INTERSTATE COMMERCE COMMISSION

REPORT NO. 3613

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

THE PENNSYLVANIA RAILROAD COMPANY

63-3

March 25, 1955

Accident at Leetonia, Ohio, on February 3, 1955, caused by a broken truck swing-hanger.

REPORT OF THE COMMISSION[1]

CLARKE, Commissioner.

On February 3, 1955, there was a derailment of a passenger train on the Pennsylvania Railroad at Leetonia, Ohio, which resulted in the injury of eight passengers and seven dining-car employees. This accident was investigated in conjunction with a representative of the Public Utilities Commission of Ohio

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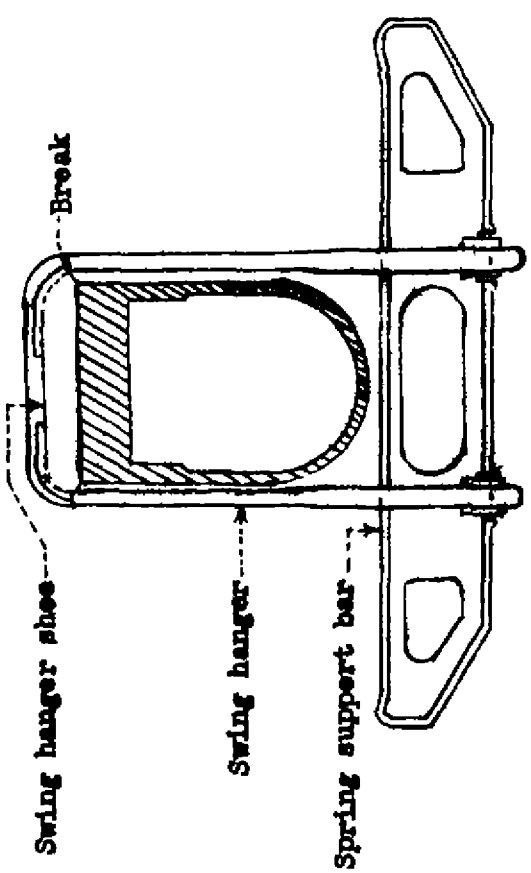
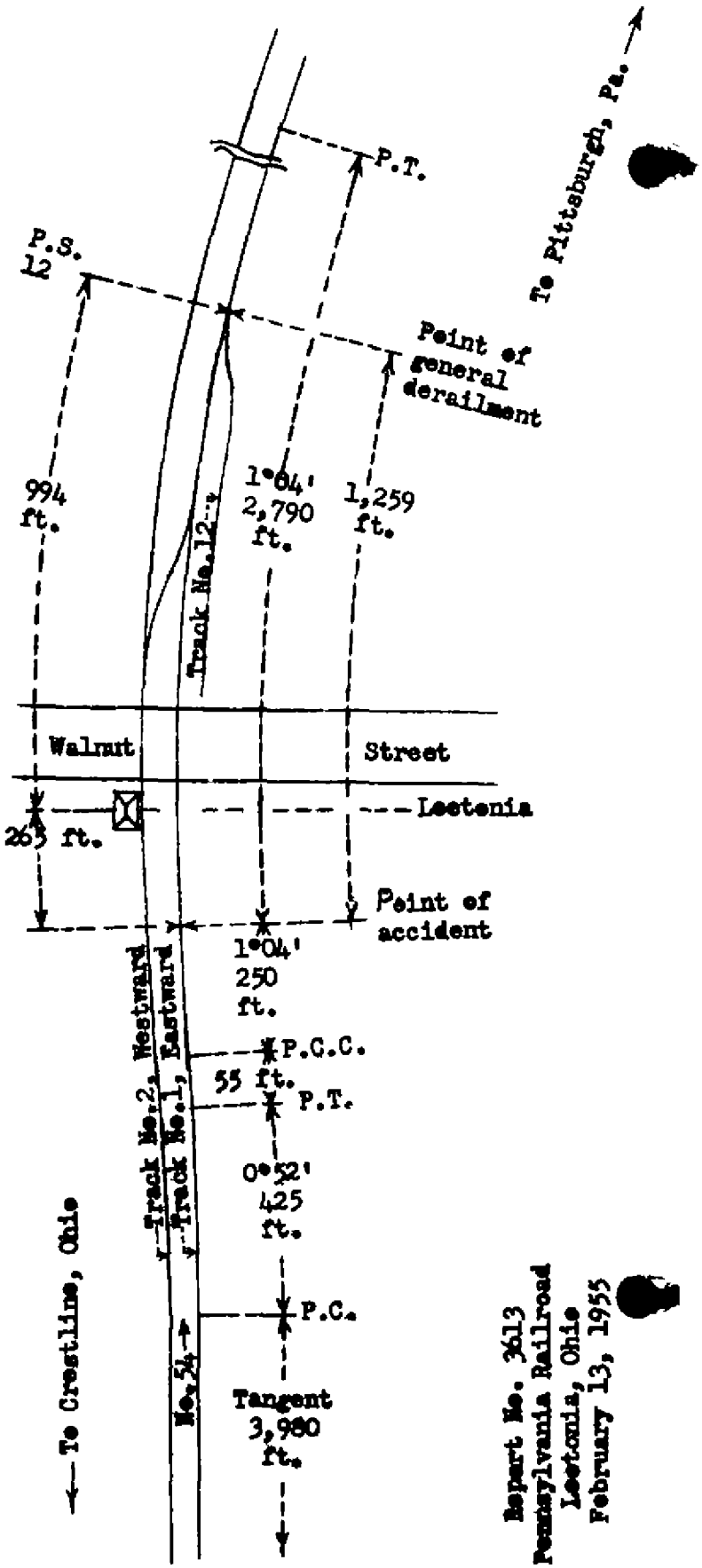
[1] Under authority of section 17 (2) of the Interstate Commerce Act the above-entitled proceeding was referred by the Commission to Commissioner Clarke for consideration and disposition.

