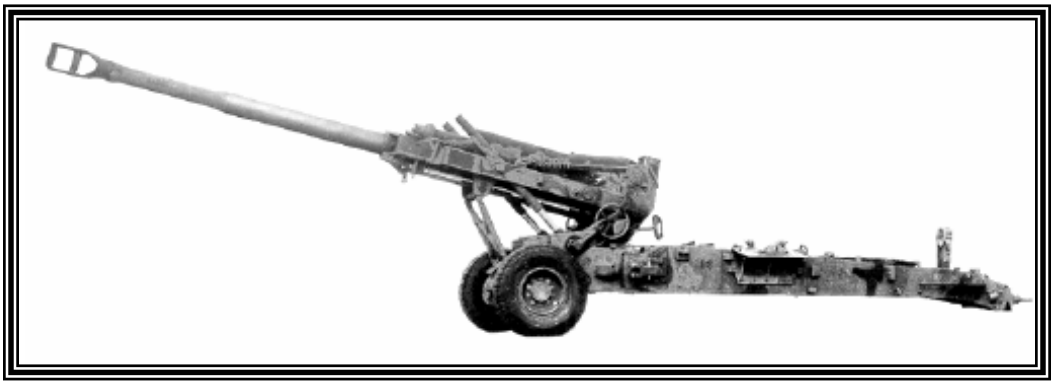
FM 4-20.127 (FM 10-527)
TO 13C7-10-191

Airdrop of Supplies and Equipment:

Rigging M198, 155-MM Howitzer



JUNE 2004

HEADQUARTERS
DEPARTMENT OF THE ARMY
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FIELD MANUAL
No. 4-20.127
TECHNICAL ORDER
No. 13C7-10-191

DEPARTMENT OF THE ARMY
DEPARTMENT OF THE AIR FORCE
Washington, DC, 29 June 2004

Airdrop of Supplies and Equipment: Rigging M198, 155-MM Howitzer

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*This publication supersedes FM 10-527, 30 September 1982.

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PREFACE

SCOPE

The purpose of this manual is to provide the latest approved procedures for rigging the M198, 155-mm howitzer on the Type V platform for low-velocity airdrop from C-130, C-141 and C-17 aircraft. This manual is written for use by the parachute rigger.

USER INFORMATION

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Introduction

DESCRIPTION OF LOAD

This manual shows and tells how to rig the M198, 155-MM howitzer with different modifications and different amounts of accompanying equipment and ammunition. The M198 is rigged in the following configurations:

a. The M198 howitzer with accompanying gun equipment weighing 610 lbs and no accompanying ammunition load.

b. The M198 howitzer with an accompanying load of ammunition, water cans, and gun equipment weighing 1509 lbs.

c. The M198 howitzer with accompanying ammunition load using the Modular Artillery Charge System (MACS), water cans and gun equipment weighing 1509 lbs.

SPECIAL CONSIDERATIONS

CAUTION

Only ammunition listed in FM 4-20.153/MCRP 4-11.3B/ TO13C7-18-41 may be airdropped.

NOTICE OF EXCEPTION:

The procedure for using the 25 foot arming lanyard with the M-2 parachute release differs from the FM 4-20.102/ NAVSEA SS400-AB-MMO-010/TO 13C7-1-5. An exception to FM 4-20.102/NAVSEA SS400-AB-MMO-010/ TO 13C7-1-5 is granted. The procedure in this manual MUST be followed.

The loads covered in this manual include hazardous material as defined in AFMAN(I) 24-204/ TM 38-250. The hazardous materials must be packaged, marked and labeled as required by AFMAN(I) 24-204/TM 38-250.

A copy of this manual must be available to the Joint Airdrop Inspectors during the before and after loading inspection.

Chapter 1

Rigging M198, 155-MM Howitzer on a Type V Platform

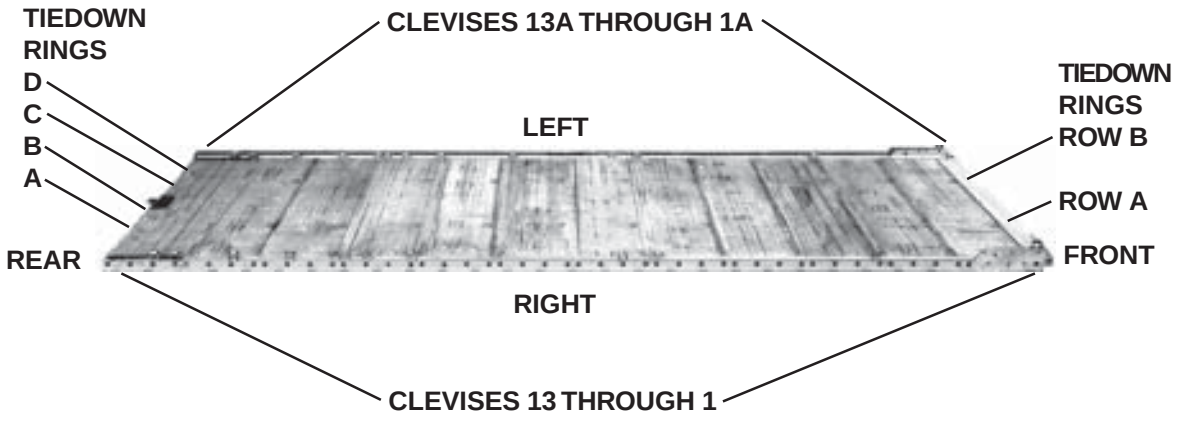
DESCRIPTION OF LOAD

1-1. The M198, 155-mm howitzer is rigged on a 24-foot, type V airdrop platform for low-velocity airdrop from C-130, C-17 and C-5 aircraft. The howitzer is dropped with the accompanying gun equipment (section chest, camouflage net and poles, cleaning pail, and pioneer tools) which weighs 610 pounds. The load may require either four G-11B or five G-11C cargo parachutes depending on the weight.

PREPARING PLATFORM

1-2. Prepare a 24-foot, type V airdrop platform according to TM 10-1670-268-20&P/TO 13C7-52-22. Install two tandem links and 26 tiedown clevis assemblies as shown in Figure 1-1.

Notes: 1. The nose bumper may or may not be installed
2. Measurements given in this chapter are from the front edge of the platfrom, NOT from the front edge of the nose bumper.



Step:

1. Inspect, or assemble and inspect, the platform as outlined in TM 10-1670-268-20&P/ TO 13C7-52-22.
2. Install a tandem link on the front of each platform side rail using holes 1, 2, and 3.
3. Bolt 13 tiedown clevises to each platform side rail according to FM 4-20.102/ NAVSEA SS400-AB-MMO-010/TO 13C7-1-5. Starting at the front of each side rail, bolt a tiedown clevis to the first bushing of the tandem link and to bushings 9, 20, 22, 28, 33, 35, 36, 37, 39, 42, 45, and 46 of the platform.
4. Starting at the front of the platform, number the clevises bolted to the right side rail from 1 through 13 and those bolted to the left side rail 1A through 13A.
5. Number the rear row of four deck rings according to FM 4-20.102/ NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.

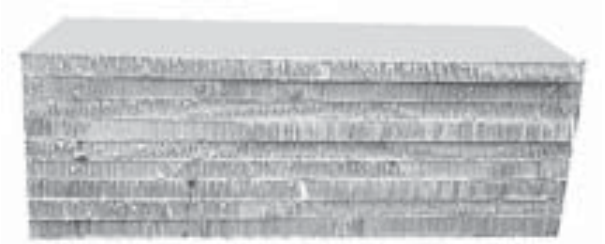
Figure 1-1. Platform Prepared

BUILDING AND POSITIONING HONEYCOMB STACKS

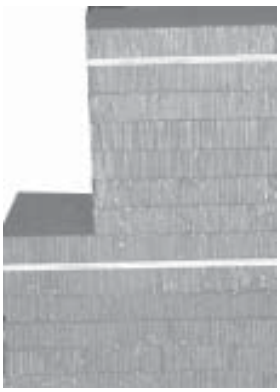
1-3. Build five honeycomb stacks and place them on the platform as shown in Figures 1-2 through 1-4.

Stack 1

Stack 2



Stack 3



Stack Number	Pieces	Width (Inches)	Length (Inches)	Material	Instructions
1	*2 *2	36 36	9 96	Honeycomb Honeycomb	Use honeycomb to make a two-layer base 105 inches long.
	6	36	75	Honeycomb	Stack and center the 75-inch pieces on the base.
2	9	30	80	Honeycomb	Form a stack.
3	5	30	18	Honeycomb	Form base.
	1	30	18	3/4-inch plywood	Place on top of honeycomb base.
	1	30	18	Honeycomb	Place on top of plywood.
	6	20	18	Honeycomb	Place on top of 30- by 18-inch honeycomb.
	1	20	18	3/4-inch plywood	Place on top of 6 layers of honeycomb.
	1	20	18	Honeycomb	Place on top of plywood.

*** Alternate the sizes of the honeycomb in each layer.**

Figure 1-2. Honeycomb Stacks 1, 2, and 3 Prepared

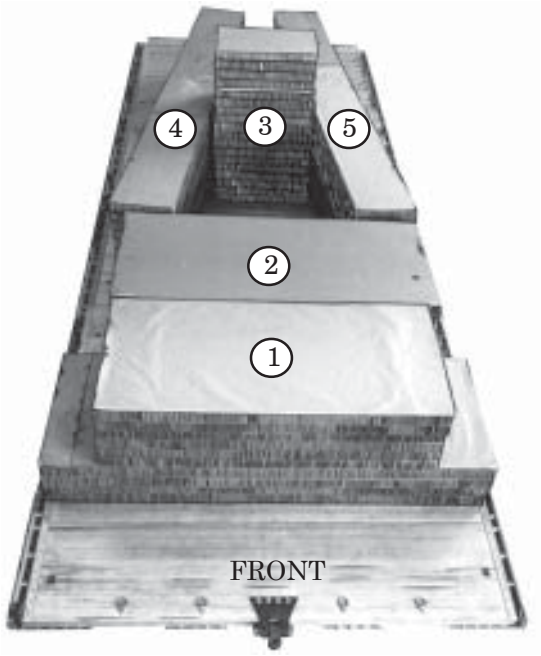
REAR FRONT

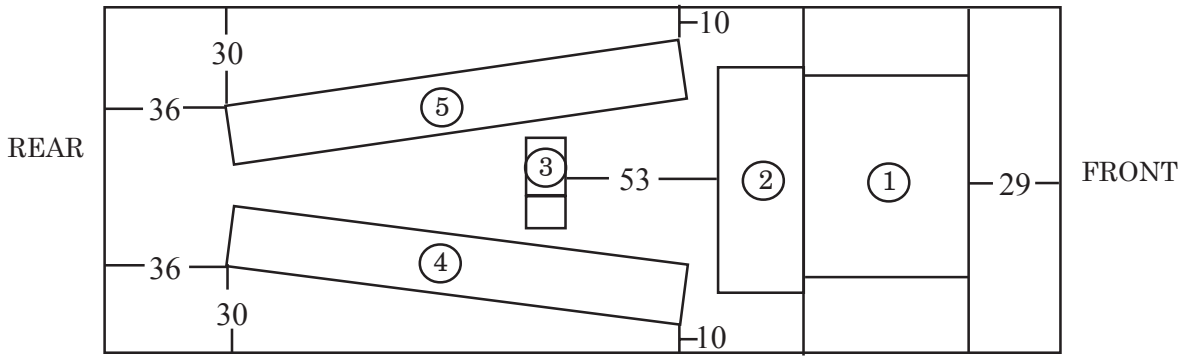
Stack Number	Pieces	Width (Inches)	Length (Inches)	Material	Instructions
4 and 5	*3 *3	18 18	96 54	Honeycomb Honeycomb	Use honeycomb to make a three-layer base 150 inches long.
	1 1	18 18	96 54	3/4-inch plywood	Form a plywood layer 150 inches long over the honeycomb base.
	*4 *4	18 18	96 54	Honeycomb Honeycomb	Use honeycomb to make four layers 150 inches long.
	1	18	88	3/4-inch plywood	Place plywood on top of the four layers of the honeycomb on the front edge of the stack.
	1	18	48	3/4-inch plywood	Place plywood on top of the 88-inch piece flush with the front of the stack.
	1 1	18 18	96 54	Honeycomb Honeycomb	Use honeycomb to make a layer 150 inches long and place it on top of the stack

*** Alternate the sizes of the honeycomb in each layer.**

Figure 1-3. Honeycomb Stacks 4 and 5 Prepared

Notes: 1. Drawing is not to scale.
2. All dimensions are given in inches.



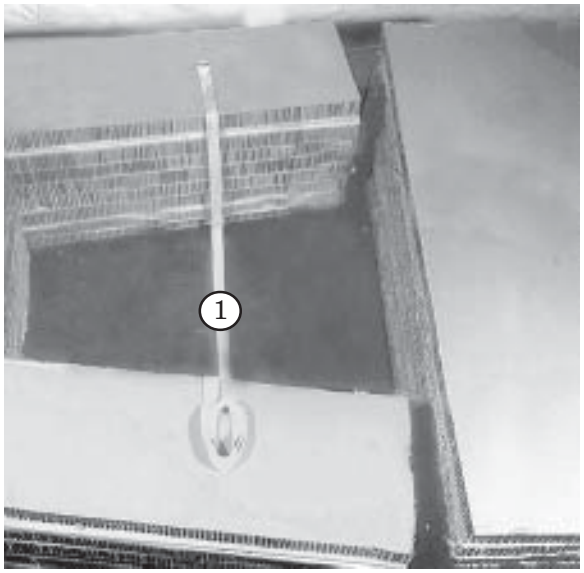


Stack Number	Instructions
	Place stack:
1	29 inches from the front edge of the platform and centered.
2	Flush against stack 1 and centered.
3	53 inches from stack 2 and centered. Make sure the highest part of the stack is on the left side of the platform.
4	36 inches from the rear edge of the platform. Place the front outside corner 10 inches from the right rail. Place the rear outside corner 30 inches from the right rail.
5	36 inches from the rear edge of the platform. Place the front outside corner 10 inches from the left rail. Place the rear outside corner 30 inches from the left rail.

Figure 1-4. Honeycomb Stacks Positioned on platform

STOWING ACCOMPANYING EQUIPMENT

1-4. If the accompanying equipment (paragraph 1-1) is to be dropped, stow it as shown in Figure 1-5.



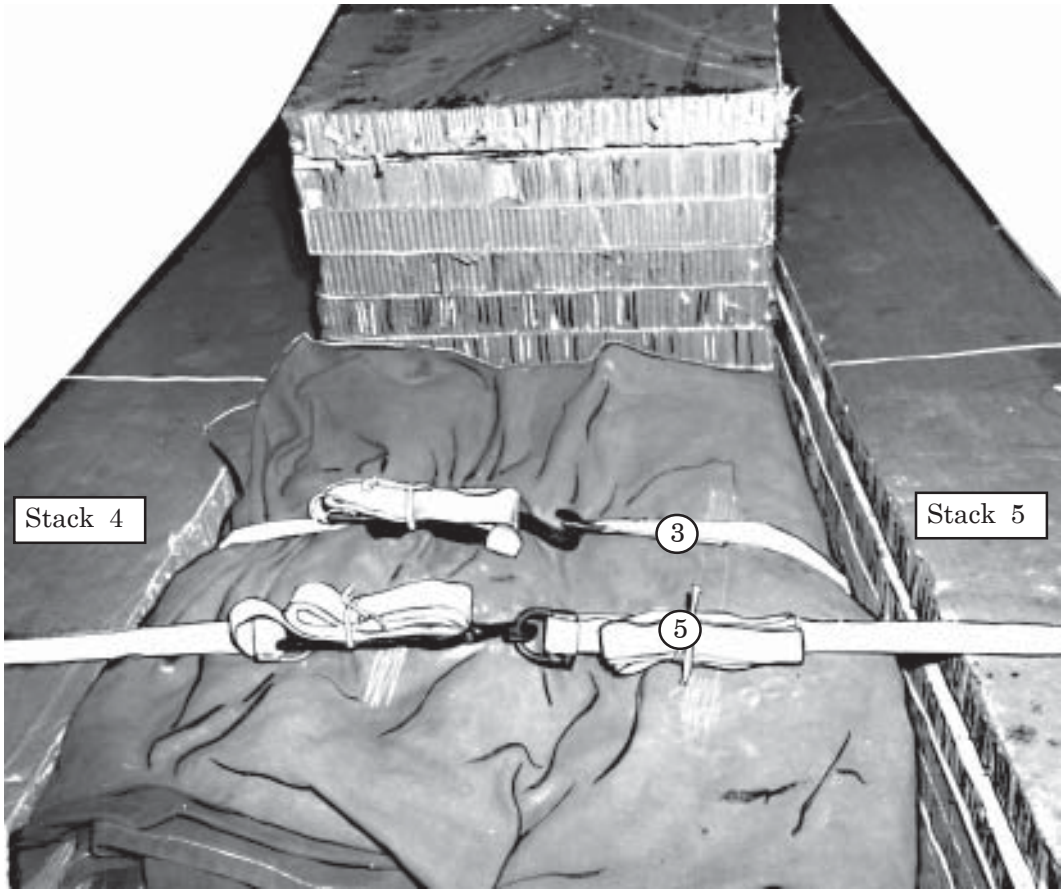
CAUTION

Stow the equipment in such a way that it will be no higher than honeycomb stacks 4 and 5.

(1) Lay a 15-foot tiedown strap on the platform across stacks 4 and 5 with the ends of the strap on top of the stacks.

(2) Fit the accompanying equipment in the space between the stacks on top of the strap. If lumber is included in the accompanying equipment, stow it on its edge against stacks 4 and 5 as shown.

Figure 1-5. Accompanying Equipment Stowed



(3) Bind the equipment with the 15-foot tiedown strap, a D-ring and a load binder.

(4) Pass the free end of a 15-foot tiedown strap through clevis 4A and a second strap through clevis 4. Run each strap through it's own D-ring and pull the straps taut (not shown).

(5) Run these straps up over honeycomb stacks 4 and 5, and hook the straps together with two D-rings and a load binder.

Figure 1-5. Accompanying Equipment Stowed (Continued)

PREPARING HOWITZER

1-5. Prepare the howitzer as described below.

a. Insure the metal breechblock support bracket is available. A previously airdropped howitzer should have it's own breechblock support bracket. If a bracket is not available for the howitzer to be rigged, use the specifications given in Figure 1-6 to construct one. The breechblock support is constructed of steel.

b. Use 2- by 6-inch and 2- by 10-inch pieces of lumber to build the wooden support blocks for the gun tube according to Figure 1-7.

c. Prepare the radio, power distribution unit and batteries as shown in Figure 1-8.

d. Prepare the gun tube as shown in Figure 1-9.

e. Lash the gun tube as shown in Figure 1-10.

f. Secure the baseplate, hoses and aiming stakes as shown in Figure 1-10.

g. Prepare the manifold and quadrant mounts as shown in Figure 1-12.

h. Secure the carrying case and spades as shown in Figure 1-13.

i. Secure the collimator as shown in Figure 1-14.

CAUTION
The breechblock support bracket must be fitted to the individual howitzer.

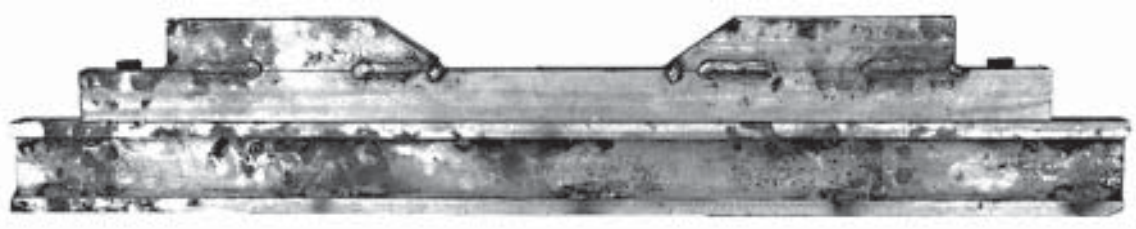


Figure 1-6. Breechblock Support Bracket Constructed

Notes: 1. Not drawn to scale.
2. All dimensions are given in inches.
3. The support is made to allow for metal shims to be inserted to ensure a snug fit under the breechblock.

CAUTION

The breechblock support bracket must be fitted to the individual howitzer.

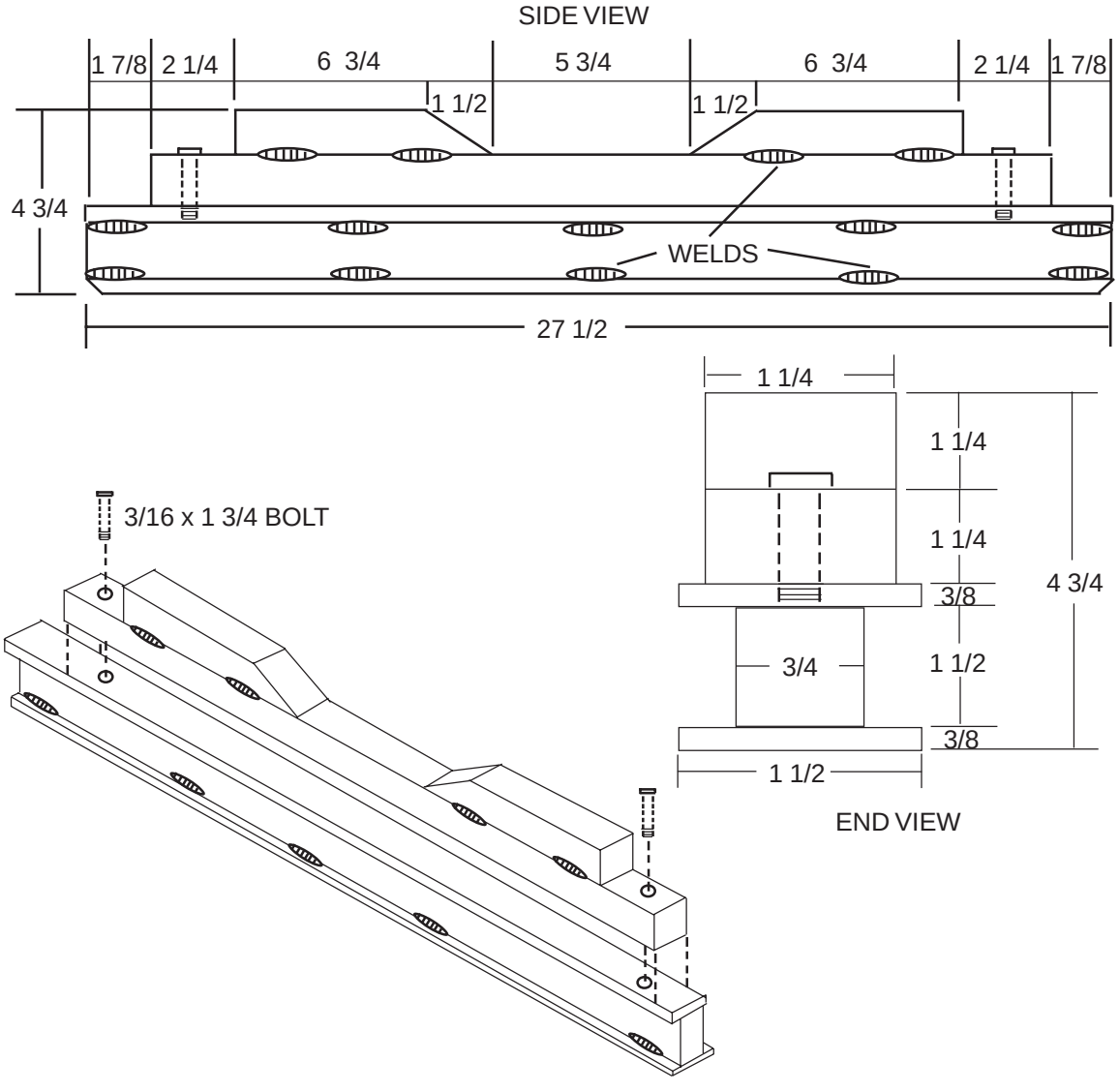
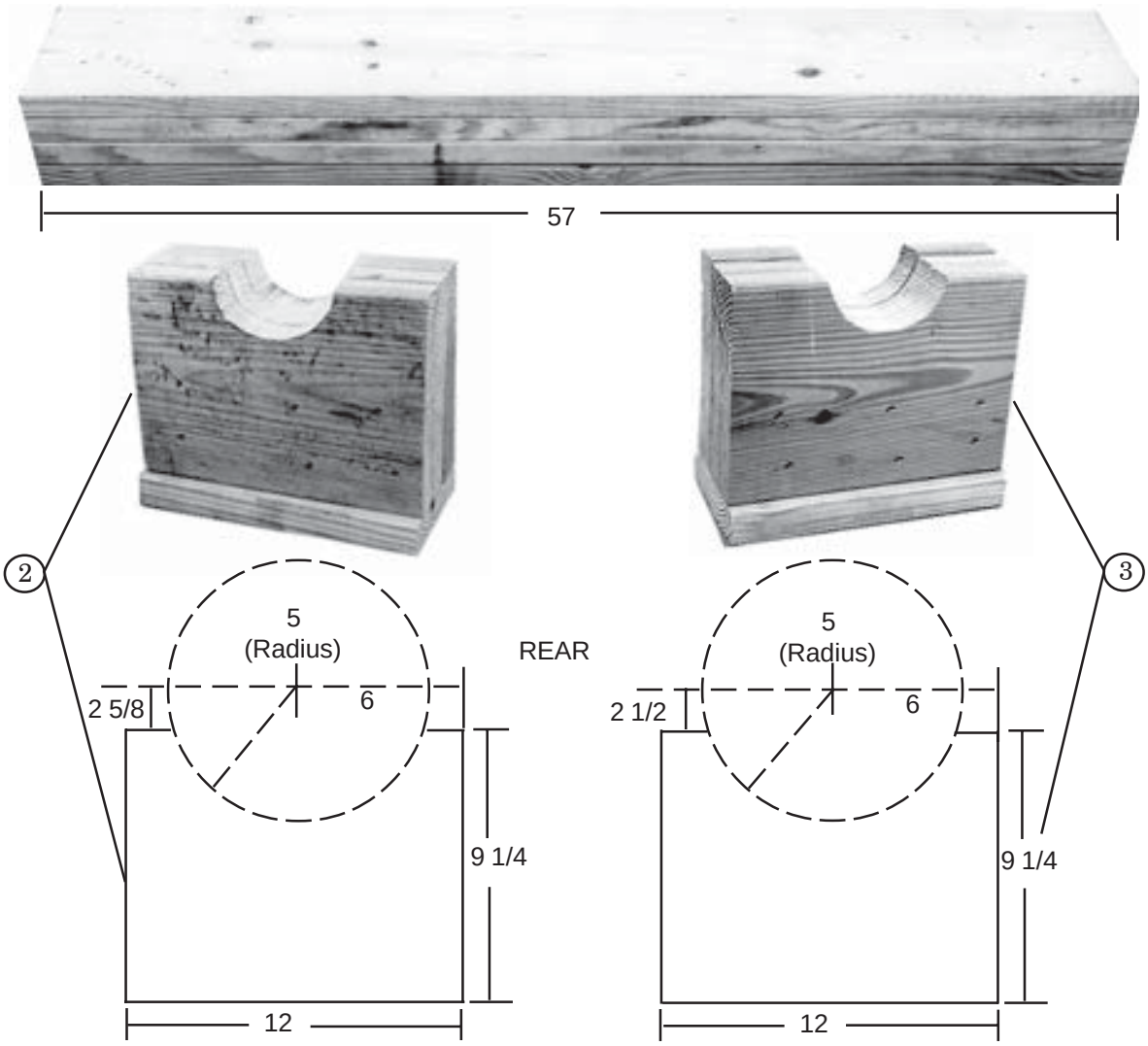


Figure 1-6. Breechblock Support Bracket Constructed (Continued)

Notes: 1. Not drawn to scale.
2. All dimensions are given in inches.

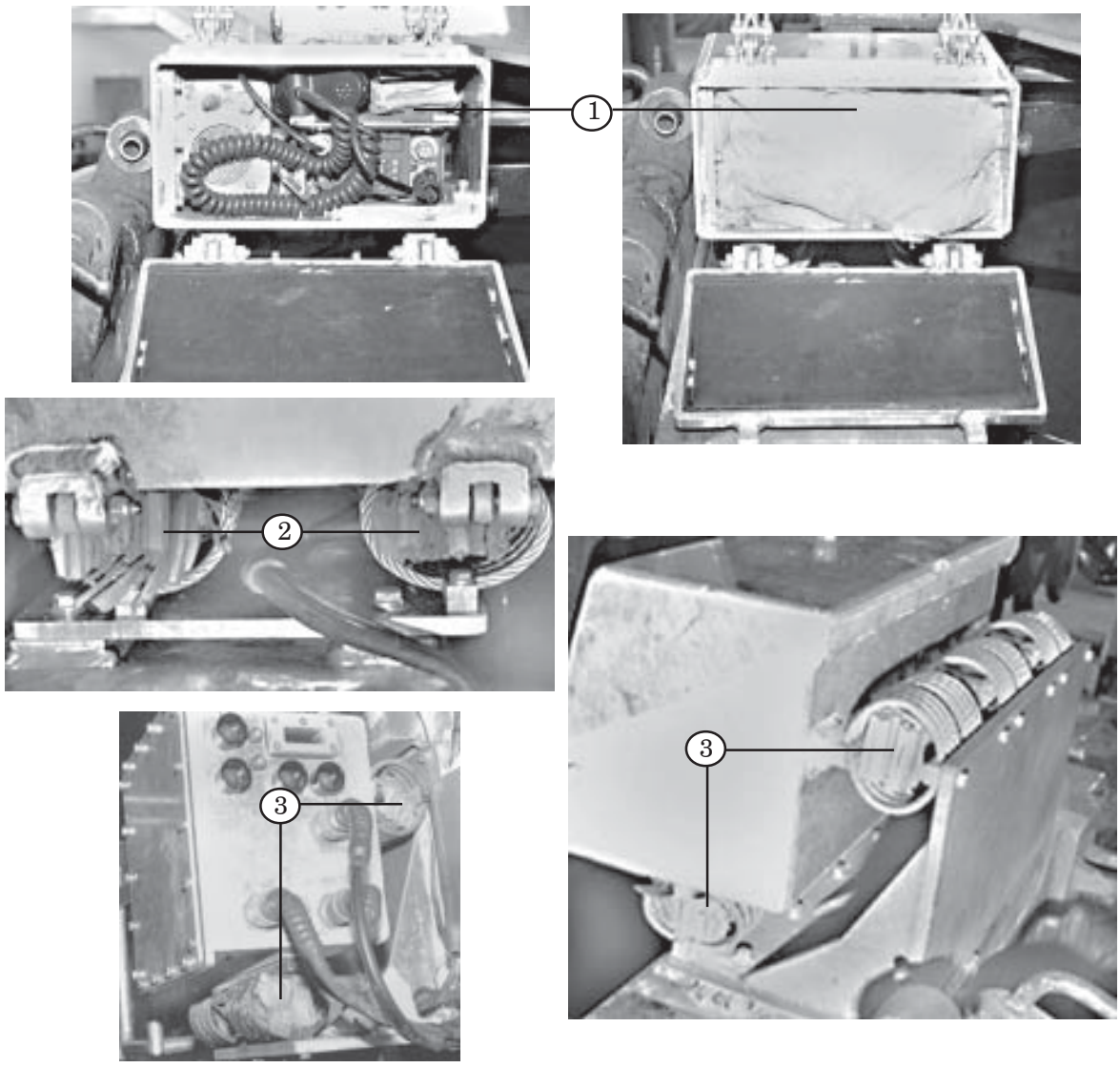


(1) Cut four 2- by 10- by 57-inch pieces of lumber. Nail the four pieces of lumber together with 20d nails.

(2) Make an arch-like cutout in three 2- by10- by 12-inch pieces of lumber. The arch is based on a 5-inch radius centered 2 5/8- inches above the top of the wood and 6- inches from either side. Nail the pieces together and to a 2- by 6- by 12-inch piece of lumber with 20d nails.

(3) Make an arch-like cutout in three 2- by 10- by 12-inch pieces of lumber. The arch is based on a 5-inch radius centered 2 1/2- inches above the top of the wood and 6- inches from either side. Nail the pieces together and to a 2- 6-by 12-inch piece of lumber with 20d nails.

Figure 1-7. Front and Rear Gun Tube Support Blocks Constructed



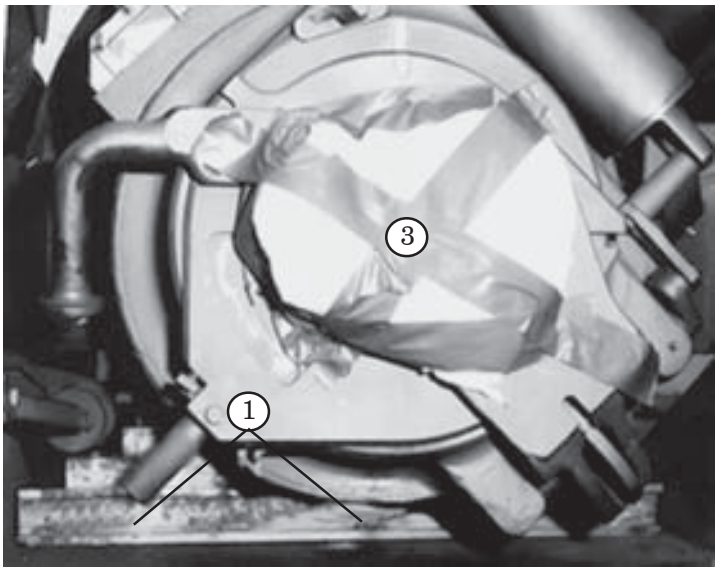
(1) Place honeycomb on top of the radio inside the box. Pad the front of the radio with cellulose wadding and secure the box latches.

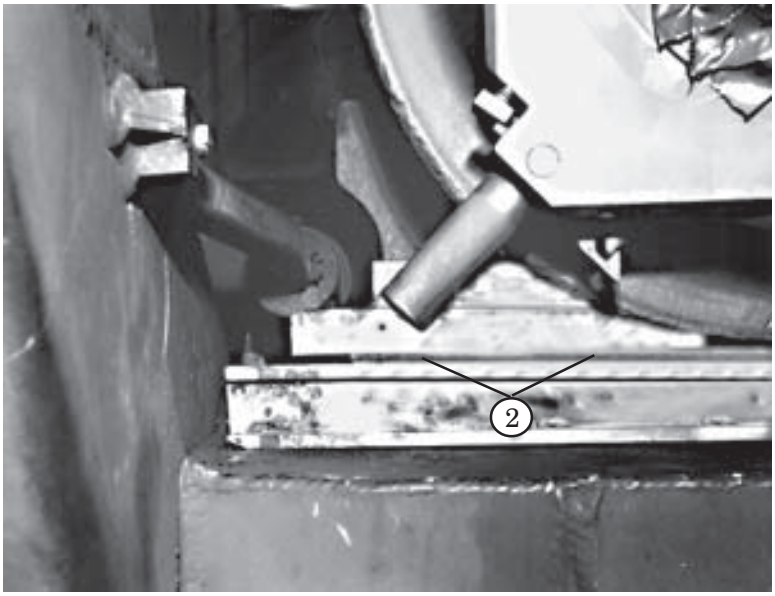
Notes: 1. Located on both left and right trails are three boxes containing the power supply distribution unit, radio, and batteries. Each box is mounted on a set of shock coils.
2. Install the honeycomb vertically to ensure maximum absorption during impact.

(2) Cut honeycomb to fit into the shock coils.

(3) Place a strip of honeycomb inside all the shock coils of each box.

Figure 1-8. Radio, Power Distribution Unit and Batteries Prepared



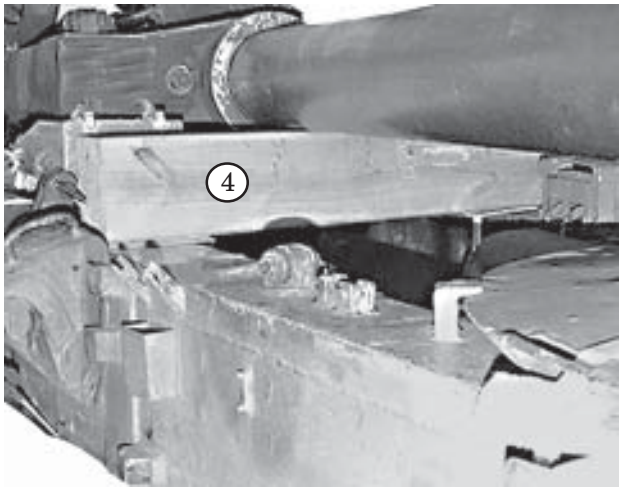


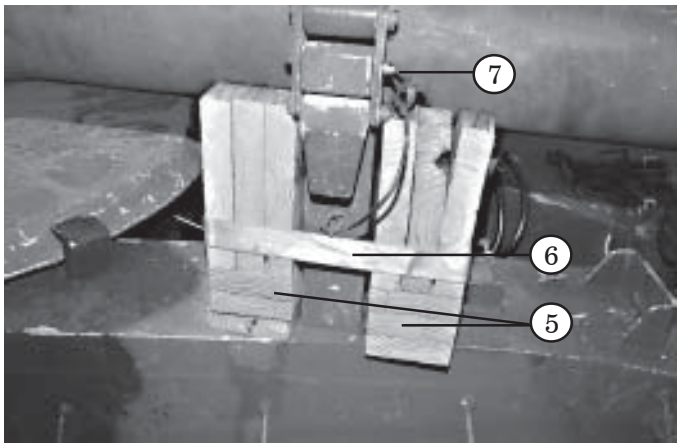
(1) Move the gun tube of the howitzer to the stowed position. Raise the tube and place the breechblock support bracket (Figure 1-6) under the breechblock. Ensure the fit is snug.

(2) The bracket should not move when the breechblock rests on it. If necessary, remove and disassemble the bracket and place metal shims in the space provided. Reassemble and replace the bracket. A bracket with shims installed is shown above.

(3) Pad the end of the breechblock with cellulose wadding. Tape the wadding in place.

Figure 1-9. Gun Tube Prepared





(4) Set the rear gun support block on the trails under the rear of the tube. Allow 1-inch clearance between the rear gun tube support block and the radio box.

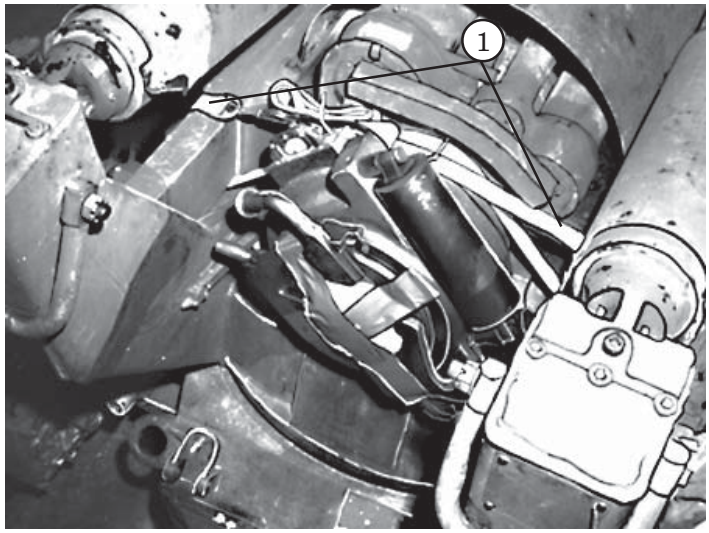
(5) Set the forward gun tube support blocks on the left trail against the gun travel lock. The block with the slightly deeper cuts fits on the breech side of the tube travel lock. If necessary, place plywood or lumber shims between the trail and the block for a snug fit. The gun shown needed an additional piece of 2- by 6-inch lumber on the base of each block.

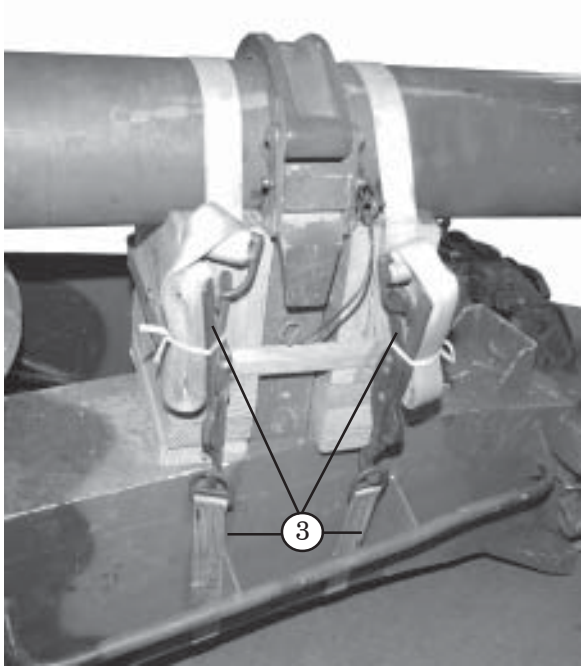
(6) Lash the support blocks to the gun tube travel lock with a 15-foot tiedown assembly.

(7) Close the gun tube travel lock, and secure it with the pin provided.

(8) Cover the muzzle and muzzle brake with plastic wrap, or insert the plug provided with the gun and muzzle. (Not Shown)

Figure 1-9. Gun Tube Prepared (Continued)



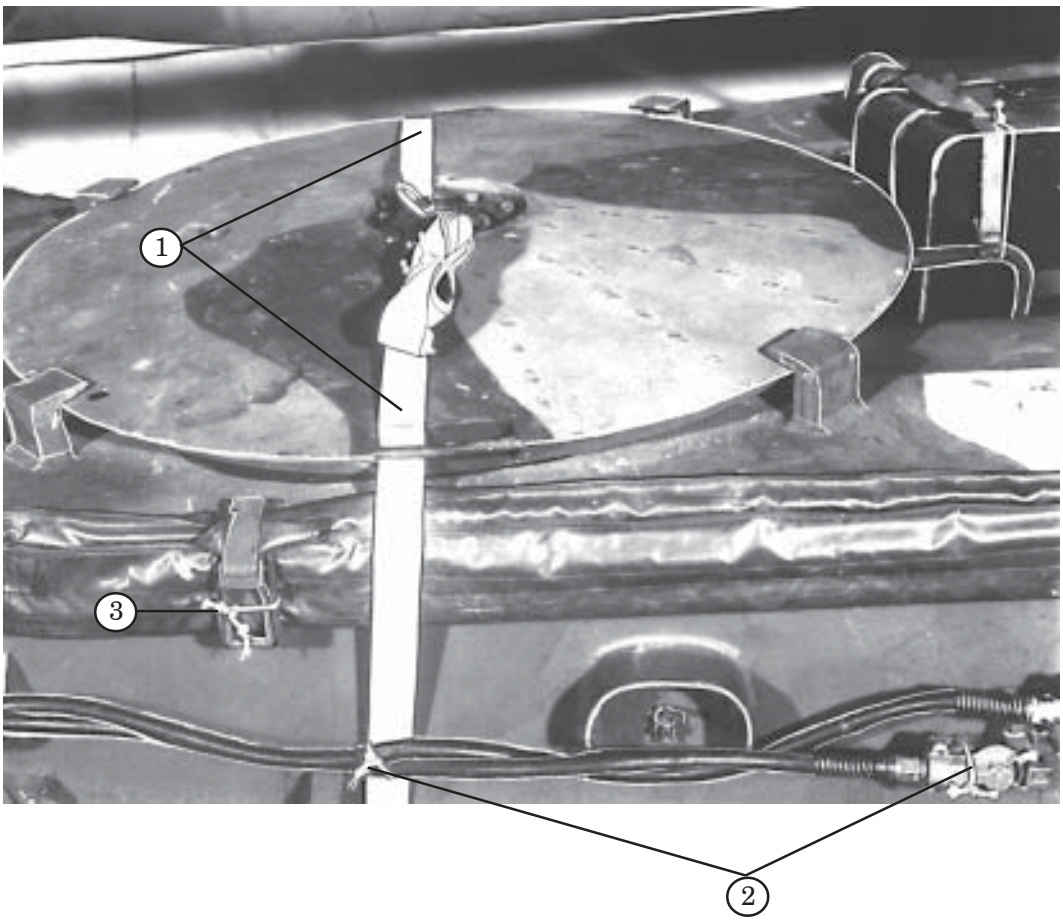


(1) Secure the breechblock with a 15-foot tiedown assembly. Run the strap under the cradle assembly, over the breechblock, and under the thermal warning device.

(2) Put the breechblock cover on the breechblock. (Not Shown)

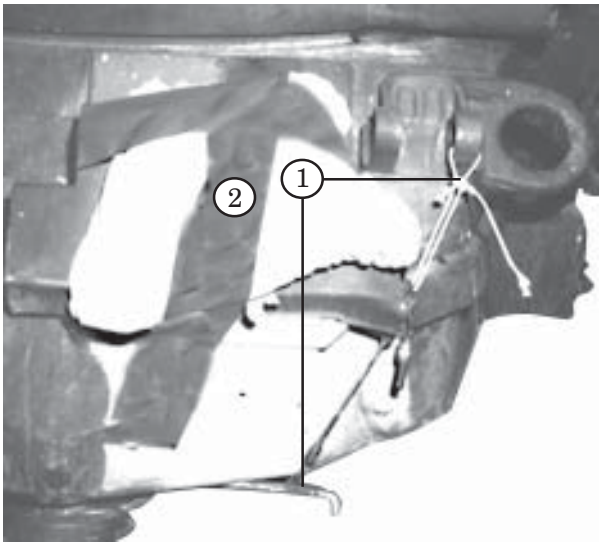
(3) Lash the gun tube to the left trail with two 15-foot tiedown assemblies. Run one strap around each support block and position load binder as shown.

