Airdrop of Supplies and Equipment: Rigging Loads for Special Operations
This publication is available at Army Knowledge Online (www.us.army.mil) and General Dennis J. Reimer Training and Doctrine Digital Library at (www.train.army.mil).
AIRDROP OF SUPPLIES AND EQUIPMENT:
RIGGING LOADS FOR SPECIAL OPERATIONS

Contents

PREFACE ..............................................................................................................v
INTRODUCTION ..................................................................................................vii

Chapter 1
RIGGING HIGH SPEED LOW LEVEL AERIAL DELIVERY SYSTEM (HSLLADS)
CONTAINER LOADS ........................................................................................ 1-1

Section I-Rigging the Container ..................................................................... 1-1
Description of Load ....................................................................................... 1-1
Preparing Container ...................................................................................... 1-2
Loading Container .......................................................................................... 1-4
Constructing Container Straps ................................................................. 1-5
Closing Container and Stowing Parachute ............................................... 1-6
Equipment Required ..................................................................................... 1-10

Section II-Modifying and Packing the 22-Foot and 28-Foot Cargo
Extraction Parachutes .................................................................................. 1-11
Modifying Cargo Extraction Parachute Deployment Bag ....................... 1-11
Attaching Static Line and Bridle Loop Breakcord ................................... 1-14
Stowing Suspension Lines .......................................................................... 1-16
Packing Parachute ....................................................................................... 1-16
Stowing Static Line ..................................................................................... 1-17

Distribution Restriction: Approved for public release; distribution is unlimited.

*This publication supersedes FM 10-542/NAVSEA SS400-AD-MMO-010/TO 13C7-51-21, 7 October 1987.
## Chapter 2

**RIGGING COMBAT RUBBER RAIDING CRAFT**

### Section I-Rigging Single Zodiac F470U Boat

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description of Load</td>
<td>2-1</td>
</tr>
<tr>
<td>Preparing the Platform</td>
<td>2-1</td>
</tr>
<tr>
<td>Installing Suspension Slings</td>
<td>2-9</td>
</tr>
<tr>
<td>Stowing Sandbags</td>
<td>2-10</td>
</tr>
<tr>
<td>Attaching Lashings to the Platform</td>
<td>2-11</td>
</tr>
<tr>
<td>Building, Placing and Securing Honeycomb Stacks</td>
<td>2-12</td>
</tr>
<tr>
<td>Preparing Boat</td>
<td>2-14</td>
</tr>
<tr>
<td>Positioning Boat</td>
<td>2-19</td>
</tr>
<tr>
<td>Preparing, Placing, and Securing Accompanying Load</td>
<td>2-20</td>
</tr>
<tr>
<td>Installing Load Cover and Lashing Boat</td>
<td>2-26</td>
</tr>
<tr>
<td>Safety Tying Suspension Slings</td>
<td>2-27</td>
</tr>
<tr>
<td>Stowing Parachute</td>
<td>2-28</td>
</tr>
<tr>
<td>Stowing the G-12 Cargo Parachute and 15-Foot Cargo Extraction Parachute</td>
<td>2-33</td>
</tr>
<tr>
<td>Installing Parachute Release</td>
<td>2-35</td>
</tr>
<tr>
<td>Installing Flotation Device</td>
<td>2-36</td>
</tr>
<tr>
<td>Marking Rigged Load</td>
<td>2-37</td>
</tr>
<tr>
<td>Equipment Required</td>
<td>2-38</td>
</tr>
</tbody>
</table>

### Section II-Rigging Double Zodiac F470U Boat

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description of Load</td>
<td>2-40</td>
</tr>
<tr>
<td>Preparing the Platform</td>
<td>2-40</td>
</tr>
<tr>
<td>Installing Suspension Slings</td>
<td>2-40</td>
</tr>
<tr>
<td>Placing and Securing Honeycomb Stacks</td>
<td>2-40</td>
</tr>
<tr>
<td>Preparing Boats</td>
<td>2-40</td>
</tr>
<tr>
<td>Positioning First Boat</td>
<td>2-40</td>
</tr>
<tr>
<td>Preparing and Stowing Accompanying Load</td>
<td>2-40</td>
</tr>
<tr>
<td>Leveling, Covering, and Lashing First Boat and Accompanying Load</td>
<td>2-41</td>
</tr>
<tr>
<td>Placing and Loading Second Boat</td>
<td>2-42</td>
</tr>
<tr>
<td>Lashing Second Boat to Platform</td>
<td>2-43</td>
</tr>
<tr>
<td>Safety Tying Suspension Slings</td>
<td>2-43</td>
</tr>
<tr>
<td>Stowing Parachutes</td>
<td>2-44</td>
</tr>
<tr>
<td>Installing Parachute Release</td>
<td>2-46</td>
</tr>
<tr>
<td>Equipment Required</td>
<td>2-47</td>
</tr>
<tr>
<td>Marking Rigged Load</td>
<td>2-48</td>
</tr>
</tbody>
</table>

## Chapter 3

**RIGGING ZODIAC F470U IN A-22 CARGO BAG**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description of Load</td>
<td>3-1</td>
</tr>
<tr>
<td>Adapting A-22 Cargo Bag</td>
<td>3-1</td>
</tr>
<tr>
<td>Constructing Engine Protection Box</td>
<td>3-4</td>
</tr>
<tr>
<td>Preparing Skid and A-22 Cargo Bag and Placing Engine Box</td>
<td>3-10</td>
</tr>
<tr>
<td>Preparing Engine and Securing Engine in Box</td>
<td>3-13</td>
</tr>
<tr>
<td>Preparing Boat and Inflation System</td>
<td>3-17</td>
</tr>
<tr>
<td>Collapsing and Folding Boat, Completing Inflation System Connection and Loading Fuel Tanks</td>
<td>3-21</td>
</tr>
<tr>
<td>Securing A-22 Cargo Bag</td>
<td>3-28</td>
</tr>
<tr>
<td>Modifying Type IV Link Assembly for use with Hydraulic Release</td>
<td>3-32</td>
</tr>
<tr>
<td>Installing Parachute Release and Parachutes</td>
<td>3-36</td>
</tr>
</tbody>
</table>

