

CHAPTER 1

FUNDAMENTAL PRINCIPLES

1-1. INTRODUCTION

This chapter contains general information about certification for helicopter sling load and explains the role of the Military Traffic Management Command Transportation Engineering Agency (MTMCTEA) and the Department of Defense (DOD) sling load 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.

1-2. CLASSIFICATION DEFINITIONS OF SLING LOADS

a. Certified Sling Loads. Certified sling loads are those items of equipment and their associated rigging procedures which have completed the evaluation and testing required by NRDEC for sling load certification. These rigging procedures are in Chapters 2 through 14. Only certified sling loads are authorized for the Marine Corps. The US Army NRDEC has indicated that any single point sling load certified under a specific aircraft is also certified for any aircraft with suitable lift capability. The following restrictions apply for sling load certification to remain in effect:

(1) The load must be within the lifting capability of the desired helicopter model and not exceed the rated capacity of the sling set being used.

(2) The load shall be rigged in accordance with the certified rigging procedure.

(3) The recommended stable airspeed specified for the load in the applicability section of the rigging procedure is a recommendation and not a restriction, unless so stated.

(4) This certification is limited to single-point loads only.

NOTE: When carrying loads at weights close to the aircraft hook limitations, close coordination with the aviation unit is required.

CAUTION

Loads weighing less than 6,000 pounds may not fly in a stable condition and may incur jet-tisoning problems when flown under a CH-53E helicopter. CH-53E units may have restrictions on flying light loads. Direct coordination with CH-53E units is encouraged.

b. Suitable Sling Loads. Suitable sling 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. In most cases these loads were not pull tested in accordance with MIL STD 913, but are known loads which have been flown without incident for years and which NRDEC considers to be proven safe. These rigging procedures are in Chapters 15 through 24.

c. Unique Sling Loads. Unique loads are equipment carried on a one time or low-frequency basis, such as telephone poles, artillery targets, or barrier material. The lack of sling load 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 sling load.

d. Prohibited Sling Loads. Prohibited sling loads are items of equipment that are prohibited from sling loading as determined by each service. These loads have been denied sling load 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.

1-3. CERTIFICATION OF EQUIPMENT FOR HELICOPTER SLING LOAD

a. Objective. The objective of helicopter sling load certification is to assure the user that the equipment being

transported can withstand the stresses of a sling load flight environment. Certification for sling load 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.

b. Responsibilities. 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 sling load certification and rigging procedures for military equipment. When an item is certified for sling load, it means that NRDEC, in cooperation with various test activities, has:

- (1) Conducted an engineering analysis of the load and lifting provisions for structural adequacy during sling loading.
- (2) Verified that the lift provisions meet the strength requirements of the applicable military standard by means of proof load testing.
- (3) Developed and/or validated sling load rigging procedures through static lift testing.
- (4) Evaluated flight test reports and determined that the particular load meets acceptable flight characteristics with the type helicopter flown during the flight test.
- (5) Issued a statement of sling load 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.

1-4. REQUESTS FOR SLING LOAD CERTIFICATION

a. Fielded Equipment. Each service headquarters must designate, request, and prioritize the fielded equipment to be evaluated by NRDEC for sling load certification. Individual units can request sling load 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. The following agencies are responsible for their branch of service:

(1) US Army - Commander, Combined Arms Support Command, ATTN: QM Combat Developments, Suite 250, 3901 A Avenue, Fort Lee, VA 23801-1809.

(2) US Marine Corps - Commanding General, Marine Corps System Command (PSE) Quantico, VA 22134-5021.

(3) US Navy - Naval Air Systems Command (NAVAIR).

(4) US Air Force - US Air Force Systems Command.

b. 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 sling load under a different helicopter from that listed in the applicability paragraph is as follows:

(1) Contact your service point of contact to determine if the load has been certified with the different helicopter subsequent to the manual publication.

(2) Obtain a multiservice flight data collection sheet (MSFDACS) from Commander, NRDEC, ATTN: STRNC-UAS, Natick, MA 01760-5017.

(3) Following the steps in the MSFDACS, conduct a flight test for the item using the certified single-point rigging procedures in this manual.

(4) Complete the MSFDACS and return it to NRDEC. NRDEC will evaluate the completed MSFDACS and certify the item as appropriate for the specified helicopter.

c. 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.

1-5. UNIQUE ITEMS OF EQUIPMENT OR OPERATIONAL REQUIREMENTS

Helicopter sling loading 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 sling load rigging procedures should assist in the static lift testing. Flight testing may be conducted after a satisfactory static rigging configuration has been determined.

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 sling load operations, even at low airspeeds, and should be flown with extreme caution.

