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## MULTISERVICE HELICOPTER EXTERNAL AIR TRANSPORT: SINGLE-POINT LOAD RIGGING PROCEDURES

### PREFACE

This manual is one of a series of manuals for aviation and ground personnel who perform helicopter external air transport (HEAT or sometimes referred to as EAT) missions ashore or aboard ship. Other manuals in this series are *Multiservice Helicopter External Air Transport: Basic Operations and Equipment* and *Multiservice Helicopter External Air Transport: Dual-Point Load Rigging Procedures*.

These manuals are a coordinated effort of the US Army, US Marine Corps, US Navy, US Air Force, and US Coast Guard. All services participate in the external air transport (EAT) certification program begun by the Army in 1984. These manuals include standardized rigging procedures and other information from that program. Chapter 2 contains rigging procedures for single-point loads which have been certified for EAT. Chapter 3 contains rigging procedures for single-point loads which have not been certified but have demonstrated acceptable static lift and flight characteristics during a flight test.

Efforts were made to standardize ground crew and hookup procedures and terminology. Where service-unique requirements apply to an entire chapter or body of text, the service initials are at the beginning of the chapter or text. Otherwise the initials are at the end of the applicable sentence.

Rigging equipment described in this manual may not be authorized for all aircraft or services because of equipment or service restrictions.

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## CHAPTER 1

# FUNDAMENTAL PRINCIPLES

This chapter contains general information about certification for helicopter external air transport (EAT) and explains the role of the Military Traffic Management Command Transportation Engineering Agency (MTMC TEA) and the Department of Defense (DOD) EAT certification authority. This authority rests with the US Army Natick Research, Development, and Engineering Center (NRDEC). This chapter also explains the information contained in the equipment rigging procedures and gives some general rigging instructions.

### CLASSIFICATION DEFINITIONS OF EXTERNAL AIR TRANSPORT LOADS

#### Certified EAT Loads

Certified EAT loads are those items of equipment and their associated rigging procedures which have completed the evaluation and testing required by NRDEC for EAT certification. These rigging procedures are in Chapter 2. Only Certified EAT loads are authorized for the Marine Corps.

\*The US Army NRDEC has indicated that any external load certified under a specific rotary aircraft designation (for example, CH-53 helicopter) is also certified under all models within that designation (for example, CH-53A/D/E helicopter). The following restrictions apply for EAT certification to remain in effect:

- The load must be within the lifting capability of the desired helicopter model.
- The load shall be rigged in accordance with the certified rigging procedure.
- The maximum stable airspeed limitation specified for the load in the applicability section of the rigging procedure must be adhered to.

- This certification is limited to single-point loads only.
- This certification does not apply to helicopters of different designations (for example, CH-47 versus CH-53E helicopter) because of possible differences in dynamic vibration, helicopter/load mass differential, and rotor wash pattern.

#### Suitable EAT Loads

Suitable EAT loads are those items of equipment and their associated rigging procedures that have not been certified but have demonstrated acceptable static lift and flight characteristics during a flight test by the US Army TEXCOM Airborne and Special Operations Test Board. In most cases, the lifting provisions have not been tested according to the applicable military standard. These rigging procedures are in Chapter 3.

#### Unique EAT Loads

Unique EAT loads are items of equipment and their associated rigging procedures which have been certified or determined to be suitable for EAT but have significant changes to a load parameter, such as weight or a change in the aircraft used to carry the load (such as a load certified with a UH-60 and now carried under a CH-46). Unique loads are also equipment

carried on a onetime or low-frequency basis, such as telephone poles, artillery targets, or barrier material.

### **Prohibited EAT Loads**

Prohibited EAT loads are items of equipment that are prohibited from EAT as determined by each service. These loads have been denied EAT certification and are a safety hazard if carried. They have either structural deficiencies or have exhibited unstable flight characteristics during flight testing. Each service will identify these loads and transmit this information by separate list.

Contact your service point of contact identified in the Preface if you have any questions regarding the classification of a particular load.

### **CERTIFICATION OF EQUIPMENT FOR HELICOPTER EXTERNAL AIR TRANSPORT**

The objective of helicopter EAT certification is to assure the user that the equipment being transported can withstand the stresses of an EAT flight environment. Certification for EAT assures the user that the item has met minimum standards for structural integrity and that the associated rigging procedures have been developed specifically for that item.

Within the US Army, the MTMCTEA is responsible for transportability approval of developmental equipment. Within the DOD, NRDEC is the lead activity responsible for providing EAT certification and rigging procedures for military equipment. When an item is certified for EAT, it means that NRDEC, in cooperation with various test activities, has –

- Conducted an engineering analysis of the load and lifting provisions for structural adequacy during EAT.
- Verified that the lift provisions meet the strength requirements of the applicable. Military standard by means of proof load testing.
- Developed and/or validated EAT rigging procedures through static lift testing.

- Evaluated flight test reports and determined that the particular load meets acceptable flight characteristics with the type helicopter flown during the flight test.
- Issued a statement of EAT certification for the particular load, including load configuration(s), weight(s), types of helicopter(s), and maximum stable airspeed(s) as attained during the flight test(s). Certification is valid only for the conditions specified in the rigging procedures.

### **REQUESTS FOR EAT CERTIFICATION**

#### **Fielded Equipment**

Each service headquarters must designate, request, and prioritize the fielded equipment to be evaluated by NRDEC for EAT certification. The following agencies are responsible for their branch of service:

- US Army - US Army Transportation School, ATTN: ATSP-CD, Fort Eustis, VA 23604-5391.
- US Marine Corps - Marine Corps Research, Development and Acquisition Command (MCRDAC), ATTN: Code SSE/T&E, Quantico, VA 22134-5080.
- US Navy - Naval Air Systems Command (NAVAIR).
- US Air Force - US Air Force Systems Command.

Individual units can request EAT certification for fielded equipment through the appropriate service agency which will add the item to the prioritized list. The NRDEC will evaluate the equipment on a priority basis.

#### **Previously Certified Single-Point Loads**

Organizations can request certification for single-point loads transported by helicopters not listed in the applicability paragraph of the certified single-point load rigging procedure. The procedure for certifying a single-point load for

EAT under a different helicopter from that listed in the applicability paragraph is as follows:

- Contact your service point of contact to determine if the load has been certified with the different helicopter subsequent to the manual publication.
- Obtain a multiservice flight data collection sheet (MSFDCS) from Commander, NRDEC, ATTN: STRNC-UAS, Natick, MA 01760-5017.
- Following the steps in the MSFDCS, conduct a flight test for the item using the certified single-point rigging procedures in this manual.
- Complete the MSFDCS and return it to NRDEC. NRDEC will evaluate the completed MSFDCS and certify the item as appropriate for the specified helicopter.

#### **Previously Certified Dual-Point Loads**

Loads cannot be certified for dual-point lift based on previously certified dual-point rigging procedures because of the differences in dual-hook helicopters, such as the distance between the two cargo hooks. Rigging procedures for dual-point loads must be developed and/or approved by NRDEC before the test flight.

#### **UNIQUE ITEMS OF EQUIPMENT OR OPERATIONAL REQUIREMENTS**

Helicopter external air transport of unique items, due to operational requirements, will be at the discretion of the commander. Equipment not listed in this manual should be static lifted (when possible) by a crane to determine proper rigging and stability characteristics. Personnel thoroughly familiar with EAT rigging procedures should assist in the static lift testing. Flight testing may be conducted after a satisfactory static rigging configuration has been determined.

Suitable loads that have been routinely and safely flown in the past will continue to be flown if units are to accomplish assigned missions. The lack of EAT certification in itself does not preclude a unit commander from carrying a load that is not certified. Each service is responsible

for determining its policy on carrying loads that have not been certified for EAT.

**NOTE:** Low density equipment with low weight and large surface area (flat surfaces), such as shelters, empty trailers, pallet loads, and empty fuel or water drums, are likely to become extremely unstable when flown during EAT, even at low airspeeds, and should be flown with extreme caution.

#### **EQUIPMENT RIGGING PROCEDURES**

This section explains the information that is contained in the rigging procedures for each load. Chapters 2 and 3 contain the rigging procedures for certified and suitable single-point loads, respectively.

#### **Applicability Paragraph**

The applicability paragraph states whether a load is "certified" or "suitable" for EAT. It also contains the helicopter types and recommended maximum airspeeds for each helicopter type. For certified loads, this airspeed is the maximum airspeed attained by the helicopter during the test flight before the load became unstable or before the aircraft power requirements were exceeded. For suitable loads, the maximum recommended airspeed is based on previous experience with this helicopter/load combination. For either certified or suitable loads, the airspeed listed is a recommendation and not a restriction, unless so stated. The aircrew should closely monitor the load during the flight, especially if the helicopter exceeds the recommended maximum airspeed.

#### **Load Description**

The load description paragraph identifies the load, model, national stock number (NSN) or other identification, and the weight of the load for certification. The actual weight of the equipment may vary somewhat from the actual rigged weight during the flight test due to equipment modifications, fuel, equipment added to the load, or different models of the same item. The load weight on the equipment data plate or in the

operator's manual takes precedence over the load weight in this manual. Weigh the load if there is any doubt about its actual weight. If the load weight exceeds the weight listed in the load description paragraph, the load becomes a unique load. Contact your service point of contact if you have any questions about the load description or weight.

Equipment such as cargo trailers and cargo trucks contain descriptions of the allowable additional cargo weight. Do not exceed the fully loaded weight. Some trailers become extremely unstable at low weights; therefore, a minimum weight is identified. If your trailer is below that weight, add more cargo or dummy weight as close to the center of the trailer as possible until you reach the minimum weight.

### **Preparation**

The preparation steps are intended to reduce the possibility of damage to the equipment caused by sling leg entanglement during the hookup and lift-off operation or by wind resistance encountered during the flight. Since these preparation steps are not directive in nature, the commander assumes responsibility for any damage to the equipment caused by deviation from the preparation steps.

### **Rigging**

The rigging steps give information as to the position of the apex fitting on the load, routing orientation of the sling legs, location of the lift provisions, chain link number for each sling leg, and steps required to prevent the sling legs from becoming entangled on the load. Do not change the chain link number in the rigging procedures under any circumstances as it may change sling leg loading and cause lift provision failure.

The purpose of the illustration accompanying the rigging procedures is to depict what a properly rigged load looks like with the slack removed from the sling legs. The arrow identifies the direction of flight.

Appendix A contains NSN component listings for slings, sling sets, cargo nets, and other miscellaneous equipment and materials.

## **GENERAL RIGGING INSTRUCTIONS**

### **WARNING**

**Inspect lifting provisions and supporting structure for damage or degradation prior to EAT. Do not transport loads with damaged or degraded lift provisions.**

Prepare the load to be transported by following the preparation and rigging instructions for each item. Typical preparation instructions will provide information to secure loose items, remove or secure canvas covers, and remove obstructions, such as antennas. Place protective padding on windshields and other components that could be damaged by the metal parts of the sling set during hookup or release. The load should be secure enough to withstand winds in excess of 120 knots caused by the forward airspeed of the aircraft. If possible, position the load in the takeoff direction so the pilot does not have to pick the load up and then turn the aircraft into the takeoff direction.

Assemble and inspect the slings and miscellaneous equipment required to prepare and rig the load. Following the instructions in Chapter 6 of the first volume in this set, add or remove sling legs, chains, or apex fittings as required. Never exceed the capacity of the sling legs or apex fitting/web ring. If you have a sling set with a higher capacity than the sling set prescribed, use the chain link conversion chart in Appendix B to determine the corresponding chain link for your sling set.

Position the sling set near the load. The sling legs for a typical load with four lifting points are routed as shown in Figure 1-1.

Rigging a typical load with four lifting points is begun by connecting —

- Sling leg 1 to the left front lifting provision.
- Sling leg 2 to the right front lifting provision.



- Sling leg 3 to the left rear lifting provision.
- Sling leg 4 to the right rear lifting provision.

If a six-leg sling set is required, the inner-most sling legs, 5 and 6, are connected to the left and right middle lift provisions.

Odd numbered sling legs go to the same side of the load.

Left, right, front, and rear directions are designated from the driver's perspective for vehicles and towed equipment. Howitzer gun tubes are considered the front of the load. The front or rear is identified on other items of equipment. The sling leg numbering system prevents sling legs from crossing each other and causing damage to the sling legs or causing the load to twist in flight. To improve flight stability, some loads are transported backwards. Do not confuse the front of the load as it is carried with the end designated as the front for rigging purposes. The arrow with the illustration identifies the direction of flight. Following the equipment rigging procedures, loop the free end of the chain end through the lift provision and insert the specified chain link in the grabhook/grab link. Tie or tape the excess chain end to prevent the unrestrained chain from damaging the load. If necessary, wrap padding around the chain or rope assembly to prevent damage to the load or sling set. If the

procedures prescribe a spreader bar, install and pat it according to the rigging instructions.

Breakaway technique tape/cotton webbing is used to temporarily restrain the sling legs to keep them from becoming entangled on the load as the helicopter lifts the load.

## A-22 CARGO BAG RIGGING INSTRUCTIONS

\*The A-22 cargo bag is an adjustable cotton duck cloth/nylon and nylon webbing container consisting of a sling assembly, cover, and four suspension webs. The bag is used to transport palletized loads, loose cargo, ammunition, drums, and other general cargo. Maximum weight capacity is 2,200 pounds. The weight of the A-22 bag is 58 pounds. You may rig the cargo in the bag with or without the cover.

The best way to learn about this carrying device is to rig and derig it several times. Figures 1-2 through 1-6 and the following steps explain how to rig an A-22 cargo bag:

**Step 1 -** Spread the suspension web assembly on the ground near the cargo to be transported. Make sure the lateral straps are facing the ground. The fat lip portion of the friction adapter on the suspension web assembly must face down to ensure correct rigging when the cover and suspension assembly are folded up around the load.

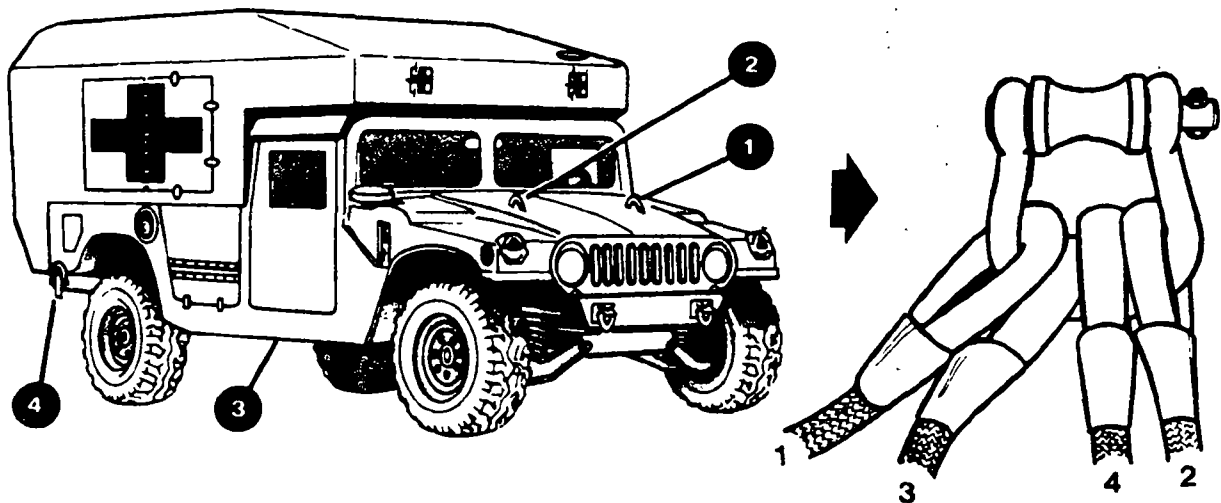
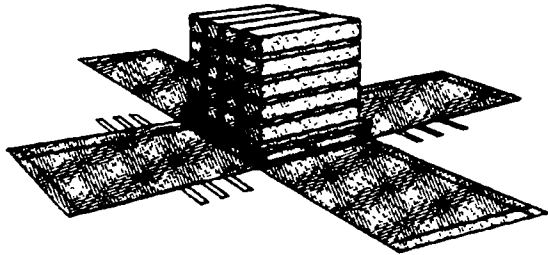


Figure 1-1. Sling Leg Lifting Point Designation

**Step 2** - Center the cover (lacing loops/eyelets down) on the sling assembly, making sure that the cover edges are even with the scuff pad of the suspension web assembly.

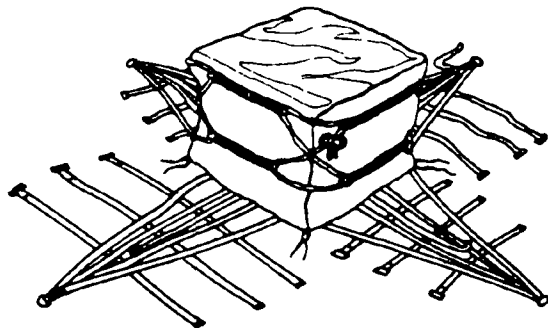
**Step 3** - Center the load on the canvas/nylon cover (Figure 1-2). Place the load so that any sharp corners or objects are toward the center of the load, if possible. Use cushioning material to protect the cover, if necessary.



**Figure 1-2. Centered Load**

**Step 4** - Fold the panels of the canvas/nylon cover over the top of the load. Fold any excess cover material under the top flap.

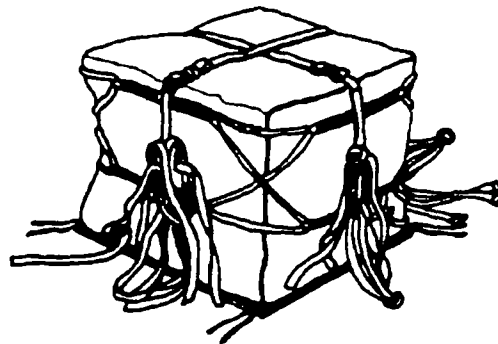
**Step 5** - Using lacing cord or Type III nylon cord, secure the cover at each corner by running the cord through the lacing loops in a figure-eight design (Figure 1-3). Tie the cord ends with a bow knot and secure. The purpose of the cord is to tighten the cover around the load so that small items cannot fall out.



**Figure 1-3. Securing the Cover with Lacing Cord**

**Step 6** - Route the 188-inch strap over top of the load. Route the free end under the floating safety bar (smooth side) and back over the friction

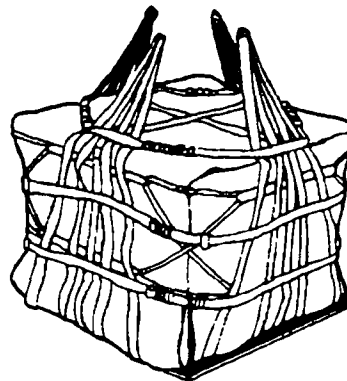
adapter (rough side). Tighten the strap, fold in 8- to 10-inch loops, and secure (Figure 1-4).



**Figure 1-4. Securing the Strap**

**Step 7** - Pull the lower lateral straps to the corners of the load. Route the free end under the floating bar and back over the friction adapter. Attempt to tighten all four lower lateral straps equally. Repeat this step using the middle lateral straps.

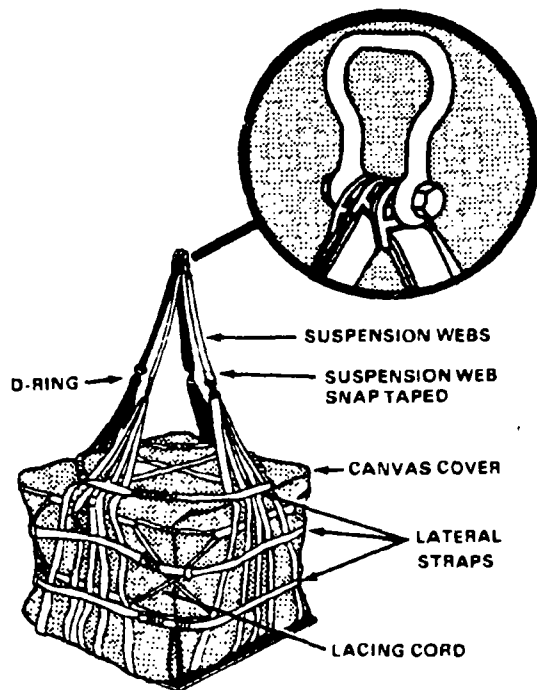
**Step 8** - Fasten the upper lateral straps in the same manner as in step 7 (Figure 1-5). If the load is not high enough for the upper lateral straps to go around the load, pull the suspension webs to their full height, and fasten the upper straps diagonally across the top corner of the load. Strap fasteners should be tightened to within 4 to 5 inches of the upper lifting legs.



**Figure 1-5. Fastening Upper Lateral Straps**

**Step 9** - Connect the four snap fasteners on the 24-inch suspension web straps to the sling assembly D-rings. Make sure the open or hook side of each butterfly snap is facing inward. Tape each butterfly snap to prevent the hooks from becoming entangled on the nylon cord or straps.

**Step 10 -** Attach the four suspension web strap D-rings to a medium clevis in a clock-wise sequence. Each strap can have a maximum of one twist to connect to the clevis (Figure 1-6).



**Figure 1-6. Upper Sling and Medium Clevis**

**Step 11 -** Adjust all straps until the sling assembly fits snugly around the load. Fold and secure any excess webbing.

**Step 12 -** Prepare the load for pickup by looping the chain end of a sling leg through the medium clevis and inserting link 3 in grabhook.

### **CARGO NET RIGGING INSTRUCTIONS**

The 5,000- and 10,000-pound capacity octagon-shaped cargo nets are constructed from interwoven nylon cord. Each set of four lifting legs has a hook that attaches to the apex fitting. The other ends of the lifting leg are attached to the outer border cord. The apex fitting can be connected directly to the aircraft cargo hook. A diamond-shaped load zone area is marked by a yellow cord interlaced with the net mesh. This zone marks the center of the net and is used as a guide to place the load. When positioning the load, the sides of the load can extend beyond the load zone, but the overhang should be the same

on each side. The apex fitting is attached by a tether cord to the set of lifting legs with the net identification tag.

The olive drab body of the 5,000-pound capacity cargo net is 15 feet wide. Mesh size is 6 inches, and the net weighs 58 pounds. Volume capacity is 125 cubic feet.

The 10,000-pound capacity cargo net is black, and the body is 18 feet wide. It is constructed from a heavy weave nylon braid with 7 1/2 inches between mesh. The net weighs 96 pounds and has a volume capacity of 380 cubic feet. When preparing to rig a net, remember the following rules:

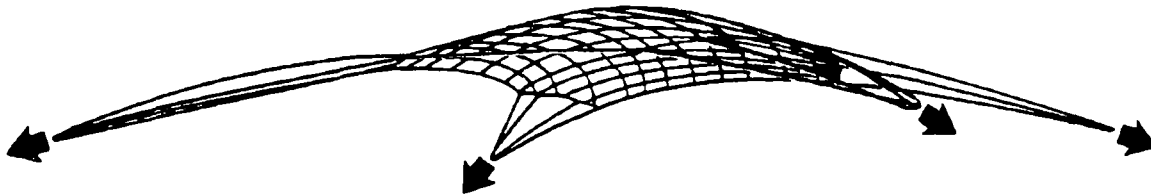
- Never exceed the weight limits of the net. Do not transport cargo having sharp edges or protrusions without first covering the edges so they will not damage the net.
- Do not carry small items that could slip through the mesh. Use a canvas liner.

Follow these instructions when rigging the net:

**Step 1 -** Spread the net out on the ground. Have four persons pull evenly on each of the four lifting legs to open the net to its fullest extension over the spot where the net is to be loaded (Figure 1-7). This will prevent overlap of the net under the pallets or load.

**Step 2 -** Inspect the net. Repair as necessary. Inspect the pallet or load and make sure that banding material and pallet frame will not puncture, cut, or tear net. Tape over sharp edges with pressure-sensitive tape.

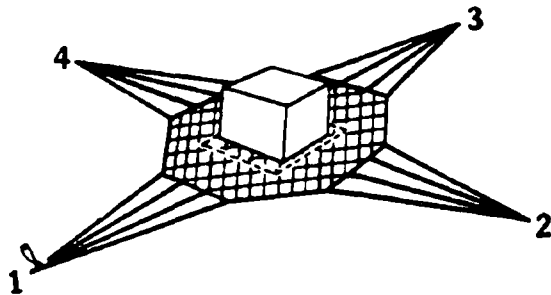
**CAUTION:** When forklifts are used to move pallets onto the nets, move the lifting legs to one side so that they will not be damaged by the tires. Do not allow the pallet or the under carriage of the forklift forks to drag on the net surface. The forklift forks could tear the net and pull it out from under the load. If the net is pulled out, the load may not be centered or could be unstable in flight.



**Figure 1-7. Fully Extended Net**

and pull it out from under the load. If the net is pulled out, the load may not be centered or could be unstable in flight.

**Step 3** - Align the load on the net so that the sides of the load are parallel with the yellow cord (Figure 1-8). The load may overlap the yellow cord. The load's center of gravity will be near the center of the net. The lifting legs will be on the

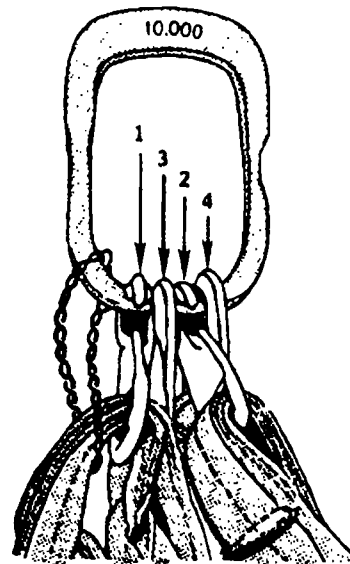


**Figure 1-8. Aligned Load**

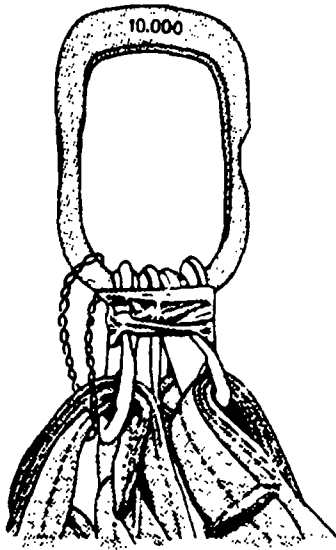
side of the load, not on the corners. If the load is loose cargo, place the cargo on the net with the heaviest items in the center and the lighter items toward the sides or on top of heavier items.

**Step 4** - Position one person on top of the load with the apex fitting. Legs are hooked to the apex in the following sequence: 1, 3, 2, and 4, to provide equal lift on all legs (Figure 1-9). Hooks do not have to face in the same direction. After connecting all four hooks to the apex fitting, tape or tie the four hooks together to prevent them from coming unhooked when the apex is laid down (Figure 1-10).

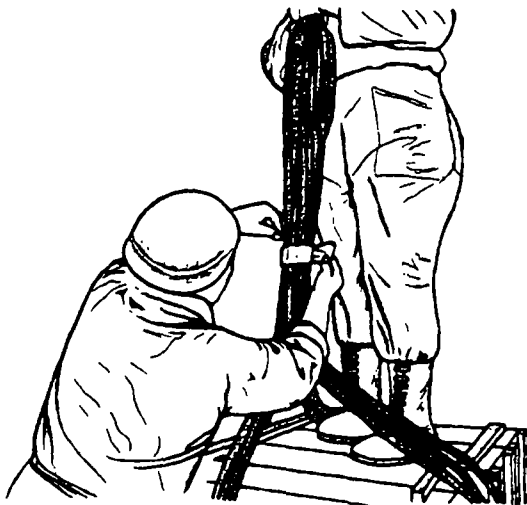
**Step 5** - All four sides of the net are now ready to be pulled up around the load. Begin by having the person on top of the load hold the apex up and another person tape or tie all 16 lifting legs together at 3- to 4-foot intervals until no more slack can be pulled up on the legs. If the load is small, you may have to tape or tie the net together above the load. Tape or tie the legs and net so that the net does not snag on the load as the helicopter lifts the net (Figure 1-11). Use breakaway technique so that the tape or tie breaks after the slack is removed from the legs and net.



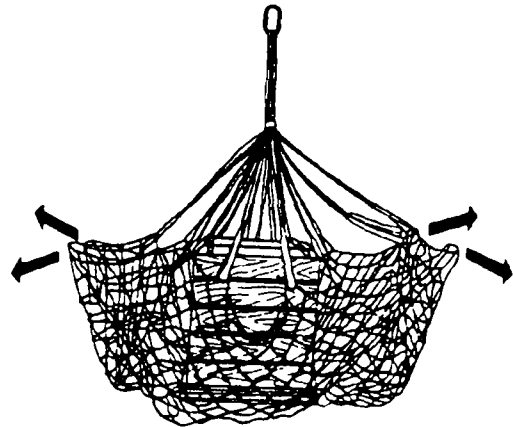
**Figure 1-9. Legs Hooked in Sequence**



**Figure 1-10. Taped Hooks**

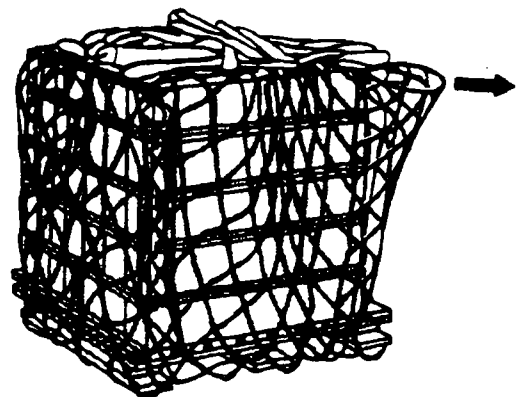


**Figure 1-11. Taping Lifting Legs**



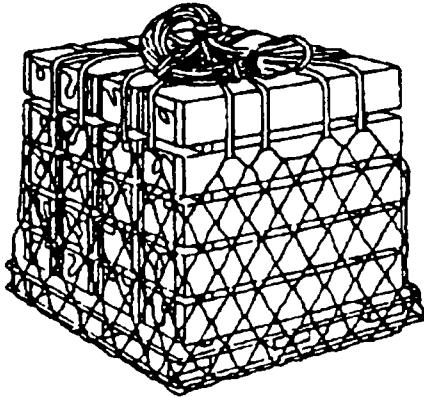
**Figure 1-12. Net Pulled Outward from the Load**

**Step 7 -** After you finish taping the legs, pull the net outward at each corner, grasp the border cord from each side near the corner of the load, and tape the border cords together to tighten the sides of the net. Take the excess netting at the corner and tape to the adjoining side. At each side, pull the net up as high as possible and tape it to prevent it from snagging on the load and tearing the net (Figure 1-13). Use only enough tape to hold the net in place on the load. **DO NOT** tape net to load.



**Figure 1-13. Excess Net Taped to Itself**

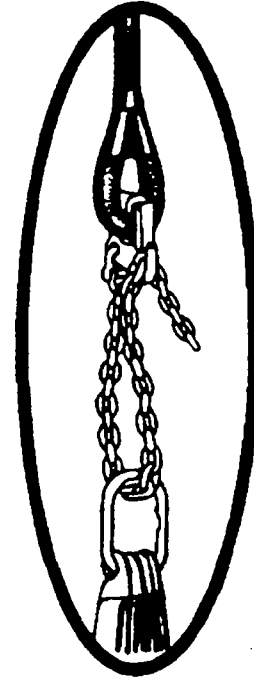
**Step 8** - Coil the lifting legs on top of the load. The net is now ready for hookup to the helicopter (Figure 1-14). If the load must be moved, carefully guide the forklift forks through the net and into the pallet slots. Pallets can be stored temporarily with nets around them. They should not be stored on concrete. Place empty pallets on the concrete surface and set the netted pallet on top of it.



**Figure 1-14. Lifting Legs Coiled on Top of Load**

**Step 9** - Normally the net apex fitting is directly attached to the cargo hook. If the load is a large one, the lifting legs may not be long enough to allow the hookup person to perform a safe hookup to the aircraft. If you cannot lift the apex fitting at least 6 feet above the top of the load,

add a leg or legs from a sling set (Figure 1-15). Route the chain end of the sling leg through the net apex fitting and insert link 3 in the grabhook. Remember, the capacity of the sling leg must be greater than the weight of the load.



**Figure 1-15. Adding a Sling Leg**

**Step 10** - Before hookup to the aircraft, make a final inspection of the apex fitting, netting, and taping to ensure the net and the load is still secure.

## CHAPTER 2

# CERTIFIED SINGLE-POINT LOAD RIGGING PROCEDURES

This chapter contains rigging procedures for single-point loads that have been certified for EAT. Each rigging procedure is found in a figure that includes a description of the load, materials required for rigging, and steps to complete the procedure. An applicability paragraph is also a part of each figure and identifies certified loads. When the load is listed as suitable in the applicability paragraph, it has been flight-tested and is awaiting final certification in the near future.

### WHEELED VEHICLES

\*The certified single-point rigging procedures for wheeled vehicles are in this section. Figures 2-1 through 2-9.3 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

---

## Figure 2-1. M151 1/4-Ton Truck

### APPLICABILITY

This load is certified by the US Army Natick Research, Development, and Engineering Center (NRDEC) for UH-60 and CH-47 helicopters at airspeeds up to and including 120 knots.

### LOAD DESCRIPTION

- Truck, utility, 1/4-ton, M151-series, LIN X60833.
- Weight: 2,400 pounds empty.

### MATERIALS

- All sling sets:
  - Tape, adhesive, pressure-sensitive, 2-inch wide roll.
  - Cord, nylon, Type III, 550-pound breaking strength.
  - Felt, sheet, cattle hair, Type IV, 1/2-inch x 24- x 60-inches.
  - Assembly, clevis, small, MS70087-1 (4 each).
  - Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Sling set (10,000-pound capacity).
- Sling set, multileg (15,000-pound capacity).

## **PERSONNEL**

Two persons can prepare and rig this load in 15 minutes.

## **PROCEDURES**

### **Step 1. Preparation**

- Remove the tarpaulin. Fold the top bows.
- Lower and secure the windshield. Fold the tarpaulin and place it over the top of the windshield. Secure with nylon cord.
- Lower the left side rearview mirror so that it is flush with the truck body. Tape it to the side of the vehicle.
- If cargo is carried, place it in the rear seat and tie it down using rope or similar lashing material.
- Make sure that the fuel tank does not exceed 3/4 capacity. Inspect the fuel tank cap, oil filler cap, and battery caps for proper installation.
- Engage the vehicle parking brake and put the transmission in neutral.
- Attach one small clevis assembly to the lifting eye on all four wheels.

### **Step 2. Rigging**

- Sling set (10,000-pound capacity):
  - Position apex fitting in the center of the vehicle. Route outer sling legs (1 and 2) to the front wheels and inner sling legs (3 and 4) to the rear wheels. Sling legs 1 and 3 should be on the left side of the load.
  - Loop the chain end of sling leg 1 through the clevis on the left front wheel and insert link 3 in the grabhook. Repeat with sling leg 2 on the clevis on the right front wheel.
  - Loop the chain end of sling leg 3 through the clevis on the left rear wheel and insert link 10 in the grabhook. Repeat with sling leg 4 through the clevis on the right rear wheel. Secure excess chain with tape or nylon cord.
  - Tape or tie (breakaway technique) sling legs 1 and 2 to the top of the steering wheel.
  - Cluster and tie or tape (breakaway technique) all sling legs together on top of the truck to prevent entanglement during hookup and lift-off.
- Multileg sling set:
  - Position the web ring in the center of the truck. Route outer sling legs (1 and 2) to the front wheels and inner sling legs (3 and 4) to the rear wheels. Sling legs 1 and 3 should be on the left side of the load.
  - Loop the chain end of sling leg 1 through the clevis on the left front wheel and insert link 4 in the grabhook. Repeat with sling leg 2 on the clevis on the right front wheel.



- Loop the chain end of sling leg 3 through the clevis on the left rear wheel and insert link 10 in the grabhook. Repeat with sling leg 4 through the clevis on the right rear wheel. Secure excess chain with tape or nylon cord.
- Tie or tape (breakaway technique) sling legs 1 and 2 to the top of the steering wheel.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

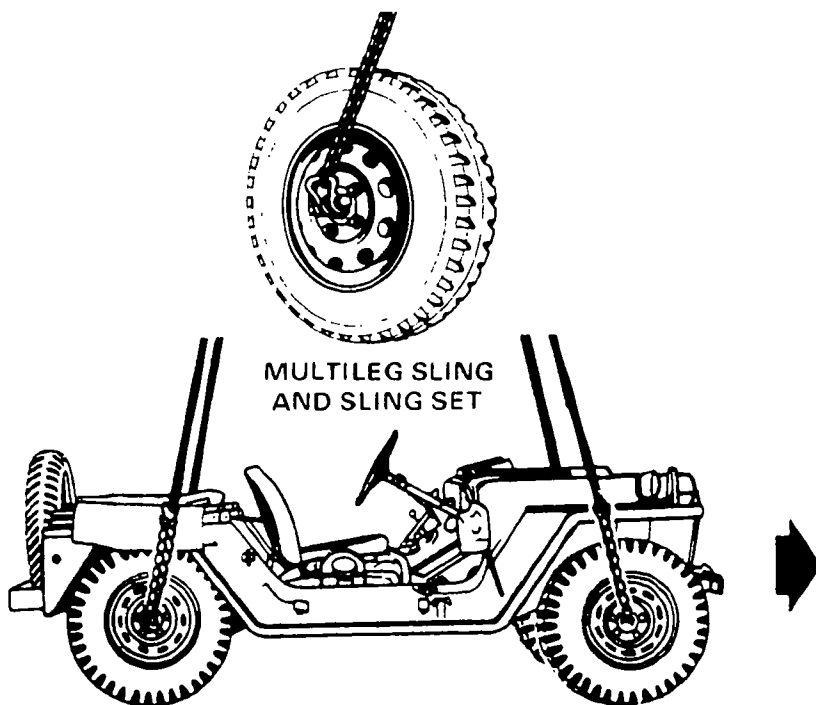
**CAUTION:** Check carefully for untaped or unpadded load areas which could damage the slings. Pad and/or tape the slings or load as necessary to prevent damage.

### Step 3. Hookup

The hookup team stands in the back of the truck. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the truck and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-2. M151 1/4-Ton Truck with TOW Launcher**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for the UH-60 and CH-47 helicopters at airspeeds up to and including 120 knots.

### **LOAD DESCRIPTION**

- Truck, GM equipment, TOW, M151A2, LIN X45549.
- Weight: 2,880 pounds.

### **MATERIALS**

Same as for M151 1/4-ton truck, Figure 2-1.

### **PERSONNEL**

Two persons can prepare and rig the load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

Same as for M151 1/4-ton truck, Figure 2-1, except that special padding of the launcher optics is required. The optics cover must be secured with nylon cord and one sheet of felt pad (30- x 36-inch) secured on top of the optics. If the fuel container and the spare tire are mounted on the front fenders, they must be secured in their normal position on the rear of the truck before EAT.

#### **Step 2. Rigging**

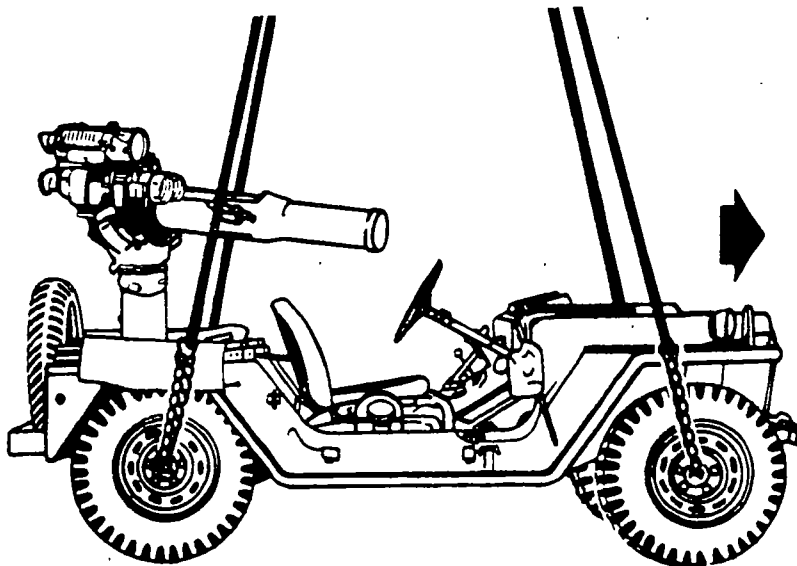
Same as for M151 1/4-ton truck, Figure 2-1.

#### **Step 3. Hookup**

Same as for M151 1/4-ton truck, Figure 2-1. Caution the pilot to hover to the side of the load when releasing the apex fitting.

#### **Step 4. Derigging**

Same as for M151 1/4-ton truck, Figure 2-1.



## **Figure 2-3. M151 1/4-Ton Truck and/or M416 1/4-Ton Trailer with TOW Missiles**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for the UH-60 helicopter at airspeeds up to and including 110 knots.

### **LOAD DESCRIPTION**

- Truck, utility, 1/4-ton, M151, LIN X61244, with 6 TOW missiles; weight: 2,704 pounds.
- Trailer, cargo, 1/4-ton, M416, LIN W95400, with 12 TOW missiles; weight: 1,228 pounds.
- Weight of M151, M416, and 18 TOW missiles: 3,932 pounds.
- Weight of single TOW missile: 54 pounds.

### **MATERIALS**

- M151 truck with 6 TOW missiles:
  - Sling set (10,000-pound capacity).
  - Tape, adhesive, pressure-sensitive, 2-inch wide roll.
  - Cord, nylon, Type III, 550-pound breaking strength.
  - Webbing, cotton, 1/4-inch, 80-pound breaking strength.
  - Felt, sheet, cattle hair, Type IV, 1/2- x 60-inch.
  - Tie-down cargo, CGU-1/B (5,000-pound capacity) (5 each).
  - In place of CGU-1/B tie-downs, tie-down assembly (10,000-pound capacity) (5 each) and load binder assembly (5 each).
- M151 truck and M416 trailer:
  - All material listed for M151 truck with 6 TOW missiles.
  - Sling leg assembly from a 10,000-pound sling set (2,500-pound capacity) (2 each).
  - Tie-down cargo, CGU-1/B (5,000-pound capacity) (2 each).

### **PERSONNEL**

Either load can be prepared by two men in 15 minutes.

## PROCEDURES

### Step 1. Preparation

- M151 with 6 TOW missiles:
  - Fold windshield and secure to hood with nylon cord.
  - Place one sheet of felt on windshield and secure with nylon cord.
  - Check TOW missiles to make sure they are properly positioned and fasteners are closed.
  - Combine two 15-foot tie-down straps with two load binder assemblies to make two 30-foot straps.
  - Route one strap through safety chain eye on one side of towing pintle, over TOW missiles, and under front brace of seat. Position load binder between seat and seat back. Tighten straps and secure load binder with tape or webbing.
  - Repeat previous procedure on the other side of the vehicle.
- M416 with 12 TOW missiles:
  - Unitize 12 missiles in bed of trailer with two 15-foot tie-down straps by removing the missiles, placing the straps in the trailer, replacing the missiles, and securing the straps on top of the stack of missiles. The stack should not be more than three layers high.
  - Combine two 15-foot tie-down straps with two load binder assemblies to make two 30-foot straps.
  - Secure the two 30-foot straps on top of the TOW missiles using the tarpaulin tie-down hooks on the outside of the trailer.
  - If cargo is located aft of missiles, route one 15-foot strap from the rear to the front of the trailer and secure to the tarpaulin hooks.
  - Tighten all load binders and secure with cotton webbing or tape.

### Step 2. Rigging

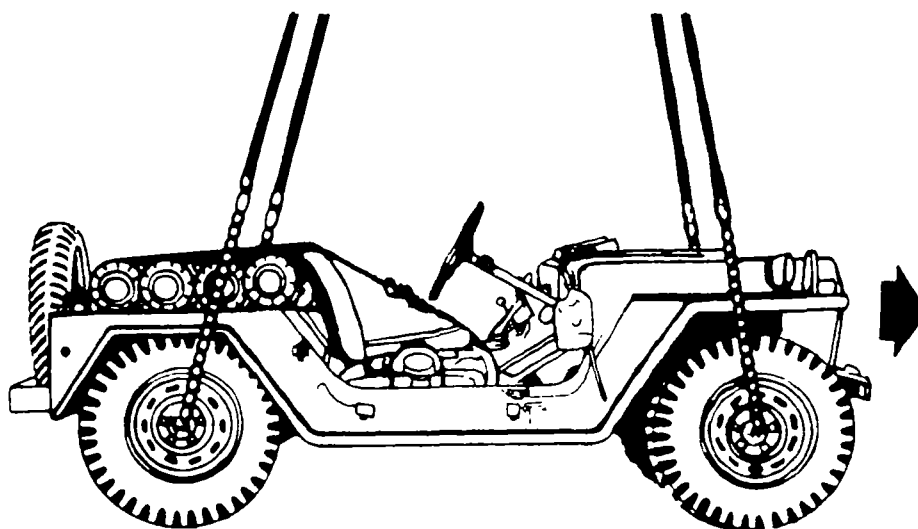
See rigging instructions for M151 truck (Figure 2-1) or M151 truck with M416 trailer (Figure 2-23).

### Step 3. Hookup

The hookup team stands in the passenger seat or on the trailer tongue. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the truck and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of preparation and rigging procedures in steps 1 and 2.



## **Figure 2-4. M966/M1036/M1045/M1046 TOW Missile Carrier M1025/M1026/M1043/M1044 Armament Carrier**

### **APPLICABILITY**

The TOW missile carriers and armament carriers are certified by the US Army NRDEC for CH-47 and CH-54 helicopters at airspeeds up to and including 90 knots and the CH-53E helicopter at airspeeds up to and including 130 knots. These vehicles are also certified by NRDEC for the UH-60 helicopter with the following limitations:

- With a vehicle gross rigged weight of less than 7,300 pounds, the UH-60A is restricted to airspeeds up to and including 100 knots and 30 degrees maximum bank angle.
- With a vehicle gross rigged weight between 7,300 pounds and 7,995 pounds, the UH-60A is limited to 70 knots and 12 degrees maximum bank angle.
- Vehicle gross rigged weight cannot exceed 7,995 pounds when using the UH-60A.

**NOTE:** When using UH-60A support, coordinate closely with the aviation unit as to the vehicle weight.

### **LOAD DESCRIPTION**

- TOW missile carrier (HMMWV); M966, LIN T05096; M1036; M1045, TAMCN D1125; M1046, TAMCN D1125.
- Armament carrier (HMMWV); M1025, LIN T92242; M1026, LIN T92310; M1043, TAMCN D1159; M1044, TAMCN D1159.
- Weight: Empty and loaded weight is dependent on model configuration.

### **WARNING**

**Vehicle gross rigged weight is limited to 7,995 pounds when using UH-60A aircraft.**

### **MATERIALS**

- Sling set (10,000-pound capacity) (UH-60, CH-47, or CH-54 only).
- Multileg sling set (15,000-pound capacity) or sling set (40,000-pound capacity) (CH-53E only).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Felt sheet, cattle hair, Type IV, 1/2-inch or suitable padding.

### **PERSONNEL**

Two persons can prepare and rig this load in 15 minutes.

## **PROCEDURES**

### **Step 1. Preparation**

- Fold mirrors forward in front of the windshield for added protection and tie together with nylon cord. If installed, remove canvas covering over the bed of the truck. Remove the doors. If time permits, fold canvas top and tie to windshield for added protection.
- Secure all equipment and cargo inside the vehicle with tape, nylon cord, or lashings. Remove antennas and stow inside vehicle.
- Make sure that the fuel tank is not over 3/4 full. Inspect fuel tank cap, oil filler cap, and battery caps for proper installation.
- Engage the vehicle parking brake and put the transmission in neutral.
- Ensure the front wheels are pointed straight ahead. Tie down the steering wheel, using the securing device attached under the dashboard.

### **Step 2. Rigging**

- Position apex fitting on the roof of the vehicle. Route outer sling legs (1 and 2) to the front of the vehicle and inner sling legs (3 and 4) to the rear of the vehicle. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the lift provision that protrudes through the left side of the hood and insert link 80 (60 for the 15,000-pound multileg sling set) or (53 for the 40,000-pound sling set) in the grabhook. Repeat with sling leg 2 on the right front lift provision. Secure excess chain with tape or nylon cord.
- Route the chain end of sling leg 3 through the eyelet opening in the upper left corner of the tailgate. Loop the chain end through the left lift provision on the bumper and thread back through the eyelet opening in the tailgate. Insert link 3 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.
- Wrap rear sling leg chains with padding where they contact the shell back.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

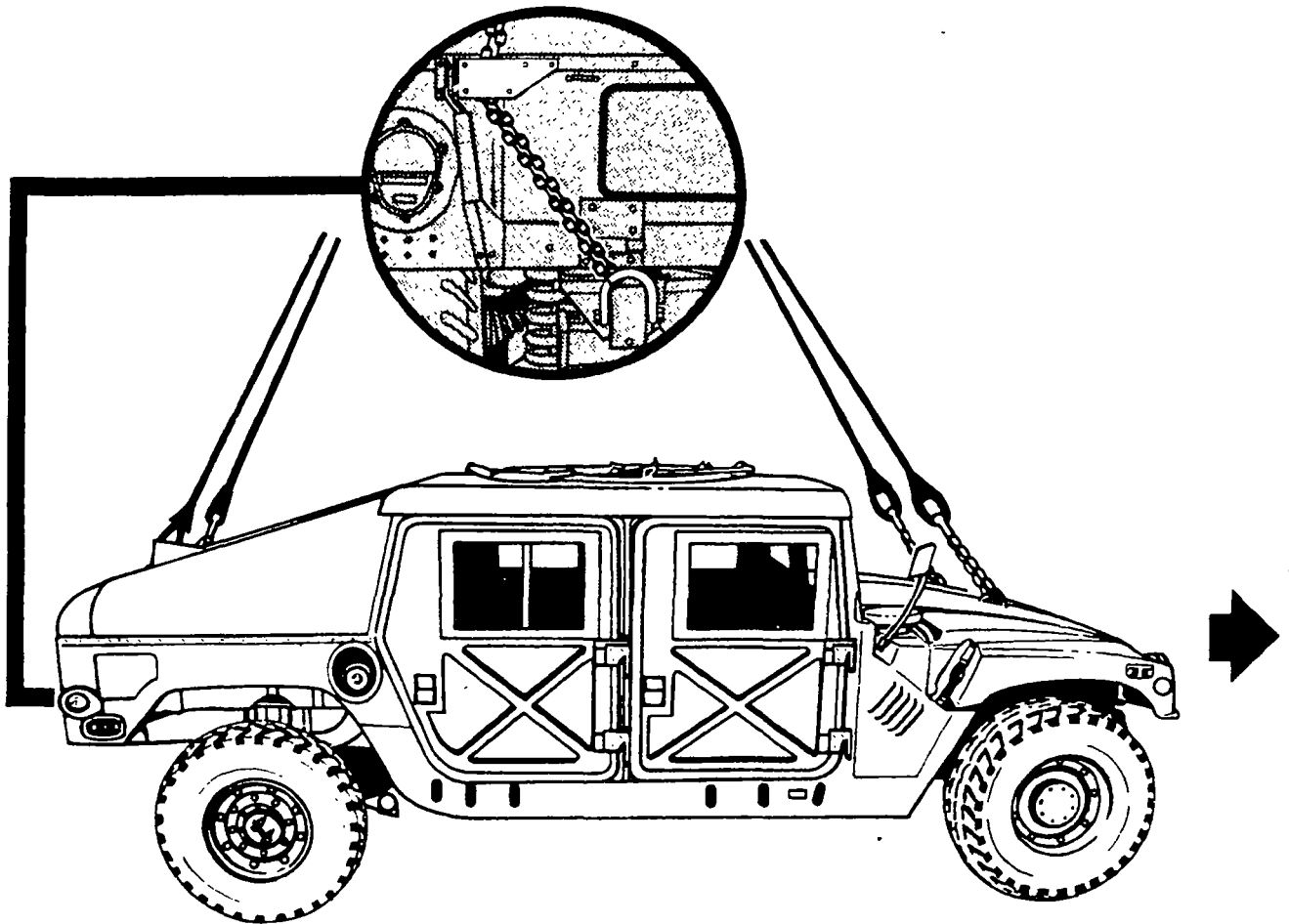
### **Step 3. Hookup**

The hookup team stands on the roof of the vehicle. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the vehicle and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of preparation and rigging procedures in steps 1 and 2.





## **Figure 2-5. M996 Truck, Ambulance (HMMWV) M997 Truck, Ambulance (HMMWV)**

### **APPLICABILITY**

The M996 ambulance is certified by the US Army NRDEC for the UH-60A and CH-47 helicopters at airspeeds up to and including 60 and 110 knots, respectively.

The M997 ambulance is also certified for the UH-60A and CH-47 helicopters at airspeeds up to and including 80 and 75 knots, respectively.

### **LOAD DESCRIPTION**

- Truck, ambulance, M996, HMMWV, LIN T38707.
- Weight:
  - Empty, 6,700 pounds.
  - Loaded, 7,400 pounds.
- Truck, ambulance, M997, HMMWV, LIN T38844.
- Weight:
  - Empty, 7,000 pounds.
  - Loaded, 7,400 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Spreader bar assembly (component of vehicle).

### **PERSONNEL**

Two persons can prepare and rig this load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Fold mirrors forward in front of the windshield and tie together using nylon cord.
- Remove the spreader bar from under the right-hand seat inside the ambulance.
- Secure all equipment inside the rear compartment with tape, nylon cord, and/or lashings. Close and secure the doors.

- Secure all other equipment inside the vehicle with tape, nylon cord, and/or lashings. Close and secure the doors.
- Make sure the fuel tank is not over 3/4 full. Inspect fuel tank cap, oil filler cap, and battery caps for proper installation.
- Engage the vehicle parking brake. Place the transmission in neutral.
- Make sure that the front wheels are pointed straight ahead. Tie down the steering wheel using the securing device attached under the dashboard.
- Secure the Red Cross insignia covers in the closed position.
- Remove the keeper from the spreader bar and extend the bar so the holes line up. Reinstall pin and engage keeper. Use the sighting hole in the tube to assist in aligning holes for the pin.
- Position the spreader bar across the rear end of the vehicle roof. Attach the spreader bar check cables to the eyebolts located on the aft exterior sidewall of the rear compartment.
- Install lift provisions on the outer ends of the rear bumper by removing the tie-down provisions located inboard of the bumper ends and installing them on the outer ends of the rear bumper, if necessary.

## **Step 2. Rigging**

- Position apex fitting on top of the ambulance. Route outer sling legs 1 and 2 to the front of the vehicle and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision that protrudes through the hood and insert link 80 in the grabhook. Repeat with sling leg 2 and the right front lift provision.
- Place the nylon rope of sling legs 3 and 4 in the guides on the ends of the spreader bar. Attach the spreader bar guide retainer pins and keepers. Lay the spreader bar on the roof. Make sure the sling legs are in front of the check cable eyebolts.
- The rear lift provisions are located on the outer ends of the rear bumper. Do not loop the chain end through the tie-down shackles located near the center of the rear bumper. Loop the chain end of sling leg 3 through the left rear lift provision and insert link 30 in the grabhook. Repeat with sling leg 4 and the right rear lift provision.
- Secure all excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the vehicle to prevent entanglement during hookup and lift-off.

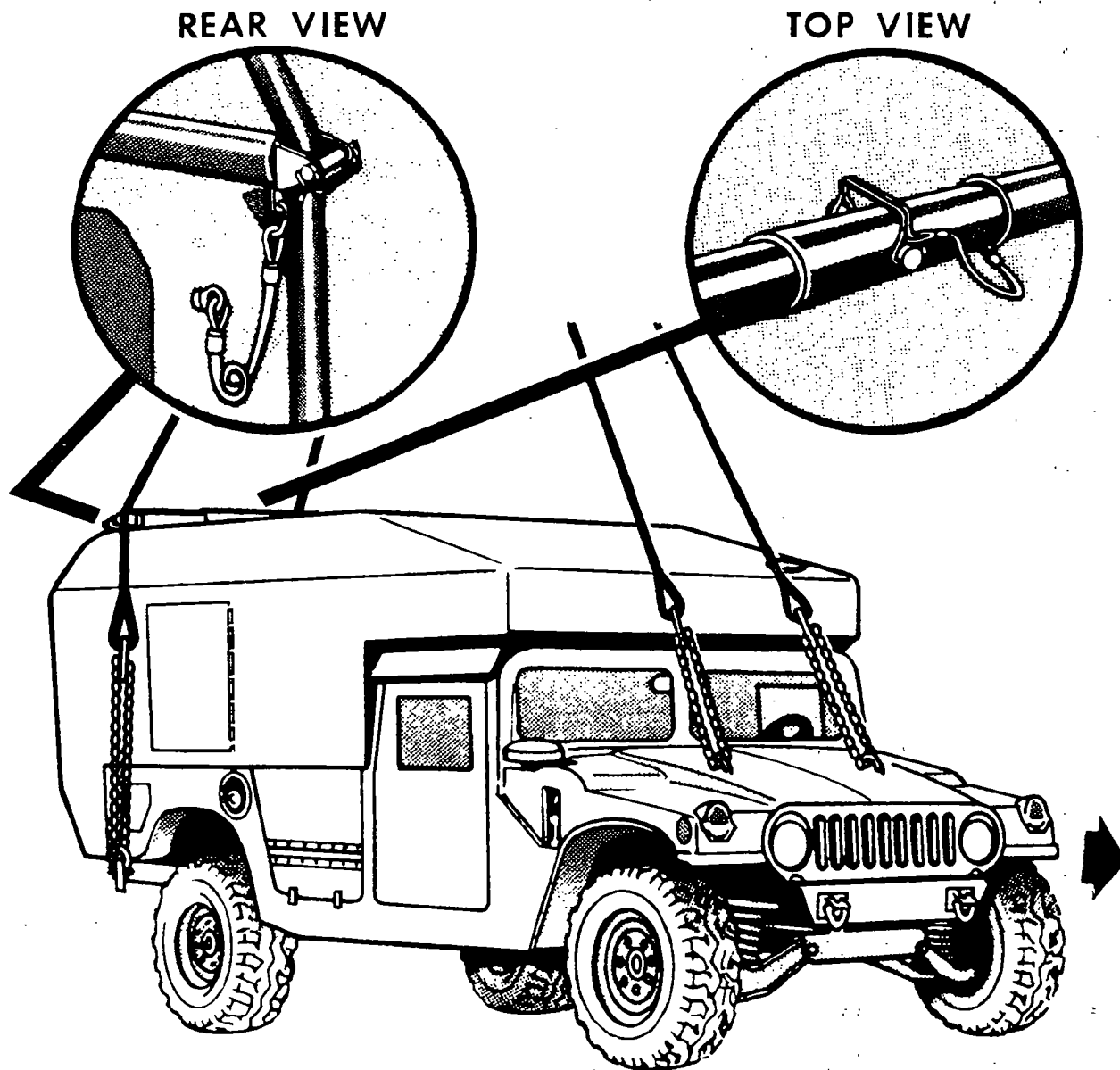
## **Step 3. Hookup**

The hookup team stands on the roof of the vehicle. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the vehicle and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

#### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.

**NOTE:** The M997 ambulance is illustrated. The M996 ambulance is similar.



## **Figure 2-6. M998/M1038 Truck, Cargo, 1 1/4-Ton (HMMWV)**

### **APPLICABILITY**

The M988 and M1038 trucks are certified by US Army NRDEC for CH-47, CH-54, and CH-53E helicopters at airspeeds up to and including 90, 90, and 130 knots, respectively. Both trucks are also certified by NRDEC for the UH-60A helicopter with the following limitations:

- With a vehicle gross rigged weight of less than 7,300 pounds, the UH-60A is restricted to airspeeds up to and including 100 knots and 30 degrees maximum bank angle.
- With a vehicle gross rigged weight between 7,300 pounds and 7,700 pounds, the UH-60A is limited to 70 knots and 12 degrees maximum bank angle.

**NOTE:** When using UH-60A support, coordinate closely with the aviation unit as to the vehicle weight.

### **LOAD DESCRIPTION**

- M998 truck, 1 1/4-ton (HMMWV), LIN T61494, TAMCN D1158.
- M1038 truck, 1 1/4-ton (HMMWV), LIN T61562, TAMCN D1158.
- Weight:
  - Empty, 5,200 pounds.
  - Loaded, 7,700 pounds.

### **WARNING**

**Vehicle gross rigged weight is restricted to 7,700 pounds when using UH-60A aircraft.**

### **MATERIALS**

- Sling set (10,000-pound capacity) (UH-60, CH-47, or CH-54 only).
- Multi-leg sling set (15,000-pound capacity) or sling set (40,000-pound capacity) (CH-53E only).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig the load in 15 minutes.

## **PROCEDURES**

### **Step 1. Preparation**

- Fold mirrors forward in front of the windshield for added protection and tie together with nylon cord. If installed, remove canvas covering over the bed of the truck. Remove the doors. If time permits, fold canvas top and tie to windshield for added protection. Fold canvas top and tie to windshield for added protection.
- Secure all equipment and cargo inside the vehicle with tape, nylon cord, or lashings.
- Make sure that the fuel tank is not over 3/4 full. Inspect fuel tank cap, oil filler cap, and battery caps for proper installation.
- Engage the vehicle parking brake and put the transmission in neutral.
- Ensure the front wheels are pointed straight ahead. Tie down the steering wheel, using the securing device attached under the dashboard.

### **Step 2. Rigging**

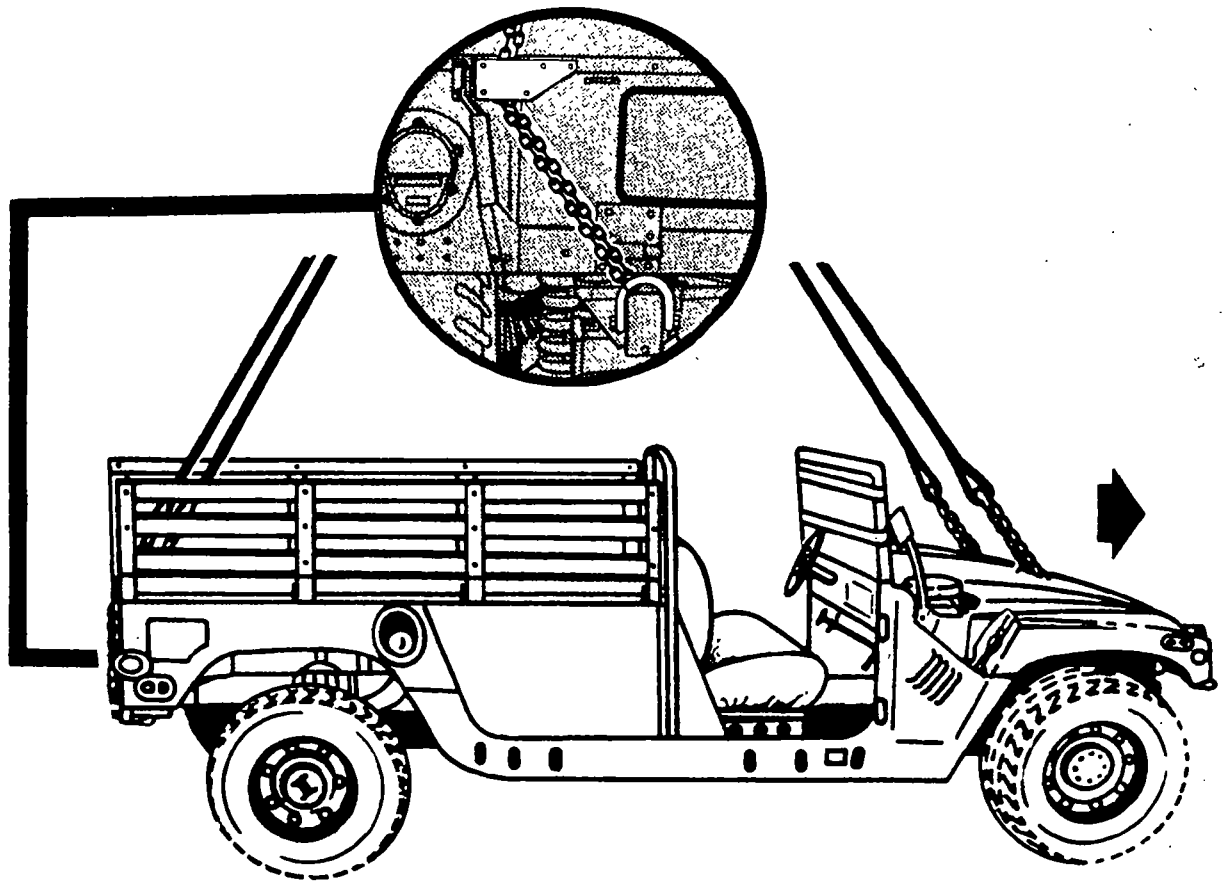
- Position apex fitting on top of the vehicle. Route outer sling legs 1 and 2 to the front of the vehicle and the inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the lift shackle that protrudes through the left side of the hood. Insert sling 80 (60 for the 15,000-pound multi-leg sling set) or (53 for the 40,000-pound sling set) in the grabhook. Repeat with sling leg 2 on the right front lift provision. Secure excess chain with tape or nylon cord.
- Route the chain end of sling leg 3 through the eyelet opening in the upper left corner of the tailgate. Loop the chain end through the left lift provision on the rear bumper and thread back through the eyelet opening in the tailgate. Insert link 3 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.
- Raise the apex fitting above the vehicle. Make sure the rear sling legs are kept to the rear of the vehicle. Cluster and tie or tape (breakaway technique) all sling legs above the vehicle to prevent fouling during hookup and lift-off.

### **Step 3. Hookup**

The hookup team stands in the bed of the truck. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team carefully dismounts and remains close to the load as the helicopter removes slack in the sling legs. When successful hookup is assured, the hookup team quickly moves to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## Figure 2-7. M1037 Truck, Shelter Carrier (HMMWV)

### APPLICABILITY

This load is certified by the US Army NRDEC for CH-47 helicopters at airspeeds up to and including 100 knots.

### LOAD DESCRIPTION

Truck, 1 1/4-ton, M1037, shelter carrier (HMMWV), LIN T07543 with S250 or S250E shelter and external air lift member.

VARIANTS	CURB WEIGHT (pounds)	MAXIMUM EAT WEIGHT (pounds)
NC Operations	8,263	8,800
NC Switch	8,248	8,513
NC LOS (V3)	8,099	8,611
NC Management	7,737	8,800
NC Support Vehicle	8,227	8,400
LEN Operations	8,412	8,800
LEN Switch	8,328	8,800
LEN LOS (V4)	7,894	8,800
LEN Management	8,100	8,800
LEN Cable Vehicle	8,148	8,180
SCC Command	8,346	8,800
SCC Planning	7,815	8,300
SCC Technical	8,237	8,507
LOS (V1)	8,106	8,800
LOS (V2)	7,687	8,500
Radio Access Unit	8,410	8,800
SEN (V1)	8,059	8,800
SEN (V2)	8,181	8,800
Maintenance 1	8,049	8,084
Maintenance 2	7,905	8,350
Battalion Spares	8,232	8,800
Company Spares	7,837	7,850

### MATERIALS

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Padding, cellulose.
- Cotton webbing, 1/4-inch, 80-pound breaking strength.



## PERSONNEL

Two persons can prepare and rig this load in 15 minutes.

## PROCEDURES

### Step 1. Preparation

- Fold mirrors forward in front of the windshield for added protection and tie together using nylon cord.
- Ensure that the shelter is secured to the truck using wire rope or tie-down assemblies. Secure all equipment inside the shelter with tape, nylon cord, or lashings; close and secure the door.
- Secure all other equipment inside the vehicle with tape, nylon cord, or lashings. Secure doors shut (if installed).
- Make sure that the fuel tank is not over 3/4 full. Inspect fuel tank cap, oil filler cap, and battery caps for proper installation.
- Engage the vehicle parking brake and put the transmission in NEUTRAL.
- Ensure that the truck front wheels are pointed straight ahead. Tie down the steering wheel using the securing device attached under the dashboard.
- Install the lift provisions on the outer ends of the rear bumper by removing the tie-down provisions located inboard of the bumper end and installing them on the outer ends of the rear bumper, if necessary.

### Step 2. Rigging

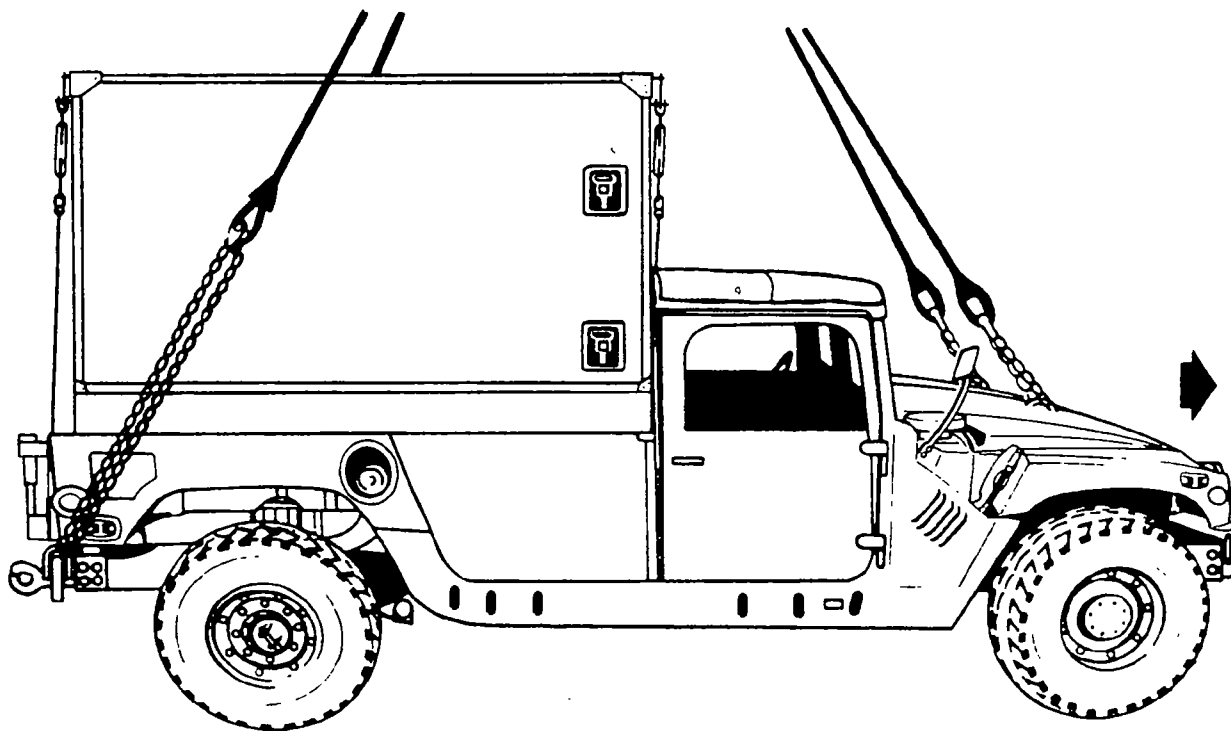
- Position apex fitting on top of the shelter. Route outer sling legs 1 and 2 to front of the vehicle and the inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision that protrudes through the hood and insert link 80 in the grabhook. Repeat with sling leg 2 on the right front lift provision.
- The rear lift provisions are located on the outer ends of the rear bumper. Do not loop the chain end through the tie-down shackles located near the center of the rear bumper. Loop the chain end of sling leg 3 through the left rear lift provision and insert link 30 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.
- Secure excess chain with tape or type nylon cord.
- Secure padding to the slings in areas where they may rub against the shelter sides.
- Raise the apex fitting above the shelter carrier. Keep the rear sling legs to the sides of the shelter.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the shelter to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on top of the shelter. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the shelter and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of preparation and rigging procedures in steps 1 and 2.



## Figure 2-8. M792 Truck, Ambulance

### APPLICABILITY

This load is certified by the US Army NRDEC for CH-47 helicopters at airspeeds up to and including 100 knots.

### LOAD DESCRIPTION

- Truck, ambulance, 1 1/4-ton, M792, LIN X38961.
- Weight: 7,800 pounds.

### MATERIALS

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### PERSONNEL

Two persons can prepare and rig this load in 20 minutes.

### PROCEDURES

#### Step 1. Preparation

- Remove canvas top from cargo compartment and cab. Remove windshield and bows.
- Secure all engine equipment inside the cargo compartment. Secure engine hood in place. Secure batteries and seats.
- Engage parking brake. Place transmission in NEUTRAL.
- Install the truss kit.

#### Step 2. Rigging

- Position apex fitting in the cargo compartment. Route outer sling legs 1 and 2 to the front of the cab and inner sling legs 3 and 4 to the rear of the cargo compartment. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located on the left front corner of the cab and insert link 30 in the grabhook. Repeat with sling leg 2 on the right front lift provision. Secure excess chain with tape or nylon cord.
- Loop the chain end of sling leg 3 through the left rear lift provision located on the left rear corner of the cargo compartment and insert link 3 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.

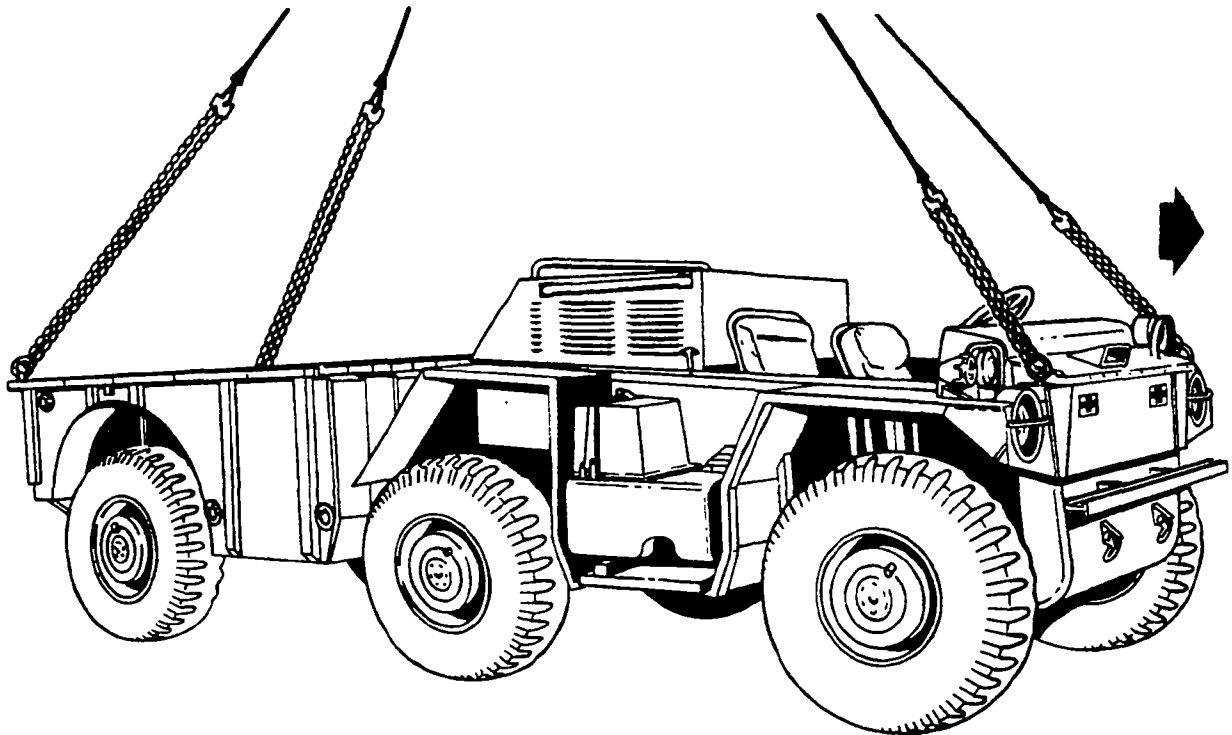
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands in the cargo compartment. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts from the truck and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-9. M718A 1/4-Ton Ambulance**

### **APPLICABILITY**

This load is certified by MTMCTEA for the UH-60A helicopter at airspeeds up to and including 115 knots.

### **LOAD DESCRIPTION**

- Truck, ambulance, 1/4-ton, LIN X38639.
- Weight: 3,790 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Load binder assembly.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Cord, nylon, Type III, 550-pound breaking strength.
- Padding material, cellulose.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Clevis assembly, small, MS 70098-1 (4 each).

### **PERSONNEL**

Two persons can prepare and rig the load in 30 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Remove top, fold bows, and secure in cargo area with tops against back of seats. Secure with nylon cord.
- Fold windshield and secure to hood with nylon cord.
- Remove canvas cover. Fold and place cover on hood under windshield. Secure with nylon cord.
- Remove spare tire and place in cargo area. Secure with cargo tie assembly.
- Pad mirrors with padding material, fold in toward body and tape.
- Secure seat covers with nylon cord.
- Secure covers, loose equipment, and steering wheel with nylon cord.
- Attach a small clevis assembly to all four truck wheel hubs.

## **Step 2. Rigging**

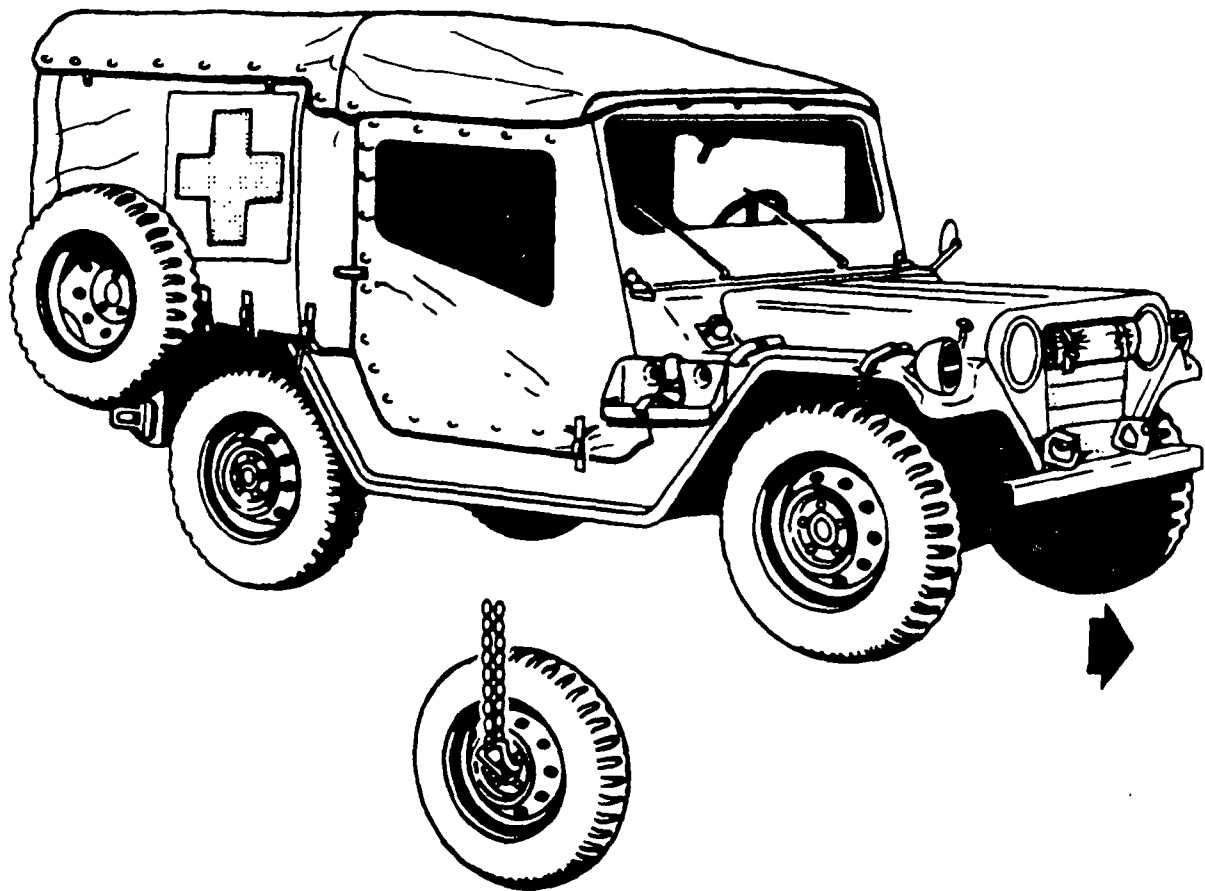
- Position apex fitting on top of the cargo area. Route outer sling legs 1 and 2 to the front of the ambulance and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the clevis on the left front wheel and insert link 3 in the grabhook. Repeat with sling leg 2 on the right front wheel clevis.
- Loop the chain end of sling leg 3 through the clevis on the left rear wheel and insert link 3 in the grabhook. Repeat with sling leg 4 on the right rear wheel clevis.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

## **Step 3. Hookup**

The hookup team stands on the front seats. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the ambulance and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

## **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **\*Figure 2-9.1. M1037 High-Mobility Multipurpose Wheeled Vehicle (HMMWV) Modified (9,400 pound GVW)**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for the CH-47D helicopter at airspeeds up to and including 90 knots indicated airspeed (KIAS).

### **LOAD DESCRIPTION**

- Truck, cargo/troop carrier, high-mobility multipurpose wheeled vehicle (HMMWV), M1037 modified, 9,400 pound GVW.

### **WARNING**

**This cargo vehicle (M1037 modified, 9,400 pound GVW) should not be confused with the shelter carrier (M1037, 8,600 pound GVW). The M1037 modified has improved lift provisions which allow it to be lifted at a higher gross vehicle weight.**

- Weight: 9,400 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig this load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Fold mirrors forward in front of the windshield, then tie together with nylon cord.
- Secure all equipment and cargo inside the vehicle with tape, nylon cord, or lashings.
- Make sure that the fuel content of the vehicle does not exceed 75 percent of the tank capacity. Inspect the gas tank, oil filter, and battery caps for proper installation.
- Engage the vehicle parking brake and put the transmission in neutral.
- Ensure that the front tires are pointed straight ahead. Tie down the steering wheel, using the securing device attached under the dashboard.



## **Step 2. Rigging**

- Position the apex fitting on top of the vehicle. Route outer sling legs (1 and 2) to the front of the vehicle and inner sling legs (3 and 4) to the rear of the vehicle. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located on the hood of the vehicle and insert link 80 in the grabhook. Repeat with sling leg 2 and the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear eyelet opening in the upper corner of the tailgate. Loop the chain end through the lift shackle on the rear bumper and thread back through the eyelet opening in the tailgate and insert link 10 in the grabhook. Repeat with sling leg 4 and the right rear lift provision.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the vehicle to prevent entanglement during hookup and lift-off.

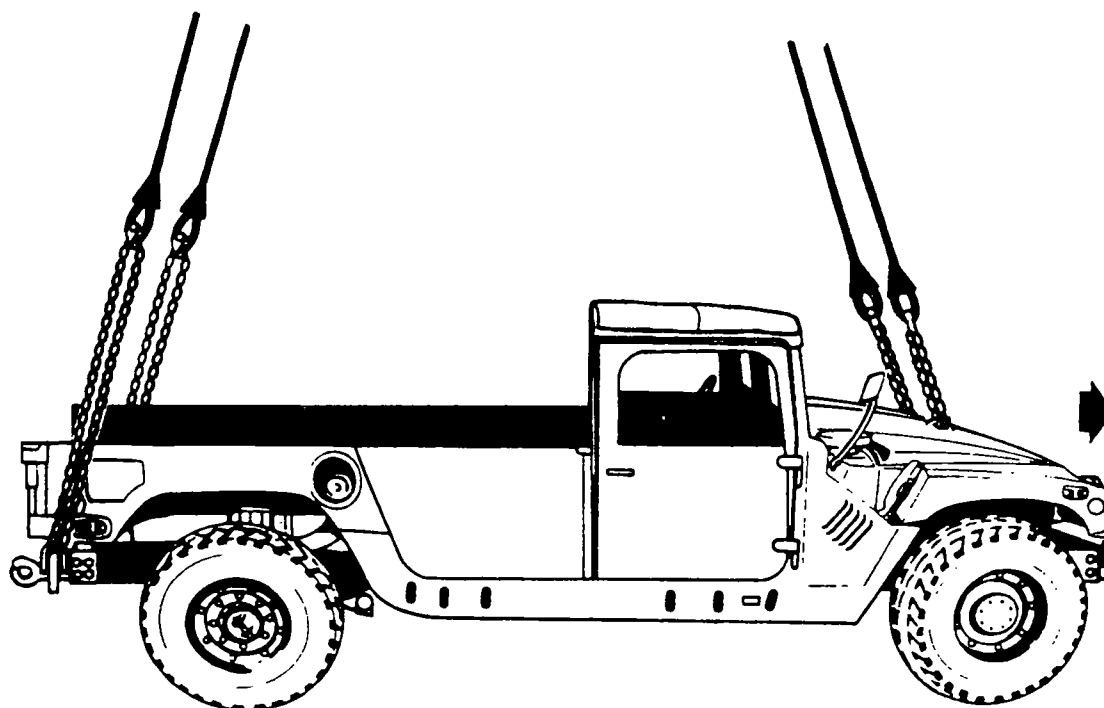
## **Step 3. Hookup**

**NOTE:** Connect the apex fitting to the cargo hook so the front of the vehicle is forward.

The hookup team stands in the bed of the vehicle. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the vehicle and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

## **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **\*Figure 2-9.2. M1037 Truck with S-318 Shelter**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for the CH-47 helicopter at airspeeds up to and including 100 knots.

### **LOAD DESCRIPTION**

- M1037 1 1/4-ton truck with S-318 shelter and external airlift member.
- Weight: 7,440 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Padding, felt, or suitable substitute.

### **PERSONNEL**

Two persons can prepare and rig this load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Fold mirrors forward in front of the windshield for added protection and tie together using nylon cord.
- Ensure that the shelter is secured to the truck using wire rope or tie-down assemblies. Secure all equipment inside the shelter with tape, nylon cord, or lashings; close and secure the door.
- Secure all other equipment inside the vehicle with tape, nylon cord, or lashings. Secure doors shut (if installed).
- Make sure that the fuel tank is not over 3/4 full. Inspect fuel tank, oil filler, and battery caps for proper installation. Engage the vehicle parking brake and put the transmission in neutral.
- Ensure that the truck front wheels are pointed straight ahead. Tie down the steering wheel using the securing device attached under the dashboard.
- Install the lift provisions on the outer ends of the rear bumper by removing the tie-down provisions located inboard of the bumper end and installing them on the outer ends of the rear bumper, if necessary.

## **Step 2. Rigging**

- Position the apex fitting on top of the shelter. Route outer sling legs (1 and 2) to the front of the vehicle and inner sling legs (3 and 4) to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision that protrudes through the hood and insert link 80 in the grabhook. Repeat with sling leg 2 on the right front lift provision.
- The rear lift provisions are located on the outer ends of the rear bumper. Do not loop the chain end through the tie-down shackles located near the center of the rear bumper. Loop the chain end of sling leg 3 through the left rear lift provision and insert link 30 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.
- Secure excess chain with tape or nylon cord.
- Secure padding to the slings in areas where they may rub against the shelter sides.
- Raise the apex fitting above the shelter carrier. Keep the rear sling legs to the sides of the shelter.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the shelter to prevent entanglement during hookup and lift-off.

## **Step 3. Hookup**

The hookup team stands on top of the shelter. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the shelter and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

## **Step 4. Derigging**

Derigging is the reverse of preparation and rigging procedures in steps 1 and 2.



## **\*Figure 2-9.3. Light Armored Vehicle (LAV) (USMC)**

### **APPLICABILITY**

The following loads are certified by the US Army NRDEC for the CH-53E helicopter at airspeeds as denoted below.

### **LOAD DESCRIPTION**

- Light armored vehicle, command and control, TAMCN E0946.
  - Weight: 27,060 pounds.
  - Airspeed: 95 knots.
- Light armored vehicle, 25-mm, TAMCN E0947.
  - Weight: 28,200 pounds.
  - Airspeed: 85 knots.
- Light armored vehicle, logistics, TAMCN E0948.
  - Weight: 28,200 pounds.
  - Airspeed: 90 knots.
- Light armored vehicle, mortar, TAMCN E0949.
  - Weight: 27,400 pounds.
  - Airspeed: 95 knots.
- Light armored vehicle, recovery unit, TAMCN E0950.
  - Weight: 28,400 pounds.
  - Airspeed: 90 knots.
- Light armored vehicle, TOW antitank, TAMCN E0942.
  - Weight: 27,650 pounds.
  - Airspeed: 90 knots.

### **MATERIALS**

- Sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.

- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Padding, felt, or suitable substitute.

## PERSONNEL

Two persons can prepare and rig this load in 15 minutes.

## PROCEDURES

### Step 1. Preparation

- Secure loose items inside.
- Remove all antennae.
- Set parking brake.
- Tie any externally carried items in place with cord.
- Pad and tape/tie all vision blocks, mirrors, and lights.
- Secure all hatches and panels.
- Ensure boom is pinned down. (Recovery Unit)
- Tape outside hydraulic cables. (Recovery Unit)

### Step 2. Rigging

VEHICLE	FORWARD END	TYPE OF SLING SET	LEG LIFTING PROVISIONS			
			1	2	3	4
Command and Control	Nose	40,000 pound	3	3	20	20
25-mm	Nose	40,000 pound	25	25	3	3
Logistics	Nose	40,000 pound	3	3	10	10
Mortar	Nose	40,000 pound	25	25	3	3
Recovery Unit	Nose	40,000 pound	3	3	10	10
Tow Anti-Tank	Nose	40,000 pound	10	10	3	3

- Position the apex fitting on top of the vehicle. Route outer sling legs (1 and 2) to the front of the LAV and inner sling legs (3 and 4) to the rear of the vehicle. Sling legs 1 and 3 must be on the left side of the vehicle.
- Loop the chain end of sling leg 1 through the left front lift provision and insert link identified in the chart in the grabhook. Repeat with sling leg 2 and the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lift provision and insert link identified in the chart in the grabhook. Repeat with sling leg 4 and the right rear lift provision.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the LAV to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

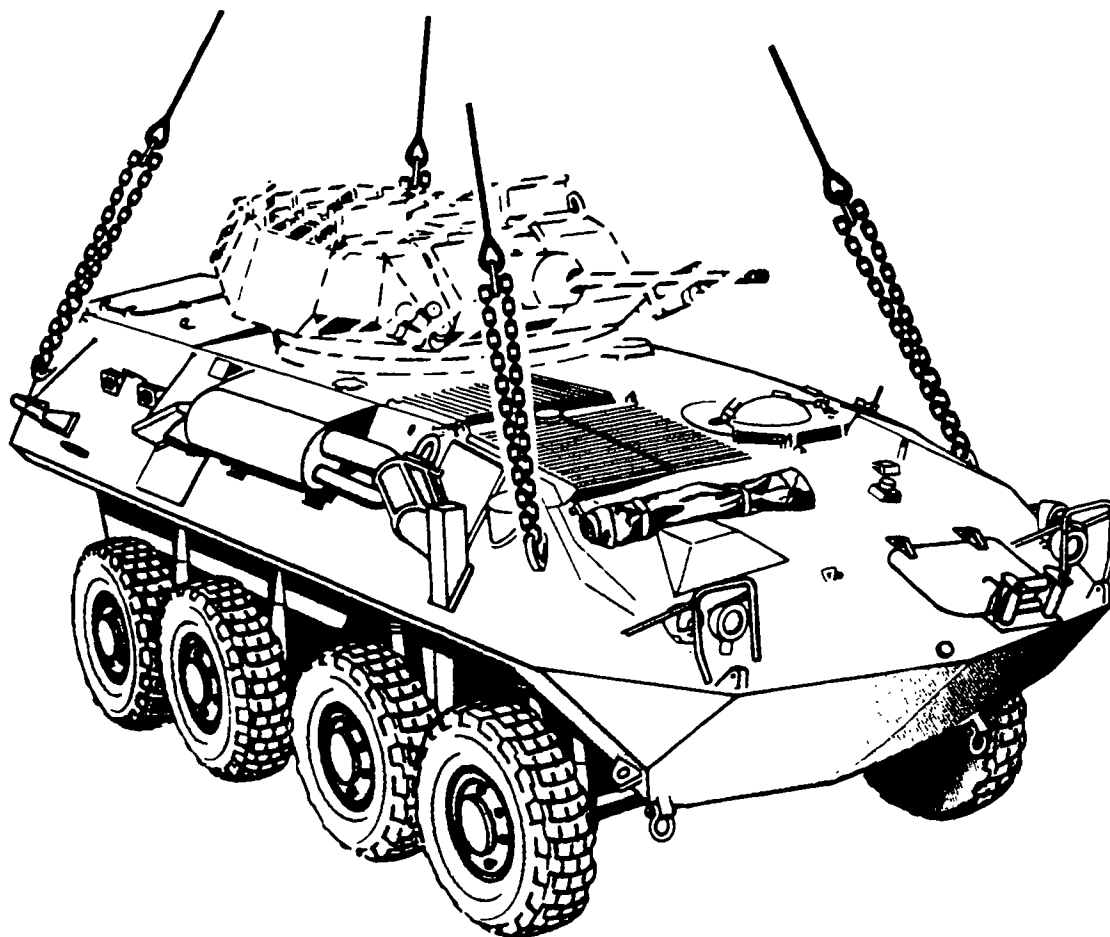
**NOTE:** Connect the apex fitting to the cargo hook so the LAV is forward.

The hookup team stands on the LAV. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the LAV and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## TRAILERS

\*The certified single-point rigging procedures for trailers are in this section. Figures 2-10 through 2-18.3 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

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### Figure 2-10. M416 1/4-Ton Trailer

#### APPLICABILITY

This load is certified by the US Army NRDEC for UH-60 helicopters at airspeeds up to and including 90 knots.

#### LOAD DESCRIPTION

- Trailer, cargo, 1/4-ton, M416, LIN W95400.
- \*Weight:
  - Empty, 580 pounds.
  - Loaded, 1,080 pounds.

#### WARNING

Do not carry the M416 trailer at gross weights of less than 800 pounds because it is extremely unstable and can contact the underside of the helicopter. Any M416 that is lighter than 800 pounds must have additional cargo or dummy weight placed as close to the center of the trailer bed as possible.

\*Maximum weight of trailer cargo is 500 pounds.

#### MATERIALS

- All sling sets:
  - Felt, sheet, cattle hair, Type IV.
  - Cord, nylon, Type III, 550-pound breaking strength.
  - Tape, adhesive, pressure-sensitive, 2-inch wide roll.
  - Rope (12-foot) or lashing materials (if cargo carried).
- Sling set, 10,000-pound capacity.
- Multileg sling set.
- Aerial delivery slings:

- Sling, 3-foot long.
- Sling, 3-loop, Type X nylon or 2-loop Type XXVI, nylon, 9-foot long (3 each).

## PERSONNEL

Two persons can prepare and rig this load in 15 minutes.

## PROCEDURES

### Step 1. Preparation

- All sling sets:
  - Tape or tie the light cable firmly to the top of the drawbar.
  - Load and lash the cargo in the bed of the trailer.
  - Engage the parking brake.
- Aerial delivery slings. Wrap 1/2 square yard of padding around the right spring rear shackle mounting bracket. Tape in place. Repeat on left spring rear shackle mounting bracket.

### Step 2. Rigging

- 10,000-pound capacity sling set and multileg sling set:
  - Position apex fitting in the trailer bed. Route outer sling legs 1 and 2 to the front of the trailer and the inner sling legs 3 and 4 to the rear of the trailer. Sling legs 1 and 3 should be on the left side of the load.
  - Loop the chain end of sling leg 1 through the lunette and insert link 3 in the grabhook. Repeat with sling leg 2 through the lunette.
  - Loop the chain end of sling leg 3 around the left rear spring shackle mounting bracket and insert link 3 in the grabhook. Repeat with sling leg 4 around the right rear spring shackle mounting bracket.
  - Tape or tie (breakaway technique) the chains of legs 3 and 4 to the next-to-last tarpaulin hold-down hook on each side.
  - Cluster and tie or tape (breakaway technique) all sling legs together on top of the trailer to prevent entanglement during hookup and lift-off.
- Aerial delivery slings:
  - Sling leg 1. Choker-hitch a 9-foot sling to the lunette by placing one end of the sling over the top of the neck and bringing the free end up through the eye of the lunette.
  - Sling leg 2. Choker-hitch a 9-foot sling around the left spring rear shackle mounting bracket.
  - Sling leg 3. Choker-hitch a 9-foot sling around the right spring rear shackle mounting bracket.
  - To form a ring, when attaching the legs to the 3-foot sling at the top, twist all legs to give one twist for each 3 feet of sling length. Pass one end of the 3-foot sling through

the upper ends of legs 3, 1, then 2. Connect the ends of the 3-foot sling with a link assembly.

- Tape or tie (breakaway technique) legs 2 and 3 to the next-to-last tarpaulin hook on each side.
- Cluster and tie or tape (breakaway technique) all slings together on top of the trailer to prevent entanglement during hookup and lift-off.

**CAUTION:** Check carefully for untaped or unpadded load areas which could damage the sling. Pad and/or tape the sling or load as necessary to prevent damage.

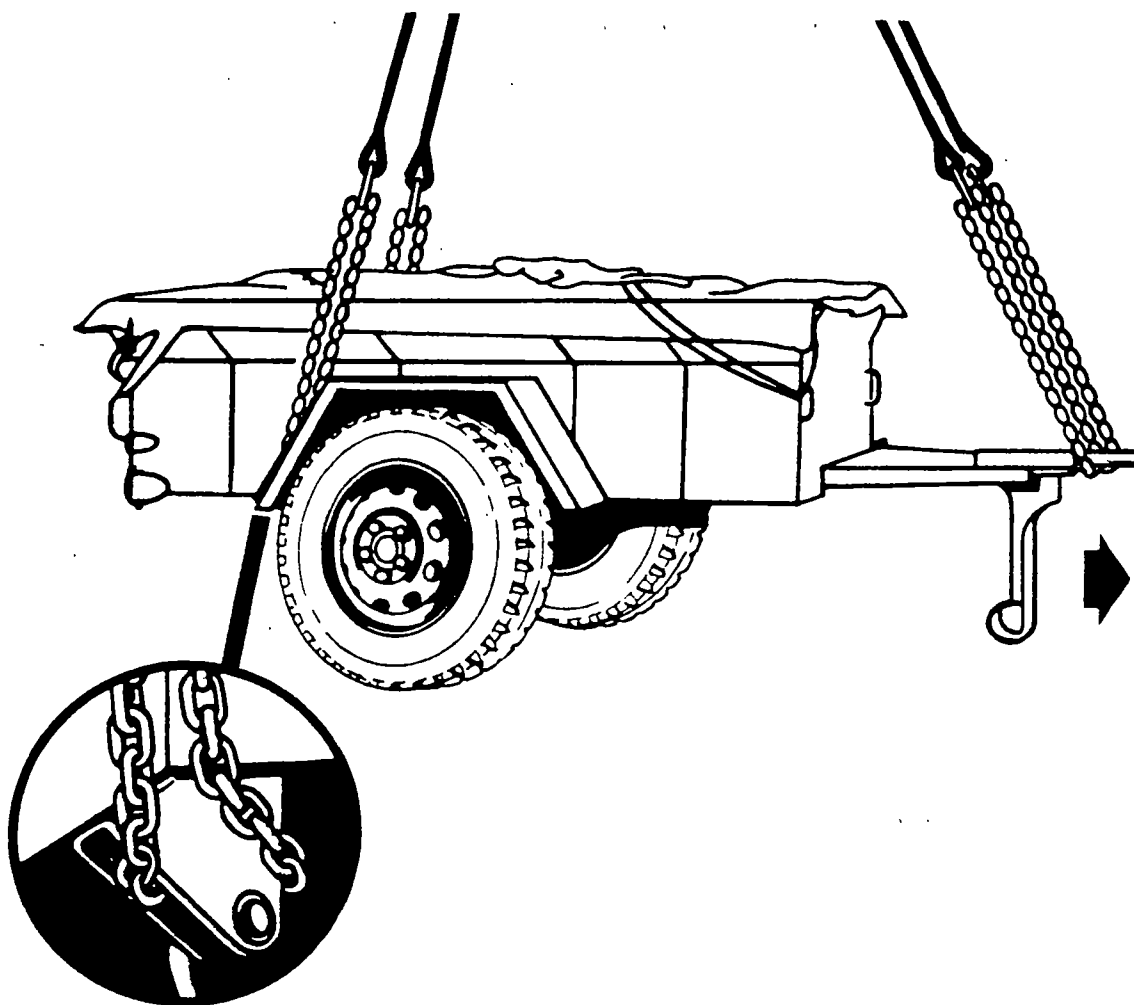
**NOTE:** When the hookup team places the 3-foot sling onto the helicopter cargo hook, they must ensure that the link assembly does not make contact with cargo hook.

### **Step 3. Hookup**

The hookup team stands in the bed of the trailer or on top of the trailer load. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## Figure 2-11. M101A2 3/4-Ton Trailer

### APPLICABILITY

This load is certified by the US Army NRDEC for CH-47 helicopters at airspeeds up to and including 65 knots.

### LOAD DESCRIPTION

- M101A2 3/4-ton cargo trailer, LIN W95537.
- Weight:
  - Empty, 1,280 pounds.

### WARNING

Do not carry the M101A2 trailer at gross weights of less than 1,575 pounds because it is extremely unstable and can contact the underside of the helicopter. Any M101A2 that is lighter than 1,575 pounds must have additional cargo or dummy weight placed as close to the center of the trailer bed as possible.

- Loaded, as follows:

VARIANTS	CURB WEIGHT (pounds)
Command Version 1 Trailer	1,958
Command Version 2 Trailer	1,981
LEN Cable Trailer	2,796
NC Support Trailer	2,643
Maintenance Trailer #2	1,430
Battalion Spares Trailer #1	1,594
Battalion Spares Trailer #2	2,206

### WARNING

Maximum weight during EAT operations for any variant of the M101A2 is 3,000 pounds.

### MATERIALS

- Sling set (10,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.

- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tie-down, cargo, CGU-1/B (2 each or equivalent).

## **PERSONNEL**

Two persons can prepare and rig this load in 15 minutes.

## **PROCEDURES**

### **Step 1. Preparation**

- Remove front rack and place in bed of the trailer. Load cargo on top of the rack.
- Fasten the tailgate in the open position with the chains on each side hooked through the keeper.
- Secure cargo in the bed of the trailer with the tie-down straps. Attach the hook end of one tie-down strap around the tailgate left hinge. Loop the tie-down strap diagonally over the load and connect the ratchet end to the right front lifting shackle. Secure loose end of strap.
- Repeat the previous procedure with the second tie-down strap using the tailgate right hinge and left front lifting shackle. Secure loose end of strap.
- Tape or tie the light cable firmly to the top of the drawbar.
- Engage the parking brake.

### **Step 2. Rigging**

- Position apex fitting on top of the trailer. Route outer sling legs 1 and 2 to the front of the trailer and inner sling legs 3 and 4 to the rear of the trailer through the opening between the tailgate and the trailer bed. Each chain must be routed on the inboard side of the tailgate hinge. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located on the front of the trailer and insert link 3 in the grabhook. Repeat with sling leg 2 on the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lift provision and insert link 40 in the grabhook. Repeat with sling leg 4 on the right rear lift provision. Secure excess chain with tape or nylon cord.
- Lift sling leg 3 and tie or tape (breakaway technique) the grabhook or sling leg to the trailer side rack so the chain does not become slack and bind in the opening between the tailgate and trailer bed. Repeat with sling leg 4 on the other side rack.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

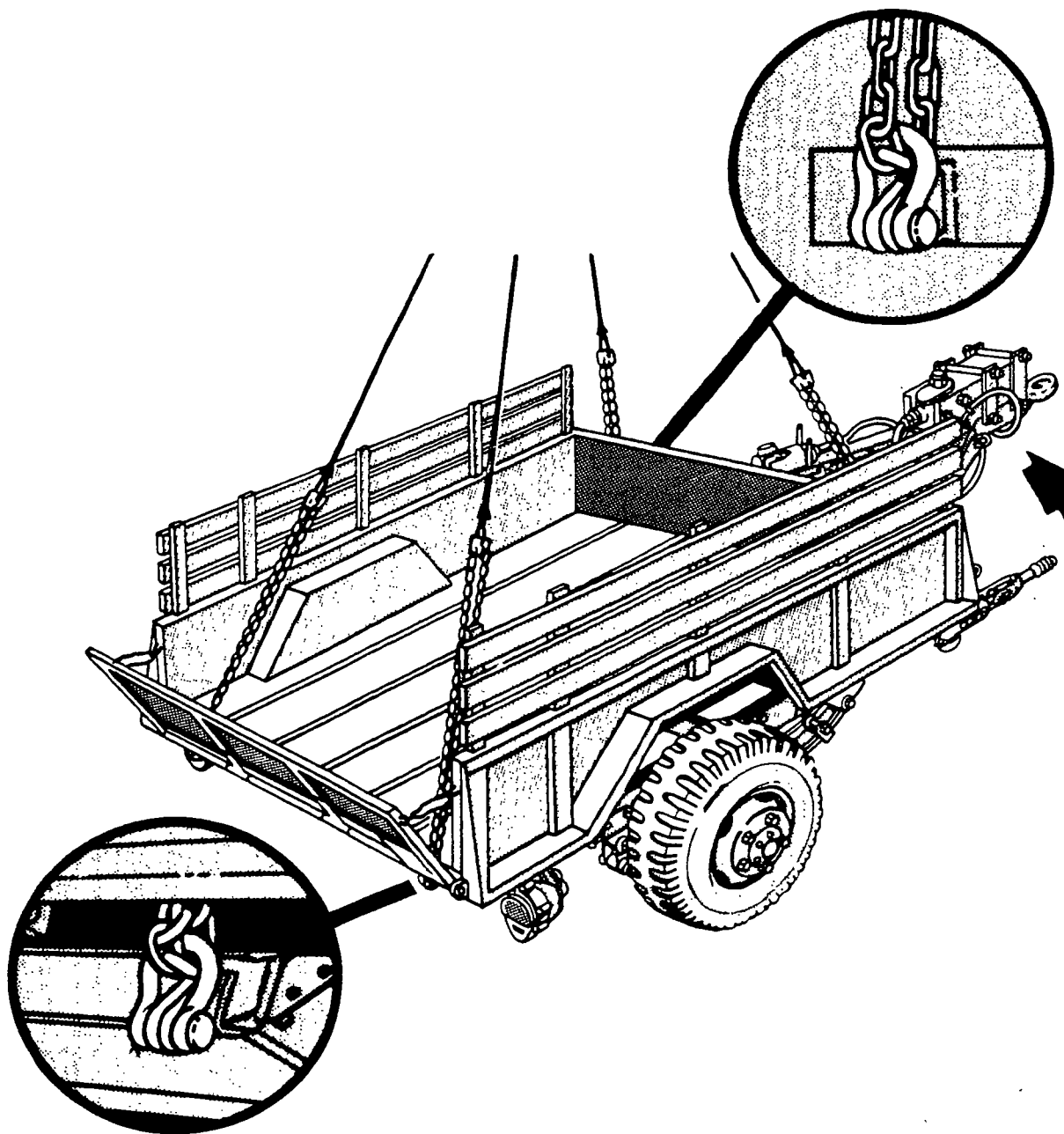
### **Step 3. Hookup**

The hookup team stands in the trailer bed. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the

hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

#### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## Figure 2-12. XM1048 Trailer

### APPLICABILITY

This load is certified by the US Army NRDEC for CH-47 helicopters at airspeeds up to and including 120 knots.

### LOAD DESCRIPTION

- Trailer, XM1048, NSN 2330-01-167-7258.
- Weight: 5,880 pounds.

### MATERIALS

- Sling set, 10,000-pound capacity.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton 1/4-inch, 80-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.

### PERSONNEL

Two persons can prepare and rig this load in 15 minutes.

### PROCEDURES

#### Step 1. Preparation

- Secure all chains, hoses, and cables to the trailer drawbar with nylon cord.
- Engage brake.
- Raise all four leveling jacks to the travel position. Stow the jack handles and secure with nylon cord.
- Secure any lids, caps, or loose items.

#### Step 2. Rigging

- Position apex fitting on bed of the trailer. Route outer sling legs 1 and 2 to the front of the trailer and inner sling legs 3 and 4 to the rear of the trailer. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located on the left front corner of the trailer and insert link 44 in the grabhook. Repeat with sling leg 2 on the right front lift provision. Secure excess chain with tape or nylon cord.
- Loop the chain end of sling leg 3 through the left rear lift provision located on the left rear corner of the trailer and insert link 6 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.

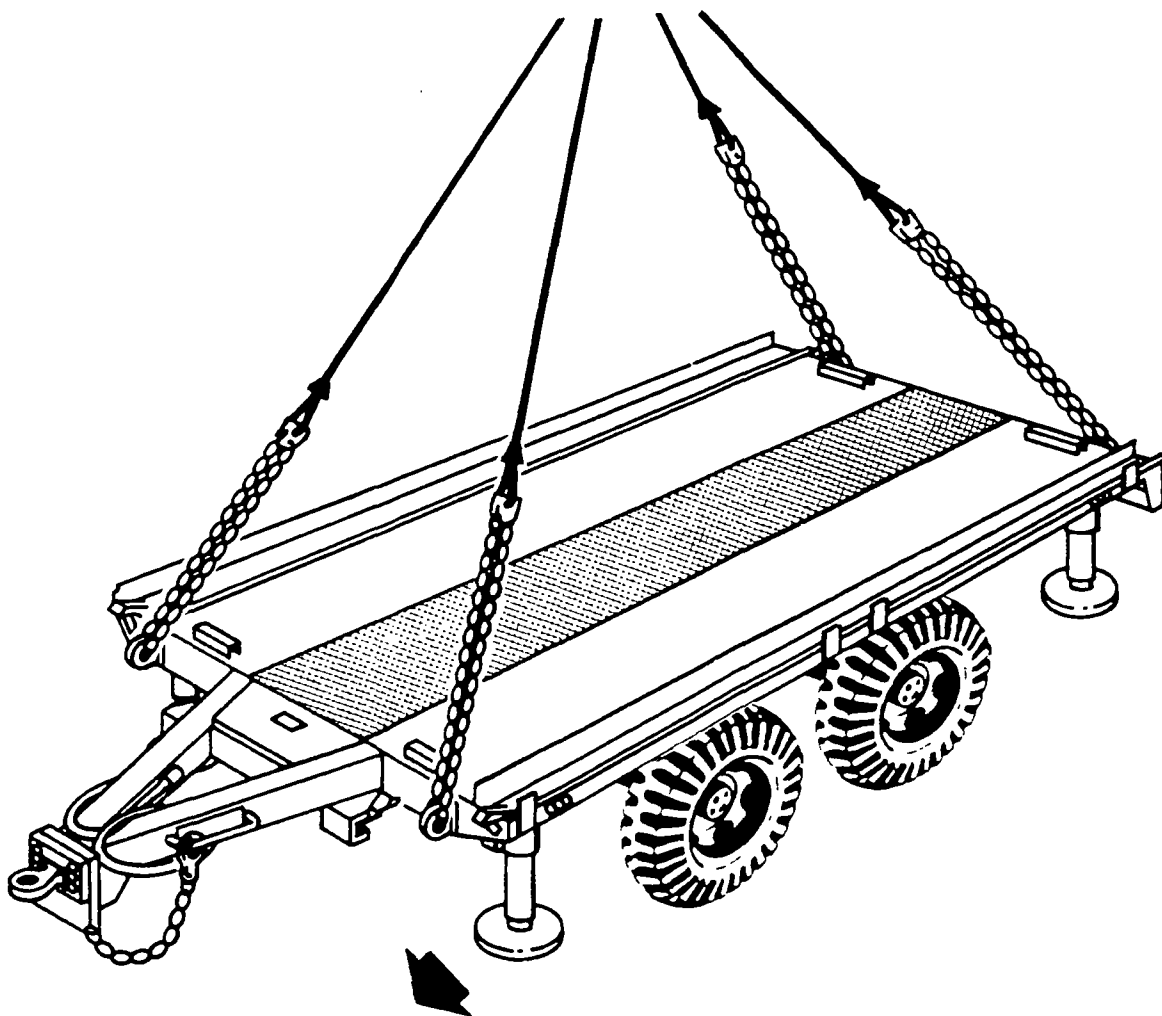
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on the bed of the trailer. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-13. M149A2 Water Trailer (USMC)**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-46 helicopters at airspeeds up to and including 90 knots.

### **LOAD DESCRIPTION**

- Trailer, tank, water, M149A2, 400-gallon, modified with clevis-type lifting provisions, (USMC), TAMCN D0880, NSN 2330-00-832-8801.
- Weight: 6,100 pounds fully loaded (this load is only certified for EAT at full weight).

### **MATERIALS**

- Multileg sling set (15,000-pound capacity) or sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Padding, felt or suitable substitute.

### **PERSONNEL**

Two persons can prepare and rig this load in 10 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Secure any loose electrical cables, air hoses, and safety chains to the trailer chassis frame with tape or nylon cord.
- Make sure the tongue wheel is locked in the down position.
- Engage one trailer hand brake.
- Secure the tank hatch closed.

#### **Step 2. Rigging**

**NOTE:** Both sling sets use the same chain link count for this load.

- Position apex fitting/web ring on top of the water tank. Route outer sling legs 1 and 2 to the front of the trailer and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision on the left side of the tongue and insert link 3 in the grab link. Repeat with sling leg 2 and the right front lift provision on the other side of the tongue.

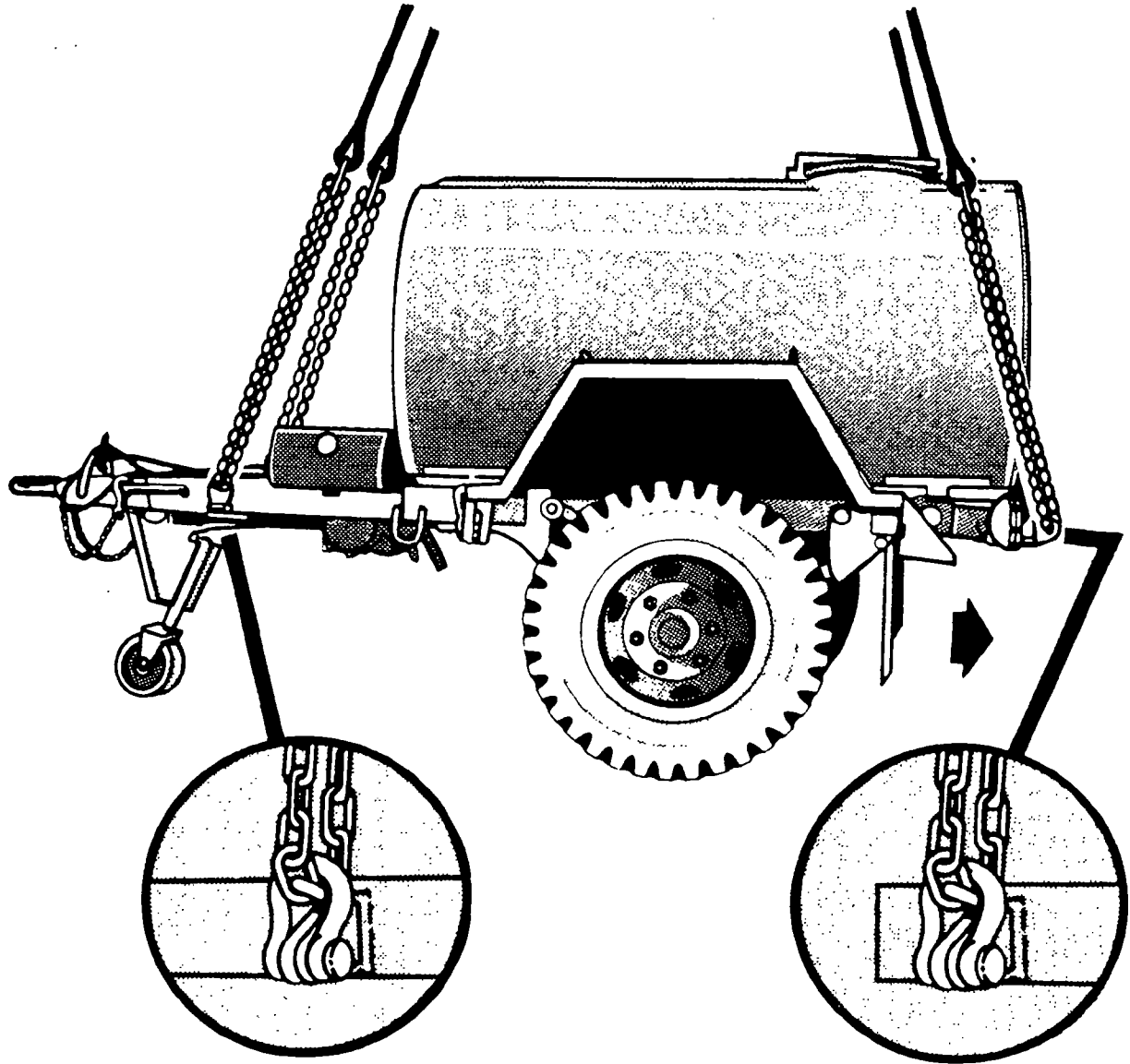
- Loop the chain end of sling leg 3 through the left rear lift provision on the left side of the rear frame and insert link 11 in the grab link. Repeat with sling leg 4 and the right rear lift provision. Secure excess chain with tape or nylon cord. Pad the rear sling legs where they contact the water tank.
- Position the two rear sling legs around the side of the tank so that the sling legs cradle the tank.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the water tank to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

The hookup team stands on the trailer fenders or the front of the trailer. The static wand person discharges the static electricity with the static wand. The hookup person places the web ring/apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-14. M989 Heavy-Expanded Mobility Ammunition Trailer**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-47 helicopters at airspeeds up to and including 120 knots.

### **LOAD DESCRIPTION**

- M989 heavy-expanded mobility ammunition trailer (HEMAT), LIN T45465, NSN 2330-01-109-4258.
- Weight: 7,640 pounds empty (this load is certified at the empty weight only).

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tie-down, cargo, CGU-1/B (4 each or equivalent).

### **PERSONNEL**

Two persons can prepare and rig this load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- At each corner of the trailer, slide the lifting provisions out until they are completely extended. Do not lift the trailer unless the provisions are fully extended and secured in position.
- Remove the side and end panels. Place two panels side by side on the trailer so that the panel ends are approximately 10 inches from the front of the trailer. Make sure the panels are positioned lengthwise on the trailer. Place the remaining panels on top of the respective panels on the trailer.
- Secure the panels on the trailer with the tie-down straps. Attach the hook end of one tie-down strap to a tie-down ring on the trailer bed beside the panels approximately one foot from the end of the panels. Connect and tighten the ratchet end to a tie-down ring on the other side of the panels. Secure loose end of strap. Repeat with a second tie-down strap at the other end of the panels.
- To secure the panels lengthwise, route the hook end of 1 tie-down strap around the vertical metal stiffeners on the top panel of the stack of panels on the left side of the trailer. Attach the hook end to a tie-down ring on the front end of the trailer bed. Connect and

tighten the ratchet end to a tie-down ring on the other end of the stack of panels. Secure loose end of strap. Repeat with a second tie-down strap on the other stack of panels.

- Tape or tie the intervehicular cable, hoses, and safety chains firmly to the top of the drawbar with tape or nylon cord.
- Engage the parking brake.

### **Step 2. Rigging**

- Position apex fitting on top of the trailer. Route outer sling legs 1 and 2 to the front of the trailer and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located on the left front corner of the trailer and insert link 40 in the grabhook. Repeat with sling leg 2 on the right front lift provision. Secure excess chain with tape or nylon cord.
- Loop the chain end of sling leg 3 through the left rear lift provision located on the left rear corner of the trailer and insert link 4 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the trailer to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

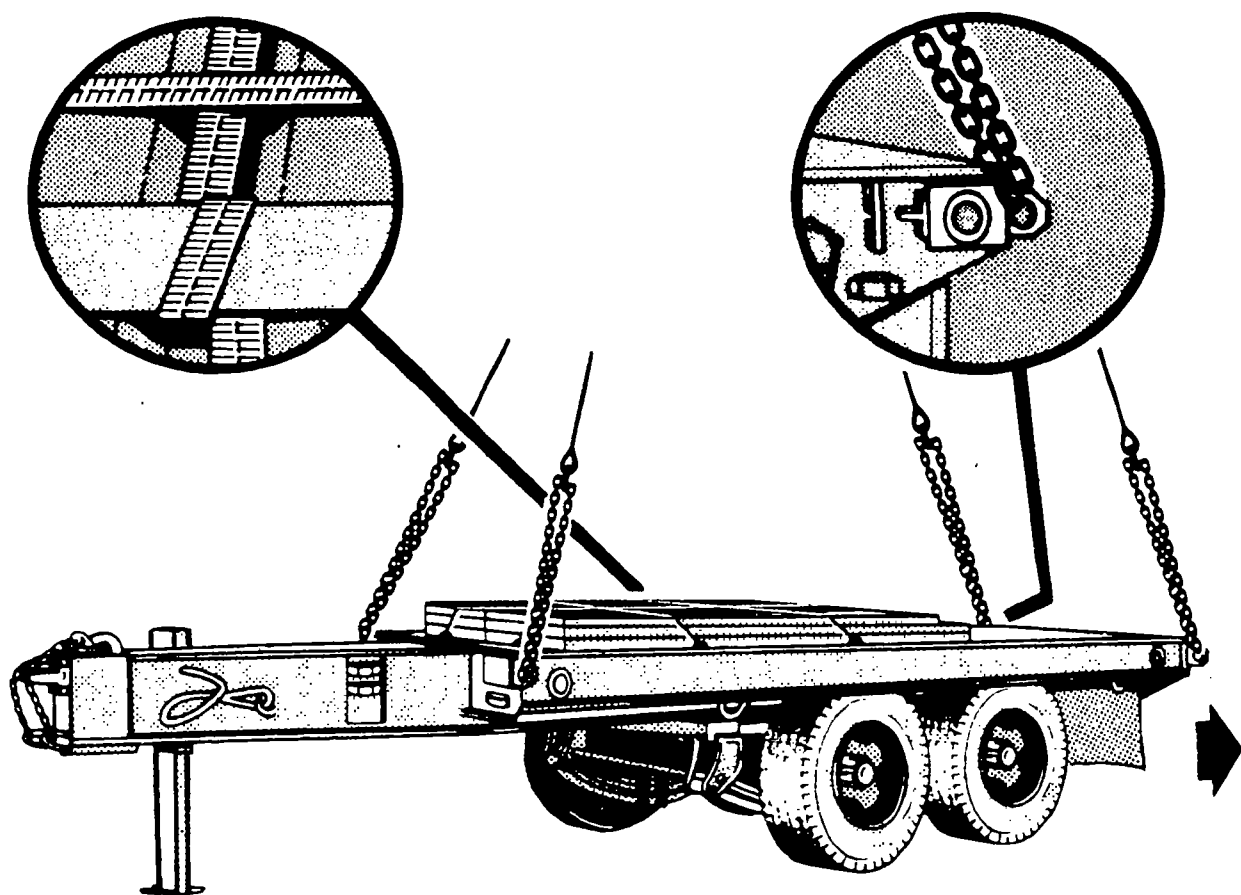
**NOTE:** Connect the apex fitting so the tongue end is carried aft.

**NOTE:** Brief the pilot to relax sling leg tension and hover to the side of the trailer when releasing the apex fitting to prevent damage to the panels on top of the trailer.

The hookup team stands on the trailer bed. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## **Figure 2-15. Mk14, Trailer, Container Hauler**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-53E helicopters at airspeeds up to and including 100 knots.

### **LOAD DESCRIPTION**

- Trailer, container hauler, Mk14, TAMCN D0876, NSN 2320-01-176-0469.
- Weight: 16,000 pounds.

### **MATERIALS**

- Sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig this load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Disengage the Mk14 from the Mk48 prime mover according to operator's manual.
- Secure all hoses with tape or nylon cord.
- Tape all lights, reflectors, and glass fixtures.
- Remove the safety retainer pins from the lifting eyelets located under the doors in the bed of the trailer. Unscrew the lifting eyelets from their stored position and reinsert the lifting eyelets so that the eyelet portion is accessible from the bed of the trailer through the access doors. Screw the lifting eyelets all the way in and back out one full turn. Reinsert the safety retainer pins to prevent the lifting eyelets from backing out in flight.
- Make sure all tool compartment doors are secured shut.

#### **Step 2. Rigging**

- Position apex fitting on top of the trailer. Route outer sling legs 1 and 2 to the front of the trailer and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision in the front of the bed and insert link 3 in the grab link. Repeat with sling leg 2 and the right front lift provision.

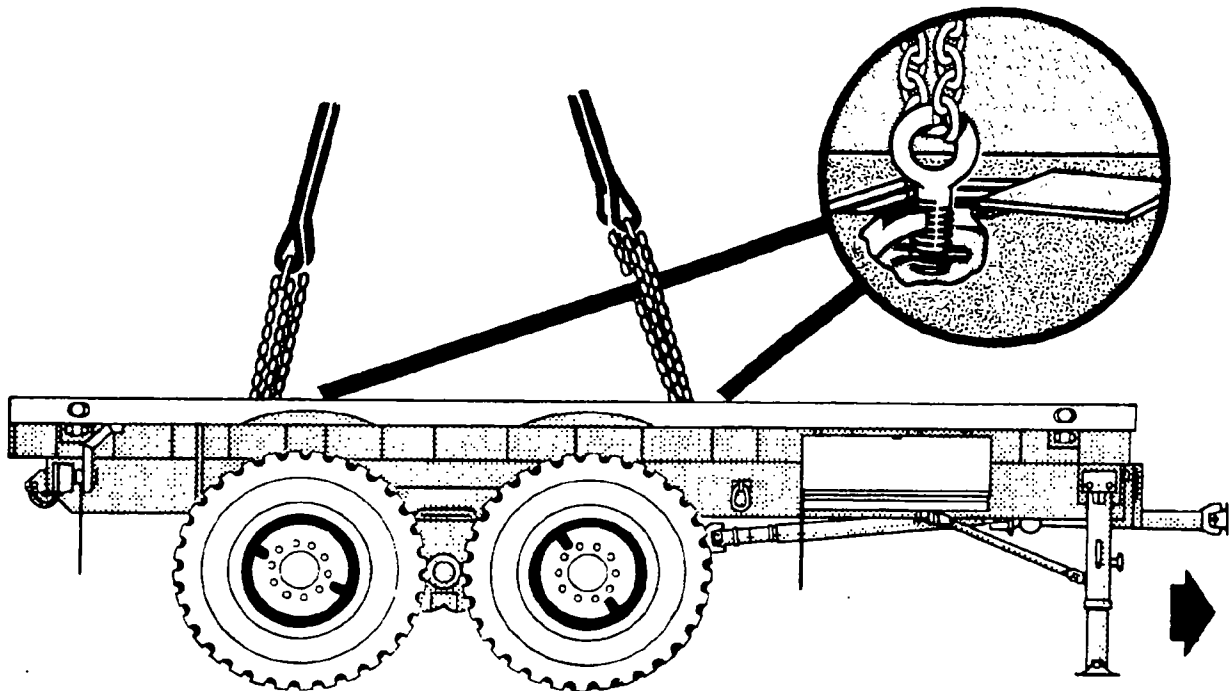
- Loop the chain end of sling leg 3 through the left rear lift provision in the rear of the bed and insert link 3 in the grab link. Repeat with sling leg 4 and the right rear lift provision.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the trailer to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on top of the trailer. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-16. Mk15, Trailer, Wrecker/Recovery**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-53E helicopters at airspeeds up to and including 90 knots.

### **LOAD DESCRIPTION**

- Trailer, powered, wrecker/recovery, Mk15, TAMCN D0877, NSN 2320-01-176-6928.
- Weight: 26,000 pounds.

### **MATERIALS**

- Sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tie-down strap, cargo, CGU-1/B (5,000-pound capacity), as required.

### **PERSONNEL**

Two persons can prepare and rig this load in 30 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Disengage the Mk15 from the Mk48 prime mover according to operator's manual.
- Remove the A-frame from rear of the trailer. Stow in trailer bed and secure with tie-down straps or nylon rope/webbing.
- Secure all hoses with tape or nylon cord.
- Tape all lights, reflectors, and glass fixtures.
- Remove the safety retainer pins from the tool storage compartment. Insert the lifting eyelets so that the eyelet portion is accessible from the bed of the trailer through the access doors. Screw the lifting eyelets all the way in and back out one full turn. Reinsert the safety retainer pins to prevent the lifting eyelets from backing out in flight.
- Make sure all tool compartment doors are secured.

## **Step 2. Rigging**

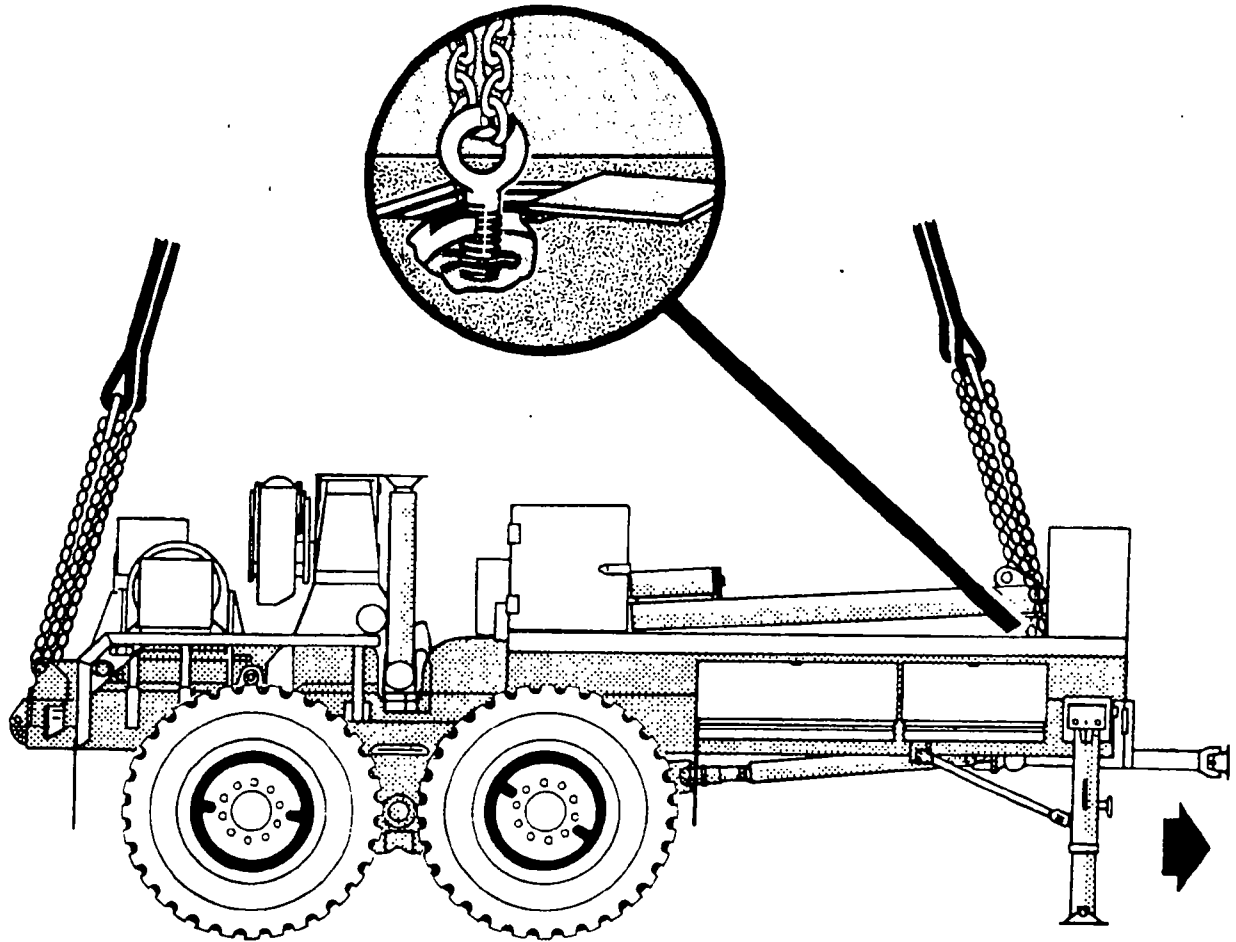
- Position apex fitting on top of the trailer. Route outer sling legs 1 and 2 to the front of the trailer and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located in the bed behind the stowage compartment and insert link 3 in the grab link. Repeat with sling leg 2 and the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lift provision located on the left side of the towing pintle hook and insert link 10 in the grab link. Repeat with sling leg 4 and the right rear lift provision. Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the trailer to prevent entanglement during hookup and lift-off.

## **Step 3. Hookup**

The hookup team stands on top of the trailer. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

## **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-17. Mk16, Trailer, Fifth-Wheel Adapter**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-53E helicopters at airspeeds up to and including 90 knots.

### **LOAD DESCRIPTION**

- Trailer, fifth-wheel semitrailer adapter, Mk16, TAMCN D0878, NSN 2320-01-176-0467.
- Weight: 16,000 pounds.

### **MATERIALS**

- Sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig this load in 30 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Disengage the Mk16 from the Mk48 prime mover according to the operator's manual.
- Secure all hoses and loose equipment with tape or nylon cord.
- Tape all lights, reflectors, and glass fixtures.
- Make sure all tool compartment doors are secured.

#### **Step 2. Rigging**

- Position apex fitting on top of the fifth wheel. Route outer sling legs 1 and 2 to the front of the adapter and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located on the main frame below the winch and behind the left front stowage compartment. Insert link 3 in the grab link. Repeat with sling leg 2 and the right front lift provision behind the right front stowage compartment.
- Loop the chain end of sling leg 3 through the left rear lift provision located on the left side of the towing pintle and insert link 3 in the grab link. Repeat with sling leg 4 and the right rear lift provision on the right side of the pintle hook.

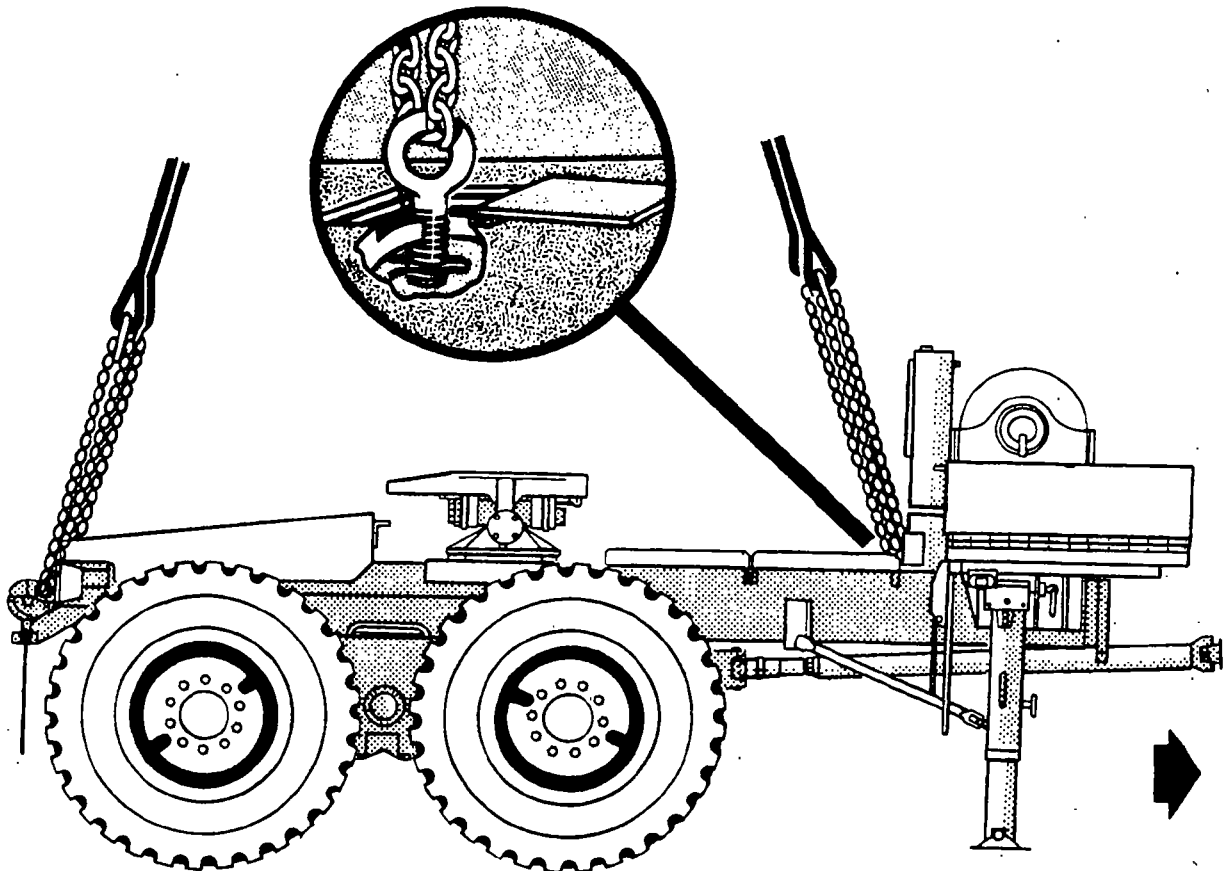
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the fifth wheel to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on top of the fifth wheel adapter. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the adapter and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-18. Mk17, Trailer, Drop-Side, Cargo**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-53E helicopters at airspeeds up to and including 75 knots.

### **LOAD DESCRIPTION**

- Trailer, drop-side, cargo, Mk17, TAMCN D0879, NSN 2320-01-176-0468.
- Weight: 23,000 pounds.

### **MATERIALS**

- Sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig this load in 20 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Disengage the Mk17 trailer from the Mk48 prime mover according to the operator's manual.
- Secure all hoses with tape or nylon cord. Tape over lights, reflectors, and glass fixtures.
- Remove the safety retainer pins from the lifting eyelets located under the doors in the bed of the trailer. Unscrew the lifting eyelets from their stored position and reinsert the lifting eyelets so that the eyelet portion is accessible from the bed of the trailer through the access doors. Screw the lifting eyelets all the way in and back out one full turn. Reinsert the safety retainer pins to prevent the lifting eyelets from backing out in flight.
- Secure all tool compartment doors with locks or nylon cord.

#### **Step 2. Rigging**

- Position apex fitting on top of the trailer. Route outer sling legs 1 and 2 to the front of the trailer and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located in the middle of the left side of the trailer bed and insert link 3 in the grab link. Repeat with sling leg 2 and the front lift provision on the right side.



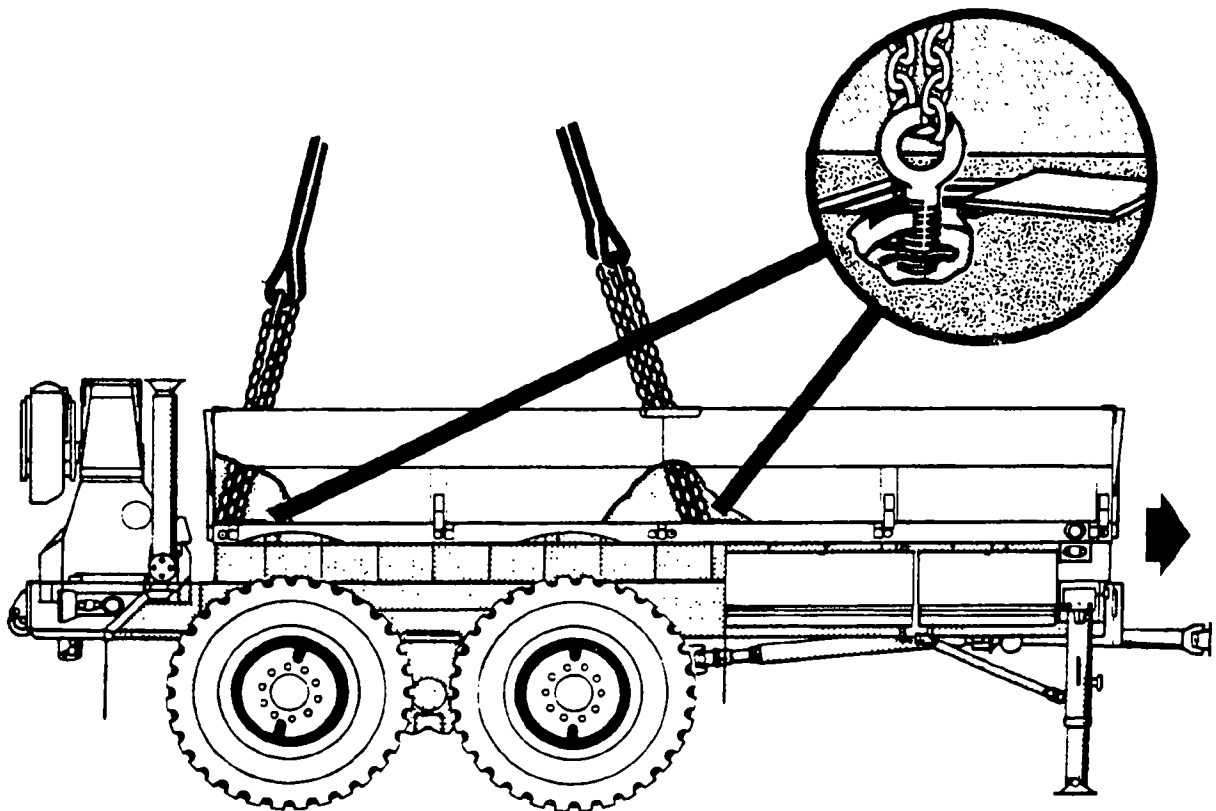
- Loop the chain end of sling leg 3 through the left rear lift provision located in the left rear corner of the trailer bed by the towing pintle hook and insert link 13 in the grab link. Repeat with sling leg 4 and the right rear lift provision. Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the trailer to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on top of the trailer. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **\*Figure 2-18.1. M989A1 Heavy-Expanded Ammunition Trailer HEMAT II**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for the CH-47 helicopter at airspeeds up to and including 125 KIAS.

### **LOAD DESCRIPTION**

- M989A1 Trailer, Ammunition, HEMAT II.
- NSN 2330-01-275-7474.
- LIN Z90962.
- Weight: 10,650 pounds.

### **MATERIALS**

- Sling set (25,000-pound capacity) (one each).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Padding, felt, or suitable substitute.
- Tie-down strap, cargo, CGU-1/B (5,000-pound capacity) (8 each).

### **PERSONNEL**

Two persons can prepare and rig this load in 10 minutes.

### **PROCEDURES**

**CAUTION:** The following rigging procedures are for the M989A1 HEMAT only. Do not use these procedures when rigging the M989 HEMAT.

#### **Step 1. Preparation**

- Inspect the lift provisions at the four upper corners of the cargo bed.
- Ensure the trailer tongue is raised and secured with cargo strap prior to EAT.
- Secure brake hose, safety hose, intervehicular cable(s), and safety chains to the trailer and tongue with nylon cord and/or tape.

- Engage the steering lockout pin.
- Secure side panels to the cargo deck with straps.

### Step 2. Rigging

- Position the apex fitting on top of the M989A1 HEMAT II. Route outer sling legs (1 and 2) to the front (tongue) end of the trailer and inner sling legs (3 and 4) to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision (tongue end) and insert link 15 in the grabhook. Repeat with sling leg 2 and the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lift provision and insert link 3 in the grabhook. Repeat with sling leg 4 and the right rear lift provision.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the HEMAT II to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

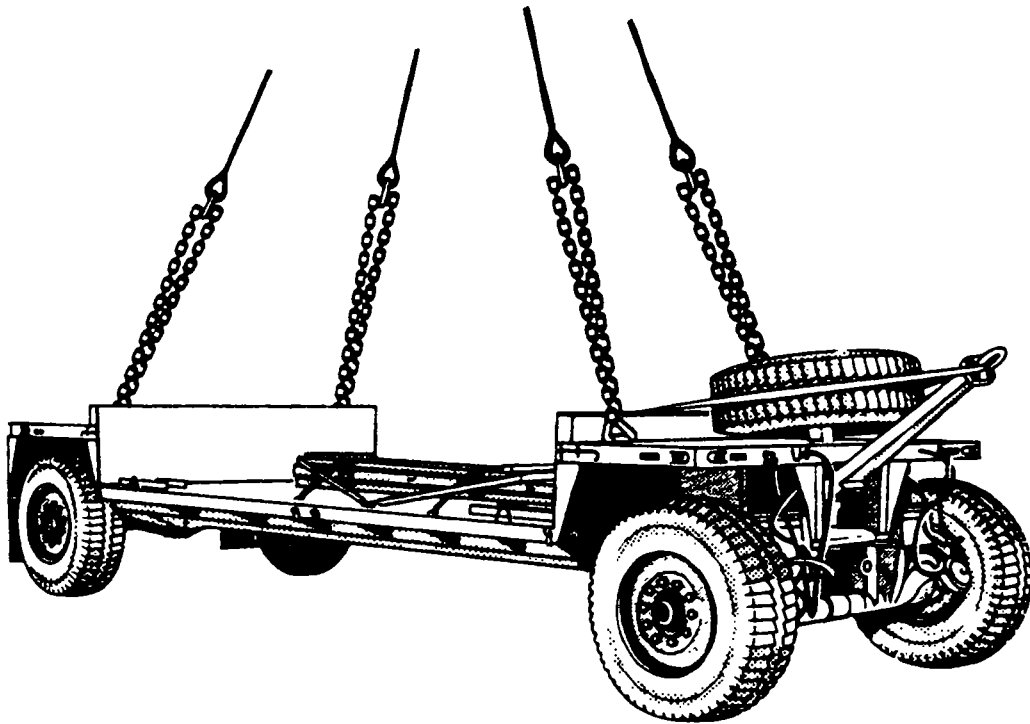
**NOTE:** Connect the apex fitting to the cargo hook so the tongue end is carried aft.

The hookup team stands on top of the trailer. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

**CAUTION:** Brief the helicopter crew to relax sling leg tension and hover to the side of the load when releasing the apex fitting to prevent damage to the panels on top of the trailer.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **\*Figure 2-18.2. M116A2 Trailer with Antenna Groups, AS-3954/TRC (2 each) (USMC)**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for the CH-46 helicopter at airspeeds up to and including 65 KIAS.

### **LOAD DESCRIPTION**

- Chassis, trailer, cargo, 3/4-ton, 2W, M116A2.
- NSN 2330-01-101-8434.
- Weight: 3,230 pounds.

### **MATERIALS**

- Multileg sling set (15,000-pound capacity) (1 each).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tie-down strap, cargo, CGU-1/B (5,000-pound capacity) as required.

### **PERSONNEL**

Two persons can prepare and rig this load in 10 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Secure all loose equipment inside the trailer with tape, nylon cord, or tie-down straps.
- Secure all covers in their proper place. Do not remove tarps. They are needed to protect the antennae.
- Engage both trailer parking brakes and ensure that the front support leg is down.
- Secure all chains, hoses, and cables with nylon cord.

### Step 2. Rigging

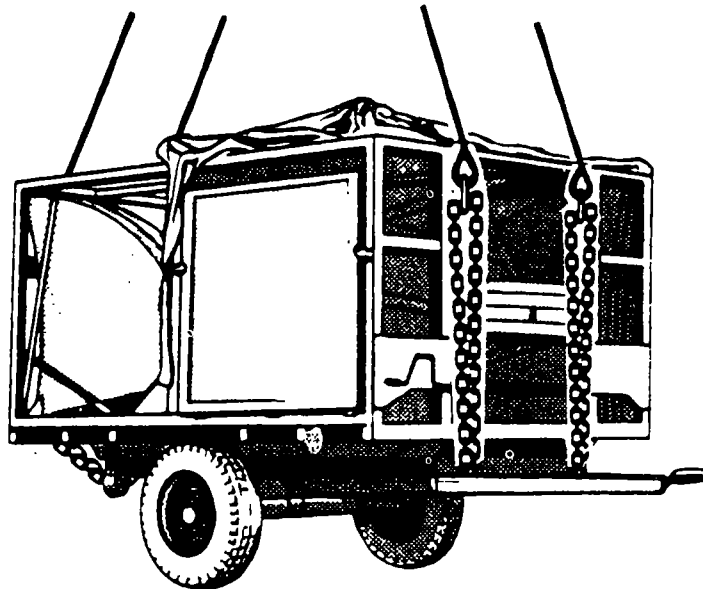
- Position the apex fitting on top of the trailer. Route outer sling legs (1 and 2) to the front of the trailer (lunette end) and inner sling legs (3 and 4) to the rear of the trailer. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located on the aluminum frame attached to the trailer. Do not use the trailer lifting provisions attached to the chassis. Insert link 3 in the grabhook. Repeat with sling leg 2 and the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lift provision located on the aluminum frame attached to the trailer. Do not use the trailer lifting provisions located on the chassis. Insert link 3 in the grabhook. Repeat with sling leg 4 and the right rear lift provision.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the aluminum frame to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on top of the trailer, being careful to stand only on the frame cross bars. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **\*Figure 2-18.3. MKT-90 Field Kitchen Trailer**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for the CH-47 helicopter at airspeeds up to and including 95 KIAS.

### **LOAD DESCRIPTION**

- MKT-90 field kitchen trailer, mounted on M103A3 trailer.
- Weight: 5,730 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Padding, felt, or suitable substitute.
- Chain, part number 38850-00053-101, from a 10,000-pound sling set (4 each).
- Coupling link, part number 577-0615, from a 10,000-pound sling set (4 each).

### **PERSONNEL**

Two persons can prepare and rig this load in 20 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Secure all items in their proper storage location before closing the unit.
- Configure the MKT for ground transportation according to the operator's instructions.
- Retract and stow all landing legs. Secure each landing leg with nylon cord.
- Lower the lunette as far as possible by adjusting the landing wheel hand screw. Do not retract the landing wheel.
- Engage both hand brakes.
- Secure the safety chains, break hoses, and intravehicular cable to the trailer drawbar with tape or nylon cord.
- Secure all loose canvas with tape.

## Step 2. Rigging

- Using the proper connecting links, connect the additional 8-foot chain sections to the end of each of the four sling legs.

**CAUTION:** While on the roof of the trailer, stay in front of the trailer axle. Moving behind the axle may cause the trailer to tip rearwards, causing possible injury to personnel and damage to the load.

- Position the apex fitting on top of the trailer roof. Route outer sling legs (1 and 2) to the front of the vehicle (drawbar end) and inner sling legs (3 and 4) to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located in the trailer frame and insert link 3 in the grabhook. Repeat with sling leg 2 and the right front lift provision. The lift provisions are in the form of cutouts in the frame.
- Loop the chain end of sling leg 3 through the left rear lift provision opening and insert link 11 in the grabhook. Repeat with sling leg 4 and the right rear lift provision.
- Secure excess chain with tape or nylon cord.
- Pull sling legs 1 and 2 up on the roof. Tie or tape (breakaway technique) the grabhooks together to keep them from sliding off the roof. Repeat with sling legs 3 and 4.
- Pad each sling leg where it contacts the edge of the roof. Secure padding with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the roof to prevent entanglement during hookup and lift-off.

