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INTERSTATE COMMERCE COMMISSION  
WASHINGTON

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INVESTIGATION NO. 2801  
THE PENNSYLVANIA RAILROAD COMPANY  
REPORT IN RE ACCIDENT  
AT ESPLEN, PA , ON  
JUNE 4, 1944

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SUMMARY

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Railroad: Pennsylvania  
Date: June 4, 1944  
Location: Esplen, Pa.  
Kind of accident: Derailment  
Train involved: Freight  
Train number: Extra 1165 South  
Engine number: 1165  
Consist: 61 cars, caboose  
Estimated speed: 10 m. p. h.  
Operation: Interlocking  
Track: Double; 11° curve; level  
Weather: Clear  
Time: 9:05 a. m.  
Casualties: 1 killed; 2 injured  
Cause: Rear driving wheels of engine  
being less than permissible  
minimum gauge

INTERSTATE COMMERCE COMMISSION

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INVESTIGATION NO. 2801

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

THE PENNSYLVANIA RAILROAD COMPANY

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July 19, 1944.

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Accident at Esplen, Pa., on June 4, 1944, caused by the  
rear driving wheels of engine being less than the  
permissible minimum gauge.

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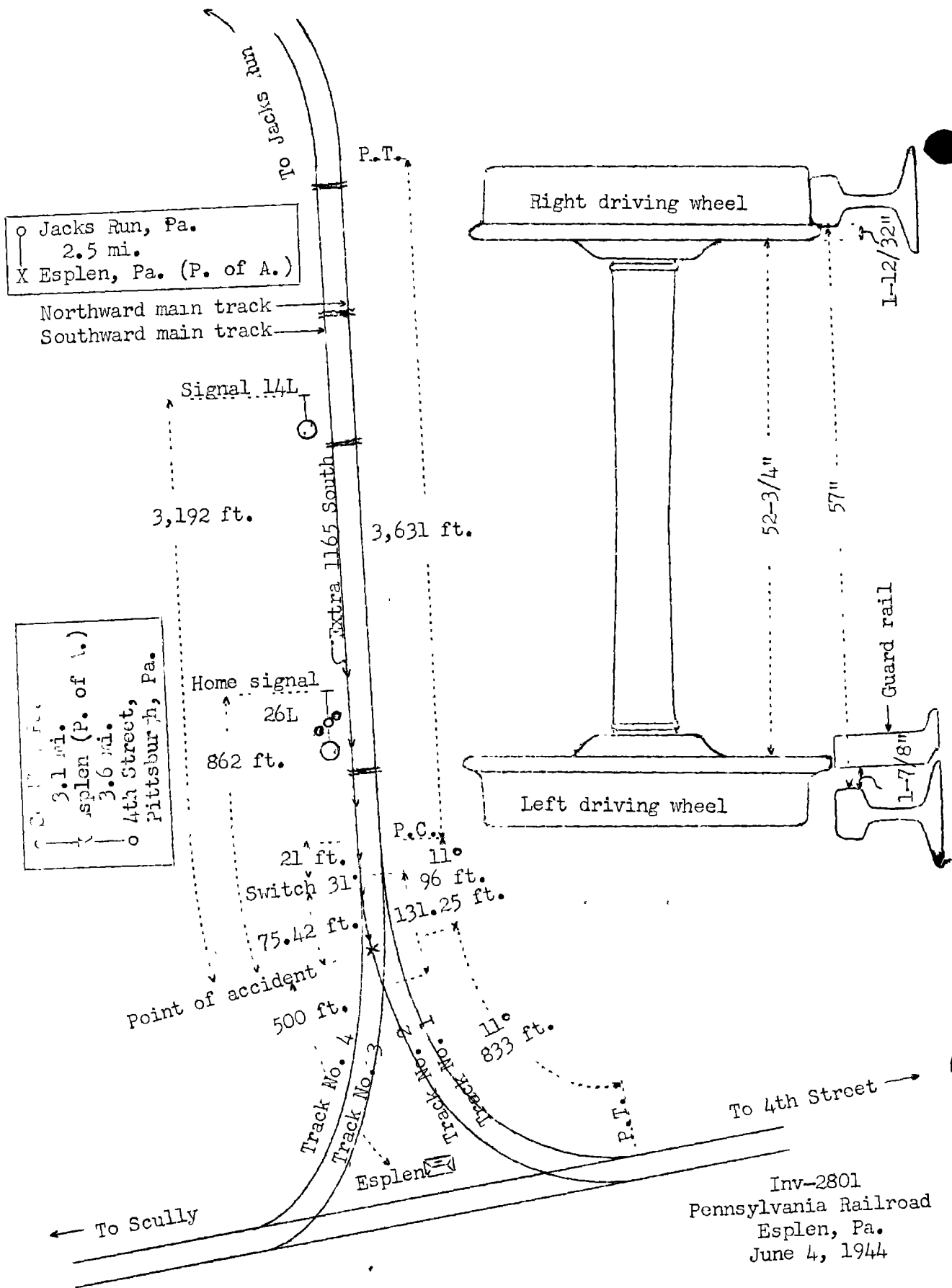
REPORT OF THE COMMISSION<sup>1</sup>

PATTERSON, Chairman:

On June 4, 1944, there was a derailment of a freight  
train on the Pennsylvania Railroad at Esplen, Pa., which  
resulted in the death of one employee and the injury of  
two employees.

