CHAPTER 7

CERTIFIED SINGLE-POINT RIGGING PROCEDURES FOR GUIDED MISSILE SYSTEMS

7-1. INTRODUCTION

This chapter contains rigging procedures for single-point guided missile systems that have been certified for sling load. Each rigging procedure is found in a paragraph 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 paragraph and identifies the certified loads. The certified single-point rigging procedures for guided missile systems are in this section. Paragraphs 7-2 through 7-8 give detailed instructions for rigging loads.

NOTE: Reach Pendants may be used on all single point loads. A static discharge person is not required when using a Reach Pendant.

7-2. M54A1/M54A2 Chaparral Launch Station

a. Applicability. The following items in Table 7-1 are certified for all helicopters with suitable lift capacity by the US Army Natick Research, Development, and Engineering Center:

Table 7-1. M54A1/M54A2 Chaparral Launch Station

NOMENCLATURE	MAX WEIGHT (POUNDS)	SLING SET	LINK COUNT FRONT/REAR	RECOMMENDED AIRSPEED (KNOTS)
M54A1 Launch Station	13,000	25K	10/3	100
M54A2 Launch Station	13,000	25K	10/3	100

b. Materials. The following materials are required to rig this load:

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

(2) Tape, adhesive, pressure-sensitive, 2-inch wide roll.

(3) Cord, nylon, Type III, 550-pound breaking strength.

(4) Webbing, cotton, 1/4-inch, 80-pound breaking strength.

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

d. Procedures. The following procedures apply to this load:

(1) Preparation. Prepare the load using the following steps:

(a) Prepare the launch station for sling loading in accordance with TM 9-1425-2585-10-1.

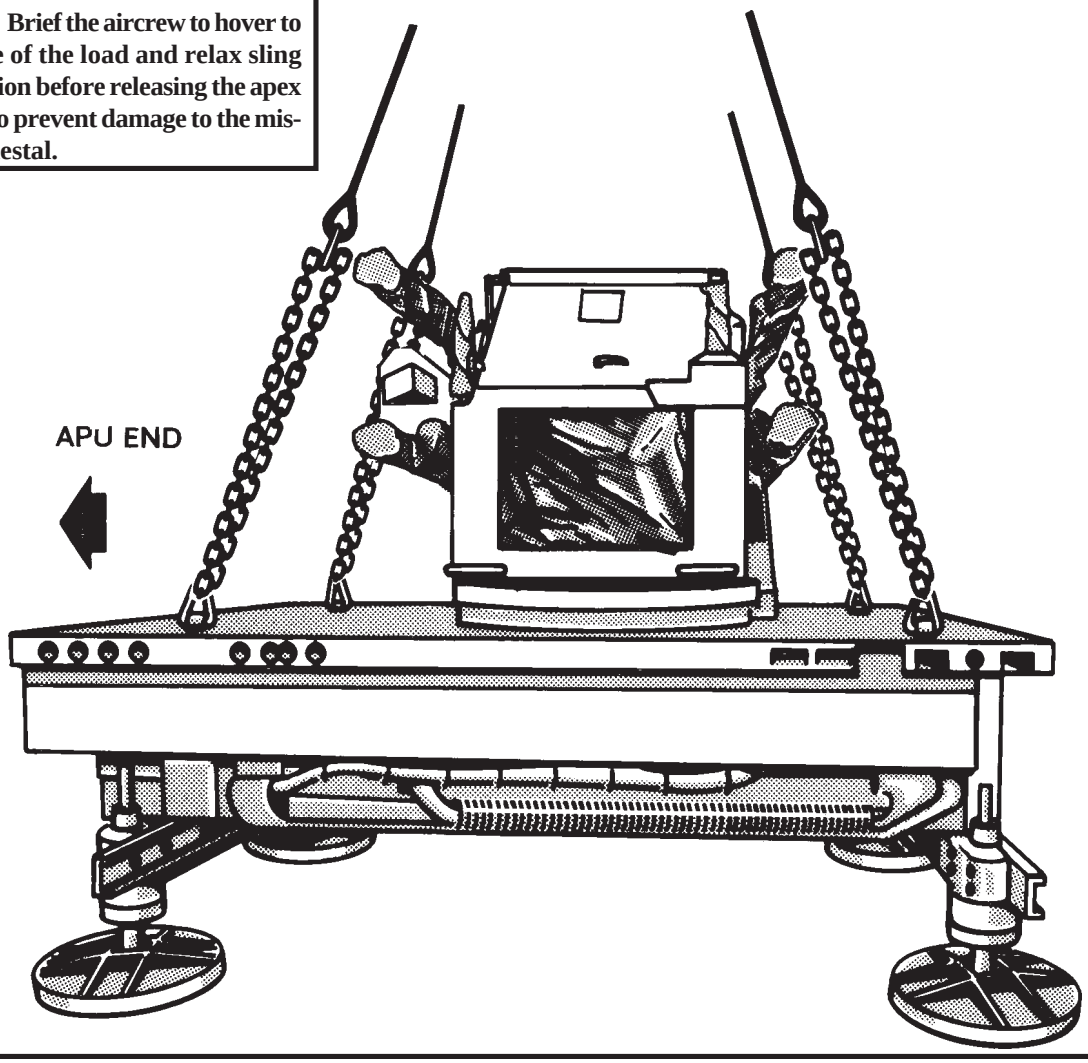
(b) Rotate the missile pedestal 90 degrees from the centerline to avoid sling interference.

