

tem on 102 miles of double track between Sidney, Wyo., and Cheyenne. Sixty miles of the installation is completed and practically half of the roadside and pole line work on the remainder of the territory is finished. Fifteen locomotives are equipped and apparatus for 17 more is on hand.

The Baltimore & Ohio, the Erie, the Chicago & Erie, and the Pere Marquette have not as yet made any definite announcement as to a choice of the train control system to be installed. The Southern, although not having announced any contract for its own installation, is associated with the C. N. O. & T. P. on the installation and tests of the General Railway Signal Company's intermittent inductive auto-manual system.

The Reading has 56 miles of double track equipped with the Union continuous system east of Camden, N. J. Twelve locomotives have been equipped and apparatus for 13 more has been received.

The Chicago, Indianapolis & Louisville has practically completed the signal changes and installation of the way-side apparatus on a 20-mile section using the Sprague intermittent induction system. Four equipped engines are now in service.

The Oregon, Washington Railroad & Navigation Com-

pany has completed over half of the pole line and way-side apparatus on the 85-mile single track installation of the Union continuous system between East Portland, Ore., and The Dalles. Control equipment for eight locomotives has been applied and other equipment is enroute.

The Erie has a test installation of the ramp type of the International Signal Company's (Webb) system of 5 miles of double track with two passenger engines equipped on the northern division and one mile of track with one freight engine equipped on the Delaware division. On its New York division a section of 4 miles of one track and one passenger engine is equipped with the Clifford system of train control. One engine has been equipped with the intermittent inductive system of the National Safety Appliance Company's and equipment for one engine has been ordered for trial from the Sprague Safety & Control Company.

As may be seen in the table herewith several of the other companies have made short test installations. Some of the carriers have let contracts and have proceeded with pole and signal changes but have not as yet placed any train control apparatus in service. A few of the roads have equipped one or two locomotives and a few track sections for test purposes.

Train Control Inspection Reports

THE Interstate Commerce Commission has made public a letter from E. H. De Groot, Jr., director of its Bureau of Signals and Train Control, to W. R. Scott, president of the Southern Pacific lines in Texas, written as a substitute for a previous letter regarding the results of the preliminary inspection by the commission's representatives of the Southern Pacific train control installation. An earlier report, which was sent to General Manager Dyer of the Southern Pacific, was the subject of a recent conference at the office of the commission, attended by representatives of the railroad and of the National Safety Appliance Company.

Following is the substance of the letter:

After further investigation, conference and demonstration my former letter, dated September 29, 1924, to General Manager Dyer concerning the preliminary inspection of the National Safety Appliance Company's automatic train stop device as installed on the 20-mile single track section of the Southern Pacific between Brantwood and Tracy, California, (this preliminary inspection having been made in accordance with the commission's circular, or press notice, of June 9, 1924) is withdrawn and the following substituted:

1. A signal governing the entrance to a block may indicate stop due to local signal trouble and the track magnet indicate clear at the same time.

The specifications and requirements covering this point are as follows:

Paragraph 1, General Requirements. "An automatic train-stop device shall be effective when the signal admitting the train to the block indicates stop, and, so far as possible, when that signal fails to indicate existing danger conditions." Also,

Paragraph 2, Design and Construction. "The apparatus shall be so constructed . . . as to perform its intended function (a) in the event of failure of the engineman to obey the signal indications; and (b) so far as possible when the signal fails to indicate a condition requiring an application of the brakes."

2. The track magnet may be displaced or removed without affecting the operation of the signal system, and, under these conditions, a stop signal and an automatic brake application would not result at the signal and magnet in the rear.

The specifications and requirements are as follows:

Paragraph 3, Design and Construction. "The apparatus shall be so constructed that it will, so far as possible, perform its intended function if an essential part fails or is removed. . . ."

3. At some distant signals track magnets are so located that an automatic brake application made thereat will not stop a train proceeding at high speed before it reaches the home signal.

