Editorial Comment

The Benefits of Either-Direction Signaling

SEVERAL ROADS, which have installed centralized traffic control on lines with two or more tracks, have arranged the signaling for train movements in either direction on each track. The principal advantages of this plan are that it permits two or more tracks to be used simultaneously in either direction during a peak movement, and that it expedites run-around movements. Another decided advantage of either-direction signaling, which was developed on a C. T. C. installation on the Peoria & Pekin Union during a recent severe snow storm, is the opportunity to so route trains that the minimum number of switches need be kept free of snow and ice.

In this particular installation, the C. T. C. installation extends over 7.6 miles of line, including 16.6 miles of track and involving three layouts which formerly required separate interlockings. The signaling is arranged to permit the running of trains in either direction on each track. Although there are 22 power-operated switches in the C. T. C. territory, the trains were so routed during the recent storm that it was generally necessary to keep only two, and occasionally three, of these switches clear of snow. Throughout the entire storm, which lasted several days, no train was delayed on this territory. The manner in which this was accomplished is evident by reference to the accompanying track and signal diagram. There is an interlocking at each end of the C. T. C. territory with track facilities so arranged that trains can be directed to or from each track. The No. 1 main track, the top one in the diagram, was used for Illinois Central, Big Four and Chicago & Illinois Midland passenger trains running in either direction between Bridge Tower (Peoria) and Pekin. Likewise, light engines and freight cuts running between Bridge Tower and East Peoria yard were run in either direction over track No. 2, and were diverted at the turnout just east of signal 222, which was kept clear of snow. All freight trains entering or leaving the yard at Wesley were handled over the turnout switch just west of signal 321, which was kept open, being operated in either direction over track No. 2 between Wesley and Pekin or Hilliard. The C. & A. passenger trains were run in either direction on track No. 2 between Bridge Tower and Hilliard, the switch for the turnout at Hilliard being kept clear for the diversion of both passenger and freight trains of the C. & A.

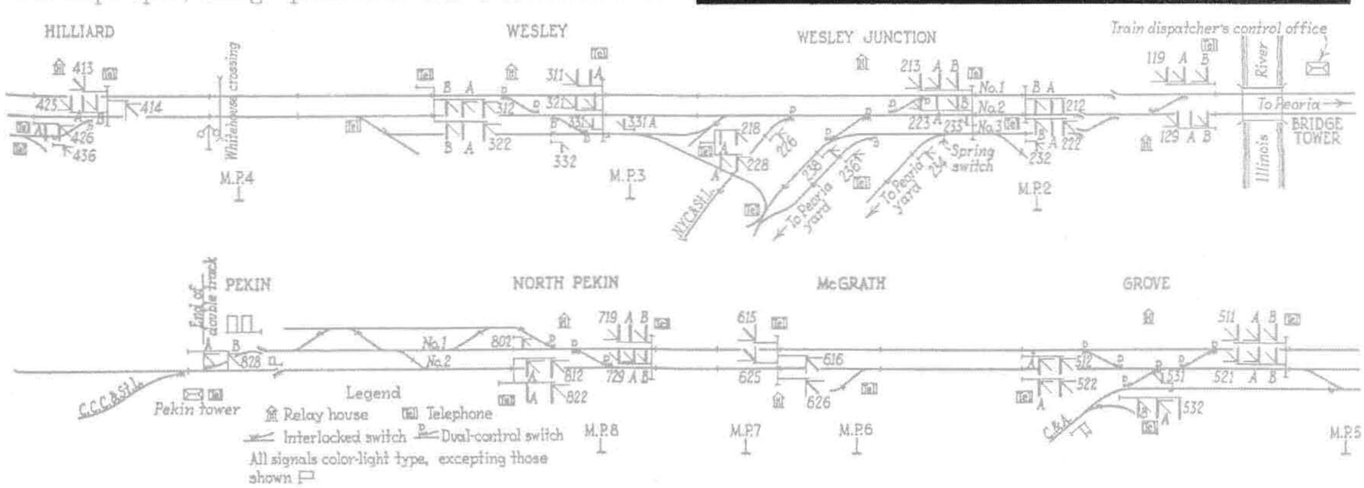
Thus, by use of the either-direction signaling, it was practical to operate all trains with only three switches in service. However, it is not to be assumed from this that the remaining 19 power switches could be removed without hampering normal operations, as all of these switches are used to advantage when traffic is normal. The moral of this story is that the slight additional cost of providing for either-direction signaling was well justified.

Replacing Semaphores

ONE OF the many ways in which a signal engineer can curtail operating expenses is to reduce, wherever possible, the cost of operating the signals and related equipment on his road. With this objective in mind, every item of equipment should be scrutinized closely to determine its economic fitness and the justification for its continued use. One of the important items to be considered is the automatic signaling.

There are more than 56,000 automatic semaphore signals in service in the United States today. Almost all of these signals were installed before light signals had been developed for use on steam roads. Practically all of these semaphores are operated by electric motor and are held clear by a solenoid device which normally consumes an appreciable percentage of the total current consumption. Furthermore, many of these semaphores are equipped with continuously-burning or approach-controlled electric lights of comparatively low optical efficiency.

This is an opportune time to make an intensive study to determine whether it is advisable to replace these old semaphores with modern color-light signals. The three-unit type of color-light signal, with Lebby reflectors and a five-watt lamp, is being used satisfactorily on some roads, one of which is the Great Northern. Other roads, such as the Atlantic Coast Line, are using



the searchlight signal with a five-watt lamp and it is now possible to use a three-watt lamp successfully in these searchlight signals. It would seem that the reduced amount of energy required to operate these modern color-light signals, as compared with the energy required for the operation of certain types of semaphores, would result in a saving sufficient to pay for the new light signals in a comparatively short period, thus classifying the changeover as a self-liquidating improvement.

