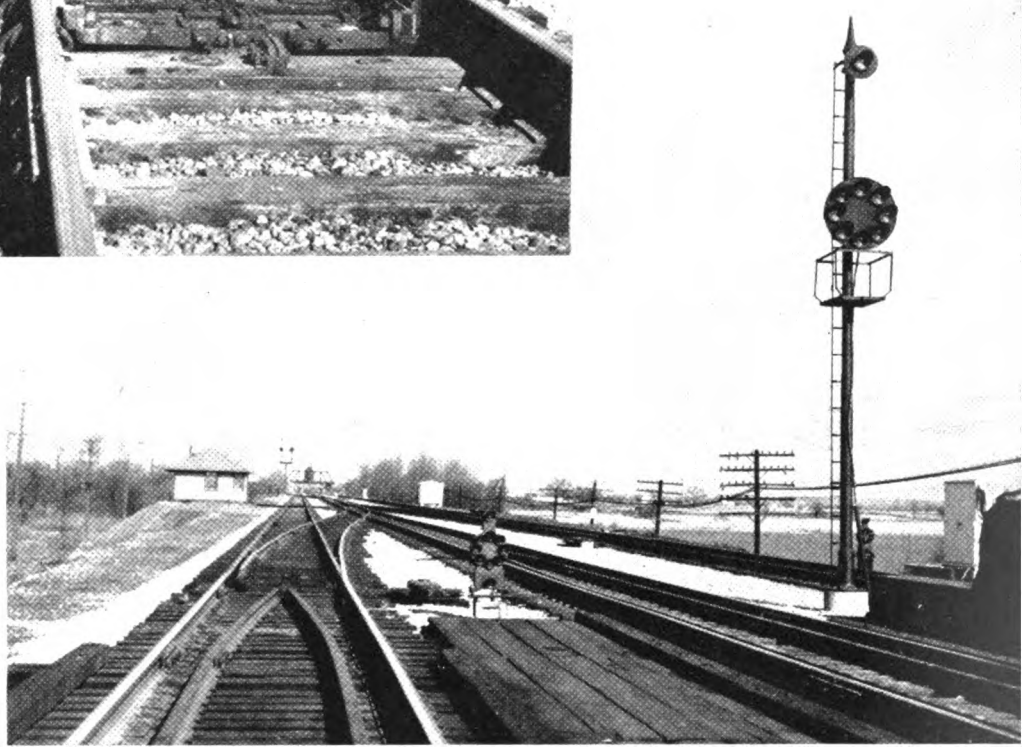
Left — Switches are operated by 32-volt high-speed machines
Below — The new signals are the color-position - light type



Interlocking at North Dayton, Ohio, with new bridge and track changes, replaces two hand-throw switch layouts

On the Baltimore & Ohio

New Interlocking Speeds Trains

AT North Dayton, Ohio, 3.2 miles; from Dayton, on its main line to Toledo, the Baltimore & Ohio has placed a new all-relay electric interlocking in service. The installation follows erection of a new three-track bridge over the Great Miami river at that point, plus several associated track changes, which reduce congestion and delays to train movements.

Bottleneck Eliminated

Prior to the installation of the new bridge at North Dayton, a double-track main line extended out of Dayton to an end-of-double-track location, known as "BC," on the south side of the Great Miami river, as shown in Fig. 1. A connecting cross-over to Leo Street Yard also entered northward main track No. 2 at this point. From the end-of-double-track, single track extended across the river towards Toledo, passing

