system. Such a system is in service on 511 miles of double-track line on the Chicago & North Western between Chicago and Council Bluffs, Iowa, the first section being installed in 1925, followed by other territories during 1926, 1927 and 1928. On territories of the Illinois Central where continuous cab signaling and automatic train stop, without speed control, are in service without wayside permissive signals, no stop is required at the wayside locations, the speed in the "red" block being limited by rule to 15 m.p.h. This system has been in service on 122 miles of double track between Champaign, Ill., and Branch Junction since 1926, and on 97.6 miles of single track between Waterloo, Iowa, and Ft. Dodge since 1926.

Adopting this practice on a much broader scale, in March, 1930, the Illinois Central modified its Rule 282 (the "Stop-and-Proceed" rule, Code 291) on all divisions outside of the Chicago terminal, the timetable rule reading as follows: "On two or more tracks, trains may pass 'Stop-and-Proceed' signals without stopping, proceeding at a speed of not exceeding fifteen (15) miles per hour." In July, 1933, the rule was made effective on single-track lines where absolute permissive automatic block signaling is in service. Thus, for several years the Illinois Central has had this rule in effect on other than automatic train stop territory, on 1,375 miles of multiple track and 995 miles of single track.

Problem Again Deserves Study

Many roads may not consider it advisable to change their practice as the Illinois Central did. Nevertheless, it may be advisable to secure the benefits at a great many locations by the more extensive use of the markers now used only at signals on ascending grades. Some signal engineers may raise a question to the effect that if trains are not to be required to stop at a signal, why should not Code Rule 290, aspect A (red-over-yellow) be used, giving an indication—Proceed at restricted speed?

Referring again to the answers in the November issue, it will be seen that the New York Central uses the regular grade markers at locations where only freight trains are to eliminate the stop, while at locations where both passenger and freight trains are permitted to pass without stopping, the red-over-yellow aspect, Code Rule 290, is used. At locations where it is desirable to keep trains moving without stopping them at signals on grades, the Lehigh Valley has for years used Rule 501GG, Indication—"Proceed at slow speed with caution, prepared to stop short of train or obstruction," Name—Caution-slow-speed signal. In semaphore automatic signal territory, a short lower arm is fixed at 45 deg., this arm being illuminated at night. Where position-light automatic signals are used, the aspect is a horizontal row of lights over a row of lights at 45 deg. in the lower right-hand quadrant. On some long ascending grades on double track in mountain territory, the Atchison, Topeka & Santa Fe controls the signals on the up-hill track so that the most restrictive aspect displayed is 45 deg. for the semaphore blade, and the yellow light.

Regardless of the type of markers used or the aspect adopted to eliminate train stops at permissive signals as a means of reducing train delays, the key to the entire problem is whether the operating officers will accept the responsibility for their enginemen observing the rules with respect to train speeds and caution when proceeding in a block under the authority of a permissive automatic signal.

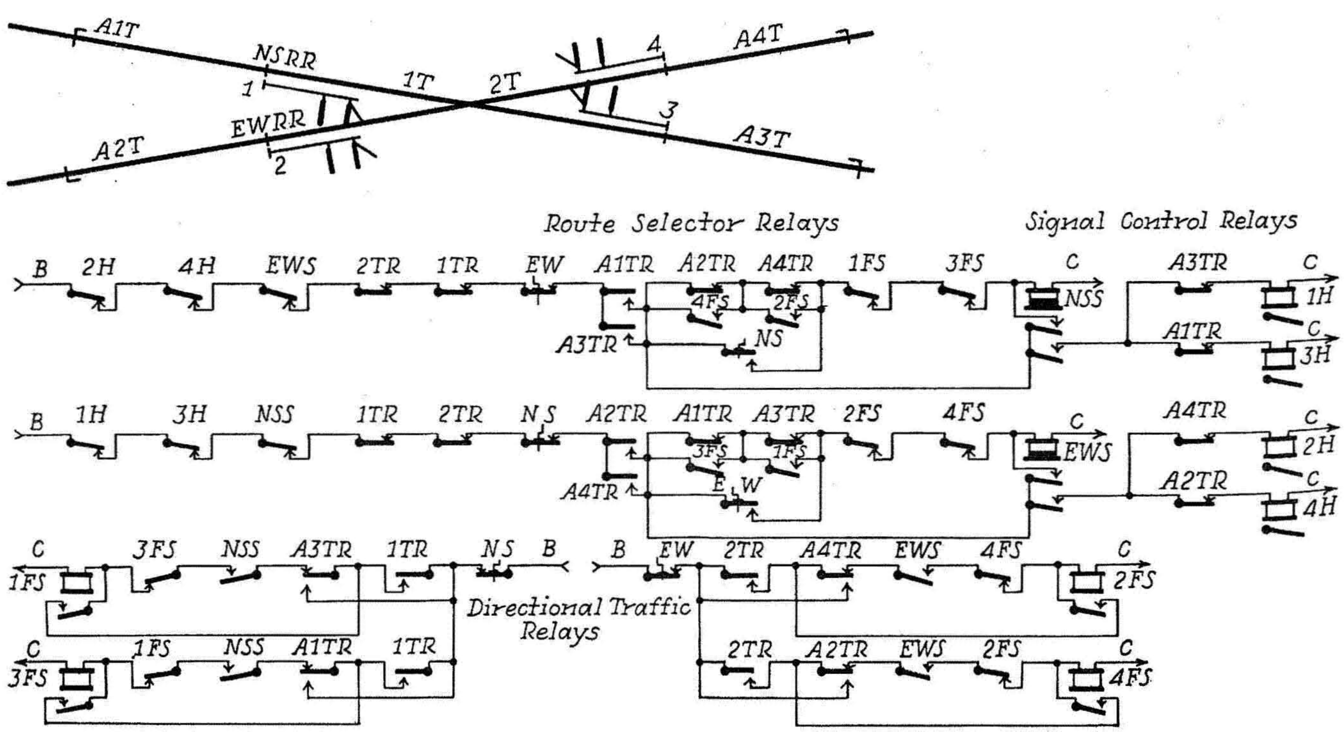
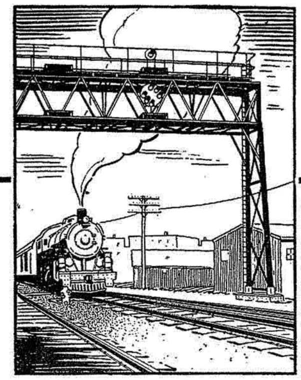


