

INTERSTATE COMMERCE COMMISSION

WASHINGTON

INVESTIGATION NO. 3005

THE PENNSYLVANIA RAILROAD COMPANY

REPORT IN RE ACCIDENT

NEAR GRAZIER, PA., ON

JULY 14, 1946

SUMMARY

Railroad: Pennsylvania
Date: July 14, 1946
Location: Grazier, Pa.
Kind of accident: Rear-end collision
Trains involved: Passenger : Passenger
Train numbers: 39 : 69
Engine numbers: 359 : Diesel-electric
units 5901 and
5900
Consists: 13 cars : 12 cars
Estimated speeds: 10 m. p. h. : 20 m. p. h.
Operation: Automatic block and cab-signal
indications
Tracks: Four; 2°07' curve; 0.40 percent
ascending grade westward
Weather: Clear
Time: 9:17 a. m.
Casualties: 223 injured
Cause: Failure to operate following
train in accordance with
signal indications

INTERSTATE COMMERCE COMMISSION

INVESTIGATION NO. 3005

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

THE PENNSYLVANIA RAILROAD COMPANY

September 10, 1946.

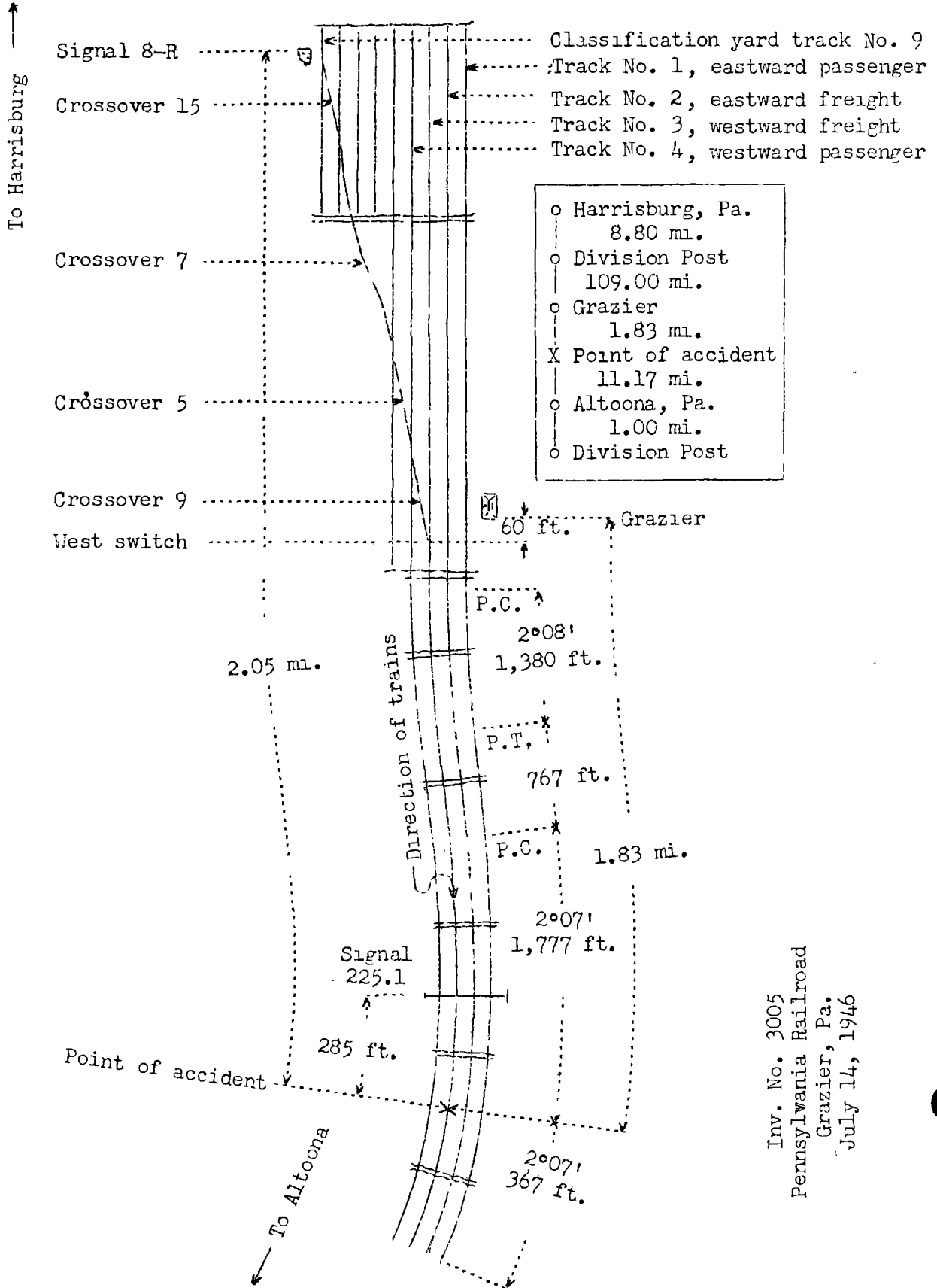
Accident near Grazier, Pa., on July 14, 1946, caused by
failure to operate the following train in accordance
with signal indications.

