

INTERSTATE COMMERCE COMMISSION
WASHINGTON

REPORT OF THE DIRECTOR
BUREAU OF SAFETY

ACCIDENT ON THE
BALTIMORE AND OHIO RAILROAD

STANDLEY, OHIO

DECEMBER 10, 1938

INVESTIGATION NO. 2318

SUMMARY

Inv-2318

Railroad: Baltimore and Ohio
Date: December 10, 1938
Location: Standley, Ohio
Kind of Accident: Derailment
Train involved: Passenger
Train number: 8
Engine numbers: 5230, 5061
Consist: 10 cars
Speed: 74.5 m.p.h.
Operation: Timetable, train orders and automatic
block system
Track: Double; tangent; 0.05 percent descend-
ing grade
Weather: Clear
Time: About 3:19 a. m.
Casualties: 17 injured
Cause: Irregularity in track surface

February 7, 1939.

To the Commission:

On December 10, 1938, there was a derailment of a passenger train on the Baltimore and Ohio Railroad near Standley, Ohio, which resulted in the injury of 16 passengers and 1 employee. This investigation was made in conjunction with the Public Utilities Commission of Ohio.

Location and Method of Operation

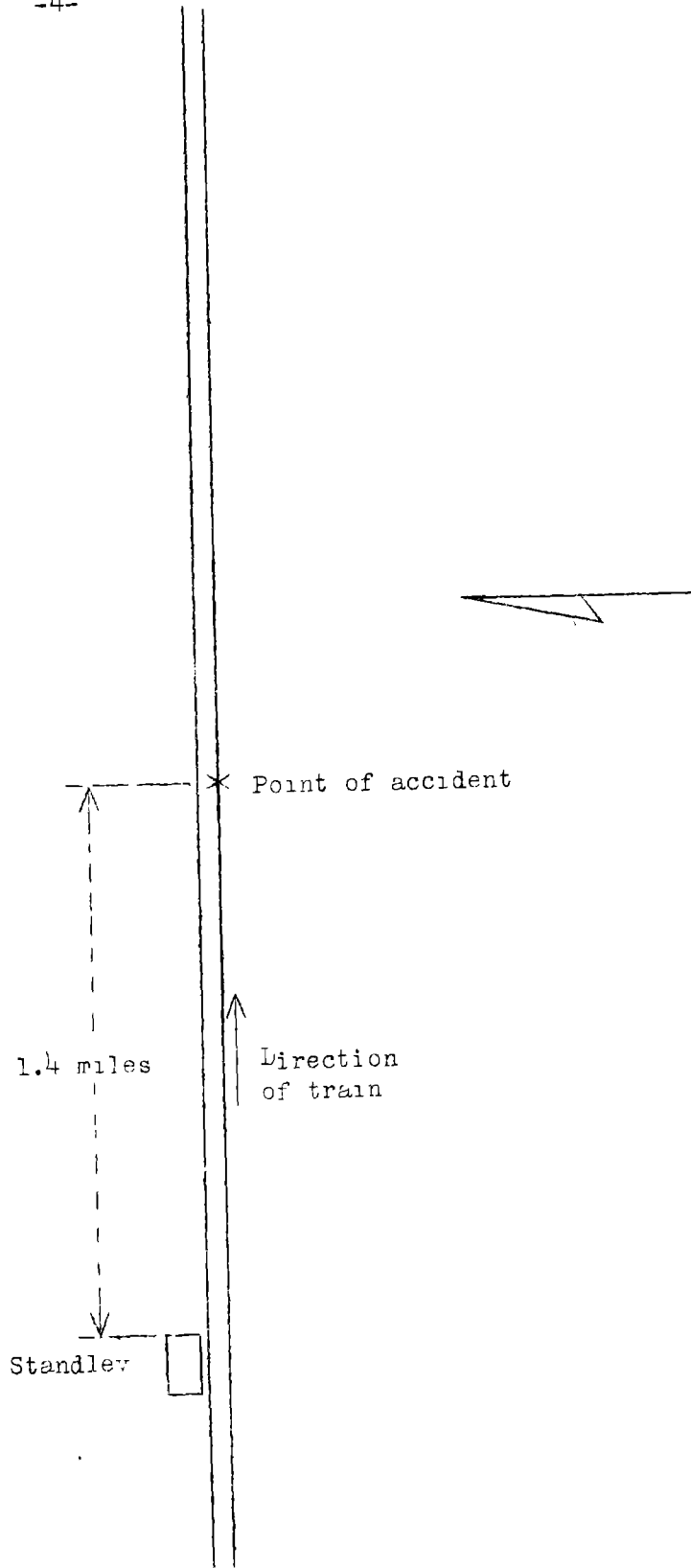
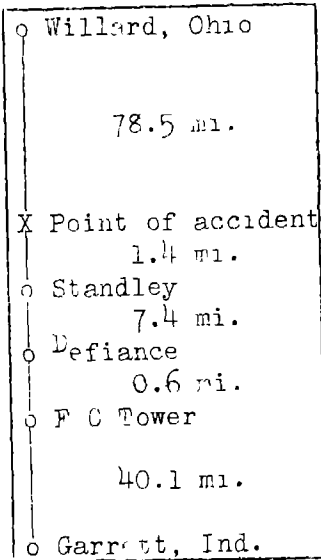
This accident occurred on that part of the Akron-Chicago Division designated as the East Sub-Division which extends between Willard, Ohio, and Garrett, Ind., a distance of 128 miles. In the vicinity of the point of accident this is a double-track line over which trains are operated by timetable, train orders, and an automatic block-signal system. The derailment occurred on the eastward main track at a point 1.4 miles east of Standley. Approaching this point from the west the track is tangent a distance of 3.2 miles to the point of derailment and several miles beyond. The grade is slightly descending eastward, being .05 percent a distance of one mile to the point of accident and two miles beyond.

