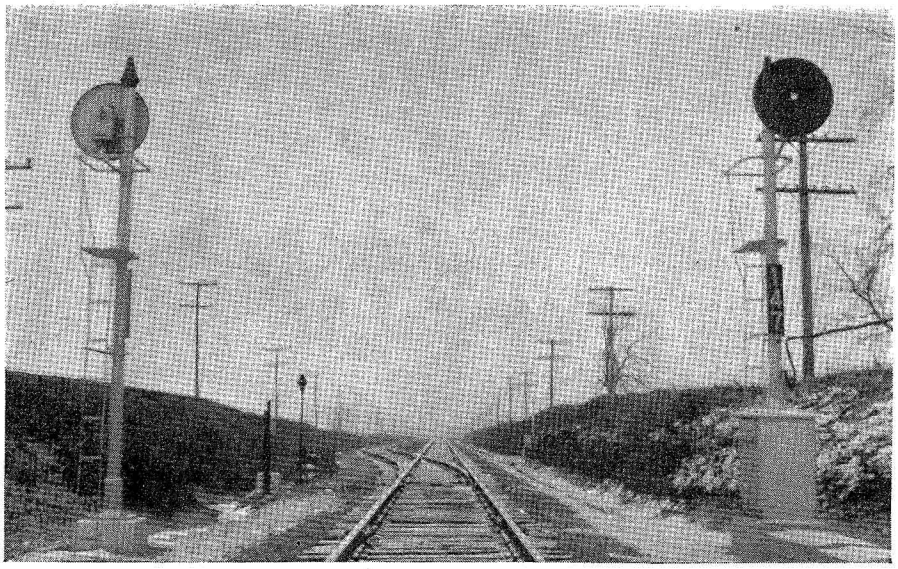
E. J. & E. Installs A. P. B. Signaling

Searchlight signals are provided on 14 miles of single-track line between Rondout, Ill., and Barrington—With this addition, train movements are now expedited and protected by automatic signals for 28 miles between Rondout and Spaulding



Signals 146 and 147 at passing siding just east of Leithton

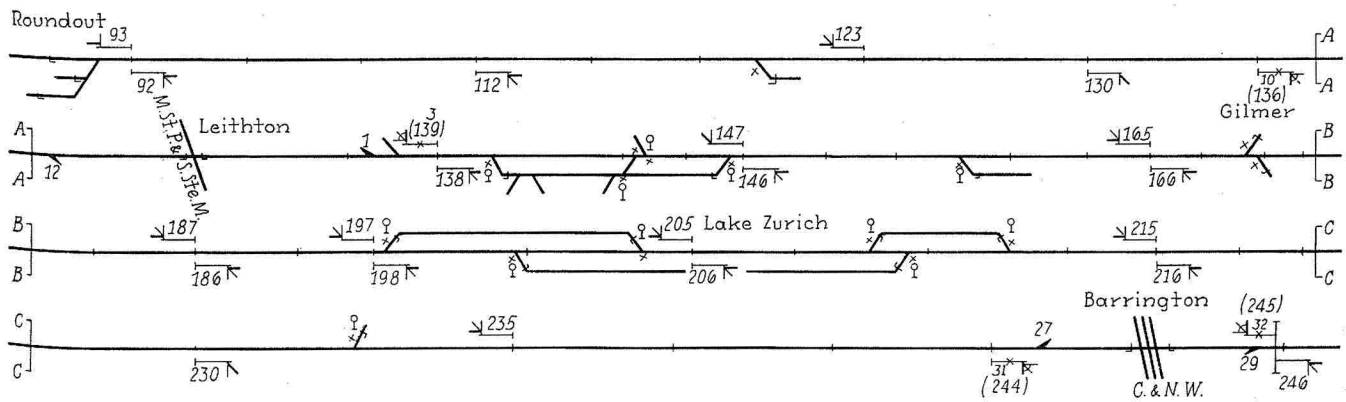
On November 23, 1937, the Elgin, Joliet & Eastern placed in service 14 miles of absolute permissive block signaing, utilizing Type SA searchlight signals, on the single-track line between Rondout, Ill., and Barrington. The 14-mile section between Barrington and Spaulding had been previously signaled with Style D automatic signals in 1930. With the recent addition, therefore, train movements are now expedited and protected by automatic signals between Rondout and Spaulding.

This road, commonly known as the Chicago Outer Belt Line, completely encircles the Chicago industrial area, has dock facilities on Lake Michigan at Waukegan, Ill., South Chicago, Gary, and East Chicago, Ind., and performs general interchange of carload freight traffic between all eastern, western, northern, and southern roads operating via Chicago. It does not operate any passenger trains. Prior to the installation of automatic signaling between Barrington and Rondout, trains were operated over this section of single track on the time-interval, train-order system. Daily traffic consists of 10 westbound and 10 eastbound freight trains. The maximum permissible speed is 35 m.p.h.

