INTERSTATE COMMERCE COMMISSION

WASHINGTON

INVESTIGATION NO. 2764

THE PENNSYLVANIA RAILROAD COMPANY

REPORT IN RE ACCIDENT

NEAR DIAMOND, PA., ON

JANUARY 15, 1944

SUMMARY

Railroad:	Pennsylvania
Date:	January 15, 1944
Location:	Diamond, Pa.
Kind of accident:	Derailment
Train involved:	Freight
Train number:	Extra 8629 West
Engine numbers:	8629, 9444 and 8682
Consist:	48 cars, caboose
Speed:	10 m. p. h.
Operation:	Timetable, train orders and manual-block system
Track:	Single; 10° compound curve; 1.83 percent descending grade westward
Weather:	Clear
Time:	About 4:40 p. m.
Casualties:	2 killed
Cause:	Engine-truck spring becoming displaced from its seat

INTERSTATE COMMERCE COMMISSION

INVESTIGATION NO. 2764

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

THE PENNSYLVANIA RAILROAD COMPANY

February 15, 1944.

Accident near Diamond, Pa., on January 15, 1944, caused by an engine-truck spring becoming displaced from its seat.

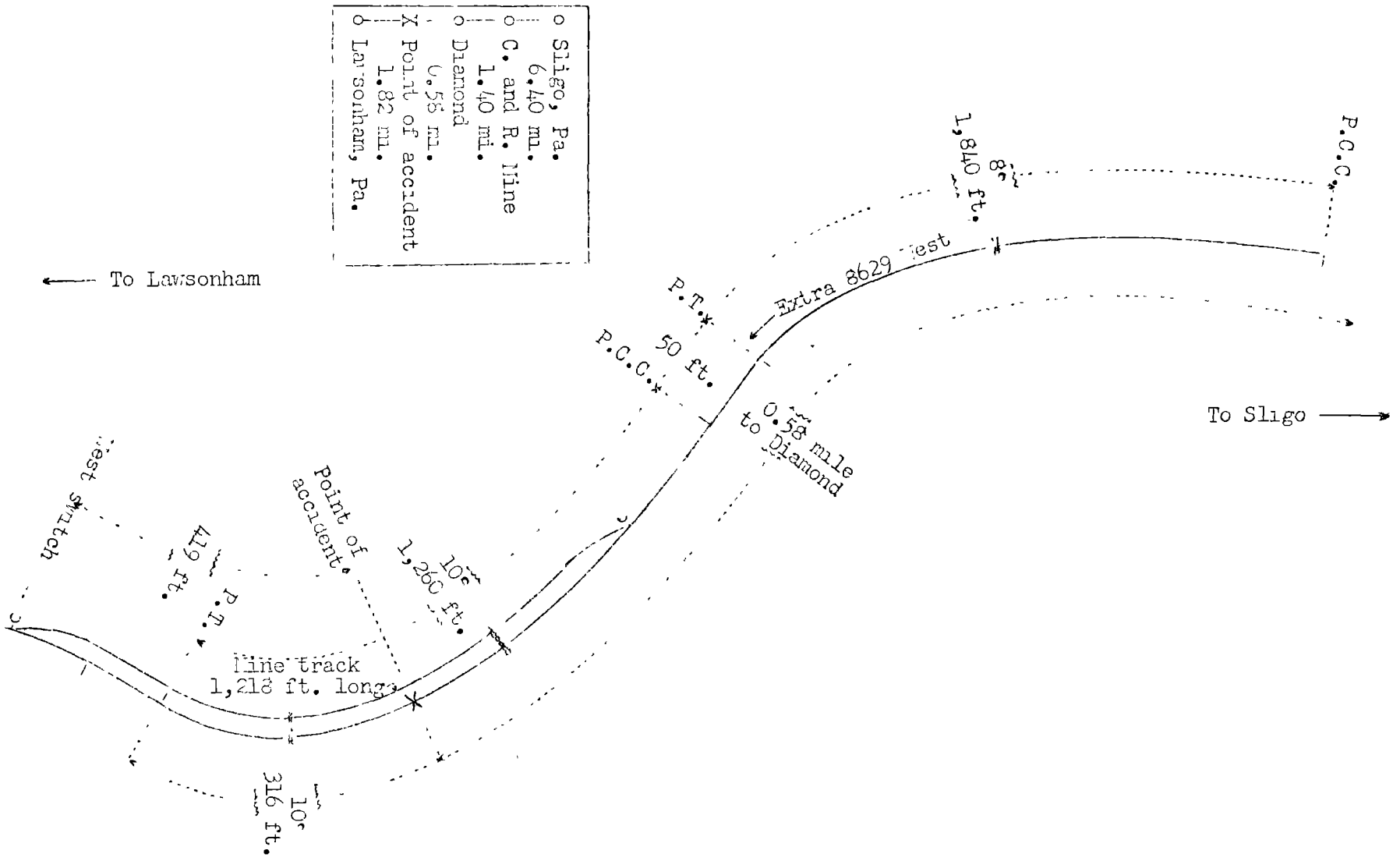
REPORT OF THE COMMISSION[1]

PATTERSON, Chairman:

On January 15, 1944, there was a derailment of a freight train on the Pennsylvania Railroad near Diamond, Pa., which resulted in the death of two employees. This accident was investigated in conjunction with a representative of the Pennsylvania Public Utility Commission.

