INTERSTATE COMMERCE COMMISSION

WASHINGTON

REPORT NO. 3445

ILLINOIS CENTRAL RAILROAD COMPANY

IN RE ACCIDENT

NEAR VINE GROVE, KY., ON

NOVEMBER 24, 1951

SUMMARY

Date:	November 24, 1951
Railroad:	Illinois Central
Location:	Vine Grove, Ky.
Kind of accident:	Derailment
Train involved:	Passenger
Train number:	101
Engine number:	1146
Consist:	8 cars
Estimated speed:	40 m. p. h.
Operation:	Timetable, train orders and automatic block-signal system
Track:	Single; spiral, 1.10 percent descending grade southward
Weather:	Clear
Time:	1:52 p. m.
Casualties:	2 killed; 9 injured
Cause:	Undetermined

INTERSTATE COMMERCE COMMISSION

REPORT NO. 3445

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

ILLINOIS CENTRAL RAILROAD COMPANY

February 21, 1952

Accident near Vine Grove, Ky., on November 24, 1951, cause undetermined.

REPORT OF THE COMMISSION[1]

PATTERSON, Commissioner:

On November 24, 1951, there was a derailment of a passenger train on the Illinois Central Railroad near Vine Grove, Ky., which resulted in the death of two train-service employees, and the injury of eight passengers and one railway-mail clerk.

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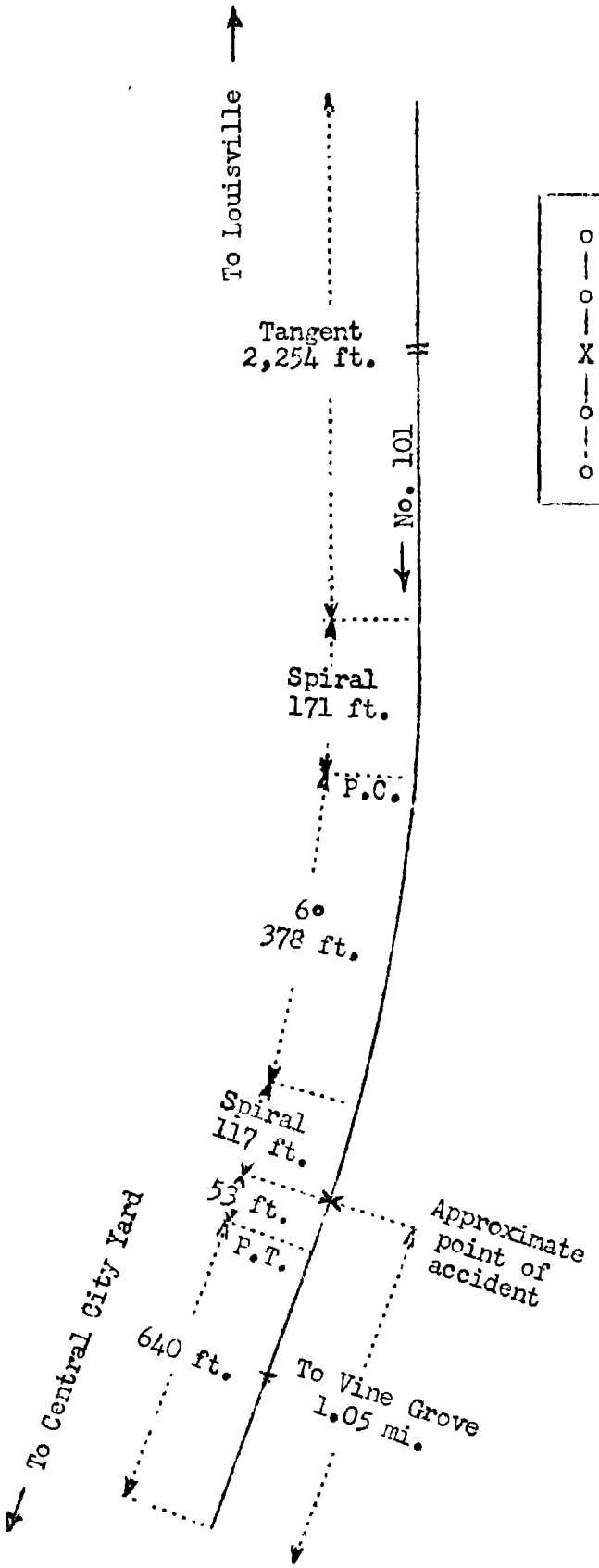
[1] Under authority of section 17 (2) of the Interstate Commerce Act the above-entitled proceeding was referred by the Commission to Commissioner Patterson for consideration and disposition.



o Louisville, Ky.
|
30.20 mi.
o Fort Knox
|
5.35 mi.
X Point of accident
|
1.05 mi.
o Vine Grove
|
88.90 mi.
o Central City Yard, Ky.

