

INTERSTATE COMMERCE COMMISSION
WASHINGTON

INVESTIGATION NO. 2458
THE READING COMPANY
REPORT IN RE ACCIDENT
AT LOGAN, PA., ON
OCTOBER 31, 1940

-2-

SUMMARY

Railroad: Reading
Date: October 31, 1940
Location: Logan, Pa.
Kind of accident: Rear-end collision
Trains involved: Passenger : Passenger
Train numbers: 325 : 207
Engine numbers: 203 : MU cars 800 - 822
Consist: 4 cars :
Speed: Standing : 30-50 m.p.h.
Operation: Automatic block-signal system
Track: Double; tangent; level
Weather: Clear
Time: 5:19:30 p.m.
Casualties: 155 injured
Cause: Accident caused by failure to furnish proper flag protection for preceding train and failure to operate following train in accordance with signal indication.

INTERSTATE COMMERCE COMMISSION

INVESTIGATION NO. 2458

IN THE MATTER OF MAKING ACCIDENT INVESTIGATION REPORTS
UNDER THE ACCIDENT REPORTS ACT OF MAY 6, 1910.

THE READING COMPANY

January 4, 1941

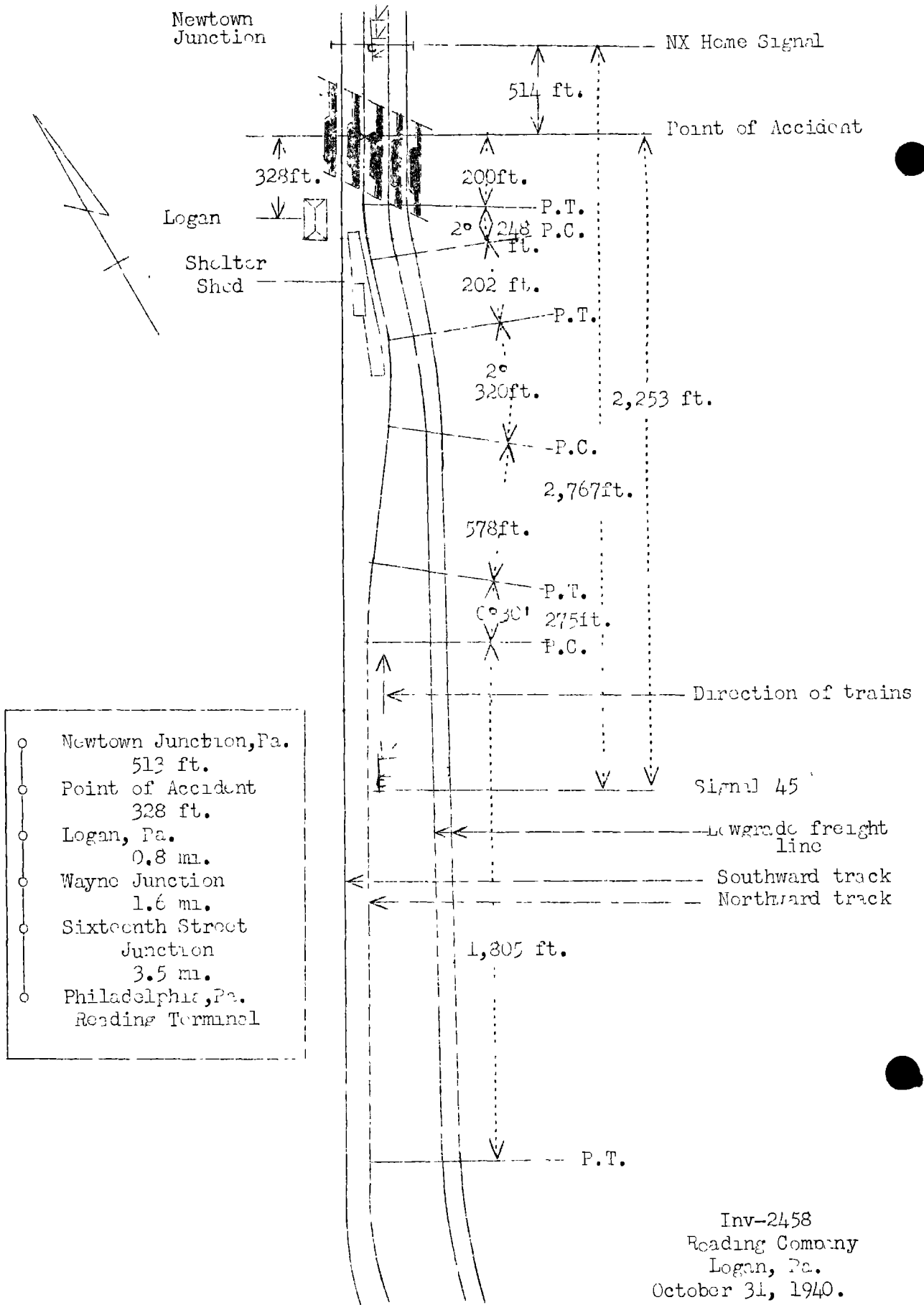
Accident at Logan, Pa., on October 31, 1940, caused by
failure to furnish proper flag protection for pre-
ceding train and failure to operate following
train in accordance with signal indication.