FM 4-20.142/MCRP 4-11.3P/NAVSEA SS400-AD-MMO-010/ TO 13C7-51-21

19 September 2007
CHAPTER 4  RIGGING THE NAVAL SPECIAL WARFARE (NSW) RIGID INFLATABLE BOAT (RIB) FOR LOW-VELOCITY AIRDROP

Description of Load..................................................................................... 4-1
Preparing Platform........................................................................................ 4-2
Installing the Platform Release System....................................................... 4-10
Installing Extraction Force Transfer Coupling (EFTC).............................. 4-13
Lifting and Positioning Boat......................................................................... 4-16
Preparing Boat.............................................................................................. 4-18
Preparing the Sponson Inflation System....................................................... 4-26
Installing the Water Activated Parachute Release ...................................... 4-27
Installing the Boat Cover, Sponson, Ties, and Sponson Covers ..................... 4-28
Preparing Suspension Slings...................................................................... 4-34
Installing Parachute Stowage Platform....................................................... 4-35
Installing Cargo Parachutes........................................................................ 4-36
Installing M-2 Cargo Parachute Release..................................................... 4-37
Installing Parachute Restraints.................................................................. 4-38
Installing Sponson Activation Lanyard....................................................... 4-39
Preparing and Testing the NSW RIB Restraint System................................ 4-40
Connecting M-21 Cutter Arming Wire Lanyards......................................... 4-47
Securing G-12E Parachute Static Line......................................................... 4-48
Placing Extraction Parachutes..................................................................... 4-49
Marking the Rigged Load............................................................................ 4-49
Equipment Required.................................................................................... 4-50

CHAPTER 5  RIGGING THE ADVANCED RESCUE CRAFT (ARC) ON A COMBAT EXPENDABLE PLATFORM (CEP)

SECTION I-RIGGING THE GP 800 ARC .......................................................... 5-1
Description of Load..................................................................................... 5-1
Building the Combat Expendable Platform.................................................. 5-2
Preparing the Platform................................................................................ 5-4
Preparing and Positioning Honeycomb....................................................... 5-6
Positioning the ARC.................................................................................... 5-8
Preparing the ARC..................................................................................... 5-9
Lashing the ARC......................................................................................... 5-13
Safety Tieing Suspension Slings................................................................. 5-16
Stowing Parachute...................................................................................... 5-17
Installing the Automatic Cargo Parachute Release..................................... 5-18
Stowing the Extraction Parachute................................................................. 5-19
Attaching Flotation Devices for Training Loads......................................... 5-21
Marking the Rigged Load............................................................................ 5-22
Equipment Required.................................................................................... 5-23

SECTION II-RIGGING THE XL1200 ARC....................................................... 5-24
Description of Load..................................................................................... 5-24
Building the Combat Expendable Platform.................................................. 5-25
Preparing the Platform................................................................................ 5-27
Preparing and Positioning Honeycomb ............................................................5-29
Positioning the ARC ..................................................................................5-31
Preparing the ARC ..................................................................................5-32
Lashing the ARC .......................................................................................5-36
Safety tying Suspension Slings.................................................................5-39
Stowing Cargo Parachute ........................................................................5-40
Installing the Automatic Cargo Parachute Release ..................................5-41
Stowing the Extraction Parachute ..............................................................5-42
Attaching Flotation Devices for Training ..................................................5-44
Marking the Rigged Load .........................................................................5-45
Equipment Required ................................................................................5-46

CHAPTER 6  RIGGING THE WIND SUPPORTED AERIAL DELIVERY SYSTEM (WSADS)
SNOW GOOSE..................................................................................................6-1
Description of Load ..................................................................................6-1
Installing Air Launch Parachute .................................................................6-2
Installing Pyrotechnic Cutters .................................................................6-10
Recovery Dispatch Pin Placement ............................................................6-14
Securing Landing Gear ............................................................................6-16
Installing Propeller Brake ........................................................................6-18
Installing Deflector Lanyards .................................................................6-19
Equipment Required ................................................................................6-21

GLOSSARY .................................................................................................... Glossary-1

REFERENCES.............................................................................................. References-1
Preface

SCOPE
This manual tells and shows how to rig the following airdrop loads for special operations:

- Four different High Speed Low Level Aerial Delivery System (HSLLADS) container loads rigged for airdrop from the MC-130 aircraft.
- Two different inflated Combat Rubber-Raiding Crafts (CRRC) rigged on a Combat Expendable Platform (CEP) for low-velocity airdrop from a C-130 or C-17 aircraft.
- The Rigging Alternate Method Zodiac (RAMZ) is rigged in an A-22 container for low-velocity airdrop from a C-130 or C-17 aircraft.
- The Naval Special Warfare Rigid Inflatable Boat (NSWRIB) is rigged for low-velocity airdrop on a specially designed platform from a C-130 or C-17 aircraft.
- Two different Advanced Rescue Crafts (ARC) rigged on a combat expendable platform (CEP) for low velocity airdrop from a C-130 or C-17 aircraft.
- The Wind Supported Aerial Delivery System (WSADS) Snow Goose is a low-cost, reusable, fully autonomous, Unmanned Aerial Vehicle (UAV) that can be used to carry out a variety of missions at otherwise inaccessible locations for low velocity airdrop from a C-130 or C-17 aircraft.

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

USER INFORMATION
The proponent of this publication is the United States Army Training and Doctrine Command (TRADOC). You are encouraged to report any errors or omissions and to suggest ways of making this a better manual.

