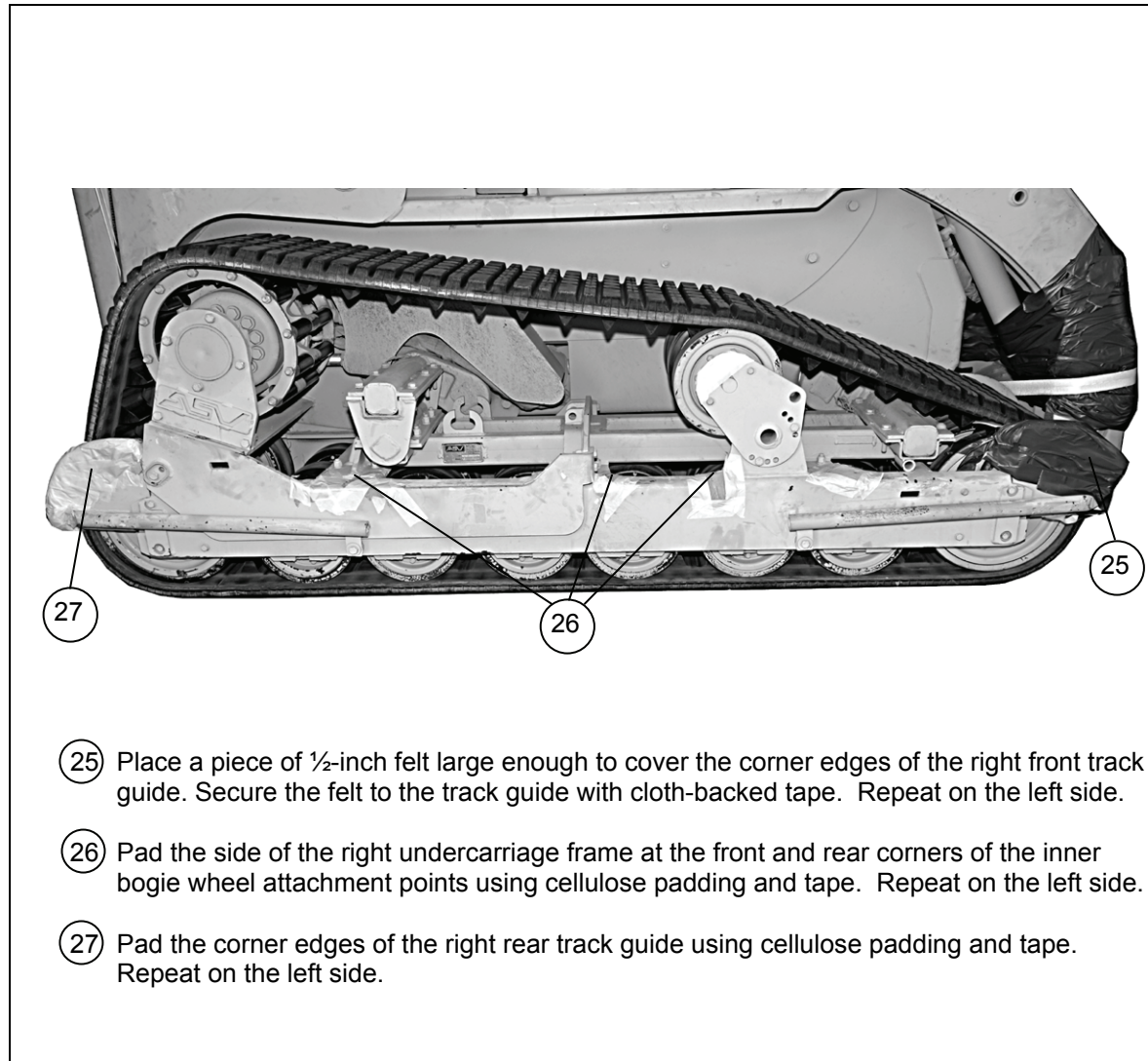


Figure 9-8. Multi-Terrain Loader Prepared (Continued)



- 25 Place a piece of ½-inch felt large enough to cover the corner edges of the right front track guide. Secure the felt to the track guide with cloth-backed tape. Repeat on the left side.
- 26 Pad the side of the right undercarriage frame at the front and rear corners of the inner bogie wheel attachment points using cellulose padding and tape. Repeat on the left side.
- 27 Pad the corner edges of the right rear track guide using cellulose padding and tape. Repeat on the left side.

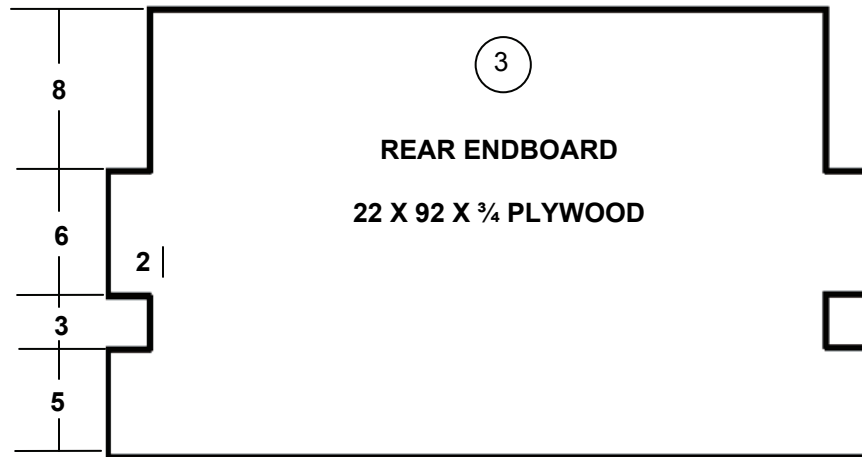
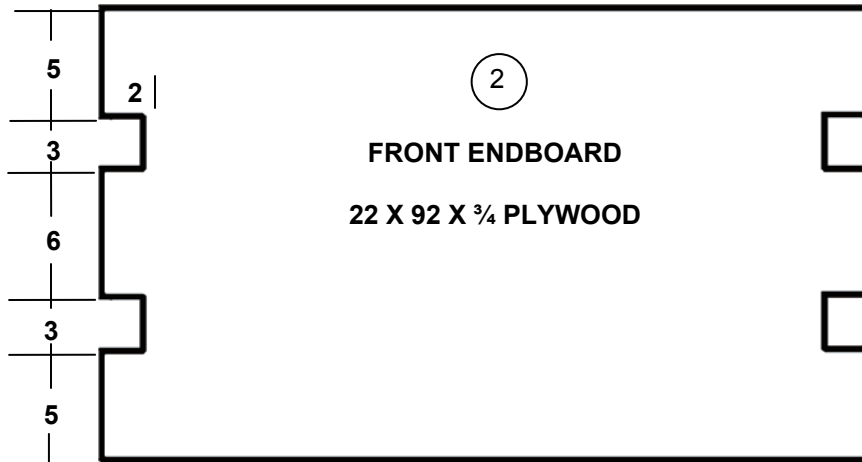
**Figure 9-8. Multi-Terrain Loader Prepared (Continued)**



## PREPARING THE ACCOMPANYING LOAD EQUIPMENT STORAGE BOX

9-5. Prepare the equipment storage box as shown in Figure 9-9.

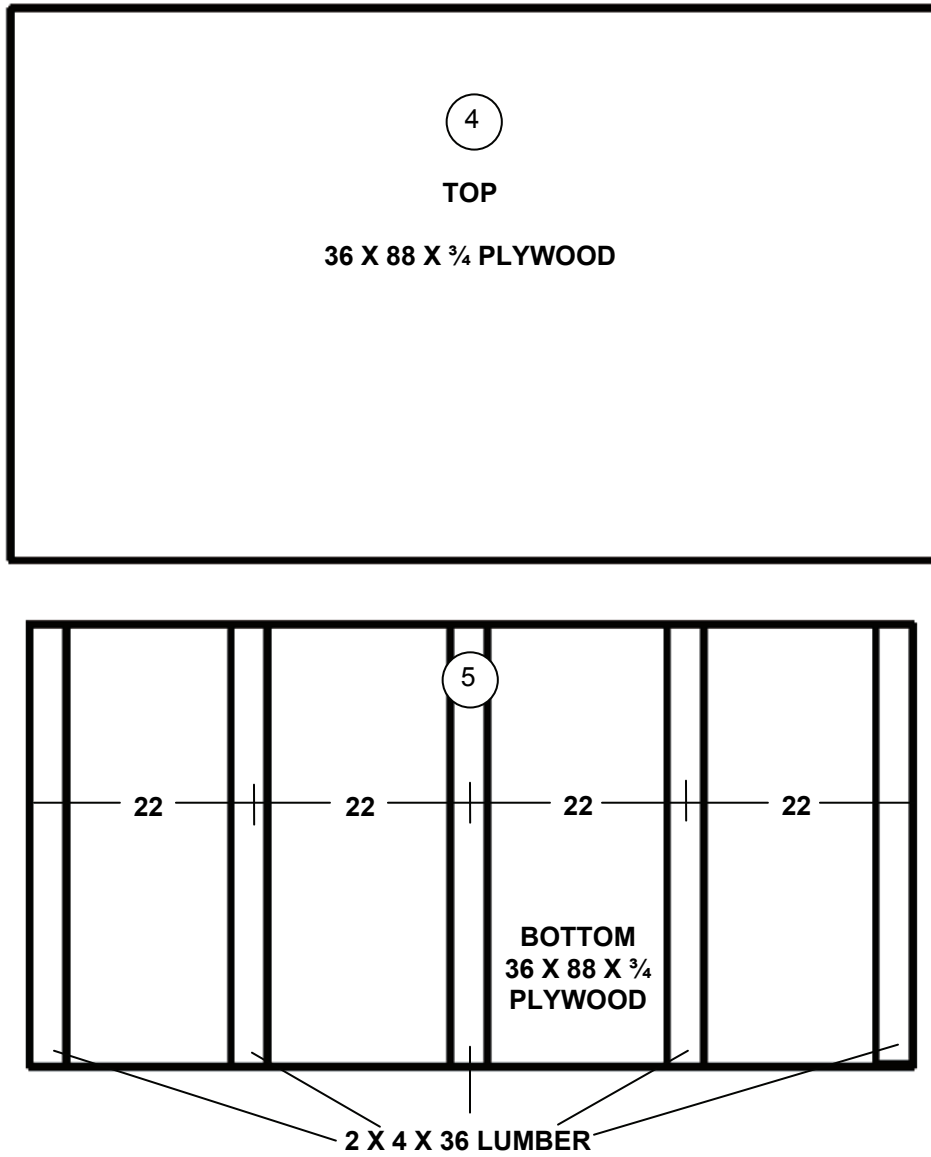
**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



- ① Build a storage box as shown. Cut two 22- by 92- by 3/4-inch pieces of plywood to form a front and rear endboard.
- ② Cut the notches in the front endboard as shown.
- ③ Cut the notches in the rear endboard as shown.

**Figure 9-9. Equipment Storage Box Prepared**

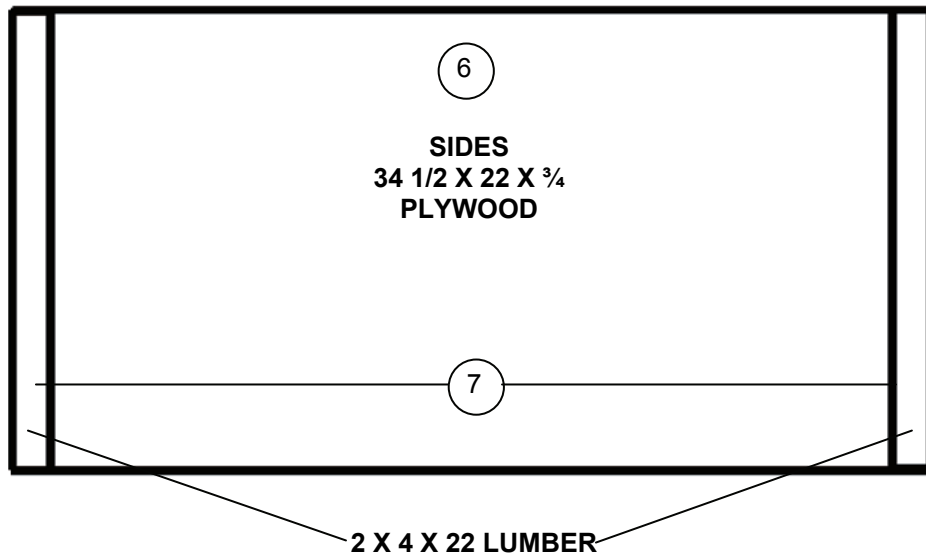
- Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



- ④ Cut the top of the box as shown.  
⑤ Build the bottom of the box as shown.

**Figure 9-9. Equipment Storage Box Prepared (Continued)**

- Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.

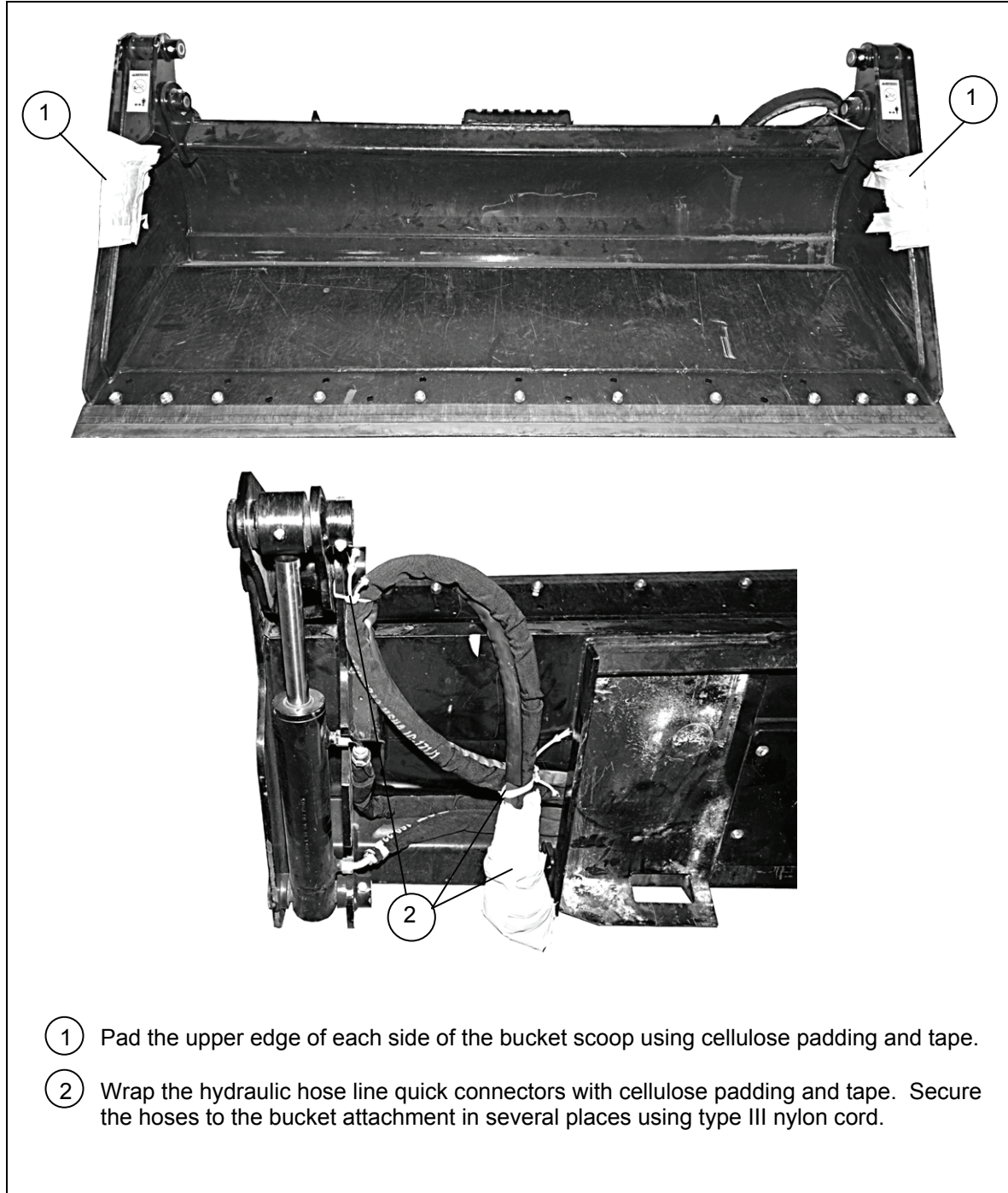


- ⑥ Cut two 34 1/2- by 22- by 3/4-inch pieces of plywood to form the ends of the box.
- ⑦ Nail a 2- by 4- by 22-inch piece of lumber flush on each end of the plywood sides.
- ⑧ Assemble the box leaving the top off (not shown).

**Figure 9-9. Equipment Storage Box Prepared (Continued)**

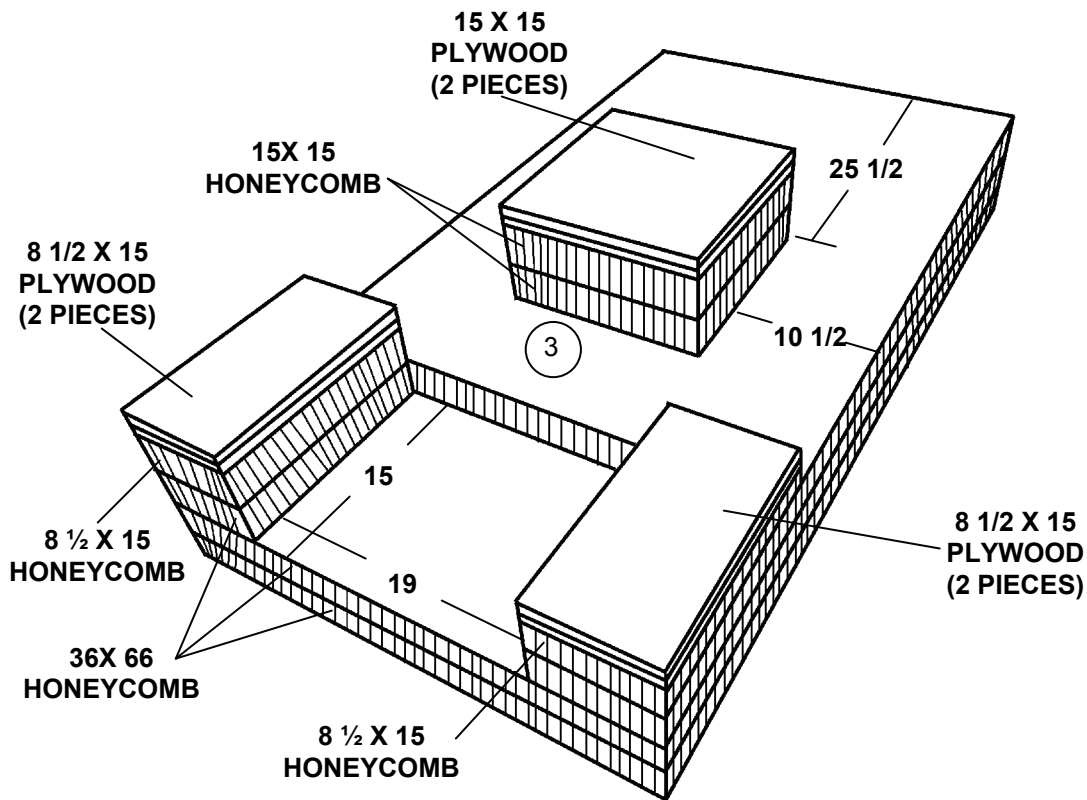
## PREPARING THE ACCOMPANYING LOAD

9-6. Prepare the accompanying load as shown in Figure 9-10.



**Figure 9-10. Accompanying Load Prepared**

**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.

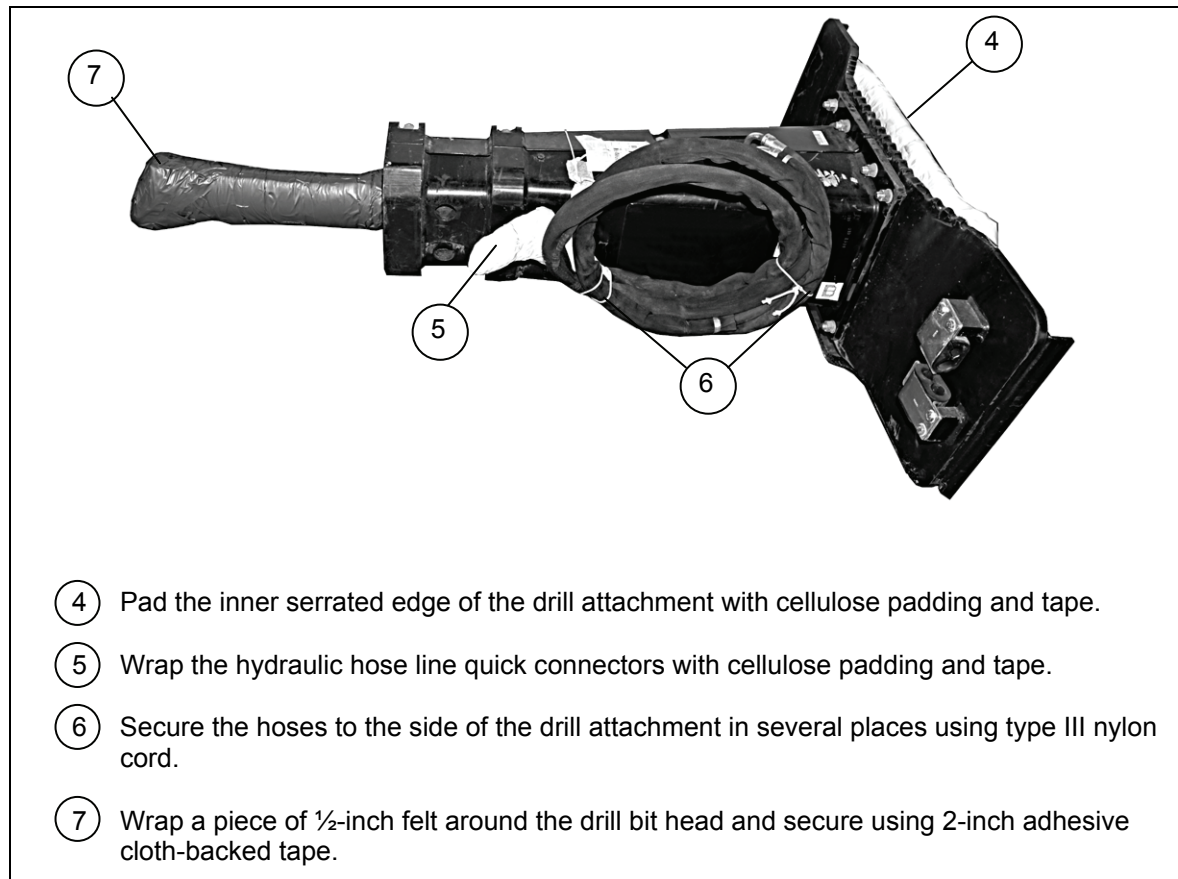


③ Prepare a honeycomb stack for the drill attachment as shown.

<i>Pieces</i>	<i>Width (Inches)</i>	<i>Length (Inches)</i>	<i>Material</i>	<i>Instructions</i>
2	36	66	Honeycomb	Glue together to form a base.
1	36	66	Honeycomb	Cut a 15- by 19- inch cutout as shown and glue to the base.
2	8 ½	15	Honeycomb	Glue on the corners of the cutout.
4	8 ½	15	¾-inch Plywood	Glue two pieces flush on top of each 8 ½- by 15-inch piece of honeycomb.
2	15	15	Honeycomb	Glue centered on top of the base as shown.
2	15	15	¾-inch Plywood	Glue two pieces flush on top of the 15- by 15- inch pieces of honeycomb.

**Figure 9-10. Accompanying Load Prepared (Continued)**

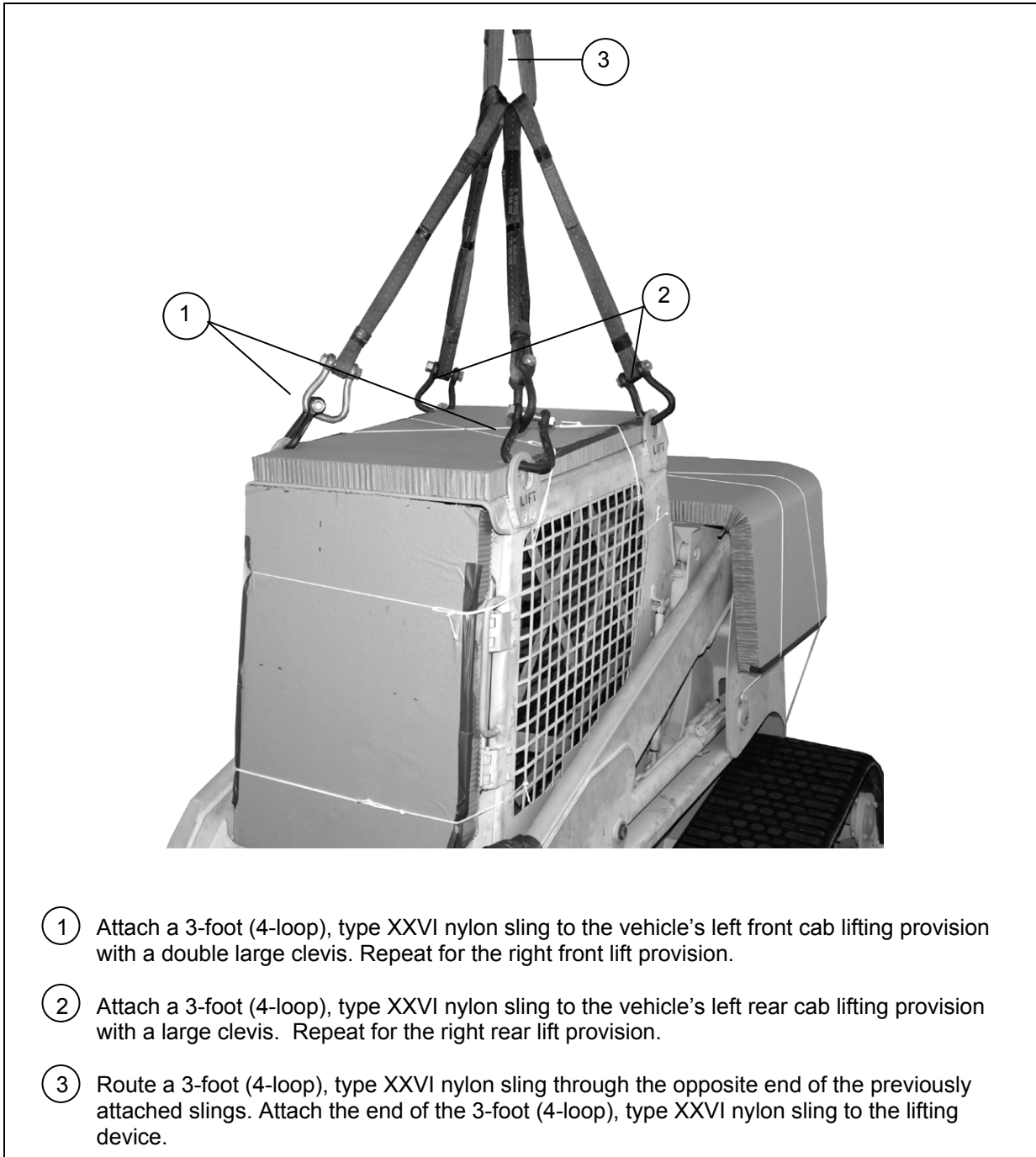




**Figure 9-10. Accompanying Load Prepared (Continued)**

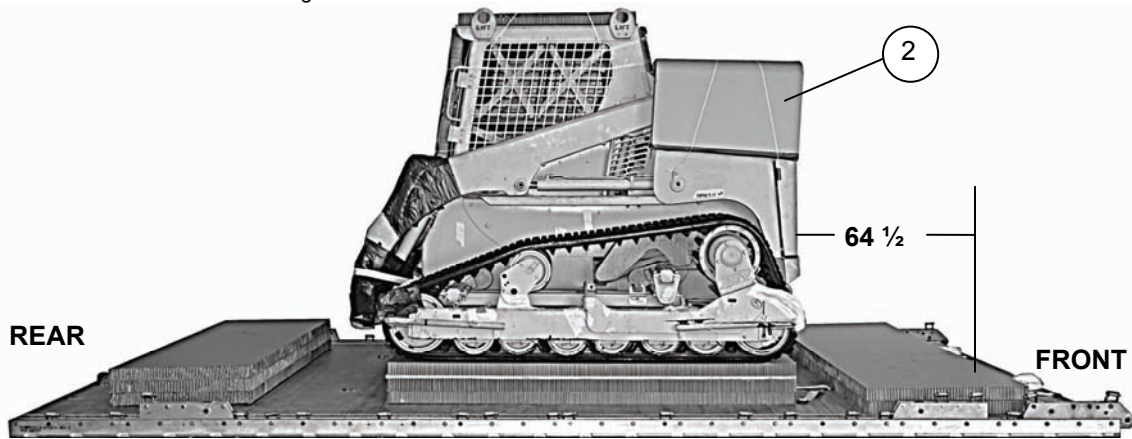
## **LIFTING AND POSITIONING THE MULTI-TERRAIN LOADER**

9-7. Install the lifting slings and position the 277 MTL as shown in Figures 9-11 through 9-17.



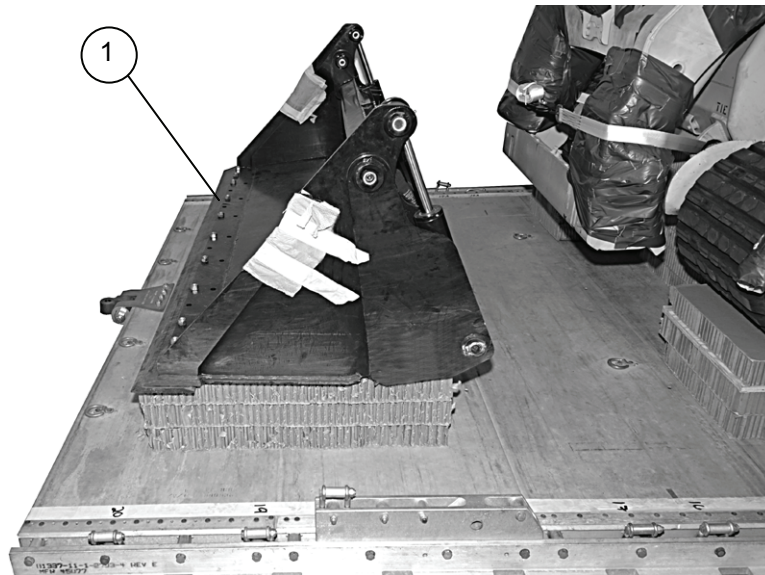
**Figure 9-11. 277 Multi-Terrain Loader Lift Slings Installed**

**Notes.** 1. All measurements are given in inches.



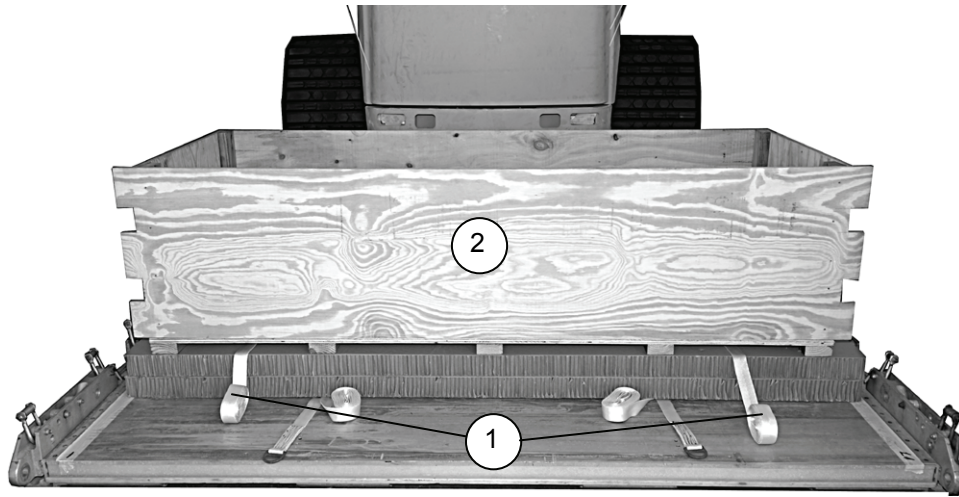
- ① Center the 277 MTL on the honeycomb stacks with the rear of the 277 MTL 64 ½ inches from the front edge of the platform. Ensure the inside edge of the tracks are flush with inside edge of honeycomb stacks 3 and 4.
- ② Remove the 3-foot (4 loop), type XXVI nylon slings from the cab (not shown).

**Figure 9-12. 277 MTL Positioned**

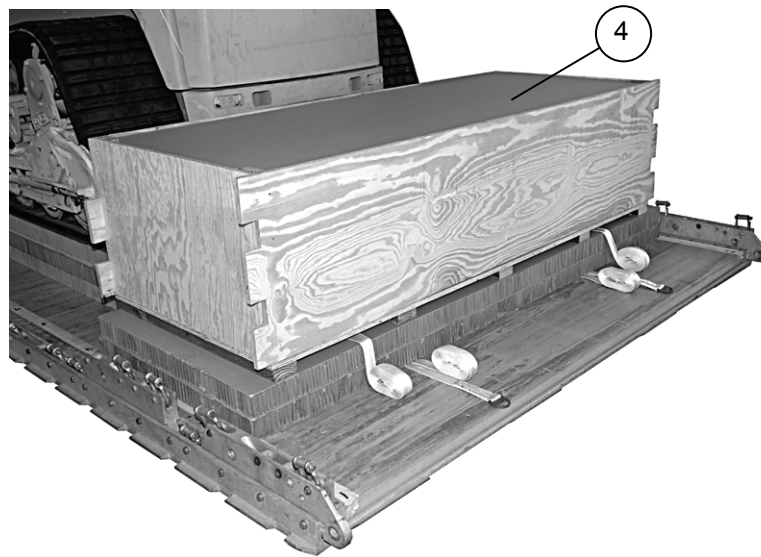


- ① Center the front-end bucket loader attachment from left to right on top of honeycomb stack 5. Ensure the front edge of the bucket is flush with rear edge of stack.

**Figure 9-13. Front-End Bucket Positioned**



- ① Place a 15-foot lashing 16 inches from each side of honeycomb stack 1.
- ② Center the equipment storage box on honeycomb stack 1.

