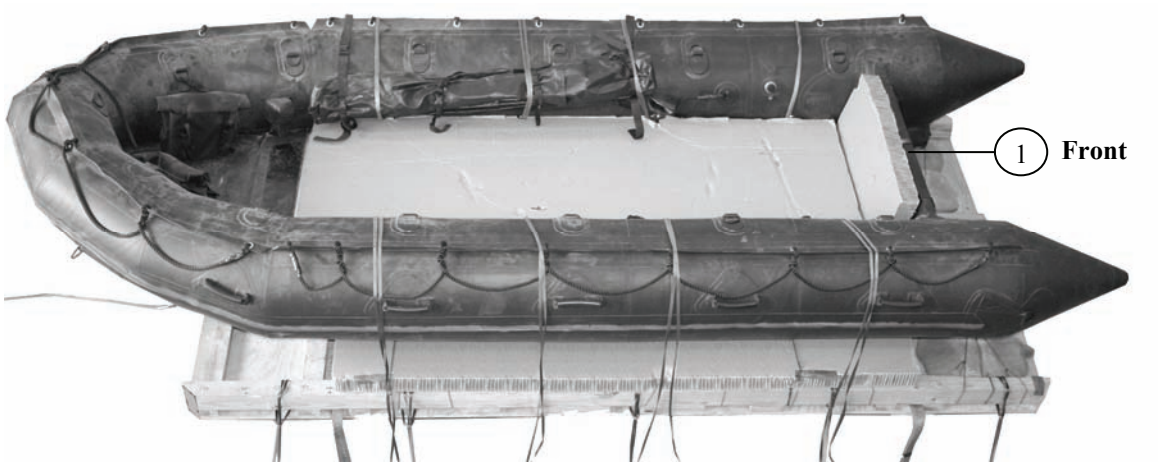
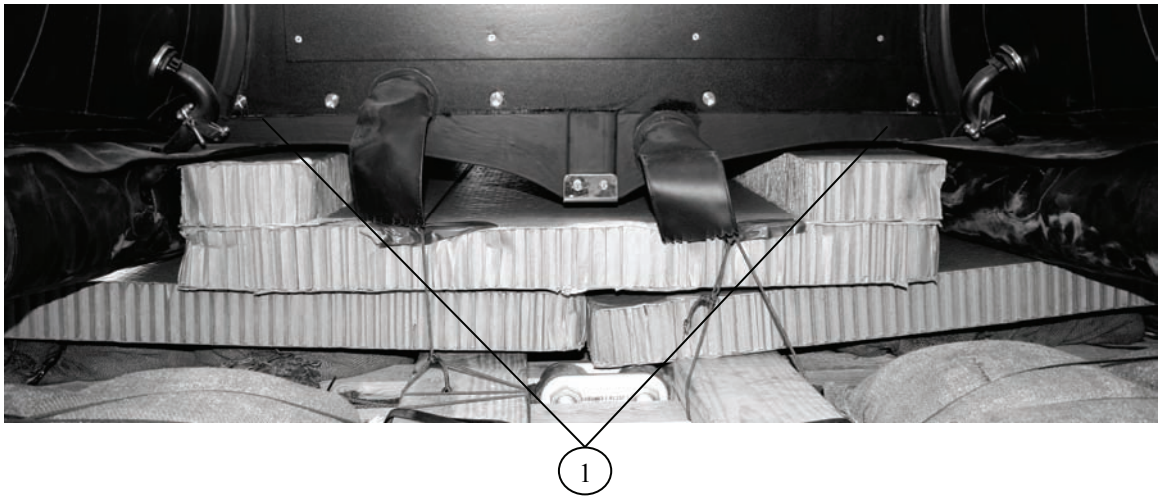
POSITIONING BOAT

2-8. Center the boat on the platform with the transom even with the front edge of the honeycomb as shown in Figure 2-14.





1. Set the boat on the platform with transom even with front edge of the honeycomb.

Figure 2-14. Boat Positioned

PREPARING, PLACING, AND SECURING ACCOMPANYING LOAD

2-9. Prepare the Johnson Enforcer or Bombardier outboard engine and fuel tanks as shown in Figure 2-15. Prepare the three tiedown rings as shown in Figure 2-16. Place the engines, fuel tanks, and load as shown in Figure 2-17. Secure the tiedown rings as shown in Figure 2-18. Secure the engines, fuel tanks, and load as shown in Figure 2-19.

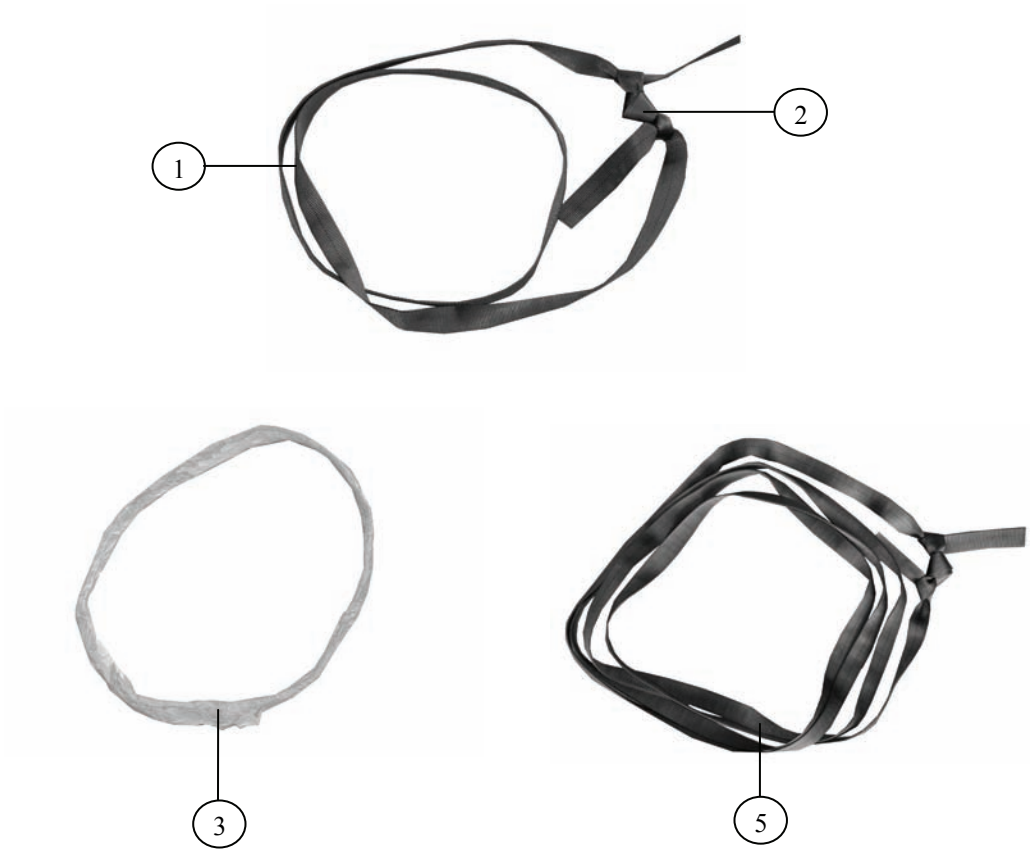
1. Wrap the lower unit of the outboard engine with cellulose wadding and tape in place.
2. Tie a 6- by 12-inch piece of honeycomb to the lower unit of the outboard engine using type III nylon cord. Tape edges of honeycomb with cloth backed adhesive tape to prevent cutting by the type III nylon cord.
3. Lay a 6- by 6-inch piece of honeycomb on the engine. Fold the operating handle onto the honeycomb and tie in place with type III nylon cord Wrap the handle with cellulose wadding and tape in place (not shown).
4. Tie the engine cover in place with two lengths of type III nylon cord (not shown). Wrap the housing with cellulose wadding and tape in place.

Note. Put only five gallons of fuel in each container if collapsible plastic containers are used. Force out all air before closing them. Pad between plastic tanks and engine or other equipment with 1/2-inch felt (not shown).

5. Make sure the fuel tank is at least 1/2 full but no more than 3/4 full (not shown).

Note. If using a metal fuel tank pad with several layers of cellulose wadding, do not cover the handle and tape the wadding in place.

Figure 2-15. Johnson Enforcer or Bombardier Outboard Engine and Fuel Tank Prepared

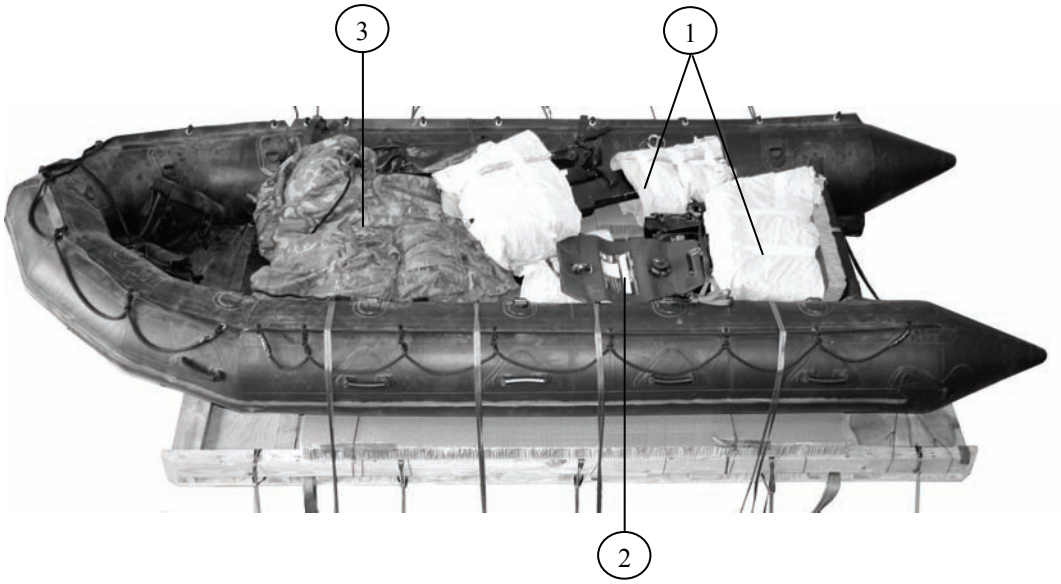


1. Use a 60-inch length of 1-inch nylon webbing to make a two-ply tiedown ring 10 inches in diameter.
2. Tie the ends of the webbing together with a square knot, and tie an overhand knot in each free end.
3. Wrap the nylon webbing using 2-inch adhesive tape.
4. Repeat steps 1 through 3 to form a second tiedown ring (not shown).
5. Use a 120-inch length of 1-inch tubular nylon webbing to make a four-ply tiedown ring 10 inches in diameter. Tie the nylon as in Step 2. Wrap as in Step 3.

Figure 2-16. Tiedown Rings Formed

CAUTION

An accompanying load weighing at least 650 pounds but no more than 1,170 pounds must be dropped with a single Zodiac F470U boat. Safety the engine to a convenient point in the boat with a length of 1/2-inch or 1-inch tubular nylon webbing.



1. Lay the outboard engine, operating handle facing up, in the rear of the boat. Place the top of the engine 3 inches from the transom.

Note. If placing a second engine, prepare as in Figure 2-15 and place as shown above.

2. Set the fuel tank beside the lower unit.

Note. Up to four collapsible tanks may be rigged in each boat.

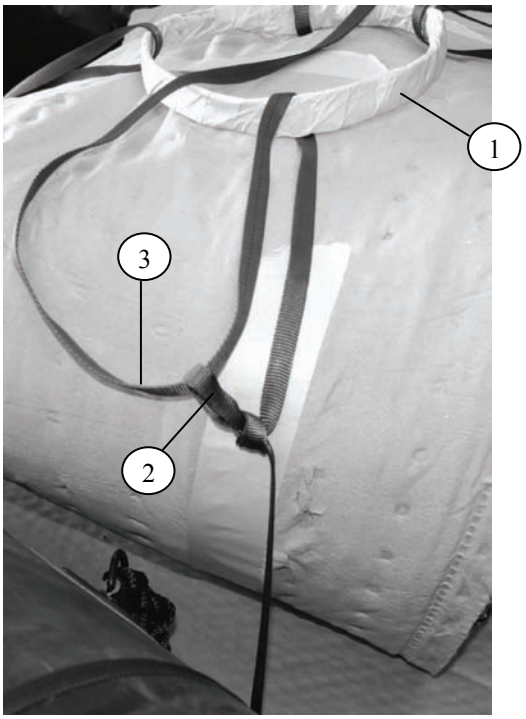
3. Lay the rucksacks in the boat. Tie the frames together using type III nylon cord.

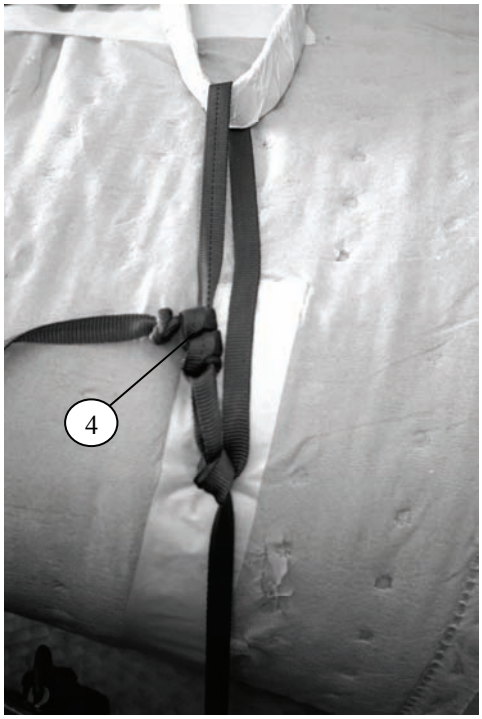
4. Place the weapons between the two rows of rucksacks. Tie them to a convenient D-ring on the boat with two lengths of type III nylon cord (not shown).

Figure 2-17. Engines, Fuel Tanks and Accompanying Load Placed

Note. Use the following procedures when securing the tiedown ring in boats with a roll-up floor.

Secured Using Roll-up Floor





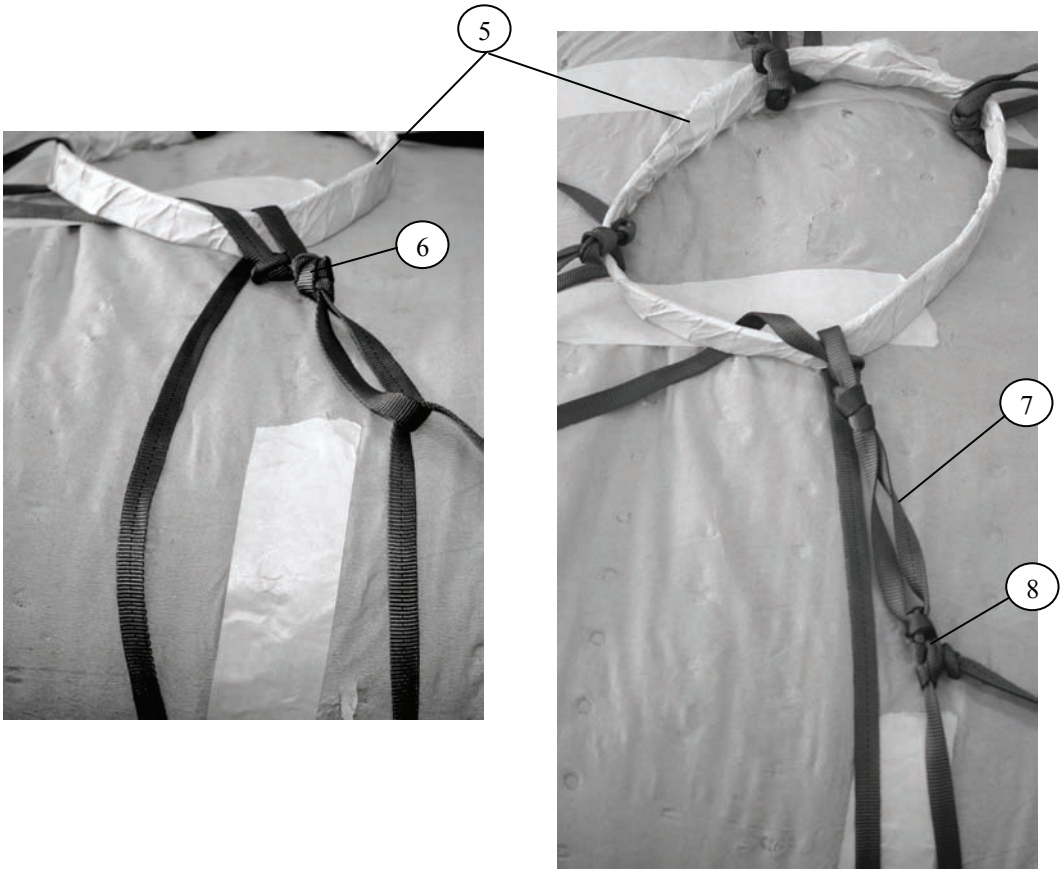
1. Place a two-ply tiedown ring over the accompanying load as described.
2. Tie a loop in the standing end of the 1/2-inch tubular nylon webbing. Tie an overhand knot in the running end.
3. Pass the running end of the 1/2-inch tubular nylon through the tiedown ring.
4. Pass the running end of the 1/2-inch tubular nylon through the loop made in Step 2. Pull it tight and tie with three alternating half hitch knots. Tie an overhand knot in the running end.

Note. The purpose of this method of tying is to allow the lashings to slide easily off the tiedown ring once cut.

