

INTERSTATE COMMERCE COMMISSION
WASHINGTON

REPORT NO. 3677
THE PENNSYLVANIA RAILROAD COMPANY
IN RE ACCIDENT
AT VERN, MD., ON
FEBRUARY 23, 1956

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SUMMARY

Date: February 23, 1956
Railroad: Pennsylvania
Location: Vern, Md.
Kind of accident: Derailment
Train involved: Passenger
Train number: 154
Locomotive number: Electric locomotive 4834
Consist: 14 cars
Speed: 80 m. p. h.
Operation: Interlocking
Tracks: Three; tangent; vertical curve
Weather: Clear
Time: 5:26 p. m.
Casualties: 6 killed; 114 injured
Cause: Broken journal

INTERSTATE COMMERCE COMMISSION

REPORT NO. 3677

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

THE PENNSYLVANIA RAILROAD COMPANY

March 26, 1956

Accident at Vern, Md., on February 23, 1956, caused by a
broken journal.

REPORT OF THE COMMISSION¹

CLARKE, Commissioner:

On February 23, 1956, there was a derailment of a passenger train on the Pennsylvania Railroad at Vern, Md., which resulted in the death of 4 passengers, 1 dining-car employee, and 1 train-service employee, and the injury of 94 passengers, 15 dining-car employees, 4 Pullman Company employees, and 1 train-service employee. This accident was investigated in conjunction with a representative of the Public Service Commission of Maryland.

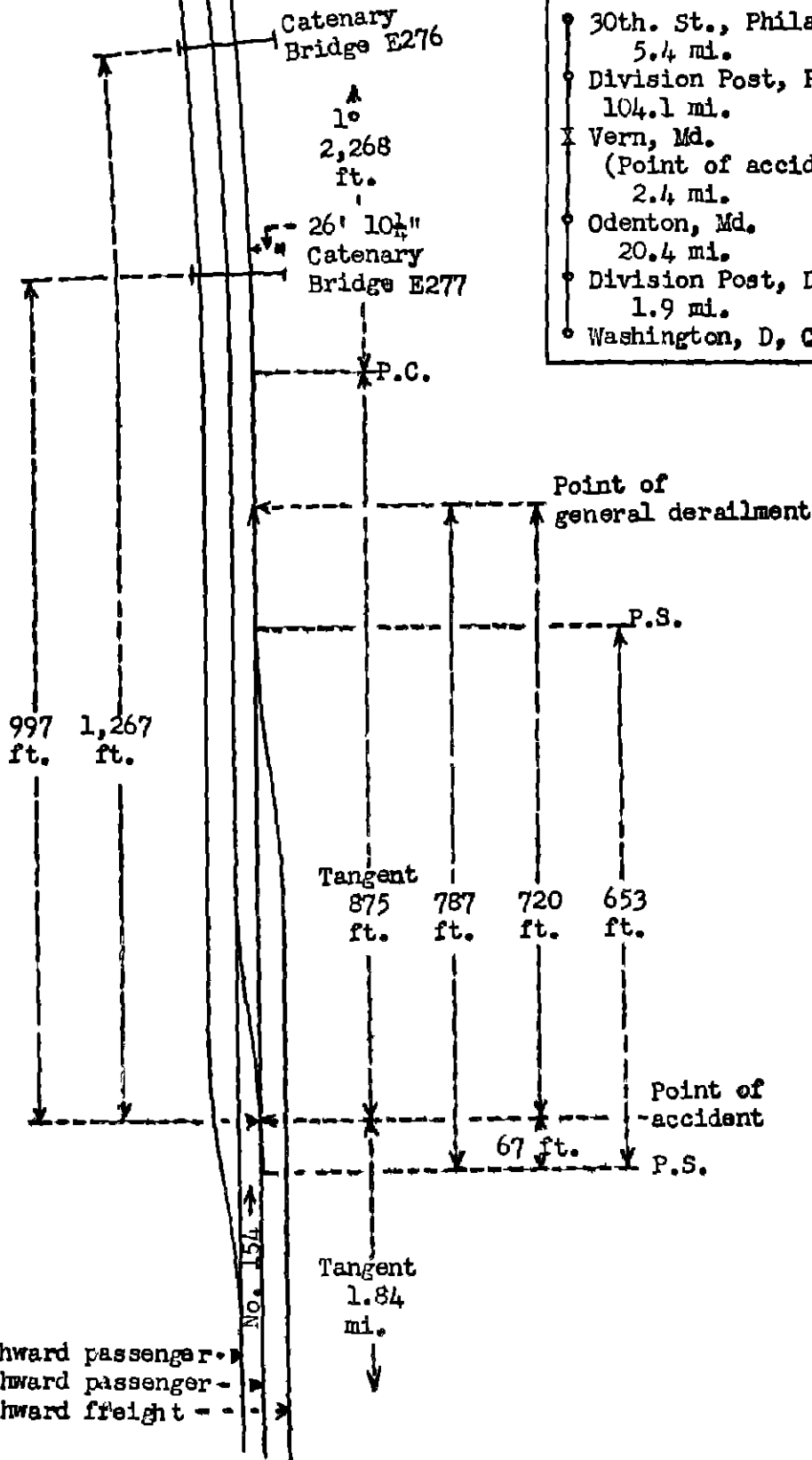
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Under authority of section 17 (2) of the Interstate Commerce Act the above-entitled proceeding was referred by the Commission to Commissioner Clarke for consideration and disposition.

