

INTERSTATE COMMERCE COMMISSION

REPORT OF THE DIRECTOR OF THE BUREAU OF SAFETY IN RE INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE PENNSYLVANIA RAILROAD NEAR MONMOUTH JUNCTION, N J, ON NOVEMBER 12, 1925

DECEMBER 4, 1925

TO THE COMMISSION

On November 12, 1925, there was a rear-end collision between two passenger trains on the Pennsylvania Railroad near Monmouth Junction, N J, which resulted in the death of 9 passengers and 1 Pullman porter, and the injury of 20 passengers, 11 mail clerks, and 4 employees. The investigation of this accident was made in conjunction with representatives of the Public Utilities Commission of New Jersey.

LOCATION AND METHOD OF OPERATION

This accident occurred on the New York division, which extends between New York City and Philadelphia, Pa. In the vicinity of the point of accident this is a four-track line over which trains are operated by time-table train orders, and an automatic block-signal system. The signals are of the three-position upper-quadrant type and are mounted on signal bridges which span all four of the tracks. Night indications are red, yellow, and green, for stop, caution, and proceed, respectively. The signals involved in the accident were those which were mounted on signal bridges 448 and 440, located 6,823 and 1,859 feet, respectively, west of the point of accident.

The tracks are numbered from north to south, as follows: 4, 3, 2, and 1, the accident occurring on track 1 at a point about 2.7 miles west of Monmouth Junction. Approaching this point from the west the track is tangent for a considerable distance, while the variations in grade are slight, the heaviest grade being that on which the accident occurred, where it is 0.164 per cent ascending for eastbound trains.

It was dark and the weather was very foggy at the time of the accident, which occurred at 5.55 or 5.56 a. m.

DESCRIPTION

Eastbound passenger train No. 166 consisted of two mail cars, one combination mail and baggage car, two coaches, and six Pullman sleeping cars, in the order named, all of steel construction, hauled

by engine 3775, and was in charge of Conductor Neal and Engineman Moore. It left Trenton, N. J., 157 miles from Monmouth Junction, at 5:31 a. m., seven minutes late, passed Princeton Junction, N. J., 6 miles from Monmouth Junction, at 5:44 a. m., eight minutes late, and was brought to a stop at signal bridge 440, at which point the signal governing track 1 was in the stop position. The train proceeded immediately and after moving a short distance was brought to a stop a second time to extinguish a fusee, it then started ahead and was moving at a speed of 8 or 10 miles an hour when its rear end was struck by train No. 6.

Eastbound passenger train No. 6 consisted of one express car, one business car, three Pullman sleeping cars, one coach, one combination passenger and baggage car, two mail cars, and one express car in the order named, all of steel construction, hauled by engine 3884 and was in charge of Conductor Hamilton and Engineman Carroll. It left Trenton at 5:39 a. m., nine minutes late, passed Princeton Junction at 5:52 a. m., still nine minutes late, and collided with the rear end of train No. 166 near Monmouth Junction while traveling at a speed estimated to have been about 35 or 40 miles an hour.

The underframe of the sleeping car on the rear end of train No. 166 was forced under the underframe of the car immediately ahead of it, resulting in the rear car being telescoped at its forward end for a distance of about two-thirds of its length, this car was practically demolished while the car which telescoped it was damaged to some extent. Minor damage was sustained by several of the other cars in this train and also by the engine which was hauling it. Engine 3884 of train No. 6 was not derailed nor was it badly damaged, the only part of this train to be derailed was the forward truck of the first car. The first two cars in this train were damaged to some extent and minor damage was sustained by a few of the other cars. All of the persons killed were riding in the rear car of train No. 166.

