EDITORIAL COMMENT

Releases for Automatic Interlockings

DURING the development of automatic interlockings, it was apparent that time releases had to be provided, the same as in manually-controlled interlockings, so that a release could be effected and a signal cleared for a train in case another train had stopped or a track circuit had failed in an approach section on the conflicting road. In the same manner as at a manually-controlled plant, before it is safe for a train on the first road to move over the crossing at an automatic plant, the signals on the conflicting routes must have been set to display the stop aspect for a period long enough for any approaching train to come to a stop short of the crossing, after observing the signal at stop.

At some automatic interlockings, where trains occupy approach control sections for considerable time while making station stops or switching, time-element cutouts are provided, by means of which the signal which had been cleared will revert to the stop aspect after a certain period, say four minutes, thus releasing the plant for trains which may be approaching on the conflicting routes. If no train approaches on the conflicting route, some action is necessary to cause the signal for the standing train on the first road to be cleared again.

Various Types of Releases

To accomplish the result of releasing at automatic interlockings under these various circumstances, the majority of the roads use a clockwork time release located at the crossing, which must be operated by a trainman. To simplify the operation, some roads use a push button in combination with a time-element relay, so that the only manipulation, on the part of the trainman, is to push a button. Where time cutouts are used in station areas, some roads locate a push button at the station so that when a train has already consumed more than its four minutes, the signal can again be cleared by a trainman pushing this button at the station. Buttons can be provided at switch or other locations as required.

In order to eliminate delays, as well as the necessity for trainmen to manipulate devices either at the crossing or at the place where trains may stop, at least one road uses an automatic releasing arrangement that includes an extra track circuit in approach to the home signal, the occupancy of which causes the home signal to clear again, providing no train has approached on a conflicting route in the meantime. Where space is available, this releasing, or in other words second clearing, section should be 800 ft. or more in length, so that if the train, having completed its station work, starts but has not yet entered the clearing circuit at the end of the measured period, it will still be braking distance from the signal when the aspect changes to stop. In other words, there will be no chance that a proceed aspect will be taken away suddenly from a train closely approaching the signal. Where stations or switches are located closer to the crossing, the clearing section may have to be shorter than 800 ft. An important point is that the clearing section is also a holding section in that once a train enters on this track circuit it holds the signal at clear.

Pre-conditioning of Release

At a manually-controlled interlocking, when a train stops in an approach section or a track circuit is out of service in such a section, the leverman can take the signal away from that route, if it has been cleared, and, by operating a time-release, he can then clear the signal for a route on the conflicting road, and, in the majority of instances, avoid a train stop. Thus, the releasing operation is accomplished prior to the approach of the second train; in other words, the release is "pre-conditioned."

At an automatic interlocking protecting a crossing of two single-track lines, where automatic time cutouts are used in station or switching areas in approach control sections, "pre-conditioning" of releases can be accomplished automatically. If a train stops in an approach section longer than the specified time, its signal can be so controlled so that it reverts to the stop aspect, a changeover period of two minutes can be provided by a time-element, and then the controls can be set up to clear a signal for a train on the conflicting road, providing a train approaches on that road. The two-minute changeover period accomplishes the equivalent of a manually-operated clockwork release. Thus, the control circuits for the opposing road have been automatically "pre-conditioned," and the use of the manually-operated release, with the attendant delay, is not required for normal movements.

Eliminating Release for One Track

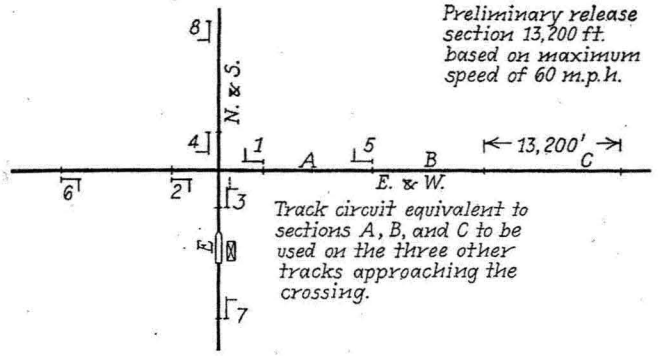
This brings out the point that it may be practicable in certain types of automatic interlocking layouts to eliminate releases on at least one road. This possibility has been utilized for the westward track of a double-track line crossing a single-track line at Winfield, Kan., as explained in an article elsewhere in this issue. In other words, no release arrangement such as clockwork releases or track section releases are provided for use in connection with the operation of trains on this track, because there is no switching on the westward approach. The

point is that, in so far as the occupancy of the approach section on the conflicting road is concerned, the time cutout and measured change-over period have previously effected the necessary measured time for a proper release.