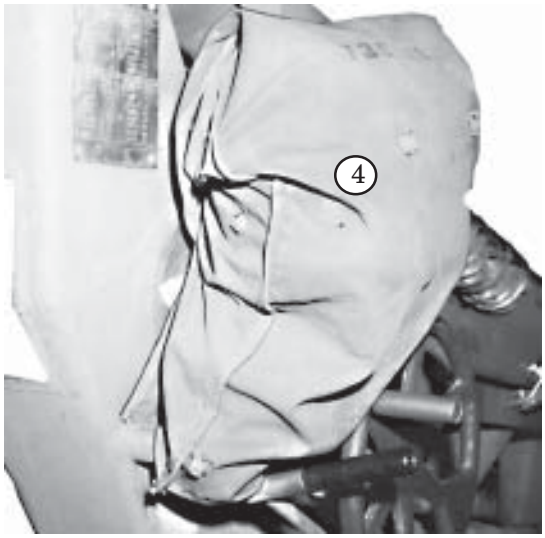
Figure 1-10. Gun Tube Lashed



1. Lash the firing base plate in its stowed position with a 15-foot tiedown assembly.
2. Tie the hose assemblies to the cleaning staff, to the lashing on the base plate, and to the dummy couplings with type III nylon cord.
3. Tie the hold down latches on the aiming stakes bracket in the closed position with type III nylon cord.
4. Tie the pump handles in place with the type III nylon cord. (Not Shown)

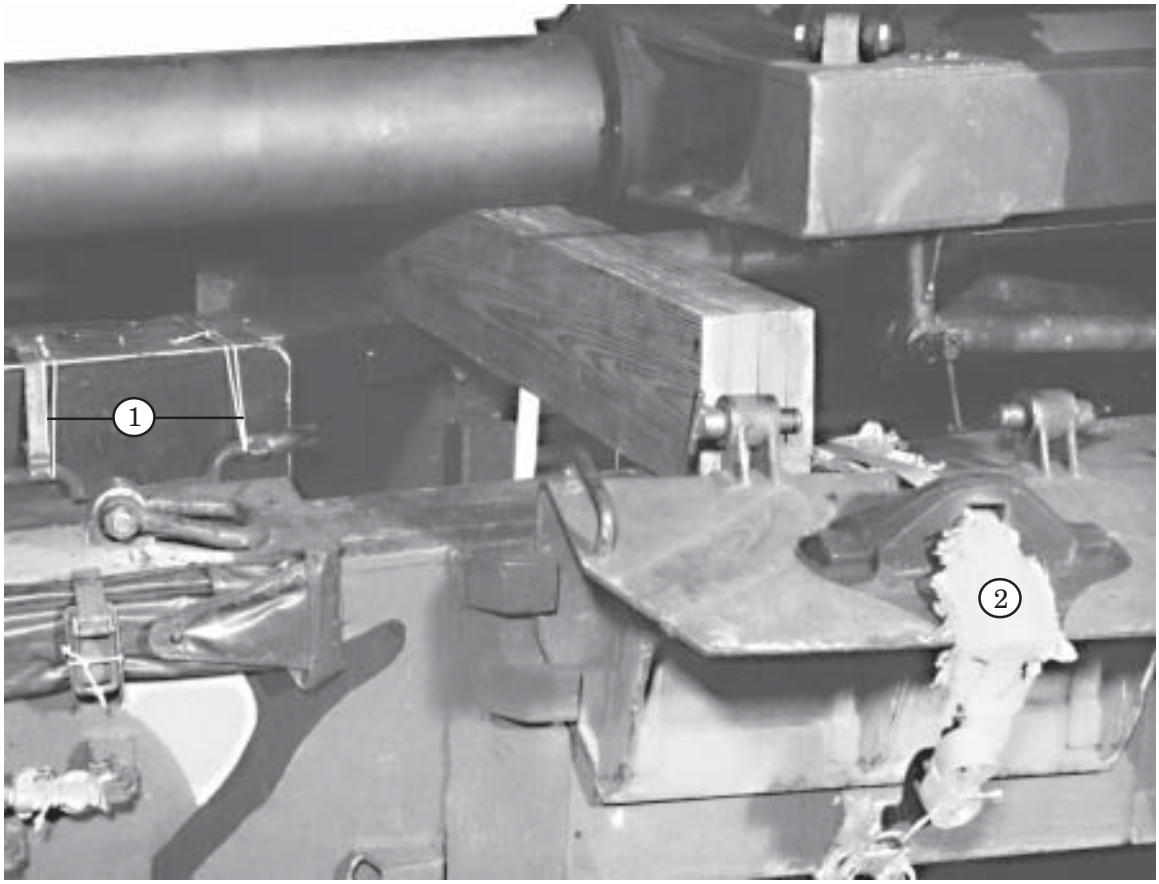
Figure 1-11. Base Plate, Hoses and Aiming Stakes Secured





1. Tie the lock-release lever to one side with type III nylon cord.
2. Pad the manifold assembly with cellulose wadding, and tape the wadding in place.
3. Pad the telescope and quadrant mounts (on both sides of the howitzer) with cellulose wadding, and tape in place.
4. Cover the padded mounts if covers are available.

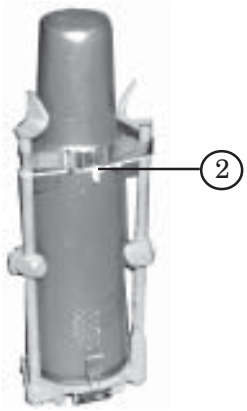
Figure 1-12. Manifold and Quadrant Mounts Prepared

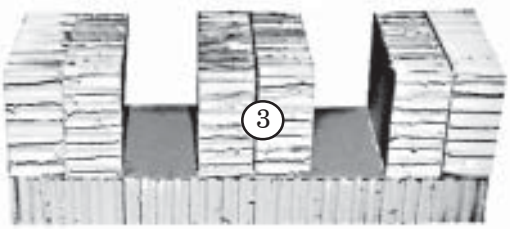


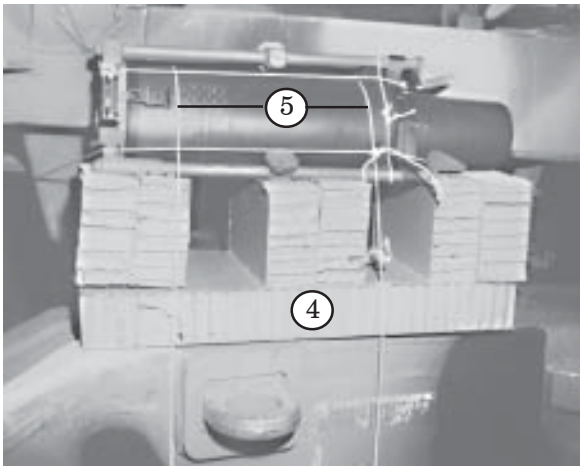
(1) Strap the fire control equipment carrying case in its bracket on the left trail. In addition, tie the case in place with two lengths of type III nylon cord.

(2) Lash each spade in its bracket on each trail with a 15-foot tiedown assembly. Pad any sharp edges that may contact the strap.

Figure 1-13. Fire Control Carrying Case and Spade Secured







1. Take an M1A1 collimator out of its case. Place the legs as shown and tighten the locking knobs. Wrap the collimator with cellulose wadding and tape the wadding in place.

2. Put the collimator back in its case. Fold the legs up and tie them in place with type III nylon cord.

3. Glue six 6- by 10-inch pieces of honeycomb to a 10- by 26-inch piece of honeycomb as shown.

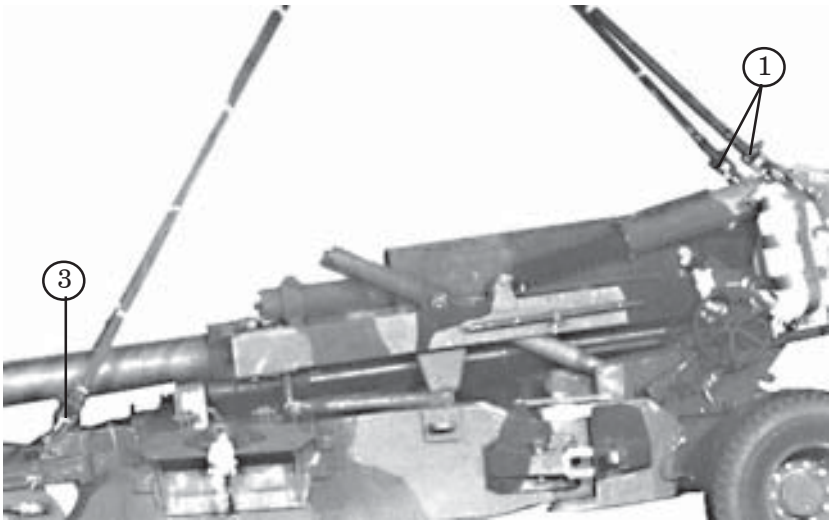
4. Set the honeycomb stack on the left trail.

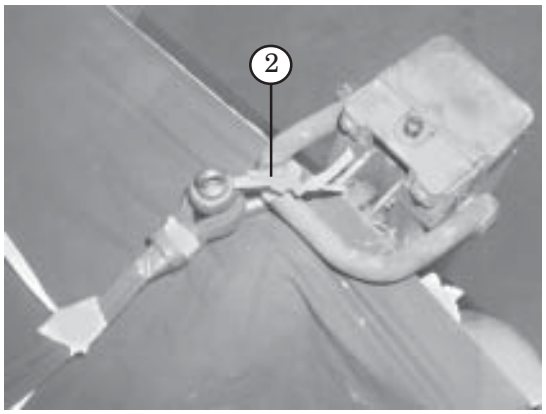
5. Lay the collimator on the honeycomb stack. Tie the honeycomb and the collimator to the trail with lengths of type III nylon cord.

Figure 1-14. Collimator Secured

INSTALLING SUSPENSION SLINGS

1-6. Install two 9-foot (4 loop) and two 12-foot (4 loop) type XXVI nylon webbing slings with four screw-pin clevises as shown in Figure 1-15.





(1) Bolt a 9-foot sling to each top carriage hoisting link with a screw-pin clevis.

(2) Tie the screw-pin clevis to the hoisting link with a length of doubled 1/2-inch tubular nylon webbing.

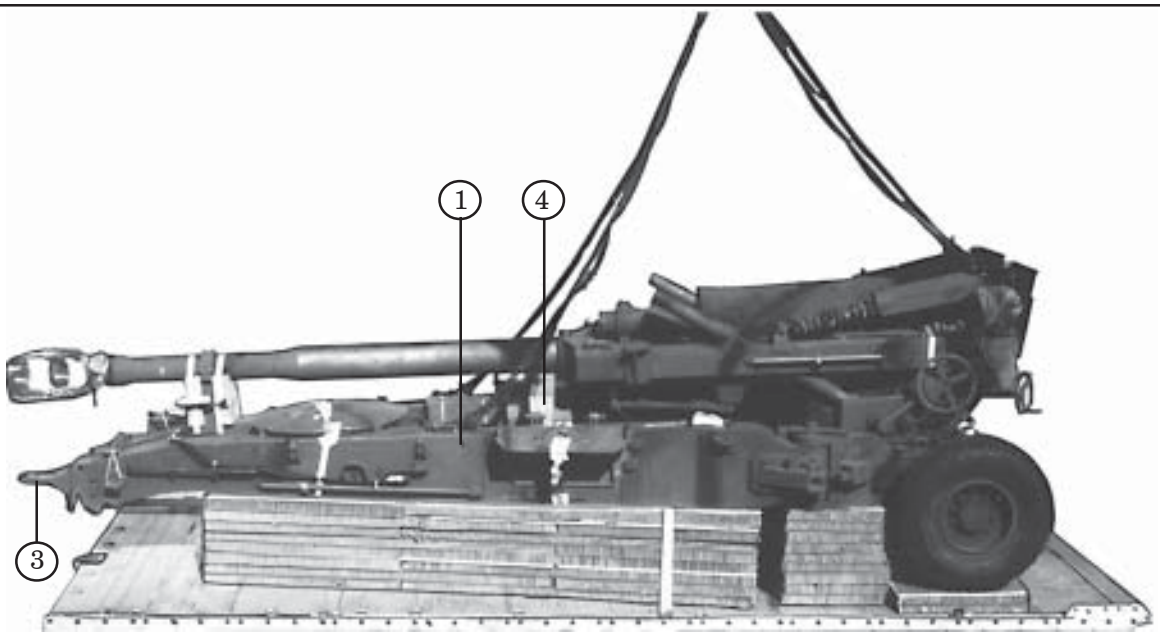
(3) Bolt a 12-foot sling to the lifting clevis on each trail with a screw-pin clevis.

(4) Tie the screw-pin clevis to the lifting clevis with a length of doubled 1/2-inch tubular nylon webbing.

Figure 1-15. Suspension Slings Installed

SETTING HOWITZER ON PLATFORM

1-7. Set the howitzer on the honeycomb stacks as shown in Figure 1-16.



(1) Center the right trail on stack number 4.

(2) Center the left trail on stack number 5. (Not Shown).

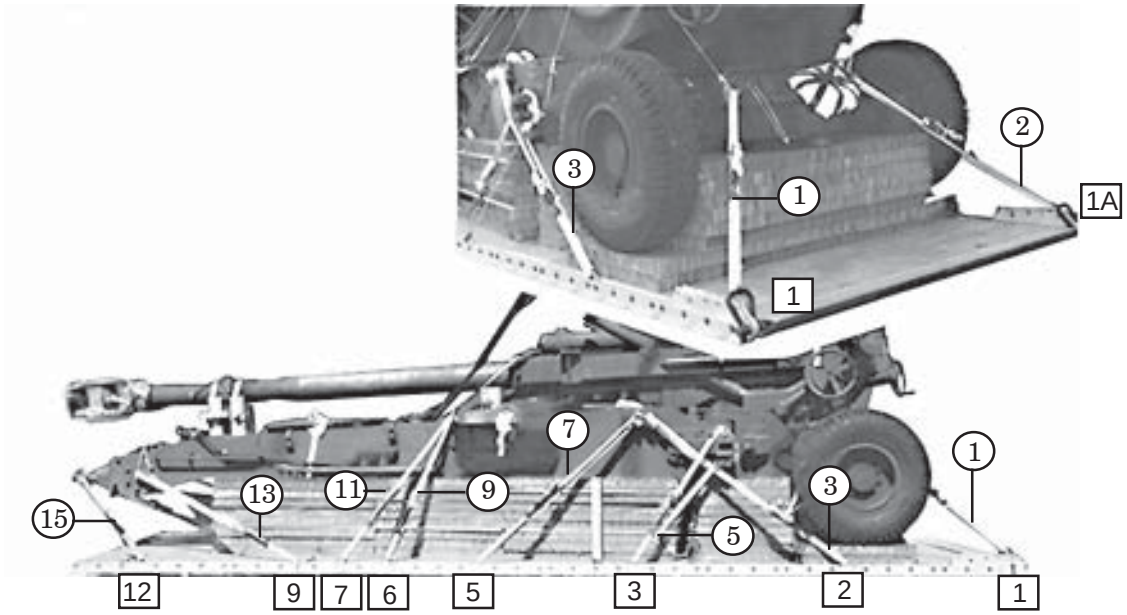
(3) The lunette will overhang the rear edge of the platform by 15 inches.

(4) Insure the rear tube support blocks (Figure 1-9) are resting solidly on stack number 3.

Figure 1-16. Howitzer Placed on Honeycomb

LASHING HOWITZER

1-8. Lash the howitzer to the platform with sixteen 15-foot tiedown assemblies as shown in Figure 1-17 and according to FM 4-20.102/ NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.

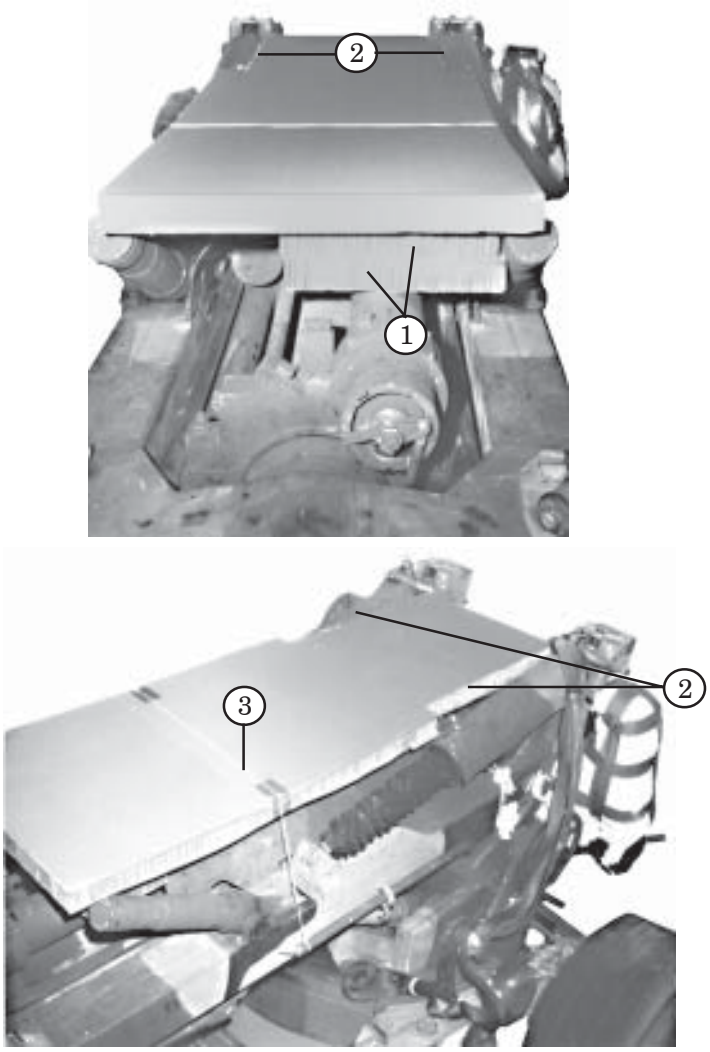


Lashing Number	Tiedown Clevis Number	Instructions
		Pass lashing:
1	1	Through right front tiedown provision on lower carriage.
2	1A	Through left front tiedown provision on lower carriage.
3	2	Through tiedown provision on right trail.
4	2A	Through tiedown provision on left trail.
5	3	Around trail lock on right trail.
6	3A	Around trail lock on left trail.
7	5	Through tiedown provision on right trail.
8	5A	Through tiedown provision on left trail.
9	6	Through clevis on right corner of cradle assembly.
10	6A	Through clevis on left corner of cradle assembly.
11	7	Through clevis on right corner of cradle assembly.
12	7A	Through clevis on left corner of cradle assembly.
13	9	Through tiedown provision on right trail.
14	9A	Through tiedown provision on left trail.
15	12	Through lunette.
16	12A	Through lunette.

Figure 1-17. Howitzer Lashed

COVERING LOAD AND SAFETY TIEING SLINGS

1-9. Cover the load and safety tie the suspension slings as shown in Figure 1-18.

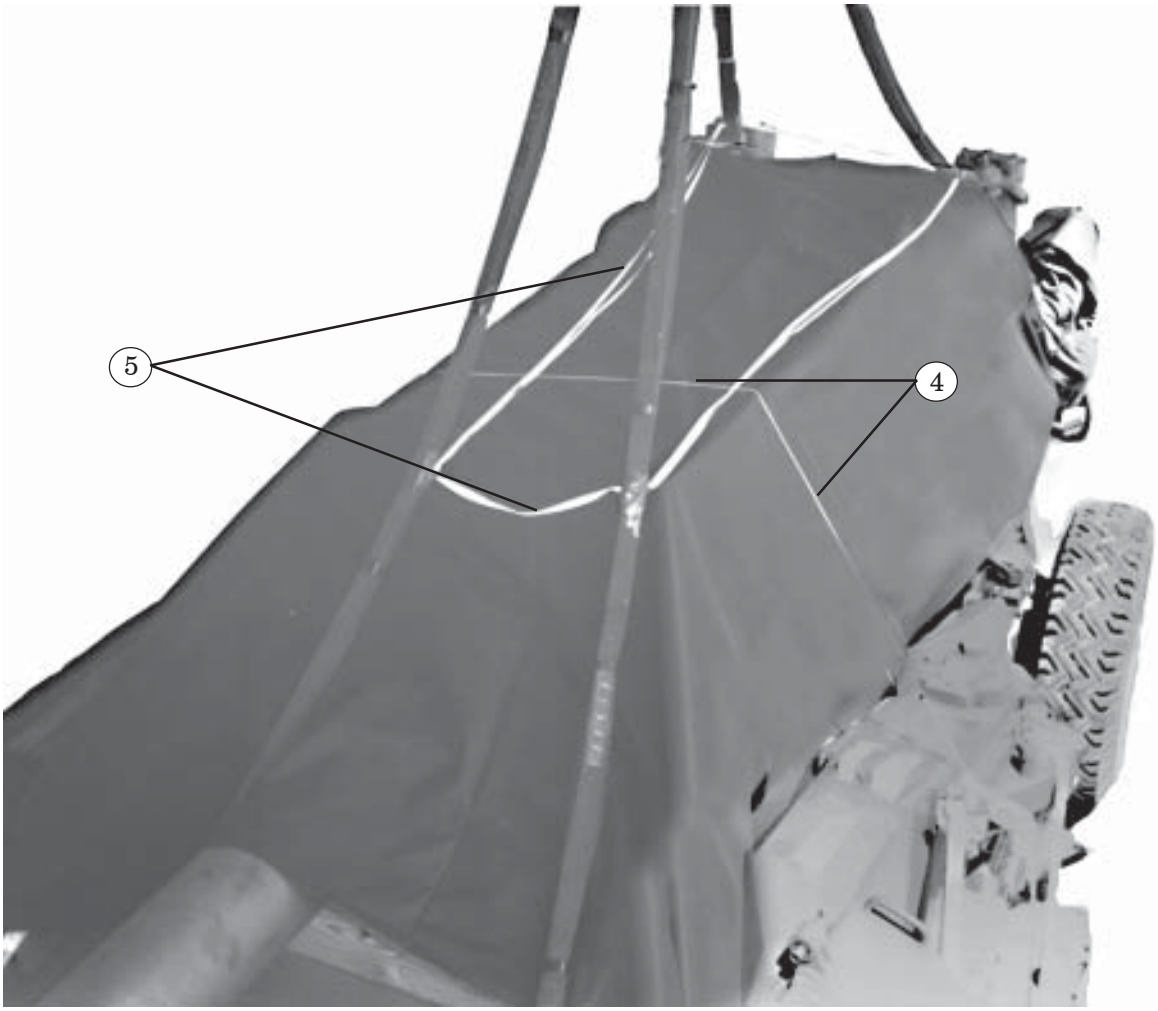


(1) Center two 12- by 18-inch pieces of honeycomb over the front recoil tube.

(2) Make two 3- by 36-inch cutouts in a 36- by 96-inch piece of honeycomb, and set the honeycomb on the cradle assembly.

(3) Tie the 36- by 96-inch piece of honeycomb in place with type III nylon cord. Tape the edges where the cord contacts the honeycomb.

Figure 1-18. Load Covered and Supension Slings Safety Tied



(4) Tie a 12- by 12-foot piece of coated cloth over the load with lengths of type III nylon cord.

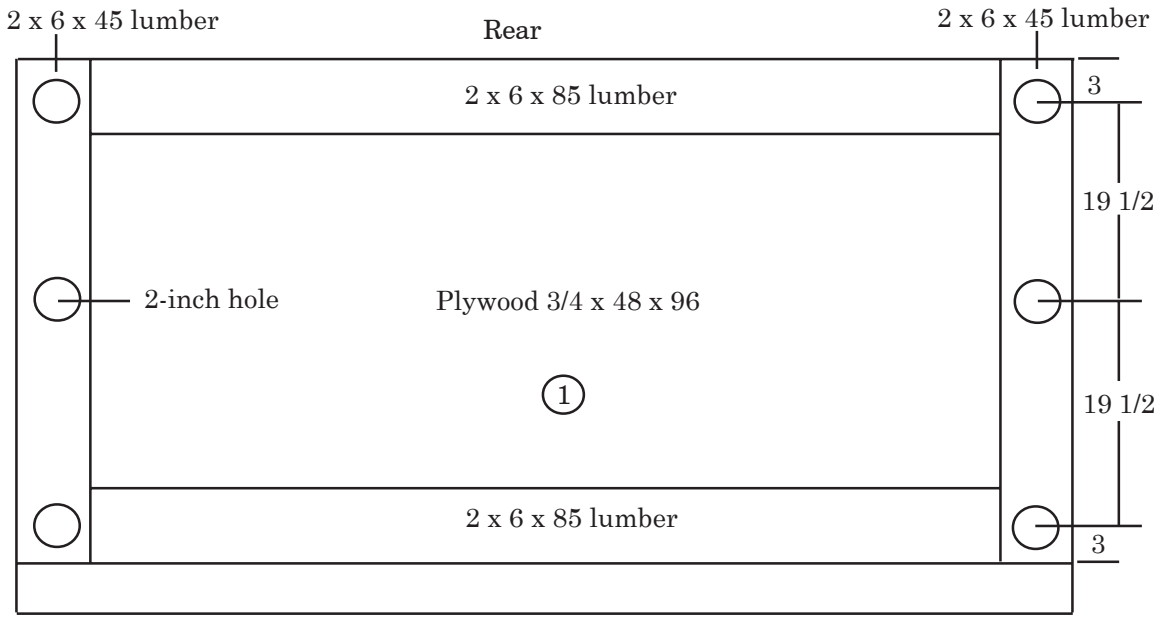
(5) Safety tie the suspension slings according to FM 4-20.102/NAVSEA SS400-AB-MMO-010/ TO 13C7-1-5.

Figure 1-18. Load Covered and Supension Slings Safety Tied (Continued)

STOWING CARGO PARACHUTES

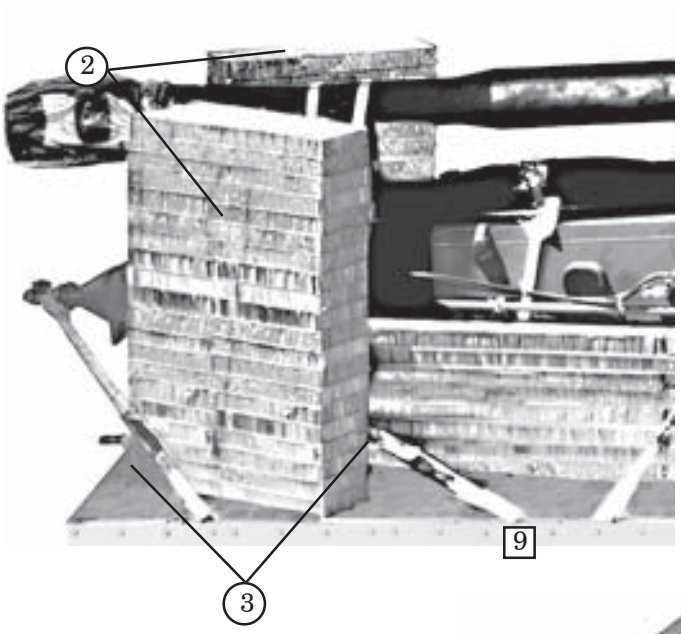
1-10. Install the parachute stowage platform as shown in Figure 1-19. Prepare and stow the appropriate number of G-11 cargo parachutes depending on the weight and as outlined in FM 4-20.102/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figure 1-20.

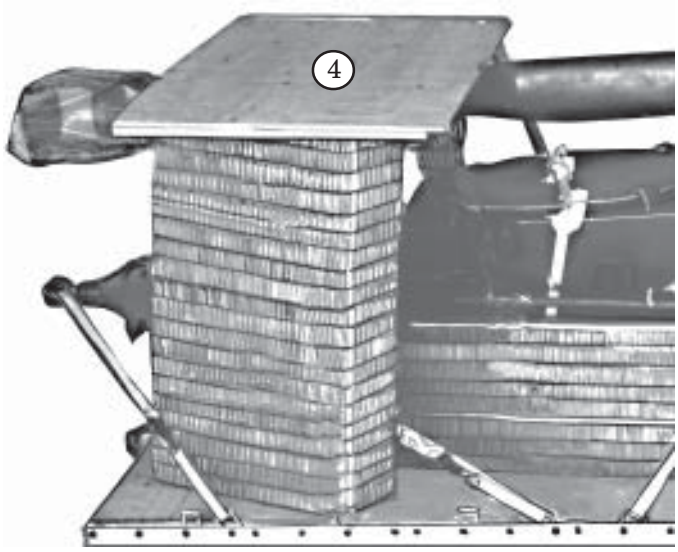
Notes: 1. Not drawn to scale.
2. All dimensions are given in inches.



(1) Construct the parachute stowage platform as shown above. Nail the lumber to the plywood using 8d nails. Drill three 2-inch holes on each side of the platform through the plywood and end pieces of the 2- by 6-inch lumber as shown.

Figure 1-19. Parachute Stowage Platform Installed



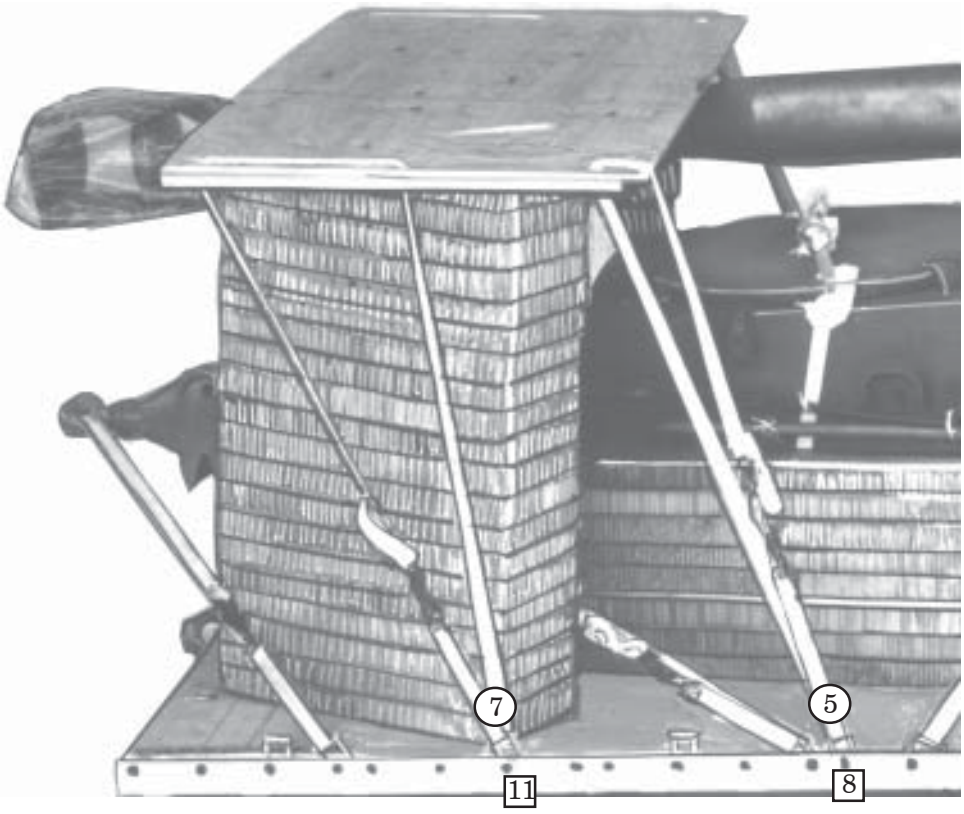


(2) Cut 40 pieces of 12-by 38-inch honeycomb. Glue pieces together forming two 20 layer stacks.

(3) Place a stack between the last two lashings on each side of the platform so the outside rear corner is 5 inches from the rear edge of the platform and the inside front corner of the stack touches the lashing from clevis 9 or 9A.

(4) Set the parachute stowage platform on the stacks with the 2-inch by 6-inch lumber facing down. The rear edge of the parachute stowage platform must be flush with the outside rear corners of the stacks.

Figure 1-19. Parachute Stowage Platform Installed (Continued)



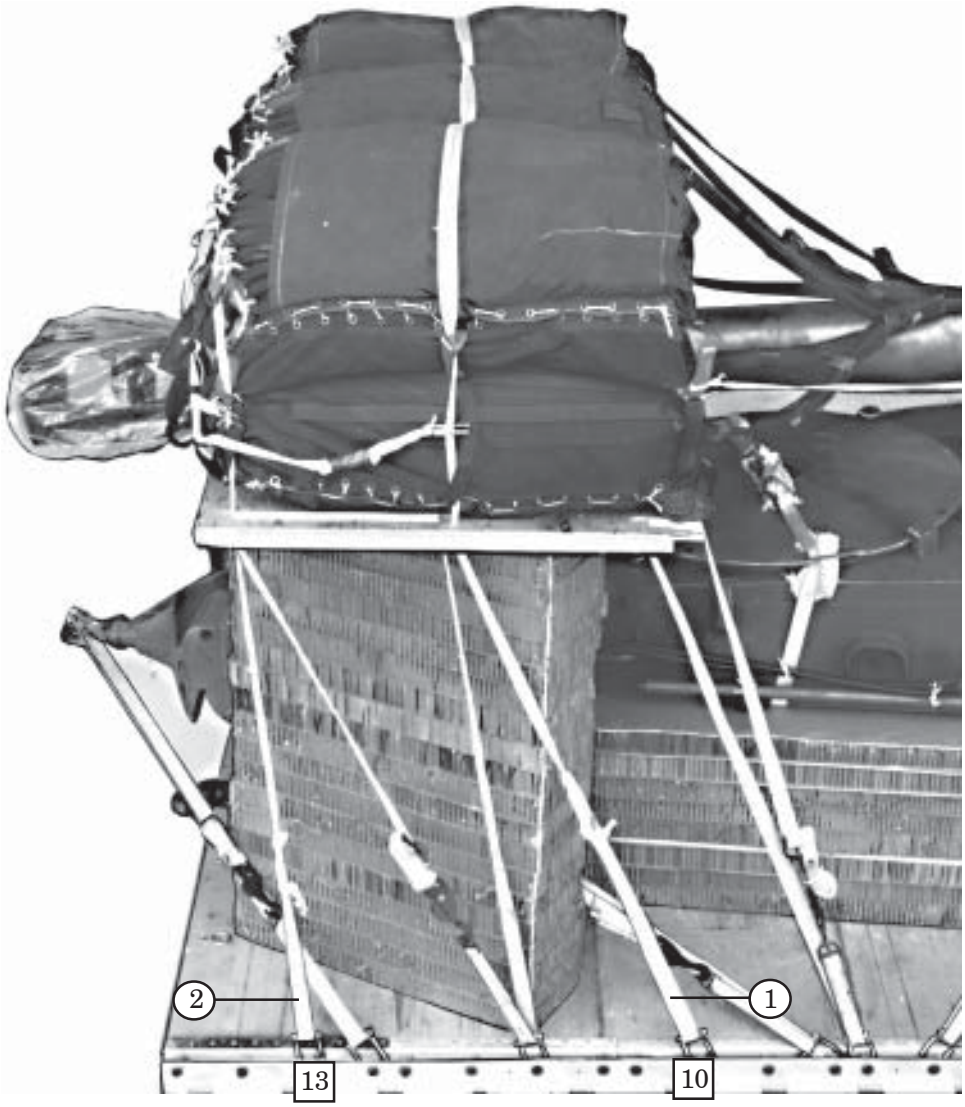
(5) Pass a 15-foot lashing through clevis 8, up through the right front hole, and down through the center hole of the parachute stowage platform. Secure the ends of the lashing with a D-ring and a load binder.

(6) Repeat step 5 using clevies 8A (Not Shown) for the left side.

(7) Pass a 15-foot lashing through clevis 11, up through the right center hole of the parachute stowage platform. Secure the ends of the lashing with a D-ring and load binder.

(8) Repeat step 5 using clevies 11A (Not Shown) for the left side.

Figure 1-19. Parachute Stowage Platform Installed (Continued)



(1) Tie the ends of the first restraint strap to load tiedown clevises 10 and 10A.

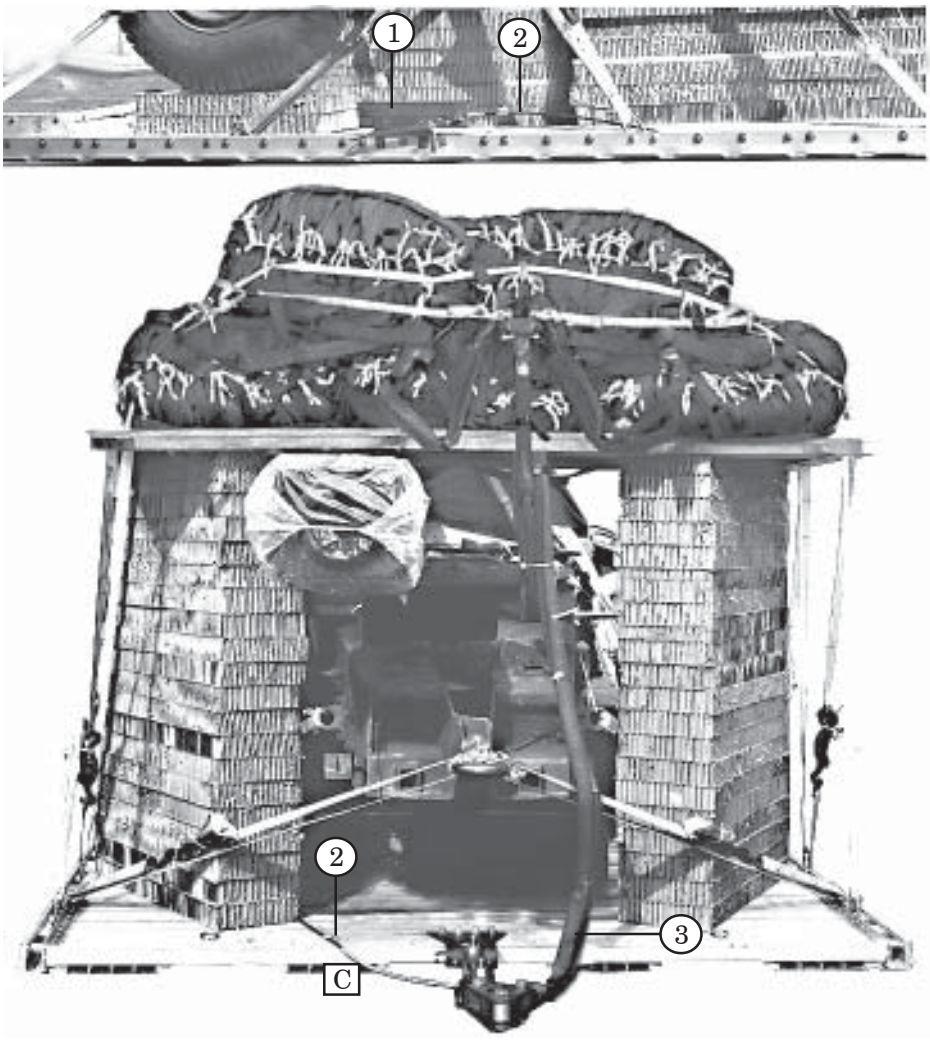
(2) Tie the ends of the second restraint strap to load tiedown clevises 13 and 13A.

(3) Install two multicut parachute release straps according to FM 4-20.102/NAVSEA SS400-AB-MMO-010/TO 1C37-1-5.

Figure 1-20. Cargo Parachutes Stowed

INSTALLING EXTRACTION SYSTEM

1-11. Use the Extraction Force Transfer Coupling (EFTC) system on the type V platform. Install the EFTC according to FM 4-20.102/ NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figure 1-21.



(1) Bolt the actuator bracket to the rear set of actuator holes in the left side rail.

(2) Using a 20-foot cable, run it rearward inside the lashings. Tie the cable to deck ring C and in convenient places with type I, 1/4-inch cotton webbing.

(3) Use a 9-foot (2-loop), type XXVI sling as the deployment line. Fold and tie the slack with type I, 1/4-inch cotton webbing.

Figure 1-21. EFTC Installed

INSTALLING RELEASE SYSTEM

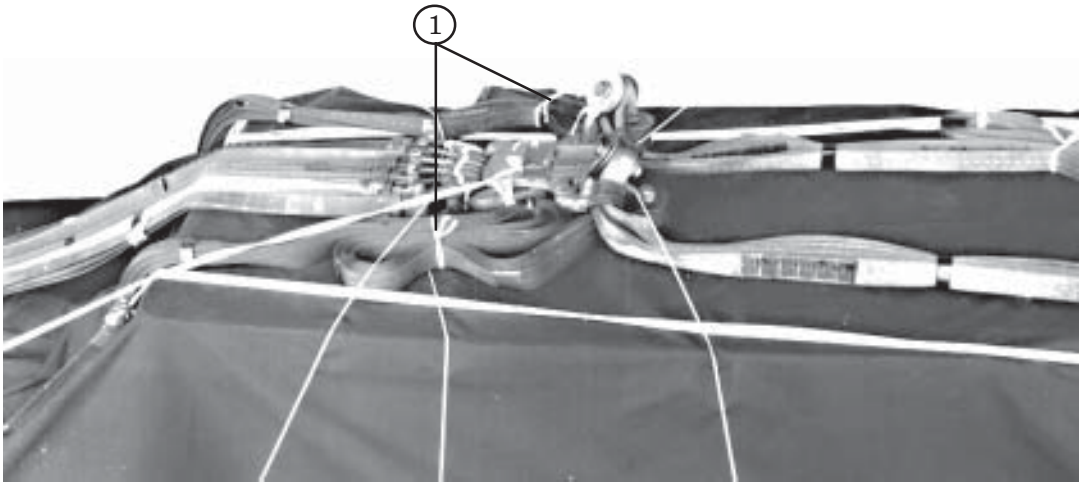
1-12. Prepare and install an M-2 cargo parachute release according to FM 4-20.102/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figure 1-22.

PLACING EXTRACTION PARACHUTE

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

INSTALLING PROVISIONS FOR EMERGENCY RESTRAINTS

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



(1) Fold and tie the excess suspension slings with type I, 1/4-inch cotton webbing.

(2) Tie the riser extension to the gun tube with type I, 1/4-inch cotton webbing (Not Shown). Do not use tape on the gun tube.

Note: If needed, one stow of the riser extension may be removed from the riser extension compartment of each cargo parachute to reach the parachute release.

Figure 1-22. Cargo Parachute Release Installed

MARKING RIGGED LOAD

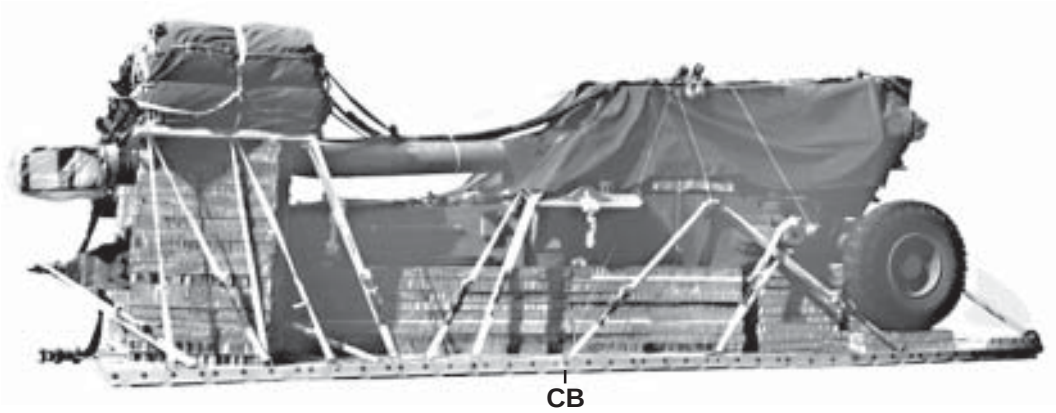
1-15. Mark the rigged load according to FM 4-20.102/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figure 1-23. Complete Shipper's Declaration for Dangerous Goods. If the load varies from the one shown, the weight, height, Center of Balance(CB), and parachute requirments must be recomputed.

EQUIPMENT REQUIRED

1-16. Use the equipment list in Table 1-1 to rig the load shown in Figure 1-23.

CAUTION

Make the final rigger inspection required by AR 59-4/ AFJ 13-210(I) and FM 4-20.102/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 before the load leaves the rigging site.



RIGGED LOAD DATA, M198

Weight: Load shown	21,030 pounds
Maximum load allowed	22,500 pounds
Height	96 inches
Width	108 inches
Length (overall)	311 inches
Overhang: Front	0 inches
Rear (EFTC)	18 inches
CB (from front edge of platform)	126 inches

Figure 1-23. M198, 155-mm Howitzer Rigged on a 24-foot, Type V Platform for Low-Velocity Airdrop

Table 1-1. Equipment Required for Rigging a M198, 155-mm Howitzer for Low-Velocity Airdrop

National Stock Number	Item	Quantity
8040-00-273-8713	Adhesive paste, 1-gal	As required
1670-01-035-6054	Bridle, extraction line bag (for DES)	1
4030-00-090-5354	Clevis, large	3
4030-00-432-2516	Clevis, suspension, with screw pin and sleeve, shackle	4
8305-00-880-8155	Cloth, coated (nylon, type II, 17 oz, green, 60 in)	As required
4020-00-240-2146	Cord, nylon, type III, 550-lb	As required
1670-00-434-5787	Coupling, airdrop, EFTC with cable, 20-ft	1
1670-00-360-0328	Cover, clevis, large	5
8135-00-664-6958	Cushioning material, packaging, cellulose wadding	As required
1670-01-183-2678	Leaf, extraction line, (line bag) (add 1 for DES)	2
1670-00-003-4391	Knife, parachute bag (for DES)	1
	Line, drogue (for DES)	
1670-01-064-4452	60-ft 1-loop, type XXVI	1
	Line, extraction, type XXVI nylon webbing	
1670-01-062-6313	60-ft (3-loop, C-130)	1
1670-01-107-7651	140-ft (3-loop, C-17, C-5)	1
	Link	
1670-01-493-6418	Assembly small, two-point, 3 3/4-in	2
1670-01-483-8259	C-17 TRM link	1
	Lumber:	
5510-00-220-6148	2- by 6- by 12-in	2
	2- by 6- by 45-in	2
	2- by 6- by 85-in	2
5510-00-220-6248	2- by 10- by 12-in	6
5510-00-220-6248	2- by 10- by 57-in	4
	Nail, steel wire, common,	
5315-00-164-5121	20d	As required
5315-00-010-4659	8d	As required

Table 1-1. Equipment Required for Rigging a M198, 155-mm Howitzer for Low-Velocity Airdrop (Continued)

National Stock Number	Item	Quantity
1670-00-753-3928	Pad, energy dissipating, honeycomb, 3- by 36- by 96-in	34 sheets
	Parachute:	
1670-01-016-7481	Cargo: G-11B/C	4/5
1670-00-040-8135	Cargo extraction 28-foot	1
1670-01-063-3715	Cargo extraction,15-foot (Drogue for DES)	1
	Platform, airdrop type V, 24-ft	
1670-01-353-8425	Bracket assembly, coupling	1
1670-01-353-8424	Bracket, assembly, extraction	1
1670-01-162-2372	Clevis assembly, type V, tiedown clevis	26
1670-01-162-2381	Tandem link assembly (Multipurpose link)	2
5530-00-128-4981	Plywood, 3/4-in by 48- by 96 inch sheet	4
1670-01-097-8817	Release, cargo parachute, M-2	1
	Sling, cargo airdrop	
	For suspension:	
1670-01-062-6305	9-ft (4-loop), type XXVI nylon webbing	4
1670-01-062-6307	12-ft (4-loop), type XXVI nylon webbing	8
	For deployment:	
1670-01-062-6304	9-ft (2-loop), type XXVI nylon webbing	1
	For riser extentsion:	
1670-01-062-6311	120-ft (2-loop), type XXVI nylon webbing	5
5340-00-040-8219	Strap, parachute release, multicut	2
7510-00-266-5016	Tape, adhesive, 2-in	As required
7510-00-266-6710	Tape, masking, 2-in	As required
1670-00-937-0271	Tie-down assembly, 15-ft	28
5365-00-937-0147	D-ring, heavy duty, 10,000-lb	29
1670-00-937-0272	Binder, load, 10,000	27
	Webbing:	
8305-00-268-2411	Cotton, 1/4-in, type I	As required
	Nylon:	
8305-00-082-5752	Tubular, 1/2-in	As required
8305-00-263-3591	Type VIII	As required

Chapter 2

Rigging M198, 155-MM Howitzer with Accompanying Ammunition Load on a Type V Platform

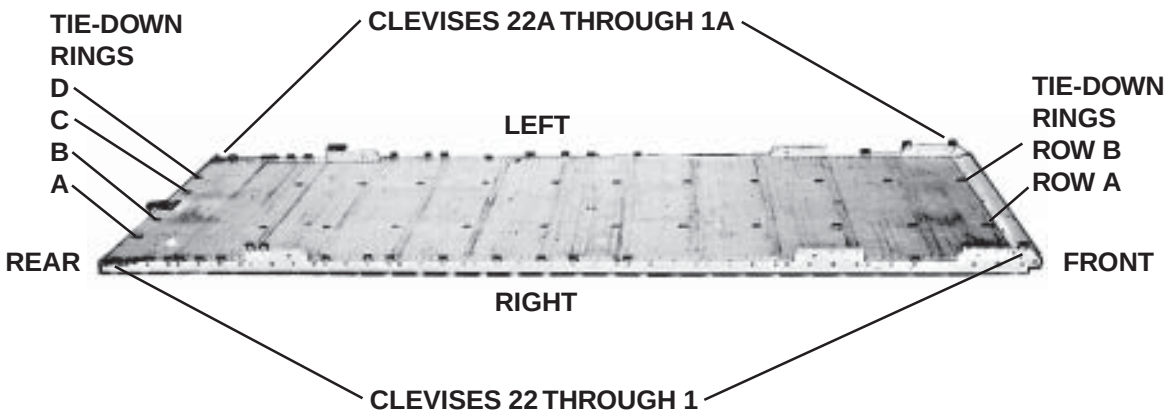
DESCRIPTION OF LOAD

2-1. The M198, 155-mm howitzer is rigged on a 24-foot, type V airdrop platform for low-velocity airdrop from C-130, C-17, and C-5 aircraft. The howitzer is dropped with an accompanying load of ammunition, water cans, and gun equipment weighing 1,509 pounds. The load requires five G-11C cargo parachutes.