Further, the staggered signals between sidings are located so close to each other, that, should opposing trains leave such sidings under clear signals, automatic brake application at these staggered stop signals might not prevent a collision.

The specifications and requirements are as follows:

Paragraph 3, General Requirements. "An automatic train-stop, train control, or speed-control device shall be operative at braking distance from the stop-signal location if signals are not overlapped, or at the stop-signal location if an adequate overlap is provided."

4. Should the condenser which bridges the contact points of the magnet relay break down and short, a false clear failure would result.

The specifications and requirements are as follows:

Paragraph 3, Design and Construction. "The apparatus shall be so constructed that it will, so far as possible, perform its intended function if an essential part fails or is removed, or a break, cross or ground occurs in electric circuits, or in case of a failure of energy."

5. The forestalling valve is experimental and while the principle appears to be correct, comment is reserved until this valve can be further inspected and tested under actual railroad operating conditions.

6. The clearances in the valve assembly of the duplex control valve are such that freedom from dirt, oil, gum, etc., must be maintained to insure proper functioning and to prevent false clear failures.

Further, should the duplex control valve strainer or the connection between the stop valve and duplex control valve be stopped up by accumulation of scale, dirt, ice, etc., a false clear failure would result.

The specification and requirements are as follows:

Paragraph 14, Design and Construction. "The apparatus shall be constructed, installed, and maintained as to be safe and suitable for service. The quality of materials and workmanship shall conform to this requirement."

It is felt that the importance of these criticisms is very great, but they are not intended, nor are they to be taken, as a condemnation of this or any other device in connection with which similar criticism may be offered in future.

We understand that you have undertaken to see that the system is properly protected from the entrance of foreign

matter, if there is any indication that it is not fully protected at present.

7. The armature nut is not so secured as to insure that it cannot work loose and back off, preventing the valve stem from rising and affecting the proper operation of the valve.

Paragraph 14, Design and Construction. "The apparatus shall be so constructed, installed, and maintained as to be safe and suitable for service. The quality of materials and workmanship shall conform to this requirement."

8. The use of a rubber gasket in the application valve of the stop valve is dangerous. The rubber may be cut and adhere to the seat in such manner as to cause a false clear failure.

The specifications and requirements are as follows:

Paragraph 14, Design and Construction. "The apparatus shall be so constructed, installed and maintained as to be safe and suitable for service. The quality of materials and workmanship shall conform to this requirement."

With the understanding which we have that the application valve in the stop valve on one of these engines used in the preliminary inspection, and which was the object of this criticism, was of an "obsolete design" which has been removed and discarded absolutely, we are glad to limit this specific criticism to this obsolete type of stop valve in which a rubber gasket was used.

With respect to the reliability of the rubber disk used in the new form of this valve, it is felt that the test of actual service over a more or less extended period will be necessary before a conclusion can be safely reached.

9. Where not already so located, the release cock should be installed where it cannot be operated while the locomotive is moving.

The specifications and requirements are as follows:

Paragraph 6, Design and Construction. "The apparatus shall be so constructed as to prevent the release of the brakes after the automatic application until the train has been brought to a stop. . . ."

The object of this and similar inspections is that of constructive criticism; the pointing out of such matters as may be helpful to the carrier in checking an installation against the specification and requirements of the commission, and comments concerning such other related points as our necessarily brief inspection may develop. The foregoing criticisms and comments are offered accordingly. This letter is addressed to you notwithstanding the fact that the installation in question is on the lines of the Pacific System, in view of the fact that you represented that system in our recent conference.

Comments on Missouri Pacific and Frisco Installations

THE Interstate Commerce Commission has also made public letters written by E. H. De Groot, director of its Bureau of Signals and Train Control Devices, under date of December 26, to L. W. Baldwin, president of the Missouri Pacific, and J. E. Hutchison, vice-president of the St. Louis-San Francisco, regarding the preliminary inspections made by representatives of the commission at the request of these roads of the 20-mile installations of the National Safety Appliance Company's automatic train stop. These letters contain comments and criticisms developed by a brief inspection and are intended to be helpful to the carrier in checking the installations against the specifications and requirements of the commission.

