Inv-2270

INTERSTATE COMMERCE COMMISSION

WASHINGTON

REPORT OF THE DIRECTOR

BUREAU OF SAFETY

ACCIDENT ON THE

LOUISVILLE & NASHVILLE RAILROAD

ELLISTON, KY.

APRIL 24, 1938.

INVESTIGATION NO. 2270

SUMMARY

Inv-2270

Railroad:	Louisville & Nashville
Date:	April 24, 1938.
Location:	Elliston, Ky.
Kind of accident:	Derailment
Train involved:	Freight
Train number:	First 72
Engine number:	1872
Consist:	43 cars and caboose
Speed:	30-50 m.p.h.
Operation:	Timetable, train orders and automatic block-signal system
Track:	Single; $6^{\circ}46'$ curve; 0.22 percent ascending grade.
Weather:	Clear
Time:	1:53 p.m.
Casualties:	1 killed, 5 injured.
Cause:	Excessive speed on sharp curve and insecure track due to lack of ballast.

May 23, 1938.

To the Commission:

On April 24, 1938, there was a derailment of a freight train on the Louisville & Nashville Railroad at Elliston, Ky., which resulted in the death of one employee and the injury of two employees and three persons carried under contract.

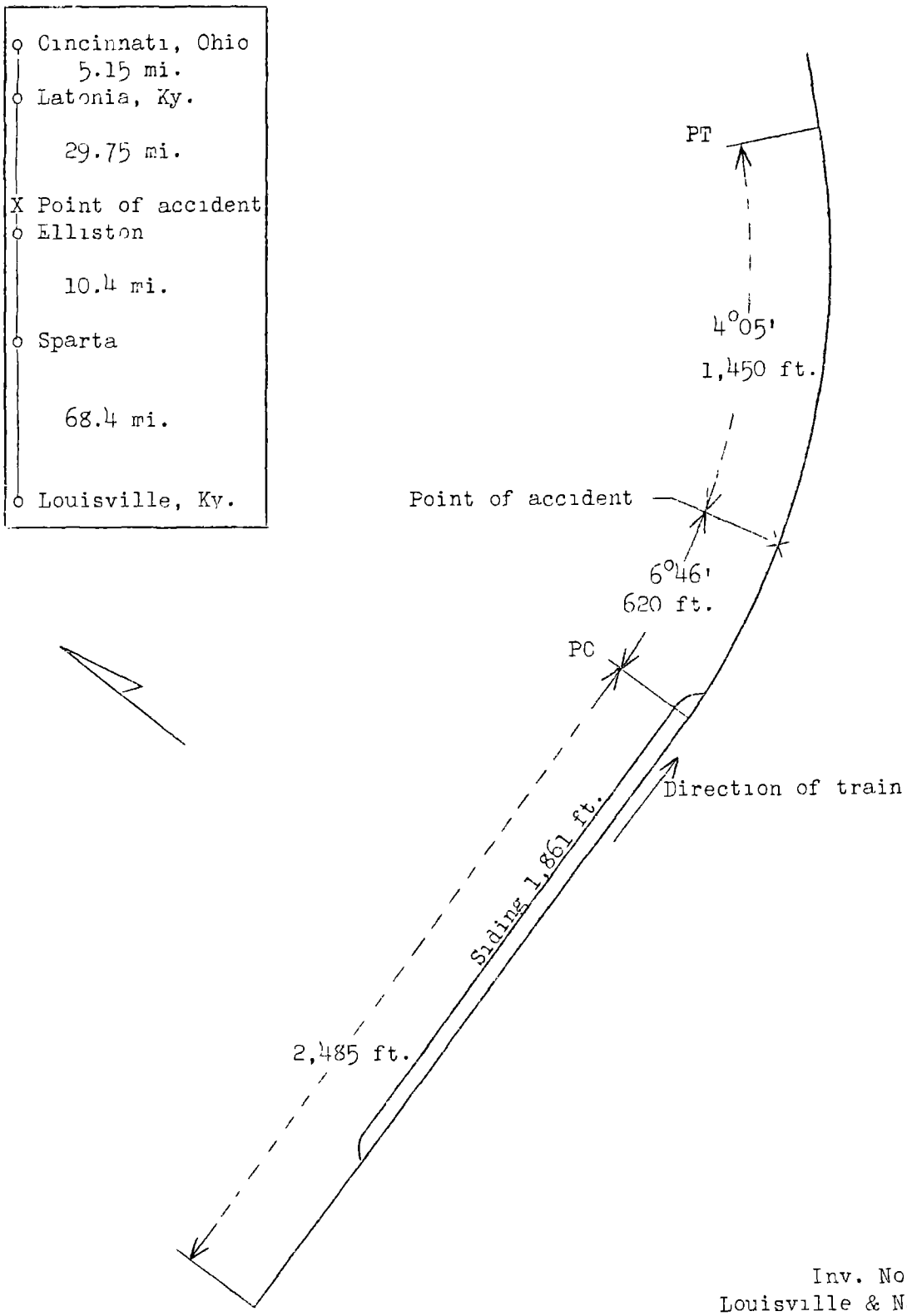
Location and method of operation

This accident occurred on that part of the Cincinnati Division which extends between Louisville and Latonia, Ky., a distance of 108.55 miles. In the vicinity of the point of accident this is a single-track line over which trains are operated by timetable, train orders and an automatic block-signal system. The accident occurred at a point 557 feet north of the north siding switch at Elliston. Approaching this point from the south the track is tangent for a distance of 2,485 feet, followed by a compound curve to the left 2,070 feet in length, consisting of 217 feet of spiral, a 6°46' curve 279 feet in length, 124 feet of spiral, and a 4°05' curve 1,450 feet in length; the accident occurred on this compound curve at a point 621 feet from its southern end. The grade for northbound trains is 1.15 percent ascending for approximately 2 miles, followed by 1.14 percent descending for approximately 1½ miles, a vertical curve 700 feet in length and 0.22 percent ascending grade for a distance of 2,707 feet to the point of accident.

In the vicinity of the point of accident the track is laid on a fill of about 3 feet. The track is laid with 100-pound rail, 39 feet in length, with an average of 22 treated oak ties to the rail length; it is fully tieplated, double-spiked on the outside of the high rail and single-spiked on the gauge side, and 4 gauge rods and 6 rail anchors are used to the rail length. A Maney guard rail is installed on the inside of the low rail. The maximum elevation of the high rail on this curve is 6½ inches. The track is ballasted with crushed limestone to a depth of about 18 inches. This curve was resurfaced and lined on April 20 and 21, and 4 or 5 new ties to the rail length were replaced.

