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 Signals at Dual-Control Switches

"Where dual-control power switch machines are used in a remote-control installation, should the circuits be designed so that it is impossible for a signal to clear while the dual-selector lever is out of its normal position?"

Dual-Control Lever in Operating Position

J. S. Gensheimer
Engineer Telegraph and Signals, Pennsylvania, New York, N. Y.

Where dual-control power switch machines are used and the signals can not be cleared with the dual-selector lever out of normal position, switching movements are facilitated, because otherwise it would not be necessary for the leverman at the tower to throw the signal levers for the switching moves.

If the signals can not be cleared with the selector lever out of normal position, instructions may be issued that the operator, before giving permission to use the selector lever, must first have normal the signal levers that govern movements over the switch. The signal indication circuits check that the signals controlled by the signal levers are displaying the proper aspect before the signal levers can be placed normal. If the signals can be cleared with the selector lever out of normal position, there is no assurance that the signals, that should display stop, have actually gone to that position.

With the switch normal and the home and distant signals clear, if the selector lever should be thrown and the switch reversed in error, an approaching train would receive a warning sooner if the signals were controlled by the selector lever.

If a trainman, after throwing the switch by hand, should fail to restore the selector lever normal, it would be discovered more quickly if the signals could not be cleared.

Assume that the selector lever is in other than the power operating position, and the switch has been operated by hand to the opposite position from the switch control lever at the tower. The signal governing over the switch, if not controlled over the selector lever, may be clear. If the selector lever is put normal, the switch on account of being in the opposite position from the switch lever at the tower, will go normal. An approaching train, having accepted the signal, may have moved on to the switch, thus resulting in a derailment.

For these reasons it appears to be better practice to arrange the circuits so that the signals governing movements over dual-control switches can not be cleared except when the dual-selector lever is in the power operating position.

To Be Answered in an Early Issue

(1) What trouble has been caused by frost on contacts and commutators of signal equipment on your road? How has this trouble been overcome?

(2) How do you locate track-circuit trouble caused by defective insulation in insulated rail joints, or by insulation in switch rods?

(3) Where a proposed automatic interlocking is located so that one of the approach sections includes switches leading to industries, where frequent main-line switching movements are made, what arrangement can be used to effect an automatic release so that such switching movements will not hold the plant too long?

(4) What methods have you found to be most successful in keeping snow out of car retarders, so as not to interfere with their operation?

(5) What results have been obtained from the use of a polar relay, rather than stick relays, for the selection between two roads at an automatic interlocking at a crossing of two single-track lines? What are the basic principles of the polar-relay method? Please give a typical circuit with explanation.

(6) Where an interlocked, or outlying power-operated, switch is used in the normal and reverse position by approximately the same number of trains for facing movements, which of the switch points should the switch circuit controller or point-detector be connected to? Is it practicable or advisable to use two separate switch circuit controllers, one connected to each point?

Responsibility Should Not Be Divided

S. N. Wight
Engineer of Train Operation, General Railway Signal Company, Rochester, N. Y.

Since the time dual-control power switch machines were introduced some six years ago, it has been quite the universal practice to arrange the circuits so that the signals governing over a switch are held at stop while the selector lever for that switch is in the hand-throw position. It would seem to be a wise provision, and particularly when switching is being done over the switch by hand operation, which is one of the important usages of the dual-control selector.

The basic principle upon which the dual-control selector was built, is that of providing two separate and distinct means for operating the switch; one by power, completely under the control of the operator, and the

other by hand, entirely independent of the operator. Obviously there should be no divided responsibility. When hand switching is being done, the responsibility rests upon the trainman, and he should be fully protected against other movements, for which he is not responsible, and of which he may or may not have knowledge. To permit the signals to clear under the conditions named, would not afford the protection to which the trainman is entitled.

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Over-Load Cut-Outs for Low-Voltage Switch Machines

"In a remote-control low-voltage switch installation, what means should be provided to prevent an unnecessary consumption of storage-battery power in case the switch point becomes obstructed?"