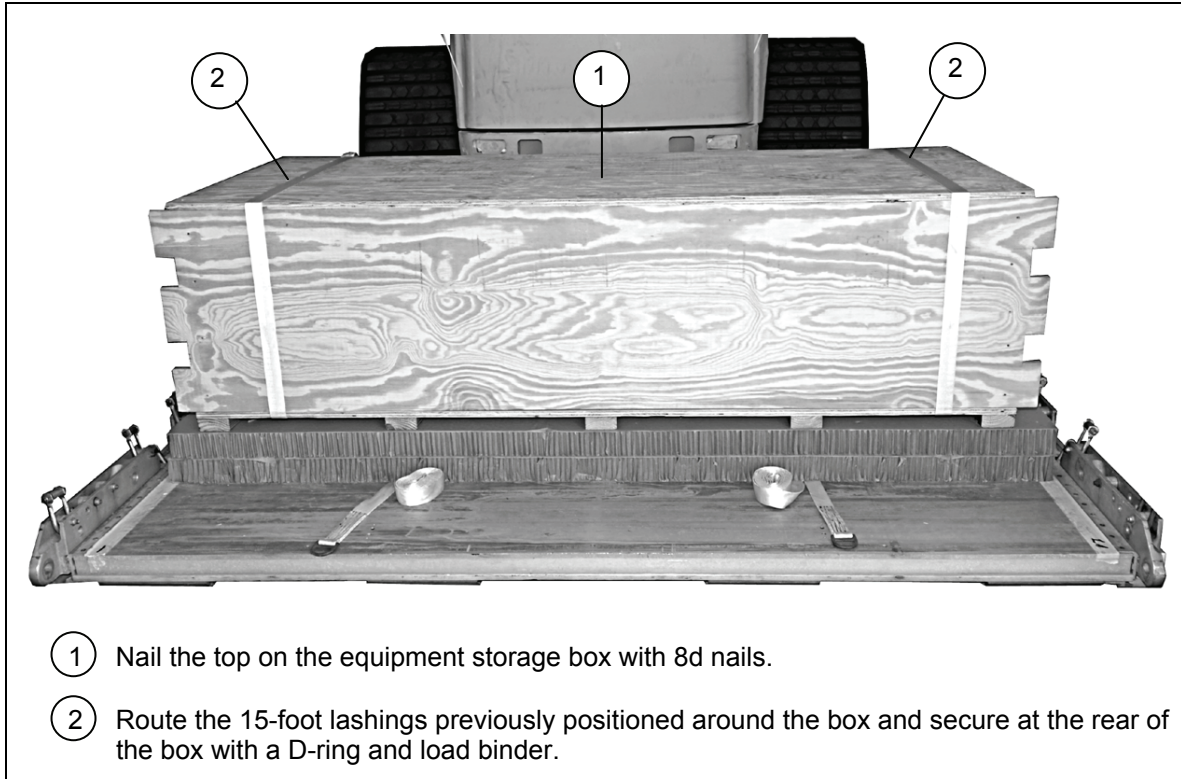


- ③ Place a 34- by 86 1/2-inch piece of honeycomb in the bottom of the equipment box. Make cutouts in each corner of the honeycomb to accommodate the 2- by 4-inch piece of lumber in the box (not shown).
- ④ Place the equipment in the storage box and fill all empty space with honeycomb. Place a 35- by 86 1/2-inch piece of honeycomb on top of the equipment to level the load.

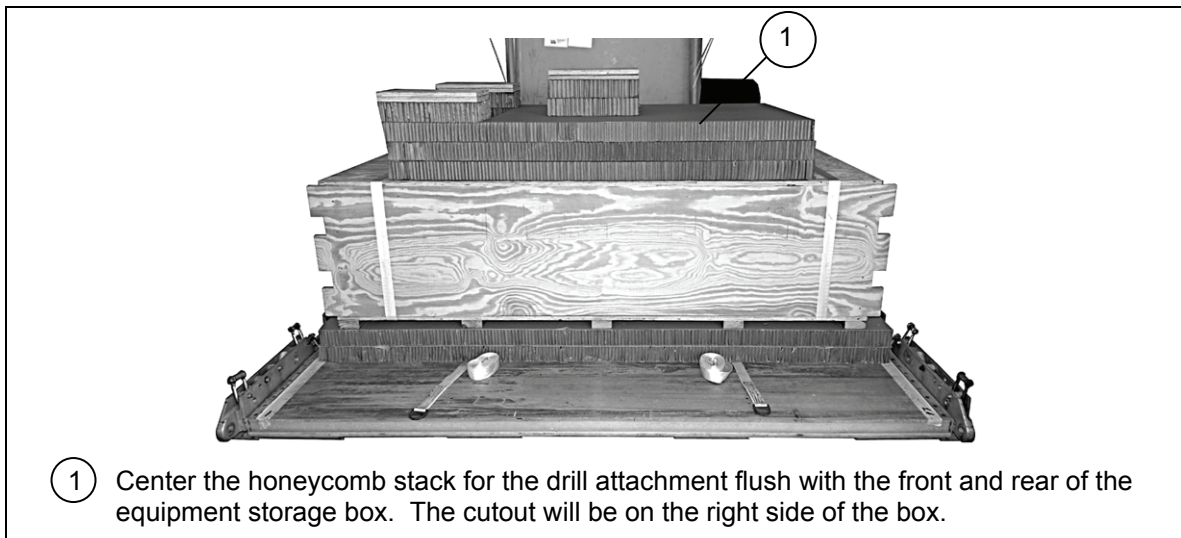
**Note:** The minimum weight for the equipment storage box is 1,500 pounds and the maximum weight is 3,000 pounds

**Figure 9-14. Equipment Box Positioned**



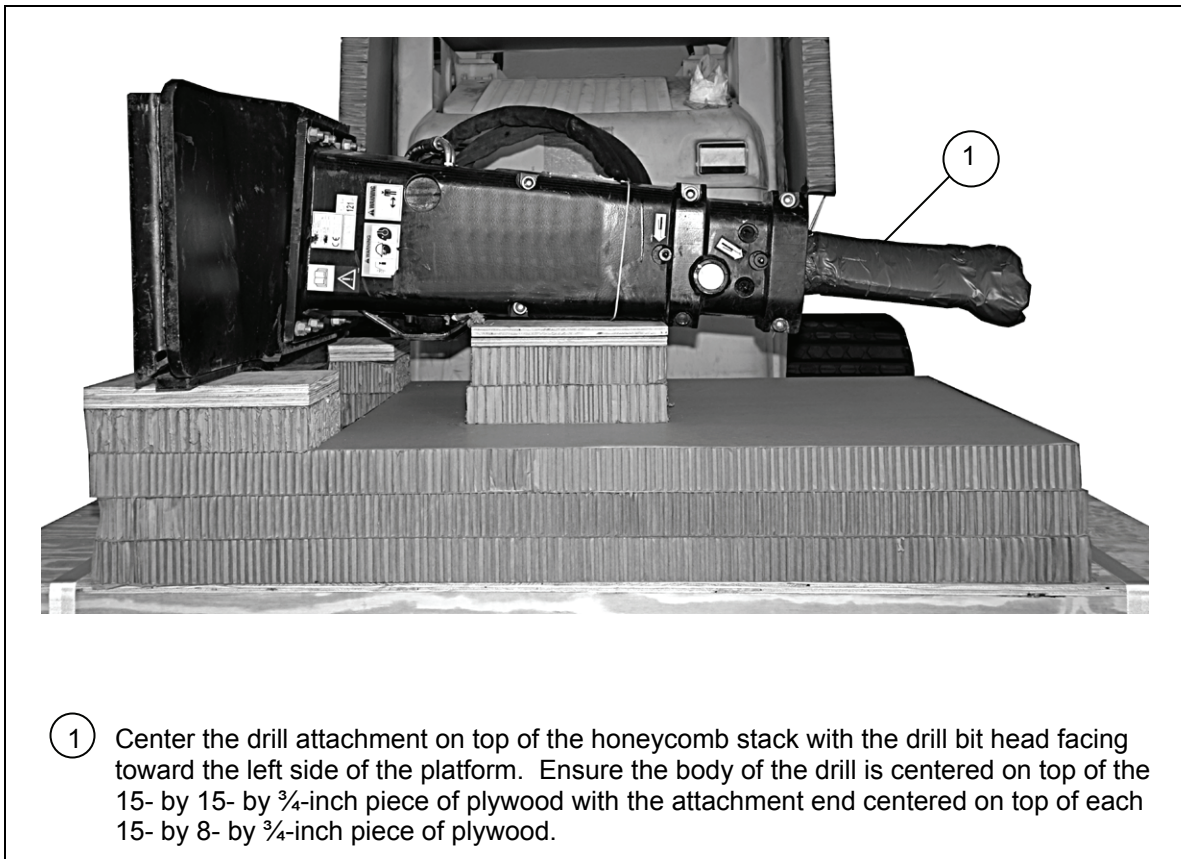


**Figure 9-15. Equipment Box Secured**



**Figure 9-16. Honeycomb Stack Positioned**



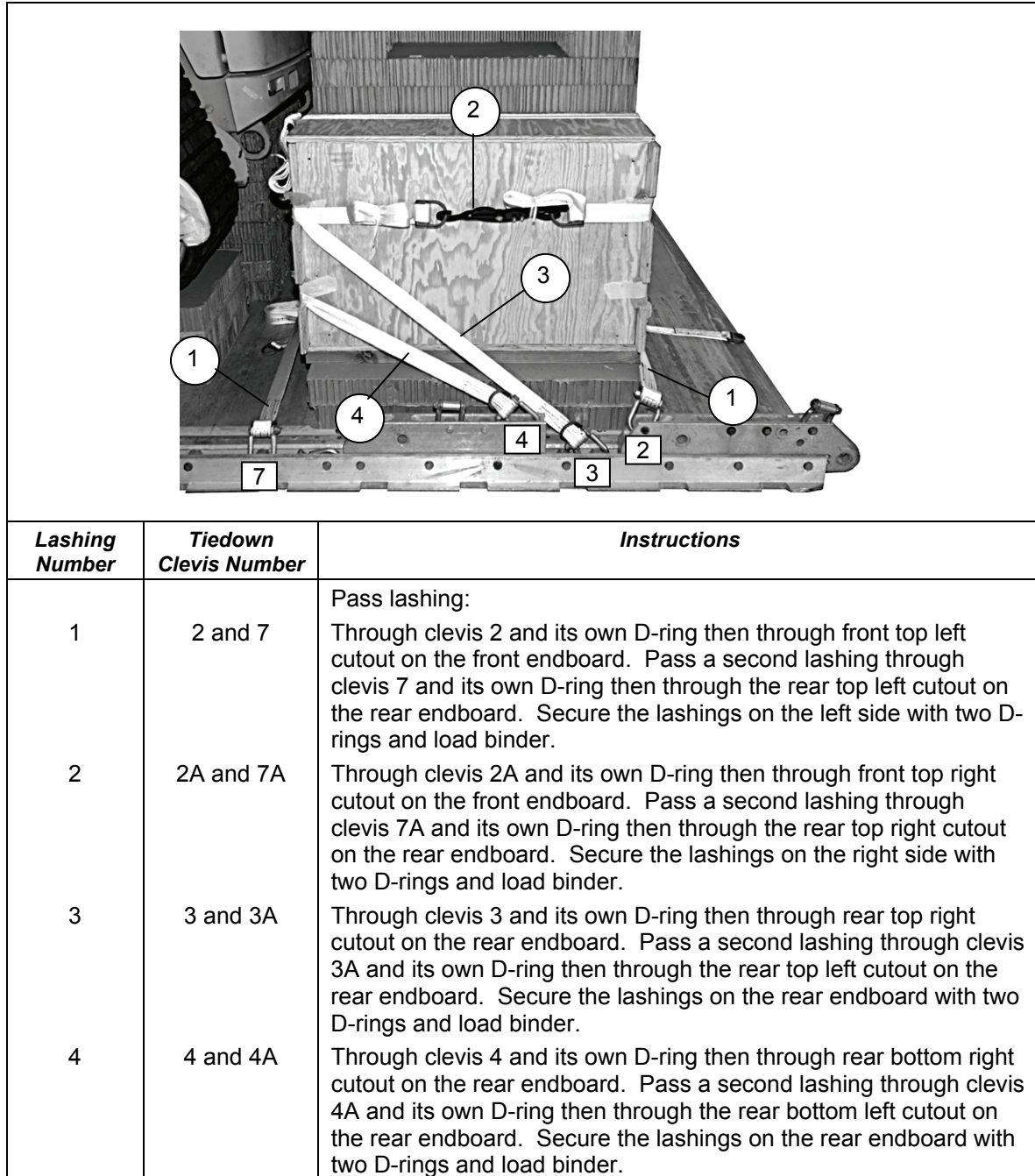


**Figure 9-17. Drill Attachment Positioned**

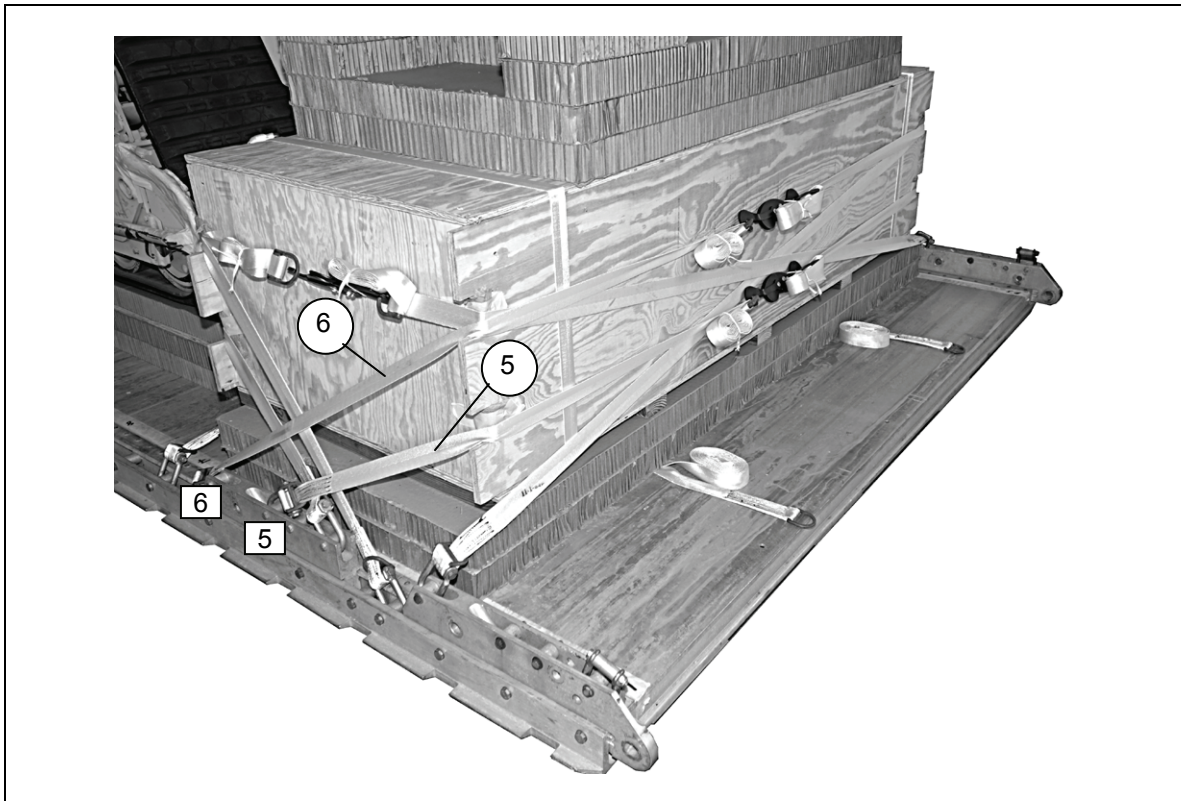
## LASHING LOAD TO PLATFORM

9-8. Lash the Multi-Terrain Loader to the platform as shown in Figure 9-18.

*Note.* Pad any sharp edges on the load where a lashing may pass. Use cellulose padding and masking tape.

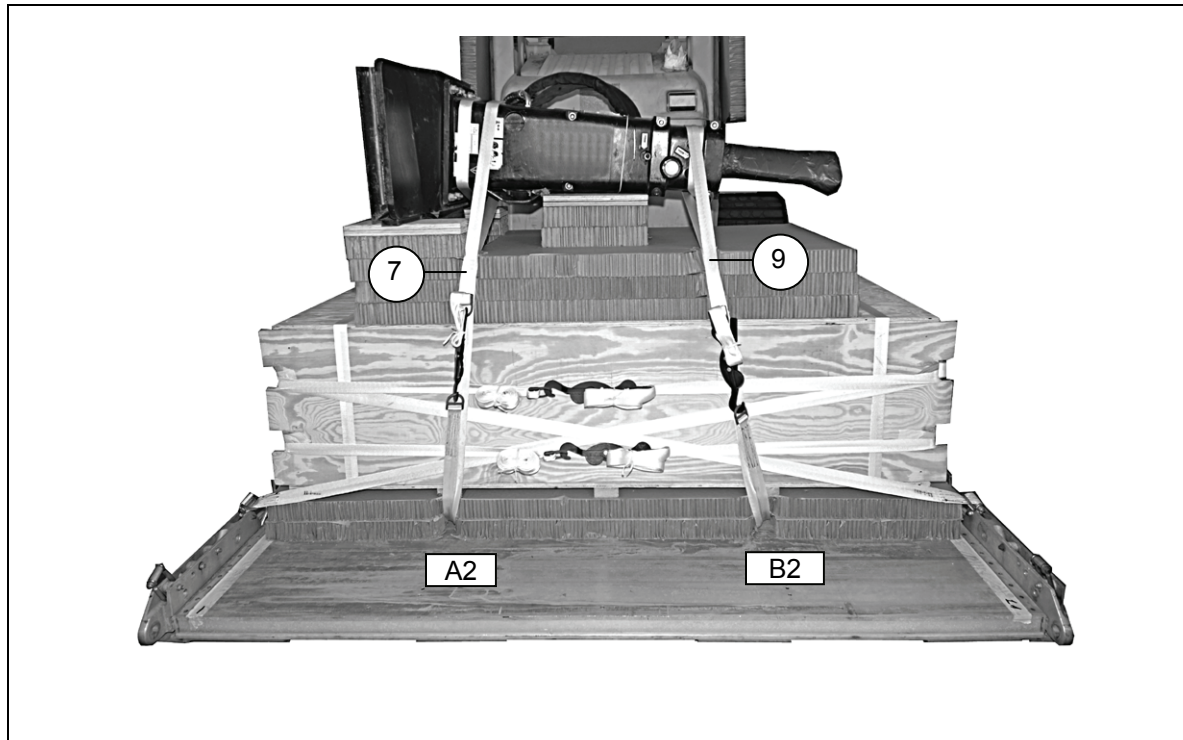


**Figure 9-18. 277 Multi-Terrain Loader Lashed to Platform**



<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
5	5 and 5A	Pass lashing: Through clevis 5 and its own D-ring then through front bottom right cutout on the front endboard. Pass a second lashing through clevis 5A and its own D-ring then through the front bottom left cutout on the front endboard. Secure the lashings on the front endboard with two D-rings and load binder.
6	6 and 6A	Through clevis 6 and its own D-ring then through front top right cutout on the front endboard. Pass a second lashing through clevis 6A and its own D-ring then through the front top left cutout on the front endboard. Secure the lashings on the front endboard with two D-rings and load binder.

Figure 9-18. 277 Multi-Terrain Loader Lashed to Platform (Continued)

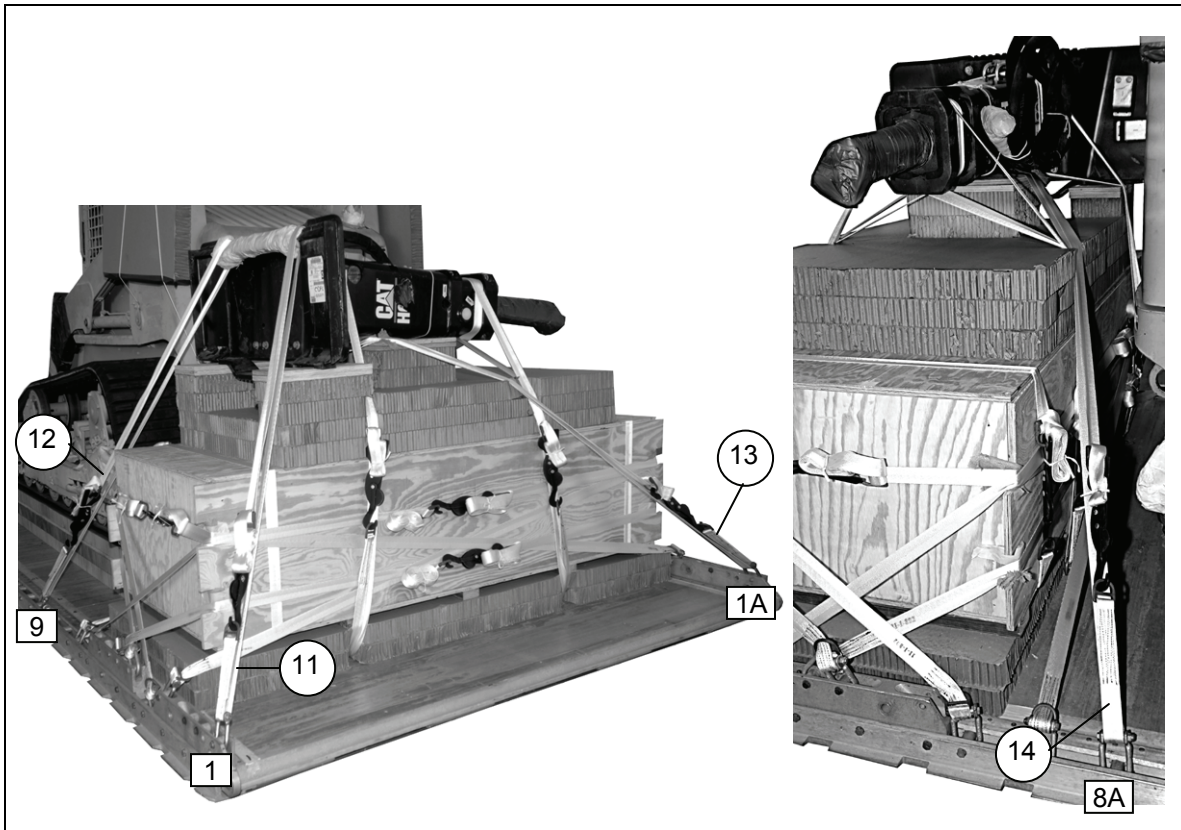


<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
7	A2	Pass lashing: Around the upper portion of the main body by its attachment point. Loosely secure the lashing with a D-ring and loadbinder.
8	A3	Around the upper portion of the main body by its attachment point. Loosely secure the lashing with a D-ring and loadbinder.
9	B2	Around the lower portion of the main body by the drill bit. Loosely secure the lashing with a D-ring and loadbinder.
10	B3	Around the lower portion of the main body by the drill bit. Loosely secure the lashing with a D-ring and loadbinder.

**Note:** Ensure the drill attachment is centered on the honeycomb stack, and tighten all of the lashings at the same time.

**Figure 9-18. 277 Multi-Terrain Loader Lashed to Platform (Continued)**

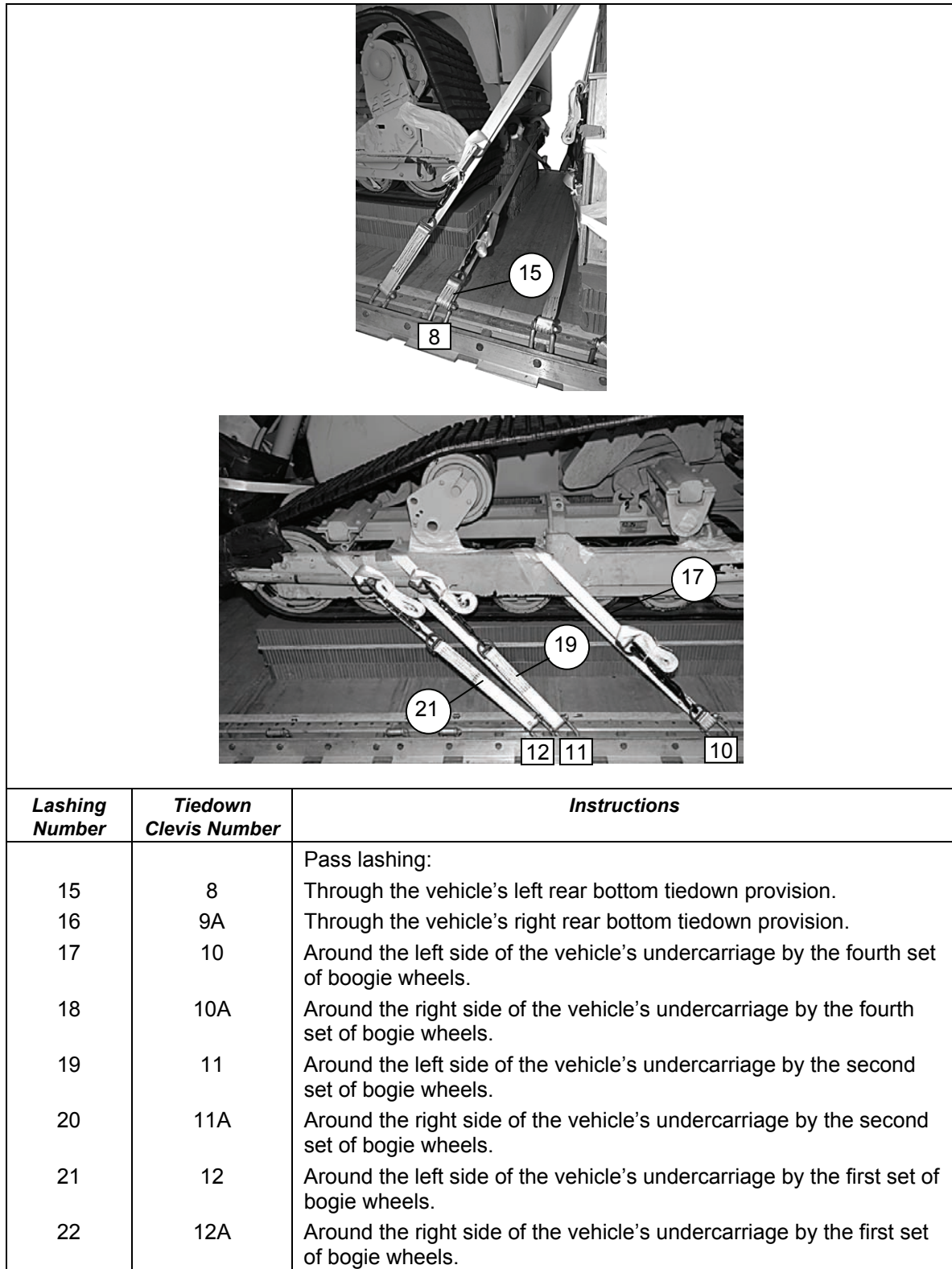




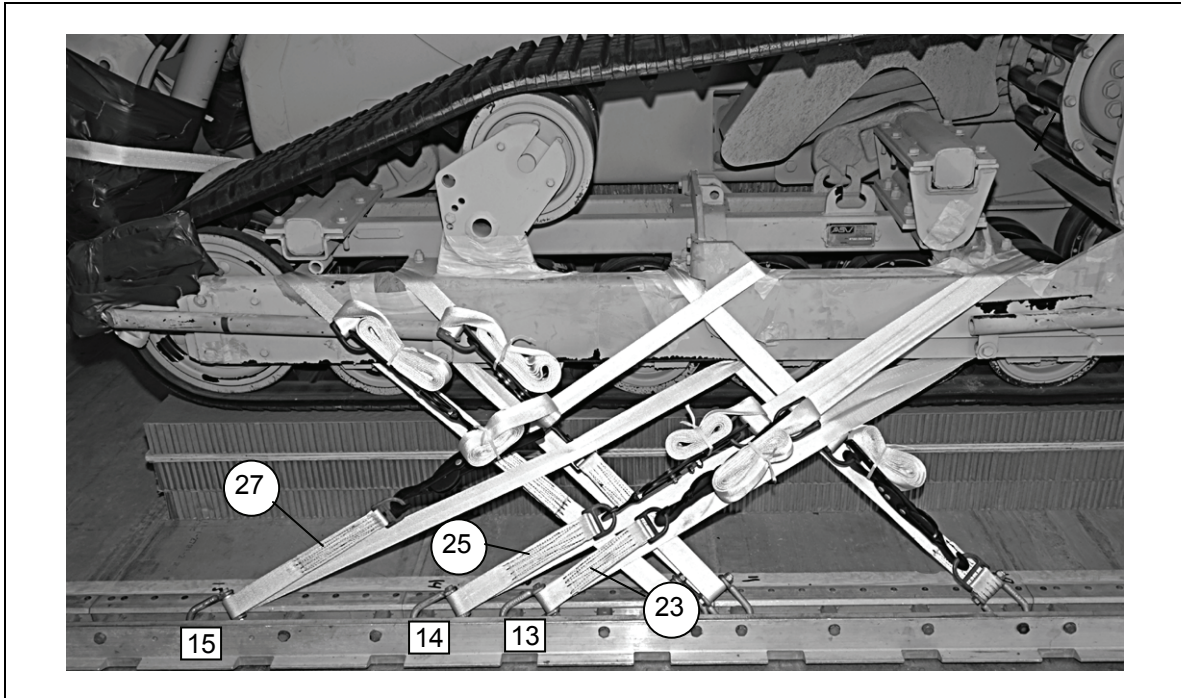
<i>Lashing Number</i>	<i>Tiedown Clevis Number</i>	<i>Instructions</i>
11	1	Pass lashing: Around the drill attachments upper front right padded corner of the attachment end.
12	9	Around the drill attachments upper rear right padded corner of the attachment end.
13	1A	Around the front bottom bracket located at the center of attachment body.
14	8A	Around the rear bottom bracket located at the center of attachment body.

Figure 9-18. 277 Multi-Terrain Loader Lashed to Platform (Continued)



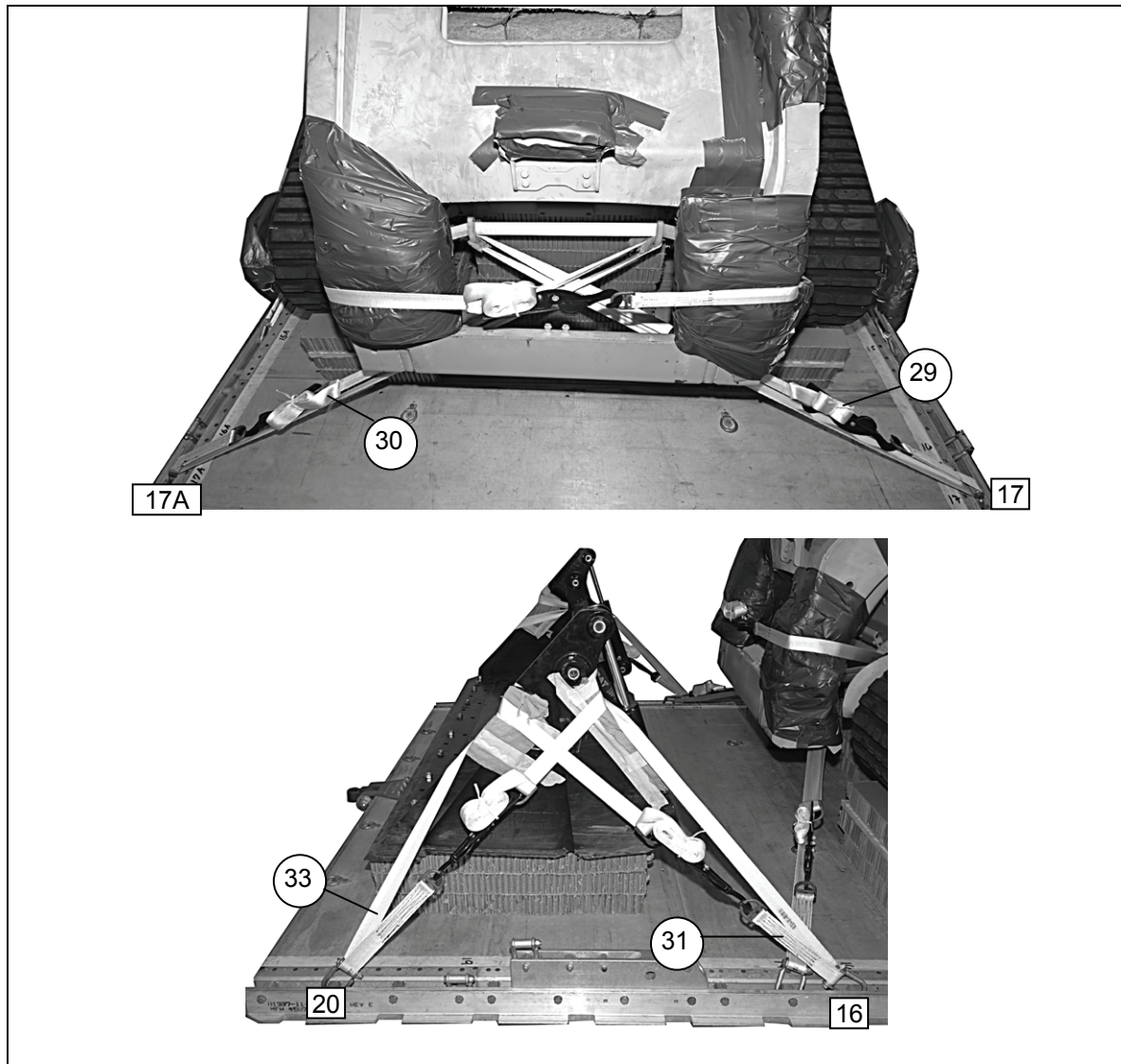


**Figure 9-18. 277 Multi-Terrain Loader Lashed to Platform (Continued)**



<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
23	13	Pass lashing: Around the left side of the vehicle's undercarriage by the seventh set of bogie wheels.
24	13A	Around the right side of the vehicle's undercarriage by the seventh set of bogie wheels.
25	14	Around the left side of the vehicle's undercarriage by the seventh set of bogie wheels.
26	14A	Around the right side of the vehicle's undercarriage by the seventh set of bogie wheels.
27	15	Around the left side of the vehicle's undercarriage by the fifth set of bogie wheels.
28	15A	Around the right side of the vehicle's undercarriage by the fifth set of bogie wheels.

Figure 9-18. 277 Multi-Terrain Loader Lashed to Platform (Continued)



<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
29	17	Pass lashing:
30	17A	Through the vehicle's left front bottom tiedown provision.
31	16	Through the vehicle's right front bottom tiedown provision.
32	16A	Through the space on the left side of the main body of the bucket loader and bucket scoop.
33	20	Through the space on the right side of the main body of the bucket loader and bucket scoop.
34	20A	Through the space on the left side of the main body of the bucket loader and bucket scoop.

**Figure 9-18. 277 Multi-Terrain Loader Lashed to Platform (Continued)**

## PREPARING PARACHUTE STOWAGE PLATFORM

9-9. Construct the parachute support stack and stowage platform as shown in Figures 9-19 through 9-22.

