

INTERSTATE COMMERCE COMMISSION  
WASHINGTON

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REPORT NO. 3494  
THE PENNSYLVANIA RAILROAD COMPANY  
IN RE ACCIDENT  
AT MOHICAN, OHIO, ON  
NOVEMBER 15, 1952

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SUMMARY

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Date: November 15, 1952

Railroad: Pennsylvania

Location: Mohican, Ohio

Kind of accident: Derailment and collision

Trains involved: Passenger : Freight

Train numbers: 23 : Extra 9622 East

Engine numbers: Diesel-electric : Diesel-electric  
units 5754A, units 9622A,  
5752B, and 9605B, and  
5750A 9603B

Consists: 12 cars : 98 cars, caboose

Estimated speeds: 70 m. p. h. : 15 m. p. h.

Operation: Signal indications

Tracks: Double; tangent: 0.20 percent  
ascending grade westward

Weather: Clear

Time: 2:57 a. m.

Casualties: 7 injured

Cause: Broken truck swing-hanger, and derailed  
cars obstructing adjacent main track  
in front of approaching train

INTERSTATE COMMERCE COMMISSION

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REPORT NO. 3494

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

THE PENNSYLVANIA RAILROAD COMPANY

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January 12, 1953

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Accident at Mohican, Ohio, on November 15, 1952, caused by  
a broken truck swing-langer, and by derailed cars  
obstructing an adjacent main track in front of an  
approaching train.

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

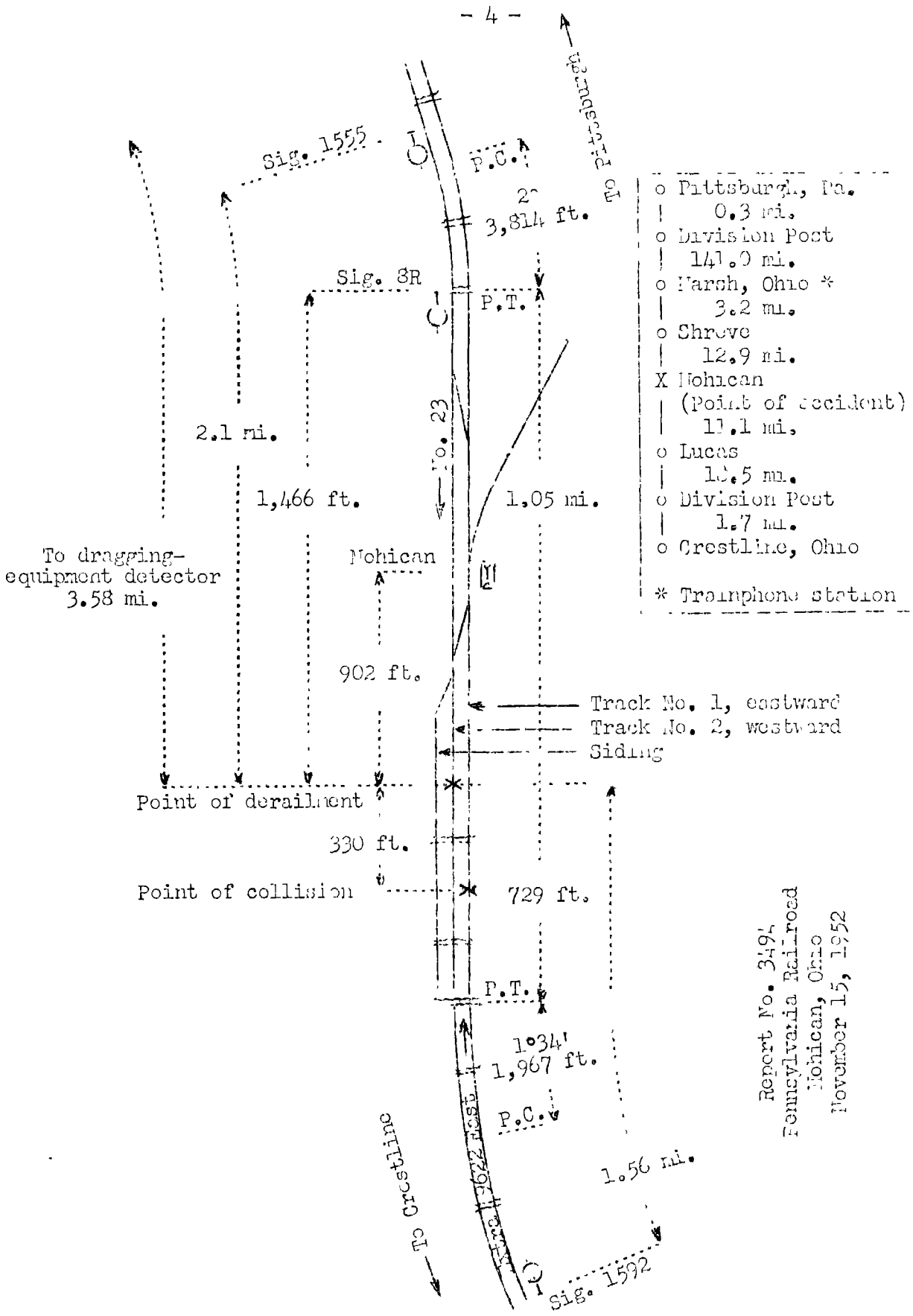
PATTERSON, Commissioner:

On November 15, 1952, there was a derailment of a  
passenger train, and a collision between derailed cars of  
that train and a freight train moving in the opposite  
direction on an adjacent main track, on the Pennsylvania  
Railroad at Mohican, Ohio, which resulted in the injury of  
two passengers, one Pullman Company employee, and four  
train-service employees. This accident was investigated in  
conjunction with representatives of the Public Utilities  
Commission of Ohio.

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



- o Pittsburgh, Pa.
  - | 0.3 mi.
  - o Division Post
  - | 141.9 mi.
  - o Marsh, Ohio \*
  - | 3.2 mi.
  - o Shrove
  - | 12.9 mi.
  - X Mohican
  - | (Point of accident)
  - | 11.1 mi.
  - o Lucas
  - | 10.5 mi.
  - o Division Post
  - | 1.7 mi.
  - o Crestline, Ohio
- \* Telephone station

Report No. 3494  
 Pennsylvania Railroad  
 Mohican, Ohio  
 November 15, 1952

Location of Accident and Method of Operation

This accident occurred on that part of the Eastern Division extending between Division Post, near Pittsburgh, Pa., and Division Post, near Crestline, Ohio, 186.70 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, and No. 2, westward. The derailment occurred on track No. 2 at a point 157.57 miles west of Pittsburgh and 902 feet west of the interlocking station at Mohican. The collision occurred on track No. 1 at a point about 330 feet west of the point of derailment. From the east there are, in succession, a 2° curve to the right 3,814 feet in length, and a tangent 1.05 miles to the point of derailment and 729 feet westward. From the west there are, in succession, a 1°34' curve to the right 1,967 feet in length, and the tangent on which the accident occurred. The grade is 0.20 percent ascending westward at the point of derailment and 0.18 percent descending westward at the point of collision.

In the vicinity of the point of accident the track structure of each main track consists of 155-pound rail, 39 feet in length, laid new in 1949 on an average of 24 treated hardwood ties to the rail length. It is fully tieplated with heavy duty double-shoulder tieplates and is spiked with two rail-holding spikes and two anchor spikes per tieplate. It is provided with 6-hole 58-1/2-inch joint bars and an average of 8 rail anchors per rail. It is ballasted with stone to a depth of 18 inches below the bottoms of the ties. The main tracks are spaced 13 feet between track centers.

Automatic signal 1555 and semi-automatic signal 8R, governing west-bound movements on track No. 2, and automatic signal 1592, governing east-bound movements on track No. 1, are located, respectively, 2.1 miles east, 1,406 feet east, and 1.56 miles west of the point of derailment. These signals are of the position-light type. Aspects applicable to this investigation and the corresponding indications and names are as follows:

<u>Aspect</u>	<u>Indication</u>	<u>Name</u>
Three amber lights in vertical position	Proceed.	Clear.

