17 May 1971

Materiel Test Procedure 9-2-016
General Equipment Test Activity

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

BUILDINGS, PREFABRICATED

1. OBJECTIVE*

This document provides test methodology and testing techniques to determine the technical performance and safety characteristics of prefabricated buildings, and associated tools and equipment as described in Materiel Need (MN's) and to determine the item suitability for service tests.

2. BACKGROUND

Prefabricated buildings provide the army with low cost temporary and semi-permanent structures. Among the attractive features inherent to prefabricated buildings are, ease of assembly and disassembly, transportability, and minimal maintenance requirements. Construction techniques are simplified by utilizing pre-drilled, finished materials which are standardized and can be assembled without the need for special tools.

Prefabricated buildings are virtually unlimited in their uses and can be adapted to suit any terrain and environment found in theatre of operations.

3. REQUIRED EQUIPMENT

The following equipment or suitable substitute will be required to accomplish the testing procedures as specified by this document.

a. Photographic equipment.
b. Suitable test weights.
c. Stress-strain measuring equipment.
d. Appropriate building furnishings, fixtures and equipment.
e. Appropriate material handling equipment (MHE).
f. Appropriate building erection tools and equipment.
g. Appropriate construction equipment such as cranes, graders, dozers, etc.

*This MTP is intended to be used as a basic guide in preparing actual test plans for the subject equipment. Specific criteria and test procedures must be determined only after careful appraisal of pertinent MN's and any other applicable documents.

h. Suitable test site.
i. Appropriate deflection measuring devices.

4. REFERENCES

A. Army Regulation 70-38 Research and Development: Research, Development, Test and Evaluation of Material for Extreme Climatic Conditions.
B. USAMC Pamphlet 706-134 Engineering Design Handbook: Maintainability Guide for Design.
C. USATECOM Regulation 385-6 Safety: Verification of Safety of Materiel During Testing.
D. USATECOM Regulation 70-23 Research and Development: Equipment Performance Reports (EPRs).
E. USATECOM Regulation 700-1 Quality Assurance: Value Engineering.
F. USATECOM Regulation 750-15 Maintenance of Supplies and Equipment: Maintenance Evaluation During Testing.
G. USAGETA Document Human Factors Evaluation Data for General Equipment (HEDGE).
H. FED-STD-101 Preservation, Packaging, and Packing Materials, Test Procedures.
I. FED-STD-151 Metals: Test.
J. MIL-STD-129 Marking for Shipment and Storage.
K. MIL-STD-209 Slinging Eyes and Attachments for Lifting and Tying Down Military Equipment.
L. MIL-STD-271 Nondestructive Testing Requirements for Metals.
M. MIL-STD-810 Environmental Test Methods.
N. MIL-STD-1186 Cushioning, Anchoring, Bracing, Blocking, and Waterproofing, and Appropriate Test Methods.
O. MIL-STD-1472 Human Engineering Design Criteria for Military Systems, Equipment and Facilities.
P. Federal Test Method Std. No. 141 Paint, Varnish, Lacquer and Related Materials, Methods of Inspection, Sampling, and Testing.
Q. Federal Test Method Std. No. 406, Plastics, Methods of Testing.
R. MTP 4-2-818, Testing and Fungus Resistance.
S. MTP 7-2-515, Air Transport (Suitability of Equipment for)
T. MTP 9-2-503, Durability.
U. MTP 9-4-001, Desert Environmental Test of Construction, Support and Service Equipment.
V. MTP 9-4-005, Arctic Environmental Test of Construction, Support and Service Equipment.
W. MTP 9-4-003, Tropic Environmental Test of Support and Service Equipment.
X. MTP 10-2-500, Physical Characteristics.
Y. MTP 10-2-501, Operator Training and Familiarization.
Z. MTP 10-2-503, Surface Transportability (General Supplies and Equipment).

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13. ABSTRACT

Test procedures are specified for evaluating the construction, maintenance, and structual adequacy of prefabricated buildings.

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14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Building, prefabricated						
Structure, temporary						
Structure, semi-permanent						

AA. MTP 10-2-505, Human Factors Evaluation.
AB. MTP 10-2-507, Maintenance Evaluation.
AC. MTP 10-2-508, Safety.
AD. MTP 10-2-511, Quality Assurance.
AE. FM 5-34, Engineer Field Data.
AF. FM 5-35, Engineer's Reference and Logistical Data.
AG. TM 5-233 Construction Surveying.
AH. TM 5-302 Construction in the Theater of Operations.
AI. TM 5-309 Arctic Construction.
AJ. TM 5-460 Carpentry and Building Construction.
AK. TM 5-541 Control of Soils in Military Construction.
AL. TM 5-704 Construction Print Reading in the Field
AM. MTP 10-2-512 Reliability.