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<sup>1</sup>Under authority of section 17 (2) of the Interstate Com-  
merce Act the above-entitled proceeding was referred by the  
Commission to Chairman Patterson for consideration and dis-  
position.



Inv-2801  
 Pennsylvania Railroad  
 Esplen, Pa.  
 June 4, 1944

Location of Accident and Method of Operation

This accident occurred on that part of the Pannandle Division extending southward from Jacks Run to Esplen, Pa., 2.5 miles. This was a double-track line over which trains moving with the current of traffic were operated by an automatic block-signal system, the indications of which superseded timetable superiority. Within interlocking limits at Esplen, this line converged with a double-track line extending eastward from Scully to 4th Street, Pittsburgh, 6.7 miles. These lines were connected by a wye, each leg of which consisted of two tracks, hereinafter referred to, from east to west, as tracks No. 1, No. 2, No. 3 and No. 4. Trains en route from Jacks Run to 4th Street entered track No. 2 at Esplen through a facing-point switch, designated as switch 31, located 575.42 feet north of the tower. The accident occurred on track No. 2 at a point 75.42 feet south of switch 31. From the north there was a tangent 3,631 feet in length, which was followed by an  $11^{\circ}$  curve to the left 96 feet to the point of accident and 833 feet beyond. The grade was level.

On the curve the track structure consisted of 130-pound rail, 39 feet in length, laid in 1926 on 26 treated ties to the rail length. It was fully tieplated and spiked with 4 rail-holding and 2 plate-holding spikes per tie. No super-elevation was maintained. The gauge varied between 4 feet 8-3/8 inches and 4 feet 9 inches, and was 4 feet 9 inches at the point of accident.

The frog of switch 31 was of the 130-pound No. 10 rigid type, and was 15 feet long. At the theoretical point of frog the wing spread was 3-3/4 inches and at the actual point of frog, 4-1/8 inches. End-blocks, clamps and filler-blocks were provided. A guard rail 9 feet long was located inside the east rail of track No. 2 and its center was 4 feet 7 inches north of the actual point of frog. The ends of the guard rail were flared. The flare at the north end was 13 inches long, and its end was 3-1/4 inches distant from the gauge side of the running rail. The flangeway between the guard rail and the running rail was 1-7/8 inches wide. At a point 131.25 feet south of switch 31, track No. 2 intersected track No. 3 by a movable-point crossing at an angle of  $11^{\circ}14'$ .

Semi-automatic signal 14L and home signal 26L, governing south-bound movements from the southward main track to track No. 2, were located, respectively, 3,192 and 862 feet north of the point of accident. These signals were of the position-light type, and were continuously lighted. The involved aspects and corresponding indications and names of these signals were as follows:

<u>Aspect</u>	<u>Indication</u>	<u>Name</u>
<u>Signal 14L</u>		
Three white lights in diagonal position to the right.	Proceed prepared to stop at next signal. Train exceeding medium speed must at once reduce to that speed.	Approach.
<u>Signal 26L</u>		
Three white lights in horizontal position above three white lights in diagonal position to the right.	Proceed prepared to stop at next signal. Slow speed within interlocking limits.	Slow-approach.

The interlocking machine was of the electric type, and consisted of 38 working levers in a 47-lever frame. Approach locking and detector locking were provided.

DEFINITIONS

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Speeds

Medium Speed--Not exceeding one-half the speed authorized for passenger trains but not exceeding 30 miles per hour.

\* \* \*

Slow Speed--Not exceeding 15 miles per hour.

\* \* \*

The maximum authorized speed for freight trains was 10 miles per hour.

### Description of Accident

Extra 1165 South, a south-bound freight train, consisted of engine 1165, a 2-8-2 type, 61 cars and a caboose. This train passed Jacks Run, the last open office north of Esplen, at 8:54 a. m., passed signal 14L, which displayed approach, passed signal 26L, which displayed slow-approach, entered switch 31, and while moving on track No. 2 at an estimated speed of 10 miles per hour the engine and the first car were derailed.

The No. 4 driving wheels were derailed to the right 75.42 feet south of switch 31, and continued in line with track No. 2 to the movable-point crossing, where the general derailment occurred. The engine and its tender, remaining coupled, stopped on their right sides west of track No. 2 and parallel to it, with the front end of the engine 202 feet south of the point of accident. The engine, tender, and first car were considerably damaged.

