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AD NUMBER
AD871127
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AUTHORITY
USATEC ltr, 14 Dec 1970

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AD No. _____

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27 April 1970

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Matériel Test Procedure 2-3-528
U. S. Army Armor and Engineer Board

U. S. ARMY TEST AND EVALUATION COMMAND
COMMON SERVICE TEST PROCEDURE

MAINTENANCE EVALUATION-TECHNICAL MANUSCRIPTS AND MANUALS

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1. OBJECTIVE

The objective of this Materiel Test Procedure (MTP) is to describe methods for determining the adequacy of equipment publications for use by the operator/crew or personnel of the various maintenance levels.

2. BACKGROUND

As the complexity of military equipment increases there is a correspondingly increasing need for equipment publications that contain clear, concise, accurate, and uniform instructions for both the operator/crew and maintenance personnel. Equipment publications are defined in reference 4A as those publications dealing with the installation, operation, maintenance and repair parts support of Army materiel. Technical manuals, technical bulletins, lubrication orders and modification work orders are the Department of the Army publication media to provide these essential instructions for the major items of equipment. The format for preparation of these publications and procedures for coordinating and obtaining approval are also in reference 4A. The conditions under which manufacturers' publications may be used as maintenance manuals for off-the-shelf commercial items are also delineated in this reference. Equipment publications in draft form are normally referred to as preliminary draft manuals and draft technical manuals. Reference 4C stipulates that draft technical manuals will be furnished to the service test activity prior to or concurrent with issue of the service test item. Service testing should determine whether assigned maintenance functions can be readily accomplished using the equipment publications, tools, test equipment, and repair parts provided, and skills authorized. All of these materials are included in the maintenance test package. Reference 4A also contains the format for equipment serviceability criteria (ESC) technical manuals which are to be prepared by the agency responsible for preparation of the maintenance support plan (see reference 4C) for each mission-essential-maintenance-significant item.

3. REQUIRED EQUIPMENT

- a. Test item(s) with maintenance test package.
- b. On equipment materiel (OEM), table of organization and equipment (TOE), and table of allowance (TA) equipment for the test item(s) or other authorized equipment.
- c. All general and specific purpose tools and equipment, tool kits, and other ancillary items for use in performing maintenance on the test item up to and including general support maintenance level as specified in the technical manuals and maintenance support plan.
- d. Equipment serviceability criteria, when appropriate

4. REFERENCES

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POST	WHITE SECTION	<input type="checkbox"/>
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UNFINISHED		<input type="checkbox"/>
REVISION		
GENERAL/AVAILABILITY CODES		
QTY.	AVAIL.	NO. OF SPECIAL
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- A. AR 310-3, Preparation, Coordination and Approval of Department of the Army Publications.
- B. AR 750-1, Maintenance Concepts.
- C. AR 750-6, Maintenance Support Planning.
- D. USATECOM Regulation 385-6, Verification of Safety of Materiel During Testing.
- E. USATECOM Regulation 750-15, Maintenance Evaluation During Testing.
- F. AMCR 750-15, Integrated Logistics Support.
- G. AR 750-57, Materiel Readiness Equipment Serviceability Criteria.
- H. MIL-M-7298B, Manuals, Technical: Commercial Equipment.
- I. MIL-M-38730, Manuals, Technical: General Requirements for Preparation of.
- J. MIL-M-63000, (TM) (Series) - Manuals, Technical.
- K. MTP 2-3-502, Maintainability.
- L. MTP 2-3-507, Reliability.
- M. MTP 2-3-527, Maintenance Evaluation - Tools and Test Equipment.

SCOPE

5.1 SUMMARY

This MTP contains guidelines for determining the adequacy of equipment publications from the operator/crew through the general support level, special training requirement, and the equipment serviceability criteria.

5.2 LIMITATIONS

None

6. PROCEDURES

6.1 PREPARATION FOR TEST

Necessary action should be taken to ensure that:

- a. Nomenclature model and serial number of the test item is recorded.
- b. A Safety Release in accordance with reference 4C has been received from HQ, USATECOM and is understood before starting the test and restrictions or limitations if any, placed upon the operational use or maintenance of the test item recorded.
- c. The maintenance test package is on hand and has been inspected and inventoried, and detailed lists made of each category of materials received, including the equipment publications and maintenance allocation chart (MAC) and authorized equipment or manufacturer's publications by title and number, including the equipment serviceability criteria.
- d. The technical publications and/or manufacturer's publications are reviewed for general format, accuracy, and adequacy, and discrepancies recorded.
- e. The operator/crew is trained in the operation and maintenance of the test item in accordance with pertinent equipment publications and familiarized with the objective of this test and how test data are to be obtained and reported.

f. Organizational personnel through general support maintenance level repairmen and supervisors are trained in the maintenance of the test item at their respective levels and familiarized with the objective of this test and how data are to be obtained and recorded.

g. All test personnel are familiar with that portion of reference 4E which outlines the maintenance evaluation of the service test.

h. Proper forms are available for recording data.

i. Name, rank or grade, military occupational specialty (MOS) or job description of personnel who received new equipment (factory) training on the test item are recorded along with a description of the training.