(2) Rigging. Rig the load according to the steps in Figure 7-1.

(3) Hookup. 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 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.

(4) Derigging. Derigging is the reverse of the preparation and rigging procedures in steps d (1) and d (2).

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.



RIGGING STEPS

1. Position the apex fitting on top of the gunner's compartment. Route outer sling legs 1and 2 to the front of the load (main power unit end). Route inner sling legs 3 and 4 to the rear of the load. Sling legs 1 and 3 must be on the left side of the load.

2. Route the chain end of sling leg 1 through the left front lift provision located on the left front corner of the platform. Place the correct link from Table 7-1 in the grab hook. Repeat with sling leg 2 and the right front lift provision. Secure the excess chain with Type III nylon cord.

3. Route the chain end of sling leg 3 through the left rear lift provision located on the left rear corner of the platform. Place the correct link from Table 7-1 in the grab hook. Repeat with sling leg 4 on the right rear lift provision.

4. Cluster and tie or tape (breakaway technique) the sling legs together on top of the gunner's compartment to prevent entanglement during hookup and lift-off.

Figure 7-1. M54A1/M54A2 Chaparral Launch Station

7-3. M85 Towed Chaparral Missile System

a. Applicability. The following item in Table 7-2 is certified for all helicopters with suitable lift capacity by the US Army Natick Research, Development, and Engineering Center:

Table 7-2. M85 Towed Chaparral Missile System

NOMENCLATURE	MAX WEIGHT (POUNDS)	SLING SET	LINK COUNT FRONT/REAR	RECOMMENDED AIRSPEED (KNOTS)
M85 Towed Chaparral Missile System	13,500	25K	28/3	100

b. Materials. The following materials are required to rig this load:

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

(2) Tape, adhesive, pressure-sensitive, 2-inch wide roll.

(3) Cord, nylon, Type III, 550-pound breaking strength.

(4) Webbing, cotton, 1/4-inch, 80-pound breaking strength.

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

d. Procedures. The following procedures apply to this load:

(1) Preparation. Prepare the load using the following steps:

(a) Prepare the launch station for sling loading in accordance with TM 9-1425-2585-10-1. Ensure the four stabilizer pads are raised all the way up.

(b) Secure the lift provisions on the upper portion of the four stabilizers.

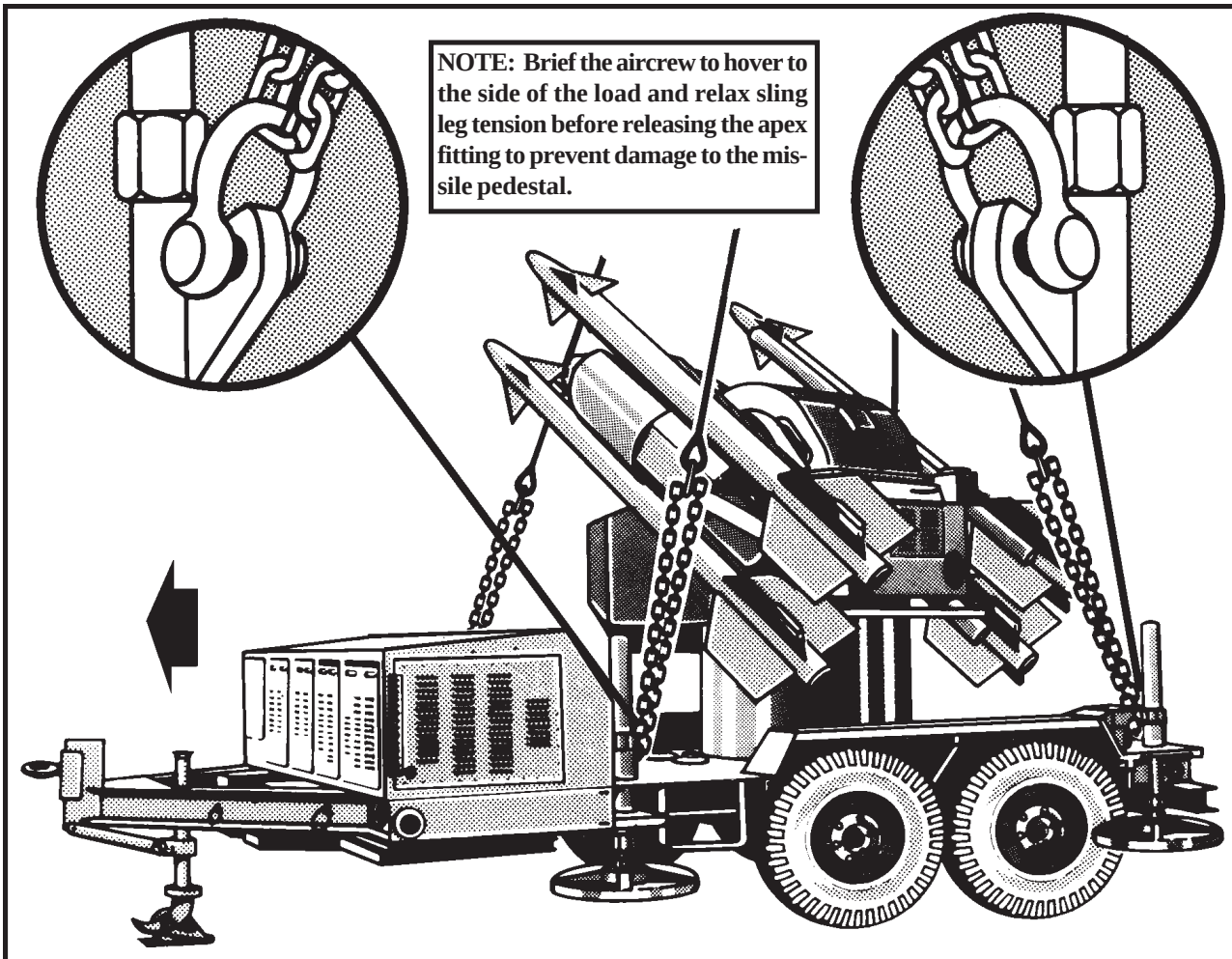
(c) Rotate the missile pedestal 90 degrees from the centerline to avoid sling interference.

