25 November 1968

Materiel Test Procedure 2-3-125
General Equipment Test Activity

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

TRUCKS, HAND

1. OBJECTIVE

This document provides procedures to determine to what degree hand trucks, and their associated tools and equipment, perform the mission as described in Qualitative Materiel Requirements (QMR's), Small Development Requirements (SDR's), and Military Characteristics (MC's), and the suitability of hand trucks and their maintenance packages for Army use.

2. BACKGROUND

A requirement exists for a man-operated material handler equipped with wheels, rollers, or casters, manually moved or self-propelled, for transporting heavy, bulky objects for short distances. This material handler or hand truck is required in a wide range of capacities, styles, sizes, and types for moving boxes, crates,, Conex containers, and heavy/bulky items in and around warehouses, storage rooms, and docks. The requirement for hand trucks extends to general utility service at various military facilities and installations such as laundries, kitchens, dining rooms, hospitals, machine shops, and bakeries. In addition, certain specialized hand trucks are required to facilitate the handling of gasoline/oil drums, oxygen/gas cylinders, bomb/munitions and other heavy, uniquely configured items in and around applicable military facilities.

The hand truck will be required to perform its mission under stress conditions ranging from capacity loads toas much as 135 percent of rated capacity for extended periods of time. Usage of the hand truck under these conditions is to be expected in addition to inadvertent abusive treatment throughout its lifetime. Therefore, the hand truck service test shall be performed in the actual service-use environment and be operated during the tests by normal hand truck operator personnel. In this way, the service test will provide evaluation data on hand truck maintainability, compatibility with the user in respect to the mission, transportability, and overall suitability for service use.

3. REQUIRED EQUIPMENT

a. Measuring tape and ruler.
b. Suitable scale for weighing.
c. Military facility or installation required for the test item mission .
d. Still camera and film.

4. REFERENCES

A. USATECOM Regulation 705-4 Equipment Performance Report.

B. USATECOM Regulation 385-7 Safety Confirmation.
C. USATECOM Regulation 700-1 Value Engineering.
D. MIL-STD-129 Marking for Shipment and Storage.
E. MIL-STD-209B Slinging Eyes and Attachments for Lifting and Tying Down Heavy Military Equipment.
F. Department of the Army Pamphlet 705-1 Maintainability Engineering.
G. Department of the Army Technical Manual TM 10-3930-254-15 Truck, Platform, 12,000 lbs., Capacity, Army Model MHE 187.
H. MIL-P-15011F Pallet, Material Handling; Wood, Post Construction, Four-Way Entry.
I. MTP 7-3-515, Air Transportability, Internal (Suitability of Equipment for.
J. MTP 10-3-500, Preoperational Inspection and Physical Characteristics.
K. MTP 10-3-501, Operator Training and Familiarization.
L. MTP 10-3-503, Transportability.
M. MTP 10-3-504, Maintenance Evaluation.
N. MTP 10-3-505, Human Factor Engineering.
O. MTP 10-3-507, Safety Hazards.

5. SCOPE

5.1 SUMMARY

This MTP includes the following:

a. Preparation for Test - A determination of the condition and physical characteristics of the test item upon arrival and to ensure that the test item is complete and functionally operational. Also, to provide operator training and familiarization.

b. Operational Performance - An evaluation of test item capability to render the specified material handling performance in accordance with the designated mission when being operated by Army personnel under service use conditions.

c. Transportability - An evaluation of test item capability to withstand shocks, extraneous forces, and impacts encountered while being transported by carriers in normal use by the Army.

d. Maintenance Evaluation - An evaluation of test item maintainability and reliability requirements under service use conditions. Also, to determine adequacy of the maintenance package, including manuals repair parts, tools and equipment.

e. Safety - An evaluation of test item compliance with safety requirements and to confirm features of the test item.

f. Human Factors Evaluation - An evaluation of the effectiveness of the man-item relationship and the ease with which the test item is operated, transported, and maintained.

g. Value Analysis - An evaluation according to USATECOM Regulation 700-1 to reveal any unnecessary test item features which may be eliminated without reducing test item performance or safety