PREPARING PLATFORM

2-2. Prepare a 24-foot, type V airdrop platform according to TM 10-1670-268-20&P/TO 13C7-52-22. Install four suspension brackets, two tandem links, and 48 clevis assemblies as shown in Figure 2-1.

Notes: 1. The nose bumper may or may not be installed.
2. Measurements given in this chapter are from the front edge of the platform, NOT from the front edge of the nose bumper.



Step:

1. Inspect, or assemble and inspect, the platform according to TM 10-1670-268-20&P/TO 13C7-52-22.

2. Install a suspension bracket in holes 9, 10, and 11 on each platform side rail. Face the flat part of the link to the front of the rail.

3. Install a suspension bracket in holes 38, 39, and 40 on each platform side rail. Face the flat part of the link to the rear of the rail.

4. Install a tandem link on each platform side rail holes 1, 2, and 3.

5. Install a clevis on bushings 1 and 4 on each front tandem link.

6. Install a clevis on bushings 3 and 4 on each rear suspension bracket.

7. Starting at the front of each platform side rail, install clevises on each platform side rail using bushings bolted on holes 6, 20, 23, 25, 27, 30, 33, 34, 36, 42, 43, 44, 45, and 46, 47 (triple), 48 (triple).

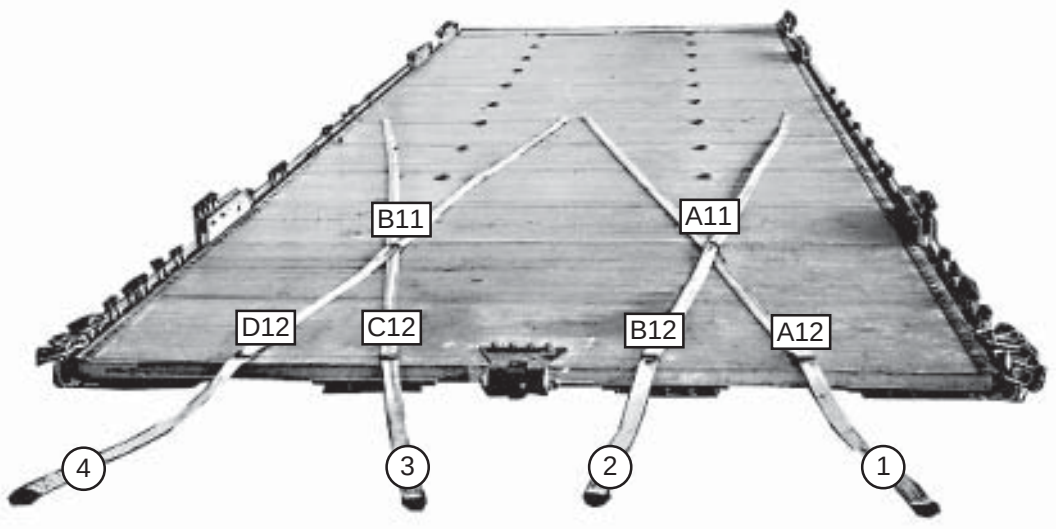
8. Starting at the front of each platform side rail, number the clevises bolted to the right side from 1 through 22 and those bolted to the left side from 1A through 22A.

9. Starting at the front of the platform, label the two tie-down rings in the first 11 panels A and B from right to left. Label the four tie-down rings in the last panel A, B, C, and D from right to left. Starting with the first panel, number the tie-down rings 1 through 12.

Figure 2-1. Platform Prepared

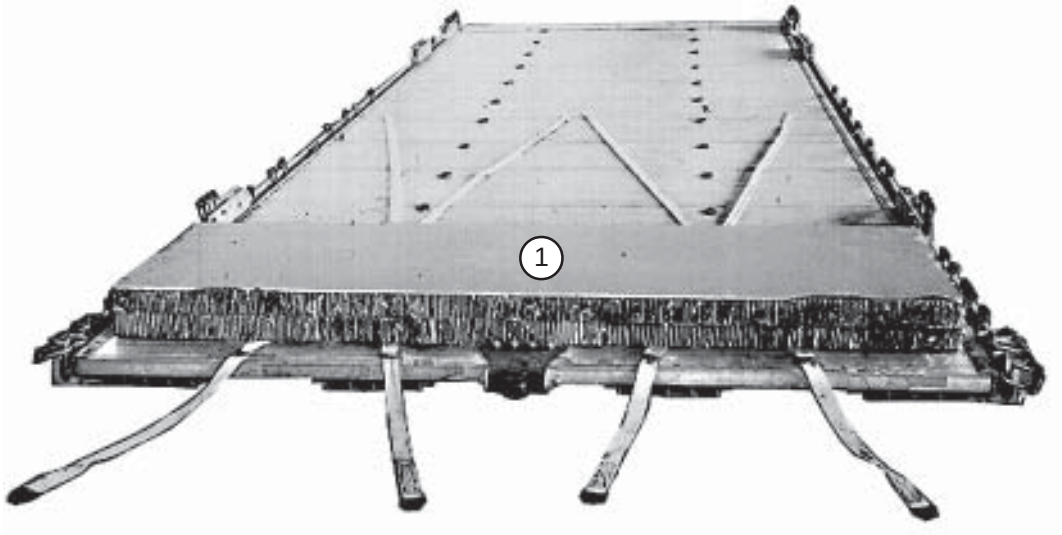
RIGGING ACCOMPANYING AMMUNITION LOAD

2-3. Rig the accompanying ammunition load (two groups of eight projectiles each) on the rear of the platform as shown in Figures 2-2 through 2-7.



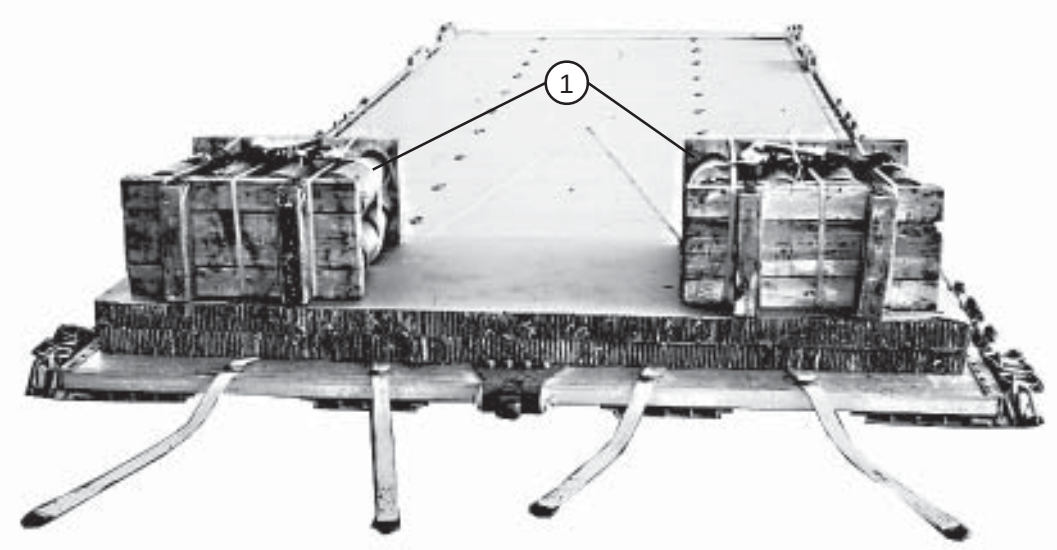
1. Pass a 15-foot lashing through tie-down rings A12 and A11.
2. Pass a 15-foot lashing through tie-down rings B12 and A11.
3. Pass a 15-foot lashing through tie-down rings C12 and B11.
4. Pass a 15-foot lashing through tie-down rings D12 and B11.

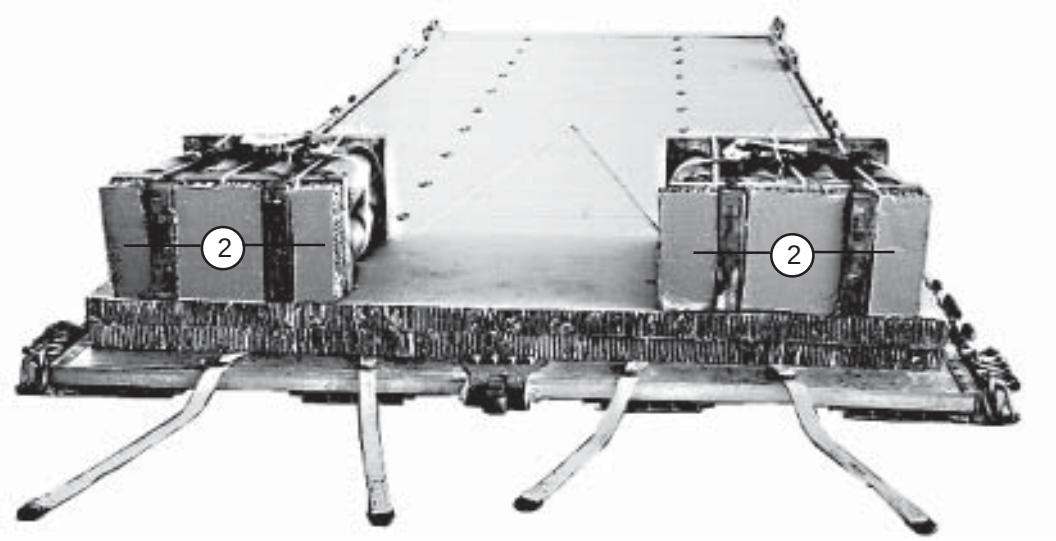
Figure 2-2. Lashings Positioned



(1) Center two 96- by 31-inch pieces of honeycomb on top of the lashings 6 inches from the rear edge of the platform.

Figure 2-3. Honeycomb Positioned



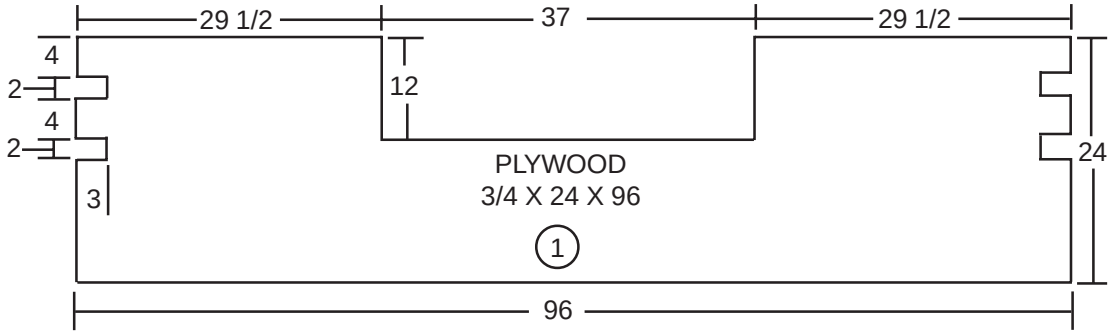


(1) Bind each group of projectiles together with a 15-foot lashing. Place one group of projectiles on each end of the honeycomb 3 inches from each side. Face the base ends of the projectiles to the rear of the platform.

(2) Cut four 5- by 13-inch pieces of honeycomb and two 10- by 13-inch pieces of honeycomb. Place the 10- by 13-inch pieces of honeycomb between the slots at the rear of the projectile groups. Place a 5- by 13-inch piece of honeycomb on each end of the rear of the projectile groups.

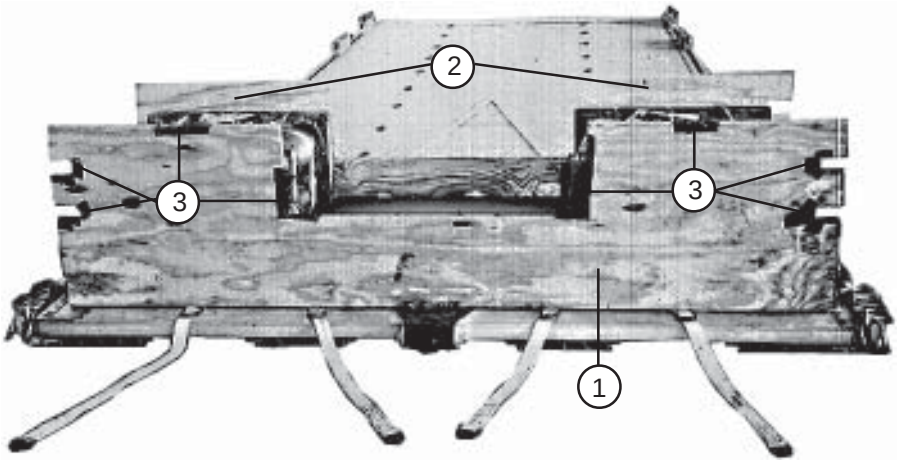
Figure 2-4. Projectiles Positioned

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



(1) Cut three endboards as shown above.

Figure 2-5. Endboards Prepared

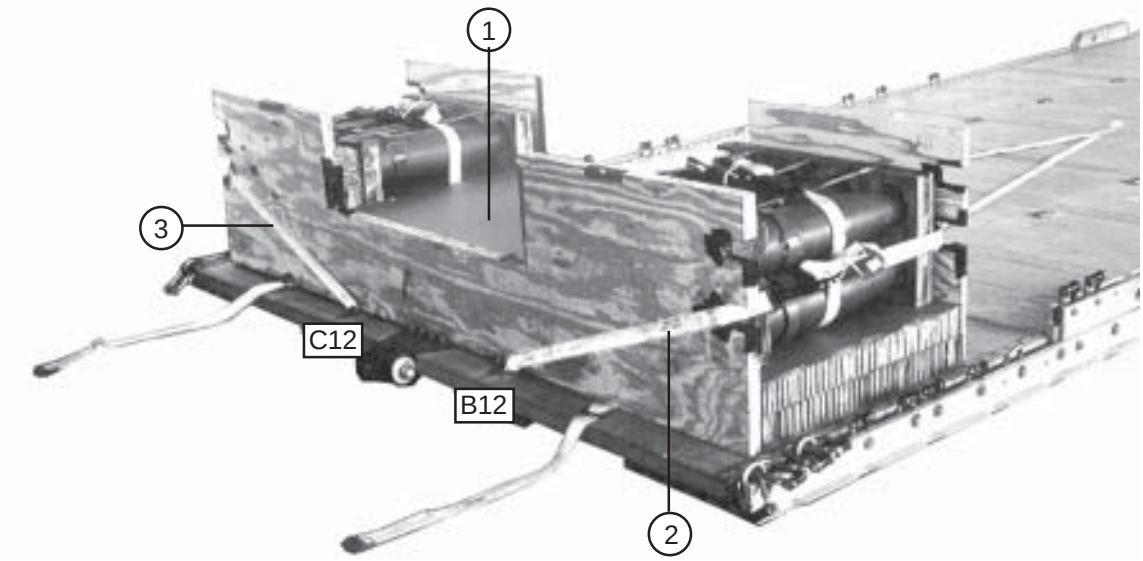


(1) Place two endboards against the rear of the load.

(2) Place one endboard against the front of the load.

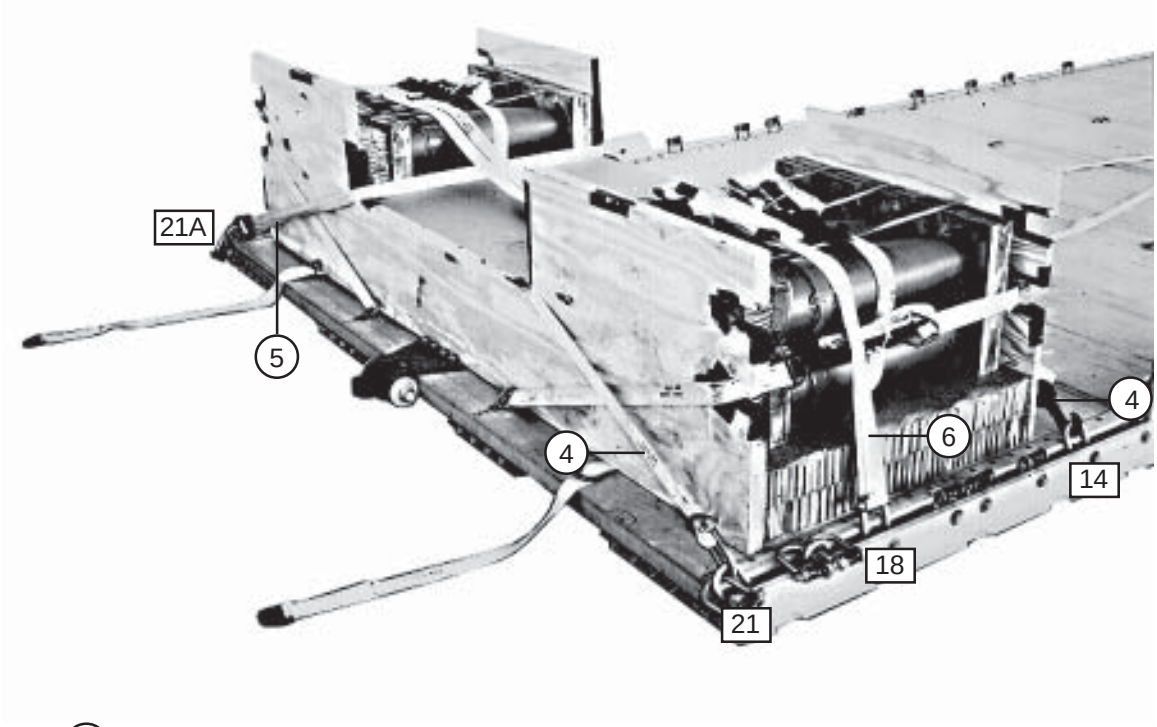
(3) Tape all cutouts and edges where the lashings will contact the endboards.

Figure 2-6. Endboards Positioned



1. Place two 36- by 31-inch pieces of honeycomb between the two projectile groups.
2. Pass the pre-positioned lashing in tie-down rings A11 and B12 through the lower cutouts in the right side of endboards. Secure the lashing with a D-ring and load binder on the right side of the projectiles.
3. Repeat step 2 for tie-down rings B11 and C12 for the left side of the endboards.

Figure 2-7. Projectiles Lashed to Platform



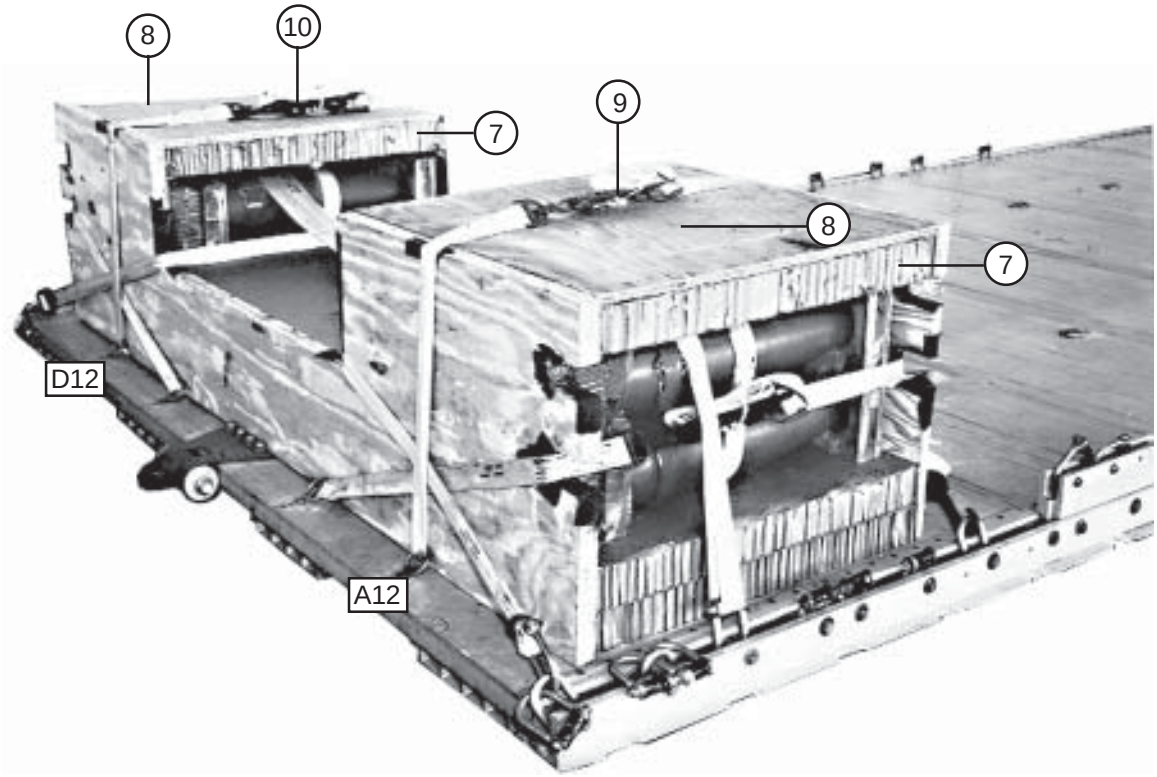
(4) Pass a 15-foot lashing through clevis 21 and through its own D-ring. Pass the lashing around the center cutouts of the endboards. Invert clevis 14, and secure the lashing with a D-ring and load binder to clevis 14.

(5) Repeat step 4 for clevises 21A and 14A.

(6) Form a 30-foot lashing according to FM 4-20.102/NAVSEA SS400-AB-MMO-010/ TO 13C7-1-5. Pass one end of the lashing through clevis 18 and the other end through clevis 18A. Secure the ends of the lashing on top of the projectiles with two D-rings and a load binder.

Note: Leave a little slack in the lashing. When the howitzer is positioned on the platform, the lashing will tighten itself.

Figure 2-7. Projectiles Lashed to Platform (Continued)



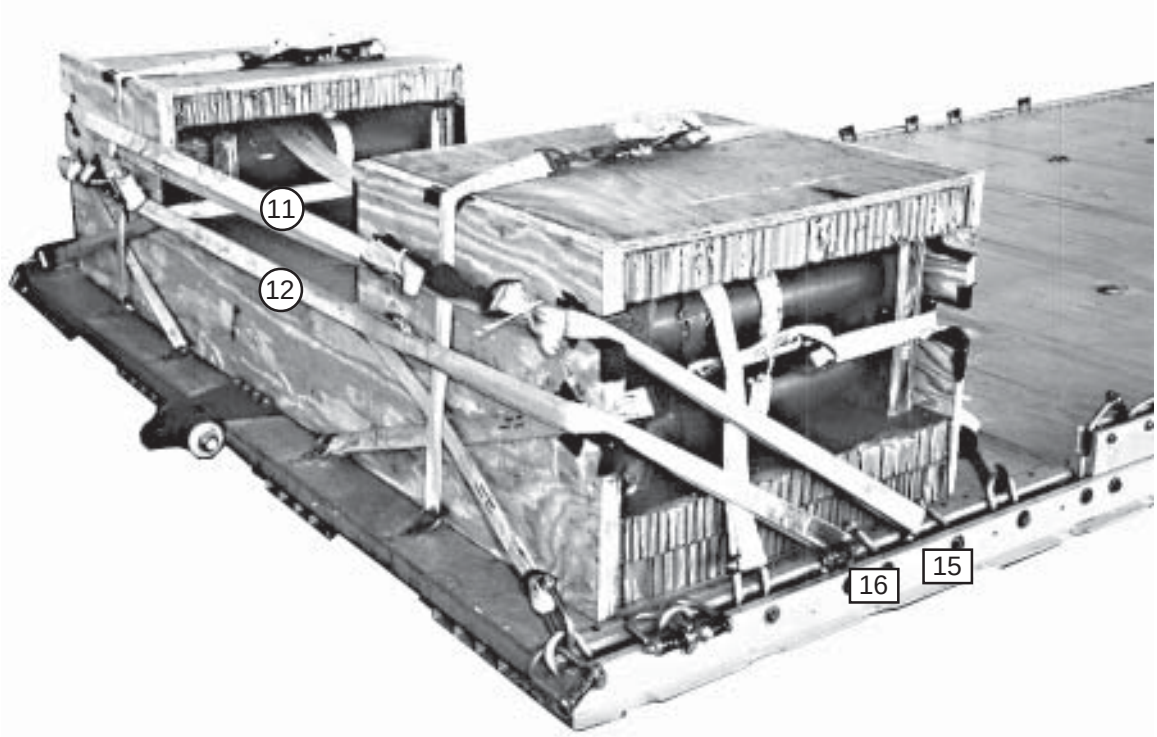
(7) Place a 29- by 31-inch piece of honeycomb flush on top of each projectile group.

(8) Place a 3/4- by 29- by 31-inch piece of plywood on top of each piece of honeycomb placed in step 7.

(9) Pass the pre-positioned lashing in tie-down rings A12 and A11 over the top of the projectile group. Secure the lashing on top with a D-ring and load binder.

(10) Repeat step 9 for tie-down rings D12 and B11 for the left projectile group.

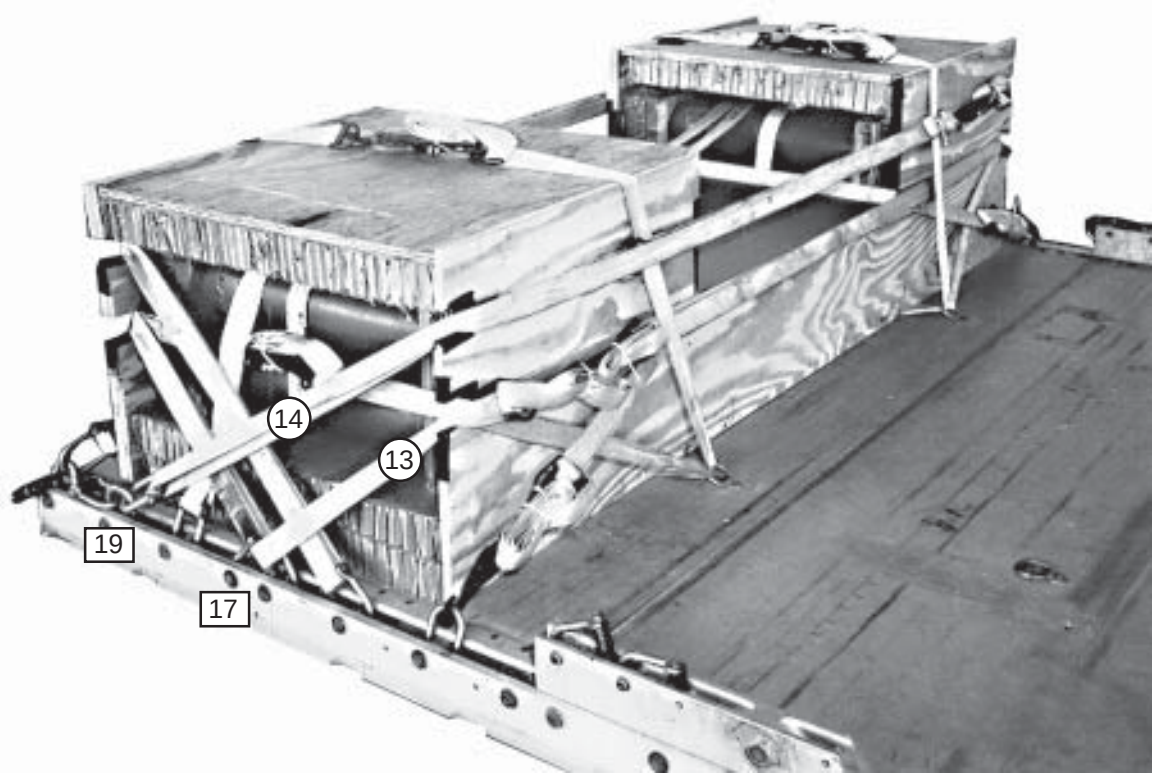
Figure 2-7. Projectiles Lashed to Platform (Continued)



(11) Form a 30-foot lashing according to FM 4-20.102/NAVSEA SS400-AB-MMO-010/ TO 13C7-1-5. Run the lashing through clevises 15 and 15A and through the upper cutouts in the rear endboards. Secure the lashing on the right side of the rear endboards with two D-rings and a load binder.

(12) Form a 30-foot lashing according to FM 4-20.102/NAVSEA SS400-AB-MMO-010/ TO 13C7-1-5. Run the lashing through clevises 16 and 16A and through the lower cutouts in the rear endboards. Secure the lashing on the left side of the rear endboards with two D-rings and a load binder.

Figure 2-7. Projectiles Lashed to Platform (Continued)



(13) Form a 30-foot lashing according to FM 4-20.102/NAVSEA SS400-AB-MMO-010/ TO 13C7-1-5. Run the lashing through clevises 17 and 17A and through the lower cutouts in the front endboard. Secure the lashing on the right side of the front endboard with two D-rings and a load binder.

(14) Form a 30-foot lashing according to FM 4-20.102/NAVSEA SS400-AB-MMO-010/ TO 13C7-1-5. Run the lashing through clevises 19 and 19A and through the upper cutouts in the front endboard. Secure the lashing on the left side of the front endboard with two D-rings and a load binder.

Figure 2-7. Projectiles Lashed to Platform (Continued)

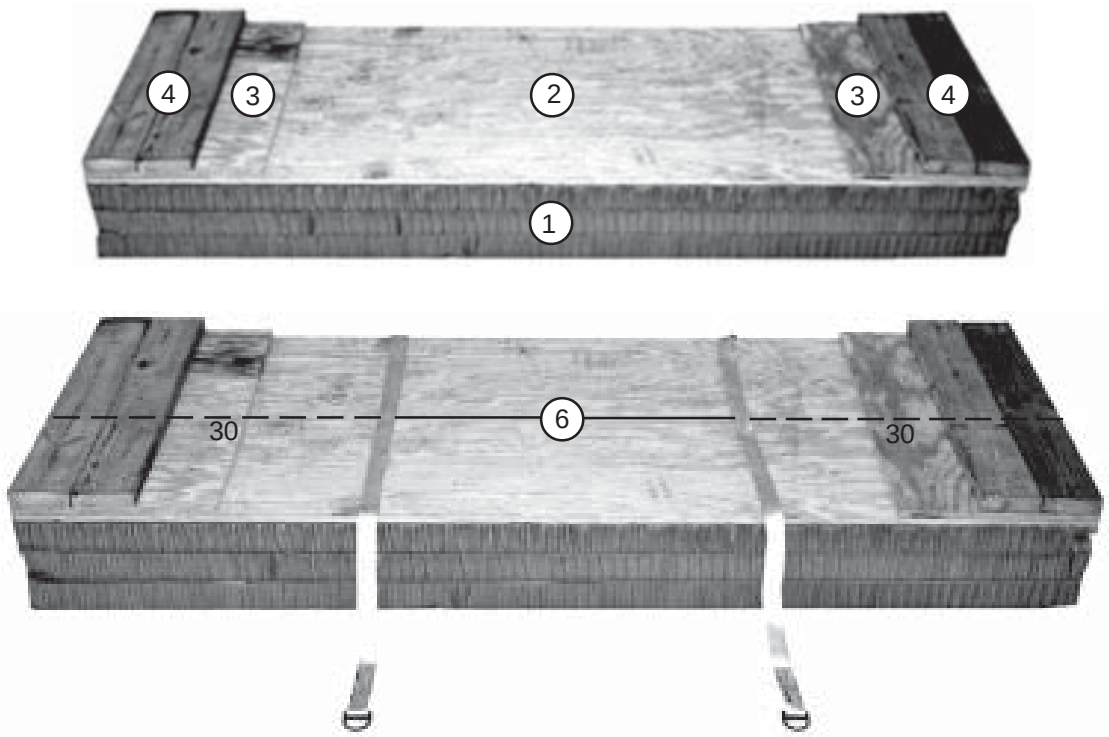
PREPARING AND POSITIONING HONEYCOMB STACKS

2-4. Prepare five honeycomb stacks as shown in Figures 2-8 through 2-11 using the materials listed in Table 2-1. Position the honeycomb stacks on the platform as shown in Figure 2-12.

Table 2-1. Materials Needed to Prepare Honeycomb Stacks

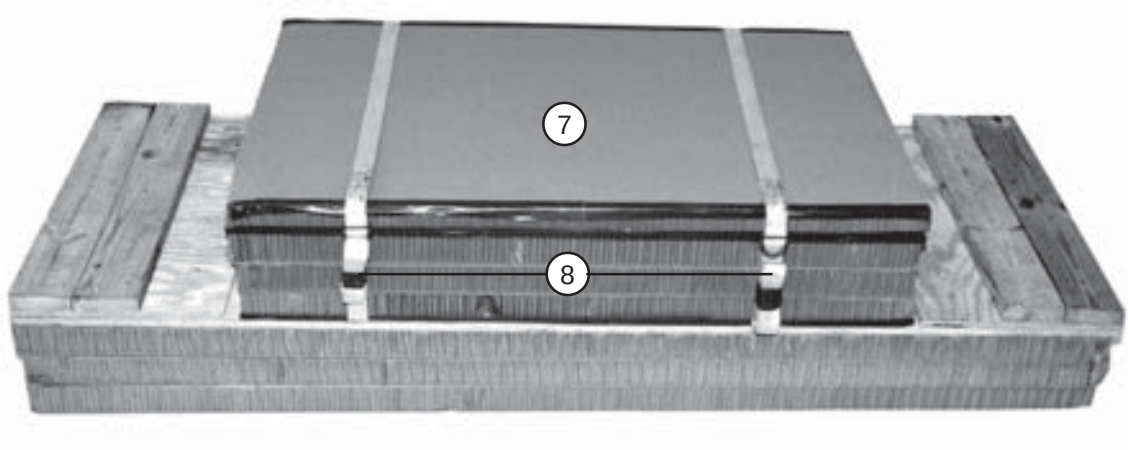
Stack Number	Pieces	Width (Inches)	Length (Inches)	Material	Instructions
1	3	96	36	Honeycomb	See Figure 2-8.
	1	96	36	3/4-inch Plywood	
	2	18	36	3/4-inch Plywood	
	4	6	36	2- by-6-inch Lumber	
	4	58	36	Honeycomb	
2	7	80	30	Honeycomb	See Figure 2-9.
3	12	30	18	Honeycomb	See Figure 2-10.
	1	30	18	3/4-inch Plywood	
	2	30	18	Honeycomb	
4	2*	18	96	Honeycomb	See Figure 2-11.
	2*	18	54	Honeycomb	
	1	18	96	3/4-inch Plywood	
	1	18	54	3/4-inch Plywood	
	3*	18	96	Honeycomb	
	3*	18	54	Honeycomb	
	1	18	88	3/4-inch Plywood	
	1	18	48	3/4-inch Plywood	
	1	18	96	Honeycomb	
	1	18	54	Honeycomb	
5	2*	18	96	Honeycomb	See Figure 2-11.
	2*	18	54	Honeycomb	
	1	18	96	3/4-inch Plywood	
	1	18	54	3/4-inch Plywood	
	3*	18	96	Honeycomb	
	3*	18	54	Honeycomb	
	1	18	88	3/4-inch Plywood	
	1	18	48	3/4-inch Plywood	
	1	18	96	Honeycomb	
	1	18	54	Honeycomb	

***Alternate the sizes of honeycomb in each layer.**



1. Glue and place three 96- by 36-inch pieces of honeycomb as the base.
2. Glue and place a 3/4- by 96- by 36-inch piece of plywood on top of the base.
3. Glue and place one 3/4- by 18- by 36-inch piece of plywood on top of the 3/4- by 96- by 36-inch piece of plywood, flush with each side edge.
4. Glue and place two 2- by 6- by 36-inch pieces of lumber side by side. Place them on top of each 3/4- by 18- by 36-inch piece of plywood, flush with each side edge.
5. Nail the pieces of plywood and lumber together using 10d nails (Not Shown).
6. Lay one 15-foot lashing on top of the base stack, 30-inches from each side.

Figure 2-8. Honeycomb Stack 1 Prepared

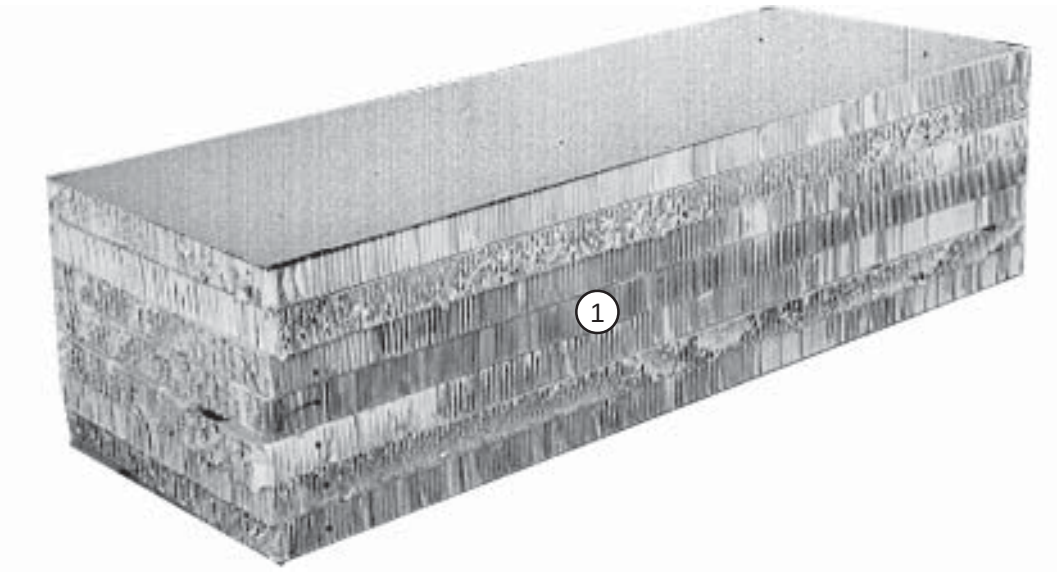


(7) Center four 58- by 36-inch pieces of honeycomb on top of the lashings. Tape the front and rear edges of the top and bottom layers of the 58- by 36-inch honeycomb.

NOTE: Do not glue the 58- by 36-inch pieces of honeycomb to the plywood.

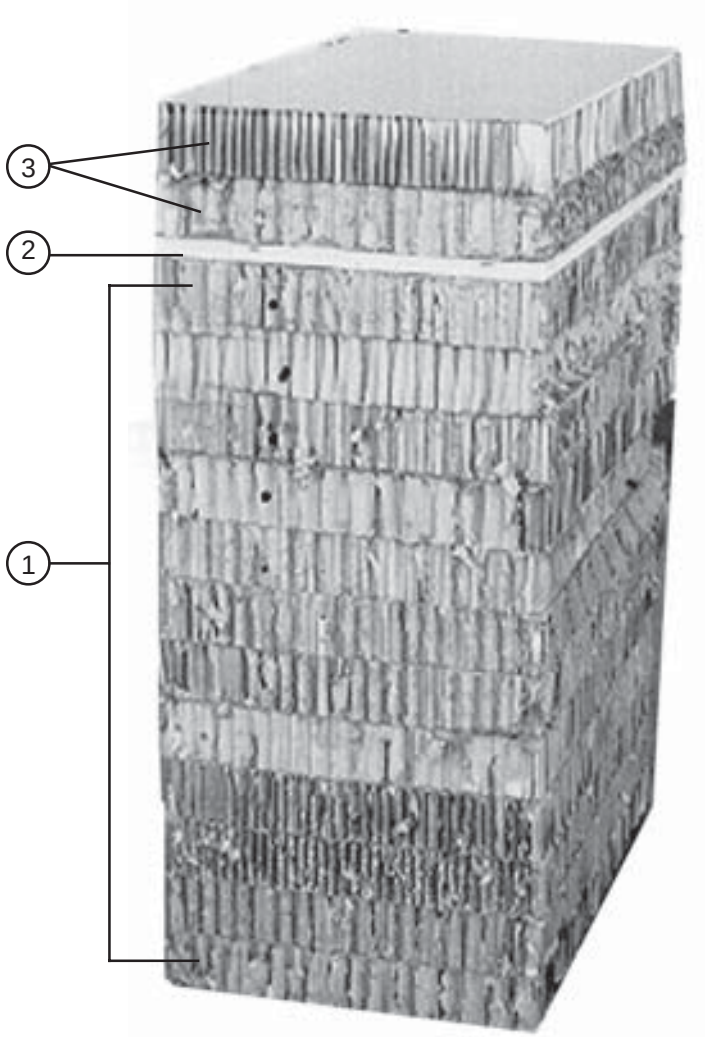
(8) Pass both lashings (step 6) over the stack. Pass the free ends through their own D-rings. Pull the lashing tight, and secure them on the front of the stack. Fold and tape the excess lashings.

Figure 2-8. Honeycomb Stack 1 Prepared (Continued)



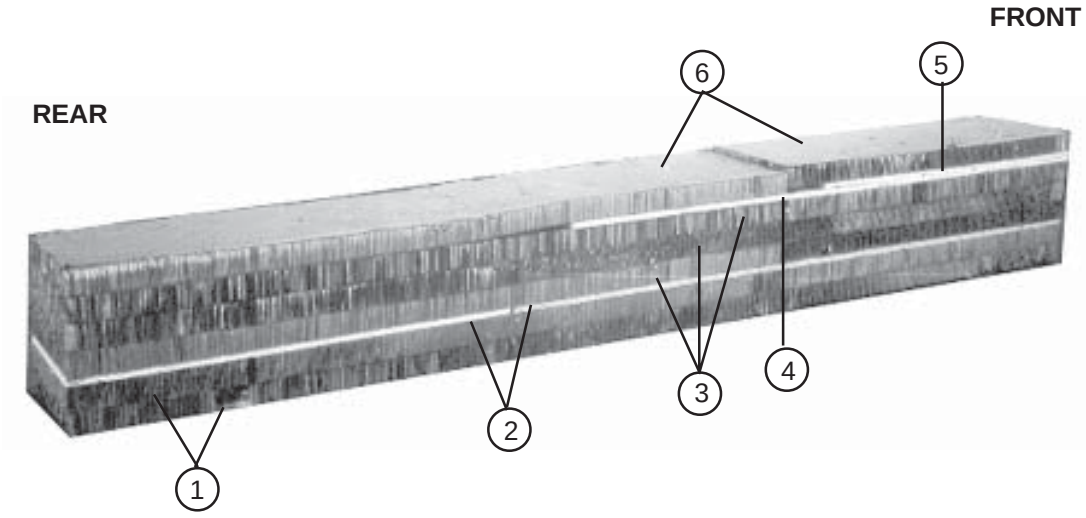
(1) Glue and place seven 80- by 30-inch pieces of honeycomb to form a stack.

Figure 2-9. Honeycomb Stack 2 Prepared



1. Place twelve 30- by 18-inch pieces of honeycomb as the base.
2. Place one 3/4- by 30- by 18-inch piece of plywood on top of the base.
3. Place two 30- by 18-inch pieces of honeycomb on top of the plywood.

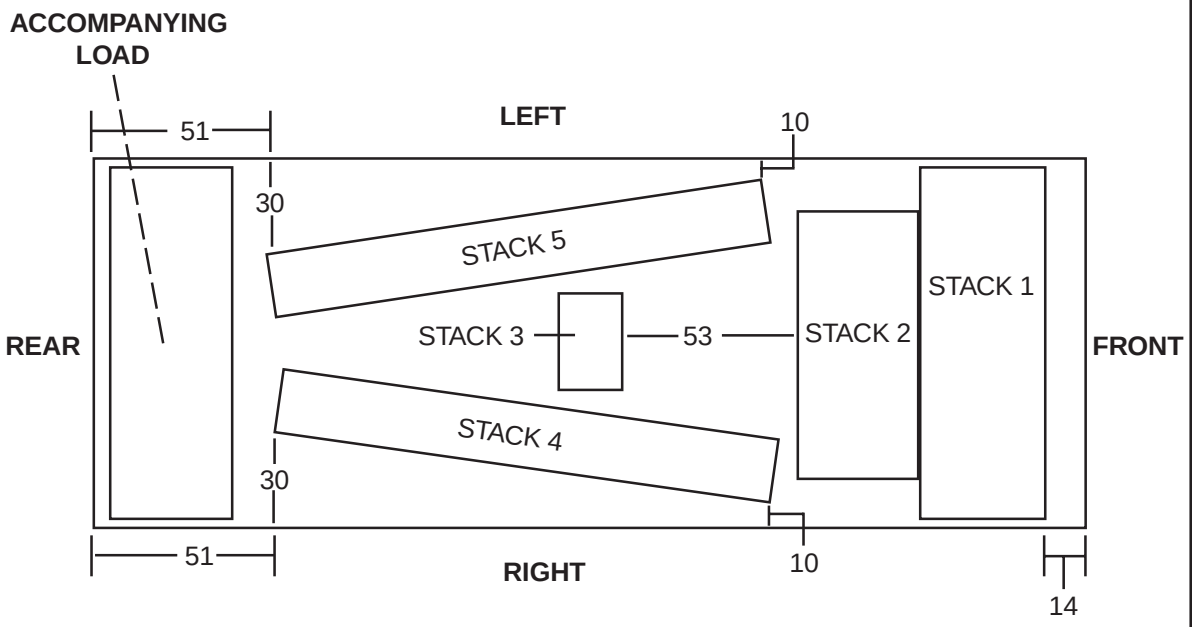
Figure 2-10. Honeycomb Stack 3 Prepared



1. Alternate two 18- by 96-inch pieces of honeycomb and two 18- by 54-inch pieces of honeycomb to form a two-layer 150 inch base.
2. Place one 3/4- by 18- by 96-inch piece of plywood and one 3/4- by 18- by 54-inch piece of plywood on top of the base to form a 150 inch layer.
3. Alternate three 18- by 96-inch pieces of honeycomb and three 18- by 54-inch pieces of honeycomb to form three 150 inch layers on top of the plywood.
4. Place one 3/4- by 18- by 88-inch piece of plywood on top of the honeycomb flush with the front edge of the stack.
5. Place one 3/4- by 18- by 48-inch piece of plywood on top of the 3/4- by 18- by 88-inch piece of plywood flush with the front edge of the stack.
6. Place one 18- by 96-inch piece of honeycomb and one 18- by 54-inch piece of honeycomb on top of the stack to form a 150 inch layer.
7. Repeat steps 1 through 6 for honeycomb stack 5.

