

INTERSTATE COMMERCE COMMISSION

REPORT OF THE DIRECTOR OF THE BUREAU OF SAFETY IN RE
INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE
BOSTON AND MAINE RAILROAD AT NORTH CHELMSFORD,
MASS., ON MAY 9, 1930.

June 24, 1930.

To the Commission

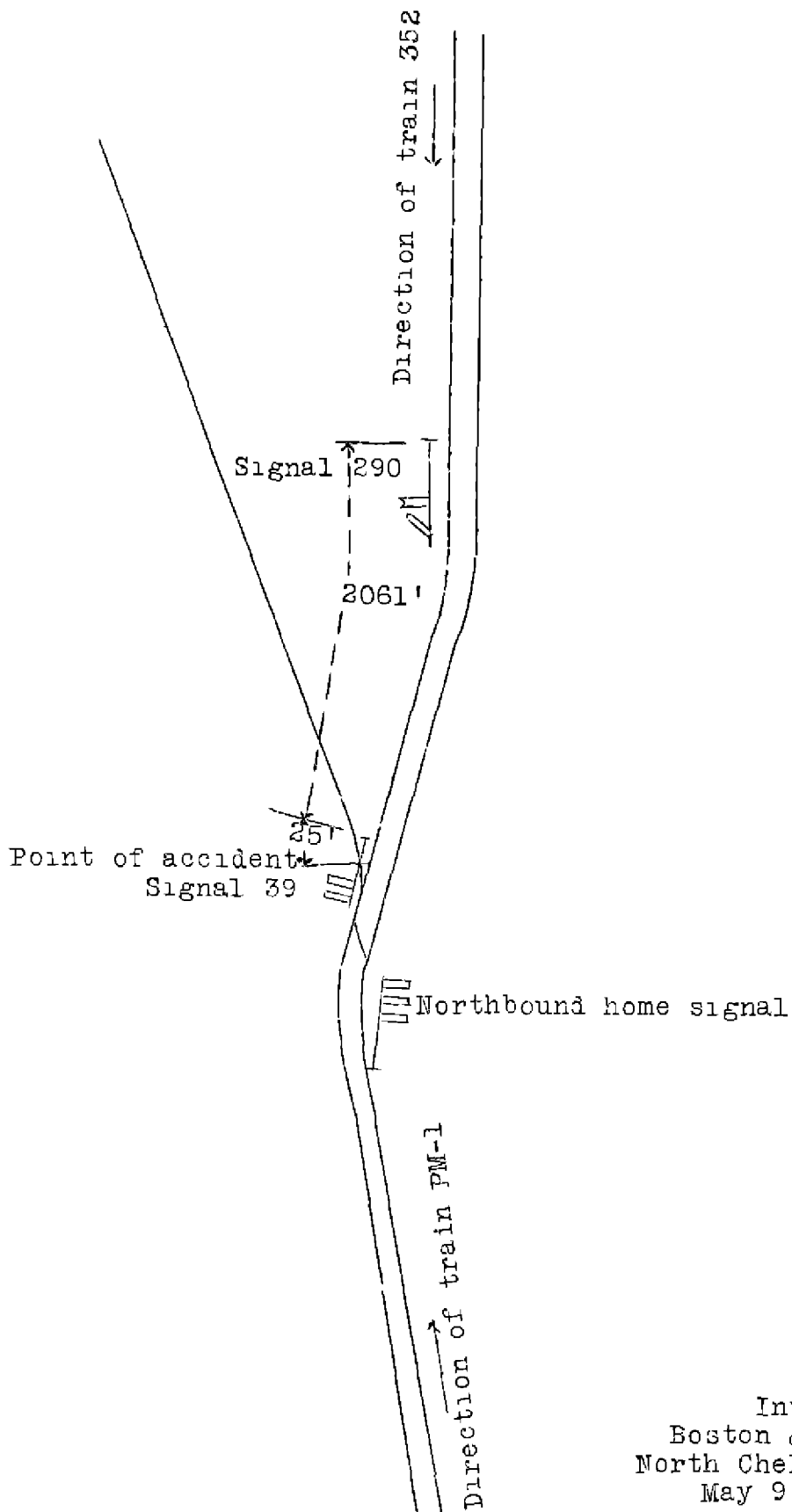
On May 9, 1930, there was a side collision between a milk train of the second class and a freight train, on the Boston & Maine Railroad, at North Chelmsford, Mass., which resulted in the injury of three employees. The investigation of this accident was held in conjunction with representatives of the Massachusetts Department of Public Utilities.

