

Furthermore, the combination rate sought would not have been applicable on the shipment in question even if it had moved via Chicago, because the tariff naming the \$1.83 factor restricted the application of that rate to apply only on shipments destined to San Luis Potosi and Agua Caliente, Mexico, and points south thereof on and beyond the National Railways of Mexico. The destination of the shipment is north of the designated territory.

We find that the applicable rate was and is \$2.585, and that the applicable rate was not, and is not, unreasonable. The complaint will be dismissed.

---

No. 13413

IN THE MATTER OF AUTOMATIC TRAIN-CONTROL  
DEVICES

---

No. 13413 (SUB-NO. 30-2)

IN THE MATTER OF AUTOMATIC TRAIN-STOP DEVICE,  
INTERMITTENT INDUCTION TYPE, OF GENERAL  
RAILWAY SIGNAL COMPANY ON SUSQUEHANNA DI-  
VISION AND PORTION OF DELAWARE DIVISION OF  
ERIE RAILROAD

---

*Inspection completed February 8, 1929. Decided May 1, 1929*

---

1. After inspection and test, installation found to be in conformity with plans furnished by the carrier and installation is approved except as noted.
2. Certain features in connection with the requirements and specifications are brought to the carrier's attention for further consideration and appropriate action.

REPORT OF THE COMMISSION

DIVISION 6, COMMISSIONERS EASTMAN, McMANAMY, AND TAYLOR

BY DIVISION 6:

This report is made after inspection and test of the automatic train-stop device installed on the Susquehanna division and a portion of the Delaware division of the Erie Railroad by the carrier, pursuant to our second order which was entered in this proceeding January 14, 1924, as modified July 18, 1924, *Automatic Train-Control Devices*, 91 I. C. C. 426. In that order we required, among others, 155 I. C. C.

the Erie to install an automatic train-stop or train-control device on a designated portion of its line in accordance with specifications and requirements therein prescribed.

The device used in the installation under consideration is an automatic train-stop, intermittent-induction (automannual) type, manufactured by the General Railway Signal Company, 44 locomotives being equipped.

#### COST OF INSTALLATION

The cost of this installation, as reported by the carrier, covering roadway and locomotive equipment as hereinafter described, is as follows:

##### Roadway equipment:

Total cost of roadway equipment of train-control installation less power lines and power apparatus, if any, less cost of signals or cost of change in existing signal system; less salvage	\$93,098.31
Total cost of power lines and power apparatus, if any, less salvage	None
Total cost of signal system installed in connection with train control; less salvage	None
Total cost of change in existing signal system made necessary by train control; less salvage	20,689.29
<b>Total cost of roadway installation</b>	<b>113,787.60</b>

##### Locomotive equipment:

Total cost of locomotive equipment installed (44 locomotives)	55,451.16
<b>Total cost of installation</b>	<b>169,238.76</b>

#### DESCRIPTION OF ROADWAY EQUIPMENT

The roadway installation was placed in service on November 18, 1927, adjoining at its eastern end the territory equipped by the carrier under our order of June 13, 1922. Westward, the installation commences at home signal 190.1 located approximately 1 mile east of the passenger station at Susquehanna, Pa.; it extends to and includes westward home signal 3, block 1, Hornell, N. Y.; eastward, from automatic signal 331.2 located 800 feet east of Hornell station to and including automatic signal 192.2 just west of Susquehanna station, comprising approximately 141 miles of double track. In this territory the roadway elements of the automatic train-stop system have been placed in service in connection with all high signals governing main-line movements.

An automatic block-signal system is in service, the signals being three-position upper-quadrant normal-clear semaphores, oil lighted.

Train-order signals are two or three position, electrically operated, upper-quadrant semaphores attached to the signal mast below the automatic semaphore with night indications similar to those of auto-

155 I. C. C.

matic signals. They are controlled through hand-operated electric switches from interlocking towers or telegraph offices, the automatic signal being controlled through the train-order signal on the same mast.

Interlocking plants are located at Cameron, Corning, Chemung Junction, Elmira, Fifth Street (Elmira), Southport Junction, Smithboro, Owego, BD and SB-NY, Binghamton, and SR, Susquehanna. In addition to the foregoing there are two signal stations at Hornell.

