

# Reading Improves 13 Crossings

At 13 road crossings in Lebanon, Pa., the Reading has up-graded crossing protection from watchmen or crossbucks to include flashers, gates and sidewalk arms. Eight of the crossings have supervisory control from a single location. The plan was worked out with city representatives.

The Boro of Lebanon, Pa., on the Reading's main line between Harrisburg and Reading, is a busy industrial town of 32,000 people. The railroad passes through the heart of the town over streets carrying upwards of 11,000 vehicles per day. Until recently, protection for 13 of these crossings consisted of watchmen, manually operated gates, or crossbucks.

Now four of these crossings are protected with automatic flashing light signals, one with automatic flashers and roadway gates, and eight with flashers, roadway gates, sidewalk arms, and supervisory manual control. "No Right Turn" and "No Left Turn" signals, with accompanying flashing yellow lights, are provided where there is a street parallel to the railroad. At some of these parallel street locations, an additional signal comprising two vertically arranged alternately flashing red lights, provide a warning for pedestrians and motorists. A minimum of 30 seconds warning at maximum train speed is provided.

Actuation of protection causes the highway crossing signals, gate lamps, No Turn signs (where used), and alarm bell to start operating. After an elapsed time of five to six seconds the gate arms start to descend, and are horizontal 10 seconds later. When the gate arms reach the horizontal position, the alarm bell ceases operation and the gate arm lights are illuminated steadily, instead of flashing. The supervisory manual control is effected 24 hours daily from a control tower at Eighth Street, Lebanon's main north-south street.

The crossings at Sixteenth Street, Partridge Street, Gannon Street, Fifth Avenue, and Eighth Avenue have automatically controlled flashers (plus

gates at Fifth Avenue), but do not have superimposed manual control.

A new three-story cinder block tower was built at Eighth Street. The first floor contains the furnace and the Edison storage battery. The second floor houses the relays, and the third floor houses the control machine and operator.

The control machine is equipped with a diagram of tracks approaching from the east of Front Street and from the west of Twelfth Street, and all track facilities and crossings between these locations. (The track diagram shown here has been extended to show all crossings involved in the protection program.) The tracks are divided into sections with an amber indicator light for each section. The indicator light is lighted when the track section is occupied.

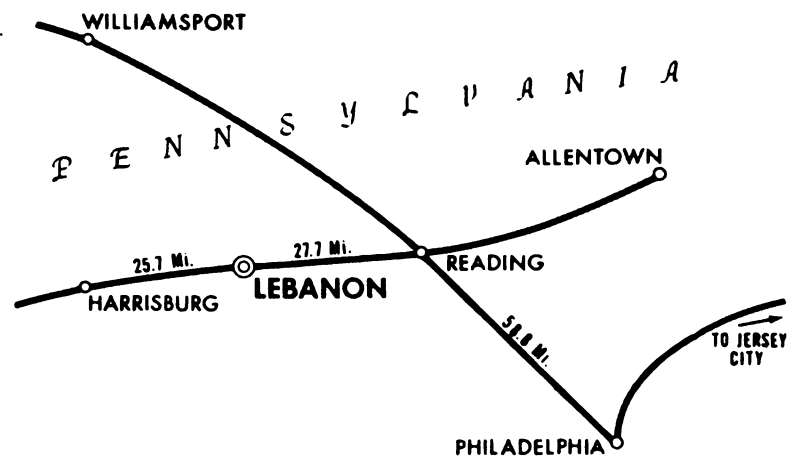
A single stroke annunciator bell sounds as a train approaches from the east or west, before the train arrives at the first crossing protection control track circuit. As the train occupies the track circuit which starts the protection at the first crossing, a buzzer sounds until acknowledged by the watchman pressing the appropriate annunciator cut-out pushbutton. A cut-out pushbutton is located at each end of the panel for trains approaching from the corresponding direction. As

the train proceeds through Lebanon, the automatic protection is operated at successive crossings in the usual manner. The buzzer sounds again as the train leaves the area controlled from the panel. This audible signal is cancelled, as before, by pressing the pushbutton at the leaving end of the panel.