Location and method of operation

This accident occurred on that part of the Southern Division extending between Concord, N. H., and North Billerica, Mass., a distance of 51.53 miles, and is a double-track line over which trains are operated by timetable, train orders, and an automatic block-signal system. The accident occurred at the fouling-point of Southern Division southbound main track and Stony Brook Branch of the Portland Division. There is a facing-point crossover for northbound trains between the main tracks of the Southern Division located just south of the switch leading to the Stony Brook Branch. Approaching the point of accident from the north the track is tangent for a distance of 4,090 feet, followed by a 1° curve to the right 410 feet in length, from which point the track is tangent for a distance of 1,730 feet, the accident occurring on this latter tangent at a point approximately 125 feet from its southern end. Approaching from the south the track is tangent for a distance of 1,930 feet, then a $2^{\circ} 40'$ curve to the right 1,420 feet in length, followed by the tangent on which the accident occurred. The grade in this vicinity is slightly undulating and at the point of accident is 0.154 per cent ascending for southbound trains. The maximum speed permitted for milk trains is 45 miles per hour.

There is an interlocking plant at North Chelmsford, with annunciator bells located in the tower to indicate the approach of trains from both directions. The track

North



South

Inv. 1636
Boston & Maine R.R.
North Chelmsford, Mass.
May 9, 1930.

circuit for the southbound annunciator begins at a point approximately 6,600 feet north, and the circuit for the northbound annunciator begins about 7,500 feet south of the switch leading to the Stony Brook Branch. The signals involved are home interlocking signal No. 39, located approximately 150 feet north of the Stony Brook Branch switch and distant semi-automatic signal No. 290, located 2,061 feet north of signal No. 39. The point of accident was about 25 feet south of signal No. 39.

A dense fog prevailed at the time of the accident, which occurred about 2.45 a.m.

Description

Northbound freight train PM-1 consisted of 100 cars and a caboose, hauled by engine 4000, and was in charge of Conductor Lemcre and Engineman Percival. This train passed Lowell, 3 miles south of North Chelmsford, at 2.23 a.m., and was entering the Stony Brook Branch at North Chelmsford at a speed estimated at 8 miles per hour when it was struck by train No. 352.

Southbound second-class milk train No. 352 consisted of 18 cars and a caboose, hauled by engine 2689, and was in charge of Conductor Mullin and Engineman McKay. This train departed from Nashua, 10.41 miles north of North Chelmsford, at 2.26 a.m., 1 hour and 11 minutes late, passed distant signal 290 which was displaying a caution indication, passed home signal 39 which was displaying a stop indication and collided with train No. PM-1 while traveling at a speed estimated at 15 miles per hour.

Engine 2689 was overturned on its left side and was considerably damaged, while one pair of wheels in the forward truck of the leading car in train No. 352 was derailed. Engine 4000 was also badly damaged but was not derailed. Two cars in train PM-1 were destroyed, and one car and the caboose were damaged.

Summary of evidence

Engineman Percival, of train PM-1, stated that water was taken at Middlesex, 1.27 miles south of North Chelmsford, and just after starting from that point he noted the time to be 2.40 a.m. There was some fog ahead but he could see the automatic block signal approximately $\frac{1}{4}$ mile distant. As his train proceeded the fog increased in density; when approaching North Chelmsford it became very heavy, and as a result he reduced speed until he could determine the indication of the home interlocking

signal governing the movement through the crossover and to the Stony Brook Branch. He could not see the indication of this signal until his train was about 50 feet from it, but as soon as he saw that it was in the clear position he released the brakes and gradually opened the throttle. When his train reached a point about opposite the tower he observed the headlight of an approaching southbound train but at that time he expected that train to stop short of the southbound home signal, he did not realize that it was not going to stop until it was from 50 to 125 feet from his own engine and the collision occurred before he had time to shut off steam or apply the brakes. He estimated the speed of his train at the time of the accident at not more than 5 miles per hour. After the accident the southbound home signal was in stop position.

