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IN RE INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE
COLORADO & SOUTHERN RAILROAD, NEAR WALSENBURG,
COLO., AUGUST 12, 1919.

October 30, 1919.

On August 12, 1919, there was a derailment of a passenger train on the Colorado & Southern Railroad, near Walsenburg, Colo., which resulted in the death of 1 employee and injuries to 2 employees. After investigation of this accident the Chief of the Bureau of Safety reports as follows:

The main line of the Trinidad District of the Southern Division of the Colorado & Southern Railroad extends between Pueblo and Trinidad, Colo., a distance of 93.9 miles, over which trains are operated by time table and train orders transmitted by telegraph. No block signal system is in use. Approaching the point of derailment from the north, there is about 2,100 feet of tangent, followed by a curve to the right of 8 degrees, 1,840 feet in length, the derailment occurring about 350 feet in on this curve. The grade is ascending for southbound trains, varying in a distance of a mile from .621% to 1%. The track is laid with 85-pound rails, 33 feet in length, bolted together with 4-hole angle bars with bolts staggered, fully tie-plated, and single-spiked to 20 or 21 mixed white oak and treated pine ties to the rail. At the point of derailment the track was on a fill of 18 feet, with cinder and coke breeze ballast $1\frac{1}{2}$ feet deep. The curve had a superelevation of about $3\frac{1}{2}$ inches, starting on the tangent about 6 rail lengths back, gradually rising to the point of curve. The gauge varied a trifle and

the outside rail on the curve was flange worn from $1/32$ to $3/8$ of an inch. The ties were in good condition and there was no indication of broken or creeping rails. The weather was clear.

The derailed train was southbound passenger No. 2, en route from Denver to Trinidad, Colo., consisting of locomotive 328, one baggage car, one combination mail and coach, and two day coaches, in charge of Conductor Bradley and Engineman Alexander. It left Denver at 12.30 p.m., and at Walsenburg, the conductor received an order to run 15 minutes late and the train was held 3 minutes until the time to depart in accordance with the order, leaving Walsenburg at 7.00 p.m. Near the station, there is a gate to the D. & R. G. R. R. Crossing, the normal position of which is against C. & S. trains, and which must be closed and locked by the crews of C. & S. trains after their trains have passed. The only stop made after leaving Walsenburg was to close and lock this gate, after which the train proceeded, and at 7.06 p.m., while travelling at a speed estimated at 25 miles an hour, was derailed at a point 495 feet north of Mile Post 173, or 1.6 miles south of Walsenburg.

The engine and first two coaches of the train were entirely derailed. The engine and tender went off on the left hand side of the track, but the remainder of the derailed equipment was thrown to the opposite side. The engine came to rest on its right side in a position parallel with the track, after turning over $1\frac{1}{2}$ times in rolling a distance of about 35 feet down the embankment. The engine truck was detached from the

engine and was lying upside down, about opposite the head of the engine, between it and the track. The tender was lying on its right side, in a reversed position, between the engine and the track. Baggage car 203, the first car in the train, came to rest on the right side of the track, about opposite the engine. It was clear of the track, leaning partly on its side and at an angle of about 45 degrees with the track. The combination mail coach remained coupled to the baggage car, with its head end partly down the embankment and its rear trucks on the ties. The third car in the train was partly derailed, the right hand pair of wheels of front truck being off the track on the inside, while the rear trucks remained on the rails. The employee killed was the engineman.

It was about 80 feet from where the first wheels left the rail to the point where the engine started down the embankment, and it was 60 feet farther to the point where the engine came to rest. There were no flange marks on the webs of the rails to indicate that the rails turned over, and there were no marks on the rails where the engine truck wheels passed over them, but one rail-length north of the point where the rails and ties were torn up, there was a flange mark on the ties which compared with the front wheel of the engine truck, and the next rail-length south of this flange mark on the ties there was evidence of where the drivers went over the rail, crushing the ties and tearing up the track. By taking soft wood impressions of the flanges of the left front wheel of the engine truck and

the left front wheel of the tender truck, and comparing them with the mark on the first tie which bore marks, it was manifest that the front wheels of the engine truck were the first to mark the ties, which conclusion was more strongly supported by the presence of a tool mark on the apex of the flange of the left front wheel of the engine truck.

In the testimony of several witnesses at the investigation there were repeated allusions to a mark on the inside rail, but at the examination made by the inspectors of the Commission some time after this accident, this mark had been obliterated.

Both front cylinder heads of the engine bore marks on the under side which appeared to have been made by wheel flanges and the driving brake beams of the engine were bent as though they might have straddled the rail when the engine was on the ties. All parts of the engine pilot were found in the wreckage and the chafing irons between the engine and tank were in position, were in good shape, and showed no signs of having slipped by.