5.2 LIMITATIONS

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None

6. PROCEDURES

6.1 PREPARATION FOR TEST

6.1.1 Initial Inspection

6.1.1.1 Arrival Inspection

Upon receipt, subject the test item and test item packages to the applicable sections of MTP 10-3-500, and the following:

a. Visually inspect test item packaging and record:

1) Evidence of damage or deterioration
2) Identification marking including:

a) Manufacturer
b) Contract number and date
c) Date of manufacture

b. Weigh and measure test item package(s) and record the following:

1) For each shipping package:

a) Contents
b) Weight
c) Length, width, and height
d) Cubage

c. Unpack the test item and record the type and adequacy of packing material in the shipping container.

d. Visually inspect the test item and record the following, when applicable: (Make use of photographs and narrative descriptions as applicable).

1) Evidence of defects in:

a) Manufacturing
b) Material
c) Workmanship

NOTE: The visual inspection shall be concentrated on the following:

a. Painted Surfaces: Should be free from roughness, runs, sags, foreign material, and irregularities.
b. Welds: Should form sound joints and connections and be free from sharp projections, burnt holes, cracks, or incomplete fusion.

c. Wheels, rollers, or casters: Should rotate smoothly and freely without binding.
d. Construction: Should be properly assembled as specified. There should be no rust or corrosion evident.
e. Hardwood Platform Frames: Should have a varnish or clear lacquer finish or as otherwise specified. The hardwood should be free of defects or noticeable blemishes.
f. Hydraulic System: Should show no evidence of leakage or malfunction.
g. Electrical System: Fuses of the specified ratings should be installed, wiring should not indicate signs of over heating or fraying, and terminal blocks/connectors should be tightly installed and free of moisture.
h. Operating Controls: All operating controls should be marked according to their function. Controls and switches should be positively mounted and operate smoothly. Emergency controls or switches should be distinctive in respect to other controls by color, size, or as specified.

e. Inspect the test item and verify that all markings are in accordance with MIL-STD-129. Record all discrepancies.
f. Record the presence of instruction plates, if applicable, including:

1) Identification
2) Caution
3) Service and handling

6.1.1.2 Inventory Check

Conduct an inventory against the basic item issue list (BIIL). Record evidence of discrepancies in the inventory of: maintenance instructions, spare parts, associated tools, associated equipments, and components. Record all shortages. Prepare an Equipment Performance Report (EPR) when applicable.

6.1.1.3 Physical Characteristics

Measure, as applicable, and record the physical characteristics of the hand truck under test in accordance with the applicable sections of MTP 10-3-500, including the following:

a. Gross weight
b. Overall width
c. Overall weight
d. Power assist features, if applicable
e. Number of wheels, rollers, or casters
f. Hand truck fork dimensions

6.1.2 Operator Training and Familiarization

a. Ensure the availability of service test personnel who have been

trained in the operation, maintenance, and safety aspects of the test item using the criteria of MTP 10-3-501 including the following:

1) Review of all safety precautions and hazards associated with the hand truck under test and the hazards of the overall testing environment. This review shall include, but not be limited to, the following:

   a) Fire hazards, fighting, and prevention
   b) Electrical shock hazards, prevention and emergency action required.
   c) Hazards of manual lifting and the recommended method for lifting heavy material or objects.
   d) Hydraulic system hazards and precautions to be observed.

2) Instructions in the capabilities, and limitations of the test item. Operator training shall include operational instructions on the following, as applicable:

   a) Rated payload capability of hand truck under test.
   b) Manual or electric hydraulic pump operation and load capacity.
   c) Hydraulic overload protection system.
   d) Pallet clearance requirements.
   e) Steering capabilities and limitations.
   f) Basic requirements to achieve even load distributions.
   g) Function and operation of all controls.
   h) Methods of tying down various payloads.
   i) Method of maneuvering test item.

