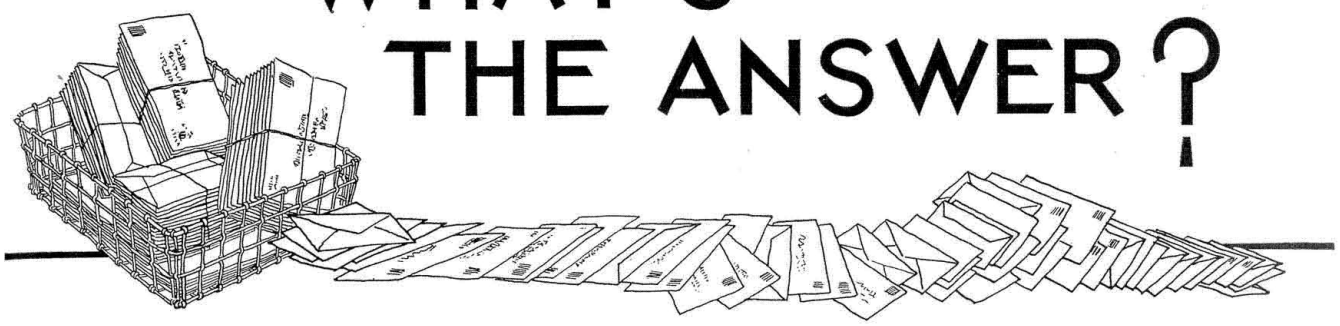
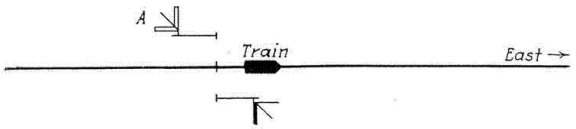
WHAT'S THE ANSWER?



Should Signal Clear?

"In A. P. B. signaling do you consider it advisable to permit the signals, governing traffic in the opposite direction to that in which a train is moving, to clear up as soon as the train in question passes? I.e., referring to the sketch:



Do your circuits permit signal A to clear as soon as the eastward train passes the insulating joints?"

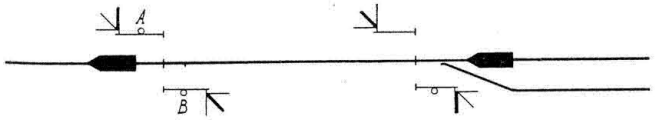
Advantages Favor Holding Signals at Stop

By CHAS. W. BELL
Union Switch & Signal Company, Swissvale, Pa.

THERE being little of real value to be gained by permitting opposite-direction intermediate signals to clear behind a train in an A. P. B. system, it seems evident that a carrier should avail itself of the advantages incident to not permitting these signals to assume an indication other than the most restrictive.

The principal advantages concern the set-up wherein two opposing adjacent signals are prevented from displaying caution indications simultaneously. Such a condition can exist when the signals in question are permitted to clear, as shown in the sketch.

In the event of signal *A* failing to clear after movement in the established direction, this failure resulting in signal *A's* stick relay remaining energized, a caution indication will be displayed on the absolute



Condition, incident to affirmative side of this question, in which adjacent opposing signals are both at caution

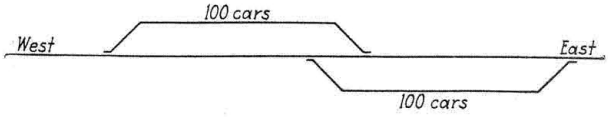
signal until the fault is eliminated. After movement in the established direction has been completed to the next passing siding, and block is still in trouble, a movement in the opposite direction may be authorized under flag protection. This train will proceed through the block under flag protection until the caution indication on signal *B* is received when the flag protection will, in all probability, be dispensed with. This train may then move under indication of signal *B* simultaneously with a possible movement past the absolute signal.

Although a definite direction of traffic has been established by the train proceeding through the block, as shown, and appreciating that back-up moves are quite effectively covered by rule, nevertheless, the caution indication on the opposite-direction signal is at variance with the rule, and would seem an inviting temptation for infraction of the back-up regulation. Thus, there is a second possibility of opposing moves being made simultaneously under the caution signals.

In the case of siding-to-siding blocks wherein single intermediates are used, the opposite-direction signal is always prevented from clearing, in the most commonly accepted A. P. B. circuit, by reason of its control beng carried over the stick relay of the intermediate signal in the established direction, and which relay, of course, is not released until the train has passed the next signal in the established direction. Conformity in the signaling arrangement, whereby intermediate signals always display the same indication under like circumstances, is of some value.

TO BE ANSWERED IN A LATER ISSUE

(1) *How would you signal a lap siding, such as that shown in the sketch, in A. P. B. territory?*



Show signal control limits. What method of operation would you recommend?

(2) *Has any satisfactory means been found to prevent the neutral armature of a polar relay from dropping when the polar armature reverses? What has been done to prevent the red flash incident to this condition in color-light signaling? Is this red flash considered a serious defect?*

(3) *In approach-lighted territory, how do you convey a leaving-signal indication to a train standing on a siding?*

(4) *What colors do you use for the indications of dwarf signals? Is red preferred to purple for the stop indication? Where and why?*

Northern Pacific Affirmative

By C. A. CHRISTOFFERSON
Signal Engineer, Northern Pacific, St. Paul, Minn.