6.2 TEST CONDUCT

NOTE: Equipment publications, especially those in draft form are referred to by several different names. Since this procedure is primarily concerned with draft technical manuals which have both titles and numbers and since there are eight different numbered technical manuals applicable to the operator, a listing of all technical manuals, with an explanation of circumstances under which each is to be used is contained in Appendix A.

Evaluate equipment publications to the extent practicable, concurrently with the other phases of the overall maintenance evaluation outlined in MTP 2-3-502 (reference 4K), MTP 2-3-507 (reference 4L), and MTP 2-3-527 (reference 4M) during operational testing. Prepare a list of publications on a suitable chart such as the sample in Appendix B, for the accumulation of data as the test progresses.

6.2.1 Operator/Crew Publications

a. Operate the test item and perform all preventive maintenance services, lubricating, troubleshooting, and corrective maintenance, including replacement of parts by the operator/crew ("C") in accordance with instructions contained in the pertinent equipment publication.

b. Evaluate all instructions, tables, photographs, during the performance of these tasks on the basis of operator/crew, supervisory personnel and specially trained evaluators (when available) observations for clarity, accuracy, completeness, conciseness, and proper sequence.

c. Check all tasks listed in the "C" column of the appropriate maintenance allocation chart (MAC) against instructions for performing the tasks to determine whether they are within the skills of the "C" and to ensure compatibility of nomenclature and completeness of instructions.

d. Compare those tasks in the "C" column of the MAC, where parts replacement are authorized, with the appropriate parts manual to ensure that the repair part is authorized and that the nomenclature is similar.

e. Review and evaluate all parts of the "C" equipment publications not evaluated during the above operations to ensure that the format and contents of the entire publication meet required standards.

f. Record the following:

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- 1) Instructional material including photographs, drawings, charts, etc., which were not accurate, simple and understandable, complete, concise, or in proper sequence, and the corrective action deemed necessary.
- 2) Instructions, if any, that should have been furnished but were not.
- 3) Incompatibilities, if any, between nomenclature used in the instructions, MAC, and repair parts and special tool list.
- 4) Tasks, if any, which were beyond the skills of the "C".
- 5) Discrepancies in equipment publications, parts, tools, and equipment furnished.
- 6) Significant items, parts or components which were not included in the ESC.
- 7) Any inconsistencies in nomenclature used in the ESC and the equipment publications.
- 8) Capability of the operator/crew to perform the ESC evaluation using the prescribed equipment.

6.2.2 Organizational Maintenance Publications

- a. Evaluate equipment publications, including the lubrication order as it pertains to the organizational level of maintenance to the extent practicable while performing organizational maintenance during operational testing.
- b. Subject all instructions, troubleshooting procedures, photographs, drawings, circuit diagrams, etc., to an evaluation by repairmen, supervisory personnel and specially trained evaluators for accuracy, clarity, completeness, conciseness and proper sequence.
- c. Accomplish the tasks listed in the MAC, troubleshooting, etc., that were not done during operational testing and evaluate the related instructional material upon completion of these tasks.
- d. Cross check the tasks listed in the MAC against instructional material and repair parts list to ensure that each task is assigned to the proper level that the nomenclature is compatible, and that all required repair parts are authorized.

NOTE: Procedures for evaluation of tools and test equipment are covered in MTP 2-3-527, reference 4M.

