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

see the signal or is concentrating on starting his car.

Being convinced of the additional protection afforded, the proponents of bells contend that such equipment should be provided, and that, being of this opinion, the elimination of the bell on a proposed installation, for fear that it might fail, violates the principle of furnishing as complete protection as is possible. Good apparatus, properly installed and adequately maintained, is relied upon to provide reliable performance, thus reducing to a vanishing minimum the number of instances in which the failure of a bell would contribute to the cause of an accident. It is contended that such occasions are so rare as to be negligible in comparison with the benefits of improved protection afforded by the bells.

It is granted that the noise created by bells is objectionable in some locations but these are, as a rule, just the locations where audible warning is most needed, and the railroad, therefore, has a logical argument for using the bell. The nuisance can be alleviated by using a soft-toned bell. Where control limits are occupied for extended periods on account of trains switching or standing at stations, automatic cut outs and starters should be provided, regardless of whether bells are used, for otherwise the drivers of vehicles soon grow to disregard the signals. Confining the operation of the signal protection to the period immediately preceding the arrival of a train at a crossing has been effective in reducing objections to bells on the part of residents in the vicinity. At locations on single-track lines where crossings near stations are blocked by a train while making a station stop, some roads arrange the control so that the bell is cut out when the locomotive passes the crossing.

The conclusion is that the recommendation of the Joint Committee, to the effect that "bells should be used when required by local conditions," is sound.

A Letter to the Editor

Highways vs. Railroads

TO THE EDITOR: I.C.C. Accident Report No. 1994, dated September 18, covers a derailment of Pennsylvania passenger train at Upper Sandusky, Ohio, July 17, 1935, as a result of striking a motor truck.

The crossing was protected by A.A.R. standard flashlight crossing signals. The report of the I.C.C. is especially pertinent in that it takes special notice of the fact that truck drivers are allowed to operate without adequate time for sleep, which condition represents a very serious hazard. The following is quoted from the report:

". . . . . from the above, it appears that Driver Williams had traveled nearly 600 miles in less than 48 hours and slept two nights on his truck, the second night's sleep apparently being of very short duration. It is doubtful whether men working under such conditions are in the mental or physical condition which is necessary in order to permit them to operate with safety in present day traffic on the highways of the country."

Either I do not read the available propaganda of the railroads, or the railroads are not, in my opinion, using information of this type in the right way to obtain regulations of motor vehicles competitive to the railroads, which would be comparable to the regulations which represent an important part of the cost of their operation.

I am frequently impressed with the almost futile efforts of the railroads to effect the closing of seemingly unnecessary grade crossings. When we observe the paths made across vacant lots, corn fields, through parks, and see the holes which have been cut in, and palings knocked off, expensive right-of-way fences, public park fences, etc., we must realize the uncontrollable urge of pedestrians to make "short cuts."

I wonder if, instead of trying to close crossings entirely, efforts have been made to close them to vehicular traffic but maintain a pedestrian crossing. The latter could be maintained and protected at a small portion of the cost for a regular road crossing. Probably the local residents would be satisfied with a sidewalk crossing in many cases where they refuse to consider closing a crossing entirely.

In all seriousness, I wonder why the railroads do not meet their bus competitors on their own grounds as relates to soliciting business. Why not locate railroad advertising posters on buildings and in empty store windows immediately adjacent to bus depots and in hotel lobbies, and use "eye catching" posters, showing the attractively low fares on railroad trains, with a few suggestions thrown in as to the added conveniences.

ICONOCLAST.

Truck Derails Passenger Train

ON JULY 17, 1935, the westbound "Liberty Limited" of the Pennsylvania was derailed after striking the trailer of a motor truck at a grade crossing at Upper Sandusky, Ohio. The engineman was killed and 27 passengers, 9 employees and the truck driver were injured. The following information was obtained from the report of an investigation by the Bureau of Safety.

The accident occurred at the Sandusky avenue (U.S. highway 23) crossing which includes the double-track main line of the Pennsylvania and a siding. From the street, the view of approaching westbound trains is obstructed by buildings. The crossing is protected by automatic flashing-light signals of the back-to-back type, located on each side of the tracks. The westward track-circuit control extends 3,430 ft. east of the crossing and the maximum authorized speed of trains in this vicinity is 75 m.p.h.

After traveling during the night the driver of the truck arrived at the crossing in Upper Sandusky shortly before 4:15 a.m., where he stopped to wait for an eastbound passenger train to pass. Believing that the crossing was clear, although the evidence indicated that the signals continued to operate, the driver of the truck immediately proceeded over the side track and the westward main line in the path of the westbound passenger train, which was approaching the crossing at 55 to 60 m.p.h.

The tractor of the semi-trailer type truck was thrown onto the eastward track west of the crossing, while the body of the trailer was south of the tracks and west of the crossing. The rear end of the trailer, including axles and wheels, was carried to the frog of a trailing-point crossover, at which point the engine became derailed and subsequently turned over, sliding along the tracks on its right side. The engine stopped across and

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