## Step 3. Hookup

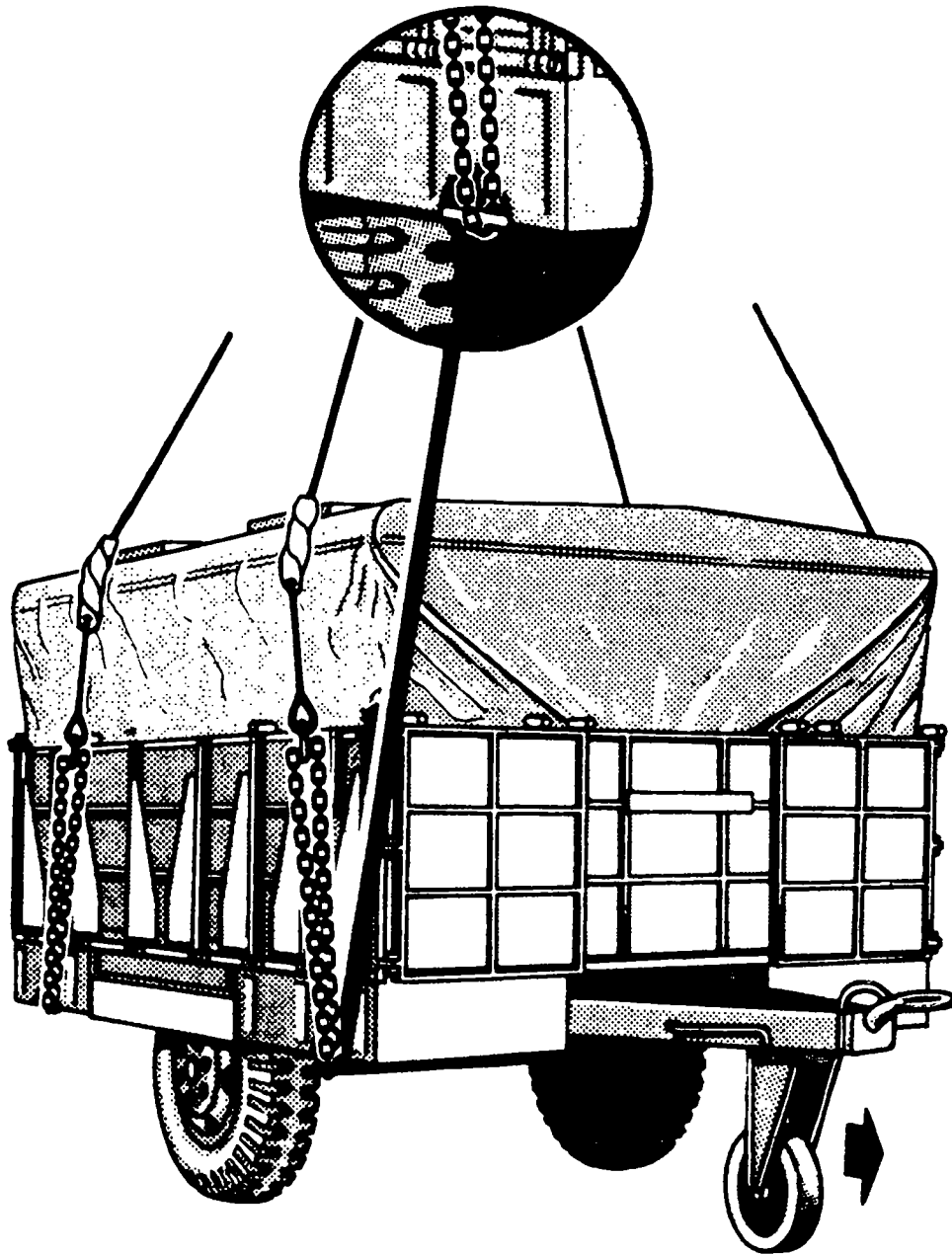
**NOTE:** Connect the apex fitting to the cargo hook so the trailer tongue is forward.

The hookup team positions themselves on the trailer roof so they are forward of the trailer axle. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

## Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## TRUCK AND TOWED COMBINATIONS

\*The certified single-point rigging procedures for truck and towed combinations are in this section. Figures 2-19 through 2-21.2 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

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### Figure 2-19. M151 1/4-Ton Truck with M416 1/4-Ton Trailer

#### APPLICABILITY

This load is certified by the US Army NRDEC for UH-60 and CH-47 helicopters at airspeeds up to and including 110 and 90 knots, respectively.

#### LOAD DESCRIPTION

- Truck, utility, 1/4-ton, M151, LIN X61244, and trailer, cargo, 1/4-ton, M416, LIN W95400. Each vehicle may be loaded with 500 pounds of cargo.
- Weight:
  - Truck, 2,380 pounds.
  - Cargo, 500 pounds.
  - Trailer, 580 pounds.
  - Cargo, 500 pounds.
  - Total, 3,960 pounds.

#### MATERIALS

- Sling set (10,000-pound capacity).
- Sling leg assembly (2,500-pound capacity) from a 10,000-pound sling set, two additional.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Rope (if cargo is carried), approximately 40 feet.
- Felt, sheet, cattle hair, Type IV, 1/2- x 60-inch.
- Clevis assembly, small MS 70087-1 (4 each).
- Cord, nylon, Type III, 550-pound breaking strength.
- Padding, cellulose.
- Assembly, tie-down (10,000-pound) (2 each).

- Tie-down, cargo, CGU-1/B (2 each) as an alternate to the load binder and tie-down assemblies.

## PERSONNEL

Two persons can prepare and rig the load in 20 minutes.

## PROCEDURES

### Step 1. Preparation

- Wrap padding around rear spring shackle mounting brackets on trailer and secure with tape.
- Secure trailer light cable with nylon cord.
- Remove tarpaulin from truck, lower windshield, and secure to hood with nylon cord. Fold tarpaulin and secure on top of windshield with nylon cord.
- Fold top bows of truck and secure seats.
- Lower side mirrors flush with truck body with glass side in and tape to side of truck.
- If truck has rear lifting shackles, wrap padding around rear bumperettes. (Remove spare tire, if necessary.)
- Attach trailer to truck by placing lunette in trailer hitch and locking hitch. Attach or tie off safety chains. Secure trailer to truck by connecting the 15-foot tie-down strap to the truck rear lifting shackle and the trailer axle. Connect the other tie-down strap to the other side of the truck and trailer. If truck does not have rear lifting shackles, attach strap to tie-down provisions on outside of rear fenders and loop around trailer axle between spring and wheel. Tighten both load binders at the same time. Safety-tie handle of load binder in closed position with cotton webbing. (Replace spare tire, if necessary.)
- If used, attach the CGU-1/B tie-down straps in the same manner.
- If cargo is carried, load and secure with rope or nylon cord.
- Remove and stow any antennas or floor coverings.
- Pad the area above the rear wheels of the truck with felt and secure with nylon cord. Use a sheet of 12- x 30-inch felt with holes cut to align with two brackets for tie-down straps used to secure the truck bows. Route nylon cord through these brackets and secure padding.
- Make sure fuel cap is secure; oil filler, radiator, and battery caps are properly installed; and hood latches are fastened tightly.
- Engage hand brake on truck and trailer and place transmission in NEUTRAL.
- Straighten front wheels of truck and secure steering wheel in place with nylon cord.
- Attach the four clevis assemblies to the wheel lifting eyes on the truck.

## Step 2. Rigging

- Add the two additional sling legs to make a six-legged sling set.
- Position apex fitting on the back seat of the truck. Route outer sling legs 1 and 2 to the front of the truck, middle sling legs 3 and 4 to the trailer, and inner sling legs 5 and 6 to the rear wheels of the truck. Sling legs 1, 3, and 5 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the clevis on the left front wheel and insert link 56 in the grabhook. Repeat with sling leg 2 on the right front wheel clevis.

**NOTE:** For variations in the amount of cargo/weight in the trailer, the front sling legs must be adjusted at link 56 when there are 500 pounds in the trailer and at link 84 when the trailer is empty. When the load is suspended, if the front of the truck is high, decrease the link number; if the trailer is high, increase the link numbers. There is no requirement to change link numbers when weight is varied in the truck.

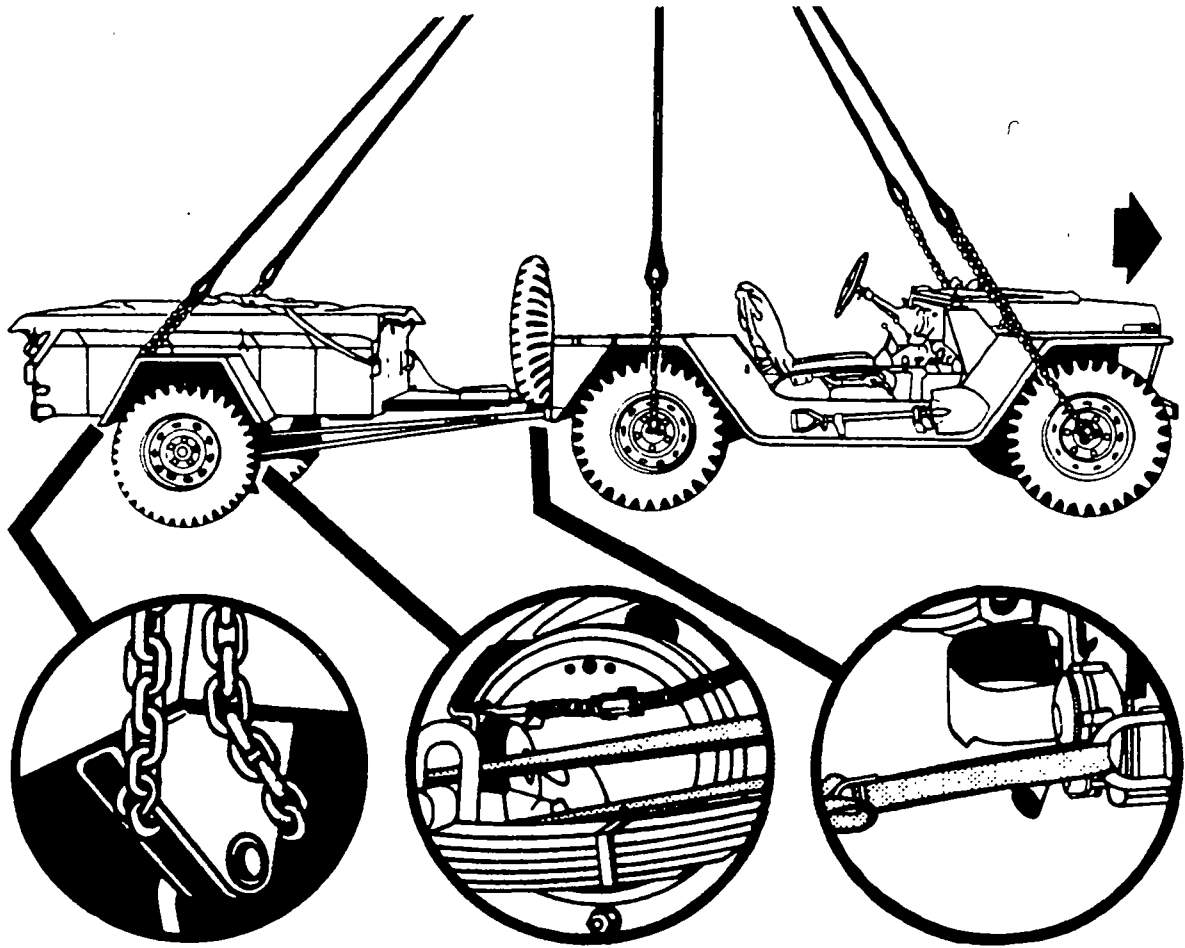
- Loop the chain end of sling leg 3 under, over, and to the rear of the left rear spring shackle bracket of the trailer and insert link 4 in the grabhook. Make sure the chain and grabhook are on the outside and to the rear of the wheel fender. Repeat this procedure for sling leg 4 on the trailer right rear spring shackle.
- Loop the chain end of sling leg 5 through the clevis on the truck left rear wheel and insert link 105 in the grabhook. Repeat this procedure with sling leg 6 on the truck right rear wheel clevis.
- Pull sling legs 3 and 4 together on top of the trailer and tie or tape grabhooks together with cotton webbing or tape.
- Pull sling legs 5 and 6 together on top of the back seat and tie or tape grabhooks together with cotton webbing or tape. Use cotton webbing to tie sling legs 5 and 6 at the padded area above the rear wheels.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together above the truck and trailer to prevent entanglement during hookup and lift-off.

## Step 3. Hookup

The hookup team stands on the back seat. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the truck and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

## Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-20. M151 1/4-Ton Truck with Radio, TTW Set, AN/VSC-2**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for UH-60 and CH-47 helicopters at airspeeds up to and including 100 knots.

### **LOAD DESCRIPTION**

- Truck, utility, 1/4-ton, M151, with radio, TTW set, AN/VSC-2, LIN X60833.

### **LOAD DESCRIPTION**

- Trailer, 1/4-ton, M416, with two 3kw generators, LIN Q91301.

### **MATERIALS**

- Same as M151 1/4-ton truck with M416 1/4-ton trailer (Figure 2-20) except for webbing.
- Webbing, nylon, 1/2-inch tubular, 1,000-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig the load in 20 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Same as M151 1/4-ton truck with M416 1/4-ton trailer (Figure 2-20).
- Secure radio and TTW to frames with 1/2-inch tubular nylon webbing.
- Secure generators in trailers with 1/2-inch tubular nylon webbing. Stow and secure any extra equipment in trailer as applicable. Secure trailer tarp over trailer.

#### **Step 2. Rigging**

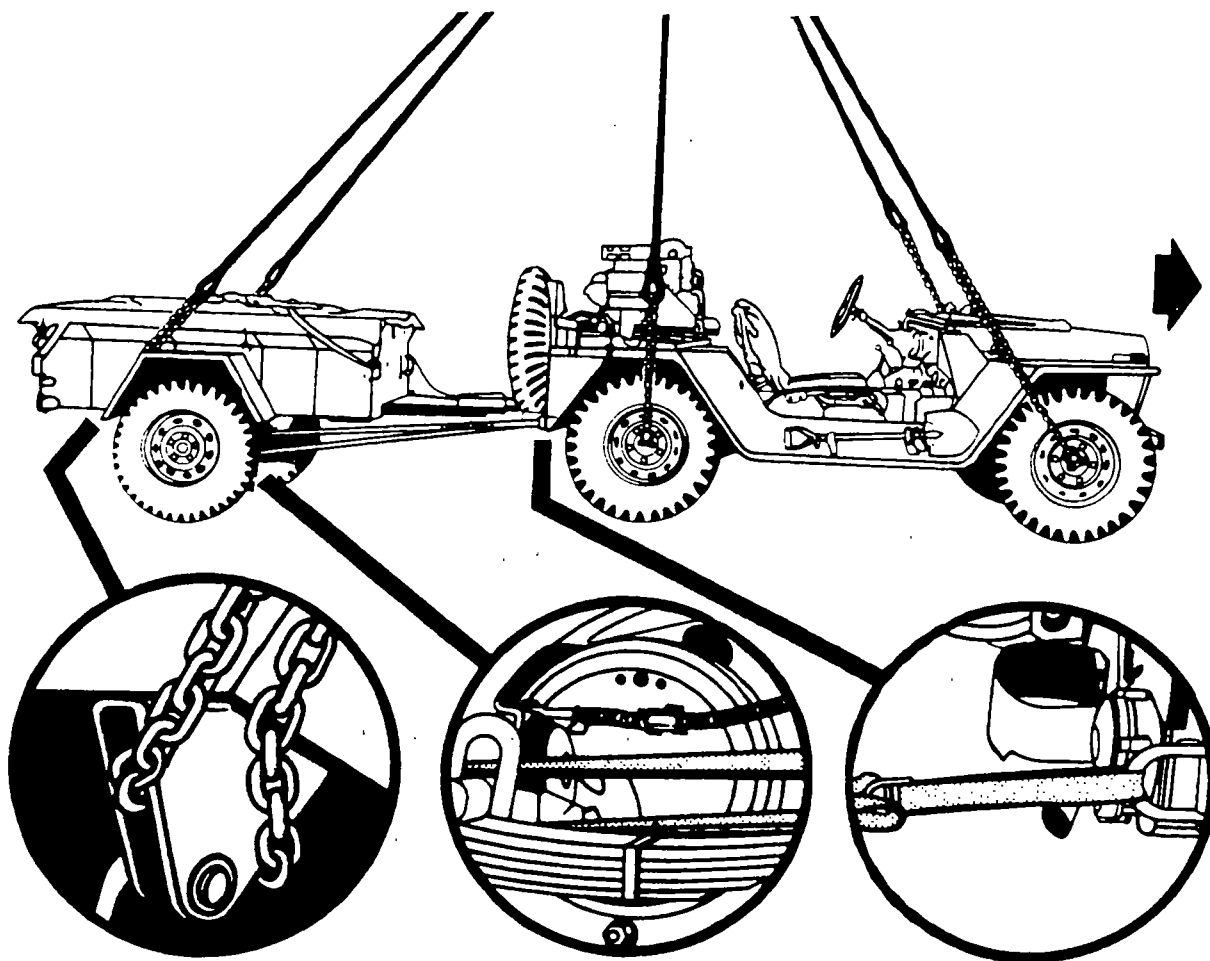
Same as M151 1/4-ton truck with M416 1/4-ton trailer (Figure 2-20).

#### **Step 3. Hookup**

Same as M151 1/4-ton truck with M416 1/4-ton trailer (Figure 2-20).

#### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-21. M151 1/4-Ton Truck with M101A1 3/4-Ton Trailer**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for UH-60 helicopters at maximum airspeeds up to 100 knots.

### **LOAD DESCRIPTION**

- Truck, utility, 1/4-ton, M151, LIN X61244, and trailer, cargo, 3/4-ton, M101A1, LIN W95537.
- Weight:
  - Truck, 2,380 pounds.
  - Cargo, 500 pounds.
  - Trailer, 1,350 pounds.
  - Cargo, 1,500 pounds.
  - Total, 5,730 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity) with two additional sling leg assemblies (2,500-pound capacity) from a 10,000-pound capacity sling set.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Padding, cellulose.
- Tie-down, cargo, CGU-1/B, 5,000-pound capacity (2 each).
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Rope (if cargo is carried in vehicle), approximately 40 feet.
- Felt, sheet, cattle hair, Type IV, 1/2- x 24- x 60-inch.
- Clevis assembly, small, MS 70087-1 (4 each).

### **PERSONNEL**

Two persons can prepare and rig the load in 20 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Open trailer tailgate approximately 45 degrees, insert safety chains in tailgate closing brackets, and secure safety chain in bracket with nylon cord.



- Secure trailer light cable with nylon cord or tape.
- Remove tarpaulin from truck, lower windshield, and secure to hood with nylon cord. Fold tarpaulin and secure on top of windshield with nylon cord.
- Fold top bows of truck and secure seats.
- Lower side mirrors flush with truck body with glass side in and tape to side of truck.
- If truck has rear lifting shackles, wrap padding around rear bumperettes. Remove spare tire, if necessary.
- Attach trailer to truck by placing lunette in trailer hitch and locking hitch. Attach or tie off safety chains. Secure trailer to truck by connecting the CGU-1/B tie-down strap to truck rear lifting shackle or tie-down provision on outside of rear fender and to the lifting shackle on the front of the trailer. Connect the other strap to the other side of the truck and trailer. Tighten both ratchets at the same time. Tape handle of ratchets in closed position. Replace spare tire, if necessary.
- If cargo is carried, load and secure with rope or nylon cord.
- Remove and stow any antennas or floor coverings.
- Pad the area above the rear wheels of the truck with felt and secure with nylon cord. Use a sheet of 12- x 30-inch felt with holes cut to align with the two brackets for the tie-down straps used to secure the truck bows. Route nylon cord through these brackets and leave a 24-inch running end on the cord at the forward bracket.
- Make sure fuel cap is secure; oil filler, radiator, and battery caps are properly installed; and hood latches are fastened tightly.
- Engage hand brake on truck and trailer and place transmission in NEUTRAL.
- Straighten truck front wheels and secure steering wheel in place with nylon cord.
- Attach one clevis assembly to each lifting eye on all four wheels.

## Step 2. Rigging

- Make a six-legged sling set.
- Place the apex fitting on the back seat of the truck. Route the outer sling legs 1 and 2 to the front wheels of the truck. Route the middle sling legs 3 and 4 to the rear of the trailer. Route the inner sling legs 5 and 6 to the rear wheels of the truck. Sling legs 1, 3, and 5 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the clevis on the left front wheel and insert link 3 in the grabhook. Repeat this procedure for sling leg 2 on the right front wheel clevis.
- Route the chain end of sling leg 3 through the opening between the tailgate and the trailer bed, through the rear lifting shackle of the trailer, and back up through the tailgate hinge opening. Insert link 28 in the grabhook. Repeat with sling leg 4 on the right side of the trailer. For variations of weight, the lengths of sling legs 1, 2, 3, and 4 may have to be changed accordingly. If the front of the truck is too high, decrease the link number of sling legs 1 and 2 and increase the link number of sling legs 3 and 4. Do the opposite when the front of the truck is too low.

**NOTE:** If the trailer is empty, the link numbers change to 3 on the trailer and 42 on the front of the truck.

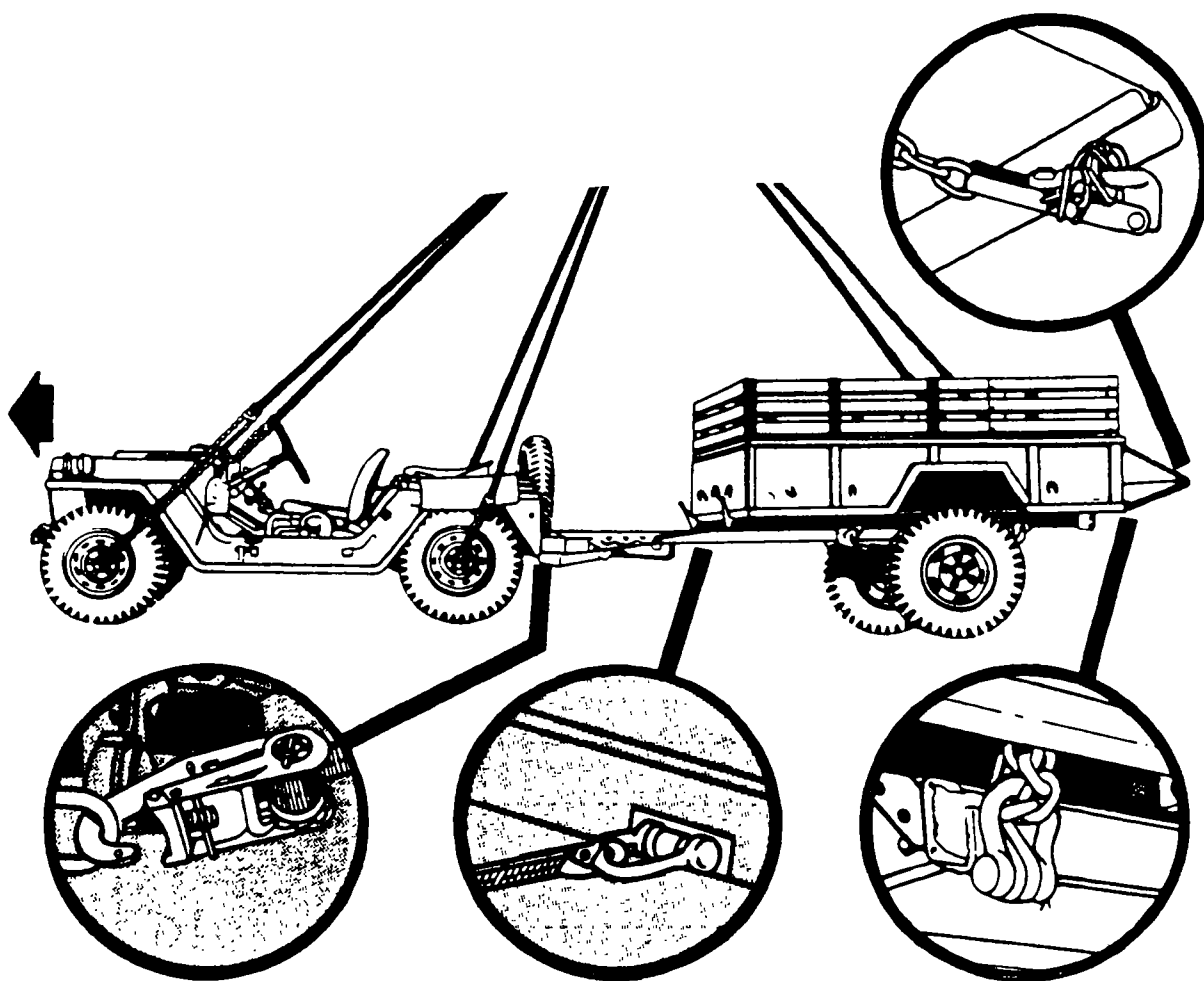
- Loop the chain end of sling leg 5 through the clevis on the left rear wheel and insert link 105 in the grabhook. Repeat with sling leg 6 on the right rear wheel clevis.
- Secure excess chain with tape or nylon cord.
- Pull sling legs 3 and 4 together on top of the trailer and tie (breakaway technique) the grabhooks to the trailer front. Pull sling legs 1 and 2 together on the engine hood and tie (breakaway technique) the grabhooks to the windshield bracket.
- Tape sling legs 1 and 2 to the top of the steering wheel. Pull sling legs 5 and 6 together on top of the back seat and tie (breakaway technique) the grabhooks together. Also, tie sling legs 5 and 6 to the side of the truck at the padded area.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the load to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

The hookup team stands in the back of the truck. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the truck and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## \*Figure 2-21.1. M973/M973E1/XM1065/XM1066 Small Unit Support Vehicle (SUSV)

### APPLICABILITY

The following vehicles are certified by the US Army NRDEC for the CH-47 helicopter using a 40-foot pendant and with the CH-53E helicopter at the weights and airspeeds denoted below.

### LOAD DESCRIPTION

- Small unit support vehicle (SUSV):
  - M973, cargo, tracked, NSN 2350-01-132-9099.
  - M973E1, cargo, tracked, NSN 2350-01-281-6451.
  - XM1065, command post, tracked, NSN 2350-01-281-8324.
  - XM1066, ambulance, tracked, NSN 2350-02-281-6215.

- Weight:

	Front car (pounds)	Rear car (pounds)	Total (pounds)
– Minimum weight	5,670	3,650	9,320
– Maximum weight	6,380	6,600	12,980

- Airspeed:

	CH-47 25K sling set (knots)	CH-53E 15K slingset (knots)	CH-53E 40K sling set (knots)
– Minimum weight	100	100	80
– Maximum weight	80	80	80

**NOTE:** During flight testing at speeds above 100 knots, the windshield has been damaged.

### MATERIALS

For the CH-47 helicopter:

- Sling set (25,000-pound capacity) (2 sets per vehicle).
- Additional chain legs, 8-foot length (6,250-pound capacity), NSN 4010-01-058-4771 (8 chains per vehicle).
- Coupling link, NSN 4010-01-041-9751 (8 links per vehicle).

For 40-foot pendant:

- Aerial delivery sling, type XXVI nylon, 4 loop, 20-foot length, NSN 1670-01-064-4453 (2 each).
- Apex fitting, 25,000-pound capacity, NSN 4030-01-048-4044 (2 each).

For the CH-53E helicopter:

- Multileg sling sets (15,000-pound capacity) or sling sets (40,000-pound capacity) (2 sets per vehicle).
- Additional chain legs, 8-foot length (10,000-pound capacity), PN JETS-WMC-5000, with coupling links, PN 577-0815 (8 chains and coupling links per vehicle; only needed when using 40,000-pound capacity sling set).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Cord, nylon, Type III, 550-pound breaking strength.
- Tie-down strap, cargo, CGU-1/B, as required.

## PERSONNEL

Two persons can prepare and rig this load in 30 minutes.

## PROCEDURES

### Step 1. Preparation

- Secure all internal cargo and loose items with nylon rope or tie-down straps.
- Remove the bumper from the vehicle steering gear assembly (articulated joint) by removing two 15-mm (9/16-inch) bolts. (See items 87 and 88, figure 135, group 1405, TM 9-2320-285-24P.) Store the bumper and bolts securely in the front car.
- Lock the articulated steering unit with the steering cylinder locks.
- Secure all doors, windows, and roof hatches in the closed position.
- Tape all lights and glass fixtures including the windshield.
- Fold side mirrors inboard and tie or tape as required.
- Tape windshield wipers to windshield.
- Secure all hoses and cables located between the two cars with tape or nylon cord to avoid entanglement with sling legs.
- Screw the lifting eyes in as far as possible while ensuring that they are pointing towards the middle of each car. Tie diagonally opposing rings of each car together (for example, the front right ring to the left rear ring) with nylon cord.
- Place mud flap in up position and tape in place.

## **Step 2. Rigging**

- Assemble the two sling sets as shown. Note the sling numbering sequence.
- Route the outer sling legs (1 and 2) to the front of the front provisions of the front car. Route the inner sling legs (3 and 4) to the top apex fitting under the roof rack and to the rear car. Sling legs 1 and 3 must be on the left side of the load.
- Route sling legs 5 and 6 of the lower apex fitting to the rear provisions of the front car. Route sling legs 7 and 8 to the front provisions of the rear car. Sling legs 5 and 7 should be to the left of the load.
- Loop the chain end of sling leg 1 through the left front lift provision of the front car. If using the 25,000-pound capacity or 40,000-pound capacity sling set, attach an additional chain leg utilizing the connector link. The chain leg must be looped through the lifting provision prior to attaching the additional chain. Insert in the grabhook the appropriate link identified in the chart below. Repeat with sling leg 2 and the right front lift provision of the front car.
- Loop the chain end of sling leg 5 through the left rear lift provision of the front car. If using the 25,000-pound capacity or 40,000-pound capacity sling sets, attach an additional chain leg utilizing the connector link. The chain leg must be looped through the lifting provision prior to attaching the additional chain. Insert in the grabhook the appropriate link identified in the chart below. Repeat with sling leg 6 and the right rear lift provision of the front car.
- Loop the chain end of sling leg 7 through the left front lift provision of the rear car. If using the 25,000-pound capacity or 40,000-pound capacity sling sets, attach an additional chain leg utilizing the connector link. The chain leg must be looped through the lifting provision prior to attaching the additional chain. Insert in the grabhook the appropriate link identified in the chart below. Repeat with sling leg 8 and the right front lift provision of the rear car.
- Loop the chain end of sling leg 3 through the left rear lift provision of the rear car. If using the 25,000-pound capacity or 40,000-pound capacity sling sets, attach an additional chain leg utilizing the connector link. The chain leg must be looped through the lifting provision prior to attaching the additional chain. Insert in the grabhook the appropriate link identified in the chart below. Repeat with sling leg 4 and the right rear lift provision of the rear car. Make sure that sling legs 3 and 4 are routed under the roof rack.

### **LINK COUNT CHART:**

<b>LINK NUMBER</b>	
25,000-pound capacity sling set	67
15,000-pound capacity sling set	23
40,000-pound capacity sling set	51

- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the vehicle to prevent entanglement during hookup and lift-off.

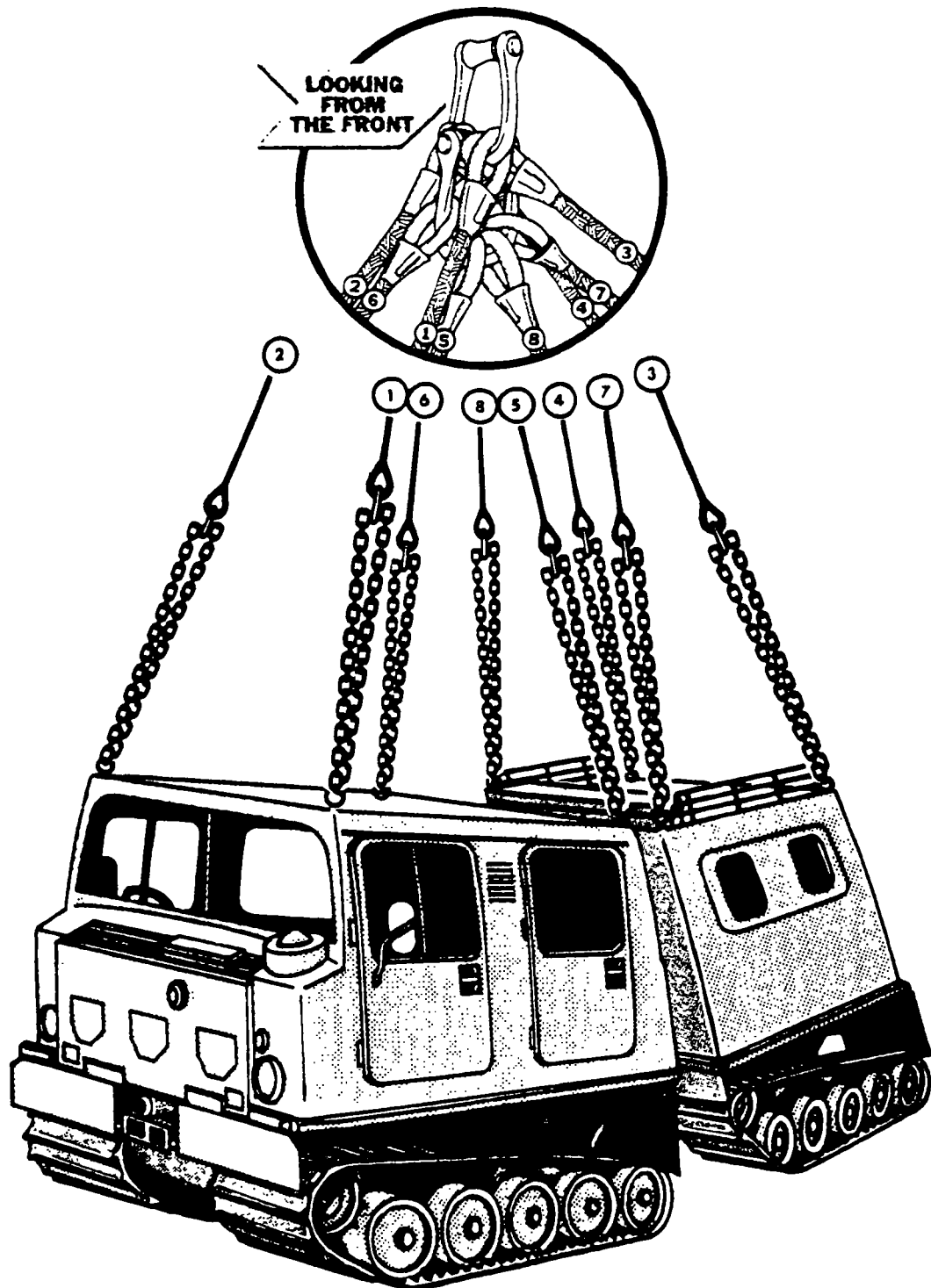
- When using the CH-47 helicopter:
  - Assemble a 40-foot pendant by utilizing two aerial delivery slings and two 25,000-pound capacity apex fittings.
  - Attach the end of the 40-foot pendant (the end without an apex fitting) to the top apex fitting of the sling set by removing the bolt of the top apex fitting, inserting the looped end of the aerial delivery sling, and replacing the bolt.

### **Step 3. Hookup**

- When using the CH-47 helicopter –
  - The helicopter lands near the vehicle. The hookup team climbs under the helicopter. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then moves clear of the helicopter but remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.
- When using the CH-53E helicopter –
  - The hookup team stands on the rear car. Make sure the front end of the vehicle is facing the direction of flight. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the vehicle and remains close to the vehicle as the helicopter removes slack in the sling legs. When successful hookup is assured, the hookup team then quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## \*Figure 2-21.2. XM1067 Flatbed Small Unit Support Vehicle

### APPLICABILITY

This load is certified by the US Army NRDEC in the single-point configuration with a 40-foot pendant. Certification is for the CH-47 helicopter at airspeeds up to and including 100 knots at empty weight and 70 knots at maximum weight.

### LOAD DESCRIPTION

- Small unit support vehicle, XM1067, flatbed, tracked, NSN 2350-01-281-6450.
- Weight:

	Front car (pounds)	Rear car (pounds)	Total (pounds)
– Minimum weight	6,200	3,400	9,600
– Maximum weight	6,600	7,150	13,750

### MATERIALS

- Sling set (25,000-pound capacity) (2 each).
- Additional chain legs, 8-foot length (6,250-pound capacity), NSN 4010-01-058-4771 (12 each).
- Tape, adhesive,,pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tie-down strap, cargo, CGU-1/B, as required.
- For 40-foot pendant:
  - Aerial delivery sling, Type XXVI nylon, 4 loop, 20-foot length, NSN 1670-01-064-4453 (2 each).
  - Apex fitting, 25,000-pound capacity, NSN 4030-01-048-4044 (2 each).

### PERSONNEL

Two persons can prepare and rig this load in 30 minutes.

### PROCEDURES

#### Step 1. Preparation

- Remove the bumper from the vehicle steering gear assembly (articulated joint) by removing two 15-mm (9/16-inch) bolts. (See items 87 and 88, figure 135, group 1405, TM 9-2350-285-24P.) Store the bumper and bolts securely in the front car.

- Lock the articulated steering unit with the steering cylinder locks.
- Secure all internal cargo and loose items with nylon rope or tie-down straps.
- Cargo in the rear car must be loaded such that it will not contact the sling legs and that it is not higher than the sides of the rear car.
- Secure all doors, windows, and roof hatches in the closed position.
- Tape all lights and glass fixtures including the windshield.
- Fold side mirrors inboard and tie or tape as required.
- Tape windshield wipers to windshield.
- Secure all hoses and cables located between the two cars with tape or nylon cord to avoid entanglement with sling legs.
- Screw the lifting provisions in as far as possible while ensuring that they are pointing towards the middle of each car. Tie diagonally opposing lifting provisions of each car together (for example, the front right lifting provision to the right rear lifting provision) with nylon cord.
- Place mud flap in the up position and tape in place.

#### **Step 2. Rigging**

- Assemble a 40-foot pendant by utilizing two aerial delivery slings and two 25,000-pound capacity apex fittings.
- Assemble the two sling sets as shown. Note the sling numbering sequence.
- Route outer sling legs (1 and 2) to the top apex fitting to the front provision of the front car. Route the inner sling legs (3 and 4) of the top apex fitting to the rear provisions of the rear car. Sling legs 1 and 3 must be on the left side of the load.
- Route sling legs 5 and 6 of the lower apex fitting to the rear provisions of the front car. Route the sling legs 7 and 8 to the front provision of the rear car. Sling legs 5 and 7 should be to the left of the load.
- Loop the chain end of sling leg 1 through the left front lift provision of the front car. Attach an additional chain leg utilizing the connector link. The chain leg must be looped through the lifting provision prior to attaching the additional chain. Insert link 67 in the grabhook. Repeat with sling leg 2 and the right front lift provision of the front car.
- Loop the chain end of sling leg 5 through the left rear lift provision of the front car. Attach an additional chain leg utilizing the connector link. The chain leg must be looped through the lift provision prior to attaching the additional chain. Insert link 67 in the grabhook. Repeat with sling leg 6 and the right rear lift provision of the front car.
- Loop the chain end of sling leg 7 through the left front lift provision of the rear car. Attach two additional chain legs utilizing connector links. The chain leg must be looped through the lift provision prior to attaching the additional chains. Insert link 64 in the grabhook. Repeat with sling leg 8 and the right front lift provision of the rear car.

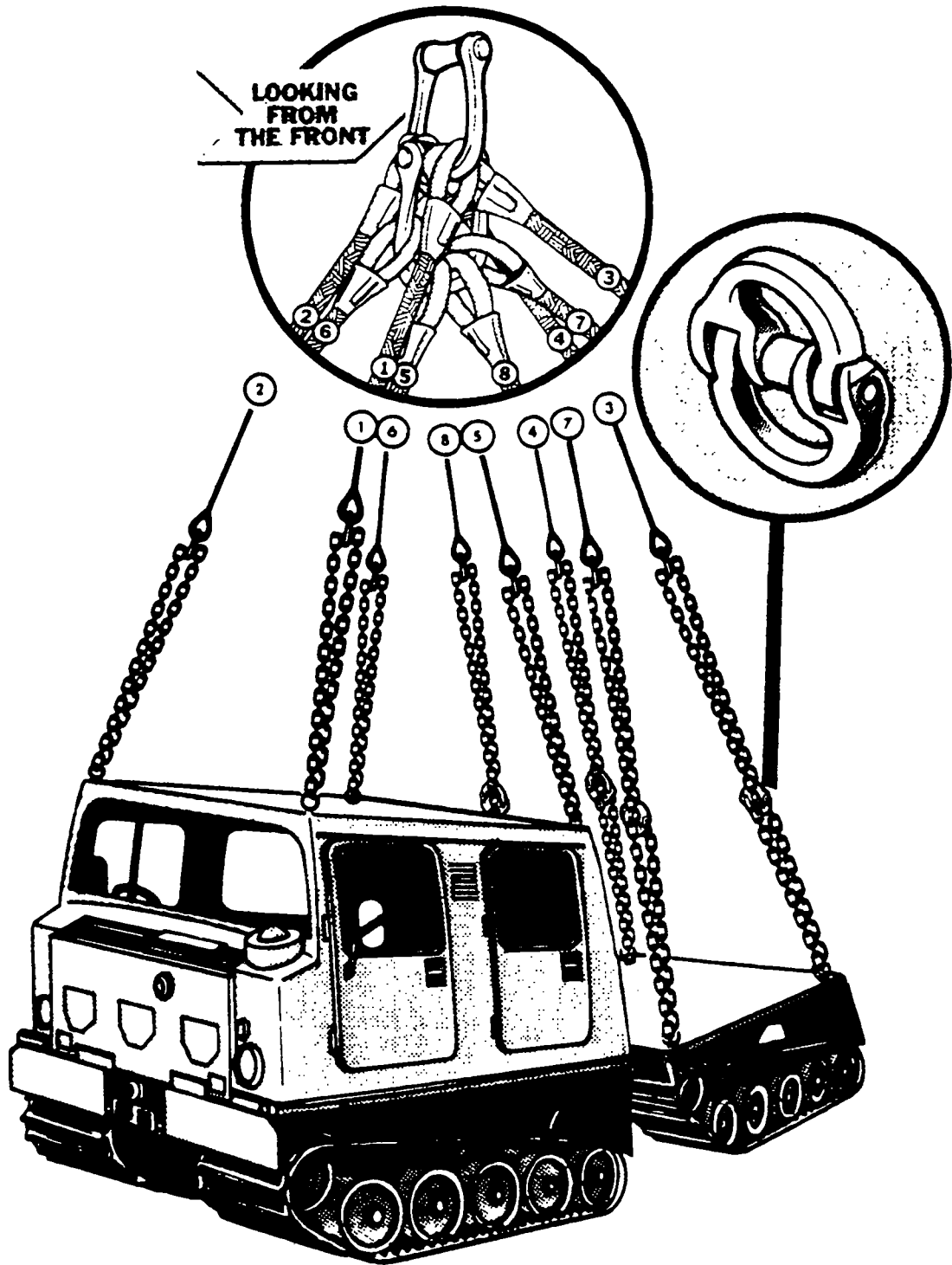
- Loop the chain end of sling leg 3 through the left rear lift provision of the rear car. Attach two additional chain legs utilizing connector links. The chain leg must be looped through the lift provision prior to attaching the additional chains. Insert link 64 in the grabhook. Repeat with sling leg 4 and the right rear lift provision of the rear car.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together with cotton webbing or tape to prevent entanglement during hookup and lift-off.
- Secure the chain legs 7 and 8 to the outside supports of the spare fuel can racks using webbing to preclude damage to the racks during lift-off.
- Attach the end of the 40-foot pendant (the end without an apex fitting) to the top apex fitting of the sling set by removing the bolt of the top apex fitting, inserting the looped end of the aerial delivery sling, and replacing the bolt.

### **Step 3. Hookup**

The helicopter lands near the vehicle. The hookup team climbs under the helicopter. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then gets out from underneath the helicopter and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## HOWITZERS AND WEAPONS SYSTEMS

\*The certified single-point rigging procedures for howitzers and weapons systems are in this section. Figures 2-22 through 2-35.1 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

### Figure 2-22. M101A1 105-mm Howitzer, with or without A-22 Cargo Bags

#### APPLICABILITY

This load is certified by the US Army NRDEC for helicopters and configurations as indicated in the load description.

#### LOAD DESCRIPTION

LOAD	WEIGHT (pounds)	TYPE HELICOPTER	AIRSPEED (knots)
M101A1 Howitzer	4,980	UH-60	95
M101A Howitzer with 1 A-22 cargo bag	7,180	UH-60	75
M101A1 Howitzer	4,980	CH-47	100
M101A Howitzer with 1 A-22 cargo bag	7,180	CH-47	90
M101A Howitzer with 2 A-22 cargo bags	9,380	CH-47	80
M101A Howitzer with 3 A-22 cargo bags	11,580	CH-47	75
M101A1 Howitzer	4,980	CH-54	115
M101A Howitzer with 1 A-22 cargo bag	7,180	CH-54	110
M101A Howitzer with 2 A-22 cargo bags	9,380	CH-54	105
M101A Howitzer with 3 A-22 cargo bags	11,580	CH-54	95
M101A1 Howitzer	4,980	CH-53	100

## MATERIALS

- Howitzer.
  - Sling set (10,000- or 25,000-pound capacity) (UH-60, CH-47, or CH-54 only).
  - Sling set (15,000- or 40,000-pound capacity) (CH-53 only).
- Howitzer with or without one A-22 cargo bag:
  - Sling set (10,000- or 25,000-pound capacity) (UH-60, CH-47, or CH-54 only).
- Howitzer with or without two or three A-22 cargo bags:
  - Sling set (25,000-pound capacity) (CH-47 or CH-54 only).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Padding, felt or suitable substitute.
- Tie-down strap, cargo, CGU-1/B, as required.
- Bag, cargo, A-22 (2,200-pound capacity), as required.
- Sling leg assembly (2,500-pound capacity), from a 10,000-pound sling set, one per A-22 cargo bag.
- Fitting, apex (10,000-pound capacity), one per accompanying load.

## PERSONNEL

Two persons can prepare and rig this load in 20 minutes.

## PROCEDURES

### Step 1. Preparation

- Close and lock the breech.
- Ensure that the trails are properly closed and secured. The lunette should be rotated downward. Secure the trail closing lock handle with nylon cord or tape.
- Ensure that the muzzle, breech, and tube covers are removed or secured.
- Ensure that all sight mounts are removed or padded.
- Secure any extra equipment in place. Place the gun section equipment chest on the trails and secure with tie-down straps.
- Engage only one hand brake so the howitzer will not rotate over on the muzzle on touchdown.
- Tape or tie padding to the gun tube above the cradle and around the forward edge of the recoil damper assembly.
- Tape or tie padding around the left and right trails aft of the traveling lock shaft area.

## Step 2. Rigging

- Position apex fitting on top of the breech. To prevent stress on the sling legs at the apex fitting, route outer sling legs 1 and 2 to the trails and inner sling legs 3 and 4 to the muzzle. Sling legs 1 and 3 must be on the same side of the load.
- Use the following procedures when rigging with the 15,000- or 40,000-pound sling set:
  - Wrap the chain end of sling leg 1 around the padded area on the left trail and insert link 3 in the grab link. Repeat with sling leg 2 on the right trail.
  - Position the grab link of sling leg 3 on the left side of the gun tube padded area. Wrap the chain end one complete turn around the tube and back up to the grab link. Insert link 33 (15,000-pound sling set) or link 22 (40,000-pound sling set) in the grab link. Repeat with sling leg 4 with the grab link on the right side of the gun tube. The chains should completely encircle, and not just cradle, the gun tube.
- Use the following procedures when rigging with the 10,000- or 25,000-pound sling set:
  - Wrap the chain end of sling leg 1 two complete turns around the padded area of the left trail and insert link 30 (10,000-pound sling set) or link 12 (25,000-pound sling set) in the grabhook. Repeat with sling leg 2 on the right trail.
  - Position the grabhook of sling leg 3 on the left side of the gun tube padded area. Wrap the chain end of sling leg 3 one complete turn around the gun tube padded area and insert link 30 (10,000-pound sling set) or link 12 (25,000-pound sling set) in the grabhook. Repeat with sling leg 4 with the grabhook on the opposite side of the gun tube. The chains should completely encircle and not just cradle the gun tube.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the howitzer to prevent entanglement during hookup and lift-off.
- Use the following procedures if accompanying A-22 cargo bags are to be transported:
  - Rig the A-22 cargo bags according to instructions in Chapter 1.
  - Place the additional apex fitting around the inner chains of sling legs 1 and 2 so that the apex fitting is between the gun trails.
  - Route the chain end of the additional sling leg assembly through the A-22 cargo bag clevis and insert link 3 in the grabhook.
  - Place the other end of the sling leg in the additional apex fitting that is between the trails.
  - Repeat previous two steps for each A-22 cargo bag.

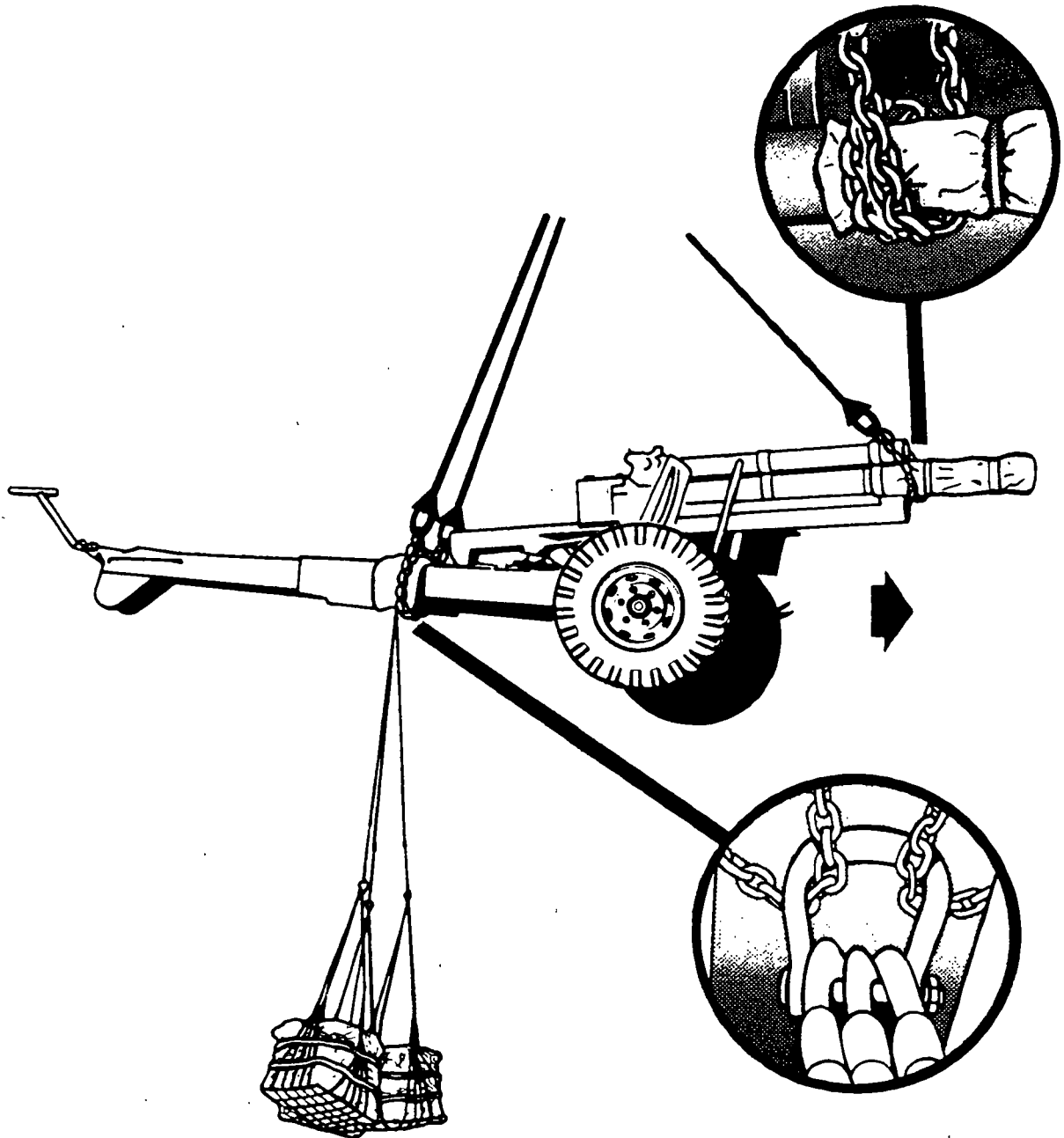
## Step 3. Hookup

The hookup team stands alongside the howitzer or on top of the trails. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the howitzer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.



#### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## Figure 2-23. M102 105-mm Howitzer

### APPLICABILITY

This load is certified by the US Army NRDEC for the UH-60 and CH-47 helicopters at airspeeds up to and including 110 and 80 knots, respectively.

### LOAD DESCRIPTION

- Howitzer, towed, light, 105-mm, M102, LIN K57392.
- Weight: 3,160 pounds.
- Weight with section equipment: 3,330 pounds.

### MATERIALS

- All sling sets:
  - Cord, nylon, Type III, 550-pound breaking strength.
  - Tape, adhesive, pressure-sensitive, 2-inch wide roll.
  - Tie-down, strap, cargo, CGU-1/B.
- Sling set (10,000-pound capacity).
- Aerial delivery slings:
  - Assembly, link, Type IV.
  - Sling, 3-loop, Type X nylon or 2-loop, Type XXVI nylon, 3-foot long.
  - Sling, 3-loop, Type X nylon or 2-loop, Type XXVI nylon, 11-foot long.
  - Sling, 3-loop, Type X nylon or 2-loop, Type XXVI nylon, 12-foot long (2 each).

### PERSONNEL

Two persons can prepare and rig the load in 10 minutes.

### PROCEDURES

#### Step 1. Preparation

- Place muzzle and sight covers on howitzer and secure with nylon cord.
- Place section equipment chest on end of trails and secure with tie-down strap.

#### Step 2. Rigging

- Sling set (10,000-pound capacity):
  - Place the apex fitting on top of the breech and route outer sling legs 1 and 2 to the trails and inner sling legs 3 and 4 to the muzzle. Sling legs 1 and 3 should be on the left side of the howitzer.

- Remove the pin from the lift provision on the left trail, lay the chain end of sling leg 1 in the lift provision, insert link 3 in the grabhook, pull the sling leg to center the chain in the lift provision, and reinstall the pin in the lift provision. Repeat with sling leg 2 on the right trail.
- Remove the pin from the lift provision on the barrel, lay the chain end of sling legs 3 and 4 in the provision, insert link 55 of each chain in its own grabhook, pull the sling leg to center the chain in the lift provision, and reinstall the pin in the lift provision.

**NOTE:** This item may be rigged with only three legs by eliminating one of the sling legs to the tube.

- Secure excess chain with tape or nylon cord.
  - Cluster and tie or tape (breakaway technique) all sling legs together on top of the howitzer to prevent entanglement during hookup and lift-off.
- Aerial delivery slings:
    - Sling leg 1. Attach one 12-foot sling to the left trail lift provision.
    - Sling leg 2. Attach one 12-foot sling to the right trail lift provision.
    - Sling leg 3. Attach the 11-foot sling to the lift provision on the howitzer barrel.
    - When attaching the legs to the 3-foot sling at the top, twist legs to give one twist for each 3-foot sling length. Pass one end of the 3-foot sling through the upper ends of sling leg 1, 3, then 2. Connect the two ends of the 3-foot sling together with a Type IV link assembly to form the upper ring (donut).
    - Tape or tie (breakaway technique) sling leg 3 to the top of the barrel. Cluster and tie or tape (breakaway technique) all sling legs together at the rear of the breech to prevent entanglement during hookup and lift-off.

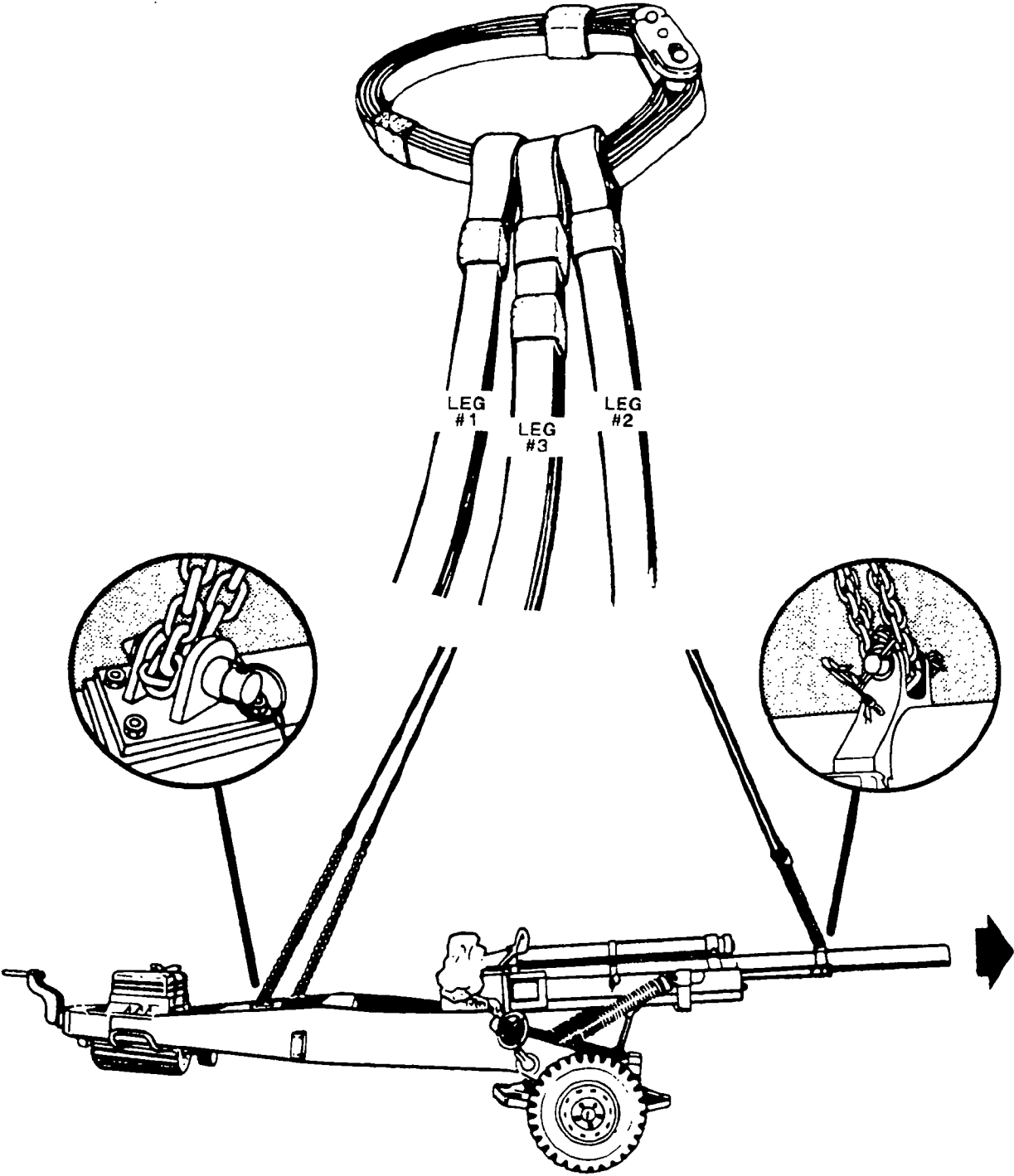
**NOTE:** When the hookup team places the 3-foot sling in the helicopter cargo hook, they must make certain that the link assembly does not contact the cargo hook.

### **Step 3. Hookup**

The hookup team stands on the trails next to the breech. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trails and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-24. M102 105-mm Howitzer with One A-22 Cargo Bag**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for the UH-60 and CH-47 helicopters at airspeeds up to and including 90 knots.

### **LOAD DESCRIPTION**

- Howitzer, towed, light, 105-mm, M102, LIN K57392.
- Bag, cargo aerial delivery, Type A-22 (2,200-pound capacity).
- Weight:
  - Howitzer, 3,160 pounds.
  - \*Accompanying load, 2,200 pounds.
  - Total, 5,360 pounds.

\*More than one A-22 bag may be used with these rigging procedures as long as the total weight of the accompanying load does not exceed 2,500 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity) (1 each).
- Clevis assembly, large, MS 70087-3.
- Load binder, assembly.
- Assembly, tie-down (10,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.

### **PERSONNEL**

Two persons can prepare and rig the load in 30 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Rig A-22 bags according to instructions in Chapter 1.
- Secure all covers on howitzer with nylon cord.
- Place section equipment chest on end of trails and secure with tie-down strap and binder.
- Place large clevis assembly on ground between the howitzer trails.

## **Step 2. Rigging**

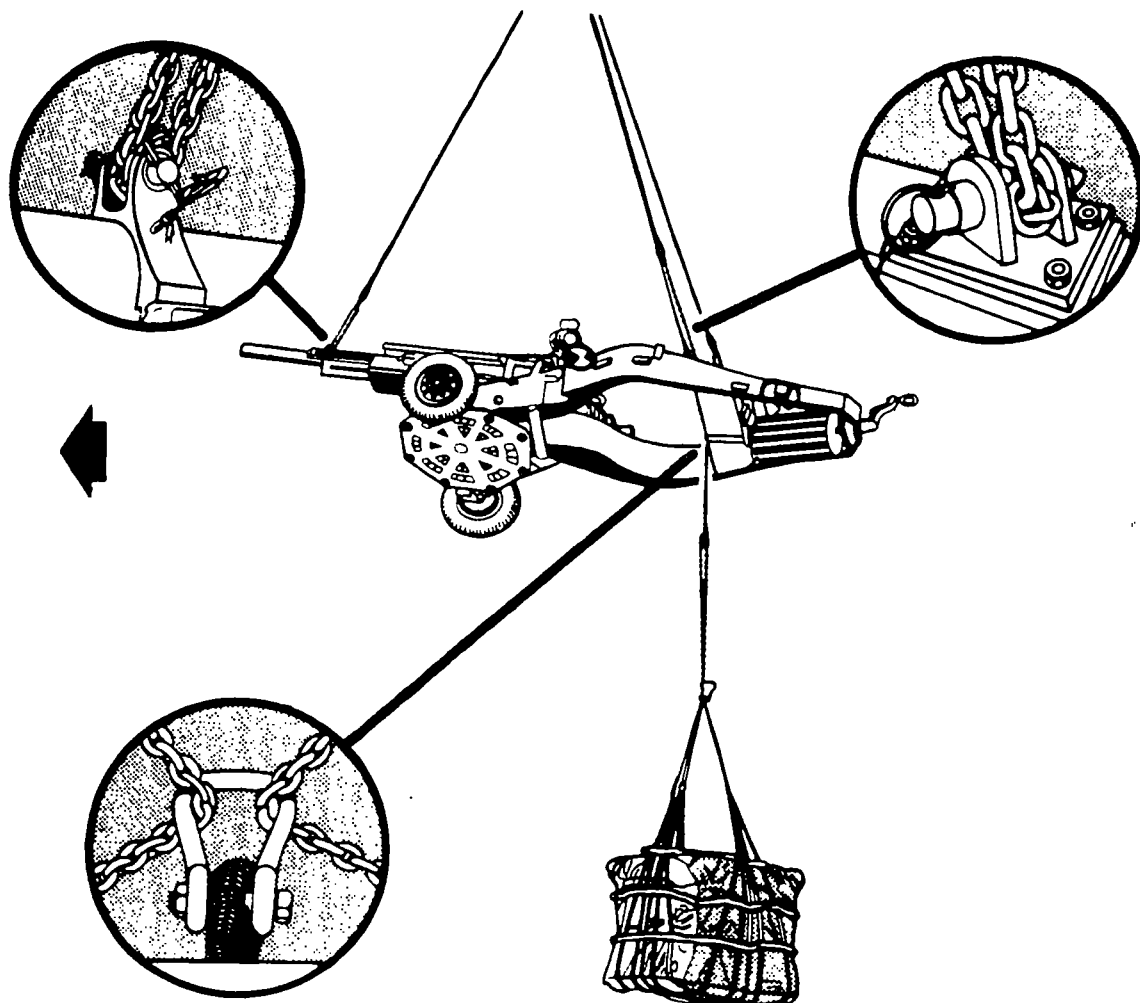
- Remove one sling leg assembly from the sling set apex fitting. The sling leg will be used to lift the A-22 cargo bag.
- Place apex fitting on top of the breech. Route outer sling leg 1 to the left trail, middle sling leg 3 to the muzzle, and outer sling leg 2 to the right trail.
- Remove the pin from the lift provision on the left trail, lay the chain end of sling leg 1 in the lift provision, insert link 3 in the grabhook, pull the sling leg up to center the chain in the lift provision, and reinstall the pin in the lift provision. Repeat with sling leg 2 on the right trail lift provision.
- Remove the pin from the lift provision on the barrel, lay the chain end of sling leg 3 in the provision, insert link 105 in the grabhook, pull the sling leg up to center the chain in the lift provision, and reinstall the pin in the lift provision. Secure excess chain with tape or nylon cord.
- Remove the pin from the large clevis between trails, place the top eye of the separate sling leg in the clevis and replace pin. The eye of the sling leg must be around pin, not around the bell portion of clevis.
- Route the other end of the sling leg under one trail and to the A-22 cargo bag. Loop chain end of the sling leg through either the A-22 cargo bag medium clevis or all four suspension strap D-rings and insert link 3 in the grabhook.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the howitzer to prevent entanglement during hookup and lift-off.

## **Step 3. Hookup**

The hookup team stands on the trails next to the breech. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trails and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

## **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-25. M102 105-mm Howitzer with Two or Three A-22 Cargo Bags**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for the CH-47 helicopters at airspeeds up to and including 80 knots.

### **LOAD DESCRIPTION**

- Howitzer, towed, light, 105-mm, M102, LIN K57392.
- Bag, cargo, aerial delivery, Type A-22, 2,200-pound capacity (2 or 3 each).
- Weight:
  - Howitzer, 3,160 pounds.
  - A-22 bags (2 each), 4,400 pounds.
  - Total, 7,560 pounds.
  - A-22 bags (3 each), 6,600 pounds.
  - Total, 9,760 pounds.

### **MATERIALS**

- Sling set (25,000-pound capacity).
- Sling leg assembly (2,500-pound capacity) from a 10,000-pound sling set, one for each A-22 cargo bag.
- A-22 cargo bags, as required.
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Clevis assembly, large, MS 70087-3, as necessary.
- Tie-down strap, cargo, CGU-1/B.
- Fitting apex (10,000-pound capacity), one additional, as necessary.
- Clevis assembly, medium, MS 70087-2 (2 each).

### **PERSONNEL**

Two persons can prepare and rig the load with two A-22 cargo bags in 45 minutes and with three A-22 cargo bags in 60 minutes.



## PROCEDURES

### Step 1. Preparation

- Rig A-22 cargo bags according to instructions in Chapter 1.
- Tie all covers on howitzer with nylon cord.
- Place section equipment chest on end of trails and secure with tie-down strap.
- Place the large clevis on the ground between the trails.
- The 25,000-pound sling set chain will not fit through the trail lift provisions. Remove the trail lift provision pin, place a medium clevis assembly in the lift provision and reinstall the pin. Make sure the pin is through the bell portion of the clevis and not the bolt portion.

### Step 2. Rigging

- Position the apex fitting on the breech. Route outer sling legs 1 and 2 to the trails, inner sling leg 3 to the howitzer tube, and the inner sling leg 4 to the area between the trails.
- Route the chain end of sling leg 1 through the medium clevis attached to the left trail lift provision and through the large clevis on the ground. Insert link 3 in the grabhook. Repeat with sling leg 2 on the right side of the load.
- Loop the chain end of sling leg 3 through the lift provision on the tube and insert link 83 in the grabhook.
- Loop the chain end of sling leg 4 through the large clevis between the trails and insert link 56 in the grabhook. Make sure the chains are at the pin end of the clevis.
- Secure excess chain with tape or nylon cord.
- Loop the chain end of the separate sling leg assemblies through the A-22 cargo bag medium clevis or four D-rings if the clevis is not used. Insert link 3 in the grabhook.
- Route the other end of the sling leg assembly under the howitzer trail.
- Attach the separate sling legs to the large clevis between the trails by one of the following methods:
  - Attach one large clevis through the eye of each separate sling leg and then to the large clevis (one clevis for each sling leg). Make sure the clevis pin is inserted through the eye of the sling leg.
  - Attach all separate sling legs to the second apex fitting and attach the apex fitting to the large clevis.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the howitzer to prevent fouling during hookup and lift-off.

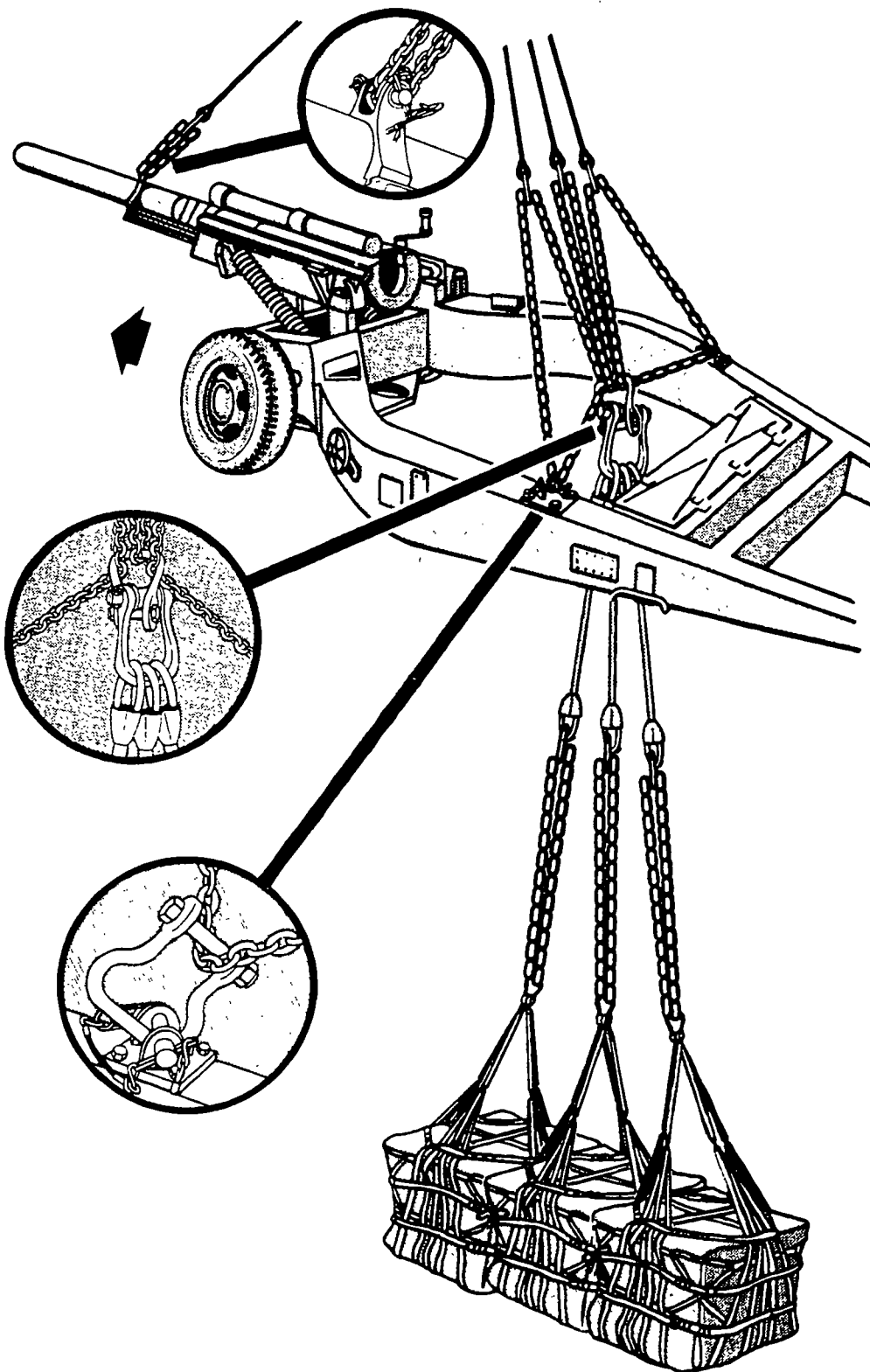
### Step 3. Hookup

The hookup team stands on the trails next to the breech. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the howitzer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is

assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

**Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-26. Two M102 105-mm Howitzers**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for UH-60 and CH-47 helicopters at airspeeds up to and including 90 knots.

### **LOAD DESCRIPTION**

- Howitzer, towed, light, 105-mm, M102, LIN K57392 (2 each).
- Weight: 6,660 pounds.

### **MATERIALS**

- Sling set, 10,000-pound capacity with one additional sling leg assembly (2,500-pound capacity) from 10,000-pound sling set.
- Tie-down strap, cargo, CGU-1/B.
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cotton webbing, 1/4-inch, 80-pound breaking strength.
- Felt sheet, 24- x 60-inch (2 each) or equivalent padding.
- Energy dissipating paper, honeycomb, 30- x 36-inch. (A wooden block or four sheets of felt may be substituted for the honeycomb.)

### **PERSONNEL**

Two persons can prepare and rig this load in 30 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Place the two howitzers side by side approximately 18 inches apart at the wheels with the barrels facing the same direction.
- Place the honeycomb pad between the two inside wheels of the howitzers. Slide both howitzers together and lash the wheels together securely with the tie-down strap.
- Wrap one sheet of felt around each inboard trail at the center of the load to prevent chafing between trails. Tie or tape padding securely. Make sure that the lift provisions are not obstructed.
- Secure all howitzer covers and loose equipment with tape or nylon cord.

## **Step 2. Rigging**

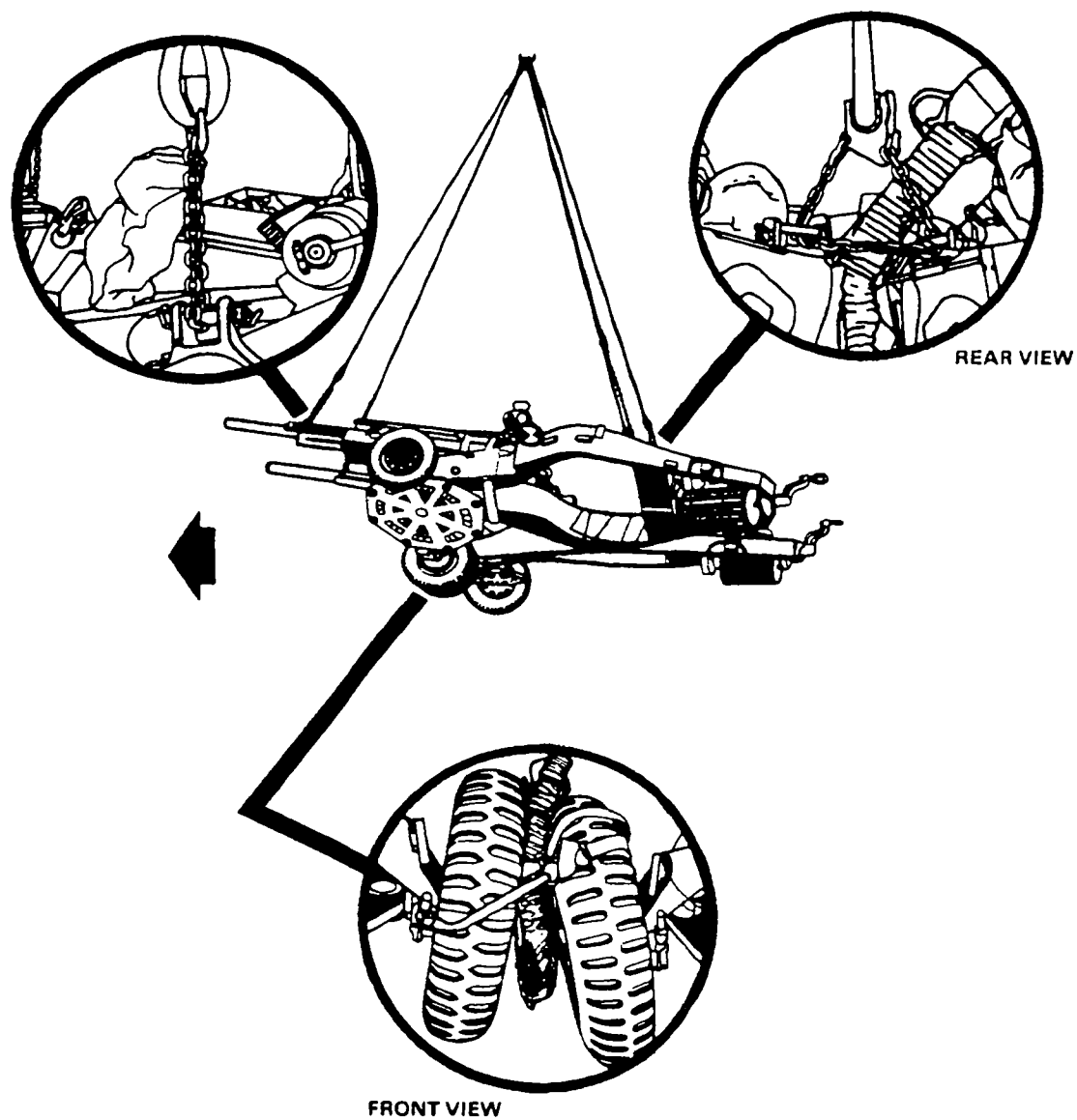
- Add the additional sling leg to the sling set. The outer sling legs are numbers 1 and 2, inner sling legs 3 and 4, and the center sling leg is number 5.
- Position apex fitting on top of the inner wheels at the center of the load. Route outer sling legs 1 and 2 to the barrels, inner sling legs 3 and 4 to the outside trails, and center sling leg 5 to the inside trails of both howitzers. Sling legs 1 and 3 must be connected to the left howitzer.
- Loop the chain end of sling leg 1 through the lift provision on the barrel of the left howitzer and insert link 60 in the grabhook. Repeat this step with sling leg 2 through the lift provision on the barrel of the right howitzer.
- Loop the chain end of sling leg 3 through the lift provision on the outside trail of the left howitzer and insert link 3 in the grabhook. Repeat this step with sling leg 4 on the lift provision on the outside trail of the right howitzer.
- Loop the chain end of sling leg 5 through both lift provisions located on the inside trails of both howitzers and insert link 20 in the grabhook.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the two howitzers to prevent entanglement during hookup and lift-off.

## **Step 3. Hookup**

The hookup team stands on the felt sheets or padding that is wrapped around the howitzer trails. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trails and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

## **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-27. Two M102 105-mm Howitzers with One, Two, or Three A-22 Cargo Bags**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-47 helicopters at airspeeds up to and including 90 knots.

### **LOAD DESCRIPTION**

- Howitzer, towed, light, 105-mm, LIN 57392 (2 each).
- Bag, cargo, aerial delivery, Type A-22, 2,200-pound capacity (1, 2, or 3 each).
- Weights:
  - Howitzer, M102 (2 each) with one A-22 cargo bag, 8,860 pounds.
  - Howitzer, M102 (2 each) with two A-22 cargo bags, 11,060 pounds.
  - Howitzer, M102 (2 each) with three A-22 cargo bags, 13,260 pounds.

### **MATERIALS**

- Two M102 howitzers with one A-22 cargo bag:
  - Sling set (10,000-pound capacity).
  - Sling leg assembly (2,500-pound capacity) from 10,000-pound sling set (2 each).
  - Apex fitting (10,000-pound capacity) (1 additional).
- Two M102 howitzers with two A-22 cargo bags:
  - Sling set (25,000-pound capacity).
  - Sling leg assembly (6,250-pound capacity) from 25,000-pound sling set (2 each).
  - Apex fitting (10,000- or 25,000-pound capacity) (1 additional).
- Two M102 howitzers with three A-22 cargo bags:
  - Sling set (25,000-pound capacity).
  - Sling leg assembly (6,250-pound capacity) from 25,000-pound sling set (3 each).
  - Apex fitting (10,000- or 25,000-pound capacity) (1 additional).
- Tie-down strap, cargo, CGU-1/B.
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cotton webbing, 1/4-inch, 80-pound breaking strength.
- Felt sheet, 24- x 60-inch (2 each) or equivalent padding.

- Energy dissipating paper, honeycomb, 30- x 36-inch. (A wooden block or four sheets of felt may be substituted for the honeycomb.)
- Clevis assembly, medium, one for each A-22 cargo bag.

## PERSONNEL

Two persons can prepare and rig this load in 30 minutes. Add 15 minutes additional rigging time for each A-22 cargo bag.

## PROCEDURES

### Step 1. Preparation

- Place the two howitzers side by side approximately 18 inches apart at the wheels with the barrels facing the same direction.
- Place the honeycomb pad between the two inside wheels of the howitzers. Slide both howitzers together and lash the wheels together securely with the tie-down strap.
- Wrap one sheet of felt around each inboard trail at the center of the load to prevent chafing between trails. Tie or tape padding securely. Make sure that the lift provisions are not obstructed.
- Secure all howitzer covers and loose equipment with tape or nylon cord as necessary.

### Step 2. Rigging

**NOTE:** Chain link number inside parentheses is used for the 25,000-pound sling set.

- Add one additional sling leg to the sling set. The outer sling legs are numbers 1 and 2, inner sling legs 3 and 4, and the center sling leg is number 5. Position apex fitting on top of the wheels at the center of the load. Route outer sling legs 1 and 2 to the barrels, inner sling legs 3 and 4 to the outside trails, and center sling leg 5 to the inside trails of both howitzers. Sling legs 1 and 3 must be connected to the left howitzer.
- Loop the chain end of sling leg 1 through the lift provision on the barrel of the left howitzer and insert link 60 (48) in the grabhook. Repeat this step with sling leg 2 through the lift provision on the barrel of the right howitzer.
- Loop the chain end of sling leg 3 through the lift provision on the outside trail of the left howitzer and insert link 3 (3) in the grabhook. Repeat this step with sling leg 4 on the lift provisions on the outside trail of the right howitzer.
- Loop the chain end of sling leg 5 through the lift provisions located on the inside trails of both howitzers and insert link 20 (16) in the grabhook.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the howitzers to prevent entanglement during hookup and lift-off.
- Accompanying load of one, two, or three A-22 cargo bags:
  - Rig A-22 cargo bag according to instructions in Chapter 1.



- Wrap the chain end of the additional sling leg(s) around both inboard trails over the felt sheets and insert link 60 (42) in the grabhook. The chain should be as tight as possible. Secure excess chain with tape or nylon cord.

**NOTE:** Use two sling leg assemblies when carrying three A-22 cargo bags as the accompanying load due to additional weight.

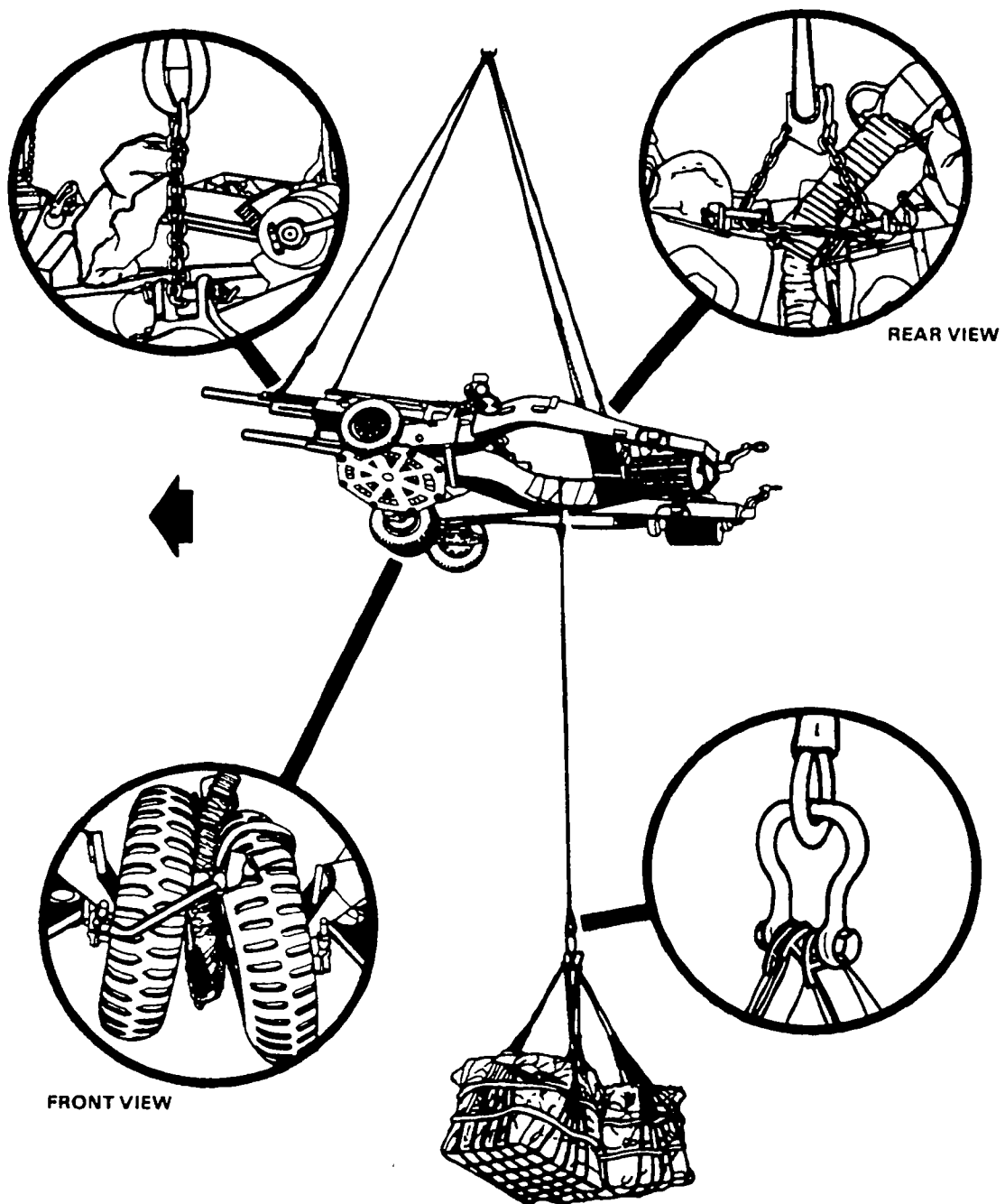
- Route the other end of the sling leg assembly under the howitzer trails to the outside of the howitzers. Place the additional apex fitting onto the sling leg(s). Place the A-22 cargo bag medium clevis onto the apex fitting. The sling leg should be positioned on the bell portion of the apex fitting and the clevis assemblies on the apex fitting bolt. Attach one, two, or three A-22 cargo bags in this manner.

### **Step 3. Hookup**

The hookup team stands on the felt sheets or padding that is wrapped around the trails. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trails and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-28. M119 105-mm Howitzer, Folded/Towed Position**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for UH-60 and CH-47 helicopters at airspeeds up to and including 120 knots.

### **LOAD DESCRIPTION**

- Howitzer, folded/towed position, 105-mm, M119, LIN H57505.
- Weight:
  - Empty, 4,180 pounds.
  - Accompanying load (maximum), 3,350 pounds.
  - Total weight, 7,530 pounds.

**NOTE:** Accompanying load must not exceed the weight limits of the net, cargo bag, or sling leg nor exceed the lift capability of the helicopter.

### **MATERIALS**

- Sling set, 10,000-pound capacity.
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Sling set chain safety clamp.
- Webbing, nylon, 1/2-inch tubular, 1,000-pound breaking strength (28 feet in length).
- If accompanying load is carried:
  - Line, multiloop, Type XXVI, 4-loop, 3-foot (NSN1670-01-062-6306).
  - Clevis, cargo suspension, medium (2 each).

### **PERSONNEL**

Two persons can prepare and rig this load in 30 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Place the howitzer in the folded-towed position. Make sure the wheel knock-off hub is horizontal. Engage the parking brake on the right wheel (wheel with the knock-off hub) only.

- Secure the sight cover to the dial sight with nylon cord or tape.
- Secure the firing platform, hand spike, and jack to the trail assembly with nylon cord.
- Make sure the lunette is in the extended position. Install the towing eye stop (C-clamp) on the lunette and secure in place with its retaining pins.
- The sling set safety clamp is an additional authorized item. Refer to TM 9-1015-252-10 for NSN information.
- If the detachable field spade is attached to the permanent spades, make sure the two locking pins are installed and locked in place. For additional security, route and tie a nylon cord through the key ring of the safety cable and around the other end of the locking pin. If the nylon cord is not available, wrap tape around the head and tail end of the pin.

## Step 2. Rigging

**NOTE:** When transporting an accompanying load that requires a sling leg from the sling set, such as an A-22 cargo bag, you may use the optional rigging configuration by removing one sling leg from the sling set apex fitting and using this sling leg to carry the accompanying load. Make sure the weight of the accompanying load is less than 2,500 pounds. With the exception of routing the single middle sling leg instead of sling legs 3 and 4 to the lunette, use the following rigging procedures to rig the howitzer.

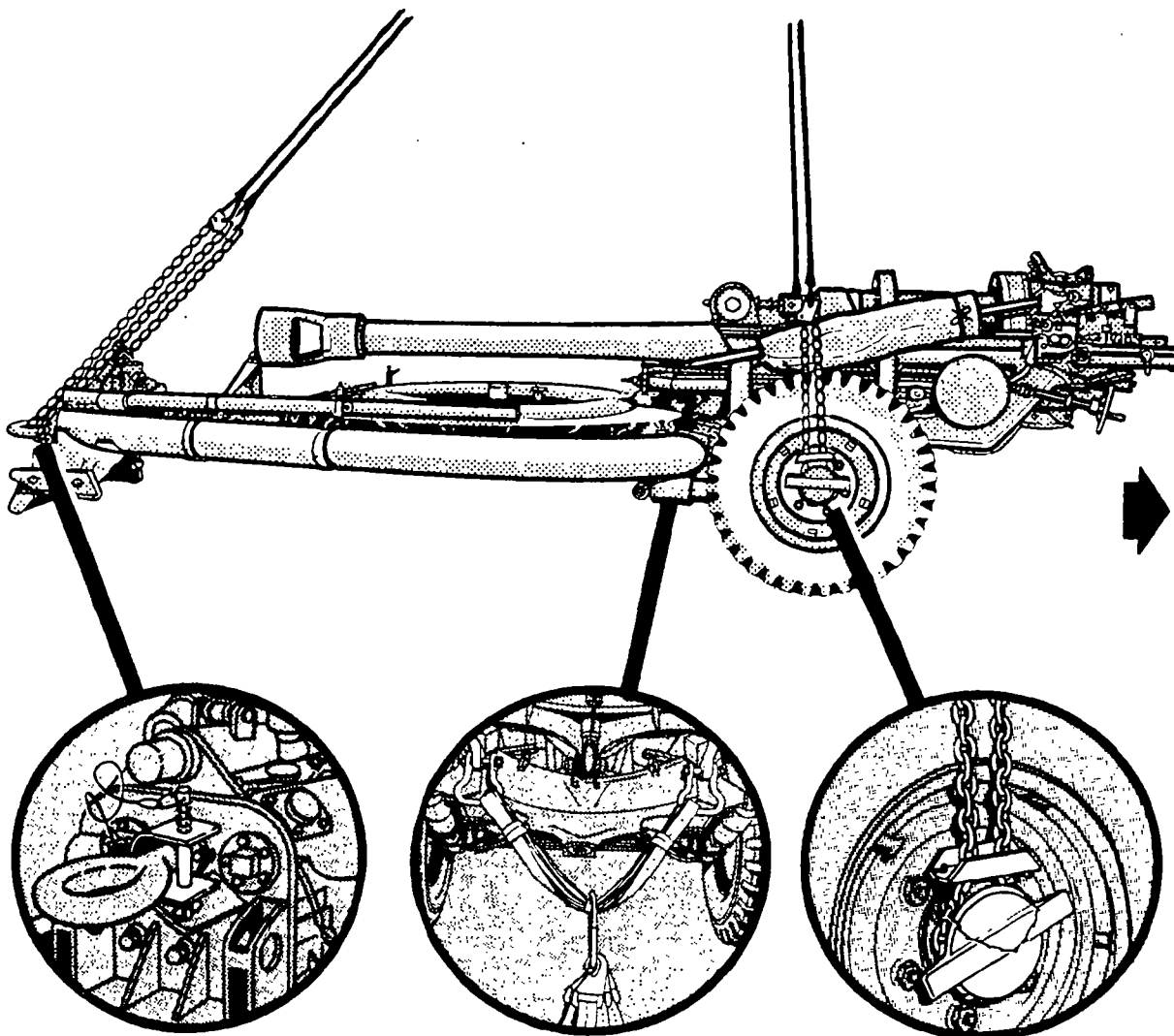
- Position apex fitting on the barrel over the firing platform. Route outer sling legs 1 and 2 to the wheel hubs and inner sling legs 3 and 4 to the lunette. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 around the left wheel hub. Insert link 50 in the grabhook. Pull the sling leg taut to remove all slack in the chain. Make sure that the two chains are even so that the same lifting pressure is applied to each chain. Install the sling set safety clamp on the two chain links as close to the top of the wheel hub as possible. If the clamp is not available, tie the two chain links nearest the top of the wheel hub with 1/2-inch tubular nylon webbing. The safety clamp or tubular nylon prevents the chain from becoming slack and slipping off the wheel hub. Repeat with sling leg 2 and the right wheel hub. Secure excess chain with tape or nylon cord.
- Loop the chain ends of sling legs 3 and 4 through the lunette and insert link 3 in the grabhook.
- Cluster and tie or tape (breakaway technique) all sling legs and the snubber line together on top of the howitzer to prevent entanglement during hookup and lift-off.
- When carrying an accompanying load, use the following procedures:
  - Rig the accompanying load in a cargo net or A-22 cargo bag according to instructions in Chapter 1.
  - Route the 3-foot multiloop line through the cargo net apex fitting or the sling leg eye from the cargo bag. Place a medium clevis through each end of the multiloop line.
  - Attach each clevis to its respective provision located underneath the howitzer carriage and inboard of the wheels.

### Step 3. Hookup

The hookup team stands beside the howitzer or on the trails. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the howitzer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## Figure 2-29. M119 105-mm Howitzer, Forward/Firing Position

### APPLICABILITY

This load is certified by the US Army NRDEC for UH-60 and CH-47 helicopters at airspeeds up to and including 110 knots.

### LOAD DESCRIPTION

- Howitzer, forward/firing (A-frame) position, 105-mm, M119, LIN H57505.
- Weight:
  - Empty, 4,180 pounds.
  - Accompanying load (maximum), 3,350 pounds.
  - Total weight, 7,530 pounds.

**NOTE:** Accompanying load must not exceed the weight limits of the net, cargo bag, or sling leg nor exceed the lift capability of the helicopter.

### MATERIALS

- Sling set, 10,000-pound capacity.
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Sling set chain, safety clamp.
- Webbing, nylon, 1/2-inch tubular, 1,000-pound breaking strength (28 feet in length).
- If accompanying load is carried:
  - Line, multiloop, Type XXVI, 4-loop, 3-foot long (NSN 1670-01-062-6306).
  - Clevis, cargo suspension, medium (2 each).

### PERSONNEL

Two persons can prepare and rig this load in 30 minutes.

### PROCEDURES

#### Step 1. Preparation

- Place the howitzer in the forward/firing (A-frame) position. Make sure the wheel knock-off hub is horizontal. Engage the parking brake on the right wheel (wheel with the knock-off hub) only.

- Secure sight cover to the dial sight with nylon cord.
- Secure the firing platform, hand spike, and jack to trail assembly with nylon cord.
- Make sure the lunette is in the extended position. Install the towing eye stop (C-clamp) on the lunette and secure in place with its retaining pins.
- The sling set safety clamp is an additional authorized item. Refer to Tm 9-1015-252-10 for NSN information.
- If the detachable field spade is attached to the permanent spades, make sure the two locking pins are installed and locked in place. For additional security, route and tie a nylon cord through the key ring on the safety cable and around the other end of the locking pin. If nylon cord is not available, wrap tape around the head and tail end of the pin.

## Step 2. Rigging

**NOTE:** When transporting an accompanying load that requires a sling leg from the sling set, such as an A-22 cargo bag, you may use the optional rigging configuration by removing one sling leg from the sling set apex fitting and using this sling leg to carry the accompanying load. Make sure the weight of the accompanying load is less than 2,500 pounds. With the exception of routing the single middle sling leg instead of sling legs 3 and 4 to the lunette, use the following rigging procedures to rig the howitzer.

- Position the apex fitting on the breech assembly. Route outer sling legs 1 and 2 to the wheel hubs and inner sling legs 3 and 4 to the lunette. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 around the left wheel hub. Insert link 50 in the grabhook. Pull the sling leg taut to remove all slack in the chain. Make sure that the two chains are even so that the same lifting pressure is applied to each chain. Install the sling set safety clamp on the two chain links as close to the top of the wheel hub as possible. If the clamp is not available, tie the two chain links nearest the top of the wheel hub with 1/2-inch tubular nylon. The safety clamp or tubular nylon prevents the chain from becoming slack and slipping off the wheel hub. Secure excess chain with tape or nylon cord.
- Repeat the previous procedure with sling leg 2 on the right wheel hub.
- Loop the chain end of sling leg 3 through the lunette and insert link 3 in the grabhook. Repeat with sling leg 4 through the lunette also.
- Cut a 28-foot section of 1/2-inch tubular nylon webbing. Route it from the center of the apex fitting between sling legs 3 and 4 through the muzzle blast deflector and back to the apex fitting, keeping it clear of the sling legs. Tie the two ends together using a square knot. The tubular nylon is not a load carrying member of the sling set; instead, it will act as a snubber line to prevent the barrel from pitching down when the howitzer is picked up.
- Cluster and tie or tape (breakaway technique) all sling legs and the snubber line together to prevent entanglement during hookup and lift-off.

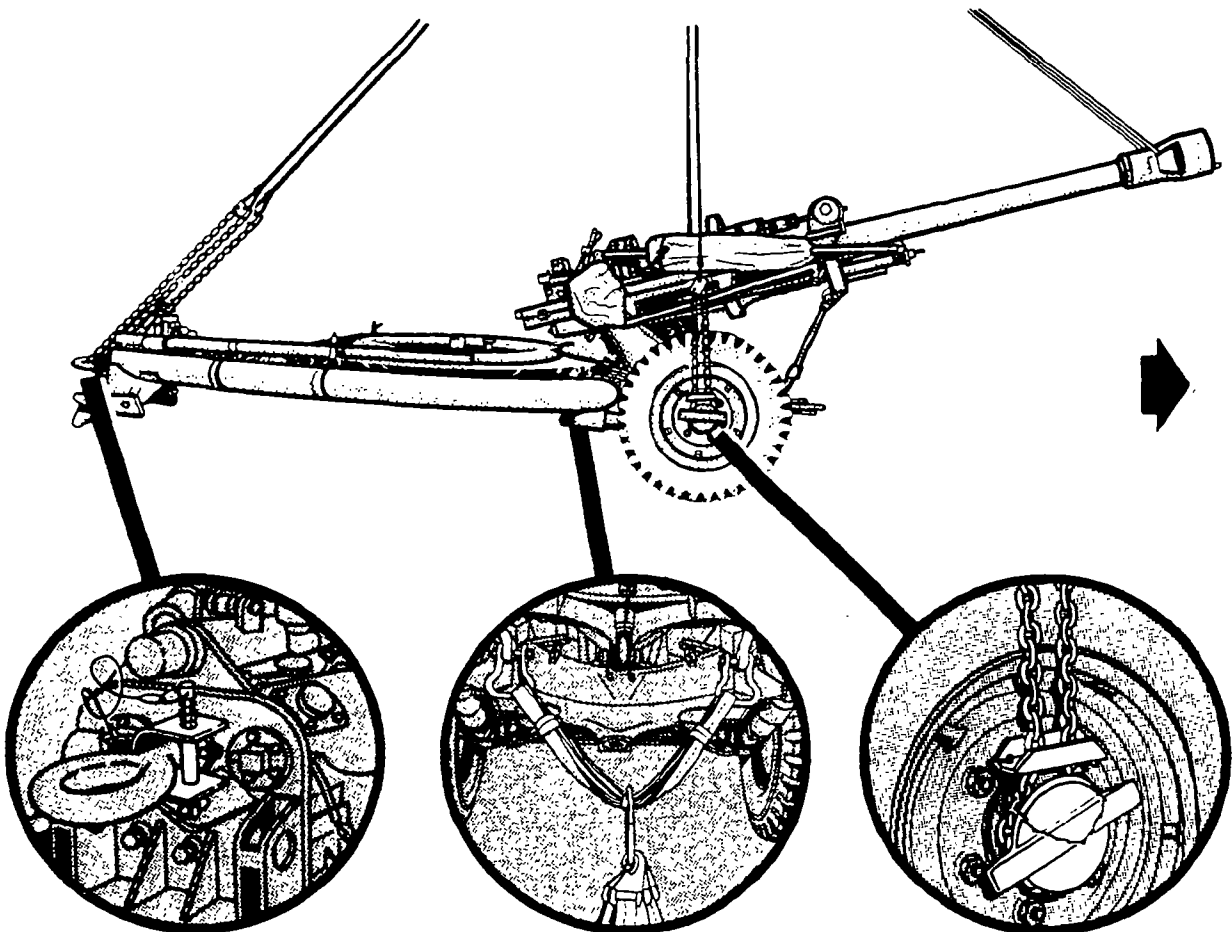
- When carrying an accompanying load, use the following procedures:
- Rig the accompanying load in a cargo net or A-22 cargo bag according to instructions in Chapter 1.
- Route the 3-foot multiloop line through the cargo net apex fitting or the sling leg eye from the cargo bag. Place a medium clevis through each end of the multiloop line.
- Attach each clevis to its respective provision located underneath the howitzer carriage and inboard of the wheels.

### Step 3. Hookup

The hookup team stands beside the howitzer or on the trails. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the howitzer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## **Figure 2-30. M114A2 155-mm Howitzer, Towed**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-53D/E helicopters at airspeeds up to and including 110 knots.

### **LOAD DESCRIPTION**

- Howitzer, towed, 155-mm, M114A2, TAMCN E0670, NSN 1025-01-025-9857.
- Weight: 12,700 pounds.

### **MATERIALS**

- Sling set (40,000-pound capacity) with two additional chains, 8-foot length (10,000-pound capacity) and coupling links.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Padding, felt, or suitable substitute.
- Tie-down straps, cargo, CGU-1/B (2 each).

### **PERSONNEL**

Two persons can prepare and rig this load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Stow all howitzer equipment, including sights, in the proper place, except the spade key. Stow spade key in the section chest. Secure all equipment with tape or nylon cord.
- Position the section chest on the rear of the trails.
- Secure the section chest to the trails by routing the tie-down strap through the handles of the chest and both trail lifting handles. Secure excess strap.
- Secure the spades to the brackets with nylon cord. Secure all hoses and cables to the sides of trails with tape or nylon cord.
- Engage one hand brake so the howitzer will not rotate over the muzzle on touchdown.
- Secure padding to the barrel forward of the recoil mechanism so the chains will not damage the barrel.
- Make sure all sight mounts are either removed or padded. Make sure the gun jack pin is locked in place.

- Remove or secure all gun covers.

### **Step 2. Rigging**

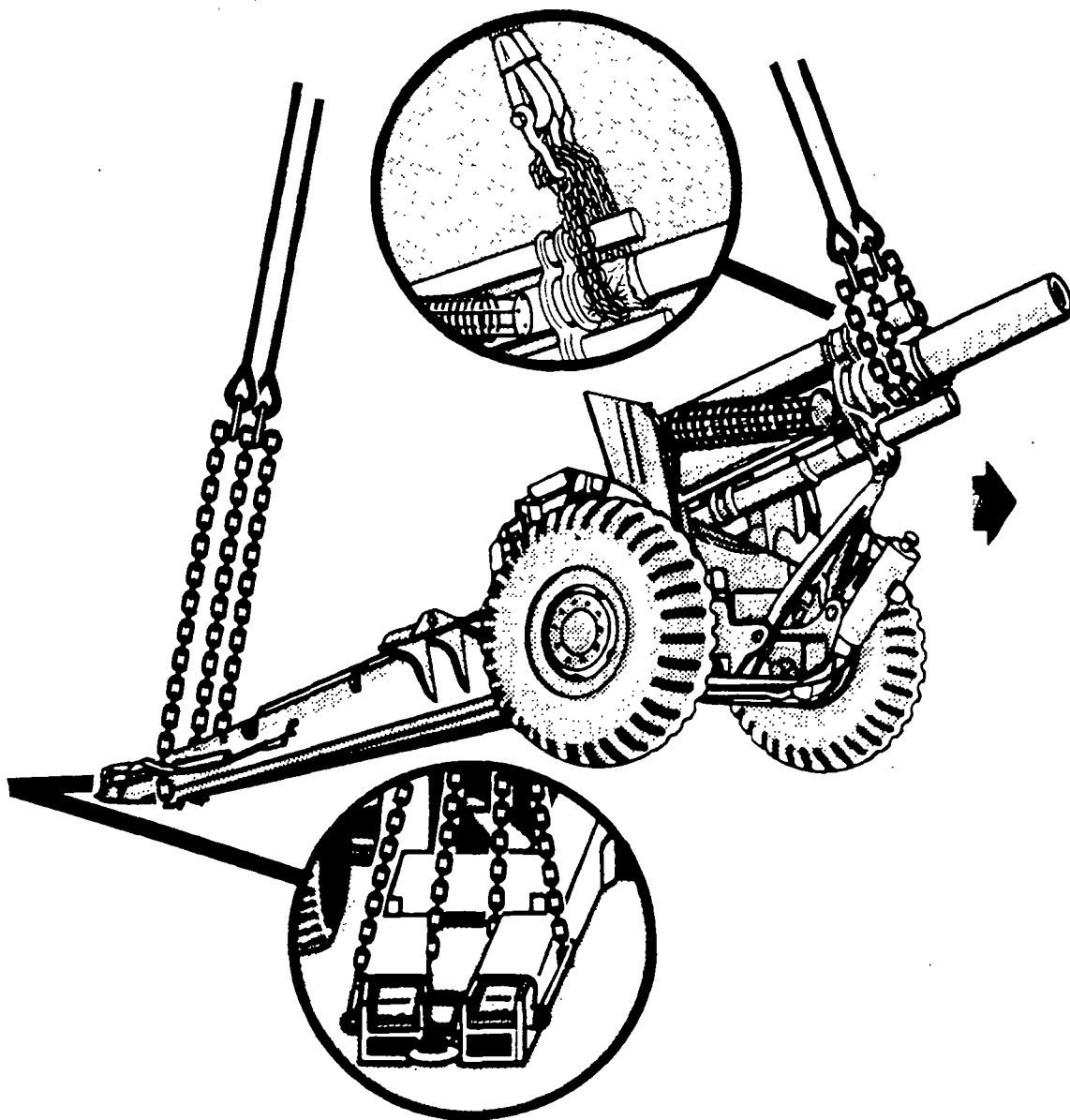
- Position the apex fitting on top of the breech. Route outer sling legs 1 and 2 to the barrel and inner sling legs 3 and 4 to the trails. Sling legs 1 and 3 must be on the left side of the load. Using the proper coupling link, attach the additional chain lengths to sling legs 3 and 4.
- Position the grab link of sling leg 1 on the left side of the gun tube padded area. Route the chain end under the tube and back up to the grab link. Insert link 50 in the grab link. Repeat with sling leg 2 with the grab link on the right side of the gun tube. The chains should cradle the gun tube.
- Loop the chain end of sling leg 3 down through the spade key bracket on the outboard side of the left trail, under the trail and up the inboard side of the trail. Insert link 10 in the grab link. Repeat with sling leg 4 on the right trail.
- Secure all excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the howitzer to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

The hookup team stands on the wheels or the firing platform. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the howitzer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## Figure 2-31. M198 155-mm Howitzer, Towed

### APPLICABILITY

This howitzer in the towed position is certified by the US Army NRDEC for CH-53E helicopters at airspeeds up to and including 135 knots. This howitzer is suitable for CH-47 and CH-54 helicopters at airspeeds up to and including 100 knots (stowed position) or 110 knots (towed position).

### LOAD DESCRIPTION

- Howitzer, towed, M198, 155-mm, LIN K57821 or TAMCN E0665, NSN 1025-01-026-6648.
- Weight: 15,740 pounds.

### MATERIALS

- Sling set (25,000-pound capacity) with two additional chains, 8-foot length (6,250-pound capacity) and coupling links (CH-47 and CH-54 only); or sling set (40,000-pound capacity) with two additional chains, 8-foot length (10,000-pound capacity) and coupling links (CH-53E only).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Padding, felt, or suitable substitute.
- Tie-down strap, cargo, CGU-1/B, as required.
- Clevis assembly, large, MS 70087-3, one per lift provision.
- For towed position with CH-47 only: adapter, pendant (part No.1670EG093-1) (see Aircraft Aerial Recovery Kit).

### PERSONNEL

Two persons can prepare and rig this load in 20 minutes after the howitzer is placed in the proper position.

### PROCEDURES

#### Step 1. Preparation

- Secure the spades to the trails with the tie-down straps.
- Secure the air hoses and electrical cable to the outboard side of the right trail.
- Pad the sight mounts and secure with tape or nylon cord.
- Attach a large clevis assembly to the trail lift provisions located forward of the stowed firing baseplate.

- Towed position.

- Ensure that the top carriage locking pin is in place and is secured with a locking safety clip.

**CAUTION:** Do not attempt to lift the howitzer if the top carriage lock pin will not drop into place, or if the locking safety clip is missing. Either of these conditions could result in the top carriage rotating in flight.

- Position the barrel and install the travel lock; secure with pins.
- Attach a large clevis assembly to the lift provision on each side of the carriage.
- Stowed position (CH-47 or CH-54 only). Attach a large clevis assembly to the two lift provisions located at the upper end of the equilibrator.

## Step 2. Rigging

**NOTE:** Chain link number inside parentheses is used for the 25,000-pound sling set.

- Towed position.

- (CH-47 only) Remove bolt from the apex fitting. Insert the pendant adapter eye (without the notch) into the apex fitting and reinstall the bolt. The pendant notched end is placed onto the aircraft cargo hook.
- Position the apex fitting and pendant on top of the breech block. Route outer sling legs 1 and 2 to the front of the carriage and inner sling legs 3 and 4 to the trails. Sling legs 1 and 3 must be on the left side of the howitzer. Using the proper coupling link, attach the additional chain lengths to sling legs 3 and 4.
- Loop the chain end of sling leg 1 through the clevis on the lift provision on the left side of the carriage assembly and insert link 54 (50) in the grabhook. Repeat with sling leg 2 and the right front lift provision on the right side of the carriage. Secure excess chain with tape or nylon cord.
- Loop the chain end of sling leg 3 through the clevis on the lift provision on top of the left trail and insert link 3 (3) in the grabhook. Repeat with sling leg 4 and the right rear lift provision.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the howitzer to prevent entanglement during hookup and lift-off. Stowed position (CH-47 and CH-54 only using the 25,000-pound sling set).
- Position the apex fitting on top of the barrel centered on the load. Route outer sling legs 1 and 2 to the trails and inner sling legs 3 and 4 to the breech end. Sling legs 1 and 3 must be on the left side of the howitzer. Using the proper coupling link, attach the additional chain assemblies to sling legs 1 and 2.
- Loop the chain end of sling leg 1 through the clevis on the trail above the brake air hose connection. Insert link 3 in the grabhook. Repeat with sling leg 2 and the other trail lift provision.

- Loop the chain end of sling leg 3 through the clevis on the left side of the equilibrator above the breech and insert link 70 in the grabhook. Repeat with sling leg 4 and the clevis on the right side. Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the howitzer to prevent entanglement during hookup and lift-off.

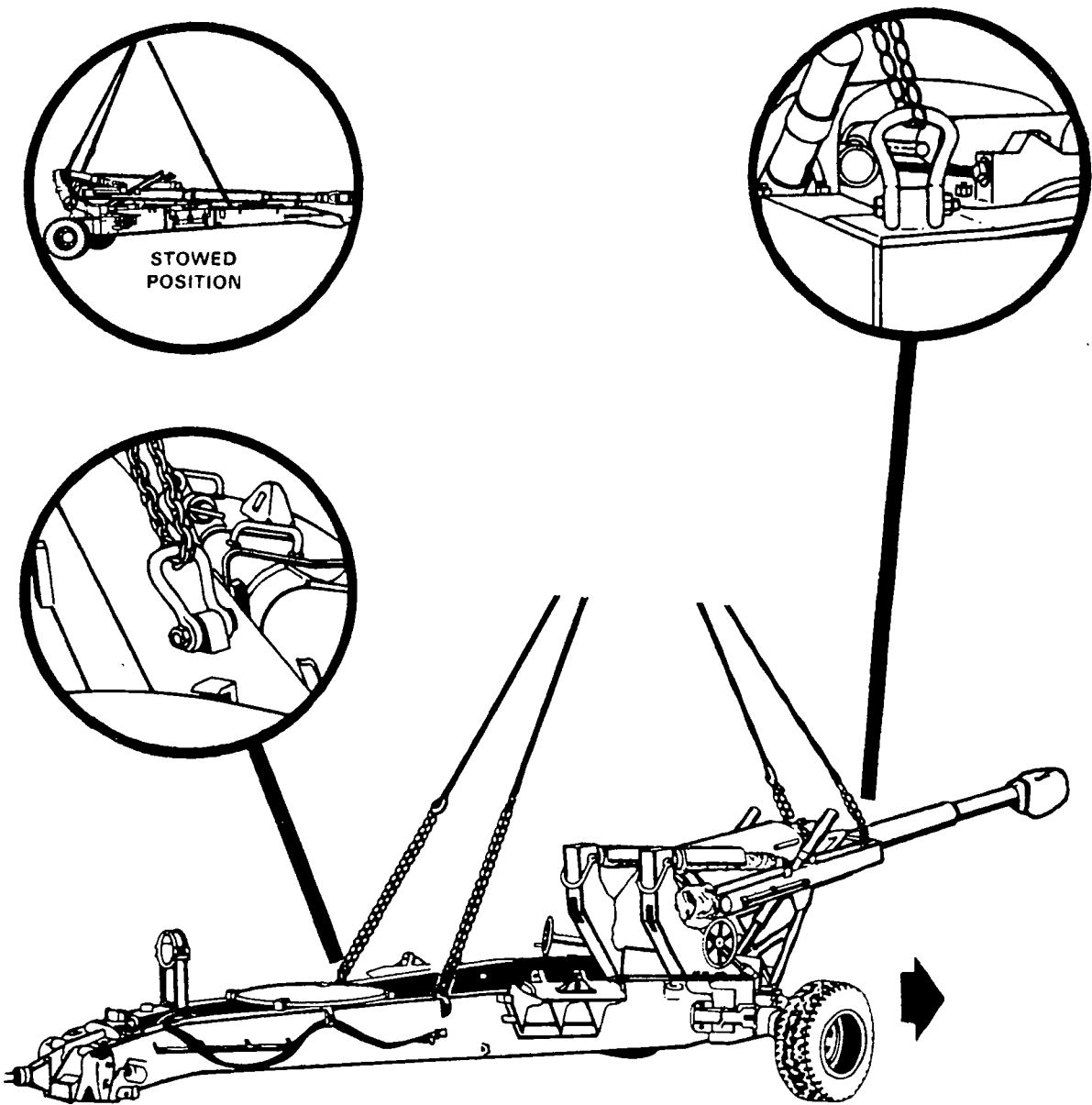
### **Step 3. Hookup**

**NOTE:** Static discharge wand is not required when the pendant assembly is used.

- Towed position. The hookup team stands on the carriage near the breech. **THE HELICOPTER MUST APPROACH THE HOWITZER OVER THE TRAILS.** The hookup person places the apex fitting/pendant adapter top eye onto the aircraft cargo hook.
- Stowed position (CH-47 and CH-54 only). The hookup team stands on top of the carriage. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook.
- After hookup, the hookup team carefully dismounts the howitzer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## Figure 2-32. M167 20-mm AA Gun (VULCAN)

### APPLICABILITY

This load is certified by the US Army NRDEC for UH-60A and CH-47 helicopters at airspeeds up to and including 80 knots.

### LOAD DESCRIPTION

- Anti-aircraft gun, towed, 20-mm, M167 (VULCAN), LIN J96845.
- Weight: 3,260 pounds.

### MATERIALS

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### PERSONNEL

Two persons can prepare and rig this load in 15 minutes.

### PROCEDURES

#### Step 1. Preparation

- Position radar antenna assembly to point directly upward.
- If the situation permits, place the cover on the gun and secure with nylon cord for added protection.
- Secure any loose equipment with tape or nylon cord, as required.
- Extend and secure the rear trails in the down position.
- Engage hand brakes. Install lifting clevises on tongue and trails, if necessary.

#### Step 2. Rigging

- Position apex fitting on top of the gun. Route outer sling legs 1 and 2 to the rear extended trails and inner sling legs 3 and 4 to the tongue end. Sling legs 1 and 3 must be on the same side of the load. Sling legs 1 and 2 are routed to the rear because the lift provisions on the trails are wider apart than the lift provisions on the tongue.
- Loop the chain end of sling leg 1 through the lift provision on the left trail and insert link 3 in the grabhook. Repeat with sling leg 2 and the right trail lift provision.



- Loop the chain end of sling leg 3 through the lift provision on top of the left side of the tongue and insert link 33 in the grabhook. Repeat with sling leg 4 on the tongue right lift provision. Secure excess chain with tape or nylon cord.

**NOTE:** If the gun cover is not used, make sure that the sling legs do not become entangled on the gun components.

- Cluster and tie or tape (breakaway technique) all sling legs together on top of the gun to prevent entanglement during hookup and lift-off. Make sure the right rear sling leg is kept free from the antenna.

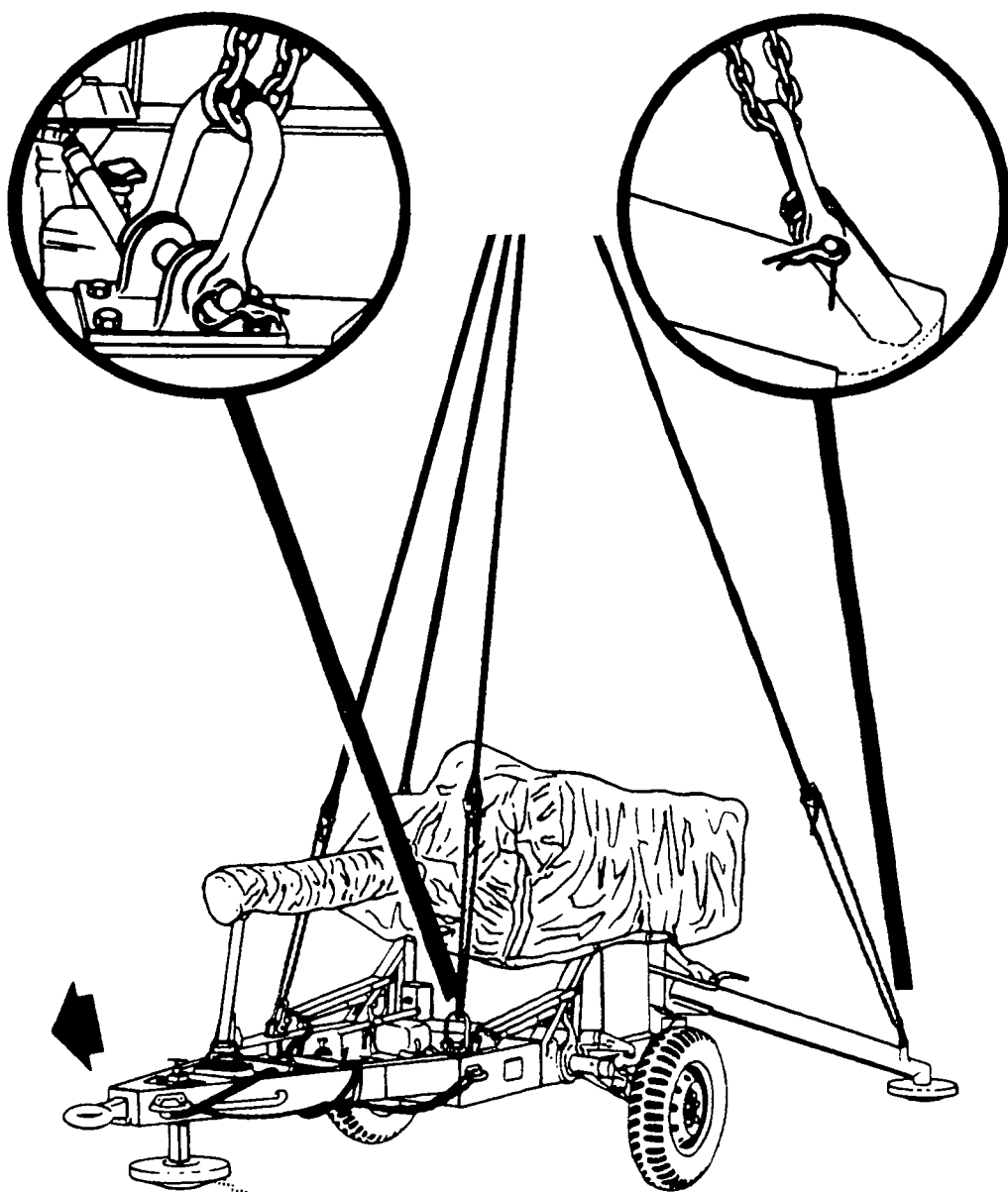
### **Step 3. Hookup**

**NOTE:** Advise the aircraft commander to release the sling set apex fitting on the side of the gun away from the radar dish to prevent damage.

The hookup team stands alongside the gun or on the trailer frame on the same side as the radar dish. The static wand person discharges the static electricity with the static wand. As the helicopter approaches, make sure that the cargo hook or wheels do not touch the radar dish. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the gun and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-33. M167 20-mm AA Gun (VULCAN) with One A-22 Cargo Bag**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for UH-60A helicopters at airspeeds up to and including 75 knots.

### **LOAD DESCRIPTION**

- Anti-aircraft gun, towed, 20-mm, M167 (VULCAN), LIN J96845.
- Bag, cargo, aerial delivery, Type A-22, 2,200-pound maximum capacity.
- Weight:
  - Gun, 3,260 pounds.
  - \*Accompanying load, 2,200 pounds.
  - Total, 5,460 pounds.

\* More than one A-22 cargo bag or cargo net may be used with these rigging procedures as long as the total weight of the accompanying load does not exceed 2,500 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Bag, cargo, aerial delivery, Type A-22.
- Fitting, apex (10,000-pound capacity), one additional.
- Sling leg assembly (2,500-pound capacity) from a 10,000-pound capacity sling set.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Felt, sheet, Type IV, 1/2-inch thick, 30- x 36-inch, one sheet.

### **PERSONNEL**

Two persons can prepare and rig this load in 30 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Rig the accompanying load according to instructions in Chapter 1.
- Wrap felt padding around the horizontal brace aft of the generator and secure with tape or nylon cord.

- Position radar antenna assembly to point directly upward.
- If the situation permits, place the cover on the gun and secure with nylon cord for added protection.
- Secure any loose equipment with tape or nylon cord, as required.
- Extend and secure the rear trails in the down position.
- Engage hand brakes. Install lifting clevises on tongue and trails if necessary.

### Step 2. Rigging

- Position apex fitting on top of the gun. Route outer sling legs 1 and 2 to the rear extended trails and inner sling legs 3 and 4 to the tongue end. Sling legs 1 and 3 must be on the same side of the load. Sling legs 1 and 2 are routed to the rear because the lift provisions on the trails are wider apart than the lift provisions on the tongue.
- Loop the chain end of sling leg 1 through the lift provision on the left trail and insert link 3 in the grabhook. Repeat with sling leg 2 and the right trail lift provision.
- Loop the chain end of sling leg 3 through the lift provision on top of the left side of the tongue and insert link 3 in the grabhook. Repeat with sling leg 4 and the tongue right side lift provision. Secure excess chain with tape or nylon cord.

**NOTE:** If the gun cover is not used, make sure that the sling legs do not become entangled on the gun components.

- Cluster and tie or tape (breakaway technique) all sling legs together on top of the gun to prevent entanglement during hookup and lift-off. Make sure that the right rear sling leg is kept free from the antenna.
- Attach the separate sling leg to the additional apex fitting. Place the apex fitting around the felt sheet on the horizontal strut (apex fitting pin must be up).
- Route the separate sling leg down under the tongue to the accompanying load. Loop the chain end through the A-22 cargo bag medium clevis or cargo net apex fitting and insert link 3 in the grabhook.

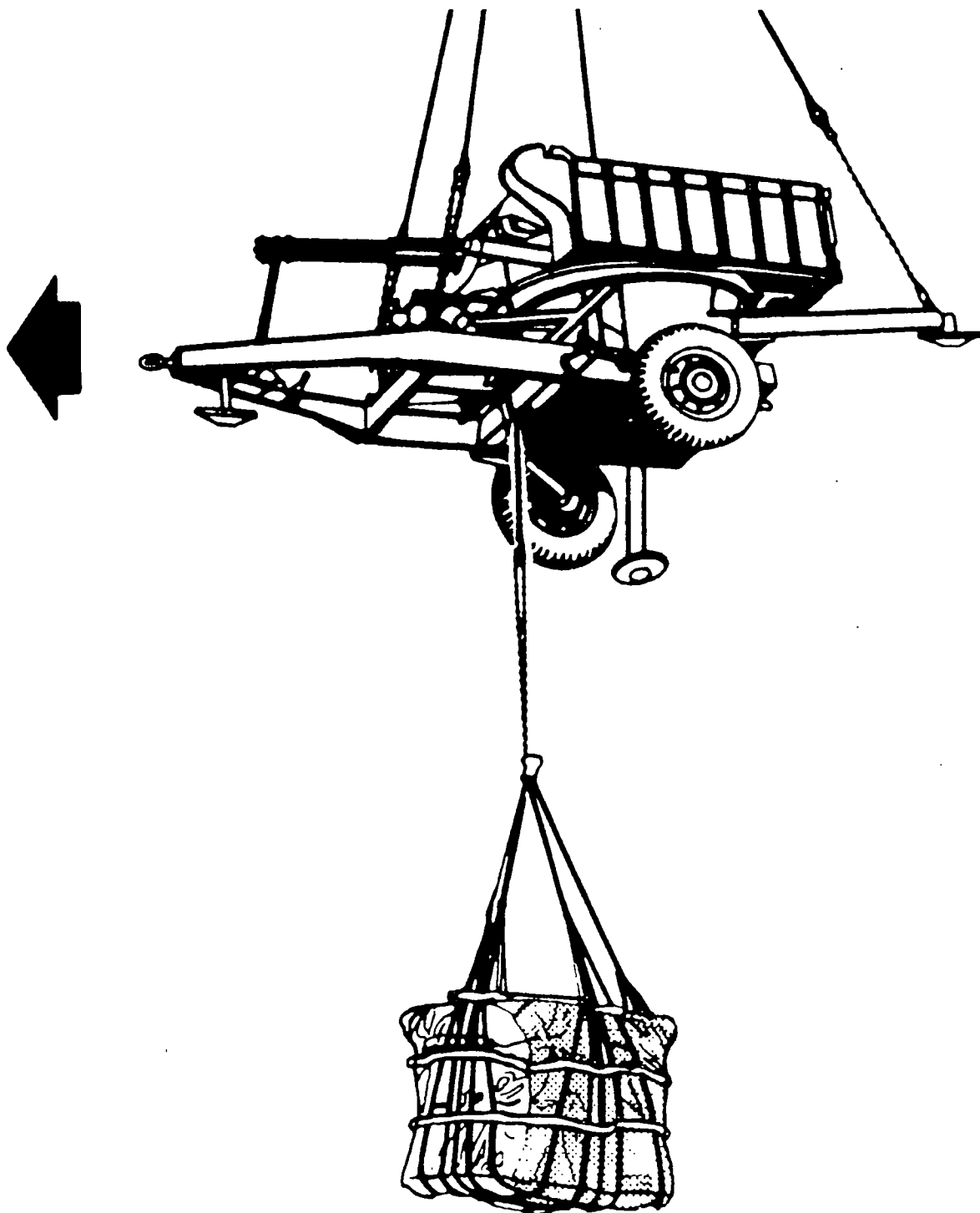
### Step 3. Hookup

**NOTE:** Advise the aircraft commander to release the sling set apex fitting on the side of the gun away from the radar antenna to prevent damage.

The hookup team stands alongside the gun or on the trailer frame on the same side as the radar dish. As the helicopter approaches, make sure that the cargo hook or wheels do not touch the radar antenna. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the gun and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-34. M712 Projectile, 155-mm HE**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for UH-1 helicopters at airspeeds up to and including 85 knots.

### **LOAD DESCRIPTION**

- One standard shipping pallet of six each 155-mm, M712 projectiles, HE, guided, cannon launched, measuring 61 inches long, 33 inches wide, and 27 inches high, rigged in a 5,000-pound capacity cargo net for external air transport.
- Weight: 1,283 pounds.

### **MATERIALS**

- Net, helicopter, cargo-carrying, external (5,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons using a forklift can prepare and rig this load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

Ensure the shipping pallet of projectiles is properly banded and in serviceable condition.

#### **Step 2. Rigging**

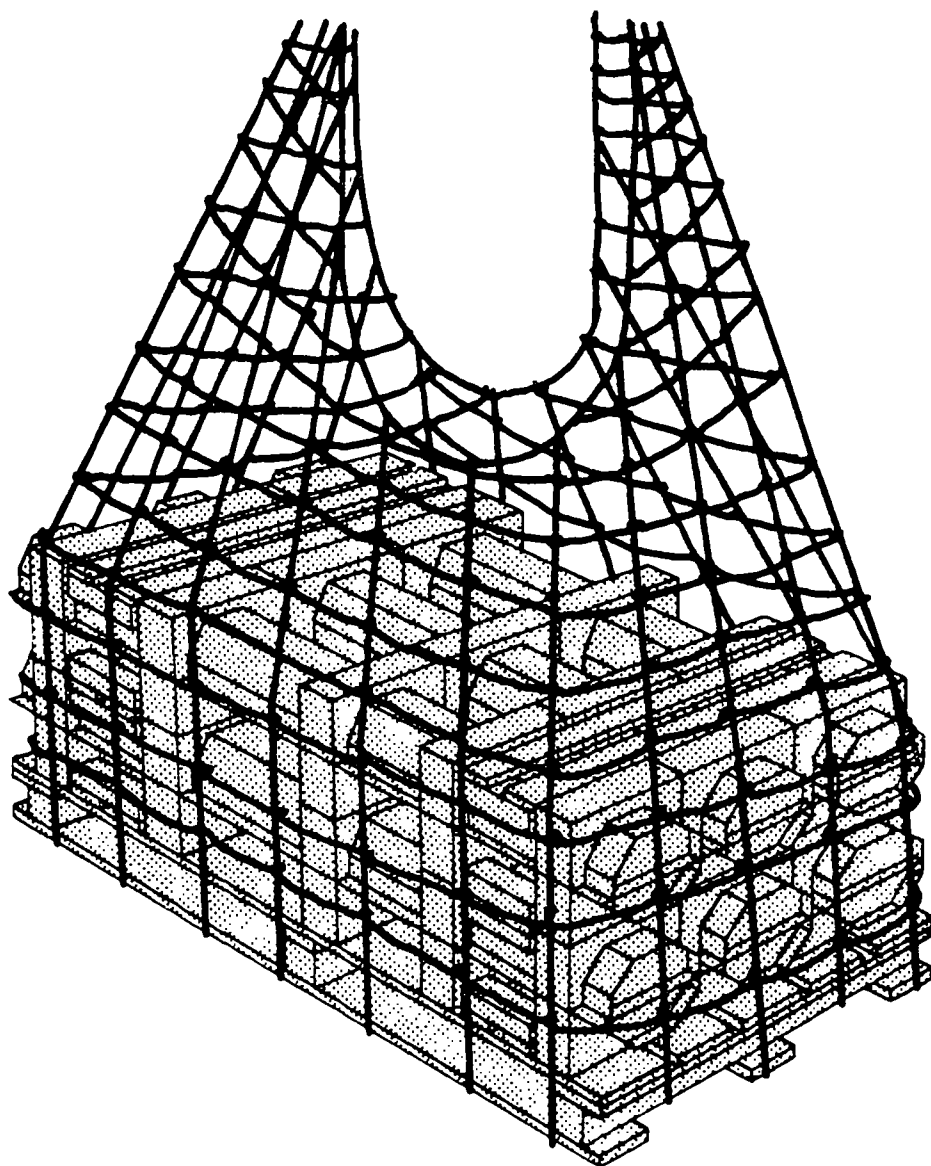
- Spread the cargo net and position the pallet of projectiles in the center of the net.
- Draw the cargo net up around the load and secure the four corner hooks in the net apex stirrup.
- Using the cargo net rigging instructions in Chapter 1, complete rigging the cargo net.

#### **Step 3. Hookup**

The hookup team stands on top or alongside the load. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team exits the area underneath the helicopter to the designated rendezvous point.

#### **Step 4. Derigging**

Derigging is the reverse of preparation and rigging procedures in steps 1 and 2. Stow the cargo net in the storage bag.



## Figure 2-35. BMS-120 Battalion Mortar System

### APPLICABILITY

This load is certified by the US Army NRDEC for UH-1H and UH-60A helicopters at airspeeds up to and including 70 and 60 knots, respectively.

**NOTE:** This load, without the carriage, can be transported in a 5,000-pound capacity cargo net.

### LOAD DESCRIPTION

- BMS-120, 120-mm light mortar, carriage mounted.
- Weight: 764 pounds.

### MATERIALS

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tie-down strap, cargo, CGU-1/B (5,000-pound capacity).
- Padding, felt or cellulose.

### PERSONNEL

Two persons can prepare and rig this load in 20 minutes.

### PROCEDURES

#### Step 1. Preparation

- Secure all loose equipment, chains, and wires with tape and nylon cord.
- Secure mortar to the carriage by routing the tie-down strap across the mortar base plate and around the axle. Route one end of the strap through the base plate left handle, around the axle, and back through the base plate handle. Continue the strap across the base plate, through the base plate right handle, around the axle, back through the base plate handle, and attach the end of the tie-down strap to the ratchet. Pad the tie-down strap where it makes contact with the sharp edges of the base plate.

#### Step 2. Rigging

**NOTE:** A three-legged sling set may be used to rig this load with the inner sling leg connected to the lunette. However, a four-legged sling set is recommended to prevent misplacing the removed sling leg.



- Position apex fitting on top of the carriage. Route outer sling legs 1 and 2 to the anchor points behind the base plate supports, and inner sling legs 3 and 4 to the lunette.
- Loop the chain end of sling leg 1 around the horizontal pipe on the left side of the carriage between the vertical pipe and the base plate. Insert link 67 in the grabhook. Repeat with sling leg 2 and the pipe on the right side of the carriage.
- Loop the chain ends of sling leg 3 and 4 through the lunette and insert link 3 in the grabhook.

**NOTE:** Give particular attention to prevent the sling legs from entangling on the protrusions during hookup. Failure to use proper breakaway technique in taping or tying the sling legs could result in damage to the load.

- Cluster and tie or tape (breakaway technique) the grabhooks from sling legs 1 and 2 together on top of the bipod assembly to prevent entanglement during hookup and lift-off. Cluster and tie or tape (breakaway technique) sling legs 3 and 4 on top of the lunette to prevent entanglement during hookup and lift-off.

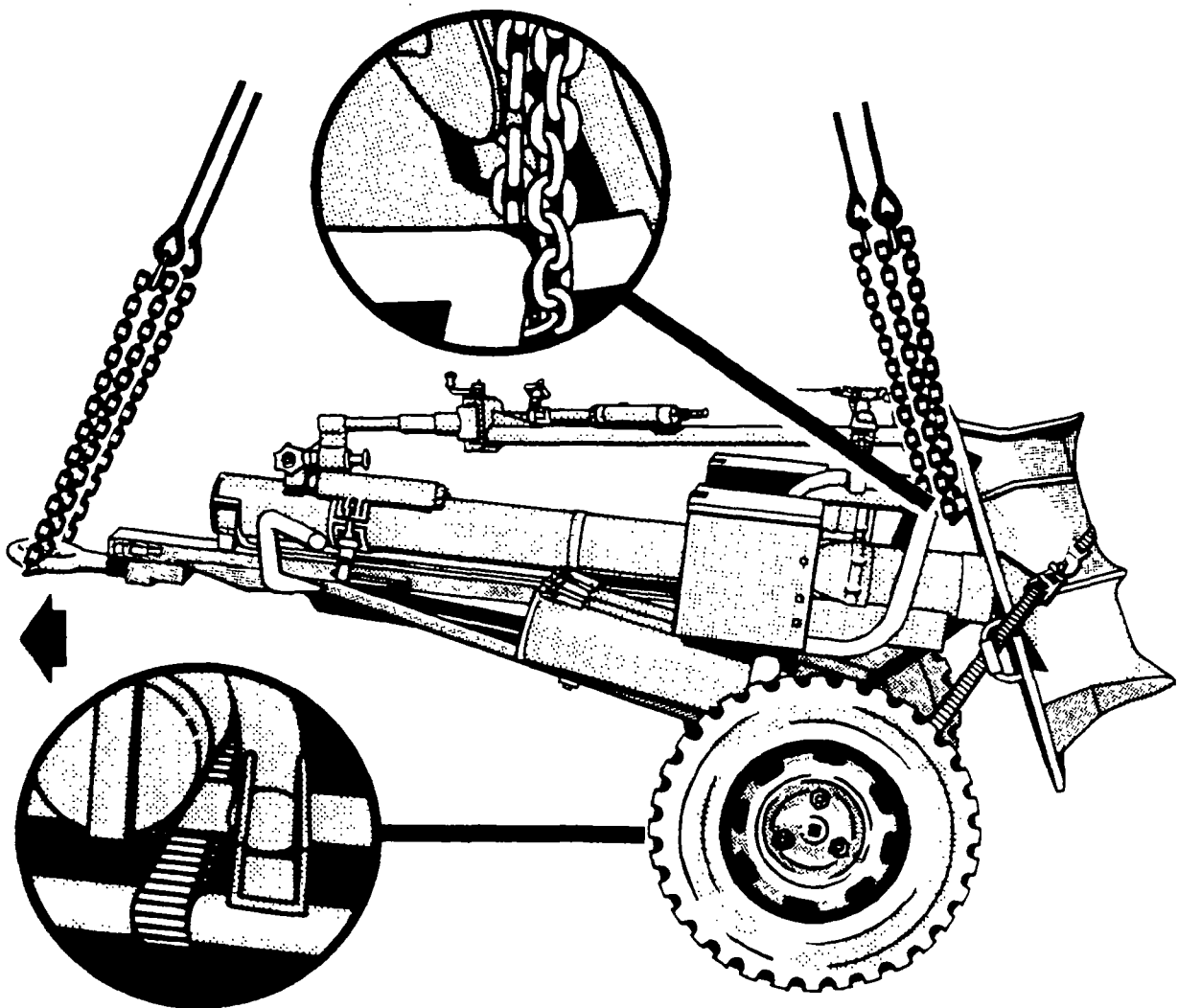
### Step 3. Hookup

**NOTE:** Connect the apex fitting so that the lunette is carried forward.

The hookup team stands beside the carriage. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **\*Figure 2-35.1. Two M101A1 Howitzers, Side by Side (USMC)**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for the CH-53E helicopters at airspeeds up to and including 100 knots.

### **LOAD DESCRIPTION**

- Howitzer, M101A1, 105-mm, side by side, TAMCN E0640 (2 each).
- Weight: 9,012 pounds.

### **MATERIALS**

- Sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Padding, felt, or suitable substitute.
- Tie-down strap, cargo, CGU-1/B (5,000-pound capacity), as required.
- Chain, 8-foot, part number JETS-WMC-5000 (10,000-pound capacity) from a 40,000-pound sling set ( each).
- Coupling link, part number 577-0815 (2 each).
- Energy dissipating paper honeycomb, 24- x 24-inch (2 each) or 4- x 4- x 24-inch wood (2 each).

### **PERSONNEL**

Two persons can prepare and rig this load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Position the two howitzers side by side with the barrels facing in opposite directions.
- Place the honeycomb or wood between the inboard wheel of one howitzer and the inboard trail of the other howitzer. Secure the honeycomb or wood in place with a tie-down strap. Repeat with the other tie-down strap on the inboard wheel of the other howitzer and the inboard trail.
- Close and lock the breech of each howitzer.
- Ensure the trails are properly closed and secured.

- Rotate the lunette downward. Secure the trail closing lock handles with tape or nylon cord.
- Remove or secure muzzle, breech, and barrel covers.
- Remove or pad the sight mounts.
- Secure loose equipment with tape or nylon cord. Place the section equipment chest on the trails and secure with tie-down straps.
- Set hand brakes.
- Wrap padding around the gun tubes above the cradle and the forward edge of the recoil damper assembly. Secure padding with tape or nylon cord.
- Wrap padding around the left and right trails of both howitzers just aft of the travel lock shaft area and secure with tape or nylon cord.

### **Step 2. Rigging**

**NOTE:** The howitzer with the barrel facing in the direction of flight is designated as howitzer 1.

- Position the apex fitting between the breech area of the two howitzers. Route outer sling leg 1 to the barrel end of howitzer 1 and the other outer sling leg 2 to the trail end of howitzer 2. Route inner sling leg 3 to the trail end of howitzer 1 and inner sling leg 4 to the barrel end of howitzer 2. Sling legs 1 and 3 should be on the left side of the load. Using the proper coupling link, attach the additional chain lengths to sling legs 2 and 3.
- Wrap the chain end of sling leg 1 once around the padding on the barrel of howitzer 1 and insert link 30 in the grab link. Repeat with sling leg 4 on the barrel end of howitzer 2.
- Wrap the chain end of sling leg 2 around the padded area on the trail end of howitzer 2 and insert link 55 in the grab link. Repeat with sling leg 3 and the trails on howitzer 1.
- Secure excess chain with tape or nylon cord. Cluster and tie or tape (breakaway technique) all sling legs together on top of the two howitzers to prevent entanglement during hookup and lift-off.

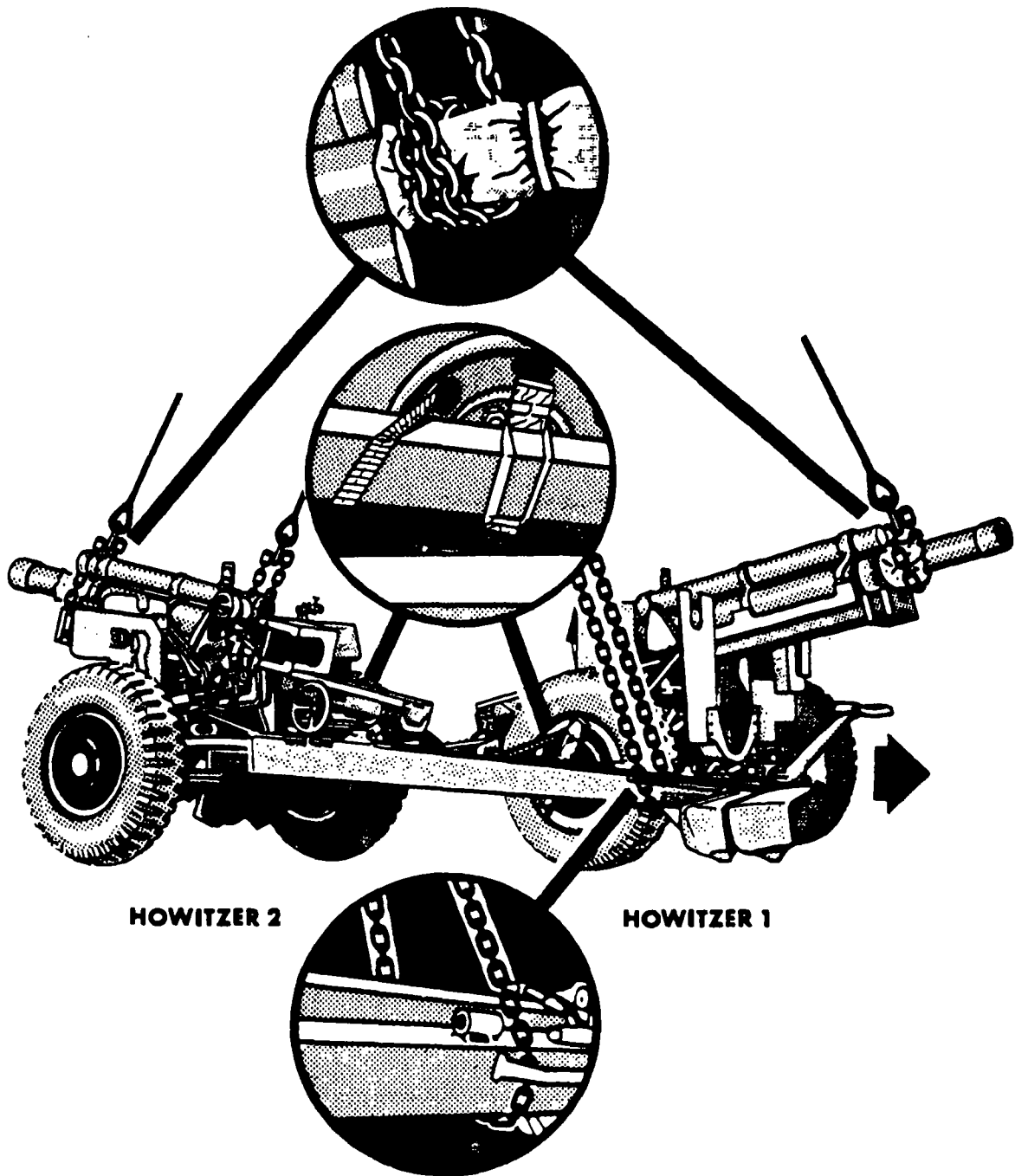
### **Step 3. Hookup**

**NOTE:** Connect the apex fitting to the cargo hook so the barrel end of howitzer 1 is forward.

The hookup team stands on the trails near the wheels. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the howitzers and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## **GUIDED MISSILE SYSTEMS**

\*The certified single-point rigging procedures for guided missile systems are in this section. Figures 2-36 through 2-40.1 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

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### **Figure 2-36. M54A1 and M54A2 Chaparral Launch Station**

#### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-47 helicopters at airspeeds up to and including 100 knots.

#### **LOAD DESCRIPTION**

- M54A1 Launch Station, Chaparral Air Defense System, NSN 1425-01-074-6799.
- M54A2 Launch Station, Chaparral Air Defense System, NSN 1425-01-142-4576.
- Weight: 13,000 pounds.

#### **MATERIALS**

- Sling set (25,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

#### **PERSONNEL**

Two persons can prepare and rig this load in 20 minutes.

#### **PROCEDURES**

##### **Step 1. Preparation**

- Prepare the launch station for external air transport in accordance with TM 9-1425-2585-10-1.
- Rotate the missile pedestal 90 degrees from the centerline to avoid possible sling interference.

## **Step 2. Rigging**

**NOTE:** The main power unit end of the platform is the front of the load for rigging purposes.

- Position apex fitting on top of the gunner's compartment. Route outer sling legs (1 and 2) to the front of the load (main power unit end) and inner sling legs (3 and 4) to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located on the left front corner of the platform and insert link 10 in the grabhook. Repeat with sling leg 2 and the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lift provision located on the left rear corner of the platform and insert link 3 in the grabhook. Repeat with sling leg 4 and the right rear lift provision.
- Secure all excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the gunner's compartment to prevent entanglement during hookup and lift-off.

## **Step 3. Hookup**

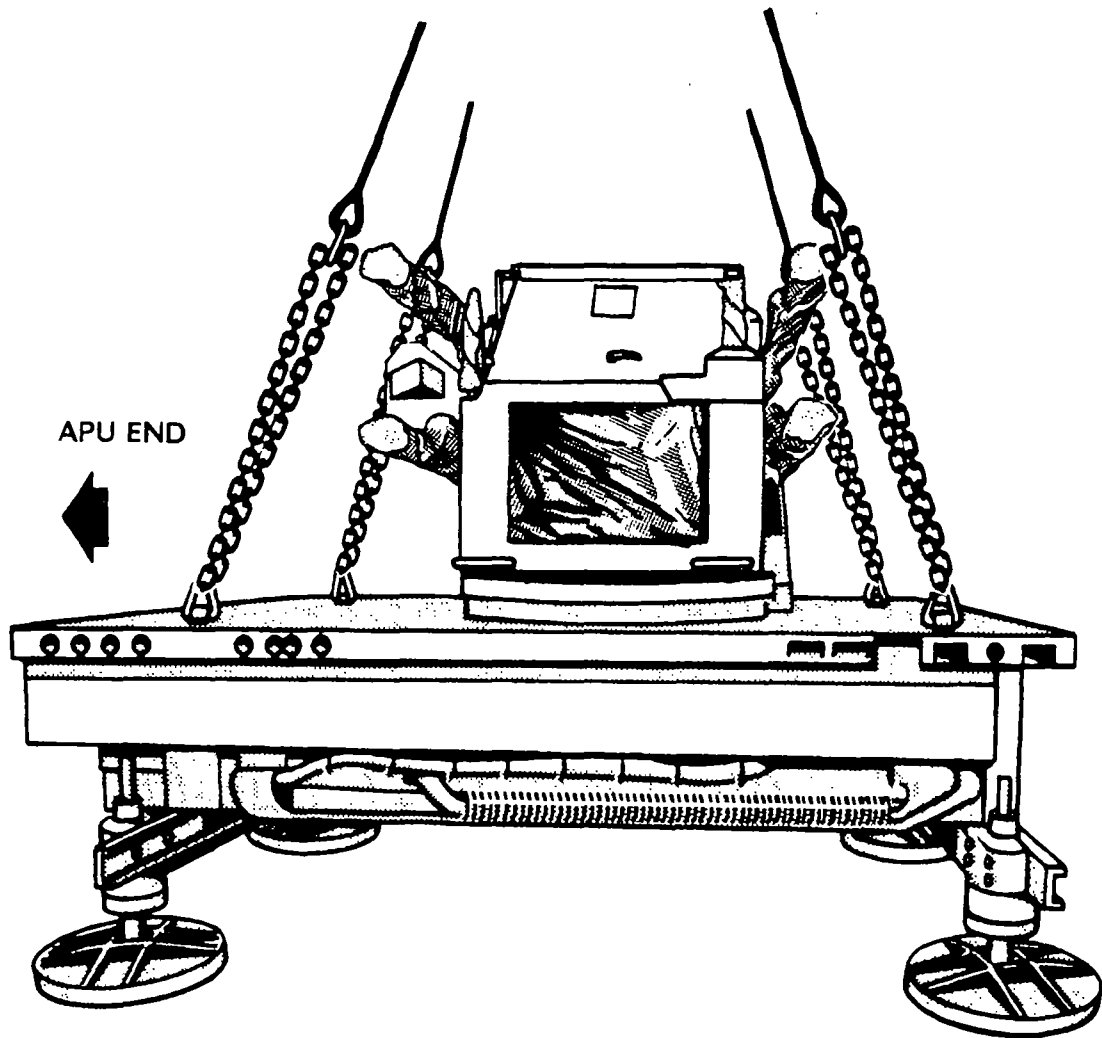
**NOTE:** Brief the aircrew to hover to the side of the load and relax sling leg tension before releasing the apex fitting to prevent damage to the missile pedestal.