**Lebanon Crossing Protection**

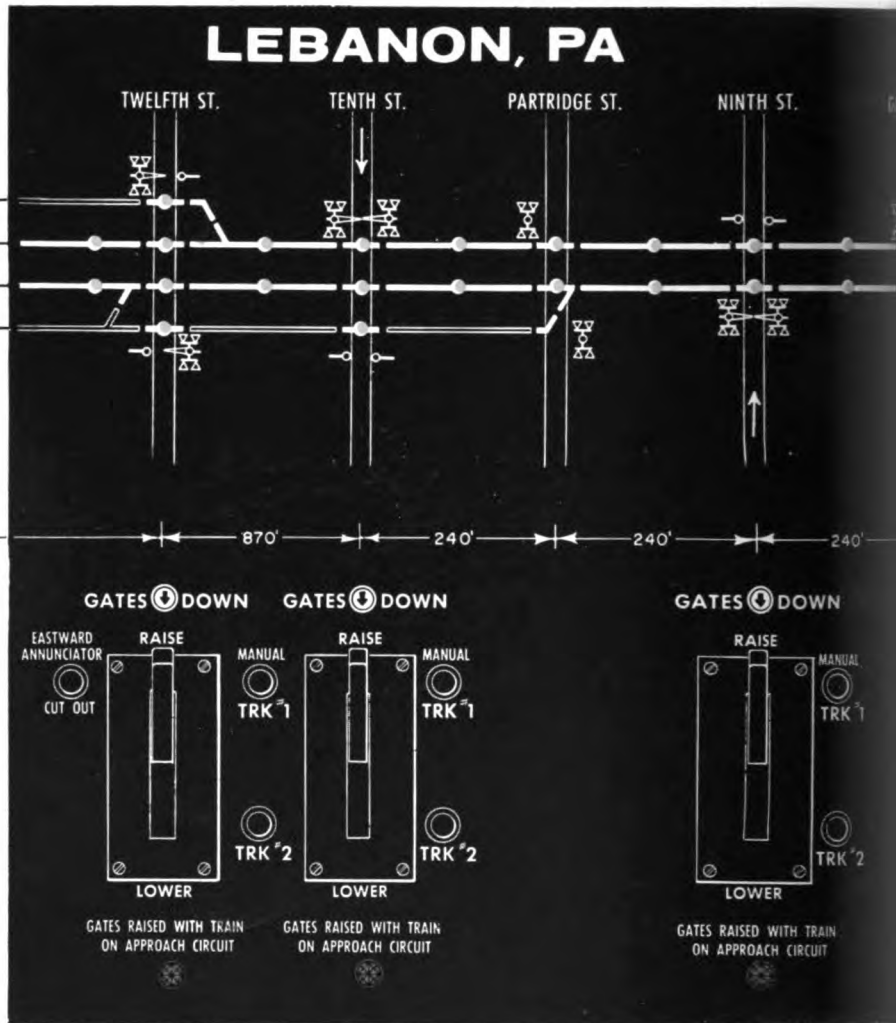
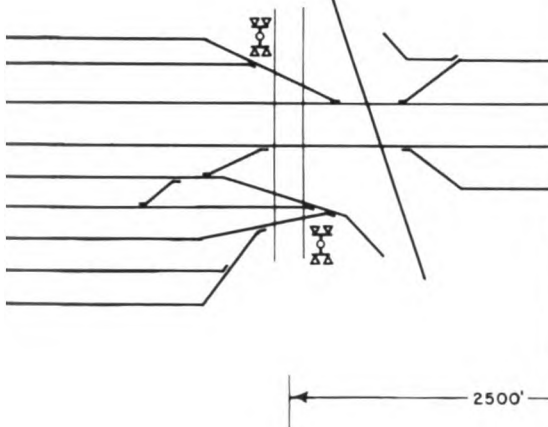
Street	Before	After	Vehicles per Day
8th Ave.	X	AF	--
5th Ave.	W	AG	--
Front St.	W-MG	AG+S+S	4,000
4th St.	W-MG	AG+S+S	2,800
5th St.	W-MG	AG+S+S	3,000
7th St.	W-MG	AG+S+S	7,000
8th St.	W-MG	AG+S+S	11,000
Gannon St.	X	AF	6,000
9th St.	W-MG	AG+S+S	10,000
Partridge St.	X	AF	1,000
10th St.	W-MG	AG+S+S	4,600
12th St.	W-MG	AG+S+S	4,000
16th St.	W	AF	--

- W = Watchman only, 16 hrs per day
- W-MG = Watchman, Manual Gates, 24 hrs per day
- X = Crossbuck protection only
- AG = Automatic roadway gates
- AF = Automatic flashers
- AG+S+S = Automatic Gates, plus Sidewalk arms, plus Supervisory control



WESTWARD TO  
HARRISBURG

SIXTEENTH ST.



- FLASHING LIGHT SIGNALS ONLY.
- ELECTRIC CROSSING GATE WITH FLASHING LIGHT SIGNALS.
- ELECTRIC SIDEWALK GATE.
- ELECTRIC CROSSING GATE WITH FLASHING LIGHT SIGNALS AND SIDEWALK ARM.

