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8 May 1970 *alt. AMSTE-TS Aberdeen Proving ground sub. 21005* Materiel Test Procedure 7-4-009
U. S. Army Arctic Test Center

U. S. ARMY TEST AND EVALUATION COMMAND
ENVIRONMENTAL TEST PROCEDURE

ARCTIC ENVIRONMENTAL TEST OF AIRDROP PLATFORMS

AD 871344

1. OBJECTIVE

The objective of the procedures outlined in this MTP is to provide a means of evaluating the performance, safety, human factors engineering, and maintenance characteristics of airdrop platforms under arctic winter environmental conditions.

2. BACKGROUND

Airdrop platforms are used to support the airdrops of supplies and equipment such as combination loads, fragile loads or unusual items which lack sufficient structural integrity to withstand parachute suspension and impact forces.

Testing in a natural arctic winter environment is used to substantiate or supplement data obtained from simulated tests conducted during the engineer design and engineering test phase. Testing in the arctic winter environment is generally not authorized until data from the simulated environmental tests provides reasonable assurance that the test item will function satisfactorily when subjected to the conditions that would be encountered in the arctic.

3. REQUIRED EQUIPMENT

- a. Appropriate arctic winter uniforms as standardized in MTP 10-4-500, paragraph 6.1.1 c.
- b. Aviation operations facility and airfield.
- c. Support aircraft.
- d. Meteorological support instrumentation.
- e. Photographic equipment (black and white or color).
- f. Instrumentation for measurement of:
 - 1) Aircraft true airspeed and release velocity.
 - 2) Altitude.
- g. General and special tools and ancillary items required for assembly and maintenance of the test item.
- h. Vehicles (cargo).
- i. Measuring tapes.
- j. Scales.

4. REFERENCES

- A. AR 70-8, Human Factors and Social Sciences Research.
- B. AR 70-10, Army Materiel Testing.
- C. AR 70-38, Research Development, Test and Evaluation of Materiel

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- for Extreme Climatic Conditions.
- D. AR 385-10, Army Safety Program.
 - E. AR 705-5, Army Research and Development.
 - F. AR 705-35, Criteria for Air Portability and Airdrop of Materiel.
 - G. TM 10-1670-208-20, Platform, Airdrop, Modular Dual Rail System Type I and II, formerly TM 10-1670-208-25.
 - H. USATECOM Regulation 350-6, Training in New or Modified Equipment and Training Devices.
 - I. USATECOM Regulation 385-6, Verification of Safety of Materiel During Testing.
 - J. USATECOM Regulation 705-2, Documenting, Test Plans and Reports.
 - K. CIR 350-45, Army Aviation Safety.
 - L. MTP 10-4-500, Arctic Environmental Test, Preoperation Inspection, Physical Characteristics, Human Factors, Safety and Maintenance Evaluation.

5. SCOPE

5.1 SUMMARY

The procedures outlined in this MTP are designed to determine and evaluate the performance characteristics of airdrop platforms under arctic winter environmental conditions.

The specific tests to be performed and their intended objectives are listed below.

a. Preoperational Inspection and Physical Characteristics - This subtest provides for an inspection of the test items to determine:

- 1) If the test items and control items are in proper condition for testing.
- 2) If the test items physical characteristics conform to applicable criteria.

b. Assembly - The objective of this subtest is to determine the ease of assembling the airdrop platforms.

c. Rigging and Loading Supplies - The objective of this subtest is to determine:

- 1) If the design of the test items provides flexibility in the choice of location of the load on the platform and of the platform in the aircraft.
- 2) If the test items are compatible with the standard equipment normally associated with the use of air-delivery platforms under arctic winter environmental conditions.
- 3) If the test items can be loaded into an aircraft in accordance with instructions provided with the test items, without modification or change in the air-delivery system in the aircraft, under arctic winter environmental conditions.

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MTP 7-4-009
8 May 1970

d. Aerial Delivery - The objective of this subtest is to determine if the test items are compatible with standard air-delivery systems (extraction systems, roller and wheel conveyors) and with the dual rail aerial unloading kit under arctic environmental conditions.

e. Durability and Reusability - The objective of this subtest is to determine the effects of air-delivery and outside storage on the test items under ambient arctic environment, and to determine the test items salvage capability in a reusable status.

f. Human Factors Evaluations and Safety - The objective of this subtest is to determine:

- 1) If the test item is safe for United States Army use under arctic winter environment.
- 2) If the test item is compatible with the skills, aptitudes, and limitations of personnel who will rig, load, and maintain it under arctic ambient temperatures.

g. Maintenance Evaluation - The objective of this subtest is to determine if the test item meets maintenance and reliability requirements as defined by QMR, SDR, TC, MC, or other established criteria under arctic winter environmental conditions.