The track structure is on a 4-foot fill and consists of 100-pound rail, 33 feet in length, joined with six-hole joint bars, and laid on an average of 16 or 17 pine and hard-wood ties to the rail length; it is single-spiked, fully tie-plated, secured with rail anchors and ballasted with crushed rock to a depth of 12 inches below the ties. The maximum authorized speed for passenger trains is 70 miles per hour.

Instructions governing the maintenance-of-way department read in part:

Paragraph-201. The following *** will govern the spacing of main *** track ties: Number of ties per rail: *** 18 to 36-foot rail.

Paragraph-335. Track shall be laid and maintained to true line and surface *** .



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Baltimore & Ohio R.R.
Standley, Ohio
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Paragraph-387. On straight line and on curves up to and including five (5) degrees, a gauge of four feet eight and one-half inches *** shall be used.

The weather was clear at the time of the accident, which occurred about 3:19 a. m.

Description

No. 8, an east-bound passenger train, known as the "Fort Pitt Limited," consisted of one mail car, one express car, one combination baggage-passenger car, one coach, one Pullman sleeping car, one lounge car and four Pullman sleeping cars, in the order named, all of all-steel construction, hauled by engines 5230 and 5061 and was in charge of Enginemen Maurer and Young and Conductor McKinley. This train departed from Garrett at 2:30 a. m., according to the train sheet, 19 minutes late, passed F C Lower, the last open office, 9.4 miles west of the point of accident, at 3:09 a. m., 17 minutes late, and was derailed while traveling at a speed of 74.5 miles per hour, according to the speed recorder tape.

The locomotives and the first two cars remained coupled and stopped about 3,130 feet east of the point of derailment with the leading truck of the second tender, the rear truck of the first car, and both trucks of the second car derailed. The wheels of the derailed tender truck were about six inches north of the rails. The third and fourth cars were derailed and stopped, coupled together, on the south side of the tracks at a point about 1,600 feet west of the second car; both leaned to the south at angles of about 25 and 60 degrees, respectively. The fifth to the tenth cars, inclusive, were derailed and stopped, coupled together, on the roadbed between the two tracks leaning northward at angles varying from 30 to 60 degrees, with the head end of the fifth car about 40 feet east of the rear of the fourth car.

The employee injured was the baggagemaster.

