

REPORT OF THE DIRECTOR OF THE BUREAU OF SAFETY IN RE
INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON
THE DENVER & SALT LAKE RAILROAD NEAR ANTELOPE,
COLO., ON DECEMBER 24, 1922.

January 11, 1923.

To the Commission.

On December 24, 1922, there was a derailment of a freight train on the Denver & Salt Lake Railroad near Antelope, Colo., which resulted in the death of two employees and the injury of one employee.

Location and method of operation,

This accident occurred on the First District, which extends between Denver and Tabernash, Colo., a distance of 86.82 miles, and is a single-track line over which trains are operated by time-table and train orders, no block-signal system being in use. Corona, 23.35 miles from Tabernash, is the beginning of a descending grade eastward, which extends practically all the way to Denver, a distance of 65.47 miles. From Corona to a point just east of where the accident occurred, a distance of about 11 miles, the grade is from 3 to 4 per cent at practically all points. All trains are required to stop at Corona for inspection, and all eastbound freight trains are required to stop at Dixie Lake and Antelope, 4.54 and 9.64 miles from Corona, respectively, for inspection and cooling of wheels, retaining valves are also required to be turned up at Corona, while the air pressure required on leaving that point is 130 pounds main reservoir, and 100 pounds brake-pipe pressure.

The point of accident was about 8,200 feet east of Antelope, approaching this point from the west there are several short curves and tangents, followed by a 16-degree curve to the left, on which the accident occurred, at a point about 1,000 feet from its western end. The weather was clear at the time of the accident, which occurred at about 12 o'clock noon.

Description.

Eastbound freight train extra 105 consisted of 23 cars of coal and a caboose, hauled by engine 105, and was in charge of Conductor Blackshear and Engineman Watkins. It left Antelope about 11.55 a.m., almost immediately got beyond control and had attained a speed estimated at 40 or 50 miles an hour when it was derailed.

The engine and first 13 cars were derailed, the engine being quite badly damaged, while the cars were demolished. The employees killed were the engineman and the head brakeman.

Summary of evidence.

According to Conductor Blackshear, when the train was inspected at Corona, it was found to be in good condition to start down the grade with the exception of the fourth and fourteenth cars from the engine, the retaining valves on these cars did not hold well and the hand brakes were applied on these two cars before the train departed. Just after the train left Corona, the first pair of wheels on next to the last car were derailed by ice, and after re-railing these wheels the train proceeded to Dixie Lake, where it arrived at 10.30 a. m. At this point another inspection of the train was made and defects were found which made it necessary to cut out the air brakes on the thirteenth and nineteenth cars; the hand brakes on these cars were not applied as the defects involved broken brake rigging. The train departed from Dixie Lake at 11.05 a.m., and arrived at Antelope at 11.35 a.m., where it stopped and another inspection was made. It is the custom at this point to change the position of the retaining valve from the heavy to the light holding position, but it occurred to Conductor Blackshear that the engineman had not handled a train over this territory for some time, and he therefore had the retainer valves left in the heavy holding position. When the train left Antelope, at 11.55 a.m., Conductor Blackshear boarded the caboose and he said he noticed that the gauge showed brake-pipe pressure of 100 pounds. When the speed had increased to 10 or 11 miles an hour, he noticed the engineman made a brake-pipe reduction of 15 or 20 pounds, which seemed to be effective and reduced the speed to 6 or 7 miles an hour. After this reduction had been made, the train line was recharged to a full 100 pounds pressure, and the conductor said a second application was made about half a minute or a minute afterwards, and on looking at the gauge he saw that the amount of the reduction was 30 pounds. This reduction did not seem to take effect and about 10 or 15 seconds afterwards the train lunged ahead, and before he could reach the conductor's emergency valve, the indicator receded toward zero, indicating an emergency application had been made. He did not think the time between the 30-pound reduction and the emergency application was sufficient to permit the train line to be recharged. The speed of the train then increased rapidly and the conductor heard the engineman sound the whistle signal for hand brakes, but before the rear brakeman could start over the train for this purpose, the speed was so great that it was considered unsafe to attempt it. The conductor

estimated the speed at the time of the accident to have been between 35 and 45 miles an hour. After telephoning for assistance, Conductor Blackshear inspected the rear portion of the train and found it to be in the same condition as when leaving Antelope, except that there was a missing brake shoe and a worn brake head on the sixteenth car, and he cut out the brake on this car, thinking that if the car were moved in that condition it might wear the brake head entirely away. Conductor Blackshear further stated that the train was in the vicinity of the east station mile board when he realized that the brakes were not holding, this mile board is about 3,000 feet from the point of accident.