REPORT OF THE COMMISSION¹

PATTERSON, Commissioner:

On October 31, 1940, there was a rear-end collision
between two passenger trains on the line of the Reading
Company at Logan, Pa., which resulted in the injury of
124 passengers, 27 employees off duty and 4 employees on
duty.

¹Under authority of section 17 (2) of the Interstate
Commerce Act the above-entitled proceeding was referred
by the Commission to Commissioner Patterson for considera-
tion and disposition.



- Newtown Junction, Pa. 513 ft.
- Point of Accident 328 ft.
- Logan, Pa. 0.8 mi.
- Wayne Junction 1.6 mi.
- Sixteenth Street Junction 3.5 mi.
- Philadelphia, Pa. Reading Terminal

Inv-2458
 Reading Company
 Logan, Pa.
 October 31, 1940.

Location and Method of Operation

This accident occurred on that part of the Philadelphia Division which extends between Reading Terminal Station, Philadelphia, Pa., and Newtown Junction, Philadelphia, a distance of 6.3 miles. In the vicinity of the point of accident this is a double-track line over which trains are operated by an automatic block-signal system, the indications of which supersede time-table superiority. This line is equipped with an overhead catenary system for electric propulsion of trains; however, both electric and steam trains are operated. The accident occurred on the northward track at a point 328 feet north of Logan and 513 feet south of the northward home interlocking signal at Newtown Junction. As the point of accident is approached from the south there are, in succession, a tangent 1,805 feet in length, a $0^{\circ}30'$ curve to the right 275 feet, a tangent 578 feet, a 2° curve to the left 320 feet, a tangent 202 feet, a 2° curve to the right 248 feet, then a tangent 200 feet to the point of accident and 425 feet beyond. The grade on the northward track is level at the point of accident.

The accident occurred on Bridge C/01, which spans Broad Street and Old York Road just north of Logan station. The bridge is of through-plate girder construction and is provided with ballast flooring. From south to north the heights of the girders above the top of the rail are, in succession, 3 feet 2 inches throughout a distance of 33 feet, 6 feet 2 inches throughout 101 feet, and 3 feet 2 inches throughout 227 feet.

At Logan a shelter shed 360 feet in length is located between the northward and the southward tracks; it varies in height between 11 feet 9 inches and 12 feet 3 inches above the top of the rail; the north end of this shed is 420 feet south of the point of accident.

Newtown Junction interlocking is controlled from NX tower, which is located approximately 1,550 feet north of Logan Station. Automatic signal 45 and the home interlocking signal at NX, which govern northward movement on the northward track, are located, respectively, 2,253 feet south and 514 feet north of the point of accident. They are of the color-light type; signal 45 is approach-lighted and the home signal is continuously lighted. The aspects, indications and names involved are as follows:

<u>Signal</u>	<u>Aspect</u>	<u>Indication</u>	<u>Name</u>
45	Red-over-red	Stop; then proceed	Stop and Proceed Signal
Home	Red-over-red-over-red	Stop	Stop Signal
Home	Green-over-red-over-red	Proceed	Clear Signal

Rules for the government of the operating department read in whole or in part as follows:

15. * * *

Torpedoes must not be placed near stations, road crossings, main track switches, under bridges, or in yards where persons might be injured by them.
* * *

99. When a train stops under circumstances in which it may be overtaken by another train, the flagman must go back immediately with flagman's signals a sufficient distance to insure full protection, placing two torpedoes, and when necessary, in addition, displaying lighted fuses.