Summary of Evidence

Engineman Young of the leading engine, which was placed on the train at Garrett, stated that the air brakes were tested at that point and a running test was made when departing. At the wayside testing point about seven miles east of Garrett he checked the speed ^{recorder gauge} and it was accurate at a speed of 70 miles per hour. In accordance with his usual practice he looked back on the curves and his last observation was made on a right curve at

a point about three miles west of the point of accident; he could clearly see the entire train and he noticed nothing unusual. About one-half mile west of the point where the accident occurred he partially closed the throttle on the slightly descending grade and the train had traveled about one-fourth mile when he observed that the speed-recorder dial indicated a speed of 70 miles per hour, which is the maximum authorized speed. Shortly thereafter the communicating signal whistle sounded and he instantly noted that the speed indicated by the recorder dial was 70 miles per hour as the emergency application of the brakes, caused by the derailment, occurred. Looking toward the rear as the locomotive was coming to a stop he saw fire flying in the vicinity of the second locomotive. After stopping he observed the derailed equipment which had remained coupled to the two locomotives. The leading tender truck of engine 5061 was derailed with all wheels close to the rails. Making a thorough inspection of both locomotives, their tenders and the derailed tender truck he found nothing broken and no parts missing or other defective condition which could have caused the derailment. He had noticed no rocking or swaying of the tender and there was no unusual movement of the locomotive prior to the time of the derailment. Informed that the speed recorder tape of engine 5250 indicated a speed of slightly more than 74 miles per hour at the time of the accident, he reiterated his statement that the dial indicated a speed of 70 miles per hour at that time and added that he could not account for the apparent discrepancy. He estimated that the accident occurred at 3:19 or 3:20 a. m.

Fireman Byers, of the leading engine, corroborated the testimony of his engineer in all essential details. About 15 miles west of the point of accident he looked back over the train and saw nothing unusual, and he noticed nothing unusual in the riding quality of the locomotive or its tender prior to derailment; he estimated the speed at the time of derailment at 70 miles per hour. An inspection of the derailed tender truck revealed nothing which would have contributed to the accident. During the past six months on the run involved there had been no slow orders received covering the track where the accident occurred. He last rode over this track two days prior to the derailment and noticed nothing unusual in the riding quality of the track at that time.

Engineman Heurer, of the second locomotive, stated that the incoming engineman, whom he relieved at Garrett, remarked about the excellent performance of engine 5061 en route over the 150 miles from Chicago to that point. After departure from Garrett he began a check of the speed-recorder dial as the illuminated initial post of the wayside testing point but smoke and steam obscured his view to the extent that he was not sure exactly when he passed the final post; however, as a result of

his observation he estimated that the recorder was one mile slow at 70 miles per hour. It was between 3:19 and 3:20 a. m. when passing through Standley. About one mile west of the point where the accident occurred he partially closed the throttle, at which time the speed recorder indicated 70 miles per hour, and he was sure that it did not exceed that figure at any time. The locomotive was riding smoothly and he noticed no unusual noise caused by intermittent displacement of the apron between the deck and the tender, and the tender rode so smoothly from Garrett to the point of accident that the fireman had to dig down coal for the stoker. His first intimation of anything irregular was when the locomotive surged slightly and sparks flew from the derailed tender truck. He immediately placed the automatic brake valve in emergency position and cut in the double-heading valve. Shortly after the train stopped he inspected the locomotive, the derailed tender and its truck but could find no parts missing or broken or other defective condition which could have caused the accident.

Fireman Radcliffe, of the second locomotive, corroborated the testimony of his engineman in all essential details. He looked back over the train at four points en route, his last inspection prior to derailment being made just east of Defiance, about eight miles west of the point of accident; he saw nothing unusual at any time. The tender of engine 5061 is of the flat-bottom type and contained about five tons of coal and two-thirds of its capacity of water when the derailment occurred. He estimated the speed at 65 or 70 miles per hour at the time of the accident.

The statement of Conductor McKinley, who was in the combination car at the time of accident, added nothing of value.

Baggageman DeLong, who was seated in the baggage car prior to and at the time of derailment, stated that the speed did not appear to be excessive and that the car rode smoothly.

Brakeman Moats, who was seated in the front portion of the coach prior to the time the accident occurred, stated that he noticed nothing unusual in the riding qualities of the train prior to the accident and he considered the track at the point of accident to be in first-class condition.

The testimony of Flagman Hughes, who was in the rear car, added nothing to the testimony of the other members of the crew.

