TEST OF PREST ALUMINUM MANUFACTURING CORPORATION FOLDING BOAT

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U.S. COAST GUARD

TESTING *and* DEVELOPMENT

DIVISION

OFFICE OF ENGINEERING WASHINGTON, D.C.

REPORT

FIELD TESTING AND DEVELOPMENT UNIT

REPORT NO. 120

PROJECT CGTD S82/6-16

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TEST OF PREST ALUMINUM MANUFACTURING CORPORATION FOLDING BOAT

By

FIELD TESTING AND DEVELOPMENT UNIT
U.S. COAST GUARD YARD
Curtis Bay, Baltimore 26, Maryland

Date: 24 OCT 1956

Submitted:
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Acting Commanding Officer

Date:

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Chief, Testing and Development Division
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Washington 25, D. C.

18

FIELD TESTING AND DEVELOPMENT

PROJECT CGTD S82/6-16

TEST OF FREST ALUMINUM MANUFACTURING CORPORATION FOLDING BOAT

I

SCOPE

1. Introduction. Headquarters Shore Units Division is investigating the possible use of various portable or collapsible small boats for emergency flood-relief work and inland boarding duty. A new type folding boat was purchased by Headquarters Testing and Development Division for tests similar to those conducted previously on a portable boat.

2. Statement of the Problem: To investigate the following boat characteristics:

2.1 Physical characteristics.

2.2 Portability.

2.3 Assembly and disassembly time.

2.4 Boat under oars.

2.5 Boat under tow.

2.6 Boat under power.

2.7 Load or capacity.

2.8 Handling, maneuverability, stability.

II

AUTHORITY

3. These tests were undertaken by authority of HQ(TTD) Memorandum to Commanding Officer, Field Testing and Development Unit dated 7 September 1956, file CGTD S82/6-16.

III

PREVIOUS INVESTIGATION OF A SIMILAR NATURE

4. Similar tests were conducted on a thirteen foot collapsible canvas boat and reported in Commanding Officer, Field Testing and Development

Unit letter to Commandant (ETD) dated 3 May 1956, file S82/1.

IV

PRESENT INVESTIGATION

5. Description of Material Under Test. The boat tested was a standard twelve foot folding boat manufactured by the Front Aluminum Manufacturing Corporation of Port Chicago, California. Designed primarily for fishing and boating, the model tested was slightly modified for Coast Guard use since only one thwart was installed instead of three.

5.1 Figures 1 - 4 are photographs of the assembled boat. Figure 5 shows the folded boat with the transom [illegible] placed on top.

