

INTERSTATE COMMERCE COMMISSION  
WASHINGTON

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INVESTIGATION NO. 2473  
THE PENNSYLVANIA RAILROAD COMPANY  
REPORT IN RE ACCIDENT  
AT MIAMI CROSSING, OHIO, ON  
JANUARY 7, 1941

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SUMMARY

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Railroad: Pennsylvania  
Date: January 7, 1941  
Location: Miami Crossing, Ohio  
Kind of accident: Derailment  
Train involved: Passenger  
Train number: 6  
Engine numbers: 5494-5487  
Consist: 11 cars  
Speed: 30-40 m. p. h.  
Operation: Interlocking  
Track: Double; tangent; 0.51 percent  
descending grade eastward  
Weather: Clear  
Time: 11:24 a. m.  
Casualties: 1 killed; 1 injured  
Cause: Accident caused by failure properly  
to control speed of train in com-  
pliance with interlocking signal  
indications

INTERSTATE COMMERCE COMMISSION

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INVESTIGATION NO. 2478

IN THE MATTER OF MAKING ACCIDENT INVESTIGATION REPORTS  
UNDER THE ACCIDENT REPORTS ACT OF MAY 3, 1910.

THE PENNSYLVANIA RAILROAD COMPANY

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March 12, 1941

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Accident at Miami Crossing, Ohio, on January 7, 1941,  
caused by failure properly to control speed of train  
in compliance with interlocking signal indications.

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

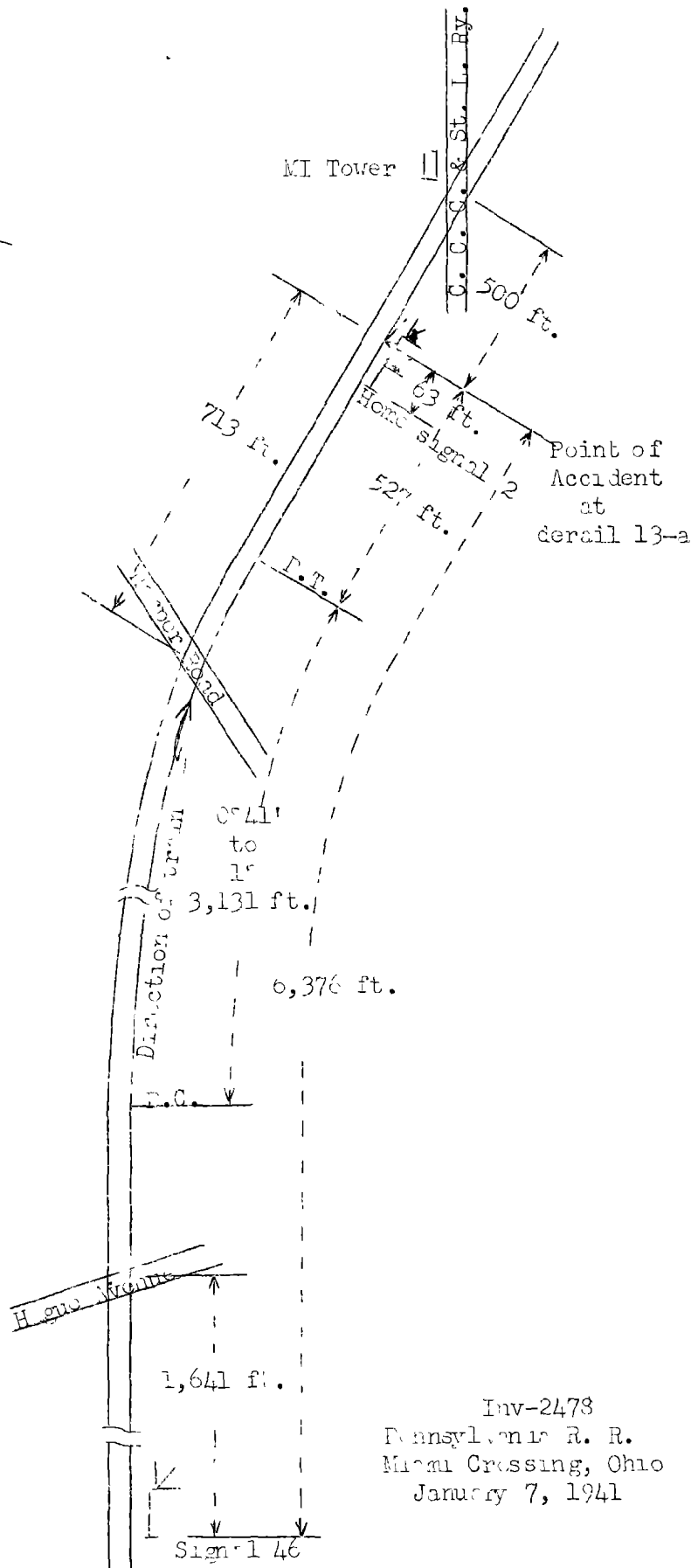
PATTERSON, Commissioner:

