

BUREAU OF SAFETY

REPORT NO. 1963

Railroad: Delaware, Lackawanna & Western
Date: January 29, 1935
Location: Harrison, N. J.
Kind of Accident: Rear-end collision
Trains involved: Deadhead passenger equipment extra
and passenger; both all-steel multiple
unit electric trains
Casualties: 93 injured
Summary of facts: While rounding curve engineman thought
train ahead was standing upon another
track, and did not reduce speed so
as to be able to stop at next signal.
Cause of accident: Failure of engineman properly to ob-
serve and obey signal indications.

1963

INTERSTATE COMMERCE COMMISSION

REPORT OF THE DIRECTOR OF THE BUREAU OF SAFETY CONCERNING AN
ACCIDENT ON THE DELAWARE, LACKAWANNA & WESTERN RAILROAD
AT HARRISON, N. J., ON JANUARY 29, 1935.

March 1, 1935.

To the Commission:

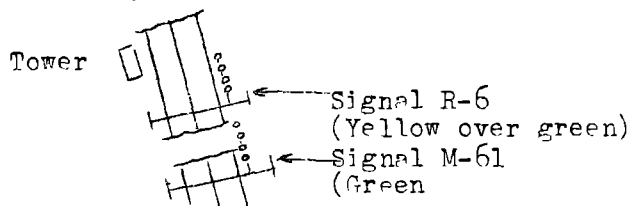
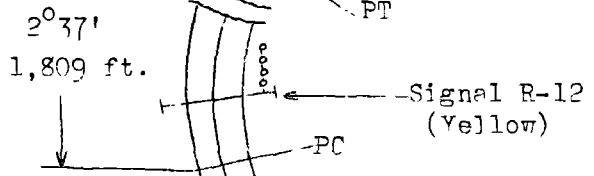
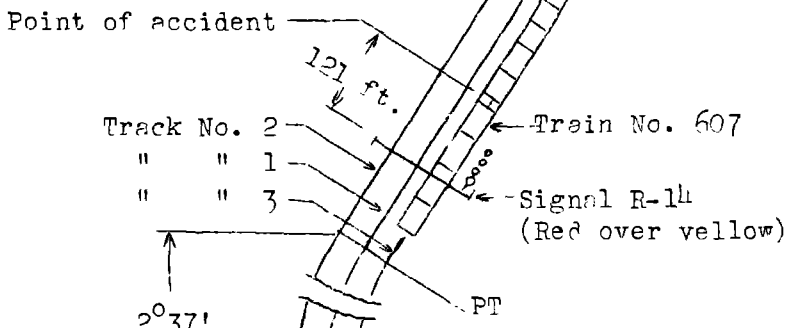
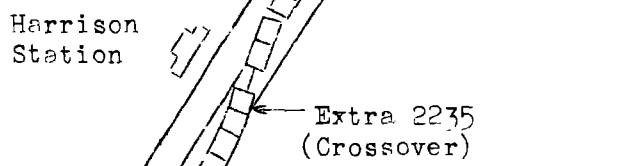
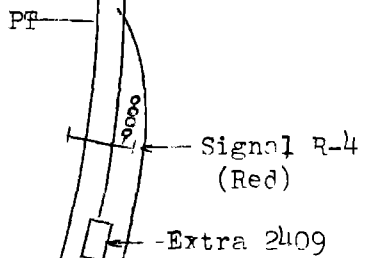
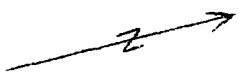
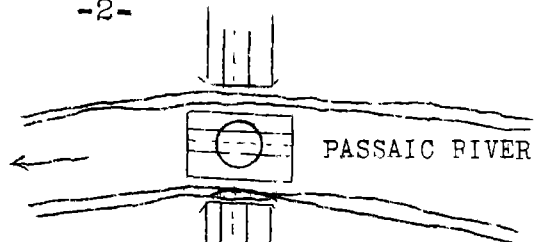
On January 29, 1935, there was a rear-end collision between a multiple-unit electric passenger equipment extra and a multiple-unit electric passenger train on the Delaware, Lackawanna & Western Railroad at Harrison, N. J., which resulted in the injury of 79 passengers and 14 employees, 7 of whom were deadheading; the majority of the injuries were of a minor nature. This accident was investigated in conjunction with representatives of the New Jersey Board of Public Utility Commissioners.