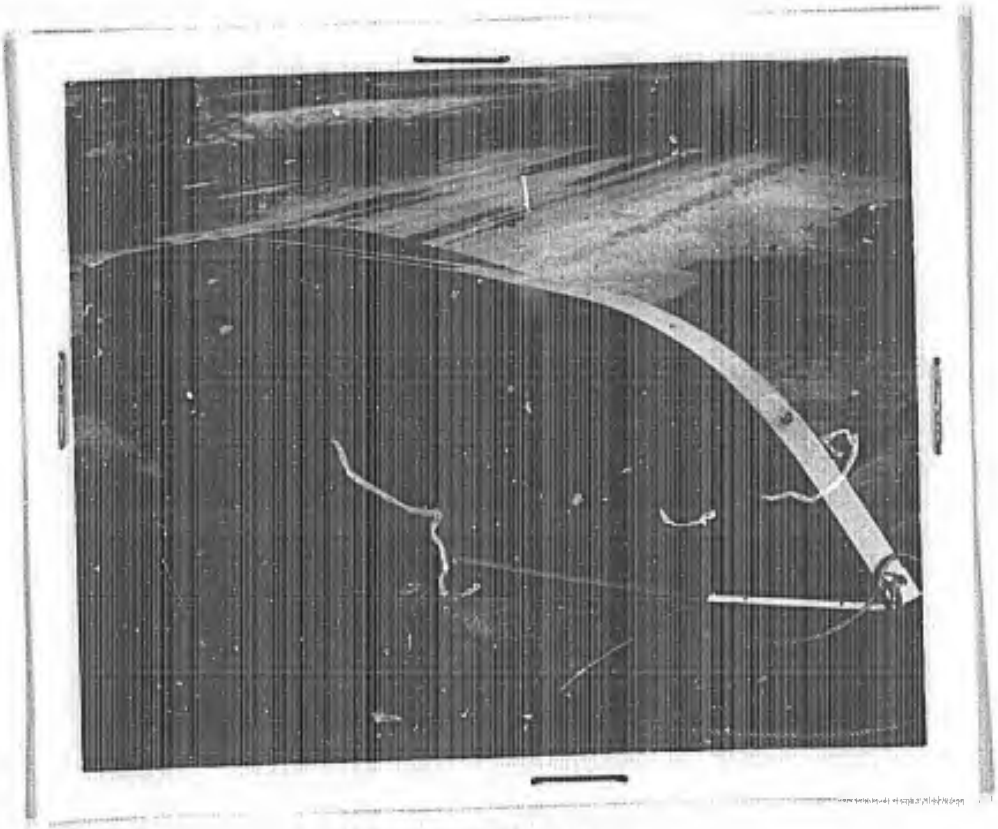

Figure 1

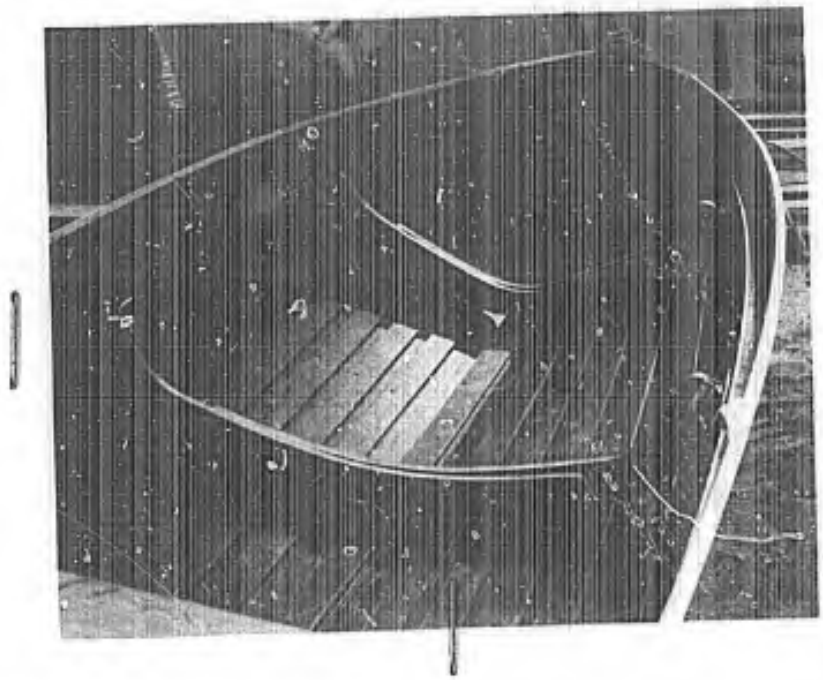

Figure 2

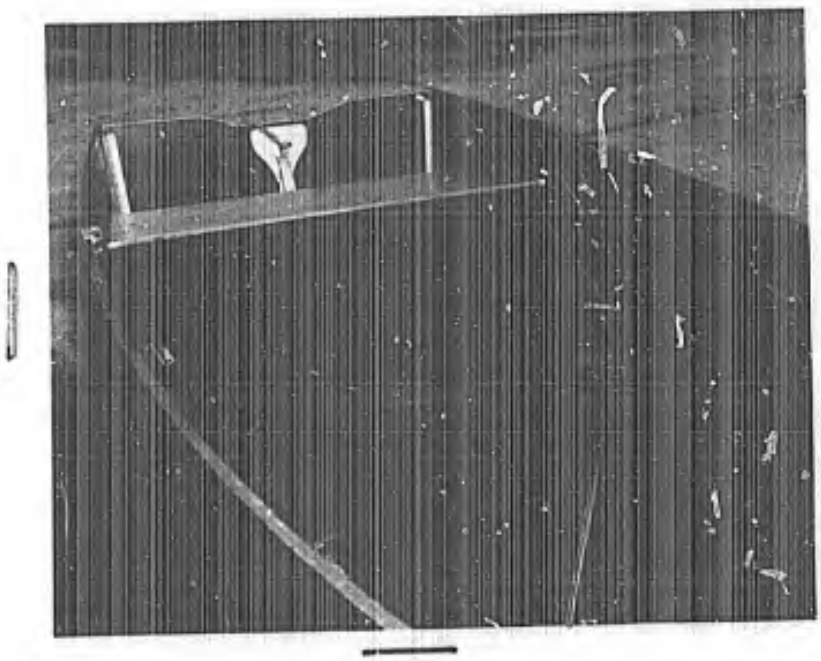

Figure 3

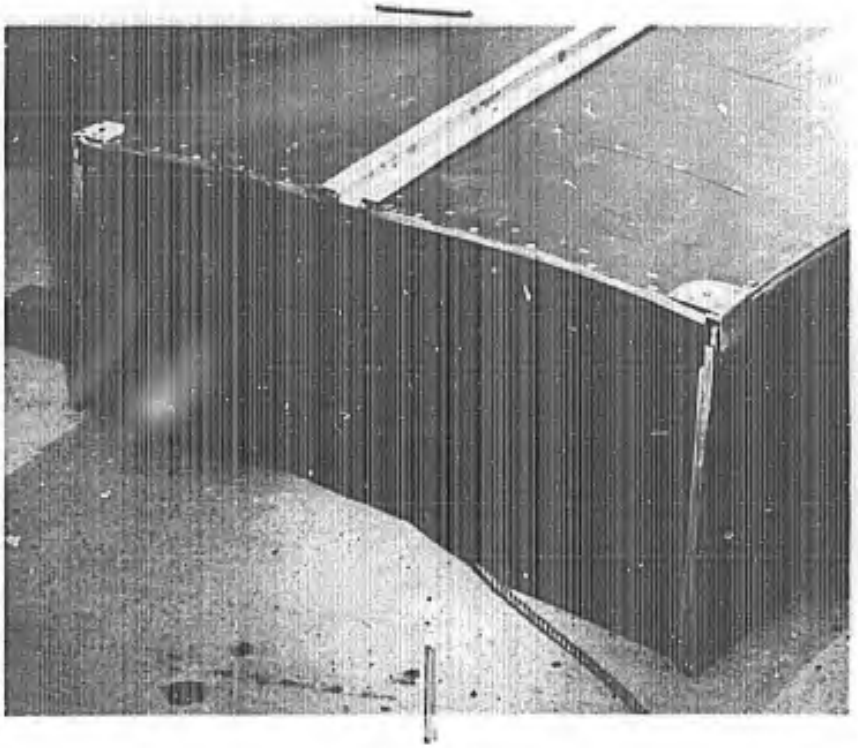

Figure 4

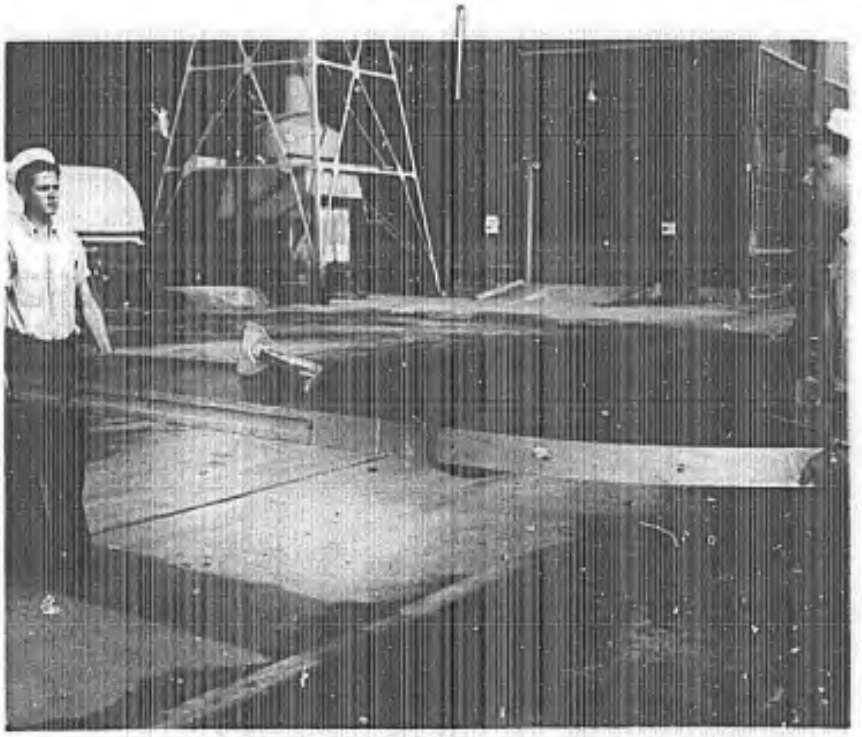

Figure 5

6. Description of Tests Conducted. The conventional small boat tests as outlined in paragraph 2 were performed as a means of comparing this boat's performance with the 13 foot portable boat previously tested. In addition, a 16mm color motion picture was filmed showing all phases of the test, except assembly and disassembly.

7. Test Results. The results of this test are reported in FTDU Movie No. 104 and in the text of this paragraph.

7.1 Physical characteristics.

7.1.1 Folded dimensions:

Length = 12' 0"
Width = 2' 2"
Depth = 7"

7.1.2 Assembled dimensions:

Length = 11' 7-3/4"
Beam = 5' 0"
Depth = 1' 10"

7.1.3 Weight = 171 pounds.

7.2 Construction Details.

7.2.1 Sides and bottom: 5/16" marine plywood.

7.2.2 Transom: Three piece; two 3/8" folding pieces covered by layer of Dupont Fairprene and one 5/16" outer transom which slides downward into position.

7.2.3 Outer keel: 2 piece, 1/8" X 4-3/8" aluminum.

7.2.4 Inner keel: 3/8" X 3-1/4" marine plywood.

7.2.5 Floor boards: 3/8" X 2-3/4" marine plywood riveted to bottom.

7.2.6 Folding ribs: 3/4" X 3-1/8" marine plywood.

7.2.7 Gunwale: 3/4" X 3/4" X 1/16" aluminum channel.

