What's the Answer?

If You Have a Question That You Would Like to Have Someone Answer, Or If You Can Answer Any of the Questions Shown Below, Please Write to the Editor.

Control of Switch from Locomotive Cab

"Has any system of cab control been tried out that enables the engineman to operate a junction switch or passing-track switch from his seat in the cab of the locomotive as the train approaches the switch? What is your opinion as to the practicability of such a system?"

Tested on Great Northern

H. E. Brashares
Assistant Superintendent of Signals, Great Northern, St. Paul, Minn.

An installation of a switch controlled from a locomotive cab was made on the Great Northern in 1925, and was tested along with our first section of automatic train control. The practicability of such an arrangement had been a matter of consideration for some time. The adaptability of the type of train control we were installing to this method of operation was so evident that the test installation was made.

We had, since 1921, installed low-voltage switch machines at several passing-track switches, the control being semi-automatic by means of a push button in the dispatcher's office. For trains moving into or out of the passing siding, the push button is operated to line up the switch. After the movement through the home signal zone has been completed, the switch automatically returns for main-line movements. For control from the engine cab, the only change required at the interlocked switch was the substitution of a train control relay for the regular push-button controlled relay, this type of relay being used because of the greater speed with which the train-control relay picked up. At a point 6,000 ft. from the switch a regular train-control receiver (as ordinarily installed on a locomotive) was mounted on the ties between the rails so that its highest point was approximately two inches below the top of the rail. The normally-open contact of the receiver was connected between the push-button control wire and common, and, when closed, performed exactly the same service as the push-button, that is, it picked up the train-control relay (at the switch) which controlled the switch-operating circuits.

In the locomotive cab, an ordinary push-button was installed just above the engineman's head, and a Sprague reset magnet (also a unit of the train-control apparatus) was mounted under the tender so that its pole pieces were five inches above the top of rail. This magnet was simply an electro-magnet producing a fairly powerful magnetic field when supplied with current from the 12-volt train-control battery, already in service on this locomotive. (The same result could have been obtained from a headlight generator if no battery had been available.)

The operation merely required holding the push-button contact closed while the electro-magnet passed over the receiver mounted between the rails. The receiver contact was closed by the magnetic action through a seven-inch air gap (the standard air gap for train-control operation).

The first effect at the switch was the energizing of the control relay. This immediately put the main-line home signals (normally clear) to stop, indicating to the enginemen that the "set-up" had been made. At the end of a one-minute period, obtained by a time relay which was started by all of the signals displaying the stop indication, the switch machine circuit was completed and the switch moved over to the siding position, and, when locked, the diverging route signal, on the home signal mast, was displayed. The passage of a train through the home signal zone broke down the control relay, operated as a stick relay, and at the end

To Be Answered in An Early Issue

(1) Under what circumstances is it necessary to provide facing-point locks for spring switches? Should such locks be installed at all spring switches over which trains are operated in the facing direction at high speed?

(2) What are the advantages or disadvantages of using point-detectors on remotely controlled power switch machines?

(3) What is the best method of applying aluminum paint, with a brush or with a spray machine? What are the advantages and disadvantages of each method?

(4) Why do some roads use a strain insulator in the messenger for a cable between a line pole and a signal case?

(5) When highway-crossing signals are installed at a railroad crossing where switching movements predominate, is it feasible to provide weather-proof switches, near the crossing, with which the trainmen can start and stop the operation of the signals?

(6) What factors are of most importance in determining whether the home signals in an automatic interlocking plant should operate to three positions or only to two positions? Under what conditions should a speed limit be imposed?

of the time interval the line-up changed back to the main line and the signals cleared. The first operation in this test was made with the locomotive passing over the receiver at 30 m.p.h. As standard train-control equipment was being used, the speed would have made no difference, as it could have been operated at 70 m.p.h. just as easily as at 30.

As to the practicability of such a system, there is little question. It could be installed at passing-track switches where difficulty of starting, after making a stop to open the switch, often holds a train back at least one station, if on short time. The crew will not take the chance of stalling and delaying perhaps a fast passenger train because of doubt as to getting into the clear after a stop to handle the switch.