SUMMARY OF EVIDENCE

The statements of Engineman Moore, of train No. 166, indicated that he received a caution indication at signal bridge 448 and made a service application of the air brakes. After having reduced the speed of the train he released the brakes and allowed the train to drift until it reached signal bridge 440, at which point a stop indication was received. The train was brought to a full stop, the flagman was recalled immediately and the train proceeded at a low rate of speed until a red fusee was encountered. A second stop was made while the fireman got off for the purpose of extinguishing the fusee. The flagman was also recalled at this point, the engineman receiving a proceed signal on the communicating whistle and



FIG NO 1 —GENERAL VIEW OF ACCIDENT FROM SOUTH SIDE OF TRACK

the train was moving ahead at a speed estimated by Engineman Moore to have been about 10 miles an hour when its rear end was struck by train No. 6. The statements of Fireman Boyd brought out nothing additional of importance except he estimated that his train had moved ahead a distance of 300 or 400 feet between the time the stop was made to extinguish the fusee and the time at which the accident occurred.

Conductor Neal had gone forward into the baggage car and was standing in one of the doorways in that car with Baggage-master Sorter when the train stopped on account of the fusee on the track ahead. Baggage-master Sorter said the train proceeded about a train-length after having made this second stop and was moving at a speed of 8 or 10 miles an hour when it was struck by train No. 6. Immediately after the occurrence of the accident Conductor Neal got off and started ahead, but on meeting the engineman who told him that the trouble was at the rear of the train he at once proceeded to that point, found out what had occurred, and reported to the dispatcher. Conductor Neal had no personal knowledge of the manner in which the flagman had been protecting the rear of his train. The statements of all of the employees above referred to indicated that the fog was so dense it was impossible to see more than a very few car lengths.

Flagman Cunningham, of train No. 166, said that when his train stopped at signal bridge 410 the engineman sounded two blasts on the whistle and that he at once gave the engineman a proceed signal and then threw off a lighted fusee, which on account of the fog disappeared from view after his train had proceeded a distance of about three car lengths. The same procedure was followed when the train made the second stop, a fusee being thrown off at a point the flagman estimated to have been 15 or 20 feet east of signal bridge 440. The train then proceeded at a speed estimated by him to have been 10 or 11 miles an hour and he said he threw off a third fusee; the head of this fusee broke off, however, and he immediately lighted another fusee and threw it off, making a total of three lighted fusees. It further appeared from his statements that all of the fusees used by him were five-minute fusees, that he did not get off the train at any time, and that he did not know his train had been delayed to such an extent that it was on the time of train No. 6, he said, however, that even if he had known of this fact he did not know of any additional protection which he could have provided for the rear of his train, saying that the stops which were made were of short duration and that he had no opportunity of putting down torpedoes.

Engineman Carroll, of train No. 6, said his train made three stops after leaving Broad Street Station in Philadelphia, these being at West Philadelphia, North Philadelphia and Trenton, and



FIG NO 2—VIEW OF TELESCOPED CARS FROM NORTH SIDE OF TRACK

that the air brakes operated properly at all times. Approaching the point of accident the fog was very dense and he failed to see the signal at signal bridge 448 and he said he did not realize he had passed this signal bridge until he saw the stop indication displayed at signal bridge 440. On account of the fog he was unable to see the indication of this signal until his engine practically had reached it and he said he at once called its indication to the fireman, applied the air brakes in emergency, and then shut off steam, he tried to open the sanders, but the wheel controlling them came off when he took hold of it. Engineman Carroll estimated that he had succeeded in reducing the speed of his train from 50 or 55 miles an hour at the time of passing the signal to about 15 miles an hour, perhaps a little more, when the accident occurred. He also stated that he only saw one fusee, which he estimated to have been within two car-lengths of the rear end of train No. 166, saying that he saw this fusee and the rear end of the train almost at the same time. Engineman Carroll further stated that he had shut off the injector when his train reached the track water pans located about $1\frac{1}{2}$ miles west of signal bridge 448 and he said he must have passed signal bridge 448 when he had his head inside the cab at the time of turning on this injector, and that when again looking out of the window he failed to realize his location.