The hookup team stands on the back of the gunner's compartment. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the missile platform and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

## **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## **Figure 2-37. M85 Towed Chaparral Missile System**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-47 helicopters at airspeeds up to and including 100 knots.

### **LOAD DESCRIPTION**

- Chaparral missile system, towed, M85.
- Weight: 13,000 pounds.

### **MATERIALS**

- Sling set (25,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig this load in 20 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Prepare the towed Chaparral for external air transport in accordance with TM 9-1425-2585-10-1. Make sure the four stabilizer pads are raised all the way up.
- Secure the lifting provisions on the upper portion of the four stabilizers.
- Rotate the missile pedestal 90 degrees to the right or left from the centerline to avoid possible sling leg interference.
- Retract the trailer front jack support to the fully retracted (UP) position.

#### **Step 2. Rigging**

- Position apex fitting on top of the crew compartment. Route outer sling legs 1 and 2 to the front of the platform (lunette end) and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located on the upper structure of the left front stabilizer. Insert link 28 in the grabhook. Repeat with sling leg 2 and the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lift provision located on the upper structure of the left rear stabilizer. Insert link 3 in the grabhook. Repeat with sling leg 4 and the right rear lift provision.

- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together above the crew compartment to prevent entanglement during hookup and lift-off.

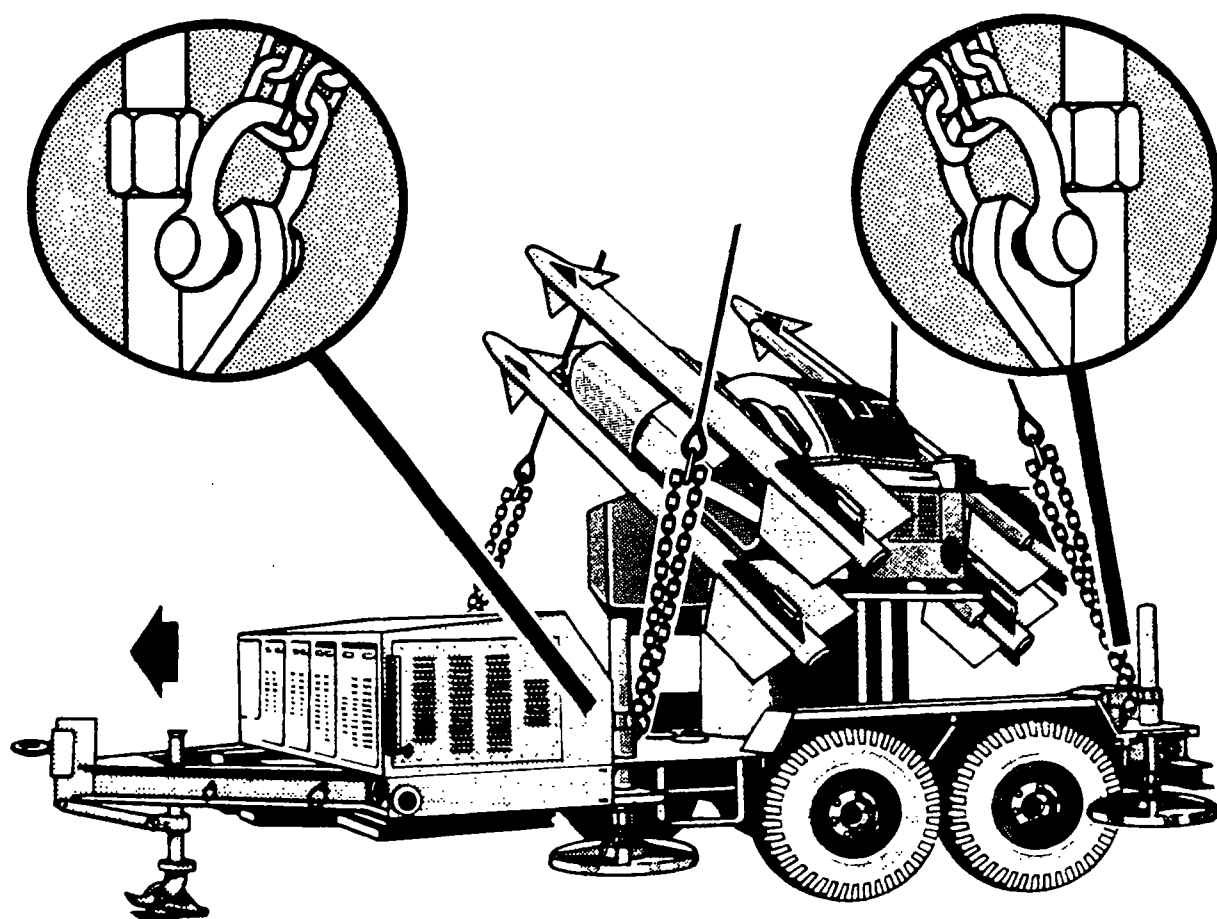
### **Step 3. Hookup**

**NOTE:** Brief the aircrew to hover to the side of the load and relax sling leg tension before releasing the apex fitting to prevent damage to the missile pedestal.

The hookup team stands on the back of the crew compartment. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the missile platform and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-38. Continuous Wave Acquisition Radar (CWAR)**

### **APPLICABILITY**

This load, a component of the HAWK Missile System, is certified by the US Army NRDEC for CH-47 helicopters at airspeeds up to and including 75 knots.

### **LOAD DESCRIPTION**

- Continuous Wave Acquisition Radar (CWAR), Phase II mounted on the M514 trailer chassis.
- Weight: 4,898 pounds.
- Continuous Wave Acquisition Radar (CWAR), Phase III mounted on the M514 trailer chassis.
- Weight: 4,840 pounds.

### **MATERIALS**

- Sling set (25,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Cord, nylon, Type III, 550-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig the load in 20 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Prepare the CWAR for general travel according to the operator's manual. Secure shipping cover over the radar.
- Extend the rear leveling jack so that the CWAR is level.
- Secure all doors and vents with tape or nylon cord.
- Secure safety chains and hoses to trailer frame chassis with tape or nylon cord.

#### **Step 2. Rigging**

- Position apex fitting on top of the radar antenna. Route outer sling legs 1 and 2 to the front of the trailer (lunette end) and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Route the chain end of sling leg 1 down through the opening between the left front leveling jack bracket and the trailer A-frame, under the short cross members, and back up through the opening between the leveling jack bracket and the front of the trailer chassis. Insert

link 3 in the grabhook. Make sure the chain is clear of the hand brake handle. Repeat with sling leg 2 on the right side of the trailer A-frame.

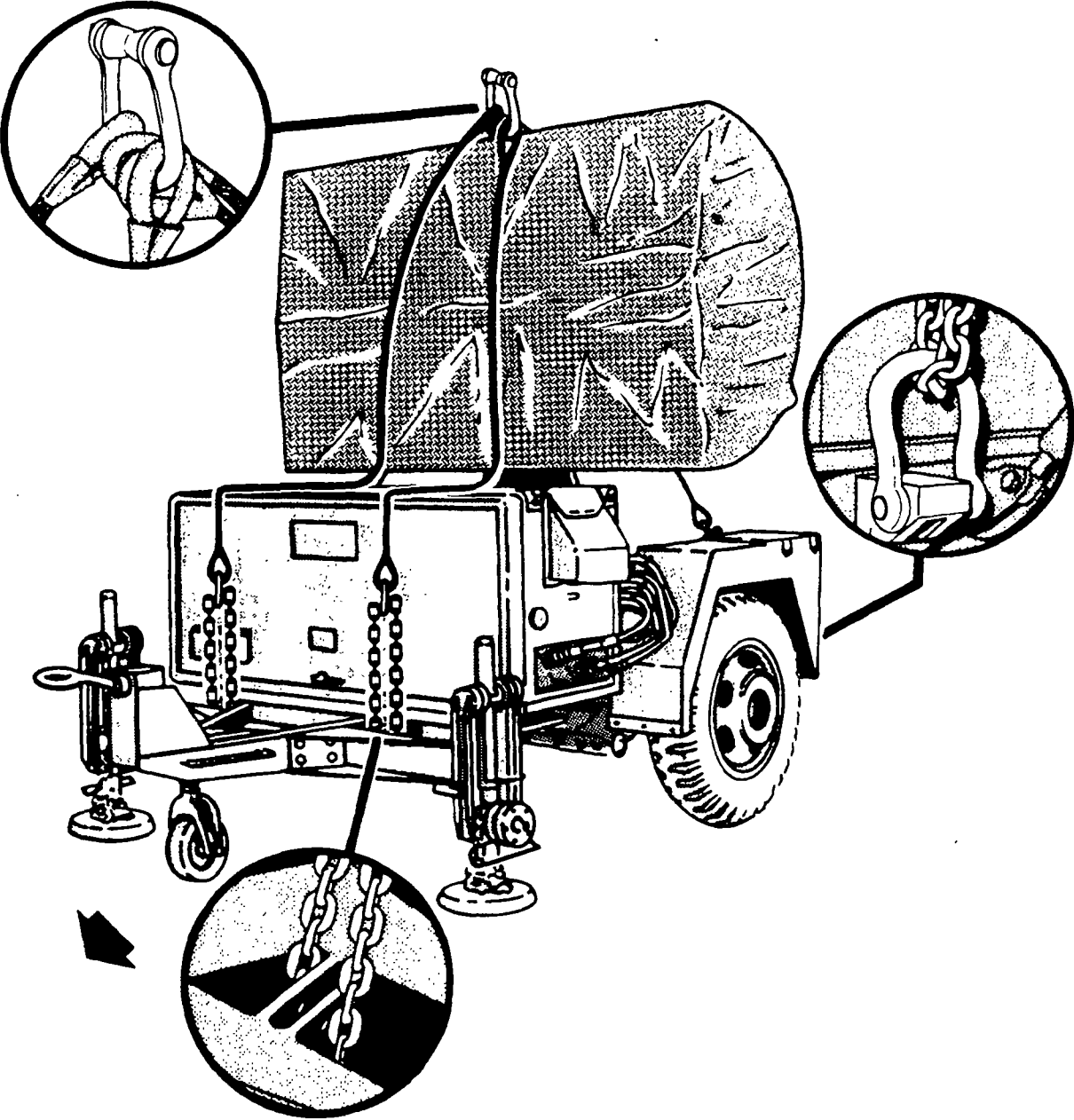
- Loop the chain end of sling leg 3 through the left rear lift provision located on the left rear corner of the trailer chassis outboard of the support rod and insert link 14 in the grabhook. Repeat with sling leg 4 and the right rear lift provision.
- Secure excess chain with tape or nylon cord.
- Pull the front sling legs up and tape or tie (break away technique) the chains together at the top of the leveling jack bracket. Tape or tie (breakaway technique) the front sling leg grabhooks to the back of the front compartment so the chains do not become entangled during hookup and lift-off.
- Pull the aft sling legs up and tape or tie (breakaway technique) the grabhooks to the base of the antenna support so the chains do not become entangled in the rear support leg.
- Position the apex fitting so that it sits vertically on top of the radar antenna. Tape in place (breakaway technique) so the helicopter aircrew can pick it up using the helicopter cargo loading pole.

### **Step 3. Hookup**

This load does not use a ground crew to connect the load to the aircraft cargo hook. As the helicopter hovers over the load, the flight engineer hooks the apex fitting with the helicopter cargo loading pole, lifts the apex fitting up, and places it on the aircraft cargo hook. The ground crew stands by the trailer and checks to make sure the sling legs do not become entangled as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## Figure 2-39. M192E1 Zero-Length Launcher

### APPLICABILITY

This load, a component of the HAWK Missile System, is certified by the US Army NRDEC for CH-47 helicopters at airspeeds up to and including 90 knots.

### LOAD DESCRIPTION

- Guided Missile Launcher, Zero-Length, M192E1, NSN 1440-00-805-3012.
- Weight: 4,482 pounds.

### MATERIALS

- Sling set (25,000-pound capacity).

**NOTE:** The 10,000-pound capacity sling set may be substituted for the 25,000-pound sling set by using the chain link count conversion chart in Appendix B.

- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Nylon, tubular, 1/2-inch, 1000-pound breaking strength (16 foot section).

### PERSONNEL

Two persons can prepare and rig this load in 20 minutes.

### PROCEDURES

#### Step 1. Preparation

- Prepare the launcher for general travel in accordance with the operator's manual.
- Secure all doors and vents with nylon cord or tape.
- Secure all chains and hoses to the adjacent structure with nylon cord or tape.
- Load the launcher section control box inside the helicopter. Following the aircrew's instructions, secure the box with tie-down straps.

#### Step 2. Rigging

- Position apex fitting on top of the launch stand pedestal. Route outer sling legs 1 and 2 to the front of the launcher (lunette end) and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located aft of the leveling cylinder outboard end. Insert link 53 in the grabhook. Repeat with sling leg 2 and the right front lift provision. Make sure you route the chain from the inside of the lifting



provision to the outside so the hook on the grabhook faces outboard when you insert the chain in the grabhook.

- The 16-foot length of tubular nylon is used to prevent sling legs 1 and 2 from interfering with the two outer booms. Route one end of the tubular nylon through the potted eye of one of the sling legs. Route the same end of the tubular nylon through the potted eye of the other sling leg. Position the potted eyes of the two sling legs 32 inches apart so the sling legs cannot contact the two outer launch booms or the center boom. Using the remainder of the tubular nylon, repeat the procedure until there are at least 5 lengths of nylon (2 1/2 complete wraps) between the potted eyes on the two sling legs. Tie the two ends together with a square knot and secure each free end with an overhand knot or half hitch.

**NOTE:** Do not route the tubular nylon between the chains or grabhooks. Failure to attach the tubular nylon between the sling leg potted eyes may result in damage to the missile launch booms or failure of the load.

- Loop the chain end of sling leg 3 through the left rear lift provision located above the taillight and insert link 53 in the grabhook. Repeat with sling leg 4 and the right rear lift provision.
- Secure excess chain with tape or nylon cord.
- Pull the sling legs up and tie or tape (breakaway technique) the grabhooks to the boom supports. Cluster and tie or tape (breakaway technique) all sling legs together above the center launch boom to prevent entanglement during hookup and lift-off.

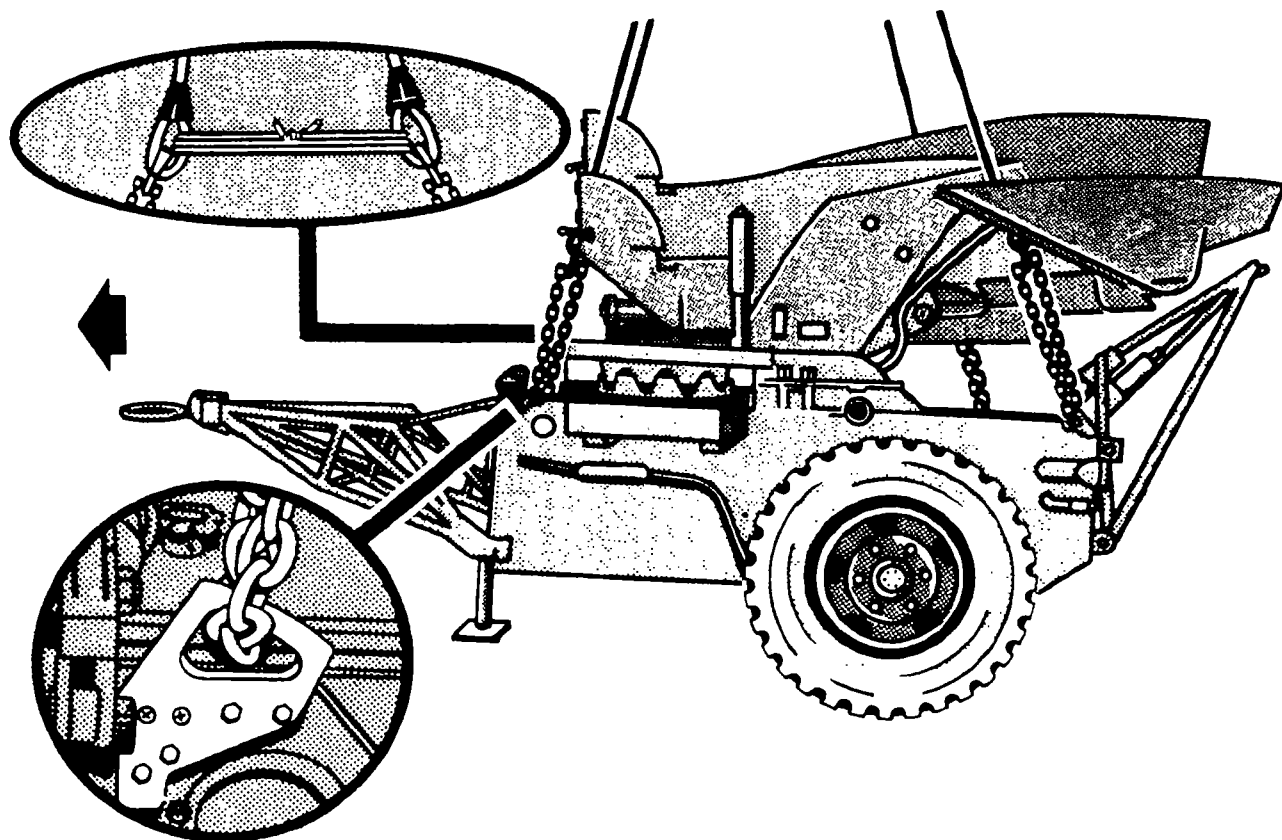
### Step 3. Hookup

The hookup team stands on the launcher on each side of the pedestal. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the launcher and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

Due to the relatively small clearance between the top of the load and the helicopter during hookup, it may be desirable for the helicopter flight engineer to make the hookup using the cargo loading pole (shepherd's hook). Place the apex fitting on top of the center launch boom with the pin end facing up. Ground crew personnel must stand by to make sure the sling legs do not become entangled on the load.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-40. XM501E3 Loader - Transporter, Guided Missile**

### **APPLICABILITY**

This load, a component of the HAWK Guided Missile System, is certified by the US Army NRDEC for the CH-47 helicopter at airspeeds up to and including 100 knots.

### **LOAD DESCRIPTION**

- Loader-Transporter, Guided Missile, XM501E3, NSN 1450-00-066-8873.
- Weight: 5,650 pounds.

### **MATERIALS**

- Sling set (25,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig this load in 20 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

With the loader-transporter engine ON, raise the super structure about 3 feet using the EXTENSION lever. Detach the operator's protective device from the rear missile support and rotate the protective device out over the left fender beyond the normals towed position. Using the ROLL/ELEVATION, AZIMUTH, and EXTENSION levers, position the superstructure in the TRANSPORT position. Shut engine down and place transmission in neutral.

- Secure the superstructure arms in the transport lock position by engaging the lock pins. SUPERSTRUCTURE CANNOT BE ALLOWED TO MOVE.
- Secure all doors, vents, and covers with tape or nylon cord.
- Secure chains and hoses with tape or nylon cord.

#### **Step 2. Rigging**

- Position apex fitting on top of the loader arm at the center of the vehicle.
- Route outer sling legs 1 and 2 to the front (driver's compartment) of the vehicle. Make sure the two sling legs are routed inboard of the outer two upper hoisting beams and outboard of the two lower superstructure arms.

- Route inner sling legs 3 and 4 to the rear (engine compartment). Make sure the two sling legs are routed in board of the outer two upper hoisting beams. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision clevis located inboard of the left front wheel and insert link 3 in the grabhook. Repeat with sling leg 2 and the right front lift provision clevis.
- Loop the chain end of sling leg 3 through the left rear lift provision clevis located inboard of the left rear fender and insert link 13 in the grabhook. Repeat with sling leg 4 and the right rear lift provision clevis.
- Secure excess chain with tape or nylon cord.
- Lift sling leg 1 and tie or tape (breakaway technique) the grabhook or sling leg to the hoisting beams so the chain does not become slack and entangled during hookup. Repeat with sling legs 2, 3, and 4.
- The sling legs are easily entangled on the superstructure arms during hookup. Cluster and tie or tape (breakaway technique) all sling legs together on top of the hoisting beams to prevent entanglement during hookup and lift-off.

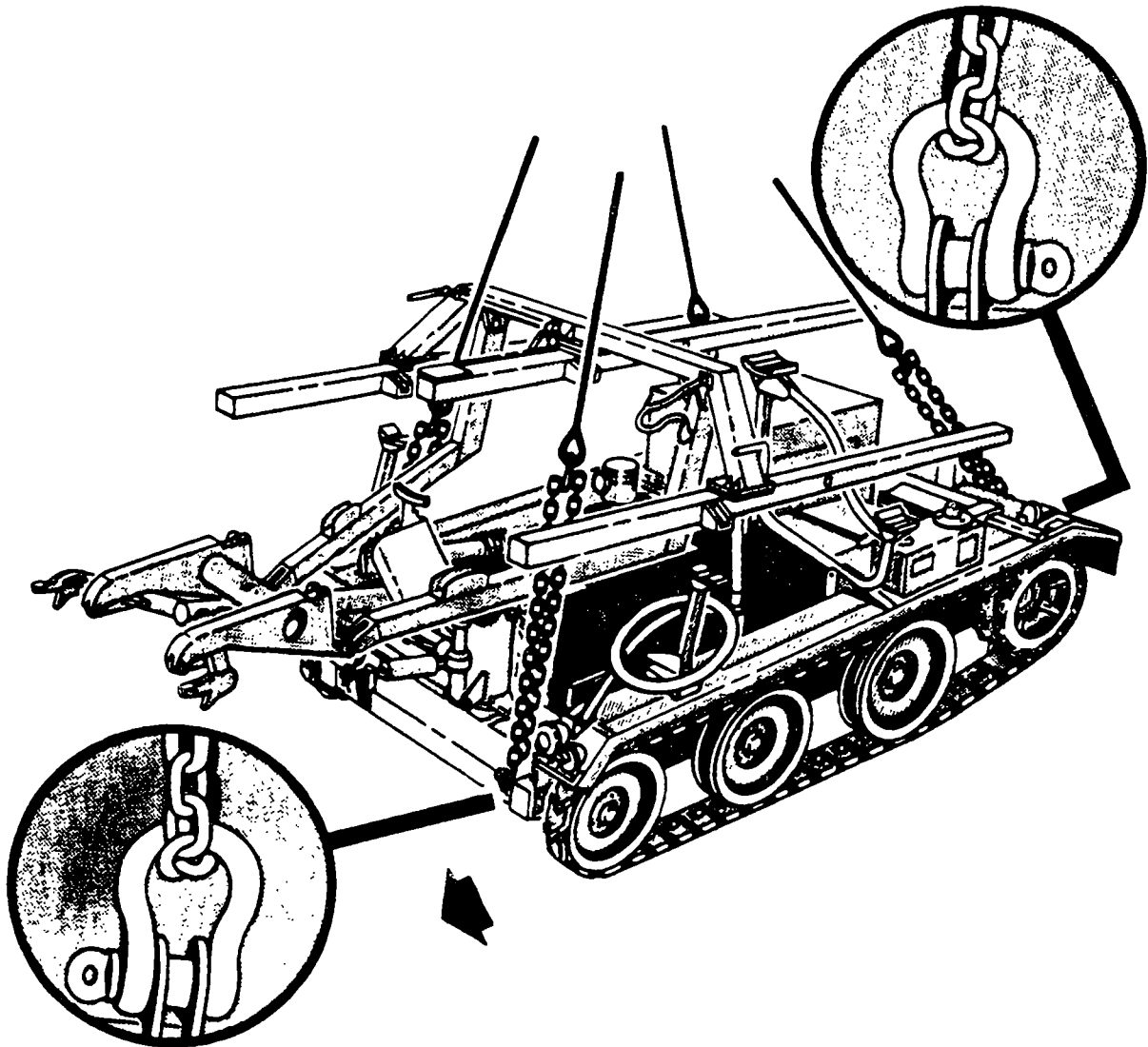
### Step 3. Hookup

**NOTE:** Connect the apex fitting to the cargo hook so the driver's compartment is forward.

The hookup team stands on the loader-transporter on each side of the center of the vehicle. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the vehicle and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **\*Figure 2-40.1. Pedestal-Mounted Stinger (Avenger)**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for the CH-47 and CH-53 helicopters at airspeeds up to and including 90 knots.

### **LOAD DESCRIPTION**

- Pedestal-mounted stinger (Avenger), NSN 1430-01-286-1314.
- Weight: 8,513 pounds.

### **MATERIALS**

- For CH-47:
  - Sling set (10,000-pound capacity).
- For CH-53:
  - Multileg sling set (15,000-pound capacity) or sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig this load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Fold mirrors forward in front of the windshield for added protection and tie together using nylon cord.
- Ensure that the Avenger fire unit is properly secured to the truck. Secure all equipment inside the fire unit with tape, nylon cord, or lashings; close and secure the hatch.
- Disconnect the standard vehicle mounted launcher connectors from the missile pods and secure them to the fire unit with tape or nylon cord.
- Secure all other equipment inside the vehicle with tape, nylon cord, or lashings. Secure doors shut (if installed).
- Make sure that the fuel tank is not over 3/4 full. Inspect fuel tank, oil filler, and battery caps for proper installation.

- Engage the vehicle parking brake and put the transmission in neutral.
- Ensure that the truck front wheels are pointed straight ahead. Tie down the steering wheel using the securing device attached under the dashboard.

### **Step 2. Rigging**

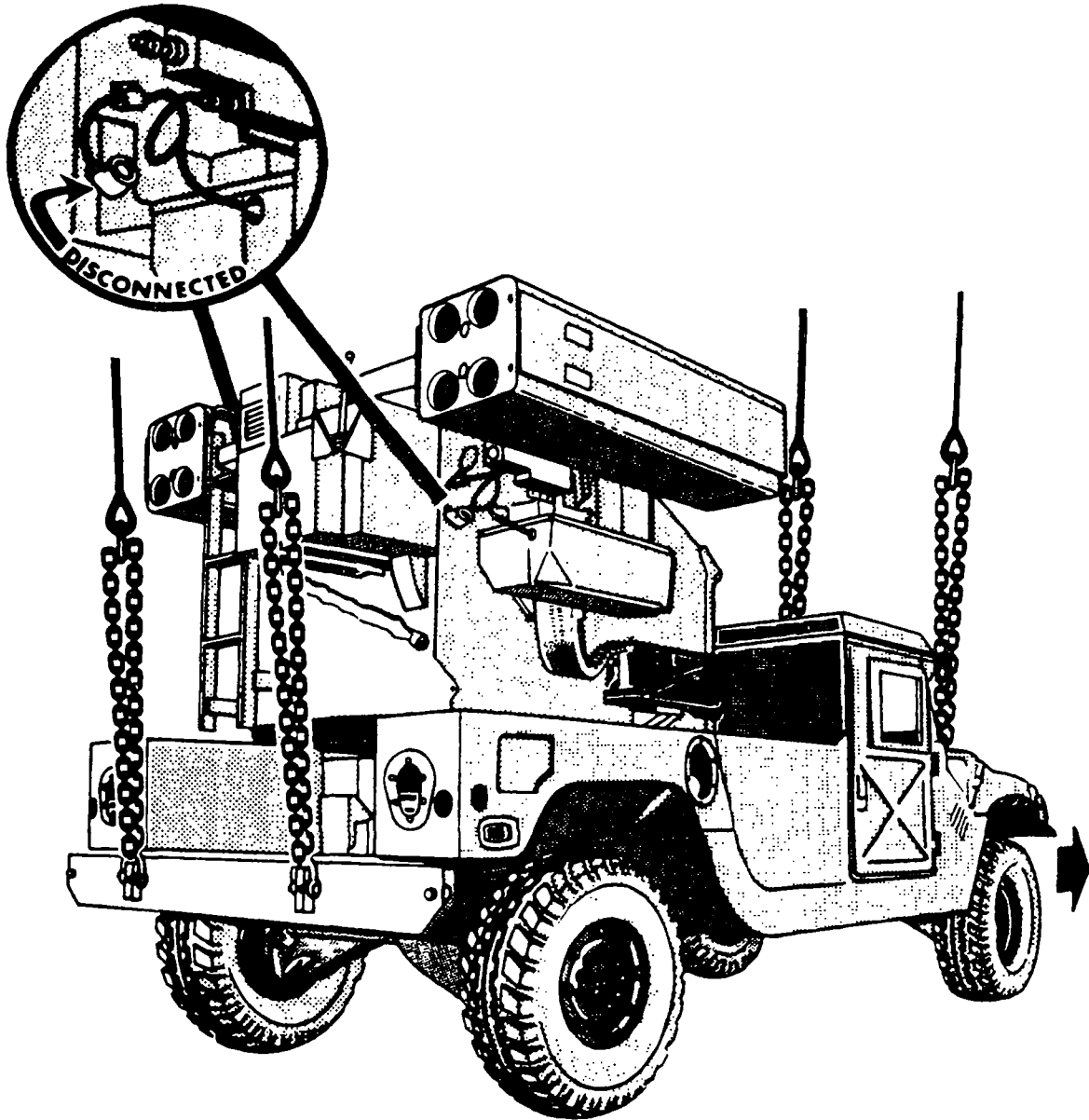
- Position the apex fitting/web ring on top of the fire unit. Route outer sling legs (1 and 2) to the front of the vehicle and inner sling legs (3 and 4) to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision that protrudes through the hood and insert link 50 (10,000-pound sling set), link 40 (15,000-pound sling set), or link 32 (40,000-pound sling set) in the grabhook/grab link. Position with sling leg 2 on the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lift provision located on the rear bumper and insert link 5 (10,000- and 15,000-pound sling set) or link 4 (40,000-pound sling set) in the grabhook/grab link. Position the sling leg in the sling guide on top of the fire unit. Secure the sling guide in place with the quick release pin. Repeat with sling leg 4 on the right rear lift provision.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the fire unit to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

The hookup team stands on top of the fire unit. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting/web ring onto the aircraft cargo hook. The hookup team then carefully dismounts the vehicle and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of preparation and rigging procedures in steps 1 and 2.







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## ENGINEER EQUIPMENT

\*The certified single-point rigging procedures for engineer equipment are in this section. Figures 2-41 through 2-71.1 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

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### Figure 2-41. T-3 Tractor, Crawler

#### APPLICABILITY

This load is certified by the Military Traffic Management Command, Transportation Engineering Agency (MTMC TEA) for CH-47 and CH-54 helicopters at airspeeds up to and including 90 knots.

#### LOAD DESCRIPTION

- Tractor, full-tracked, diesel-engine driven, JD-550, equipped with roll-over protection system (ROPS), towing winch, and hydraulic angle blade, LIN W76336.
- Weight: 16,662 pounds with 3/4 tank of fuel.

#### MATERIALS

- Sling set (25,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Padding, cellulose or suitable substitute.

#### PERSONNEL

Two persons can prepare and rig this load in 10 minutes.

#### PROCEDURES

##### Step 1. Preparation

- Make sure that T-3 fuel tank is not over 3/4 full.
- Secure the operator's seat cushions to the seat frame with tape or nylon cord.
- Remove both canopy lights, wrap in padding, and store in tractor toolbox.
- Secure all loose covers and panels with tape or nylon cord.
- Place the transmission in neutral, start the engine, and raise the blade 12 inches above the ground. Align the blade 90 degrees to the tractor. Turn the engine off and tape the ignition key in place to prevent loss.

## **Step 2. Rigging**

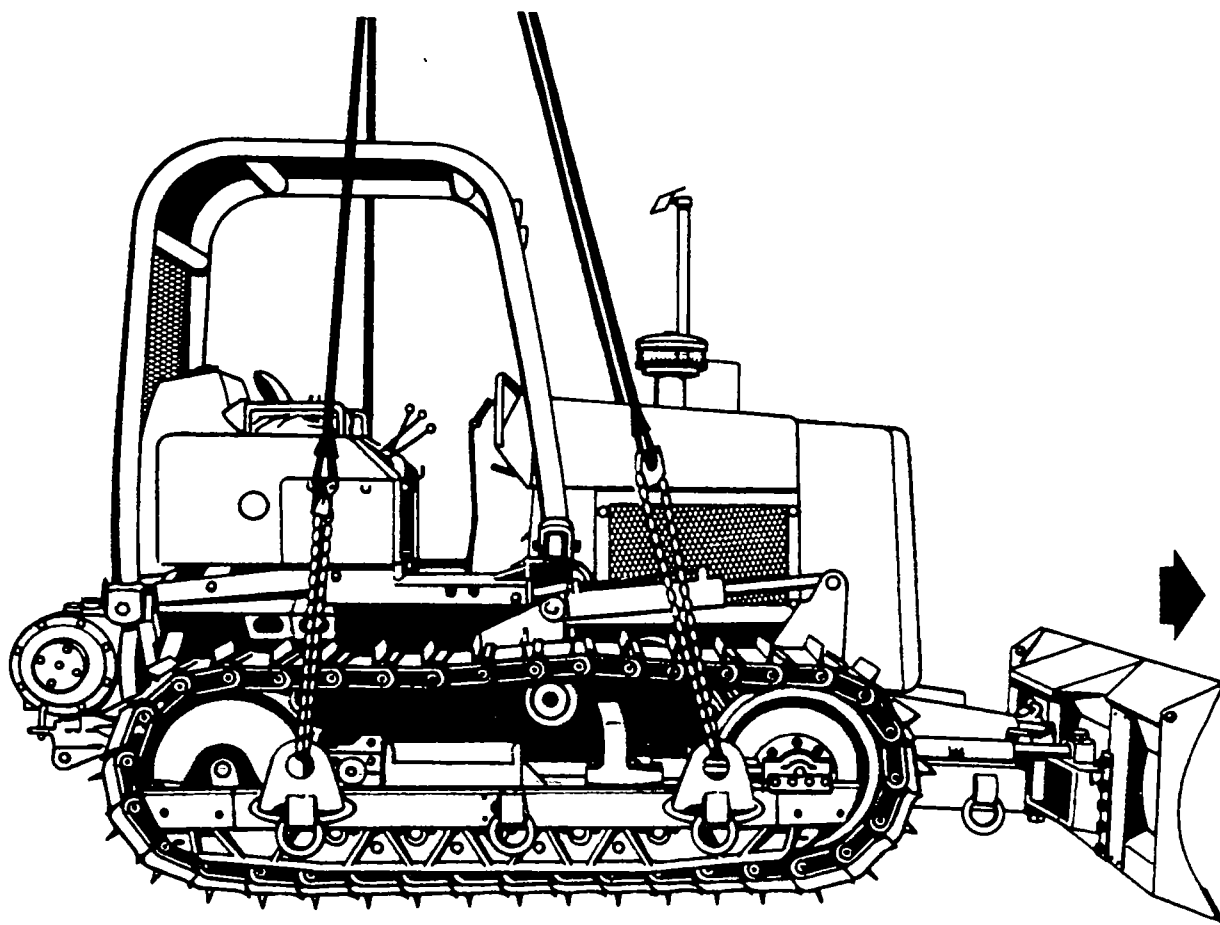
- Position apex fitting on top of the ROPS. Route outer sling legs 1 and 2 to the front of the tractor and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located just aft of the front of the left track and insert link 10 in the grabhook. Repeat with sling leg 2 on the right front lift provision located on the right track.
- Loop the chain end of sling leg 3 through the left rear lift provision located forward of the left track rear wheel and insert link 20 in the grabhook. Repeat with sling leg 4 on the right rear lift provision located on the right track.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

## **Step 3. Hookup**

The hookup team stands on the engine cowl in front of the ROPS. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the engine cowl and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

## **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-42. D5B Tractor, Dozer**

### **APPLICABILITY**

The D5B tractor power section and track section are certified by the US Army NRDEC for the CH-47 helicopter at airspeeds up to and including 70 and 90 knots, respectively.

### **LOAD DESCRIPTION**

- D5B tractor, dozer, Type II, sectionalized, LIN W76268.
- Weight
  - Power section without ROPS, 18,915 pounds.
  - Track section, 13,735 pounds.

### **MATERIALS**

- Sling set (25,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.

### **PERSONNEL**

- Four persons can sectionalize the dozer in 2 1/2 hours.
- Two persons can prepare and rig each load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Sectionalize the dozer in accordance with operator's manual. Do not remove winch or winch pump.
- Remove the exhaust stack and secure on top of the winch with nylon cord.
- Remove pre-air cleaner and secure on seat with nylon cord.
- Tape over lights and gages to prevent breakage.
- Secure seat with nylon cord.
- Place transmission in neutral and secure safety lock lever with nylon cord.

#### **Step 2. Rigging**

- Power section:

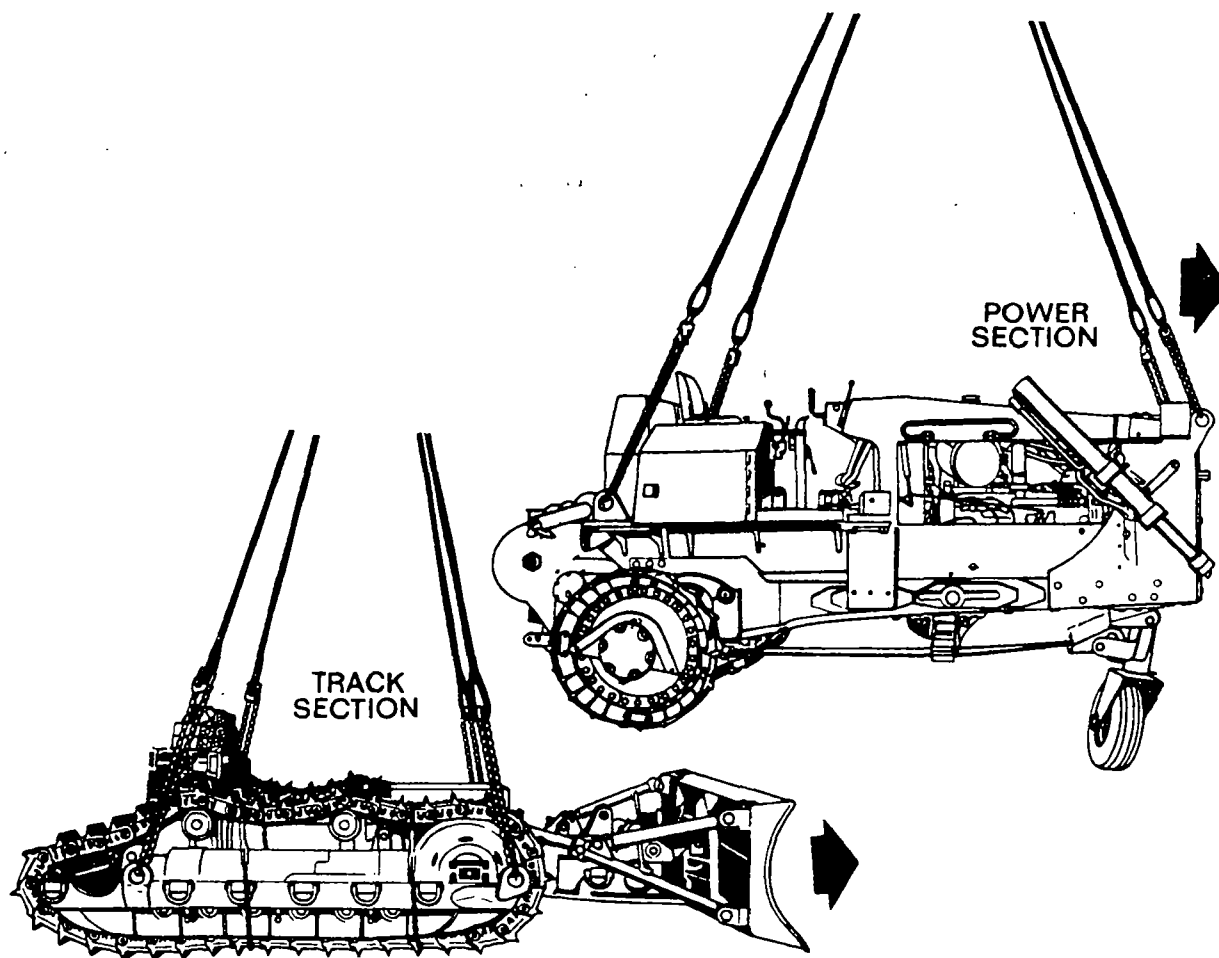
- Position apex fitting on top of the section. Route outer sling legs 1 and 2 to the front (radiator end) of the section and inner sling legs 3 and 4 to the rear (operator seat) end. Sling legs 1 and 3 should be on the left side of the load.
  - Loop the chain end of sling leg 1 through the left front lift provision by the left headlight and insert link 47 in the grabhook. Repeat with sling leg 2 on the right front lift provision.
  - Loop the chain end of sling leg 3 through the left rear lift provision located beside the fuel tank and insert link 8 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.
  - Secure excess chain with tape or nylon cord.
- Track section:
    - Position apex fitting on top of the section. Route outer sling legs 1 and 2 to the front (blade) end and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side of the load.
    - Loop the chain end of sling leg 1 through the left front lift provision and insert link 21 in the grabhook. Repeat with sling leg 2 on the right front lift provision. Secure excess chain with tape or nylon cord.
    - Loop the chain end of sling leg 3 through the left rear lift provision and insert link 3 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.
  - Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

The hookup team stands on top of the power or track section. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the section and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-43. Tractor, Full-Track, MC 1150E**

### **APPLICABILITY**

This load is being certified by the US Army NRDEC for CH-53 helicopters at airspeeds up to and including 75 knots.

### **LOAD DESCRIPTION**

- Tractor, full-tracked, MC 1150E, TAMCN B2460, NSN 2410-01-254-1667.
- Weight: 24,062 pounds.

### **MATERIALS**

- Sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Padding, felt or suitable substitute.
- Chain, 8-foot, part no. JETS-WMC-5000 (10,000-pound capacity) from a 40,000-pound sling set (2 each).
- Coupling link, part no. 577-0815 (2 each).
- Tie-down chain assembly (10,000-pound capacity), MB-1.

### **PERSONNEL**

Two persons can prepare and rig this load in 30 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Elevate the blade two feet off the ground. Using the tie-down chain, secure the blade in the UP position to prevent the blade from creeping down.
- Twist the lights on the cab inward. Tape over the lights, glass fixtures, and exhaust pipe opening.
- Make sure that all caps, lids, and hatches are securely fastened.
- Engage the hand brake and place the transmission in neutral.

#### **Step 2. Rigging**

**NOTE:** This load is rigged to carry blade forward.



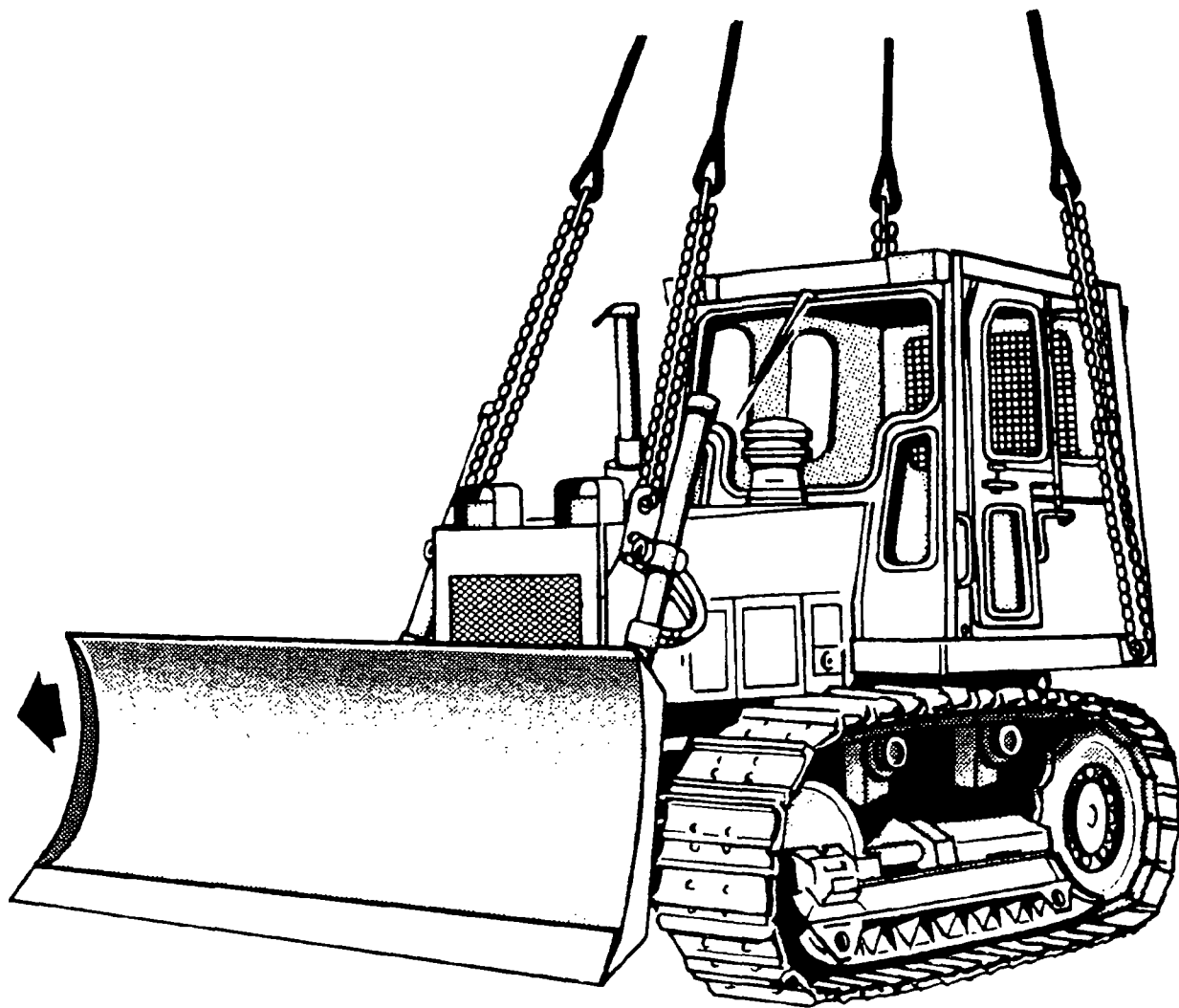
- Position apex fitting on top of the cab. Route outer sling legs 1 and 2 to the front of the tractor and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located on the left front corner of the engine deck. Insert link 5 in the grab link. Repeat with sling leg 2 and the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lift provision mounted near the base of the cab. Using the coupling link, add the additional chain section to the sling leg chain assembly. Insert link 35 in the grab link. Repeat with sling leg 4 and the right rear lift provision. Add the additional chain section after the sling leg chain is looped through the lift provision because the coupling link will not fit through the opening in the lift provision. Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the tractor to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

The hookup team stands on top of the engine deck or cab. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the tractor and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-44. Tractor, Wheeled, Industrial, Case Model 580**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-53E helicopters at airspeeds up to and including 80 knots.

### **LOAD DESCRIPTION**

- Tractor, rough terrain (RT), wheeled, industrial, case model 580, TAMCN B2467, NSN 2420-00-156-4583.
- Weight: 10,500 pounds.

### **MATERIALS**

- Multileg sling set (15,000-pound capacity) with two 6-foot chain extensions and two coupling links; or sling set (40,000-pound capacity) with two 8-foot chain extensions and two coupling links (part no. 577-0815).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tie-down strap, cargo, CGU-1/B (5,000-pound capacity) (2 each).

### **PERSONNEL**

Two persons can prepare and rig this load in 20 minutes.

### **PROCEDURES**

#### **Step 1. Preparation.**

- Elevate front bucket halfway and tilt bucket toward the rear.
- Position rear backhoe arm with backhoe in the up position and secure with tie-down straps to prevent the backhoe arm from swinging freely. Route the straps from each stabilizer to the backhoe arm.
- Tape all lights and glass fixtures, and tape exhaust pipe shut.
- Ensure that all caps, lids, and hatches are securely fastened.
- Engage hand brake and place transmission in neutral.

#### **Step 2. Rigging**

**NOTE:** This load is rigged to fly large bucket forward.

**NOTE:** Chain link number inside parentheses is used for the 40,000-pound sling set.

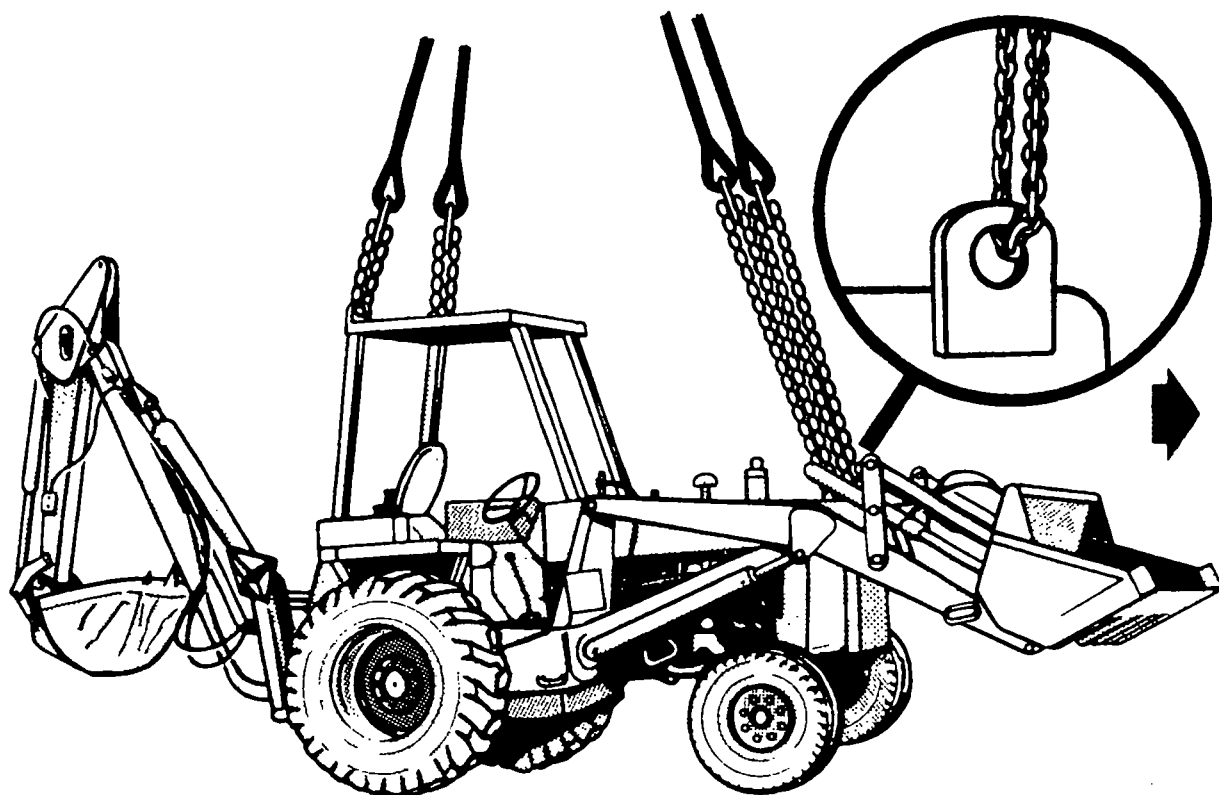
- Position apex fitting/web ring on top of the engine deck. Route outer sling legs 1 and 2 to the front of the tractor and inner sling legs 3 and 4 to the rear of the tractor. Sling legs 1 and 3 must be on the left side of the load. Using the proper connecting link, join the two chain extensions to sling legs 1 and 2.
- Loop the chain end of sling leg 1 through the left front lift provision located on the left front corner of the engine hood and insert link 30 (45) in the grab link. Repeat with sling leg 2 and the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lift provision located on the left rear corner of the ROPS and insert link 54 (54) in the grab link. Repeat with sling leg 4 and the right rear lift provision.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the tractor to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

The hookup team stands on top of the engine deck or ROPS. The static wand person discharges the static electricity with the static wand. The hookup person places the web ring/apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the tractor and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Rigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## Figure 2-45. Small Emplacement Excavator

### APPLICABILITY

This load is certified by the US Army NRDEC for CH-47, CH-54, and CH-53E helicopters at airspeeds up to and including 110, 95, and 120 knots, respectively.

### LOAD DESCRIPTION

- Small emplacement excavator (SEE), LIN T34437 or TAMCN B2482, NSN 2420-01-160-2754.
- Weight: 16,240 pounds.

### MATERIALS

- Sling set (25,000-pound capacity) (CH-47 or CH-54 only) or sling set (40,000-pound capacity) (CH-53E only).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Padding, felt or suitable substitute.

### PERSONNEL

Two persons can prepare and rig this load in 30 minutes.

### PROCEDURES

#### Step 1. Preparation

- Elevate the bucket halfway and tilt toward the rear. Ensure that the front end loader assembly travel locks located at the ends of both front end loader boom cylinders are properly pinned in place.
- Secure steering wheel, doors, and all loose equipment with nylon cord or tape as necessary.
- Tape all lights and glass fixtures. Tape over the exhaust opening. (USMC)
- Fold side mirrors inboard and tie or tape as required. Tape windshield wipers to windshield and tie or tape engine compartment hood securely to prevent damage during flight. (USA)
- Engage hand brake. Place transmission in NEUTRAL.
- Tie or tape hydraulic lines and hoses in close proximity to the forward lift provisions to prevent possible entanglement during hookup.

## Step 2. Rigging

**NOTE:** Chain link number inside parentheses is used for the 40,000-pound capacity sling set.

- Position apex fitting on top of the falling objects protection structure (FOPS). Route outer sling legs 1 and 2 to the front of the excavator and inner sling legs 3 and 4 to the rear (backhoe bucket end). Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located on the front bumper inboard of the front end loader left support arm. Insert link 3 (3) in the grabhook/grab link. Repeat with sling leg 2 and the right front lift provision inboard of the right support arm.
- Loop the chain end of sling leg 3 through the left rear lift provision (closest to the backhoe operator's seat) located at the top left between the left rear wheel and frame. Insert link 5 (19) in the grabhook/grab link.
- Loop the chain end of sling leg 4 through the right rear lift provision (closest to the backhoe bucket) located at the top right between the right rear wheel and frame. Insert link 10 (21) in the grabhook/grab link.
- Secure all excess chain with tape or nylon cord. Form the felt padding into a tube around the chain end of each sling leg and secure with tape or nylon cord to protect chains and the hydraulic levers.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the FOPS to prevent entanglement during hookup and lift-off.

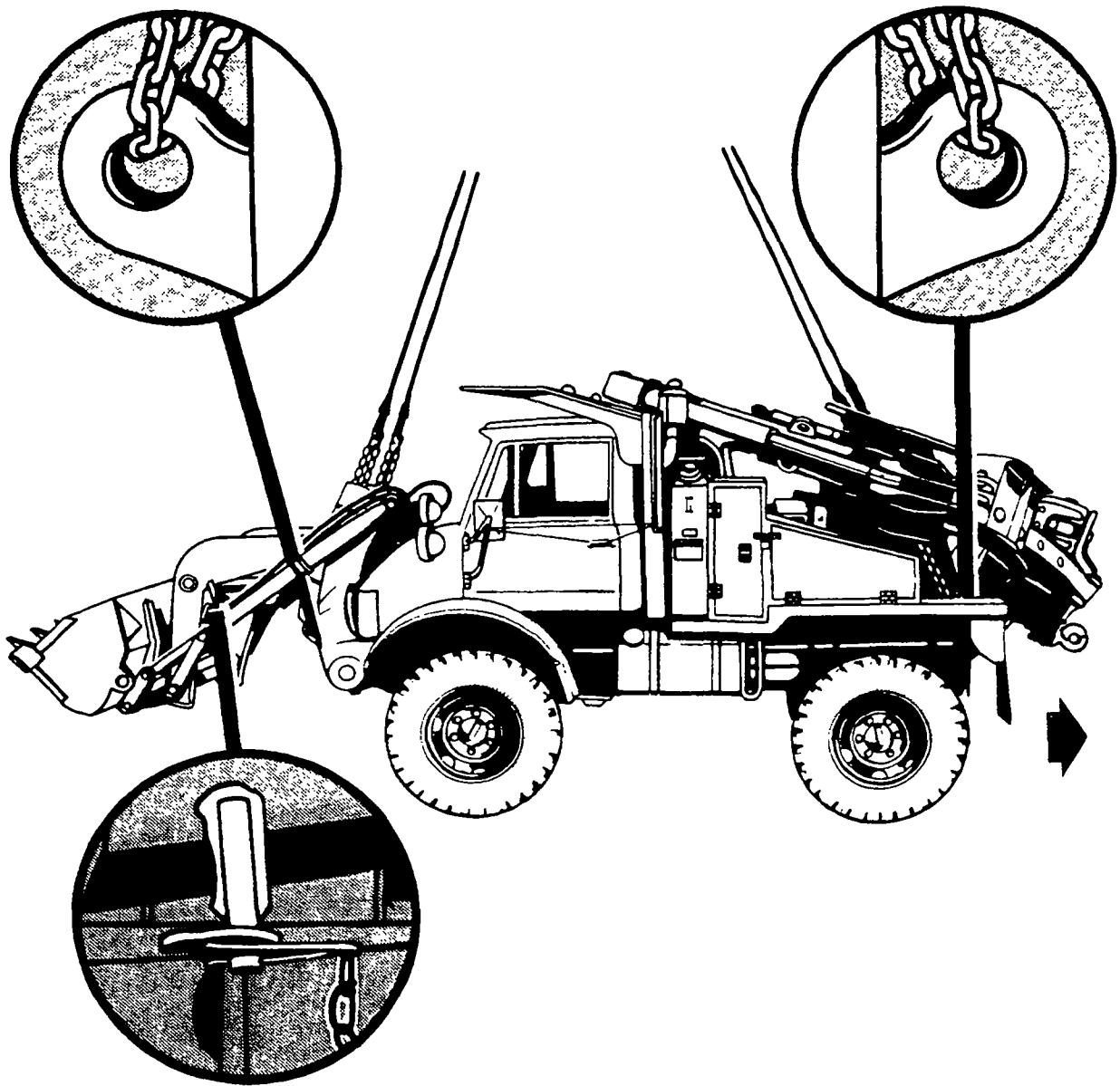
## Step 3. Hookup

**NOTE:** Connect the apex fitting so the excavator is carried front end loader aft.

The hookup team stands on top of the FOPS. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts from the excavator and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

## Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in in steps 1 and 2.





## **Figure 2-46. High Mobility Materiel Handler (HMMH)**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-47 helicopters at airspeeds up to and including 115 knots.

### **LOAD DESCRIPTION**

- High Mobility Materiel Handler (HMMH), NSN 2420-01-205-8636.
- Weight: 15,650 pounds.

### **MATERIALS**

- Sling set (25,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Padding, felt or suitable substitute.

### **PERSONNEL**

Two persons can prepare and rig this load in 30 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Ensure that all travel locks are properly pinned in place.
- Engage parking brake.
- Secure steering wheel, doors, and all loose equipment with nylon cord or tape as necessary.
- Fold side mirrors inboard and tie or tape as required.
- Tape windshield wipers to windshield to prevent damage.
- Tie and tape engine compartment hood securely.
- Tie or tape the hydraulic lines and hoses in close proximity to the forward lift provisions to prevent possible entanglement during hookup.

#### **Step 2. Rigging**

- Position apex fitting on top of the falling object protection system (FOPS). Route outer sling legs 1 and 2 to the front of the HMMH and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the driver's side of the load.

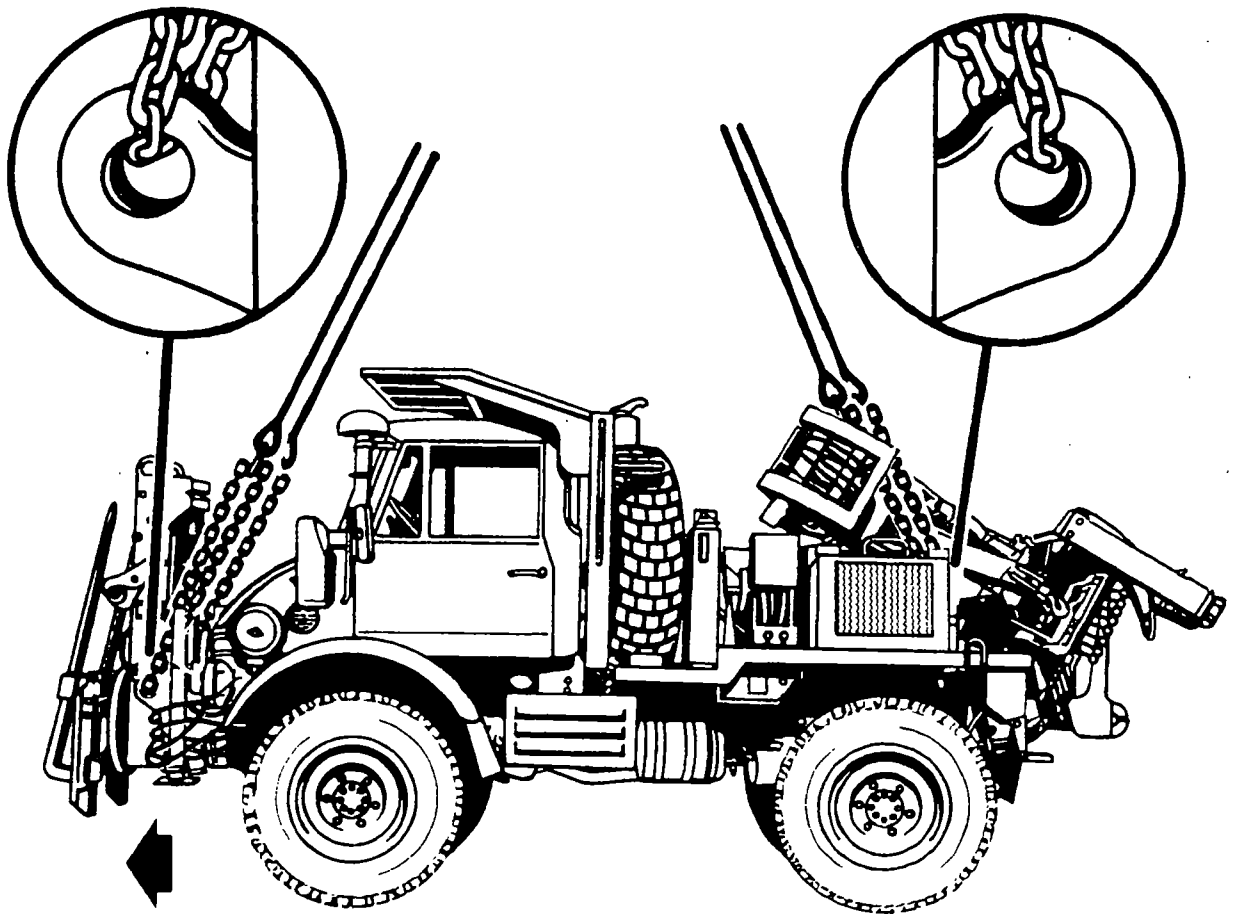
- Loop the chain end of sling leg 1 through the left front lift provision located near the front bumper outboard of the forklift frame and insert link 3 in the grabhook. Repeat with sling leg 2 and the right front lift provision.
- Wrap felt padding into a tube around the chain ends on sling legs 1 and 2 and secure with tape or nylon cord.
- Loop the chain end of sling leg 3 through the left rear lift provision located on the frame inboard of the rear wheel and insert link 3 in the grabhook. Repeat with sling leg 4 and the right rear lift provision.
- Wrap felt padding into a tube around the chain ends on sling legs 3 and 4 and secure with tape or nylon cord. Position the two sling legs at their contact point with the crane boom and tape or tie (breakaway technique).
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the truck to prevent entanglement during hookup and lift-off. Make sure the front sling legs are not twisted and interfering with the lifting forks.

### **Step 3. Hookup**

The hookup team stands on the FOPS, facing aft. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the truck and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## Figure 2-47. 950BS Scoop Loader

### APPLICABILITY

This load, when sectionalized, is certified by the US Army NRDEC for the CH-47 and CH-54 helicopters at airspeeds up to and including the following speeds:

- CH-47 - Work section, 100 knots.
- Power section, 90 knots.
- CH-54 - Work and power sections, 80 knots.

### DESCRIPTION

- Loader, scoop, model 950BS (Type II, sectionalized), LIN L76693.
- Rigged weights:
  - Work section, 15,830 pounds.
  - Power section, 16,110 pounds (with 3/4 fuel).

### MATERIALS

- Sling set (25,000-pound capacity).
- Chain assembly, 8 foot-long (2 each).
- Coupling link assembly (2 each).
- Tie-down chain assembly (10,000-pound capacity), 15-foot dacron, NSN 1670-00-937-0271 (2 each) (power section only).
- Load binder, assembly (2 each) (power section only).
- Tie-down assembly (10,000-pound capacity), MB-1, NSN 1670-00-545-9062 (2 each) (work section only).
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Plastic bags (4 each).
- Padding material (cellulose).

### PERSONNEL

- Four persons can sectionalize the scoop loader in 2.5 hours.
- Two persons can prepare and rig each section in 20 minutes.

## PROCEDURES

### Step 1. Preparation

- Sectionalize the loader according to instructions provided in the operator's manual.
- Work section:
  - Secure the bucket lift arm assembly to the work section housing with two MB-1 chain tie-down assemblies. Pass a chain around the left side of the bucket control group arm crosstube through the lift point on the housing, and secure the running ends with an MB-1 tensioning device. Repeat this procedure on the right side of the crosstube.

**CAUTION: Chains must be tight to prevent sagging of the hydraulic system during flight.**

- Cover all hitch pins and pivot holes with plastic and tape to prevent contamination by dust and dirt.
- Tape all lights.
- Secure tool basket lid, located in the bucket, with nylon cord.
- Power section:
  - Cover all hitch pins and pivot holes with plastic and tape to prevent contamination by dust and dirt.
  - Secure all hoses and cables, located on front of the section, with nylon cord to prevent damage.
  - Secure the floating axle in level position with two 15-foot tie-down assemblies. On the left side, pass the running end of a 15-foot tie-down strap down through the tie-down provision aft of the axle, under the axle, and up through the tie-down provision forward of the axle. Secure the running ends of the strap using a D-ring and load binder on top of the axle. Repeat this procedure on the right side. Fold and secure excess webbing and loadbinder with cotton webbing or tape.
  - Install the low velocity airdrop suspension provisions on the left and right sides of the operator's platform. (These provisions are used as forward lift points for EAT.) Torque mounting bolts to 640 + 80 foot-pounds.
  - Remove exhaust stack and stow on the component tray-mounted in the work section bucket. Cover opening of exhaust stack with tape.
  - Remove the pre-air cleaner and pad with cellulose padding and stow in the stowage compartment located behind the operator's seat. Cover opening of pre-air cleaner with tape.
  - Fold the back of the operator seat down and secure in place with nylon cord. Secure the seat belt over the seat back.
  - Tape all lights and instruments.
  - Secure all doors and covers with tape or nylon cord.
  - Place controls in neutral and release brakes.

## Step 2. Rigging

- Work section:

**NOTE:** Work section is rigged to fly bucket aft.

- Lay out a 25,000-pound sling set and connect the additional 8-foot chain sections to sling legs 1 and 2 using the proper coupling links.
- Position apex fitting on top of the hydraulic cylinder. Route outer sling legs 1 and 2 to the bucket end of the load and the inner sling legs 3 and 4 to the aft end. Sling legs 1 and 3 should be on the left side of the load.
- Pass the chain end of sling leg 1 through the left front lift provision, located on the left side of the back of the bucket and insert link 10 in the grabhook. Repeat with sling leg 2 on the right front lift provision on the right side of the bucket.
- Loop the chain end of sling leg 3 through the left rear lift provision, located on top of the control group left support arm, and insert link 5 in the grabhook. Repeat with sling leg 4 on the right rear lift provision on the right arm.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

- Power section:

**NOTE:** Power section is rigged to fly bumper to the rear.

- Lay out a 25,000-pound sling set and connect the additional 8-foot chain sections to sling legs 3 and 4 using the proper coupling links.
- Position apex fitting on the engine hood. Route outer sling legs 1 and 2 to the front of the load (operator's seat) and inner sling legs 3 and 4 to the rear of the load (bumper end). Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located to the left of the operator's seat above the fuel tank and insert link 10 in the grabhook. Repeat with sling leg 2 on the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lift provision located on the forward edge of the battery box aft of the left wheel and insert link 20 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.
- Secure excess chain with tape or nylon cord.

### **WARNING:**

**Do not attach sling legs 3 and 4 to frame lifting provisions located on the frame. Slings attached to these provisions may cause loss of the load in flight.**

- Pull sling legs up on top of the engine hood and secure together with cotton webbing. Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

- Work section:

**NOTE:** Connect apex fitting so that the work section is carried bucket aft.

- The hookup team stands on the wheels or fender. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the work section and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

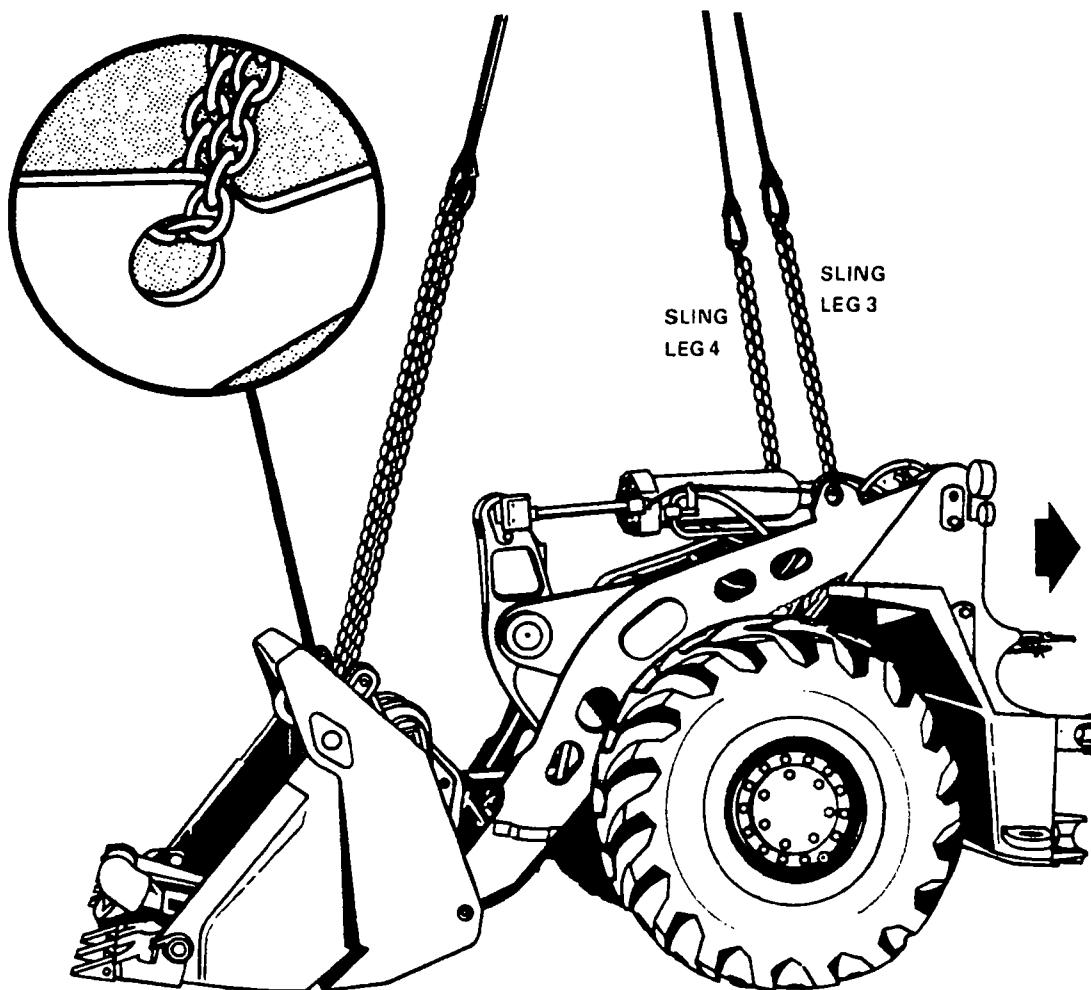
- Power section:

**NOTE:** Connect apex fitting so that the power section is carried bumper aft.

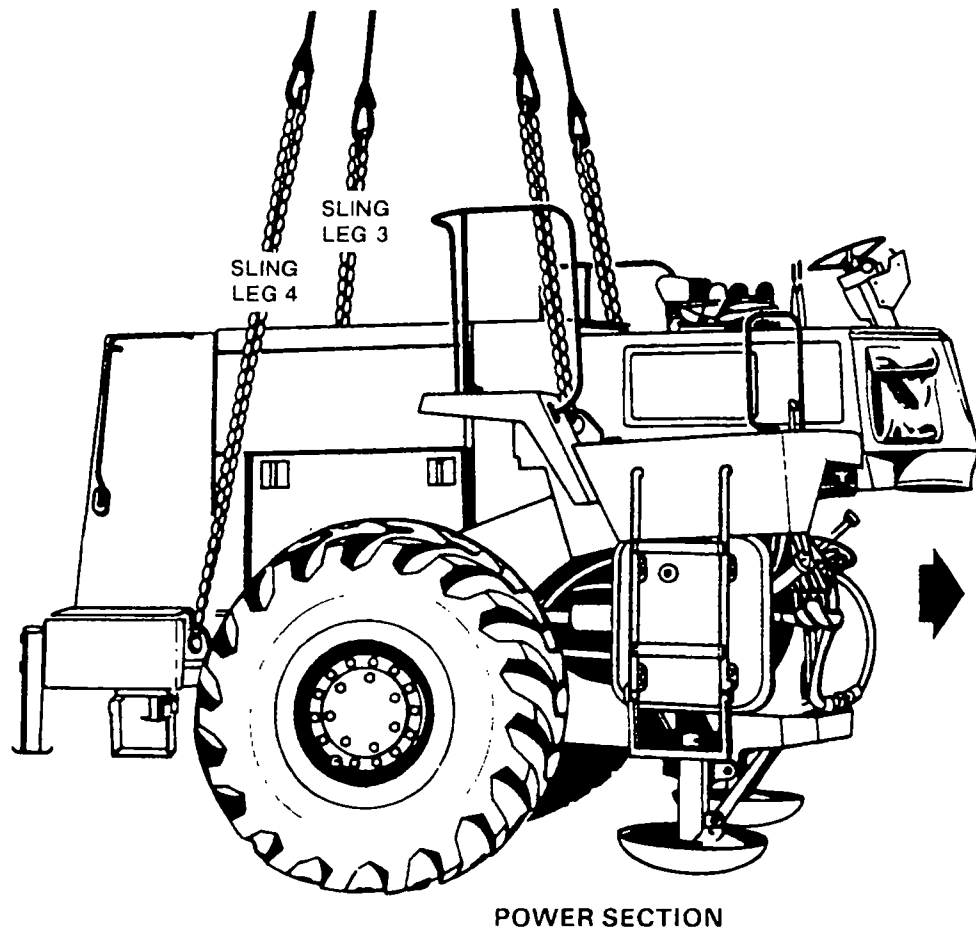
- The hookup team stands on the operator's platform. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting on the aircraft cargo hook. The hookup team then carefully dismounts the power section and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.







## Figure 2-48. 130GS Grader

### APPLICABILITY

This load is certified by the US Army NRDEC for CH-47 helicopters at airspeeds up to and including 100 knots.

### LOAD DESCRIPTION

- Grader, sectionalized, model 130 GS, LIN J74886, with front-mounted scarifier.
- Weight:
  - Front section ROPS and low-velocity airdrop (LVAD) suspension provisions removed, 16,120 pounds rigged weight.
  - Rear section, 14,270 pounds rigged weight.

### MATERIALS

- Sling set (25,000-pound capacity) (2 each).
- Tape, adhesive, pressure-sensitive 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Padding material (cellulose).
- Tie-down, cargo, CGU-1/B (2 each).
- Bags, plastic.
- Posts, wooden, 4- x 4- x 48-inch (2 each).

### PERSONNEL

Two persons can prepare and rig each load in 20 minutes after the ROPS and LVAD suspension provisions are removed and the grader is sectionalized.

### PROCEDURES

#### Step 1. Preparation

- Remove ROPS and LVAD suspension provisions mounted on the front bolster.
- Make sure fuel tank is not over 3/4 full.
- Sectionalize the 130GS grader according to the operator's manual.
- Front end:
  - Use a tie-down assembly to secure each side of the front axle to front tie-down points.

- Loosen front headlight bar, rotate forward 180 degrees, and retighten. Pad lights with padding and tape.
  - Tape work lights on forward edge of operator's platform.
  - Secure steering wheel to horizontal control bar with nylon cord on both sides. Secure seat with nylon cord.
  - Cover all pivot points in the articulated hitch group with plastic bags or a suitable substitute and tape securely to prevent fouling by sand and dirt.
- Rear section:
    - Cover all pivot points in articulated hitch group with plastic bags or suitable substitute and tape.
    - Remove throttle handle and secure in toolbox.
    - Pad instrument panel with cellulose padding and tape.
    - Remove air cleaner and exhaust stack and secure to top rail with nylon cord.
    - Tie 4- x 4- x 48-inch posts to inside rear guardrail with nylon cord.
    - Pad and tape rear working light and taillights.
    - Secure doors with one loop of nylon cord horizontally around the body of the unit.

## Step 2. Rigging

- Front section:
  - Position apex fitting on top of the front section. Route outer sling legs 1 and 2 to the front (wheel end) of the section and inner sling legs 3 and 4 to the rear end. Sling legs 1 and 3 should be on the left side of the load.
  - Loop the chain end of sling leg 1 through the left front lift provision by the left wheel and insert link 3 in the grabhook. Repeat with sling leg 2 on the right front lift provision.
  - Loop the chain end of sling leg 3 through the left rear lift provision above the blade and insert link 77 in the grabhook. Repeat with sling leg 4 on the right rear lift provision. Secure excess chain with tape or nylon cord.
- Rear section:
  - Position the apex fitting on top of the engine compartment. Route outer sling legs 1 and 2 to the front (forward wheel) end and inner sling legs 3 and 4 to the rear (radiator) end of the rear section. Sling legs 1 and 3 should be on the left side of the load.
  - Loop the chain end of sling leg 1 through the left front lift provision located inboard of the left front wheel and insert link 46 in the grabhook. Repeat with sling leg 2 on the right front lift provision.
  - Loop the chain end of sling leg 3 through the left rear lift provision located aft of the left rear wheel and insert link 56 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.

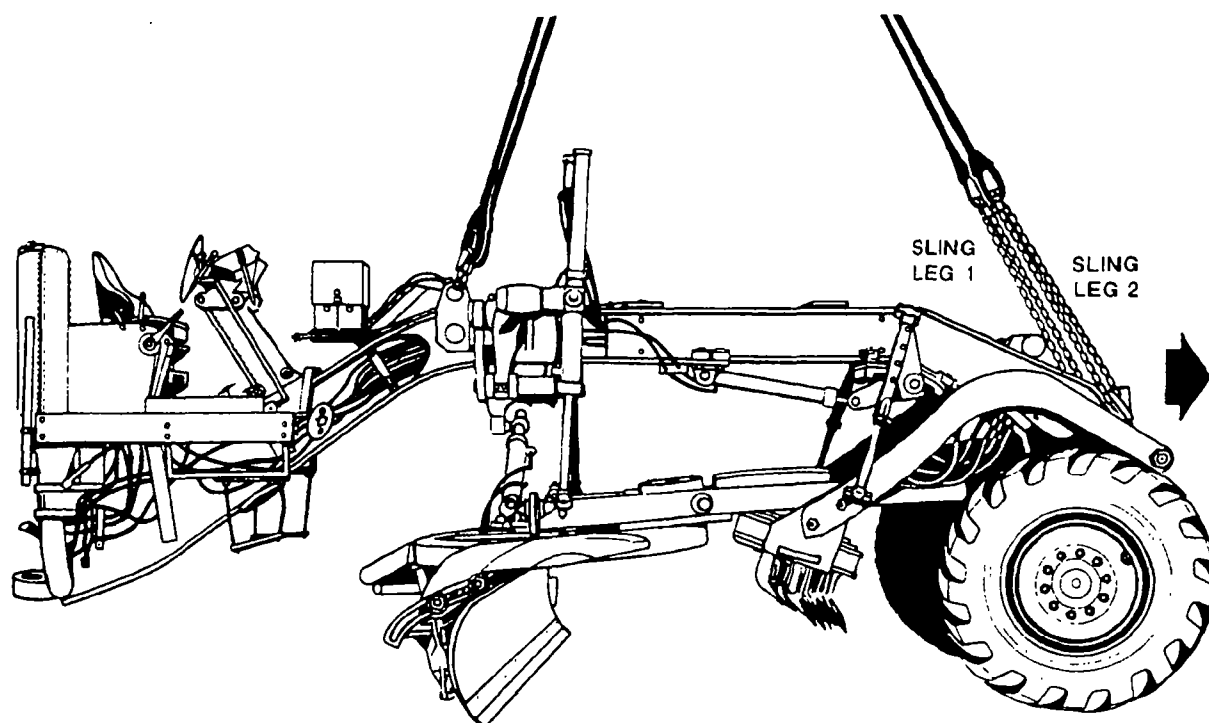
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off. Make sure legs are located outside the 4- x 4- x 48-inch posts.

### **Step 3. Hookup**

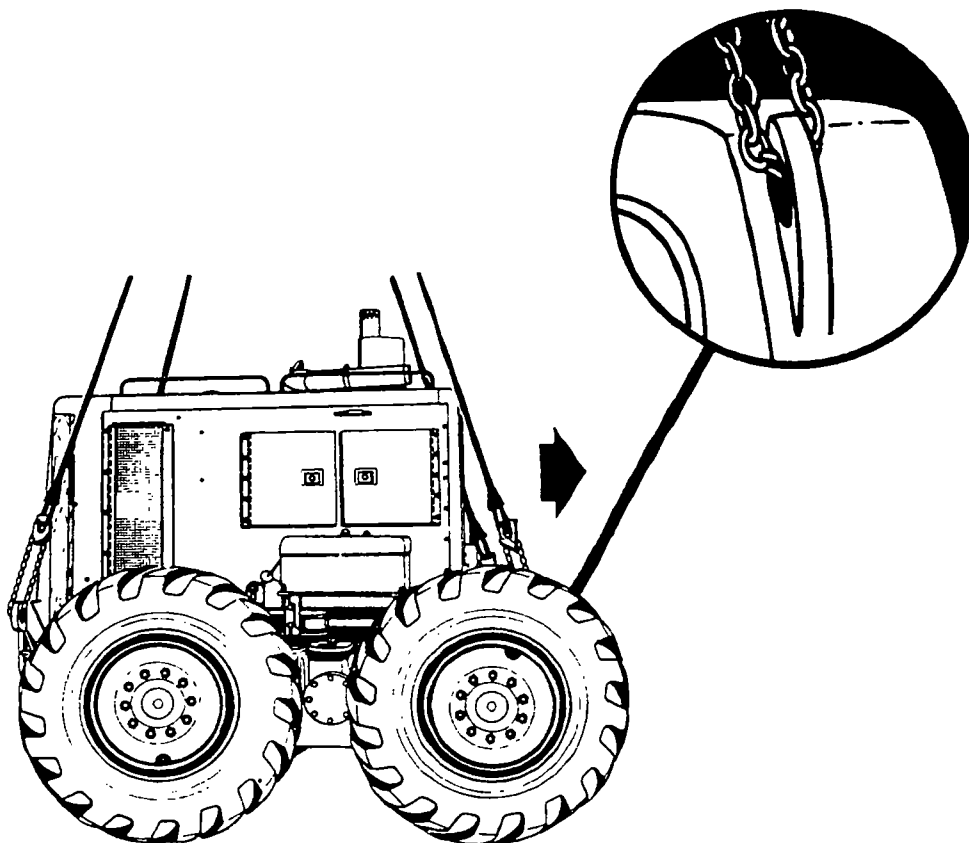
The hookup team stands on top of each section. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



FRONT SECTION



REAR SECTION

## **Figure 2-49. 613BS Scraper, Elevating**

### **APPLICABILITY**

The scraper, when sectionalized, is certified by the US Army NRDEC for the CH-47 and CH-54 helicopters at airspeeds up to and including the following:

- CH-47 - Work section, 105 knots.
  - Power section, 110 knots.
- CH-54 - Work and power sections, 80 knots.

### **LOAD DESCRIPTION**

- Scraper, elevating, model 613BS<sup>c</sup> (Type II, sectionalized), LIN S30039.
- Rigged weights:
  - Work section, 16,330 pounds.
  - Power section, 16,860 pounds (with 3/4 fuel).

### **MATERIALS**

- Sling set (25,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Plastic bags (4 each).
- Felt material (power section only) (2 each).
- Plywood, 3/4- x 8- x 46-inch (2 each) (power section only).

### **PERSONNEL**

- Four persons can sectionalize the scraper in 1 hour.
- Two persons can prepare and rig the work section in 20 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Sectionalize the scraper according to instructions in operator's manual:
  - Secure operator's seat with nylon cord.
  - Secure all covers and doors with nylon cord or tape.
  - Secure auxiliary fuel tank in place with nylon cord.

- Work section:

- Stow elevator motor hoses and hangar arms on elevator flights in the bowl, and secure with nylon cord.
- Secure hydraulic cylinders up in a stowed position with doubled nylon cord.
- Secure loose hoses and cables with nylon cord.
- Fold and secure steps located on outside of bowl.
- Tape all lights.
- Cover all hitch pins and pin holes with plastic and tape to prevent contamination by dirt and dust.
- Secure toolbox lid closed with nylon cord.

- Power section:

- Ensure that steering wheels are aligned.
- Install front bumper lift provision. Ensure that pin safety clip is installed. If clip is missing, secure the pin in place with nylon cord.
- Fabricate a hood protection from two pieces of 3/4- x 8- x 46-inch plywood. Nail plywood together forming an L-shaped protector. Drill two 1/2-inch holes in each corner for restraint. Plywood will protect the top edge of the radiator grill where it meets the hood.
- Place felt padding over the headlights and tape in place.
- Position the plywood protector on the hood and secure in place at four corners with nylon cord.

**CAUTION: Plywood hood protector is essential to prevent hood damage by sling leg chains.**

## Step 2. Rigging

- Work section:

- Place apex fitting on top of rockguard and route outer sling legs 1 and 2 to forward end of load and inner sling legs 3 and 4 to aft (bumper) end. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located on the left front corner of the bowl and insert link 3 in the grabhook. Repeat with sling leg 2 on the right front lift provision on the right front corner.
- Pull both sling legs aft and secure (breakaway technique) to elevator and rockguard with cotton webbing or tape.
- Loop the chain end of sling leg 3 through the left rear lift fitting located on the aft deck above the left wheel and insert link 40 in the grabhook. Repeat with sling leg 4 on the right rear lift provision. Secure excess chain with tape or nylon cord.
- Pull both sling legs forward and secure (breakaway technique) to rockguard with tape or cotton webbing.



- Cluster and tie or tape (breakaway technique) all sling legs together on top of the rockguard to prevent entanglement during hookup and lift-off.
- **Power section:**
  - Position apex fitting on top of the engine hood. Route outer sling legs 1 and 2 to the center of the power section by the main wheels. Route inner sling leg 3 forward to the front bumper and the other inner sling leg 4 to the arm assembly frame.
  - Loop the chain end of sling leg 1 through the left center lift provision to the left of the operator's seat and insert link 40 in the grabhook. Repeat with sling leg 2 on the right center lift provision.
  - Loop the chain end of sling leg 3 through the front bumper lift provision located in the center of the bumper and insert link 3 in the grabhook. Pull the sling leg up over the hood protector and tape or tie (breakaway technique) the sling leg to the ROPS mount.
  - Loop the chain end of sling 4 through the lift provision located on the center top of the draft arm assembly frame and insert link 24 in grabhook. Tape or tie (breakaway technique) the sling leg to the top of the draft arm.
  - Secure excess chain with tape or nylon cord.
  - Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

- **Work section.** The hookup team stands on the aft deck. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts over the front end of the load and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

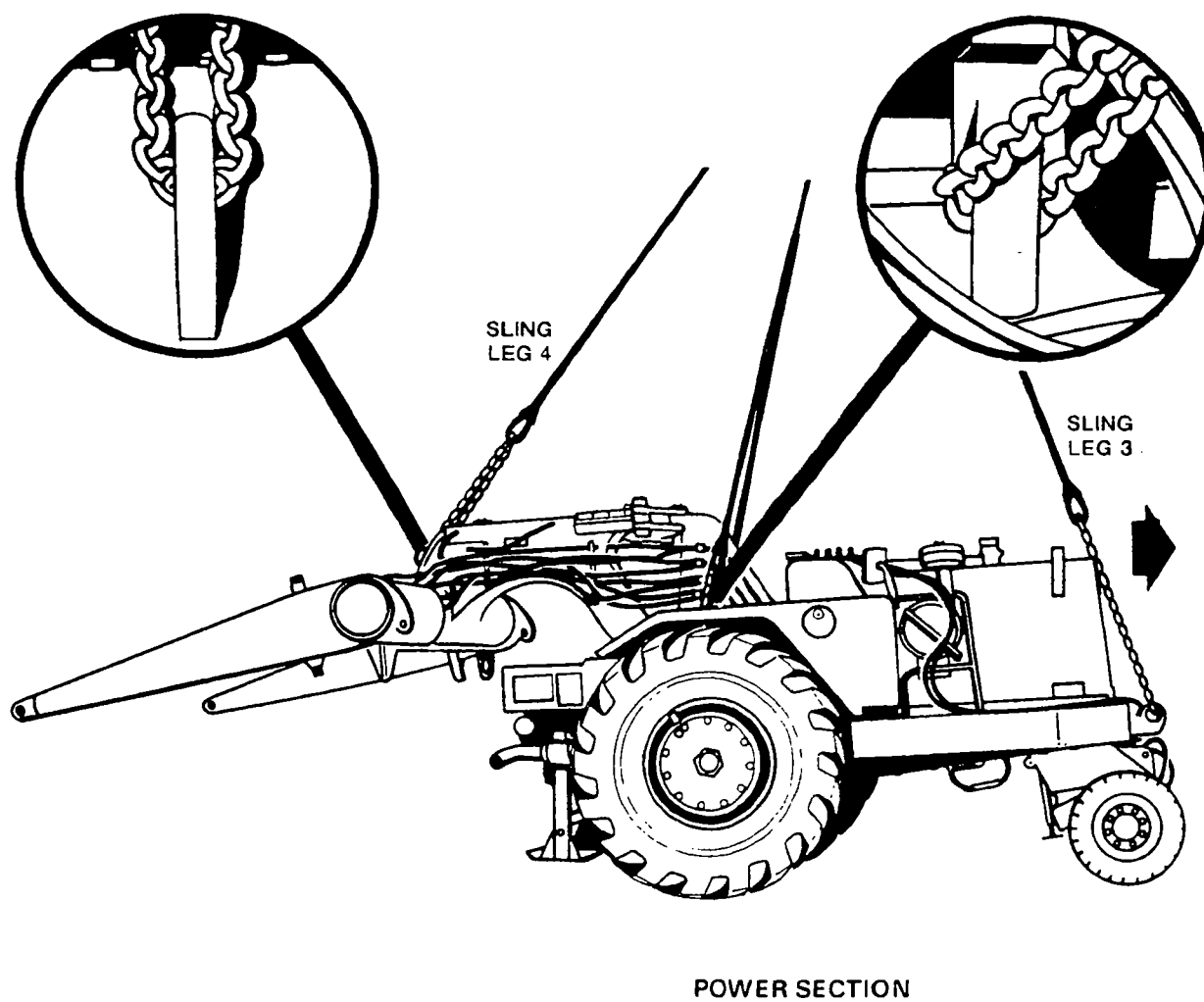
**NOTE:** Connect apex fitting so the work section is carried rear end (bumper) forward.

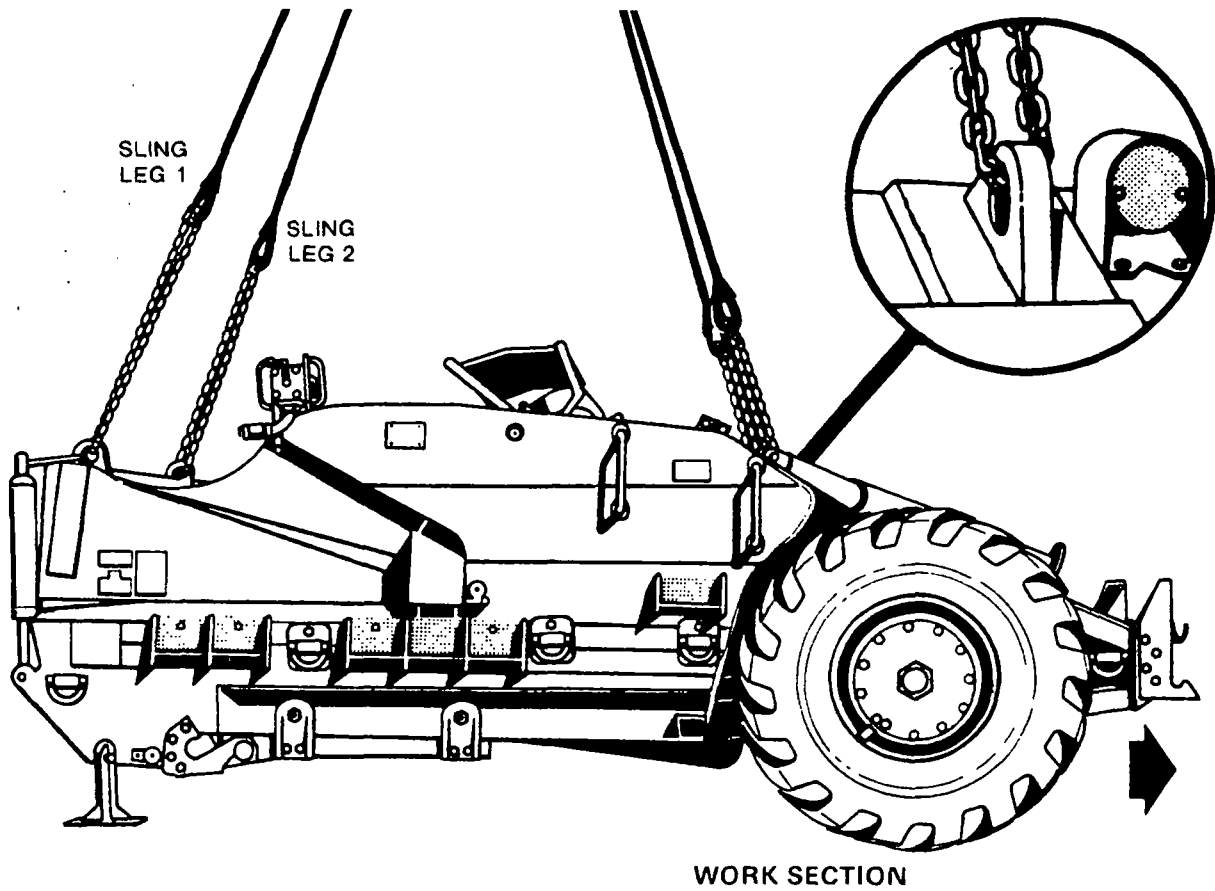
- **Power section.** The hookup team stands on top of the fenders. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

**NOTE:** Connect the apex fitting so the power section is carried front end forward and high.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## **Figure 2-50. 613WDS Water Distributor**

### **APPLICABILITY**

The 613WDS water distributor, when sectionalized, is certified by the US Army NRDEC for the CH-47 and CH-54 helicopters at airspeeds up to and including 110 and 80 knots, respectively.

### **LOAD DESCRIPTION**

- Distributor, water, model 613WDS (Type II, sectionalized), LIN D28804.
- Rigged weights:
  - Work section, 15,400 pounds (with 3/4 fuel).
  - Power section, 16,960 pounds.

### **MATERIALS**

- Sling set (25,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch wide, 80-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Plastic bags (4 each).
- Felt material (power section only).
- Plywood, 3/4- x 8- x 46-inch (2 each) (power section only).

### **PERSONNEL**

- Four men can sectionalize the distributor in 1 hour.
- Two men can prepare and rig each section in 20 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Sectionalize the distributor according to instructions in the operator's manual.
  - Secure the operator's seat with nylon cord.
  - Secure all covers and doors closed with nylon cord.
  - Secure the auxiliary fuel tank in place with nylon cord.
  - Tape all lights.

- Work section:

- Secure the distribution control panel and cable in place on top of the tank with nylon cord.
- Ensure that the tank manhole cover is closed and secured.
- Secure the toolbox and hose stowage compartment covers closed with nylon cord.
- Secure the hose nozzle and reel with nylon cord.
- Cover hitch pins and pin holes with plastic and tape to prevent contamination by dust and dirt.

- Power section:

- Ensure that the steering wheels are aligned.
- Install front bumper lift provision. Ensure that the pin safety clip is installed. If clip is missing, safety the pin in place with nylon cord.
- Fabricate a hood protector from two pieces of 3/4- x 8- x 46-inch plywood; nail plywood together forming an L-shaped protector. Drill two 1/2-inch holes in each corner of the protector for installing restraint ties.
- Place felt padding over the headlights and tape in place.
- Position the plywood protector on the hood and secure in place at four corners with nylon cord.
- Secure lift cylinders to the draft arms with a doubled length of nylon cord.

**CAUTION: Plywood hood protector must be used to prevent hood damage by sling leg chains.**

## **Step 2. Rigging**

- Work section:

- Place the apex fitting on top of work section tank. Route outer sling legs 1 and 2 to the forward end of the water tank and inner sling legs 3 and 4 to the aft (wheel) end of the work section. Sling legs 1 and 3 must be to the same side of the water tank.
- Pass chain end of sling leg 1 through the forward left lift provision located on left forward corner of the water tank and insert link 3 in grabhook. Repeat this procedure for sling leg 2 on the lift provision on the right forward corner of the water tank.
- Pass chain end of sling leg 3 through the aft left lift provision located on the aft deck by the left wheel and insert link 45 in the grabhook. Repeat this procedure for sling leg 4 on the lift provision by the right wheel.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the tank to prevent entanglement during hookup and lift-off.

- Power section:

**NOTE:** Radiator end is the forward end of the power section.

- Place the apex fitting on top of the engine hood. Route outer sling legs 1 and 2 to the center lift provisions, inner sling leg 3 forward, and the other inner sling leg 4 aft.
- Loop the chain end of sling leg 1 through left center lift provision located on left side of frame behind and below operator's compartment and insert link 40 in grabhook. Repeat with sling leg 2 on the right side.
- Pull sling legs 1 and 2 up and tape or tie (breakaway technique) sling legs to draft assembly frame.
- Loop the chain end of sling leg 3 through front bumper lift provision and insert link 3 in grabhook. Pull sling up over hood protector and tape or tie (breakaway technique) to ROPS mount.
- Loop the chain end of sling leg 4 through the lift provision located in the center on top of the draft arm assembly frame and insert link 24 in grabhook. Tape or tie (breakaway technique) sling leg to the top of draft arm assembly.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of draft arm frame to prevent entanglement during hookup and lift-off.
- Place controls in neutral and release brake.

### Step 3. Hookup

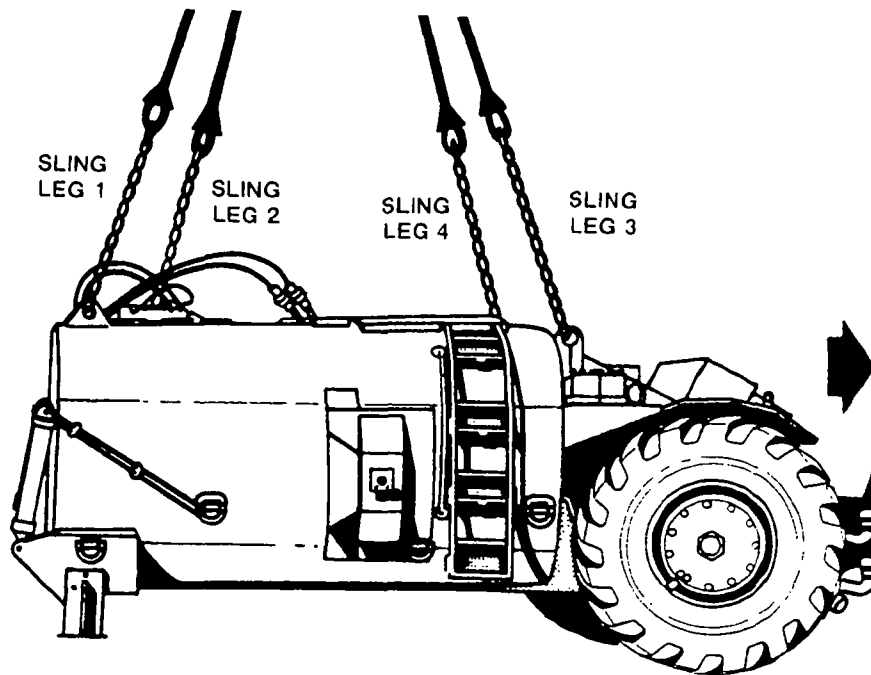
- Work section. The hookup team stands on top of the tank. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts over the front end of the load and remains close to the load as the helicopter removes slack in the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

**NOTE:** Connect the apex fitting so the wheel end is carried forward.

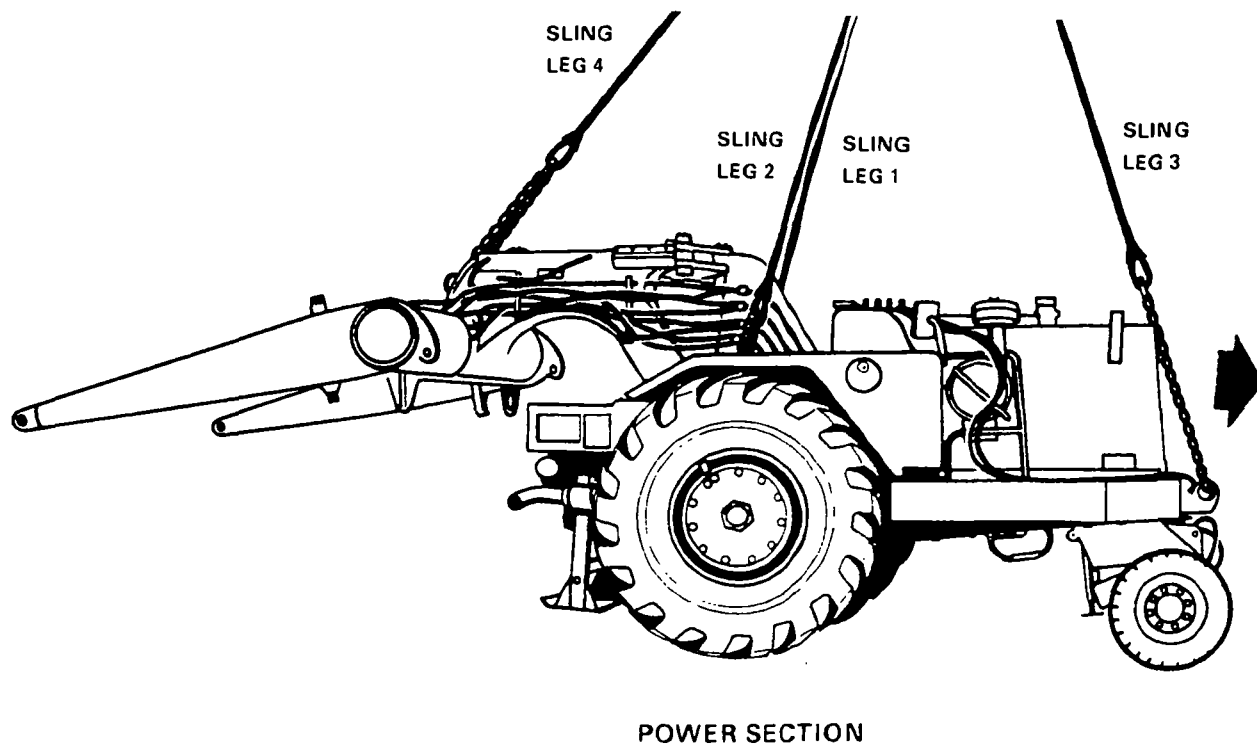
- Power section. The hookup team stands on top of the fenders. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts over the side of the load and remains close to the load as the helicopter removes slack in the sling leg. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



WORK SECTION





## Figure 2-51. Roller, Towed, Vibrating

### APPLICABILITY

This load is certified by the US Army NRDEC for UH-60 and CH-47 helicopters at airspeeds up to and including 120 knots.

### LOAD DESCRIPTION

- Roller, towed, vibrating, smooth drum, airmobile, LIN S10682, NSN 3895-01-193-4078.
- Weight: 4,830 pounds.

### MATERIALS

- Sling set (10,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### PERSONNEL

Two persons can prepare and rig this load in 10 minutes.

### PROCEDURES

#### Step 1. Preparation

- Lift tongue and position support leg in its stowed or travel position. Secure with nylon cord.
- Check battery box cover, fuel cap, hoses, and any loose items for security. Tie or tape any loose items as required.

#### Step 2. Rigging

- Carefully place apex fitting on top of the roller. Route the outer sling legs 1 and 2 to the front (tongue) end of the load and the inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be to the left side of the load.
- Loop the chain end of each sling leg through its respective lift provision and insert link 3 into the grabhook.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the roller to prevent entanglement during hookup and lift-off.

#### Step 3. Hookup

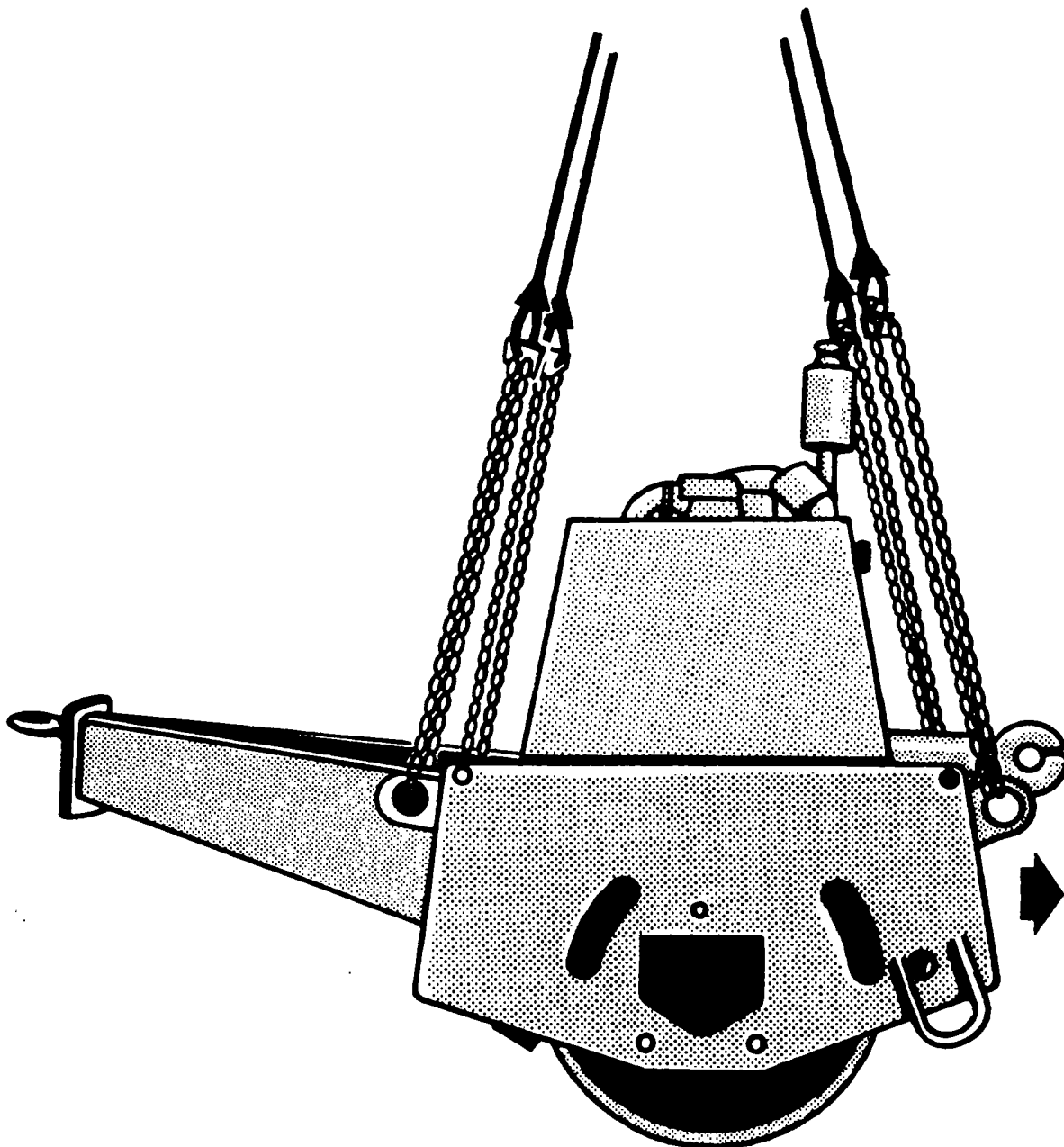
**NOTE:** Connect the apex fitting so the tongue is carried aft.

The hookup team stands alongside the load. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft

cargo hook. The hookup team remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

#### Step 4. Derigging

Derigging is the reverse of preparation and rigging procedures in steps 1 and 2.



## Figure 2-52. Mk155 Launcher, Mine Clearing

### APPLICABILITY

This load is certified by the US Army NRDEC for UH-1, UH-60, and CH-47 helicopters at airspeeds up to and including 90, 80, and 100 knots, respectively.

### LOAD DESCRIPTION

- Launcher, Mk155, mine clearing.
- Weight: 860 pounds.

### MATERIALS

- Sling set (10,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cotton webbing, 1/4-inch, 80-pound breaking strength.

### PERSONNEL

Two persons can prepare and rig this load in 10 minutes.

### PROCEDURES

#### Step 1. Preparation

- Ensure that the launch rail is in the collapsed or storage mode and not in its vertical position.
- Ensure that the storage box lid is closed and secured with nylon cord or tape, as required.

#### Step 2. Rigging

**NOTE:** Storage box end is front end of load.

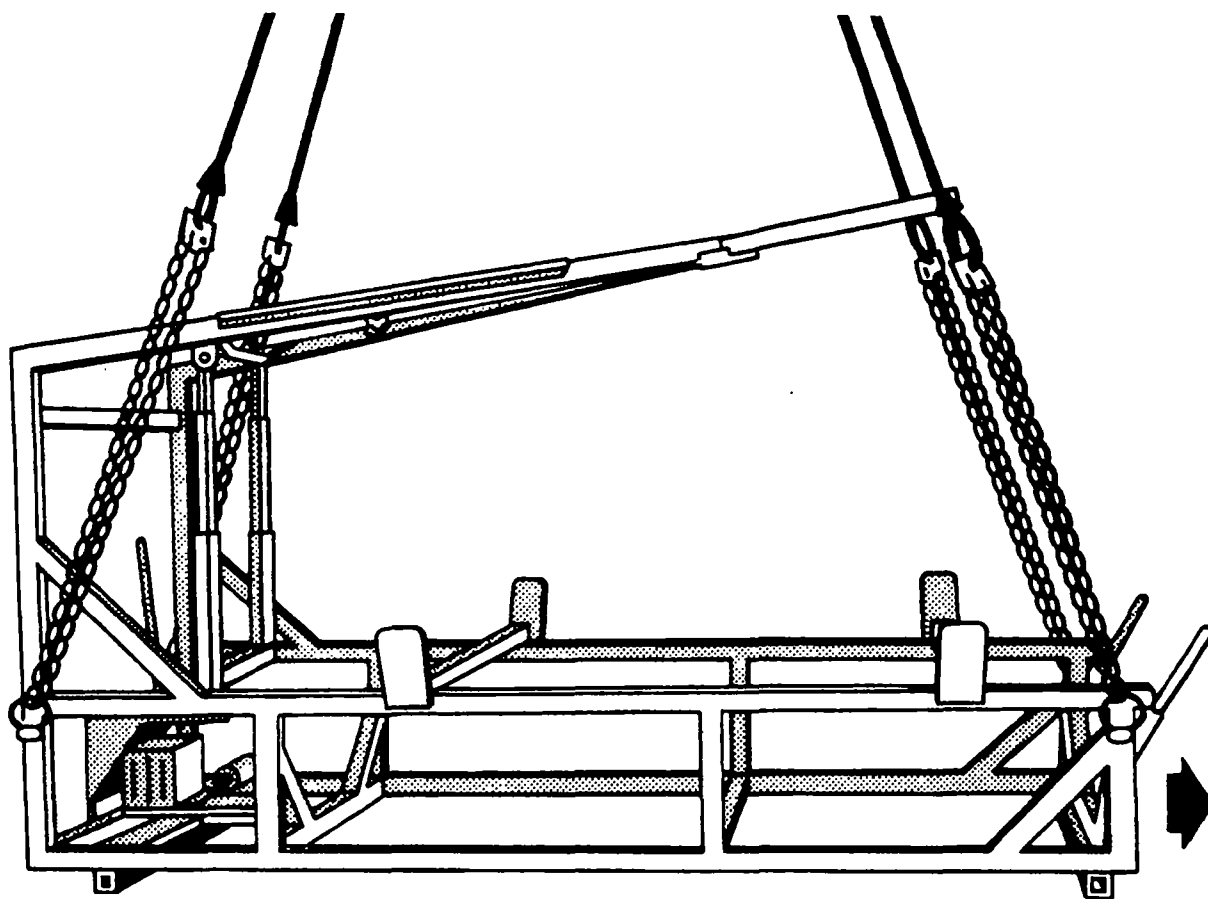
- Position apex fitting on top of the launch rail. Route outer sling legs 1 and 2 to the front of the load and the inner sling legs 3 and 4 to the rear end. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift ring located behind the left rear corner of the storage box. Insert link 3 in the grabhook. Repeat with sling leg 2 and the right front lift ring on the other side of the storage box.
- Loop the chain end of sling leg 3 through the left rear lift ring and insert link 3 in the grabhook. Repeat with sling leg 4 and the right rear lift ring.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the launch rail to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands alongside the launcher. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area from underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## Figure 2-53. M68A2 Line Charge, Demolition

### APPLICABILITY

This load is certified by the US Army NRDEC for UH-60 and CH-47 helicopters at airspeeds up to and including 70 and 100 knots, respectively.

### LOAD DESCRIPTION

- Line charge, demolition, M68A2, inert.
- Weight: 2,486 pounds.

### MATERIALS

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Cord, nylon, Type III, 550-pound breaking strength.

### PERSONNEL

One person can prepare and rig this load in 10 minutes.

### PROCEDURES

#### Step 1. Preparation

Ensure that the lid to the line charge container is closed and secure.

#### Step 2. Rigging

**NOTE:** The front of the line charge is the end opposite the electrical connectors and fuse storage area.

- Position the apex fitting on top of the container. Route outer sling legs 1 and 2 to the front end of the load and the inner sling legs 3 and 4 to the rear (electrical connector) end. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift ring and insert link 3 in the grabhook. Repeat with sling leg 2 and the right front lift ring.
- Loop the chain end of sling leg 3 through the left rear lift ring and insert link 3 in the grabhook. Repeat with sling leg 4 and the right rear lift ring.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the container to prevent entanglement during hookup and lift-off.

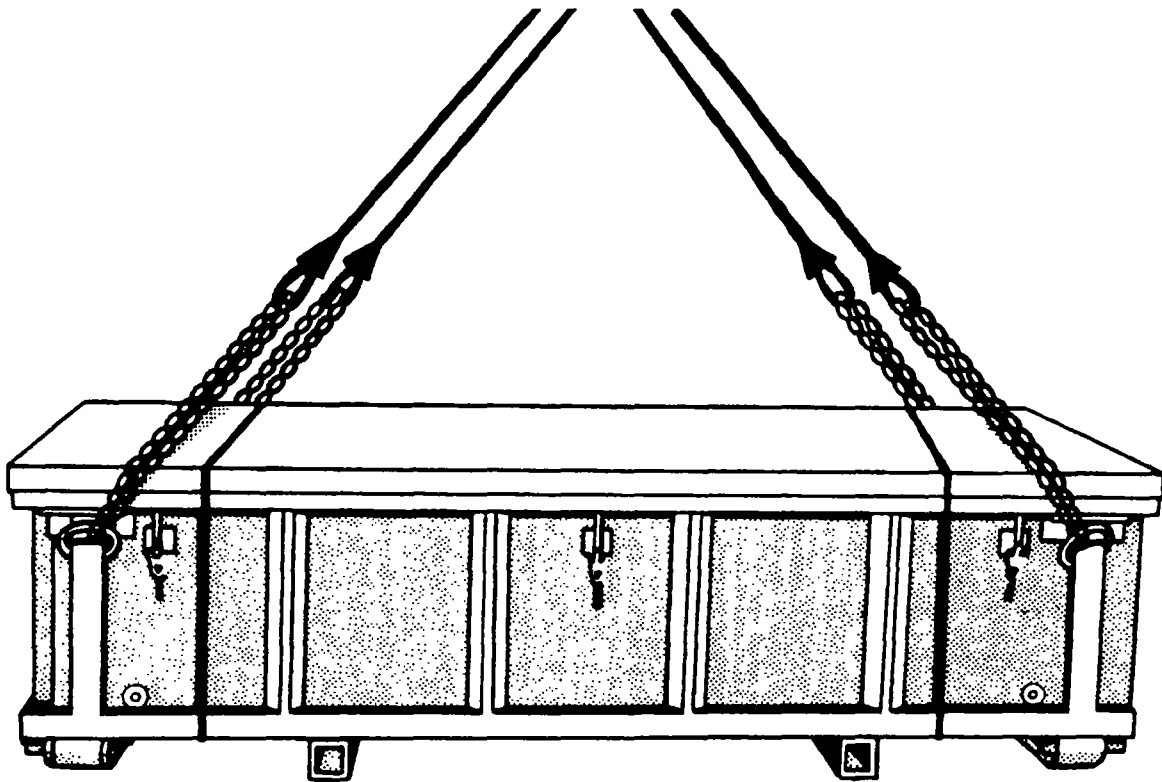
#### Step 3. Hookup

The hookup team stands alongside the line charge. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the

aircraft cargo hook. The hookup team remains close to the load as the helicopter removes slack in the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

#### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-54. M68A2 Line Charge, Demolition with Mk22 Rocket Motor**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for UH-60 and CH-47 helicopters at airspeeds up to and including 70 and 90 knots, respectively.

### **LOAD DESCRIPTION**

- Line charge, demolition, M68A2, 2,486 pounds.
- Rocket motor, Mk22, 186 pounds.
- Total weight: 2,672 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tie-down straps, CGU-1/B (4 each).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Cord, nylon, Type III, 550-pound breaking strength.

### **PERSONNEL**

- Two persons can prepare and rig this load in 20 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Ensure that the lid to the line charge container is closed and secured.
- Ensure that the rocket motor box is securely fastened together with the metal shipping bands.
- Center the rocket motor box on top of the line charge container.
- Connect two CGU-1/B tie-down straps together to make one long strap and route it around the line charge and rocket motor box lengthwise. Tighten strap securely.
- Route two CGU-1/B tie-down straps across the rocket motor box and underneath the line charge container. Position the strap at each end of the containers approximately equal distance from the center. Tighten strap securely.
- Tape or tie excess strap of CGU-1/B tie-down straps.

## **Step 2. Rigging**

**NOTE:** The front of the load is the end opposite the electrical connector end on the line charge.

- Position apex fitting on top of the rocket motor box. Route outer sling legs 1 and 2 to the front end of the load and sling legs 3 and 4 to the rear (electrical connector) end. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift ring and insert link 3 in the grabhook. Repeat with sling leg 2 and the right front lift ring.
- Loop the chain end of sling leg 3 through the left rear lift ring and insert link 3 in the grabhook. Repeat with sling leg 4 and the right rear lift ring.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the rocket motor box to prevent entanglement during hookup and lift-off.

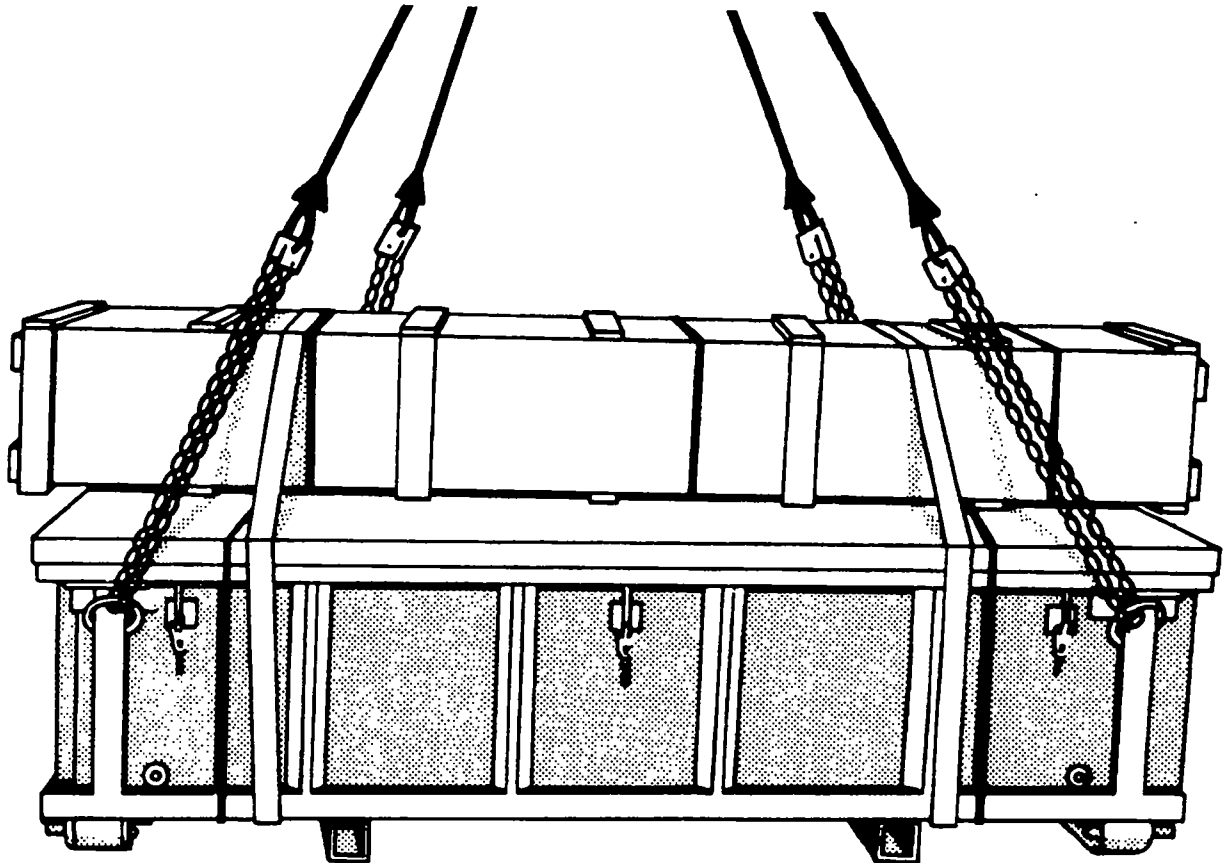
## **Step 3. Hookup**

The hookup team stands alongside the line charge. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team remains close to the load as the helicopter removes slack in the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

## **Step 4. Derigging**

Derigging is the reverse of preparation and rigging procedures in steps 1 and 2.





## **Figure 2-55. Mk155 Launcher Mounted on M353 Trailer**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for UH-60 and CH-47 helicopters at airspeeds up to and including 90 and 120 knots, respectively.

### **LOAD DESCRIPTION**

- Trailer chassis, M353, general purpose (GP), 2,780 or 2,840 pounds depending on trailer modification.
- Launcher, Mk155, mine clearing, 860 pounds.
- Total weight: 3,640 or 3,700 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Cord, nylon, Type III, 550-pound breaking strength.

### **PERSONNEL**

- Two persons can prepare and rig this load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Ensure the launcher is securely attached to the trailer chassis. Ensure that the launch rail is in the collapsed or storage mode and not in its vertical position.
- Ensure that the storage box lid is closed and secured with nylon cord or tape, as required.
- Tie off hoses and safety chains and secure any loose items with nylon cord or tape.
- Set parking brake.

#### **Step 2. Rigging**

- Position apex fitting on top of the launcher. Route outer sling legs 1 and 2 to the front of the trailer and the inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be to the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision on the trailer chassis located aft of the left leveling wheel assembly. Insert link 3 in the grabhook. Repeat with sling leg 2 and the right front lift provision.

- Loop the chain end of sling leg 3 through the left rear lift provision on the trailer chassis located aft of the trailer left wheel. Insert link 3 in the grabhook. Repeat with sling leg 4 and the right front lift provision.
- Raise the apex fitting above the launcher and tie or tape sling legs to the launch rail to prevent entanglement during hookup.
- Cluster and tie or tape (breakaway technique) all sling legs above the launch rail to prevent entanglement during hookup and lift-off.

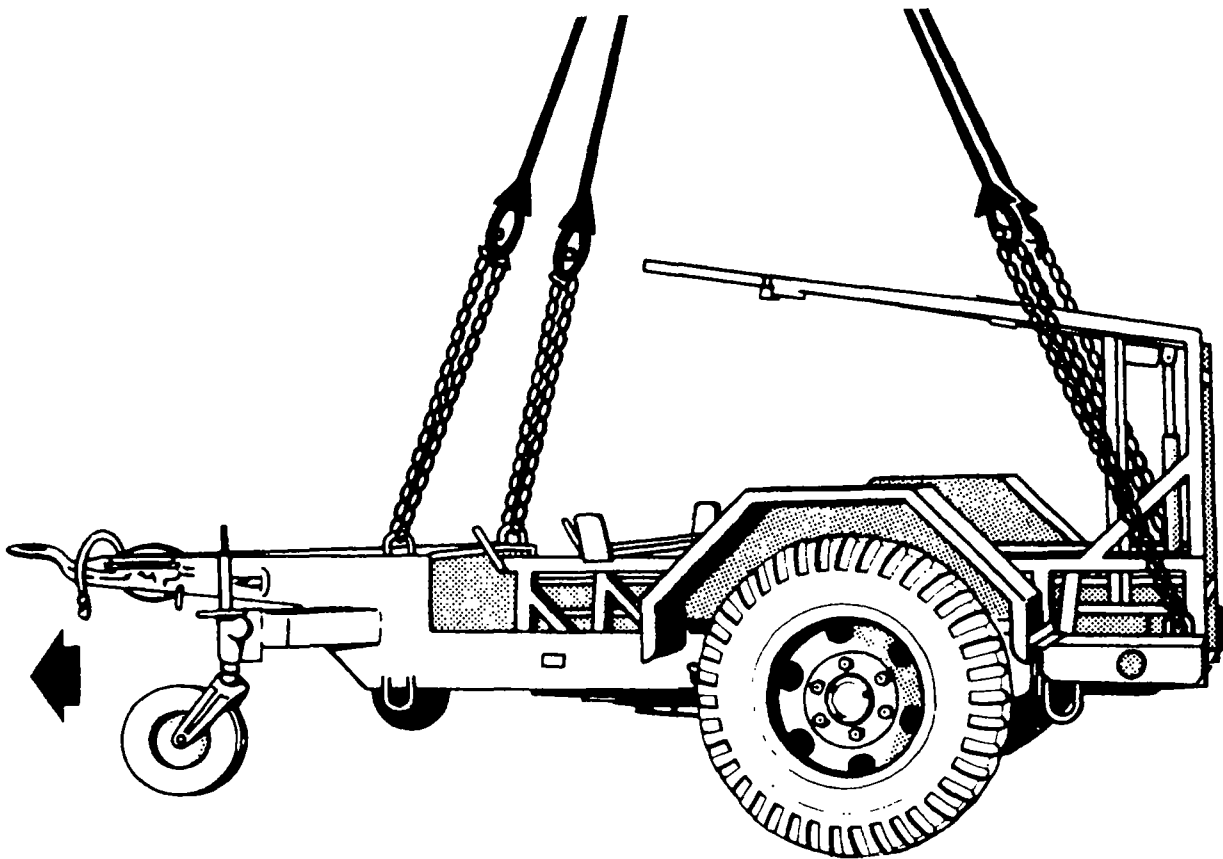
### **Step 3. Hookup**

**NOTE:** Connect the apex fitting to the cargo hook so the trailer lunette is forward.

The hookup team stands on the trailer chassis. Make sure the trailer lunette is facing the direction of flight. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack in the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-56. Mk155 Launcher Mounted on M200A1 Trailer**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for UH-60A and CH-47 helicopters at airspeeds up to and including 90 and 120 knots, respectively.

### **LOAD DESCRIPTION**

- Trailer chassis, M200A1, NSN 2330-00-331-2307, 2,470 pounds.
- Launcher, mine clearing, Mk155, NSN 1055-01-281-2770, 860 pounds.
- Weight: 3,330 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig this load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Ensure that the launcher is securely attached to the trailer chassis.
- Ensure that the launch rail is in the collapsed or storage position and not in its vertical position.
- Ensure that the storage box lid is closed and secured. Secure hoses, chains, and any other loose items with nylon cord or tape, as required.
- Engage parking brake.

#### **Step 2. Rigging**

- Position apex fitting on top of the launcher. Route outer sling legs 1 and 2 to the front (lunette end) of the vehicle and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located on the trailer chassis frame aft of the lunette and insert link 3 in the grabhook. Repeat with sling leg 2 and the right front lift provision.

- Loop the chain end of sling leg 3 through the left rear lift provision located on the trailer chassis frame aft of the trailer left wheel and insert link 3 in the grabhook. Repeat with sling leg 4 and the right rear lift provision.
- Raise the apex fitting above the launch rail. Cluster and tie or tape (breakaway technique) all sling legs together above the launch rail to prevent entanglement during hookup and lift-off.

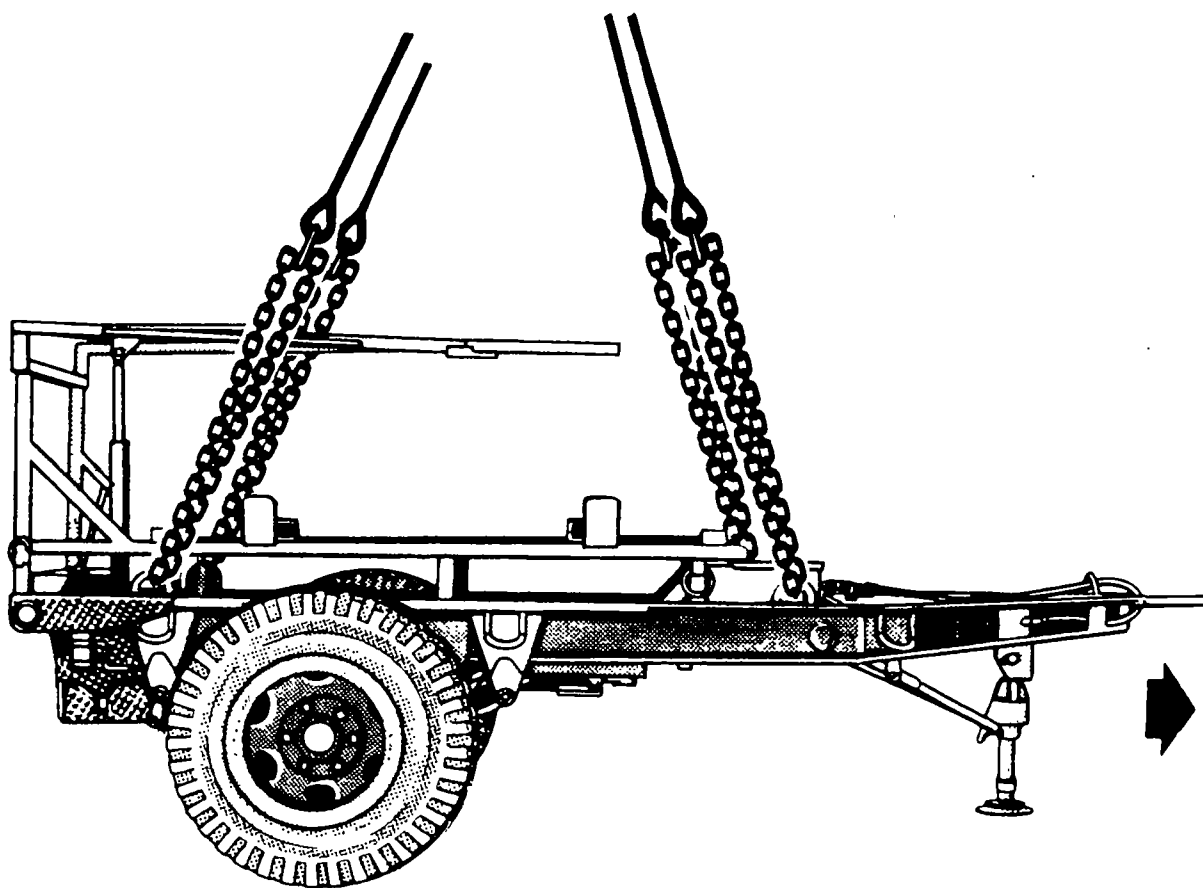
### **Step 3. Hookup**

**NOTE:** Connect the apex fitting to the cargo hook so the trailer lunette is aft.

The hookup team stands on the trailer chassis. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-57. Mine Clearing Line Charge Mounted on M353 Trailer**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for UH-60 and CH-47 helicopters at airspeeds up to and including 100 and 120 knots, respectively.

### **LOAD DESCRIPTION**

- Mine clearing line charge (MICLIC), complete, LIN L67342 or TAMCN B1298 mounted on M353 trailer:
  - Trailer chassis, M353, 2,780 or 2,840 pounds depending on trailer modifications.
  - Launcher, Mk155, mine clearing, 860 pounds.
  - Charge, demolition, M68A2, 2,486 pounds.
  - Rocket motor, Mk22, 186 pounds. Total weight: 6,312 or 6,372 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing cotton, 1/4-inch, 80-pound breaking strength.
- Tie-down straps, CGU-1/B (used to secure rocket motor box inside the helicopter) (4 each).

### **PERSONNEL**

Two persons can prepare and rig this load in 20 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Ensure that all components are securely attached together.
- The rocket motor cannot be safely secured to the load in this configuration; therefore, the motor box must be kept separate and loaded internally into the helicopter.
- Ensure that the launch rail is in the collapsed or storage position and not in its vertical position.
- Ensure that the storage box lid is closed and secured. Tie off hoses and chains and secure any other loose items with nylon cord or tape, as required.
- Set one of the two parking brakes.



## **Step 2. Rigging**

- Position apex fitting above the launcher. Route outer sling legs 1 and 2 to the front of the trailer and the inner sling legs 3 and 4 to the rear of the trailer. Sling legs 1 and 3 should be to the left side of the load.
- Loop the chain end of sling 1 through the left front lift provision on the trailer chassis located aft of the front leveling wheel assembly. Insert link 3 in the grabhook. Repeat with sling leg 2 and the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lift provision on the trailer chassis located aft of the trailer left wheel. Insert link 3 in the grabhook. Repeat with sling leg 4 and the right rear lift provision.
- Raise the apex fitting above the launcher. Cluster and tie or tape (breakaway technique) all sling legs above the launch rail to prevent entanglement during hookup and lift-off.

## **Step 3. Hookup**

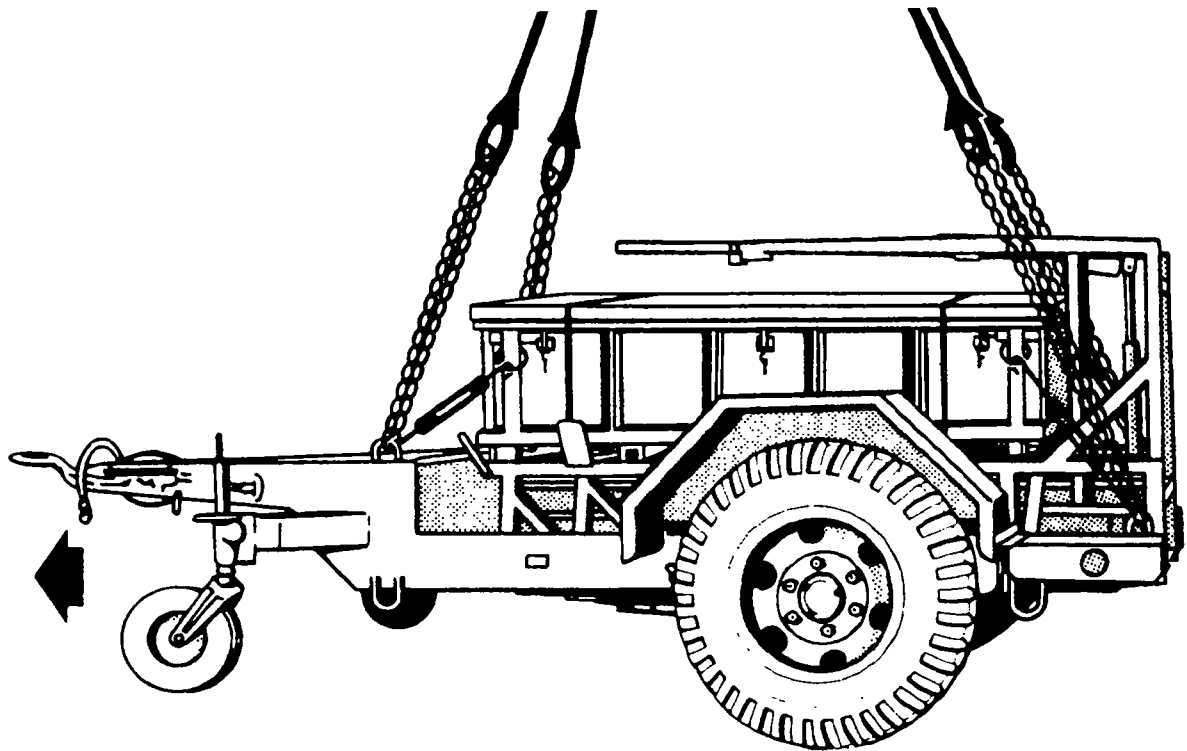
- Land helicopter and load rocket motor box internally into helicopter. Secure box with tie-down straps as directed by the aircrew.

**NOTE:** Connect the apex fitting to the cargo hook so the trailer lunette is carried forward.

- The hookup team stands on the trailer chassis. Make sure the trailer lunette is facing the direction of flight. The static wand person discharges the static electricity with the static wand. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

## **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-58. Mine Clearing Line Charge Mounted on M200A1 Trailer**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for the UH-60A and CH-47 helicopters at airspeeds up to and including 110 knots.

### **LOAD DESCRIPTION**

- Mine clearing line charge (MICLIC), complete, mounted on M200A1 trailer chassis.
  - Trailer chassis, M200A1, NSN 2330-00-331-2307, 2,470 pounds.
  - Launcher, Mk155, NSN 1055-01-281-2770, 860 pounds.
  - Charge, demolition, M68A2, NSN 1375-01-125-6521, 2,486 pounds.
  - Rocket motor, Mk22, 186 pounds.
- Weight: 6,002 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tie-down strap, cargo, CGU-1/B or equivalent (used to secure rocket motor box inside helicopter) (4 each).

### **PERSONNEL**

Two persons can prepare and rig this load in 20 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Ensure that all components are securely attached together.
- The rocket motor cannot be safely secured to the load in this configuration; therefore, the rocket motor box must be kept separate and loaded internally into the helicopter.
- Ensure that the launch rail is in the collapsed or storage position and not in its vertical position.
- Ensure that the storage box lid is closed and secured. Secure hoses, chains, and any other loose items with nylon cord or tape, as required.
- Engage parking brake.

## Step 2. Rigging

- Position apex fitting on top of the launcher. Route outer sling legs 1 and 2 to the front (lunette end) of the vehicle and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located on the trailer chassis frame aft of the lunette and insert link 10 in the grabhook. Repeat with sling leg 2 and the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lift provision located on the trailer chassis frame below the aft end of the demolition charge container and insert link 3 in the grabhook. Repeat with sling leg 4 and the right rear lift provision.
- Secure excess chain with tape or nylon cord.
- Raise the apex fitting above the launch rail. Cluster and tie or tape (breakaway technique) all sling legs together above the launch rail to prevent entanglement during hookup and lift-off.

## Step 3. Hookup

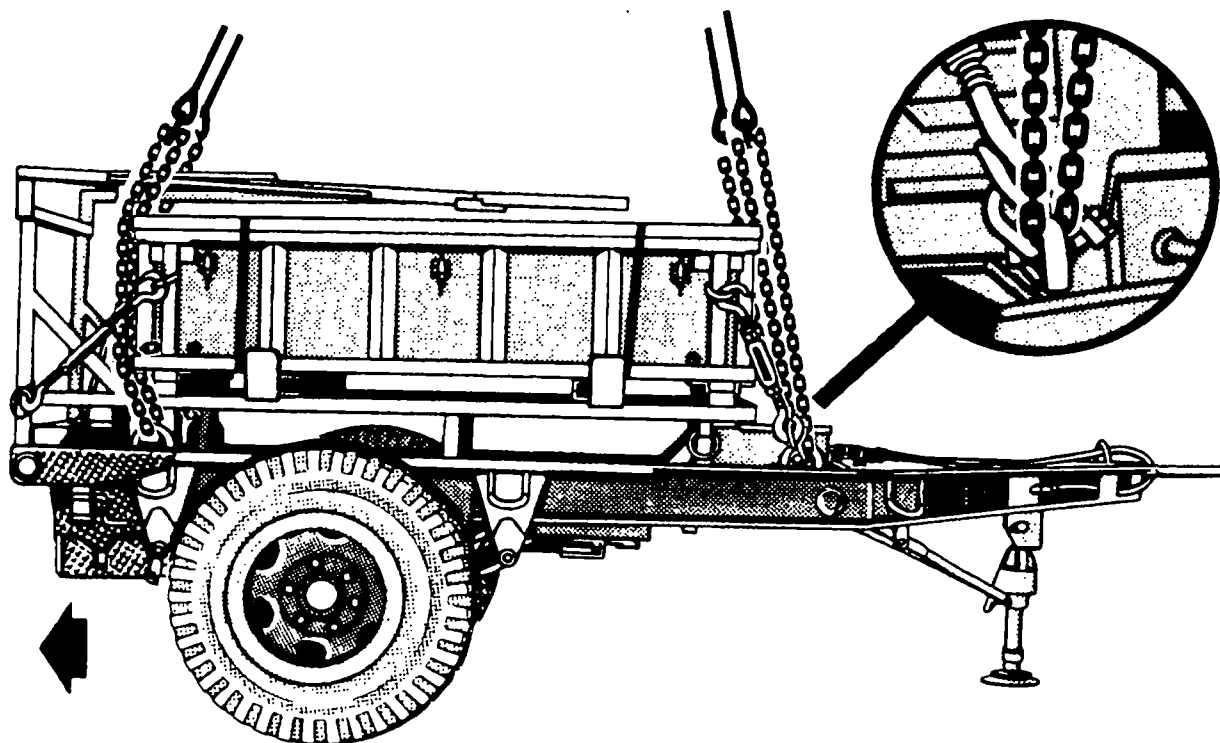
- Land helicopter and load rocket motor box internally into the helicopter. Secure the box with tie-down straps as directed by the aircrew.

**NOTE:** Connect the apex fitting to the cargo hook so the trailer lunette is aft.

- The hookup team stands on the demolition charge box. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

## Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-59. LRT-110, 7 1/2-Ton Crane**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-47 helicopters at airspeeds up to and including 120 knots.

### **LOAD DESCRIPTION**

- 7 1/2-ton crane, Type II, LRT-110, LIN C36219.
- Weight: 24,230 pounds.

### **MATERIALS**

- Sling set, 25,000-pound capacity.
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cotton webbing, 1/4-inch, 80-pound breaking strength.
- Nylon, tubular, 1/2-inch, 1,000-pound breaking strength.
- Tie-down, nylon, cargo, CGU-1/B.
- Padding material, felt or cellulose.

### **PERSONNEL**

Two persons can prepare and rig this load in 20 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Fold side mirrors in toward cab and tie or tape, as necessary. Tape or secure windshield wipers to windshield.
- Ensure the wheels are pointing straight ahead. Secure the steering wheel with nylon cord or tape.
- Secure doors, tool box covers, and all loose equipment with nylon cord or tape. Secure hook-block assembly to the end of the boom mast with CGU-1/B cargo tie-down or equivalent.
- Secure boom light power cable with nylon cord or tape.
- Insert wooden cable wedges at the drum to prevent the cable from unspooling if the cable becomes slack. Secure wedges with 1/2-inch tubular nylon.

## **Step 2. Rigging**

- Position apex fitting on top of the boom directly above the boom base. Route outer sling legs 1 and 2 to the front (cab end) of the crane and the inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left (driver's) side of the load.
- Loop the chain end of sling leg 1 through the lift provision located on the inboard side of the front left outrigger. Insert link 3 in the grabhook. Repeat with sling leg 2 on the right front outrigger.
- Loop the chain end of sling leg 3 through the lift provision located on the inboard side of the left rear outrigger. Insert link 3 in the grabhook. Repeat with sling leg 4 on the right rear outrigger.
- Pad the sling legs where they contact the crane cab.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

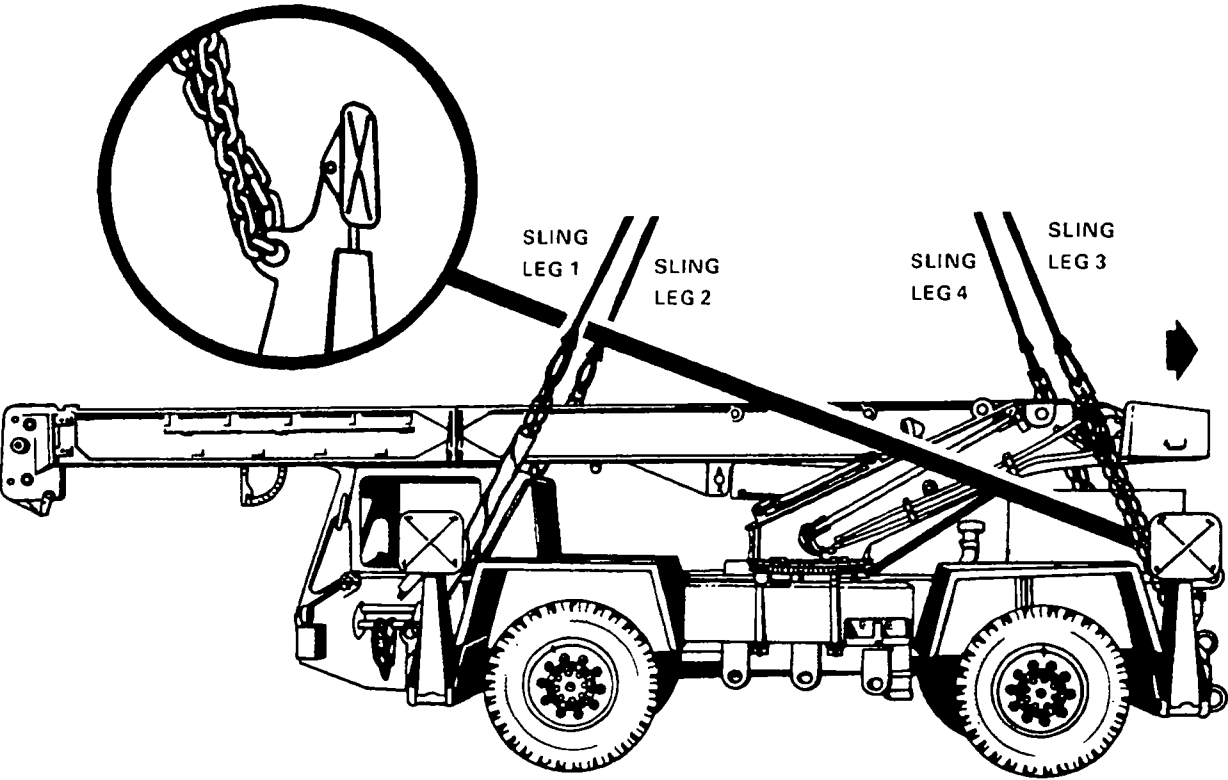
## **Step 3. Hookup**

**NOTE:** Connect the apex fitting so the rear end (engine) is carried forward.

The hookup team stands beside the left and right sides of the boom base. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts from the crane and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

## **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## Figure 2-60. LRT-110, 7 1/2-Ton Crane (Boom)

### APPLICABILITY

This load is certified by the US Army NRDEC for CH-47 helicopters at airspeeds up to and including 140 knots.

### LOAD DESCRIPTION

- Boom section, LRT-110, Type II, 7 1/2-ton crane.
- Weight: 8,600 pounds.

### MATERIALS

- Sling set, 10,000-pound capacity.
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cotton webbing, 1/4-inch, 80-pound breaking strength.
- Nylon, tubular, 1/2-inch, 1,000-pound breaking strength.
- Tie-down, nylon, cargo, CGU-1/B.

### PERSONNEL

Two persons can prepare and rig this load in 20 minutes.

### PROCEDURES

#### Step 1. Preparation

- Sectionalize the crane according to instructions in the operator's manual.
- Secure hook-block assembly to the end of the boom mast with CGU-1/B cargo tie-down or equivalent.
- Secure boom light power cable with nylon cord or tape.
- Insert wooden cable wedges at the drum to prevent the cable from unspooling if the cable becomes slack. Secure wedges with 1/2-inch tubular nylon.
- Secure the boom hydraulic hoses with tape or nylon cord. Make sure the hoses are clear of the boom base.

#### Step 2. Rigging

**NOTE:** Front end of load is rear end (counterweight).

- Position apex fitting on top of the boom directly above the boom base. Route outer sling legs 1 and 2 to the front (counterweight) end and inner sling legs 3 and 4 to the rear (hook) end. Sling legs 1 and 3 must be on the left side of the boom.

