

In re investigation of an accident on the  
Virginian Railway which occurred near  
Danieltown, Va., on September 20, 1916.

October 21, 1916.

On September 20, 1916, there was a derailment of a light engine on the Virginian Railway near Danieltown, Va., which resulted in the death of 3 employees and injury to 1 employee.

The first division of the Virginian Railway Company on which this accident occurred, extends from Norfolk, Va., to Victoria, Va., a distance of 120 miles. It is single track and the movement of trains is governed by time-table and train orders which are transmitted by telephone.

Eastbound freight extra consisting of engine 434, 100 loaded cars and caboose, in charge of Engineman Staley and Conductor Connell, left Victoria at 10:00 a. m., en route to Sewells Point, Va. The train passed Delphin, 27.8 miles east of Victoria, at 11:28 a. m., and had reached a point about 2.4 miles east of Delphin when at about 11:45 a. m. the main pin on the right main driver broke off. The train was stopped without further damage. The train dispatcher was notified of the accident and arrangements were made to send another engine to relieve engine 434. Engine 451 in charge of Engineman Browder was later sent from Victoria to Adsit for this purpose. After the accident Conductor Connell walked to Adsit, the next station, 2.5 miles east, secured the engine of the local freight which was working there and returned to the point of accident. In the meantime, Engineman Staley had taken down the main and side rods on the right side of engine 434. The engine from the local freight was then coupled to extra 434 and it was towed to Adsit. While waiting at Adsit for the arrival of relief engine 451, the side rods on the left side of engine 434 were removed, leaving the left main rod the only rod connection on either side of the engine. Upon arrival of the relief engine, engine 434 was turned over to Engineman Browder. Engine 434 then took a full tank of water, and in charge of Engineman Browder and Fireman Stepp, accompanied by Master Mechanic Thomas and Roundhouse Foreman Pond, departed from Adsit light at 4:07 p. m. for Victoria, running backward. It stopped at the point where the main pin broke, and picked up the rods which had been left there on the trip eastward. It then proceeded passing Delphin at 4:48 p. m. and arrived at Alberta, 6.4 miles west, at 5:04 p. m. At this point engine 434 took the siding to meet an eastbound extra. It pulled through the passing siding and when stopping to open the west switch it stopped on the center.

The crew secured a jack from a well digging outfit nearby and after a delay of about ten minutes, succeeded in starting the engine. It departed from the west switch of the passing siding between 5:20 and 5:25 p. m., and was derailed at a point 3.7 miles west of Alberta, between 5:30 and 5:35 p. m. At the time of the accident the weather was clear.

The locomotive and tender turned over on its left side on the north side of, and nearly parallel with the track. The tender was forced close to the engine cab, closing the gangway on the left side. The rear of the tender was driven into the ground, throwing large quantities of mud and earth a distance of 45 feet. The tender trucks were forced forward; the forward truck came to rest close to the trailer truck of the engine, remaining upright, the south wheels partly upon the roadbed. The rear truck came to rest near the middle of the tank with its west end turned toward the south. The cab was partly torn from the engine and the steam turret on top of the boiler was torn from its fastenings. The smoke stack and headlight were broken and the rear transmission bar of the trailer truck was broken in the center. The bodies of the engineman, master mechanic, and roundhouse foreman were found in a heap in the cab, having been scalded to death by the steam escaping from the orifice of the steam turret. Fireman Stepp was found in an unconscious condition, lying across the north rail, his limbs being pinned to the ground by the wheels of the forward tender truck. His skull was fractured and at the rendering of this report he had not recovered sufficiently to give any facts in connection with the accident.

Approaching the point of accident from the east, the track is tangent for about two miles and continues so for about one-quarter of a mile west thereof with a slight ascending grade. The track is laid with 85-pound steel rails, 33 feet in length, 19 oak ties to the rail, on crushed stone ballast, having a depth of two feet. The joints are staggered, 6 hole angle bars being used. The rails are single spiked without tie plates. The track is in good condition and well maintained.

The first mark of the derailment found was a flange mark on the inside of the south rail about four inches from its base; a few ties further west there appeared a corresponding mark on the north side of the north rail. These marks continued to appear on the ties westward and leading toward the north for a distance of 23 feet 6 inches, at which point there was a scar or abrasion on the gauge side of the head of the north rail. This mark extended westward for about four feet, increasing in depth and ended abruptly in a deep gouge, which was followed

by a flange mark across the top of the rail leading diagonally toward the north. From this point westward for a distance of sixteen feet eight inches, there appeared two flange marks after which the track was so badly torn up as to obliterate all marks. From the point where the first mark of the derailment appeared to the point where the rear of the tender came to rest was a distance of 294 feet.

