Editorial Comment

Preventing Unnecessary Operation of Highway-Railroad Crossing Signals

WITHIN recent years the more extensive use of motor vehicles on improved highways has created new problems in the control of highway-railroad crossing protection. In a paper presented before a convention of the Institute of Traffic Engineers, P. X. Rice, a professor in Pennsylvania State College, criticized the railroads for following certain practices which result in delays to motor vehicles at crossings protected by signals. Mr. Rice stated that "where signals are used, the equipment and circuits are generally inadequate from all standpoints except that of the railroad lawyer." He also said that "Where trains do much switching, or stand at stations or water tanks, considerable delay to vehicular traffic may occur if the crossing signal continues to operate while no danger exists. The railway signal department can solve almost any circuit problem in connection with such situations if the municipal authorities will demand improvement. . . . . Although the railroad companies have signal engineers who are thoroughly competent, such competence has not and will not, of itself, insure proper protection and expedition (of highway traffic) at crossings. Traffic engineers are needed to prepare functional specifications at least."

Mr. Rice then explained various means of reducing the amount of unnecessary operation of crossing protection, which showed familiarity with the various methods available. However, it would be assumed from his comments that although the signal engineers of the railroads know about these measures, they have not provided such arrangements at many installations, the inference being that their use might in some way jeopardize the interests of the railroad from a legal standpoint in the event of an accident at a crossing. This latter statement, inferring that the circuits might in some way fail to provide proper protection, seems to be contradictory to Mr. Rice's earlier recognition of the competence of the railroads' signal engineers in designing such arrangements. The signal engineers not only have designed circuits to meet these requirements but, of more importance, such facilities have been installed extensively on numerous roads where needed, a fact that Mr. Rice failed to bring out in his paper.

What the Railroads Have Done

The circumstances on which the criticisms are based are not new to the railroads, because signal engineers have recognized these problems for years and much has been done to alleviate the conditions which have given rise to the criticisms. For example, in the discussion of Prof. Rice's paper, A. H. Rudd, chief signal engineer of the Pennsylvania and chairman of the Signal Section, A.A.R. Committee on Highway Crossing Protection, stated that "the only feature of the present signals which, in my opinion, may be and certainly is justly criticized is the undue delay to highway traffic owing to the signals indicating the approach of a train for a considerable time interval before the train reaches the crossing, due to their slow movement, switching on sidings, stopping at stations, or for other reasons, after entering the operating section. This condition, if known locally, in many cases results either in the weakening of the significance of the signal, or in some cases the disregard of it, with serious results. . . . . Prof. Rice presented a number of means that may be used to minimize the delays, and said that 'The railway signal department can solve nearly any circuit problem in connection with such situations, if the municipal authorities will demand improvement'. The signal engineers have solved most of them, largely without demand from municipal authorities or anybody else, except their own people."

Installations In Service

Perhaps the worst offenders, so far as the unnecessary operation of the signals is concerned, are those installations where trains stop in the control limits at water columns, coal chutes or passenger stations. Under such circumstances some roads have provided automatic cut-outs and restarts, which stop the operation of the crossing signals after a train occupies a track circuit for a certain time, and then restart their operation when the train again proceeds toward the crossing. Such an arrangement has been installed on the Reading at Modena, Pa., while an article describing a similar arrangement on the Canadian National appeared in the September, 1933, issue.

In some locations switches leading to passing sidings are so located that trains pulling in or out of these sidings cause the signals to operate unnecessarily and in some cases falsely where the train is headed away from the crossing or will not move to the crossing. In such cases many roads, such as the Canadian National, provide a circuit arrangement involving a switch circuit controller so designed that false operation of the signals is reduced to a minimum, such installations being explained in the article mentioned in the preceding paragraph, and in a similar article describing a Northern Pacific installation in the April, 1935, issue.

Where local trains or switching crews permit cars to stand at almost any point on the control circuits when switching house or industry tracks, some sort of a manual control seems to be necessary if improper operation of the crossing protection is to be eliminated. Such a system so arranged as to be operated in a practicable way by a member of the switching crew, was described in the Canadian National article mentioned above. Descriptions of other installations of a similar character have appeared as follows: Maine Central, July, 1933, Northern Pacific, April, 1935.

As a general rule, switching by local trains is done about the same time each day, so that certain roads have arranged for part-time manual control to be in effect during these periods, with automatic track-circuit control in effect the remainder of the 24-hour period. Some of the installations of this character which have been described in *Railway Signaling* are: Missouri-Kansas-

Texas, June, 1930; Milwaukee, September, 1931; Burlington, July, 1933; Milwaukee, August, 1933; Western Maryland, February, 1934; Boston & Maine, June, 1934; Canadian Pacific, October, 1934; Nickel Plate, December, 1934, and T. & N.O., January, 1935, and May, 1935.

