

INTERSTATE COMMERCE COMMISSION
WASHINGTON

INVESTIGATION NO. 2523
THE PENNSYLVANIA RAILROAD COMPANY
REPORT IN RE ACCIDENT
AT FORT WAYNE, IND., ON
SEPTEMBER 8, 1941

SUMMARY

Railroad: Pennsylvania
Date: September 8, 1941
Location: Fort Wayne, Ind.
Kind of accident: Derailment
Train involved: Passenger
Train number: 113
Engine number: 5377
Consist: 7 cars
Speed: 50-55 m. p. h.
Operation: Automatic block-signal system
Track: Double; tangent; 0.38 percent ascending grade westward
Weather: Slightly cloudy
Time: About 9:50 p. m.
Casualties: 2 killed; 5 injured
Cause: Accident caused by train entering crossover at a high rate of speed on account of a misunderstanding between the yardmaster and a switch-tender
Recommendation: That the Pennsylvania Railroad Company give consideration to the installation of electric switch-locking at main-track facing-point switches in high-speed territory

INTERSTATE COMMERCE COMMISSION

INVESTIGATION NO. 2523

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

THE PENNSYLVANIA RAILROAD COMPANY

October 31, 1941

Accident at Fort Wayne, Ind., on September 8, 1941, caused by a train entering a crossover at a high rate of speed on account of a misunderstanding between the yardmaster and a switchtender.

