

# Bay City Improves Its Bridges

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**Contents in Brief**—After half a century of service the bridges of Bay City, Mich., required drastic rehabilitation or replacement. Improvement work recently accomplished includes one new bridge and reconstruction of two existing ones to carry modern loads.

IN BAY CITY, MICH., crossing of the Saginaw River, which cuts through the city close to the business section, was until recently effected by four bridges more than 40 yr. old, of which three were grossly inadequate for modern traffic. The fourth bridge, reconditioned in 1938, was capable of carrying H-15 loads and was therefore satisfactory. Replacement of one of these old structures by a new bridge and extensive though inexpensive repair of two others have greatly improved the city traffic situation.

In 1934 the three inadequate bridges were posted for maximum loads varying from 1½ to 8 tons. This was followed by condemnation of one of the structures, the Lafayette Ave. bridge, an action which focused the attention of the city on the pressing question of bridge replacements. However, no progress was made because of financial difficulties, for two years, when a city-wide bridge survey was authorized. The program evolved from these studies was as follows: Immediate construction of a temporary pontoon swing span for the La-

fayette Ave. structure, followed by construction of a new Lafayette Ave. bridge; rehabilitation of the Belinda St. bridge; and repairs to the Cass Ave. bridge including replacement of the east channel swing span, this bridge and the one at Lafayette Ave. crossing over an island in the river which creates an east and west channel.

## Lafayette Ave. pontoon

For 3½ years after the Lafayette Ave. bridge was condemned until the new one was put in service late last year a pontoon bridge did duty over the navigated channel; it was flanked on both ends by timber trestle approaches. This structure had a 20-ft. roadway and one 5-ft. sidewalk and was designed for H-15 loading. The movable truss span, 135 ft. long, was supported on one end by a timber pier, where one truss rested on a spherical bearing and the other on a two-wheel truck running on a circular track. The front end of the span was supported on a 26x56x8-ft. barge at the second and third panel points.

When the span was in the closed position the barge was lowered by pumping in water ballast until the span rested on the front pier. Thus the structure rested firmly on the supporting piers when carrying traffic. When it was desired to open the span, water ballast could be removed in 60 sec. to lift the span clear of the rest pier. A gasoline-driven single-speed hoist, mounted on a barge with front and back haul cables anchored to a pile cluster, operated the pontoon. The barge was divided laterally into three watertight compartments to obtain lateral bracing and to reduce the surging effect of the water ballast, ordinarily placed in the center compartment only. The cost was \$37,500.

## New Lafayette Ave. bridge

At Lafayette Ave. the river is 1,500 ft. wide with a 500-ft. island in the center. Over the east branch, 18½ ft. deep and navigable for a 200-ft. width, a 185-ft. double-leaf skew bascule, affording 150-ft. horizontal navigation clearance was erected in 11 months and put in service last November. Over the non-navigable west channel a new fixed bridge of deck girder spans with curved bottom chords was constructed. The bascule is flanked on the east by a deck plate