Diagram of circuits for automatic interlocking as explained in article on the opposite page

What's the ANSWER?



Clearing of Signals at Automatic Interlockings

"If it is necessary for a trainman of Road A to operate a release at an automatic interlocking and then the signal for that road fails to clear due to some defect in the signal or control relay, would a signal for Road B clear if a train were approaching on that road? If not, how is the circumstance prevented?"

Such Operation "False Clear"

M. R. Snyder
Chief Signal Inspector, Seaboard Air Line, Norfolk, Va.

Signals clearing for Road B after the release was operated by Road A trainman should certainly be considered as a "false clear" and circuits should be designed so as to prevent this.

Automatic interlockings are installed to expedite and not to delay train movements; therefore, they should be designed so that if a train on Road A was forced to stop and operate the release, it would be reasonably safe for that train to proceed if the signals did not clear and no train was seen to be approaching on Road B.

At the usual automatic interlocking, the signal controls are made through clearing relays, normally de-energized, these clearing relays being energized on the approach of a train, only when opposing road signals are at stop and approaches unoccupied. Follow-up clearing is usually obtained by directional stick relays making the circuit around the open approach relays of the approach circuits.

The release, regardless of the type used, should open all signal controls, clearing relays and directional stick relays, and on closing, after the time element has expired, clear the signals for the home road, holding the foreign road clearing relays open.

If an open circuit should cause the home clearing or signal control relays to remain open, the open approach relay of the home road would prevent the foreign road clearing relays and signal control relays from obtaining energy.

The circuit plan shown on the page opposite demonstrates how this can be accomplished.

Depends on Circuit Design

Leroy Wyant
Engineer Signals, C. R. I. & P., Chicago

The condition outlined in the question indicates there is no train within the approach limits of plant on Road B when the trainman of Road A finds the "stop" signal. This would indicate a signal circuit failure of some kind and it would be difficult to visualize just what conditions could be set up, depending on the nature of the circuit failure.

Under normal operation, the release would be used by a trainman of Road A only when his signal did not clear because there happened to be a train in the approach circuit on Road B and evidently not intending to move over the crossing. With this set-up, when the trainman of Road A operates the release, the signal on Road B should not clear after operation of the release, irrespective of what happened on Road A, until the trainman of Road B operated his release or the train on Road A backed out of the approach section. Even in this case, the action of the signal on Road B would depend on the nature of the failure which prevented the signal on Road A from clearing after the release had been operated.

Again reviewing the entire question: Present-day automatic interlocking circuits are quite complicated but can be designed to operate in about anyway which might be desired, always, of course, to show "stop" signals unless all factors are on the safe side.

During very recent years, we have

To Be Answered in a Later Issue

(1) When making concrete foundations, as for example at highway crossing signal installations, during cold weather, what is the most practicable method of preparing the mixture and protecting the foundations to prevent freezing?

(2) On single track, when automatic signals are out of order and a head block signal is red, what is the rule for handling a train to proceed by the red head block signal?

(3) On territories where the a-c. floating or a-c primary system of power supply are in service, what is the longest period in which the a-c. power has been cut off and what failures of the signaling occurred due to discharge of the battery after how many days?

