

ERIE'S "NAVY" GETS FLOATING DRY DOCK

New unit permits underwater repairs to be made at this road's marine terminal and thus eliminates heavy dock charges at private shipyards

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Underwater maintenance and repair of most of the 234 units of floating equipment operated by the Erie in New York harbor are now being carried out on a new welded steel floating dry dock, believed to be the only one of its kind owned by a private fleet operator in this district. The new dock, which was recently placed in service at the Erie's marine terminal at Jersey City, N.J., permits more effective use to be made of the terminal which, although improved and enlarged in 1942, was not equipped to make repairs to vessels below the water line. Thus, formerly, when hull repairs and other underwater work were necessary, vessels had to be taken to a private shipyard for dry-docking, resulting in considerable lost time for the vessels and tugs as well as additional expense.

A floating dry dock is a submersible, shallow-draft vessel, with parallel wing walls on each side, which rise vertically above the deck. The hull and the wing walls are constructed with a number of cells, or tanks, which can be flooded to cause the dry dock to sink. When submerged, a vessel requiring under water repairs is towed into position above the deck and made fast to the wing walls. The tanks are then pumped out, or dewatered, raising the dry dock and, with it, the vessel to be repaired. On completion of the repair work, the dock is again submerged and the vessel towed away.

The Erie's new dock is entirely of welded steel construction and is designed for a normal lifting capacity of 400 tons and a maximum load of 700 tons. It is 130 ft. long, over-all, and has an extreme width of 60 ft. The wing walls are 19 ft. high above the deck and 110 ft. long with 48 ft. inside clearance. The bottom of the vessel is 8 ft. below the deck, thus making the total height 27 ft. When floated light, the dock has a draft of 3 ft.

Has Six Flooding Tanks

The dock structure is divided into six independent flooding tanks—three on each side of the center line. Each tank extends from the center-line bulkhead to the side of the dock and then upward in the wing walls, to a safety deck, 11 ft. above the main deck level. Four buoyancy compartments are provided in the dry dock, one being at each end of the hull, while the other two are in the wing walls above the safety decks. The buoyancy compartments are completely sealed to pre-

vent their flooding. Normally, the main deck is 5 ft. above water, but, when the dock is fully submerged, its deck is 15 ft. 6 in. below water.

The dock is submerged by opening six 10-in. flooding ports—one for each tank—to allow the tanks to fill with water. About 20 min. are required to fill the tanks completely and submerge the dock to maximum depth.

Floating the dock is accomplished by pumping out the flooding tanks by means of vertical centrifugal pumps—one for each tank—rated at 1,100 g.p.m. Each pump is driven by its own electric motor, located on the safety deck, the pumps and motors being connected directly by vertical stainless-steel shafts. The pumps discharge through sea cocks 8 in. in diameter. To float the dock requires 51 min. of continuous pumping.

Emergency Valves Provided

The flooding tanks are connected in pairs by gate valves in the center-line bulkhead so that, in case of a pump failure, the corresponding pump on the opposite side of the dock can be used to dewater both tanks.

All operating controls are mounted on a single panel in a small control house on top of the port side wing wall. The flooding and discharge ports are opened and closed hydraulically, but provision has been made for hand operation, if necessary. The emergency valves in the center-line bulkhead are opened by hand controls on the safety decks.

The dry dock is moored directly alongside the Erie's Pier 1. The pier slip, directly at the site of the dock, was dredged to a depth of 29 ft. below low water so as to permit complete submergence of the dock. Six pile clusters were driven on a line 75 ft. north of and parallel with Pier 1 as protection for the dock.

A permanent platform 10 ft. wide extends 16 ft. into the slip, at pier level, directly west of the dry dock. A narrow catwalk extends 19 ft. farther into the slip, beyond the platform, and is used by the dock-master when centering vessels on the dry dock. A hinged ramp, that rises and falls with the dock, connects the dock and the platform and provides access for men and materials.

The Erie fleet in New York harbor includes five ferries, 11 tugs, 27 car floats, four self-propelled lighters, 111 barges, 61 scows, one steam derrick and 14 gasoline-hoist lighters. These are being augmented in 1948 by a new tug, two car floats, and 25 new barges and scows and in 1949 by five new floats and 25 barges

*Mr. Visintainer died on September 27, as reported in *Railway Age* of October 2, page 74.

and lighters. Except for the ferries, the car floats and the derrick, all of this floating equipment can be handled in the new dry dock.

How Vessels Are Supported

When a vessel is repaired in the dry dock, its weight is concentrated on keel blocks located on the center line of the deck. Transverse structural-steel frames below the deck, spaced 7 ft. 6 in. apart, distribute this load evenly over the bottom of the dock. The keel blocks are located directly over the frames and midway between them. Movable bilge blocks, located over the frames, support the ship laterally.

The keel blocks and bilge blocks are made of several layers of heavy timber and may be adjusted with respect to height. The top pieces of the bilge blocks are shaped so as to conform to the contour of the hull of the vessel being raised. The bilge blocks are moved into position after the dock has been submerged and the vessel has been secured in position. This is done by means of hand-gear controls located on top of the wing walls.