The accident was first reported to the train dispatcher at 5:52 p. m. by telephone by a farmer named Pritchett, who was in the vicinity of the accident at the time it occurred. Mr. Pritchett stated that he was working in a field on the south side of the track about 250 feet from the point of derailment, his view, however, being hidden by a narrow strip of woodland. He stated that he heard engine 434 approaching and when it reached a point about opposite him, it began to bump on the ties and one or two seconds later there was a grinding of wheels and a final crash when the engine came to a stop, this was followed by a burst and roar of escaping steam. He hurried to the scene of the accident, looked around for a minute or two and seeing that there was no assistance he could give, started for Danielstown station, about a mile west to notify the superintendent's office. Upon arrival at Danielstown, he found the building containing the telephone locked; he then went to the agent's home, about 900 feet farther and secured a key to the telephone booth and returned. Two or three minutes elapsed before he succeeded in communicating with the dispatcher. Mr. Pritchett stated that judging from the time that elapsed between the last crossing whistle and the bumping of the engine on the ties, it must have been running at a rapid speed. He estimated that about 17 minutes elapsed between the time the accident occurred and the time he reported it to the dispatcher.

Wrecking Foreman Britt stated that he arrived at the scene of the accident about 8:05 p. m. and after caring for the dead, he made an examination of the engine. He found the reverse lever in backward motion about 5 notches from the center; the throttle was open, he tried it and found that he could open it no further, but it closed easily. Both the automatic and independent brake valve handles were in the release position. Foreman Britt further stated that judging from the distance the engine ran after it was derailed and the general condition of the wreck, he reached the conclusion that the engine was running about 35 miles per hour at the time the accident occurred.

Engineman Staley stated that engine 434 had been assigned to him and he had been in charge of it, with the exception of two trips, since September 5th. Upon his arrival at Victoria with engine 434 at 12:15 a. m., on September 20th, he inspected

the engine and among other things entered on the inspection sheet, "Shorten pulling bar between engine and tank." He stated that he had noticed some slack between the engine and tender, just enough so that he could see between the buffer castings. When he took the engine out on the trip on which the accident occurred, he looked the engine over and found that all the repairs had been made, except shortening the pulling bar, but as he did not consider the slack sufficient to be unsafe, he took the engine in the condition in which it was delivered to him. Engineman Staley stated that he did not notice any excessive rocking of the engine or tender and in his opinion the side bearings were of proper clearance. When he turned the engine over to Engineman Browder at Adsit, the tender contained about 12-1/2 tons of coal. He also stated that his experience leads him to believe that an engine running with the only connection to the drivers being one main rod, its movement would be by jerks or lurches on account of the drivers not being properly counter-balanced. Engineman Staley further stated that on the trip previous arriving at Sewells Point, he noticed the excessive slack between the engine and tender, but did not enter it on the work report as he had been instructed by the master mechanic to report only such work at Sewells Point as was necessary to make the return trip to Victoria.

Roundhouse Foreman Breckenridge stated that he inspected engine 434 before it was sent out of Victoria on the morning of September 20th and that with the exception of taking up the slack between the engine and tender all repairs had been made. He stated that on the trip previous the engine and tender had been separated and the yoke and pulling bar bushings renewed; at that time, in putting the engine and tender together the buffer springs were compressed from three-quarters to seven-eighths of an inch. Before the engine went out on September 20th, he examined the drawbar personally and found the chaffing castings were together, and in view of this he did not consider it necessary to shorten the drawbar.

General Foreman McCumber stated that all reports required by the rules of the Division of Locomotive Boiler Inspection of the Interstate Commerce Commission had been made. The last annual inspection was made at Princeton, W. Va., on April 13, 1916, after the engine had been given a general overhauling. The last monthly inspection was made on September 14th, 1916, and daily inspections had been made after each trip and all defects discovered by the above inspections have been repaired. He also stated that the engine was turned out of Victoria shop on September 5, having received light repairs. Mr. McCumber said that since the accident he had inspected the engine and

found the rod bushings were from one-sixteenth to seven-sixty-fourths of an inch larger than the pins and the flanges and treads were in good condition. He found a small chip in the flange of one of the tender wheels, but from its appearance he believes that it was chipped out in loading the wheels subsequent to the accident.

