Crossing protection installation includes special uniform timing, switching and time cut-out provisions

Eastbound N. Y. C. train passing over crossing at First-Front Streets in Dayton, Ohio, with gates lowered

"Central" Increases Safety

At Highway Crossings in Dayton

AS a means of obtaining full 24-hour protection, and thereby increasing safety at highway-railway grade crossings in Dayton, Ohio, new automatic flashing-light signals and short-arm gates have been installed at six locations on the Big Four operating district of the New York Central in that city. Due to operating peculiarities in the territory, which is on the road's main line between Cincinnati, Dayton and Columbus, the over-all project includes several interesting features in the way of special speed-determining sections, switching and time cut-outs.

Busy Crossings

As shown in the accompanying plan, double track with automatic signals extends east over the Miami River to Miami City Junction at Washington Street. This is a junction point with the Baltimore & Ohio and the Pennsylvania, as well as the west end of the Dayton Union Railway, which extends east to First-Front Streets. Trains of the N. Y. C., the B. & O., the P. R. R. and the Erie use the facilities of the D. U. and the Dayton Union Station in passing through that city.

Five of the new crossing protection jobs on the N. Y. C. are located between Miami-Chapel Road and Miami City Junction, about 0.9 mile. From west to east, these include Miami-Chapel Road, Bolander and Homestead Avenues, Albany and Washington Streets. The total number of train movements in this territory, including switching movements, average approximately 38 daily. The sixth crossing is First-Front Streets, at the east end of the D. U., where the total train movements run around 42 every 24 hours. Of all these crossings, the busiest, from the standpoint of highway traffic, are Miami-Chapel Road, Bolander Avenue and First-Front Streets. Operation of crossing protection is based on 30 m.p.h. train speed.

Protection Before

Previous protection at these crossings consisted of 20-hour watchman service (one man) at Miami-Chapel Road, Bolander Avenue and First-Front Streets, two men being on duty during this period at the latter crossing. Flashers were already in service at Homestead Avenue, and were continued in service, although modernized. Crossbuck warning signs were the protection at Albany Street, these being replaced by flashers and short-arm gates as part of the project. Manual gates controlled by a watchman in an elevated tower were in service at Washington Street. These facilities were also replaced by automatic flashers and short-arm gates.

The new protection at Miami-Chapel Road, Bolander Avenue, Albany and Washington Streets consists of a conventional arrangement of flashers, signs and short-arm gates on each side of the crossings. Flashers only are in service at Homestead Street, but due to a street intersection adjacent to and on the north side of the crossing, there is an additional set of flashers mounted at right angles to the others on the mast on that side of the crossing. The protection at the First-Front

crossing, consists of flashers and gates on both sides of the crossing on First Street and flashers only on the south side of the crossing on Front Street, which intersects First Street at about right angles. On the southeast side of the crossing, there is an industrial driveway into First Street. For this reason, a "No-Left-Turn" sign and flashing-yellow lamp unit was installed at the intersection, which operates with the gates and flashers. The new facilities at Miami-Chapel Road, Bolander and Homestead Avenues, Albany Street and First-Front Street were installed by forces of the N. Y. C., whereas those at Washington Street were installed by forces of the B. & O.

The new flasher and gate assemblies on this project are the Western Railroad Supply Company's Model 10, with Type 3563 and 3566 mechanisms, designed for operation on 14 volts d.c., and to drive both up and down. Gate arms vary in length from 18 ft. to 40 ft., the 40-ft. arms being in service at First-Front Streets. Each arm is equipped with three red electric lamps which are lighted when the arm is lowered. The end lamp burns steadily, and the other two flash alternately with the flashers.