Changes Made

Two interlockings, Leithton and Barrington, were involved in the recent changes. At Rondout, interchanges are made with the Chicago, Milwaukee, St. Paul & Pacific, and with the Chicago, North Shore & Milwaukee. At Leithton, approximately five miles east of Rondout, the E. J. & E. crosses the Minneapolis, St. Paul & Sault Ste. Marie, interchanges being effected with this road at this point. Interchange movements are also made at Barrington, where the E. J. & E. crosses the Chicago & North Western. Passing sidings are located at Lake Zurich, 3.6 miles west of Barrington, and at Leithton.

A total of 21 General Railway Signal Company Type SA signals, equipped with 8-volt, double-filament, 13+3.5 watt bulbs, were installed between Barrington and Rondout. The signals between sidings are spaced according to grades and curvatures, the spacing averaging approximately two miles. Two sets of



The track layout between Barrington and Rondout

intermediate signals were provided between Barrington and Lake Zurich and between Lake Zurich and Leithton, while one set of intermediates was provided between Leithton and Rondout. The signals give two-block indications and are controlled by d-c. neutral track circuits and polarized line circuits. The signal control circuits are the usual type of absolute-permissive-block type of circuits, modified to meet local conditions. Normally de-energized stick relays are used for direction selection. Model 7 switch circuit controllers are used to shunt the track when a turnout or siding switch in the territory is thrown. In addition, Type 9D switch indicators were provided at the end of each passing siding and for certain turnouts.

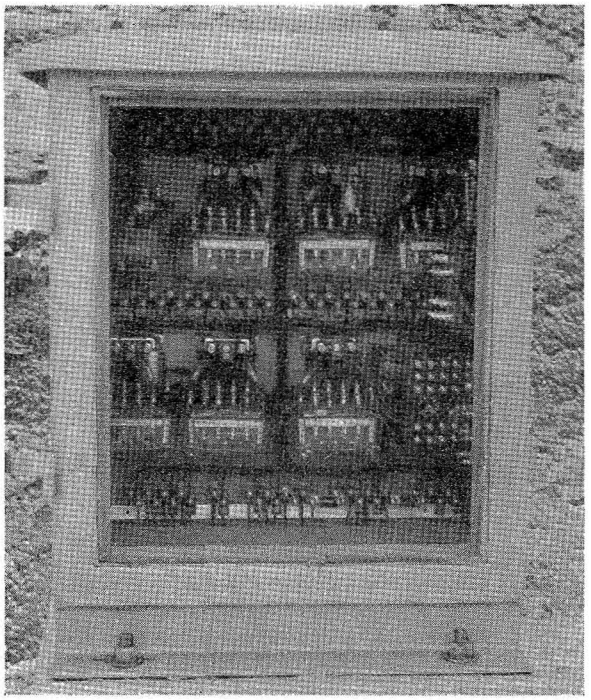
Involved in the territory are eight highway crossing flashing-light installations previously in service, the controls of which were redesigned and rewired to fit into the new signaling circuits. One set of flashing-light signals is located between Rondout and Leithton, three sets are located between Leithton and Lake Zurich, two sets at Lake Zurich, and two sets between Lake Zurich and Barrington. All flashing-light signals are in accordance with A.A.R. standards and are controlled by interlocking relays, line controlled over the appropriate track relays. Where such crossing protection is located at a crossing which is near a passing siding switch, special direction selection reset control of the crossing protection is effected by providing a pick up circuit for the side of the interlocking relay used for that side of the crossing. This pick up circuit is broken through a back contact of a special stick relay and through a contact on the passing track switch circuit controller, which is made when the switch is reversed. At the same time as the interlocking features of the interlocking relay are reset by picking up the coil for the passing track side, a thermal relay is energized and, when heated, closes a circuit to pick up the special stick relay, thus breaking the pick up circuit for the interlocking relay and alowing protection to be set up for the train leaving the passing siding. The thermal relay is set for three seconds and the stick relay is de-energized as soon as the passing siding switch is restored to its normal position.

Track Circuits

The track circuits are fed by two 500-a.h. cells of Edison primary battery floated on G.R.S. BB ¼ rectifiers with K ½ transformers, and are equipped with 4-ohm Type K track relays. The primary track cells are adjusted to normally feed approximately 10 milliamperes, the rectifiers normally supplying the major portion of the track circuit current. The insulated joints are of the continuous type and the track bonds are the A. S. & W. S-1 Type. Single conductor No. 8 Armorlokt parkway cable is used for the track leads with Aldobilt parkway outlets and A. S. & W. duplex-stranded plug terminal type connectors. At the Model 7 switch circuit controllers the track shunting connections are No. 8 Armorlokt single-conductor parkway with parkway outlets and connectors. The fouling wires are the 10 ft. S-1 Type.