If you have a question you would like to have someone answer, or if you can answer any of the questions above, please write to the editor. Answer to any of the questions above will be paid for in cash or by a subscription to Railway Signaling.

encountered a problem of track circuits picking up, even though only for an instant, under trains. With the older circuit arrangement, this "losing of a train" would permit the plant to immediately change over to the opposing line if there happened to be a train in its approach section. We have corrected this condition by installing an automatic time element which must elapse before the plant can be changed from one line to another under any condition. This, of course, holds the plant for the first road receiving a clear signal a predetermined time limit even though the track relay should pick up for an instant under light-weight equipment. This arbitrary time element introduces some handicaps under certain traffic conditions, but we have considered it essential for safety and we have received no complaints from operating officers.

Route-Selecting Relays Effective

I. A. Uhr
Signal Engineer, Frisco,
Springfield, Mo.

When a release is operated by a trainman, the selection of route relays is made just the same as if a train has entered an approach clearing section, which is to lock one route against the other. The fact that some trouble was existing in a signal or its control relay or circuits would have no effect on the operation of route-selecting relays. The signal on Road B would not clear due to its control circuit being open at the route-selecting relays.

Rule Quoted

A. Hunot
Chief Draftsman, Missouri Pacific,
St. Louis, Mo.

At automatic interlocking plants, if it becomes necessary for the trainman of road A to operate the time release to clear the signal for his train, and this signal fails to clear due to failure of the releasing apparatus, the signal on road B may clear for the approaching train. No special apparatus has been provided to prevent such conditions.

Special instructions covering the movement of trains when signals fail to clear provide:

"When home signal indicates 'Stop' and no conflicting movement is being made, a trainman shall proceed to the crossing and operate hand release which is located in iron box near the crossing. If, after operating the hand release, the home signal continues to indicate 'Stop,' the train will be governed by hand signals given from the crossing by a member of its own crew, prepared to flag trains on conflicting routes.

Hand signals must not be given for at least one minute after the release has run down and the trainman will remain at the crossing until the forward end of his train reaches the crossing.

"Instruction chart is posted inside the iron box containing the hand release, near the crossing.

Painting Cable

"What is a satisfactory and efficient method of painting an extended mileage of aerial cable having a cotton braid covering?"

Lower Messenger

J. P. Muller
Engineer Signals & Telegraph, Boston & Maine, Boston, Mass.

I believe the most satisfactory method is to lower the messenger and cable where it can be painted from the ground. Of course, where it is over other lines or highway crossings, it seems to me it will be necessary to ride the messenger. In doing this, move the cable rings slightly, which may prevent excessive wear and possibly cut through the braid and rubber.

Various Methods

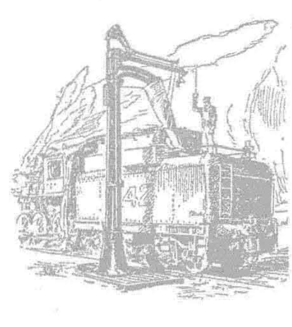
F. B. Wiegand
Signal Engineer, New York Central,
Cleveland, Ohio

This is a somewhat difficult question to answer. The practice on our road varies considerably. We have tried lowering the cable to a point where the men could paint it from the ground; we have had men ride the cable; and we have had cable painted by the use of ladders; also, where the cable is low (from 10 to 12 ft. above the ground), we have used a hand-made, two-wheel cart with high platform, on which the men stand while painting the cable.

Ordinarily, the cable is painted in place; it is lowered only when the condition of the cable requires extensive repairs. When the cable is lowered, usually it is painted with a brush. We have tried spraying, but find this method costly on account of the excessive loss of paint.

An economical method of painting the cable, when lowered, is to construct a trough, long enough so the cables will be at the bottom of the trough at the center, holding them to this point by a roller, with pads at each end of the trough to remove the surplus paint. The trough is carried by four men, and we find that it is possible to have three cables passing through the trough at the same time. The trough method is also used for painting cable before it is placed in service.

Generally speaking, I would say that the most economical and satisfactory method of painting cable is to use ladders where this is possible, painting the cable in place; and where it is necessary, to lower the cable, using the trough method.



Trough Used

E. G. Wesson
Assistant Signal Engineer, Burlington,
Lincoln, Neb.

The Chicago, Burlington & Quincy signal engineer's forces have developed for practical use the idea of one of the signal maintainers working on the Fort Worth & Denver City, which proposed a needle trough which could have cable running through cable paint in a trough and through stuffing box gaskets at each end of the trough. The whole trough will pass through the rings and it will paint and wipe the cable as it goes. The cable messenger is lowered so the handling of the painter trough can be worked from the ground. Thorough covering and soaking of the fabric is assured with regulation of the moving speed.