Army personnel, send your comments on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to:

Director
Aerial Delivery and Field Services Department
USA Quartermaster Center and School
710 Adams Avenue
Fort Lee, Virginia 23801-1502

Marine Corps. Readers of this publication are encouraged to submit suggestions and changes through the Universal Need Statement (UNS) process. The UNS submission process is delineated in Marine Corps Order 3900.15A, Marine Corps Expeditionary Force Development System, which can be obtained from the Marine Corps Publications Electronic Library Online (universal reference locator: http://www.usmc/directiv.nsf/web+orders). The UNS recommendation should include the following information:

- Location of change
- Publication number and title
MCCDC will consolidate changes and forward to:
  Director
  Aerial Delivery and Field Services Department
  USA Quartermaster Center and School
  710 Adams Avenue
  Fort Lee, Virginia 23801-1502

Navy personnel send all correspondence to the (PEO LMW) Program Office.
  Program Executive Officer,
  Littoral and Mine Warfare (PMS NSW)
  614 Sicard St. SE
  Washington Navy Yard, DC  20376-7210

PEO LMW will consolidate changes and forward to:
  Director
  Aerial Delivery and Field Services Department
  USA Quartermaster Center and School
  710 Adams Avenue
  Fort Lee, Virginia 23801-1502

Air Force personnel, send your reports on AFTO Form 22 through your respective command Weapons and Tactics to:
  Headquarters
  Air Mobility Command (AMC/A3DT)
  402 Scott Drive, Unit 3AI
  Scott AFB, Illinois 62225-5302

Air Force personnel in Special Operations Command, send your reports on AFTO Form 22 (Technical Order Publication Improvement Report). HQ AMC/A3DT will consolidate and forward changes to:
  Director
  Aerial Delivery and Field Services Department
  USA Quartermaster Center and School
  710 Adams Avenue
  Fort Lee, Virginia 23801-1502

Also, send an information copy of AFTO Form 22 to:
  584 CBSS/GBMUDE
  380 Richard Ray Blvd
  STE 104
  Robins AFB, Georgia. 31098-1640
Introduction

DESCRIPTION OF ITEMS

The descriptions of the items rigged in this manual are given below:

- **High Speed Low Level Aerial Delivery System (HSLLADS):** The HSLLADS container is an adjustable container made of an A-21 cargo cover and other airdrop items. The dimensions and weight capacity of the container is determined by the load being airdropped.

- **Zodiac F470U Combat Rubber Raiding Craft (CRRC):** The inflated Zodiac 470U boat is airdropped singly or in pairs. Each boat is 75 inches wide, 22 inches high, 185 inches long and may be airdropped utilizing a roll-up floor or hard deck. A single boat weighs approximately 322 pounds.

- **Zodiac F470U Combat Rubber Raiding Craft rigged in an A-22 Container or Rigging Alternate Method Zodiac (RAMZ):** The boat is rigged in an A-22 container rigged for low-velocity airdrop over water. The boat is deflated and rigged for rapid inflation and deployment once in the water.

- **Naval Special Warfare Rigid Inflatable Boat (NSWRIB):** The NSWRIB is 108 inches wide, 100 inches high and 432 inches long. The boat rigged on its platform can weigh a maximum of 20,640 pounds.

- **Advanced Rescue Craft (ARC):** The ARC is rigged on a 48- x 87-inch combat expendable platform for low-velocity airdrop. The load can be rigged with or without a 20-man life raft and a rescue board, a rucksack, and an aid bag. The ARC is 70 inches high, 48 inches wide and 111 inches long. The ARC is 1,140 pounds when rigged.

- **Snow Goose:** The Wind Supported Aerial Delivery System (WSADS) Snow Goose is a low-cost, reusable, fully autonomous, unmanned aerial vehicle (UAV) that can be used to carry out a variety of missions at otherwise inaccessible locations. It is quickly configurable for air or ground launch deployable missions.

SPECIAL CONSIDERATIONS

**CAUTION**

Only ammunition listed in FM 4-20.153/MCRP 4-11.3B/TO 13C7-18-41 may be airdropped. Only ammunition and supplies approved for high velocity or HSLLADS airdrop may be airdropped by HSLLADS. When a dangerous material is being rigged, the container must be marked, labeled and comply with AFMAN 24-204(l)/TM 38-250/NAVSUP PUB 505/MC0 P4030.19H/DLAI 4145.3. A copy of this manual must be available to the joint airdrop inspectors during the before and after loading inspections.

**HSLLADS Container.** The following items apply to the HSLLADS container:

- A multiple drop of four HSLLADS containers may be airdropped on one pass provided the total weight of the load does not exceed 2,200 pounds.
- The type XXVI nylon webbing used to secure multiple HSLLADS loads will be furnished by the US Army.
- HSLLADS containers are airdropped from the MC-130 aircraft only.
Note. For Air Force use only. A HSLLADS container weighing at least 250 pounds may be airdropped for continuance training purposes only, provided the 35 pounds per square foot minimum is maintained. For unilateral training loads honeycomb is not required.

Boats and Parachutists. The following items apply to boats and parachutists:

- At no time will the total number of static lines on the anchor line cable for personnel and cargo exceed 20.
- The total rigged weight of rubber raiding craft loads on CEP must be a minimum of 2,100 pounds. Sandbags or other ballast may be added to the platform for this purpose.
Chapter 1

Rigging High Speed Low Level Aerial Delivery System (HSLLADS) Container Loads

SECTION I-RIGGING THE CONTAINER

DESCRIPTION OF LOAD

1-1. The HSLLADS container (Figure 1-1) is an adjustable container made of an A-21 (nylon) cargo cover and other airdrop items. The assembled items are rigged to ensure that the container will withstand the shock of the parachute opening when airdropped at high speeds.

Figure 1-1. High Speed Low Level Aerial Delivery System (HSLLADS)
PREPARING CONTAINER

1-2. Dimensions of the load base in these procedures are typical. The size of the load base may change to fit other supply loads. Prepare the load base and HSLLADS container as shown in Figures 1-2 and 1-3.