The signal locations are provided with welded steel cases with single doors, the relays being wall-mounted on wood back boards. All cases are on the line side and are placed so that the door is on the track side. Short grey-base Raco terminals and No. 16 relay leads with soldered eyelets were used. The line relays are all G.R.S. Type K, the stick relays having 750-ohm coils and the slow-acting, PC, and GYP relays having 450-ohm coils. At cut sections where track relays are used, small G.R.S. instrument track cases were provided in order to facilitate the installation of parkway cable. All batteries and rectifier cells are in concrete battery boxes manufactured by the E. J. & E. These boxes have wood lids covered with sheet steel. All outside equipment, with the exception of the signal backgrounds, which are black, are painted with aluminum paint.

The line wires, which varied from 3 between stations to 14 at interlockings, are No. 8 triple-braid on glass insulators. An existing communication pole line was rebuilt to carry both the signal and communication circuits. The signal circuit lead-ins to the instrument cases are No. 14, 3/64-in. rubber, 1 tape, 1 braid, wires made up in cable form to cable entrances at the tops of the cases. Circuits between instrument housings and signals on opposite sides of the track are in No. 14 Armorlokt parkway cables of various sizes, the cables running directly to the signal mechanism. Two-conductor No. 14 Armorlokt parkway cables are run to the switch indicators. All line circuits are protected by W. R. R. S. Co. neon-type lightning arresters.



Left—Instrument case. Below—Corner of battery box showing rectifier and battery cells (photograph taken during snowstorm)

Power Supply

Power is obtained from commercial sources at 220-volts, 60-cycle, at Leithton, feeding the territory between Rondout and halfway to Lake Zurich; at Lake Zurich feeding half-

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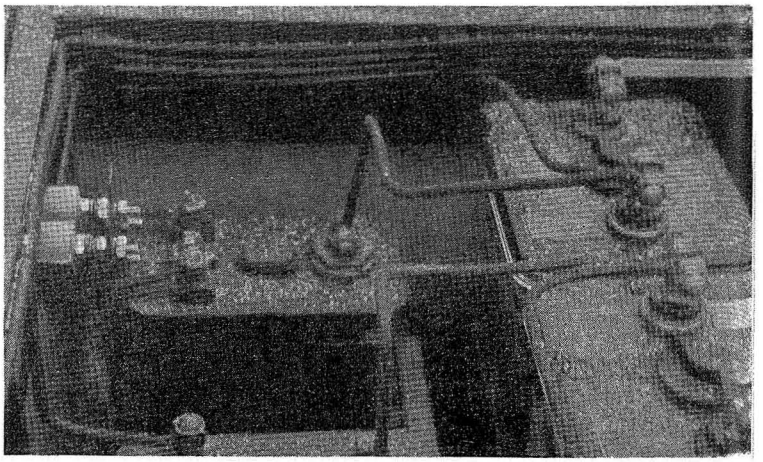
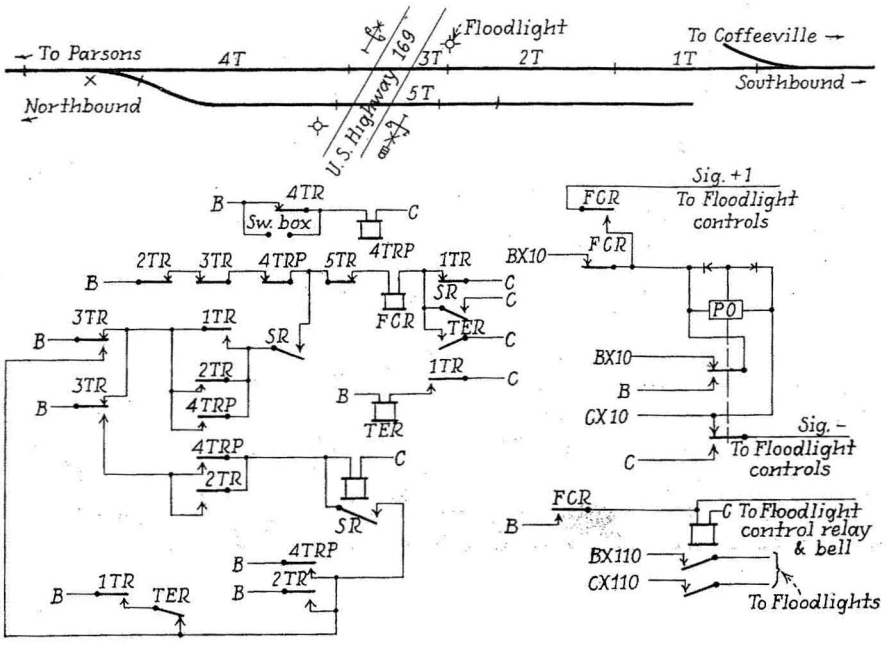


train. The beam is directed at such an angle to the highway and at such an angle below the horizontal, that glare is eliminated, both to the motorist and to the engineman. Actual tests made at Coffeyville during recent months show that the driver of an automobile can see a train occupying the crossing from a point a half mile from the crossing. Cars are plainly visible from a distance of 1,500 ft.



