WHAT'S THE ANSWER?

Interlocking Check

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

A. Needless to say, before testing is begun, an accurate line-up of train movements is secured from the train dispatcher.

A shunt is applied first to the rails at each home signal on the approach side of the insulated joints, then on the plant track side to ascertain that signals are clearing and that the operation of approach, lock, and track relays in the instrument house correspond with the location of track shunt. The operations recorder, used at all automatic interlockings maintained by the Monon, is also observed at this time to insure that recording of field functions is correct.

Having ascertained that relay nomenclature and recording operation is correct, the use of track shunt wires is discontinued and all subsequent tests are made in the instrument house by shunting track relay coils with a jumper or by removing coil wire of relay fed by operating battery.

Searchlight-type home signals are in use on all automatic interlockings on this road. Indication locking is checked by first removing distant signal control wires from arresters and dropping terminal straps on coil circuits for home signals. Temporary jumpers are connected to positive and negative battery and applied to the terminal of cables leading to the searchlight head of each home signal unit, first with normal polarity then with reverse polarity, observing that the red repeater relay drops out each time the battery is applied, and that applicable lock stick relay also drops out. While home signal straps are still open, the battery jumpers are applied directly to the distant signal wires previously removed from lightning arrester, causing the distant signal to assume a false clear position. The red-yellow repeating relay of this signal is observed to determine that it drops out, and in turn drops out the lock stick relay.

Removing battery from distant signal control wires, stop watch is started to check operating time of time element relay. While time is running, each of the remaining approach circuits is dropped in turn to insure that locking is effective and that conflicting or opposing home signals cannot display a proceed indication. Actual time of operation is noted upon completion of the timing cycle. At the expiration of time check, the lock circuit is momentarily opened again and stick locking checked by shunting applicable track relays in the route to simulate passage of a train.

This same procedure is followed on the remaining routes except that where a time element relay provides time locking for more than one route, its time is not rechecked.

Plant over-run is checked by dropping each approach in turn, clearing its associated home signal, and then shunting applicable plant track circuits and observing operations recorder to insure that signal goes to stop position. Loss of shunt time for each approach circuit is checked and recorded while over-run checks are being made.

Final step is to insure that all terminal nuts have been secured, all jumpers restored to tool box, and that operations recorder is normal.

R. L. Wyant
Assistant Chief Engineer
Monon
Lafayette, Ind.

A. Shunt approach track circuit on foreign road and home signal on foreign road should "clear". Shunt approach circuits on *home road* and foreign road home signal should remain "clear" and *home road* home signal should indicate "stop". Operate time release for *home road* and foreign road home signal should immediately indicate "stop". After the pre-determined time interval has elapsed, home road home signal should "clear". (Repeat the above procedure for each route and direction, recording the operation and showing time interval of time releases.)

Signal Operation. Shunt approach track circuit on foreign road and foreign road home signal should "clear". Shunt *all* track circuits separately on both roads between home signals and observe that foreign home signal goes to "stop", when each track circuit is shunted. (Repeat the above procedure for each home signal.)

Check of stick relay operation. Shunt approach track circuit to eastbound home signal. Home signal should clear. Shunt track circuit between home signals and home signal should indicate "stop". Remove shunt from eastbound approach circuit and place on westbound approach circuit. Westbound home signal should indicate stop. Remove shunt from track circuit between home signals and westbound home signals should continue to indicate "stop", showing that stick relay has picked up. (Use train operation in place of above shunt test where possible.) (Repeat in reverse direction.)

Loss of shunt test shall be made.

All circuits shall be tested for grounds.

Observe—All apparatus shall be properly locked and sealed. Crossing frogs shall be in good condition. Parkway outlets, track, fouling, and bond wires shall be inspected to know they are in good condition.

Carl R. Holmberg
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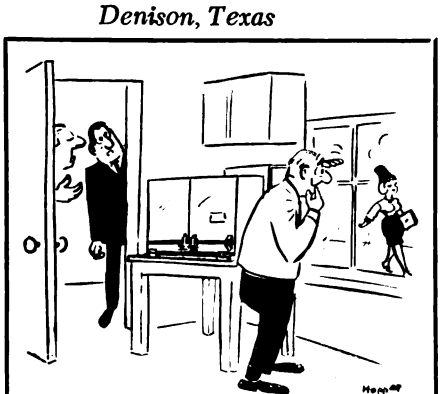
A. To test the operation of the interlocking, we follow a method similar to that which would be near actual train operation. First, one of the approach relays is de-energized to permit the interlocking signal to clear for that particular route. When the signal clears, de-energize the approach relay on the conflicting road. Then operate the release lever or pushbutton of the conflicting road at the crossing to secure the changeover, and time interval of the changeover. This same procedure is used when testing the operation from either road to the other.