Location and method of operation

This accident occurred on that part of the Morris and Essex Division extending between Hoboken and Denville, N. J., a distance of 36.3 miles; in the immediate vicinity of the point of accident this is a three-track electric line over which trains are operated by time table and an automatic block-signal system. The tracks are numbered from north to south, 3, 1, and 2, tracks 3 and 1 being signaled for operation in either direction, and the accident occurred on track 3 about 450 feet east of the center line of the station at Harrison; approaching this point from the east, there is a $2^{\circ}37'$ curve to the right 1,809 feet in length and then 1,350 feet of tangent, the accident occurring on the tangent at a point 316 feet from its eastern end. The grade is generally ascending for west-bound trains, varying from 0.012 to 0.960 percent, and is at its minimum at the point of accident.

Harrison station is located south of the tracks and about 1,725 feet east of Newark drawbridge, over the Passaic River, while Harrison interlocking tower is also located on the south side of the tracks and about 3,000 feet east of the station; opposite the station there is a cross-over 367 feet in length which connects track 3 with track 1, this being a facing-point cross-over for west-bound trains moving on track 3. The switches and signals in the territory involved are controlled from a 23-lever electro-pneumatic interlocking machine, located in

○ Danville, N.J.
 29.17 miles
 × Harrison
 Point of accident
 7.13 miles
 ○ Hoboken, N.J.



Distance between signals	
Signal R-4	1,733 ft.
Signal R-14	1,752 ft.
Signal R-12	1,012 ft.
Signal R-6	2,171 ft.
Signal M-61	

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the tower. The signals involved in the accident are signals R-6, R-12, and R-14, located 2,885, 1,873, and 121 feet, respectively, east of the point of accident. These signals are of the 4-indication color-light type, mounted on signal bridges spanning the tracks, and display the following indications: Red for stop; approach, yellow, meaning prepare to stop at next signal, train exceeding one-half its maximum authorized speed at point involved must at once reduce to not exceeding that speed; approach restricting, yellow over green, meaning approach next signal at restricted speed; and green for proceed. In addition, push button control is provided whereby the towerman may change the red or stop indication to red over yellow, a slow-speed or calling-on signal, meaning to proceed at slow speed prepared to stop, this being done for the purpose of advancing a train into an occupied block.

The maximum permissible speed is 70 miles per hour; on the curve approaching the point of accident the speed limit is 50 miles per hour, and in addition there is a speed restriction of 30 miles per hour through the interlocking switches at Harrison station.

There was a light snow falling but visibility was good at the time of the accident, which occurred about 8:26 a.m.

Description

Newark drawbridge had been opened at 8:20 a.m. and at the time of the accident Extra 2409, an empty passenger equipment train of 8 cars, was standing on track 1 with its front end immediately east of drawbridge signal R-4, which is 1,612 feet west of the point of accident; Train No. 115, a 6-car passenger train, was standing 10 or 15 feet behind Extra 2409 with the two rear cars occupying the west end of the cross-over opposite the station, and Extra 2235, an empty passenger equipment train of 8 cars, stopped about 15 or 20 feet behind Train No. 115 about 8:24 a.m. with the three forward cars occupying the east end of the cross-over and the five rear cars on track 3, the rear end of the last car being 121 feet west of signal R-14. All three of these trains were of the multiple-unit type and composed of all-steel equipment.

Train No. 607, a west-bound multiple-unit passenger train, consisted of 4 cars, all of steel construction, and was in charge of Conductor Sutton and Engineer Black. This train left Hoboken, 7.13 miles east of Harrison, at 8:16 a.m., according to the train sheet, 1 minute late, passed signal R-6, which was displaying an approach-restricting indication; passed signal R-12 displaying an approach indication; passed the flagman of extra 2235 at a point approximately 316 feet behind his train; passed signal R-14 displaying a slow-speed or calling-on indication, and collided with the rear of Extra 2235 while traveling at a speed estimated to have been between 15 and 30

miles per hour.

The rear end of the last car in Extra 2235 was badly damaged and the rear truck derailed, while all but two of the other cars in this train were damaged to some extent by the force of the impact, which drove the train ahead and into the rear of Train No. 115, damaging the rear car of that train. The front end of the first car in Train No. 607 was badly damaged and the front truck derailed, and the second car was damaged to some extent. The employees on duty who were injured were 2 members of the crew of Extra 2235 and 5 members of the crew of Train No. 607, including the engineman.