There was a road crossing near signal bridge 448 which Engineman Carroll said served as a land mark for that signal, but that on this occasion he passed this road crossing without seeing it. As a matter of fact, however, the crossing in question is east of signal bridge 448 and had he waited until he reached this crossing he would then have been approximately $\frac{1}{2}$ mile beyond the signal. Engineman Carroll was told that his train traveled a distance of approximately 1,800 feet beyond the signal before colliding with train No. 166 but was unable to account for the fact that it traveled that distance with the air brakes applied in emergency and collided with the train ahead with sufficient force to cause the damage which resulted, except to say that the engine probably was two or three engine lengths beyond the signal by the time the brakes were actually applied, that they did not hold as well as would have been the case with dry rails, and that perhaps his train was moving at a higher rate of speed when the accident actually occurred than he at first estimated.

Fireman Armstrong, of train No. 6, said that after water had been taken at the track pans west of the point of accident he remained on the deck of the engine until it passed signal bridge 458, at which point a clear indication was received. The train then passed the station at Plainsboro, after which he began to work on the fire, and he said he did not see the indication displayed at signal bridge 448. He returned to his seat box to ring the bell when

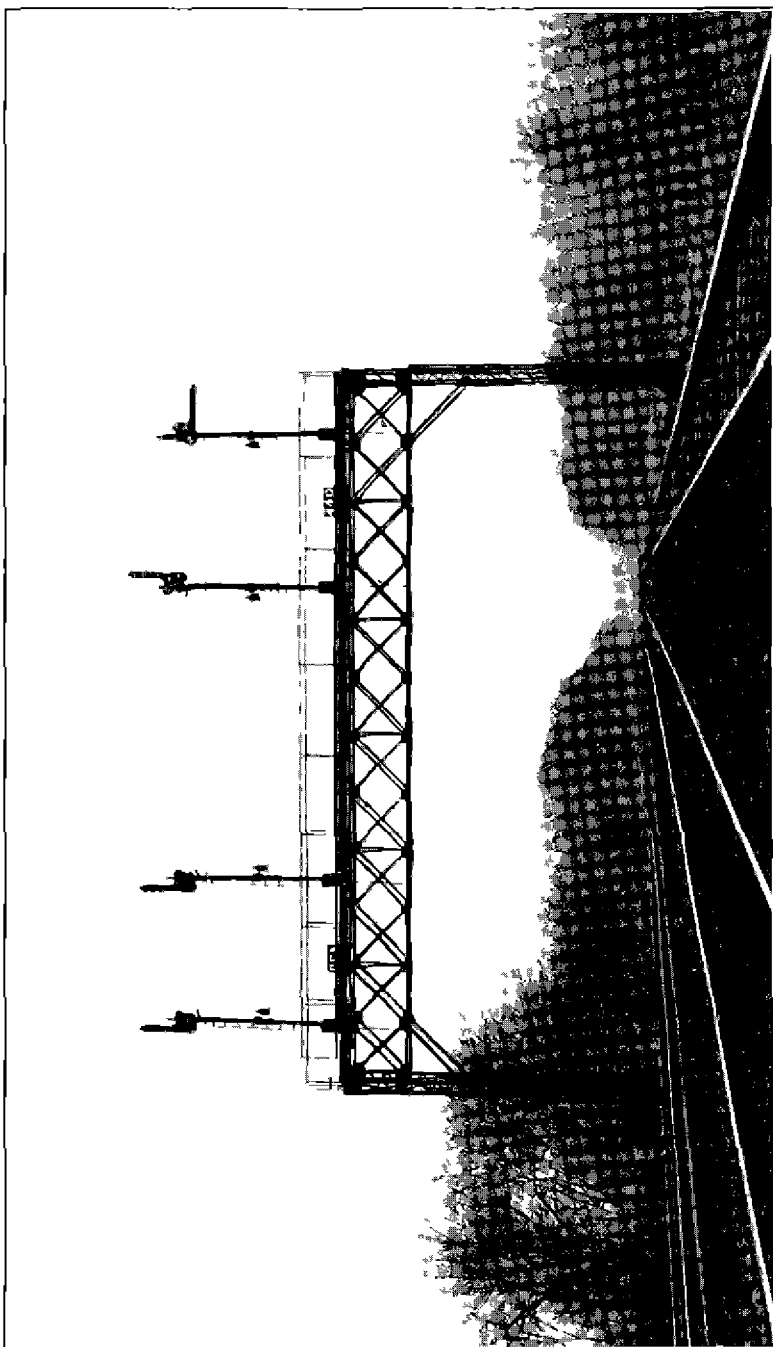


FIG NO 3—SIGNAL BRIDGE 440 SIGNAL GOVERNING TRACK 1 IS IN STOP POSITION

passing over a road crossing, did some more work on the fire, and on again returning to his seat box he began looking for signals, and almost immediately he saw the stop indication displayed at signal bridge 440, as the engine passed under it. He said he was the first to call the indication of the signal, and that the engine man immediately applied the air brakes in emergency. Freeman Armstrong estimated the speed of his train at this time to have been between 50 and 60 miles an hour, and he thought the speed was reduced to about 50 miles an hour when the accident occurred, his statements indicating that while the brakes took hold well they were applied only a short time before the accident occurred, while the rear end of train No. 166 apparently was not far beyond the signal, he thought, however, that had the rails been dry the speed would have been reduced more quickly. Freeman Armstrong further stated he thought he could see the rear end of train No. 166 a distance of about two car lengths and that although he was on his seat box all the time from signal bridge 440 up to the time of the accident he did not see a fusee.

