Inv-2387

INTERSTATE COMMERCE COMMISSION

WASHINGTON

REPORT OF THE DIRECTOR

BUREAU OF SAFETY

ACCIDENT ON THE

PENNSYLVANIA RAILROAD

PHILADELPHIA, PA.

OCTOBER 13, 1939

INVESTIGATION NO. 2387

SUMMARY

Inv-2387

Railroad:	Pennsylvania	
Date:	October 13, 1939	
Location:	Philadelphia, Pa.	
Kind of accident:	Side collision	
Trains involved:	Freight	: Passenger
Trains numbers:	PT-56	: 76
Engine numbers:	1785	: 4873
Consist:	22 cars and caboose	: 10 cars
Speed:	5-10 m. p. h.	: 30 m. p. h.
Operation:	Interlocking	: Interlocking and cab-signals
Track:	Double; 8°30' curve to right; 0.2 percent descending grade	: Double; tangent; : 1.76 percent : ascending grade
Weather:	Clear	
Time:	6:21 a. m.	
Casualties:	5 injured	
Cause:	Failure to operate PT-56 in accordance with interlocking signal indications.	

December 26, 1939.

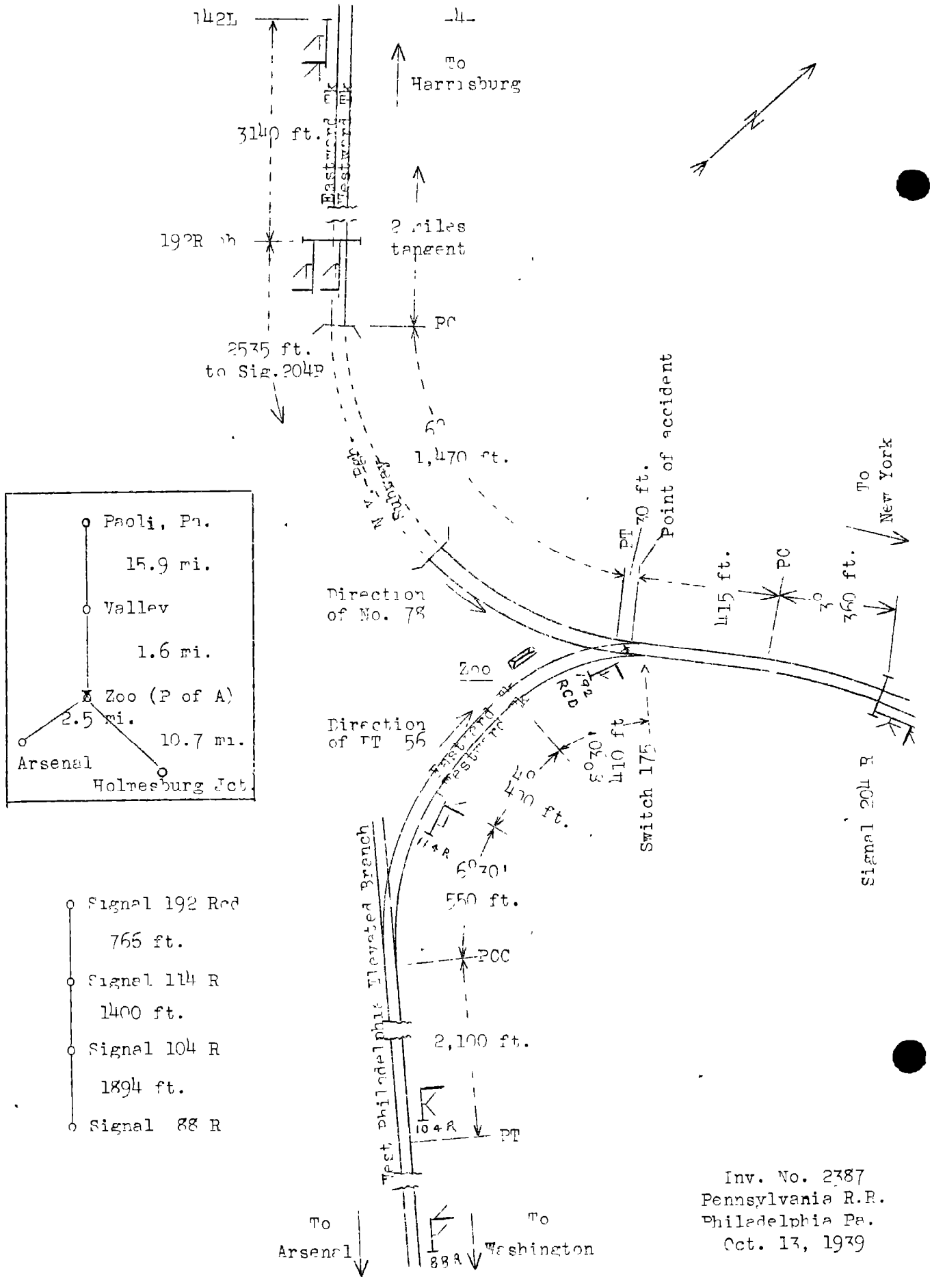
To the Commission:

On October 13, 1939, there was a side collision between a freight train and a passenger train on the Pennsylvania Railroad at Philadelphia, Pa., which resulted in the injury of five dining-car employees.

Location and Method of Operation

This accident occurred within the limits of Zoo interlocking, at the junction of that part of the Philadelphia Terminal Division, hereinafter referred to as the main line, which extends between Paoli and Holmesburg Junction, Pa., a distance of 28.2 miles, and the West Philadelphia Elevated Branch, hereinafter referred to as the branch, which extends between Brill and Zoo, a distance of 4.5 miles. Both are double-track lines and are equipped with overhead catenary systems. Trains on the main line are operated by timetable, train orders and an automatic block and cab-signal system, while those on the branch are operated by timetable, train orders and an automatic block system. The accident occurred at the fouling point of the junction switch, which is at a point approximately 200 feet east of Zoo interlocking tower. Approaching this point from the west on the main line, there are, successively, a tangent more than 2 miles long, a 6° curve to the left 1,470 feet in length, and a tangent extending 30 feet to the point of accident and 385 feet beyond; the grade for east-bound trains is descending 0.9 percent a distance of more than 2 miles, 1.5 percent descending for 825 feet, and 1.76 percent ascending for 375 feet to the point of accident. Approaching on the branch line, there is a tangent 2,100 feet in length, which is followed by a compound curve to the right consisting in succession of 550 feet of 6°30' curvature, 400 feet of 4° curvature, and 365 feet of 8°30' curvature, which extends to the point of accident and 45 feet beyond; the grade for west-bound trains is successively 0.7 percent ascending for 900 feet, 0.4 percent of 500 feet, and 0.2 percent descending 891 feet to the point of accident.

The interlocking machine at Zoo is of the electro-pneumatic type and consists of 142 working levers; it is equipped with approach or time locking on all routes and advance locking for all switches. Time releases are of the clockwork type. All movements through the plant are controlled by signal indications. A model board, which indicates track occupancy, direction of traffic, and position of signals, is provided.



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Pennsylvania R.R.
Philadelphia Pa.
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The signals involved, governing eastward movements on the main line, are interlocking signals 142L and 192Rab, located, respectively, 4,940 feet and 1,800 feet west of the point of accident. Interlocking signal 204R, governing eastward main-line movements, is located 745 feet east of the point of accident. The signals involved on the branch are interlocking signals 88R, 104R, 114R, and 192Rcd located, respectively, 4,184 feet, 2,291 feet, 891 feet, and 125 feet east of the point of accident. These signals are of the two-unit position-light type; the indications and names involved are as follows:

Indication	Name
Stop	: Stop-signal
Proceed prepared to stop at next signal. Within interlocking limits, a train must not exceed 15 miles per hour.	: Slow-speed-signal
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
Approach next signal at not exceeding one-half the speed authorized for passenger trains at next signal but not exceeding 30 miles per hour.	: Approach-restricting-signal
Proceed. Within interlocking limits, a train must not exceed one-half the speed authorized for passenger trains, but not exceeding 30 miles per hour.	: Clear-restricting-signal

When the route is set for an eastward movement on the main line and signal 204R is displaying a clear-restricting indication, signals 192Rab and 142L display clear-restricting indications; under these conditions the most favorable indications that can be displayed in the immediate vicinity on the branch are a stop indication at signal 192Rcd, and an approach indication at signal 114R.

Rule 34 of the book of operating rules provides as follows:

Immediately upon seeing a Fixed-signal affecting the movement of their train, the engineman and fireman must, and when practicable the trainmen will, call its indication by name to each other.

Rule No. 4 of the timetable reads as follows:

When cab-signal and fixed-signal aspects conflict, the more restrictive indication governs.