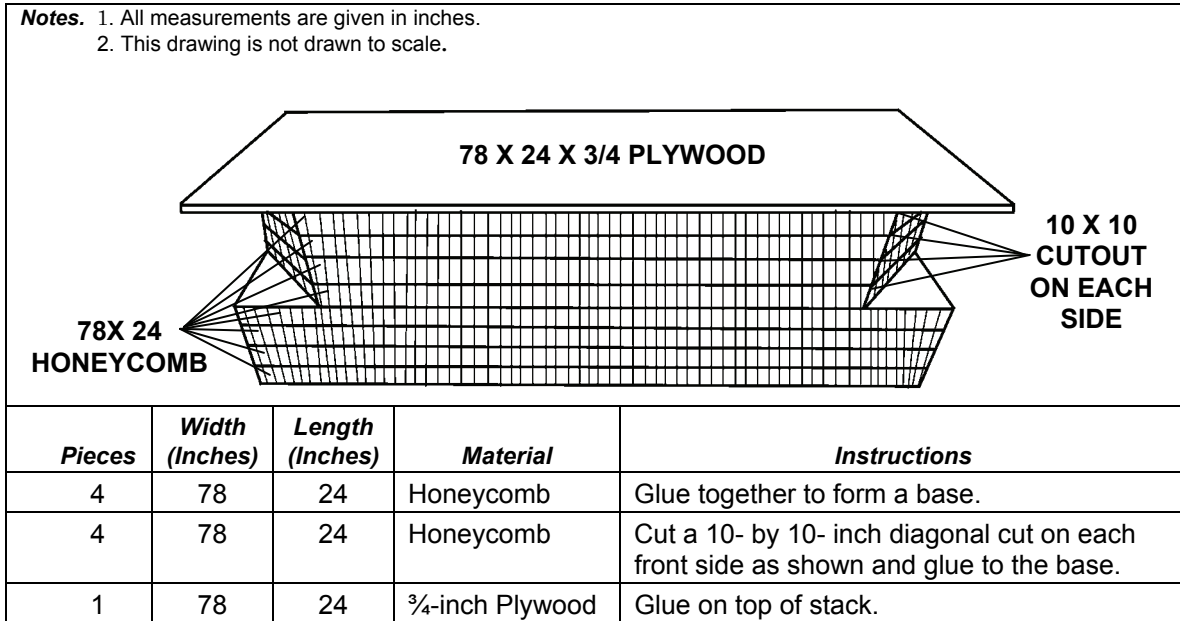


Figure 9-19. Parachute Support Stack Prepared

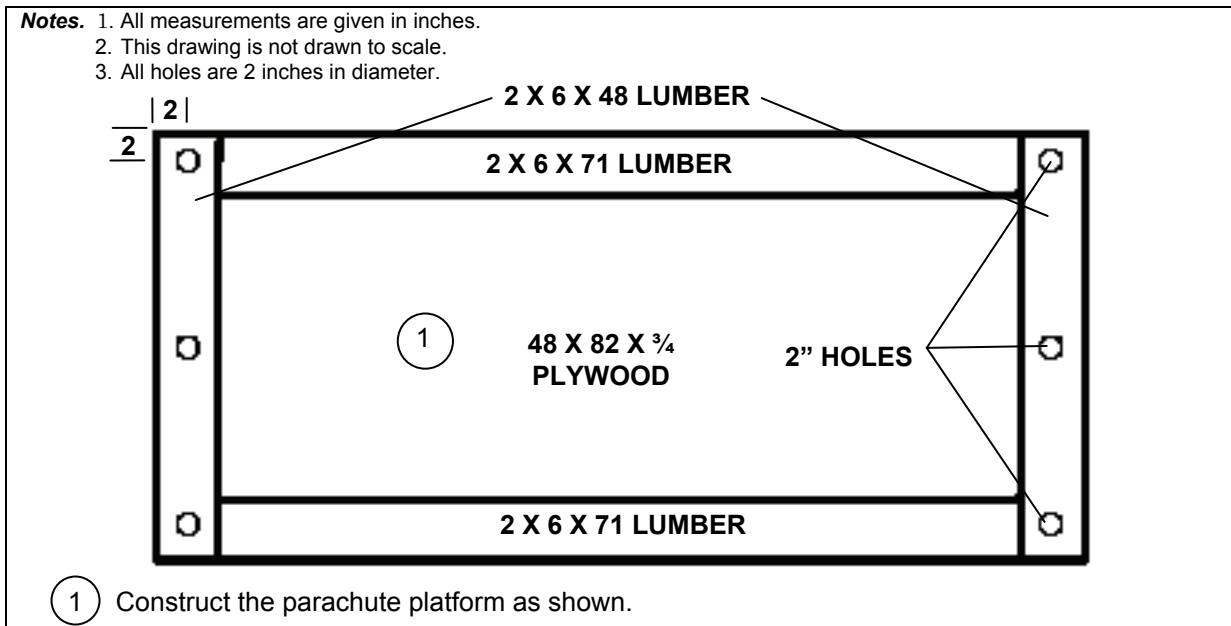
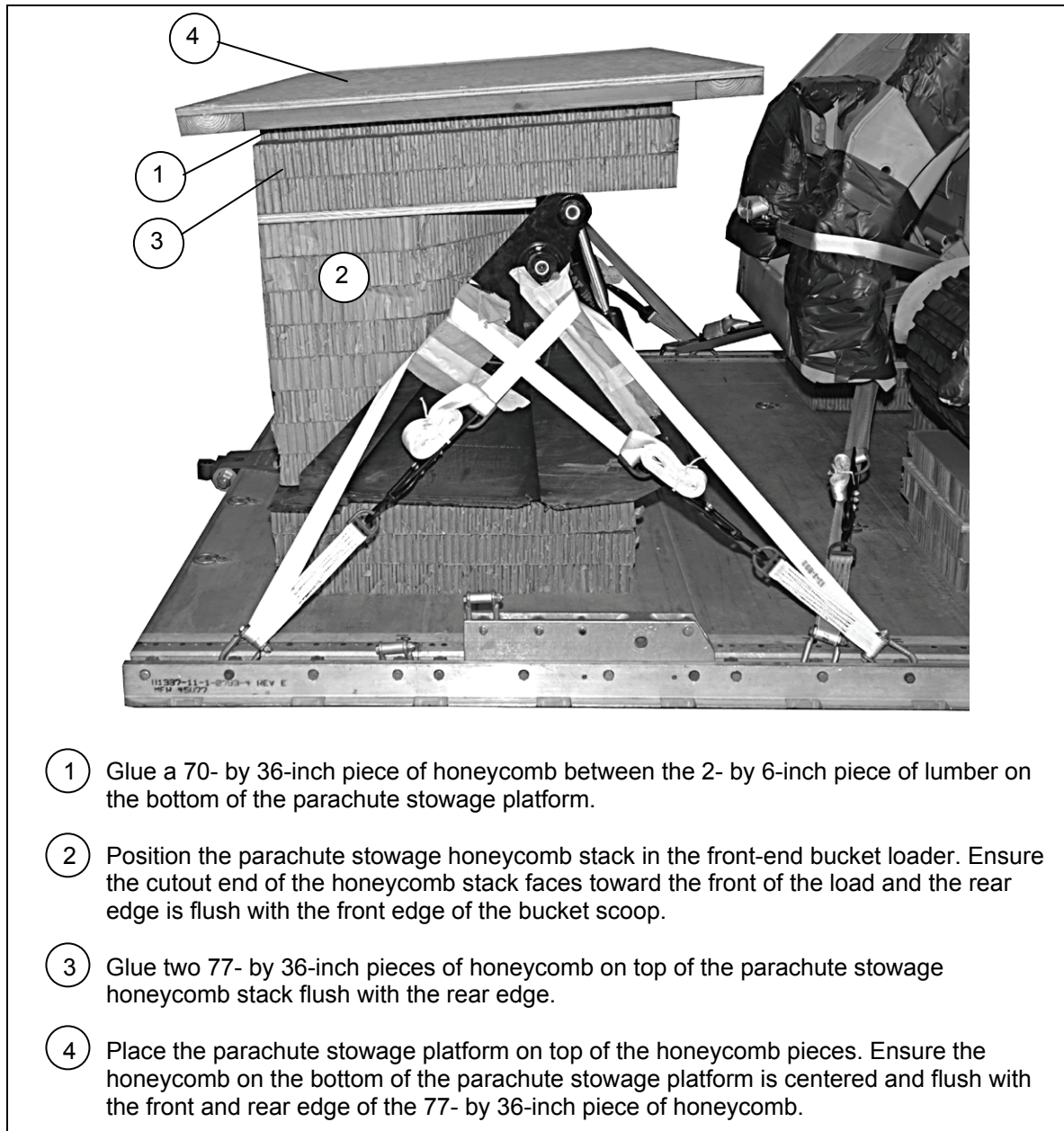


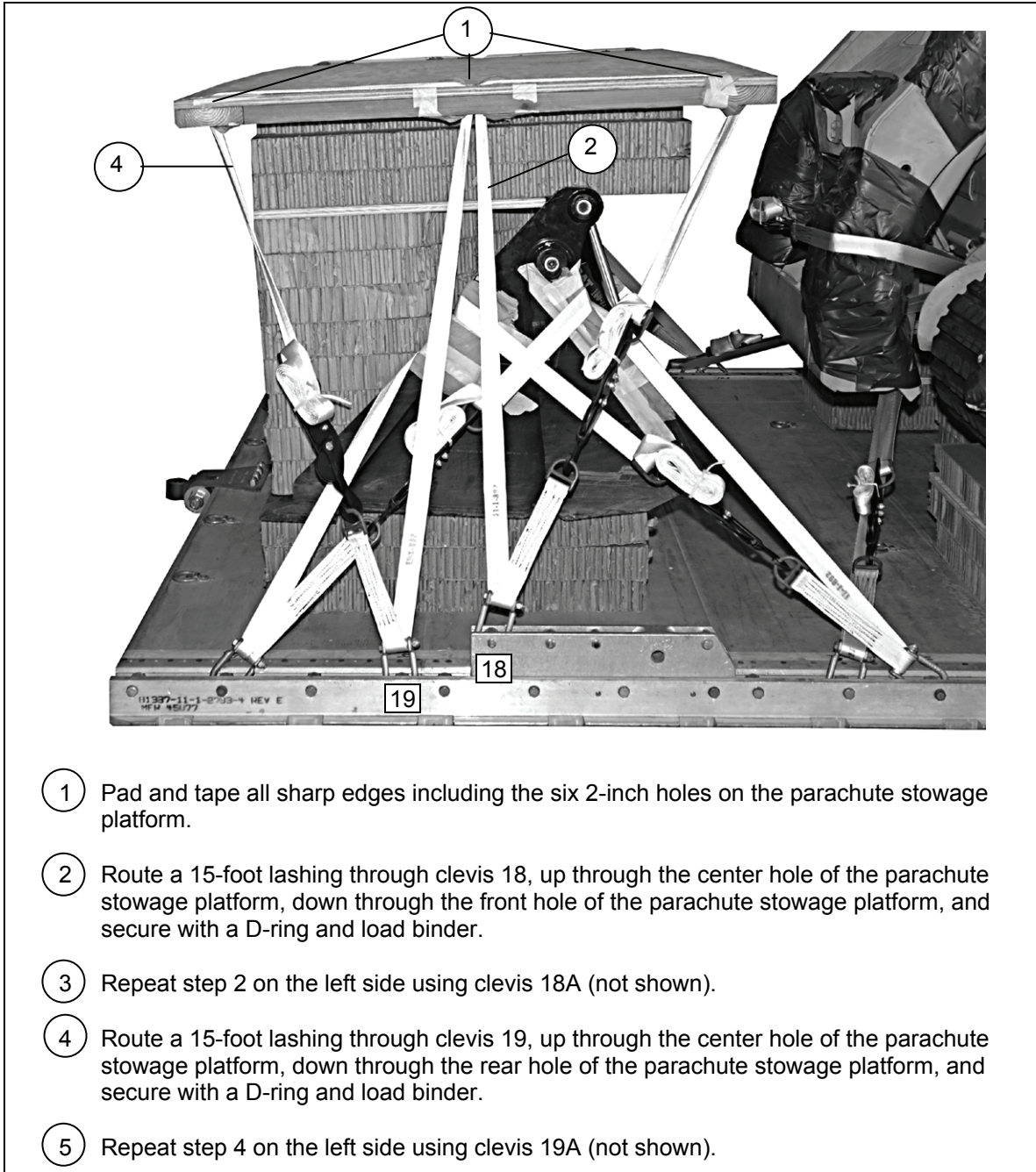
Figure 9-20. Parachute Stowage Platform Built





**Figure 9-21. Parachute Stowage Platform Positioned**





- ① Pad and tape all sharp edges including the six 2-inch holes on the parachute stowage platform.
- ② Route a 15-foot lashing through clevis 18, up through the center hole of the parachute stowage platform, down through the front hole of the parachute stowage platform, and secure with a D-ring and load binder.
- ③ Repeat step 2 on the left side using clevis 18A (not shown).
- ④ Route a 15-foot lashing through clevis 19, up through the center hole of the parachute stowage platform, down through the rear hole of the parachute stowage platform, and secure with a D-ring and load binder.
- ⑤ Repeat step 4 on the left side using clevis 19A (not shown).

**Figure 9-22. Parachute Stowage Platform Lashed**

## INSTALLING AND SAFETY TIEING THE SUSPENSION SLINGS

9-10. Install and safety tie the suspension slings as shown in Figures 9-23 through 9-26.

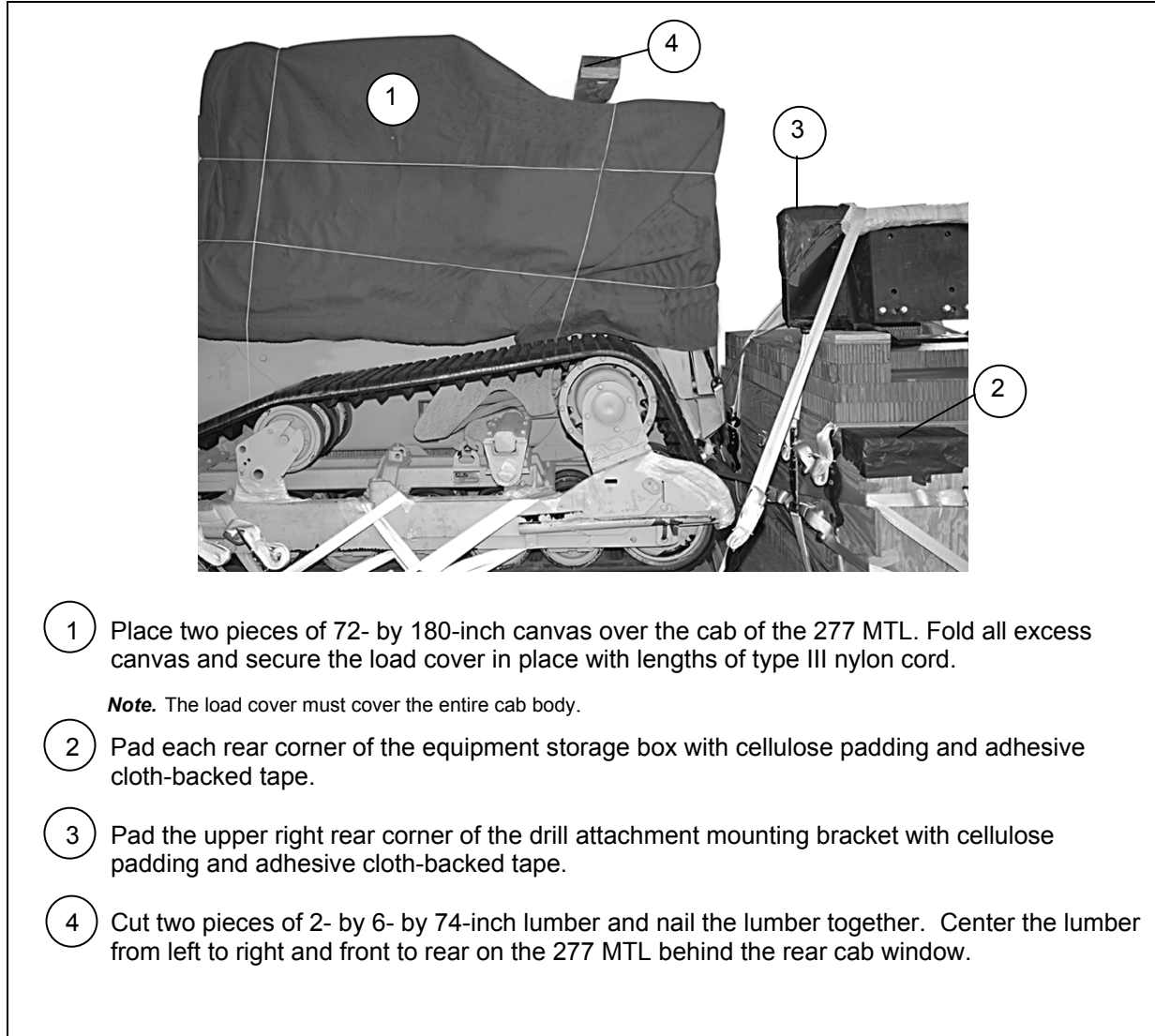
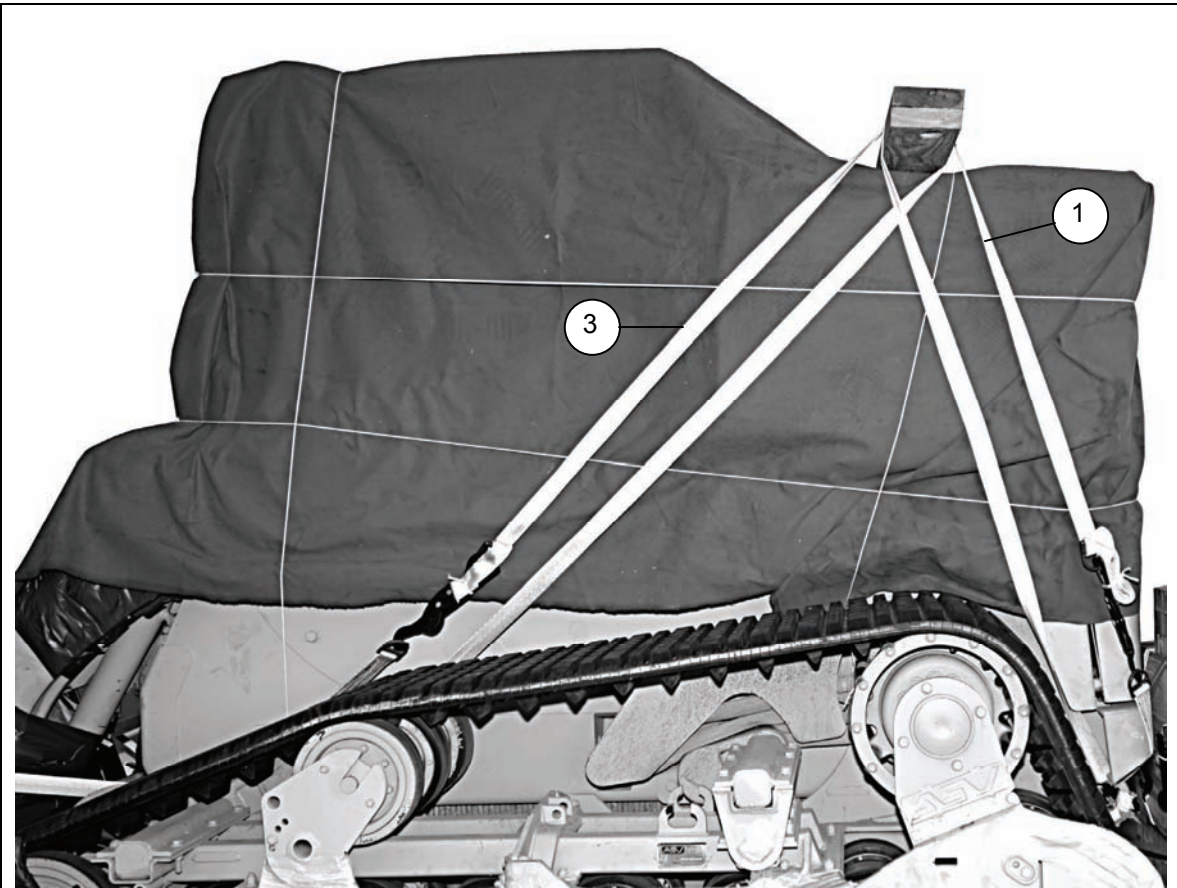
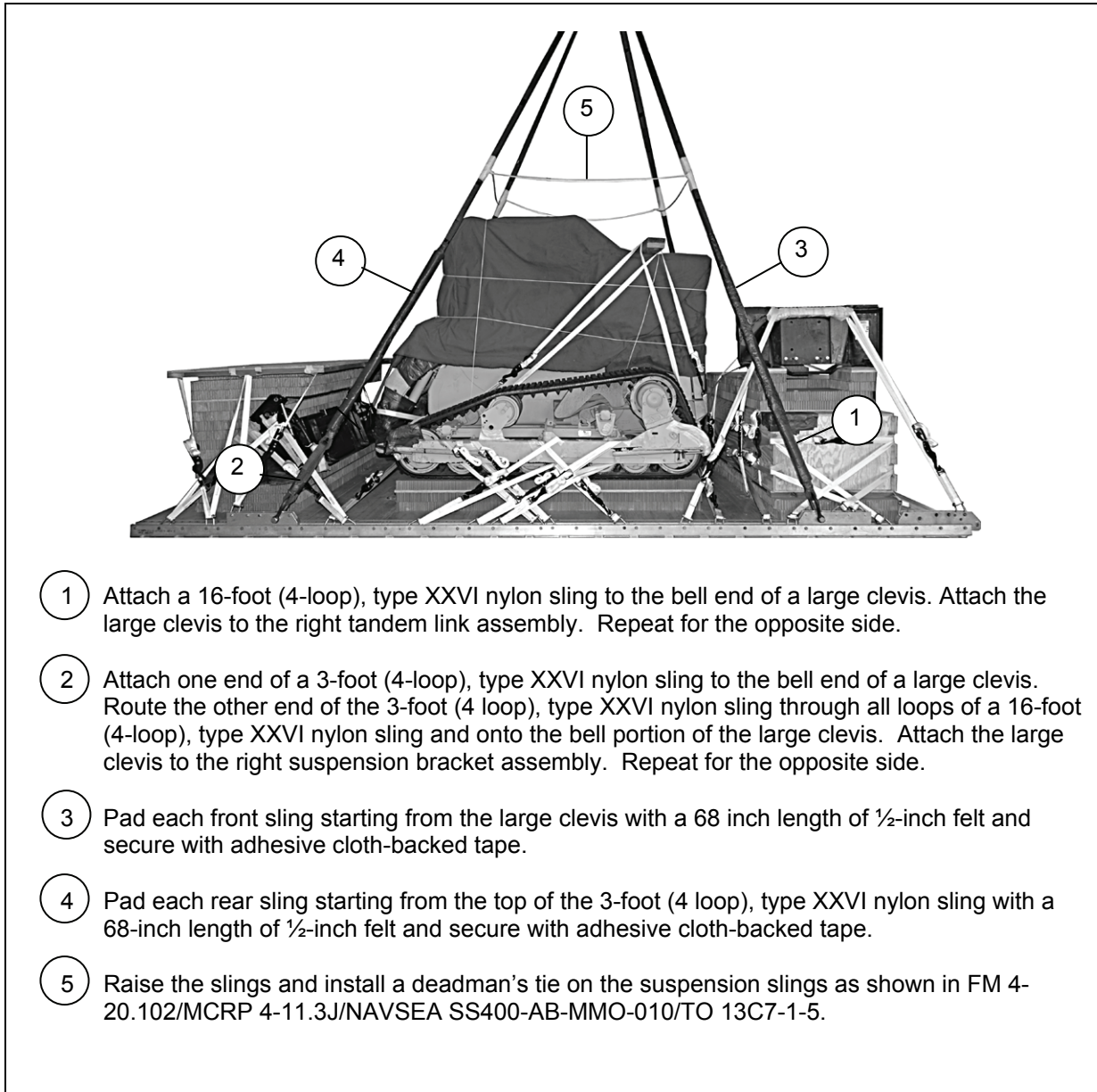


Figure 9-23. Load Covered and Spreader Bar Installed



- ① Route the running end of a 15-foot lashing through the vehicle's left rear tiedown provision, around the 2- by 6- by 74-inch piece of lumber from bottom to top, and back toward its own D-ring. Loosely secure the lashing with a D-ring and loadbinder.
- ② Repeat step 1 on the left side using the vehicle's right rear tiedown provision (not shown).
- ③ Route the running end of a 15-foot lashing around the vehicle's front left undercarriage attaching point, around the 2- by 6- by 74-inch piece of lumber from bottom to top, and back toward its own D-ring. Loosely secure the lashing with a D-ring and loadbinder.
- ④ Repeat step 3 on the right side using the vehicle's front right undercarriage attaching point (not shown).
- ⑤ Close all load binders simultaneously ensuring the spreader bar remains centered on the 277 MTL.

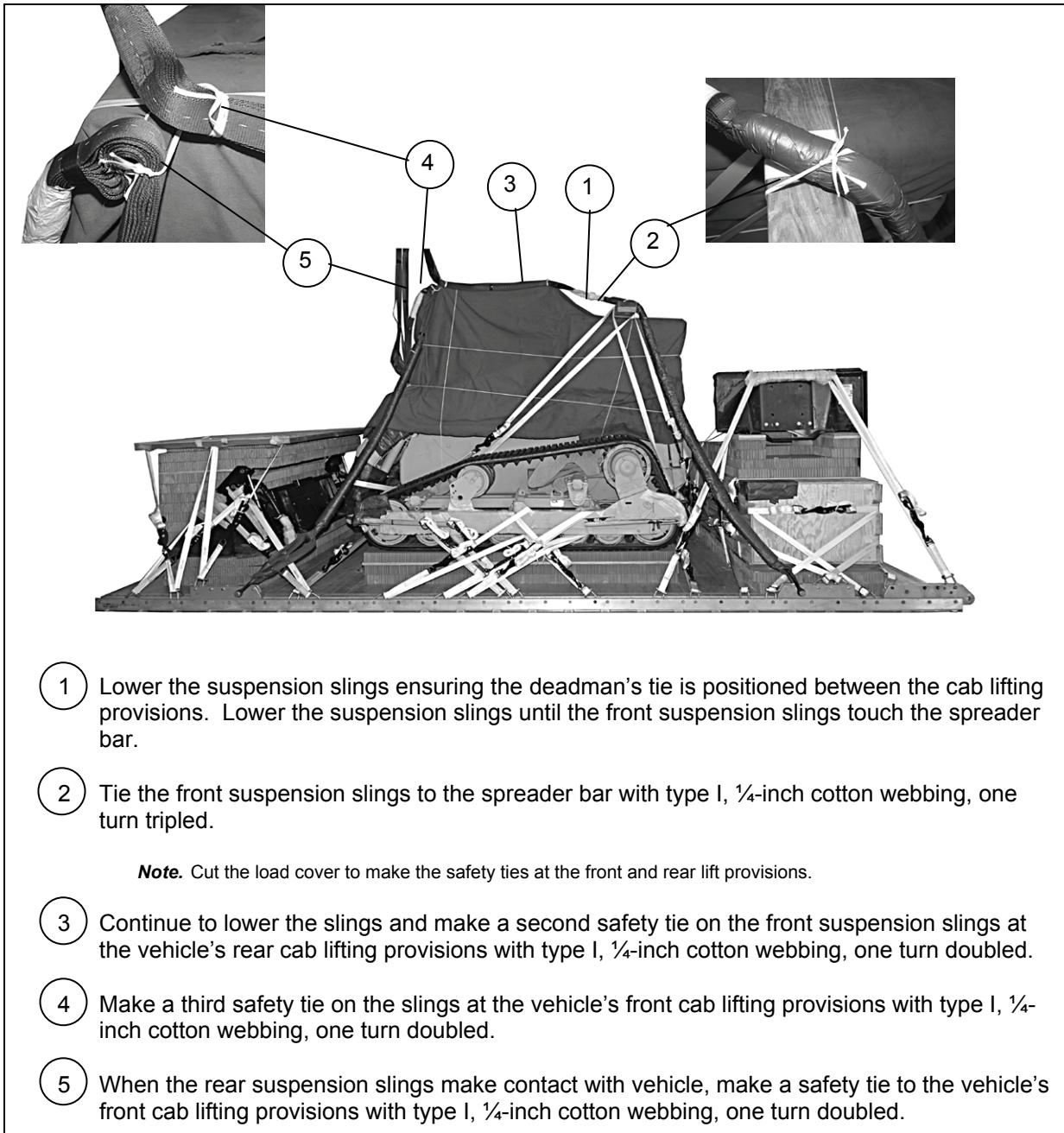
**Figure 9-24. Spreader Bar Lashed**



- 1 Attach a 16-foot (4-loop), type XXVI nylon sling to the bell end of a large clevis. Attach the large clevis to the right tandem link assembly. Repeat for the opposite side.
- 2 Attach one end of a 3-foot (4-loop), type XXVI nylon sling to the bell end of a large clevis. Route the other end of the 3-foot (4 loop), type XXVI nylon sling through all loops of a 16-foot (4-loop), type XXVI nylon sling and onto the bell portion of the large clevis. Attach the large clevis to the right suspension bracket assembly. Repeat for the opposite side.
- 3 Pad each front sling starting from the large clevis with a 68 inch length of ½-inch felt and secure with adhesive cloth-backed tape.
- 4 Pad each rear sling starting from the top of the 3-foot (4 loop), type XXVI nylon sling with a 68-inch length of ½-inch felt and secure with adhesive cloth-backed tape.
- 5 Raise the slings and install a deadman's tie on the suspension slings as shown in FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.

**Figure 9-25. Suspension Slings Installed**



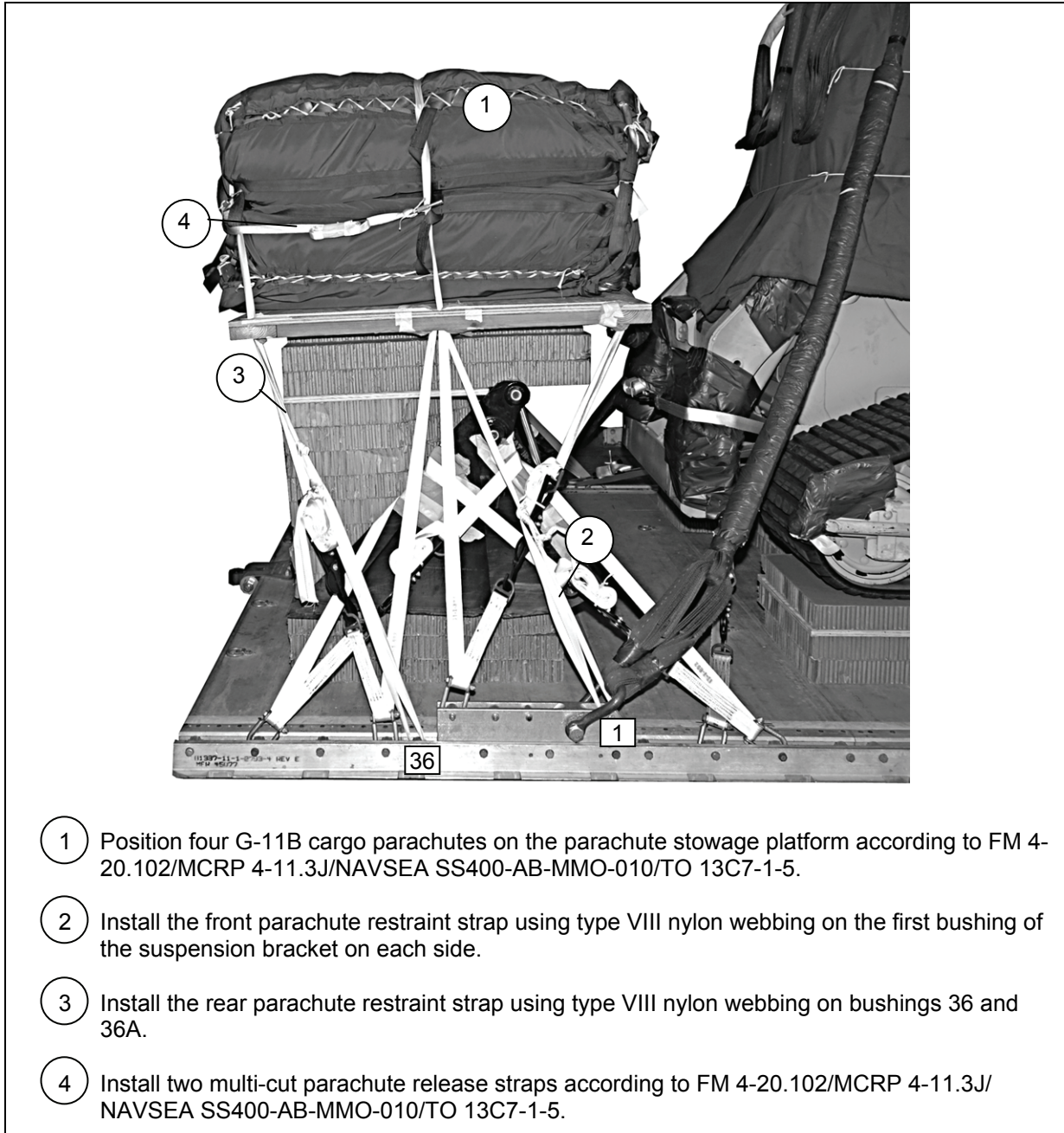


**Figure 9-26. Suspension Slings Safety Tied**



## STOWING CARGO PARACHUTES

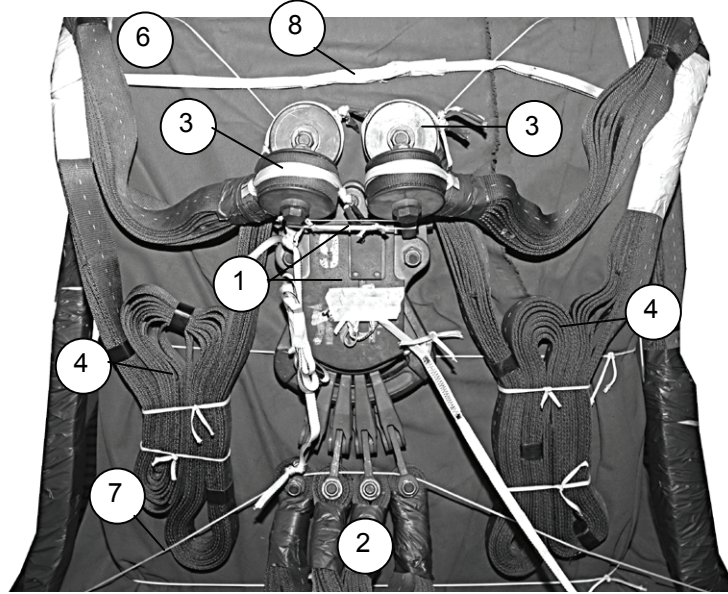
9-11. Prepare, stow, and restrain four G-11B cargo parachutes according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figure 9-27.



**Figure 9-27. Cargo Parachutes Positioned and Restrained**

## INSTALLING PARACHUTE RELEASE SYSTEM

9-12. Prepare and install an M-2 parachute release system according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figure 9-28.

