10:00 a.m.—Unloading both of the large cable reels from the trucks at river dock

Fast Work Laying Submarine Cable

Erie lays 2,615 ft. of 52-conductor signal cable at Hackensack river bridge in 6½ hours after it left the cable factory

THE Erie recently carried out an interesting project involving the laying of two lengths of 52-conductor submarine cable, aggregating 2,615 ft., across the Hackensack river, 5.5 mi. west of its passenger station at Jersey City, N. J. The project was noteworthy because the entire operation—from the time the cable was loaded on trucks at the plant where it was manufactured until it was laid across the river, ready for connection—required only 6½ hours.

The Erie's main line at this point is a four-track railroad, converging to two main tracks over the drawbridge which spans the Hackensack river. Extensive layouts of power-operated switches and crossovers, located on each side of the river, permits the routing of trains over tracks, as desired. These switches and signals are controlled from an electric interlocking located in "HX" tower, directly west of the bridge.

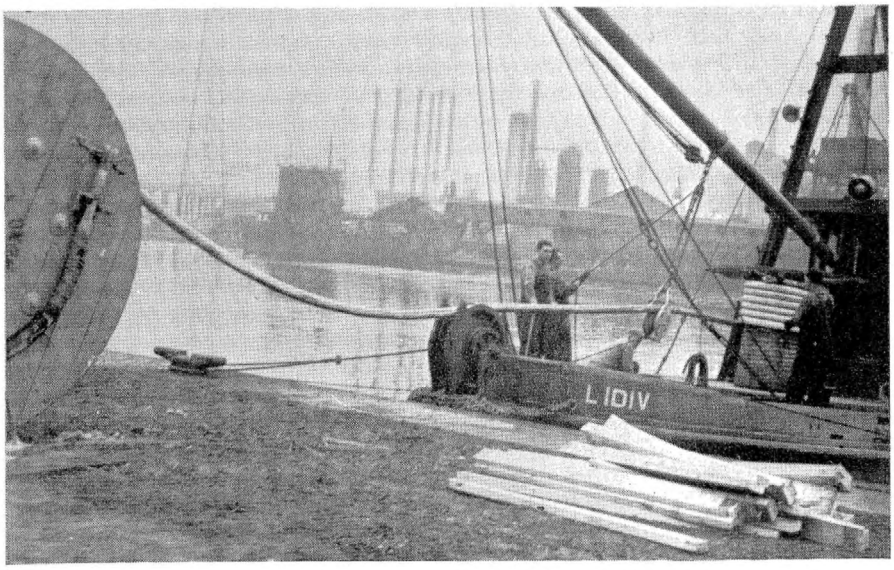
The Hackensack river bridge is 1,095 ft. 6 in. long and consists of a bascule-type lift span, 152 ft. 3 in. in length, over the navigable channel, flanked on each end by girder spans founded on concrete piers. The various circuits for controlling the switch machines and the signals on the east side of the river were formerly carried in several non-metallic aerial cables supported by messengers which were attached to the outside of the girder approach spans, beneath the deck level. Submarine cables were laid across the channel proper and the individual conductors in them were connected to those of the messenger-supported cables. The terminal cases are located on the bridge abutments.

