EDITORIAL COMMENT

Modernization of Terminal Interlocking Plants

DURING the last five years, numerous roads have made extensive changes in automatic block signaling, as well as in outlying interlockings, to meet the new requirements brought about by higher train speeds and modern train equipment. However, in certain cases, the railroads have been slow to extend these rehabilitation programs to include terminal areas, where some of the older interlockings include equipment, circuits, and types of construction which are obsolete, or at least subject to decided improvement.

Signal engineers face changing problems in providing equipment that will properly withstand present-day demands for rapid operation of interlockings. Many of the large terminals are crowded to maximum capacity. Furthermore, with the increasing demands for reductions in overall time between termini, delays in terminal areas for arriving or departing trains cannot be tolerated. For these reasons, operating officers are insisting that levermen rush their work of operating the interlocking machines to change line-ups as rapidly as possible. As a result, the levermen "crowd" the machines by grasping the switch levers and "taking" the lock as soon as they can get it, without regard to the position of the train as indicated on the track chart or as they might possibly see the train through a window. Although this is recognized as a bad practice that should be discouraged, nevertheless it represents a condition which interlocking is designed to guard against, and if the present facilities do not meet the requirement in full, it is high time to discard the antiquated or worn apparatus and provide new equipment and circuits.

At some of the larger plants which have been in service at busy layouts for many years, the interlocking machines have become worn, especially such parts as the mechanical locking, latches, electric locks, etc. In some instances, especially where forced-drop locks are not in use or cannot be applied, the most logical procedure is to install a new interlocking machine rather than spend any considerable sum for repair parts and then still be handicapped with a machine of obsolete design. Under some conditions, it might be advisable to replace the interlocking machine with a miniature-lever type machine in combination with an all-relay control system. Where rapidity in changing line-ups is desirable, the most modern route-control machines are available.

One of the important features that requires attention in many old interlockings is to provide modern electric, approach, route, and detector locking. In view of the height of modern rails, the weight of present-day equipment, and the increased space between car trucks, the use of detector bars is indeed antiquated, and it is surprising that detector bars have been continued in service at some large plants until quite recently. On certain other plants where track circuits have been in service for years, accidents have occurred for reasons which can be corrected, in part, by improvements. Especially in complicated track layouts, where considerable difficulty is encountered in locating insulated rail joints properly to secure maximum protection, the track forces, when making rail changes, are quite apt to shift the joints to meet their convenience, unless the signal department is insistent. Relinquishing a few feet here and there from time to time, eventually brings about a condition in which the detector locking is not effective for certain sections.

Reliable Track Circuit Performance

In so far as faulty track circuit operation or layout is concerned, the first objective is to get the insulated joints back where they belong, thus reducing dead sections to a minimum. In complicated layouts where double-rail track circuits cannot be arranged, it may be possible to secure complete track-circuit protection by using single-rail track circuits and thus eliminate non-track-circuited sections entirely. Some roads are arranging the detector lock circuits to hold through two or more consecutive track circuits. This scheme provides safety in instances in which a train, when stopped, may, when taking up slack, allow the rear car to drift back. Another advantage is that the shunt may be lost by a single-car truck in crossing over frogs or switches, and, therefore, the added safety of the scheme is an advantage.

In some terminal interlockings, track circuits must be operated under adverse conditions such as: Dirty ballast up to the base of the rails; sand, dirt and scum on the rails; and the operation of light-weight passenger car equipment. Under such circumstances, various means have been used to improve the reliability of track-circuit operation. On the basis that a pulsating current is shunted more readily than a steady current, some roads are feeding d-c. track circuits from rectifiers. Other roads are installing the primary-secondary relay track circuit scheme to insure that a track circuit will shunt readily and stay shunted without momentary pick-ups.

Years ago, when interlockings were installed at some of the large terminals, trains were much shorter and were operated in these areas at very low speeds, therefore, the signaling was arranged and controlled accordingly. For example, in some instances no time locking was in effect on the slow-speed dwarf signals. With the operating conditions that prevail today, it

seems evident that complete safety necessitates the use of time locks on all signals, so arranged that there will be no chance for a leverman to place a signal at stop just before the pony trucks of a locomotive pass that signal, with subsequent improper operation of switch levers under certain circumstances.