Figure 2-11. Honeycomb Stacks 4 and 5 Prepared

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

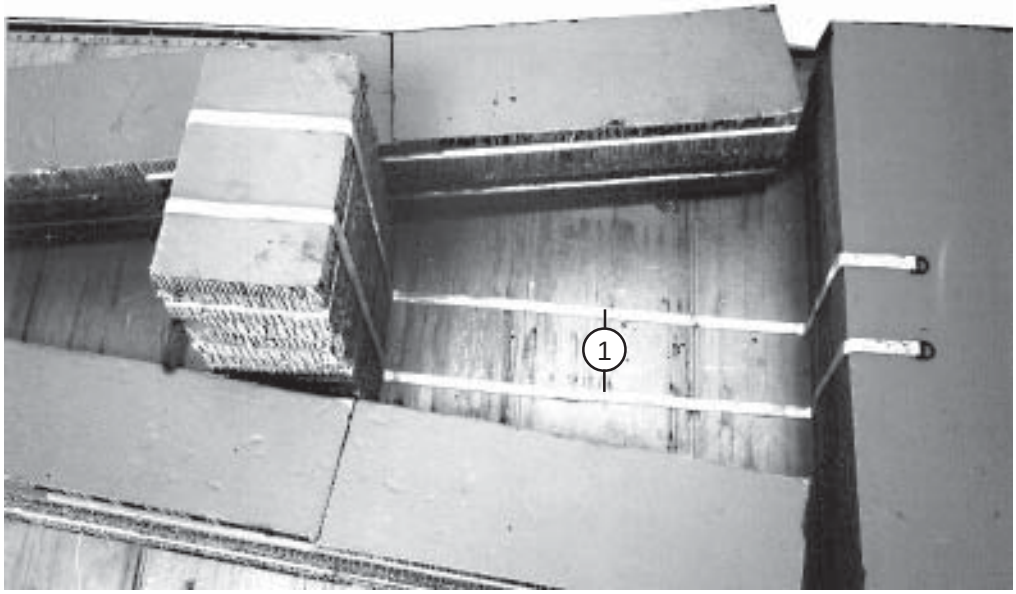


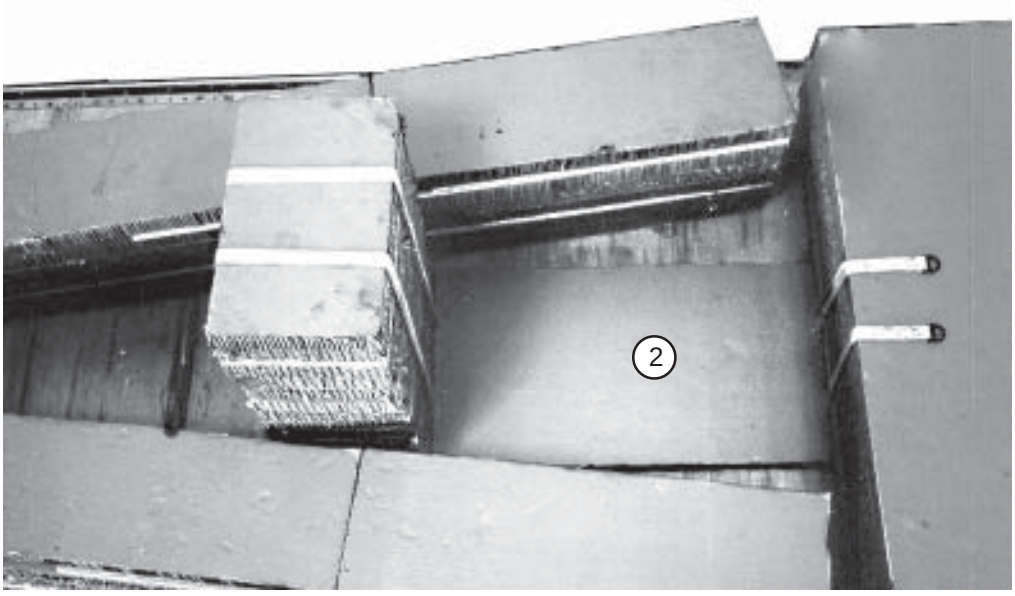
Stack Number	Position of Stack on Platform
	Place stack:
1	29 inches from the front edge of the platform and centered.
2	Flush against stack 1 and centered.
3	53 inches from stack 2 and centered. Make sure the highest part of the stack is on the left side of the platform.
4	36 inches from the rear edge of the platform. Place the front outside corner 10 inches from the front right rail. Place the rear outside corner 30 inches from the right rail.
5	36 inches from the rear edge of the platform. Place the front outside corner 10 inches from the left rail. Place the rear outside corner 30 inches from the left rail.

Figure 2-12. Honeycomb Stacks Positioned on Platform

STOWING ACCOMPANYING EQUIPMENT

2-5. Stow the accompanying equipment as shown in Figures 2-13 and 2-14.

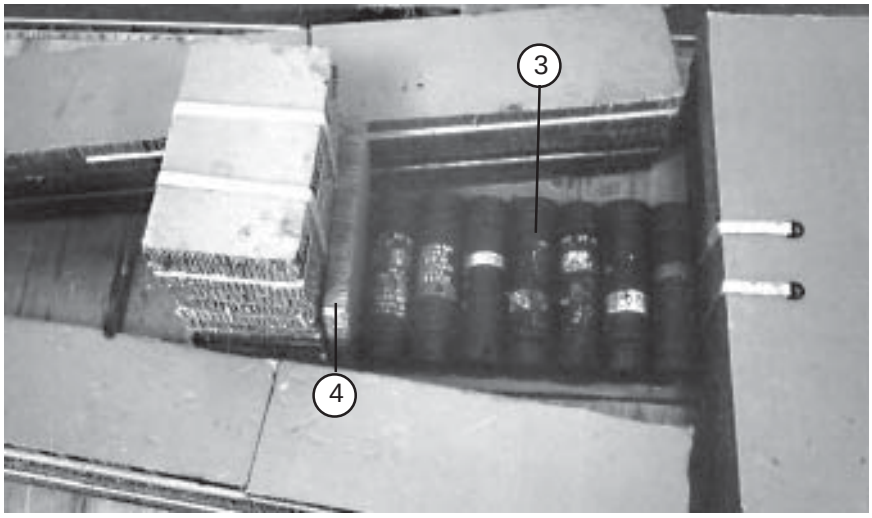




(1) Center two 15-foot lashings 18 inches apart between honeycomb stacks 2 and 3.

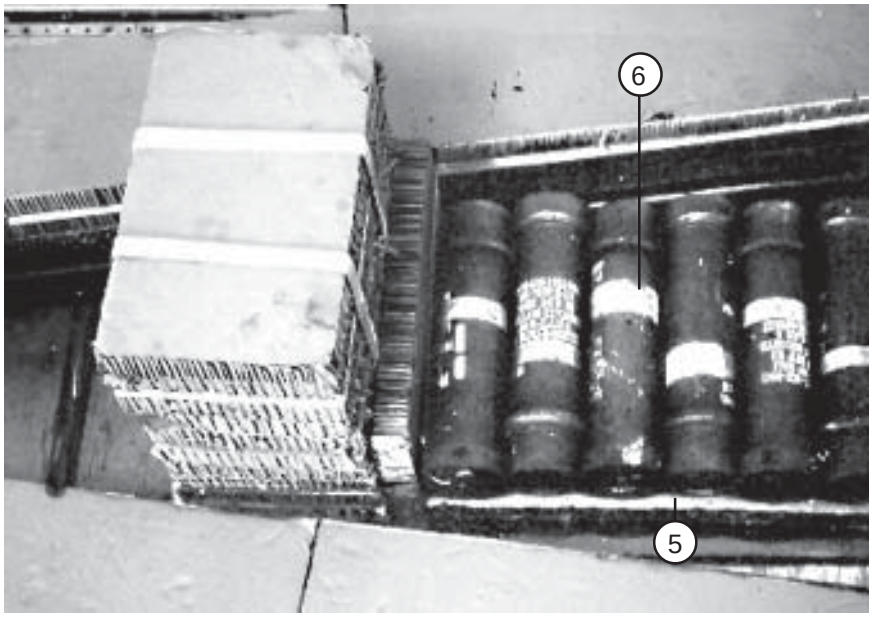
(2) Place one 30- by 53-inch piece of honeycomb on top of the lashings.

Figure 2-13. Accompanying Equipment Stowed



(3) Place seven powder canisters on top of the honeycomb.

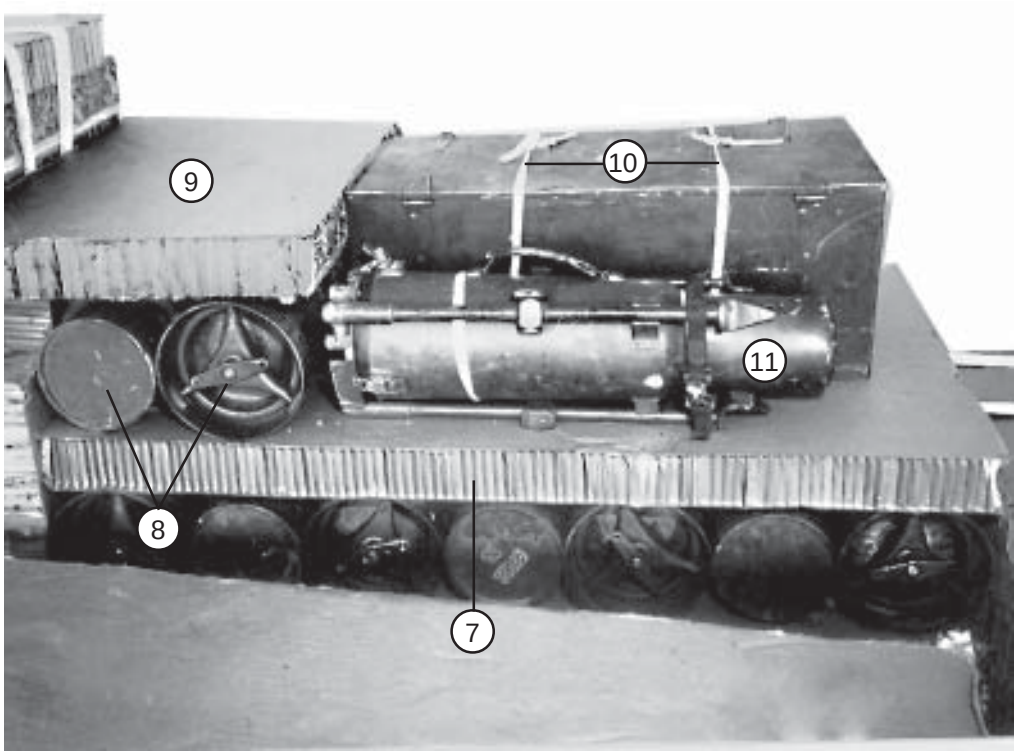
(4) Wedge a 3- by 30-inch piece of honeycomb on its edge between the rear of the powder canisters and the front edge of honeycomb stack 3.



(5) Place a 30- by 50-inch piece of honeycomb on top of the seven powder canisters.

(6) Place seven powder canisters on top of the honeycomb.

Figure 2-13. Accompanying Equipment Stowed (Continued)



(7) Place a 30- by 50-inch piece of honeycomb on top of the seven powder canisters.

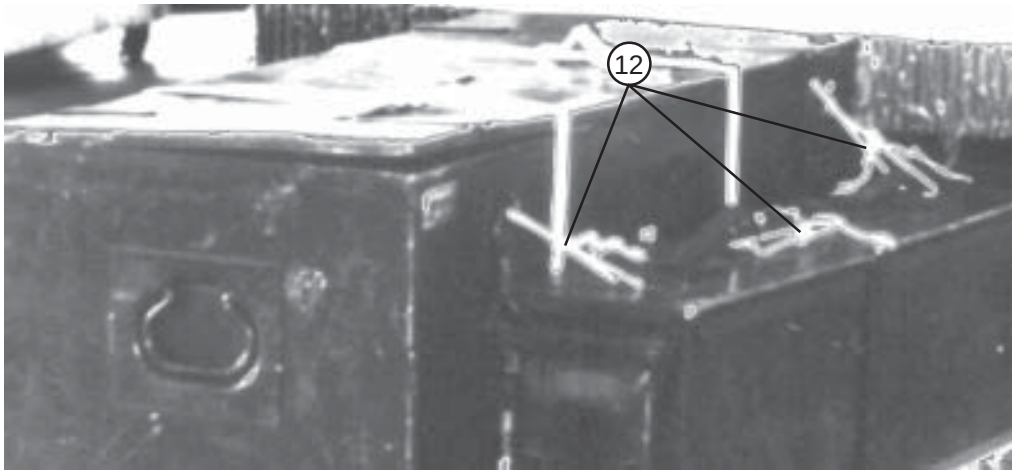
(8) Place two powder canisters side by side against the honeycomb placed in step 4.

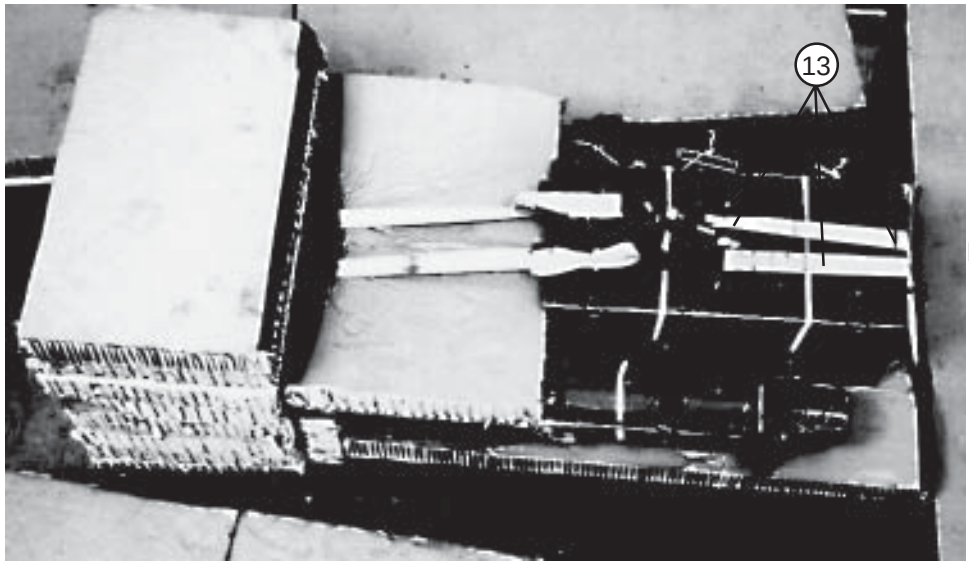
(9) Place a 20-by 30-inch piece of honeycomb on top of the two powder canisters.

(10) Tie the section chest closed with two lengths of 1/2-inch tubular nylon webbing. Center the section chest against the honeycomb placed in step 5.

(11) Tie the collimator to the ties on the right side of the section chest with 1/2-inch tubular nylon webbing.

Figure 2-13. Accompanying Equipment Stowed (Continued)

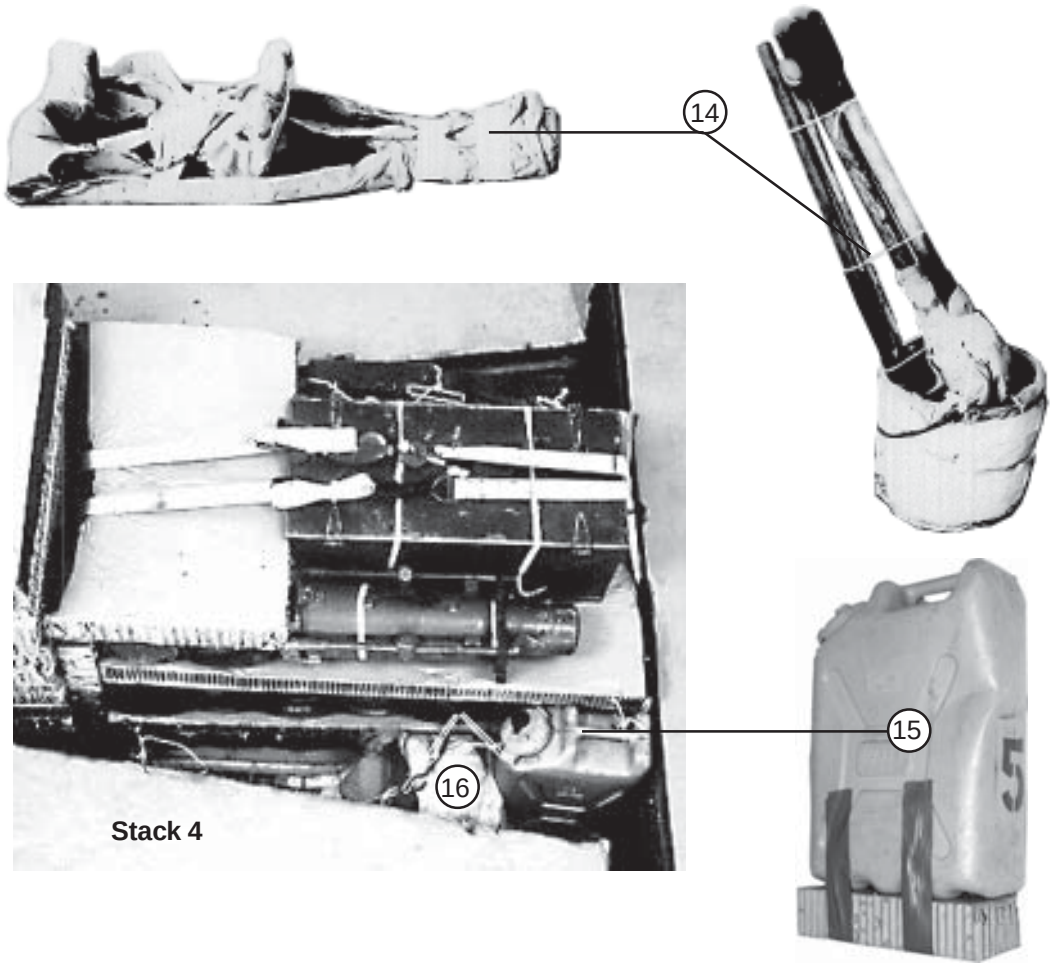




(12) Place two fuse boxes to the left of the section chest. Tie the handles of the fuse boxes together with type III nylon cord. Tie the fuse boxes to the section chest latches with type III nylon cord.

(13) Pass the 15-foot lashings positioned in step 1 through the handles on the front of the section chest. Secure the lashings on top of the section chest with D-rings and load binders.

Figure 2-13. Accompanying Equipment Stowed (Continued)



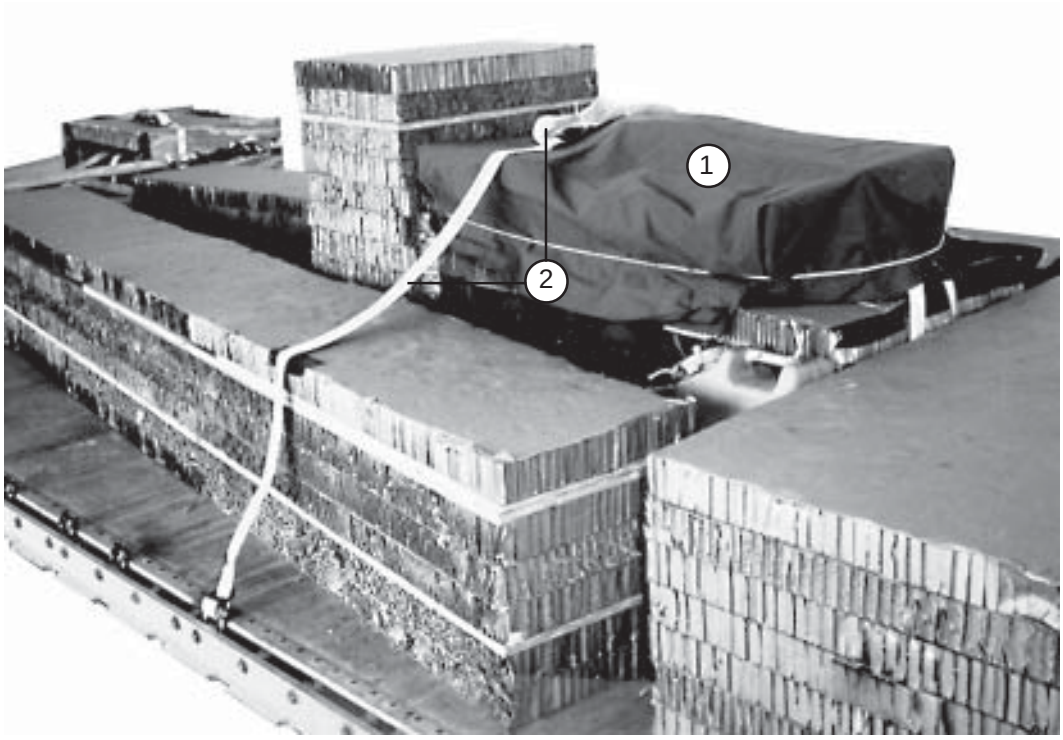
(14) Tape cellulose wadding around the shovels, ax, sledgehammer, pail, and loader. Place the shovels, ax, and sledgehammer inside the pail. Secure them together with type III nylon cord.

(15) Tape a piece of honeycomb (Not Shown) to the bottom of two water cans. Place one filled water can on each side of the powder canisters flush against honeycomb stack 2. Secure the water cans to the powder canisters with type III nylon cord.

(16) Place the shovels, ax, sledgehammer, and pail between the powder canisters and honeycomb stack 4. Secure them to the powder canisters with type III nylon cord.

(17) Place the loader between the powder canisters and honeycomb stack 5. Secure the loader to the powder canisters with type III nylon cord (Not Shown).

Figure 2-13. Accompanying Equipment Stowed (Continued)



(1) Place a 60- by 60-inch canvas cover over the equipment. Secure it with type III nylon cord.

(2) Pass a 15-foot lashing through clevis 4 and through its own D-ring. Pass another 15-foot lashing through clevis 14A and through its own D-ring. Secure the lashings on top of of the load with two D-rings and a load binder.

Note: Leave a little slack in the lashings. When the howitzer is positioned on the platform, the lashings will tighten themselves.

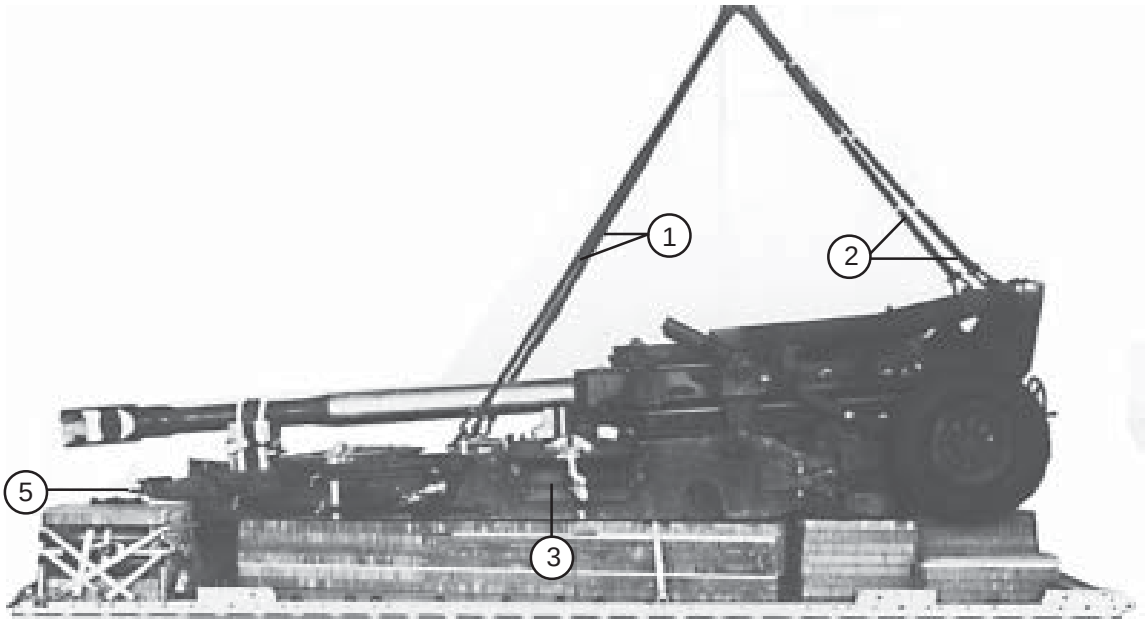
Figure 2-14. Accompanying Equipment Lashed to Platform

PREPARING HOWITZER

2-6. Prepare the howitzer as shown in Paragraph 1-5, Figures 1-6 through 1-14.

INSTALLING LIFTING SLINGS AND POSITIONING HOWITZER

2-7. Install lifting slings and position the howitzer on the platform as shown in Figure 2-15.



(1) Bolt a 12-foot (4-loop), type XXVI nylon webbing sling to the lifting clevis on each trail with a large suspension clevis.

(2) Bolt a 9-foot (4-loop), type XXVI nylon webbing sling to each top carriage hoisting link with a large suspension clevis.

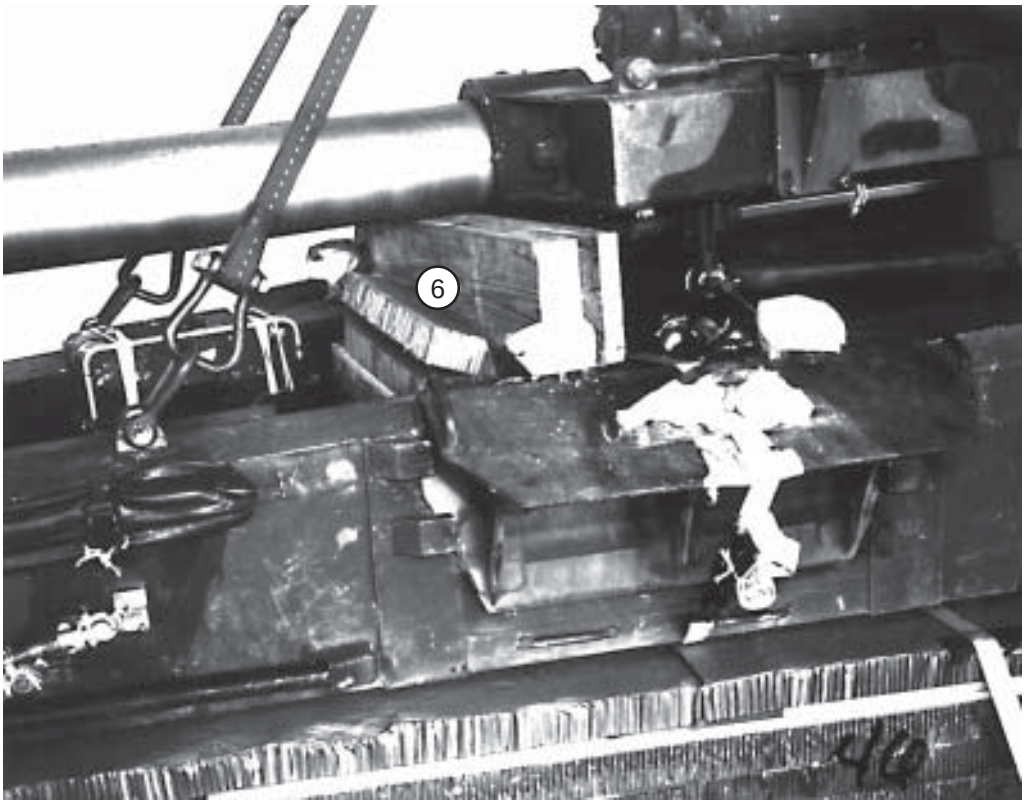
Note: Raise the wheels when the howitzer is lifted off the ground. Lock the wheels in the UP position.

(3) Center the right trail on honeycomb stack 4.

(4) Center the left trail on honeycomb stack 5 (Not Shown).

(5) Let the lunette overhang the rear of the platform by 5 inches.

Figure 2-15. Howitzer Positioned



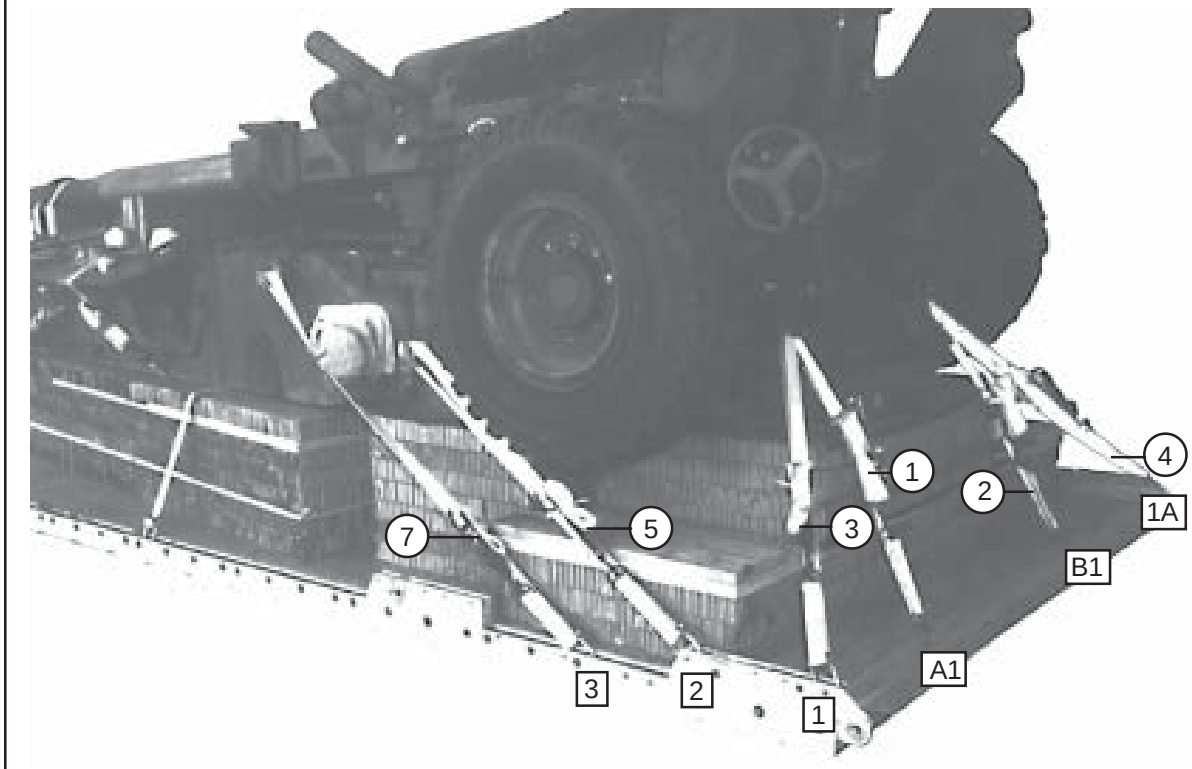
(6) Ensure the tube support blocks are resting solidly on honeycomb stack 3.

(7) Remove the lifting slings (Not Shown).

Figure 2-15. Howitzer Positioned (Continued)

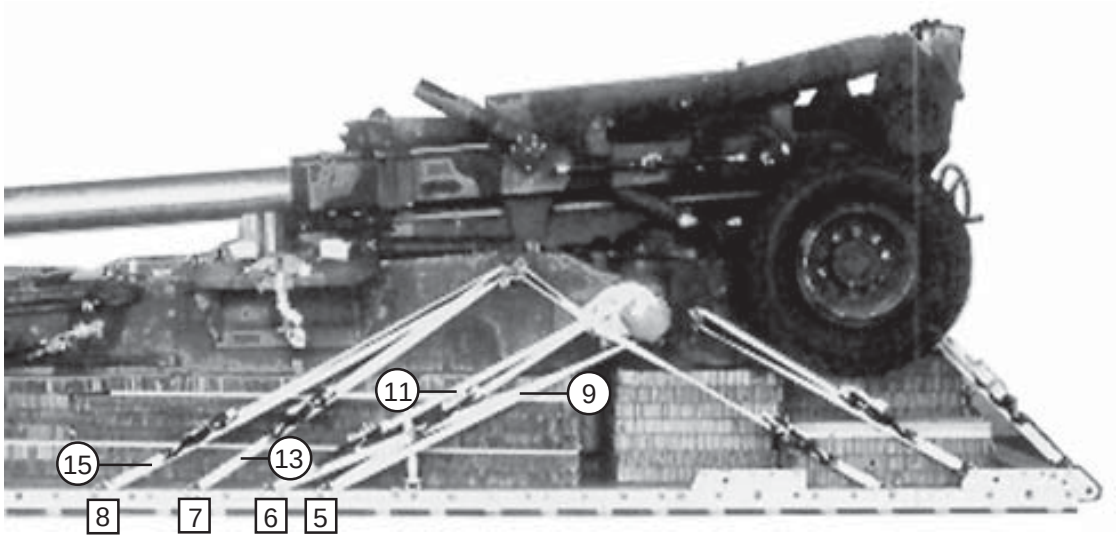
LASHING HOWITZER

2-8. Lash the howitzer to the platform using thirty-two 15-foot tie-down assemblies. Install the lashings as shown in Figures 2-16 through 2-20.



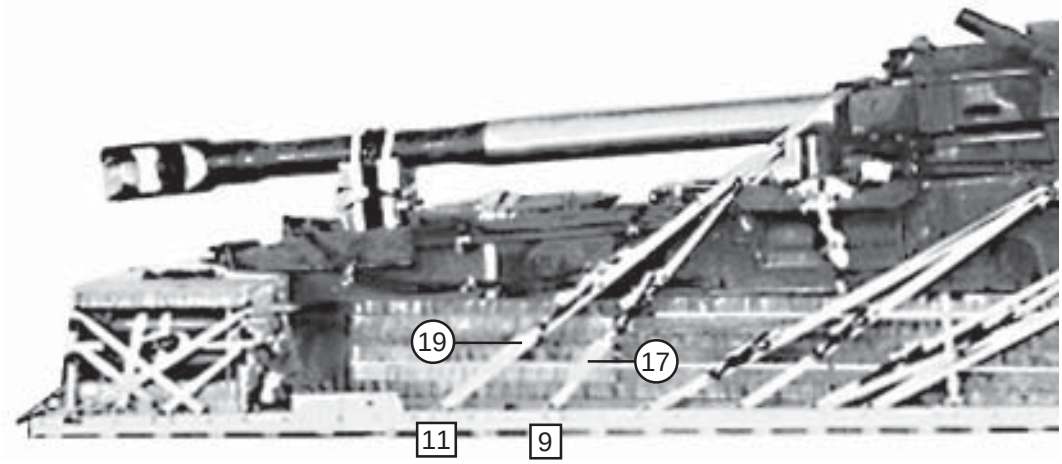
Lashing Number	Tie-down Clevis Number	Instructions
		Pass lashing:
1	A1	Through right front tie-down provision on lower carriage.
2	B1	Through left front tie-down provision on lower carriage.
3	1	Through right front tie-down provision on lower carriage.
4	1A	Through left front tie-down provision on lower carriage.
5	2	Through right locking plug hole on lower carriage.
6	2A	Through left locking plug hole on lower carriage.
7	3	Through tie-down provision on right trail.
8	3A	Through tie-down provision on left trail.

Figure 2-16. Lashings 1 through 8 Installed



Lashing Number	Tie-down Clevis Number	Instructions
		Pass lashing:
9	5	Around trail lock on right trail
10	5A	Around trail lock on left trail.
11	6	Around trail lock on right trail.
12	6A	Around trail lock on left trail.
13	7	Through tie-down provision on right trail.
14	7A	Through tie-down provision on left trail.
15	8	Through tie-down provision on right trail.
16	8A	Through tie-down provision on left trail.

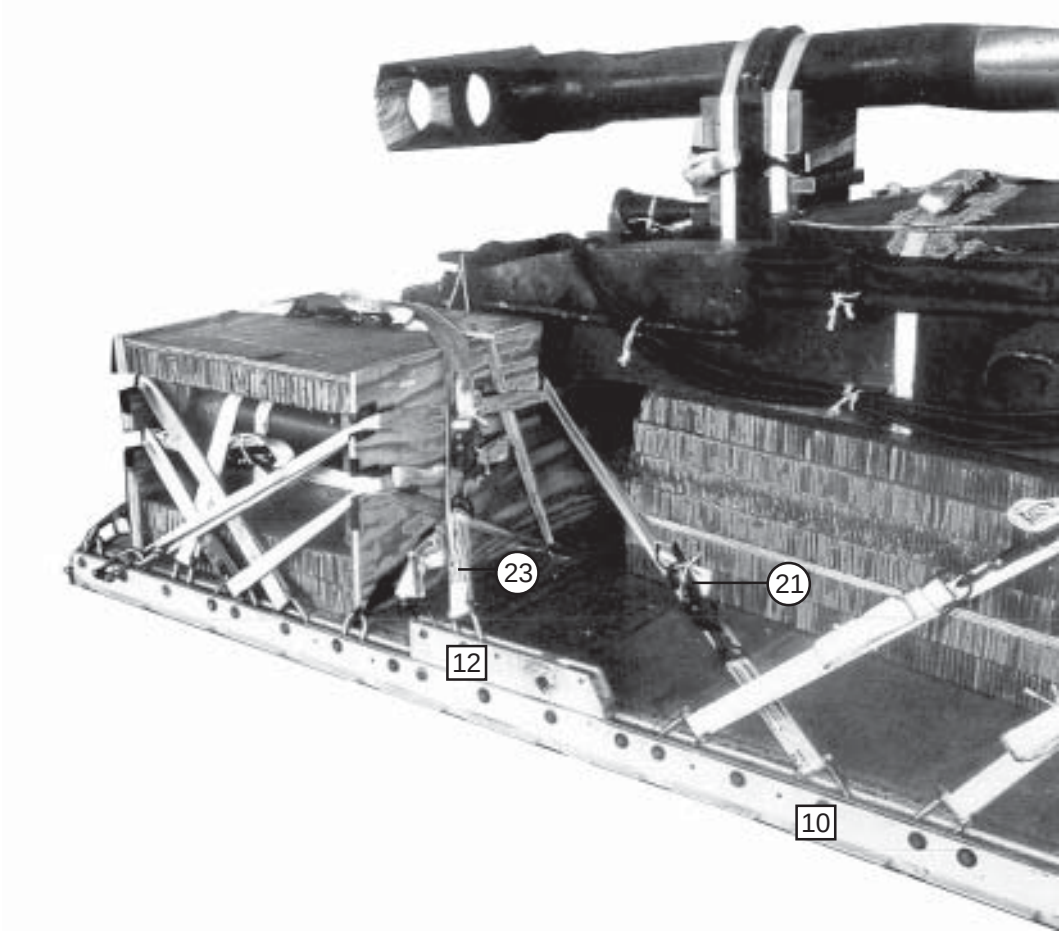
Figure 2-17. Lashings 9 through 16 Installed



Lashing Number	Tie-down Clevis Number	Instructions
		Pass lashing:
17*	9	Through clevis on right corner of cradle assembly.
18*	9A	Through clevis on left corner of cradle assembly.
19*	11	Through clevis on right corner of cradle assembly.
20*	11A	Through clevis on left corner of cradle assembly.

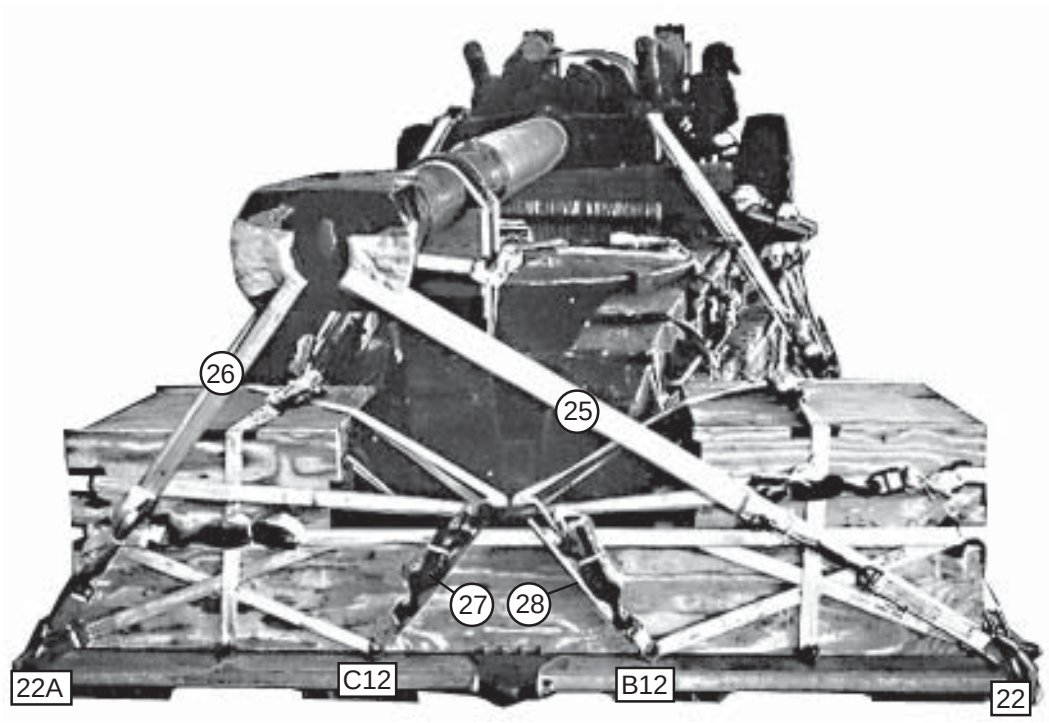
***30-foot lashing**

Figure 2-18. Lashings 17 through 20 Installed



Lashing Number	Tie-down Clevis Number	Instructions
		Pass lashing:
21	10	Through tie-down provision on right trail.
22	10A	Through tie-down provision on left trail.
23	12	Over ammunition load and through lunette.
24	12A	Over ammunition load and through lunette.

Figure 2-19. Lashings 21 through 24 Installed

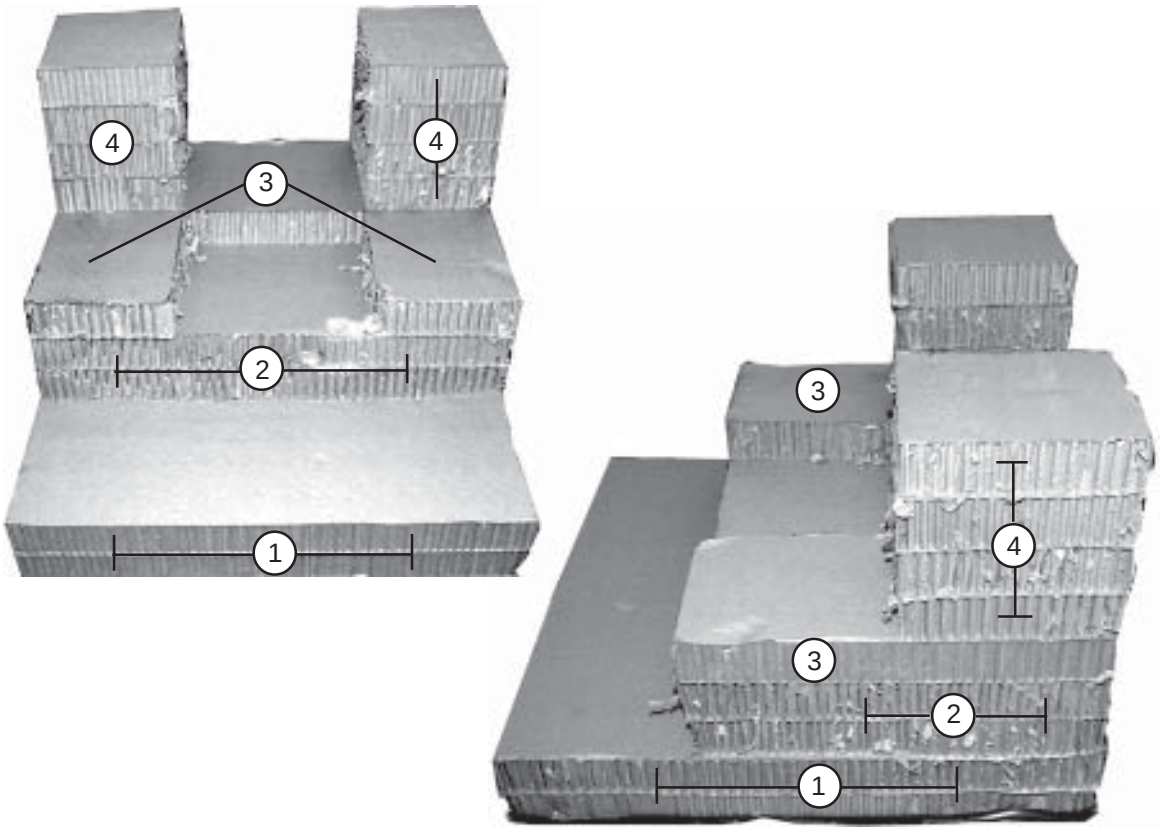


Lashing Number	Tie-down Clevis Number	Instructions
		Pass lashing:
25	22	Through muzzle brake.
26	22A	Through muzzle brake.
27	B12	Through lunette.
28	C12	Through lunette.

Figure 2-20. Lashings 25 through 28 Installed

BUILDING AND INSTALLING RELEASE STOWAGE PLATFORM

2-9. Build the release stowage platform as shown in Figure 2-21. Install the release stowage platform as shown in Figure 2-22.



(1) Form a base with two 34- by 36-inch pieces of honeycomb.

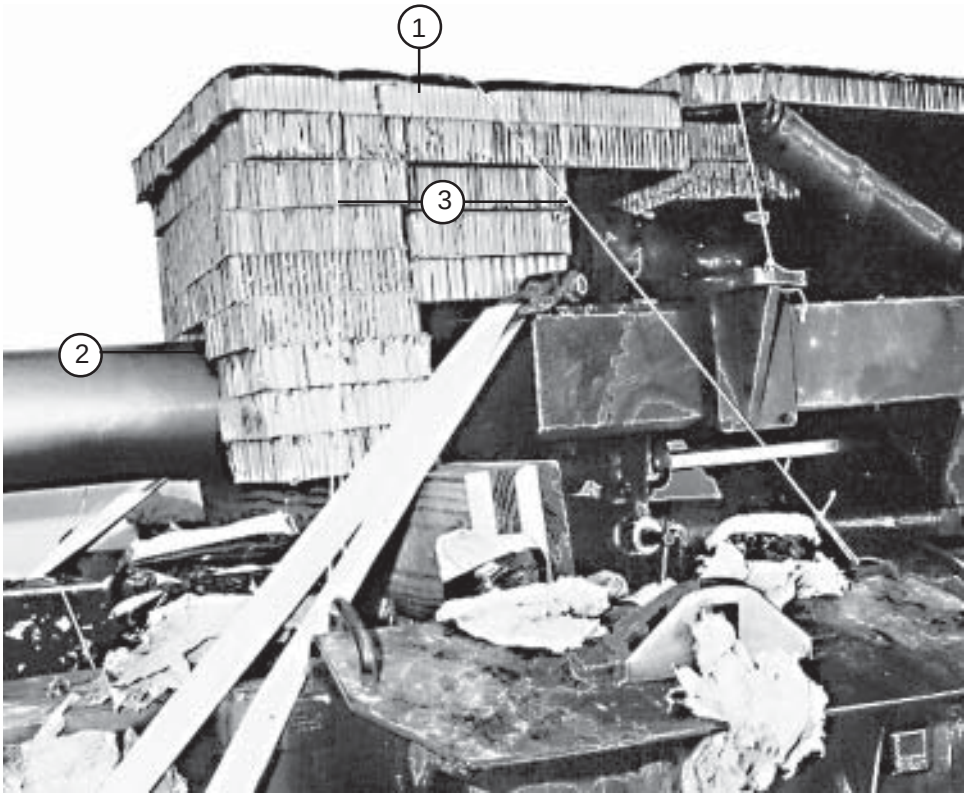
(2) Cut and glue two 34- by 24-inch pieces of honeycomb flush with the rear edge of the base stack.