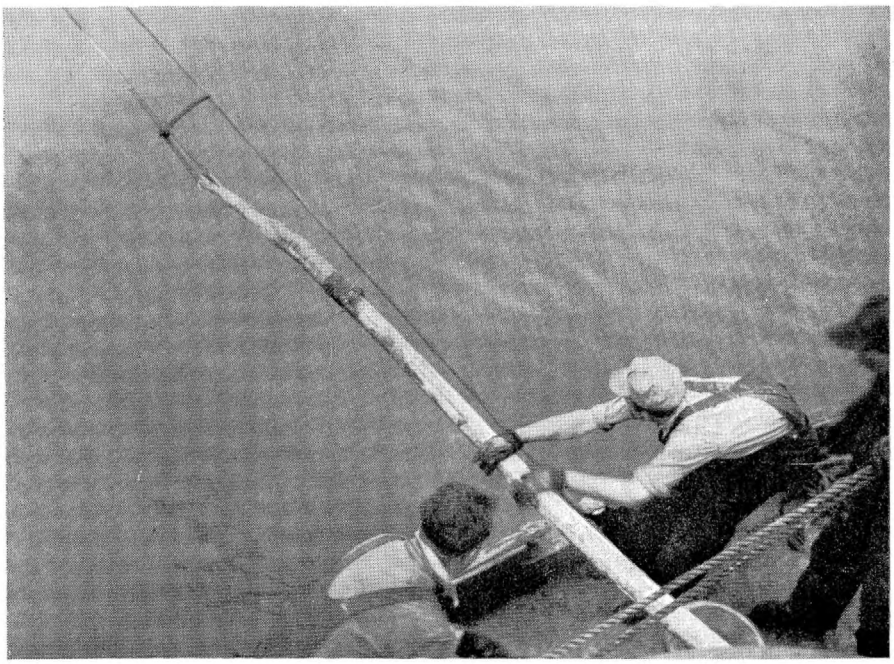
This arrangement proved to be expensive to maintain, largely because of brine drippings from large number of refrigerator cars moving over the bridge, which caused rapid deterioration of the messenger and the cable supports. In addition, the location of the submarine cable directly beside and through the lift span proved to be undesirable because of it continually being damaged by tide action and floating work equipment when making repairs to the fender system on each side of the channel.

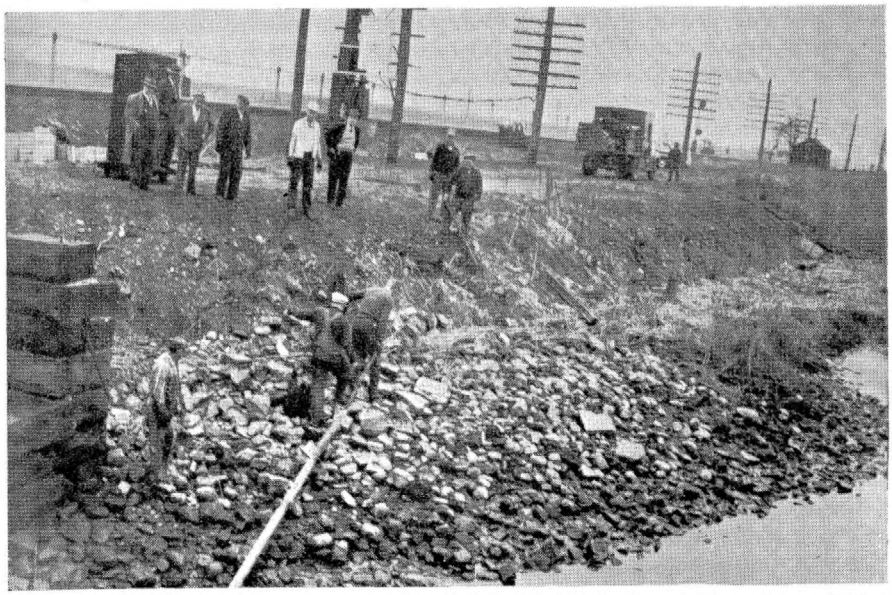
Recently it became necessary to install a new cable at this point, and because of the unsatisfactory experience with the existing cables, it was decided to use submarine cables, laid from shore to shore, and located well to the south of the bridge and its fender systems thereby eliminating any future damage caused by fender repair work, and other sources of deterioration.

Arrange for Cable Boat

In preparing for the project, the railroad arranged for the use of the cable boat LIDIV, owned by the New York Telephone Company, and normally used for laying submarine telephone cable in and about the waters of New York harbor. This is a 52-ft. motor-driven vessel manned by a crew of five. The vessel is well equipped with gear essential to cable-laying work, including two power-operated capstans, a derrick, tackle of







all types and a large cable reel arranged to rotate horizontally, mounted directly forward of the wheel house. This reel, which is power operated, holds approximately 3,600 ft. of the type cable used in the Erie project.