5. SCOPE

5.1 SUMMARY

This procedure describes the preparation for and the methods to be used in evaluating the technical performance and safety characteristics of prefabricated buildings and their associated tools and equipment. To assess the degree of conformance with required standards and established criteria, the test item(s) should be subjected to the following:

a. Preparation for Test - A pretest inspection to determine the condition of the test item(s) as received by the testing facility. This includes an inventory check, inspection for damage and a determination of the test items physical characteristics.

b. Assembly and Erection Test - An evaluation of the prefabricated building assembly and erection characteristics with respect to adequacy of design and prescribed techniques.

c. Building Strength Test - A determination of the test building ability to withstand the normal forces associated with its intended usage and the additional loading associated with environmental extremes such as ice, snow and wind.

d. Environmental Effects - A determination of the test building ability to resist the deterioration effects presented by accelerated climatic and environmental conditions.

e. Durability - An evaluation of the test item ability to retain original physical and performance characteristics after periods of extended usage, handling, and/or environmental exposure.

f. Transportability - An evaluation of the prefabricated building disassembly and transportability characteristics.

g. Maintenance Evaluation - To determine and verify the maintenance/maintainability characteristics and requirements of the test item; an appraisal of the design and of the maintenance test package, and the calculation of indicators which express the effects of the preceding aspects.

h. Reliability - An evaluation to determine the probability that the test item will perform its intended function for a specified interval under stated conditions.

i. Safety - A determination of the test item's safety characteristics and potential hazards.

j. Human Factors - An evaluation to determine the adequacy of the design of the test item's construction characteristics in terms of conformance to accepted human factors engineering and design criteria.

k. Value Analysis - An evaluation directed at analyzing the primary function and features of the test item for the purpose of cost reduction without compromising performance, reliability, quality, maintainability, or safety.

l. Quality Assurance - An evaluation directed at analyzing the results of the above sub-tests to ensure that the test item meets all quality requirements as set forth in applicable MN's.

5.2 LIMITATIONS

Subject equipment as referred to in this document are prefabricated buildings which upon acceptance would be standard items available for issue from U.S. Army depots together with the component parts necessary for the building erection.

6. PROCEDURES

6.1 PREPARATION FOR TEST

6.1.1 Inspections

6.1.1.1 Arrival Inspection

Upon arrival of the test building assembly at the test facility, proceed as follows:

a. Layout the test building assembly with all boxed or crated materials unpackaged.

b. Photograph the entire shipment giving special attention to damaged items and noting packaging methods, where applicable.

c. Visually inspect the shipment recording any deviations from the applicable portions of the following military standards:

1) FED-STD-101, Preservation, Packaging and Packing Materials, Test Procedures.
2) MIL-STD-129, Marking for Shipment and Storage.
3) MIL-STD-1186, Cushioning, Anchoring, Bracing, Blocking, and Waterproofing, and Appropriate Test Methods.

NOTE: Care should be taken to ensure that all applicable protective materials have been removed.

d. Prior to accomplishing item (e) below, members of the inspection group should become familiar with the applicable portions of the following:

1) MIL-STD-10, Surface Roughness, Waviness, and Lay.
2) MIL-STD-271, Nondestructive Testing Requirements for Metals.
3) FED-STD-151, Metals: Test.
4) Federal Test Method Std. No. 141, Paint, Varnish, Lacquer, and Related Materials, Methods of Inspection, Sampling, and Testing.
5) Federal Test Method Std. No. 406, Plastics, Methods of Testing.

e. Proceed to inspect the test item(s) and record any evidence of defects in the following areas:

1) Workmanship/Construction/Materials: In general the test item should be well made and free from defects. Methods of construction should indicate sound design and good shop practice. Materials should be new and as authorized by the applicable component specifications.

2) Record and bring to the attention of the test officer any observed defect or condition which is considered to be a potential hazard to the safety of test personnel or facilities.

6.1.1.2 Inventory Check

a. Conduct an inventory against the Basic Issue Items List (BIIL). Record evidence of the following:

1) Missing blueprints, diagrams, maintenance literature or draft technical manuals.
2) Shortages in the necessary structural materials and fasteners.
3) Missing repair parts, accessories or tools.

