

INTERSTATE COMMERCE COMMISSION

REPORT OF THE DIRECTOR OF THE BUREAU OF SAFETY CONCERNING AN
ACCIDENT ON THE NORFOLK AND WESTERN RAILWAY NEAR
WHARNCLIFFE, W. VA., ON AUGUST 10, 1932.

September 15, 1932.

To the Commission:

On August 10, 1932, a freight train was derailed on the Norfolk and Western Railway near Wharncliffe, W. Va., which resulted in the death of one employee and the injury of two employees.

Location and method of operation

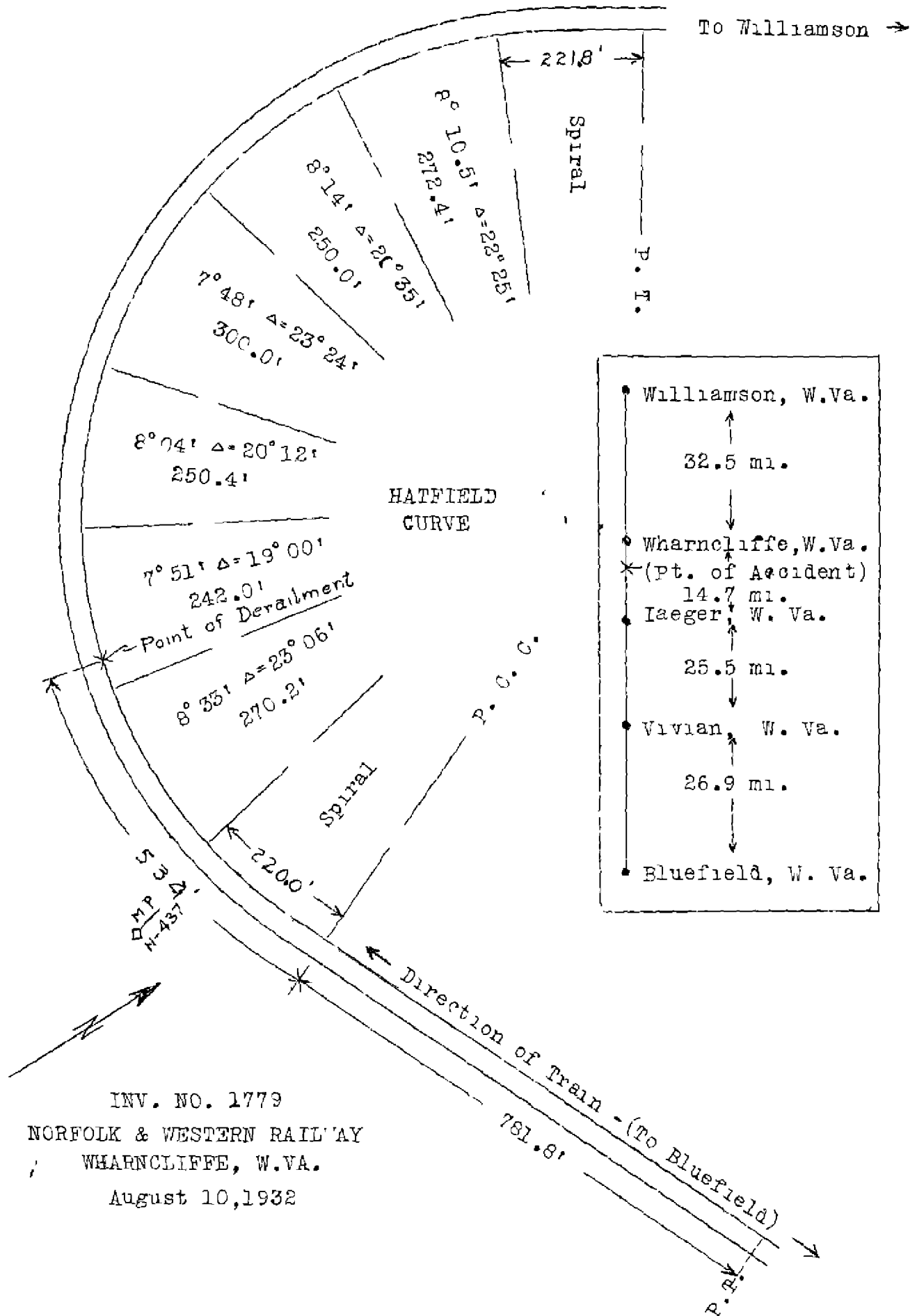
This accident occurred approximately three-quarters of a mile east of Wharncliffe station, on the Pocahontas Division, 67.4 miles west of Bluefield and 32.2 miles east of Williamson, W. Va. In the vicinity of the point of accident, this is a double-track line on which trains are operated by time-table, train orders and an automatic block-signal system. Freight trains are restricted to a maximum speed of 30 miles per hour on the track involved in this accident.