CAUTION

When a container is rigged for delivery from Air Force aircraft, the rigged weight divided by the largest surface area (measured in square feet) must be a minimum of 35 pounds per square foot.

1. Drill 1/2-inch diameter holes 4 inches from each corner and 1 inch from the edge of a 3/4-by 30- by 48-inch piece of plywood.

2. Center two additional 1/2-inch diameter holes on each 48 inch side of the skid 4 inches from each other and 1 inch from the edge.

3. Thread a 12-foot length of 1/2-inch tubular nylon webbing through each pair of holes in the skid. (Doubled, type III nylon cord may be used).

Note. Denoted skid tiedown numbers are referred to in Figure 1-7.

Figure 1-2. Skid Prepared
1. Center a 30- by 48-inch piece of honeycomb on the skid.

2. Thread three 12- foot lengths of type X nylon webbing through the keepers on the A-21 cargo cover.

3. Place the cover, with the webbing down, on top of the honeycomb and skid.

4. Center another 3/4- by 30- by 48-inch piece of plywood and a 30- by 48-inch piece of honeycomb on top of the cargo cover. This is the load base.

Figure 1-3. A-21 Honeycomb, Container Cover and Load Base Placed on Skid
Chapter 1

LOADING CONTAINER

1-3. Place the items to be airdropped on the honeycomb in the manner shown in Figure 1-4. Place the durable or heavy items on the bottom and the lighter or more fragile items on the middle or top layers. Use the cellulose wadding, felt or honeycomb to cushion the rigged items. Use honeycomb to level and square the load before closing the container.

**Note.** The rigged container must weigh at least 250 pounds but no more than 600 pounds.

---

1. Place the items to be airdropped on the load base.

**Note.** Only items that have been tested and approved for high-velocity or HSLLADS airdrop may be loaded in this container.

2. Square the load using the necessary honeycomb pieces.

3. Place a 3/4-inch piece of plywood cut to fit on each side of the load.

4. Tie the plywood in place with type III nylon cord.

**Figure 1-4. Load Positioned on Load Base with Sideboards in Place**
CONSTRUCTING CONTAINER STRAPS

1-4. Construct two container straps as shown in Figure 1-5.

**Note.**
1. Sewing should be five to seven stitches per inch.
2. All dimensions given are in inches.
3. This drawing is not to scale.

**Figure 1-5. HSLLADS Container Strap Prepared**

1. Cut a 33-inch and a 2 1/4-inch length of type X nylon webbing.
2. Sear both ends of the webbing (not shown).
3. Sew a friction adapter and buffer in one end and a loop in the other end.
4. Use number 3 or 5 cord and sew the 6-inch, four-point WW stitch.
CLOSING CONTAINER AND STOWING PARACHUTE

1-5. Close the container and secure the skid as shown in Figures 1-6 and 1-7. Attach and restrain a 22-foot cargo extraction parachute to the load as shown in Figures 1-8 and 1-9. If a 22-foot cargo extraction parachute is not available, use a 28-foot cargo extraction parachute.

1. Close the cargo cover, and fold under the excess material.
2. Place a 3/4-inch piece of plywood, cut to fit, on top of the load.
3. Fit the loop end of a container strap on the bolt of a cargo suspension clevis.
4. Pass the free end of a 12-foot, type X nylon webbing strap (attached to the A-21 container cover) through the container strap's friction adapter.
5. Attach the second container strap to the other end of the 12-foot, type X nylon webbing strap and then bolt the second cargo suspension clevis in the same manner as in steps 3 and 4.
6. Run the remaining type X nylon webbing straps around the container. Pass the ends of the straps under and up through the cargo suspension clevises.
7. Place a D-ring on each end of the type X nylon webbing straps.

Figure 1-6. HSLLADS Container Closed
Steps:

1. Tie an end of the 12-foot length of 1/2-inch tubular nylon (positioned on the skid in Figure 1-1) to each clevis indicated below under the first tie column using three half-hitch knots and one overhand knot.

2. Form a loop an appropriate distance from the end of each piece of 1/2-inch tubular nylon for the second tie. Pass the free end through the clevis indicated below in the second tie column and back through the loop. Pull the 1/2-inch tubular nylon tight, and tie it with three half-hitch knots and one overhand knot.

<table>
<thead>
<tr>
<th>Skid Tie-down Number</th>
<th>First Tie</th>
<th>Second Tie</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Clevis 1</td>
<td>Clevis 2</td>
</tr>
<tr>
<td>2</td>
<td>Clevis 1</td>
<td>Clevis 2</td>
</tr>
<tr>
<td>3</td>
<td>Clevis 1</td>
<td>Clevis 2</td>
</tr>
<tr>
<td>4</td>
<td>Clevis 2</td>
<td>Clevis 1</td>
</tr>
<tr>
<td>5</td>
<td>Clevis 2</td>
<td>Clevis 1</td>
</tr>
<tr>
<td>6</td>
<td>Clevis 2</td>
<td>Clevis 1</td>
</tr>
</tbody>
</table>

Figure 1-7. Skid Tied to the Container
1. Prepare and pack a 22- or 28-foot cargo extraction parachute according to TM 10-1670-277-23&P (28-ft) or TM-1670-279-23&P (22-ft).

2. Place the adapter web of the cargo extraction parachute on a cargo suspension clevis.

3. Place four D-rings on the bolt of the cargo suspension clevis that has the adapter web attached.

4. Tighten all straps. Fold any excess webbing, and tape it or tie it with 80-pound cotton webbing.

**Figure 1-8. Parachute Prepared**
CAUTION
The load band must be as tight as possible to prevent it from stretching
when it is attached to the release system.

1. Be sure the parachute is installed so that the apex faces forward in the aircraft. Restrain the parachute to the load with a tie of one turn of single, type I, ¼-inch cotton webbing from each of the four cluster attaching loops to the straps on the container.