A speed board located approximately 4½ miles south of the point of accident restricts the speed in this territory for passenger trains to 40 miles per hour and freight trains to 30 miles per hour.

The weather was clear at the time of the accident, which occurred at 1:53 p.m.



Inv. No. 2270
Louisville & Nashville R.R.
Elliston, Ky.
Apr. 24, 1938

Description

First 72, a north-bound freight train, consisted of 43 cars and a caboose, hauled by engine 1872, of the 2-8-2 type, and was in charge of Conductor Williams and Engineman Gordon. This train departed from South Louisville, 77.9 miles from Elliston, at 11:10 a.m., according to the train sheet, 1 hour 20 minutes late; left Sparta, 10.4 miles from Elliston, at 1:35 p.m., 50 minutes late, and after passing Elliston was derailed while traveling at a speed estimated to have been between 30 and 50 miles per hour.

The engine and tender, coupled, stopped on their left sides to the left of and parallel with the track, with the front end of the engine 351 feet beyond the point of derailment. The first 20 cars were derailed and piled up in a mass of wreckage between the tender and the point of derailment, 15 of these cars being destroyed. The front truck of the twenty-first car was derailed, but the remainder of the train was neither derailed nor damaged. The employee killed was the head brakeman and those injured were the engineman and the fireman.

Summary of evidence

Engineman Gordon stated that the air brakes had been tested and they functioned properly en route. He left Sparta at 1:35 p.m.; passed Glencoe, 5.4 miles beyond, at 1:44 p.m., and passed Elliston about 1:53 p.m., using about 18 minutes between Sparta and the point of accident. When proceeding over the hill south of Elliston the speed was about 20 or 25 miles per hour, after which it was increased. He thought that he applied the brakes about 1½ miles south of Elliston to steady the train around the curves, drawing off about 15 pounds of brake pipe pressure and releasing the brakes about ½ mile beyond, and at that time the speed had been reduced to about 35 miles per hour. The speed was between 35 and 40 miles per hour when he made the second application approximately 10 car lengths south of the south siding-switch at Elliston and he released the brakes in the vicinity of the north switch, the siding being 1,861 feet in length. He was working a light throttle and the speed was 30 miles per hour on entering the curve and he proceeded about 5 car lengths on the curve when the engine lurched to the right as though it had struck a low joint; it then lurched to the left and he applied the air brakes in emergency. He stated that, except for pounding, this engine rode about the same as other engines; he had not noticed that it was any rougher than any of the others. It was his opinion that when the track is in good condition, this curve is safe for a speed of 45 miles per hour for freight trains.