The main points of the letter addressed to the Missouri Pacific are as follows:

- (1) Same as (1) under Southern Pacific.
- (2) Same as (2) under Southern Pacific.
- (3) No track magnets are provided on sidings or at siding head blocks in the main track to cause an automatic brake application should a train for any reason attempt to move from the siding to the main track when the block is occupied.
- (4) No track magnets are provided to check the home signals at Kenneth interlocking plant. Magnets are pro-

vided at the distant signals to enforce a speed restriction when approaching the home signal at stop, but as installed at present a train may pass a home signal in the stop position without an automatic brake application.

The specifications and requirements covering this are as follows:

Paragraph 3, under General Requirements—"An automatic train stop, train-control, or speed-control device shall be operative at braking distance from the stop-signal location. . . ." Also, .

Paragraph 2, Design and Construction—"The apparatus shall be so constructed as to operate in connection with a system of fixed block or interlocking signals, if conditions so require, and so inter-connected with the fixed signal system as to perform its intended function (2) in event of failure of the engineman to obey the signal indication; and—"

- (5) Same as (4) under Southern Pacific.
- (6) Same as (6) under Southern Pacific.
- (7) Same as (7) under Southern Pacific.
- (8) Same as (8) under Southern Pacific.
- (9) A magnet should be provided braking distance at maximum speed from the signal governing entrance to train control territory.

The specifications and requirements are as follows:

Paragraph 1, General Requirements—"An automatic train-stop device shall be effective when the signal admitting the train to the block indicates stop, and, so far as possible, when that signal fails to indicate existing danger conditions." Also,

Paragraph 3, General Requirements—"An automatic train-stop train control, or speed-control device shall be operative at braking distance from the stop-signal location if signals are not overlapped, or at the stop-signal location if an adequate overlap is provided."

(10) The factor of safety could be increased by the installation of shunt boxes on hand-thrown derails.

(11) It is suggested that the type of fouling protection employed at sidings and cross-overs be given consideration with a view to possibly increased protection.

The concluding paragraph is similar to that in the report on the Southern Pacific installation.

Points on Frisco Inspection

In the letter addressed to the Frisco the main points are as follows:

- (1) Same as (1) under Southern Pacific
- (2) Same as (2) under Southern Pacific.
- (3) Magnetic metal protection plates are installed on track magnets.

The specifications and requirements are as follows:

Paragraph 14, Design and Construction—"The apparatus shall be so constructed, installed and maintained as to be safe and suitable for service. The quality of materials and workmanship shall conform to this requirement."

- (4) Same as (4) under Southern Pacific.
- (5) Similar to (5) under Southern Pacific.
- (6) Similar to (6) under Southern Pacific.
- (7) The obvious superiority of the new style duplex control valve over the old style with fluted stem and yoke stop renders the use of the new style valve desirable.
- (8) Same as (7) under Southern Pacific.
- (9) Same as (8) under Southern Pacific.
- (10) The seal on the stop valve wheel should be so applied that any movement of the wheel will cause the seal to break.

The specifications and requirements are as follows:

Paragraph 14, Design and Construction—"The apparatus shall be so constructed, installed and maintained as to be safe and suitable for service. The quality of materials and workmanship shall conform to this requirement."

(11) The obvious superiority of the diaphragm type stop valve over the piston type stop valve renders the use of the former valve desirable.

(12) The factor of safety could be increased by the installation of a shunt box on the hand-thrown derail protecting the main track.

(13) It is suggested that the type of fouling protection employed at sidings be given consideration with a view to possibly increased protection.

The last paragraph is similar to that in the report on the Southern Pacific installation.