Report No. 3445
Illinois Central Railroad
Vine Grove, Ky.
November 24, 1951

Location of Accident and Method of Operation

This accident occurred on that part of the Kentucky Division extending between Louisville and Central City Yard, Ky., 125.5 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 on the main track at a point approximately 35.55 miles south of Louisville and 1.05 miles north of the station at Vine Grove. From the north there are, in succession, a tangent 2,254 feet in length, a spiral 171 feet, a 6° curve to the right 378 feet, a spiral 117 feet to the point of accident and 53 feet southward, and a tangent 640 feet. The grade varies between 0.77 percent and 1.16 percent descending southward throughout a distance of 3,200 feet immediately north of the point of accident, and it is 1.16 percent descending southward at that point.

In the vicinity of the point of accident the track structure consists of 112-pound rail, 39 feet in length, laid new in 1944 on an average of 21 treated ties to the rail length. It is fully tieplated with double-shoulder tieplates, spiked with two rail-holding spikes and two anchor spikes per tieplate, and is provided with 6-hole 36-inch joint bars, and eight rail anchors and four gage rods per rail. It is ballasted with limestone to a depth of approximately 18 inches. Where the most northerly marks of derailment appeared the track is laid in a cut approximately 5 feet in depth, and where the front of the train stopped the track is laid on a fill approximately 20 feet in height. The specified superelevation on the 6° curve immediately north of the point of accident is 4-1/2 inches.

The maximum authorized speed for the train involved was 75 miles per hour, but it was restricted to 40 miles per hour on the curve on which the accident occurred.

Description of Accident

No. 101, a south-bound first-class passenger train, consisted of engine 1146, two express-refrigerator cars, two baggage cars, one mail car, and three coaches, in the order named. The first two cars were of steel underframe construction, and the other cars were of lightweight steel construction. This train departed from Louisville at 12:40 p. m., on time, departed from Fort Knox, 5.35 miles north of the point of accident and the last open office, at 1:44 p. m., 10 minutes late, and while moving at an estimated speed of 40

miles per hour the entire train, except the rear truck of the rear car, was derailed at a point approximately 1.05 miles north of the station at Vine Grove.

The engine and tender stopped on their left sides, at right angles to the track, with the rear end of the tender toward the east and the front end of the engine 551 feet south of the most northerly mark of derailment and 28 feet east of the track. The engine truck was detached from the engine, and it stopped with the rear wheels derailed to the left and about 15 feet south of the engine. The cab of the engine was demolished, the brake rigging was damaged, and air reservoirs and other appurtenances were torn off. Both trucks were detached from the tender, and the frame of the tender was bent. One tender truck stopped about 60 feet east of the track and 374 feet south of the most northerly mark of derailment, and the other truck stopped 30 feet west of the track and 381 feet south of this mark. The first car stopped on its top, at right angles to the track, and about 30 feet north of the engine. The second car stopped upright, about 100 feet east of the track and about 50 feet north of the engine. There were no separations between the other cars of the train. The third car stopped with its front end 73 feet east of the track and about 6 feet north of the engine, and the rear car stopped with its rear end on the track. The third, fourth, and fifth cars leaned to the east at an angle of about 45 degrees, and the sixth and seventh cars leaned slightly to the east. The first two cars were badly damaged, and the third to the seventh cars, inclusive, were somewhat damaged.

The engineer and the fireman were killed.

The weather was clear at the time of the accident, which occurred at 1:52 p. m.