On January 7, 1941, there was a derailment of a passenger train on the Pennsylvania Railroad at Miami Crossing, Columbus, Ohio, which resulted in the death of one employee and the injury of one employee. This accident was investigated in conjunction with a representative of the Public Utilities Commission of Ohio.

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<sup>1</sup>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 Columbus, Ohio. 3.4 mi.
- o Miami Crossing
- X Point of accident 4.8 mi.
- o Alton 16.8 mi.
- o London 29.8 mi.
- o Xenia, Ohio



Inv-2478  
 Pennsylvania R. R.  
 Miami Crossing, Ohio  
 January 7, 1941

### Location and Method of Operation

This accident occurred on that part of the Columbus Division which extends between Xenia and Columbus, Ohio, a distance of 54.8 miles. In the vicinity of the point of accident this is a double-track line over which trains are operated by an automatic block-signal system, the indications of which supersede time-table superiority. At Miami Crossing, a double-track line of the Cleveland, Cincinnati, Chicago & St. Louis Railway, hereinafter referred to as the C. C. C. & St. L. Ry., crosses the tracks of the Pennsylvania Railroad at an angle of  $27^{\circ}47'$ . This crossing is protected by an interlocking which is controlled from MI Tower, located in the northwest angle of the crossing. The interlocking is maintained and operated by the C. C. C. & St. L. Ry. The accident occurred within interlocking limits on the eastward main track at a split switch-point derail, 500 feet west of the crossing. As the point of accident is approached from the west there are, in succession, a tangent about 3 miles in length, a compound curve to the right consisting of a spiral 186 feet in length, a  $0^{\circ}41'$  curve 837 feet, a spiral 155 feet, a  $1^{\circ}$  curve 1,736 feet and a spiral 217 feet, and a tangent 527 feet to the point of accident and some distance beyond. The grade for east-bound trains varies from 0.51 to 0.79 percent descending a distance of 9,500 feet to the point of accident, at which point it is 0.51 percent.

The interlocking machine is of the electro-mechanical type. The mechanical machine consists of 21 working levers in a 40-lever frame, and the electrical portion consists of 8 working levers. The mechanical levers operate 8 derails, 2 crossovers, and 6 facing-point locks, and also control 6 signals on the Pennsylvania; the electric levers control the home signals on the C. C. C. & St. L. Ry. and operate in connection with the electric switch-locking and the indication locking of the mechanical switch and lock movements operating the derails and switches on the Pennsylvania. Approach locking and electric switch-locking are provided throughout the interlocking. Time releases in connection with approach locking are provided; the time release for the approach locking on the Pennsylvania eastward track is set for 4 minutes 48 seconds.

Approach signal 46 and home signal 2 governing east-bound movements on the eastward main track of the Pennsylvania are located, respectively, 6,376 feet and 63 feet west of the point of accident. Derail 13-a, a split switch-point derail, is located 63 feet east of home signal 2. Signal 46 is of the automatic, single-arm, upper quadrant, semaphore type; its normal indication is approach. Signal 2 is of the semi-automatic, 2-arm, upper quadrant, semaphore type; its normal

indication is stop. The involved aspects, indications, and names of these signals, and numbers of corresponding rules are as follows:

<u>Signal</u>	<u>Day Aspect</u>	<u>Indication</u>	<u>Name</u>	<u>Rule</u>
46	45 degree	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	283 modified
2	Both arms horizontal	Stop	Stop Signal	275

An audible approach-indicator, located in MI Tower, gives information of the approach of a Pennsylvania train on the eastward main track from a point 18,668 feet west of home signal 2. A visual approach-indicator is illuminated when a train enters the approach section 9,418 feet west of home signal 2.

