Inv-2174

INTERSTATE COMMERCE COMMISSION

WASHINGTON

REPORT OF THE DIRECTOR

BUREAU OF SAFETY

ACCIDENT ON THE

LOUISVILLE & NASHVILLE RAILROAD

EAST BERNSTADT, KY.

MAY 23, 1937

INVESTIGATION NO. 2174

SUMMARY

Inv-2174

Railroad:	Louisville & Nashville
Date:	May 23, 1937
Location:	East Bernstadt, Ky.
Kind of accident:	Derailment
Train involved:	Passenger
Train number:	First No. 32
Engine number:	419
Consist:	13 cars
Speed:	45 to 60 m.p.h.
Track:	8° 43' curve 1.35 percent descending grade
Weather:	Clear
Time:	5:10 p.m.
Casualties:	1 killed and 100 injured
Cause:	Excessive speed on a sharp curve

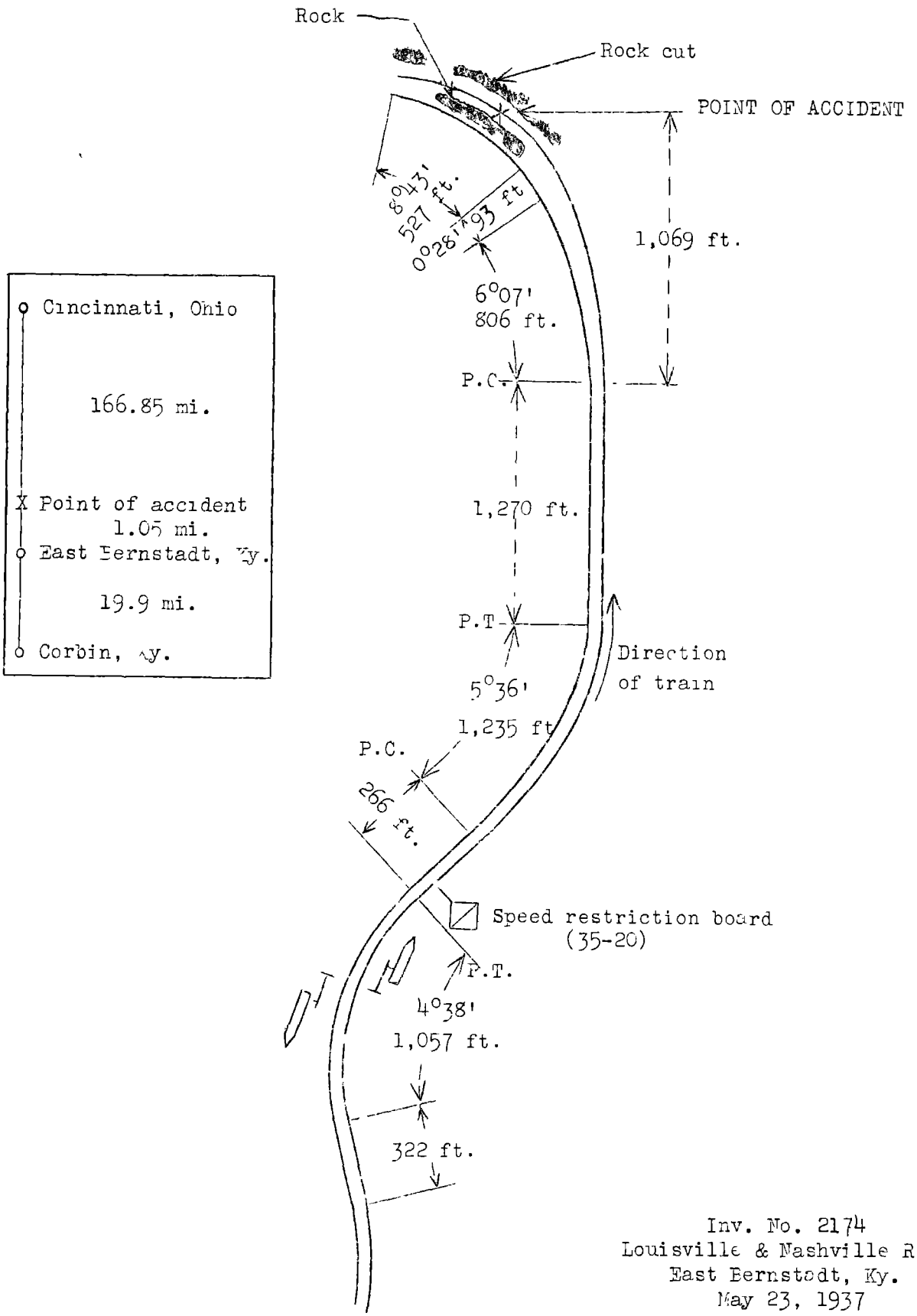
To the Commission:

On May 23, 1937, there was a derailment of a passenger train on the Louisville & Nashville Railroad near East Bernstadt, Ky., which resulted in the death of 1 employee and the injury of 83 passengers, 3 employees on duty, 1 employee off duty, 1 Pullman employee, 3 railway mail clerks, 1 express messenger and 8 dining car employees.

Location and Method of operation

This accident occurred on the Cincinnati-Corbin Subdivision of the Cincinnati Division which extends between Cincinnati, Ohio, and Corbin, Ky., a distance of 187.8 miles, and is a double-track line over which trains are operated by timetable, train orders and an automatic block-signal system. The accident occurred on the northward track at a point 5,559 feet north of the station at East Bernstadt; approaching this point from the south there is a series of curves and tangents, followed by a 5°36' curve to the left 1,235 feet in length, tangent track for 1,270 feet and then a compound curve to the left 1,426 feet in length consisting of a 6°07' curve for a distance of 806 feet, a 0°28' curve for 93 feet and an 8°43' curve for 527 feet. The derailment occurred at a point 1,069 feet from the southern end of the compound curve, where a curvature of 8°43' exists. The station is located at the apex of the mountain and from that point northward the grade is descending for more than 1 mile to the point of accident, varying from 0.47 percent to a maximum of 1.35 percent at the point of accident.

On the 8°43' curve on which the accident occurred the northward track is laid in a jagged rock cut about 30 feet high and 16 feet wide at the base, and the main tracks are separated by a natural wall of rock about 275 feet long and 50 feet wide. North of the rock wall there is an open space having a maximum width of about 75 feet and tapering with the convergence of the tracks to the usual width of a double track line. To the east of the open space the mountainside has a gradual slope for a distance of about 150 feet north of the rock wall, after which a precipitous rocky formation overhangs the northward main track. The track is laid with 100-pound rails, 39 feet in length, with 23 treated ties to the rail length, double-spiked on the outside and single-spiked on the inside, fully tieplated and equipped with 5 gauge rods and from 6 to 12 rail anchors



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to the rail length. The track is ballasted with crushed rock to a depth of about 24 inches and is well maintained. A Maney guard rail set 2¼ inches from the low rail on tieplates that extend under the running rail, extends the entire length of the compound curve. The maximum speed for passenger trains on this subdivision is 55 miles per hour, but in the vicinity of the point of accident, the speed is restricted to 35 miles per hour by a speed board located 3,787 feet south of the point of derailment.

The weather was clear at the time of the accident, which occurred at 5:10 p.m.

Description

Train First No. 32, a north-bound passenger train, consisted of 1 express car, 1 mail car, 2 express cars, 1 express and baggage car, 3 coaches, 1 Pullman sleeping car, 1 dining car and 5 Pullman sleeping cars, all of steel construction with the exception of the first car which had a steel underframe, hauled by engine 419, and was in charge of Conductor Arnold and Engineman Elam. At Corbin the crew received a copy of train order 58, form 19, directing them to run 30 minutes late from Corbin to Paris and 20 minutes late Paris to Grant Court; Paris and Grant Court being located 106.2 and 182.6 miles respectively, north of Corbin. This train departed from Corbin, 19.9 miles from East Bernstadt, at 4:41 p.m., according to the train sheet, 50 minutes late, and after passing East Bernstadt was derailed while traveling at a speed estimated to have been between 45 and 60 miles per hour.