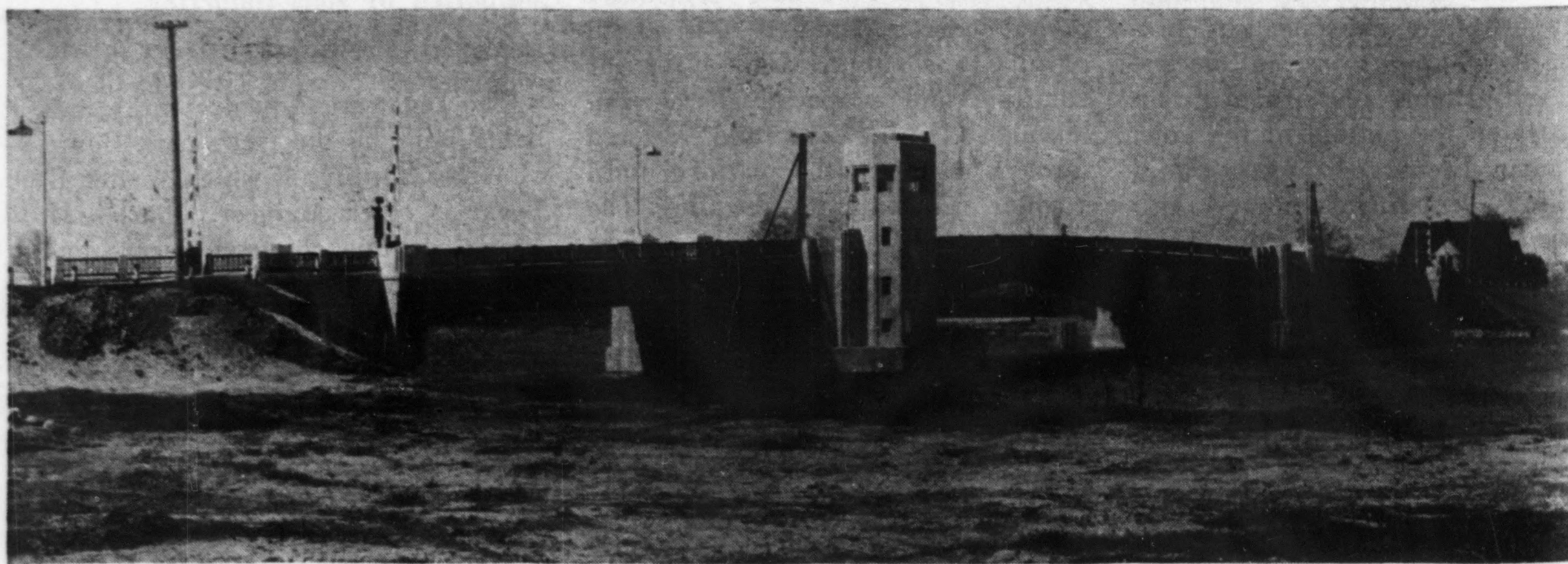


Fig. 1. New Lafayette Ave. bridge at Bay City, Mich. This bascule, across the east channel of the Saginaw River, was recently designated the most beautiful movable bridge of the year.



girder span, 107 ft. 8 in. long, and on the west by a plate girder span 96 ft. 10 in. long. The approach spans accommodate a 30-ft. roadway on a 7½-in. concrete slab and two 5-ft. sidewalks on a 4-in. slab. To reduce weight, the 30-ft. roadway of the bascule span is made of 3½-in. grid-type decking, filled with light-weight concrete, while similar construction with 2½-in. grid section is used for the sidewalks. Weight per square foot of deck is 45 lb. for the roadway and 25 lb. for sidewalks.

The bascule span, which received the A.I.S.C. award for the most beautiful movable bridge of the year (*ENR*, June 22, 1939, p. 39), is of the Scherzer rolling lift type with the rear break in the floor in front of the point of support with bridge closed. Each leaf of the bridge is operated by two 25-hp motors. Emergency brakes of the thruster type are provided, and the total braking capacity is more than ample to hold the bridge in the open position against a wind load of 15 lb. per sq. ft. The motors are located on the movable span and drive through a special speed reducer unit, equipped with built-in equalizer, thence through two open gear trains to the fixed racks. The use of the speed reducer unit simplifies the machinery layout and facilitates access to all parts of the equipment. Both leaves of the bridge, as well as the traffic gates and signals, are operated from one operator's house located at the east bascule pier.

On a floor at the track girder level is the auxiliary or standby power equipment consisting of a 75-kva generator, direct-connected to a 120-hp 1,200-rpm gasoline engine. To change from the main power supply to auxiliary power requires only the operation of three "throw-over" switches.

The total cost of the project, including both east channel and west channel bridges, was \$618,000.

#### Belinda St. bridge

The 47-yr. old Belinda St. bridge, serving the north end of the city, consists of one 260-ft. through truss swing span flanked by a 140-ft. through truss span at each end. Two approach girder spans made the total length of bridge 600 ft. All metal above the deck was in satisfactory condition but below deck corrosion was well advanced, particularly on the floorbeams, stringers and side-

