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IN RE INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE
DENVER, BOULDER & WESTERN RAILROAD NEAR SALINA,
COLO., ON JULY 5, 1915.

On July 5, 1915, there was a derailment of a passenger train on the Denver, Boulder & Western Railroad near Salina, Colo., which resulted in the death of the fireman and the slight injury of 2 or 3 passengers. After investigation of this accident, the Chief of the Division of Safety reports as follows:

Fastbound passenger train No. 36 was en route from Eldora, Colo., to Boulder, Colo., and consisted of 1 combination car, 2 coaches and an observation car, hauled by locomotive 30, and was in charge of Conductor Phillips and Engineer Flint. It left Salina at 4.24 p.m., 19 minutes late and at 4.36 p.m. was derailed at a point about 2,800 feet beyond Salina while running at a speed of 8 or 10 miles per hour.

The tender was the first part of the train to be derailed, turning over on its right side. The coupling held between it and the engine. The combination car, pushed forward by the weight of the train on the heavy descending grade, crowded in between the derailed tender on the right and the wall of rock on the left side of the track, coming in contact with the left side of the cab of the engine and pinning the fireman against the boiler. The second car in the train turned nearly over on its right side, while the other two cars remained on the rails.

This part of the Denver, Boulder & Western Railroad is a single-track, narrow-gauge line, laid with 56-pound rails, 30 feet in length, with about 17 ties under each rail. Tie plates are used and the track is ballasted with gravel. Approaching the point of accident from the west, there is 600 feet of tangent, followed by a curve to the left of 30 degrees. The grade at the point of accident was 4-3/4 percent, descending for eastbound trains. An allowance of 3/4 of an inch excess gauge is made on the sharper curves, with a superelevation of 2 1/2 inches. The general condition of the track was good.

Engineman Flint stated that the air brake equipment and appurtenances on the engine and tender were in good condition and the speed of the train had been properly controlled by the brakes. He had made an application of the air brakes just prior to the accident, and stated that while running at a speed of 8 or 10 miles per hour, he heard a noise and on looking around saw that the tender had been derailed and that the combination car was forcing its way between the derailed tender and the wall of rock on the inside of the curve. He made an inspection of the wheels and brake rigging of the tender, but could not find anything which might have caused the accident. After the relief train arrived he again examined the tender, as well as the engine and train, in company with the master mechanic, but did not find out what caused the derailment.

Conductor Phillips stated that the speed was about

10 miles per hour when the train was derailed. He thought it ran about 25 feet before stopping. He also stated that the air brakes were working well, and that while he made an examination of the track and tender he was unable to ascertain the cause of the accident.

Examination of the track revealed nothing which in any way could have contributed to the accident. Examination of the equipment showed that the brake shoe on the second wheel on the right side of the forward tender truck was broken. The fracture was at right angles with the side of the shoe, 3 inches from the bottom, and very close to the lugs and eye which had held it in place in the brake shoe head, leaving the upper part intact and secured by the key. When the brake shoe broke the lower part fell on the rail under the second wheel of the forward truck of the tender, undoubtedly causing that wheel to mount the outside rail of the curve, resulting in the derailment of the tender. The broken brake shoe made a mark on the ball of the rail extending a distance of 24 inches diagonally to the outside of the outer rail of the curve. It then dropped to the base of the rail, sliding along on it for some distance.

Examination of this brake shoe showed that it was defective, there being a blow hole in the metal at the point of fracture which was equal to about 1/3 of the cross-sectional area. When the two parts of the brake shoe were fitted together, however, it was found that there was nothing on the exterior to indicate that a blow hole existed except a very

slight indentation on the side such as is often found on iron castings, due to shrinking. There was also a coating of scale about 1/16 of an inch thick on the outside of the shoe. For these reasons, the most thorough inspection would not have disclosed the defective condition of the brake shoe.

This brake shoe was of the ordinary cast iron type, 14 inches long without steel backing. It was comparatively new, the wear having been only $\frac{1}{4}$ inch.

This accident was caused by the breaking of a brake shoe on the right side of the forward tender truck, due to the presence of an interior defect which could not have been discovered by careful inspection.