(3) Cut and glue a 34- by 24-inch piece of honeycomb with a 14- by 12-inch cutout on the 34-inch edge. Place the cutout to the front.

(4) Cut and glue two stacks of four 10- by 12-inch pieces of honeycomb. Place them flush with the rear right and left corners.

(5) Allow the stacks to dry after being glued.

Figure 2-21. Release Stowage Platform Built



(1) Invert the platform. Place tape on the left and right top sides of the platform.

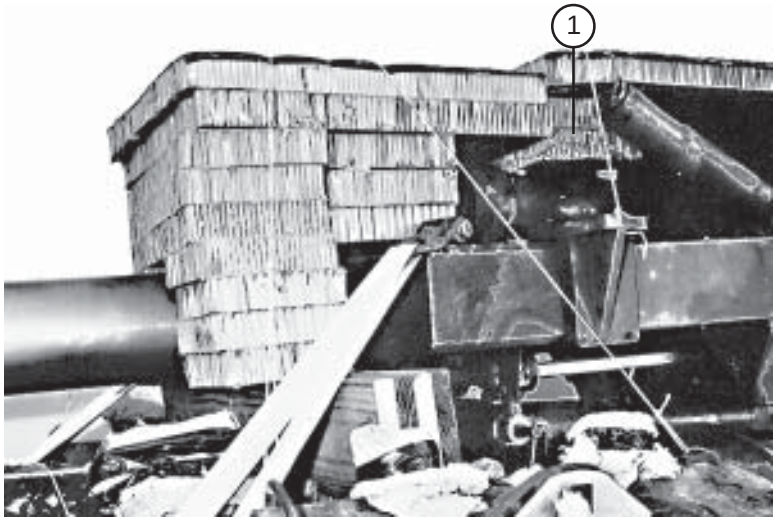
(2) Place the platform over the top of the gun tube, flush with the tube support lumber.

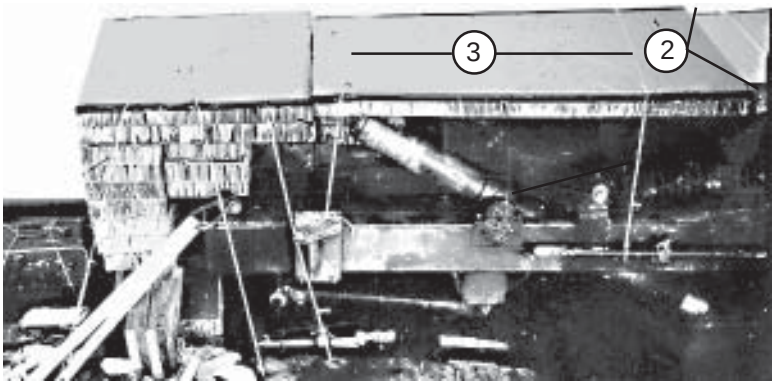
(3) Secure the stowage platform to the load with type III nylon cord at convenient points on the load.

Figure 2-22. Release Stowage Platform Installed

COVERING LOAD

2-10. Cover the load as shown in Figure 2-23.



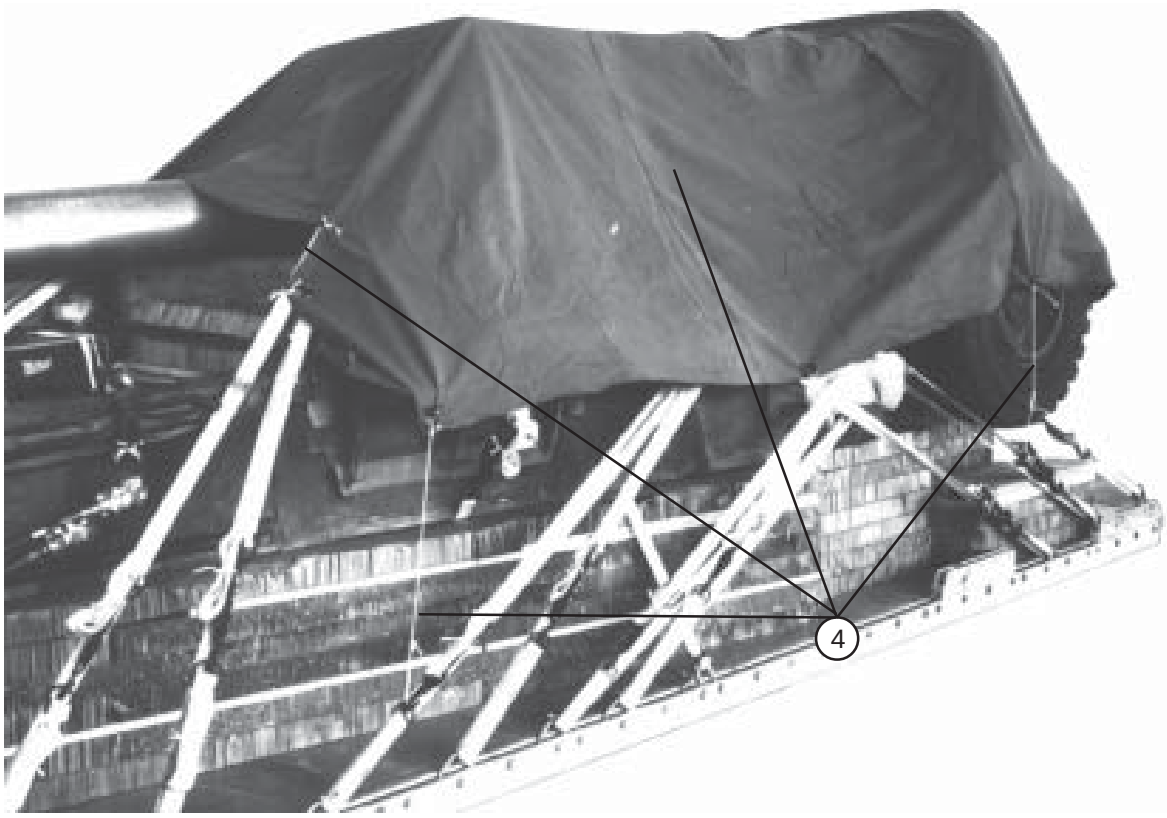


(1) Center two 12- by 18-inch pieces of honeycomb over the recoil tube.

(2) Make a 3- by 36-inch cutout in each front corner of a 36- by 96-inch piece of honeycomb. Tape along the sides of the honeycomb. Set the honeycomb on the cradle assembly as shown.

(3) Tie the 36- by 96-inch piece of honeycomb in place with type III nylon cord.

Figure 2-23. Load Covered

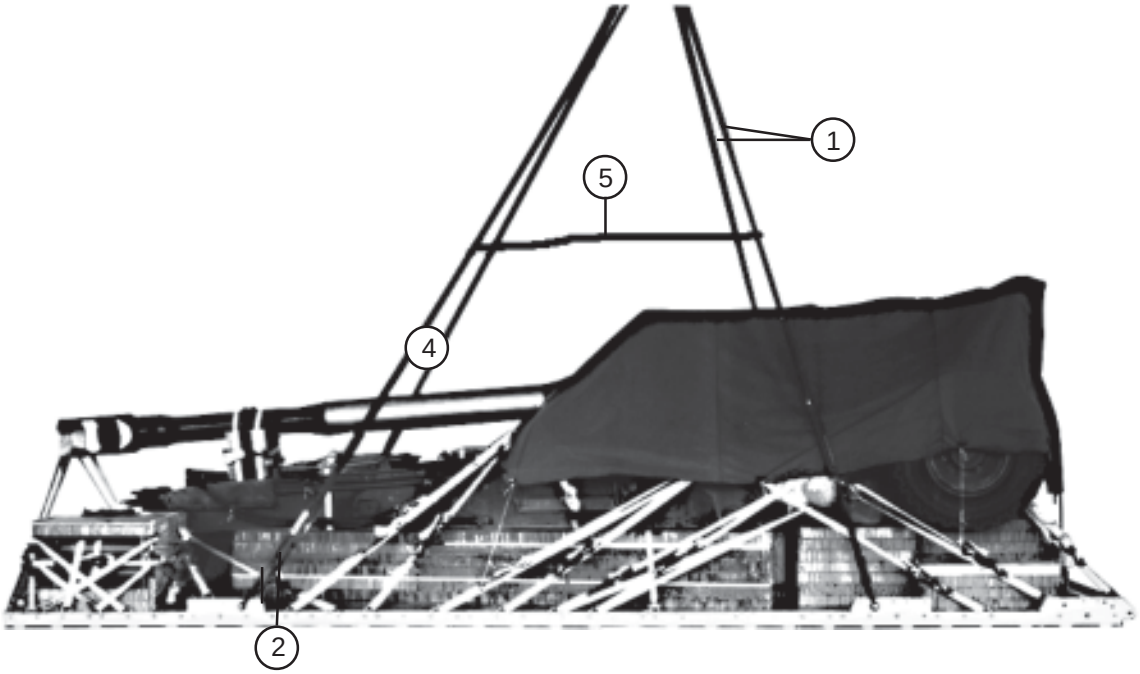


(4) Tie a 15- by 16-foot load cover over the load with type III nylon cord. Tie the cord under the gun tube and to convenient points on the load.

Figure 2-23. Load Covered (Continued)

INSTALLING SUSPENSION SLINGS

2-11. Install the suspension slings according to FM 4-20.102/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figure 2-24.



1. Attach a 16-foot (4-loop), type XXVI nylon suspension sling to each front suspension bracket with a large clevis.

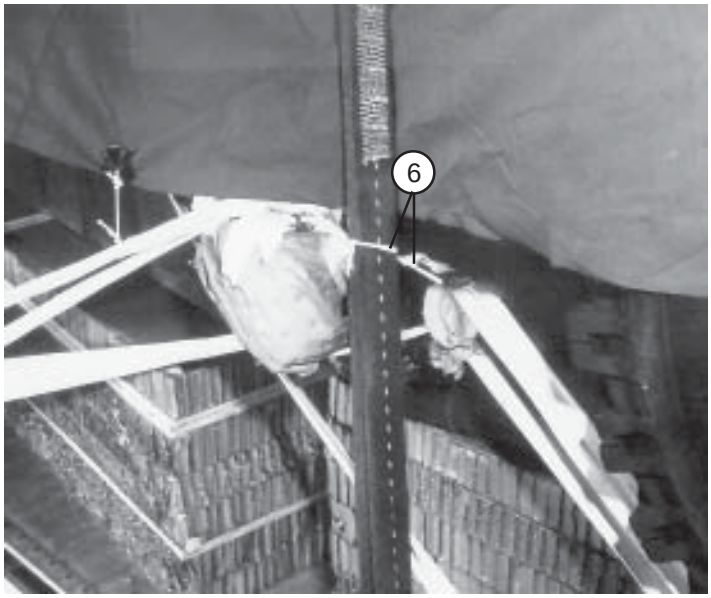
2. Place one end of a 3-foot (4-loop), type XXVI nylon suspension sling on a large clevis. Pass the free end of the sling through a 5 1/2-inch, two-point link assembly. Place the remaining end of the 3-foot sling onto the large clevis. Bolt the large clevis to the right rear suspension bracket.

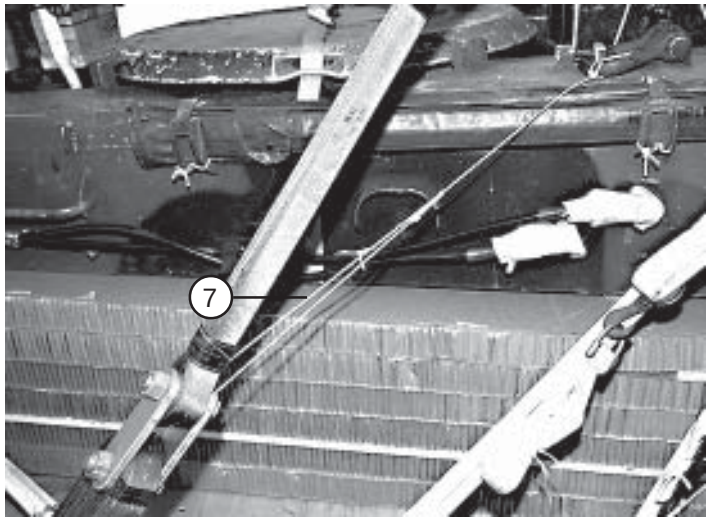
3. Repeat step 2 for the left side of the platform (Not Shown).

4. Attach a 16-foot (4-loop), Type XXVI nylon webbing sling to each 5 1/2-inch two-point link assembly on the rear.

5. Raise the suspension slings. Install the safety tie according to FM 4-20.102/ NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.

Figure 2-24. Suspension Slings Installed





(6) Run a length of 1/2-inch tubular nylon webbing through each trail lock. Safety the front suspension slings to the 1/2-inch tubular nylon webbing with type I, 1/4-inch cotton webbing.

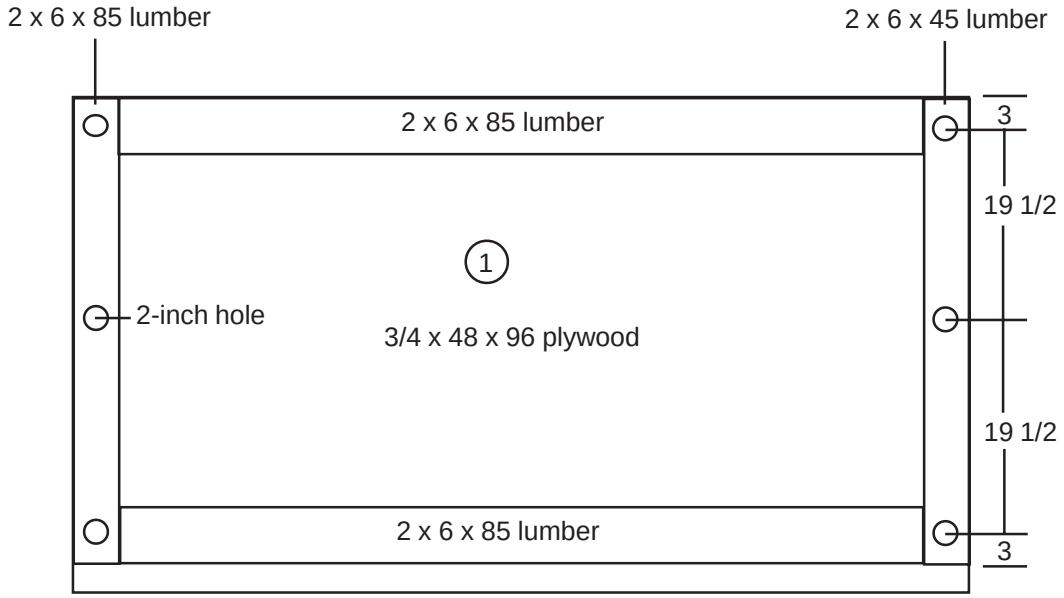
(7) Lower the suspension slings. Tie each 5 1/2-inch, two-point link assembly on the rear suspension slings to the lifting provision on the howitzer trail with type III nylon cord.

Figure 2-24. Suspension Slings Installed (Continued)

STOWING CARGO PARACHUTES

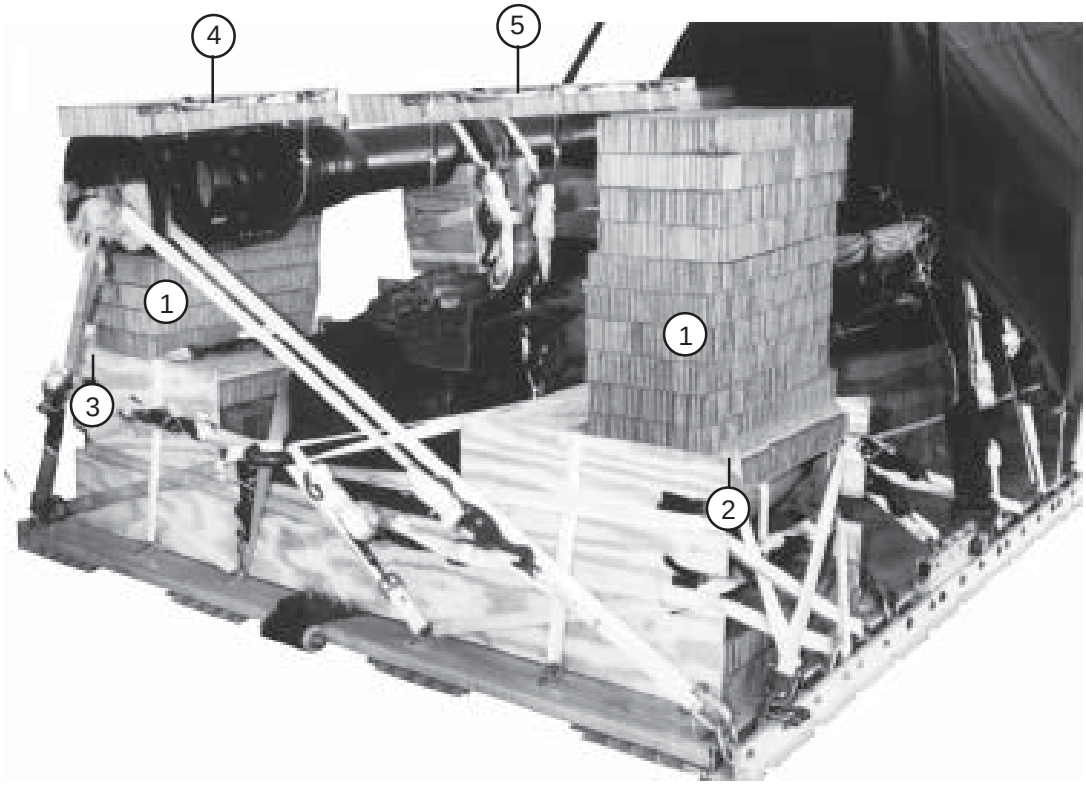
2-12. Build the stowage platform as shown in Figure 2-25. Install the parachute stowage platform as shown in Figure 2-26. Stow the G-11 cargo parachutes as shown in Figure 2-27. Install the parachute restraint straps as shown in Figure 2-28. Install the multicut parachute release straps as shown in Figure 2-29.

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



(1) Build the parachute stowage platform as shown. Nail the lumber to the plywood using 8d nails. Drill 2-inch holes through the plywood and the end pieces of the 2- by 6-inch lumber as shown.

Figure 2-25. Parachute Stowage Platform Built



(1) Make two 10-layer honeycomb supports using twenty 12- by 29-inch pieces of honeycomb.

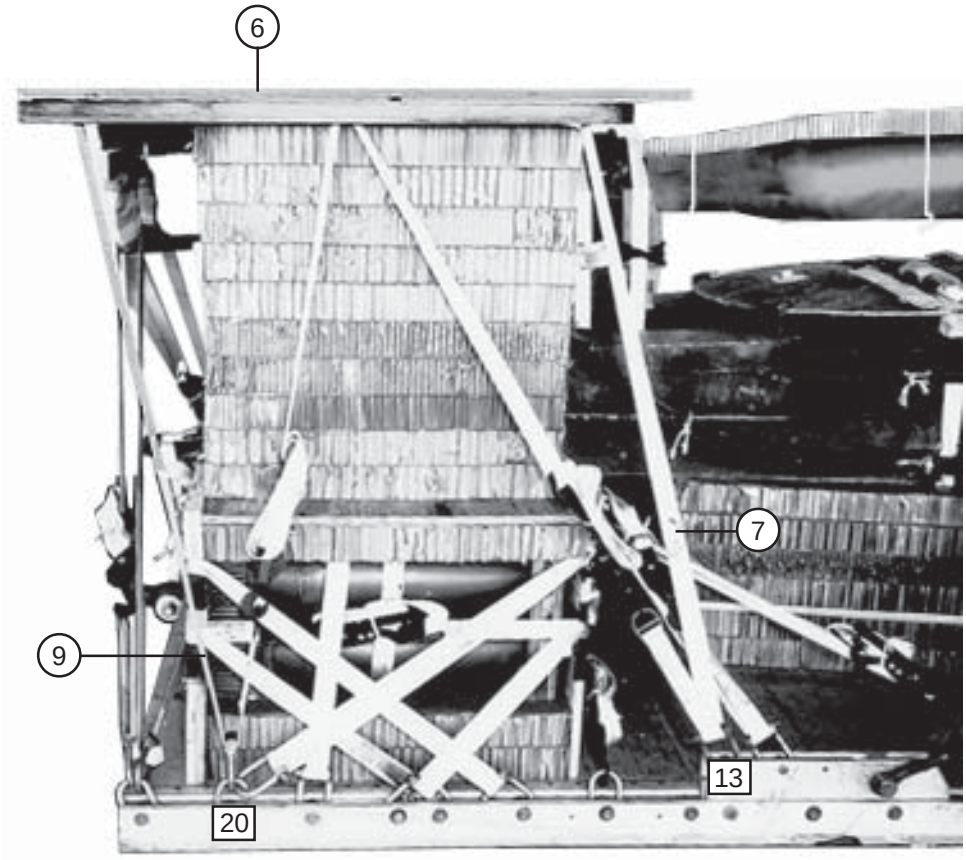
(2) Place one honeycomb support 5 inches from the right side and flush with the rear edge of the ammunition load.

(3) Repeat step 2 for the left side.

(4) Place a 14- by 29-inch piece of honeycomb on top of the muzzle brake. Tape the edges of the honeycomb where the type III nylon cord will contact. Secure the honeycomb in place with two lengths of type III nylon cord.

(5) Place a 10- by 56-inch piece of honeycomb over the length of the gun tube. Tape the edges of the honeycomb where the type III nylon cord will contact. Secure the honeycomb with type III nylon cord in three evenly spaced places. Do not use tape on the gun tube.

Figure 2-26. Parachute Stowage Platform Installed



(6) Center the parachute stowage platform on top of the honeycomb supports with the rear edge of the parachute stowage platform flush with the rear edge of the platform.

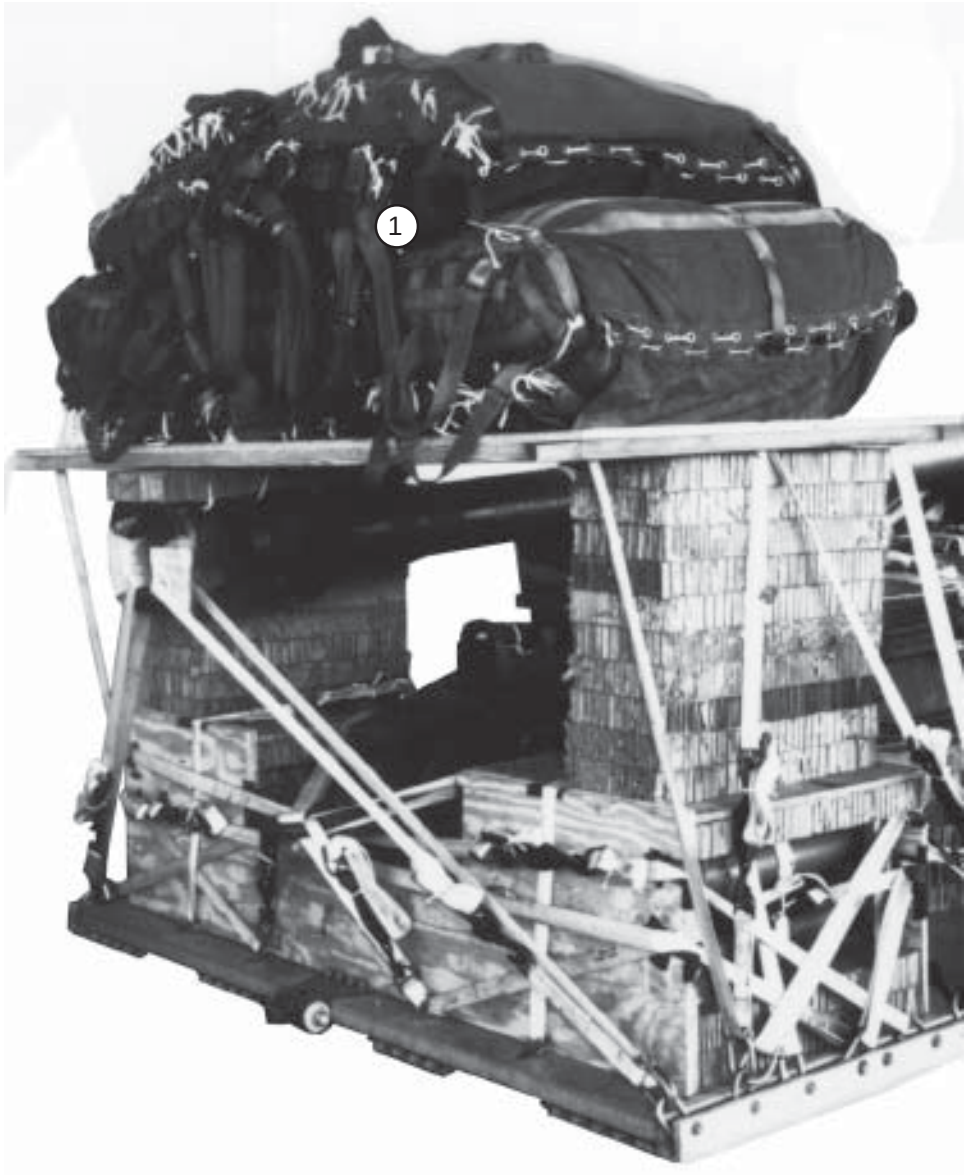
(7) Pass a 15-foot lashing through clevis 13, up through the right front hole, and down through the center hole of the parachute stowage platform. Secure the ends of the lashing with a D-ring and a load binder.

(8) Repeat step 7 using clevis 13A (Not Shown) for the left side.

(9) Pass a 15-foot lashing through clevis 20, up through the right rear hole, and down through the right center hole of the parachute stowage platform. Secure the ends of the lashing with a D-ring and load binder.

(10) Repeat step 9 using clevis 20A (Not Shown) for the left side.

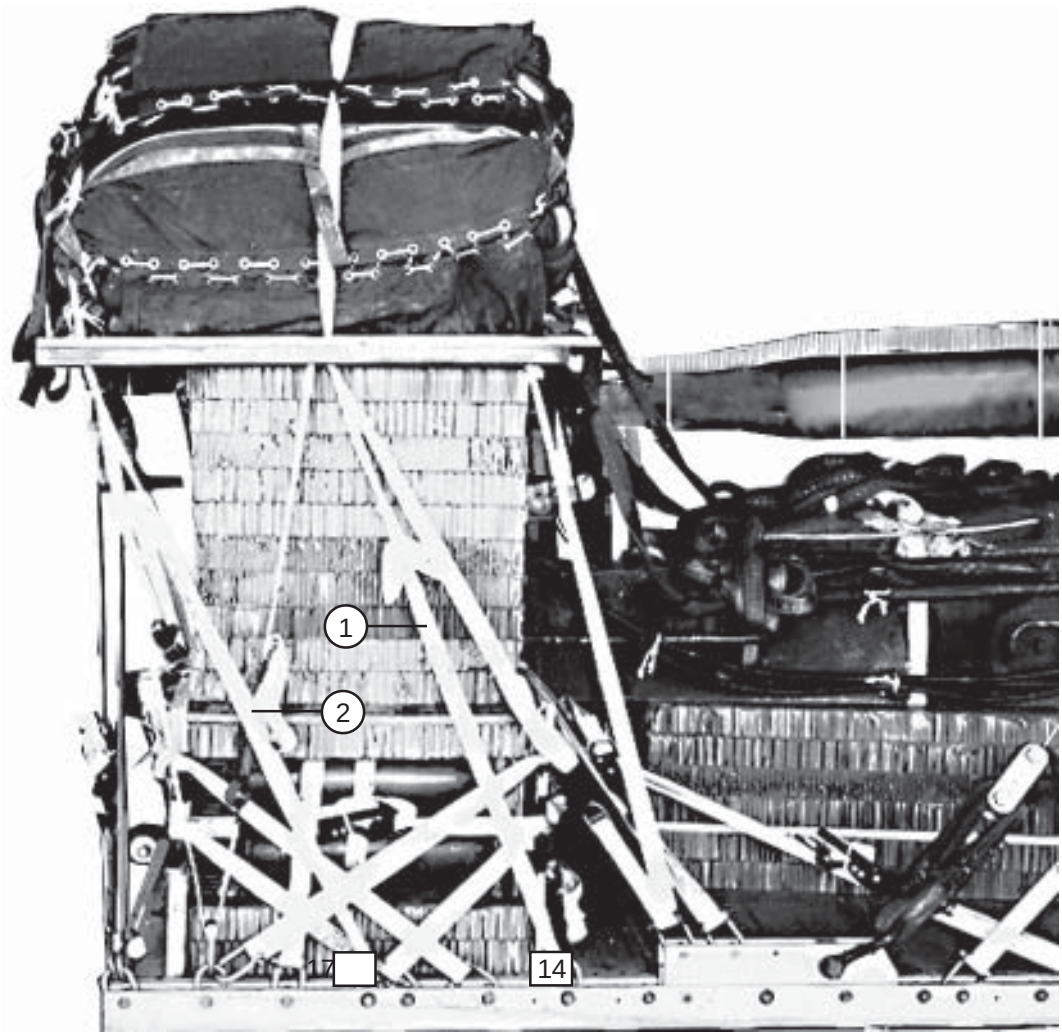
Figure 2-26. Parachute Stowage Platform Installed (Continued)



(1) Prepare and stow five G-11C cargo parachutes on the parachute stowage platform according to FM 4-20.102/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.

Note: If needed, a stow or two of the riser extension may be removed from the riser extension compartment of each cargo parachute.

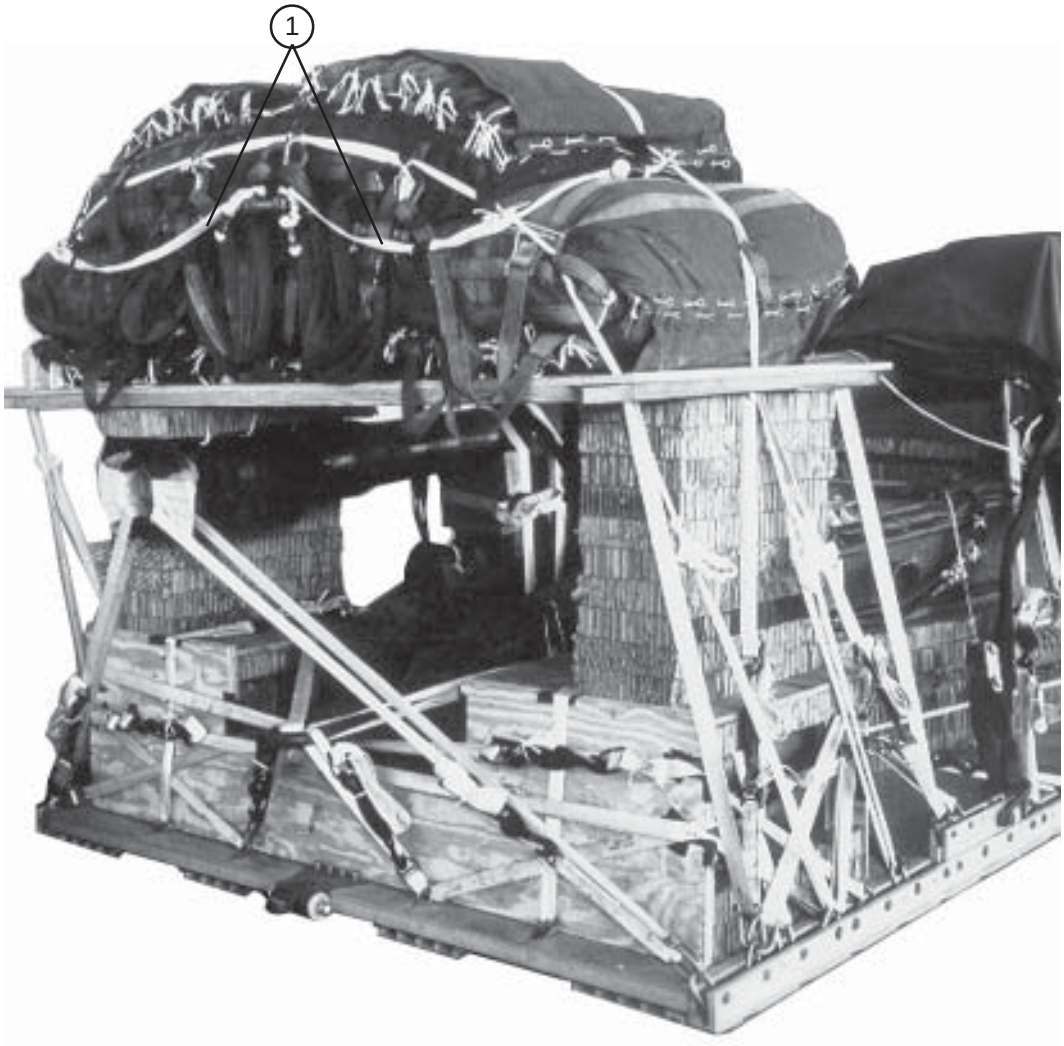
Figure 2-27. Cargo Parachutes Stowed



(1) Install the first parachute restraint strap through the center hole of the parachute stowage platform and to clevises 14 and 14A.

(2) Install the second parachute restraint strap through the rear holes of the parachute stowage platform and to clevises 17 and 17A.

Figure 2-28. Parachute Restraint Straps Installed

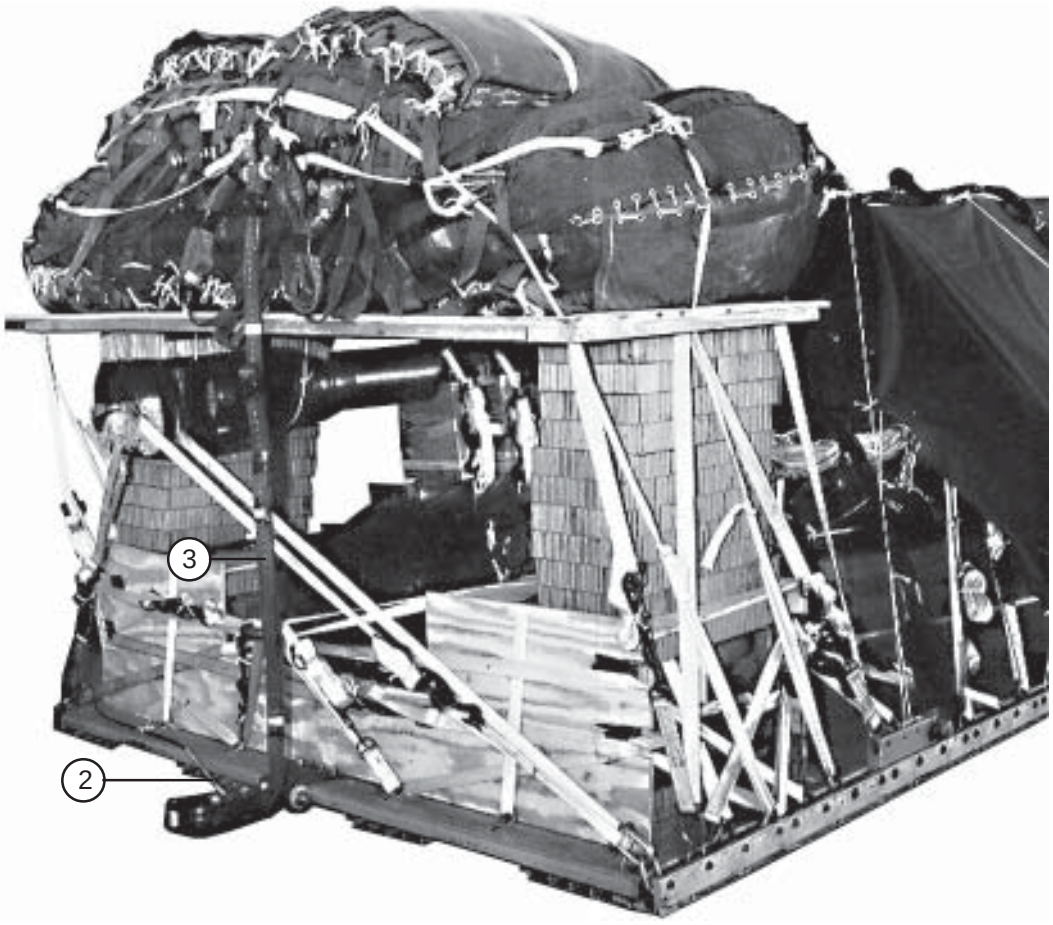


(1) Install two multicut parachute release straps according to FM 4-20.102/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.

Figure 2-29. Multicut Parachute Release Straps Installed

INSTALLING EXTRACTION SYSTEM

2-13. Install the Extraction Force Transfer Coupling (EFTC) System according to FM 4-20.102/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figure 2-30.



(1) Install the EFTC actuator mounting brackets using the rear mounting holes (Not Shown).

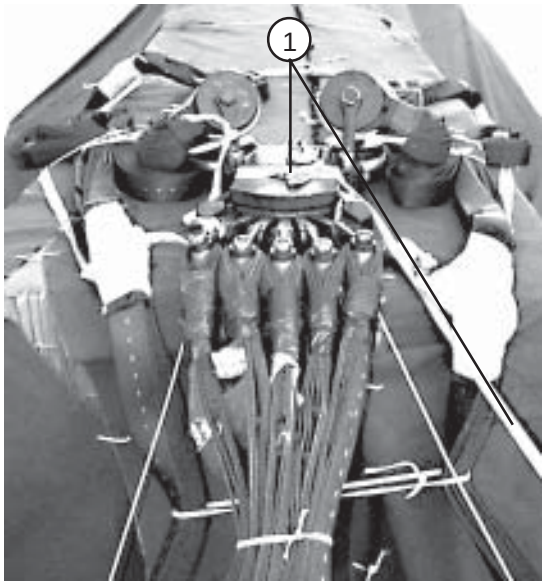
(2) Install a 24-foot cable.

(3) Attach a 9-foot (2-loop), type XXVI nylon sling as the deployment line.

Figure 2-30. Extraction System Installed

INSTALLING PARACHUTE RELEASE SYSTEM

2-14. Install an M-2 parachute release system according to FM 4-20.102/ NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figure 2-31.

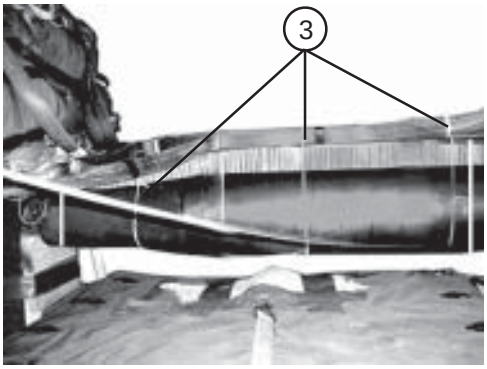


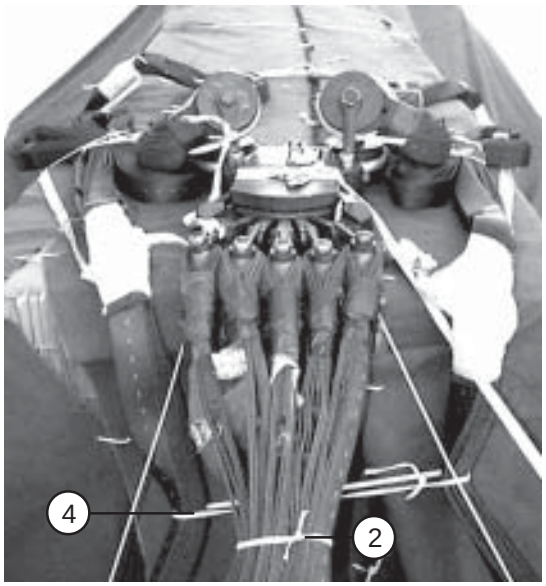
NOTICE OF EXCEPTION

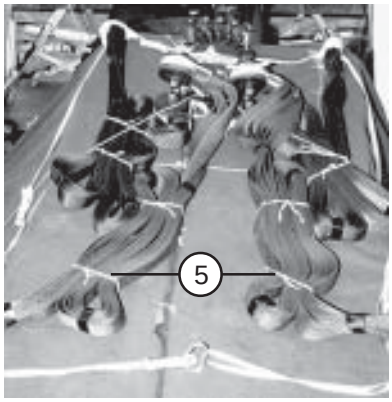
The procedures in this manual for using the 25-foot arming wire lanyard are different from those in FM 4-20.102/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and an exception is granted. The procedures in step 1 below **MUST** be followed.

(1) Using a 25-foot arming wire lanyard, install the M-2 parachute release on top of the load cover at the rear edge of the release stowage platform. Attach suspension slings and parachute riser extensions according to FM 4-20.102/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.

Figure 2-31. Parachute Release Installed







(2) Group and tie the riser extensions with type I, 1/4-inch cotton webbing at a convenient point approximately 12 inches above the parachute release.

(3) Group and tie the parachute riser extensions with type I, 1/4-inch cotton webbing using a girth hitch at three convenient points. Route the free ends around honeycomb and gun barrel and tie underneath.

(4) Secure the rear suspension slings together with a length of 1/4-inch cotton webbing.

(5) S-fold all the slack in the front suspension slings and secure with 1/4-inch cotton webbing.

Figure 2-31. Parachute Release Installed (Continued)

INSTALLING PROVISIONS FOR EMERGENCY RESTRAINTS

2-15. Install the provisions for the emergency restraints on the load according to FM 4-20.102/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.

PLACING EXTRACTION PARACHUTE

2-16. Place the extraction parachute as described below.

a. C-130 Aircraft. Place a 28-foot cargo extraction parachute; a 60-foot (3-loop), type XXVI nylon webbing extraction line; and a 5 1/2-inch, two-point link assembly on the load for installation in the aircraft.

b. C-17 Aircraft. Place a 28-foot cargo extraction parachute; a 140-foot (3-loop), type XXVI nylon webbing extraction line; and a 5 1/2-inch, two-point link assembly on the load for installation in the aircraft.

c. C-5 Aircraft. Place a 28-foot cargo extraction parachute on the load for installation in the aircraft. See FM 4-20.102/NAVSEA SS400-AB-MMO-010/TO 13C7-5-1 for extraction line requirments.

MARKING RIGGED LOAD

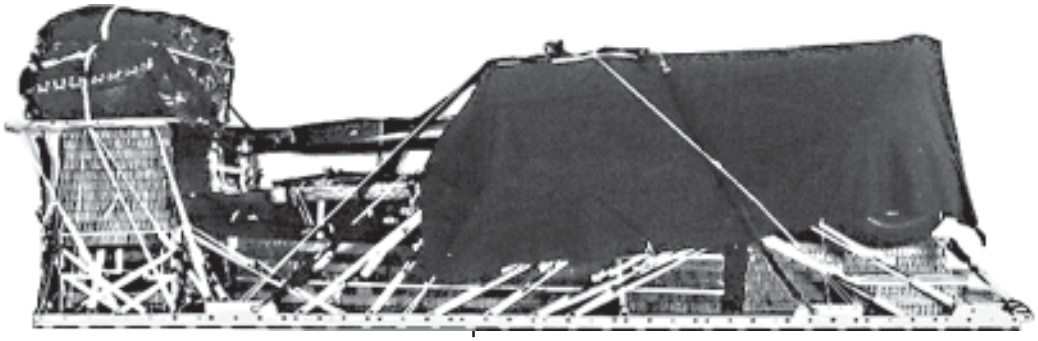
2-17. Mark the rigged load according to FM 4-20.102/NAVSEA SS400-AB-MMO-010/TO 13C7-5-1 and as shown in Figure 2-32. Complete the Shipper's Declaration for Dangerous Goods. If the load varies from the one shown, the weight, height, Center of Balance(C/B), and parachute requirements must be recomputed.

EQUIPMENT REQUIRED

2-18. Use the equipment listed in Table 2-2 to rig this load.

CAUTION

Make the final rigger inspection required by AR 59-4/AFJ 13-210(I) and FM 4-20.102/NAVSEA SS400-AB-MMO-010/ TO 13C7-5-1 before the load leaves rigging site.



