

Preliminary Report on C. & N. W. Train Control

THE Interstate Commerce Commission has made public a letter sent by E. H. DeGroot, Jr., director of its Bureau of Signals and Train Control Devices, to Fred W. Sargent, president of the Chicago & North Western, regarding the preliminary inspection of the installation of the two-speed continuous inductive train control device of the General Railway Signal Company on the North Western, between Council Bluffs, Iowa, and Missouri Valley, 21 miles double track. As a result of this inspection, the following criticisms and comments are offered:

1. Complete plans and description of the final installation as it is, should be furnished before final inspection and test.

The track circuit layout plans furnished to our engineers at Council Bluffs, Ia., on June 5, 1925, show that these plans were revised under date of March 7, 1925. At the time these plans were made, it was evidently the intention to use an automatic cut-in and cut-out feature at the beginning and end of train-control territory, based upon local train-control track-current conditions, and the installation was made accordingly. Since these plans were drawn, it appears that it was decided to abandon the automatic features above referred to, and use a manual device instead, as shown by the arrangement of the mechanical clutch and key-token used in the demonstration of June 11, 1925.

2. While no interference from foreign current influence was reported and none observed during the inspection other than a momentary flicker of the primary relay while passing over, or near, a turn-out switch and certain insulated track joints in the vicinity of Council Bluffs depot, in non-equipped territory, nevertheless the current used for this installation is that of commercial frequency, and since stray current of this frequency, should it flow toward the locomotive from in front, in one rail, and away from the locomotive, in the opposite direction, in the other rail, might cause serious trouble, notwithstanding the fact that both your representative and those of the train-control company state that they do not believe any such set-up is at all probable, nevertheless the matter is discussed here, inasmuch as it would be necessary, should such trouble develop, at once to employ adequate means for overcoming it.

When operating under low speed restrictions, should there occur a false clear energization of the primary relay, there might result under certain circumstances the cancelling of whatever distance had been recorded by the operation of the cam, and the distance to the acknowledging point automatically would be extended in proportion to the distance cancelled by this false clear energization of the primary relay.

3. It is suggested that very careful consideration be given to the question whether or not greater efficiency, and possibly safety, can be secured by the installation of continuous cab indications, which it is our understanding could be provided by connecting two wires, with the installation of two electric light bulbs, with the necessary lenses, in the existing housing.

An analysis of this installation indicates that the locations of fixed signals are not considered as stop indication points and that the device is applied in a manner to simulate an installation wherein fixed signals are not provided. That is, it is apparently the idea to demonstrate the feasibility of installing automatic train-control without working wayside signals.

The observations made indicate that the use of continuous visual cab signals would be of material benefit to the enginemen, for the reason that a change of conditions of locomotive apparatus would thereby be recorded by a distinctive indication in conformity with such condition at the time the change occurred. As now installed and operated, a change in the condition of the locomotive apparatus, when running under the low speed limit, may not be indicated until the train has moved a distance varying from a minimum of approximately one-quarter of a mile to a minimum of approximately one-half mile, at which time the first intimation that a change in locomotive apparatus has occurred is the sounding of the acknowledging warning whistle.

There are a number of conditions under which the use of continuous cab indications would seem to be much more desirable than the present arrangement. As a specific example: assume that a train is moving in a clear block at a speed below the low limit and that a switch is open in that block in advance; under such conditions the low speed limit would be imposed upon the advancing train, but no cab indication would result until the train had moved a distance of approximately one-quarter of a mile, at which time the acknowledging warning whistle would sound. It

would seem to be better practice to indicate the change in track and locomotive conditions by the use of a distinctive visual indication that would become effective without any considerable delay period. This is especially true in view of the fact that restrictive indications of wayside signals may be ignored by the device, and that it may even come about that the device will be used without such signals.

4. Recurrent acknowledgment is provided for in this installation, when for any reason the low speed limit is imposed. Under such conditions the action of a cam initiates an automatic brake application at a distance of approximately one-quarter of a mile after the low speed restriction has been imposed, and under these conditions the train is brought to a stop unless the brake application is forestalled by the act of acknowledging. If the low speed restriction is still in force, reacknowledgment will be required approximately each half-mile thereafter, or until the low speed restriction is removed by the energization of the train-control primary relay.

When the low speed restriction is in effect, a fixed wayside signal indicating caution or stop may be passed without acknowledgment, but, under the low speed limit, acknowledgment being enforced by the cam and governor system of the engine equipment, as described above.

In case of failure of power, or if for any other reason, the train-control wayside circuits are deenergized, while train movements can only be made at speeds below the low speed limit, and recurrent acknowledgment will be enforced at each half-mile, nevertheless if operated below the low speed limit and recurrent acknowledgment is properly made at each half-mile, a train may proceed through the deenergized territory without receiving an automatic brake application.

5. The letters "TC" are illuminated in the cab when the electrical apparatus of the train-control device is in service, although the actuator of the device can be cut out of service without affecting this TC indication. In view of the fact that provision has been made under which the mechanical clutch and key-token, mentioned in paragraph 1 of this letter, are employed to prevent the entrance of the train into train-control territory unless the device is cut in, it would seem that this affords reasonable protection on this score; conductors being instructed not to enter train-control territory unless they personally hold the required token, which cannot be removed from the actuator unless the pneumatic device is cut in.

Radio as a Railway Necessity

I. C. FORSHEE, telegraph and telephone engineer of the Pennsylvania, in an address before the national convention of the American Radio Relay League at Chicago, outlined the radio devices which, if developed, could be used in quantity by the railroads.

Pointing out the need of better communication between the engine and caboose of long freight trains, especially during storms or foggy weather, Mr. Forshee said there was an immediate demand for "a two-way service that is reliable under all conditions, economical to install, maintain and operate, rugged to withstand the service conditions and simple to operate.

"Small portable radio sets that could be used to bridge the gaps caused by storms or washouts and operate reliably over distances up to, say, five miles, would be considered favorably by railroad superintendents of telegraph," he added. "They would have to be rugged, economical, and also relatively simple to operate and maintain."

The installation of radio receiving sets on passenger trains has been experimented with on various railroads, Mr. Forshee said, but as a general thing they have not been retained as regular equipment.

"The apparatus available now would make it possible to furnish this service, if there were a real demand for it, in a more satisfactory manner than heretofore. The likes and dislikes of the traveling public are variable quantities and that also applies to radio entertainment," he said.

"There are certain conditions that exist on and along a railroad that are appreciably different than at home, such as axle and head light generators and fan motors.