Figure 2-18. Tiedown Rings Secured

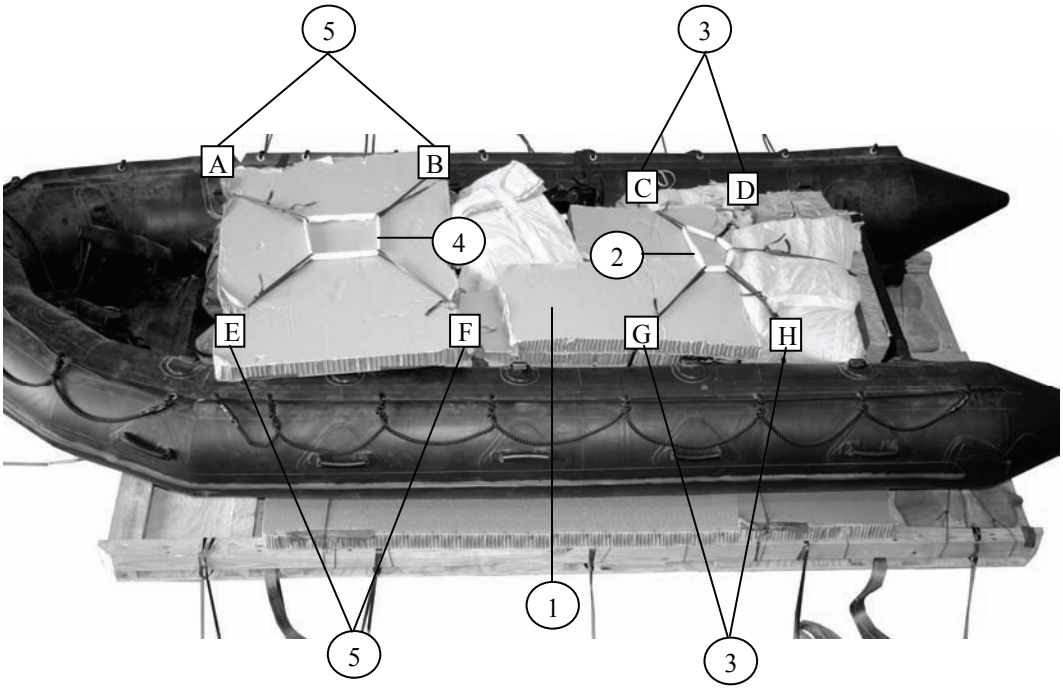
Note. Use the following procedures when securing the tiedown ring in boats with a hard deck (aluminum floorboards).

Secured Using Hard Deck Floor



5. Place a two-ply tiedown ring over the accompanying load as described.
6. Tie a loop in one end of the 1/2-inch tubular nylon webbing. Tie an overhand knot in the running end.
7. Pass the loop end through the tiedown ring.
8. Pass the opposite end of the 1/2-inch tubular nylon through the loop made in Step 6, pull it tight and tie with three alternating half hitch knots. Tie an overhand knot in the running end.

Figure 2-18. Tiedown Rings Secured (Continued)



1. Cut and place honeycomb over the accompanying load as shown.

Note. Honeycomb placement over the accompanying load is optional.

2. Center a two-ply tiedown ring (Figure 2-16) on the middle unit of the outboard engine.

Note. Keep the two-ply, 10-inch tiedown ring centered over the middle unit of the outboard engine. Use the procedures in Figure 2-18 to secure the in-boat tiedowns, depending on the type of floor used in the boat.

3. Pass one tie from in-boat tiedowns C, D, G, and H on both sides of the boat and from the tiedown on the transom through the tiedown ring. Tie each tie to the loop made in one of the running ends. Secure them to the ring as shown in Figure 2-18 accordingly.

Note. Route the ties on the transom through the handle on the fuel tank. Secure the fuel tank to a convenient D-ring with type III nylon cord.

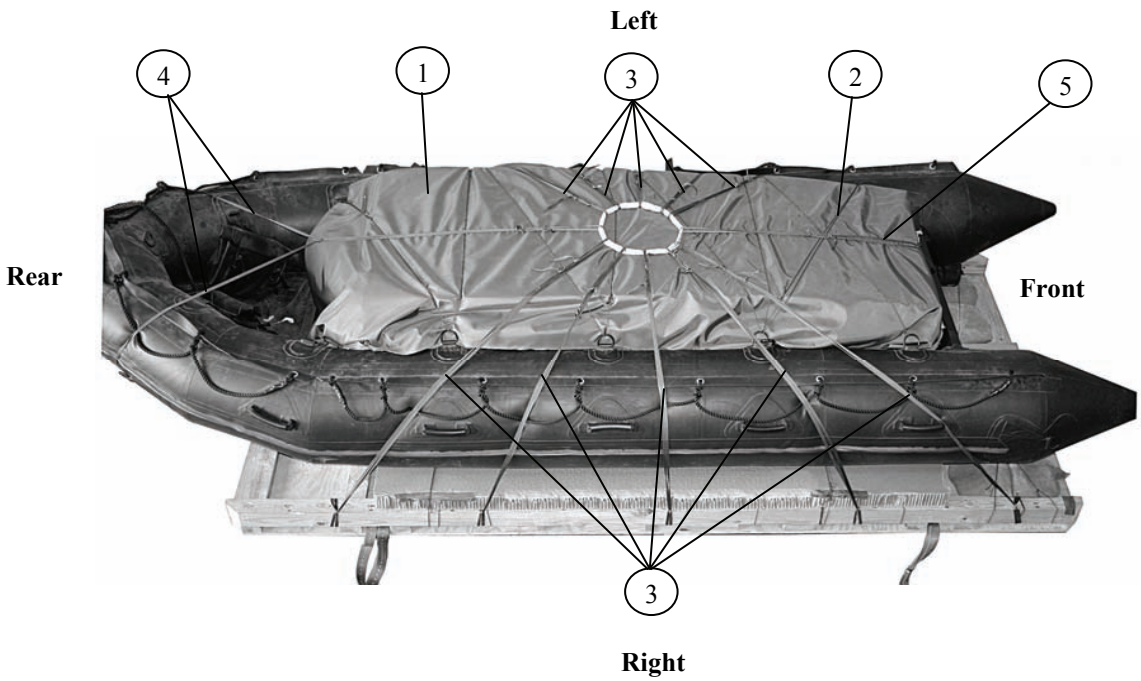
4. Center a two-ply tiedown ring on the rucksacks.

5. Use in-boat tiedowns A, B, E and F to restrain the load as described in Step 3 above.

Figure 2-19. Engines, Fuel Tanks and Accompanying Load Secured

INSTALLING LOAD COVER AND LASHING BOAT

2-10. Place a 5- by 10-foot piece of cotton duck or nylon cover over the accompanying load and lash the boat to the platform as shown in Figure 2-20.

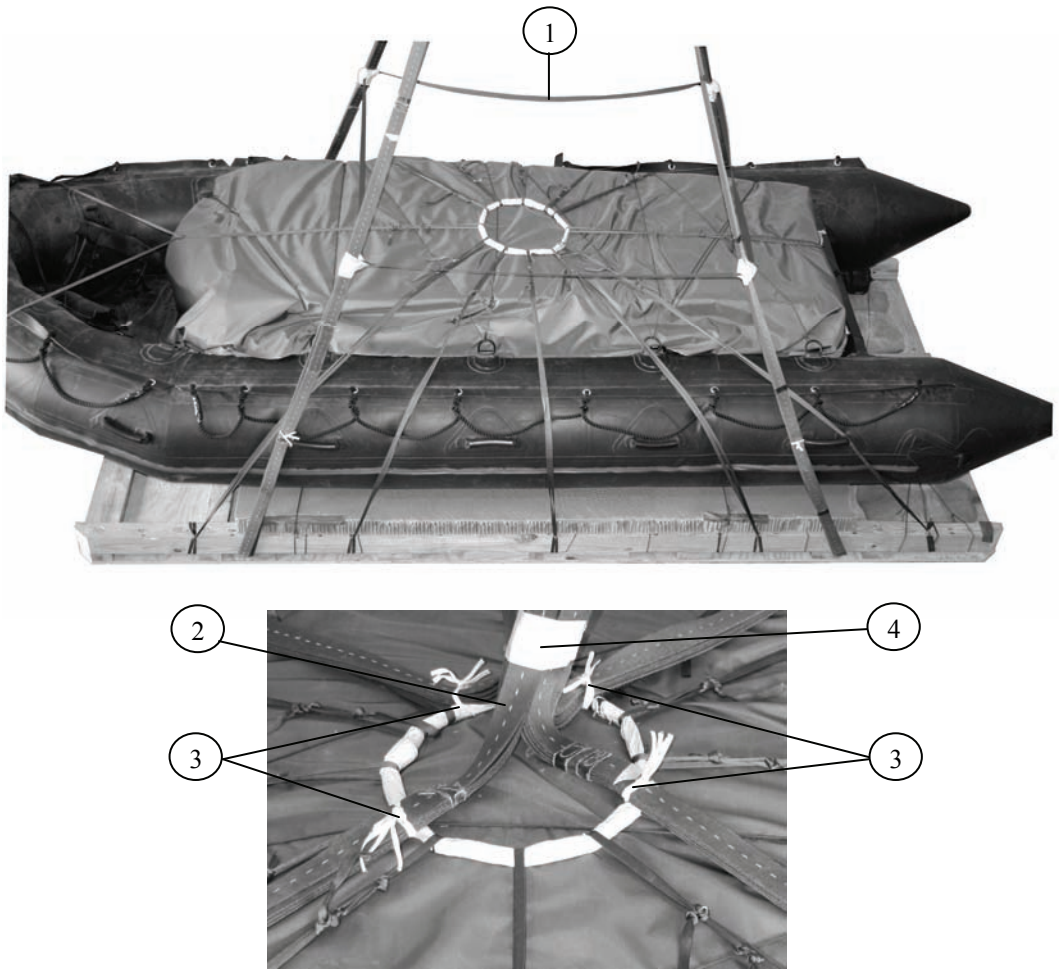


1. Place a 5- by 10-foot piece of cotton duck or nylon cover over the accompanying load. Push the edges of the cloth down between the load and the side of the boat.
2. Tie the cloth in place with type III nylon cord using the D-rings on the sides of the boat.
3. Tie all the 18-foot lashings to the four-ply, 10-inch tiedown ring as described in Figure 2-16, Steps 1 through 5.
4. Pass one end of the rear lashing around each side of the bow. Tie the ends together with an overhand knot. Tie the remainder of the lashing to the four-ply, 10-inch tiedown ring as described in Figure 2-18, Steps 5 through 8.
5. Use the intermediate loop tie to tie each end of the front lashing to the four-ply, 10-inch tiedown ring as described in Figure 2-18, Steps 5 through 8.

Figure 2-20. Cover Placed, Secured and Load Lashed to Platform

SAFETY TIEING SUSPENSION SLINGS

2-11. Safety the suspension slings as shown in Figure 2-21.



1. Raise the suspension slings and install deadman's tie according to FM 4-20.102/MCRP 4-11.3JNAVSEA SS400-AB-MMO-010/TO 13C7-1-5/.
2. Lower the suspension slings until they touch the tie down ring.
3. Tie each sling to the tiedown ring with two lengths of 80-pound, 1/4-inch cotton webbing.
4. Tape the slings together at the tiedown ring and at 2-foot intervals with two turns of paper masking tape.

Figure 2-21. Suspension Slings Safety Tied

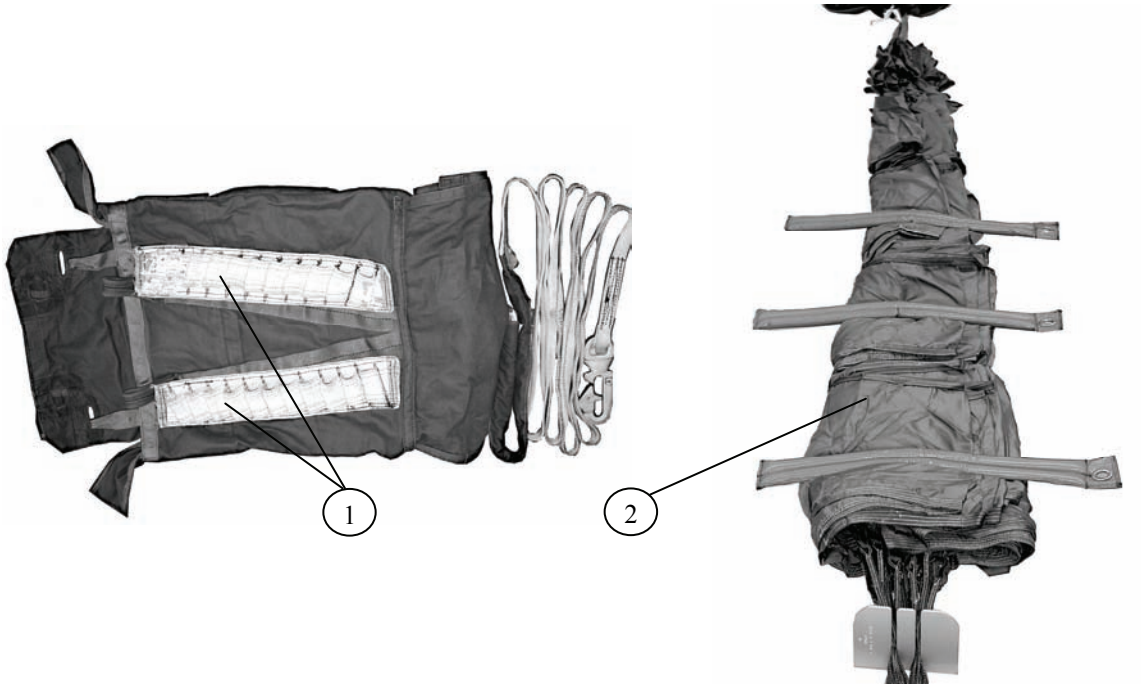
STOWING PARACHUTE

2-12. A 15-foot cargo extraction parachute is used to deploy the G-12 cargo parachute after the load is pushed from the aircraft. When used as a deployment parachute for this load, the 15-foot cargo extraction parachute is packed in a T-10 deployment bag.

Note. If the standard 15-foot parachute deployment bag is attached to the parachute, remove the bag at the bag retaining line.

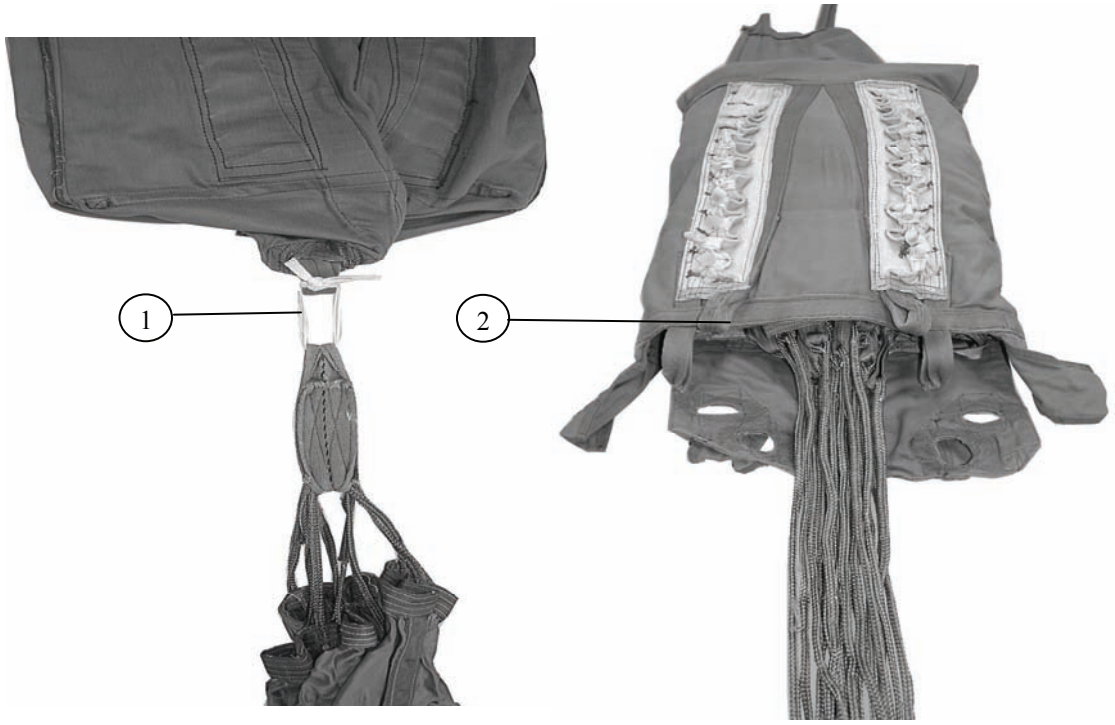
- **Packing the 15-foot extraction parachute.** Use the following items to pack the 15-foot cargo extraction parachute in a T-10 deployment bag for use with this load as shown in Figures 2-22 through 2-26:
  - One T-10 deployment bag with universal static line
  - Retainer bands as required
  - Type I, 1/4-inch cotton webbing
  - Ticket number 5, 8/4 cotton thread
  - One large cargo suspension clevis

  In addition, for a parachute with a 36-inch adapter web, use one 9-foot (3-loop), type XXVI nylon sling and one two-point connector link.



1. Attach retainer bands to the first eight stow loops on each side of the T-10 deployment bag.
2. Flat fold and long fold the canopy according to TM 10-1670-278-23&P/TO 13C5-26-2/NAVAIR 13-1-27/TM 01109C-23&P/1.

Figure 2-22. 15-Foot Extraction Parachute Stowed



1. Pass two lengths of type I, 1/4-inch cotton webbing through the bridle loop of the deployment bag to form a 3-inch loop. Cross the ends of the webbing over the bridle attaching loop. Tie them with a surgeon's knot and locking knot.

2. S-fold the canopy into the deployment bag, starting at the upper right corner of the bag.

Figure 2-23. Deployment Bag Attached and Canopy Stowed

1. Make the locking stows as shown above and according to TM 10-1670-293-23&P/TO 14D1-2-467-2/TM 01136C-23&P/2.
2. Make the first suspension line stow with the upper right retainer band.
3. Continue stowing the lines from side to side.
4. Pass a length of type I, 1/4-inch cotton webbing through the right side connector link, the connector link loops, and the suspension line protector flap loop. Tie it with a surgeon's knot and locking knot. Repeat the procedures on the left side.

Figure 2-24. Locking Stows and Suspension Line Stows Made and Connector Links Tied

1. Attach a two-point, 3 3/4-inch link assembly to a 36-inch adapter web.
2. Attach a 9-foot (3-loop), type XXVI nylon sling to the two point 3 3/4-inch link assembly.
3. Bolt a cargo suspension clevis or a two-point, 3 3/4-inch link assembly to the free end of the sling (shown).