RIGGED LOAD DATA

Weight ..... 23,400 pounds

Maximum Weight ..... 25,000 pounds

Height ..... 94 inches

Width ..... 109 1/2 inches

Overall Length ..... 311 inches

Overhang: Front ..... 0 inches
Rear (EFTC) ..... 18 inches

Center of Balance (CB) (from front edge of platform) ..... 128 inches

Figure 2-32. M198, 155-mm Howitzer with Accompanying Load Rigged on a Type V Platform for Low-Velocity Airdrop

Table 2-2. Equipment Required for Rigging the M198, 155-mm Howitzer With Accompanying Ammunition Load on a Type V Platform for Low-Velocity Airdrop

National Stock Number	Item	Quantity
8040-00-273-8713	Adhesive paste, 1-gal	As required
1670-01-035-6054	Bridle, extraction line bag (for DES)	1
4030-00-090-5354	Clevis, large	8
4030-00-678-8562	Clevis, medium	4
8305-00-880-8155	Cloth, coated, 60-inch	As required
4020-00-240-2146	Cord, nylon, type III, 550-lb	As required
1670-00-434-5783	Coupling, airdrop, extraction force transfer with cable, 24-ft	1
1670-00-360-0328	Cover, clevis, large	5
1670-01-183-2678	Leaf, extraction line (line bag)(add 1 for DES)	2
	Line, drogue (for DES)	
1670-01-064-4452	60-foot (1-loop), type XXVI	1
	Line, extraction:	
1670-01-062-6313	For C-130: 60-foot (3-loop), type XXVI	1
1670-01-107-7651	For C-17: 140-foot (3-loop), type XXVI	1
	For C-5:	
1670-01-062-6313	60-ft, (3-loop), type XXVI	1
1670-01-107-7651	140-ft, (3-loop), type XXVI	1
	Link assembly:	
	Two-point, 3 3/4-in	3
5306-00-435-8994	Bolt, 1-in diam, 4-in long	(6)
5310-00-232-5165	Nut, 1-in, hexagonal	(6)
1670-00-003-1953	Plate, side, 3 3/4-in	(6)
5365-00-007-3414	Spacer, large	(6)
	Two-point, 3 3/4-in (for DES)	1
5306-00-435-8994	Bolt, 1-in diam, 4-in long	(2)
5310-00-232-5165	Nut, 1-in, hexagonal	(2)
1670-00-003-1953	Plate, side, 3 3/4-in	(2)
5365-00-007-3414	Spacer, large	(2)
1670-01-483-8259	Link, tow release mechanism (H-Block) C-17 aircraft	1

Table 2-2. Equipment Required for Rigging the M198, 155-mm Howitzer With Accompanying Ammunition Load on a Type V Platform for Low-Velocity Airdrop (Continued)

National Stock Number	Item	Quantity
	Lumber:	
5510-00-220-6148	2- by 6-in	As required
5510-00-220-6248	2- by 10-in	As required
	Nail, steel wire, common:	
5315-00-010-4659	8d	As required
5315-00-010-4661	10d	As required
5315-00-164-5121	20d	As required
1670-00-753-3928	Pad, energy dissipating, honeycomb, 3- by 36- by 96-in	40 sheets
	Parachute:	
1670-01-016-7841	Cargo, G-11C	5
1670-00-040-8135	Cargo, extraction, 28-ft	1
1670-01-063-3715	Cargo, extraction, 15-ft (for DES)	1
	Platform, airdrop, type V, 28-ft	1
1670-01-353-8425	Bracket assembly, EFTC	(1)
1670-01-162-2376	Bracket assembly, extraction	(1)
1670-01-162-2372	Clevis assembly	(48)
1670-01-247-2389	Bracket, suspension	(4)
1670-01-162-2381	Tandum link assembly (multipurpose link)	(2)
5530-00-128-4981	Plywood, 3/4-in	7 sheets
1670-01-097-8817	Release, cargo parachute, M-2	1
	Sling, cargo, airdrop:	
	For lifting:	
1670-01-062-6305	9-ft (4-loop), type XXVI nylon webbing	2
1670-01-062-6307	12-ft (4-loop), type XXVI nylon webbing	2
	For suspension:	
1670-01-062-6306	3-ft (4-loop), type XXVI nylon webbing	2
1670-01-062-6308	16-ft (4-loop), type XXVI nylon webbing	4
	For riser extensions:	
1670-01-062-6311	120-ft (2-loop), type XXVI nylon webbing	5
	For deployment:	
1670-01-062-6304	9-ft (2-loop), type XXVI nylon webbing	1
5340-00-040-8219	Strap, parachute release, multicut (comes w. 3 knives)	2
7510-00-266-5016	Tape, adhesive, 2-in	As required
7510-00-266-6710	Tape, masking, 2-in	As required

Table 2-2. Equipment Required for Rigging the M198, 155-mm Howitzer With Accompanying Ammunition Load on a Type V Platform for Low-Velocity Airdrop (Continued)

National Stock Number	Item	Quantity
1670-00-937-0271	Tie-down assembly, 15-ft	66
	Webbing:	
8305-00-268-2411	Cotton, 1/4-in, type I	As required
8305-00-082-5752	Nylon, tubular, 1/2-in	As required
8305-00-263-3591	Type VIII	As required

Chapter 3

RIGGING M198, 155-MM HOWITZER WITH ACCOMPANYING AMMUNITION LOAD, MODULAR ARTILLERY CHARGE SYSTEM (MACS) ON A TYPE V PLATFORM

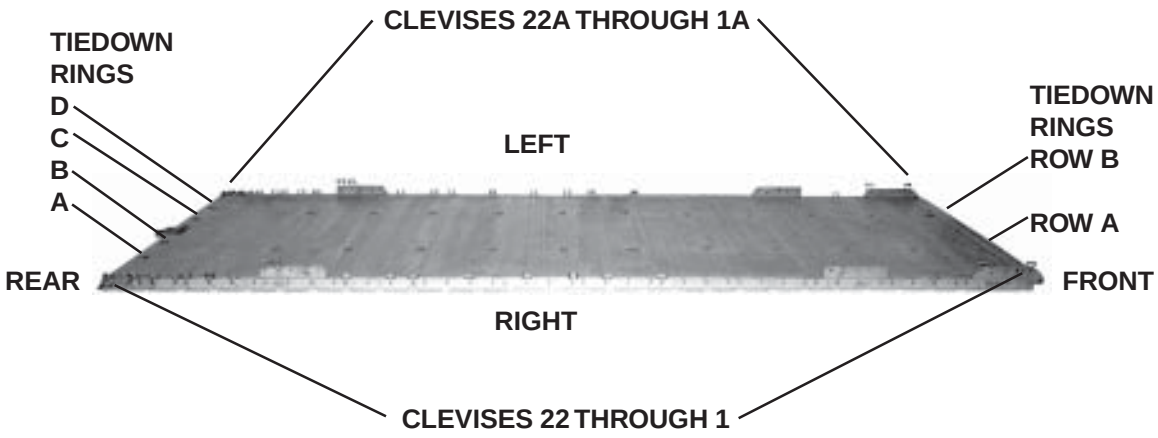
DESCRIPTION OF LOAD

3-1. The M198, 155-mm howitzer is rigged on a 24-foot, type V airdrop platform for low-velocity airdrop from C-130, C-17 and C-5 aircraft. The howitzer is dropped with the accompanying load of ammunition, water cans and gun equipment weighing 1,509 pounds. The load requires five G-11C cargo parachutes.

PREPARING PLATFORM

3-2. Prepare a 24-foot, type V airdrop platform according to TM 10-1670-268-20&P/TO 13C7-52-22. Install two tandem links, four suspension brackets and 48 tiedown clevis assemblies as shown in Figure 3-1.

Notes: 1. The nose bumper may or may not be installed.
2. Measurements given in this chapter are from the front edge of the platform, NOT from the front edge of the nose bumper.



Steps:

1. Inspect, or assemble and inspect, the platform according to TM 10-1670-268-20&P/TO 13C7-52-22.

2. Install a suspension bracket in holes 9, 10, and 11 on each platform side rail. Face the flat part of the link to the front of the rail.

3. Install a suspension bracket in holes 38, 39, and 40 on each platform side rail. Face the flat part of the link to the rear of the rail.

4. Install a tandem link on each platform side rail holes 1, 2, and 3.

5. Install a clevis on bushings 1 and 4 on each front tandem link.

6. Install a clevis on bushings 3 and 4 on each rear suspension bracket.

7. Starting at the front of each platform side rail, install clevises on each platform side rail using bushings bolted on holes 6, 20, 23, 25, 27, 30, 33, 34, 36, 42, 43, 44, 45, 46, 47 (triple), and 48 (triple).

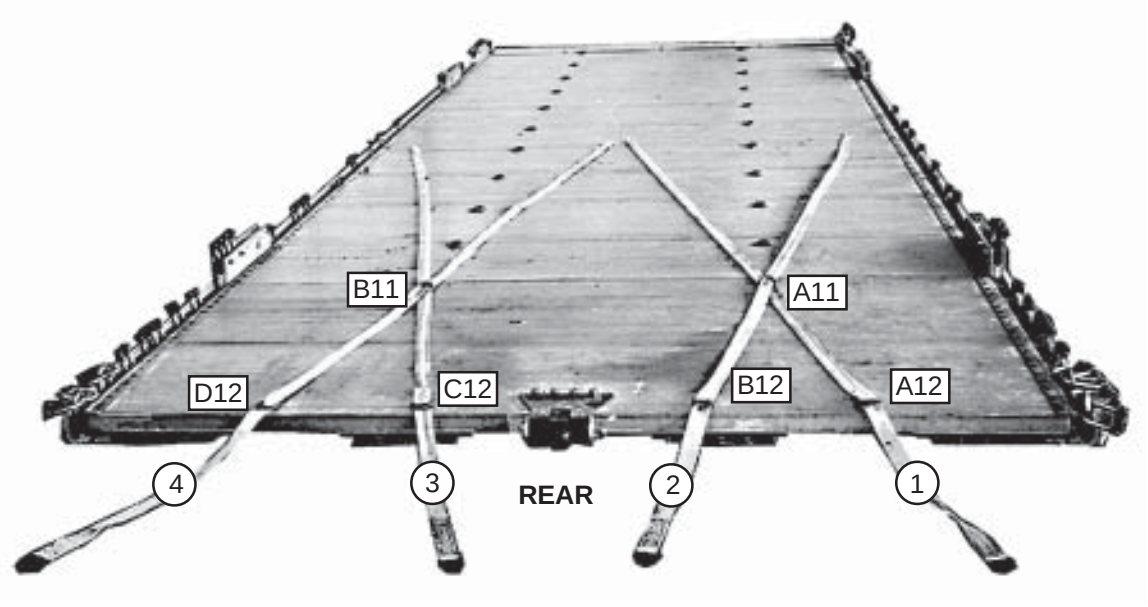
8. Starting at the front of each platform side rail, number the clevises bolted to the right side from 1 through 22 and those bolted to the left side from 1A through 22A.

9. Starting at the front of the platform, label the two tiedown rings in the first 11 panels A and B from right to left. Label the four tiedown rings in the last panel A, B, C, and D from right to left. Starting with the first panel, number the tiedown rings 1 through 12.

Figure 3-1. Platform Prepared

RIGGING ACCOMPANYING AMMUNITION LOAD

3-3. Rig the accompanying ammunition load (two groups of eight projectiles each) on the rear of the platform as shown in Figures 3-2 through 3-7.



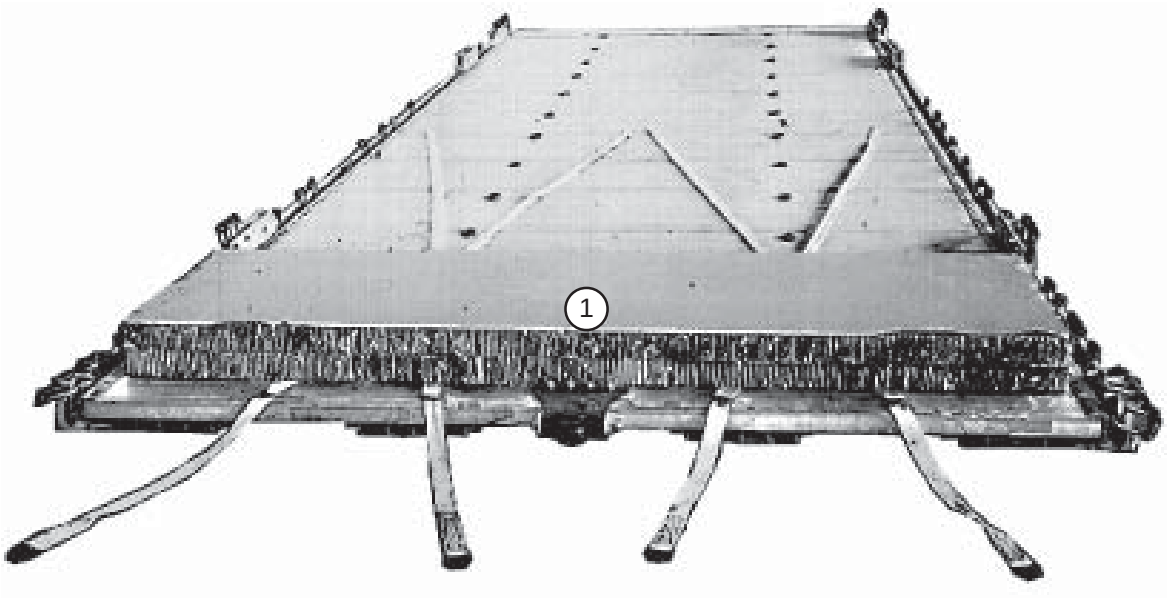
(1) Pass a 15-foot lashing through tiedown rings A12 and A11.

(2) Pass a 15-foot lashing through tiedown rings B12 and A11.

(3) Pass a 15-foot lashing through tiedown rings C12 and B11.

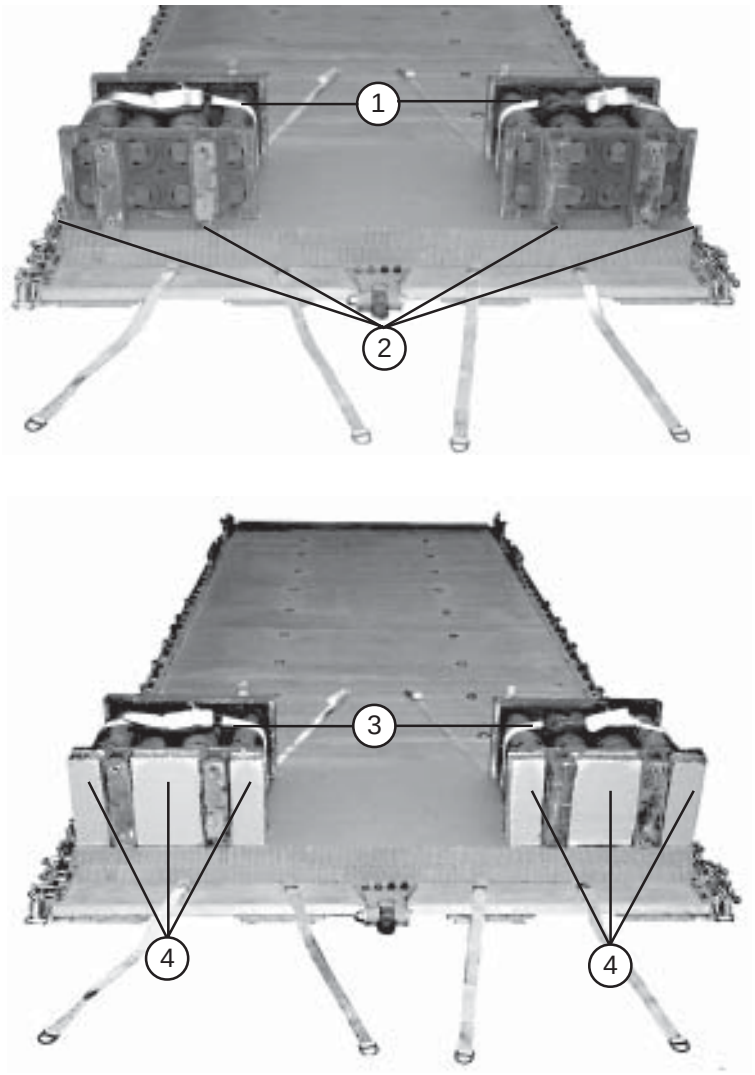
(4) Pass a 15-foot lashing through tiedown rings D12 and B11.

Figure 3-2. Lashings Positioned



(1) Center two 96- by 31-inch pieces of honeycomb on top of the lashings 6 inches from the rear edge of the platform.

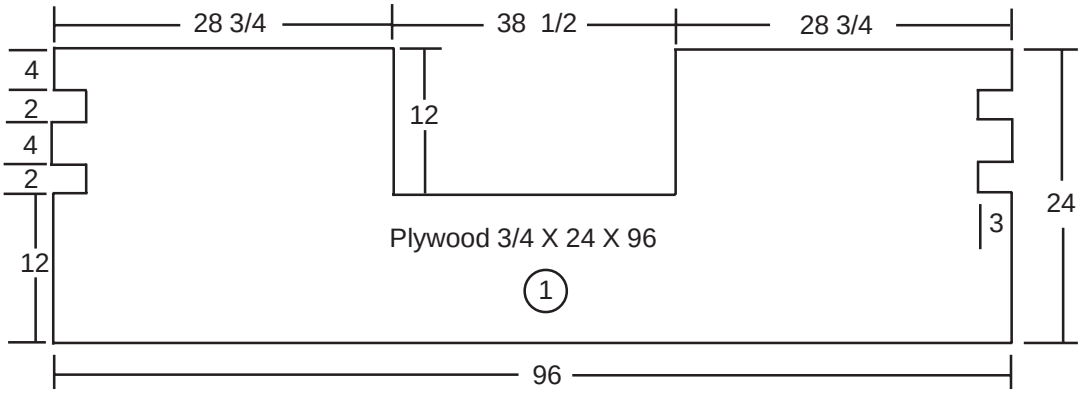
Figure 3-3. Honeycomb Positioned



1. Bind each group of projectiles together with a 15-foot lashing with a piece of felt under the load binder.
2. Position each group of projectiles flush with the rear and side edge of the honeycomb.
3. Face the base of the projectiles to the rear of the platform with the load binder on top.
4. Cut four 5- by 14 1/2-inch pieces of honeycomb and two 10- by 14 1/2-inch pieces of honeycomb. Place the cut pieces on the base of the projectiles.

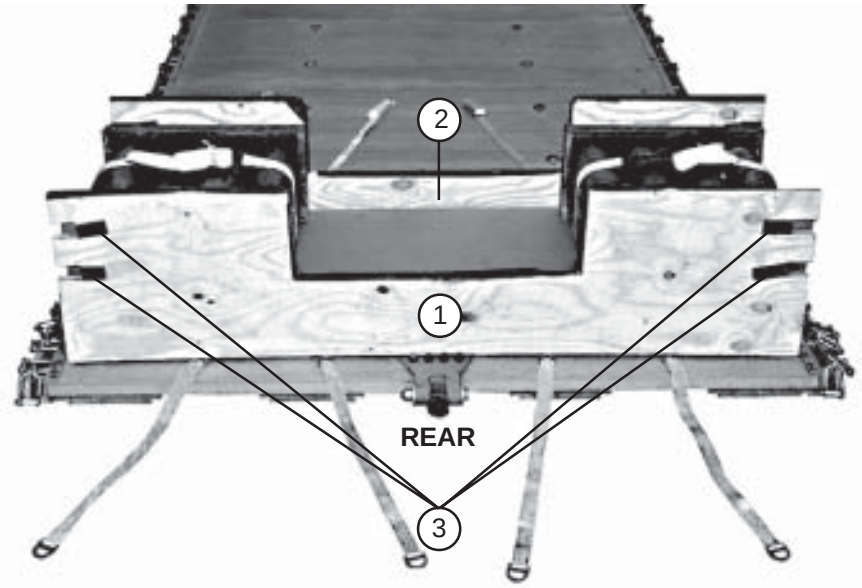
Figure 3-4. Projectiles and Honeycomb Positioned

Notes: 1. Drawing is not to scale.
2. All dimensions are given in inches.



(1) Cut three endboards as shown above.

Figure 3-5. Endboards Prepared

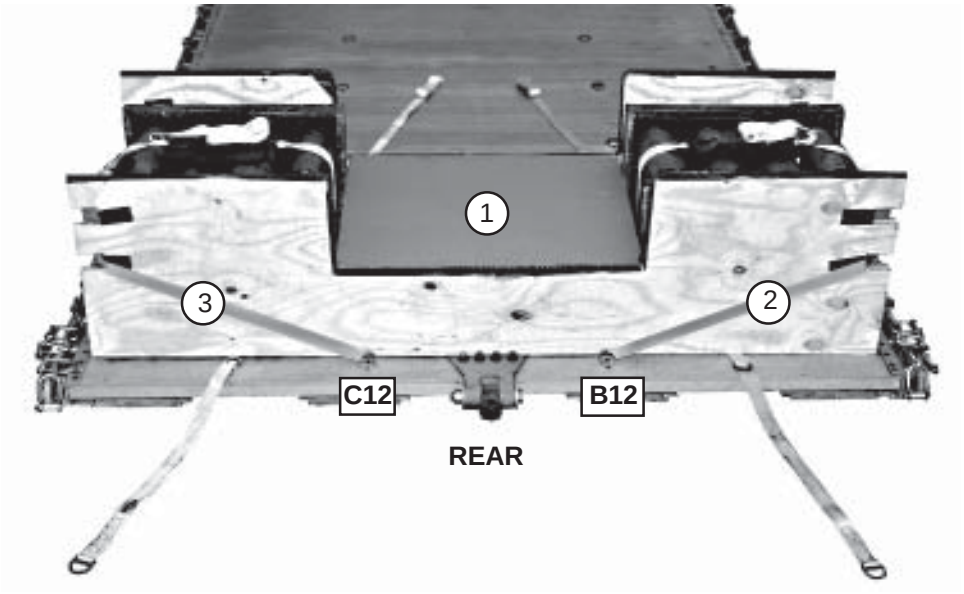


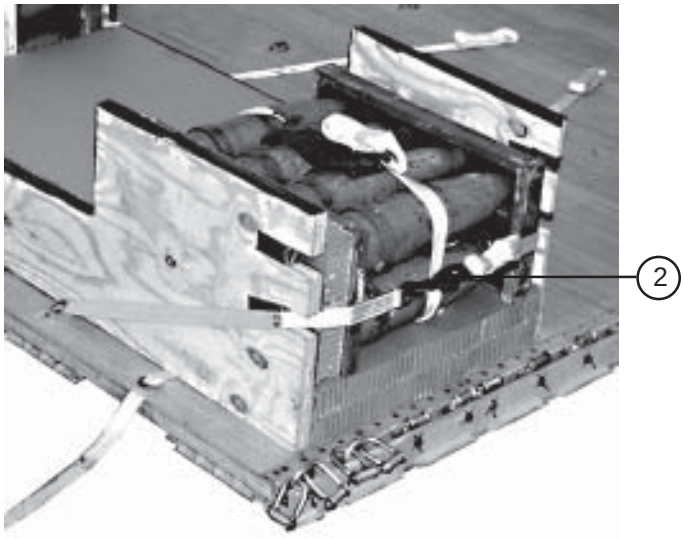
(1) Position two endboards against the rear of the accompanying load.

(2) Position one endboard against the front of the accompanying load.

(3) Tape all cutouts and edges of the endboards where lashings will contact.

Figure 3-6. Endboards Positioned



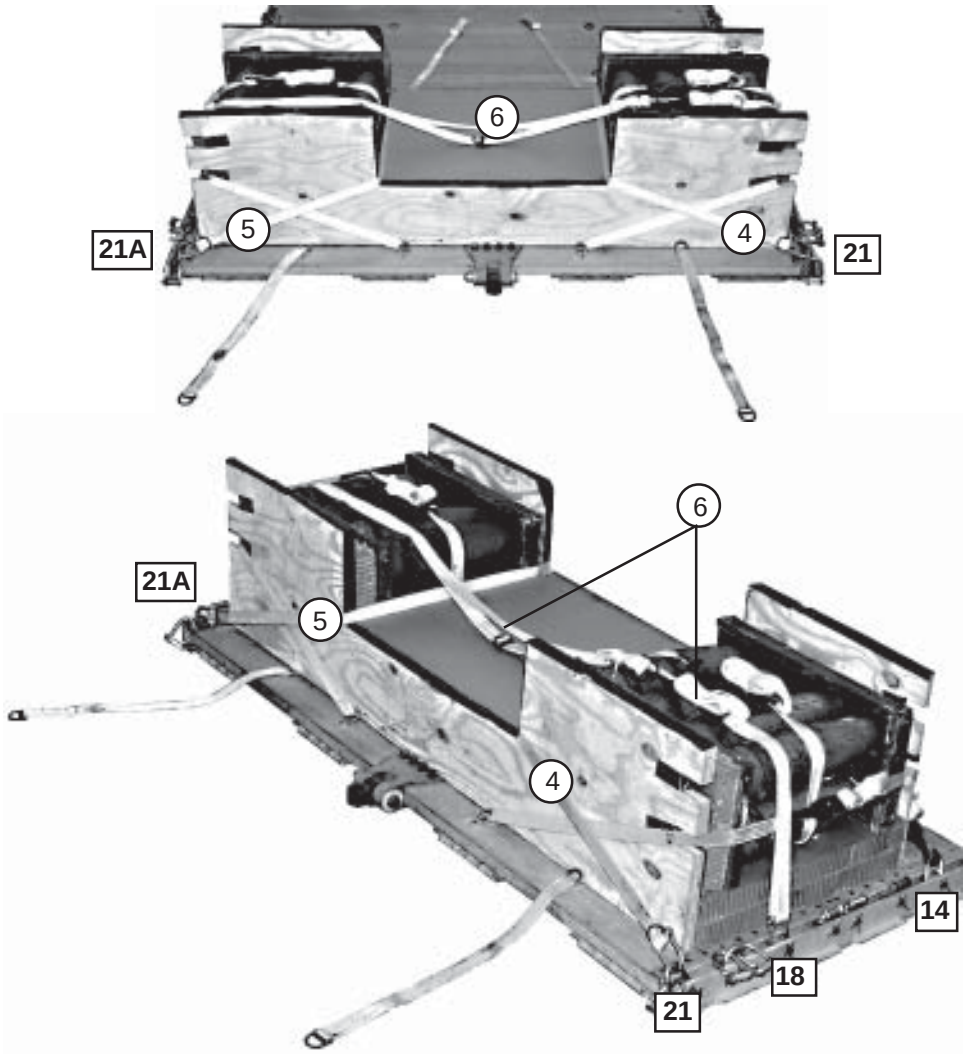


(1) Cut and position two 31- by 37-inch pieces of honeycomb between the two groups of projectiles.

(2) Pass the ends of the pre-positioned lashings in tiedown rings A11 and B12 through the lower cutouts of the endboards. Secure the lashing with a D-ring and load binder on the right side of the projectiles.

(3) Repeat step 2 using tiedown rings B11 and C12 for the lashing on the left side endboard.

Figure 3-7. Projectiles Lashed to Platform



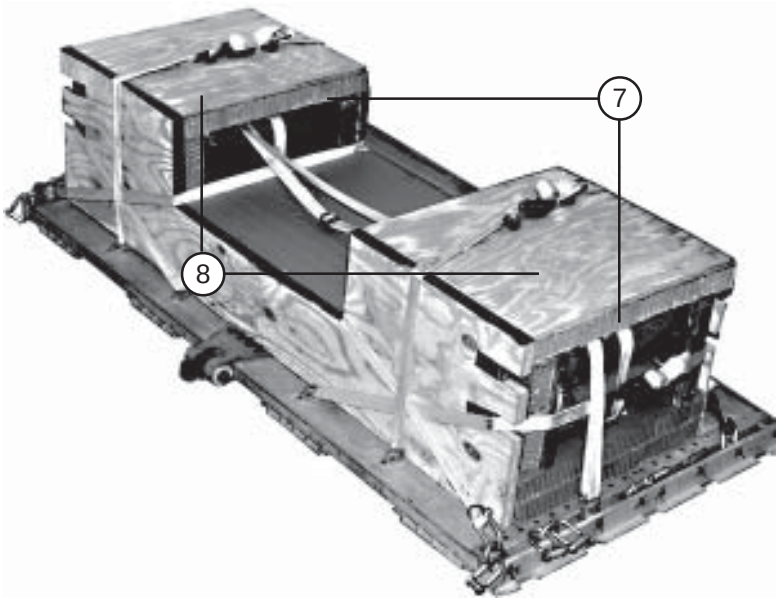
(4) Pass a 15-foot lashing through clevis 21 and through its own D-ring. Pass the lashing around the inside cutout of the endboards and secure the load binder to clevis 14.

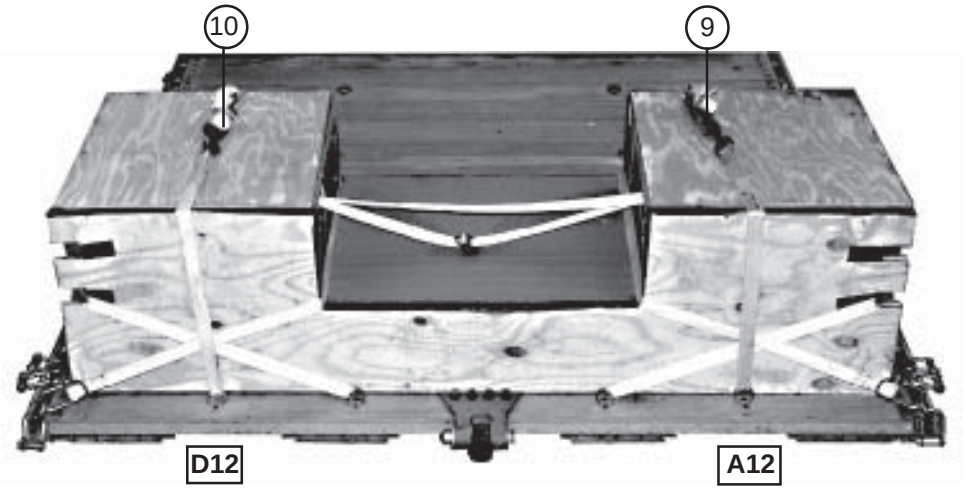
(5) Repeat step 4 using clevises 21A and 14A for the left side.

(6) Form a 30-foot lashing passing one end through clevis 18 and the other free end through clevis 18A. Secure the lashing with D-rings and the load binder on top of the projectile group.

Note: Leave a little slack in the lashing in step 6. When the howitzer is positioned on the platform, the lashing will tighten itself.

Figure 3-7. Projectiles Lashed to Platform (Continued)





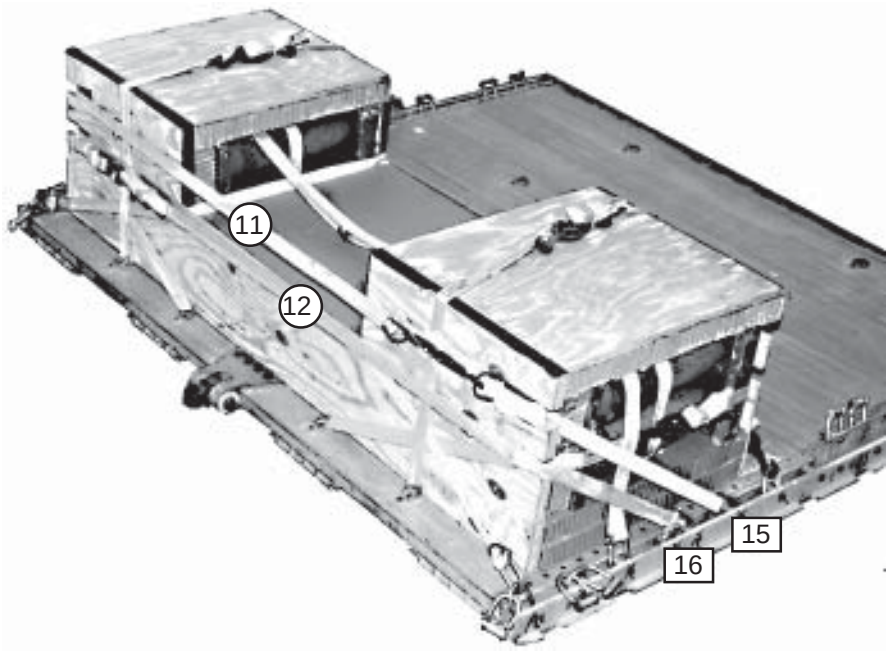
(7) Cut and position a 29- by 31-inch piece of honeycomb on top of each projectile group.

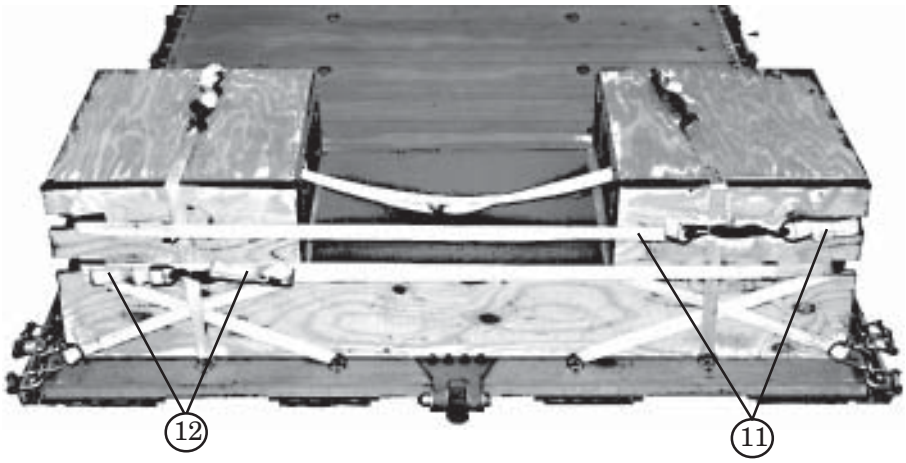
(8) Cut and position a 29- by 31- by 3/4-inch piece of plywood on top of the honeycomb in step 7.

(9) Pass the pre-positioned lashing in tiedown rings A12 and A11 over the top of the right projectile group. Secure the lashing with a D-ring and load binder on top.

(10) Repeat the step for the left side using tiedown rings D12 and B11.

Figure 3-7. Projectiles Lashed to Platform (Continued)

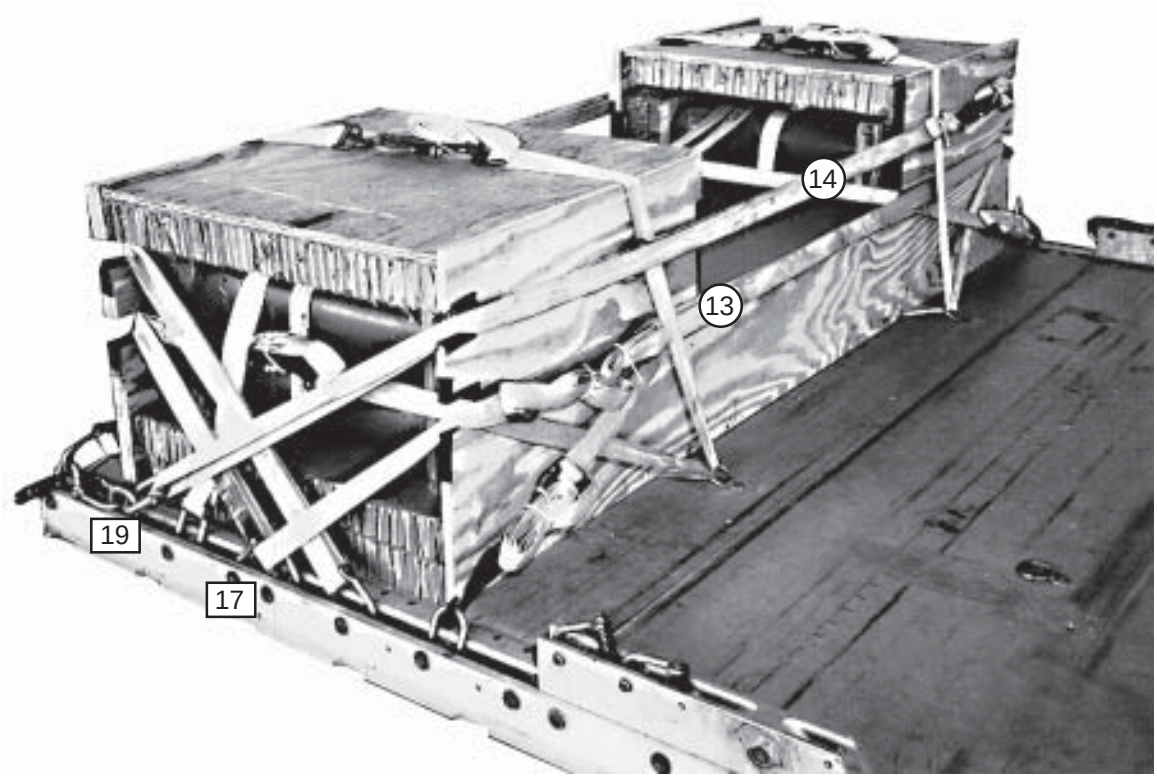




(11) Form a 30-foot lashing according to FM 4-20.102/NAVSEA SS400-AB-MMO-010/ TO 13C7-1-5. Run the lashing through clevises 15 and 15A and through the top cutouts in the rear endboard. Secure the lashing on the right side of the rear endboards with two D-rings and a load binder.

(12) Form a 30-foot lashing according to FM 4-20.102/NAVSEA SS400-AB-MMO-010/ TO 13C7-1-5. Run the lashing through clevises 16 and 16A and through the lower cutouts in the rear endboards. Secure the lashing on the left side of the rear endboards with two D-rings and a load binder.

Figure 3-7. Projectiles Lashed to Platform (Continued)



(13) Form a 30-foot lashing according to FM 4-20.102/NAVSEA SS400-AB-MMO-010/ TO 13C7-1-5. Run the lashing through clevises 17 and 17A and through the lower cutouts in the front endboard. Secure the lashing on the right side of the front endboard with two D-rings and a load binder.

(14) Form a 30-foot lashing according to FM 4-20.102/NAVSEA SS400-AB-MMO-010/ TO 13C7-1-5. Run the lashing through clevises 19 and 19A and through the upper cutouts in the front endboard. Secure the lashing on the left side of the front endboard with two D-rings and a load binder.

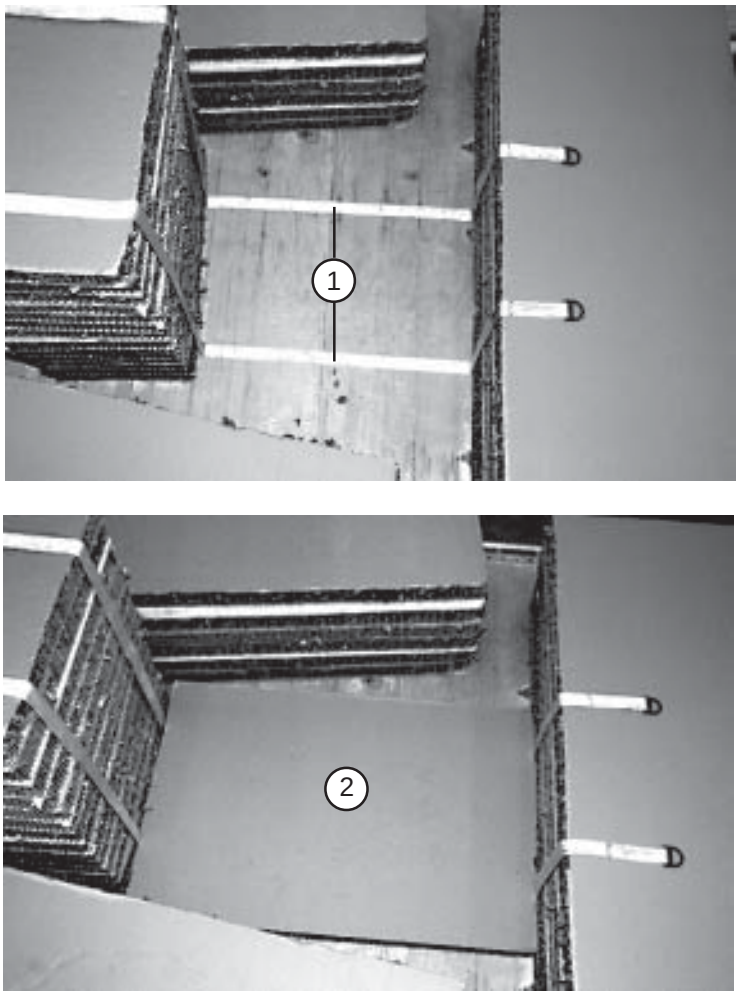
Figure 3-7. Projectiles Lashed to Platform (Continued)

PREPARING AND POSITIONING HONEYCOMB STACKS

3-4. Prepare five honeycomb stacks as shown in Table 2-1 and Figures 2-8 through 2-11. Position the honeycomb stacks on the platform as shown in Figure 2-12.

STOWING ACCOMPANYING EQUIPMENT

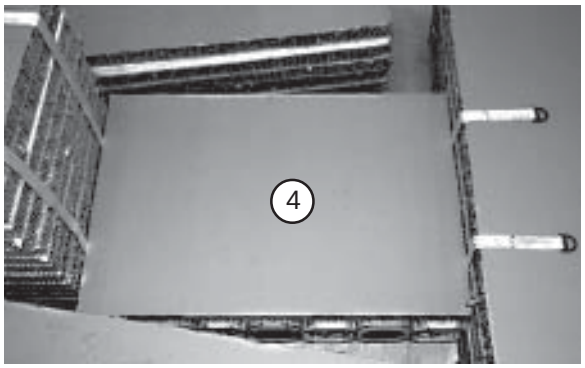
3-5. Stow the accompanying equipment as shown in Figures 3-8 and 3-9.

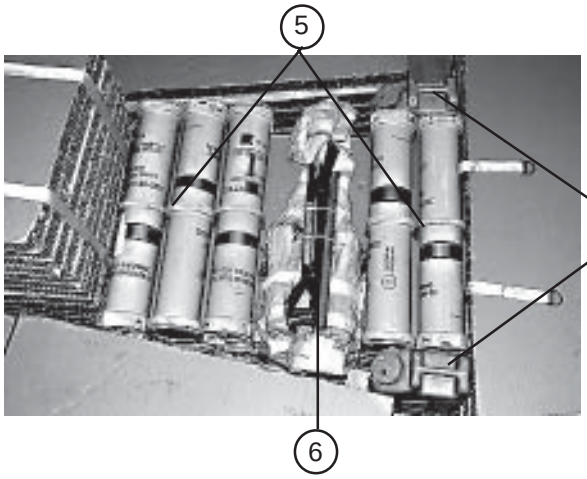


(1) Center two 15-foot lashings 18 inches apart between honeycomb stacks 2 and 3.

(2) Place one 30- by 53-inch piece of honeycomb on top of the lashings.

Figure 3-8. Accompanying Equipment Stowed





(3) Place two rows of seven ammunition canisters on top of the honeycomb.

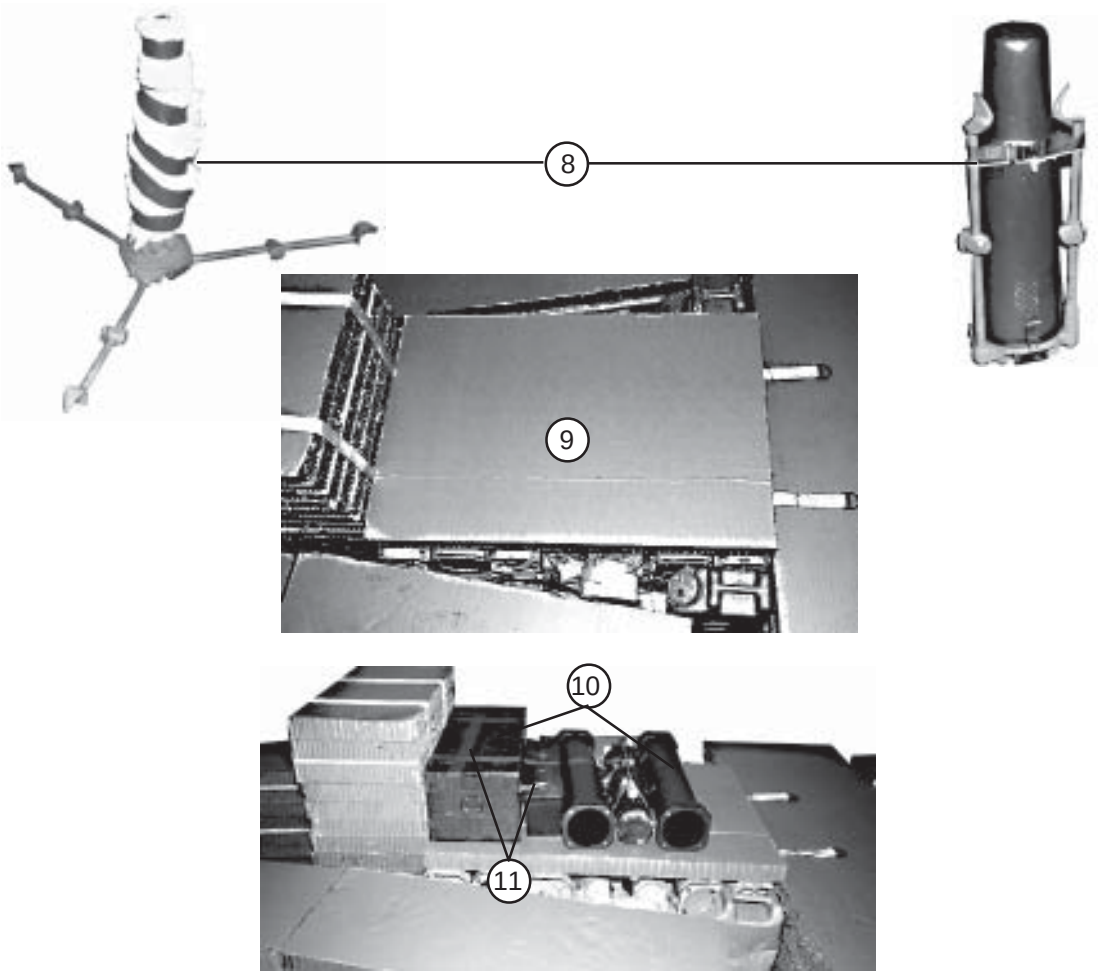
(4) Place a 36- by 53-inch piece of honeycomb on top of the seven ammunition canisters.

(5) Place two rows of three ammunition canisters on the rear of the honeycomb and two rows of two canisters on the front.

(6) Cellulose pad and tape the loading tray, shovel, axe and sledge hammer. Place the loading tray on the honeycomb between the groups of ammunition canisters. Place and secure the remaining items.

(7) Cut a piece of honeycomb and place on the bottom of each water can. Place a water can on each side of the ammunition canister behind stack 2.

Figure 3-8. Accompanying Equipment Stowed (Continued)



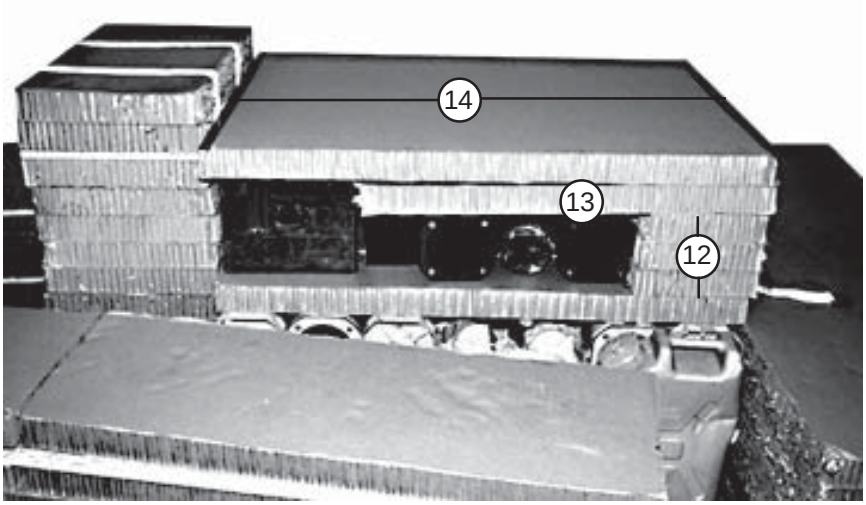
(8) Take the M1A1 collimator out of its case. Place the legs as shown, and tighten the locking knobs. Wrap the collimator with cellulose wadding, and tape the wadding in place. Put the collimator back in its case. Fold the legs up, and tie them in place with type III nylon cord.

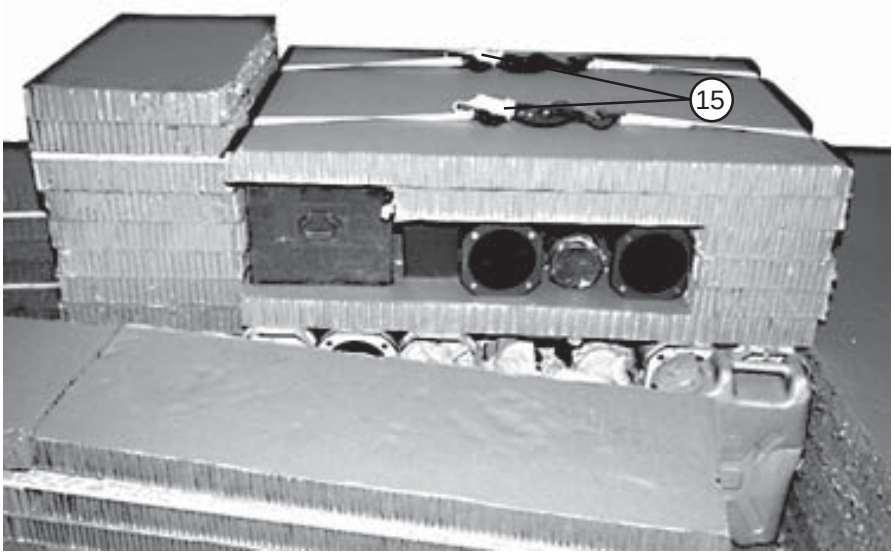
(9) Cut and place a 36- by 53-inch piece of honeycomb on top of the ammunition canisters and miscellaneous items.

(10) Position the section box against stack 3 and position two fuse boxes to the front of the section box. Place one ammunition canister in front of the fuse boxes. Position the collimator in front of the ammunition canister. Place the last ammunition canister in front of the collimator.