The statement of Fireman Siefried practically corroborated that of the engineman as to the operation of the train prior to the time of the accident. The train entered the curve at a speed of between 30 and 35 miles per hour and when the engine first lurched to the right the effect was about the same as on all engines, but when it went to the left it swayed too much; it then rocked back to the right. He ran toward the tender while the engineman applied the air brakes in emergency and when the engine swayed back toward the left it turned over. He had noticed nothing unusual in the riding qualities of the engine.

Conductor Williams estimated the maximum speed between Sparta and Elliston to be about 35 miles per hour and when an air-brake application was made on descending the grade south of Elliston he looked at the air gauge and saw that the engineman had drawn off about 10 pounds. After the second application was made he thought the speed was about 20 or 25 miles per hour; the brakes were released just before the emergency application was made.

Flagman Jewell thought the speed was reduced from 35 miles per hour to 20 miles per hour on descending the hill, and the second time the air brakes were applied the engine was about halfway between the siding switches, and the air brakes were applied in emergency without having been previously released.

Section Laborer Jump stated that he was standing on a highway about 15 feet east of the track and about 250 feet south of the point of accident when First 72 passed. He noted that it was running at an excessive rate of speed, estimating it to be about 50 miles per hour. He did not think, however, that it was moving at a higher rate of speed than northward trains usually travel on passing that point.

Section Foreman Rex arrived at the scene of accident about 1 hour after its occurrence. He found that the track had been knocked out of line about 3 inches at three different locations, and again out of line at a fourth location at which point the derailment occurred. There was a kink in one of the rails about a rail length north of the point of derailment. It was his opinion, judging from the manner in which the track was out of line and the position of the wreckage, that the derailment was due to excessive speed. He stated that this curve had been resurfaced and lined on April 20 and 21, at which time the track was raised about 1½ inches and thoroughly tamped. The track was about half full of ballast and a good cinder berm was built up to the ends of the ties. He considered it as safe as a fully ballasted track and thought it was safe for a speed of 60 miles per hour. The joints were open on the low side and a pencil could have been placed between several of the joints on the high side. He had last walked over this track on the morning of April 23 and it was in good condition at that time.

Section Foreman Griffin with his gang assisted in performing the work on this track on April 20 and 21. The track was about one-third full of ballast when he left it on the evening of April 21, and he instructed the man who took charge of his gang to put in the rest of the ballast the next day, which was done. All of the work was done in the customary manner, and he considered the track safe for a speed of 45 miles per hour, but if it had been fully ballasted it would have been more substantial.

Roadmaster Lavon stated that the first deflection in the track, which was about 2 inches, was about 8 rail lengths from the south end of the curve; the next deflection was 3 inches, the third 4 inches, and the last, at which the derailment occurred, was 5 or 6 inches, all deflections being toward the outside of the curve. He considered the track about one-third full of ballast but the ballast was up two-thirds of the way on the ends of the ties. Supervisor Taylor assisted him in checking the track; the gauge was found to be 4 feet 8½ inches, the superelevation 6½ inches, and the first deflection to be at the full elevation of the 6°46' curve. He considered the track safe for a speed of 40 miles per hour. The work performed on this track as stated by the section foremen was carried out in accordance with the instructions of the roadway department. While a fully ballasted track would be more substantial than a partially ballasted track, he did not think that the speed now authorized should be any higher on this curve under any condition. There were flange marks on the ties on the gauge side of the high rail beginning at the point of derailment and continuing for about 10 feet, and it was his opinion that these marks had been made by the trailer-truck wheels and the rear driving wheels, which were the first to be derailed. The track was torn up for a distance of 351 feet. At the point where the engine stopped, the low rail, which had been torn out, showed marks to within 6 feet of the engine truck, indicating that the flange of the engine truck had been running on the web of the rail. The Maney guard rail had been torn out about 10 or 15 feet north of the front end of the engine. It was his opinion that the derailment was due either to some defect on the engine or excessive speed. He had heard supervisors make general remarks about excessive speed on this line and several cases had been reported and handled by the trainmaster.

Master Mechanic Hunter arrived at the scene of accident about 5:30 p.m. He examined the engine as it lay on its side and noted that the left engine-truck wheel showed more wear than the right wheel, but was not within the condemning limit. The left front driving wheel also showed some wear, but neither of these flanges would take the 1 inch gauge. The diameter of the right engine-truck wheel was 31 17/32 inches and the left wheel, 31 3/8 inches, a difference of 5/32 inch. Master Mechanic Hunter was of the