Rules of the operating department read as follows:

34. 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.

Special time-table instructions read as follows:

D1102 Rule 34- In calling signals, the name as it appears in the Book of Rules shall be used, omitting the word "signal," except Rule 275.

The maximum authorized speed for east-bound passenger trains passing signal No. 46 is 50 miles per hour.

The wind was blowing from the north and the weather was clear at the time of the accident, which occurred at 11:24 a. m.

#### Description

No. 6, an east-bound first-class passenger train, with Conductor Bailey and Enginemen Van Cleaf and Cooper in charge, consisted of engines 5494 and 5487, both of the 4-6-2 type,

four baggage cars, three mail cars, one passenger-baggage car, one coach, one Pullman sleeping car, and one dining car, in the order named; all cars were of steel construction. This train departed from Indianapolis, Ind., 177.2 miles west of Miami Crossing, at 6:55 a. m., according to the train sheet, 15 minutes late, left London, 21.6 miles west of Miami Crossing and the last open office, at 11:04 a. m., on time, passed signal 46, which was displaying an approach indication, at a speed estimated between 40 and 50 miles per hour, passed signal 2, which was displaying a stop indication, and, while moving at a speed estimated to have been between 30 and 40 miles per hour, was derailed at derail 13-a.

Both engines and the first four cars were derailed to the right. The first engine stopped with the front end about 77 feet west of the center of the crossing; this engine and tender and the second engine were upright on the ties. The tender of the second engine and the first three cars stopped off the roadbed, parallel to the track, and leaned to the right at angles of 20 to 25 degrees. The front truck of the fourth car was derailed to the right and the rear truck stopped on the derail.

The employee killed was the fireman of the first engine and the employee injured was the engineman of the first engine.

#### Summary of Evidence

Engineman Van Cleaf, of the first engine, stated that at Indianapolis a terminal air-brake test was made and the brakes functioned properly at all points where used en route. Brake-pipe pressure of 110 pounds was maintained. The weather was clear, but wind from the north blew smoke and exhaust steam along the right side of the cab and obscured his view ahead. After the train left Alton, 4.8 miles west of Miami Crossing, he told the fireman that he could not see the signals and was depending on him to observe them and to call their indications. The engineman said that he did not see signal 46. He determined the location of his train by looking across the cab and watching for landmarks on the left side. As his train passed Wilson Road, 3,000 feet west of signal 46, he asked the fireman what indication that signal was displaying and the fireman answered "clear." The engineman asked a second time and the fireman again replied "clear." The engineman said that he and the fireman were on their respective sides of the cab and were maintaining a lookout ahead. The smoke and steam did not lift and the engineman could not see the signal. He reduced the speed of his train, which passed signal 46 at a speed of between

40 and 50 miles per hour, then released the brakes. The train was moving at a speed of about 45 miles per hour as it rounded the curve west of signal 2. The smoke lifted momentarily as the engine crossed Harper Road, about 650 feet west of signal 2; at that instant he saw a C. C. C. & St. L. Ry. west-bound train opposite the tower and about to enter the crossing and, at the same time, he saw home signal 2 displaying a stop indication. He immediately applied the air brakes in emergency and jumped off about 42 feet west of the home signal. The speed of his train was about 40 miles per hour when the engine entered the derail. Apparently the fireman saw the train and the stop signal at the same time, as he also jumped off; however, neither had time to say anything about signal 2. The engineman said that the fireman had frequently fired for him; he was a promoted man, and had had over 20 years of service. The engineman considered the fireman reliable in observing and correctly calling signal indications. Because the type of engine involved is prone to trail steam and smoke so that the view ahead is obscured for a considerable distance under certain conditions of weather, it is necessary to depend on the fireman to observe and to call signal indications. The engineman said that in view of the speed of his train and a considerable number of highway crossings in that vicinity he did not consider it safe practice to leave his usual position and to cross to the left side of the cab to observe signal 46. He said that under favorable conditions signal 46 could be seen about 3/4 mile.

