

CIRCULATED

Oct 31/19

IN RE INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE
ST. LOUIS SOUTHWESTERN RAILROAD OF TEXAS AT
BASSETTS, TEXAS, ON AUGUST 26, 1919.

October 27, 1919.

On August 26, 1919, there was a derailment of a passenger train on the St. Louis Southwestern Railroad of Texas at Bassetts, Texas, which resulted in the death of 1 employee and the injury of 1 employee and 2 trespassers. As a result of the investigation of this accident, the Chief of the Bureau of Safety submits the following report:

This accident occurred on the Texarkana Subdivision of the Fort Worth Division, a single-track line extending from Texarkana to Commerce, Texas, a distance of 118.85 miles. Trains are operated by time-table and train orders, no block signal system being in use. The speed of passenger trains is limited by time-table rule to 35 miles an hour, and freight trains to 20 miles an hour. Approaching the point of accident from the north, there are 2,315 feet of tangent, followed by a 2-degree curve to the left, 1,274 feet in length. The accident occurred on this curve, 1,067 feet south of its northern end. On the tangent track the grade is descending, with a maximum of 1%, while on the curve it is practically level. The track is laid with 75-pound rails, 30 feet in length, single-spiked, with an average of 18 ties to the rail. Four-hole angle bars are used, the joints being even on tangent track and staggered on curves. Tie plates are used on curves. The ballast is of cinders and gravel, from 6 to 8 inches in depth. The weather was foggy at the time of the accident.

The train involved was southbound passenger train No. 1, en route from St. Louis, Mo., to Fort Worth, Texas. This train consisted of 1 baggage car, 2 combination mail and express cars, 1 baggage car, 1 coach, 1 chair car, 1 Pullman sleeping car, 1 chair car and 1 Pullman sleeping car, in the order named, hauled by engine 663, and was in charge of Conductor Cannon and Engineman Hemphill. It departed from Texarkana at 11.30 p.m., 35 minutes late, made stops at various points en route, and at about 12.55 a.m. was derailed near the north passing track switch at Bassetts, 2,735 feet north of the station, while traveling at a speed estimated by the employees to have been from 15 to 25 miles an hour.

The train came to a stop with the head end of the engine 329 feet south of the switch point of the passing track switch, the passing track being on the west side of the main track. The engine and tender both turned over to the right, the engine being nearly parallel to and about 20 feet distant from the main line. The first two cars in the train were also derailed to the right, but were not materially damaged. None of the other cars was derailed, and all of them, including the derailed cars, remained coupled together. The employee killed was the engineman.

The first mark of derailment was a wheel mark on top of the west rail, 18 inches north of the switch point. This mark followed along the stock rail a distance of 24 feet, at which point the wheel dropped off on the inside of the stock rail. From this point, a flange mark appeared on the ties be-

tween the stock rail and the switch point, and a corresponding flange mark appeared on the ties on the gauge side of the east main-line rail. These marks continued along near the rails until the right wheel apparently came in contact with the frog. The marks then diverged to the right, astride the west main-line rail and the east side-track rail until the distance between these rails exceeded the distance between the wheels. These rails were then pulled toward each other, the main track being torn up for a distance of 130 feet and the side track for a distance of about 200 feet. A mark was found on the frog guide cover in line with the flange marks between the switch point and frog which corresponded with the flange of the right forward engine-truck wheel, this wheel having a seam or ridge near the crown of the flange which was not present on any other wheel on the right side of the engine or tender.

Fireman Dyer stated that the train was brought to a stop a short distance north of the point of accident on account of live stock being on the track. The engineman then worked steam for a short distance on the descending grade, after which he shut off and the train was drifting when approaching Bassette. The fireman was on the deck of the engine, preparing to take water at Bassette, when he heard a click which sounded like a broken rail, and he told the engineman that the engine was off the track. The engineman said he did not think so, but at the same time applied the air brakes and reversed the engine. He estimated the speed to have been from 20 to 25 miles an hour.

The fireman was positive that the engine was the first to be derailed and said that after it began to ride roughly he looked at the tender and saw that it was also derailed. Afterwards he saw the marks on the ties, but did not know what caused the accident. He had not noticed the indication of the switch light.

Conductor Cannon said that the first knowledge he had of the derailment was when he felt a sudden lunge of the train. He thought the speed at the time could not have been in excess of 15 miles an hour, as the train had been brought to a full stop about half a mile north of the point of derailment on account of live stock on the track. On examining the track at the point of derailment, he found flange marks which indicated that a wheel had mounted the rail between the switch point and the frog. He also examined the engine truck and stated that the flange of the right forward wheel was badly worn. He did not know whether or not it would take the gauge and did not know what caused the accident.

Flagman Flennikin stated that the speed of the train was about 15 miles an hour when he felt a jar, indicating that something was wrong. He went back to flag as soon as the train stopped and did not return to the scene of the accident until about daylight. At that time he examined the engine and track. He saw the worn flange on the right forward engine-truck wheel and also noticed that the switch point did not fit tightly to the rail. He could shake the switch stand a little, but on

doing so found that it did not move the switch point.

Road Master Milligan stated that on his arrival at the scene of the accident at daylight, he made an examination of the track and found where a wheel had mounted the rail just north of the switch point. He examined the track for 200 or 300 feet north of this point, but could find nothing in the way of track conditions which might have caused the accident. He also examined the switch stand, which was intact, together with the switch point, and he found a very small piece, about an inch long, broken from the end of the point. The point did not fit tightly against the rail, there being just space enough to see between them. Road Master Milligan said that he had been over this part of the track on August 23, riding on the rear end of a train, and at that time did not notice anything wrong on the curve approaching the point of accident. Previously he had been over this track on a motor-car on August 21, and at that time the line and surface were good. The rails were not in good condition, having been turned around so that what formerly had been the gauge side was now the outside, but he did not think there was anything in connection with the condition of the rails which might have caused this accident, considering the rates of speed at which trains are operated.