Where highway crossings are located within the limits of interlockings, certain roads have arranged the controls so that the crossing signals will not operate unless an interlocking signal is cleared for a route to permit a train to pass over the highway crossing. This arrangement allows trains to stop or switch on the track circuits of the crossing protection without causing unnecessary operation. Such an arrangement, as used on the Louisville & Nashville, was described on page 215 of the June, 1935, issue.

On some branch lines, where train speeds have been reduced from what they were when certain installations were made, roads have reduced the length of control sections where such changes will remove passing track switches or other turnouts from the control section.

Not Subject to Regulations

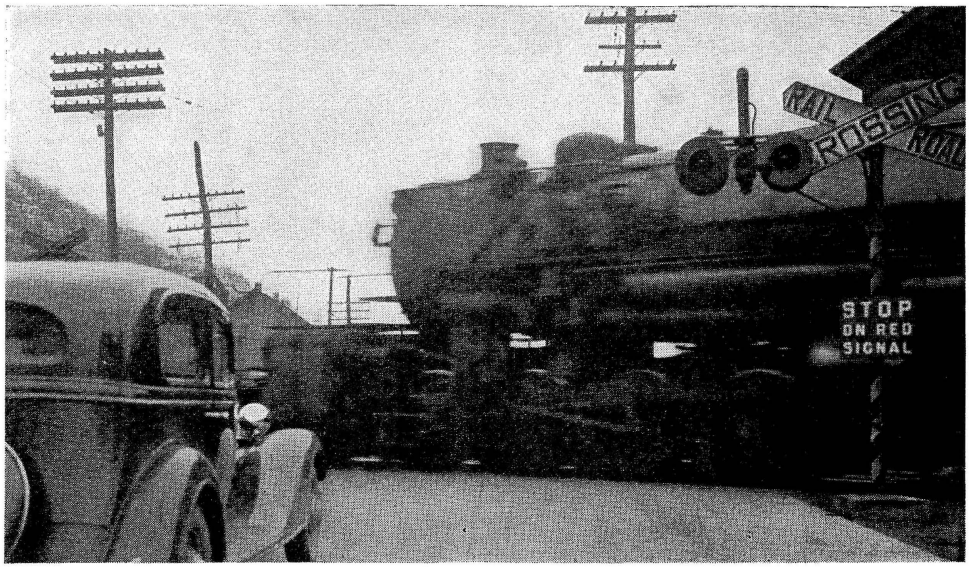
The articles referred to above describe only a few of the outstanding examples to show that many roads have already gone to considerable expense to provide correct operation of crossing protection at numerous locations. In studying these installations it is important to consider that each installation is a problem in itself, and no regulations can be made applicable to all locations or circumstances. However, the difficult problem of devising such regulations were foreseen by Mr. Rice when he offered the suggestion that "Traffic engineers are needed to prepare functional specifications at least."

To require that all automatically-controlled crossing protection must operate a specified time, as for example not less than 20 seconds or more than 50 seconds prior to the arrival of any train at a crossing so protected, regardless of variations in speed or train stops in the control limits, is unreasonable because the numerous uncontrollable factors in the operation of crossing protection are not subject, in all instances, to laws or governmental regulations.

At locations where special controls may be justified by the volume of highway traffic and number of train movements, the railroads can be depended upon to install whatever is practicable, however, there are thousands of installations at crossings where the highway traffic or the number of trains is so limited that any extra expenditure for special controls cannot be justified when considering the comparatively few instances in which a highway vehicle might be delayed unnecessarily.

Furthermore, consideration should be given to the fact that the warning aspect displayed by wig-wag or flashing-light signals is, in reality, of a cautionary nature only, as was explained by Mr. Rudd, in discussing Prof. Rice's paper, when he stated that "it is not intended that the driver of a vehicle shall stop and continue to stand until the train has gone. If a vehicle driver sees a train approaching at slow speed a long way off, or standing at the station, or doing work, and there is no train coming from the opposite direction, he is entirely justified in proceeding when he knows that it is safe to do so."

Furthermore, with comparatively few exceptions, especially in recent years, the railroads have, at their own expense, installed and maintained the crossing protection at thousands of crossings. If the highway authorities insist on the provision of special control arrangements merely to save a small amount of time for some motorists, it would seem logical that the users of the highways should pay for additional expense. In this respect, the State of Michigan has set an example by paying one half of the cost of each new crossing protection installation, and also $10 per month toward the maintenance. However, regardless of whether the states, the federal government or the railroads pay the bills, the decision to install crossing protection or to add special controls should in each case be based on a study of the needs and the results possible under the local circumstances. No blanket rule will be equitable for all locations.



Crossing protection on the Reading at Tamaqua, Pa.