The engine and tender stopped on their right sides, parallel to and to the right of the track, with the front end of the engine 375 feet beyond the point of derailment. The first six cars were piled up within a distance of about 125 feet; the first car stopped across the track with one end on top of the tender; the second car was across the track behind the first car and fouled the south-bound main; the third car paralleled the north-bound track on the right and the fourth car extended up the mountainside a distance of 80 feet; the fifth car was across the north-bound track while the sixth car fouled the south-bound track. The seventh and eighth cars were derailed but remained upright on the roadbed, and the front truck of the ninth car was also derailed. The first four cars were destroyed, and excepting the ninth car, the other derailed cars sustained heavy damage. The employee killed was the engineman and those injured were the conductor, fireman and baggageman.

Summary of evidence

Fireman Botkin stated that a terminal air brake test had been made at Corbin, but no running test was made at that place, nor were the brakes applied anywhere after leaving that point until just prior to the derailment. The train was operated at a speed of 60 miles per hour for most of the way between Corbin and the point of accident and was making about that speed when they tipped over the crest of the hill at East Bernstadt. About 2,000 feet south of the point of accident, while on tangent track, he heard an application of the air brakes being made, and shortly afterward the engine entered the curve and reared up on the high rail. The engine kept leaning farther to the right and appeared to be suspended in the air for about an engine length and then lay over on its right side without striking the ties or the ground. He did not hear the brakes being applied in emergency and did not think that the service application had materially reduced the speed of the train at the time of the accident. A drifting throttle was being used. He talked with Engineman Elam before leaving Corbin and believed him to be in normal condition. Fireman Botkin stated that he had fired for Engineman Elam on Train No. 31 the previous evening, and on that trip, as well as on the trip during which the accident occurred, the speed was a little high but the engine rode all right.

Conductor Arnold stated that his train left Knoxville at 4:41 p.m. He did not notice any excessive speed except at Pattsburg, where the train seemed to be handled roughly, and through London and East Bernstadt where the speed was about 35 miles per hour although there are speed restrictions of 20 miles per hour through these towns. On the descending grade, north of East Bernstadt the speed increased considerably and was about 50 miles per hour as they approached the compound curve, and when the brake application which he expected was not made he prepared to take some action but was knocked down by the shock of the derailment.

Both Baggageman Gutzeit and Dining Car Steward Nettles considered the speed of the train too high when it entered the curve upon which the derailment occurred, their estimates ranging from 45 to 55 miles per hour; Flagman Jones estimated the speed at about 40 miles per hour which he did not consider excessive.

Section Foreman Philpott stated that he arrived at the scene of accident about 6 p.m. and made an inspection of the track southward but found no indication that there had been anything dragging or anything on the track which could have caused the derailment. The track was in good condition. He had been over this track on the day previously with a gauge and cross level.

Division Engineer Nickerson stated that the first mark of derailment was a wheel mark on top of the guard rail 3½ inches from the gauge side of the low rail. At a point 7½ feet from this mark the first mark on the outside of the right or high rail appeared; it was on the head of a spike and was followed by a mark on the tieplate. At a point 25 feet beyond the first mark the derailed equipment left the ties on the east side. At a point 26 feet beyond, some part of the wreckage struck the side of the cut, tearing out some of the rock, and 47 feet from this point the side of the cut was struck again. From the point of derailment the guard rail was in its proper position for about 50 feet northward but from that point to where the wreckage stopped the track was completely destroyed. The southward track was knocked slightly out of line and damaged to the extent that it was necessary to remove two rails. After the derailment the track was checked for gauge and elevation; the superelevation varied from 5¼ to 5 7/8 inches, being 5¼ inches at the point of derailment. This is standard on the L. & N. for a speed of 35 miles per hour. It was his opinion that the derailment was caused by excessive speed, which he estimated to have been about 60 miles per hour, and the fact that the brakes were applied when the train struck the sharpest part of the curve. The center of gravity on engine 419 would be 5 feet 4 inches above the rail, and according to the formula of the American Railroad Engineering Association the overturning speed on an 8°43' curve would be 69.3 miles per hour.