To Philadelphia, Pa. →

← To Washington, D. C.

- ← No. 4 Southward freight
- ← No. 3 Southward passenger
- ← No. 2 Northward passenger



- 30th. St., Philadelphia, Pa. 5.4 mi.
- Division Post, Pa. 104.1 mi.
- Vern, Md. (Point of accident) 2.4 mi.
- Odenton, Md. 20.4 mi.
- Division Post, D. C. 1.9 mi.
- Washington, D. C.

- No. 3 Southward passenger →
- No. 2 Northward passenger →
- No. 1 Northward freight →

Report No. 3677
 Pennsylvania Railroad
 Vern, Md.
 February 23, 1956

Location of Accident and Method of Operation

This accident occurred on that part of the Maryland District extending between Division Post, near Washington, D. C., and Division Post, near 30th Street, Philadelphia, Pa., 126.9 miles. In the vicinity of the point of accident this is a three-track line, over which trains moving with the current of traffic are operated by automatic block-signal and cab-signal indications. A catenary system is provided for the electric propulsion of trains. South of an interlocking at Vern, Md., 24.7 miles north of Washington, the main tracks are designated from east to west as No. 1, northward freight; No. 2, northward passenger; and No. 3, southward passenger. North of this interlocking the main tracks are designated from east to west as No. 2, northward passenger; No. 3, southward passenger; and No. 4, southward freight. The interlocking is remotely controlled from an interlocking station at Odenton, Md., 2.4 miles south of Vern. Within interlocking limits at Vern, tracks Nos. 2 and 3 are connected by a facing-point crossover. Track No. 1 converges with track No. 2 at a trailing-point switch located 653 feet north of the south switch of the crossover. The initial derailment occurred on track No. 2 at a point 67 feet north of the south switch of the crossover, and the general derailment occurred 787 feet north of this switch. From the south on track No. 2 there is a tangent 1.84 miles to the point of initial derailment and 875 feet northward, and a 1° curve to the left 2,268 feet. From the south the grade is, successively, 0.60 percent descending 1,500 feet, a vertical curve 563 feet to the point of initial derailment and 337 feet northward, and 0.80 percent ascending to the point of general derailment.

Catenary bridges for supporting the catenary lines and high-voltage electric power lines span the tracks and are spaced 270 feet apart. Catenary bridges E277 and E276 are located, respectively, 997 feet and 1,267 feet north of the point of initial derailment. The east poles of these bridges are approximately 27 feet east of the center-line of track No. 2. The poles are structural steel beams having 14-inch CB sections and weighing 87 pounds per lineal foot. Each pole extends approximately 69 feet 6 inches above the level of the tops of the rails and is embedded in a concrete foundation.

In the vicinity of the point of accident the tops of the rails are about four feet above the ground level. The track structure consists of 155-pound rail, 39 feet in length, laid new in 1953 on an average of 24 treated ties

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to the rail length. It is fully tieplated with double-shoulder canted tie plates, spiked with two rail-holding spikes and two plate-holding spikes per tie plate, and is provided with 6-hole 38-1/2-inch joint bars and an average of 8 rail anchors per rail. It is ballasted with crushed stone to a depth of 36 inches below the bottoms of the ties.

This carrier's operating rules read in part as follows:

76. * * *

Engine and train crews as frequently as opportunity permits must observe engines and cars in their train, moving and standing, to detect any conditions that might interfere with the safe movement of trains.

* * *

77. So far as practicable and other duties permit, employes will observe passing trains for defects and should there be any indication or conditions endangering the train they must take necessary measures for its protection.