(d) Place the trailer jack support in the fully retracted (UP) position.

(2) Rigging. Rig the load according to the steps in Figure 7-2.

(3) Hookup. 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 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.

(4) Derigging. Derigging is the reverse of the preparation and rigging procedures in steps d (1) and d (2).



RIGGING STEPS

1. Position the apex fitting on top of the crew compartment. Route outer sling legs 1and 2 to the front of the load (lunette end). Route inner sling legs 3 and 4 to the rear of the load. Sling legs 1 and 3 must be on the left side of the load.

2. Route the chain end of sling leg 1 through the left front lift provision located on the upper structure of the left front stabilizer. Place the correct link from Table 7-2 in the grab hook. Repeat with sling leg 2 and the right front lift provision. Secure the excess chain with Type III nylon cord.

3. Route the chain end of sling leg 3 through the left rear lift provision located on the upper structure of the left rear stabilizer. Place the correct link from Table 7-2 in the grab hook. Repeat with sling leg 4 on the right rear lift provision.

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

Figure 7-2. M85 Towed Chaparral Missile System

7-4. Continuous Wave Acquisition Radar (CWAR)

a. Applicability. The following items, components of the HAWK Missile System, in Table 7-3 are certified for all helicopters with suitable lift capacity by the US Army Natick Research, Development, and Engineering Center:

Table 7-3. Continuous Wave Acquisition Radar (CWAR)

NOMENCLATURE	MAX WEIGHT (POUNDS)	SLING SET	LINK COUNT FRONT/REAR	RECOMMENDED AIRSPEED (KNOTS)
CWAR, Phase II, on M514 Trailer	4,898	25K	3/14	75
CWAR, Phase III, on M514 Trailer	4,840	25K	3/14	75

b. Materials. The following materials are required to rig this load:

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

(2) Tape, adhesive, pressure-sensitive, 2-inch wide roll.

(3) Cord, nylon, Type III, 550-pound breaking strength.

(4) Webbing, cotton, 1/4-inch, 80-pound breaking strength.

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

d. Procedures. The following procedures apply to this load:

(1) Preparation. Prepare the load using the following steps:

(a) Prepare the CWAR for general travel according to the operator's manual. Secure the shipping cover over the radar.

(b) Extend the rear leveling jack so the CWAR is level.

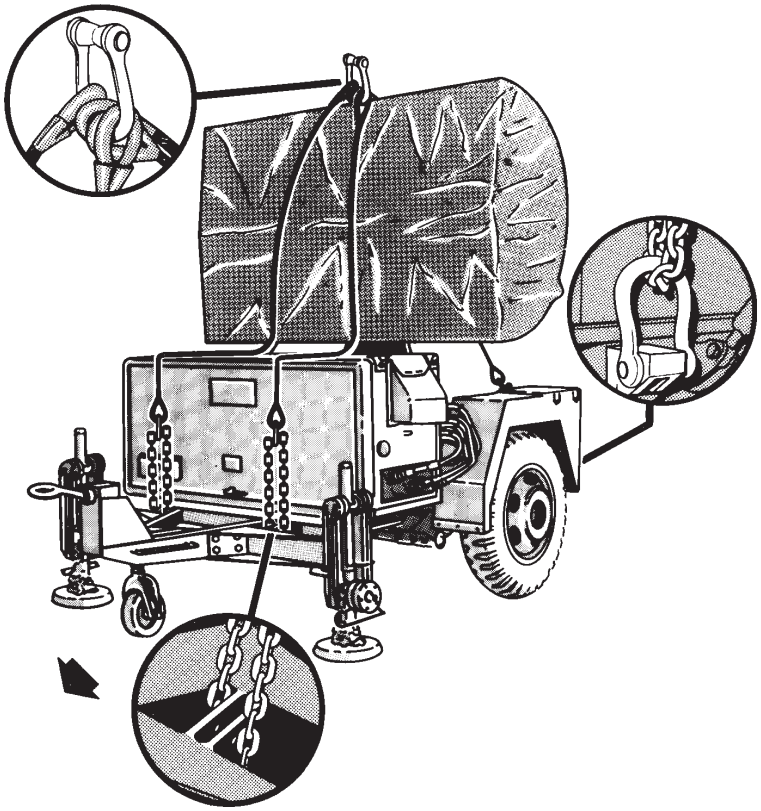
(c) Secure all doors and vents with tape or Type III nylon cord.