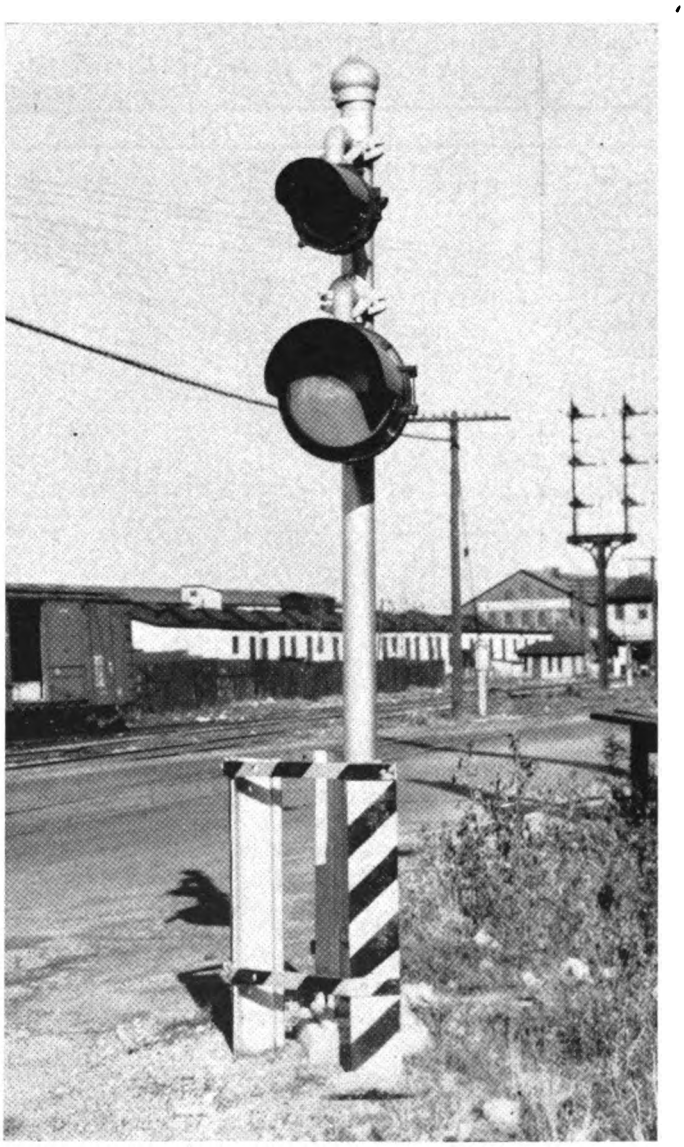
The flashers are arranged to go into operation approximately 30 sec. prior to arrival of the fastest train at the crossings, there being a 4 to 5-sec. delay before the gates commence to lower after the flashers have started. This serves as an additional warning to vehicle drivers.

Uniform Timing

The eastward approach control for Miami-Chapel Road is 2,522 ft. However, through train speeds in this section vary, and, accordingly, timing circuits are in service to cut out operation of the protection if these trains fail to approach the crossing within specified times. Highway traffic at this busy crossing is thus not blocked unnecessarily. For example, if an eastward train occupies the special short uniform-timing speed-selection track section B2102T 45 sec. or more before reaching track section C2102T, the protection at Miami-Chapel Road will be cut out automatically by the energization of a time-element relay until the train passes signal 2092, when the protection is again automatically cut in. If the train occupies the track section less than 45 sec. before reaching track section C2102T, and fails to clear track section C2102T in approach of signal 2092 within 75 sec., the energization of another time-element relay will cut out the protection until the train has passed signal 2092.

Signal 2092 is the approach signal to the home signal near Washington Street governing N. Y. C. train movements onto D. U. trackage and through the Dayton Union Station. If this approach signal is not at Clear (green), through freight trains will lag until it is, to prevent being stopped at the D. U. home signal and tying up the crossings to highway traffic. This crossing protection timing feature for eastbound train movements approaching Miami-Chapel Road is thus a big advantage. To prevent eastbound trains from accelerating after they have passed the uniform timing control section, they are required by special time-table instruction, when moving over the Miami River Bridge at 15 m.p.h. or less, not to exceed slow speed when passing signal 2092. This is protection against arrival of trains at the crossing too soon after the protection has again cut-in.

On the westward main track at the east side of the Miami-Chapel Road crossing, there is a trailing-point siding which leads to the Dayton Envelope Company. When the local freight crew works this siding, it usually leaves its train immediately in approach of signal 2091, which is within the 1,978-ft. westward approach control for the crossing. Ordinarily, this would result in the crossing protection continuing to operate after the locomotive had entered the siding to do its work. Thus, in order to prevent unnecessary operation of the protection and tying up of highway traffic during such switching movements, a special automatic-cut-out was introduced in the control circuits. This is known as a reverse-switch cut-out. When the locomotive leaves its train in approach of signal 2091, proceeds to the crossing, reverses the siding switch and enters the siding, the protection is automatically cut out



"No-Left-Turn" sign and yellow flasher in industrial driveway into First Street. Note scrap steel rail barricade painted black and white around base of mast

as soon as the locomotive clears the short track circuit over the crossing, and as long as the siding switch is reversed. An eastbound train movement over the crossing during such a switching movement on the westward main, of course, would automatically cut the flashers and gates back in. The reverse-switch cut-out feature is controlled by a 670-ohm relay known as the RSR, energization of which is through the switch circuit controller in the reverse position.

