

# Controlled Overlaps for Single-Track APB Signaling



W. H. Claus

**Two schemes, a manually-controlled directional overlap and an automatically controlled timed overlap have been developed and installed extensively on the Illinois Central**

By **W. H. Claus**

Assistant Engineer  
Illinois Central

IN single track absolute permissive block signaling, the distance between adjacent sidings may be such that there is not twice train stopping distance for opposing trains between opposing intermediate signals, such as signals 5 and 6 in Fig. 1. Under such circumstances, and without overlaps, two opposing trains might simultaneously pass signals 10 and 7 with both displaying the Clear aspect, and later these trains would approach the respective intermediate signals 5 and 6 which would be displaying the red aspect.

It should be recognized, however, that opposing trains do not ordinarily leave adjacent sidings simultane-

circuit C at station West, and overlap the controls of signals 3 and 5 to include similar track circuit at station East. With such overlaps, however, a westbound train standing on track circuit at station East would hold an eastbound train at signal 3, and, likewise, this eastbound train would hold the westbound train at signal 8. Therefore, the objective of the development herein to be discussed is to "apply" or "release" overlaps depending on circumstances.

## Manually-Controlled Overlap

In some towns or in the vicinity of some interlockings, there may be certain switching moves, or trains may make stops at stations or elsewhere so that manual control of the overlaps may be desirable if operators are on duty three tricks daily at some office or interlocking in that territory. On the Illinois Central, we

track and signal plan Fig. 1, the control lever to the left will establish overlap for signal 3 and 5 to extend through station limits at station East. The control lever to the right will establish overlap for signal 6 and 8 through station limits at station West. The scheme includes a slow-pick up track repeater stick relay TPS to permit 6HDR relay or 5HDR relay to pick up and thus release 6SR or 5SR in the event that the position of the lever is changed the instant that the train clears the track circuits 3T or 8T, for meeting train conditions at the end of a siding. Details of this circuit are not shown.

## Time-Controlled Overlap

For use where manual control of overlaps is not feasible, we have developed an automatically-controlled timed overlap scheme, based on the locations of trains and the speed at which trains approach station-leaving head-block signals. In this scheme, the section of main track in station limits is cut into track circuits A, B and C as at station

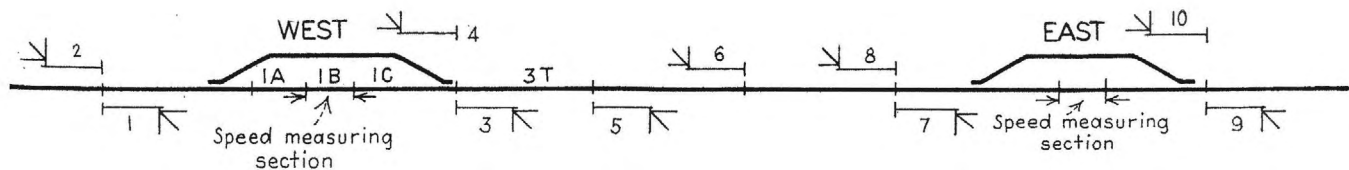


Fig. 1—Typical track and signal plan using speed measuring time-controlled overlaps

ously except through the wrong interpretation or application of train orders.

## By Overlap

One means of preventing such a situation is to overlap the controls of signals 8 and 6 to include track

have developed circuits and made several installations of what we term manually-controlled directional overlap. This scheme includes a two-position control lever with indication lamps, etc. A circuit through lever contacts and a front contact of a track-repeater stick relay TPS, controls a ZR relay. As applying to

West. Time element relays are used to measure train speeds in sections such as B.

## Typical Circuits

Referring to Fig. 2, in the normal condition of the special circuits, no overlaps are in effect, in other words

the control of signal 8 and signal 6 extends to signal 3 for opposing movements and the control of signals

over to East. Direct release of overlaps is provided, through contacts in switch circuit controllers, for move-

of enveloping the printed instruction in plastic, which can be done for a very small sum (local price 65c), and our tests and experience to date indicate that it is eminently satisfactory. The plastic envelope seems to be impervious to the elements and has not faded or become opaque.

Instruction S-I 119 is of the form and size to fit in the upper portion of the door of the electric lock case. We generally drill the case and fasten the instruction with brass rivets, washers being used between the rivet-head and the instruction. This particular instruction covers the operation of a manually-controlled electric switch lock as differentiated from the method whereby release is obtained automatically. Instruction S-I 108 is posted in the telephone booth at the switch lock location, and is usually fastened with small wood screws.