Engine 1146 was of the 4-6-2 type. The weight on the driving wheels was 189,400 pounds, and the total weight of the engine in working order was 285,500 pounds. The specified diameters of the engine-truck wheels, the driving wheels, and the trailing-truck wheels were, respectively, 33 inches, 75-1/2 inches, and 50 inches. The driving wheelbase was 13 feet, the total wheelbase was 34 feet 4 inches, and the total length of the engine and tender, coupled, was 81 feet 5-1/4 inches. The engine was not equipped with a speed indicating or recording device. The tender was rectangular in shape and was equipped with two 4-wheel trucks. Its capacity was 12,000 gallons of water and 16 tons of coal. The total weight when fully loaded

was 216,500 pounds. The wheelbase was 27 feet 6 inches, and the overall length was 34 feet 8-1/2 inches. It was estimated that at the time of the accident the tender contained 6,000 gallons of water and 14 tons of coal. The calculated equilibrium, safe, and overturning speeds of the engine on a 6° curve having a superelevation of 4-5/8 inches were, respectively, 34 miles per hour, 50 miles per hour, and 77 miles per hour. The calculated equilibrium, safe, and overturning speeds of the tender on the same curve were, respectively, 37 miles per hour, 54 miles per hour, and 85 miles per hour.

The last class repairs of engine 1146 were completed in April, 1951. The accumulated mileage since class repairs was 36,264. The last trip inspection and repairs were made at Louisville on November 23, 1951.

Discussion

As No. 101 was approaching the point where the accident occurred the enginemen were on the engine, and the members of the train crew were at various locations in the cars of the train. The members of the train crew said they noticed nothing unusual in the operation of the train before the derailment occurred. They were not certain whether the brakes were applied before the derailment occurred. The baggageman and the flagman thought that the brakes were applied in emergency about the same time that the cars lurched, but the conductor said that he did not notice an emergency application of the brakes. Surviving members of the crew all estimated that the speed of the train was about 40 miles per hour when the derailment occurred.

Examination of the track structure throughout a distance of 1 mile north of the most northerly mark of derailment disclosed that the surface, gage, and alinement were in good condition and were well maintained for the maximum authorized speed. There was no mark of dragging equipment or of an obstruction having been on the track. Throughout a distance of 639 feet immediately north of the most northerly mark on the track structure, cross-level and gage measurements taken at joints and centers disclosed a maximum variation in superelevation of 3/8 inch between adjacent stations and a maximum variation in gage of 1/2 inch. On the 6° curve immediately north of the point of accident the superelevation varied between 4-7/16 inches and 4-7/8 inches, and the gage varied between 56-5/8 inches and 56-7/8 inches. At the most northerly mark of derailment the superelevation was 3-7/16 inches, and the gage was 56-3/8 inches.

The most northerly mark on the track structure was an indentation on a rail anchor on the gage side of the east rail at a point 53 feet north of the south end of the spiral at the south end of the curve. South of this mark other marks on the ties and tieplates indicated that a wheel had dropped to the ties on the gage side of the east rail and had continued in line with the track about 95 feet to the point at which the east rail was torn out. There were no marks on the ties on the outside of the west rail throughout this distance to indicate that the companion wheel had dropped from the west rail. The sixth, seventh, and eighth ties south of the initial mark bore scraping marks 12 inches east of the east rail, and the eighth tie was split from the east rail to the east end of the tie. At a joint in the east rail 15 feet south of the most northerly mark the bolts were sheared on the gage side of the rail, metal was sheared from the top shoulder of the inside joint bar throughout the entire length of the bar, and horizontal scraping marks appeared on the top shoulder of the outside joint bar. The abrasions on the surface of the inside joint bar where the metal was sheared were inclined at an angle of about 75 degrees, and apparently they were made by a revolving wheel. A tie 31 feet south of the most northerly mark had been scraped across the top 13 inches east of the east rail, and the north side of the next tie had been struck a heavy blow at a point 17 inches east of the east rail. At a point about 45 feet south of the most northerly mark, marks on the ties indicated that a pair of wheels had become derailed to the east. The left rear step of the tender was found east of the track and about 10 feet farther south, and marks on the ground indicated that it had bounded in the direction in which the train was moving after it had been broken from the tender. At the second joint in the east rail south of the most northerly mark, the bolts were sheared on both sides of the joint bars. At the third joint the bolts also were sheared on both sides of the joint bars and the rails were separated about 12 inches. A triangular section of metal approximately 1-5/8 inches in width and 4 inches in length was sheared from the gage side of the head of the receiving end of the south rail. The abrasions on the sheared surface had the same appearance as those on the sheared joint bar and apparently also were made by a revolving wheel. From this point southward the east rail was torn out throughout a distance of approximately 400 feet. The west rail was not damaged, but it was shifted to the west a maximum of about 12 inches throughout the distance that the east rail was torn out. No marks were found on the west rail or on the portion of the east rail which remained in place that could be identified as having been caused by

a flange crossing the rail or by a wheel striking an obstruction on the rail. The portion of the east rail which was torn out was badly twisted and was broken in seven places. All of the rail was recovered and inspected, but no marks which could be identified as flange or wheel marks were found on the head or web of the rail. All of the breaks were angular and had the appearance of having been caused by twisting of the rail. None of the broken ends had the appearance of having been struck by a wheel. There were no broken joint bars.