Summary of evidence

Engineman Black, of Train No. 607, stated that he saw the indications displayed by the various signals, including the approach indication of signal R-12, and that the speed of his train approaching signal R-14 was between 20 and 30 miles per hour. While rounding the curve he saw a train standing opposite the station which at first he thought was an east-bound train, and it appeared to him as though it was pulling out. In the meantime he started to make an air-brake application so as to be prepared to stop at signal R-14 but on seeing that the signal was displaying a slow-speed indication, at which time the speed of his train was 30 miles per hour, he reduced the speed not less than 10 miles per hour. On looking again, however, he saw the rear ends of two trains and realizing that the track was occupied he immediately applied the air brakes in emergency, when about five car lengths from the rear of Extra 2235; he thought there was snow and ice on the rails, however, and said the wheels locked and that his train slid into Extra 2235 while traveling at a speed of 15 or 20 miles per hour. When asked if he had seen a flagman he replied that he had seen a man at the side of the train ahead. Engineman Black understood the signal indications he had received and knew that when he received red over yellow, or a slow-speed-indication, such as was displayed by signal R-14, it might indicate two things; first, that he should reduce speed to 10 miles per hour, and second, that a train might be standing just inside the block. In this particular case he knew that Extra 2235 had left Hoboken shortly ahead of his own train and he thought he was operating his train under proper control; he also said that the air brakes had been tested and that they worked properly en route, also that he felt normal in every respect.

Conductor J. H. Sutton, of Train No. 607, who was in the baggage compartment of the first car, said that the train was drifting as it approached the point of accident. The door between the baggage compartment and the front end was open, and looking through the glass in the front end he saw a train about

two car lengths distant; he immediately shouted a warning of danger, following which the engineman left his seat on the right side of the front end, jumped inside the baggage compartment and slammed the door, the collision occurring immediately afterwards while the train was running at a speed of about 30 miles per hour. Conductor Sutton said that no air-brake application had been made up to the time he shouted the warning of danger and that he did not feel the brakes apply in emergency until the engineman took his hand off the controller, and in his opinion they were applied as a result of operation of the "dead man" control feature, which causes the brakes to apply in emergency when the engineman removed his hand from the controller. Conductor Sutton had been on this run with Engineman Black for several years and was unable to advance any reason for the engineman's apparent failure to operate the train in a normal manner.

Baggageman J. S. Sutton verified the conductor's estimate as to speed at the time of the accident and also concerning an application of the brakes a few seconds before the accident occurred. He got off immediately afterward and then saw the flagman of Extra 2235 coming around the rear of Train No. 607. Baggageman Sutton had known Engineman Black for many years; he talked with the engineman at Hoboken and he appeared to be in normal condition.

Engineman Buddle, of Extra 2235, stated that his train followed Train No. 115 closely out of Hoboken and that he experienced no difficulty in observing the signal indications displayed en route. Signals R-6, R-12, and R-14 were displaying approach restricting, approach, and slow-speed indications, respectively, the latter indication permitting his train to pass signal R-14 under full control and close up behind Train No. 115. He whistled out a flag just as he was stopping, and about 2 minutes after his train stopped, its rear end was struck by Train No. 607. Conductor Hockenbury, of Extra 2235, stated that as soon as his train stopped Flagman Brinkerhoff got off and started back to flag; Conductor Hockenbury looked back through the rear window and saw the flagman going over the bridge at Sussex Street with his flag unfurled, and then walked back in the car and was about to sit down when the crash occurred, about $1\frac{1}{2}$ or 2 minutes after stopping.

Flagman Brinkerhoff, of Extra 2235, stated that his train stopped at 8:24 $\frac{1}{2}$ a.m. and that he went back as far as he could go within the time at his disposal, reaching a point on the east side of Sussex Street bridge, or 316 feet from the point where his train stood, and giving stop signals with his flag as Train No. 607 approached around the curve. These signals were not answered and when Train No. 607 was three or four car lengths away he saw the engineman in his compartment, at which

time the speed of the train was about 25 or 30 miles per hour, with no indication that the brakes had been applied, and then the flagman had to jump out of the way, going down the bank on the engineman's side of the track. Flagman Brinkerhoff further stated that the movements in question were of regular occurrence and that he had had occasion to flag this same train at the same location on an average of about once in every week or 10 days, due to the drawbridge being open, and he said that previously the engineman had always had the train under proper control, answered the flag signals, and stopped without incident.

Towerman Ford, on duty at Harrison tower, said Train No. 607 received an approach-restricting indication at signal R-6 and an approach indication at signal R-12, while a stop indication was displayed by signal R-14 until the train had reached a point about half way between signals R-12 and R-14 or where the engineman could have the view of signal R-14, at which time Towerman Ford operated the push button which resulted in the aspect changing from red to red over yellow, thus authorizing Train No. 607 to proceed at slow speed prepared to stop. Towerman Ford was not paying particular attention to the speed of the train when it passed the tower but thought it might have been traveling from 25 to 30 miles per hour.