Train and engine crews on moving trains will be on the lookout for signals when passing other trains and while passing stations, highway crossings where watchmen are on duty and points where trackmen and other employes are working and when practicable exchange hand signals with them.

* * *

The maximum authorized speed for passenger trains in the vicinity of the point of accident is 80 miles per hour.

Description of Accident

No. 154, a north-bound first-class passenger train, consisted of electric locomotive 4834, three baggage cars, six coaches, one kitchen-counter car, one dining car, one lounge car, and two parlor cars, in the order named. The fifth car was of lightweight construction, and the other cars were of conventional all-steel construction. The fifth to the eleventh cars, inclusive, were equipped with tight-lock couplers. This train departed from Washington at 5:01 p. m., 1 minute late, passed Odenton, the last open office, at 5:24 p. m., 3 minutes late, and while it was moving on track No. 2 at a speed of 80 miles per hour the front truck

of the sixth car was derailed at a point 67 feet north of the south switch of the crossover at Vern. The rear trucks of the fifth and sixth cars, and both trucks of the seventh to the fourteenth cars, inclusive, were derailed at a point 720 feet north of the point of initial derailment.

The locomotive and the first eight cars stopped with the front end of the locomotive 2,901 feet north of the point of initial derailment. The fifth, sixth, and eighth cars stopped in line with the track and leaned to the west at angles of approximately 15 degrees, 40 degrees, and 15 degrees, respectively. The seventh car rerailed before it stopped. Separations occurred at each end of the eighth and the eleventh cars. The coupler shank at the front end of the ninth car was broken. The ninth car struck the east pole of catenary bridge E276. The pole was bent and twisted. The ninth and tenth cars stopped on their right sides with the front end of the ninth car 1,286 feet north of the point of initial derailment. These cars stopped in line with the track and approximately 25 feet east of it. The front end of the eleventh car struck the east pole of catenary bridge E277, and the body of the car was crushed inwardly a distance of approximately one-third the length of the car. The catenary-pole foundation was uprooted and moved about 30 feet northward. The pole was bent around the car. This car stopped with the front end 1,064 feet north of the point of initial derailment and about five feet east of the track, and with the rear end about 50 feet east of the track. The twelfth to the fourteenth cars, inclusive, stopped approximately in line, with the front end of the twelfth car about 45 feet east of the track, and the rear end of the fourteenth car on the track structure. These cars leaned to the east at angles of approximately 45 degrees, 20 degrees, and 15 degrees, respectively. The eleventh car was demolished. The ninth, tenth, and twelfth cars were badly damaged. The fifth to the eighth cars, inclusive, and the thirteenth and fourteenth cars were somewhat damaged. The track structure was destroyed throughout a distance of 547 feet northward from the point of general derailment.

The flagman was killed. The front brakeman was injured.

The weather was clear and it was dusk at the time of the accident, which occurred at 5:26 p. m.

The sixth car, P.R.R. 1746, a conventional all-steel coach, was built in September 1915. It is 80 feet 3-3/4 inches long between buffers when uncoupled. Its light weight is 135,000 pounds. It is provided with two four-wheel

trucks spaced 56 feet 3 inches between truck centers. The trucks have a wheelbase of 8 feet 6 inches and are equipped with 6-inch by 11-inch journals and multiple-wear 36-inch steel wheels. The journals are equipped with roller bearings. Helical springs are provided on truck equalizers, and full-elliptic and helical springs are provided at the truck bolsters.

Discussion

No. 154 was moving at a speed of 80 miles per hour, as indicated by the speed-indicating device of the locomotive, when the derailment occurred. The engineer was maintaining a lookout ahead from the control compartment at the front of the locomotive. The fireman was tending the steam-heat boiler near the rear control compartment. The conductor and one brakeman-ticket collector were in the fourth car, one brakeman-ticket collector was in the fifth car, and one brakeman-ticket collector was in the ninth car. The brakes of this train had been tested and had functioned properly when used en route. The surviving members of the train crew said that prior to the time of the accident the cars in which they were located had been riding smoothly. One of the brakemen-ticket collectors had collected transportation in the sixth car after the train departed from Washington, and another brakeman-ticket collector had passed through this car several minutes before the accident occurred. Neither of these employees noticed any unusual condition. The first the crew knew of anything being wrong was when the derailment occurred.