Engineman Cooper, of the second engine, stated that because of trailing smoke and exhaust steam he did not see the indications of the automatic signals throughout the trip until after the first engine had passed them. Neither he nor his fireman saw the indication of signal 46. As his train was approaching signal 46 the speed was 70 miles per hour, the throttle on his engine was closed and the engineman of the first engine made a service application of the brakes, which reduced the speed to between 45 and 50 miles per hour in the vicinity of signal 46. The second engineman was unable to identify his location. He thought the first engineman released the brakes in the vicinity of Regue Avenue, which is 1,641 feet east of signal 46. At Harper Road the speed was between 35 and 40 miles per hour when the air brakes were applied in emergency and the speed was reduced to about 30 miles per hour when the first engine entered the derail. Engineman Cooper did not see the engineman of the first engine jump off, nor did he see the home signal until after the accident occurred. Subsequent to the accident he entered the cab of the first engine and observed that the throttle was closed, the reverse lever was in position for forward motion, and the automatic brake valve was in emer-



gency position. He said that on a clear day, if there was no smoke to obstruct the view, signal 46 could be seen a distance of 3/4 mile.

Fireman Murray, of the second engine, stated that the only signal indication he had seen en route was at West Jefferson, 11.4 miles west of Miami Crossing. As his train was approaching the point where the accident occurred the speed was about 60 miles per hour. The throttle was closed, and the blower was turned on but it was not effective in lifting the smoke and, as a result, he was unable to see either signal 46 or signal 2. The rules require that members of the crew on the second engine observe and call signal indications but it is rarely possible to see signal indications from the second engine. As his train approached signal 46 he leaned out the window but on account of trailing smoke and steam from both engines he was unable to see it; the engineman of the first engine made a service brake application, which reduced the speed to 50 miles per hour in the vicinity of signal 46. Just before the train started to round the curve west of Miami Crossing the brakes were released and the speed was between 30 and 35 miles per hour. He was unaware of anything being wrong until the brakes were applied in emergency about 650 feet west of the point where the accident occurred and he saw the fireman of the first engine jump off. Fireman Murray stated that under favorable conditions signal 46 can be seen a distance of 1-1/2 or 2 miles.

Conductor Bailey stated that as his train approached Miami Crossing he felt a service application of the air brakes, which reduced the speed to about 40 miles per hour. Soon afterward the brakes were applied in emergency and the train stopped abruptly at 11:24 a. m. He is assigned regularly as conductor on No. 6 and has observed that frequently signals at Miami Crossing display restrictive indications, because a train on the C. C. C. & St. L. Ry. is due at Miami Crossing about the same time as No. 6. In several instances No. 6 has stopped at that point.

The statement of Front Brakeman Allison added nothing of importance.

Flagman Harrison stated that when his train stopped he proceeded back to provide flag protection and observed signal 46 displaying stop; later, when his train was moved away, he observed that signal 46 displayed an approach indication.

Trainmaster Streett, who was on No. 6 at the time of the accident, stated that as the train approached signal 46 he felt an application of the air brakes, which reduced the speed from

30 to about 45 miles per hour, then the brakes were released. Soon afterward he felt an emergency application, which was followed by several surges. The train stopped at 11:24 a. m.

Road Foreman of Engines Berdelman, who was in the ninth car of No. 6 at the time of the accident, stated that at Dayton he talked with the members of both engine crews and they appeared to be in normal condition. When the train was about 3/4 mile west of signal 46, he felt a service application of the air brakes, which reduced the speed to about 45 miles per hour, then the brakes were released. The speed was between 45 and 50 miles per hour in the vicinity of Harper Road and he felt an emergency application of the brakes. At the time of the derailment the speed was 50 or 35 miles per hour. Subsequent to the accident he found the blower valve of the first engine fully open, the automatic brake-valve in emergency position and the throttle closed; the double-heading cock of the second engine was closed and the automatic brake-valve was in running position. He stated that when visibility is good the night aspect of signal 46 can be seen a distance of 3 or 4 miles but on a dark or hazy day it is difficult to see it clearly a distance of more than about 1,000 feet. Because of track curvature the view of signal 2 from the right side of an east-bound engine is restricted to about 1,348 feet. He stated that the blowers on engines of the type involved do not lift the smoke efficiently when the throttle is closed or eased to drifting position; however, the Pennsylvania Railroad is experimenting with devices to lift the smoke over the cab. An engineman can cause the smoke to be lifted by applying the brakes and opening the throttle. He said that Rule 34 does not require both the engineman and the fireman to observe signal indications under all conditions but that a signal indication must be called by name by the one who observes it and the other must reply; however, if practicable, both should observe signal indications. He had often observed that the fireman of the first engine of the train involved was alert and called signal indications clearly and distinctly.

