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

SAFETY HAZARDS

1. OBJECTIVE

The objective of this materiel test procedure (MTP) is to determine, during service tests of an item of missile or rocket systems equipment, whether safety hazards to personnel or equipment are present, and to formulate recommendations concerning the correction, alleviation, or accommodation of such safety hazards.

2. BACKGROUND

Any device used by man can be hazardous. When equipment contains significant levels of energy -- electrical, radiated kinetic, or chemical -- hazards tend to be greater. Military personnel must be aware and alert to the hazards associated with equipment they are using, and they must not be distracted from efficient performance by worry or concern for hazards undetected and unknown; nor must they be exposed to unnecessary hazards which can be eliminated.

Items undergoing commodity service testing will be explicitly inspected, and the operational experience reviewed, to detect and identify safety hazards associated with the equipment or its usage, and the findings and recommendations will be incorporated in the test reports.

3. REQUIRED EQUIPMENT

a. The test item and maintenance test package
b. Instrumentation as required by the commodity service test MTP
c. Test equipment, material, and supplies as required by the commodity service test MTP
d. Microwave energy field strength meters
e. Radiation detectors (film badges)
f. Acoustic field strength meters
g. Cameras and film
h. Voice tape recorders
i. Weight measuring equipment

4. REFERENCES

A. AR 70-10, Army Materiel Testing
B. USATECOM Reg. 385-6, Verification of Safety of Materiel During Testing
C. USAMC Reg. 385-224, AMC Safety Manual
D. AR 705-4, Equipment Performance Report
E. MIL-STD-721B, Effectiveness Terms for Reliability, Maintainability, Human Factors, and Safety

F. MTP 5-3-507, Human Factors Engineering
G. MTP 10-3-501, Operator Training and Familiarization
H. TB MED 251, Noise and Conservation of Hearing
I. TB MED 270, Control of Hazards to Health from Microwave Radiation

5. SCOPE

5.1 SUMMARY

This procedure describes safety inspections and evaluation for missile and rocket equipment and antiaircraft guns, including the following:

a. Safety Inspections

1) Adequacy of protective measures and placards associated with high voltage electrical equipment
2) Condition of surfaces and arrangement of mechanical equipment, components, and associated handling aids
3) Detection of unsafe levels of radiated energy -- microwave, thermal, acoustic, or nuclear
4) Detection of hazardous conditions due to fumes or exhausts

b. Operational Evaluations

1) Hazards associated with mobility operations, and with emplacement, preparing for action, and march ordering
2) Hazards associated with serving of guns and launchers and hazards caused by blast effects from firing or launching
3) Safety of maintenance operations

5.2 LIMITATIONS

The procedures of this MTP are limited to determining safety hazards in items of missile and rocket systems and antiaircraft guns during commodity service tests of the respective items. However, the inspections and evaluations may be adapted for safety testing of other items of Army equipment.

6. PROCEDURES

6.1 PREPARATION FOR TEST

6.1.1 Personnel

a. Ensure that personnel assigned to conduct the inspections and evaluations described in this MTP are familiar with the test item, its mission, use cycle, TOE manning requirements, applicable QMR/SDR, applicable sections

of MTP 5-3-507, Human Factors Engineering, and MTP 10-3-501, Operator Training and Familiarization.

b. Record details of identity, training, and experience of all assigned personnel.

6.1.2 Safety Release

a. Review the safety release provided by the Engineering Test Agency. Ensure that the following points have been covered as a minimum:

1) Operational limitations for safe utilization of the test item
2) Specific hazards peculiar to the system or components

b. Prior to start of service testing, ensure that safety release information, detailing explicit safety hazards as understood from engineering tests and analyses during personnel familiarization of the test item, and its intended use has been disseminated.

6.2 TEST CONDUCT

The concept of this test procedure is to conduct detailed safety inspections of the test item during service test activities, and to observe the experience of crew members during all phases of operational use and maintenance. Actual and potential safety hazards will be identified and recorded. Responsible judgements will be made regarding the significance of safety hazard observations, considering the characteristics of the "Average Soldier" (see reference H) and the operational conditions being simulated.

NOTE: Notwithstanding the need for observation of safety hazard conditions during use of the test item, any circumstance which could endanger test personnel will be cause for testing to be suspended until safe conditions are restored.

6.2.1 Safety Inspections

6.2.1.1 High Voltage Hazard Control

Inspect the test item and its components for the following:

a. Protective interlocks to deenergize equipment when access is required.

b. Protective shielding or guards to prevent contact with high-voltage sources.

c. Bleeder circuits in all high-voltage sources.

d. Discharge bars for all high-voltage, high-current power sources.

e. Grounding of high voltage equipment modules.

f. Adequate and legible CAUTION and WARNING labels, placards, or plates.

