

RAILROAD ACCIDENT INVESTIGATION

REPORT NO. 4129

THE PENNSYLVANIA RAILROAD COMPANY

WEST JEFFERSON, O.

AUGUST 4, 1967

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION

Washington

Summary

DATE: August 4, 1967

RAILROAD: Pennsylvania

LOCATION: West Jefferson, O

KIND OF ACCIDENT: Derailment

TRAIN INVOLVED: Passenger

TRAIN NUMBER: 77

LOCOMOTIVE NUMBERS: Diesel-electric units 4286, 4310

CONSIST: 11 cars

SPEED: 69 m p h

OPERATION: Signal indications

TRACKS: Double; tangent; 0 5 percent ascending grade westward

WEATHER: Clear

TIME: 6:19 a m

CASUALTIES: 20 injured

CAUSE: Inadequately maintained track.

RECOMMENDATION: That the Pennsylvania Railroad Company immediately correct the remaining poor track conditions in the West Jeffersonville, Ohio, area so that all the track structure in this area will meet the carrier's specifications for maintenance of track.

DEPARTMENT OF TRANSPORTATION
FEDERAL RAILROAD ADMINISTRATION
RAILROAD SAFETY BOARD

RAILROAD ACCIDENT INVESTIGATION
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Synopsis

On August 4, 1967, a westbound Pennsylvania Railroad passenger train derailed at West Jefferson, O., resulting in injury to 20 passengers and employees

The accident was caused by inadequately maintained track

Location and Method of Operation

The accident occurred on that part of the Buckeye Division extending between Columbus and Xenia, O, a distance of 54.7 miles. In the accident area this is a double-track line over which trains moving with the current of traffic operate by signal indications of an automatic block-signal system, supplemented by a cab-signal system. From the south, the main tracks are designated as No. 1 eastward and No. 2 westward. At West Jefferson, 14.8 miles west of Columbus, a spur track on the north side of the main tracks converges with track No. 2. The spur-track switch is trailing point for westbound movements on track No. 2.

The initial derailment occurred on track No. 2, 965 feet east of the spur-track switch at West Jefferson. The general derailment occurred at the spur-track switch

Details concerning the tracks, carrier's specifications for maintenance of track, train involved, damages, and other factors are set forth in the appendix

Description and Discussion

No. 77, a westbound first-class passenger train consisting of 2 diesel-electric units and 11 cars, left Columbus at 6:00 a.m., on time, and proceeded westward on track No. 2. About 19 minutes later, while moving on a tangent at 69 miles per hour, as indicated by the speed-recording tape, the front wheels of the rear truck of the 6th car derailed to the south, 965 feet east of the spur-track switch at West Jefferson. Moments later, the derailed pair of wheels struck the frog and curved closure rail of the spur-track turnout. Immediately thereafter, both trucks of the 7th to 11th cars, inclusive, also derailed, at the spur track switch. The brakes of the train became applied in emergency as a result of the general derailment. None of the crew members was aware of anything being wrong before this time.

The flagman, brakeman, 1 sleeping-car employee, 4 railway post office employees and 13 passengers were injured.

Examination of track No. 2 throughout a considerable distance east of the initial derailment point disclosed no evidence of dragging equipment or of an obstruction having been on the track.

The first mark of derailment was a wheel mark on the top of a rail anchor on the gage side of the north rail, 965 feet east of the spur-track switch. It indicated that a pair of wheels, apparently the front wheels of the rear truck of the 6th car, had derailed to the south at this point. Two and one-half feet west of the initial derailment point, a flange mark appeared on a tie plate on the field side of the south rail. Two and one-half feet farther westward, a pair of wheel marks appeared on the tops of the ties, 7 inches from the gage side of the north rail and 4 inches from the field side of the south rail. These marks extended westward on the ties to the frog of the spur-track turnout. Scrape marks appeared on the south side of the frog and curved closure rail. They extended westward on the curved closure rail to a point two feet east of the heel of the switch, indicating that the derailed pair of wheels had been diverted southward at the frog, causing the general derailment. Westward from the spur-track switch, the structure of track No. 2 was destroyed for a distance of 840 feet

Examination of track No. 2 shortly after the accident disclosed that within a distance of 1,230 feet east of the initial derailment point, there were several locations where mud had worked up through the ballast sufficiently to cover the ties, due to inadequate drainage and insufficient ballast. At three of these locations, the drainage, surface, cross level, and ballast conditions were below standards prescribed

by carrier's specifications for maintenance of track, and ties were found suspended from the rails with 3/4 inch spaces between the tops of the tie plates and the base of the rails. In addition, several ties were displaced to the extent that they were against each other. Within 1,230 feet east of the initial derailment point, the cross levels of the north and south rails varied excessively, due to inadequate drainage of the ballast and sub ballast section. From 30 to 11 feet east of the initial derailment point, the cross levels varied up to 1-1/8 inches, which is 5/8 inch in excess of the maximum variance permitted under the carrier's specifications for maintenance of track.