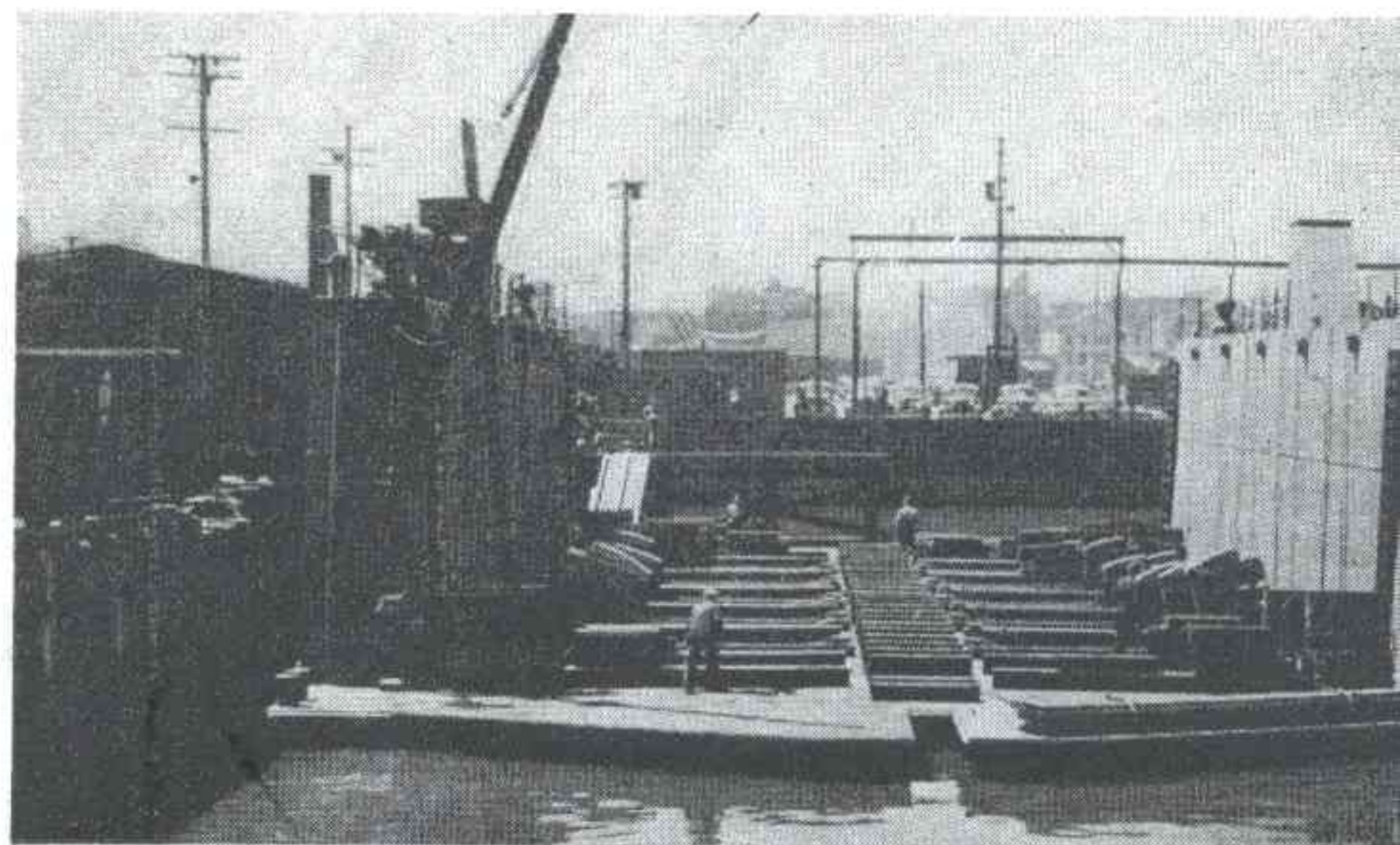
A 24-in. slot, with hinged cover plate, is provided at the aft end of the dry dock for use in dropping rudders of self-propelled equipment. A 3-ton power hoist on the aft end of the port wing wall facilitates the removal of rudders and propellers.

To protect it against corrosion from impurities in the sea water, the hull of the dry dock was given a heavy bitumastic coating to a height of one foot above the normal water line. The interiors of the floating tanks were given a heavy grease-like coating and the deck was finished with a 1-in. mastic wearing surface.

The surfaces above the hull were painted standard box-car color and decorated with the Erie's diamond insignia.

The dock was designed and constructed under the general direction of I. H. Schram, chief engineer of the Erie, the writer, and M. B. Roderick, superintendent, Marine department, in cooperation with the Dravo Corporation, Pittsburgh, Pa. The component parts of the dock were fabricated and assembled at Dravo's Neville Island plant, near Pittsburgh, and were shipped by rail to that company's shipyard at Wilmington, Del., where the final assembly was performed. On completion the dock was towed 225 mi. to the Jersey City terminal.

The dock is operated by a dockmaster and a crew working under the general supervision of Mr. Roderick and T. Wouters, master mechanic, marine repairs.



Above—The dry dock afloat and being made ready for lowering to receive a tug that requires hull repairs



Left—A tug is maneuvered into position on the submerged dry dock for lifting

Right—The dock is again raised—this time with the tug securely blocked in place