opinion that the more rapid wear of the left wheel was due to it being of a softer metal. The thickness of the right wheel at the throat of the flange was 2 15/32 inches; thickness of the left flange was 2 $\frac{1}{4}$ inches, a difference of 7/32 inch. He did not consider the wear on the left wheel necessitated taking the engine out of service, although it is the practice when one wheel develops more wear than the opposite wheel to remove the wheel before it reaches the condemning limit in order to save the metal. These wheels were applied March 18, 1937. The wedges for both driving boxes of the front pair of wheels were examined and found to be free. Engine 1872 had been turned out of the Decoursey Shops on January 21, 1938, after having received class 5 repairs and the 5-year test. At this time intermediate wheels were dropped, journals trued up and new crown brasses applied to the boxes, and a new set of tires, 2 $\frac{3}{4}$ inches thick, were applied. Master Mechanic Hunter attributed the accident to excessive speed, stating that the thrust of the engine to the right kinked the rail in three or four places, and that it did not climb the high rail because of the elevation for passenger speed and the presence of the guard rail.

Master Mechanic Sengel stated that when examining engine 1872 on its arrival at South Louisville on April 28, he noted the wear of the left engine-truck wheel, and stated that had he known of this condition he would not have permitted the engine to leave the terminal.

The statement of General Foreman Kroeger, who made an examination of engine 1872, accompanied by General Master Mechanic Mathews, brought out nothing additional of importance.

The engineman of No. 99, the last train to pass over this track south-bound prior to the accident, stated that he rounded the curve approaching Elliston at 10:13 a.m. on the day of the accident at a speed of 20 or 25 miles per hour, that the speed had been reduced for the purpose of observing another train that was into clear, and he noticed no unusually rough riding at that time. He had previously passed over the track on the morning of April 21 at a speed of about 30 miles per hour and had noticed nothing wrong with the track.

Observations of Commission's Inspectors

Inspection of the track revealed that due to the lack of supporting ballast the bottom edges of the ties could be seen their full length, and this condition extended the full length of the curve to the point where the track was torn out. The first point at which the track was out of line was about 352 feet from the southern end of the curve. This deflection extended for about 52 feet and was followed by a normal section

39 feet long; a second deflection over a distance of 66 feet was followed by a normal section 27 feet long; a third deflection over a 41-foot section was followed by a normal section 33 feet long; and at a point on the north end of a fourth deflection, which was 28 feet long, the derailment occurred. These deflections were toward the outside of the curve and varied from 2 to 4 inches in extent. At the fourth deflection there was a flange mark on the tie 5½ inches from the gauge side of the right rail, and this mark gradually led away from the rail for about 18 feet to the point where the track was torn out. Opposite the first flange mark on the tie the left rail had been overturned to the left. A mark made by the rim of a wheel showed that it had ridden on the gauge side of the rail and flange marks continued on the web to the point where the track was destroyed. The last two rails involved on the left side also showed flange marks on the web. The indications were that the engine had practically stopped before turning over; the lower part of the engine sustained only slight damage. The only defect that appeared to have existed prior to the derailment was the condition of the left wheel of the engine truck and it did not appear that this was a contributing cause of derailment.

Discussion

The curve on which this accident occurred had been resurfaced and lined three days prior to the accident. The work had been performed in the customary manner and the track was only about from one-third to one-half full of ballast, and after the accident there was very little ballast between the ties. This condition would permit the track to be thrown out of line more readily than if it had been fully ballasted. The manner in which the track was knocked out of line is conclusive that it was not in proper condition for the speed involved.

The first thrust of the engine was toward the outside of the curve, followed immediately by an inward thrust, then another outward thrust followed by a second inward thrust and the derailment to the inside of the curve. Normally, where excessive speed on a curve occurs, the derailment will be to the outside of the curve following the first or some successive rebound from the inside rail. Apparently the guard rail prevented the derailment to the outside of the curve, but the second rebound from the high rail was of sufficient force to cause the flanges on the left side to be raised high enough to clear the ball of the rail. The estimates of the speed at the time of the accident, made by the crew of First 72, were from 30 to 35 miles per hour, but according to the statement of a laborer, who was standing near the point of accident at the time of its occurrence, the speed of the train was

50 miles per hour. The damage which resulted indicated that the speed was considerably in excess of the maximum allowable speed of 30 miles per hour. From this evidence and the fact that this train consumed 18 minutes from Sparta to the point of accident, a distance of about 10.7 miles, an average speed of 35.66 miles per hour, and taking into consideration the heavy ascending grade south of Elliston which naturally would reduce the speed, it would appear that the speed was considerably higher at the time of the accident than estimated by the members of the crew.

There was nothing to indicate that the condition of the engine contributed to the cause of the derailment.

Conclusion

This accident was caused by excessive speed on a sharp curve, together with insecure track due to lack of ballast.

Respectfully submitted,

W. J. PATTERSON,

Director.