7.2.8 Chine: 3/4" X 3/8" X 1/16" Aluminum angle.

7.2.9 Flexible joints: double thickness Dupont Fairprene.

7.2.10 Attachment of Parts: 1/8" brass rivets.

7.2.11 Thwart: 3/4" marine plywood.

7.3 Portability. This boat can be carried by two men without physical exertion. In the folded condition it handles easily. If necessary, it can be launched from a low pier by two men or on a beach it can be launched by one man.

7.4 Assembly and Disassembly Time. The time required to assemble and disassemble the boat was determined for three conditions; two men who had no instruction, two men who had seen the Frost Aluminum Manufacturing Corp. movie showing assembly, and two men who had performed the operation before.

	Assembly time	Disassembly time
Two men with no instructions	5 min. 22 sec.	4 min. 05 sec.
Two men after viewing movie	15 min. 15 sec.	4 min. 40 sec.
Two men after previous assembly	4 min. 30 sec.	3 min. 15 sec.

7.5 Boat Under Oars. Figures 6 and 7 are photographs of the boat under oars with four and eight men. Due to the position of the single thwart, the men rowing must face the bow of the boat. The manufacturer's representative stated that the standard boat would have a thwart in a location nearly amidship. The boat handled well under oars with four men but was a little difficult to turn with eight men. Standard 1/2" X 2", #2 oarlocks were cut down to fit the sockets and a standard 7 foot oar was used in all rowing tests.

