INTERSTATE COMMERCE COMMISSION

WASHINGTON

INVESTIGATION NO. 3098

THE PENNSYLVANIA RAILROAD COMPANY

REPORT IN RE ACCIDENT

AT DUFF, PA., ON

APRIL 22, 1947

SUMMARY

Railroad:	Pennsylvania	
Date:	April 22, 1947	
Location:	Duff, Pa.	
Kind of accident:	Side collision	
Trains involved:	Freight	: Engine
Train numbers:	Extra 7624 West	: Extra 2867 West
Engine numbers:	7624-8375	: 2867
Consist:	64 cars	:
Estimated speeds:	5 m. p. h.	: 2 m. p. h.
Operation:	Signal indications	
Tracks:	Double; 9°19' curve; level	
Weather:	Clear	
Time:	10:50 p. m.	
Casualties:	1 killed; 1 injured	
Cause:	Failure properly to control movement of engine after it had been stopped clear of a conflicting crossover movement	

INTERSTATE COMMERCE COMMISSION

INVESTIGATION NO. 3098

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

THE PENNSYLVANIA RAILROAD COMPANY

June 13, 1947

Accident at Duff, Pa., on April 22, 1947, caused by failure properly to control the movement of an engine after it had been stopped clear of a conflicting crossover movement.

REPORT OF THE COMMISSION[1]

PATTERSON, Commissioner:

On April 22, 1947, there was a side collision between a freight train and an engine on the Pennsylvania Railroad at Duff, Pa., which resulted in the death of one employee, and the injury of one employee.

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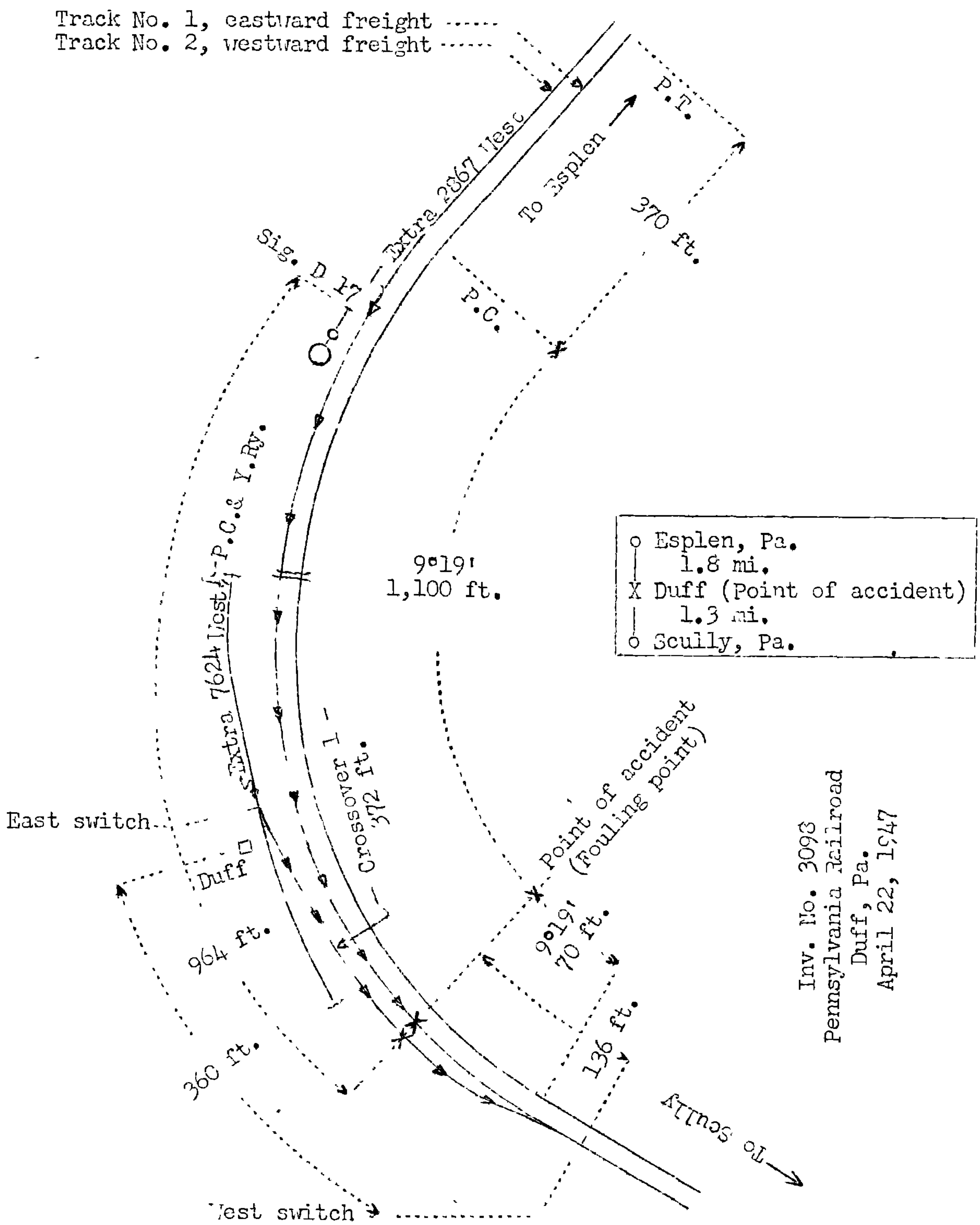
[1]Under authority of section 17 (2) of the Interstate Commerce Act the above-entitled proceeding was referred by the Commission to Commissioner Patterson for consideration and disposition.


