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Materiel Test Procedure 10-2-153
General Equipment Test Activity

U S. ARMY TEST AND EVALUATION COMMAND
COMMODITY ENGINEERING TEST PROCEDURE

SHOE REPAIR SHOP, TRAILER-MOUNTED

1. OBJECTIVE

This document provides test methods and techniques necessary to determine the technical performance and safety characteristics of trailer-mounted shoe repair shops, and their associated tools and equipment, as described in Qualitative Material Requirements (QMR's), Small Development Requirements (SDR's), Technical Characteristics (TC's), and to determine the item's suitability for service tests.

2. BACKGROUND

A requirement exists for a mobile self-contained shoe repair shop capable of repairing military footwear in the field. The trailer mounted shoe repair shops contain a finisher, stitching machine, skiver and beveler, trimmer, patching machine, shoe jacks, and a gasoline engine driven electrical generator. The repair shop is designed for field use where, normally, all components except the generator and patching machine are operated from the side of the trailer. The generator normally is removed from the trailer and operated at a distance from the machines allowed by its cable length. The patching machine is removed and placed on a stand near the trailer. The shop is usually operated inside a tent or temporary shelter. The shoe repair shops are normally towed from one field site to another. The shops are equipped with a waterproof cabinet designed to protect the components during transport and storage.

3. REQUIRED EQUIPMENT

a. Platform Scales.
b. Steel Measuring Tape.
c. Still Camera and Film.
d. Ohmmeter.
e. Industrial Analyzer.
f. Sound Level Meter and Octave Band.
g. Meteorological Instruments.
h. Rain-Measuring Gage.
i. Stroboscope.
j. Recording Accelerometers.
k. Equipment as required in the referenced MTP's.
l. Highway Course - Paved and Gravel Roads.
m. Cross Country Course.
n. Actual and/or Simulated Shipping and Handling Facilities (rail, marine, and seashore).
o. Environmental Storage Facility (-65°F to 135°F, 85% RH).
p. Rain Facility.

4. REFERENCES

A. USATECOM Regulation 385-6, Safety Regulations.
B. USATECOM Regulation 700-1, Value Engineering.
C. USATECOM Regulation 705-4, Equipment Performance Report.
D. Military Specification MIL-S-40615A, Shoe Repair Shop, Trailer Mounted, with Interim Amendment 4.
E. Military Specification MIL-G-52367, Generator Sets, Gasoline-Engine-Driven, 3.0 KW, Alternating Current, Air Cooled, Portable, Tubular Frame, Skid-Shock-Mounted.
F. AR 705-15, Operation of Material under Extreme Conditions of Environment with Change 1.
G. HEL-Standard S-1-63B, Maximum Noise Level for Army Materiel Equipment.
H. MTP 2-2-613, Broadband Radio Interference Testing for Vehicles and Electrical Equipment - Noncommunication.
I. MTP 2-2-520, Logistics-Over-the-Shore (LOTS).
J. MTP 2-2-800, Center of Gravity.
K. MTP 7-2-515, Air Transport, Internal (Suitability of Equipment for).
L. MTP 10-2-500, Physical Characetristics.
M. MTP 10-2-501, Operator Training and Familiarization.
N. MTP 10-2-502, Durability.
O. MTP 10-2-503, Surface Transportability (General Supplies & Equipment).
P. MTP 10-2-505, Human Factors Evaluation.
Q. MTP 10-2-507, Maintenance Evaluation.