Fireman Boody, of train PM-1, stated that from 4 to 6 minutes were consumed in taking water at Middlesex, and that due to the fog the train was operated very slowly after leaving that point; a period of about 10 minutes was required to run from Middlesex to the point of accident. From his position on the engine he could not see train No. 352 approaching; after the accident he observed that the home signal governing the movement of that train was displaying red indications. He estimated the speed of his train at the time it was struck at 3 to 5 miles per hour.

Head Brakeman Wood, of train PM-1, stated that he was riding in the gangway on the engineman's side of the engine while approaching North Chelmsford. The weather was very foggy, and speed was reduced to about 2 miles per hour because of not being able to see the home signal until the engine was 3 or 4 car-lengths from it, then the speed was increased to 4 or 5 miles per hour. When he saw the headlight of train No. 352 in the fog it was only 50 or 100 feet away. He further stated that it took his train 9 minutes to travel from Middlesex water tank to North Chelmsford and that under favorable weather conditions it required but 4 minutes.

Conductor Lemere, of train PM-1, stated that his train stopped at Middlesex for water at 2.29 a.m., departed from that point at 2.36 a.m., and did not stop until at North Chelmsford he felt a sudden lurch of the caboose which he thought at the time was caused by a burst air hose, this occurred at 2.45 a.m. He went forward with a wrench to make repairs and did not learn that an accident had occurred until he reached the head end of the train. He also said that banks of fog were encountered en route, and at North Chelmsford where the fog was considerably heavier than at any other point the view was restricted to less than four car-lengths.

Engineman McKay, of train No. 352, stated that before departing from White River Junction, the initial terminal, an air-brake test was made and upon receiving a proceed signal from the rear end the train departed. Several stops were made en route where cars were set off and others picked up, the last place being at Nashua where six cars were set off, and in each instance the brakes were tested before leaving these points; no difficulty was experienced in making these stops and reducing speed at various points. It was foggy the entire trip; the fog grew heavier as the train continued, and after leaving Nashua it became very dense although he was able to discern all signal indications at distances of three or four car-lengths. He shut off steam approximately 10 or 15 car-lengths north of distant signal 290 and when his train reached a point about three car-lengths from this signal he discovered that it was displaying a yellow indication. He said he immediately made a service application of the brakes, reducing the brake-pipe pressure about 15 pounds, but the brakes did not seem to take proper hold and when the train reached a point about 10 car-lengths beyond the distant signal he moved the brake valve from service emergency position, without having released the brakes, and opened the sanders. This application also failed to have the desired effect as the cars in the rear appeared to be surging against the forward part of the train. He estimated the speed of the train at 18 or 20 miles per hour when he applied the brakes in emergency and at 8 miles per hour at the time of the accident. He said that he could see the headlight of the opposing train when he applied the brakes in emergency but was unable to see the home signal until the engine of train PM-1 started to head into the Stony Brook Branch. He also said that he thought he was handling his train properly as he always shuts off steam in the vicinity of the point he did on the morning of the accident and if signal 290 is in the caution position an ordinary service application of the brakes will stop the train within one-half the distance to the home signal providing the brakes are working properly. About 45 minutes after the accident he went back and found all brakes set on the entire train.

Fireman Stearns, of train No. 352, stated that he noticed nothing unusual about the handling of the train prior to its approach to North Chelmsford. When the train entered the straight track north of signal 290 that signal was displaying a caution indication, he called its indication, and the engineman acknowledged by a nod of his head.

He was of the opinion that the signal could be seen for a distance of 8 or 10 car-lengths but the engineman did not apply the brakes until the engine was passing the signal, he said the brakes seemed to take hold. He was watching for the home signal and paid no particular attention to the speed, although he thought it was probably 35 miles per hour. When the headlight of an engine appeared in the fog he crossed over to the engineman's side of the cab and got down on the lower step, and when it appeared a collision was inevitable he jumped off.