(d) Secure all safety chains and hoses to the trailer frame with tape or Type III nylon cord.

(2) Rigging. Rig the load according to the steps in Figure 7-3.

(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.

(4) Derigging. Derigging is the reverse of the preparation and rigging procedures in steps d (1) and d (2).



RIGGING STEPS

1. Position the apex fitting on top of the radar antenna. Route outer sling legs 1and 2 to the front of the trailer (lunette end). Route inner sling legs 3 and 4 to the rear of the load. Sling legs 1 and 3 must be on the left side of the load.

2. 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. Place the correct link from Table 7-3 in the grab hook. Repeat with sling leg 2 on the right side of the trailer A-frame.

3. Route 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. Place the correct link from Table 7-3 in the grab hook. Repeat with sling leg 4 on the right rear lift provision. Secure the excess chain with Type III nylon cord.

4. Pull the front sling legs up and tape or tie (breakaway technique) the chains together at the top of the leveling jack bracket. Tape or tie (breakaway technique) the front sling leg grab hooks to the back of the front compartment so the chains do not become entangled during hookup and lift-off.

5. Pull the aft sling legs up and tape or tie (breakaway technique) the grab hooks to the base of the antenna support so the chains do not become entangled in the rear support leg.

6. 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.

Figure 7-3. Continuous Wave Acquisition Radar (CWAR)

7-5. M192E1/M192-1 Zero Length Launcher

a. Applicability. The following items, components of the HAWK Missile System, in Table 7-4 are certified for all helicopters with suitable lift capacity by the US Army Natick Research, Development, and Engineering Center:

Table 7-4. M192E1/M192-1 Zero Length Launcher

NOMENCLATURE	MAX WEIGHT (POUNDS)	SLING SET	LINK COUNT FRONT/REAR	RECOMMENDED AIRSPEED (KNOTS)
M192E1, Guided Missile Launcher, Zero Length	4,482	25K	53/53	90
M192-1, Guided Missile Launcher, Zero Length	4,500	15K	47/50	60

b. Materials. The following materials are required to rig this load:

(1) Sling set (25,000 or 15,000-pound capacity).

(2) Tape, adhesive, pressure-sensitive, 2-inch wide roll.

(3) Cord, nylon, Type III, 550-pound breaking strength.

(4) Webbing, cotton, 1/4-inch, 80-pound breaking strength.

(5) Webbing, nylon, tubular, 1/2-inch (20' length).

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

d. Procedures. The following procedures apply to this load:

(1) Preparation. Prepare the load using the following steps:

(a) Prepare the launcher for general travel according to the operator's manual.

(b) Secure all doors and vents with tape or Type III nylon cord.

(c) Secure all safety chains and hoses to the trailer frame with tape or Type III nylon cord.

(d) Load the launcher section control box inside the helicopter.

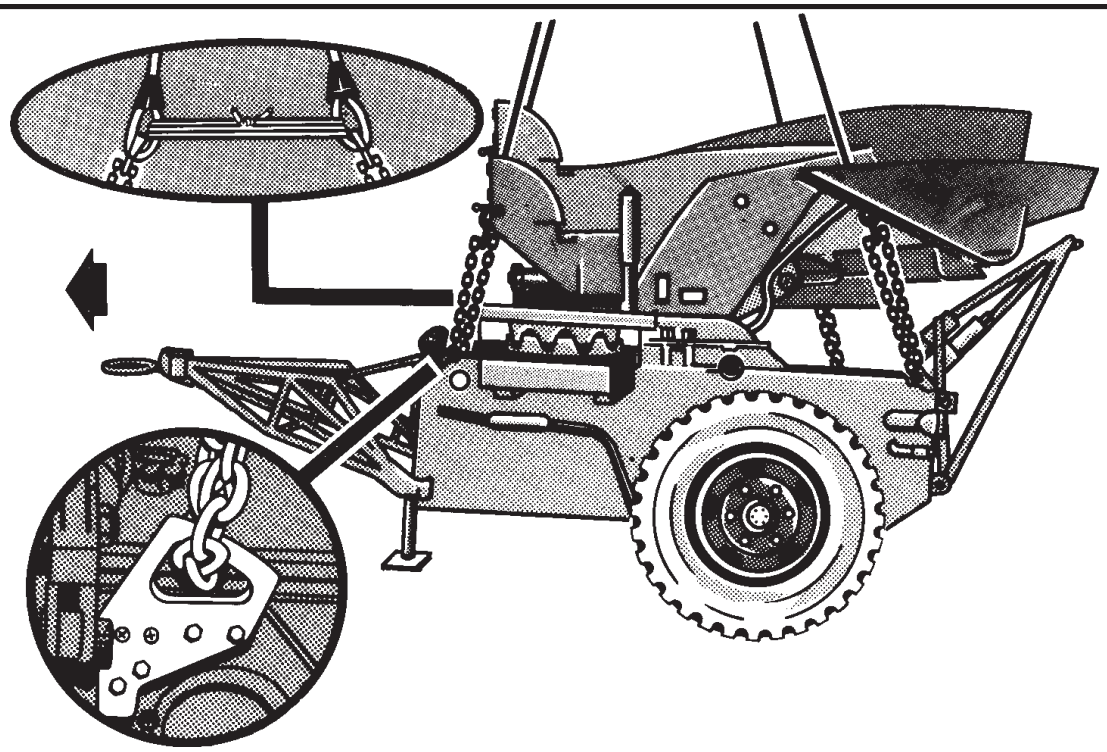
(e) Engage the brakes.

