WHAT'S THE ANSWER?

Signal Testing

Q. When testing a signal installation before placing in service: (a) what procedure is used to verify each vital circuit is free of grounds? (b) When breaking down vital circuits, do you verify electrically that a contact on a relay is the one assigned on the circuit plan?

A. All circuits are meggered before being placed in service. In addition, voltmeter tests are made between all battery and ground.

In making the breakdown test, each individual circuit is opened at each break. This is done by actually disconnecting the wire and observing that all battery is removed from circuit under test. The relays, levers, switches, etc., are then operated to assure that the circuit operates as intended. If the circuit under test is normally de-energized, battery is applied at the feed end temporarily for test purposes.

R. J. Miller, Circuit Engineer, Baltimore & Ohio, Baltimore, Md.

A. (a) Cable is meggered for crosses and grounds after cable ends have been terminated. Tower and case wiring is checked by observing voltmeters connected between each side of supply source and ground while breakdown check is being made. Meters are also connected and observed while operating check is made at time of cut in.

(b) The breakdown check is made electrically and the contact assignments shown on the circuit plan are verified. We do not use any wiring diagrams and all work is done directly from the circuit plan.

R. C. Bailey, Assistant Engineer-Signals, Richmond, Fredericksburg & Potomac, Richmond, Va.

Hunting Grounds

Q. How do you hunt grounds in signal or communications circuits?

A. On this property, the signal circuits are checked constantly for grounds. This is done with a voltmeter with all circuits intact. When a circuit is grounded, we use the process of elimination to determine its location. The line circuits are disconnected from top of the line arresters and the underground cable disconnected to isolate the battery and local wiring. During this operation, a check with the voltmeter should determine which portion of the circuits may be sectionalized between terminal points to further confine the ground. The final search is performed with a 500-volt Megger insulation tester.

C. C. Evans, Chief Draftsman, St. Louis-San Francisco, Springfield, Mo.

A. We use the following procedure when hunting DC grounds in signal circuits:

When hunting a negative ground, the negative lead of a voltammeter is placed on ground and the positive lead on the positive side of local battery. A momentary 5-ohm shunt should be placed on common and a control circuit from each direction. If an increase in meter reading is detected, you should go in the direction where the shunt

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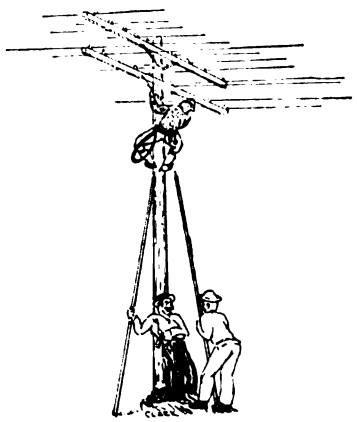

"Why don't you clowns go on up the track and help Sam?"

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WHAT'S THE ANSWER?

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created the greatest meter deflection. Test each location in the direction indicated until there is no change in the meter reading. This indicates the ground to be at that location.

The same method is used when hunting a positive ground except the positive lead of a voltammeter is placed on ground and the negative lead on common. Also, a decrease in the meter reading will be detected, instead of an increase, when the momentary 5-ohm shunt is placed.

Apparatus may be falsely energized when current readings are taken so extreme caution should be exercised when making tests.

M. A. Haight
Senior Signal Inspector
Milwaukee Road
Chicago, Ill.

Track Motor Cars

Q. What procedures or rules do you follow for the operation of track motors cars, particularly in traffic control territory?

A. In traffic control territory motor cars are operated on what we term motor car block. Block is issued by the train dispatcher, either a time block which would only be issued if motor car operator wanted to move to a point where no phone communications was available, or what we term a call block if operator wanted to move to a point where phone communications was available.

In either case, trains are not permitted to enter block until time has expired or the motor car operator has contacted the dispatcher in charge and advised his car or equipment is clear of track.

In ABS territory, motor cars are operated on train line only.

B. C. Eaton, Signal Engineer, Denver & Rio Grande Western, Denver, Colo.

A. On the Louisville & Nashville in traffic control territory, track cars are operated by authority of the train dispatcher. Before a motor car is placed on the track the operator

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must be granted authority by the train dispatcher to occupy the main track between designated points and within designated time limits.

After authority is given by the train dispatcher to a track car operator, the dispatcher must protect the movement within the prescribed time and limits against opposing and following trains and engines. However, no protection is provided by the dispatcher against other track cars. Track car operator must clear main track and restore all switches before the authorized time limit has expired. If necessary to work beyond authorized limits or time, additional time or limits must be obtained before the original time has expired.

The above is covered in our rules and instructions of the maintenance of way department.

J. P. Powell, Engineer Signals
Louisville & Nashville
Louisville, Ky.

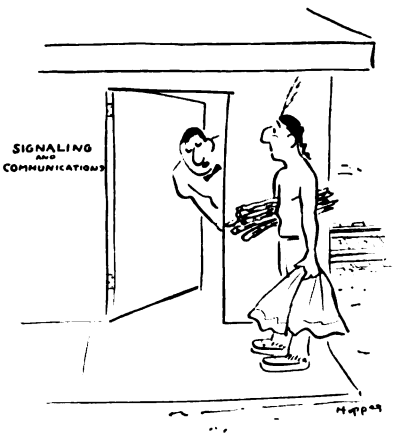
Interlocking Check

Q. What is the best and quickest method to use when testing the operation, etc., of an automatic interlocking?

A. Assuming that the question refers to the original checking out of a new automatic interlocking, it is considered that the best way to make sure that the plant is properly installed is to have men at all the signals and to have them in direct communication with the man conducting the test at the diamond. The tracks should be shunted to simulate train movements and the signal indications called in to the man conducting the test. Unlike British law, I consider that a new signal plant which is to be placed in service is guilty until proven innocent. Therefore the word "quickest" should really be avoided and I believe the questioner really means the most expeditious method.

D. H. Green
Engineer of Signals
Canadian National
Montreal, Que.

A. Our method of testing an automatic interlocking is as follows:



"I appreciate your offer, but we're not interested in adding any help right now."

Station one man with two shunts at each home signal to observe signal indications and do shunting.

Station two men at main crossing case to direct tests and check integrity of relays as tests are made.

Shunt an approach on track No. 1 to clear signal. *(Signal indications should be checked after each shunt throughout tests).* Shunt all inside track circuits. Simulate a train movement over interlocker on track No. 1 with shunts, leaving receding track section occupied. Release shunts in order applied, checking directional release. Operate emergency release at crossing for track No. 1 and reverse direction after signal clears. Check all routes in this manner.

Shunt an approach on track No. 1 and after signal clears, shunt an approach on track No. 2, operate emergency release for track No. 2, observing change-over time and signal indications. Check all routes in this manner.

Shunt an approach on track No. 1, clearing signal on track No. 1. False clear signals on conflicting routes, observing signal indications. Check all signals in this manner.

Check the following: loss of shunt protection, grounds, voltage on lamp units both AC and DC; also, alignment of lamps, voltage on track relays and main battery supply voltages.

These tests are for an automatic plant with inoperative approach signals. For operative approach signals, additional tests will be required.

W. D. Archer
Chief Signal & Communications Officer, Gulf, Mobile & Ohio
Bloomington, Ill.