IN the condition you have set up in the sketch, we permit the signal in the opposite direction from that in which the trian is going, to clear up after the train has passed the insulated joints. We can see no good reason why it should not clear up.

If this question has come up in connection with a work train working in a block and backing up, I

might state that in the early days of our A. P. B. signaling we had this question brought up quite frequently by our operating officers but we always objected to making any changes in the circuit as it would make it very complicated and, therefore, it has been left as it is.

When a work train is working in the block, it has the right of way over all trains and trains that enter this block must do so under protection of flag.

W. M. Post, assistant chief signal engineer of the Pennsylvania, "can see no reason why signals, governing traffic in the direction opposite to that in which a train is moving, should not clear up as soon as the train passes the insulating joints." Referring to the sketch accompanying the question, and assuming the most restrictive conditions, i. e., where the signal *A* is adjacent to a headblock or leaving signal, on, say, the west, Mr. Post continues, "Assuming that there is no train following, which has passed the headblock signal at the passing siding I can see no reason why signal *A* should not clear. The circuits used in A. P. B. signaling on the Pennsylvania permit it to do so, under these conditions.

"If there is a train following which has passed the headblock signal at the passing siding, signal *A* would display the stop indication.

"To protect against a train which has not passed the headblock signal at the passing siding, but is approaching and about to enter such block, a train in the block between the sidings will be prevented from backing, by our Rule 505-c: 'A train having passed beyond the limits of a block, must not back into that block without orders from the superintendent.'"

B. W. Molis, signal engineer of the Denver & Rio Grande Western, states that under the given circumstances their circuits preclude signal "A" from clearing as soon as the eastward train has passed the insulating points. "Unless some form of positive overlap were used there would be times, with certain set-ups, when a hazardous condition would be produced by two trains passing "approach" or "yellow" signals simultaneously. The fact that signal "A" is held in the "stop" position is a positive check on the correct operation of the eastward directional relay located at the eastward signal."

W. H. Stilwell, signal engineer of the Louisville & Nashville, replies as follows: "We have 1,000 miles of A. P. B. signaling in service. It is our practice to permit a westbound signal at a double location, as indicated by "A" in the diagram, to clear as soon as an eastbound train passes the insulated joints. Installations on this road have been in service since 1913, and I do not know of any trouble having ocurred as a result of permitting the signal to clear."

Storage Battery Maintenance

"Are hydrometer readings essential to the proper maintenance of storage batteries.

Maintenance of Edison Storage Batteries

By Fred A. Stallknecht
General Sales Engineer, Thomas A. Edison, Inc., Bloomfield, N. J.

EDISON storage battery electrolyte does not change materially from charge to discharge and therefore no indication of the state of charge is given by specific gravity readings. However, specific gravity readings should be taken at reasonable intervals to determine the condition of the electrolyte. The following table indicates the proper range of specific gravity of electrolyte, all values being based upon correct solution levels. Gravity readings should be taken after the battery has been fully charged, as the gassing during charge causes a thoroughly mixing of the electrolyte.

Temperature of electrolyte	Maximum recommended gravity	Minimum recommended gravity
100 deg. F.	1.220	1.150
90 deg. F.	1.2225	1.1525
80 deg. F.	1.2250	1.1550
70 deg. F.	1.2275	1.1575
60 deg. F.	1.230	1.160
50 deg. F.	1.2325	1.1625
40 deg. F.	1.2350	1.1650

The low limit to which the specific gravity should be permitted to go is shown in the above table for various temperatures, and when reached, the electrolyte should be renewed with Edison renewal electrolyte.

Hydrometer a Check on Voltmeter in Floating Battery System

Operating Department, Hugh Lesley, Engineer in Charge, Electric Storage Battery Company, Philadelphia, Pa.

IT is well known that the state of charge of a lead-acid storage cell can be indicated by the specific gravity of the electrolyte. As the cell discharges the specific gravity decreases in proportion to the number of ampere hours discharged.

If the specific gravity of a cell when fully charged, and the gravity drop for a complete discharge (this information is given in the manufacturers' instruction book) are known, a gravity reading taken at any time indicates very closely the state of charge. For example, take a cell having a capacity of 168 ampere hours, a fully charged gravity of 1.215, and a gravity drop of 50 points for a complete discharge. If the hydrometer reading shows a gravity of 1.190, what is the state of charge? Answer: 1.215 minus 1.190 is 25 points. As the gravity drop for a complete discharge is 50 points, on the basis of the foregoing figures, the cell is half discharged.

The cells are adjusted at the factory for a fully-charged gravity within the limits as given in the instruction book, and, barring accidents which would cause a loss of electrolyte, they do not require the addition of electrolyte throughout their life.

Where batteries are operated on a cycle-charge basis, hydrometer readings should be used to determine the proper time to recharge, and the amount of charge to give. In the absence of a hydrometer, however, a voltmeter can be used, in recharging, to determine when the charge is complete, as it is known that as the gravity rises on charge the voltage rises also, and voltage and gravity will reach maximum values practically simultaneously.

Where the Exide a-c. floating battery system is applied to straight signaling installations covering miles of road, the regular use of the hydrometer is not essential but is of value to use occasionally as an additional check upon the state of charge, and also as a check on the voltmeter.

When a new battery is installed at any type of signal location, the rectifier should be set at the maximum charging rate and when voltage readings, entered on the record card, indicate that the battery is fully charged, it is a good policy then to read and record the specific gravity of each cell to determine definitely that they are within the specific gravity range as given by