The single stroke bell does not sound for a departing train.

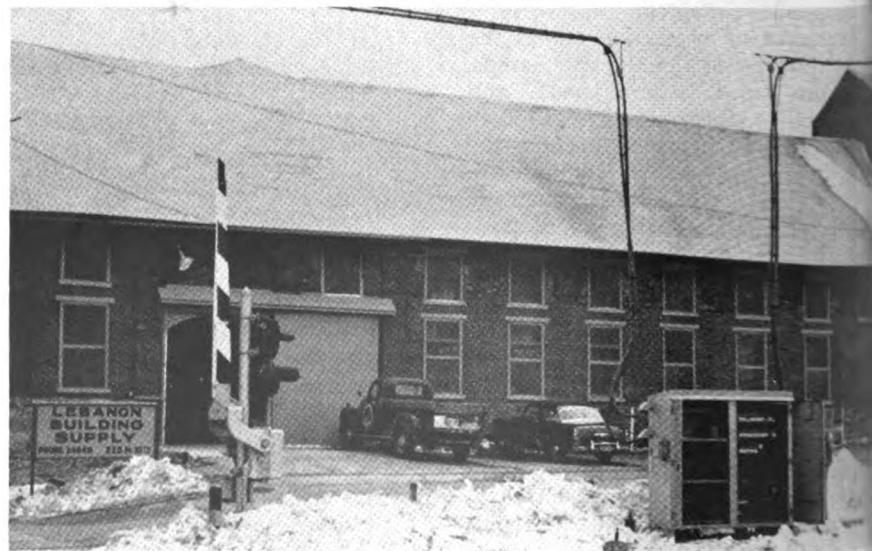
The progress of the train is indicated by amber track occupancy lights. As the gate protection at each crossing becomes effective, it is indicated by a white light with an engraved black arrow above the corresponding lever on the panel.