Rules Nos. 5 and 5a of the timetable read as follows:

5. Unless otherwise directed by the Superintendent, a non-equipped train moving on a track equipped for cab-signal operation in the direction in which it is moving must not exceed speed as follows:
Trains other than passenger trains 22½ miles per hour.
Passenger trains 35 miles per hour.

5a. Approved exceptions authorized:
Yard Engines or Runner Engines with or without cars. * * * .

The maximum authorized speed for all trains at the point of accident is 35 miles per hour, except that trains not equipped with cab-signals are restricted to 22½ miles per hour.

It was daylight and the weather was clear at the time of the accident, which occurred at 6:21 a. m.

Description

No. 78, an east-bound passenger train, consisted of one passenger-baggage car, one coach, one Pullman sleeping car, one dining car, one lounge car and five Pullman sleeping cars, in the order named, all of steel construction, hauled by electric engine 4873, and was in charge of Conductor Taylor and Engineman Buck. This train departed from Paoli, 17.5 miles west of Zoo, at 6:02 a. m., according to the train sheet, on time, passed Valley, 1.6 miles west of Zoo, at 6:18 a. m., passed signals 142L and 192Rab displaying clear-restricting indications and approach-restricting cab-signal indications being displayed, and was side-swiped by PT-56 at the fouling point of the junction switch of the branch, while moving at a speed of approximately 30 miles per hour.

PT-56, a west-bound freight train, consisted of 19 loaded and 3 empty cars, hauled by steam engine 1785, a yard engine not equipped with cab-signals, and was in charge of Conductor Blakely and Engineman Baker. This train, operating on the branch, departed from Arsenal, 2.5 miles east of Zoo, at 6:11 a. m., on the westward track, passed signal 86R displaying an approach indication, passed signal 104R displaying a slow-speed indication, passed signal 114R displaying an approach indication, passed signal 192Rcd displaying a stop indication, and while moving at a speed between 5 and 10 miles per hour struck the side of No. 78.

The left front corner of engine 1785 struck No. 78 between the first and second cars. The second car was derailed and stopped upright at a point approximately 300 feet east of the point of collision, with the east truck in line with the eastward track and the west truck fouling the westward track; the right side was badly damaged. The remainder of the train broke away from the second car, struck the left rear corner of the cab of engine 1785, and stopped about 35 feet to the rear of the second car. The third and fourth cars stopped practically in line with the track, with all trucks derailed and both cars leaning at an angle of about 15 degrees to the left; the front vestibules of these cars were badly crushed and the side sheets on the right side were scraped. The fifth car stopped upright and in line with the track, with the east truck derailed; the east end was slightly damaged on the right side. Engine 1785 stopped at the fouling point of the switch, with its left side leaning against the fifth car of No. 78, but was not derailed. The bumper and the left side of the engine and cab were badly damaged.

Summary of Evidence

Engineman Buck, of No. 78, stated that his train left Paoli on time. Approaching Zoo interlocking his train was being operated under a clear signal indication. Signal 142L, at the entrance to Zoo interlocking limits, was displaying a clear-restricting indication and signal 192Rcb also was displaying a clear-restricting indication. After the train passed signal 142L the cab-signal changed to display an approach-restricting indication and retained that indication until after the accident. He maintained a speed of 30 to 35 miles per hour to the point of accident. When passing the junction switch he observed a freight train approaching on the branch. After his engine passed the switch he looked back and observed that the freight train was not stopping, whereupon he immediately placed the brake valve in emergency position and then his train was struck.

Fireman Powers, of No. 78, corroborated the statement of Engineman Buck in all essential details.

Conductor Taylor, of No. 78, stated that he was just entering the rear end of the fifth car when he felt a slight bump followed immediately by a heavier bump; before he could get to the emergency cord the train had stopped. He said that the accident occurred at 6:25 a. m.

Baggageman Riley and Flagman Geiter, of No. 78, added nothing of importance to the statement of Conductor Taylor.