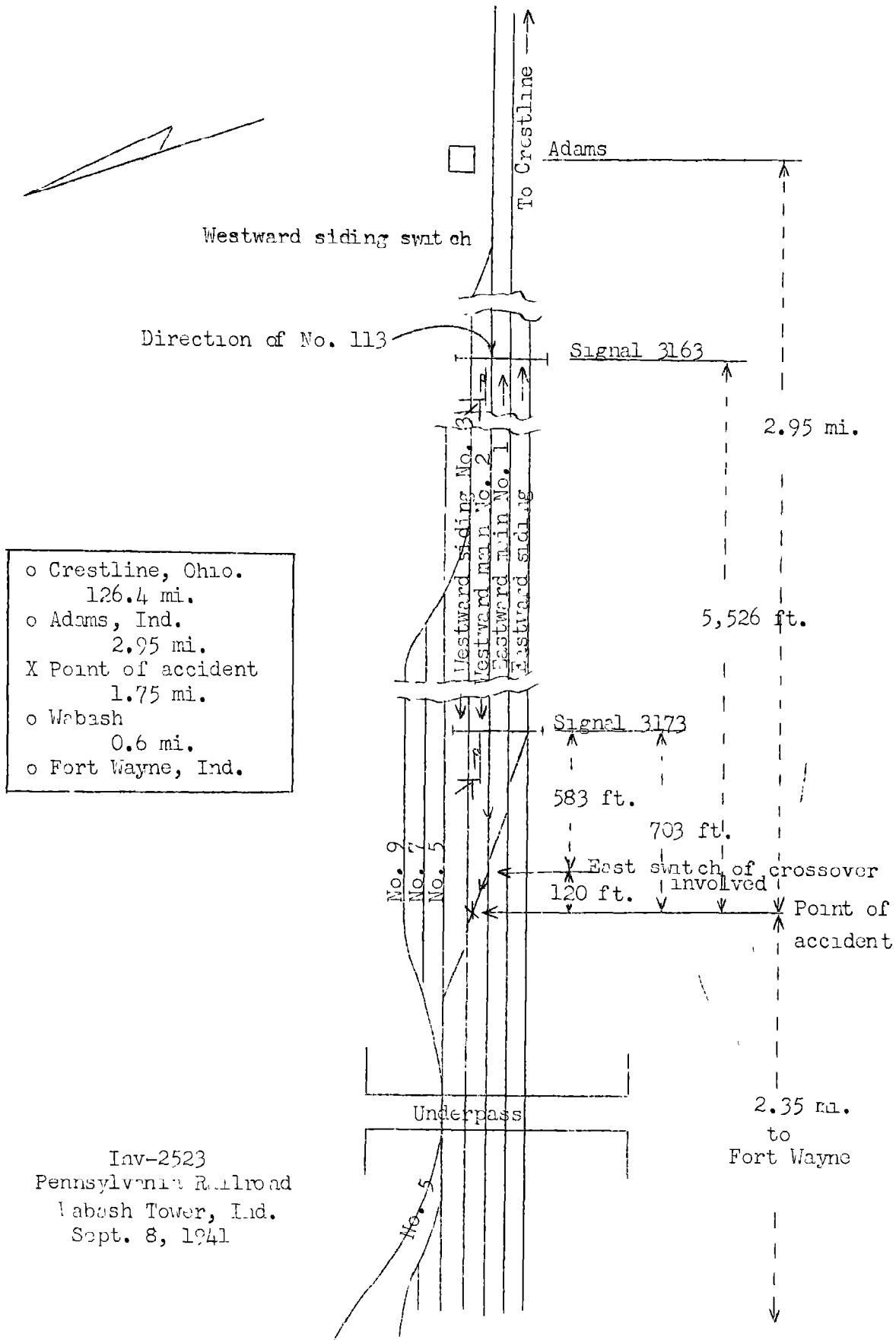
REPORT OF THE COMMISSION¹

PATTERSON, Commissioner:

On September 8, 1941, there was a derailment of a passenger train on the Pennsylvania Railroad near Wabash Tower, Fort Wayne, Ind., which resulted in the death of one trespasser and one employee and the injury of three passengers, one trespasser and one employee. This accident was investigated in conjunction with the Public Service Commission of Indiana.

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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 Patterson for consideration and disposition.



- o Crestline, Ohio. 126.4 mi.
- o Adams, Ind. 2.95 mi.
- X Point of accident 1.75 mi.
- o Wabash 0.6 mi.
- o Fort Wayne, Ind.

Inv-2523
 Pennsylvania Railroad
 Wabash Tower, Ind.
 Sept. 8, 1941

2.35 mi.
 to
 Fort Wayne

Location of Accident and Method of Operation

This accident occurred on that part of the Fort Wayne Division which extends between Crestline, Ohio, and Fort Wayne, Ind., a distance of 131.7 miles. In the vicinity of the point of accident this is a double-track line over which trains moving with the current of traffic are operated by an automatic block-signal system, the indications of which supersede time-table superiority. The main tracks from south to north are No. 1, eastward main, and No. 2, westward main. Between Adams and Wabash, located 5.3 miles and 0.6 mile, respectively, east of the station at Fort Wayne, track No. 3, designated as the westward siding, parallels track No. 2 on the north. The westward classification yard extends between Adams and Wabash and parallels track No. 3 on the north. Yard track No. 5 is adjacent to track No. 3. A facing-point crossover for movements with the current of traffic on track No. 2 connects tracks Nos. 2 and 3 at a point 1.75 miles east of Wabash. The accident occurred 120 feet west of the east switch of this crossover, at the frog of track No. 3. Another facing-point crossover having a turnout to the right connects tracks Nos. 3 and 5. The east switch of this crossover is 25 feet west of the west switch of the first-mentioned crossover.

As the point of accident is approached from the east on track No. 2, there is a tangent a distance of about 3 miles to the east switch of the crossover involved and some distance beyond. The grade for west-bound trains is 0.38 percent ascending a distance of 1,900 feet to the point of accident.

The crossover involved is 198 feet in length and is provided with a No. 10 turnout having a curvature of $7^{\circ}27'37.4''$. There is no superelevation. On track No. 2 the track structure consists of 130-pound P. S. rail, 39 feet in length, laid on an average of 22 treated ties to the rail length; it is fully tieplated, single-spiked, provided with four rail anchors per rail length, and is ballasted with crushed stone to a depth of 18 inches. The track structure of the crossover involved consists of 130-pound rail, laid on treated hardwood ties; it is double-spiked, fully tieplated, provided with four anchors per rail length, and is ballasted with stone to a depth of 18 inches. Both track No. 2 and the crossover are well maintained. The switch-stand at the east switch of the crossover involved is located on the north side of track No. 2; it is of the hand-throw, low-stand type and is equipped with an oil lamp. The centers of the lenses of the switch-lamp are 4 feet 2-1/2 inches north of the gage side of the north rail and 10 inches above the top of the ties. The lenses are 5 inches in diameter and are provided with 10-inch flared-disc reflectors. When the switch is lined for movement on track No. 2, the switch-lamp displays a green aspect, and a white disc is displayed. When the switch is lined for movement through the crossover the switch-lamp displays a red aspect, and a red disc is displayed.

Signals 3163 and 3173, governing west-bound movements on track No. 2, are mounted on signal bridges located at points, respectively, 5,406 feet and 583 feet east of the east switch of the crossover involved. These signals are of the automatic, 2-unit, 4-indication, position-light type, and are approach lighted.