Track No. 1, eastward freight
Track No. 2, westward freight
P.T.
To Esplen
370 ft.
Extra 2867 West
Sig. D 17
P.C.
Extra 7624 West-P.C.& Y.Ry.
9°19'
1,100 ft.
Esplen, Pa.
1.8 mi.
X Duff (Point of accident)
1.3 mi.
Scully, Pa.
Crossover 1 - 372 ft.
Point of accident (Fouling point)
East switch
Duff
964 ft.
9°19', 70 ft.
136 ft.
360 ft.
To Scully
West switch
Inv. No. 3093
Pennsylvania Railroad
Duff, Pa.
April 22, 1947

Location of Accident and Method of Operation

This accident occurred on that part of the Panhandle Division extending between Esplen and Scully, Pa., 3.1 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 signal indications. The main tracks from south to north are designated as No. 1, eastward freight, and No. 2, westward freight. At Duff, 1.8 miles west of Esplen, an interchange track of the Pittsburgh, Chartiers & Youghiogheny Railway practically parallels the main tracks of the P.R.R. on the north. A trailing-point crossover, 372 feet in length and designated as crossover 1, connects the P.C.& Y. interchange track and P.R.R. track No. 2. The west switch of crossover 1 is 360 feet west of the station. West-bound movements en route from the P.C.& Y. interchange track to Scully, 1.3 miles west of Duff, are made through crossover 1, thence westward on track No. 2. The accident occurred at the fouling point of track No. 2 and crossover 1, at a point 136 feet east of the west switch. From the east on the main tracks there is a tangent 370 feet in length, then a 9°19' curve to the left 1,100 feet to the point of accident and 70 feet westward. The grade is level.

A telephone for communication between members of train crews and the operator at Esplen is located in a booth immediately adjacent to the east switch of crossover 1.

The switches of crossover 1 are hand-operated. The switchstand of the west switch is of the ground-throw low-stand type, and is 4.85 feet north of the centerline of track No. 2. A spindle bearing a switch lamp is located between tracks Nos. 1 and 2, and is 3.9 feet south of the gage side of the south rail of track No. 2. The faces of the switch lamp are fitted with flared disc targets. The tops of the targets are 1.5 feet above the tops of the ties. When the west switch is lined for movement through crossover 1, a red light and a red target are displayed for track No. 2.

Automatic signal D 17, governing west-bound movements on track No. 2, is 964 feet east of the point of accident. This signal is of the position-light type, and is approach lighted. The involved aspect and corresponding indication and name of this signal are as follows:

Aspect	Indication	Name
Three white lights in horizontal position over white marker light	Stop; then proceed at Restricted speed.	Stop-and-proceed.