Engineman Baker, of PT-56, stated that his train originated at Pay Yard, about 9 miles east of Zoo. He went on duty at 2 a. m. and had been off duty 3 days prior to this time. After leaving Pay Yard at 4:20 a. m., his train proceeded to Arsenal where they set off and picked up cars at Grays Ferry yard and when ready to depart their train consisted of 19 loaded and 5 empty cars. A terminal test of the air brakes was made and the train left Arsenal about 6 a. m. When entering Zoo interlocking limits, signal 88R displayed an approach indication, signal 104R a slow-speed indication, and signal 114R an approach indication. The fireman was working on the fire when passing these signals but the conductor and the brakeman were on the seat-box on the left side of the engine and they called the indications of signals 88R and 104R. He had called the indication of signal 114R, and it was repeated. Somewhere between signals 104R and 114R he had started to use steam and was still working the engine when the conductor and the brakeman called to him that the towermen were shouting and waving stop signals, at which time his engine was about opposite signal 192Rcd. When the conductor called the warning to stop, Engineman Baker looked across the left side of the engine, observed No. 78 approaching, immediately closed the throttle, and placed the brake valve in emergency position, at which time the speed of his train was about 15 miles per hour. During the investigation he was unable to account for his failure to see the stop indication of signal 192Rcd, but in a subsequent statement he said that after rehearsing the occurrence many times he reached the conclusion that he dozed off momentarily or for the few seconds necessary for the accident to occur. The brakes responded satisfactorily to the emergency application and his train was nearly stopped when the front end of the engine sideswiped No. 78. He said that the sun was shining and his cab window was open. He was familiar with the territory involved and on previous occasions when in charge of trains had been stopped at signal 192Rcd.

Fireman Brown, of PT-56, stated that he observed signal 104R and called the slow-speed indication which it displayed. After passing this signal he started to work on the fire. The engineman called the approach indication of signal 114R, which was repeated by the conductor and the brakeman who were on the seat-box on the left side of the engine. He was still busy with the fire when approaching signal 192Rcd and did not hear anyone on the engine call its indication. At this time the engineman was using the right-hand injector and had his hand on the throttle, which was open. When opposite Zoo tower he heard the towermen shouting to stop, which caused him to look up, and he observed No. 78 approaching on the main line. He immediately got off the right side of the engine and while doing so observed the engineman place the brake valve in emergency position, at which time the speed of his train was about 20 miles per hour.

Conductor Blakely, of PT-56, stated that when leaving Grays Ferry yard his train consisted of 19 loaded and 3 empty cars. An air-brake test was made at that point and the train departed about 6:07 a. m. He and the brakeman were on the left seat-box of the engine cab when entering Zoo interlocking limits; signal 88R displayed an approach indication and signal 104R a slow-speed indication, both of which he called and the engineman repeated. The engineman called an approach indication for signal 114-R which he and the brakeman repeated, but he could not see this signal because of track curvature. When repeating the indication of this signal he observed that the engineman was looking ahead and had his hand on the throttle, which was open. He was on the lookout for yarding instructions, which were usually transmitted by a megaphone from Zoo tower, and took no action to ascertain the indication of signal 192Rcd, nor did he hear the indication of this signal called by anyone on the engine. The towermen were waving stop signals and shouting, and at the same time he observed No. 78 approaching on the main line; he called to the engineman to stop, and then jumped off after observing the engineman place the brake valve in emergency position; it was his opinion that the speed of his train was 15 to 20 miles per hour at that time. The engineman appeared to be normal in every respect.

The statements of Front Brakeman Scott and Flagman Friel, of PT-56, brought out nothing additional of importance.

Train Director Tarr, on duty at Zoo interlocking, stated that the route had been set for No. 78, through on the main line, approximately 5 minutes in advance of the time that train was due at Zoo, and about the same time the route was set for PT-56 on the branch as far as signal 192Rcd. After PT-56 had passed signal 114R he observed that the engine was still working steam and realizing the speed was too high for the train to stop at signal 192Rcd, he raised the window and attempted to draw the crew's attention to the stop indication of signal 192Rcd by shouting and by waving hand signals to stop. He also ordered the assistant train director to sound a stop signal on the emergency whistle, which was done. He observed that after engine 1785 passed signal 192Rcd steam was shut off. He believed that the speed of the train was reduced somewhat before it struck No. 78. He had made a check of the model board before the accident and of the machine after the accident and all switches and signals were set properly for the intended routes.

Assistant Train Director Duff, on duty at Zoo, stated that the engine of PT-56 was approaching the tower, at a point about 30 yards distant, when the train director remarked that the speed was too high for the train to stop at signal 192Rcd. The train director gave stop signals from the window and ordered Duff to sound the emergency whistle, which he sounded immediately and continued to sound until after the collision occurred. When engine 1785 was passing the tower he observed that there were two men at the left cab window, which was open.