4) Erection instructions (if not included) in technical manuals.

b. Submit an equipment performance report (EPR) for each noted shortage or discrepancy in accordance with the applicable procedures in USATECOM Regulation 70-23.

6.1.1.3 Physical Characteristics

Perform the applicable procedures of MTP 10-2-500 and record the appropriate data.

6.1.2 Operator Training and Familiarization

Members of the test team shall be oriented in accordance with MTP 10-2-501.

a. Record rank, MOS skill level, past experience, and extent of additional training required for each test team member.

b. Test personnel shall receive a review of all safety precautions and hazards associated with the appropriate test facilities and the test item. This review shall include but not be limited to the following:

1) General test facility hazards and safety precautions.
2) Fire hazards, fighting, and prevention.
3) Hazards and precautions associated with manual lifting.
4) Safety precautions relating to mechanical equipment.
5) Electrical shock hazards, prevention, and emergency action required.

c. Test team members should be familiar with applicable sections of the following publications:

1) FM 5-34, Engineer Field Data.
2) TM 5-233, Construction Surveying.
3) TM 5-302, Construction in the Theater of Operations.
4) TM 5-460, Carpentry and Building Construction.
5) TM 5-541, Control of Soils in Military Construction.
6) TM 5-704, Construction Print Reading in the Field.
7) Design and Control of Concrete Mixtures, Tenth Edition, Portland Cement Assoc., as appropriate.

6.1.3 Selection of Erection Site

a. Selection of the building erection site is dependent to some degree upon the type of prefabricated building to be tested; arctic buildings in the arctic, tropic buildings in the tropics, etc. The following site characteristics are desirable:

1) Good avenues of approach to and from the erection site.
2) Level terrain.
3) Compact soil for foundation structures.
4) Appropriate drainage.
5) Absence of obstructions.
6) Ample storage area adjacent to construction site.

b. Photograph the proposed erection site.

c. Describe the terrain and geographic/geologic characteristics of the test erection site.

6.2 TEST CONDUCT

NOTE: 1. All equipment malfunctions occurring during the testing procedures shall be reported in accordance with USATECOM Regulation 70-23.

2. Prior to initiating test procedures the test officer will review and implement all safety considerations contained in Section 6.2.8.

6.2.1 Assembly and Erection Test

6.2.1.1 Erection Site Layout

Prepare the proposed erection site in accordance with those procedures as specified by the appropriate draft technical manual(s). Describe the layout operations accounting for any difficulties and deviations from the procedures of the draft technical manual(s).

6.2.1.2 Pre-Erection Assembly

Those elements of the prefabricated structure which so lend themselves should be assembled prior to the building erection operation. Record the following information concerning the test item's assembly characteristics.

a. Description of structure to be assembled, i.e., floor, side walls, roof truss. . . .

b. Any misalignment of pre-drilled bolt holes.

c. Any incorrect or insufficient fasteners.

d. Truss connectors wrong size or configuration.

e. Failure of wall panels to form a weather-tight seal.

f. Insufficient number of pre-drilled bolt holes to adequately secure the structure.

g. Any other difficulties or deficiencies encountered.

6.2.1.3 Foundation Construction

a. Construct the building foundation in accordance with the applicable draft technical manual(s). If more than one type of foundation is permitted by the draft technical manual(s) use the one most appropriate for the geologic conditions of the erection site and the building's intended use. Describe the type of foundation employed giving the reason(s) for its selection.

6.2.1.4 Building Erection Evaluation

Proceed to erect the building as prescribed by the applicable draft technical manual(s). Throughout the erection stage, record any discrepancies to include the following areas:

NOTE: Include a vapor barrier in floor construction, if applicable, otherwise, place it in the foundation.

a. Floor Framing (where applicable).

1) Improper or misaligned pre-drilled bolt holes.
2) Difficulty in leveling floor framing.
3) Failure of joists to mate properly with the floor stringers.

b. Floor Paneling (where applicable).

1) Failure of floor panels to mate with connecting members.
2) Members wrong size or insufficient (number, length, width).
3) Failure of floor panels to form a weather tight seal. Not required if vapor barrier used.

c. Sidewall and Roof Framing (Where applicable).