- Pittsburgh, Pa.
  0.3 mi.
- Division Post, Pa.
  62.95 mi.
- Leetonia, Ohio
  (Point of accident)
  19.55 mi.
- CP Alliance
  0.80 mi.
- Wall
  103.40 mi.
- Division Post
  1.70 mi.
- Crestline, Ohio



Sketch showing swing hanger arrangement



Report No. 3613
Pennsylvania Railroad
Leetonia, Ohio
February 13, 1955

Location of Accident and Method of Operation

This accident occurred on that part of the Eastern Division extending between Division Post, near Crestline, Ohio, and Division Post, near Pittsburgh, Pa., 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 accident occurred on track No. 1 at a point 125.45 miles east of Crestline and 265 feet west of the interlocking station at Leetonia, Ohio. The interlocking station is located on the north side of the main tracks adjacent to track No. 2. Walnut Street crosses the railroad at grade immediately east of the interlocking station. East of Walnut Street an auxiliary track designated as track No. 12 parallels track No. 1 on the south and converges with it at a switch located 994 feet east of the interlocking station. This switch is trailing-point for east-bound movements. From the west on track No. 1 there are, in succession, a tangent 3,980 feet in length, a 0°52' curve to the left 425 feet, a tangent 55 feet, and a compound curve to the right, having a maximum curvature of 1°04', 250 feet to the initial point of derailment and 2,790 feet eastward. The grade for east-bound trains is 0.57 percent ascending at the initial point of derailment.

In the vicinity of the point of accident the structure of track No. 1 consists of 131-point rail, 39 feet in length, laid new in 1941 on an average of 22 treated ties to the rail length. It is fully tieplated and is spiked with three rail-holding and two plate-holding spikes per tieplate. It is provided with six-hole joint bars and an average of eight rail anchors per rail. It is ballasted with stone to a depth of 18 inches below the bottoms of the ties.

A dragging-equipment detector, which operates in conjunction with the eastward home signal at Wall interlocking, is located in track No. 1 west of that station. Wall is 20.35 miles west of the initial point of derailment.

This carrier's operating rules 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.

* * *

77. So far as practicable and other duties permit, employes will observe passing trains for defects and should there be any indication of conditions endangering the train they must take necessary measures for its protection.

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A train must be stopped when it is observed with any of the following defects * * *
* * *

Defective truck

* * *

400N-21. Operators — Signalmen

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

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The maximum authorized speed for passenger trains is 70 miles per hour, but it is restricted to 60 miles per hour on curves in the vicinity of the point of accident.

Description of Accident

No. 54, an east-bound first-class passenger train, consisted of Diesel-electric units 5760 and 5762, coupled in multiple-unit control, one mail car, three express cars, one mail car, one express refrigerator car, one mail-baggage car, three coaches, one dining car, one lounge-sleeping car, and four sleeping cars, in the order named. The first car was of steel underframe construction, the eighth, ninth, and fourteenth cars were of lightweight steel construction, and the other cars were of conventional all-steel construction. The eighth to the eleventh cars, inclusive, and the

sixteenth car were equipped with tightlock couplers. This train departed from Crestline at 5:10 a.m., on time, departed from CP interlocking at Alliance, 19.55 miles west of the point of accident and the last open office, at 7:33 a. m., 23 minutes late, and while moving on track No. 1 at a speed of 63 miles per hour the front truck of the sixth car was derailed at a point 265 feet west of the interlocking station at Leetonia. The rear truck of the eleventh car and all wheels of the twelfth to the sixteenth cars, inclusive, were derailed at the turnout at the east end of track No. 12.