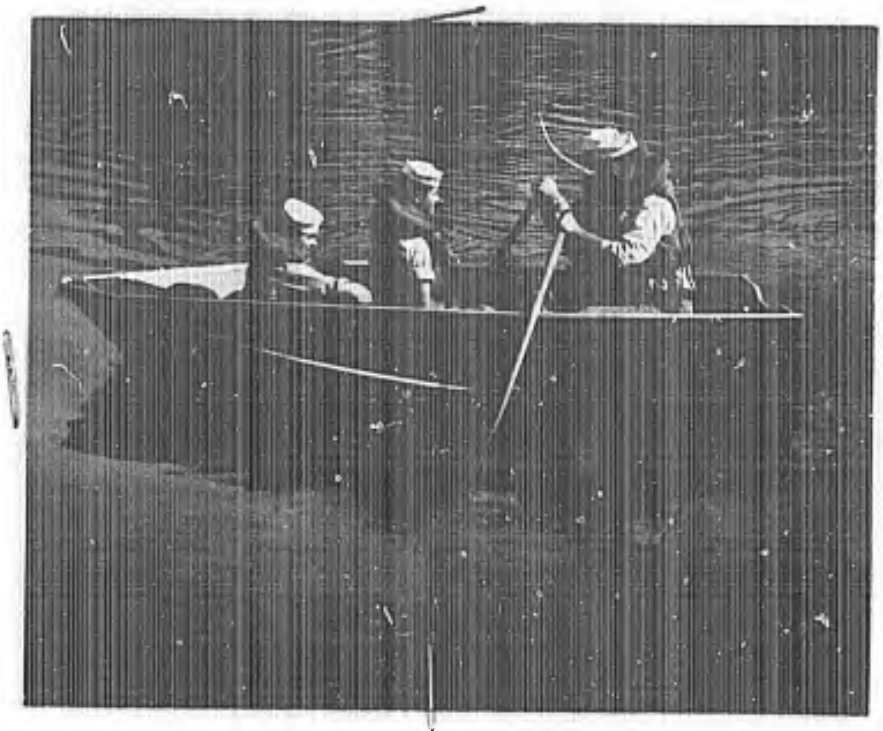

Figure 6

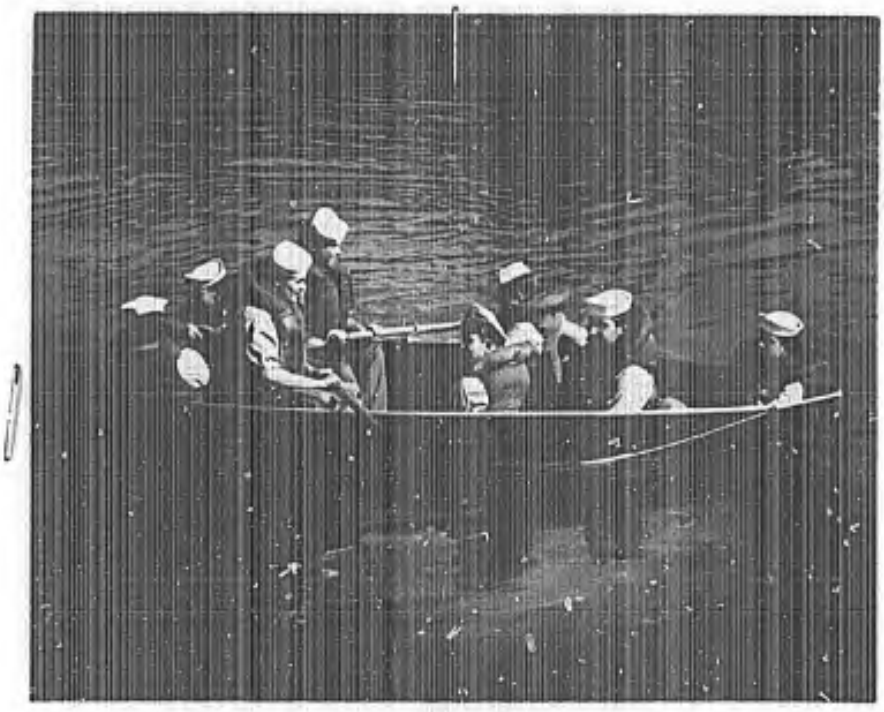

Figure 7

7.6 Boat Under Tow. All towing tests were performed with four men in the boat. Figures 8 and 9 show the boat being towed by the upper bow ring and Figures 10 and 11 show the boat being towed by the lower bow ring. The boat rides better when towed from the lower ring and is the method recommended by the manufacturer. No difficulty in towing was experienced and the towing behaviour in a turn is recorded in the movie.

