Meyer
Nov. 18/19

IN RE INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE BALTIMORE & OHIO RAILROAD, AT SMITHBURG, W. VA., SEPTEMBER 26, 1919.

November 12, 1919.

On September 26, 1919, there was a derailment of a freight train on the Baltimore & Ohio Railroad, at Smithburg, W. Va., which resulted in the death of 1 employee and injury of 1 employee. After investigation, the Chief of the Bureau of Safety reports as follows:

That part of the Monongah Division of the Baltimore & Ohio Railroad on which this accident occurred extends between Grafton, W. Va., and Parkersburg, W. Va., a distance of 103.1 miles. Excepting about 2.5 miles of double track between Grafton and DK Tower, and 1.9 miles through Clarksburg yard, it is a single track line. Trains are operated by time-table, train orders transmitted by telephone, and a manual block signal system which is absolute for passenger trains and permissive for freight trains. General Order No. 117, issued August 29, 1919, restricts the speed of Mikado type engines over this line to 50 miles an hour.

Approaching the point of derailment from the east there is a 5° 44' curve to the right, then a tangent 659 feet in length passing Smithburg Station, then a 5° 44' curve to the left, 1,213 feet long, reaching to the point of the switch at the west end of Smithburg passing siding, which is on the right side of the main track. The derailment occurred immediately west of the switch frog, where the curvature is 5 degrees. Beyond this point there is a tangent about 20 feet long, fol-

lowed by a curve to the right extending into No. 5 tunnel, 475 feet from the eastern end of the curve. After passing the switch, the track enters a cut which increases in depth until the entrance of the tunnel is reached. The grade is descending for westbound trains for several miles, being .36% at the point of derailment.

The track in the vicinity of the point of accident was laid with 90-pound rails, 33 feet in length, tie-plated and single-spiked to 17 or 18 oak ties to the rail, with about 8 inches of crushed-stone ballast. The frog used in the switch at the point of derailment was laid in the track at that point about 4 years ago, while new ties were laid in July, 1918. The weather at the time of the accident was clear.

The train involved was the second section of train No. 97, a fast freight train, and at the time of derailment it was running as the third section of first-class train No. 37, a local passenger train. It consisted of B. & O. Mikado type engine 4059, 32 loaded freight cars and a caboose, and was en route westbound from Grafton to Parkersburg, in charge of Conductor Lowther and Engineman McKeem. It left Grafton at about 7.30 a.m., passed Long Run at 9.58 a.m., Smithburg at 10.09 a.m., and at 10.10 a.m., while running at a speed estimated to have been about 30 miles an hour, was derailed at a point about 1,400 feet west of the telegraph station at Smithburg.

The engine ran a distance of approximately 400 feet from the point where it was derailed until it came to rest just

inside the east portal of the tunnel. The engine sustained no damage. The front drivers and pony truck remained on the rails, the intermediate and main drivers were on top of the left rail, which had turned over on its left side, while the back drivers and trailer trucks were derailed on the left side. The brake valve was found in the emergency position. The tender remained coupled to the engine and came to rest lying partially on its left side against the east portal of the tunnel, on the south side of the track. The front tender truck was about half a car length back of the rear end of the tender, while the rear tender truck was about 15 or 20 feet further east; both were lying in the ditch on the left side of the track. The three head cars remained coupled together and came to rest lying against the left side of the cut, on their left sides, the fourth car in the train telescoping the third car. The next three cars rested across the track, while the next eleven cars were piled up in a broken mass, two of them down the embankment. The switch was torn out and the track from the switch to the east portal of the tunnel, a distance of approximately 445 feet, was completely torn up.

About 12 feet west of the switch frog the right rail of the main track bore a flange mark which extended diagonally across its surface about 8 feet, 11 inches, to where it left the rail on the outside, this being the first mark made by a wheel climbing the rail. The rail from this point was turned over, while there were flange marks on the ties.

