

AD-751 154

PREOPERATIONAL INSPECTION

**Army Test and Evaluation Command
Aberdeen Proving Ground, Maryland**

30 June 1972

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U. S. DEPARTMENT OF COMMERCE
5285 Port Royal Road, Springfield Va. 22151**

UNCLASSIFIED
Security Classification

AD-751154

DOCUMENT CONTROL DATA - R & D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY (Corporate author)

US Army Air Defense Board
Fort Bliss, Texas 79916

2a. REPORT SECURITY CLASSIFICATION

UNCLASSIFIED

2b. GROUP

3. REPORT TITLE

US Army Test and Evaluation Command
Common Engineering and Service Test Operations Procedure - Preoperational Inspection

4. DESCRIPTIVE NOTES (Type of report and inclusive dates)

Final

5. AUTHOR(S) (First name, middle initial, last name)

6. REPORT DATE

30 June 1972

7a. TOTAL NO. OF PAGES

17

7b. NO. OF REFS

16

8a. CONTRACT OR GRANT NO.

8b. PROJECT NO.

c.

d.

8c. ORIGINATOR'S REPORT NUMBER(S)

8d. OTHER REPORT NO(S) (Any other numbers that may be assigned this report)

10. DISTRIBUTION STATEMENT

Approved for public release; distribution unlimited.

11. SUPPLEMENTARY NOTES

NA

12. SPONSORING MILITARY ACTIVITY

US Army Test and Evaluation Command
Aberdeen Proving Ground, Maryland 21005

13. ABSTRACT

The document
Describes a method for evaluation of test item completeness, condition, and operability upon receipt for tests. ~~Identifies the facilities and equipment required.~~ Provides procedures for document, receiving, packaging, maintenance test package, item, inventory, safety, operational, and technical inspections: Applicable to all classes of materiel.

AD 751154 Supersedes:

AD 717 276 -

718 649 -

718 685 -

719 255 -

867 072 -

867 933 -

868 363 -

871 740 -

876 410 -

UNCLASSIFIED

Security Classification

14.

KEY WORDS

LINK A

LINK B

LINK C

ROLE

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ROLE

WT

ROLE

WT

Preoperational Inspection
Inspection (Pretest)
Rereipt Inspection
Preliminary Operation

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**U. S. ARMY TEST AND EVALUATION COMMAND
COMMON ENGINEERING AND SERVICE TEST OPERATIONS PROCEDURE**

AMSTE-RP-702-100

*Test Operations Procedure 1-3-505

30 June 1972

PREOPERATIONAL INSPECTION

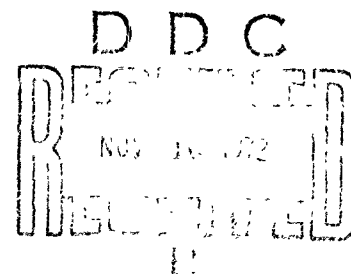
Section I.	GENERAL	Paragraph	Page
	Purpose and Scope	1	1
	Background	2	2
	Equipment and Facilities	3	2
II.	TECHNICAL PRESENTATION		
	Documents Inspection	1	3
	Receiving Inspection	5	3
	Packaging Inspection	4	4
	Maintenance Test Package (MTP)		
	and Item Inspection	4	4
	Inventory Inspection	8	5
	Technical Inspection	9	5
	Safety Inspection	10	5
	Operational-Technical Inspection	11	5
APPENDIX A.	REFERENCES		A-1
B.	AVIATION MATERIEL WEIGHTS AND MEASUREMENTS		B-1

**SECTION I
GENERAL**

1. Purpose and Scope. This TOP is to be used for preoperational inspection of all items to be tested by TECOM. The purpose of the Preoperational Inspection is to determine and record the completeness and receipt condition of the test item and maintenance test package (MTP), and to insure prior to testing that the equipment is operational. This TOP can be used for preoperational inspection in the arctic, tropic and temperate environments for Engineering and Expanded Service Tests.

*This TOP supersedes MTP 2-3-500(F), 1 Jul 69; 3-3-500(G), Aug 67; 4-3-500(G), 24 Sep 68; 5-3-500(D), 5 Feb 70; 6-3-501(C), 1 Apr 67, 7-3-500, 16 Sep 70; 8-3-500, 12 Nov 69; 9-3-508, 11 May 70; 10-3-500, 17 Apr 67, including all changes.