The involved aspects, indications, and names are as follows:

<u>Aspect</u>	<u>Indication</u>	<u>Name</u>
Vertical	Proceed	Clear-Signal
45 degrees	A train exceeding one-half its maximum authorized speed here must at once reduce to not exceeding that speed. Approach next signal prepared to stop.	Approach-Signal
Horizontal	Stop- Then proceed * * *.	Stop-And-Proceed-Signal

The crossover involved is equipped with a center-locking device, which consists of a lever located in the center-line of the crossover and midway between the two switches. Transmission rods connect the center lever to locking bars with which each switch is provided. When the center lever is moved from normal to reverse, a shunting mechanism shunts the track signal-circuits, and the locking bars disengage from the lock rods, which are attached to the switch points of both switches. The center-locking device must be moved to reverse position before either of the hand-throw switches can be lined for a crossover movement. When the center-locking lever is placed in reverse position, signal 3163 displays approach and signal 3173 displays stop-and-proceed.

Special time-table instructions provide as follows:

S16C

* * *

A switch tender must not set a switch to divert an approaching train until he is assured of its identity and that its speed does not exceed 15 miles per hour.

In the vicinity of the point of accident the maximum authorized speed for passenger trains is 80 miles per hour on track No. 2, and through non-interlocked turnouts, 10 miles per hour.

Description of Accident

No. 113, a west-bound first-class passenger train, consisted of engine 5377, of the 4-6-2 type, one express-box car, one baggage car, one baggage-mail car, one passenger-baggage car, one coach, one dining car, and one express-box car, in the order named; all cars were of steel construction. After a terminal air-brake test was conducted at Crestline, 131.7 miles east of Fort Wayne, this train departed at 6:52 p. m., according to the dispatcher's record of movement of trains, on time. At Lima, Ohio, 59.5 miles east of Fort Wayne, one car was added to the rear of the train, an air-brake test was made, and the brakes functioned properly at all points where used en route. This train passed Adams, 2.95 miles east of the point where the accident occurred and the last open office, at 9:48 p. m., 6 minutes late, passed signal 3163, which displayed proceed, passed signal 3173, which displayed proceed until the engine almost reached it, and, while moving at a speed estimated as from 50 to 60 miles per hour, it entered a facing-point crossover to the right and was derailed at the west frog.

The engine was in good mechanical condition. There was no indication of dragging equipment, defective track, or of any obstruction having been on the track. The specified curvature of the turnout was 7°27'37". The maximum authorized speed on the turnout was 10 miles per hour. The first marks of derailment were flange marks outside the north rail of the crossover, on two ties 3 feet and 4 feet west of the frog of the west switch. The west end of the crossover was destroyed, track No. 2 was damaged throughout a distance of 325 feet west of the point of derailment, and track No. 3 was destroyed throughout a distance of 426 feet. The crossover between tracks Nos. 3 and 5 was destroyed.

Engine 5377 was derailed to the right and stopped, badly damaged, on its right side, parallel to track No. 2, with its front end about 475 feet beyond the point of derailment and 45 feet north of track No. 2. The engine truck was demolished, the pilot and the cab were crushed, and the right injector was broken. The tender frame remained coupled to the engine but the cistern was torn loose and stopped, badly damaged, to the rear of the engine and at an angle of 45 degrees to it. The first car was derailed but remained upright and stopped, badly damaged, at right angles to the tracks, with its front end on track No. 2 and its rear end on yard track No. 7. The second car was derailed and stopped upright, with its front end 45 feet and its rear end 35 feet north of track No. 2. Both trucks were damaged. The left side-sheets, the front roof-sheet, and the left side-sill were bent. The third, fourth, fifth and sixth cars were derailed but remained upright and in general line with the crossover. These cars were slightly damaged. The front truck of the seventh car was derailed.

The weather was slightly cloudy at the time of the accident, which occurred about 9:50 p. m.

The employee killed was the engineman and the employee injured was the fireman.

Mechanical Data

After the accident, an inspection disclosed that no condition of the engine existed prior to the accident that might have contributed to the cause of the derailment. The automatic brake valve was in service position, the throttle was slightly open, and the reverse lever was in position for forward motion at short cut-off.

The total weight of engine 5377 is 308,890 pounds, distributed as follows: Engine truck, 53,400 pounds; driving wheels, 201,830 pounds; trailer truck, 53,420 pounds. The tender is rectangular in shape and has two four-wheel trucks. The weight of the tender loaded is 212,725 pounds. The diameters of the engine-truck wheels, the driving wheels and the trailer-truck wheels are, respectively, 36 inches, 80 inches and 50 inches. The rigid wheel-base is 13 feet 10 inches in length and the total length of the engine and tender is 82 feet 11-3/4 inches.

Signal Data

After the accident, signals 3163 and 3173 were tested and were under observation for a time sufficient to determine that they functioned as intended. The center-locking device shunted the track circuit as intended.

