

# Some Points to Consider in Selection of Train Control

By *E. L. Adams*

**I**N view of the recent proposed order of the Interstate Commerce Commission to require installations of automatic train control on a number of railroads, it may be well to touch on some points which should be considered by those studying this subject. The installation, maintenance and operation of any automatic train control scheme will require the operating, engineering, motive power and signal departments to work in much closer co-operation than is necessary in connection with almost any other apparatus or device now in use.

Operating officers may find it necessary to revise some of their rules and methods to comply with the demands of the particular type of train control that may be adopted. The engineering department will have to consider clearances and the relation of the apparatus installed on the roadway and locomotive to other parts of the track and structures. The motive power department must consider the application of the apparatus to the locomotive and the effect of its operation on the braking of trains. The signal department will have to tie the control into the signal system and should be the one to co-ordinate all of the interested departments.

All interested departments must work together in deciding on the system which should be used; after which the incidental details can be worked out. The maintenance and operation will most directly concern the motive power and signal departments. These two must necessarily work together very closely in order to obtain satisfactory results. In addition, the operating department will have a very large share in making the operation of the scheme satisfactory.

In general there are two types of control—intermittent and continuous. Intermittent control, as its name signifies, is such that the control is effected intermittently at certain predetermined points and the control in effect just after passing one control point may or may not be maintained until a stop is produced or another control point passed, depending on the extent to which the control is carried. Continuous control operates throughout the protected section of track so that every change from a safe to a dangerous, or from a dangerous to a safe condition ahead, is at once transmitted to the control apparatus on the locomotive.

The various train control devices may be divided into two general classes: One, when actual physical contact is required between the apparatus on the roadway and that on the locomotive; the other, where physical contact is not required. These have been classified further by the Automatic Train Control Committee of the United States Railroad Administration. With either of these two classes of control the device used may be such as simply to produce a stop when conditions require or may in addition control automatically the speed under predetermined conditions.

It is not the intention to discuss the relative merits of the schemes of control, or of the various devices that have been tried out with more or less thoroughness. It is more the object to call attention to some of the questions that must be considered before adopting any device.

The first question that must be answered is—"To

what extent are we going to control our trains?" A device may be installed that will operate to open the line automatically and keep it open until a stop is produced, when conditions ahead are such as to require a stop. Such a device will operate at any speed and for any class of train with any number of cars. It may be arranged so that it will operate regardless of any action of the engineman, or it may be considered safe to add apparatus so that the operation may be prevented either by the engineman alone or by the engineman and fireman acting together. Then, if for any reason such action is not taken, the stop will result. In any event after a stop had been produced, there will be no control of the speed in a permissive block.

More complete protection and perhaps better operating conditions may be obtained by adding to the device apparatus which is governed by the speed of the train, and arranged so that the train line will be opened only when certain definite speeds were being executed. Such speeds depend on the condition of the block or the indication of the signal ahead of the train. Any of these arrangements can be provided with either intermittent or continuous control schemes. It seems that the operating officers must be the ones to decide that question, after considering, with the air brake experts, the effect on the braking of trains. In fact, it comes to the question of whether the engineman can be depended on to handle his train according to prescribed rules, provided he knows what the conditions are ahead.

The next question to decide is whether a device requiring physical contact between the apparatus on the roadway and that on the locomotive, or one that does not require such contact is to be used. With any device requiring physical contact, either the roadway apparatus must extend inside or the locomotive apparatus outside of the established clearances. Existing clearances must therefore be looked into very thoroughly in connection with this type of device and may be a determining factor in some cases.

With non-contact devices, clearances do not need to be considered. Decision as to the type of device should depend on reliability, adaptability, cost of operation and maintenance, first cost.

The air brake expert must consider the effect on the braking of trains when the train line is opened and held open continuously until a complete stop is produced or, if speed control is used, until the speed is reduced to a predetermined rate. This means that instead of making a definite reduction of brake pipe pressure sufficient to reduce the speed to the required rate in the distance available and then lapping the valve as the engineman would do, the brake pipe pressure drops continuously from the time of application until the prescribed rate of speed is reached. This may, in some cases, result in an emergency application at low speed. Another important point in connection with braking is the effect of bleeding the train line on grades, thus leaving the train without air. Another condition which may arise is an automatic application with an uncontrolled reduction at low speeds. When this happens on a long freight train that



































































