

INTERSTATE COMMERCE COMMISSION  
WASHINGTON

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INVESTIGATION NO. 2812  
THE LOUISVILLE & NASHVILLE RAILROAD COMPANY  
REPORT IN RE ACCIDENT  
NEAR HIGH CLIFF, TENN , ON  
JULY 6, 1944

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SUMMARY

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Railroad: Louisville & Nashville  
Date: July 6, 1944  
Location: High Cliff, Tenn.  
Kind of accident: Derailment  
Train involved: Passenger  
Train number: 47  
Engine number: 418  
Consist: 16 cars  
Estimated Speed: 45 m. p. h.  
Operation: Timetable, train orders and  
automatic block-signal and  
automatic train-control system  
Track: Single; 11°15' curve; 0.69 percent  
ascending grade southward  
Weather: Clear  
Time: 9:05 p. m.  
Casualties: 35 killed; 98 injured  
Cause: Combination of wide gage of  
track and excessive speed  
on sharp curve

INTERSTATE COMMERCE COMMISSION

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INVESTIGATION NO. 2812

IN THE MATTER OF MAKING ACCIDENT INVESTIGATION REPORTS  
UNDER THE ACCIDENT REPORTS ACT OF MAY 6, 1910.

THE LOUISVILLE & NASHVILLE RAILROAD COMPANY

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August 22, 1944.

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Accident near High Cliff, Tenn., on July 6, 1944, caused  
by a combination of wide gage of track and excessive  
speed on a sharp curve.

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REPORT OF THE COMMISSION<sup>1</sup>

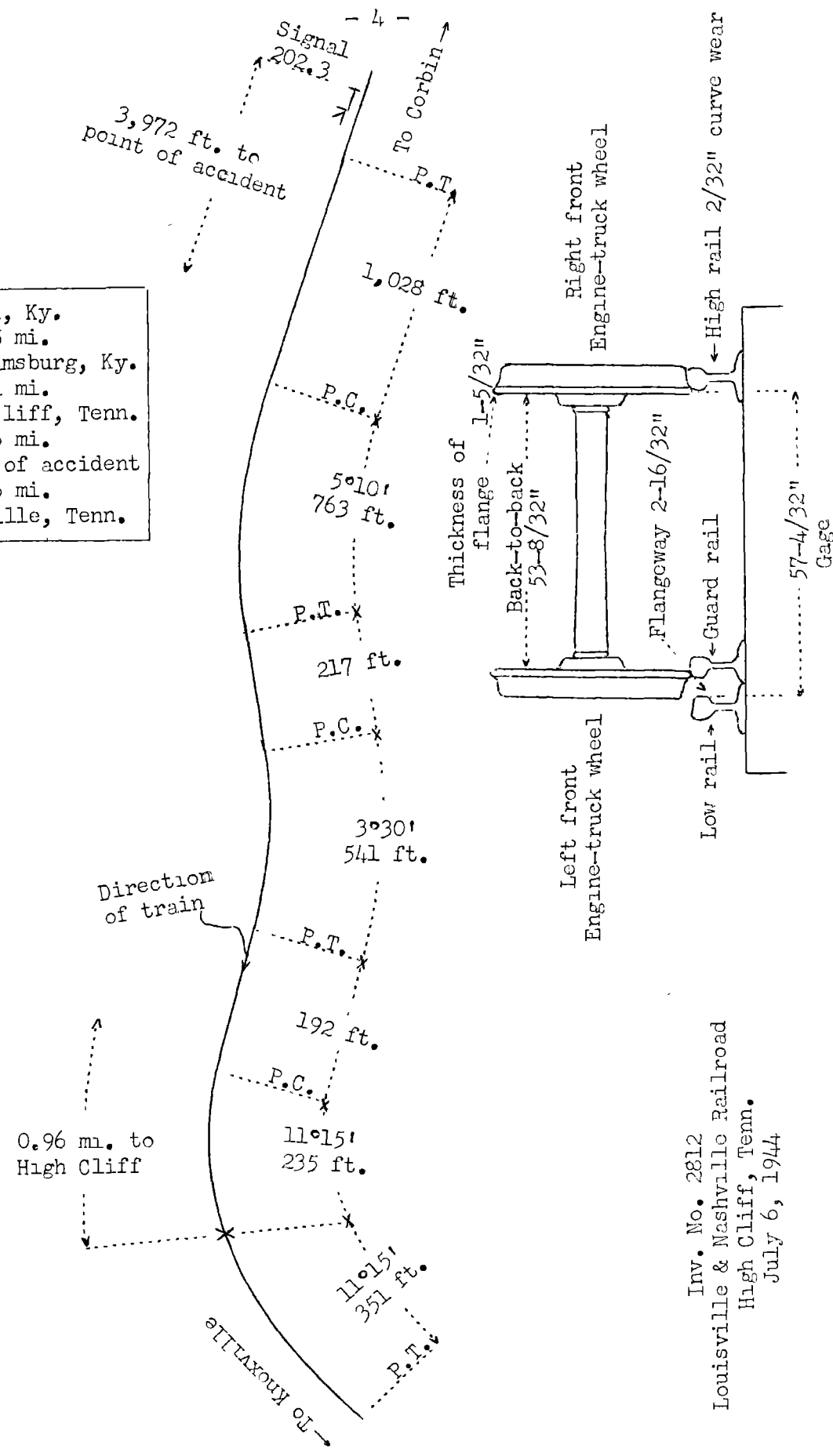
PATTERSON, Chairman:

On July 6, 1944, there was a derailment of a passenger train on the Louisville & Nashville Railroad near High Cliff, Tenn., which resulted in the death of 33 passengers and 2 train-service employees, and the injury of 93 passengers, 3 Pullman employees and 2 train-service employees.

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<sup>1</sup>Under authority of section 17 (2) of the Interstate Commerce Act the above-entitled proceeding was referred by the Commission to Chairman Patterson for consideration and disposition.

- Corbin, Ky. 17.45 mi.
- Williamsburg, Ky. 13.11 mi.
- High Cliff, Tenn. 0.96 mi.
- X Point of accident 73.16 mi.
- Knoxville, Tenn.



Inv. No. 2812  
 Louisville & Nashville Railroad  
 High Cliff, Tenn.  
 July 6, 1944

Location of Accident and Method of Operation

This accident occurred on that part of the Knoxville and Atlanta Division extending southward from Corbin, Ky., to Knoxville, Tenn., 104.68 miles. This was a single-track line over which trains were operated by timetable, train orders and an automatic block-signal and automatic train-control system. The accident occurred 31.52 miles south of Corbin, at a point 0.96 mile south of the station at High Cliff. From the north there were, in succession, a tangent 1,028 feet in length, a 5°10' curve to the left 763 feet, a tangent 217 feet, a 3°30' curve to the right 541 feet, a tangent 192 feet and a 11°15' curve to the left 235 feet to the point of accident and 351 feet beyond. The grade for south-bound trains varied between 0.0475 percent and 0.7433 percent ascending 5,575 feet to the point of accident, and was 0.6975 percent ascending at this point.

On the curve the track structure consisted of 101.49-pound rail, 39 feet in length, laid on 22 treated ties to the rail length. It was fully tieplated, double-spiked outside and single-spiked inside each rail, provided with 4-hole angle bars, 4 rail anchors and 6 gage rods per rail length, and was ballasted with slag to a depth of 12 inches. The high rail was rolled in 1943 and was laid in December, 1943. The low rail was rolled in 1926, was relaid on the high side of the curve in 1942 and was moved to the low side in December, 1943. Throughout the curve guard rails were located inside the low rail. A flangeway of 2-1/2 inches was maintained between the guard rail and the running rail. The maximum superelevation on the curve was 5-1/2 inches and the gage varied between 4 feet 8-3/8 inches and 4 feet 9-1/8 inches. The superelevation at the point of derailment was 5-1/2 inches and the gage was 4 feet 9-1/8 inches.

In the vicinity of the point of accident the track was laid on a hillside cut, and generally paralleled the east bank of Clear Fork River.

Automatic signal 202.3, which governed south-bound movements, was 3,972 feet north of the point of accident.

Rules of the Maintenance of Way Department read in part as follows:

156. Gage of Curves.--Curves of less than eleven degrees shall be put to standard gage. Gage on curves of eleven degrees and over shall be widened as shown by the following table:

Degree of Curve	Gage to be Widened
11° and 12° * * *	1/4-inch * * *

The maximum authorized speed for passenger trains was 35 miles per hour.

### Description of Accident

No. 47, a south-bound second-class passenger train, consisted of engine 418, a 4-8-2 type, 4 Pullman tourist cars, 1 Pullman kitchen car, 1 Pullman troop-sleeping car, 2 Pullman tourist cars, 1 baggage car, 3 Pullman troop-sleeping cars, 1 Pullman kitchen car, 2 Pullman troop-sleeping cars and 1 baggage car, in the order named. All cars were of steel construction. This train passed Williamsburg, Ky., 13.11 miles north of High Cliff and the last open office, at 8:42 p. m., 8 hours 2 minutes late, passed High Cliff, passed signal 202.3, and while it was moving at an estimated speed of 45 miles per hour the engine and first eight cars were derailed.

The engine and tender stopped on their right sides on the river bed 65 feet west of the track and about 33 feet below the level of the track, with the front end of the engine 333 feet south of the point of accident. Both were badly damaged. The first two cars stopped against the engine and were practically demolished. The third and fourth cars stopped on their sides, on top of the wreckage of the second car, and were practically demolished. The fifth car stopped down the embankment and at right angles to the track. The sixth and seventh cars stopped upright, with the front end of the sixth car on top of the fifth car and the rear end of the seventh car on the track structure. The front truck of the eighth car was derailed. Soon after the derailment occurred, fire broke out and the combustible portion of the first, second, third, fifth and sixth cars was destroyed.