The automatic signals are operated by 5 cells of 24 AH storage battery or 16-cell sets of 500 A. H. primary battery housed in the bottom of signal cases or in concrete vaults. Where storage batteries are employed two sets of batteries are installed except where the trickle-charge system is used, so that one set may be on charge or in reserve while the other is in use.

Track circuits are energized by four cells of primary battery, 500 AH capacity, connected in multiple, or one cell of storage battery where the trickle-charging system is employed. Polarized track or line circuits usually control the signals but in a number of instances neutral line and track circuits are employed. In some cases, the signal circuits are arranged to provide two or more caution signals approaching a stop signal.

With few exceptions, noninterlocked turnout switches are equipped with pipe-connected or hand-thrown lift-type derails. These switches and derails are equipped with switch-circuit controllers, the mechanism of which is adjusted to shunt the track circuit when the switch is opened 0.25 inch in the case of facing point switches and 0.375 inch for trailing switches, or when the derailing element is off the rail.

The signal and train-stop roadway apparatus is installed substantially as described in our report No. 13413 (Sub-No. 30), 126 I. C. C. 231.

At the locomotive terminals at Susquehanna, Pa., Hornell, N. Y., Binghamton, N. Y., Buffalo, N. Y., Salamanca, N. Y., and Avon, N. Y., test inductors are located on outbound enginehouse tracks for tests prior to departure, and some instruments are also available for making periodic tests.

#### DESCRIPTION OF LOCOMOTIVE EQUIPMENT

Forty-four locomotives have been equipped under this order and in addition caboose 04529 has been equipped as a train-stop test car, being operated in regular trains over train-stop territory at intervals of four to six weeks.

Twelve locomotives in pusher service equipped and operating under the first order also operate on 4 miles at the eastern end of this 155 I. C. C.

installation. Eight of these locomotives have receivers on the left side of the tender for reverse running only, while the other four have receivers for operation in either direction.

Headlight generators for supplying current for the operation of the system and for locomotive lighting are 32 volt, 800 watt, 3,300 r. p. m., made especially for train-control purposes.

The locomotives are equipped as described in our report No. 13413 (Sub-No. 30), 126 I. C. C. 231, excepting that on some of the locomotives the reset contactor is operated by means of a lever and plunger instead of a push button and plunger.

#### OPERATION

The operation of the system is as described in our report No. 13413 (Sub-No. 30), 126 I. C. C. 231.

#### TRAFFIC

Normal traffic over train-stop territory is as follows:

Miles	Between	First-class scheduled trains				Freight and/or extra <sup>1</sup>
		Daily	Daily except Sunday	Daily except Monday	Sunday only	
1.8	Lanesboro and Susquehanna <sup>2</sup> ..... East	8	1	1		4.1
	Do..... West	6	1	1		5.4
22.5	Susquehanna and Binghamton..... East		1			1.0
	Do..... West		1			1.0
139.7	Susquehanna and Hornell..... East	7		1		3.0
	Do..... West	5		1		3.0
7.5	Binghamton and Endicott <sup>3</sup> ..... East		1			1.0
	Do..... West		1			1.0
22.0	Binghamton and Owego <sup>4</sup> ..... East					1.0
	Do..... West					1.0
.9	Southport Junction and Elmira <sup>5</sup> ..... East	1			1	.5
	Do..... West	1			1	.5
4.9	Southport Junction and GJ <sup>6</sup> ..... East	2	1			11.0
	Do..... West	2	1			11.1
4.0	Elmira and GJ (only) <sup>7</sup> ..... East					1.0
	Do..... West					1.0
10.3	Elmira and Painted Post <sup>8</sup> ..... East	1				
	Do..... West	1				
1.9	Corning and Painted Post <sup>9</sup> ..... East	1				1.0
	Do..... West	1				1.0

<sup>1</sup> Freight and extra trains, daily average for January, 1929.

<sup>2</sup> Delaware division trains exclusive of pusher movements. Jefferson division trains between Susquehanna and JA.

<sup>3</sup> Additional train eastward, Saturday only, not shown.

<sup>4</sup> D. & H. Co. freight train each way daily.