Tangent track extends westward 1,086.1 feet to a left-hand compound curve, varying in curvature from $3^{\circ} 54'$ to $8^{\circ} 29'$, 1,837.9 feet long, including spirals. Thence tangent track extends 781.8 feet to a right-hand compound curve, varying in curvature from $7^{\circ} 48'$ to $3^{\circ} 33'$, 2,026.8 feet long, including spirals, the accident occurred on this right-hand curve, designated as Hatfield Curve, 534 feet west of point of eastward spiral, curvature at point of accident being $7^{\circ} 51'$. Grade at point of accident is 0.43 per cent descending westward. In the vicinity of the point of accident, a rock cut rises abruptly from 12 to 65 feet at the north side of the roadway, restricting vision to less than $\frac{1}{4}$ mile. The tracks consist of 130-pound rails, about 22 treated ties per 39 foot rail length, supported by limestone ballast approximately 24 inches in depth, and are well maintained. Normal superelevation of the outer rail of the curve on which this accident occurred is approximately $4\frac{1}{2}$ inches.

The weather was clear at the time of the accident, which occurred about 9 42 p.m.

Description

Westbound second class freight train No. 85, in charge of Conductor Thomas and Engineman Martin, consisted of engine 2102, of the 2-8-8-2 Mallet type, 52 freight cars and a caboose, 1,546 tons or less than half specified tonnage rating. Train



No. 85 departed from Bluefield at 7.25 p.m., August 10, according to the train sheet, 3 hours 20 minutes in advance of schedule time, stopped at Vivian, 26.9 miles west of Bluefield, about 10 minutes for inspection of train, passed Iaeger, the last open train order office, 14.7 miles east of the point of accident, at 9.18 p.m., according to the train sheet, 4 hours 47 minutes in advance of schedule time, and was derailed near Wharncliffe while moving at estimated speed of 30 or 35 miles per hour.

The left front driving wheel of the locomotive indented the top of an angle bar on the gauge side of the south or outer rail of the curve, 7.5 feet westward, the flange of the right front driving wheel crossed the north or inner rail of the curve, not marking the top of the rail but chafing the north side of head of the rail a distance of 186 feet. The outer rim of tire of the left front driving wheel received sufficient support from the slightly worn gauge side of the south or outer rail to prevent the flange from coming in contact with the ties. Shearing portions from angle bars on gauge side of the south rail, the locomotive continued 186 feet in this position, then overturned upon its left side, resting upon and parallel with the north rail of the eastbound track, and skidded westward approximately 181.5 feet beyond the point at which it left the westbound track. The tender remained attached to the locomotive and was also overturned. The leading 14 cars of the train were derailed and stopped crosswise of the main tracks within a space of less than 100 feet, six of these cars were overturned and two were demolished. The fireman died beneath the overturned locomotive, and the engineer and front brakeman were seriously injured.