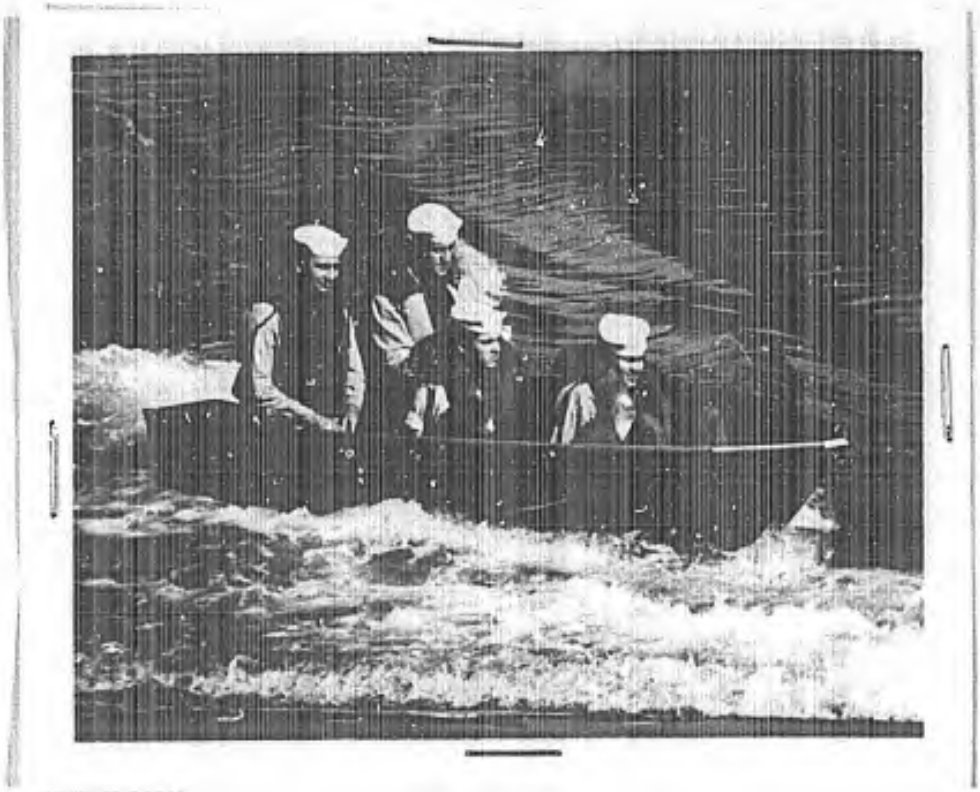

Figure 8

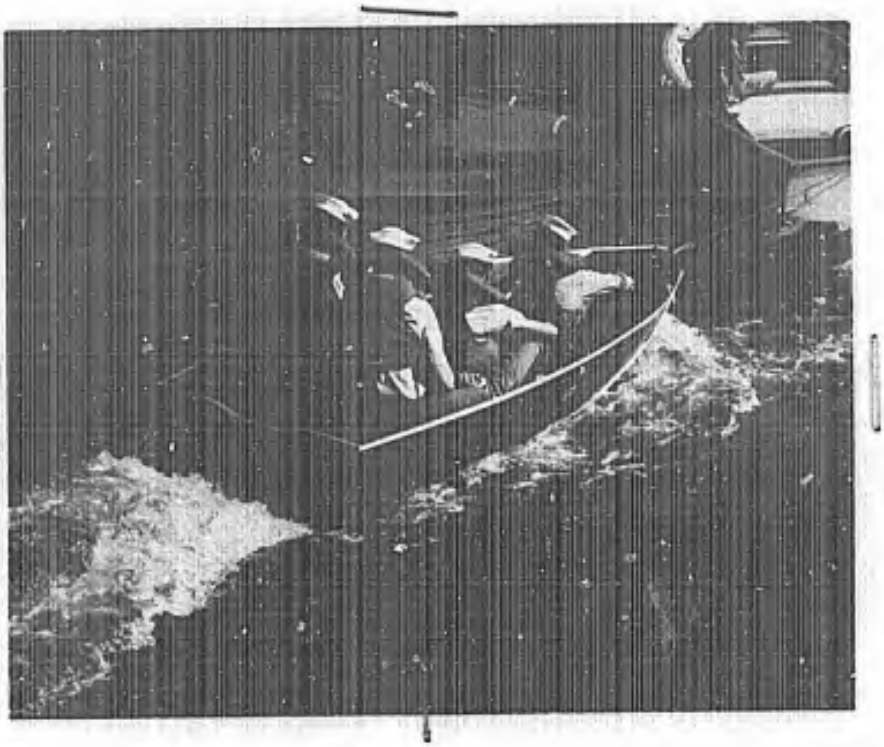

Figure 9

Figure 10

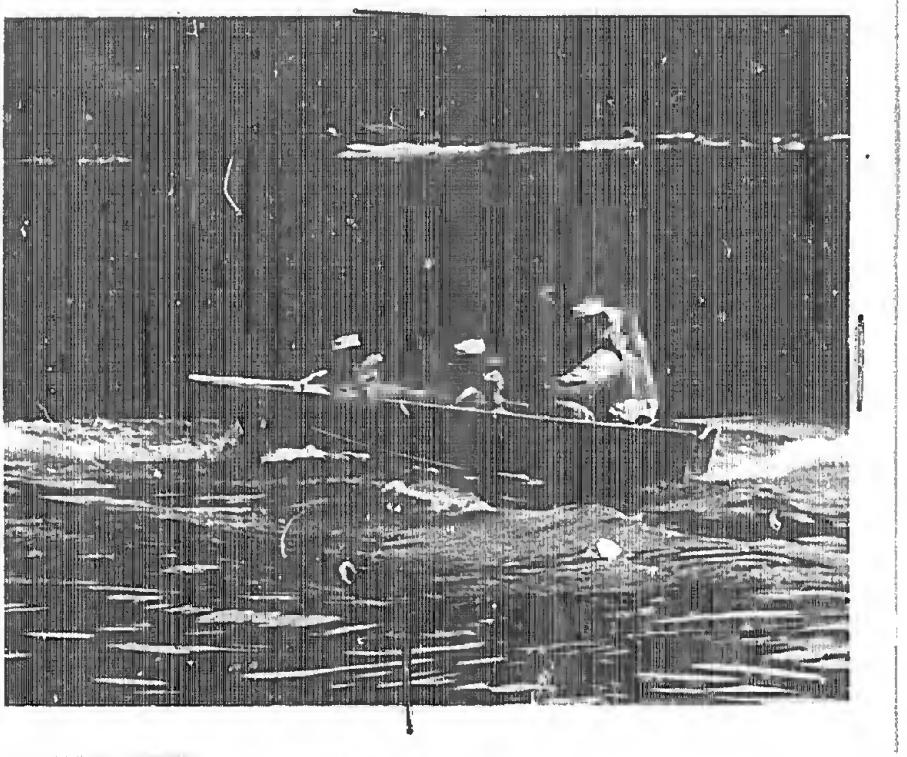

Figure 11

7.7 Boat Under Power. The boat was operated under power in calm water and with two men. Three different outboard motors were used in the power tests.

7.7.1 Figures 12 and 13 show full speed runs of the boat with a 25 HP Johnson Sea Horse. No difficulty was experienced with this large motor in calm water with straight runs or high speed turn. The operator stated he had full control of the boat throughout this phase of the test. A maximum speed of 26.7 miles per hour was attained with the 25 HP motor.

