

1913

INTERSTATE COMMERCE COMMISSION

REPORT OF THE DIRECTOR OF THE BUREAU OF SAFETY CONCERNING AN
ACCIDENT ON THE NORFOLK AND WESTERN RAILWAY NEAR NACE,
VA., ON MAY 20, 1934.

July 5, 1934.

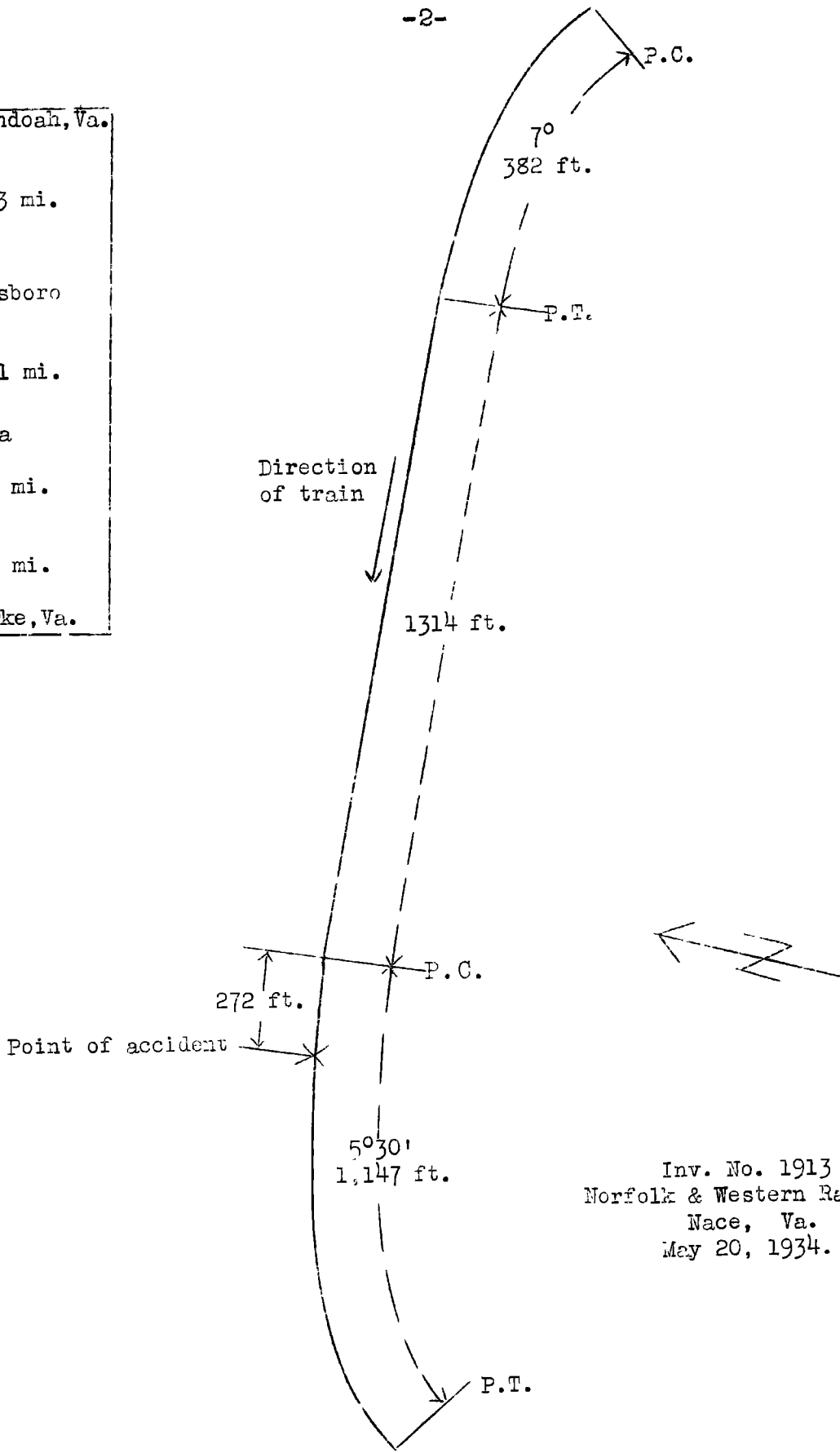
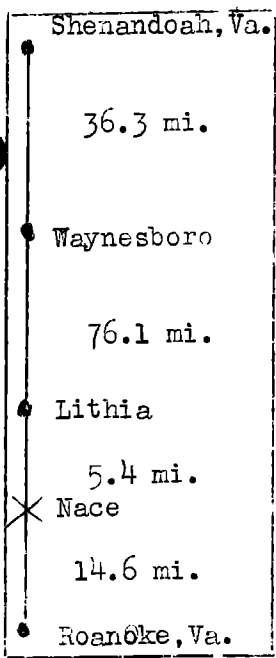
To the Commission:

On May 20, 1934, there was a derailment of a freight train on the Norfolk and Western Railway near Nace, Va., which resulted in the death of 1 employee and the injury of 1 employee.