Conductor Lowther stated that Engineman McKeen used the air brakes at several points in controlling the speed between Industrial School and Long Run Tunnel, 9.6 and 5 miles, respectively, from Smithburg. The speed restriction of 10 miles an hour through Long Run Tunnel between 7.00 a.m. and 5.00 p.m. was not observed, the train passing through it at a speed of about 30 miles an hour. At Morgansville, 2.8 miles from Smithburg, the speed might have reached as high as 32 or 35 miles an hour. The next point where he felt the air applied was when approaching Smithburg station, where the speed was reduced from 30 to 25 miles an hour. When a clear signal was received Engineman McKeen began to use steam and had the train moving at about 30 miles an hour at the time of derailment. Conductor Lowther stated he had been sitting in the caboose but immediately went to the head end of his train and on examining the track, saw where the rail had turned over, and found the derailed driving wheels to be on the right side of the track. The first mark of derailment appeared to hi to be east of the frog, where it looked like the trailer truck had dropped upon the ties. The first rail west of the switch point on the left hand side was torn out and the switch point looked as though it had been run through and turned out. He had no knowledge or opinion as to what might have caused the derailment, and said that the brakes had been working properly and that Engineman McKeen had not made any complaint about the engine. He had been with Engineman McKeen on four or five previous runs, and on these occasions he

had observed slow orders and speed restrictions.

Fireman Relic stated that they took on a full tank of coal and water at Clarksburg, 25.5 miles from Smithburg, and made three stops between there and Salem, where they met train 1st No. 33. He stated that the tender jumped up and down, being the worst on curves, and he called Engineman McKeen's attention to it, saying he had better slow down around the curves, to which the engineman replied: "All right." He noticed the motion of the tender particularly on the curve west of Salem. He stated that Engineman McKeen made a brake application at the top of the Long Run grade, then after running about one mile, released the brakes. This was the only brake application made by the engineman. The engineman had shut off steam when passing the station at Smithburg, and the fireman at first said the train was drifting at the time of the derailment, while he afterwards said that as soon as a clear block was received the engineman again began working steam. Fireman Relic said he was putting in a fire and that the first he knew of the derailment was when he felt a jerk of the tender and the engineman ran over on his side and jumped off. He was standing in the gangway at the time the engineman got off, but ran back upon the tender and remained there until it turned over and threw him off. He estimated the speed at the time of the derailment at from 40 to 45 miles an hour and was positive the tender was the first to leave the track. He had previously told the superintendent that the speed at the time of derailment was 25 or 30 miles an hour.

Head Brakeman Messenger stated he did not think the speed exceeded 30 miles an hour at any point between Grafton and the point of derailment. He said that Engineman McKeen made three brake applications between Industrial School and Long Run and two after passing Long Run, and that the air seemed to be working properly. Approaching Smithburg he was sitting on the fireman's seatbox and he estimated the speed at the time of derailment to have been 25 or 30 miles an hour. The engine rode smoothly and when it passed over the switch there seemed to be no unusual motion or swing; the tender, however, appeared to ride roughly, continually bouncing up and down. He felt the engine drop down on the ties at or just beyond the switch, at which time the engineman applied the air, but did not close the throttle, ran over to the fireman's side and jumped off. He stated that he had ridden on this engine on prior trips and that the motion of the tender was practically the same as on this trip, riding roughly, with an up and down motion.

Flagman Powell stated that he did not think they exceeded the speed limit of 30 miles an hour at any point after leaving Grafton; that although Engineman McKeen slowed down when passing through tunnel No. 3, they passed through it at a higher speed than the 10-miles-an-hour limit. He did not know whether or not the brakes were applied approaching Smithburg. A clear signal was received and the train was running between 28 and 30 miles an hour at the time of the accident.