3) Instructions pertaining to service test objectives and detailed procedures of individual tests.

b. Record the following for each test member:

1) Rank
2) MOS
3) Training in MOS
4) Experience in MOS

6.1.3 Preoperational Functional Performance

a. Assemble the test item as described in the applicable technical manual.

b. Perform and record required preoperational service, using specified techniques and material, as applicable, such as:

1) Lubrication of:

a) Wheel, roller, or caster bearings
b) Swiveling wheel mounting bearings

2) Hydraulic reservoir level
3) Battery

NOTE: Avoid contact with the battery electrolyte. Do not smoke or use an open flame in the vicinity when servicing batteries since explosive hydrogen gas is generated during the charging process.

c. Examine, as applicable, and make and record required adjustments to or non-functionability of the following:

1) Wheel locking devices
2) Steering mechanisms
3) Hydraulic pressure-relief valve
4) Hydraulic pallet lift and lowering mechanism
5) Self-propelling mechanism
6) Electrically driven platforms

6.2 TEST CONDUCT

NOTE: All equipment failures occurring during conduct of the tests shall be reported in accordance with USATECOM Regulation 705-4.

6.2.1 Operational Performance

NOTE: Operational performance shall be determined under the following conditions.

a. Hand trucks undergoing service tests will be operated in realistic service environments and will be used to perform tasks within the mission of various TOE units that normally use hand trucks for material handling. Operators and maintenance personnel organic to the operation or support units will be used.

b. During the operational evaluation, the effectiveness of the test item and operator combination to handle specified material will be assessed. Test operations will be conducted under all possible and practical mission conditions and records will be maintained of performance.

c. The test item shall be scheduled for use in a warehouse, store room, dock, shop, or other facility in accordance with the individual test item intended mission.

d. The performance evaluation will be continued until sufficient test hours have been accumulated to be representative of the specific test item mission requirements and enough data have been collected to predict with confidence test item value relative to reliability, availability, and mission performance.

6.2.1.1 Loading Test

6.2.1.1.1 Multi-Wheeled Hand Trucks - Load manual multi-wheeled hand truck types to the specified maximum load capacity, and observe and record the following:

a. Evidence of test item instability when loaded as specified
b. Difficulty of operator(s) to evenly distribute the load due to test item construction or design.
c. Adequacy of tie downs, if applicable
d. Adequacy of wheel locks or brakes, if applicable, during the loading operation.
e. Adequacy of shelves for specified materials, if applicable

1) Spacing between shelves for specified materials
2) Width of shelves for specified materials
3) Shelf rim or ridge preventing loaded material from slipping, sliding, or falling.

f. Adequacy of pan or tray slides and slide recesses. if applicable:

1) Pan or tray "stops" compatibility with designated pan or tray
2) Vertical clearance between slides

g. Suitability of test item for loading

6.2.1.1.2 Two Wheeled Hand Trucks - Load manual two wheeled hand trucks with the specified or simulated maximum load and observe and record the following:

a. Suitability of load bearing cradle, platform, or frame to fit specified load shapes.
b. Suitability of test item load rim or drum/cylinder clamping devices, where applicable.
c. Ease with which operator(s) pick-up specified material from a horizontal position on a level floor, where applicable.
d. Ease with which operator(s) pick-up specified material from a vertical position on a level floor, where applicable.
e. Adequacy of support legs to support loaded test item, where applicable.
f. Adequacy of securing straps for designated loads.
g. Overall suitability of test item for loading

6.2.1.1.3 Lifting and Pick-up Capability - Record the following:

a. Utilize test item hydraulic lifting and lowering mechanism manually or electrically driven if applicable, to lift specified materials such as loaded pallets. Observe this operation and record the following:

1) Compliance of test item forks with clearance requirements of of military pallets conforming to MIL-P-15011.