1) Failure of side wall framing to align properly with the floor stringer.
2) Failure of the wall studs to mate with the eave angles (channels, etc.).
3) Failure of roof trusses and framing to assemble properly.

4) Difficulty in maintaining the squareness of all roof, floor, and wall junctions, especially door and window framing.

d. Sidewall and Roof Paneling.

1) Failure of wall and roof panels to mate together to form a weather-tight seal.
2) Improper alignment of individual wall and roof panels to the wall and roof framing.
3) Ease of installing and continuity of insulation.
4) Fit and weathertightness of fenestration.

6.2.1.5 Plumbing and Associated Fixtures

During the building erection, install the plumbing system as specified by the draft technical manual(s). Describe any difficulties encountered and record any evidence of the following:

a. Lack of (or insufficient number of) provisions for pipe hangers or supports.

b. Inadequate provisions for installing and supporting fixtures such as sinks, water closets and urinals.

c. Insufficient piping materials supplied to correctly install all piping systems.

d. Improper piping and fittings provided.

e. Insufficient number of flanged joints or pipe unions specified to allow for ease of installation and maintenance.

f. Man-operated valves and gauges installed in areas which are readily accessible.

g. Failure of piping penetrations through weather bulkheads and floor to form a weather-tight seal.

h. Lack of pitch on drainage lines.

i. Any other items noted.

6.2.1.6 Electrical System and Fixtures

Install the electrical system and associated fixtures in accordance with the erection drawings and the appropriate draft technical manual(s). Describe any difficulties encountered and record any evidence of discrepancies in the following areas:

a. Proper size and number of wire provided to conduct the specified current.

b. Sufficient length of wire and conduit to complete the installation of the electrical system.

c. Provisions made to support the electrical cables and fixtures.

d. Sufficient number of outlets, receptacles, and switches provided.

e. Is sufficient illumination provided by the lighting system as specified by the draft technical manual and erection drawings?

f. Fuse box or circuit breaker panel appropriate for the electrical system?

g. Other items noted.

6.2.1.7 Ventilation System and Equipment

Install the ventilation system and associated equipment in accordance with the draft technical manual(s). Describe any difficulties encountered and record the following:

a. Adequate provisions made for exhaust and supply terminals (where appropriate).

b. Sufficient amount of ducting, insulation when applicable, and the necessary installation materials provided to complete the ventilation system.

c. Failure of the roof jack to properly adapt to the roof structure.

d. Weather-tightness of roof or wall vents and louvers.

e. Suitable provisions made to install and support the heating and airconditioning equipment where appropriate.

f. Heating, ventilation, and air conditioning controls provided and installed in readily accessible areas.

g. Lack of adequate number of windows and doors for ventilation.

h. Other items noted.

6.2.2 Building Strength Test

6.2.2.1 Working Load Test

Upon completion of the building erection subject the structure to loading conditions which it will experience during its normal usage.

a. Load the building with weights and/or equipment to a predetermined lb/ft established in design.

b. Using stress-strain measuring equipment, determine the loading stresses transmitted to critical structural members, floor panels, bulkhead framing and roof trusses.

6.2.2.2 Environmental Stress Test

Determine the building's ability to withstand additional stress due to environmental extremes germane to the areas where the test building is intended to be used. Proceed as follows:

a. Subject the building to stresses due to weather conditions in addition to the normal working stress as described in section 6.2.2.1. Snow and ice loads, if practicable, should be of sufficient magnitude to reflect the average accumulation during a 48-hour period; wind loads shall be equivalent to that which would be experienced due to the average annual maximum wind speeds common to the erection area.

b. Using suitable stress-strain measuring equipment determine the stresses transmitted to critical structural members, wall frames and panels, and roof trusses and panels.

c. Describe the procedures of the environmental loading test, record any unsafe conditions of failure of the building materials.

6.2.3 Environmental Effects

Determine the ability of the test item and its various components and accessories to resist physical damage and/or deterioration when subjected to accelerated climatic and environmental conditions. Testing should be conducted as necessary to ensure that the test item is suitable for transport, storage, and operation under conditions existing within the appropriate areas and/or environments as specified by the applicable MN and as defined by AR 70-38. In the preparation for conduct of testing, test personnel should consult the applicable portions of MIL-STD-810 and/or other appropriate documents as specified below.

6.2.3.1 Desert Environmental Evaluation

Subject the test item to the applicable procedures of MTP

9-4-001. Record the appropriate data.