(2) Rigging. Rig the load according to the steps in Figure 7-4.

(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 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.

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 facing up. Ground crew must stand by to ensure the sling legs do not become entangled on the load.

(4) Derigging. Derigging is the reverse of the preparation and rigging procedures in steps d (1) and d (2).



RIGGING STEPS

1. Position the apex fitting on top of the launch stand pedestal. Route outer sling legs 1and 2 to the front of the launcher (lunette end). Route inner sling legs 3 and 4 to the rear of the load. Sling legs 1 and 3 must be on the left side of the load.

2. Route the chain end of sling leg 1 through the left front lifting provision located aft of the leveling cylinder outboard end. Place the correct link from Table 7-4 in the grab hook. Repeat with sling leg 2 on the right front lift provision. Ensure the chain is routed from the inside of the lifting provision to the outside so the hook on the grab hook faces outboard when you insert the chain in the grab hook. Secure the excess chain with Type III nylon cord.

3. Route one end of the tubular nylon through the potted eye of sling leg 1. Route the same end of the tubular nylon through the potted eye of sling leg 2. Position the potted eyes of the two sling legs 39 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 wraps) between the potted eyes of the two sling legs. Tie the ends of the tubular nylon together with a square knot and an overhand knot in each running end.

NOTE: Do not route the tubular nylon between the chains or grab hooks. 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.

4. Route the chain end of sling leg 3 through the left rear lift provision located above the taillight. Place the correct link from Table 7-4 in the grab hook. Repeat with sling leg 4 on the right rear lift provision. Secure the excess chain with Type III nylon cord.

5. Pull the sling legs up and tape or tie (breakaway technique) the grab hooks to the boom supports. Cluster and tape or tie (breakaway technique) all sling legs together above the center launch boom to prevent entanglement during hookup and lift-off.

Figure 7-4. M192E1/M192-1 Zero Length Launcher

7-6. M501E3 Loader-Transporter, Guided Missile

a. Applicability. The following items, components of the HAWK Missile System, in Table 7-5 are certified for all helicopters with suitable lift capacity by the US Army Natick Research, Development, and Engineering Center:

Table 7-5. M501E3 Loader-Transporter, Guided Missile

NOMENCLATURE	MAX WEIGHT (POUNDS)	SLING SET	LINK COUNT FRONT/REAR	RECOMMENDED AIRSPEED (KNOTS)
M501E3 Loader-Transporter, Guided Missile	5,650	25K	3/13	100
M501E3 Loader-Transporter, Guided Missile	5,300	15K	8/3	80

b. Materials. The following materials are required to rig this load:

(1) Sling set (25,000 or 15,000-pound capacity).

(2) Tape, adhesive, pressure-sensitive, 2-inch wide roll.

(3) Cord, nylon, Type III, 550-pound breaking strength.

(4) Webbing, cotton, 1/4-inch, 80-pound breaking strength.

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

d. Procedures. The following procedures apply to this load:

(1) Preparation. Prepare the load using the following steps:

(a) With the loader-transporter engine **ON**, raise the super structure about 3 feet using the **EXTENSION** lever. Using the **ROLL/ELEVATION, AZIMUTH, and EXTENSION** levers, position the super structure in the **OPERATIONAL READY** position. Shut the engine down and place the transmission in neutral.