It was clear at the time of the accident, which occurred about 9:05 p. m.

The engineer and the fireman were killed. The conductor and the front brakeman were injured.

The total weight of engine 418 in working order was 337,730 pounds, distributed as follows: Engine truck, 57,280 pounds; driving wheels, 226,910 pounds; and trailer truck, 53,540 pounds. The diameters of the engine-truck wheels, the driving wheels and the trailer-truck wheels were, respectively, 33, 70, and 43 inches. The tender was equipped with four-wheel trucks. The rigid wheelbase of the engine was 18 feet 3 inches long, and the total length of the engine and tender was 86 feet 9-5/8 inches. The center of gravity was about 72 inches above the top of the rails. The engine was equipped with a speed indicator, but it was inoperative at the time of the accident.

Discussion

No. 47 was moving on a curve to the left when the engine and the first eight cars were derailed at a point where the curvature was  $11^{\circ}15'$  and the superelevation was 5-1/2 inches. The specified curvature was  $10^{\circ}$ . The engine overturned to the right and stopped 333 feet beyond the point of derailment. The maximum authorized speed on the curve was 35 miles per hour. As the train was approaching the point where the accident occurred the members of the train crew were in various locations throughout the cars of the train. The cars had been riding smoothly, and the first these employees knew of anything being wrong was when the brakes became applied in emergency just before the derailment occurred. The train was moving at a speed of about 45 miles per hour, and there was no service application of the brakes made immediately prior to the accident. It could not be determined when the enginemen first became aware of anything being wrong, as they were killed in the accident. There was no defective condition of the engine prior to the accident, and there was no indication of dragging equipment or of any obstruction having been on the track. The brakes had been tested and had functioned properly en route. Because of damage to the engine, the position of the throttle lever, the reverse lever and the brake valves at the time of the accident could not be determined. There was no condition found that would prevent the proper application of the train brakes.

Examination of the track disclosed that, beginning at a point 235 feet south of the north end of the curve, a flange mark appeared on the top of the head of the guard rail. This mark began on the flangeway side and extended diagonally throughout a distance of 30 feet to the inner side of the head. At a point 2 feet 9 inches south of the south end of this mark, a flange mark appeared on a spike at the inner edge of the base of the guard rail, and flange marks continued southward and diagonally toward the center of the track throughout a distance of 115 feet, to a point beyond which the track was destroyed. The south end of the outer rail opposite the north end of the mark on the guard rail was canted outward. The south end of this rail was 8 feet south of the point of derailment. The three outer rails immediately south were overturned outwardly, and flange marks appeared on the inner side of the web. The left front engine-truck wheel was the first to be derailed. The north end of the flange mark on the guard rail was the approximate point of derailment.

With the speed of the train being approximately 45 miles per hour, which was about 20 miles per hour above equilibrium speed and about 10 miles per hour above maximum safe speed on the curve, evidently the engine rolled laterally, crowded the high rail, and the greater part of the force was exerted against

the gage side and the top surface of the head of that rail. At the point of derailment the gage of the track was 57-1/8 inches, the flangeway between the low rail and the guard rail was 2-1/2 inches wide, and the high rail was curve-worn 1/16 inch. The back-to-back measurement of the front engine-truck wheels was 53-1/4 inches, and the flange of the right front engine-truck wheel was 1-5/32 inches thick. Considering all these measurements together with the crowding of the high rail by the flange of the right front engine-truck wheel, the back of the flange of the left front engine-truck wheel was 2-25/32 inches from the gage side of the low rail, or 9/32 inch inside the flangeway side of the guard rail. Apparently the engine rolled enough for the left front engine-truck wheel to mount the guard rail, then the flange of the companion wheel exerted additional pressure against the gage side of the head of the outer rail, which in turn was canted outward, and following wheels completed the overturning of the rail.

If the engine had not been rolling laterally when it entered the curve, it is probable the left front engine-truck wheel would not have mounted the guard rail. However, if the gage and the alinement of the track had been maintained in accordance with the specifications of the railroad, the curvature would have been 10° instead of 11°15' and the gage would have been 4 feet 8-1/2 inches instead of 4 feet 9-1/8 inches, and the flange of this wheel would not have mounted the guard rail. Considering the actual curvature at the point of derailment, the specifications provide for the maintenance of a gage of only 4 feet 8-3/4 inches on curvature of 11° and 12°, or 3/8 inch less than the gage in question.

Cause

It is found that this accident was caused by a combination of wide gage of track and excessive speed on a sharp curve.

Dated at Washington, D. C., this twenty-second day of August, 1944.

By the Commission, Chairman Patterson.

(SEAL)

W. P. PARTEL,  
Secretary.