6.2.3.2 Arctic Environment Evaluation

Subject the test item to the applicable procedures of MTP 9-4-005. Record the appropriate data.

6.2.3.3 Tropic Environment Evaluation

Subject the test item to the applicable procedures of MTP 9-4-003. Record the appropriate data.

6.2.3.4 Fungus Resistance

All appropriate test item type components and accessories shall be subjected to the applicable procedures of MTP 4-2-818.

6.2.3.5 Rain Test

Subject the assembled test item to a rain test. Proceed as follows:

a. External surfaces of the assembled structure shall be exposed to natural or simulated rain falling toward the item at an angle of approximately 45 degrees to the horizontal. Continue the rainfall for one hour at a rate of 3 inches per hour.

NOTE: Ensure that roof, walls, doors and windows of the test item have been exposed to the rainfall.

b. During and immediately upon completion of the rain test proceed to inspect for leakage and for any condition of damage resulting from the test.

c. Record the following:

1) Rain test conditions and parameters.
2) Any condition of leakage or damage resulting from the test.

6.2.3.6 Sand and Dust Test

a. Subject samples of critical components of the equipment to a sand and dust test in accordance with MIL-STD-810, Method 410.

b. Upon completion of the test examine the unit and its components for the effects of sand and dust.

c. Record the extent of damage resulting from abrasion or other factors.

6.2.4 Durability

The test item's durability shall be verified by performing

the applicable procedures of MTP 9-2-503. Record appropriate data.

6.2.5 Transportability

Evaluate the transportability characteristics of the test item.

NOTE: Personnel should be familiar with the applicable portions of the following documents.

a) MIL-STD-101, Preservation, Packaging, and Packing Materials, Test Procedures.
b) MIL-STD-129, Marking for Shipment and Storage.
c) MIL-STD-209, Slinging Eyes and Attachments for Lifting and Tying Down Military Equipment.
d. MIL-STD-1186, Cushioning, Anchoring, Bracing, Blocking, and Waterproofing, Appropriate Test Methods.

6.2.5.1 Surface Transportability

a. The draft technical manual shall be reviewed or consulted for proper procedures for disassembly, packaging, tying down, lifting, and transporting the test item by various media. Any inadequacy of instructions should be reported by EPR.

b. Evaluate the transportability characteristics of the test item by accomplishing the applicable procedures of MTP 10-2-503. Record the appropriate data.

c. Evaluate the effectiveness of tie-down/securing devices and lifting attachments, using MIL-STD-209 as a basis for the evaluation.

6.2.5.2 Air Transportability - External/Internal (Where Appropriate)

Perform the applicable procedures of MTP 7-2-515 and record the appropriate data.

6.2.5.3 Post Transport Assembly and Erection

Upon completion of the transportability evaluation the test item shall be assembled and erected. Repeat the procedures of section 6.2.1 of this document. Record any difficulties experienced and other appropriate data as noted in section 6.2.1.

6.2.6 Maintenance Evaluation

Evaluate the maintenance related factors of the test item as described in MTP 10-2-507 and USAMC Pamphlet 706-134 with emphasis on the following:

a. Organizational (O), Direct Support (F), and General Support (H) maintenance requirements.

b. Operator through General Support Maintenance Literature, if applicable.

c. Repair parts.

d. Calibration standards and facilities.

e. Test and handling equipment.

f. Maintenance facilities.

g. Personnel skill requirements.

h. Maintainability.

i. Availability.

6.2.7 Reliability

Evaluate and appraise the reliability related factors of the test item as described in MTP 10-2-512.

6.2.8 Safety

Record applicable data required by MTP 10-2-508 and the following:

a. Comments regarding unsafe conditions found in the procedures of any test.

b. General safety characteristics:

1) Poorly worded or unclear erection instructions.
2) Sharp metal edges.
3) Unprotected electrical circuits.
4) Markings for environmental limitation.
5) Unsafe assembly procedures.
6) Lack of adequate number of windows and doors.

c. A tabulation of the following:

1) List of all safety devices used.
2) Type of failure each device is to detect.
3) Indication that the device has successfully passed two cycles of operation.

d. List any missing devices or unsafe conditions.

e. List any suggested additions to the test item's safety features.

f. Recommendation for safety release.

g. The safety statement will be reviewed by the test officer who will assure that all test personnel are aware of the safety limitations of the test prior to the conduct of engineering test.