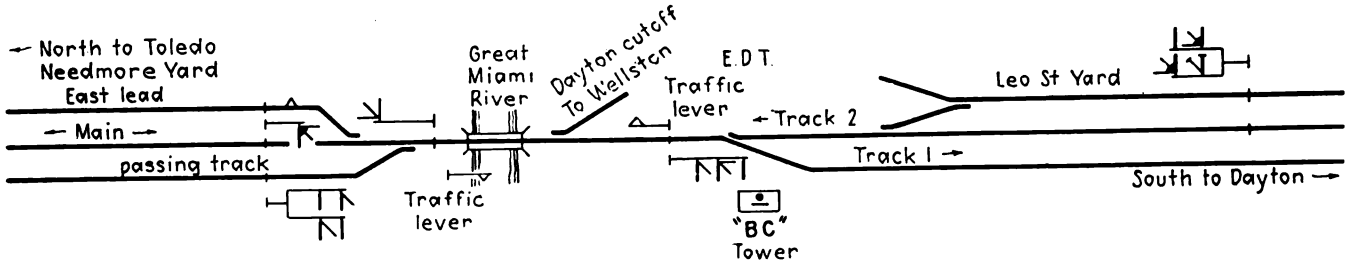


Fig. 1—Track layout prior to the construction of new bridge

About 32 trains are operated through the interlocking daily

Needmore yard, approximately 3,500 ft. north of the river. The south ends of the east lead into Needmore yard and the Needmore passing track entered the main line about 200 ft. north of the river.

Hand-throw switches and semi-automatic semaphore signals were in service at both locations, as shown in Fig. 1, the switches on the north side of the river being handled by train crews, and those at the end of double track on the south side, by the operater in "BC" tower. The operator also had lever control of the protecting signals. Traffic-locking was in effect on the single track between the two layouts controlled through traffic levers in the tower.

Numerous Track Changes

Traffic through North Dayton daily consists of about 22 through trains, plus 9 trains via North Dayton cutoff, and a considerable number of switching movements. With the single track over the Great Miami river and the previous hand-throw switch layouts, congestion and delays to through and local switching train movements were being incurred. These conditions have been practically eliminated by the new bridge, improved track layout and interlocking facilities, the latter being controlled from a new "BC" tower on the north side of the river, as shown in Fig. 2.

Upon completion of the new three-track bridge over the river, main tracks 1 and 2 were extended over and 343 ft. north of the bridge to a new end-of-double-track location (crossover 8), as shown in Fig. 2. The east lead to Needmore yard was extended across the bridge, to connect with Leo Street yard lead and the North Dayton cut-off to Wellston.

A pocket track was constructed between the south end of the Needmore passing siding and main track 1, and crossovers 4 and 6 were installed to permit through movements from Needmore passing siding to North Dayton cutoff.

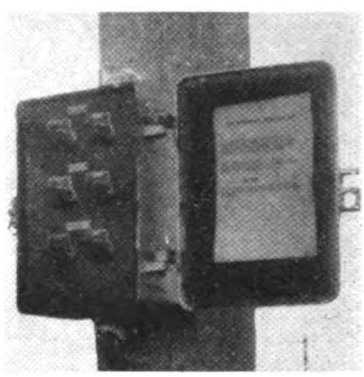
Color-Position-Light Signals

The new signals at "BC," as shown in Fig. 2, are the B. & O.'s color-position-light type and display standard aspects. They are arranged for semi-automatic operation, and include three high signals and four dwarfs. The new power switch machines are the General Railway Signal Company's Model 5C, with biased-neutral controllers and high-speed 24 to 32-volt d.c. motors. Turnouts are No. 16's, with 24-ft. points, and authorized speed is 25 m.p.h.

The control machine at the new plant is the panel type, with a conventional arrangement of miniature switch and signal levers, track and signal diagram, and associated indication lamps. There are four switch levers for the control of four crossovers, and four signal levers for the control of seven signals.

