What's the Answer?

The Light-Traffic Crossing

"What form of protection is recommended for railroad grade crossings where the traffic is heavy on one line and extremely light on the other?"

Electric Type of Half-Interlocker Operated by Train Crew of Light-Traffic Line*

By B. J. Schwendt

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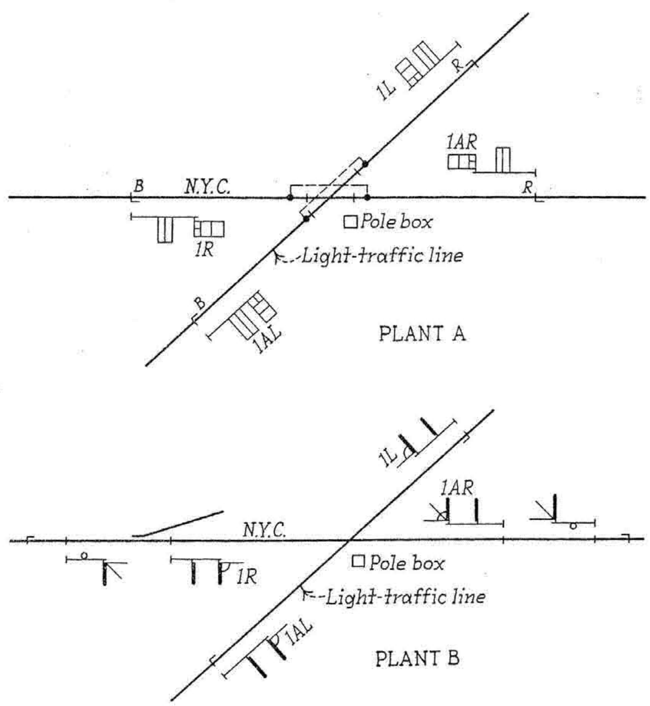
The illustration shows two plans for installations that have been made on this road at grade crossings where in each case the traffic on one line is very light. Both installations are substitutes for what used to be known



Plant A has one three-position working lever with electric stick locking and a time release, located in the pole box at the crossing. The lever is operated by a member of the train crew on the light-traffic line. Plant B is similarly controlled, but has distant signals on the heavy-traffic line

as the mechanical half interlocking, but each is of the electric type. This is the type of plant anticipated in the second paragraph of Mr. Loomis' reply, except that there are no derails and that a three-position electric lever is substituted for the ground-lever stand. This electric lever, together with its electric lock and time release, is mounted on a pole box on a post at the crossing. Therefore, so to speak, a pole box ordinarily used for telephone purposes is now substituted for an interlocking tower or cabin. With the lever in one position, right, left, forward or backward, as the case may be, the signals on one road are cleared, and when this lever is in the opposite position the signals on the other line are cleared. In each of the two cases the signals are left normally clear for the line of heavier traffic and against the line of lighter traffic. In each of these two cases the plant is operated by the train crew of the light-traffic line. In changing the line-up from the heavy-traffic to the light-traffic line, it is necessary first to set the signals on the heavy-traffic line to indicate Stop and then to wait for the clock-work time-release to run down, after which, if there are no trains inside of home signal limits, the signals for the light-traffic line may be set to indicate Proceed. The reverse procedure is followed in changing back.

In plants A and B the traffic on the heavier line is about 8 passenger and 10 freight trains per day and on the light traffic line one mixed train in each direction each day. In Case A the present arrangement replaced a mechanical pole target. In the case of Plant B it replaced a mechanical interlocking plant and caused two operators to be transferred to other duties. In both cases a mixed train on the light-traffic line is required

*Four other answers to this question were published in the December, 1931, issue. Mr. Schwendt's answer was received too late to be included in that issue.

To Be Answered in a Later Issue

(1) *Based on your experience, what would you say is the maximum number of trains that can be handled under practical conditions over a single-track division of say 60 to 100 miles? (See editorial comment on page 52.)*

(2) *What type of automatic interlocking would you install at a railway grade crossing on one line of which it is not feasible to use track circuits?*

(3) *It is desired to use existing d-c. control wires as media for the simultaneous transmission of approach indications. How can this be accomplished? Alternating current is available.*

(4) *What time interval should be allowed for the operation of power switch machines used for remote-control or CTC installations? Under what circumstances is it desirable to provide fast operation—say, 3 seconds? What changes in power supply, gearing, etc., are most practicable, in order to secure faster operation?*

to stop at the crossing for switching and interchange work and therefore there is no loss to this line on account of unnecessary train stops.

Plant A is in low-speed territory, whereas Plant B is in high-speed territory for the heavy-traffic line. Therefore, distant signals are not required for Plant A but are required for Plant B. Roughly, the cost of Plant A was about $3,000 and of Plant B about $8,500. Plant B has color-light signals throughout, whereas Plant A has motor signals throughout.