* * *

When a train is moving under circumstances in which it may be overtaken by another train the flagman must take such action as may be necessary to insure full protection. By night, or by day when the view is obscured, lighted fuses must be thrown off at proper intervals.

* * *

509. When a train is stopped by a block signal it may proceed:

* * *

(b) On two or more tracks at once at slow speed, expecting to find a train in the block, broken rail, obstruction or switch not properly set.

Medium speed is defined as: One-half the normal speed, not to exceed thirty (30) miles per hour.

Slow speed is defined as: One-quarter the normal speed, not to exceed fifteen (15) miles per hour.

The maximum authorized speed for the trains involved was 45 miles per hour.

It was dusk and the weather was clear at the time of the accident, which occurred at 5:19:30 p.m.

Description

No. 325, a north-bound first-class passenger train, with Conductor Kenney and Engineman Bickley in charge, consisted of steam engine 203, one passenger-baggage car and three coaches, in the order named; all cars were of steel construction. This train departed from Reading Terminal, Philadelphia, 5.9 miles south of Logan, at 5 p.m., according to the train sheet, on time, passed Sixteenth Street Junction, 2.4 miles south of Logan, at 5:10 p.m., 1 minute late, stopped at the northward home signal of Newtown Junction interlocking, which signal was displaying stop, at 5:17 p.m., 1 minute late, and at 5:19:30 p.m. the rear end was struck by No. 207.

No. 207, a north-bound first-class passenger train, with Conductor Phy and Engineman Showers in charge, consisted of multiple-unit coaches Nos. 800 and 822, in the order named. This train departed from Reading Terminal at 5:04 p.m., according to the train sheet, on time; passed Sixteenth Street Junction at 5:12 p.m., on time; stopped at signal 45, which displayed stop-and-proceed; proceeded from that point and, while moving at a speed estimated from 30 to 50 miles per hour, collided with the rear of No. 325.

The impact moved the engine and tender of No. 325 forward about 20 feet. The coupler on the front end of the first car of No. 325 was pushed back between the center sills about 2 feet behind the end sill, which mounted the end sill of the tender and crushed the rear sheet of the cistern inward. The rear vestibule of the fourth car was crushed inward and the draft sills were buckled; the corner, end, and side posts were broken. The front end of the first car of No. 207 was crushed inward about 7-1/2 feet. The draft sills were broken from the center-sills. The center-sills, the body bolster, and the side sheets were buckled. The longitudinal seats at the front end were crushed. The car floor was buckled and the area above the body bolster at the front end was badly damaged.

The front truck was pushed back a distance of 26 inches and the front pair of wheels was derailed. The main transformer on the second car of No. 207 was shifted and the backs of some of the seats were bent and twisted.

The employees injured were the flagman of No. 325 and the engineman, the conductor and the flagman of No. 207.

Summary of Evidence

Engineman Bickley, of No. 325, stated that the home signal at Newtown Junction displayed stop for his train. He stopped at the home signal and immediately sounded the whistle signal for the flagman to protect the rear of the train. About 1 minute later the home signal displayed clear for his train. He recalled the flagman, received a proceed signal on the train air-signal whistle, and opened the throttle to start, but before the train got under way the accident occurred. His train had been stopped about 3 minutes before the accident occurred. After the accident he found that his engine was separated from the train and was standing about 20 feet ahead of it. He said that because of conflicting movements through the interlocking it is not unusual for trains to be stopped at Newtown Junction. It was dusk and the weather was clear.

Fireman Davis, of No. 325, corroborated the statement of his engineman.