---

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



Inv-2764
Pennsylvania Railroad
Diamond, Pa.
January 15, 1[redacted]

Location of Accident and Method of Operation

This accident occurred on that part of the Renovo Division designated as the Sligo Branch and extending between Sligo and Lawsonnam, Pa., 10.2 miles. This was a single-track line over which trains were operated by timetable, train orders and a manual-block system. The east switch of a mine track paralleling the main track on the north was located 0.42 mile west of Diamond. This track was 1,218 feet long. The derailment occurred on the main track 419 feet east of the west switch of the mine track. From the east there were, in succession, a compound curve to the left 1,840 feet, having a maximum curvature of 8°, a tangent 50 feet, and a compound curve to the right 1,260 feet, having a maximum curvature of 10°. The accident occurred on the latter-mentioned curve 316 feet east of its western end, where the curvature was 10°. Throughout a distance of 1.11 miles immediately east of the point of accident the grade for west-bound trains varied between 1.58 and 2.17 percent descending, and at the point of accident it was 1.83 percent descending.

The track was laid on a hillside cut. At the point of derailment the track structure consisted of 100-pound rails of varying lengths, laid on an average of 21 ties to a panel 39 feet long. It was fully tieplated, spiked with 4 spikes per tie on the high rail and 3 spikes per tie on the low rail, provided with 4-hole angle bars, and an average of 5 rail anchors on each 39-foot panel, and was ballasted with cinders to a depth of 16 inches. At the point of derailment the superelevation was 1 inch and the gage was 4 feet 8-3/4 inches.

The maximum authorized speed for all trains was 15 miles per hour.

Description of Accident

Extra 8629 West, a west-bound freight train, consisted at the time of the accident of engines 8629 and 9444, coupled, 46 loaded and 2 empty cars, engine 8682 and a caboose, in the order named. At C. and R. Mine, 1.98 miles east of the point of derailment, an air-brake test was made, and the brakes functioned properly. This train departed from C. and R. Mine about 4:22 p. m., and while it was moving at an estimated speed of 10 miles per hour engines 8629 and 9444, the first car and the front truck of the second car were derailed.

Engine 8629 was derailed to the south and stopped, practically upright, down the embankment, at an angle of 45 degrees to the track, with the front end 494 feet beyond the point of derailment. The cab was demolished, and steam pipes within the cab were broken. Both legs of the engine-truck radial bar were broken, the back engine-truck spring was missing, and the front engine-truck spring was displaced from its seat. The tender stopped, badly damaged, to the rear of engine 8629, across the track and at right angles to it. Engine 9444 stopped, badly damaged, against the tender of engine 8629 and parallel

to it. The tender of engine 9444 was torn loose, and it stopped against engine 9444 and parallel to it. The first and second cars stopped on the roadbed and practically in line with the track.

It was clear at the time of the accident, which occurred about 4:40 p. m.

The engineer and the fireman of engine 8629 were killed.

After the accident an inspection disclosed that the throttle valves of engines 8629 and 9444 were closed. The automatic and the independent brake valves of engine 8629 were in running position and the double-heading cock was open. The automatic brake valve of engine 9444 was in emergency position and the double-heading cock was closed.

Engine 8629 was of the 2-8-0 type, and its total weight in working order was 247,500 pounds, distributed as follows: Engine truck, 24,500 pounds; driving wheels, 223,000 pounds. The specified diameters of the engine-truck wheels and the driving wheels were, respectively, 33 inches and 62 inches. The tender was rectangular in shape and was equipped with two 4-wheel trucks. Its capacity was 7,300 gallons of water and 32,600 pounds of coal. The weight of the tender loaded was 162,800 pounds. The spring equalization system was arranged in two parts. The front part consisted of the engine-truck and the No. 1 pair of driving wheels, and the rear part consisted of the Nos. 2, 3 and 4 pairs of driving wheels. The length of the rigid wheelbase of engine 8629 was 17 feet 1/2 inch, and the total length of the wheelbase was 25 feet 9-1/2 inches. The last Class 3 repairs were completed on June 16, 1941, and the last heavy running repairs were completed on January 6, 1944. The accumulated mileage since the last class repairs was 52,000 miles.

