EDITORIAL COMMENT

Helping to Meet the Present Emergency

APPRECIATING the problem confronting railroad managements in attempting to reduce operating expenses in proportion to revenues, the signal department forces of the railroads can not do other than exert every effort to make every dollar spent under their jurisdiction do full duty. As a general rule the work required for adequate inspection and maintenance of interlocking and signaling facilities cannot be reduced to any great extent if correct performance of the equipment is to be assured with attendant safety of train operation. However, there are numerous minor items that will permit savings which in the aggregate, total an appreciable amount of money.

In view of the fact that the last several years have been comparatively prosperous for the railroads, the signaling should be in fairly good condition. Therefore, it should be practicable to defer expenditures for certain repairs at this time. Where appearance is not considered, perhaps some of the 1930 painting program can be postponed until later. A few extra nails may be used here and there to hold some old trunking together until next year. Although worn considerably, a little extra attention to the adjustments will assist in retaining certain compensators and cranks in service until another season. Although perhaps more attention may be required, several days more service from each set of battery will reduce the total expenditure for battery renewals considerably. When renewing insulated wires, a little thought in making measurements so as to prevent wasting wire unnecessarily will in the long run total high in cash savings.

Of course, it may be contended that all the above suggestions have been followed to the limit as a general practice for years. If such is the case it is now necessary to make still further studies and investigations as to ways and means of reducing operating costs. Just as "necessity is the mother of invention," adversity likewise leads to the development of economical methods that continue to be of benefit through years to come. Every signal department employee owes it to himself and his railroad to do his bit in reducing operating expenses at this time.

Unique Development at the Cleveland Interlocking

IN order to speed up operation, simplify the apparatus and reduce the maintenance and repair costs, several new ideas which embody decided departures from past interlocking practice, were developed and applied for the first time at the new Cleveland station. The design, construction, and operation of this interlocking are described in detail in an article elsewhere in this issue, but the author, the officer in charge of this installation, has been perhaps a bit too modest in emphasizing the outstanding innovations incorporated in this plant.

For example, the handling of a terminal of this size, including approach tracks totaling 3.8 miles of road, from one interlocking machine represents a forward step. Incidentally, the machine, with 576 levers, is the largest in the world. An outstanding feature is the elimination of lock rods for the interlocked switches. As the track is constructed with 127-lb. rail, using heavy switch rods and adequate braces and plates, it is practically impossible for a switch point to roll. Further, the switch machine, as used on this plant, includes a dog in the slide-bar mechanism which locks the cam that operates the throw bar of the switch, thus providing a reliable means of holding the switch in position, a function for which lock rods have been required previously. In addition, the control system for the interlocked signals includes circuits through independent point detectors, thus insuring that the signals will not be cleared unless the switches are in the proper position. Therefore, in view of the fact that the throw rod can be effectively locked in the switch machine and the exact position of the switch can be checked by the signal control circuits, it was decided that the lock rods were unnecessary.

In order to speed up the operation of the levers of the interlocking machine, the indication locking was eliminated, with the result that the levers for the switches and signals for a route can be pulled to complete stroke as fast as the leverman can handle them, without waiting at each lever for the switch to complete its movement and give the indication. As a consequence, the operation of the several switches is practically simultaneous, and as soon as the last one is over and locked, the signal clears. An entire line-up, involving the throwing of three switches, can be completed in 4 or 5 seconds, as compared with 15 or 20 seconds with equipment of the earlier type.

The switch-indicating circuit utilizes what is termed a "WP" relay which is controlled in such manner as to guarantee that the position of the switch point corresponds with that of the controlling lever. In the control of the "WP" relay, two sets of contacts in the switch machine are employed, one set being actuated by the pole-changer and the other set by the point detector. This "WP" relay circuit is also carried through contacts on the lever circuit controller and on the indication selector, and is operated by alternating current. A common wire serves for both the d.c. operating circuits and the a.c. indicating and locking circuits for each individual operated unit.

The principle on which the elimination of the indication locking was based is that with the advent of electric route and detector locking, the additional indication lock on the signal-control lever performs no function except to delay the release of the mechanical locking until the signal controlled by that lever has displayed its most restrictive indication. It was decided that with the proper design of signal-control circuit, it was unnecessary to maintain a switch-control lever in the indicating position until the dynamic indication is received, because the only function of the indication magnet is to disarrange the mechanical locking be-

tween levers to such an extent as to make it impossible to reverse a signal lever governing a route until the indication has been received. Therefore, it was believed that indication magnets were unnecessary in-so-far as the performance of the plant was concerned, because all of the other electrical features have been retained. When the switch machine completes its throw, the dynamic indicating current operates an indication selector and the signal controls are so arranged that a signal will not clear unless all of the switches have returned a dynamic indication and have operated their respective indication selectors accordingly. All of this is accomplished, however, without any delay in releasing the mechanical locking between levers, which is used in order to enforce a predetermined sequence.

