The Erie Installs Either-Direction Signaling on Seven Miles of Double Track

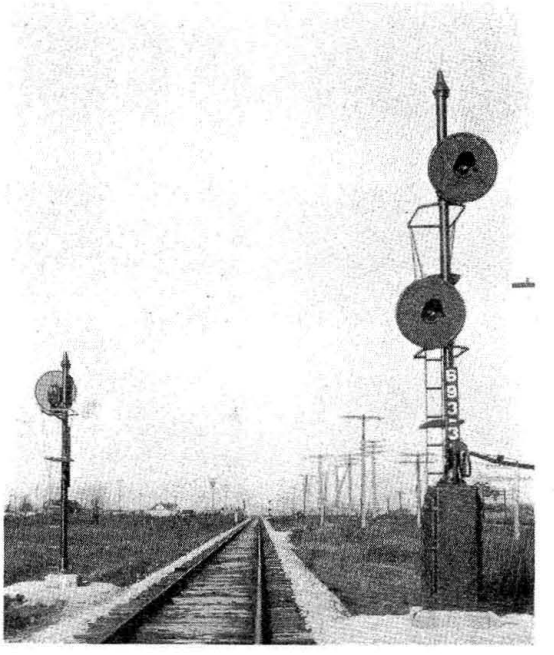
Traffic direction locking, improvements in interlockings and crossing signals at 10 highways included

AUTOMATIC block signaling arranged for either-direction operation on each of two tracks has recently been installed on seven miles of line between HY tower, Hammond, Ind., and Griffith. Between these points the Erie and the Chesapeake & Ohio have each a single-track line, the latter being south of and 80 ft. on centers from the Erie line. At the east end of this territory, Griffith, the C. & O. crosses the Erie, the switches, derails and signals being controlled by an electric interlocking which also includes protection for crossings with the Elgin, Joliet & Eastern, the Grand Trunk, and the Michigan Central. At HY Hammond yard, the west end of this territory, a mechanical interlocking had been in service for years, to operate the junction with the C. & O. track, as well as crossovers and switches leading to a large yard of the Erie lying to the north of the main line west of this tower.

For many years the Erie and the C. & O. have used these sections of single-track jointly, right-hand running being used, thus providing a double-track line between these points. As no signal protection was provided, train movements were made by manual block and train orders according to regular double-track operating practice.

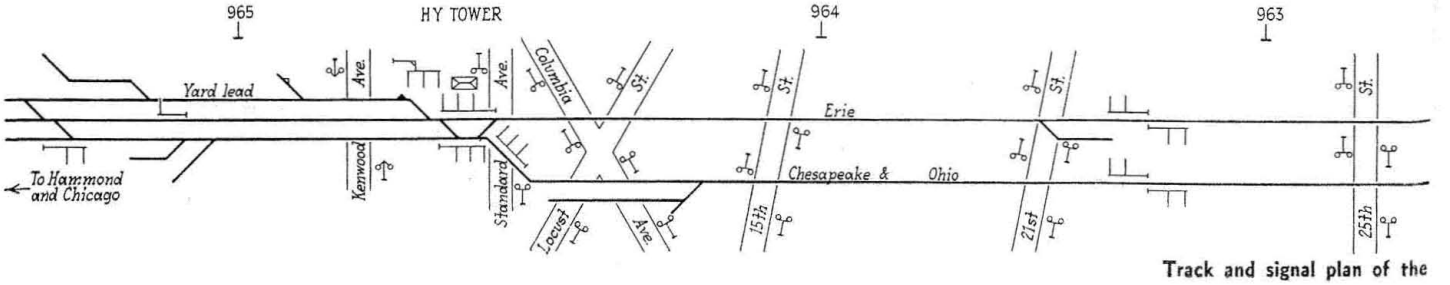
In this territory at the present time, the Erie operates 6 passenger trains and about 13 freight trains daily in each direction, and the C. & O. operates 2 passenger trains and 10 freight trains each way—a total of approximately 62 train movements daily. In normal times the traffic is much heavier. Even at the present low level of traffic, it was quite a problem to get these trains over the joint track without delays.