The engine-truck involved was of the two-wheel type, with journal boxes inside the wheels. The radial bar was of wrought iron, and was U-shape, 3 inches wide and 1-1/4 inches thick. The front ends of the legs were bolted to the tops of the journal boxes. The engine-truck was provided with semi-elliptic springs at the front and the rear of the axle, and were parallel to it. These springs were of the 14-leaf type, and were seated in caps provided in the lower end of the center-pin casting, with the long leaves at the bottom. The springs were suspended at each end by T-shape swing links. These links were 11-13/16 inches long, and were supported by two hanger bolts at the top. At the lower end the links were connected to the ends of the springs by one bolt. The swing-link arrangement, the loose fit of the center-pin in its guide and the radius provided by the radial bar permitted the engine-truck to move to either side of the center-line of the engine proportionately to the curvature.

After the accident measurements of 155 feet of track immediately east of the point of derailment were as follows:

Station		Curvature	Gage		Superelevation Light	Superelevation Under load
	Feet	Degrees	Feet	Inches	Inches	Inches
	155.0	11°00'	4	8-7/8	1	1
	139.5	9°00'	4	8-1/2	0-15/16	0-15/16
H.S.	137.0					0-15/16
L.S.	125.0					1
	124.0	8°00'	4	8-5/8	1-1/8	1
	108.5	6°30'	4	8-1/2	0-3/4	0-3/4
H.S.	104.0					0-3/4
	93.0	13°45'	4	8-5/8	0-5/8	0-3/4
L.S.	92.0					0-3/4
H.S.	82.5					0-5/8
	77.5	11°15'	4	8-3/4	0-3/8	0-5/8
	62.0	12°00'	4	8-5/8	0-11/16	0-3/4
L.S.	59.0					0-3/4
H.S.	55.5					1
	46.5	7°15'	4	8-5/8	1-7/16	1
	31.0	6°15'	4	8-5/8	1-7/16	1-3/16
L.S.	25.5					1-1/8
H.S.	19.5					1-1/8
	15.5	10°00'	4	8-7/8	1-7/16	1
P. of D.		10°00'	4	8-3/4	1	1

Note: H.S. is joint of high rail;
L.S. is joint of low rail.

Discussion

Extra 8629 was moving at a speed of about 10 miles per hour on a compound curve to the right, where the maximum authorized speed was 15 miles per hour, when the engine-truck wheels of the first engine became derailed to the left. The curvature was 10°, and the superelevation was 1 inch. The engineer of the second engine observed that the first engine was derailed, and placed his brake valve in emergency position. Before the brakes became effective the general derailment occurred when the right engine-truck wheel of the first engine struck the wing rail of a frog 333 feet west of the point of derailment. Since both enginemen of engine 8629 were killed in the accident, it could not be determined when they first became aware of anything being wrong.

The first mark of derailment on the track structure was 944 feet west of the east end of the curve. This was a diagonal flange mark starting near the gage side and extending diagonally outward on top of the head of the rail a distance of 3.5 feet. The next mark was on a spike outside the high rail. The first mark inside the low rail was 3.5 feet west of the first mark on the high rail. These flange marks continued diagonally

about 3 feet. Throughout a distance of 330 feet westward from this point, flange marks appeared on the ties about 10 inches inside the low rail and 6 inches outside the high rail.

After the accident, examination of engine 8629 disclosed that the back engine-truck spring was missing. This spring was found about 40 feet east of the point where engine 8629 stopped. The front engine-truck spring was displaced to the right about 3 inches from its seat in the center-pin casting, and the right side of the seat was worn more than the left. Both legs of the radial bar were broken, but these were new breaks. The flange of the left engine-truck wheel was worn 1/16 inch more than the flange of its companion wheel. The conductor said that when engine 8629 was moving on a mine track about 2 miles east of the point of derailment, he heard an unusual grinding sound at the engine-truck location, and told the engineer about it. The engineer replied that it was not unusual for engine-trucks to grind on the track at that point.

The engine-truck was so designed that when the engine moved on a curve the swing links, the center-pin and the radial bar permitted the truck center-pin to be laterally displaced in proportion to the degree of curvature. Apparently, the front engine-truck spring became displaced to the right prior to the time engine 8629 entered the curve on which the derailment occurred. The master mechanic said that such a condition would cause the left engine-truck wheel to thrust heavily against the high rail. The worn condition of the flange of the left engine-truck wheel indicated that the engine-truck wheels had been inclining to the left some time before the derailment occurred.

Cause

It is found that this accident was caused by an engine-truck spring becoming displaced from its seat.

Dated at Washington, D. C., this fifteenth day of February, 1944.

By the Commission, Chairman Patterson.

W. P. BARTEL,
Secretary.

(SEAL)