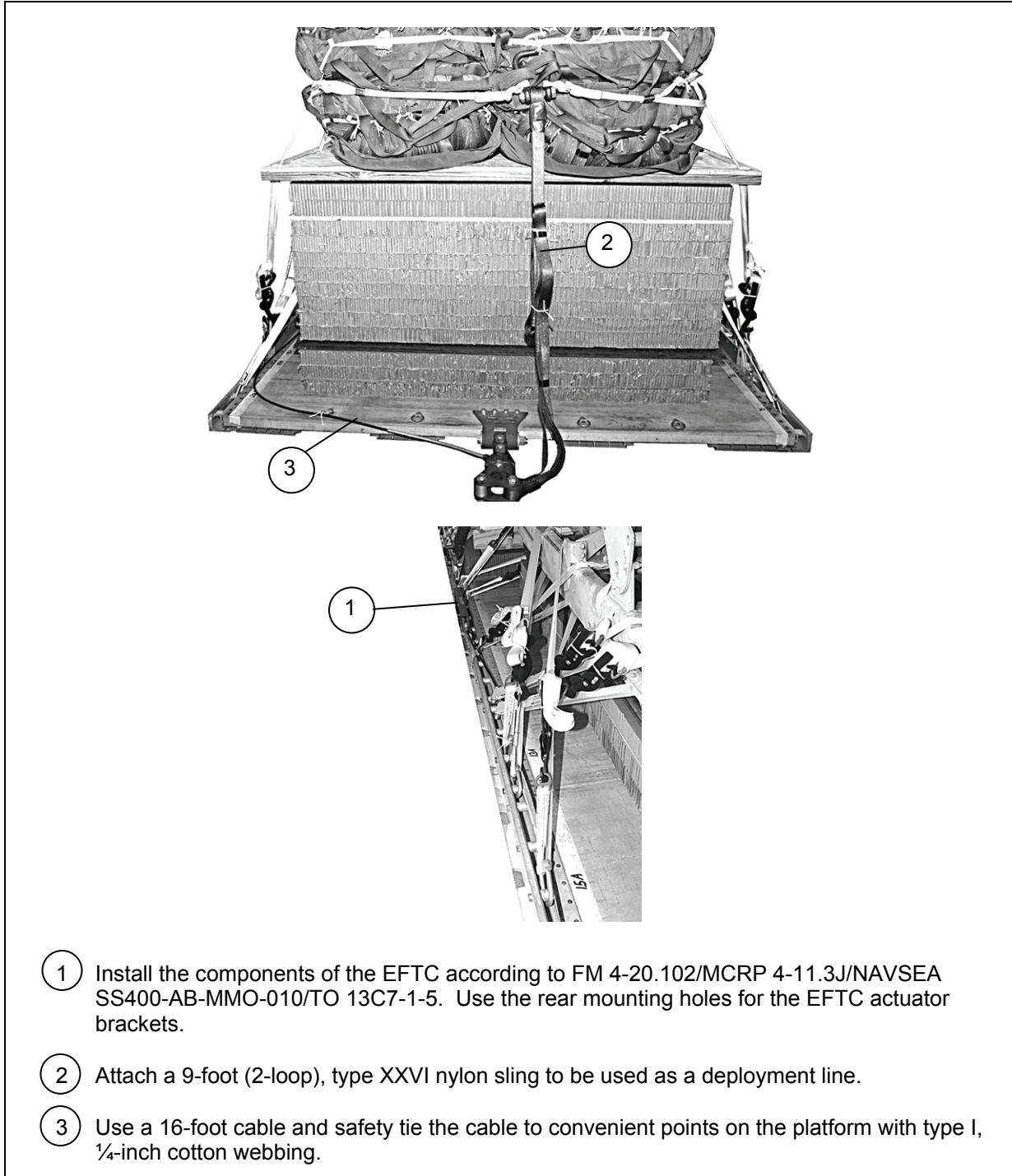


- ① Position an M-2 parachute release assembly on the front of the 277 MLT and temporarily safety tie in place with type I, ¼-inch cotton webbing. Tie the lower suspension links together with type I, ¼-inch cotton webbing.
- ② Attach the parachute riser extensions to the parachute release connectors.
- ③ Attach the suspension slings to the lower suspension links.
- ④ Fold the excess suspension slings and safety tie with type I, ¼-inch cotton webbing.
- ⑤ Safety tie any slack in the riser extensions using type I, ¼-inch cotton webbing to the center parachute (not shown).
- ⑥ Tie the front M-2 parachute release safety tie to the vehicle's front lift points with type III nylon cord. Remove the temporary safety tie.
- ⑦ Tie the rear M-2 parachute release safety tie to convenient points on the load with type III nylon cord.
- ⑧ S-fold the slack in the deadman's tie and secure with masking tape.

**Figure 9-28. M2 Parachute Release Installed**

## INSTALLING EXTRACTION SYSTEM

9-13. Install the extraction system as shown in Figure 9-29.



**Figure 9-29. Extraction System Installed**

## **PLACING EXTRACTION PARACHUTE**

9-14. Select the extraction parachute and extraction line needed using the extraction line requirements table in FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5. Place the extraction parachute and line on the load for installation in the aircraft.

## **INSTALLING PROVISIONS FOR EMERGENCY RESTRAINTS**

9-15. Select and install the provisions for the emergency aft restraints according to the emergency aft restraint requirements table in FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.

## **MARKING RIGGED LOAD**

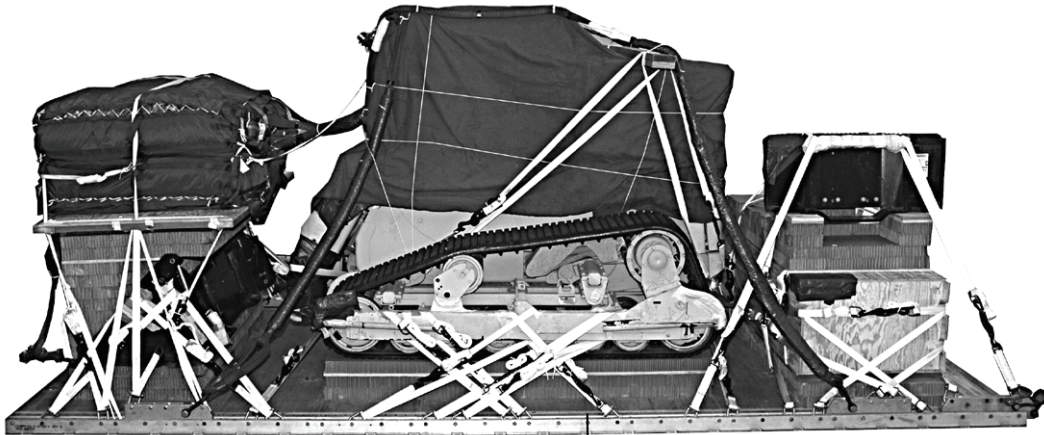
9-16. Mark the rigged load according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5, and as shown in Figure 9-30. Complete Shipper's Declaration for Dangerous Goods. If the load varies from the one shown, the weight, height, CB, and parachute requirements must be recomputed.

## **EQUIPMENT REQUIRED**

9-17. Use the equipment listed in Table 9-1 to rig this load.

**CAUTION**

Make the final rigger inspection required by AR 59-4 and FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 before the load leaves the rigging site.



C/B

**RIGGED LOAD DATA**

Weight: Load Shown.....	18,240 pounds
Max Weight Load .....	18,240 pounds
Height.....	100 inches
Width.....	108 inches
Overall Length .....	258 inches
Overhang: Front.....	0 inches
Rear.....	0 inches
Center of Balance (CB) (from front edge of the platform).....	111 inches
Extraction System with 16-foot cable (adds 18 inches to the length of the load)	

**Figure 9-30. 277 Multi-Terrain Loader Rigged on a 20-Foot, Type V Platform for Low-Velocity Airdrop**



**Table 9-1. Equipment Required for Rigging the 277 Multi-Terrain Loader on a 20-Foot, Type V Platform for Low-Velocity Airdrop**

<i>National Stock Number</i>	<i>Item</i>	<i>Quantity</i>
8040-00-273-8713	Adhesive paste, 1-gal.	As required
4030-00-090-5354	Clevis, suspension, 1-inch (large)	7
8305-00-880-8155	Cloth, coated (nylon, type II, 17.0 oz, green, 60-in)	As required
4020-00-240-2146	Cord, nylon, type III, 550-lb	As required
1670-00-434-5785	Coupling, airdrop extraction force transfer, w/16-ft. cable	1
1670-00-360-0328	Cover, clevis	4
8135-00-664-6958	Cushioning material (Cellulose padding)	As required
8305-00-958-3685	Felt, 1/2-inch thick	As required
1670-01-183-2678	Leaf, extraction line (line bag) ( add 2 for C-17)	2
	Line extraction:	
1670-01-062-6313	60-foot (3-loop), type XXVI (for C-130)	1
1670-01-107-7651	140-foot (3-loop), type XXVI (for C-17)	1
1670-01-064-4452	60-foot (1-loop), type XXVI (for C-17), (drogue line)	1
1670-00-783-5988	Link assembly, type IV (C-17 only)	1
	Link assembly, two-point:	
5306-00-435-8994	Bolt, 1-inch diameter, 4-inches long	6
5310-00-232-5165	Nut, 1-inch	6
1670-00-003-1954	Plate, side, 5 1/2-inch	6
5365-00-007-3414	Spacer, large	6
	Lumber:	
5510-00-220-6146	2- by 4- by 96-inch	3
5510-00-220-6148	2- by 6- by 96-inch	5
5315-00-010-4659	Nail, steel, common, 8D	As required
5315-00-753-3885	Nail, steel, common, 16D	As required
1670-00-753-3928	Pad, energy-dissipating (honeycomb)	30 sheets
1670-01-016-7841	Parachute, cargo, G-11B	4
	Parachute, cargo, extraction:	
1670-00-040-8135	28-foot	1
1670-01-063-3715	15-foot (C-17 only)	1
	Platform, airdrop, type V, 20-foot:	
1670-01-162-2372	Clevis assembly (type V)	40
1670-01-162-2376	Extraction bracket assembly	1
1670-01-247-2389	Link, suspension bracket, type V	4
1670-01-162-2381	Tandem link assembly (Multipurpose link)	2
5530-00-128-4981	Plywood, 3/4-inch	9 Sheets

**Table 9-1. Equipment Required for Rigging the 277 Multi-Terrain Loader on a 20-Foot, Type V Platform for Low-Velocity Airdrop (Continued)**

<i>National Stock Number</i>	<i>Item</i>	<i>Quantity</i>
1670-01-097-8817	Release, cargo parachute, M-2	1
	Sling, cargo, airdrop:	
1670-01-062-6306	3-foot (4-loop), type XXVI	5
1670-01-062-6308	16-foot (4-loop), type XXVI	4
1670-01-062-6313	60-foot (3-loop), type XXVI	4
5340-00-040-8219	Strap, parachute, release, multi-knife	2
7501-00-266-5016	Tape, adhesive, 2-inch	As required
1670-00-937-0271	Tiedown assembly, 15-foot	54
1670-01-483-8259	Link, parachute, connector (H-block) (C-17 only)	1
	Webbing:	
8305-00-268-2411	Cotton, 1/4-inch, type I	As required
8305-00-082-5752	Nylon, tubular, 1/2-inch	As required
8305-00-261-8585	Nylon, type VIII	As required

## Chapter 10

# Rigging the A/S37U-3 All-Purpose Remote Transporter (ARTS II) on a 16-Foot, Type V Platform for Low-Velocity Airdrop

### DESCRIPTION OF THE LOAD

10-1. The A/S37U-3 all-purpose remote transporter (Figure 10-1) is rigged on a 16-foot, type V airdrop platform using three G-11 cargo parachutes. The ARTS II is 78 inches high, 64 inches wide, 146 inches long, and weighs 9,880 pounds.

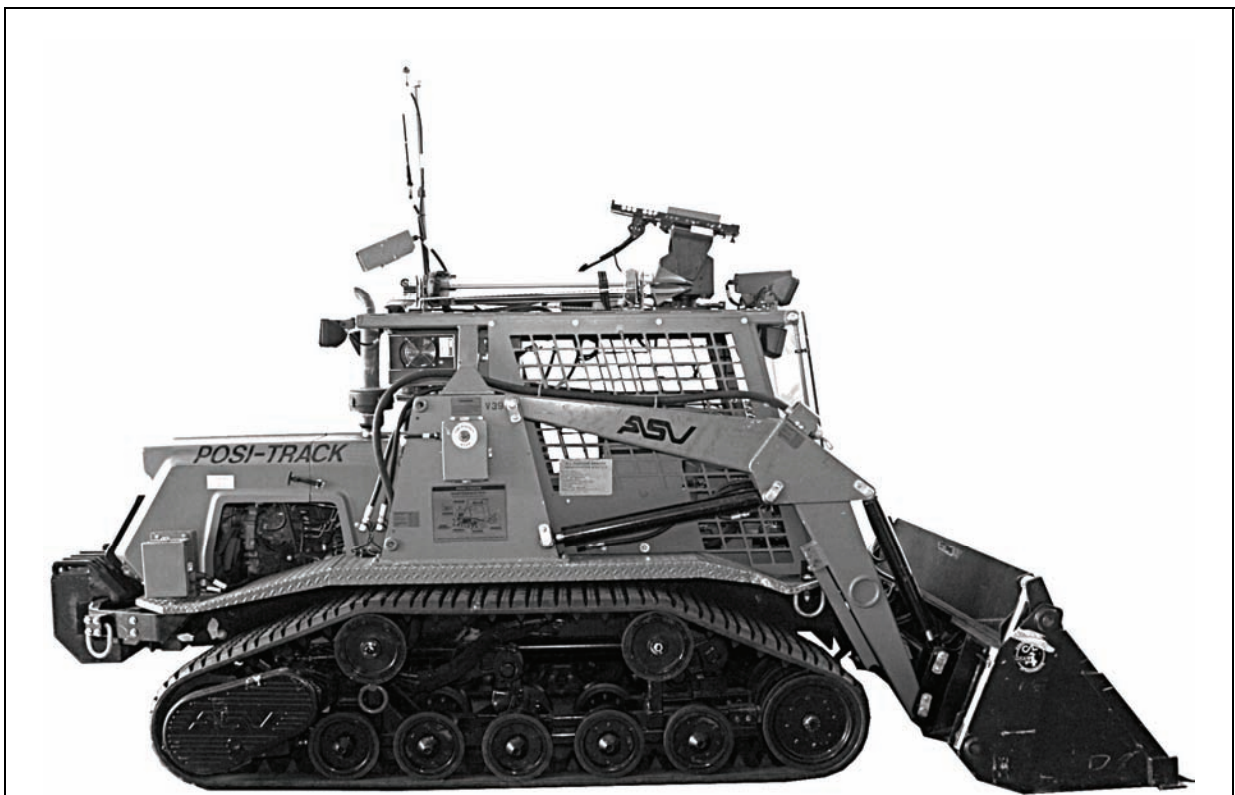
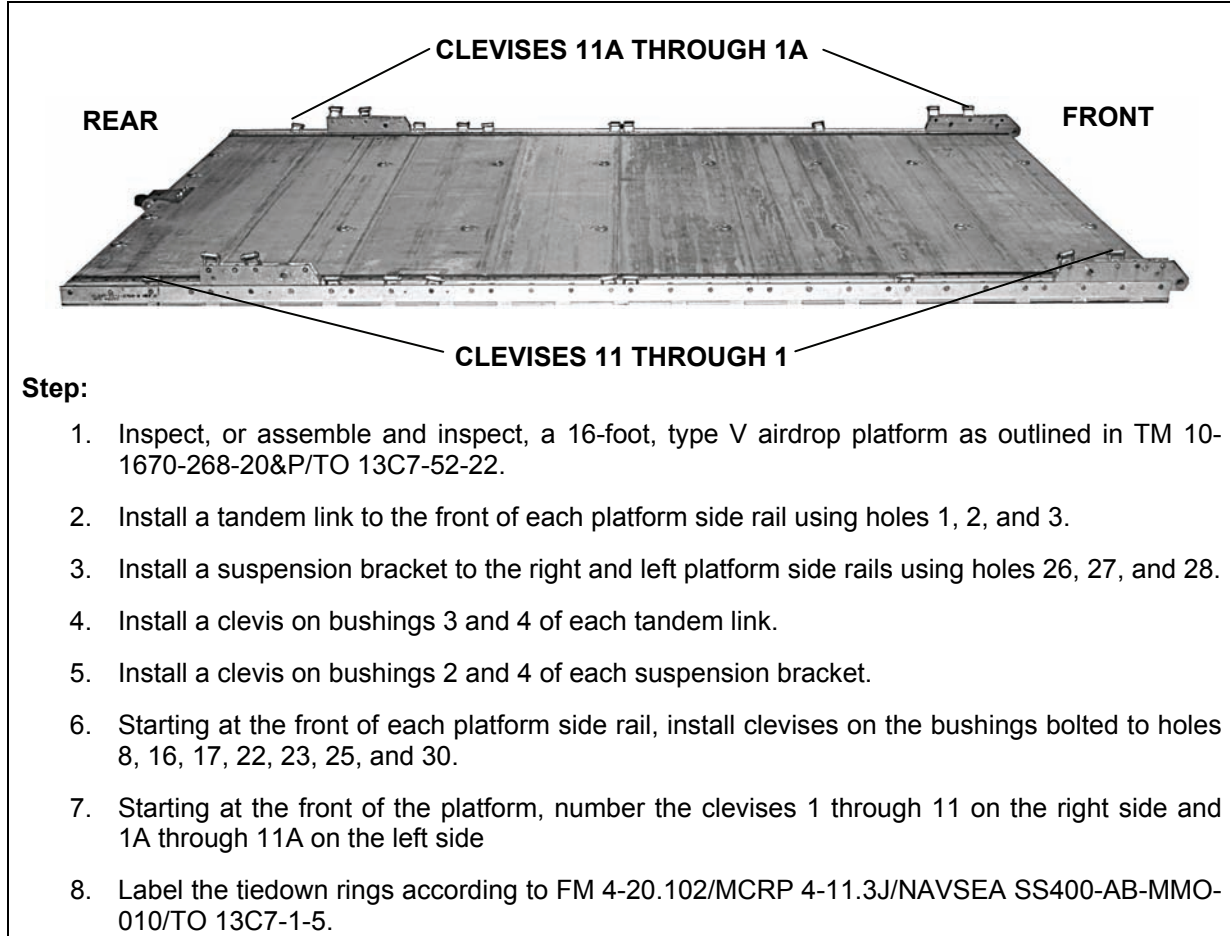


Figure 10-1. All-Purpose Remote Transporter

## PREPARING PLATFORM

10-2. Prepare a 16-foot, type V airdrop platform as shown in Figure 10-2.



**Figure 10-2. Platform Prepared**

## BUILDING AND POSITIONING HONEYCOMB STACKS

10-3. Build the honeycomb stacks as shown in Figures 10-3 through 10-6. Position the stacks as shown in Figure 10-7.

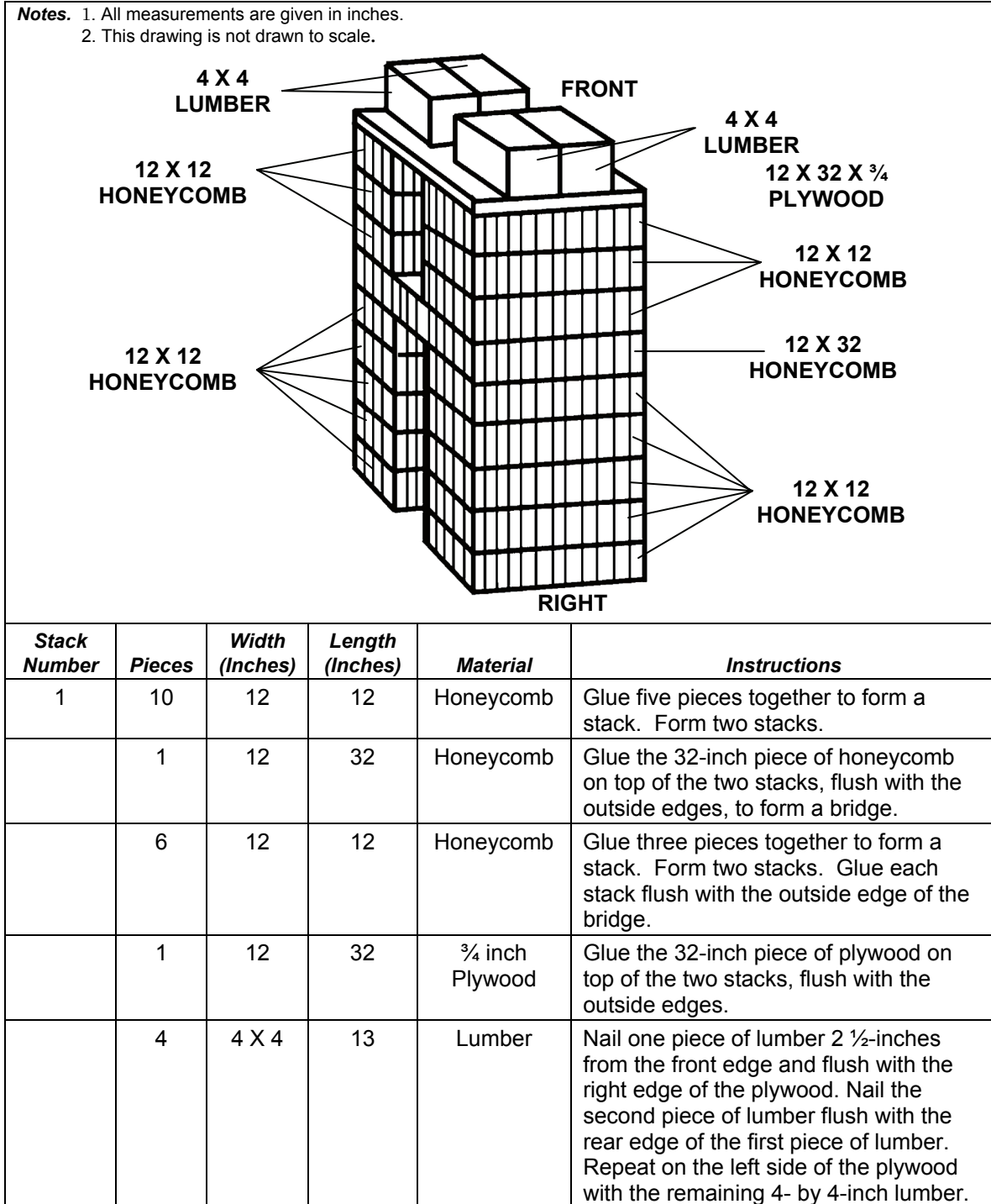


Figure 10-3. Honeycomb Stack 1 Prepared



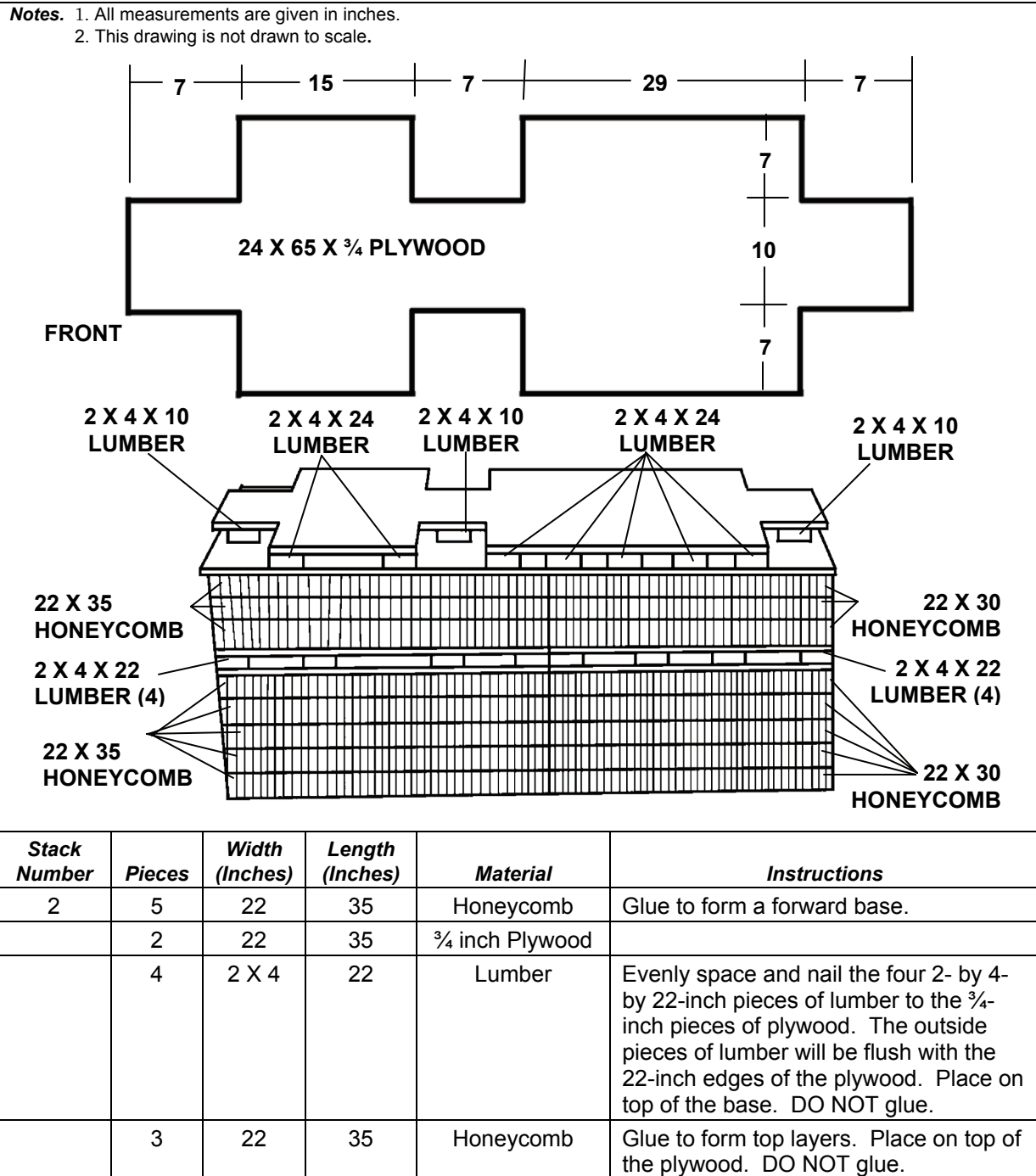
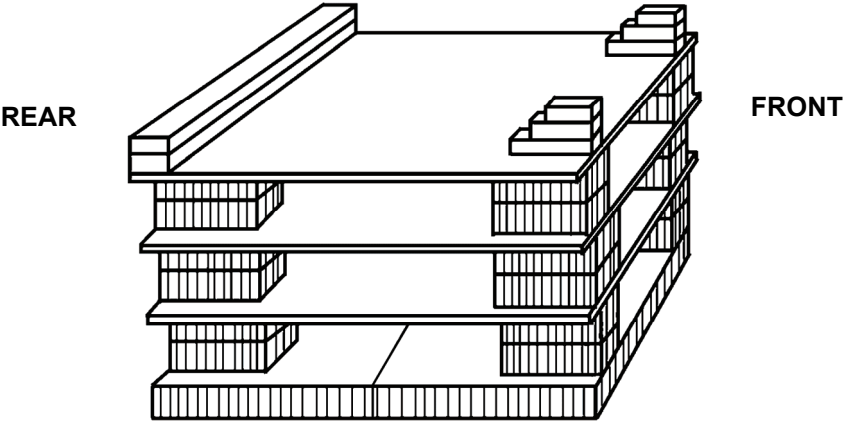


Figure 10-4. Honeycomb Stack 2 Prepared

<i>Stack Number</i>	<i>Pieces</i>	<i>Width (Inches)</i>	<i>Length (Inches)</i>	<i>Material</i>	<i>Instructions</i>
2 (Cont)	5	22	30	Honeycomb	Glue to form an aft base.
	2	22	30	¾ inch Plywood	
	4	2 X 4	22	Lumber	Evenly space and nail the four 2- by 4- by 22-inch pieces of lumber to the ¾-inch pieces of plywood. The outside pieces of lumber will be flush with the 22-inch edges of the plywood. Place on top of the base. DO NOT glue.
	3	22	30	Honeycomb	Glue to form top layers. Place on top of the plywood. DO NOT glue.
	2	24	65	¾ inch Plywood	Cut the top piece of plywood as shown.
	7	2 X 4	22	Lumber	
	3	2 X 4	10	Lumber	Nail a 2- by 4-by 10-inch piece of lumber 1 ½ inches in from the front edge and centered on the top piece of plywood. Nail a 2- by 4- by 24-inch piece of lumber with one edge flush against the forward edge of the first set of cutouts. Nail a 2- by 4- by 24-inch piece of lumber with one edge flush against the front edge of the second set of cutouts. Nail a 2- by 4-by 10-inch piece of lumber centered on the second set of cutouts. Nail a 2- by 4- by 24-inch piece of lumber with one edge flush against the rear edge of the second set of cutouts. Nail a 2- by 4- by 24-inch piece of lumber with one edge flush against the forward edge of the third set of cutouts. Center three 2- by 4- by 24-inch pieces of lumber evenly spaced between the third and fourth 2 by 4 positioned above. Nail a 2- by 4- by 10-inch piece of lumber 1 ½ inches in and centered from the rear edge of the top piece of plywood. Nail the bottom 24- by 65- by ¾ -inch piece of plywood on top of the 2- by 4-inch pieces of lumber. Position the load spreader on top of the honeycomb stack, with the cut outs on top, even with the front and rear and with a 1-inch overhang on both sides of the stack.

Figure 10-4. Honeycomb Stack 2 Prepared (Continued)

**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



Stack Number	Pieces	Width (Inches)	Length (Inches)	Material	Instructions
3	2	60	20	Honeycomb	Place honeycomb side by side to form a 60- by 40-inch base.
	24	10	9	Honeycomb	Glue honeycomb to form twelve stacks of two pieces. Glue one stack of honeycomb to the front edge of the base with the 10-inch side flush with the front and 4 inches in from the left side. Glue one stack of two pieces of honeycomb to the front edge of the base with the 10-inch side flush with the front and 4 inches in from the right side. Glue one stack of honeycomb to the rear edge of the base with the 10-inch side flush with the rear and 4 inches in from the left side. Glue one stack of two pieces of honeycomb to the rear edge of the base with the 10-inch side flush with the rear and 4 inches in from the right side.
	3	60	40	$\frac{3}{4}$ inch Plywood	Glue one piece of plywood onto the honeycomb stacks centered left to right and front to rear. Build three layers.
	2	2 X 4	8	Lumber	Nail the 2- by 4- by 8-inch piece of lumber on top of the plywood with the 3 $\frac{1}{2}$ -inch side flush with the front edge and 7 inches in from the right side. Repeat on the left side.
	2	2 X 4	6	Lumber	Nail the 2- by 4- by 6-inch piece of lumber on top of the 2- by 4- by 8-inch piece of lumber with the 3 $\frac{1}{2}$ -inch side flush with the front. Repeat on the left side.

Figure 10-5. Honeycomb Stack 3 Prepared

<i>Stack Number</i>	<i>Pieces</i>	<i>Width (Inches)</i>	<i>Length (Inches)</i>	<i>Material</i>	<i>Instructions</i>
3 (Cont)	2	2 X 4	4 ¾	Lumber	Nail the 2- by 4- by 4 ¾-inch piece of lumber on top of the 2- by 4- by 6-inch lumber with the 3½ inch side flush with the front. Repeat on the left side.
	2	2 X 4	60	Lumber	Nail the 2- by 4- by 60-inch piece of lumber flush with the rear edge of plywood. Nail the second piece of lumber flush on top of the first piece of lumber.

Figure 10-5. Honeycomb Stack 3 Prepared (Continued)

**Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.

<i>Stack Number</i>	<i>Pieces</i>	<i>Width (Inches)</i>	<i>Length (Inches)</i>	<i>Material</i>	<i>Instructions</i>
4, 5, 6, & 7	20	18	13	Honeycomb	Glue five pieces together to make a stack. Make four stacks.

Figure 10-6. Honeycomb Stacks 4 through 7 Prepared

- Notes.** 1. All measurements are given in inches.  
 2. This drawing is not drawn to scale.