1-6. EQUIPMENT RIGGING PROCEDURES

This section explains the information that is contained in the rigging procedures for each load. Chapters 2 through 14 contain the rigging procedures for certified single-point loads and chapters 15 through 24 contain the rigging procedures for suitable single-point loads.

a. Applicability Paragraph. The applicability paragraph states whether a load is “certified” or “suitable” for sling load. 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.**

b. 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.

(1) 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.

(2) 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.

c. 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.

d. 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.

(1) 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.

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

e. Hookup. Certain sling loads, such as HMMWVs with shelters, present substantial risk of damage to the load or injury to the hookup personnel. This risk is increased during dual point hookup or night operations.

(1) To reduce the risk of damage to the load or injury

to the hookup personnel an extended sling system or reach pendant as defined in FM 10-450-3 may be used.

(2) Using a reach pendant increases the distance between the load and the helicopter. Reach pendants should not be used on loads that have a tendency to spin during flight. A static discharge person is not required when using a reach pendant.

(3) If the tactical environment permits the use of an extended sling set may reduce the risk. Polyester round slings are recommended for use as vertical pendants.

1-7. GENERAL RIGGING INSTRUCTIONS

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

a. Preparing the Load. 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.

b. Preparing the Equipment. Inspect and assemble the slings and miscellaneous equipment required to prepare and rig the load. Following the instructions in Chapter 6 of FM 10-450-3/MCRP 4-23E, VOL I/NWP 3-04.11/AFJMAN 11-223, VOL I/COMDTINST M13482.2A, 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.

c. Positioning and Attaching the 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.

(1) Rigging a typical load with four lifting points is begun by connecting -

- (a) Sling leg 1 to the left front lifting provision.
- (b) Sling leg 2 to the right front lifting provision.
- (c) Sling leg 3 to the left rear lifting provision.
- (d) Sling leg 4 to the right rear lifting provision.

(2) 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.

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

(3) 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.

(4) Breakaway safety ties are used to temporarily restrain the sling legs to keep them from becoming entangled on the load as the helicopter lifts the load. These safety ties are made of Type I, 1/4-inch cotton webbing or duct tape.

d. Viewing 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 shown in the illustration identifies the direction of flight.

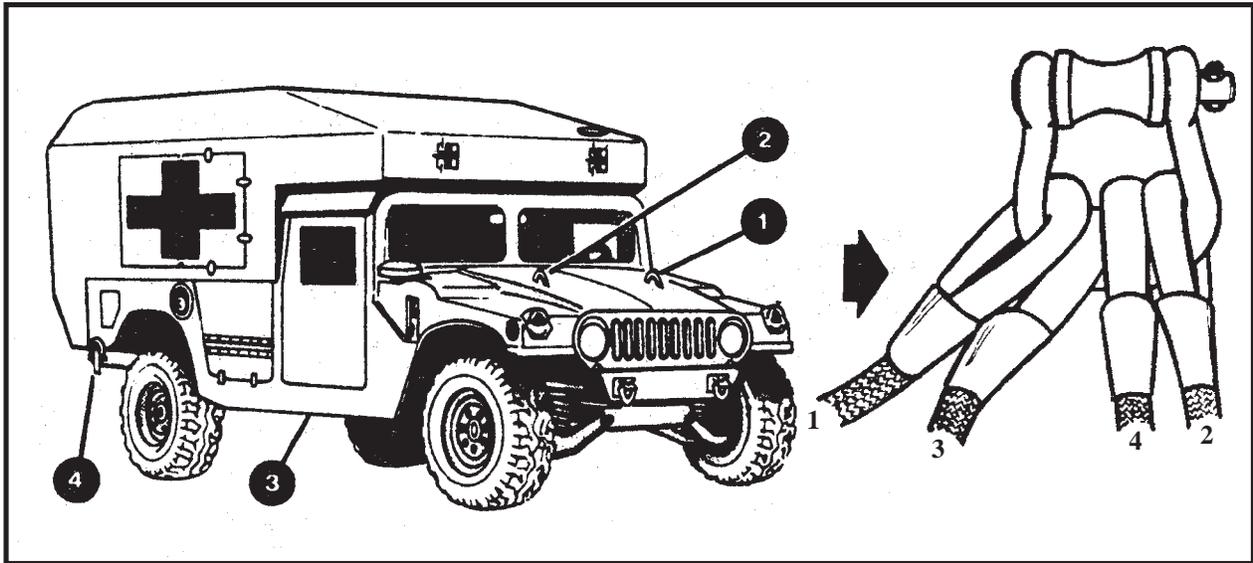


Figure 1-1. Sling Leg Lifting Point Designation