

In Re. Investigation of an Accident which occurred on the Chicago & Alton Railroad, near Francis, Mo., June 7, 1916.

July 8, 1916.

On June 7, 1916, there was a derailment of a passenger train on the Chicago & Alton Railroad near Francis, Mo., which resulted in the injury of 19 passengers and 1 employee. After investigation of this accident the Chief of the Division of Safety submits the following report:

The train which was involved in this accident was westbound train No. 213, and consisted of a combination mail and baggage car and two coaches, hauled by locomotive 220, and was in charge of Conductor Clampitt and Engineman Blackman. It left Louisiana, Mo., at 6.00 a. m., on time, passed Littleby at about 7.47 a. m., and at about 7.50 a. m. was derailed at a point about one and one-half miles east of Francis while traveling at a speed estimated to have been about 20 miles an hour.

The locomotive was not derailed, and came to a stop about 280 feet beyond the head end of the first car. All of the cars were derailed to the left, turning over and coming to rest part way down a 12-foot embankment.

This part of the Chicago & Alton Railroad is a single-track line, trains being operated by time-table and train orders, supplemented by a telegraphic block signal system. The track is laid with 80-pound rails, 33 feet in length, with

18 or 19 ties under each rail, single-spiked and without tie-plates. It is ballasted with about 14 inches of coarse crushed stone. Approaching the point of derailment from the east the track is tangent for over three miles. The grade is nearly level.

A careful examination of the equipment of the derailed train failed to disclose anything which might have caused the accident. Examination of the track showed that the first mark of derailment was a broken rail on the left side, this rail having broken into six pieces. The initial rupture occurred 36½ inches from the receiving-end of the rail, over a tie, and extended practically vertically through the rail. The metal had a slightly rusty appearance, showed considerable chafing at certain points, and the metal at the running surface of the ball of the rail, on each side of the break, had a smooth appearance which indicated that it had been run over in both directions since breaking. This rupture evidently had occurred at some time previous to the accident, the ends of the fractured rail having been supported by the tie under them until, as the result of the passage of trains and locomotives over it, the support weakened sufficiently to allow the rail to break again under the derailed train. When the rail broke originally is not known, for it had been passed over by ten trains within eight hours preceding the time of the derailment, and none of the crews of these trains had detected its presence. The second rupture was about 26½ inches from the first

rupture, just beyond the edge of a tie. The receiving-end of the fragment on the west side of this rupture was battered and there were flange marks at the ball of the rail and also on the gauge side of the web. The third rupture was $49\frac{1}{2}$ inches from the second, the fourth was $43\frac{1}{2}$ inches beyond, and the fifth rupture was 97 inches beyond the fourth rupture, or $12\text{ feet } 1\frac{1}{2}$ inches from the leaving-end of the rail. No indication of rust or chafing was found at any of the ruptures other than the first one. This was a Bessemer rail, weighing 90 pounds to the yard, A. S. C. E. section, and was laid in the track in April, 1904.

Conductor Clampitt stated that he thought the speed was about 20 miles an hour when the train was derailed. He did not make any examination of the track except to look at the broken rail and to conclude that it was the cause of the accident.

Engineman Blackman stated that the speed was about 20 miles an hour. He felt the broken rail as the trucks of the locomotive struck it, and there was a lurch as the driving wheels passed over it. He at once shut off steam and applied the air brakes. After the accident he examined his locomotive, but did not find anything about it which might have caused the accident. He thought the first rupture in the rail was the one nearest the receiving-end, saying that the others were fresh, while this one appeared to be an old rupture, the metal at one point indicating that trains had been over it.

Fireman Greamer stated that he thought the speed was about 15 miles an hour at the time of derailment. He felt the driving wheels strike the broken rail, and said that an application of the brakes was made immediately. While he did not make any careful examination of the rail he noticed that one part was rounded off and there was also a little rust on it.

Section Foreman W. E. Kline stated that he had been section foreman on this district for three years, previous to which he had had over 30 years' experience in track work. During the afternoon of the preceding day he went over the track where the accident afterwards occurred, and at that time he noticed nothing wrong with it. He stated that he reached the scene of the accident in about half an hour after its occurrence and found the broken rail. There were no marks on the track before the broken rail was reached, and he concluded that it was the cause of the accident. When asked if there were any indications of the rail having been broken prior to the accident he stated that it looked as if one or two trains might have gone over it. He saw where the ends of the rail had been chafed, but did not see any signs of rust. He did not discover any flaw in the metal at the point where it first broke. The tie which had supported the ends of the rail was split on both ends, but not in the center. He also said that in good weather he sent a track-walker over the track every other day, while on the alternate days he went over it himself. During bad weather he went over the track every day.

Roadmaster H. Kline stated that he had had 15 years' experience as a section foreman, 7 years' as a supervisor, and 6 years' as a roadmaster. He arrived at the scene of the accident about six hours after its occurrence, made a careful examination of everything connected with the accident, and decided that it was due to a broken rail. He thought that the rail had been broken by some train which passed prior to the train which was derailed, saying that the ends of the rail showed that they had been working up and down and that apparently one or two trains had passed over the rail after it had broken and before the accident. There was some rust on the fresh parts of the rupture, but as there had been a shower he thought the rust might have come from that source. He also said that he did not find any visible flaw at the point where the rail first broke and did not know what made it break.

The members of the crew of a train which passed over this part of the road at about 7.12 a. m. stated that they did not notice anything which would indicate the presence of a broken rail, and that so far as they knew there were no flat spots on the wheels under any of the cars in their train.

This accident was due to the presence in the track of a rail which had been broken by some preceding train. The appearance of the metal at the point where the rail first broke showed conclusively that it had been broken some time previously, the ends being ^hoiled and rubbed smooth from the motion of passing trains. The rail was not badly worn, and in the absence of any evidence on the point it is impossible to say exactly when and under what circumstances the rail broke, neither was the cause of its failure definitely determined.