Rear Brakeman Heuelsen said he personally inspected the first 13 cars at Antelope and that the Conductor inspected the rear portion of the train, the head brakeman not knowing how to handle the retainers. He also said that on account of the short section of level track at Antelope it is necessary to turn down the retainers to allow the brakes to release in order to start the train, the retainers being turned up again as soon as the brakes are released and that this was done on this occasion. According to his further statements, the first reduction made as the train was leaving Antelope was a 15-pound reduction, and he thought it was a minute or two before the second reduction was made, giving the train line time to recharge. This second reduction was a 30-pound reduction, which did not seem to take effect, and he said the brakes were then released and an emergency application made. The statements of both the conductor and the rear brakeman were to the effect that the usual piston travel on heavily loaded cars leaving Corona is from 4 to 5 inches, that the piston travel on the cars of this train appeared to be in proper condition, and that they made no adjustments.

Fireman Lemmon said the engineman experienced no difficulty in handling the train between Corona and Antelope, except at the point where the car was derailed just east of Corona, the train stood at this point about an hour, and the brakes seemed to leak off on two or three occasions and allowed the train to creep ahead a short distance. After leaving Antelope the first reduction made by the engineman seemed to hold, but the fireman said the next reduction did not seem to take effect and that the engineman then made an emergency application and told him to jump, at the same time reversing the engine, opening the throttle and whistling for hand brakes. Fireman Lemmon had not noticed the air gauge to ascertain the extent of the reductions which were made, neither did he know whether the water brake had been used after leaving Antelope,

although he said it had been used between Corona and Antelope. He estimated the speed at the time he jumped to have been between 35 and 40 miles an hour.

Conductor Roth, in charge of the train which handled the undamaged portion of extra 105 back to Antelope, said he examined the cars before moving them and found that the tenth car from the caboose had a broken brake pipe caused by the accident, that the retaining valves were turned down on four cars, while on two others the air brakes were cut out. Brakeman Corder, who was in Conductor Roth's crew, heard the conductor say the retaining valves were turned down on four cars and said he also heard Conductor Blackshear say he had turned them down himself, when he heard the relief train coming.

On December 29, inspection of the 10 rear cars, which were still at Antelope, showed that the piston travel was from $5\frac{1}{4}$ to $7\frac{1}{2}$ inches. The brakes were cut out on what had been the sixteenth and nineteenth cars of the train, while there was a broken check lever on the "A" end of the fifteenth car, making the brakes on the rear end of this car inoperative, and the seventeenth car had a retaining valve which held poorly.

Inquiry into the experience of the members of the crew over this part of the railroad disclosed the following:

This was the second trip the engineman had made as an engineman, with a tonnage train, over this portion of the road, since he qualified for hill service in June, 1921, the previous trip having been in July 1921, he also had made many trips in helper service. The fireman was making his second trip since November, 1921, and had had only 6 weeks prior experience in railroad service. The conductor was making his second trip as a conductor in more than a year, although during the same period he had made 12 trips as a brakeman. The head brakeman was making his first trip over this territory. The rear brakeman had made one trip as a brakeman since November, 1921, in addition to 16 days' service on a rail loader.

Conclusions.

It is believed this accident was caused by failure of the engineman to operate the brakes properly.

The investigation disclosed that this train had been properly controlled on the heavy grade between Corona and Antelope, demonstrating that the train brake system was in such condition that the train could be

controlled, and the first application which was made after departing from Antelope was effective in reducing the speed. It appears, however, that after this application the brakes were released before the speed of the train had been sufficiently reduced to permit the train brake system to be recharged properly, and that the second application was made before sufficient time had elapsed to permit the auxiliary reservoirs to be fully recharged, resulting in lack of adequate braking power from a service application to control the train, the emergency application which was made following the second service application was, on account of the depleted pressures then available and the increased speed, equally ineffective.

As previously shown, all the members of the train crew of extra 105 were inexperienced in the operation of trains over this territory. Operating conditions on this railroad are probably as severe as on any railroad in the country, and if trains are to be operated in safety, it is a matter of absolute necessity that only employees thoroughly experienced in mountain operation be placed in charge, and the officials of this railroad are open to severe censure in permitting a train to be operated by a crew composed entirely of inexperienced men.

It also appears that the crew of this train had been on duty in violation of the Hours of Service law. The train crew went on duty at 3.20 p.m., and the engine crew at 3.10 p.m., December 23, 1922, and at the time of the accident, therefore, these employees had been on duty nearly 21 hours.

Respectfully submitted,

W. P. BORLAND

Director.