Summary of evidence

Conductor Thomas of train No. 85, stated that air brakes of his train were tested and all were operative when that train departed from Bluefield at 7.25 p.m. Train No. 85 stopped at Vivian about 10 minutes for inspection, after which no further stops were made until the accident occurred. Speed restrictions may have been exceeded between Vivian and the point of accident, but no excessive speed was attained. Speed restrictions were observed on the curve just east of Panther, and also when approaching Hatfield Curve, where the engineer set the brake on the engine and the train was bunched, speed on that curve was neither excessive nor unusual, and was about 25 or 30 miles per hour at the time of derailment. Riding in cupola of the caboose, Conductor Thomas observed that Iaeger Tower was passed at 9.17 p.m., at which time the weather was clear and the moon was shining, and objects could be distinguished at some distance. The independent or engine brake was used to reduce speed of the train at Panther Curve and again at Hatfield Curve, this he determined by the manner in which the train was bunched at those points. He believed that the independent brake was applied when engine 2102 was 10 to 15

car-lengths east of the entrance to Hatfield Curve. He felt no severe jar at time of derailment, but sudden drop of hand of air gauge informed him that emergency application of the brakes had been made. As the train stopped, his watch indicated 9.42 p.m. Later, Engineman Martin told him that the accident was caused by the pony truck jumping the track.

Because of his injuries no further statement was obtained from the engineman.

Flagman Armstead of train No. 85, corroborated generally the statement of Conductor Thomas and fixed speed of his train between Iaeger Tower and the point of derailment as about 30 miles per hour. He stated that slack of train was bunched on the curve at Panther, and speed of train was reduced at Alnwick by use of engine brake. Slack was bunched again when the engine was 50 or 60 car-lengths east of the point of accident, and remained bunched until derailment occurred. He heard the air brakes applied in emergency as the train was moving about 25 or 30 miles per hour, and he observed air pressure on caboose gauge diminish as the train stopped. Prior to this emergency application he observed no application of the automatic air brakes in the vicinity of the point of accident.

Brakeman Pollard of train No. 85, stated that brakes were not applied, but the engine was eased off at Wyoming and again at War Eagle. He thought that speed of his engine entering Hatfield Curve, was between 25 and 35 miles per hour. From his location in brakeman's cupola on tender he could not tell certainly if brakes were applied. He was unaware of the derailment until he heard a hissing noise, then observed that the engine was derailed, almost immediately afterward, the engine turned over.

Track Foreman Phillips stated that he has served in that capacity more than 21 years on the Pocahontas Division, and was in charge of track work in the vicinity of the point of accident. Between 7.45 and 9.30 a.m., on the day of accident, his force raised the track about $2\frac{1}{2}$ inches from a point about 2,000 feet west of the mile post near which the accident afterward occurred to a point about 1,000 feet east of the point of accident. Until 3.30 p.m., they lined, ballasted, and dressed this track, smoothing the surface twice after trains passed over it during the day. Old ballast beneath the ties was not disturbed. Before he left the track at the end of the day, new ballast had been tamped beneath the ties, shoulders had been tamped at the ends of ties, ballast was filled in half-full between the ties, and the track was in good condition, there was no apparent reason to anticipate lateral movement of track on account of insecure ballast. Superelevation of $4\frac{1}{2}$ inches maintained on this curve is ample for safe movement of trains at a maximum speed permitted, track is safe for speed of 35 to 40 miles per hour. He inspected this track about 3 p.m., observing levels at each joint.

After the accident occurred, he found the track east of the point of derailment badly out of alignment, but ballast was not disturbed east of the point at which the engine turned over.

Assistant Superintendent Derrick, in charge of track maintenance, stated that on account of his competence Track Foreman Phillips was placed in charge of ballasting at Hatfield Curve, where his methods of work have been considered safe and satisfactory. Assistant Superintendent Derrick considered this track safe for speed of 35 miles per hour at the time of accident. The south or high rail of the curve was slightly flangeworn, but not sufficiently to contribute to cause of derailment. On the preceding day, he rode over the track involved, and he passed over it again on the afternoon prior to the accident. Arriving at scene of the accident about three hours after derailment occurred, before the track had been repaired, he found the track moved off center, toward the south or high side of the curve, from 6 to 15½ inches from original location, for approximately 248 feet east of the point of derailment. Track joints were open from one-fourth to one-half inch for several hundred feet east of the point of accident, however no appreciable longitudinal movement of ties was indicated except where shifted by rail anchors.