5. SCOPE

5.1 SUMMARY

This MTP describes the following tests:

a. Preparation for Test - An inventory of components, a determination of the condition of the test item upon arrival, its physical characteristics, and operator training and familiarization requirements.

b. Electrical Tests - A verification of electrical continuity of all cabling, and a test to determine proper generator operation and load characteristics.

c. Electromagnetic Compatibility - A determination of electromagnetic interference generated by the test item.

d. Machine Performance - An evaluation of the operability of the finisher, stitch head assembly, patcher machines, and the hand-operated machines.

e. Durability - A determination of the repair shop's durability during normal operations and transportation.

f. Trailer Brake - A determination of the braking capability of the trailer under load.

g. Transportability - An evaluation of the test item's ability to be moved by various means of transportation used by the Army.

h. Cabinet Assembly Water Leakage - A determination of the ability of the waterproof cabinet or cover to protect the components of the shoe repair shop.

i. Environmental Storage - An evaluation to determine whether the shoe repair shops can withstand storage under extreme conditions of heat,

cold, and humidity.

j. Safety - An evaluation to determine whether the test item contains any unwarranted hazards.

k. Maintainability and Reliability Evaluation - That portion of the test which is concerned with the following: verification and appraisal of failures; determination and appraisal of maintenance characteristics and requirements; appraisal of design-for-maintainability; appraisal of the maintenance test package; and, calculation of indicators which express the effects of the preceding aspects.

l. Human Factors Evaluation - An evaluation of the man-item relationship during normal use to determine adequacy of design as related to installation, operation, maintenance and transport of the test item.

m. Value Analysis - An evaluation to determine whether the shoe repair shops have unnecessary, costly, or "nice-to-have" features, as stated in USATECOM Regulation 700-1.

5.2 LIMITATIONS

This document applies to trailer-mounted shoe repair shops as currently designed. The addition, deletion or revision of the basic components does not necessarily invalidate those procedures.

6. PROCEDURES

NOTE: During equipment set-up and operation, the operating techniques provided in the manufacturer's instruction manual shall be used. Any change or deviation from these instructions shall be recorded in the test item logbook.

6.1 PREPARATION FOR TEST

6.1.1 Initial Inspection

Upon arrival at the test site, subject the test item to the following procedures:

a. Visually inspect the assembled test item and, if applicable, the blocking used for rail shipment, and record the following:

1) Evidence of damage or deterioration to both the test item and blocking.
2) Identification markings, including:

a) Name of manufacturer
b) Number and date of contract
c) Date of manufacture

NOTE: Make use of photographs, diagrams, and narration to document the condition of the test item.

b. Unload the test item, as required, visually inspect each of the components, both on and off the trailer and record the following:

1) Evidence of defects in:

a) Manufacturing
b) Material
c) Workmanship

2) Evidence of damage
3) Evidence of deterioration
4) Component identification markings, including:

a) Identification, name, model and serial number
b) Caution instructions
c) Service instructions
d) Manufacturer's name and date of manufacture

5) Evidence of shortages

NOTE: Make use of photographs, diagrams, and narration to document the condition of the test item components.

6.1.2 Physical Characteristics

Determine and record the physical characteristics of the shoe repair shop as specified in the applicable sections of MTP 10-2-500 and the following:

a. For the assembled test item:

1) Weight.
2) Length, width and height.
3) Cubage.
4) Center of gravity as described in MTP 2-2-800.
5) Dimensions of all access openings, storage compartments, and material for operator or passenger use.

b. For the test item major components:

1) Weight
2) Length, width and height
3) Cubage

6.1.3 Operator Training and Familiarization

Test personnel shall be oriented in all aspects of the shoe repair shop as described in the applicable sections of MTP 10-2-501 and the following:

a. All members of the test team shall receive a review of safety precautions listed in the technical manuals or developed from previous test experience. The safety precautions will, as a minimum, include the following:

1) Vehicle and cabinet assembly
2) Generator operation
3) Finisher operation
4) Patching machine operation
5) Stitching machine operation
6) Skiver and trimmer operation

7) Handling during transport ope
8) Shoe jack operation

b. Test personnel will be instructed in the capabilities of the test item and in the objectives and procedures of the test.

c. The set up, operating, and maintenance procedures for the generator, shoe jacks, finishing machine, stitching machine and the skiver and trimmer machines will be presented. Methods of securing the components for transport will be reviewed The technical manuals will be made available for study.

d. Operators will undergo simulated operations with the test item. The progress of each operator will be reviewed to assess the degree of proficiency attained.

e. Record the amount of time and type training or familiarization required for each operator.

f. Record any unusual difficulties encountered during training.