(11) Tape the section box with 2-inch adhesive tape. Secure the fuse cans to the section box with 1/2-inch tubular nylon webbing.

Figure 3-8. Accompanying Equipment Stowed (Continued)





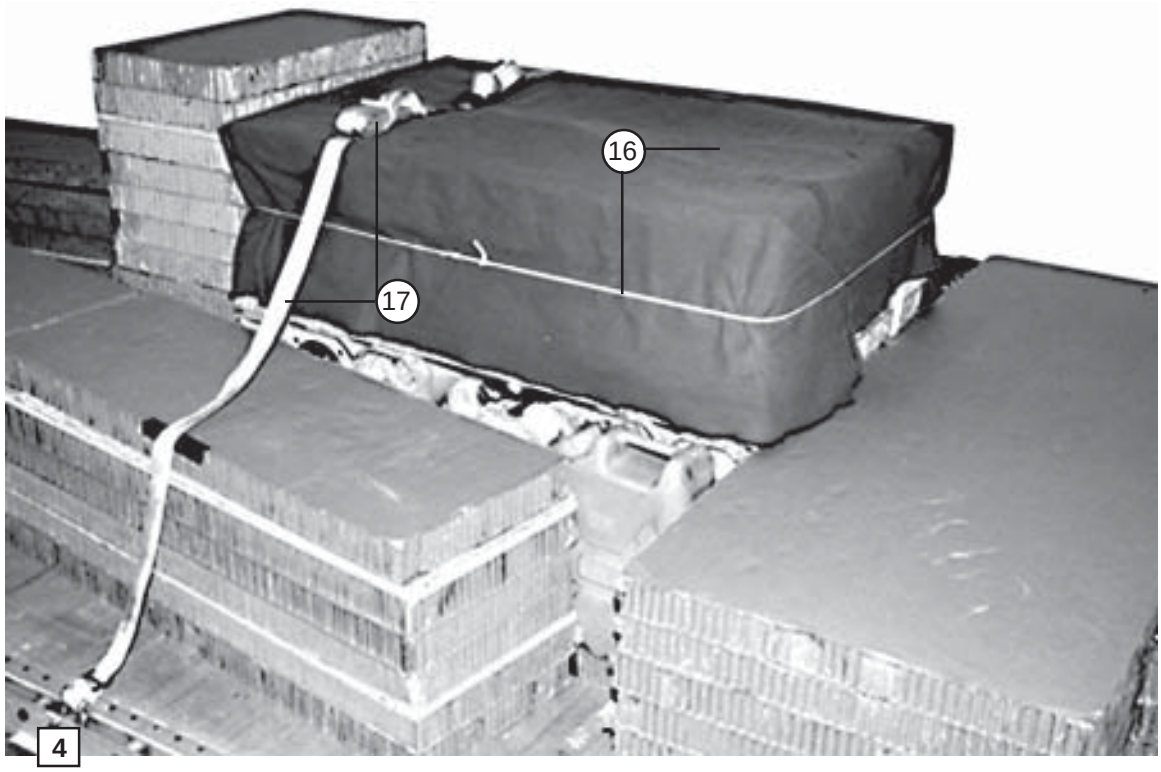
(12) Cut and glue three 12- by 36-inch pieces of honeycomb. Position them in front of the ammunition canister on top of the honeycomb in step 7.

(13) Cut a 40- by 36- inch piece of honeycomb. Place it on top of the section box, collimator, fuse boxes, and ammunition canisters.

(14) Cut a 55-inch by 36-inch piece of honeycomb. Tape the 36-inch edges with 2-inch adhesive tape and position on top of the accompanying load.

(15) Secure the pre-positioned lashings under the accompanying load on top of the 55- by 36-inch piece of honeycomb placed in step 14.

Figure 3-8. Accompanying Equipment Stowed (Continued)



(16) Place a 60- by 60-inch canvas cover over the equipment. Secure the cover with type III nylon cord.

(17) Pass a 15-foot lashing through clevis 4 and through its own D-ring. Pass another 15-foot lashing through clevis 4A and through its own D-ring. Secure the lashing on top of the load with D-rings and load binder. Leave a little slack in the lashings. When the howitzer is positioned, the lashing will tighten.

Figure 3-8. Accompanying Equipment Stowed (Continued)

PREPARING HOWITZER

3-6. Prepare the howitzer as described below.

a. Make sure a metal breechblock support bracket is available. If a bracket is not available, construct one as shown in Figure 1-6. The breechblock support is constructed of steel.

b. Build the gun tube support blocks as shown in Figure 1-7.

c. Prepare the gun tube as shown in Figure 3-9.

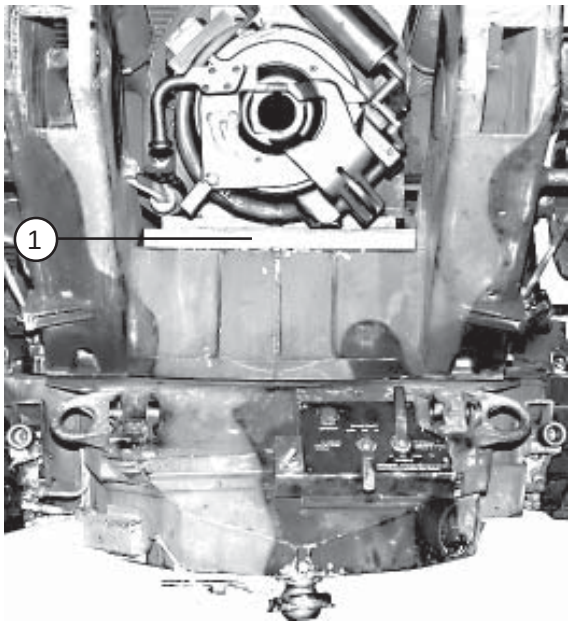
d. Lash the gun tube as shown in Figure 3-10.

e. Secure the baseplate and equipment as shown in Figure 3-11.

f. Prepare the muzzle as shown in Figure 3-12.

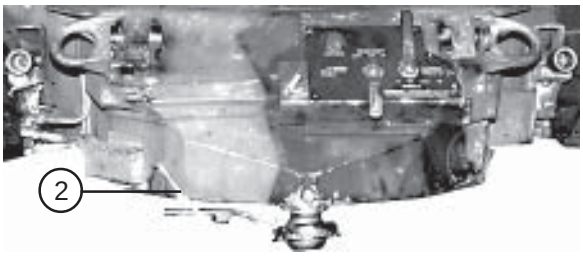
g. Secure additional equipment as shown in Figure 3-13.

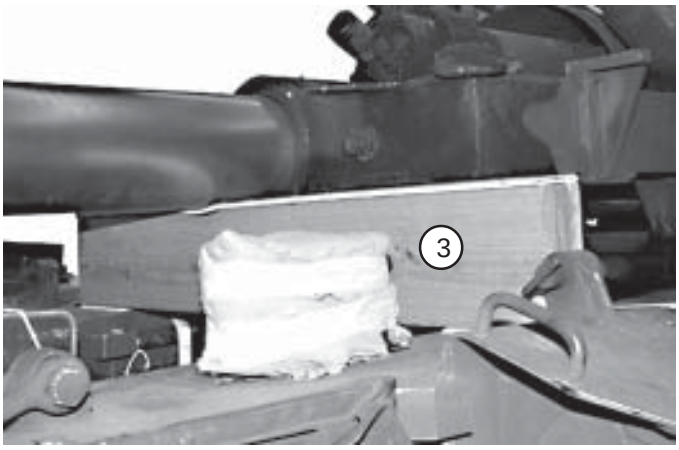
h. Secure the breechblock and pad the breech as shown in Figure 3-14.

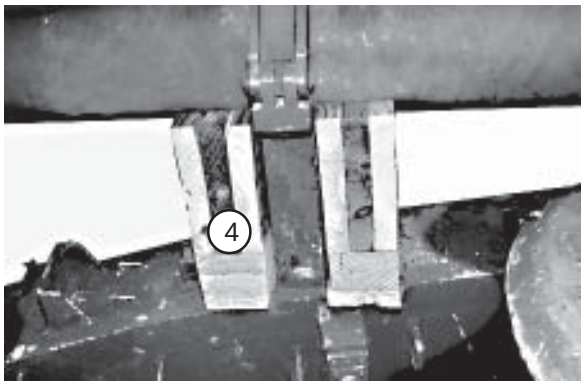


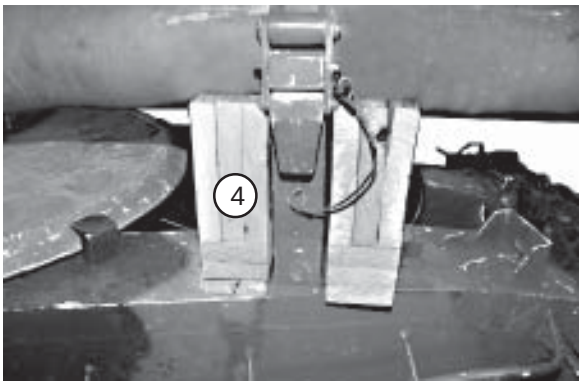
(1) Move the gun tube of the howitzer to the stowed position. Raise the gun tube, and place the metal support bracket under the breechblock. Be sure the fit is snug. The bracket should not move when the breechblock rests on it. If necessary remove and disassemble the bracket and place metal shims in the space provided. Reassemble and replace the bracket.

Figure 3-9. Gun Tube Prepared







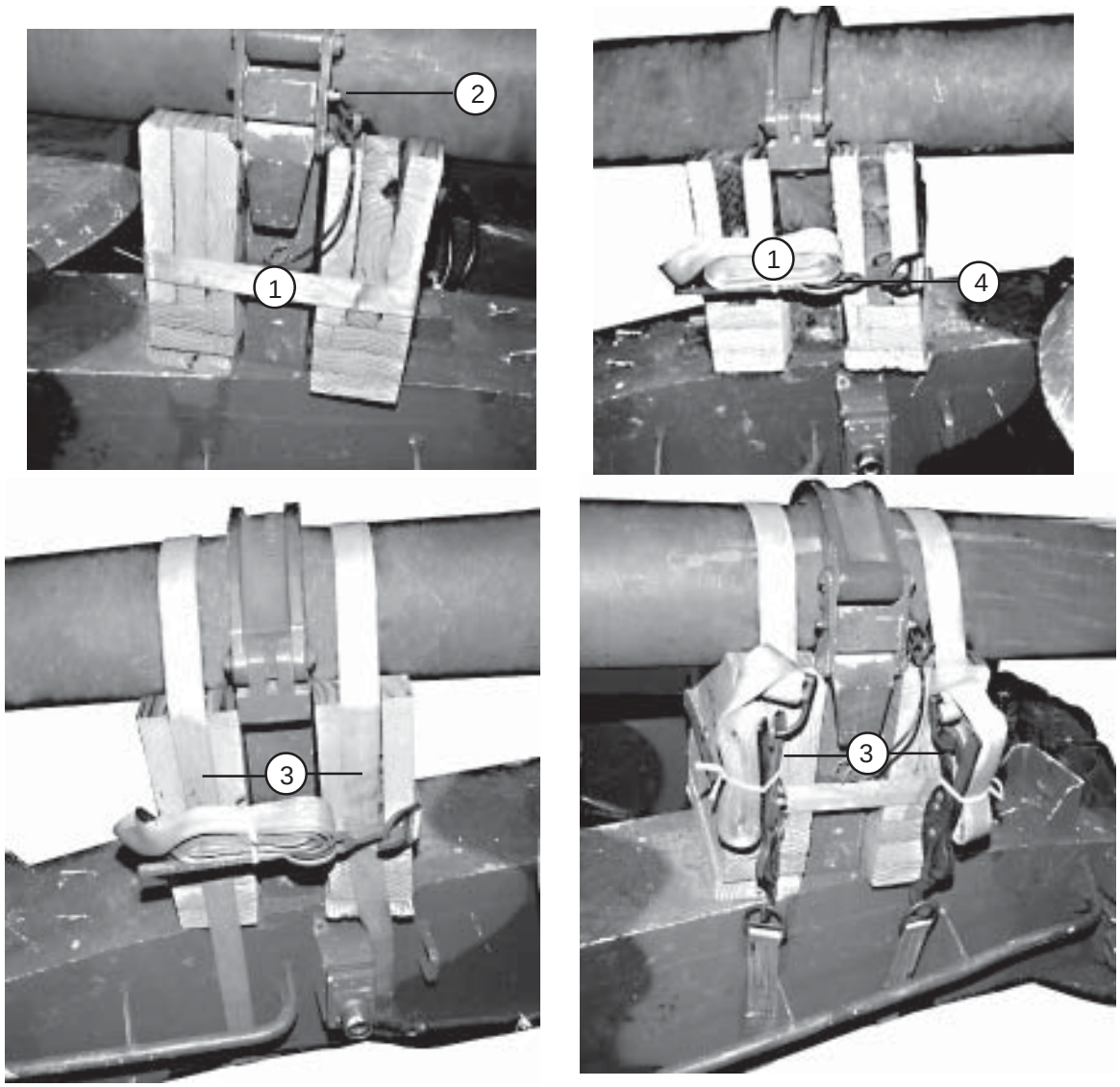


(2) Secure the ball lock lever in place with type III nylon cord.

(3) Set the rear gun tube support block on the trails under the rear of the tube. If necessary use plywood shims of proper thickness between the block and the trails.

(4) Set the forward gun tube blocks on the left trail against the gun tube travel lock. Place the block with the slightly deeper cuts on the breech side of the tube travel lock. If necessary, place plywood or lumber shims between the trail and the block for a snug fit.

Figure 3-9. Gun Tube Prepared (Continued)



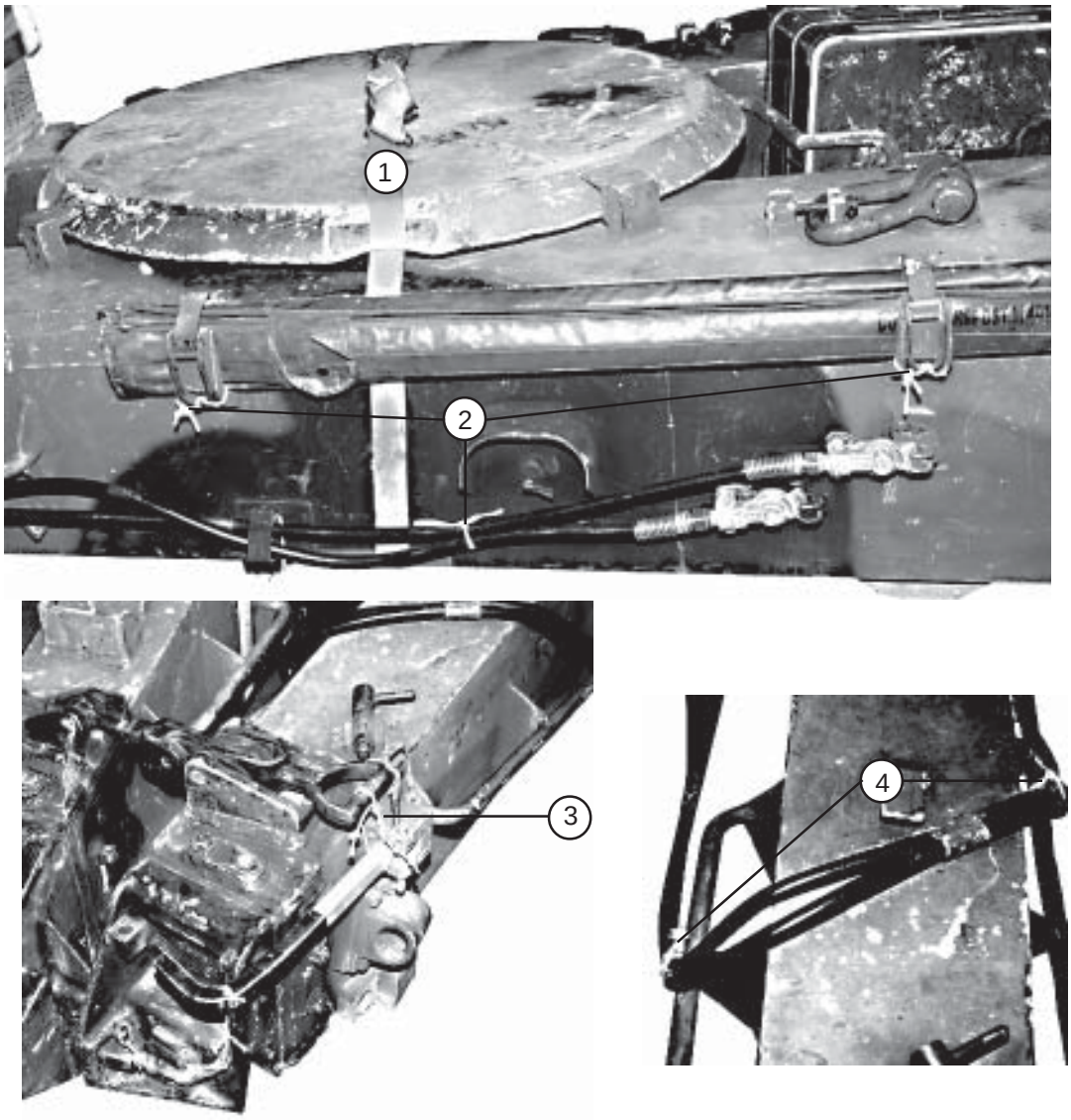
(1) Lash the support blocks to the gun tube travel lock with a 15-foot lashing. Loosely secure the lashings with a D-ring and a load binder to the outside of the gun tube travel lock.

(2) Close the gun tube travel lock, and secure it with the pin provided.

(3) Lash the gun tube left trail with two 15-foot lashings over each forward gun tube support block. Pass them under the load binder from step 1. Secure the lashings with a D-ring and a load binder to the outside of the gun tube travel lock.

(4) Tighten and secure the load binder in step 1.

Figure 3-10. Gun Tube Lashed



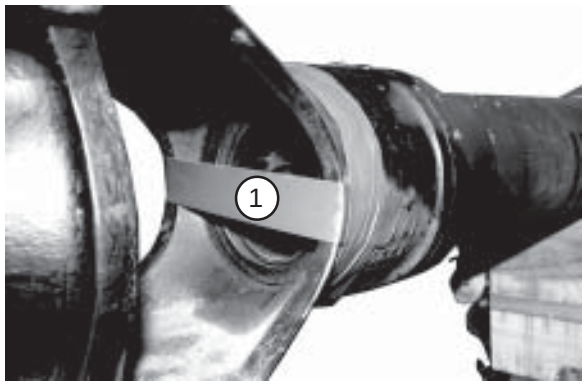
1. Lash the firing baseplate in its stowed position with a 15-foot lashing. Route the lashing around both trails and through the holes in the baseplate. Secure with a D-ring and load binder.

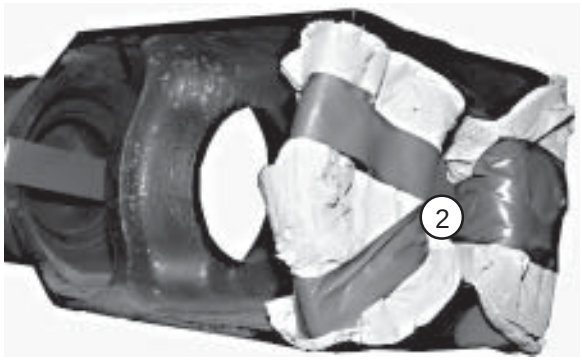
2. Secure the hoses and aiming poles latches to convenient places on the trail with type III nylon cord. Tie the hoses together with 1/4-inch cotton webbing.

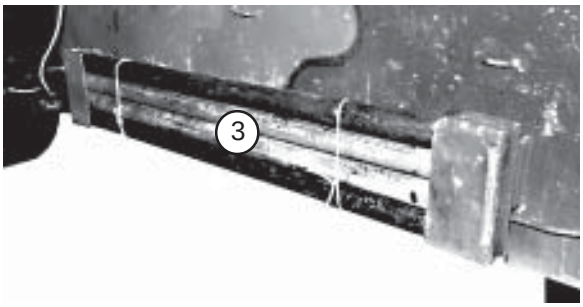
3. Secure the trail lock latch with type III nylon cord.

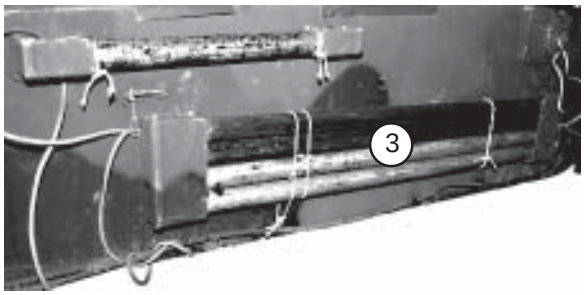
4. Secure the air hose to the left trail lifting handle with type III nylon cord.

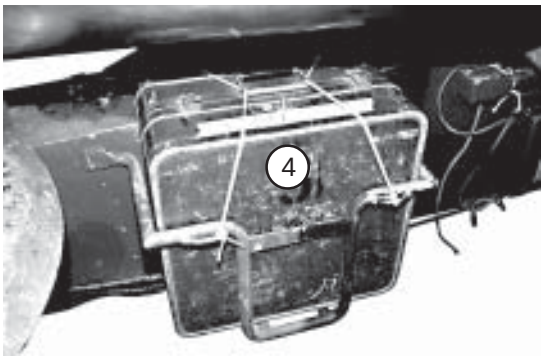
Figure 3-11. Base Plate, Hoses, Aiming Stakes and Trail Lock Secured

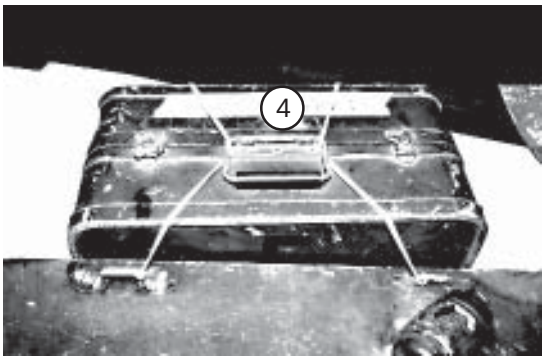












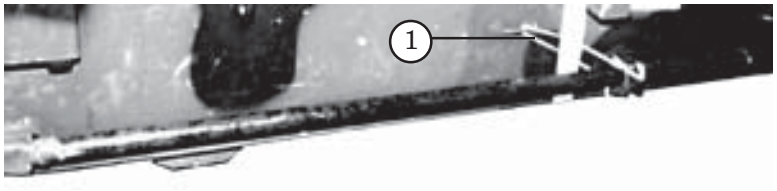
(1) Insert the muzzle plug into the muzzle and secure with 2-inch adhesive tape.

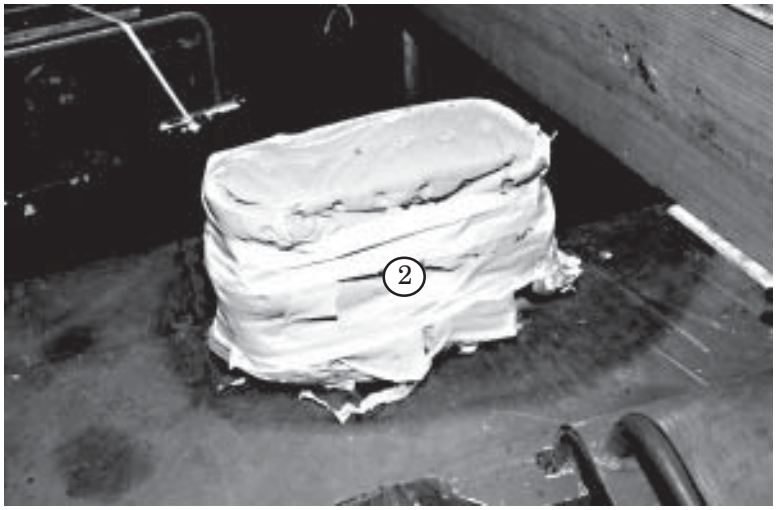
(2) Pad the muzzle with cellulose wadding on each side and tape in place with 2-inch adhesive tape.

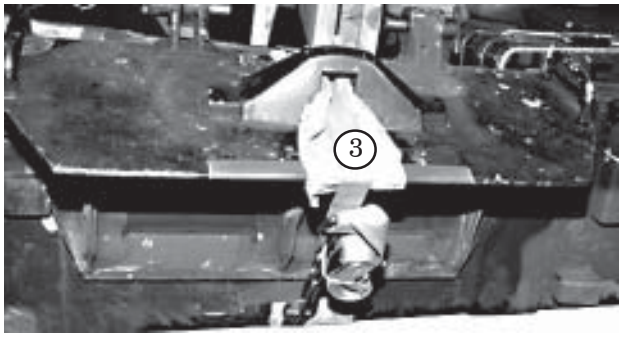
(3) Secure the ramming staff on the inside of the trails with type III nylon cord.

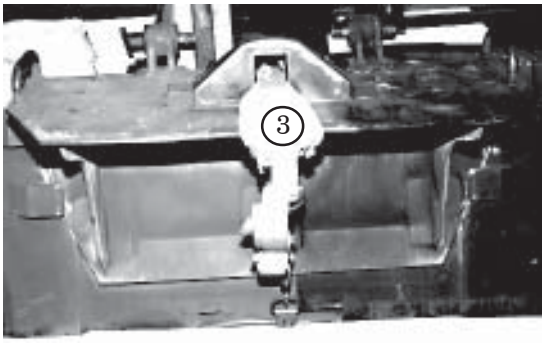
(4) Secure the sight box in its bracket with doubled type III nylon cord.

Figure 3-12. Muzzle Plugged and Ramming Staff and Sight Box Secured







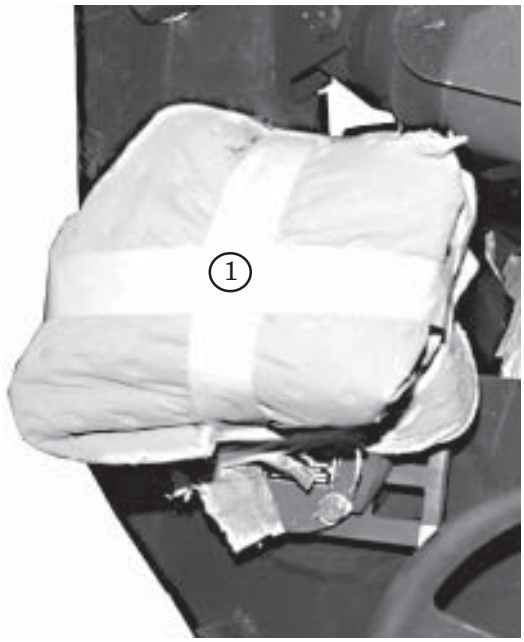


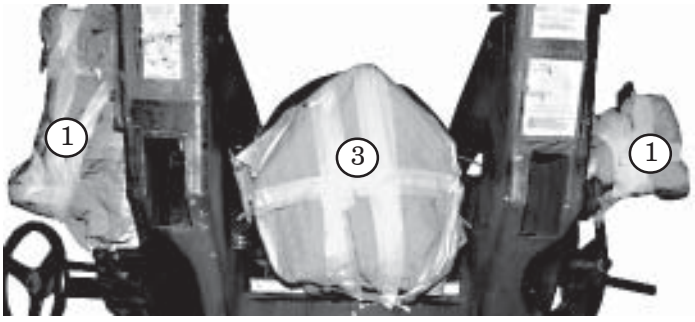
(1) Secure the pole on the left trail with type III nylon cord.

(2) Pad and tape the brake precheck box with cellulose wadding and 2-inch adhesive tape.

(3) Lash each spade in its bracket on each trail with a 15-foot lashing. Pad and tape the edges with cellulose wadding and 2-inch adhesive tape. Secure with D-rings and load binders.

Figure 3-13. Pole Secured, Brake Precheck Box Padded and Spades Secured





(1) Pad and tape the quadrant and telescope mounts on both sides with cellulose wadding and 2-inch adhesive tape.

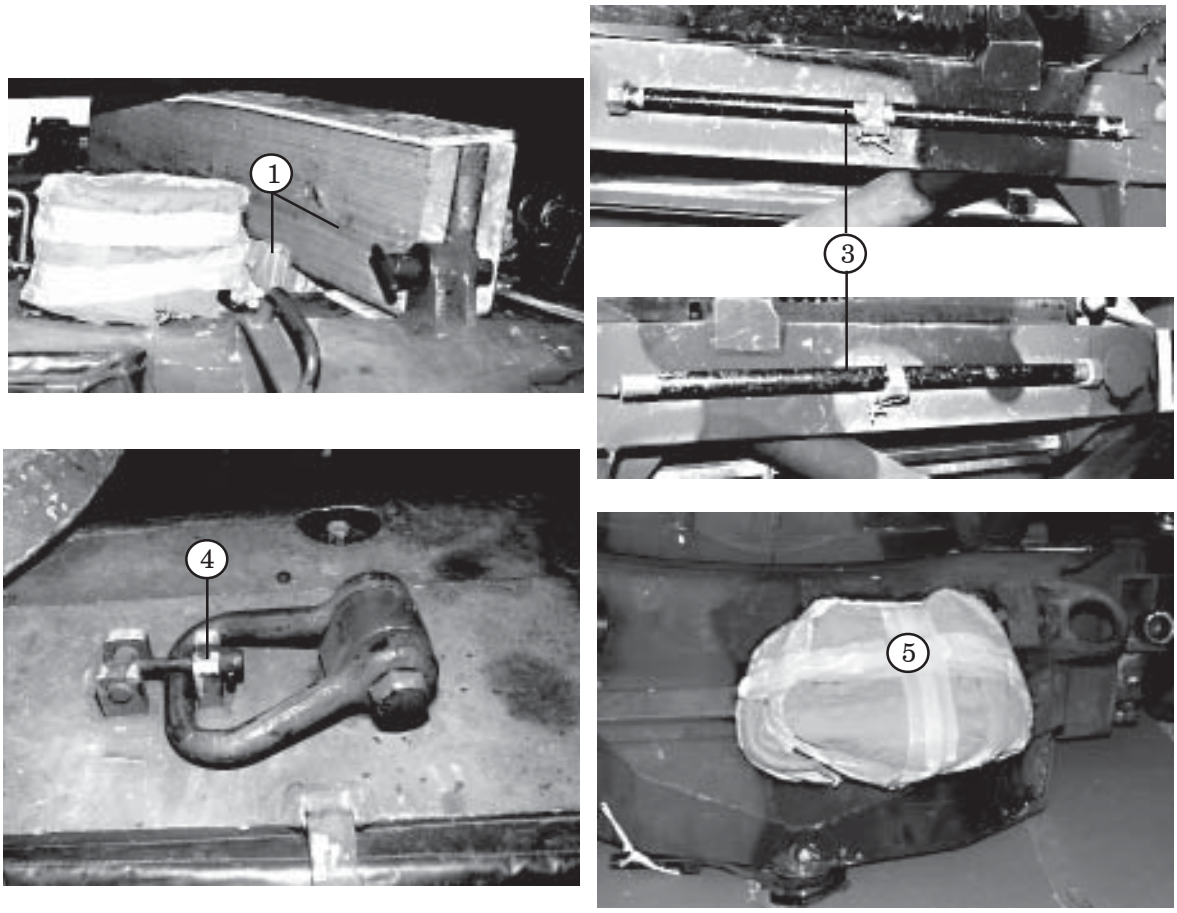
(2) Secure the breechblock with a 15-foot lashing. Run the lashing under the cradle assembly, over the breechblock, and under the thermal warning device. Secure on top with a D-ring and load binder.

(3) Pad the breech with cellulose wadding and tape in place. Put on the breechblock cover, if available.

Figure 3-14. Mounts and Breech Padded and Breechblock Secured

INSTALLING LIFTING SLINGS AND POSITIONING HOWITZER

3-7. Install lifting slings and position the howitzer according to Paragraph 2-7, Figure 2-15, steps 1 through 5 and Figure 3-15.

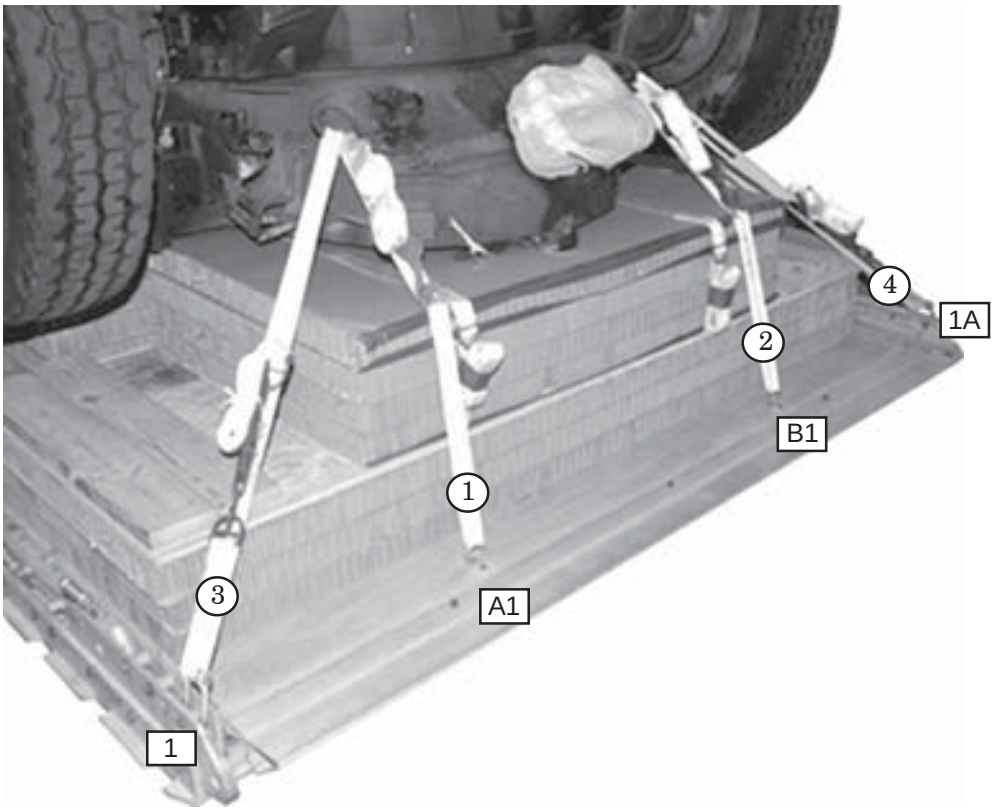


1. Ensure the tube support blocks are resting solidly on honeycomb stack 3.
2. Remove the lifting slings and large clevises (Not Shown).
3. Stow the pump handles into their brackets and secure the latch with type III nylon cord.
4. Stow the lifting point clevises.
5. Pad and tape the manifold assembly (speed shift) with cellulose wadding and tape.

Figure 3-15. Howitzer Positioned

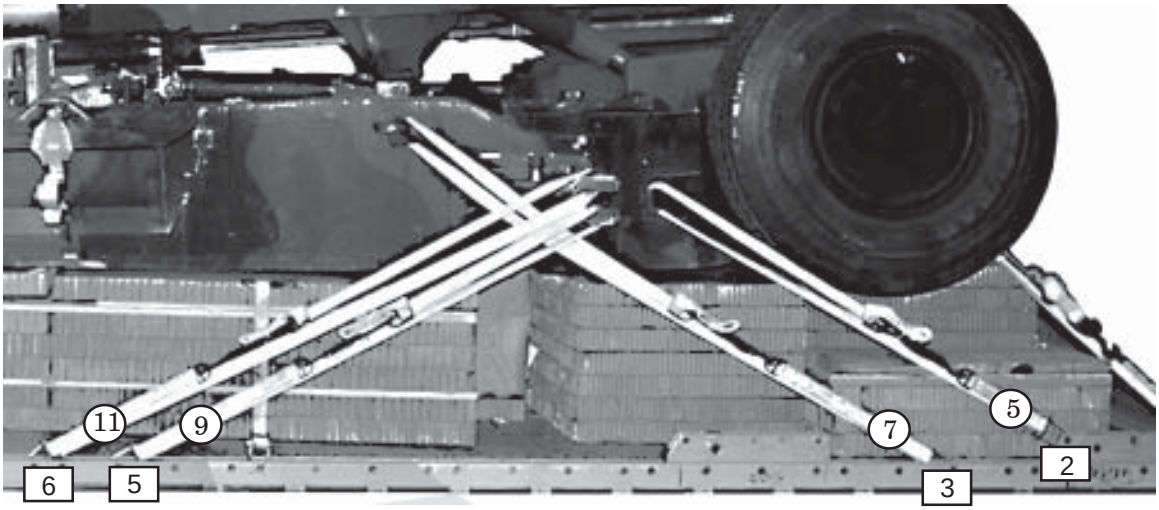
LASHING HOWITZER

3-8. Lash the howitzer to the platform using thirty 15-foot tiedown assemblies. Install the lashings as shown in Figures 3-16 through 3-20. Secure the bucket between the trails as shown in Figure 3-21.



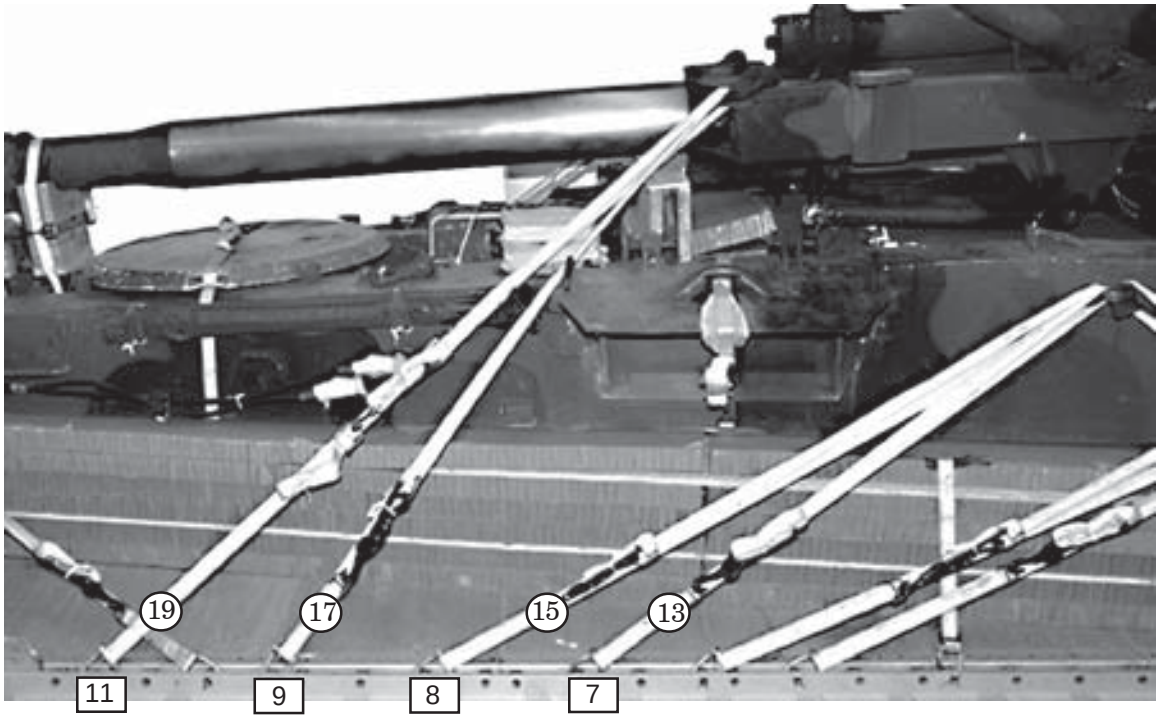
Lashing Number	Tie-down Clevis Number	Instructions
		Pass lashing:
1	A1	Through right front tiedown provision on lower carriage.
2	B1	Through left front tiedown provision on lower carriage.
3	1	Through right front tiedown provision on lower carriage.
4	1A	Through left front tiedown provision on lower carriage.

Figure 3-16. Lashings 1 through 4 Installed



Lashing Number	Tie-down Clevis Number	Instructions
		Pad the contact point with felt and pass lashing:
5	2	Through right locking plug hole on lower carriage.
6	2A	Through left locking plug hole on lower carriage.
7	3	Through tiedown provision on right trail.
8	3A	Through tiedown provision on left trail.
9	5	Through the lower trail locking plug hole on right trail.
10	5A	Through the lower trail locking plug hole on left trail.
11	6	Through the upper trail locking plug hole on right trail.
12	6A	Through the upper trail locking plug hole on the left trail.

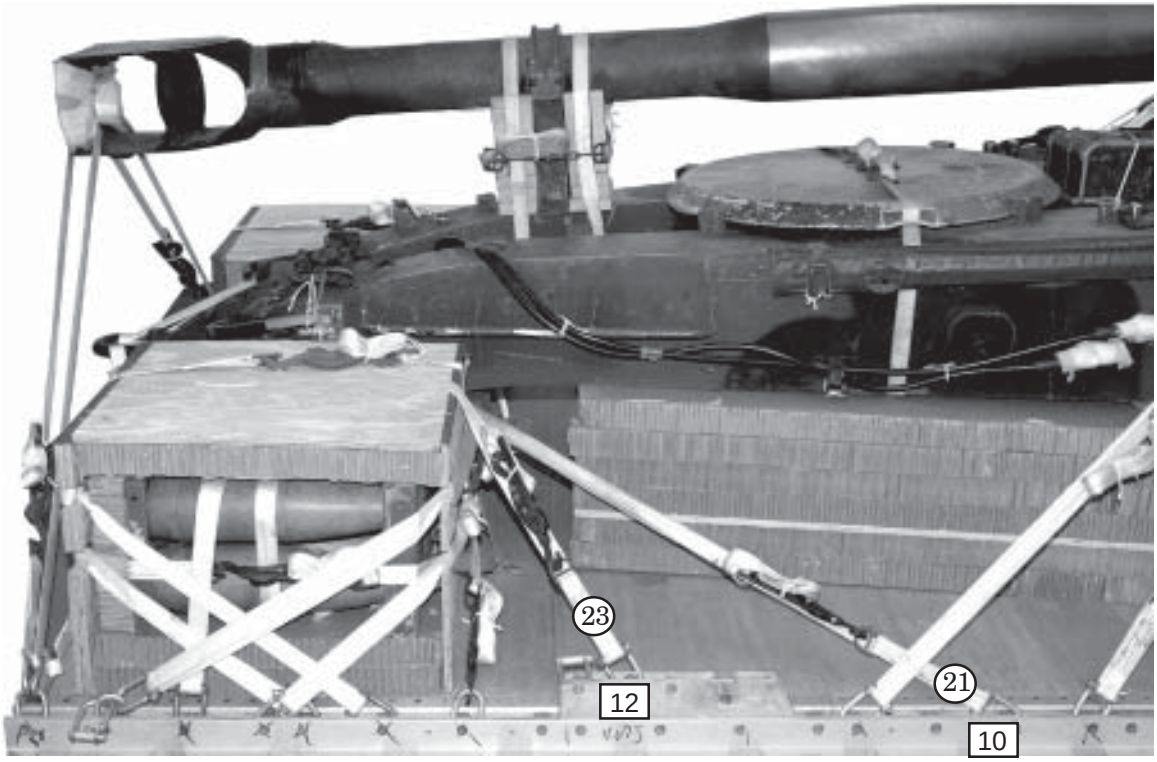
Figure 3-17. Lashings 5 through 12 Installed



Lashing Number	Tie-down Clevis Number	Instructions
		Pad the contact point with felt and pass lashing:
13	7	Through tiedown provision on right trail.
14	7A	Through tiedown provision on left trail.
15	8	Through tiedown provision on right trail.
16	8A	Through tiedown provision on left trail.
17	9	Through the clevis on the right corner of the cradle assembly.
18	9A	Through the clevis on the left corner of the cradle assembly.
19*	11	Through the clevis on the right corner of the cradle assembly.
20*	11A	Through the clevis on the left corner of the cradle assembly.

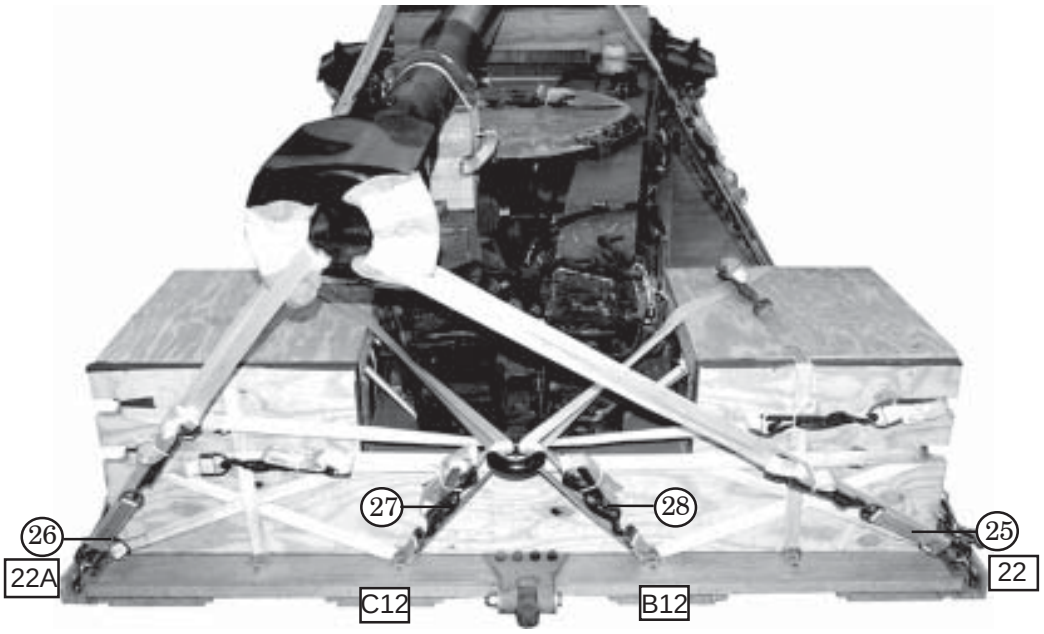
* 30-foot lashing

Figure 3-18. Lashings 13 through 20 Installed



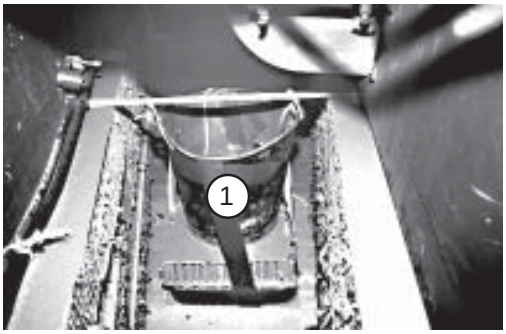
Lashing Number	Tie-down Clevis Number	Instructions
		Pass lashing:
21	10	Through tiedown provision on right trail.
22	10a	Through tiedown provision on left trail.
23	12	Over the ammunition load, and through the lunette.
24	12a	Over the ammunition load, and through the lunette.

Figure 3-19. Lashings 21 through 24 Installed



Lashing Number	Tie-down Clevis Number	Instructions
		Pass lashing:
25	22	Through the muzzle brake on the right side.
26	22A	Through the muzzle brake on the left side.
27	B12	Through the lunette.
28	C12	Through the lunette.