Leverman Williams, on duty at Zoo, stated that when instructed to do so by the train director he set the route for No. 78 through the interlocking about 5 minutes ahead of the schedule time of that train. He had no jurisdiction over that part of the machine controlling trains approaching the junction from the branch until signal 192Rcd was reached. No. 78 had tripped signal 192Rab and he was restoring lever 192 to its normal position when the train director remarked that PT-56 was not stopping. He then went to a window other than that used by the train director and waved stop signals, which he thought the crew understood because after that the train seemed to slacken speed. He immediately left the window to see if it were possible to stop No. 78, but there was nothing further he could do to prevent the accident.

Leverman McCusker, on duty at Zoo, stated that he had charge of that part of the machine controlling trains approaching from the branch up to signal 192Rcd. About 2 minutes after calling for the route to be set for No. 78, the train director called for the route to be set for PT-56 as far as signal 192Rcd which he

lined accordingly. He exchanged remarks with the train director concerning the high rate of speed at which PT-56 was moving when it passed signal 114R. When engine 1785 was about opposite the tower he and the train director waved stop signals from a window to two men at the left cab window of the engine. In his opinion the train was moving at a speed of 15 miles per hour when the engine was opposite the tower, and about 8 miles per hour at the time of collision.

Signal Maintainer Coxon, on duty at Zoo, stated that he was on the first floor of the tower when the accident occurred. He went upstairs immediately and observed that switch lever No. 175 was in its normal position, which was the proper position for the route intended for No. 78; this lever controls the position of the switch at the junction between the main line and the branch. He then went to the ground and observed that signal 192Rcd was displaying a stop indication.

Observations of the Commission's Inspectors

Observations of the Commission's inspectors disclosed that signal 114R on the branch could first be seen from the right side of the cab of a west-bound engine at a point approximately 1,400 feet east of that signal and it remained in clear view from the right side of the cab until the signal was reached. Immediately after passing signal 114R, signal 192Rcd could be seen from the right side of an engine and it remained in clear view the entire distance from signal 114R to signal 192Rcd, which was approximately 766 feet. Tests made after the accident revealed that all signals involved were working properly.

Discussion

The evidence indicates that the route was set for No. 78 to proceed through Zoo interlocking; about the same time the route was set for PT-56 to proceed on the branch as far as signal 192Rcd which is located at the junction with the main line, and it was intended to hold PT-56 at this signal until No. 78 had passed. PT-56 entered Zoo interlocking limits at signal 88R; the distance from that signal to signal 192Rcd is 4,060 feet. Within that distance, four signals were encountered, namely, 88R, 104R, 114R, and 192Rcd. The evidence is to the effect that the crew of PT-56 observed and obeyed signals 88R and 104R. Signal 114R was seen and called by the engineman as displaying an approach indication, which required his train to approach the next signal prepared to stop. The distance between signals 114R and 192Rcd is 766 feet. This train passed signal 192Rcd, which was displaying a stop indication, and struck No. 78. The brakes had functioned properly en route and the signals were functioning

normally. The engineman stated that he must have dozed off momentarily at some point between these two signals and for that reason did not comply with the indication of signal 114R, which resulted in his train over-running signal 192Red. The engineman had been on duty 4 hours 21 minutes at the time of the accident and prior to this tour of duty he had been off duty 7 days.

Rule 34 provided that upon seeing a fixed signal affecting the movement of their train the engineman, fireman, and trainmen, should call its indication to each other. Signals 114R and 192Red could be seen from only the right side of the engine of PT-56. Approaching signal 192Red, the fireman was working on the fire; the conductor and the brakeman, who were on the left seat-box of the engine, were on the lookout for yarding instructions from the towermen at Zoo, instead of observing signal indications, and were depending upon their engineman to observe the indication of signal 192Red, which resulted in the indication of that signal not being called by any member of the crew. The towermen at Zoo observed that the engine of PT-56 was still working steam after it passed signal 114R and they gave stop signals from the windows of the tower, whereupon the conductor called to the engineman to stop. The towermen were unable to stop No. 78 as that train had already passed signal 192Rab, the last signal before reaching the junction switch.

The investigation disclosed that No. 78 was exceeding the maximum authorized speed under a clear-restricting signal indication but it does not appear that this had any direct bearing on the cause of the accident.

Conclusion

This accident was caused by the failure to operate PT-56 in accordance with interlocking signal indications.

Respectfully submitted,

S. N. MILLS

Director.