6.1.4 Preparation

Prepare the shoe repair shop for test as follows:

a. Set up the components of the test item in a normal operating arrangement as described in the manufacturer's instructions or draft technical manual.

b. Remove all protective material and preservatives.

c. Lubricate all components of the test item following the procedures of the applicable lubrication order.

6.2 TEST CONDUCT

NOTE: 1. All equipment failures shall be reported in accordance with USATECOM Regulation 705-4.

2. Before the test of the shoe repair shop is begun, the following precautions shall be taken:

a) Trailer brakes set and trailer stable.
b) Tape covering generator ventilator opening removed.
c) Air intake shutter set to proper position.
d) No fuel leakage or fuel vapors present.
e) All machine switches and the generator circuit breaker switch in the "off" position.
f) Generator and machines properly grounded.
g) Proper exhaust for engine.
h) Personnel clear of machines before starting generator.
i) Fire extinguisher inspected and checked for good working condition.

3. At all times during the test, normal safety precautions such as the following shall be observed:

a) Refuel the generator set only when off.
b) Ensure power is shut off and belts are removed prior to maintenance on machines.

c) Keep hands, fingers, and face clear of needles while patching or stitching.
d) Operate generator set with proper ventilation.
e) Keep loose material away from all power driven machines while operating.

6.2.1 Electrical Tests

6.2.1.1 Continuity Test

a. Determine that all electrical cables supplied with the test item are correctly wired and marked by checking continuity with an ohmmeter and record the presence and location, as applicable, of the following:

1) Short circuits
2) Open circuits
3) Incorrect wiring
4) Defects in materials, i.e., frayed insulation

b. Connect electrical power cable into a 208 volt, 60 cycle three phase source of power and verify that machine motor(s) operates and that all lights are working.

c. Record all defects and the manufacturer, model, and serial number of any defective motor(s).

6.2.1.2 Generator Test

NOTE: The ambient temperature for this test shall exceed 60 degrees F. Determine proper generator operation and load as follows:

a. Install an industrial analyzer (or equivalent instruments capable of measuring voltage, current, power factor, and wattage) in the cable leaving the generator.

b. Remove the needle and bobbin from the stitcher machine.

c. With all electrical equipment off, start the generator.

d. Allow the generator to warm up for the specified time. Record the minimum and maximum voltage obtainable by varying the voltage control. Set the voltage to 208 volts. Measure and record the generator rpm.

e. Place the generator circuit breaker in the"on" position. Place shoe shop circuit breaker in the "on" position.

f. Start all machines and turn on all machine work lights.

g. Record generator voltage and readjust to 208 volts, if necessary.

h. Apply load to the stitching machine for a period of less than four minutes by depressing the operating treadle. Record the following for each power line:

1) Voltage
2) Current
3) Power Factor
4) Wattage

i. Measure and record the generator rpm.
j. Replace the needle and bobbin in the stitcher machine.
k. Repeat steps h and i under the following conditions:

1) Operating under load for:

a) Each machine
b) Two heavy machines
c) All machines

2) Machine in stalled condition for:

a) Eacn machine
b) Two heavy machines
c) All machines

l. Repeat steps h through j two times.

6.2.2 Electromagnetic Compatability

Determine the electromagnetic compatibility of the test item as described in the applicable sections of MTP 2-2-613 with the shoe repair shop operated as follows:

a. Ambient temperature shall be above 60 degrees F.
b. All machines shall be properly lubricated as described in the applicable lubrication order.
c. The finishing, stitching, and patching machines shall be operated normally with thread installed and with combat boots. All electrical components, including work lights, will be turned on.
d. All machines and the generator shall be properly grounded with wiring harness and grounding rod.