2. Use a 15-foot tiedown strap or a length of type XXVI, nylon webbing with two D-rings attached as a load band around the rigged HSLLADS container at the estimated vertical center of balance.

3. Place the two D-rings on the front of the load. Secure the tiedown strap with a D-ring and a load binder.

Figure 1-9. Parachute Restrained and Load Band Installed
EQUIPMENT REQUIRED

1-6. The equipment needed to prepare and rig the HSLLADS container is listed in Table 1-1.

Table 1-1. Equipment Required for Rigging a HSLLADS Container

<table>
<thead>
<tr>
<th>National Stock Number</th>
<th>Item</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>4030-00-678-8562</td>
<td>Clevis, 3/4-inch medium</td>
<td>3</td>
</tr>
<tr>
<td>4030-00-360-0304</td>
<td>Clevis, small</td>
<td>3</td>
</tr>
<tr>
<td>4020-00-240-2146</td>
<td>Cord, nylon, type III, 550-lb</td>
<td>As required</td>
</tr>
<tr>
<td>1670-00-360-0321</td>
<td>Cover, canvas, type A-21 bag</td>
<td>1</td>
</tr>
<tr>
<td>8135-00-664-6958</td>
<td>Cushioning material (Cellulose wadding)</td>
<td>As required</td>
</tr>
<tr>
<td>5365-00-937-0147</td>
<td>D-ring, 10,000-lb</td>
<td>6</td>
</tr>
<tr>
<td>8305-00-958-3685</td>
<td>Felt, 1/2-inch</td>
<td>As required</td>
</tr>
<tr>
<td>1670-00-753-3928</td>
<td>Pad, energy-dissipating, honeycomb</td>
<td>As required</td>
</tr>
<tr>
<td>1670-00-687-5458</td>
<td>Parachute, cargo extraction: 22-ft. or</td>
<td>1</td>
</tr>
<tr>
<td>1670-00-262-1797</td>
<td>28-ft. with deployment-bag</td>
<td>1</td>
</tr>
<tr>
<td>5530-00-618-8073</td>
<td>Plywood, 3/4-inch</td>
<td>As required</td>
</tr>
<tr>
<td>1670-00-136-9820</td>
<td>Static line, cargo parachute with universal static line</td>
<td>1</td>
</tr>
<tr>
<td>No NSN</td>
<td>Strap, container assembly (fabricated locally)</td>
<td>2</td>
</tr>
<tr>
<td>1670-00-937-0271</td>
<td>* Tie-down assembly, 15-ft.</td>
<td>1</td>
</tr>
<tr>
<td>Webbing:</td>
<td>Cotton, type I, 1/4-inch</td>
<td>As required</td>
</tr>
<tr>
<td>8305-00-268-2411</td>
<td>Nylon, tubular, 1/2-inch</td>
<td>As required</td>
</tr>
<tr>
<td>8305-00-268-2455</td>
<td>Nylon, tubular, 1-inch</td>
<td>As required</td>
</tr>
<tr>
<td>8305-00-261-8585</td>
<td>Nylon, type VIII</td>
<td>As required</td>
</tr>
<tr>
<td>8305-00-261-8584</td>
<td>Nylon, type X</td>
<td>12 yd.</td>
</tr>
</tbody>
</table>

* When the following item is not available, the following items are required:

<table>
<thead>
<tr>
<th>National Stock Number</th>
<th>Item</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1670-00-937-0272</td>
<td>Binder, load, 10,000-lb.</td>
<td>1</td>
</tr>
<tr>
<td>1670-00-937-0147</td>
<td>D-ring</td>
<td>2</td>
</tr>
<tr>
<td>8305-00-206-9219</td>
<td>Webbing, nylon, type XXVI</td>
<td>15-ft.</td>
</tr>
</tbody>
</table>
SECTION II-MODIFYING AND PACKING THE 22-FOOT AND 28-FOOT CARGO EXTRACTION PARACHUTES

MODIFYING CARGO EXTRACTION PARACHUTE DEPLOYMENT BAG

1-7. Remove the pendulum line, safety cords, deployment bag bridle loop, and V-rings from the deployment bag as shown in Figure 1-10. Construct two bridle straps as shown in Figure 1-11. Attach the bridle straps to the deployment bag as shown in Figure 1-12.

**Note.**
1. If the 28-foot cargo extraction parachute is to be used, the deployment bag must be used. Prepare the bag as you would for the 22-foot cargo extraction parachute.
2. Do not remove the slot reinforcement.

- Cut the V-rings off the deployment bag.
- Cut the safety cords off the bag.
- Cut the bridle loop strap from the deployment bag.

Figure 1-10. Deployment Bag Modified
1. Cut two 24-inch lengths of treated, type VIII nylon webbing.
2. Sear the cut ends.
3. Form a 4-inch roll in the center of each strap.
4. Stitch around the roll and across the center of the roll with ticket 3 nylon cord.

Figure 1-11. Bridle Straps Formed
1. Sew one end of a bridle strap to a main strap (on each side of the bag) with a 5-inch four-point WW stitch formation. Use ticket 3 nylon cord.

2. Cross the bridle straps diagonally over the end of the bag. Sew the free end of each bridle strap to the main strap on the other side of the bag with a 5-inch four-point WW stitch formation.

Figure 1-12. Bridle Straps Attached to the 22-Foot Cargo Extraction Parachute Deployment Bag
ATTACHING STATIC LINE AND BRIDLE LOOP BREAKCORD

1-8. Using the G-14/Universal Static Line (USL) cargo parachute static line, attach the static line to the bag bridle straps with a length of 1-inch tubular nylon webbing as shown in Figure 1-13. Make the bridle loop break cord tie as shown in Figure 1-14. Stow the static line as shown in Figure 1-15.