Special Clearing Feature

With reference to the signals at "BC," of interest are dwarfs 1R and 1L, governing train movements over crossovers 2 and 6 on the east lead. These signals are controlled and cleared in the conventional manner for train movements from the east lead to the main line through crossovers 2 or 6 reversed. However, they can be made to display Restricting for an engine to switch back and forth on the east lead when crossovers 2 and 6 are normal. The towerman is thus relieved of unnecessary work when such switching is done. Manipulation of the machine for the simultaneous-clearing feature consists of rotation of signal lever No. 1 to either the left or right position and pushing a button on the control panels. A special stick circuit is used to hold signals 1R and 1L at



Case with push buttons for the control of crossing gates

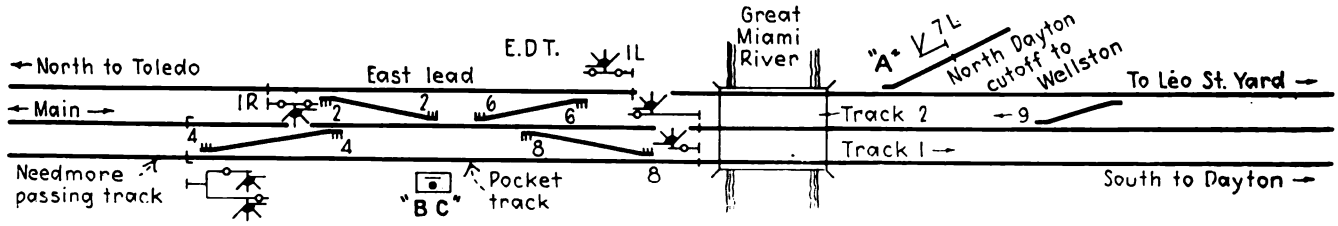
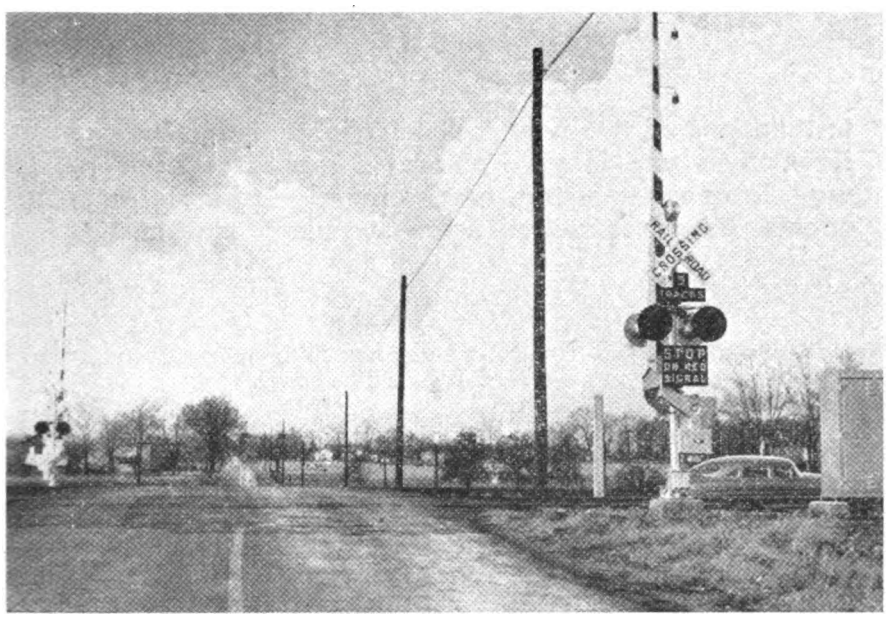