(b) Secure the super structure arms in the operational position by engaging the lock pins. **THE SUPER STRUCTURE CANNOT BE ALLOWED TO MOVE.**

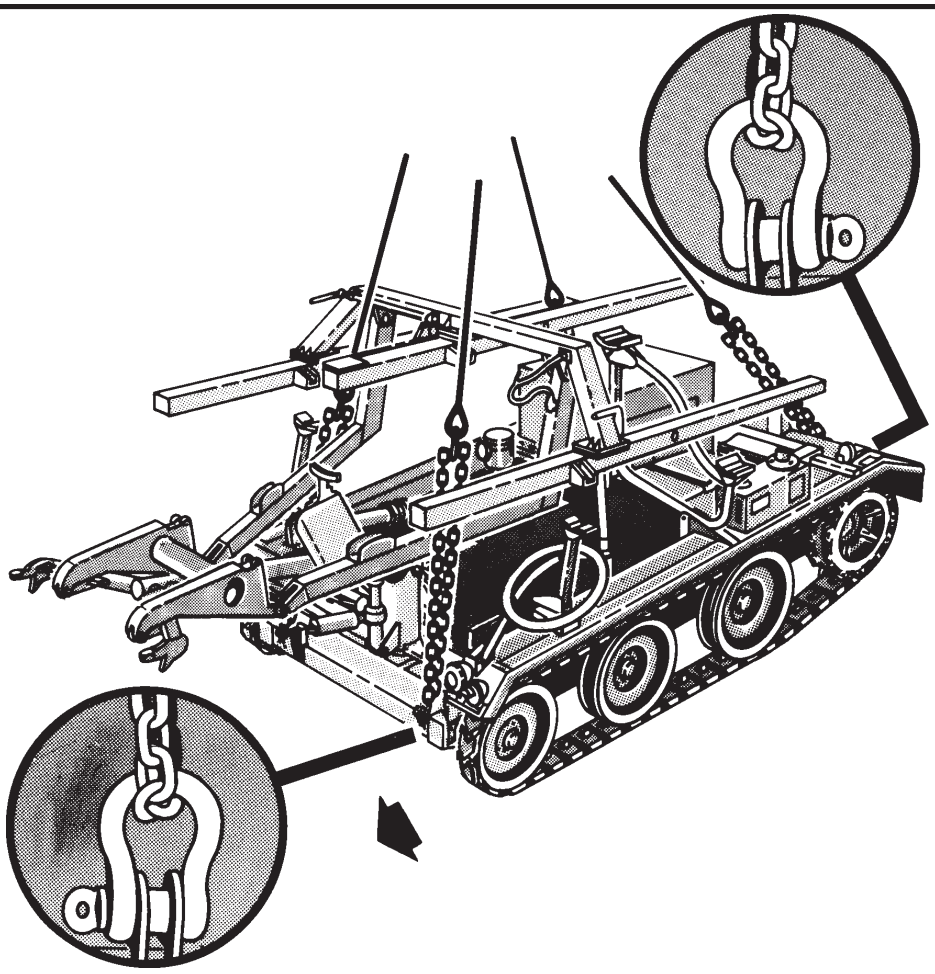
(c) Secure all safety chains and hoses to the adjacent structure with tape or Type III nylon cord.

(d) Secure all doors and vents with tape or Type III nylon cord.

(2) Rigging. Rig the load according to the steps in Figure 7-5.

(3) Hookup. 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 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.

(4) Derigging. Derigging is the reverse of the preparation and rigging procedures in steps d (1) and d (2).



RIGGING STEPS

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

2. Route inner sling legs 3 and 4 to the rear of the load (engine compartment). Ensure the sling legs are routed inboard of the outer two upper hoisting beams. Sling legs 1 and 3 must be on the left side of the load.

3. Route the chain end of sling leg 1 through the left front lift provision clevis located inboard of the left front wheel. Place the correct link from Table 7-5 in the grab hook. Repeat with sling leg 2 on the right front lift provision clevis.

4. Route the chain end of sling leg 3 through the left rear lift provision clevis inboard of the left rear fender. Place the correct link from Table 7-5 in the grab hook. Repeat with sling leg 4 on the right rear lift provision clevis. Secure the excess chain with Type III nylon cord.

5. Pull the sling legs up and tape or tie (breakaway technique) the grab hooks to the hoisting beams. Cluster and tape or tie (breakaway technique) all sling legs together above the hoisting beams to prevent entanglement during hookup and lift-off.

Figure 7-5. Guided Missile Loader-Transporter

7-7. M1E2 Loading and Storage Missile Pallet

a. Applicability. The following item, component of the HAWK Missile System, in Table 7-6 is certified for all helicopters with suitable lift capacity by the US Army Natick Research, Development, and Engineering Center:

Table 7-6. M1E2 Loading and Storage Missile Pallet

NOMENCLATURE	MAX WEIGHT (POUNDS)	SLING SET	LINK COUNT FRONT/REAR	RECOMMENDED AIRSPEED (KNOTS)
M1E2 Loading and Storage Missile Pallet on M390C Trailer Chassis	4,670	15K	3/35	100

b. Materials. The following materials are required to rig this load:

(1) Sling set (15,000-pound capacity).

(2) Tape, adhesive, pressure-sensitive, 2-inch wide roll.

(3) Cord, nylon, Type III, 550-pound breaking strength.

(4) Webbing, cotton, 1/4-inch, 80-pound breaking strength.

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

d. Procedures. The following procedures apply to this load:

(1) Preparation. Prepare the load using the following steps:

(a) Prepare the missile pallet for general travel in accordance with the operator's manual.

(b) Ensure the 3 1/4-ton shackles initially provided with the M390C trailer chassis have been replaced by the 6 3/4-ton shackles (NSN 4030-00-278-0699). Ensure the shackles are properly pinned.