Operator-Leverman Rowland, of the C. C. C. & St. L. Ry. at Miami Crossing, stated that at 11:21 a. m. he lined the route for C. C. C. & St. L. No. 121, a west-bound passenger train, and he observed that home signal 2 displayed stop. The annunciator bell in his tower indicated that No. 6 entered the approach circuit at the same time he lined the route. When he saw No. 6 rounding the curve it was moving about 40 miles per hour. The rear end of the C. C. C. & St. L. Ry. train cleared the crossing about 11:24:30 a. m., at which time No. 6 became derailed. He said that he does not change a route after

he has lined it for a movement. After a train has entered its approach circuit the route cannot be changed except by operating the time release.

Engineman Keleher, of No. 206, which was due at Miami Crossing at 11:38 a. m., stated that the weather was fair but a strong wind from the north caused the smoke to trail down on the right side of his engine; the view ahead was obscured. He did not see the indication of signal 70, the first signal west of signal 46, but the fireman called its indication as approach and the engineman reduced speed to between 40 and 45 miles per hour. The engine in his charge was of the same type as those involved in the accident. The blowers on this type of engine are not effective in lifting smoke and exhaust steam above the cab when a train is moving at a high rate of speed. Because his train was moving only 40 miles per hour when it was approaching Miami Crossing, the smoke and steam were lifted so that he could see the indication displayed by signal 46. When the smoke and the exhaust steam trail along the right side of the engine cab, he depends on the fireman to observe and to call signal indications; however, when doubtful the engineman crosses to the left side of the cab to observe the signal himself. He understood that under Rule 34 both the engineman and the fireman must see and call signal indications. He understood that the maximum authorized speed from signal 46 to Miami Crossing is 50 miles per hour.

Fireman Grandin, of No. 206, stated that signal 2 cannot be seen from the left side of an engine until the engine has passed Harper Road. It is customary for a fireman to cross to the right side to observe signals at points where the view from the left side is obscured by curvature; however, this is not done on the engine of a train approaching Miami Crossing, because a fireman is required to remain on the left seatbox until after the engine has passed over the highway crossing.

Engineman Hoog stated that he frequently operates an engine of the type involved. The condition which results in obscuring the view ahead is not particularly trailing smoke but more often it is trailing exhaust steam. The type of blowers provided do not produce draft sufficiently strong to lift the trailing smoke and steam above the cab.

Master Mechanic Porter stated that numerous complaints have been made by Pennsylvania enginemen with regard to blowers provided on engines of the type involved failing properly to raise trailing smoke and steam above the cab while such engines are being operated at high speed with a closed or a drifting

throttle. The blower is of the ring type, is located in the base of the lift pipe, and is operated by a quick-action valve located in a 1-1/4-inch blower pipe; however, the valve has an area of only 0.563 square inch. The blower ring is provided with seven 5/16-inch holes, which are slanted inward toward the center of the stack at a ratio of one to four. When the valve is open a jet of steam is projected upward in the center of the stack and this results in a forced draft. He said that it is not practicable to develop, by means of a blower, stack velocity sufficient to overcome the effect of strong cross or head winds; however, the railroad is conducting experiments on this type of engine with wind deflectors built around the stack and with a wind deflector on the front of the smoke-box; also, observation is being made of the effect produced by covering engines with shrouding.

Assistant Enginehouse Foreman Dalton stated that subsequent to the accident he tested the air-brake equipment on engines 5494 and 5487. All devices performed their functions properly.

Assistant Car Foreman Trickel stated that subsequent to the accident the brakes of the rear seven cars applied and released properly but the first four cars could not be tested because of bent and broken brake beams; however, the control valves of the first four cars functioned properly. There were slid-flat spots on the wheels of the first and third cars.