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AD 751154

Engineering and Expanded Service Testing is usually the last testing to be conducted on an item of equipment before recommendations relative to its suitability for Army use are made. In many cases, the same items received for Engineering or Expanded Service Test may have already been subjected to Engineer Design Test or climatic chamber tests, any one or all of which may cause wear and tear or degradation of performance. Such wear and tear or degraded performance must be detected prior to Engineering or Expanded Service Test to preclude ascribing such conditions to Engineering or Expanded Service Test use; otherwise, test results obtained will not be valid, and valuable test time in the field will have been wasted. Some items received for test, conversely, may have been subjected to little or no operation prior to receipt. In other cases, components may require interoperation. It is possible that one or more components received have never been actually operated together on a complete system basis. Under such circumstances, the preoperational inspection, which includes full operation, may reveal errors, faults, need for alignment or adjustment, and defective or missing parts. Additionally, such operation, if occurring within the "debugging" or "burn-in" period before a constant failure rate is reached, gives all marginal parts a chance to fail and other incipient failures a chance to occur prior to testing in the field, thereby reducing the probability of time-consuming interruptions in test execution. The results obtained from the Preoperational Inspection establish the basis for determining whether the test item is, in fact, in condition suitable for Engineering or Expanded Service Test.

- a. Material handling equipment.
- b. Tools for uncrating and unpacking.
- c. Photographic equipment.
- d. Open and/or covered inspection areas.
- e. Form on which to record the required data; i.e., DA Form 2404.
- f. Appropriate tools required to inspect and check out the test item.

g. All required general and special purpose test and measuring equipment as specified in the technical manuals (when available) and the maintenance support plan (when available) for use in adjustment, alignment, and maintenance of the test item (excluding depot level).

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30 June 1972

1-3-505

- h. Safety statement or release.
- i. Safety equipment as required by test directive.

SECTION II TECHNICAL PRESENTATION

4. Documents Inspection.

a. Record the following information from the shipping documents for each test item received:

- (1) Nomenclature.
- (2) Manufacturer (use code as required).
- (3) Model number.
- (4) Serial number.
- (5) Federal stock number.

b. The markings on the package, container or crate will be checked against the shipping document for correctness and results will be recorded.

c. The data plate on the test item will be checked against the shipping document for correctness and the results recorded.

d. Data in paragraph 4a for the major components will be recorded, if applicable.

e. Record the date the test item arrived.

f. Record the mode of transportation to include carrier and Government bill of lading number as required.

g. Record the mileage, rounds, hot starts, hours or other appropriate measures of test item usage.

5. Receiving Inspection.

a. Record the general condition of all boxes, crates and containers. (Take photos of any damaged containers.)

b. Inspect the test item and MTP in the shipping configuration for any visible damage before uncrating or unpacking and record the results. (Take photos of any damaged containers.)

c. Photograph the test item and MTP in the shipping configuration.

d. Prior to uncrating or unpacking, weigh and measure the test item and MTP in the shipping configuration.

6. Packing Inspection. (Record results.) (AR 700-15 and MIL-P-14232)

a. Uncrate and unpack the test item and the MTP. Record and photograph any observed damage.

b. Inspect the crating and packing of the test item and the MTP for damage.

c. Determine the adequacy of the internal packing material for protection of the equipment.

d. Inspect reuseable containers for adequacy of protection.

e. Determine if the crating is adequate to protect the test item and MTP.

f. Record any difficulties encountered when uncrating the test item and MTP, and note the adequacy of instructions and tools required.

7. Test item and MTP Inspection. (Record results.)

a. Inspect the following items of the MTP for damage and/or calibration.

(1) Tools.

(2) Test equipment.

(3) Technical literature.

(4) Repair parts.

(5) Support and ground handling equipment.

(6) Shop facilities.

b. Inspect the test item for damage and/or calibration.

8. Inventory Inspection. (Record results).

- a. Inventory the test item and the MTP against the packing list.
- b. Inventory the test item and the MTP against the list provided by the project/commodity manager.
- c. Inventory the tools and test equipment against the correct supply catalog (if available).
- d. Inventory the repair parts against the repair parts technical literature (if available).
- e. Report shortages per TECOM Reg 70-23.

9. Technical Inspection.

- a. Inspect the test item, using the operator and organizational technical manual when available. When technical manuals are not available, this inspection should be conducted using the best source data available to include the experience of the project officer. Record the results of this inspection.
- b. Inspect items in the MTP, using the technical manual and record the results. When technical manuals are not available, use the best source available to include project officer's experience.
- c. Photograph the test item and the MTP.

10 Safety Inspection. (Reocrd results).

- a. Inspect the test item and items of the MTP for safety hazards without power applied.
- b. Photograph any safety hazards.
- c. Insure that the TECOM approved safety statement or release is available at the test site and that all personnel are aware of safety limitations.
- d. Inspect the test item and test equipment for safety hazards during operation and record the results.