5.2 LIMITATIONS

The procedures described in this MTP are limited to the testing of airdrop platforms under arctic winter environmental conditions. Specific procedures and testing requirements will be determined by the characteristics and performance criteria of the test item.

6. PROCEDURES

6.1 PREPARATION FOR TEST

a. Prepare and submit the test plan in accordance with USATECOM directives. Insure that the test plan includes:

- 1) Only the overall objectives established in the test directive or those approved by higher headquarters.
- 2) Specific test criteria as contained in the Qualitative Materiel Requirements, (QMR), Small Development Requirements (SDR), Technical Characteristics (TC), or other appropriate requirements documents.

NOTE: When specific criteria are not provided elsewhere, additional criteria will be obtained from USACDC, from developers, or be developed by USAATC. All criteria will be clearly labeled as to source, to include specific paragraph citation when this information is available, and strictly adhered to or deviations fully explained.

b. When necessary to augment assigned personnel, arrange for TDY

MTP 7-4-009
8 May 1970

personnel who are representative of soldiers who will operate and maintain the test item(s) under field conditions. TDY personnel shall be trained to the degree that they are as proficient on individual tests and comparison items as the troops who will use these items.

c. Insure that all test personnel are familiar with required technical and operational characteristics of the test item under test, such as stipulated in QMR's, SDR's, and TC's.

d. When applicable, insure that all personnel receive new equipment training as referenced in paragraph 4H.

e. At the earliest possible date, select and schedule for the use of testing sites, facilities and equipment.

f. Upon arrival, review all instructional material issued with the test item(s) by the manufacturer, contractor, or government agencies, as well as reports of previous tests conducted on the test item and the same type of equipment and familiarize all test personnel with such documents.

g. Select test equipment ideally having an accuracy 10 times greater than that of the specified tolerances of the function(s) being measured.

h. Prepare record forms for systematic entry of data, chronology of tests, and analysis in final evaluation.

i. Prepare adequate safety precautions to provide safety for personnel and equipment. Insure that all safety SOP's are observed throughout the test. Insure that a safety release has been obtained prior to test conduct.

j. Outfit all personnel in appropriate arctic uniform as described in MTP 10-4-500.

k. Except for periods when indoor maintenance is required, store all test and comparison items in an unsheltered area where they are exposed to prevailing air temperatures and arctic winter conditions of ice, snow, and winds. Record:

- 1) Grade, MOS, background and training of all test personnel.
- 2) Nomenclature, serial number(s), and manufacturer's name of all test items.
- 3) Nomenclature, serial number(s), accuracy, tolerance, calibration requirements, and last date calibrated of testing equipment selected to conduct the test.
- 4) Date test items were packed.
- 5) Prevailing meteorological conditions during the storage phase as well as the test conduct.

6.2 TEST CONDUCT

6.2.1 Preoperational Inspection and Physical Characteristics

a. Upon receipt, carefully inspect all test items and their shipping and/or packaging containers for completeness, damage and general condition in accordance with applicable sections of MTP 10-4-500.

b. Perform a limited operational check in accordance with applicable instructional manuals.

c. Record the following data:

- 1) Any damage sustained during shipment and handling

- 2) Dimensions and weight of the test and comparison item
- 3) Identification photograph of the test and comparison item
- 4) Results of operational check
- 5) All discrepancies detected

6.2.2 Assembly

a. Assemble the test and comparisons in accordance with instructions in the appropriate technical manuals, and instructions contained in TM 10-1670-208-20.

b. Place the test item in a ready status for testing. Safety aspects of the operations shall be noted and the assembly operation shall be monitored continuously for human factors implications.

NOTE: Unless otherwise specified, each phase of the subtest shall be conducted in ambient temperatures as follows: 25 percent of test in 0°F to -25°F, 50 percent of test in -25°F to -50°F and 25 percent of test in -50°F to lowest temperature available.

c. Record the following data:

- 1) The average time required to assemble the test item.
- 2) The amount and type of tools required in assembly of the test item.
- 3) Each ambient air temperature and percent of subtest conducted at this temperature.
- 4) Photographs of all phases of the assembly.

6.2.3 Rigging and Loading Supplies

a. Select representative combinations of bulk supply and dummy loads.

b. Rig these loads as prescribed by instructions provided with the test items.

c. Load onto the appropriate aircraft.

NOTE: Unless otherwise specified, each phase of the subtest shall be conducted in ambient air temperatures as follows: 25 percent of test in 0°F to -25°F, 50 percent of test in -25°F to -50°F, and 25 percent of test in -50°F to lowest temperature available.

d. Record the following data:

- 1) Ease of rigging.
- 2) Compatibility with dual rail aerial unloading kits.
- 3) Compatibility with standard procedures and equipment (including extraction systems, roller and wheel conveyors), normally associated with the use of airdrop platforms.
- 4) Recommendation as to the adequacy of the assembly and rig-

MTP 7-4-009
8 May 1970

- ging instructions, including any suggested improvements.
- 5) Photographs of all phases of the rigging and loading procedures and rigged loads.
 - 6) Degree of flexibility of location of the load on the test items and of the test items in the aircraft.
 - 7) Each ambient air temperature and percent of subtest conducted at this temperature.