6.2.3 Machine Performance

6.2.3.1 Patching Machine

Evaluate the performance of the patching machine as follows:

a. Sew at least three patches on a pair of combat boots.
b. Sew a suitable length of test leather at minimum threads per inch. Record the following for each machine:

1) Machine model and serial number
2) Length of stitch
3) Stitches per inch
4) Observe and record any stitch defects
5) Size of thread and needle
6) Type of test leather

c. Repeat step a for nominal and maximum stitch setting (threads per inch).

6.2.3.2 Stitching Machine

Evaluate the performance of the stitching machine as follows:

a. Prepare the stitcher for operation following the procedures in the draft technical manuals. This includes allowing proper time for heating the wax (30 minutes minimum) and hand operating the stitcher to check for proper alignment of the needle, looper, lifter, and presserfoot. The stitcher motor shall be started and allowed to run for one hour.

b. Hold the two pieces of thread (regular and bobbin) and depress the treadle enough to unlock the machine.

c. Turn the handwheel approximately 1/16 of a turn, remove foot from the treadle and turn the machine over until it is in the stop position.

d. Repeat step c three times.

e. Hold the two pieces of thread as in step b and depress the treadle for 30 seconds. Remove foot quickly. The machine should return to the stop position.

f. Repeat step e ten times.

g. Recheck the stitcher set up and adjust for stitching. Stitch at least two pairs of combat boots and record the following:

1) Machine model and serial number.
2) Stitches per inch.
3) Stitch defects and possible causes.
4) Size of needle and thread.
5) Type of shoes being repaired.
6) Deficiencies or difficulties encountered when setting up or operating stitcher.

6.2.3.3 Finishing Machine

Evaluate the performance of the finishing machine as follows:

a. Turn the finisher on and allow the motor to run for one hour.

b. Check the finisher wheels for smooth operation and wobble. Record any discrepancies.

c. Perform a sanding operation on two pair of combat boots and record any difficulties encountered in operation of the finisher.

6.2.3.4 Hand-Operated Machines

a. Check for proper operation of the sole skiver and beveler and sole trimmer, or combination sole skiver, beveler, trimmer and welt roller, as appropriate, using two pairs of combat boots, and record any deficiencies in operation.

b. Record the name, manufacturer, model and serial number of all hand-operated machines which have operational deficiencies.

6.2.3.5 Shoe Jacks

Evaluate the performance of the shoe jacks and lasts as follows:

a. Set up all shoe jacks and last in their proper position.
b. Repair at least six pairs of combat boots with new heels using at least three (3) different size combat boots and record any difficulties encountered.

6.2.4 Durability

Determine the durability of the test item as described in the applicable sections of MTP 10-2-502 and as follows:

NOTE: Durability tests, when applicable, shall be conducted in conjunction with the transportability test of paragraph 6.2.6.2.

6.2.4.1 Preparation for Test

Prepare the shoe repair shop as follows:

a. Install all components of the repair shop and secure for transport in accordance with instructions.
b. Attach and record the location of recording accelerometers to the repair shop so as to obtain shock readings along the longitudinal, transverse, and vertical axis.

6.2.4.2 Test Procedure

a. Tow the fully loaded shoe repair shop over paved roads for a minimum of fifty (50) miles at speeds up to 50 mph and perform the following:

1) Conduct a minimum of five quick starts on each of the following:

a) Ascending grades between five and 10 percent
b) Descending grades between five and 10 percent

2) Conduct a minimum of five quick stops from varying speeds on each of the following:

a) Ascending grades between five and 10 percent
b) Descending grades between five and 10 percent

b. Record the following for each quick start and stop:

1) Speed before stop, if applicable
2) Accelerometer recording readings
3) Grade and type of slope (10% ascending, 7% descending, etc.)

c. Record the ambient weather conditions.
d. Unload the shoe repair shop, visually inspect all components, and record any damages.
e. Ensure proper functioning of each machine by performing the procedures of paragraph 6.2.3.

f. Repeat steps a through e for 50 miles of gravel road at speeds averaging 35 mph.

g. Tow the fully loaded shoe repair shop over a minimum of 50 miles of open terrain and cross-country at speeds averaging five mph. The test course shall have surface irregularities such as pot holes, mounds, rocks, and brush. Perform the following:

1) Conduct a minimum of 10:

a) Abrupt stops from varying speeds
b) Abrupt starts
c) Sharp left hand turns
d) Sharp right hand turns

2) Record:

a) Speed before stops
b) Accelerometer recording readings

h. Repeat steps d and e.