Within three days after the accident, the carrier corrected the aforesaid poor track conditions within a distance of 138 feet east and 87 feet west of the initial derailment point by replacing deteriorated ties, respacing ties, laying new stone ballast, and raising and resurfacing the track. The poor track conditions existing between 138 and 1,230 feet east of the initial derailment point were not corrected. Thus, the structure of track No. 2 in that area remained in a condition which does not meet the carrier's specifications for maintenance of track. This condition, which is not within jurisdiction of Federal Railroad Safety laws, was called to the attention of an official of the carrier's maintenance of way department.

NYC 9414, the 6th car of No. 77 was equipped with A-3 ride-control trucks. Examination of these trucks disclosed that the column friction wear plates were considerably worn. From measurements of the ride-control friction shoe castings extending above the top horizontal plane of the bolster, it was estimated that 55 percent of the original snubbing control value remained in the front and rear trucks of this car. According to the manufacturer, 55 percent of the original snubbing control value is adequate for cars moving over tracks maintained in average condition.

Findings

The structure of track No. 2 within a distance of 1,230 feet east of the initial derailment point was in an unstable condition due to insufficient ballast and inadequate drainage of the sub-ballast section, which resulted in excessive variations in cross levels between the north and south rails. As No. 77 moved at high speed over the unstable track, the excessive variations in the cross levels, combined with the reduced effectiveness of the snubbing control in the trucks of the sixth car, caused this car to develop a harmonic lateral rocking action to the extent that the left front wheel of the rear truck raised sufficiently above the top of the rail to derail to the south, resulting in derailment of the mate wheel also. Soon afterward, the derailed pair of wheels struck the frog and the curved closure rail of the spur-track turnout, causing the general derailment.

It is evident that the derailment was caused by inadequate maintenance of tracks, and that the reduced effectiveness of the snubbing control features of the sixth car was a contributing factor.

Cause

This accident was caused by inadequately maintained track.

Recommendation

It is recommended that the Pennsylvania Railroad Company immediately correct the remaining poor track conditions in the West Jeffersonville, Ohio, area so that all the track structure in this area will meet the carrier's specifications for maintenance of track

Dated at Washington, D C this 3rd
day of March 1968.
By the Federal Railroad Administration
Railroad Safety Board

Bette E Holt
Acting Executive Secretary

(SEAL)

Appendix

Tracks

The main tracks are tangent a considerable distance east and west of the initial derailment point. The grade in this area is 0.5 percent ascending westward.

The structure of track No. 2 in the derailment area consists of 131-pound rail, 39 feet in length, laid new in 1944 on an average of 24 treated ties per rail length. It is fully tie plated with double-shoulder tie plates, spiked with 2 rail-holding spikes per tie plate, and is provided with 6-hole, 36-inch joint bars and an average of 8 rail anchors per rail. It is ballasted with slag and gravel to a depth of 22 inches below the ties.

The tracks in the derailment area were last inspected by a track patrol foreman on July 31, 1967. No exceptions were taken to the condition of the tracks.

Carrier's Specifications for Maintenance of Track

No. 1 Drainage is of first importance in track maintenance.

No. 3 Stability of track requires that water *** falling upon the roadbed be quickly drained to the side ditches. ***

No. 4 (a) Water pockets in the roadbed *** must be drained; ***

No. 903 ***

The change in cross level *** of opposite rails on tangents in 31 feet, max (for speeds of) 51 to 70 m p h (is) 3/4-inch.

Train Involved

No. 77 consisted of car-body type diesel-electric units 4286 and 4310, coupled in multiple-unit control, 5 mail cars, 1 baggage car, 2 mail cars, 1 sleeping car, 1 coach, and 1 railway post office car, in that order. The cars were of all-steel construction. The three rear cars were equipped with tightlock couplers. As the train approached the accident point, the enginemen were in the control compartment at the front of the first diesel-electric unit. The other crew members were at various locations in the cars. The brakes had been tested and had functioned properly when used en route.

NYC 9414, the sixth car of No. 77, was built in 1944 as a military sleeping car and was converted in 1949 to a baggage car. Its lightweight and nominal capacity were, respectively, 64,400 and 50,000 pounds. Its width, height,

and length over strikers were, respectively, 9 feet 9-5/8 inches, 13 feet 4-3/4 inches, and 51 feet 8½ inches. The trucks were of the A-3 ride-control, 4-wheel spring plankless type. They were provided with 33-inch wrought steel wheels, 5½ by 10-inch journals, cast-steel control bolsters, and cast-steel side frames having integral journal boxes. The trucks had a wheel base of 5 feet 6 inches and were spaced 40 feet 8½ inches between truck centers. Each side frame had five single-coil springs with 3-1/16 inch travel. Each side frame had a group of five outer single-coil springs with 3-1/16 inch travel. Each end of the bolsters was equipped with a ride-control feature consisting of two precompressed coil springs fitted into two high tensile heat-treated friction shoes. The design permits the springs to force the shoes diagonally upward and outward with constant pressure against opposing hardened friction surfaces of the truck side bolster columns. This action serves as a snubbing control to prevent excessive lateral oscillation of the car.