The advantage of Plant A is its simplicity and low cost. The maintenance and interest amount to about $510 per year. If a train stop costs 51 cents, it is necessary that about 1,000 train stops per year, or about three per day, be saved, to carry this kind of a plant. If the average train-stop at slow speed is worth a dollar, then this plant becomes a 100 per cent investment, as it will not only carry itself but will pay for itself, in addition, each year, on three train stops saved per day.

Under normal conditions at this crossing approximately 2,880 passenger-train stops and 3,650 freight-train stops are eliminated per year. If the passenger train stop is worth 51 cents and the freight train stop $1.50 (5 minutes at $18 per train-hour), the savings are about as follows:

Train stops saved—	
2,880 passenger trains at 50 cents.........	$1,440
3,650 freight trains at $1.50..............	5,475
Total	$6,915

Crossing - Signal History

"A flashing-light highway crossing signal, incorporating two red lights mounted horizontally and flashed alternately, was placed in service on the Pennsylvania Railroad at New Bethlehem, Pa., on June 27, 1923. Were there any earlier installations of such signals?"

First Flashing-Light Signal on New Haven Had Only One Unit

By C. H. Morrison
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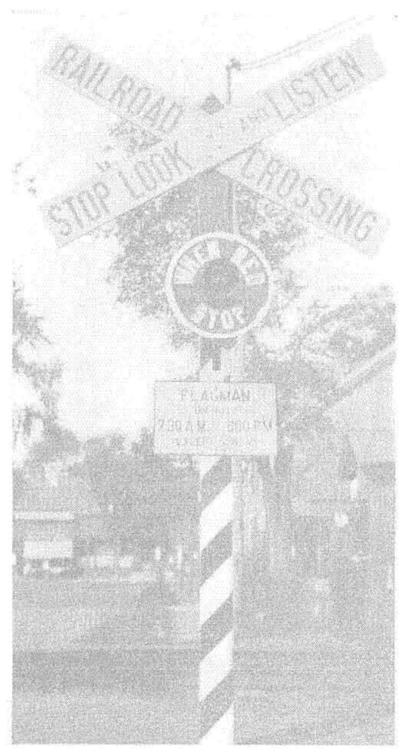
Because highway-crossing bells did not give sufficient warning to noisy trucks and closed automobiles, the New Haven developed an electric flashing-light highway-crossing signal consisting of a high-powered bulb in a lantern, equipped with a polished parabolic reflector and a red cover-glass. The flashing was accomplished by the use of a commercial sign flasher. A disk was installed on the post supporting the lantern, reading "When Red, Stop, Train Coming." This disk was illuminated at night by an oil lantern and a "long-time" burner. The first signal of this kind was placed in service September 11, 1920, at Woodway Grove in Springdale, Conn., and gave very good service. Later on, a signal known as the "Morrison" signal was developed; this signal is shown in the illustration. The relays used for accomplishing the flashing light, prior to the development of the flashing relay, consisted of two standard slow-acting relays, adjusted in such a manner that the lights flashed once in two seconds, but the duration of the period of light was twice that of the period of darkness. The first signal of this type was placed in service on August 2, 1921.

On or about 1922, the Signal Section of the American Railway Association, appointed a special committee on highway-crossing-signal protection. In the early spring of 1923, a meeting of the committee was held in Chicago, at which time it was agreed to use two electric flashing lanterns in a horizontal line with the lights flashing alternately. The first one of these was installed on the Pennsylvania at New Bethlehem, Pa., on June 27, 1923.



An early type of flashing-light highway-crossing signal, known as the "Morrison" signal

Because the New Haven had already adopted the Morrison light signal as a standard, it did not install any of the signals recommended by the Signal Section, until August 8, 1924. After the installation of these signals, it was found that highway vehicles could pass the signal and approach the railroad and thereby lose the indication of the light. Therefore, various schemes were suggested to give a side view of the signal, but without a great deal of success.

The New Haven in November, 1928, installed duplicate signals on each signal mast; that is, the signal on the far side of the railroad tracks gave the same indication as that given by the signal on the near side. This, I believe, was one of the first, if not the first, case of each signal shining both ways.

Due to highway travelers misinterpreting the double flashing light as a railroad grade-crossing signal, various types of signs were attached to the signal, such as the word, "Stop," in vertical line, giving an indication during the approach of a train. Others gave the word, "Stop," by a revolving disk. Both of these schemes consumed electric energy and required additional apparatus. The New Haven developed a "Stop on Red Signal" sign made up of reflecting lenses, such as is illustrated on page 739 of the November 14 issue of Railway Age. This type of sign was recommended to the special committee of the American Railway Association on highway grade-crossing protection, was approved by them, and later approved by the Signal Section, as well as by numerous railroads. The first sign of this kind was installed on the New Haven in April, 1930.