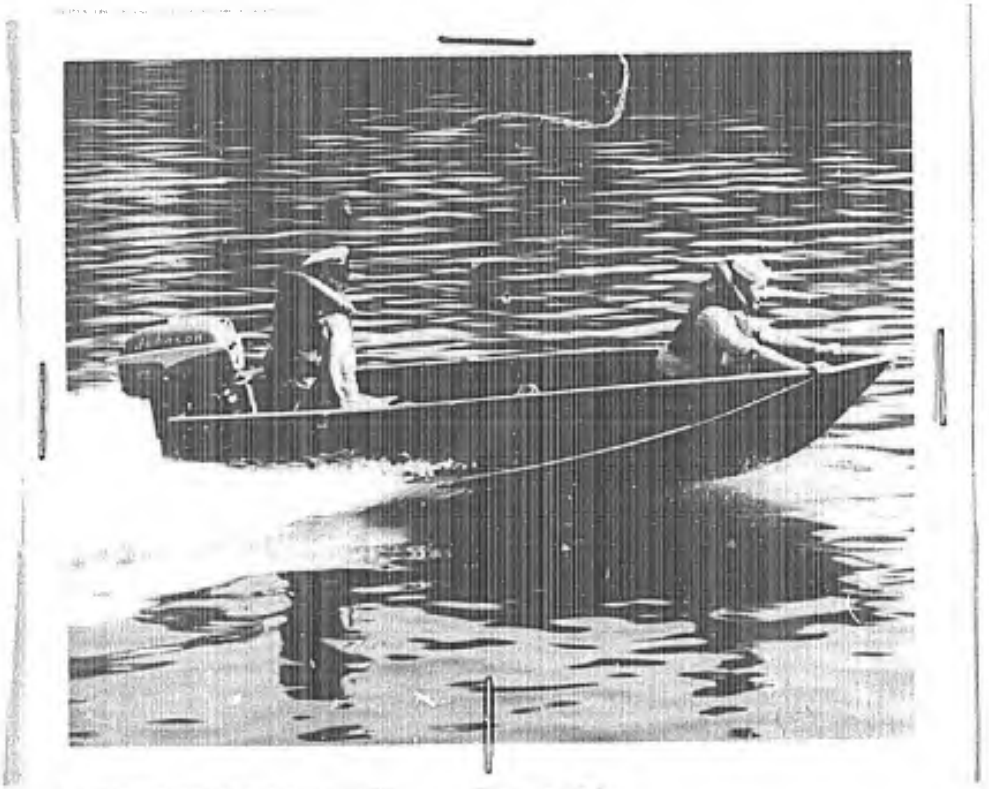

Figure 12

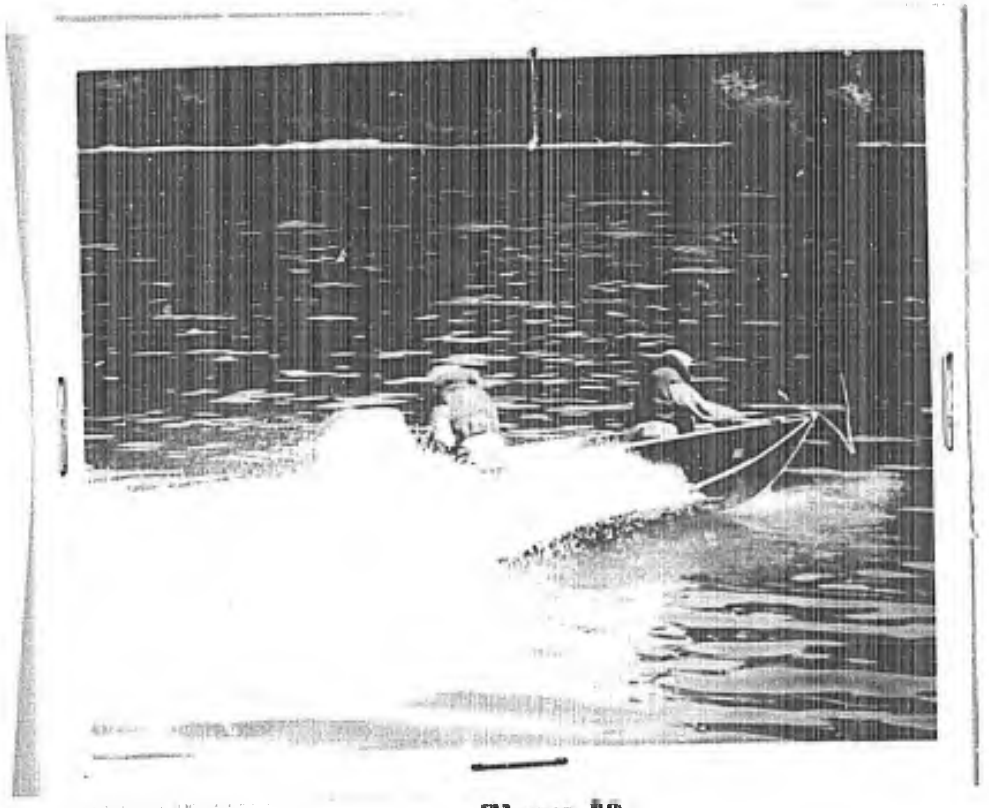

Figure 13

7.7.2 Figures 14 and 15 show full speed runs of the boat with a 15 HP Voyager motor. With this motor the boat road well and displayed good manouverability and stability. A maximum speed of 18.9 miles per hour was attained.