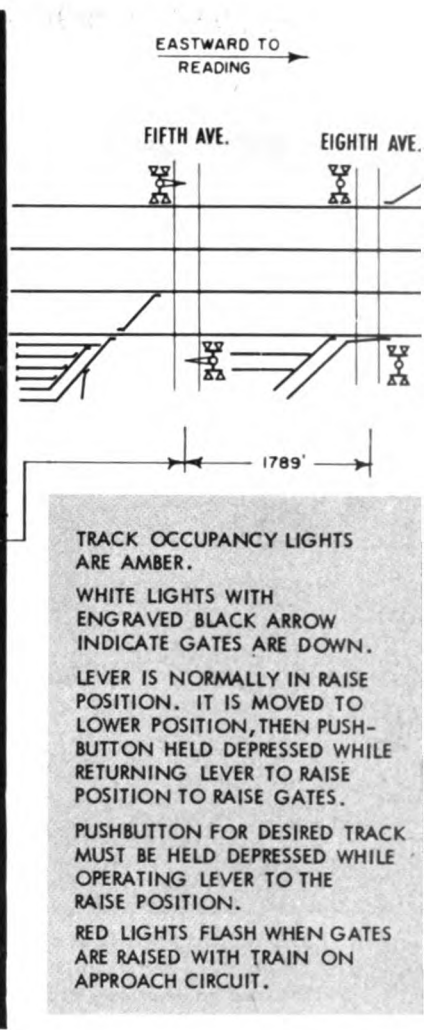
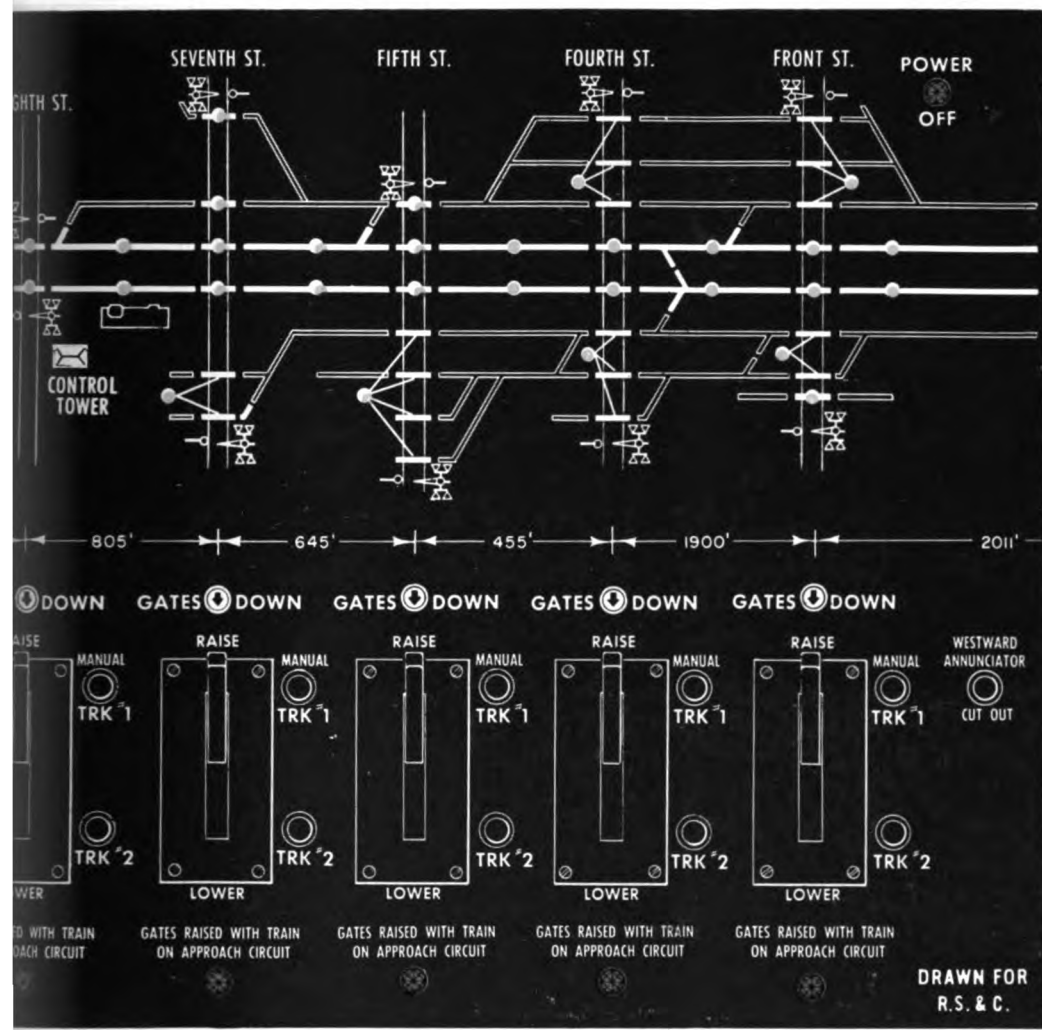
At Twelfth, Tenth, Ninth, Eighth, Seventh, Fifth, Fourth and Front Streets, supervisory manual control is available. Should a train stop on the approach to one of these streets without occupying the crossing, a trainman will contact the watchman by one of the telephones provided for that purpose. The watchman may then raise the gates by the following operation: The watchman must first depress and hold a foot pedal. Then he moves the lever for the desired crossing from the normal RAISE position to the LOWER position. Then, while depressing a pushbutton corresponding to the track occupied by the train, he returns the lever to the RAISE position. The gates will then rise and the flashers stop. The watchman must continue to hold the foot pedal depressed so long as manual control is to be ef-

fective. Should he remove his foot from the pedal, operation will revert to automatic, and any protection being withheld by manual action will again become effective. This operating procedure was adopted to prevent forstalling operation of the gates with a train approaching and to keep the watchman aware of his responsibilities.

In no case can the protection be cut out with a train occupying the "island" track circuit over the crossing. While the protection is being withheld, a red light flashes beneath the lever.

Normally, when the train is ready to proceed over the crossing, a member of the crew notifies the watchman. The gates will be lowered by the watch-





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an placing the manual switch in the LOWER position. The foot operated switch can then be released, unless depressed to hold out protection at another crossing. After the train has passed over and cleared the crossing, the lever is restored to its normal RAISE position. The gates cannot be lowered by manual action alone; a

train must be on one of the control circuits.  
 In the case of a passenger train stopping at the passenger station, no notification to the watchman is necessary, as he raises the gates when the train comes to a stop at the station, which is adjacent to the control tower. He lowers them again when the engineer

signals by whistle or bell that he is ready to proceed.  
 After manual control has caused protecting devices to cease operation at a crossing, should a train proceed to occupy the crossing without further action being taken by the operator, the shunting of the island circuit over the crossing will put the gates down.

sidewalk gate at 10th St includes a No Left Turn signal and flashing yellow light for a private drive. Note method of hanging cables into relay case. At this location plug-in relays are used, just visible in upper part of case.

A new control tower was built at 8th St for watchman who has supervisory control over eight crossings. From here to 10th a narrow one way public road parallels tracks. View is toward passenger station and 7th St.