Signal Engineer Saunders stated that signal R-14 is so arranged that the towerman at Harrison interlocking tower can change the red aspect to red over yellow, if the block is occupied, by pressing a push button located immediately below the lever, saying that the towerman was permitted to use the push button for the purpose of advancing trains according to his own judgment. In the present case, however, he did not think it would have made any difference had signal R-14 displayed a stop instead of a slow-speed indication, as it would not have affected the indications displayed by the preceding signals, and while normally a stop indication might have aroused the engineman sufficiently to cause him to apply the brakes and stop before reaching signal R-14, yet in this case the engineman apparently was looking at a train which he thought was on another track, instead of looking at the signal, and in his opinion the accident was caused primarily by the failure of Engineman Black to conform to the requirements of the approach indication of signal R-12 and to control the speed of his train accordingly. Signal Engineer Saunders also was of the opinion that a cab-signal system in this location would not have prevented the accident, in view of the short distance between blocks and the short space of time, saying that a cab signal could not have given any more restrictive indication than the engineman actually received, and under the circumstances he did not think that the engineman would have acted any

differently. Inspection of the signal system after the accident disclosed it to be in proper working order.

Multiple Unit Shed Foreman Purcell stated that all multiple-unit cars are inspected after 2,300 miles of service, or every 28 or 30 days, this inspection including the air-brake equipment. The car from which Train No. 607 was being controlled on this trip, which was trailer 2407, was in the shop for inspection on the day prior to the accident and everything about it was found to be in proper condition. After the accident he inspected the equipment in Train No. 607, but found no indication of slid-flat wheels or blown fuses, and the rear unit of the train continued in service following the accident. All controllers are equipped with a "dead man" control feature.

Car Inspector Thomas stated that he tested the air brakes on Train No. 607 before it departed from Hoboken on this trip and they were in proper working order; this test consisted of examining all brakes after they were applied and again after they were released, following which there was an emergency application indicating that the engineman was testing the "dead man" control.

Vision tests disclosed that the engineman of an approaching west-bound train could see the rear end of a train standing at the point of accident a distance of 987 feet across the inside of the curve, but he could not definitely determine on which track it was standing until he had practically reached the leaving end of the curve, or when the train ahead was only 325 feet distant.

Discussion

There is conflicting evidence as to the action of Engineman Black immediately prior to the accident. Engineman Black stated that he saw the restrictive indications displayed by signals R-6 and R-12, and he knew that the approach indication displayed by the latter signal required him to operate his train prepared to stop at the succeeding signal, R-14; however, he was looking across the curve at a train which he thought was an east-bound train standing at the station and started to apply the brakes, but on seeing signal R-14 displaying a slow-speed or calling-on indication he said he made only a light application; the speed at the time was 30 miles per hour and according to his statement he reduced speed to about 20 miles per hour, not realizing that the train ahead was standing on track 3 until it was only about five car lengths distant, at which time he applied the **brakes** in emergency, the wheels locking and the

train sliding into the rear of the standing train at a speed of 15 or 20 miles per hour. The statements of the conductor and baggagemen, however, indicated that no application of the brakes was made until there was an emergency application as a result of the operation of the "dead-man" control feature when the engineman took his hand from the controller and jumped from his compartment after the conductor had shouted a warning, when about two car lengths from the point of accident.

Tests which were made subsequent to the accident disclosed that Engineman Black could not have told definitely upon which track Extra 2235 was standing until it was only 325 feet distant. There is no question, however, as to the signal indications he had received approaching this point, and the engineman knew that he was required to approach signal R-14 prepared to stop. The air brakes had been tested prior to starting the trip and had worked properly en route. Had Engineman Black properly obeyed the approach indication of signal R-12, he would have approached signal R-14 prepared to stop and would then have been in position to accept the slow-speed or calling-on indication displayed by that signal and close up behind Extra 2235. Engineman Black had been an engineman since 1902, qualified for multiple-unit service on August 5, 1930, had operated in this territory for several years, and was on his regular run.

The evidence indicates that Flagman Brinkerhoff had done all that he could to protect his train within the limited time at his disposal. While apparently Engineman Black did not see the flagman, Baggage man Setton said that on getting off a few seconds after the accident he saw the flagman of Extra 2235 coming around the rear of Train No. 607, indicating that the flagman had been back a distance nearly equal to the length of Train No. 607.

Conclusions

This accident was caused by the failure of Engineman Black, of Train No. 607, to obey signal indications.

Respectfully submitted,

W. J. PATTERSON,

Director.