- Loop the chain end of sling leg 1 through the lift provision located on top of the boom left support arm near the counterweight end. Insert link 3 in the grabhook. Repeat with sling leg 2 on the right side support arm.
- Loop the chain end of sling leg 3 through the lift provision located on the left side near the middle of the boom. Insert link 3 in the grabhook. Repeat with sling leg 4 on the right side.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

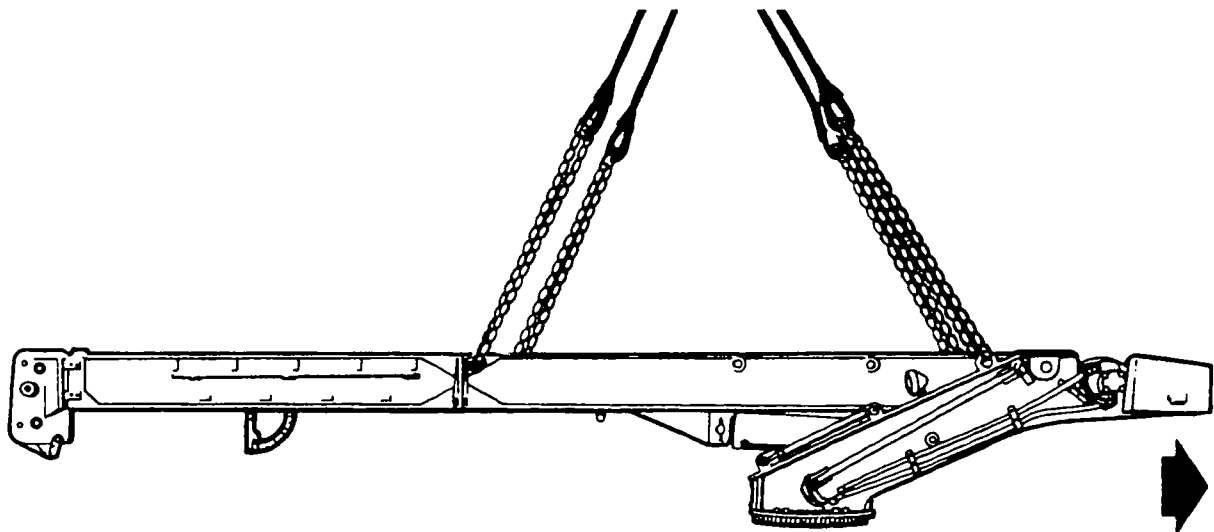
### Step 3. Hookup

**NOTE:** Connect the apex fitting so the rear end (counterweight) is carried forward.

The hookup team stands beside the boom. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the crane and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-61. LRT-110, 7 1/2-Ton Crane (Power Unit)**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-47 helicopters at airspeeds up to and including 140 knots.

### **LOAD DESCRIPTION**

- Power unit section, LRT-110, Type II, 7 1/2-ton crane, sectionalized.
- Weight: 15,600 pounds.

### **MATERIALS**

- Sling set, 25,000-pound capacity.
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cotton webbing, 1/4-inch, 80 pound breaking strength.
- Nylon, tubular, 1/2-inch, 1,000-pound breaking strength.
- Tie-down, nylon, cargo, CGU-1/B.
- Padding material, felt or cellulose.

### **PERSONNEL**

Two persons can prepare and rig this load in 20 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Sectionalize the crane according to instructions in operator's manual.
- Fold side mirrors in toward cab and tie or tape, as necessary. Tape or secure windshield wipers to windshield.
- Ensure the wheels are pointing straight ahead. Secure the steering wheel with nylon cord or tape.
- Secure doors, toolbox covers, and loose equipment with nylon cord or tape.

#### **Step 2. Rigging**

- Position apex fitting on top of the crane at the boom base attachment point. Route outer sling legs 1 and 2 to the front (cab end) of the crane and the inner sling legs 3 and 4 to the rear (engine end). Sling legs 1 and 3 must be on the left (driver) side of the crane.

- Loop the chain end of sling leg 1 through the lift provision located on the inboard side of the front left outrigger. Insert link 3 in the grabhook. Repeat with sling leg 2 on the right front outrigger.
- Loop the chain end of sling leg 3 through the lift provision located on the inboard side of the left rear outrigger. Insert link 3 in the grabhook. Repeat with sling leg 4 on the right rear outrigger.
- Pad the sling legs where they contact the cab.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

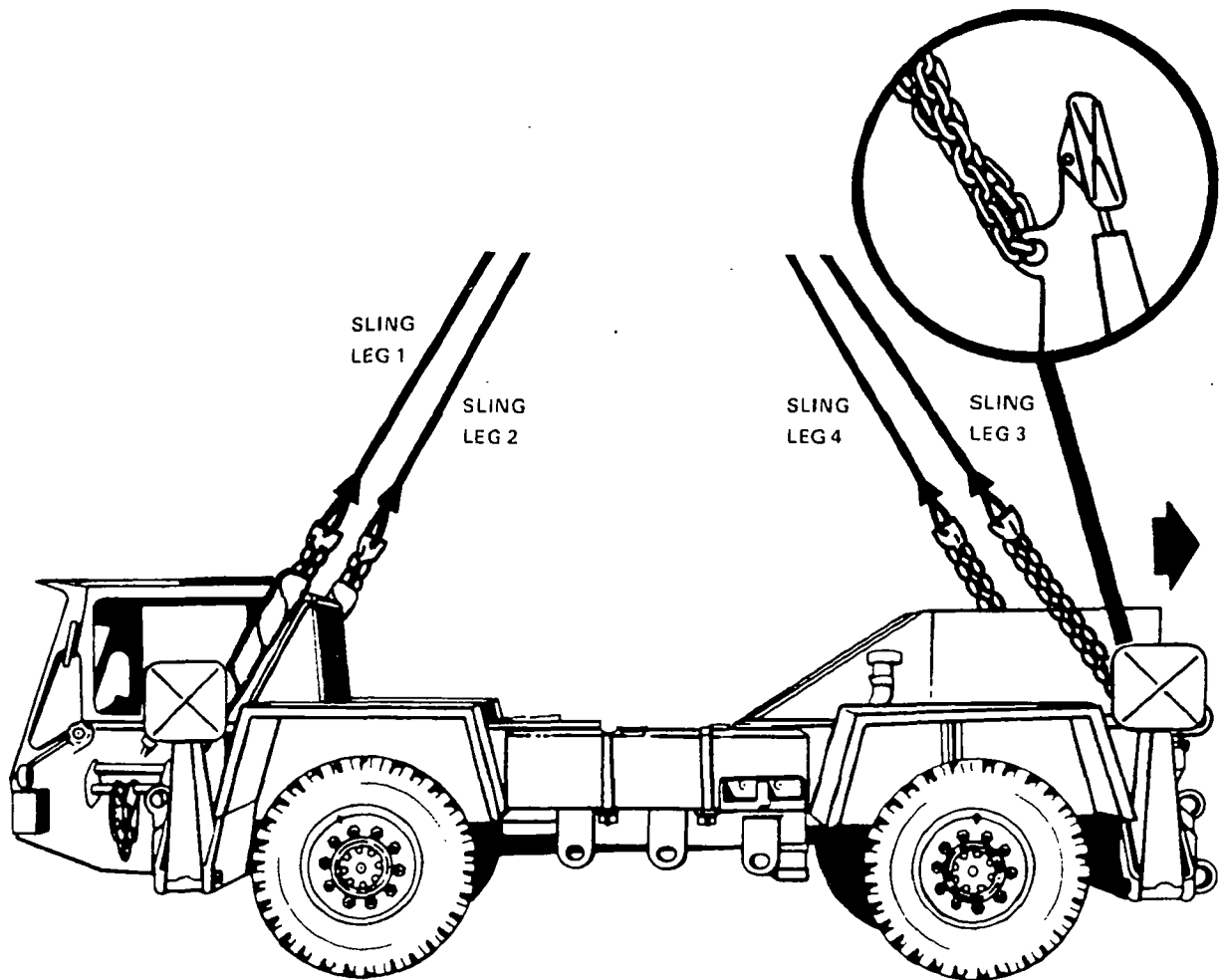
### **Step 3. Hookup**

**NOTE:** Connect the apex fitting so the rear end (engine) is carried forward.

The hookup team stands beside the left and right side of the boom base attachment point. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the crane and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## Figure 2-62. Truck, Forklift, MC-4000

### APPLICABILITY

The MC-4000 forklift is certified by the US Army NRDEC for CH-53E helicopters at airspeeds up to and including 90 knots.

### LOAD DESCRIPTION

- Truck, forklift, rough terrain, MC-4000, TAMCN B2565, NSN 3930-00-415-0098.
- Weight: 8,600 pounds.

### MATERIALS

- Multileg sling set (12,000-pound capacity) or sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tie-down strap, cargo, CGU-1/B.

### PERSONNEL

Two persons can prepare and rig this load in 20 minutes.

### PROCEDURES

#### Step 1. Preparation

- Insert the articulating lock pin to keep the forklift front and rear sections from twisting in flight.
- Secure steering wheel with nylon cord. Engage hand brake. Place transmission in neutral. Secure the seat cushions with tape or nylon cord.
- Make sure the fuel tank is less than 3/4 full.
- Raise the fork tines approximately one foot above the ground. Lift the ends of the fork tines by hand to point upward and secure the fork tines to the lift cylinder frame using the tie-down strap.

#### Step 2. Rigging

**NOTE:** Both sling sets use the same link count for this load.

- Position apex fitting/web ring on top of the engine hood or ROPS. Route outer sling legs 1 and 2 to the front of the forklift and inner sling legs 3 and 4 to the rear of the engine area. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision (not the tie-down provision) that is located directly above the forward axle housing between the left front

tire and the hydraulic cylinder. Insert link 4 in the grabhook. Repeat with sling leg 2 on the right front lift provision.

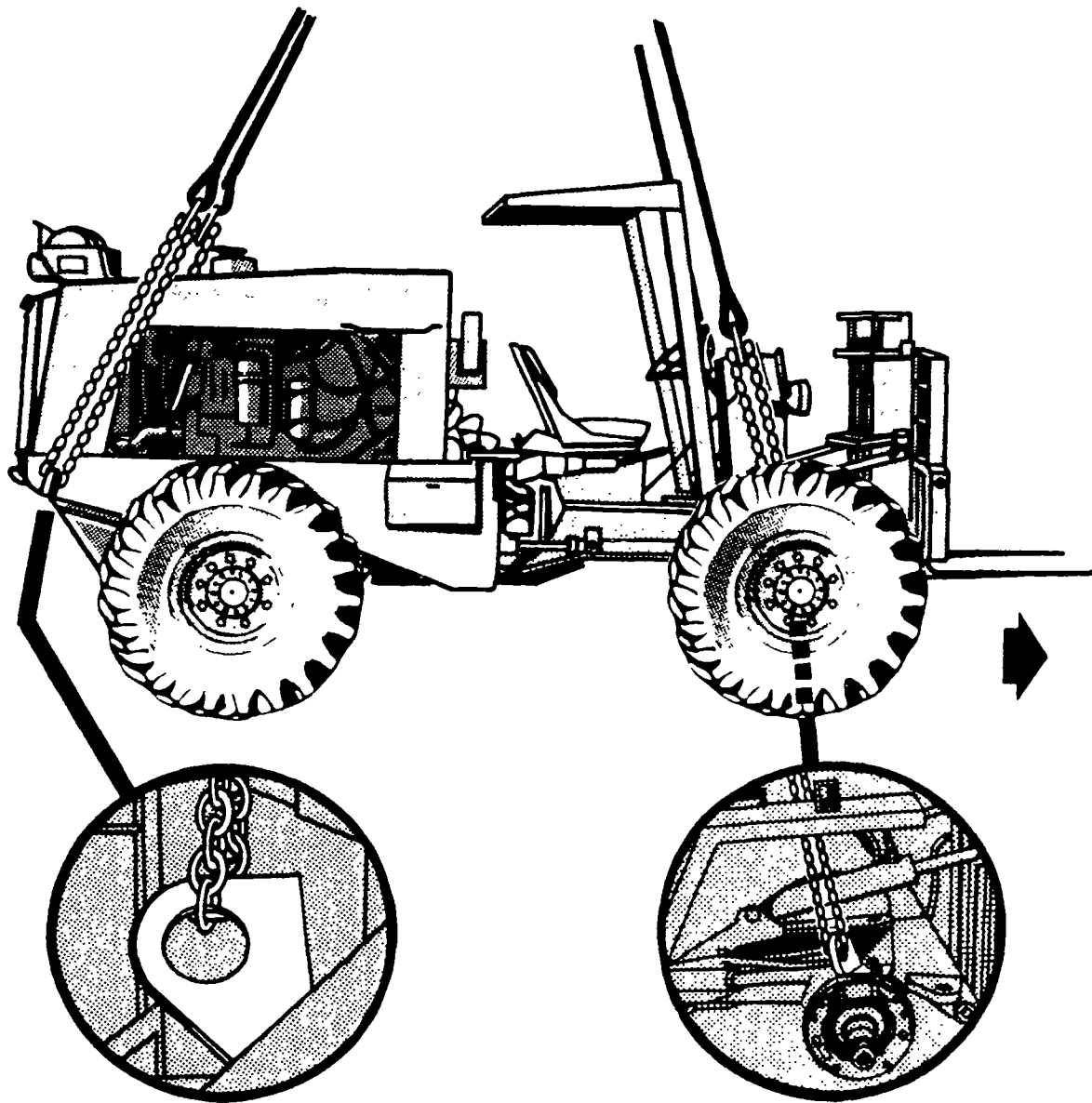
- Loop the chain end of sling leg 3 through the left rear lift provision and insert link 10 in the grabhook. Repeat with sling leg 4 and the right rear lift provision.
- Pull the front sling legs up and tape or tie (breakaway technique) the grab links to the front side of the upper light brackets to ensure the sling legs do not become entangled.
- Pull the aft sling legs together on top of the engine compartment and tie or tape (breakaway technique) the two grab links together.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the forklift to prevent entanglement with the ROPS and/or air cleaner/exhaust during hookup and lift-off.

### **Step 3. Hookup**

The hookup team stands on top of the engine deck. The static wand person discharges the static electricity with the static wand. The hookup person places the web ring/apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the forklift and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## **Figure 2-63. Truck, Forklift, MC-6000**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-53E helicopters at airspeeds up to and including 85 knots.

### **LOAD DESCRIPTION**

- Forklift truck, MC-6000, 6,000-pound capacity, TAMCN B2560.
- Weight: 19,800 pounds.

### **MATERIALS**

- Sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tie-down strap, cargo, CGU-1/B (5,000-pound capacity) (4 each).
- Padding, felt material or suitable substitute.

### **PERSONNEL**

Two persons can prepare and rig this load in 10 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Position the forks so that they are sitting on the travel blocks and tilted all the way aft.
- Using two tie-down straps, make a large single loop and secure both rear access doors longitudinally.
- Using the other two tie-down straps, secure both engine access doors.
- Secure the toolbox lid closed using nylon cord or tape.

#### **Step 2. Rigging**

- Position apex fitting on top of the ROPS. Route outer sling legs 1 and 2 to the front of the forklift and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision mounted on the frame inboard of the left front tire and insert link 3 in the grab link. Repeat with sling leg 2 and the right front lift provision.

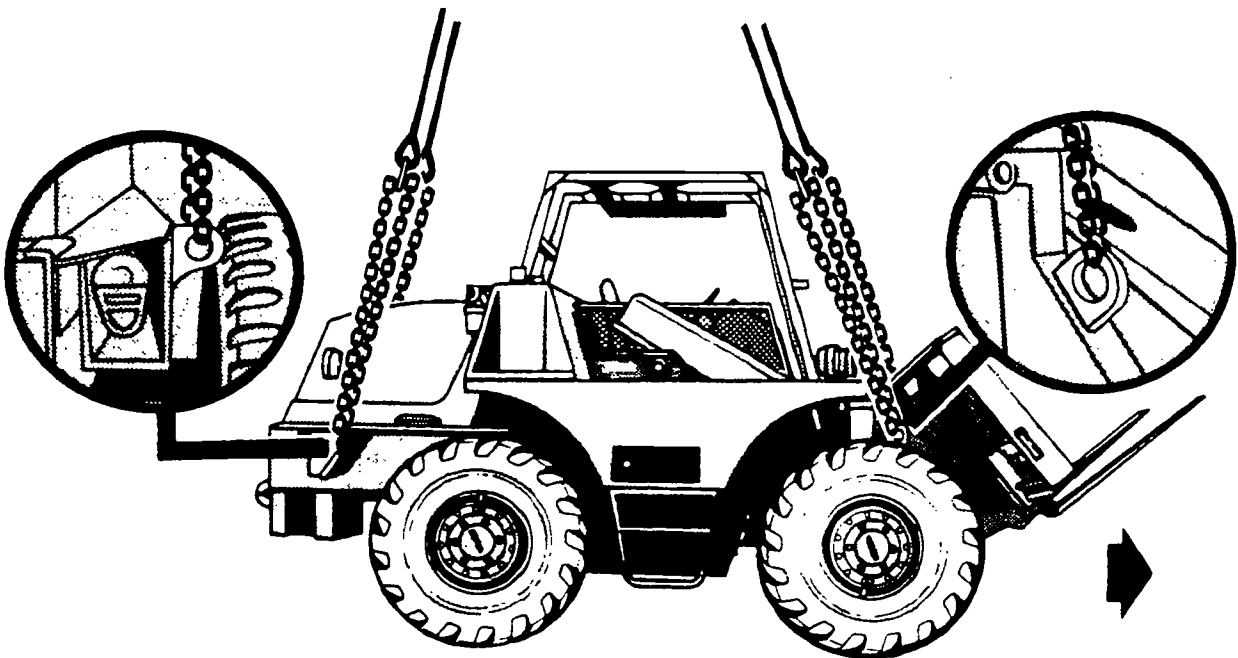
- Loop the chain end of sling leg 3 through the left rear lift provision located on the frame aft of the left rear tire and insert link 16 in grab link. Repeat with sling leg 4 and the right rear lift provision.
- Lift the sling leg and tie or tape (breakaway technique) the grabhooks to the ROPS. Cluster and tie or tape (breakaway technique) all sling legs together on top of the forklift to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on the engine deck or ROPS. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the forklift and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-64. Welding Shop, Trailer-Mounted**

### **APPLICABILITY**

This load is certified by the MTMCTEA for the CH-47 helicopter at airspeeds up to and including 120 knots.

### **LOAD DESCRIPTION**

- Welding shop, M200A1 trailer-mounted, LIN W48391.
- Weight: 7,220 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, nylon, tubular, 1/2-inch, 1,000-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig the load in 20 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Secure all compressed gas cylinders to trailer with nylon cord. Check that all caps are properly installed.
- Secure safety chains to tow bar of trailer.
- Secure rear outriggers in position by routing 1/2-inch tubular nylon over rear deck and under engine housing and tie on outriggers below step plate.
- Secure engine doors and control panel cover by routing nylon cord around entire engine and tying cord.
- Front leg must be in full down position.

#### **Step 2. Rigging**

- Position apex fitting on top of welding shop. Route outer sling legs 1 and 2 to the front of the trailer and inner sling legs 3 and 4 to the rear of the trailer. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located on the left front corner of the trailer and insert link 3 in the grabhook. Repeat with sling leg 2 on the right front lift provision.

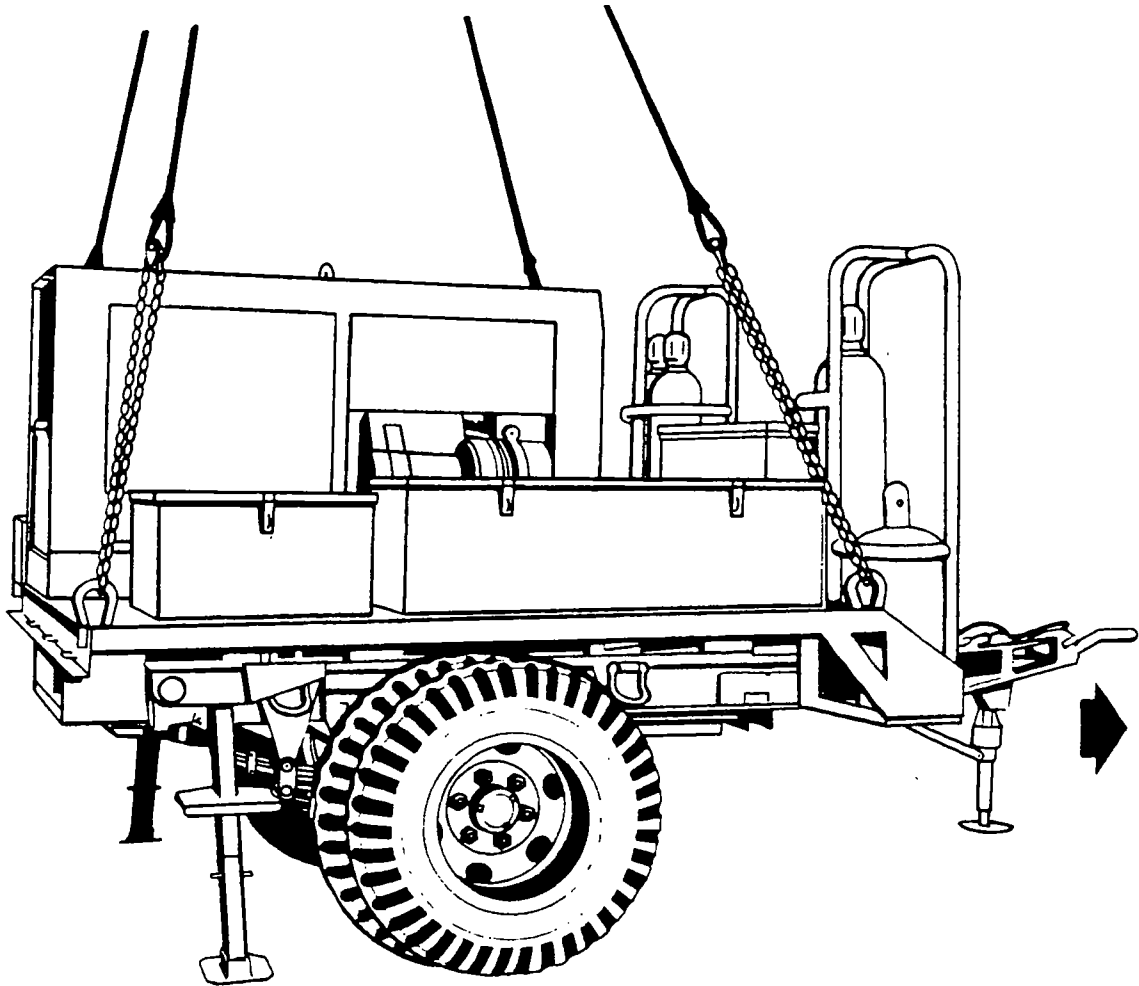
- Loop the chain end of sling leg 3 through the left rear lift provision and insert link 17 in the grabhook. Repeat with sling leg 4 on the right rear lift provision. Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

The hookup team stands on top of the trailer. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of preparation and rigging procedures in steps 1 and 2.



## **Figure 2-65. 250 CFM Air Compressor**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for the CH-47 helicopter at airspeeds up to and including 100 knots.

### **LOAD DESCRIPTION**

- Compressor, air, rotary, diesel engine driven, and pneumatic tool outfit, LIN E72804.
- Weight: 7,425 pounds, rigged.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Felt, sheet, cattle hair, Type VI.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig the load in 20 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Engage parking brake. Secure light cables with tape or nylon cord. Tie off hoses on reels to prevent unrolling. Close and latch all doors and lids.
- Ensure fuel cap is secure. Pad front corners of shelter along bolt lines with felt and tape.
- Tape or tie lift provisions in the UP position to prevent fouling.

#### **Step 2. Rigging**

- Carefully place apex fitting on top of the compressor. Route outer sling legs 1 and 2 to the front of the trailer and the inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end from sling leg 1 through the left front lift provision on the tongue of the trailer and place link 3 in the grabhook. Repeat this procedure for sling leg 2 on the right side of the tongue.
- Loop the chain end from sling leg 3 through the left rear lift provision and place link 15 in the grabhook. Repeat this procedure for sling leg 4. Tape or tie (breakaway technique) the sling legs to prevent fouling the hose reels.

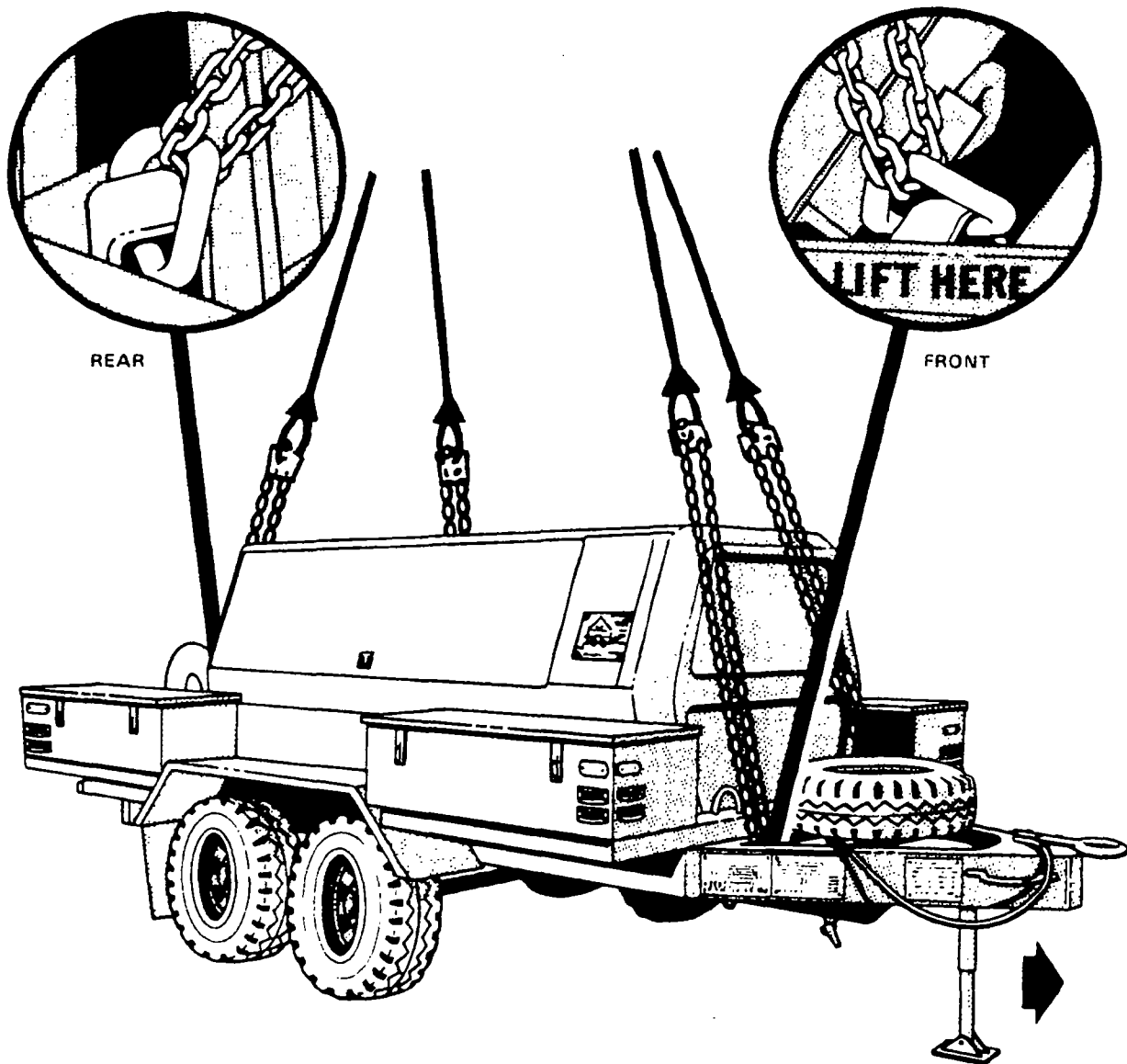
- Secure excess chain with tape or nylon cord.
- Cluster and tape or tie (breakaway technique) the sling legs together to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

The hookup team stands on the rear of the trailer. The static wand person discharges static electricity with the static wand. The hookup man places the apex fitting onto the aircraft cargo hook. The hookup person then carefully dismounts and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## **Figure 2-66. Pneumatic Tool and Compressor Outfit**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-53E helicopters at airspeeds up to and including 75 knots. This load is suitable for the CH-47 and CH-54 helicopters at airspeeds up to and including 90 knots.

### **LOAD DESCRIPTION**

- Pneumatic tool and compressor, air, rotary, TAMCN B0395, LIN P11866, NSN 3820-00-950-8584.
- Weight: 8,040 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity), multileg sling set (15,000-pound capacity), or sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig this load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Make sure all loose gear is properly stowed. Secure all hatches. Ensure that the fuel cap is closed.
- Secure light cable to drawbar with tape or nylon cord.
- Tape all lights and glass fixtures/reflectors.
- Secure the two small wheels by taping over the adjustment pins.
- Set one of the two handbrakes.

#### **Step 2. Rigging**

**NOTE:** Chain link number inside parentheses is used for the 10,000-pound sling set.

- Position apex fitting/web ring on top of the compressor. Route outer sling legs 1 and 2 to the front of the trailer and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.

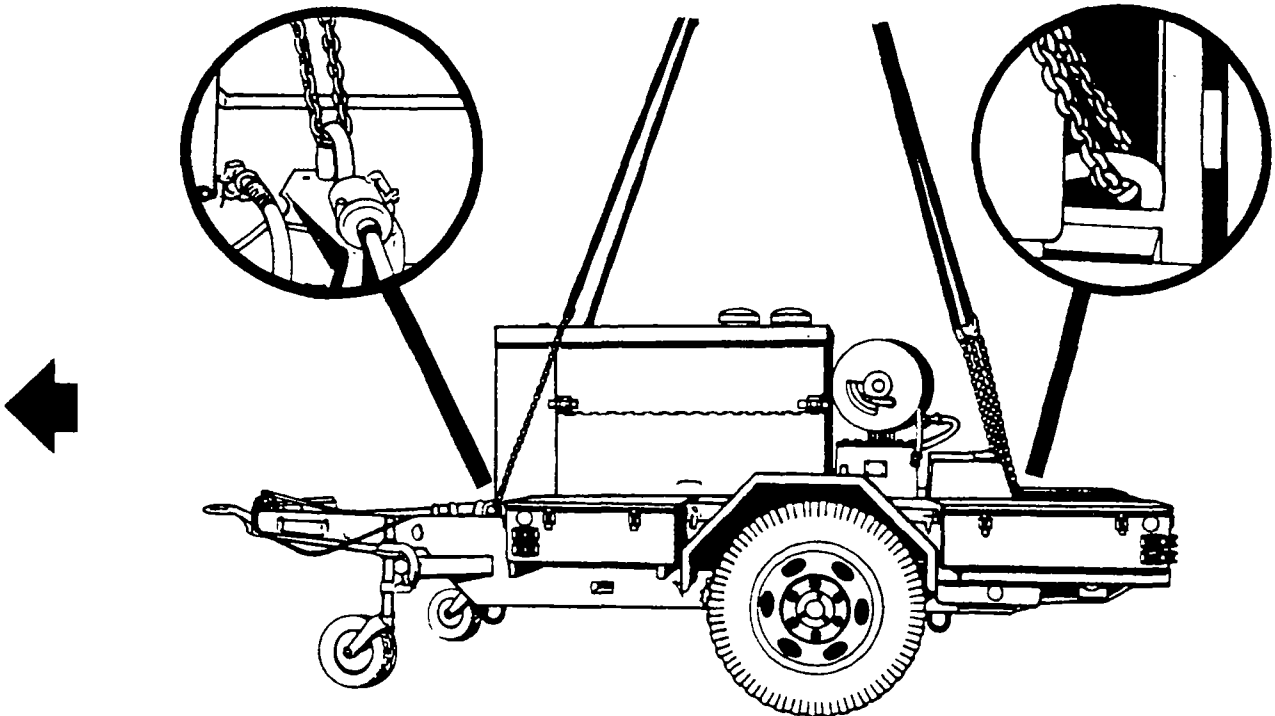
- Loop the chain end of sling leg 1 through the short lifting eye located at the left front corner of the trailer and insert link 5 (18) in the grab link. Repeat with sling leg 2 and the short lifting eye located at the right front corner of the trailer.
- Loop the chain end of sling leg 3 through the tall (only) lifting eye at the left rear corner of the trailer and insert link 5 (3) in the grab link. Repeat with sling leg 4 and the tall (only) lifting eye at the right rear corner of the trailer.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the air compressor to prevent entanglement during hookup and lift-off. Make sure rear sling legs are tied so they do not become entangled under the hose reels.

### Step 3. Hookup

The hookup team stands on the rear of the trailer. The static wand person discharges the static electricity with the static wand. The hookup person places the web ring/apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-67. Fuel Dispensing System, Tactical Airfield (TAFDS)**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-46 helicopters at airspeeds up to and including 60 knots.

### **LOAD DESCRIPTION**

- Pump, 600 gallons per minute (gpm), tactical airfield fuel dispensing system, TAMCN B0675, NSN 4930-01-094-0026.
- Weight: 3,500 pounds.

### **MATERIALS**

- Multileg sling set (15,000-pound capacity) or sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig this load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Secure battery cover, inlet plugs, and outlet plugs.
- Tape engine intake and exhaust openings.
- Secure canvas cover on pump with nylon cord.
- Engage one hand brake.

#### **Step 2. Rigging**

**NOTE:** Both sling sets use the same chain link number for this load.

- Position apex fitting/web ring on top of the pump. Route outer sling legs 1 and 2 to the front of the trailer and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located on the left front corner of the trailer and insert link 5 in the grab link. Repeat with sling leg 2 and the right front lift provision.

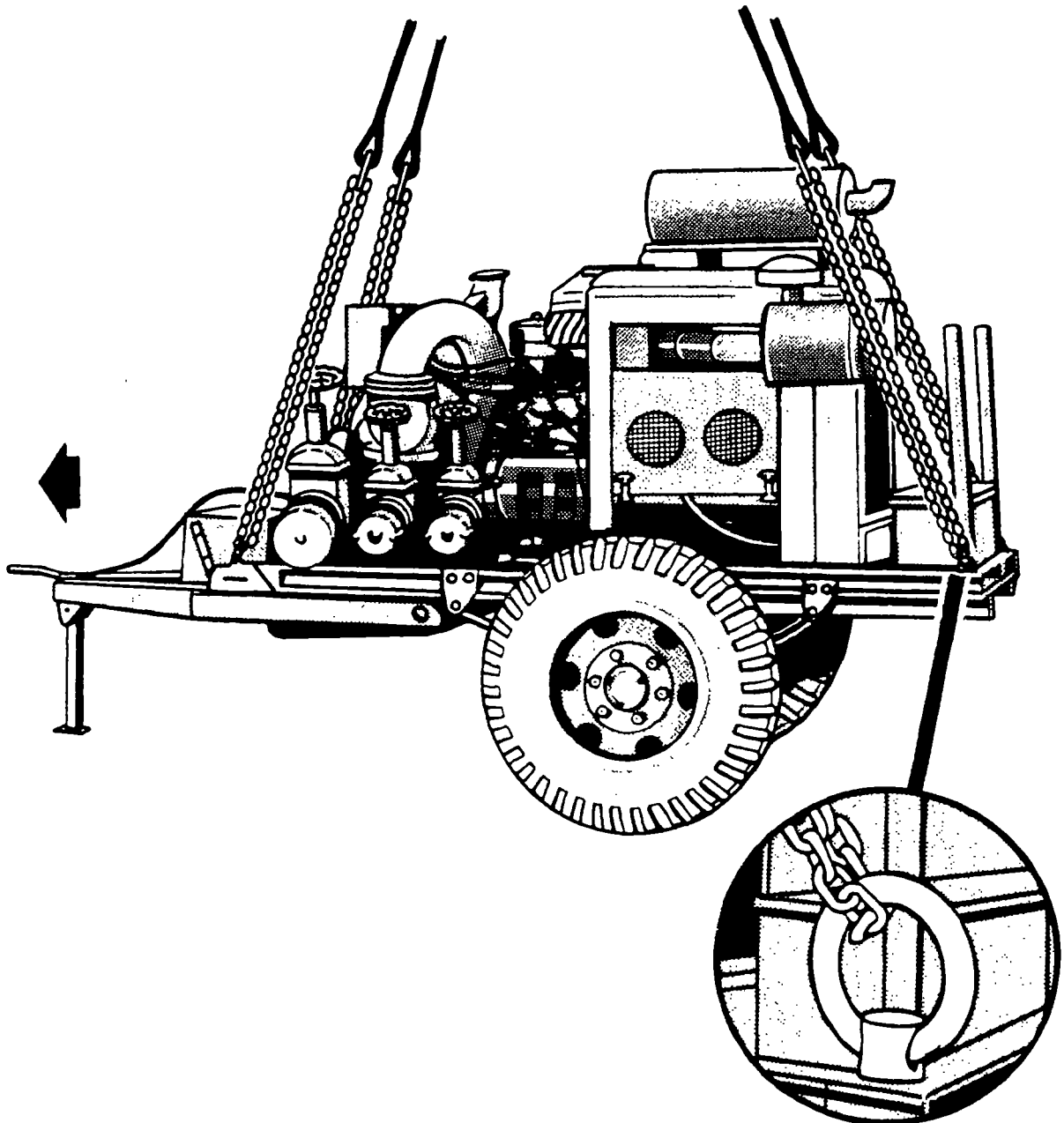
- Loop the chain end of sling leg 3 through the left rear lift provision located on the left rear corner of the trailer and insert link 5 in the grab link. Repeat with sling leg 4 and the right rear lift provision.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the pump to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

The hookup team stands on the pump tires. The static wand person discharges the static electricity with the static wand. The hookup person places the web ring/apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-68. Bath Unit, Trailer-Mounted**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-53E helicopters at airspeeds up to and including 45 knots.

### **LOAD DESCRIPTION**

- Bath unit, M103 trailer-mounted, TAMCN B0060, ID NO. 00848D, NSN 4510-00-763-1082.
- Weight: 4,800 pounds.

### **MATERIALS**

- Multileg sling set (15,000-pound capacity) or sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig this load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Make sure all tanks are empty. Secure all tank hatches with tape or nylon cord.
- Secure jack mounts so that jacks clear the ground by one foot.
- Engage the parking brakes.

#### **Step 2. Rigging**

**NOTE:** Both sling sets use the same chain link count for this load.

- Position apex fitting/web ring on top of the bath unit. Route outer sling legs 1 and 2 to the front of the trailer and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front steady jack eye, under the jack mount and insert link 16 in the grab link. Repeat with sling leg 2 and the right front jack mount.
- Loop the chain end of sling leg 3 around the left rear jack mount and insert link 30 in the grab link. Repeat with sling leg 4 and the right rear jack mount.

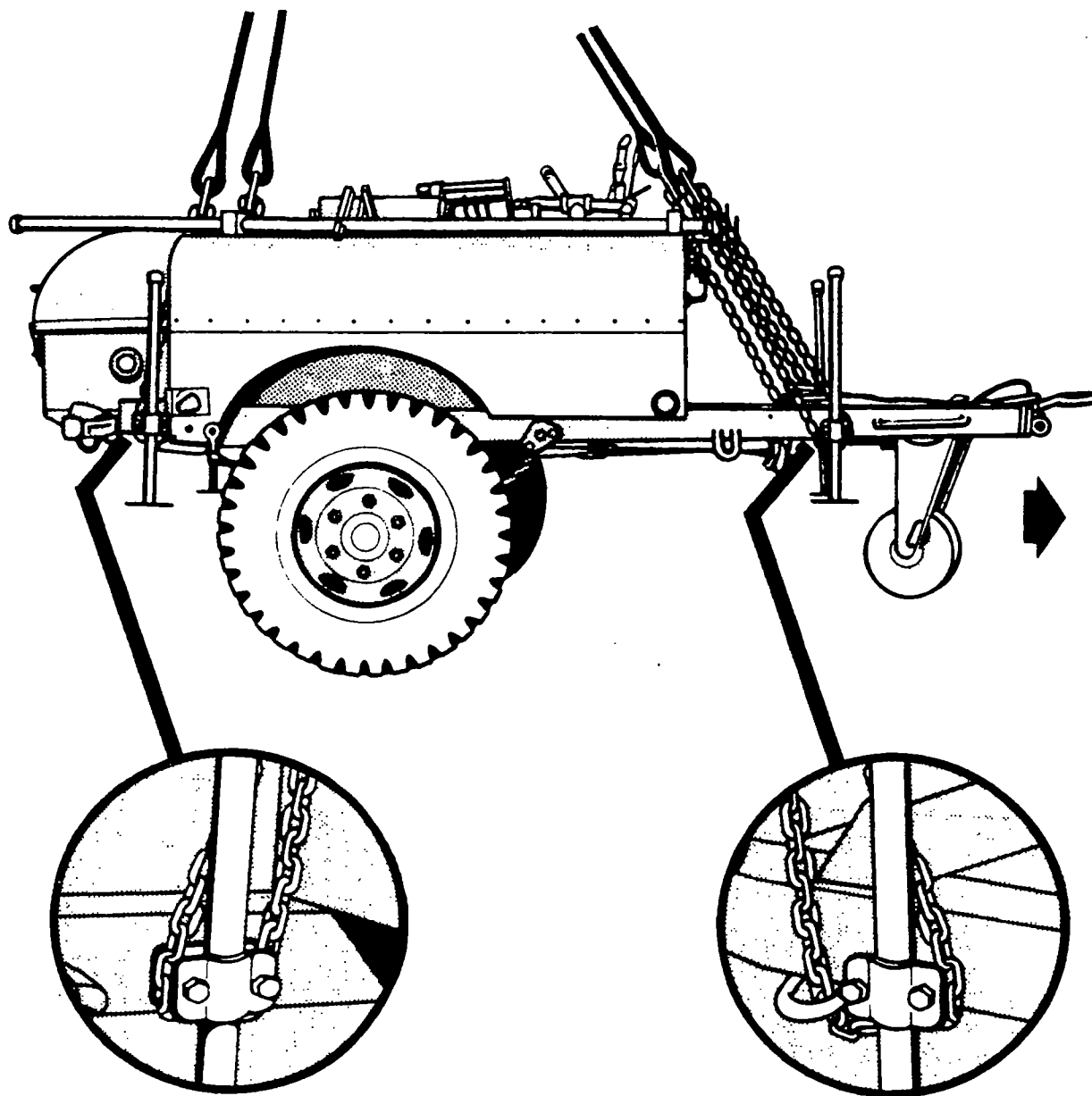
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the bath unit to prevent entanglement during hookup and lift-off. Make sure sling legs do not become fouled on the water pipes.

### **Step 3. Hookup**

The hookup team stands beside the bath unit. The static wand person discharges the static electricity with the static wand. The hookup person places the web ring/apex fitting onto the aircraft cargo hook. The hookup team remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## **Figure 2-69. Boat, Bridge Erection**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-53E helicopters at airspeeds up to and including 60 knots.

### **LOAD DESCRIPTION**

- Boat, bridge erection, 27-foot, TAMCN B0110, NSN 1940-00-915-0079.
- Weight: 6,000 pounds.

### **MATERIALS**

- Multileg sling set (15,000-pound capacity) or sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig this load in 30 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Remove canvas covers and stow in the rear (stern) boat section.
- Secure or remove all loose items of equipment.
- Attach the front section to the rear section of the boat.
- Tape all glass items such as lights, gages, and compass.
- Make sure that both cradles on which the boat sections are shipped are not attached to the boat sections.

#### **Step 2. Rigging**

**NOTE:** Both sling sets use the same chain link count for this load.

**NOTE:** This load is rigged to fly aft (stern) end forward.

- Position apex fitting/web ring on top of the center of the boat. Route outer sling legs 1 and 2 to the stern section and inner sling legs 3 and 4 to the bow section. Make sure chains for sling legs 3 and 4 are forward (toward the bow) of the horizontal arms on the rear towing bitt. Sling legs 1 and 3 must be on the same side of the load.

- Loop the chain end of sling leg 1 through the left rear lifting U-bolt located on the left side of the stern section and insert link 4 in the grab link. Repeat with sling leg 2 and the right rear lifting U-bolt.
- Wrap the chain end of sling leg 3 two times around the vertical post of the rear towing bitt and insert link 4 in the grab link. Wrap the chain end of sling leg 4 two times in the opposite direction around the vertical post of the rear towing bitt and insert link 4 in the grab link. Make sure the chain is below the horizontal arm of the towing bitt.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the boat to prevent entanglement during hookup and lift-off.

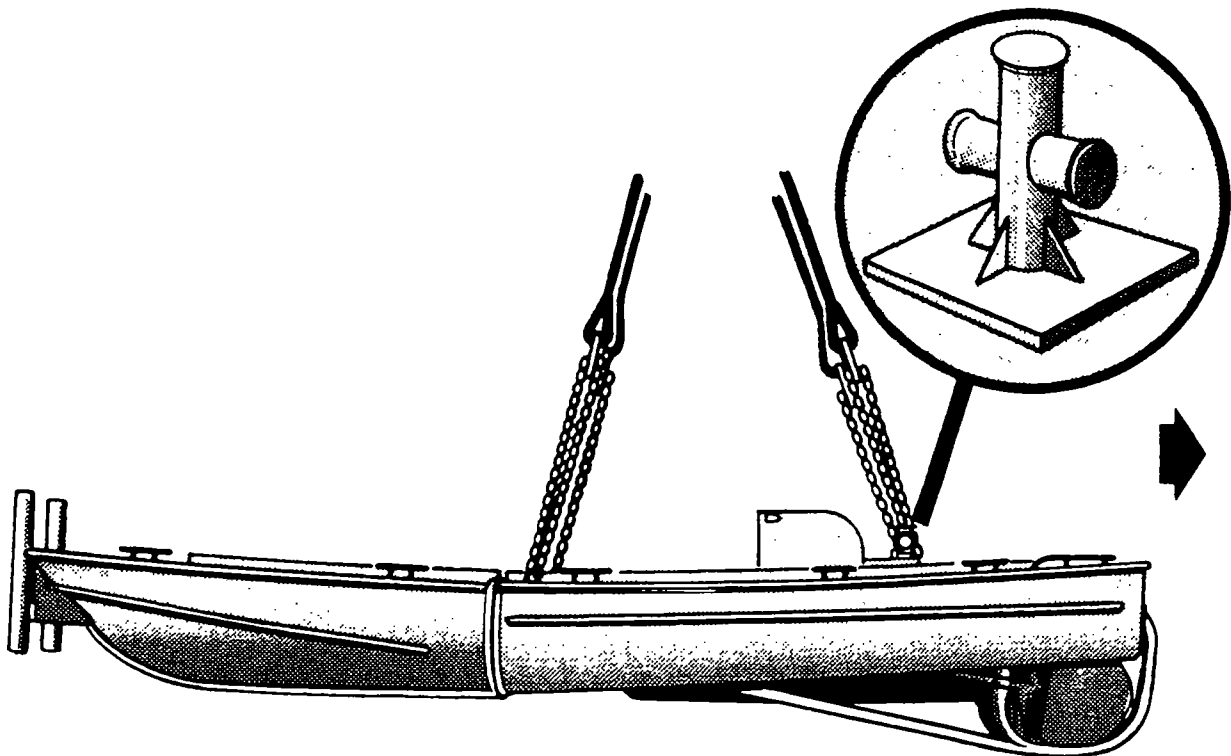
### Step 3. Hookup

**NOTE:** Connect the apex fitting/web ring so that the boat is carried aft (stern) end forward.

The hookup team stands on top of the boat. The static wand person discharges the static electricity with the static wand. The hookup person places the web ring/apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the boat and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-70. Bridge, Medium Girder, Dry Gap (MGB)**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-53E helicopters at airspeeds up to and including 70 knots.

### **LOAD DESCRIPTION**

- Medium girder bridge, ramp section, palletized, TAMCN B0152, NSN 5420-00-172-3520.
- Weight: 6,500 pounds.

### **MATERIALS**

- Multileg sling set (15,000-pound capacity) or sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tie-down straps, cargo, CGU-1/B (5,000-pound capacity), as required.

### **PERSONNEL**

Two persons can prepare and rig this load in 20 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

Make sure all sections of the bridge are properly secured to the pallet using the cargo tie-down straps. Route two straps from the pallet forward end to the aft end. Route the remaining straps from one side of the pallet, over the ramp sections, and to the other side of the pallet. Tighten all tie-down straps.

#### **Step 2. Rigging**

**NOTE:** The larger ends of the bridge sections are at the front of the load.

**NOTE:** Chain link number inside parentheses is used for the 40,000-pound sling set.

- Position apex fitting/web ring on top of the ramp sections. Route outer sling legs 1 and 2 to the front of the load and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.

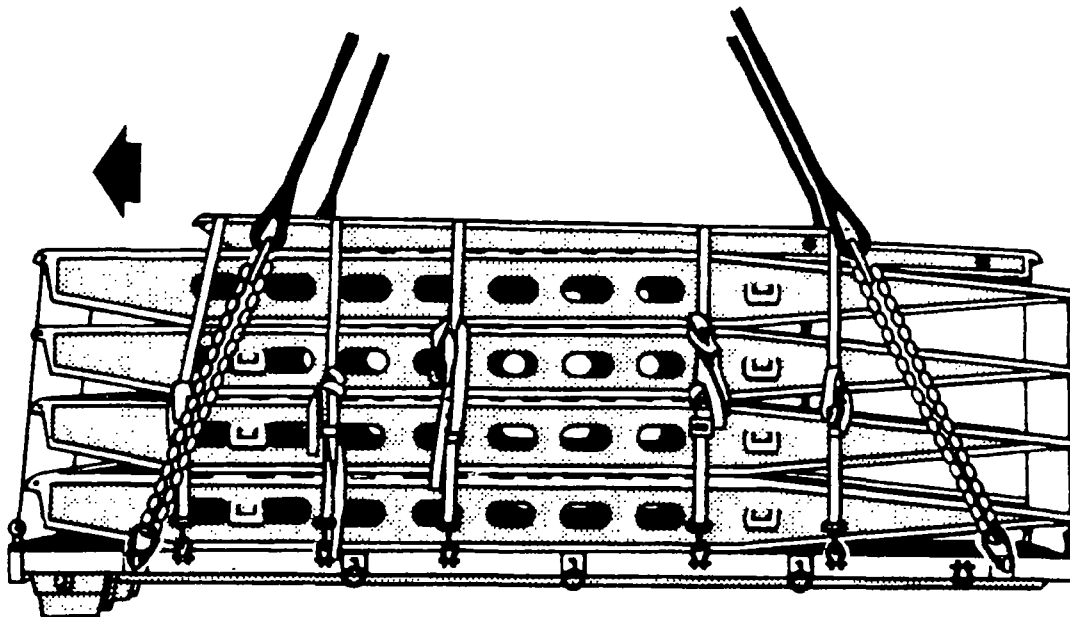
- Loop the chain end of sling leg 1 through the pallet left front lift provision and insert link 10 (3) in the grab link. Repeat with sling leg 2 and the pallet right front lift provision. Secure excess chain with tape or nylon cord.
- Loop the chain end of sling leg 3 through the pallet left rear lift provision and insert link 5 (3) in the grab link. Repeat with sling leg 4 and the pallet right rear lift provision.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the bridge ramp sections to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on top of the bridge ramp sections. The static wand person discharges the static electricity with the static wand. The hookup person places the web ring/apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the ramp sections and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-71. Water Purification Unit-Reverse Osmosis (ROWPU)**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-53E helicopters at airspeeds up to and including 90 knots.

### **LOAD DESCRIPTION**

- Water purification unit-reverse osmosis, MC 257, 600 gallons per hour (gph), skid-mounted, TAMCN B2064, NSN 4610-01-113-8651.
- Weight: 7,400 pounds.

### **MATERIALS**

- Multileg sling set (15,000-pound capacity) or sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig this load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Secure all containers, boxes, and other gear.
- Tape all glass fixtures to prevent breakage.

#### **Step 2. Rigging**

**NOTE:** The water pump end is the forward end of the load.

**NOTE:** Both sling sets use the same chain link count for this load.

- Position apex fitting/web ring on top of the ROWPU unit. Route outer sling legs 1 and 2 to the front of the unit and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift ring on the top of the unit and insert link 5 in the grab link. Repeat with sling leg 2 and the right front lift ring.
- Loop the chain end of sling leg 3 through the left rear lift ring and insert link 5 in the grab link. Repeat with sling leg 4 and the right rear lift ring.

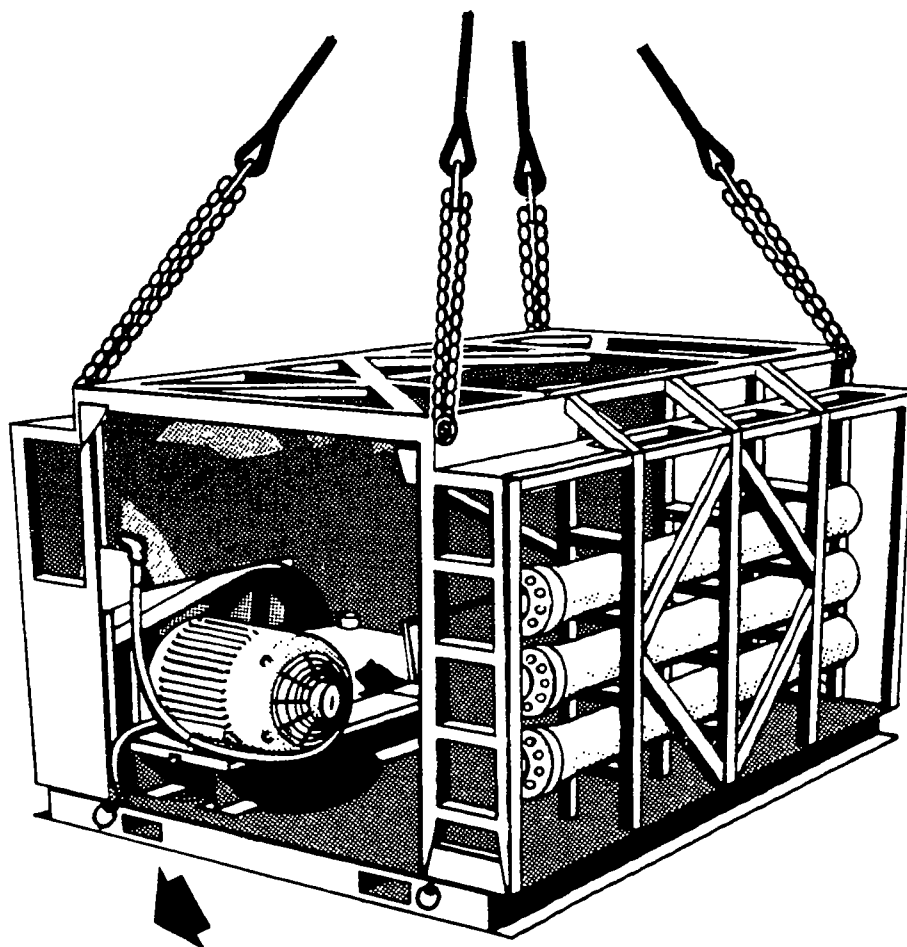
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the unit to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on top of the unit. The static wand person discharges the static electricity with the static wand. The hookup person places the web ring/apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the unit and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **\*Figure 2-71.1. Extendable Boom Forklift (EBFL) (USMC)**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-53 helicopters at airspeeds up to and including 105 knots, respectively.

### **LOAD DESCRIPTION**

- Extendable boom forklift, TAMCN B2561.
- Weight: 25,640 pounds.

### **MATERIALS**

- Sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tie-down strap, cargo, CGU-1/B (5,000-pound capacity) (2 each or as required).

### **PERSONNEL**

Two persons can prepare and rig this load in 10 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Secure the forks against the carriage using the CGU-1/B.
- Raise the carriage 10 inches off the ground, retract and raise boom.
- Set parking brake.
- Place gear selector in neutral.
- Tape exhaust pipe end.

#### **Step 2. Rigging**

- Position the apex fitting on top of the falling object protection system (FOPS). Route outer sling legs (1 and 2) to the front of the EBFL and inner sling legs (3 and 4) to the rear of the EBFL. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision and insert link 3 in the grab link. Repeat with sling leg 2 and the right front lift provision.

- Loop the chain end of sling leg 3 through the left rear lift provision and insert link 20 in the grab link. Repeat with sling leg 4 and the right rear lift provision. Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the FOPS to prevent entanglement during hookup and lift-off.

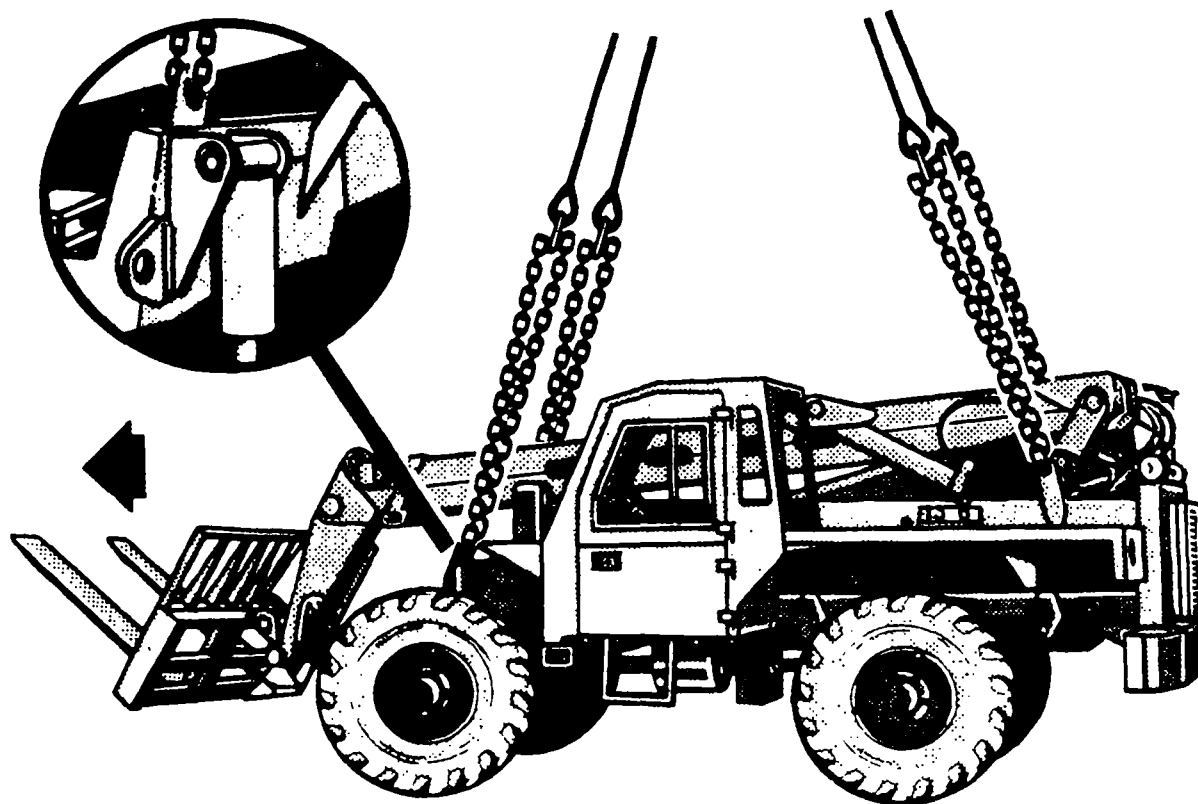
### Step 3. Hookup

**NOTE:** Connect the apex fitting to the cargo hook so the forks of the EBFL are forward.

The hookup team stands on the FOPS, facing aft. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the center aircraft cargo hook. The hookup team then carefully dismounts the EBFL and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## **\*Figure 2-71.2. MS114WFD Concrete Mixer (USMC)**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for the CH-46E helicopters at airspeeds up to and including 90 knots. This load is also certified by the US Army NRDEC for the CH-53E helicopters when rigged with the 15,000-pound multileg sling set or the 40,000-pound sling set at airspeeds up to and including 75 and 70 knots, respectively.

### **LOAD DESCRIPTION**

- Concrete mixer, MS114WFD, TAMCN B1326.
- Weight: 4,223 pounds.

### **MATERIALS**

- Multileg sling set (15,000-pound capacity).
- Sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Cord, nylon, Type III, 550-pound breaking strength.
- Tie-down strap, cargo, CGU-1/B (5,000-pound capacity) as required.

### **PERSONNEL**

Two persons can prepare and rig this load in 10 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Secure all hoses, cables, or chains with tape or nylon cord.
- Secure the towbar in the raised/locked position.
- Raise the scoop to the up position and secure the scoop elevating wheel with the tie-down strap.
- Since the mixer does not have a hand brake, loop a tie-down strap through a wheel rim and secure it to the frame to keep the wheel from turning.

## **Step 2. Rigging**

**NOTE:** The chain link number inside parentheses is used for the 40,000-pound capacity sling set.

- Position the web ring/apex fitting on top of the mixer. Route outer sling legs (1 and 2) to the front of the mixer (towbar end) and inner sling legs (3 and 4) to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front U-bolt lift provision located on the left topside of the mixer and insert link 50 (15) in the grab link. Route the chain from the inboard side of the provision to the outboard side. Repeat with sling leg 2 and the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear U-bolt lift provision located on the left topside of the mixer and insert link 30 (3) in the grab link. Route the chain from the inboard side of the provision to the outboard side. Repeat with sling leg 4 and the right rear lift provision.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the mixer to prevent entanglement during hookup and lift-off.

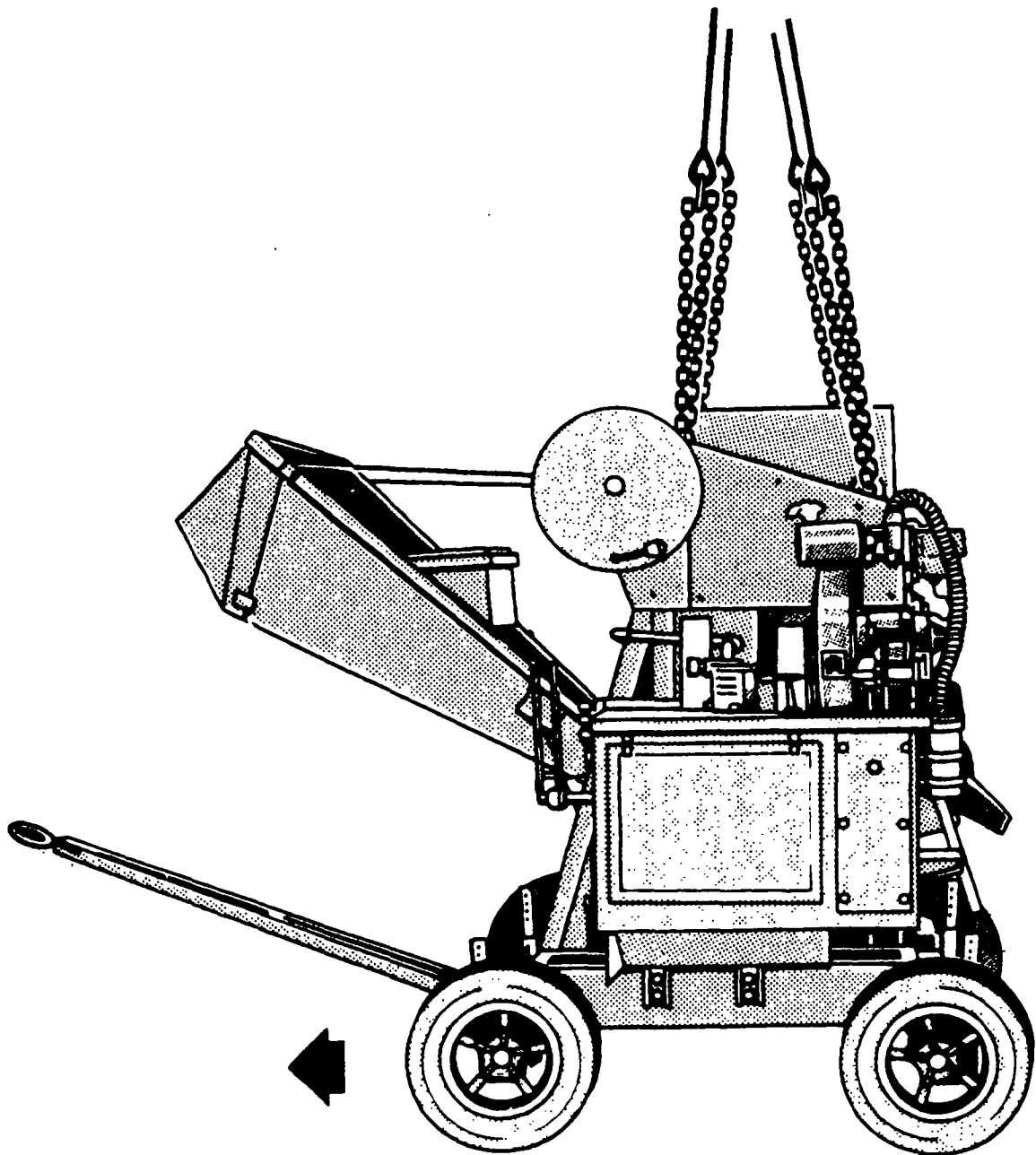
## **Step 3. Hookup**

**NOTE:** Connect the apex fitting to the cargo hook so the towbar is forward.

The hookup team stands on top of the mixer. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the mixer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

## **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **\*Figure 2-71.3. RT4000 Forklift (USMC)**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for the CH-53 helicopters at airspeeds up to and including 120 knots.

### **LOAD DESCRIPTION**

- Forklift, rough terrain, 4,000-pound, TAMCN B2566.
- Weight: 10,860 pounds.

### **MATERIALS**

- Multileg sling set (15,000-pound capacity).
- Sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tie-down strap, cargo, CGU-1/B (5,000-pound capacity).

### **PERSONNEL**

Two persons can prepare and rig this load in 10 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Engage hand brake. Place transmission in neutral.
- Raise the fork tines approximately one foot above the ground. Lift the ends of the fork tines by hand to point upward and secure the fork tines to the lift cylinder frame using the tie-down strap.
- Tape the exhaust pipe end.

## **Step 2. Rigging**

**NOTE:** Both sling sets use the same link count for this load.

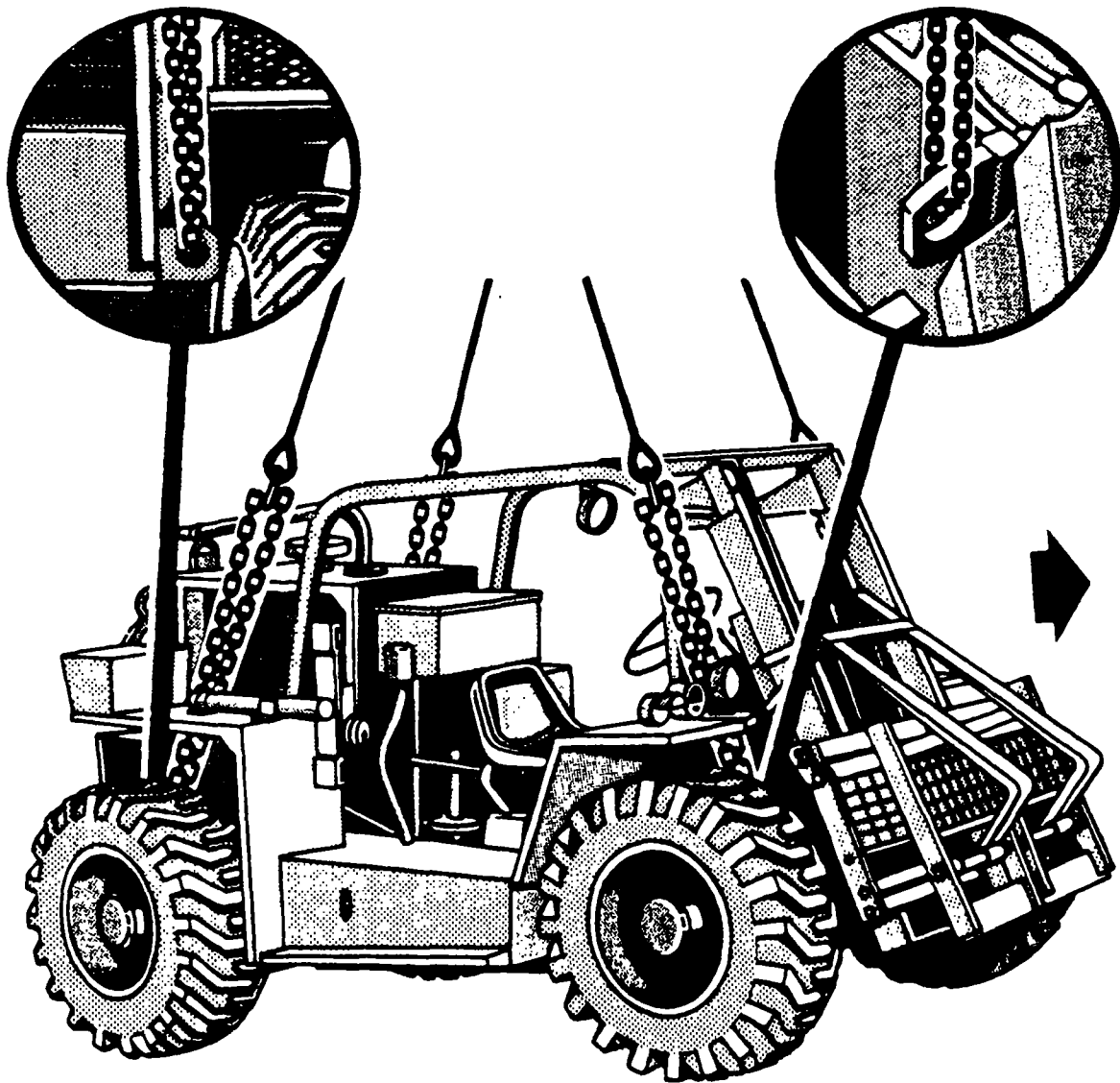
- Position apex fitting/web ring on top of the falling object protection system (FOPS). Route outer sling legs (1 and 2) to the front of the forklift and inner sling legs (3 and 4) to the rear of the engine area. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision (not the tie-down provision) that is located directly above the forward axle housing between the left front tire and the hydraulic cylinder. Insert link 3 in the grabhook. Repeat with sling leg 2 on the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lift provision and insert link 10 in the grabhook. Repeat with sling leg 4 and the right rear lift provision. Secure excess chain with tape or nylon cord.
- Pull the front sling legs up and tape or tie (breakaway technique) the grab links to the front side of the upper light brackets to ensure the sling legs do not become entangled.
- Pull the aft sling legs together on top of the engine compartment and tie or tape (breakaway technique) the two grab links together.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the forklift to prevent entanglement with the FOPS and/or air cleaner/exhaust during hookup and lift-off.

## **Step 3. Hookup**

The hookup team stands on top of the FOPS. The static wand person discharges the static electricity with the static wand. The hookup person places the web ring/apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the forklift and remains close to the load as the helicopter removes slack from the sling leg. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

## **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **LIQUID CONTAINERS**

\*The certified single-point rigging procedures for liquid containers are in this section. Figures 2-72 through 2-77 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

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### **Figure 2-72. Lightweight Collapsible Fabric Tank**

#### **APPLICABILITY**

This load is certified by the US Army NRDEC for UH-1, UH-60, and CH-47 helicopters.

#### **LOAD DESCRIPTION**

- Tank, fabric, lightweight collapsible, 160 gallons, LIN Z77871.
- Weight: 1,400 pounds.

#### **MATERIALS**

- Cargo net, helicopter, 5,000-pound capacity.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

#### **PERSONNEL**

Two persons can prepare and rig this load in 15 minutes.

#### **PROCEDURES**

##### **Step 1. Preparation**

Ensure all sharp edges on the tank are protected.

##### **Step 2. Rigging**

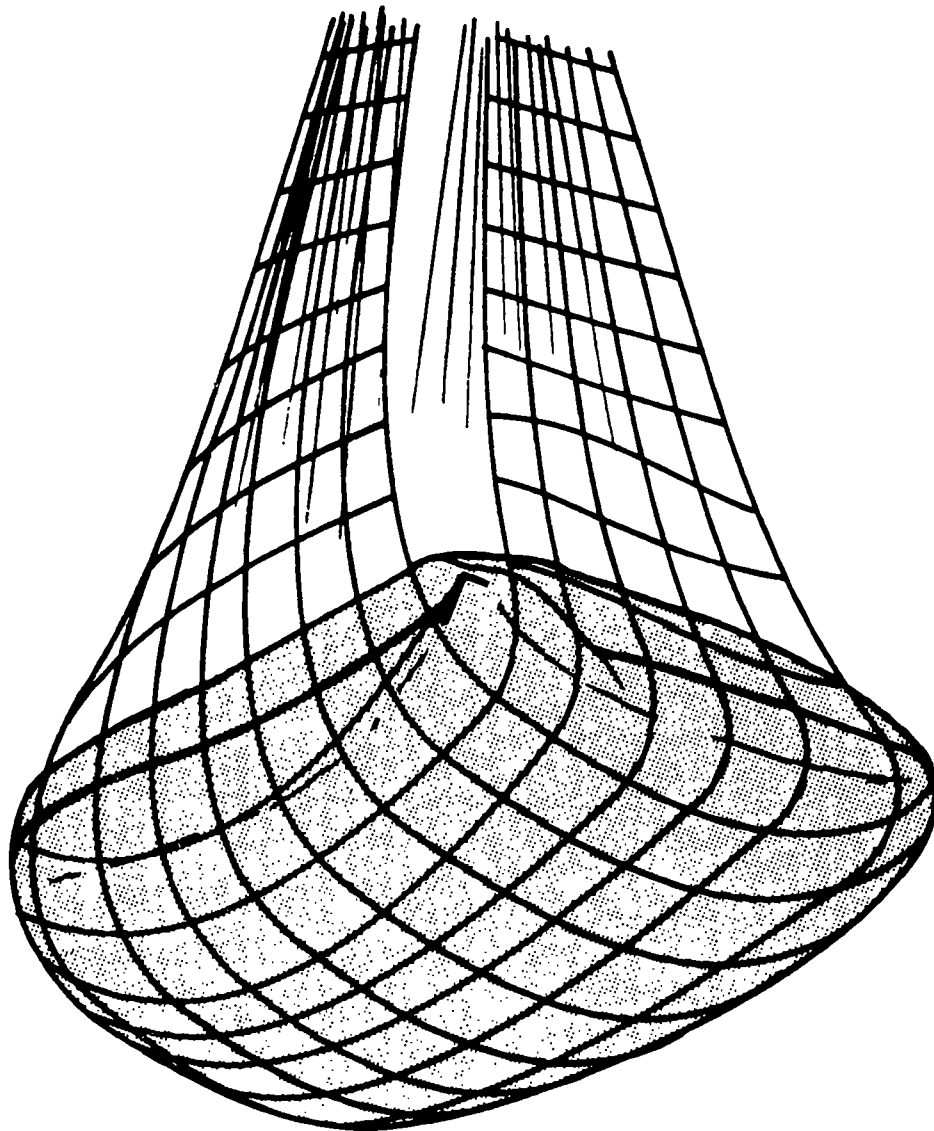
- Spread the cargo net and position the tank in the center of the net.
- Using the cargo net rigging instructions in Chapter 1, complete rigging the cargo net.

##### **Step 3. Hookup**

The hookup team stands alongside the load. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team exits the area underneath the helicopter to the designated rendezvous point.

##### **Step 4. Derigging**

Derigging is the reverse of the rigging procedures in Step 2. Stow the cargo net in the storage bag.





## **Figure 2-73. One to Four 500-Gallon Fuel Drums**

### **APPLICABILITY**

One fuel drum is certified by the US Army NRDEC for UH-60 and CH-53A/D/E helicopters at airspeeds up to and including 120 and 80 knots, respectively. One to four fuel drums are a suitable load for the CH-47 helicopter at airspeeds up to and including 80 knots.

### **LOAD DESCRIPTION**

- Drum, fabric, fuel, 500-gallon capacity:
  - LIN G68961 or LIN G68966.
  - TAMCN B0570 (NSN 8110-00-965-2313).
- Weight:
  - Drum, empty, 250 pounds.
  - One drum, 4,200 pounds.
  - Two drums, 8,400 pounds.
  - Three drums, 12,600 pounds.
  - Four drums, 16,800 pounds.

**NOTE:** Exact weight of each drum may vary depending on type and amount of fuel.

### **MATERIALS**

- Sling sets:
  - One drum, 10,000- or 25,000-pound capacity (USA) or 15,000- or 40,000-pound capacity (USMC).
  - Two drums, 10,000-pound capacity sling set.
  - Three drums, 25,000-pound capacity sling set.
  - Four drums, 25,000-pound capacity sling set.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Cord, nylon, Type III, 550-pound breaking strength.

### **PERSONNEL**

Two persons can rig one to four drums in 5 to 15 minutes.

## PROCEDURES

### Step 1. Preparation

- Align drums side by side in a row.
- Make sure lifting clevises are serviceable.
- Rotate the drum hubs so that a clevis is at the top.

### Step 2. Rigging

- One drum:
  - Position apex fitting on top of the drum. Route one outer and one inner sling leg 1 and 3 to the the left side of the drum and the other two sling legs 2 and 4 to the right side.
  - Loop the chain end of sling leg 1 through the right clevis and insert link 3 in the grabhook. Repeat with sling leg 4 through the same clevis.

**NOTE:** One drum can be rigged with a two-legged sling set using sling legs 1 and 2.
- Two drums:
  - Position apex fitting on top of the two drums. Route outer sling legs 1 and 2 to one drum and inner sling legs 3 and 4 to the other drum. Sling legs 1 and 3 should be on the same side of the two drums.
  - Loop the chain end of sling leg 1 through the left clevis and insert link 3 in the grabhook. Repeat with sling leg 2 through the right clevis.
  - Loop the chain end of sling leg 3 through the left clevis of the other drum and insert link 3 in the grabhook. Repeat with sling leg 4 through the right clevis.
- Three drums:
  - Position apex fitting on top of the center drum. Route outer sling legs 1 and 2 to the middle drum and inner sling legs 3 and 4 to an outer drum. Sling legs 1 and 3 should be on the same side of the three drums.
  - Loop the chain end of sling leg 1 through the clevis on the left hub of the middle drum, through the clevis on the left side of one of the outer drums, and insert link 3 in the grabhook. Repeat with sling leg 2 through the clevises on the right side of the two drums.
  - Loop the chain end of sling leg 3 through the clevis on the left hub of the outer drum not yet connected and insert link 55 in the grabhook. Repeat with sling leg 4 through the right side of the drum.

- Four drums:

- Position the apex fitting on the top of the drums. route outer sling legs 1 and 2 to two drums and inner sling legs 3 and 4 to the other two drums. Sling legs 1 and 3 should be on the same side of the load.
- Loop the chain end of sling leg 1 through the clevis on the left hub of one drum, over and through the clevis of the second drum, and insert link 3 in the grabhook. Repeat with sling leg 2 through the other side of the the two drums.
- Loop the chain end of sling leg 3 through the clevis on the left hub of one of the other drums, over and through the clevis of the second drum, and insert link 3 in the grabhook. Repeat with sling leg 4 through the other side of the two drums.

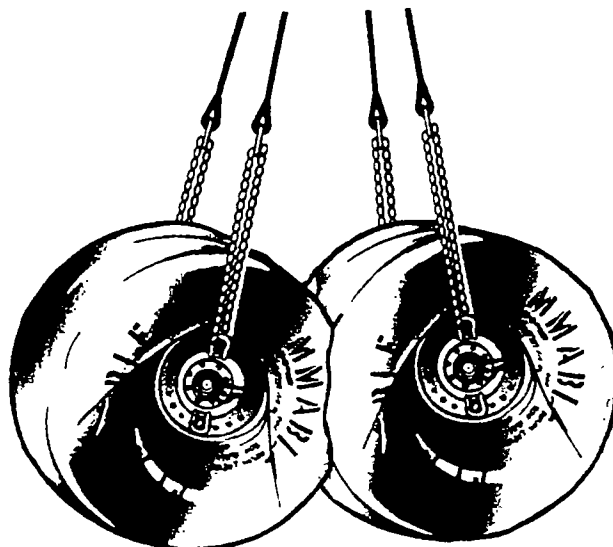
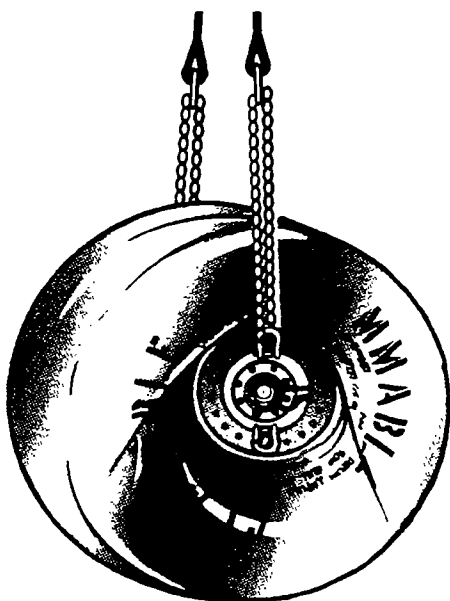
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the drums to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

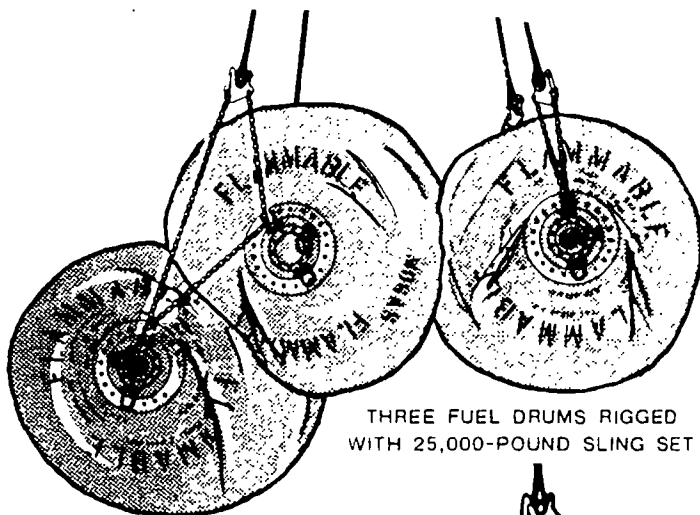
The hookup team stands beside the drums. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

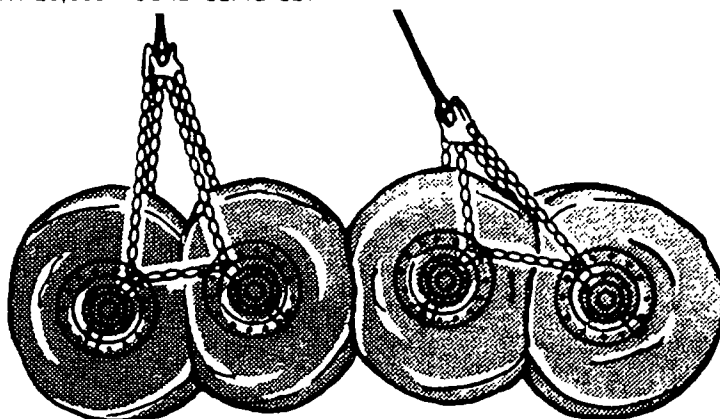
Derigging is the reverse of preparation and rigging procedures in steps 1 and 2.



TWO FUEL DRUMS RIGGED  
WITH 10,000-POUND SLING SET



THREE FUEL DRUMS RIGGED  
WITH 25,000-POUND SLING SET



FOUR FUEL DRUMS RIGGED  
WITH 25,000-POUND SLING SET

## **Figure 2-74. Fuel Drums, 500-Gallon, Six, Empty**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for the UH-60 and CH-47 helicopters at airspeeds up to and including 90 knots.

**CAUTION:** One to five empty fuel drums are not a stable external air transport load and are not certified. One to five empty fuel drums may cause damage to the aircraft and endanger the aircrew due to violent oscillations and inherent instability.

### **LOAD DESCRIPTION**

- Drum, fabric, fuel, 500-gallon capacity, (6 each, empty), LIN G68961 or G68966.
- Weight: 3,000 to 4,500 pounds with individual empty 500-gallon fuel drum (blivets) weighing no more than 750 pounds each.

**NOTE:** Weight will vary due to amount of fuel remaining in individual drums.

### **MATERIALS**

- Sling set (10,000-pound capacity), with two additional sling leg assemblies (2,500-pound capacity).
- Tubular nylon, 1/2-inch, 1,000-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Four persons can prepare and rig this load in about 20 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

Align six drums side-by-side in a row. Check to ensure that caps, hub, and clevis assemblies on the fuel drum are secure.

#### **Step 2. Rigging**

- Configure a six-leg sling set.
- Route outer sling legs 1 and 2 to the forward outer drum, middle sling legs 3 and 4 to the rearward outer drum, and inner sling legs 5 and 6 to the two center drums.

- Loop the chain end of sling leg 1 through the left clevis on the outer drum, through the left clevis of the next inner drum and insert link 3 in the grabhook. Repeat with sling leg 2 on the right side of the two drums.
- Loop the chain end of sling leg 3 through the left clevis on the other outer drum, through the left clevis of the next inner drum and insert link 3 in the grabhook. Repeat with sling leg 4 on the right side of the two drums.
- Loop the chain end of sling leg 5 through the left clevis on the two center drums and insert link 14 in the grabhook. Repeat with sling leg 6 on the right side of the two center drums. Secure excess chain with wide tape or nylon cord.
- Sling legs 1, 3, and 5 should be on the left side of the load.

**NOTE:** At this point, you have effectively rigged three individual, 2-leg sling loads under one apex fitting. Now you must unitize the three pairs of drums.

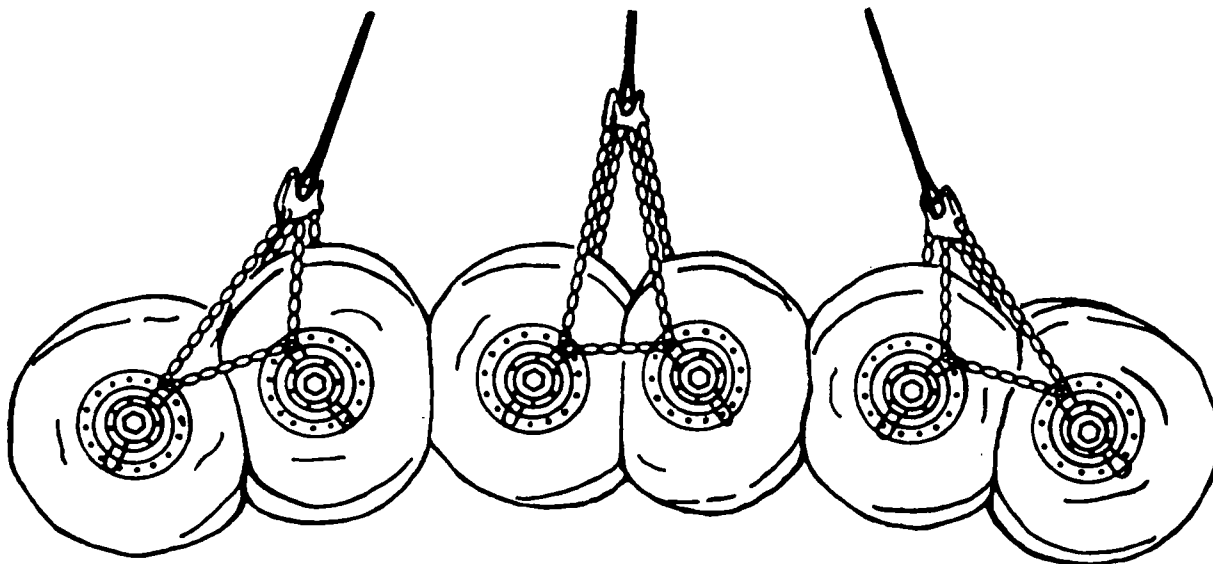
- Loop a length of tubular nylon through the clevis assemblies on each side of the load. Tighten as securely as possible.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands alongside the load. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-75. Storage Module, Fuel/Water Six Compartment Container (SIXCON) Individual**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-53E helicopters at airspeeds up to and including 100 knots.

### **LOAD DESCRIPTION**

- Module, storage, SIXCON, one, fuel/water, TAMCN B2085/B2086, NSN 5430-01-240-4578/5430-01-203-9971.
- Weight: 10,000 pounds (this load is certified at full weight only).

### **MATERIALS**

- Sling set, multileg (15,000-pound capacity) or sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig this load in 5 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Make sure that the storage tank is either completely full or empty.
- Secure all hatches, hoses, valves, and loose gear.

#### **Step 2. Rigging**

**NOTE:** Both sling sets use the same chain link count for this load.

- Position apex fitting/web ring on top of the SIXCON. Route outer sling legs 1 and 2 to one end of the SIXCON and inner sling legs 3 and 4 to the other end. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the opening on the side of the left front corner international organization of standardization (ISO) lift provision and out through the front opening. Insert link 3 in the grab link. Repeat with sling leg 2 and the right front corner ISO lift provision.

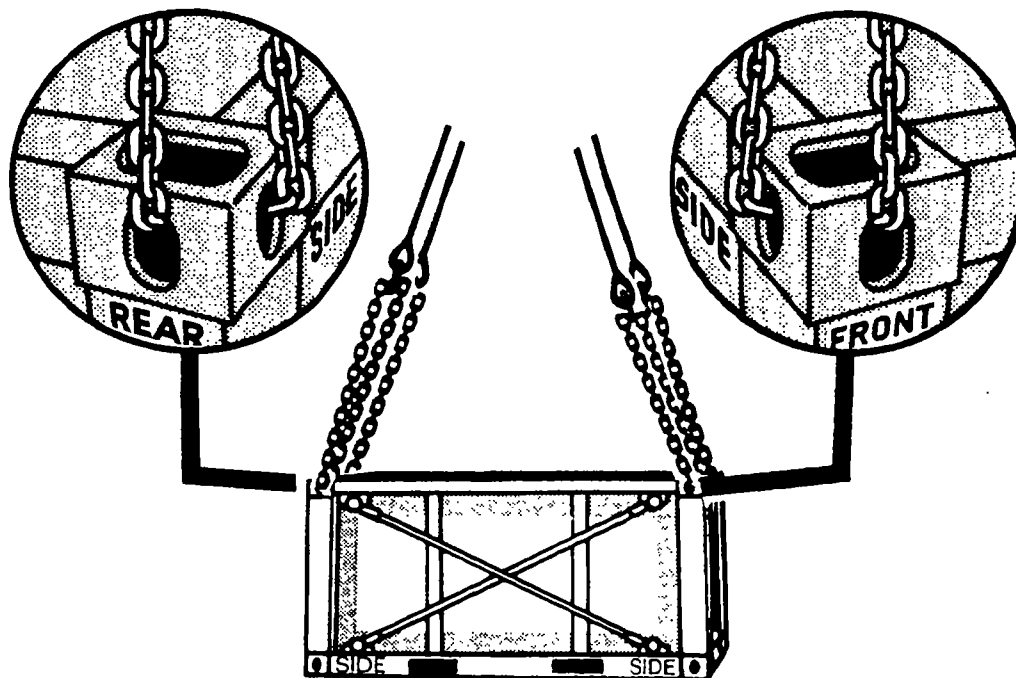
- Loop the chain end of sling leg 3 through the opening on the side of the left rear corner ISO lift provision and out through the rear opening. Insert link 3 in the grab link. Repeat with sling leg and the right rear corner ISO lift provision.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the SIXCON to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on top of the SIXCON. The static wand person discharges the static electricity with the static wand. The hookup person places the web ring/apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the SIXCON and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## **Figure 2-76. Two Storage Modules, Fuel/Water (Stacked)**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-53E helicopters at airspeeds up to and including 110 knots.

### **LOAD DESCRIPTION**

- Module, storage, SIXCON, two, fuel/water, stacked, TAMCN B2085/B2086, NSN 5430-01-240-4578/5430-01-203-9971.
- Weight: 20,000 pounds (this load is certified at full weight only).

### **MATERIALS**

- Sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig this load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Position the two SIXCONs on top of each other. Make sure that the ISO vertical corner connectors are properly secured.
- Tape the pins in the ISO vertical corner connectors.
- Make sure that the storage tanks are either completely full or empty.
- Secure all hatches, hoses, valves, and loose gear.

#### **Step 2. Rigging**

- Position apex fitting on top of the SIXCONs. Route outer sling legs 1 and 2 to one end of the SIXCON and inner sling legs 3 and 4 to the other end. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the opening on the side of the left front ISO lift provision and out through the front opening. Insert link 3 in the grab link. Repeat with sling 2 and the right front ISO lift provision.

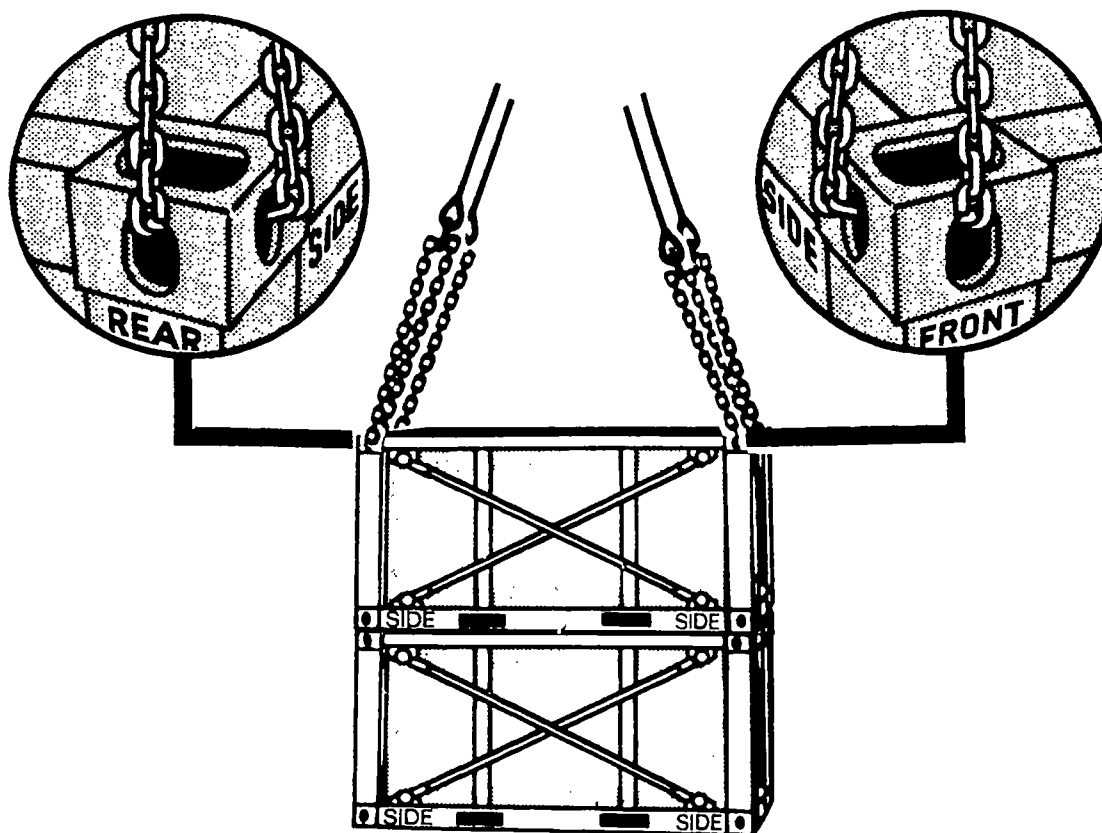
- Loop the chain end of sling leg 3 through the opening on the side of the left rear ISO lift provision and out through the rear opening. Insert link 3 in the grab link. Repeat with sling leg 4 and the right rear ISO lift provision.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the SIXCON to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on top of the SIXCON. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the SIXCON and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-77. Two Storage Modules, Fuel/Water (Side-by-Side)**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-53E helicopters at airspeeds up to and including 80 knots.

### **LOAD DESCRIPTION**

- Module, storage, SIXCON, two, fuel/water, side-by-side, TAMCN B2085/B2086, NSN 5430-01-240-4578/5430-01-203-9971.
- Weight: 20,000 pounds (this load is certified at full weight only).

### **MATERIALS**

- Sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig this load in 15 minutes.

#### **Step 1. Preparation**

- Position the two SIXCONs side by side. Make sure that the ISO horizontal corner connectors are properly secured.
- Make sure that the storage tanks are either completely full or empty.
- Secure all hatches, hoses, valves, and loose gear.

#### **Step 2. Rigging**

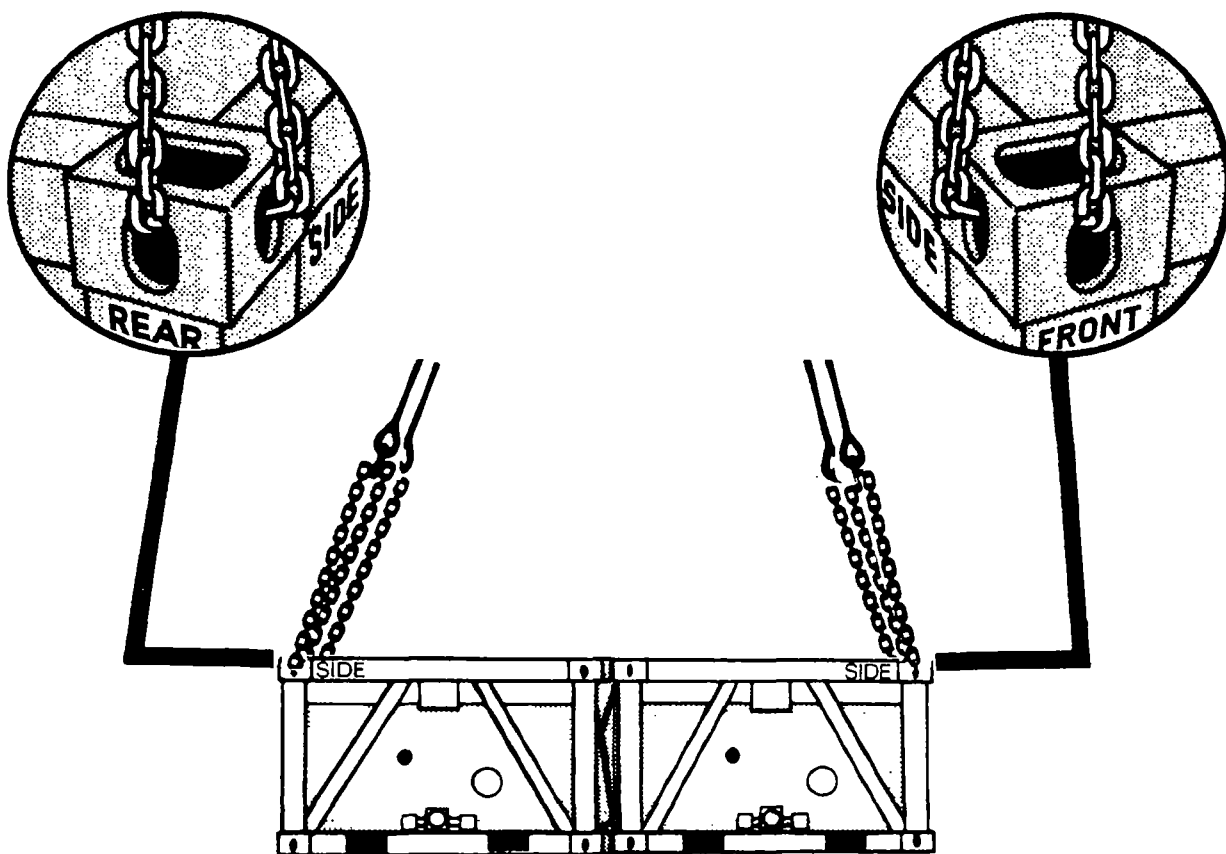
- Position apex fitting on top of the two SIXCONs. Route outer sling legs 1 and 2 to the front of one SIXCON and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the opening on the side of the left front ISO lift provision and out through the front opening. Insert link 3 in the grab link. Repeat with sling leg 2 and the right front ISO lift provision.
- Loop the chain end of sling leg 3 through the opening on the side of the left rear ISO lift provision and out through the rear opening. Insert link 3 in the grab link. Repeat with sling leg 4 and the right rear ISO lift provision.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the SIXCONs to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on top of the two SIXCONs. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the SIXCONs and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **SHELTERS**

\*The certified single-point rigging procedures for shelters are in this section. Figures 2-78 through 2-87.1 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

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### **Figure 2-78. AN/ASM-146 Electronic ShopAN/MSM-108 Electronic Shop**

#### **APPLICABILITY**

This load is certified by the US Army NRDEC for the CH-47 helicopter at airspeeds up to and including 80 knots.

#### **LOAD DESCRIPTION**

- Shop, electronic, shelter-mounted, AN/ASM-146, LIN H01907 or AN/MSM-108, LIN Z26048.
- Weight: 3,940 pounds.

#### **MATERIALS**

- Sling set (10,000-pound capacity).
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

#### **PERSONNEL**

One person can prepare and rig this load in 20 minutes.

#### **PROCEDURES**

##### **Step 1. Preparation**

- Close and secure all doors, vents, and caps.
- Engage brakes.
- Secure tongue in raised position with safety chain.

##### **Step 2. Rigging**

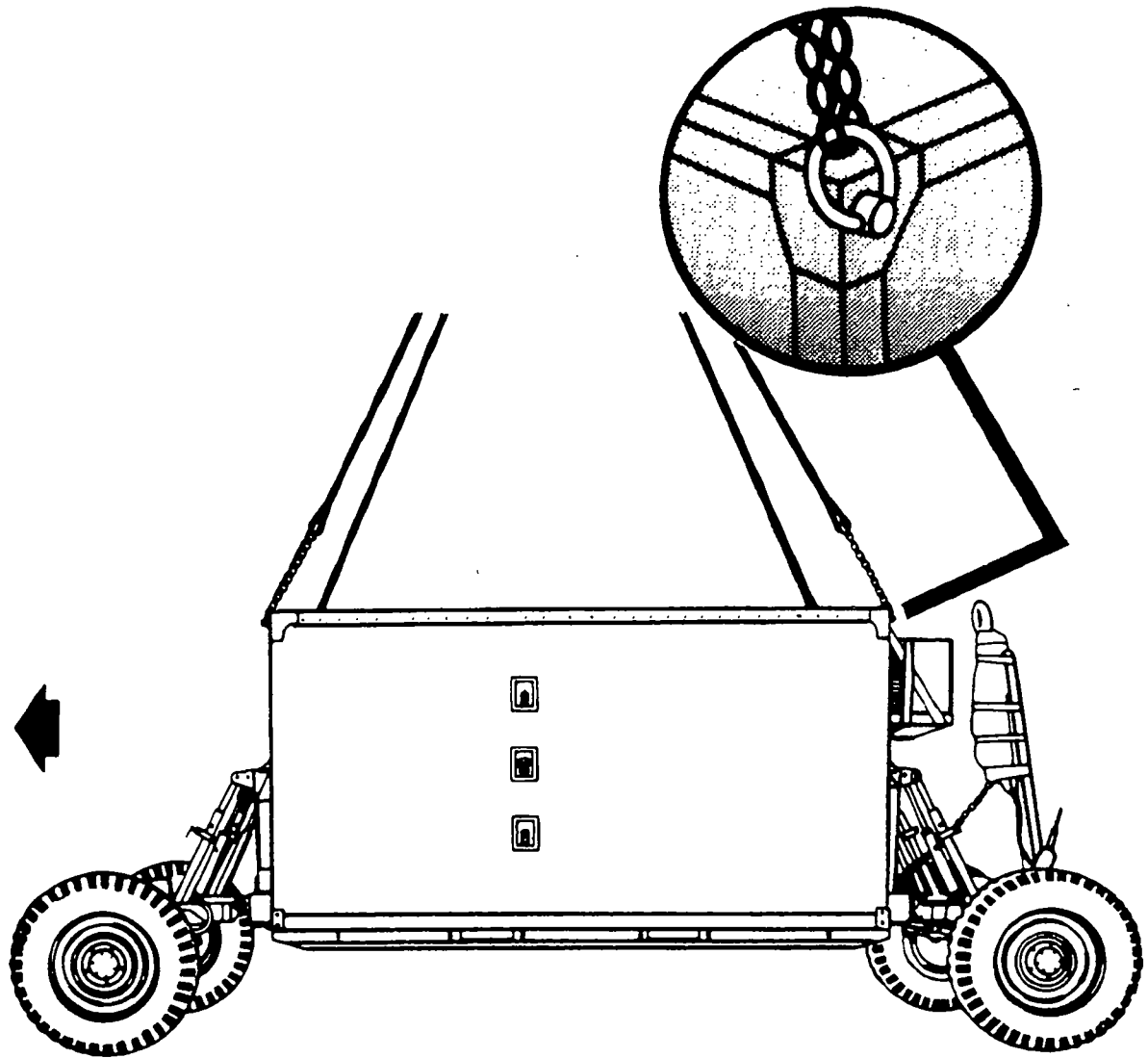
- Position apex fitting on top of the shelter. Route outer sling legs (1 and 2) to the front (door end) of the shelter and inner sling legs (3 and 4) to the rear.
- Loop the chain end of sling leg 1 through the left front lift provision at the top left corner of the shelter and insert link 3 in the grabhook. Repeat with sling leg 2 on the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lift provision at the top left corner of the shelter and insert link 3 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

The hookup team stands on top of shelter. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the shelter and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-79. Communications or Electronic Systems Housed in S-250 Shelters**

### **APPLICABILITY**

The following system is mounted in an S-250 shelter and is certified by either the US Army NRDEC for the identified helicopters up to the airspeeds denoted below.

### **LOAD DESCRIPTION**

- Terminal, satellite, tactical, AN/TRC-93B(V)1:
  - LIN S34895.
  - Weight: 3,250 pounds.
  - Type helicopter: UH-60 and CH-47.
  - Airspeed: 115 and 120 knots, respectively.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig this load in 10 to 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Secure all loose equipment inside the shelter with tape or nylon cord.
- Close and secure all hatches, vents, caps, and access doors.
- Secure any external hoses, cables, ladders, and power unit components with nylon cord or tape.
- Secure the environmental control unit (ECU) panels with tape or nylon cord. Check the bolts that attach the ECU to the ECU frame for security.



## Step 2. Rigging

**NOTE:** Either the shelter door end or the ECU end is designated as the forward end for rigging purposes and varies depending on shelter contents. The corner lift provisions (identified in the illustration) and the forward end are identified in the chart which follows.

- Position the apex fitting on top of the shelter. Route outer sling legs 1 and 2 to the forward end and inner sling legs 3 and 4 to the aft end. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front corner lift provision and insert the link identified in the chart in the grabhook. Repeat with sling leg 2 on the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear corner lift provision and insert the link identified in the in the chart in the grabhook. Repeat with sling leg 4 on the right rear lift provision.

SHELTER	FORWARD END	TYPE OF SLING SET	CORNER LIFTING PROVISIONS			
			1	2	3	4
AN/TSC-93B(V)1	ECU	10,000 pound	33	33	3	3

- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

## Step 3. Hookup

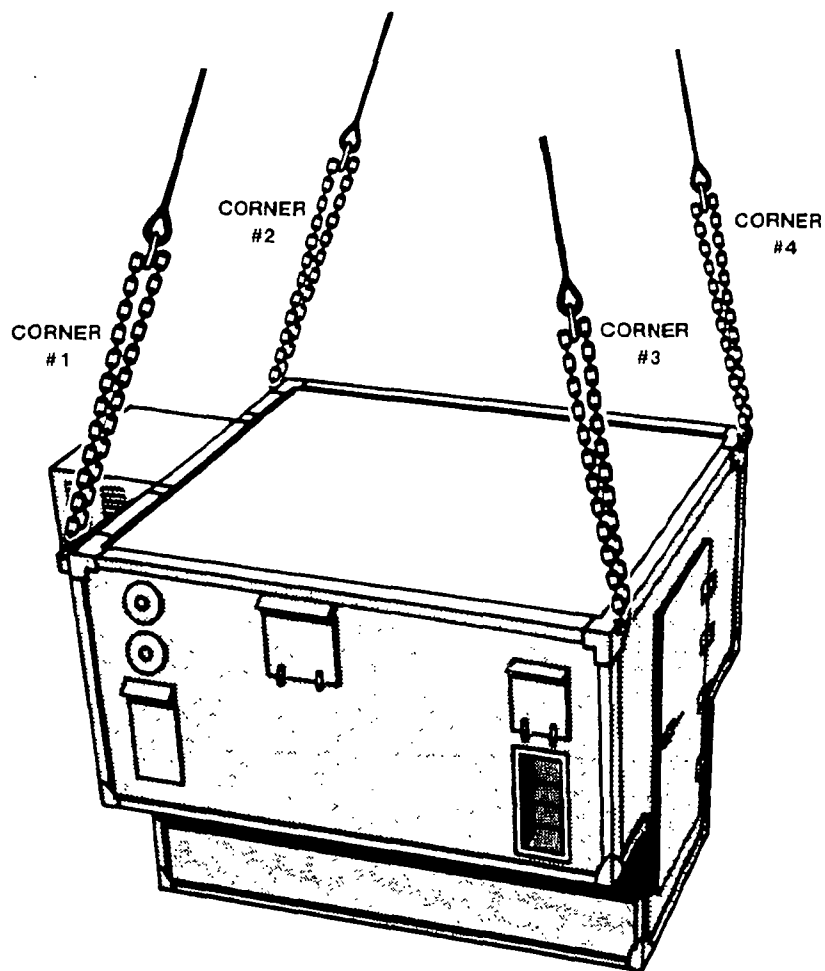
**NOTE:** Connect the apex fitting so the forward end designated in the chart is in the direction of flight.

**NOTE:** Brief the pilot to relax sling leg tension and hover to the side of the load when releasing the apex fitting to prevent damage to the top of the shelter.

The hookup team stands on top of the shelter. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the shelter and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

## Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-80. Communications or Electronic Systems Housed in S-280 Shelters**

### **APPLICABILITY**

The following systems are mounted in S-280 shelters and are certified by either the US Army NRDEC or MTMCTEA for the identified helicopters up to the airspeeds denoted below.

### **LOAD DESCRIPTION**

- Shelter, battery servicing, AN/TSM-133:
  - LIN S10034.
  - Weight: 5,240 pounds.
  - Type helicopter: UH-60 and CH-47.
  - Airspeed: 65 and 70 knots, respectively.
- Facility, improved message, AN/TSC-58A:
  - LIN V57504.
  - Weight: 5,368 pounds.
  - Type helicopter: UH-60 and CH-47.
  - Airspeed: 55 knots.
- Facility, improved message, AN/MSQ-29A:
  - LIN V57504.
  - Weight: 5,368 pounds.
  - Type helicopter: UH-60 and CH-47.
  - Airspeed: 55 knots.
- Station, system master, reporting, position location, AN/TSQ-129:
  - Weight: 6,050 pounds.
  - Type helicopter: CH-53E.
  - Airspeed: 75 knots.
- Station, control, enhanced position location reporting system net, AN/TSQ-158:
  - Weight: 6,289 pounds.
  - Type helicopter: CH-53E.
  - Airspeed: 75 knots.

- Terminal, regency net force, AN/TRC-179(V)1:
  - NSN 5895-01-156-0411.
  - Weight: 8,200 pounds.
  - Type helicopter: CH-47.
  - Airspeed: 70 knots.

## **MATERIALS**

- Sling set (10,000-pound capacity).
- Multileg sling set (15,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

## **PERSONNEL**

Two persons can prepare and rig this load in 10 to 15 minutes.

## **PROCEDURES**

### **Step 1. Preparation**

- Secure all loose equipment inside the shelter with tape or nylon cord.
- Close and secure all hatches, vents, and access doors.
- Secure any external hoses, cables, ladders, and power unit components with nylon cord or tape.
- Secure the environmental control unit (ECU) panels with tape or nylon cord. Check the bolts that attach the ECU to the ECU frame for security.

### **Step 2. Rigging**

**NOTE:** Either the shelter door end or the ECU end is designated as the forward end for rigging purposes and varies depending on shelter contents. The corner lift provisions (identified in the illustration) and the forward end are identified in the chart which follows.

SHELTER	FORWARD END	TYPE OF SLING SET	CORNER LIFTING PROVISIONS			
			1	2	3	4
AN/TSM-133	Door	10,000 pound	30	30	3	3
AN/TSC-58A	Door	10,000 pound	37	37	3	3
AN/MSQ-29A	Door	10,000 pound	37	37	3	3
AN/TSQ-129	ECU	15,000 pound	10	10	4	4
AN/TSQ-158	ECU	15,000 pound	10	10	4	4
AN/TRC-179	Door	15,000 pound	30	30	3	3

- Position the apex fitting/web ring on top of the shelter. Route outer sling legs 1 and 2 to the forward end and inner sling legs 3 and 4 to the aft end. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front corner lift provision and insert the link identified in the chart in the grabhook. Repeat with sling leg 2 on the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear corner lift provision and insert the link identified in the chart in the grabhook. Repeat with sling leg 4 on the right rear lift provision.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

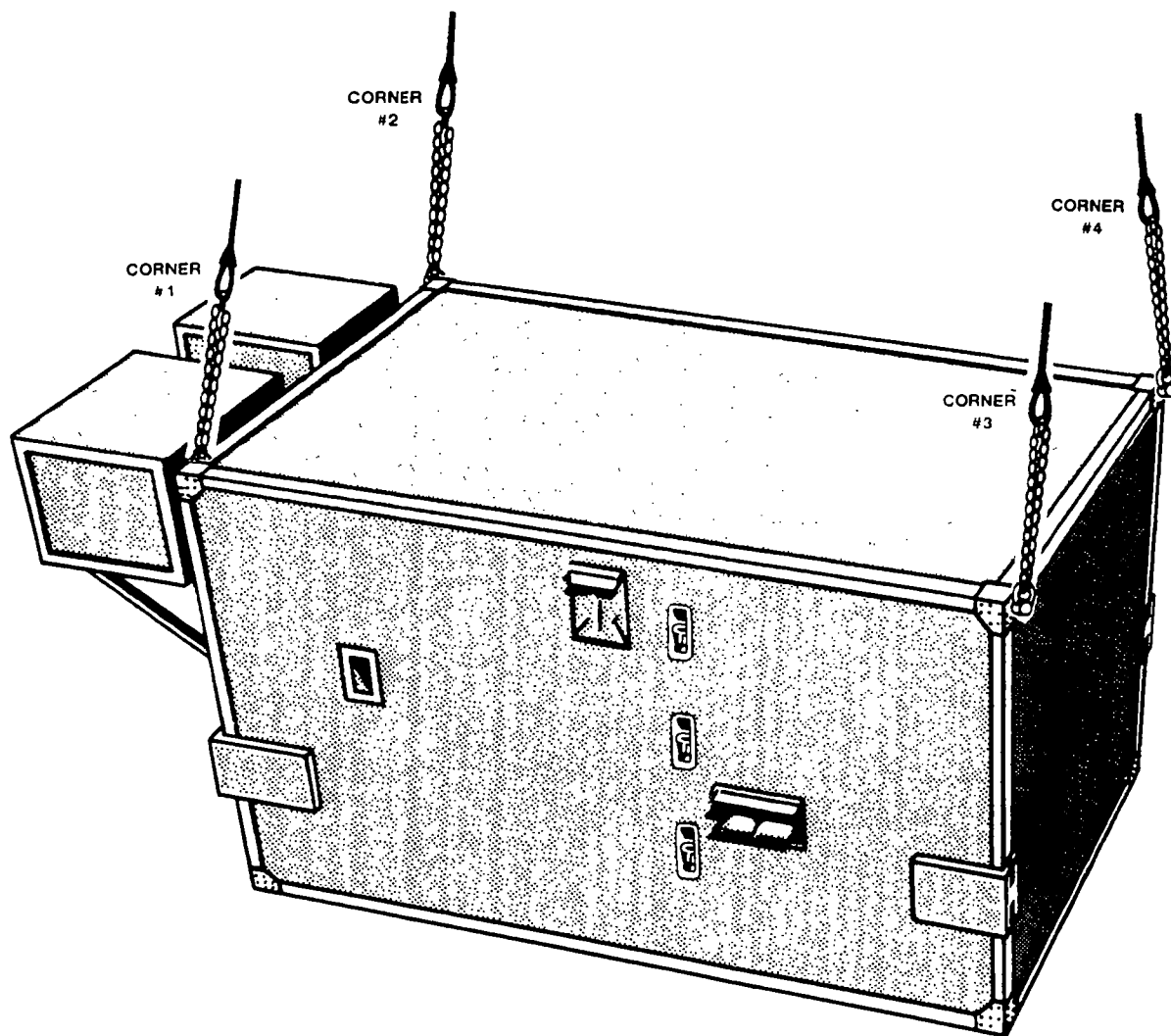
**NOTE:** Connect the apex fitting/web ring so the forward end designated in the chart is in the direction of flight.

**NOTE:** Brief the pilot to relax sling leg tension and hover to the side of the load when releasing the apex fitting/web ring to prevent damage to the top of the shelter.

The hookup team stands on top of the shelter. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting/web ring onto the aircraft cargo hook. The hookup team then carefully dismounts the shelter and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-81. Hardened Army Tactical Shelter (HATS)**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-47 helicopters at airspeeds up to and including 70 knots.

### **LOAD DESCRIPTION**

- Shelter, tactical, Army, hardened, S-658( )/G, NSN 5411-01-151-4109.
- Weight:
  - Empty, 3,100 pounds.
  - Loaded, 8,160 pounds.

### **MATERIAL**

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

One person can prepare and rig the load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Secure all loose equipment inside with nylon cord or tape.
- Ensure all latches and access doors are secured.
- Ensure air conditioner panels are secure and taped.

#### **Step 2. Rigging**

- Position apex fitting on top of the shelter. Route outer sling legs 1 and 2 to the front (door end) of the shelter and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lifting ring located on the left corner of the shelter door end and insert link 3 in the grabhook. Repeat with sling leg 2 on the right front lift provision.

- Loop the chain end of sling leg 3 through the left rear lifting ring on the left rear corner and insert link 30 in the grabhook. Repeat with sling leg 4 on the right rear lift provision. Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

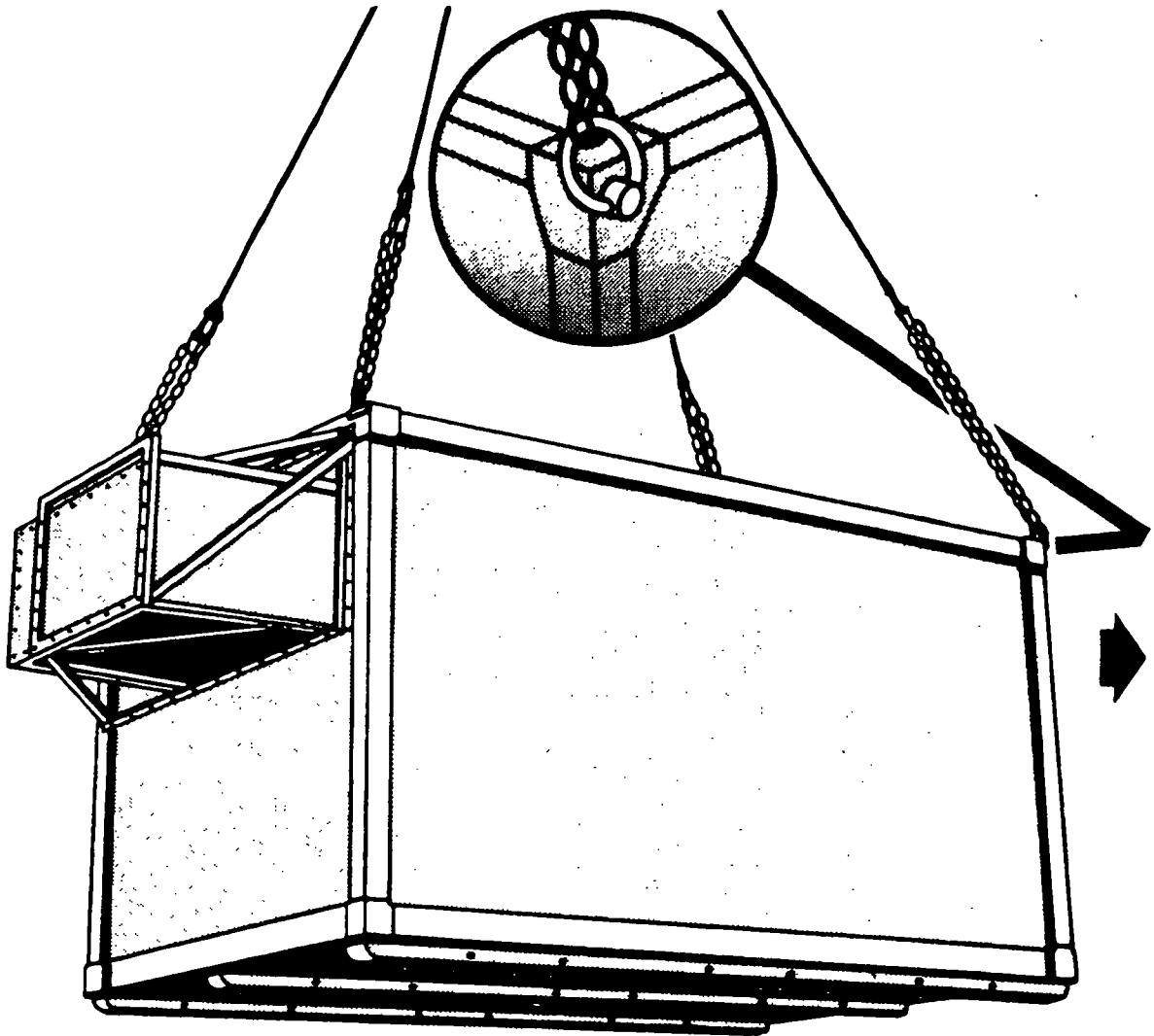
**NOTE:** Connect the apex fitting so the door end is carried forward.

The hookup team stands on the top of the shelter. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the shelter and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## **Figure 2-82. AN/TSQ-146(V) Multiplexer Terminal Set**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for the UH-60 and CH-47 helicopters at airspeeds up to and including 90 knots.

### **LOAD DESCRIPTION**

- Terminal set, multiplexer, AN/TSQ-146(V), NSN 5895-01-188-8681.
- Weight: 6,190 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Cotton webbing, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig this load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Items that are not a component of AN/TSQ-146(V) must not be loaded inside the set during airlift. Secure all loose equipment inside the set with nylon cord or tape as required.
- Close and secure all doors, vents, and caps with nylon cord or tape.
- Make sure that ECU panels are secured with nylon cord or tape.

#### **Step 2. Rigging**

- Position apex fitting on top of the terminal set. Route outer sling legs 1 and 2 to the front (door end) and the inner sling legs 3 and 4 to the rear (ECU) end. Sling legs 1 and 3 should be on the left side of the load. Loop the chain end of sling leg 1 through the left front lift provision located on the top left corner and insert link 5 in the grabhook. Repeat with sling leg 2 on the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lift provision located on the top left corner and insert link 50 in the grabhook. Repeat with sling leg 4 on the right rear lift provision. Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

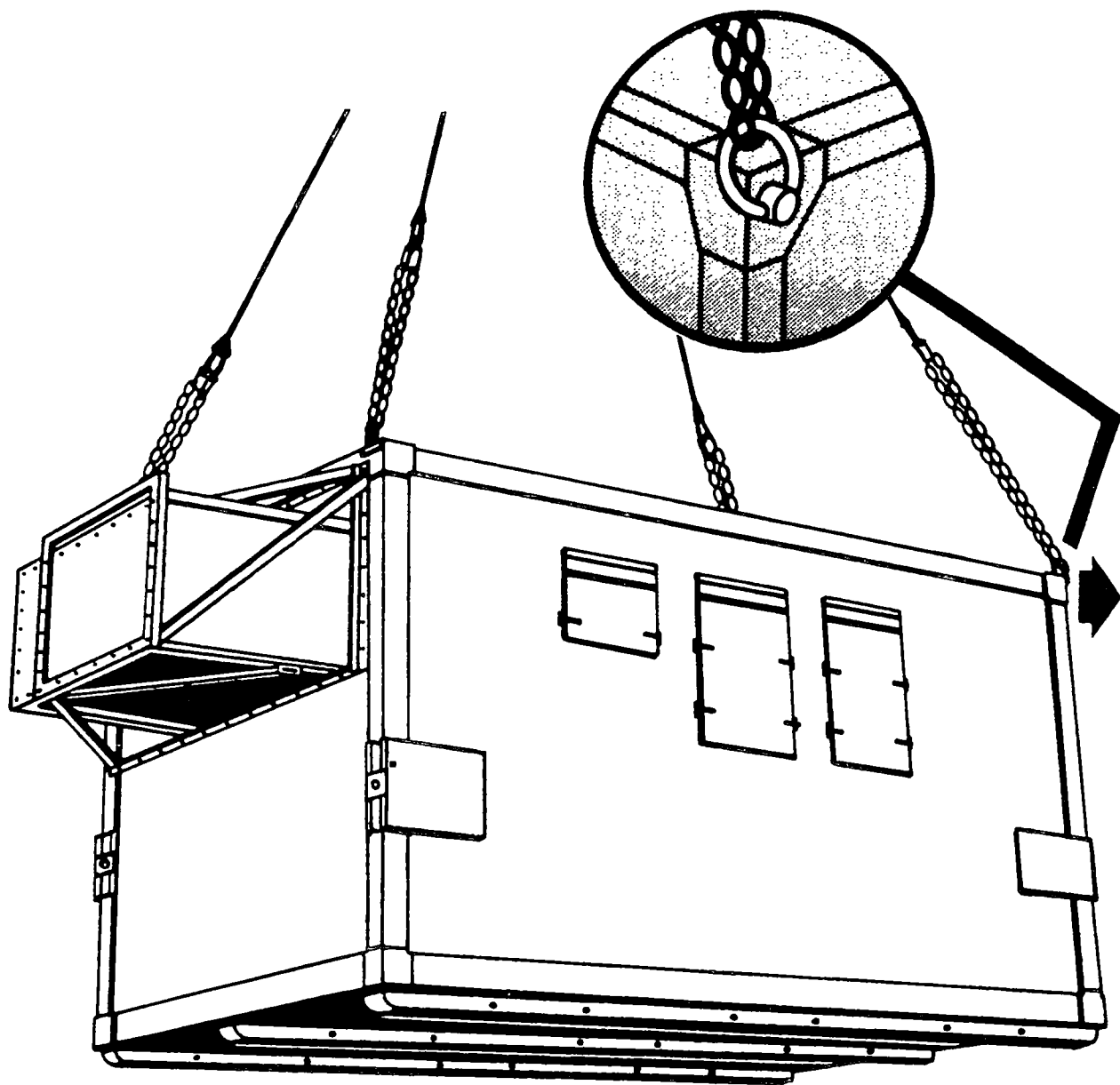
### **Step 3. Hookup**

**NOTE:** Connect the apex fitting so the door end is carried forward.

The hookup team stands on top of the terminal set. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the set and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



**CAUTION:** Brief the helicopter crew to relax sling leg tension and hover to the side of the load when releasing apex fitting to prevent damage to the roof.

---

## **Figure 2-83. AN/TSQ-111 Communications Nodal Control Element**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-47 helicopters at airspeeds up to and including 80 knots.

### **LOAD DESCRIPTION**

- Communications, nodal, control element (CNCE), AN/TSQ-111, NSN 5895-01-188-8682.
- Weight: 10,000 pounds.

### **MATERIALS**

- Sling set (25,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.

### **PERSONNEL**

Two persons can prepare and rig the load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Secure all equipment inside the shelter.
- Close and secure all vents, hatches, and doors, using tape or nylon cord as necessary.
- Tape over rope lashing points located close to corner lift points to prevent possible entanglement of sling legs during lift-off.

#### **Step 2. Rigging**

- Position the apex fitting on top of the shelter. Route outer sling legs 1 and 2 to the front (door) end of the load and inner sling legs 3 and 4 to the rear (ECU) end. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lifting ring located on the shelter front left corner and insert link 3 in the grabhook. Repeat with sling leg 2 on the right front lifting ring.

- Loop the chain end of sling leg 3 through the left rear lifting ring located on the shelter left rear top corner and insert link 24 in the grabhook. Repeat with sling leg 4 on the right rear lifting ring. Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the shelter legs together on top of the shelter to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

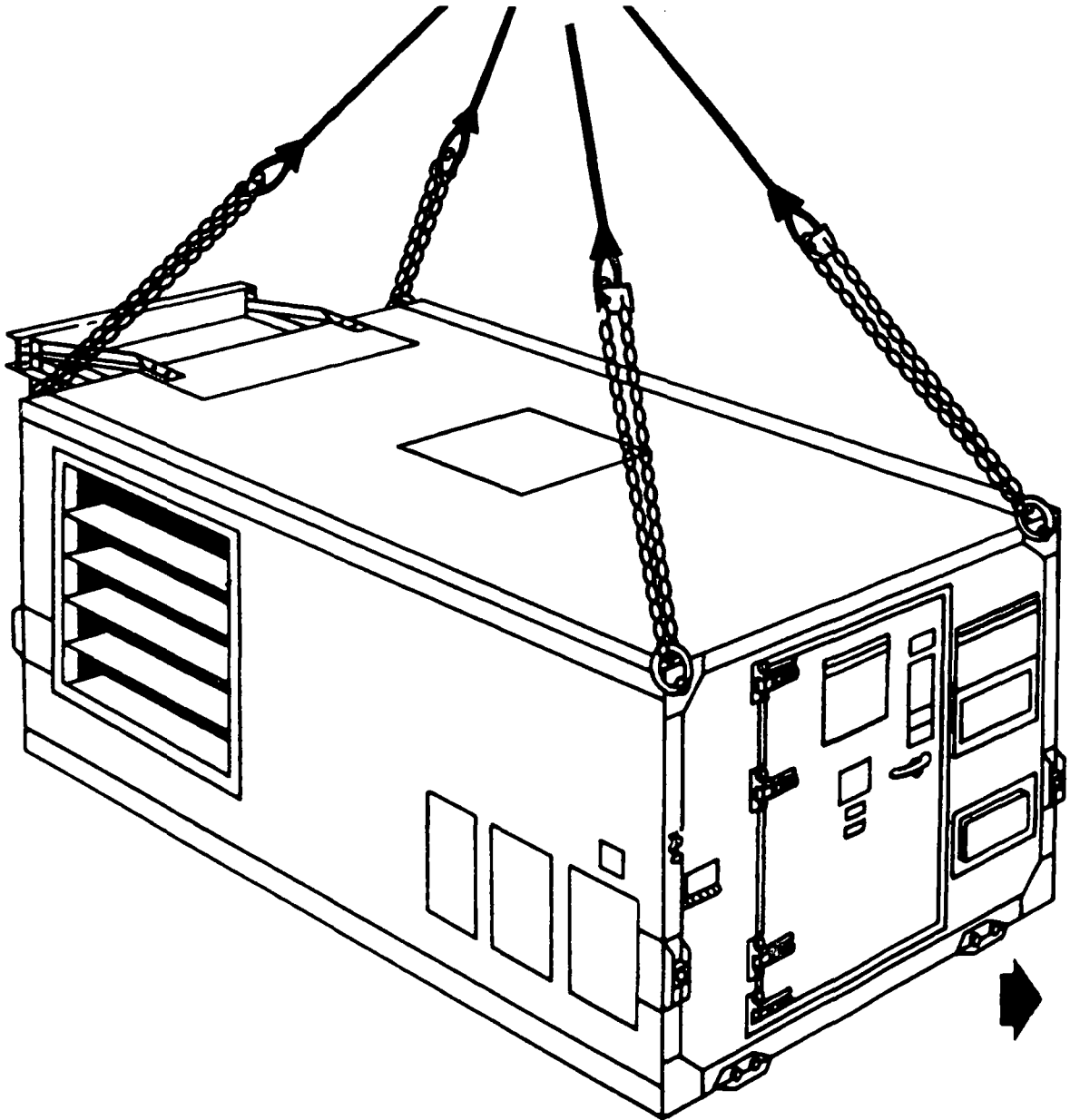
**NOTE:** Do not allow the sling legs to become entangled in the rope lashing points located near the lift points as damage may occur to either the nylon portion of the sling leg or to the lashing point of the shelter.

**NOTE:** Connect the apex fitting so the door end is carried forward.

The hookup team stands on top of the shelter. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the shelter and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **\*Figure 2-84. 8- x 8- x 10-Foot Shelter Systems**

### **APPLICABILITY**

The following systems are mounted in 8- x 8- x 10-foot shelters and are certified by the US Army NRDEC for the identified helicopters up to the airspeeds denoted below.

### **LOAD DESCRIPTION**

- Shelter, electromechanical induction (EMI):
  - TAMCN C6110, NSN 5411-01-206-6079.
  - Weight: 7,700 pounds (this load is certified at loaded weight only).
  - Type helicopter: CH-53E.
  - Airspeed: 70 knots.
- Shelter, radar set, precision approach, AN/TPN-22:
  - TAMCN Q2115.
  - Weight: 7,200 pounds (this load is certified at loaded weight only).
  - Type helicopter: CH-53E.
  - Airspeed: 80 knots.
- Shelter, reproduction distribution facility, S-715/T:
  - Weight: 4,826 pounds (this load is certified at loaded weight only).
  - Type helicopter, sling set, and airspeed: CH-46E, 15,000-pound sling set, 80 knots; CH-46E, 40,000-pound sling set, 50 knots; and CH-53E, 15,000- or 40,000-pound sling set, 60 knots.

### **MATERIALS**

- Sling set, multileg (15,000-pound capacity) or sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig this load in 15 minutes.



## PROCEDURES

### Step 1. Preparation

- Secure all loose equipment inside the shelter with tape or nylon cord.
- Secure the door in the closed/locked position.

### Step 2. Rigging

**NOTE:** The single personnel door is designated as either the forward end or the aft end for rigging purposes and varies depending on shelter contents. The corner lift provisions (shown in the figure) and the door position are identified in the chart which follows.

SHELTER	PERSONNEL DOOR	TYPE OF SLING SET	CORNER LIFTING PROVISIONS			
			1	2	3	4
EMI Shelter	Forward	15,000 pound	5	5	5	5
EMI Shelter	Forward	40,000 pound	5	5	5	5
AN/TPN-22	Forward	15,000 pound	3	3	3	3
AN/TPN-22	Forward	40,000 pound	3	3	3	3
S-715/T	Forward	15,000 pound	3	3	3	3
S-715/T	Forward	40,000 pound	3	3	3	3

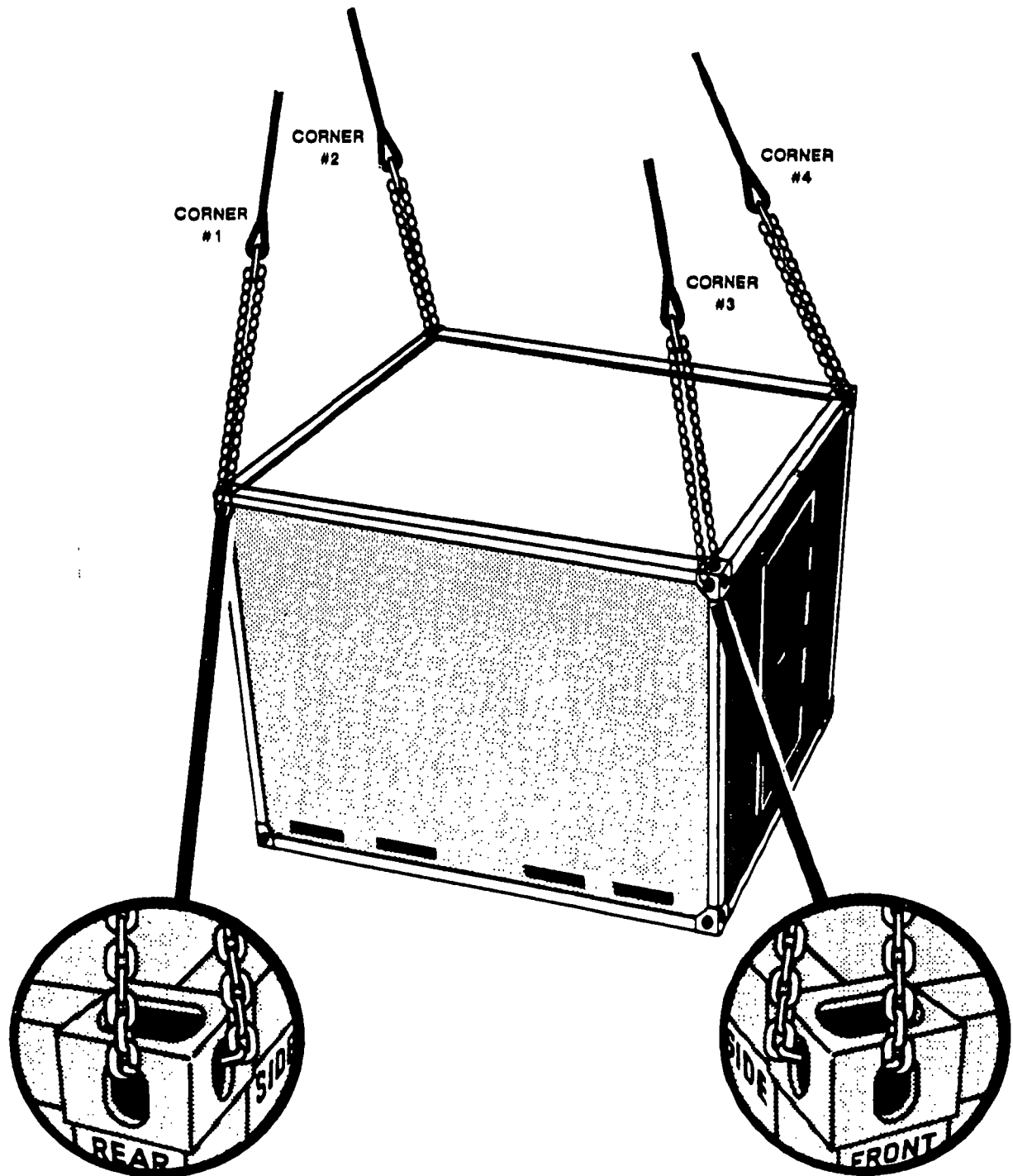
- Position the apex fitting/web ring on top of the shelter. Route outer sling legs (1 and 2) to the forward end and inner sling legs (3 and 4) to the aft end. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the opening in the side of the ISO lift provision on the left front corner and out through the front opening. Insert the link identified in the chart into the grab link. Repeat with sling leg 2 and the right front ISO lift provision.
- Loop the chain end of sling leg 3 through the opening in the side of the ISO lift provision on the left rear corner and out through the rear opening. Insert the link identified in the chart into the grab link. Repeat with sling leg 4 and the right rear ISO lift provision.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the shelter to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on top of the shelter. The static wand person discharges the static electricity with the static wand. The hookup person places the web ring/apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the shelter and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-85. AN/TYC-5A Data Communications Terminal**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-53E helicopters at airspeeds up to and including 70 knots.

### **LOAD DESCRIPTION**

- Terminal, data communications, AN/TYC-5A, TAMCN A0437, NSN 5895-00-253-8955.
- Weight: 7,451 pounds.

### **MATERIALS**

- Sling set, multileg (15,000-pound capacity) or sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig this load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Secure all gear inside the shelter.
- Secure door in the closed/locked position.
- Remove the transporter dolly lift sets if attached to the shelter.

#### **Step 2. Rigging**

**NOTE:** Both sling sets use the same chain link count for this load.

- Position apex fitting/web ring on top of the shelter. Route outer sling legs 1 and 2 to the front (door end) of the shelter and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located on the shelter corner and insert link 5 in the grab link. Repeat with sling leg 2 and the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lift provision located on the shelter corner and insert link 5 in the grab link. Repeat with sling leg 4 and the right rear lift provision.

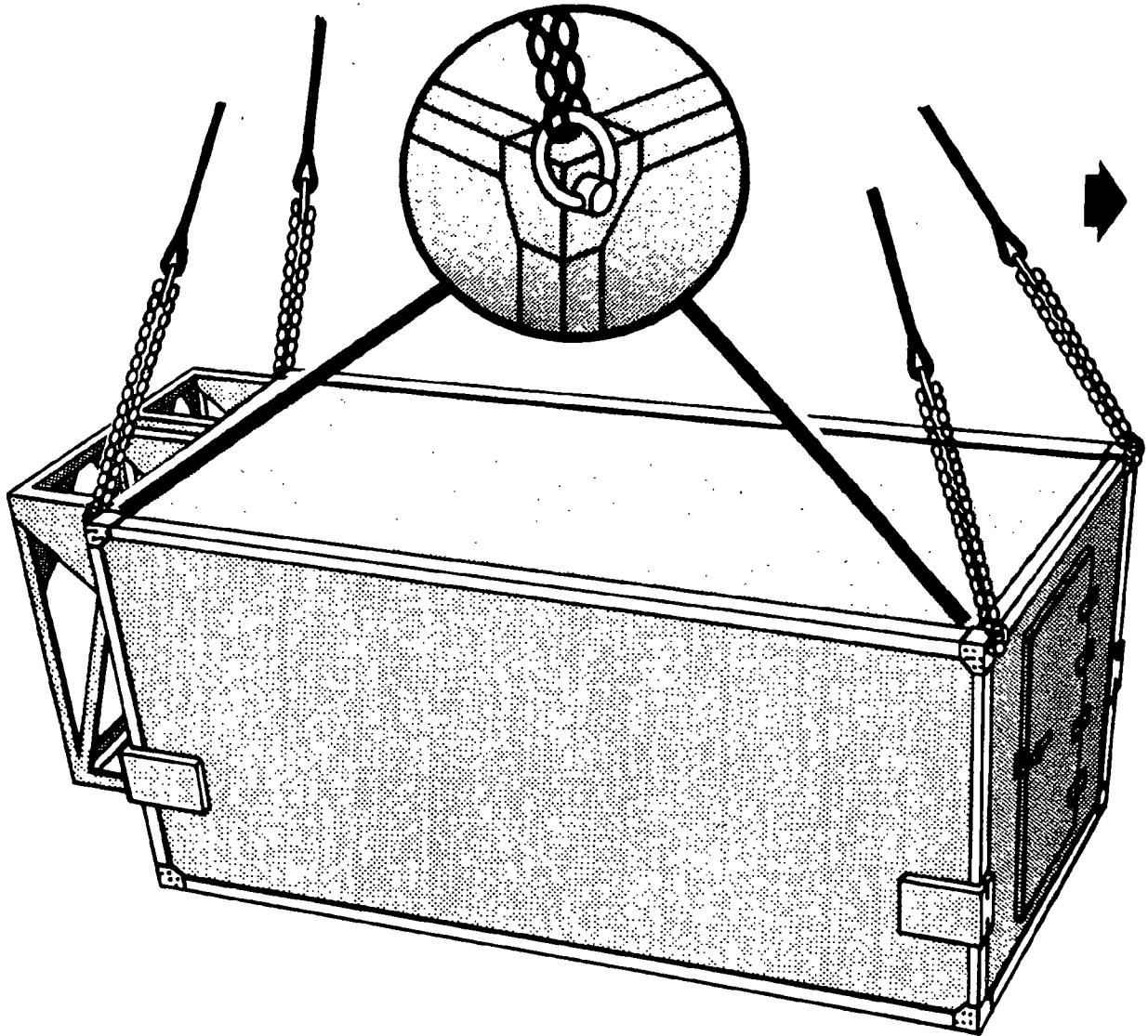
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the shelter to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

The hookup team stands on top of the shelter. The static wand person discharges the static electricity with the static wand. The hookup person places the web ring/apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the shelter and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-86. AN/TRN-44 Tactical Air Navigation Shelter**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-53 helicopters at airspeeds up to and including 75 knots.

### **LOAD DESCRIPTION**

- Shelter, air navigation, tactical, AN/TRN-44, TAMCN Q2115.
- Weight: 6,800 pounds.

### **MATERIALS**

- Sling set, multileg (15,000-pound capacity) or sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig this load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Secure all loose equipment inside the shelter.
- Secure door in the closed/locked position.

#### **Step 2. Rigging**

**NOTE:** Both sling sets use the same chain link count for this load.

- Position apex fitting/web ring on top of the shelter. Route outer sling legs 1 and 2 to the front (door end) of the shelter and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located on the shelter corner and insert link 3 in the grab link. Repeat with sling leg 2 and the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lift provision located on the shelter corner and insert link 3 in the grab link. Repeat with sling leg 4 and the right rear lift provision.

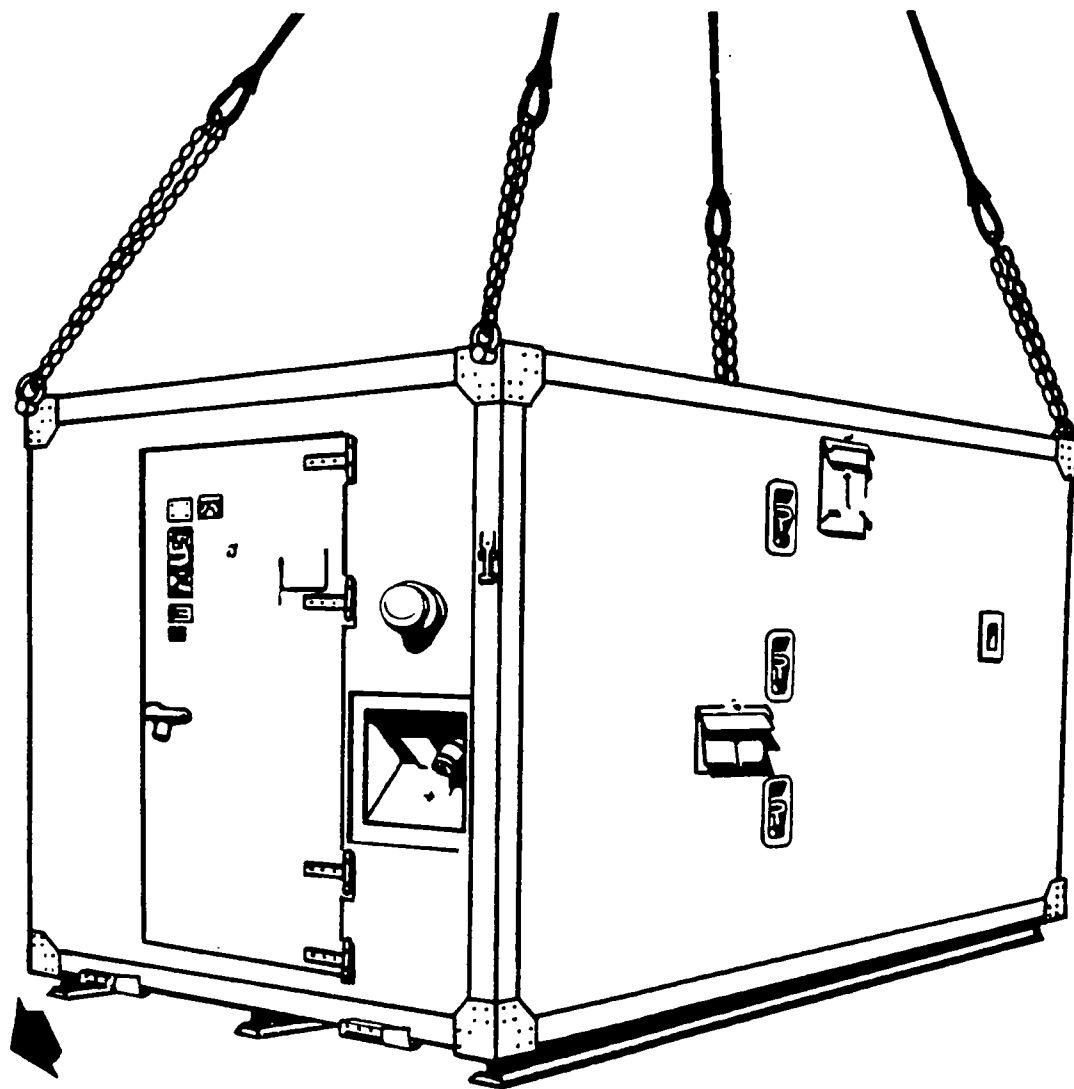
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the shelter to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

The hookup team stands on top of the shelter. The static wand person discharges the static electricity with the static wand. The hookup person places the web ring/apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the shelter and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## **Figure 2-87. Downsized Direct Support Section (DDSS) Shelter**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-47D helicopters at airspeeds up to and including 90 knots.

**CAUTION:** Transporting this shelter at airspeeds in excess of 90 knots may result in sudden and uncontrollable instabilities.

### **LOAD DESCRIPTION**

- Downsized direct support section (DDSS) shelter, P/N 707500-010, manufactured by Brunswick Corporation.
- Weight: 2,400 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig this load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Secure all loose equipment inside the shelter with tape or nylon cord as required.
- Close and secure all doors and vents with tape or nylon cord.

#### **Step 2. Rigging**

- Position apex fitting on top of the shelter. Route outer sling legs 1 and 2 to the front (ECU end) of the shelter and inner sling legs 3 and 4 to the rear (door end). Sling legs 1 and 3 should be to the left side of the shelter.
- Loop the chain end of sling leg 1 through the left front lift provision at the top left corner of the shelter and insert link 10 in the grabhook. Repeat with sling leg 2 on the right front lift provision.

- Loop the chain end of sling leg 3 through the left rear lift provision at the top left corner of the shelter and insert link 20 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the shelter to prevent entanglement during hookup and lift-off.