The fouling circuit of crossover 1 extends 170 feet east of the west switch. The controlling circuits are so arranged that when a west-bound train is occupying track No. 2 between signal D 17 and the next signal westward, or when the switches of crossover 1 are lined for movement through the crossover, signal D 17 displays stop-then-proceed-at-restricted-speed.

Operating rules read in part as follows:

DEFINITIONS

* * *

Reduced Speed--Prepared to stop short of train or obstruction.

* * *

Restricted Speed--Not exceeding 15 miles per hour prepared to stop short of train, obstruction or switch not properly lined and to look out for broken rail.

11. A train finding a fusee burning red on or near its track must stop and extinguish the fusee and then proceed at Reduced speed.

99. When a train stops under circumstances in which it may be overtaken by another train, the flagman must go back immediately with flagman's signals a sufficient distance to insure full protection, placing two torpedoes, and when necessary, in addition, displaying lighted fusees.

* * *

When a train is moving under circumstances in which it may be overtaken by another train, the flagman must take such action as may be necessary to insure full protection. By night, or by day when the view is obscured, lighted fusees must be thrown off at proper intervals.

Note--When trains are operating under Automatic Block System Rules, the requirements of Rule 99, in so far as protecting against following trains is concerned, will have been complied with when full protection is afforded against trains moving at Restricted speed.

104. * * *

* * *

When practicable, the engineman must see that the switches nearest the engine are properly lined.

A train or engine must not foul a track until switches connected with the movement are properly lined. * * *

* * *

152. When a train crosses over to or obstructs another track, unless otherwise provided, it must first be protected as prescribed by Rule 99.

502. A train or engine must not enter a block at a hand operated switch or crossover nor foul the main track without permission of the signalman, * * *

* * *

504. Unless so directed by the superintendent, the signalman must not give permission to a train or engine to enter a block at a hand operated switch or crossover or foul the main track on which another train is moving or has been authorized to move, in the direction of such switch or crossover from the next block station or interlocking.

When permission has been given by the signalman to a train or engine to enter a block at a hand operated switch or crossover, the signalmen in charge of the block stations or interlockings between which the block is located must know that the movement has been made before permitting another train to move between such block stations or interlockings and the switch or crossover where such movement is being made.

Note--The movement has been made when the train or engine has moved so that any portion of it occupies the main track.

Brake and Train Air Signal instructions read in part as follows:

22. Locomotive Piston Travel--The piston travel on the locomotive and tender must not vary more than one (1) inch in either direction from the following dimensions, except on truck mounted brake cylinders, which must not vary more than one-half (1/2) inch:

Steam Locomotive--Equalizer Driver Brake ..... 5"

* * *

Tender Brakes Without Slack Adjusters..... 6"

* * *

The maximum authorized speed for all trains moving on track No. 2 is 20 miles per hour.

Description of Accident

Extra 7624 West, a west-bound P.R.R. freight train consisting of engines 7624 and 8375, coupled, and 64 cars, en route from the P.C.& Y. interchange track at Duff to Scully, was moving through crossover 1 to track No. 2 at an estimated speed of 5 miles per hour when the forty-ninth car was struck by Extra 2867 West at the fouling point of track No. 2 and crossover 1.

Extra 2867 West, a west-bound engine, headed west, passed Esplen, the last open office, at 10:32 p. m., stopped at signal D 17, which displayed stop-then-proceed-at-restricted-speed, then proceeded and stopped about 10:40 p. m. at a point about 100 feet east of the fouling point of the west switch of crossover 1. About 10 minutes later this engine proceeded westward and was moving at an estimated speed of 2 miles per hour when it struck Extra 7624 West.

Engine 2867 stopped with the front end 46 feet west of the point of collision. The engine-truck wheels and the Nos. 1, 2 and 3 pairs of driving wheels were derailed. The engine stood upright on the roadbed of track No. 2, and at an angle

of about 10 degrees to it. The right side of the engine was damaged. The cab was demolished, the power-reverse lever was torn off, and steam pipes and air pipes within the cab were broken. None of the equipment of Extra 7624 West was derailed. The south sides of the forty-ninth to fifty-eighth cars, inclusive, were damaged, and a separation occurred between the fifty-sixth and fifty-seventh cars.

The engineer of Extra 2867 West was killed, and the fireman was injured.

The weather was clear at the time of the accident, which occurred about 10:50 p. m.