Division Engineer Pattison stated that he arrived at

the scene of the derailment about four hours after it occurred, made an examination of the track and found that at three points east of the point of derailment the alignment varied from one to two inches. The track was in gauge, but at two points, respectively 60 and 90 feet east of the point of derailment, he found two joints on the outside of the curve which were about $\frac{3}{8}$ of an inch low. On examining the frog, he found about $\frac{1}{8}$ an inch play in it, also that a sliver of metal about 5/32 of an inch in thickness and 2 feet in length had been cut from the center of the frog, about $\frac{1}{8}$ an inch below the cap of the rail and he thought this had been done by the flange of a wheel. There was a similar mark on the head of a rail on the right side of the track at a point between the frog and the point where the first wheel mounted the rail. At the point of derailment the curvature was 3 degrees and the superelevation $1\frac{1}{2}$ inches.

Supervisor of Track Hyatt stated that the section foreman in charge of the section where the derailment occurred had been employed in that capacity and at that point for about nine years. The switch points had been changed about eight months ago and necessary new ties laid last fall. The track had been aligned and surfaced about a week before the accident, at which time he had assisted in doing some of the leveling. He had passed over the piece of track three days before the accident, noticed nothing unusual, and considered it safe for the speed permitted. He stated that his examination, made three hours after the derailment, showed that the track was about right as to

gauge and elevation. The frog used in the passing track switch was of the type known as a stiff frog. This frog showed some evidence of having worked in the track, while the guard rail, which was spaced about 1-7/8 inches from the stock rail, had about 1/8 of an inch play, but he said this was not uncommon with rigid frogs used in main line switches on curves.

Superintendent Van Horn stated that he reached the scene of the accident about five hours after it occurred. With the exception of the pony truck and forward drivers, all wheels of the engine were derailed to the left, while the left rail was turned out. The tender was leaning against the east portal of the tunnel, on the left side of the track. After the tender trucks were derailed he found a broken arch bar on the left front truck. This appeared to be a fresh break, although there were some signs of crystallization. He examined the frog and found that a sliver 10 or 11 inches long and about 1/32 of an inch thick had been chipped off; about 12 feet west of the frog the high rail bore a mark where a flange had mounted it and run a distance of 8 feet, 11 inches, to where it crossed the rail. The track measurements he took showed track out of line at two points.

Several days after the derailment Master Mechanic Porterfield measured locomotive 4059 for lateral and found it to be as follows: Front driving boxes and engine truck boxes, $\frac{1}{2}$ inch; intermediate driver boxes, 3/8 inch; main and back driver boxes, $\frac{1}{2}$ inch, while the trailer truck boxes had a lateral of $\frac{1}{2}$ inch. The left side of the front tender truck, the side on

which the broken arch bar was found, was found to measure 4/32 of an inch longer from center to center of wheels than the opposite side, and in his opinion the truck had dropped down about 1½ inches. He stated that if the arch bar had been broken prior to the derailment, it would allow the truck to drop on that side and cause the side-bearing on the opposite side to carry a heavier load. This, together with the slight difference between wheel centers on the left side, would have a tendency to relieve rather than increase the pressure against the right rail and would tend to make the truck lead to the left. He stated that the only thing indicating such a condition was the fact that the flange of the second left wheel was worn more than the corresponding flange on the right side.

Road Foreman of Engines Detzen stated that he arrived at the scene of the derailment about five hours after it occurred. On examining the engine he found the pony truck wheels and forward drivers on the rail, while under the intermediate and main driving wheels the rail had turned over and those wheels were resting upon it. The left back driving wheel was on the left side of the rail, while the rail up to the trailer had turned over outside of the trailer. The right rail was completely torn up. The tender remained coupled to the engine, while the tender trucks were in the ditch on the left side of the track, the forward truck about 20 feet back of the tender and the rear truck about 15 or 20 feet farther back. There was a broken arch bar on the left side of the front tender truck, back of the column

belt, and broken column bolts on the right side of the rear tender truck. He also found side-bearings and liners from both trucks scattered around and what he took to be a broken side-bearing block from one of the rear trucks. He stated that the frog had the appearance of having been struck hard by a wheel flange. Apparently the wheel had then continued 10 or 15 feet west of the frog, and he saw where the flange of a wheel had shaved the rail for 12 or 15 inches and then climbed the rail. The marks on the rail were about 6½ feet long. At the point where the wheel went over, the left wheel dropped on the ties and spread the rail. It looked to him as though the wheels of the front tender truck were derailed between the frog and switch point, went down in the switch point and wedged between the rails, turning the left rail over under the engine. He stated that locomotive 4059 was received from the Mt. Clair shops July 13th, at which time he had measured the side-bearing clearance, which he found to be ample, but he had not measured it since a liner had been put in the rear truck. As far as he knew, the tender trucks had not been changed since the engine had been received.