Trainmaster Mendell stated that he arrived at the scene of accident about 45 minutes after its occurrence. He found the leading truck of the tender of engine 5061 derailed to the north with the wheels close to the rail. After daylight he noted that the track under this locomotive and tender and the first car was undamaged. Proceeding westward to the point of derailment he found a flange mark where a wheel had climbed the north rail at a joint and had traveled on top of the rail a distance of 21 feet 4 inches to the point where it dropped off on the north side of the rail. He did not notice any condition of the locomotive, or of the track immediately west of the point of derailment, which might have contributed to the derailment.

General Foreman Harper stated that when engine 5230 arrived at New Castle after the accident he made a thorough check of the speed recorder thereon with the device used for the testing of passenger locomotive speed recorders. Prior to the test, inspection established that the recorder contained the proper amount of oil. The speed recorder was found to be accurate and operating correctly. He furnished a copy of the speed-recorder tape which indicated that the speed at the time of the accident was 74.5 miles per hour. Master Mechanic Harris stated that engine 5061 was put in freight service November 19, 1938, and was satisfactorily broken in after being reconditioned at New Castle Shop, which included overhauling of the tender trucks. It had been in regular passenger service on the division involved since November 27. Numerous work reports covering this engine, submitted by enginemen and locomotive inspectors at its various terminals since that date, contain no items referring to any defective condition of the tender trucks or to the riding quality of the locomotive. After the occurrence of the accident a detailed inspection of the engine and tender was made at Willard. No parts were broken or missing and no defects were found which might have contributed to the accident. Before the tender was separated from the locomotive it was noted that there were approximately 3.4 inches of compression in the buffer springs. The buffers, which are of the radial type, were gaged and found to be in proper contour and in good condition. There were two new fractures in one buffer spring and an old fracture in the other; they were removed intact from their proper positions and there was no indication of fouling. The pulling bar was straight, with 2-7/8 inch clearance, and it bore no indication of interference. The tender truck involved is equipped with Andrews side-frames. There was no indication of interference on the truck bolster. The side bearings were 56 1/2 inches apart with 1/8 and 1/4 inch clearance of the right and left bearing, respectively. The center plates were in good condition and securely riveted; the male casting on the transom was 11-11/16 inches in diameter and extended into the female casting 1 inch. The female

casting was 12-1/32 inches in diameter at the nearest point and 12-3/32 inches at the farthest, being 1/16 inch out of round; the bearing was properly lubricated. The front and rear wheels of this truck were 34-9/16 and 35-1/8 inches in diameter, respectively; there was practically no tread wear and the flanges were in good condition; back to back measurement disclosed but 1/32 inch variation. The cistern splash plates were tightly secured in their proper positions and they were in good condition; the inspection of the tender disclosed nothing which could have contributed to the derailment.

Section Foreman Kline, in charge of the section on which the accident occurred, stated that his section consists of approximately 6 miles of track. During November his force consisted of six men but it was reduced to five men for December which he believed was a sufficient force properly to maintain the track on his section. He has an ample supply of ties for renewals. During the past two months he had been engaged principally in lining and surfacing track and renewing a few ties. He had end-tamped, lined and gaged the eastward track at a few points two days prior to the occurrence of the accident; however, for more than one month prior to the date of the accident no work of any kind had been performed on that portion of the eastward track extending from a point one-eighth mile east of the point of derailment to a point one-half mile west thereof. He had experienced no particular trouble in maintaining the gage of this particular piece of track. He said the ties are in good condition more than one mile westward and he considered it to be in safe and satisfactory condition for all requirements; however, some soft spots existed just west of the point of derailment and there might be one or two ties in that vicinity which should be renewed. In his opinion the track involved is good for the maximum speed of 70 miles per hour and there had been no reason to request a slow order on it since he took charge on April 1, 1938. He added that no maintenance work whatever had been performed from the point of derailment westward between the time the accident occurred and the subsequent inspection by the Commission's inspectors.

Track Supervisor Reynolds stated that at least once each week he rides passenger trains over his territory to determine the riding quality of the track. He last rode over the track involved about 2:30 p. m., December 9, on No. 10, an east-bound passenger train, and the train rode smoothly from a point 2 miles west to and including the point where the accident later occurred and he noticed no lurch or jerk which would indicate bad track. At the point of accident, and immediately west thereof, the track and its structure do not materially differ from the rest of the track in his territory; it is in good condition

and safe for a speed of 70 miles per hour. There are a few pine ties which are soft on top but their greater portions are still good; they will be renewed as soon as it can be done; however, their condition does not indicate that they should have been removed prior to the occurrence of the derailment. He considered the track 95 percent perfect. The rules do not permit any variation in gage and they require perfect surface and alinement.

