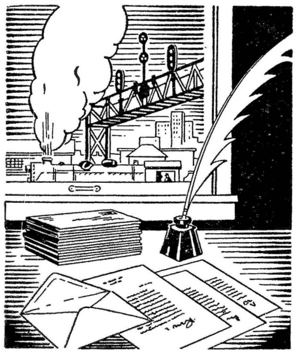


What's the Answer?

Contributions Paid for in Cash or by a Subscription to Railway Signaling

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.

To Be Answered in a Later Issue

(1) Do you require back locks on approach signals at mechanical interlockings? Would the type of signal or use of derails change your requirements regarding back locks?

(2) What effect does excessive current (above rated working current) have on the life and operating characteristics of a direct-current relay, neutral or polar? Is it advisable to check the working values of line-relay circuits and insert limiting resistances where the values seem high?

(3) What are the advantages or disadvantages of using three-aspect searchlight dwarf signals for main-line signaling in restricted-speed territory as compared with high-mast or overhead-bridge mounting?

(4) Is it good practice to stagger the insulated rail joints over the crossing at a highway crossing signal location as a means of operating the signal until the rear of a train clears the crossing? What are the limiting factors of this scheme as applied to single-track and double-track lines, with or without automatic signaling?

Testing Automatic Interlockings

"What is the most practical means of providing an arrangement whereby one man can check the complete operations of an automatic interlocking of two single-track roads?"

Time Recorder Method

A. A. Roberts
Engineer of Signals, New York Rapid Transit, Brooklyn, N. Y.

One of the most practical and satisfactory devices for checking the operation of an automatic interlocking plant is the modern strip chart time-recording instrument. The tracing elements may be controlled by all or at least the most important units of apparatus involved in the operation of the plant. The continuous record so produced provides a fairly complete picture of the operation of the plant, the time of passage of each train, as well as the time and sequence of operation of individual units.

Reliable recording instruments, either spring or synchronous-motor driven, may be obtained with the desired number of pen elements from one to a maximum of twenty. The pen actuating magnets are supplied for operation on either direct or alternating current and the current requirement of the pen magnets is so small that remote control of the instruments is possible through small-gage conductors. In fact, single conductors in a telephone cable may be utilized for remote control with the ground as a common return current medium.

One of the most important advantages to be secured by the time recorder method of checking an automatic plant is derived from the facility with which it enables a maintainer to confine his search for trouble within narrow limits whenever plant failures occur.

Greater linear spacing of time intervals may be secured by utilizing a recording instrument geared to provide a rapid chart feed, thus facilitating a more accurate interpretation of the record. In order to avoid excessive waste of paper, instruments having rapid chart movements should also be equipped with an electro-magnetic trip attachment which may be controlled through track relays or other apparatus, so as to mechanically engage the chart-driving mechanism only while trains are within automatic control limits of the plant; at all other times the chart would remain stationary. This method of operating time recording instruments, however, sacrifices the timekeeping feature that is inherent in the continuously moving chart.

Simulate Train Movements

Otto M. Jensen
Office Engineer, Chicago, Milwaukee, St. Paul & Pacific, Milwaukee, Wis.

The only satisfactory way to check the complete operations of an automatic interlocking is to duplicate the action of train movements progressively through the circuits by means of reliable shunt wires. While such tests are being made on one line, shunt wires should be applied on the conflicting line in the various circuits in order to completely check the operations.

If only one man is available to make such tests, it will take approximately four hours to complete them on a single crossing equipped with color-light signals without peep

(Continued on page 170)

holes in the light units. Where peep holes are used or where the installation involves semaphore type signals, the tests may be made in less time.

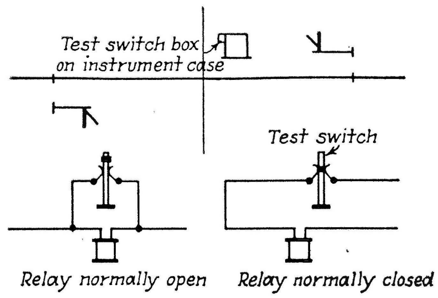
While several schemes may be provided for in the instrument housing at the crossing, such as switches and push buttons, which can be wired so as to duplicate tests made by shunt wires, I do not feel that such tests are reliable operating tests. Although it would take considerably less time for one man to check the plant, I believe that the time it takes to make tests by means of shunt wires is well spent whenever a test of an interlocking is necessary.