6.2.5 Trailer Brake

NOTE: This subtest shall be conducted in conjunction with the applicable procedures of paragraph 6.2.6.

6.2.5.1 Preparation for Test

Prepare the shoe repair shop for tests as described in 6.2.4.1, step a and record the trailer model and serial number.

6.2.5.2 Test Procedure

Determine and record the maximum grade on which the fully loaded trailer will not roll or slide with brakes locked.

6.2.6 Transportability

6.2.6.1 Preparation for Test

Prepare the shoe repair shop for transport as described in paragraph 6.2.4.1.

6.2.6.2 Surface Transportability

Perform the surface transportability tests as described in the applicable sections of MTP 10-2-503.

6.2.6.3 Air Transportability

NOTE: The conduct of air transportability testing shall be coordinated

with the appropriate unit conducting the air transportability tests.

Determine and record the internal air transportability of the test item as described in the applicable sections of MTP 7-2-515.

6.2.6.4 Logistics-Over-the-Shore (LOTS)

Determine the LOTS characteristics of the test item as described in the applicable sections of MTP 2-2-520 and the following:

a. Load the test item and a suitable towing vehicle aboard a landing craft from a ship anchored offshore using normal ships handling equipment; couple the test item to the towing vehicle, and record the following:

1) Sea state and duration
2) Wind direction and speed
3) Equipment used for loading
4) Difficulties encountered loading or coupling
5) Materials used for securing
6) Damage to test item or towing vehicle

b. Transport the test item to the shoreline, off-load and tow through sea and surf up to 20 inches, including vehicle-sinkage depth and wave height, for a minimum of 15 minutes. Tow the test item over the sand to a point not less than two miles from the shoreline, and then disassemble, inspect and set up for normal operation. Determine the optimum tire pressures for both the test item and the towing vehicle and record the following:

1) Water depth.
2) Difficulties in towing.
3) Test item and towing vehicle tire pressures.
4) Any deficiencies in operation or damage to the components of the test item.

c. Secure the test item for transport, tow it to the shoreline and reload it onto the landing craft by both driving and backing into the craft. Record any difficulties encountered in reloading or damage to the test item.

6.2.7 Cabinet Assembly Water Leakage

6.2.7.1 Preparation for Test

Prepare the shoe repair shop for a test as described in 6.2.4.1, step a.

6.2.7.2 Test Procedure

a. Subject the test item to simulated rainfall at the rate of three inches per hour for a minimum of one hour. Expose each side of the test item for a minimum of 15 minutes with exposure including exposure of the top.

NOTE: The direction of rainfall shall include all angles from vertical to 45 degrees from vertical.

b. At the completion of the test, determine and record the following:

1) Test item identification data.
2) Amount of water present in the cabinet interior.
3) Damage to components such as machines, stored materials, etc. due to water penetration or moisture contamination.
4) Location and reason for leakage.

6.2.8 Environmental Storage

6.2.8.1 Preparation for Test

Prepare the shoe repair shop as described in paragraph 6.2.4.1.a.

6.2.8.2 High Temperature Storage

a. Store the test item for four hours in a test chamber producing an air temperature of 155°F at an absolute humidity of 13 grains/ft^3 without benefit of solar radiation and with neglible air movement.

b. At the completion of the storage period, perform the following:

1) Disassemble the test item and record any damage or deterioration to the test item or test item components.
2) Ensure proper functioning of the test item by performing the procedures of paragraph 6.2.3 at normal operating atmospheric conditions.

6.2.8.3 Low Temperature Storage

a. Store the test item for 12 hours in a test chamber producing an air temperature of -65°F without benefit of solar radiation and with neglible air movement.

b. Repeat the procedures of paragraph 6.2.8.2.b.