Figure 2-25. Deployment Line Installed on 36-inch Adapter Web

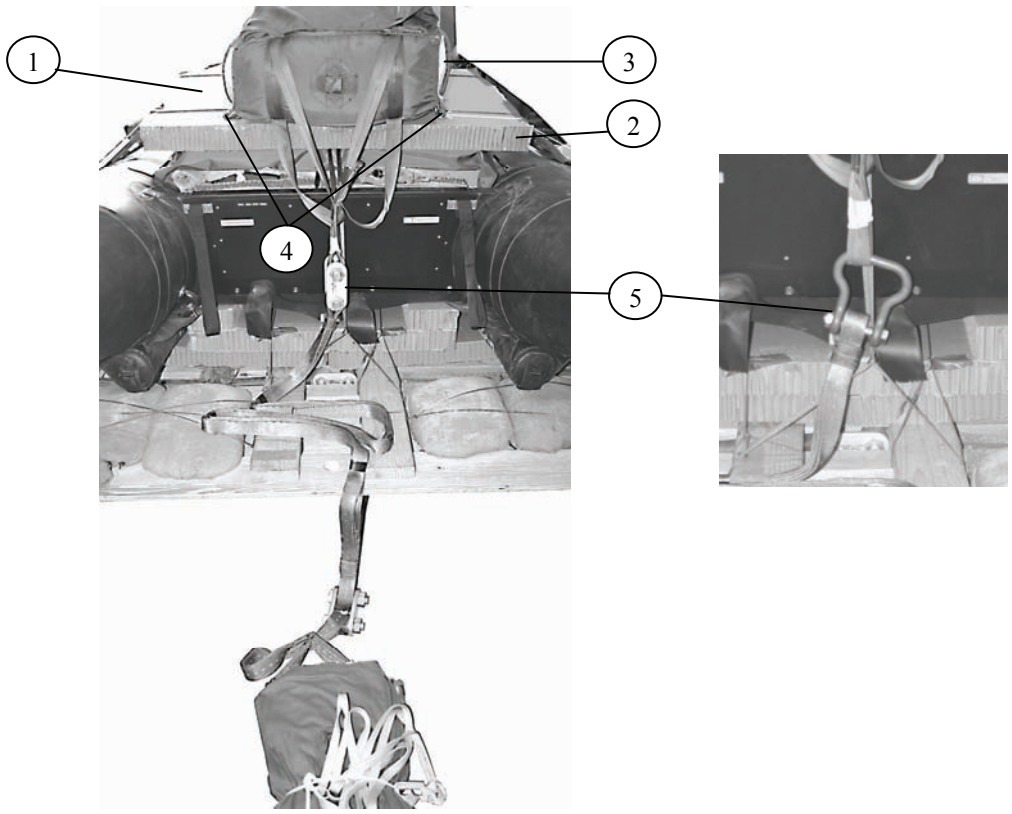
1. S-fold the deployment line and the universal static line. Place them on top of the deployment bag.

2. Secure the deployment line and the universal static line in place with two lengths of type I, 1/4-inch cotton webbing wrapped around the lines and the bag.

Figure 2-26. Cargo Extraction Parachute Packed in a T-10 Deployment Bag

STOWING THE G-12 CARGO PARACHUTE AND 15-FOOT CARGO EXTRACTION PARACHUTE

2-13. Prepare and stow one G-12 cargo parachute as shown in Figure 2-27. Stow the 15-foot cargo extraction parachute as shown in Figure 2-28.



1. Lay a 36- by 55-inch piece of honeycomb on the top front of the accompanying load. Extend it 1-inch past the transom.

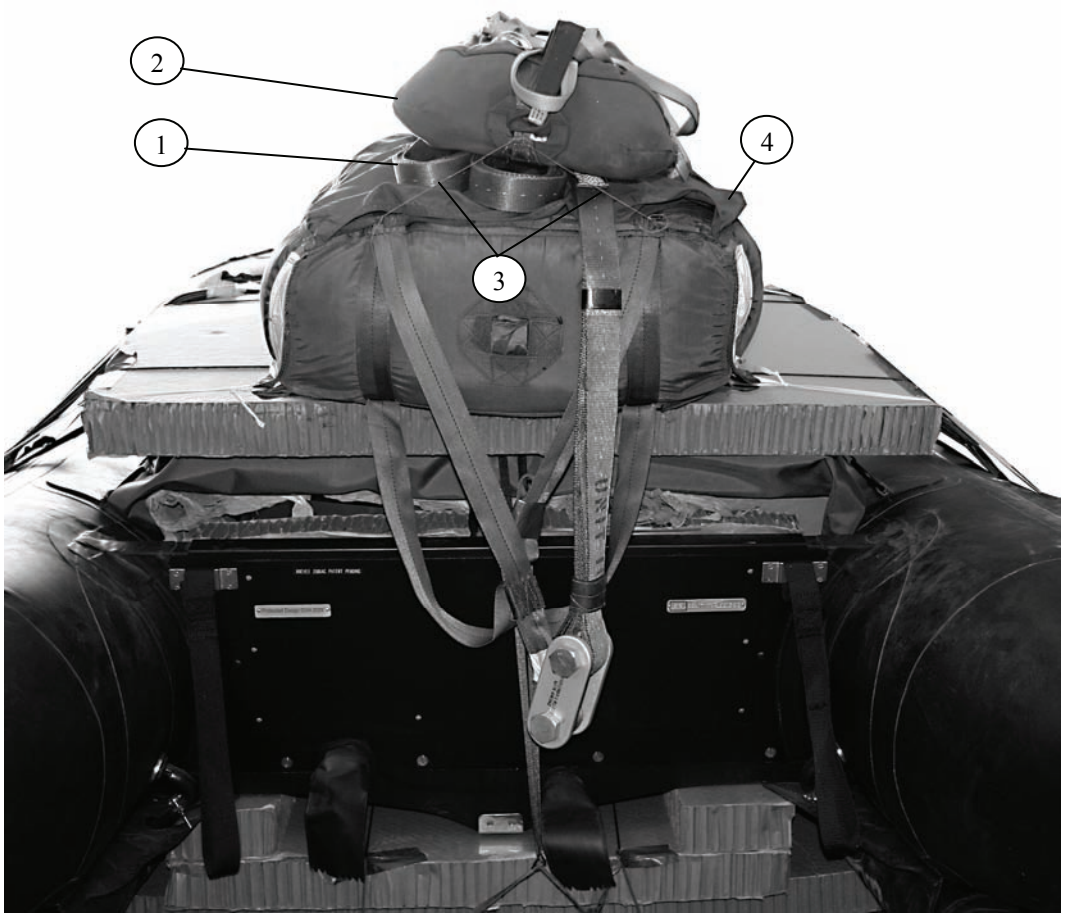
2. Bend the honeycomb over the load towards the sides of the boat. Tie it to convenient places with type III nylon cord. Use tape under the cord to prevent it from cutting the honeycomb. (not shown)

3. Set a G-12 cargo parachute on top of the honeycomb with the bridle toward the front of the platform.

4. Tie each corner of the parachute to the platform with one length of type I, 1/4-inch cotton webbing.

5. Attach the 9-foot sling from the 15-foot cargo extraction parachute to the G-12 cargo parachute deployment bag with a cargo suspension clevis (medium) or a two-point, 3 3/4-inch link assembly.

Figure 2-27. G-12 Cargo Parachute Positioned on Load and 15-foot Cargo Extraction Parachute Attached

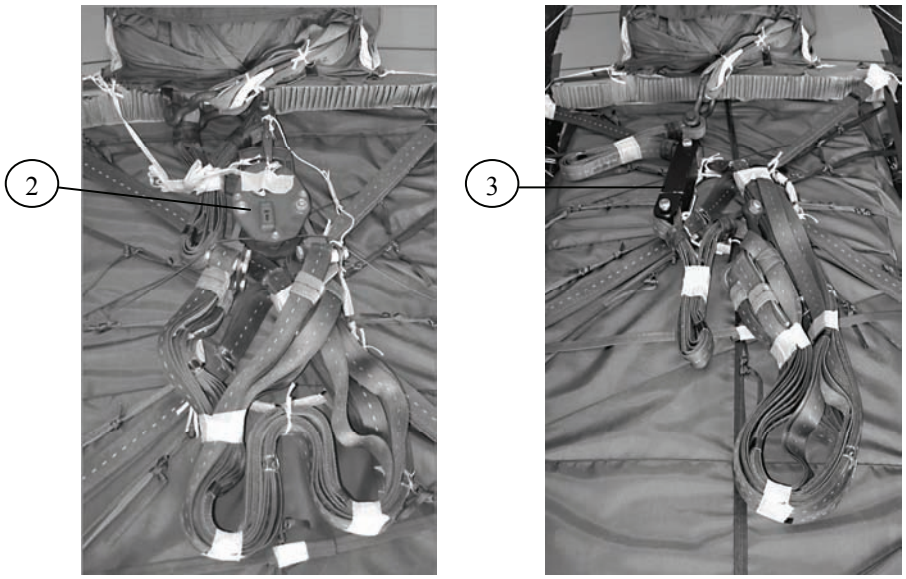


1. Lay the 9-foot sling of the cargo extraction parachute on top of the G-12 cargo parachute.
2. Place the 15-foot cargo extraction parachute on top of the 9-foot sling.
3. Tie the extraction parachute to the G-12 cargo parachute with four lengths of ticket number 5, 8/4 cotton thread.
4. Attach rubber retainer bands to the riser retaining loops on the G-12 cargo parachute. Fold the static line, and hold the folds in place with the retainer bands.

Figure 2-28. Cargo Extraction Parachute Placed on Load

INSTALLING PARACHUTE RELEASE

2-14. Use the M-1 or the automatic cargo parachute release on this load as shown in Figure 2-29 and according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.



1. Perform the pre-drop activation test to insure the automatic cargo parachute release is fully functional and ready to use according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.

2. Prepare, install, and safety the M-1 cargo parachute release according to FM 4-20.102/ MCRP 4-11.3J NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.

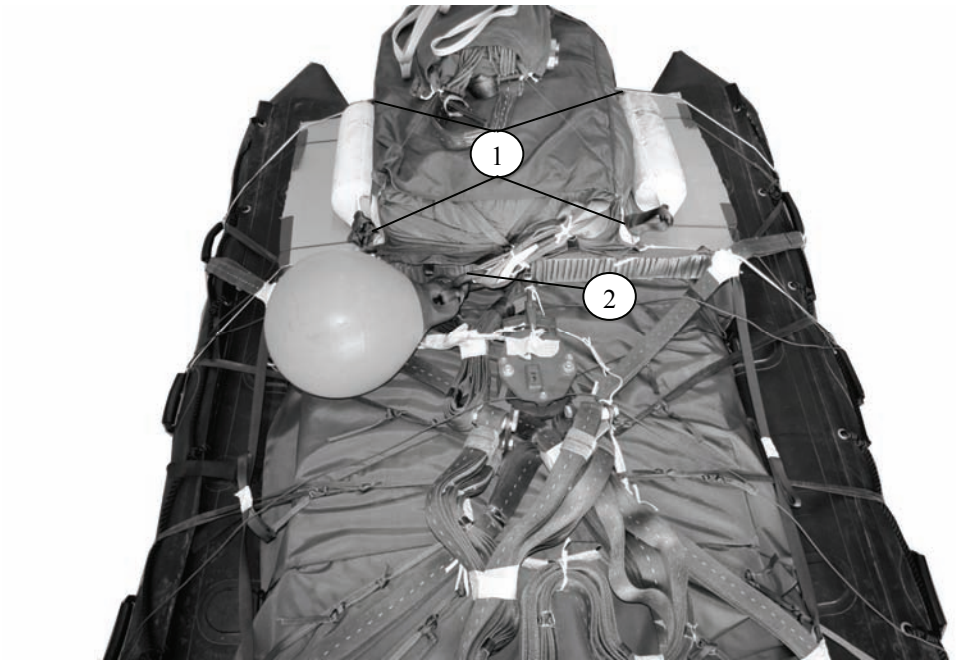
3. Prepare, install, and safety the automatic cargo parachute release according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.

Note. When using the automatic cargo parachute release, install a 25-foot drag line from the G-12 deployment bag to the main body of the automatic cargo parachute release.

Figure 2-29. Cargo Parachute Release Installed

INSTALLING FLOTATION DEVICE

2-15. Use flotation devices on training loads to help recover the parachute and parachute deployment bag. Install the flotation devices as shown in Figure 2-30. Recommended flotation devices include dock bumpers, life preservers, diving buoys, and two 12- by 12-inch pieces of honeycomb taped with waterproof tape.



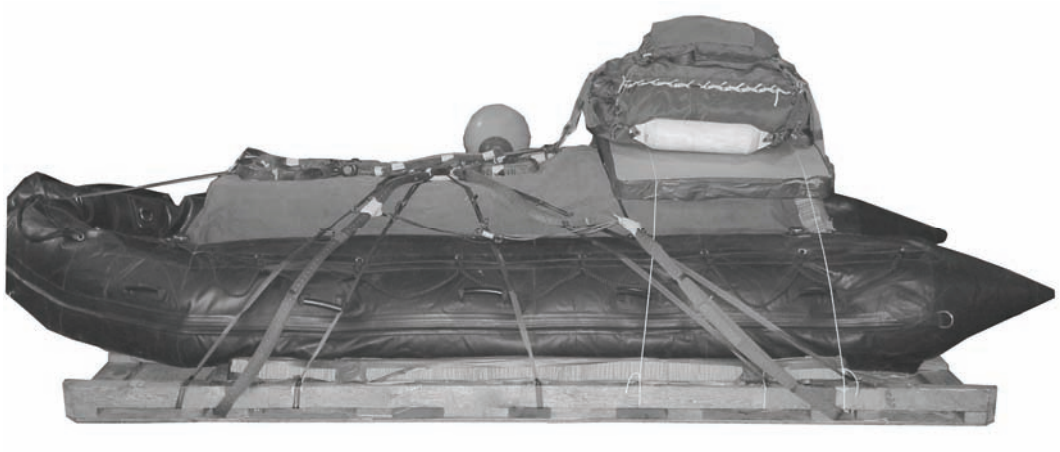
1. Tie one flotation device to the G-12 cargo parachute deployment bag clustering attaching straps with 1-inch tubular nylon.

2. Tie one flotation device to the clevis between the cargo parachute and the parachute release assembly with a length of 1-inch tubular nylon webbing.

Figure 2-30. Flotation Devices Tied to Load

MARKING RIGGED LOAD

2-16. Mark the rigged load according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figure 2-31. If the accompanying load varies from the one shown, the weight, height, and CB must be recomputed.



Weight: Load shown ..... 2,470 pounds
Height ..... 60 inches
Width ..... 75 inches
Length ..... 189 inches
Overhang: Front ..... 16 inches
Rear ..... 29 inches
CB (from front edge of platform) ..... 60 inches

Figure 2-31. F470 Combat Rubber Raiding Craft Fully Rigged

EQUIPMENT REQUIRED

2-17. The equipment needed to prepare and rig this load is listed in Table 2-1. Additional items may be listed with the load description.

Table 2-1. Equipment Required for Rigging the Combat Rubber Raiding Craft for Low-Velocity Airdrop

National Stock Number	*Item*	*Quantity*
8105-00-285-4744	Bag, sand	16
1670-00-568-0323	Band, rubber, parachute	As required
No NSN	Bolt, carriage, 3/8-in dia, 7-in long, with washer and nut (add eight for training)	8
No NSN	Bolt, carriage, 3/8-in dia, 5-in long with washer and nut	4
1670-01-064-4928	Centerline (G-12E, 57 feet)	
4030-00-090-5354	Clevis assembly, large, 1-in., shackle	2
		1
4030-00-678-8560	Clevis, shackle, 3/8 inch diameter	1
8305-00-242-3593	Cloth, cotton duck, 60 inches	4 yd
4020-00-240-2146	Cord, nylon, type III, 550 lb	As required
1670-00-360-0328	Cover, clevis, large	1
8135-00-664-6958	Cushioning material, cellulose wadding	As required
1670-01-476-3131	Deployment bag, w/o static line	1
5306-00-435-8994	Deployment bag, parachute (G-12)	2
1670-00-039-5073	Link assembly, two-point, 3 3/4”	2
1670-00-487-6077	Link assembly connector, type IV	
	Lumber: (Platform)	4
5510-00-220-6146	2- by 4- by 10-in	4
	2- by 4- by 75-in	2
	2- by 6- by 30-in	4
	2- by 6- by 75in	2
5510-00-220-6148	2- by 6- by 144-in	2
5510-00-220-6274	4- by 4- by 144-in	
	Nail, steel, wire, common:	As required
5315-00-010-4657	6d	As required
5315-00-010-4659	8d	As required
5315-00-164-5121	20d	
1670-00-753-3928	Pad, energy-dissipating, honeycomb,	4 sheets
	3- by 36- by 96-in	(1)
	6- by 6-in	(1)
	6- by 12-in	(1)
	7- by 17-in	(2)
	7- by 28-in	(2)
	7- by 36-in	(1)
	36- by 55-in	(3)
	36- by 96-in	

Table 2-1. Equipment Required for Rigging the Combat Rubber Raiding Craft for Low-Velocity Airdrop (Continued)

National Stock Number	*Item*	*Quantity*
1670-00-788-8666	Parachute, G-12	1
1670-01-063-3715	Parachute Cargo 15-ft Extraction	1
5530-00-128-4981	Plywood, 3/4- by 48- by 75-in	3
	Release, cargo, airdrop:	
1670-01-097-8816	M-1, cargo parachute release	1
1670-01-337-4366	Automatic cargo parachute release	1
	Sling, cargo, airdrop:	
1670-01-062-6301	3-foot (2 loop), type XXVI	2
1670-01-062-6304	9-foot (2 loop), type XXVI	1
1670-01-062-6302	16-foot (2 loop), type XXVI	4
1670-01-063-7761	20-foot (2-loop), type XXVI	1
7510-00-266-5016	Tape, adhesive, pressure sensitive, 2-in, OD	As required
8125-00-074-5124	Tape, adhesive, cloth backed, type IV, 2-in	As required
8310-00-917-3945	Thread, cotton, 8/7 (ticket 5)	As required
8305-00-268-2411	Webbing, textile (cotton, type I, Nat, 1/4-in, 80lb.)	As required
8305-00-262-2455 (GRN) 8305-00-082-5752 (WHT)	Webbing, textile nylon, tubular 1/2-in, OD	As required
8305-00-268-2455	Webbing, textile nylon, tubular, 1-in	As required

SECTION II-RIGGING DOUBLE ZODIAC F470U BOAT

DESCRIPTION OF LOAD

2-18. The description of the load rigged in this section is given below.

- **Inflated Zodiac F470 rubber raiding craft.** This boat is rigged in tandem on a 75- by 144-inch combat expendable platform (CEP) with a G-12E cargo parachute. Tandem loads require two parachutes. The boats weigh 250 pounds each. When inflated, each boat is 75 inches wide, 185 inches long, and 22 inches high. One or two 35-horsepower outboard engines that weigh 136 pounds each power the boat shown or one 55-horsepower engine that weighs 215 pounds with a full fuel tank. Six paddles weighing a total of 24 pounds and two sets of air pumps with hoses are part of each boat's equipment.