Conductor Bradley stated that the usual speed around the curve was from 20 to 25 miles an hour and while he did not take particular notice of the speed before the derailment, he thought it was nothing unusual. He was in the rear coach when he noticed the air going on in emergency, but the shock did not throw him off his feet. He looked out and judged the speed was about 25 miles an hour. He estimated that the train moved

about 100 feet after the emergency application of the air. He examined the track and found it in good condition as to ties, joints, surface and curvature. He could find no marks on the outside rail, but there were bright marks on the inside rail of the curve, and he thought some metal object had either been placed on the rail or had dropped from the pilot, resulting in the lead trucks being the first to derail.

Brakeman Root estimated the speed of the train at 25 miles an hour, the usual speed. On the day after the accident he saw a bright, heavy mark on the inside rail, about 8 inches long and $\frac{1}{2}$ inch wide at its widest place, and he thought the derailment was caused by some obstruction placed on the rail, being of the opinion that the engine was the first to leave the rails.

Engineman Callahan stated that while on duty the day of the accident he passed over the track involved at about 10.00 a.m. at which time it rode smoothly. He was an eyewitness to the accident from the doorway of his home, about $\frac{1}{2}$ of a mile distant, estimated the speed of train No. 2 at 25 miles an hour and was of the opinion that the engine was the first to leave the track. He was on the scene within 10 minutes after the derailment, examined the locomotive cab and found the throttle open and the brake valve in emergency position. It was his opinion that the derailment was caused by some object having been placed on the inside rail, which left a mark thereon about 9 inches long. Three or four ties south of the marked

rail he found flange marks on the ties, which from all appearances were made by the engine trucks. He could find no marks indicating where the outside wheels had crossed the outside rail. He stated that when running on time, his usual speed around this curve was 25 miles an hour, but that on occasions when he was late, he had taken the curve at a speed as high as 35 miles an hour. He said that it was almost a daily occurrence to find sticks and spikes placed on the rails by children.

C. E. Peet, an eyewitness to the derailment, stated that he was at a point about 700 feet distant and watched the train approach at a speed he estimated at 15 miles an hour. Just as the engine started around the curve, he saw it rise up off the track and it seemed as though it stood in the air momentarily, while the tender passed to the right of it. The engine then turned over, with a slow movement, then righted itself, then settled back on its right side. He said the movement of the train seemed to be smooth until the engine turned over and there was no buckling of the train.

Roadmaster Nolan stated that when he arrived at the scene of the accident about 2.00 a.m. on the morning of the 13th, he found that beginning 12 feet beyond the point of derailment the track was torn off the fill; there were several broken ties and several of the rails had been carried down the embankment with the engine and were bent and broken. From the position of the equipment he thought the engine truck was the first to leave the rails. He examined the flanges on the engine

truck end, while one was a little worn, he did not think the condition of the flanges would cause the wheels to climb the rail. He did not examine the flanges of the tender trucks. He noticed on the top of the ball of the inside rail of the curve an abrasion about 8 inches long and about one quarter of an inch, or possibly a little more, in width, which seemed to cut into the rail as if made by some sharp object. Accompanied by the section foreman he measured every half rail for elevation, proceeding northerly from the first mark on the ties. Five and one half rail-lengths north of the point of derailment the elevation was $3\frac{3}{4}$ inches, which dropped to level about 10 or 15 rail lengths north of the point of curve. He stated that the track had been re-surfaced about a month ago, the condition of rails and ties was good, the track well spiked, the angle-bars in good condition, full bolted and nuts tight, and while the outside rail on the curve was worn a very little, he considered the track in safe condition for a speed of from 40 to 45 miles an hour. He stated that he had not personally walked over this section of track for 4 months, but in his absence had detailed Asst. Roadmaster Barrett to inspect the track. There are several mining camps in this vicinity, as well as at other points, and he said it was a fairly common occurrence for the boys to place sticks, bolts, spikes or anything else on the track, apparently just to see what would happen.

Assistant Roadmaster Barrett, in charge of the territory in which the derailment occurred, stated that he walked over

the point of derailment about 8.20 a.m. on the day of the accident, and passed the point again at 6.20 p.m., on a motor car at a speed of about 20 miles an hour, and that at that time the track rode smoothly and was in good alignment. He was followed within 5 minutes by train No. 528, which passed the point of derailment at 6.25 p.m., or about 40 minutes prior to the derailment. He stated that the rails on the curve had been changed a little more than a year ago, when the outside rail had become slightly worn, and that in July, defective ties on the curve had been replaced by new ones and the track surfaced. He stated that the rails were well spiked and fully tie-plated and that the angle bars were in good condition, fully bolted, with all track bolts tight. He examined the rails which had been torn up but found no marks on them, or anything to indicate that they had turned over. Judging from the first flange marks on the ties being so light, he thought the engine truck was the first to leave the track. He saw the mark on the inside rail but did not know whether or not it had anything to do with the derailment. He did not know anything about obstructions having been placed on the track at any time.