6.2.8.4 Humidity Test

a. Store the test item (packed for storage) for 12 hours in a test chamber producing an air temperature of 85°F at a relative humidity of 100%.

b. Repeat the procedures of paragraph 6.2.8.2.b.

6.2.9 Safety

NOTE: Safety regulations shall be issued in accordance with USATECOM Regulation 385-6.

a. Record the following throughout the test:

1) Normal safety precautions followed on operating the shoe repair shop as indicated in notes 2 and 3 of paragraph 6.2.

2) Any special precautions required for operating and maintaining the test item
3) Any condition that might present a safety hazard, cause of the hazard, and steps taken to alleviate the hazard.

b. Check for and record any evidence of ground voltage in machine frames, etc.

6.2.10 Maintainability and Reliability Evaluation

Evaluate the maintenance-related factors of the test item as described in MTP 10-2-507 with emphasis on the following:

a. Organizational (O), Direct Support (F), and General Support (H) Maintenance Requirements.
b. Operator through General Support Maintenance Literature.
c. Repair parts.
d. Tools.
e. Test and handling equipment.
f. Calibration and maintenance facilities.
g. Personnel skill requirements.
h. Maintainability.
i. Reliability.
j. Availability.

6.2.11 Human Factors Evaluation

NOTE: This sub-test is conducted to evaluate the man-item relationship during normal trailer use and to compare the test item with a standard or control trailer (if possible) as to the following operational characteristics: assembly, disassembly, operability, maintainability, and transportability. Evaluate the design of the electrical system as related to personal safety. Comparisons between the characteristics of the test and standard trailers will be considered in determining the suitability of the trailers. Criteria for acceptable noise and illumination level will be in accordance with standard testing procedures in the HEL-Standard S-1-63B.

Human factors evaluation shall be conducted as described in the applicable sections of MTP 10-2-505 and the following:

a. Throughout all testing, observe and record the user's comfort and his capability to operate and maintain the machines.

b. Measure and record the sound level of a fully operating shoe repair shop (all machines operating) at an operator's station and record any adverse effects on test personnel due to noise.

c. Comment on mobility, accessibility, assembling, dismantling, transporting, safety, dependability and noise, as regards human factors.

d. Observe and record any difficulties such as excessive pressure

or awkwardness in the operation of generator, or machine controls.

e. Record the environmental conditions both inside and outside the trailer.

f. Throughout the test, observe and record difficulties in accessibility to, or operation of the individual components of the test item.

g. Measure and record illumination levels at operator positions.

h. Record any difficulties encountered operating trailer jacks for initial set-up.

6.2.12 Value Analysis

During equipment set-up, operation, and maintenance of the test item, test personnel shall observe and record any design features that can be eliminated, modified, or simplified without compromising the technical characteristics and safety of the repair shops.

6.3 TEST DATA

6.3.1 Preparation for Test

6.3.1.1 Initial Inspection

Record the following:

a. For the assembled test item:

1) Evidence of damage or deterioration
2) Identification markings:

a) Name of manufacturer
b) Number and date of contract
c) Date of manufacture

b. For each component:

1) Evidence of defects in:

a) Manufacturing
b) Material
c) Workmanship

2) Evidence of deterioration
3) Evidence of damage
4) Identification markings:

a) Identification, name and serial number
b) Caution instructions
c) Service instructions
d) Manufacturer's name and date of manufacture

5) Evidence of shortages

6.3 1.2 Physical Characteristics

Record data collected as described in the applicable sections of MTP 10-2-500 and the following:

a. For the assembled test item:

1) Weight, in pounds
2) Overall dimension, in feet and inches, of:

a) Length
b) Width
c) Height

3) Cubage in cubic feet
4) Center of gravity
5) Dimensions, in feet and inches, of:

a) Access openings
b) Storage compartments
c) Material for operator or passenger use

b. For the test components:

1) Weight, in pounds
2) Overall dimensions, in feet and inches, of:

a) Length
b) Width
c) Height

3) Cubage, in cubic feet

6.3.1.3 Operator Training and Familiarization

Record the following:

a. Data as described in MTP 10-2-501.
b. Amount of time and type of training or familiarization required for each operator.
c. Any unusual difficulties encountered during training.