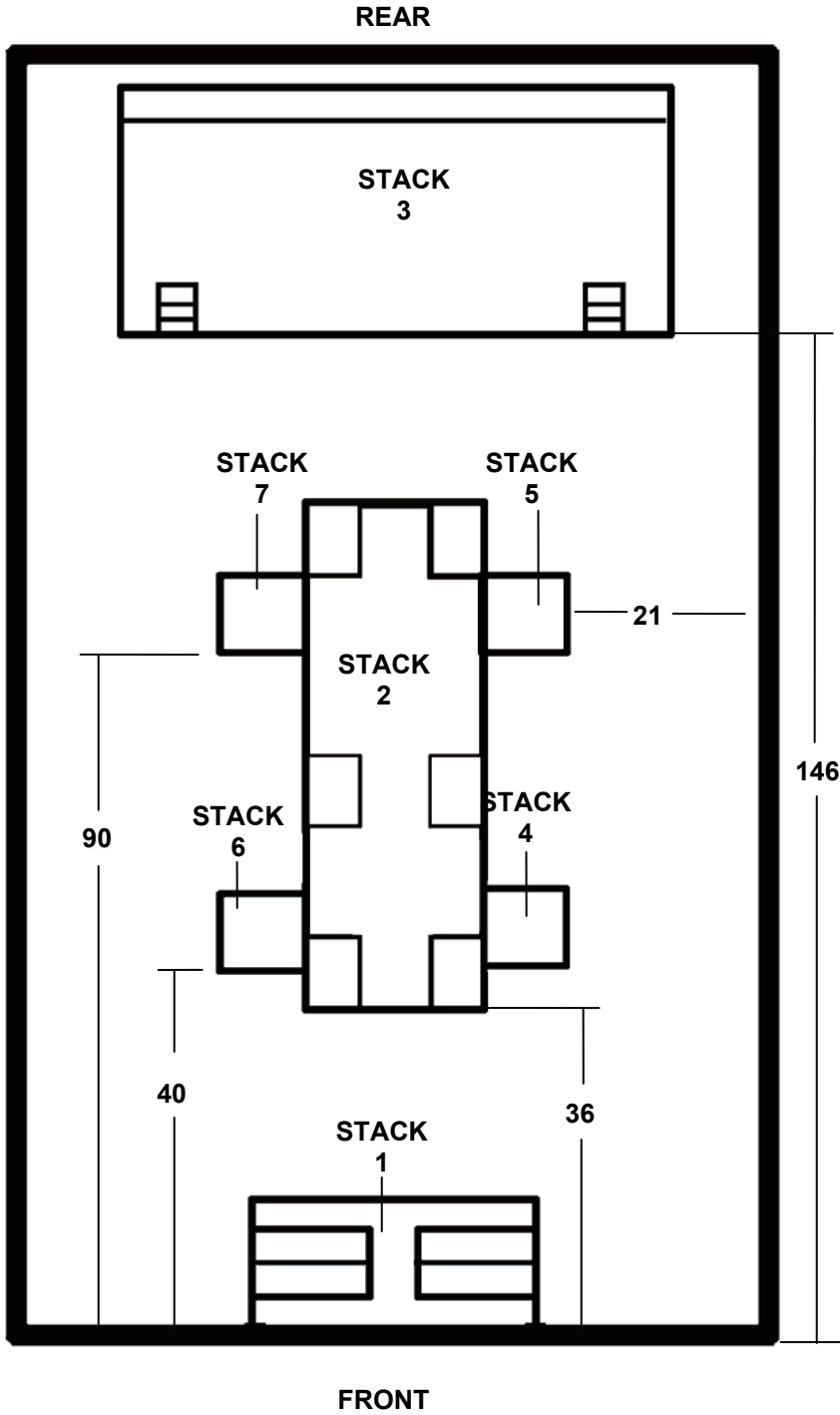
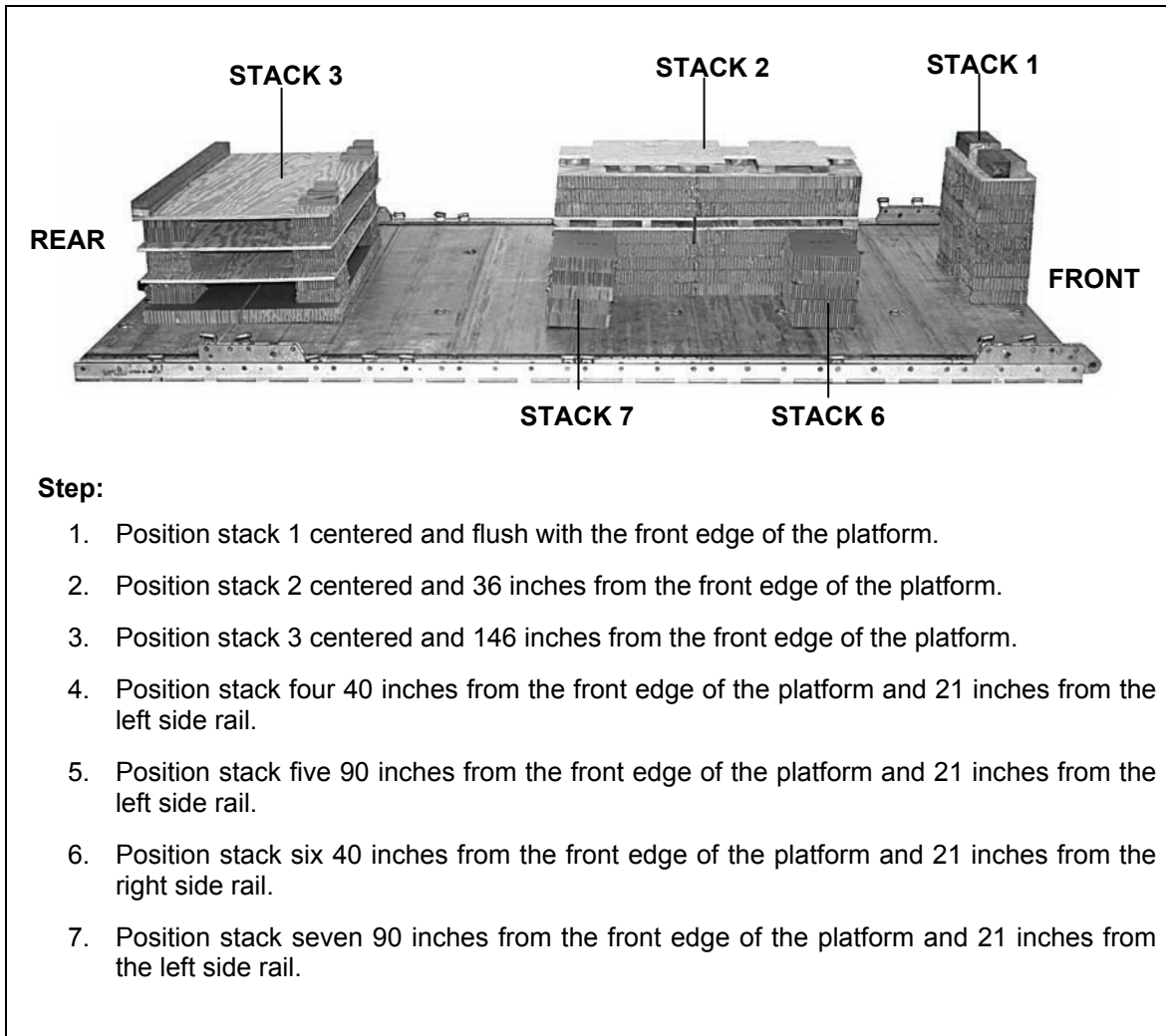


Figure 10-7. Honeycomb Stacks Positioned on Platform

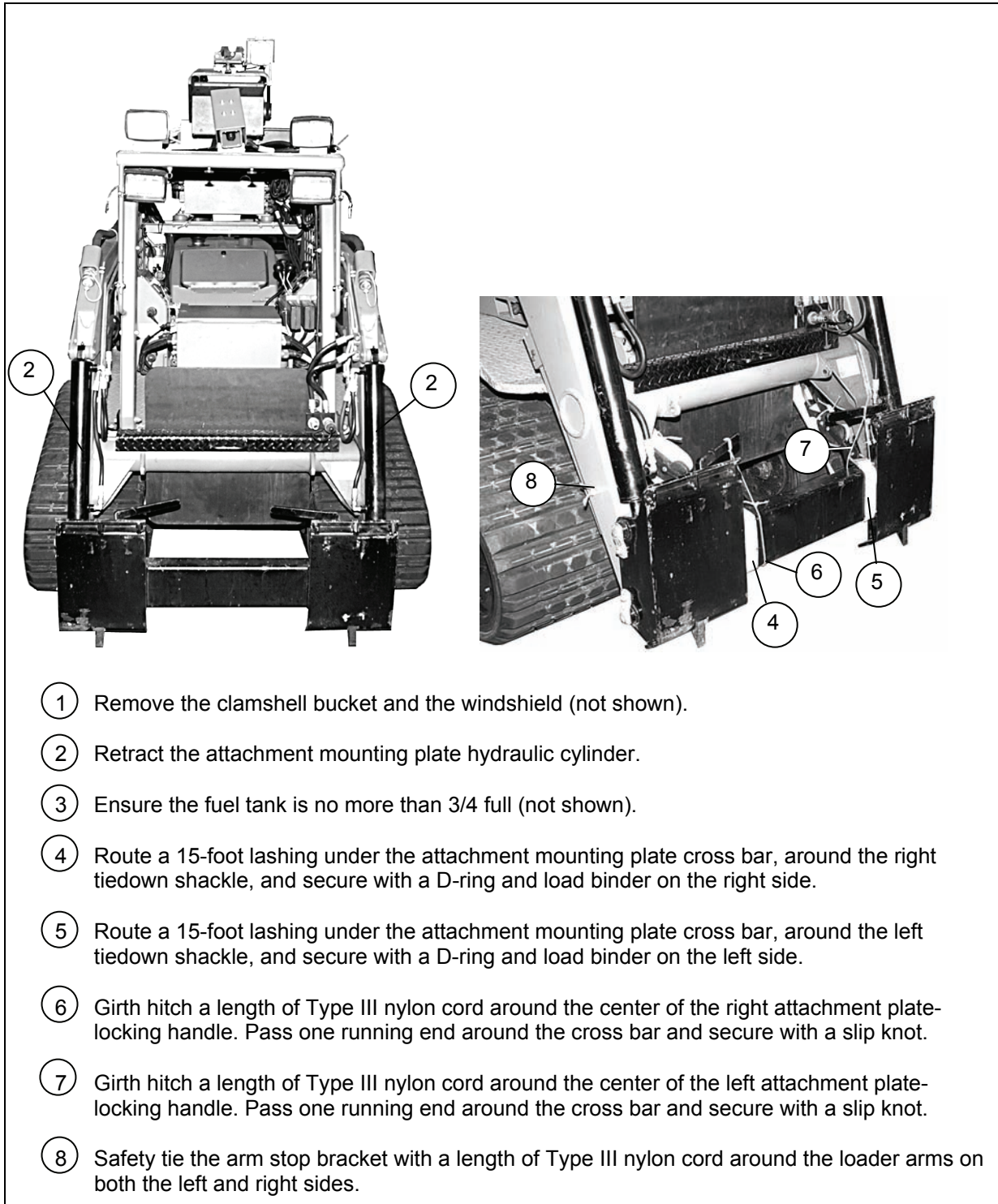




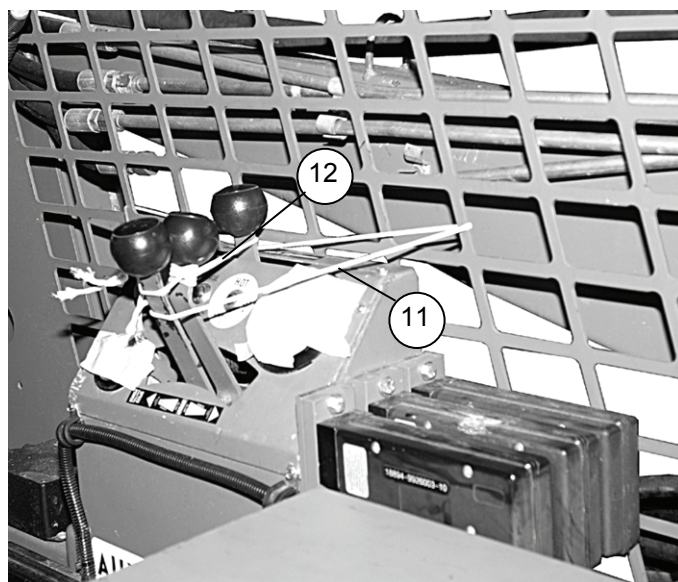
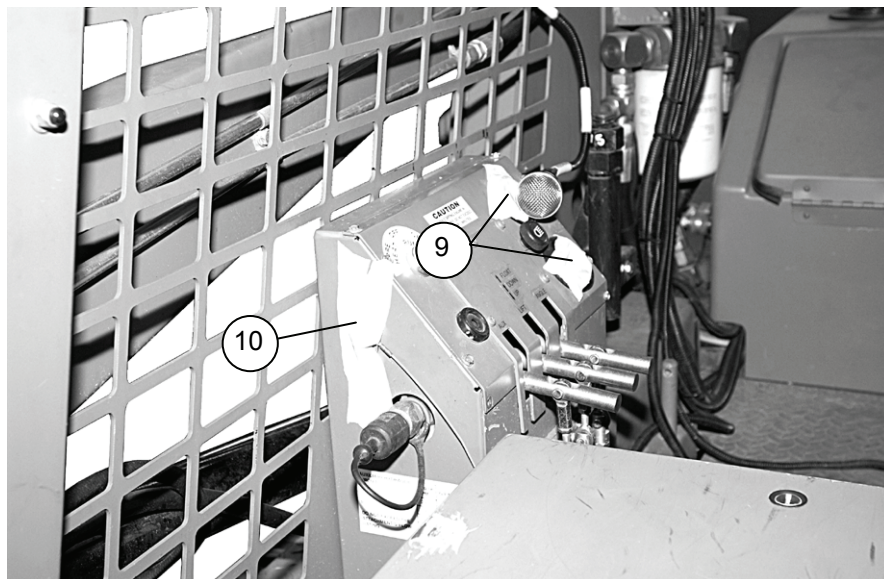
**Figure 10-7. Honeycomb Stacks Positioned on Platform (Continued)**

## PREPARING THE ALL-PURPOSE REMOTE TRANSPORTER

10-4. Prepare the ARTS as shown in Figure 10-8.

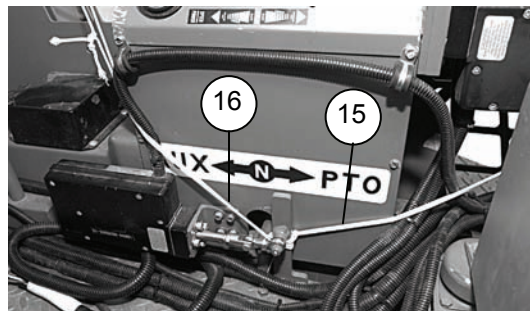
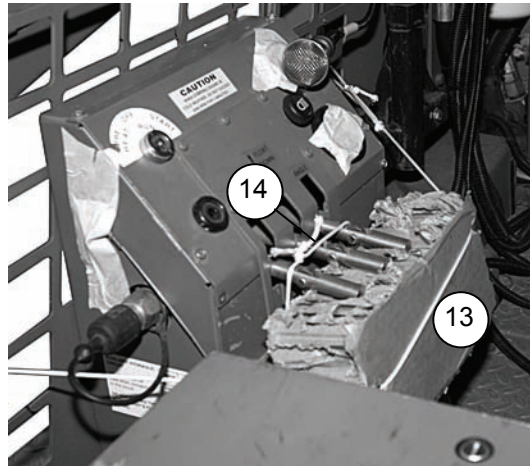


**Figure 10-8. All-Purpose Remote Transporter Prepared**



- ⑨ Tape all glass, gauges, and reflectors.
- ⑩ Remove the key from the valve control station ignition switch and tape to the side panel.
- ⑪ Girth hitch a length of Type III nylon cord around the steering/revolutions per minute (RPM) control station center control lever. Route the running ends to the rear and around the outside control levers and secure to the roll cage fence.
- ⑫ Girth hitch a second length of Type III nylon cord around the steering/RPM control station center control lever. Route the running ends to the front and around the outside control levers and secure to the roll cage fence.

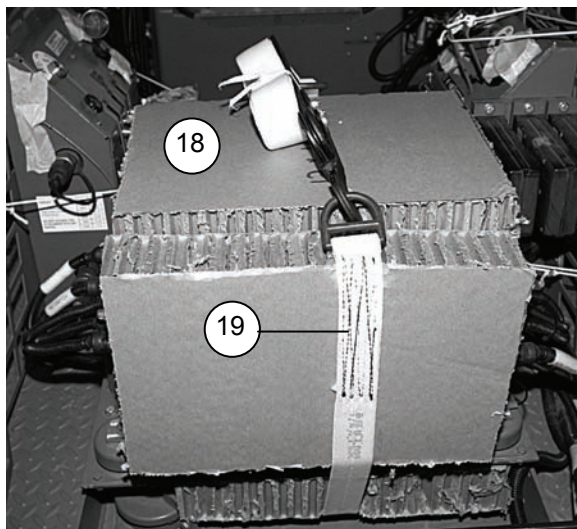
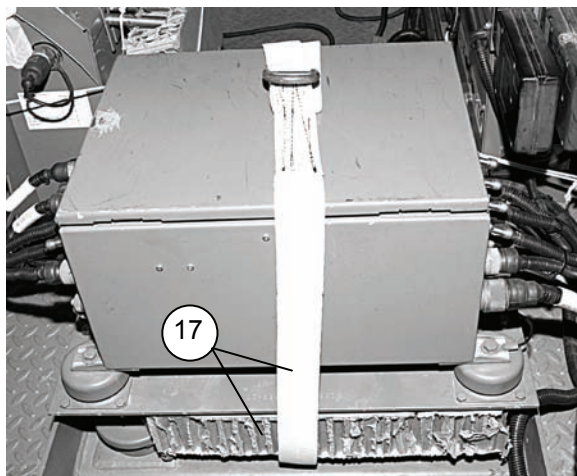
Figure 10-8. All-Purpose Remote Transporter Prepared (Continued)



- ⑬ Position a 5- by 10-inch piece of honeycomb under the valve control station hydraulic control levers. Secure with a length of Type III nylon cord to the roll cage fence.
- ⑭ Route a length of Type III nylon cord through the bottom actuator mounting bracket, over top of the hydraulic control levers and secure on top.
- ⑮ Position the auxiliary power take off (PTO) in the neutral position. Girth hitch a length of Type III nylon cord around the PTO lever. Route the running ends to the rear and secure to the roll cage fence.
- ⑯ Girth hitch a second length of Type III nylon cord around the PTO lever. Route the running ends to the front and secure to the roll cage fence.

**Figure 10-8. All-Purpose Remote Transporter Prepared (Continued)**





- ①7 Place a 15-foot lashing under the actuator control node mount. Place a 12- by 16-inch piece of honeycomb on top of the lashing and under the mount with the 16-inch side facing towards the front.
- ①8 Place a second piece of 12- by 16-inch piece of honeycomb on top of the actuator control node.
- ①9 Place a 10- by 16-inch piece of honeycomb on the front and rear side of the actuator control node. Secure the honeycomb in place with the pre-positioned lashing with the D-ring and load-binder on top.

Figure 10-8. All-Purpose Remote Transporter Prepared (Continued)



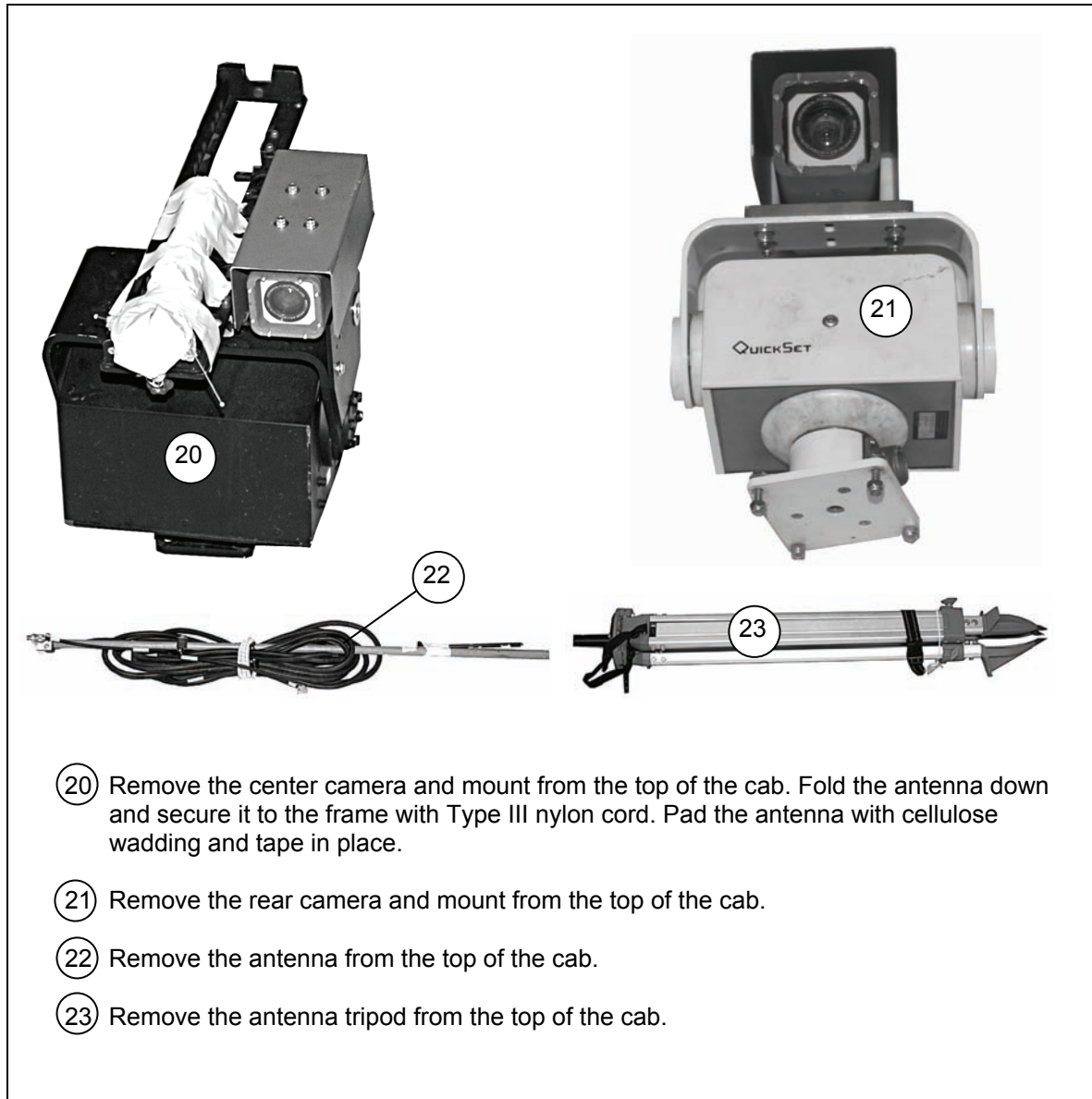


Figure 10-8. All-Purpose Remote Transporter Prepared (Continued)

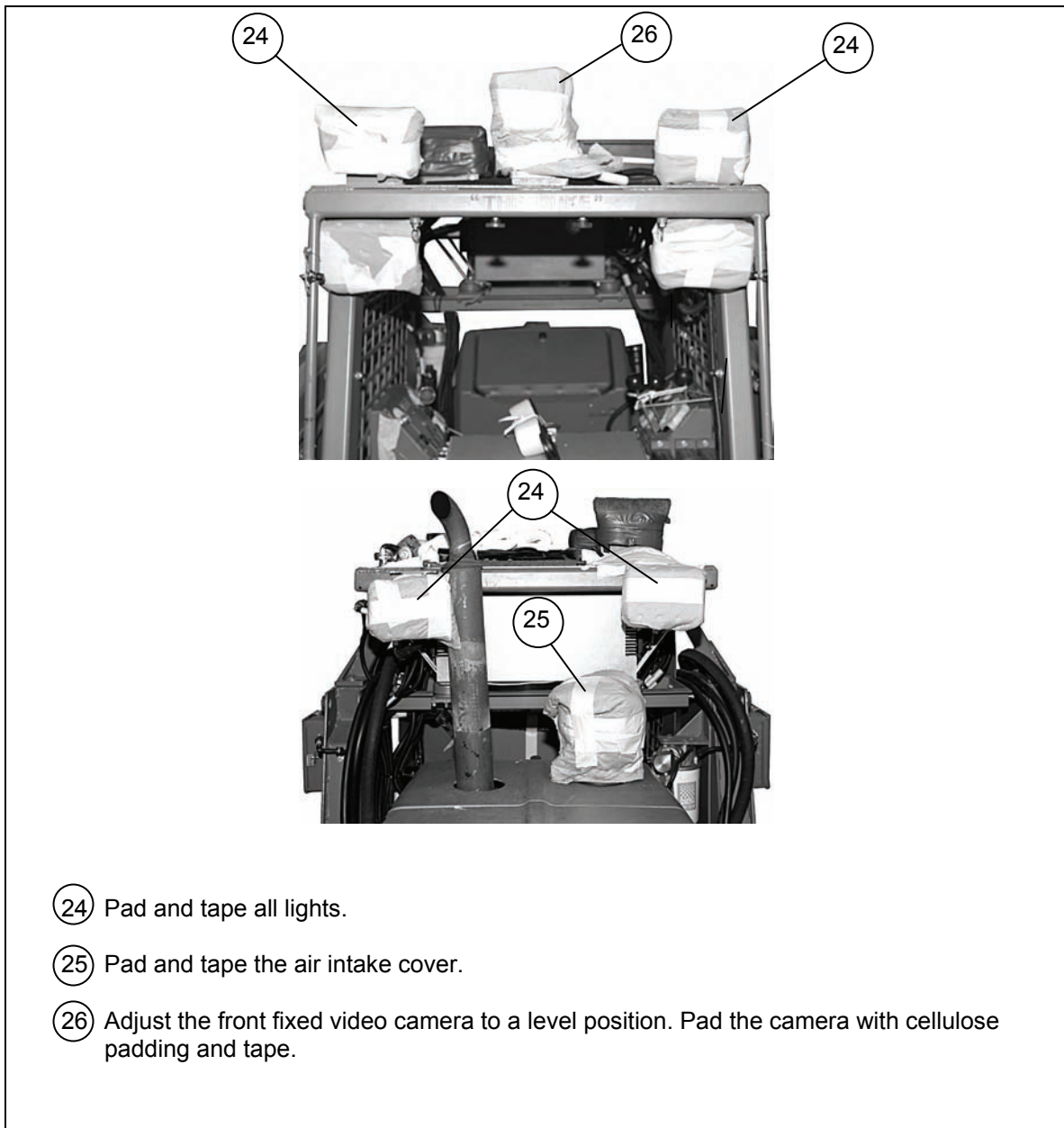
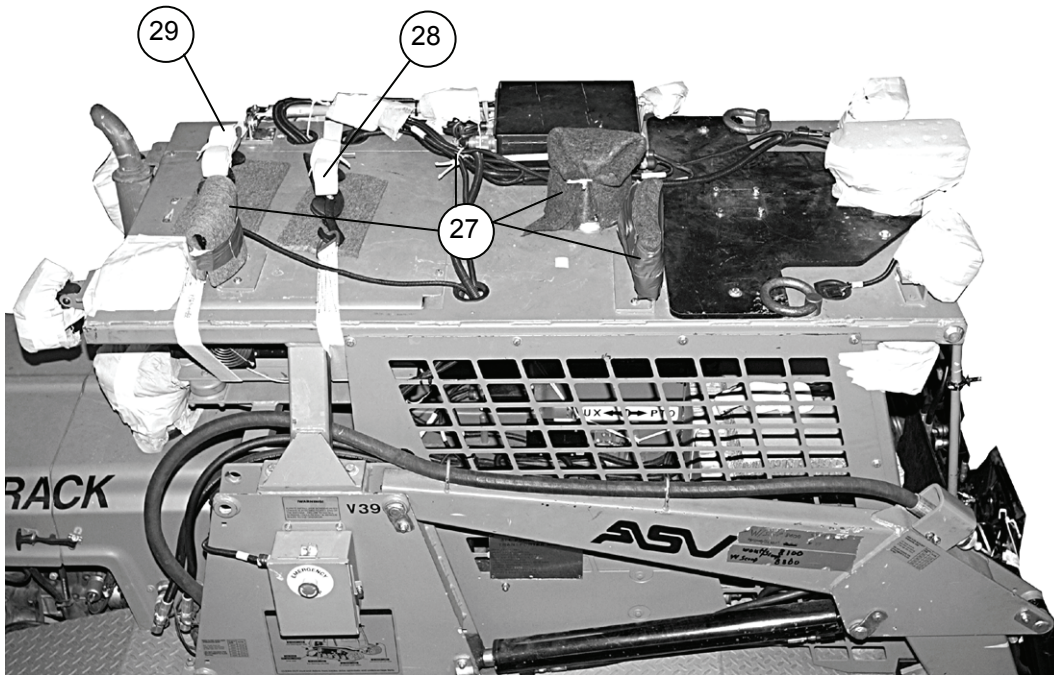
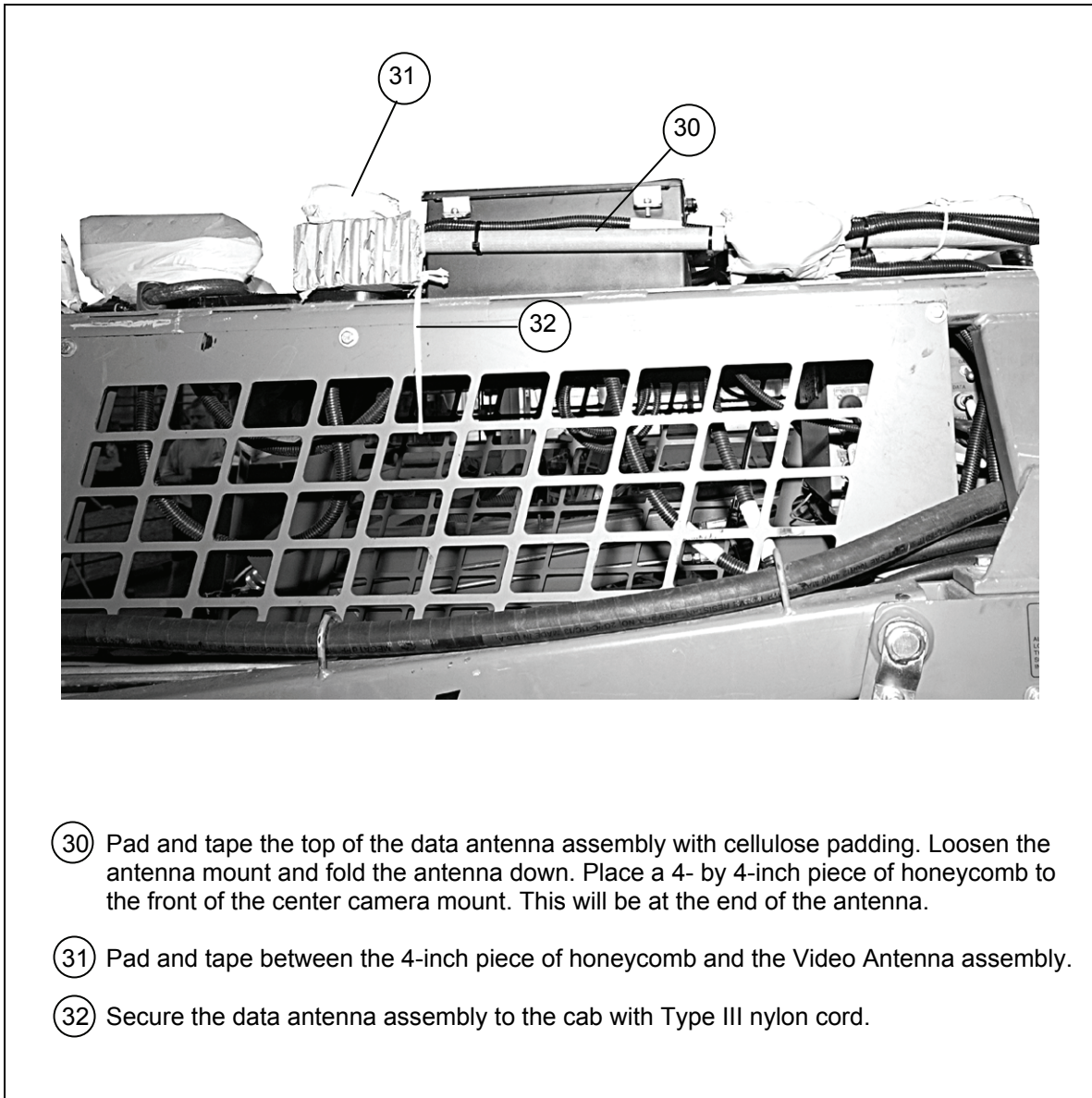


Figure 10-8. All-Purpose Remote Transporter Prepared (Continued)



- ②7 Place a 12- by 12-inch piece of felt on the safety strobe light and secure with Type III nylon cord. Pad the cradles for the antenna tripod with felt and tape in place. Secure all cables together with Type III nylon cord.
- ②8 Route 15-foot lashing between the right rear roll cage support arm and fence, under the platform control unit mount, between the left rear roll cage support arm and fence, on top of the roll cage and under the fixed camera wiring harness. Cut a 4- by 12-inch piece of felt and position under the load-binder and D-ring.
- ②9 Route the free end of a lashing between the right rear roll cage support arm and the right rear shock mount of the platform control unit mount, under the platform control unit mount, between the left rear roll cage support arm and the left rear shock mount of the platform control unit mount, on top of the roll cage, between the platform antenna assembly and platform antenna assembly wiring harness under the fixed video camera wiring harness. Cut a 4- by 12-inch piece of inch felt and position under the load-binder and D-ring.

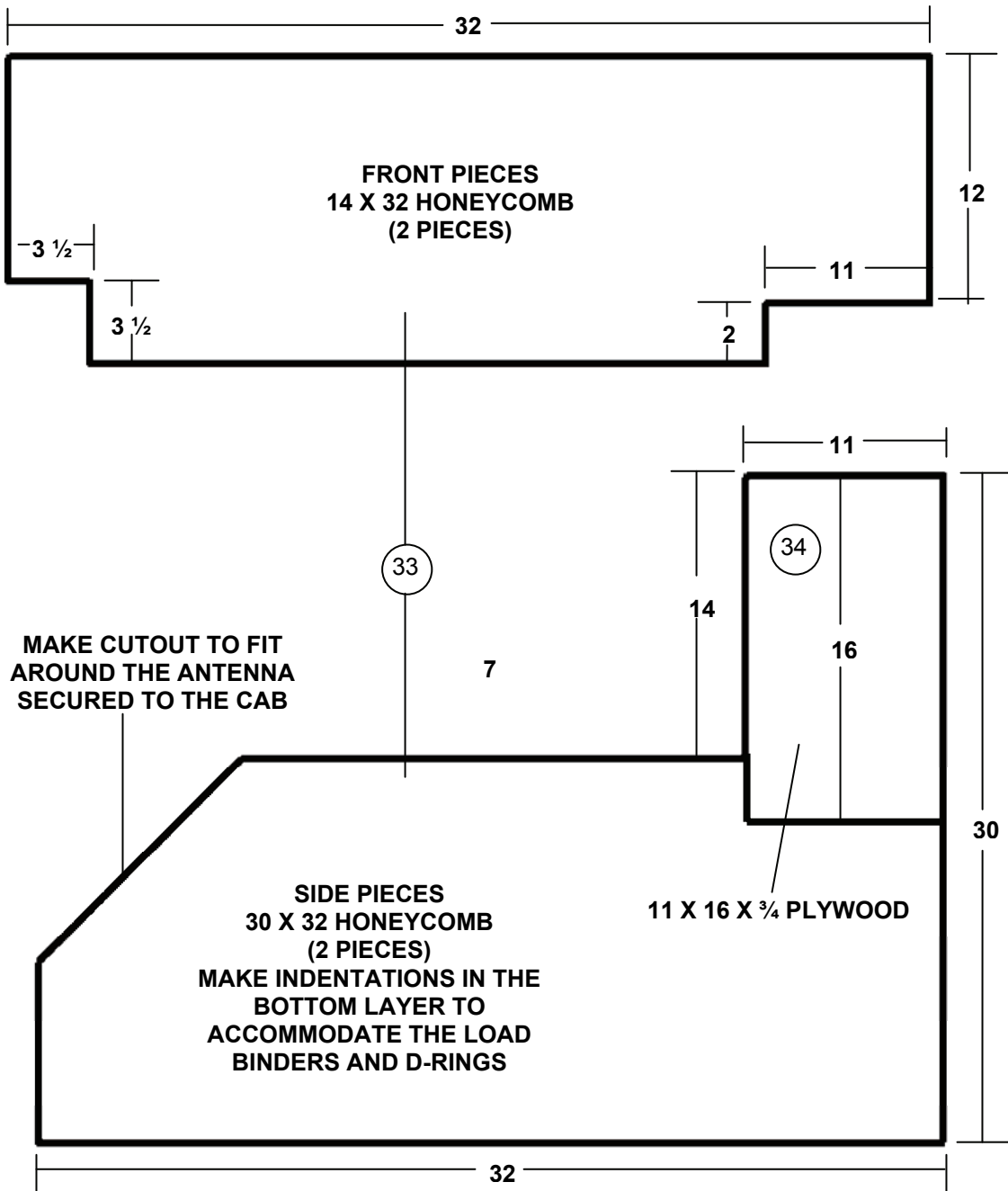
**Figure 10-8. All-Purpose Remote Transporter Prepared (Continued)**



- ③① Pad and tape between the 4-inch piece of honeycomb and the Video Antenna assembly.
- ③② Secure the data antenna assembly to the cab with Type III nylon cord.

Figure 10-8. All-Purpose Remote Transporter Prepared (Continued)

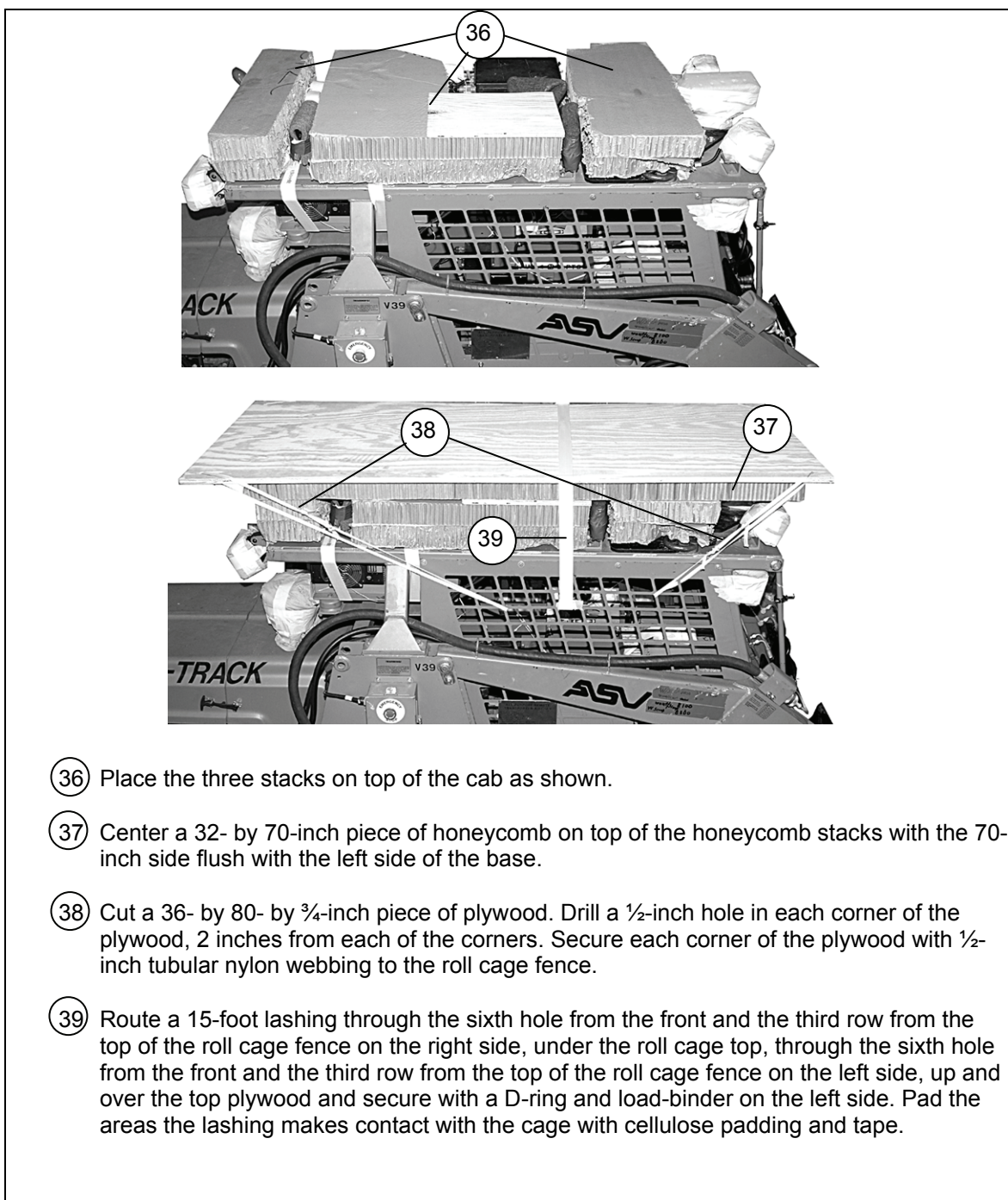
- Notes.** 1. All measurements are given in inches.  
 2. This drawing is not drawn to scale.



