

## INTERSTATE COMMERCE COMMISSION

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REPORT OF THE CHIEF OF THE BUREAU OF SAFETY IN RE INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE PENNSYLVANIA RAILROAD AT CINCINNATI, OHIO, ON NOVEMBER 7, 1922.

December 12, 1922.

To the Commission:

On November 7, 1922, there was a rear-end collision between two passenger trains on the Pennsylvania Railroad at Cincinnati, Ohio, resulting in the death of 1 employee, and the injury of 52 passengers and 9 employees. This accident was investigated in conjunction with representatives of the Public Utilities Commission of the State of Ohio.

Location and method of operation.

The Cincinnati Division extends between Cincinnati and Columbus, Ohio, a distance of 119.6 miles and this accident occurred in the west end of the passenger yard at Cincinnati; in the vicinity of the point of accident this is a double-track line over which trains are operated by time-table and train orders, no block-signal system being in use at this point. Approaching the point of accident from the east there are 1,425 feet of tangent and a 42-minute curve to the right 425 feet in length, followed by 150 feet of tangent to the point of accident. The grade is descending for westbound trains, varying from 0.73 to 1 per cent for a distance of 2,000 feet, and then variable for 1,500 feet, being 0.45 per cent descending at the point of accident. A partial view of the point of accident can be obtained from the fireman's side of a westbound train for a distance of about 2,600 feet. Under instructions contained in the time-table, passenger trains in both directions are required to approach the crossover located about 500 feet west of the point of accident under control, and to come to a full stop unless a proceed signal is received from the switchtender. The weather was clear at the time of the accident, which occurred at about 7.40 a.m.

### Description.

Westbound passenger train No. 5061 consisted of 2 express cars, 1 combination car, and 1 coach, in the order named, hauled by engine 8484, and was in charge of Conductor Dempsey and Engineman Bartlett. The first two cars were of wooden construction, while the last two were of all-steel construction. This train passed OD Tower, 1.7 miles east of Cincinnati, at 7.31 a. m., made a stop at the crossover in accordance with the rules, and after standing at this point about 7 minutes the rear end was struck by train No. 505.

Westbound passenger train No. 505 consisted of 4 coaches and 1 combination car, in the order named, of wooden construction hauled by engine 0837, and was in charge of Conductor Stubbs and Engineman Pyle. This train passed OD Tower at 7.39 a. m., and while traveling at a speed estimated to have been 30 or 12 miles an hour collided with train No. 5061.

Engine 0837, its tender, and the rear <sup>car</sup> end of train No. 5061 were slightly damaged, while the front platform was knocked off the first car in train No. 505, the leading truck of this car was derailed. The employee killed was a general yard master.

### Summary of evidence.

At Morrow, the initial terminal of train No. 505, the air brakes were tested, however, before departing from this point, Fireman Essert informed Engineman Pyle, who was starting his first trip as a passenger train engineman, to watch the brakes closely as the engine was in poor condition. At South Lebanon, 4.8 miles west of Morrow, the air brakes did not hold properly, and even though Engineman Pyle made an emergency application at this point the train ran past the station 3 or 4 car-lengths. At four points en route the air brakes did not hold properly and the train ran by the proper stopping points. On passing a grain elevator 3,600 feet east of the point of accident a 15 or 18-pound reduction was made, at which time speed was about 25 or 30 miles an hour, in order to have the train under control approaching the crossover, and Engineman Pyle said it was shortly afterwards that Conductor Stubbs sounded the communicating whistle signal to reduce speed. When about 2,400 feet from the rear end of train No. 5061, Engineman Pyle saw <sup>the</sup>