<sup>5</sup> P. R. R. passenger trains, Sunday only. Tioga division trains daily between Elmira and JF.

<sup>6</sup> P. R. R. passenger, freight, and switching movements. N. Y. C. R. R. freight trains. Erie switching movements between Elmira and Horseheads.

<sup>7</sup> Erie freight daily to Watkins, N. Y. via P. R. R.

<sup>8</sup> Rochester division passenger trains.

<sup>9</sup> Rochester division passenger and freight trains, not including trains noted between Elmira and Painted Post (footnote 8) that operate in same territory west of Corning.

Throughout this territory trains are operated by time-table, a code of operating rules, train orders, automatic block signals, and the automatic train-stop system. The maximum speed of passenger trains is restricted to 60 miles per hour and of freight trains to 50

155 I. C. C.

miles per hour with greater restrictions at certain points and for certain classes of locomotives.

#### CONCLUSIONS

Our order in *Automatic Train-Control Devices, supra*, provides that each installation made pursuant to the order shall, when completed, be subject to inspection by and to the approval of the commission or any division thereof to which the matter may be referred. Accordingly, the purpose of this inspection and test was to determine whether or not the installation was made in accordance with the plans furnished by the carrier and the specifications and requirements of our order.

As a result of this inspection and test, it is found that the installation is made in conformity with the plans furnished, and the installation is approved except that with respect to compliance with the requirements of the specifications and order in *Automatic Train-Control Devices, supra*, certain features were disclosed which require further consideration by the carrier as follows:

1. Because of the arrangement of circuits, should a signal be falsely clear due to a defect in the signal mechanism or a mechanical failure, a false-clear signal and inductor would obtain at the signal or signals in the rear with the result that train-stop protection and braking distance would be limited to the distance between the stop inductor at the defective signal and the point of danger or obstruction.

2. The fouling protection provided at turnouts and crossovers and the switch-circuit controller shunt used for protection at open outlying crossover and turnout switches and derails, are designed on the open-circuit principle, their effectiveness being dependent upon a high degree of maintenance.

3. Additional protection should be provided at Chemung and Southport Junctions at which points both unequipped Pennsylvania and equipped New York Central and Erie trains enter train-stop territory of this installation.

4. Because of the design of inductor and receiver used in this device, a cross between certain wires of the electric circuits, or derangement or improper location of certain of the parts of the train-stop equipment, may result in a locomotive passing an inductor location without the locomotive apparatus receiving or properly responding to the impulse intended to cause a stop operation. To guard against possible false-clear failures from this cause, dependence is placed upon the materials of construction and the method of installation employed, and it is apparent that a high degree of maintenance is constantly required.

155 I. C. C.

5. On the locomotives equipped for both forward and reverse operation, should the drive shaft of the reversing mechanism become disconnected or otherwise inoperative, the reversing switch would not function to open or close the electrical circuits as intended and a false-clear operation might result. The present construction of the driving mechanism appears rugged and substantial. However, should it be found that the present construction and maintenance are not adequate, other means must be provided to insure reliability of operation of the device.

6. Strict observance of the carrier's rules and instructions covering the inspection and maintenance of the train-stop apparatus should be enforced, and at locomotive terminals where not now available adequate testing instruments should be provided.

7. The design and method of installation of the test inductors now in use at locomotive terminals do not afford positive assurance of the serviceability of the train-stop equipment under actual operating conditions. To provide a more reliable service test, inductors of correct characteristics, properly installed and maintained, should be provided at all locomotive terminals and used for making service tests of train-stop equipment before departure.

8. As noted in our report covering the inspection of the installation made by the carrier under our order of June 13, 1922, the double-heading cocks on all locomotives equipped with the train-stop device should be so modified that when operated the engineman's automatic brake valve will be cut out of service before the train-stop device.

9. In response to a number of petitions, we have granted authority for the operation without train-stop equipment of certain locomotives between designated points within the limits of this installation. This inspection indicated that operating conditions were in some instances changed since these petitions were filed, and the carrier should now reconsider the matter of operating unequipped engines in train-stop territory with a view of utilizing to the fullest practicable extent the protection afforded by this installation.

The Erie is expected promptly to inform us as to the measures which it will take in respect to the matters noted above.

155 I. C. C.