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A FAMILY OF HELICOPTER EXTERNAL CARGO CARRYING DEVICES (NETS) 5--ETC(U)
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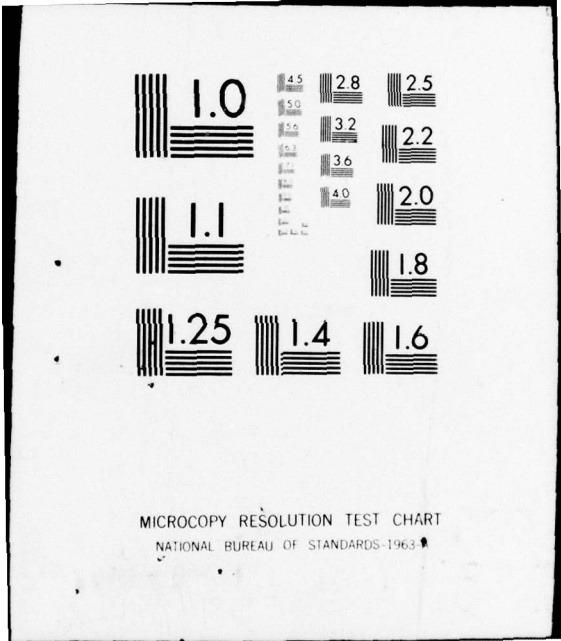
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INDEPENDENT EVALUATION REPORT. 9 Aug - 20 Sep 76

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A Family of Helicopter
External Cargo Carrying Devices (NETS)
5,000- and 10,000-Pound Capacity

Executive Summary

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20 Sep 76

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INDEPENDENT EVALUATION REPORT
Family of External Cargo Carrying Devices

1. Purpose and Scope. The purpose of this evaluation is to determine the operational capabilities of:

- a. Helicopter cargo net, 5,000-pound capacity.
- b. Helicopter cargo net, 10,000-pound capacity.
- c. US Navy pallet lifting sling, 4,000-pound capacity for 29 to 40-inches high pallet load, FSN 1450-169-6927.
- d. US Navy pallet lifting sling, 4,000-pound capacity for 48 to 70-inch high pallet load, FSN 1398-004-9175.

This Independent Evaluation Report is based on an OT II conducted by the US Army Airborne and Communications-Electronics Board at Fort Bragg, NC, during the period of 9 August to 20 September 1976. Items 1c and 1d were not tested as the Revised Section 1 of the Development Plan for the Small Development Requirement (SDR) for a Family of Helicopter External Cargo Carrying Devices, dated 24 October 1975, indicated no tests were deemed necessary for the US Navy pallet lifting slings.

2. System Description.

a. Helicopter cargo net, 5,000-pound capacity: The net is manufactured from a 3,500-pound break strength, braided, nylon cord joined by a knotless intersection method to a nominal 6-inch mesh size. The net is octagonal in shape with a diameter of 15 feet. It has a 7,000 pound break strength, braided, nylon border cord which is fitted around the periphery of the net to provide reinforcement. Four multi-legged suspension straps, with four legs per strap made from 1.75-inch wide nylon webbing are attached at 16 points around the periphery of the net. A metal hook located at the center of each suspension strap provides an attachment point for suspension. A stirrup affixed to one of the suspension straps permits interlocking of the strap hooks for single point attachment of the net directly to the helicopter external cargo hook. The entire net, dyed a customer specified color (OD) is protected by an antiabrasive compound (Splyflex).

b. Helicopter cargo net, 10,000-pound capacity: The net is manufactured from a 7,000-pound break strength, braided, nylon cord joined by a knotless intersection method to a nominal 7.5 inch mesh size. The net is octagonal in shape with a diameter of 18 feet. It is fitted with a double thickness braided, nylon border cord, each cord having a 7,000-pound break strength around the periphery of the net to provide reinforcement. Four lifting loops (four-ply each) made from 2-inch wide, 15,000 pound break strength, nylon webbing are attached at eight points around the periphery of the net. A type IV connector link is affixed to the center of each loop. The links

connect to the ends of the slings. Two lifting slings, with a stirrup attached to the center of each, connect the suspended net to the external cargo hook of the helicopter. The entire net, dyed a customer specified color (OD), is protected by an antiabrasive compound (Splyflex).

3. Limitations. There were no known factors which limited the scope and quality of the evaluation.

4. Adequacy of Testing. The testing of the nets was performed by user personnel who for the most part had little prior experience with nets. This provided the opportunity for an evaluation of the nets and the control items without previous familiarization of net operation by the user. The test itself consisted of rigging, hookup, derigging and 52 flights. In addition, various ground exercises which required the user personnel to move the nets around the test area were conducted.

5. Operational Issues.

a. Does the Family of Helicopter External Cargo Carrying Devices provide an improved operational capability over the devices they are designed to replace?

b. Does on-the-job training satisfactorily prepare user troops to employ the Family of Helicopter External Cargo Carrying Devices under operational conditions?

c. Can the assigned maintenance functions be readily accomplished using skills authorized and the literature, tools, test equipment, and repair parts authorized?