Figure 3-20. Lashings 25 through 28 Installed

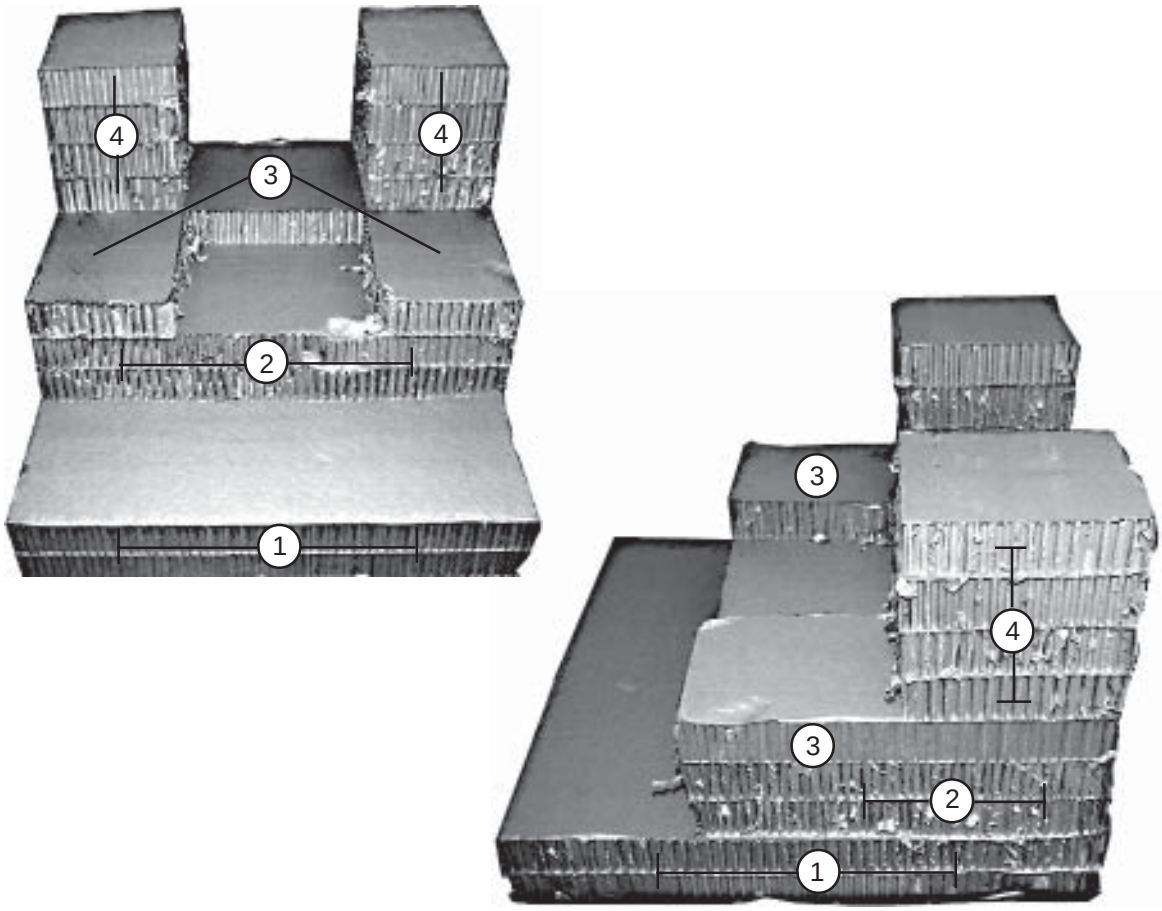


(1) Cut and glue two 12- by 12- inch pieces of honeycomb. Secure the pieces of honeycomb to the bottom of the bucket using 2-inch adhesive tape. Secure the bucket handle to the baseplate lashing between the trails with type III nylon cord.

Figure 3-21. Bucket Placed and Secured

BUILDING AND INSTALLING RELEASE STOWAGE PLATFORM

3-9. Build the release stowage platform as shown in Figures 3-22 and 3-23. Install the release stowage platform as shown in Figure 3-24.



(1) Form a base with two 34- by 36-inch pieces of honeycomb.

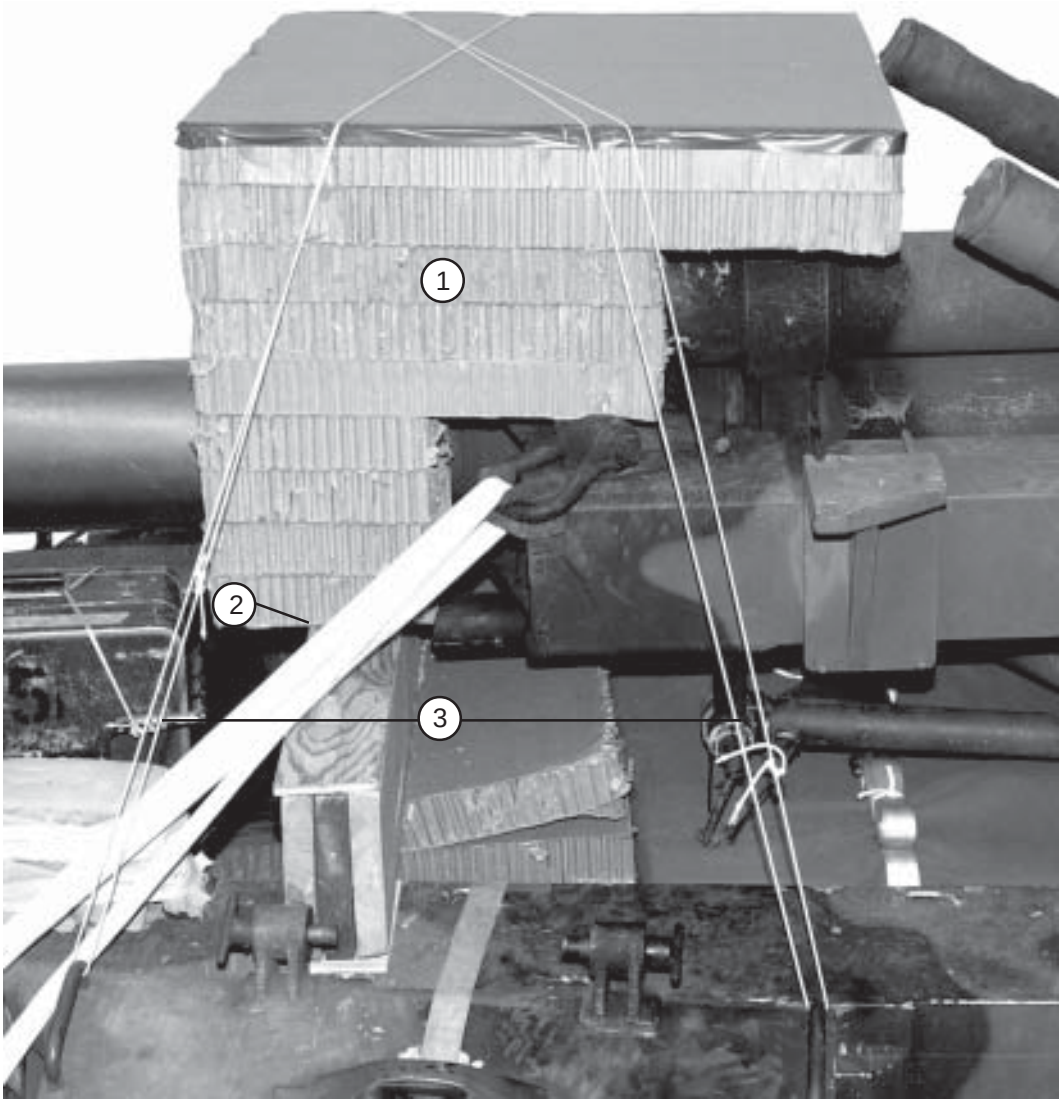
(2) Cut and glue two 34- by 24-inch pieces of honeycomb flush with the rear edge of the base stack.

(3) Cut and glue a 34- by 24-inch piece of honeycomb with a 14- by 12-inch cutout on the 34-inch edge. Place the cutout to the front.

(5) Cut and glue two stacks of four 10- by 12-inch pieces of honeycomb. Place them flush with the rear right and left corners.

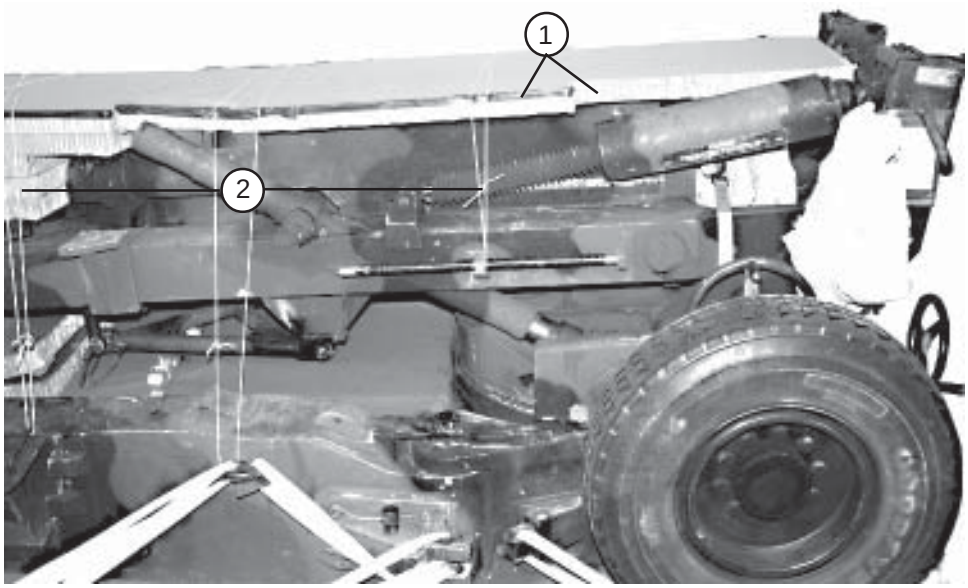
(6) Allow the stacks to dry after being glued.

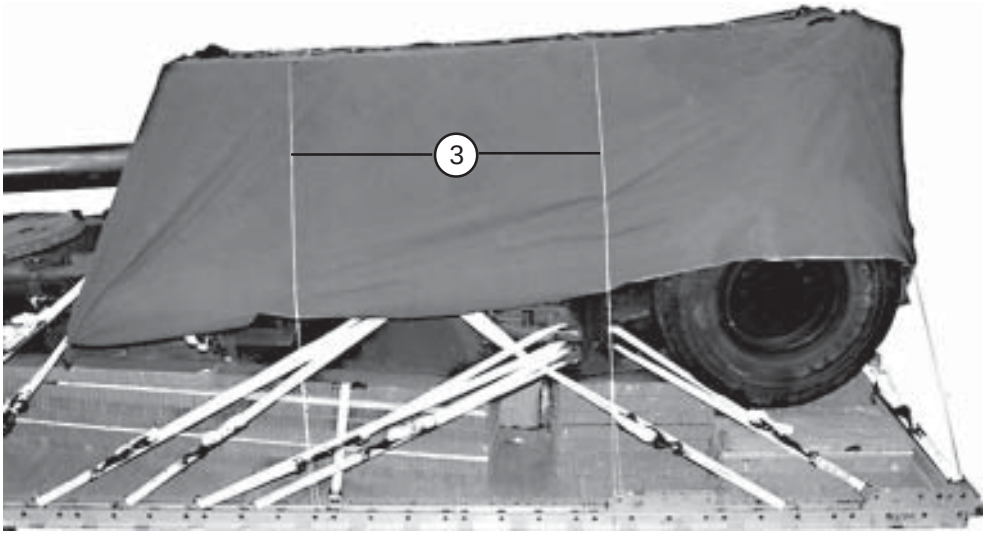
Figure 3-22. Release Stowage Platform Built



1. Invert the release platform. Place 2-inch adhesive tape along the top left and right sides of the honeycomb platform.
2. Place the platform over the top of the gun tube, flush with the tube support lumber.
3. Secure the release platform to the load with type III nylon cord at convenient points on the load.

Figure 3-23. Release Platform Installed





(1) Make a 3- by 36-inch cutout in each front corner of a 36- by 96-inch piece of honeycomb. Place 2-inch adhesive tape along the sides of the honeycomb. Place the piece on top of the cradle assembly.

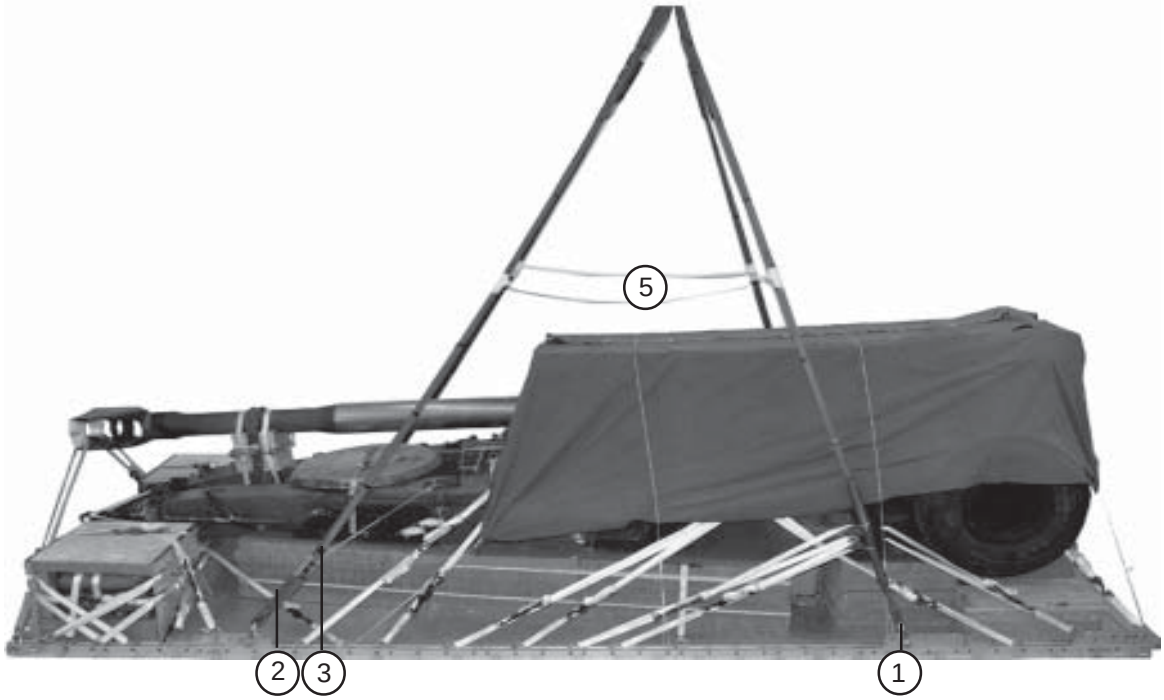
(2) Tie the 36- by 96-inch piece of honeycomb in place with type III nylon cord.

(3) Place a 10- by 16-foot piece of canvas over the load. Tie the canvas in place with type III nylon cord under the gun tube and to convenient points on the load.

Figure 3-24. Release Platform Installed and Load Covered

INSTALLING, PADDING AND SECURING SUSPENSION SLINGS

3-10. Install suspension slings according to FM 4-20.102/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figure 3-25. Pad and secure the suspension slings as shown in Figure 3-26.



Note: Pad and tape any sharp areas the suspension slings may come in contact with during deployment.

(1) Attach a 16-foot (4-loop), type XXVI nylon sling to each front suspension bracket with a large clevis.

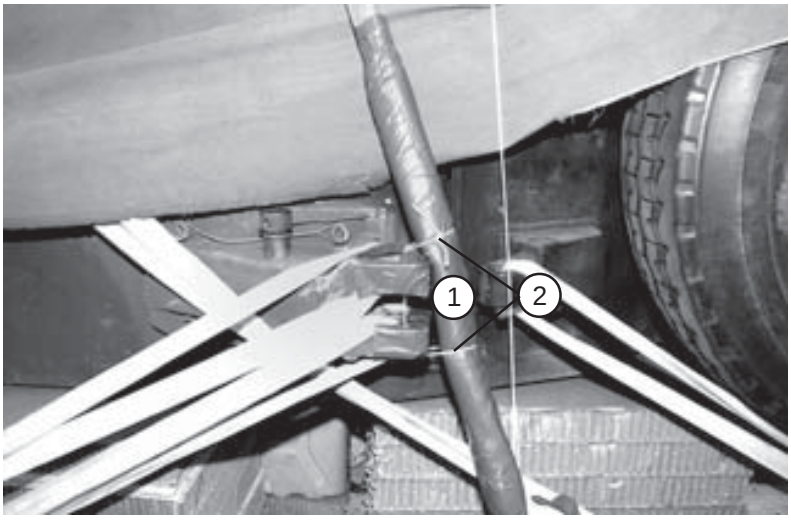
(2) Place one end of a 3-foot (4-loop), type XXVI nylon sling on a large clevis. Pass the free end of the sling through a 5 1/2-inch two point link. Place the free end on the large clevis and attach it to the rear suspension bracket. Repeat for the opposite side (Not Shown).

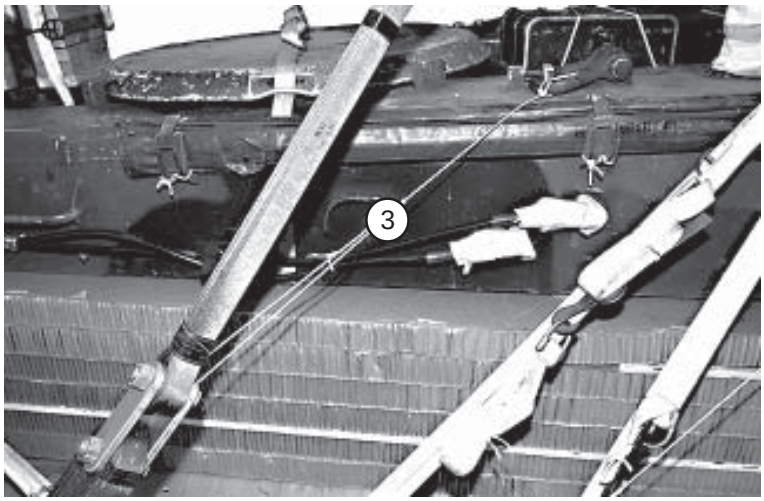
(3) Attach a 16-foot (4-loop), type XXVI nylon sling to the 5 1/2 -inch two-point link.

(4) Repeat for the opposite side (Not Shown).

(5) Raise the suspension slings and install the safety tie according to FM 4-20.102/NAVSEA SS400-AB-MMO-010/TO13C7-1-5.

Figure 3-25. Suspension Slings Installed





(1) Pad both front suspension slings with a 24- by 6-inch piece of felt. Center the felt on the slings where they make contact with the rear trail locking plug holes. Tape the felt in place with 2-inch adhesive tape. Tape both rear trail locking plug holes with 2-inch adhesive tape.

(2) Route a length of type III nylon cord through the rear trail locking plug holes, around the sling, and back through the rear trail locking plug holes. Secure it against the rear trail locking plug hole. Repeat for the other side of gun.

(3) Secure the 5 1/2-inch two-point links to the lifting provisions on the trails with type III nylon cord.

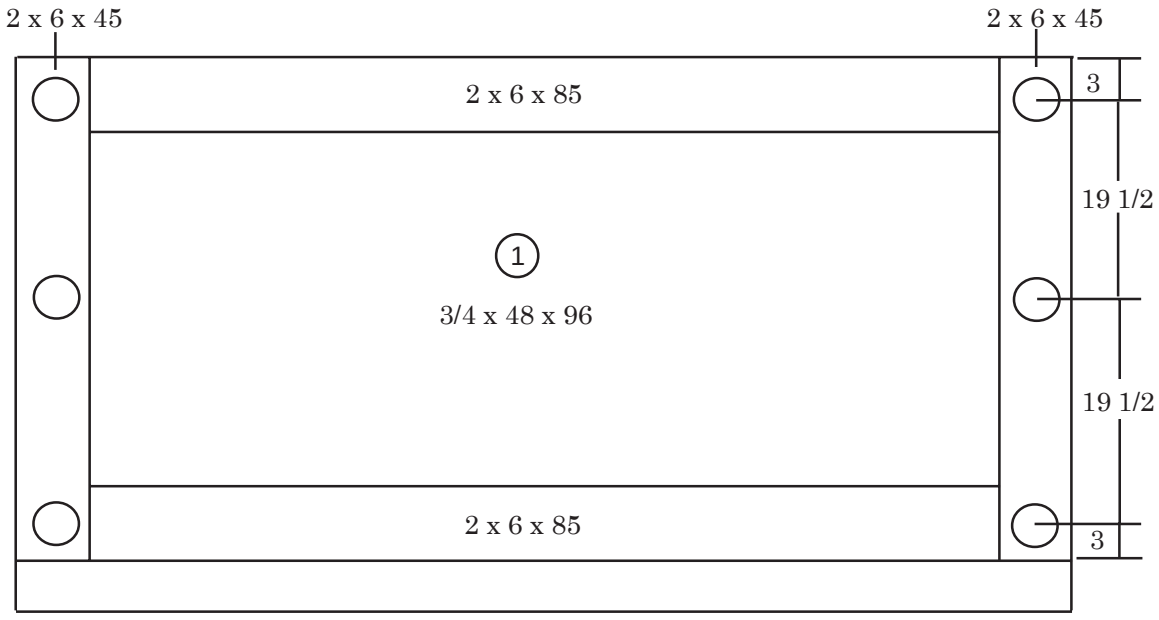
(4) Lower the suspension slings (Not Shown).

Figure 3-26. Suspension Slings Padded and Secured

STOWING CARGO PARACHUTES

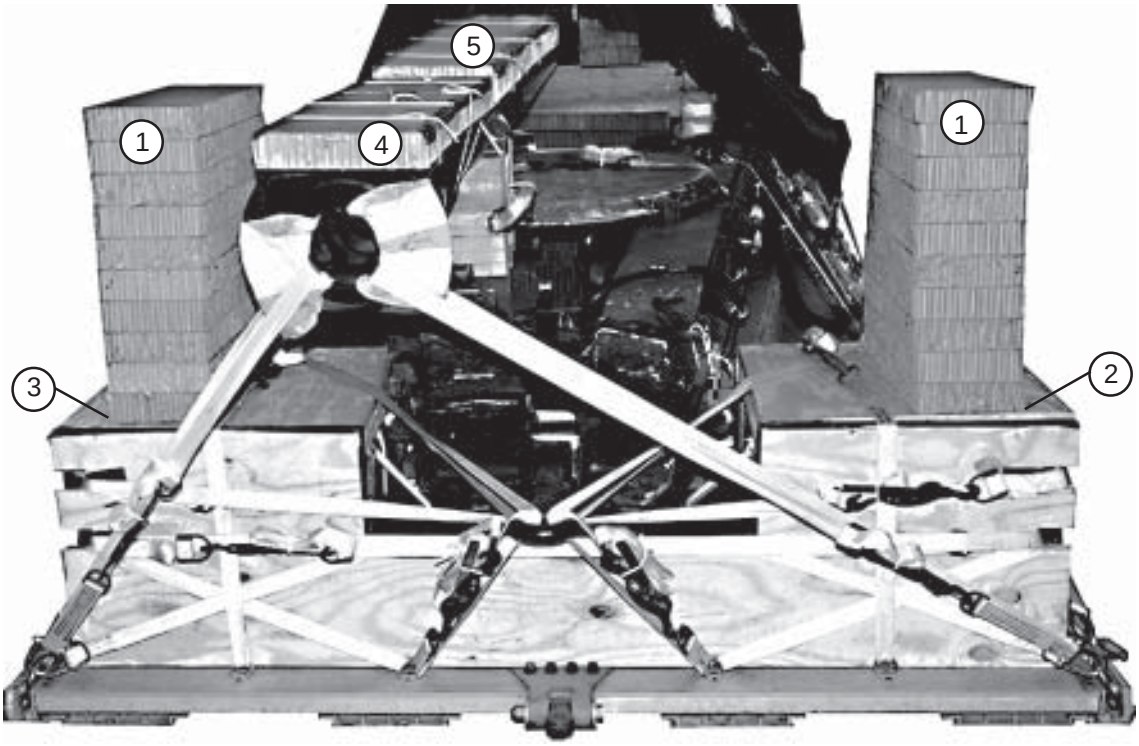
3-11. Build the stowage platform as shown in Figure 3-27. Install the parachute stowage platform as shown in Figure 3-28. Stow five G-11C cargo parachutes and install the parachute restraint straps and install the multicut parachute release straps as shown in Figure 3-29.

Notes: 1. Drawing is not to scale.
2. All dimensions are given in inches.



(1) Build the parachute stowage platform as shown using 8d nails. Drill 2-inch holes through the plywood and the end pieces of the 2- by 6-inch lumber as shown.

Figure 3-27. Parachute Stowage Platform Built



1. Cut 20 pieces of 12- by 29-inch honeycomb and make two 10-layer support stacks.
2. Place one honeycomb stack 5 inches from the right side and flush with the rear edge of the ammunition load.
3. Repeat step 2 for the left side.
4. Place a 14- by 50-inch piece of honeycomb on top of the muzzle brake. Tape the edges with 2-inch adhesive tape. Secure the piece with four lengths of type III nylon cord.
5. Place a 10- by 56-inch piece of honeycomb on top of the gun tube. Tape the edges with 2-inch adhesive tape. Secure with type III nylon in three evenly spaced places. Do not use tape on the gun tube.

Figure 3-28. Parachute Stowage Platform Installed

(6) Center the parachute stowage platform on top of the honeycomb support stacks with the rear edge of the stowage platform flush with the rear edge of the type V platform.

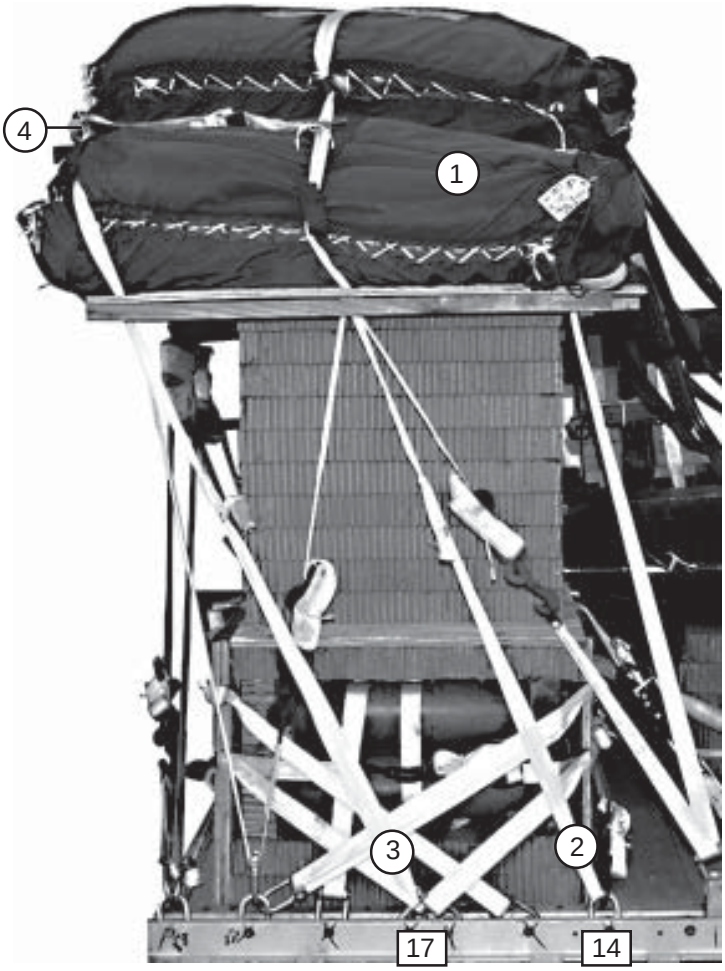
(7) Route a 15-foot lashing through clevis 13, up through the right front hole, down through the center hole, and secure with a D-ring and load binder.

(8) Repeat step 7 on the left side clevis 13A (Not Shown).

(9) Route a 15-foot lashing up through clevis 20, up through the right rear hole, down through the center hole, and secure with a D-ring and load binder.

(10) Repeat step 8 on the left side using clevis 20A (Not Shown).

Figure 3-28. Parachute Stowage Platform Installed (Continued)



(1) Prepare and stow five G-11C cargo parachutes on the parachute stowage platform according to FM 4-20.102/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.

Note: If needed, a stow or two of the riser extension may be removed from the riser extension compartment of each cargo parachute.

(2) Install the first parachute restraint strap through the center hole of the parachute stowage platform and to clevises 14 and 14A.

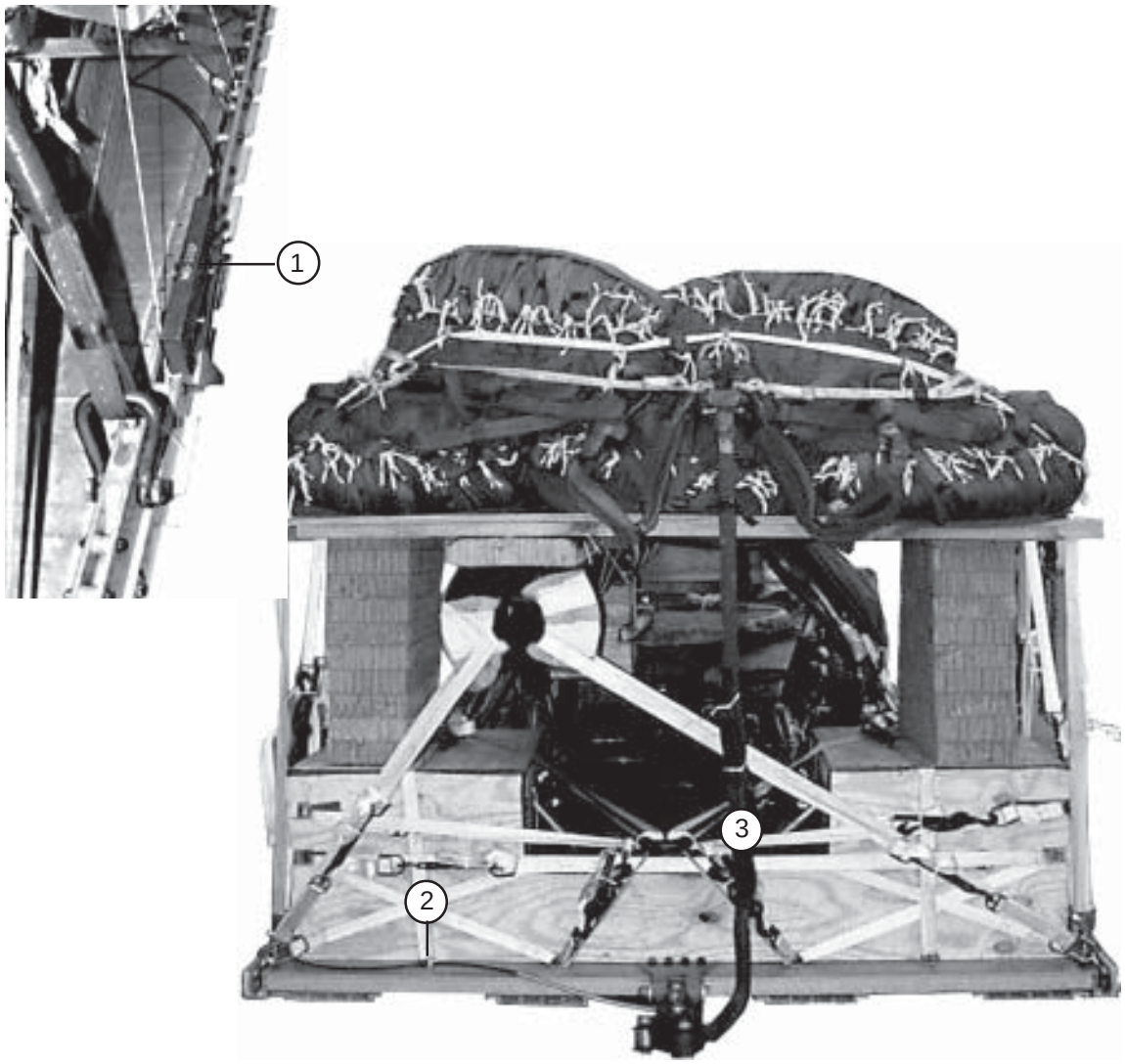
(3) Install the second parachute restraint strap through the rear holes of the parachute stowage platform and to clevises 17 and 17A.

(4) Install two multicut parachute release straps according to FM 4-20.102/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.

Figure 3-29. Cargo Parachutes Stowed and Restraint Installed

INSTALLING EXTRACTION SYSTEM

3-12. Install the Extraction Force Transfer Coupling (EFTC) system according to FM 4-20.102/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figure 3-30.



(1) Install the EFTC actuator mounting brackets using the rear mounting holes.

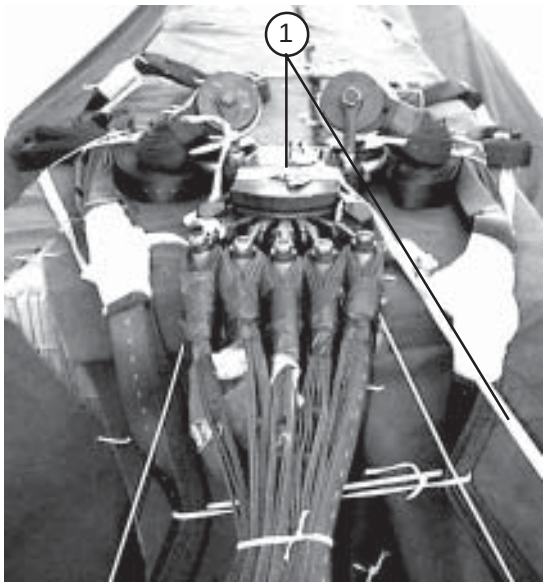
(2) Install a 24-foot cable. Safety tie the cable in convenient places with one turn type I, 1/4-inch cotton webbing.

(3) Attach a 9-foot (2 loop), type XXVI nylon sling as the deployment line.

Figure 3-30. Extraction System Installed

INSTALLING PARACHUTE RELEASE SYSTEM

3-13. Install an M-2 parachute release system according to FM 4-20.102/ NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figure 3-31.

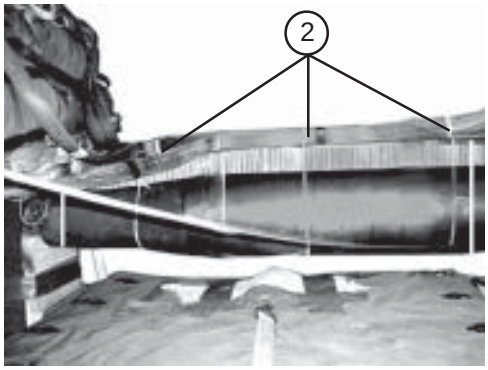


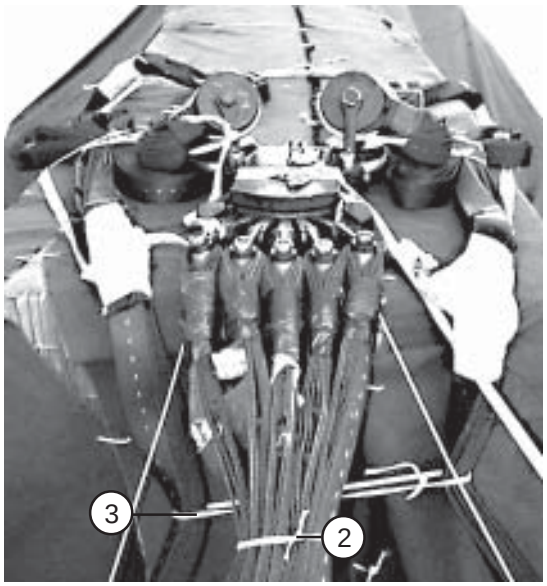
NOTICE OF EXCEPTION

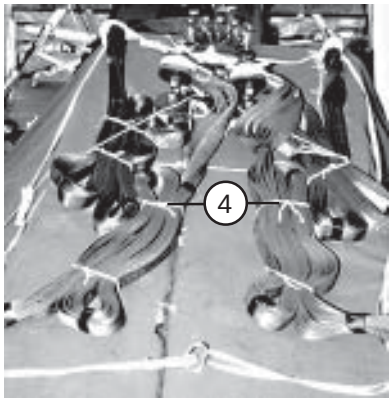
The procedures in this manual for using the 25-foot arming wire lanyard are different from those in FM 4-20.102/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and an exception is granted. The procedures in step 1 below **MUST** be followed.

(1) Using a 25-foot arming wire lanyard, install the M-2 parachute release on top of the load cover at the rear edge of the release stowage platform. Attach suspension slings and parachute riser extensions according to FM 4-20.102/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.

Figure 3-31. Parachute Release Installed and Suspension Slings Secured







(2) Group and tie the parachute riser extensions with type I, 1/4-inch cotton webbing using a girth hitch. Route the free ends around honeycomb and gun barrel and tie underneath.

(3) Secure the rear suspension slings together with a length of 1/4-inch cotton webbing.

(4) S-fold all the slack in the front suspension slings and secure with 1/4-inch cotton webbing.

Figure 3-31. Parachute Release Installed and Suspension Slings Secured (Continued)

INSTALLING PROVISIONS FOR EMERGENCY RESTRAINTS

3-14. Install the provisions for the emergency restraints on the load according to FM 4-20.102/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.

PLACING EXTRACTION PARACHUTE

3-15. Select the extraction parachute and extraction line needed using the extraction line requirements table in FM 4-20.102/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. If a drogue parachute and drogue line are required, place them on the platform for installation in the aircraft as well.

MARKING RIGGED LOAD

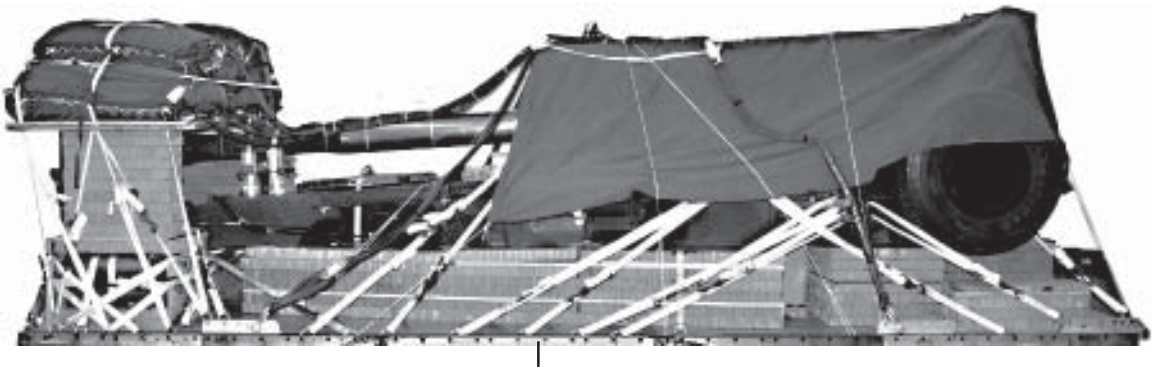
3-16. Mark the rigged load according to FM 4-20.102/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figure 3-32. Complete the Shipper's Declaration for Dangerous Goods. If the load varies from the one shown, the weight, height, center of balance (CB), and parachute requirements must be recomputed.

EQUIPMENT REQUIRED

3-17. Use the equipment listed in Table 3-1 to rig this load.

CAUTION

Make the final rigger inspection required by AR 59-4/AFJ 13-210(I) and FM 4-20.102/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 before the load leaves the rigging site.



RIGGED LOAD DATA

Weight ..... 23,700 pounds

Maximum Weight ..... 25,000 pounds

Height ..... 92 inches

Width ..... 108 inches

Overall Length ..... 288 inches

Overhang: Front ..... 0 inches
Rear (EFTC) ..... 18 inches

Center of Balance (CB) (from front edge of platform) ..... 124 inches

Figure 3-32. M198, 155-mm Howitzer with MACS Rigged on a Type V Platform for Low Velocity Airdrop

Table 3-1. Equipment Required for Rigging the M198, 155-mm Howitzer With Accompanying Ammunition Load on a Type V Platform for Low-Velocity Airdrop

National Stock Number	Item	Quantity
8040-00-273-8713	Adhesive paste, 1-gal	As required
1670-01-035-6054	Bridle, extraction line lead, (line bag for DES)	1
4030-00-090-5354	Clevis, large	7
4030-00-678-8562	Clevis, medium	6
8305-00-880-8155	Cloth, coated (nylon, type II, 17 oz, green, 60 in)	As required
4020-00-240-2146	Cord, nylon, type III, 550-lb	As required
1670-00-434-5782	Coupling, airdrop, EFTC, 24-ft	1
1670-00-360-0328	Cover, clevis, large	3
8135-00-664-6958	Cushioning material, packaging, cellulose wadding	As required
1670-00-003-4391	Knife, parachute bag (for DES)	1
1670-01-183-2678	Leaf, extraction line, (line bag) (add 1 for DES)	1
	Line, drogue (for DES)	
1670-01-064-4452	60-ft 1-loop, type XXVI	1
	Line, extraction, type XXVI nylon webbing	
1670-01-062-6313	60-ft (3-loop, C-130)	1
1670-01-107-7651	140-ft (3-loop, C-17, C-5)	1
	Link	
1670-01-493-6418	Assembly small, two-point, 3 3/4-in	2
1670-01-493-6420	Assembly large, two-point, 5 1/2-in	2
1670-01-483-8259	Tow Release Mechanism (TRM)(H-block) C17 aircraft	1
	Lumber:	
5510-00-220-6148	2- by 6- by 12-in	2
	2- by 6- by 36-in	4
	2- by 6- by 45-in	2
	2- by 6- by 85-in	2
5510-00-220-6248	2- by 10- by 12-in	6
	2- by 10- by 57-in	4
	Nail, steel wire, common,	
5315-00-164-5121	20d	As required
5315-00-010-4659	8d	As required

Table 3-1. Equipment Required for Rigging the M198, 155-mm Howitzer With Accompanying Ammunition Load on a Type V Platform for Low-Velocity Airdrop (Continued)

National Stock Number	Item	Quantity
1670-00-753-3928	Pad, energy dissipating, honeycomb, 3- by 36- by 96-in	34 sheets
	Parachute:	
1670-01-016-7481	Cargo: G-11C	5
1670-00-040-8135	Cargo extraction 28-foot	1
1670-01-063-3715	Cargo extraction, 15-ft (Drogue for DES)	1
	Platform, airdrop type V, 24-ft	
1670-01-353-8425	Bracket assembly, coupling	1
1670-01-353-8424	Bracket, assembly, extraction	1
1670-01-162-2372	Clevis assembly, type V, tiedown clevis	48
1670-01-162-2381	Tandem link assembly (Multipurpose link)	4
5530-00-128-4981	Plywood, 3/4-in by 48- by 96 inch sheet	8
1670-01-097-8817	Release, cargo parachute, M-2	1
	Sling, cargo airdrop	
	For suspension:	
1670-01-062-6306	3-ft (4-loop), type XXVI nylon webbing	2
1670-01-062-6308	16-ft (4-loop), type XXVI nylon webbing	4
	For deployment:	
1670-01-062-6305	9-ft (2-loop), type XXVI nylon webbing	1
	For riser extentsion:	
1670-01-062-6311	120-ft (2-loop), type XXVI nylon webbing	5
5340-00-040-8219	Strap, parachute release, multicut	2
7510-00-266-5016	Tape, adhesive, 2-in, OD	As required
7510-00-266-6710	Tape, masking, 2-in	As required
1670-00-937-0271	Tie-down assembly, 15-ft	61
5365-00-937-0147	D-ring, heavy duty, 10,000-lb	55
1670-00-937-0272	Binder, load, 10,000-lb	51
	Webbing:	
8305-00-268-2411	Cotton, 1/4-in, type I	As required
	Nylon:	
8305-00-082-5752	Tubular, 1/2-in	As required
8305-00-263-3591	Type VIII	As required

GLOSSARY

AD	**airdrop**
AFB	**Air Force base**
AFJMAN	**Air Force Joint Manual**
AFTO	**Air Force Technical Order**
AGL	**Above Ground Level**
ALC	**Airlift Logistics Center**
AMC	**Air Mobility Command**
attn	**attention**
CB	**center of balance**
chap	**chapter**
d	**penny**
DA	**Department of the Army**
DES	**Drogue Extraction System**
DC	**District of Columbia**
DD	**Department of Defense**
diam	**diameter**
fig	**figure**
FM	**field manual**
ft	**foot/feet**
gal	**gallon**
HQ	**headquarters**
in	**inch**
JAI	**joint airdrop inspector**
lb	**pound**
MAJCOM	**Major Command**
MACS	**Modular Artillery Charged System**
LV	**low-velocity**
MCRP	**Marine Corps Reference Publication**
mm	**millimeter**
NAVSEA	**Navel Sea Command**
NSN	**national stock number**
PFA	**platform fitting assembly**
TM	**technical manual**
TO	**technical order**
TRADOC	**US Army Training and Doctrine Command**
US	**United States**
wt	**weight**
w	**with**
w/o	**without**
yd	**yard**

REFERENCES

AR 59-4/AFJ 13-210(I) Joint Airdrop Inspection Records, Malfunction Investigation and Activity Reporting 1 May 1998

AFMAN 24-204(I)/ TM 38-250/NAVSUP PUB 505/MCOP4030 Preparing Hazardous Materials for Military Air Shipments. 11 December 2001.

FM 4-20.102/NAVSEA SS400-AB-MM0-010/ TO 13C7-1-5 Airdrop of Supplies and Equipment: Rigging Airdrop Platforms. 22 August 2001.

FM 4-20.153/ MCRP 4-11.351/ TO 13C7-18-41 Airdrop of Supplies and Equipment: Rigging Ammunition.

TM 9-1025-211-10 Operator's Manual for Howitzer, Medium, Towed: 155-MM, M198, 10 January 1991

TM 10-1670-268-20&P/ MCRP 4-3.8/ TO 13C7-52-22 Organizational Maintenance Manual With Repair Parts and Special Tools List: Type V Airdrop Platform and Dual Row Airdrop Platform. 15 September 2002.

TM 10-1670-277-23&P/ TO 13C5-28-2/ NAVAIR 13-1-30 Unit and Direct Support (DS) Maintenance Manual (Including Repair Parts and Special Tools List) for Parachute, Cargo Type: 28-Foot Diameter, Cargo Extraction Parachute NSN 1670-01-262-1797 and NSN 1670-00-040-8135, 5 August 1991.

TM 10-1670-280-23&P/ TO 13C5-31-2/ NAVAIR 13-1-31 Unit and Intermediate Direct Support (DS) Maintenance Manual (Including Repair Parts and Special Tools List) for Parachute, Cargo Type: 100-Foot Diameter, G-11B, G-11C and G-11D, (NSN 1670-01-016-7841). 15 September 2002.

TM 10-1670-286-20/ TO 13C5-2-41 Unit Maintenance Manual for Sling/Extraction Line Panel (Including Stowing Procedures). 15 March 2001.

TM 10-1670-296-20&P/ TO 13C7-49-2 Unit Maintenance Manual Including Repair Parts and Special Tools List for Ancillary Equipment for Low Velocity Airdrop System. 30 October 2002.

AFTO Form 22	Technical Order Publication Improvement Report
DA Form 2028	Recommended Changes to Publication and Blank Forms. February 1974.
DD Form 1748 Series	Joint Airdrop Inspection Record.
Shipper's Declaration for Dangerous Goods	Locally procured form.

FM 4-20.127 (FM 10-527)
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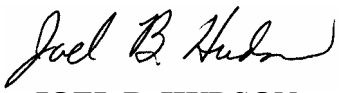
By Order of the Secretary of the Army and the Air Force:

PETER J. SCHOOMAKER
General, United States Army
Chief of Staff

Official:



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