Note. A 40-horsepower engine is the largest that may be used on this boat when the boat is equipped with the accordion floor. An engine as large as 65-horsepower may be used on this boat with a solid floor.

- **Accompanying load.** An accompanying load weighing at least 650 pounds but no more than 1,170 pounds must be dropped with the boat.

PREPARING THE PLATFORM

2-19. Build a new CEP, or inspect and repair a used platform, using the procedures shown in Figures 2-1 through 2-4 and as described in paragraph 2-2.

INSTALLING SUSPENSION SLINGS AND STOWING SANDBAGS

2-20. Install four suspension slings on the platform according to paragraph 2-3 and Figure 2-5. Stow sandbags on the platform according to paragraph 2-4 and Figure 2-6.

PLACING AND SECURING HONEYCOMB STACKS

2-21. Build, place, and secure the honeycomb stacks as shown in Figures 2-8 and 2-9

PREPARING BOATS

2-22. Inflate the boats except the keel. If the keel is inflated, let the air out. Install the hose clips as shown in Figure 2-10. Prepare the boats as shown in Figures 2-10 through 2-12.

POSITIONING FIRST BOAT

2-23. Position the first boat as shown in Figure 2-14.

PREPARING AND STOWING ACCOMPANYING LOAD

2-24. Prepare and stow the outboard engines, fuel tanks, paddles, all boat accessories, and accompanying load as described in paragraph 2-9 and Figures 2-15 through 2-17.

LEVELING, COVERING, AND LASHING FIRST BOAT AND ACCOMPANYING LOAD

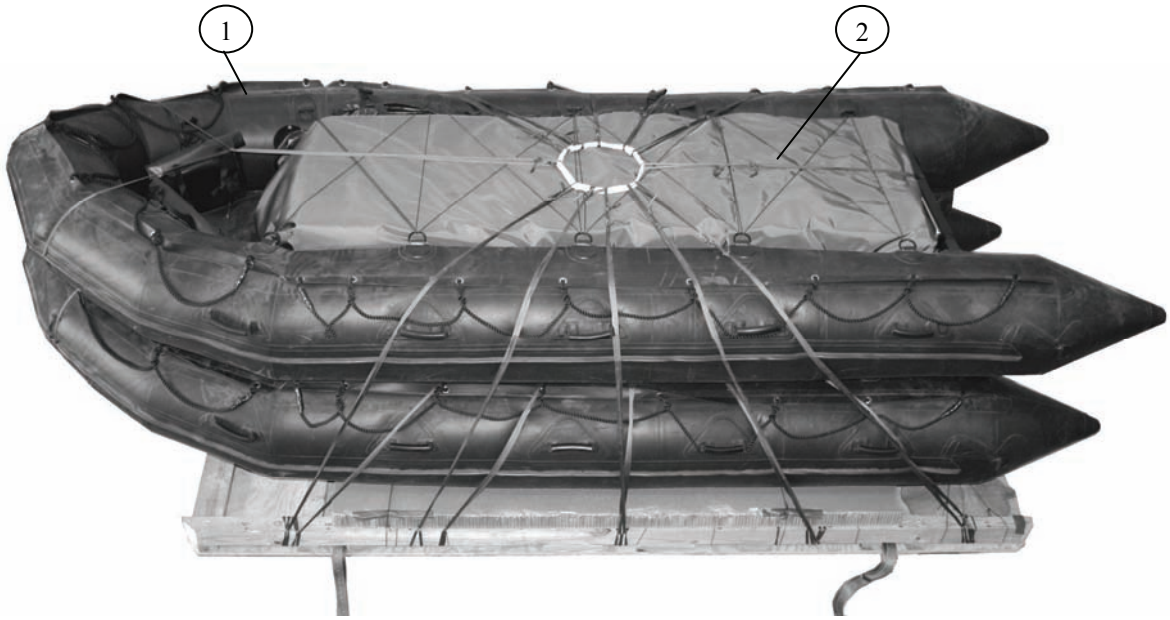
2-25. Level the load on the first boat, position the load cover, and lash the boat to the platform as described below, and shown in Figure 2-31.

- Use honeycomb pieces to level the load to the top of the engine. If collapsible fuel tanks are used, fit honeycomb around them by standing the honeycomb on edge for support.
- Place a 30- by 90-inch piece of honeycomb on top of the leveled load.
- Cover the load as shown in Figure 2-20.
- Lash the boat to the platform as shown in Figures 2-18, 2-20, and 2-31.

Figure 2-31. Load Covered, Tied in Place and Boat Lashed to Platform

PLACING AND LOADING SECOND BOAT

2-26. Prepare, place, load, and cover the second Zodiac F470U boat as shown in Figure 2-32.



1. Inflate the second boat except the keel (not shown). Prepare it according to Figures 2-10 through 2-12.

2. Prepare, stow, and cover third engine, fuel tanks, and load items according to Figures 2-15 through 2-20.

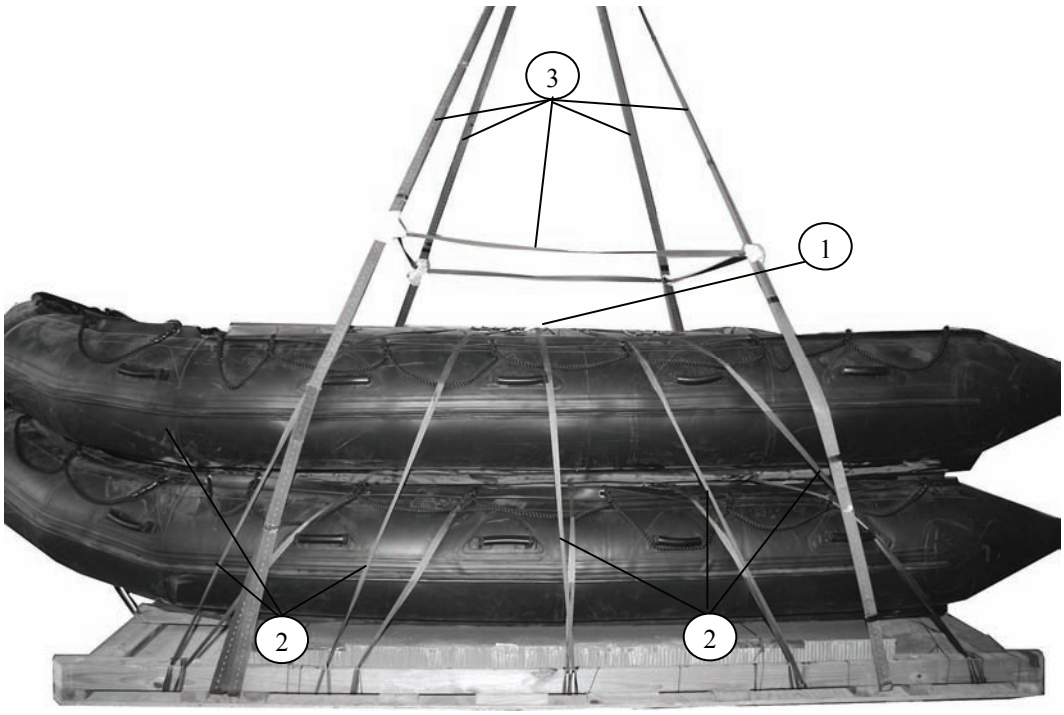
Figure 2-32. Second Boat Prepared, Placed and Covered

LASHING SECOND BOAT TO PLATFORM

2-27. Lash the second boat to the platform as shown in Figures 2-32 and 2-33.

SAFETY TIEING SUSPENSION SLINGS

2-28. Make a deadman's tie, and safety the suspension slings according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figures 2-21 and 2-33.



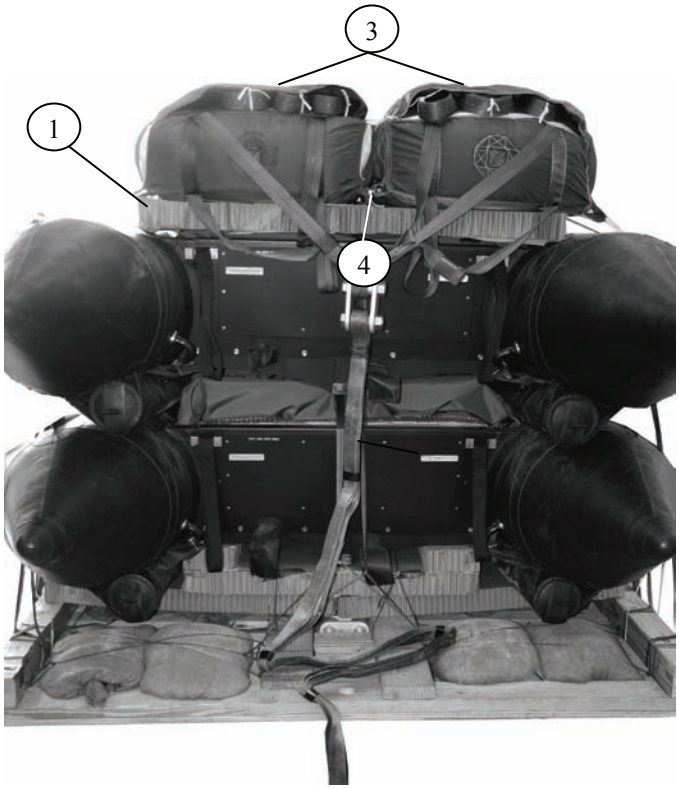
1. Center the four-ply tiedown ring over the load cover of the second boat.
2. Position the lashings and tie them to the tiedown ring as shown in Figures 2-18 through 2-20.
3. Raise the suspension slings, and make the deadman's tie, using 1/2-inch double or 1-inch tubular nylon webbing according to FM 4-20.102/ MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5, using 1/2-inch double or 1-inch tubular nylon webbing.
4. Lower the slings and tie them to the tiedown ring as shown in Figure 2-21.

Figure 2-33. Boat Lashed and Suspension Slings Safety Tied

STOWING PARACHUTES

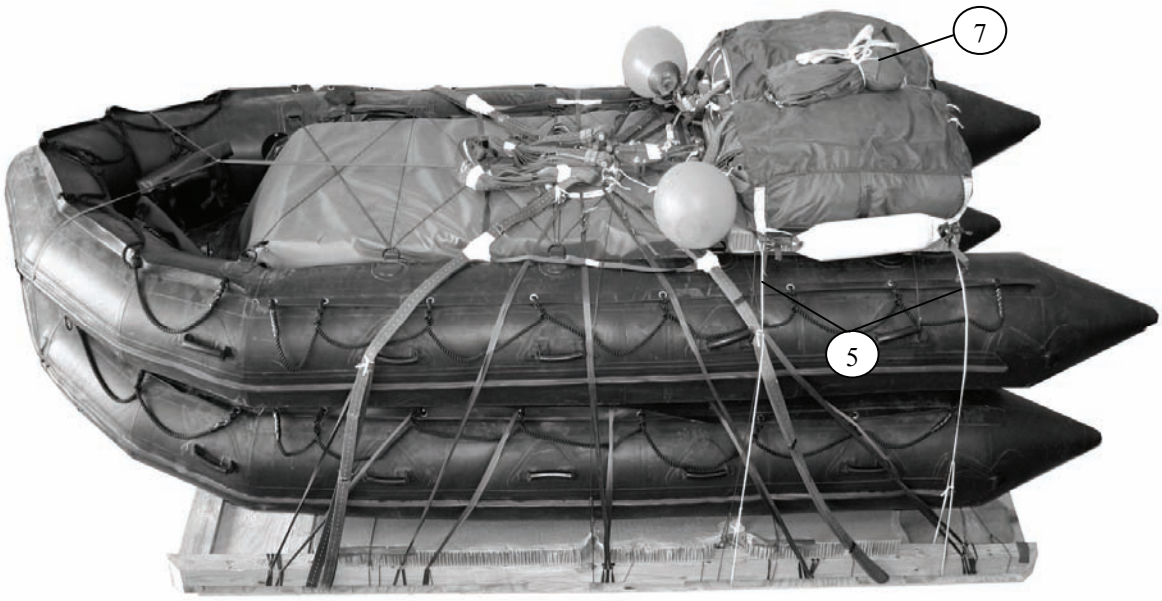
2-29. Stow parachutes as described below.

- Lay a 36- by 55-inch piece of honeycomb across the load cover of the second boat as shown in Figure 2-34.
- Prepare and pack the 15-foot cargo extraction parachute as described in paragraph 2-12.
- Prepare two G-12 cargo parachutes. Stow them on front of the load according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.



1. Lay a 36- by 55-inch piece of honeycomb across the load cover of the second boat extending 1-inch past the transom.
2. Bend the honeycomb over the load. Tape the edges of the honeycomb (not shown).
3. Set two G-12 cargo parachutes on the honeycomb with the riser extension compartment up and the bridle toward the front of the platform.
4. Cluster the parachutes together with single lengths of type I, 1/4-inch cotton webbing.

Figure 2-34. Parachutes Stowed



5. Secure the parachutes to convenient points on the load with four lengths of type I, 1/4-inch cotton webbing.

6. Attach the deployment line (9-foot, type XXVI nylon webbing sling) from the packed 15-foot extraction parachute to the G-12 bridles with a two-point link assembly or a medium clevis (not shown)

7. Center the 15-foot cargo extraction parachute on top of the G-12 cargo parachutes. Safety it in place with ticket number 5, 8/4 cotton thread.

8. S-fold the slack in the deployment line, and tape the folds. Secure the clustering clevis to the riser extension tiedown loops with a double length of type I, 1/4-inch cotton webbing (not shown).

9. Remove the left secondary bag closing tie from both G-12 parachutes (not shown).

Figure 2-34. Parachutes Stowed (continued)

INSTALLING PARACHUTE RELEASE

2-30. Use either one M-1 release or two automatic cargo parachute releases according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5.

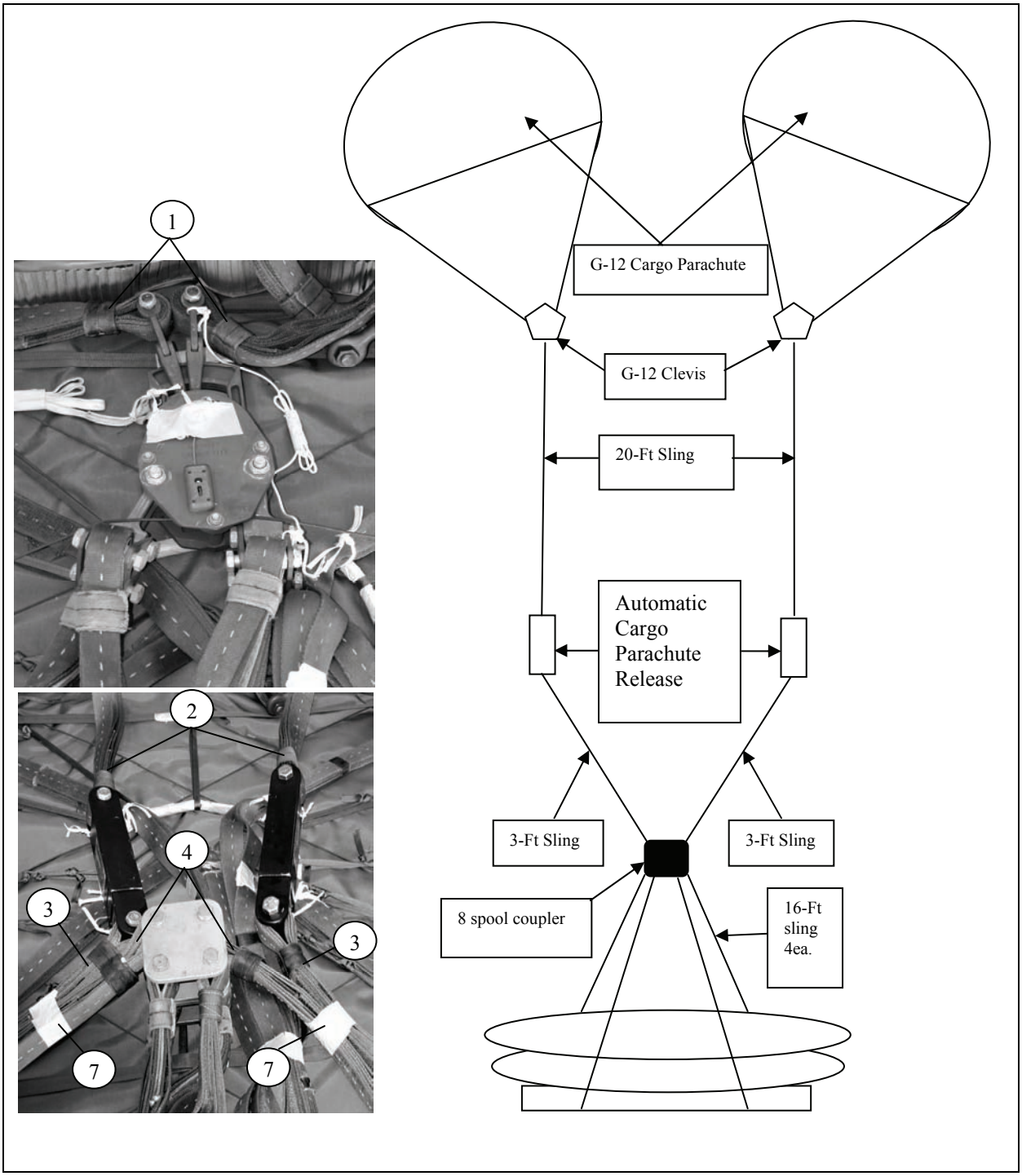


Figure 2-35. M-1 and Automatic Cargo Parachute Release Installed

1. Attach the riser extensions on the G-12 parachutes to the two parachute connectors on the M-1 release. Safety the release to convenient points on the platform with type III nylon cord.
2. Attach 20-foot type XXVI nylon webbing, riser extensions to the main body of the hydraulic cargo release.
3. Attach a 3-foot sling to the release fitting shackle (lower body).
4. Attach opposite ends of the 20-foot riser extension to the large clevis.
5. Secure both releases to the donut using a single turn type I, 1/4-inch cotton webbing on both ends of each release (not shown).
6. Secure the 8 spool load coupler or large clevis to the donut using one turn type I, 1/4-inch cotton webbing (not shown).
7. Tape excess webbing of 3-foot sling with masking tape.
8. Secure cherry buoy to the main body of the hydraulic cargo release with 1-inch tubular nylon webbing. (not shown)

Figure 2-35. M-1 and Automatic Cargo Parachute Release Installed (continued)

EQUIPMENT REQUIRED

2-31. In addition to the items listed in Table 2-1, use one additional G-12 cargo parachute, four 36- by 96-inch pieces of honeycomb, two 5- by 96-inch pieces of honeycomb, two 30- by 90-inch pieces of honeycomb, one 13- by 36-inch piece of honeycomb, and one eight spool coupler and another automatic cargo parachute release and another 20-foot (2-loop), type XXVI sling.