He stated further that he had ridden engine 4059 on several occasions, the last time being six days before the derailment, from Clarksburg to Grafton, but had never noticed any bad riding qualities of engine or tender, neither had any reports of such nature reached him prior to the derailment, but since then he had examined the reports made at Parkersburg and Grafton roundhouses. He found that on August 7, at Parkersburg, the

defective condition of the front truck and springs had been reported, and under date of September 7 the tender had been reported as riding roughly; upon investigation he was advised by the roundhouse foreman that he had examined the tender pulling bar and pulling bar clearance; that the pulling bar had three inches clearance and that he could see nothing wrong with the tender. On August 17 and 20, September 9 and 10, the left front truck spring was reported broken. Reports made at Grafton roundhouse under dates of September 6, 10, 12 and 14, specified bad riding qualities of the tender and referred particularly to the bad condition of the front truck. He stated that Engineman McKeon was considered a good engineman, but that on one occasion he had been cautioned for fast running and exceeding speed limit on the C. & B. Branch, resulting in a derailment.

Carpenter Foreman Whitman stated that measurements of the tender, made several days after the derailment, showed that from the top of rail to top of side-bearings, the right side was $\frac{3}{4}$ of an inch higher than the left side, while the left side-bearing clearance was 7/8 inch and the right side-bearing clearance was 5/16 inch. He found two truck springs missing from the back truck and one side-bearing block missing.

Starting at the eastern end of the curve west of Smithburg station and continuing to the point of derailment, measurements of the track were taken by the Commission's inspectors to ascertain the condition of gauge and elevation. Two measurements were taken for each rail length and in this

distance the track did not vary in gauge more than 3/8 of an inch, this being the maximum of overgauge existing at any point. At two points, respectively 60 and 90 feet east of the frog, two low joints were found in the track.

Engine 4059 was of the 2-8-2 type, having a total weight, engine and tender equipped for service, of 457,550 pounds. Although the last inspection reports showed the general condition of engine and tender to have been good, the tender had been riding roughly and had broken a number of springs in the left front truck, which indicated the existence of some defect either undiscovered or at least only temporarily remedied.

The conductor and two brakemen estimate the speed of the train at the time of derailment at 30 miles an hour, while the fireman's estimate was between 40 and 45 miles an hour. The train sheet shows that the train passed Long Run at 9.59 a.m., and Smithburg, 5.2 miles distant, at 10.09 a.m., which indicates that the average speed between the two points was 31.2 miles an hour. Between the two points is No. 3 tunnel, through which there is a speed restriction of 10 miles an hour, effective between the hours of 7.00 a.m. and 5.00 p.m. The evidence shows that this speed restriction was not observed but that the train passed through this tunnel at a speed of approximately 20 miles an hour.

Although the exact cause of this derailment could not be definitely determined, it is believed that the condition of the tender truck, the poor alignment of the track immediately

preceding the point of derailment, the two low joints on the high side of the curve east of the frog, and the frog itself being loose in the track, with the track beneath it in poor surface, and the comparatively high rate of speed resulted in the derailment of this train. The arch bar in the front truck and the column bolt in the rear truck were probably broken as a result of the derailment, as both were fresh breaks and disclosed no flaws.

All the employees involved were experienced men with good records.

Previous to this trip the engineman had been on a 10-day vacation; at the time of the accident, he, together with the fireman and conductor, had been on duty 5 hours and 45 minutes. The two brakemen had been on duty 5 hours and 35 minutes; all the employees had been off duty in excess of 12 hours.

RWL