Location and method of operation

This accident occurred on that part of the Shenandoah Division extending between Shenandoah and Roanoke, Va., a distance of 132.4 miles; in the vicinity of the point of accident this is a single-track line over which trains are operated by time table, train orders, and an automatic block and cab-signal system. The accident occurred approximately three-fourths mile south of the station at Nace; approaching this point from the north, there is a 7° curve to the left 382 feet in length and then the track is tangent for a distance of 1,315 feet, followed by a 5°30' curve to the left 1,147 feet in length, the accident occurring on this last-mentioned curve at a point 272 feet from its northern end. The grade for south-bound trains is descending for a distance of 900 feet, ranging from 1.05 percent to 1.20 percent, leading to a vertical curve, and then it is 0.74 percent ascending for a distance of 1,127 feet to the point of accident, and for some distance beyond that point.

The track is laid with 130-pound rails, 39 feet in length, with an average of 34 hardwood ties to the rail length, fully tieplated, single-spiked, equipped with from 1 to 5 rail anchors to the rail length, and is ballasted with crushed stone to a depth of about 8 inches, underlaid with slag. The track had been raised recently but no new ballast had been added, the result being that there was no ballast between some of the ties while in other cases it varied up to about 4 inches above the bottoms of the ties; the ballast under the ties, however, was firm. The maximum speed permitted for freight trains is 45 miles per hour.



Inv. No. 1913
 Norfolk & Western Railway
 Nace, Va.
 May 20, 1934.

The weather was clear and very warm at the time of the accident, which occurred about 2:50 p.m.

Description

South-bound freight train Extra 2012 consisted of 5 loaded and 70 empty cars, and a caboose, hauled by engine 2012, and was in charge of Conductor Morris and Engineman Talbert. This train left Waynesboro, 81.5 miles north of Nace, at 11:30 a.m., passed Lithia, 5.4 miles from Nace, at 2:31 p.m., and was derailed shortly afterwards while traveling at an estimated speed of from 25 to 30 miles per hour.

The engine and tender were derailed and stopped on their left sides against the embankment to the left of and parallel with the track, with the front end of the engine 360 feet south of the point of derailment. The first car and the fifth to the twelfth cars, inclusive, also were derailed, the first car stopping immediately behind the tender and the other derailed cars being scattered in various positions. The engine was badly damaged, one car was destroyed, and the other cars were more or less badly damaged. The employee killed was the engineman, and the employees injured were the fireman and head brakeman.

Summary of evidence

Fireman Alley noticed nothing unusual about the riding of the engine and had been looking ahead from the left side cab window as the train approached the point of accident, but did not see anything wrong with the track, although immediately preceding the derailment his vision was momentarily diverted from the track in order to look at the water gauge. The train was traveling between 25 and 30 miles per hour, with the engine working steam, and just after the slack had run in while passing through the dip in the track the engine suddenly lurched and then overturned. He said the engineman did not apply the brakes, nor did he hear him shout any warning prior to the accident. Fireman Alley was unable to get off before the engine stopped, but as soon as he got out of the wreckage he looked back and saw that the track was off the roadbed and had the appearance of having buckled.

Head Brakeman Cromer stated that before leaving Shenandoah, the initial terminal, he saw an inspector give the engineman a signal and heard the engine whistle sounded to indicate that the brakes were being tested, and later he saw an air-brake clearance card showing that all brakes were operative, with a leakage of 5 pounds. The train stopped at Waynesboro to set out a car and at Loch Laird for coal, and there was nothing about the

handling of the train or the riding of the engine and tender during the trip that attracted his attention except that the engineman complained that the engine was sluggish and would not run fast enough. After passing Lithia he got down off the tender and was standing on the deck of the engine behind the engineman while approaching the point of accident, and his first intimation of anything wrong was when he heard a change in the exhaust and the engineman said that the engine was derailing then jumped from his seat box and ran towards the fireman's side of the cab without first applying the brakes. Brakeman Cromer then observed that the front end of the engine was heading towards the embankment on the right side of the track and immediately jumped from the gangway; he estimated the speed at the time of the accident at 25 miles per hour. After the accident he looked at the engine and track to determine the cause of the accident, but saw no defects.