A dragging-equipment detector is located in track No. 2 at a point 3.58 miles east of the point of derailment. This device is actuated by a passing train if any portion of the equipment between the rails extends more than 2-1/2 inches below the level of the tops of the rails or if any portion of the equipment outside the rails extends below the level of the tops of the rails. When the device is actuated, signal 1555 is caused to indicate Approach and signal 8R is caused to indicate Stop.

This carrier's operating rules read in part as follows:

76. \* \* \*

\* \* \*

Engine and train crews as frequently as opportunity permits must observe engines and cars in their train, moving and standing, to detect any conditions that might interfere with the safe movement of trains.

\* \* \*

102. When a train is \* \* \* stopped suddenly by an emergency application of the air brakes or other causes, adjacent tracks \* \* \* that are liable to be obstructed must be protected at once in both directions until it is ascertained they are safe and clear for the movement of trains.

\* \* \*

400N-21. Operators and signalmen \* \* \*

\* \* \* must \* \* \* when practicable, observe passing trains for defects \* \* \*

The maximum authorized speeds were 70 miles per hour for passenger trains and 50 miles per hour for freight trains.

#### Description of Accident

No. 23, a west-bound first-class passenger train, consisted of Diesel-electric units 5754A, 5752B, and 5750A coupled in multiple-unit control, one baggage car, two express cars, one baggage car, four coaches, one dining car, and three sleeping cars, in the order named. The tenth and the twelfth

cars were of lightweight steel construction, and the other cars were of conventional all-steel construction. The fifth to the tenth cars, inclusive, and the twelfth car were equipped with tightlock couplers. This train departed from Pittsburgh at 12:14 a. m., 19 minutes late, passed the interlocking station at Mohican at 2:57 a. m., 12 minutes late, and while moving on track No. 2 at a speed of about 70 miles per hour the fifth to the twelfth cars, inclusive, were derailed at a point 902 feet west of the interlocking station at Mohican. The rear end of the tenth car and the front ends of the eleventh and twelfth cars were derailed to the south and obstructed and damaged track No. 1. A few seconds later the side of the tenth car was struck by Extra 9622 East, and the eleventh and twelfth cars were struck by derailed equipment of Extra 9622 East.

Extra 9622 East, an east-bound freight train, consisted of Diesel-electric units 9622A, 9605B, and 9603B, coupled in multiple-unit control, 98 cars, and a caboose. This train departed from Crestline at 12:12 a. m., passed Lucas, 10.93 miles west of the point of derailment and the last open office, at 2:46 a. m., and while moving on track No. 1 at an estimated speed of 15 miles per hour it struck the derailed equipment of No. 23.

No. 23 stopped with the front end of the locomotive 1,376 feet west of the point of derailment. Separations occurred between the sixth and seventh, the tenth and eleventh, and the eleventh and twelfth cars. The eleventh and twelfth cars stopped with the front end of each car obstructing track No. 1. The other derailed cars stopped approximately in line with track No. 2. None of the derailed cars overturned. The fifth to the ninth cars, inclusive, were somewhat damaged, the tenth and eleventh cars were badly damaged, and the twelfth car was considerably damaged. The first Diesel-electric unit of Extra 9622 East stopped on its right side, at an angle of about 45 degrees to the track, with the front end near the south rail of track No. 1 and several feet west of the rear end of the rear car of No. 23. The second unit stopped upright, with the front end against the rear end of the first unit and the rear end against the front end of the rear car of No. 23. The third unit stopped upright, at an angle of about 50 degrees to the track, with the front end against the rear end of the second unit and the side of the eleventh car of No. 23. The first seven cars were derailed and stopped in various positions on or near the track. The Diesel-electric units and the first six cars were considerably damaged. The seventh car was somewhat damaged.

The weather was clear at the time of the accident, which occurred at 2:57 a. m.

The engineer and the front brakeman of Extra 9622 East and one brakeman and the flagman of No. 23 were injured.