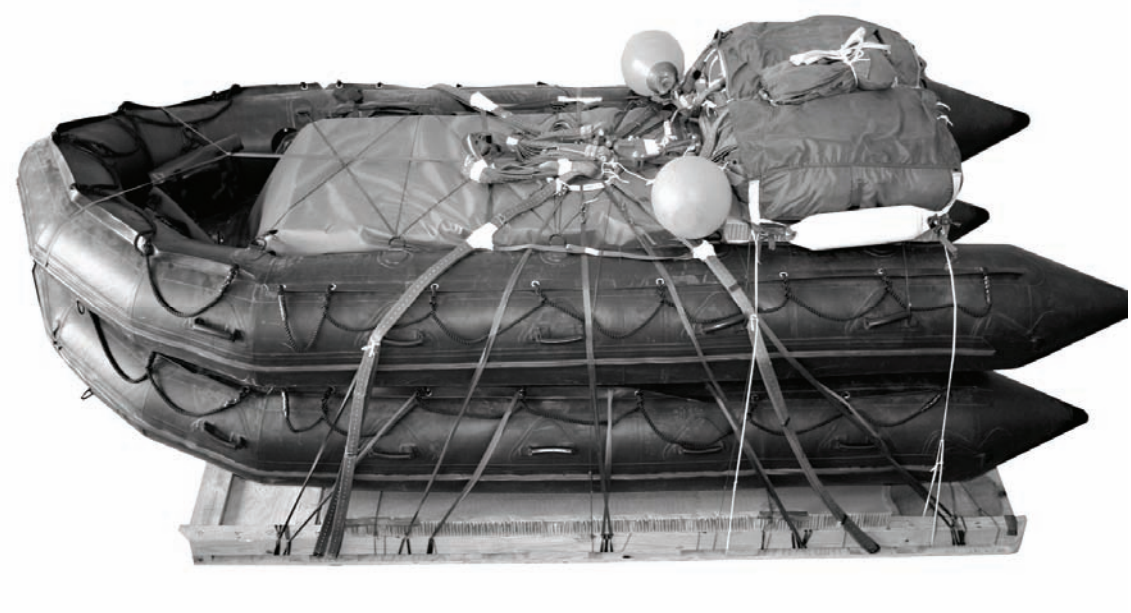
MARKING RIGGED LOAD

2-32. Mark the rigged load according to FM 4-20.102/MCRP 4-11.3J/NAVSEA SS400-AB-MMO-010/TO 13C7-1-5 and as shown in Figure 2-36. If the accompanying load varies from the one shown, the weight, height, and CB must be recomputed.

CAUTION:

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

Note. Remove the plastic and tape from the fuel pump and filter and reattach them before using the MARS engine. Inflate the keel before using the boat.



Weight: (maximum suspended weight) ..... 3500 pounds
Height ..... 86 inches
Width ..... 75 inches
Length ..... 189 inches
Overhang: Front ..... 16 inches
Rear ..... 29 inches
CB (from front edge of platform) ..... 60 inches

Figure 2-36. Double Zodiac F470U Fully Rigged

Chapter 3

Rigging Zodiac F470U Boat in A-22 Cargo Bag

DESCRIPTION OF LOAD

3-1. The description of the load rigged in this section is given below.

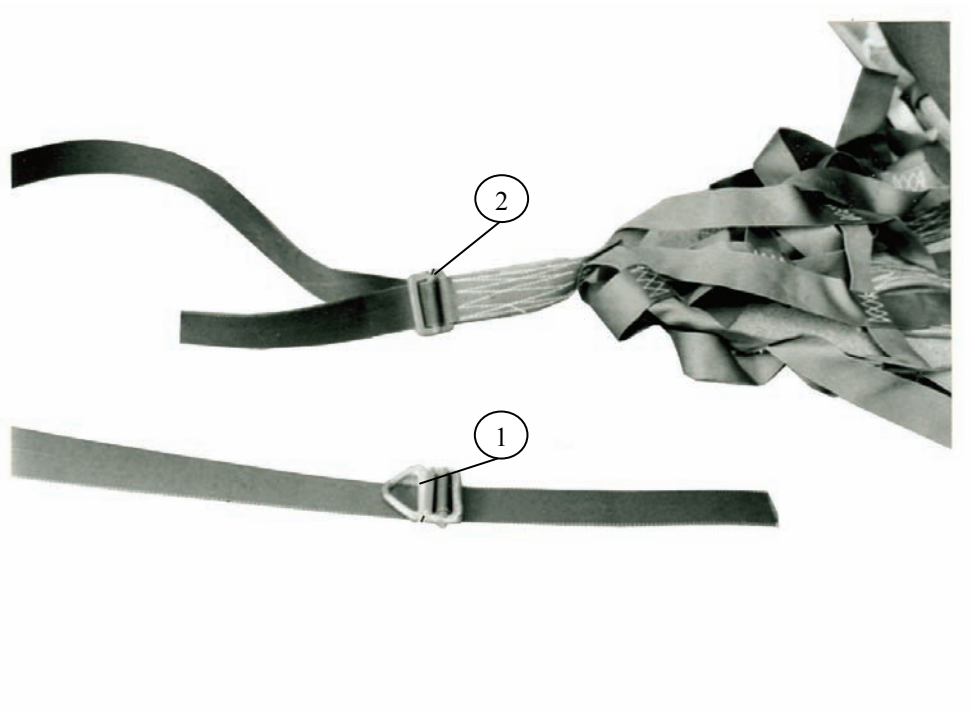
- The Zodiac F470U Combat Rubber Raiding Craft (CRRC) is described in this chapter. This boat is rigged in an adapted A-22 cargo bag on a 48- by 48-inch skid board for low-velocity airdrop over water. The boat is rigged with the 35-horsepower Marine Amphibious Reconnaissance Submersible (MARS) engine installed on the boat transom. This boat is designed for rapid inflation and deployment of the boat. The load shown weighs 600 pounds.
- The accompanying load is limited to equipment that can be stowed on both sides of the engine box and secured within the A-22 cargo bag. No accompanying load is shown.

CAUTION

This load differs from other rubber boat loads. Strict adherence to rigging procedures is critical.

ADAPTING A-22 CARGO BAG

3-2. Adapt the long and short tiedown straps on the sling assembly of the A-22 cargo bag as shown in Figure 3-1.



1. Install a V-ring to one end of a 36-inch length of type VIII nylon webbing. Prepare a second assembly in the same way.

2. Thread the free end of each length of type VIII nylon webbing through the quick fit adapter on the long tiedown strap. Repeat for the short tiedown strap.

Figure 3-1. Sling Assembly Adapted

3. Install a parachute harness snap to each of the remaining long and short tiedown straps on the sling assembly. Install the parachute harness snap so that it will open inward when the A-22 container is closed.

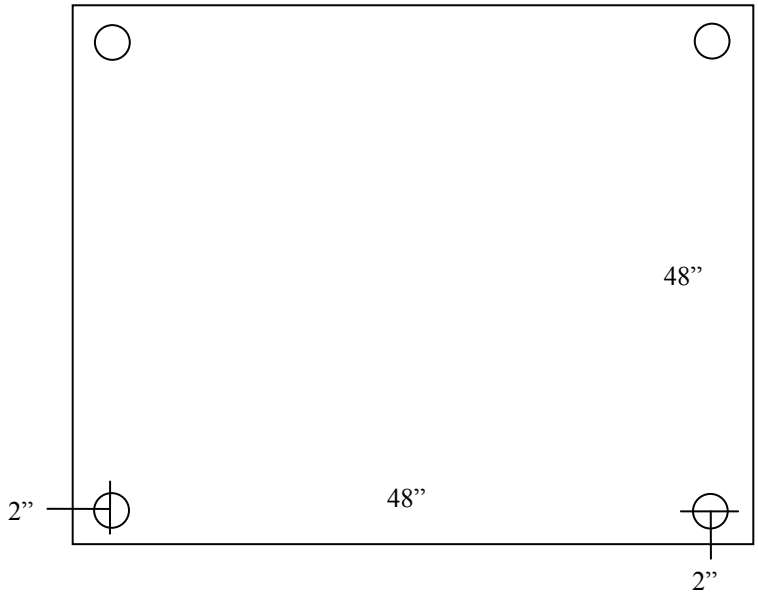
4. Make a pull handle for each parachute harness ejector snap.

Figure 3-1. Sling Assembly Adapted (continued)

CONSTRUCTING ENGINE PROTECTION BOX

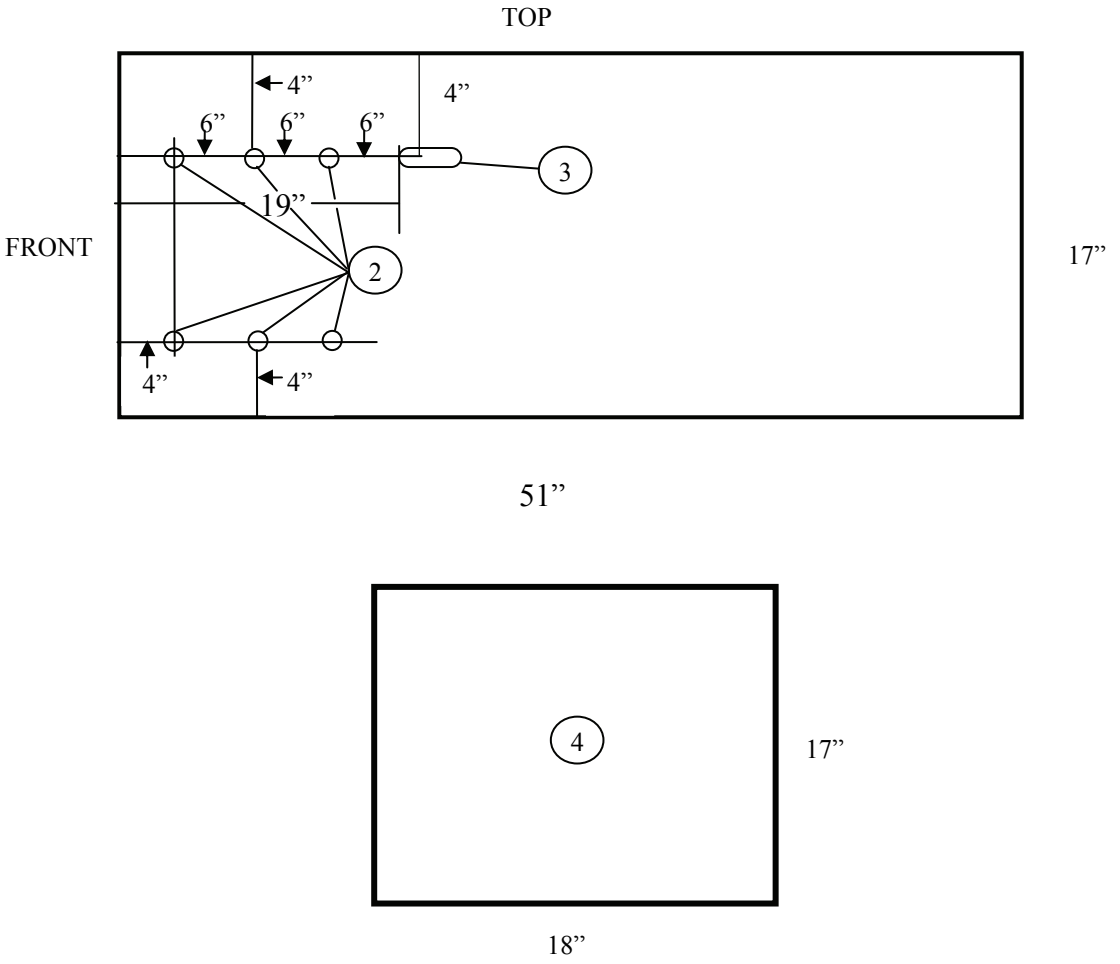
3-3. Construct the engine protection box as shown in Figure 3-2. If the engine protection box is to be recovered and reused, construct the box of oiled marine-grade plywood and aluminum braces. For one-time use, standard plywood and nails may be used.

Note. This drawing is not to scale.



1. Drill 1/2-inch holes as shown in a 3/4- by 48- by 48-inch piece of plywood. This piece will be the bottom.

Figure 3-2. Engine Protection Box Constructed

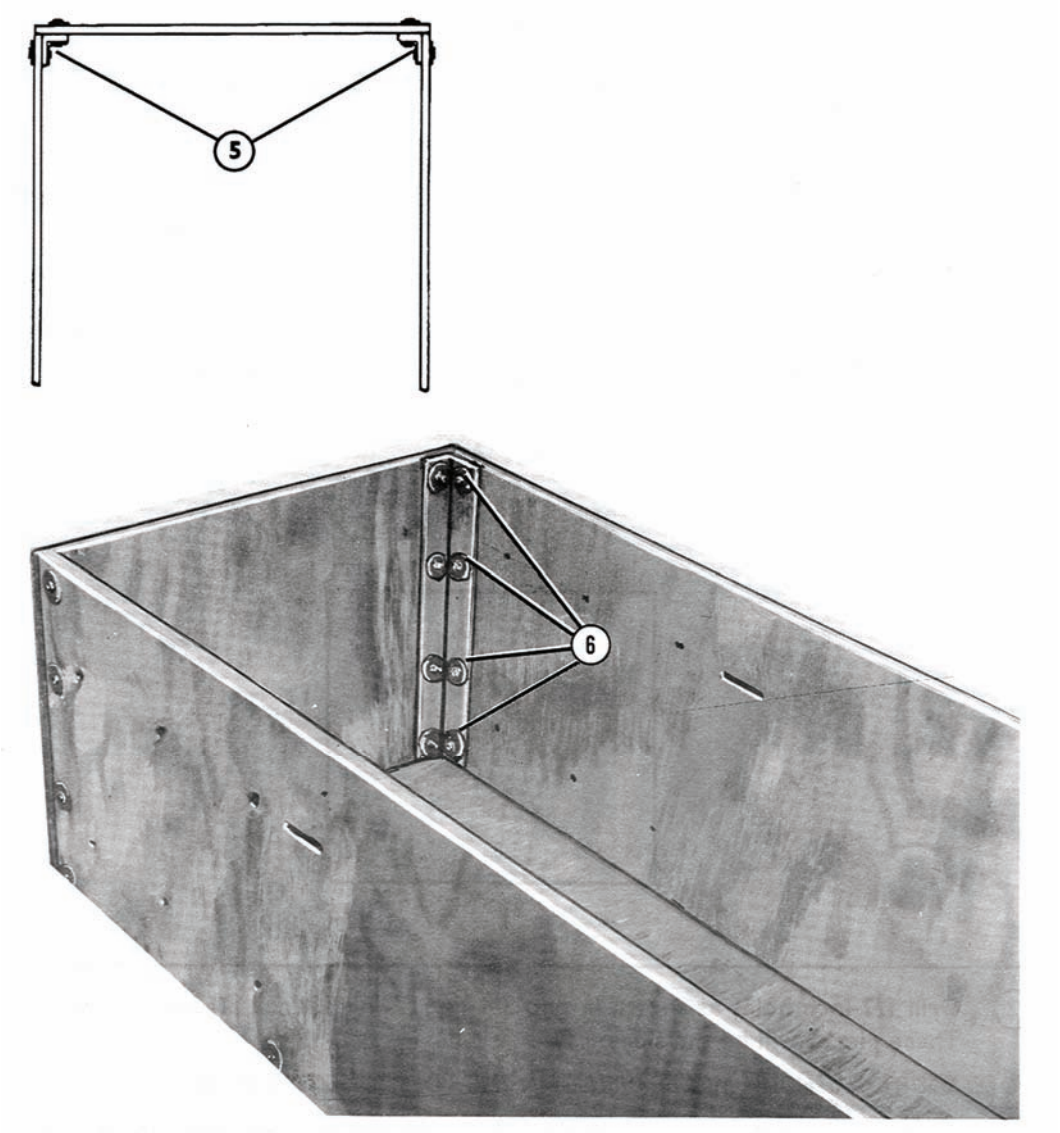


2. Drill 1/2-inch holes as shown in two 3/4- by 17- by 51-inch pieces of plywood. These pieces will be used as the sides.

3. Cut a 2- by 1/2-inch slot in each side 19 inches from the front edge and 4 inches from the top.

4. Cut two 3/4- by 17- by 18-inch pieces of honeycomb to be used as the ends.

Figure 3-2. Engine Protection Box Constructed (continued)

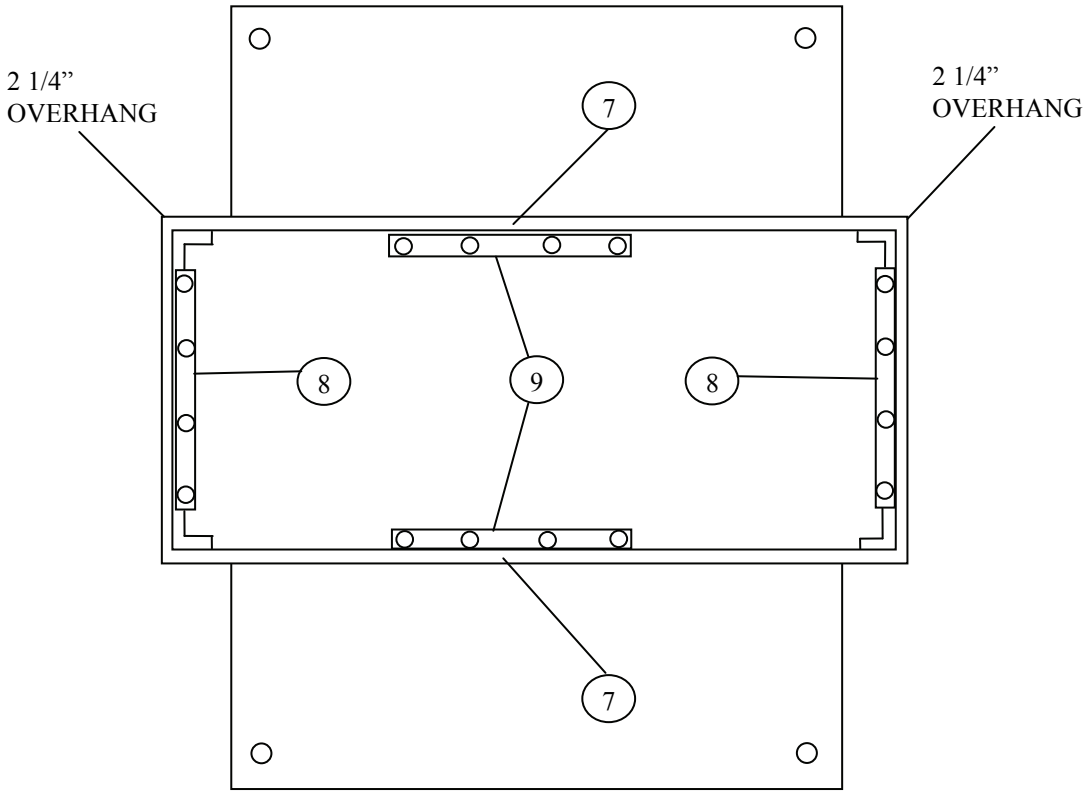


5. Join the ends and the sides of the box with a 17-inch length of angled aluminum. Fit the ends of the box to the outside edges of the sides.