6. Analysis. These subparagraphs correspond with the subparagraphs of paragraph 5 above.

a. Load stability during flight using the test items was equal to the standard cargo net and better than the A-22 cargo bags. The test items are more easily adaptable to varying load configurations and dimensions than are the control items. Movement/handling of the 10K and 5K test items were equal to the control items. No special equipment was required for rigging or hookup of the test items. Special equipment is required for the control items. Rigging and derigging with the test items were easier than with the A-22 cargo bag and are equal to the standard net. The test items were as easy to handle as the control items. Ease in arrangement and tying off of the test items and the control items to prevent entanglement was equal. Chemical-biological protective clothing had the same effect of performance of assigned tasks with the test items and control items. The 10K test item with its 20-foot lifting slings caused excessive aircraft vibrations during three consecutive flights. The test items provide an improved carry capacity over the existing standard cargo net and the A-22 cargo bag. The test items have 5,000 and 10,000 pound lift capacity where the cargo bag and standard cargo nets are restricted to 2,000 and 8,930 pound capacities, respectively.

b. User personnel became proficient in use of the test items with the same OJT program (approximately 1 hour) required for proficient use of the control items. User personnel proficiency in utilization of the Family of Helicopter External Cargo Carrying Devices (NETS) is equal to that required for control items with the same effort of OJT.

c. During the test, organizational maintenance, which consisted of a daily visual inspection, was performed by user personnel. Maximum time allowable for diagnosing failures at organizational level was five minutes. The user personnel average inspection times of 3 minutes for the 5K net and 2.8 minutes for the 10K net confirmed that user personnel are capable of performing organizational maintenance. Direct support maintenance was performed by a parachute rigger, MOS 43E. When performing maintenance, the DS repairman used the manufacturer's publications, tools, and repair parts contained in the maintenance test support package. The manufacturer's publications received in the maintenance test support package were inadequate based upon the quantity of United Kingdom terminology, different types of publications, inconsistent information, and failure to address requisition procedures to obtain repair parts. Following the completion of the test, operator (user) personnel performed the final inspection on the nets. The mean time to repair was 1.98 hours for the 5K nets at the DS maintenance level (excluding drying time for the antiabrasive treatment). Based on only two maintenance actions, this statistic may not represent a realistic MTR. The DS repairperson bent the eyelets on two splicing tools while attempting to splice two torn segments of a 10K net. The ring handle on the splicing tool is approximately 1 1/8 inches in diameter which caused undue pain to the palm of the hand. Using the repair kit provided in the maintenance test support package, the 10K net could not be repaired by a parachute rigger MOS 43E.

d. During the conduct of this test, there was one deficiency, four shortcomings, and three suggested improvements. The deficiency was for the inability of a parachute rigger, MOS 43E, to repair a damage 10K net using the repair kit provided in the maintenance test support package. This failure was caused by the stretching of the materiel to a much lesser diameter (7/8") than the materiel provided for the repair (1 1/4") which made splicing the two impractical. A shortcoming was for the terminology used in the publications; the nets were not marked with their rated capacity, the 20-foot lift slings of the 10K net caused vibration during flight; and the splicing tool is inferior for extended use. The suggested improvements were the tools in the repair kits should be identified by nomenclature and part number; appropriate personnel should assess the requirements of a repair kit for each net; and the Spynflex should be removed from the repair kit and stored separately.

e. The 10K and 5K nets used in this test were purchased in the United Kingdom. Due to legal matters, the nets that will ultimately be purchased and used by the Army, must be manufactured in the United States. Therefore, the materiel developer in preparing their performance specifications will

eliminate the deficiency and shortcomings and accomplish the suggested improvements. In addition, the performance specification will be prepared to include all the favorable aspects discovered in the nets manufactured in the United Kingdom.

f. The Small Development Requirement (SDR) which included these nets also addressed pallet slings and a cloth helmet already in use by the Navy. They have been type classified and have FSN's, therefore, no further testing was considered since the Navy has successfully demonstrated their usefulness.

7. Conclusions.

As a result of this evaluation, the following conclusions were made:

(a.) The 5K and 10K nets provide lifting capacity and ease of handling advantages over standard external cargo carrying equipment.

(b.) The 5K and 10K nets provide a load variety capacity advantage over standard external cargo carrying equipment.

(c.) The pallet lifting slings and cloth helmets used and type classified by the Navy have application in the Army. *and*

(d.) The one deficiency, four shortcomings, and three suggested improvements must be evaluated by the US Army Airborne and Communications-Electronics Board during the follow-on evaluation.

8. Operational Effectiveness/Military Utility. The performance of the nets, pallet slings, and cloth helmets during the evaluation provided a level of improved performance over the control items in the areas of dependability, ease of use, rapid inspection, reduced weight and user acceptance. These items are capable of improved mission accomplishment over the existing nets.