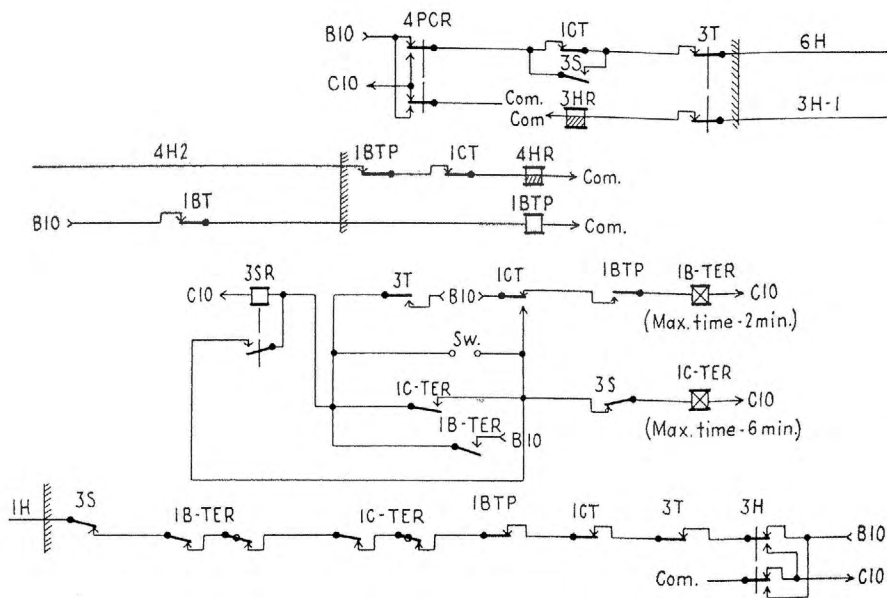


Fig. 2—Diagram of typical circuits used in timed-overlaps

3 and 5 extends to signal 8. However, if an eastbound train approaches signal 3 at station West at a speed that will not enable it to stop at signal 5, then signals 6 and 8 are automatically overlapped to include the first track circuit west of signal 4 at station West. In this instance, the speed of the eastbound train is measured automatically while passing from the west to the east end of track circuit B at station West.

In a corresponding manner, if a westbound train approaches signal 8 at station East at a speed that will not permit it to be stopped short of signal 6, then signals 6 and 8 are overlapped to include the first track circuit west of signal 4 at station West. With these overlaps in effect, the trains would automatically control the opposing station-leaving head-block signal to the red aspect and thus establish protection.

### Time Element

A westbound train, for example, after having established an overlap, may be brought to a stop short of signal 8, in which instance the overlap continues in effect for a predetermined time, as measured by a second automatic time-element relay. When this time expires, the overlap is released, so that if there is an eastbound train approaching signal 3 at station West, that signal will clear to permit this train to run on

ments in and out of siding switches adjacent to head-block signals 3 and 8.

## Weatherproof Mounting of Instructions

By H. A. SCOTT

Assistant Engineer, Signal Department  
New York Central, Cincinnati

THE increased use of electric switch locks on hand-operated switches and crossovers has made more prominent the necessity for posting the required instructions to trainmen for handling of this apparatus. This has been further amplified by the increasing numbers of new and inexperienced men in the transportation department.

On our railroad we have standardized on the Model 9A electric switch lock, and have, for some time, tried various means of posting the necessary instructions in these electric lock mechanism cases. For example, we have tried blue-printing and photostating, both of which required pasting to the castiron door, with the inevitable result, as time passed, the adherent gradually became ineffective and the instruction "went with the wind." We then tried a method of photographing the instruction on metal, and fastening this metal plate in the door of the electric lock case. This had the advantage of being permanent but the disadvantage of being very expensive in first cost.

We have now settled on the method

### INSTRUCTIONS TO TRAINMEN GOVERNING USE OF ELECTRIC SWITCH LOCK

#### 1. TO UNLOCK ELECTRIC SWITCH LOCK

- (a) Obtain authority from signalman at control station.
- (b) After authority is received, unlock door of electric lock case and be governed by instructions posted therein.

CAUTION: DO NOT push button in electric switch lock until authorized by signalman at control station, except in event of failure of communication.

S-I 108

SUPERINTENDENT

#### 1. TO OPERATE CROSSOVER TO REVERSE POSITION

- (a) Obtain authority from signalman at control station.
- (b) Push the button in the electric lock case.
- (c) After semaphore indicator clears, throw lock lever to the left to unlock bolt lock.
- (d) Place bolt lock lever in "R" position.
- (e) Crossover switches may now be operated.

#### 2. TO OPERATE CROSSOVER TO NORMAL POSITION

- (a) Operate switches to normal position.
- (b) Place bolt lock lever in "N" position and padlock.
- (c) Throw lock lever in switch lock case to right.
- (d) Close and lock door of electric lock case.

S-I 119

SUPERINTENDENT