6. Drill four holes (one at each end of the brace and two evenly spaced between the end holes). Install bolts and nuts using 1 1/2-inch diameter fender washers under each bolt and each nut.

Figure 3-2. Engine Protection Box Constructed (continued)

Note. This drawing is not to scale.

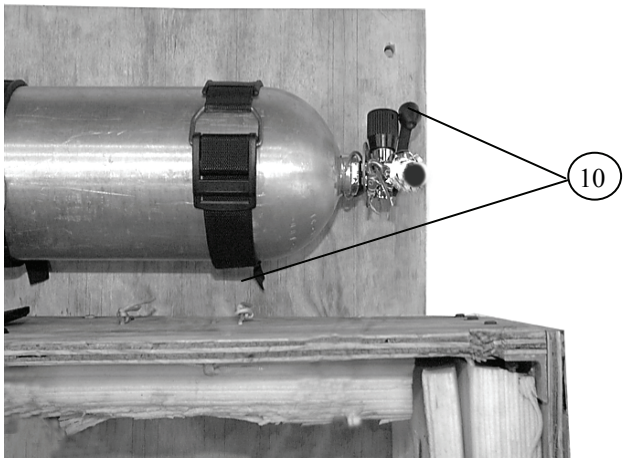


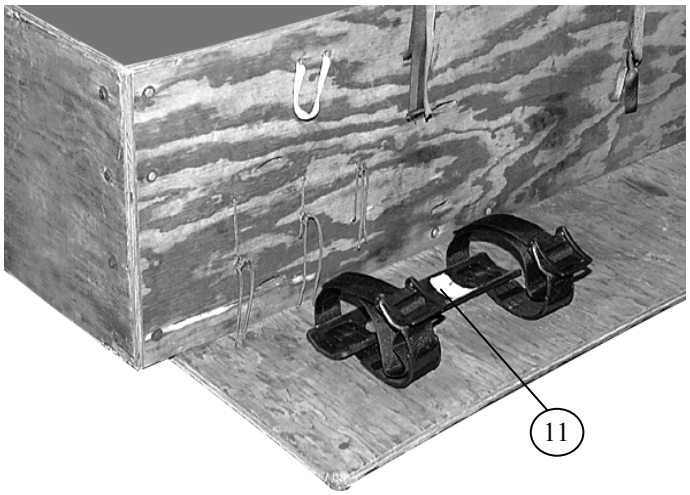
7. Center the sides of the box over the bottom so that the ends overhang the bottom 1 1/2 inches at the front and rear.

8. Join each end of the box to the bottom with a 14-inch length of angled aluminum. Drill holes and install fasteners and washers as in step 6. Note that the total overhang at each end for a 51-inch box is 2 1/4 inches.

9. Join each side of the box to the bottom with a 20-inch length of angled aluminum centered along each side. Drill holes and install fasteners and washers as in step 6.

Figure 3-2. Engine Protection Box Constructed (continued)

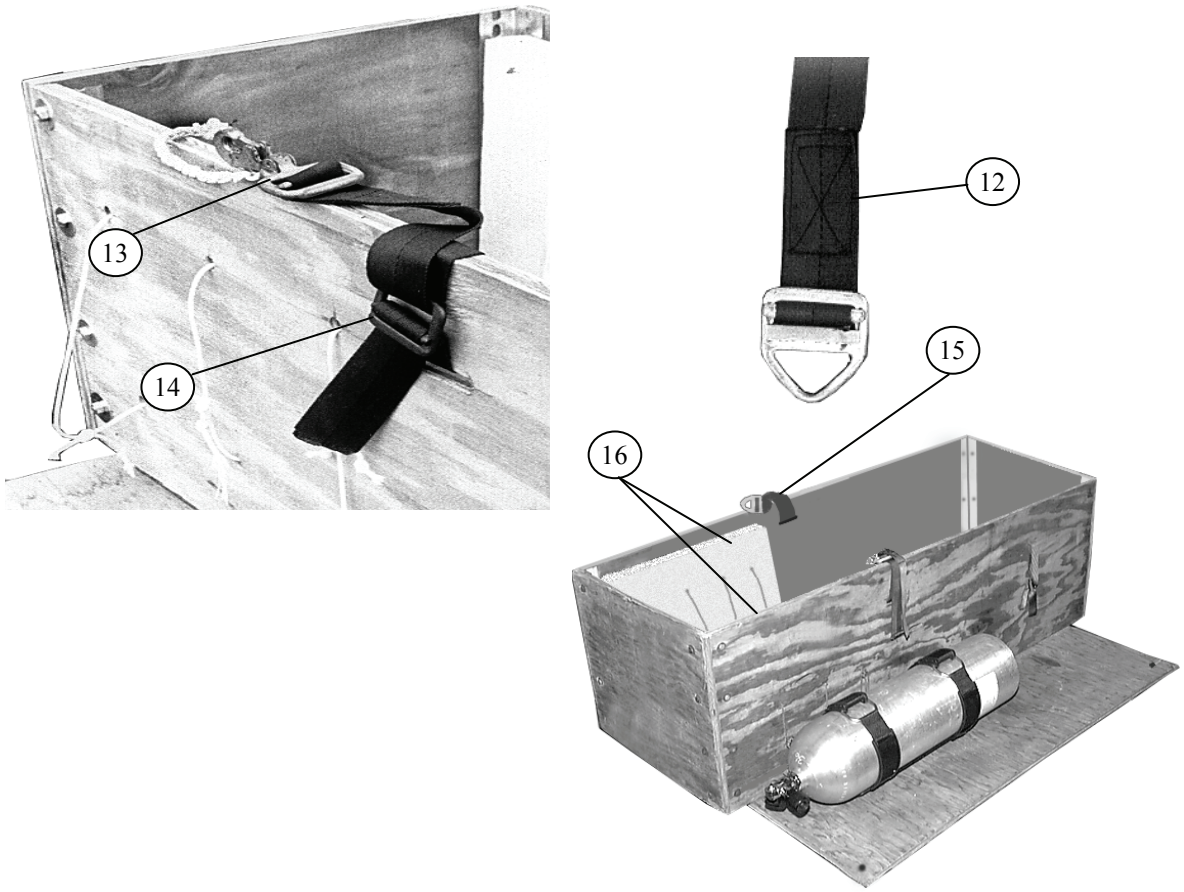




(10) Fill a Self Contained Underwater Breathing Apparatus (SCUBA) cylinder with compressed air at 3000 pounds per square inch (psi), and position the cylinder in its mounting plate. Place the cylinder on the left side of the box base so that the cylinder is 1-inch from the box side, and the cylinder valve flush with the front edge of the base. A carbon fiber apparatus (SCUBA) cylinder with compressed air at 4500 psi may also be used.

(11) Remove the cylinder. Using the mounting plate as a template, drill holes through the box base. Install the mounting plate using the bolts provided.

Figure 3-2. Engine Protection Box Constructed (continued)



12. Sew a V-ring to a 30-inch length of type VIII nylon webbing.

13. Attach a parachute harness strap to another 30-inch length of type VIII nylon webbing using the friction adapter on the snap. Make a pull handle for the snap as shown in step 4 of Figure 3-1.

14. With the snap opening facing the inside of the box, attach the strap with the parachute harness snap to the slot on the left side of the box using a friction adapter.

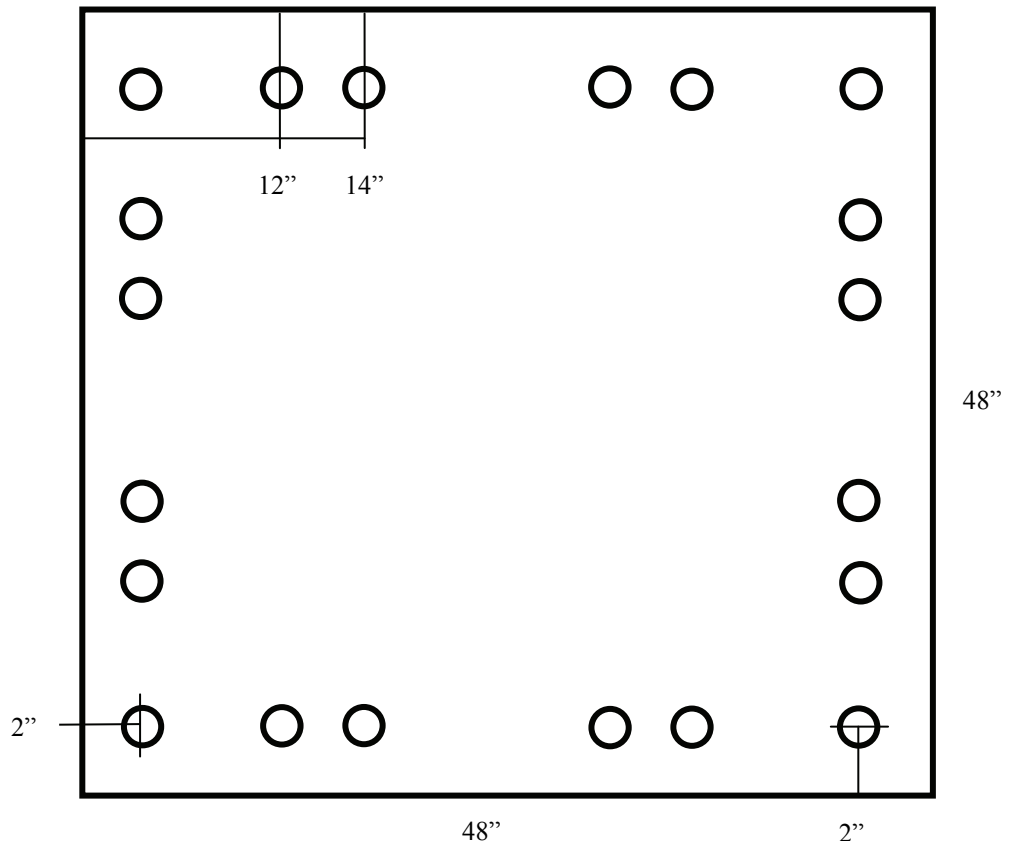
15. Attach the strap with the V-ring to the slot on the right side of the box with a friction adapter.

16. Place one 13- by 17-inch piece of foam padding in each front side of the box. Secure them with type III nylon cord tied through the holes in the sides of the box.

Figure 3-2. Engine Protection Box Constructed (continued)

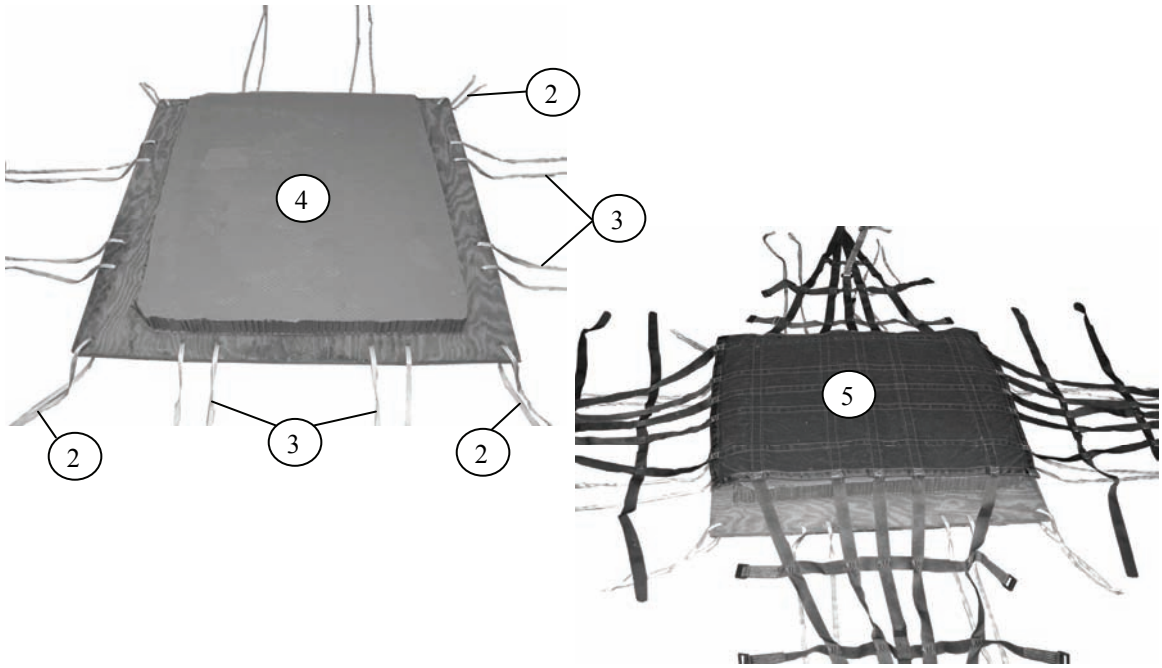
PREPARING SKID AND A-22 CARGO BAG AND PLACING ENGINE BOX

3-4. Prepare the skid board and A-22 cargo bag assembly as shown in Figures 3-3 and 3-4. Place the engine box as shown in Figure 3-5.



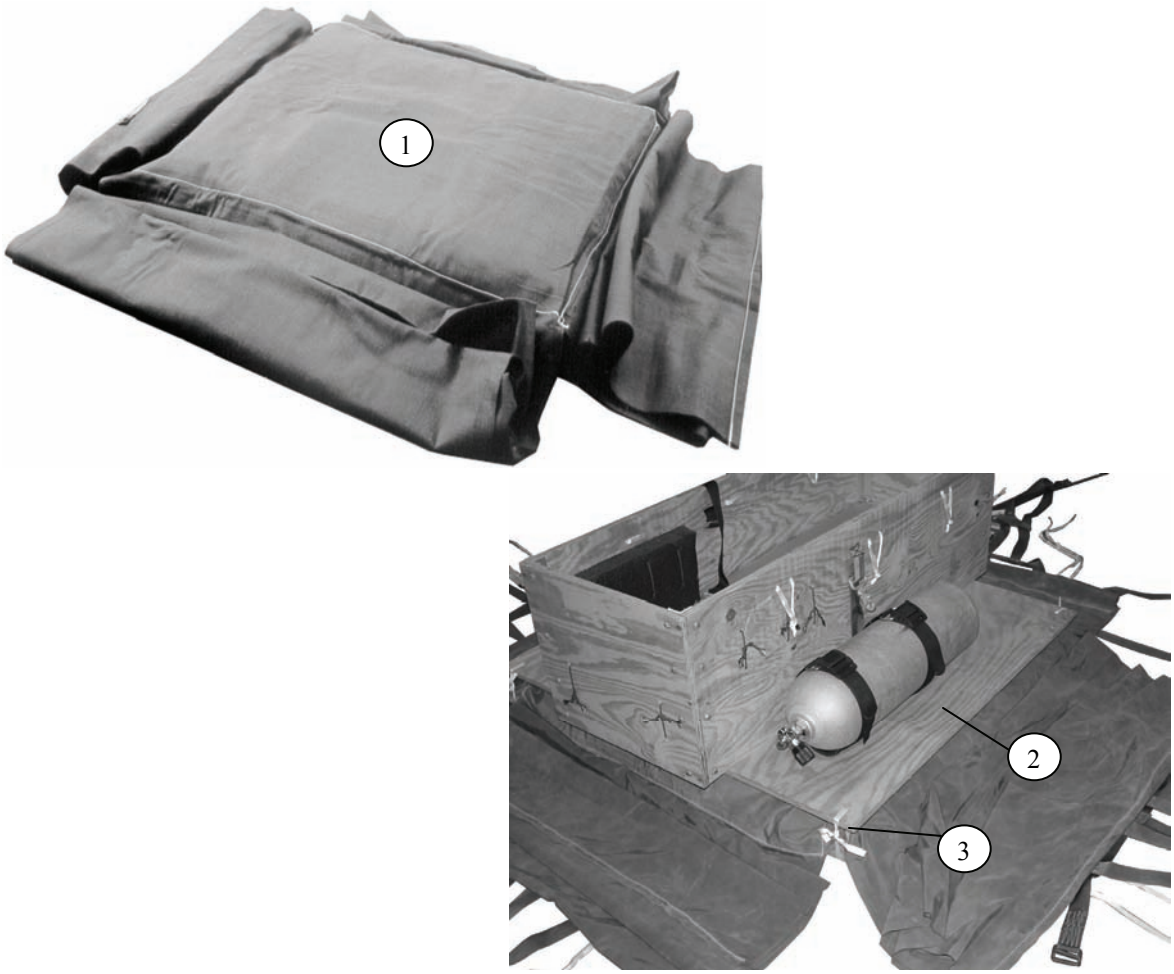
1. Drill 1/2-inch holes in skid board according to Figure 3-2, step 1.

Figure 3-3. A-22 Skid Board Prepared



1. Place the skid board on dunnage to allow lifting by forklift. (not shown)
2. Center a 24-inch length of 1/2-inch tubular nylon webbing through each corner hole.
3. Pass a length of 1/2-inch tubular nylon webbing through each pair of holes in the sides of the skid board.
4. Center a 36- by 42-inch piece of honeycomb on the skid board as shown.
5. Center the scuff pad of the A-22 sling assembly over the honeycomb and skid board.