Division Engineer Woerner stated that a few hours after the accident occurred he inspected and took measurements of the track involved. The first mark of derailment was a light flange mark which appeared on top of the north rail and continued thereon for a distance of 21 feet 4 inches to the point where a wheel dropped off and the mark appeared on the ties; there was then a distance of 132 feet to the point where an additional mark indicated that a second wheel had become derailed; the two marks were from 8 to 18 inches apart. Beginning at the point of derailment and proceeding westward cross levels were taken both when the track was under load and when not, at joints and centers and the gage was checked and recorded. He found a maximum variation in surface of $5/16$ inch and the gage from $1/8$ inch tight to $1/8$ inch wide. It was his opinion that variations in the cross levels were not sufficient to set up an oscillation of the tender sufficient to enable a wheel to climb the rail. He stated that within the limits involved the track contained some partly shattered and splintered ties but their condition is not such as to require immediate removal; they will be renewed next April. He was of the opinion that the track involved is safe for a speed of 80 or 85 miles per hour and he said that its condition at the time of accident fully met the standard requirements of his railroad.

Officials submitted a record of track measurements, taken after the accident occurred, of the joints and centers, the joints being stationary, which indicated the following conditions: Starting at a point 402.5 feet west of the initial point of derailment and proceeding eastward, the north rail was low at 15 points, the variation ranging from $1/8$ to $3/4$ inch; it was $1/8$ inch low at the joint where the first flange mark appeared. The south rail was low at 3 points, the variation being from $3/16$ to $5/16$ inch, the maximum being at points 54 and 70.5 feet, respectively, west of the point of derailment; at 2 points only there was no variation. Under-load measurements were later taken with the cross-level under the front coupler of a 2-4-0 type locomotive. Proceeding eastward and within the same limits, the north rail was low at 15 points and the variation ranged from $1/8$ to $11/16$ inch; it was $1/4$ inch low at the joint where the first flange mark appeared. The south rail was low at 6 points, the variation ranging from $1/16$ to $3/8$ inch, the maximum being at a point 54 feet west of the point of derailment; at two points only there was no variation. The gage varied from 4 feet $8-3/8$ to 4 feet $8-5/8$ inches; it was standard at the point of derailment.

According to records submitted, both engines involved are of the 4-6-2 type, stoker fired; Engine 5230 is equipped with a Vanderbilt tender and engine 5061 has a rectangular-type tender. The tender of engine 5061 is 33 feet 8-5/8 inches in length, its maximum height which is at the top of the coal compartment, is 14 feet 2-3/16 inches above the top of the rails; it has a capacity of 21 tons of coal and 13,500 gallons of water. The trucks are equipped with Andrews steel side-frames and have four wheels with 6 1/2 x 12-inch journals. At the time of the accident this tender contained about five tons of coal and two-thirds its capacity of water.

Observations of the Commission's Inspectors

Inspection by the Commission's inspectors of the locomotives and their tenders disclosed their mechanical condition to be as described by the master mechanic; it was observed that the tender truck wheels, which were derailed first, bore no evidence of having struck any object on the track, and the condition of the flange of the left leading wheel indicated that it had borne very little weight during its revolutions on top of the north rail; the brake shoes and all parts of the brake rigging were in good condition and intact.

Examination of the speed recorder tape of engine 5230 indicated that the speed was 74.5 miles per hour at the time of derailment.

Inspection of the track involved revealed no marks made by dragging or defective equipment. The flange mark which had appeared on the top of the north rail a distance of 21 feet 4 inches was obliterated before the Commission's inspectors arrived at the scene of the accident, but other marks of derailment were found to be substantially as described by the division engineer.

