In re investigation of accident which occurred on Missouri Pacific Railway, near Lyndon, Kansas, on January 14, 1913.

On January 14, 1913, two freight trains were derailed on the Missouri Pacific Railway near Lyndon, Kansas, resulting in the death of 3 employees and 1 stockman, and the injury to 9 employees. This accident was reported by telegraph on the date following its occurrence, and after investigation the Chief Inspector of Safety Appliances reports as follows:

East-bound train No. 64 consisted of 1 car of live stock, 1 deadhead caboose, and the regular caboose, hauled by engine No. 1207. This train left Council Grove, Kansas, at 7 p.m., and left Osage City, 8 miles from Lyndon, and its last stopping point prior to the derailment, at 9:05 p.m. It was derailed near bridge No. 79 about 1/4 of a mile west of Lyndon, at 9:25 p.m. The engine and tender passed over the bridge in safety, the tender then breaking away from the engine, which ran along the track for a distance of about 50 feet beyond the bridge before going down a 12-foot embankment and turning over on its side. The car of stock and the two cabooses went over the north side of the bridge. They caught fire from the stoves carried in the cabooses and were totally destroyed, along with the bridge. The speed of this train at the time of the derailment was estimated to have been between 25 and 30 miles per hour.

East-bound train No. 52 consisted of engine No. 1210 and a caboose. It left Osage City at 9:15 p.m., 10 minutes behind No. 64, and was derailed at the same point, about 330 feet west of the bridge. The engine ran along on the ground for a distance of about 200 feet and then plunged down the embankment, which at this point was about 20 feet high. The caboose of this train also caught fire and was destroyed.

This division of the Missouri Pacific Railway is a single track line. No block signals are in use, the movement of trains being governed by train orders. The track is laid with 75-pound steel rails, 30 feet in length. Oak ties are used, being laid about 16 to the rail. No tie plates are used. The ballast consists of about 10 or 12 inches of chatt, on top of about 12 inches of crushed rock. The rails are joined together with six-hold angle bars, only four bolts, however, being used. In November, 1911, stretch of track was re-ballasted and new ties were placed. The track is straight for several miles in each direction from the point of derailment.

On examining the track after the derailment the eighth rail from the bridge on the north side of the track was found to be in a broken condition. The west, or receiving, end of the rail was intact for a distance of about 8 feet, while the east, or leaving, end was intact for a distance of about 17 feet. The intervening section, 5 feet in length, was broken into many pieces, 12 of which were recovered. This rail was assembled and sent to the Bureau of Standards, of the Depart of Commerce and Labor, for examination

into the causes of its failure. This examination was conducted by Mr. James E. Howard, Engineer-Physicist, and the following is a synopsis of his report:

Both the eastern and western intact portions of the rail were bent in a sidewise direction, concave on the gauge side of the head. The bends were not gradual in their curvature, but sharpest near the western and eastern ends, respectively, of the entire rail. At the west end the curvature was most abrupt at a point somewhat beyond the place occupied by the splice bar; at the east end the bend was sharpest immediately abreast the end of the splice bar. On the inside face of the web there were marks extending lengthwise the rail, apparently due to wheel flanges running upon it. From the evidence presented it is clear that the rail was on its side at the time of the passage of one of the wrecked trains, while the trucks which bent this rail must have been traveling at a fairly high rate of speed in order to cause the wheels to be carried across a clear space while dropping from the splice bar to the level of the face of the web, thus striking the rail and bending it at a substantial distance beyond the end of the splice bar. The sharp bend abreast the splice bar at the east end of the rail was doubtless caused by the sudden effort of the trucks to mount the splice bar from the level of the web on which the wheels were then running. The rail at this end was necessarily bent just at the beginning of the splice bar.

The fragments composing the intermediate section of the rail clearly show flange marks upon the surface of the web, while the manner in which the fragments were detached in succession, and the several lines of rupture of the metal of the head, furnish corroborative evidence that the rail was ruptured by a force acting in a direction normal to the plane of the web. Such a force could only be applied and received by the rail when on its side.

The primary cause of the derailments is not shown by the fractured rail, but the manner of the failure of the rail i self is clearly indicated by the evidence found on the fragments. The most easterly fracture of the rail is a typical transverse fracture, in which the gauge side of the rail was intension. The wheel load causing this line of rupture was at the time acting on the rail at some point east of this fracture. The receiving ends of the various fragments were battered on the gauge side of the head as they were detached from the main part of the rail. There were wheel marks on the web of the rail beyond the most easterly line of rupture, but they were less conspicuous than the markings at the opposite end of the ruptured sections.

In conslusion, the bent condition of the western and eastern intact portions; the flange marks on the inside

surface of the web extending the full length of the rail, the sidewise transverse fractures of the head, and the battered condition of the receiving ends of the several fragments, establish the fact that the rail was on its side at the time of rupture, but evidence has not been presented to indicate how it came to be in that position. The primary cause of these derailments should be looked for at some place on the track which permitted this rail to turn over, or which caused it to do so.

From the investigation conducted by Mr. Howard, it would appear that this accident was caused by the turning over of a rail. The inspectors of the Commission did not reach the scene of this accident until January 16. By that time the bridge had been rebuilt, the wreckage cleared up, and the track repaired. Such examination as could be made, therefore, failed to disclose the cause or causes leading to the turning over of this rail.

Engine No. 1207, which was hauling train No. 64, is of the 2-8-2 type. The weight on the driving wheels is 106 tons, while the combined weight of the engine and tender ready for service is 219 tons. Examination showed nothing about this engine which could have caused the derailment.

When train No. 64 was derailed, everyone on the train was either killed or injured. The conductor, who received slight injuries, tried to flag No. 62 in time to prevent its derailment, but only succeeded in warning the engineman in time to enable him to materially reduce the speed of his train. In view of the fact that the electric headlight with which the engine of train No. 62 was equipped was not burning, an oil lamp being used in its place, it is probable that the engineman, who was killed, did not see that the track was torn up, his attention first being attracted by the conductor of No. 64. While the wreckage of No. 64 caught fire and was destroyed, it seems probable that by the time No. 62 reached the scene of the derailment, the fire had not spread to such an extent that it was noticed by the engineman.