Figure 3-4. Skid Board and A-22 Cargo Bag Prepared



1. Center the A-22 cover assembly over the scuff pad. Tuck the slings and cover flaps around skid board to allow working space.
2. Center the base of the engine box over the skid board and A-22 cargo bag.
3. Tie the corners of the skid board to the corners of the engine box using the lengths of 1/2-inch tubular nylon webbing placed in step 3 of Figure 3-4.

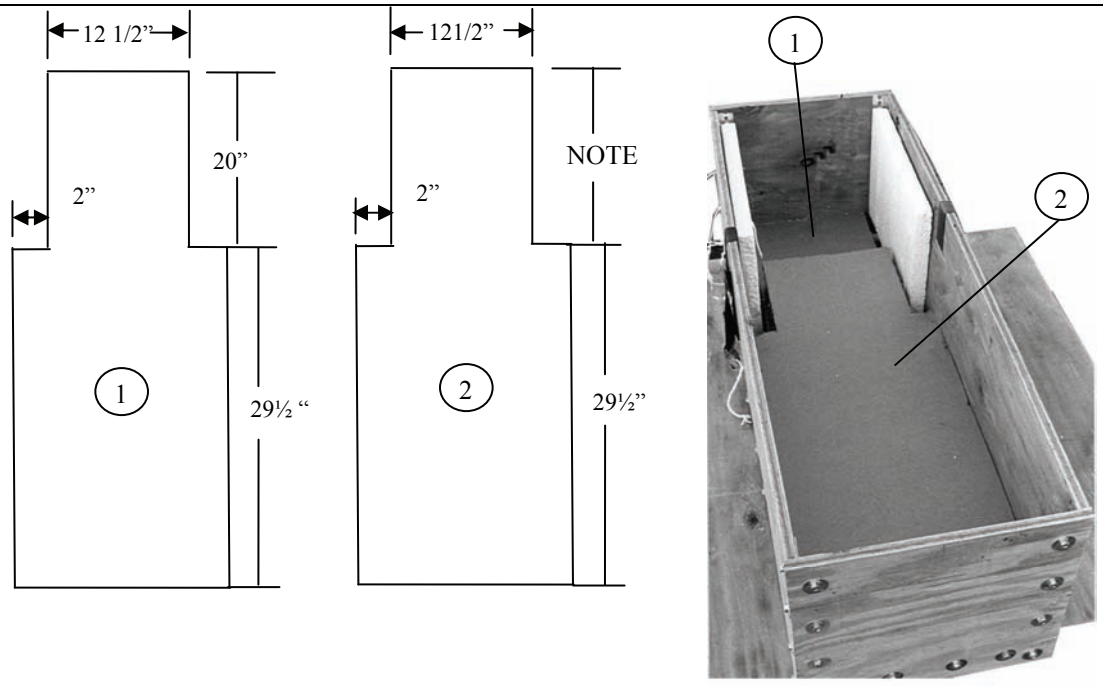
Figure 3-5. Engine Box Placed

PREPARING ENGINE AND SECURING ENGINE IN BOX

3-5. Prepare a 35-horsepower MARS submersible engine and secure it in the engine box as described below:

- Prepare the engine with the assistance of a boat operator as described below.
  - Place the shift lever in the NEUTRAL position
  - Open the throttle fully
  - Place the dewatering valve in the OUT position
  - Coat the ignition components with moisture-resistant sealer
- Place the engine in the engine box, pad it with honeycomb, and secure it as shown in Figure 3-6.

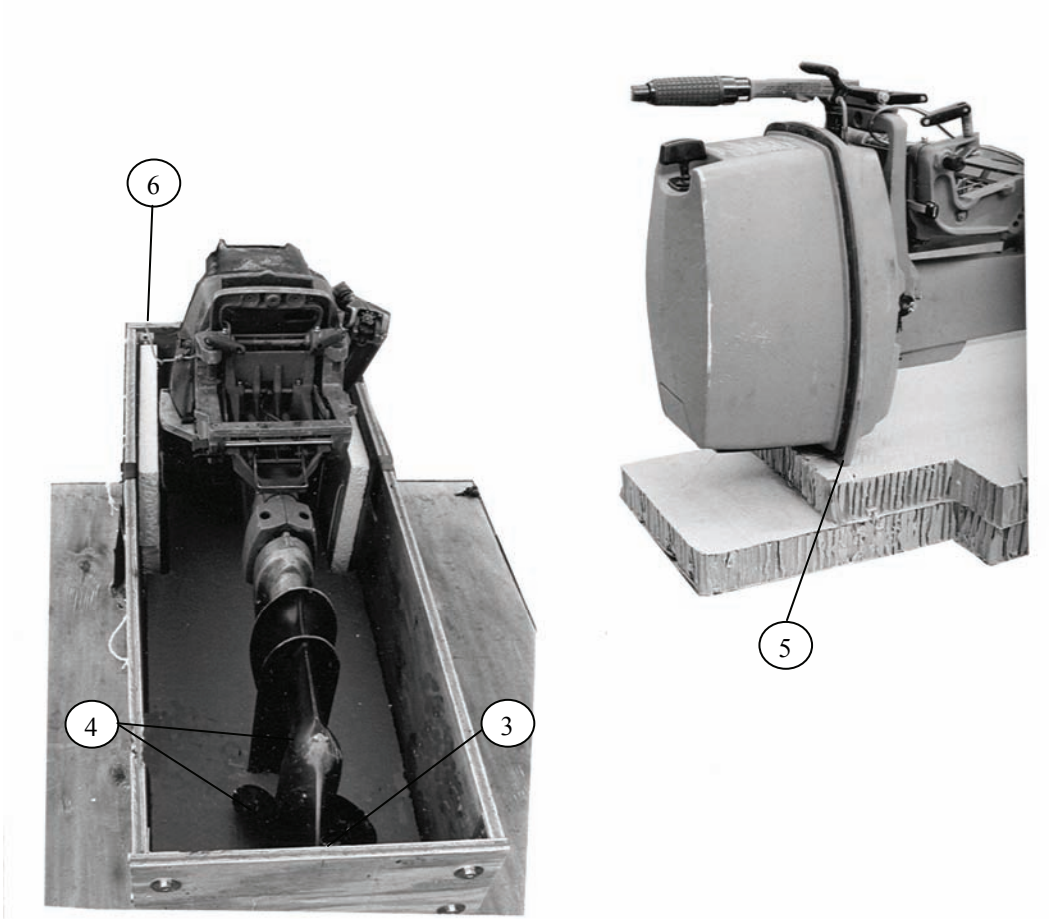
Note. This drawing is not to scale.



Note. This length will vary with the model of the engine used. See Step 5 for proper alignment.

1. Cut a piece of honeycomb as shown. Place it in the bottom of the engine box.
2. Cut the second piece of honeycomb as shown. Place it in the box, aligning the rear edge with the rear edge of the first piece.

Figure 3-6. Engine Secured in Box



3. Place the engine in the box with the skeg touching the rear of the box.

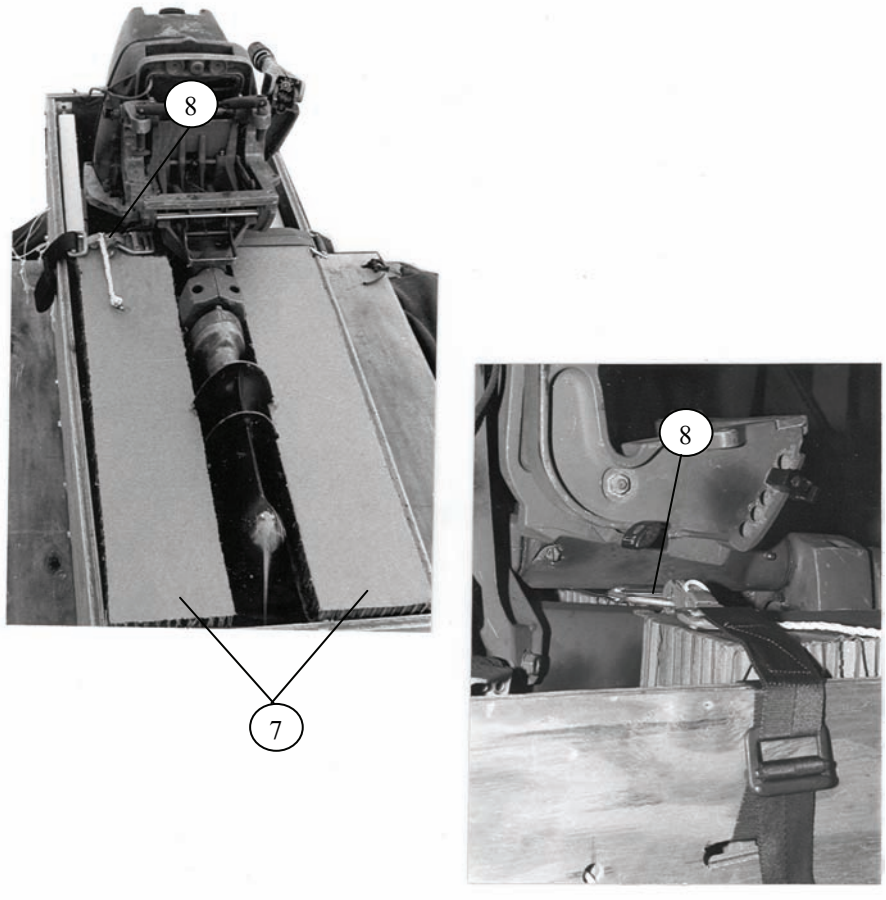
4. Push the propeller and the anti-ventilation plate down into the honeycomb.

5. Make sure the metal ledge below the engine cover rests on the honeycomb as shown. (The box is NOT shown here for visual purposes.)

Note. Make sure the engine cover does not rest on the honeycomb.

6. Leave the engine retention cable outside the box.

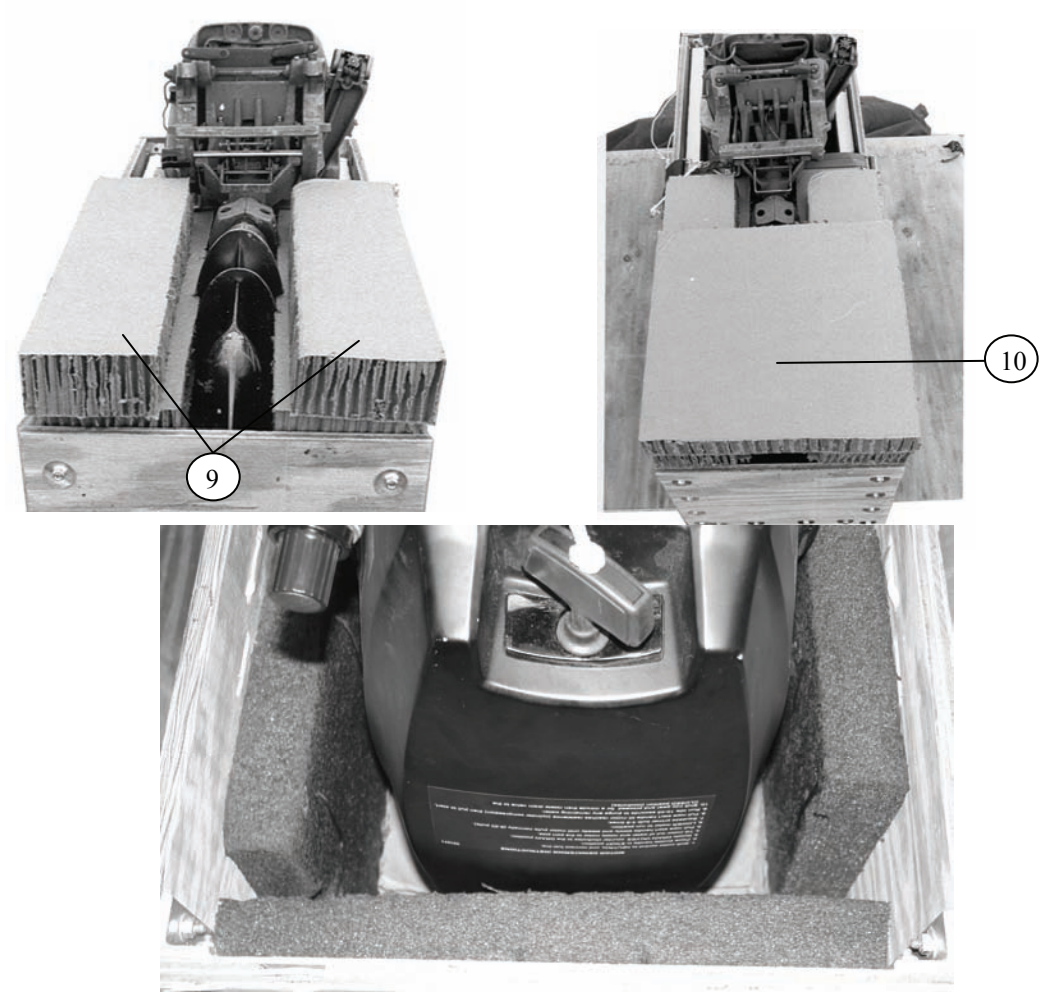
Figure 3-6. Engine Secured in Box (continued)



7. Place four 6- by 30-inch pieces of honeycomb in the box on each side of the lower engine shaft.

8. Fasten the engine restraint strap snugly over the engine. Pass the strap between the engine mounting bracket and drive shaft housing.

Figure 3-6. Engine Secured in Box (continued)



9. Place a layer of 6- by 26-inch honeycomb on each side of the engine, flush with the rear corners of the box.

10. Place an 18- by 18-inch piece of honeycomb flush over the rear of the box.

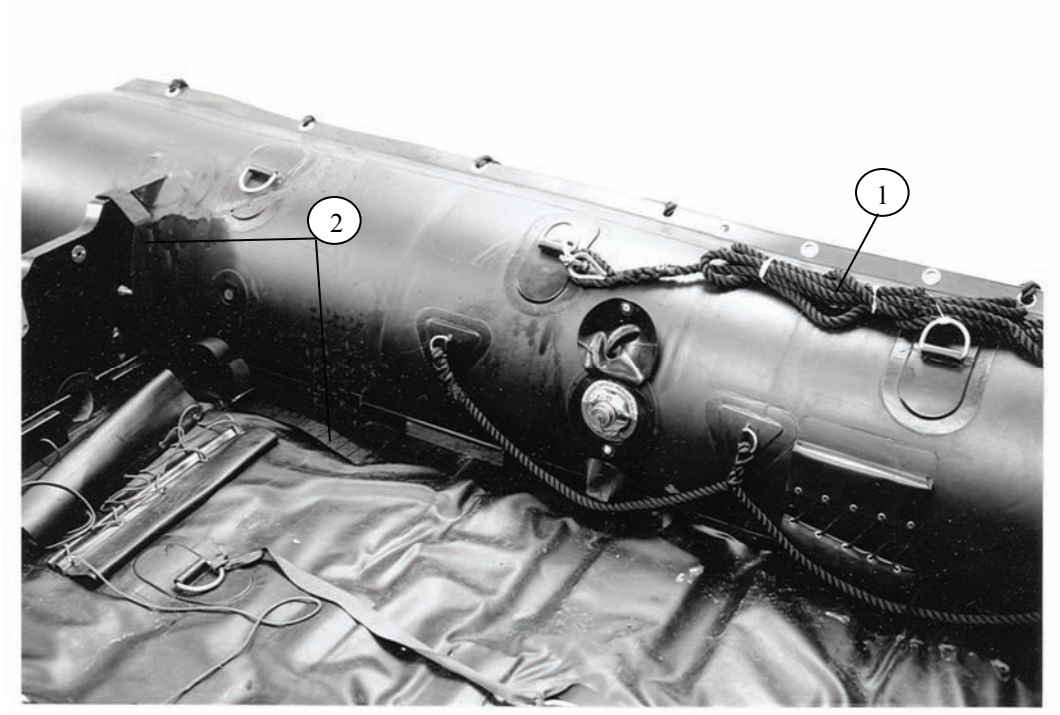
11. If the short-shaft engine is being rigged, place a piece of honeycomb or a piece of 2-inch thick styrofoam between the top of the engine and the front end of the engine box.

Figure 3-6. Engine Secured in Box (continued)

PREPARING BOAT AND INFLATION SYSTEM

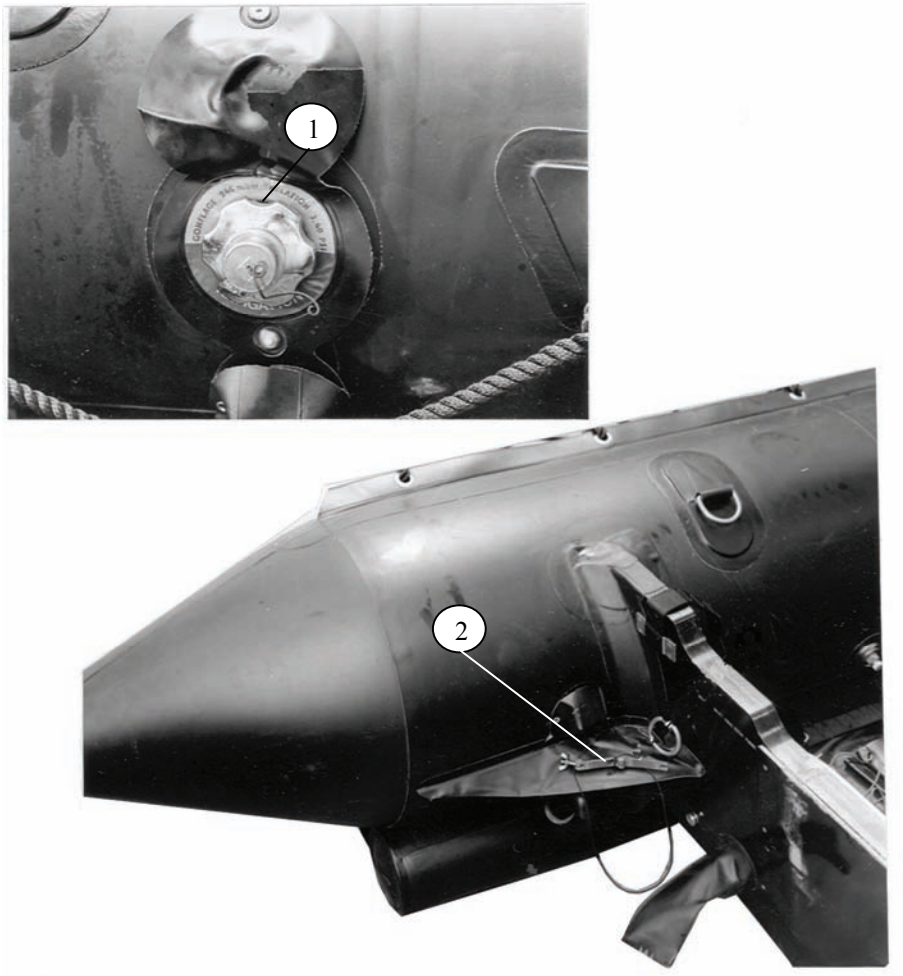
3-6. Prepare the F470U boat and the inflation system as described below.

