

INTERSTATE COMMERCE COMMISSION

WASHINGTON

REPORT OF THE DIRECTOR

BUREAU OF SAFETY

ACCIDENT ON THE

BALTIMORE & OHIO RAILROAD

STAUNTON, VA.

SEPTEMBER 14, 1936

INVESTIGATION NO. 2099

SUMMARY

Railroad: Baltimore & Ohio
Date: September 14, 1936
Location: Staunton, Va.
Kind of accident: Derailment
Train involved: Freight
Engine number: 2044
Consist: Caboose and 11 cars
Speed: 4-5 m.p.h.
Track: 8°15' curve; level track.
Weather: Cloudy and dark
Time: 7:15 p. m.
Casualties: 1 killed
Cause: Loose wheel

October 20, 1936

To the Commission:

On September 14, 1936, there was a derailment of a freight train on the Baltimore & Ohio Railroad at Staunton, Va., which resulted in the death of one employee.

Location and method of operation

This accident occurred in the Staunton yard on that part of the Shenandoah Sub-division of the Baltimore Division, which extends between Harrisonburg and Lexington, Va., a distance of 61.8 miles. A yard track, known as Lexington track, approximately 900 feet in length, parallels the main track on the south and connects with the lead track at a point 600 feet west of the main track switch; the accident occurred on the lead track at a point 143 feet west of the main track switch. The lead track, which is level, is on an 8°15' curve to the left for east-bound movements, the accident occurring on this curve at a point 67 feet from its eastern end.

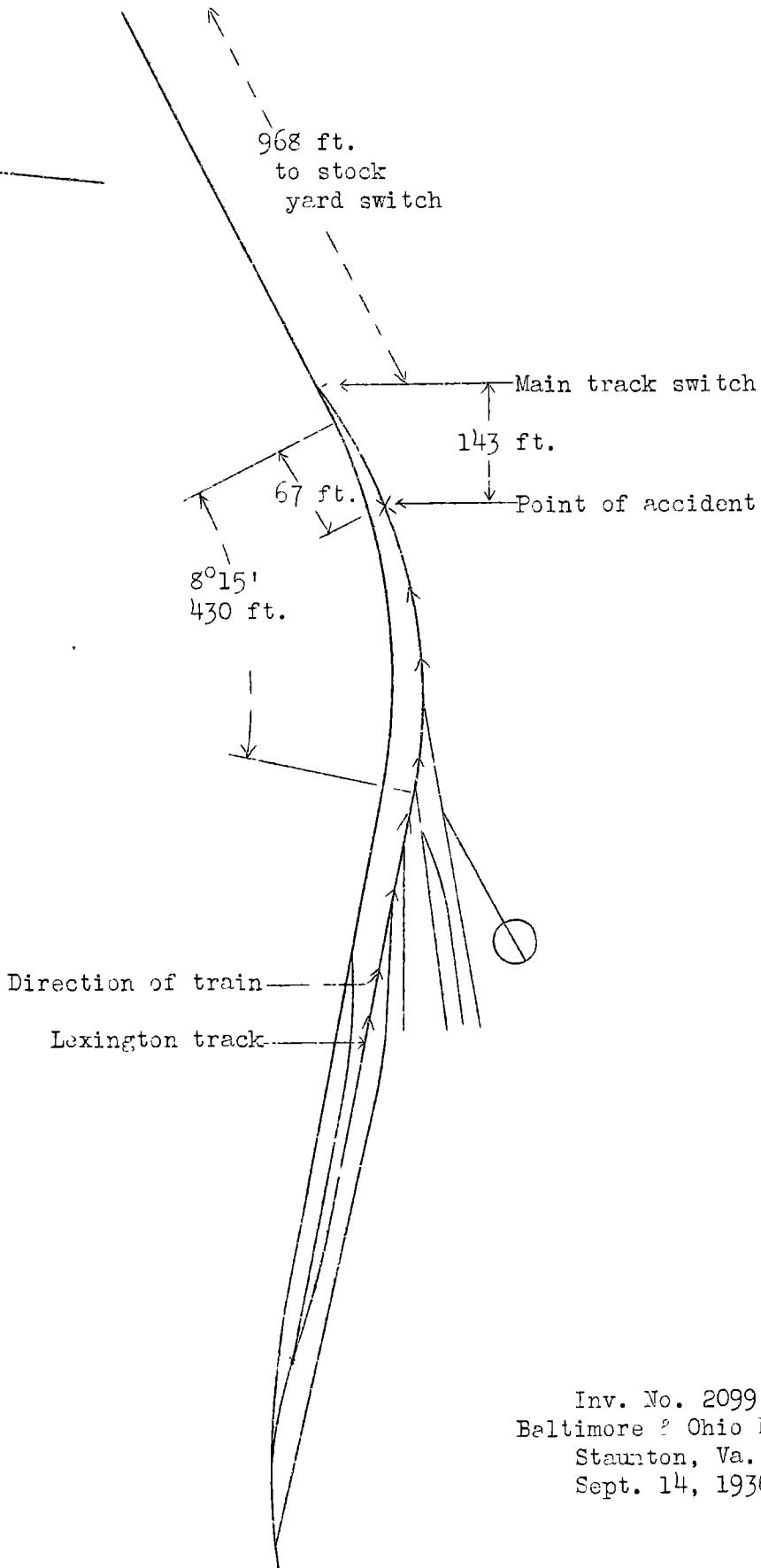
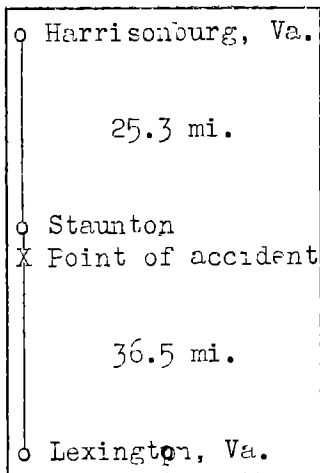
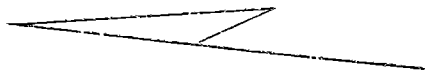
The track is laid with 85-pound rails, 33 feet in length, with 18 to 20 ties to the rail length, single-spiked, tie-plated and ballasted with cinders and is well maintained.