No. 54 stopped with the front end of the locomotive 1,701 feet east of the point of general derailment. No separations occurred in the train. The sixth car stopped in line with the track. The rear truck of the eleventh car and all trucks of the twelfth to the sixteenth cars, inclusive, were derailed to the north. The eleventh car stopped at an angle of about 20 degrees to the track. The other derailed cars stopped approximately in line, on the north side of track No. 1 and parallel to it, with the rear end of the rear car 400 feet east of the point of general derailment. The twelfth and thirteenth cars leaned toward the north at an angle of about 30 degrees, and the other derailed equipment remained upright. The eleventh car was slightly damaged, and the other derailed cars were somewhat damaged. The main tracks are spaced 39 feet between track centers at the point where the derailed equipment stopped.

The sixth car, REX 6834, an express refrigerator car, was built by the Pullman-Standard Car Manufacturing Company in 1945 as a troop sleeper. It was rebuilt as an express refrigerator car at the shops of the Chicago Freight Car and Parts Company in Pueblo, Colo., in October, 1952. It is 54 feet 2-1/2 inches long over the pulling faces of the couplers. The light weight is 79,400 pounds, and the capacity is 100,000 pounds. At the time of the accident the car was loaded with 550 pieces of mail with an estimated weight of 27,500 pounds. The car is equipped with AB-1B type brake equipment.

At the time of the accident this car was mounted on Allied Full-Cushion trucks spaced 40 feet 8-1/2 inches between truck centers. Each truck had a wheelbase of 5 feet 6 inches. Each was constructed with one-piece cast-steel side frames with integral pedestals and a one-piece cast-steel bolster with integral center plate. The side frames were supported on double coil springs housed in the truck frame on each side of each pedestal. The lower ends of these springs rested on seat castings which engaged a support bar extending across each pedestal opening between guides at the lower ends of the

pedestal jaws. Each spring support bar was supported by an inverted U-shape swing hanger which was seated on a shoe casting on top of the journal box. The swing hangers were of forged steel with an overall length of 51-3/4 inches. Each hanger was 5/8 inch thick and 3 inches wide except for a widened portion at the bottom of each leg, where the width varied from 4-3/4 inches to 6 inches. The inside length of each leg was 19-7/8 inches. The inside width between the legs at the top and the bottom was 9-3/8 inches and 8-7/8 inches, respectively. The radius of each bend at the tops of the hangers was 1-1/4 inches. The bottom portions of the legs were slotted to permit entry of the spring support bars. The slots were 6 inches long and varied in width from 2-1/2 inches to 3-1/4 inches. A curved steel wearing plate was welded to the bottom of each slot.

The truck involved was at the B end of the car. It was applied at the time the car was rebuilt. The wheels of this truck were changed at the shops of the Southern Pacific Company at Roseville, Calif., on June 3, 1954.

Discussion

As No. 54 was approaching the point where the accident occurred the speed was 63 miles per hour, as indicated by the tape of the speed-recording device. The engineer and the fireman were maintaining a lookout ahead from their respective positions in the control compartment at the front of the locomotive. The conductor and the front brakeman were in the twelfth car, and the flagman was in the rear car. The locomotive and the cars had been riding smoothly. The members of the crew on the locomotive were not aware of anything being wrong until the brakes of the train became applied in emergency as a result of the derailment.

No. 54 passed Leetonia at 7:56 a. m., according to the block record. The operator said that No. 54 and a west-bound passenger train moving on track No. 2 passed the interlocking station simultaneously and he was unable to observe the running gear of the equipment in No. 54. However, after the trains had passed he observed that the structure of the grade crossing at Walnut Street had been damaged by dragging or derailed equipment on track No. 1. He immediately communicated by telephone with the train dispatcher and informed him of the defective condition in the equipment of No. 54. The operator at CP interlocking overhead this conversation and at once used the trainphone apparatus in his office to warn the engineer of No. 54. The engineer said that this warning was received a few seconds after the train had been stopped by an emergency application of the brakes.

