Railway Signaling

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Automatic Gauntlet Signals Installed on the South Shore

Also train movements from interchange track and siding directed by signals

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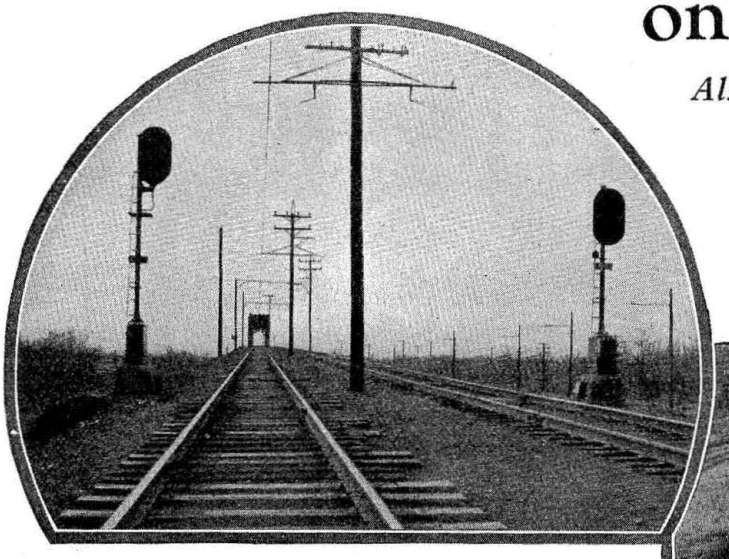
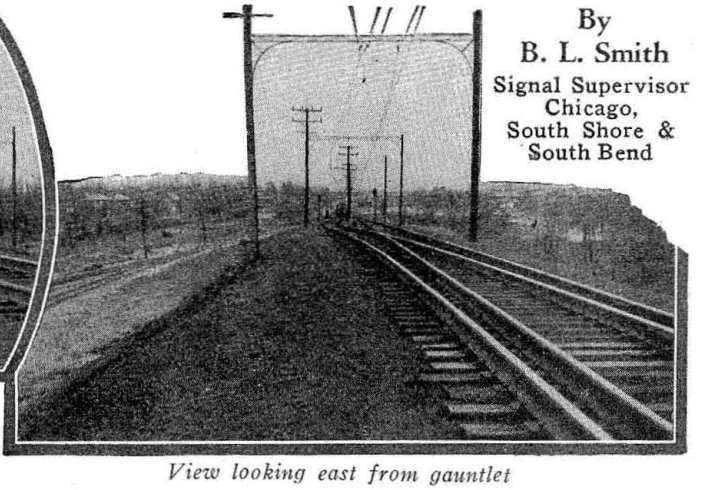


View looking west toward gauntlet



View looking east from gauntlet

THE Chicago, South Shore & South Bend has installed an unique arrangement of automatic interlocked signals for the protection of a gauntlet track near Gary, Ind., an interesting feature of which is that the signals also protect switching movements into and out of an interchange track with the Wabash, as well as passing track movements in this area. The South Shore is handling 44 passenger and 8 to 10 freight trains over this line daily, and, in the summer, as many as 62 passenger trains on Sunday. Passenger trains consist of from 2 to 8 cars, and freight trains, up to 40 cars. The South Shore carries fast l.c.l. freight with overnight service between points on its own lines, and interchanges car loads at several points with steam roads.

The line is double track from Kensington, Ill., to a point about a mile east of Gary, Ind., a total of 17.6 miles. Some of the bridges in this territory were constructed for single track, and over these two tracks run gauntlet. At the point under discussion, the South Shore main line is carried over the Pennsylvania and the Wabash main lines by an overhead bridge, the gauntlet on this bridge being about 758 ft. long. From each direction the tracks approach the bridge on an ascending grade of about 2.5 per cent for 2,100 ft.

Operation of Interlocked Signals

The automatically interlocked home signals, marked *E* and *W* on the diagram, are designated as absolute signals by a lunar white marker light mounted four feet below and to the left of the signal unit. When a train is stopped by such a signal indicating "danger," it is necessary that flagman precede the train over the gauntlet track into the clear on the other side.