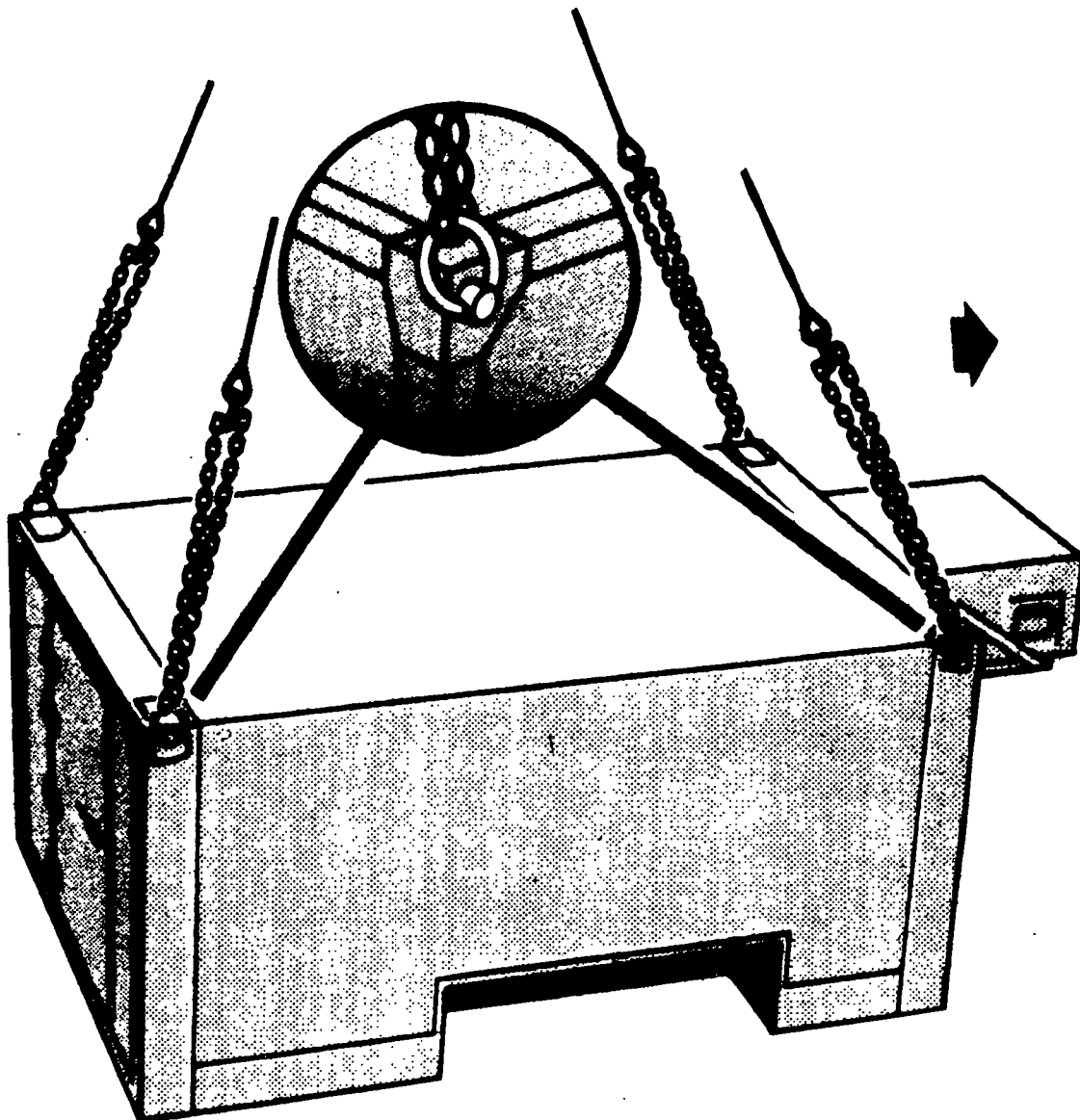
### **Step 3. Hookup**

**NOTE:** Connect the apex fitting so the shelter is carried ECU end forward.

The hookup team stands on top of shelter. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the shelter and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **\*Figure 2-87.1. Cradle-Mounted AN/TPQ-32A Radar Set, Part of an AN/MPQ-49A Forward Area Alerting Radar (FAAR) System**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for the UH-60A and CH-47 helicopters at airspeeds up to and including 90 and 120 knots, respectively.

**NOTE:** The AN/TPQ-32A must be removed from the truck prior to lift.

### **LOAD DESCRIPTION**

- Cradle-mounted radar set, AN/TPQ-32A, part of AN/MPQ-49A. Consists of a cradle, S250/G shelter, and a generator.
- Weight: 7,100 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Additional chain legs, 8-foot length (2,500-pound capacity), NSN 4010-01-058-4772 (4 each).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tie-down strap, cargo, CGU-1/B (5,000-pound capacity) (1 each or as required).
- Coupling link, part number 577-0615, from a 10,000-pound sling set (4 each).
- Wrench, box, 9/16-inch (1 each).

### **PERSONNEL**

Two persons can prepare and rig this load in 25 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Remove the cradle from the modified M35A2 truck and remount the mast in the vertical position in accordance with TM 9-1430-588-10.
- Remount the antenna reflectors from over the generator assembly to the front of the cradle by removing and replacing the quick release pins.

- Remove the two turnbuckles located between the front (shelter door end) cradle tie-down provision and the shelter lifting provisions using a 9/16-inch box wrench. Store them inside the shelter or in a cradle cabinet.
- Pin mud flaps in the up position.
- Secure all loose equipment inside the shelter and between the cradle and the shelter with nylon cord and/or cargo tie-down straps as necessary.
- Close and secure all vents, hatches, and doors using tape or nylon cord as necessary.

### Step 2. Rigging

- Position the apex fitting on top of the shelter. Route outer sling legs (1 and 2) to the front of the shelter (door end) and inner sling legs (3 and 4) to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Attach an additional chain leg to each sling leg utilizing the coupling links.
- Loop the chain end of sling leg 1 through the left front lift provision of the shelter and through the left front lift provision of the cradle. Be sure to use the cradle lift provision, not the tie-down provision. Insert link 3 in the grabhook. Repeat with sling leg 2 and the right front lift provision of the shelter and cradle.
- Loop the chain end of sling leg 3 through the left rear lift provision of the cradle and insert link 20 in the grabhook. Repeat with sling leg 4 and the right rear lift provision of the cradle.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the shelter to prevent entanglement during hookup and lift-off.

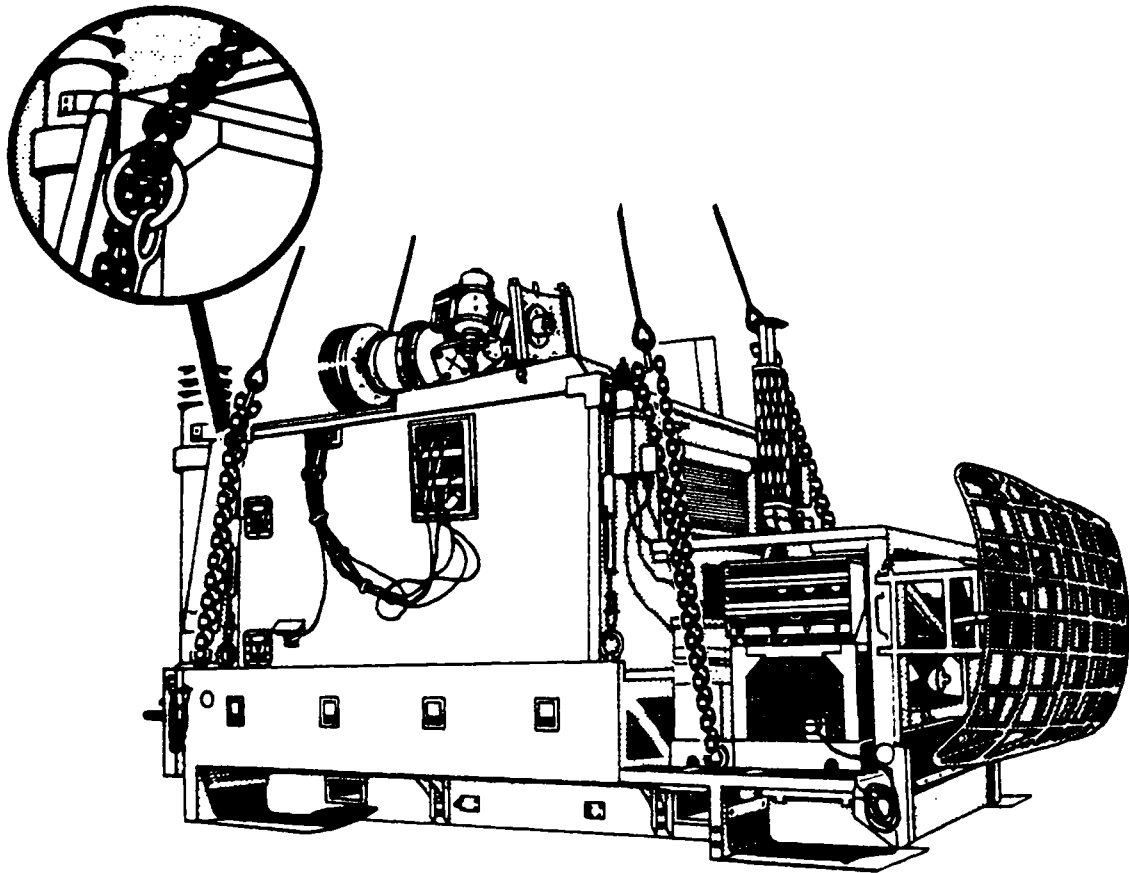
### Step 3. Hookup

**NOTE:** Connect the apex fitting to the cargo hook so the door end is forward.

The hookup team stands on the roof of the shelter. Make sure the door end of the shelter is facing in the direction of flight. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the shelter and cradle and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





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1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100.

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## CONTAINERS

\*The certified single-point rigging procedures for containers are in this section. Figures 2-88 through 2-93 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

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### Figure 2-88. Pershing II Second Stage Section

#### APPLICABILITY

This load is certified by the MTMCTEA for the CH-47 helicopters at airspeeds up to and including 110 knots.

#### LOAD DESCRIPTION

- Pershing II, second stage section, in container, NSN 8140-01-128-5443.
- Weight: 10,158 pounds.

#### MATERIALS

- Sling set (25,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

#### PERSONNEL

Two persons can prepare and rig this load in 10 minutes.

#### PROCEDURES

##### Step 1. Preparation

Ensure that the container cover is fastened securely and that the container skids and lift handles are serviceable.

##### Step 2. Rigging

- Position apex fitting on top of the container. Route outer sling legs (1 and 2) to the front of the container and inner sling legs (3 and 4) to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift handle and insert link 3 in the grabhook. Repeat with sling leg 2 on the right front handle.



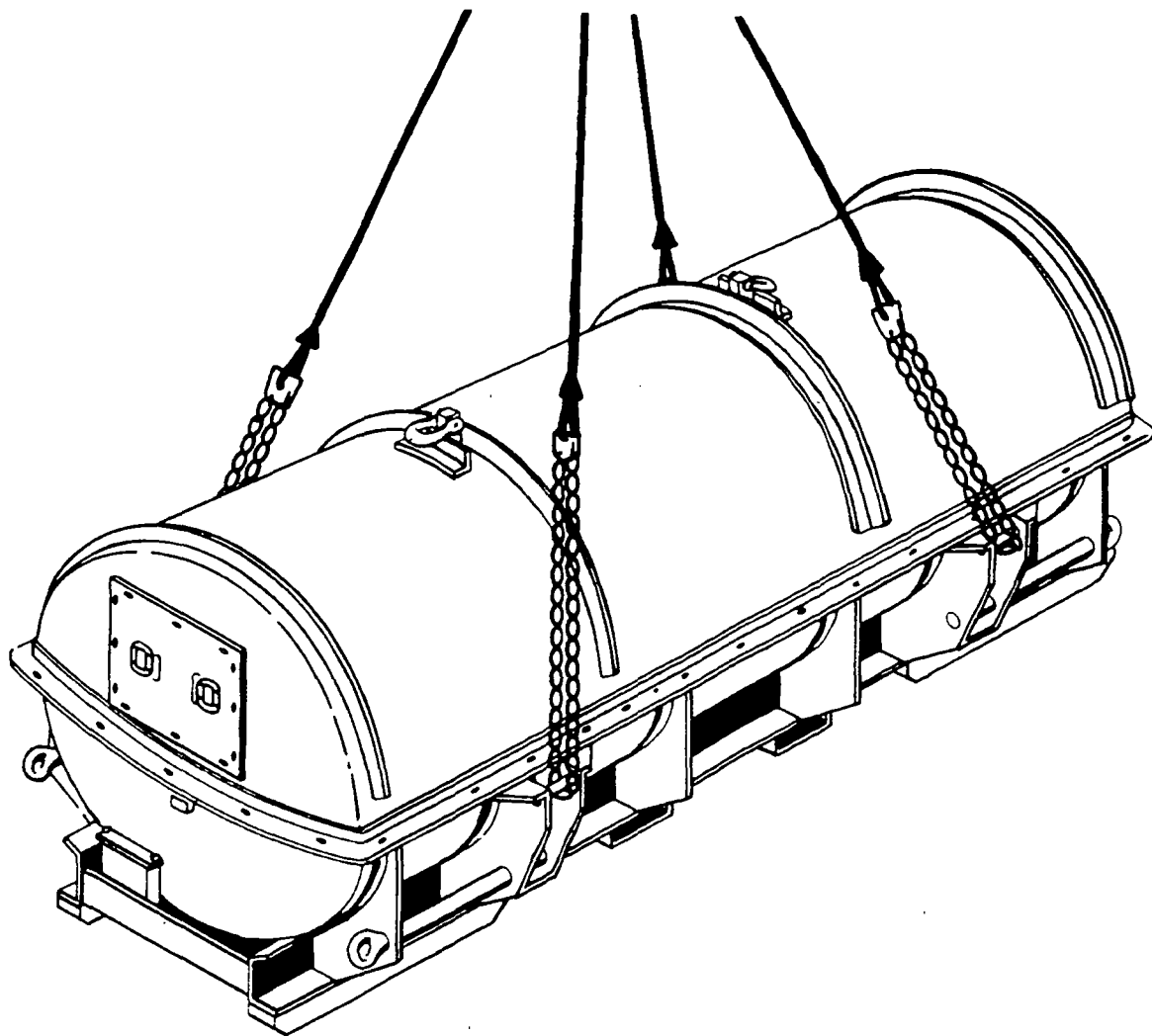
- Loop the chain end of sling leg 3 through the left rear lift handle and insert link 13 in the grabhook. Repeat with sling leg 4 on the right rear lift handle. Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

The hookup team stands on top of the container. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the container and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-89. Pershing II Guidance and Control/Adapter Section**

### **APPLICABILITY**

This load is certified by the MTMCTEA for the UH-60 and CH-47 helicopters at airspeeds up to and including 100 knots.

### **LOAD DESCRIPTION**

- Pershing II, guidance and control/adapter section, in container, NSN 8140-01-128-5444.
- Weight: 3,500 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig the load in 10 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

Ensure that the container cover is fastened securely and that the container skids and lift handles are serviceable.

#### **Step 2. Rigging**

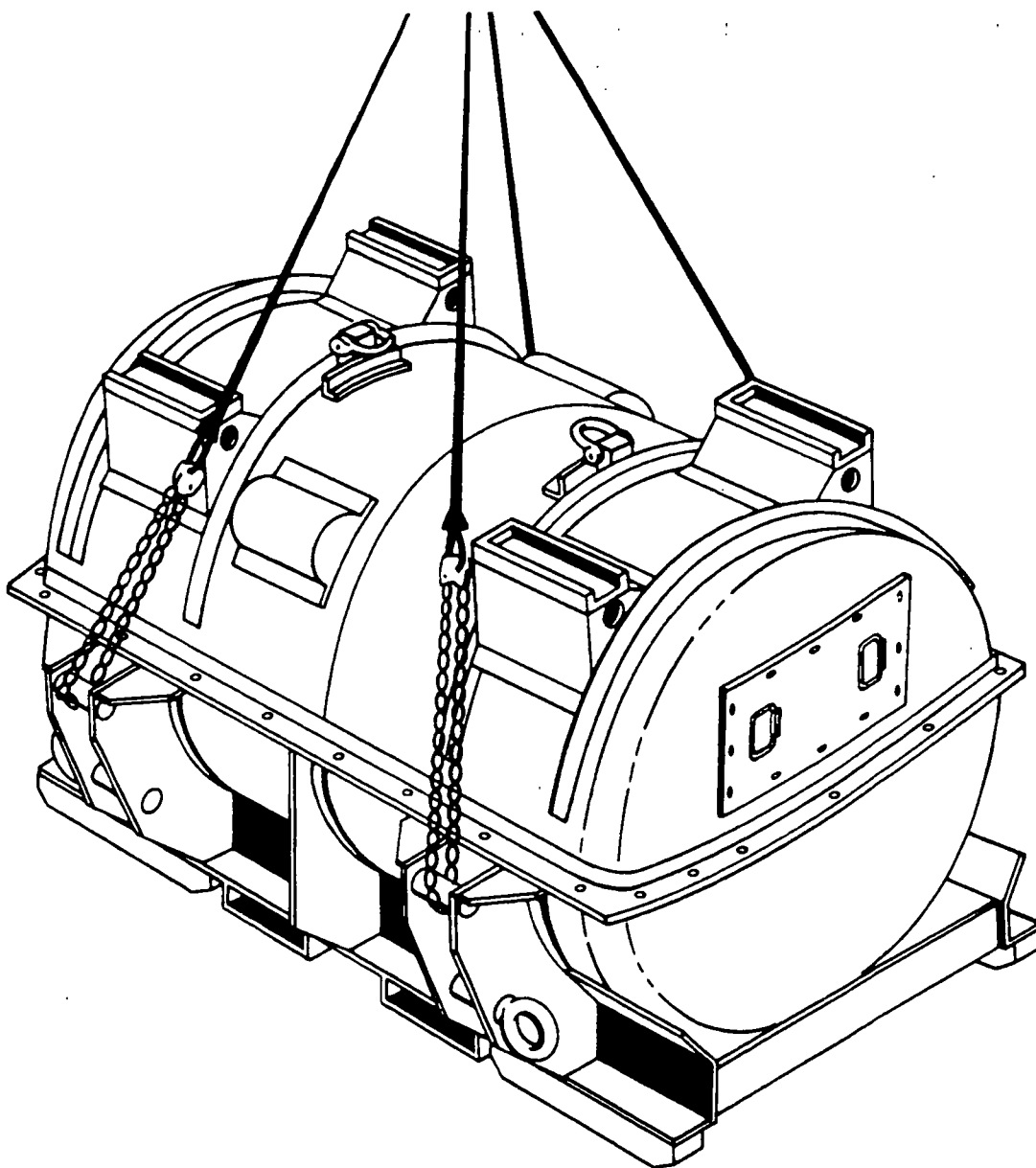
- Position apex fitting on top of the container. Route outer sling legs 1 and 2 to the front of the container and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift handle and insert link 3 in the grabhook. Repeat with sling leg 2 on the right front lift handle.
- Loop the chain end of sling leg 3 through the left rear lift handle and insert link 14 in the grabhook. Repeat with sling leg 4 on the right rear lift handle. Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

The hookup team stands on top of the container. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the container and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-90. Pershing II Radar Section**

### **APPLICABILITY**

This load is certified by the MTMCTEA for the UH-60 and CH-47 helicopters at airspeeds up to and including 70 knots.

### **LOAD DESCRIPTION**

- Pershing II radar section, in container, NSN 8140-01-128-5445.
- Weight: 1,708 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig the load in 10 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

Ensure that the container cover is fastened securely and the container skids and lift handles are serviceable.

#### **Step 2. Rigging**

- Position apex fitting on top of the container. Route outer sling legs 1 and 2 to the front of the container and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift handle and insert link 3 in the grabhook. Repeat with sling leg 2 on the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lift handle and insert link 3 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

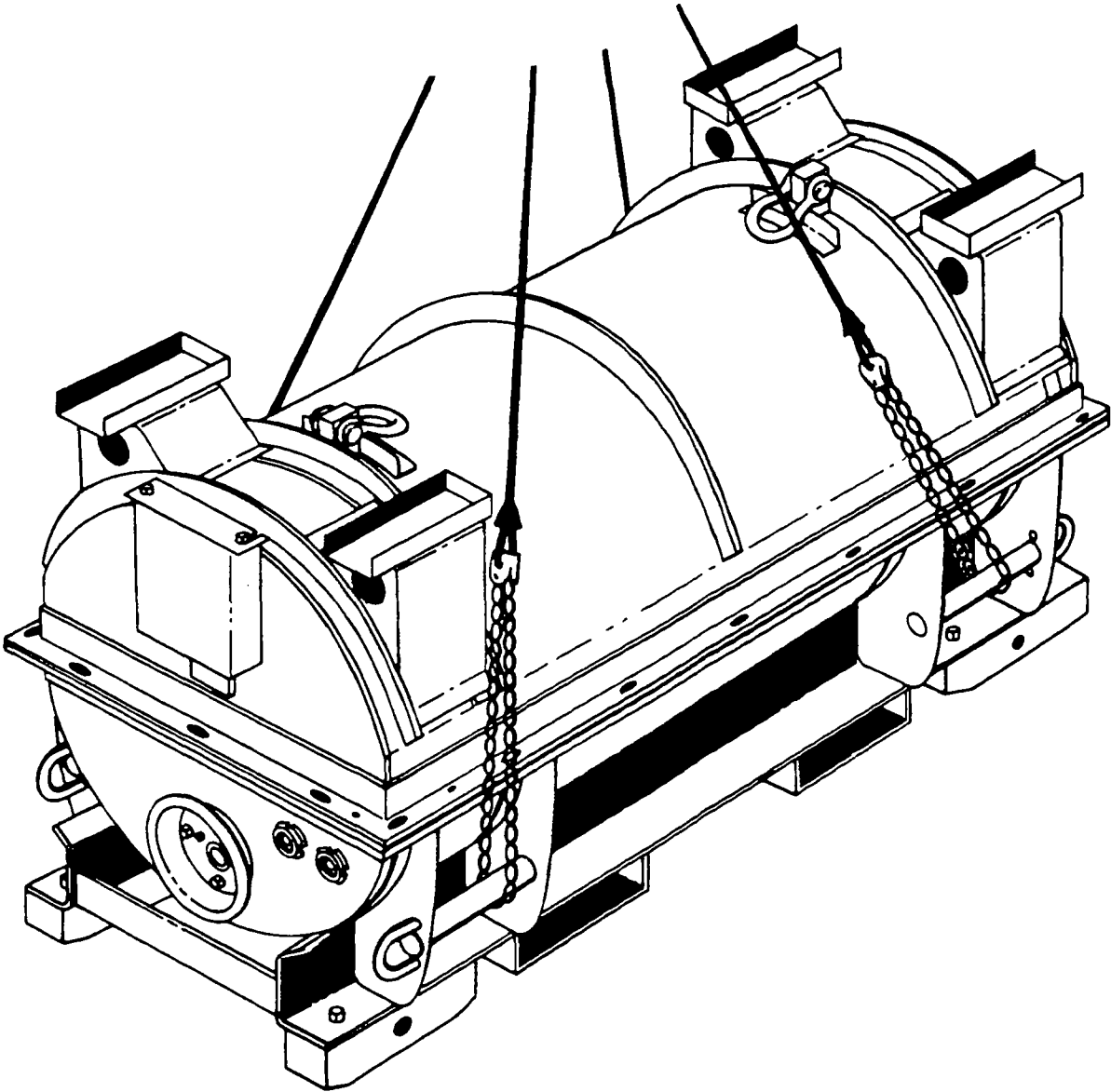
#### **Step 3. Hookup**

The hookup team stands on top of the container. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft

cargo hook. The hookup team then carefully dismounts the container and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

#### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## **Figure 2-91. Pershing II First Stage Section**

### **APPLICABILITY**

This load is certified by the MTMCTEA for the CH-47 helicopter at airspeeds up to and including 90 knots.

### **LOAD DESCRIPTION**

- Pershing II first stage section, in container, NSN 8140-01-130-1117.
- Weight: 14,410 pounds.

### **MATERIALS**

- Sling set (25,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig the load in 10 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

Ensure that the container cover is fastened securely and that the container skids and lift handles are serviceable.

#### **Step 2. Rigging**

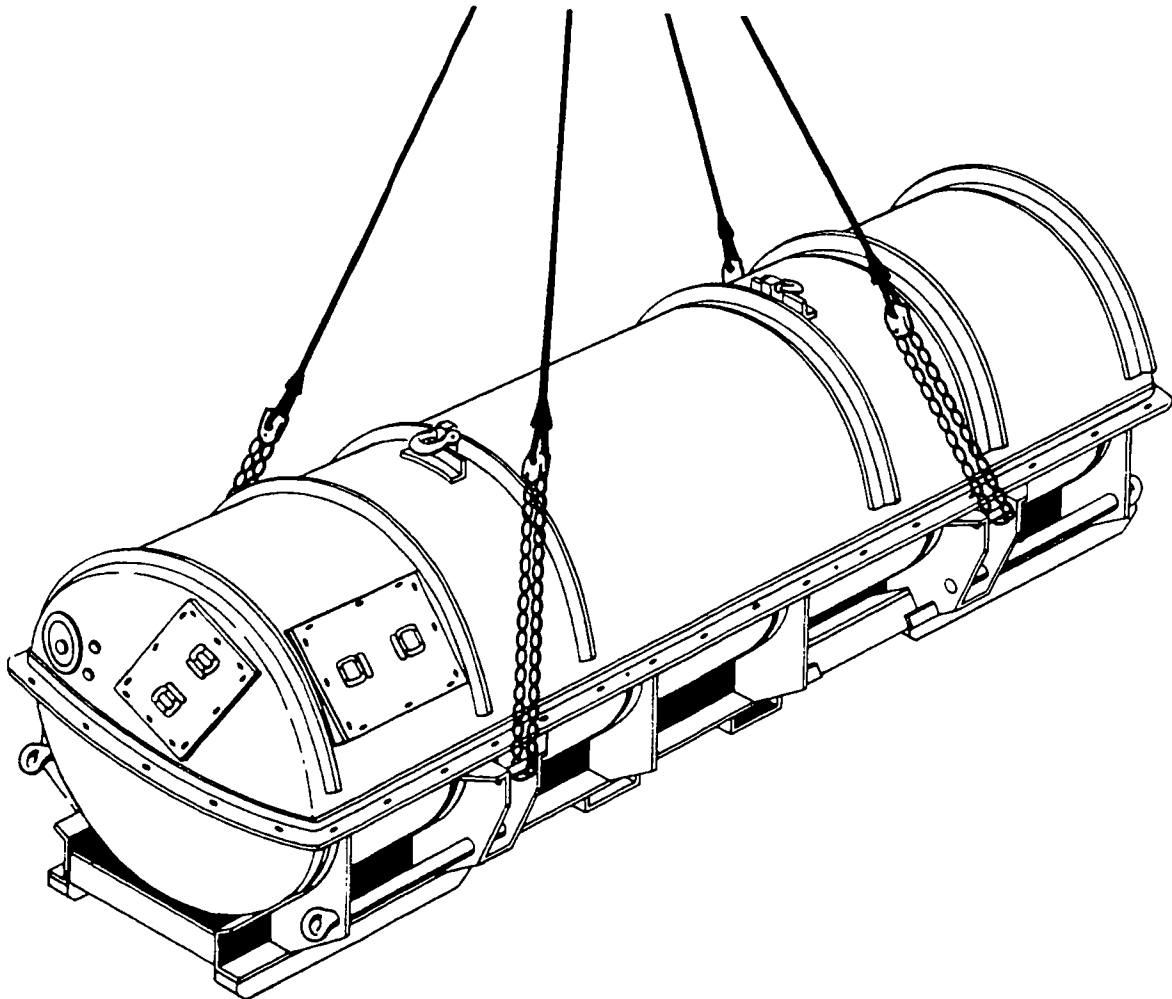
- Position apex fitting on top of the container. Route outer sling legs 1 and 2 to the front of the container and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift handle and insert link 3 in the grabhook. Repeat with sling leg 2 on the right front lift handle.
- Loop the chain end of sling leg 3 through the left rear lift handle and insert link 20 in the grabhook. Repeat with sling leg 4 on the right rear lift handle. Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on top of the container. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the container and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-92. ISU-60 Shipping/Storage Container**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-47 helicopters at airspeeds up to and including 80 knots.

### **LOAD DESCRIPTION**

- Container, shipping and storage, ISU-60, 108 x 88 x 60 inches.
- Weight: 11,650 pounds (loaded).

### **MATERIALS**

- Sling set (25,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig the load in 10 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Secure all cargo inside the container.
- Secure all doors in the closed/locked position.

#### **Step 2. Rigging**

- Position apex fitting on top of the container. Consider the two sets of doors as the sides of the load. Route the outer sling legs 1 and 2 to the front end of the container and inner sling legs 3 and 4 to the rear end. Sling legs 1 and 3 must be on the left side.
- Loop chain end of each sling leg through its respective lift provision at the top corner of the container and insert link 3 in the grabhook.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the container to prevent entanglement during hookup and lift-off.

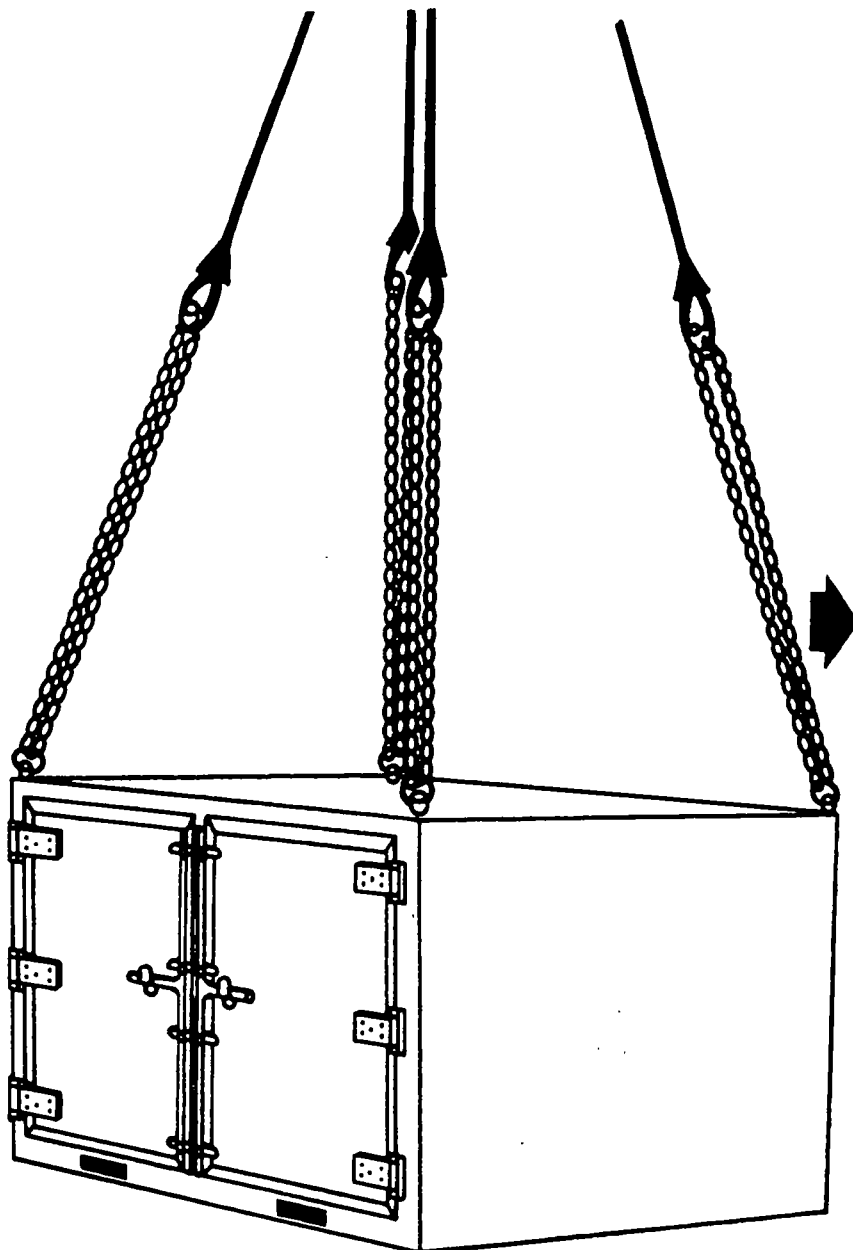
#### **Step 3. Hookup**

The hookup team stands on top of the container. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. After hookup, the team dismounts using the steps at the corner of the container. The helicopter must be centered over the load before tension is put on the sling. When

successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

#### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## Figure 2-93. ISU-90 Shipping/Storage Container

### APPLICABILITY

This load is certified by the US Army NRDEC for CH-47 helicopters at airspeeds up to and including 65 knots (empty container) and 105 knots (fully loaded container).

### LOAD DESCRIPTION

- Container, shipping and storage, ISU-90, 108 x 88 x 90 inches.
- Weight:
  - Loaded, 11,900 pounds
  - Empty, 1,930 pounds

### MATERIALS

- Sling set (25,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Cord, nylon, Type III, 550-pound breaking strength.

### PERSONNEL

Two persons can prepare and rig the load in 10 minutes.

### PROCEDURES

#### Step 1. Preparation.

- Secure all cargo inside the container.
- Secure all doors in the closed/locked position.

#### Step 2. Rigging

**NOTE:** The 10,000-pound capacity sling set may be used to rig an empty container.

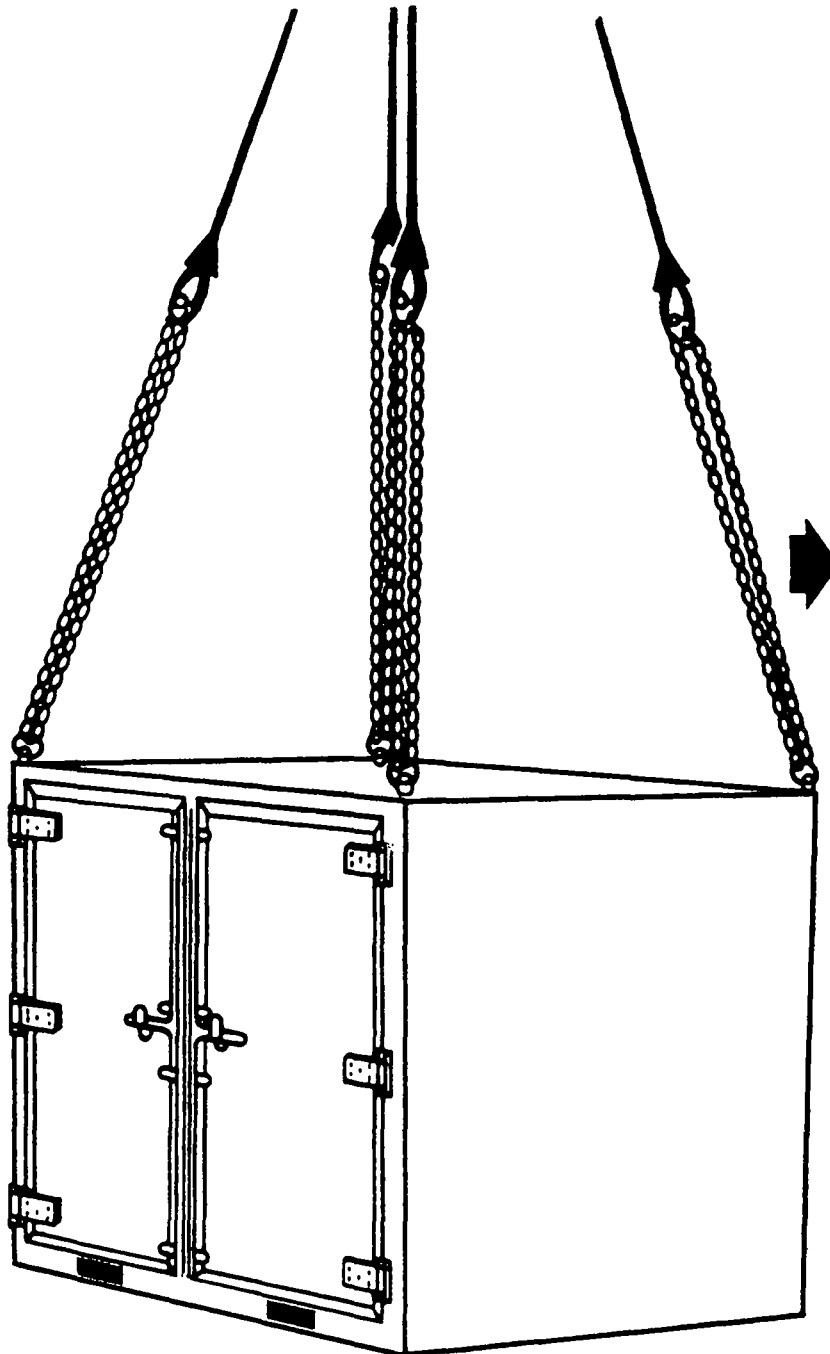
- Position the apex fitting on top of the container. Consider the two sets of doors as the sides of the load. Route outer sling legs 1 and 2 to the front end of the container and inner sling legs 3 and 4 to the rear end. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of each sling leg through its respective lift provision and insert link 3 in the grabhook.
- Cluster and tape or tie (breakaway technique) all sling legs together on top of the container to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

The hookup team stands on top of the container. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. After hookup, personnel dismount using the steps at the corner of the container. The helicopter must be centered over the load before tension is put on the sling. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **RADAR AND SATELLITE EQUIPMENT**

\*The certified single-point rigging procedures for radar equipment are in this section. Figures 2-94 through 2-98.1 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

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### **Figure 2-94. AN/TPQ-37 Artillery-Locating Radar Set (Firefinder)**

#### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-47 helicopters at airspeeds up to and including 90 knots.

#### **LOAD DESCRIPTION**

- Radar set, artillery-locating, AN/TPQ-37 (Firefinder), NSN 5840-01-084-5374.
- Weight: 10,800 pounds.

#### **MATERIALS**

- Sling set (25,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Padding, felt or cellulose as required.
- Ladder.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.

#### **PERSONNEL**

Two persons can prepare and rig this load in 30 minutes.

#### **PROCEDURES**

##### **Step 1. Preparation**

Antenna unit should be configured for march order. If the antenna unit is mounted on its transport trailer, it must be removed for helicopter transport. If the trailer is to accompany the unit, it must be rigged and transported as a separate load.

- Ensure that the maintenance tent frame and cover are stowed and secured in their proper position.
- Ensure that all cover panels, cabinet doors, and vents are installed and secure.
- Secure and tie down any loose items.



- Ensure that the rear door is closed and secured with its locking handle. Door rods must be secured in their clips.
- Ensure that the antenna transport cover is secured tightly to the lacing brackets with its bungee cord. If necessary, secure the antenna with additional nylon cord.

## Step 2. Rigging

**CAUTION:** Do not stand on top of load. Use the ladder to connect the sling legs.

- Open the access holes in the antenna transport cover as necessary to reach the lifting rings.
- Rotate the antenna tie-down bolt ratchet handles toward the center of the trailer to prevent sling interference.
- Position apex fitting on top of the load. Route outer sling legs 1 and 2 to the front of the unit and inner sling legs 3 and 4 to the rear (door end). Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift ring and insert link 68 in the grabhook. Repeat with sling leg 2 on the right front lift ring. Secure excess chain with tape or nylon cord.
- Loop the chain end of sling leg 3 through the left rear lift ring. Make sure that the chain is routed through the slot at the top of the corner post. Insert link 5 in the grabhook. Repeat with sling leg 4 on the right rear lift ring. Wrap felt or cellulose padding around both chain legs where they contact the top of the corner posts. Secure the padding with nylon cord or tape.
- Close the openings in the rear of the antenna transport cover and fasten securely.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

## Step 3. Hookup

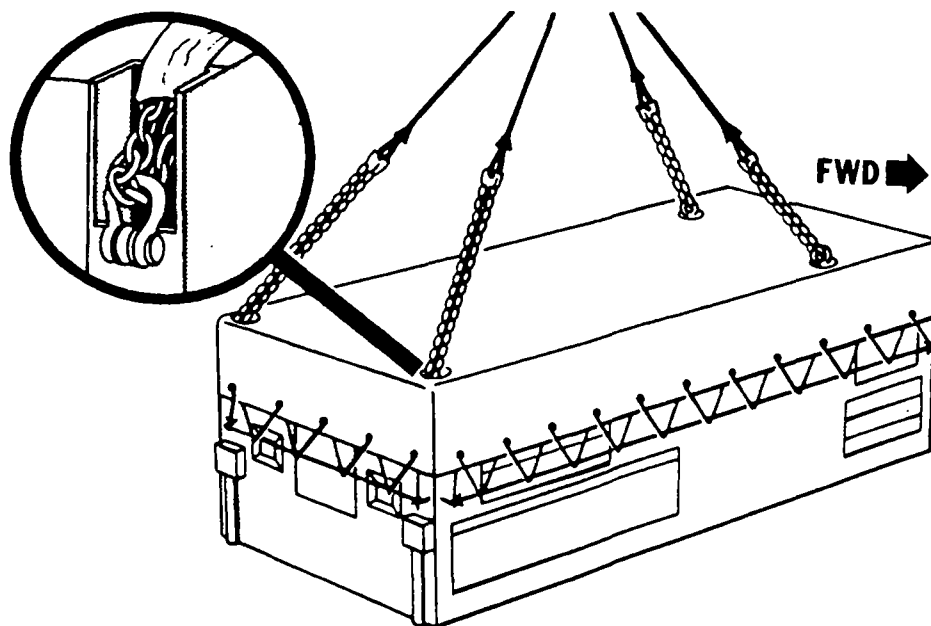
**NOTE:** Hookup is accomplished by the flight engineer using a cargo-hook loading pole. The helicopter crew should be informed of this in advance.

The hookup team remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

**NOTE:** Caution the pilot to hover to one side before he releases the apex fitting to prevent damage to the radar unit.

## Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-95. AN/TMQ-31 Radio Direction Finder**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for UH-60 and CH-47 helicopters at airspeeds up to and including 90 knots.

### **LOAD DESCRIPTION**

- Radio direction finder (RDF) antenna pedestal-mounted on 1 1/2-ton modified M103A3 trailer, LIN M04941.
- Weight: 5,010 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig the load in 30 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Place radar set in travel mode.
- Secure air hose, safety chains, and intervehicular cable to trailer tongue with nylon cord or tape.
- Engage trailer hand brake.
- Remove canvas cover and stow on top of ladder with nylon cord.
- Fold canvas bows down and secure to trailer deck with nylon cord.

#### **Step 2. Rigging**

- Position apex fitting on top of the trailer. Route outer sling legs 1 and 2 to the front of the trailer and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lifting ring located on the left front corner of the trailer and insert link 3 in the grabhook. Repeat with sling leg 2 on the right front lift provision.

- Loop the chain end of sling leg 3 through the left rear lifting ring located on the left rear corner of the trailer and insert link 22 in the grabhook. Repeat with sling leg 4 on the right rear lift provision. Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

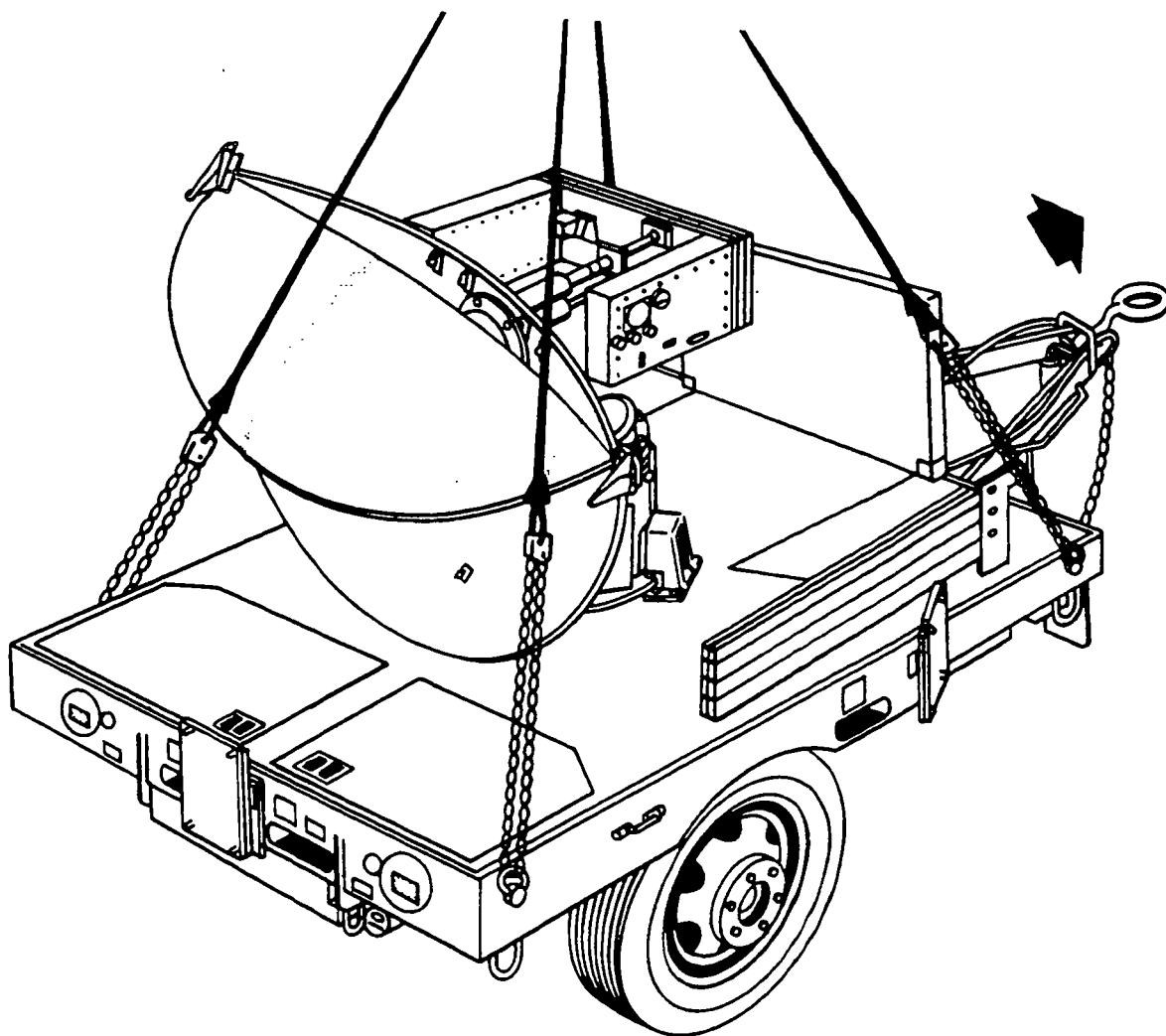
### **Step 3. Hookup**

**NOTE:** Caution pilot not to release apex fitting on top of the radar.

The hookup team stands on the platform to the rear of trailer antenna. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the rear of the radar set and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-96. AN/TPQ-36 Firefinder Antenna Radar Set**

### **APPLICABILITY**

This load is certified by the MTMCTEA for UH-60 and CH-47 helicopters at airspeeds up to and including 110 knots.

### **LOAD DESCRIPTION**

- Radar set mounted on a M103A1 modified trailer, AN/TPQ-36, NSN 5840-01-084-2444.
- Weight: 4,110 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tape, adhesive pressure-sensitive, 2-inch wide roll.
- Multiloop line, 9-foot long, Type XXVI, nylon, NSN 1670-01-062-6304 (4 each).
- Cord, nylon, Type III, 550-pound breaking strength.
- Small or medium clevis assembly (2 required).
- Cellulose or felt padding.

### **PERSONNEL**

Two persons can prepare and rig the load in 20 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Engage parking brake.
- Secure doors shut with nylon cord.
- Place radar set in travel mode and tightly secure cover on antenna.
- Attach a small or medium clevis to each rear lift provision.

#### **Step 2. Rigging**

**NOTE:** Radar panel cannot support any extra weight.

- Connect one 9-foot multiloop line to the left rear clevis. Place multiloop line in the sling guide on the antenna, pull up until tight, and tape it at sling guide to prevent it from slipping down. Repeat on the right side.
- Wrap the A-frame with tape and padding just aft of the lunette on the left side. Choker-hitch one 9-foot multiloop line around the taped section. Repeat on the right side.

- Position apex fitting on top of trailer (but not on top of the radar panel). Route outer sling legs 1 and 2 to the front of the trailer and inner sling legs 3 and 4 to the rear of the trailer. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the 9-foot line attached to the left side of the tongue and insert link 16 in the grabhook. Repeat with sling leg 2 on the right front multiloop line.
- Loop the chain end of sling leg 3 through the 9-foot line attached to the left rear lift provision and insert link 11 in the grabhook. Repeat with sling leg 4 on the right rear multiloop line.
- Secure excess chain with tape or cord.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

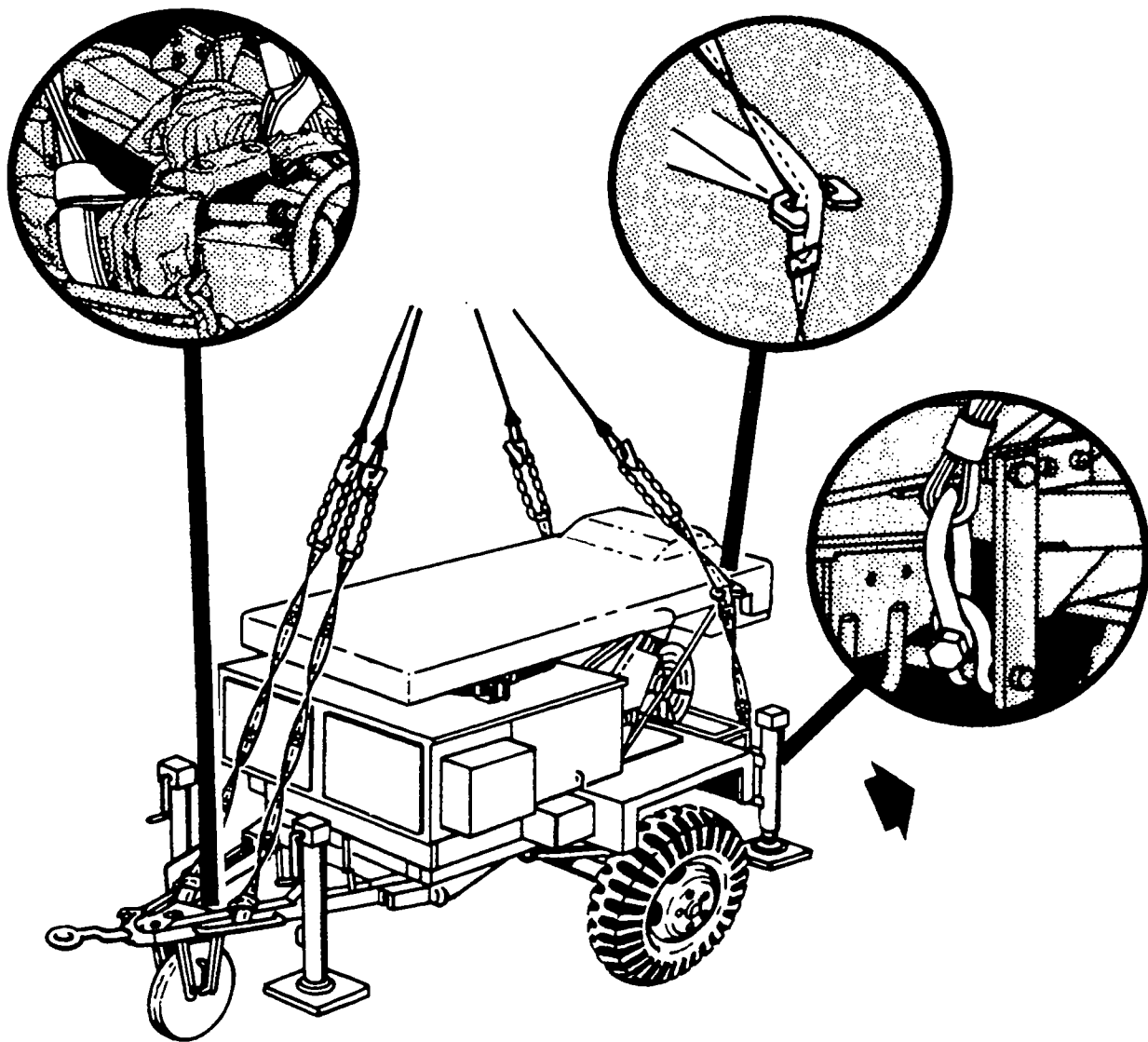
**NOTE:** Connect apex fitting so the trailer tongue is carried aft.

**NOTE:** Advise the aircrew to hover off to one side before they release the apex fitting to prevent damage to the radar panel.

The hookup team stands on the fenders, being careful not to damage the radar panel. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## Figure 2-97. AN/TPQ-36 Firefinder II

### APPLICABILITY

This load is certified by the US Army NRDEC for the CH-47 helicopter at airspeeds up to and including 120 knots.

### LOAD DESCRIPTION

- FIREFINDER II, AN/TPQ-36, Block II.
- Weight: 9,673 pounds.

### MATERIALS

- Sling set (25,000-pound capacity) with four additional chains, 8-foot length (6,250-pound capacity) and coupling links.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength
- Padding, felt or suitable substitute.
- Tie-down strap, cargo, CGU-1/B (2 each).
- Spreader bar assemblies, 117-inch and 91.8-inch in length (component of FIREFINDER II).

### PERSONNEL

Two persons can prepare and rig this load in 30 minutes.

### PROCEDURES

#### Step 1. Preparation

**NOTE:** Do not stand on the surface of the antenna array at any time.

- Assemble the two spreader bar assemblies by matching similar sections to form a long (117-inch) and a short (91.8-inch) spreader bar.
- Prepare the FIREFINDER II for transport in accordance with operator's manual.
- Secure all loose equipment on the pallet with tape or nylon cord.
- Make sure that all latches, doors, and panels are secured with tape or nylon cord.
- Using the two tie-down straps, secure the antenna cover to the antenna array. Route the tie-down straps from front to rear.

- Place the long (117-inch) spreader bar on top of the shelter roof. Position the bar (parallel with the side of the shelter) between the edge of the shelter that is adjacent to the antenna array and the radio mount on the shelter roof. Secure the spreader bar loosely in place (allow adequate slack for movement) with nylon cord to prevent the spreader bar from rolling off the shelter roof.
- Place the short (91.8-inch) spreader bar through the opening in the antenna array support arms directly below the antenna array as indicated in the illustration. Secure the spreader bar loosely in place with nylon cord to prevent the spreader bar from sliding out the openings in the support arms.

## Step 2. Rigging

- Position apex fitting on top of the shelter. Route outer sling legs 1 and 2 to the front (shelter) end of the load and inner sling legs 3 and 4 to the rear (generator end). Sling legs 1 and 3 must be on the left side of the load.
- Using the proper coupling links, add the chain extensions to each sling leg chain assembly.
- Route the chain end of sling leg 1 through the fitting on the left end of the long spreader bar and down the side of the shelter. Insert link 10 (counting down from the grabhook coupling link) in the spreader bar end fitting. Route the chain end through the lift provision located on the left side of the pallet frame, back up to the spreader bar, and insert link 23 in the end fitting. Secure the chain in the end fitting by installing the retaining pin in the end of the spreader bar. Insert chain link 11 in the sling set grabhook. Repeat with sling leg 2, right end fitting on the spreader bar, and lift provision on the right side of the pallet frame.
- Route the chain end of sling leg 3 through the fitting on the left end of the short spreader bar and down the side of the antenna array assembly. Route the chain end through the lift provision located on the left side of the pallet frame below the generator engine and back up through the spreader bar end fitting. Pull the chains tight to remove slack and insert link 3 in the sling set grabhook. Install the retaining pin in the end of the spreader bar. Repeat with sling leg 4, right end fitting on the spreader bar, and lift provision on the right side of the pallet frame.

**NOTE:** The chain links do not lock in the end fittings on the short spreader bar like they do on the long spreader bar.

- Tape the two loops of the chain legs together every 1 to 2 feet. Secure all excess chain with tape or nylon cord. Place padding around the grabhooks and secure with tape or nylon cord to prevent damage caused by the grabhooks when the sling is released.
- Pull the rear sling legs 3 and 4 tight over top of the antenna array to remove slack from the sling legs. Cluster and tie or tape (breakaway technique) the sling legs together to prevent the chains and grabhooks from fouling on the antenna array during hookup and lift-off.
- Cluster and tie or tape (breakaway technique) the front sling legs 1 and 2 together on top of the shelter to prevent entanglement during hookup and lift-off.

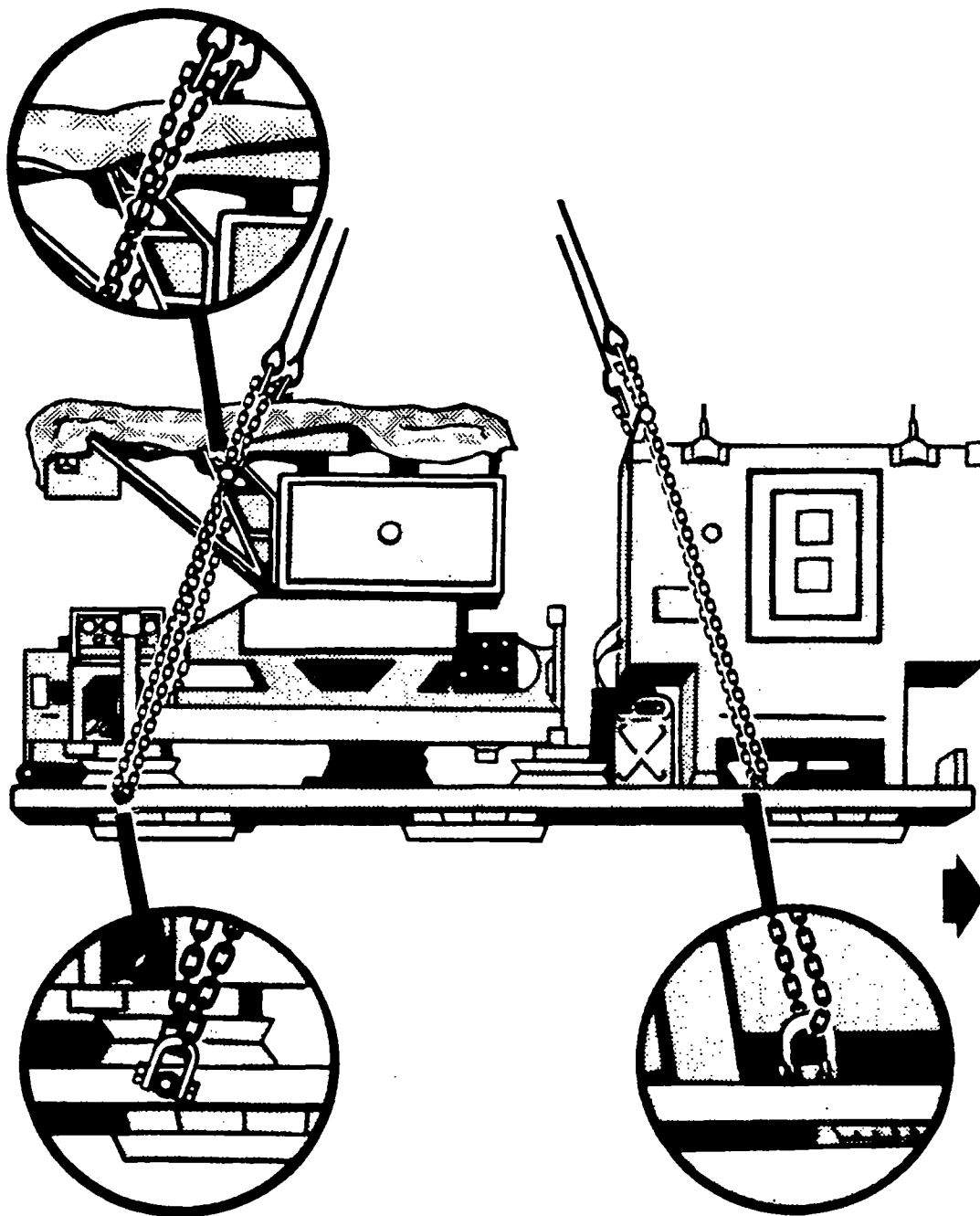
### **Step 3. Hookup**

**NOTE:** Brief the helicopter crew to relax sling leg tension, lower spreader bars onto the shelter roof and antenna array support arms, and hover to the side of the load when releasing the sling set. Damage may occur to the antenna array or shelter roof if this precaution is not observed.

The hookup team stands on top of the shelter. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the shelter and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-98. OE-361/G Quick Reaction Satellite Antenna**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for UH-60 and CH-47 helicopters at airspeeds up to and including 80 knots.

### **LOAD DESCRIPTION**

- Antenna, satellite, quick reaction (QRSA), OE-361/G, NSN 5895-01-179-5494.
- Weight: 4,830 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Felt padding or other suitable cushioning material.

### **PERSONNEL**

Four persons can prepare and rig the load in 30 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Install the spreader bar assembly which is stored on the load. After hooking the spreader bar assembly to the lift rings, tape the keepers securely with tape.
- Pad both spreader bars with felt or other cushioning material to prevent damage to the antenna panels during load release. Tape or tie the padding securely to prevent it from being dislodged during flight.
- Pad the uppermost stacked antenna panel with available material to prevent possible damage from the apex clevis at load release. Tape or tie the padding securely to prevent it from being dislodged during flight.
- Ensure that the ladder, box covers, and any other loose items are properly secured. If the tie-down straps are missing or worn, replace with nylon cord.

#### **Step 2. Rigging**

- Position the apex fitting on top of the load. Route outer sling legs 1 and 2 to the front (ladder end) of the load and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.

- Loop the chain end of sling leg 1 through the left lift eye of the front spreader bar and insert link 3 in the grabhook. Repeat with sling leg 2 and the right lift eye on the front spreader bar.
- Loop the chain end of sling leg 3 through the left lift eye of the rear spreader bar and insert link 30 in the grabhook. Repeat with sling leg 4 and the right lift eye on the rear spreader bar. Secure excess chain with tape or nylon cord.
- Wrap felt padding or other suitable cushioning material around each grabhook assembly to protect the antenna when the sling set is released. Tape or tie the padding securely to prevent it from being dislodged during flight.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the antenna to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

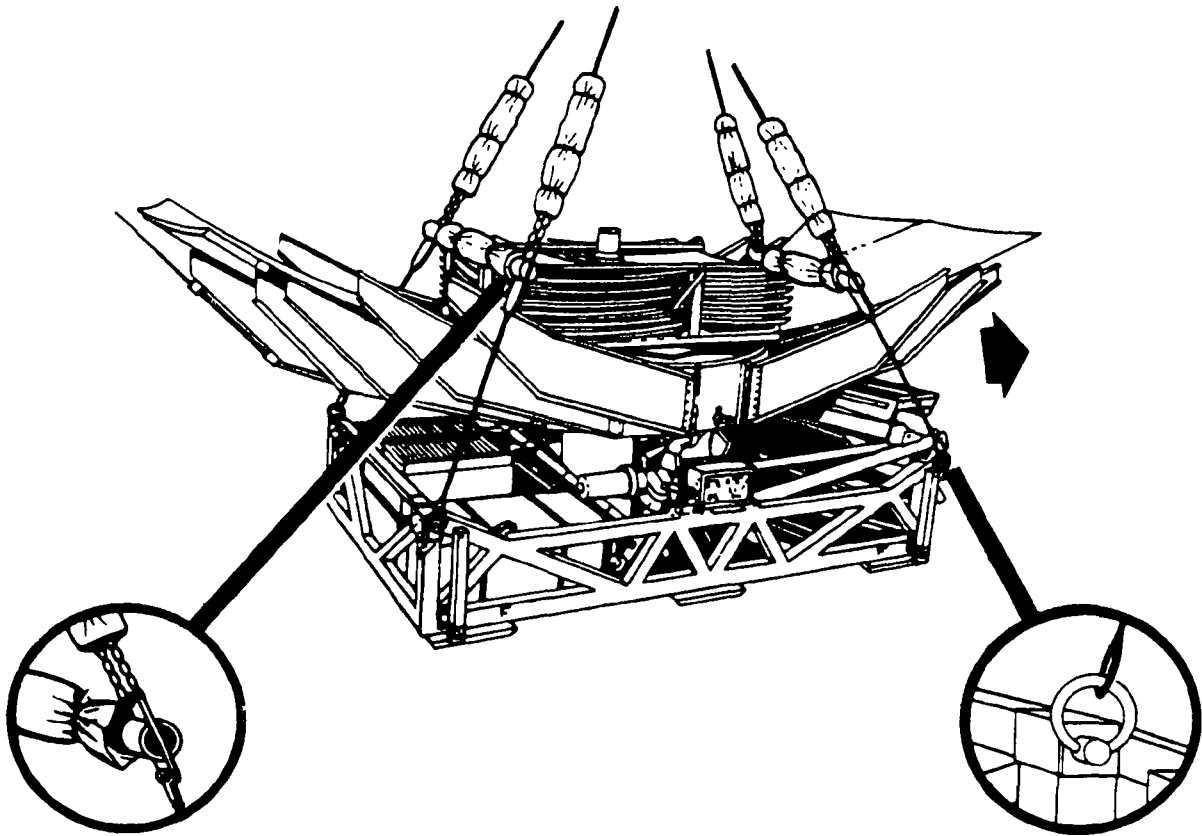
**NOTE:** Connect the apex fitting so the ladder end is carried forward.

The hookup team stands on top of the load between the stacked antenna panels and either side of the center post. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. When hookup is complete, the hookup team should dismount on opposite sides of the load and observe the sling legs as they rise to tension. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

**CAUTION:** Instruct the helicopter crew to relax sling leg tension and to hover to the side of the load when releasing the apex fitting to prevent damage to the top of the set.

### **Step 4. Derigging**

Derigging is the reverse of preparation and rigging instructions in steps 1 and 2.



## **\*Figure 2-98.1. AS-3471/TPN-22 Antenna Pallet (USMC)**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for the CH-53 helicopter at airspeeds up to and including 80 KIAS.

### **LOAD DESCRIPTION**

- Antenna pallet, AS-3471/TPN-22, TAMCN Q2115.
- Weight: 5,700 pounds.

### **MATERIALS**

- Sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Padding, felt, or suitable substitute.
- Chain, 8-foot, part number JETS-WMC-5000 (10,000-pound capacity) from a 40,000-pound sling set (4 each).
- Coupling link, part number 577-0815 (4 each).

### **PERSONNEL**

Two persons can prepare and rig this load in 5 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Secure all handles.
- Secure the crank handle at the base of the pallet.
- Using the proper coupling links, add the additional chain sections to the end of each of the four sling legs.

#### **Step 2. Rigging**

- Position the apex fitting on top of the antenna. Route outer sling legs (1 and 2) to the front of the antenna pallet (supply box end) and inner sling legs (3 and 4) to the rear (leveling disk end). Sling legs 1 and 3 must be on the left side of the load.



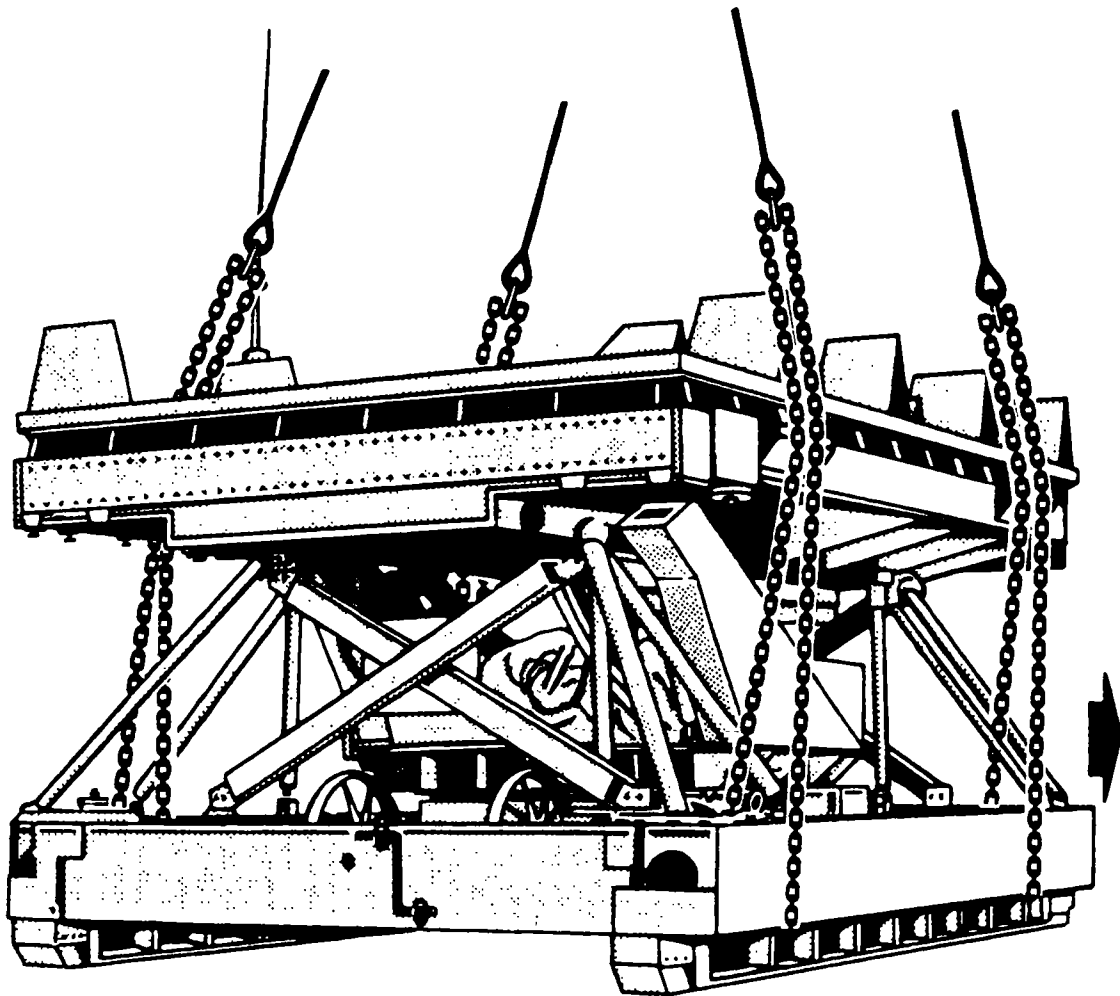
- Loop the chain end of sling leg 1 through the small space between the channel beams at the front base of the antenna and insert link 3 in the grabhook. Repeat with sling leg 2 and the right base of the antenna.
- Loop the chain end of sling leg 3 through the small space between the channel beams at the left rear base of the antenna and insert link 5 in the grabhook. Repeat with sling leg 4 and the right base of the antenna.
- Tie or tape (breakaway technique) all chains loosely to the straps at the bumpers to prevent the chains from moving off the protective bumpers.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the antenna to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

The hookup team stands on the pallet. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the antenna and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-98.2. Antenna Pallet Transit Frame**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for the CH-47 helicopter at airspeeds up to and including 75 KIAS.

### **LOAD DESCRIPTION**

- Antenna pallet transit frame used with the AN/TSC-93B satellite communications terminals. There are two pallet frame configurations.
- Weight:
  - 1,970 pounds (SM-F 973604-1 used with AN/TSC-93B).
  - 2,107 pounds (SM-F 973604-2 used with AN/TSC-85B).

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig this load in 10 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Secure all equipment with eight ratchet straps supplied. Use tape or nylon cord if additional security is necessary.
- Remove and stow the protective cover. Secure with nylon cord.

#### **Step 2. Rigging**

- Position the apex fitting on top of the frame. Route outer sling legs (1 and 2) to the frame opposite the antenna segments and inner sling legs (3 and 4) to the other side. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located on the top corner of the frame and insert link 30 in the grabhook. Repeat with sling leg 2 and the right front lift provision.

- Loop the chain end of sling leg 3 through the left rear lift provision and insert link 3 in the grabhook. Repeat with sling leg 4 and the right rear lift provision.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the frame to prevent entanglement during hookup and lift-off.

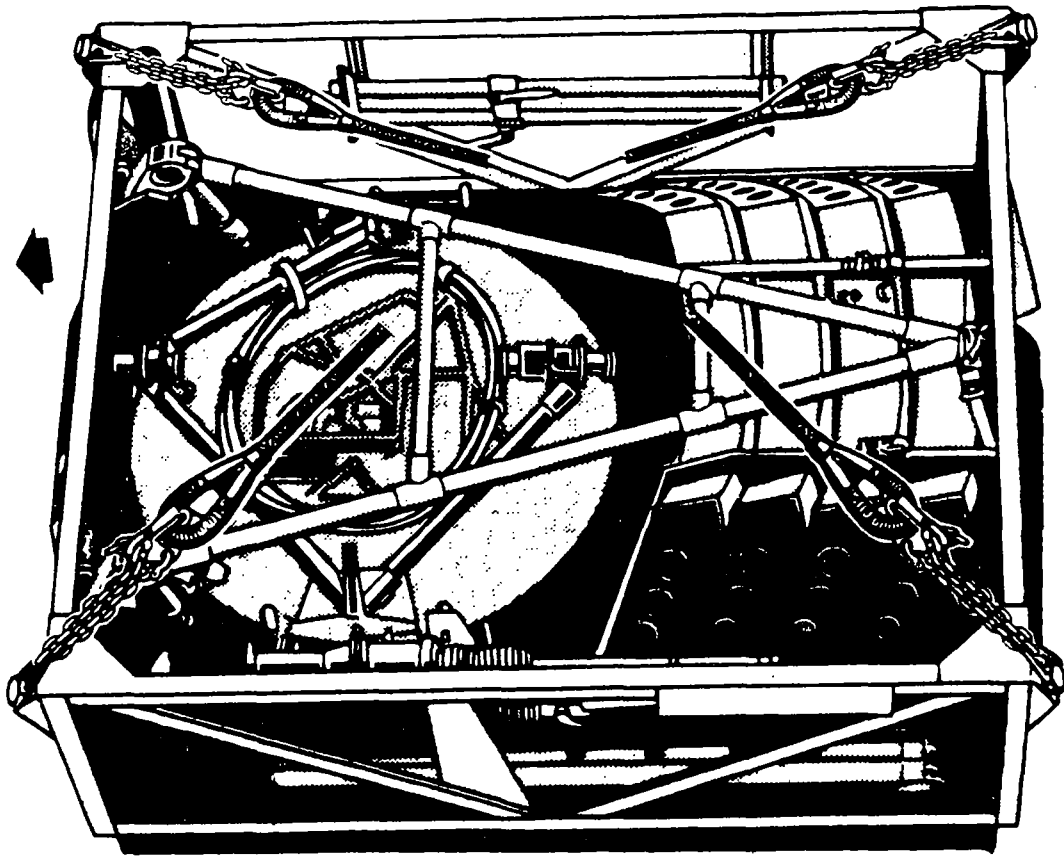
### **Step 3. Hookup**

**NOTE:** Connect the apex fitting to the cargo hook so the antenna segment end is aft.

The hookup team stands on the frame. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the antenna and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## GENERATOR SETS

\*The certified single-point rigging procedures for generator sets are in this section. Figures 2-99 through 2-107 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

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### Figure 2-99. M200A1 Trailer-Mounted Generator Sets

#### APPLICABILITY

Generator sets, PU-405A/M and PU-406B/M, are certified by the US Army NRDEC for the identified helicopter up to the airspeeds denoted below. The other loads listed in the load description are suitable for the CH-47 helicopter at airspeeds up to and including 100 knots.

#### LOAD DESCRIPTION

- Chassis, trailer, generator, M200A1.
  - LIN E02807.
  - Weight: 2,445 pounds.
- Generator set, 15kw, 6113.
  - LIN J35869.
  - Weight: 5,119 pounds.
- Generator set, 30kw, CE301ACWK1.
  - LIN J36304.
  - Weight: 5,625 pounds.
- Generator set, 45kw, 52300.
  - LIN J37342.
  - Weight: 6,885 pounds.
- Generator set, 60kw, MEP-006A.
  - LIN J38301.
  - Weight: 7,347 pounds.

- **PU-405A/M power unit, 15kw, without acoustic suppression kit (ASK).**
  - LIN J35492.
  - Weight: 6,119 pounds.
  - Type helicopter: CH-47.
  - Airspeed: 100 KIAS.
- **PU-405A/M power unit, 15kw, with acoustic suppression kit (ASK).**
  - LIN J35492.
  - Weight: 6,740 pounds.
  - Type helicopter: UH-60 and CH-47.
  - Airspeed: 80 KIAS.
- **PU-406B/M power unit, 30kw, with acoustic suppression kit (ASK).**
  - LIN J36383.
  - Weight: 7,250 pounds.
  - Type helicopter: UH-60 and CH-47.
  - Airspeed: 80 KIAS.
- **PU-732 power unit, 15kw, with acoustic suppression kit (ASK).**
  - LIN G36074.
  - Weight: 6,690 pounds.
  - Type helicopter: UH-60 and CH-47.
  - Airspeed: 80 KIAS.
- **PU-760 power unit, 30kw, with acoustic suppression kit (ASK).**
  - LIN G53971.
  - Weight: 7,240 pounds.
  - Type helicopter: UH-60 and CH-47.
  - Airspeed: 80 KIAS.

#### **MATERIALS**

- **Sling set (10,000-pound capacity).**
- **Cord, nylon, Type III, 550-pound breaking strength.**

- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Padding, felt or cellulose.

## PERSONNEL

One man can prepare and rig this load in 15 minutes.

## PROCEDURES

### Step 1. Preparation

- Lower the lunette as far as possible by adjusting the landing leg.
- Engage both hand brakes.
- Secure safety chains and brake hose with nylon cord or tape.
- Secure all lids, doors, and caps.

### Step 2. Rigging

- Position the apex fitting on top of the generator. Route outer sling legs (1 and 2) to the front (lunette end) of the trailer and inner sling legs (3 and 4) to the rear. Sling legs 1 and 3 must be on the same side of the load.
- Loop the chain end of sling leg 1 through the lift provision on the trailer chassis on the left side of the tongue and insert the link identified below in the grabhook. Repeat with sling leg 2 on the right side of the trailer tongue.
- Loop the chain end of sling leg 3 through the lift provision on the left side of the trailer chassis at the rear of the generator and insert the link identified below in the grabhook. Repeat with sling leg 4 on the right side of the trailer chassis.

| GENERATOR             | SLING LEGS<br>1 AND 2 | SLING LEGS<br>3 AND 4 |
|-----------------------|-----------------------|-----------------------|
| 6113                  | 3                     | 23                    |
| CE301ACWK1            | 3                     | 28                    |
| 52300                 | 3                     | 30                    |
| MEP-006A              | 3                     | 33                    |
| PU-405A/M without     | 3                     | 33                    |
| PU-450A/M without ASK | 3                     | 28                    |
| PU-406B/M with ASK    | 3                     | 28                    |

- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the generator to prevent entanglement during hookup and lift-off.



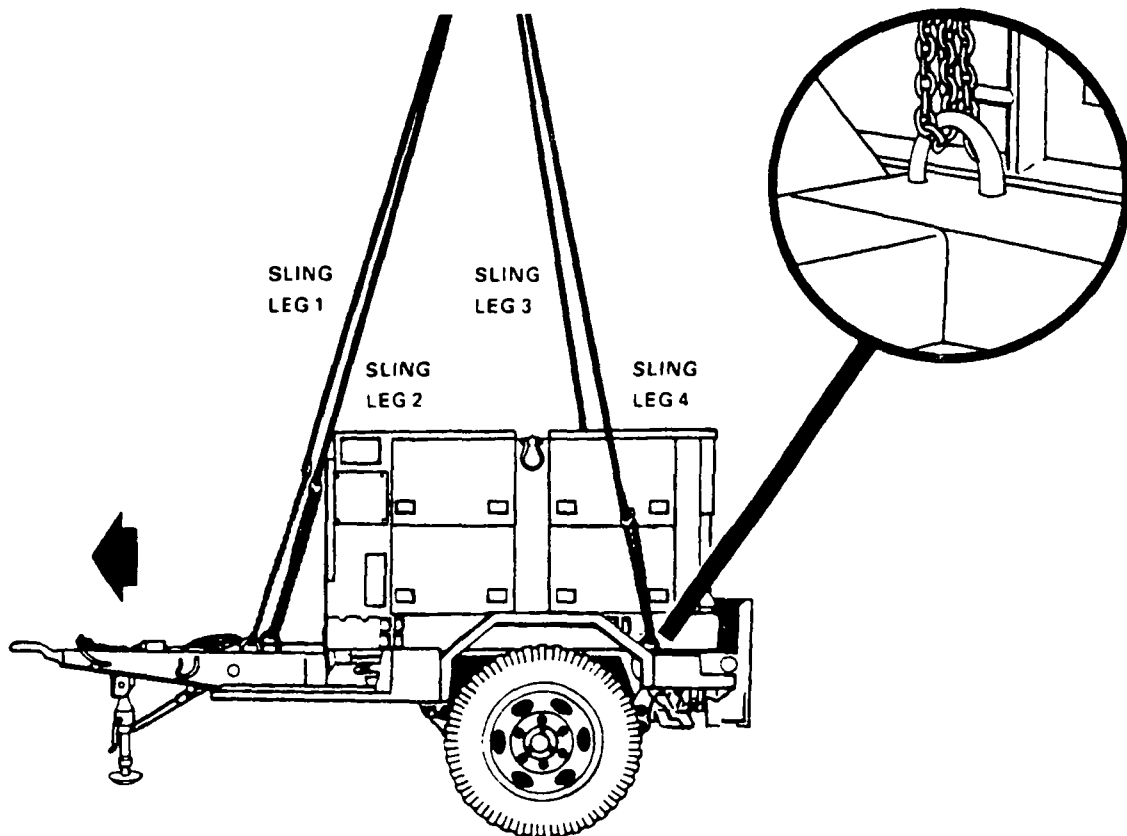
### Step 3. Hookup

**NOTE:** Connect the apex fitting to the helicopter cargo hook so the trailer lunette end is carried aft.

The hookup team stands on top of the generator. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the generator and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-100. PU-794/G Generator Set**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for UH-60 and CH-47 helicopters at airspeeds up to and including 90 and 110 knots, respectively.

### **LOAD DESCRIPTION**

- PU-794/G generator set mounted on a M200A1 trailer, NSN 6115-01-242-1665.
- Weight: 6,440 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Padding material, cellulose.

### **PERSONNEL**

One person can prepare and rig this load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Lower the lunette as far as possible by adjusting the landing leg.
- Engage both hand brakes.
- Secure safety chains and brake hose with nylon cord or tape.
- Secure all lids, doors, and caps with nylon cord or tape.

#### **Step 2. Rigging**

**NOTE:** Generator set is rigged to fly tongue aft. Due to interference between rear sling legs and generator, the outer sling legs are routed to rear lift points.

- Position the apex fitting on top of the generator. Route outer sling legs (1 and 2) to the rear of the trailer and inner sling legs (3 and 4) to the lunette end. Sling legs 1 and 3 must be on the same side of the load.

- Route the chain end of sling leg 1 through the right rear lift provision on the trailer chassis and insert link 3 in the grabhook. Repeat with sling leg 2 on the left rear lift provision.
- Route the chain end of sling leg 3 through the right front lift provision on the tongue of the trailer and insert link 18 in the grabhook. Repeat with sling leg 4 on the left front lift provision.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup.
- Secure padding on sling legs 3 and 4 in the area where the slings rub against the generator.

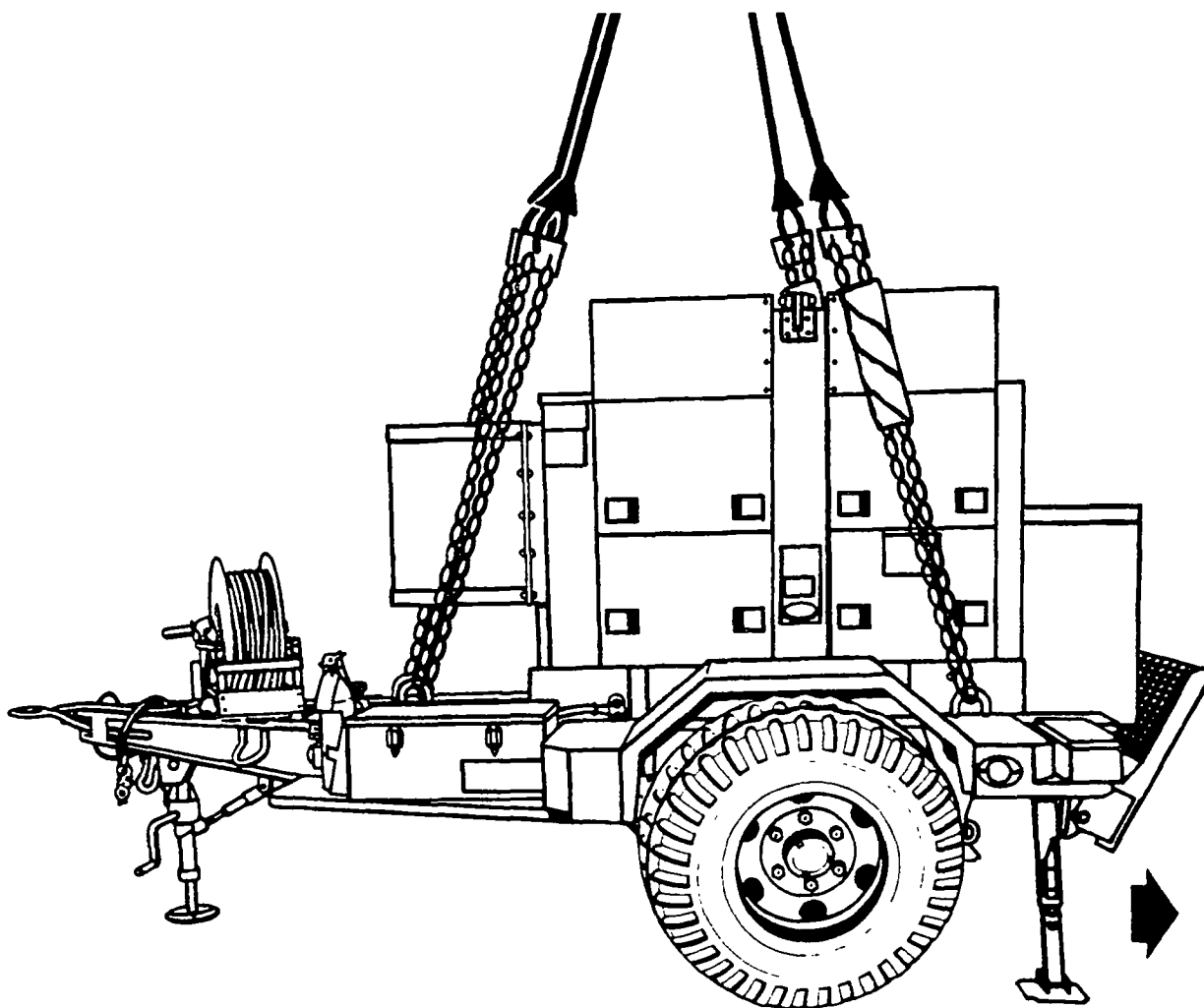
### **Step 3. Hookup.**

**NOTE:** Connect the apex fitting so the tongue is carried to the rear.

The hookup team stands on the fender of the trailer. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting on the aircraft cargo hook. The hookup team carefully dismounts and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging in steps 1 and 2.



## **Figure 2-101. Aviation Ground Power Unit (AGPU)**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for UH-60 and CH-47 helicopters at airspeeds up to and including 110 and 90 knots, respectively.

### **LOAD DESCRIPTION**

- Aviation ground power unit (AGPU), LIN P44627.
- Weight: 4,190 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tie-down assembly, CGU-1/B (4 each).
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Nylon, tubular, 1/2-inch, 1,000-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig this load in 10 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Stow and secure the towbar with 1/2-inch tubular nylon.
- Close all doors, secure handles with tape, and attach four CGU-1/B tie-down straps.
- Route one tie-down strap horizontally around the power unit. Position it approximately 16 inches down from the top of the power unit. Repeat using another tie-down strap positioned approximately 8 inches higher than the first strap.
- Route another tie-down strap through the forklift lift provisions and then vertically around the power unit. Repeat this procedure using another tie-down strap through the other lift provision.
- Secure all equipment inside the unit with nylon cord or tape.
- Secure exhaust cover closed with tape.

**CAUTION:** Pay careful attention to securing the exhaust cover closed to preclude possible damage during flight. If cover cannot be adequately secured, it should be removed.

- Ensure that fuel tank is not more than 3/4 full. Inspect fuel tank cap, oil filler caps, and battery caps to ensure they are secure.
- Engage the parking brake.

### **Step 2. Rigging**

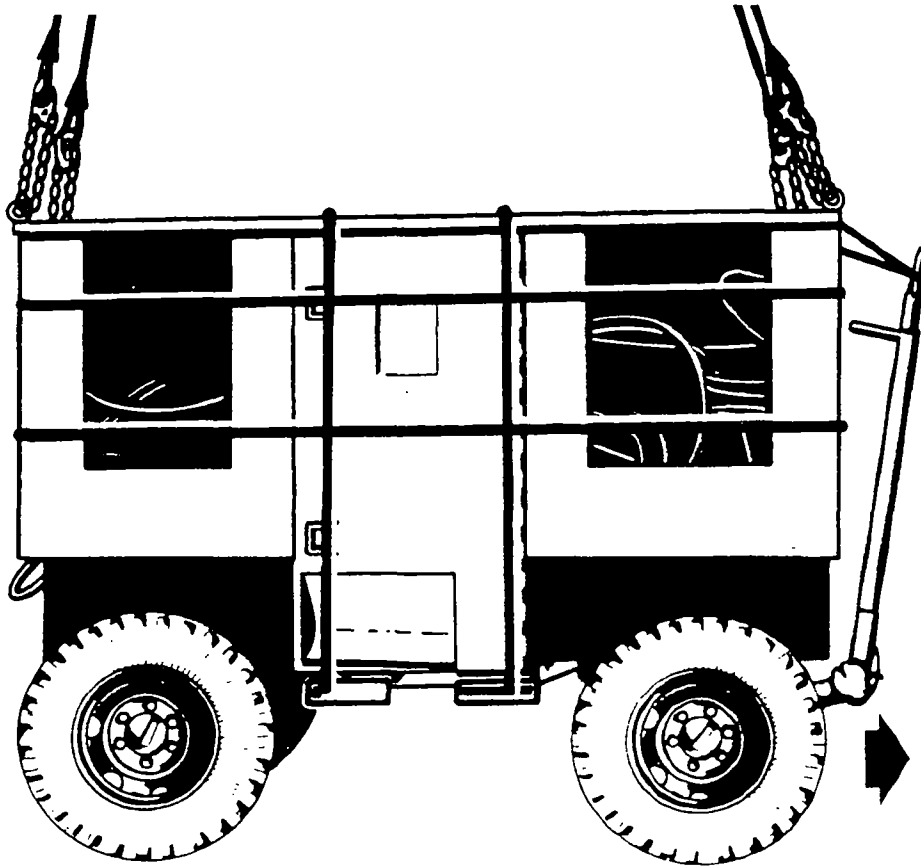
- Position apex fitting on top of the unit. Route outer sling legs 1 and 2 to the front (tongue) of the trailer and the inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift ring and insert link 3 in the grabhook. Repeat with sling leg 2 on the right front lift ring.
- Loop the chain end of sling leg 3 through the left rear lift ring and insert link 3 in the grabhook. Repeat with sling leg 4 on the right rear lift ring.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

The hookup team stands on top of the power unit. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the power unit and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-102. Aviation Direct Current Generator Set (ADCGS)**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for the UH-1 helicopter at airspeeds up to and including 90 knots.

### **LOAD DESCRIPTION**

- Aviator direct current generator set (ADCGS), LIN G38140.
- Weight:
  - Without fuel, 980 pounds.
  - With fuel, 1,100 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Felt, sheet, Type IV, 1/2-inch thick, 30- x 36-inch (4 sheets).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig the load in 20 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Fold and tape ground cable to the inside of the tongue frame. Roll rear cable in the rack provided. Tape and tie rear cable together and to the rack. Tape hold-down latch on rear cable rack.
- Cover cable receptacles. Secure door latches. Tape exhaust stack cover down.
- Route single loop of nylon cord under, through the frame, over the exhaust stack cover and instrument cover, and tie to secure both covers. Tape over gage on fuel tank.
- Set wheel brakes in the ON position.

#### **Step 2. Rigging**

- Position apex fitting on top of the generator set. Route outer sling legs 1 and 2 to the front of the generator and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side of the load.



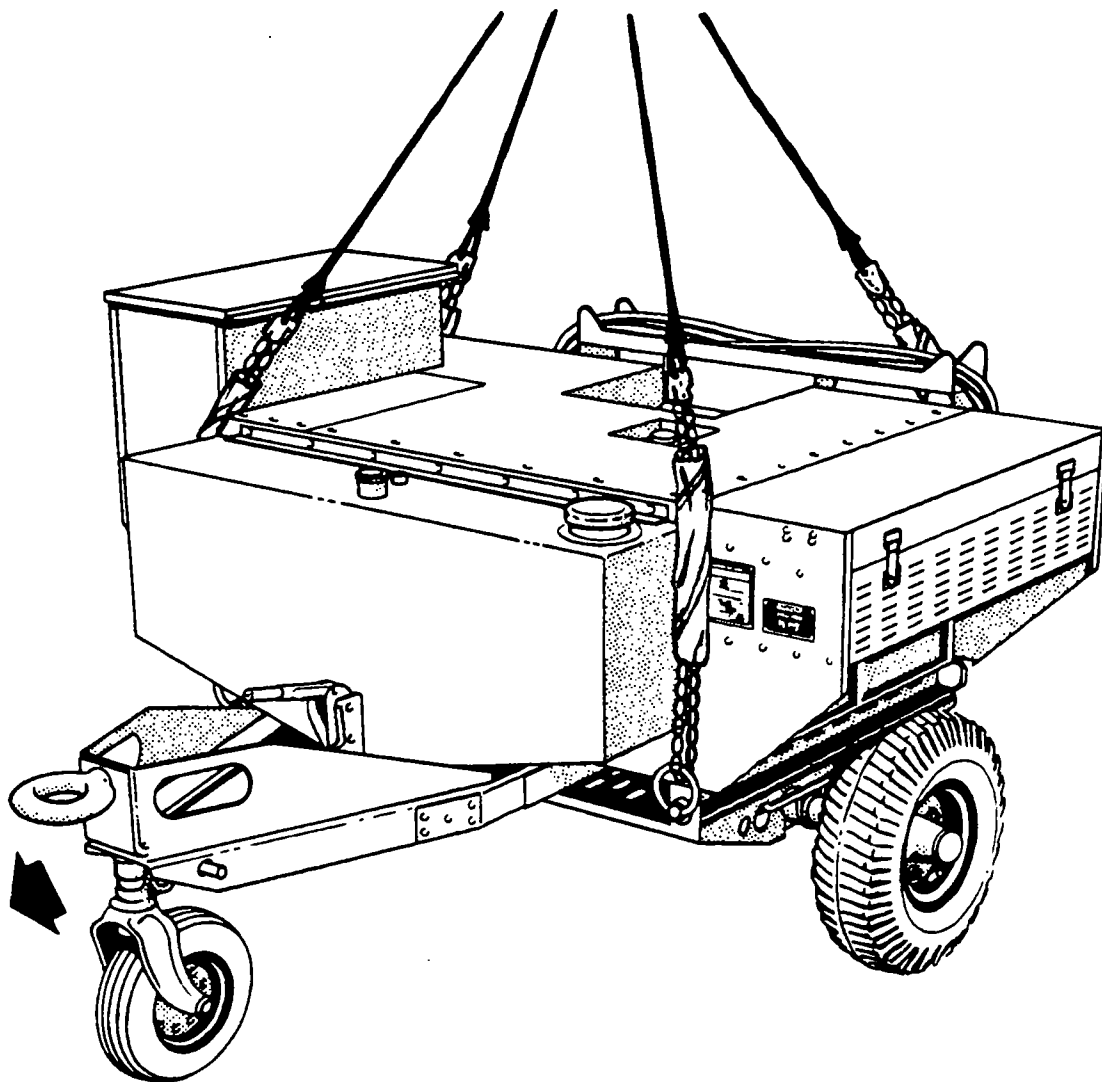
- Loop the chain end of sling leg 1 through the left front lift provision located on the left front corner and insert link 3 in the grabhook. Repeat with sling leg 2 on the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lift provision and insert link 3 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

The hookup team stands to one side of the load. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-103. AN/MJQ-16/18/25 Generator Set**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-47 and CH-54 helicopters at airspeeds up to and including 120 knots.

### **LOAD DESCRIPTION**

- Powerplant, M103A3 trailer-mounted.
  - AN/MJQ-16, 5kw, 60Hz, LIN P41832.
  - AN/MJQ-18, 10kw, 60Hz, LIN P28015.
  - AN/MJQ-25, 10kw, 400 Hz, LIN P42364.
- Weights:
  - AN/MJQ-16, 5,100 pounds.
  - AN/MJQ-18, 5,765 pounds.
  - AN/MJQ-25, 5,750 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Cotton webbing, 1/4-inch, 80-pound breaking strength.
- Tie-down, cargo, CGU-1/B (two each, if required).

### **PERSONNEL**

Two persons can prepare and rig this load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Remove canvas top and bows. Secure canvas top and bows on the generator trailer or coordinate other transportation for the canvas top and bows.
- Make sure the fuel tank is less than 3/4 full to prevent fuel from siphoning out at high altitudes.
- Tape or tie the light cable and air hoses firmly to the top of the trailer tongue frame.
- Engage the parking brakes.

### **Step 2. Rigging**

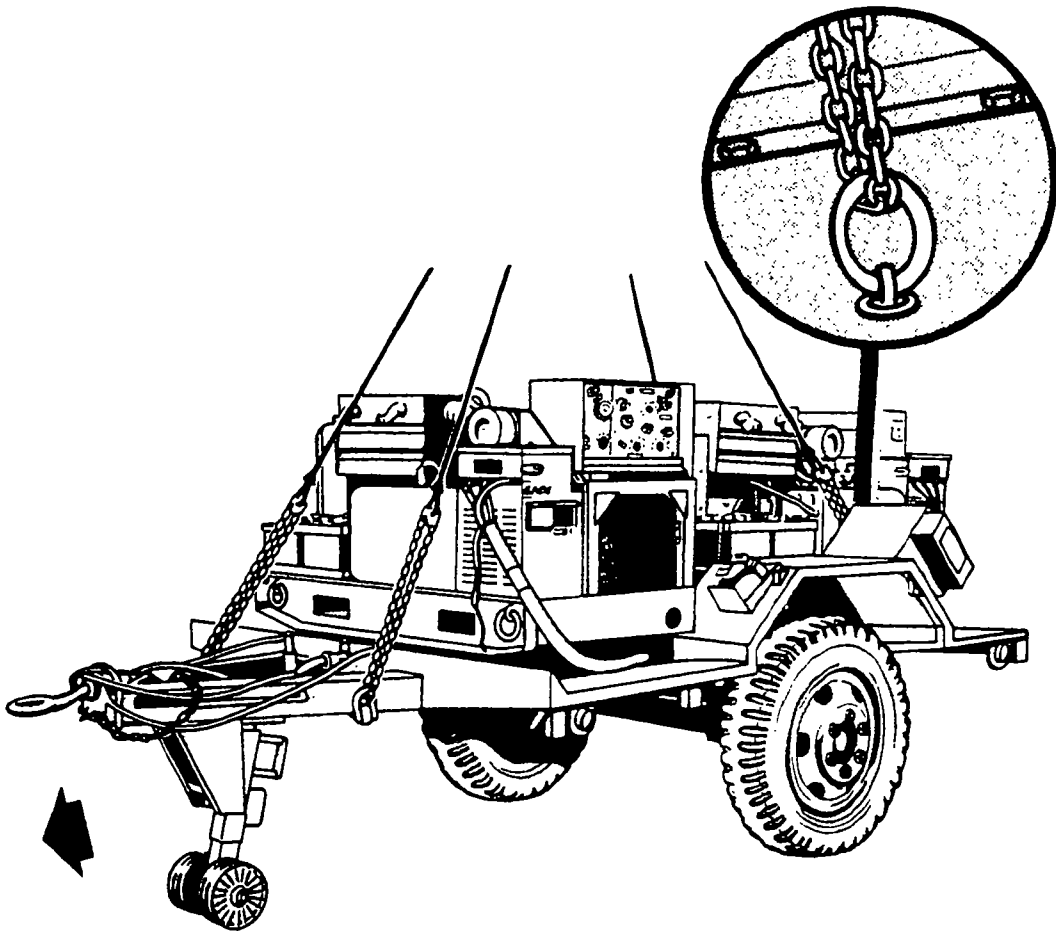
- Position apex fitting on top of the generator. Route the outer sling legs 1 and 2 to the front of the trailer and the inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located on the outboard side of the trailer tongue left frame and insert link 5 in the grabhook. Repeat with sling leg 2 on the right front lift provision.
- Loop the chain end of sling 3 through the left rear lift ring located above the trailer deck aft of the left wheel fender and insert link 10 in the grabhook. Repeat with sling leg 4 on the right rear lift provision. Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

The hookup team stands on the trailer deck. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-104. AN/MJQ-32 Power Plant AN/MJQ-33 Power Plant**

### **APPLICABILITY**

The AN/MJQ-32 is certified by the US Army NRDEC for the UH-60A and CH-47 helicopters at airspeeds up to and including 120 knots.

The AN/MJQ-33 is certified by the US Army NRDEC for the UH-60A and CH-47 helicopters at airspeeds up to and including 115 and 100 knots, respectively.

### **LOAD DESCRIPTION**

- AN/MJQ-32 power plant, 3kw, with acoustic suppression kit mounted on a M116A2 trailer chassis.
- Weight (including miscellaneous equipment): 3,160 pounds.
- AN/MJQ-33 power plant, 3kw, with acoustic suppression kit mounted on a M116A2 trailer chassis.
- Weight (including miscellaneous equipment): 3,160 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Padding, felt or suitable substitute.
- Tie-down strap, cargo, CGU-1/B, as required.

### **PERSONNEL**

Two persons can prepare and rig either generator in 20 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Engage both hand brakes.
- Secure safety chains and brake hose to trailer chassis with tape or nylon cord.
- Remove canvas tarpaulin and all bows from the trailer. Stow in their appropriate location and lash or tie them in place with nylon cord or tape.

- Stow any miscellaneous equipment (not to exceed 40 pounds in the case of the AN/MJQ-32 or 302 pounds in the case of the AN/MJQ-33) as closely to the center of gravity of the generator as possible. Make sure this equipment does not contact the slings or come loose during flight. Secure the equipment with tie-down straps or equivalent.
- Secure all lids, doors, and caps with nylon cord or tape.

## **Step 2. Rigging**

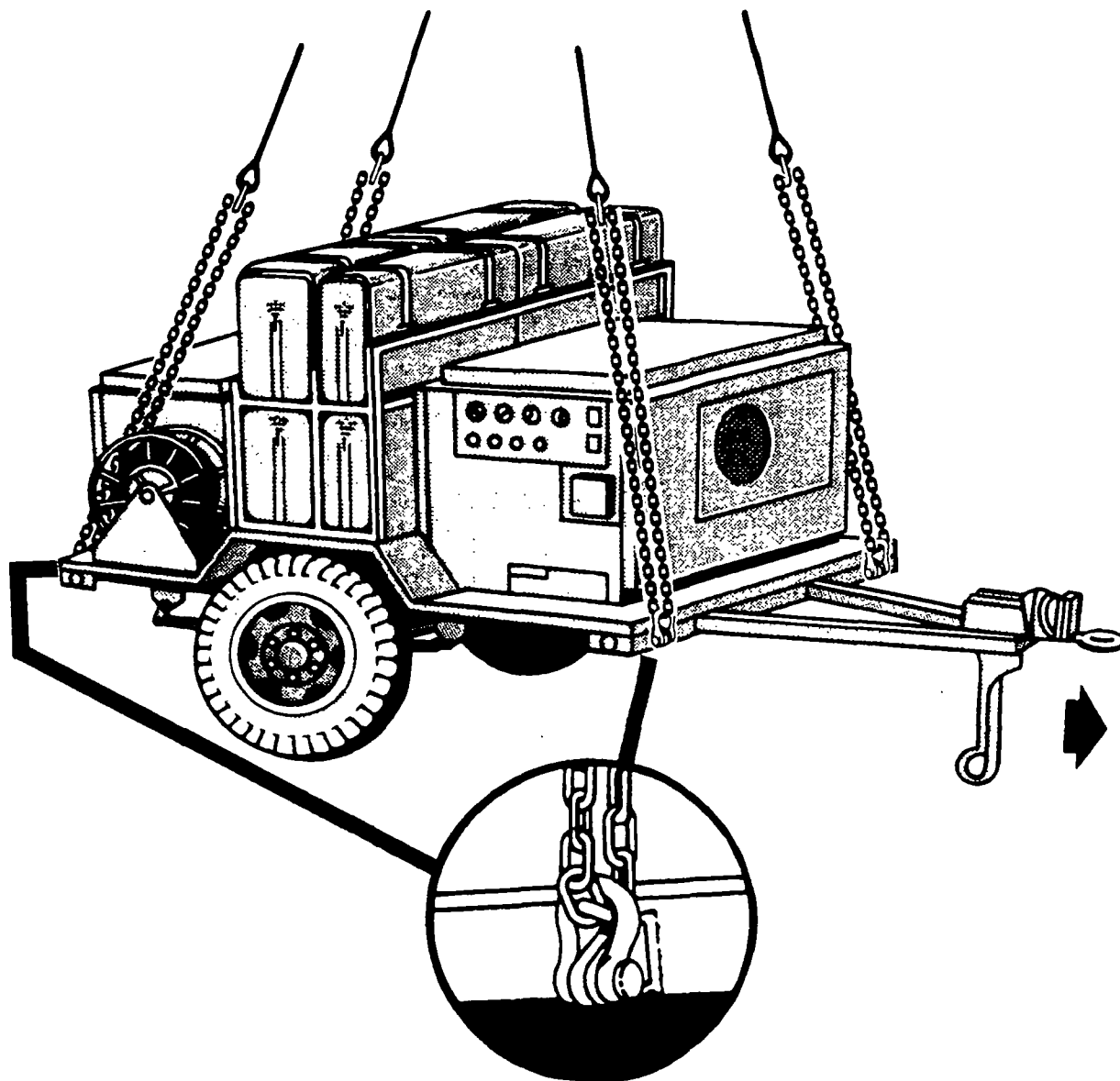
- Position apex fitting on top of the center section. Route outer sling legs 1 and 2 to the front of the trailer and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located on the left front corner of the trailer chassis frame and insert link 7 in the grabhook. Repeat with sling leg 2 and the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lift provision located on the left rear corner of the trailer chassis frame and insert link 3 in the grabhook. Repeat with sling leg 4 and the right rear lift provision.
- Secure all excess chain with tape or nylon cord.
- Wrap padding around the sling legs where they contact the generators and secure with nylon cord and tape.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the generators to prevent entanglement during hookup and lift-off.

## **Step 3. Hookup**

The hookup team stands on top of the forward generator. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the generator and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

## **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





**NOTE:** AN/MJQ-32 is illustrated. AN/MJQ-33 is similar.

## Figure 2-105. PU-751/M and PU-753/M Generator Sets

### APPLICABILITY

This load is certified by the US Army NRDEC for UH-60 and CH-47 helicopters at airspeeds up to and including 75 and 115 knots, respectively.

### LOAD DESCRIPTION

- PU-751/M generator set, 5kw, LIN G37273.

| VARIANTS                      | CURB WEIGHT<br>(pounds) | MAXIMUM<br>EAT WEIGHT<br>(pounds) |
|-------------------------------|-------------------------|-----------------------------------|
| LOS (V1) Trailer              | 2,772                   | 3,000                             |
| LOS (V3) Trailer              | 2,772                   | 3,000                             |
| LOS (V4) Trailer              | 2,772                   | 3,000                             |
| LOS (V2) Trailer              | 2,772                   | 3,000                             |
| Planning Trailer              | 2,531                   | 3,000                             |
| Radio Access Units<br>Trailer | 2,751                   | 3,000                             |

- PU-753/M generator set, 10kw, LIN G40744.

| VARIANTS                 | CURB WEIGHT<br>(pounds) | MAXIMUM<br>EAT WEIGHT<br>(pounds) |
|--------------------------|-------------------------|-----------------------------------|
| NC OPS Trailer           | 2,681                   | 3,000                             |
| SCC Tech Trailer         | 2,681                   | 3,000                             |
| NC MGMT Trailer)         | 2,681                   | 3,000                             |
| LEN MGMT Trailer)        | 2,681                   | 3,000                             |
| LEN OPS Trailer          | 2,759                   | 3,000                             |
| SEN (V1) Trailer         | 2,759                   | 3,000                             |
| SEN (V2) Trailer         | 2,759                   | 3,000                             |
| Maintenance 1<br>Trailer | 2,680                   | 3,000                             |

## **MATERIALS**

- Sling set (10,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

## **PERSONNEL**

One person can prepare and rig the load in 15 minutes.

## **PROCEDURES**

### **Step 1. Preparation**

- Partially retract all landing legs. Secure in position and tie with nylon cord.
- Retract lunette leg. Secure in position and tie with nylon cord.
- Engage both hand brakes.
- Tie off safety chains and brake hose with nylon cord.
- Secure all lids, doors, and caps with nylon cord or tape.

### **Step 2. Rigging**

- Position apex fitting on top of the generator set. Route outer sling legs 1 and 2 between the two front bows to the front of the generator and the inner sling legs 3 and 4 between the two rear bows to the rear of the generator. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located on the left front corner of the trailer and insert link 3 in the grabhook. Repeat with sling leg 2 on the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lift provision located on the left rear corner of the trailer chassis and insert link 40 in the grabhook. Repeat with sling leg 4 on the right rear lift provision. Secure excess chain with tape or nylon cord.
- Make sure sling leg 1 does not become snagged on the cable reel handle during hookup. Tape the sling leg to the bow of the trailer.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the generator to prevent entanglement during hookup and lift-off.

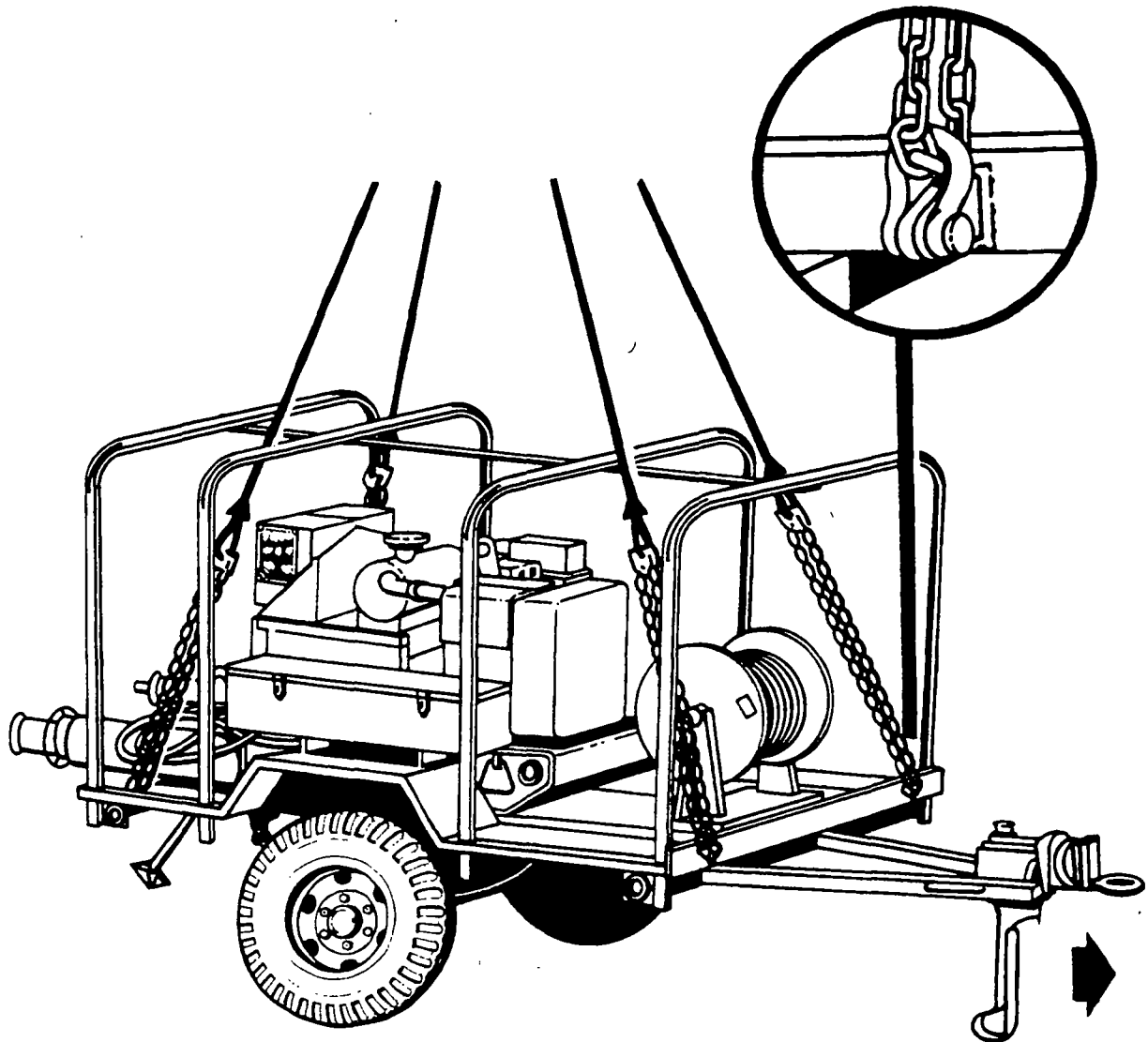
### **Step 3. Hookup**

The hookup team stands on the fender of the trailer. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured,

the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

#### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## Figure 2-106. M353 Trailer Chassis with Generator Sets

### APPLICABILITY

The generator sets identified below are certified by US Army NRDEC for CH-53A/D/E helicopters at airspeeds up to and including 120 knots. The generator sets listed are suitable for CH-47 and CH-54 helicopters at airspeeds up to and including 100 knots.

### LOAD DESCRIPTION

- Chassis, trailer, M353, 3 1/2-ton:
  - TAMCN D0080, NSN 2330-00-542-2831 or LIN E02670.
  - Weight: 2,720 pounds.
- Generator sets mounted on M353 trailer chassis:

| GENERATOR SETS | LIN    | TAMCN | NSN              | WEIGHT<br>(pounds) |
|----------------|--------|-------|------------------|--------------------|
| MEP-005A       | J36109 | B0953 | 6115-00-118-1240 | 6,220              |
| MEP-006A       | J38301 | B1021 | 6115-00-118-1243 | 7,720              |
| MEP-114A       | J36725 | B0971 | 6115-00-118-1248 | 6,220              |
| MEP-115A       | J38506 | B1016 | 6115-00-118-1253 | 6,320              |

### MATERIALS

- Sling set (10,000-pound capacity), or multileg sling set (15,000-pound capacity), or sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### PERSONNEL

Two persons can prepare and rig this load in 10 minutes.

### PROCEDURES

#### Step 1. Preparation

- Engage both hand brakes.
- Secure safety chains and brake hoses with tape or nylon cord.
- Secure all lids, doors, and caps with tape or nylon cord.

## **Step 2. Rigging**

**NOTE:** Chain link number inside parentheses is used for the 40,000-pound capacity sling set.

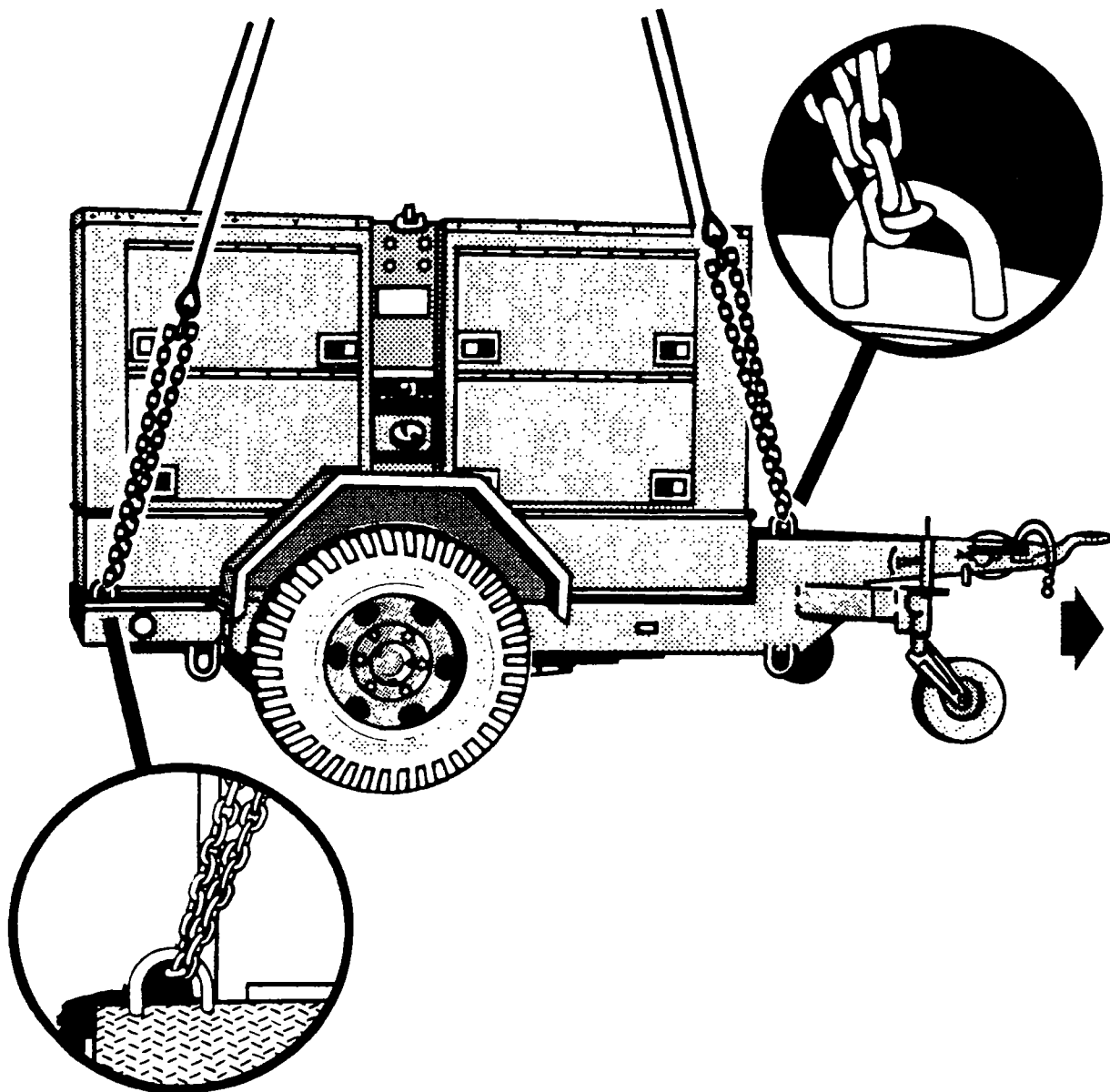
- Position apex fitting/web ring on top of the generator. Route outer sling legs 1 and 2 to the front of the trailer and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision on the trailer frame at the front end of the generator and insert link 20 (20) in the grabhook. Repeat with sling leg 2 and the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lift provision on the trailer frame near the rear end of the trailer and insert link 3 (9) in the grabhook. Repeat with sling leg 4 and the right rear lift provision.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the generator to prevent entanglement during hookup and lift-off. Make sure the sling legs are on the sides of the generator and not up over the end of the generator.

## **Step 3. Hookup**

The hookup team stands on top of the generator. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the generator and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

## **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **\*Figure 2-107. Skid-Mounted Generator Sets**

### **APPLICABILITY**

The following generator sets are certified by the US Army NRDEC for the identified helicopters up to the airspeeds denoted below.

### **LOAD DESCRIPTION**

- MEP-004AAS with acoustic suppression kit, 15kw:
  - LIN: J35835.
  - Weight: 4,031 pounds.
  - Type helicopter: UH-60 and CH-47.
  - Airspeed: 40 and 65 knots, respectively.
- MEP-005AAS with acoustic suppression kit, 30kw:
  - LIN: J36109.
  - Weight: 4,556 pounds
  - Type helicopter: UH-60 and CH-47.
  - Airspeed: 65 and 70 knots, respectively.
- MEP-103A with acoustic suppression kit, 15kw:
  - LIN: J35869.
  - Weight: 4,230 pounds.
  - Type helicopter: UH-60 and CH-47.
  - Airspeed: 40 and 65 knots, respectively.
- MEP-104A with acoustic suppression kit, 30kw:
  - LIN: J36304.
  - Weight: 4,830 pounds.
  - Type helicopter: UH-60 and CH-47.
  - Airspeed: 40 and 65 knots, respectively.

- MEP-113A with acoustic suppression kit, 15kw:
  - LIN: J36006.
  - Weight: 4,230 pounds.
  - Type helicopter: UH-60 and CH-47.
  - Airspeed: 40 and 65 knots, respectively.
- MEP-114A with acoustic suppression kit, 30kw:
  - LIN: J36725.
  - Weight: 4,830 pounds.
  - Type helicopter: UH-60 and CH-47.
  - Airspeed: 40 and 65 knots, respectively.

## **MATERIALS**

- Sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tie-down strap, cargo, CGU-1/B (5,000-pound capacity) (4 each).
- Padding, felt material or suitable substitute.

## **PERSONNEL**

Two persons can prepare and rig this load in 10 minutes.

## **PROCEDURES**

### **Step 1. Preparation**

- Position the forks so that they are sitting on the travel blocks and tilted all the way aft.
- Using two tie-down straps, make a large single loop and secure both rear access doors longitudinally.
- Using the other two tie-down straps, secure both engine access doors.
- Secure the toolbox lid closed using nylon cord or tape.

### **Step 2. Rigging**

- Position apex fitting on top of the ROPS. Route outer sling legs (1 and 2) to the front of the forklift and inner sling legs (3 and 4) to the rear. Sling legs 1 and 3 must be on the left side of the load.



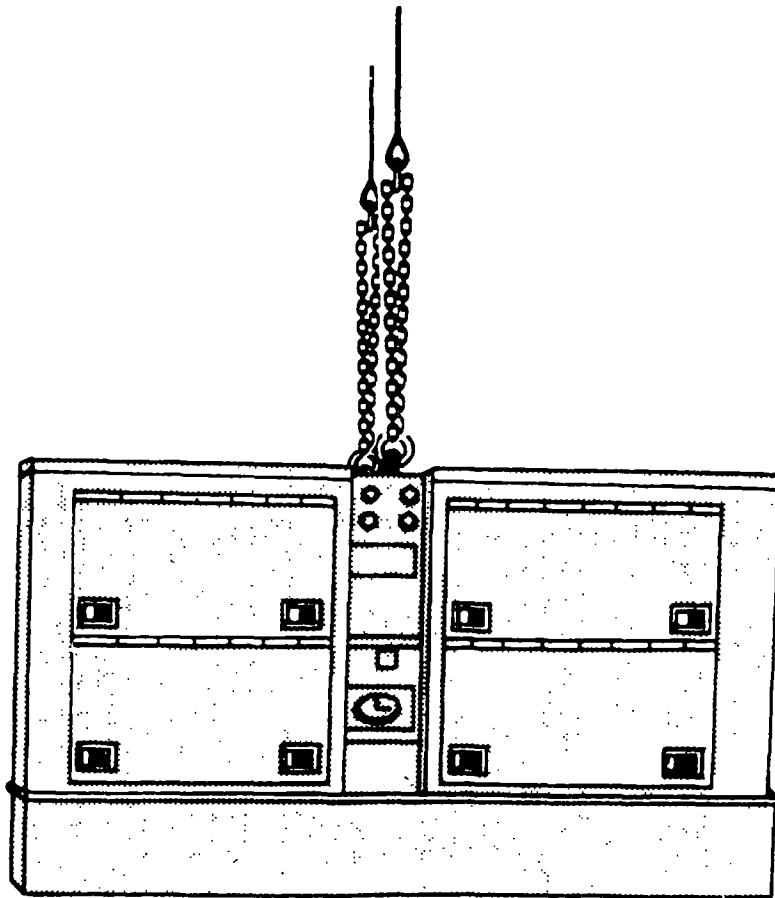
- Loop the chain end of sling leg 1 through the left front lift provision mounted on the frame inboard of the left front tire and insert link 3 in the grab link. Repeat with sling leg 2 and the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lift provision located on the frame aft of the left rear tire and insert link 16 in grab link. Repeat with sling leg 4 and the right rear lift provision.
- Lift the sling leg and tie or tape (breakaway technique) the grabhooks to the ROPS. Cluster and tie or tape (breakaway technique) all sling legs together on top of the forklift to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on the engine deck or ROPS. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the forklift and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## MISCELLANEOUS EQUIPMENT

\*The certified single-point rigging procedures for miscellaneous equipment are in this section. Figures 2-108 through 2-110 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

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### Figure 2-108. Forward Area Refueling Equipment (FARE)

#### APPLICABILITY

This load is certified by the US Army NRDEC for the UH-60 and CH-47 helicopter at airspeeds up to and including 60 and 100 knots, respectively.

#### LOAD DESCRIPTION

- Forward area refueling equipment (FARE) consisting of the following:
  - Generator, 1.5kw.
  - Hoses, fuel with reels (2 each).
  - Hoses, fuel with carrying bags (2 each).
  - Assembly, pump.
  - Extinguishers, fire (3 each).
- LIN H94824; Weight: 820 pounds.

#### MATERIALS

- Net, helicopter, cargo-carrying, external (5,000-pound capacity).
- Webbing, nylon, tubular, 1/2-inch, 1,000-pound breaking strength.
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.

#### PERSONNEL

Two persons can prepare and rig this load in 15 minutes.

#### PROCEDURES

##### Step 1. Preparation

- Secure two fire extinguishers to the inside frame of fuel hose reels with 1/2-inch tubular nylon webbing. Secure the two fuel hose reels together with nylon cord.

- Spread a 5,000-pound capacity net on the ground. Center the two fuel hose reels on the net. Place pump assembly on either side of reels. Place a 1.5kw generator, with 5-gallon gas can attached, on the opposite side of reels. Place fuel hose carrying bags in front of reels. Secure the two carrying bags with the remaining fire extinguisher together with nylon cord. Secure net carrying bag to top of reels.

#### **Step 2. Rigging**

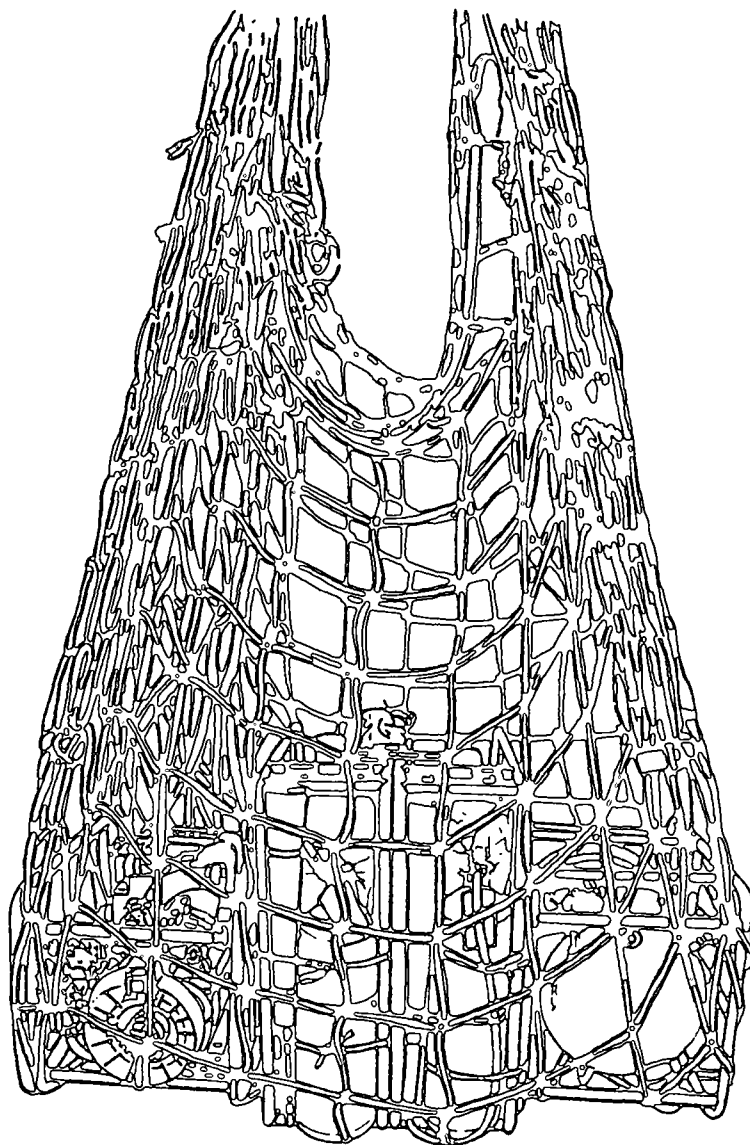
Rig the cargo net according to instructions in Chapter 1.

#### **Step 3. Hookup**

The hookup team stands beside the load. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then quickly exits the area underneath the helicopter to the designated rendezvous point.

#### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## Figure 2-109. Fire Extinguisher, Dry Chemical

### APPLICABILITY

This load is certified by the US Army NRDEC for CH-46 helicopters at airspeeds up to and including 100 knots.

### LOAD DESCRIPTION

- Fire extinguisher, dry chemical, self-contained, TAMCN C4765, NSN 4210-01-205-2246.
- Weight: 3,000 pounds.

### MATERIALS

- Sling set, multileg (15,000-pound capacity) or sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### PERSONNEL

Two persons can prepare and rig this load in 10 minutes.

### PROCEDURES

#### Step 1. Preparation

- Prevent hose reel from turning and tie nozzle to frame.
- Secure or remove all loose attachments. Tape all glass including gages.

#### Step 2. Rigging

**NOTE:** Hose reel is the aft end of the load.

**NOTE:** Both sling sets use the same chain link count for this load.

- Position apex fitting/web ring on top of the fire extinguisher. Route outer sling legs 1 and 2 to the front of the fire extinguisher and inner sling legs 3 and 4 to the rear end (hose reel). Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located at the top corner of the frame near the pressure vessel. Insert link 5 in the grab link. Repeat with sling leg 2 and the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lift provision located at the top corner of the frame near the hose reel. Insert link 5 in the grab link. Repeat with sling leg 4 and the right rear lift provision.

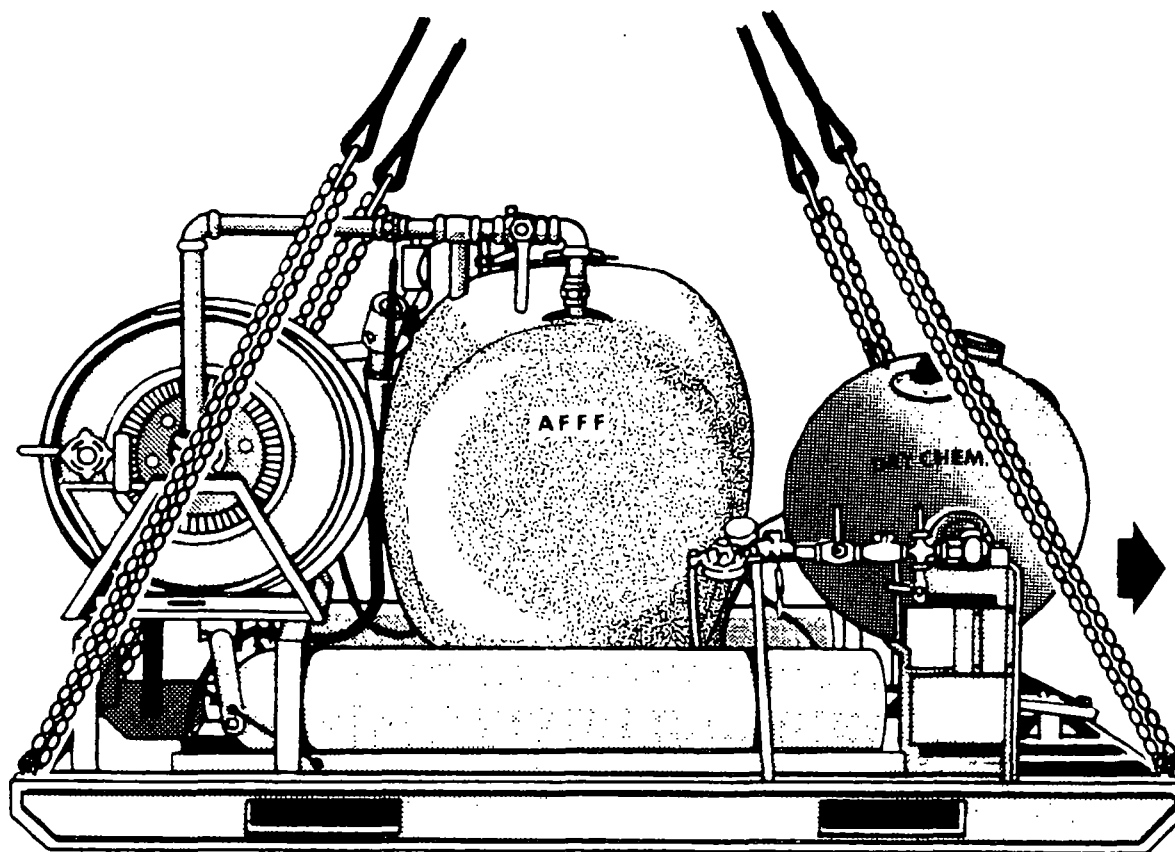
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the fire extinguisher to prevent entanglement during hookup and lift-off. Pay close attention to the pipes and valves.

### Step 3. Hookup

The hookup team stands beside the fire extinguisher. The static wand person discharges the static electricity with the static wand. The hookup person places the web ring/apex fitting onto the aircraft cargo hook. The hookup team remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-110. Rigid Raiding Craft**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-46 helicopters at airspeeds up to and including 75 knots.

### **LOAD DESCRIPTION**

- Rigid raiding craft, boat, fiberglass, 18-foot TAMCN C5902, NSN1940-01-277-0069.
- Weight: 3,200 pounds.

### **MATERIALS**

- Sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig this load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Tighten all straps on the anchor, paddles, cushions, and loose equipment.
- Stow the boat utility bags in the console. Remove the anchor chain and line and stow in the console. Protect the battery from the chain.
- Secure the console hatch with tape. Secure the anchor to the deck and secure the loose end of the anchor.
- Secure the running lights to an inner handrail with tape or nylon cord.
- Secure the base of the outboard motors tightly to the bar directly above with nylon cord.
- Tape the compass glass on top of the console.

#### **Step 2. Rigging**

- Position apex fitting on top of the boat. Route outer sling legs 1 and 2 to the front (bow) of the boat and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift ring on the inside of the hull and insert link 5 in the grab link. Repeat with sling leg 2 and the right front lift ring.

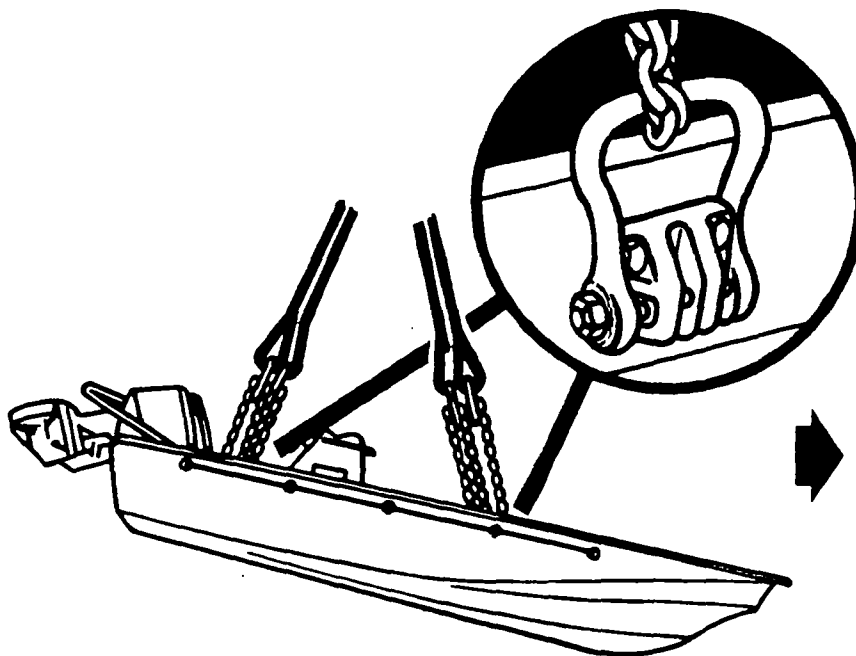
- Loop the chain end of sling leg 3 through the left rear lift ring on the inside of the hull and insert link 10 in the grab link. Repeat with sling leg 4 and the right rear lift ring. Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the boat to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands beside the boat. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## **EXTENDED SLING LOAD SYSTEM**

\*The extended sling system improves tactical efficiency and preserves the integrity of the crew and the sling load (for example, a howitzer, ammunition, and assigned gun crew). This system eliminates the need for a static discharge person because the aircraft lands. Also, all of the equipment, crew, and accompanying ammunition can be transported in one lift. The certified single-point rigging procedures for the extended sling load system are in this section. Figure 2-111 gives detailed instructions for rigging loads. The figure also contains a description of each load and the materials required for rigging it.

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### **Figure 2-111. M102 105-mm Howitzer with One A-22 Cargo Bag**

#### **APPLICABILITY**

This load is suitable for the UH-60 and CH-47 helicopters.

#### **LOAD DESCRIPTION**

- Howitzer, towed, light, 105-mm, M102, LIN K57392.
- Bag, cargo, aerial delivery, Type A-22 (2,200-pound maximum capacity).
- Weight:
  - Howitzer, 3,160 pounds.
  - Accompanying load, 2,220 pounds.
  - Total, 5,380 pounds.

#### **MATERIALS**

- Sling set (10,000-pound capacity).
- Apex fitting (10,000-pound capacity) (1 additional).
- Sling leg and chain assembly from 25,000-pound sling set (6,250-pound capacity).
- Clevis, assembly, large, part no. MS70087-3.
- Tie-down strap, cargo, CGU-1/B.
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

#### **PERSONNEL**

Two persons can prepare and rig this load in 30 minutes.

## PROCEDURES

### Step 1. Preparation

- Rig A-22 cargo bag according to instructions in Chapter 1.
- Secure all covers on howitzer with nylon cord.
- Place section equipment chest on end of trails and secure with tie-town strap.

### Step 2. Rigging

- Rig the M102 howitzer according to instructions in Figure 2-27.
- Extended sling system.
  - Connect additional apex fitting to the single sling leg and chain assembly (6,250-pound capacity) from a 25,000-pound sling set. This sling leg will be the extended sling leg riser (pendant) between the cargo hook and the rigged sling set.

#### WARNING:

**Do not use a sling leg and chain assembly (2,600-pound capacity) from a 10,000-pound sling set for the extended sling leg riser because the load exceeds its capacity. Failure to follow these instructions may result in loss of load.**

- Route the chain end of the 6,250-pound capacity extended sling leg riser around the pin of the apex fitting of the sling set used to rig the load. Wrap the chain around the pin two or three turns so the chain will not slide back and forth on the apex fitting pin. Insert link 3 in the grabhook.
- Secure the chain onto the apex fitting pin by tying the chain links together with cotton webbing. This ensures the chain will not slip off the pin over the edge of the apex fitting and cause damage to the apex fitting.
- Proper use of the breakaway technique is important to prevent the sling legs from entangling on the howitzer as the helicopter hovers upward. Tape or tie (breakaway technique):
  - – Forward sling leg at three evenly spaced intervals from lift provision to top of the barrel even with tires.
  - – Each rear sling leg to the trails, then secured together at the breech and on top of the barrel.
  - – All three sling legs together where they meet on top of the barrel and then secured to the outside of the left wheel assembly.

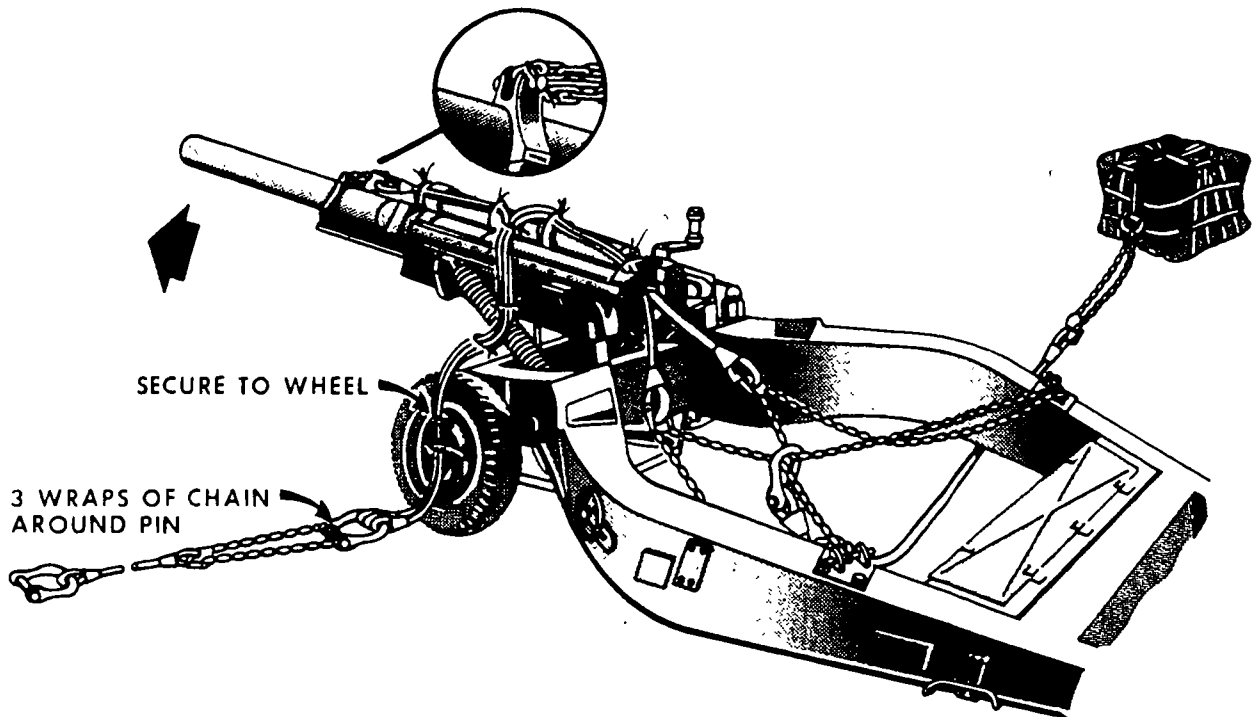
### Step 3. Hookup

- Position the load down slope of the aircraft landing point so the aircraft rotor blades will not strike the load.

- Secure the apex fitting of the extended sling leg riser with a sand bag or equivalent to prevent the aircraft rotor wash from blowing it around causing damage to aircraft.
- Hookup person kneels next to the howitzer tire. After the helicopter lands, wait for the aircrew member to signal the hookup person to crawl under the aircraft and place the apex fitting onto the aircraft cargo hook. The aircrew member will check for proper hookup through the cargo hook opening.
- After hookup, the ground crew boards the aircraft. The aircrew member watches the load during lift-off.

#### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## CHAPTER 3

### SUITABLE SINGLE-POINT LOAD RIGGING PROCEDURES

This chapter contains rigging procedures for loads that have not been certified but have been evaluated and demonstrated acceptable static lift and flight characteristics during a flight test by the US Army TEXCOM Airborne and Special Operations Test Board. In most cases, the lifting provisions have not been tested according to MIL-STD-209G. These loads are identified by the word "suitable" in the applicability paragraph. When the rigging procedures for these loads are certified, they will be moved to the certified chapter as the manual is updated. Each rigging procedure is found in a figure which includes a description of the load, materials required for rigging, and steps to complete the procedure.

#### WHEELED VEHICLES

\*The suitable single-point rigging procedures for wheeled vehicles are in this section. Figures 3-1 through 3-9 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

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#### Figure 3-1. M274 Truck, Platform, Utility (Mule), with M29A1 Mortar

##### APPLICABILITY

This load is suitable for the UH-1 or CH-47 helicopter at airspeeds of 80 knots.

##### LOAD DESCRIPTION

- Truck, platform, utility, M274, LIN X55627.
- Mortar, 81-mm, M29A1, LIN M68008.
- \*Weight:
- Truck with equipment, 980 pounds.
- Mortar, 240 pounds.
- Total, 1,220 pounds.

\*These procedures apply to trucks with or without cargo. If cargo is carried in the truck, it does not exceed 1,000 pounds.

## **MATERIALS**

- Sling set (10,000-pound capacity).
- Webbing, nylon, 1/2-inch tubular, 1,000-pound breaking strength, approximately 30 feet.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.

## **PERSONNEL**

One person can prepare and rig this load in 15 minutes.

## **PROCEDURES**

### **Step 1. Preparation**

- Place mortar components in carrying cases and position on truck as follows:
  - Right front - bipod, barrel, aiming post, cleaning staff, camouflage net poles, and aiming circle tripod.
  - Behind seat - 5-gallon water can, 5-gallon fuel can, night light, M134 sight, and M11 decon apparatus.
  - Center aft - baseplate with camouflage net on top.
- Secure items in right front of truck to rail with tubular nylon webbing attached around side rail of truck. Loop around rail toward end and near center of truck. Do not tie webbing directly above wheels, as the sling chains will pass through this area.
- Secure items behind seat with tubular nylon and webbing. Loop webbing through carrying handles of night light and sight cases and secure webbing to floor of foot rest.
- Place baseplate under camouflage net and secure with webbing to side rails. Secure load at both forward and aft ends.
- Tie the steering wheel with nylon cord and engage the hand brake.
- Place all wheel lifting provisions in the up position.

### **Step 2. Rigging**

- Position apex fitting on the camouflage net. Route outer sling legs (1 and 2) to the front of the truck and inner sling legs (3 and 4) to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of each sling leg down through the inside rail of the side of the truck, through the wheel lift provision, back up through the inside of the rail, and insert link 3 in the grabhook.
- Pull each chain leg by the grabhook until it is centered in the lifting provision. Tie the chain to the rail with cotton webbing so that it cannot become entangled under the lifting provision.

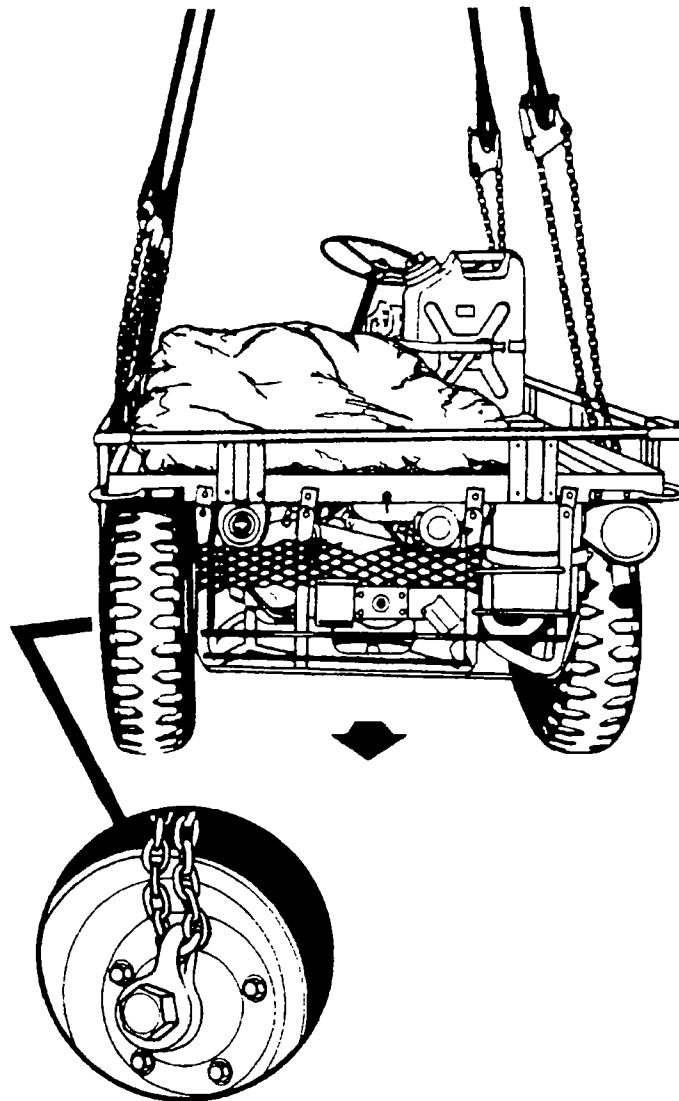
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on the floor of the truck to the rear of the camouflage net. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the truck and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 3-2. Two M274 Trucks, Platform, Utility (Mule), with or without Accompanying Load**

### **APPLICABILITY**

This load is suitable for the UH-1 or CH-47 helicopter at airspeeds of 80 knots. Check with UH-1 unit to determine maximum load that can be transported.

### **LOAD DESCRIPTION**

- Truck, platform, utility, M274, LIN X55627 (2 each).
- \*Weight:
  - Two trucks, 1,860 pounds.
  - Accompanying load, 1,000 pounds each truck.
  - Total, 3,860 pounds.

\*These procedures apply to trucks with or without accompanying loads, not to exceed 1,000 pounds of accompanying load per truck.

### **MATERIALS**

- Sling set (10,000-pound capacity) with two sling leg assemblies (2,500-pound capacity) from a 10,000-pound sling set.
- Webbing, nylon, 1/2-inch tubular, 1,000-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.

### **PERSONNEL**

Two men can prepare and rig the load in 10 minutes; allow an additional 15 minutes for accompanying load.

### **PROCEDURES**

#### **Step 1. Preparation**

- Configure a six-leg sling set.
- Park trucks side by side facing in opposite directions with steering wheels to the outside and lift provisions turned up.
- Secure accompanying loads with nylon webbing, if applicable.
- Secure each steering wheel with nylon cord. Engage both parking brakes.