Conductor Morris stated that a normal run was made from Shenandoah to the point of accident, the speed not exceeding 35 miles per hour at any point. The train increased speed from about 20 miles per hour to 25 or 30 miles per hour after passing into the hollow at Nace and he did not hear or feel any brake application before the emergency application which apparently occurred at the time of the derailment. He examined the track after the accident and while there were some badly-kinked rails under the engine he did not find any broken rails or other defects which would enable him to say what caused the accident.

Road Foreman of Engines Edmonston arrived at the scene of accident at 4:32 p.m., and on inspecting the engine he found the throttle about two-thirds open, while both brake valves were in running position and did not appear to have been touched after the accident, as the handles were coated with mud. The brake shoes and brake rigging appeared to be intact, the flanges and tires were in good condition, and he found no defects about the engine truck, while there was no indentation on the flanges or tires that would have been made by the engine striking some metallic object. His inspection of the track disclosed no indication of buckled track or any other track condition that might have contributed to the cause of the accident. General Foreman Budwell and Assistant to Superintendent Motive Power Barry inspected engine 2012 where it stopped, again after it was re-tracked, and again after it was moved to Roanoke, but their examination disclosed no condition that could have contributed to the derailment. Prior to its departure on this trip engine 2012 had been inspected by Engine Inspectors Tate and Lam, who found nothing that could have had any bearing on the accident.

Section Foreman Bryant stated that the last work performed on the track in the vicinity of the point of accident was to

raise the track about 3 or $3\frac{1}{2}$ inches, this work being completed about May 2. The track was surfaced and the alignment and elevation checked, the elevation being $5\frac{1}{2}$ inches. No new ballast was added, but the ties were thoroughly tamped with the original ballast, which left it averaging about half full between the ties. This work was done in the same manner that he has followed in surfacing and ballasting for the past 20 years and he considered the track in first-class condition. There was no indication of the track becoming too tight or liable to buckle, and he had no knowledge of the track ever having buckled in that vicinity since new rail was laid in 1928. He said that it was his specific duty to observe contraction and expansion during warm weather and that he walked over this portion of track about 11 a.m. the previous day and at that time the general condition of the track was good, with the ends of some of the rails fitting together while others still had some space between them; he thought the weather was about as hot when this inspection was made as it was on the day of the accident. He arrived at the scene of accident about 4 p.m. on the day of its occurrence, but on account of the wreckage on the track he could not thoroughly inspect it, and he did not know how much of the track had been shoved out of line as his gang made repairs to the south end of the damaged track and another gang repaired the northern end.

Roadmaster Woolvine stated that the track in the locality of the point of accident was raised an average of 3 inches between April 30 and May 3, the work being done in accordance with standard specifications and the general practice for work of this nature. He last rode over this track on May 16 and observed that the alignment and riding conditions were good. After the accident he took measurements of the curve from the first mark of disturbance northward to the end of the curve and found it in good condition. There were no low joints or irregularities in alignment, the curvature being practically uniform at $5\frac{1}{2}$ degrees, the elevation $5\frac{1}{2}$ inches, and the gauge 4 feet $8\frac{1}{2}$ inches, and each joint was spaced an average of $1/8$ to $3/16$ inches. From the point of accident southward the track was distorted and knocked out of line for distances ranging from 18 inches to 4 feet, up to the point where the track was completely torn up. He found no broken rails except at the point where the engine stopped, and was positive that the condition of the track did not contribute to the cause of the accident.

