June 6, 1941.

Palmer C. Putnam, Technical Aide,
National Defense Research Committee,
140 Federal Street,
Boston, Massachusetts.

Subject: Heavy Ponton Ferry
Design No. 2

Dear Mr. Putnam:

To further investigate the possibilities of the subject matter as requested in our letter of May 28, we present herewith seven folders of data and design descriptive of an alternate method for accomplishing the objective.

The revised method, based upon "end" launching rather than on "side" launching, is recommended for consideration as possessing greater merit for service and use.

Yours very truly,

T. R. Tarn

(T. R. Tarn)
SECOND REPORT
- on -
ENGINEERING DETERMINATIONS
- re -
HEAVY PONTON FERRY

Prepared For
NATIONAL DEFENSE RESEARCH COMMITTEE

Hartley Rowe, Vice Chairman,
Division "C".

Palmer C. Putnam,
Technical Aide.

- By -

T. REES TARN,
Naval Architect
Pittsburgh, Pa.

June 1941.

(1st Printing)
SYLLABUS

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LIST OF ATTACHMENTS

Comments on Design No. 1

Considerations Forming Basis of Design No. 2

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LIST OF DRAWINGS

DRAWING NO. 1-A

General Arrangement of Tractor - Trailer - Cradle - Assembly.

DRAWING NO. 2-A

Typical Sections of Trailer - Cradle Assembly.

DRAWING NO. 3-A

Diagram of Assembled Ponton Units.

DRAWING NO. 4-A

Diagrams of Water Launchings.

DRAWING NO. 5-A

Methods of Assembly and Use. (Original No. 1.)

DRAWING NO. 6-A

Transverse and Longitudinal Sections. (Original No. 5.)

DRAWING NO. 7-A

Details of Lock Bar, etc. (Original No. 4.)

DRAWING NO. 8-A

Details of Bed Timbers, Spuds, Expansion Trunk, etc.

DRAWING NO. 9-A

Towboat.

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SIDE LAUNCHING

(1) In the design previously submitted, dated May 1941, the means for transport was based upon the use of trucks, or lorries;

(2) they were adapted solely for side launching of the ponton units.

ASSEMBLY

(3) Additionally, the assembly of the necessary number of ponton units, to form a water borne floating structure capable of use to ferry the requisite load, accentuated the unloading and assembly of the ponton units on land;

(4) and required their subsequent movement to/and second launching at stream side.

TRANSPORT

(5) Further; the transport of a single ponton unit (or pair of units) established an unwarranted dependence upon accompanying transport units for needed launching material, special gear, tractor assist-

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(6) and, in consequence, the isolated service of a ponton unit was either jeopardized or prohibited,

(7) and a tendency was present to cause general confusion under circumstances that could well prove to be critical.

**OTHER FACTORS**

(8) Analysis of a system of routine to cover the various phases of expeditious handling and manipulation disclosed that certain operations were decidedly hazardous to personnel under circumstances requiring a minimum of time for completion of objective.

(9) Also, that operations and facilities for reloading had been subordinated in favor of rapid unloading and assembly;

(10) in that, special gear to accomplish reloading with an expenditure of minimum effort and within reasonable time was not adequately provided.

(11) Further, positive control of the unloading operation from the trucks and a full measure of control to govern the subsequent water launching was left to chance, without option or recourse.

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HEAVY PONTON FERRY

DESIGN NO. 2

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CONSIDERATIONS FORMING BASIS OF DESIGN NO. 2

* * * * * * *

UNITs SELF-CONTAINED

(12) Basically, the revised design is predicated on providing self-contained and independently operable transport units each capable of duty on isolated service;

(14) or, as units for co-ordination and assembly with similar units to provide ferry, bridge, barge, and other service.

(15) The assembled and built-in features of each mechanized transport ponton unit provide for:-

(17) self-loading,

(18) self-launching,

(19) self-transport, and

(20) self-propulsion.

END LAUNCHING

(21) The design is further predicated on the utilization of the "end" launching principle, rather than the "side" launching principle,

(22) from a movable confined cradle superimposed on the side frames of

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a conventional trailer chassis.

**LAUNCHING ON WATER**

(23) Unlike the launching method portrayed by the former design in which the unloading and assembly of the individual ponton units on land was made of prime importance; in this, the revised design, unloading and launching directly into the water and assembly of the various ponton units while water borne is accentuated.

(24) And this without prejudice to unloading and assembly on land as established by the former design.

**ABILITY TO RELOAD**

(25) Provision is now made to reload the ponton units by utilizing the motive power of the tractor by means of a windlass;

(26) or, by operating the windlass manually in emergency.

(27) Under the operations of reloading or launching, the movements of the launching cradle are modified by the action of the pneumatic cushioning and retarding cylinder.

**METHOD OF LAUNCHING**

(28) The procedure for either land or water launching is identical.

