EDITORIAL COMMENT

Adapting Signaling to Requirements

IN YEARS gone by, automatic block signaling installations were laid out to meet entirely different conditions of train operation than, in many instances, are in effect today. Furthermore, as viewed now, it would seem that in certain instances rule of thumb procedure, rather than an analysis of train operation, might have been used as a basis for locating the signals as they were located in those earlier years.

For example, in single-track signaling, the practice formerly followed in many installations was to locate an approach signal about 3,000 ft. in the approach to each station-entering head-block signal, and to provide one set of staggered intermediate signals or one or more double intermediate locations with the result that, where passing tracks were a comparatively short distance apart, the automatic blocks were very short. Such an arrangement provided safety and maximum track capacity and was well adapted to the traffic at that time, i.e., many more trains, shorter trains, and slower train speeds.

However, methods of train operation have changed materially during the last 20 years. Larger locomotives pull longer and heavier trains, especially freight trains. Improved service to the public demands that all trains, both passenger and freight, be operated at higher speeds. Although the volume of traffic is at a low ebb at present, thus reducing the number of trains, signaling should be planned to handle traffic during peak periods, as well as to be prepared for the gradual return of traffic to normal volume.

Although the short blocks gave maximum capacity for light trains moving at low speeds, these same short blocks would not afford adequate braking distances for heavy trains operating at high speeds. Furthermore, on territories where new signaling is being proposed today, the average number of trains is comparatively few, and the problem is to increase the average train speed and improve safety. Both of these results are accomplished by automatic signals which give the enginemen confidence that main-line switches are in the proper position and that the track ahead is not occupied, the latter being of special benefit by eliminating "slow downs" in permissive manual block territory, particularly where sighting distance is short on account of curves or during storms.

Keeping these facts in mind and also considering that track capacity is not the major problem because trains are fewer and speeds higher, thus in effect reducing block lengths in train time, it would seem logical that block lengths be increased, which, of course, solves the problem of adequate braking distance, except where the volume of traffic necessitates closer spacing of trains, especially in the territories approaching interlockings.

Not only can block lengths be increased to a minimum of braking distance, but where traffic volume permits, certain block lengths can be extended up to a maximum of two or three miles, which might previously have been considered faulty signaling. An example of such a procedure is presented on the Missouri Pacific between McCracken, Kan., and Sugar City, Colo., as explained on page 458 of the July, 1937, issue of *Railway Signaling,* and a second example on the Rock Island as described on page 506 of the September, 1937, issue. The Rock Island is also following this practice on a 467-mile installation now practically completed between Herington, Kan., and Tucumcari, N.M. A special arrangement of signaling to meet operating conditions encountered on a heavy grade on the Northern Pacific is described elsewhere in this issue.

A point of importance is that the lengthening of certain blocks results in the use of fewer signals, thus reducing the cost of signaling per mile to a figure readily justified. As a result, extended mileages, as on the Missouri Pacific and the Rock Island, are readily authorized on the basis of improved safety and faster average train speeds, even with a comparatively light volume of total traffic. These points are important, in view of the fact that an estimated 5,000 miles of lines not now signaled should be so equipped within the next five years as a means of effecting faster schedules to meet competition. Furthermore, an even greater mileage of existing antiquated automatic signals should be modernized, using light signals spaced properly to meet requirements for braking distances.

An Example of Modernization

NEW APPARATUS and systems of interlocking and signaling have been brought out so frequently and applied so extensively during the last 25 years, that it is difficult to visualize progress as a whole for this period unless installations presenting decided contrasts are set side by side.

For example, in 1899, the Denver & Rio Grande Western installed a mechanical interlocking at Pueblo, Colo., in which the derails and switches were operated by pipe line connections and the signals by wire line connections. Mechanical selectors were used, by means of which one signal lever controlled two and in some cases three sig-