Similarly, when the local freight works the Specialty Paper Company siding from the eastward main track at Miami-Chapel Road, it leaves its train in approach of a sign, "Leave Cars West of This Sign", about 150 ft. west of the crossing, which is the end of the short track circuit over the crossing. After the locomotive has cleared this track section, as well as a similar section on the siding, and as long as the siding switch is reversed, the protection at the crossing will be inoperative because of a reverse switch cut-out.

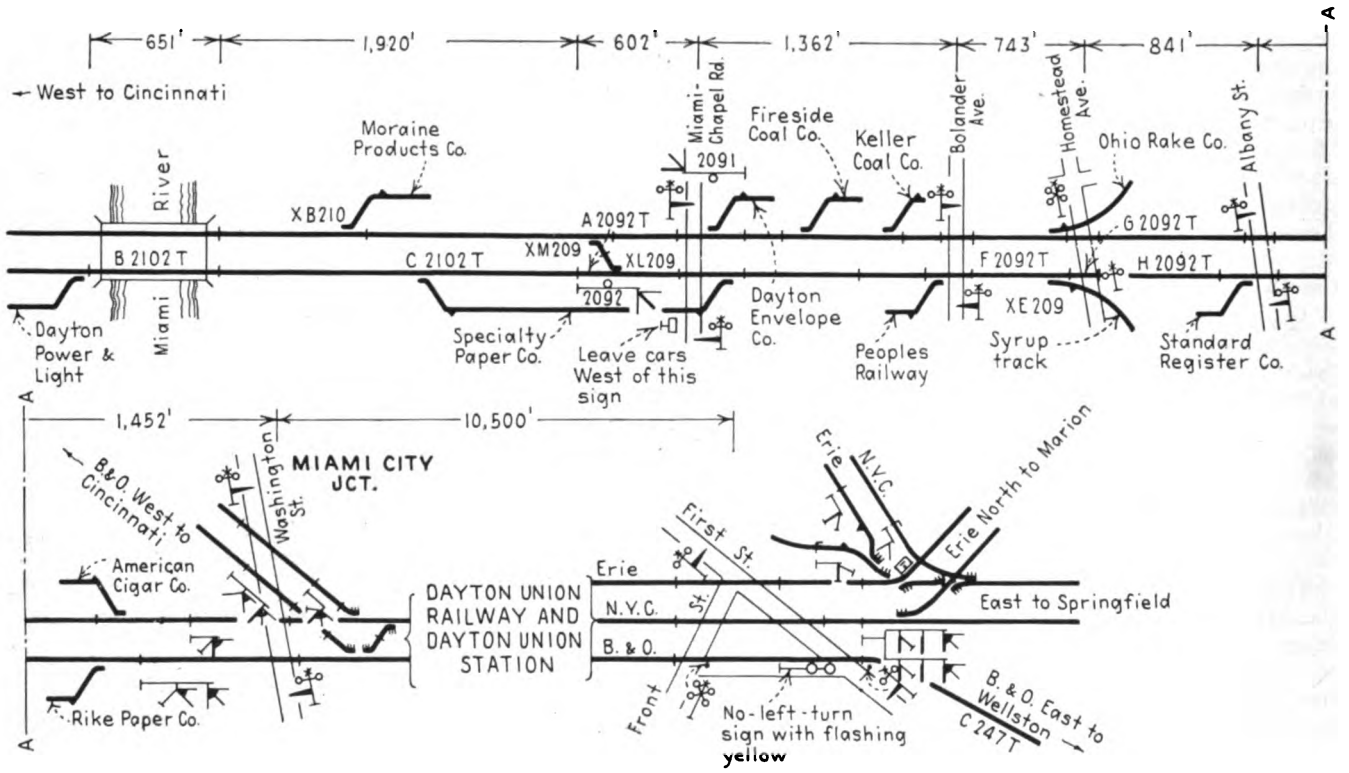
Crossing Over Between Mains

The short track circuit on the eastward main over the Miami-Chapel Road crossing was extended west of the crossing because, after the switch run has completed work on the westward main, the train or locomotive backs through crossover X209 to the eastward main, then proceeds west on the eastward main to the west end of the Specialty Paper Company track to do work. When the crossover switches are reversed, an RS relay picks up, which cuts out the eastbound approach to Bolander Avenue on the eastward main. The approach to Miami-Chapel Road is still effective when the train enters the eastward main, but, at this time, a thermal relay starts to operate, and, at the end of 45 sec., picks up time element stick relay A2092 TESR, which, in turn, cuts out the approach to Miami-Chapel Road.