Engine 2867 is of the 2-10-0 type, and is provided with No. 6-ET brake-equipment, one 8-1/2-inch cross-compound air compressor, and an auxiliary emergency valve located on the back of the right side of the cab. The air-compressor governor is of the duplex type. The low-pressure head and the high-pressure head were adjusted to supply main-reservoir pressures of 105 pounds and 135 pounds. The reducing valve was adjusted to supply a brake-cylinder pressure of 45 pounds by use of the independent brake valve. The brake-pipe feed valve was adjusted to supply brake-pipe pressure of 72 pounds. The safety-valve of the distributing valve was adjusted to open when brake-cylinder pressure reached 72 pounds, and to seat when the brake-cylinder pressure was 68 pounds or less. The brake system is so arranged that when the independent brake valve is placed in slow-application position the brake-cylinder pressure should increase to 40 pounds in 6 to 10 seconds, and when the independent brake valve is placed in quick-application position the brake-cylinder pressure should increase to 40 pounds in 2 or 3 seconds. The releasing time after either application should be 13 seconds. The engine is provided with two 18-inch by 12-inch driving-wheel brake-cylinders, and one 12-inch by 12-inch tender brake-cylinder. The tender is provided with two 4-wheel trucks. Braking force is applied against all wheels of the engine and the tender, except the engine-truck wheels. The engine is equipped with a balanced-type throttle-valve mounted in the steam dome. This valve is arranged with a balancing piston, on first lift, which must rise 1-1/4 inches before the main valve starts to lift. The main valve has a lift of 1-1/8 inches. In either event, steam is admitted from the top of the dome through the throttle-valve cage and stand pipe, thence to the dry-pipe, the superheater system, and to the cylinders. Movement of the throttle-valve is controlled by a throttle-lever on the

back-head of the boiler. This lever is arranged with a 17-tooth quadrant mounted integrally with the throttle stem. A 4-tooth throttle-latch, actuated manually, meshes with the quadrant and holds the throttle valve in the desired position. The latch is held engaged by a tempered spring of brass wire 0.114 inch thick, coiled in 19 turns to a length of 4 inches and a diameter of 1/2 inch.

The last class repairs on engine 2867 were completed and the brake-system was last cleaned on November 23, 1946. General repair of the air compressor was completed April 17, 1947, and the compressor was applied to engine 2867 on April 19, 1947.

Discussion

The investigation disclosed that about 10:26 p. m. the operator at Esplen issued by telephone to the conductor of Extra 7624 West authority for that train to move from the interchange track at Duff through crossover 1 and to proceed westward on track No. 2 to Scully after Extra 4441 West, a west-bound freight train en route to Scully on track No. 2, had cleared the crossover. At that time the operator informed the conductor of Extra 7624 West that Extra 2867 West, a west-bound engine on route to Scully, would enter track No. 2 at Esplen about 10:30 p. m. Extra 2867 West passed Esplen at 10:32 p. m., and Extra 4441 West passed Duff about 10:37 p. m. Immediately after Extra 4441 West cleared the west switch of crossover 1, a member of the crew of Extra 7624 West lined the switches of the crossover for that train to proceed through the crossover to track No. 2. Extra 7624 West was moving through the crossover when the forty-ninth car was struck by Extra 2867 West at the fouling point of track No. 2 and the crossover.

The flagman of Extra 7624 West said that about 3 minutes before his train started to move through the crossover he was standing about 225 feet east of the crossover to provide flag protection for the movement, and he saw the reflection of the headlight of Extra 2867 West a few hundred feet distant. He gave stop signals with a lighted red fusee, and these signals were acknowledged by two short blasts on the whistle of the approaching engine. Soon afterward Extra 2867 West stopped in the vicinity of the point where the flagman was stationed, then Extra 7624 West began to move through the crossover.

During the movement of this train through the crossover the flagman heard the sound of brakes releasing, then he observed that engine 2867 was moving westward, and the collision occurred immediately afterward.