The most obvious plan for increasing track capacity was to run trains in either direction on both tracks, under a manual-block and train-order system. This method was tried to some extent, but, for several reasons, was not successful. In the first place, delays were occasioned by the handling of train-orders. Furthermore, no following moves could be made if a passenger train was involved. As a third reason, the operation of freight trains through a No. 10 yard turnout and through two No. 10 crossovers in the HY layout was so hampered by speed restrictions that the consequent delays offset the time savings that were effected elsewhere, and thus the purpose of this method was defeated.



Searchlight signals are used

It was therefore decided that three things would have to be done to expedite train movements between HY and Griffith interlockings: First, to install regular single-track automatic block signaling on each track so as to increase the track capacity. Second, to provide signals and traffic direction locking for the operation of trains in either direction on either track without train orders. Third, to install No. 15 turnouts in the HY plant, so as to permit the prevalence of faster train speeds through the plant. A fourth consideration of major importance was the fact that the city of Hammond had ordered the Erie and the C. & O. to provide either gates or flashing-light signals at several street crossings. The installation of these signals involved the construction of about five



Track and signal plan of the

miles of track circuits on each line—a fact which made even more feasible the plan to install automatic block signaling at the same time.

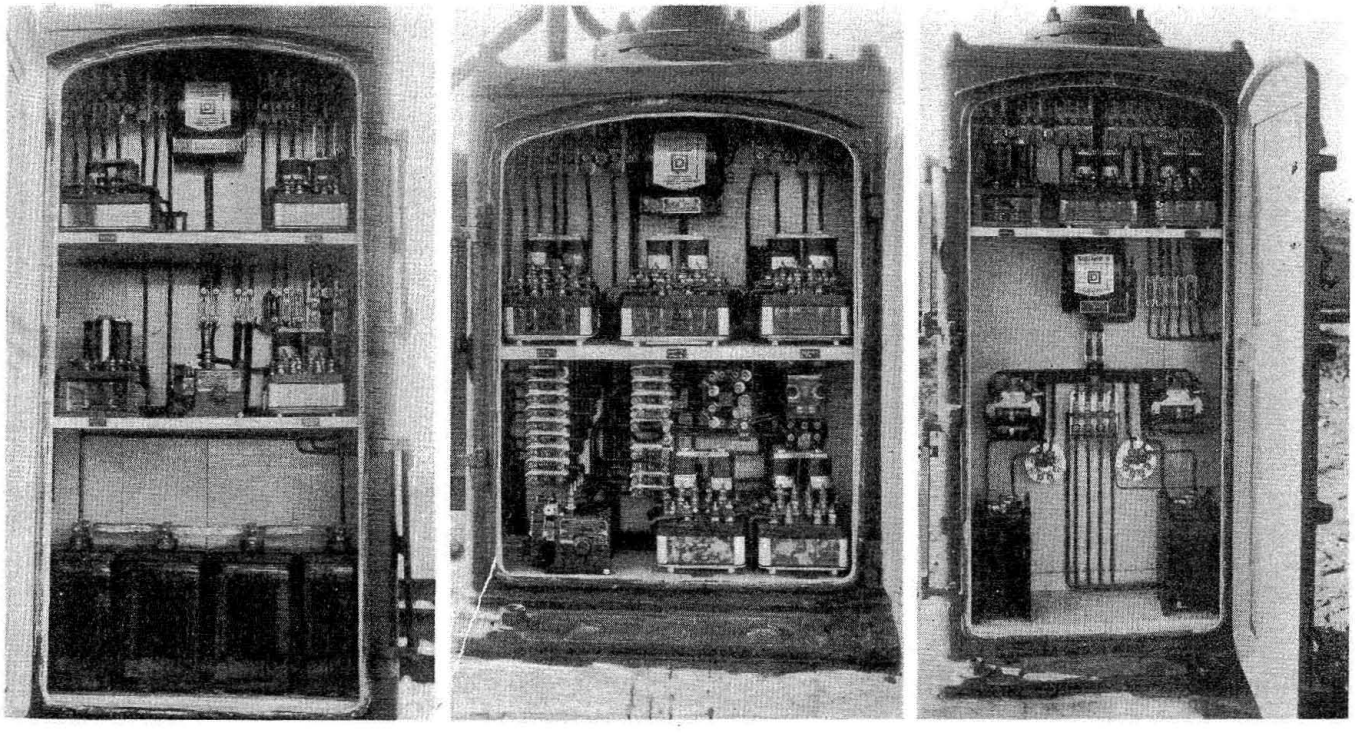
The Automatic Block Signaling

A mechanical interlocking is provided to protect the crossing of the double-track line of the New York Central with the Erie and the C. & O. at Highlands, located about midway between HY and Griffth. Therefore, the location of the home and approach signals for the three plants practically fixed the spacing of the automatic signals, as the accompanying plan shows. The signals are the Union searchlight type using 8-volt 16½-watt double-filament lamps. The concrete foundations were poured in place using a power mixer on a flat car in a work train.