Discussion

No. 113 passed Adams, 2.95 miles east of the point of accident, at 9:48 p. m., and as it was approaching the point where the accident occurred the speed was about 65 miles per hour. The engineman and the fireman were maintaining a lookout ahead from their respective sides of the cab. There was no condition of the engine which obscured their view. Signal 3163, located about 5,500 feet east of the point where the accident occurred, displayed proceed. Signal 3173, located 583 feet east of the east switch of the crossover involved, displayed proceed and the switch-lamp at this switch displayed green until the engine reached a point near signal 3173; then, apparently, the switch-lamp aspect changed to red and the indication displayed by signal 3173 changed from proceed to stop-and-proceed, as the engineman applied the brakes in emergency and called to the fireman that some person had opened the switch. At this time the fireman was unable to see signal 3173 and consequently he did not observe if the indication changed to stop-and-proceed. Since the engineman was killed in the accident, it could not be determined if he

observed both the aspect of the switch-lamp and the indication of signal 3173 change. The train entered the east switch of the crossover at an estimated speed of 50 or 55 miles per hour and the engine became derailed at a point 120 feet west of this switch, at the west frog. At the point of derailment the curvature was 7027'37" to the left. The engine overturned to the right and slid on its right side a distance of 475 feet.

There was no superelevation on the crossover. According to A. R. E. A. tables, at the point where the derailment occurred the equilibrium speed, safe speed and overturning speed are, respectively, 25 miles per hour, 33 miles per hour and 61 miles per hour. Since the brakes were applied when the engine entered the crossover, undoubtedly this factor, in addition to the estimated speed of 50 to 55 miles per hour, caused the engine to overturn.

The switches in the vicinity of the point of accident were in the charge of a switchtender, who was performing service with a yard crew. A few minutes before No. 113 approached, the yardmaster had instructed the switchtender to line the route for a west-bound freight train to enter yard track No. 5. Although the switchtender had worked in this yard several months, the first time he had worked in this portion of the yard was on the night of the accident, and he was not thoroughly familiar with the movement of west-bound freight trains to the classification yard. After he was instructed to arrange the route for the west-bound freight train, he lined the crossover between tracks Nos. 3 and 5, then observed the headlight of an engine approaching from the east on track No. 2, and, since No. 113 was overdue, he assumed that the approaching train was the west-bound freight train which was to be diverted to the yard. After he reversed the center-locking device and when the engine of the approaching train was a short distance east of signal 3173 he reversed the east switch of the crossover between tracks Nos. 2 and 3, and almost immediately he heard a succession of short blasts sounded on the engine whistle, which indicated to him that the approaching train was not the west-bound freight train in question. He ran to the east switch in an attempt to restore it to normal position but he was unable to reach the switch in time to do so.

The operating rules provide that a switch must not be lined to divert an approaching train until the employee operating the switch is certain as to the identity of the train and that the speed is not in excess of 15 miles per hour. The switchtender understood these requirements; however, he did not know that all west-bound freight trains proceed from Adams on track No. 5. If the switchtender had known of this practice, undoubtedly he would not have thought the train approaching on track No. 2 was the west-bound freight train in question. There was discrepancy in the statements of the yardmaster and the switchtender concerning the instructions the yardmaster gave the switchtender regarding the routing of the west-bound freight train. The yardmaster said

he told the switchtender to route the west-bound freight train on track No. 5. The switchtender said the yardmaster told him that the west-bound freight train was approaching and that it should be routed to track No. 5. The switchtender understood this to refer to the train he saw approaching at that time.

During the 10-year period prior to this accident, the Commission has investigated twelve accidents which resulted from switches being thrown immediately in front of approaching trains, similar to the accident here under discussion. These twelve accidents resulted in the death of 21 and the injury of 213 persons. In nine of these accidents, the trains involved had passed automatic signals displaying indications that permitted the trains to proceed. The other three accidents occurred in non-automatic signal territory. All the switches involved were of the hand-throw type and were located on high-speed tracks. If the switches had been equipped with electric switch-locking, undoubtedly these accidents would have been averted. If the crossover switch involved in this accident had been equipped with electric switch-locking, the switchtender would not have been able to throw the switch immediately in front of the approaching train.

Cause

It is found that this accident was caused by a train entering a crossover at a high rate of speed on account of a misunderstanding between the yardmaster and a switchtender.

Recommendation

It is recommended that the Pennsylvania Railroad Company give consideration to the installation of electric switch-locking at facing-point main-track switches in high-speed territory.

Dated at Washington, D. C., this thirty-first day of October, 1941.

By the Commission, Commissioner Patterson.

W. P. BARTEL,

Secretary.

(SEAL)