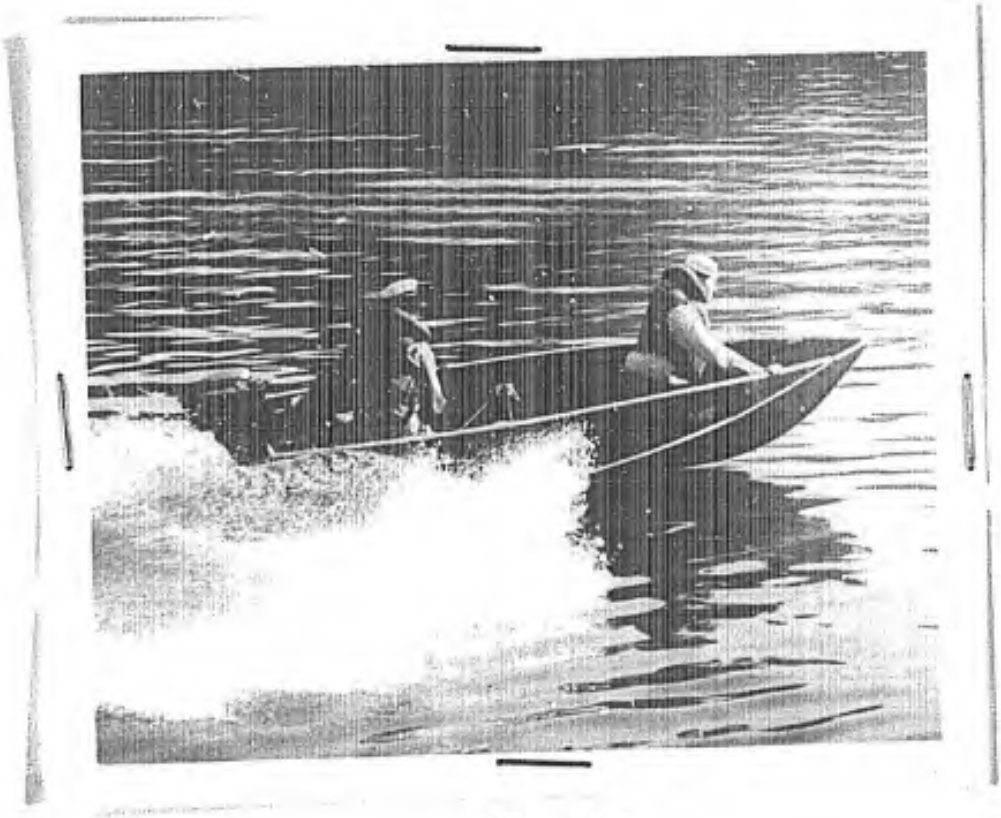

Figure 14.