6.2.9 Human Factors Evaluation

Accomplish the applicable procedures of MTP 10-2-505 and the following:

The test item shall be evaluated to determine the degree to which its physical design and revealed performance characteristics conform to recognized human factors engineering design criteria. Use the applicable requirements of Human Factors Evaluation Data for General Equipment (HEDGE), for Class IIIB equipment. Prepare checklists to evaluate the human factors characteristics to be considered during conduct of the denoted tests.

In some instances, the HEDGE test functions and subtests may be under consideration during the conduct of other tests. Where this condition exists the HEDGE requirements will be integrated into, and conducted simultaneously with, the corresponding tests.

In particular, the following should be included in the consideration:

a. General considerations to be included in checklists for all tasks:

1) Adequacy of instructions for assembly and erection.
2) Adequacy of assembly and erection tools.
3) Construction and material handling equipment required.
4) Personnel required to erect the test item.

b. Perform the following tasks for the HEDGE test functions given and rate the task from a human factors standpoint. The considerations shall include, but not be limited to, the following:

1) Erectability.

a) Special requirements for erection.
b) Preparation for erection.
c) Erect.

2) Maintainability

a) Perform preventative maintenance

1. Inspect fasteners and special bracing for proper tightness.
2. Perform routine preventative maintenance such as surface repair, or spot painting.

b) Perform unscheduled maintenance.

1. Detect any signs of structural degradation.
2. Detect any signs of over stressing.
3. Isolate and identify causes.

c) Remove and replace.

1. Remove any deficient structural members.
2. Tighten, repair or replace any deficient structural member.

3) Transportability.

a) Prepare for transport.

1. Place in transit configuration.
2. Package appropriate components.

b) Load/Unload.

1. Lift into/out of carrier.

c) Secure/Unfasten.

1. Immobilize items.
2. Prepare for use.

6.2.10 Value Analysis

During the conduct of all tests, test personnel shall evaluate the test item from a value versus cost standpoint. Record all pertinent comments concerning features or components which can be eliminated or modified to accomplish cost reduction without impairment of performance, reliability, quality, maintainability, or safety. The applicable portions of USATECOM Regulation 700-1 shall be used for this evaluation.

Consideration shall be given to the topics listed below. Record appropriate comments for each topic.

a. Mission Capacity

The test item should be capable of accomplishing the specified mission with only a reasonable margin of excess capability. Excess capacity and unused capability normally results in unnecessary bulk, excessive weight, and unwarranted costs.

b. Simplicity

Unnecessarily complex components and systems, redundancy, and the use of unneeded parts which will increase costs and maintenance efforts.

c. State of the Art

In many instances, the use of recently developed, currently available, components and automated features can result in overall product improvement and cost savings.

d. Standardization

The use of identical parts and parts currently in the military system can reduce the overall logistics burden.

e. Materials and Methods of Construction

Polished surfaces, overdone finishes, and the use of expensive materials can result in unnecessary costs if used inappropriately.

f. Clearances and Alignments

Inadequate clearances and misalignments can result in erection difficulties and delays. All prefabricated parts must be checked for adherence to design tolerances.

6.2.10 Quality Assurance

Throughout all tests, examine the test item for compliance with the quality requirements of the applicable MN and the provisions of MTP 10-2-511.

6.3 TEST DATA

NOTE: In compiling the Test Data section, test personnel should expound upon those data procedures which are other than quantitative in nature by recording narrative descriptions which will provide full details of conditions and/or events occurring during the conduct of the test.

6.3.1 Preparation for Test

6.3.1.1 Inspections

6.3.1.1.1 Arrival Inspection -

a. Record the following:

1) Description of the test item including type, class, material, etc.
2) Method of transport; if more than one so state giving distance transported by each.
3) Any deviations from the appropriate military standards concerning shipment of military equipment.
4) Any damage to the test item's components or materials.

6.3.1.1.2 Inventory Check -

a. Record the following:

1) Missing instructions, blueprints or other erection and/or maintenance literature.
2) Missing assembly items.
3) Shortages in repair parts, accessories, or tools.
4) List any other items in the Basic Issue Items List (BIIL) which are missing.
5) Missing special tools.

6.3.1.1.3 Physical Characteristics -

Record the appropriate data as required by MTP 10-2-500.

6.3.1.2 Operator Training and Familiarization

a. Record the following:

1) Methods used and completion of test personnel training and evaluation of the technical manuals.
2) Evidence that the test personnel are sufficiently knowledgeable in objectives and procedures.
3) The personal data required for selected personnel.