- (33) Cut the top front and top side pieces of honeycomb as shown.
- (34) Glue an 11- by 16- by 3/4-inch piece of plywood on the top layer of the side piece of honeycomb.
- (35) Cut two 8- by 32-inch pieces of honeycomb for the top back pieces (not shown).

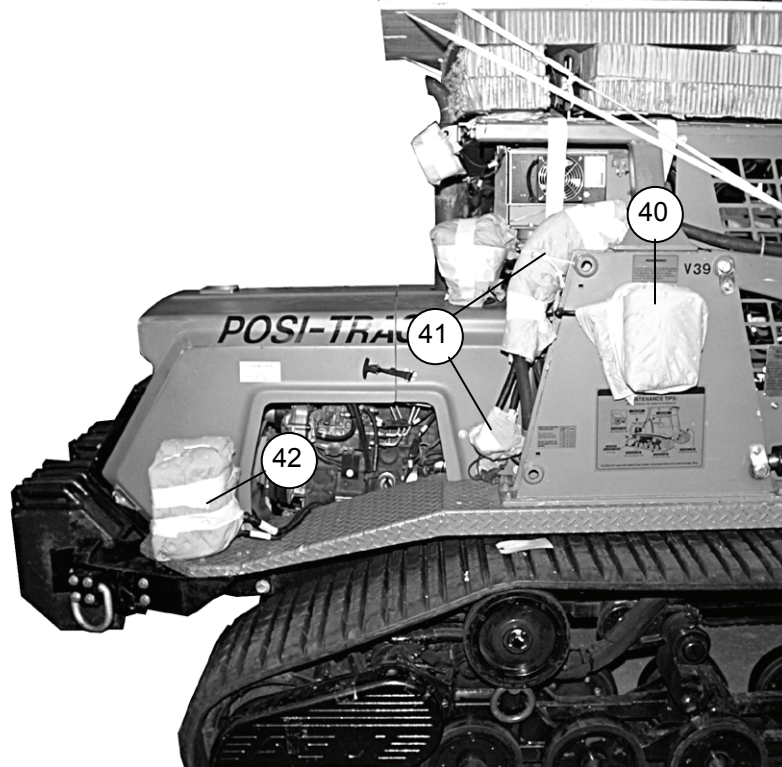
**Figure 10-8. All-Purpose Remote Transporter Prepared (Continued)**





- ③⑥ Place the three stacks on top of the cab as shown.
- ③⑦ Center a 32- by 70-inch piece of honeycomb on top of the honeycomb stacks with the 70-inch side flush with the left side of the base.
- ③⑧ Cut a 36- by 80- by  $\frac{3}{4}$ -inch piece of plywood. Drill a  $\frac{1}{2}$ -inch hole in each corner of the plywood, 2 inches from each of the corners. Secure each corner of the plywood with  $\frac{1}{2}$ -inch tubular nylon webbing to the roll cage fence.
- ③⑨ Route a 15-foot lashing through the sixth hole from the front and the third row from the top of the roll cage fence on the right side, under the roll cage top, through the sixth hole from the front and the third row from the top of the roll cage fence on the left side, up and over the top plywood and secure with a D-ring and load-binder on the left side. Pad the areas the lashing makes contact with the cage with cellulose padding and tape.

Figure 10-8. All-Purpose Remote Transporter Prepared (Continued)



- ④① Pad and tape the mode control station/emergency stop buttons on both the left and right sides.
- ④① Pad and tape all hydraulic hose fittings. Secure the hydraulic hoses to the body on both the left and right side with Type III nylon cord.
- ④② Pad and tape the pintle hook control box.
- ④③ Fold a 6- by 6-inch piece of felt and position between the hydraulic tubing on both sides of the loader arms. Secure in place with Type III nylon cord around the loader arms.

**Figure 10-8. All-Purpose Remote Transporter Prepared (Continued)**

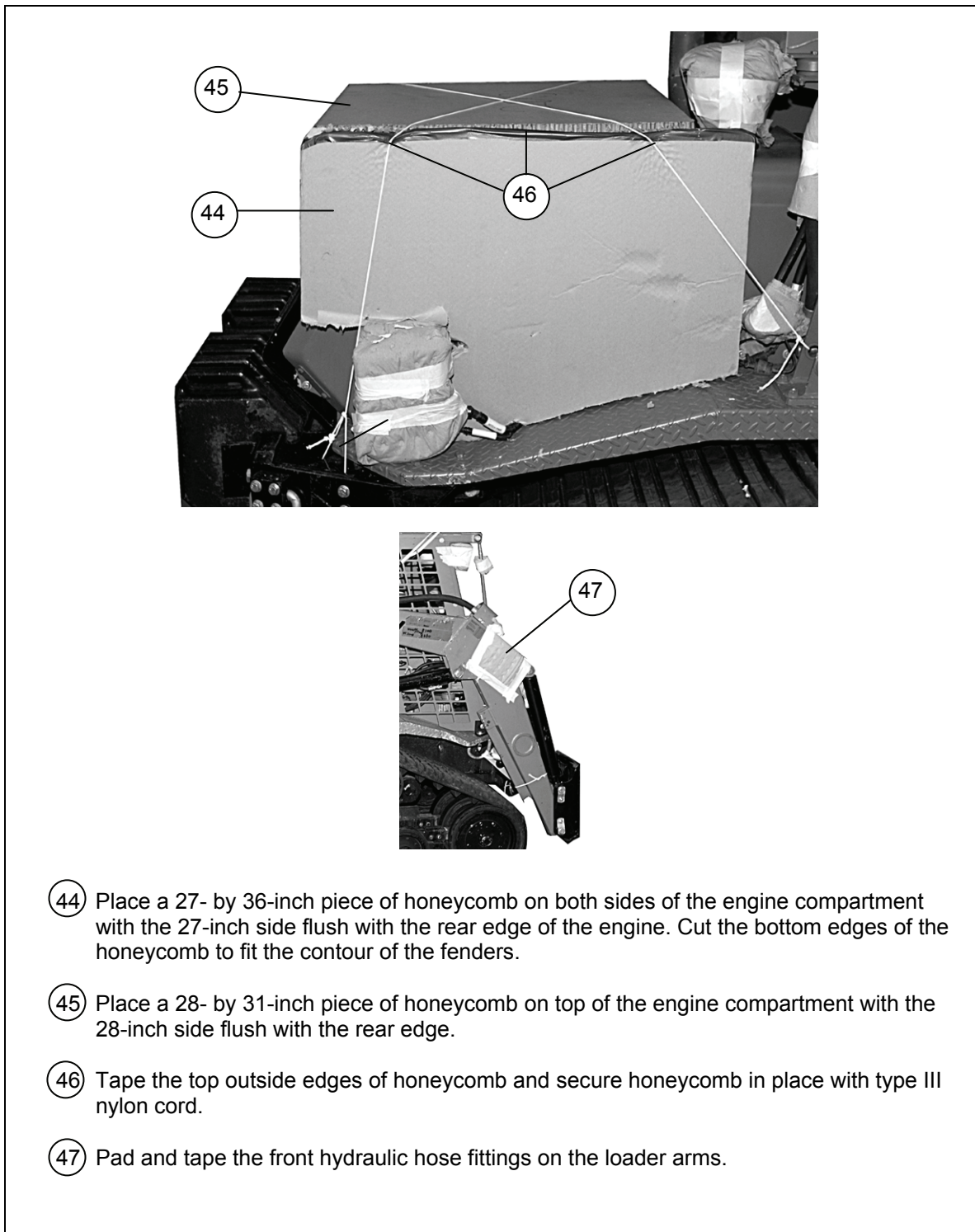
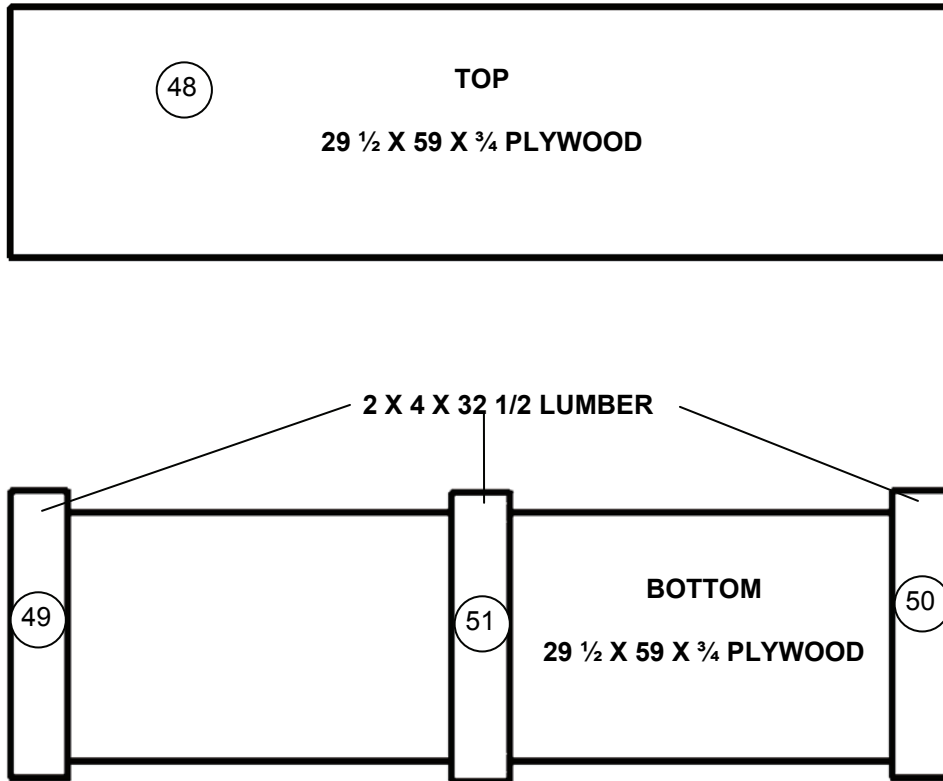


Figure 10-8. All-Purpose Remote Transporter Prepared (Continued)

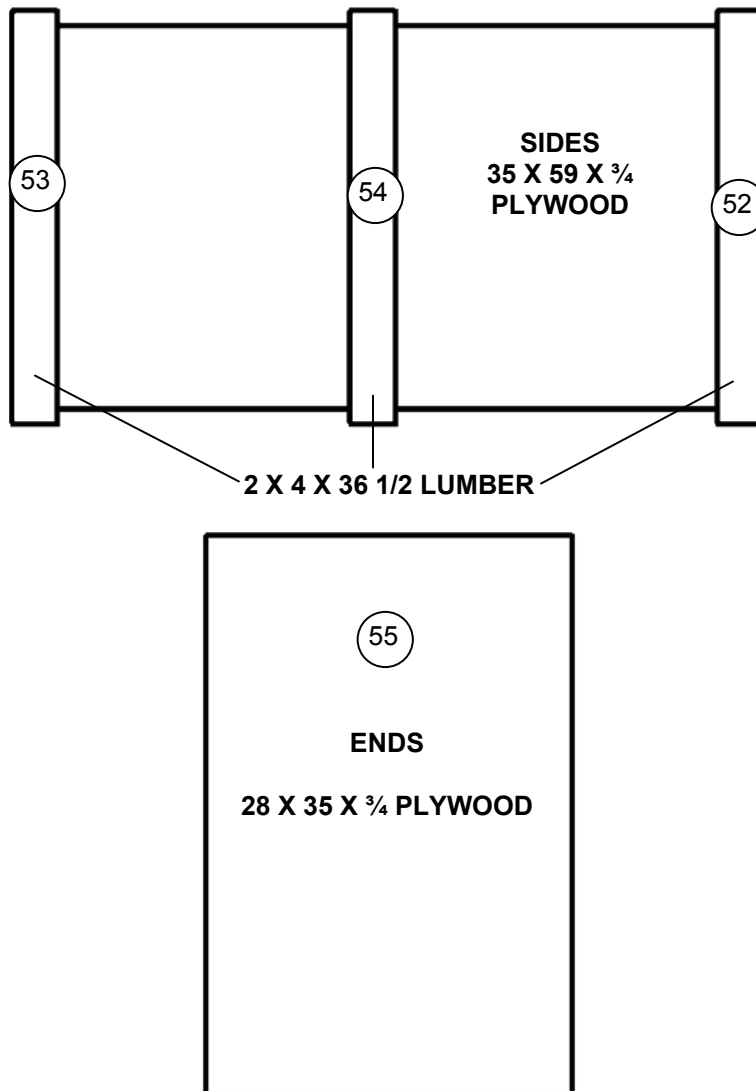
- Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



- ④8 Build a storage box as shown. Cut two 29 1/2- by 59- by 3/4-inch pieces of plywood to form a top and bottom.
- ④9 Nail a 2- by 4- by 32 1/2-inch piece of lumber (on the flat side) flush on the left side (29 1/2-inch side) of the bottom with a 1 1/2-inch overhang on each end using 8d nails.
- ④0 Nail a 2- by 4- by 32 1/2-inch piece of lumber (on the flat side) flush on the right side (29 1/2-inch side) of the bottom with a 1 1/2-inch overhang on each end using 8d nails.
- ④1 Center and nail a 2- by 4- by 32 1/2-inch piece of lumber (on the flat side) using 8d nails between the two pieces of lumber on the bottom with a 1 1/2-inch overhang on each end.

**Figure 10-8. All-Purpose Remote Transporter Prepared (Continued)**

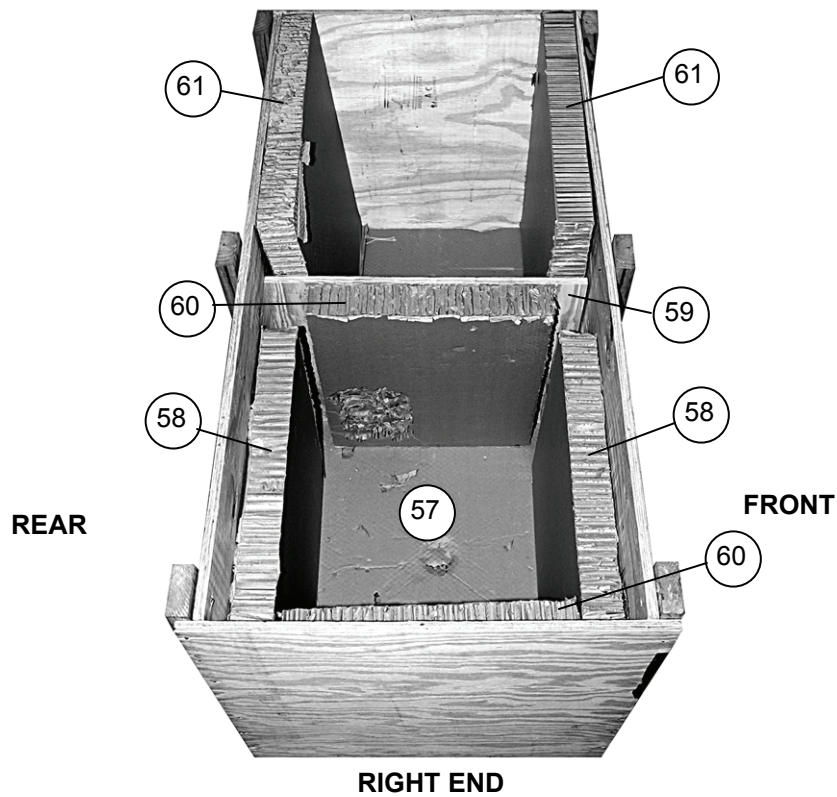
- Notes.** 1. All measurements are given in inches.  
2. This drawing is not drawn to scale.



- 52) Nail a 2- by 4- by 36 1/2-inch piece of lumber (on the flat side) flush on the left side (35-inch side) of the plywood sides with a 3/4- inch overhang on each end using 8d nails.
- 53) Nail a 2- by 4- by 36 1/2-inch piece of lumber (on the flat side) flush on the right side (35-inch side) of the plywood sides with a 3/4- inch overhang on each end using 8d nails.
- 54) Center and nail a 2- by 4- by 36 1/2-inch piece of lumber (on the flat side) using 8d nails between the two pieces of lumber on the sides with a 3/4- inch overhang on each end. Build a storage box as shown.
- 55) Cut two 28- by 35- by 3/4-inch pieces of plywood to form the ends of the box.
- 56) Assemble the box leaving the top off (not shown).

Figure 10-8. All-Purpose Remote Transporter Prepared (Continued)





- ⑤7 Place a 27- by 57-inch piece of honeycomb in the bottom of the equipment box.
- ⑤8 Place a 29- by 26-inch piece of honeycomb on the front right and rear right sides of the box.
- ⑤9 Place a 25 ½- by 28- by ¾-inch piece of plywood flush against the ends of the honeycomb inside the box.
- ⑥0 Place a 21- by 26-inch piece of honeycomb against the right end piece and one to the right side of the plywood.
- ⑥1 Place a 26- by 33-inch piece of honeycomb on the front left of the equipment box and one on the left rear of the equipment box.

**Figure 10-8. All-Purpose Remote Transporter Prepared (Continued)**

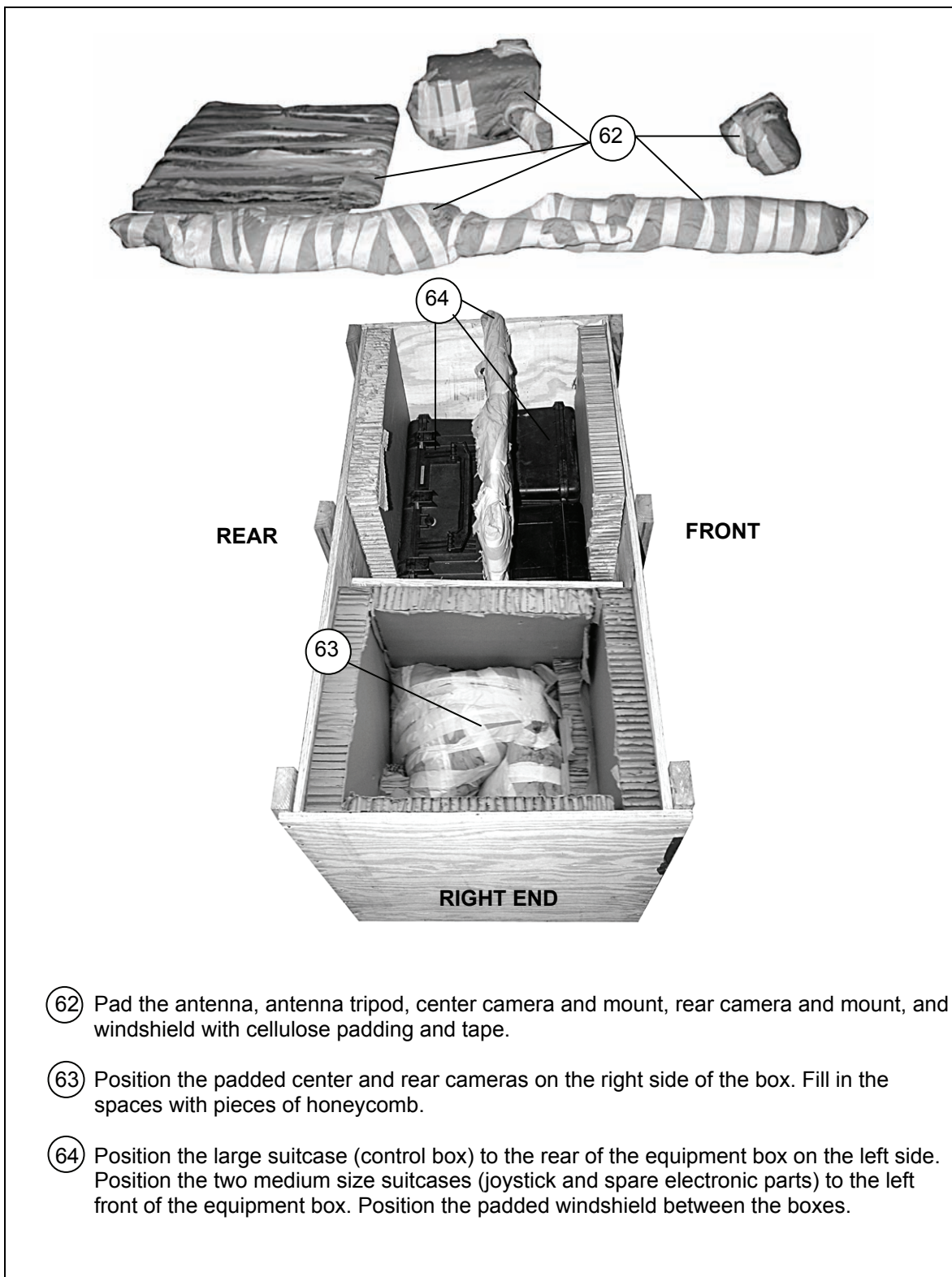
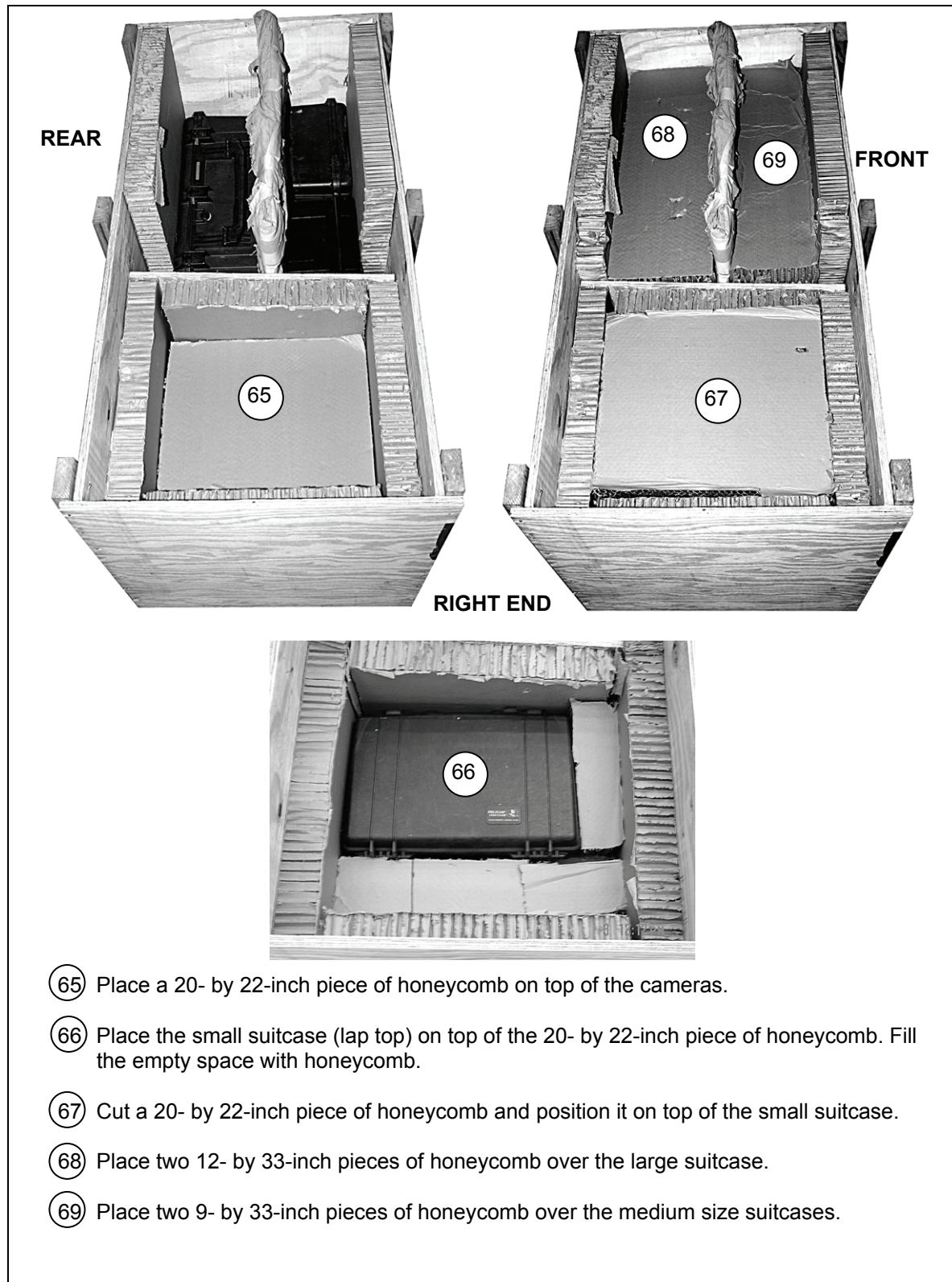
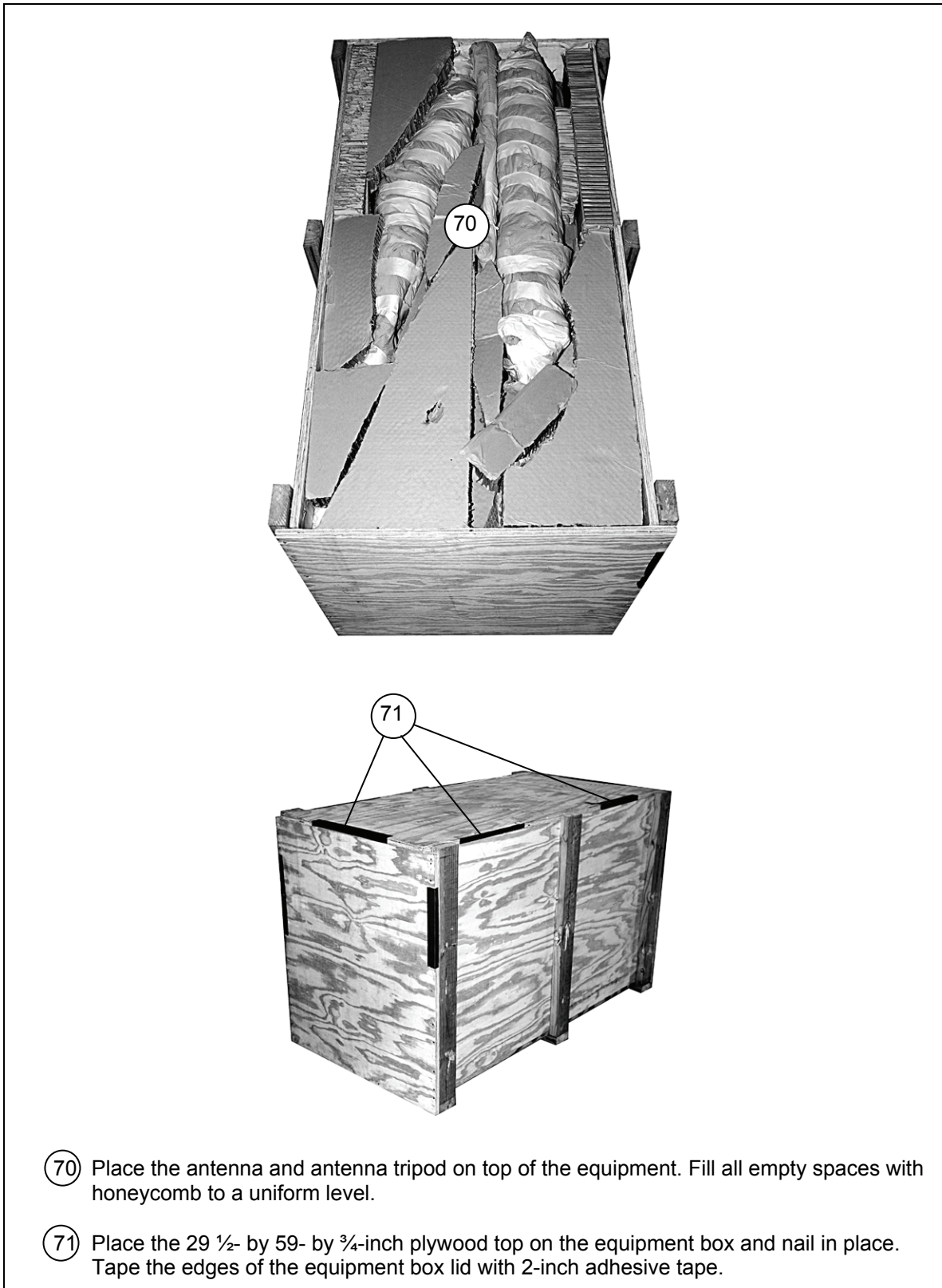


Figure 10-8. All-Purpose Remote Transporter Prepared (Continued)

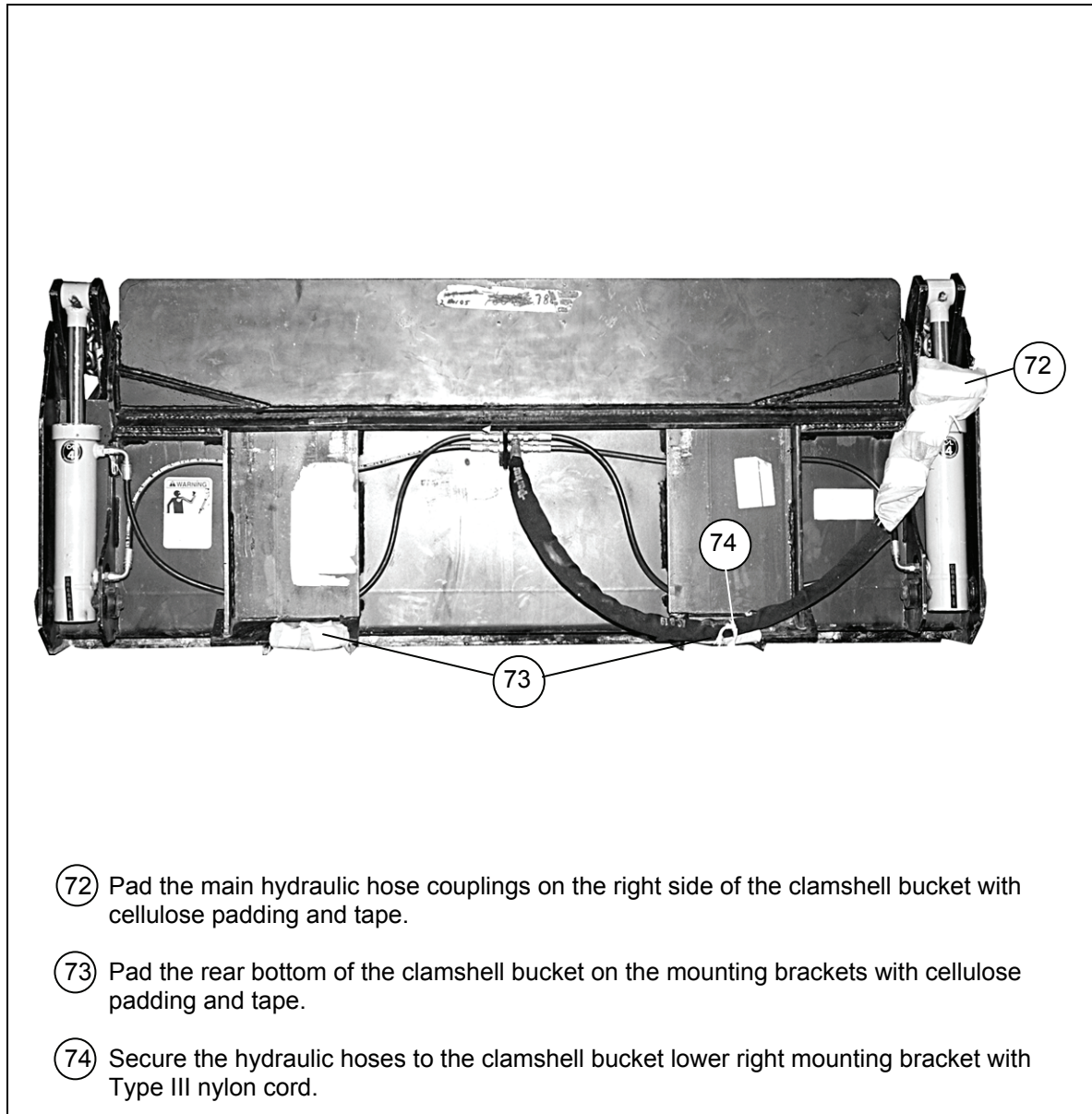


**Figure 10-8. All-Purpose Remote Transporter Prepared (Continued)**





**Figure 10-8. All-Purpose Remote Transporter Prepared (Continued)**



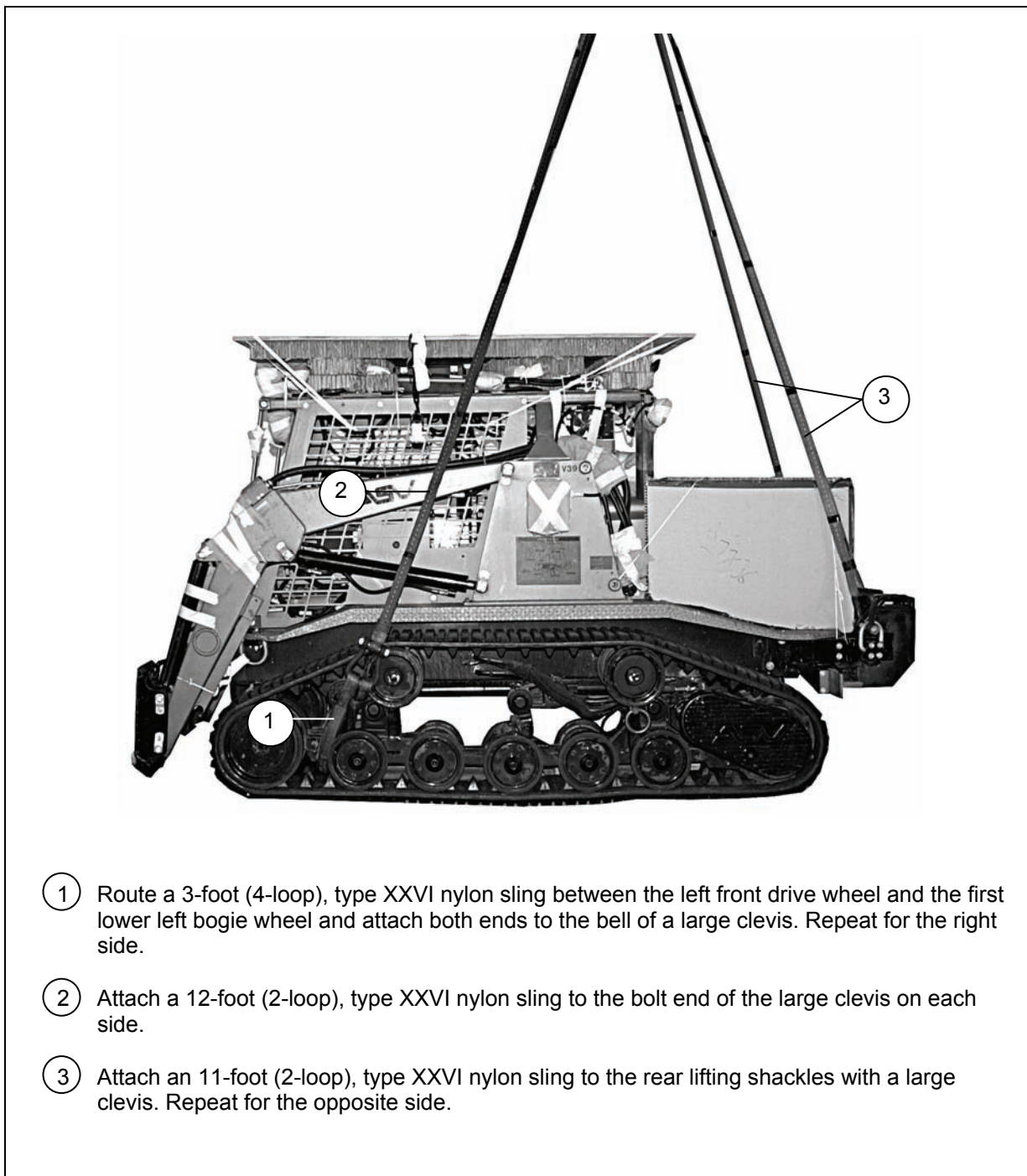
- ⑦② Pad the main hydraulic hose couplings on the right side of the clamshell bucket with cellulose padding and tape.
- ⑦③ Pad the rear bottom of the clamshell bucket on the mounting brackets with cellulose padding and tape.
- ⑦④ Secure the hydraulic hoses to the clamshell bucket lower right mounting bracket with Type III nylon cord.