The gauntlet signals normally indicate "danger." When an eastbound train passes the second automatic signal in the approach of Signal *E*, the circuits are automatically checked to determine that the gauntlet is unoccupied and that no westbound train is in the westbound approach section. If such a condition exists, Signal *E* changes from "red" to "green" and the first automatic signal in approach No. 621 changes from "yellow" (caution) to "green."

As the train passes gauntlet Signal *E*, the indication is changed from "green" to "red," thus providing rear-end protection. After the train has passed over the gauntlet and proceeded into the clear beyond the first automatic signal, the control for the automatically interlocked gauntlet signal is returned to normal, and is then in a condition to be accepted by other trains approaching in either direction.

The operation is the same for westbound trains except for the fact that westbound trains are superior in class and are given preference. If a westbound and an eastbound train both hit their respective approach sections simultaneously, the signals for the westbound route would be cleared, and the eastbound train would be required to stop. This result is accomplished by using a slow pick-up relay in the eastbound circuits.

Interchange Connection Causes Complications

As shown in the diagram, a connecting track leaving the westbound main line at a point 200 ft. east of the westbound gauntlet signal, extends to a small inter-

change yard connected with the Wabash. Movements are made to this interchange about eight or ten times each day. On such occasions, when a South Shore locomotive enters the connection, the switch is closed so as to no longer interfere with main-line movements. After the cars are coupled up and the train is ready to put out, a trainman goes to the color-light switch indicator at the main-line switch and pushes a button; if the indicator gives a purple light this informs the trainman that no train is approaching on the westbound main line, and that he has authority to throw the switch. As soon as he does so, the dwarf signal marked *D* changes from "purple" to "yellow," giving the engineman authority to pull out on the main track. When the switch is thrown, a train pulling out will not cause the westbound gauntlet Signal *W* to change to clear, but if an eastbound train is approaching, the eastbound Signal *E* will be lined up automatically to give a clear indication because the route is not fouled by the switching movement being made. If an indicator only had been provided to permit westbound main-line trains to trail through at normal speed.

A freight train on the Wabash interchange track, after getting a proceed indication of dwarf Signal *D*, pulls out on the westbound main and moves against the normal direction of traffic for about 1,400 ft., and through the switch normally lined for the passing track until the train is in the clear on this passing track. As all freight from the interchange moves west from this point, it is necessary to cut off the locomotive from the east end of the train and run it down the westbound main and back through the spring switch so as to couple on the west end of the train.

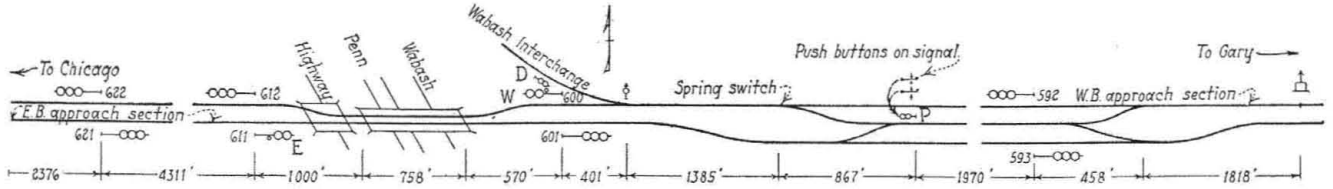
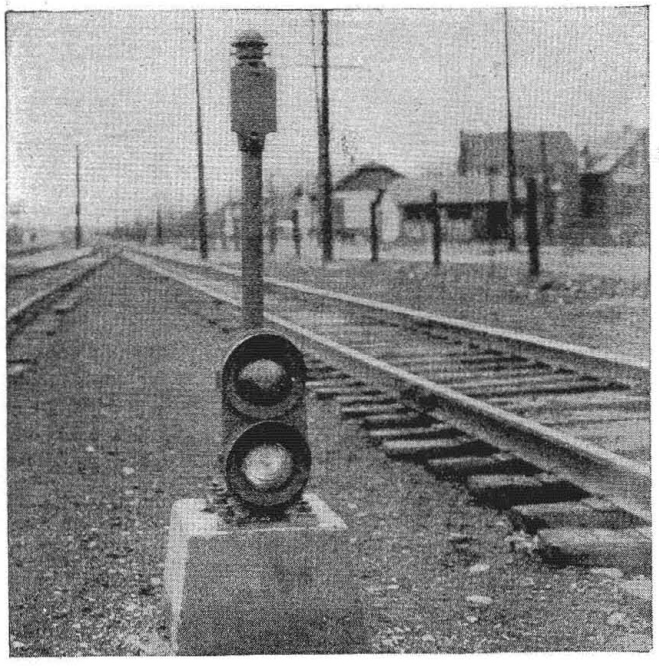


Diagram showing location of switches and signals with respect to the gauntlet



The push button box is mounted on dwarf signal P

used at the transfer track switch, the freight crew might not always observe it; but, with the dwarf signal *D* back of the clearance point on the interchange track, the engineman of the freight train must be governed by the indication of this dwarf signal.