Flagman Baumgardner, acknowledged his signals by sounding the engine whistle, and moved the brake valve to the emergency position. However, as the air brakes did not respond properly, he placed the engine in reverse and opened the throttle slightly. When about 2 car-lengths from the rear of train No. 5061, at which time speed had been reduced to about 10 or 12 miles an hour, the throttle was opened wide, and Engineman Pyle and Fireman Essert jumped just before the accident occurred. Engineman Pyle stated that Flagman Baumgardner was back a sufficient distance for the proper protection of the rear end of train No. 5061 under ordinary conditions, and said the accident was caused by the air brakes not responding properly. Fireman Essert stated that Engineman Buchanan, who is regularly assigned to train No. 505, had experienced trouble in making stops during the last 3 or 4 days prior to the accident, and that the engineman took the brake valve apart and cleaned it at Loveland, 22.9 miles from Cincinnati, on the day prior to the accident, but after this had been done, the air brakes still did not operate properly. He did not think the train ran by at South Lebanon on this trip as a result of excessive speed, and stated that Engineman Pyle started to apply the air brakes at the usual place for this stop. Fireman Essert further stated in his opinion the accident was caused by defective brakes. Conductor Stubbs said it was after sounding the communicating signal in the vicinity of the grain elevator, at which time the speed was about 40 miles an hour, that he felt an air-brake application made, and he had no doubt but that the train would be brought safely to a stop in time to avoid striking a train should one be standing at the point at which train No. 5061 was standing on this occasion, otherwise, he would have pulled the conductor's emergency valve. The estimate of Baggage Master McKenzie as to the speed agreed with that of Conductor Stubbs, while the brakeman had not noticed the speed.

With the exception of Flagman Baumgardner, of train No. 5061, who went back about 10 car-lengths to flag when this train stopped before reaching the crossover, none of the members of the crew was aware of anything wrong until the accident occurred. Flagman Baumgardner stated that train No. 505 was about 25 or 30 car-lengths away when his flag signals were acknowledged, at which time he started back to his train. Shortly afterwards he heard an unusual noise which sounded as though the engine of the approaching train was working steam in reverse, and he jumped aside. He estimated the speed of the train at the time it passed him to have been about 35 or 40 miles an hour, and stated there was no fire flying from the brake shoes at this time.

Engineman Buchanan, who is regularly assigned to engine 0837, stated that at Loveland, on the day before the accident, with the help of Fireman Essert, he took the brake valve apart and discovered it was very dirty, engine oil apparently having been poured into it. After giving it a thorough cleaning, it was oiled with cylinder oil and assembled, after which the brakes worked better. On testing the air brakes, at this point, he found the right piston had so much travel that the lever struck the guide yoke, while the left piston at full travel was about three inches from the yoke. However, slack was not taken up in the engine brake, but on arrival at Cincinnati three new brake shoes were applied to the tender, and the dead lever adjusted, after which the tender brakes were in good condition. Engineman Buchanan further stated the engine brake had been out of adjustment for three or four weeks, that he had reported the condition of the brakes on two or three occasions, but nothing was done to them to his knowledge. On arrival at Cincinnati on November 6, 1922, he filled out a regular engine repair form, stating that the brake valve needed cleaning, and to install new rings in the equalizing piston, also listing other repairs that were needed. Engineman Buchanan expressed the opinion that under the circumstances as they existed on the morning of the accident, a 15 or 18-pound reduction would not have stopped the train in time.

Foreman McArthur, stationed at Pendleton Shops, stated the brake valve was not cleaned, nor the rings installed in the equalizing piston, as requested by Engineman Buchanan on November 6, 1922, however, he signed the report showing that this work had been performed, giving as his reason for this error that this particular engine repair report was placed on the table with others and they were signed by him without any notice being given the engine numbers.

Engine 0837 is of the 4-4-2 type, with Westinghouse G-6 air-brake equipment and two 9 $\frac{1}{2}$ -inch pumps. The engine is not equipped with independent or straight air brakes.

After making such light repairs as were necessary on account of damage sustained in the accident, airbrake tests were made with the following results:

The first test was made with the engine and tender, and consisted of a reduction of 23 $\frac{1}{2}$  pounds, at which time the main-reservoir pressure was 125 pounds and the brake-pipe pressure 107 $\frac{1}{2}$  pounds, the right driving-wheel brake had a piston travel of

5-3/8 inches, and the left a piston travel of 5 inches, while the tender brake had a piston travel of 9 1/4 inches; the driving wheel brakes released in 20 seconds, and the tender brakes immediately. the brake pipe leakage was 10 pounds for the first minute, followed by an additional leakage of 21 pounds in the next four minutes.