(c) Secure all cables, safety chains, and hoses to the adjacent structure with tape or Type III nylon cord.

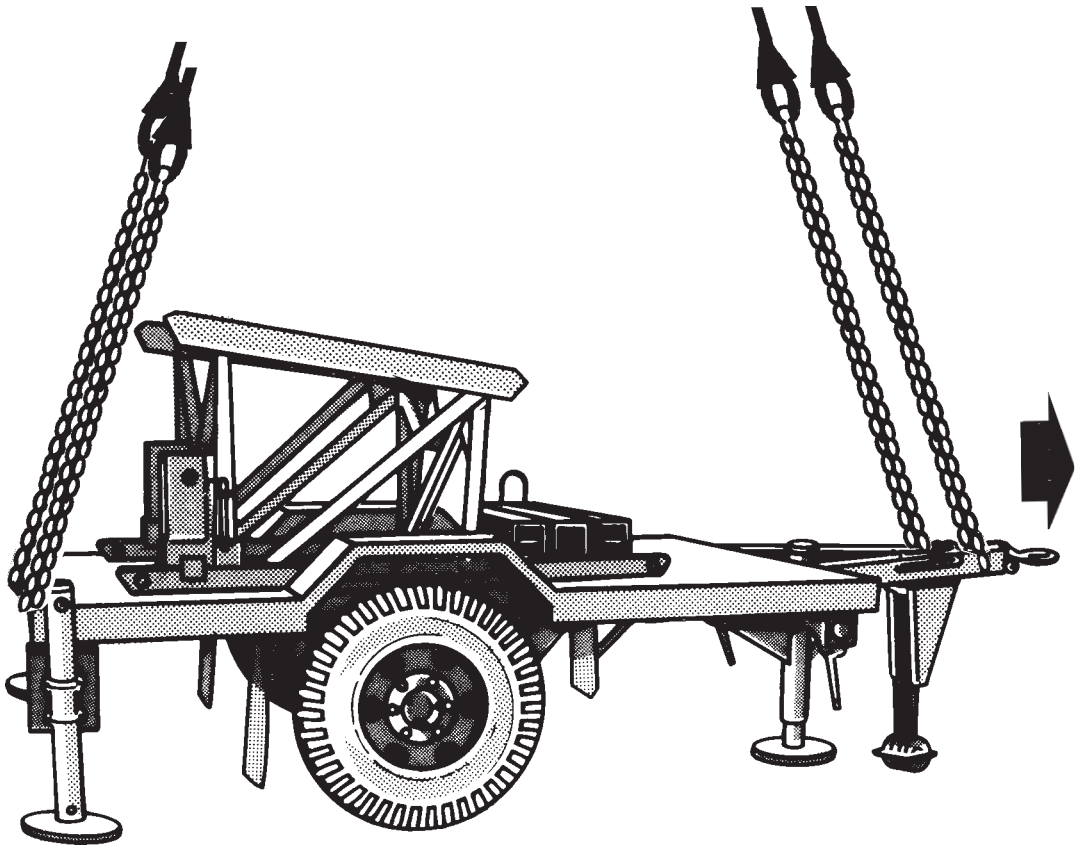
(d) Engage the parking brake.

(e) Adjust the forward and aft leveling jacks so the pads are located just above ground level.

(2) Rigging. Rig the load according to the steps in Figure 7-6.

(3) Hookup. The hookup team stands on the missile 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 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.

(4) Derigging. Derigging is the reverse of the preparation and rigging procedures in steps d (1) and d (2).



RIGGING STEPS

1. Position the apex fitting on top of the missile storage racks. Route outer sling legs 1and 2 to the rear of the missile pallet and inner sling legs 3 and 4 to the front of the missile pallet (lunette end).

2. Route the chain end of sling leg 1 through the left rear lift provision located on the corner of the trailer above the taillight. Route the chain from the inside to the outside of the lift provision. Place the correct link from Table 7-6 in the grab hook. Repeat with sling leg 2 on the right rear lift provision. Secure the excess chain with Type III nylon cord.

3. Loop the chain end of sling leg 3 through the opening aft of the lunette and of the landing wheel on the left side of the tongue. Place the correct link from Table 7-6 in the grab hook. Repeat with sling leg 4 on the side of the tongue.

4. Cluster and tie or tape (breakaway technique) the sling legs together on top of the missile storage racks to prevent entanglement during hookup and lift-off.

Figure 7-6. M1E2 Loading and Storage Missile Pallet

7-8. Pedestal-Mounted Stinger (Avenger)

a. Applicability. The following items in Table 7-7 are certified for all helicopters with suitable lift capacity by the US Army Natick Research, Development, and Engineering Center:

Table 7-7. Pedestal-Mounted Stinger (Avenger)

NOMENCLATURE	MAX WEIGHT (POUNDS)	SLING SET	LINK COUNT FRONT/REAR	RECOMMENDED AIRSPEED (KNOTS)
Stinger, Pedestal-Mounted on M998 (Avenger)	8,513	10K	50/5	90
Stinger, Pedestal-Mounted on M1097 (Avenger)	9,087	10K	50/5	90

b. Materials. The following materials are required to rig this load:

(1) Sling set (10,000-pound capacity).