1. Use G-14 cargo parachute static line or USL.

2. Pass a length of 1-inch tubular nylon webbing through the static line break cord attaching loop and around the crossed bridle straps to make a two-ply tie.

Figure 1-13. Static Line Positioned
1. Secure the 1-inch tubular nylon webbing with a surgeon’s knot, locking knot, and an overhand knot in the running ends.

2. Pass a length of coreless type III nylon cord through the parachute bridle loop and through the static line break cord attaching loop.

3. Tie the coreless type III, nylon cord using a surgeon’s knot and locking knot with an overhand knot in the running end (not shown).

Figure 1-14. Static Line Attached and Bridle Loop Break Cord Placed and Tied
STOWING SUSPENSION LINES

1-9. Use ticket number 8/7, cotton thread instead of retainer bands to stow the suspension lines. Attach the thread to the suspension line retaining straps by making a loop around the straps. Place the suspension line stow between both ends of a length of ticket number 8/7, cotton thread. Secure the ends with a surgeon's knot and a locking knot.

PACKING PARACHUTE


Note. Make the bag-closing tie using one turn single, type I, ¼-inch cotton webbing.
STOWING STATIC LINE

1-11. Stow the static line as shown in Figure 1-15.

1. Attach a retainer band to each of the two cluster attaching loops nearest the static line.
2. S-fold the static line, and secure it with the installed retainer bands.

Figure 1-15. Break Cord Tie Made and Static Line Stowed
This page intentionally left blank.
SECTION I-RIGGING SINGLE ZODIAC F470U BOAT

DESCRIPTION OF LOAD

2-1. The description of the load rigged in this section is given below.

- **Inflated zodiac F470U rubber raiding craft.** This boat is rigged on a 75- by 144-inch combat expendable platform (CEP) with one G-12E cargo parachute. The weight of the boat is 250 pounds. When inflated, the 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 parts 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 without the accordion 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

2-2. Build a new CEP, or recondition a used one, using the procedures shown in Figures 2-1 through 2-4 and as described below. This platform is used for all the loads in this chapter.

- **New platform.** When no used CEP is available, build a new platform for this load as shown in Figures 2-1 through 2-4. Salt-treated lumber is recommended for the platform frame.

- **Used platform.** When a used CEP is available, inspect and recondition it as described below.

  - **Inspecting for damaged or missing parts.** Check the platform to see that all parts are present. Inspect each part carefully for damage. When the following conditions exist, the platform is not suitable for use until it is repaired:
    - Any part is missing.
    - A stringer or spacer block is broken, cracked, split, or severely gouged.
    - A plywood panel is cracked or gouged through at least one ply for a width of 2 inches or more.
    - A plywood panel is gouged for a length of 12 inches or more.

- **Inspecting parts, screws or nails.** Check the entire platform for loose stringers, spacer blocks, and plywood panels. Also, check for loose, missing, damaged, or protruding screws, bolts or nails. These defects may be corrected as follows:
  - Nail loose parts that are undamaged. Do not nail in original holes or in the grain line used before. Use screws when possible.
  - Replace loose, damaged, or missing nails, screws, and bolts. Reset or remove and replace protruding nails, screws, and bolts.
Chapter 2

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

1. Mark, cut and layout two 4- by 4- by 144-inch pieces of treated lumber to be used as longitudinal stringers. Place them 75 inches apart on a level surface with the crowns of the stringers down.

2. Mark, cut and layout four 2- by 6- by 75-inch pieces of treated lumber to be used as lateral stringers across the longitudinal stringers, placing one at each end and the other two at the center as shown.

3. Mark, cut and layout the four 2- by 4- by 75-inch pieces of treated lumber to be used as lateral stringer across the longitudinal stringers, placing the two stringers next to each 2- by 6- by 75-inch end stringer as shown.

4. Using the measurements shown, measure and mark reference lines and position the eight lateral stringers in place. Apply waterproof construction adhesive to each lap joint. Square the platform frame and tack the lateral stringers to the longitudinal stringers using 16d nails. Place each nail 3 inches inboard of each lateral stringer.

Note. CEPs built before June 2006 that were used with the Type IV connector link will be used until exhausted.

Figure 2-1. Platform Frame Built
Notes. 1. All dimensions shown are in inches.
   2. Drawing is not to scale.

5. Turn the frame over and square the frame.

6. Mark, cut and place two 2- by 6- by 144-inch pieces of treated lumber to be used as longitudinal stringers on the frame. Assemble and position the inboard side of each stringer 3½ inches from the center of the frame's width as shown. This will create a 7 inch space between the two inboard longitudinal stringers.

7. Ensure the platform is still square and mark reference lines for the inboard longitudinal stringer placement across each lateral stringer. Apply waterproof construction adhesive to each lap joint and tack the longitudinal stringers to the outboard lateral stringers using one 8d nail placed 2 inches inboard from each end.

8. Drill two diagonally spaced $\frac{3}{16}$-inch diameter pilot holes, 2½ inches deep at each lateral stringer intersection of the two inboard longitudinal stringers. Install a 2½-inch screw into each pilot hole.

Note. Ensure the screw heads are tightened flush with the surface of the longitudinal stringers.

Figure 2-1. Platform Frame Built (Continued)
1. Turn the platform over so the lateral stringers are facing up and ensure the frame is square.

2. Apply waterproof construction adhesive to one side of each spacer block. Adhere the four 2- by 4- by 10-inch spacer blocks to the outboard longitudinal stringers as shown, maintaining 7 ½ inches between the lateral stringers and stringer blocks.

3. Center and adhere the two 2- by 6- by 32-inch spacer blocks on the inboard longitudinal stringers.

4. Drill two diagonally spaced $\frac{3}{16}$-inch diameter pilot holes, 4 inches deep, 1 1/2-inches from the ends of the lateral stringer. Install a 4-inch screw into each pilot hole. Ensure the screw heads are tightened flush with the surface.