Assistant Trainmaster Fields stated that he rode the preceding freight train westward from Eckman to Vulcan on the day of accident. Standing at the left side of locomotive gangway, with his left foot on the tank and his right foot on the apron, as train rounded Hatfield Curve about 7.55 p.m., moving approximately 20 miles per hour, about 1 hour 45 minutes before the accident occurred, he detected no irregularity of track in that vicinity and no adverse comments were made by the engineer or fireman. The brakes on this train were not applied in the vicinity of the point of accident.

Engineer of Tests Coddington, made a detailed inspection of the locomotive and track involved, on the morning after the accident occurred. He stated that markings on the track indicated that not more than one pair of derailed wheels fouled any part of the track, also the conditions of driving-box cellars and markings on tires pointed conclusively to the front pair of drivers as those that left markings on the track. After the locomotive was rerailed, further inspection disclosed nothing irregular about the spring rigging or the equalizing system.

Master Mechanic Brown arrived at the scene of the accident about 3 hours after the derailment occurred and corroborated generally the statement of Mr. Coddington. He inspected engine 2102 and tender carefully, both before and after the locomotive was rerailed. He checked lateral on engine truck, driving wheels and trailer truck. He inspected all tires and found no evidence of tires cutting or engine being out of

alignment. The boiler slide bearings were well lubricated; the running gear was in good condition, and there was no mark on the engine to indicate that anything had been fouling. All details enumerated were found in good condition.

Superintendent Tracy stated that time-table speed restrictions between Bluefield and the point of accident were exceeded by the train involved in this accident, however, because of improved condition of track and equipment since these speed limits were fixed many years ago, they were commonly exceeded. A revision of time-table rules, increasing maximum speed limits to conform with present practice, was in course of preparation, under which it is proposed to increase the maximum speed limit for freight trains, in the territory where the accident occurred, from 30 to 35 miles per hour.

Conclusions

The cause of this accident could not be definitely ascertained.

On the day of this accident considerable work was done on the track in the vicinity of the point of accident which may have somewhat weakened the track structure temporarily; however, statements of Assistant Superintendent Derrick and Track Foreman Phillips indicate that the track was left in good condition about six hours before the accident occurred. Apparently this track was still smoothly surfaced when passed over by Assistant Trainmaster Fields, riding the gangway of a locomotive, less than two hours prior to time of accident. Statements of Engineer of Tests Coddington and Master Mechanic Brown indicate no mechanical defect of engine 2102 which tended to cause derailment. Inspection of track and locomotive involved, made by representatives of this Bureau, discovered no defect of track or locomotive which might have caused this accident.

The evidence indicates that the speed was slightly reduced and the slack bunched as the train closely approached Hatfield Curve, the conductor thought this was done by means of an application of the independent brake, or it may have been accomplished by merely shutting off the heavy Mallet engine pulling this train. The train brakes were applied automatically when the train broke in two as a result of the derailment.

Including two reductions of speed made en route, this train was moved between Iaeger and the point of accident, 14.7 miles, in 24 minutes, or at an average speed of 36.75 miles per hour. This was in excess of time-table speed restriction of 30 miles per hour; however, it was common practice to exceed this speed limit, and the time-table rule was being revised to conform with current practice.

It is believed that this accident was the result of a number of contributing factors, most important of which were the sharp curve, the relatively high rate of speed and the fact that braking or retarding force was confined to the engine. It appears to be definitely established that the right front driving wheel was the first to be derailed, in the investigation the theory was advanced that the force created by the momentum of the 53 unbraked cars, centrifugal force, overhang of boiler, construction of boiler slide bearing, together with other factors, combined to cause the engine to roll sufficiently to raise the right front driving-wheel above the low or inside rail of the curve and that it came down outside the low rail, not marking the rail head as the flange crossed over. Centrifugal force then caused the left front driving-wheel tire to remain in contact with the gauge side of the high rail a distance of 186 feet, where the engine turned over. Safely to reduce speed, the brake should have been applied before engine 2102 entered upon the curve.

Respectfully submitted,

W. P. Borland,

Director.