(2) Tape, adhesive, pressure-sensitive, 2-inch wide roll.

(3) Cord, nylon, Type III, 550-pound breaking strength.

(4) Webbing, cotton, 1/4-inch, 80-pound breaking strength.

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

d. Procedures. The following procedures apply to this load:

(1) Preparation. Prepare the load using the following steps:

(a) Fold the mirrors in front of the windshield and tie together with Type III nylon cord.

(b) Ensure the Avenger fire unit is secured to the truck. Secure all equipment inside the fire unit with tape, tie-downs, or nylon cord; close and secure the door.

(c) Disconnect the standard vehicle mounted launcher connectors from the missile pods and secure them to the fire unit with tape or nylon cord.

(d) Secure all equipment inside the vehicle with tape, nylon cord, or tie-downs. Close and secure the doors (if installed).

(e) Ensure the fuel tank is not over 3/4 full. Inspect the fuel tank, oil filter, and battery caps for proper installation.

(f) Place the transmission in neutral and set the parking brake.

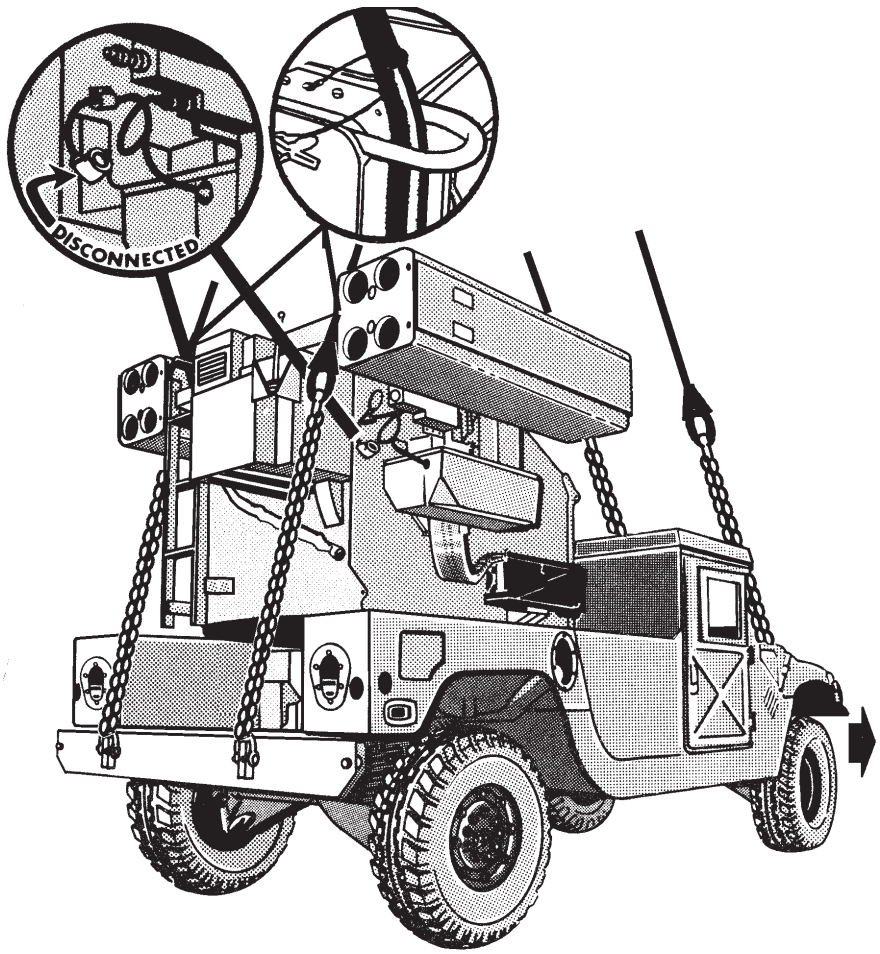
(g) Ensure the front wheels are pointed straight ahead. Secure the steering wheel using the securing device attached under the dashboard.

(2) Rigging. Rig the load according to the steps in Figure 7-7.

NOTE: Hookup of this load presents substantial risk of damage to the load or injury to the hookup personnel. Use of a reach pendant is recommended for this load.

(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 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.

(4) Derigging. Derigging is the reverse of the preparation and rigging procedures in steps d (1) and d (2).



RIGGING STEPS

1. Position the apex fitting on top of the fire unit. Route outer sling legs 1and 2 to the front of the vehicle and inner sling legs 3 and 4 to the rear of the load. Ensure sling legs 1 and 3 are on the left side of the load.

2. Route the chain end of sling leg 1 through the left front lift provision that protrudes through the hood. Place the correct link from Table 7-7 in the grab hook. Repeat with sling leg 2 on the right front lift provision. Secure the excess chain with Type III nylon cord.

3. Loop the chain end of sling leg 3 through the left rear lift provision located on the rear bumper. Place the correct link from Table 7-7 in the grab hook. Place the sling leg in the sling guide on top of the fire unit. Repeat with sling leg 4 on the right rear lift provision.

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

Figure 7-7. Pedestal-Mounted Stinger (Avenger)