6.3.1.3 Selection of Erection Site

a. Provide a narrative description of the site selected for the test item erection. Include the following:

1) Reasons for selection of that particular site.
2) Type of terrain and any Geographic/Geologic/ Topographic features of the test site which might present erection difficulties.

3) Roads or other means of access or egress to and from the site.

b. Substantiate the narrative description with photographs of the proposed site.

6.3.2 Test Conduct

6.3.2.1 Assembly and Erection

6.3.2.1.1 Erection Site Layout -

Prepare a narrative description of all layout operations including any difficulties experienced and any deviations from the procedures indicated by the draft technical manual(s).

6.3.2.1.2 Pre Erection Assembly -

Record the following:

a. Description of structure to be assembled, i.e., floor, side walls, roof truss . . .

b. Any misalignment of pre-drilled bolt holes.

c. Any incorrect or insufficient fasteners.

d. Truss connectors wrong size or configuration.

e. Failure of wall panels to form a weather-tight seal.

f. Insufficient number of pre-drilled bolt holes to adequately secure the structure.

g. Any other difficulties or deficiencies encountered.

6.3.2.1.3 Foundation Construction -

Describe the type of foundation used and indicate the reasons for use of that particular foundation. Also, state where the vapor barrier was installed.

6.3.2.1.4 Building Erection Evaluation -

Record any indiaction of the following:

a. Improper or misaligned pre-drilled bolt holes.

b. Difficulty in leveling floor framing.

c. Failure of joists to mate properly with the floor stringers.

d. Failure of floor panels to mate with the connecting members.

e. Members wrong size or insufficient quantity.

f. Failure of floor panels to form a weather tight seal - not necessary when vapor barrier used.

g. Failure of side wall framing to align properly with the floor stringer.

h. Failure of the wall studs to mate with the eave angles (channels, etc.).

i. Failure of roof trusses and framing to assemble properly.

j. Difficulty in maintaining the squareness of all roof, floor, and wall junctions, especially door and window framing.

k. Failure of wall and roof panels to mate together to form a weather-tight seal.

l. Improper alignment of individual wall and roof panels to the wall and roof framing.

6.3.2.1.5 Plumbing and Associated Fixtures -

Record any difficulties encountered and any indication of the following:

a. Lack of (or insufficient number of) provisions for pipe hangers or supports.

b. Inadequate provisions for installing and supporting fixtures such as sinks, water closets and urinals.

c. Insufficient piping materials supplied to correctly install all piping systems.

d. Improper piping and fittings provided.

e. Insufficient number of flanged joints specified to allow for ease of installation and maintenance.

g. Man-operated valves and gauges installed in areas which are readily accessible.

h. Inadequate pitch on drainage systems.

6.3.2.1.6 Electrical System and Fixtures -

Record any difficulties encountered and any indication of the following:

a. Improper wire size.

b. Insufficient material to complete the installation.

c. Lack of provisions for support of cable and fixtures.

d. Insufficient number of outlets, recepticles, and switches provided.

e. Improper components furnished for installation.

6.3.2.1.7 Ventilation System and Equipment -

Record any difficulties encountered and the following:

a. Adequacy of provisions made for exhaust and supply terminals (where appropriate).

b. Adequacy of ducting, insulation, and the necessary installation materials provided to complete the ventilation system.

c. Failure of the roof jack to properly adapt to the roof structure.

d. Adequacy of provisions made to install and support the heating and air conditioning equipment where appropriate.

e. Adequacy and suitability of controls.

f. Weather tightness of exterior vents and louvers.

g. Lack of adequate number of windows and doors.

h. Any other item noted.

6.3.2.2 Building Strength Test

6.3.2.2.1 Working Load Test -

a. Describe the test method(s) used including amount and method of loading.

b. Record appropriate stress values as determined by testing.

Indicate member concerned.

c. Record any condition considered potentially hazardous.

6.3.2.2.2 Environmental Loading Test -

a. Describe in detail the type of testing accomplished including amount of loading and other appropriate information.

b. Record any indication of damage, malfunction, or unsafe condition.

6.3.2.3 Environmental Effects

6.3.2.3.1 Desert Environment Evaluation -

Record appropriate data as required by the applicable procedures of MTP 9-4-001.

6.3.2.3.2 Arctic Environment Evaluation -

Record appropriate data as required by the applicable procedures of MTP 9-4-005.