The new cable for the Erie project was manufactured at the Paterson (N.J.) factory of the Okonite Company. It was fabricated in one continuous piece and was then cut into two lengths—one piece being 1,310 ft. and the other 1,305 ft. The cable contains 52 conductors. Thus, with the two lengths installed, 104 wires are provided for use—ample for the immediate requirements at "HX" tower. Of the 52 conductors, 50 are No. 12 A.W.G. solid copper and insulated with 5/64-in. Okolite, 1/64-in. Okoprene; and 2 are No. 8 A.W.G. solid copper insulated with 6/64-in. Okolite, 1/64-in. Okoprene. The wires are cabled and taped, covered with 8/64-in. lead sheath, saturated jute, No. 4 B.W.G. armor wire and saturated jute. Pulling eyes were provided on each end of each length of cable. After fabrication, each length of cable was reeled onto a large shipping reel, 8 ft. in diameter.

At 8:30 a.m. on April 13—the day scheduled for laying the cable—each of the reels was loaded on a heavy-duty truck at the factory and was securely blocked in place. This work was completed within a half-hour. The trucks then departed for a 15-mi. drive to a dock on the Hackensack river in Jersey City, selected in advance, where there was sufficient room to maneuver the trucks in obtaining the most favorable position for unloading. The trucks bearing the cable and the cable boat arrived at the dock at 10 a.m. On arrival, each reel was unloaded to the ground by rolling it off the tailboard of the truck. During this rather hazardous task, each reel was held in check by a stout wire rope, attached to a power winch on the truck, which passed over the reel and was secured to the rear of the truck frame.

Once on the ground, the protective crating around the circumference of

Top view — 12 noon — Two hours were required to transfer the cable from the shipping reels to reel on the boat

Center view—1 p.m.—The free end of the first length of cable being hauled ashore by a line which ran from the cable boat to a snatch block on the shore and back to the capstan on the boat

Bottom view—2 p.m.—The truck in the background was used to haul the end of cable ashore

each reel was removed, a steel bar was inserted through the center of the reel to act as an axle, and the reel was jacked up with a pair of Simplex reel jacks until free to turn. The free end of one cable was then hauled aboard the cable boat, and made fast to the horizontal reel on the vessel. This reel was then set in motion and the cable was all reeled onto the boat. This operation began at 10:30 a.m. and was completed at 12 o'clock noon.

The trip from the dock to the point of work—about four miles—required 45 minutes, because the boat was sailing against a heavy tide and because of a 10-min. delay at one drawbridge.

As soon as the cable boat reached the point of work, the Captain investigated the depth of water near each side of the river, and then proceeded to a point near the west bank and anchored. A stout line was passed ashore and, after being passed through a snatch block, which was secured on the shore, was then returned to the boat. One end of this line was made fast to the free end of the cable, while the other end was passed around one of the power-operated capstan winches on the boat.

Using the capstan as the pulling power, the free end of the cable was hauled ashore at 1:00 p.m. and made fast. The boat then weighed anchor and moved rapidly across the river, paying out the cable over the port side.

When close to the east bank, the boat was again anchored while the section of first length of cable remaining on the reel was removed. This was done with the aid of the boat's derrick, and the cable was coiled across the bow of the vessel in the form of a large figure eight. A line was made fast to the pulling eye on this end of the cable and was then passed ashore where it was attached to the frame of a signal department truck. The truck, moving slowly, then pulled the end of the cable ashore, completing the operating at 2:00 p.m.

The LIDIV then returned to the west bank to start the laying of the second length of cable. By this time, the rapid tidal current had slackened considerably and less difficulty was experienced in maneuvering the boat. The second cable was laid in only 35 minutes, and the entire operation was finished at 2:55 p.m.

Signal department activities on the Erie are carried out under the general direction of W. S. Storms, signal engineer, Cleveland, Ohio. J. H. Storms, signal supervisor, S. D. Richardson, assistant signal supervisor and R. S. Wharton, construction foreman were in direct charge of the cable laying work described above.

