A view of one of the switches at Gresham interlocking during a severe snowstorm illustrating effectiveness of the electric heaters

Electric Switch Heaters at

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Thirty-two units installed—Prove their value in severe snowstorm

THE GRESHAM interlocking plant, located near 88th and South Halsted streets, Chicago, is one of the most important on the Chicago, Rock Island & Pacific, controlling a junction of the main line with a heavy traffic suburban line and a crossing with a double-track line used by passenger trains of the Baltimore & Ohio and the Pere Marquette. Traffic through this plant is heavy, especially from 5:52 a.m. to 7:52 a.m., when 37 trains pass. During the balance of the day from 8 to 15 trains per hour cross this junction.

The tracks lie in open country, with little protection from the wind. In periods of heavy snowfall, this plant has been difficult to keep open. Even with a man stationed at each switch, it remained a difficult job because the passage of trains over a turnout on one route wedged snow and ice about the switch points in such a way that it was impossible to throw the switch until the points were again cleaned out. This condition frequently resulted in serious and costly train delays; a six-minute tieup on one occasion is reported to have held up 12 trains.

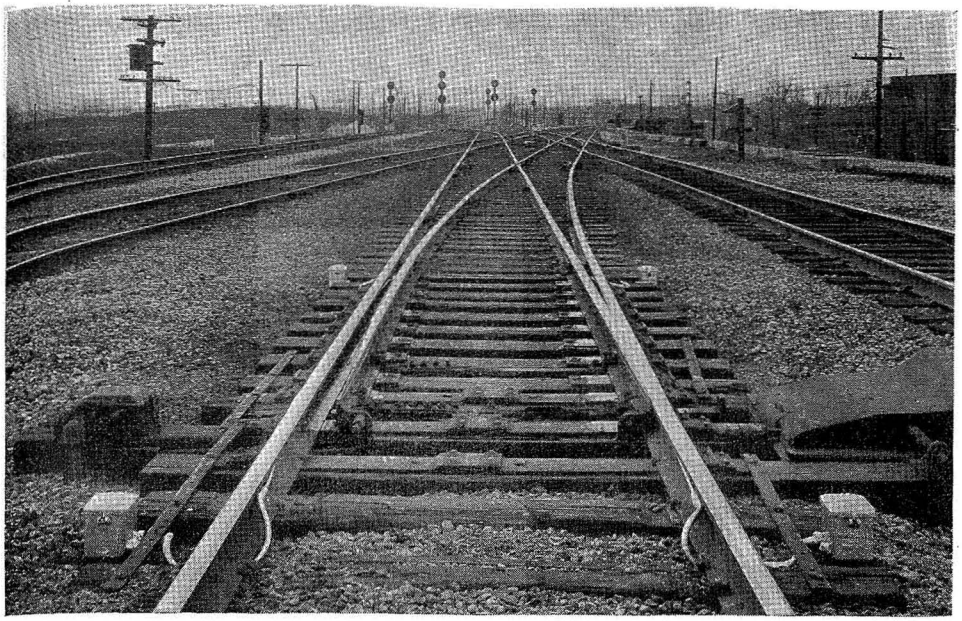
To cope with this situation, the Rock Island, in January of this year, applied Westinghouse heating elements to the rails of the most important turnouts in the Gresham interlocking; three No. 10 turnouts, two No. 15 turnouts, two No. 10 double slip switches, and one No. 10 movable point frog. In all, 32 heating units were installed.

Construction of Heaters

These heating elements consist essentially of a coiled nickelchrome wire centered in magnesium oxide and enclosed within a nickel silver tube 9/16 in. in diameter. The active heat-radiating element of nickelchrome wire is varied in length and in heat output according to the location in which it is applied. For the No. 10 turnouts the wire is 15 ft. long, of which 6 ft., extending from a point slightly in advance of the switch point through the distance in which the switch rail makes contact with the stock rail, is rated at 350 watts per ft., and the other 9 ft. is rated at 125 watts per ft. The element placed on a No. 15 turnout is 18 ft. long, of which the first 7 ft. rates at 350 watts and the remainder at 125 watts per ft. On the movable point frog and on the center points of the slip switches a 14-ft. unit is doubled back upon itself and rates uniformly throughout at 350 watts per ft.

The heating tube is secured against the web of the rail under the ball by "VV" conduit clamps held by ¼-in. stove bolts running through holes drilled in the web. The elements are non-rigid. Flattening for special clearances and the making of short-radius bends for the double-back was done in the shops at the time of assembling the complete units.

At either end of the heating elements a brass male connection is silver-soldered, which enters a female connection 1⅜ in. in diameter and approximately 4⅛ in. long that completely encloses the terminal contacts. From the heating wire a monel rod leads to a contact with the terminal brass insert which is seated in a



The heating units consist of coiled nickelchrome wire enclosed within a nickel silver tube secured against the web of the rail

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moulded sleeve within the connection. Where the rubber-covered lead leaves the connection, a separate cap nut and rubber gasket insure a water-tight joint.

There are 2 such complete heating units to each turnout, 2 on the movable frog, and 10 on each double slip switch. These units are placed on the gage side of the fixed rails and have proved to be effective in keeping clear of snow an area approximately 7 in. wide on each side of the rail.

A revision of the existing contract under which the local electric utility company supplied power for the Gresham interlocking plant and for the automatic signals and lighting from 91st street (Beverly Hills) to South Chicago, included a provision for serving this installation of switch heaters with 220-volt 3-phase 60-cycle current. The power company installed three 37½ kva. 2300-v./220-v. transformers to step down the high voltage line current, and the 220-volt power is carried to five control boxes from which it is distributed to the heating elements which are so grouped for control as to balance the three phases of the transformer. In these five control boxes are placed one 60-amp., three 100-amp., and one 200-amp. safety switches, which permit the snow melters to be turned on manually when weather conditions require them, an arrangement which is feasible here since this location is serviced 24 hours a day by a signal maintainer. Multiple conductor No. 9 parkway cable sheathed in lead and steel and bedded in the ballast runs from the control boxes to cast iron junction boxes close to the terminals of the heating units, and from these junction boxes rubber-covered leads, protected by 8-ply ½-in. "squirt hose" extend the short distance to the heater terminal connections. The total power consumption and heat output of the 32 units is 58.35 kilowatts per hour.

Results Satisfactory

Following their installation early in January these switch heaters had one serious test—during the severe snow storms of April 6, 7 and 8. Nine inches of snow fell on the 6th and four inches more on the 8th, while the temperature reached a minimum of 28 degrees. The heaters were in operation between 16 and 20 hours a day during this period and provided complete protection for the switches on which they were applied, permitting the regular operation of the interlocking plant without any additional men. The only labor required was that of the sigal maintainer, who cleared the operating rods and cleaned around the switch machines at convenient times, approximately once every 24 hours. The power consumed during the month from March 25 to April 25, which included these three days, was only 4,133 kilowatts above the previous normal consumption for the equipment served by that contract, creating an additional power cost by reason of the switch heaters of $124. The savings in labor costs can only be estimated, but, at the standard figure of "a man per switch per day" during storm periods, the road estimates that the annual savings in labor and materials during a normal winter at the Gresham interlocking, including the cost of train delays, will approach $1,500.

The application of these heaters was made by Rock Island forces under the direction of the writer and J. P. Zahnen, signal supervisor. With the exception of the transformer poles and transformers, which were installed by the power company at its expense, the cost of installing the 32 heating units, controls and connections was $3,600 for materials and $550 for labor, or between $225 and $250 per switch. Where power circuits are already in, the cost for equipping each switch would be considerably less.