2) Tendency of lifting mechanism to move freely without dragging on pallet boards.
3) Leakage of hydraulic system
4) Ease of manually pumping hydraulic system pump during loading operation and number of pump strokes required to achieve specified lift height as applicable.
5) Premature operation of hydraulic pressure relief valves
6) Maximum height above level floor test item hydraulic lift is capable of lifting a maximum loaded pallet or other specified material.
7) Adequacy of electrically driven hydraulic lift controls, including marking of controls for specified function, where applicable.
8) Downward drift of hydraulic lift holding a maximum loaded pallet or other specified material for the time as specified in the test plan.
9) Suitability of test item maneuverability in relation to being positioned for lifting operation.
10) Overall suitability of test items equipped with manual or electrically driven hydraulic lift systems to pick up and hold specified loads.

b. Utilize test items of the electric driven platform type to pick-up Convex containers. Observe this operation and record:

1) Difficulty of operator in positioning test item to pick-up Convex container due to test item construction or design.
2) Tendency of fuses to burn out for loads not exceeding maximum rated capacity.
3) Leakage of hydraulic lines or fittings
4) Endurance of battery:

a) Hours utilized
b) Approximate total payload weight

5) Suitability of platform clearances for specified loads
6) Maximum height hydraulic lift is capable of attaining when test item is loaded to specified payload
7) Suitability of manual or electrically driven brake(s) during loading operation.
8) Overall suitability of electrically driven platform type test items to pick up Convex containers or other specified material .

6.2.1.2 Cargo Handling

Load the test item as specified by the applicable procedures of 6.2.1.1 and move the specified load to a new location. Observe and record the following:

a. Evidence that any test item moving part(s) exhibit a tendency to

bind or require excessive lubricant to sustain quiet operation.

b. Evidence that the test item wheels, rollers, or casters mar or otherwise damage the test facility floor.

c. Evidence of undue force required to start the test item rolling when loaded at rated capacity or less and moved as specified.

d. Any difficulty encountered by the operator(s) in turning the test item.

e. Tendency of test item to stall in hole or cut on the test facility floor when loaded to the specified load capacity.

f. Evidence of damage to objects stored in the test facility by test item wheel, roller, caster mounting(s), or other test item projecting parts or fittings.

g. Suitability of emergency stop control or reverse control, as applicable.

h. Evidence of operator difficulty in balancing specified load on test item of the tilt type.

i. Evidence of operator difficulty in coordinating the movements of a swiveling type test item.

j. Evidence that more than the specified number of personnel are required to move the test item loaded to no more than rated capacity.

k. Evidence of marks on facility walls or other surfaces caused by test item frame bumpers.

l. Overall suitability of the test item to transport the required load when moved as specified.

6.2.1.3 Overload Test

a. Overload the test item but to no more than the rated overload capacity.

b. Repeat the applicable procedures of paragraph 6.2.1.1.

c. Inspect the test item for the following:

1) Permanent deformation to test item shelves, platform, frame members, cradle, or manual push-bar, as applicable.
2) Improper operation of hydraulic overload relief valves.
3) Weld or rivet failures
4) Distortion or failure of any hand truck part
5) Hydraulic system leakage and/or malfunction

d. Record the results of this inspection using photographs and narrative descriptions, as applicable. Include in detail the circumstances associated with any observed failure and the following:

1) Failures observed, if applicable
2) Service test hours completed
3) Load and weight at time of failure
4) Evidence of improper design
5) Evidence of material failure suggesting improper choice of material for the test item mission.

6.2.2 Transportability

NOTE 1. Transportability evaluation of this item will be conducted in conjunction with other commodity items, as applicable or convenient.
2. If test item mission or intended use includes overseas locations, subject properly packed item to 5 hours of marine transport in accordance with 1. above.

6.2.2.1 Packaging

Package the hand truck, free of defects, for domestic, marine and air shipment and record the following, as applicable:

a. Organization/Unit selected or simulated for this test
b. Type, size and serial number of test item
c. Type of container used for packaging
d. Dimensions of container
e. Weight of container
f. Time required to disassemble test item for packaging, if applicable
g. Degree of disassembly required, if applicable
h. Time required to pack the test item
i. Method of packing
j. Gross weight of packing container plus test item

NOTE Tie-downs and lifting attachments shall be provided as appropriate and in accordance with MIL-STD-209B

6.2.2.2 Surface Transportability

a. Subject the test item(s) packaged for domestic shipment and overseas marine shipment during the procedures of paragraph 6.2.2.1 to the applicable procedures of MTP 10-3-503, including:

1) For containers packaged for domestic shipment:

a) A minimum of 50 miles of railroad travel
b) A minimum of 50 miles of motor vehicle travel

2) For containers packed for overseas marine shipment:

a) A minimum of 5 hours of marine vessel travel

b. Subject the containers and test items to the applicable procedure of MTP 10-3-500, at the completion of the respective transportability tests.
c. Record the following for the containers:

1) Method of transportation
2) Mileage of hours of water travel, as applicable

d. Record the organization/unit being simulated

6.2.2.3 Air Transportability

NOTE: 1. The conduct of air transportability testing shall be coordinated with the appropriate unit conducting air transportability tests.
2. Background information on air transport operations is contained in MTP 7-1-002.

a. Subject a test item container packaged for air transport during the procedure of paragragh 6.2.2.1 to the applicable procedures of MTP 7-3-515.
b. Subject the container and test item to the applicable procedures of MTP 10-3-500, at the completion of the internal transport operations.
c. Record the organization/unit being simulated

6.2.3 Maintenance Evaluation

Determine the test item maintainability and reliability, throughout the conduct of the test, in accordance with the applicable sections of MTP 10-3-504, including the assessing of the adequacy of the technical literature, and from the observed data, evaluation availability of a test item.

6.2.4 Safety

a. Determine the test item safety hazards resulting from transport, operation, maintenance and packaging as described by the applicable sections of MTP 10-3-507.
b. Observe and record the following throughout the conduct of testing:

1) Dangerous or unsafe conditions resulting from inadequate features, such as inadequate wheel locks, etc.
2) Suggestions to improve test item safety features
3) Suggested additional caution or warning plates

c. Prepare a Safety Confirmation in accordance with USATECOM Regulation 385-7.

6.2.5 Human Factors Evaluation

Determine the effectiveness of the man-item relationship during use of the test item by performing the applicable sections of MTP 10-3-505, and the following:

a. Observe and record the ease with which the test item is assembled if applicable, and functionally checked prior to operation.
b. Observe and record any restrictions to the operator when operating the test item under the following conditions:

1) When the operator is wearing protective clothing, such as gloves.
2) When tying down loads, if applicable

c. Informally question test item operators regarding their opinions of the test item ease of use. Record these findings.

d. Informally question test item maintenance personnel regarding their opinion of test item ease of maintenance. Record these findings.

e. Informally question test item operator personnel and maintenance personnel in regard to their opinion of the technical manuals or other instructional matter furnished with the test item. Record these findings.

6.2.6 Value Analysis

A value analysis of the hand truck under test is conducted to ascertain whether the test item has any nonfunctional, costly, or unnecessary features as stated in USATECOM Regulation 700-1. Perform the following:

a. Observe the test item being operated and maintained. Record any evidence that the test item incorporates features which could be eliminated without compromising performance, reliability, durability, or safety.

b. Informally question test item operators and maintenance personnel in regard to their opinion of test item features which could be eliminated without decreasing the functional value of the test item. Record these findings.

c. Test team members shall observe the test item in use and will comment separately in the daily log in regard to the elimination of unnecessary features.

6.3 TEST DATA

6.3.1 Preparation For Test

6.3.1.1 Initial Inspection

6.3.1.1.1 Arrival Inspection

Record data collected as described in the applicable sections of MTP 10-3-500, and the following:

a. For test item packaging:

1) Evidence of damage or deterioration
2) Identification marking including:

a) Manufacturer
b) Contract number and date
c) Date of manufacturer

b. For each shipping package

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

a) Length
b) Width
c) Height

4) Cubage in ft.^{3}

c. Type and adequacy of packing material
d. For the test item:

1) Defects in:

a) Construction
b) Material
c) Workmanship

2) Discrepancies in marking as per MLD-STD-129
3) Presence of:

a) Identification plate(s)
b) Caution instructions plate(s)
c) Handling and service instructions(s)

6.3.1.1.2 Inventory Check

Record discrepancies and shortages in the inventory of maintenance instructions, spare parts, associated tools, associated equipments and components.

