In Re Investigation of an Accident which Occurred on the Missouri, Kansas & Texas Railway of Texas, near Henrietta, Texas, on February 20, 1916

April 11, 1916

On February 20, 1916, there was a derailment of a passenger train on the Missouri, Kansas & Texas Railway of Texas near Henrietta, Texas, which resulted in the death of 2 employees and injury of 2 employees. After investigation of this accident the Chief of the Division of Safety reports as follows:

The division on which this accident occurred is a single-track line, over which the movement of trains is governed by time-table and train orders. Approaching the point of accident from the west there is about 600 feet of straight track, followed by a slight curve to the left about 160 feet in length, which in turn is followed by a tangent about 350 feet in length, the accident occurring in about the middle of this tangent. The track at this point is on a 7-foot fill and the grade is practically level. The weather at the time was clear.

The track is laid with 56-pound rails, 30 feet in length, with approximately 16 oak and pine ties to the rail, with no tie-plates. Rails are single-spiked inside and outside, and 4-hole angle-bars are used. The track on this division is not generally ballasted, although at some previous time

a few cinders had been distributed for about 4 rail lengths in the immediate vicinity of the accident. That these cinders rendered practically no service to the track was apparent, because the clay had worked up between the ties.

The train involved was eastbound passenger train No. 12, en route from Wichita Falls, Texas, to Denison, Texas. It consisted of locomotive 223, 1 baggage car, 1 combination mail car and coach, 1 coach and 1 chair car, and was in charge of Conductor Williams and Engineman Alder. This train left Wichita Falls at 12:3- p. m., on time, departed from Henrietta, which is about 18.5 miles east of Wichita Falls, at 1:18 p. m., 8 minutes late, and was derailed at a point about 3 miles east of Henrietta at about 1:30 p. m., while running at a speed estimated to have been 25 or 30 miles an hour.

The engine, tender, baggage car, combination car and head end of the coach were derailed. The engine turned over on its right side, clearing the track about 4 feet, and, with the exception of the cab being torn off, was practically undamaged. The tender frame remained coupled to the engine, turning bottom side up and resting against the cistern which had slid off its frame. The front tender truck stopped crosswise the track, while rear tender truck stopped just right of and parallel with the track, being practically undamaged. The baggage car tore away from its forward truck and turned over on its right side, the rear truck remaining intact. The front end of the combina-

tion car remained coupled to the baggage car and the front truck of this car remained intact on side of embankment. The rear end of the combination car and the front end of the coach were derailed, but remained on ties. The remainder of the train was not derailed or damaged.

Examination of the equipment revealed the fact that the bottom arch bar on the right side of the front tender truck had recently been broken at the front column bolt hole. This arch bar was 5 inches wide and 1½ inches thick, and the metal showed an old break for its entire width on both top and bottom extending to a depth of one-third the thickness of the bar from each side, except on the inside edge, where the cracks extended entirely through the bar. That part showing fresh break was about the center and was seamy and in places was less than one-third the thickness of the bar. Whether or not this defect contributed to the derailment, or was a result thereof, could not be definitely ascertained. Careful examination of the engine and tender failed to reveal any other defect which might in any way have contributed to the accident.

The first indication of the derailment was found to be a flange mark on the ball of the south rail, beginning about 4 feet 8 inches west of a rail joint and continuing on ball of rail for a distance of about 8 feet 6 inches. This mark then crossed over to the outside of the rail and continued on ties, diverging to the right until it finally left right ends of ties at a point about 39 feet beyond the first

flange mark on ties. There was a corresponding mark on the ties on the inside of the north rail. About 90 feet east of the initial point of the derailment the south rail was crowded outward and shoved down embankment up to the point where the tender overturned, a distance of 6 or 8 feet. The ties over this distance were bunched and broken and the north rail was pulled out of line and was more or less torn from the ties.

It is apparent from the condition and position of the tender after the derailment that the flange marks on the ties were made by the front wheels of the front tender truck, and it is believed that these wheels leading off the right ends of the ties slued the truck which spread the rails, bunched and broke the ties and caused the derailment of the following cars. The right front wheel of the front tender truck, together with the oil box, binder plate and bottom ends of column bolts indicated that this wheel had been running or dragging in the clay in a slued position. The flange of the left back wheel of this truck showed evidence of chafing on the rail side, which was probably done when the wheel was in a cramped or diagonal position to the rails, on account of the front pair of wheels being derailed and diverging to the right. That this truck slued is further indicated by the bent and broken condition of the safety chain hangers and by the wheel marks on the bottom of the tender frame, which were apparently made by the wheels in a slued or practically crosswise position to the rails.