#### **Step 2. Rigging**

**NOTE:** Two trucks are rigged to fly sideways.



- Position apex fitting on top of the two trucks. Route outer sling legs 1 and 2 to the outside of the left truck, inner sling legs 3 and 4 to the outside of the right truck and innermost sling legs 5 and 6 to the center of the two trucks. Sling legs 1, 3, and 5 should be on the same side of the load.
- Loop the chain end of sling leg 1 through the inside of the left truck outer rail, through the lift provision on the wheel, back up through the rails and insert link 3 in the grabhook. Repeat with sling leg 2 on the other wheel.
- Repeat the previous step using sling legs 3 and 4 on the lift provisions of the right truck.
- Pull each chain leg by its grabhook so that it is centered in the lift provision. Tie the chain to the rail with cotton webbing so that it will not become entangled under the lift provisions.
- Loop the chain end of sling leg 5 between the inner rails of the two trucks, through the lift provisions of one truck, over, to and through the lift provision of the other truck, and insert link 15 in the grabhook. Repeat with sling leg 6 on the other two inner wheels.
- Pull the chains of sling legs 5 and 6 up by their grabhooks so that they are centered. Manhandle the trucks as close together as possible and repeat this procedure. Tie or tape (breakaway technique) these chains to the rails so they will not become entangled under the lift provisions.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

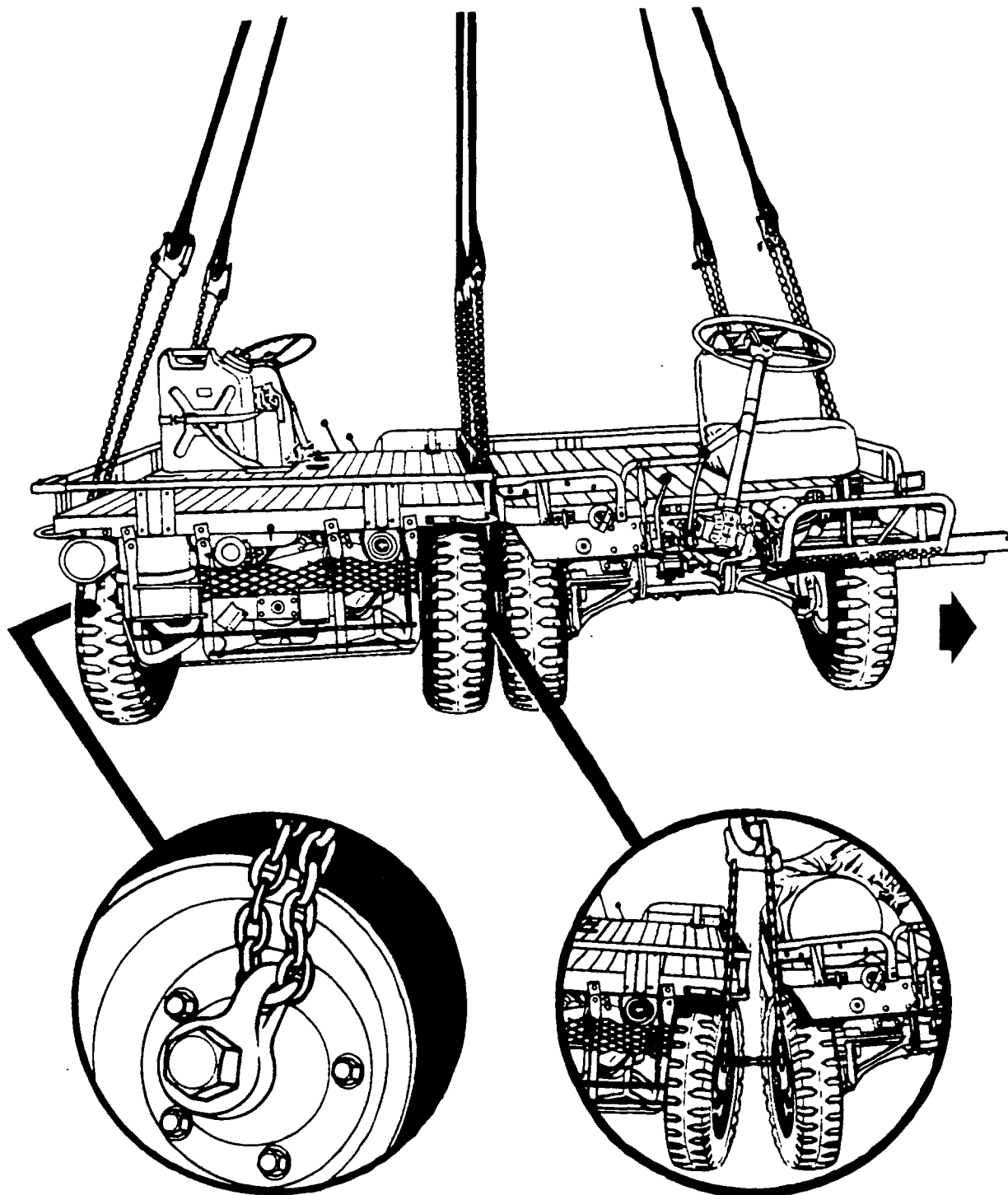
### **Step 3. Hookup**

**NOTE:** The two trucks are rigged to fly sideways.

The hookup team stands on top of the trucks. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trucks and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures steps 1 and 2.



## **Figure 3-3. M561 1 1/4-Ton Truck (Gamma Goat)**

### **APPLICABILITY**

This load is suitable for the CH-47 helicopter at airspeeds of 80 knots.

### **LOAD DESCRIPTION**

- Truck, 1 1/4-ton, M561, Gamma Goat, LIN X39940.
- Weight: 7,480 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity) with two additional sling leg assemblies (2,500-pound capacity) from a 10,000-pound sling set.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.

### **PERSONNEL**

Two men can prepare and rig the load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Remove tarps from the cargo compartment and the cab. Remove windshield and bows. Secure all equipment inside the cargo compartment.
- Secure engine hood. Check batteries and seats for security.
- Place the transmission in neutral and engage the parking brake.

#### **Step 2. Rigging**

- Add the two additional sling legs to the apex fitting to configure a six-legged sling set.
- Position apex fitting on top of the center of the truck. Route outer sling legs 1 and 2 to the front of the truck, inner sling legs 3 and 4 to the rear, and innermost sling legs 5 and 6 to the middle. Sling legs 1, 3 and 5 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision on front of the cab and insert link 5 in the grabhook. Repeat with sling leg 2 on the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lift provision on the aft left corner of the cargo compartment and insert link 5 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.

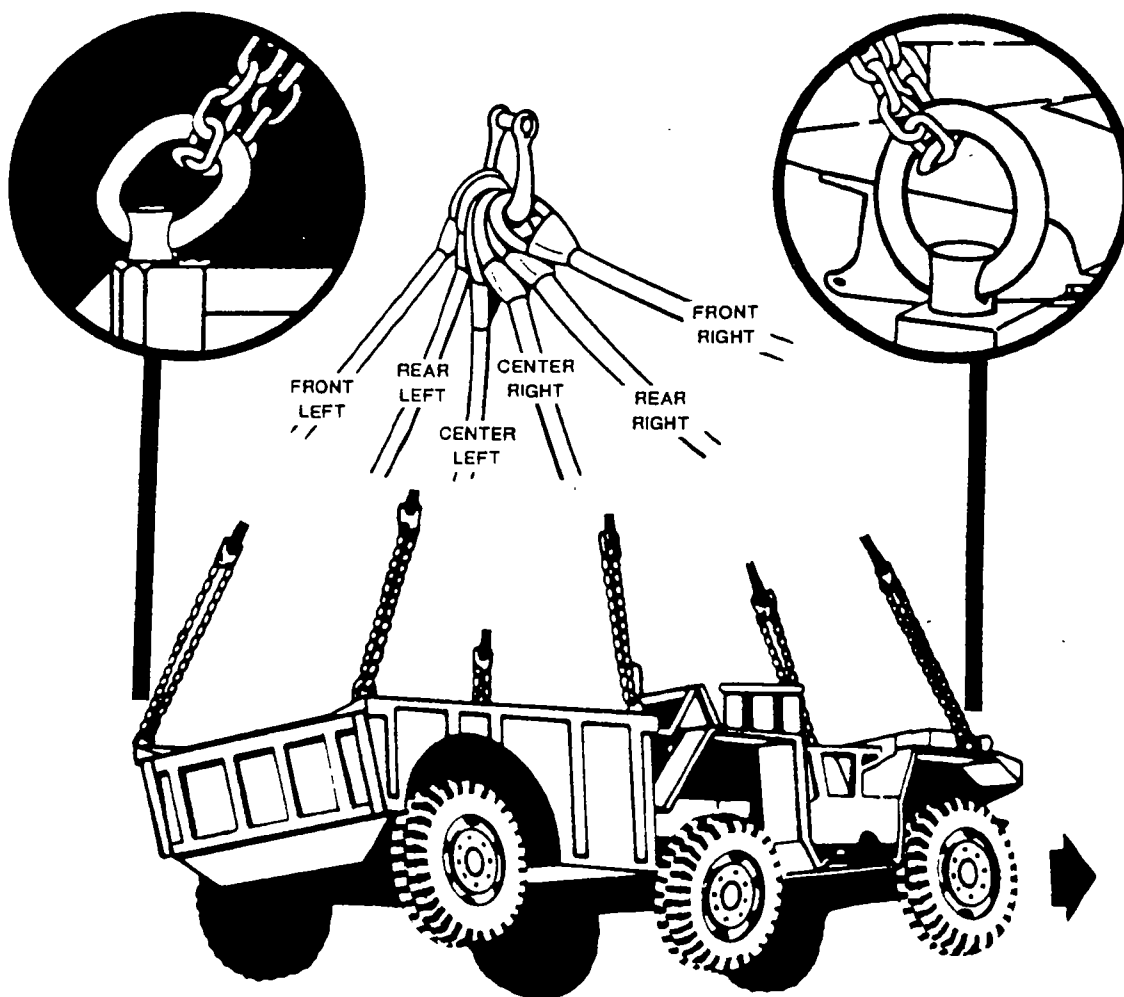
- Loop the chain end of sling leg 5 through the middle lift provision on the forward end of the cargo compartment and insert link 90 in the grabhook. Repeat with sling leg 4 on the middle lift provision on the right side. Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.
- If the truss kit is installed on the truck, a four-legged sling can be used to rig the M561.
  - Route outer sling legs 1 and 2 to the front of the truck and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side.
  - Loop the chain end of each sling leg through their respective lifting rings mounted on the vehicle corners and insert link 3 in the grabhook.
  - Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

The hookup team stands in the cargo compartment. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the truck and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 3-4. M561 1 1/4-Ton Truck with AN/GRC-122 Radio Teletypewriter Set in S318/G Shelter**

### **APPLICABILITY**

This load is suitable for the CH-47 or CH-54 helicopter at airspeeds of 90 knots.

### **LOAD DESCRIPTION**

- Truck, cargo, 1 1/4-ton, M561 (Gamma Goat), LIN X39940; weight: 7,480 pounds.
- Shelter, S318/G; weight: 418 pounds.
- Radio teletypewriter set, AN/GRC-122, mounted in shelter, LIN Q90100; weight: 1,832 pounds.
- Total weight: 9,730 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tie-down strap, cargo, CGU-1/B, (4 each).

### **PERSONNEL**

Three men can prepare and rig the load in 30 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Remove cab canvas. Remove windshield and bows. Secure all loose equipment.
- Secure engine hood. Check batteries and seats for security.
- Install truss kit on truck.
- Secure shelter to truck with blocking and tie-down kit or tie-down straps. If tie-down straps are used, anchor the forward top corner of the shelter to the aft tie-down/lift ring on the truck and the aft top corner of the shelter to the forward tie-down/lift ring of the cargo compartment so that the straps form an "X" on the side of the load. Wire rope assemblies designed for the M37B1 3/4-ton truck with shelter will not be used. Secure all equipment inside shelter with tape or nylon cord. Close and secure the door.

### **Step 2. Rigging**

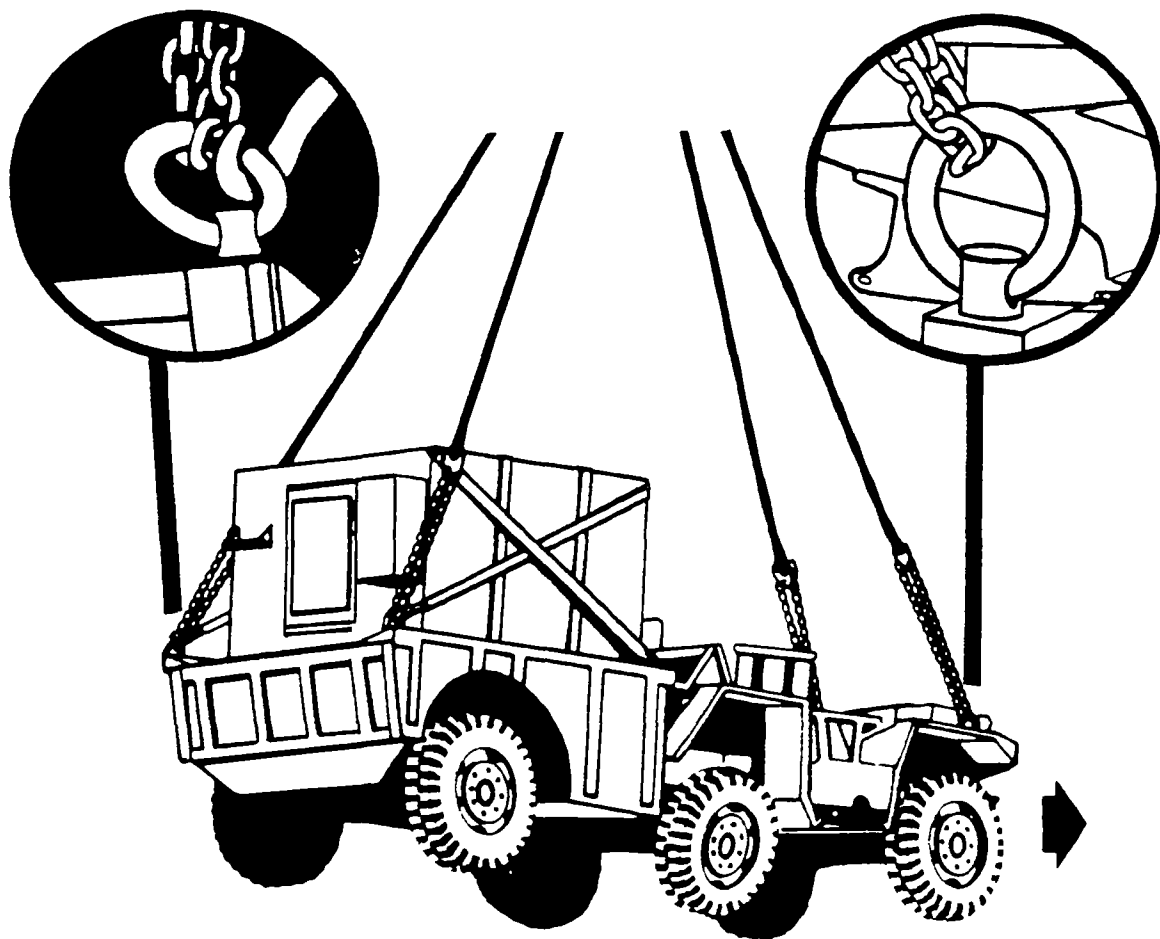
- Position apex fitting on top of the shelter. Route outer sling legs 1 and 2 to the front of the truck and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift ring on the left front corner of the cab and insert link 3 in the grabhook. Repeat with sling leg 2 on the right front lift ring.
- Loop the chain end of sling leg 3 through the left rear lift ring on the left aft corner of the cargo compartment and insert link 3 in the grabhook. Repeat with sling leg 4 on the right rear lift ring.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off. Make sure rear sling legs go around the sides of the shelter and not over the back end.

### **Step 3. Hookup**

The hookup team stands on the shelter or truck engine area. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the truck and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## **Figure 3-5. M342A2 2 1/2-Ton Dump Truck with Winch**

NOT CURRENTLY APPROVED FOR LIFT WITH ORIGINAL LIFT  
PROVISIONS

### **APPLICABILITY**

This load is suitable for the CH-47 or CH-54 helicopter at airspeeds of 85 knots.

### **LOAD DESCRIPTION**

- Truck, dump, 2 1/2-ton, M342A2, LIN X43434.
- Weight: 15,770 pounds empty.

### **MATERIALS**

- Sling set (25,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.

### **PERSONNEL**

One person can prepare and rig the load (after modification to the bed) in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Modify cargo bed. Secure bed in down position.
- Place transmission in neutral. Engage hand brake.
- Secure steering wheel and doors with nylon cord.
- Tape windshield wipers to windshield.
- Tie hood down with nylon cord routed through grill and hood latch brackets.

#### **Step 2. Rigging**

- Position the apex fitting on top of the forward end of the dump box. Route outer sling legs 1 and 2 to the front of the vehicle and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the front left lift provision on the left side of the front bumper of vehicle and insert link 3 in the grabhook. Repeat with sling leg 2 on right front lift provision.
- Loop the chain end of sling leg 3 through the left hole in floor of cargo bed, under the lifting pin on the spring shackle between the wheels, back up through the hole, and insert

link 30 in the grabhook. Repeat with sling leg 4 on right side of the cargo bed. Secure excess chain with tape or nylon cord.

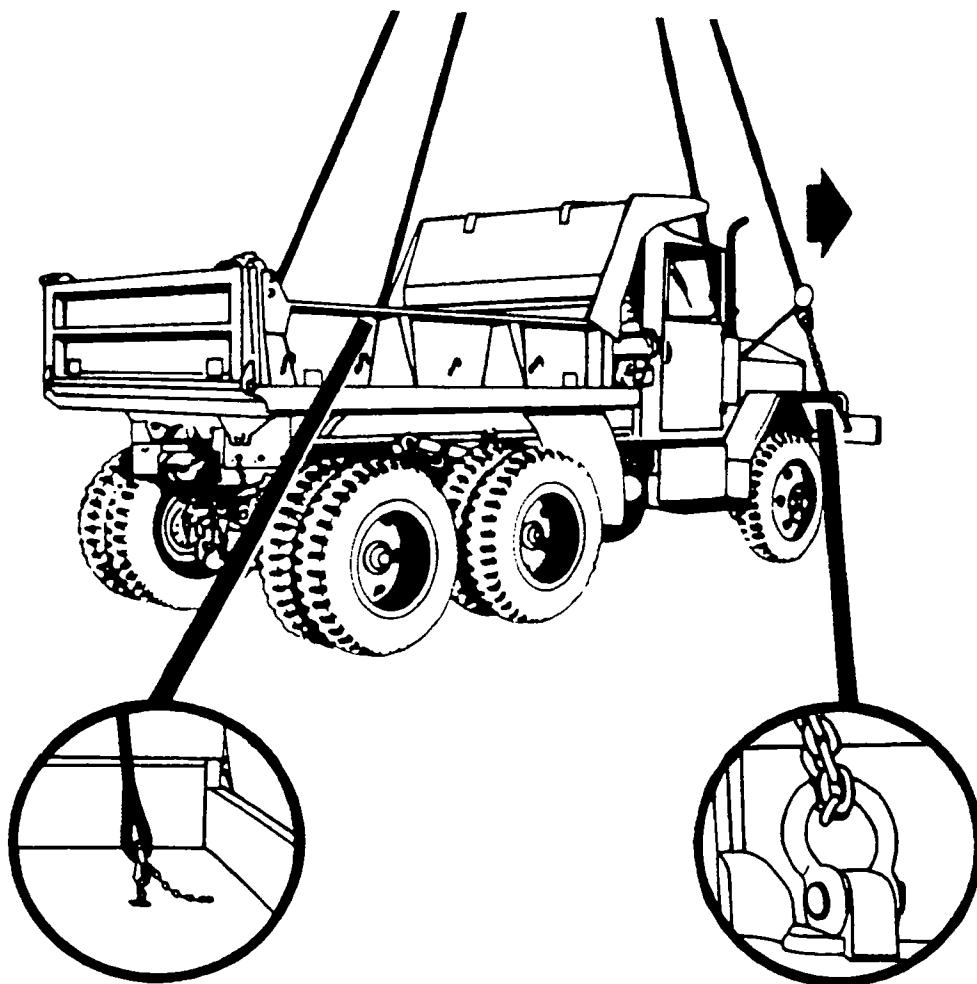
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the truck to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

Hookup team stands in cargo bed of truck. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the truck and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 3-6. M35A1/2 2 1/2-Ton Cargo Truck with Winch**

NOT CURRENTLY APPROVED FOR LIFT WITH ORIGINAL LIFT  
PROVISIONS

### **APPLICABILITY**

This load is suitable for the CH-47 or CH-54 helicopter at airspeeds of 90 knots.

### **LOAD DESCRIPTION**

- Truck, cargo, 2 1/2-ton, M35A1 or M35A2 with winch or bumper extension, LIN X40146.
- Weight:
  - M35A1: 13,550 pounds empty.
  - M35A2: 13,570 pounds empty.

### **MATERIALS**

- Sling set (25,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Padding, cellulose.
- Tie-down, cargo, CGU-1/B, as required.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig the load in 25 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Remove the bed tarpaulin and bows and secure in truck bed with nylon cord or tie-down strap.
- Remove cab top tarpaulin, lower and secure the windshield, and place the cab tarpaulin over the windshield. Secure with tape or nylon cord.
- Tie hood closed with nylon cord around the hood latch brackets and front grill.
- Make sure fuel cap is secure; oil filler, radiator, and battery caps are properly installed; and the battery compartment door is fastened.
- Tie seats down and secure closed doors with nylon cord.

- Engage vehicle hand brake and put transmission in NEUTRAL.
- Straighten front wheels on truck and secure steering wheel with nylon cord.

### **Step 2. Rigging**

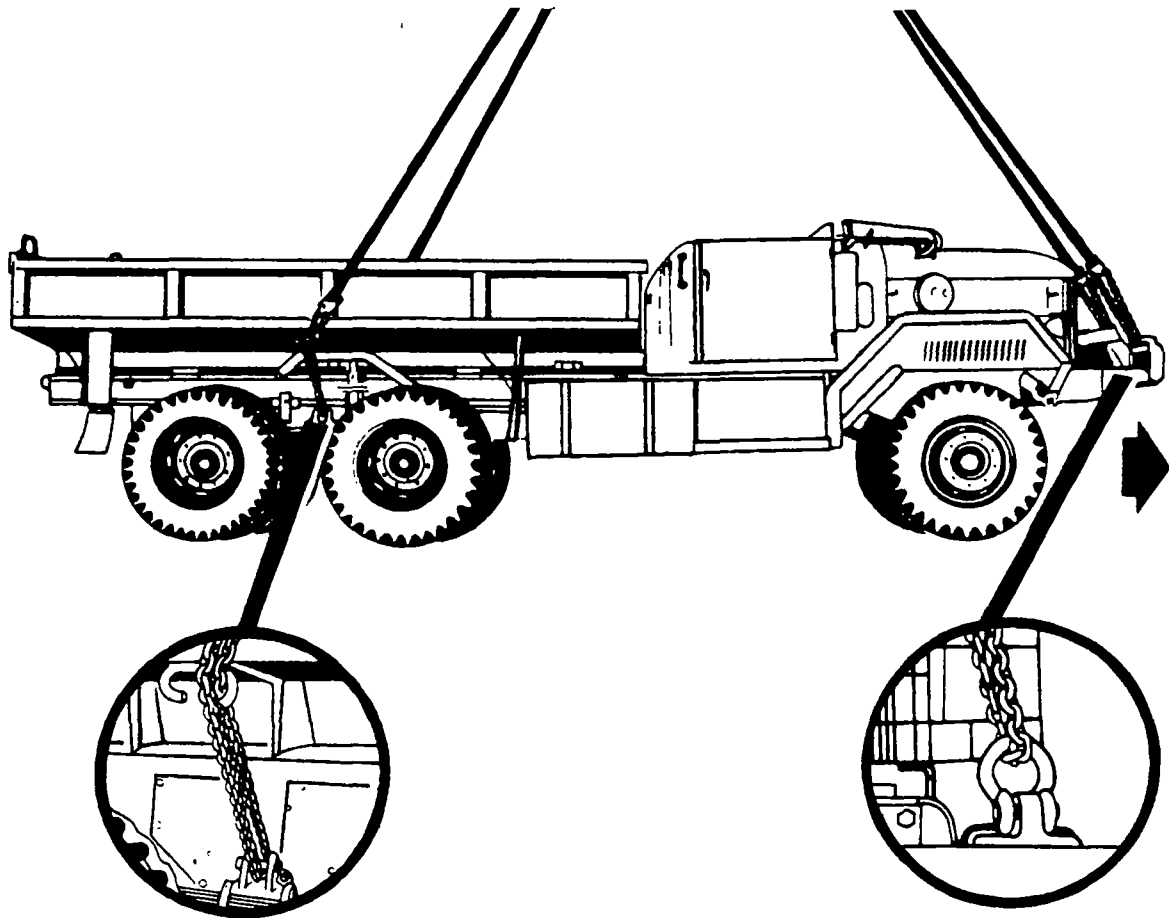
- Place apex fitting in bed of truck near cab. Route outer sling legs 1 and 2 to the front bumper and inner sling legs 3 and 4 to the rear wheels. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through left lifting shackle on the front bumper and insert link 13 in the grabhook. Repeat with sling leg 2 on the right lifting shackle. Secure excess chain with tape or nylon cord.
- Loop the chain end of sling leg 3 through the lifting provision on top of the spring between the left rear wheels and insert link 3 in the grabhook. Pull the grabhook up against the side of the truck and tie the chain in the chain guide bracket so that it will stay in the guide on the side of the bed. Make sure the hook side of the grabhook faces outward so it will not snag on the side of the truck. Repeat with sling leg 4 on the right rear spring lift provision.
- Pull the rear sling leg grabhooks together across the top of the bed and tie them with cotton webbing (breakaway technique) so the chain will not fall out of the guide or become entangled.
- Pull the front sling legs up over the hood and tie or tape (breakaway technique) the grabhooks to the hood latch attachment or similar object so the chains do not become entangled on the front bumper.
- Tape legs 1 and 2 to the top of the steering wheel. Cluster and tie or tape (breakaway technique) all sling legs together on top of the truck to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

Hookup team stands in the truck bed. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the cargo hook. The hookup team then carefully dismounts the truck and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area under the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 3-7. M54A2 5-Ton Cargo Truck with Winch**

NOT CURRENTLY APPROVED FOR LIFT WITH ORIGINAL LIFT  
PROVISIONS

### **APPLICABILITY**

This load is suitable for the CH-47 or CH-54 helicopter at airspeeds of 80 knots.

### **LOAD DESCRIPTION**

- Truck, cargo, 5-ton, M54A2, with winch, LIN X40968.
- Weight: 20,782 pounds empty. MATERIALS
- Sling set (25,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tie-down, cargo, CGU-1/B, as required.
- Padding, cellulose or suitable material.

### **PERSONNEL**

Two persons can prepare and rig the load in 25 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Remove the tarpaulin and bows from the cargo area and secure them in the bed of the truck with nylon cord.
- Remove cab top tarpaulin, lower and secure the windshield, and fold the cab tarpaulin over the windshield. Secure with tape or nylon cord.
- Safety-tie hood closed with nylon cord around the hood latch brackets and front grill.
- Make sure fuel cap is secure; oil filler, radiator, and battery caps are properly installed; and the battery compartment door is fastened.
- Tie seats down and secure doors closed with nylon cord.
- Engage vehicle hand brake and place transmission in neutral.
- Straighten front wheels on truck and secure steering wheel in place with nylon cord.

## **Step 2. Rigging**

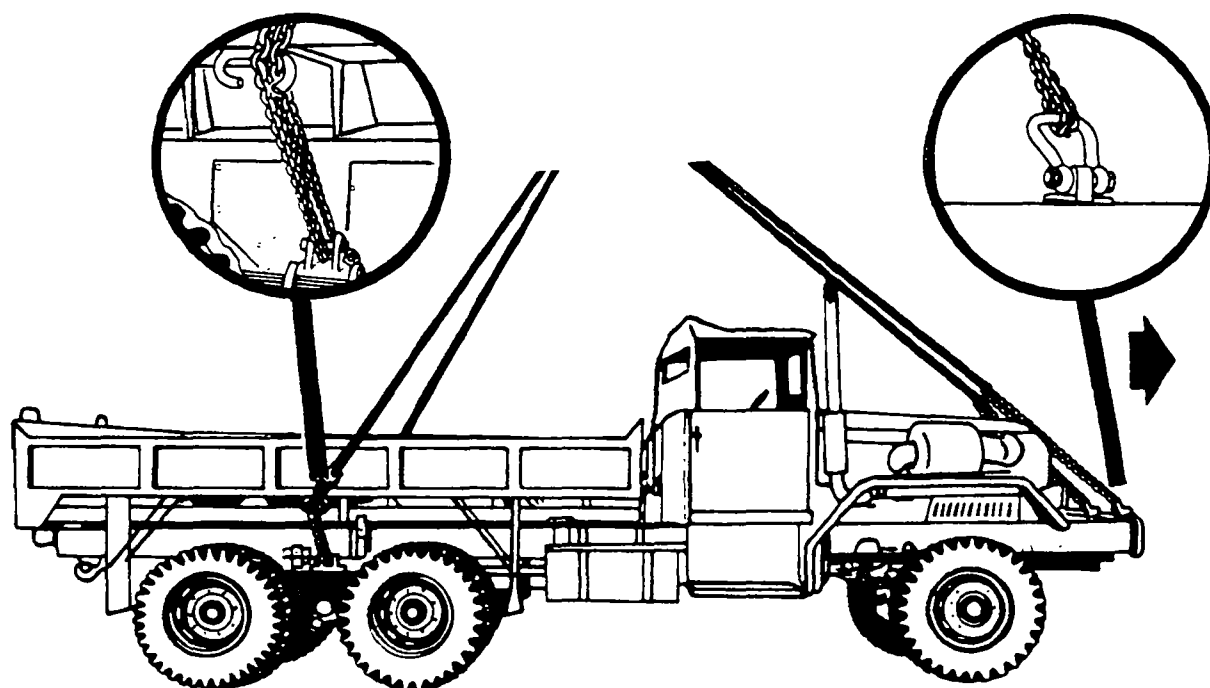
- Place apex fitting in bed of truck near cab. Route outer sling legs 1 and 2 to the front bumper and inner sling legs 3 and 4 to the rear wheels. Sling legs 1 and 3 must be on the left side of the vehicle.
- Loop the chain end of sling leg 1 through the left lifting shackle on the front bumper and insert link 3 in the grabhook. Repeat with sling leg 2 on the right lifting shackle.
- Pull the front sling legs up over the hood and tie or tape (breakaway technique) the grabhooks to the hood latch attachment or similar object so the chains do not become entangled on the front bumper.
- Loop the chain end of sling leg 3 through the lifting provision on top of the spring between the left rear wheels and insert link 13 in the grabhook. Pull the grabhook up against the side of the truck and tie the chain so that it will stay in the guide on the side of the truck. Make sure the hook side of the grabhook faces outward so the hook does not snag on the side of the truck. Repeat with sling leg 4 on the right rear spring lift provision. Secure excess chain with tape or nylon cord.
- Pull the rear sling leg grabhooks together across the top of the bed and tie them together with cotton webbing (breakaway technique) so the chain will not fall out of the guide or become entangled.
- Tape sling legs 1 and 2 to the top of the steering wheel. Cluster and tie or tape (breakaway technique) all sling legs together on top of the truck to prevent entanglement during hookup and lift-off.

## **Step 3. Hookup**

The hookup team stands in the truck bed. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team carefully dismounts the cargo bed and remains close to the truck as the helicopter removes the slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

## **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## **Figure 3-8. M52A2 or M818 5-Ton Tractor with Winch**

NOT CURRENTLY APPROVED FOR LIFT WITH ORIGINAL LIFT  
PROVISIONS

### **APPLICABILITY**

This load is suitable for the CH-47 or Ch-54 helicopter at airspeeds of 85 knots.

### **LOAD DESCRIPTION**

- Truck, tractor, 5-ton, M52A2 or M818 with winch, LIN X59463.
- Weight:
  - M52A2, 18,430 pounds.
  - M818, 20,107 pounds.

### **MATERIALS**

- Sling set (25,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

One person can prepare and rig load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Engage hand brake and place transmission in NEUTRAL.
- Secure steering wheel and doors with nylon cord. Tape windshield wipers to windshield.
- Secure air hoses in brackets and tie with nylon cord. Tie hood down with nylon cord routed through front grill and hood latch brackets.

#### **Step 2. Rigging**

- Position apex fitting on top of the spare tire. Route outer sling legs 1 and 2 to the front bumper and inner sling legs 3 and 4 to the rear wheels. Sling legs 1 and 3 must be on the left side of load.
- Loop chain end of sling leg 1 through the left lift provision on the front bumper and insert link 3 in the grabhook. Repeat with sling leg 2 on right lift provision.

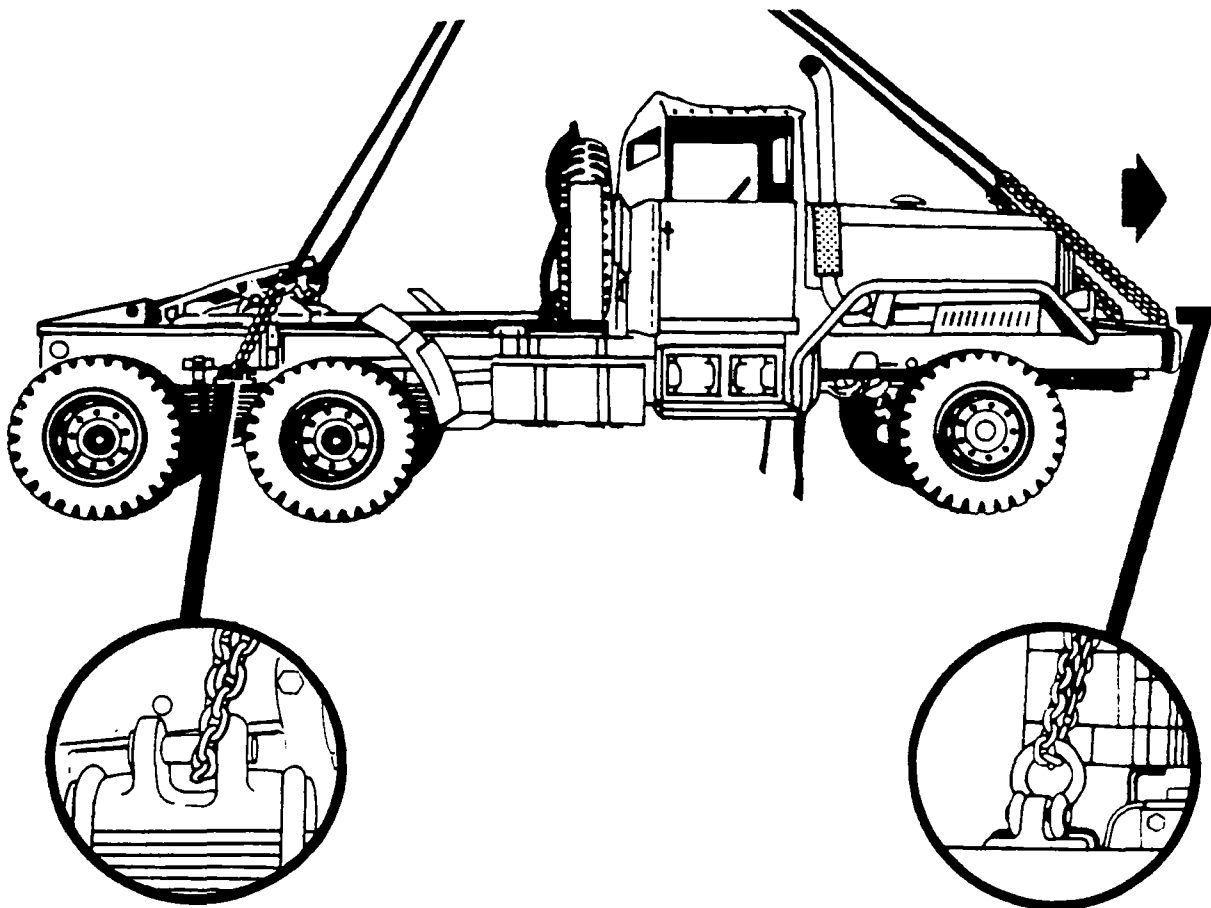
- Pull the front sling legs up over the hood and tie or tape (breakaway technique) the grabhooks to the hood latch attachment or similar object so they do not become entangled on the front bumper.
- Loop the chain end of sling leg 3 through the lift provision on top of the spring between the left rear wheels and insert link 43 in the grabhook. Repeat with sling leg 4 on the right rear spring lift provision. Secure excess chain with tape or nylon cord.
- Pull the rear sling legs up and tape or tie (breakaway technique) the sling legs to the top of the spare tire. Cluster and tie or tape (breakaway technique) all sling legs together on top of the truck to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on the rear of the hood. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the truck and remains close to the load as the helicopter removes the slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 3-9. Crane, Self-Propelled, for Army Aircraft Maintenance and Positioning (SCAMP)**

### **APPLICABILITY**

This load is suitable for the CH-47 helicopter at airspeeds up to and including 85 knots.

### **LOAD DESCRIPTION**

- Crane, Self-Propelled (SCAMP), LIN F43003.
- Weight: 14,600 pounds.

### **MATERIALS**

- Sling set (25,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig this load in 10 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Attach the block and tackle to the front pintle hook (cable must be snug).
- Tape all glass. Rotate mirrors in toward cab.
- Secure engine cover in place with nylon cord. Secure tow bar and tow wheels in place with nylon cord.
- Secure any other loose equipment, doors, or panels with tape or nylon cord.
- Engage the parking brake and put the transmission in NEUTRAL.

#### **Step 2. Rigging**

- Position the apex fitting on top of the boom. Route outer sling legs 1 and 2 to the front of the crane and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located on the left front outrigger and insert link 3 in the grabhook. Repeat with sling leg 2 on the right front lift provision.

- Loop the chain end of sling leg 3 through the left rear lift provision located on the left rear outrigger and insert link 40 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the crane to prevent entanglement during hookup and lift-off.

**NOTE:** The rear sling leg routed on the exhaust must be secured above the exhaust pipe to prevent entangling the sling.

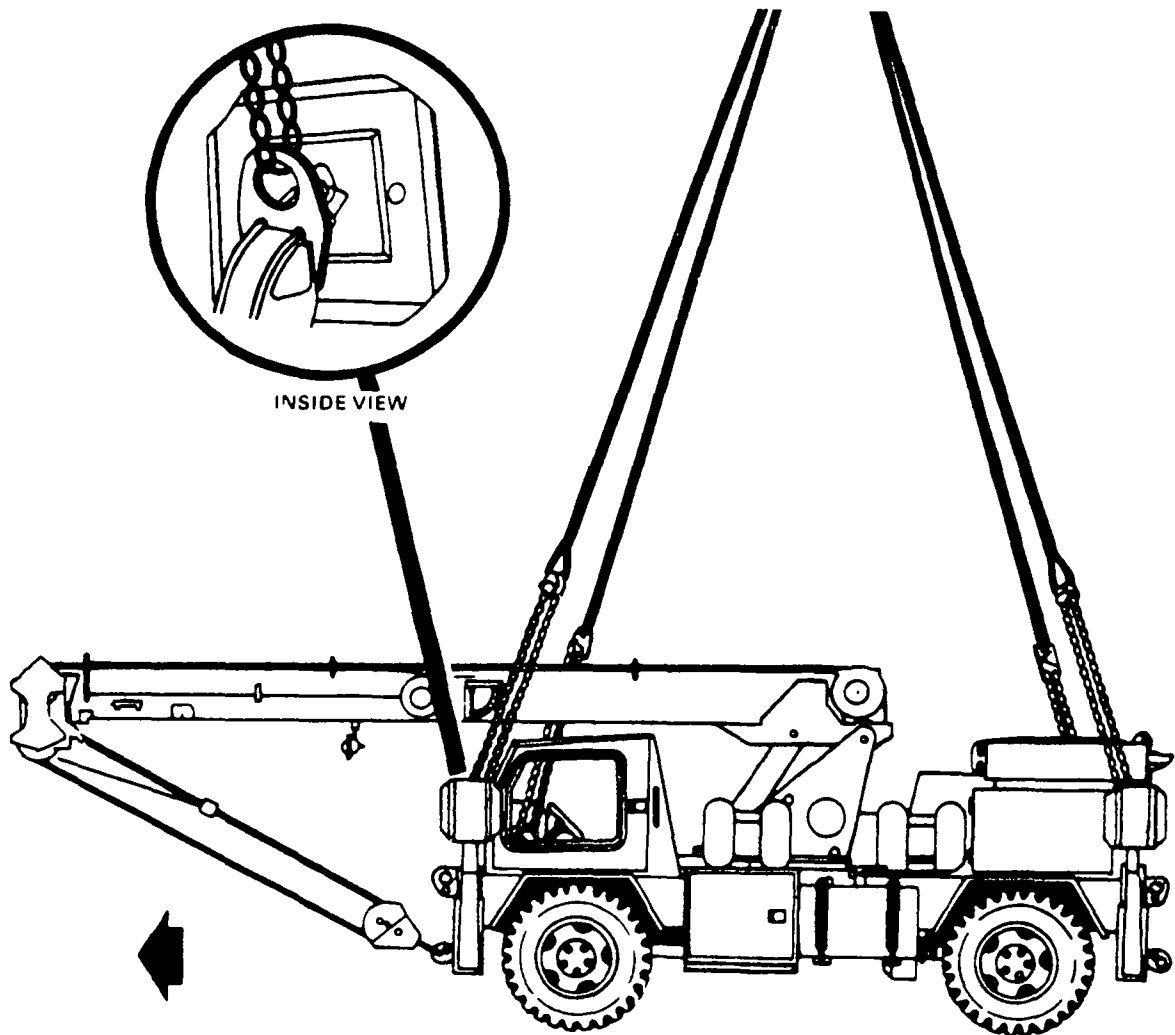
### **Step 3. Hookup**

**NOTE:** This load will fly boom low to prevent the boom from striking the aircraft.

The hookup team stands between the end of the boom and the engine cover. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the crane and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## TRAILERS

\*The suitable single-point rigging procedures for trailers are in this section. Figures 3-10 through 3-21 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

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### Figure 3-10. M105 1 1/2-Ton Trailer

#### APPLICABILITY

This load when empty, is suitable for the UH-1, CH-47, and CH-54 helicopters at airspeeds up to and including 45, 80, and 50 knots, respectively. It can be transported with any amount of payload up to 3,000 pounds by the CH-47 and CH-54. As the trailer payload weight increases, airspeed may be increased accordingly.

#### LOAD DESCRIPTION

- Trailer, cargo, 1 1/2-ton, M105 series, LIN W95811.
- Weight:
  - Empty, 2,750 pounds.
  - Loaded, 5,750 pounds.

#### MATERIALS

- Sling set (10,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tie-down, cargo, CGU-1/B (as required).

#### PERSONNEL

Two persons can prepare and rig this load in 25 minutes.

#### PROCEDURES

##### Step 1. Preparation

- Remove the top tarpaulin and bows.
- Remove the front and rear racks, stow in the slots provided on each side of the trailer, and secure in place with tape or nylon cord.
- Stow the bows in the trailer bed on the left side and secure with nylon cord.
- Stow the tarpaulin in the trailer bed on the right side and secure with nylon cord.

- Fasten the tailgate in the open position with the chains on each side hooked through the keeper.
- Secure cargo in the bed of the trailer with the tie-down straps. Attach the hook end of one tie-down strap around the tailgate left hinge. Loop the tie-down strap diagonally over the load and connect the ratchet end to the U-bolt welded on the bottom of the right side of the trailer tongue. Tighten ratchet and secure loose end of strap.
- Repeat the previous procedure with the second tie-down strap using the tailgate right hinge and left front U-bolt.
- Tape or tie the light cable firmly to the top of the drawbar.
- Engage the parking brake.
- If the trailer has modified rear lift provisions, remove the push pin, and rotate the provisions downward.

### **Step 2. Rigging**

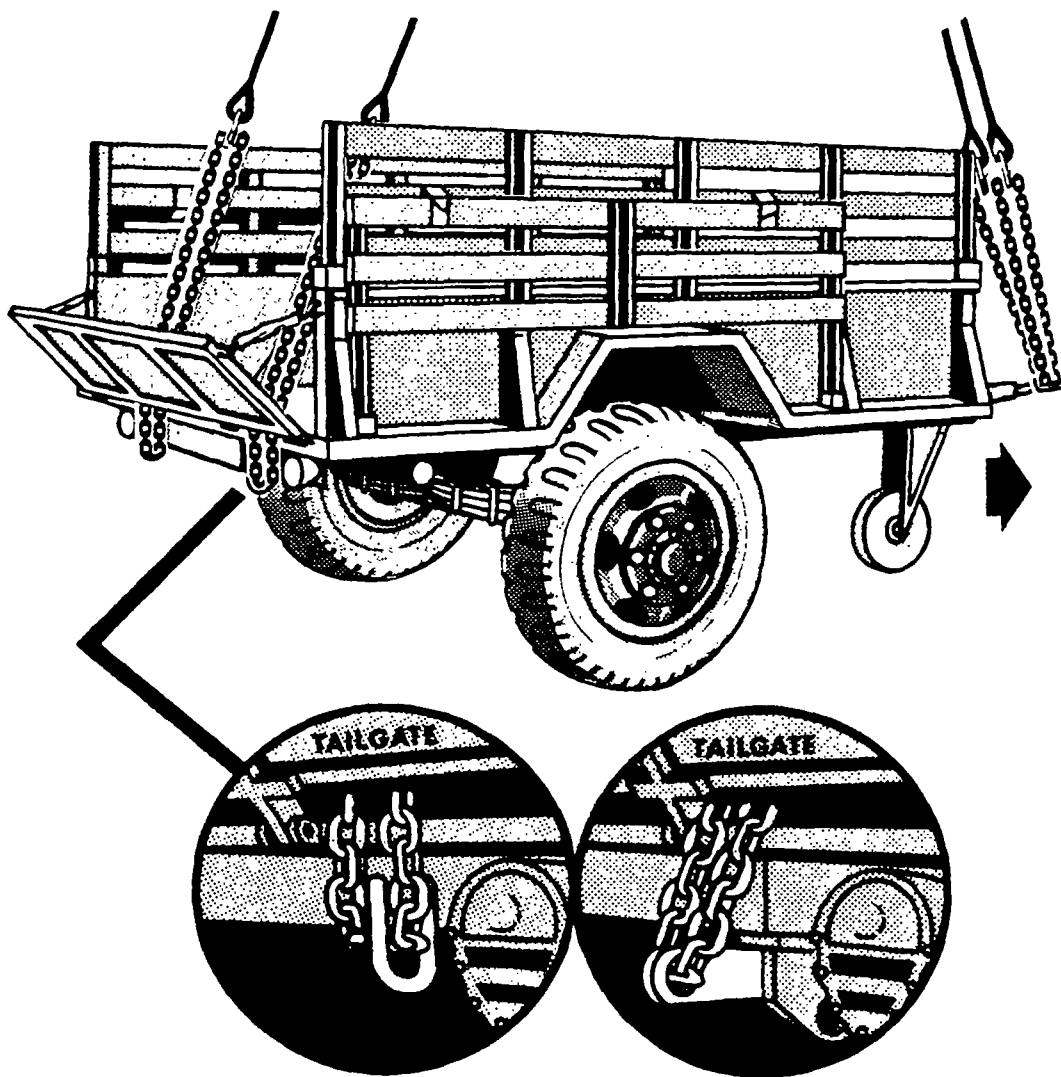
- Position apex fitting in the trailer bed. Route outer slinglegs 1 and 2 to the front of the trailer and the inner slinglegs 3 and 4 to the rear of the trailer through the opening between the tailgate and the trailer bed. Each chain must be routed between the outboard and inboard hinge on the tailgate. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the lunette and insert link 4 in the grabhook. Repeat with sling leg 2 through the lunette.
- Loop the chain end of sling leg 3 through the left rear left provision located at the aft end of the trailer chassis frame and insert link 30 in the grabhook. Repeat with sling leg 4 and the right rear lift provision. Secure excess chain with tape or nylon cord.
- Lift sling leg 3 and tie or tape (breakaway technique) the grabhook or sling leg to the trailer side rack so the chain does not become slack and bind in the opening between the tailgate and trailer bed. Repeat with sling leg 4 on the other siderack.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the trailer to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

The hookup team stands in the bed of the trailer or on top of the trailer load. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## **Figure 3-11. M270A1 Semitrailer, Wrecker**

NOT CURRENTLY APPROVED FOR LIFT WITH ORIGINAL LIFT  
PROVISIONS

### **APPLICABILITY**

This load is suitable for the CH-54 helicopter at air speeds of 80 knots.

### **LOAD DESCRIPTION**

- Semitrailer, lowbed, wrecker, 12-ton, 4-wheel, LIN S70243.
- Weight: 17,500 pounds.

### **MATERIALS**

- Sling set (25,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

One person can prepare and rig the load in 10 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

None.

#### **Step 2. Rigging**

- Position apex fitting on top of the bed in the vicinity of the spare tire. Route outer sling legs 1 and 2 to the front of the trailer and inner sling legs 3 and 4 to rear end. Sling legs 1 and 3 must be on the same side of the load.
- Loop the chain end of sling leg 1 through the third stake pocket from the forward end of the trailer and secure link 55 in the grabhook. Repeat with sling leg 2 on the other side of the load. Secure excess chain with tape or nylon cord. Loop the chain end of sling leg 3 through the lift provision on the frame forward of the wheels and secure link 3 in the grabhook. Repeat with sling leg 4 on the other side of the load.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

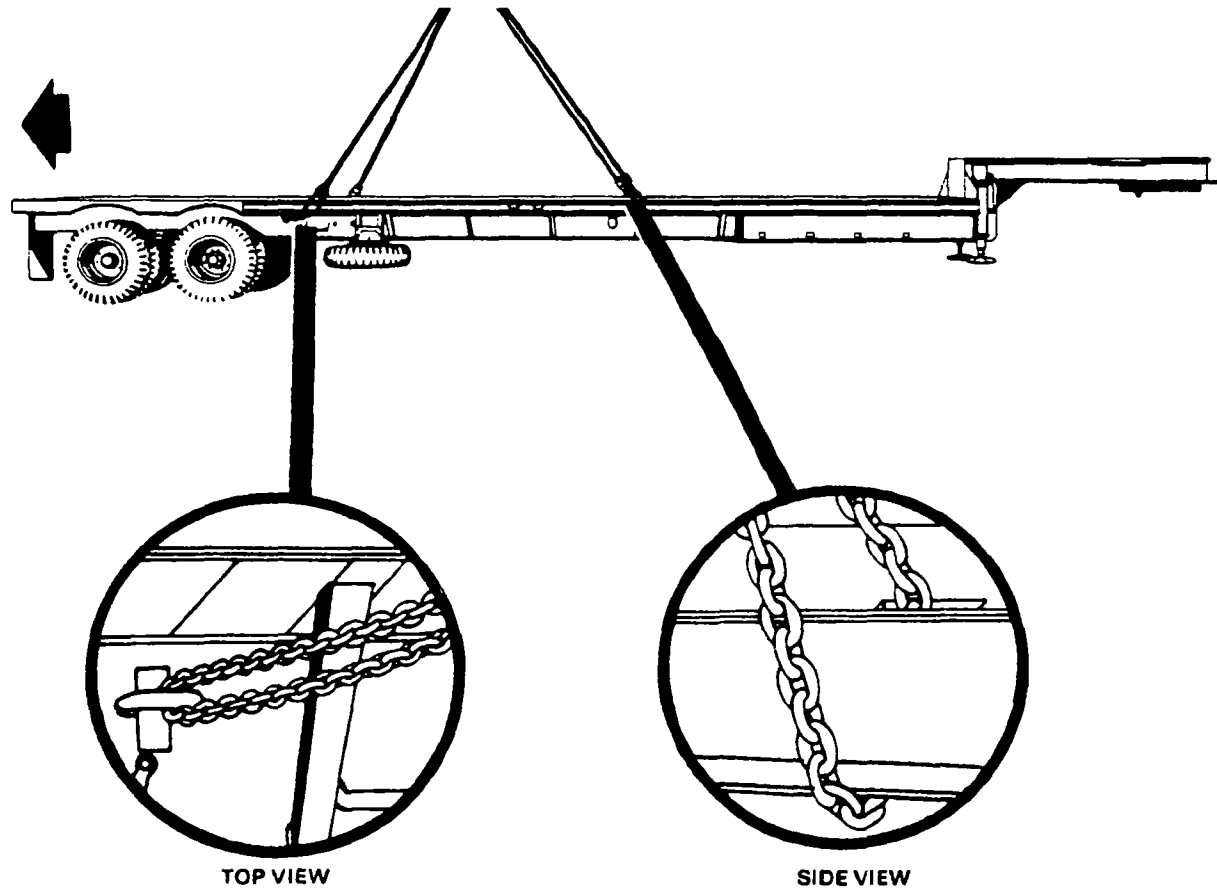
### Step 3. Hookup

**NOTE:** Connect the apex fitting so the trailer is carried rear end forward.

The hookup team stands on the trailer. The static wand person discharges the static electricity with static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the side of the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 3-12. M172A1 Semitrailer, Low Bed**

**NOT CURRENTLY APPROVED FOR LIFT WITH ORIGINAL LIFT  
PROVISIONS**

### **APPLICABILITY**

This load is suitable for the CH-47 or CH-54 helicopter at airspeeds of 80 knots.

### **LOAD DESCRIPTION**

- Semitrailer, lowbed, M172A1, 25-ton, LIN S70517.
- Weight: 16,500 pound.

### **MATERIALS**

- Sling set (25,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.

### **PERSONNEL**

One person can prepare and rig the load in 10 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

None.

#### **Step 2. Rigging**

- Position apex fitting on top of the trailer. Route outer sling legs 1 and 2 to the front of the trailer and inner sling legs 3 and 4 to the rear end. Sling legs 1 and 3 must be on the same side of the load.
- Loop the chain end of sling leg 1 through the forward lift provision on the left side of the trailer and insert link 3 in the grabhook. Repeat with sling leg 2 on the other side of the trailer.
- Loop the chain end of sling leg 3 through the aft lift provision located on the left side of the trailer forward of the wheels and insert link 60 in the grabhook. Repeat with sling leg 4 on the other side of the trailer. Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the trailer to prevent entanglement during hookup and lift-off.

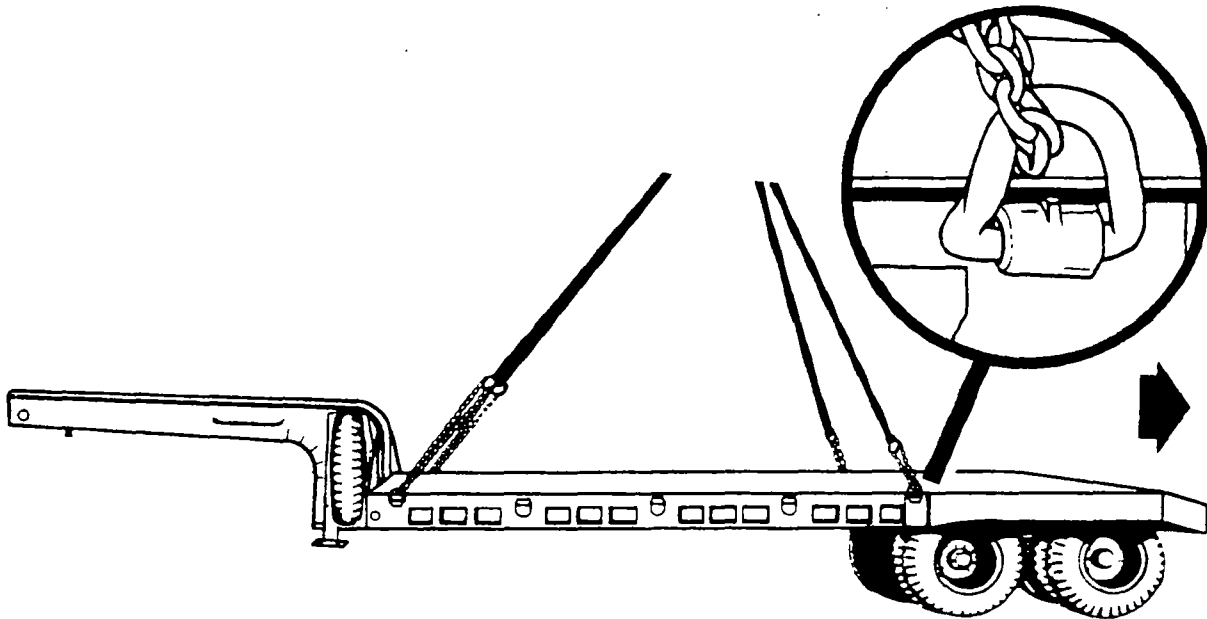
### Step 3. Hookup

**NOTE:** Connect apex fitting so the trailer is carried rear end forward.

The hookup team stands on the bed of the trailer. The static wand person discharges the static electricity with the static wand. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 3-13. Trailer, Flatbed, Tilt Deck, 15-Ton, 8-Wheel**

NOT CURRENTLY APPROVED FOR LIFT WITH ORIGINAL LIFT  
PROVISIONS

### **APPLICABILITY**

This load is suitable for the CH-47 helicopter at airspeeds of 70 knots.

### **LOAD DESCRIPTION**

- Trailer, flatbed, tilt deck, 15-ton, 8-wheel.
- Weight: 9,000 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig this load in 10 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Secure air brake hose, safety chains, and so forth, to the trailer tongue with nylon cord.
- Make sure that the spare tire is attached securely.
- Engage parking brakes.

#### **Step 2. Rigging**

- Position apex fitting on top of the trailer bed. Route outer sling legs 1 and 2 to the front of the trailer and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the same side of the load.
- Loop the chain end of sling leg 1 through the first hole on the side of trailer at the left front corner and insert link 50 in the grabhook. Repeat with sling leg 2 on the other side of the trailer.
- Loop the chain end of sling leg 3 through the lifting ring located on top of the trailer in the left rear corner and insert link 30 in the grabhook. Repeat with sling leg 4 on the lift provision located on the other side.
- Secure excess chain with tape or nylon cord.

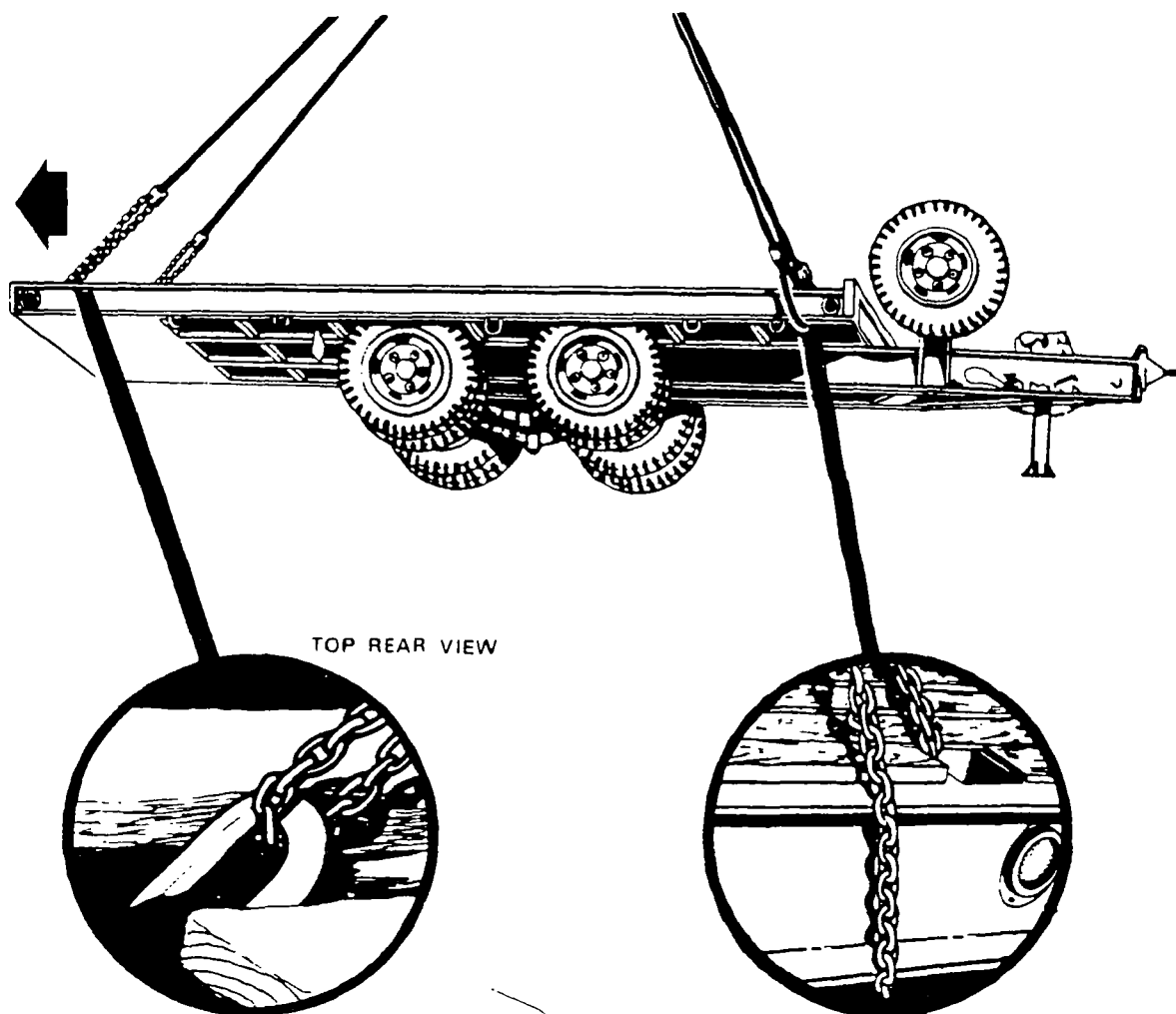
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the trailer to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on top of the trailer. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 3-14. Trailer-Mounted Welding Shop**

### **APPLICABILITY**

- This load is suitable for CH-47 helicopter at airspeeds of 110 knots.

### **LOAD DESCRIPTION**

- Welding shop, trailer-mounted, LIN Y48323.
- Weight: 2,960 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig this load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Safety-tie all tie-down handles on tanks with nylon cord. Secure safety chains and intervehicular cable to trailer tongue with tape or nylon cord.
- Make sure that all covers, lids, doors, and latches are securely fastened.
- Engage the parking brakes.

#### **Step 2. Rigging**

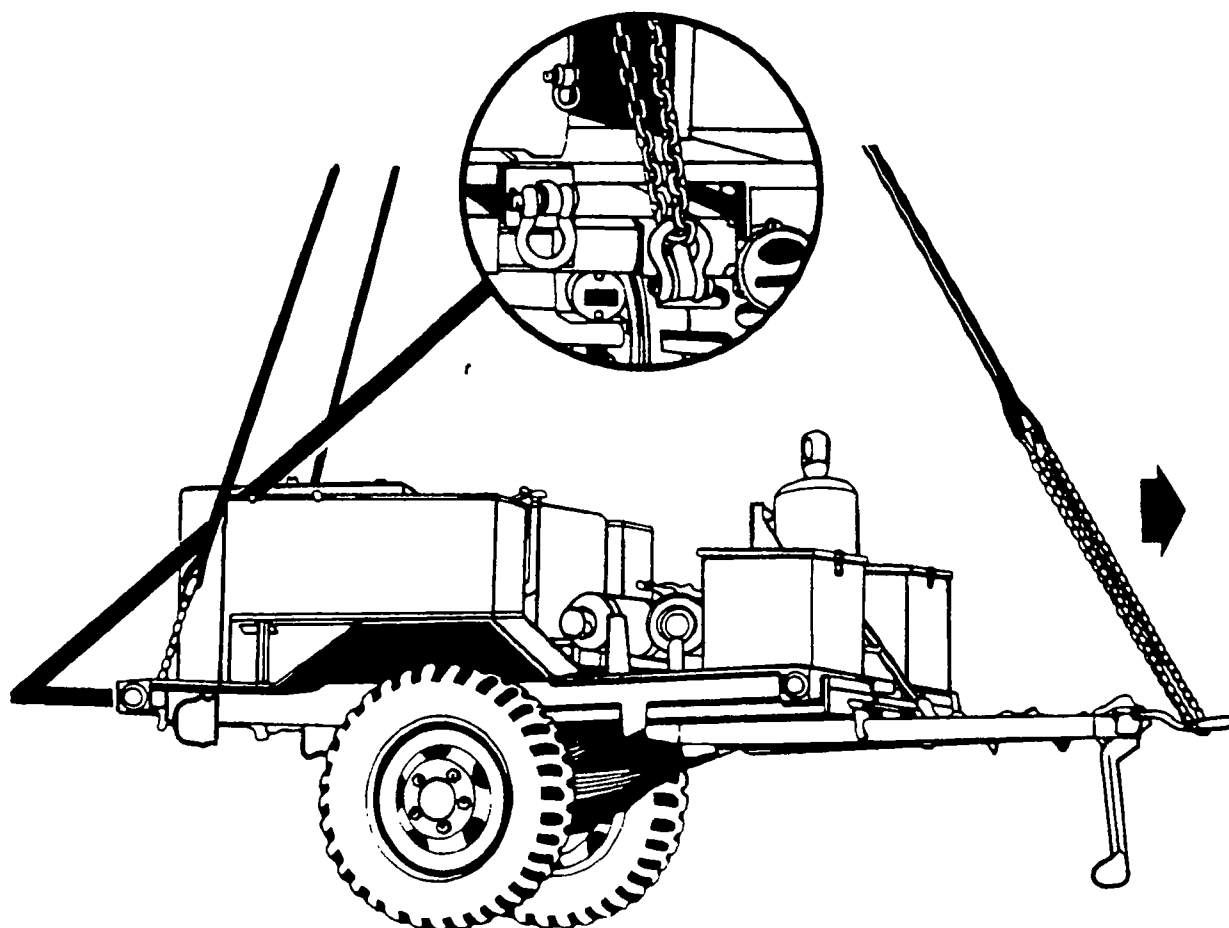
- Position apex fitting on top of the center of the load. Route outer sling legs 1 and 2 to the front of the trailer and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the trailer tongue lunette and insert link 10 in the grabhook. Repeat with sling leg 2 through the lunette.
- Loop the chain end of sling leg 3 through the left rear lift provision located on the left rear corner of the trailer and insert link 65 in grabhook. Repeat with sling leg 4 on the right rear lift provision located on the right rear corner of the trailer.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together above the trailer to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on the platform to the rear of the trailer near the vise. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## **Figure 3-15. LEB 300 Welding Machine on 2 1/2-Ton Trailer Chassis**

### **APPLICABILITY**

This load is suitable for the CH-47 helicopter at airspeeds of 100 knots.

### **LOAD DESCRIPTION**

- Welding machine, ARC, LEB 300, LIN Y46200.
- Chassis, trailer, 2 1/2-ton, LIN E02944.
- Weight:
  - Welding machine, 2,510 pounds.
  - Trailer chassis, 2,800 pounds.
  - Total, 5,310 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Chock blocks (2 each) (addition to OVE chock blocks).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

One person can prepare and rig the load in 10 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Place chock blocks behind and in front of one wheel.
- Secure brake hoses, safety hoses, and safety chains to trailertongue with tape or nylon cord.
- Secure OVE chock blocks on trailer in racks with nylon cord.
- Close and secure all lids, doors, and caps.

#### **Step 2. Rigging**

- Position apex fitting on top of the welding machine. Route outer sling legs 1 and 2 to the front of the trailer and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side of the load.

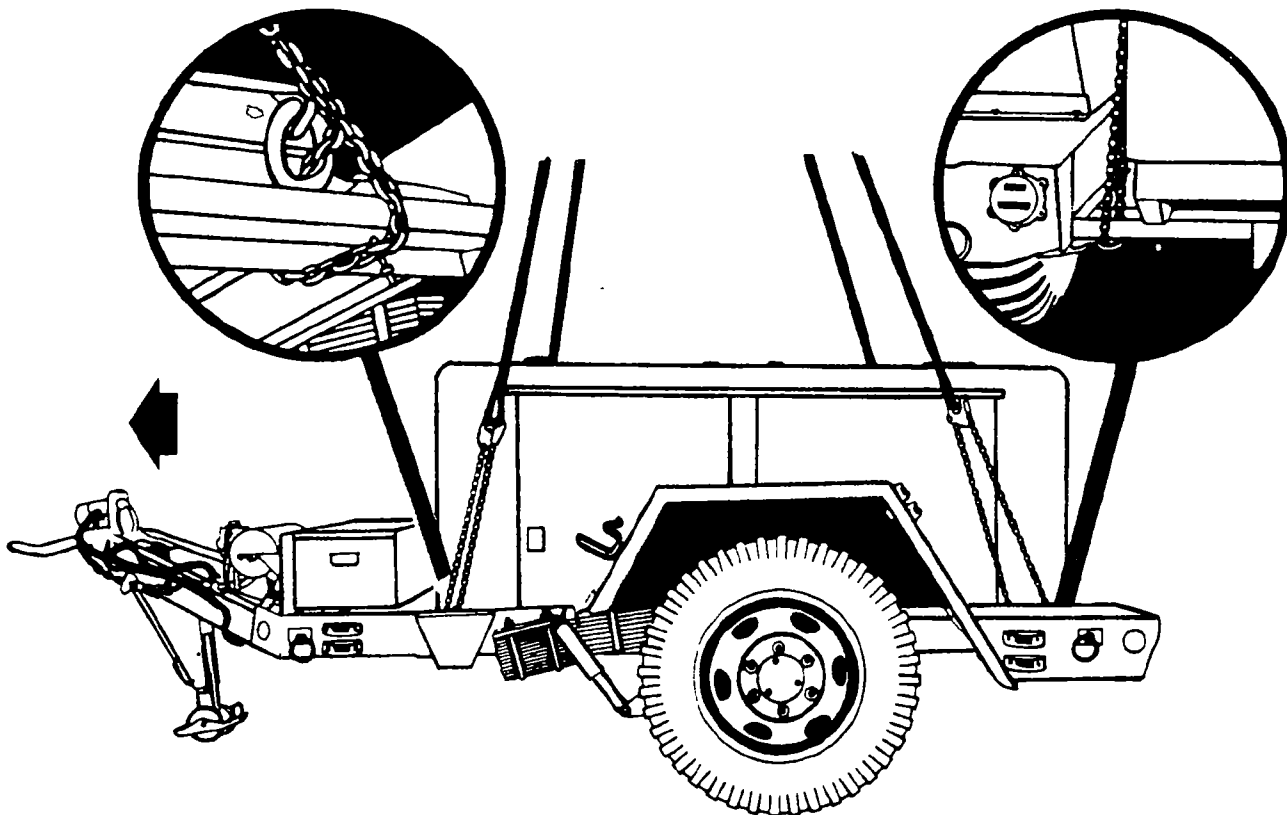
- Loop the chain end of sling leg 1 down through the left front lift provision on the LEB 300 arc welder, around the trailer frame, back up by the welder, and insert link 28 in the grabhook. Repeat with sling leg 2 on the right front lift provision located on the right front side of the welder. Secure excess chain with tape of nylon cord.
- Loop the chain end of sling leg 3 around the rear cross member, back up by the welder, and insert link 3 in the grabhook. Repeat with sling leg 4 on the right rear lift provision located on the right rear corner of the welder.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the welder to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on trailer chassis at forward end of LEB 300. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the welding machine and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 3-16. Trailer-Mounted Compressor, Reciprocating**

### **APPLICABILITY**

This load is suitable for the UH-1 helicopter at airspeeds of 90 knots.

### **LOAD DESCRIPTION**

- Compressor, reciprocating, trailer-mounted, LIN E70338.
- Weight: 900 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig this load in 10 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Secure front leg in down position.
- Secure safety chains to trailer tongue and secure any loose covers shut with tape or nylon cord.
- Engage parking brake.

#### **Step 2. Rigging**

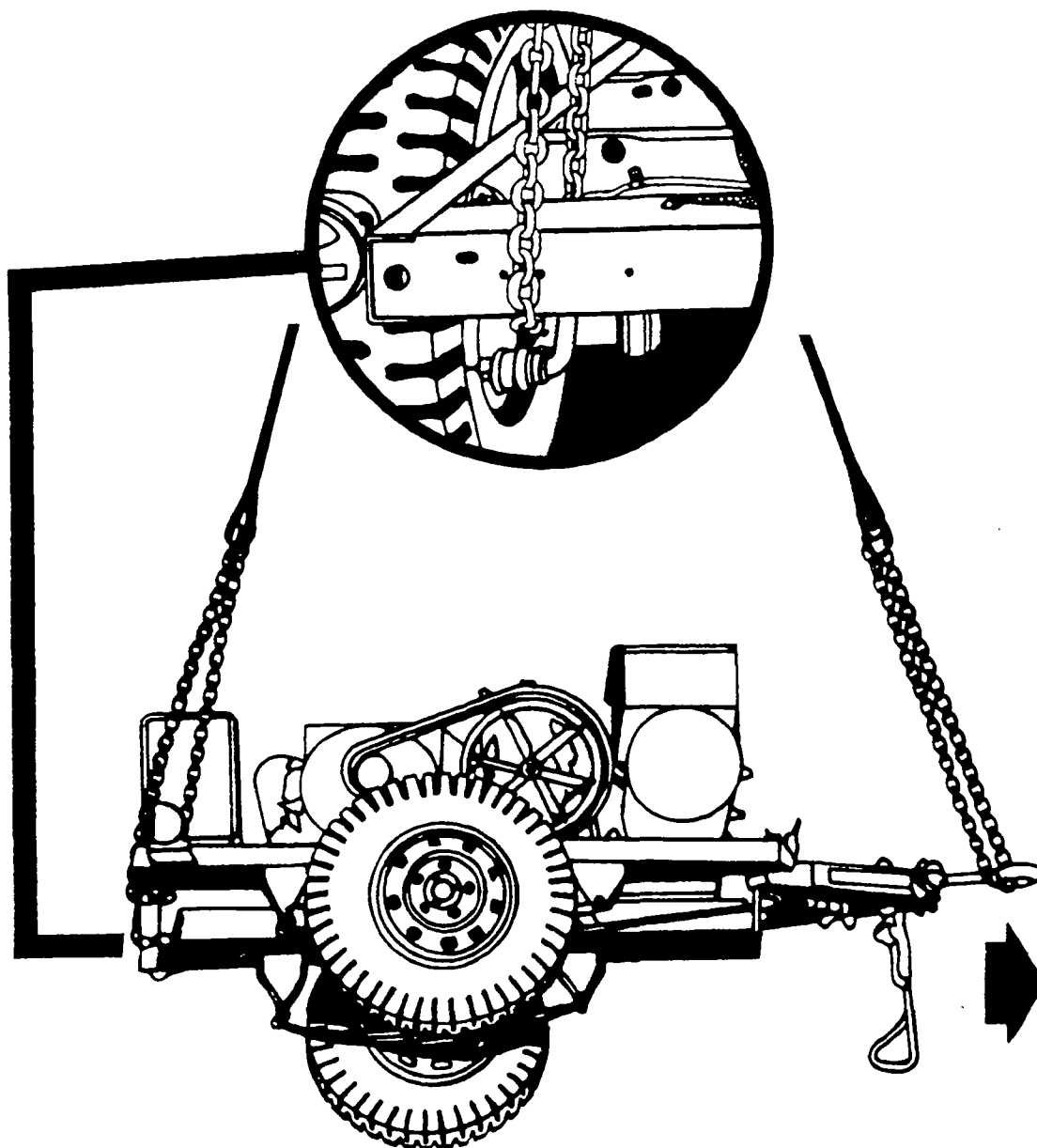
- Position apex fitting on top of the compressor. Route outer sling legs 1 and 2 to the front of the trailer and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 and 2 through the trailer tongue lunette and insert link 10 in the grabhook.
- Loop the chain end of sling leg 3 around rear frame member to the left of the fuel tank and insert link 15 in the grabhook. Repeat with sling leg 4 around the rear frame member to the right of the fuel tank.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the compressor to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands along side the trailer. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## Figure 3-17. Trailer-Mounted AN/MTC-10

### APPLICABILITY

This load is suitable for the UH-1 helicopter at airspeeds up to 70 knots.

### LOAD DESCRIPTION

- Telephone central office group, AN/MTC-10 in trailer, cargo, 1/4-ton, M416, LIN V29156 and W95400.
- Weight: 1,800 pounds rigged load.

### MATERIALS

- Sling set, (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### PERSONNEL

Two persons can prepare and rig the load in 30 minutes.

### PROCEDURES

#### Step 1. Preparation

- Remove tarpaulin. Remove all external items and stow in back of trailer.
- Stow accompanying load on top of folded chairs. Secure all items with nylon cord. Secure tarpaulin on top of load underframe.
- Tape all fittings on fenders and tongue to prevent sling leg entanglement.
- Fold rear stand before hookup to helicopter.

#### Step 2. Rigging

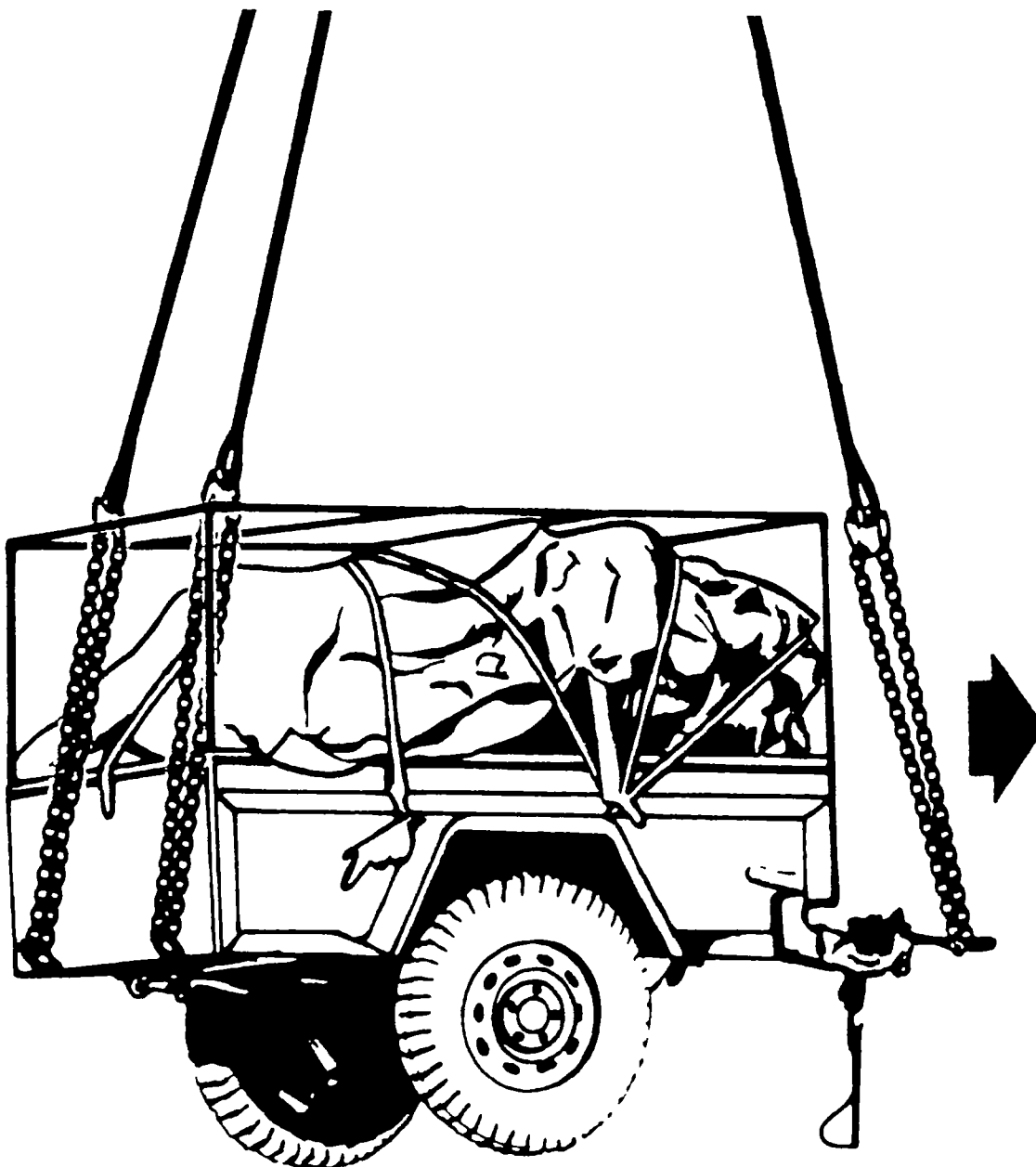
- Position apex fitting on top of the trailer load. Route outer sling legs 1 and 2 to the front of the trailer and inner sling legs 3 and 4 to the rear making sure they are forward of the aft top frame. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 and 2 through the lunette and insert link 3 in the grabhook.
- Loop the chain end of sling leg 3 down under the left rear corner of the trailer, around the left rear spring shackle, and insert link 3 in the grabhook. Repeat with sling leg 4 on the right rear spring shackle.
- Cluster and tie or tape (breakaway technique) all sling legs to the upper frame to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on top of the load. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## Figure 3-18. Trailer-Mounted Tool Outfit

### APPLICABILITY

This load is suitable for the CH-47 helicopter at airspeeds of 70 knots.

### LOAD DESCRIPTION.

- Trailer-mounted tool outfit, LIN W58486.
- Weight: 2,450 pounds.

### MATERIALS.

- Sling set (10,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### PERSONNEL

Two persons can prepare and rig the load in 15 minutes.

### PROCEDURES

#### Step 1. Preparation .

- Secure the covers and doors with tape or nylon cord.
- Secure intervehicular cable and safety chains to trailer tongue with nylon cord.
- Engage parking brake.

#### Step 2. Rigging.

- Position apex fitting on top of tool outfit cover. Route outer sling legs 1 and 2 to the front of the trailer and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 and 2 through the trailer tongue lunette and insert link 5 in the grabhook.
- Loop the chain end of sling leg 3 around the left rear leaf spring shackle located aft of the left wheel and insert link 35 in the grabhook. Repeat with sling leg 4 around the right rear spring shackle. Secure excess chain with tape or nylon cord.

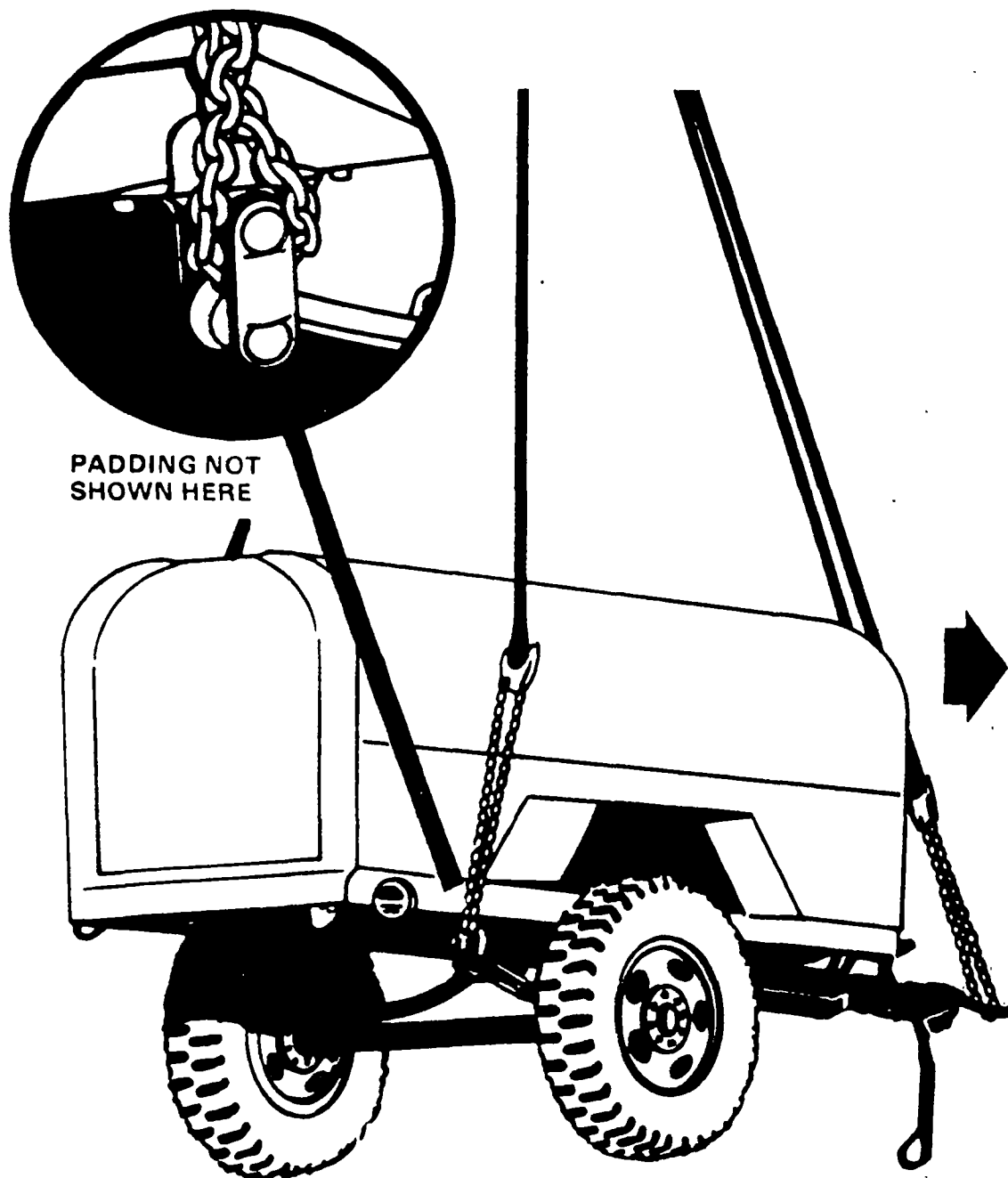
#### Step 3. Hookup

The hookup team stands on the wheel fenders or on top of the tool outfit. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful

hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

#### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## **Figure 3-19. Trailer-Mounted, Lube, Service Unit**

### **APPLICABILITY**

This load is suitable for the CH-47 helicopter at airspeeds of 120 knots.

### **LOAD DESCRIPTION .**

- Trailer-mounted, lube, service unit, engine 3A, LIN L85283.
- Weight: 5,540 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tie-down assembly consisting of 15-foot strap, load binder, and D-ring (2 each) or tie-down strap, CGU-1/B (2 each).
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL .**

Two persons can prepare and rig this load in 20 minutes.

### **PROCEDURES**

#### **Step 1. Preparation.**

- Make sure batteries and loose equipment under the cover are secured.
- Secure doors shut with nylon cord.
- Secure box to frame with two 15-foot straps (making a 30-foot strap) and load binder/D-ring. Safety-tie the handle of the load binder with nylon cord. Use CGU-1/B tie-down straps as an alternative.
- Secure brake hoses and safety chains to trailer tongue with tape or nylon cord.
- Engage parking brakes.

#### **Step 2. Rigging.**

- Position apex fitting on top of the lube service unit. Route outer sling legs 1 and 2 to the front of the trailer and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 and 2 through the trailer tongue lunette and insert link 5 in the grabhook.

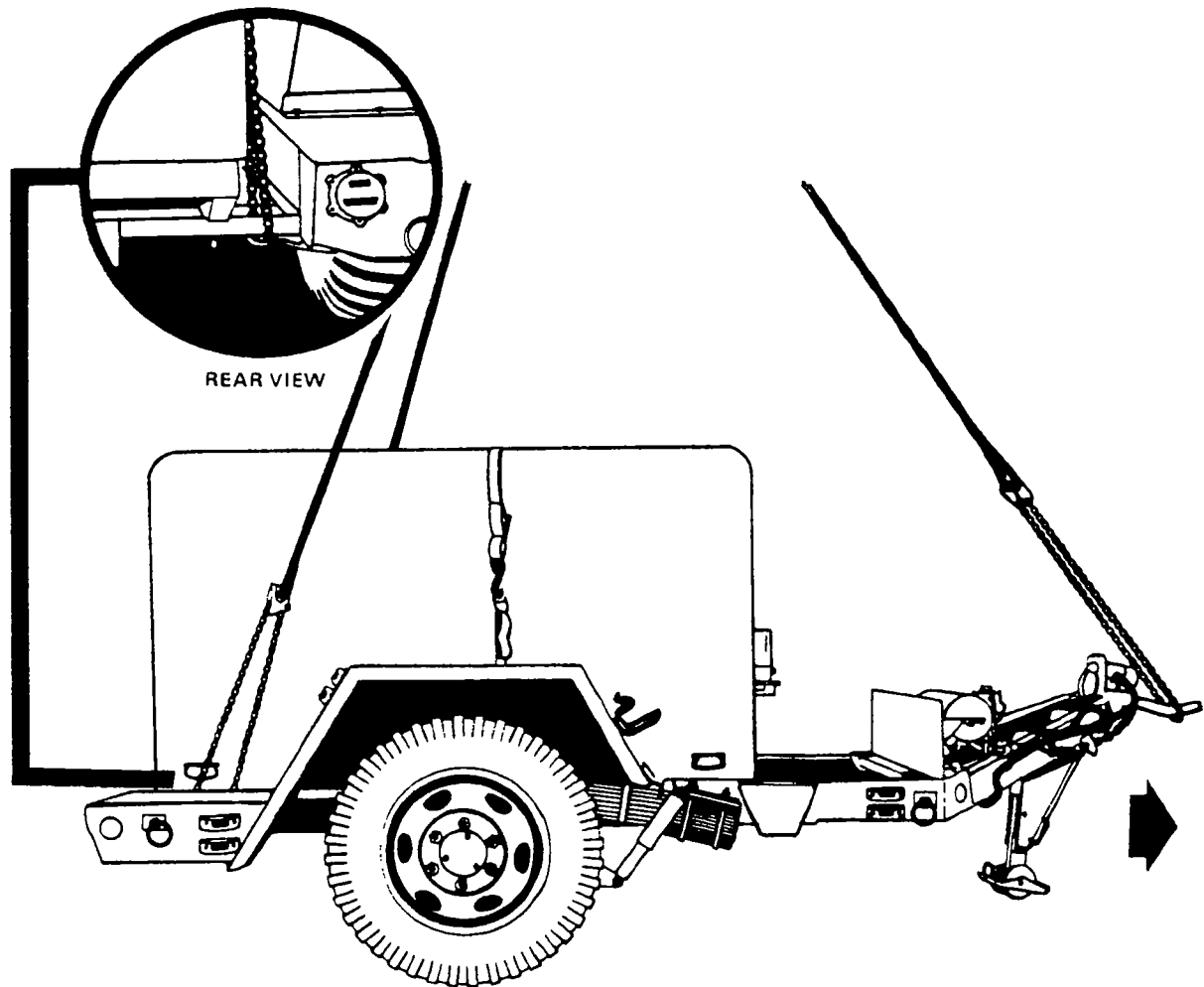
- Loop the chain end of sling leg 3 around frame member between the left rear side of the service unit and work platform and insert link 20 in the grabhook. Repeat with sling leg 4 on the right side of the trailer. Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on the fenders or on top of the service unit. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 3-20. M796 Trailer Bolster**

### **APPLICABILITY**

This load is suitable for the CH-47 helicopter at airspeeds of 110 knots.

### **LOAD DESCRIPTION.**

- Trailer bolster, 4-ton, 4-wheel, M796, LIN W94536.
- Weight: 6,340 pounds (empty).

### **MATERIALS.**

- Sling set (10,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.

### **PERSONNEL**

Two persons can prepare and rig the load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation.**

- Secure front leg in DOWN position.
- Secure safety chains and air hoses to handles on trailer tongue with tape or nylon cord. Secure spare tire in position. Engage hand brakes.

#### **Step 2. Rigging.**

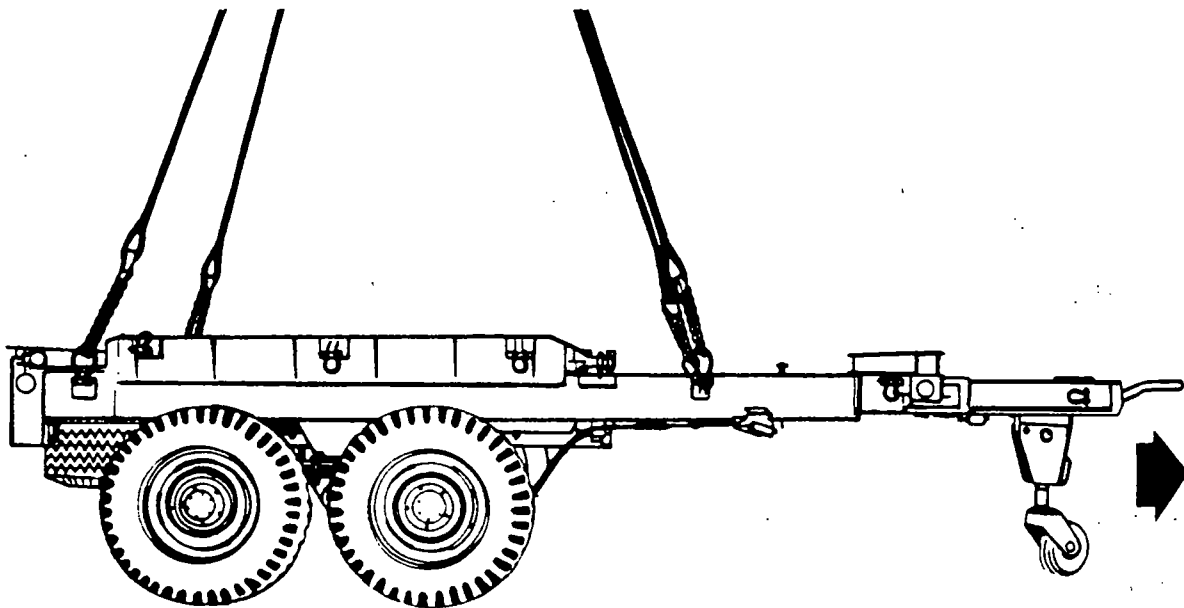
- Position apex fitting on top of the trailer. Route outer sling legs 1 and 2 to the front of the trailer and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision mounted aft of the left hand brake and insert link 100 in the grabhook. Repeat with sling leg 2 on the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lift provision located aft of the left wheel and insert link 8 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the trailer to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on top of the trailer. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## Figure 3-21. M149-Series Water Trailer

### APPLICABILITY

This load is suitable for CH-47 helicopters at airspeeds up to and including 80 knots.

### LOAD DESCRIPTION

- Trailer, water, 400-gallon, M149-series, with original lift provisions, LIN W98825.
- Weight:

|        | EMPTY<br>(pounds) | LOADED<br>(pounds)  |
|--------|-------------------|---------------------|
| M149   | 2,540             | 6,060 (see Warning) |
| M149A1 | 2,540             | 6,060 (see Warning) |
| M149A1 | 2,800             | 6,320 (see Warning) |

### WARNING:

The M149, M149A1, and M149A2 water trailers, without modified clevis-type lift provisions, are not currently certified for EAT due to inadequate lift provision strength when the trailer is loaded.

### MATERIALS

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### PERSONNEL

Two persons can prepare and rig this load in 10 minutes.

### PROCEDURES

#### Step 1. Preparation

- Secure the light cable and air hoses to the drawbar with tape or nylon cord.
- Place the support leg and wheel in the DOWN position.
- Tape the top edge of the aft end of the water tank to prevent the sling legs from chafing on the top of the tank.
- Engage both hand brakes.
- Make sure that the fill port is securely closed. Tape if necessary.

## Step 2. Rigging

- Position apex fitting on top of the tank. Route outer sling legs 1 and 2 to the front of the trailer and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the trailer.
- Loop the chain ends of sling leg 1 and 2 through the lunette and insert link 75 in the grabhook.
- Using the rear lift provisions as a guide to keep the chains in place, route the chain end of sling leg 3 down between the tank and the crossmember under the rear crossmember, and back up through the lift provision. Insert link 90 in the grabhook. Repeat with sling leg 4 and the right rear lift provision.
- Secure all excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the water tank to prevent entanglement during hookup and lift-off.

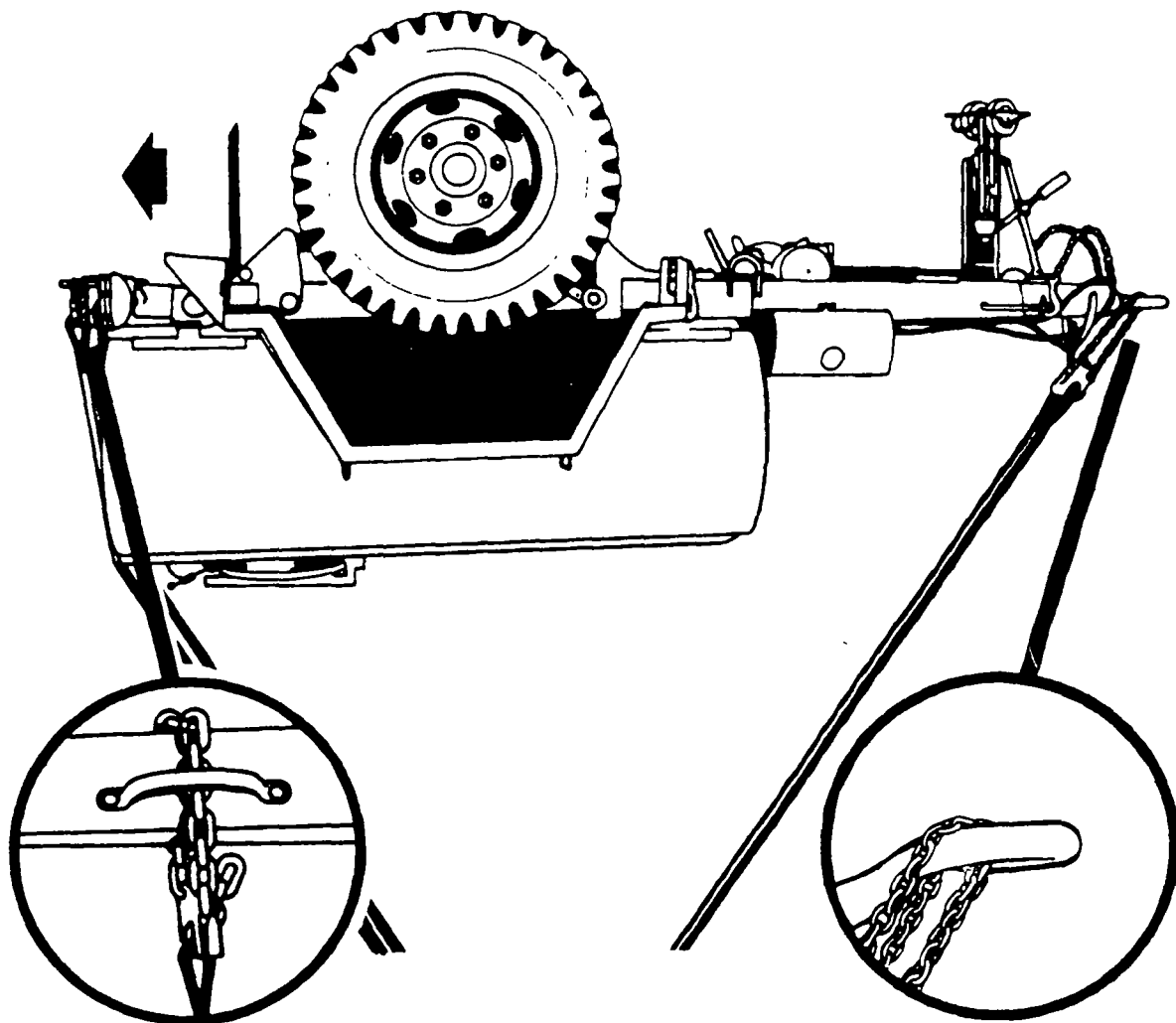
## Step 3. Hookup

**NOTE:** Connect the apex fitting so the trailer is carried tongue aft.

The hookup team stands on each wheel fender. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

## Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **HOWITZERS**

\*The suitable single-point rigging procedures for howitzers are in this section. Figures 3-22 through 3-23 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

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### **Figure 3-22. M114A1 155-mm Howitzer**

#### **APPLICABILITY**

This load is suitable for the CH-47 and CH-54 helicopters at airspeeds up to and including 90 knots.

#### **LOAD DESCRIPTION**

- Howitzer, towed, 155-mm, M114A1, LIN K57803.
- Weight: 12,660 pounds.

#### **MATERIALS**

- Sling set (25,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tie-down strap, cargo, CGU-1/B, as required.
- Clevis assembly, large, MS 70087-3.

#### **PERSONNEL**

Two persons can prepare and rig this load in 15 minutes.

#### **PROCEDURES**

##### **Step 1. Preparation**

- Stow all howitzer equipment, including sights, in the proper place except for the spade key. Stow the spade key in the section chest. Secure all equipment with tape or nylon cord.
- Secure the section chest on the rear of the trails by routing the tie-down strap through the handles of the chest and both trail lifting handles. Secure excess strap.
- Secure spades to brackets with nylon cord. Secure all cables and hoses to sides of trails with tape or nylon cord.
- Secure trail latching handle in the closed position with nylon cord and insert trail locking pin.



- Engage only one hand brake so the howitzer will not rotate over on the muzzle on touchdown.
- Position the left ballistic shield in the raised position.
- Remove or secure all gun covers.

### **Step 2. Rigging**

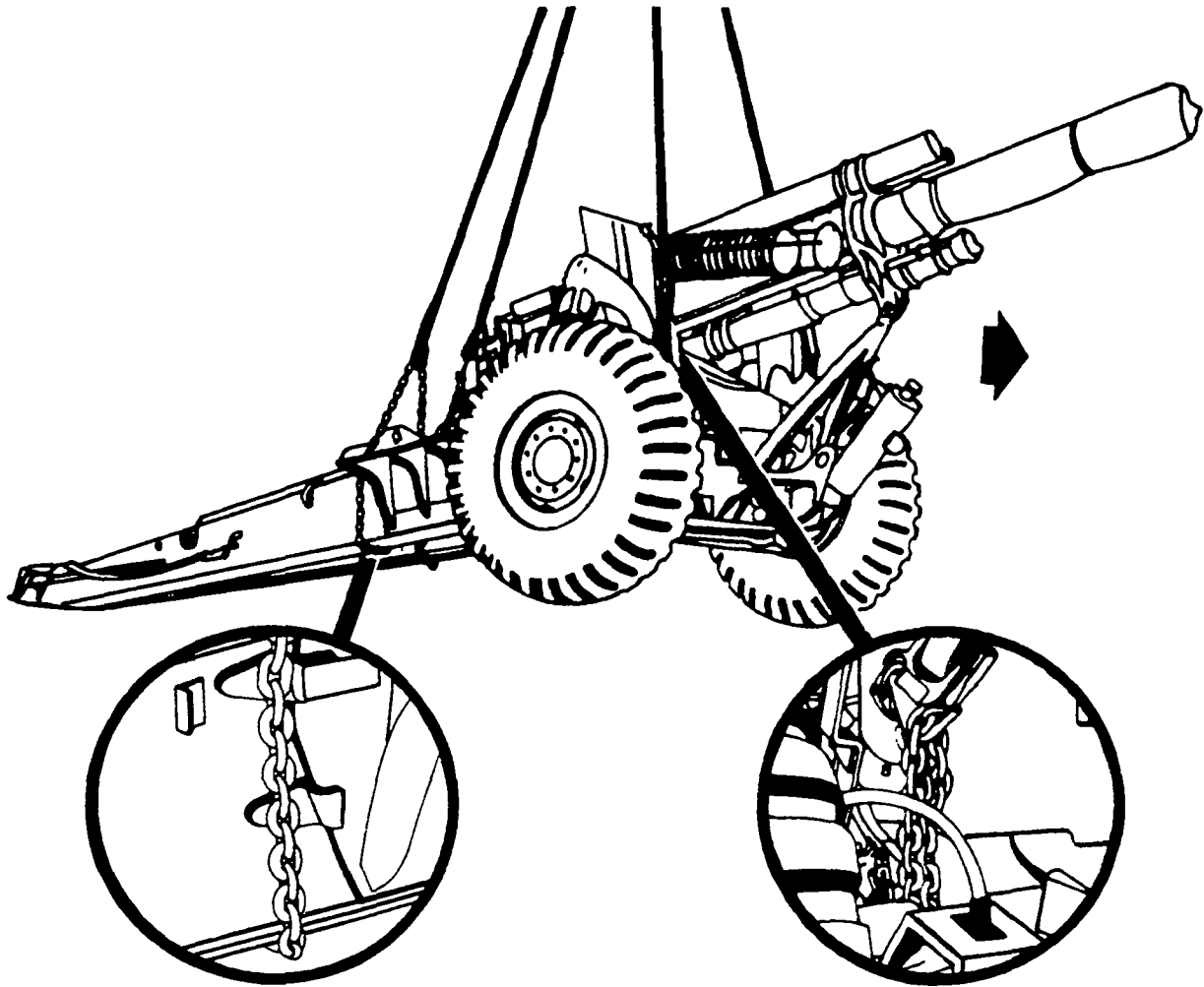
- Position apex fitting on top of the breech. Route outer sling legs 1 and 2 to the barrel and inner sling legs 3 and 4 to the trails. Sling legs 1 and 3 must be on the left side of the load. Position the large clevis on the ground between the trails.
- Loop the chain end of sling leg 1 through the left front lifting bracket inboard of the left wheel and insert link 53 in the grabhook. Repeat with sling leg 2 and the right front lifting bracket. Secure excess chain with tape or nylon cord.
- Pull sling legs 1 and 2 up until the chains are tight and tie or tape (breakaway technique) the grabhooks to the ballistic shields to prevent the sling legs from becoming entangled.
- Loop the chain end of sling leg 3 down through the spade key bracket on the left trail, under the trail, up through the large clevis, and insert link 3 in the grabhook.
- Loop the chain end of sling leg 4 down the outside of the right trail behind the rear edge of the spade, under the trail, up through the large clevis, and insert link 3 in the grabhook.
- Pull the grabhooks on sling legs 3 and 4 tight while keeping the large clevis centered between the trails.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the breech to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

The hookup team stands on the trails near the breech. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the howitzer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 3-23. M114A1 155-mm Howitzer with One A-22 Cargo Bag**

### **APPLICABILITY**

This load is suitable for the CH-47 and CH-54 helicopters at airspeeds up to and including 85 knots.

### **LOAD DESCRIPTION**

- Howitzer, towed, 155-mm, M114A1, LIN K57803.
- Bag, cargo, aerial delivery, Type A-22, 2,200-pound capacity or cargo net.
- Weight:
  - Howitzer, 12,660 pounds.
  - \*Accompanying load, 2,200 pounds.
  - Total, 14,860 pounds.

\* More than one A-22 cargo bag or cargo net may be used with these rigging procedures as long as the total weight of the accompanying load does not exceed 2,500 pounds.

### **MATERIALS**

- Sling set (25,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tie-down strap, cargo, CGU-1/B, as required.
- Clevis assembly, large, MS 70087-3.
- Cargo bag, A-22 (2,200-pound capacity) or cargo net.
- Sling leg assembly (2,500-pound capacity) from a 10,000-pound capacity sling set.

### **PERSONNEL**

Two persons can prepare and rig this load in 35 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Stow all howitzer equipment, including sights, in the proper place except for the spade key. Stow the spade key in the section chest. Secure all equipment with tape or nylon cord.
- Secure the section chest on the rear of the trails by routing the tie-down strap through the handles of the chest and both trail lifting handles. Secure excess strap.

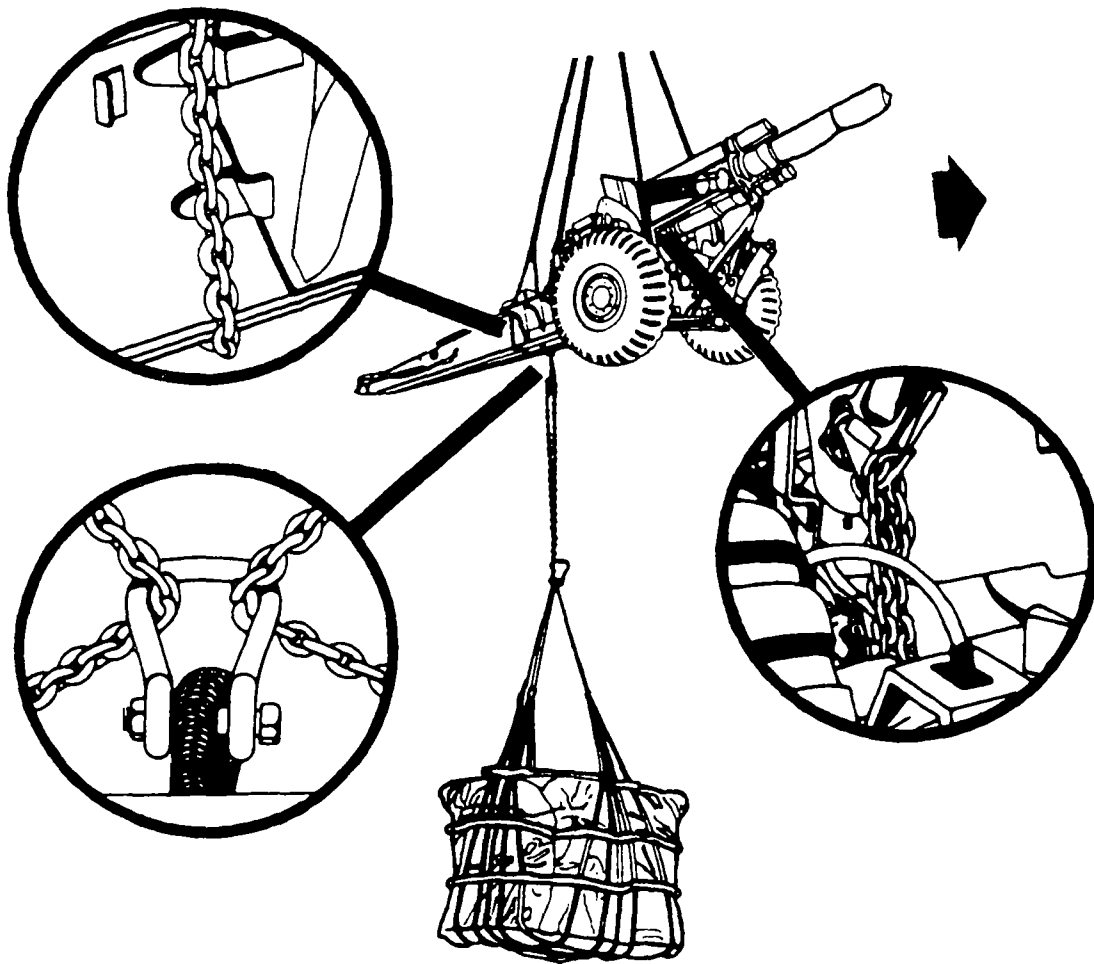
- Secure spades to brackets with nylon cord. Secure all cables and hoses to sides of trails with tape or nylon cord.
- Secure trail latching handle in the closed position with nylon cord and insert trail locking pin.
- Engage only one hand brake so the howitzer will not rotate over on the muzzle on touchdown.
- Position the left ballistic shield in the raised position.
- Remove or secure all gun covers.

## **Step 2. Rigging**

- Rig the accompanying load according to instructions in Chapter 1.
- Position apex fitting on top of the breech. Route outer sling legs 1 and 2 to the barrel and inner sling legs 3 and 4 to the trails. Sling legs 1 and 3 must be on the left side of the load. Position the large clevis on the ground between the trails.
- Loop the chain end of sling leg 1 through the left front lifting bracket inboard of the left wheel and insert link 53 in the grabhook. Repeat with sling leg 2 and the right front lifting bracket. Secure excess chain with tape or nylon cord.
- Pull sling legs 1 and 2 up until the chains are tight and tie or tape (breakaway technique) the grabhooks to the ballistic shields to prevent the sling legs from becoming entangled.
- Loop the chain end of sling leg 3 down through the spade key bracket on the left trail, under the trail, up through the large clevis, and insert link 3 in the grabhook.
- Loop the chain end of sling leg 4 down the outside of the right trail behind the rear edge of the spade, under the trail, up through the large clevis, and insert link 3 in the grabhook.
- Pull the grabhooks on sling legs 3 and 4 tight while keeping the large clevis centered between the trails.
- Remove the bolt from the clevis between the trails, place the eye of the additional sling leg assembly in the clevis and replace the bolt. The sling leg eye must be around the bolt, not around the bell portion of the clevis.
- Route the sling leg assembly under one trail and to the A-22 cargo bag. Loop the chain end through all four D-rings on the A-22 bag suspension web straps or through the medium clevis on the suspension straps. Insert link 3 in the grabhook. If a cargo net is used, you may attach the apex fitting directly to the clevis.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the breech to prevent entanglement during hookup and lift-off.

## **Step 3. Hookup**

The hookup team stands on the trails near the breech. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the howitzer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.



## **ENGINEER EQUIPMENT**

\*The suitable single-point rigging procedures for engineer equipment are in this section. Figures 3-24 through 3-34 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

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### **Figure 3-24. MRS-100 Wheeled Industrial Tractor**

#### **APPLICABILITY**

This load is suitable for CH-47 and CH-54 helicopters at airspeeds of 80 knots.

#### **LOAD DESCRIPTION**

- Tractor wheeled, industrial, MRS-100, LIN W90927.
- Weight: 21,100 pounds.

#### **MATERIALS**

- Sling set (25,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.

#### **PERSONNEL**

One person can prepare and rig this load in 15 minutes.

#### **PROCEDURES**

##### **Step 1. Preparation**

- Sectionalize the tractor from the scraper according to operator's manual instructions.
- Secure the hydraulic lift cylinder in the carrying bracket.
- Ensure that all caps, lids, and hatches are securely fastened.
- Set hand brake and place transmission in neutral.
- Lock the blade in the raised position.

##### **Step 2. Rigging**

- Position apex fitting on driver's seat. Route outer sling legs (1 and 2) to the front of the tractor and inner sling legs (3 and 4) to the rear. Sling legs 1 and 3 should be on the left side of the load.

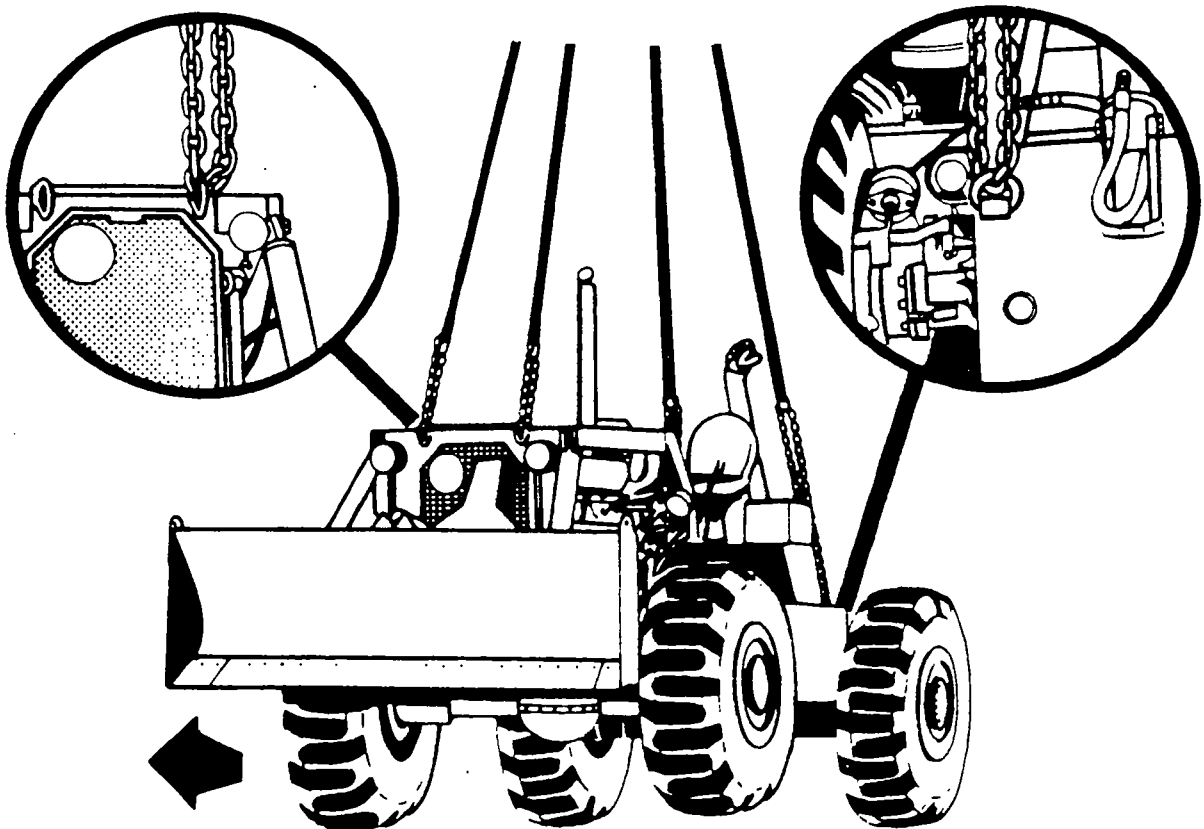
- Loop the chain end of sling leg 1 through the left front lift provision by the radiator and insert link 53 in the grabhook. Repeat with sling leg 2 on the right front lift provision. Secure excess chain with tape or nylon cord.
- Loop the chain end of sling leg 3 through the left rear lift provision near the left brake light and insert link 3 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the tractor to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on the driver's seat. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the tractor and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 3-25. M5 8-Foot Aggregate Spreader**

### **APPLICABILITY**

This load is suitable for UH-1 and CH-47 helicopters at airspeeds of 90 knots.

### **LOAD DESCRIPTION**

- Spreader, aggregate, towed, 8-foot, M5, LIN U12063.
- Weight: 2,290 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

One person can prepare and rig the load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

Remove operator's platform and block off plates. Secure them inside the spreader with nylon cord.

#### **Step 2. Rigging**

- Position apex fitting on top of spreader. Route outer sling legs 1 and 2 to the front (tongue end) of the spreader and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lifting eye on the left front corner and insert link 3 in the grabhook. Repeat with sling leg 2 on the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lifting eye on the left aft corner and insert link 3 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

#### **Step 3. Hookup**

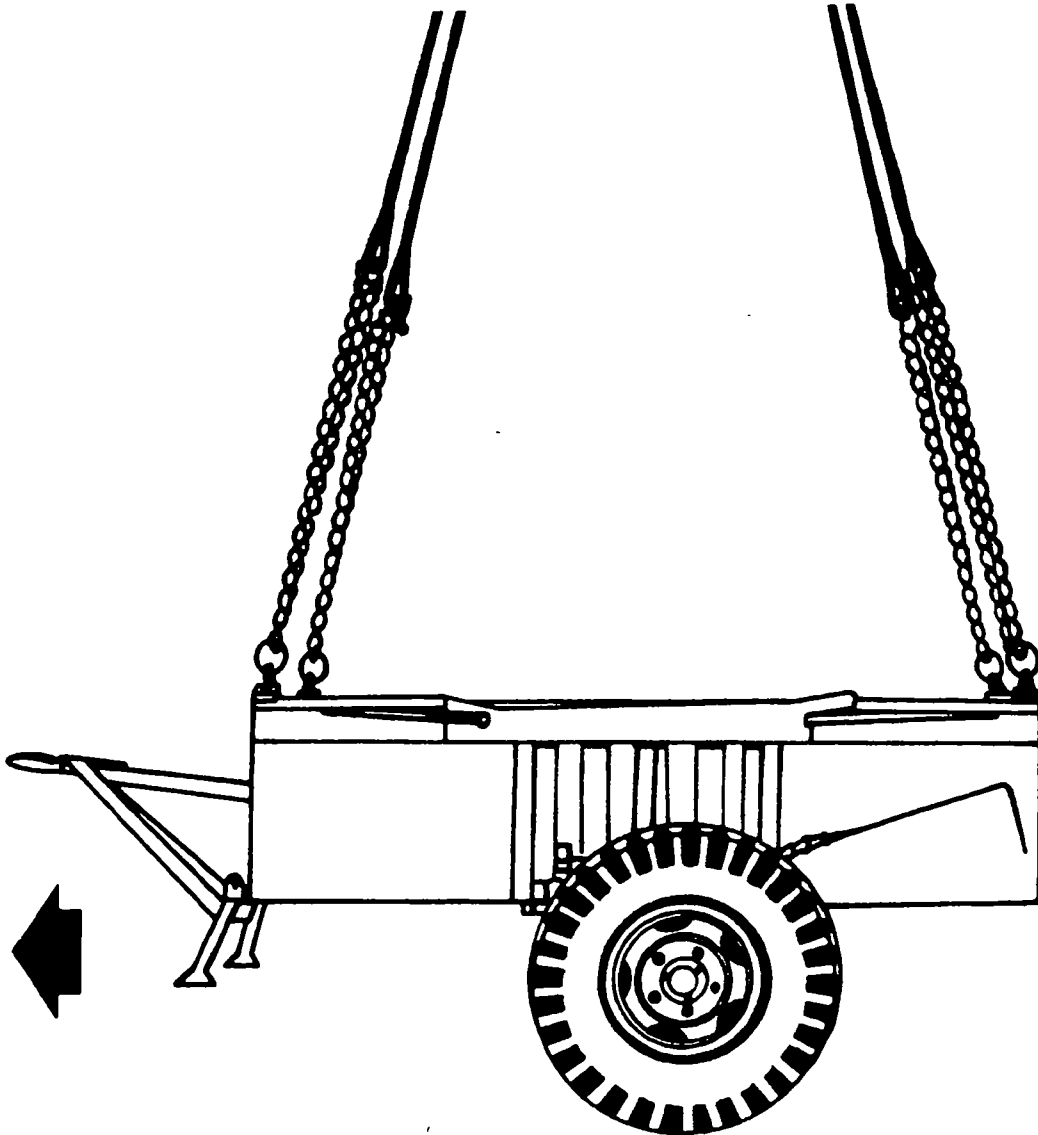
The hookup team stands on top of the spreader. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the spreader and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the



hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

#### Step 4. Derigging

The derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 3-26. Roller, Towed, Vibrating, 1-Drum, 5-Ton, VR 55TM**

### **APPLICABILITY**

This load is suitable for the CH-47 helicopter at airspeeds of 90 knots.

### **LOAD DESCRIPTION**

- Roller, towed, vibrating, Essick model, VR 55TM, one drum, 5-ton, LIN S10682.
- Weight: 3,450 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig the load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Tie front and rear support legs in DOWN position with nylon cord.
- Secure battery box cover and engine top cover with nylon cord.

#### **Step 2. Rigging**

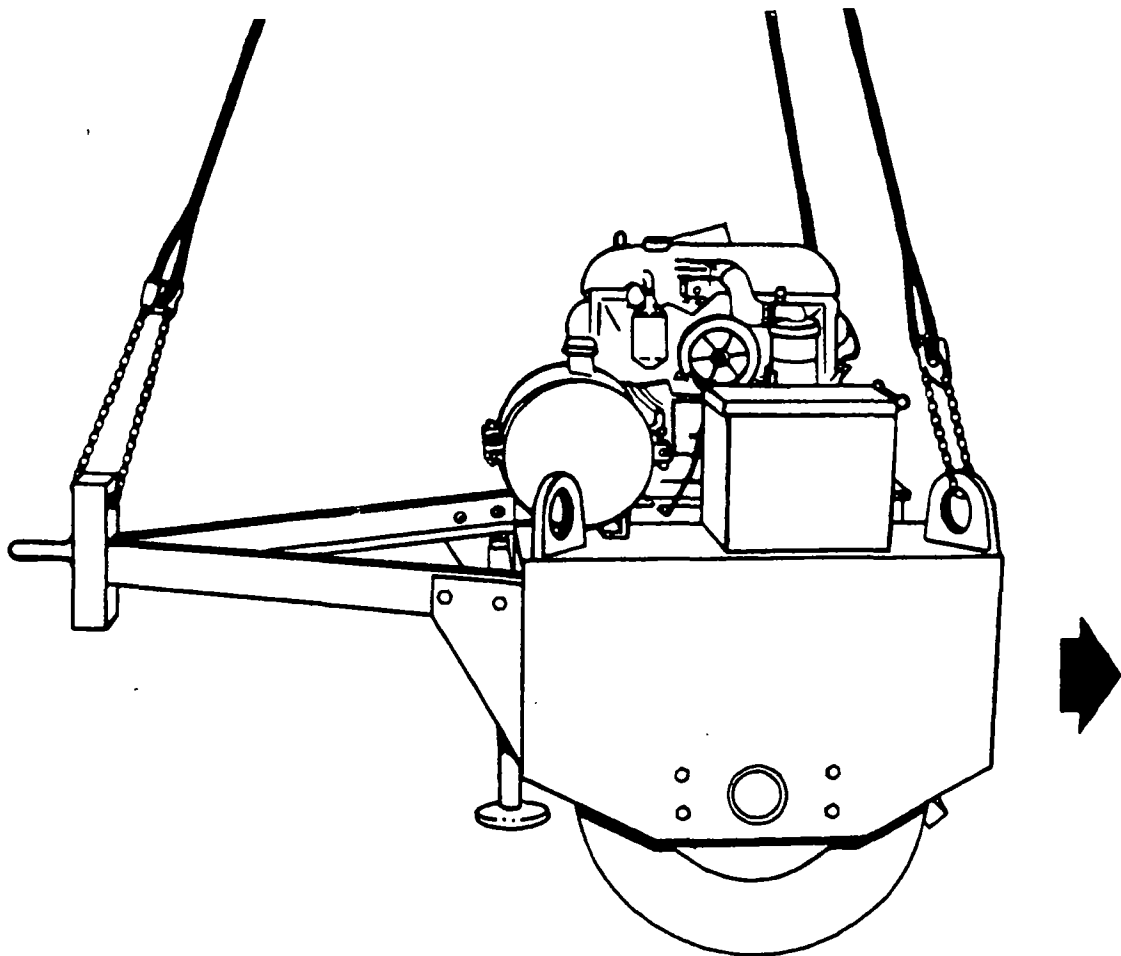
- Position apex fitting on top of the roller. Route outer sling legs 1 and 2 to the front (pintle) end of the roller and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the same side.
- Loop the chain end of sling leg 1 and 2 through the front lifting point on top of pintle eyelet and insert link 20 in the grabhook.
- Loop the chain end of sling leg 3 through the left rear lifting provision located on the left rear corner of the roller and insert link 90 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on top of the roller. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the roller and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 3-27. Roller, Road, Towed, Wheeled, 13-Tire, 9-Ton**

### **APPLICABILITY**

This load is suitable for the CH-47 helicopter at airspeeds up to and including 90 knots.

### **LOAD DESCRIPTION**

- Roller, road towed, wheeled, 13-tire, 9-ton, 67B-MIL, LINS12164, NSN 3895-00-051-7213.
- Weight: 3,300 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4 inch, 80-pound breaking strength.
- Tie-down, cargo, CGU-1/B.
- Chock blocks (2 each).

### **PERSONNEL**

Two persons can prepare and rig this load in 10 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Secure drain plugs with tape.
- Raise tongue and secure in place with tie-down strap.
- Place chock blocks by each set of rollers.

#### **Step 2. Rigging**

- Position apex fitting on top of the roller. Route outer sling legs 1 and 2 to the front of the roller and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located on the left front corner of the roller and insert link 3 in the grabhook. Repeat with sling leg 2 on the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lift provision located on the left rear corner of the roller and insert link 3 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.

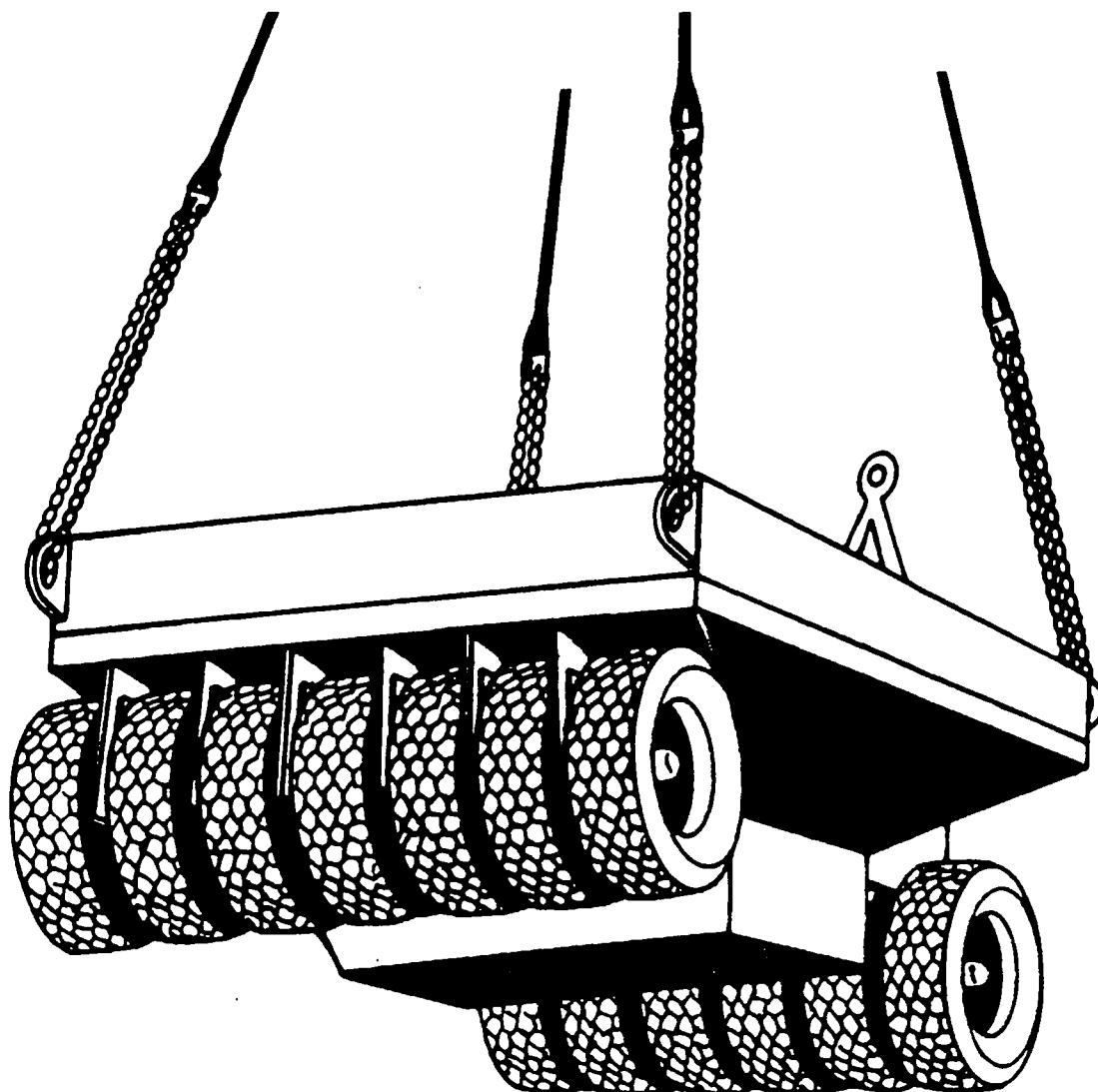
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on the roller. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the roller and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 3-28. Tar Kettle, 165-Gallon Capacity 7ZPSAP Bitumen, Kettle**

### **APPLICABILITY**

This load is suitable for the UH-1 helicopter at airspeeds of 70 knots.

### **LOAD DESCRIPTION**

- Kettle, heating, bitumen (165 gallon capacity)
  - LIN: L21437, NSN 3895-00-051-3834.
  - Weight: 1,750 pounds.
- Kettle, bitumen, trailer-mounted, 7ZPSAP.
  - LIN: L21437, NSN 3895-00-247-7593.
  - Weight: 1,900 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig this load in 10 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Secure trailer front support leg in DOWN position. Secure all safety chains, vehicle cables, and hoses in place with tape or nylon cord.
- Secure any loose covers or equipment with nylon cord.
- Engage parking brake.

#### **Step 2. Rigging**

- Position apex fitting on top of the tar kettle. Route outer sling legs 1 and 2 to the front of the trailer and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lifting ring located on the trailer beside the left front corner of the tar kettle and insert link 5 in the grabhook. Repeat with sling leg 2 on the right front lift provision.

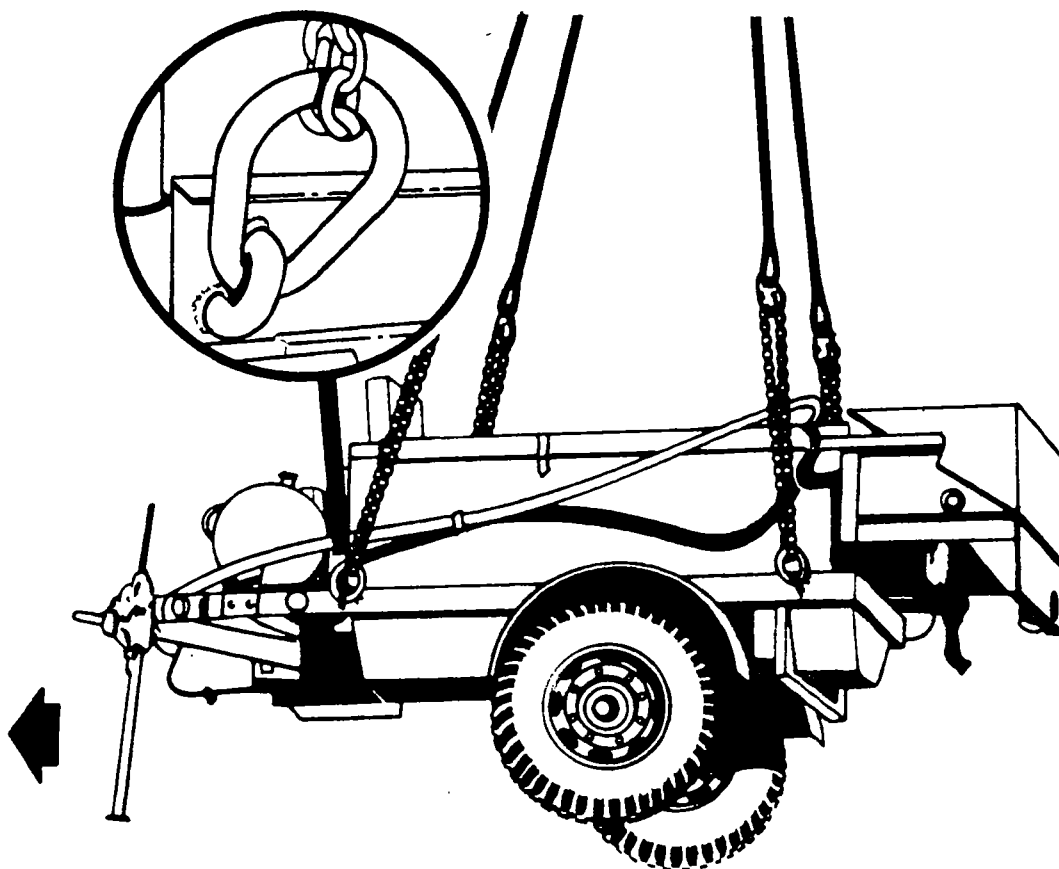
- Loop the chain end of sling leg 3 through the left rear lifting ring located on the left rear corner of the trailer and insert link 20 in the grabhook. Repeat with sling leg 4 on the right rear lift provision. Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on frame along side the kettle. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the kettle and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## Figure 3-29. 16SM Concrete Mixer

### APPLICABILITY

This load is suitable for the CH-54 helicopter at airspeeds of 90 knots.

### LOAD DESCRIPTION

- Mixer, concrete, trailer-mounted, 16SM, LIN M54151.
- Weight: 6,040 pounds.

### MATERIALS

- Sling set (10,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Tie-down strap, cargo, CGU-1/B, as required.
- Chock blocks, 6- x 6- x 24-inch (4 each).
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### PERSONNEL

Two persons can prepare and rig the load in 20 minutes.

### PROCEDURES

#### Step 1. Preparation

- Place chock blocks to the inside of each wheel.
- Secure tongue in raised position with tie-down strap.
- Secure scoop elevating wheel with scoop in raised position. Use rope or nylon cord.

#### Step 2. Rigging

- Place apex fitting on cupola on top of concrete mixer. Route outer sling legs 1 and 2 to the front (tongue end) of the mixer and inner sling legs 3 and 4 to the rear end. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lifting eye on the trailer frame near the left front wheel and insert link 3 in the grabhook. Repeat with sling leg 2 on the right front lift provision.
- Route sling leg 3 inside the scoop elevating wheel and loop the chain end through the left rear lifting eye on the trailer frame near the left rear wheel. Insert link 3 in the grabhook.
- Route sling leg 4 inside the fan belt housing and loop the chain end through the right rear lifting eye on the trailer frame near the right rear wheel. Insert link 3 in the grabhook.



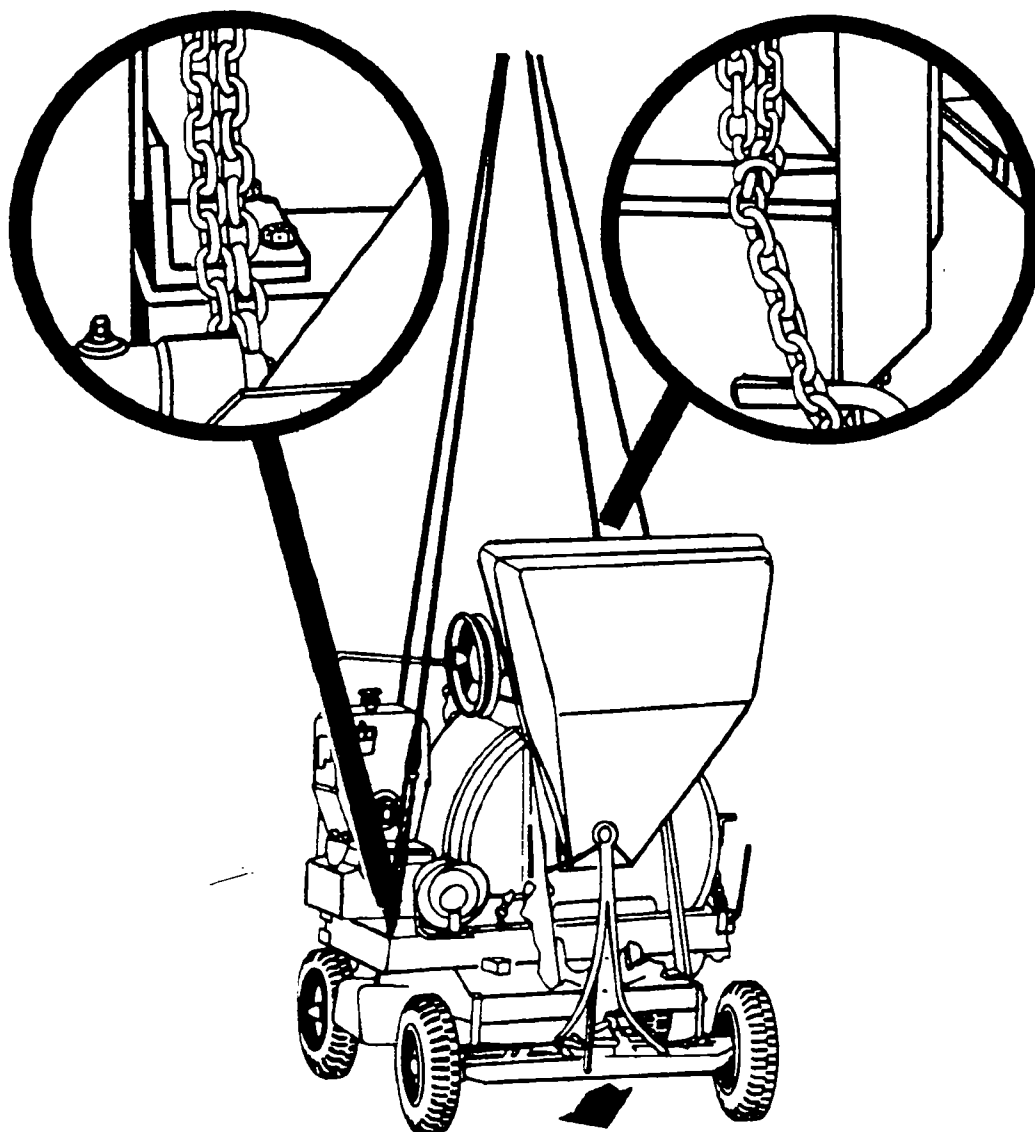
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on top of the mixer. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the mixer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 3-30. Road Sweeper, Towed**

### **APPLICABILITY**

This load is suitable for the UH-1 helicopter at speeds of 80 knots.

### **LOAD DESCRIPTION**

- Sweeper, rotary towed, with 150-gallon water tank sprinkling system, LIN U76871.
- Weight: Empty, 2,120 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig the load in 10 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Rotate the towing bar around and secure in place to the top horizontal bar. Secure safety chains in place with nylon cord.
- Rotate brush to the last locking hole and secure with the locking pin.
- Secure hydraulic handle in the UP position with nylon cord.

#### **Step 2. Rigging**

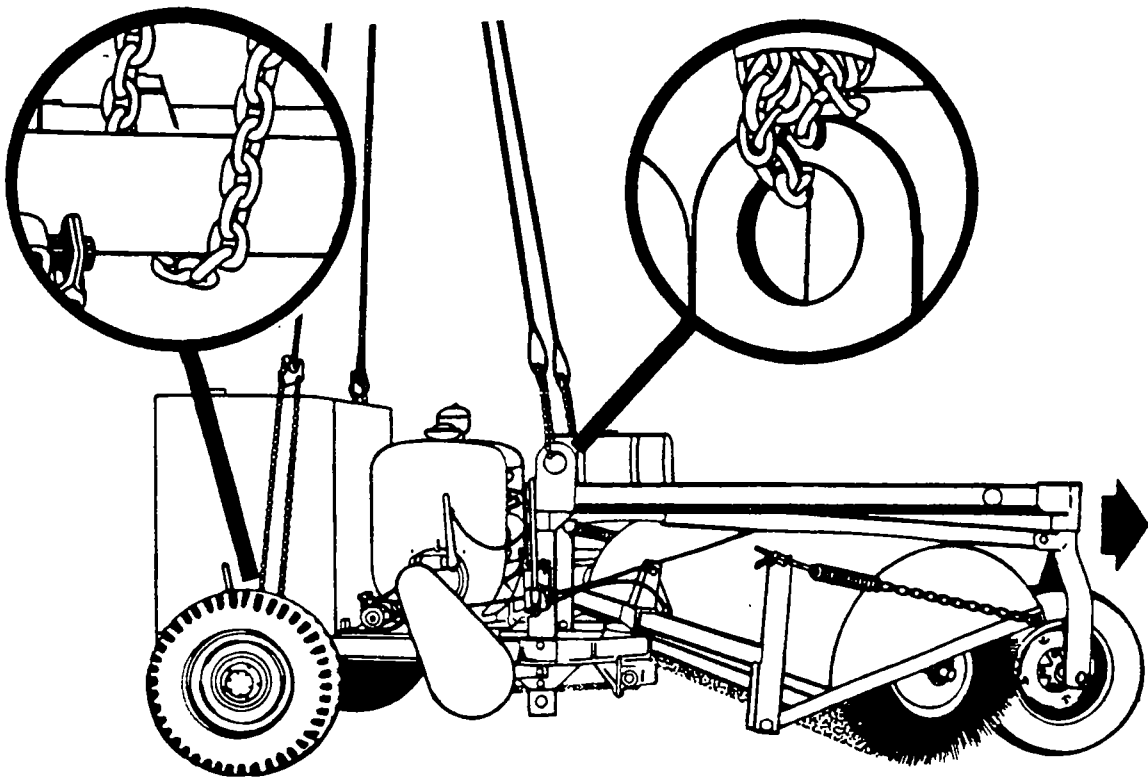
- Position apex fitting on top of the road sweeper. Route outer sling legs 1 and 2 to the front of the engine and inner sling legs 3 and 4 to the rear axle. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lifting point and insert link 90 in the grabhook. Repeat with sling leg 2 on the right front lift provision. Secure excess chain with tape or nylon cord.
- Loop the chain end of sling leg 3 around the axle by the left wheel and insert link 3 in the grabhook. Repeat with sling leg 4 around the rear axle by the right wheel.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on the frame next to the engine. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the mixer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

2. Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 3-31. Sheepfoot Roller, Two-Drum, MD-96**

### **APPLICABILITY**

This load is suitable for the CH-47 helicopter at airspeeds up to 80 knots.

### **LOAD DESCRIPTION**

Roller, towed, sheepfoot, two-drum, MD-96, LIN S12575, NSN 3895-00-134-7981. Weight: 7,500 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Chain assembly, 2 each.

### **PERSONNEL**

Two persons can prepare and rig the load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Wrap a chain 4 or 5 times around the two lower tie-down points aft of the inner sections of the drums and engage hook in the chain end to prevent the two drum sections from pivoting upwards. Secure the hook with tape or nylon cord so the hook will not disengage.
- Repeat using the other chain on the two forward lower tie-down points.

#### **Step 2. Rigging**

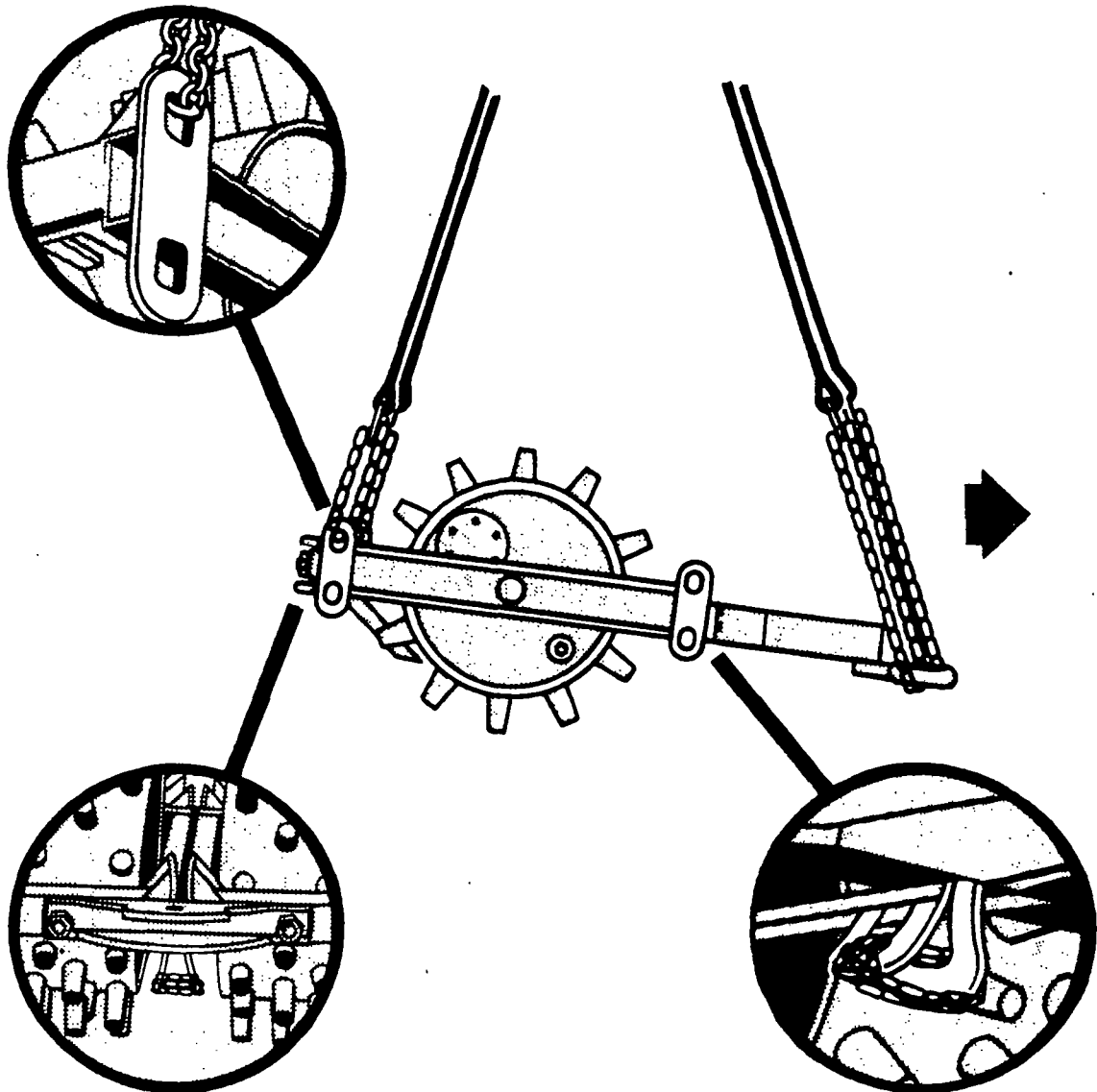
- Position apex fitting on top of the two rollers. Route outer sling legs 1 and 2 to the front (tongue end) of the rollers and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 and 2 through the lunette and insert link 3 in the grabhook.
- Loop the chain end of sling leg 3 through the left rear lifting provision on the aft left corner of the left roller and insert link 3 in the grabhook. Repeat with sling leg 4 on the right rear lifting provision on the right roller.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands beside the rollers. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## Figure 3-32. Model 1150 Full-Track Tractor

### APPLICABILITY

This load is suitable for the CH-54B helicopters as a single load at airspeeds of 85 knots. This load is also suitable for CH-47 and CH-54 helicopters as two separate loads at airspeeds of 90 to 100 knots.

### LOAD DESCRIPTION

- Tractor, full-tracked, case model 1150, NSN 2410-00-177-7041.
- Weight:
  - Tractor without ROPS, 21,930 pounds.
  - Tractor without blade, 18,740 pounds.

### MATERIALS

- Sling set (25,000-pound capacity).
- Sling set (10,000-pound capacity) two sling legs only, forblade section.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Two protective plugs for hydraulic lines, if sectionalizing tractors.

### PERSONNEL

One person can rig each load in 5 minutes. Two persons can remove ROPS and sectionalize the tractor and blade in 2 hours.

### PROCEDURES

#### Step 1. Preparation

- Sectionalize the load, if required, according to the operator's manual. Install protective caps over hoses and install trunnion caps securely.
- Place transmission in neutral.

#### Step 2. Rigging

- Tractor without ROPS:
  - Position apex fitting on top of the center of the tractor. Route outer sling legs 1 and 2 to the front of the tractor and inner sling leg 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.