In order to bring out discussion, a question on this problem is published in the "What's the Answer?" department of this issue, and those who are familiar with the factors involved are invited to prepare answers for publication. The thought is that the only major change involved would be the replacement of the semaphore head and mechanism with a color-light signal. For example, in an article in the January issue, it was stated that on the Frisco, where electrically-lighted Style-S semaphores are used, the 16-cell 500-a.h. battery has an average life of 11 months 12 days. Here the problem would be to determine whether a light signal would save enough power in comparison with the semaphore to justify the changeover.

Each writer, in answering this question, should base his study on actual records of an existing semaphore installation and should calculate anticipated operating costs on records of existing installations of light signals or on data available as to certain types of light signals. Every item of equipment that consumes an appreciable amount of energy should be taken into consideration. Thus, where additional relays on line circuits are required, these must be considered. Study should be given to the possible application of the new retained-neutral polar relay, as a power-saving device, as well as to the idea of using an arrangement whereby the operating coil of a searchlight signal is normally de-energized, rather than normally energized as in existing installations.

The new signals in any contemplated setup should be of either the three-unit or the searchlight type. The power supply—whether straight a-c., straight primary, a-c. floating or a-c. primary—is not to be changed. The economy to be effected by the new signals, in reduced operating expenses, is to be explained in detail and the answer should state whether the amount saved is sufficient to pay for the new signals, and if so, how soon.

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C. & A. Crossing Signals

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wires being brought in from the rear and extended through holes to the terminals on the instruments. Wires coming in from the outside are brought up through a hole in the foundation, and terminate on porcelain-based terminals in the bottom row in the case. These cases are made up in three different standard sizes to meet different requirements. The wood is clear pine and has two coats of paint. The galvanized-iron sheet-metal covering is painted with two coats of black paint. The wires from the cases to the signals and to the track are in Okonite parkway cable made up with a lead covering and two wrappers of steel tape. On account of the long runs from the battery to certain signals, No. 8 five-conductor cable is used. No. 8 single-conductor is used for the track connections.

The flasher-light signals, relays, etc., on the installation were furnished by the General Railway Signal Company. The engineering and construction were handled by the signal department forces of the Alton.

A. R. E. A. Signaling Report

ON March 14 and 15, the American Railway Engineering Association held its annual convention in Chicago. The report of the Committee on Signals and Interlocking included a general review of the various activities of the Signal Section, which information is familiar to the readers of *Railway Signaling*. One report of special interest to the signaling field had to do with methods of lowering costs of construction. An abstract of this report follows:

To Lower Cost of Construction

1. *Determine minimum requirements and have all interested departments approve the plan of the track layout:* This is an important item as any change upsets all calculations and involves changes in bill of material, delay and additional expense for interlocking machines on account of change in locking and change in circuit controller arrangement and their application. Where duct lines are used the number of ducts is involved, as the number of wires or their size (in order to provide proper carrying capacity) may be increased, either of which will increase the outside diameter of the cable and may involve additional cable or ducts. It at least involves change in the make-up of the cable.

2. *Adopt universal switch layout:* Some roads are now doing this. It reduces considerably the cost of interlocking, as all ties, tie plates, rail braces and other switch fittings are not disturbed or replaced when interlocked.

3. *Standardize signal materials:* Much has been done along this line. It enables the manufacturer to reduce his variety of stock and to sell at a lower price.

4. *Use power tools where practicable:* This item reduces labor cost; very often one man can do the work of two or three men. We have in mind such tools as rail bonding machines, power drilling machines at site of the work, paint spraying machines, small concrete mixers, etc.

5. *Use unskilled labor for unskilled work:* In the construction of an interlocking there is a vast amount of work commonly classed as laborers' work, such as digging, refilling, handling material, assisting in erecting poles, etc., which should be done by laborers and not by the signal craft who receive a much higher rate of pay.

6. *Use modern materials:* As materials are developed which may be lower in price or less expensive to install, but which at the same time answer the purpose fully as well as materials generally used, these should be considered.

7. *Use apparatus of lower standard of excellence where safety is not involved:* By lower standard of excellence we do not mean materials that do not have lasting qualities nor materials that frequently fail to operate as intended. We do mean less expensive materials which will answer the purpose satisfactorily but with less rigid specifications.

8. *Omit derails:* Derails are non-essentials. In multiple track territory they are a source of danger. It may have been all right to use them in earlier days when signals were few and far between, but today when enginemen run by signal indications and must keep constantly alert, their use is only an added expense.

To Lower Cost of Maintenance

1. *Build soundly and solidly:* By this is meant that signaling should be installed in a substantial manner. In other words, it should be installed to stay and not installed to stay only when kept there by the maintenance forces.

2. *Employ ample supervision:* By ample supervision is meant sufficient supervision to see that the maintenance force is performing a day's work for a day's pay.

3. *Reclaim materials that may be reclaimed at less cost than new:* This item is self-explanatory. It is an important one. Large quantities of expensive materials are involved.

4. *Omit reports where practicable:* The omission of non-essential reports will give the maintenance force more time to devote to maintenance and will permit reduction in their number, or extension of their territory.

5. *Omit derails:* If omitted they need not be maintained and as they are not essential for train movements, their omission seems desirable.