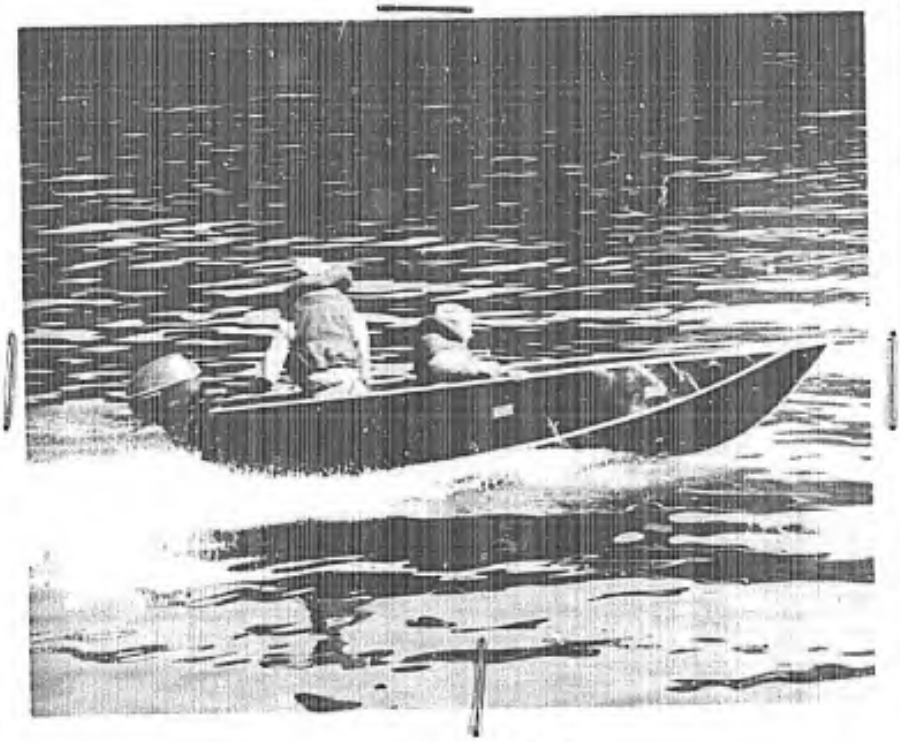

Figure 16

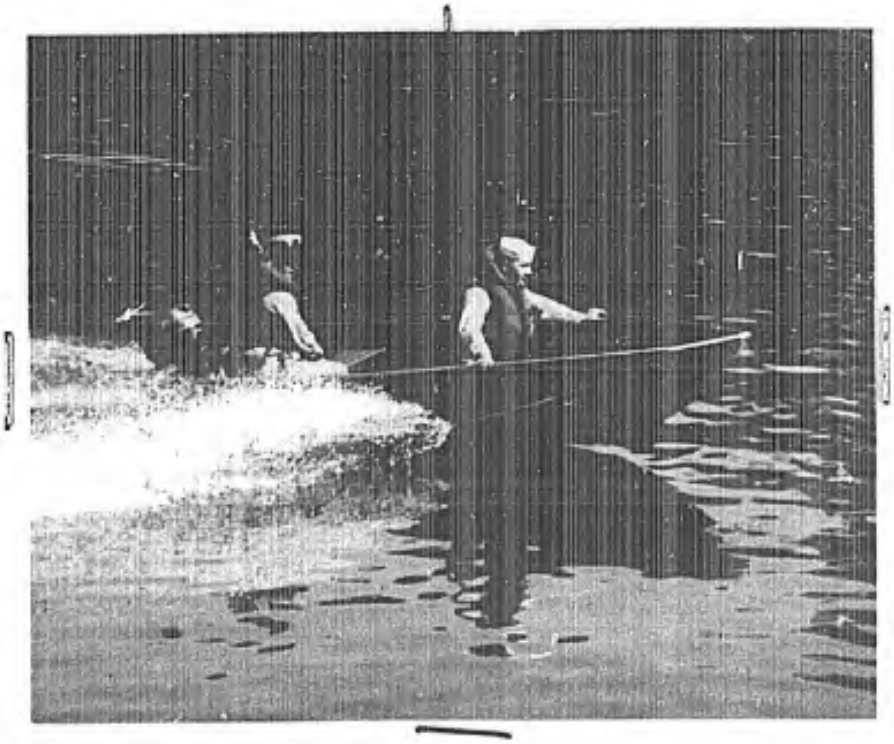

Figure 17

7.8 Capacity: Figure 7 shows the boat loaded with eight men, total weight 1390 pounds. The boat had a freeboard of 13 inches and 12 inches when loaded with four and eight men, respectively.

7.9 Reserve Buoyancy: The reserve buoyance of the boat was found to be 67 pounds. Figure 18 shows the method used in determining the reserve buoyancy. Pig iron weights were loaded in the boat until it would no longer support the weights.

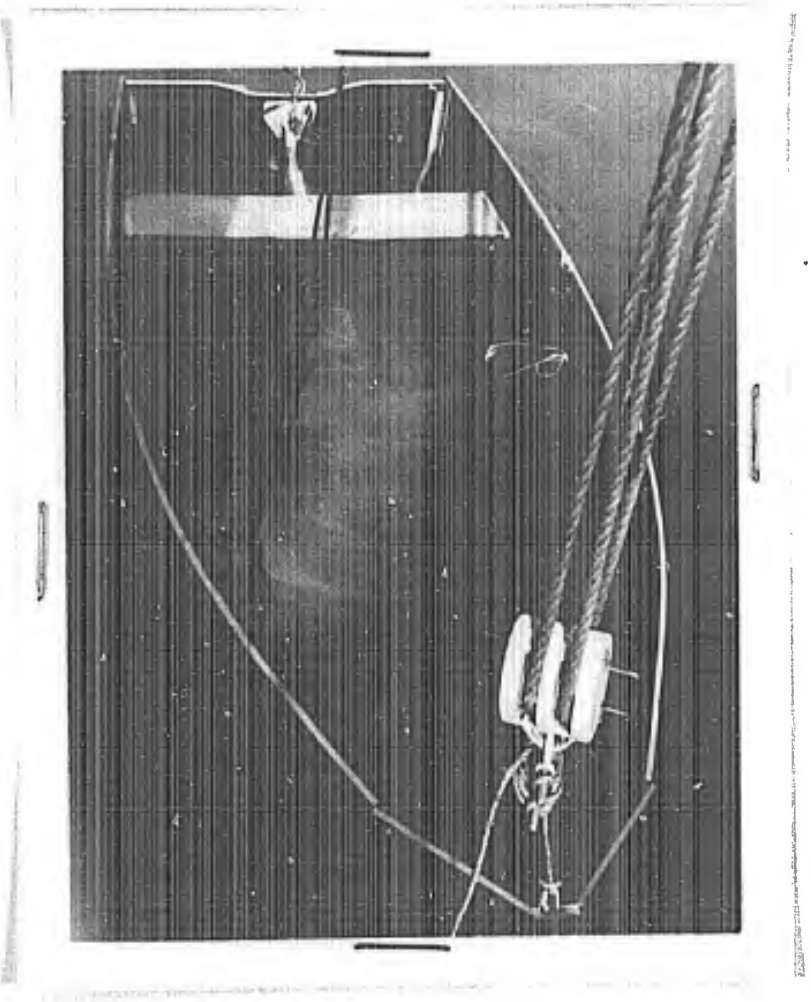

Figure 18

7.10 Stability. When empty the boat will not support the weight of a 200 pound man stepping on the gunwale amidships.

8. Discussion. The criterion by which a boat's performance may be deemed satisfactory is greatly dependent upon the judgement of the observer. In this project the motion picture and still pictures have recorded the performance of the boat better than a verbal description. In evaluating the results of this test it should be brought out that this boat was designed for fishing and hunting and therefore will not possess the properties of a boat designed primarily for Coast Guard use.

8.1 The tests were all performed in calm water.

8.2 It was noted in paragraph 7.4 that the two men viewing the movie took considerably more time to assemble the boat than the two men with no instruction. It should be pointed out that the men who had viewed the movie were not of the seamen branch and may have been less familiar with boats than the other men.

V

CONCLUSIONS

9. This unit makes the following conclusions as a result of the above tests:

9.1 Strength, stiffness, and stability are acceptable for a boat of the portable type.

9.2 Transom strength and strength of fittings and thwart are acceptable.

9.3 Behavior of the boat under oars, under tow, and under power is acceptable.

9.4 The reserve buoyancy of the boat is poor. However, it should be remembered that this boat was not designed for reserve buoyancy. The manufacturer's representative has stated that inflatable 'May-West' type buoyancy rings can be attached inside the gunwale to provide reserve buoyancy if necessary.

9.5 The quality of workmanship in the boat is good.