The two red lights flash alternately to warn pedestrians. Signal is used in the four blocks between 8th and 10th streets where sidewalks line both sides of tracks. Roadway gates are used on both sides of street here at 10th St because of one way traffic.

When the train clears the island track circuit, the gates will raise. In this case the automatic protection will not be effective for a second train approaching on the same track and from the same direction as the first train, until the watchman operates his lever to the LOWER position, or releases his foot pedal, or until the first train clears the reverse approach track circuit.

Each side track extending through a crossing is provided with one track circuit extending over and about 500 feet either side of the crossing. For operation, the movement is brought to a stop with the leading wheels occupying the track circuit. When the protection has become effective, the movement can proceed over the crossing. No superimposed manual control is necessary or provided for these tracks.

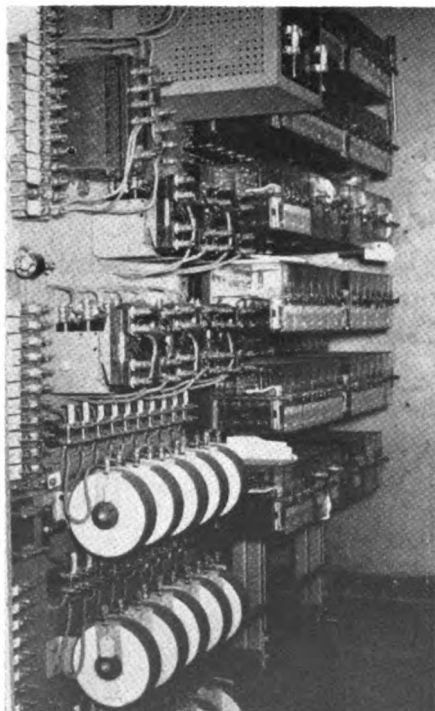
### Emergency Switch Raises Gates

A precast concrete relay house is provided at Seventh and Twelfth Streets; sheet steel instrument cases are used at other locations. Each of the concrete houses has electric heaters to prevent moisture condensation. Heaters are also used in the steel cases where required. At each gate location a box containing a knife switch is secured with a switch lock and sealed with a conventional type car seal, which is inspected by the signal maintainer each inspection period. In case of an emergency, closing the switch raises the gates. The maintainer and specially qualified maintenance of way men are authorized to make use of this switch. It is not for use by trainmen. When the switch is closed (gates up) the door of the box cannot be closed.

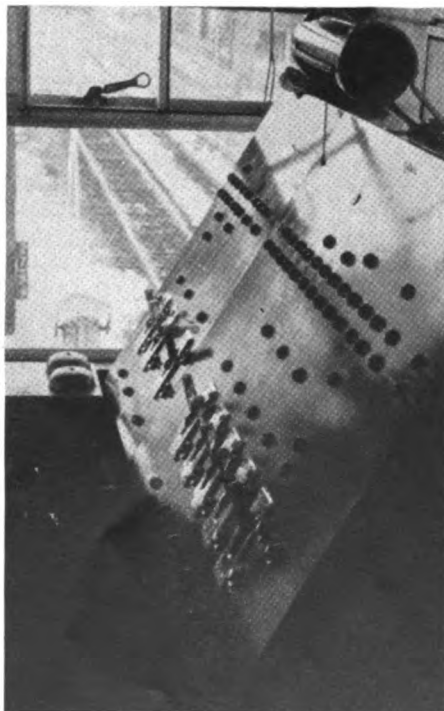
New plug-in relays were used at Ninth, Tenth, and Twelfth Streets and shelf-type relays at the others. The relays were supplied by both GRS and US&S. Telephone type relays were used for machine indication. The control panel, gates and flashers were supplied by Western Railroad Supply Co. Precast foundations were used for most signals, but some were poured concrete. Edison storage batteries were used at each location. Kerite aerial cable was attached to a 3/8-in. Copperweld stranded messenger on an existing pole line. GE Thyrite lightning arresters were used on track circuits and Raco Clearview on line circuits.

The estimated cost of installing the protection at the 13 crossings was \$406,319. The project was installed by forces under Supervisor of Signals E. L. Rogers, under the jurisdiction of George B. Blatt, Chief Signal, Electrical and Communications Engineer.

RAILWAY SIGNALING and COMMUNICATIONS



Large discs in the 7th St relay house are GE Thyrite lightning arresters used on all track circuits. An electric heater is on low at all times to prevent condensation in the relay house.



Light on machine provides general panel illumination at night. Watchman is contacted by phone (note bells) to raise or lower gates for trains stopping on approach circuits.