C.T.C. on the Frisco

(*Continued from page 370*)

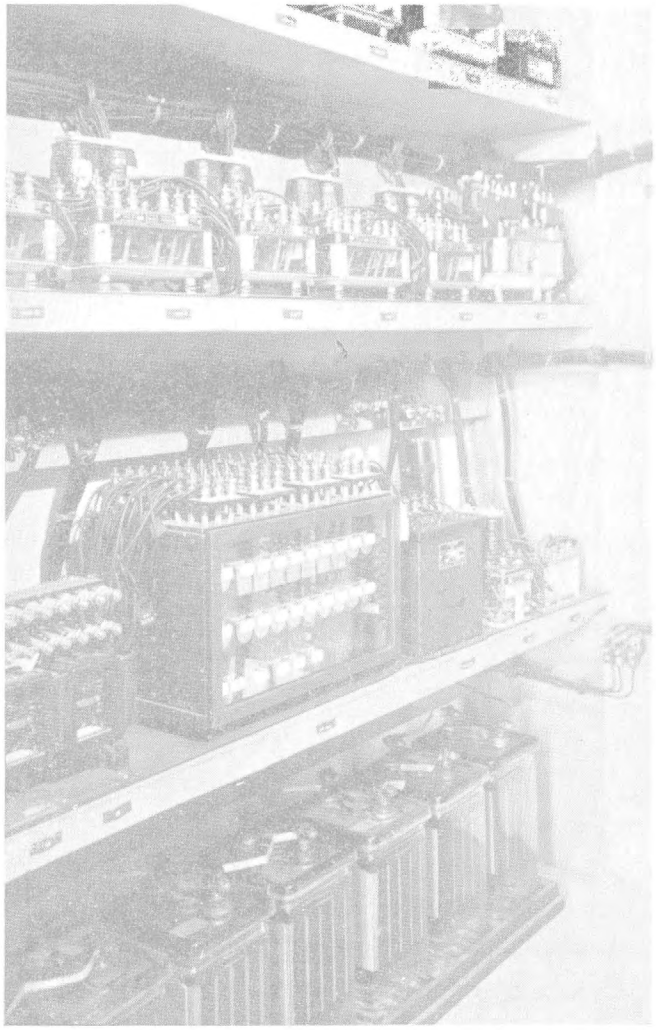
set of 13 cells of 80-a.h. Exide lead storage battery which operates the switch machine. Eight of these cells also feed the line code equipment. Also at each switch and at each intermediate signal, there is a set of 5 cells of 60-a.h. battery to feed the line circuits and to serve as a standby for the lamp feed. Each track circuit is fed by two cells of Edison 500-a.h. primary with a rectifier in multiple to take all but about 12 m.a. of the load.

A concrete house, 8 ft. by 10 ft., is located at each field station power switch. These houses were wired complete with relays and other equipment in place at the shop in Springfield. The relays and code equipment are on shelves on the side walls. On the rear wall is a ¾-in. plywood panel on which are mounted the terminals, arresters, transformers, rectifiers and power-off relay. Raco Clearview type arresters are used on line circuits, and Model-12 Western Railroad Supply arresters on the track circuits.

Also on this board is a special case with levers which are similar to those on the dispatcher's machine. If the code line fails, a man can be sent to each field station to use the small panel to control the switch and signals locally. In order to cut a field panel in service, a lead seal must be broken to operate a master lever.

The signal line wires are on the lower arm on the poles used also for communications. These signal wires are all provided with weatherproof covering. The four signal wires are No. 12 Copperweld, the two code wires No. 8 Copperweld and the two a.c. power wires are No. 8 solid copper. The underground cables are Kerite, using a seven-conductor No. 14 from each concrete house to a signal; five single-conductor No. 9 and a seven-conductor No. 14 to each switch machine, and single-conductor No. 9 for track connections.

This C.T.C. project was planned and installed by signal forces of the St. Louis-San Francisco, under the direction of R. W. Troth, superintendent of communications and signals, the major items of signaling equipment being furnished by the Union Switch & Signal Company.



Relays, coding equipment and batteries in house at one typical siding