11. Operational-Technical Inspection. A technical inspection must be performed prior to initiation of a test to ascertain the operational status of the item under test. This inspection will establish a baseline upon which performance or malfunction during the test can be measured. Technical manuals for items which are similar to the test item or technical manuals which accompany the test item will provide more comprehensive assistance to the project officer in conducting an operational-technical inspection on a specific item under test. Checks listed below are furnish-

30 June 1972

ed as a guide for the project officer to determine the scope of the operational-technical inspection. These checks are oriented toward electronic equipment, and are not intended to be all inclusive. In addition, appendix B addresses aviation materiel weight and measures which would be a part of this inspection if the test item were on an avionic item. Technical manuals for items which are similar to the test item or technical manuals which accompany the test item will provide more comprehensive assistance to the project officer in conducting an operational-technical inspection on a specific item under test. Appendix B addresses aviation material weights and measures.

a. Preparation for Operation.

(1) Examine all cables and associated connectors for visible damage and test for correct wiring, open circuits and short circuits through use of electrical continuity techniques.

(2) Examine internal parts of all components for any existing damage and insure that all plug-in items are properly inserted and secured.

(3) Assemble all components and install cables as specified in the technical manuals (when available).

(4) Examine all fuses for electrical continuity and correct current rating.

(5) Set all circuit breakers and examine interlock devices. Assure that electrical continuity exists in all such items.

(6) Set all switches and other controls and accomplish all adjustments (as specified in the technical manuals when available) in preparation for operation.

(7) Inspect all cooling air vents and any associated filters. Clean the filters or install new ones as required and specified, and assure that all air vents and passageways are open and not obstructed.

(8) Insure that all fan motors rotate freely and that these and all other parts requiring lubrication are lubricated properly.

(9) Check the power source(s) to be used. If an engine generator is involved, insure that proper levels of lubricating oil, cooling liquid (if any) and fuel exist. Where primary cell batteries are used, their condition must be determined to be satisfactory by use of testing equipment that imposes the proper electrical load. Where secondary cell batteries are involved, a fully charged condition must be assured. Make appropriate checks to insure proper operation of such power sources as fuel cells or thermal cells.

(10) Note and record any missing components and accessories.

(11) Insure that equipment is properly grounded when required.

b. Application of Power.

(1) Apply power to the test item, insure that all fan motors rotate in the correct direction and check for any unusual conditions (e.g., smoke, excessive noise and vibration, electrical arcing, flame). If any of the above-mentioned conditions exist, deenergize immediately, record condition; determine cause of condition, correct cause of condition and repair as applicable.

(2) Note all readings of integral meters and other indicating devices. Make the adjustments necessary for proper meter readings as specified in the technical manuals (when available).

(3) Through use of specified test and measuring equipment, conduct a thorough check of voltage, current, frequency, phase, signal level and waveform at the various test points as specified in the technical manuals (when available).

(4) Note and record all instances where, although specified adjustments are made, the proper electrical quantities or other responses are not obtained.

c. Operational Functions.

(1) All knobs and other controls intended for use by the test item operator(s) will be operated throughout their ranges and associated responses will be noted. All incorrect responses and improper functioning will be noted and recorded.

(2) All accessory items will be used and checked for proper operation.

(3) All equipment that can be will be calibrated.

Recommended changes to this publication should be forwarded to Commanding General, US Army Test and Evaluation Command, ATTN: AMSTE-ME, Aberdeen Proving Ground, Maryland 21005. Technical information related to this publication may be obtained from the preparing activity, US Army Air Defense Board, ATTN: STEBD-MO, Fort Bliss, Texas 79916. Additional copies of this document are available from the Defense Documentation Center, Cameron Station, Alexandria, Virginia 22314. This document is identified by the accession number (AD No.) printed on the first page.

APPENDIX A
REFERENCES

1. AR 70-10, "Test and Evaluation During Development and Acquisition of Materiel."
2. AR 70-39, "Criteria for Air Transport and Airdrop of Materiel."
3. AR 385-10, "Army Safety Program."
4. AR 700-15, "Preservation, Packaging, Packing and Marking of Items of Supply."
5. AR 705-5, "Army Research and Development."
6. AR 705-35, "Criteria for Air Portability and Air Drop of Materiel."
7. AR 705-50, "Army Materiel Maintainability and Reliability."
8. AMC Reg 385-12, "Verification of Safety of Army Materiel."
9. AMC Reg 385-224, "AMC Safety Manual."
10. TECOM Reg 70-23, "Equipment Performance Reports."
11. TECOM Reg 70-24, "R&D Documenting Test Plans and Reports."
12. TECOM Reg 70-33, "Research and Development, TECOM Test Cost Estimates."
13. TECOM Reg 385-6, "Verification of Safety of Materiel During Testing."
14. TECOM Reg 705-25, "Reliability Program for Materiel and Equipment."
15. TECOM Reg 705-26, "Maintainability Program for Materiel and Equipment."
16. MIL-P-14232, "Part Equipment and Tools for Army Materiel."

