Editorial Comment

Continued Activity and Development in Signaling

THE construction of signal, interlocking and highway crossing protection during 1927 was in excess of even the previous high record of 1926. This continued activity, with good prospects for 1928, is evidence of the fact that railroad managements are recognizing signaling as the most economical method of expediting train movements and thereby deriving the greatest capacity from existing trackage. It is the duty of those in the signaling field not only to use the means available to assist in solving traffic problems but also to develop new equipment and applications to expedite train movements.

The tendency of modern methods of train operation is to use larger locomotives to handle longer trains. The successful operation of such trains depends obviously, on the possibility of reducing the number of train stops to an absolute minimum and especially of eliminating stops on adverse grades.

Developments of Signaling to Meet New Operating Requirements

Early automatic signaling was installed as a safety measure to stop trains in case of danger ahead. Modern signaling should include enough indications and be so located as to keep trains moving, even at reduced speeds, and to avoid stopping them unless the track immediately ahead is actually occupied. The desired result can be accomplished in dense traffic zones by using more indications such as on a portion of the Delaware, Lackawanna & Western, where a six-indication system is used, i.e., clear, clear-restricting, approach-restricting, approach, slow-speed and stop. The track capacity is increased and train stops are reduced, also by using short blocks and controlling the speed in accordance with the indications, so that the spacing between trains is reduced with safety while, unless a dangerous condition arises, trains are seldom required to actually come to a stop.

Many roads are using a special indication or marker, authorizing tonnage trains to proceed at low speed past permissive automatic signals indicating danger, without stopping. The Chicago, Rock Island & Pacific is deriving considerable benefit from its train control by means of which trains are permitted to proceed at low speed past permissive signals indicating danger without stopping. The same result is obtained by the Atchison, Topeka & Santa Fe and the Illinois Central where intermediate automatic wayside signals are not used. The Chicago & North Western does not approve of the idea of training enginemen to disregard stop indications, therefore, the wayside automatic signals on its automatic train control territory are being removed. The Chicago & North Western cab signals are unique in that only two indications are given, i.e., green for clear and yellow for caution. The only stop indications are a wayside interlocking signal, the tail lights of a train in the block or a flagman's hand signal. The effective block lengths for the cab signaling are 1,000 ft. long. Therefore, signaling either on the wayside or in the cab is gradually conforming to the ideal of "signals keep trains moving."

Eliminating Written Train Orders

On multiple track lines equipped with automatic signals the majority of the roads have for years, directed scheduled train movements in the normal direction by signal indication, the only necessity for written train orders being in the case of irregular movements. On single track the circumstances are evidently different and ordinarily written orders are required to direct train movements; however, where automatic signal protection is provided, the majority of the roads are now using the Form 19 train orders, thus eliminating the necessity for train stops to pick up orders.

Answers to a questionnaire sent to all of the leading roads show that trains are operated by signal indication on short stretches of single track on at least a dozen roads. The Missouri Pacific has used such a system for several years on a 60-mile single track sub-division. Early in 1927 the Central of Georgia completed a unique installation whereby train movements are directed by signal indication on 24 miles of single track and in July the New York Central completed a centralized dispatching system on 40 miles of single track, in which territory the operation of all signals and passing track switches is controlled from a central point. The year 1927, therefore, saw great strides in the use of signals to direct train movements without written train orders.

These methods of centralized dispatching can be applied to advantage, especially on busy single track divisions. Various railroad officers estimate that such a system is not justified unless the traffic averages 20 to 30 trains a day, although the type of traffic, schedules of delivery, and local grade conditions perhaps have more influence than the minimum number of trains. Recognizing the advantages of operating trains by signal indication without written train orders, many roads no doubt will proceed with installations of centralized control of the signaling, installing power switches where most needed and spring switches where trailing movements predominate on one route, thereby reducing the cost of the complete installation to meet present traffic conditions and securing an installation that may be added to as traffic grows.

Protection and Operation of Outlying Layouts

Interest in automatic interlocking has increased rapidly in the last few years, especially on roads in the middle west. Thirty such plants were installed in 1927, seven of which are on the Chicago, Milwaukee & St. Paul. This system of interlocking was applied first to simple crossings of single-track lines, where the results were so successful that several installations have been made where an important double-track line is crossed by a branch line of another road. Examples of this are the plants at Delmar Jct., Ia., on the Chicago, Milwaukee & St. Paul and on the Wabash at Raisin Center, Mich. The traffic over this crossing on the Wabash includes 12 passenger trains and about 16 freight trains a day, while the New York Central single-track line has about 10 passenger and freight trains a day.

Train stops can be eliminated by the use of buffer type spring switches at the ends of double track, passing tracks, yard leads, junctions, etc., where movement on one route predominates. This type of spring switch has been under development for several years and numerous roads have test installations. Where proper signal protection is provided, roads are permitting increased speeds over switches equipped with spring buffers. Over 81 of these spring switches were installed on 20 roads in 1927, and reports indicate that such devices are proving an economical and efficient means of eliminating train stops, where adaptable. With the results of these tests as a basis, it is expected that spring switches will be installed quite extensively in the next few years.