Conductor Kenney, of No. 325, stated that when his train stopped at the home signal at Newtown Junction he alighted and remained on the ground until the home signal displayed proceed. At that time the engine whistle-signal was sounded for the flagman to return to the train. The conductor did not see his flagman go to the rear to flag but heard a proceed signal sounded on the train air-signal whistle and, assuming that the flagman had sounded it from the rear of the train, he boarded the train and was in the front vestibule of the second car when the accident occurred; he stated positively that he did not sound the proceed signal on the train air-signal system. The train crew consisted of the conductor and the flagman only. He said that it is customary for the flagman to collect tickets in the rear two cars.

Flagman Carman, of No. 325, stated that his duties require him to collect tickets in the rear two cars of his train. When his train was approaching the point where the accident occurred he was in the third car collecting tickets and when it stopped at the home signal at Newtown Junction

he was near the middle of the third car. The engine whistle signal was sounded for him to protect the rear of the train and immediately he obtained his flagging equipment from the rear vestibule of the rear car and proceeded to the rear to furnish flag protection; he observed that the marker lights on the rear of his train were burning brightly. The rear end was standing opposite the north end of the highest girder of Bridge 6/01. He had proceeded to the south end of this girder, about 100 feet to the rear of his train, when he was recalled. He estimated that about 1 minute was consumed in alighting from the train, 1 minute in proceeding to the farthest point reached, and 1 minute in returning to the point where No. 207 overtook him. Before he reached the rear of his train he heard No. 207 approaching, also a warning called by a passenger stationed on the rear platform of his train. He waved stop signals above his head with the red lantern but his signals were not acknowledged, and he climbed over the bridge girder to avoid being struck. The brakes had not been applied when No. 207 passed him. He estimated the speed of No. 207 at 40 or 45 miles per hour at the time of the accident. He was aware that trains were scheduled closely behind his train and that he should have placed a lighted fusee when recalled, but he failed to do so because he thought his train would start before a following train approached closely. When No. 207 was first observed there was insufficient time to light a fusee. He said he did not sound a proceed signal on the train air-signal system prior to the time of the accident. It was dark and lights could be seen a considerable distance. He said that it was not unusual for his train to approach Newtown Junction slowly but that a stop was seldom made at that point. In this instance he expected the train to proceed without stopping, therefore, he did not furnish flag protection until the whistle signal was sounded for him to protect the rear of the train.

Engineman Showers, of No. 207, stated that his train followed No. 325 from Sixteenth Street Junction. He stopped his train at signal 45, which displayed stop-and-proceed, then proceeded at a speed of about 15 miles per hour and maintained a lookout for a train ahead. When his train was approaching Logan station he made a service brake application, then the home signal at Newtown Junction changed from stop to proceed. At this time he could see one dimly burning marker in the vicinity of the station shed at Logan. Since there was no flagman or fusee visible, he assumed the marker was displayed on an engine on an adjoining track, therefore he released the brakes and increased speed. The speed of his train had increased to about 30 miles per hour at the north end of the shelter shed when he observed simultaneously the markers of No. 325 about 5 car lengths distant and its flagman who was

only several feet to the rear of his train. Engineman Showers immediately applied the air brakes in emergency and they functioned properly but the distance was insufficient in which to stop short of the preceding train. It was dusk at the time of the accident and the headlight switch was in medium position. He understood that after a train stopped at a signal displaying stop-and-proceed it should proceed through that block prepared to stop; however, in this instance he became confused after he observed that the home signal displayed proceed.

Conductor Phy, of No. 207, stated that the air brakes on his train were tested at Reading Terminal. A running test was made soon after the train left that point, several stops were made en route, and the brakes functioned properly. As his train approached the point where the accident occurred he was stationed on the right doorway of the rear vestibule of the first car to maintain a lookout ahead. His train stopped at signal 45, which displayed stop-and-proceed. After it passed this signal a speed of 15 miles per hour was maintained to a point 4 or 5 car lengths south of the station shed at Logan. At this point he observed the home signal at Newtown Junction change from stop to proceed, then the speed of his train increased quickly to 45 or 50 miles per hour. Soon afterward the air brakes were applied in emergency and he observed the flagman of No. 325 waving stop signals with a red lantern. He said that the collision occurred so soon after the emergency application of the brakes was made that there was no appreciable reduction in speed. The rear end of No. 325 was standing between the highest girders of Bridge 6/01 and at dusk it was difficult to see it in that location. He understood that after a train passes a signal displaying stop-and-proceed it should be operated at slow speed throughout that block, expecting to find a train in the block, broken rail, obstruction, or switch not properly set; but in this instance he depended upon the ability of his engineman to see and to determine if the track ahead was occupied. When the conductor saw the train closely ahead in the same block the speed of his train was increasing so rapidly that the accident occurred before he could take action to prevent it. Engineman Showers, who was regularly assigned to the same run as he, was normal on the day of the accident.