- Make a pressure check on the boat in accordance with the manufacturer's manual
- Make sure the bow line is less than 12 feet long
- Stow any tools, spare engine parts, foot pump, and hose in the bow storage pouches. Attach chemical lights (not red) to the zipper pulls if mission requirements dictate
- Prepare the boat as shown in Figure 3-7
- Prepare the inflation system as shown in Figure 3-8



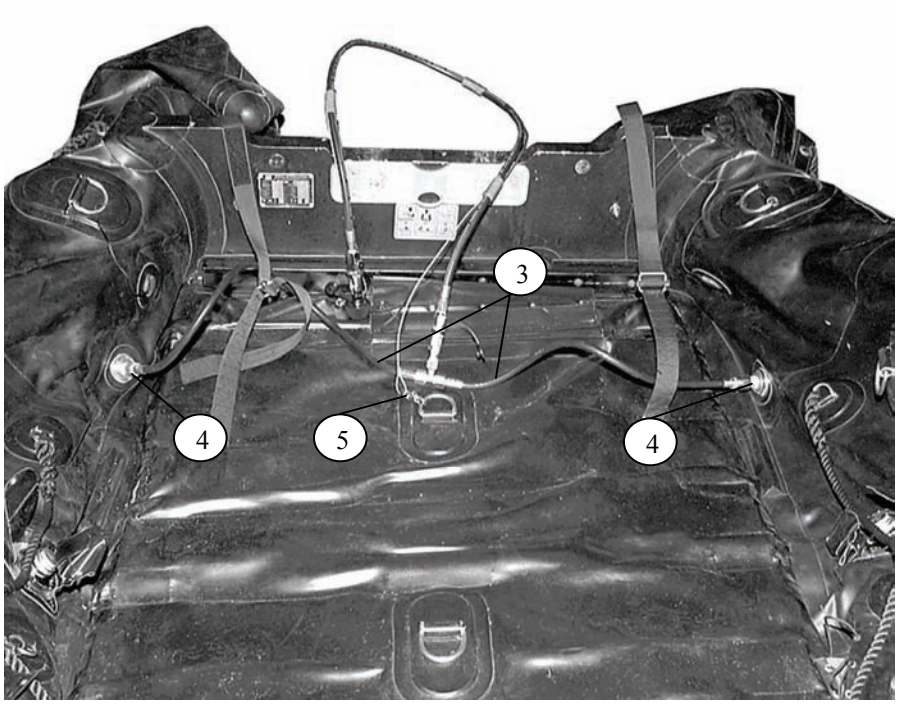
1. S-fold all loose boat lines. Secure the folds to adjacent rings with retainer bands.
2. Loosen the transom straps.

Figure 3-7. Boat Prepared



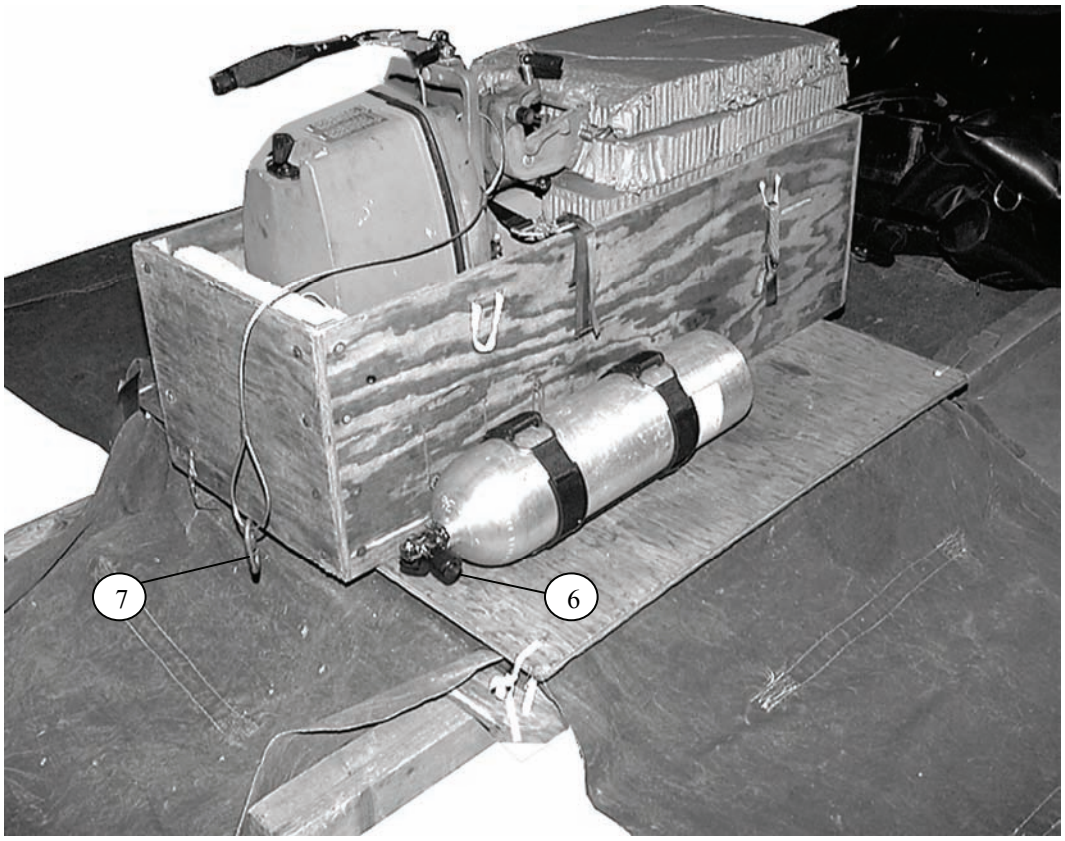
1. Make sure all four valves are set in the center of the inflation (red) position.
2. Remove the isolator clamps from the shock absorption tubes. Store them in the pouch provided.

Figure 3-8. Inflation System Prepared



3. Connect the two Zodiac high-pressure inflation hoses to the Zodiac tee tube.
4. Connect the Zodiac high-pressure inflation hoses to the buoyancy tubes.
5. Connect the safety lanyard to the aft center D-ring with a small clevis.

Figure 3-8. Inflation System Prepared (continued)



6. Make sure the cylinder is placed and secured in its holder, exactly as shown, and that the hand wheel faces away from the box wall.

7. Place a carabiner or small clevis on the engine securing cable.

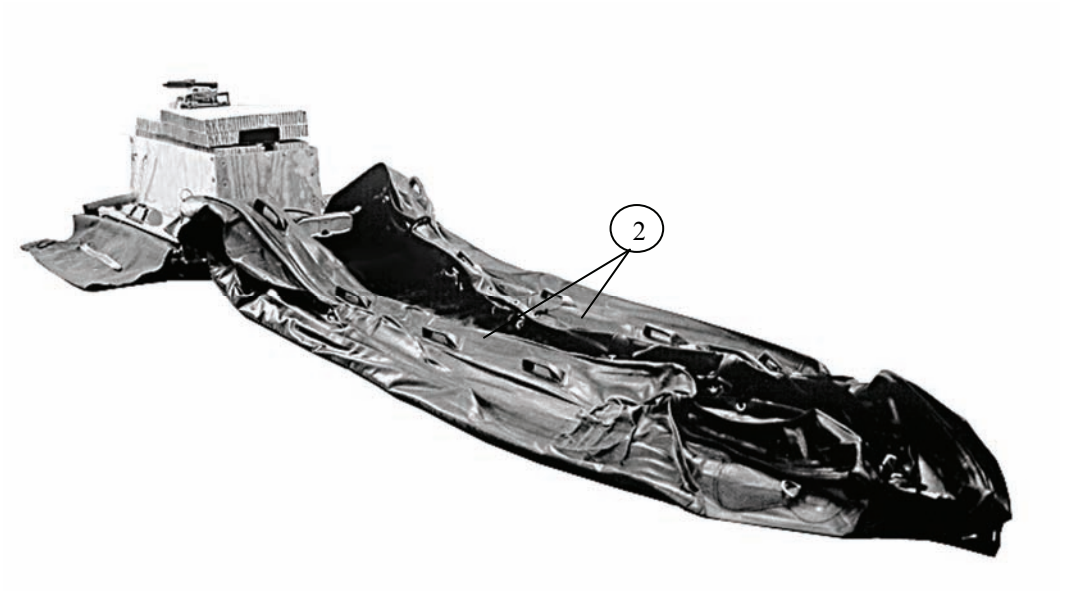
Figure 3-8. Inflation System Prepared (continued)

COLLAPSING AND FOLDING BOAT, COMPLETING INFLATION SYSTEM CONNECTION AND LOADING FUEL TANKS

3-7. Collapse the boat, attach it to the engine, and connect the inflation hoses to the cylinder as shown in Figure 3-9. Fold the boat over the engine box as shown in Figure 3-10. Stow the fuel tanks and make the final folds as shown in Figures 3-11 and 3-12.

CAUTION

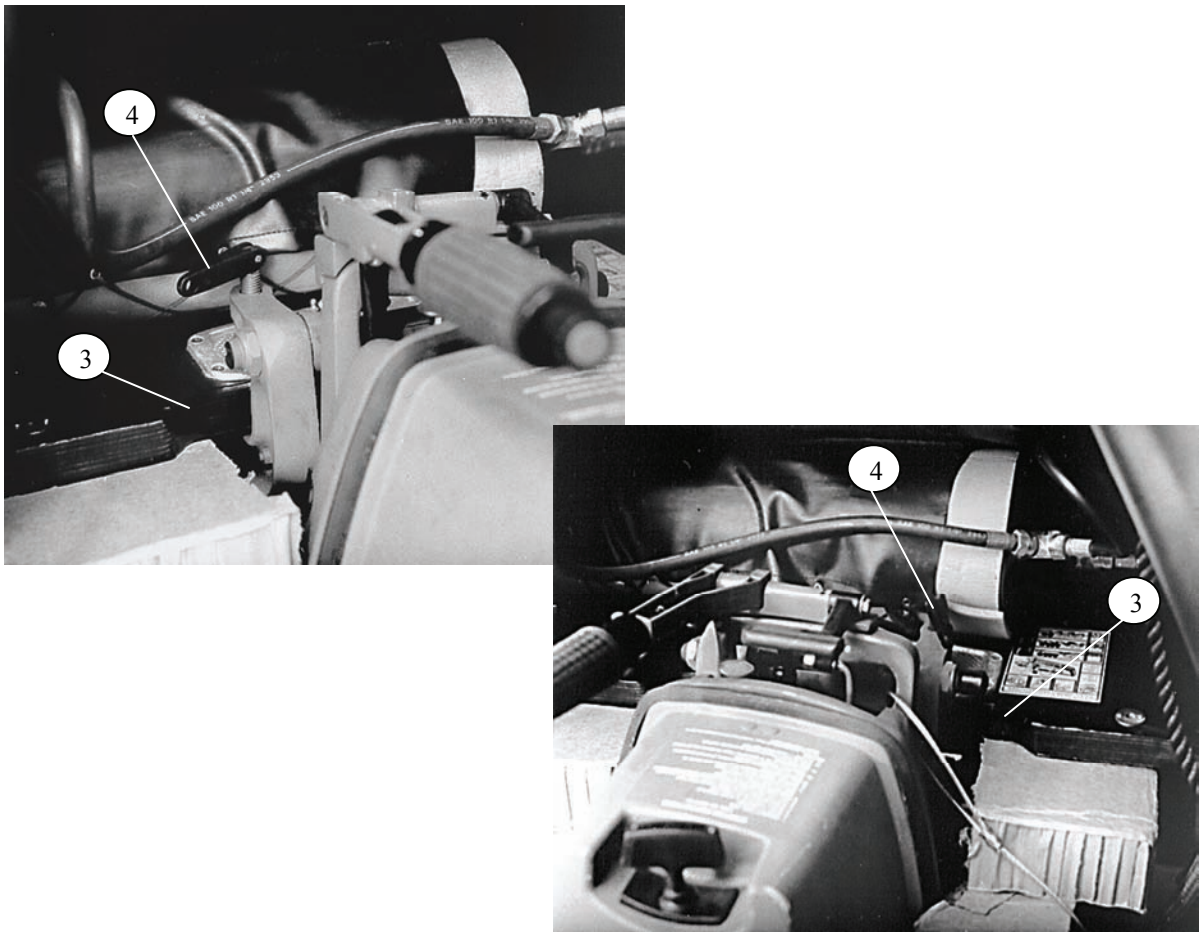
Make sure the isolator clamps are removed from the shock absorption tubes and stowed. Also make sure all inflation valves are closed and in the center of the inflation (red) position.



1. Use an industrial strength vacuum cleaner to extract the air out of the buoyancy tubes and the keel chamber of the boat. (not shown)

2. Fold the side tubes in toward the center. The bottom seams of the buoyancy tubes will lie along the edge of the deflated boat. The left and right tubes will touch as they are folded toward the center of the boat.

Figure 3-9. Boat Collapsed and Attached to Engine, Final Inflation System Connection Made

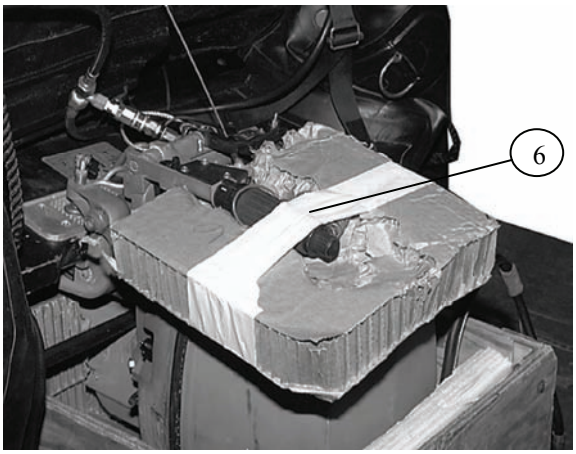


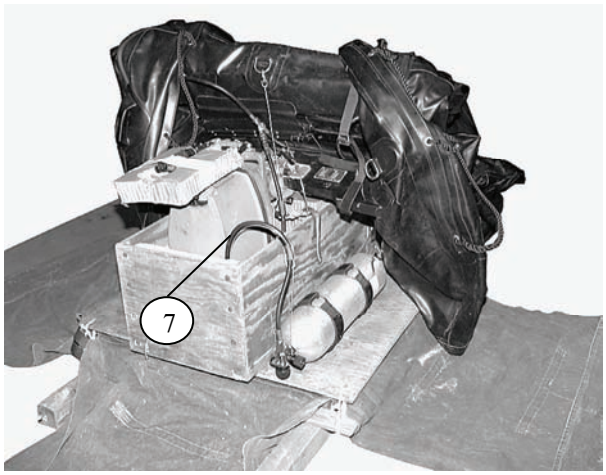
3. Open the mounting clips on the engine. Lift the transom of the boat with the help of an assistant and slide the transom into the engine mounting clamps. Crush the surrounding honeycomb, if necessary.

4. Make sure the clips are aligned with the metal engine mounting pads on the transom. Tighten the engine mounting clamps.

5. Attach the engine safety cable to the ring provided on the transom using a small clevis, or the locking carabiner installed in Figure 3-8, Step 7 (not shown).

Figure 3-9. Boat Collapsed and Attached to Engine, Final Inflation System Connection Made (continued)

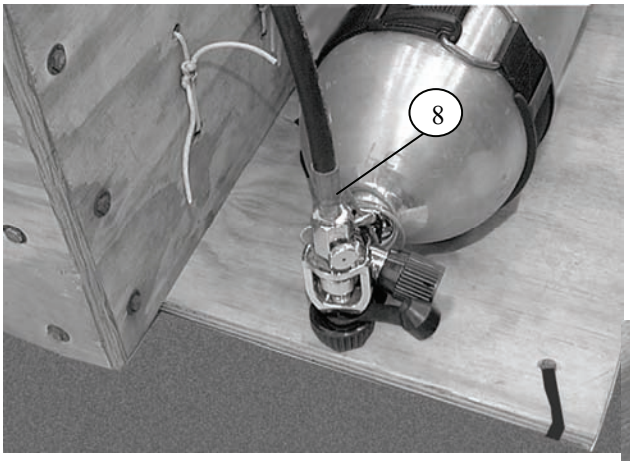


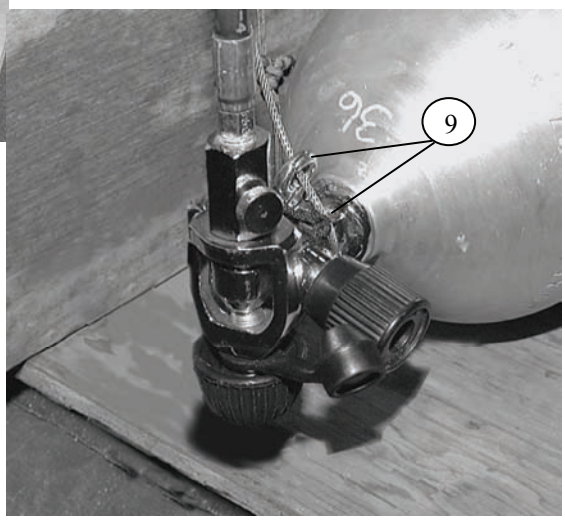


6. Center the motor control handle in a 12- by 12-inch piece of honeycomb. Crush the honeycomb to allow the handle to lay in it. Secure the honeycomb to the handle with two turns of masking tape.

7. Route the main inflation hose down into the box on the left side. Allow a smooth turn of the hose out of the box to where it joins the cylinder valve.

Figure 3-9. Boat Collapsed and Attached to Engine, Final Inflation System Connection Made (continued)





8. Connect the inflation tube to its connector.

9. Route the lanyard through the ring, and attach it to its connector.

Figure 3-9. Boat Collapsed and Attached to Engine, Final Inflation System Connection Made (continued)