The variations indicated by the cross levels and the gage compared approximately with those recorded by maintenance-of-way officials; however, it did not appear to the Commission's inspectors that the variations noted under load indicated the maximum that might have been developed under a moving train. During their inspection of the track they noted that all joints were fully bolted and were reasonably tight. The heads of the track spikes were driven to a point within about 3/16 inch of the base of the rail, few being fully driven down. There were 16 to 17 ties to the rail-length; inspection of 394 ties immediately west of the point of derailment developed that 346 were in good condition, 48 being either considerably cut by the tie-plates, partly decayed, spongy, or shattered at one or both ends, one of

the shattered ties being a pine tie located about 12 feet west of the point of derailment; the south end of this tie was shattered in several directions from its center to the outward edges. They observed that the compression of this tie under the weight of a heavy freight engine hauling a train at a speed of about ten miles per hour resulted in a deflection of about 5/8 inch.

Discussion

No member of the crew estimated the speed of the train at the time of the accident to be in excess of 70 miles per hour; however, the speed recorder tape indicated the speed to be 74.5 miles per hour at the time of the accident; the maximum authorized speed is 70 miles per hour. The locomotives and the first two cars stopped at a point about 3,160 feet east of the initial point of derailment. The leading truck of the tender of the second engine was the first unit in the train to become derailed. The marks of derailment indicated that the leading north wheel of this truck had mounted the top of the rail at a joint and the flange had traveled thereon a distance of 21 feet 4 inches and dropped to the ties.

Inspection of both locomotives, their tenders, and the derailed tender truck by officials and the Commission's inspectors disclosed no parts broken or missing nor any defects which contributed to the derailment. The locomotive tender involved contained about five tons of coal and two-thirds its capacity of water at the time of the accident; the splash plates were securely in place.

There was no evidence on the track of dragging equipment and the wheels of the tender bore no marks indicating they had struck any object.

The record of the cross-levels for a distance of 402.5 feet immediately west of the initial point of derailment disclosed that the south and north rails were low at 6 and 15 points, respectively, the variation between the two rails ranging from 3/16 to 3/4 inch; the south rail was 5/16 inch low at points 54 and 70.5 feet west of the initial point of derailment. The gage within these limits varied from 4 feet 8-5/16 inches to 4 feet 8-5/8 inches. In addition, the Commission's inspectors noted that very few of the spikes were fully driven down to the base of the rail and there were only 16 or 17 ties to the rail length; their inspection of 304 ties immediately west of the initial point of derailment disclosed that 48 were either

considerably cut by tie-plates, partly decayed, spongy, or shattered at one or both ends; the south end of a pine tie located about 12 feet west of the point of derailment was shattered from its center to the outward edges. It was observed that the weight of a heavy freight engine hauling a train at a speed of ten miles per hour caused a deflection of approximately 5/8 inch at that point.

The section foreman stated that he had ample ties for renewal and that his force was sufficient for proper maintenance. He stated that he had performed no work in the immediate vicinity of the point of accident for more than a month; he said that some soft spots existed and that one or two ties might need renewal but he considered the track to be in safe and satisfactory condition to meet all requirements. The supervisor stated that while there were a few pine ties which were soft on their tops their greater portions were still firm and they did not require immediate renewal; he was of the opinion that the track involved was safe for the maximum authorized speed. The division engineer thought that the variations indicated by the cross-levels were not great enough to cause the tender to oscillate sufficiently to cause a wheel to mount the rail; he stated that there were some partly splintered and shattered ties within the limits involved but added that their condition did not necessitate immediate renewal; he thought that the track involved was safe for a speed of 80 or 85 miles per hour.

Instructions governing the maintenance-of-way department specify 18 ties to the 55-foot rail shall be used in main track but in the vicinity of the point of accident there were only 16 or 17 ties to the 33-foot rail; these instructions also require a true surface and a gage of 4 feet 8-1/2 inches be maintained but as shown above the surface was not true and the gage was not uniformly 4 feet 8-1/2 inches; from this it is apparent that the maintenance of the track involved did not comply with the instructions of the maintenance-of-way department.

The investigation established the fact that the left front wheel of the leading truck of the second tender was derailed first; it is believed that this resulted from a combination of factors, including variations in the cross levels between the north and the south rails, the rate of speed and the fact that the tender was only lightly loaded at the time. While the engine crew of the second locomotive noticed no unusual swaying of the tender prior to the accident there is nothing in the evidence to indicate that they had been giving this matter any particular attention.

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Conclusion

It is believed this accident was caused primarily by irregularities in the track.

Respectfully submitted,

W. J. PATTERSON,

Director.