

# RAILROAD ACCIDENT INVESTIGATION

Report No 3839

---

THE PENNSYLVANIA RAILROAD COMPANY

VANDALIA, ILL

MARCH 14, 1959

---

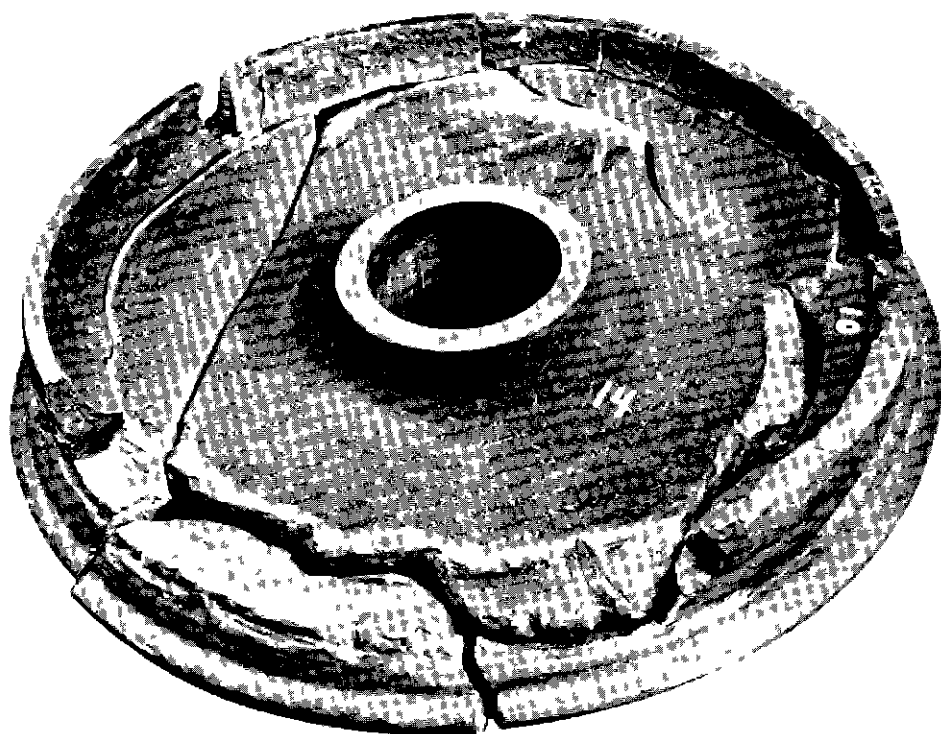
INTERSTATE COMMERCE COMMISSION

Washington

## SUMMARY

§ § §

DATE	March 14, 1959
RAILROAD	Pennsylvania
LOCATION	Vandalia, Ill
KIND OF ACCIDENT	Derailment
TRAIN INVOLVED	Passenger
TRAIN NUMBER	4
LOCOMOTIVE NUMBER	Diesel electric units 5848A, 5715A, and 5860A
CONSIST	15 cars
SPEED	85 m p h
OPERATION	Timetable, train orders and automatic block-signal system
TRACK	Single, 1°27' curve, 0.54 percent ascending grade eastward
WEATHER	Clear
TIME	11 28 a m
CASUALTIES	1 killed
CAUSE	Broken wheel