Head Brakeman Cushing, of train No. 352, stated that the cars set off at Nashua had been located behind the first car in the train and after he recoupled the train the engineman applied the brakes, called in the flagman, then the brakes were released, and the train departed. He rode on the fireman's side of the engine after leaving Nashua, and on account of the heavy fog he could not distinguish the signal lights until the engine was possibly two car lengths from them. He said steam was shut off 8 or 10 car-lengths north of signal 290 and when the train reached a point not more than three car-lengths from this signal he observed it to be in the caution position. At about the same time the engineman called the indication yellow and then the engineman made a service application of the brakes but by this time the engine was passing the signal, at a speed of about 25 miles per hour. As there was no perceptible reduction in speed the engineman applied the brakes in emergency at a point approximately 10 car-lengths south of the signal but from the manner in which the train responded he thought they did not properly apply on the rear end. He saw the headlight of the engine of train PM-1 before he could see the home signal, the latter being visible for a distance of only about three car-lengths. He jumped off after passing the station or within two car-lengths of the point of accident and at that time the train was traveling at a speed of about 8 miles per hour. After the accident he accompanied the engineman in the inspection of the brakes and found the air properly cut through on the side of the train he inspected while the engineman reported the same condition existed on the other side of the train. Brakeman Cushing also stated that he went back and found sand on the rails for a distance of approximately 1,500 feet.

Conductor Mullin, of train No. 352, stated that he noticed nothing out of the ordinary about the functioning of the brakes in making numerous stops and reductions in speed after leaving the initial terminal. Cars were set out and picked up at various points, the last place being Nashua, and after the train was recoupled at that point he heard the air brakes release following an application

for a train line test. He did not look at the air gauge in the caboose after leaving Nashua. He rode in the cupola and while the weather was foggy he could see the signal indications for a distance of six or seven car-lengths. As the train approached the distant signal at North Chelmsford, traveling at a speed of about 25 miles per hour, he felt a slight application of the brakes at which time he thought the engine was in the vicinity of that signal. It appeared to him that other applications of the brakes were made as the train continued to reduce speed until there was a sudden shock which he later learned was caused by the collision. He estimated the speed at 8 miles per hour at the time of the accident. Upon looking at the gauge he discovered it did not register any air pressure. After the accident he examined the train and found the brakes applied. He also stated that he did not think the speed was more than 35 miles per hour at any time between Nashua and the point of accident.

Flagman Buelow, of train No. 352, stated that he heard the air brakes release at Nashua while he was returning to the train after going back to flag. He said the brakes were applied in the vicinity of the distant signal at North Chelmsford; he estimated the engine was then by the signal about 10 car-lengths. A short time later he felt a severe application of the brakes and the train traveled about three car-lengths before it came to a stop.

Towerman Colgate, on duty at North Chelmsford at the time of the accident, stated that the annunciator bell for northbound trains started ringing and continued to ring for some time, which indicated to him that train PM-1 was taking water at Middlesex. When the bell stopped ringing he knew the train had passed off from the track circuit for the annunciator, and he lined the route for it to enter the Stony Brook Branch. In order to do so it was necessary to set signal 290 and the home signal for southbound trains in stop position. About 8 minutes later the annunciator bell for southbound trains rang, and at that time train PM-1 was slowly approaching the tower. He paid no further attention to the trains and did not know train No. 352 was not going to stop until he heard the crash of the collision. He said that as near as he could remember he was notified that train PM-1 had passed the tower at Bleachery, approximately $3\frac{1}{2}$ miles south of his station, at 2.15 a.m., and that train No. 352 passed Nashua at 2.26 a.m. He had not been given instructions concerning the handling of trains through the plant according to their superiority but is governed entirely by the annunciator bells and if he figures that he can get a freight train across ahead of a superior train he lines the route accordingly. In this instance he thought there was sufficient time for train PM-1 to enter the Stony Brook Branch without delaying train No. 352.

Engineman Miller stated that he hauled the equipment of train No. 352 from the scene of accident to Nashua with engine 2695 which is of the same type as engine 2689 and he experienced no difficulty in stopping the train at the latter point from a speed of 20 miles per hour with an 8-pound brake-pipe reduction. Engineman Fosgate, who handled the same equipment from Nashua to Ayer, and Engineman Coleman, who handled it from Ayer to Boston, also stated that there were no irregularities in the operation of the train brakes.