REPORT OF THE COMMISSION¹

PATTERSON, Commissioner:

On July 14, 1946, there was a rear-end collision between two passenger trains on the Pennsylvania Railroad near Grazier, Pa., which resulted in the injury of 201 passengers, 8 Pullman employees, 11 dining-car employees and 3 train-service employees.

¹Under 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.



Inv. No. 3005
 Pennsylvania Railroad
 Grazier, Pa.
 July 14, 1946

Location of Accident and Method of Operation

This accident occurred on that part of the Middle Division extending between Division Post, near Harrisburg, and Division Post, near Altoona, Pa., 123 miles, a four-track line in the vicinity of the point of accident. The main tracks from south to north are designated as No. 1, eastward freight, No. 2, eastward passenger, No. 3, westward passenger, and No. 4, westward freight. Trains moving with the current of traffic on tracks Nos. 1, 2, 3 and 4 are operated by automatic block-signal and cab-signal indications. At Grazier, 117.8 miles west of Harrisburg, the tracks of a freight classification yard parallel the main tracks on the north. West-bound movements from yard track No. 9 to main track No. 4 and thence to track No. 3 are made through crossovers 15, 7, 5 and 9, the switches of which are controlled from the tower at Grazier. The west switch of crossover 9 is 60 feet west of the tower. The accident occurred on track No. 3 at a point 1.83 miles west of the tower at Grazier. From the east on track No. 3 there are, in succession, a 2°08' curve to the left 1,380 feet in length, a tangent 767 feet, and a 2°07' curve to the right 1,777 feet to the point of accident and 367 feet westward. The grade is 0.40 percent ascending westward.

Home signal 8-R, which is a dwarf signal governing movements from yard track No. 9 to the main tracks, and automatic signal 225.1, governing west-bound movements on track No. 3, are, respectively, 2.05 miles and 285 feet east of the point of accident. These signals are of the position-light type. The cab signals are of the four-indication position-light type. The involved aspects and corresponding indications and names of these signals are as follows:

<u>Signal</u>	<u>Aspect</u>	<u>Indication</u>	<u>Name</u>
8-R and cab signal	Two white lights in diagonal position to the left	Proceed at Restricted speed.	Restricting.
Cab signal	Three white lights in diagonal position to the right	Proceed prepared to stop at next signal. * * *	Approach.
225.1	Three white lights in horizontal position over white marker	Stop; then proceed at Restricted speed.	Stop-and-proceed.

The controlling circuits are so arranged that when a west-bound train is occupying track No. 3 in the block extending between a point 1,466 feet west of signal 8-R and signal 225.1,

and the switches of crossovers 15, 7, 5 and 9 are lined for a west-bound movement to proceed from yard track No. 9 to main track No. 3, signal 8-R and the cab signals of a following train will display proceed-at-restricted-speed. When a west-bound train is occupying the block immediately west of signal 225.1, this signal will display stop-then-proceed and the cab signals of a following train occupying the block immediately east of signal 225.1 will display proceed-prepared-to-stop-at-next-signal until the engine of the following train passes signal 225.1, then the cab signals will display proceed-at-restricted-speed.

Operating rules read in part as follows:

DEFINITIONS

* * *

Cab Signal--A signal located in engineman's compartment or cab indicating a condition affecting the movement of a train or engine.

* * *

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.

15. TORPEDOES

The explosion of two torpedoes is a signal to proceed at Reduced speed. The explosion of one torpedo will indicate the same as two but the use of two is required.

* * *

35. The following signals will be used by flagmen:

Day signals--A red flag, torpedoes and fusees.

* * *

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 fuseses.

* * *

When conditions require, he will leave the torpedoes and a lighted fusee.

* * *

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 fuseses must be thrown off at proper intervals.

When day signals cannot be plainly seen, owing to weather or other conditions, night signals must also be used.

* * *

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.

296. Cab signal indications do not supersede fixed signal indications except when cab signal changes to a more restrictive or a more favorable indication after passing a fixed signal.

A train-communication system, known as a trainphone system, is in use on the division on which this accident occurred. This system is operated on the inductive two-channel principle, and equipment is provided for communication between employees at four wayside block stations and employees on trains. Where train equipment is provided, it is installed in the cabs of passenger-train engines, in cabooses and in the cabs of freight-train engines. Grazier is one of the equipped block stations.