## INTERSTATE COMMERCE COMMISSION

REPORT NO 3839

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

THE PENNSYLVANIA RAILROAD COMPANY

June 29, 1959

Accident near Vandalia, Ill , on March 14, 1959, caused by a broken wheel

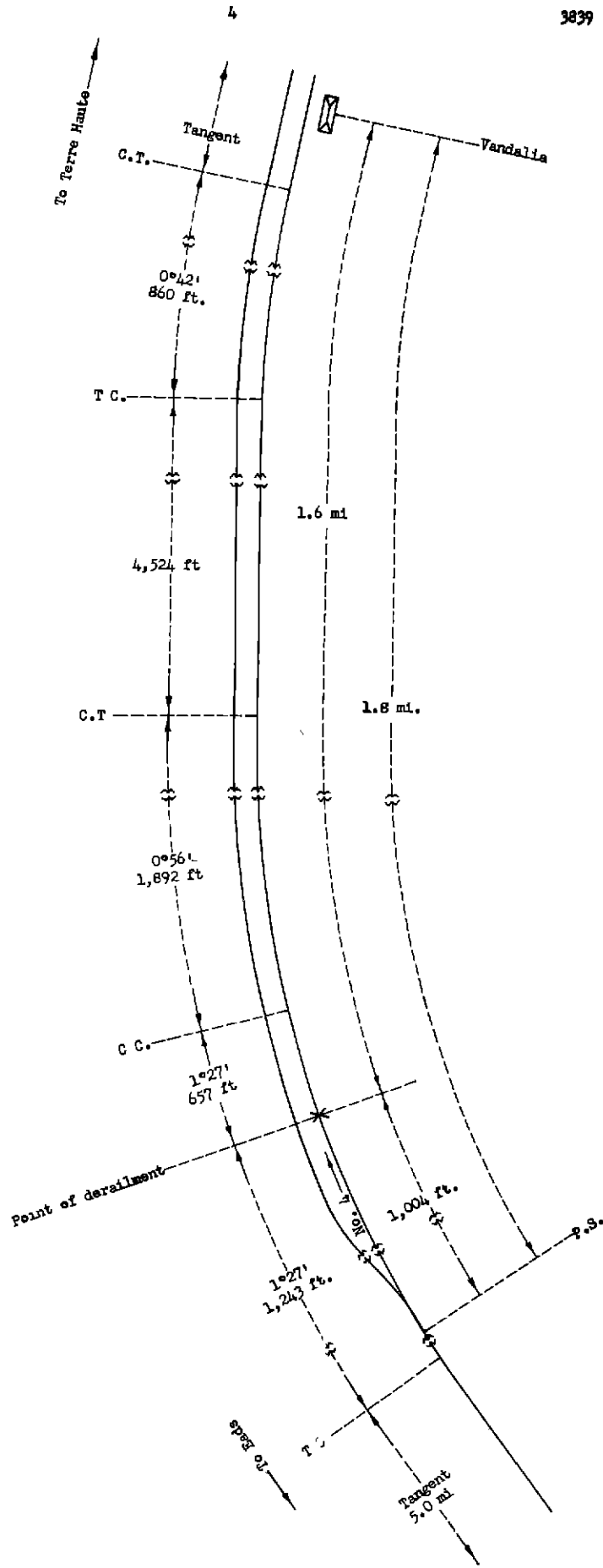
REPORT OF THE COMMISSION<sup>1</sup>*FREAS, Commissioner*

On March 14, 1959, near Vandalia, Ill , there was an accident involving a passenger train of the Pennsylvania Railroad Company, which resulted in the death of one passenger

---

<sup>1</sup> Under authority of section 17 (2) of the *Interstate Commerce Act* the above-entitled proceeding was referred by the Commission to Commissioner Freas for consideration and disposition

- o Terre Haute, Ind  
99.4 mi
- o Vandalia, Ill  
1.6 mi.
- X Point of accident  
10.5 mi.
- o East Smithboro  
52.1 mi
- o Eads, Ill



The Pennsylvania Railroad  
Vandalia, Ill  
March 14, 1959

### Location of Accident and Method of Operation

This accident occurred on that part of the Southwestern Region extending between Eads, Ill , 3 4 miles east of St Louis, Mo , and Terre Haute, Ind , 163 6 miles In the vicinity of the point of accident this is a single-track line over which trains are operated by time table, train orders and an automatic block-signal system At Vandalia, Ill , 64 2 miles east of Eads, a siding parallels the main track on the north The west switch of the siding is located 1 8 miles west of the station