APPENDIX B
AVIATION MATERIEL WEIGHTS AND MEASUREMENTS

1. Fixed-Wing Aircraft Exterior Measurements. Obtain the measurements indicated below with the aircraft's flight controls centered or positioned as recommended by the operator's manual. For maximum height and minimum ground clearance dimensions, measure alternately with the aircraft configured for ferry and combat, with applicable minimum and maximum gross takeoff weights for each configuration. Tires should be inflated to recommended pressures. Situate the aircraft on a smooth, level surface and obtain the following measurements under the conditions described above:

- a. Wingspan.
- b. Overall length.
- c. Maximum fuselage width.
- d. Height to top of cabin (ferry and combat configurations).
- e. Height to highest point of the rudder structure (ferry and combat configuration gross takeoff weights).
- f. Height to propeller tip when placed in a vertical position (ferry and combat configuration gross takeoff weights).
- g. Propeller swept circle diameter.
- h. Ground clearances (ferry and combat configuration gross takeoff weights).
 - (1) Propeller.
 - (2) Wingtip.
 - (3) Horizontal stabilizer tip.
- i. Minimum turning radii.
 - (1) Wingtip.
 - (2) Horizontal stabilizer tip.
 - (3) Propeller tip (placed in a horizontal position).
- j. Wheelbase and tread width.

2. Rotary-Wing Aircraft Exterior Measurements.

a. Obtain the measurements indicated below with the aircraft's cyclic stick, directional pedals, and other controls in the positions recommended by the operator's manual (usually neutral) and in other positions which will result in minimum ground clearance dimensions and the maximum overall length-width-turning radii dimensions.

b. Configure the aircraft alternately for ferry and combat with minimum and maximum gross takeoff weights applicable for each configuration.

c. Inflate tires, as applicable, to the operating pressures recommended by the maintenance manual for each operational configuration.

d. Situate the aircraft on a smooth, level surface and obtain the following measurements under the conditions described above:

(1) Length.

(a) Overall static length with flight controls neutralized and in positions to yield the maximum length (ferry and combat configurations with the rotor(s) static).

(b) Overall dynamic length with flight controls neutralized and in safe positions to yield the maximum length (ferry and combat configurations with the rotor(s) turning).

(2) Width.

(a) Overall static width with flight controls neutralized and in positions to yield the maximum width with the rotor(s) static.

(b) Overall dynamic width with flight controls neutralized and in safe positions to yield the maximum.

(3) Height (ferry and combat configurations gross takeoff weights).

(a) Maximum height of aircraft's fuselage.

(b) Height of entrance(s).

(c) Fuselage (at minimum clearance point).

- (d) Armament subsystem launchers.
 - (e) Antennas or probes.
 - (4) Turning radii.
 - (a) Main rotor or forward rotor blade tip, as applicable.
 - (b) Tail rotor or aft rotor blade tip, as applicable.
 - (c) Fuselage (circle diameter).
 - (d) Armament subsystem weapon-launcher support station(s).
 - (5) Swept circle diameters.
 - (a) Main rotor or forward rotor, as applicable.
 - (b) Tail or aft rotor, as applicable.
 - (6) Wheelbase, tread width, or skid-type landing gear dimensions.
3. Interior Measurements. Obtain the following aircraft measurements.
- a. Compartment and access door(s) dimensions.
 - b. Cockpit and passenger cabin dimensions.
 - c. Floor plan indicating cargo tiedown locations, dimensions, and strength of each tiedown.
 - d. Avionics compartment dimensions.
 - e. Ammunition compartment dimensions.
 - f. Baggage compartment dimensions.
4. Aircraft Weight and Center of Gravity (c.g.). Weight the aircraft in accordance with the procedures of TM 55-405-9 and Materiel Test Procedures 7-3-518. Determine the following as appropriate.
- a. Empty weight and c.g.

- b. Basic weight and c.g. for ferry and/or combat.
- c. Operating weight.
- d. Gross takeoff weight for ferry and/or combat.

Photograph to the extent necessary to illustrate adequately measurements taken and to document specific features of the aircraft.