The system could be used at junctions of branch lines with main lines where an interlocking could be operated entirely automatically for main line movements and for movements from branch line to main line, and with the push-button in cab control for movements from main line to branch line. It would give all the advantages of interlocked passing-siding switches and junction switches with standard equipment. The locomotive equipment would be very simple and low in cost. In my opinion this manner of operation on railroads deserves more consideration than it has apparently received up to the present time.

System Available

S. M. Day
Principal Assistant Engineer, General Railway Signal Company, Rochester, N. Y.

We know of no trial installation of a system of cab control that enables the engineman to operate a junction switch from his seat as the train approaches the switch. However, a practical system is available, and we will be glad to have anyone contemplating the installation of such an arrangement get in touch with us.

Other Methods Preferred

Leroy Wyant
Signal Engineer, Chicago, Rock Island & Pacific, Chicago, Ill.

I have seen plans of such a system of cab control for switches and understand that some tests have been made of an actual trial installation. There is no doubt in my mind but that it can be made to work entirely satisfactorily. However, I do not consider there is much need for its general application at present. The amount of money that would be required to install it on a sufficient number of locomotives to be of any economic value could be used to much greater advantage in applying spring switches and operation of switches from a remote point. As a matter of fact, an ordinary inexpensive spring switch will eliminate at least 75 per cent of the time lost at the average passing track switch.

It would be quite interesting, to those not familiar with railroad operation, to observe with what clock-like precision an engineman can pull up to and enter a siding switch, many times without bringing the train to a complete stop. However, in leaving a siding there is considerable delay, especially with long freight trains, due to an engineman having to estimate the position of his caboose with respect to the switch. Frequently the caboose is a quarter of a mile away from the switch before an engineman is satisfied that he can increase his speed. The spring switch eliminates this delay.

This brings up the general question of the need for a more extensive application of centralized traffic control as one important means of solving the "railroad problem." I have recommended from the beginning, and actively sponsored the application of C.T.C. without power operation of ordinary passing track switches on the basic logic described above, that spring switches will eliminate the most annoying delays at passing tracks, and for a given sum of money so many more miles of C.T.C. can be installed if the power switches are omitted, that the most benefit to a railroad would be gained so doing.

▼ ▼ ▼

Call-On Signals

"What is your practice as to the use of call-on signals at interlockings? Does the call-on unit on a home signal mast give an engineman authority to proceed beyond interlocking limits, or is such authority given by a track-circuit-controlled automatic signal located at the leaving end of the interlocking limits?"

Automatic Signal at Leaving End of Interlocking Limits

W. J. Eck
Assistant to Vice-President, Southern, Washington, D. C.

The indication given by the call-on signal on the Southern Railway is "Proceed at Slow Speed Prepared to Stop" and gives the engineman authority to proceed to the next signal whether located just beyond the interlocking limits or some distance away. To facilitate traffic, it is desirable to have a track-circuit-controlled automatic signal located at or near the leaving end of the interlocking limits and such a signal is provided at many of our plants.

Practice on the Pennsylvania

W. M. Post
Assistant Chief Signal Engineer, Pennsylvania, Philadelphia, Pa.

On the Pennsylvania the basic principle observed when it is desired to close a train in on an occupied track with traffic, in an interlocking, is that the train must first be stopped.

Where position-light signals are used, a "Stop and Proceed" signal can be displayed by reversing the signal lever, then pushing a button which will light the marker light on the home signal under the horizontal row of lights, giving the same aspect as displayed by an automatic signal when the block is occupied. This marker light can be displayed only when the route is set with the traffic. The indication given is "Stop then Proceed in accordance with Rule 509 or 660." Rule 660 reads as follows:

660. (Double, three or more tracks.) In automatic block system territory, when a train is stopped by a "Stop-and-Proceed" signal that governs its movement into or within an interlocking, it may proceed at once not exceeding 15 m. p. h. to the next signal expecting to find a train ahead, broken rail, obstruction, or switch not properly set.