6.3.1.1.3 Physical Characteristics

Record data collected as described in the applicable sections of MTP 10-3-500, and the following:

a. Gross weight, in pounds
b. Overall width, in inches
c. Overall weight, in pounds
d. Power assist features
e. Number of wheels, rollers, or casters
f. Hand truck fork dimensions, in inches

6.3.1.2 Operator Training and Familiarization

Record data collected as described in the applicable MTP 10-3-501, and the following for each test team member.

a. Rank
b. MOS
c. Training in MOS, in months
d. Experience in MOS, in months

6.3.1.3 Preoperational Functional Performance

Record the following:

a. Preoperational service required
b. Required adjustments to , or non-functionability of:

1) Wheel locking devices
2) Steering mechanisms
3) Hydraulic pressure-relief valve
4) Self-propelling mechanism
5) Hydraulic pallet lift and lowering mechanism
6) Electrically driven platforms

6.3.2 Test Conduct

6.3.2.1 Operational Performance

6.3.2.1.1 Loading Test

a. Multi-Wheeled Hand Trucks - record the following:

1) Evidence of manually loaded truck type to be unstable when loaded as specified.
2) Difficulty of operator(s) to evenly distribute load due to test item construction or design.
3) Adequacy of tie downs
4) Adequacy of wheel locks or brakes during loading operation
5) Adequacy of shelves for specified materials, if applicable

a) Spacing between shelves for specified materials
b) Width of shelves for specified materials
c) Shelf rim or ridge preventing loaded material from slipping, sliding, or falling.

6) Adequacy of pan or tray slides and slide recesses

a) Pan or tray "stops" compatibility with designated pan or tray.
b) Vertical clearance between slides

7) Suitability of manually loaded test item for loading

b. Two Wheel Hand Trucks - record the following:

1) Suitability of load bearing cradle, platform, or frame to fit specified load shapes.
2) Suitability of test item load rim or drum cylinder clamping devices.

3) Ease with which operator(s) pick-up specified material from a horizontal position on a level floor.
4) Ease with which operator(s) pick-up specified material from a vertical position on a level floor.
5) Adequacy of support legs to support loaded test item, where applicable.
6) Adequacy of securing straps for designated loads
7) Overall suitability of test item for loading

c. Lifting and Pick-up Capability - record the following:

1) For manual or electrical driven hydraulic systems:

a) Compliance of test items employing hydraulic lifting and lowering mechanisms to lift specified loads such as military pallets conforming to MIL- P-15011.
b) Tendency of lifting mechanism to move freely without dragging on pallet boards.
c) Leakage of hydraulic system
d) Ease of manually pumping hydraulic system pump during loading operation and number of pump strokes required to achieve specified lift height.
e) Premature operation of hydraulic pressure relief valves
f) Height above the level floor test item hydraulic system is capable of lifting a maximum loaded pallet, or other specified material, in inches.
g) Adequacy of electrically driven hydraulic lift controls, including marking of controls for specified function.
h) Downward drift of hydraulic lift holding a maximum loaded pallet or other soecified material, in inches per hour.
i) Suitability of test item maneuverability in relation to being positioned for lifting operation.
j) Overall suitability of test items equipped with manual or electrically driven hydraulic lift systems to pick up and hold specified loads.

2) For electric driven platform hand trucks:

a) Difficulty of operator in positioning test item to pick up Convex container due to test item construction or design.
b) Tendency of fuses to burn out for test item loads not exceeding maximum rated capacity.
c) Leakage of hydraulic lines or fittings
d) Endurance of battery, in hours:

1) Hours utilized
2) Approximate total payload weight, in tons

e) Suitability of platform clearances for specified loads
f) Maximum height hydraulic lift is capable of attaining when test item is loaded to specified payload, in inches.
g) Suitability of manual or electrically driven brake during loading operations.
h) Overall suitability of electrically driven platform type test items to pick up Convex containers or other specified material.