To permit the handling of a considerable number of cars from the interchange at one time and to reduce to a minimum the time that such movements will block the main line, a center passing track was constructed starting about 1,500 ft. east of the gauntlet. This track is connected to each main track at both ends, and the west-end switch connection to the westbound track is provided with a No. 20 turnout. This switch is normally lined for the passing track, a spring and oil buffer being

Special Signaling for Siding Movement

In order to move this westbound train out of the siding on to the main line and over the gauntlet without stopping it on the grade approaching the bridge, a special signaling arrangement was designed. A dwarf signal, marked *P* on the diagram, was placed at the clearance point on the siding, which is controlled in conjunction with push buttons and the regular track circuits on the main tracks.

When a train on the passing track is ready to go, a trainman pushes a button marked "Set Up," which lines up the route and clears gauntlet Signal *W*, providing no train is on either approach section. At the same time the dwarf Signal *P* changes from "purple" to "yellow," which authorizes the engineman to pull out and in the meantime the other gauntlet signal and westbound automatic Signal 592 are held at "danger" in order to stop any other approaching trains.

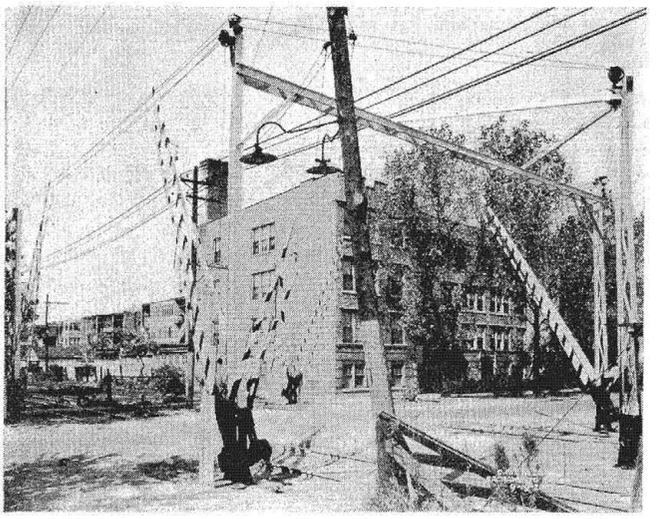
If some unexpected delay prevents the freight train from pulling out as soon as the signals are lined up for the route over the gauntlet, then the trainman pushes a second button marked "Restore," which restores the control of the gauntlet and automatic signals to the normal control so as to be operated by approaching trains on the main lines. At the same time, the dwarf Signal *P* is changed back from "yellow" to "purple," thus holding the freight train on the siding. As explained previously, this switch is normally lined for the passing track, so that the westbound freight train pulling out of this track is not required to stop to open or close the switch. This arrangement is necessary in order to permit the freight train to get well under way so as to make the grade approaching the gauntlet. The signal equipment used on this installation was furnished by the Union Switch & Signal Company.

Crossing Gates Operated by An Overhead Cable System

AN improved type of overhead cable-operated safety gate for grade crossings has been developed by the Chicago Rapid Transit Company and is now being given a practical test at the Sacramento avenue crossing on the Ravenswood branch of that electric road. This new gate, constructed by one of the Rapid Transit signal engineers, eliminates all sub-surface construction work. An overhead steel frame consisting of five up-

right beams 22½ ft. high and one cross span carries the ⅜-in. cables connecting the gate arms with the levers in the operating shelter. There are two levers, each lever controlling the gate arms on one side of the crossing. Turnbuckles in each cable connection permit of making any slight adjustments to take care of temperature changes.