6.3.2 Test Conduct

6.3.2.1 Electrical Tests

6.3.2.1.1 Continuity Tests -

Record the following for each cable:

a. Cable identification markings, if applicable

b. Presence and location of defects, as applicable:

1) Shorts
2) Opens
3) Incorrect wiring
4) Frayed insulation
5) Other defects

c. Manufacturer, model, and serial number of defective sewing machine motors.

6.3.2.1.2 Generator Tests -

a. Record the following for the generator with no load:

1) Minimum generator output voltage, in volts
2) Maximum generator output voltage,in volts
3) Generator speed, in rpm at 208 volts output

b. Record the following for each power line:

1) For each load condition:

a) Number and type machine(s) on line
b) Type load (operating, sewing, stalled)

2) Voltage
3) Current
4) Power factor
5) Wattage

c. Record the following for the generator under load:

1) For each load condition:

a) Number and type machine(s)
b) Type load (operating, sewing, stalled)

2) Generator speed, in rpm

6.3.2.2 Electromagnetic Compatability

Record data collected as described in the applicable sections of MTP 2-2-613.

6.3.2.3 Machine Performance

6.3.2.3.1 Patching Machine -

Record the following for each test run:

a. Machine model and serial number
b. Length of stitch
c. Stitches per inch
d. Defects and causes

1) Loose stitches
2) Poorly formed stitches
3) Crowded stitches
4) Tight stitches
5) Crooked stitches
6) Slipped stitches

e. Size of thread and needle
f. Type of test leather

6.3.2.3.2 Stitching Machine -

Record the following:

a. Machine model and serial number
b. Stitches per inch
c. Defects and causes
d. Size of needle and thread
e. Type of shoes being repaired
f. Deficiencies or difficulti s encountered when setting up or operating stitcher.

6.3.2.3.3 Finishing Machine -

Record the following:

a. Test item identification (name, manufacturer, model and serial number.
b. Finisher smoothness or wobble.
c. Difficulties encountered in operation of finisher.

6.3.2.3.4 Hand Operated Machines -

Record the following:

a. Identification data (name, manufacturer, model and serial number
b. Deficiencies in operation

6.3.2.3.5 Shoe Jacks -

Record any difficulties in the use of the shoe jacks.

6.3.2.4 Durability Tests

6.3.2.4.1 Preparation -

Record the location of recording accelerometers

6.3.2.4.2 Test Procedure -

Record the following:

a. Data collected as described in the applicable sections of MTP 10-2-502.
b. For each quick start and stop:

1) Road condition (paved, gravel, cross-country)
2) Speed before stop, if applicable, in mph
3) Accelerometer recording readings, in G's
4) Grade and type of slope (in percent, ascending or descending)
5) Weather conditions (clear, raining, etc)

c. Any damages incurred
d. Any malfunctioning of sewing machines

6.3.2.5 Trailer Brake

Record the following:

a. Title, model and serial number
b. Maximum grade, in percent, on which the fully loaded trailer will not roll or slide with brakes locked.

6.3.2.6 Transportability

6.3.2.6.1 Preparation -

Record location of accelerometers.

6.3.2.6.2 Surface Transportability -

Record the test data as required in the applicable sections of MTP 10-2-503.

6.3.2.6.3 Air Transportability -

Record data collected as described in the applicable sections of MTP 7-2-515.

