

IN RE INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE  
LOUISVILLE & NASHVILLE RAILROAD NEAR SOLWAY, TENN., ON  
MAY 19, 1921.

July 16, 1921.

On May 19, 1921, there was a derailment of a passenger train on the Louisville & Nashville Railroad near Solway, Tenn., which resulted in the death of 2 employees, and the injury of 1 employee and 1 other person. After investigation of this accident the Chief of the Bureau of Safety reports as follows:

Location and method of operation.

The Knoxville Division, on which this accident occurred, extends between Etowah, Tenn., and Corbin, Ky., a distance of 163.03 miles. It is a single-track line over which trains are operated by time-table, train orders, and an automatic block-signal system. The accident occurred about  $1\frac{1}{2}$  miles north of Solway; approaching the point of accident from the south there are several short curves and tangents, followed by a compound curve to the left 2,196.7 feet in length, the accident occurring on this curve about 1,200 feet from its southern end, at a point where the curvature is  $3^{\circ} 39'$ ; the superelevation of the outside rail on this curve is 4 inches. The grade is 0.65 per cent descending for several miles. To the right of the roadway a limestone cliff rises abruptly to a height of from 50 to 100 feet, while to the left is a drop of about 60 feet to the Clinch River. The track is laid with 90-pound rails, 33 feet in length, with 20 ties to the rail-

length, ballasted with crushed stone, and is fairly well maintained. Tie-plates are used on curves, but no rail-braces or anti-creepers are used in the vicinity of the point of accident. The speed of passenger trains in the territory within which the accident occurred is restricted to 45 miles an hour. The weather was clear at the time of the accident, which occurred at about 1.03 p.m.

Description.

Northbound passenger train No. 32 consisted of 1 express car, 1 combination mail and express car, 1 baggage car, 2 coaches, 1 dining car, 1 chair car, and 1 Pullman sleeping car, hauled by engine 230, and was in charge of Conductor Sorrell and Engineman Glenn. According to the train sheet this train left Knoxville at 12.25 p.m., on time, passed Byington, 4.06 miles south of Solway and the last open office, at 12.55 p.m., 6 minutes late, and was derailed north of Solway while traveling at a speed of about 45 miles an hour.

The engine came to rest on the roadway on its left side, headed south, while the tender and express car turned over to the left and fell to the foot of the embankment. The next two cars headed down the embankment, but were not entirely overturned, while the coaches were derailed but remained upright on the roadway; the remaining cars were not derailed or damaged. The employees killed were the engineman and fireman

Summary of evidence.

The first indication of derailment was a faint flange mark on the outer edge of the head of the right or east rail. Six feet farther north, flange marks appeared on the ties, the marks indicating that the engine left the curved track and ran tangent for a distance of 220 feet to the point where its right front corner struck the cliff, which at that point is 21 feet 7 inches from the east rail. The momentum of the heavy train turned the engine entirely around, and apparently it turned over on its left side and was dragged a short distance. Examination of the engine revealed no defects that could have caused the accident.

The statements of the train crew were to the effect that at the time of the accident the train was running at about its schedule speed, which is slightly more than 45 miles an hour at this point, that prior to the emergency application made at the time of the accident the brakes had not been applied since passing Solway, and that the train ran about 10 rail-lengths after the emergency application was made. Conductor Sorrell said he believed the accident was due to the track buckling under the train because of the heat, and to the new ties in the track and the lack of sufficient ballast between the ties.

Section Foreman Pittman said he had been raising and surfacing the track in the vicinity of the point of derailment, putting up caution flags 90 rail-lengths distant in

both directions before beginning work. He put in 40 or 45 new ties, which were neither tamped nor spiked; not more than two consecutive ties were left unspiked and then only in one or two instances. He said the old ties left in the track were tamped full length and spiked, and that the track was in good alignment. At the time of stopping work for the lunch hour he had surfaced the track for about 8 rail-lengths and had put in a run-off between the old and new elevations. During the lunch hour two southbound freight trains passed, but did not disturb the alignment of the track. After the lunch hour some ballast was thrown between the ties, filling nearly to the top of the ties, preparatory to continuing the work of raising the track, and a man was sent to remove the caution signal until after train No. 32 passed. As the train approached, the section foreman was standing on the inside of the curve opposite the run-off, about 5 rail-lengths south of the point where the engine left the rails, and he saw the track buckle outward about 6 inches. He considered the tamping and spiking of alternate ties to be a safe practice, and said it was customary to leave track open, with little ballast, without caution signals, if the track was caught up and spiked in good shape. He thought the weather was hot enough to cause the track to buckle, although he said he had not noticed any indications of expansion. Apprentice Section Foreman Violet in general corroborated the statements of the section

foreman, but estimated that at the time of the derailment the track was about one-fourth full of ballast. He said the track was considered safe for the passage of train No 32 at schedule speed.

Roadmaster Stark said the first flange mark was 215 feet north of the run-off and 35 feet north of where the section foreman had started work on that day.

#### Conclusion

This accident was due to the weakened condition of the track resulting from repairs which were being made by Section Foreman Pittman.

The evidence indicates that he had been putting in new ties, and raising and surfacing the track, but had not tamped nor spiked the new ties, and the tops of the new ties were from  $\frac{1}{2}$  inch to 1 inch below the base of the rails. These conditions, together with the insufficient ballast, undoubtedly resulted in the track being unable to withstand the strain placed upon it by the passage of the heavy train at schedule speed.

Section Foreman Pittman had been in charge of this section for about 12 years, and had had 17 years' experience as a section foreman on this railroad.

The train crew of train No. 32 had been on duty about 1 hour and the engine crew less than 3 hours, after off duty periods of more than 17 hours.