6.2.4 Aerial Delivery

- a. With the test items rigged with dummy and representative loads, transport the test item to an appropriate drop zone area.
- b. Airdrop the test items with their loads at air speeds as prescribed by instructions provided with the test items.

NOTE: Unless otherwise specified, each phase of the subtest shall be conducted in ambient air temperatures as follows: 25 percent of test in 0°F to -25°F, 50 percent of test in -25°F to -50°F, and 25 percent of test in -50°F to lowest temperature specified in criteria or available.

- c. Record the following data:
 - 1) Type aircraft, speed and altitude.
 - 2) Composition, dimensions, weights and photographs will be recorded.
 - 3) Compatibility with standard extraction devices and procedures.
 - 4) Air-to-air and ground-to-ground photographs.
 - 5) Suitability for use with combination and bulk supply loads.
 - 6) Each ambient air temperature and percent of subtest conducted at this temperature.
 - 7) Wind velocity.
 - 8) Complete airdrop data charts.

6.2.5 Durability and Reusability

- a. Conduct this subtest concurrently with the rigging and loading, and aerial delivery subtests.

NOTE: The test and comparison items shall be stored and air dropped under arctic environmental conditions in accordance with the plan of test and inspected regularly for signs of deterioration or unserviceability. Unless otherwise specified, each phase of the subtest shall be conducted in ambient air temperatures as follows: 25 percent of test in 0°F to -25°F, 50 percent of test in 0°F to -50°F, and 25 percent of test in -50°F to lowest temperature available.

- b. Record the following data:

- 1) Number of drops made by each component of the test item and the weight they supported.
- 2) Degree of interchangeability of components.
- 3) Requirements for special training and/or tools.
- 4) Damage sustained during airdrop.
- 5) Each ambient air temperature and percent of subtest conducted at this temperature.
- 6) Condition of test and comparison items stored under field conditions.
- 7) Each of assembly and disassembly and amount of time for each task.
- 8) Photographs will be made to substantiate recorded data when necessary.

6.2.6 Human Factors Evaluation and Safety

- a. Conduct all Human Factors Evaluation and Safety tests in accordance with the applicable sections of MTP 10-4-500.
- b. Conduct these tests concurrently with the operational tests described in this MTP.

6.2.7 Maintenance Evaluation

- a. Conduct all maintenance evaluation tests (maintenance and reliability) in accordance with applicable sections of MTP 10-4-500.
- b. Conduct these tests concurrently with the operational tests as described in this MTP.

6.3 TEST DATA

All test data to be recorded will be as specified in the individual subtests of this MTP.

6.4 DATA REDUCTION AND PRESENTATION

Processing of raw test data shall, in general, consist of organizing, marking for identification and correlation, and grouping the test data according to test title.

Specific instructions for the reduction and presentation of individual test data are outlined in the succeeding paragraphs.

6.4.1 Preoperational Inspection and Physical Characteristics

Preoperational inspection and physical characteristics data will be reduced and presented in accordance with MTP 10-4-500.

6.4.2 Assembly

Test data shall be reviewed and compared with data obtained from previously accepted items of like nature and specifications to determine the

MTP 7-4-009
8 May 1970

the relative ease of assembly of the test item under arctic winter environmental conditions.

6.4.3 Rigging and Loading Supplies

Rigging and loading data shall be compared to data obtained from the comparison items and also against accepted military standard and specifications.

6.4.4 Aerial Delivery

The suitability of the item under test for airborne operations under arctic winter environmental conditions shall be determined by comparison with previously accepted items of like nature and specifications.

6.4.5 Durability and Reusability

Test data obtained from the airdrop and storage subtests shall be evaluated to determine the test items' salvage capability.

6.4.6 Human Factors Evaluation and Safety

Human Factors Evaluation and Safety data shall be reduced and presented in accordance with MTP 10-4-500.

6.4.7 Maintenance Evaluation

Maintenance data shall be reduced and presented in accordance with MTP 10-4-500.

MTP 7-4-009
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13. ABSTRACT This Environmental Test Procedure describes test methods and techniques for evaluating the performance and characteristics of Airdrop Platforms under Arctic Winter environmental conditions. Evaluation is related to criteria established by Qualitative Materiel Requirements (QMR), Small Development Requirements (SDR), Technical Characteristics (TC), and other design re- quirements or specifications.		

DD FORM 1 NOV 55 1473 (PAGE 1)
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MTP 7-4-009
8 May 1970

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