The weather was cloudy and it was dark at the time of the accident, which occurred at 7:15 p. m.

Description

Extra 2044 West, a Staunton turn-around freight train, was in charge of Conductor Strippy and Engineman Knick; this train left Harrisonburg at 4:45 p.m. and arrived at Staunton, Va., at 6:30 p.m., according to the train sheet, and after disposing of the train, the crew placed 11 stock cars against the east end of the caboose on the Lexington track and ran the engine around them. The engine then started shoving the train eastward for the purpose of placing the cars at the stock pens on an auxiliary track located 968 feet east of the lead track switch, and had proceeded a distance of 6 or 7 car lengths, moving at a speed of 4 or 5 miles per hour when the derailment occurred.

The front truck of the lead car was derailed to the right or south and on encountering the bank of a cut, the car was diverted to the left and stopped at a point 105 feet beyond, leaning at an angle of about 40° with the front end against the embankment on the left side of the track. The body of the car became detached from the trucks; the lead truck was crosswise of the track and against the rear truck which was not derailed.



Inv. No. 2099
 Baltimore & Ohio R.R.
 Staunton, Va.
 Sept. 14, 1936

The front wheels of the rear truck of the second car were also derailed. None of the remaining equipment was derailed. The employee killed was the flagman.

Summary of evidence

Enginemen Knick stated that after setting out his train on arrival at Staunton at 6:30 p.m., he lined up 11 stock cars on the Lexington track. After running around them he started shoving the caboose and 11 stock cars eastward, and had proceeded a distance of 6 or 7 car lengths at a speed of 4 or 5 miles per hour when he received a violent stop signal from the conductor's lamp, Conductor Strippy being on top of the car ahead of the caboose. Engineman Knick immediately applied the air brakes in emergency, stopping the train within a distance of 2 car lengths.

Conductor Strippy stated that after the stock cars were coupled and the engine placed behind the caboose, he and Flagman Riddle climbed on top of the cars; Flagman Riddle rode the front or east end of the cut, while the conductor rode the first car ahead of the caboose. After proceeding a distance of 6 or 7 car lengths a violent stop signal was given by Flagman Riddle and at the same time the conductor heard cars bumping and saw fire flying from the wheels. He immediately relayed the signal to the engineman who stopped the train at once.

Track Foreman Sutton stated that on his arrival at the scene of the accident about 1 hour after its occurrence, he found that the derailment was caused by a loose wheel which had slipped on the axle on the south side of the lead car, and the north wheel had dropped inside the rail. The first mark of derailment was a flange mark on the tie $3\frac{1}{2}$ inches south of the base of the north rail; similar marks were found on the second, third, fifth, tenth and fourteenth ties. The first mark of derailment on the south side of the track was 1 inch outside of the base of the south rail and 23 feet beyond the first mark near the north rail. The succeeding tie was similarly marked about $2\frac{1}{2}$ inches from the base of the rail; marks then continued in a diagonal direction for a distance of 28 feet to a point where the derailed car apparently encountered the embankment on the south side of the track and was deflected to the bank on the north side, 54 feet beyond. Track Foreman Sutton further stated that at the point of derailment the gauge measured 4 feet 10 inches, and that this excessive gauge was due to the bent condition of the rail caused by the derailment of the car. This rail was later removed. He then took measurements of the track for gauge and elevation at half rail lengths west of the point of derailment and found

the gauge was 1 inch wide at three points. The elevation was $3\frac{1}{4}$ inches, with not more than $\frac{1}{4}$ inch variation.