Locomotive 223 is of the 4-6-0 type, the engine weighing 146,000 pounds and the tender 127,000 pounds. The tender has a capacity of 12 tons of coal and 6,500 gallons of water, and at the time of derailment was practically full of coal and water.

Fireman Calhoun stated that the tender was the first part of the train to be derailed. He was putting in a fire at the time and noticed the tender commence to jump up and down on the ties. He called to Engineman Alder and Road Foreman of Engines Cassidy, who was riding on the locomotive, to jump, while he himself jumped out the cab window. He was not positive whether or not the engineman applied the brakes, but stated that after the locomotive had turned over on its side it made a good many revolutions and he kicked off the throttle with his foot and then shut off the main sounding valve. He stated that the engine fell in such a way that the throttle could have very easily been opened after the engineman had shut it off. Fireman Calhoun stated further that the track in the vicinity of the accident was fairly good and was always considered a "race track," as, even when the track was bad everywhere else on the division, it was possible to make running time over this portion of it. It was his opinion that at the time of the accident the train was running at a speed of from 25 to 30 miles an hour.

Engineman Alder and Road Foreman of Engines Cassidy were killed in the accident.

Conductor Williams stated that at the time of the derailment he was standing up against the rear end of the second car of the train and felt a jar as if a heavy application of the air had been made, and then felt the car wheels on the ground. He further stated that after the derailment had occurred he talked with the division engineer and the superintendent of motive power, and as a result, reached the conclusion that the derailment was due to a low joint, which he thought was located at the point where the rear car came to a stop. In his opinion the train was traveling at a speed of about 25 miles an hour at the time of the derailment.

Beginning at the first rail joint west of the initial point of derailment, Roadmaster Patterson and Resident Engineer Montgomery took measurements of the surface of the track for a distance of 10 rail lengths west of that joint, using the south rail as the basis. The record of these measurements, as furnished by them, is as follows:

1st joint,		1/2" higher than north rail.
1st center,		3/4" " " " "
2nd joint,	2	" " " " "
2nd center,	2	1/2" " " " "
3rd joint,	1	3/4" " " " "
3rd center,		1/4" " " " "
4th joint	0	" " " " "
4th center,		1/4" " " " "
5th joint,		3/4" " " " "
5th center,		1/2" " " " "
6th joint,		1/2" " " " "
6th center,		3/8" " " " "
7th joint,	0	" " " " "
7th center,		1/4" " " " "

8th joint,		1/8"	higher	than	north	rail.
8th center		1/8"	"	"	"	"
9th joint,	0	"	"	"	"	"
9th center,		3/4"	"	"	"	"
10th joint,		3/4"	"	"	"	"
10th center,		1/4"	"	"	"	"
11th joint,	1	"	"	"	"	"

Roadmaster Patterson stated that he inspected the track on Saturday, February 19th, the day before the accident occurred, and went over it again on Sunday morning on train No. 14, but at neither time found anything unsafe in the condition of the track or anything to prevent the making of schedule time. He stated, however, that the ties were bad in places and that all ties that would not last two years were being removed preparatory to ballasting. He stated that at about 7:30 a. m. Monday morning work was started on the track at this point and that within a distance of 16 rail lengths west of the point of derailment 106 ties were renewed. He further stated that during the month of January, 1916, there had been a great deal of wet weather and on this account there were a number of joints which were swinging some and counter-bound some. He further stated that the track was ballasted with a few cinders and that he considered there were enough materially to strengthen and protect the track. Roadmaster Patterson also stated that he did not examine the derailed equipment and was unable to determine the cause of the accident. He thought that the pressure on the north rail, due to its being lower than the south rail, may have been a contributing cause, but did not consider this condition wholly responsible

for the accident. He also stated that he did not believe the variation of 2½ inches in the height of the north and south rails within a distance of 30 feet was dangerous, in view of the low rate of speed at which trains are operated over this division.