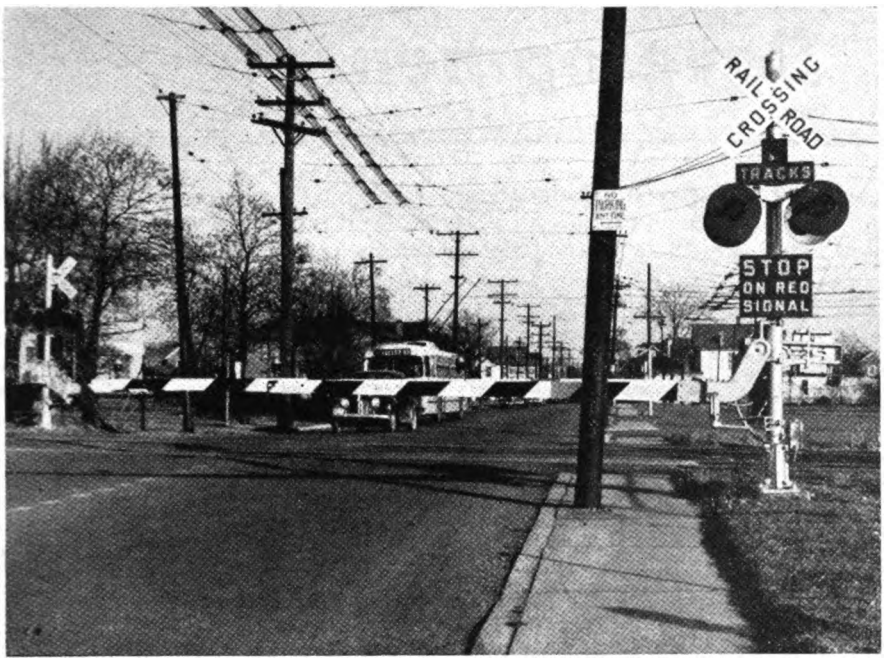
Ordinarily, the train will be back over Miami-Chapel Road before this thermal time has expired, but, in case it has stopped after reaching the eastward main and before entering the short track circuit, the A2092 TESR will cut out the approach to Miami-Chapel Road. Crews have instructions when switching over these crossings to be sure the gates are down before crossing the street. The long center circuit in this case permits them to enter the center circuit, and move over the street at a very slow speed without stopping, and yet have the gates down before they reach the crossing.

An RSR circuit is installed on turnout XB210 leading from the westward main to the Moraine Products Company siding west of Miami-Chapel Road. This is to take care of a move the switch run sometimes makes. The train moves west on the westward main, switching the industries on that track as it goes. At times, a through train will come in behind, so the local gets in the clear in this siding. After the through train has passed, the switch run pulls out on the main and backs east on the westward main, and leaves its train between XB210 and XM209 while switching the Moraine Products plant. The RSR circuit is to cut out the approach to Miami-Chapel Road while doing this work.

Additional RSR cut-outs are in service on the two sidings leading from the westward main to the Fireside and Keller Coal Companies between Miami-Chapel Road and Bolander Avenue, on the Ohio Rake Company siding at Homestead Avenue, and the American Cigar Company siding between Albany and Washington Streets. The local freight crew, when working the two coal-company sidings, leaves its train just east and in the clear of Bolander Avenue, which has a 1,700-ft. westward approach; when working the Ohio Rake siding, just east and in the clear of Homestead Avenue, which has a 1,600-ft. approach; and when working the American Cigar siding, just in approach of the



Layout of tracks and new highway crossing protection on the N.Y.C. through Dayton



Gates and flashers at Bolander Avenue, showing gates lowered

siding. The westward approach for Albany Street is 1,400 ft. Reverse cut-outs are also in service on the facing-point siding from the eastward main line at Homestead Avenue, and on the trailing-point siding to the Standard Register Company just west of Albany Street.