6.3.2.1.2 Cargo Handling - Record the following:

a. Evidence that any test item moving part(s) exhibit a tendency to bind or require excessive lubricant to sustain quiet operation.
b. Evidence that the test item wheels, roller, or casters mar or otherwise damage the test facility floor.
c. Evidence of undue force required to start the test item rolling when loaded at rated capacity or less and moved as specified.
d. Difficulty encountered by the operator(s) in turning the test item.
e. Tendency of test item to stall in hole or rut, in the test facility floor.
f. Evidence of damage to objects stored in the test facility by test item roller, wheel, caster mounting(s) or other test item projecting parts or fittings.
g. Suitability of emergency stop control or reverse control, as applicable
h. Evidence of operator difficulty in balancing specified load on test item of the tilt type.
i. Evidence that more than the specified number of personnel are required to move the test item loaded to no more than rated capacity.
j. Evidence of marks on facility walls or other surfaces caused by test item frame bumpers.
k. Evidence of operator difficulty in coordinating the movements of a swiveling type test item.
l. Overall suitability of the test item to transport the required load when moved as specified.

6.3.2.1.3 Overload Test -

Record the following:

a. Data collected as described in the applicable procedures of paragraph 6.2.1.2.
b. Permanent deformation of test item shelves, platforms, frame members, cradle, or manual push-bar, as applicable.
c. Improper operation of hydraulic overload relief valves
d. Weld or rivet failures
e. Distortion or failure of any hand truck part
f. Hydraulic system leakage and/or malfunction
g. Failures observed

h. Service test hours completed
i. Load and weight at time of failure, in pounds
j. Evidence of improper design
k. Evidence of material failure suggesting improper choice of material for the test item mission.

6.3.2.2 Transportability

6.3.2.2.1 Packaging -

Record the following:

a. Organization/unit selected or simulated
b. Type, size and serial number of test item
c. Type of container used for packing
d. Length, width, and height of container in feet and inches
e. Weight of container, in pounds
f. Time to disassemble test item for packing, if applicable, in hours and minutes.
g. Degree of disassembly required, if applicable
h. Time to pack test item, in hours and minutes
i. Method of packing
j. Gross weight of packing container plus test item

6.3.2.2.2 Surface Transportability -

Record the following:

a. Data collected as described in the applicable sections of MTP 10-3-503.
b. Data collected as described in the applicable sections of MTP 10-3-500.
c. For the containers:

1) Method of transportation
2) Mileage or hours of water travel, as applicable

d. Organization/unit being simulated

6.3.2.2.3 Air Transportability -

Record the following:

a. Data collected as described in the applicable sections of MTP 7-3-515.
b. Data collected as described in the applicable sections of MTP 10-3-500.
c. Organization/unit being simulated

6.3.2.3 Maintenance Evaluation

a. Record data collected as described in the applicable sections of MTP 10-3-504.
b. Record all test item availability.

6.3.2.4 Safety

a. Record data collected as described in the applicable sections of MTP 10-3-507.
b. Record the following throughout the conduct of testing:

1) Dangerous or unsafe conditions resulting from inadequate features.
2) Suggestions to improve test item safety features.
3) Suggested additional caution or warning plates

6.3.2.5 Human Factors Evaluation

Record data collected as described in the applicable sections of MTP 10-3-505, and the following:

a. Ease with which the test item is assembled, if applicable, and functionally checked prior to operation.
b. Restrictions to operator(s):

1) When operator is wearing protective clothing.
2) When tying down loads.

c. Test item operator(s) opinion of test item ease of use.
d. Test item maintainer(s) opinion of test item ease of maintenance.
e. User opinion of instructional matter furnished with test item.

6.3.2.6 Value Analysis

Record the following :

a. Features which could be eliminated without compromising performance, reliability, durability, or safety.
b. User opinion of features which could be eliminated without decreasing functional value.

6.4 DATA REDUCTION AND PRESENTATION

Data obtained during the conduct of the service test will be summarized making use of photographs and charts, as appropriate. Test data will be obtained for each hand truck tested and summarized and evaluated as required.

Presentation shall include narrative reports of all test phases in addition to applicable charts and photographs.

All data will be analyzed to determine the extent to which the test

item and its associated maintenance package meet the requirements of the AMR's, SDR's, and detail specifications for the test item.