Car Inspector Duncan, employed jointly by the B. & O. and the C. & C. at Staunton, stated that the two lead cars in this train, Southern stock cars 43877 and 45475, arrived at Staunton at 2:45 p. m. and he gave these cars, together with 6 other cars, class "C" inspection about 3:40 p. m. He inspected the running gear and underneath the cars as closely as possible without going under the cars. He found worn brake shoes which he repaired, on two other Southern cars and this repair work and inspection consumed about 25 minutes. Car Inspector Duncan stated that while the rules require that cars set out at Staunton shall be given class "A" inspection before they are dispatched, the reason he failed to give these cars class "A" inspection was because he did not have time, due to being occupied inspecting cars to be picked up by another train. He stated, however, that had there been any evidence of oil seepage around the axle while making the "C" inspection, he believed he would have detected it. He thought the cars were suitable for loading. After examining the derailed equipment and the marks on the track, he was of the opinion that the accident was caused by a loose wheel and the fact that the track was $1\frac{1}{2}$ inches wide, allowing the wheel to drop inside the rail. The wheel had moved inward on the axle $\frac{3}{4}$ inch, but there was no seepage of grease visible on the wheel. The wheel was removed from the axle by hand on the following day.

General Foreman Spiro, at Harrisonburg, stated that Southern car 43877 was delivered at Harrisonburg by the Southern Railway on September 11, and was given a class "C" inspection by an inspector of the Southern Railway on the following day. On September 14 the car was again given a class "C" inspection by Joint Car Inspector Melhorn before its departure in B. & O. Train No. 85, and the car was not given class "A" inspection at Harrisonburg as required by the P. & O. rules. Joint Car Inspector Melhorn stated that he found nothing wrong with Southern car 43877 when he made a "C" inspection of the car before its departure from Harrisonburg on September 14 and he thought a "C" inspection would detect a loose wheel.

Car Foreman Bissett stated that he dismantled the lead truck, and the lead wheel on the right side was sufficiently loose to permit of removal from the axle by hand with the efforts of four men. Examination developed that the wheel bore was from $1/32$ to $1/16$ inch larger than the $5\frac{3}{4}$ inch wheel seat. There were marks on the inside of the wheel bore evidently caused by metal dislodged from the wheel seat. The wheel bore measured 7 inches and the distance from the outer end of the wheel seat to the axle shoulder was $7\frac{1}{2}$ inches. The

shoulder on the axle was worn bright by the wheel hub, but just when this wear commenced it is impossible to say. If it did not exist prior to the time the car arrived at Staunton, it would not be possible to detect the loose wheel by either "A" or "C" inspections, as there was no oil seepage through the wheel fit to indicate that the wheel was loose, and the bright spots could have developed in a very short movement of the car. He stated, however, that this car should have received "A" inspection before being accepted from the Southern Railway at Harrisonburg.

The car involved, Southern 43877, is a 60,000-pound capacity, steel underframe stock car, equipped with cast iron wheels with 4 $\frac{1}{4}$ by 8 inch journals. The loose wheel was the right forward wheel of the lead truck which was equipped with Scullin truck frames. The axle and both wheels were shipped to the Mount Clare Shops at Baltimore for analysis and examination by the Baltimore and Ohio Test Bureau. Their report is as follows:

The loose wheel, No. 19203, was made by the Southern Car Wheel Company, cast 5-23-1927.

Bore at wheel fit	(Inner side	5.7805"
(loose wheel)	(Center	5.793"
	(Outer side	5.7915"
Diam. of axle in	(Inner side	5.7465"
(loose wheel)	(Center	5.741"
	(Outer side	5.735"

It will be noted that the inner side of the wheel fit was .034" greater than the axle at this point; the center of the wheel fit was .052" greater than the axle at this point, and the outer side of the wheel fit was .0565" greater at this point, all of which indicates a very loose fit, causing gouging of the axle and grooving of the wheel fit.

The axle had been rough turned, with a tool cutting about 12 $\frac{1}{2}$ threads to the inch on an 1/8 inch feed. The axle fit had not been smoothed with a finishing tool and at the time of mounting, the wheel apparently gripped the top of the threads which later broke down and caused the wheel to become loose upon the axle, resulting in the accident.