Special Directional Sticks

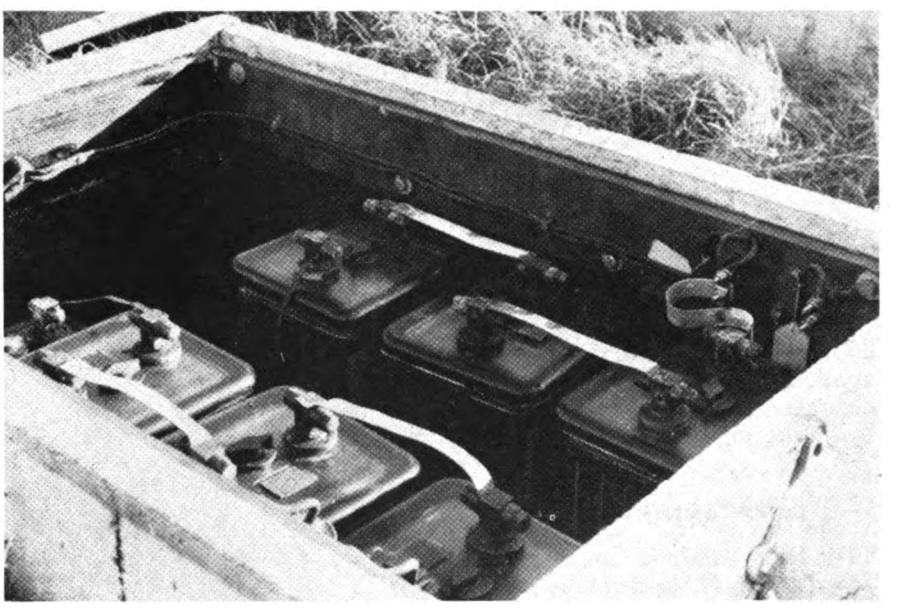
At Bolander Avenue, there is a special directional stick circuit on the westward main. This is to take care of the switch run, while switching the Fireside and Keller Coal Companies. In doing this work, the train is left east of Bolander Avenue, and the locomotive proceeds over the street only with the cars for these tracks. This would ordinarily cause the crossing protection at Bolander Avenue to be in operation during the time the engine was west of the street. The circuit is designated to pick up the directional stick relay when the train is standing east of the street and the engine moves west and clears the center track circuit, cutting out the crossing protection at Bolander Avenue and the westbound approach to Miami-Chapel Road. When the engine moves back over the crossing, this stick circuit is released and the circuit set up for normal operation.

Also, at Bolander Avenue, there is a directional stick relay (H2092 EXSPR) for cutting out the west approach to Bolander Avenue for receding movements on the eastward track. This relay picks up through the H2092 EXSR up (directional stick relay for Homestead Street) and the G2092 track relay down. The train does not enter G2092 track until it has closed the turnout switch and started its move eastward.

The facing-point turnout on the eastward main at Homestead Avenue leads to a track known as the Syrup Track. This track leads to a small yard which serves several industries. The switch run goes in this track to do switching, and, after this work is done, backs out onto the eastward main to clear the switch, and then proceeds east to Dayton Yard. In making this move, the train enters the westward approach for Bolander Avenue, and the rear end of the train, as a rule, reaches Bolander Avenue before it starts to move east. This movement would have the protection at Bolander Avenue and Miami-Chapel Road in operation while the train was moving away from the street. To take care of this, the RS relay picks up when XE209 is reversed and sticks up as long as F2092 track is down. This cuts out the approach to Miami-Chapel Road.

Cut-Out When Backing Into Yard

At First-Front Streets, some westbound freight trains set out cars in Dayton Yard, entry to which is off of the eastward main within interlocking limits. To make this move, the train proceeds west through the interlocking until the last car is west of the eastward home signal. In doing this, the train must pass over First-Front Streets. Then, the interlocking is lined for the movement from the eastward main to the yard lead. When making this move, the train is on the eastward main and occupying the westward approach to First-Front Streets, which would ordinarily cause the crossing protection to operate while it was making the receding move. To take care of this, a stick relay is provided to pick up under these operating conditions, and the clearing of the call-on signals. This relay will stay up as long as the train is on the westward approach, and cut out the crossing protection after the train has cleared the short track circuit.



Standby storage battery in concrete box at crossing

The crossing protection at Wash-

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(Continued from page 412)
this, we follow up with the other gangs for hooking up and placing in service.

Plans, Instructions Should Stem from Main Office

By W. Abell
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AS a means of easing, simplifying and minimizing extra work, and in the interests of uniformity, plans, both general and detail, should be prepared at the main office, and all general instructions should stem from that source. From this point on, the procedure will vary depending upon the size and nature of the undertaking. On smaller jobs, such as the installation of isolated highway crossing protection or automatic signals and, in the case of general modernizing and revising of existing signals, the assembling of equipment and the wiring of housings can be carried out simultaneously at the point of installation with economy and dispatch.