**Figure 10-8. All-Purpose Remote Transporter Prepared (Continued)**

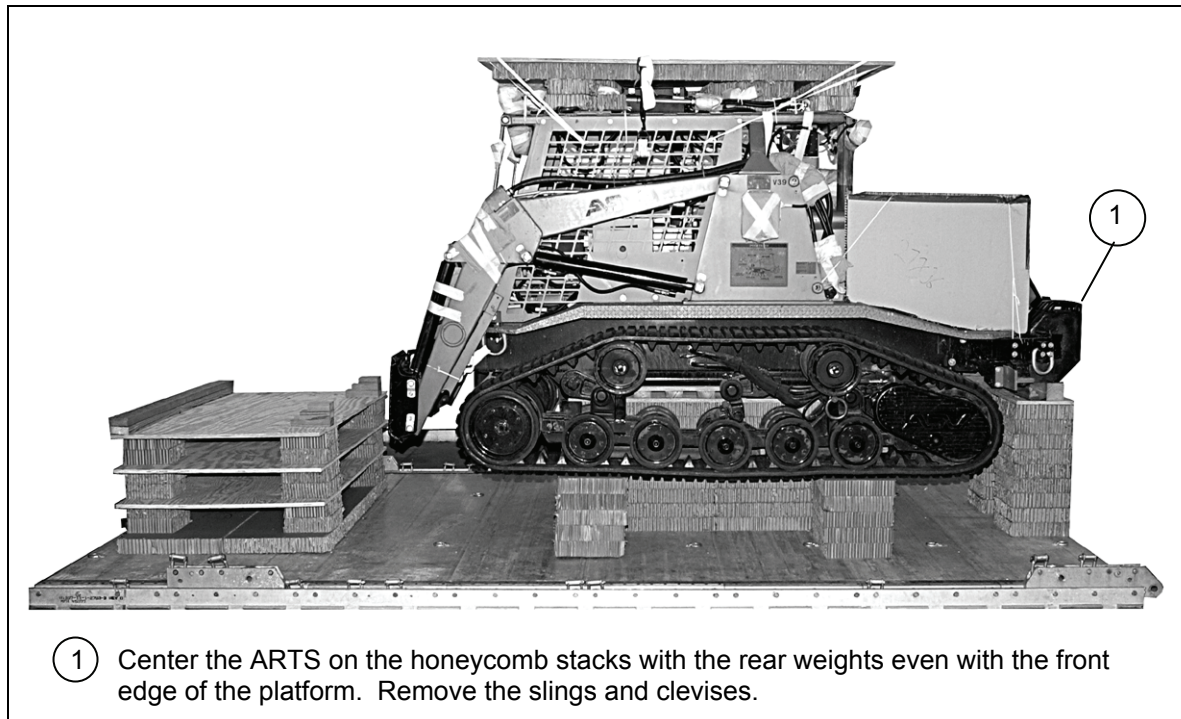


## LIFTING AND POSITIONING THE ALL-PURPOSE REMOTE TRANSPORTER

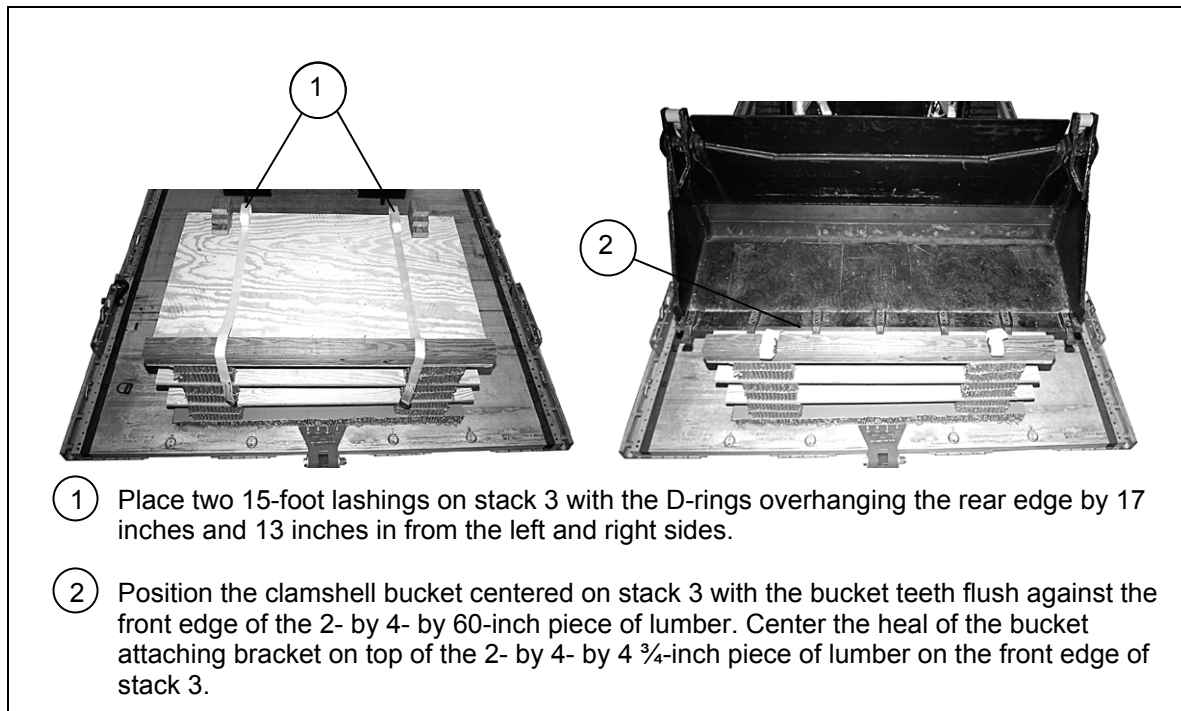
10-5. Install the lifting slings and position the ARTS as shown in Figures 10-9 through 10-13.



**Figure 10-9. All-Purpose Remote Transporter Lift Slings Installed**



**Figure 10-10. All-Purpose Remote Transporter Positioned**



**Figure 10-11. Clamshell Bucket Positioned**

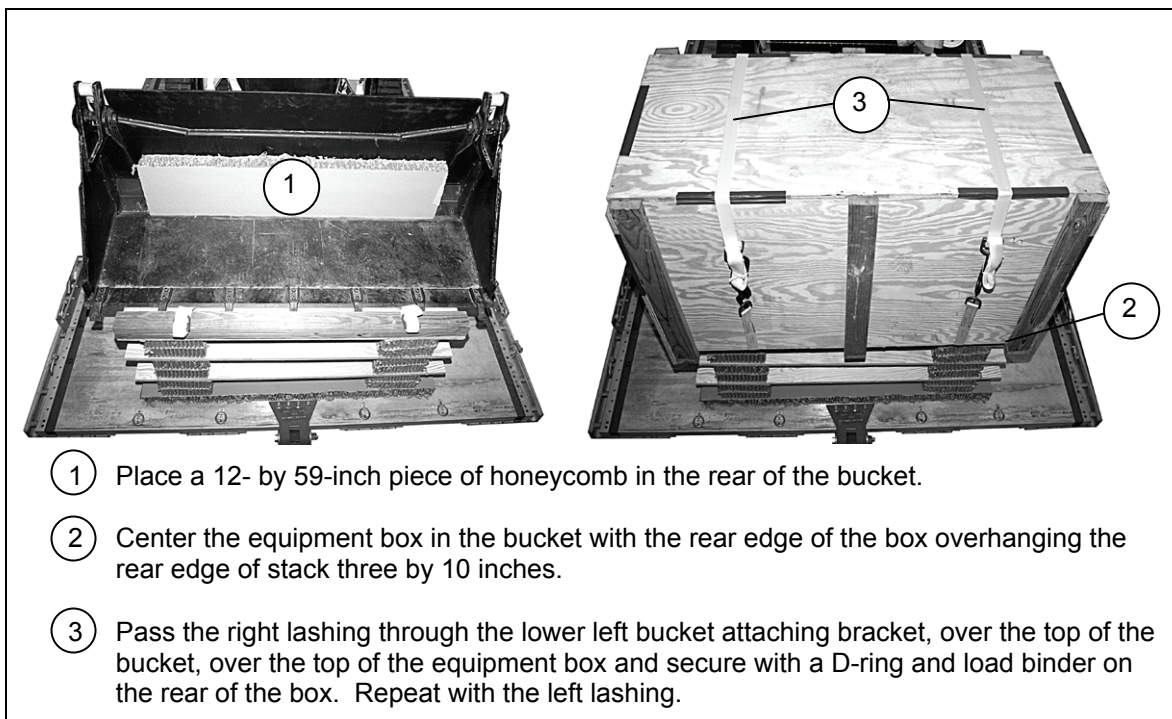


Figure 10-12. Equipment Box Positioned

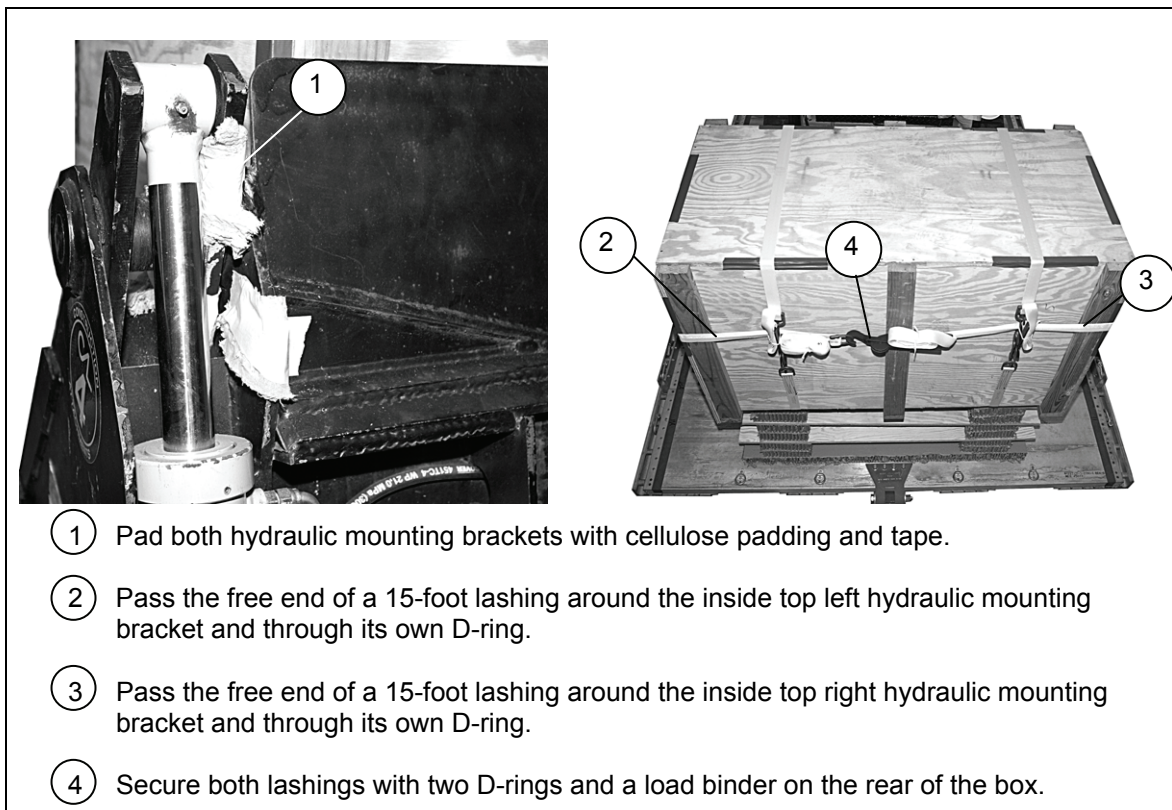
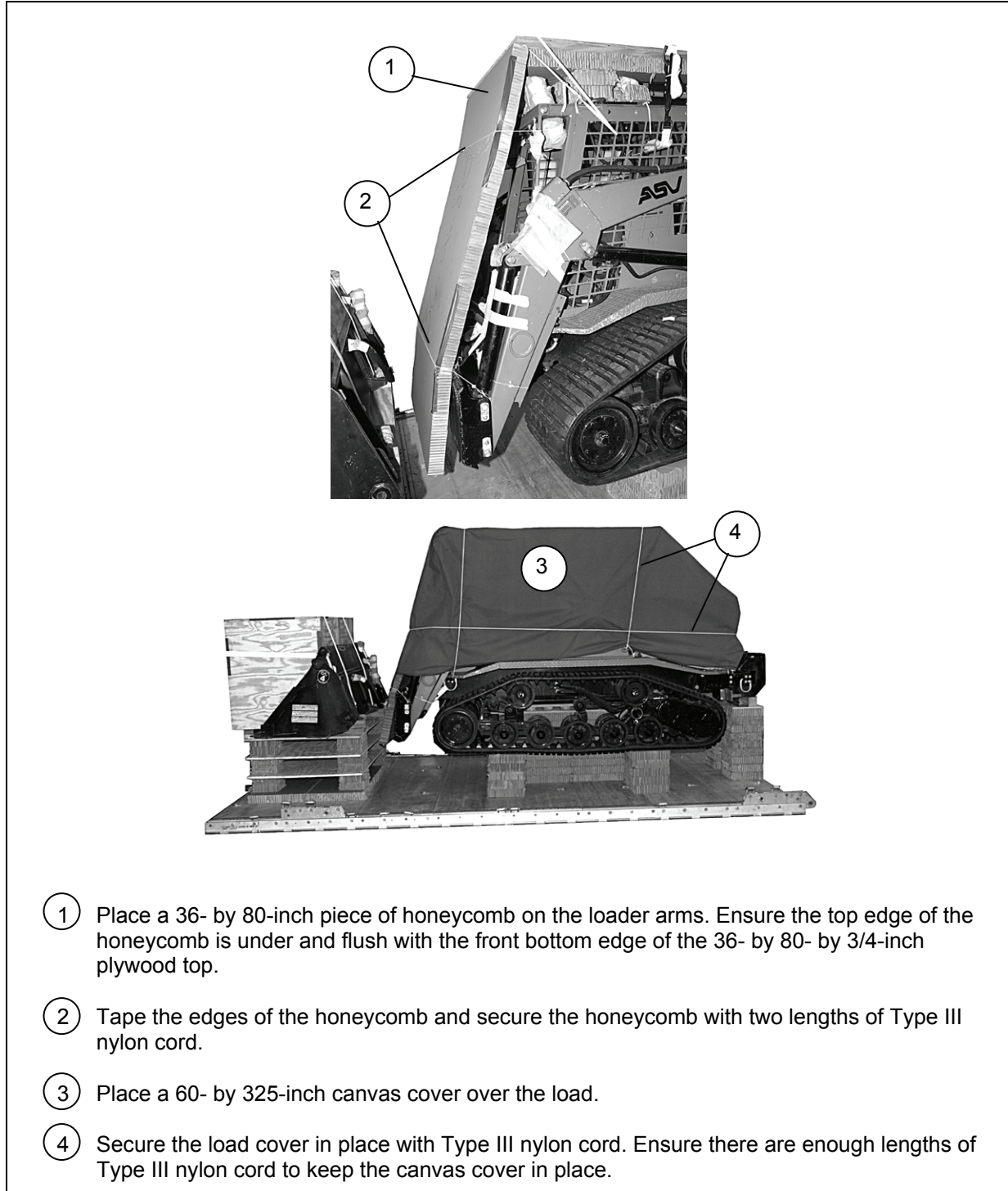


Figure 10-13. Equipment Box Secured



## COVERING THE LOAD

10-6. Prepare and cover the load as shown in Figure 10-14.

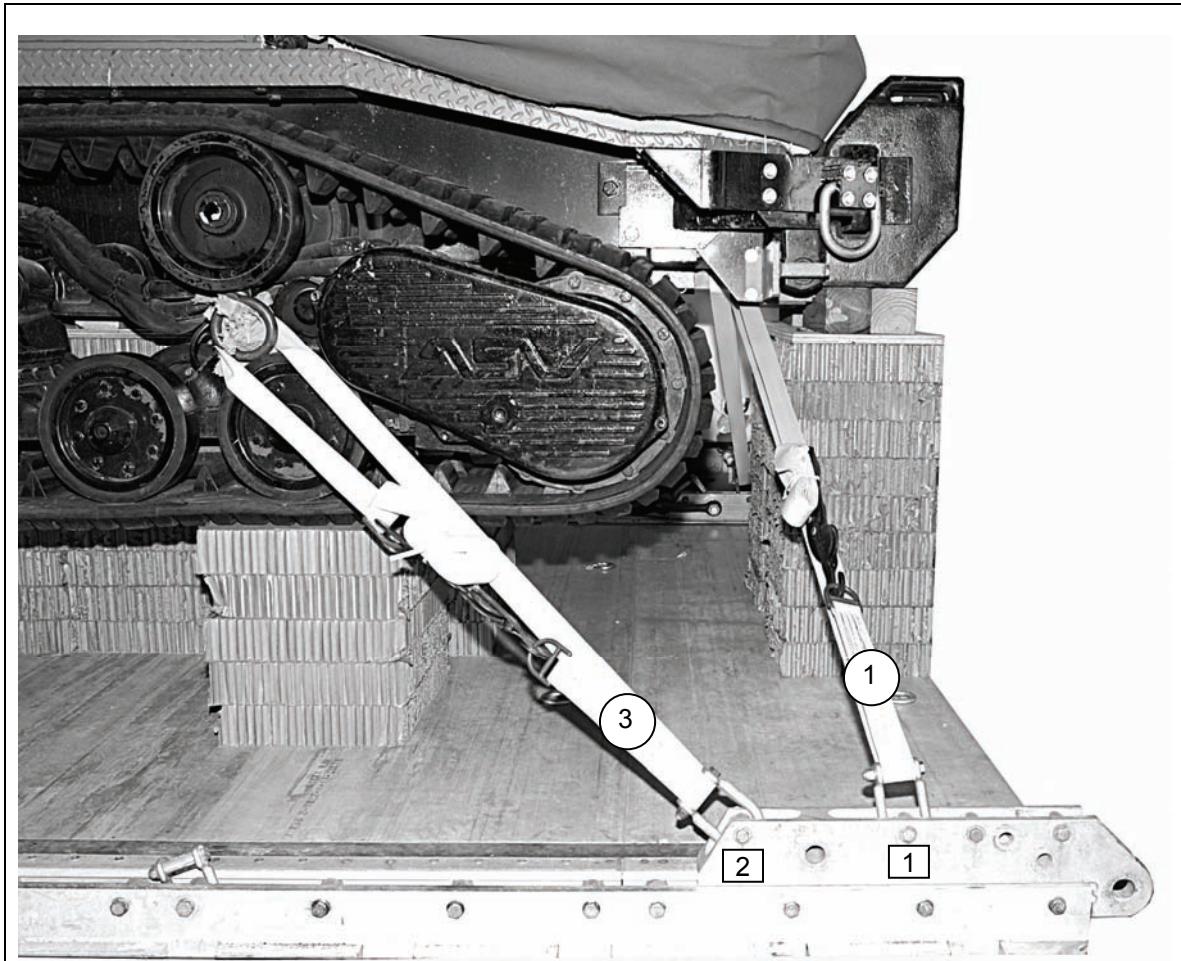


**Figure 10-14. Load Cover Secured**

## LASHING LOAD TO PLATFORM

10-7. Lash the ARTS to the platform as shown in Figure 10-15.

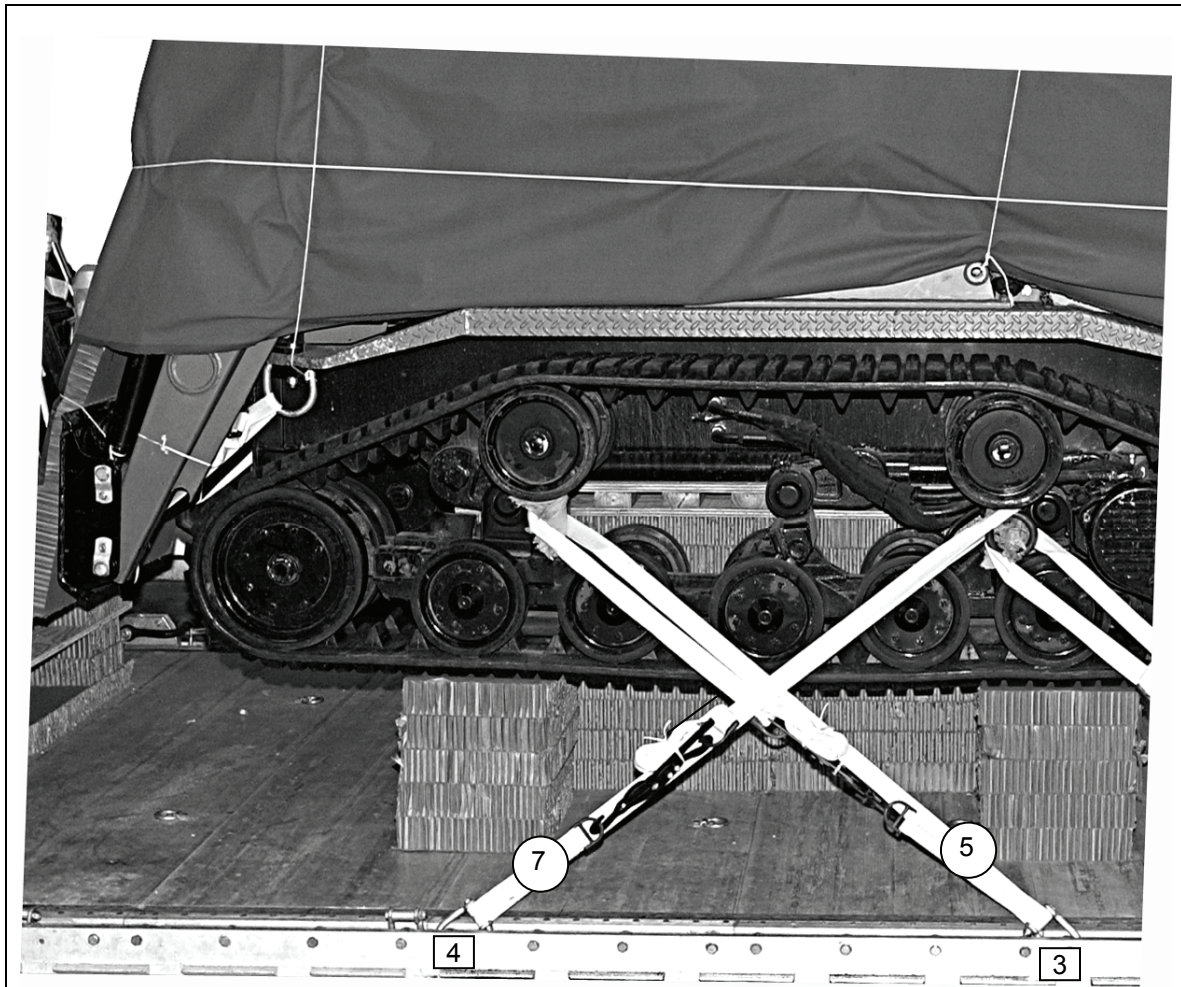
*Note.* Pad any sharp edges on the load where a lashing may pass. Use cellulose padding and masking tape.



<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
1	1	Pass lashing: Around the pintle hook receiver.
2	1A	Around the pintle hook receiver.
3	2	Between the left rear top and bottom bogie wheel and around the lower support arm.
4	2A	Between the right rear top and bottom bogie wheel and around the lower support arm.

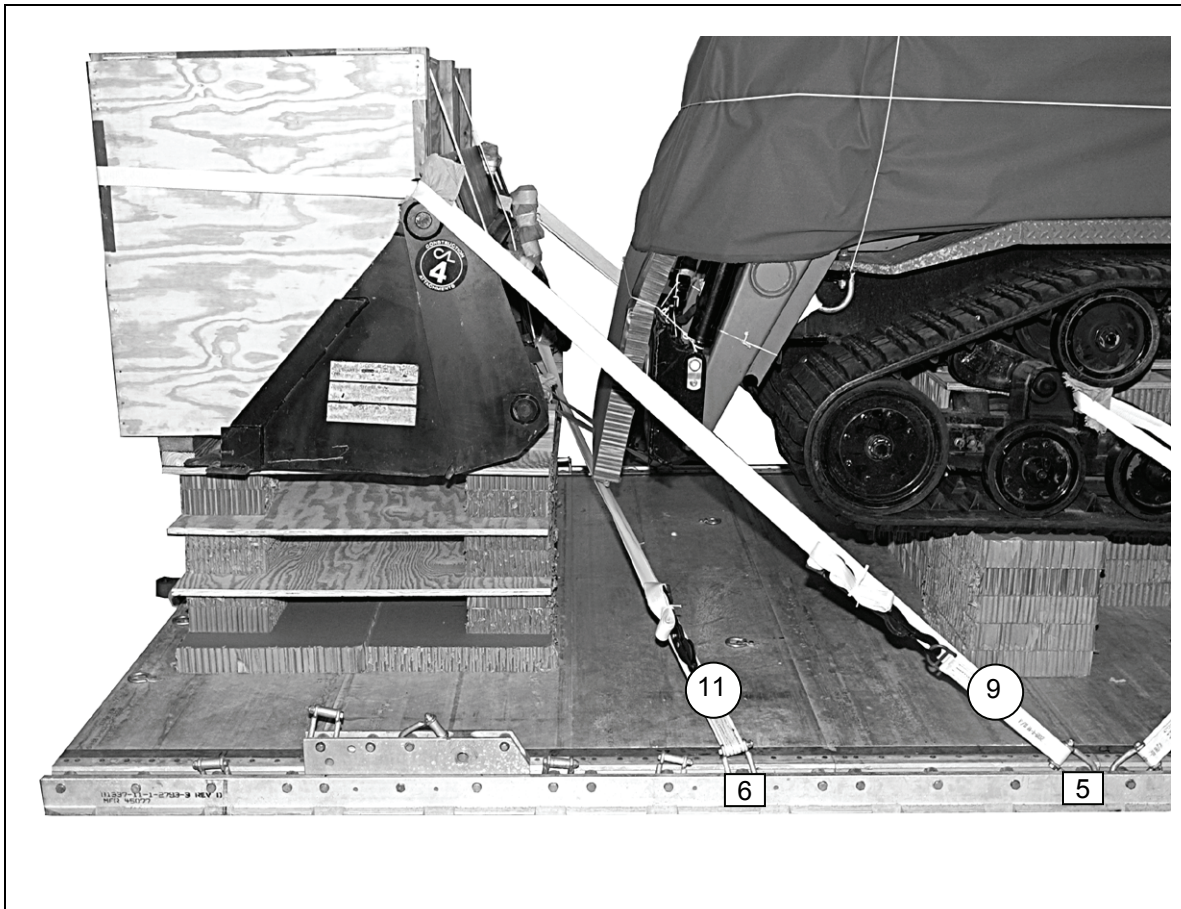
**Figure 10-15. ARTS Lashed to Platform**





<i>Lashing Number</i>	<i>Tiedown Clevis Number</i>	<i>Instructions</i>
5	3	Pass lashing: Between the left front top and bottom bogie wheel and around the lower support arm.
6	3A	Between the right front top and bottom bogie wheel and around the lower support arm.
7	4	Between the left rear top and bottom bogie wheel and around the lower support arm.
8	4A	Between the right rear top and bottom bogie wheel and around the lower support arm.

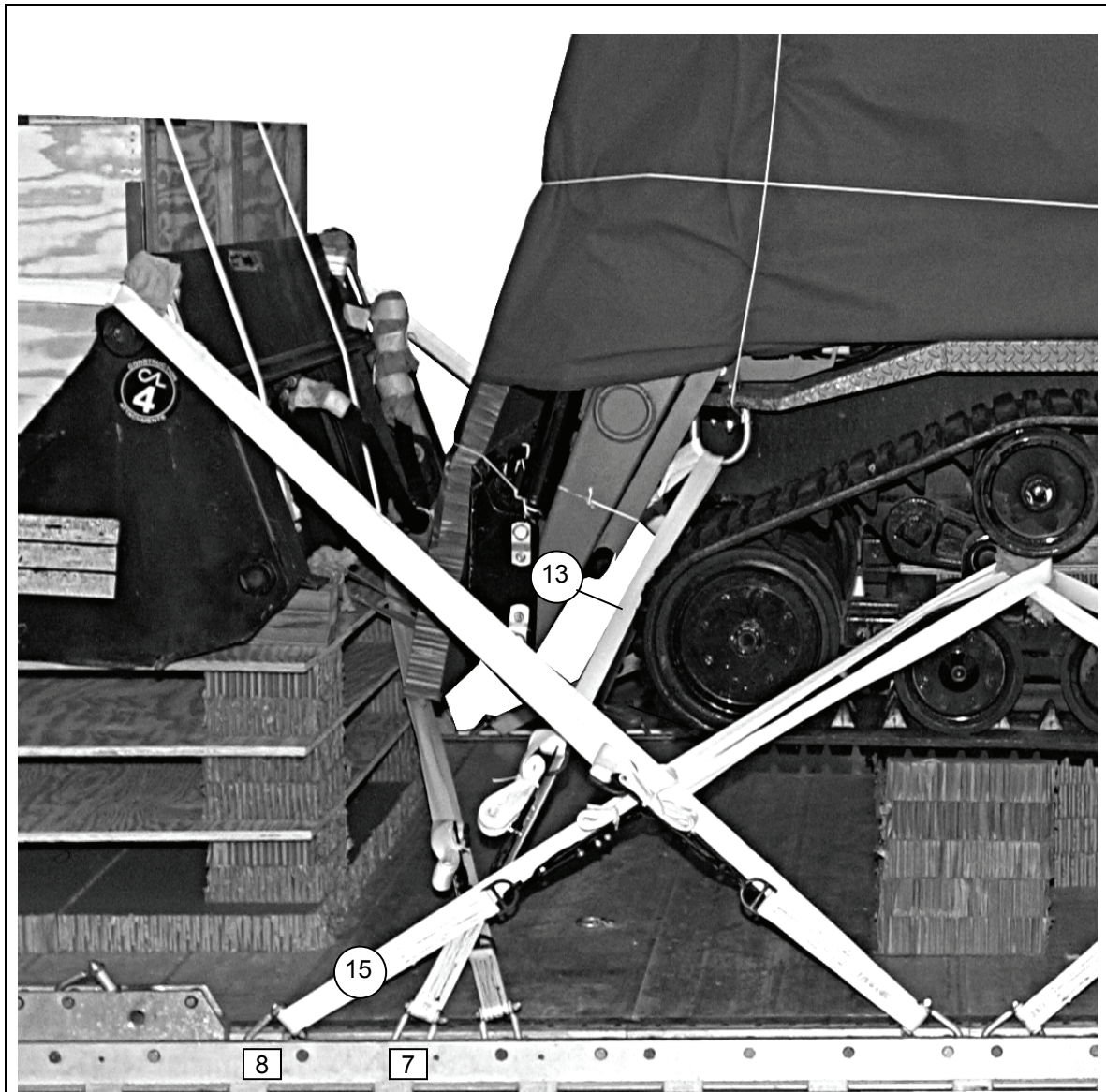
**Figure 10-15. ARTS Lashed to Platform (Continued)**



<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
9	5	Pass lashing: Around the clamshell bucket's top left outside hydraulic cylinder attaching bracket.
10	5A	Around the clamshell bucket's top right outside hydraulic cylinder attaching bracket.
11	6	Around the clamshell bucket's bottom right attaching bracket.
12	6A	Around the clamshell bucket's bottom left attaching bracket.

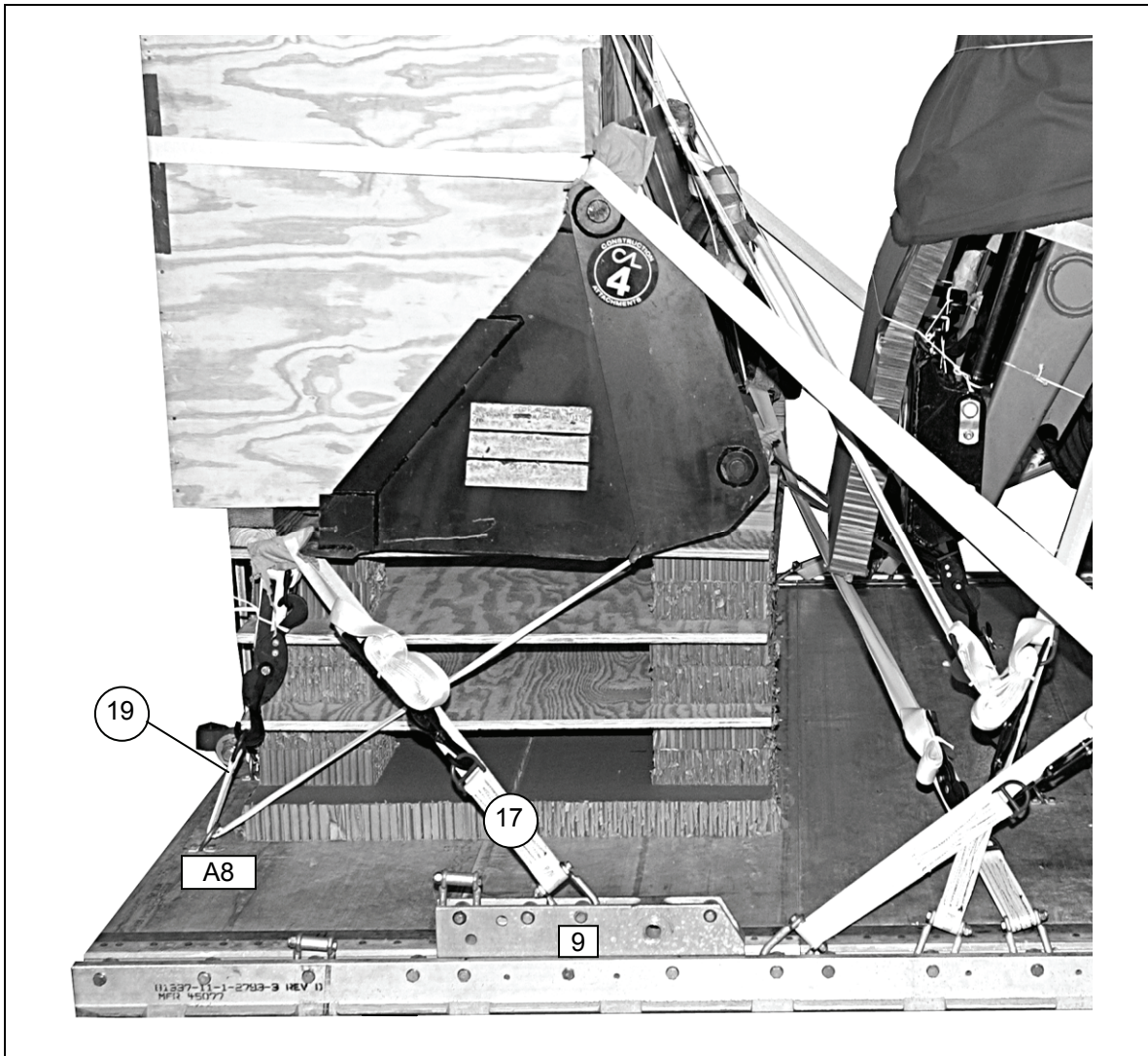
**Figure 10-15. ARTS Lashed to Platform (Continued)**





<i>Lashing Number</i>	<i>Tiedown Clevis Number</i>	<i>Instructions</i>
13	7	Pass lashing: Around the left front shackle.
14	7A	Around the right front shackle.
15	8	Between the left front top and bottom bogie wheel and around the lower support arm.
16	8A	Between the right front top and bottom bogie wheel and around the lower support arm.

