Editorial Comment

What Is the Capacity of a Single-Track Line?

AN OFFICIAL of a railroad of a foreign country is on his way to America to study railroad practices and, in particular, to gather information concerning methods employed to develop the maximum capacity of a single-track main line where modern signaling and centralized traffic control are in service. He will find instances were as many as 60 trains a day have been operated over such a line, and he may receive so many general statements that will leave him in a haze, with the conclusion that his question is similar to that of "How long is a piece of string?" On the other hand, we can develop from available records and methods of calculation information that will be valuable not only to our visitor from abroad, but to the railroads of America as well.

In determining the capacity of a single-track line, consideration must, of course, be given to the characteristics of the line as to grade, curvature and number and location of sidings, as well as to the rating and speed of locomotives, and the number of passenger, manifest and drag freight trains, as well as their spacing throughout the 24 hr. By using outlines presented by Committee I of the Signal Section, time-distance charts can be prepared for any specific conditions which will show how the existing traffic as well as the expected increase can be handled over the line being studied.

Furthermore, data available on such roads as the Pennsylvania, the New York Central, the Wabash, the Southern Pacific, the Missouri Pacific and the Baltimore & Ohio, where sections of centralized traffic control have been in service for several years, can be used to prove that such facilities not only permit on-time performance of passenger trains on faster schedules, but also reduce the road time of through freight trains about two minutes per mile, as for example, increase the average speed from about 15 m.p.h. to 30 m.p.h.

With these facts in hand, our visitor might reasonably question why the railroads of America are not using these facilities more extensively. Of course, it might be explained that some roads have reverted from double to single track, and by means of power-operated or spring switches and signaling have been able to handle trains efficiently. The Milwaukee has followed this procedure on approximately 200 miles of line and another road is now considering the abandonment of one track of 30 miles of double track, the remaining track to be equipped with centralized traffic control.

The Chesapeake & Ohio has developed a comprehensive method for increasing the capacity of an existing single-track division by relocating the passing tracks on a time-distance basis and providing centralized traffic control for the direction of trains by signal indication. Likewise, two other large railroads have made studies which prove that it would be practicable to revert from double track to single track on extensive sections of important divisions. In certain of these cases, the deciding factor is the utilization of the life of the existing rail now in the track. In other words, the time for changing to single-track operation is coincident with the end of the life of the rail in one of the tracks. In this respect, the Milwaukee solved its rail problem by operating on one of the tracks until the rail was worn out and then gradually switching over to the remaining track, at which time the second track was abandoned.

As a whole, it might be said that we have as yet comparatively few examples to show our foreign visitor. Therefore, such data as he may accumulate regarding the capacity of a single-track line will be of equal interest to the railroads of America, because, faced with the necessity for reducing operating expenses, it is logical to expect that the railroads of this continent will give serious consideration in the near future to more extensive joint operation of sections of line, thereby permitting the abandonment of other portions of track. Furthermore, present and anticipated traffic on some double-track lines can now be handled efficiently on a single-track line equipped with modern signaling. Therefore, our visitor from across the water is bringing to us a question which the railroads of America must soon prepare to answer for themselves.

Slide Detector Fences

THE USE of the line control circuits of automatic block signals to detect rock slides that might foul the tracks has been followed in various forms for years. Such roads as the Northern Pacific and the Great Northern have used such forms of protection very effectively in the mountainous regions of the Northwest. Likewise, the Norfolk & Western has installed detector fences on its lines through the Allegheny mountains, and more recently the Pennsylvania has made sixteen installations, while the Baltimore & Ohio, the Southern, the New York Central and other roads have made investigations and estimates for proposed installations.

The use of detector fences provides many advantages over and above the economies effected by the replacement of watchmen. The protection is effective in giving instantaneous notice of rock or ice slides 24 hr. every day, whereas it is impracticable to employ enough watchmen to provide effective patrol over entire slide areas at all times and have the men in position to stop trains quickly in the event of hazard. Therefore, some roads consider the improvement in protection afforded by the fences to be the deciding factor, providing the proposed saving in operating expense will offset the carrying charges and maintenance.

Since March, 1928, the Norfolk & Western has installed 71,531 lin. ft. of slide detector fences at 55 locations, at a total cost of $75,047, the unit cost varying from $0.53 to $3.15 per lineal foot, or an average of $1.14 per foot. The costs vary with the height of the fence required and the difficulties encountered in construction, while the savings depend on local conditions. As an example, the installation of seven fences on one division resulted in the elimination of a monthly operating expense of $1,150 for part-time watchman service, at which rate the fences paid for themselves in approximately one year.

The most serious disadvantage of slide detector fences is the fact that the detector device sometimes sets the