Signal Maintainer Eggleston, of the C. C. C. & St. L. Ry., stated that he arrived at the scene about 10 or 12 minutes after the accident occurred. The home signal was displaying stop but he could not see the indication displayed by signal 46. He maintains the interlocking involved. The last work on this interlocking was done on January 4; this work consisted of adjusting and testing several switches and derrails. In October, 1940, the plant was checked and found to be functioning as intended. He stated that, after an east-bound train moving on the Pennsylvania has entered the approach circuit and passed the approach signal displaying clear, the operator can operate the home signal to display stop, but he cannot open the derail without operating the time release; in addition to the time required for the release to operate, it requires from 1-1/2 to 2 minutes to manipulate the necessary levers to change the route.

Signal Maintainer McComsey, of the Pennsylvania, stated that he maintains signal 46 and inspects it at 10-day intervals. He had never experienced any difficulty with this signal. About 12:45 p. m. on the day of the accident he sealed the motor case of this signal; at this time the signal displayed stop-and-proceed.

Supervisor of Telegraph and Signals King, of the Pennsylvania, stated that he arrived at the scene about 30 minutes after the accident occurred. He observed that signal 46 displayed stop-and-proceed and home signal 2 displayed stop; the deraill on the eastward track was open. He examined the machine levers and observed their positions; he tested the mechanical locking and found that it was functioning as intended. All locks were properly secured and in good condition. Examination of the time release showed it to be in normal position. The mechanical levers for the Pennsylvania route were mechanically locked for normal position and the route was lined for the C. C. C. & St. L. Ry. The operator informed him that he had not touched the signals since he had lined the route for movement on the C. C. C. & St. L. Ry. He assisted in making inspections and tests, which disclosed that the apparatus was functioning properly.

Engineer of Telegraph and Signals Salmonson, of the Pennsylvania, stated that on January 7, in conjunction with officials of the C. C. C. & St. L. Ry., he tested the interlocking involved and signal 46. The tests covered the mechanical locking of the interlocking machine, the electric locking of lever No. 2, which controls home signal 2, all relays, wires, motor mechanism and local control wires involved in the signal system of home signal 2 and signal 46. The tests disclosed that all the equipment was within the prescribed requirements of both railroads; all apparatus functioned properly.

#### Observations of the Commission's Inspectors

The Commission's inspectors arrived at the scene about 9 hours after the accident occurred. Signal 46 was inspected for mechanical obstructions that might have caused the signal to remain in false proceed position, but nothing was found wrong. All line wires were inspected throughout the distance between signals 2 and 46. The insulation was intact and all insulators were in place. The mechanism and local wiring of approach signal 46 were found to be within the Commission's requirements. A detailed check was made of the switch and signal equipment; these tests included a check of mechanical locking. All relays were checked for release and pick-up values, and all were found to be within the limits prescribed by the carrier. The batteries at the tower, at home signal 2 and at signal 46 were tested and were found to be free of grounds. There was nothing found which might have caused signal 46 to function abnormally. This signal was under observation continuously from 12:45 p. m., January 7, the day of the accident, until 4:50 p. m., January 10; during that time it operated properly and no improper indication was displayed. The Commis-

sion's inspectors observed tests conducted by railroad officials and found that the signals and the approach locking circuits were operating as intended.

From the right side of an east-bound engine of the type involved, the Commission's inspectors observed on January 10 that signal 46 could be seen a distance of 4,463 feet and from the left side a distance of 4,009 feet. When the engine was 397 feet distant, signal 46 was lost to view from the left side. Home signal 2 could be first seen from the right side of the cab at a distance of 1,393 feet and from the left side a distance of 700 feet. The weather conditions and visibility were approximately the same as on the day of the accident except that the wind had more velocity and was blowing from the south. During this test the engine proceeded at a low rate of speed. In numerous instances during the 3-day period when signal 46 was under observation, smoke and steam obscured the right side of the engines of approaching east-bound passenger trains.

#### Discussion

According to the evidence, No. 6 reduced speed and passed approach signal 46, which was displaying approach, at a speed of 40 or 45 miles per hour, passed home signal 2, which was displaying stop, and, while moving at a speed of 30 to 40 miles per hour, became derailed at the derail, 63 feet beyond the home signal. The route was lined for a west-bound C. C. C. & St. L. Ry. movement and a passenger train on that line had just cleared the crossing.