Superintendent Reith stated that shortly after the accident occurred, he made a careful examination of the track and found it in good condition; that on account of the speed of eastbound trains at this point this particular section of track is kept in better condition than the average.

Locomotive 434 is of the Mikado 2-8-2 type, having a total weight of 254,000 pounds being distributed as follows: Pony truck 20,850 pounds; driving wheels 207,450 pounds; trailer truck 25,700 pounds. Rigid wheel base 15 feet 6 inches; total wheel base 33 feet. It is equipped with Westinghouse E. T. air brake equipment and has one compound and one single pump. The engine was converted into a superheater at the time it was given general overhauling at the Princeton shop in April, 1916, and carried a steam pressure of 200 pounds. The tender has a total ~~length~~ length of 29 feet, 9 inches, a total wheel base of 23 feet, 1 inch, and the top of the tender is 12 feet, 1-5/16 inches from the top of the rail. It has a capacity of 15 tons of coal and 9,500 gallons of water, and loaded has a total weight of 172,000 pounds. It is equipped with two four-wheel pedestal trucks, each having a wheel base of 5 feet 6 inches. The wheels are 33 inches in diameter and are of cast iron with the exception of the rear wheels of the rear truck, which are of pressed steel. Each truck is provided with four safety chains.

An examination of the locomotive subsequent to the accident, disclosed the following: The main pin on the right side was broken off about one-half inch outside of the pin fit. The pin was 8-1/2 inches in diameter and its condition indicates that there was an old fracture covering about four-fifths of its area. This fracture was hidden from view within the wheel and could not have been discovered by inspection. The side lateral clearance was as follows: Pony truck 5/8 inch, forward driver 3/16 inch, intermediate main and rear drivers and trailers 1/4 inch each. The side bearings on the tender are 78 inches apart and are 10-1/2 inches outside of the gauge side of the rail. The female casting of the forward truck was equipped with a liner 3/16 inch in thickness and the side bearing clearance was 1-5/8 inches.

The rear tender truck was not equipped with a liner and the side bearing clearance was 5/8 inch. All of the wheels were in proper gauge, and the flanges and treads were in good condition. One of the tender wheels had a small piece about one and one-half inches in length, chipped off from the inside of the flange, but it bore the appearance of having been done subsequent to the derailment. Connected to the steam turret which was broken off were the steam pipes to the injectors, air pumps, drifting valve and lubricator. The turret was placed on a ball socket, having an opening 3 inches in diameter and was fastened to the top of the boiler, just inside of the cab, by four 7/8 inch bolts, which were screwed into the boiler shell. Three of these bolts were broken off close to the boiler shell, apparently new fractures, while the fourth one pulled out stripping the thread. The position of the turret and the cab as found after the accident, indicate that the turret was broken off by the cab when the engine turned over.

The marks appearing on the ties and rails, the condition of track and the position of the engine and tender and tender trucks as they were found after the accident, all lead to the conclusion that the rear trucks of the tender were the first to derail and were followed by the forward trucks.

From an examination made of the equipment and records submitted in connection with this investigation, it appears that there was a compliance with the boiler and machinery inspection law and rules, with the possible exception of the drawbar between the engine and tender concerning which there is a conflict in evidence.

The speed of engines running backward on this division is limited by bulletin notice, dated October 13, 1911, which is as follows:

"Engines backing up must not exceed  
a speed of fifteen miles per hour."

In this instance on account of the exact time the engine left Alberta and the time the engine was derailed being unknown, it is impossible to definitely determine the speed at which the engine was running when the accident occurred. However, it is definitely known that but 16 minutes were consumed in running from Dolphin to Alberta, a distance of 6.4 miles, thus fixing the speed of the engine between those points at 24 miles per hour. The distance which the engine ran after being derailed, the distance that mud and earth was thrown by the tender and the statement of Mr. Pritchett, all lead to the conclusion that at the time of the

accident the engine was running considerably faster than that permitted by the bulletin notice.

While it is not possible to definitely determine the cause of the derailment, it is believed that the locomotive propelled by one driving wheel, connected on one side only, running backward at a high rate of speed, was so unevenly counterbalanced that it resulted in a lurching of the engine which in turn being transmitted to the tender caused it to rock to such an extent that its rear wheels mounted the rails.

Engineman Browder entered the service as fireman in August, 1909, was promoted to engineman on May 4, 1912, and at the time of the accident had been on duty five hours.

Fireman Stepp entered the service as fireman on December 1, 1912, and at the time of the accident had been on duty 9 hours and 15 minutes.