The derailment occurred on the main track at a point 1,004 feet east of the west switch of the siding and 1 6 miles west of the station From the west there are, in succession, a tangent approximately 5 miles in length, a 1°27' curve to the right 1,243 feet to the point of accident and 657 feet eastward, a 0°56' curve to the right 1,892 feet, a tangent 4,524 feet, a 0°42' curve to the right 860 feet, and a tangent on which the train stopped The grade is 0 54 percent ascending eastward at the point of accident

The main track structure consists of 140-pound rail, 39 feet in length, laid new in 1953 on an average of 24 treated ties to the rail length It is fully tieplated, spiked with three spikes per tie plate, and is provided with 6-hole, 36-inch joint bars and an average of 10 rail anchors per rail It is ballasted to a depth of 12 inches below the bottoms of the ties

This carrier's operating rules read in part as follows

76 \* \* \*

Members of crew, 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

The maximum authorized speed for passenger trains in the vicinity of the point of accident is 79 miles per hour

### Description of Accident

No 4, an eastbound first-class passenger train, consisted of diesel-electric units 5848A, 5715A, and 5860A, coupled in multiple-unit control, 1 mail car, 1 baggage car, 1 coach-lounge car, 3 coaches, 1 dining car, 1 kitchen-dormitory car, 6 sleeping cars, and 1 coach, in the order named The cars were of all-steel construction The 4th to the 15th cars, inclusive, were equipped with tightlock couplers This train departed from St Louis at 10 20 a m , on time, and passed East Smithboro, Ill , 55 5 miles east of St Louis, at 11 18 a m , 1 minute ahead of schedule About 10 minutes later, while it was moving at a speed of about 85 miles per hour, as indicated by the tape of the speed-recording device, the leading wheel on the north side of the rear truck of the third car was derailed at a point 1 6 miles west of the station at Vandalia None of the other equipment derailed, and no separations occurred The train stopped with the front end about 1 7 miles east of the point of derailment The derailed car was slightly damaged

The third car, PRR 1131, a coach-lounge car, was built in 1908 It is 80 feet 3 3/4 inches in length between the buffers and weighs 148,500 pounds It is mounted on four-wheel trucks spaced 56 feet 3 inches between centers The wheel base of each truck is 8 feet The journals are 5 1/2 by 10 inches and are equipped with roller bearings The spring arrangement consists of helical equalizer springs and elliptical bolster springs The front wheels of the rear truck were multiple-wear wrought steel, class BE, 36 inches in diameter, and were manufactured in 1951 in accordance with AAR specification M-107

The weather was clear at the time of the accident, which occurred about 11 28 a m

### Discussion

As No. 4 was closely approaching the point where the derailment occurred the speed was 85 miles per hour, as indicated by the tape of the speed-recording device. The enginemen were in the control compartment at the front of the locomotive, a lounge car attendant was in the third car, the front brakeman was in the fourth car, and the conductor and the flagman were in cars to the rear of the train. The fireman, a qualified engineer, was operating the locomotive. The brakes of the train had been tested and had functioned properly when used en route.

The enginemen and the flagman said that they had made several observations of the train en route and had not noticed any unusual conditions. The lounge car attendant said that he did not notice anything unusual in the movement of the third car as the train was closely approaching Vandalia, but that as he was about to serve a passenger, who was standing in the corridor between the north side of the car and the kitchen near the west end, he heard an unusual sound. He then turned toward the passenger and observed him slumping to the floor. Subsequent investigation disclosed that the passenger evidently had been struck by a piece of metal, which penetrated the floor of the corridor after becoming detached from a wheel of the third car. The lounge car attendant did not notice anything unusual in the movement of the car, and he immediately proceeded to the fourth car to inform the front brakeman of the injury to the passenger. The front brakeman said that the train was 2 - 3 miles west of Vandalia when he was notified of the mishap in the third car, and that he immediately signalled the enginemen, by means of the communicating signal, to stop the train at Vandalia. He then proceeded to the third car. Immediately after entering it and noticing that the car was moving in an unusual and noisy manner, and that there was a hole in the corridor floor, the front brakeman operated the emergency air-brake valve located in the third car. When the enginemen received the signal to stop at Vandalia, the fireman initiated a service application of the brakes. However, the speed was not materially reduced before the brakes became applied in emergency as a result of the action taken by the front brakeman. The train stopped with the front end approximately 550 feet east of the station at Vandalia, and an examination of the train equipment disclosed that the leading wheel on the north side of the rear truck of the third car, PRR 1131, was broken.