Track layout and principal circuits

Track Layout

The tracks involved at the crossing are a single main-line track and a siding, which joins the main line north of the crossing. A turnout switch is located in the main line south of the crossing just beyond the northbound track circuit controlling the protection at the crossing for northbound train movements. A short track circuit over the crossing provides protection when this portion of the siding is occupied. The main-line track is provided with one approach control track circuit on the north and two on the south, with a separate track circuit over the crossing to obtain positive protection whenever the main track at the crossing is occupied. The floodlights are controlled over a master crossing relay so as to be lighted only when a train is approaching and occupying the crossing. Directional cut-out when the rear of a train leaves the crossing is obtained by the use of a special stick relay. The protective devices at the crossing are cut-out while switching movements are being made at the turnout south of the crossing, by using a time-element relay which picks up 1½ minutes after the first approach track circuit controlling protection for northbound moves is shunted. Protection is cut in again as the train proceeds over the crossing when the second track circuit in approach to the crossing is shunted. Movements into or out of the siding at the siding switch north of the crossing are prevented from causing unnecessary operation of the protection devices by picking up a repeating relay for the southbound approach control track relay over a contact on the switch circuit controller closed when the switch is reversed. The control circuits are shown in the accompanying diagram. An interesting construction feature of this installation is that the instrument cases are placed 4 ft. 9 in. above the rail. This was done because, during the floods of 1927, flood water rose to a depth of 42 in. at this crossing.

Division of Costs

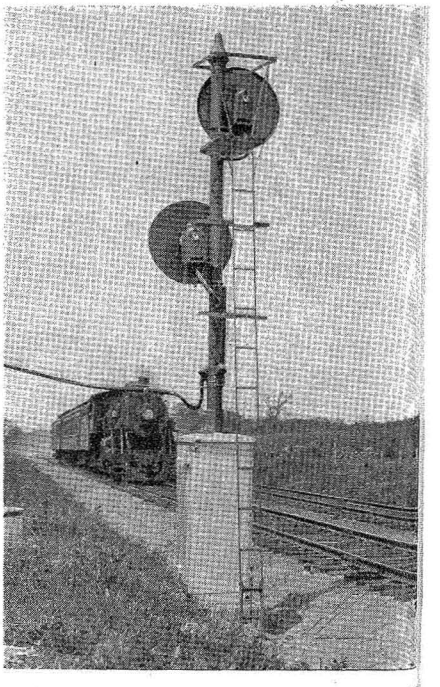
The protection was installed by the signal forces of the railroad and all costs of installation were borne by the state with federal funds as a United States Works Program Grade Crossing Project under the Emergency Relief Appropriation Act of 1935. The operation, maintenance and renewal of the flashing-light signals are handled and paid for by the railroad company, while the maintenance and operation of the floodlights is handled and paid for by the state.

A. P. B. on the E. J. & E.

(Continued from page 40)

way to Leithton and halfway to Barrington; and at Barrington which feeds halfway to Lake Zurich and also supplies points on the other side of Barrington. Sectionalizing is provided so that power may be cut through manually from section to section if a failure should occur. The power wires are No. 8 triple-braid HD copper wires on glass insulators protected with General Electric compression-chamber type lightning arresters. At instrument locations pole-mounted transformers cut the voltage down to 110 volts before it is taken into the cases. The line circuits are operated at 8 volts from 4 cells of Exide DMGO-9 storage battery floating on Fansteel C-12 rectifiers. These rectifiers are placed in the battery boxes with the batteries.

This installation was designed in the office of the signal engineer of the E. J. & E. at Joliet, Ill. The instrument cases were all wired at the Joliet shops before being taken out on the job. The field work was started by a gang consisting of eight men and a foreman on July 20, 1937. No expense for work train service was incurred. The materials for the concrete foundations were unloaded at each location from the local freight train, which was used 3 times for 45 min. each time. The signals, the instrument cases, and other materials were unloaded at the nearest stations and taken to the site by motor car and trailer.



Multiple-aspect automatic signal on th Boston & Maine