Inspector of Safety Bowling stated that the mark on the guard rail extended for a distance of 8 feet. From the south end of this mark to a point 13 feet southward some of the spikes on the gauge side of the east rail had been pulled about 3 inches and the heads of some of the other spikes had been bent back, releasing the base of the rail. Opposite the flange mark on the guard rail there was a mark on the outer end of the gauge rod near the right rail, the rod was bent downward and disengaged from the base of the rail. About 8 or 10 feet northward the track was torn up from the center of the ties to the east edge of the ties; from that point northward there were indications that the right flanges had run along the web on the gauge side of the rail. Measurements for a distance of 13 rail lengths southward indicated the gauge to be 1/16 inch tight due to the roll of the ball of the west rail. At the time of his inspection the rail where the spikes had been disengaged was back in its normal position and was resting on the ties. The next rail, however, showed indications of wheels running on the base of it and was still partly turned. The engine turned over at a point approximately 70 feet beyond the point of derailment.

Master Mechanic Feather stated that he examined the engine as it lay on its side at the scene of accident and also after it had been taken to Corbin and was unable to find any defects which in his opinion could have caused the accident. The flanges were in good condition and there were no flat spots on the driving wheels. Driving box shoes and wedges had been properly lubricated and there was no indication of stuck wedges. There was no excessive lateral motion and the spring rigging seemed to be in good condition. The breaks in the engine truck were all new, there being no indication of old defects. This engine was turned out of the Corbin Shops on January 23, 1937, after having received class 5 repairs.

Master Mechanic Hunter, at Covington, Ky., stated that Engineman Elam had been qualified to run passenger trains since 1928, and was an experienced engineman on the Cincinnati Division. Due to the records having been destroyed in the flood a detailed record was not available concerning his service on passenger, freight or yard engines, but since January, 1937, he had been on freight service almost exclusively.

Master Mechanic Hunter also stated that he had known Engineman Elam for many years and that he was a man of good habits.

Engineman DePrato, who handled Train No. 32 between Etowah, Tenn., and Corbin, Ky., stated that the brakes were properly tested before leaving Etowah and Knoxville and functioned properly en route.

Machinist Martin stated that he inspected the air brake equipment on engine 419 before it departed from Corbin on May 23rd. The driving brake piston travel on the left side was approximately 1 inch more than the piston travel on the right side; he reported it and it was adjusted by Machinist Corn. Car Inspectors and Repairmen Bailey and Hill made the air brake test on Train No. 32 before its departure from Corbin and all brakes were found to be operating properly.

Inspection of the track and engine by the Commission's inspectors revealed nothing in addition to that outlined by the railroad officials.

Discussion

All of the evidence in this investigation points to excessive speed as the cause of this derailment. While the estimates of the members of the crew with regard to speed differ somewhat, they ranged from 40 to 60 miles per hour, while the maximum speed permitted on this curve is 35 miles per hour. The superelevation on the curve was checked after the accident

and found to be between 5¼ and 5 7/8 inches which is standard for an 8°43' curve on the Louisville & Nashville Railroad for a speed of 55 miles per hour, and is generally regarded as safe practice. There was no evidence of dragging equipment in the train, or of defects on the locomotive that would have caused a derailment, nor was there any indication that there had been any foreign object on the track.

Conclusions

This accident was caused by excessive speed on a sharp curve.

Respectfully,

W. J. PATTERSON,

Director.