The principal feature making this new gate an improvement over other manually-operated types, is its greater operating efficiency. The gate arms can be



This overhead cable-controlled gate installation eliminated the need of sub-surface construction work

stopped almost instantaneously at any position, when being raised or lowered. Another factor that makes for greater grade crossing protection is the elimination of all danger of the cables freezing in cold weather, which may happen when the control apparatus is underground. Maintenance costs also are reduced by the new gate, due to its simplicity of construction.

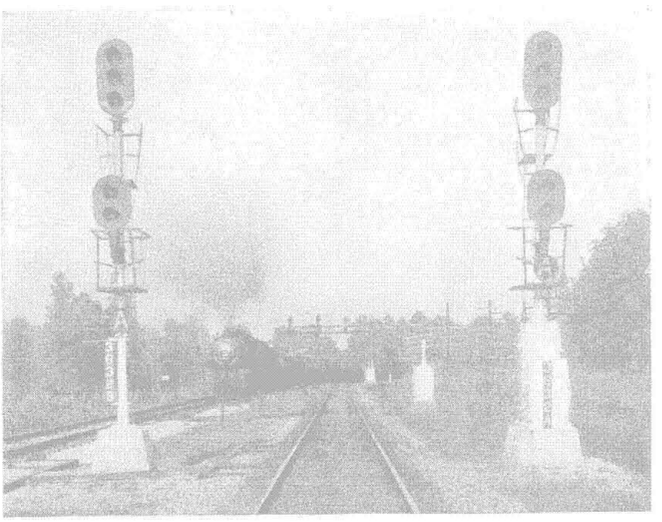
C. & E. I. Derailment and Collision at Chicago

FAILURE to observe and obey a signal indication is given as the cause of the C. & E. I. derailment and collision at West 21st street and Stewart avenue, Chicago, on December 6, 1928, according to a report issued by W. P. Borland, director of the Bureau of Safety of the Interstate Commerce Commission. A Chicago & Eastern Illinois passenger train moving over the tracks of the Chicago & Western Indiana was derailed and then collided with the side of a Pennsylvania express train at the intersection of the tracks of the two last named roads. One employee was injured.

In the vicinity of the point of accident, this is a six-track line, the tracks being numbered from east to west; tracks 1 and 2 are used by passenger trains and train movements over these tracks are governed by time-table train orders, and an automatic block signal system. Train movements over the Pennsylvania crossing are protected by an interlocking plant, and the derailment occurred within these interlocking limits on track 1, the northbound main track, at a derail located about 100 ft. north of the home signal, while the collision occurred about 450 ft. beyond the derail, where the Pennsylvania tracks cross those of the Chicago & Western Indiana.

This accident was caused by the failure of the engine man of the train properly to observe and obey signal indications. The engineman maintained that he took proper precautions to bring his train to a stop in obedience to the caution indication displayed by the distant signal and the stop indication displayed by the home signal, as well as observing the requirement that all trains come to a full stop at the crossing, regardless of the position of the signals. He attributed his failure to stop to the fact that the air brakes did not apply properly on the train. The weight of evidence, however, did not support such a contention. Aside from the difficulty experienced in making stops with an Atlantic-type engine with 79-in. driving wheels, and a light train of only two cars, it appeared that the brakes operated properly on the southbound trip, that they operated in making several stops enroute on the northbound trip, the last such stop having been made about five minutes prior to the occurrence of the accident, and, according to the engineman's own statement, they had operated properly up to the time of the accident. It appeared from the engineman's statements that the brakes on the engine were set at the time the fireman reversed the engine and the conductor examined the brakes immediately after the accident and found them set on the cars in the train, while officers reaching the scene within a comparatively few minutes found all angle cocks open, with the brake valve handle in the emergency position.

Under these circumstances, with the air brakes in the same condition as they had been throughout the southbound and northbound trips, it seemed incredible that an experienced engineman in full possession of his faculties could have misjudged speed and distance to such an extent as to cause an accident of this kind, and it is believed, therefore, that, "the engineman was not in full possession of his faculties and that this condition resulted in his failure to operate his train in accordance with signal indications. That something was wrong with the engineman is obvious in view of the fact that he ran his train off the derail and then continued on the ties a distance of 450 ft. and over three railroad crossings to the point where it collided with the Pennsylvania train, but on the record as it stands, it is believed that any attempt to explain why he failed to obey signal indications is a matter of mere conjecture."



Remote control signaling on Missouri Pacific double-track line