6.3.2.3.3 Tropic Environment Evaluation -

Record appropriate data as required by the applicable procedures of MTP 9-4-003.

6.3.2.3.4 Fungus Resistance -

Record appropriate data as required by MTP 4-2-818.

6.3.2.3.5 Rain Test -

Record the following:

a. Test conditions and parameters.

b. Any damage or condition of leakage resulting from the test.

6.3.2.3.6 Sand and Dust Test -

Record appropriate data as required by MIL-STD-810 and any damage resulting from the test.

6.3.2.4 Durability -

Record the appropriate data as required by MTP 9-2-503 and as follows:

a. Fastening failure.

b. Excessive wear.

c. Warping and/or distortion.

d. Damage to any component, material, or finish.

6.3.2.5 Transportability

6.3.2.5.1 Surface Transportability -

Record the data required by MTP 10-2-503 and the following:

a. Item under test.

b. Number of packages in the shipment.

c. Type of container and packaging methods used.

d. Dimensions of each package.

e. Weight of the complete package.

f. Time required to accomplish preparations for shipment.

g. MHE used.

h. Number of personnel required (indicate rank and MOS).

i. Method of transport utilized.

j. Any damage to the test item or the shipping package.

k. Any evidence of shifting of contents, loosening or breaking of holddowns, ties, stays, blocking of holddowns, ties, stays, blocking or bracing.

l. Adequacy of the tie-down/securing devices and lifting attachments.

6.3.2.5.2 Air Transportability - External - (Where Appropriate) -

Record appropriate data as required by MTP 7-2-515.

6.3.2.5.3 Air Transportability - Internal - (Where Appropriate) -

Record appropriate data as required by MTP 7-2-516.

6.3.2.5.4 Post Transport Assembly and Erection -

Record appropriate data as required by section 6.3.2.1 of this document.

6.3.2.6 Maintenance Evaluation

Record data required by applicable procedures of MTP 10-2-507 and Appendixes A and B to USATECOM Regulation 750-15.

6.3.2.7 Reliability

Record data required by applicable procedures of MTP 10-2-512.

6.3.2.8 Safety Evaluation

a. Record the appropriate data as required by MTP 10-2-508, noting any condition(s) that might present a safety hazard(s) and the steps taken to alleviate the condition(s).

b. Provide a safety recommendation in accordance with the provisions of USATECOM Regulation 385-6.

c. List results of all tests of safety devices.

d. Data requested in paragraph 6.2.8.

6.3.2.9 Human Factors

Record the data required by MTP 10-2-505, and accomplish the following:

Prepare checklists for each of the various tasks associated with the test item erection. Rate each task as satisfactory or unsatisfactory from a human factors standpoint. In rating the task, include the specific considerations peculiar to the task and the following general considerations.

a. Adequacy of instructions and procedures provided for assembly and erection.

b. Adequacy of assembly and erection tools.

c. Use of construction and materials handling equipment.

d. Personnel required to erect the building.

e. Could better use of materials handling equipment reduce personnel requirements.

6.3.2.10 Value Analysis

a. Record appropriate comments for each of the topics listed below:

1) Mission capacity.
2) Simplicity.
3) State of the art.
4) Standardization.
5) Materials and methods of construction.
6) Tolerances, clearances and alignments.

b. When making recommendations for changes to test item features or components record the following:

1) Feature or component under consideration.
2) Recommended change(s).
3) Reason(s) for recommended change(s).

6.3.2.11 Quality Assurance

Record:

a. Data required by MTP 10-2-511.

b. Comments as to any design shortcomings in the area of required quality.

6.4 DATA REDUCTION AND PRESENTATION

Data obtained during the conduct of the test will be summarized making use of photographs and charts as appropriate. All photographs and charts will be properly identified and labeled. Test data will be obtained for each item evaluated. Data shall be summarized and evaluated as required.

Data obtained for each performance characteristics will be compared with established technical performance characteristics as specified in MN's or other developmental criteria. Test data obtained from different types of buildings undergoing the same test will be compared. Where performance is repeated after a specific test or repair, the data obtained will be compared with the previously obtained data, and where definite differences occur, the conditions that caused the differences and the degree of difference will be summarized along with the appropriate comments of the test personnel.

In addition to charts and photographs, the presentation shall include narrative reports of all phases of the test.

The presentation shall conclude with a summarization of the suitability of the test item for service testing.