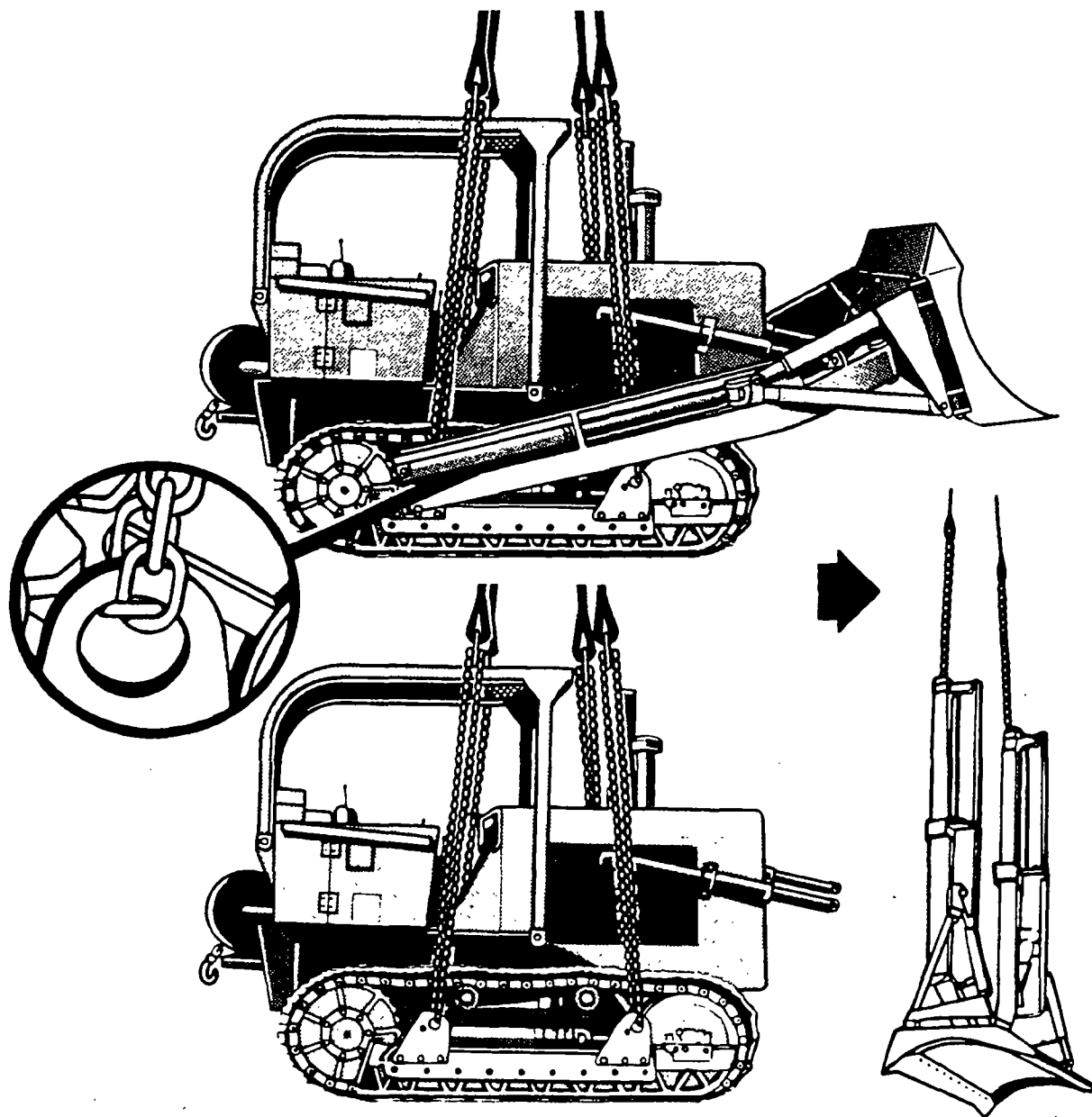
- Loop the chain end of sling leg 1 through the left front lift provision located by the front idler and insert link 3 in the grabhook. Repeat with sling leg 2 and the right front lift provision.
  - Loop the chain end of sling leg 3 through the left rear lift provision located outboard of the drive sprocket and insert link 3 in the grabhook. Repeat with sling leg 4 and the right rear lift provision.
  - Cluster and tie or tape (breakaway technique) all sling legs together on top of the tractor to prevent entanglement during hookup and lift-off.
- Tractor without blade assembly:
    - Position apex fitting and route the sling legs as in the first step for tractor without ROPS.
    - Loop the chain end of sling leg 1 through the left front lift provision located by the front idler and insert link 3 in the grabhook. Repeat with sling leg 2 and the right front lift provision.
    - Loop the chain end of sling leg 3 through the left rear lift provision located outboard of the drive sprocket and insert link 23 in the grabhook. Repeat with sling leg 4 and the right rear lift provision. Secure excess chain with tape or nylon cord.
    - Cluster and tie or tape (breakaway technique) all slinglegs together on top of the tractor to prevent entanglement during hookup and lift-off.
  - Blade assembly:
    - Position the apex fitting between the two trunnion arms. Loop the chain end of the left sling leg through the hole in the left trunnion cap and insert link 3 in the grabhook. Repeat with the right sling leg and the right trunnion arm.
    - Cluster and tie or tape (breakaway technique) both sling legs together to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

The hookup team stands on the driver's seat or beside the blade assembly. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the tractor and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## **Figure 3-33. M4K 4,000-Pound Forklift**

### **APPLICABILITY**

This load is suitable for CH-47 helicopters at airspeeds up to and including 100 knots.

### **LOAD DESCRIPTION**

- Forklift, rough terrain, 4000-pound, M4K, LIN T49255.
- Weight: 9,725 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Padding, felt, or suitable substitute.
- Tie-down strap, cargo, CGU-1/B.

### **PERSONNEL**

Two persons can prepare and rig this load in 20 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Insert locking pin or bolt and nut to prevent the front end and rear end from pivoting in flight.
- Secure the steering wheel with nylon cord. Engage hand brake.
- Make sure fuel tank is less than 3/4 full.
- Place felt padding or suitable substitute on the forward edge of the ROPS so that the sling legs do not chafe. Secure padding with tape or nylon cord.
- Raise the fork tines approximately 1 foot above the ground. Lift the ends of the fork tines by hand to point upward and secure the fork tines to the lift cylinder frame using the tie-down strap.

#### **Step 2. Rigging**

- Position apex fitting on top of the engine hood. Route outer sling legs 1 and 2 to the front of the forklift. Make sure the sling legs are routed behind the lower driving light box beam that is mounted on top of the front fenders.

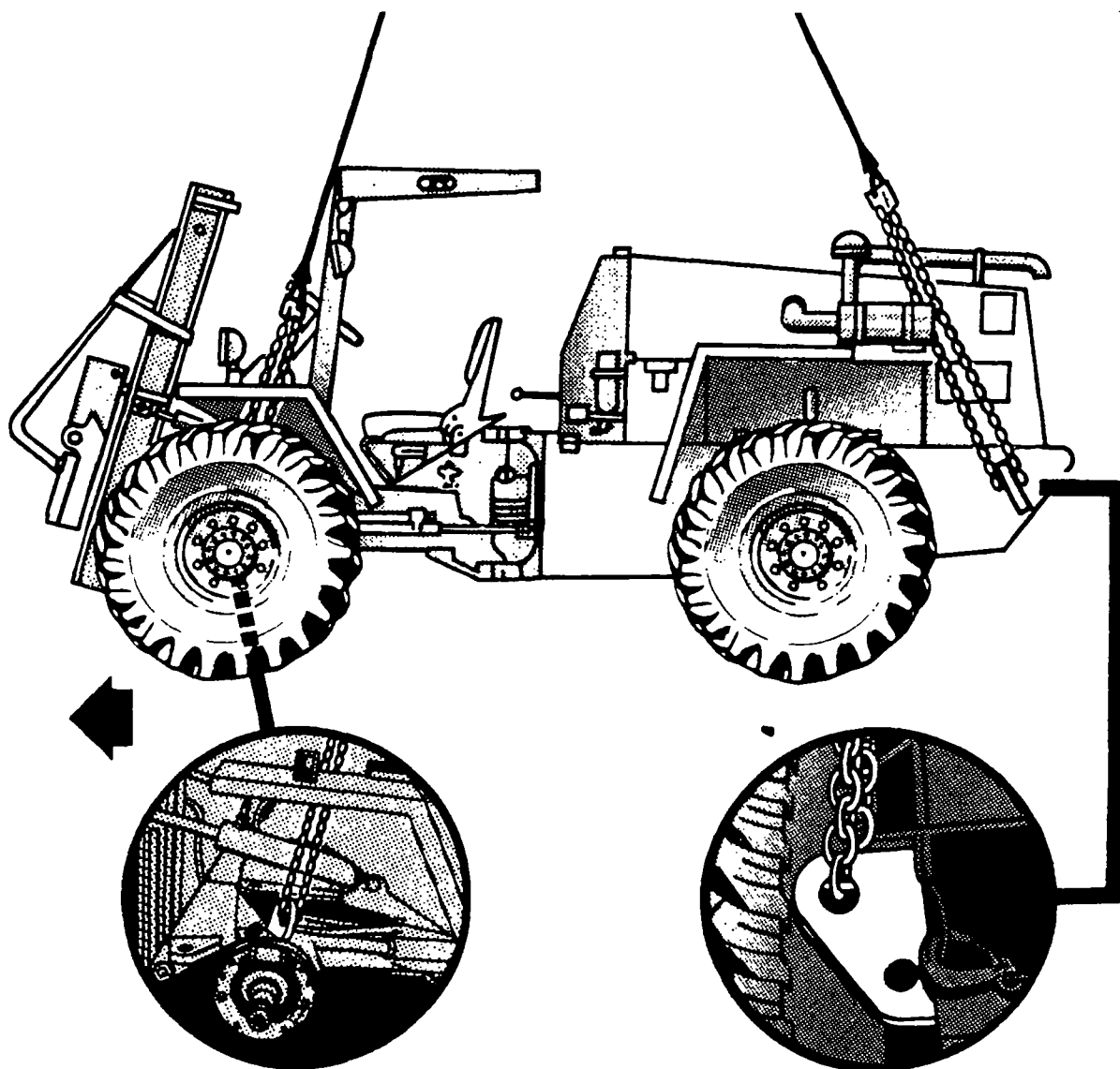
- Route inner sling legs 3 and 4 to the rear of the forklift. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision that is located directly above the forward axle housing between the left front tire and the hydraulic cylinder. Insert link 25 in the grabhook. Repeat with sling leg 2 on the right front lift provision. Do not loop the chain through the tie-down provisions. Secure excess chain with tape or nylon cord.
- Loop the chain end of sling leg 3 through the top hole in the left rear lift provision and insert link 3 in the grabhook. Repeat with sling leg 4 and the right rear lift provision.
- Pull the front sling legs up and tape or tie (breakaway technique) the grabhooks to the front side of the upper light brackets to ensure the sling legs do not become entangled on the fenders or light brackets.
- Pull the aft sling legs together on top of the engine compartment and tie or tape (breakaway technique) the grabhooks together.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the forklift to prevent entanglement with the ROPS or air cleaner/exhaust during hookup and lift-off.

### **Step 3. Hookup**

The hookup team stands on top of the engine deck. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the forklift and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 3-34. Floodlight Set, Trailer-Mounted**

### **APPLICABILITY**

This load is suitable for the UH-60 and CH-47 helicopters at airspeeds of 100 and 85 knots respectively.

### **LOAD DESCRIPTION**

- Floodlight set, M762 trailer-mounted, Model No. HLT-3KW-M.1, LIN F79334, NSN 6230-01-056-5238. Weight: 2,300 pounds.

### **MATERIAL**

- Sling set (10,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cotton webbing, 1/4-inch, 80-pound breaking strength.
- Tie-down straps, CGU-1/B, as required.

### **PERSONNEL**

Two persons can prepare and rig this load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Make sure that the generator set is secured in place with the security bolts. Use CGU-1/B tie-down straps, if necessary.
- Secure mast sections and lights in place with nylon cord.
- Secure vehicle cables and safety chains to trailer tongue with nylon cord. Secure any loose hoses, cable, or other equipment with tape or nylon cord.
- Engage parking brake. Raise all leveling legs to the full up position. Secure trailer tongue leg in the down position.

#### **Step 2. Rigging**

- Place the apex fitting on top of the floodlight set. Route outer slings legs 1 and 2 to the front of the trailer and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located on the left side of trailer and insert link 40 in the grabhook. Repeat with sling leg 2 on the right front lift provision.

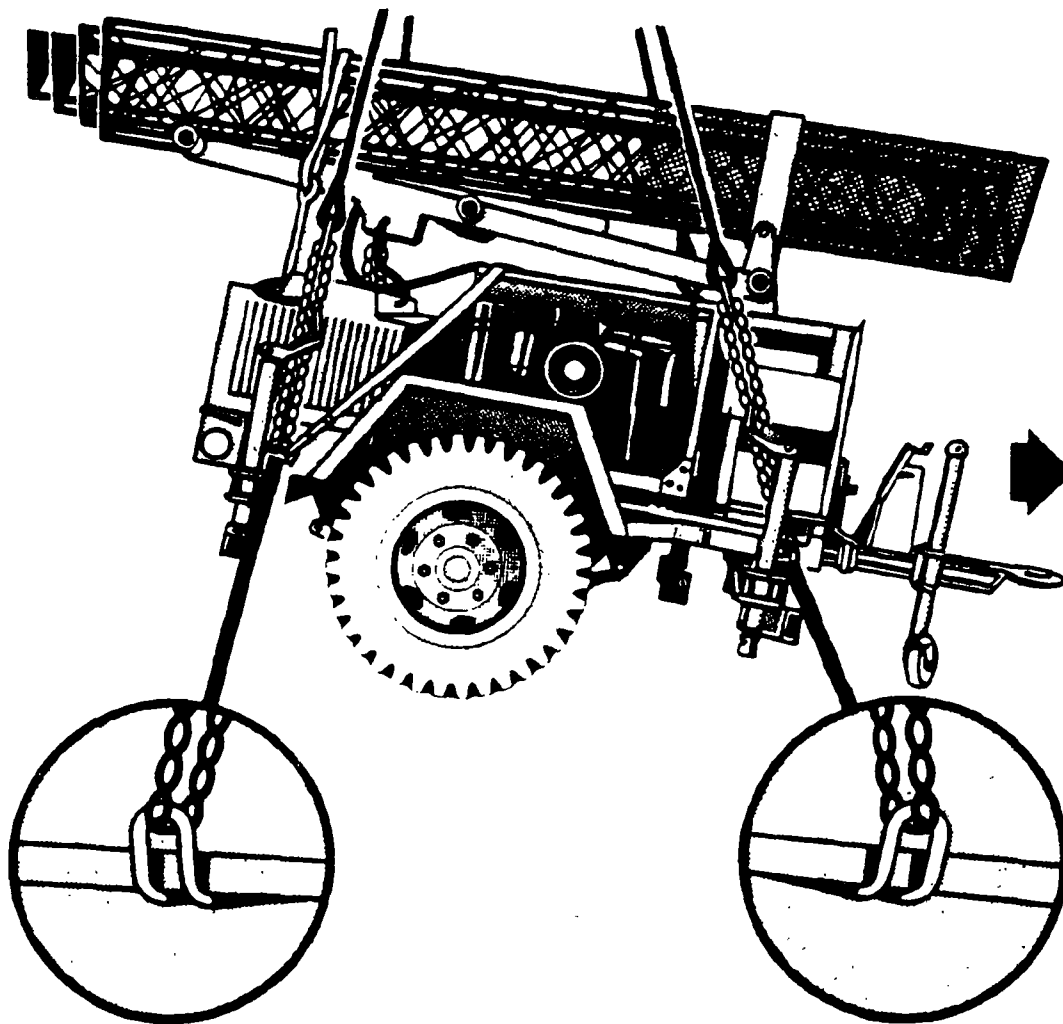
- Loop the chain end of sling leg 3 through the left rear lifting ring located on the left rear side of the tank and insert link 100 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands alongside the load. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## LIQUID CONTAINERS

\*The suitable single-point rigging procedures for liquid containers are in this section. Figures 3-35 through 3-37 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

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### Figure 3-35. Assembly, Tank, Fabric, Collapsible, 10,000-Gallon

#### APPLICABILITY

This load is suitable for the UH-1 helicopter at airspeeds of 35 knots.

**NOTE:** This load may become unstable at airspeeds higher than 35 knots.

#### LOAD DESCRIPTION

- Assembly, tank, fabric, collapsible, 10,000-gallon, LIN V12552.
- Weight: 1,040 pounds.

#### MATERIALS

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

#### PERSONNEL

Two persons can prepare and rig this load in 10 minutes.

#### PROCEDURES

##### Step 1. Preparation

Make sure that all safety latches on the cover are secured shut.

##### Step 2. Rigging

**NOTE:** Do not carry more than one tank at a time.

- Position apex fitting on top of the center of the tank. Route outer sling legs (1 and 2) to the front of the tank and inner sling legs (3 and 4) to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lifting ring located on the left forward side of the tank and insert link 100 in the grabhook. Repeat with sling leg 2 on the right front lift provision.

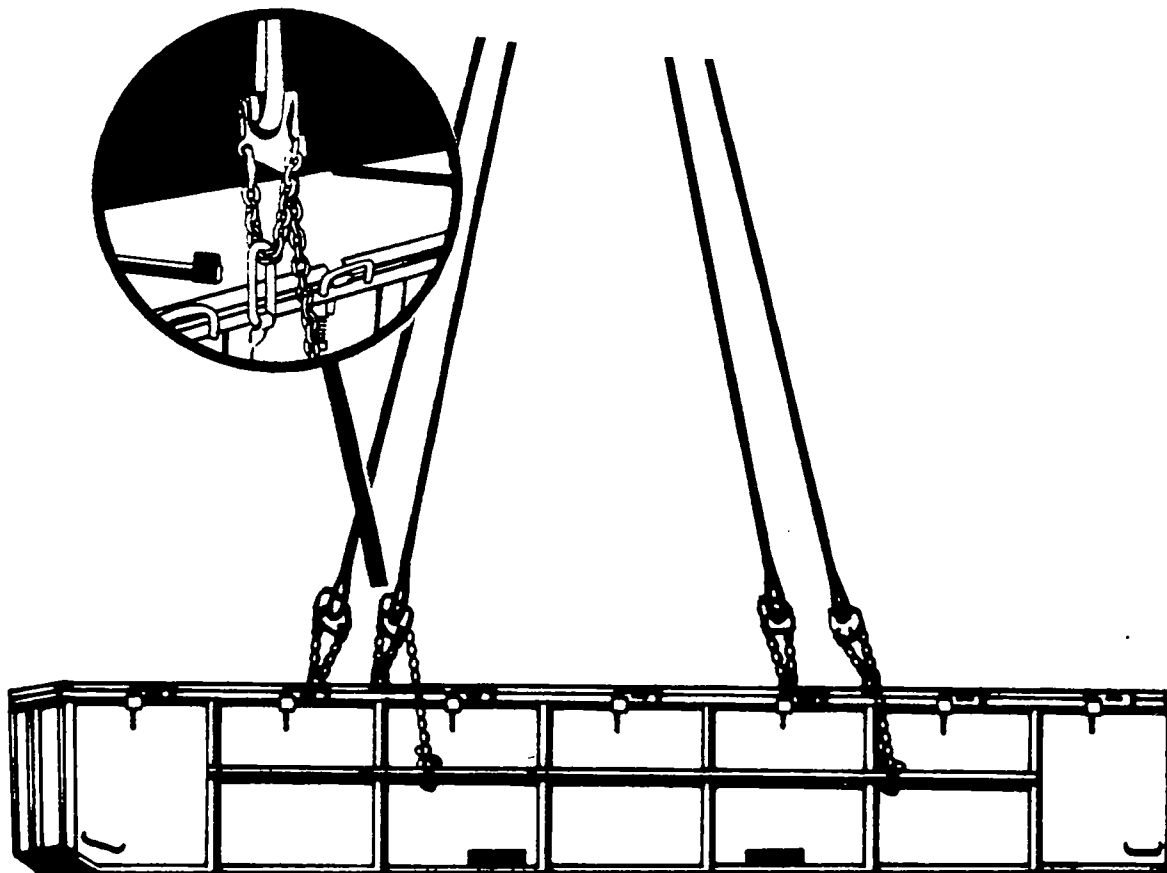
- Loop the chain end of sling leg 3 through the left rear lifting ring located on the left rear side of the tank and insert link 100 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands alongside the load. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 3-36. 60,000-Gallon Fuel System Supply Point**

### **APPLICABILITY**

These five net loads are suitable for the CH-47 or CH-54 helicopter as two lifts at airspeeds up to 100 knots or as one lift at airspeeds of 80 knots.

### **LOAD DESCRIPTION**

- Fuel system, supply point, 60,000-gallon, LIN J04716, with six collapsible fabric petroleum tanks, hoses, fittings, tools, signs, and nine fire extinguishers.
- Pump assembly, flammable liquid, US36ACG, LIN P96845.
- Weight:
  - Pump, Net 1, 1,300 pounds Load #1
  - Tanks, Net 2, 6,000 pounds 7,300 pounds
  - Hoses, Net 3, 2,000 pounds
  - Hoses, Net 4, 2,200 pounds Load #2
  - Hoses, Net 5, 4,000 pounds 8,200 pounds
  - TOTAL: 15,500 pounds
- The six collapsible tanks are consolidated in three metal containers along with all fittings.

### **MATERIALS**

- Net, helicopter, cargo-carrying, external (5,000-pound capacity) (4 each).
- Net, helicopter, cargo-carrying, external (10,000-pound capacity).
- Sling set (10,000-pound capacity) (2 each).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Apex fitting (25,000-pound capacity) if rigged as one load.

### **PERSONNEL**

Eight persons can prepare and rig the load in 60 minutes.



## PROCEDURES

### Step 1. Preparation

- Spread out all five nets side by side.
- Place applicable equipment inside the proper cargo net.
- Net 1 (5,000-pound capacity cargo net) - Roll pump onto center of net.
- Net 2 (10,000-pound capacity cargo net) - Place two metal containers with fuel tanks and fittings centered in net 2, set third container on top center of stack.
- Net 3 (5,000-pound capacity cargo net) - Place both filters in center of net 3. Lash three fire extinguishers to each side of filters with nylon cord and place six rolled hoses on top of filters, pull net up around the load, and secure corners to top of pumps.
- Net 4 (5,000-pound capacity cargo net) - Place 15 long hoses side by side in the center of net 4. Build a pyramid of 120 hoses in the net, and pull the net closed.
- Net 5 (5,000-pound capacity cargo net) - Tie all signs on a pallet with nylon cord and place pallet at one end of net 5; place four fire extinguishers on a second pallet, lying down, next to the first pallet; pile all remaining hoses in net.

### Step 2. Rigging

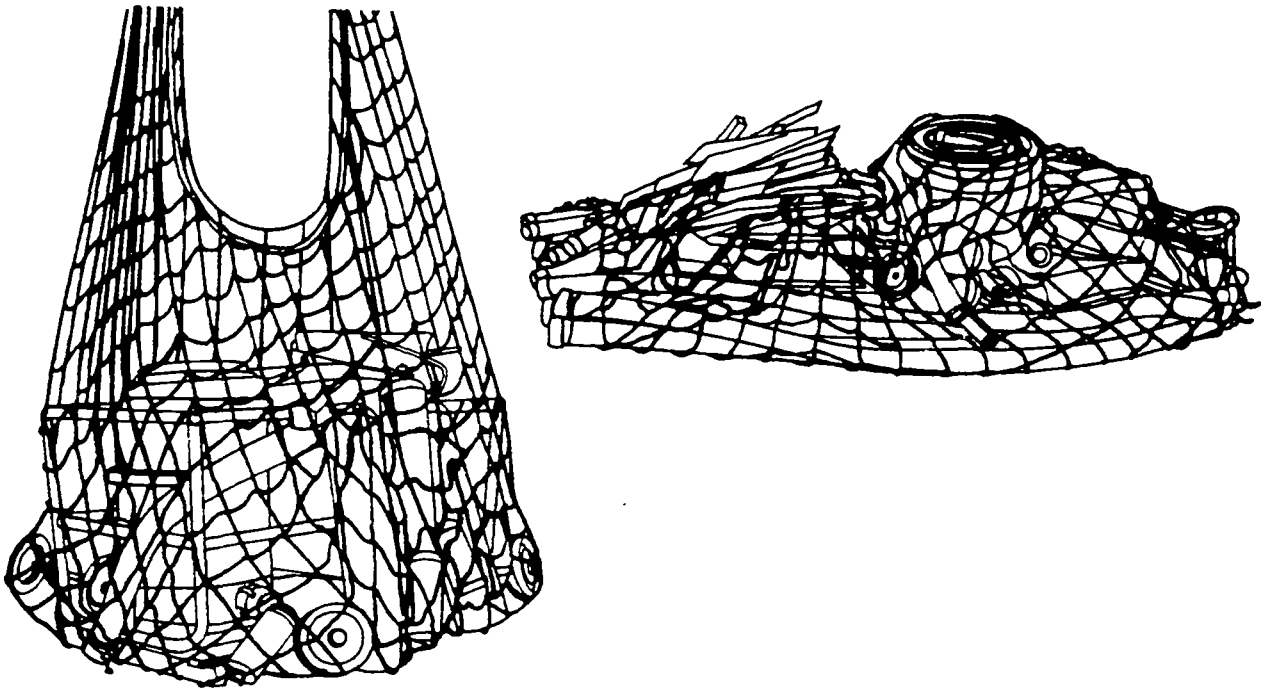
- Rig each cargo net using instructions in Chapter 1.
- Load 1 (10,000-pound sling set).
  - Loop the chain end of three sling legs through the apex fitting on net 2 and insert link 3 in the grabhook.
  - Loop the chain end of one sling leg through the apex fitting on net 1 and insert link 3 in the grabhook.
  - Load 2 (10,000-pound capacity sling set). Loop the chain ends of two sling legs through the apex fitting on net 3 and insert link 3 in the grabhook.
  - Repeat the first step under load 2 on net 4.
  - Loop the chain ends of two sling legs through the apex fitting on net 5 and insert link 3 in the grabhook.
- If transported as one load, place both 10,000-pound sling set apex fittings in a 25,000-pound apex fitting before attaching the load to the helicopter cargo hook.

### Step 3. Hookup

The hookup team stands beside the cargo nets. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## Figure 3-37. One to Six 250-Gallon Water Drums

### APPLICABILITY

This load is suitable for the UH-1 (one drum) at airspeeds of 80 knots, and the CH-47 (six drums) at airspeeds of 110 knots.

### LOAD DESCRIPTION

- Drum, fabric, water, 250-gallon capacity, LIN G68998.
- Weight:
  - Drum, empty, 210 pounds.
  - One drum, 2,210 pounds.
  - Two drums, 4,420 pounds.
  - Three drums, 6,630 pounds.
  - Four drums, 8,840 pounds.
  - Five drums, 11,050 pounds.
  - Six drums, 13,260 pounds.

**NOTE:** Weight is based on 2,000-pound/250-gallon drum as a planning guide; percent of fill of drum(s) will normally be less than this planning figure.

### MATERIALS

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Five and six drum configurations:
  - Two additional sling leg assemblies (2,500-pound capacity) from a 10,000-pound sling set.
  - Apex fitting (25,000-pound capacity), one additional.

### PERSONNEL

One person can prepare and rig one drum in 5 minutes; add 5 minutes for each additional drum.

## PROCEDURES

### Step 1. Preparation

Align all drums side by side (if appropriate) and rotate hubs of each drum so that a clevis is positioned at the top.

### Step 2. Rigging

**NOTE:** Route sling legs so that the odd numbered sling legs are to one side of the drum(s) and the even numbered sling legs are to the other side(s).

- One drum:

- Position apex fitting beside the drum. Route one outer and one inner sling leg (1 and 3) to one side of drum and the other two sling legs (2 and 4) to the other side of drum.
- Loop chain end of each sling leg through the clevis at the top of the hub of the drum and insert link 3 of each chain in its own grabhook.
- A single drum may be transported by a two-leg sling set, attaching one sling leg to each hub.

- Two drums:

- Position apex fitting beside or on top of two drums. Route outer sling legs 1 and 2 to one drum and inner sling legs 3 and 4 to the other drum.
- Loop the chain end of each sling leg through the appropriate clevis at the top of the hub on each drum and insert link 3 in the grabhook.

- Three drums:

- Position apex fitting beside or on top of the three drums. Route outer sling legs 1 and 2 to one outer drum and inner sling legs 3 and 4 to the other outer drum.
- Route chain end of sling leg 1 through the clevis of the outer drum and the clevis of the center drum. Insert link 3 in the grabhook. Repeat this procedure with sling leg 2 at the other end of the same two drums.
- Loop the chain end of sling leg 3 through the clevis at the top of the left hub of the outer drum and insert link 20 in the grabhook. Repeat with sling leg 4 at the other end of the drum. Secure excess chain with tape or nylon cord.

- Four drums:

- Position apex fitting on top of the four drums. Route outer sling legs 1 and 2 to one outer drum and inner sling legs 3 and 4 to the other outer drum.
- Route the chain end of sling leg 1 through the clevis of an outer drum and the clevis of the next inner drum. Insert link 3 in the grabhook. Repeat this procedure with sling leg 2 on the other side of the two drums.
- Route the chain end of sling leg 3 through the clevises of the other two drums. Insert link 3 in the grabhook. Repeat with sling leg 4 on the other side of the two drums.

- **Five drums:**

- Configure a six-leg sling set using a 25,000-pound apex fitting and six sling leg assemblies from a 10,000-pound sling set.
- Route outer sling legs 1 and 2 to one outer drum, middle sling legs 3 and 4 to the other outer drum, and inner sling legs 5 and 6 to the center drum.
- Route chain end of sling leg 1 through the left clevis of an outer drum and the left clevis of the adjacent drum. Insert link 3 in the grabhook. Repeat with sling leg 2 on the right side of the two drums.
- Route chain end of sling leg 3 through the left clevis of the other outer drum and the left clevis of the adjacent drum. Insert link 3 in the grabhook. Repeat with sling leg 4 on the right side of the two drums.
- Loop the chain end of sling leg 5 through the clevis at the top of the left hub of the center drum and insert link 33 in the grabhook. Repeat with sling leg 6 on the right hub of the center drum. Secure excess chain with tape or nylon cord.

- **Six drums:**

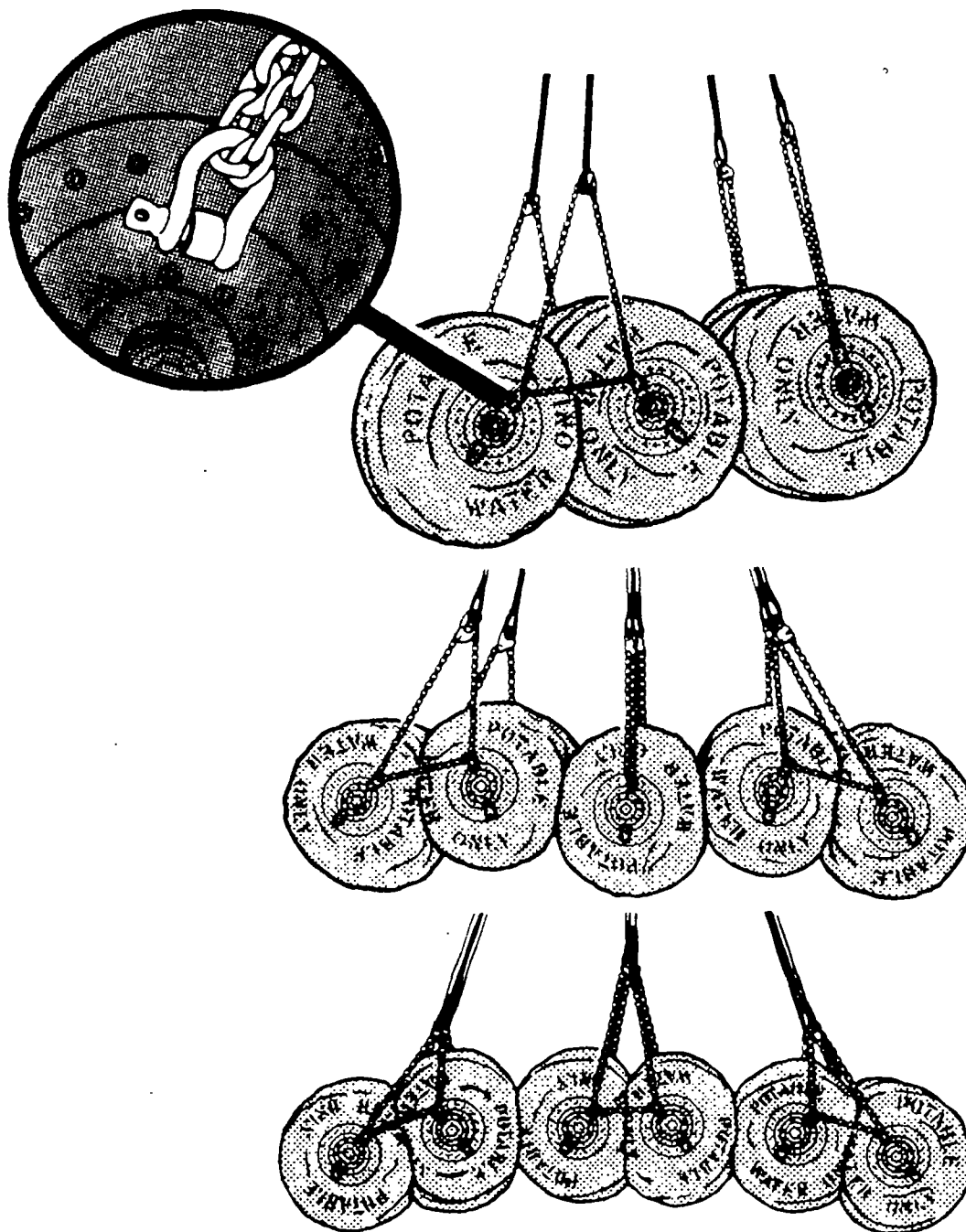
- Configure a six-leg sling set using a 25,000-pound apex fitting and six sling leg assemblies from a 10,000-pound sling set.
- Route outer sling legs 1 and 2 to one outer drum, middle sling legs 3 and 4 to the other outer drum, and inner sling legs 5 and 6 to the center two drums.
- Route chain end of sling leg 1 through the left clevis of an outer drum and the left clevis of the adjacent drum. Insert link 3 in the grabhook. Repeat with sling leg 2 on the right side of the two drums.
- Route chain end of sling leg 3 through the left clevis of the other outer drum and the left clevis of the adjacent drum. Insert link 3 in the grabhook. Repeat with sling leg 4 on the right side of the two drums.
- Loop the chain end of sling leg 5 through the clevis at the top of the left hub of both center drums and insert link 22 in the grabhook. Repeat with sling leg 6 on the right side of the two center drums. Secure excess chain with tape or nylon cord.

### **Step 3. Hookup**

The hookup team stands to one side of the drums. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team remains close to the load to make sure that the chains do not become entangled under the check valve assemblies as the helicopter removes slack from sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging.**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **SHELTERS**

\*The suitable single-point rigging procedures for shelters are in this section. Figures 3-38 through 3-40 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

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### **Figure 3-38. Transporter, Airmobile with Shop Set, Aircraft,**

Airmobile, UH-1D

#### **APPLICABILITY**

This load is suitable for the CH-47 helicopter at the airspeed of 60 knots.

#### **LOAD DESCRIPTION**

- Transporter, airmobile, 4000A, LIN X23227, and shop set, aircraft airmobile, UH-1D, LIN T17090.
- Weight:
  - Transporter, 1,000 pounds.
  - Shop set, 2,350 pounds.
  - Cargo, 1,650 pounds.
  - Total, 5,000 pounds.

#### **MATERIALS**

- Sling set (10,000-pound capacity).
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.

#### **PERSONNEL**

One person can prepare and rig this load in 10 minutes.

#### **PROCEDURES**

##### **Step 1. Preparation**

- Close and secure shop set doors.
- Secure tongue in up position using safety chain. Route one chain through bracket on bottom of tongue and around transporter support at front of shelter. Wrap other chain around bottom of tongue and then make two turns around the transporter support. Connect the two chain hooks together.

- Set the hand brake and secure light cable with tape or nylon cord.

### **Step 2. Rigging**

- Position apex fitting on top of the shop set. Route outer sling legs (1 and 2) to the front of the shop set and inner sling legs (3 and 4) to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lifting provision at the bottom corner of the shop set and insert link 55 in the grabhook. Repeat with sling leg 2 on the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lifting provision at the bottom corner of the shop set and insert link 55 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

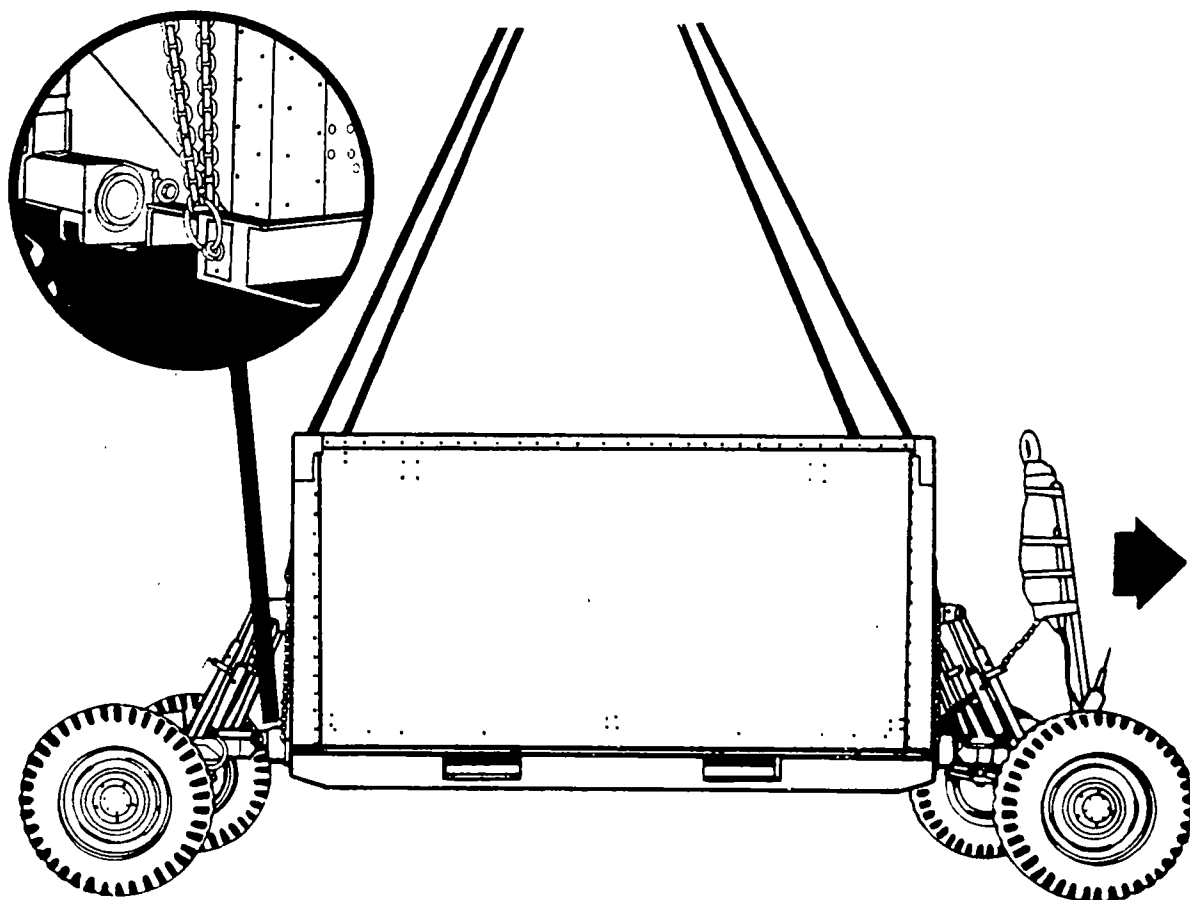
### **Step 3. Hookup**

The hookup team stands on the shop set. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the shop set and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## **Figure 3-39. Tool Set, Aviation Maintenance, SE 1, Airmobile**

### **APPLICABILITY**

This load is suitable for the CH-47 helicopter at airspeeds of 90 knots.

### **LOAD DESCRIPTION**

- Tool set, aviation maintenance, SE 1, airmobile, LIN W62611.
- Weight: 3,030 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Padding, felt, or suitable material.

### **PERSONNEL**

Two persons can prepare and rig the load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Front of tool set: Stow transporter tongue in UP position with nylon cord. Secure safety chains and hoses to tongue with nylon cord. Secure jack handles in position with tape or nylon cord.
- Rear of tool set: Wrap felt padding around rear axle on each side of towing pintle. Secure with tape or nylon cord (to protect brake lines).

#### **Step 2. Rigging**

- Position apex fitting on top of the tool set. Route outer sling legs 1 and 2 to tongue end of the tool set and inner sling legs 3 and 4 to the other end. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 around the left front axle just inside the suspension springs. Avoid pinching the brake lines. Insert link 30 in the grabhook. Repeat with sling leg 2 on the right side of the axle.
- Loop the chain end of sling leg 3 around the padded area of the rear axle and insert link 30 in the grabhook. Repeat with sling leg 4 around the padded area on the right side of the rear axle.
- Secure excess chain with tape or nylon cord.

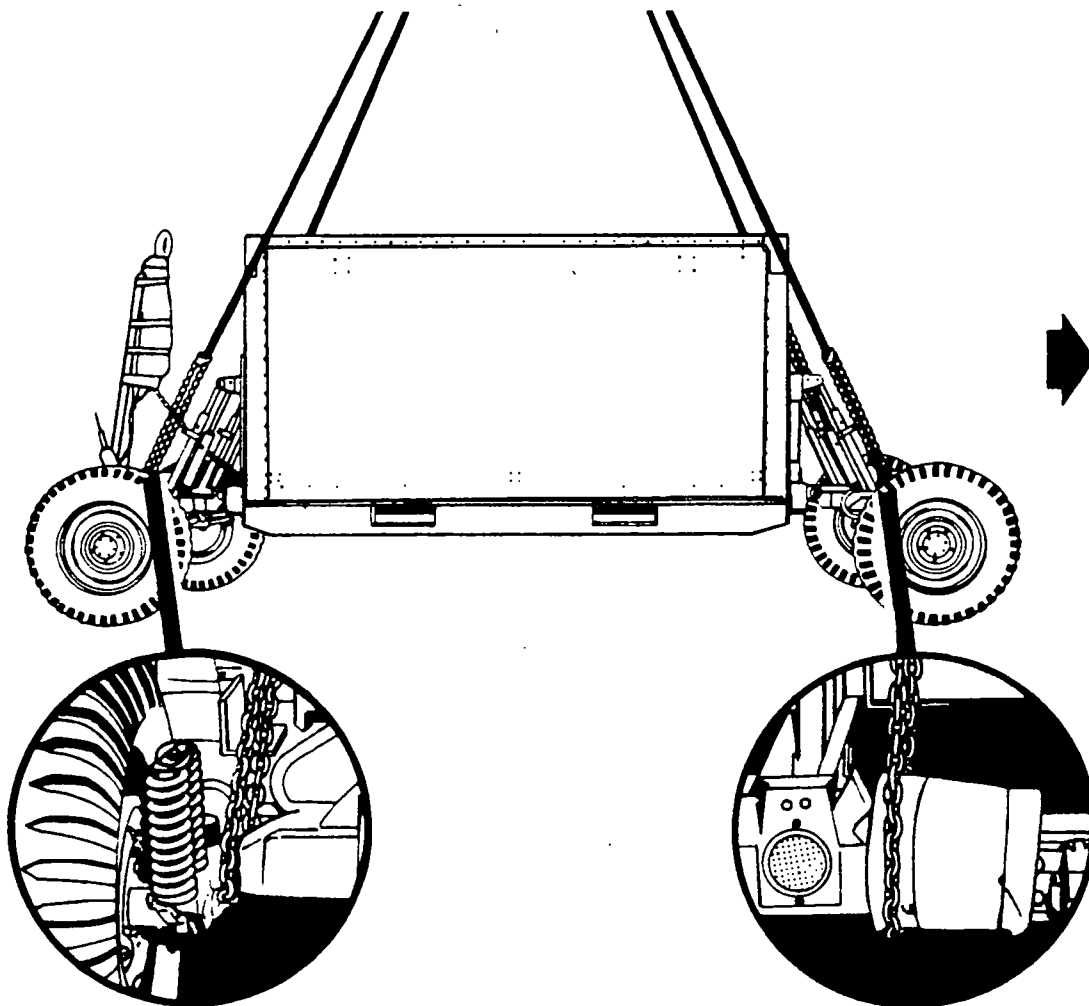
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

**NOTE:** Connect the apex fitting so the tool set is carried tongue aft. The hookup team stands on top of tool set. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the tool set and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 3-40. Shop, Portable, Aircraft Maintenance (SPAM)**

### **APPLICABILITY**

This load is suitable for the CH-47 helicopter at airspeeds of 60 knots.

### **LOAD DESCRIPTION**

- Shop, portable, aircraft maintenance (SPAM), NSN 5410-01-003-2933.
- Weight:
  - Empty, 4,220 pounds.
  - Full, 5,425 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

One person can prepare and rig the load in 5 minutes.

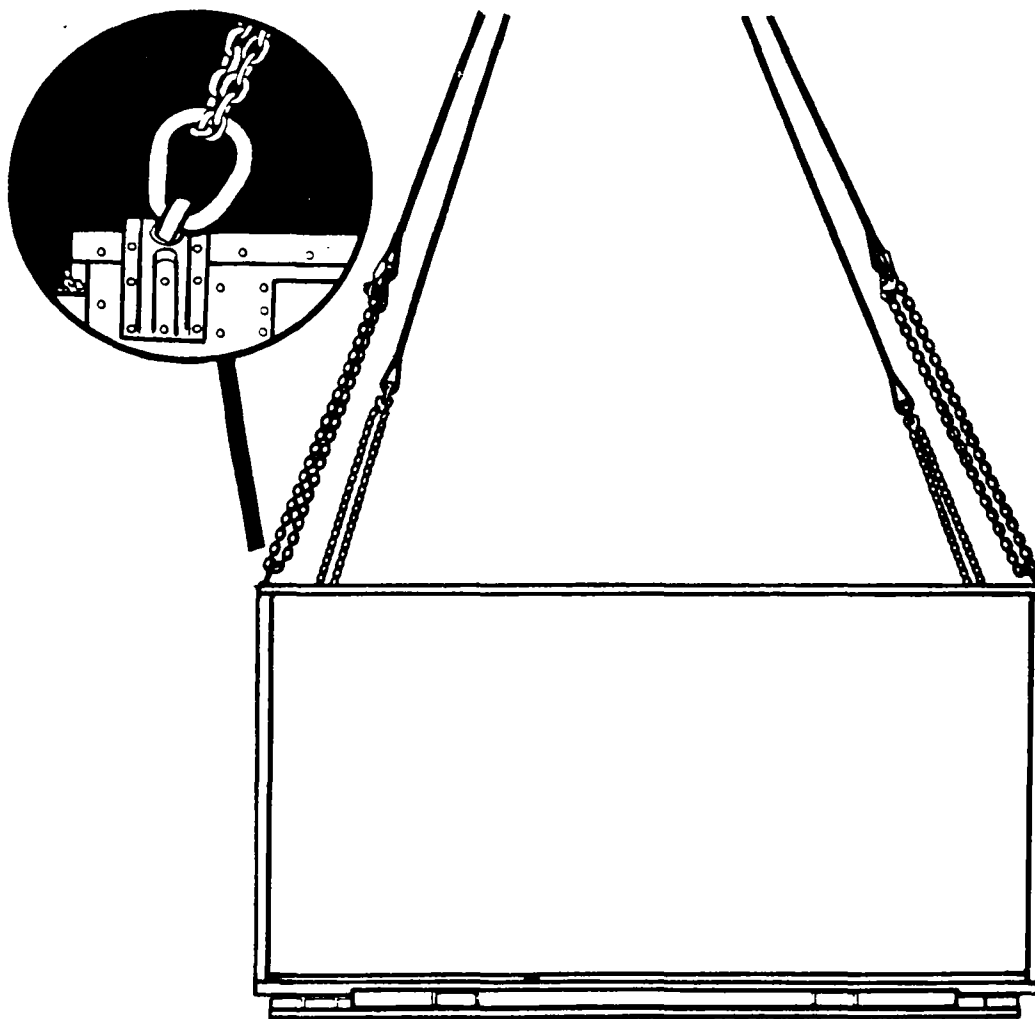
### **PROCEDURES**

#### **Step 1. Preparation**

- Close and secure all vents and doors.
- Secure fold-out safety cables.

#### **Step 2. Rigging**

- Position apex fitting on top of the shop. Route outer sling legs 1 and 2 to the front (door) end of the shop and inner sling legs 3 and 4 to the rear end. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lifting eye and insert link 3 in the grabhook. Repeat with sling leg 2 on the right front lifting eye.
- Loop the chain end of sling leg 3 through the left rear lifting eye and insert link 3 in the grabhook. Repeat with sling leg 4 on the right rear lifting eye.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.



## CONTAINERS

\*The suitable single-point rigging procedures for containers are in this section. Figures 3-41 through 3-42 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

---

### **\*Figure 3-41. One CONEX Container**

#### APPLICABILITY

This load is suitable for the CH-47 or CH-54 helicopter at airspeeds of 60 knots.

#### LOAD DESCRIPTION

- Box, metal, shipping, CONEX, 270 or 295 cubic feet, LIN C13311 or C13448.
- Weight:
  - C13311, 1,560 pounds.
  - C13448, 2,140 pounds.

These procedures apply to one CONEX container, either empty or loaded with not more than 6,500 pounds.

#### MATERIALS

- Sling set.
  - Sling set (10,000-pound capacity).
  - Tie-down straps (CGU-1/B).
- Aerial delivery slings.
  - Assembly, link, Type IV (3 each).
  - Sling, 3-loop, Type X, nylon or 2-loop, Type XXVI, nylon, 3-foot (3 each).
  - Sling, 3-loop, Type X, nylon or 2-loop, Type XXVI, nylon, 20-foot (4 each).
  - Tie-down straps (CGU-1/B).
  - Clevis assembly, medium, MS 70087-2 (4 each).

#### PERSONNEL

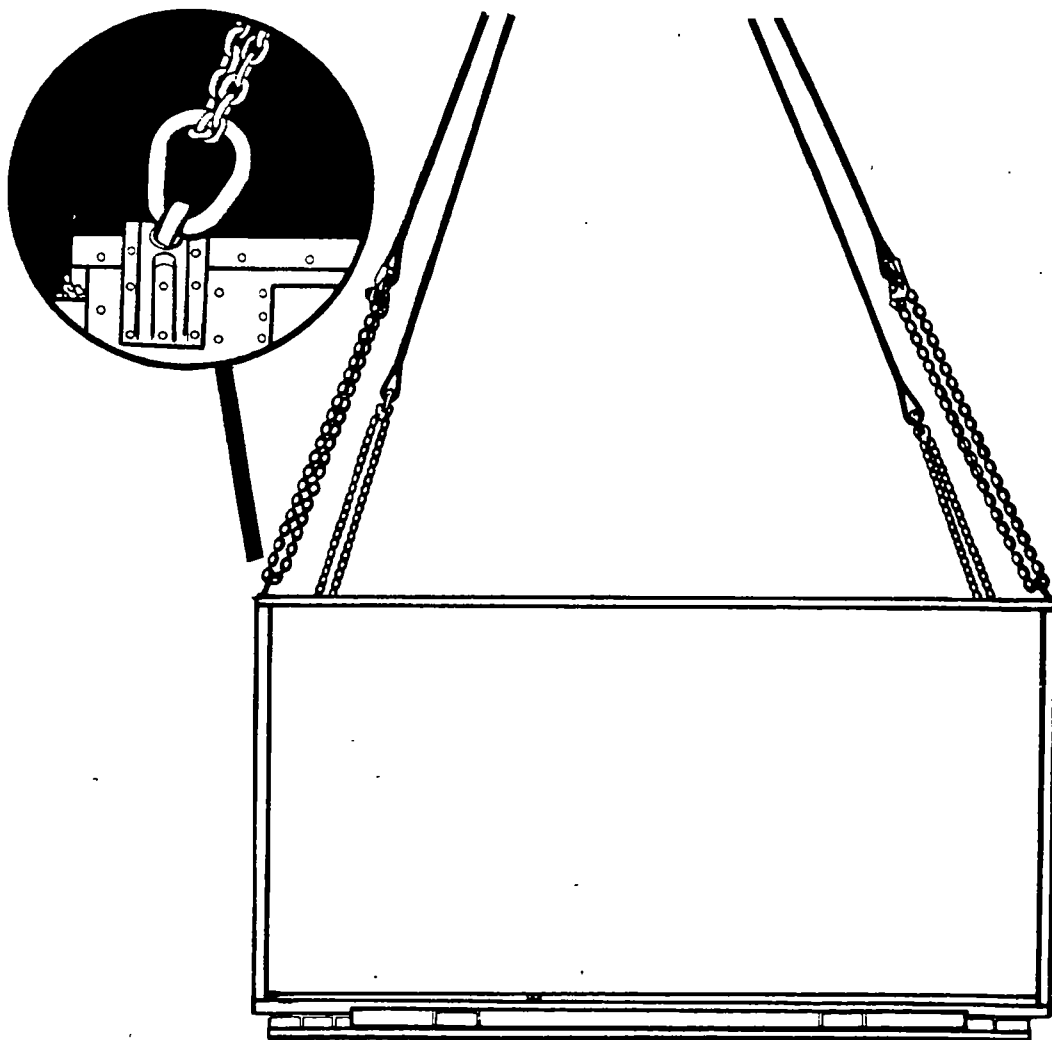
One person can prepare and rig this load in 10 minutes.

### Step 3. Hookup

The hookup team stands on top of the shop. The static wand person discharges the static electricity with static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the top of the shop and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## CONTAINERS

The suitable single-point rigging procedures for containers are in this section. Figures 3-40 through 3-41 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

---

### Figure 3-41. One CONEX Container

#### APPLICABILITY

This load is suitable for the CH-47 or CH-54 helicopter at airspeeds of 60 knots.

#### LOAD DESCRIPTION

- Box, metal, shipping, CONEX, 270 or 295 cubic feet, LIN C13311 or C13448.
- Weight:
  - C13311, 1,560 pounds.
  - C13448, 2,140 pounds.
- These procedures apply to one CONEX container, either empty or loaded with not more than 6,500 pounds.

#### MATERIALS

- Sling set.
  - Sling set (10,000-pound capacity).
  - Tie-down straps (CGU-1/B).
- Aerial delivery slings.
  - Assembly, link, Type IV (3 each).
  - Sling, 3-loop, Type X, nylon or 2-loop, Type XXVI, nylon, 3-foot (3 each).
  - Sling, 3-loop, Type X, nylon or 2-loop, Type XXVI, nylon, 20-foot (4 each).
  - Tie-down straps (CGU-1/B).
  - Clevis assembly, medium, MS 70087-2 (4 each).

#### PERSONNEL

One person can prepare and rig the load in 10 minutes.



## PROCEDURES

### Step 1. Preparation

Secure doors in locked position with tie-down strap routed through hinges and door handle. If hinges are not accessible, a second tie-down assembly is required to route the strap completely around the CONEX container.

### Step 2. Rigging

**NOTE:** The container should fly one side forward.

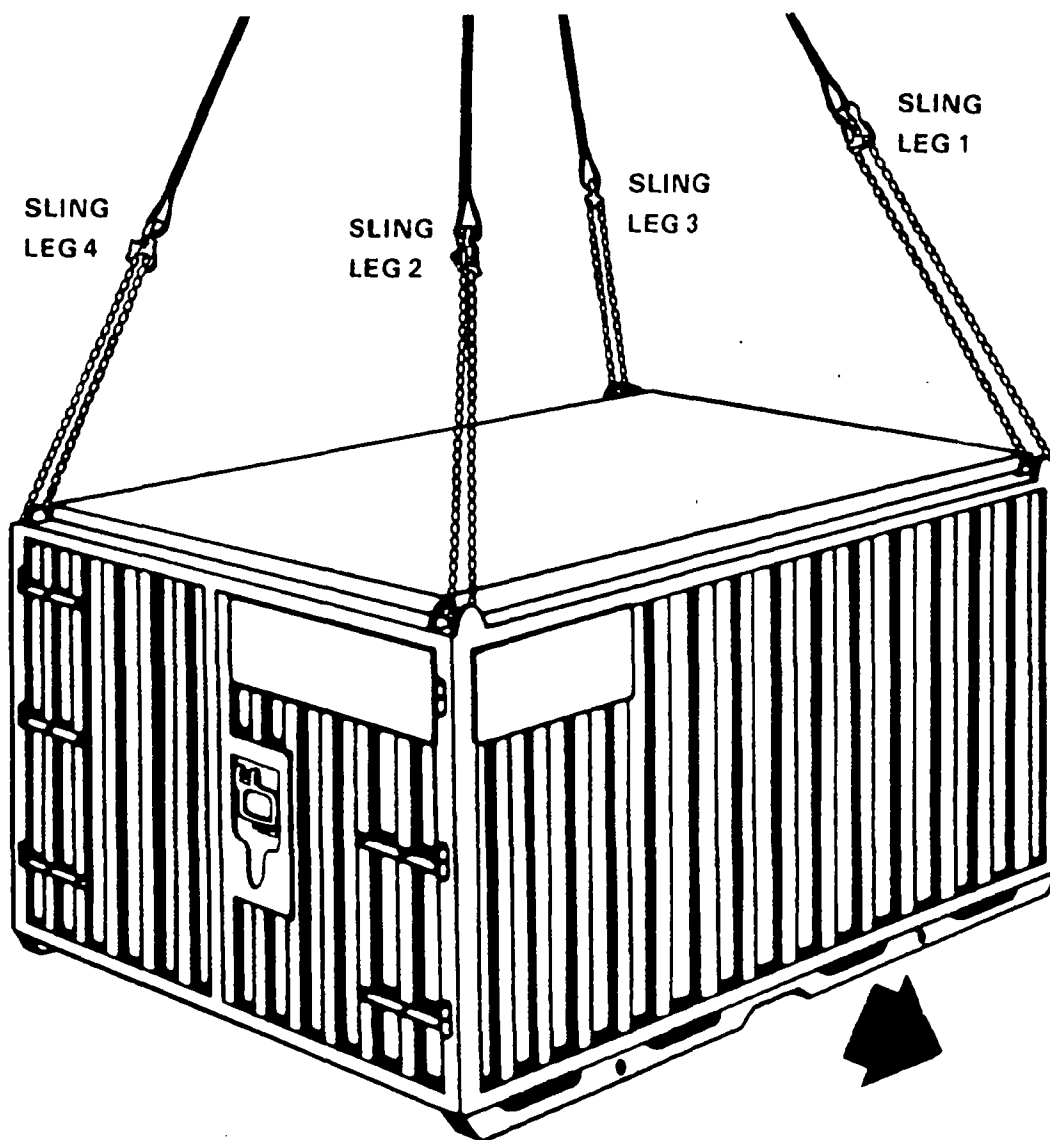
- Sling set (10,000-pound capacity):
  - Position apex fitting on top of the container. Designate one of the sides adjacent to the door as the front. Route outer sling legs 1 and 2 to the side designated as the front side and inner sling legs 3 and 4 to other side. Sling legs 1 and 3 must be on the same side of the container.
  - Loop the chain end of sling leg 1 through the lift provision on the left corner of the designated front side and insert link 3 in the grabhook. Repeat with sling leg 2 on the right corner of the designated front side.
  - Loop the chain end of sling leg 3 through the lift provision on the left corner of the designated rear side and insert link 3 in the grabhook. Repeat with sling leg 4 on the right corner.
  - Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.
- Aerial delivery slings:
  - Attach the bell portion of a medium clevis assembly to the lifting provisions on each corner of the container. Designate one of the sides adjacent the door as the front side.
  - Attach a 3-foot sling to the bolt portion of the medium clevis attached to the left and right corner of the designated front side.
  - Sling leg 1. Attach one 20-foot sling to the left 3-foot sling with a Type IV link assembly.
  - Sling leg 2. Attach one 20-foot sling to the right 3-foot sling with a Type IV link assembly.
  - Sling leg 3. Attach one 20-foot sling to the bolt portion of the medium clevis located on the left corner of the designated rear side.
  - Sling leg 4. Attach one 20-foot sling to the bolt portion of the medium clevis located on the right corner of the designated rear side.
  - To form a ring: When attaching the legs to the 3-foot sling at the top, twist all legs to give one twist for every 3 feet of sling length. Pass one end of the 3-foot sling through the upper ends of the sling legs 1, 3, 4, and 2 in that order. Connect the ends of the 3-foot sling with a Type IV link assembly.
  - Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on top of the container. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the container and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 3-42. Two CONEX Containers**

### **APPLICABILITY**

This load is suitable for the CH-47 helicopter at airspeeds of 95 knots.

### **LOAD DESCRIPTION**

- Box, metal, shipping, CONEX, 270 or 295 cubic feet, LIN C13311 or C13448 (2 each).
- Weight of two empty CONEX containers:
  - C13311, 3,120 pounds.
  - C13448, 4,280 pounds.
- These procedures apply to two CONEX containers, empty or loaded, not to exceed a total combined weight of 10,000 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Sling leg assemblies (2,500-pound capacity) from a 10,000-pound sling set (2 additional).
- Tie-down strap, cargo, CGU-1/B (2 each).

### **PERSONNEL**

Two persons can prepare and rig the load in 20 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Position CONEX containers side by side with doors facing same direction.
- Secure doors in locked position with tie-down straps routed through hinges and door handle. If hinges are not accessible, wrap each individual CONEX container with one tie-down strap to secure the door. Do not wrap both CONEX containers together with the tie-down strap.

#### **Step 2. Rigging**

- Configure a six-leg sling set by adding the two additional sling legs to the sling set.
- Position apex fitting on top of the two CONEX containers. Route outer sling legs 1 and 2 to the front (door) end of the two containers, middle sling legs 3 and 4 to the rear outboard end of the two containers, and inner sling legs 5 and 6 to the center of the two containers.
- Loop the chain end of sling leg 1 through the lift provision located on the front outboard corner of the left container. Insert link 3 in the grabhook. Repeat with sling leg 2 on the front outboard corner of the right container.

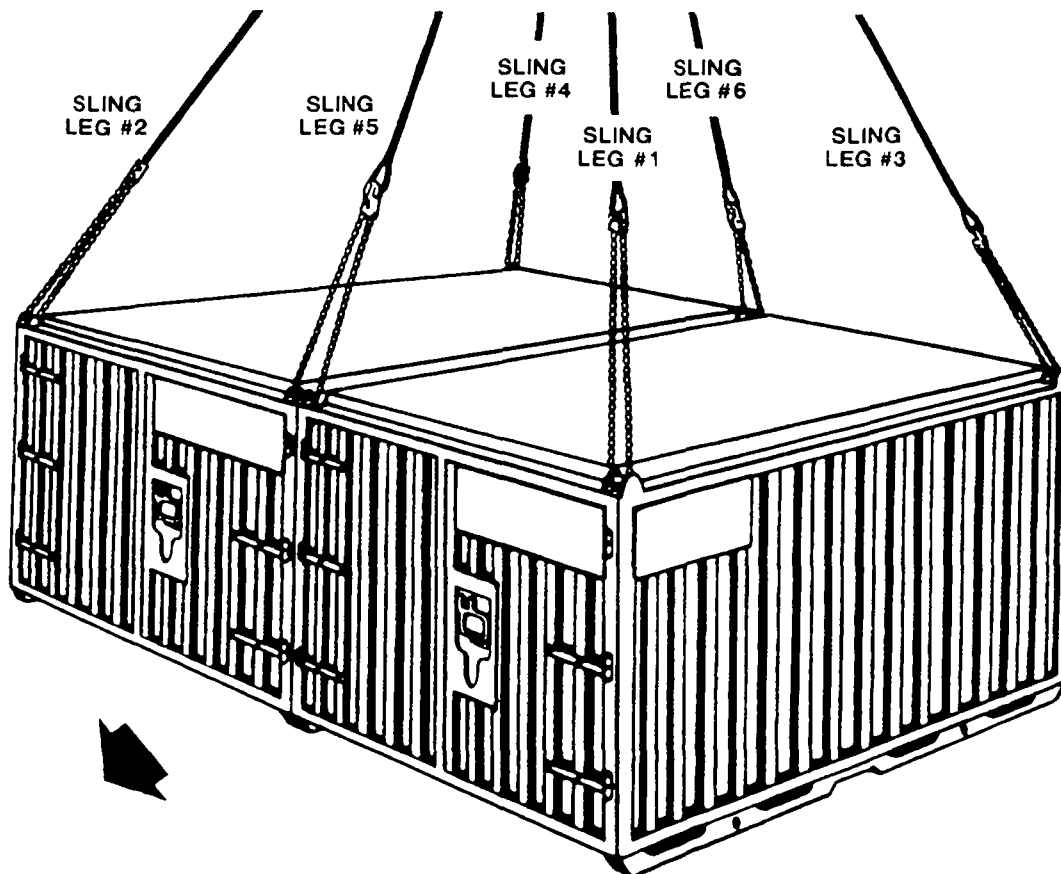
- Loop the chain end of sling leg 3 through the lift provision located on the rear outboard corner of the left container. Insert link 3 in the grabhook. Repeat with sling leg 4 on the rear outboard corner of the right container.
- Loop the chain end of sling leg 5 through the front inboard lift provisions of both containers and insert link 60 in the grabhook. Repeat with sling leg 6 on the rear inboard lift provisions of both containers. Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on top of the containers. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the containers and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **RADAR EQUIPMENT**

\*The suitable single-point rigging procedures for radar equipment are in this section. Figure 3-43 gives detailed instructions for rigging loads. The figure also contains a description of each load and the materials required for rigging it.

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### **Figure 3-43. AN/MPQ-4A Radar Set**

#### **APPLICABILITY**

This load is suitable for the CH-47 helicopter at airspeeds of 80 knots.

#### **LOAD DESCRIPTION**

- Radar set, trailer-mounted, AN/MPQ-4A, LIN Q15414, with or without one 55-gallon drum of fuel.
- Weight:
  - Without fuel, 6,290 pounds.
  - With fuel, 6,690 pounds.

#### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, nylon, 1/2-inch tubular, 1,000-pound breaking strength.
- Felt, sheet, cattle hair, Type IV, 1/2-inch thick, 24- x 60-inch (2 sheets).
- Felt, sheet, cattle hair, Type IV, 1/2-inch thick, 30- x 36-inch (1 sheet).

#### **PERSONNEL**

Two persons can prepare and rig this load in 30 minutes.

#### **PROCEDURES**

##### **Step 1. Preparation.**

- Place radar set in travel mode.
- Secure air hoses and safety chain to tongue with tape or nylon cord.
- Secure handles of rear outriggers and all pins with tape.
- Cut one sheet of felt to 24 inches by 48 inches, place over receiver-transmission group, and secure with tape.

- Place two sheets of felt side by side on top of the reflector, tape the centerline, and secure in place with nylon cord routed from one step over the receiver-transmission group and reflector to the other step.
- Secure fuel drum with nylon webbing to front step.

### **Step 2. Rigging**

- Place apex fitting on top of the reflector. Route outer sling legs (1 and 2) to the forward (tongue) end of radar set and inner sling legs (3 and 4) to the aft end. Sling legs 1 and 3 must be on left side of load.
- Loop the chain end of sling leg 1 through the lift provision on the left side of the tongue and secure link 3 in the grabhook. If a fuel drum is being transported, loop chain end through lunette instead of front lift provision and insert link 3 in the grabhook. Repeat with sling leg 2 on the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lift provision located aft of the receiver-transmission group and insert link 55 in the grabhook. If a fuel drum is being transported, insert link 85 in the grabhook. Repeat with sling leg 4 on the right rear lift provision. Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs on top of the set to prevent entanglement during hookup and lift-off.

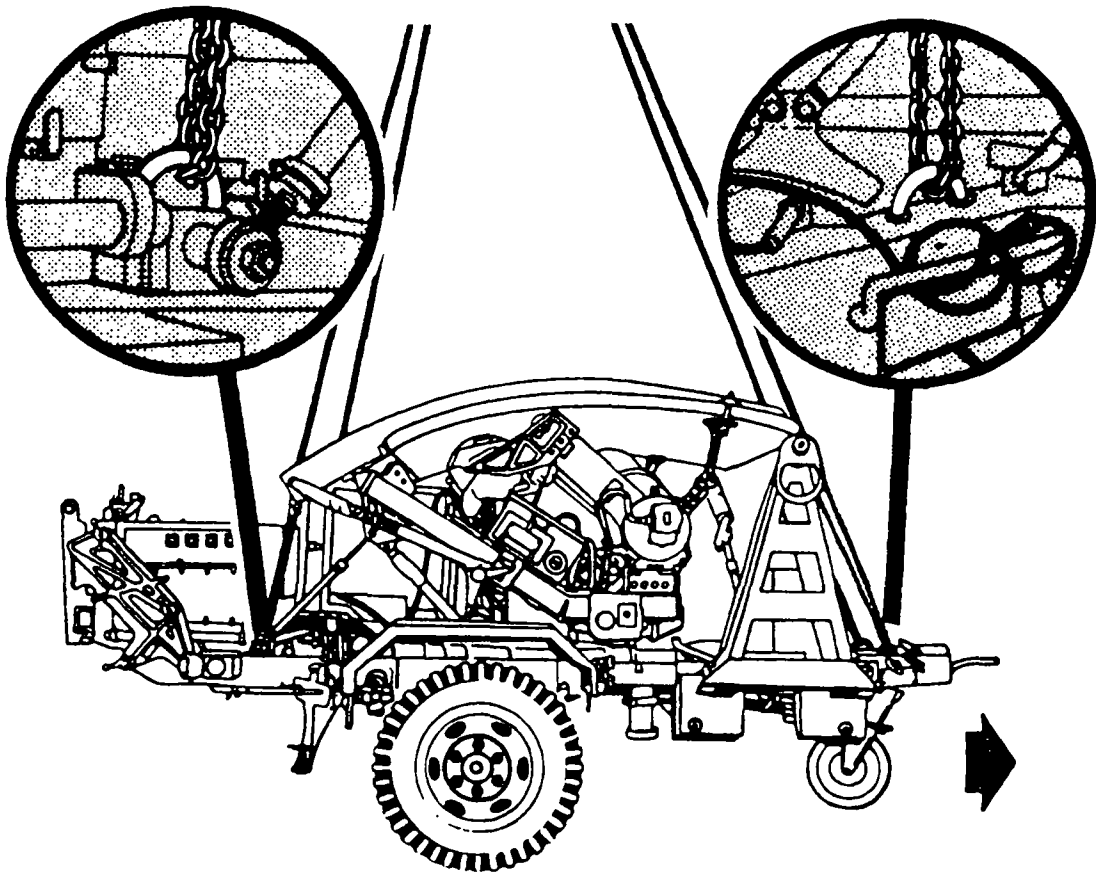
### **Step 3. Hookup**

**NOTE:** Caution pilot not to release apex fitting on top of the radar.

The hookup team stands on the trailer fenders. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the radar and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## GENERATOR SETS

\*The noncertified single-point rigging procedures for generator sets are in this section. Figures 3-44 through 3-47 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

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### Figure 3-44. PU-620/M Generator Set

#### APPLICABILITY

This load is suitable for the UH-1 or CH-47 helicopter at airspeeds up to 85 knots.

#### LOAD DESCRIPTION

- Generator set, gasoline-engine-driven, PU-620/M, LIN J47617, consists of two 5kw generators mounted in a M116 3/4-ton trailer.
- Weight: 2,840 pounds.

#### MATERIALS

- Sling set (10,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.

#### PERSONNEL

Two persons can prepare and rig this load in 10 minutes.

#### PROCEDURES

##### Step 1. Preparation

- Secure all fuel containers to trailer with nylon cord and make sure that all caps/lids are properly closed.
- Engage handbrake.
- Secure safety chain to tow bar of trailer.

##### Step 2. Rigging

- Position apex fitting on center of trailer. Route outer sling legs (1 and 2) to the front (lunette) end of the trailer and inner sling legs (3 and 4) between the last two bows to the rear of the trailer. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 and 2 through the lunette and insert link 3 in the grabhook.



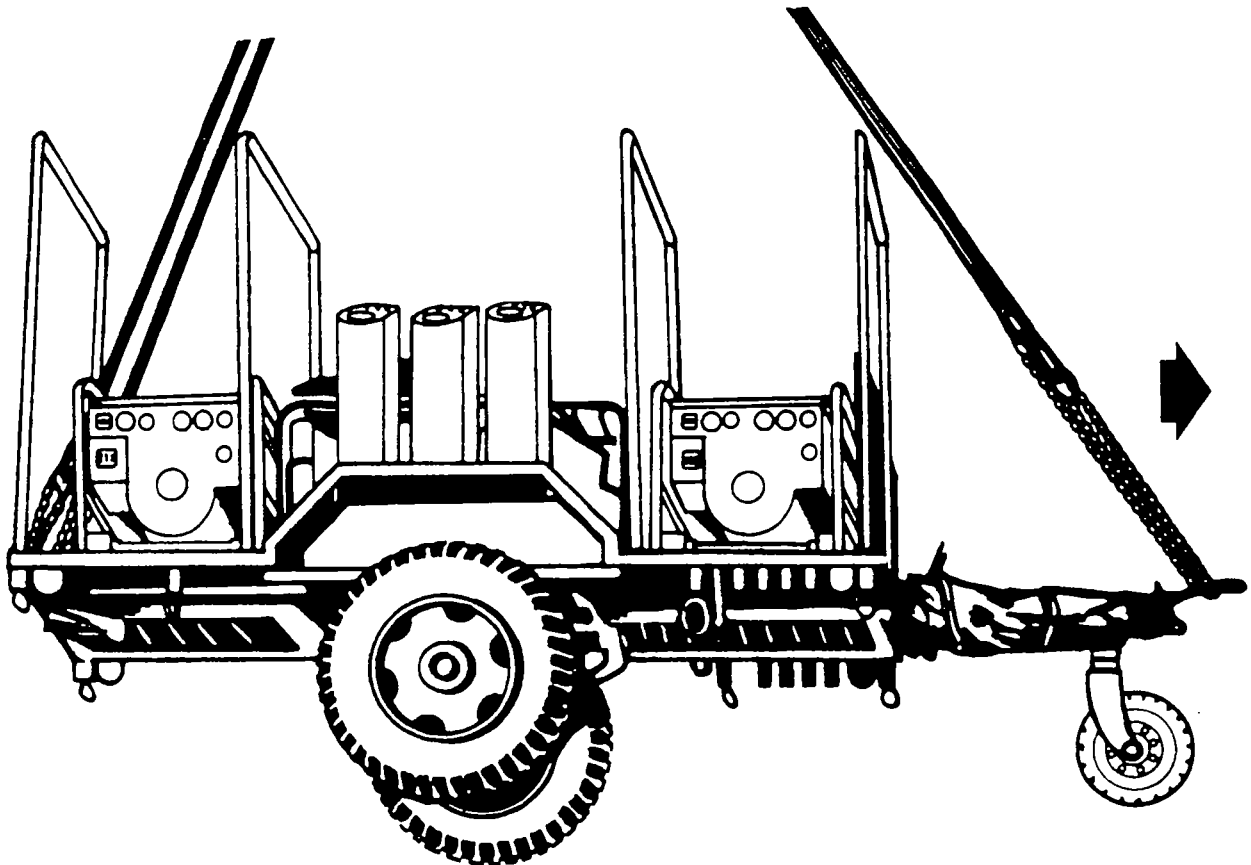
- Loop the chain end of sling leg 3 inside the rear bow to the lift shackle on the left rear corner of the trailer and insert link 50 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.
- Cluster and tie or tape (breakaway technique) all sling legs to the trailer bows to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on the trailer. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 3-45. PU-304 Generator Set**

### **APPLICABILITY**

This load is suitable for the CH-47 helicopter at airspeeds of 100 knots.

### **LOAD DESCRIPTION**

- Trailer, cargo, M105, with generator sets, 10kw, PU-304, LIN J41452.
- Weight: 4,110 pounds.

### **MATERIALS**

- Sling set (10,000-lb capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig this load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Remove canvas cover and stow on top of generator with nylon cord.
- Secure 5-gallon gas cans in place with nylon cord.
- Check batteries and caps for security.
- Secure any loose engine covers, lids, doors, or hatches with tape or nylon cord.
- Secure air brake hoses and intervehicular cable to trailer tongue with tape or nylon cord.
- Make sure parking brakes are in the ON position.
- Inspect the lifting provisions under the trailer for cracks in welds.

#### **Step 2. Rigging**

- Position apex fitting on top of the trailer. Route outer sling legs 1 and 2 in front of bow 1 to the front of the trailer and inner sling legs 3 and 4 to the rear of the trailer between bows 3 and 4. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 and 2 through the trailer lunette and insert link 40 in the grabhook.

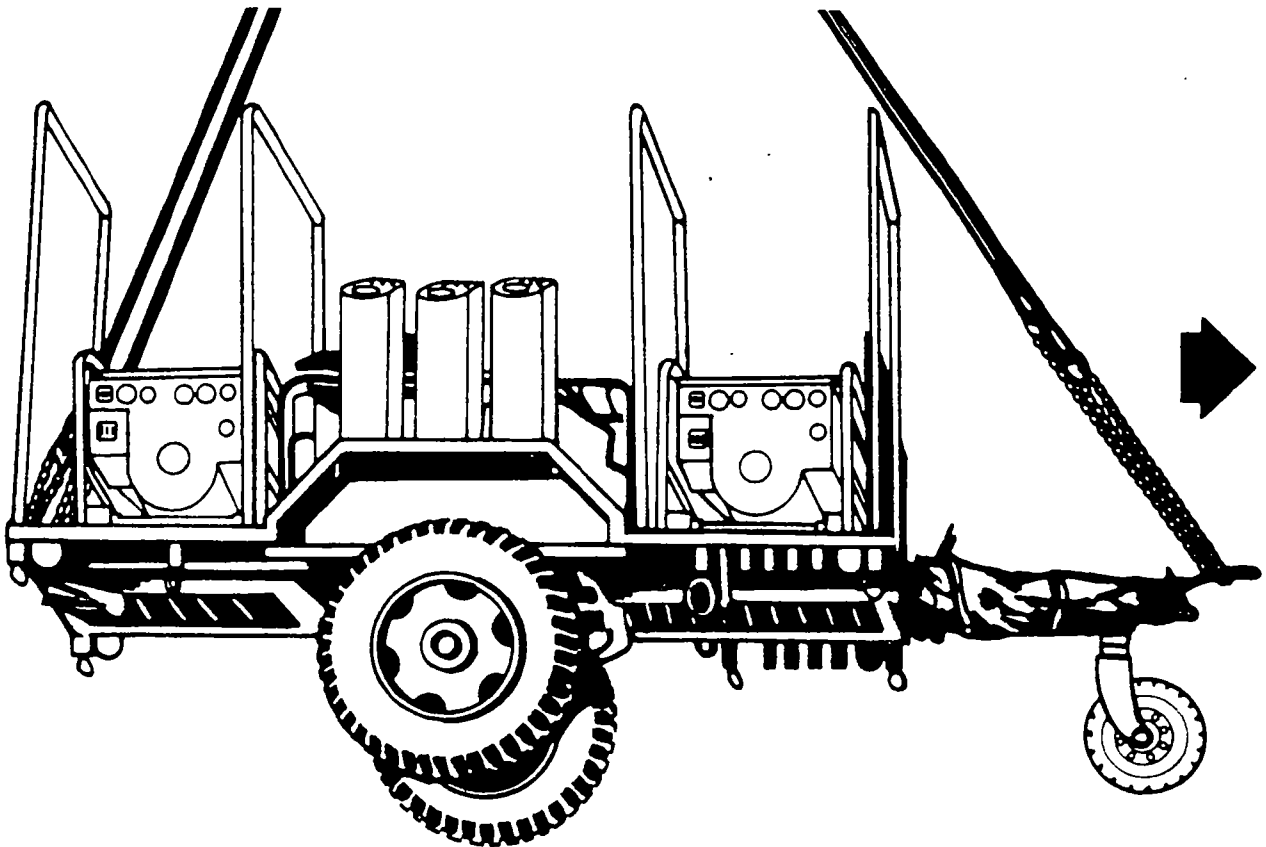
- Loop the chain end of sling leg 3 through the left rear lift provision located under the trailer and insert link 50 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs to the trailer bows to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on top and center of the load between the two bows. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the generator and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 3-46. PU-619/M Generator Set**

NOT CURRENTLY APPROVED FOR LIFT WITH ORIGINAL LIFT  
PROVISIONS APPLICABILITY

This load is suitable for the CH-47 helicopter at airspeeds of 120 knots.

### **LOAD DESCRIPTION**

- Generator set, 10kw, PU-619/M, LIN J42100, mounted on trailer, cargo, M105, LIN W95811.
- Weight: 3,530 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### **PERSONNEL**

Two persons can prepare and rig the load in 10 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Remove canvas top, fold, and stow on top of generator set.
- Secure with nylon cord.
- Secure 5-gallon gas cans in place and secure intervehicular cable to trailer tongue with nylon cord.
- Check rear lifting points for cracks in welds.
- Engage parking brakes.

#### **Step 2. Rigging**

- Position apex fitting on top of the trailer. Route outer sling legs 1 and 2 in front of bow 1 to the trailer lunette and inner sling legs 3 and 4 to the rear of the load between bows 5 and 6. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 and 2 through the lunette and insert link 30 in the grabhook.

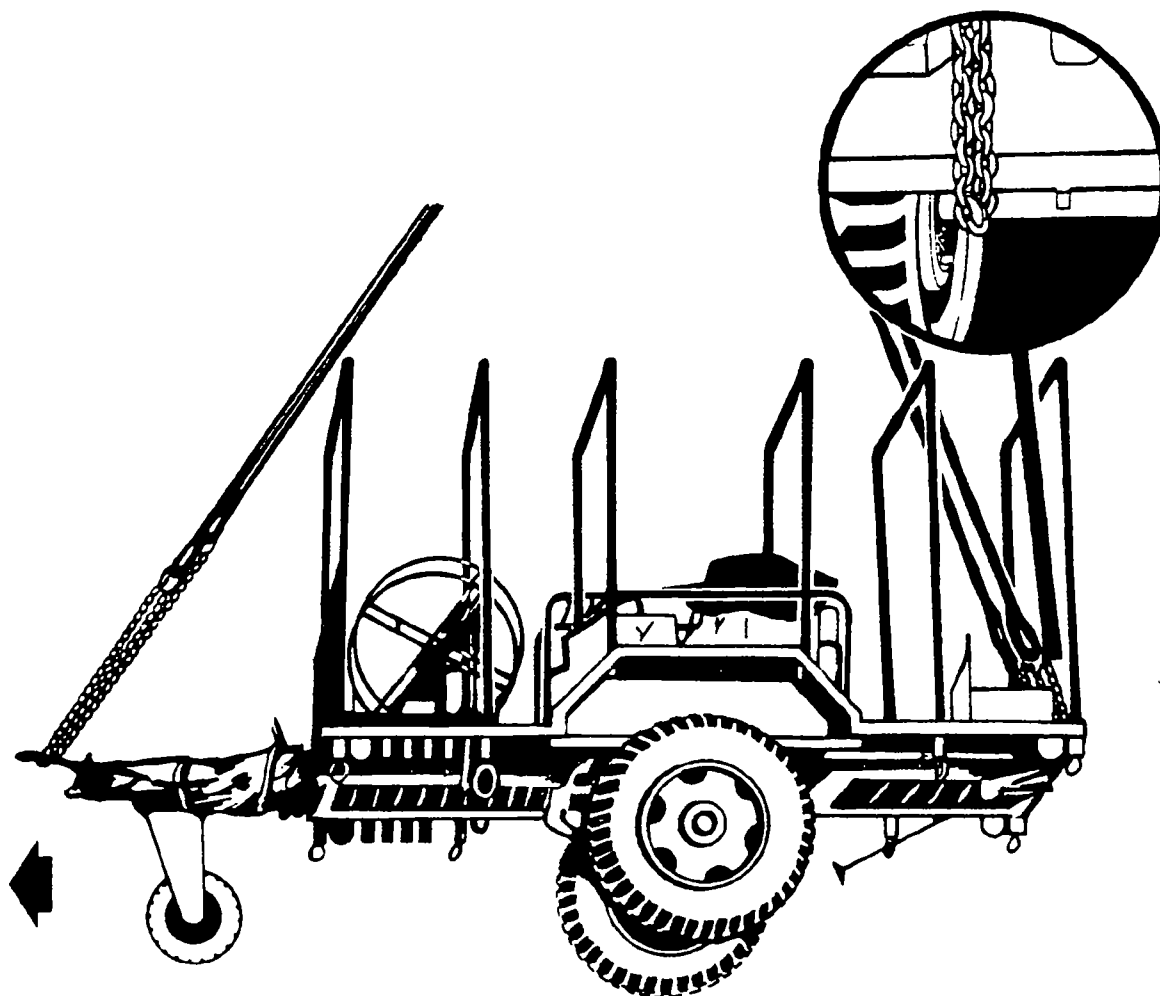
- Loop the chain end of sling leg 3 through the left rear lift provision located under the left side of the trailer bed and insert link 30 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs to the trailer bows to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on top of the trailer. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 3-47. 7.5kw Generator Set**

### **APPLICABILITY**

This load is suitable for the UH-1 and CH-47 helicopters at airspeeds of 80 knots.

### **LOAD DESCRIPTION**

- Generator set, 7.5kw, wheel-mounted, JHGV7.5A, LIN J49055.
- Weight: 810 pounds.

### **MATERIALS**

- Generator transported by a sling set.
  - Sling leg assembly (2,500-pound capacity) from a 10,000-pound capacity sling set.
  - Cord, nylon, Type III, 550-pound breaking strength.
  - Tape, adhesive, pressure-sensitive, 2-inch wide roll.
  - Generator transported in a cargo net.
  - Net, helicopter, cargo-carrying (5,000-pound capacity).
  - Tape, adhesive, pressure-sensitive, 2-inch wide roll.

### **PERSONNEL**

One person can prepare and rig the load in 5 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Tie tow bar in raised position with nylon cord.
- Secure all cables/hoses.

#### **Step 2. Rigging**

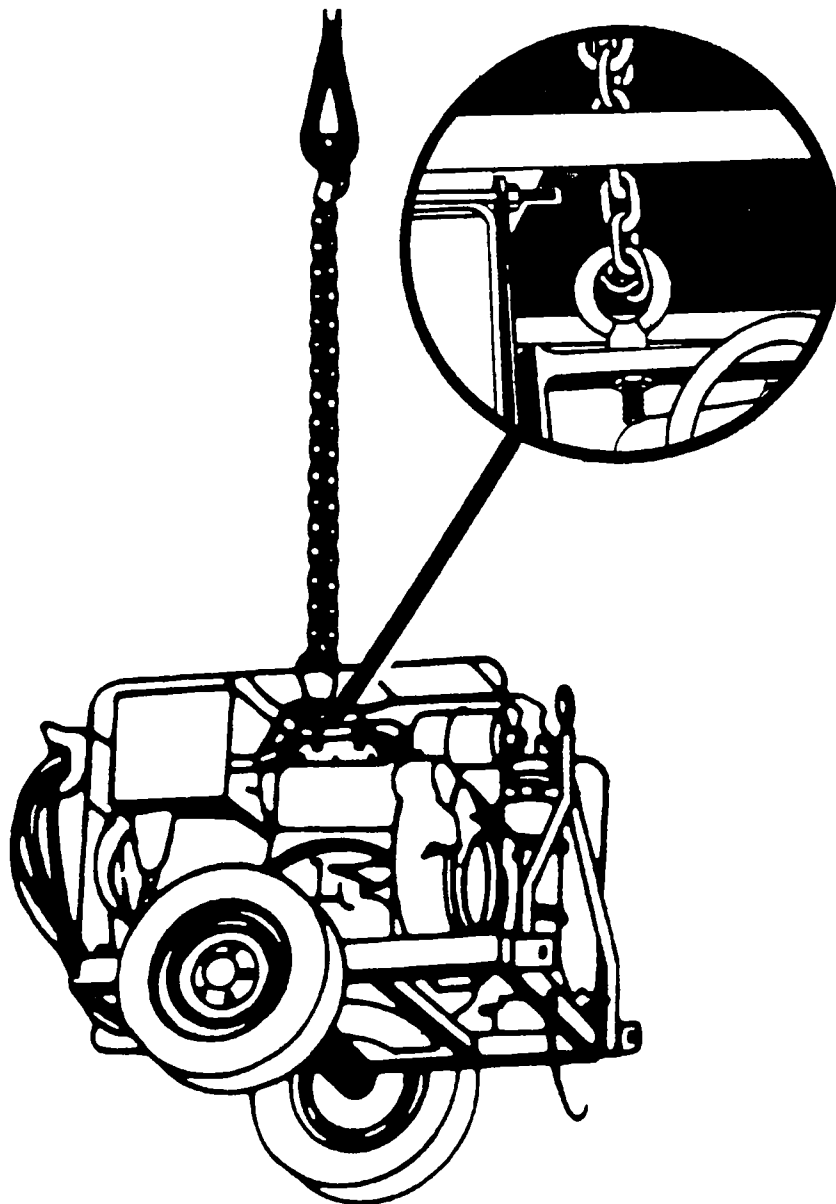
- Sling set:
  - Position apex fitting beside the generator set.
  - Loop the chain end of the sling leg through the lifting provision located on the top of the generator. Insert link 3 in the grabhook.
  - Tape the sling leg (breakaway technique) to the upper frame to prevent entanglement during hookup and lift-off. Cargo net:
    - Spread the net out flat. Place the generator in the center of the net.
    - Rig cargo net according to instructions in Chapter 7.

### Step 3. Hookup

The hookup team stands beside the generator. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## MISCELLANEOUS EQUIPMENT

\*The suitable single-point rigging procedures for miscellaneous equipment are in this section. Figures 3-48 through 3-54 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

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### Figure 3-48. Company Level Field Feeding Kit

#### APPLICABILITY

This load is suitable for UH-1 and UH-60 helicopters at airspeeds up to and including 80 and 85 knots, respectively.

#### LOAD DESCRIPTION

- Company level field feeding kit (CLFFK).
- Rigged dimensions: 54 inches (L) x 48 inches (W) x 43 inches (H).
- Weight (75 percent fuel and water with 8 cases of T-rations): 950 pounds.

#### MATERIALS

- A-22 cargo bag (2,200-pound capacity).
- Sling leg assembly (2,500-pound capacity) from a 10,000-pound sling set.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Skid board, plywood (53 1/2- x 48- x 3/4-inch).
- Padding, felt, or suitable substitute.
- Webbing, nylon, tubular, 1/2-inch, 1,000-pound breaking strength.

#### PERSONNEL

Two persons can prepare and rig this load in 30 minutes.

#### PROCEDURES

##### Step 1. Preparation

- Drill a 3/4-inch hole along the edge of the plywood skid 8 inches from each corner.
- Thread an 8-foot length of 1/2-inch tubular nylon webbing through the 8 holes in the skid board. This webbing is used to tie the skid plate to the A-22 cargo bag suspension sling.



- Lay out the A-22 cargo bag and cover on the skid board. While facing the long side of the skid board, place the heater cabinet with its burner unit in the near left corner, set in about 1/2 inch from either side. Secure the burner to the cabinet frame with nylon cord.
- Place the water jugs, toolbox, fire extinguisher, cutting board, tray pack opener, and water sterilizing bag in the heater cabinet. Pad as necessary. Close and secure the cover.
- Moving counterclockwise, place the stacked pot assembly, including pots and burner, next to the heater cabinet. The burner should be parallel to the long side of the plywood. Place the extra pot cover on the burner before stacking the pot cradle on the stand. Pad between the heater cabinet and pot assembly. Secure the components of the pot assembly together with nylon cord.
- Moving counterclockwise, place the two large food transporters in the next corner. The long side should be flush with the long side of the skid board. Place two boxes of T-rations in each transporter.
- Place the two gas cans (not stacked) between the food transporters and the pot assembly.
- Pad the lantern and place it on top of the gas cans.
- Stack the four beverage transporters with the two tall containers on top in the last corner.
- Stack the four boxes of T-rations between the food transporters and the beverage transporters.
- Place the table across the heater cabinet and the pot assembly. Level the table with blocks of wood or scrap honeycomb.

## **Step 2. Rigging**

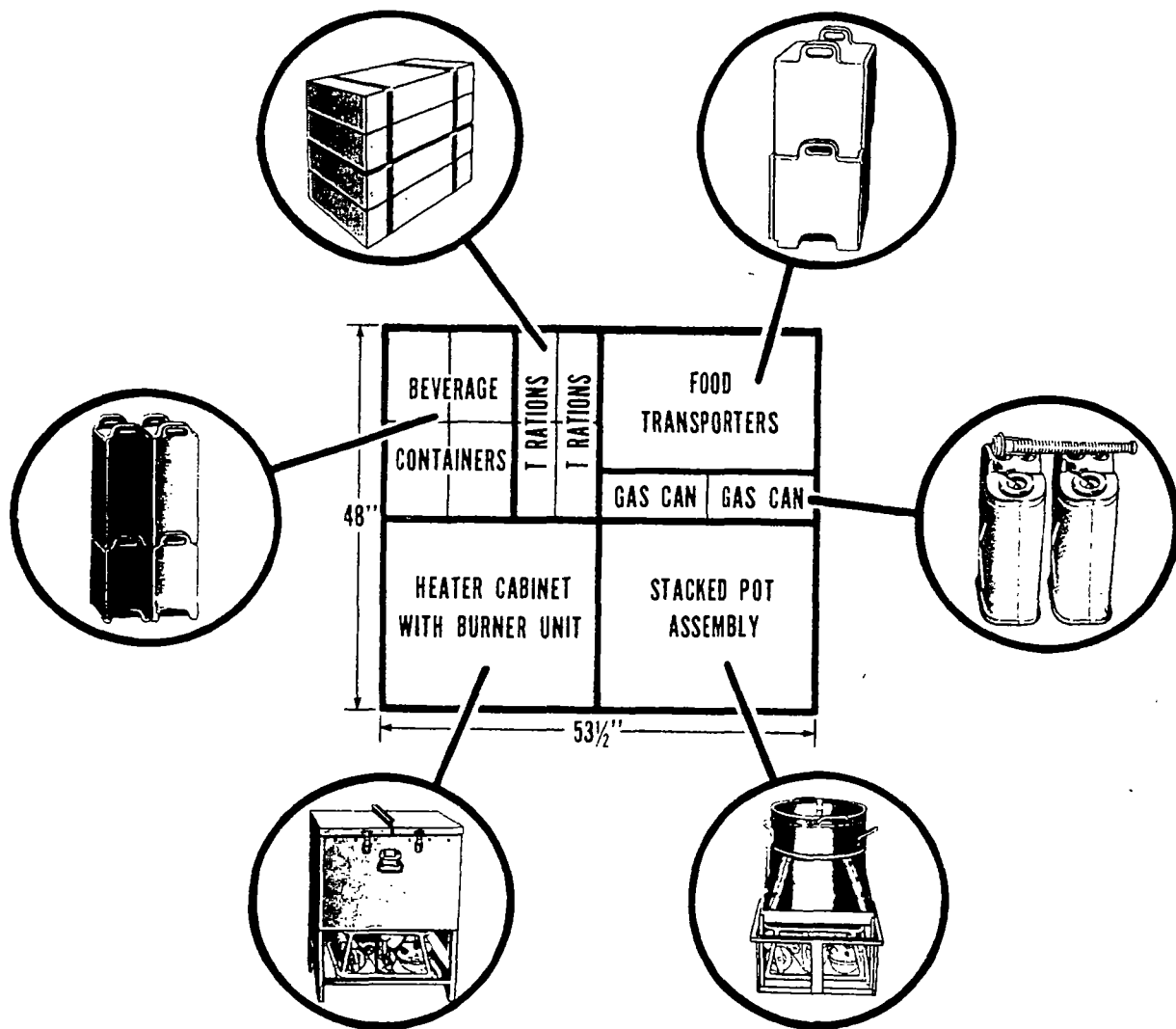
- Close the A-22 cargo bag cover. Using the instructions in Chapter 1, rig the A-22 cargo bag.
- Route the chain end of the sling leg through the suspension web D-rings or medium clevis. Insert link 3 in the grabhook.

## **Step 3. Hookup**

The hookup team stands on top or beside the A-22 cargo bag. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the load and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

## **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in Steps 1 and 2.



## **Figure 3-49. 350 GPM Pump Assembly**

### **APPLICABILITY**

This load is suitable for the UH-1, UH-60, and CH-47 helicopters at airspeeds of 60 knots.

### **LOAD DESCRIPTION**

- Pump assembly, 350 gpm, LIN P97051.
- Weight: 1,165 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.

### **PERSONNEL**

Two persons can prepare and rig this load in 10 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Secure engine cover and any other loose equipment with nylon cord.
- Slide tow bar all the way in and secure with safety pins.

#### **Step 2. Rigging**

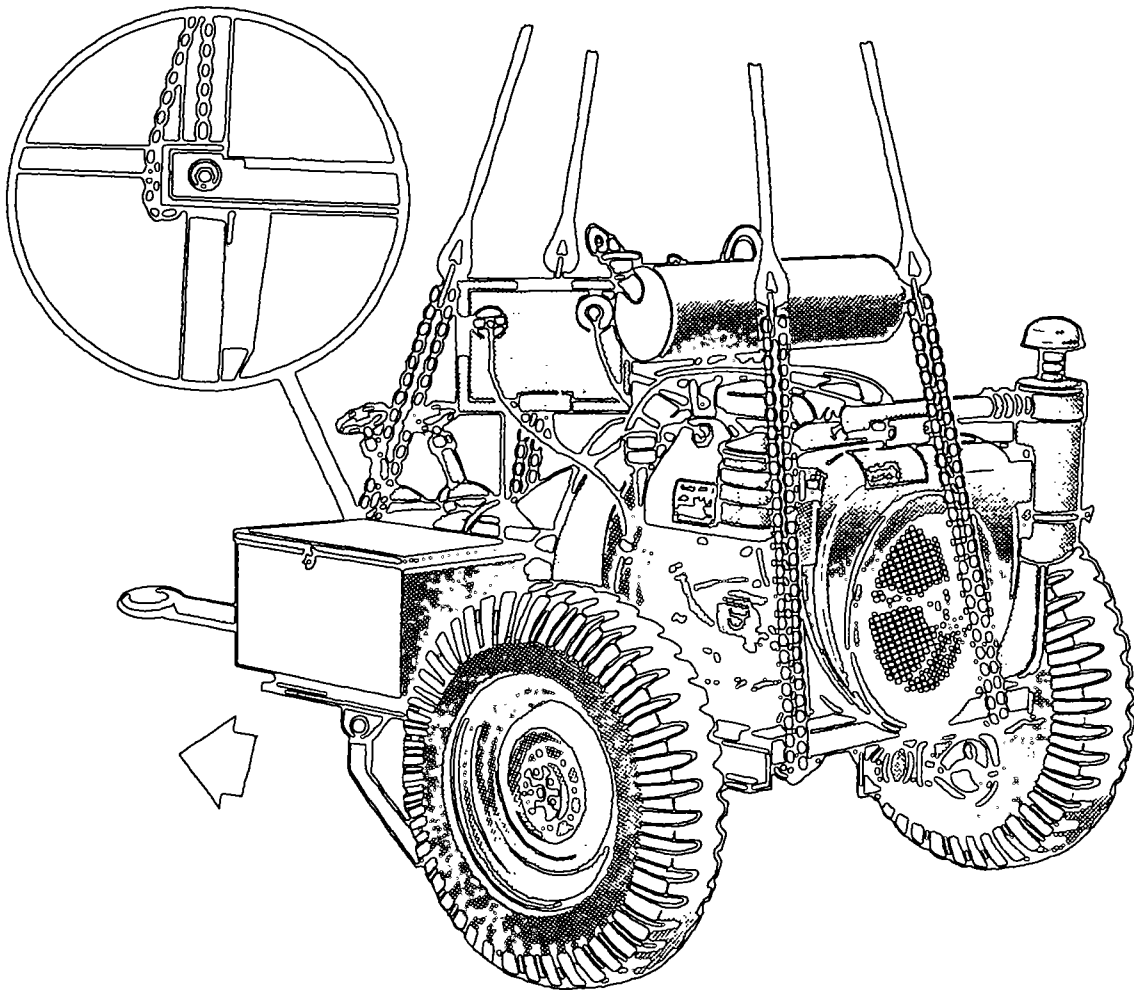
- Position apex fitting on top of the pump. Route outer sling legs 1 and 2 to the front of the trailer and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 around the left front corner of the frame and through the rings on the bottom of the frame. Insert link 50 in the grabhook. Repeat with sling leg 2 on the right front corner.
- Loop the chain end of sling leg 3 around the left rear corner of the frame and through the rings on the bottom of the frame. Insert link 50 in the grabhook. Repeat with sling leg 4 on the right rear corner.
- Secure excess chain with tape or nylon cord.
- Pull each grabhook up and tie or tape (breakaway technique) to the top corner of the load. Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands beside the pump. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## Figure 3-50. Light Tactical Floating Raft Bridge (LTR)

### APPLICABILITY

These loads are suitable for CH-47 and CH-54 helicopters at airspeeds of 80 to 90 knots. The bridge can be moved as three loads (pontoons, superstructure, and motors).

### LOAD DESCRIPTION

- Bridge, floating, raft, section, light, tactical, LIN C25757.
- Weight:
  - M796, 4-ton bolster trailer (LIN W94536) with eight half-pontoons and cradle, 10,620 pounds.
  - Eight half-pontoons and cradle, 6,000 pounds.
  - LTR superstructure (light bundle), 5,250 pounds.
  - LTR superstructure (medium bundle), 7,000 pounds.
  - LTR superstructure (heavy bundle), 10,000 pounds.
  - Two motors and mounting brackets, 1,290 pounds.

### MATERIALS

- For bolster trailer with pontoons and cradle:
  - Sling set (25,000-pound capacity).
  - Tie-down assembly (10,000-pound capacity) (6 each); withload binder assembly (2 each), strap, tie-down, 15-foot (2each), D-ring, heavy duty (2 each) or,
  - Tie-down assembly, cargo, CGU-1/B, as required.
  - Cord, nylon, Type III, 550-pound breaking strength.
  - Webbing, cotton, 1/4-inch, 80-pound breaking strength.
  - Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- For pontoons and cradle:
  - Sling set (10,000-pound capacity).
  - Cotton webbing, 1/4-inch, 80-pound breaking strength.
  - Cord, nylon, Type III, 550-pound breaking strength.
  - Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- For LTR (light bundle):
  - Sling set (10,000-pound capacity).

- Webbing, nylon, 1/2-inch tubular, 1,000-pound.
- Cotton webbing, 1/4-inch, 80-pound breaking strength.
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Panel, deck (4 each).
- Panel, filler, deck (8 each).
- Panel, filler, short deck (6 each).
- Panel, end ramp (2 each).
- Assembly, articulating (2 each).
- Curb, normal (4 each).
- Curb, short (6 each).
- Cable, 5/8-inch, 26-foot lengths (2 each).
- Clamp, cable, 5/8-inch (8 each).
- Turnbuckle, 5/8- x 24-inch (2 each).
- For LTR (medium bundle):
  - Sling set (10,000-pound capacity).
  - Webbing, nylon, 1/2-inch tubular, 1,000-pound breaking strength.
  - Tape adhesive, pressure-sensitive, 2-inch wide roll.
  - Cord, nylon, Type III, 550-pound breaking strength.
  - Panel, deck (6 each).
  - Panel, filler, deck (6 each).
  - Panel, filler, short deck (2 each).
  - Panel, end ramp (4 each).
  - Curb, normal (6 each).
  - Curb, short (4 each).
  - Cable, 5/8-inch, 24-foot lengths (2 each).
  - Clamp, 5/8-inch cable (8 each).
  - Turnbuckle, 5/8- x 24-inch (2 each).
- For LTR (heavy bundle):
  - Sling set (25,000-pound capacity).
  - Webbing, nylon, 1/2-inch tubular, 1,000-pound breaking strength.

- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Panel, deck (8 each).
- Panel, filler, deck (16 each).
- Panel, filler, short deck (12 each).
- Panel, end ramp (4 each).
- Assembly, articulating (4 each).
- Curb, normal (8 each).
- Curb, short (12 each).
- Cable, 5/8-inch, 40-foot lengths (2 each).
- Clamp, cable 5/8-inch (8 each).
- Turnbuckle, 5/8- x 24-inch (2 each).
- For two motors and mounting brackets:
  - Net, helicopter, cargo-carrying, external (5,000-pound capacity).
  - Tape, adhesive, pressure-sensitive, 2-inch wide roll.
  - Webbing, nylon, 1/2-inch, tubular, 1,000-pound breaking strength.

## PERSONNEL

- Eleven persons can prepare each load in the following time:
  - Bolster trailer with pontoons and cradle, 30 minutes.
  - Pontoons and cradle, 20 minutes.
  - LTR (light bundle), 20 minutes.
  - LTR (medium bundle), 25 minutes.
  - LTR (heavy bundle), 30 minutes.
- Two persons can rig each load in 10 minutes.

## PROCEDURES

### Step 1. Preparation

- Bolster trailer with pontoons and cradle:
  - Secure pontoons on cradle and trailer according to the operator's manual.
  - Secure both sides of cradle to trailer with tie-down assemblies.

- Under the bottom pontoon and on top of the cradle, secure the cradle to the trailer by wrapping one tie-down strap around the cradle and trailer frame at each side of the load in the vicinity of the rear wheels. Repeat this procedure at the forward wheels.
- Pontoons and cradle:
  - Secure pontoons to cradle according to the operator's manual.
- LTR superstructure (light bundle):
  - Place two timbers on the ground as shoring approximately 6 feet apart.
  - Lay both cables on the ground parallel to and on the outside of the timbers.
  - Stack the four deck panels on the timbers. Face the deckplates of the bottom and third panels down and the second and top panels up. All male ends must be in the same direction.
  - Connect the two articulating assemblies and place them on top of the stack of deck panels.
  - Place two end ramp panels, butt end to butt end, on top of the articulating assemblies.
  - Place six deck filler panels in the space between the bottom and second deck panels.
  - Place remaining two deck filler panels, six short deck filler panels, and six short curbs in the space between the third and top deck panels.
  - Place the four normal curbs in the space between the top deck panel and the articulating assemblies.
  - Close off the ends of the deck panels and articulating assemblies by lacing 1/2-inch tubular nylon webbing across the ends of the stack.
  - Bring cables up over load, route each end through the turnbuckle, secure each end with two cable clamps, and tighten turnbuckle.

**CAUTION: Do not over tighten the cables as damage to the load will occur.**

- Tie the two cables together with 1/2-inch tubular nylon webbing.
- LTR superstructure (medium bundle):
  - Place two timbers on the ground as shoring approximately 6 feet apart.
  - Lay both cables on the ground parallel to and on the outside of the timbers.
  - Stack two parallel sets of deck panels, three panels high, with male ends facing in same direction.
  - Place two end ramp panels, butt end to butt end, on top of each stack of deck panels.
  - Place deck filler panels between deck panels.
  - Close off ends of deck panels by lacing 1/2-inch tubular nylon webbing across ends of stacks.



- Place three normal curbs on each side of load, alternating short curbs in between the normal curbs.
- Bring cables up over load, route each end through turnbuckle, secure each end with two cable clamps, and tighten turnbuckle.

**CAUTION:** Do not overtighten the cables as damage to the load will occur.

- Tie each short curb to the turnbuckle with nylon webbing.
- Tie the two cables together with 1/2-inch tubular nylon webbing.
- LTR superstructure (heavy bundle):
  - Place two timbers on the ground as shoring approximately 6 feet apart.
  - Lay both cables on the ground parallel to and on the outside of the timbers.
  - Configure two light bundle stacks side-by-side and secure each end of load with cables.

## **Step 2. Rigging**

- Bolster trailer with pontoons and cradle:
  - Position apex fitting on top of the pontoons. Route outer sling legs 1 and 2 to the front of the trailer and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.
  - Loop the chain end of sling leg 1 through the left front lift provision mounted on the left front corner of the trailer frame and insert link 3 in the grabhook. Repeat with sling leg 2 and the right front lift provision on the right side of the trailer.
  - Loop the chain end of sling leg 3 through the left rear lift provision mounted on the left rear corner of the trailer and insert link 13 in the grabhook. Repeat with sling leg 4 and the right rear lift provision on the right rear corner. Secure excess chain with tape or nylon cord.
  - Pull each sling leg up as high as it will go and tie the grabhook to one of the boat rails with cotton webbing. Cluster and tie or tape (breakaway technique) all sling legs together on top of the pontoons to prevent entanglement during hookup and lift-off.
- Pontoons and cradle:
  - Position apex fitting on top of the pontoons. Route outer sling legs 1 and 2 to the front of the boats and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.
  - Loop the chain end of sling leg 1 through the left front lifting eye on the cross beam of the cradle and insert link 3 in the grabhook. Repeat with sling leg 2 and the right front lifting eye.
  - Loop the chain end of sling leg 3 through the left rear lifting eye on the cross beam of the cradle and insert link 3 in the grabhook. Repeat with sling leg 4 and the right rear lifting eye.

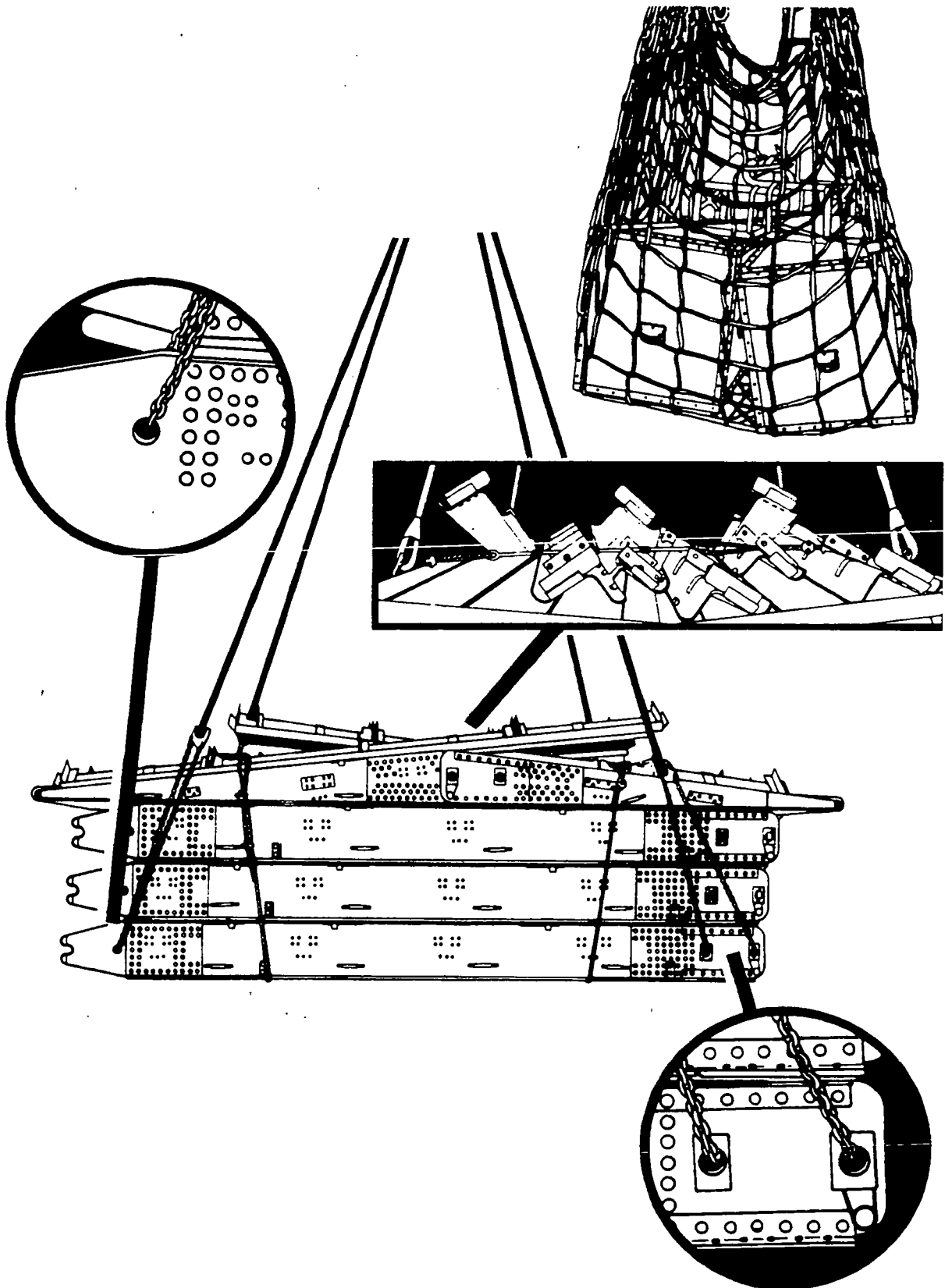
- Pull each sling leg up as high as it will go and tie the grabhook to one of the boat rails with cotton webbing. Cluster and tie or tape (breakaway technique) all sling legs together on top of the pontoons to prevent entanglement during hookup and lift-off.
- LTR (light, medium, and heavy bundle):
  - Position apex fitting on top of the load. Route outer sling legs 1 and 2 to the female end of deck panels and inner sling legs 3 and 4 to the male ends. Sling legs 1 and 3 must be on the left side of the load.
  - Loop the chain end of sling leg 1 through the inside hole and back out through the outside hole of the bottom deckpanel and insert link 3 in the grabhook. Repeat with sling leg 2 on the opposite side of the load.
  - Loop the chain end of sling leg 3 through the hole at the male end of the bottom deck panel and insert link 3 in the grabhook. Repeat with sling leg 4 on the opposite side.
  - Remove safety pins and place in boat motor containers or safety-tie in place with nylon webbing.
  - Cluster and tie or tape (breakaway technique) all sling legs together on top of the load to prevent entanglement during hook and lift-off.
- Two boat motors and mounting brackets:
  - Spread out the 5,000-pound capacity cargo net.
  - Secure motors, pins, paddles, and miscellaneous items in containers. Tie lid down with nylon cord.
  - Place containers side by side in center of the net.
  - Place mounting brackets on top of the containers.
  - Rig the cargo net according to instructions in Chapter 1.

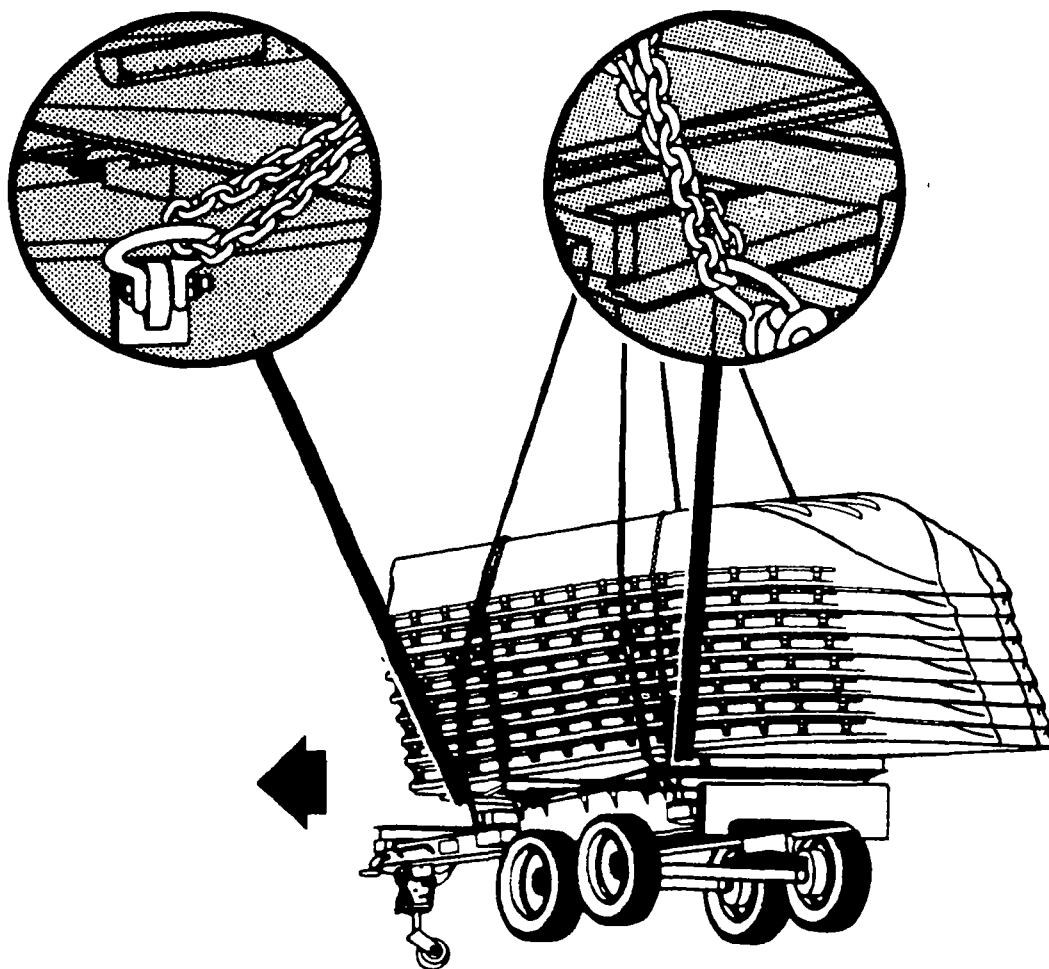
### Step 3. Hookup

The hookup team stands either on top of pontoons, on top of the superstructure bundles, or alongside the cargo net, depending upon the load. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the load and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## **Figure 3-51. Medium-Span Bridge**

### **APPLICABILITY**

This load is suitable for the CH-47 helicopter at airspeeds of 60 knots.

### **LOAD DESCRIPTION**

- Bridge erection set, medium girder section, LIN C22126.
- Weight: 13,870 pounds.

### **MATERIALS**

- Sling set (25,000-pound capacity).
- Multiloop line, Type XXVI nylon, 12-foot, 4-loop, NSN 670-01-062-6307 (4 each).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Padding, felt, or suitable substitute.
- Assembly, clevis, large, MS 70087-3 (4 each).
- Tie-down assembly, cargo, CGU-1/B, as required.

### **PERSONNEL**

Six persons can prepare and rig this load in 30 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Position the ramp sections on top of the bridge main structure. Secure with tie-down straps.
- Secure the four pieces of padding on the bottom side at each corner where the nylon straps are choker-hitched.

#### **Step 2. Rigging**

- Position apex fitting on top of the bridge. Route outer sling legs 1 and 2 to one end of the bridge and inner sling legs 3 and 4 to the other end. Sling legs 1 and 3 must be on the same side of the load.
- Route one end of each 12-foot nylon sling through the opening in the four corners of the bridge. Insert the end of the sling through the other end forming a choker hitch around the bridge end.

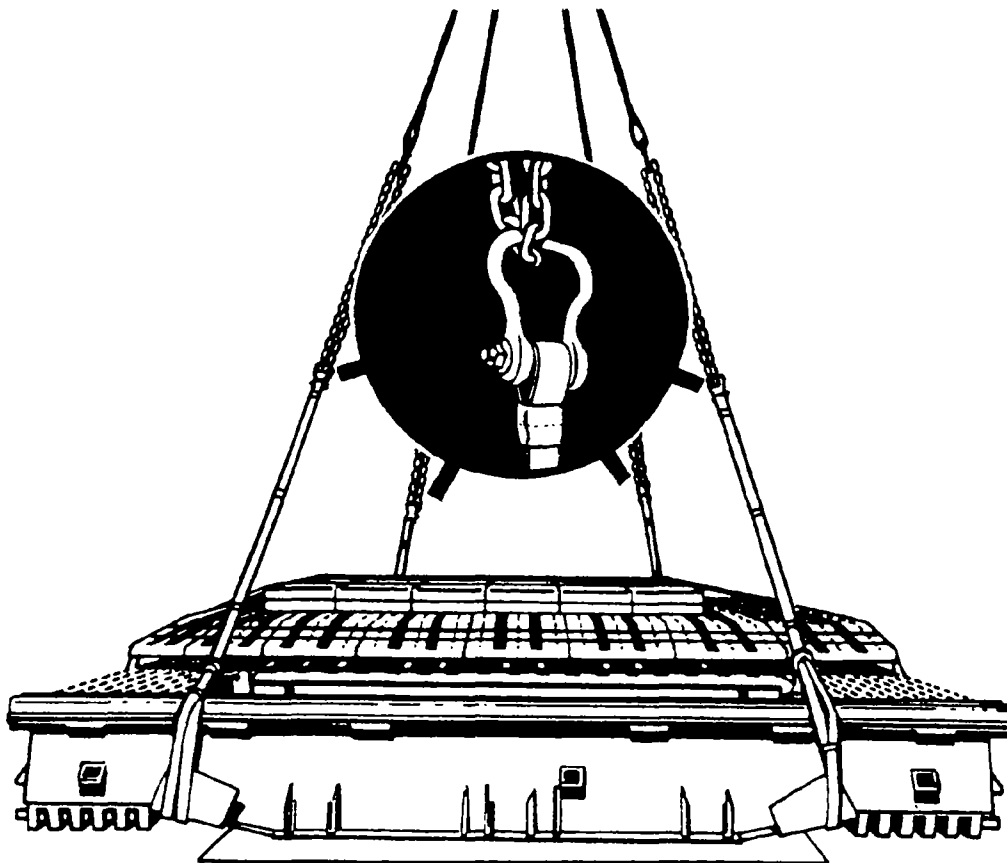
- Insert a large clevis through the free running end of each 12-foot nylon sling. Tighten the nut and bolt securely. Make sure the sling is at the bolt end of the clevis.
- Loop the chain end of sling leg 1 through the large clevis on the 12-foot nylon sling on the left front corner and insert link 5 in the grabhook. Repeat with sling leg 2 and the right front 12-foot sling.
- Loop the chain end of sling leg 3 through the large clevis on the 12-foot nylon sling on the left rear corner and insert link 5 in the grabhook. Repeat with sling leg 4 and the right rear 12-foot sling.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the bridge to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on top of the bridge center. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the bridge and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## Figure 3-52. M4T6 Bridge

### APPLICABILITY

This load is suitable for CH-54 helicopters at airspeeds up to and including 50 knots.

### LOAD DESCRIPTION

- Bridge, floating aluminum, highway type, deck-balk superstructure on pneumatic floats, M4T6.
- Weight: 9,000 pounds.

### MATERIALS

- Sling set (25,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### PERSONNEL

Two persons can prepare and rig this load in 10 minutes.

### PROCEDURES

#### Step 1. Preparation

- Ensure that all components are securely attached together.

#### Step 2. Rigging

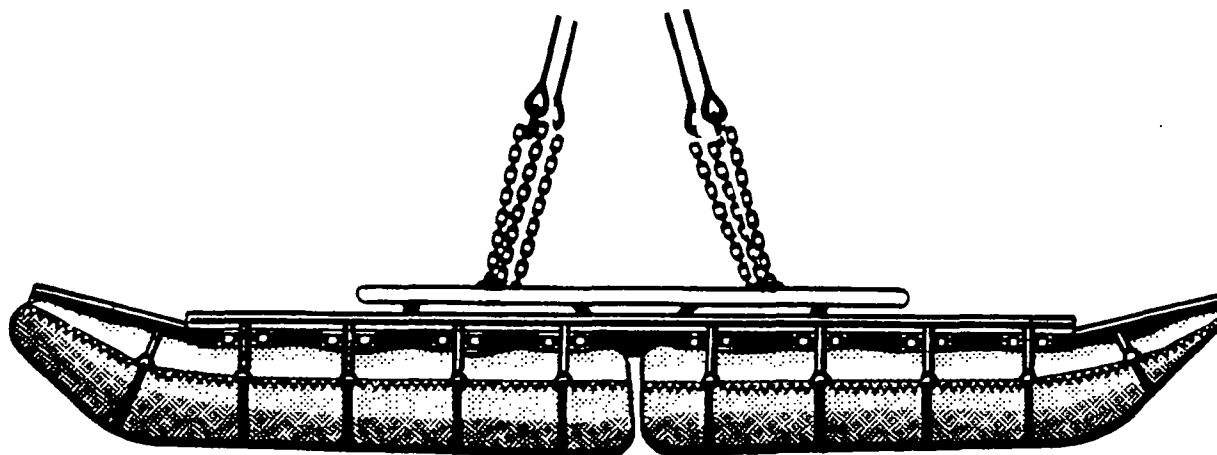
- Position apex fitting on top of the center of the bridge. Route outer sling legs 1 and 2 to the forward end of the balk connecting stiffener and inner sling legs 3 and 4 to the rear end of the balk connecting stiffener. Sling legs 1 and 3 must be on the left side of the load.
- Pass the chain end of sling leg 1 around the seventh balk connection pin from the forward end on the left balk connecting stiffener and insert link 4 in the grabhook.
- Pass the chain end of sling leg 2 around the seventh balk connection pin from the forward end on the right balk connecting stiffener and insert link 4 in the grabhook.
- Pass the chain end of sling leg 3 around the seventh balk connection pin from the rear end on the left balk connecting stiffener and insert link 4 in the grabhook.
- Pass the chain end of sling leg 4 around the seventh balk connection pin from the rear end on the right balk connecting stiffener and insert link 4 in the grabhook.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the bridge to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on the bridge. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the bridge and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## **Figure 3-53. Ribbon Bridge, Interior Bay**

### **APPLICABILITY**

This load is suitable for CH-54 helicopters at airspeeds up to and including 55 knots.

### **LOAD DESCRIPTION**

- Ribbon bridge, interior bay, Model 7282, NSN 5420-00-071-5322.
- Weight: 12,000 pounds.

### **MATERIALS**

- Sling set (25,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Clevis assembly, large, MS 70087-3 (4 each).

### **PERSONNEL**

Two persons can prepare and rig this load in 10 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Attach the four clevis assemblies to the bridge lifting provisions so the bell portion of the clevis is up.

#### **Step 2. Rigging**

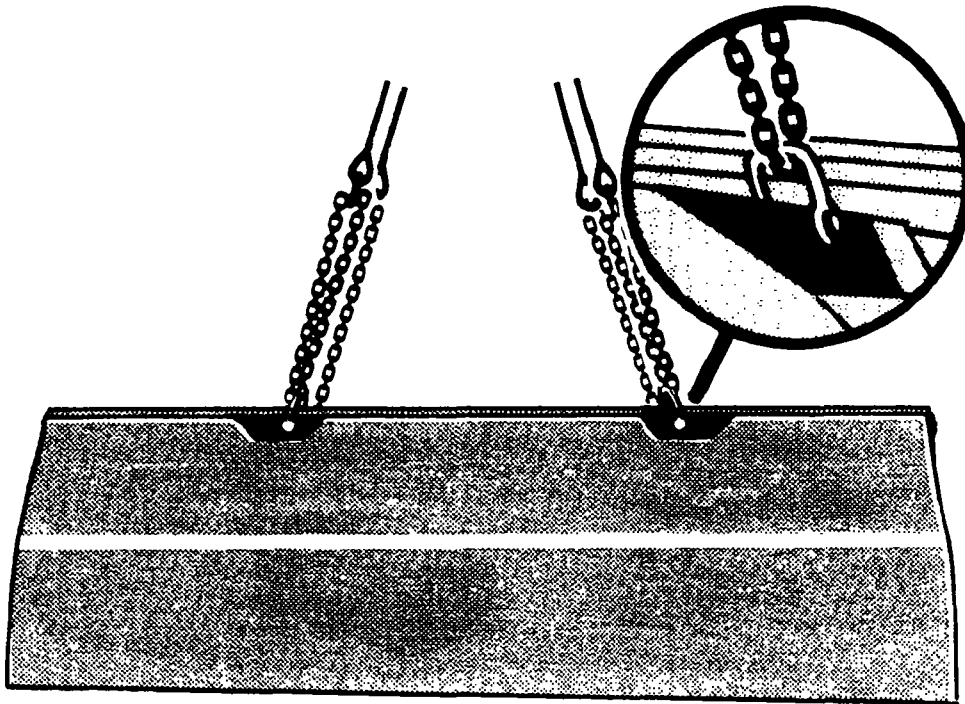
- Position apex fitting on top of the bridge. Designate one end of the bridge as the forward end. Route outer sling legs 1 and 2 to the forward end of the bridge and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the same side of the load.
- Loop the chain end of sling leg 1 through the clevis attached to the left front lift provision and insert link 4 in the grabhook. Repeat with sling leg 2 and the right front lift provision.
- Loop the chain end of sling leg 3 through the clevis attached to the left rear lift provision and insert link 4 in the grabhook. Repeat with sling leg 4 and the right rear lift provision.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the bridge to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on top of the center of the bridge. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the bridge and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 3-54. Ribbon Bridge, Ramp Bay**

### **APPLICABILITY**

This load is suitable for CH-54 helicopters at airspeeds up to and including 55 knots.

### **LOAD DESCRIPTION**

- Ribbon bridge, ramp bay, Model 2281, NSN 5420-00-497-5276.
- Weight: 11,700 pounds.

### **MATERIALS**

- Sling set (25,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Clevis assembly, large, MS 70087-3 (4 each).

### **PERSONNEL**

Two persons can prepare and rig this load in 10 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Attach the four clevis assemblies to the bridge lifting provisions so the bell portion of the clevis is up.

#### **Step 2. Rigging**

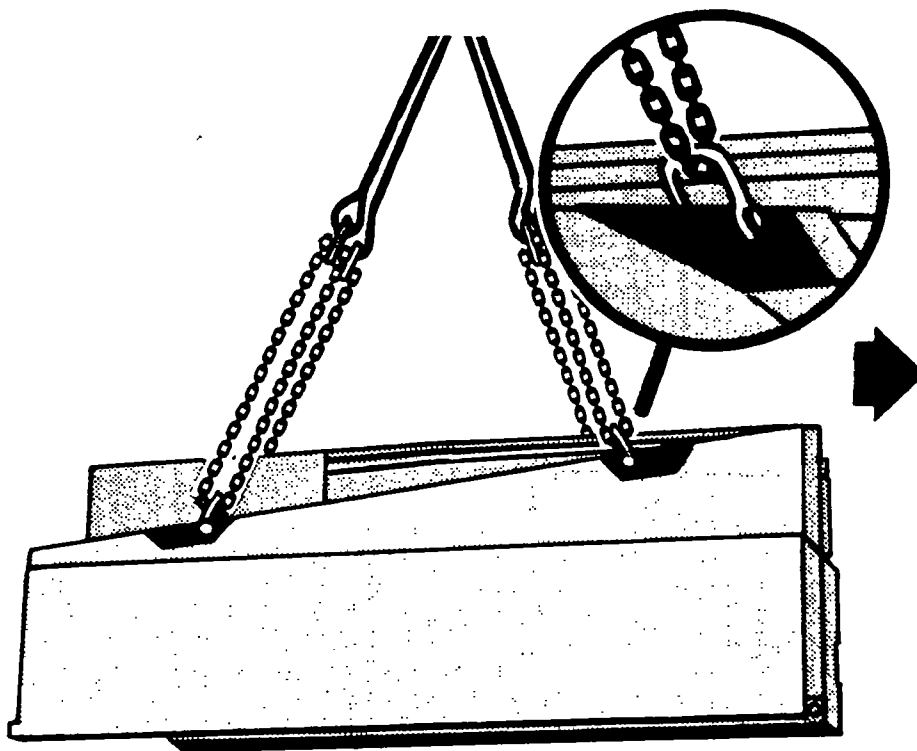
- Position apex fitting on top of the bridge. Route outer sling legs 1 and 2 to the two higher lift provisions.
- Loop the chain end of sling leg 1 through the large clevis on the left lift provision and insert link 35 in the grabhook. Repeat with sling leg 2 and the large clevis on the right lift provision.
- Route inner sling legs 3 and 4 to the two lower lift provisions.
- Loop the chain end of sling leg 3 through the large clevis on the left lift provision and insert link 4 in the grabhook. Repeat with sling leg 4 and the large clevis on the right lift provision.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the bridge to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

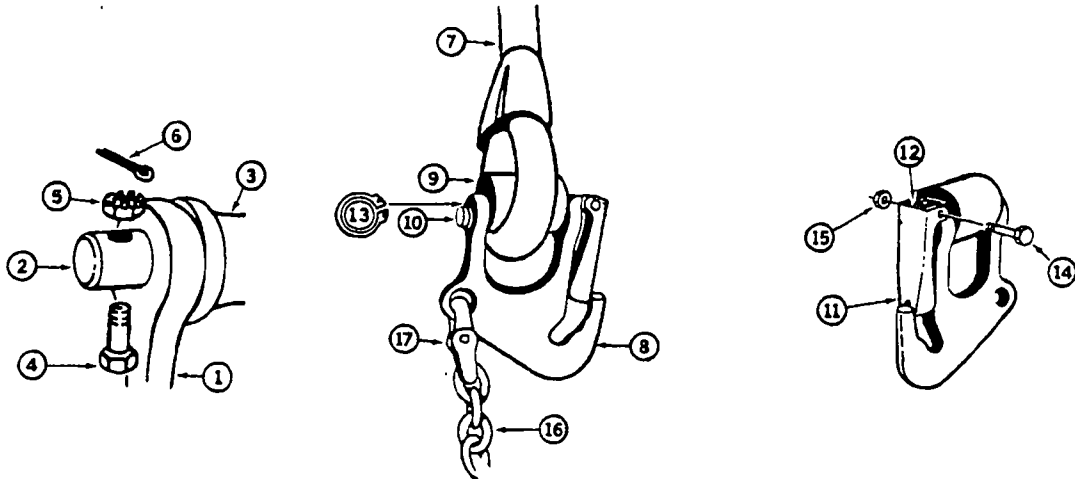
The hookup team stands on top of the center of the bridge. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the bridge and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



APPENDIX A  
NATIONAL STOCK NUMBERS FOR SLINGS,  
NETS, AND SPARE PARTS  
10,000-POUND CAPACITY SLING SET AND COMPONENTS



**Figure A-1. 10,000- or 25,000-pound Capacity Sling Set (Circled Numbers Correspond with NSNs of Identified Part)**

| NSN                | Part Number     | Description                             | Qty  |
|--------------------|-----------------|---|------|
| 1670-01-027-2902   | 38850-00001-043 | Sling set assembly, complete LIN T79003 | 1 ea |
| ① 4030-01-048-4045 | 38850-00004-045 | Apex fitting assembly                   | 1 ea |
| ② 5315-01-115-3482 | 38850-00008-101 | Pin, apex fitting                       | 1 ea |
| ③ 1670-01-235-0908 | 38850-00015-104 | Spacer, apex                            | 1 ea |
| ④ 5306-00-944-1536 | NAS1306-16D     | Bolt                                    | 1 ea |
| ⑤ 5310-00-207-9274 | AN 320C6        | Nut, castellated                        | 1 ea |
| ⑥ 5315-00-234-1864 | M5 24665-302    | Cotter pin                              | 1 ea |
| ⑦ 1670-01-047-6814 | 38850-00009-055 | Rope assembly                           | 4 ea |
| ⑧ 4030-01-048-4046 | 38850-00011-041 | Grabhook assembly                       | 4 ea |
| ⑨ 1670-01-109-2543 | 38850-00015-101 | Spacer, grabhook                        | 4 ea |
| ⑩ 5315-01-121-0497 | 38850-00008-103 | Pin, spacer                             | 4 ea |
| ⑪ 4030-01-100-1684 | 38850-00017-101 | Keeper, grabhook                        | 4 ea |
| ⑫ 5360-01-115-6833 | 38850-00019-101 | Keeper spring                           | 4 ea |
| ⑬ 5365-01-046-3670 | MS 3217-1050    | Snap ring                               | 4 ea |
| ⑭ 5306-00-771-7621 | NAS 1303-21     | Bolt, shear                             | 4 ea |
| ⑮ 5310-01-024-7080 | MS 51865-6C     | Nut, lock                               | 4 ea |
| ⑯ 4010-01-058-4772 | 38850-00053-101 | Chain, 8-foot length                    | 4 ea |
| ⑰ 4010-01-193-9331 | 577-0615        | Coupling, link                          | 4 ea |
| 8460-00-606-8366   | MIL-K-41835     | Kit bag, flyers                         | 1 ea |

### 15,000-POUND CAPACITY MULTILEG SLING ASSEMBLY

| NSN              | Part Number  | Description  | Qty  |
|------------------|--------------|--|------|
| 1670-00-902-3080 | 3900061      | Sling, multileg assembly,<br>LIN T80571, TAMCN B2030 | 1 ea |
| 1670-00-946-8719 | AC6000292    | Web ring, assembly                                   | 1 ea |
| NA               | MS24553-1    | Link assembly, web ring                              | 1 ea |
| 1670-00-946-8631 | 3110167      | Sling leg assembly                                   | 4 ea |
| NA               | 3910112-5    | Keeper, 5-inch, leg assembly                         | 4 ea |
| NA               | 3910112-1    | Keeper, 6 1/4-inch, leg assembly                     | 4 ea |
| NA               | MS24553-1    | Link assembly, sling leg                             | 1 ea |
| NA               | 31610        | Grab link  | 4 ea |
| NA               | FE 7623-3    | Keeper, grab link                                    | 4 ea |
| NA               | 34012-18     | Spring, keeper, grab link                            | 4 ea |
| 5310-00-167-0818 | AN960-10     | Washer, keeper, grab link                            | 4 ea |
| 5315-00-812-3765 | MS20392-2033 | Pin, keeper, grab link                               | 4 ea |
| 5315-00-839-2325 | MS24665-132  | Cotter pin, keeper, grab link                        | 4 ea |
| NA               | 31611        | Coupling link  | 4 ea |
| NA               | 34080-4      | Chain  | 4 ea |

### 25,000-POUND CAPACITY SLING SET AND COMPONENTS

|    | NSN              | Part Number     | Description                                 | Qty  |
|----|------------------|-----------------|---|------|
|    | 1670-01-027-2900 | 38850-00001-044 | Sling set assembly, complete,<br>LIN T79009 | 1 ea |
| 1  | 4030-01-048-4044 | 38850-00004-046 | Apex fitting assembly                       | 1 ea |
| 2  | 5315-01-119-9065 | 38850-00008-102 | Pin, apex fitting                           | 1 ea |
| 3  | 1670-01-235-0907 | 38850-00015-105 | Spacer, apex                                | 1 ea |
| 4  | 5306-00-944-2659 | NAS 1306-22D    | Bolt  | 1 ea |
| 5  | 510-00-207-9274  | AN 320C6        | Nut, castellated                            | 1 ea |
| 6  | 5315-00-234-1864 | MS 24665-302    | Cotter pin                                  | 1 ea |
| 7  | 1670-01-047-6815 | 38850-00009-056 | Rope assembly                               | 4 ea |
| 8  | 4030-01-048-4047 | 38850-00011-046 | Grabhook assembly                           | 4 ea |
| 9  | 1670-01-109-2544 | 38850-00015-102 | Spacer, grabhook                            | 4 ea |
| 10 | 5315-01-121-2874 | 38850-00008-104 | Pin, spacer                                 | 4 ea |
| 11 | 4030-01-100-1685 | 38850-00017-102 | Keeper, grabhook                            | 4 ea |
| 12 | 5360-01-115-6833 | 38850-00019-101 | Keeper spring                               | 4 ea |
| 13 | 5365-00-261-3918 | MS 3217-1075    | Snap ring                                   | 4 ea |
| 14 | 5306-00-771-7621 | NAS 1303-21     | Bolt, shear                                 | 4 ea |
| 15 | 5310-01-024-7080 | MS 51865-6C     | Nut, lock                                   | 4 ea |
| 16 | 4010-01-058-4771 | 38850-00053-102 | Chain, 8-foot length                        | 4 ea |
| 17 | 4010-01-041-9751 | 664241          | Coupling, link                              | 4 ea |
|    | 8460-00-606-8366 | MIL-K-41835     | Kit bag, flyers                             | 1 ea |

### 40,000-POUND CAPACITY SLING SET AND COMPONENTS

| NSN              | Part Number   | Description                                  | Qty  |
|------------------|---------------|--|------|
| 3940-01-183-2118 |               | Sling set assembly, complete,<br>TAMCN B2035 | 1 ea |
| 4838-01-199-9562 | FE 8109-1     | Apex shackle, assembly                       | 1 ea |
| NA               | FE 8109-5     | Shackle                                      | 1 ea |
| NA               | FE 8109-3     | Pin, shackle, apex                           | 1 ea |
| NA               | FE 8109-2     | Spacer, shackle, apex                        | 1 ea |
| 5306-00-944-1538 | NA51306-21D   | Bolt   | 1 ea |
| 5310-00-176-8110 | AN320-6       | Nut, castellated                             | 1 ea |
| 5315-00-234-1864 | MS24665-302   | Cotter pin                                   | 1 ea |
| 3940-01-194-9364 | JETS WMC-2000 | Sling leg                                    | 4 ea |
| 4030-01-197-1629 | FE 8103-1     | Grab link, assembly                          | 4 ea |
| NA               | FE 8103-4     | Spacer, grab link                            | 4 ea |
| 5306-00-151-1482 | AN12-42       | Bolt, grab link                              | 4 ea |
| 5310-00-167-1292 | AN310-12      | Nut, grab link                               | 4 ea |
| 5315-00-285-7161 | MS24665-377   | Cotter pin, grab link                        | 4 ea |
| NA               | FE 7623-3     | Keeper, grab link                            | 4 ea |
| 5315-00-812-3765 | MS20392-2033  | Pin, keeper, grab link                       | 4 ea |
| NA               | 34012-18      | Spring, keeper, grab link                    | 4 ea |
| 5310-00-167-0818 | AN960-10      | Washer, keeper, grab link                    | 4 ea |
| 5315-00-839-2325 | MS24665-132   | Cotter pin, keeper, grab link                | 4 ea |
| 4010-01-081-5114 | 577-0815      | Coupling link                                | 4 ea |
| NA               | 607050        | Chain, 8-foot length                         | 4 ea |



**FLAT WEB NYLON SLINGS**  
**TYPE X NYLON AERIAL DELIVERY SLING**

| <b>NSN</b>       | <b>Description</b>                   |
|------------------|--------------------------------------|
| 3940-00-675-5001 | Sling, endless donut, 10-inch        |
| 1670-00-393-0460 | Ring assembly, 25,000-pound capacity |

**TYPE XXVI NYLON MULTILoop LINE**

| <b>NSN</b>       | <b>Description</b> |
|------------------|--------------------|
| 1670-01-062-6301 | 2-loop, 3 foot     |
| 1670-01-062-6306 | 4-loop, 3 foot     |
| 1670-01-062-6304 | 2-loop, 9 foot     |
| 1670-01-062-6305 | 4-loop, 9 foot     |
| 1670-01-063-7760 | 2-loop, 11 foot    |
| 1670-01-062-6310 | 4-loop, 11 foot    |
| 1670-01-062-6303 | 2-loop, 12 foot    |
| 1670-01-062-6307 | 4-loop, 12 foot    |
| 1670-01-063-7761 | 2-loop, 16 foot    |
| 1670-01-062-6308 | 4-loop, 16 foot    |
| 1670-01-062-6302 | 2-loop, 20 foot    |
| 1670-01-064-4453 | 4-loop, 20 foot    |
| 1670-01-062-6309 | 4-loop, 28 foot    |
| 1670-01-062-6313 | 3-loop, 60 foot    |
| 1670-01-064-4454 | 6-loop, 60 foot    |
| 1670-01-062-6311 | 2-loop, 120 foot   |
| 1670-01-062-6312 | 6-loop, 120 foot   |
| 1670-01-107-7651 | 3-loop, 140 foot   |

### 5,000- AND 10,000-POUND CAPACITY CARGO NETS AND COMPONENTS

| NSN              | Part Number  | Description  | Qty    |
|------------------|--------------|--|--------|
| 1670-01-058-3811 | 6018-5       | Net, 5,000-pound capacity,<br>LIN NO2776, TAMCN J3121  | 1 ea   |
| 1670-01-058-3810 | 6018-10      | Net, 10,000-pound capacity,<br>LIN NO2708, TAMCN J3120 | 1 ea   |
| 1670-01-070-5276 | X6019        | Apex fitting   | 1 ea   |
| 1670-01-067-9989 | 6020         | Hook   | 4 ea   |
| 4020-01-118-5826 | 6018-15      | Repair cord, used on<br>part no. 6018-5                | As req |
| 4020-01-119-5994 | 6018-20      | Repair cord, used on<br>part no. 6018-10               | As req |
| 8030-01-152-2286 | 2300-3       | Antiabrasion compound,<br>olive drab                   | As req |
| 8030-01-154-2327 | 1003         | Antiabrasion compound,<br>black                        | As req |
| 1080-00-108-1155 | 13226E0964-2 | Transport case   | 1 ea*  |
| 8460-00-606-8366 | MIL-K-41835  | Kit bag, flyers  | 1 ea*  |

\* Alternate NSN is 1080-00-107-8580. These cases are designed and marked for use with the camouflage screen. Camouflage system markings should be replaced with "Helicopter External Cargo Net, 10,000-pound capacity."

## PROTECTIVE EQUIPMENT

| NSN              | Description                         |
|------------------|-------------------------------------|
| 4240-00-052-3776 | Eye goggles                         |
| 8415-01-158-9445 | Gloves, electrical workers, size 9  |
| 8415-01-158-9446 | Gloves, electrical workers, size 10 |
| 8415-01-158-9447 | Gloves, electrical workers, size 11 |
| 8415-01-158-9448 | Gloves, electrical workers, size 12 |
| 8415-00-268-7859 | Gloves, leather                     |
| 4240-00-759-3290 | Headset (USAF)                      |
| 4240-00-762-2582 | Headset (USAF)                      |
| 8415-00-071-8786 | Helmet, flight deck (USN/USMC/USAF) |

## MISCELLANEOUS EQUIPMENT AND MATERIAL

| NSN              | Description   |
|------------------|---|
| 4030-00-360-0304 | Clevis assembly, small, MS 70087-1                          |
| 5305-00-726-2553 | Bolt  |
| 5310-00-835-2037 | Nut   |
| 4030-00-678-8562 | Clevis assembly, medium, MS 70087-2                         |
| 5305-00-940-8069 | Bolt  |
| 5310-00-842-1190 | Nut   |
| 4030-00-090-5354 | Clevis assembly, large, MS 70087-3                          |
| 5305-00-177-5617 | Bolt  |
| 5310-00-891-3428 | Nut   |
| 4030-00-162-9668 | Clevis, screw pin, AN 116-14                                |
| 4020-00-240-2146 | Cord, nylon, Type III, 550-pound breaking strength          |
| 8305-00-958-3685 | Felt sheeting, 1/2-inch thick, 30-inch wide                 |
| 8305-00-191-1101 | Felt sheeting, 1/2-inch thick, 60-inch wide                 |
| 7520-00-079-0286 | Ink, marking, parachute, orange-yellow, marker              |
| 7520-00-634-6583 | Ink, marking, parachute, orange-yellow, liquid              |
| 7520-00-230-2734 | Ink, marking parachute, strata-blue, marker                 |
| 7520-00-286-5362 | Ink, marking parachute, strata-blue, liquid                 |
| 5825-00-917-3738 | Light, beacon, beanbag                                      |
| 6260-01-074-4230 | Light, chemical wand, 30-minute glow time                   |
| 6260-00-106-7478 | Light, chemical wand, 6-hour glow time                      |
| 6260-01-074-4229 | Light, chemical wand, 12-hour glow time                     |
| 1670-00-783-5988 | Link assembly, Type IV                                      |
| 1670-00-212-1149 | MB-1 chain assembly, 10,000-pound capacity:                 |
| 1670-00-516-8405 | Adjuster assembly   |
| 1670-00-753-3928 | Chain assembly  |
| 8135-00-664-6958 | Pad, energy-dissipating, honeycomb                          |
| 8135-00-808-6446 | Padding, cellulose, 20-inch by 60-foot                      |
| 8345-00-174-6865 | Padding, cellulose, 24-inch by 125-foot                     |
| 4020-00-231-2581 | Panel, marker, red-yellow, VS-17                            |
| 4020-00-968-1357 | Rope, 3/8-inch, TR605                                       |
| 6850-00-264-9038 | Rope, fibrous, 1/2-inch, MIL-R-17343                        |
| 7510-00-266-5016 | Solvent, dry cleaning, PD-680                               |
| 7510-00-074-4969 | Tape, adhesive, pressure-sensitive, 2-inch wide roll, green |
|                  | Tape, adhesive, pressure-sensitive, 2-inch wide roll, red   |

### MISCELLANEOUS EQUIPMENT AND MATERIAL (CONTINUED)

| NSN              | Description   |
|------------------|---|
| 1670-00-725-1437 | Tie-down strap, CGU-1/B, 5,000-pound capacity                   |
| 5340-01-204-3009 | Tie-down strap, web nylon, 5,000-pound capacity                 |
| 1670-00-937-0271 | Tie-down strap, web nylon, 10,000-pound capacity                |
| 5365-00-937-0147 | D-Ring, aerial delivery   |
| 1670-00-937-0272 | Load binder assembly  |
| 1670-00-360-0340 | Quick-fit strap fastener  |
|                  | Two-point link assembly components:                             |
| 5306-00-435-8994 | Bolt, 1-inch diameter, 4-inch long (2 each)                     |
| 5310-00-232-5165 | Nut, 1-inch diameter (2 each)                                   |
| 1670-00-003-1954 | Plate, side, 5 1/2-inch long (2 each)                           |
| 5365-00-007-3414 | Spacer, large   |
| 1670-00-574-8044 | Wand, static discharge  |
| NA               | Wand, static discharge, 3-foot, PN 1610AS100-1,<br>TAMCN C6254  |
| NA               | Wand, static discharge, 5-foot, PN 1610AS100-2,<br>TAMCN C6252  |
| 8305-00-082-5752 | Webbing, nylon, tubular, 1/2-inch, 1000-pound breaking strength |
| 8305-00-268-2411 | Webbing, cotton, 1/4-inch, 80-pound breaking strength           |

### EXTERNAL LIFT DEVICES

|                  |   |
|------------------|---|
| 1670-00-587-3421 | Bag, cargo, A-22, LIN B 14181, TAMCN C4070              |
| 3940-00-892-4380 | Cargo net, 14-foot square, 10-inch mesh                 |
| 3940-00-892-4374 | Cargo net, 14-foot square, 8-inch mesh                  |
| 1450-01-219-4360 | Mk105 pendant   |
| 1450-00-414-7172 | Mk105 hoisting sling assembly, 6,000-pound capacity     |
| 1450-00-881-8736 | Mk105 sling leg assembly                                |
| 1670-01-003-0803 | Releasable swivel hook pendant sling<br>AC6000500 Mod 1 |
| 1450-00-169-6927 | Sling, pallet, Mk86, LIN S80670                         |
| 1398-00-004-9175 | Sling, pallet, Mk100, LIN S80738                        |
| 1670-00-103-6617 | Swivel hook sling leg, AC6000153 (USMC, USN)            |

# APPENDIX B

## SLING CONVERSION TABLES

| SLING CONVERSION TABLES                        |  |  |  |
|--|--|--|--|
| 10,000-POUND<br>SLING SET<br>CHAIN LINK NUMBER | 25,000-POUND<br>SLING SET<br>CHAIN LINK NUMBER | 40,000-POUND<br>SLING SET<br>CHAIN LINK NUMBER | 15,000-POUND<br>MULTILEG SLING SET<br>CHAIN LINK NUMBER              |
| 3  | 3  | 3  | 51   |
| 4  | 4  | 4  | 52   |
| 5  | 4  | 4  | 52   |
| 6  | 5  | 5  | 53   |
| 7  | 6  | 6  | 54   |
| 8  | 6  | 6  | 54   |
| 9  | 7  | 7  | 55   |
| 10   | 8  | 7  | 56   |
| 11   | 9  | 8  | 57   |
| 12   | 9  | 9  | 57   |
| 13   | 10   | 9  | 58   |
| 14   | 11   | 10   | 59   |
| 15   | 11   | 11   | 59   |
| 16   | 12   | 11   | 60   |
| 17   | 13   | 12   | 61   |
| 18   | 14   | 13   | 62   |
| 19   | 14   | 13   | 62   |
| 20   | 15   | 14   | No further<br>conversions for<br>15,000 pound<br>multileg sling set. |
| 21   | 16   | 15   |  |
| 22   | 16   | 15   |  |
| 23   | 17   | 16   |  |
| 24   | 18   | 16   |  |
| 25   | 19   | 17   |  |
| 26   | 19   | 18   |  |
| 27   | 20   | 18   |  |
| 28   | 21   | 19   |  |
| 29   | 21   | 20   |  |
| 30   | 22   | 20   |  |
| 31   | 23   | 21   |  |
| 32   | 24   | 21   |  |

## SLING CONVERSION TABLES (CON'T)

| 10,000-POUND<br>SLING SET<br>CHAIN LINK NUMBER | 25,000-POUND<br>SLING SET<br>CHAIN LINK NUMBER | 40,000-POUND<br>SLING SET<br>CHAIN LINK NUMBER | 15,000-POUND<br>MULTILEG SLING SET<br>CHAIN LINK NUMBER              |
|--|--|--|--|
| 33   | 24   | 22   | No further<br>conversions<br>for 15,000-pound<br>multileg sling set. |
| 34   | 25   | 22   |  |
| 35   | 26   | 23   |  |
| 36   | 27   | 24   |  |
| 37   | 27   | 24   |  |
| 38   | 28   | 25   |  |
| 39   | 29   | 25   |  |
| 40   | 30   | 26   |  |
| 41   | 31   | 26   |  |
| 42   | 31   | 27   |  |
| 43   | 32   | 28   |  |
| 44   | 33   | 28   |  |
| 45   | 34   | 29   |  |
| 46   | 34   | 29   |  |
| 47   | 35   | 30   |  |
| 48   | 36   | 30   |  |
| 49   | 37   | 31   |  |
| 50   | 38   | 32   |  |
| 51   | 39   | 32   |  |
| 52   | 39   | 33   |  |
| 53   | 40   | 33   |  |
| 54   | 41   | 34   |  |
| 55   | 42   | 34   |  |
| 56   | 43   | 35   |  |
| 57   | 44   | 36   |  |
| 58   | 45   | 36   |  |
| 59   | 45   | 37   |  |
| 60   | 46   | 37   |  |
| 61   | 47   | 38   |  |
| 62   | 48   | 38   |  |
| 63   | 49   | 39   |  |
| 64   | 50   | 40   |  |
| 65   | 50   | 40   |  |
| 66   | 51   | 41   |  |
| 67   | 52   | 41   |  |
| 68   | 53   | 42   |  |
| 69   | 54   | 42   |  |
| 70   | 54   | 43   |  |
| 71   | 55   | 44   |  |
| 72   | 56   | 44   |  |
| 73   | 57   | 45   |  |
| 74   | 57   | 46   |  |

## SLING CONVERSION TABLES (CON'T)

| 10,000-POUND<br>SLING SET<br>CHAIN LINK NUMBER | 25,000-POUND<br>SLING SET<br>CHAIN LINK NUMBER | 40,000-POUND<br>SLING SET<br>CHAIN LINK NUMBER | 15,000-POUND<br>MULTILEG SLING SET<br>CHAIN LINK NUMBER           |
|--|--|--|---|
| 75   | 58   | 46   | No further conversions<br>for 15,000-pound<br>multileg sling set. |
| 76   | 59   | 47   |   |
| 77   | 60   | 48   |   |
| 78   | 61   | 48   |   |
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| 94   | 73   | 58   |   |
| 95   | 74   | 59   |   |
| 96   | 75   | 60   |   |
| 97   | 76   | 60   |   |
| 98   | 76   | 61   |   |
| 99   | 77   | 62   |   |
| 100  | 78   | 62   |   |
| 101  | 79   | 63   |   |
| 102  | 79   | 64   |   |
| 103  | 80   | 64   |   |
| 104  | 81   | 65   |   |
| 105  | 82   |  |   |
| 106  | 83   |  |   |
| 107  | 83   |  |   |
| 108  | 84   |  |   |





## GLOSSARY

|                 |  |                   |   |
|-----------------|--|-------------------|---|
| ADCGS . . . . . | aviation direct generator set                    | LVAD . . . . .    | low velocity airdrop  |
| AGPU . . . . .  | aviation ground power unit                       | MGB . . . . .     | medium girder bridge  |
| CFM . . . . .   | cubic feet per minute                            | MICLIC . . . . .  | mine clearing line charge   |
| CG . . . . .    | center of gravity                                | mm . . . . .      | millimeter  |
| CLFFK . . . . . | company level field feeding<br>kit               | MTMCTEA . . . . . | Military Traffic Management<br>Command Transportation<br>Engineering Agency |
| CNCE . . . . .  | communications nodal control<br>element          | NC . . . . .      | node center   |
| CONEX . . . . . | container express                                | NRDEC . . . . .   | Natick Research, Development,<br>and engineering Center                     |
| decon . . . . . | decontamination                                  | NSN . . . . .     | national stock number   |
| DOD . . . . .   | Department of Defense                            | OVE . . . . .     | operator vehicle equipment  |
| EAT . . . . .   | external air transport                           | QRSA . . . . .    | quick reaction satellite antenna  |
| *EBFL . . . . . | extendable boom forklift                         | RDF . . . . .     | radio direction finder  |
| ECU . . . . .   | environmental control unit                       | ROPS . . . . .    | roll-over protection system   |
| EMI . . . . .   | electromagnetic induction                        | ROWPU . . . . .   | reverse osmosis water<br>purification unit                                  |
| FARE . . . . .  | forward area refueling<br>equipment              | RT . . . . .      | rough terrain   |
| *FOPS . . . . . | falling objects protection<br>system             | SCAMP . . . . .   | self-propelled crane for Army<br>aircraft maintenance and<br>positioning    |
| gp . . . . .    | general purpose                                  | SCC . . . . .     | system control center   |
| gph . . . . .   | gallons per hour                                 | SEE . . . . .     | small emplacement excavator   |
| gpm . . . . .   | gallons per minute                               | SEN . . . . .     | small extension node  |
| *GVW . . . . .  | gross vehicle weight                             | SIXCON . . . . .  | six-compartment container   |
| HATS . . . . .  | hardened Army tactical<br>shelter                | SPAM . . . . .    | shop, portable aircraft<br>maintenance                                      |
| HE . . . . .    | high explosive                                   | *SUSV . . . . .   | small unit support vehicles   |
| HMMWV . . . . . | high-mobility multipurpose<br>wheeled vehicle    | TAFDS . . . . .   | tactical airfield fuel dispersing<br>system                                 |
| ISO . . . . .   | International Organization<br>of Standardization | TAMCN . . . . .   | Table of Authorized Material<br>Control Number                              |
| *KIAS . . . . . | knots indicated airspeed                         | TOW . . . . .     | tube-launched, optically<br>tracked, wire-guided                            |
| kw . . . . .    | kilowatt(s)                                      | TTW . . . . .     | teletypewriter  |
| *LAV . . . . .  | light armored vehicle                            | USA . . . . .     | United States Army  |
| LEN . . . . .   | large extension node                             | USMC . . . . .    | United States Marine Corps  |
| LIN . . . . .   | line number                                      |                   |   |
| LOS . . . . .   | line of sight                                    |                   |   |
| LTR . . . . .   | light tactical floating raft<br>bridge           |                   |   |



1

2



3

4



## **REFERENCES**

### **REQUIRED PUBLICATIONS**

Required publications are sources that users must read in order to understand or to comply with this publication.