The crew of Extra 2867 West consisted of an engineer and a fireman. The engineer was killed in the accident. The brakes of this engine had been tested and had functioned properly en route. The fireman said that when the engine was stopped at signal D 17, in compliance with the stop-and-proceed indication displayed by that signal, he and the engineer saw stop signals being given with a lighted fusee in the vicinity of the crossover. Soon after the engine was stopped in response to the flagging signals the fireman observed that the crossover switches were lined for movement through the crossover and that Extra 7624 West was moving westward on the interchange track toward the crossover. Then the fireman was engaged in tending the fire, and he was not aware that his engine had started to move westward until immediately before the collision occurred.

Although there was some damage to appliances in the cab, examination of engine 2867 after the accident disclosed that the throttle lever was latched in closed position, the valve gear was in position for backward motion, the automatic brake-valve handle was on the shoulder between running and release positions, and the independent brake valve was in quick-application position. Tests of the air-brake system disclosed that the distributing valve, both brake valves and the compressor governor functioned properly. The travel of the driving-wheel brake-cylinder pistons varied from 1/4-inch to 3/4-inch in excess of the maximum specified travel, and the travel of the tender brake-cylinder piston was 1-3/4 inches in excess of the maximum specified travel. There was excessive leakage of the tender brake-cylinder, because of worn condition of the packing cup. However, after a 20-pound brake-pipe reduction was made, braking force sufficient to prevent movement was maintained at the wheels during a period of 6 minutes 25 seconds after the stop-cock was closed in the main-reservoir supply pipe to the distributing valve. Engine 2867 stopped on level track on a 9°19' curve to the left. Considering the resistance to movement presented by track curvature, particularly with this type of engine, it appears that steam would have to be admitted to the cylinders and the brakes to be released for this engine to start to move on level track.

Several days after the accident, tests of the throttle valve, the throttle-lever rigging, the dry-pipe, and the air-compressor were conducted with a boiler pressure of 220 pounds. At the cylinder cocks there was a slight leakage of

steam, which indicated that either a throttle-valve or a dry-pipe leak existed. The throttle-lever latch had been removed and could not be found, but a new latch was substituted. The teeth and recesses of the throttle-lever quadrant were in good condition, but the teeth of the new latch did not properly engage the quadrant, because of a non-standard latch spring, which was 3-11/16 inches long, coiled in 23 turns, and which offered less resistance to compression than a standard spring. This non-standard spring was in the throttle-lever assembly at the time of the accident. With the non-standard spring in use the throttle-lever latch would not properly engage unless the latch-handle was released carefully. If the latch-handle was not released carefully, the throttle lever would kick open 1 to 2 notches on the quadrant. The throttle is arranged for a drifting throttle with 1 to 2 notches and a heavy drifting throttle with 3 notches, and the main valve starts to lift when the throttle latch is midway of the quadrant. When the non-standard latch spring was replaced with a standard latch spring the throttle latch readily engaged the quadrant, regardless of the degree of care used in manipulating the latch handle. The throttle valve and the stand-pipe were removed and inspection disclosed that the balancing piston, the main valve, the piston rings and the valve seats were in good condition. There was no steam admitted to the cylinders when the throttle lever was latched in closed position. No foreign material, which could have blocked the throttle valve from seating, was found in the valve cage. There was a slight amount of leakage to the dry pipe at its connection with the stand pipe, but not of sufficient volume to move the engine. Orifice tests and examination of all parts of the air-compressor disclosed that the compressor was in good condition and not subject to erratic action or stoppage during use. The compressor was capable of maintaining adequate air pressure in accordance with the requirements.

The evidence indicates that the engineer of Extra 2867 West released the brake of his engine sometime after the engine was stopped clear of crossover 1. Since this engine had an inherent resistance to movement unless a considerable amount of steam pressure was admitted to the cylinders, it appears either the engineer failed to observe whether the throttle latch was holding the throttle lever in closed position, or that he inadvertently opened the throttle enough for steam to be admitted to the cylinders in amount sufficient

to move the engine slowly ahead. Apparently an attempt was made to stop the engine, as evidenced by the position of the independent brake valve, the throttle lever and the valve gear after the accident.

Cause

It is found that this accident was caused by failure properly to control the movement of an engine after it had been stopped clear of a conflicting movement.

Dated at Washington, D. C., this thirteenth day of June, 1947.

By the Commission, Commissioner Patterson.

(SEAL)

W. P. BARTEL,

Secretary.