The wheel on the opposite end of the axle was made for the Atlantic Coast Line, by the Tredegar Company of Richmond, Va., and was cast 6-2-1925. This wheel was unseated in the wheel press, requiring but 75 tons pressure to start it, after which the gauge immediately dropped to zero. This end of the

axle had also been turned without the use of a finishing tool.

The axle was for a $4\frac{1}{4}$ by 8 inch journal and had no marking on the center portion or the end next to the loose wheel. Stamped on the end opposite the loose wheel was No. 6367, evidently the heat number, also 23, which seemed to be the day of the month, but the figures indicating the month and year were not discernible. There was also a mark which evidently was an inspectors mark. Chemical analysis of the axle is:

Carbon	.37 comb.
Sulphur	.044
Phosphorus	.006
Manganese	.39

Inspection of the track by the Commission's inspectors disclosed the marks as described by Track Foreman Sutton. While there was evidence of open gauge at some points on the curve it was not sufficient to cause the derailment and there was no other track condition that could have contributed to the derailment. Examination of the rail removed from the south side of the track showed it badly bent but apparently a result of the derailment. Examination of the wheel and axle at Staunton, after the truck had been dismantled and the loose wheel removed, showed no indication of oil seepage on either the axle or the wheel fit. The axle showed evidence of brightness on the wheel seat and against the shoulder, apparently due to the wheel turning, and there were several spots that appeared to be pitted or gouged. Evidence of rough turning was also apparent upon the wheel seat where machine marks had not been entirely erased by wear. The rough turning which left a threaded effect, was very prominent on that part of the axle outside the wheel seat and the grooves thereon were estimated to be $1/64$ inch in depth. The wheel fit showed brightness and 2 small spots of apparent gouging or pitting and a series of grooves, apparently cut by the material displaced from the pitted or gouged places in the axle.

Neither the flange nor wheel tread showed signs of wear. The inspectors were present when micrometric measurements of the axle and wheel fit were made at Mount Clare shops; they observed the dismantling of the mate wheel and it was noted that oil seepage had commenced and had progressed inwardly about 2 inches, while marks of rough turning were very prominent on the seat of this wheel.

Discussion

The evidence disclosed that the right front wheel of the forward truck of the lead car had moved inwardly on the axle approximately $3/4$ inch. The loose wheel was later removed from

the axle by hand, four men participating in its removal. An examination made by the Test Bureau of the Baltimore & Ohio showed that the wheel had been mounted on a rough turned wheel seat of the axle. Micrometric measurements showed that the diameter of the wheel fit was greater than the wheel seat of the axle, indicating a very loose fit; the axle had been rough turned with a tool cutting about 12½ threads per inch on an 1/8 inch feed and the wheel mounted on the axle in that condition apparently gripped only the tops of the threads which eventually broke down and caused the wheel to become loose.

The rules of the B. & O. Railroad required that cars shall receive "A" inspection when received at interchange or junction points, or when a car is found in a train without form 1137 (certification card record of "A" inspection) attached, or before being placed for loading. "A" inspection is defined as one which should detect all defects existing that can be found without dissecting the car before each trip, and car inspection rule 22, referring to "A" inspection of wheels, directs inspectors to see that wheels are not loose on axles. "C" inspection is defined as inspection for the purpose of making general observation to discover I.C.C. defects or any conditions that may have developed in transit which would render car unsafe or which might develop trouble before end of trip.

The car involved was received by the B. & O. from the Southern Railway at Harrisonburg on the day of the accident, having received "C" inspection only. The car was then moved from this interchange point to Staunton, a distance of 25.3 miles, where the car again received "C" inspection only, and was about to be placed for loading at the time of the accident. While Car Foreman Bissett did not think that an "A" inspection would have necessarily detected the loose wheel on this car, as there was no oil seepage through the wheel^{fit} to indicate that the wheel was loose, and the bright spots could have developed in a very short movement of the car, Inspector Melhorn, who made the inspection at Harrisonburg, thought a loose wheel should be detected by a "C" inspection. Car Inspector Duncan, who made the "C" inspection at Staunton, thought the car was suitable for loading, and gave as his reason for not making an "A" inspection that he did not have time. The car had been moved a very short distance, however, after its last inspection, and had it been inspected as required by the rules it is possible that the defective condition might have been detected. The car inspection rules of this carrier were disregarded by accepting the car at an interchange point and also in moving the car to be placed for loading without an "A" inspection.

Conclusion

This accident was caused by a loose wheel.

Respectfully submitted,
W. J. PATTERSON,
Director.