Car Foreman Johnson stated that he measured the piston travel on the equipment of train No. 352 and found it varied from 5 inches to $9\frac{1}{4}$ inches. Engine Inspector Spaulding stated that he inspected and tested the brakes on engine 2689 before it departed on the trip on which the accident occurred and found them to be in good condition.

Mechanical Officer Richardson stated that he instructed Supervisor of Locomotive Operation Ayers to inspect the track and observe how far back sand marks could be found on the rails, and Mr. Ayers reported the distance to be 630 feet from the home signal. Road Foreman of Engines Foster stated that he also walked back along the track subsequent to the accident and noticed sand on the rails for a distance of approximately 600 feet north of the home signal.

Signal Supervisor Wood stated that he arrived at the scene of accident at 5 45 a.m., and made an examination of the interlocking plant, this was found to be in proper operating condition. Signal 39 was in stop position and signal 290 in caution position, with the route line for a crossover movement to the Stony Brook Branch.

Conclusions

This accident was caused by the failure of Engineman McKay, of train No. 352, properly to control the speed of his train in view of existing weather conditions and by his failure to obey signal indications.

According to Engineman McKay's statement, the dense fog prevailing after passing Nashua materially restricted the visibility and he was unable to distinguish the indications of signals until his engine had almost reached them. The rules for enginemen provide that when fixed signals are obscured by fog or storms they must approach them at such speed as to be able to stop within the distances at which their indications can be distinguished.

Should they be unable to see the indication of a signal without encroaching upon the danger point protected by it they must stop clear of such point and send the fireman or trainman ahead to ascertain the indications and be advised thereof by them before proceeding.

According to the records, train No. 352 made the run from Nashua to North Chelmsford, a distance of 10.41 miles, in 19 minutes, 3 minutes less than schedule time, the average speed being approximately 32 miles per hour. Engineman McKay said he did not apply the brakes after leaving Nashua until approaching the distant signal at North Chelmsford, and from the statements of other employees as well, it appears that the usual rate of speed was maintained on this run, and that no special precautions were taken, notwithstanding the dense fog and the special requirements applicable under such conditions.

Engineman McKay observed that signal 290 was displaying a caution indication when his train reached a point about three car-lengths from it, he said he made a service application of the brakes and when his engine was approximately ten car-lengths beyond the signal he observed the headlight of an opposing train and he applied the brakes in emergency and opened the sanders, but he was unable to stop the train in time to prevent the accident and he attributed this failure to lack of efficiency in the brake equipment. However, the evidence established the fact that the brakes were in proper operating condition, they had been tested at the initial terminal and at various points en route where changes were made in the consist of the train, and prior to the accident no difficulty had been experienced in stopping or controlling the speed. Nearly an hour after the accident the brakes still remained applied, and subsequent examination, tests and operation disclosed that they were in proper operating condition. According to Engineman McKay's statement, he started to make a service application of the brakes before he reached the distant signal; other employees thought he had reached or passed the distant signal before he started braking. He thought he was about 10 car-lengths beyond the distant signal when he placed the brake valve in emergency, but stated that when he did so he could see the headlight of the opposing train. The distant signal was located approximately 2,200 feet from the Stony Brook Branch Junction, and a point 10 car-lengths beyond the distant signal would still be about 1,700 feet from that junction. In view of the dense fog it is not believed a headlight could be seen for that distance, one employee estimated that it could be seen for only about 3 car lengths, and furthermore,

had the brakes been applied at that point it is believed the train would have been stopped considerably short of the junction. The engineman said he opened the sanders when he made the emergency application, and there was an indication of sand having been used for a distance of approximately 650 feet from the point of accident. It is therefore believed that Engineman McKay did not begin braking soon enough properly to control the speed of his train when approaching this junction point, and when he made the emergency application he was too close to the junction to be able to stop in time to avert the accident.

At this point there was an average daily movement of approximately 62 trains, of which 24 movements were over the branch line; on this line movements between North Chelmsford and Ayer, Mass., are governed by a centralized traffic control installation. The circumstances under which this accident occurred and the density of traffic warrant serious consideration as to the necessity of additional protection at this point.

The employees involved were experienced men and at the time of the accident none of them had been on duty in violation of any of the provisions of the hours of service law.

Respectfully submitted,

W. P. BORLAND,

Director.