Note. Do not position the pilot holes on the extreme corners of the frame where the corners will be cut-off later.

5. Drill a $\frac{3}{16}$-inch diameter pilot hole, 2 1/2 inches deep, and 1 1/2 inches from the end of each spacer block. Drill one hole in each end of the four outboard spacer blocks and two holes at each end of both inboard spacer blocks. Install a 2 1/2-inch screw into each pilot hole. Ensure the screw heads are tightened flush with the surface.

Figure 2-2. Spacer Blocks Attached to Frame
1. Apply waterproof construction adhesive to each lateral stringer and spacer block. Mark, cut and layout three ¾- by 48- by 75-inch sheets of plywood across the platform frame, positioning the plywood flush with the frame's edges. Nail each plywood sheet to the platform frame using one 8d nail placed 2 inches in from the corner of each plywood sheet.

2. Using a chalk line, locate and mark the centerline of each lateral stringer across the plywood as shown. Repeat for the four longitudinal stringers.

3. At the reference line intersection, drill a $\frac{3}{16}$-inch diameter hole through the plywood and framing.

**Figure 2-3. Plywood Attached to Frame**
4. Using a \( \frac{7}{16} \)-inch countersink bit, countersink a \( \frac{1}{4} \)-inch hole in each \( \frac{3}{16} \)-inch diameter hole prepared in Step 3.

5. Turn the platform over. Using a 1-inch diameter countersink bit, countersink a \( \frac{3}{4} \)-inch hole in each outboard \( \frac{3}{16} \)-inch diameter hole prepared in step 4. Additionally, countersink a \( \frac{3}{4} \)-inch hole in each inboard \( \frac{3}{16} \)-inch diameter hole prepared in step 4.

*Note.* Do not countersink holes too deep or the platform will be structurally weakened.

6. From the plywood side, insert 6-inch carriage bolts into each outboard longitudinal stringer hole and 4-inch carriage bolts into each inboard longitudinal stringer hole. Tap the bolt heads into place. Install a washer and nut to the outboard bolts only and tighten until the top of the bolt head is flush with the plywood surface.

*Note.* The washers and nuts will be installed onto the inboard carriage bolts when the platform is turned over.

Figure 2-3. Plywood Attached to Frame (Continued)
7. Starting 4½ inches inboard from the sides and 1 inch in from each end of the platform, drill a 2-inch deep pilot hole using a \( \frac{7}{16} \)-inch bit at 6-inch intervals. Repeat for the plywood edges that are flush together across the lateral stringers. Install a 2-inch screw into each pilot hole and tighten flush with the surface.

8. Using the inboard lateral stringer chalk lines previously prepared as a guide, drill \( \frac{7}{16} \)-inch diameter pilot holes across the platform at each lateral stringer. Start 4 1/2-inches inboard from the platform side at 6-inch intervals. Install a 2-inch screw into each pilot hole and tighten flush with the surface.

9. Drill additional pilot holes 1 inch inboard from the ends of each inboard lateral stringer, 1 inch inboard from each platform edge and at 6 inch intervals into the spacer blocks. Install a 2-inch screw into each pilot hole and tighten flush with the surface.

Figure 2-3. Plywood Attached to Frame (Continued)
1. Mark a 2-inch square on each corner of the platform. Draw a diagonal line across each square as a reference line and saw off each corner with a circular saw to start the cut, and a handsaw to finish through the cut thickness.

2. Turn the platform right side up, install washers and nuts to the inboard carriage bolts, and tighten until the top of the bolt head is flush with the plywood surface.

3. Drill a 2-inch hole, 3 inches and centered through the front lateral stringer and plywood as shown.

Note. Inspect the platform. Make sure there are no protruding screws, nails or bolts on the bottom of the platform.

4. Label the tiedown spaces on each longitudinal stringer as shown above.

Figure 2-4. Corners Cut Off, Bolts Installed and Tiedown Spaces Numbered
INSTALLING SUSPENSION SLINGS

2-3. Install four 16-foot (2-loop), type XXVI nylon webbing slings as suspension slings on the platform. Use two 3¾-inch two-point link assemblies or two type IV link assemblies with covers to finish installing the suspension slings. Installation is shown in Figure 2-5.

*Note.* The two-point link cannot be installed on platforms manufactured before June 2006.

---

Figure 2-5. Suspension Slings Installed on Platform

1. Run a 16-foot (2-loop), type XXVI sling from the right side of the platform through tiedown space A2.
2. Run a 16-foot (2-loop), type XXVI sling from the left side of the platform through tiedown space D2.
3. Join the two slings together between the center longitudinal stringers using a 3¾-inch two-point link (shown) or a type IV link assembly. Place the link on the floor between the longitudinal stringers.

*Note.* If using the type IV, place a link cover around the type IV link and secure.
4. Repeat steps 1, 2 and 3 to install the rear slings through tiedown spaces A8 and D8.
STOWING SANDBAGS

2-4. Fill 16 sandbags with 35 pounds of sand or gravel in each bag. Stow the sandbags in the platform recesses as shown in Figure 2-6.

CAUTION
Ensure that all sandbags are securely tied to the platform recess to prevent them from separating from the load during the extraction deployment sequence.

1. Lay two sandbags in each platform recess as shown.
2. Tie a length of type III nylon cord across both sandbags and to the appropriate tie down spaces.
3. Form an X over each pair of sandbags using type III nylon cord and tie the cord to the appropriate tie down spaces.

Note. For training drops, use less sand or remove the sandbags before de-rigging the boat.

Figure 2-6. Sandbags Stowed on Platform
ATTACHING LASHINGS TO THE PLATFORM

2-5. Using ten 18-foot and two 26-foot lengths of 1/2-inch tubular nylon webbing, attach the lashings to the CEP as shown in Figure 2-7.