Examination of the track structure after the accident occurred disclosed no condition which could have caused or contributed to the cause of the accident. The first mark of derailment on the track structure was a dragging mark on a rail brace outside the west stock rail of the south switch of the crossover at a point 16 feet north of the point-of-switch. Several succeeding rail braces were marked. Corresponding marks on the left equalizer of the front truck of the sixth car indicated that this equalizer had been in contact with the rail braces. A rubbing mark made by the equalizer then appeared on the outside of the head of the west rail of the crossover and extended northward for a distance of 68 feet. A mark on the head of the rail indicated that the equalizer had then crossed the rail. This rail was canted inward throughout a distance of about 100 feet northward from the point where the rubbing marks first appeared. The first flange mark appeared on the east side on the base of the east closure rail of the south switch at a point 67 feet north of the point-of-switch and indicated

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that a wheel had become derailed to the west. Marks about 30 feet north of the frog indicated that a second pair of wheels had derailed to the west at this point. Rubbing marks made by the bottom of the equalizer then appeared on the ties outside the west rail on track No. 2. These rubbing marks and flange marks continued on the track structure to the point of general derailment 134 feet north of the switch at which track No. 1 converges with track No. 2. The west closure rail of the turnout was badly damaged.

Examination of the equipment after the accident occurred disclosed that the left rear journal of the front truck of P.R.R. 1746, the sixth car, had broken inside the roller-bearing inner race at a point $3/8$ inch from the root of the fillet and 9 inches from the end of the journal. The roller-bearing assembly involved consisted of tubular inner and outer races, with two rows of cylindrical solid rollers mounted in cages located between the races. The inner race had been shrunk on the journal. End thrust was taken by a ball-bearing assembly mounted on the front cover of the journal box. After the journal was broken, wear and flow of metal, resulting from the friction of contact between the broken end of the axle and portions of the journal-box assembly, had continued until the broken end of the axle worked free from the box. The rear end of the equalizer was then permitted to drop sufficiently to contact rail braces and other portions of the track structure. After this occurred the concentration of weight on the right wheel caused this wheel to act as a fulcrum and tended to raise the left wheel off the rail. The right wheel was then free to drop inside the rail.

The break in the journal was approximately vertical. The broken surface of the portion of the journal remaining in the box indicated that a crack had originated on the circumference of the journal and had extended completely around the journal. The crack had progressed from a point on the circumference and had extended over approximately 80 percent of the fractured area before the final break occurred. The metal along the periphery of the fracture was scored as a result of the failure to the extent that the cause of the origin of the fracture could not be determined. Laboratory tests made after the accident occurred disclosed that the chemical composition and the physical properties of the axle were in accordance with the specifications of the Association of American Railroads.

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Examination of the wheels mounted on the axle involved and examination of the roller-bearing assembly disclosed no defective condition which would have contributed to the failure of the journal. The roller-bearing assembly was distorted as a result of the failure of the journal, but it was well lubricated and showed no indications of heating other than that caused by the broken end of the axle. There were no indications that the journal had been working in the inner race before the journal was broken.

The pair of wheels involved was applied to car P.R.R. 1746 on January 16, 1956.

The axle involved was manufactured in 1949. Tests made in the laboratory of the carrier at that time indicated that the chemical composition of the axles from that heat were in accordance with A.A.R. specifications. The axle involved had received magnetic particle tests on February 27, 1951, and May 19, 1954. No defective condition was found at the time of these tests.

The roller-bearing assembly of the broken journal was first placed in service April 18, 1950. It was disassembled and inspected for defects on November 18, 1954, and September 17, 1955. No defective condition was found at the time of these inspections. It was mounted on the journal involved after the latter inspection. Oil was last applied to the journal boxes of car P.R.R. 1746 at Sunnyside Yard, New York, N. Y., on February 19, 1956, at which time approximately one pint of oil was added to each journal box.

Car P.R.R. 1746 arrived at Washington in train No. 115 at 1:24 p. m. on the day of the accident. The equipment of this train was inspected upon arrival by car inspectors and no defective condition was found. The car was then assembled in train No. 154. The equipment of this train was inspected before departure by car inspectors and no defective condition was found. The engineer and the fireman said that they made frequent observations of the train en route and that the last observation prior to the accident was made on a curve at Odenton. They observed no defective condition. Block operators located at points 17.5 miles and 2.4 miles south of the point of initial derailment, and crossing watchmen located at points 13.4 miles, 11.7 miles, and 10.6 miles south of the point of initial derailment, observed no defective condition as the train passed their respective locations.

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Cause

This accident was caused by a broken journal.

Dated at Washington, D. C., this twenty-sixth day of March, 1956.

By the Commission, Commissioner Clarke.

(SEAL)

HAROLD D. McCOY,
Secretary.