It was clear at the time of the accident, which occurred about 9:05 a. m.

The fireman was killed. The engineer and the front brakeman were injured.

The Nos. 1 and 4 pairs of driving-wheel tires were flanged, and the Nos. 2 and 3 driving wheels had plain tires. The total weight of the engine in working order was 324,700 pounds distributed as follows: Engine truck, 31,000 pounds; No. 1 driving wheels, 57,500 pounds; No. 2 driving wheels, 57,000 pounds; No. 3 driving wheels, 59,000 pounds; No. 4 driving wheels, 59,000 pounds; and trailer truck, 61,200 pounds. The diameters of the engine-truck wheels, driving wheels and trailer-truck wheels were, respectively, 33, 62 and 50 inches. The tender was rectangular in shape and was equipped with four-wheel trucks. Its capacity was 8,835 gallons of water and 38,935 pounds of coal. The weight of the tender loaded was 189,850 pounds. The rigid wheelbase of the engine was 17 feet 1/2 inch long, and the total length of the engine and tender was 82 feet 1/4 inch. The last Class 3 repairs were completed on July 20, 1942. The accumulated mileage was 59,552 miles.

### Discussion

Extra 1165 South entered track No. 2 at switch 31 and was moving at a speed of about 10 miles per hour on an 11° curve to the left, having no superelevation, when the rear driving wheels of the engine became derailed. The curve was within interlocking limits. The maximum authorized speed was 10 miles

per hour. There was no defective condition of the track prior to the accident, and there was no indication of dragging equipment.

As the train was approaching the point where the accident occurred, the enginemen were maintaining a lookout ahead. The air brakes had functioned properly en route, and the engine had been riding smoothly. When the engine reached a point about 75 feet south of switch 31 the engineer observed an unusual movement of the engine. He immediately moved the brake valve to emergency position, but the general derailment occurred before the brakes became effective.

Examination of the track disclosed a flange mark on top of the head of the guard rail beginning at a point 17 inches south of the receiving end and extending southward throughout the length of the guard rail. Opposite the south end of the guard rail there was a flange mark beginning at the point of frog and extending southward throughout the length of the frog. Extending southward from the south end of the guard rail and the heel of the frog, flange marks appeared on the ties inside the east rail and outside the west rail to the movable-point crossing, where the general derailment occurred. Examination disclosed that the rear driving wheels were the first to be derailed. At the point where the rear driving wheels became derailed the gauge of the track was 57 inches, and the flangeway between the running rail and the guard rail was 1-7/8 inches wide. Examination of the engine disclosed that the back-to-back measurement of the flanges of the rear driving wheels was 52-3/4 inches. The flanges of the No. 4 right and left driving wheels were, respectively, 1-6/16 and 1-5/16 inches in thickness, and 1-6/16 and 1-5/16 inches in height.

On account of sharp curvature to the left, the right rear driving wheel bore heavily against the right rail. As a result of the thickness of the flange of the right rear driving wheel being 1-3/8 inches, the back-to-back measurement between the rear driving wheels being 52-3/4 inches and the gauge of the track being 57 inches, the back of the flange of the left rear driving wheel was approximately 2-7/8 inches from the gauge side of the left rail when this wheel approached the receiving end of the guard rail. As a result of the flangeway between the left rail and the guard rail being only 1-7/8 inches wide, the flange of the left driving wheel mounted the guard rail and traversed its entire length on the top surface next to the flangeway. Then the companion driving wheel was forced to the right side of the frog point, instead of following the preceding wheels to the left of the point.



The Commission's rules and instructions for inspecting and testing of steam locomotives and tenders provide that wheels used on standard gauge track will be out of gauge and shall not be continued in service if the inside gauge of flanges, measured on base line, is less than 53 inches or more than 53-3/8 inches. The investigation disclosed that the instrument used to measure the inside gauge of the flanges of the rear driving wheels of engine 1165 when the tires were last applied, on January 25, 1944, was set to space the flanges at 53 inches. However, a test made after the occurrence of the accident disclosed that when set at 53 inches, according to the graduated scale of this instrument, it actually measured 52-3/4 inches. The instrument was found to be in a worn condition. The use of this instrument in its defective condition resulted in the flanges of the rear driving wheels of engine 1165 being 1/4 inch less than the permissible minimum gauge. The engine was continued in service in this condition from the time the tires were applied to the wheel-centers until the accident occurred, a period of approximately 4-1/2 months, in violation of the Commission's rules and instructions. If the flanges of the driving wheels of this engine had been properly spaced in accordance with these requirements, this accident would not have occurred.

Cause

It is found that this accident was caused by the rear driving wheels of engine being less than the permissible minimum gauge.

Dated at Washington, D. C., this nineteenth day of July, 1944.

By the Commission, Chairman Patterson.

(SEAL)

W. P. BARTEL,  
Secretary.