Editorial Comment

A Problem in Spacing Signals for Higher Train Speeds

BRAKING tests of high-speed trains made up of standard equipment have brought to light a new problem in the spacing of signals. For example, in stopping an 8-car passenger train from a speed of approximately 100 m.p.h., approximately 70 per cent of the stopping distance was traversed when reducing the speed to 60 m.p.h. In other words, more than two-thirds of the stopping distance was covered in reducing the speed 40 per cent. As another example, a freight train, consisting of 44 loads and 2 empties, total tonnage of approximately 3,500 tons, when being stopped from a speed of 50 m.p.h., required 3,600 ft. to reduce the speed to 40 m.p.h., and then 1,400 ft. to bring the train to a stop. In this case, 72 per cent of the total stopping distance was traversed in dissipating the higher 20 per cent of the speed.

Assume that the volume of traffic is such that blocks less than full braking distance, and four-aspect three-block signaling, are to be used, with each block 4,000 ft. long. The point of importance to note is that a train encountering the first signal of a set of signals, that is the one displaying the least restrictive indication, will not in all cases have time or space to reduce speed, in a block of this length, to the limit prescribed by the aspects, indications and rules. In other words, the first of the three blocks should be longer than the other two succeeding ones.

The idea of a moving arrangement ahead of a train, such that blocks of different lengths will be set up, is considered impracticable for extended mileages of through routes. The conclusion is that, in the approach to interlockings or on heavy traffic territory, there may be some sections where five-aspect four-block signaling will be needed. As an alternate to avoid too many aspects and delays to trains operating at speeds between 45 and 60 m.p.h., a system of time-distance control circuits offers possibilities. Such a suggestion may seem to be far ahead of the need, but the fact that the speeds of regular scheduled passenger trains have been increased rapidly during the last few years from 60 to 90, or even 100 m.p.h., and freights to more than 50 m.p.h., indicates the necessity for solving some of the signaling problems so introduced, before such speeds become prevalent.

Bells as Accessory Highway Crossing Protection

THE recommendations of the A.A.R. Joint Committee on Grade Crossing Protection include the statement that "a bell shall be used on crossing signals when required by local conditions." The logical conclusion to be drawn from this statement is that bells are recommended as accessory protection for wig-wag or flashing-light signals at crossings where an audible signal will provide a warning to pedestrians or to drivers of vehicles approaching at reduced speed, especially when they are coming up to the crossing from a side street where a full view of the signal itself is not obtained.

When it comes to the more general practice of providing bells on all crossing signals, railroad signal officers differ in their attitude and practices. Indicative of these differences are the comments in the "What's the Answer?" department in this issue, in which one signal engineer states that bells should seldom, if ever, be used, while another signal engineer claims that bells should be used at all locations, except where nearby residents object too strenuously, and suggests even in such cases that a bell giving a more subdued tone can be used for warning pedestrians.

In behalf of those opposed to bells, it can be argued that the driver of a closed car on a through highway in open territory will not hear a bell until very near the crossing and an audible warning is, therefore, of but little value. Furthermore, at crossings in the vicinity of business houses or residences, the noise created by a bell soon becomes seriously objectionable, especially if the signal operates when trains are stopped at stations or are switching within the control limits. It is also contended that a bell is subject to failure and if an accident occurs at a crossing where a bell fails to operate, it would probably subject the railroad to claim for damages, whereas if no bell had been provided such would not be the case.

However, there is much to be said in support of those who favor the use of bells as additional warnings for crossings. Modern improvements in automobile engines and their mountings result in very quiet operation, even at high speeds, so that a loud-sounding crossing bell can, in many instances, be heard by an automobile driver in a closed car. An important point advanced is that a driver keeps his eyes directed primarily on the road ahead, noting signals along the highway only as a secondary consideration. In contrast, his ears are not directed in any particular direction, and function subconsciously for sound warnings. This reasoning is applicable especially at crossings where side roads or streets are involved, for at such locations drivers are concentrating their attention on approaching cars in order to enter the highway safely, and may fail to see the signals but would hear the bells, thus calling attention to the dangerous situation.

At crossings used by pedestrians, especially school children, a bell serves effectively because the audible warning is impressed on the ears subconsciously, whereas a person must be standing in the range of the beam and looking at a flashing-light signal in order to observe the warning. Furthermore, a person walking close to a crossing, or even a driver in a car that is stopped or driving slowly close to a crossing, may not be within the range of the beam spread of a light signal. This condition is of special importance at a crossing of a multiple-track line when an automobile stops close to the crossing to wait for one train to pass and then is inclined to start over the crossing without waiting to see whether a second train is approaching on another track. In such circumstances the continued ringing of the bell should serve to warn the driver of a continued hazardous condition when he is too near to