6.3.2.6.4 Logistics-Over-The-Shore (LOTS) -

Record the following:

a. Data collected as described in the applicable sections of MTP 2-2-520.
b. During loading:

1) Sea state (1, 5, etc.) and duration, in seconds
2) Wind direction and speed, in knots
3) Equipment used for loading
4) Difficulties encountered loading or coupling
5) Materials used for securing
6) Damage to test item or towing vehicle

c. During off-loading and towing operations:

1) Water depth, in inches.
2) Difficulties in towing.
3) Test item and towing vehicle tire pressures, psi.
4) Any deficiencies in operation or damage to the components of the test item.

d. During reloading operations:

1) Difficulties encountered reloading
2) Damage to the test item

6.3.2.7 Cabinet Assembly Water Leakage

Record the following:

a. Test item's identification (name, manufacturer, model and serial number.
b. Simulated rainfall rate, in inches per hour.
c. Direction of rainfall, in degrees from vertical.
d. Time of application, in minutes.
e. Amount of water in cabinet interior, if applicable.
f. Damage to components such as sewing machines, stored thread, etc., due to water penetration or moisture contamination.
g. Location and reason for water leakage, if applicable.

6.3.2.8 Environmental Storage

Record the following for each test:

a. Type of storage
b. Temperature of storage, in °F
c. Relative or absolute humidity, as applicable
d. Damage to test item components
e. Data collected as described in paragraph 6.2.3

6.3.2.9 Safety

Record the following throughout the test:

a. Normal safety precautions followed in operating the shoe repair shop.

b. Any special precautions required for operating and maintaining the test item.

c. Any condition that might present a safety hazard, cause of the hazard, and steps taken to alleviate the hazard.

d. Evidence of ground voltage in machine frames, etc.

6.3.2.10 Maintainability and Reliability Evaluation

Record data collected as described in the applicable sections of MTP 10-2-507.

6.3.2.11 Human Factors Evaluation

Record the following:

a. Data collected as described in the applicable sections of MTP 10-2-505.

b. Evaluation of the using personnel concerning their comfort.

c. Noise level in decibels for all noise measurements, position and distance from each machine of each measurement, and any adverse effects on test personnel.

d. Comments on mobility, accessibility, assembling, dismantling, transporting, safety, dependability, and noise.

e. Difficulties such as excessive pressure or awkwardness in the operation of generator or machine controls.

f. Environmental conditions both inside and outside the trailer.

g. Difficulties arising from man-item relationships and actions taken to overcome them.

h. Illumination levels at operator positions.

i. Difficulties in operating trailer jacks.

6.3.2.12 Value Analysis

Record the following:

a. Non-functional features
b. Costly features
c. "Nice-to-have" features
d. Possible design eliminations, simplifications, or modifications

6.4 DATA REDUCTION AND PRESENTATION

6.4.1 General

Data shall be summarized to reveal significant discrepancies between specified and observed performance, and presented in chart, tabular, or graphic form, as appropriate, presented as described in the applicable sections of the appropriate MTP's, and as follows:

6.4.2 Electrical Tests

6.4.2.1 Generator Tests

Perform the following calculations:

a. Average the three readings of:

1) Voltage
2) Current
3) Power factor
4) Wattage

b. Calculate the load on each generator coil using the following formula:

$$\text{Load} = \frac{I}{\sqrt{3}}$$

I = average current in one power line

c. Determine the maximum, minimum and average fuse loads for each machine.

d. Tabulate the measured data and calculated generator coil loads.

6.4.3 Machine Performance

Summarize the results of the operability tests. Include the type of test material and indicate the machine settings used.

6.4.4 Durability

Tabulate the accelerometer readings for each axis of the test item during each test run. Plot a graph which will show shock level as a function of speed before stopping for each axis of the test item. Summarize the damages sustained to the equipment as a result of the durability tests.

6.4.5 Trailer Brake

Tabulate the maximum grade on which the fully loaded trailer will not slide or roll.

6.4.6 Transportability

a. Data shall be reduced and presented as described in the applicable sections of:

1) MTP 10-2-503 for surface transportability tests
2) MTP 7-2-515 for internal air transportability tests
3) MTP 2-2-520 for logistics-over-the-shore tests

b. Marine test accelerometer data shall be tabulated for each axis