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13. ABSTRACT Describes a method for evaluation of waterway equipment operational and functional performance characteristics. Identifies supporting tests, facilities, and equipment required. Provides procedures for watertightness, stability, compatibility with related equipment, functional performance, and maneuverability. Applicable to barges, boats (cargo, passenger, and picket), landing craft, and waterway equipment. <u>Not applicable</u> to equipment attached to, or mounted on, the item to perform auxiliary functions.			

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14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Barge						
Cargo Boat						
Passenger Boat						
Landing Craft						
Waterway Equipment						
Marine Equipment						
Boat						

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U.S. ARMY TEST AND EVALUATION COMMAND  
SYSTEM SERVICE TEST OPERATIONS PROCEDURES

AMSTE-RP-702-108

\*Test Operations Procedure 9-3-252

18 February 1972

WATERWAY EQUIPMENT - BOAT, BARGE

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SECTION I  
GENERAL

1. Purpose and Scope. This Test Operations Procedure (TOP) describes service tests for evaluating the operational, performance and maintenance characteristics of waterway equipment - boat, barge to determine the degree to which this equipment meets the requirements of Materiel Needs (MN) and whether it is suitable for Army use. Testing is conducted using personnel representative of those who will operate and maintain the equipment in the field and under all climatic and environmental conditions representative of those areas where the equipment will be used. These procedures are not intended to service test equipment attached to, or mounted on, the test item to perform auxiliary functions.

2. Background. Planning and executing military operations, amphibious in character, requires a variety of waterway equipment for the purpose of transporting personnel, equipment, materiel and use as work boats. The limitations imposed by requirements for a capability to operate in

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waters varying in depth from extremely shallow to deep and to perform variant functions makes it impractical to design a single boat meeting all requirements and specifications. For this reason, waterway equipment currently in use, includes many types of boats and craft uniquely designed to satisfy a given set or sets of conditions. The various types of waterway equipment includes barges (deck or liquid cargo carrying, non-propelled), sectionalized or nesting and used for moving materials ship to ship and ship to shore, supporting bridges, pipelines, etc.; passenger and cargo boats for ship to ship and ship to shore transport; picket boats for patrol purposes and landing craft for transporting troops and equipment ship to shore.

3. Equipment and Facilities. Equipment and facilities required are defined in the documents listed in Section II.

SECTION II  
TEST PROCEDURES

4. Supporting Tests. Common Service TOPs, the tests defined in Section III, and other published documents to be considered in formulating a service test plan are as follows:

	<u>TEST SUBJECT TITLE</u>	<u>PUBLICATION NO.</u>
a.	Operator Training and Familiarization	10-3-501
b.	Photographic Coverage	7-3-519
c.	Technical Inspection	9-3-508
	(1) Watertightness (Refer to para 5)	
	(2) Stability (Refer to para 6)	
d.	Physical Characteristics	9-3-500
e.	Safety	10-3-507
f.	Compatibility with Related Equipment Barges (Refer to para 7)	
g.	Performance Tests	
	(1) Operation (Refer to para 8)	
	(2) Maneuverability (Refer to para 9)	
	(3) Cargo Capacity	2-3-503
	(4) Kit Installation and Evaluation	2-3-514
h.	Qualitative Electromagnetic Interference	6-3-513

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<u>TEST SUBJECT TITLE</u>	<u>PUBLICATION NO.</u>
i. Security (Susceptability to Detection)	2-3-511
j. Tropic Environmental Test of Construction, Support and Service Equipment	9-4-003
k. Maintenance Evaluation	10-3-504
l. Reliability	2-3-507
m. Human Factors Evaluation	10-3-505
n. Transportability	2-3-519
o. Durability	10-3-502
p. Value Analysis	USAMC SUPPL 1 to AR 11-26

SECTION III  
SUPPLEMENTARY INSTRUCTIONS

5. Watertightness.

a. Objective. To evaluate the watertightness of the test item.

b. Method. The test item is placed in water of sufficient depth and tied fast to a dock or pier. The test item is then loaded with suitable weights or loads evenly distributed, up to its rated capacity. At the end of a reasonable period or as stated in the MN the area below the waterline is inspected for leakage. Watertight areas of the test item above the water line are subjected to a water hose test at a minimum pressure of 50 psi for an equivalent period of time followed by an inspection for leakage.

c. Data Required.

- (1) Nomenclature and type of test item.
- (2) Amount and type of weight added.
- (3) Duration of test (hull).
- (4) Hose test water pressure.
- (5) Any indication of leakage.

d. Analytical Plan. The amount of leakage observed is compared with the requirements of the MN and this comparison is used to prepare recommendations relative to the suitability of the test item for Army use.