P.R.R. 9200, the fourth car of No. 23, is a baggage car of conventional all-steel construction. It was built in December, 1928. It is 63 feet 7-1/4 inches in length. The light weight of the car is 101,300 pounds, and the capacity is 40,000 pounds. At the time of the accident the car was carrying an estimated load of 10,000 pounds. The car is equipped with equalized, swing-hanger type, four-wheel trucks, spaced 44 feet between truck centers. The wheelbase of each truck is 8 feet long. The specified diameter of the wheels is 36 inches. The journals are 5-1/2 inches by 10 inches and are provided with plain bearings. The truck frames are cast-steel with integral pedestals and transoms. The one-piece cast-steel truck bolsters are suspended between the transoms and are equipped with removable center plates. The spring arrangement consists of helical equalizer springs and elliptic bolster springs. The spring planks are cast-steel and are supported on a cross bar at each end. The cross bars rest in slotted openings at the bottoms of the swing hangers. The swing hangers are suspended from 2-1/4-inch by 6-7/8-inch steel pins, which fit into recessed pockets in the tops of the transoms. The swing hangers are of forged-steel construction. They are 29-7/8 inches in length, 2 inches in thickness throughout a distance of 5 inches at the top, 1-1/2 inches in thickness through the shank, and 2 inches in thickness throughout a distance of 9-1/2 inches at the bottom. The diameter at the top is 5 inches, the width of the shank is 3 inches, and the width throughout the length of the slot at the bottom is 4 inches. The eye at the top is 2-13/16 inches in diameter, and the slotted opening at the bottom is 5-3/4 inches in length and 1-5/16 inches in width. A hardened-steel bushing having an inside diameter of 2-5/16 inches is specified for the eye. The carrier's specifications require renewal of swing hangers if contact surface is worn 7/16 inch or more or if inside face of hanger loop is worn 1/4 inch or more, renewal of bushings if they are worn through or broken, and renewal of swing-hanger pins if they are worn to the extent that the remaining thickness at any point is 2 inches or less.



### Discussion

As No. 23 was approaching the point where the accident occurred the speed was about 70 miles per hour. The enginemen were maintaining a lookout ahead from the control compartment at the front of the locomotive. The members of the train crew were in various locations throughout the cars of the train. Signal 1555 and signal 8R each indicated Proceed. The headlight was dimmed as the train approached Mohican. Prior to the time of the derailment the locomotive and the cars had been riding smoothly. The members of the crew were not aware of any indication of defective equipment or track until the brakes became applied in emergency as the train was passing Mohican. At this time the fireman observed that Extra 9622 East was approaching on track No. 1. He immediately lighted a red fusco and gave stop signals. The front end of Extra 9622 East passed before the locomotive of No. 23 had stopped.

As Extra 9622 East was approaching the point where the accident occurred the speed was between 40 and 45 miles per hour. The enginemen and the front brakeman were maintaining a lookout ahead from the control compartment at the front of the locomotive. The conductor and the flagman were in the caboose. Signal 1592 indicated Proceed. The employees on the locomotive said that the engineer dimmed the headlight when they observed the reflection of the headlight of No. 23. When their locomotive reached a point which they thought was about 1,000 feet west of the locomotive of No. 23 they observed sparks flying from the wheels of that train and at the same time they observed the stop signals being given by the fireman. The engineer immediately made an emergency application of the brakes. These employees thought that the speed of their train had been reduced to between 10 and 15 miles per hour when the collision occurred.

The interlocking station at Mohican is located south of the tracks. The operator said that as the locomotive of No. 23 was closely approaching or passing the interlocking station he observed sparks flying from underneath the train. He immediately gave stop signals with a red lantern. After the rear end of the train passed he saw sparks flying throughout the length of the train, and he then observed that the train was derailed. He immediately called the operator at Marsh, 16.1 miles east of Mohican and the nearest station which is provided with wayside trainphone equipment, and notified him to warn the crew of Extra 9622 East of the derailed cars by use of the trainphone. As he completed this call he observed Extra 9622 East enter the tangent track and strike the derailed cars of No. 23.