A number of roads using spring switches furnished information with reference to the signaling provided as protection. The spring switch is readily adaptable for the end of double track, and in such a layout most roads use an automatic signal at or near the switch to stop a train making a facing point movement in case the switch is not in the proper position. Several roads provide an additional dwarf as a back-up signal on the wrong main. Where the spring switch is applied at the end of a passing track for movements off of it with the current of traffic, a dwarf signal is provided for a back-up movement against the current of traffic on seven roads while three other roads do not use such a signal.

As a general practice the roads report that the high signal at the switch for the facing point movement is designated by a number plate as an automatic signal, while no number plates are used on the dwarfs. Three roads out of 17 answering the question, use a number plate on the switch stand to designate the switch as being equipped with a spring buffer. The trailing speed is limited to 15 m.p.h. on three roads, 20 m.p.h. on three, 25 m.p.h. on three, 30 m.p.h. on two, and the normal speed for a main line movement or a turn-out governs on two others. The speed for facing point train movements is limited on five roads to less than 20 m.p.h. while three roads allow 25 m.p.h. and one road places no special speed limit. Most of the roads include in the employees' time tables special information as to the location of spring switches and the speed limits and call attention to the fact that once a movement out of a spring switch is started the train movement must not be reversed without throwing the switch by hand.

Six roads use pale semaphore oil in the cylinders of spring switches, one road uses arctic ammonia, and others gas engine oil thinned with kerosene.

Highway Crossing Protection Developments

Of the 2,074 automatic highway crossing signals completed in the year just closed, 733 were the wig-wag type and 1,341 were the flashing-light type, either of which conforms to the A. R. A. Signal Section standard. In a few cities the railroads have been requested by city authorities to install the same types of street traffic color-light signal at railroad crossings of streets as are used at the principal street intersections throughout the city. In answer to a questionnaire sent to all signal engineers of Canada and the United States, 29 opposed the use of such signals, while only 9 approved the idea. Six others favored the A. R. A. signal but granted that there were certain circumstances where traffic-type signals might be used to advantage, particularly in large cities in the midst of a traffic signal system. On account of switching moves, automatic control is not considered practical and manual control for the 24-hour period is considered necessary. The majority of these railroad officers are of the opinion that as a general practice the railroads and the automobile drivers will be better protected by adhering to the use of the A. R. A. standard signals which are being installed so extensively that the average drivers are rapidly becoming accustomed to the significance of these exclusive aspects as being definite indications of railroads on which trains are approaching.

Interlocking Developments

The use of electrically interlocked circuits is becoming more and more a means of duplicating the mechanical locking between levers in an interlocking machine. In directing trains by signal indication in either direction on multiple-track lines, at least one road is using a system of controllers that are not mechanically locked in the sense ordinarily known as traffic locking. On the New York Central's installation of centralized dispatching no mechanical locking is used between the levers in the machine, the locking being accomplished locally by track circuits for approach route and detector locking. The application of such a method of control for a railroad crossing is now quite common in the form of automatic interlocking and it is to be expected that developments of the near future will bring out a system of controlling the operation of the switches, signals, etc., of a more complicated layout by means of levers without mechanical locking, using instead complete electrical locking.

New Ideas with Reference to Maintenance

The maintenance of signaling equipment is more and more becoming a process of testing and inspecting equipment to anticipate and prevent failures rather than chasing trouble. With the increasing importance of preventing avoidable train stops, the operating departments of many roads will not tolerate any considerable number of signal failures. Signal maintainers and supervisors are beginning to speak more in terms of train delays than signal failures, thus bringing signal maintenance into train operation in such a way that every one concerned is impressed with the importance of better signal performance.

Our New Dress

WITH this issue, the readers of *Railway Signaling* are greeted with a new typographical dress and rearrangement of make-up which we hope will meet with approval because type is the medium through which our printed pages carry their message of service to the reader. We hope that the attractiveness of the pages has been increased as well as the practical value of their contents. The editorial columns, heretofore at the beginning of each issue, have been moved to a position just in advance of the departmental features. This change was made to improve the appearance of the first two or three reader pages and to lend more prominence to the feature article which may be accorded first position. By placing all general articles (as distinguished from departmental material) together at the front of each issue, we believe that the continuity of the issue as a whole will be improved, because all departmental features are grouped together back of the general feature section. A new departure is also introduced in our general news section—a three-column arrangement which we believe will improve the appearance and facilitate reading because of the shorter type lines. Many items in "News of the Month" are brief, and properly so, and their contents will be read more quickly, we hope, in the present three-column page. We shall await the reaction of our readers, who after all must judge of the propriety and value of the changes that have been made.