The power supply is of the a-c. floating type with the 440-volt a-c. distribution line carried on No. 8 hard-drawn copper wire protected by triple-braid weather-proof covering. Pyrex No. 622 glass insulators are used for this line. At each signal and cut section location there is a General Electric 110-v.a. Type-M line transformer protected by G. E. fused-plug cutouts and Electric Service Supply Co. Crystal-Valve arresters. A No. 6 bare solid-copper wire extends down the pole to two one-inch galvanized iron ground rods eight feet long, to which it is attached by an O-B ground-connector. The line control, signal, and lock circuits are on No. 10 hard-drawn copper with triple-braid weather-proof covering. A new pole line was constructed for the signaling circuits, using Class-B chestnut poles which are butt-treated with creosote.

The cables from the pole line to the instrument cases are made up of single-conductor wire using a ¼-in. Copperweld stranded messenger, a strain insulator being located in the messenger. These cable wires are No. 14 for the control circuits and No. 9 for the 110-volt a-c. feed, all wire being insulated with 5/64-in.-wall rubber, tape and braid. As shown in one of the views of the interior of a case, the instruments are wired with No. 9 solid wire which is insulated with 5/64-in.-wall and braid only.

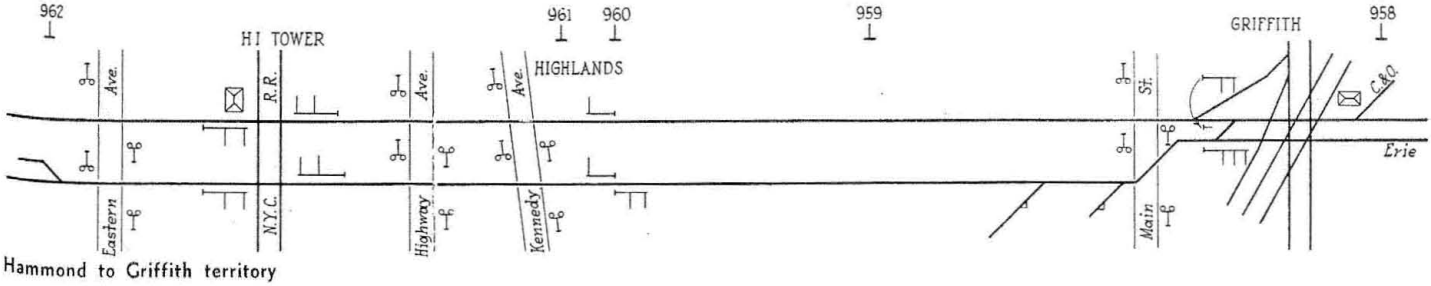
Everett choke-coil type arresters, No. 300-6, with air-gap, are provided for line circuits and are mounted at the top of the case. The track and neutral line relays are Union Type DN-11, the track relays being 2-ohm and the line relays 1,000-ohm. Union Model-12 250-ohm polarized relays were used.



Solid conductor wiring is used in the instrument cases, thus presenting a very neat appearance

The operating battery at each signal location consists of four cells of Exide KXHS-11 and each track circuit is operated by an Edison B6H cell. These batteries are on floating charge through Union RT-10 rectifiers.