6. Stability.

a. Objective. To evaluate the static stability characteristics of the test item (trim, list, draft and freeboard).

b. Method. The test item is positioned in a sheltered area, to avoid the effects of wind and sea, and loaded to a light load condition. The fore and aft draft marks and the amidships freeboard measurement are observed and recorded. The test item is then loaded to full load conditions and the fore and aft draft and list are observed and recorded.

c. Data Required.

- (1) Nomenclature and type of test item.
- (2) Specific gravity of flotation water.
- (3) Total load at light load and capacity load.
- (4) Fore and aft draft and freeboard measurement at light load.
- (5) Fore and aft draft and list at capacity load.

d. Analytical Plan. The fore and aft draft, freeboard and list measurements are evaluated and compared with the requirements of the MN. This comparison is used as a basis for preparing recommendations relative to the suitability of the test item for Army use.

7. Compatibility with Related Equipment.

a. Objective. To evaluate the compatibility of the test item for use with related equipment.

b. Method. The test item is configured for supporting a bridge, pipeline or heavy operating equipment. The ease of installing and operating the supported equipment is observed and recorded over a reasonable period of time or as stated in the MN.

c. Data Required.

- (1) Nomenclature and type of test item.
- (2) Type of equipment supported.

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(3) Comments by test personnel on:

- (a) Ease of installation of supported equipment.
- (b) Operating compatibility.
- (c) Difficulties encountered.

d. Analytical Plan. The comments of the test personnel are summarized, analyzed, and compared with the requirements of the MN. This comparison is used to prepare recommendations relative to the suitability of the test item for Army use.

8. Operation.

a. Objective. To evaluate the degree to which the test item complies with the performance standards stated in the MN.

b. Method. The test item is operated to perform the type or types of sailings for which it was designed. It is loaded to carrying capacity and manned by test personnel representative of those who would normally operate such equipment. After loading, the test item departs the docking or launching area and sails the planned course to its destination. Each course is planned to exercise all performance characteristics of the test item. At destination the cargo is discharged and the test item is prepared for the return journey by reloading with cargo, ballast or it is left empty. The test item then sets sail for the return destination. Sailings are accomplished during daylight and darkness and under all conditions of existing weather. As many sailings will be made as are necessary to adequately evaluate the test item. During each sailing, test personnel will observe and record comments on all aspects of the test item performance.

c. Data Required.

- (1) Nomenclature and type of test item.
- (2) Planned and actual sailings and comparative times.
- (3) Conditions of visibility and weather.
- (4) Load capacity.
- (5) Comments by test personnel, when sailed loaded to capacity, with ballast, and empty, concerning:
  - (a) Ease of loading and unloading.

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- (b) Ease of launching and berthing.
- (c) Ease of handling and response to controls.
- (d) Speed and stability characteristics.
- (e) Any difficulties encountered.

d. Analytical Plan. All comments and data are summarized and analyzed with reference to the performance characteristics stated in the MN. The results of this analysis are used to prepare recommendations relative to the suitability of the test item for Army use.

9. Maneuverability.

a. Objective. To evaluate the maneuverability characteristics of the test item.

b. Method. Each sailing is planned to exercise the maneuvering capabilities of the test item. Provisions are made for starting forward from dead stop, stopping, reversing engines to full astern, steering hard turns to port and starboard and complete 180° turns. Test personnel observe and record comments on all maneuvers.

c. Data Required.

- (1) Nomenclature and type of test item.
- (2) Conditions of visibility and weather.
- (3) Test item load configuration.
- (4) Comments by test personnel concerning:
  - (a) Forward and astern operations.
  - (b) Port and starboard steering.
  - (c) Radius of turn.
  - (d) Maneuvering difficulties encountered.

d. Analytical Plan. All comments and data are summarized and analyzed with reference to the maneuverability characteristics stated in the MN. The results of this analysis are used to prepare recommendations relative to the suitability of the test item for Army use.

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Recommended changes to this publication should be forwarded to Commanding General, U.S. Army Test and Evaluation Command, ATTN: AMSTE-PA-M, Aberdeen Proving Ground, Maryland 21005. Technical information related to this publication may be obtained from the preparing activity, President, U.S. Army Armor and Engineer Board, ATTN: STEBB-MO, Fort Knox, Kentucky 40121. Additional copies of this document are available from the Defense Documentation Center, Cameron Station, Alexandria, Virginia 22314. This document is identified by the accession number (AD No.) printed on the first page.