Section Foreman Mitchell stated that he reached the scene of the accident very shortly after its occurrence, and on making an examination of the truck, found it to be in good condition. He saw the sharp flange on the engine truck wheel, but

did not form any conclusion as to the cause of the accident. He said that he passed over this section of track when returning from work on the afternoon preceding the date of the accident, and at that time did not notice any indication of anything wrong. He also said that within three weeks preceding the date of the accident he had put in some new switch ties at the switch.

Wrecking Foreman Roderick stated that he examined the engine truck wheels as soon as he arrived on the scene and found the forward wheels to be a little sharp. He did not gauge them. He thought the driving wheels were the first to be derailed, but based his opinion entirely on his experience, which was that in the majority of cases driving wheels were the first to derail. He also said that when he examined the center casting, he found half a shim about $5/8$ of an inch thick, but could not find the other half. The center pin was in proper position and was not marked in any way.

Master Mechanic McDermott stated that the worn flange on the right forward engine-truck wheel did not take the gauge, lacking about $3/16$ of an inch. The flanges on the left front and right rear engine-truck wheels were in perfect condition, while the flange on the left rear wheel was slightly worn. The front wheels were of the same size, while the rear wheels varied from each other in diameter by $3/16$ of an inch, the left wheel being the smaller of the two. The effect of this would be that the truck would have a tendency to run toward the flange of the smaller wheel, causing more wear on that flange. These wheels had a lateral of about $1/4$ of an inch. The engine truck was

trammed and it was found that the distance between the centers of the axles on the right side was $3/16$ of an inch greater than the corresponding distance on the left side. Master Mechanic McDermott also said that he found half of a $3/4$ -inch raising-iron, or shim, missing from the center casting. With regard to the driving boxes, the lateral was found to be $3/16$ of an inch. The engine had recently been returned to the St. Louis Southwestern Railroad of Texas from a foreign road, and he had no record of when the engine truck wheels had been renewed.

Examination of the tender trucks showed them to be practically undamaged, with no sign of irregularities which could have contributed to the derailment. Measurements of the track for a distance of 300 feet north of the point of derailment showed some irregularities, but nothing which could have caused the derailment. These measurements were made some time afterwards, but officials said this part of the track had not been disturbed since the derailment.

The investigation made by the division officials of the railroad shortly after the accident resulted in conclusions, signed by these officials, that the accident was due to a combination of causes, as follows: (1) The engine truck led to the right, resulting in a tendency of the right forward wheel to mount the rail; (2) the gauge was $3/8$ of an inch wide at a point 4 feet north of the actual point of derailment, while just north of this point and also at the actual point of derailment the gauge was exactly correct; (3) beginning 21 feet north of

the point of derailment, the inside rail was level for $17\frac{1}{2}$ feet and then was raised $\frac{1}{8}$ of an inch in a distance of $3\frac{1}{2}$ feet, while the outer rail was raised $\frac{1}{4}$ of an inch for $17\frac{1}{2}$ feet, and then dropped $\frac{1}{8}$ of an inch in $3\frac{1}{2}$ feet. Their theory was that while these variations in surface were slight, yet the condition of the engine truck made it so susceptible to irregularities in track that, when combined with the proximity of the variation in gauge, they were sufficient to cause the wheel to mount the rail at that particular point. To these findings, Master Mechanic McDermott added a signed statement to the effect that the absence of half of the raising iron, or shim, would allow the remaining half to work around, causing the truck to run the opposite way from the location of the shim. This was a defect which could not have been discovered without the engine being jacked up and the truck removed, and there had been no occasion for such work being done.

The Commission's inspectors did not reach the scene of this accident until all wreckage had been removed or destroyed, and the engine and tender were being repaired, while the track had already been repaired. In view of these conditions, their investigation did not throw any additional light upon the cause of this accident.

All of the employees involved were experienced men, and at the time of the accident had been on duty about $2\frac{1}{2}$ hours after a period off duty of about $14\frac{1}{2}$ hours.

The investigation of this accident was not undertaken

until September 11, on which date the president of the railroad called attention to the matter, saying that his information was to the effect that the accident was due to the dangerous track conditions existing at that point, which conditions he stated to be typical of those existing at other points and to be of such a nature as to render unsafe the operation of trains.

After completing the investigation of the accident, a general investigation was made of track conditions, covering 503 miles of the more important part of the system. These examinations showed many broken ties, loose or missing spikes, and surface-bent rails. Lack of proper ballast was prevalent, and in territory where natural soil was used as ballast, comprising about 40% of the total examined, the track was center-bound in many places and as a result there were many broken ties. Most of this natural-soil ballast consisted of heavy sand. On tangent track the rails were usually laid with even joints, and the operation of heavy power over these even joints, coupled with the general deficiency in ballast, has tended to create irregularities at joints. The records of the various subdivisions inspected showed that the tie renewals authorized for the year 1919 varied from 10 to 15 per cent of the total ties in the track, and that the renewals completed up to August 31 varied from 38 to 66 per cent of those authorized, leaving in the track from 3.37 to 7.7 per cent of the total still to be renewed by the end of the year. Taken as a whole, the drainage was fair and the gauge good, the principal trouble being lack of adequate ballast and a general need of resurfacing.