In addition to the other features, a new type of color-light dwarf signals was developed especially for the Cleveland Terminal, the special requirement being to provide a fourth indication to be used when desiring to close up two trains on one track, the special aspect being red over yellow, which indicates to the engineman "proceed at slow speed prepared to stop short of another train which is occupying this track." This fourth indication is of particular assistance when making switching movements.

These unique developments mark a forward step in the evolution of interlocking and signaling practice. The Cleveland plant is, therefore, one that may be accorded an unusual place in the record of progress in the field.

Directional Control and Approach Lighting

MUCH interest has been shown in the "What's the Answer" discussion of the question regarding the advisability of permitting opposite-direction signals to clear after a train passes. Some roads have given this question serious consideration, and plausible arguments have been offered both for and against the idea. Those roads whose A.P.B. circuits preclude opposite-direction signals from clearing as soon as a train clears the insulated joints at the signal location, take the stand that there should be no "loopholes" which, under even the most improbable circumstances, can permit a hazardous condition to exist, and cite two possibilities to support their practice.

The first is that condition wherein a westbound train enters a block, passes the opposing distant-to-entering signal, then stops and reverses its direction out the block. Under these circumstances, if a following westbound train were approaching the headblock signal, it would be possible for the two trains to accept caution signals simultaneously and meet head-on. While this set-up is obviously an improbable one and is quite effectively covered by operating rules which compel a train to reverse its direction out of a block only under flag protection, nevertheless the idea of permitting false caution signals to be displayed is at variance with the fundamental precepts of signaling.

The second and more serious hazardous condition is emphasized by Mr. Bell, (see page 263, July issue), wherein a westbound train might pass entirely through a clear block and the directional relay at the first intermediate westward signal fail to release. An eastbound train would then be compelled to flag through the block to the distant-to-entering signal, which might then display a caution signal simultaneously with a caution indication on the opposing adjacent head-block signal, thus permitting the two trains to pass their respective signals simultaneously and meet head-on running at caution speed, each having reason to suppose that the track is clear at least as far as the next signal.

These are the principal objections that have been offered to the affirmative practice. Adherents of this practice claim, however, that the operating rules effectively cover the reverse movement of a train out of a block, but they do not reckon with the second and more hazardous condition stated. It would be interesting to know the attitude of trainmen toward the clearing of these signals. Do they make use of the information given by such a signal? It is not inconceivable that under certain conditions it would be highly desirable that the indication of these signals should depend only upon conditions in advance of them.

However, even where these signals are permitted to clear, there is an inconsistency in that, even there, single intermediate signals do not clear behind trains, since their control is nearly always selected through a back contact of the adjacent opposing stick relay, in accordance with almost universal practice.

If uniformity is desired, the logical choice is to preclude all such signals from clearing behind a train, which objective is easily effected at double locations by simply selecting the signal control through a back contact of the directional relay for the signal on the opposite side of the track, at single locations as stated above.

If uniformity is not considered a cardinal virtue, and the benefits of the affirmative practice are desired, this circuit selection can be dispensed with and the two hazardous conditions mentioned can be elminated by slotting all the headblock signals through one track circuit in the rear of the adjacent distant-to-entering signal. This would retard following moves somewhat, which might or might not be objectionable.

There is still another aspect that apparently has not been considered: If we do not permit these signals to clear, why not make our lighting effective only for approaching, and not for leaving, trains, and thus effect a saving in lamps and batteries, which should be most appreciable in primary-battery territory. This could be accomplished at no extra cost by utilizing, for the directional-lighting effect, the stick-relay contact that would ordinarily be used to prevent these signals from clearing. The attitude of operating and signal officers toward this phase of the question would determine the advisability of this practice.

Flexibility in the Control of Highway Crossing Signals

SEVENTY-EIGHT fewer persons were killed in highway-railroad grade crossing accidents in the United States during the first three months of 1930 than in the corresponding period of 1929, according to the statistics issued by the American Railway Association. Although this reduction is encouraging, the fact that the fatalities for the 1930 period mentioned are still as high as 484 serves to emphasize the fact that there is a fertile field for the installation of highway crossing signals, as well as for the improvement of such equipment to insure that the average automobile driver will develop a greater sense of responsibility in the observance of the signal indications. Many railroad men are giving this subject serious thought and the results secured contribute in no small measure to the reduction in the number of accidents.