(29) The launching cradle carries a ponton unit on steel runners and thereby provides metal to metal sliding surfaces.

(30) The cradle in turn is carried on rollers installed within the side frame portions of the trailer chassis.

(31) The order of launching, or release of the cradle carrying the ponton unit, first provides for the initial acceleration of the cradle which is mounted on rollers,

(32) the subsequent stoppage of the cradle at a predetermined position involving the relative locations of the gravity centers of cradle and ponton unit,

(33) and then the combination slide and tip launching of the ponton unit from the cradle made positive by inertia due to its mass; or, by exceeding the angle of repose, or both.

**CONTROL OF LAUNCHING**

(34) If desired, both the slide launching and the tip launching operations may be controlled by means of the windlass.

(35) To control the slide and tip launchings by means of the windlass the ponton cradle and ponton unit are provided with independent
releasing gear.

(56) Provision for launching a ponton unit from a trailer when the trailer is in motion at a reasonably high speed is readily accomplished.

(57) In launching a ponton unit, into the water, the windlass cable is attached to the ponton in order that the ponton may be towed to shore and not go adrift.

(58) In event of a ponton unit going adrift the assistance of the towboat, or the use of the outboard motors would be required.

(59) The outboard motors may be mounted in place on their brackets on a ponton unit prior to its launching.

(60) The anchorage spuds may be mounted, in place, prior to the launching of a ponton unit.

ASSEMBLY OF PONTON UNITS

(61) The method of assembling multiples of the ponton units (say four) is best accomplished by launching the individual ponton units directly to the water and hauling them to shoal water by means of the windlass cable.

(62) Two of the ponton units, after launching, are temporarily anchored by means of the "lock-bar" spuds, and another ponton unit is brought alongside of each anchored unit for attachment at end, or side, as may be determined at the time.

(63) After the assembly of the pontons in pairs, one of the assembled pairs is released from the control of the spud anchors and is pulled, or towed, alongside of the other assembled pair remaining in an anchored condition (at the selected point for loading) and attachment is made thereto.

(64) During the time the ponton units are being assembled the outboard motor equipment is in use, and the towboats are assisting to best advantage and eventually take position to accomplish the crossing.

(65) With the assistance of one or more of the towboats and/or outboard motors the ponton units may be launched and assembled in remote and at protected locations whenever available (preferably upstream of the place selected for crossing) and towed either singly or as an assembled section, either with or without its deck load, to the desired point for loading.

(66) The time interval in transit from place of final and complete assembly of the ponton units to place of making crossing, navigational conditions permitting, may be accomplished in an expeditious manner with the propulsive power readily installed on the helper towboat.

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This is evidenced by the favorable relation of power to ponton unit displacement when in the loaded condition.

**TRANSPORT UNITS**

(47) Each transport unit, a tractor and its trailer, is completely equipped as a self-supporting and self-contained unit to provide for performing service as a transport and launching medium for one ponton unit.

(48) After a ponton unit has been launched either on the land or in the water, or at other times, the tractor may be uncoupled and used for other purpose. This feature is readily made possible by the use of the retractible standing-gear.

(49) In the event of a ponton unit being used as a gravity tank for the storage of fuel or water supply; the tractor may be freed to perform other service.

(50) For the purpose of present illustration, the truck shown on the trailer is provided with four pneumatic tires "in line". The design permits of the use of a twin axled truck with four tires mounted on each axle; or, a truck of the so-called creeper type.

(51) The center of gravity of the load, and the combined center of gravity of both load and trailer has been appreciably lowered.

(52) Power consuming gear, from outside source, to affect the actual physical maneuver associated with the launching of a ponton unit has been obviated and avoided.

(53) As before, (Design No. 1) this design has been generally regulated to fall within the limits of labor grades and the ordinary manufacturing facilities to be found in conventional structural, forge and machine establishments without sacrifice of consistent use of easily available materials and associated equipment.

(54) It will be noted that the design permits of some latitude in arranging a satisfactory distribution of weight and wheel loading.

**TOWBOAT TRANSPORT UNITS**

(55) As previously provided (Design No. 1) the transport units herein described are likewise a suitable and satisfactory means for accomplishing the "end" launching of the portrayed towboat; and, interchangeable with the ponton transport units in every respect.

(56) As an aid and safeguard in launching, and as a precautionary measure to protect the under water propelling and maneuvering gear against possible damage when operating in shoal water; guards or protective shoes have been fitted under the fan-tail portion of the towboat stern.
(57) The methods for loading, launching and use of standing-gear described for the ponton units also applies to the towboats with equal force.

PONTON UNITS

(58) The ponton units herein considered are the 40 x 10 x 4 feet ponton units with the parabolic formed nose and square transom stern included with Design No. 1 previously presented.

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RECORD OF
BROCHURES AND PORTFOLIOS

- pertaining to -

90 TON PONTOON-PERRY.

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