The second test consisted of an emergency application with a main-reservoir pressure of 140 pounds and a brake-pipe pressure of 112 pounds, the right driving wheel brake had a piston travel of 6 1/4 inches, and the left a piston travel of 6-3/4 inches, while the tender brake had a piston travel of 10 inches. this piston travel of 10 inches was reduced to 7-3/4 inches in three minutes and the piston remained in that position two minutes. There was a leak at a union due to the coupling nut being loose, and the driving wheel brakes were fully released in 43 seconds. In connection with the Piston travel of 10 inches on the tender, it was noted that the cylinder lever came in contact with the end of the guide after about 9 inches travel and then slid up the leg of the guide for the remaining inch, this condition apparently had existed for some time, as the guide was deeply grooved from the contact.

Tests made with the cars coupled to the engine showed that piston travel varied from 5 1/4 to 8 1/2 inches.

When the gauges were compared with a test guage, it was found that when the main-reservoir and brake-pipe pressures were indicated as 128 and 108 pounds, respectively, the corresponding pressures, according to the test gauge, were 123 and 104 pounds. Testing of the rotary valve, after draining the brake pipe and also the auxiliary reservoirs, with the brake valve on lap, showed that the pressure would not build up in the brake pipe against the leakage sufficient to show on a gauge attached to the hose at the rear of the tender, or on the brake-pipe gauge on the engine.

According to time-table rule, the speed of all trains between OD Tower and Point Isabella is restricted to 20 miles an hour, and to 10 miles an hour from Point Isabella to the terminal, a distance of 0.3 miles. If these restrictions were observed, a train would consume six minutes from OD Tower to the station. Examination of the time-table, however, shows that of the 22 west-bound first class trains scheduled, there are nine which are scheduled to cover this distance in five

minutes, and one in four minutes. The schedule time between these points for train No. 505 is five minutes.

#### Conclusions.

This accident was caused by failure of Engineman Pyle properly to control the speed of his train, due partly to defective air brake equipment on the engine and also to probable misjudgment of the rate of speed on the part of the engineman.

According to the statement of Engineman Pyle himself, the speed at which train No. 505 was moving at the time the brakes were applied after passing OD Tower was in excess of the 20-miles-an-hour limit prescribed by the time-table as applying in that locality, while according to the conductor and baggage master it was about 40 miles an hour, the conductor said he signalled the engineman to reduce speed before the brake application was made. Tests made two days after the accident indicated that the brakes on the cars in this train were in good condition, and it is believed that with the engine brakes in the condition disclosed by the test above referred to, a 15 or 18-pound brake-pipe reduction at a point 3,600 feet from the point of accident, with the train traveling at a speed of 30 miles an hour, would have brought the train to a stop in time to avert the accident. It is therefore believed the estimates of the conductor and baggage master that the speed was about 40 miles an hour, are more nearly correct, and that the engineman considerably underestimated the speed of his train when he made this application. Had the engineman operated his train in accordance with the prescribed speed restrictions between OD Tower and Cincinnati, he would undoubtedly have been able to stop in time to avoid this accident. Knowing that the brake system was not operating properly, he should have exercised extraordinary caution, and inasmuch as this was Engineman Pyles' first trip as a passenger-train engineman it is believed his failure to observe these speed restrictions resulted from failure to judge the rate of speed properly.

Examination of the engine disclosed that the air brake equipment was in a defective condition, and the evidence indicated that it had been in that condition for some time. Reports had been made by engineman concerning various air brake defects on this engine and work reported on the day previous to the accident had not been performed, although the foreman had signed the report to indicate that the work had been done.

There is no excuse for permitting an engine to be operated with air brake equipment in the defective condition which existed in the case of engine 0837, and in view of these conditions the operating officials are open to censure. Furthermore, the time-table schedules provided in several instances for higher rates of speed than would be possible without violating prescribed speed restrictions, proper adjustment of the schedule should be made.

Engineman Pyle had had about 12 years experience, and was promoted to the position of engineman in February, 1920, this was his first trip as an engineman in passenger-train service. All the other employees were experienced men. At the time of the accident the crew of train No 5061 had been on duty about 3 hours, and the crew of train No. 505 about 2 hours, previous to which they had been off duty from 10 to 30 hours.

Respectfully submitted,

W P. Borland,

Chief, Bureau of Safety.