Flagman Mitchell, of No. 207, corroborated the statement of his conductor.

John R. Histan, employed as a clerk by the Reading Company, stated that when No. 325 stopped at Newtown Junction he was on the rear platform and saw the flagman proceeding to the

rear, carrying a red lantern and a white lantern. The flagman proceeded about 200 feet to the rear, then started to return to his train, when the headlight of an approaching train came into view. Clerk Hestand said that he watched the headlight about 5 seconds, then, realizing it was on the northward track, he called a warning to the flagman. Immediately the flagman started to wave his red lantern. Clerk Hestand said that the accident occurred about 3 minutes after No. 325 stopped.

Engineman Kyle, of No. 898, stated that his train followed No. 207 on the day of the accident. Because of track curvature in the vicinity of the shelter shed at Logan, the rear end of No. 207 first came into view when his engine reached the south end of the shelter shed, a distance of about 800 feet.

Towerman Lengel, on duty at NX tower, stated that No. 325 was stopped at the home signal because of conflicting movements. He cleared the home signal for No. 325 at 5:18 p.m. It was dusk and night signals were necessary at the time of the accident.

Car Inspector Wolcott, on duty at Reading Terminal, stated that he tested the air brakes on No. 207 prior to the departure of that train. The brakes applied and released properly in both pneumatic application and electric application; also, the brakes applied in emergency when the safety control feature was tested.

General Foreman of Electric Car Shop Catherman stated that the wiring of the air-brake control circuits from the master controller to the rear of the vestibule on MU car 800 was damaged in the accident, but after the damaged section was isolated an air-brake test disclosed that the brakes functioned properly. The piston travel on MU car 800 was 10 inches; however, this excessive travel resulted from the front truck becoming shifted in the accident.

Power Dispatcher Moorehouse stated that the circuit breakers on the power lines for the territory involved opened at 5:19:30 p.m. and he was certain that this condition was a result of damage to the electrical equipment of MU car 800.

Superintendent Keene stated that the use of fuses in the territory involved is not prohibited.

According to data submitted by the railroad, each multiple-unit car involved is 70 feet 11-1/4 inches in length over vestibule ends, weighs 126,300 pounds, and has seating capacity for 86 passengers. The cars are powered with 300 horse-power

electric motors. Each car is provided with UEA-12-BC electro-pneumatic universal valves. A control station, in which are located an ME-23 brake valve and a master controller, is provided at each end of each car. A train consisting of one or more multiple-unit cars is operated from the front end of the first car. Safety-control features are provided in each master controller and are actuated by release of pressure on either the foot-pedal or the controller handle; when the safety-control is released the brakes apply in emergency and power is shut off.

Engineman Showers was last given a physical examination April 19, 1940, and was approved for service. He was last examined on operating rules on October 12, 1938. He was last given a surprise signal test October 22, 1940, and he responded satisfactorily.

Subsequent to the accident, two MU cars similar to those involved in the accident were used in conducting four braking tests at the point of accident. During two tests, starting at signal 45, speed was accelerated to 15 miles per hour at a point 350 feet north of the signal, then increased to full acceleration to the south end of the platform at Logan, where the safety control was released. During two other tests full automatic acceleration was used from signal 45 to the south end of the platform at Logan, where the safety control was released. The results were as follows:

	<u>Power on seconds</u>	<u>Maximum speed m.p.h.</u>	<u>Braking time seconds</u>	<u>Stopping distance feet</u>
Test No. 1	48	40	15.5	528
Test No. 2	44	40.5	16	598
Test No. 3	37	43	17-4/5	664
Test No. 4	38	44	17-1/5	647

Observations of the Commission's Inspectors

The Commission's inspectors observed that after dark the markers of a train standing at the point of accident could be seen from the control station of an MU car a distance of 1,030 feet; a lantern signal given 200 feet to the rear of the train could be seen a distance of 1,300 feet.

