INCREASED EFFICIENCY THROUGH USE OF BARGE TO FLOAT DRAGLINE OR CLAM SHELL CRANE

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I will endeavor to be entirely objective in my appraisal of the comparative operations between machines operating on Mats and those operating on Barges.

INITIAL DESIGN PROBLEM INVOLVED. Several basic factors had to be considered in designing the first barge to float a unit one-half yard dragline: First, we considered the width and length of the unit machine to be mounted; second, consideration was given to the gross weight of the machine plus the weight of the loaded bucket which would extend twenty feet beyond the end of the barge; third, it was necessary in our planning that the barge after loading would be maneuverable and have sufficient floatation to be readily movable in both deep or shallow water.

TYPE OF BARGE DESIRED. The type of barge desired was one to be built of steel with three water-tight compartments; a rear tank for ballast large enough to hold water sufficient in weight to equal the weight of the unit; a center tank for fuel; and a small storage compartment at the forward end. I desired a spud and spud well on each side of the working end of the barge for stability; plus a hand winch with cable and anchor mounted on after end of the barge on each side to hold the barge stable and permit it to move forward and backward.

This information was placed in the hands of the Engineering Department of the Olson Boat Works for study.

RESULTS OF ENGINEERING STUDY. The aforementioned Engineering Staff, after research and study, approved a design for a barge 15 feet wide, 3½ feet deep, and 35 feet long. The displacement of water by the barge would support 65,000 pounds plus its own weight of 28,000 pounds. This would be ample to ballast the after-hold with 30,000 pounds of water. The fuel tank would be constructed to hold 1,000 gallons of fuel. The depth of the draft would give the barge the necessary stability in rough water.

PROCUREMENT OF THE BARGE. Satisfied that the engineering study had given us what we wanted, invitations to bid, which included detailed plans and specifications, were sent out. These detailed plans and specifications are available if desired.

The Olson Boat Works, bidding $6,000.00, was the low bidder. Six weeks were allotted for the building of the barge.

Upon completion, since the barge was too large for highway travel, it was towed up the St. John's River to Jacksonville from DeLand and then down the Inland Waterway to Daytona Beach, a distance of 247 miles in two and one-half days' running time. Transportation cost was reasonable.

PUTTING THE BARGE INTO OPERATION. The barge was put into operation immediately. Through its use, we moved two of our draglines onto islands south of New Smyrna Beach. These islands were inaccessible other than by barge. Deep water was not available at the shore lines of these islands so we dug our way in with the draglines operating off the barge.

We continued using the barge in this operation . . . moving the draglines from island to island until the work was completed. The draglines were then returned by barge to the mainland.

Breeding areas totaling 400 acres on these islands were eliminated through this operation. Without the barge it would have been impossible to perform this permanent control work.

DITCHING FROM THE BARGE. Actual work in ditching from the barge began in January 1957 when a new dragline equipped with an Erie ½ yard Clam Shell bucket was purchased.

The first few days of operation were slow. Some changes in the final position of the dragline on the barge had to be made. The difficulties experienced were eliminated by use of 5/8 x 4 steel bars made in two parts. These were welded to the sides of the barge, the bars extending across the frame of the dragline from side to side, both front and back. Thus the movements of the barge and the dragline were as one solid piece of equipment with no slipping or moving on the deck.

This rigidity having been accomplished, the operator soon picked up the rhythm of, you might say, "Rock and Roll" in the operation. By the end of the month, he had tripled the lineal feet of ditch dug by a like machine operating on mats in the same area for the same period of time. Ditches were uniform, being 15 feet wide —5½ feet deep—with flat bottom and straight up and down sides to the canal being dug.

During the early stages of operation, it was found that the spuds and anchors were unnecessary. The barge moved forward automatically as the ditch was dug.

STATISTICAL ACCOMPLISHMENTS. The operator, operating from the barge in heavy marsh mud, operates at the rate of six buckets per minute. His average day's work is 550 lineal feet of 15 x 5½ canal or 1,530 cubic yards . . . at a cost of two-and-eight-tenths cents per cubic yard.

The daily record of the three draglines in operation during 1957 . . . two on mats, one on the barge . . . produced these totals: For the year—

A total of 167,610 lineal feet were dug, 391,726 cubic yards were moved and 662 acres of land were improved.

The floating dragine accomplished (of the above total) 74,633 lineal feet dug—203,872 cubic yards moved. This averages 65 percent more work accomplished by the floating dragline than accomplished by either of the draglines on mats. The floating dragline moved more spoil than that moved by the other two draglines together . . . an outstanding record.

COMPARATIVE ANNUAL COSTS. The combined annual cost of operation of the floating dragline (including salaries, fuel, oil, gas, cable and depreciation) totals $8,687.00, or slightly over four cents a yard of spoil moved.

Comparable cost of draglines on mats total $17,720.00, at a cost of slightly more than nine cents per yard of spoil moved.

So far as lineal feet dug is concerned, the floating dragline accomplished this job at approximately eleven and six-tenths cents per foot while the draglines on mats accomplished the same job at slightly over nineteen cents a foot.

OTHER BENEFITS OF FLOATING OPERATION. In addition to lower cost of operation, other advantages are that there is no wear on the crawlers, chains, rails spreads and pins and bushings. A floating unit is always high and dry with no chance of slipping off mats or getting stuck crossing small streams, both of which are ever present hazards.

NEW BARGES RECENTLY PURCHASED. The two new barges purchased this year are a two-pontoon barge with overall measurement of 15 x 32 x 3½ feet. It was constructed in two parts so that it could be transferred by tractor and low-boy from one project to another. Several of our projects have no navigable waterway entrances. Each pontoon, weighing 12,000 pounds, can be moved singly and launched separately and assembled while floating in a pond dug by the unit. As with the first barge, copies of detailed specifications are available. Operation of this barge has proved as satisfactory as that of the solid barge. This operation has proven so successful that the fourth and last machine is being mounted on a two-part barge in May of this year.