- e. Review and evaluate all parts of the pertinent equipment publications not evaluated during the above operations to ensure that the format and contents of the entire publication meets required standards.
- f. Record the following:

- 1) Instructional material including photographs, drawings, charts, etc., which were not accurate, simple and understandable, complete, concise, or in proper sequence, and the suggested corrective action deemed necessary.
- 2) Instructions, if any, that should have been furnished but were not.
- 3) Incompatibilities, if any, between nomenclature used in the

- instructions, MAC, and repair parts and special tools list.
- 4) Tasks, if any, which were beyond the skills and/or tools authorized and should be reassigned to a higher level.
 - 5) Tasks, if any, assigned to a higher level than should be re-assigned to this level.
 - 6) Tasks allocated for which there were no instructions furnished.
 - 7) Difficulties, if any, encountered with troubleshooting instructions and/or charts.
 - 8) Difficulties, if any, encountered with schematic wiring circuit or hydraulic system diagrams.
 - 9) Discrepancies, if any, noted in those portions of the technical publications not directly related to maintenance, e.g., indexes and introduction chapter.
 - 10) Repair parts, if any, which should be added to or deleted from the repair parts special tool list.
 - 11) List of all special tools, if any, needed to maintain this equipment.

6.2.3 Direct and General Support Maintenance Publications

a. Evaluate equipment publications received for these levels of maintenance to the extent that maintenance is actually performed, and, in addition, simulate maintenance task listed on the MAC chart, troubleshooting procedures, etc., to the extent necessary to determine that the equipment publications are satisfactory for the direct and general support maintenance level.

b. Subject publications to the evaluation procedures described in paragraph 6.2.2.

6.2.4 Special Training Requirements

Determine the adequacy and/or need of established special training requirements, if any, by observing maintenance operations throughout service testing and in connection with the concurrent evaluation of equipment publications. Record the following as applicable:

- a. List of established special training requirements, if any.
- b. Established special training requirements, if any, which were not met.
- c. Difficulties encountered, if any, due to a lack of special training.

6.2.5 Equipment Serviceability Criteria

a. Evaluate the equipment serviceability criteria for completeness and adequacy, at appropriate periods during testing, by the operator/crew using only the equipment which will be available to the operator/crew. Assistance required from organizational or higher maintenance level personnel (including tools and equipment) will render the ESC as unsatisfactory.

NOTE: Equipment serviceability criteria will be prepared by the

agency responsible for the preparation of the maintenance support plan for each mission-essential-maintenance significant items. Test and measurements prescribed for each mission-essential-maintenance significant item of equipment will be performed to evaluate its capability to satisfactorily perform its primary mission for a period of 90 days with normal maintenance support. Equipment serviceability criteria must assure the rapid categorization of equipment into one of the following three categories of combat serviceability:

- 1) Green - Equipment free of condition that would limit the reliable performance of its primary mission for a period of 90 days of operation.
- 2) Amber - Operationally ready equipment that possesses a limiting factor(s) which may curtail a reliable performance of its primary mission for a period of 90 days of operation.
- 3) Red - Equipment unable to perform its primary mission immediately or possessing an unacceptable reliability for sustained performance (90 days) of its primary mission.

b. Record any inadequacies or incompleteness in the ESC.

6.2.6 Safety

Evaluate the adequacy and completeness of the safety related content of equipment publications as follows:

- a. Have the test item crew and personnel at all levels of maintenance observe and list all actual and potential hazards encountered in operating the test item and related equipment or in servicing and maintaining the material.
- b. Compare each item on the list of actual and potential hazards with cautions and warnings contained in the maintenance publication and with warning plates installed on the test item.
- c. Record the description of each actual or potential safety hazard encountered, if any, not covered by adequate data plates, caution, or warning in the equipment publications.

6.3 TEST DATA

6.3.1 Preparation for Test

Record the following:

- a. Nomenclature, model and serial number of test item.
- b. Restrictions or limitations, if any, placed upon operational use or maintenance of the test item by the Safety Release.
- c. Authorized equipment or manufacturer's publications by title and number.
- d. Received equipment, publications and MAC chart.

- e. Discrepancies in equipment publications received (format, adequacy, accuracy).
- f. For all test personnel receiving new equipment (factory) training:
 - 1) Name, rank or grade
 - 2) MOS or job description
 - 3) Extent of training

6.3.2 Test Conduct

6.3.2.1 Operator/Crew Publications

Record the following:

- a. Instructional material including photographs, drawings, charts, etc., which were not accurate, simple and understandable, complete, concise, or in proper sequence, and the corrective action deemed necessary.
- b. Instructions, if any, that should have been furnished but were not.
- c. Incompatibilities, if any, between nomenclature used in the instructions, MAC, repair parts list and special tool list.
- d. Tasks, if any, which were beyond the skills of the operator/crew.
- e. Discrepancies in equipment publications, parts, tools, and equipment furnished.
- f. Significant items, parts or components which were not included in the ESC.
- g. Any inconsistencies in nomenclature used in the ESC and the equipment publications.
- h. Capability of the operator/crew to perform the ESC evaluation using the prescribed equipment.