Conditions to Be Met

B. E. O'Hagan
Union Switch & Signal Company, Swissvale, Pa.

A device used to prevent unnecessary consumption of storage battery power in the event of the switch points being obstructed in a remote control low-voltage switch installation, must, in order to be acceptable, comply with the following conditions:

1. It must never operate to remove power from the motor when the switch points are moving, even though, due to weather conditions, voltage, or adjustment, the time of operation is extended considerably beyond normal.

2. If the switch machine is provided with a clutch which slips when the points are obstructed, the clutch adjustment, within a reasonable range, should not cause inoperative failures of the overload device.

3. An inverse time element should be provided to prevent tripping of the overload device due to high current taken by the motor while starting or, if reversed, while running.

4. It is desirable to have the overload circuit breaker self-restoring with the next operation of the control lever after the breaker has operated, as this feature may often avoid the necessity of sending a maintainer to the switch location.

In the case of relay-controlled or contactor-controlled low-voltage movements, a thermal relay will comply with the conditions given. It consists of a heater which is placed in series with the motor circuit and a bi-metal operating member which deflects, due to increased temperature, and opens a contact by means of a snap action toggle. The contact thus opened is used to deenergize a separate stick relay or the switch control stick relay used in some types of circuits. Two of these thermal relays are used, one in the normal and one in the reverse motor operating circuit so that the switch may be returned immediately to the last operated position. The circuits are so arranged that the stick circuit is re-established by reversal of the control circuit for the switch.

When the Type-F switch circuit controller is used, the circuit breaker, which is an integral part of the controller, provides the necessary overload protection. The breaker used in this controller has a coil in series with the motor circuit and this coil is shunted by a resistor having a high temperature coefficent of resistance. When the motor current exceeds the tripping value for a given time, the increased resistance of the shunt resistor due to the heating of the resistor, causes a greater percentage of the current to flow through the tripping coil. The armature of the magnet is then picked up and trips a latch which releases the circuit breaker contacts and opens the motor circuit. The circuit breaker contacts then remain open until the controller is reversed, when they are again closed and latched. Thus it will be seen that no auxiliary overload stick relay is needed with this type of controller. On account of the extremely quick cooling of the thermal element, the breaker can be reset almost immediately after tripping and thus two breakers are not needed to permit restoring the switch to its last-operated position after the points have been obstructed.

Controller and Circuits Used

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

It is the present standard practice of the General Railway Signal Company to furnish, for all of our remote-control switch machines, an overload relay and circuits of such design that the current will be automatically cut off in case the machine becomes stalled for any reason. The overload relay can again be restored to its normal condition by moving the control lever at the control point to its opposite position, thereby permitting several successive operations in the attempt to break up the obstruction in the switch points or permit it to drop out. The control relay is also of such design that it will not trip off due to momentary surges of current resulting from starting the motor or from sudden reversal of the machine in midstroke.

Note—See also page 243 of the September issue.—Editor.

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Paraffin for Fiber Insulation

"What are the advantages and disadvantages of applying a coat of paraffin to the fiber insulation used in insulated rail joints?"

Lubricates Fiber When Assembling Joint

C. F. Stoltz
Signal Engineer, Cleveland, Cincinnati, Chicago & St. Louis, Cincinnati, Ohio

We require that all of our fiber insulation parts be dipped in paraffin at the point of manufacture, primarily to exclude moisture with the resultant warping and bending that sometimes take place. Paraffin also serves an important function in that it acts as a lubricant between the surfaces of the fiber and those on the rail and the angle-bars, thus permitting the joint to be drawn up to an exact fit, which of course insures maximum life for the fiber.

Other Waterproof Materials

Gerald Swallow
Sales Engineer, Continental-Diamond Fibre Company, Newark, Del.

The object in coating any fiber insulated part with paraffin or any other coating, is to protect the fiber—which is hygroscopic by nature—from moisture during the period between manufacture and installation in the joint. No coating has any appreciable advantage on the fiber after it is once installed in the joint.

It is my opinion that an insulating paint applied as a coating has advantages over paraffin, namely in that