

freight, and once installed be a matter of no concern to the engineman as to adjustment, upkeep or replacement.

Unaffected by shock, jar and vibration, and proof against roadway dust and changes in atmospheric humidity.

Readily replacable, at least as easily as the standard parts of the regular brake equipment.

Of such character that a locomotive may be used interchangeably in all kinds of train service, and with any kind of braking which may be required.

Subject to speed control, that is, to a proper co-ordination of the elements of train speed and the braking power of equipment.

Engine and track equipment should be as nearly as possible foolproof and demand the minimum of upkeep and attention, both as to time and special knowledge required; and all necessity for adjustments by the engineman should be eliminated.

Finally, the system should be a friendly mentor and guide for the engineman, aiding, not unnecessarily opposing, him, and a thoroughly reliable but unobtrusive partner in the operation of his engine, which, while interposing an effective shield between him and disaster, will leave, within all proper limits, the handling of the train subject to his judgment.

Comment on Papers Presented*

By A. G. Shaver

Regan Safety Devices Co., Inc., Chicago.

Installations of automatic train control have been in service on railroads under practicable operating conditions sufficiently long to demonstrate their usefulness and reliability. The fact that a train can be safely stopped automatically or can have its speed efficiently controlled automatically is not debatable in view of the records for such performances extending over a period of several years under the variety of operation conditions existing on the usual railroad. Theorizing may be indulged in as to the elegance or convenience of this or that method or feature, and it is good so to set the imagination at work, because that is the means for attainment of progress and precision, but in view of the evidence before us there is now no need to speculate as to whether the essentials of automatic train control are practicable and efficient.

That I may not be misunderstood, I would define the essentials of automatic control to be: Means for automatically stopping a train; means to permit it to proceed after being stopped, and means to restrict its speed under certain conditions.

In its application and use automatic train control involves two different engineering departments of the railroad, neither of which usually has any particular interest or part in the business of the other. It has not been necessary for a motive power man to know how to signal a railroad in order to build and maintain a locomotive, nor has it been necessary for a signal man to know much about a locomotive in order to equip a railway line with a signal system. With automatic train control it is different, both the motive power and the signal departments are concerned, and the lack of fully appreciating this fact, perhaps, has been quite a drawback in train control progress.

It has been shown that for systems already installed and in regular operation the locomotive equipment can be looked after by the regular roundhouse forces; and there is nothing about the track appliances which a good maintainer's helper cannot do. To get good service it is, of course, necessary to understand the working of the apparatus and its diseases in operation, but a knowledge of these is soon acquired since the maintaining forces are already familiar with railroad equipment of a similar sort.

The major part and the important part of the train control system is the equipment on the locomotive. It is essential that it be properly applied and that it be given the same high order of inspection and maintenance as that now given by most railroads to their automatic block signal systems.

Although, generally speaking, that part of the train control system located on the track is simple and easily installed and maintained there is the problem of its proper application to serve best the operating and traffic conditions of the railroad. No matter how good and efficient a train control system may be, it will not best serve a railroad if improperly applied. The important function of a train control system is to keep trains moving safely, and already there are systems which will do this.

As has been suggested in one of the very able papers with automatic train control in use on the railroads what will be the necessity for trains to stop for stop automatic block signals and for rear flagging to be continued? It is evident there are other advantages to be had from the use of automatic train control than that of safety only.

Train Control on the C. & N. W.

IN COMPLIANCE with the Interstate Commerce Commission's order of January 10, requiring the installation of automatic train control on 49 railroads, the Chicago & North Western has awarded the General Railway Signal Company of Rochester, N. Y., the contract for the installation of automatic block signals with train speed control from West Chicago, Ill., to Elgin, a distance of 12 miles.

From West Chicago to Wayne, there is five miles of double track, the balance being single track. The double track will be equipped with Model 2A, direct current signals located on bridges and the single track will be equipped with the absolute permissive block system, Model 2A direct current signals being mounted on masts in the usual manner. The system of automatic train control will be the General Railway Signal Company's train speed control as described in the *Railway Signal Engineer* for March, 1922, page 105.

The installation will be of special interest due to the nature of the track and the varied classes of traffic which operate over it. Fixed limited speed is to be imposed at certain locations, as approaching the end of double track and interlocking plants, i.e., there are certain fixed speed limitations that are in effect which will be enforced through the use of pairs of inductors constructed without windings. The speed control scheme generally contemplates the use of three pairs of inductors governing the approach to stop signals which force the deceleration of train to insure a safe stop. Speed will be so tapered as to handle the trains as they are normally handled now, automatic braking being used only when speed limits are exceeded.

There is an interlocking plant a short distance from the West Chicago station from which it has been customary, under certain traffic conditions, to advance trains to the station on "Call-on" signals. The limited speed indicated by the "Call-on" signals will be enforced by the application of pairs of inductors suitably placed between the interlocking plant and West Chicago station.

The speed control and receiving apparatus for freight and passenger locomotives will be identical except for the timing of the time element contactor. Locomotives that are, under certain circumstances, used in both passenger and freight service will be equipped with time element contactors that may be automatically adjusted for either class of service.

*Abstract of written discussion presented to chairman of the meeting.