Superintendent Ayers stated that he arrived at the point of accident about 4:45 p.m., and shortly afterwards he made an inspection of the track and derailed equipment before it had been disturbed. All of the joints on the entire curve approaching the point of derailment had openings ranging from $1/16$ to $5/8$ inch, no rails were broken, the angle bars were intact and fully bolted, the spikes were well settled, and the rail anchors

indicated no sign of there having been any longitudinal movement in either direction. From a point just south of the first mark of derailment to the point where the engine stopped, the track was so badly distorted and out of line that it was impossible to determine what had transpired, but in his opinion this disturbance was a result of the derailment and had no bearing on its cause. From his examination of the equipment and track it was evident that the right No. 1 and left No. 4 driving wheels of the engine were the first to be derailed and the resulting diagonal twist in the running gear started to turn the engine over before the other wheels were derailed. A blue print representation of conditions as found by the superintendent, his assistant, and the roadmaster, shortly after the occurrence of the accident, showed that the track south of the first mark of derailment was out of line to the left or inside of the curve for a maximum distance of 8 inches; then to the right for a maximum of 3 feet, and then to the left for a maximum of $4\frac{1}{2}$ feet for a distance of several rail lengths to where the engine stopped.

Examination of the track by the Commission's inspectors, north of the point where it had been demolished, showed that it was in fairly good condition although the ballast between the ties was not equally distributed, varying from none to probably 3 or 4 inches above the bottoms of the ties, and averaging less than 50 percent of full ballast. The first mark of derailment consisted of a scar on the gauge side of the head of the low rail, extending a distance of 37 inches to a rail joint, the receiving end of which was lightly marked, and opposite this point there was a mark diagonally across the ball of the high rail, extending from the gauge side to the outer edge, 7 inches in length. South of these initial marks there was evidence that the receiving ends of several joints in the low rail had been struck by some hard object, while there were scrape marks along the outside of the high rail for a distance of $1\frac{1}{2}$ rail lengths, followed by no such marks for about a rail length and then additional scrape marks extending nearly 3 rail lengths to the point where there was another diagonal mark across the ball of the rail, 7 inches in length, similar to the first mark on the high rail previously mentioned. South of this point the track was torn up, and up to this point, more than five rail lengths from the first mark, there had been no flange marks or other marks on the ties. The gauge north of the first mark of derailment varied from 4 feet $8\frac{1}{4}$ inches to 4 feet $8\frac{3}{4}$ inches, and the elevation varied from $5\frac{1}{2}$ inches to $5\frac{3}{4}$ inches.

Engine 2013 is of the 3-8-8-2 Mallet type with a driving wheel base of 43 feet 4 inches and a total wheel base of 58 feet; engine and tender, in working order, weighed 843,700

pounds. This engine received general repairs in December, 1933, and since that time its approximate mileage was 20,000 miles. Inspection of the engine disclosed that the right No. 1 driving wheel of the low-pressure engine had a pronounced scar on the gauge side of the flange, and a heavy scour or grind mark extended entirely around the inside of this wheel, indicating that it had been running in contact with the outside of the rail. The left No. 4 driving wheel had a mark on the outside edge of the tire which extended around the wheel and appeared to have been made by the wheel running against the gauge side of the rail. No other wheels showed any similar marks, and there was nothing found to indicate there was anything defective about the engine that could have been responsible for the accident.

Conclusions

The cause of this accident was not definitely ascertained.

Approximately 3 weeks prior to the accident the track had been raised 3 inches, without adding new ballast; however, the statements of the section foreman and roadmaster indicated that the track was left in good condition, and it had been inspected by the section foreman the day preceding the accident, while the last train to pass over it was south-bound passenger Train No. 1, which passed Troutville, the next station south of the point of accident, at 8:04 a.m. An inspection of the track by the roadmaster and superintendent subsequent to the accident did not disclose anything which could have contributed to the accident, nor did the road foreman of engines, general foreman, or assistant to the superintendent of motive power discover any mechanical defect about the engine that could have contributed to its derailment. A careful inspection of the track and engine by the Commission's inspectors also revealed no defects that might have caused the accident.

The temperature on the day of the accident was about 90° and consideration was given to the possibility that the track might have buckled due to this warm weather when coupled with the fact that additional ballast had not been added when the track was raised. It was not definitely determined that this was the case, however, nor did it appear that there was any question as to excessive speed, and examination of the marks on the rails, the absence of marks on the ties, and the manner in which the track was found to be out of line, first several inches to the left or inside of the curve, then several feet to the right for a short distance, and then several feet to the left for a considerable distance, coupled with the marks which indicated that the right front driver of the low-pressure engine

had been running on the outside of the rail with the left back driver on the inside, without marking either ties, rail bases or spikes, failed to lead to any definite conclusion as to the cause of the accident. The train crew had no warning of anything wrong prior to the derailment, and it is apparent that evidence as to the cause of accident was destroyed as a result of damage to the engine and track following the derailment.

Respectfully submitted,

W. J. PATTERSON,

Director.