Flagman Dickens, of train No. 6, was riding in the express car on the rear end of the train and was delayed in getting out of the car after the accident on account of having been knocked down among the express matter and also by the fact that the doors of the car had been knocked off the rollers and were difficult to open. After getting out of the car, however, and on going back to protect his train he found a lighted fusee in the center of the track at a point he thought was about six car-lengths behind the rear end of his own train, he did not notice how much of this fusee had been burned. Flagman Dickens further stated that his train had been maintaining a speed of about 55 miles an hour and that the accident occurred about 10 seconds after the brakes had been applied in emergency, by which time the speed had been reduced to about 40 miles an hour. He estimated that when on his way back to flag his range of vision was limited by the fog to about 50 feet.

Conductor Hamilton, of train No. 6, was in one of the baggage cars when he felt the air brakes being applied in emergency, at which time the speed was about 45 or 50 miles an hour, and he estimated that this speed had been reduced to 35 or 40 miles an hour by the time the accident occurred. On getting out of the car immediately afterwards he did not see a burning fusee back of the rear of his train but went immediately to the head end and then to a telephone to notify the dispatcher.

Head Brakeman Green, who was riding in the sixth car in the train, thought the application of the air brakes had reduced the speed of the train to the extent of about 10 miles an hour and estimated that the speed at the time the accident occurred was

about 30 miles an hour. In his opinion there was an interval of only a few seconds between the time the brakes were applied and the time at which the accident occurred. Baggage-master McKelby, who was riding in the baggage car with the conductor, said he thought the train moved a distance of about 500 feet between the time the brakes were applied and the time at which the accident occurred. He thought the speed had been reduced from 50 or 55 miles an hour to about 35 or 40 miles an hour.

Electrical Inspector Rainey said that when he reached the point of accident at about 10 a. m. he found the case which controlled the signal apparatus had been sealed and was informed by the signal maintainer that the signals were then in the same position as when the maintainer first reached the scene, the signal on bridge 440 governing track 1 was displaying a stop indication while the corresponding signal on bridge 448 was displaying a caution indication. He was also informed that no changes of any kind had been made and he said that after the wreck train had departed at about 10 p. m. he found that the signals operated properly, and continued to operate properly while under observation for several hours afterward.