Examination of the track structure after the accident occurred disclosed no condition which could have caused or contributed to the cause of the derailment. Between Shreve, 12.9 miles east of Mohican, and the point of derailment the outside of the south rail of track No. 2 had been marked intermittently by dragging equipment. The marks were about 1 inch below the top of the rail. Numerous bond wires on the outside of the south rail throughout this distance had been damaged. The marks on the rail and the damaged bond wires appeared only at points at which No. 23 was moving on a curve to the right. Bond wires were damaged at points, respectively, 1,000 feet east and 1 mile west of the dragging equipment detector, but none were damaged in the immediate vicinity of the detector. Apparently when the train was moving on a curve to the right dragging equipment was in contact with the outside of the south or high rail, but on tangents and on curves to the left the dragging equipment did not extend below the level of the top of the rail sufficiently to actuate the dragging-equipment detector. A road crossing about 2 miles east of Mohican was gouged adjacent to the south rail. At a point about 790 feet west of the interlocking station at Mohican the centers of several ties were gouged and splintered. About 50 feet west of these marks the centers of six or seven ties were deeply gouged. The latter marks were approximately 2 feet in width. West of this point other marks appeared in the center of the track. About 80 feet west of the broad gouge marks the ties bore indications that a wheel had become derailed inside the north rail. West of this point the track was destroyed throughout a considerable distance.

Examination of the equipment of No. 23 after the accident occurred disclosed that the left rear swing hanger, both swing-hanger cross bars, the spring plank, and the elliptic bolster springs were missing from the rear truck of P.R.R. 9200, the fourth car of the train, and that the steam keel connector and the air hose had been torn off the rear end of the car. It was found that the swing hanger adjacent to wheel No. 7, the left rear wheel of the rear truck at the time of the accident, had broken through the eye at the top. The swing-hanger pin remained in place. The bottom portion of the swing hanger was found in the vicinity of Shreve. The top portion was found on top of the truck bolster. One swing-hanger cross bar, the spring plank, and the elliptic springs were found in the vicinity of the point at which the rear car of No. 23 stopped. The other swing-hanger cross bar was not found. One end of the spring plank was broken, and splinters of creosoted ties

were imbedded in the broken end. The marks on the track structure and the locations at which the parts of the truck were found indicate that the swing hanger failed and the support was removed from the rear end of the left cross bar and the left end of the spring plank when the train was in the vicinity of Shreve. The spring plank became dislodged and dropped from the truck as the train was passing Mohican. Apparently it struck and tore off the steam heat connector and the air hose and then became wedged underneath the front truck of the fifth car and caused the derailment of the truck. When this occurred the track structure was damaged to the extent that the following cars were derailed.

The swing hanger involved was broken transversely through the walls of the top eye at points slightly above the center of the eye. Approximately 75 percent of the cross-sectional areas of the breaks were progressive fractures which originated at the outer edges of the eye. In addition to the transverse fractures there were numerous small cracks radiating outward from the contact surfaces of both the upper and the lower portions of the eye. The edges of the eye on each side of the hanger showed evidence of having been built up by electric arc welding. Only the edges of the eye were welded, and it appears that the welding may have been done in order to fix a bushing in place after the eye was worn to the extent that a proper pressed fit could not be obtained. Laboratory analysis of the metal indicates that the welding was done without preheating and with no subsequent normalizing heat treatment. The progressive fractures originated in the resulting brittle zone at the edges of the eye. The swing-hanger pin was also built up by welding. This welding apparently was done in order to bring the pin back to proper size after it had become worn. After being welded the pin had again become very badly worn and may have contributed to the failure of the hanger by providing a badly distorted contact surface. No part of the bushing was found. This car last received classified repairs in June, 1951, at Wilmington, Del. According to information furnished by the carrier, the welding was not done at the time the car received classified repairs, and the carrier has been unable to ascertain where it was done.

On trucks of this type the upper portions of the swing hangers are concealed by the transoms and the sides of the truck, and a transverse fracture near the top of a swing hanger cannot be detected by visual inspection while the truck is in place

under a car. On the day of the accident the equipment of No. 23 was inspected by members of the car department at Pittsburgh. No defective condition was observed. There is no open office between Shreve, the point at which the swing hanger dropped from the truck, and Mohican. The enginemen said that they each looked back along the sides of the train at intervals between Shreve and Mohican, but they did not observe any unusual condition.

Cause

It is found that this accident was caused by a broken truck swing-hanger, and by derailed cars obstructing an adjacent main track in front of an approaching train.

Dated at Washington, D. C., this twelfth day of January, 1953.

By the Commission, Commissioner Patterson.

(SEAL)

GEORGE W. LAIRD,  
Acting Secretary.