In some instances, the circuits at older interlockings have not been changed to include certain auxiliary protection that has proved desirable at other locations. For example, so-called back-locking can be arranged so that a dwarf signal immediately in the approach to a facing-point crossover cannot be cleared prior to the lining up of the route including an advance signal.

Test the Wires and Cables

On perhaps too many interlockings, the insulation on wires and in cables has long since rendered its useful life, and, as a result, "grounds" are liable to cause faulty operation. Especially where the "grounds" are effective intermittently, persistent effort is required to locate and correct them; furthermore, where this condition exists, there is always a condition of uncertainty. One safe procedure is to make a thorough test of the insulation values and replace all wiring and cables of doubtful performance.

Thus it is evident that an interlocking, even with the best of day-to-day maintenance, becomes obsolete and inadequate to render the safe and efficient service demanded by modern train operating conditions. Therefore, constant attention of an engineering nature is desirable, and where such attention has been postponed too long, complete modernization is necessary, and, in many instances, should receive preferred attention at this time.

Train Control Petition Denied by I. C. C.

THE Interstate Commerce Commission has denied the application of the Illinois Central for authority to discontinue the use of automatic train stop and two-indication cab signal devices, and to substitute in lieu thereof three-indication searchlight automatic block signals on its 122-mile line between Champaign, Ill., and Branch Junction. The proposed change was opposed by the employees of the Illinois Central and representatives of the four train and engine service brotherhoods.

The commission found, in part, that: "From the record in this case it is apparent that if the additional protection afforded by the device is disregarded, savings would be effected by the Illinois Central if the petition were granted. If financial considerations were controlling, the change should be permitted. However, it is necessary that both the purpose and the provisions of section 26 of the Interstate Commerce Act, as amended August 26, 1937, be given careful consideration. In administering that section we may, after investigation, if found necessary in the public interest, order any carrier subject thereto to install the block signal system, interlocking, automatic train-stop, train-control, and/or cab-signal devices, and/or other similar appliances, methods, or systems intended to promote safety of railroad operation, and none of such appliances, methods, or systems which are in service may be discontinued or materially modified without our approval. Nowhere does that section relate to financial advantages or savings which might be effected by discontinuing the use of devices which promote safety. Its provisions apply to all carriers by railroad subject to our jurisdiction regardless of their financial condition. Its main purpose is to require 'common carriers by railroad to install and maintain certain appliances, methods, and systems intended to promote safety of employees and travelers on railroads.' The duty is imposed upon us to see that the requirements of this section, all of which relate to safety and to no other matter, are observed by carriers, and all powers heretofore granted us are extended to the carrying out of those purposes. . . . Petitioner asserts that the money saved by the proposed change could be spent to better advantage in the separation of grades or protection of grade crossings, in laying heavier rail, and in other ways which would improve safety conditions, although in this connection no specific program is advanced. . . . As stated in specifications described by us, 69 I. C. C. 280, the primary function of automatic train-stop or train-control devices is to enforce obedience to the indications of fixed signals. The proposal of the petitioner in this case consists merely of the installation of an improved type of fixed signal system, which does not comprise either cab signals, or automatic devices to enforce obedience to restrictive signal indications. The primary question presented in this proceeding is whether the use of even the most modern automatic block signals would provide as safe train operation as the present automatic train-stop and cab-signal devices. The evidence discloses that the system now in use not only gives the engine crew a true indication of track conditions ahead, but the cab-signal indications are more readily discernible, and, therefore, safer than wayside signals under adverse weather and other conditions such as are at times encountered on this division.

There are no changes in the trackage which, from the standpoint of safety, would warrant discontinuance of the present system and the substitution of wayside signals. The record is not convincing that there has been sufficient permanent reduction in traffic on this line to warrant any decrease in the safeguards employed; on the contrary, considering the increased speeds now authorized and proposed, any change in the present methods of safeguarding operation should be directed definitely toward increased protection. Undoubtedly the separation of grades and protection of grade crossings, as well as laying heavier rail, promote safety, but our consideration here must be directed to a comparison between the present signal system and the one proposed. We find that the proposed change would not promote the safety of operation in the territory involved, but that safety of operation would be decreased by the change."