The weather was clear and wind was blowing from the north. The approach indication required the Pennsylvania train to approach the home signal prepared to stop short of it. The engineman of the first engine was unable to see signals en route because, when the throttle was either closed or in drifting position, the blower failed to lift smoke and steam above the cab, and the crosswind caused the smoke and steam to trail down over the right side of the cab; in some instances the view ahead was completely obscured. The engineman was depending on the fireman to observe and to call signal indications en route. When the train was approaching signal 46 the fireman called the indication as clear. The engineman asked the fireman to repeat and the fireman again called the indication as clear. The engineman did not see the signal at any time. The only means of identifying his location was to look across the cab and to observe landmarks on the left side of the track. He made a service brake application, then released the brakes, and when the train passed the approach signal the speed was not in excess of 50 miles per hour. When the engine was about 700 feet west

of the home signal, the wind shifted and the smoke and steam lifted momentarily. At this instant the engineman observed that a C. C. C. & St. L. train was approaching the crossing and that the home signal was displaying stop for his own train. He immediately applied the brakes in emergency, but the train failed to stop short of the open derail. According to the evidence, there was nothing to obstruct the fireman's view ahead, since the train moved on tangent track a considerable distance before it reached the approach signal, the weather was clear, and there was no trailing smoke or steam along the left side of the first engine. Why the fireman failed to observe that the approach signal was displaying approach and why he called the indication as clear could not be ascertained, as he was killed in the accident. Because of trailing smoke and steam, the crew of the second engine did not see either the approach or the home signal. The engineman of a train following closely the train involved was unable to observe several signals because of trailing smoke and steam.

The evidence indicates that it is customary for enginemen, when their view is obscured, to rely on their firemen to observe and to call signal indications. The rules require that as soon as a fixed signal is seen, the engineman and the fireman must call its indication by name to each other. According to the statement of the road foreman of engines, when an engineman is unable to see a signal, the fireman must observe and call its indication to the engineman, who will then repeat it; when only the engineman can observe a signal, he will call its indication to the fireman, who must repeat, but an engineman is not required to leave his usual position to ascertain signal indications if the fireman is in position to observe the indications and calls them; however, an engineman could apply the brakes and open the throttle sufficiently to lift the smoke and exhaust steam above the cab and thus be able to observe signals. Had the engineman himself been able to see the indication displayed by the approach signal, it is probable this accident would have been averted.

There was considerable testimony introduced to the effect that the blowers on the type of the engines involved fail to produce sufficient stack velocity to lift smoke and exhaust steam when the engine is moving at high speed with the throttle in drifting position or but slightly open. Numerous complaints have been made by enginemen of this carrier concerning this condition. As a result of these observations and complaints the carrier began experiments some time prior to the occurrence of this accident to develop a device whereby smoke and exhaust steam will be lifted sufficiently so that the view of those on an engine will not be obscured.

The investigation disclosed that about the same time No. 6 entered the approach circuit the route was lined for a west-bound train on the C. C. C. & St. L. Ry. to move over the crossing. The interlocking was so arranged that when the route was lined for movement on the C. C. C. & St. L. Ry., No. 6 would receive an approach indication at the approach signal and a stop indication at the home signal, and the derail would be open. Since the approach circuit for No. 6 extended 9,418 feet west of the home signal, since operation of the time release requires 4 minutes 48 seconds, and since the average speed of No. 6 throughout this circuit was not less than 50 miles per hour, it follows that the approach signal could not have displayed proceed at any time after the train involved entered the circuit; therefore, during a period of 4 minutes 48 seconds immediately preceding the time of the accident, the route could not have been lined for No. 6 and then lined for the C. C. C. & St. L. train. Tests conducted subsequent to the accident disclosed that the interlocking was functioning as intended.

#### Cause

It is found that this accident was caused by failure properly to control the speed of the train in compliance with interlocking signal indications.

Dated at Washington, D. C., this nineteenth day of March, 1941.

By the Commission, Commissioner Patterson.

W. P. BARTEL,

(SEAL)

Secretary.