On large undertakings, such as the installation of A.P.B. signaling on a major part of a subdivision, the picture changes, and the wiring of housings and the fitting and assembling of signals and related equipment in the field will be unnecessarily expensive, due to time lost in getting men from location to location in the face of train movements. For this reason, such work should, as far as is possible, be carried out at some point where there will be no interference, and where there is sufficient ground space available to permit its being done more or less on an assembly-line basis. Also, there must be sufficient idle trackage adjacent to accommodate outfit cars and make possible the loading of assembled signals and wired housings in work-train quantities.

Such a point can be classified as field headquarters, and there, housings can be set up on old bridge timbers or similar material to provide ready and convenient access to a large number of them. Here, they can be fitted, wired, tested, painted one coat and numbered with a minimum of lost motion by a few competent men who will be continuously under the supervision of the foreman and inspector, leaving nothing to be done in the field proper, other than the hooking up of line and cable connections and the application of the final coat of paint. While the housings are being fitted and wired, another crew, which will be part of the same gang, can be fitting, assembling, wiring, painting and applying number plates to signals; leaving wires of sufficient length in masts of signals that are to be mounted on housings to permit their being pulled down and onto the housings when the signals are being placed in position in the field. Applying one coat of paint to all equipment saves time later on, and the numbering of both masts and housings makes readily apparent their relationship to each other and their ultimate location in the field.

When sufficient housings and signals are in a finished state to complete the signaling of a predetermined portion of the territory, they can be quickly and cheaply loaded on properly-prepared flat cars by a portable crane and made secure for movement by work train to the scene of installation. Before starting to load this equipment, much time will be saved if a loading diagram is prepared showing the position, by number, of each housing and signal on the various flat cars required. This will permit all equipment being unloaded as the work trains moves over the territory without loss of time due to extra switching on the road. A ditcher crane is a very efficient means of unloading this equipment and, if it is cut in between cars carrying signals and cars carrying housings, all placed in proper sequence and so arranged that no car will be made empty between passing tracks, the whole operation will proceed smoothly, safely and with the minimum of lost time.

Two or more additional gangs, depending upon the size of the project, should be working in the field well in advance of the wiring and assembly gang, so that before equipment is ready for distribution, all concrete foundations, cable, track and line work will have been completed and the locations filled in. This will leave only the hooking up of line and cable connections and the installation of batteries to be carried out before the completed section is ready for testing and placing in service. Only a few days are required to carry out these final operations, after which the wiring and assembly gang is free to return to field headquarters and proceed with the preparation of equipment for the next section of the territory that is to be signaled. Final painting and trimming around all locations can be carried out by one of the other gangs later.

Dayton, N.Y.C.

(Continued from page 397)

ington Street is within home signal limits. Consequently, the controls are arranged so this protection will not go into operation unless a train is approaching on the N.Y.C. or B. & O. and home signals have been cleared for the movement. Highway traffic on Washington Street is thus not delayed if a train is stopped at a home signal. Similar provisions are made at First-Front Streets.

If a westbound B. & O. train fails to arrive at First-Front Streets within 45 sec., such as in the case of making switching movements, the protection at this crossing will be cut out after that time. This is accomplished by the pick up of a time-element relay with track section C247T deenergized.

Power

Power is supplied at each crossing from a 550-volt a.c. railroad line through Raco No. 506 fused cut-outs Standby at each end of these locations consists of seven cells of Exide or Gould 200-ah. lead-acid storage battery on floating charge, and located in a Permacrete 33-in. by 49-in. concrete battery box separately from the instrument housing. Each track circuit is fed by one cell of Exide EM-7 120-ah. lead-acid storage battery. These circuits are the conventional d.c. type with 4-ohm relays, rail in the territory being 105-lb. stock, bonded with railhead type bonds.

Line circuits are on No. 10, 30 per cent conductivity, double-braid weatherproof open line wires varying from 4 to 17 conductors, furnished by the Copperweld Steel Company. The line circuits are protected against lightning by Raco 485-B arresters, and track circuits by Raco 560-B's. The relays, rectifiers and other apparatus at each crossing are sheltered in a Permacrete 6-ft. by 6-ft. concrete house.

This highway crossing protection installation was planned, with the cooperation of city, county and state officials, by the regular signal department forces of the New York Central under the jurisdiction of the late B. J. Schwendt, assistant signal engineer, and A. M. Gilbert, present assistant signal engineer. The major items of equipment were furnished by the Western Railroad Supply Company and the General Railway Signal Company.