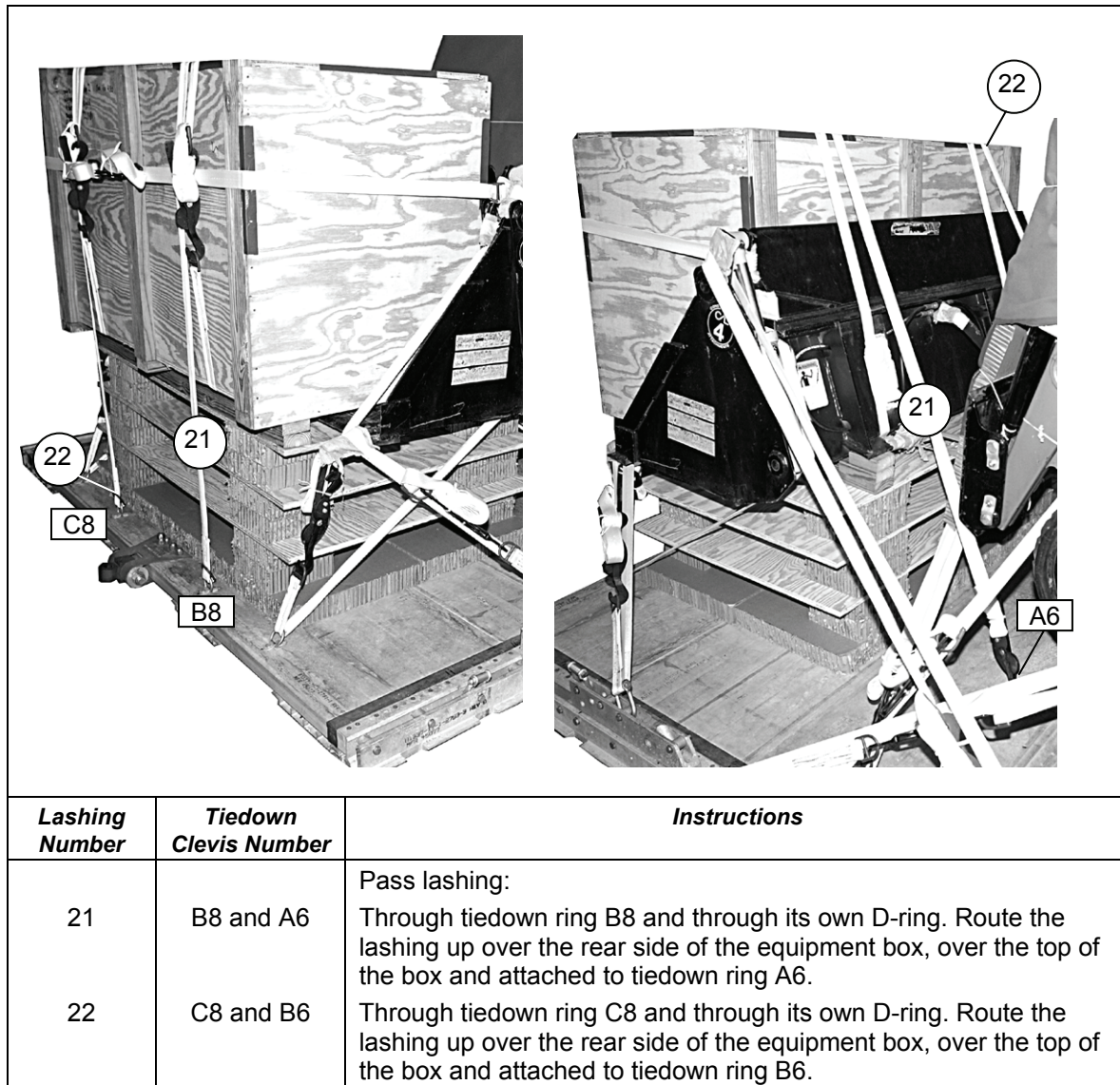
**Figure 10-15. ARTS Lashed to Platform (Continued)**



<b>Lashing Number</b>	<b>Tiedown Clevis Number</b>	<b>Instructions</b>
17	9	Pass lashing: Around the clamshell bucket's left front tooth.
18	9A	Around the clamshell bucket's right front tooth
19	A8	Through tiedown ring A8, up through and behind the left hydraulic cylinder over the front of the bucket.
20	D8	Through tiedown ring D8, up through and behind the right hydraulic cylinder over the front of the bucket.

Figure 10-15. ARTS Lashed to Platform (Continued)





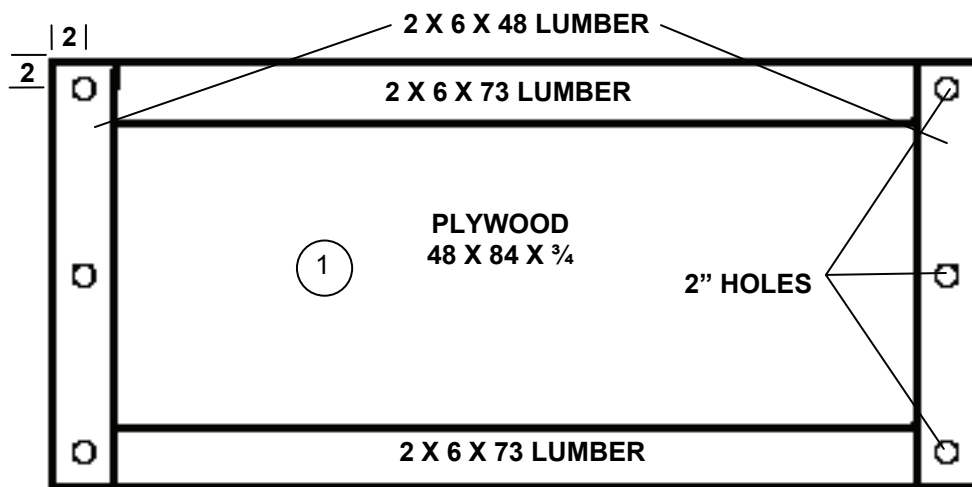
**Figure 10-15. ARTS Lashed to Platform (Continued)**



## PREPARING PARACHUTE STOWAGE PLATFORM

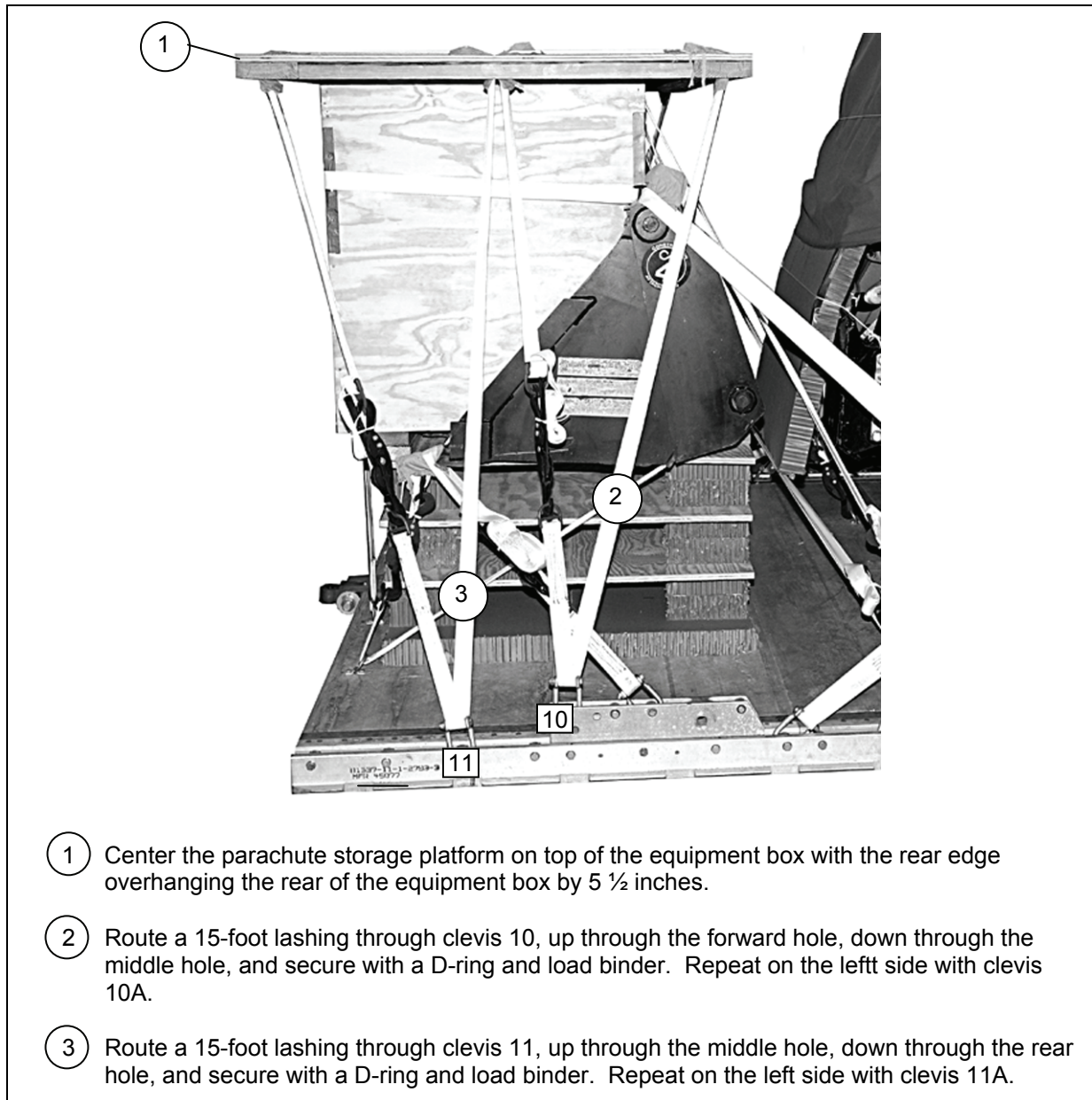
10-8. Construct and install the parachute stowage platform as shown in Figures 10-16 and 10-17.

- Notes.**
1. All measurements are given in inches.
  2. This drawing is not drawn to scale.
  3. All holes are 2 inches in diameter.



- ① Construct the parachute platform as shown.

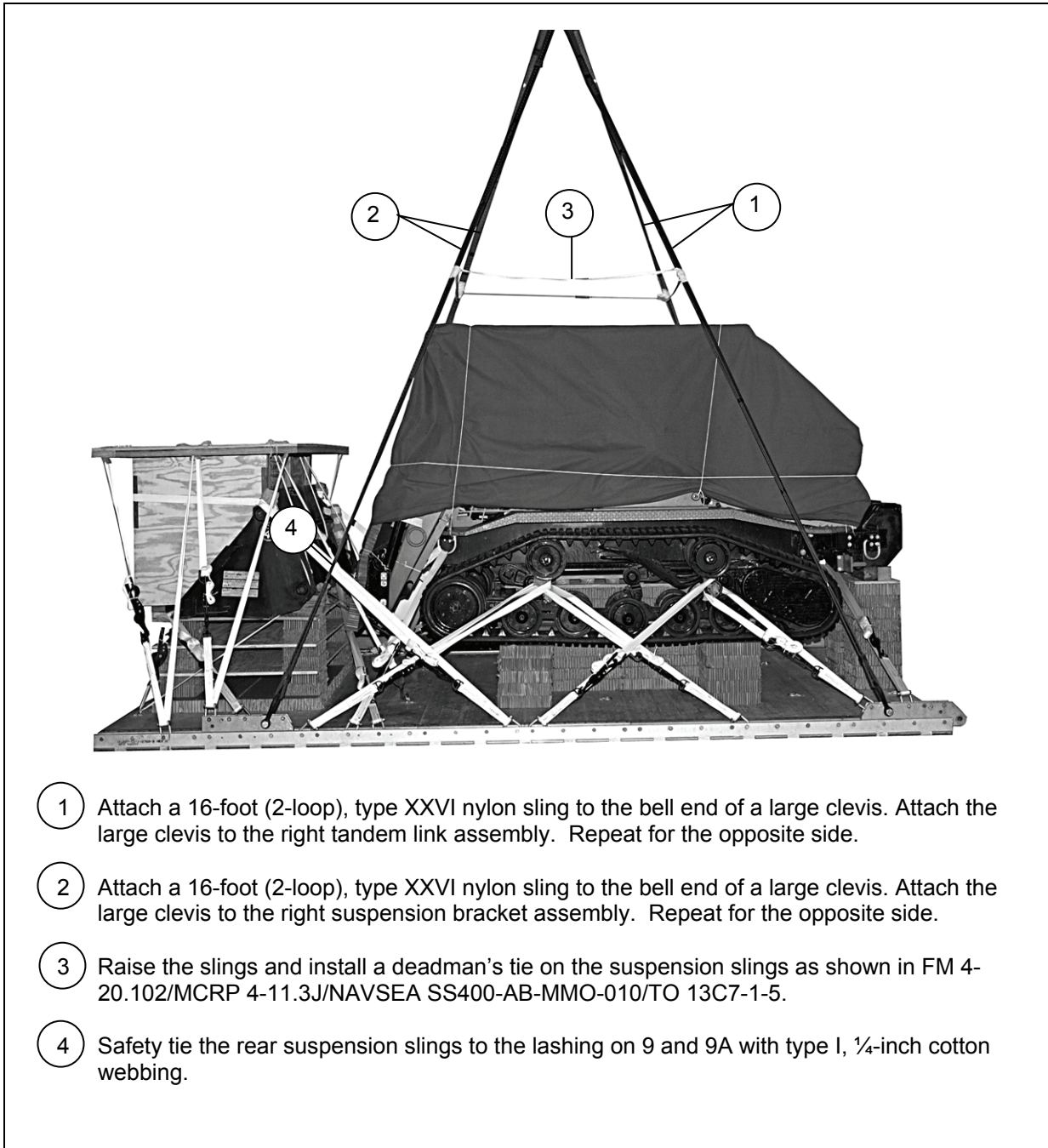
Figure 10-16. Parachute Stowage Platform Built



**Figure 10-17. Parachute Stowage Platform Installed**

## INSTALLING AND SAFETY TIEING THE SUSPENSION SLINGS

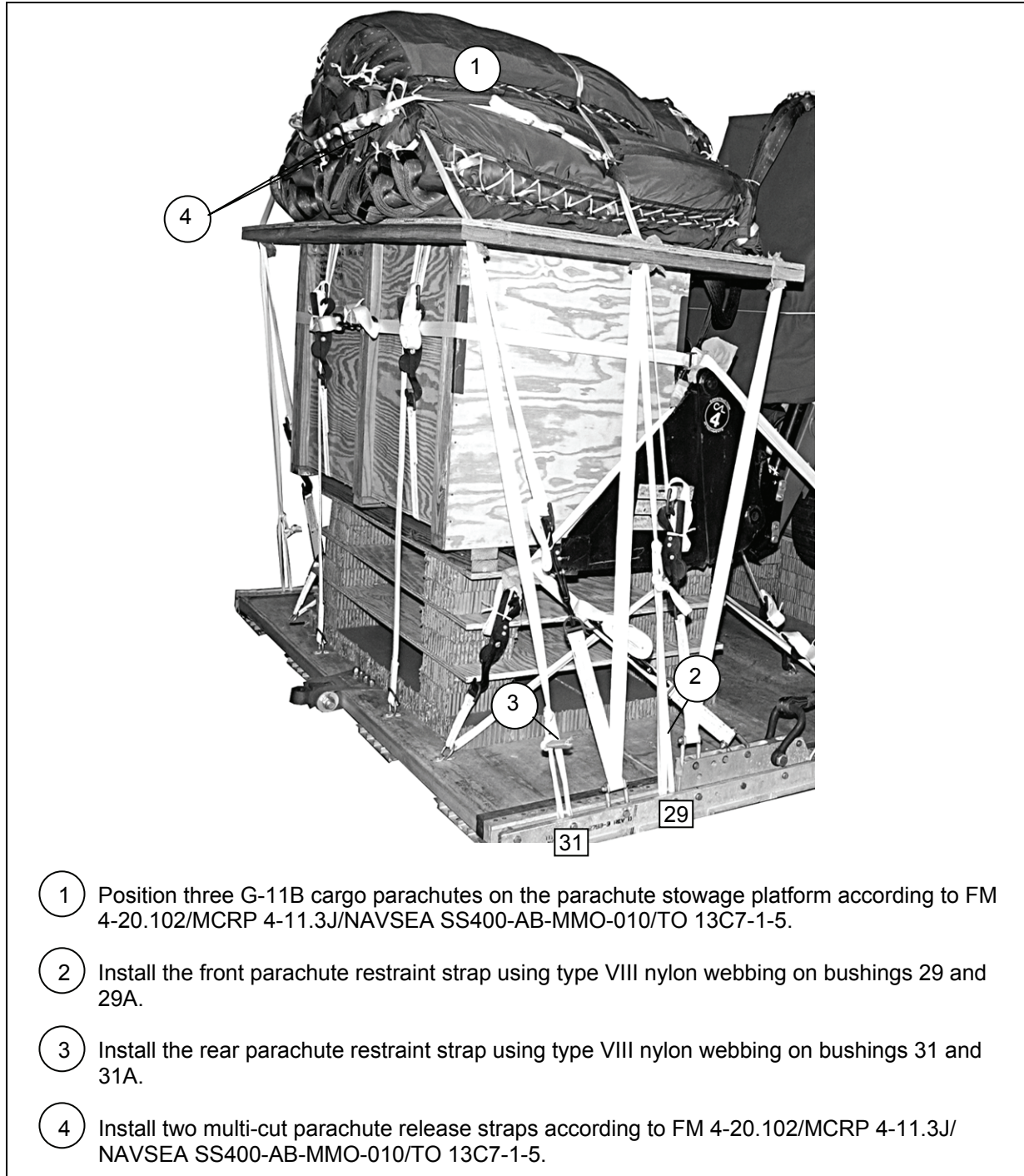
10-9. Install and safety tie the suspension slings as shown in Figure 10-18.



**Figure 10-18. Suspension Slings Installed**

## STOWING CARGO PARACHUTES

10-10. Prepare, stow, and restrain three G-11B cargo parachutes according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figure 10-19.

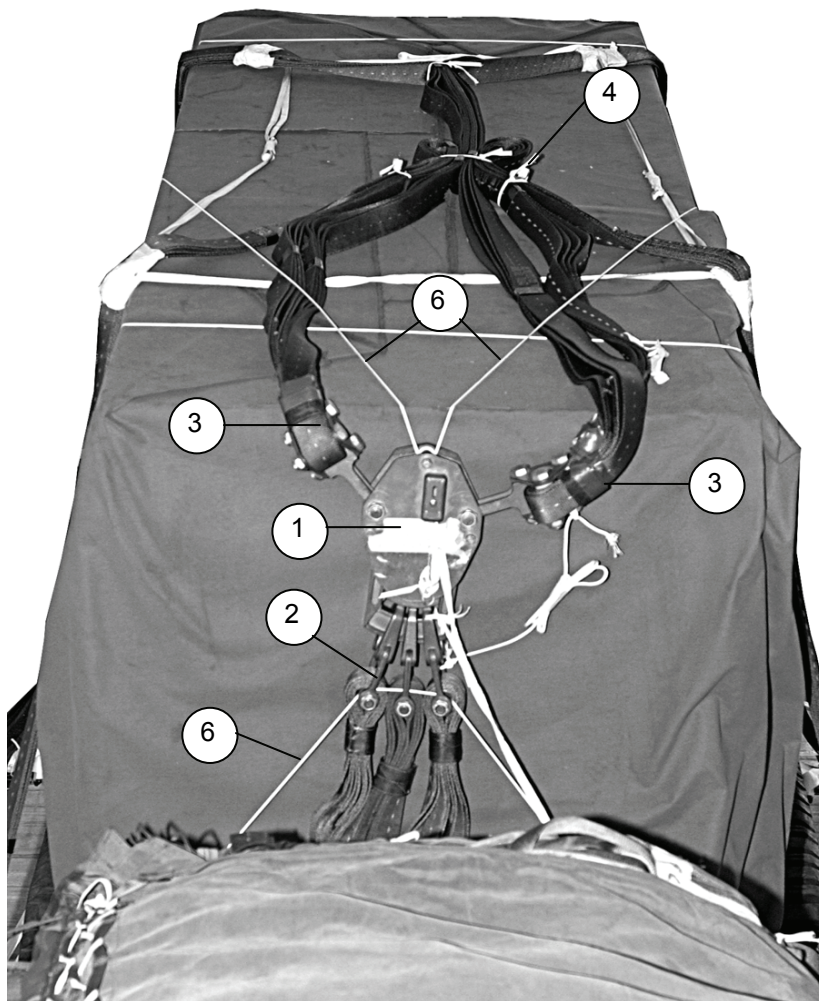


**Figure 10-19. Cargo Parachutes Positioned and Restrained**



## INSTALLING PARACHUTE RELEASE SYSTEM

10-11. Prepare and install an M-1 parachute release system according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figure 10-20.



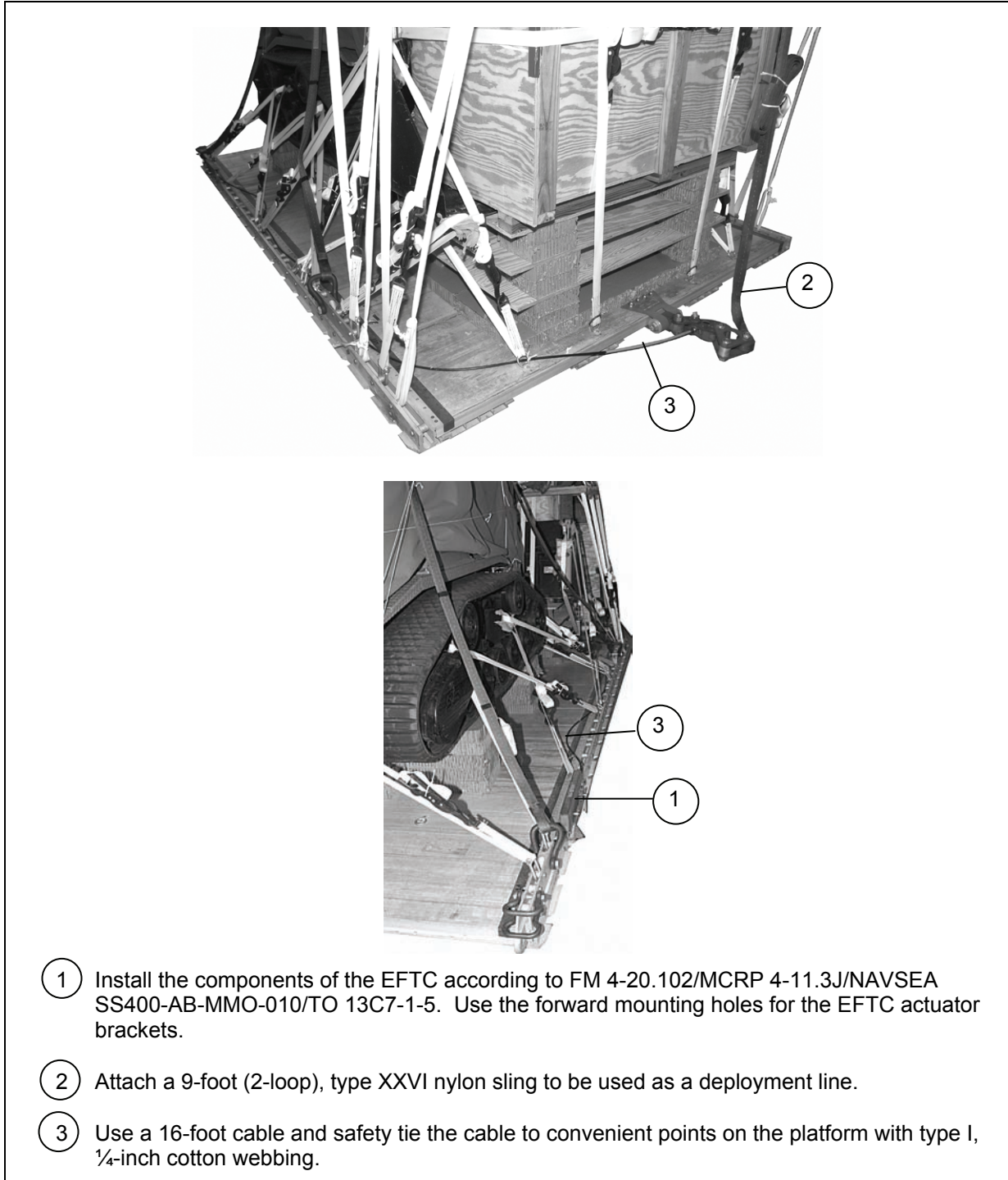
- ① Position an M-1 parachute release assembly on the front of the ARTS and temporarily safety tie in place.
- ② Attach the parachute riser extensions to the parachute release connectors.
- ③ Attach the suspension slings to the lower suspension links.
- ④ Fold the excess suspension slings and safety tie with type I, ¼-inch cotton webbing.
- ⑤ Safety tie any slack in the riser extensions using type I, ¼-inch cotton webbing (not shown).
- ⑥ Tie the front and rear M-1 parachute release safety ties to convenient points on the load with Type III nylon cord. Remove the temporary safety tie.

**Figure 10-20. M1 Parachute Release Installed**



## INSTALLING EXTRACTION SYSTEM

10-12. Install the extraction system as shown in Figure 10-21.



- ① Install the components of the EFTC according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5. Use the forward mounting holes for the EFTC actuator brackets.
- ② Attach a 9-foot (2-loop), type XXVI nylon sling to be used as a deployment line.
- ③ Use a 16-foot cable and safety tie the cable to convenient points on the platform with type I, ¼-inch cotton webbing.

**Figure 10-21. Extraction System Installed**

## **PLACING EXTRACTION PARACHUTE**

10-13. Select the extraction parachute and extraction line needed using the extraction line requirements table in FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5. Place the extraction parachute and line on the load for installation in the aircraft.

## **INSTALLING PROVISIONS FOR EMERGENCY RESTRAINTS**

10-14. Select and install the provisions for the emergency aft restraints according to the emergency aft restraint requirements table in FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.

## **MARKING RIGGED LOAD**

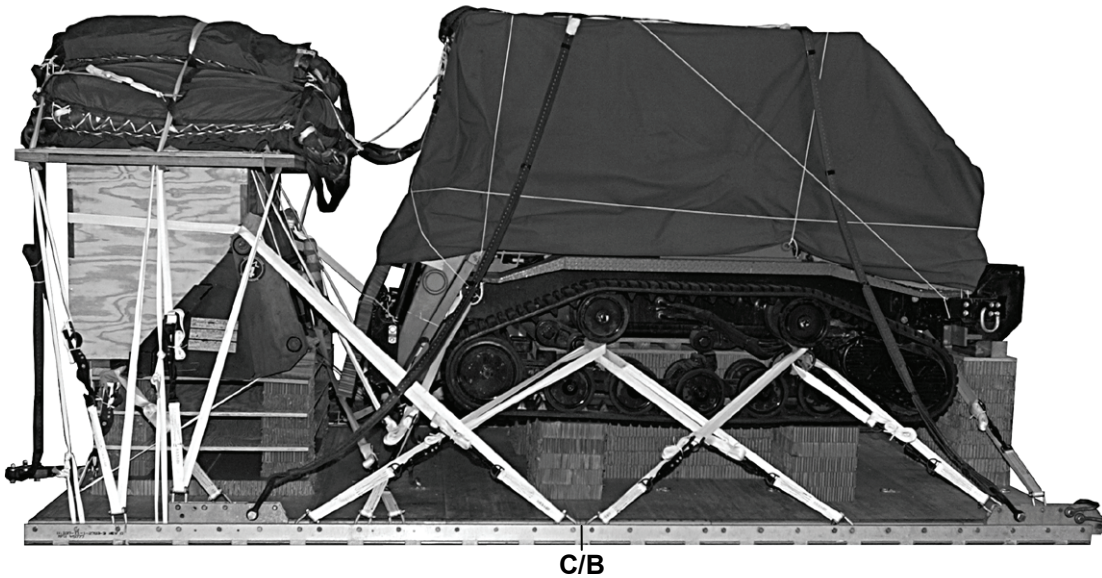
10-15. Mark the rigged load according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5, and as shown in Figure 10-22. Complete Shipper's Declaration for Dangerous Goods. If the load varies from the one shown, the weight, height, CB, and parachute requirements must be recomputed.

## **EQUIPMENT REQUIRED**

10-16. Use the equipment listed in Table 10-1 to rig this load.

**CAUTION**

Make the final rigger inspection required by AR 59-4 and FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 before the load leaves the rigging site.



**RIGGED LOAD DATA**

Weight: Load Shown.....	12,440 pounds
Maximum Weight Load.....	15,000 pounds
Height.....	99 inches
Width.....	108 inches
Overall Length .....	210 inches
Overhang: Front.....	0
Rear (parachute platform).....	0 inches
Center of Balance (CB) (from front edge of the platform).....	88 inches
Extraction System with 16-foot cable (adds 18 inches to the length of the load)	

**Figure 10-22. All-Purpose Remote Transporter Rigged on a 16-Foot, Type V Platform for Low-Velocity Airdrop**

**Table 10-1. Equipment Required for Rigging the All-Purpose Remote Transporter on a 16-Foot, Type V Platform for Low-Velocity Airdrop**

<i>National Stock Number</i>	<i>Item</i>	<i>Quantity</i>
8040-00-273-8713	Adhesive paste, 1-gal.	As required
4030-00-090-5354	Clevis, suspension, 1-inch (large)	5
8305-00-880-8155	Cloth, coated (nylon, type II, 17.0 oz, green, 60-in)	As required
4020-00-240-2146	Cord, nylon, type III, 550-lb	As required
1670-00-434-5785	Coupling, airdrop extraction force transfer, w/16-ft. cable	1
1670-00-360-0328	Cover, clevis	3
8135-00-664-6958	Cushioning material (Cellulose padding)	As required
8305-00-958-3685	Felt, 1/2-inch thick	As required
1670-01-183-2678	Leaf, extraction line (line bag) ( add 2 for C-17)	2
	Line extraction:	
1670-01-062-6313	60-foot (3-loop), type XXVI (for C-130)	1
1670-01-107-7651	140-foot (3-loop), type XXVI (for C-17)	1
1670-01-064-4452	60-foot (1-loop), type XXVI (for C-17), (drogue line)	1
1670-00-783-5988	Link assembly, type IV (C-17 only)	1
	Link assembly, two-point:	
5306-00-435-8994	Bolt, 1-inch diameter, 4-inches long	2
5310-00-232-5165	Nut, 1-inch	2
1670-00-003-1953	Plate, side, 3 3/4-inch	2
5365-00-007-3414	Spacer, large	2
	Lumber:	
5510-00-220-6146	2- by 4- by 96-inch	8
5510-00-220-6148	2- by 6- by 96-inch	3
5510-00-220-6274	4- by 4- by 96-inch	1
5315-00-010-4659	Nail, steel, common, 8D	As required
1670-00-753-3928	Pad, energy-dissipating (honeycomb)	16 sheets
1670-01-016-7841	Parachute, cargo, G-11B	3
	Parachute, cargo, extraction:	
1670-01-063-3716	22-foot	1
1670-01-063-3715	15-foot (C-17 only)	1
	Platform, airdrop, type V, 16-foot:	
1670-01-162-2372	Clevis assembly (type V)	22
1670-01-162-2376	Extraction bracket assembly	1
1670-01-247-2389	Link, suspension bracket, type V	2
1670-01-162-2381	Tandem link assembly (Multipurpose link)	2
5530-00-128-4981	Plywood, 3/4-inch	8 sheets

**Table 10-1. Equipment Required for Rigging the All-Purpose Remote Transporter on a 16-Foot, Type V Platform for Low-Velocity Airdrop (Continued)**

<i>National Stock Number</i>	<i>Item</i>	<i>Quantity</i>
1670-01-097-8816	Release, cargo parachute, M-1	1
	Sling, cargo, airdrop:	
1670-01-062-6306	3-foot (4-loop), type XXVI	2
1670-01-0637760	11-foot (2-loop), type XXVI	2
1670-01-062-6303	12-foot (2-loop), type XXVI	2
1670-01-063-7761	16-foot (2-loop), type XXVI	2
1670-01-062-6313	60-foot (3-loop), type XXVI	3
5340-00-040-8219	Strap, parachute, release, multi-knife	2
7501-00-266-5016	Tape, adhesive, 2-inch	As required
1670-00-937-0271	Tiedown assembly, 15-foot.	35
1670-01-483-8259	Link, Parachute, Connector (H-block) (C-17 only)	1
	Webbing:	
8305-00-268-2411	Cotton, 1/4-inch, type I	As required
8305-00-082-5752	Nylon, tubular, 1/2-inch	As required
8305-00-261-8585	Nylon, type VIII	As required



# Glossary

<b>ACB</b>	attitude control bar
<b>acft</b>	aircraft
<b>AFB</b>	Air Force Base
<b>AFMAN</b>	Air Force Manual
<b>AFR</b>	Air Force regulation
<b>AFTO</b>	Air Force Technical Order
<b>ARTS</b>	All-Purpose Remote Transporter
<b>attn</b>	attention
<b>CB</b>	center of balance
<b>DA</b>	Department of the Army
<b>DC</b>	District of Columbia
<b>DD</b>	Department of Defense
<b>DEUCE</b>	Deployable Universal Combat Earthmover
<b>efc</b>	extraction force transfer coupler
<b>FM</b>	field manual
<b>FOPS</b>	falling objects protection system
<b>HQ</b>	headquarters
<b>MTL</b>	Multi-Terrain Loader
<b>NAVSUP</b>	naval supply
<b>NO</b>	number
<b>NSN</b>	national stock number
<b>PTO</b>	power takeoff
<b>qty</b>	quantity
<b>ROPS</b>	roll-over protection system
<b>rpm</b>	revolutions per minute
<b>SEE</b>	small emplacement excavator
<b>TM</b>	technical manual
<b>TO</b>	technical order
<b>TRADOC</b>	United States Army Training and Doctrine Command
<b>US</b>	United States (of America)
<b>USAR</b>	United States Army Reserve
<b>VA</b>	Virginia
<b>w</b>	with

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**6 September 2007**

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