To check the locking between the interlocking signals, first clear a route by de-energizing one of the approach relays, permitting the inter-

locking signal to clear. This in turn de-energizes an NP relay (red signal repeater RGPR) locking out the control of all other H relays, or signal control circuits for the interlocking signals. (This NP relay is selected through the normal position of interlocking signal mechanism or its equivalent.) After any given signal is cleared, de-energize each NP relay controlled by each interlocking signal. Make certain each de-energized NP relay will set the cleared signal at stop. Permit the signal to reclear between each test before releasing the next NP relay. After the signal has been checked by each NP relay separately, then de-energize each track relay or its repeater of each track circuit on both roads within the interlocking signal limits. Permit the signal to reclear after each test before releasing the next relay in turn. Each signal is cleared in like manner and the same procedure is followed after clearing until each interlocking signal has been checked individually.

The operation test, and the check of locking between signals can be combined, if desired. First clear a signal. Check its control through each NP relay and each track relay or its repeater. After this is completed, de-energize an approach relay on the other road. Operate the release lever or pushbutton at the crossing for the other road to change over the route. When the change over has been obtained and signal clears on the other road, check locking between signals by using same procedure as previously outlined. Follow this same procedure until each route and each signal has been tested.

A. J. Mitchell, Signal Supervisor
Missouri-Kansas-Texas
Denison, Texas



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Questions to be Answered in Future Issues

- Where you have standby power generators in service, how do you make periodic tests of their operation? Please describe your procedures and state how often such tests are made. Where you have two such power units in service at a location without commercial power, do you alternate their operation; or is one the normal unit and the other the standby unit? Please give reasons for your practice. Who maintains the units, and how often are they inspected?

- Where bare copper communication line wires are subject to salt spray from adjacent highway bridges and it is not practical to relocate line wires, what can be done to eliminate or minimize damaging affects of corrosion? Has the highway department ever erected a barrier to spray? Has your railroad used insulated or weatherproof covering on such line wire exposed to this condition?

- Do you install switch heaters on non-interlocked power switches, such as may be used in classification yards? Why or why not? Please explain. Do you install switch heaters on hand-throw switches? Why or why not?

Send answers to these questions to the WA editor, Railway Signaling and Communications, 14 E. Jackson Blvd., Chicago, Ill. 60604. Payment is made for all answers printed. Answers will be printed without names or railroad identification if desired, but all letters with answers must be signed.

KINKS

Short-Circuited Rectifiers

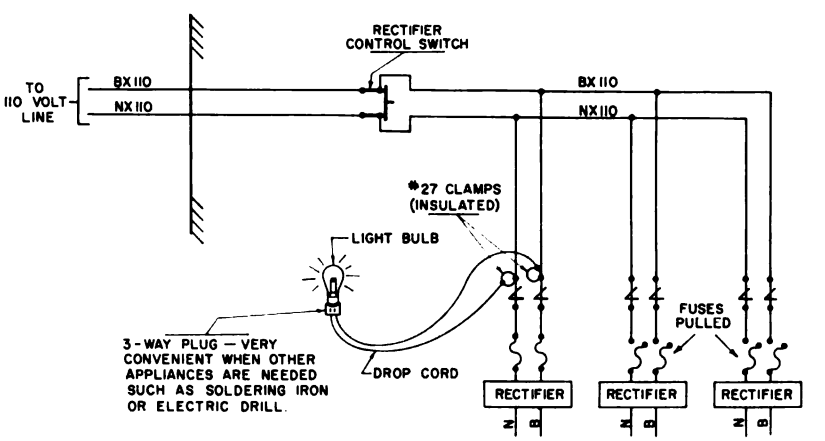
Fred T. Grainger,
Signal Maintainer
Chesapeake & Ohio
Carleton, Mich.

Short circuits are often hard to find when a multitude of circuits are connected to one set of fuses in a service box. This is often the case when you are looking for a short-circuited rectifier.

I find that using a simple light bulb testing circuit (as shown in the drawing) is very effective when applying the process of elimination.

At a certain location on my territory one of several rectifiers drawing current from a 110 volt line, shorted out. After opening the local service feed switch and replacing the blown fuse I went down the line and pulled all the rectifier control switches in each signal case receiving power from the local service feed. Then I went back to the service feed and restored the power to the line.

It was then necessary to test the rectifiers at each location by attaching the light bulb testing circuit to the lightning arrestor as shown in the diagram. Also, replace the fuse in the circuit that leads to the rectifier. (make sure they are not blown) Cautiously close and open the rectifier control switch quickly. If the light bulb burns brightly, the rectifier is normal. If the light is dim, the rectifier is short-circuited.



Grainger, C&O: Light bulb testing for short-circuited rectifiers.