According to Acting General Superintendent Davis, engineers are examined periodically for acuteness of vision, color sense, and hearing, and are also given regular physical examinations, those under 40 years of age being examined every two years, while those over 40 years of age are examined annually. Engineman Carroll was examined in April, 1923, July, 1924, and in July, 1925, and passed these examinations satisfactorily.

CONCLUSIONS

This accident was caused by failure of Engineman Carroll, of train No. 6, to observe and obey the indications of automatic block signals which were partially obscured by fog. A contributing cause was the failure of Flagman Cunningham, of train No. 166, to place torpedoes on the track rail as required by the rules.

Investigation disclosed that train No. 166 received a caution signal indication at signal bridge 448 and a stop signal indication at signal bridge 440. These signal indications were observed by the engineman and train No. 166 was operated in accordance with their requirements. The conditions were such that train No. 6 should also have received a caution signal indication at signal bridge 448 and a stop signal indication at signal bridge 440. There is no question that the signals were operating properly at the time train No. 6 passed them, they operated properly for the preceding train which was only a few minutes ahead of it and

when the track was cleared after the accident they also operated properly, without any adjustments or repairs having been made. Engineman Carroll, of train No. 6, admitted that he passed signal bridge 448 without seeing it. Under the rules the caution indication of the signal at that point required that train No. 6 at once reduce speed to a rate not exceeding one-half its maximum authorized speed and approach the next signal prepared to stop. Had Engineman Carroll observed and obeyed the indication of that signal the accident would have been prevented. According to the evidence train No. 6 approached signal bridge 440, the signal on which was in stop position, at a speed of from 50 to 60 miles an hour. Engineman Carroll and Fireman Armstrong both stated positively that they saw the stop indication displayed at signal bridge 440 just as the engine was passing under it and an emergency application of the brakes was made immediately. According to the statements of the other members of the train crew, however, the emergency application of the brakes was made only a very few seconds before the shock of collision, the time interval between the emergency application of the brakes and the occurrence of the collision being so short that there was a reduction in the rate of speed of the train of only about 10 miles an hour. The point of accident was 1,859 feet east of signal 440, which should have been an adequate distance, even under the somewhat unfavorable conditions existing on the morning of the accident, in which to bring the train to a stop or at least to reduce the speed to a very low rate, if an emergency application of the brakes had been made at the signal location. The evidence indicates, therefore, that the head end of train No. 6 had gotten a considerable distance beyond the stop signal before the emergency application of the brakes was made and that Engineman Carroll did not act as promptly in applying the brakes as he thought he did.

Rule 99 provides in part as follows:

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.

According to the evidence, Flagman Cunningham, of train No. 166, threw off lighted fuses but did not place torpedoes. Had Flagman Cunningham placed torpedoes on the rails when his train stopped at signal bridge 440 and also when it stopped for the fuse east of that signal, the engineman of train No. 6 probably would have been warned of the presence of a preceding train in sufficient time to enable him to bring his train under proper control, notwithstanding his failure to observe block signal indications.

This accident again calls attention to the necessity for the use of an automatic train-control device which will intervene to stop a train when an engineman for any reason disregards the stop indication of an automatic block signal. Had an adequate automatic train-control device been in use at this point this accident would have been averted.

Engineman Carroll had been employed by this railroad company in various capacities since 1882, he entered train service as fireman in 1888 and was promoted to engineman in 1902.

The engine crew of train No. 6 had been on duty about 3 hours, after 4 hours off duty, previous to this period of 4 hours off duty they had been on duty about $3\frac{3}{4}$ hours after about 36 hours off duty. Flagman Cunningham had been on duty nearly $6\frac{1}{4}$ hours, after 4 hours off duty, previous to this he had been on duty about $5\frac{1}{2}$ hours after about 32 hours off duty.

Respectfully submitted

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Director

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