In the vicinity of the point of accident, the maximum authorized speed for passenger trains on track No. 3 is 70 miles per hour.

Description of Accident

No. 39, a west-bound first-class passenger train, consisted of engine 359, two coaches, one passenger-baggage car, one coach, one Pullman sleeping car, one Pullman lounge car, six Pullman sleeping cars and one coach, in the order named. This train passed signal 8-R, which displayed proceed-at-restricted-speed, moved through crossovers 15, 7, 5, and 9, entered track No. 3, passed the tower at Grazier, the last open office, at 9:08 a. m., 7 hours 2 minutes late, and stopped about 9:15 a. m. at signal 225.1, which displayed stop-then-proceed. About 2 minutes later, after this train had moved westward and had attained a speed of about 10 miles per hour, the rear end was struck by No. 69 at a point 285 feet west of signal 225.1.

No. 69, a west-bound first-class passenger train, consisted of Diesel-electric units 5901 and 5900, coupled in multiple-unit control, two coaches, one passenger-baggage car, three coaches, one dining car, one Pullman lounge car and four Pullman sleeping cars, in the order named. This train passed signal 8-R, which displayed proceed-at-restricted-speed, moved through crossovers 15, 7, 5 and 9, entered track No. 3, passed the tower at Grazier at 9:14 a. m., 10 hours 40 minutes late, passed signal 225.1, which displayed stop-then-proceed, and while moving at a speed of 20 miles per hour, as indicated by the tape of the speed recorder with which Diesel-electric unit 5901 is equipped, it collided with No. 39.

The rear coupler of the rear car of No. 39 and the front coupler of the first Diesel-electric unit of No. 69 were broken. There was slight damage to several of the cars of each train.

The weather was clear at the time of the accident, which occurred about 9:17 a. m.

The engineer, the fireman and the flagman of No. 39 were injured.

Discussion

The investigation disclosed that, because of a derailment which had occurred about 65.4 miles east of Grazier at 9 p. m., July 13, a considerable number of passenger trains were being detoured via other portions of the railroad and had re-entered the Middle Division at Grazier. Nos. 39 and 69 had completed the detour movement a short time before the rear-end collision between these trains occurred.

About 9:15 a. m., July 14, No. 39 stopped at signal 225.1, which displayed stop-then-proceed, then proceeded westward on track No. 3 and had attained a speed of about 10 miles per hour when the rear end was struck by No. 69 at a point 285 feet west of signal 225.1.

Immediately preceding this accident, the route was lined at Grazier for a number of west-bound trains, including Nos. 39 and 69, to move from yard track 9, through crossovers 15, 7, 5 and 9, thence to main track No. 3. The most favorable indication that can be displayed by home signal 8-R, which governs west-bound movements using this route, is proceed-at-restricted-speed. No. 39 passed signal 8-R and entered track No. 3 at 9:08 a. m. Signal 8-R displayed proceed-at-restricted-speed for No. 39, and the cab signals on each side of the cab displayed the same indication. This train proceeded through the block, which extends from the westward limits of the interlocking, 1,466 feet west of home signal 8-R, to automatic signal 225.1, a distance of 1.72 miles. West-bound trains moving from yard track No. 9 to main track No. 3 are governed by the indication displayed by home signal 8-R until the train reaches automatic signal 225.1, unless the cab signals change to display an indication which is more favorable. As No. 39 moved through this block the cab signals continued to display proceed-at-restricted-speed and this train was operated in accordance with this indication. Automatic signal 225.1 displayed stop-then-proceed, and No. 39 stopped short of the signal, then the engineer sounded two short blasts on the engine whistle, and after a short interval No. 39 proceeded.

Under the flagging rule of this railroad, "full protection" in automatic block-signal territory consists of providing flag protection a distance sufficient only for stopping a following train which is being operated under a proceed-at-restricted-speed indication. A train operating under this indication must not exceed a speed of 15 miles per hour, and the train must be so operated that it can be stopped short of a preceding train or an obstruction. Throughout the movement of No. 39 the flagman was stationed on the rear platform of the rear car. The train was about 1,200 feet in length. Although this train was moving at restricted speed from Grazier to signal 225.1, in territory where the view was obscured by curves, hillside cuts and pole lines, he did not drop lighted fusees. Neither did he place torpedoes on the rail nor place a lighted fusee at the rear of his train when it stopped at signal 225.1. He said that, since the sun was shining and following trains were required to be operated in such manner that they could be stopped short of a preceding train, he did not consider it necessary to drop lighted fusees. He was not aware that the following train was closely approaching until he saw the engine moving on the curve a few hundred feet distant. Then he jumped from the rear

platform of the rear car and the collision occurred immediately afterward. The other members of the crew were not aware that anything was wrong until the brakes became applied in emergency as a result of the collision.