Discussion

According to the evidence, No. 325 stopped at Newtown Junction because of another train moving through the interlocking over a conflicting route. When the route had been lined up for this train to proceed, about 3 minutes later and just after the engineman had recalled the flagman, the rear end was struck by No. 207.

The flagman of the preceding train was collecting tickets near the center of the second car from the rear during the time his train was moving at slow speed preparing to stop at the next signal. He continued to collect tickets, because it was customary for his train to receive a stop indication at the home signal at Newtown Junction, but usually the signal was cleared before it was necessary to stop the train. After his train stopped, he obtained his flagging equipment, went back to protect his train, and had reached a point approximately 100 feet to the rear of his train when he was recalled. He started to run toward his train but almost immediately he heard the approaching train and a warning called to him by a passenger on the rear of No. 325. He turned around, and waved stop signals about 15 seconds with his red lantern above his head. The rules require that when a train is moving under circumstances in which it may be overtaken the flagman must throw off lighted fuses at proper intervals. It is apparent that if the flagman had complied with this rule when his train was moving at slow speed as it approached Newtown Junction the engineman of No. 207 would have been forewarned and this accident undoubtedly would have been prevented. The rules also require that when a train stops under circumstances in which it may be overtaken the flagman must go back immediately a sufficient distance to insure full protection, and display lighted fuses when necessary. The flagman was aware that other trains were scheduled closely behind his train; nevertheless, even after his train had stopped, he failed to display a lighted fusee. The evidence indicates that the flagman was required to collect tickets in the rear two cars. If he had not been engaged in this work but had been at the rear end of his train, he would have been able to drop lighted fuses as required during the time his train was reducing speed.

The engineman of No. 207 stopped his train at signal 45, which was displaying stop; then he operated his train at slow speed, in accordance with the rules, until the train reached a point near the south end of the shelter shed at Logan. From this point he observed the home signal at Newtown Junction change from stop to proceed and, assuming the proceed signal was for his train, he increased speed. At this time he did not see a flagman and he thought the markers ahead were

those of an engine on an adjacent track. When he first observed the flagman, No. 325 was about 5 car lengths distant; he applied the air brakes in emergency but too late to avert the accident. During vision tests conducted subsequent to the accident it was disclosed that, from the cab of a north-bound MU train, there was nothing to obstruct the view of the home signal at Newtown Junction but the view of the rear end of a train, standing at the point where the rear end of No. 325 stood, was restricted to a distance of 1,030 feet by the station shelter-shed and track curvature in the vicinity of the shed. A flagman stationed 200 feet to the rear of this train could first be seen from a point 1,300 feet to the rear of the train. A passenger on the rear of No. 325 estimated the distance the flagman reached from the rear of his train was 200 feet but the flagman stated that he was not back any farther than about 100 feet. Considering the fact that the light of a lantern carried in a person's hand is about 1-1/2 feet above the ground, it appears probable that the flagman's lanterns were below the bridge girders and that the engineman of No. 207 did not see the flagman's lights until the flagman raised the lantern above his head and waved stop signals. According to the rules, the engineman should have operated his train at slow speed to the home signal at Newtown Junction since a signal displaying stop-and-proceed indicates a condition of the track which requires restricted speed to the next signal. Had he obeyed this rule undoubtedly the accident would have been averted.

The failure of the flagman to furnish proper flag protection and the failure of the engineman to operate his train according to signal indication resulted in each of these employees placing dependence upon the rule affecting the operation of the other train, rather than upon the proper performance of their respective duties.

Cause

It is found that this accident was caused by failure to furnish proper flag protection for No. 325 and by failure to operate No. 207 in accordance with signal indication.

Dated at Washington, D.C., this fourth day of January, 19

By the Commission, Commissioner Patterson.

SEAL

W. P. BARTEL,

Secretary.