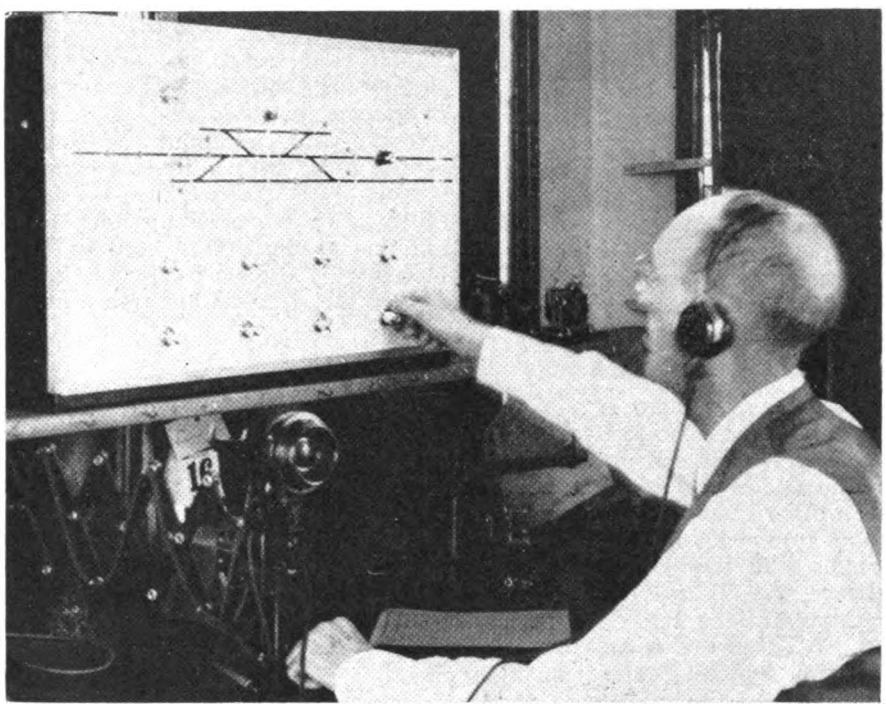
Fig. 2—Track and signal plan including new bridge and new interlocking

Restricting. Restoration of signal lever No. 1 to its normal (center) position breaks the stick circuit and causes the signals to assume their most restrictive aspect.

Occasional southward movements are made via northward main track No. 2 under manual block rules. As an added precaution, reminder lever (No. 9) on the control machine must be rotated 180 deg. to the reverse position before the southward signal at "BC" can be cleared for such a movement. An arrow on reminder lever 9 normally points to the left for northward movement. When reversed, the northward approach signal on track No. 2 (not shown on plan) is caused to display the Stop aspect.



New protection was installed at Needmore Road



The new interlocking is controlled by the panel type machine

Hold-Out Signal

It is desirable to hold out trains approaching on the North Dayton cut-off from Wellston until Needmore yard lead is clear. This is accomplished by a two-aspect dwarf signal (7L) located at the clearance point of the hand-throw turnout into the east lead at "A." The signal is lever controlled like the other signals in the plant, except that it is not controlled through track relays. Stop and Restricting indications are displayed.

The principal relays, rectifiers, storage battery and other equipment at the interlocking are sheltered in an 8-ft. by 10-ft. welded sheet-steel bungalow across the tracks from the tower. Power is furnished from a railroad power line at 110 volts, a.c. One battery of 14 cells and one 6-cell battery of Exide Type DME-13, 120-a.h. storage battery are provided in the bungalow. Each track circuit which is of the conventional d.c. type with a 2-ohm relay, is fed by 1 cell of DME-13 Exide. Rail is 140 lb., bonded with Cadweld type rail-head bonds. The principal circuits in the plant are carried in asbestos braid-type aerial and underground cable, furnished by the Kerite Company. Copperweld ⅝ in. messenger and National Copperweld cable rings are used.

In addition to the above work, certain signals in vicinity of Needmore yard were changed from the semaphore to color-position-light type, and automatic short-arm gates and flashers were installed at Needmore road, north of the area covered by the plan. The gates and flashers are Model 10, with Type-B mechanisms, designed for operation on 14 volts d.c., and which drive up and down. Each gate has a 21-ft. arm with three red lamps, and the flashers and signs are standard assemblies. Circuits for the protection are designed for the signals to begin operation approximately 30 sec. prior to arrival of the fastest train at the crossing. For manual control, a Raco push button box with operating instructions on a concrete post is located adjacent to the crossing. Previous protection of this crossing consisted of standard crossback signs.

The new signaling facilities were planned and installed by the regular signal forces of the Baltimore & Ohio. The major items of interlocking equipment were furnished by the General Railway Signal Company, and the highway crossing signals by the Western Railroad Supply Company.