Division Engineer Montgomery stated that in wet weather when the soil under the track becomes wet, the bearing power decreases to a large extent, due to liability of soil being displaced by the load above it. He stated that this condition was in a measure overcome by cinder ballast under ties immediately west of point of derailment and also by three additional ties laced in under rail at the point where no cinders had been applied and where soil had a less resisting power. The failure of the foundation under the ties had caused the north rail to settle one-fourth inch to two and one-half inches lower than the south rail. Division Engineer Montgomery further stated that the track conditions on the Henrietta Division were far from good, but that there were many other places on the division where the conditions were much worse than at this particular point, and that while the uneven condition of the track was undoubtedly a contributing cause, he was firmly convinced that it was not entirely responsible for the derailment. In his opinion the accident was caused by a combination of conditions acting simultaneously, which might have occurred on track in very much better physical condition with the same

result. He thought that possibly the tender may have been riding heavy on one side, due to a concealed defect in the center bearings, or that the splash boards in the tank may have been down and the force of the water in the tank caused a lurch which resulted in a wheel mounting the rail. He also stated that the engineman may have made an application of the air and then increased the speed by opening the throttle, causing a sudden motion in tank, which, together with the water, would cause a lurch, and he also thought that possibly the engineman may have been exceeding the schedule running time.

Section Foreman Huddleston stated that he last worked on the track at the point of accident on either the Wednesday or Thursday prior to the Sunday on which the accident occurred. He stated that at that time there were two low spots which he picked up, one on the north rail and one on the south rail, close to the point of derailment. He stated that he again went over this track at about five o'clock on Saturday afternoon, at which time the track was in practically the same condition as when he left it on the Wednesday or Thursday previous, and that he considered it to be absolutely safe for the speed at which trains travel over this division. He stated further that during the wet weather which they had in January the track at this point had to be lined up every day, but since the weather had settled the track seemed to hold very much better. He also stated that about February 1, 1916, he placed 3 ties under the center of the track at a point about -

30 feet west of the point where the derailment afterwards occurred, as an extra support to the track. Section Foreman Huddleston was undecided as to the cause of the accident, but thought it must have been due to fast running and probably bad equipment, and stated that the condition of the track may have been a contributing cause, admitting that it was a bit out of surface and that at one or two places the north rail was from 1 inch to 2 inches low.

Extra Gang Foreman Bishop stated that he started work on the track at the point of accident on Sunday afternoon soon after the accident had occurred, putting the track in surface so that trains could get over this point at a slow rate of speed, and at that time noticed one rail about 30 feet west of the point of derailment which was from 1 inch to 1½ inches low. He stated that he again started work on the track in this vicinity at about 7:30 a. m. Monday and put in 106 new ties within a distance of 400 or 500 feet west of the point of derailment, stating that he had received instructions to renew all ties that would not last a year. Extra Gang Foreman Bishop further stated that the general surface and alignment of the track were fairly good and that he considered the track to be in good condition in view of the fact that it was laid on the natural soil. He also stated that he did not know to what this derailment was due.

General Mechanical Inspector Wallace stated that he considered locomotive 223, of the derailed train, to be in

good condition. Three days after the occurrence of the accident, however, he discovered a broken arch bar on the lead truck of the tender, which had an old flaw in it, probably more than half broken, but in his opinion the arch bar was secure, as the flaw was at the column bolt and he did not think that it gave way until after the wheels struck the ties. He was unable to say positively, however, whether or not this condition contributed to the derailment.

Trainmaster Moore stated that he arrived at the scene of the accident at 4:00 p. m. Sunday and looked over the track and equipment in a general way, but was unable to form an opinion as to any one cause of this accident, but thought that probably it was due to the uneven condition of the track, coupled with the front tender truck being weak on account of the broken arch bar, and thought possibly the tank may have been loaded heavier on top than at the bottom.

Superintendent Butz stated that he arrived at the point of derailment at about 9:30 Sunday evening, but made no examination of the track or equipment until the following morning. He stated that the records of the track measurements were made in his presence and in his opinion the track conditions were responsible for this derailment. His investigation of the equipment MX was not complete and he therefore was unable to make a statement concerning its condition. Superintendent Butz further stated that on Sunday morning he rode over the point where the derailment afterwards occurred, but

noticed nothing out of the ordinary with the track at that time.

The evidence indicates that the front truck of the tender was the first part of the train to be derailed, and while the direct cause of its derailment was not determined it is believed to have been due to the extremely uneven condition of the track causing the tender to rock to such an extent that the forward tender truck mounted the rail, and that the broken arch bar found after the accident was a result of, and not the cause of the derailment.

Section No. 113, on which the derailment occurred, consists of 6 miles of main line and a part of the station tracks at Henrietta. Section Foreman Huddleston of this section has had seven years' experience as foreman, but had been assigned to this section only since January 17, 1916. His regular force consisted of 10 men up to February 17th, when it was reduced to 7 men, account extra gang having been assigned to his section.

At the time of the accident the crew in charge of train No. 12 had been on duty about 50 minutes.