No. 69 passed signal 8-R, which displayed proceed-at-restricted-speed, entered track No. 3 and departed from Grazier at 9:14 a. m. The cab signal, which is located in the center of the front of the control compartment of Diesel-electric engine 5901, displayed proceed-at-restricted-speed during the movement of No. 69 through the interlocking limits at Grazier and throughout the block extending westward to signal 225.1. Both enginemen, a special-duty Diesel-engine instructor, and a machinist were in the front control compartment of the first Diesel-electric unit. The enginemen and the special-duty instructor understood that the indications displayed by signal 8-R and the cab signal required their train to be operated at a speed not in excess of 15 miles per hour and to be so controlled that the train could be stopped short of a preceding train. As No. 69 was approaching signal 225.1, the speed was 49 miles per hour, as indicated by the tape of the speed recorder with which engine 5901 is equipped. The employees on the engine said they did not think the speed of their train exceeded 35 miles per hour in this territory. However, they did not look at the speedometer during the time their train was moving from Grazier to the point where the collision occurred. The engineer said that when the engine was about 1,000 feet east of signal 225.1 he saw the rear end of the preceding train as it passed the signal. Then he moved the controlling lever to closed position and placed the brake valve in emergency position. The speed of No. 69 was about 20 miles per hour when the collision occurred. Analysis of the speed-recorder tape indicated that the speed of No. 69 was 49 miles per hour where the emergency application of the brakes became effective, at a point approximately 165 feet east of signal 225.1 and 450 feet east of the point of accident. The brakes of this train had been tested and had functioned properly en route. The employees who were on the engine of No. 69 said that they did not see the indication displayed by signal 225.1. Under the conditions present, this signal should have displayed stop-then-proceed-at-restricted-speed for No. 69, and in tests after the accident it functioned properly. The engineer of No. 69 said that he had reported for duty at 7:15 p. m., July 13, and, because of the detour via other portions of the railroad, had been on continuous duty 14 hours at the time of the accident. The employees who were assigned to pilot No. 69 over the territory involved in the detour movement were not qualified to operate Diesel-electric engines. Therefore, the engineer of No. 69 had operated the train a total of 261 miles when the accident occurred. Throughout most of this movement the tracks were not equipped for cab-signal operation, and the cab signals

displayed proceed-at-restricted-speed continuously. Also, the wayside signals for the most part displayed restrictive indications for the movement of his train, because other trains were moving via the same detour route. He was 69 years of age in February, 1946, and he said that, because of advanced age, long hours and mileage during the trip, constant strain in operating his train in unfamiliar territory under the directions of pilots, and fog conditions during the night, he became very tired and less vigilant in the performance of his duties. In addition, since the cab signals had displayed proceed-at-restricted-speed during a period of about 10 hours, the indication had lost significance. He said that on several occasions he had been criticized by officers of the railroad for losing time on the schedules of trains which he had operated in accordance with restrictive-signal indications. The fireman of No. 69 said that when he first observed the rear end of No. 39 he thought that train was moving on track No. 4, and he momentarily delayed his warning to the engineer. Then, when he did call a warning, the engineer had taken action to stop their train. The special-duty instructor said that after No. 69 departed from Grazier he was occupied in entering data in the performance log book and did not observe conditions ahead until the engine was a short distance to the rear of No. 39. He said that he applied the brakes in emergency, as the engineer did not seem to respond quickly enough under the circumstances. None of the employees on the engine of No. 69 heard or saw any flagging signals throughout a considerable distance immediately east of the point of accident. They first saw the flagman of No. 39 when he jumped from his train immediately prior to the collision. The engineer of No. 69 said if lighted fusees had been dropped between Grazier and signal 225.1, or had torpedoes and a lighted fusee been placed at the rear of No. 39 when that train stopped in the vicinity of signal 225.1, he would have been warned sufficiently to become alert and to take action in time to avert the accident. The flagman of No. 39 said that it is not the practice to drop lighted fusees from a moving train during daylight hours, nor to leave torpedoes and a lighted fusee at the rear of the train when it stops momentarily in compliance with a stop-then-proceed-at-restricted-speed indication.

At the time of the accident four wayside stations and a considerable number of engines and cabooses on this division were provided with trainphone equipment. The engine of No. 69 was not provided with this equipment, and the equipment provided on the engine of No. 39 was inoperative. However, had each train been provided with operative trainphone equipment, it probably would not have been used since both trains were moving in automatic block-signal territory under normal operating conditions. The employees of this division are instructed

that the trainphone system is required to be used in an emergency as a means to avert an accident.

Cause

It is found that this accident was caused by failure to operate the following train in accordance with signal indications.

Dated at Washington, D. C., this tenth day of September, 1946.

By the Commission, Commissioner Patterson.

(SEAL)

W. P. BARTEL,
Secretary.