Provide Special Test Switches

E. J. Schaefer
Wilmington, N. C.

A very recent development is a small compact test switch box which is used to enable section masters to test highway crossing signals. This box has a maximum capacity of eight switches, which can be set "normally open" or "normally closed," and is so designed that the closing of the door restores all switches to their normal operating positions.

This box can be attached to the central instrument case of an automatic interlocking, and the switches so incorporated in the circuits that four switches will shunt the four approaches and two switches will shunt



Test switches arranged for series breaking and by-passing

the two sections between the home signals. One man can readily set up any conditions encountered in actual train movements, in a simple layout, without the use of external shunting devices, and without leaving his position at the crossing housing.

Lost Motion in Locking

"On your railroad, what limits of lost motion due to wear are permitted in the locking and operating connections of the locking on interlocking machines before replacements are made?"

New York Central Standards

F. B. Wiegand
Signal Engineer, New York Central, Cleveland, Ohio

The limits of lost motion due to wear permitted in the locking and operating connections of the locking on interlocking machines on the New York Central are as follows:

Locking bars and tappets must have full stroke as shown in the table. Latch block adjustment on mechanical interlocking machine:

Latch block must not lift more than 1/8 in. above top of quadrant.
Latch block lift to permit operation of lever must be not less than 3/4 in.
Mechanical locking under the loosest locking conditions must prevent lift of latch block more than:
(1) 5/16 in. where electric latch locks are used.
(2) 7/16 in. where electric lever locks are used.
(3) 7/16 in. on levers without electric locks.
Maximum movement of lever-latch block with tappet or longitudinal locking bar held stationary must not exceed 1/8 in.

Lever movement adjustment on G.R.S. Model-2 electric interlocking machines:

Mechanical locking under the loosest locking condition must not permit movement of lever from normal toward reverse position of more than 5/16 in., and from reverse toward normal of more than 9/16 in.
Maximum movement of tappet due to lost motion must not exceed 1/16 in.

Adjustment on G.R.S. Model-5 electric interlocking machines:

Mechanical locking under the loosest locking conditions must not permit tappet movement of more than 3/16 in.
Maximum movement of tappet due to lost motion must not exceed 1/16 in.

Longitudinal locking bar movement adjustment on U.S. & S. power interlocking machine:

Mechanical locking under the loosest locking condition must prevent movement of longitudinal locking of more than 3/32 in.
The maximum movement of the longitudinal locking bar due to lost motion must not exceed 1/64 in.

Longitudinal locking bar movement adjustment on U.S. & S., Style S-8 electro-mechanical interlocking machine:

Mechanical locking under the loosest locking condition must prevent movement of longitudinal locking bar more than 3/16 in.
The maximum movement of the longitudinal locking bar due to lost motion must not exceed 1/16 in.

LOCKING REQUIREMENTS FOR VARIOUS CLASSES OF INTERLOCKING MACHINES

Item	Type of Interlocking Machine	Type of Locking	Longitudinal Bar or Tappet (Length of stroke in inches)	Cross Locking or Locking Bar (Length of stroke in inches)
A	Mechanical	S. & F.	1-3/4 in.	3/8 in.
B	Mechanical	Style "A"	1-1/16	7/16
C	Electro-mech'l	S. & F.	1-3/4	3/8
D	Electro-mech'l	S. & F.	*1-5/16	3/8
E	Electro-mech'l	S. & F.-Min.	Sig. 1/2, Sw. 1	3/16
F	Electro-mech'l	Style "A"-Min.		
G	Power	Style "A"-Min.	3/4	1/4
H	Power (Fed.)	Stevens	3/4	3/8
I	Power	S. & F.-Min.		
J	Table (GRS)	S. & F.-Min.	Sig. 1/2, Sw. 1	3/16
K	Table (US&S)	S. & F.-Min.		

*Stroke from center position

Rely on Forced-Drop Lever Locks

R. D. Moore
Signal Engineer, Southern Pacific, San Francisco, Cal.

Regarding the limits of lost motion, due to wear, permitted in the locking and operating connections of the locking on interlocking machine before replacements are made, on the Southern

(Continued on page 172)