Examination of the engine and the tender after the accident occurred did not disclose any condition which would have caused or contributed to the cause of the accident. The driving-wheel assembly of the engine was in good condition. The flanges and the treads of all wheels were of good contour, and there was no appreciable tread wear. All wheel centers were tight on their axles, and all tires were tight on their wheel centers and parallel to their companion tires. The lateral motion of the engine-truck wheels, the driving wheels, and the trailing-truck wheels was, respectively, 11/16 inch, 15/16 inch, 7/16 inch, 11/32 inch, 11/16 inch, and 5/16 inch. The driving-box shoes and wedges were in good condition and well lubricated. The spring assembly was intact. The spring buffer assembly between the engine and the tender was in good condition, and the chafing plates were well lubricated. Both safety bars between the engine and the tender were broken. The drawbar was not broken, but it was twisted slightly in a counter clockwise direction. The bolsters were displaced from the trucks of the tender during the derailment, but all springs, equalizers, and other major parts were in place. There was no evidence of improper side-bearing clearance. Inspection of the splash plates disclosed no condition which would have contributed to the cause of the accident. None of the wheels of the tender was found to be loose on its wheel seat. None of the wheels of the engine or the tender bore marks which could be identified as having been caused by contact with track fastenings or tieplates.

The trucks were torn from each of the first two cars of the train. Wheels became separated from the trucks and were scattered at random along the right-of-way, and the respective trucks could not be identified after the accident occurred. The wreckage of one truck was buried under the front end of the third car and was damaged to the extent that it collapsed when an attempt was made to pick it up. All major parts which were recovered bore no indication of having been defective before the accident occurred. All wheels were examined, and no loose or defective wheel was found.

All of the surviving members of the crew of No. 101 said they noticed nothing unusual in the handling of the train before the accident occurred and each said that the speed of No. 101 on the curve was about 40 miles per hour. The engine and tender, coupled, stopped on their left sides almost at right angles to and headed toward the track. However, the front engine-truck wheels were not derailed, and marks on the track structure indicated that the rear engine-truck wheels were not derailed until immediately before the truck stopped about 15 feet south of the engine. The rear engine-truck wheels were derailed to the left, and the safety chains on the engine truck were broken. From the position in which the engine and tender stopped and the fact that the front engine-truck wheels were not derailed, it is evident that all wheels of the engine and tender, except the engine-truck wheels, were derailed and the tender and the rear of the engine were moving down the fill when the engine truck became detached from the engine. The track on the curve and about 40 feet southward on the tangent to the point where it was destroyed during the derailment was well maintained for the authorized speed of 40 miles per hour. There were only minor variations in the gage, surface and alinement. A north-bound passenger train had passed over the curve on which the accident occurred about 1 hour 30 minutes before No. 101 was derailed. The rear step on the left side of the tender was broken and was found east of the track and 55 feet south of the most northerly mark of derailment. There were marks on the ground which indicated that the step, after having been broken, moved southward after striking the ground. Marks on the sixth, seventh, and eighth ties south of the most northerly mark of derailment indicated that each of these ties was struck about 12 inches east of the east rail, and the eighth tie was split as a result of having been struck. These marks were not made by a wheel. Similar marks were found on the ties east of the east rail and about 20 feet farther south. From the location at which the tender step was found, it is apparent that it was broken in the vicinity of the most northerly mark of derailment and before the general derailment occurred. There was no mark found on the step. A number of railroad officials who participated in this investigation

expressed the view that some derailing action occurred behind the engine, possibly the failure of a truck under the first or second car, or perhaps the rocking of the tender, but no specific evidence in support of either theory could be developed.

Cause

The cause of this accident was not determined.

Dated at Washington, D. C., this twenty-first day of February, 1952.

By the Commission, Commissioner Patterson.

(SEAL)

W. P. BARTEL,

Secretary.