Further investigation developed that the entire rim, with the exception of a small segment, was separated from the plate and broken into numerous pieces as shown in Plate 1. The hub and a portion of the plate remained fixed to the axle (No. 14, Plate 1). A piece of the rim, approximately 20 inches in length and of triangular cross section (No. 1, Plates 1 and 2), penetrated the floor of the third car at a point in line with the wheel and about 15 feet from the west end of the car. Other portions of the wheel were found on the track structure throughout a distance of 1,400 feet eastward beginning at a point 1,200 feet east of the west switch of the siding at Vandalia.

Examination of the track structure disclosed 3 small indentations in the head of the north rail at a point 1,004 feet east of the west switch of the siding. Nine feet farther eastward, the gage side of the north rail bore marks consisting of a series of deep indentations within a distance of 18 inches, indicating that the wheel derailed to the inside of the north rail at this point. Throughout a distance of 1.6 miles eastward from the point of derailment there were marks indicating that the west end of every joint bar on the gage side of the north rail had been struck by the derailed wheel. At the initial point of derailment the north rail was out-of-line northward approximately 1 1/2 inches, and throughout a distance of 1.6 miles eastward it was out-of-line northward 1/4 to 1/2 inch. No marks were found on the south rail, and there were no indications of the south wheel having been derailed.

Measurements of the broken wheel disclosed a rim thickness of  $1 \frac{1}{16}$  inches, a flange height of  $1 \frac{15}{32}$  inches, and the development of a double flange. The mate wheel had a rim thickness of  $1 \frac{3}{32}$  inches, a flange height of  $1 \frac{14}{32}$  inches, and a flange thickness of  $\frac{61}{64}$  inch. No visual evidence of overheating was found on either wheel. There was no indication that either wheel had moved on the axle wheel seat, and a pressure of 140 tons was required to dismount the broken wheel. Back to back measurements could not be determined because the small segment of rim remaining on the plate was bent. The wheels were last mounted by the carrier on January 8, 1957, and applied to PRR 1131 during the same month.

Laboratory analysis of the failed wheel disclosed that the steel met the chemical requirements of AAR Specification M-107-57 for class B wheels, and that the Brinell hardness was within the specification range of 277-341 BHN for Class BE wheels. Magnetic particle examination revealed numerous small thermal cracks on the periphery of the broken rim pieces. Evidence of subsurface shelling was found on the tread of numerous pieces of the rim. This condition varied in depth from approximately  $\frac{1}{8}$  to  $\frac{3}{8}$  inch and was about  $2 \frac{1}{2}$  to 3 inches from the edge of the rim. The maximum width of the shelled area was about  $\frac{5}{8}$  inch. All breaks in the wheel had characteristics of sudden fractures.

Prior to the departure of No. 4 from St. Louis on the day of the accident, PRR 1131 was inspected by car inspectors of the carrier. During the inspection, it was noted that the leading wheels of the rear truck were extensively worn. However, the wear did not exceed  $\frac{15}{16}$  inch for thin flange nor  $1 \frac{1}{2}$  inches for high flange, the condemning limits as recommended by the Association of American Railroads.

### Cause

This accident was caused by a broken wheel.

Dated at Washington, D. C., this twenty-ninth day of June, 1959

By the Commission, Commissioner Freas

(SEAL)

HAROLD D. McCOY,

Secretary



**Interstate Commerce Commission**

**Washington 25, D. C.**

**OFFICIAL BUSINESS**

**RETURN AFTER FIVE DAYS**

**POSTAGE AND FEES PAID**  
**INTERSTATE COMMERCE COMMISSION**