Examination of the track structure after the accident occurred disclosed no defective condition which could have caused or contributed to the cause of the derailment. Light indentations or scraping marks, apparently caused by dragging equipment, were found on the tops of ties 58 feet west of the initial point of derailment. Flange marks on the ties indicated that the wheels of a truck had become derailed to the north at a point 265 feet west of the interlocking station. The planking in the crossing at Walnut Street had been struck and damaged. Flange marks outside the south rail immediately east of the east switch of a trailing-point crossover located approximately 350 feet east of the interlocking station indicated that derailed wheels had been forced over that rail. The tops of the ties between the rails in the vicinity of the turnout at the east end of track No. 12 had been marked by a dragging object. The track east of this point was torn up throughout a distance of 892 feet.

Examination of the equipment after the accident occurred disclosed that the east truck of REX 6834 had disintegrated. The truck sides, the truck bolster, and other component parts of the truck had been displaced. The front wheels had become rerailed and were under the front end of the car. The rear wheels of this truck, which were derailed, were displaced toward the center of the car. It was found that the swing hanger at the east wheel on the north side of this truck had broken near the top of one of the legs. The portion of the leg beneath the break was found adjacent to the track approximately 290 feet east of the interlocking station, and the remaining portion of the hanger was found 300 feet farther eastward. The truck side-frames were found on opposite sides of the track about 170 feet east of the trailing-point crossover. The truck bolster was found on the north side of the track approximately 100 feet east of the point where the general derailment occurred. Evidently after the swing hanger failed, the spring support bar dropped sufficiently to come in contact with the track structure. This resulted in the derailment of the truck, and its subsequent destruction. Apparently some portion of the truck which was dragged or struck by following equipment became lodged under the rear truck of the eleventh car and caused it to become derailed. After this occurred the track structure was damaged to the extent that following equipment was derailed.

The failed swing hanger was broken transversely through the leg immediately below the bent and 18-3/4 inches above the bottom. According to the report of the engineer of tests of the carrier, a chemical analysis disclosed that the material of the swing hanger met the chemical requirements for the grade of low carbon steel which was specified for swing hangers on this type of equipment at the time the truck was manufactured.

One corner of one fracture face showed approximately 10 percent progressive fracture. The remaining area of the fracture faces was badly battered. It was the opinion of the analysts that this hanger was subjected to abnormally high stresses for this grade of steel and that these stresses resulted in the development of a fatigue crack and ultimate failure.

The Mechanical Division of the Association of American Railroads, in a circular letter dated April 28, 1954, made the following recommendation in connection with repairs and maintenance of Allied Full-Cushion trucks:

> Trucks shall be overhauled at two-year intervals, at which time spring support bars and swing hangers shall be magnetic particle tested and date of such attention shall be stenciled on the truck. * * *

The owner of the car involved began a program of testing its cars in compliance with this recommendation, but at the time of this accident the recommended tests had not been made on this car. On January 5, 1955, the Committee on Car Construction of the Association of American Railroads made the further recommendation that the interchange rules be amended to require that, effective January 1, 1956, all Allied Full-Cushion trucks on cars in interchange service shall be equipped with improved swing hangers and swing-hanger shoes conforming to revised specifications. The owner of the car involved is now engaged in a program of replacing the type of swing hanger originally specified for this type of truck with swing hangers of a higher grade of steel and having a thickness of 1-1/16 inches instead of 5/8 inch as originally specified. The swing hangers now being applied to these cars conform to the specifications in the recommendation of the Committee on Car Construction of the Association of American Railroads. The swing hanger which failed was scheduled to be replaced a short time after the date of the accident.

The shoulders of swing-hanger shoes of the type with which the truck was equipped at the time of the accident extend beyond the sides of the journal box, and a crack or break in the edge of the swing hanger behind the shoulders would not be detected during routine inspection. On the day of the accident the equipment of No. 54 was inspected by members of the car department before the train departed from Crestline. The operator at CP interlocking inspected the train as it passed the interlocking station and the members of the train crew observed the equipment at points where the train stopped en route. No defective condition was observed. The enginemen said they made frequent observations of the equipment of the train en route, but visibility was restricted by swirling snow and they observed no defective condition.

Cause

This accident was caused by a broken truck swing-hanger.

Recommendation

In view of the facts disclosed by this investigation, it is recommended that on trucks of the type involved in this accident 5/8-inch swing hangers be replaced as soon as possible by swing hangers having greater strength.

Dated at Washington, D.C., this twenty-fifth day of March, 1955.

By the Commission, Commissioner Clarke.

(SEAL)

HAROLD D. McCOY

Secretary.