Section Foreman Nolan, in charge of the section where the derailment occurred, stated that he had passed over the track on a handcar at about 4.50 p.m. and it was in good condition at that time. About one month previously a total of 250 new ties were put in on the curve, averaging from 3 to 5 new ties to the rail, after which the track was surfaced. The curve was first

given an elevation of $3\frac{1}{4}$ inches, but after the surfacing of the track, the inner rail settled as he expected it would and thereby increased the elevation to $3\frac{3}{4}$ inches. The outside rail of the curve had been in the track at that point about 2 years and was but slightly worn. He stated that 100 ties were broken and 8 rails taken out as a result of the derailment. He noticed a rough mark about 8 inches long on the inside rail of the curve, evidently made by something dragging on the rail.

Acting Assistant Superintendent O'Connor stated that his examination of the track showed wheel marks on the ties on the outside of the curve and on the inside rail of the curve. Just north of the point where the ties were marked, there was a light mark about 8 inches long, which looked as if something had gotten under a wheel and had been pushed along on top of the rail. He thought the engine left the track first and that the momentum of the train shoved the tender ahead of the engine, causing it to be turned around, while the baggage car was shunted to the opposite side of the track. On the bottom of the left cylinder of the engine there was a cut about $1\frac{1}{2}$ inches long, where it appeared that the flange of a wheel had cut into the bottom of the cylinder head, indicating to him that the front engine truck wheels had left the track first, slowing to the left, allowing the cylinders to strike the wheel. His conclusion was that some obstruction large enough to overcome the elevation of the track had been placed on the inside rail, thus permitting the derailed wheels to go over the outside rail with-

out leaving any marks. He said it was not uncommon to find small obstructions placed on the track by boys.

Superintendent of Motive Power Ridgeway stated that he arrived at the scene of the accident at 7.00 a.m. of the next day and made a thorough inspection of the engine and derailed equipment, as well as the track, and was unable to find anything concerning the equipment which might have caused the derailment. The flanges, while worn, were not sharp, and he did not think their condition could have contributed to the derailment. The lateral motion of the forward engine truck wheels was about $\frac{1}{4}$ inch and between $\frac{1}{4}$ and $\frac{5}{8}$ inch for the rear wheels. The lateral motion did not exceed $\frac{3}{8}$ inch for any of the driving wheels. The engine truck, being of the swing motion type, supported by the ordinary 3-point hangers, was free to accommodate itself to any inequalities of the track. The springs and hangers were all intact, while the center pin was through the male and female castings. The male casting entered the female casting about $3\frac{1}{2}$ inches, with a good substantial bearing. Excepting the rear half, the flange of the female casting had been broken off, although the break was new and was no doubt caused by the derailment. The pilot braces and slats were all accounted for, and while badly broken, there was no evidence of any of them having dropped on the track and caused the derailment. The tender truck was in good condition throughout. The freedom of the draw-bar between engine and tender was according to standard practice, there being no indication of any bind-

ing while negotiating curves which might have caused the derailment. He thought the abrasion on the inside rail might have been caused by some obstruction of a fibrous or woody nature.

Engine 328 was of the 4-6 type and had been running on this division since 1906. Its total weight was 174,000 pounds, 134,000 pounds of which was on the drivers, the remainder, 40,000 pounds, being carried by the engine truck. The records of the Superintendent of Motive Power show that this engine was given general repairs January 31, 1918, and light repairs in December, 1918. Since receiving general repairs it had travelled 108,272 miles, and while it was seen to have received a general overhauling, it did not appear to be in a dangerous mechanical condition. The engine truck had been changed on May 2nd, and the engine was put in service on May 8th. On May 24th the entire truck was trammed.

While the cause of this accident was not definitely ascertained, it is believed to have been caused by some obstruction on the rails. Nothing was found which bore any marks indicating it had been run over, and the evidence is not sufficient to judge whether the obstruction, if there was one, was placed on the rails maliciously or whether it dropped from the engine.

Engineman Alexander had been employed as an engineman for 32 years and had a good record. At the time of the accident, the crew had been on duty about 6½ hours, after about 12 hours off duty.