The track connections are single conductor No. 9 Okonite parkway cable made up with insulation tape, two layers of jute, two layers of steel tape and a jute covering. This cable terminates in a Raco bootleg outlet, the conductor being soldered to a 39-strand cable copper



Hammond to Griffith territory

connector, the other end of which is plugged into the rail. This cable is covered with loom for mechanical protection and to reduce the liability of theft. The rail joints are bonded with welded bonds, about half of which are Ohio Brass OBalloy bonds with a center strand of copper, and the remainder of which are the American Steel & Wire Company's Tigerweld type of the same general construction.

The highway crossing signals are the Union Type HC-7 using 10-volt 10-watt lamps. Each signal is equipped with an automatically controlled STOP sign

Automatically controlled "STOP" sign and button type crossbuck signs are part of crossing protection

using 10-volt 5-watt lamps. The flasher relays are the Union NF-DC type, wound to 350 ohms. The interlocking relays are Type DX-13.

Interlocking Changes

On account of the fact that new No. 15 crossovers and a new No. 15 yard-lead turnout were installed at the HYlayout, it was necessary to entirely rebuild this mechanical plant, converting it into an electro-mechanical plant. A mechanical machine with 10 working levers is provided for the operation of the switches and facing-point locks, with an S-8 electric section comprising two levers for signals and two levers for traffic-direction locking. The old mechanically-operated semaphore signals were replaced by searchlight signals. A new rocker-shaft lead-out with 1½-in. up-and-down rods was installed and the pipe lines were rebuilt with metal foundation tops. Complete electric locking was included as a part of the improvements, and KR (switch-repeater) relays are provided. Although a separate lever is used for each end of each crossover, both ends are served by only one KR relay, the circuit through the switch circuit controllers being so arranged as to be complete only when both switches are in proper position, and to be shunted at all other times. The wiring to the switches in parkway cable while the circuits extending to the signals are in made-up aerial cable, on the pole line except where it passes under the tracks, at which places parkway is used.

At Griffith interlocking, two spare levers in the existing General Railway Signal Co. electric interlocking machine were used for the traffic-direction control. As trains were to be run in either direction on each track, it was necessary to provide a derail on the Erie track approaching the plant from the west. Furthermore, the semaphore signals on the Erie and the C. & O. were replaced with searchlight signals.

Traffic Direction Locking

Ordinarily the traffic locking is set up for trains to run on the right-hand track, and as long as this set-up is not disturbed a green light burns over the traffic lever for each direction. However, it is desirable at times to run a train against the normal direction, as for example, in dispatching an Erie freight train out of the Hammond yard and over the Erie track to Griffith. In this case the towerman at HY calls the towerman at Griffith for a release. The Griffith man reverses his lever, which permits the HY man to reverse his lever, providing the track is not occupied between these points. The operation of the last lever unlocks the signal lever controlling the signal authorizing the eastbound train to enter the block at HY and to run left-handed to Griffith. This locking is controlled over a two-wire line circuit which is carried through each track relay involved. The intermediate automatic block signals operate as regular single-track signals.

Frequent use is being made of the facilities provided for running trains on the opposing track, and the reduction in delays has been very satisfactory. The interlocking changes and the new signaling construction involved in these improvements was carried out by the signal construction forces of the Erie railroad.

Activities of the I.R.S.E.

THE annual general meeting of the Institution of Railway Signal Engineers (Great Britain) was held on February 10, in London. Officers for the ensuing term were elected. The council's nominations were: For president, Charles Carslake; vice-president, William Challis; treasurer, Arthur Bryant Wallis; secretary, Maurice George Tweedie.

The nineteenth annual report of the Institution, for the 1931 session, shows a net gain in membership, 65 new members of all classes having been elected, as against a total of 29 whose memberships ceased for various reasons. The net increase is 36 members, making a total registered membership of 824.

One annual meeting and six general meetings were held during the 1931 session, which dated from February, 1931, to January, 1932, inclusive. Some of the papers which were read are: A Contribution to the Question of Route Lever Locking, by T. S. Lascelles; The Ethics and Economics of Speed Signaling, by G. H. Crook; Electric Lever Interlocking and Intermittently Fed Track Circuits, by W. Challis; Railway Signaling Economies, by C. W. Prescott; Indicators and Repeaters, by W. Buckingham and A. W. Weir; and Disks and Miniature Signals for Shunting and Setback Movements, by B. F. Wagenreider.