At the time of the derailment the car was carrying lading weighing less than 1,000 pounds, according to estimates.

Damages

No. 77 stopped with the front end 3,464 feet west of the initial derailment point. The rear truck of the 6th car and all trucks of the 7th to 11th cars, inclusive, were derailed. Separations occurred at both ends of the 7th and 8th cars. The 6th car stopped upright on and in line with the track structure, and with its rear truck at right angles to the rails. The 7th car stopped upright on and in line with the structure of track No. 2 about 2,367 feet west of the initial derailment point. The 8th car overturned and stopped on one side, with the west end 60 feet north of track No. 2 and 1,947 feet west of the initial derailment point. The 9th car stopped upright with the front end 40 feet north of No. 2 track and the rear end on the track structure, 2,051 feet west of the initial derailment point. The 10th and 11th cars stopped upright on and in line with the track structure. The 8th and 9th cars were heavily damaged. The 6th, 7th, 10th and 11th cars were slightly damaged.

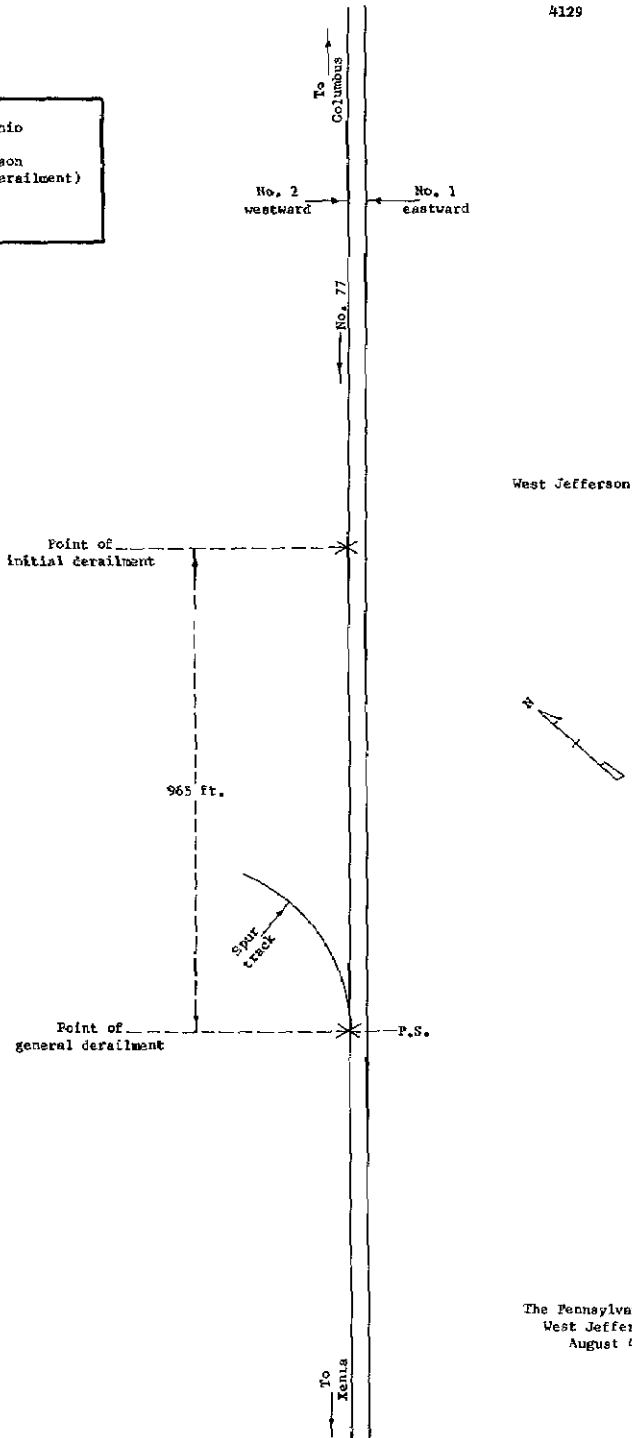
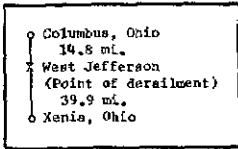
Other Factors

The accident occurred at 6:19 a.m., in clear weather.

The maximum authorized speed for passenger trains in the accident areas is 70 miles per hour.

According to their daily time returns, the engineer and fireman had been on duty 1 hour 34 minutes at the time of the derailment, after having been off duty 10 hours. The conductor and flagman had been on duty 1 hour 31 minutes after having been off duty 10 hours 13 minutes. The front brakeman had been on duty 1 hour 31 minutes after having been off duty 9 hours 48 minutes.

This accident was investigated in conjunction with representatives of the Public Utilities Commission of Ohio



The Pennsylvania Railroad
 West Jefferson, Ohio
 August 4, 1967