Perhaps further study will develop a means of eliminating releases as such on both roads at a crossing. In the previous paragraph, it should be noted that the termination of the cutout period and the placing of the signal at stop on the first road bring about the initiation of the changeover or time-release period. The next step may be to provide an arrangement whereby the approaching train on the second road may initiate the changeover releasing period.

Proposed Scheme

The accompanying sketch shows a track layout for the proposed scheme. Say that the northbound train on the N. & S. had cleared its home signal 3 but had stopped in the track section E for a period of more than the specified four minutes. Signal 3 would remain in the clear position, but if a westbound train on the E. & W. entered preliminary release section C, then signal 3 on the N. & S. would change to the stop aspect, and while



Track and signal plan for proposed scheme.

the E. & W. train is traversing section C, a changeover time-releasing period of about 2½ minutes would be measured by a time-element relay. At the end of this period, the signals 1 and 5 would clear about the time the westbound E. & W. train entered track section B, thus permitting this train to proceed through the plant without stopping. After the E. & W. train has passed through the home signal limits, signal 3 would then clear for the N. & S. train. The time-distance for the preliminary approach section is suggested as being 2½ minutes rather than 2 minutes, the extra 30 seconds being allowed for the time required for the relays to operate and for variations in the operation of time-element relays.

A question may arise as to what procedure would be necessary if the E. & W. train stopped for an extended period before passing signal 1. In this case, the circuits can be arranged so that when the E. & W. train had stopped for more than four minutes, its signal would revert to the stop aspect and a two-minute changeover period would then be measured, after which signal 3 would clear for the waiting N. & S. train.

The advantage of this arrangement, if applicable to a given layout, would be that no releases would be required, such as clockwork releases, push buttons in connection with time-element relays, or track circuit releases, all of which require certain action on the part of trainmen or enginemen.

Comments on the subject of releases for automatic interlockings, for publication in the Open Forum column of *Railway Signaling*, are invited by the editor.

OPEN FORUM

This column is published to encourage interchange of ideas on railway signaling subjects. Letters published will be signed with the author's name, unless the author objects. However, in order to encourage open discussion of controversial matters, letters may be signed with pen names at the request of the author. In such instances, the correspondent must supply the editor with his name and address as evidence of good faith. This information will not be disclosed, even on inquiry unless the correspondent consents.

Grounding Cable Sheaths

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To the Editor:

After reading the various answers, which appeared in the February issue of *Railway Signaling*, on the fastening of ground wires to lead cable sheath, it seems to me that an article which appeared in the Electrical World for February 29, 1936, Volume 106, page 37 (597), written by Edgar F. Wolf of the Consolidated Gas, Electric Light and Power Company of Baltimore, Md., entitled, "Sheath Corrosion at Bond Straps Prevented," would be of interest.

This article points out the difficulties from corrosion which have occurred when the bond straps have been permitted to lie down against the cable sheath or even lie along in the fireproofing material near the cable sheath, and also in certain cases wherein the bond straps have been soldered to the lead sheath. Probably fireproofing is rarely used over signal cables at bonds or ground strap connections, and so this article and its solutions are not of so much interest, and yet, these conditions must occur periodically.

This article points out a number of cases of severe corrosion of lead sheath under the bond straps when soldered, or in the sheath at points at which the bond straps were separated from the sheath by only a short distance in the fireproof material. The solutions were always to bring the bond straps out at right angles to the cable, thus avoiding points where the strap would lie in the fireproofing close to the sheath, or even against the sheath; changing the kind of fireproofing to reduce the amount of free alkaline; avoiding the use of solder, by bringing the wiping lead from the joint up around the copper bonding straps; and the application of asphalt-coated muslin over the sheath and bond straps.

The application of the asphalt-treated fabric over the sheath and bond straps was quite helpful. It is interesting to note that similar fabrics treated with hot paraffin were of no help, or even made the condition worse, since the paraffin cracked and permitted moisture to enter.

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