5. Aircraft Subsystems and Allied Equipment. Determine subsystem physical characteristics by performing the following:

- a. Weigh each major component. Where the subsystem contains expendable components (flares or ammunition), weigh with and without the expendable items.
- b. Measure the principal dimensions of each major component.
- c. Measure, if applicable, the volume of irregular and complex shaped components of the subsystem by the displacement method (immersion-proof items) or for nonimmersion-proof items by computing the volume of the smallest container which will hold the component.

6. Ancillary Equipment (Avionics).

- a. Measure the length, height, and width of each unit. Indicate maximum dimensions where peripheral objects extend beyond the envelope of major dimensions; e.g., switch handles, knobs and chassis locking fasteners.
- b. Weigh each unit including attachments such as knobs, dials, switches, and plug mounts. Exclude associated cables and connectors.
- c. Determine any other physical characteristics specified by the MN document.

7. Ground Support Equipment.

- a. Vehicles and Carts.

(1) Determine the following exterior measurements:

- (a) Maximum length.
- (b) Maximum width.

- (c) Height (tires inflated to recommended pressure).
 - (d) Wheelbase.
 - (e) Tread width.
 - (f) Control, storage, and maintenance access door(s) dimensions.
 - (g) Minimum ground clearance (level surface).
 - (h) Cable, hose, maximum length and diameter.
 - (i) Tow bar length and type, as applicable.
 - (j) Pintle height, if applicable.
- (2) Determine the following interior measurements.
- (a) Storage compartment dimensions.
 - (b) Cargo compartment dimensions.
 - (c) Equipment, engine, generator, compartment dimensions.
 - (d) Fuel, oil, storage tank, bin, capacity or volume.
- (3) Weigh the equipment under the conditions which will yield the following types of information:
- (a) Empty weight (ready for storage).
 - (b) Fueled weight, as applicable.
 - (c) Maximum gross weight (combat or mission task configuration).
 - (d) Equipment c.g. under above conditions.
- b. Test Sets. Determine the physical characteristics by performing the following:
- (1) Measure principal dimensions of the equipment prepared for service and configured for storage.

30 June 1972

(2) Weigh the equipment prepared for service and configured for storage.

8. Personnel Equipment.

a. Clothing (Protective and Flight).

(1) Perform the following measurements and record the results:

(a) Breast. Measure across the breast area of the clothing, from side seam to side seam, at the bottom of the armholes.

(b) Sleeve length. Measure along the sleeve inseam, from the base of the armhole to the bottom of the sleeve cuff.

(c) Leg inseam length. Measure along the trouser inseam, from the center of the crotch to the bottom of the leg.

(d) Waist. Measure along the belt line.

(2) Match the clothing fabric/material with a sample of the QMR, SDR, or TC specified fabric shade under artificial daylight having a color temperature of 7,500 degrees Kelvin. Record whether the desired color match was achieved.

(3) Identify clothing stitches and seam types by classification in accordance with the MN documents or FED-STD-751, as appropriate.

b. Helmets (Aviation).

(1) Measure the following:

(a) Helmet dimensions (diameter, outer and inner).

(b) Helmet chin strap (maximum and minimum length).

(c) Communications cable length and type of connector(s).

(d) Visor dimensions.

(2) Determine by trial fittings on various standard size headforms the range of head sizes, ideally from the 5th to the 95th percentile, that the helmet will accommodate (sizing adjustments will be made as required)

(3) Record visor lens type; e.g., clear, neutral gray or gold coated.

30 June 1972

1-3-505

(4) Weigh the helmet with and without communications accessories.

9. Ammunition.

a. Photograph representative ammunition items from the received lots.

b. Measure, weigh, and record the data listed below for representative ammunition items of each lot:

(1) Length.

(2) Diameter (minimum and maximum).

(3) Weight.

c. Composition of projectile/payload, as appropriate.

10. Accuracy of Measurement and Weight.

a. For equipment or components possessing approximate dimensions listed below, use a tool with the minimum accuracy indicated.

(1) Up to four inches, measurements will be to the nearest $\frac{1}{8}$ inch, using a steel rule with at least $\frac{1}{16}$ -inch divisions.

(2) From four inches to three feet, measurements will be to the nearest $\frac{1}{4}$ inch.

(3) Above three feet, measurements will be to the nearest inch or tenth of a foot.

b. For equipment or components possessing approximate weights listed below, use a scale with the minimum accuracy indicated.

(1) Below five pounds, weight will be to the nearest ounce (scale divisions $\frac{1}{4}$ ounce).

(2) From five pounds to thirty pounds, weight will be to the nearest $\frac{1}{4}$ pound.

(3) From thirty pounds to 1,000 pounds, weight will be to the nearest pound.