6.2.1.2 Mechanical Hazards

Inspect the test item and its components for the following:

a. Sharp corners, sharp edges, projecting objects -- handles or other parts, exposed rotating or reciprocating parts, exposed wiring.

b. Missing or inadequate handholds or steps, slippery footing surfaces.

c. Unprotected surfaces at hot or cold temperatures.

6.2.1.3 Radiation Hazards

Survey and record unsafe levels of radiation as follows:

a. Microwave energy (hazard lower limit 10 mw/cm^2)

b. X-Rays and Gamma radiation (film badge registers positive)

c. Thermal radiation levels

6.2.1.4 Breathing Hazards

Examine any discharges of vapors, fumes, or engine exhaust to detect possible hazards to personnel from high velocities, unusual levels of toxicity, or concentrations in crew-occupied areas.

6.2.1.5 Noise Hazards

Measure, record and evaluate noise level readings in accordance with TB MED 251.

6.2.2 Operational Evaluations

Monitor service test operations to detect unsafe conditions or practices associated with the test item and using personnel.

6.2.2.1 Field Operations

As applicable, conduct and monitor the following:

a. Mobility operations -- maneuvering the test item in the field

b. Emplacement and preparation for action

c. March ordering the test item

6.2.2.2 Serving of Guns and Launchers

As applicable, monitor safety conditions associated with the following:

a. Loading

b. Procedures called for in case of:

1) Misfire or hangfire
2) Gun stoppage -- immediate action procedures
3) Gun clearing procedures

c. Fire control procedures, including field of fire limiting

d. Muzzle or exhaust blast effects

e. Special handling procedures for ammunition and missiles

6.2.2.3 Safety of Maintenance Operations

Conduct appropriate phases of organizational and general support scheduled and corrective maintenance of the test item and monitor the operations to detect unsafe conditions, including the following:

a. Uncontrolled dropping of heavy parts or release of springs

b. Uncontrolled discharge of hot, cold, or toxic fluids

c. Inadequate switches, interlocks, or other protective devices

d. Inadequate provisions for de-energizing or inerting

e. Unsafe practices in technical manuals

f. Unidentified hazards not listed in technical manuals

6.3 TEST DATA

6.3.1 Preparation for Test

6.3.1.1 Personnel

Record for all service personnel assigned to conduct the inspections and evaluations under this MTP:

a. Service Number and Rank

b. MOS or other specialty

c. Training time in MOS, weeks

d. Experience in MOS or other specialty, months

e. Training and familiarization time with test item, weeks

6.3.1.2 Safety Release

a. Record operational limitations and safety hazards as identified in the Engineering safety release.

b. Record any other limitations and hazards as inferred from familiarization with the test item.

c. Record reference numbers and dates of safety release.

6.3.2 Test Conduct

Data from the inspections and evaluations conducted under this MTP will be recorded in narrative form, supported by photographs. Engineering measurements of temperatures, radiation field strengths, sound levels, and gas concentrations will be recorded only if unavailable from prior engineer tests and required to support the safety hazard findings.

Comments of operators and observers relative to safety will be recorded on audio tape.

Safety hazards associate with operational or maintenance procedures and sequential steps will be recorded as necessary on motion picture film.

Deficiencies and shortcoming related to safety of personnel and equipment will be reported on AMSTE Form 1025 in accordance with AR 705-4.

6.4 DATA REDUCTION AND PRESENTATION

Summaries of safety hazard inspections and safety hazard evaluations during operation and maintenance of the test item will be incorporated in the Report of Test as prepared in connection with test item commodity service test. Summaries will be in a form which identifies the incremental areas or operational procedures examined and states whether or not safety hazards are present or a possibility. Emphasis will be given to presentation which cover:

a. Inherent safety hazards and corresponding precautions

b. Safety hazards requiring corrective action

c. Level of confidence that other unknown safety hazards do not exist

All data, including comments of personnel, will be summarized, compared, and evaluated according to procedures described in this MTP, or according to equivalent current practice where not otherwise covered. Appropriate charts, graphs, and tables will be used as necessary to display summaries and comparisons of test data. Coordinates and other features of charts, graphs, and tables will be selected for clarity and uniformity with like presentations in other reports.

All photographs, motion pictures, audio tapes, and other records will be explicitly identified and referenced; significant frames, transcriptions, and samples will be selected for illustrative purposes. All illustrations will be completely identified.

The influence of weather and other external environmental factors will be considered in the determinations of whether safety hazards are present.

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13. ABSTRACT

This Common Service Test Procedure describes safety inspections and operational evaluations for missile and rocket equipment and anti-aircraft guns during service tests. However, the inspections and evaluations may be adapted for safety testing of other items of equipment. The primary objective is to isolate, identify and alleviate hazardous conditions associated with electrical, chemical and radiated energies, as well as noise and fumes and exhausts.

14 KEY WORDS	LINK A		LINK B		LINK C	
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Safety Hazards During Test						
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Noise Hazards