#### **FIELD MANUAL**

55-450-3                      Multiservice Helicopter External Air Transport:  
   Basic Operations and Equipment

#### **MILITARY STANDARD**

209G                          Slings and Tie-Down Provisions for Lifting and  
   Tying Down Military Equipment



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11 FEBRUARY 1991

By Order of the Secretary of the Army:

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## CHAPTER 1

### FUNDAMENTAL PRINCIPLES

This chapter contains general information about certification for helicopter external air transport (EAT) and explains the role of the Military Traffic Management Command Transportation Engineering Agency (MTMCTEA) and the Department of Defense (DOD) EAT certification authority. This authority rests with the US Army Natick Research, Development, and Engineering Center (NRDEC). This chapter also explains the information contained in the equipment rigging procedures and gives some general rigging instructions.

#### CLASSIFICATION DEFINITIONS OF EXTERNAL AIR TRANSPORT LOADS

##### Certified EAT Loads

Certified EAT loads are those items of equipment and their associated rigging procedures which have completed the evaluation and testing required by NRDEC for EAT certification. These rigging procedures are in Chapter 2. Only Certified EAT loads are authorized for the Marine Corps.

##### Suitable EAT Loads

Suitable EAT loads are those items of equipment and their associated rigging procedures that have not been certified but have demonstrated acceptable static lift and flight characteristics during a flight test by the US Army TEXCOM Airborne and Special Operations Test Board. In most cases, the lifting provisions have not been tested according to the applicable military standard. These rigging procedures are in Chapter 3.

##### Unique EAT Loads

Unique EAT loads are items of equipment and their associated rigging procedures which have been certified or determined to be suitable for EAT but have significant

changes to a load parameter, such as weight or a change in the aircraft used to carry the load, such as a load certified with a UH-60 and now carried under a CH-46. Unique loads are also equipment carried on a onetime or low-frequency basis, such as telephone poles, artillery targets, or barrier material.

##### Prohibited EAT Loads

Prohibited EAT loads are items of equipment that are prohibited from EAT as determined by each service. These loads have been denied EAT certification and are a safety hazard if carried. They have either structural deficiencies or have exhibited unstable flight characteristics during flight testing. Each service will identify these loads and transmit this information by separate list.

Contact your service point of contact identified in the Preface if you have any questions regarding the classification of a particular load.

#### CERTIFICATION OF EQUIPMENT FOR HELICOPTER EXTERNAL AIR TRANSPORT

The objective of helicopter EAT certification is to assure the user that the

equipment being transported can withstand the stresses of an EAT flight environment. Certification for EAT assures the user that the item has met minimum standards for structural integrity and that the associated rigging procedures have been developed specifically for that item.

Within the US Army, the MTMCTEA is responsible for transportability approval of developmental equipment. Within the DOD, NRDEC is the lead activity responsible for providing EAT certification and rigging procedures for military equipment. When an item is certified for EAT, it means that NRDEC, in cooperation with various test activities, has--

- Conducted an engineering analysis of the load and lifting provisions for structural adequacy during EAT.
- Verified that the lift provisions meet the strength requirements of the applicable military standard by means of proof load testing.
- Developed and/or validated EAT rigging procedures through static lift testing.
- Evaluated flight test reports and determined that the particular load meets acceptable flight characteristics with the type helicopter flown during the flight test.
- Issued a statement of EAT certification for the particular load, including load configuration(s), weight(s), types of helicopter(s), and maximum stable airspeed(s) as attained during the flight test(s). Certification is valid only for the conditions specified in the rigging procedures.

## REQUESTS FOR EAT CERTIFICATION

### Fielded Equipment

Each service headquarters must designate, request, and prioritize the fielded equipment to be evaluated by NRDEC for EAT certification. The following agencies are responsible for their branch of service:

- US Army - US Army Transportation School, ATTN: ATSP-CD, Fort Eustis, VA 23604-5391.
- US Marine Corps - Marine Corps Research, Development and Acquisition Command (MCRDAC), ATTN: Code SSE/T&E, Quantico, VA 22134-5080.
- US Navy - Naval Air Systems Command (NAVAIR).
- US Air Force - US Air Force Systems Command.

Individual units can request EAT certification for fielded equipment through the appropriate service agency which will add the item to the prioritized list. The NRDEC will evaluate the equipment on a priority basis.

### Previously Certified Single-Point Loads

Organizations can request certification for single-point loads transported by helicopters not listed in the applicability paragraph of the certified single-point load rigging procedure. The procedure for certifying a single-point load for EAT under a different helicopter from that listed in the applicability paragraph is as follows:

- Contact your service point of contact to determine if the load has been certified with the different helicopter subsequent to the manual publication.
- Obtain a multiservice flight data collection sheet (MSFDCS) from Commander, NRDEC, ATTN: STRNC-UAS, Natick, MA 01760-5017.
- Following the steps in the MSFDCS, conduct a flight test for the item using the certified single-point rigging procedures in this manual.
- Complete the MSFDCS and return it to NRDEC. NRDEC will evaluate the completed MSFDCS and certify the item as appropriate for the specified helicopter.

## Previously Certified Dual-Point Loads

Loads cannot be certified for dual-point lift based on previously certified dual-point rigging procedures because of the differences in dual-hook helicopters, such as the distance between the two cargo hooks. Rigging procedures for dual-point loads must be developed and/or approved by NRDEC before the test flight.

## UNIQUE ITEMS OF EQUIPMENT OR OPERATIONAL REQUIREMENTS

Helicopter external air transport of unique items, due to operational requirements, will be at the discretion of the commander. Equipment not listed in this manual should be static lifted (when possible) by a crane to determine proper rigging and stability characteristics. Personnel thoroughly familiar with EAT rigging procedures should assist in the static lift testing. Flight testing may be conducted after a satisfactory static rigging configuration has been determined.

Suitable loads that have been routinely and safely flown in the past will continue to be flown if units are to accomplish assigned missions. The lack of EAT certification in itself does not preclude a unit commander from carrying a load that is not certified. Each service is responsible for determining its policy on carrying loads that have not been certified for EAT.

**NOTE:** Low density equipment with low weight and large surface area (flat surfaces), such as shelters, empty trailers, pallet loads, and empty fuel or water drums, are likely to become extremely unstable when flown during EAT, even at low airspeeds, and should be flown with extreme caution.

## EQUIPMENT RIGGING PROCEDURES

This section explains the information that is contained in the rigging procedures for each load. Chapters 2 and 3 contain the

rigging procedures for certified and suitable single-point loads, respectively.

## Applicability Paragraph

The applicability paragraph states whether a load is "certified" or "suitable" for EAT. It also contains the helicopter types and recommended maximum airspeeds for each helicopter type. For certified loads, this airspeed is the maximum airspeed attained by the helicopter during the test flight before the load became unstable or before the aircraft power requirements were exceeded. For suitable loads, the maximum recommended airspeed is based on previous experience with this helicopter/load combination. For either certified or suitable loads, the airspeed listed is a recommendation and not a restriction, unless so stated. The aircrew should closely monitor the load during the flight, especially if the helicopter exceeds the recommended maximum airspeed.

## Load Description

The load description paragraph identifies the load, model, National Stock Number (NSN) or other identification, and the weight of the load for certification. The actual weight of the equipment may vary somewhat from the actual rigged weight during the flight test due to equipment modifications, fuel, equipment added to the load, or different models of the same item. The load weight on the equipment data plate or in the operator's manual takes precedence over the load weight in this manual. Weigh the load if there is any doubt about its actual weight. If the load weight exceeds the weight listed in the load description paragraph, the load becomes a unique load. Contact your service point of contact if you have any questions about the load description or weight.

Equipment such as cargo trailers and cargo trucks contain descriptions of the allowable additional cargo weight. Do not exceed the fully loaded weight. Some trailers become extremely unstable at low weights; therefore, a minimum weight is identified. If your trailer is below that weight, add more cargo



or dummy weight as close to the center of the trailer as possible until you reach the minimum weight.

### **Preparation**

The preparation steps are intended to reduce the possibility of damage to the equipment caused by sling leg entanglement during the hookup and lift-off operation or by wind resistance encountered during the flight. Since these preparation steps are not directive in nature, the commander assumes responsibility for any damage to the equipment caused by deviation from the preparation steps.

### **Rigging**

The rigging steps give information as to the position of the apex fitting on the load, routing orientation of the sling legs, location of the lift provisions, chain link number for each sling leg, and steps required to prevent the sling legs from becoming entangled on the load. Do not change the chain link number in the rigging procedures under any circumstances as it may change sling leg loading and cause lift provision failure.

The purpose of the illustration accompanying the rigging procedures is to depict what a properly rigged load looks like with the slack removed from the sling legs. The arrow identifies the direction of flight.

Appendix A contains NSN component listings for slings, sling sets, cargo nets, and other miscellaneous equipment and materials.

## **GENERAL RIGGING INSTRUCTIONS**

### **WARNING**

**Inspect lifting provisions and supporting structure for damage or degradation prior to EAT. Do not transport loads with damaged or degraded lift provisions.**

Prepare the load to be transported by following the preparation and rigging instructions for each item. Typical preparation instructions will provide information to secure loose items, remove or secure canvas covers, and remove obstructions, such as antennas. Place protective padding on windshields and other components that could be damaged by the metal parts of the sling set during hookup or release. The load should be secure enough to withstand winds in excess of 120 knots caused by the forward airspeed of the aircraft.

If possible, position the load in the takeoff direction so the pilot does not have to pick the load up and then turn the aircraft into the takeoff direction.

Assemble and inspect the slings and miscellaneous equipment required to prepare and rig the load. Following the instructions in Chapter 6 of the first volume in this set, add or remove sling legs, chains, or apex fittings as required. Never exceed the capacity of the sling legs or apex fitting/web ring. If you have a sling set with a higher capacity than the sling set prescribed, use the chain link conversion chart in Appendix B to determine the corresponding chain link for your sling set.

Position the sling set near the load. The sling legs for a typical load with four lifting points are routed as shown in Figure 1-1.

Rigging a typical load with four lifting points is begun by connecting--

- Sling leg 1 to the left front lifting provision.
- Sling 2 to the right front lifting provision.
- Sling leg 3 to the left rear lifting provision.
- Sling leg 4 to the right rear lifting provision.

If a six-leg sling set is required, the innermost sling legs, 5 and 6, are connected to the left and right middle lift provisions.

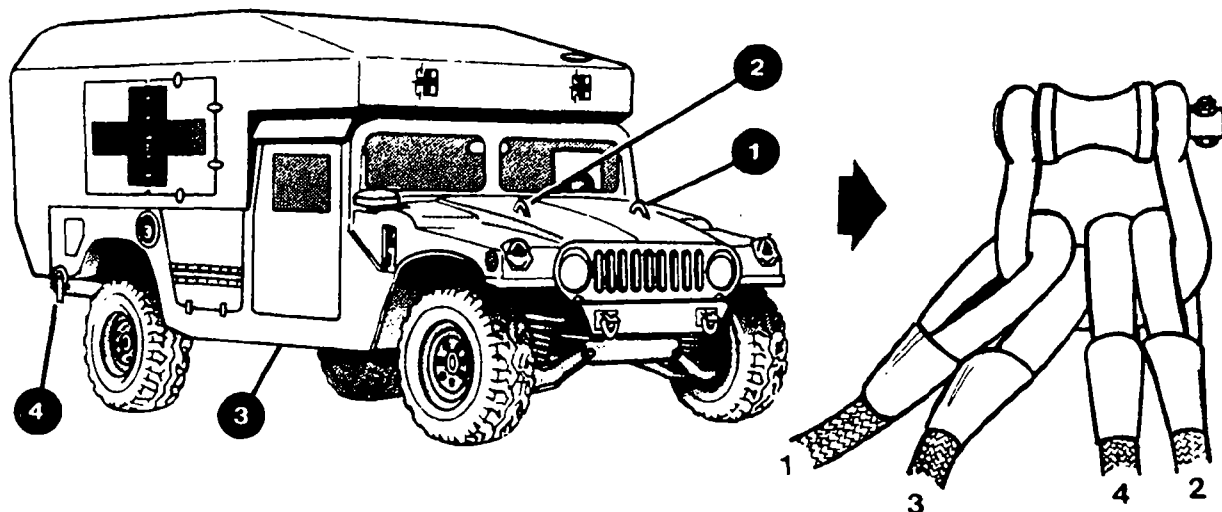


Figure 1-1. Sling Leg Lifting Point Designation

Odd numbered sling legs go to the same side of the load.

Left, right, front, and rear directions are designated from the driver's perspective for vehicles and towed equipment. Howitzer gun tubes are considered the front of the load. The front or rear is identified on other items of equipment. The sling leg numbering system prevents sling legs from crossing each other and causing damage to the sling legs or causing the load to twist in flight. To improve flight stability, some loads are transported backwards. Do not confuse the front of the load as it is carried with the end designated as the front for rigging purposes. The arrow with the illustration identifies the direction of flight.

Following the equipment rigging procedures, loop the free end of the chain end through the lift provision and insert the specified chain link in the grabhook/grab link. Tie or tape the excess chain end to prevent the unrestrained chain from damaging the load. If necessary, wrap padding around the chain or rope assembly to prevent damage to the load or sling set. If the procedures prescribe a spreader bar, install and pad it according to the rigging instructions.

Breakaway technique tape/cotton webbing is used to temporarily restrain the sling legs to keep them from becoming entangled on the load as the helicopter lifts the load.

### A-22 CARGO BAG RIGGING INSTRUCTIONS

The A-22 cargo bag is an adjustable cotton duck cloth/nylon and nylon webbing container consisting of a sling assembly, cover, and four suspension webs. The bag is used to transport palletized loads, loose cargo, ammunition, drums, and other general cargo. Maximum weight capacity is 2,200 pounds. You may rig the cargo in the bag with or without the cover.

The best way to learn about this carrying device is to rig and derig it several times. Figures 1-2 through 1-6 and the following steps explain how to rig an A-22 cargo bag:

**Step 1** - Spread the suspension web assembly on the ground near the cargo to be transported. Make sure the lateral straps are facing the ground. The fat lip portion of the friction adapter on the suspension web assembly must face down to ensure correct rigging when the cover and suspension assembly are folded up around the load.

**Step 2** - Center the cover (lacing loops/eyelets down) on the sling assembly, making sure that the cover edges are even with the scuff pad of the suspension web assembly.

**Step 3** - Center the load on the canvas/nylon cover (Figure 1-2). Place the load so that any sharp corners or objects are toward the center of the load, if possible. Use cushioning material to protect the cover, if necessary.

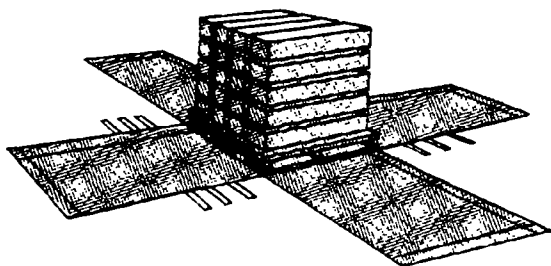


Figure 1-2. Centered Load

**Step 4** - Fold the panels of the canvas/nylon cover over the top of the load. Fold any excess cover material under the top flap.

**Step 5** - Using lacing cord or Type III nylon cord, secure the cover at each corner by running the cord through the lacing loops in a figure-eight design (Figure 1-3). Tie the cord ends with a bow knot and secure. The purpose of the cord is to tighten the cover around the load so that small items cannot fall out.

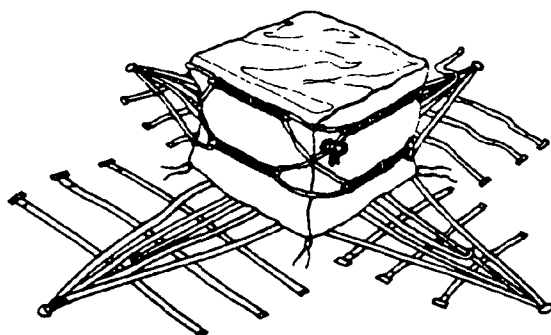


Figure 1-3. Securing the Cover with Lacing Cord

**Step 6** - Route the 188-inch strap over top of the load. Route the free end under the floating safety bar (smooth side) and back over the friction adapter (rough side). Tighten the strap, fold in 8- to 10-inch loops, and secure (Figure 1-4).

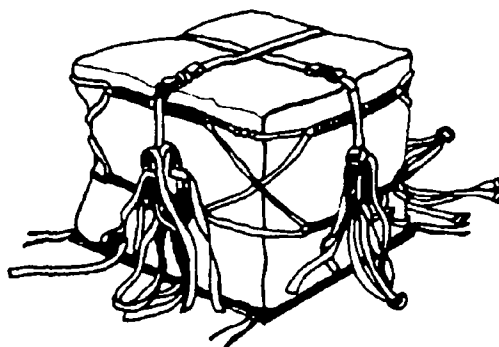


Figure 1-4. Securing the Strap

**Step 7** - Pull the lower lateral straps to the corners of the load. Route the free end under the floating bar and back over the friction adapter. Attempt to tighten all four lower lateral straps equally. Repeat this step using the middle lateral straps.

**Step 8** - Fasten the upper lateral straps in the same manner as in step 7 (Figure 1-5). If the load is not high enough for the upper lateral straps to go around the load, pull the suspension webs to their full height, and fasten the upper straps diagonally across the top corner of the load. Strap fasteners should be tightened to within 4 to 5 inches of the upper lifting legs.

**Step 9** - Connect the four snap fasteners on the 24-inch suspension web straps to the sling assembly D-rings. Make sure the open or hook side of each butterfly snap is facing inward. Tape each butterfly snap to prevent the hooks from becoming entangled on the nylon cord or straps.

**Step 10** - Attach the four suspension web strap D-rings to a medium clevis in a clockwise sequence. Each strap can have a maximum of one twist to connect to the clevis (Figure 1-6).

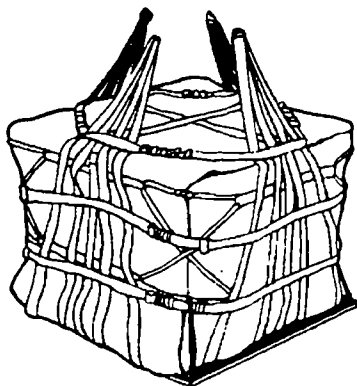


Figure 1-5. Fastening Upper Lateral Straps

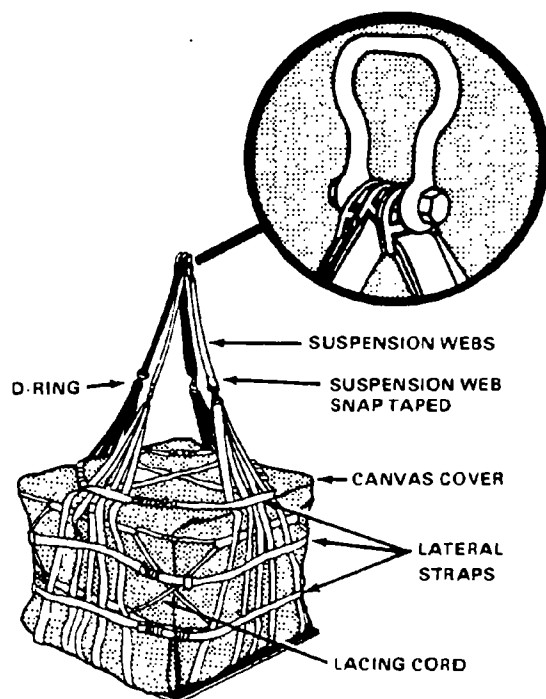


Figure 1-6. Upper Sling and Medium Clevis

**Step 11** - Adjust all straps until the sling assembly fits snugly around the load. Fold and secure any excess webbing.

**Step 12** - Prepare the load for pickup by looping the chain end of a sling leg through

the medium clevis and inserting link 3 in grabhook.

## CARGO NET RIGGING INSTRUCTIONS

The 5,000- and 10,000-pound capacity octagon-shaped cargo nets are constructed from interwoven nylon cord. Each set of four lifting legs has a hook that attaches to the apex fitting. The other ends of the lifting legs are attached to the outer border cord. The apex fitting can be connected directly to the aircraft fitting. A diamond-shaped load zone area is marked by a yellow cord interlaced with the net mesh. This zone marks the center of the net and is used as a guide to place the load.

When positioning the load, the sides of the load can extend beyond the load zone, but the overhang should be the same on each side. The apex fitting is attached by a tether cord to the set of lifting legs with the net identification tag.

The olive drab body of the 5,000-pound capacity cargo net is 15 feet wide. Mesh size is 6 inches, and the net weighs 58 pounds. Volume capacity is 125 cubic feet.

The 10,000-pound capacity cargo net is black, and the body is 18 feet wide. It is constructed from a heavy weave nylon braid with 7 1/2 inches between mesh. The net weighs 96 pounds and has a volume capacity of 380 cubic feet.

When preparing to rig a net, remember the following rules:

- Never exceed the weight limits of the net.
- Do not transport cargo having sharp edges or protrusions without first covering the edges so they will not damage the net.
- Do not carry small items that could slip through the mesh. Use a canvas liner.

Follow these instructions when rigging the net:

**Step 1** - Spread the net out on the ground. Have four persons pull evenly on each of the four lifting legs to open the net to its fullest

extension over the spot where the net is to be loaded (Figure 1-7). This will prevent overlap of the net under the pallets or load.

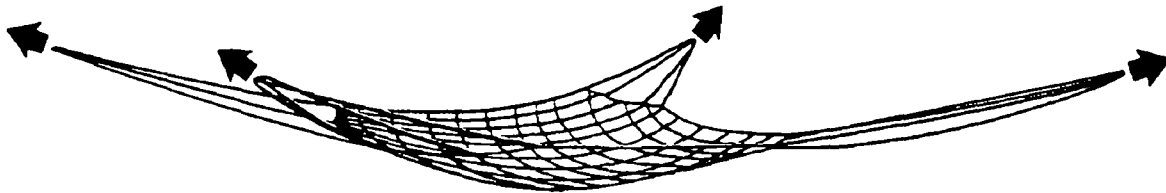


Figure 1-7. Fully Extended Net

**Step 2** - Inspect the net. Repair as necessary. Inspect the pallet or load and make sure that banding material and pallet frame will not puncture, cut, or tear net. Tape over sharp edges with pressure-sensitive tape.

same direction. After connecting all four hooks to the apex fitting, tape or tie the four hooks together to prevent them from coming unhooked when the apex is laid down (Figure 1-10).

**CAUTION:** When forklifts are used to move pallets onto the nets, move the lifting legs to one side so that they will not be damaged by the tires. Do not allow the pallet or the under carriage of the forklift forks to drag on the net surface. The forklift forks could tear the net and pull it out from under the load. If the net is pulled out, the load may not be centered or could be unstable in flight.

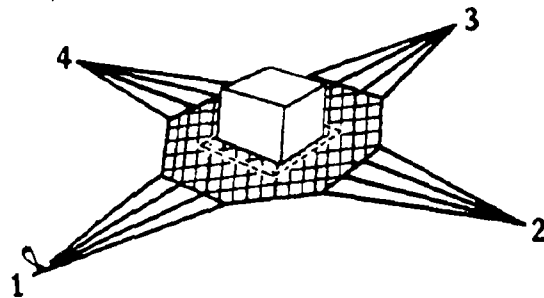


Figure 1-8. Aligned Load

**Step 3** - Align the load on the net so that the sides of the load are parallel with the yellow cord (Figure 1-8). The load may overlap the yellow cord. The load's center of gravity will be near the center of the net. The lifting legs will be on the side of the load, not on the corners. If the load is loose cargo, place the cargo on the net with the heaviest items in the center and the lighter items toward the sides or on top of heavier items.

**Step 5** - All four sides of the net are now ready to be pulled up around the load. Begin by having the person on top of the load hold the apex up and another person tape or tie all 16 lifting legs together at 3- to 4-foot intervals until no more slack can be pulled up on the legs. If the load is small, you may have to tape or tie the net together above the load. Tape or tie the legs and net so that the net does not snag on the load as the helicopter lifts the net (Figure 1-11). Use breakaway technique so that the tape or tie breaks after the slack is removed from the legs and net.

**Step 4** - Position one person on top of the load with the apex fitting. Legs are hooked to the apex in the following sequence: 1, 3, 2, and 4, to provide equal lift on all legs (Figure 1-9). Hooks do not have to face in the

**Step 6** - Lift the sides of the net up while taping the legs so that the net does not get caught on the pallet or load protrusions (Figure 1-12).

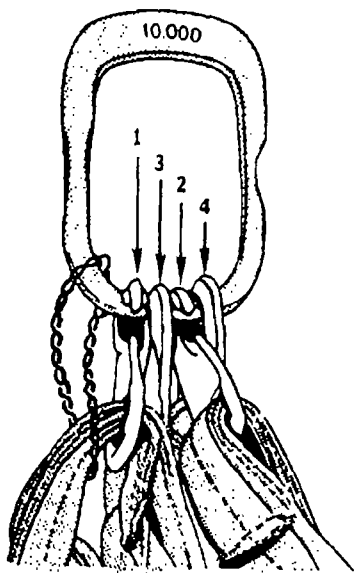


Figure 1-9. Legs Hooked in Sequence

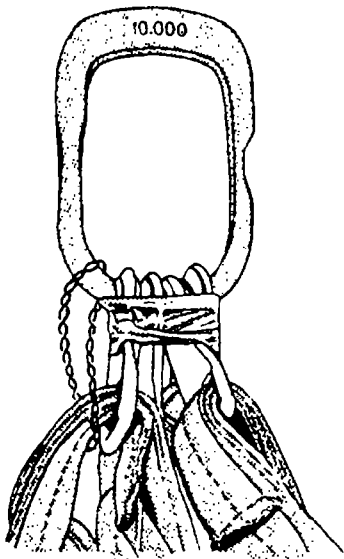


Figure 1-10. Taped Hooks

**Step 7 -** After you finish taping the legs, pull the net outward at each corner, grasp the border cord from each side near the corner of the load, and tape the border cords together to tighten the sides of the net. Take the excess netting at the corner and tape to the

adjoining side. At each side, pull the net up as high as possible and tape it to prevent it from snagging on the load and tearing the net (Figure 1-13). Use only enough tape to hold the net in place on the load. DO NOT tape net to load.

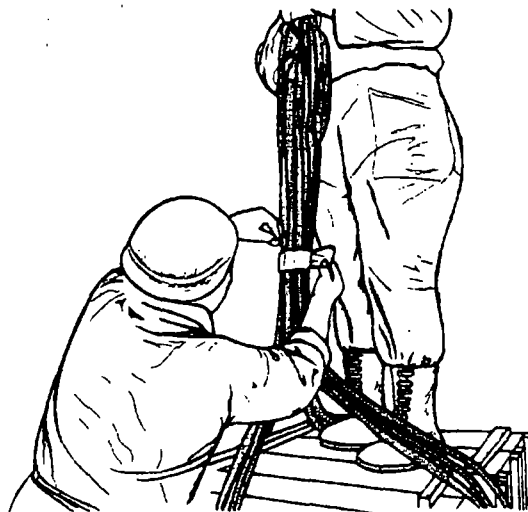


Figure 1-11. Taping Lifting Legs

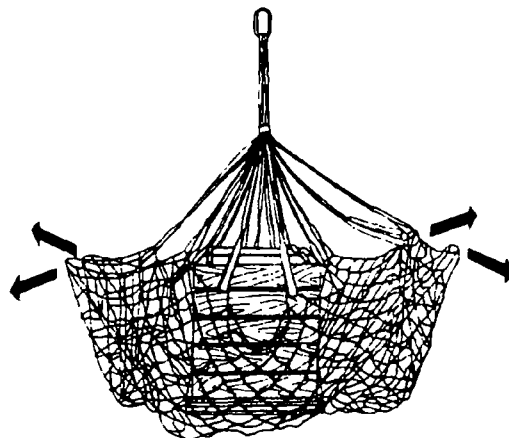
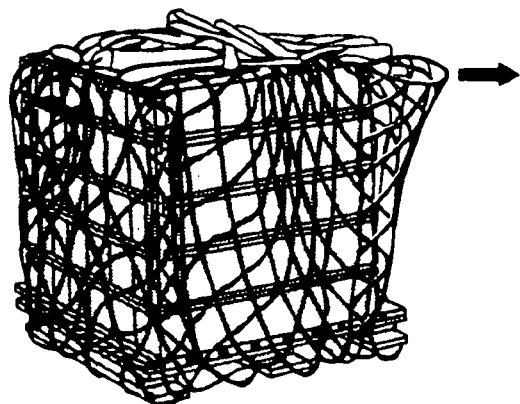
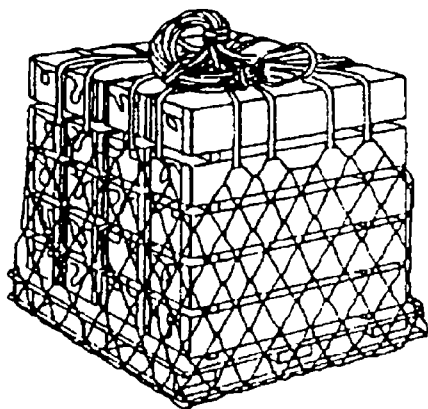


Figure 1-12. Net Pulled Outward from the Load



**Figure 1-13. Excess Net Taped to Itself**

**Step 8** - Coil the lifting legs on top of the load. The net is now ready for hookup to the helicopter (Figure 1-14).



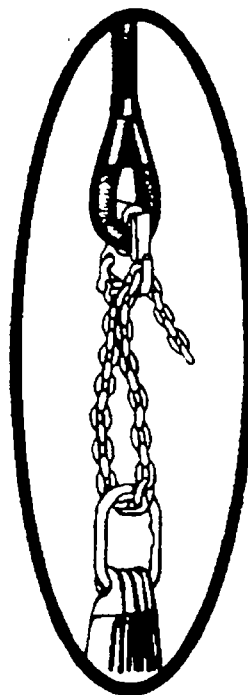
**Figure 1-14. Lifting Legs Coiled on Top of Load**

If the load must be moved, carefully guide the forklift forks through the net and into the pallet slots. Pallets can be stored temporarily with nets around them. They

should not be stored on concrete. Place empty pallets on the concrete surface and set the netted pallet on top of it.

**Step 9** - Normally the net apex fitting is directly attached to the cargo hook. If the load is a large one, the lifting legs may not be long enough to allow the hookup person to perform a safe hookup to the aircraft. If you cannot lift the apex fitting at least 6 feet above the top of the load, add a leg or legs from a sling set (Figure 1-15). Route the chain end of the sling leg through the net apex fitting and insert link 3 in the grabhook. Remember, the capacity of the sling leg must be greater than the weight of the load.

**Step 10** - Before hookup to the aircraft, make a final inspection of the apex fitting, netting, and taping to ensure the net and the load is still secure.



**Figure 1-15. Adding a Sling Leg**

## CHAPTER 2

### CERTIFIED SINGLE-POINT LOAD RIGGING PROCEDURES

This chapter contains rigging procedures for single-point loads that have been certified for EAT. Each rigging procedure is found in a figure that includes a description of the load, materials required for rigging, and steps to complete the procedure. An applicability paragraph is also a part of each figure and identifies certified loads. When the load is listed as suitable in the applicability paragraph, it has been flight-tested and is awaiting final certification in the near future.

#### WHEELED VEHICLES

The certified single-point rigging procedures for wheeled vehicles are in this section. Figures 2-1 through 2-10 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

---

#### Figure 2-1. M151 1/4-Ton Truck

##### APPLICABILITY

This load is certified by the US Army Natick Research, Development, and Engineering Center (NRDEC) for UH-60 and CH-47 helicopters at airspeeds up to and including 120 knots.

##### LOAD DESCRIPTION

- Truck, utility, 1/4-ton, M151-series, LIN X60833.
- Weight: 2,400 pounds empty.

##### MATERIALS

- All sling sets:
  - Tape, adhesive, pressure-sensitive, 2-inch wide roll.
  - Cord, nylon, Type III, 550-pound breaking strength.
  - Felt, sheet, cattle hair, Type IV, 1/2-inch x 24- x 60-inches.
  - Assembly, clevis, small, MS70087-1 (4 each).
  - Webbing, cotton, 1/4-inch, 80-pound breaking strength.



- Sling set (10,000-pound capacity).
- Sling set, multileg (15,000-pound capacity).

## PERSONNEL

Two persons can prepare and rig the load in 15 minutes.

## PROCEDURES

### Step 1. Preparation

- Remove the tarpaulin. Fold the top bows.
- Lower and secure the windshield. Fold the tarpaulin and place it over the top of the windshield. Secure with nylon cord.
- Lower the left side rearview mirror so that it is flush with the truck body. Tape it to the side of the vehicle.
- If cargo is carried, place it in the rear seat and tie it down using rope or similar lashing material.
- Make sure that the fuel tank does not exceed 3/4 capacity. Inspect the fuel tank cap, oil filler cap, and battery caps for proper installation.
- Engage the vehicle parking brake and put the transmission in neutral.
- Attach one small clevis assembly to the lifting eye on all four wheels.

### Step 2. Rigging

- Sling set (10,000-pound capacity):
  - Position apex fitting in the center of the vehicle. Route outer sling legs (1 and 2) to the front wheels and inner sling legs (3 and 4) to the rear wheels. Sling legs 1 and 3 should be on the left side of the load.
  - Loop the chain end of sling leg 1 through the clevis on the left front wheel and insert link 3 in the grabhook. Repeat with sling leg 2 on the clevis on the right front wheel.
  - Loop the chain end of sling leg 3 through the clevis on the left rear wheel and insert link 10 in the grabhook. Repeat with sling leg 4 through the clevis on the right rear wheel. Secure excess chain with tape or nylon cord.
  - Tape or tie (breakaway technique) sling legs 1 and 2 to the top of the steering wheel.
  - Cluster and tie or tape (breakaway technique) all sling legs together on top of the truck to prevent entanglement during hookup and lift-off.
- Multileg sling set:
  - Position the web ring in the center of the truck. Route outer sling legs (1 and 2) to the front wheels and inner sling legs (3 and 4) to the rear wheels. Sling legs 1 and 3 should be on the left side of the load.
  - Loop the chain end of sling leg 1 through the clevis on the left front wheel and insert link 4 in the grabhook. Repeat with sling leg 2 on the clevis on the right front wheel.

## **Figure 2-4. M966/M1036/M1045/M1046 TOW Missile Carrier M1025/M1026/M1043/M1044 Armament Carrier**

### **APPLICABILITY**

The TOW missile carriers and armament carriers are certified by the US Army NRDEC for CH-47 and CH-54 helicopters at airspeeds up to and including 90 knots and the CH-53E helicopter at airspeeds up to and including 130 knots. These vehicles are also certified by NRDEC for the UH-60 helicopter with the following limitations:

- With a vehicle gross rigged weight of less than 7,300 pounds, the UH-60A is restricted to airspeeds up to and including 100 knots and 30 degrees maximum bank angle.
- With a vehicle gross rigged weight between 7,300 pounds and 7,995 pounds, the UH-60A is limited to 70 knots and 12 degrees maximum bank angle.
- Vehicle gross rigged weight cannot exceed 7,995 pounds when using the UH-60A.

**NOTE:** When using UH-60A support, coordinate closely with the aviation unit as to the vehicle weight.

### **LOAD DESCRIPTION**

- TOW missile carrier (HMMWV); M966, LIN T05096; M1036; M1045, TAMCN D1125; M1046, TAMCN D1125.
- armament carrier (HMMWV); M1025, LIN T92242; M1026, LIN T92310; M1043, TAMCN D1159; M1044, TAMCN D1159.
- Weight: Empty and loaded weight is dependent on model configuration.

### **WARNING**

**Vehicle gross rigged weight is limited to 7,995 pounds when using UH-60A aircraft.**

### **MATERIALS**

- Sling set (10,000-pound capacity) (UH-60, CH-47, or CH-54 only).
- Multi-leg sling set (15,000-pound capacity) or sling set 40,000-pound capacity (CH-53E only).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Felt sheet, cattle hair, Type IV, 1/2-inch or suitable padding.

## PERSONNEL

Two persons can prepare and rig the load in 15 minutes.

## PROCEDURES

### Step 1. Preparation

- Fold mirrors forward in front of the windshield for added protection and tie together with nylon cord. If installed, remove canvas covering over the bed of the truck. Remove the doors. If time permits, fold canvas top and tie to windshield for added protection.
- Secure all equipment and cargo inside the vehicle with tape, nylon cord, or lashings. Remove antennas and stow inside vehicle.
- Make sure that the fuel tank is not over 3/4 full. Inspect fuel tank cap, oil filler cap, and battery caps for proper installation.
- Engage the vehicle parking brake and put the transmission in NEUTRAL.
- Ensure the front wheels are pointed straight ahead. Tie down the steering wheel, using the securing device attached under the dashboard.

### Step 2. Rigging

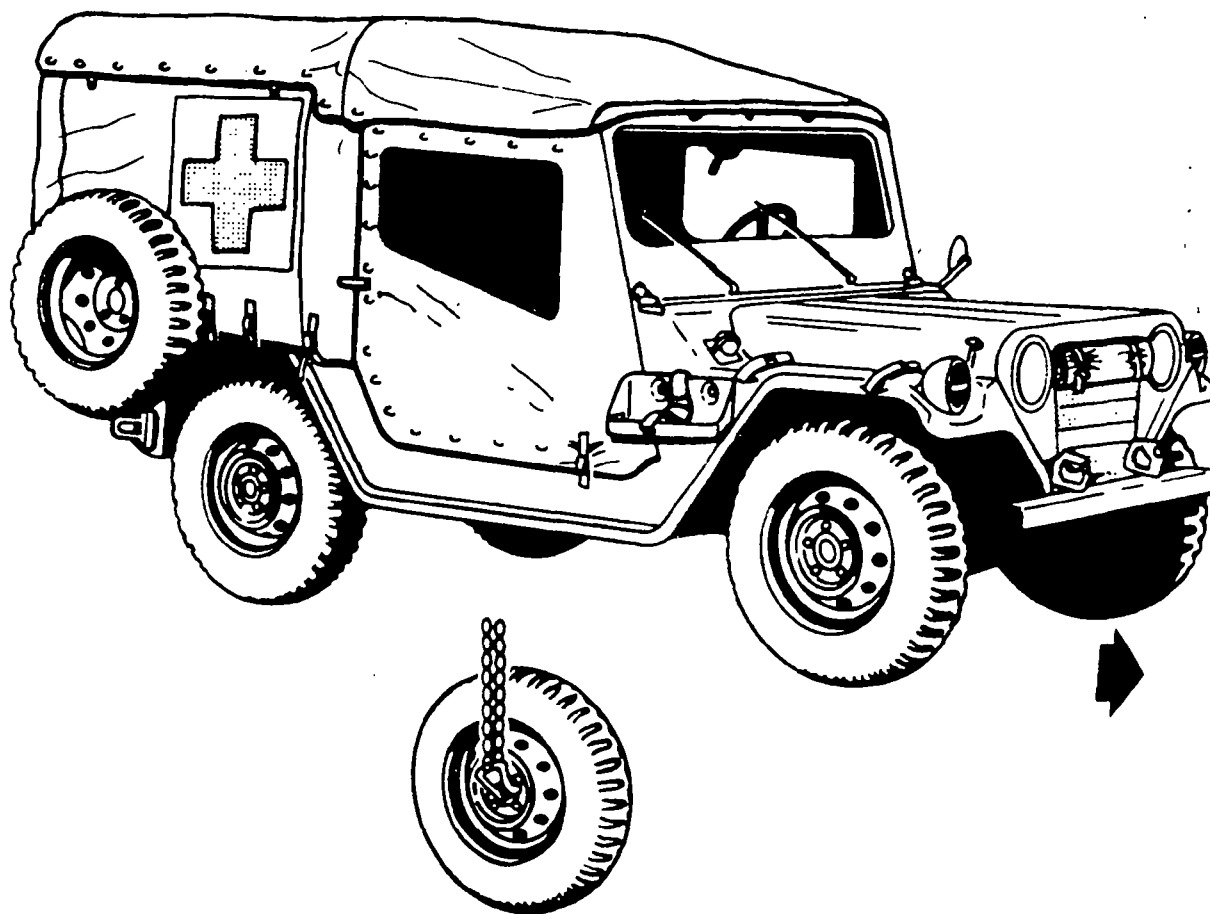
- Position apex fitting on the roof of the vehicle. Route outer sling legs 1 and 2 to the front of the vehicle and inner sling legs 3 and 4 to the rear of the vehicle. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the lift provision that protrudes through the left side of the hood and insert link 80 (60 for the 15,000-pound multi-leg sling set) or (53 for the 40,000-pound sling set) in the grabhook. Repeat with sling leg 2 on the right front lift provision. Secure excess chain with tape or nylon cord.
- Route the chain end of sling leg 3 through the eyelet opening in the upper left corner of the tailgate. Loop the chain end through the left lift provision on the bumper and thread back through the eyelet opening in the tailgate. Insert link 3 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.
- Wrap rear sling leg chains with padding where they contact the shell back.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on the roof of the vehicle. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the vehicle and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of preparation and rigging procedures in steps 1 and 2.



## TRAILERS

The certified single-point rigging procedures for trailers are in this section. Figures 2-11 through 2-19 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

---

### Figure 2-10. M416 1/4-Ton Trailer

#### APPLICABILITY

This load is certified by the US Army NRDEC for UH-60 helicopters at airspeeds up to and including 90 knots.

#### LOAD DESCRIPTION

- Trailer, cargo, 1/4-ton, M416, LIN W95400.
- \*Weight:
  - Empty, 580 pounds.
  - Loaded, 1,080 pounds.

#### WARNING

**Do not carry the M416 trailer at gross weights of less than 800 pounds because it is extremely unstable and can contact the underside of the helicopter. Any M416 that is lighter than 800 pounds must have additional cargo or dummy weight placed as close to the center of the trailer bed as possible.**

\*Maximum weight of trailer cargo is 500 pounds.

#### MATERIALS

- All sling sets:
  - Felt, sheet, cattle hair, Type IV.
  - Cord, nylon, Type III, 550-pound breaking strength.
  - Tape, adhesive, pressure-sensitive, 2-inch wide roll.
  - Rope (12-foot) or lashing materials (if cargo carried).
- Sling set, 10,000-pound capacity.
- Multileg sling set.
- Aerial delivery slings:
  - Link assembly, Type IV.

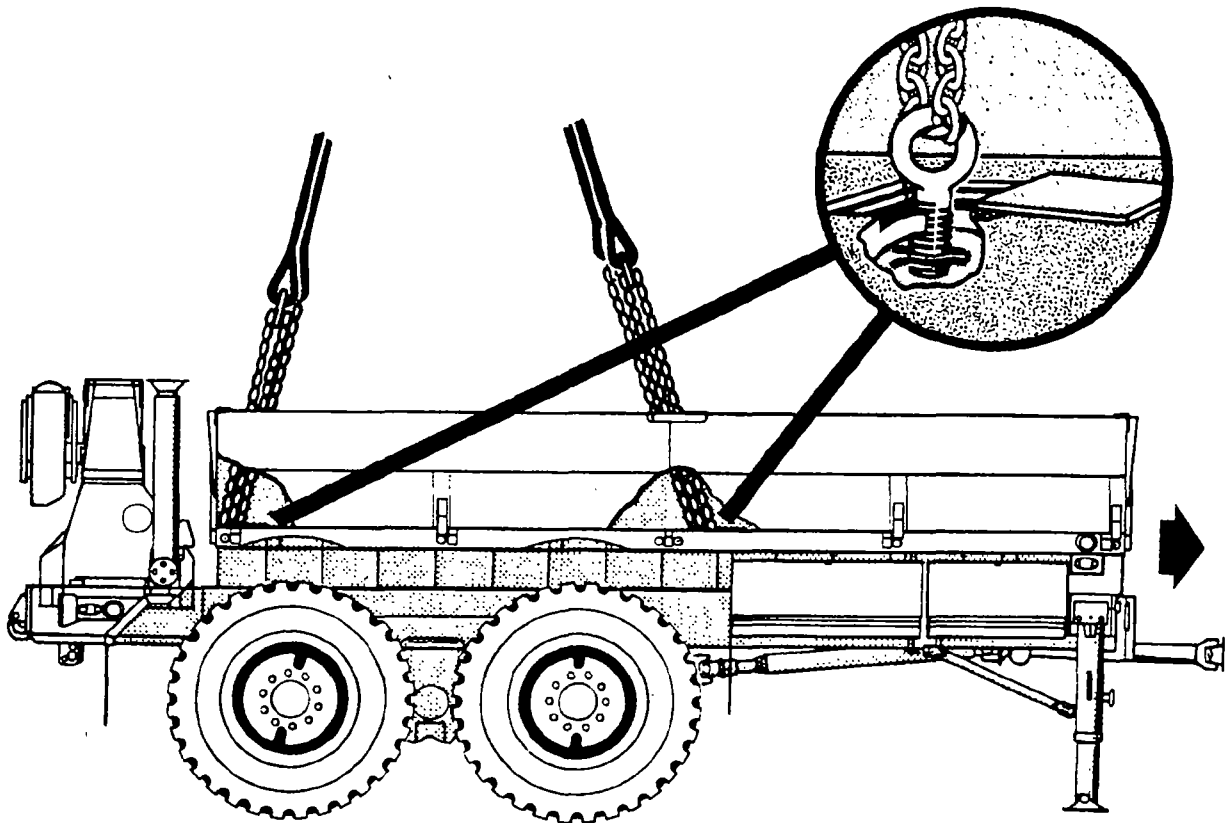
- Loop the chain end of sling leg 3 through the left rear lift provision located in the left rear corner of the trailer bed by the towing pintle hook and insert link 13 in the grab link. Repeat with sling leg 4 and the right rear lift provision. Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the trailer to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands on top of the trailer. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the trailer and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## TRUCK AND TOWED COMBINATIONS

The certified single-point rigging procedures for truck and towed combinations are in this section. Figures 2-20 through 2-22 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

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### Figure 2-19. M151 1/4-Ton Truck with M416 1/4-Ton Trailer

#### APPLICABILITY

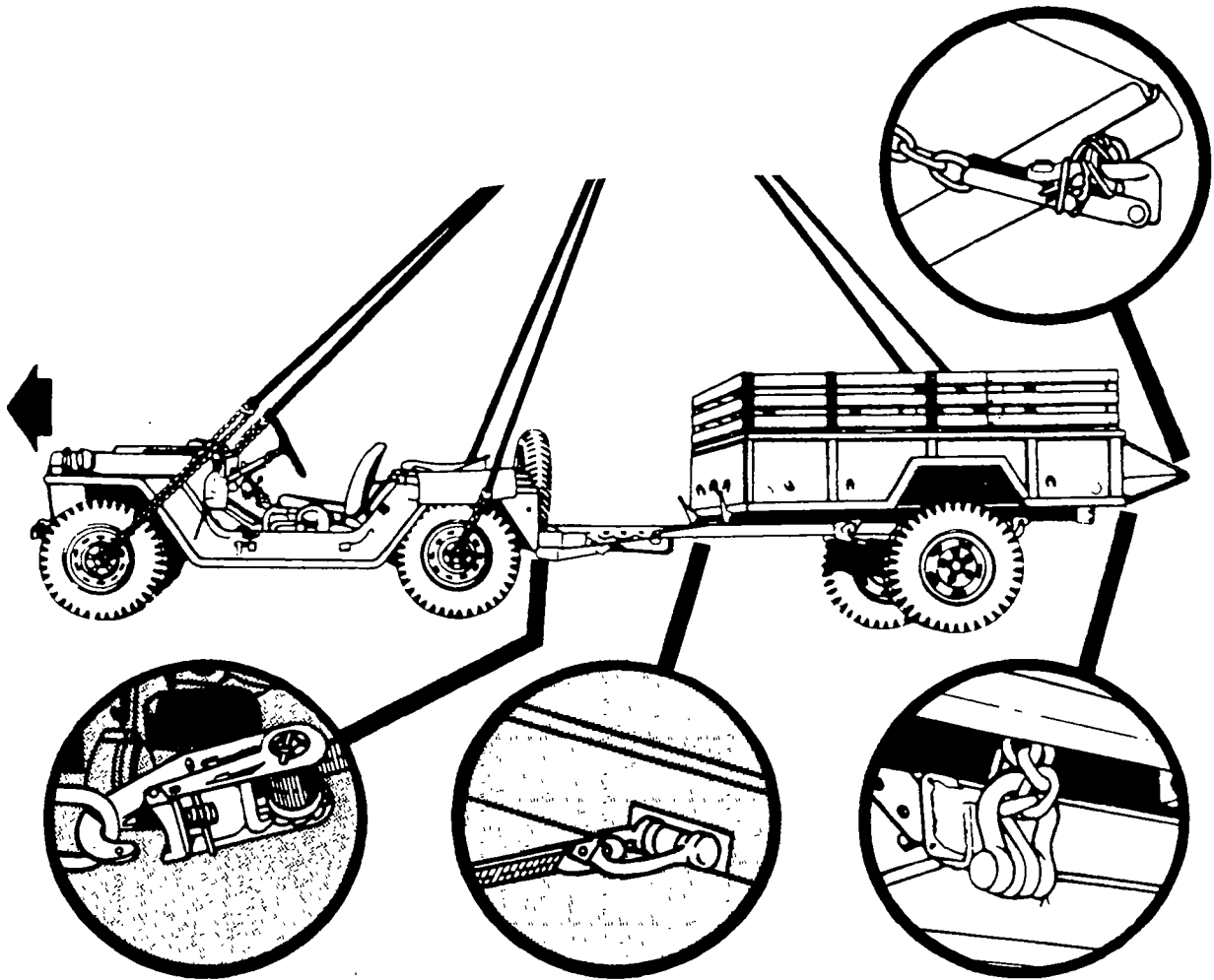
This load is certified by the US Army NRDEC for UH-60 and CH-47 helicopters at airspeeds up to and including 110 and 90 knots, respectively.

#### LOAD DESCRIPTION

- Truck, utility, 1/4-ton, M151, LIN X61244, and trailer, cargo, 1/4-ton, M416, LIN W95400. Each vehicle may be loaded with 500 pounds of cargo.
- Weight:
  - Truck, 2,380 pounds.
  - Cargo, 500 pounds.
  - Trailer, 580 pounds.
  - Cargo, 500 pounds.
  - Total, 3,960 pounds.

#### MATERIALS

- Sling set (10,000-pound capacity).
- Sling leg assembly (2,500-pound capacity) from a 10,000-pound sling set, two additional.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Rope (if cargo is carried), approximately 40 feet.
- Felt, sheet, cattle hair, Type IV, 1/2- x 60-inch.
- Clevis assembly, small MS 70087-1 (4 each).
- Cord, nylon, Type III, 550-pound breaking strength.
- Padding, cellulose.
- Assembly, tie-down (10,000-pound) (2 each).
- Load binder assembly (2 each).





## HOWITZERS AND WEAPONS SYSTEMS

The certified single-point rigging procedures for howitzers and weapons systems are in this section. Figures 2-23 through 2-36 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

---

**Figure 2-22. M101A1 105-mm Howitzer, with or without A-22 Cargo Bags**

### APPLICABILITY

This load is certified by the US Army NRDEC for helicopters and configurations as indicated in the load description.

### LOAD DESCRIPTION

| LOAD                                     | WEIGHT<br>(pounds) | TYPE<br>HELICOPTER | AIRSPPEED<br>(knots) |
|--|--------------------|--------------------|----------------------|
| M101A1 Howitzer                          | 4,980              | UH-60              | 95                   |
| M101A Howitzer with<br>1 A-22 cargo bag  | 7,180              | UH-60              | 75                   |
| M101A1 Howitzer                          | 4,980              | CH-47              | 100                  |
| M101A Howitzer with<br>1 A-22 cargo bag  | 7,180              | CH-47              | 90                   |
| M101A Howitzer with<br>2 A-22 cargo bag  | 9,380              | CH-47              | 80                   |
| M101A Howitzer with<br>3 A-22 cargo bag  | 11,580             | CH-47              | 75                   |
| M101A1 Howitzer                          | 4,980              | CH-54              | 115                  |
| M101A Howitzer with<br>1 A-22 cargo bag  | 7,180              | CH-54              | 110                  |
| M101A Howitzer with<br>2 A-22 cargo bag  | 9,380              | CH-54              | 105                  |
| M101A Howitzer with<br>3 A-22 cargo bags | 11,580             | CH-54              | 95                   |
| M101A1 Howitzer                          | 4,980              | CH-53              | 100                  |

## GUIDED MISSILE SYSTEMS

The certified single-point rigging procedures for guided missile systems are in this section. Figures 2-37 through 2-41 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

---

### Figure 2-36. M54A1 and M54A2 Chaparral Launch Station

#### APPLICABILITY

This load is certified by the US Army NRDEC for CH-47 helicopters at airspeeds up to and including 100 knots.

#### LOAD DESCRIPTION

- M54A1 Launch Station, Chaparral Air Defense System, NSN 1425-01-074-6799.
- M54A2 Launch Station, Chaparral Air Defense System, NSN 1425-01-142-4576.
- Weight: 13,000 pounds.

#### MATERIALS

- Sling set (25,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

#### PERSONNEL

Two persons can prepare and rig this load in 20 minutes.

#### PROCEDURES

##### Step 1. Preparation

- Prepare the launch station for external air transport in accordance with TM 9-1425-2585-10-1.
- Rotate the missile pedestal 90 degrees from the centerline to avoid possible sling interference.

##### Step 2. Rigging

**NOTE:** The main power unit end of the platform is the front of the load for rigging purposes.

- Position apex fitting on top of the gunner's compartment. Route outer sling legs 1 and 2 to the front of the load (main power unit end) and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift provision located on the left front corner of the platform and insert link 10 in the grabhook. Repeat with sling leg 2 and the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lift provision located on the left rear corner of the platform and insert link 3 in the grabhook. Repeat with sling leg 4 and the right rear lift provision.
- Secure all excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the gunner's compartment to prevent entanglement during hookup and lift-off.

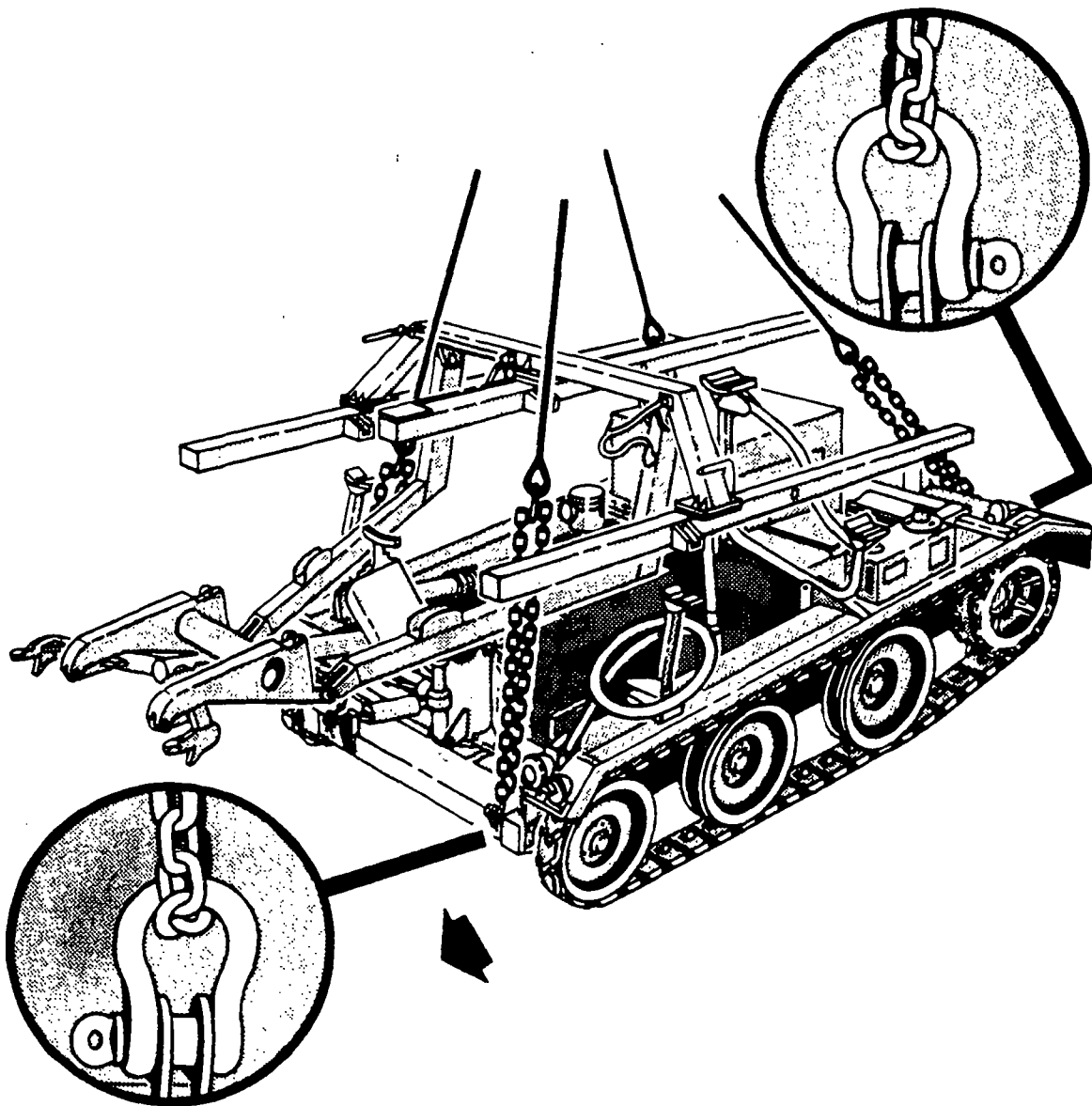
### Step 3. Hookup

**NOTE:** Brief the aircrew to hover to the side of the load and relax sling leg tension before releasing the apex fitting to prevent damage to the missile pedestal.

The hookup team stands on the back of the gunner's compartment. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the missile platform and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## ENGINEER EQUIPMENT

The certified single-point rigging procedures for engineer equipment are in this section. Figures 2-42 through 2-72 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

---

### Figure 2-41. T-3 Tractor, Crawler

#### APPLICABILITY

This load is certified by the Military Traffic Management Command, Transportation Engineering Agency (MTMCTEA) for CH-47 and CH-54 helicopters at airspeeds up to and including 90 knots.

#### LOAD DESCRIPTION

- Tractor, full-tracked, diesel-engine driven, JD-550, equipped with roll-over protection system (ROPS), towing winch, and hydraulic angle blade, LIN W76336.
- Weight: 16,662 pounds with 3/4 tank of fuel.

#### MATERIALS

- Sling set (25,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Padding, cellulose or suitable substitute.

#### PERSONNEL

Two persons can prepare and rig the load in 10 minutes.

#### PROCEDURES

##### Step 1. Preparation

- Make sure that T-3 fuel tank is not over 3/4 full.
- Secure the operator's seat cushions to the seat frame with tape or nylon cord.
- Remove both canopy lights, wrap in padding, and store in tractor toolbox.
- Secure all loose covers and panels with tape or nylon cord.
- Place the transmission in neutral, start the engine, and raise the blade 12 inches above the ground. Align the blade 90 degrees to the tractor. Turn the engine off and tape the ignition key in place to prevent loss.

## **LIQUID CONTAINERS**

The certified single-point rigging procedures for liquid containers are in this section. Figures 2-73 through 2-78 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

---

### **Figure 2-72. Lightweight Collapsible Fabric Tank**

#### **APPLICABILITY**

This load is certified by the US Army NRDEC for UH-1, UH-60, and CH-47 helicopters.

#### **LOAD DESCRIPTION**

- Tank, fabric, lightweight collapsible, 160 gallons, LIN Z77871.
- Weight: 1,400 pounds.

#### **MATERIALS**

- Cargo net, helicopter, 5,000-pound capacity.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

#### **PERSONNEL**

Two persons can prepare and rig this load in 15 minutes.

#### **PROCEDURES**

##### **Step 1. Preparation**

Ensure all sharp edges on the tank are protected.

##### **Step 2. Rigging**

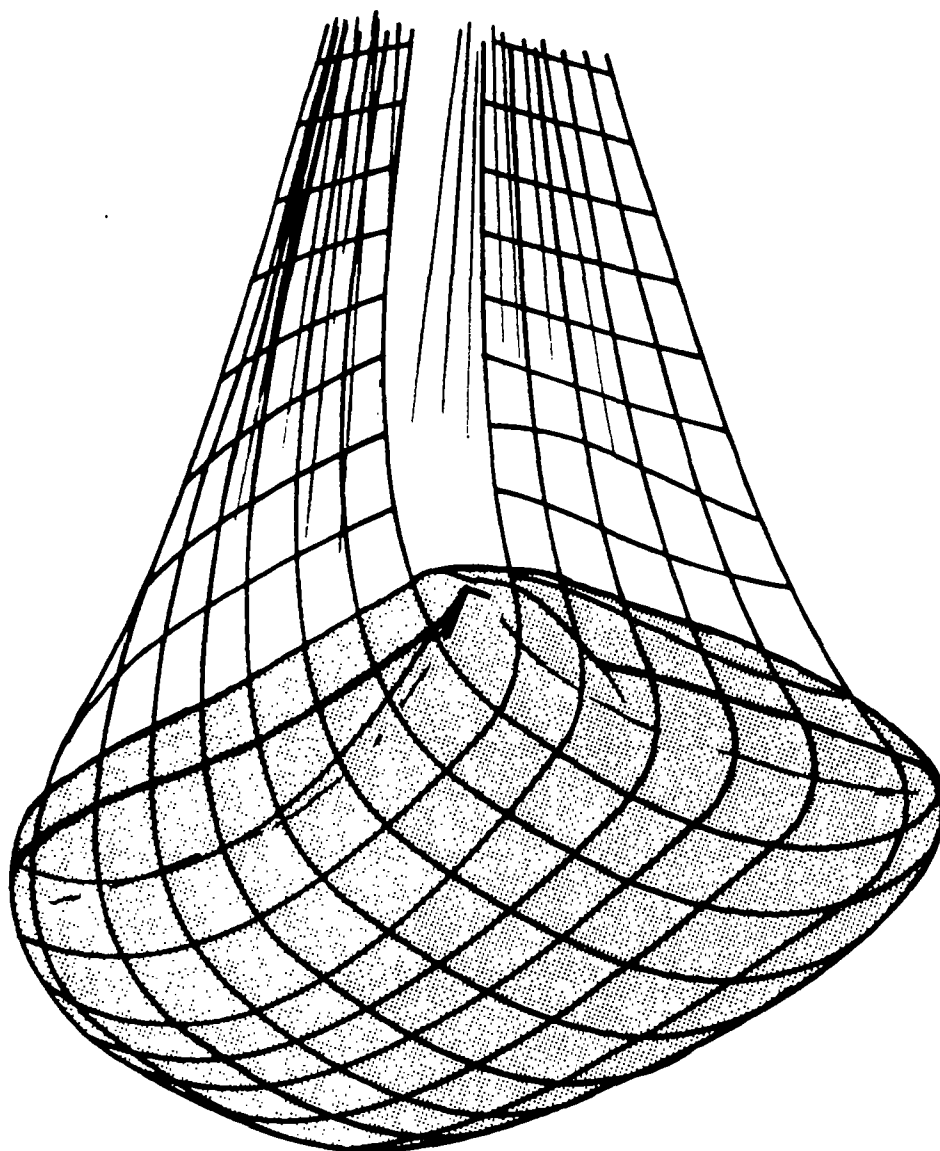
- Spread the cargo net and position the tank in the center of the net.
- Using the cargo net rigging instructions in Chapter 1, complete rigging the cargo net.

##### **Step 3. Hookup**

The hookup team stands alongside the load. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team exits the area underneath the helicopter to the designated rendezvous point.

#### Step 4. Derigging

Derigging is the reverse of the rigging procedures in Step 2. Stow the cargo net in the storage bag.



## **SHELTERS**

The certified single-point rigging procedures for shelters are in this section. Figures 2-79 through 2-88 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

---

### **Figure 2-78. AN/ASM-146 Electronic Shop AN/MSM-108 Electronic Shop**

#### **APPLICABILITY**

This load is certified by the US Army NRDEC for the CH-47 helicopter at airspeeds up to and including 80 knots.

#### **LOAD DESCRIPTION**

- Shop, electronic, shelter-mounted, AN/ASM-146, LIN H01907 or AN/MSM-108, LIN Z26048.
- Weight: 3,940 pounds.

#### **MATERIALS**

- Sling set (10,000-pound capacity).
- Webbing, cotton, 1/4-inch 80-pound breaking strength.

#### **PERSONNEL**

One person can prepare and rig the load in 20 minutes.

#### **PROCEDURES**

##### **Step 1. Preparation**

- Close and secure all doors, vents, and caps.
- Engage brakes.
- Secure tongue in raised position with safety chain.

##### **Step 2. Rigging**

- Position apex fitting on top of the shelter. Route outer sling legs 1 and 2 to the front (door end) of the shelter and inner sling legs 3 and 4 to the rear.
- Loop the chain end of sling leg 1 through the left front lift provision at the top left corner of the shelter and insert link 3 in the grabhook. Repeat with sling leg 2 on the right front lift provision.



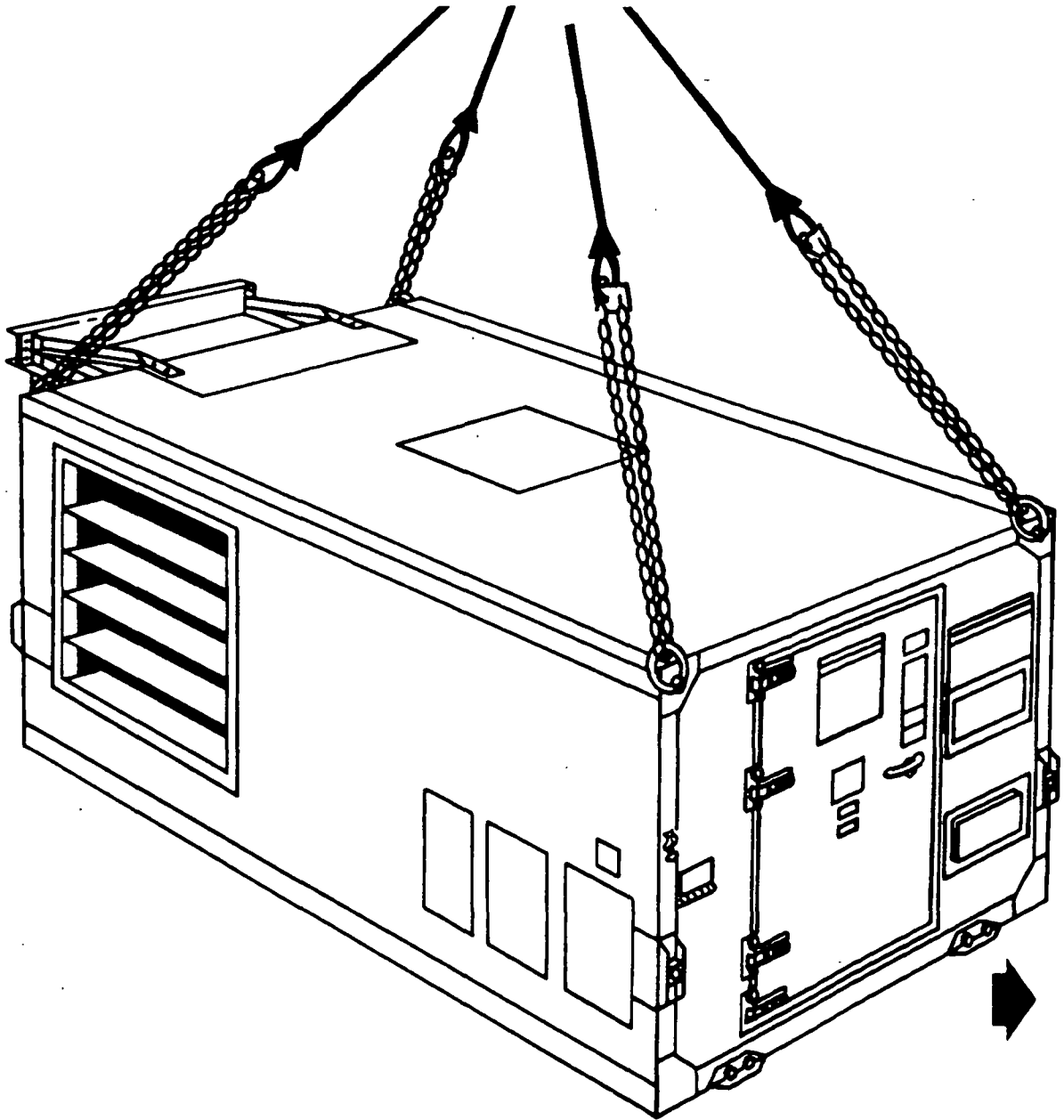
- Loop the chain end of sling leg 3 through the left rear lift provision at the top left corner of the shelter and insert link 3 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

The hookup team stands on top of shelter. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the shelter and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## Figure 2-84. 8- x 8- x 10-Foot Shelter Systems

### APPLICABILITY

The following systems are mounted in 8- x 8- x 10-foot shelters and are certified by the US Army NRDEC for the CH-53 helicopter up to the airspeeds denoted below.

### LOAD DESCRIPTION

- Shelter, electromechanical induction (EMI):
  - TAMCN C6110, NSN 5411-01-206-6079.
  - Weight: 7,700 pounds (this load is certified at loaded weight only).
  - Airspeed: 70 knots.
- Shelter, Radar Set, precision approach, AN/TPN-22:
  - TAMCN Q2115.
  - Weight: 7,200 pounds (this load is certified at loaded weight only).
  - Airspeed: 80 knots.

### MATERIALS

- Sling set, multileg (15,000-pound capacity) or sling set (40,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

### PERSONNEL

Two persons can prepare and rig this load in 15 minutes.

### PROCEDURES

#### Step 1. Preparation

- Secure all loose equipment inside the shelter with tape or nylon cord.
- Secure the door in the closed/locked position.

#### Step 2. Rigging

**NOTE:** The single personnel door is designated as either the forward end or the aft end for rigging purposes and varies depending on shelter contents. The corner lift provisions

(shown in the figure) and the door position are identified in the chart which follows.

| SHELTER     | PERSONNEL<br>DOOR | TYPE OF<br>SLING SET | CORNER LIFTING PROVISIONS |   |   |   |
|-------------|-------------------|----------------------|---------------------------|---|---|---|
|             |                   |                      | 1                         | 2 | 3 | 4 |
| EMI Shelter | Forward           | 15,000 pound         | 5                         | 5 | 5 | 5 |
| EMI Shelter | Forward           | 40,000 pound         | 5                         | 5 | 5 | 5 |
| AN/TPN-22   | Forward           | 15,000 pound         | 3                         | 3 | 3 | 3 |
| AN/TPN-22   | Forward           | 15,000 pound         | 3                         | 3 | 3 | 3 |

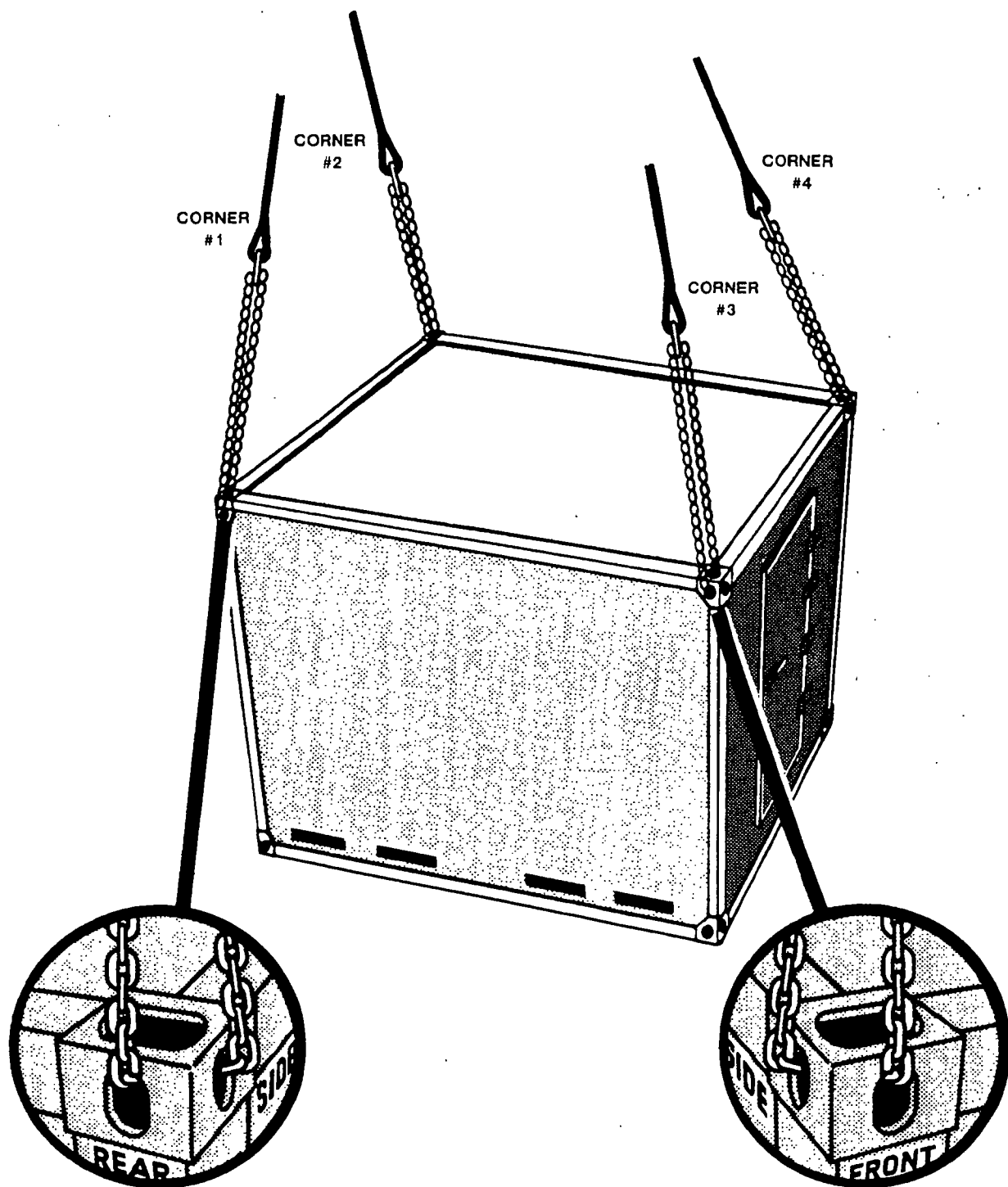
- Position the apex fitting/web ring on top of the shelter. Route outer sling legs 1 and 2 to the forward end and inner sling legs 3 and 4 to the aft end. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the opening in the side of the ISO lift provision on the left front corner and out through the front opening. Insert the link identified in the chart into the grab link. Repeat with sling leg 2 and the right front ISO lift provision.
- Loop the chain end of sling leg 3 through the opening in the side of the ISO lift provision on the left rear corner and out through the rear opening. Insert the link identified in the chart into the grab link. Repeat with sling leg 4 and the right rear ISO lift provision.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the shelter to prevent entanglement during hookup and lift-off.

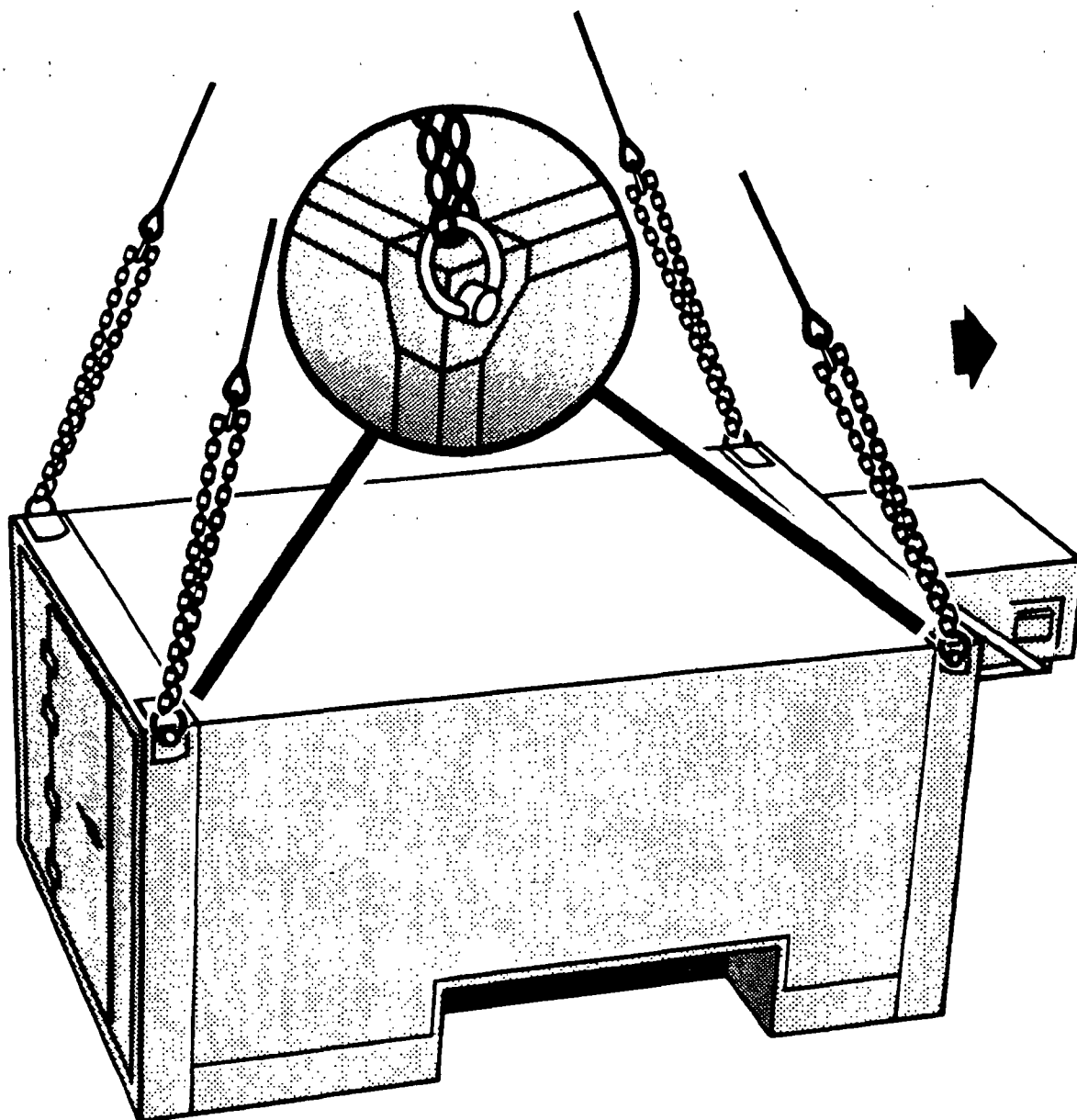
### Step 3. Hookup

The hookup team stands on top of the shelter. The static wand person discharges the static electricity with the static wand. The hookup person places the web ring/apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the shelter and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.





## CONTAINERS

The certified single-point rigging procedures for containers are in this section. Figures 2-89 through 2-94 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

---

### Figure 2-88. Pershing II Second Stage Section

#### APPLICABILITY

This load is certified by the MTMCTEA for the CH-47 helicopters at airspeeds up to and including 110 knots.

#### LOAD DESCRIPTION

- Pershing II, second stage section, in container, NSN 8140-01-128-5443.
- Weight: 10,158 pounds.

#### MATERIALS

- Sling set (25,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

#### PERSONNEL

Two persons can prepare and rig the load in 10 minutes.

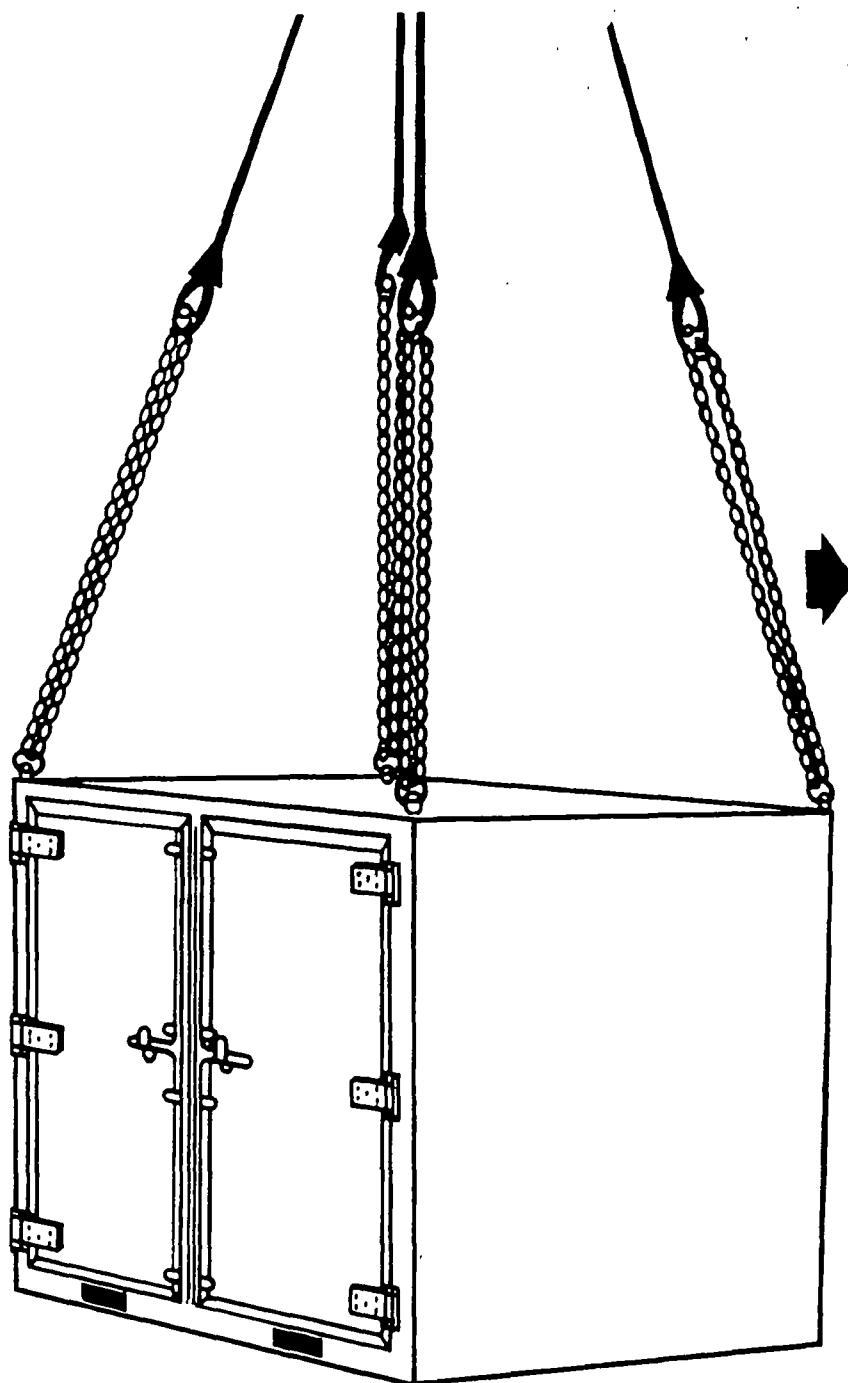
#### PROCEDURES

##### Step 1. Preparation

Ensure that the container cover is fastened securely and that the container skids and lift handles are serviceable.

##### Step 2. Rigging

- Position apex fitting on top of the container. Route outer sling legs 1 and 2 to the front of the container and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lift handle and insert link 3 in the grabhook. Repeat with sling leg 2 on the right front handle.





## **RADAR AND SATELLITE EQUIPMENT**

The certified single-point rigging procedures for radar equipment are in this section. Figures 2-95 through 2-99 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

---

### **Figure 2-94. AN/TPQ-37 Artillery-Locating Radar Set (Firefinder)**

#### **APPLICABILITY**

This load is certified by the US Army NRDEC for CH-47 helicopters at airspeeds up to and including 90 knots.

#### **LOAD DESCRIPTION**

- Radar set, artillery-locating, AN/TPQ-37, (Firefinder), NSN 5840-01-084-5374.
- Weight: 10,800 pounds.

#### **MATERIALS**

- Sling set (25,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Padding, felt or cellulose as required.
- Ladder.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.

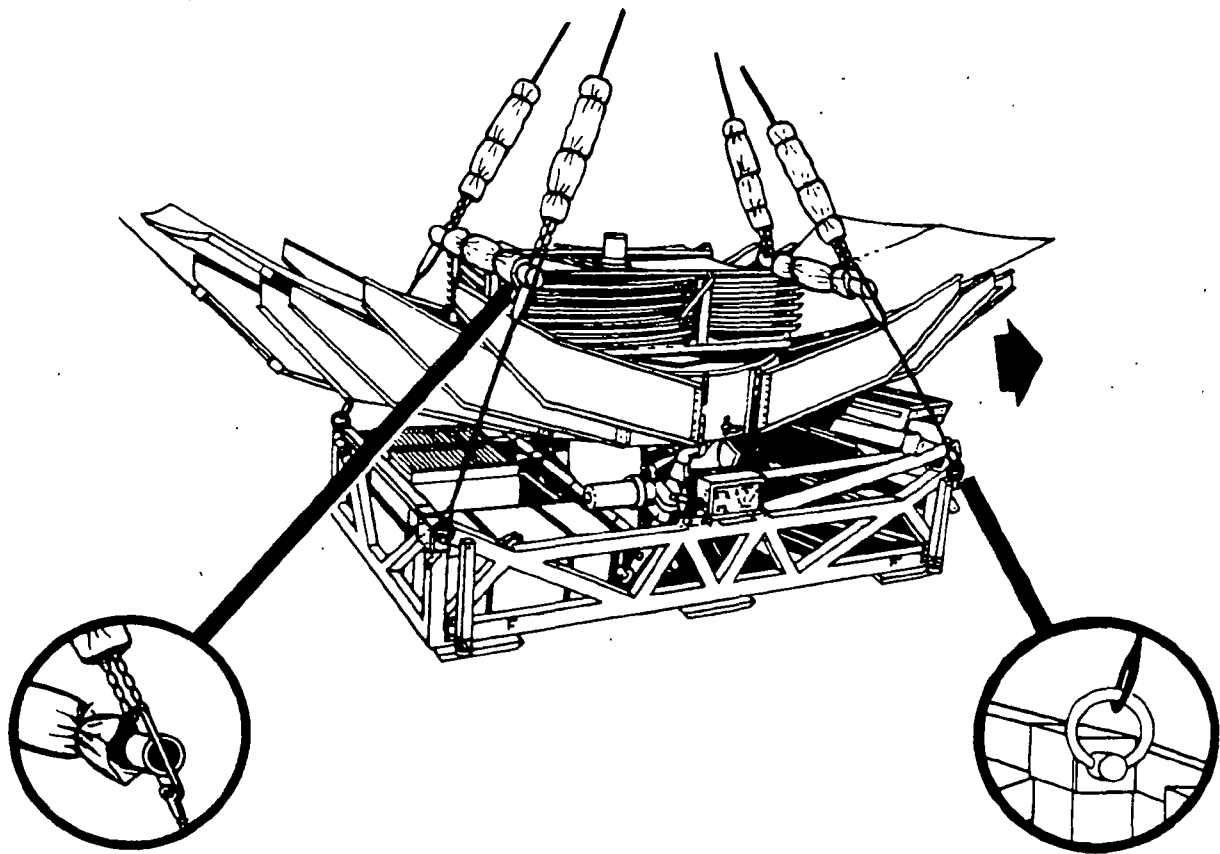
#### **PERSONNEL**

Two persons can prepare and rig the load in 30 minutes.

#### **PROCEDURES**

##### **Step 1. Preparation**

- Antenna unit should be configured for march order. If the antenna unit is mounted on its transport trailer, it must be removed for helicopter transport. If the trailer is to accompany the unit, it must be rigged and transported as a separate load.
- Ensure that the maintenance tent frame and cover are stowed and secured in their proper position.
- Ensure that all cover panels, cabinet doors, and vents are installed and secure.
- Secure and tie down any loose items.



## GENERATOR SETS

The certified single-point rigging procedures for generator sets are in this section. Figures 2-100 through 2-108 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

---

### Figure 2-99. M200A1 Trailer-Mounted Generator Sets

#### APPLICABILITY

Generator sets, PU-405A/M and PU-406B/M, are certified by the US Army NRDEC for the identified helicopter up to the airspeeds denoted below. The other loads listed in the load description are suitable for the CH-47 helicopter at airspeeds up to and including 100 knots.

#### LOAD DESCRIPTION

- Chassis, trailer, generator, M200A1
  - LIN E02807.
  - Weight: 2,445 pounds.
- Generator set, 15kw, 6113.
  - LIN J35869.
  - Weight: 5,119 pounds.
- Generator set, 30kw, CE301ACWK1.
  - LIN J36304.
  - Weight: 5,625 pounds.
- Generator set, 45kw, 52300.
  - LIN J37342.
  - Weight: 6,885 pounds.
- Generator set, 60kw, MEP-006A.
  - LIN J38301.
  - Weight: 7,347 pounds.
- PU-405A/M power unit, 15kw, without acoustic suppression kit (ASK).
  - LIN J35492.
  - Weight: 6,119 pounds.
  - Type helicopter: CH-47.

- Airspeed: 100 knots.
- PU-405A/M power unit, 15kw, with acoustic suppression kit (ASK).
  - LIN J35492.
  - Weight: 6,740 pounds.
  - Type helicopter: UH-60 and CH-47.
  - Airspeed: 80 knots.
- PU-406B/M power unit, 30kw, with acoustic suppression kit (ASK).
  - Weight: 7,250 pounds.
  - Type helicopter: UH-60 and CH-47.
  - Airspeed: 80 knots.

## **MATERIALS**

- Sling set (10,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Padding, felt or cellulose.

## **PERSONNEL**

One man can prepare and rig the load in 15 minutes.

## **PROCEDURES**

### **Step 1. Preparation**

- Lower the lunette as far as possible by adjusting the landing leg.
- Engage both hand brakes.
- Secure safety chains and brake hose with nylon cord or tape.
- Secure all lids, doors, and caps.

### **Step 2. Rigging**

- Position the apex fitting on top of the generator. Route outer sling legs 1 and 2 to the front (lunette end) of the trailer and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 must be on the same side of the load.
- Loop the chain end of sling leg 1 through the lift provision on the trailer chassis on the left side of the tongue and insert the link identified below in the grabhook. Repeat with sling leg 2 on the right side of the trailer tongue.

- Loop the chain end of sling leg 3 through the lift provision on the left side of the trailer chassis at the rear of the generator and insert the link identified below in the grabhook. Repeat with sling leg 4 on the right side of the trailer chassis.

| GENERATOR             | SLING LEGS<br>1 AND 2 | SLING LEGS<br>3 AND 4 |
|-----------------------|-----------------------|-----------------------|
| 6113                  | 3                     | 23                    |
| CE301ACWK1            | 3                     | 28                    |
| 52300                 | 3                     | 30                    |
| MEP-006A              | 3                     | 33                    |
| PU-405A/M without ASK | 3                     | 33                    |
| PU-450A/M with ASK    | 3                     | 28                    |
| PU-406B/M with ASK    | 3                     | 28                    |

- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the generator to prevent entanglement during hookup and lift-off.

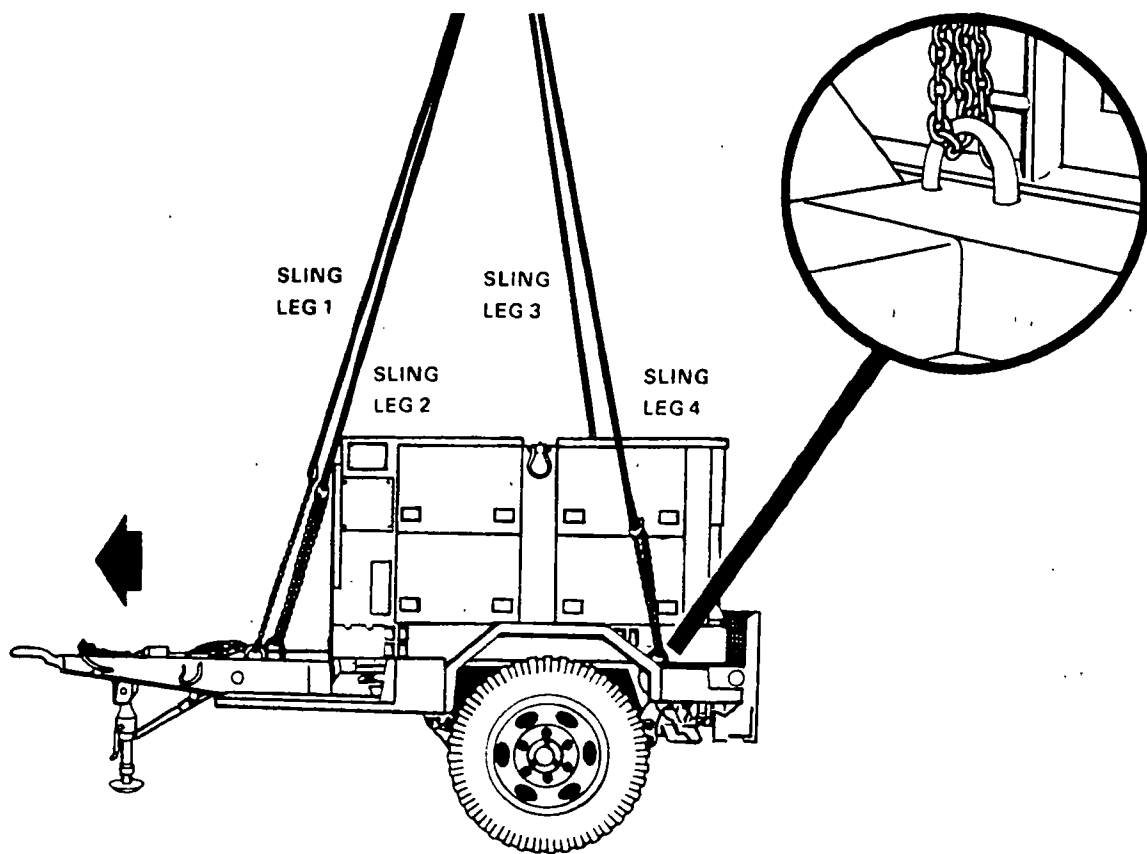
### Step 3. Hookup

**NOTE:** Connect the apex fitting to the helicopter cargo hook so the trailer lunette end is carried aft.

The hookup team stands on top of the generator. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the generator and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## **Figure 2-100. PU-794/G Generator Set**

### **APPLICABILITY**

This load is certified by the US Army NRDEC for UH-60 and CH-47 helicopters at airspeeds up to and including 90 and 110 knots, respectively.

### **LOAD DESCRIPTION**

- PU-794/G generator set mounted on a M200A1 trailer, NSN 6115-01-242-1665.
- Weight: 6,440 pounds.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Padding material, cellulose.

### **PERSONNEL**

One person can prepare and rig the load in 15 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Lower the lunette as far as possible by adjusting the landing leg.
- Engage both hand brakes.
- Secure safety chains and brake hose with nylon cord or tape.
- Secure all lids, doors, and caps with nylon cord or tape.

#### **Step 2. Rigging**

**NOTE:** Generator set is rigged to fly tongue aft. Due to interference between rear sling legs and generator, the outer sling legs are routed to rear lift points.

- Position the apex fitting on top of the generator. Route outer sling legs 1 and 2 to the rear of the trailer and inner sling legs 3 and 4 to the lunette end. Sling legs 1 and 3 must be on the same side of the load.

## **Figure 2-107. MEP-004 Generator Set MEP-005 Generator Set**

### **APPLICABILITY**

The following generator sets are certified by US Army NRDEC for the identified helicopters up to the airspeeds denoted below.

### **LOAD DESCRIPTION**

- Generator set, MEP-004AAS, with acoustic suppression kit, 15kw, skid mounted:
  - Weight: 4,031 pounds.
  - Type helicopter: UH-60 and CH-47.
  - Airspeed: 40 and 65 knots, respectively.
- Generator set, MEP-005AAS, with acoustic suppression kit, 30kw, skid mounted:
  - Weight: 4,556 pounds.
  - Type helicopter: UH-60 and CH-47.
  - Airspeed: 65 and 70 knots, respectively.

### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Padding, felt or cellulose.

### **PERSONNEL**

Two persons can prepare and rig this load in 10 minutes.

### **PROCEDURES**

#### **Step 1. Preparation**

- Secure all lids, doors, and caps with tape or nylon cord.



## **Step 2. Rigging**

**NOTE:** This load has only two lift provisions. If a four legged sling set is used to rig the generator set, loop the chain ends of sling leg 1 and 3 through one lift provision and the chain ends of sling leg 2 and 4 through the other lift provision.

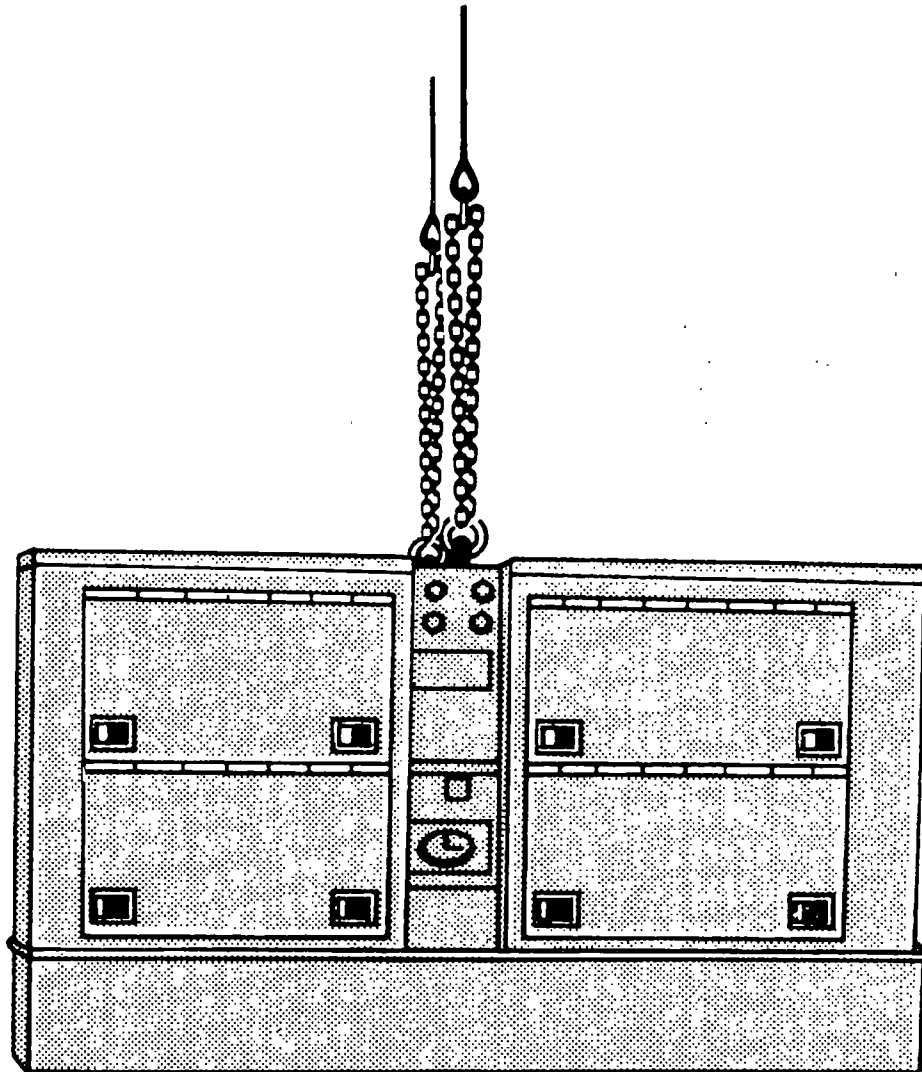
- Position apex fitting on top of the generator. Route the left sling leg through the lift provision on the left side of the generator and insert link 3 in the grabhook. Repeat with the right sling leg and the right lift provision.
- Cluster and tie or tape (breakaway technique) the sling legs together on top of the generator to prevent entanglement during hookup and lift-off.

## **Step 3. Hookup**

The hookup team stands on top of the generator. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the generator and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

## **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## MISCELLANEOUS EQUIPMENT

The certified single-point rigging procedures for miscellaneous equipment are in this section. Figures 2-109 through 2-111 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

---

### Figure 2-108. Forward Area Refueling Equipment (FARE)

#### APPLICABILITY

This load is certified by the US Army NRDEC for the UH-60 and CH-47 helicopter at airspeeds up to and including 60 and 100 knots, respectively.

#### LOAD DESCRIPTION

- Forward area refueling equipment (FARE) consisting of the following:
  - Generator, 1.5kw.
  - Hoses, fuel with reels (2 each).
  - Hoses, fuel with carrying bags (2 each).
  - Assembly, pump.
  - Extinguishers, fire (3 each).
- LIN H94824; Weight: 820 pounds.

#### MATERIALS

- Net, helicopter, cargo-carrying, external (5,000-pound capacity).
- Webbing, nylon, tubular, 1/2-inch, 1,000-pound breaking strength.
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.

#### PERSONNEL

Two persons can prepare and rig this load in 15 minutes.

#### PROCEDURES

##### Step 1. Preparation

- Secure two fire extinguishers to the inside frame of fuel hose reels with 1/2-inch tubular nylon webbing. Secure the two fuel hose reels together with nylon cord.

## EXTENDED SLING LOAD SYSTEM

The extended sling system improves tactical efficiency and preserves the integrity of the crew and the sling load (for example, a howitzer, ammunition, and assigned gun crew). This system eliminates the need for a static discharge person because the aircraft lands. Also, all of the equipment, crew, and accompanying ammunition can be transported in one lift. The certified single-point rigging procedures for the extended sling load system are in this section. Figure 2-112 gives detailed instructions for rigging loads. The figure also contains a description of each load and the materials required for rigging it.

---

### Figure 2-111. M102 105-mm Howitzer with One A-22 Cargo Bag

#### APPLICABILITY

This load is suitable for the UH-60 and CH-47 helicopters.

#### LOAD DESCRIPTION

- Howitzer, towed, light, 105-mm, M102, LIN K57392.
- Bag, cargo, aerial delivery, Type A-22 (2,200-pound maximum capacity).
- Weight:
  - Howitzer, 3,160 pounds.
  - Accompanying load, 2,220 pounds.
  - Total, 5,360 pounds.

#### MATERIALS

- Sling set (10,000-pound capacity).
- Apex fitting (10,000-pound capacity) (1 additional).
- Sling leg and chain assembly from 25,000-pound sling set (6,250-pound capacity).
- Clevis, assembly, large, part no. MS70087-3.
- Tie-down strap, cargo, CGU-1/B.
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

#### PERSONNEL

Two persons can prepare and rig the load in 30 minutes.

## PROCEDURES

### Step 1. Preparation

- Rig A-22 cargo bag according to instructions in Chapter 1.
- Secure all covers on howitzer with nylon cord.
- Place section equipment chest on end of trails and secure with tie-down strap.

### Step 2. Rigging

- Rig the M102 howitzer according to instructions in Figure 2-27.
- Extended sling system.
  - Connect additional apex fitting to the single sling leg and chain assembly (6,250-pound capacity) from a 25,000-pound sling set. This sling leg will be the extended sling leg riser (pendant) between the cargo hook and the rigged sling set.

### WARNING:

**Do not use a sling leg and chain assembly (2,500-pound capacity) from a 10,000-pound sling set for the extended sling leg riser because the load exceeds its capacity. Failure to follow these instructions may result in loss of load.**

- Route the chain end of the 6,250-pound capacity extended sling leg riser around the pin of the apex fitting of the sling set used to rig the load. Wrap the chain around the pin two or three turns so the chain will not slide back and forth on the apex fitting pin. Insert link 3 in the grabhook.
- Secure the chain onto the apex fitting pin by tying the chain links together with cotton webbing. This ensures the chain will not slip off the pin over the edge of the apex fitting and cause damage to the apex fitting.
- Proper use of the breakaway technique is important to prevent the sling legs from entangling on the howitzer as the helicopter hovers upward. Tape or tie (breakaway technique):
  - Forward sling leg at three evenly spaced intervals from lift provision to top of the barrel even with tires.
  - Each rear sling leg to the trails, then secured together at the breech and on top of the barrel.
  - All three sling legs together where they meet on top of the barrel and then secured to the outside of the left wheel assembly.

### Step 3. Hookup

- Position the load down slope of the aircraft landing point so the aircraft rotor blades will not strike the load.

## CHAPTER 3

### SUITABLE SINGLE-POINT LOAD RIGGING PROCEDURES

This chapter contains rigging procedures for loads that have not been certified but have been evaluated and demonstrated acceptable static lift and flight characteristics during a flight test by the US Army TEXCOM Airborne and Special Operations Test Board. In most cases, the lifting provisions have not been tested according to with MIL-STD-209G. These loads are identified by the word "suitable" in the applicability paragraph. When the rigging procedures for these loads are certified, they will be moved to the certified chapter as the manual is updated. Each rigging procedure is found in a figure which includes a description of the load, materials required for rigging, and steps to complete the procedure.

#### WHEELED VEHICLES

The suitable single-point rigging procedures for wheeled vehicles are in this section. Figures 3-1 through 3-8 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

---

#### Figure 3-1. M274 Truck, Platform, Utility (Mule), with M29A1 Mortar

##### APPLICABILITY

This load is suitable for the UH-1 or CH-47 helicopter at airspeeds of 80 knots.

##### LOAD DESCRIPTION

- Truck, platform, utility, M274, LIN X55627.
- Mortar, 81-mm, M29A1, LIN M68008.
- \*Weight:
  - Truck with equipment, 980 pounds.
  - Mortar, 240 pounds.
  - Total, 1,220 pounds.

\*These procedures apply to trucks with or without cargo. If cargo is carried in the truck, it does not exceed 1,000 pounds.

## **MATERIALS**

- Sling set (10,000-pound capacity).
- Webbing, nylon, 1/2-inch tubular, 1,000-pound breaking strength, approximately 30 feet.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.

## **PERSONNEL**

One person can prepare and rig the load in 15 minutes.

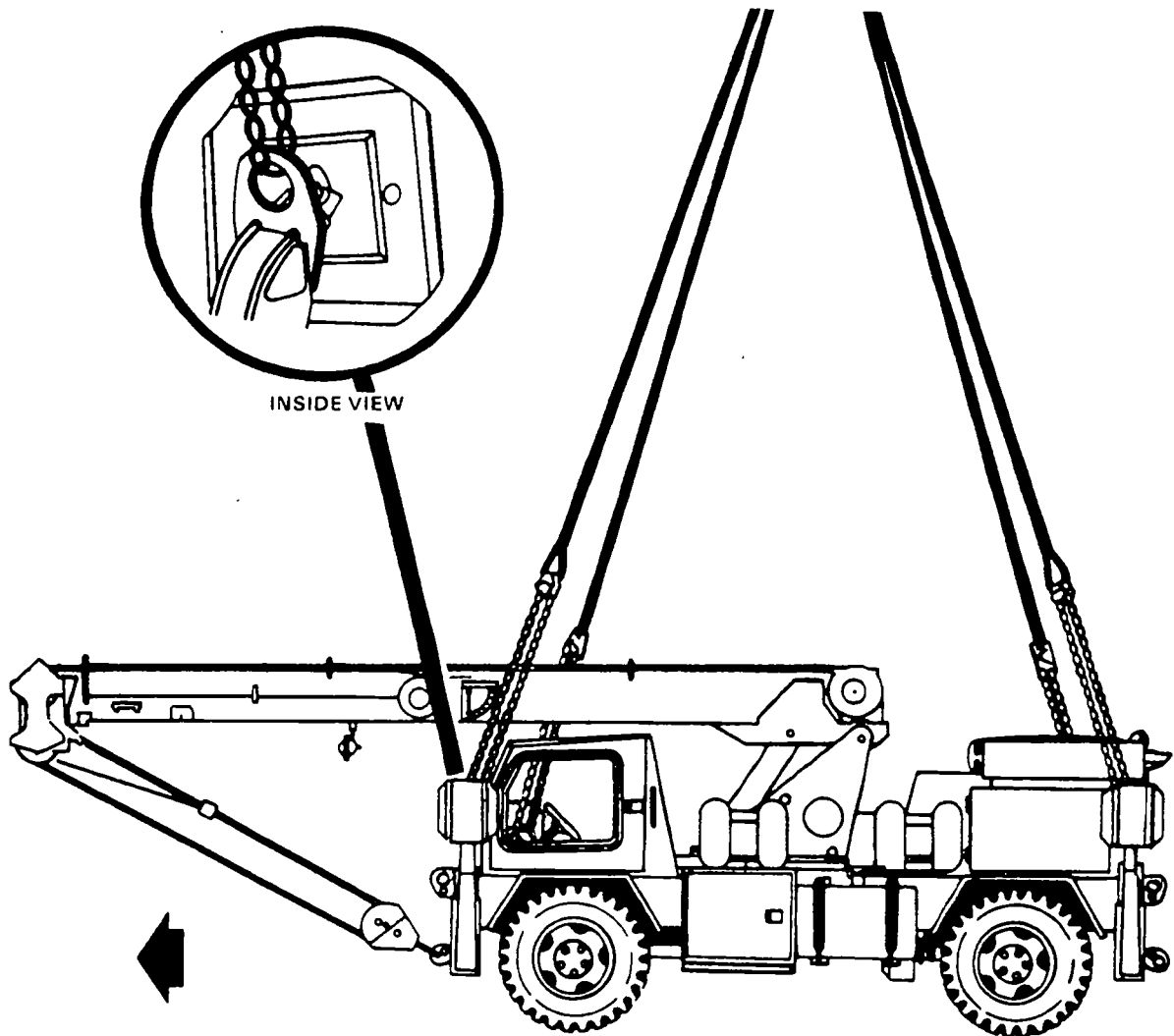
## **PROCEDURES**

### **Step 1. Preparation**

- Place mortar components in carrying cases and position on truck as follows:
  - Right front - bipod, barrel, aiming post, cleaning staff, camouflage net poles, and aiming circle tripod.
  - Behind seat - 5-gallon water can, 5-gallon fuel can, night light, M34 sight, and M11 decon apparatus.
  - Center aft - baseplate with camouflage net on top.
- Secure items in right front of truck to rail with tubular nylon webbing attached around side rail of truck. Loop around rail toward end and near center of truck. Do not tie webbing directly above wheels, as the sling chains will pass through this area.
- Secure items behind seat with tubular nylon and webbing. Loop webbing through carrying handles of night light and sight cases and secure webbing to floor of foot rest.
- Place baseplate under camouflage net and secure with webbing to side rails. Secure load at both forward and aft ends.
- Tie the steering wheel with nylon cord and engage the hand brake.
- Place all wheel lifting provisions in the UP position.

### **Step 2. Rigging**

- Position apex fitting on the camouflage net. Route outer sling legs 1 and 2 to the front of the truck and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of each sling leg down through the inside rail of the side of the truck, through the wheel lift provision, back up through the inside of the rail, and insert link 3 in the grabhook.
- Pull each chain leg by the grabhook until it is centered in the lifting provision. Tie the chain to the rail with cotton webbing so that it cannot become entangled under the lifting provision.





## TRAILERS

The suitable single-point rigging procedures for trailers are in this section. Figures 3-9 through 3-20 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

---

### Figure 3-10. M105 1 1/2-Ton Trailer

#### APPLICABILITY

This load when empty, is suitable for the UH-1, CH-47, and CH-54 helicopters at airspeeds up to and including 45, 80, and 50 knots, respectively. It can be transported with any amount of payload up to 3,000 pounds by the CH-47 and CH-54. As the trailer payload weight increases, airspeed may be increased accordingly.

#### LOAD DESCRIPTION

- Trailer, cargo, 1 1/2-ton, M105 series, LIN W95811.
- Weight:
  - Empty, 2,750 pounds.
  - Loaded, 5,750 pounds.

#### MATERIALS

- Sling set (10,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Webbing, cotton, 1/4 inch, 80-pound breaking strength.
- Tie-down, cargo, CGU-1/B (as required).

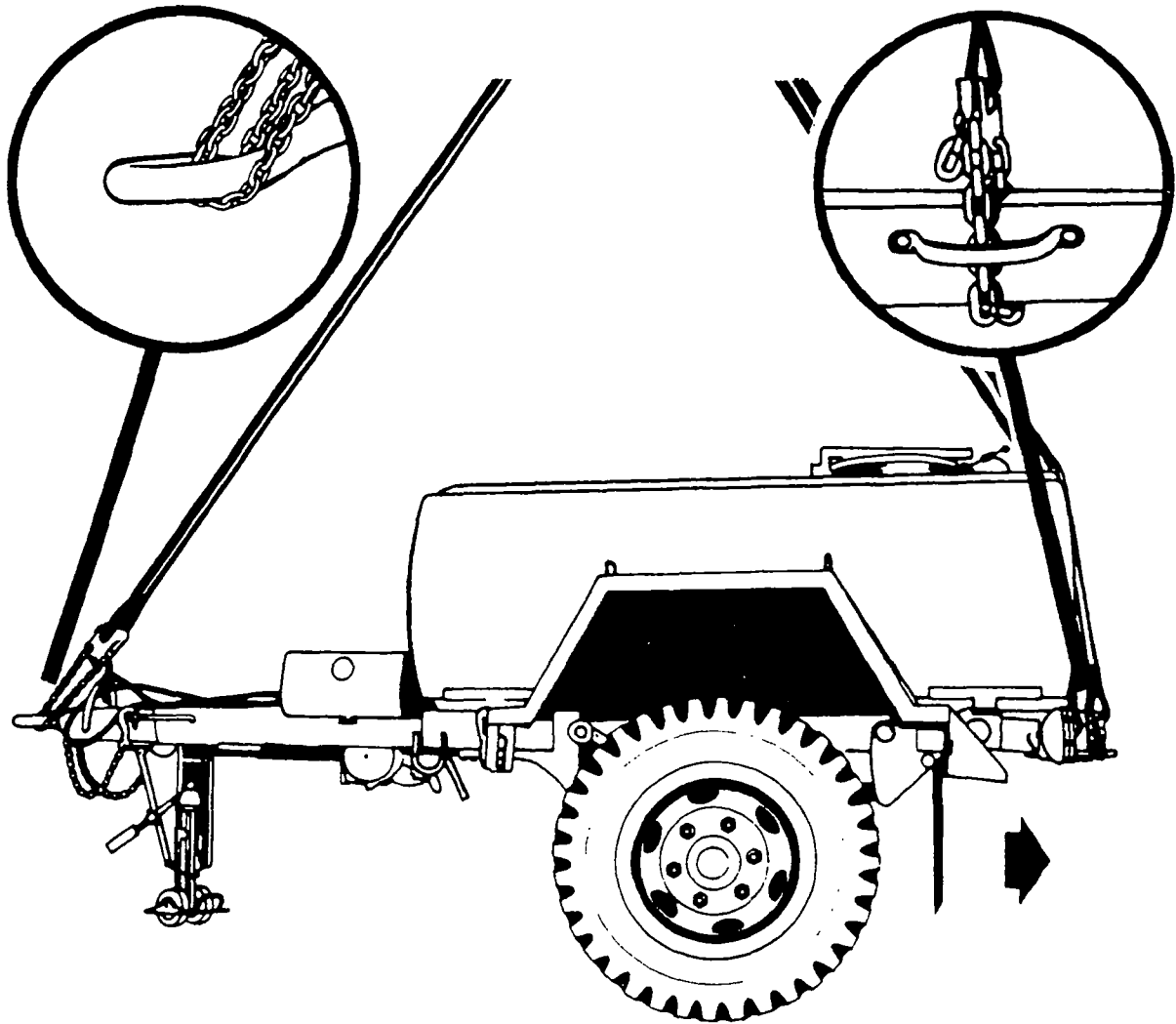
#### PERSONNEL

Two persons can prepare and rig this load in 25 minutes.

#### PROCEDURES

##### Step 1. Preparation

- Remove the top tarpaulin and bows.
- Remove the front and rear racks, stow in the slots provided one each side of the trailer, and secure in place with tape or nylon cord.
- Stow the bows in the trailer bed on the left side and secure with nylon cord.
- Stow the tarpaulin in the trailer bed on the right side and secure with nylon cord.



## HOWITZERS

The suitable single-point rigging procedures for howitzers are in this section. Figures 3-21 through 3-22 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

---

### Figure 3-22. M114A1 155-mm Howitzer

#### APPLICABILITY

This load is suitable for the CH-47 and CH-54 helicopters at airspeeds up to and including 90 knots.

#### LOAD DESCRIPTION

- Howitzer, towed, 155-mm, M114A1, LIN K57803.
- Weight: 12,660 pounds.

#### MATERIALS

- Sling set (25,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tie-down strap, cargo, CGU-1/B, as required.
- Clevis assembly, large, MS 70087-3.

#### PERSONNEL

Two persons can prepare and rig this load in 15 minutes.

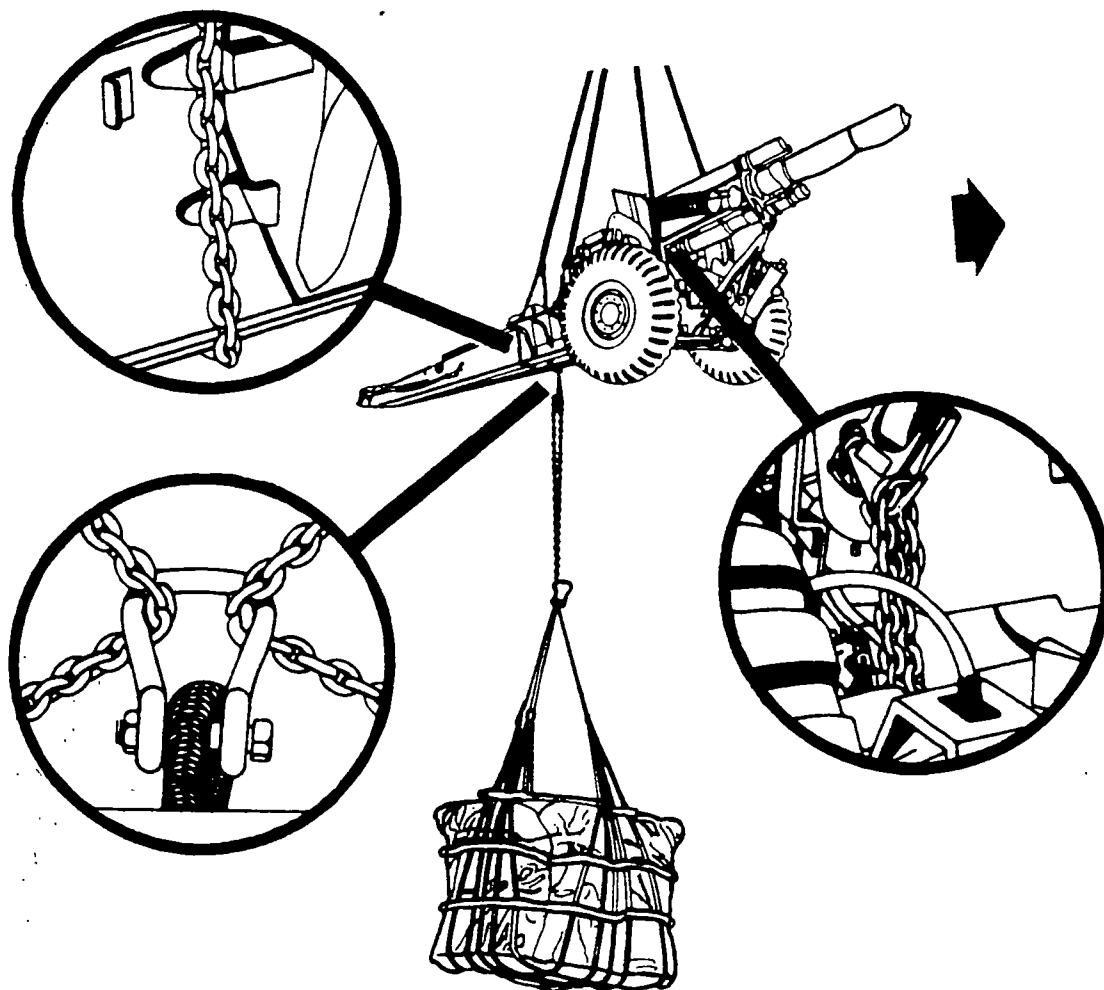
#### PROCEDURES

##### Step 1. Preparation

- Stow all howitzer equipment, including sights, in the proper place except for the spade key. Stow the spade key in the section chest. Secure all equipment with tape or nylon cord.
- Secure the section chest on the rear of the trails by routing the tie-down strap through the handles of the chest and both trail lifting handles. Secure excess strap.
- Secure spades to brackets with nylon cord. Secure all cables and hoses to sides of trails with tape or nylon cord.
- Secure trail latching handle in the closed position with nylon cord and insert trail locking pin.

#### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## ENGINEER EQUIPMENT

The suitable single-point rigging procedures for engineer equipment are in this section. Figures 3-23 through 3-33 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

---

### Figure 3-24. MRS-100 Wheeled Industrial Tractor

#### APPLICABILITY

This load is suitable for CH-47 and CH-54 helicopters at airspeeds of 80 knots.

#### LOAD DESCRIPTION

- Tractor wheeled, industrial, MRS-100, LIN W90927.
- Weight: 21,100 pounds.

#### MATERIALS

- Sling set (25,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.

#### PERSONNEL

One person can prepare and rig the load in 15 minutes.

#### PROCEDURES

##### Step 1. Preparation

- Sectionalize the tractor from the scraper according to operator's manual instructions.
- Secure the hydraulic lift cylinder in the carrying bracket.
- Ensure that all caps, lids, and hatches are securely fastened.
- Set hand brake and place transmission in neutral.
- Lock the blade in the raised position.

##### Step 2. Rigging

- Position apex fitting on drivers seat. Route outer sling legs 1 and 2 to the front of the tractor and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side of the load.

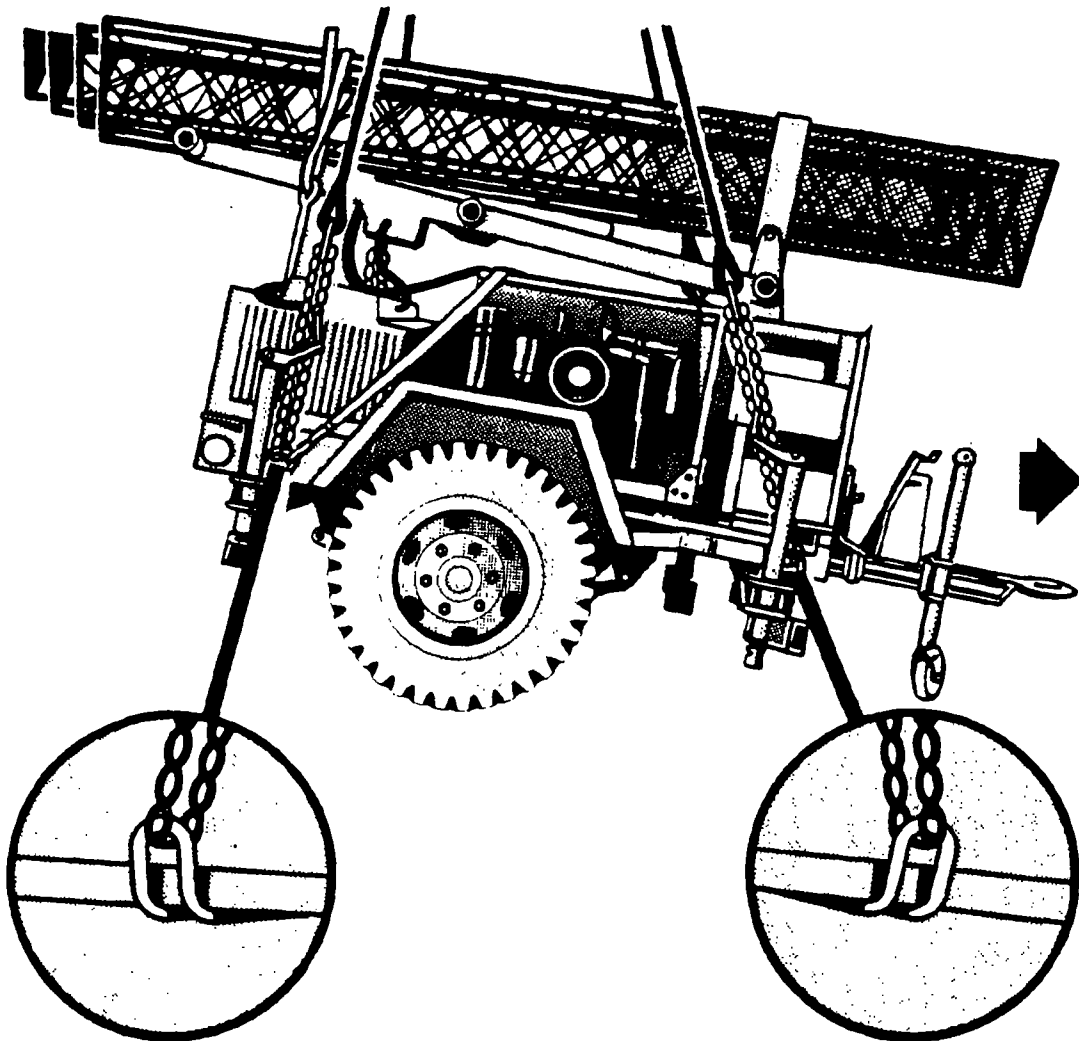
- Loop the chain end of sling leg 3 through the left rear lift provision located on the left side of the trailer by the rear leveling leg and insert link 30 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together on top of the floodlight sections to prevent entanglement during hookup and lift-off.

### Step 3. Hookup

The hookup team stands alongside the trailer. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## LIQUID CONTAINERS

The suitable single-point rigging procedures for liquid containers are in this section. Figures 3-34 through 3-36 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

---

### Figure 3-35. Assembly, Tank, Fabric, Collapsible, 10,000-Gallon

#### APPLICABILITY

This load is suitable for the UH-1 helicopter at airspeeds of 35 knots.

**NOTE:** This load may become unstable at airspeeds higher than 35 knots.

#### LOAD DESCRIPTION

- Assembly, tank, fabric, collapsible, 10,000-gallon, LIN V12552.
- Weight: 1,040 pounds.

#### MATERIALS

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.

#### PERSONNEL

Two persons can prepare and rig this load in 10 minutes.

#### PROCEDURES

##### Step 1. Preparation

Make sure that all safety latches on the cover are secured shut.

##### Step 2. Rigging

**NOTE:** Do not carry more than one tank at a time.

- Position apex fitting on top of the center of the tank. Route outer sling legs 1 and 2 to the front of the tank and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lifting ring located on the left forward side of the tank and insert link 100 in the grabhook. Repeat with sling leg 2 on the right front lift provision.

## **SHELTERS**

The suitable single-point rigging procedures for shelters are in this section. Figures 3-37 through 3-39 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

---

### **Figure 3-38. Transporter, Airmobile with Shop Set, Aircraft, Airmobile, UH-1D**

#### **APPLICABILITY**

This load is suitable for the CH-47 helicopter at the airspeed of 60 knots.

#### **LOAD DESCRIPTION**

- Transporter, airmobile, 4000A, LIN X23227, and shop set, aircraft airmobile, UH-1D, LIN T17090.
- Weight:
  - Transporter, 1,000 pounds.
  - Shop set, 2,350 pounds.
  - Cargo, 1,650 pounds.
  - Total, 5,000 pounds.

#### **MATERIALS**

- Sling set (10,000-pound capacity).
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Cord, nylon, Type III, 550-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.

#### **PERSONNEL**

One person can prepare and rig the load in 10 minutes.

#### **PROCEDURES**

##### **Step 1. Preparation**

- Close and secure shop set doors.
- Secure tongue in UP position using safety chain. Route one chain through bracket on bottom of tongue and around transporter support at front of shelter. Wrap other chain around bottom of tongue and then make two turns around the transporter support. Connect the two chain hooks together.



- Set the hand brake and secure light cable with tape or nylon cord.

### **Step 2. Rigging**

- Position apex fitting on top of the shop set. Route outer sling legs 1 and 2 to the front of the shop set and inner sling legs 3 and 4 to the rear. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 through the left front lifting provision at the bottom corner of the shop set and insert link 55 in the grabhook. Repeat with sling leg 2 on the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lifting provision at the bottom corner of the shop set and insert link 55 in the grabhook. Repeat with sling leg 4 on the right rear lift provision.
- Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs together to prevent entanglement during hookup and lift-off.

### **Step 3. Hookup**

The hookup team stands on the shop set. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the shop set and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.

## **RADAR EQUIPMENT**

The suitable single-point rigging procedures for radar equipment are in this section. Figure 3-42 gives detailed instructions for rigging loads. The figure also contains a description of each load and the materials required for rigging it.

---

### **Figure 3-43. AN/MPQ-4A Radar Set**

#### **APPLICABILITY**

This load is suitable for the CH-47 helicopter at airspeeds of 80 knots.

#### **LOAD DESCRIPTION**

- Radar set, trailer-mounted, AN/MPQ-4A, LIN Q15414, with or without one 55-gallon drum of fuel.
- Weight:
  - Without fuel, 6,290 pounds.
  - With fuel, 6,690 pounds.

#### **MATERIALS**

- Sling set (10,000-pound capacity).
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, nylon, 1/2-inch tubular, 1,000-pound breaking strength.
- Felt, sheet, cattle hair, Type IV, 1/2-inch thick, 24- x 60-inch (2 sheets).
- Felt, sheet, cattle hair, Type IV, 1/2-inch thick, 30- x 36-inch (1 sheet).

#### **PERSONNEL**

Two persons can prepare and rig the load in 30 minutes.

#### **PROCEDURES**

##### **Step 1. Preparation.**

- Place radar set in travel mode.
- Secure air hoses and safety chain to tongue with tape or nylon cord.
- Secure handles of rear outriggers and all pins with tape.
- Cut one sheet of felt to 24 inches by 48 inches, place over receiver-transmission group, and secure with tape.

- Place two sheets of felt side by side on top of the reflector, tape the centerline, and secure in place with nylon cord routed from one step over the receiver-transmission group and reflector to the other step.
- Secure fuel drum with nylon webbing to front step.

### **Step 2. Rigging**

- Place apex fitting on top of the reflector. Route outer sling legs 1 and 2 to the forward (tongue) end of radar set and inner sling legs 3 and 4 to the aft end. Sling legs 1 and 3 must be on left side of load.
- Loop the chain end of sling leg 1 through the lift provision on the left side of the tongue and secure link 3 in the grabhook. If a fuel drum is being transported, loop chain end through lunette instead of front lift provision and insert link 3 in the grabhook. Repeat with sling leg 2 on the right front lift provision.
- Loop the chain end of sling leg 3 through the left rear lift provision located aft of the receiver-transmission group and insert link 55 in the grabhook. If a fuel drum is being transported, insert link 85 in the grabhook. Repeat with sling leg 4 on the right rear lift provision. Secure excess chain with tape or nylon cord.
- Cluster and tie or tape (breakaway technique) all sling legs on top of the set to prevent entanglement during hookup and lift-off.

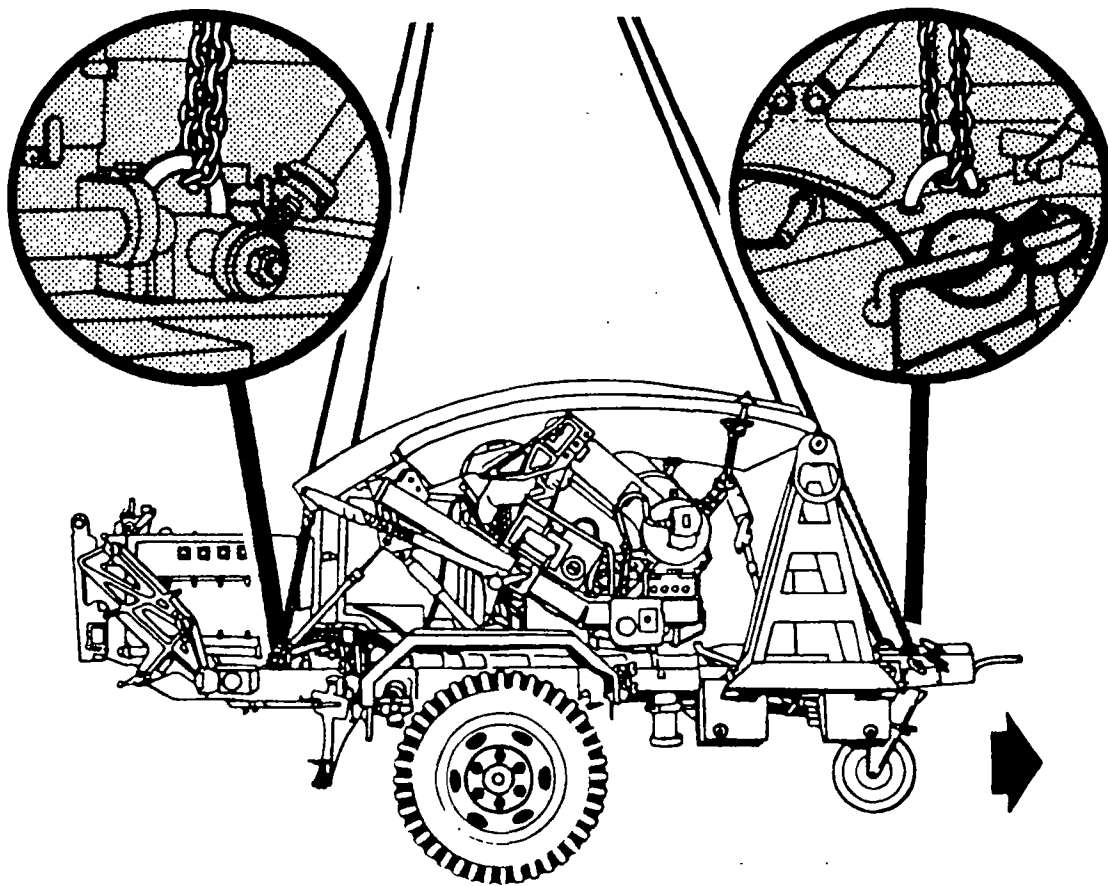
### **Step 3. Hookup**

**NOTE:** Caution pilot not to release apex fitting on top of the radar.

The hookup team stands on the trailer fenders. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team then carefully dismounts the radar and remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### **Step 4. Derigging**

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## GENERATOR SETS

The noncertified single-point rigging procedures for generator sets are in this section. Figures 3-43 through 3-46 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

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### Figure 3-44. PU-620/M Generator Set

#### APPLICABILITY

This load is suitable for the UH-1 or CH-47 helicopter at airspeeds up to 85 knots.

#### LOAD DESCRIPTION

- Generator set, gasoline-engine-driven, PU-620/M, LIN J47617, consists of two 5kw generators mounted in a M116 3/4-ton trailer.
- Weight: 2,840 pounds.

#### MATERIALS

- Sling set (10,000-pound capacity).
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.

#### PERSONNEL

Two persons can prepare and rig the load in 10 minutes.

#### PROCEDURES

##### Step 1. Preparation

- Secure all fuel containers to trailer with nylon cord and make sure that all caps/lids are properly closed.
- Engage handbrake.
- Secure safety chain to tow bar of trailer.

##### Step 2. Rigging

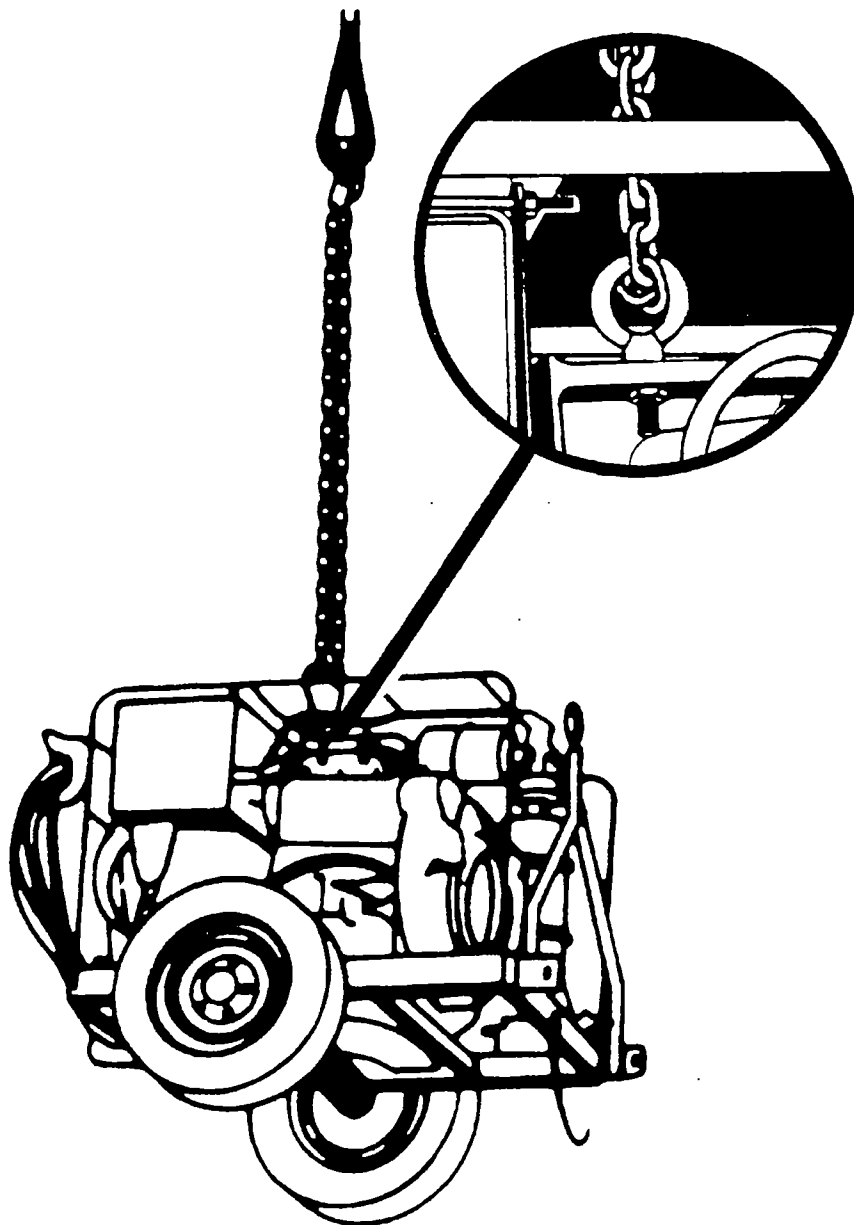
- Position apex fitting on center of trailer. Route outer sling legs 1 and 2 to the front (lunette) end of the trailer and inner sling legs 3 and 4 between the last two bows to the rear of the trailer. Sling legs 1 and 3 should be on the left side of the load.
- Loop the chain end of sling leg 1 and 2 through the lunette and insert link 3 in the grabhook.

### Step 3. Hookup

The hookup team stands beside the generator. The static wand person discharges the static electricity with the static wand. The hookup person places the apex fitting onto the aircraft cargo hook. The hookup team remains close to the load as the helicopter removes slack from the sling legs. When successful hookup is assured, the hookup team quickly exits the area underneath the helicopter to the designated rendezvous point.

### Step 4. Derigging

Derigging is the reverse of the preparation and rigging procedures in steps 1 and 2.



## MISCELLANEOUS EQUIPMENT

The suitable single-point rigging procedures for miscellaneous equipment are in this section. Figures 3-47 through 3-53 give detailed instructions for rigging loads. The figures also contain a description of each load and the materials required for rigging it.

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### Figure 3-48. Company Level Field Feeding Kit

#### APPLICABILITY

This load is suitable for UH-1 and UH-60 helicopters at airspeeds up to and including 80 and 85 knots, respectively.

#### LOAD DESCRIPTION

- Company level field feeding kit (CLFFK).
- Rigged dimensions: 54 inches (L) x 48 inches (W) x 43 inches (H).
- Weight (75 percent fuel and water with 8 cases of T-rations): 950 pounds.

#### MATERIALS

- A-22 cargo bag (2,200-pound capacity).
- Sling leg assembly (2,500-pound capacity) from a 10,000-pound sling set.
- Cord, nylon, Type III, 550-pound breaking strength.
- Webbing, cotton, 1/4-inch, 80-pound breaking strength.
- Tape, adhesive, pressure-sensitive, 2-inch wide roll.
- Skid board, plywood (53 1/2- x 48- x 3/4-inch).
- Padding, felt, or suitable substitute.
- Webbing, nylon, tubular, 1/2-inch, 1000-pound breaking strength.

#### PERSONNEL

Two persons can prepare and rig this load in 30 minutes.

#### PROCEDURES

##### Step 1. Preparation

- Drill a 3/4-inch hole along the edge of the plywood skid 8 inches from each corner.
- Thread a 8-foot length of 1/2-inch tubular nylon webbing through the 8 holes in the skid board. This webbing is used to tie the skid plate to the A-22 cargo bag suspension sling.

## GLOSSARY

|                     |  |                     |   |
|---------------------|--|---------------------|---|
| <b>ADCGS</b> .....  | aviation direct generator set                    | <b>mm</b> .....     | millimeter  |
| <b>AGPU</b> .....   | aviation ground power unit                       | <b>MTMCTEA</b> ...  | Military Traffic Management<br>Command Transportation<br>Engineering Agency |
| <b>CFM</b> .....    | cubic feet per minute                            | <b>NC</b> .....     | node center   |
| <b>CG</b> .....     | center of gravity                                | <b>NRDEC</b> .....  | Natick Research,<br>Development, and<br>Engineering Center                  |
| <b>CLFFK</b> .....  | company level field feeding<br>kit               | <b>NSN</b> .....    | national stock number   |
| <b>CNCE</b> .....   | communications nodal<br>control element          | <b>OVE</b> .....    | operator vehicle equipment  |
| <b>CONEX</b> .....  | container express                                | <b>QRSA</b> .....   | quick reaction satellite<br>antenna   |
| <b>decon</b> .....  | decontamination                                  | <b>RDF</b> .....    | radio direction finder  |
| <b>DOD</b> .....    | Department of Defense                            | <b>ROPS</b> .....   | roll-over protection system   |
| <b>EAT</b> .....    | external air transport                           | <b>ROWPU</b> .....  | reverse osmosis water<br>purification unit                                  |
| <b>ECU</b> .....    | environmental control unit                       | <b>RT</b> .....     | rough terrain   |
| <b>EMI</b> .....    | electromagnetic induction                        | <b>SCAMP</b> .....  | self-propelled crane for Army<br>aircraft maintenance and<br>positioning    |
| <b>FARE</b> .....   | forward area refueling<br>equipment              | <b>SCC</b> .....    | system control center   |
| <b>FOPS</b> .....   | falling objects protection<br>structure          | <b>SEE</b> .....    | small emplacement<br>excavator  |
| <b>gp</b> .....     | general purpose                                  | <b>SEN</b> .....    | small extension node  |
| <b>gph</b> .....    | gallons per hour                                 | <b>SIXCON</b> ..... | six-compartment container   |
| <b>gpm</b> .....    | gallons per minute                               | <b>SPAM</b> .....   | shop, portable aircraft<br>maintenance                                      |
| <b>HATS</b> .....   | hardened Army tactical<br>shelter                | <b>TAFDS</b> .....  | tactical airfield fuel<br>dispensing system                                 |
| <b>HE</b> .....     | high explosive                                   | <b>TAMCN</b> .....  | Table of Authorized Material<br>Control Number                              |
| <b>HMMWV</b> .....  | high-mobility multipurpose<br>wheeled vehicle    | <b>TOW</b> .....    | tube-launched, optically<br>tracked, wire-guided                            |
| <b>ISO</b> .....    | International Organization<br>of Standardization | <b>TTW</b> .....    | teletypewriter  |
| <b>kw</b> .....     | kilowatt(s)                                      | <b>USA</b> .....    | United States Army  |
| <b>LEN</b> .....    | large extension node                             | <b>USMC</b> .....   | United States Marine Corps  |
| <b>LIN</b> .....    | line number                                      |                     |   |
| <b>LOS</b> .....    | line of sight                                    |                     |   |
| <b>LTR</b> .....    | light tactical floating raft<br>bridge           |                     |   |
| <b>LVAD</b> .....   | low velocity airdrop                             |                     |   |
| <b>MGB</b> .....    | medium girder bridge                             |                     |   |
| <b>MICLIC</b> ..... | mine clearing line charge                        |                     |   |



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