6.3.2.2 Organizational Maintenance Publications

Record the following:

- a. Instructional material including photographs, drawings, charts, etc., which were not accurate, simple and understandable, complete, concise, or in proper sequence and the suggested corrective action deemed necessary.
- b. Instructions, if any, that should have been furnished but were not.
- c. Incompatibilities, if any, between nomenclature used in the instructions, MAC, and repair parts list and special tool list.
- d. Tasks, if any, which were beyond the skills and/or tools authorized and should be reassigned to a higher level.
- e. Tasks, if any, assigned to a higher level that should be reassigned to this level.
- f. Tasks allocated for which there were no instructions furnished.
- g. Difficulties, if any, encountered with troubleshooting instructions and/or charts.
- h. Difficulties, if any, encountered with schematic wiring circuit or hydraulic system diagrams.

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- i. Discrepancies, if any, noted in those portions of the technical publications not directly related to maintenance, e.g., indexes and introduction chapter.
- j. Repair parts, if any, which should be added to or deleted from the repair parts and special tool lists.
- k. List of all special tools, if any, needed to maintain this equipment.

6.3.2.3 Direct and General Support Maintenance Publications

Record the data as indicated in paragraph 6.3.2.2.

6.3.2.4 Special Training Requirements

Record the following as applicable:

- a. List of established special training requirement, if any.
- b. Established special training requirements, if any, which were not met.
- c. Difficulties encountered, if any, due to a lack of special training.

6.3.2.5 Equipment Serviceability Criteria

Record inadequacies or incompleteness of the ESC

6.3.2.6 Safety

Record the description of each actual or potential safety hazard encountered, not covered by adequate data plates, caution, or warning in the equipment publications.

6.4 DATA REDUCTION AND PRESENTATION

All data obtained by inspection, observations, questionnaires, and testing in this MTP will be suitably tabulated or otherwise arranged for correlation under appropriate subtest within the report of Commodity Service test and presented in a manner to indicate whether the test item meets the QMR or other applicable criteria.

APPENDIX A

LIST OF TECHNICAL MANUALS
(Extracted from AR 310-3)

The following titles, descriptive of the content and organizational level of use, will be used in conjunction with the nomenclature of the equipment covered:

- 10 - Operator's Manual
- 12 - Operator's and Organizational Maintenance Manual
- 13 - Operator's, Organizational, and DS Maintenance Manual
- ¹14 - Operator's, Organizational, DS, GS, and Depot Maintenance Manual
- ¹15 - Operator's, Organizational, DS, GS, and Depot Maintenance Manual
- 20 - Organizational Maintenance Manual
- 23 - Organizational and DS Maintenance Manual
- ¹24 - Organizational, DS, and GS Maintenance Manual
- ¹25 - Organizational, DS, GS, and Depot Maintenance Manual
- 30 - DS Maintenance Manual
- ³34 - DS and GS Maintenance Manual
- ¹35 - DS, GS, and Depot Maintenance Manual
- ⁴40 - GS Maintenance Manual
- ¹45 - GS and Depot Maintenance Manual
- ⁵50 - Depot Maintenance Manual
- ²12P - Operator's and Organizational Maintenance Repair Parts and Special Tool Lists
- ³14P - Operator's, Organizational, DS, and GS Maintenance Repair Parts and Special Tool Lists
- ⁴15P - Operator's, Organizational, DS, GS, and Depot Maintenance Repair Parts and Special Tool Lists
- 20P - Organizational Maintenance Repair Parts and Special Tool Lists
- 23P - Organizational and DS Maintenance Repair Parts and Special Tools Lists
- 24P - Organizational, DS, and GS Maintenance Repair Parts and Special Tools Lists
- ⁴25P - Organizational, DS, GS, and Depot Maintenance Repair Parts and Special Tools Lists
- 30P - DS Maintenance Repair Parts and Special Tools Lists
- 34P - DS and GS Maintenance Repair Parts and Special Tools Lists
- 35P - DS, GS, and Depot Maintenance Repair Parts and Special Tools Lists
- ⁴40P - GS Maintenance Repair Parts and Special Tools Lists
- ⁴45P - GS and Depot Maintenance Repair Parts and Special Tools Lists
- ⁵50P - Depot Maintenance Repair Parts and Special Tools Lists

¹May be prepared when the printed narrative pages for all categories of maintenance are less than 200.

²Will be prepared when no operating and maintenance instructions manuals are required.

³Will be prepared for high-cost low density systems.