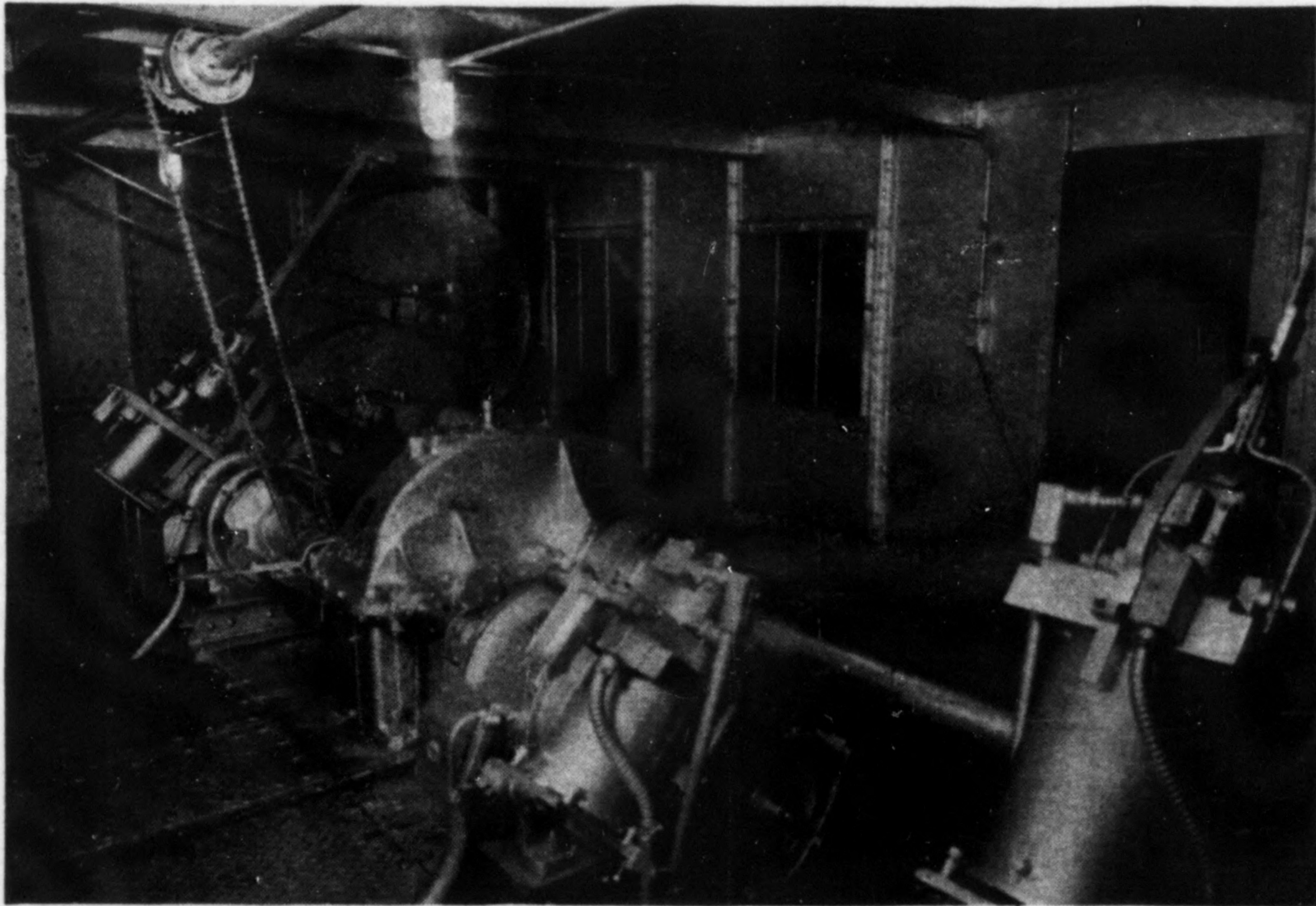


Fig. 2. Operating machinery for the Lafayette Ave. bascule. Motors drive through a speed reducer unit in the housing near the center of the picture.

walk brackets. The bottom chords of the center panel, immediately over the pivot pier, were likewise corroded to a dangerous degree. A generous use of salt at the approaches during slippery weather had obviously done much to accelerate the deterioration of the metal. Finally, dredging of the channel had robbed the pivot pier of its original stability, and frost action had taken a heavy toll at the joints in the rubble masonry of all piers.

Calculations indicated this structure, the replacement value of which was \$500,000, could be reconditioned to carry H-15 loading for \$80,000. WPA did the job. The items included were as follows: (1) stabilization of pivot piers and rest piers by steel sheetpiling; (2) replacement of fender system; (3) deck replacement with concrete-filled steel grid; (4) new treated-timber sidewalks; (5) new electrical controls, electrical brakes, roadway gates, signals and operator's house.

#### Cass Ave. bridge

Salvage from the Lafayette Ave. temporary bridge, including the pontoon span, is being used this season to recondition the Cass Ave. bridge and to widen the channel from 67 to 100 ft. This work involves the following items: (1) removal of the east swing span; (2) dredging; (3) moving in the pontoon span from Lafayette Ave.; (4) replacement of the timber approach to the west channel swing span, using salvaged material; (5) strengthening the floor system of

the west swing span and replacement of the deck with salvaged material.

W. J. Meagher, Bay City, Mich., had the contract for the Cass Ave. bridge at \$23,000. The Owens-Ames Kimball Co., Grand Rapids, Mich., with Max Pearse as general superintendent, was general contractor for the Lafayette Ave. bridge; R. C. Mahon Co., Detroit, was sub-contractor for steel fabrication and erection. A. L. R. Sanders was resident engineer for Hazelet & Erdal, consultants for the entire program. J. Harry Nelson, city manager, represented the city in all negotiations.

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### Thousands Complete Courses for WPA Foremen

More than 46,000 foremen on WPA construction projects have completed on their own time special training courses offered by the WPA. Whereas there were originally courses in the supervision of labor, the program has now been expanded to include classes in semi-technical phases of construction and road-building, and about 19,000 men are now enrolled in such study.

The courses in supervision include such topics as discipline, giving orders, planning project work, and accident prevention. The semi-technical courses include interpretation of drawings, measurements of quantities, soils, road surfacing, concrete work, scaffolding and rigging.