1. Girth-hitch the 18-foot lengths of 1/2-inch tubular nylon webbing through tiedown spaces A1, A3, A5, A7 and A9 on the right outboard longitudinal stringer and through tiedown spaces D1, D3, D5, D7 and D9 on the left outboard longitudinal stringer.

2. Pass one of the 26-foot lengths of 1/2-inch tubular nylon webbing through tiedown spaces B1 and C1. Even the ends and make an overhand knot about 18 inches from the tiedown spaces.

3. Pass one end of the other 26-foot length of 1/2-inch tubular nylon webbing through tiedown spaces B8 and C8. Even the ends and make an overhand knot about 18 inches from the tiedown space.

Figure 2-7. Boat Lashings Attached
BUILDING, PLACING AND SECURING HONEYCOMB STACKS

2-6. Build the honeycomb stacks as shown in Figure 2-8. Place and secure the honeycomb stacks as shown in Figure 2-9.

<table>
<thead>
<tr>
<th>Stack Number</th>
<th>Pieces</th>
<th>Width (Inches)</th>
<th>Length (Inches)</th>
<th>Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>36</td>
<td>96</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>36</td>
<td>96</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>36</td>
<td>96</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>5</td>
<td>96</td>
<td>Glue a 5- by 96-inch piece of honeycomb flush with each outside edge of the full sheet of honeycomb.</td>
</tr>
</tbody>
</table>

Figure 2-8. Honeycomb Stacks Built
Note. To prevent damage to the honeycomb, tape the edges where the type III nylon cord passes.

1. Pass a length of type III nylon cord through tiedown spaces A3 and B3 (not shown).
2. Pass a length of type III nylon cord through tiedown spaces A7 and B7 (not shown).
3. Pass a length of type III nylon cord through tiedown spaces C3 and D3 (on the left side of the platform) and another length through tie down spaces C6 and D7.
4. Lay a 36- by 96-inch piece of honeycomb on the right side of the platform 23 inches from the front of the platform. Tie the honeycomb in place with the type III nylon cord placed in Steps 1 and 2 (not shown).
5. Lay a 36- by 96-inch piece of honeycomb on the left side of the platform 23 inches from the front of the platform. Tie the honeycomb in place with the type III nylon cord placed in Step 3.
6. Center and glue stack 3 over stacks 1 and 2 flush with the front and rear of the honeycomb.
7. Tie stack 3 to the inboard longitudinal stringers of the platform with lengths of type III nylon cord.

Figure 2-9. Honeycomb Placed and Secured
PREPARING BOAT

2-7. Inflate the boat except the keel. If the keel is inflated, let the air out. Install the hose clips as shown in Figure 2-10. Prepare boats with a hard deck (aluminum floorboards) as shown in Figure 2-11. Prepare boats with a roll-up floor as shown in Figure 2-12. Prepare and position honeycomb in both boats as shown in Figure 2-13.

1. Remove the hose clips from the stowage pockets behind the transom on the left and right sides of the boat (not shown).

2. Place the hose clips around the hoses connecting the upper and lower tubes, and tighten the hose clips with the wing nuts provided.

Figure 2-10. Hose Clips Installed
1. Drill two 1/2-inch holes in both sides of each floor panel.
2. Drill two additional holes in the rear floor panel centered near the aft edge.
3. Run a 4-foot length of 1/2-inch or 1-inch tubular nylon webbing through both holes prepared in Step 1. Tie the ends of the nylon webbing together with a square knot and an overhand knot in the running ends on the bottom of the platform. (Not shown)

Note. Additional floorboard holes may be drilled to accommodate the accompanying load.

Figure 2-11. Boat Prepared with Hard Deck (Aluminum Floorboards)
Run a 6-foot length of 1/2-inch or 1-inch tubular nylon webbing through the two holes prepared in Step 2. Secure as in Step 3.

Install the floor panels, and inflate the boat.

Note. Additional ties may be added to panels to accommodate the accompanying load.

Start at the bow of the boat and name the in-boat tiedowns on the right side A, B, C and D. Name the in-boat tiedowns on the left side E, F, G and H.

Tie chemical lights to the bow of the boat and to the center side carrying handles with type I, 1/4-inch cotton webbing if dictated by mission requirements (not shown).

Using type III nylon cord, tie the paddles to the side of the boat in the holders provided.

Stow an air pump and air hose in each of the pockets provided in the right front and left rear of the boat.
1. Girth hitch a 14-foot length of 1/2-inch tubular nylon webbing to the bracket on the inboard side of the transom.

2. Girth hitch two 14-foot lengths of 1/2-inch tubular nylon webbing to the second in-floor D-ring from the rear of the boat. Pass the running ends through the nearest safety rope D-ring and over the side.

3. Girth hitch one 14-foot length of 1/2-inch tubular nylon webbing to each of the three remaining in-floor D-rings. Pass each running end through the nearest safety rope D-ring and over the side.

4. Start at the bow of the boat and name the in-boat tiedowns on the right side A, B, C and D. Name the in-boat tiedowns on the left side E, F, G and H.

Figure 2-12. Boat Prepared with Roll-up Floor
Notes. 1. All dimensions given are in inches.
2. Drawing is not to scale.

Note. The procedures in Step 1 are only used on boats with hard deck (aluminum floorboards).
1. Pass a 13-foot length of 1/2-inch tubular nylon webbing through each in-boat tiedown positioned in Steps 4 and 5 of Figure 2-11. Even the ends, and tie in place with a girth hitch. Lay the lengths outside the boat.

Note. Boats with or without hard deck (aluminum floorboards) will be prepared as shown in Steps 2, 3 and 4.
2. Set a 13- by 36-inch piece of honeycomb against the transom.
3. Make 2- by 54-inch cutout on each side, starting from the same end, of a 36- by 96-inch piece of honeycomb.
4. Place the honeycomb on the floor of the boat with the cutouts against the paddles.

Figure 2-13. Honeycomb Prepared and Positioned