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- ⁴ May be prepared when a multiple part narrative maintenance manual is prepared.
- ⁵ Will be prepared when a separate narrative depot maintenance manual is prepared.

NOTE: The inclusion of repair parts and special tools lists in a combined maintenance manual, such as -15, -25, -35, will be indicated by adding "Including Repair Parts and Special Tools Lists" to that part of the title preceding the nomenclature.

APPENDIX B

PREPARATION OF THE MAINTENANCE TEST
PACKAGE LITERATURE CHART

The following instructions were extracted from Appendix V, USATECOM Regulation 750-15, except for those instructions in parenthesis.

Column 1

Enter Army or manufacturer's publication or draft manual number. (All entries will be made from the lowest numbered manual to the highest numbered manual with any unnumbered entries being made last. Changes reviewed separately should be listed immediately following the entry for the basic publication).

Column 2

Number of copies received. Insert "0" if none were supplied. Use Para III i, Chapter 9, of AR 310-3, as a guide to determine those manuscripts and publications that should accompany the test item. Publications contained in the maintenance package should cover operations and functions through general support maintenance and should specify the categories involved.

Column 3

Complete title

Column 4

Enter date publication was received. (This date is the date the publication was received by the evaluator/project officer)

Column 5

Enter date test item or material was received.

Columns 6 and 7

Insert "X" in appropriate block. Minor errors noted on DA Form 2028 forms are not in themselves sufficient reason to term a publication inadequate.

Column 8

Insert ERP number (if appropriate) and date DA Form 2029 was forwarded.

Column 9

In addition to appropriate remarks, explain if manuscript was not evaluated and the reason therefor.

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SAMPLE MAINTENANCE TEST PACKAGE
 LITERATURE CHART

Number	MANUSCRIPT		DATE RECEIVED		EVALUATION		FORM 2028 Date Forwarded	REMARKS
	Quantity	Title	Lit	Materiel	Adqt	Inadqt		
1	2	3	4	5	6	7	8	9

MTP 2-3-528
27 April 1970

UNCLASSIFIED

Security Classification

DOCUMENT CONTROL DATA - R & D		
<i>Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified.</i>		
1. ORIGINATING ACTIVITY (Corporate author) US Army Test and Evaluation Command (USATECOM) Aberdeen Proving Ground, Maryland 21005		2a. REPORT SECURITY CLASSIFICATION Unclassified
		2b. GROUP -----
3. REPORT TITLE US Army Test and Evaluation Command Materiel Test Procedure 2-3-528, Common Service Test Procedure, - "Maintenance Evaluation - Technical Manuscripts and Manuals."		
4. DESCRIPTIVE NOTES (Type of report and, inclusive dates) Final		
5. AUTHOR(S) (First name, middle initial, last name) -----		
6. REPORT DATE 27 April 1970	7a. TOTAL NO. OF PAGES 14	7b. NO. OF REFS 13
8a. CONTRACT OR GRANT NO. DA-18-001-AMC-1045(R)	8b. ORIGINATOR'S REPORT NUMBER(S)	
b. PROJECT NO. AMCR 310-6		
c. d.	9. OTHER REPORT NUMBER(S) (Any other numbers that may be assigned this report) -----	
10. DISTRIBUTION STATEMENT This document is subject to special export controls and each transmittal to foreign governments or foreign nationals, -WITH THE EXCEPTION OF AUSTRALIA, CANADA, AND UNITED KINGDOM, -may be made only with prior approval of HQ,USATECOM.		
11. SUPPLEMENTARY NOTES -----	12. SPONSORING MILITARY ACTIVITY Headquarters US Army Test and Evaluation Command Aberdeen Proving Ground, Maryland 21005	
13. ABSTRACT This Army Service Test Procedure describes methods for determining the adequacy of equipment publications for use by personnel at various maintenance levels (from operator/crew through the general maintenance support level), and for determining their suitability for service use by the U. S. Army. The evaluation is related to criteria expressed in applicable Qualitative Materiel Requirements (QMR), Small Development Requirements (SDR), Technical Characteristics (TC), or other appropriate design requirements and specifications.		

DD FORM 1473 (PAGE 1)
1 NOV 65
S/N 0101-907-6811

UNCLASSIFIED
Security Classification

C-1

A-31408

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UNCLASSIFIED

Security Classification

KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Army Service Test						
Technical Manuals and Publications						
Equipment Maintenance Publications						
Evaluation Methods						

DD FORM 1473 (BACK)
1 NOV 65

UNCLASSIFIED
Security Classification