

**In re Investigation of an accident which occurred
on the Chicago, Burlington & Quincy Railroad
at Cromwell, Iowa, on February 2, 1917.**

February 27, 1917.

On February 2, 1917, there was a derailment of a passenger train on the Chicago, Burlington & Quincy Railroad at Cromwell, Iowa, which resulted in the death of 4 passengers and injury to 78 passengers and 12 employees. After investigation of this accident, the Chief of the Division of Safety reports as follows:

The Creston Division of the Iowa District, on which this accident occurred, is a double-track line, over which train movements are governed by time-table and train orders, and the division is equipped with manually controlled block signals. The accident occurred at a point 330 feet east of the Cromwell station at a spring frog in a crossover switch from the west-bound to the eastbound track. Approaching this point from the west, the track is straight for a distance of 3 miles and the grade is level, while at the point of accident the track is laid on a 25-foot fill approximately 1,500 feet in length. The weather at the time was clear with a temperature at zero.

The track in the vicinity of the accident is laid with 90-pound rails, with 18 ties to the rail, single spiked, trestled and ballasted with 18 inches of gumbo. The track is in excellent condition.

The train involved was eastbound passenger train No. 12, operating between Denver, Colo., and Chicago, Ill., and consisting of locomotive 2959, 3 wooden baggage cars, 1 wooden coach, 1 steel chair car, 1 wooden dining car with steel underframe, 3 steel Pullman sleeping cars and 1 wooden lounge car with steel underframe. This train, in charge of Conductor Slingluff and Engineer O'Rourke, departed from Lincoln, Nebr., at 4.35 p. m., 5 minutes late. At Red Oak, Iowa, 45 miles west of Cromwell and at Villisca, Iowa, 29 miles west of Cromwell, the engineer oiled his locomotive but at neither place noticed anything wrong with the locomotive. The last stop prior to the accident was a stop for one minute at Corning, 14.9 miles west of Cromwell. It left Corning at 9.49 p. m., 25 minutes late and was derailed at 10.12 p. m., while traveling at a speed of 48 miles an hour, as indicated by the speed recorder tape on the locomotive.

The engine and forward tender truck remained on the track; the rear tender truck pedestal was broken and the truck

derailed to the south. The coupling between the tender and the first car in the train was broken, the locomotive being separated 3 feet from the rest of the train. The first two baggage cars were partly derailed to the south of the track, while the third baggage car and the coach were entirely derailed, the rear track of the coach dropping down into a street which passed under the track near where the car stopped. There was a distance of about 400 feet between the point where this car came to a stop and the point where the chair car, the fifth car in the train turned over. The chair car turned completely over on its right side and came to rest at the bottom of the fill, about 90 feet south of the track. It was in this car that all the fatalities occurred. The dining car the sixth car in the train also turned completely over and came to rest at the bottom of the fill, lying parallel with and at a distance of 110 feet from the track. The three Pullman sleeping cars went down the fill, resting on their right sides, coupled together, the head end being 87 feet and the rear end 15 feet from the track. The lounge car followed the sleeping cars down the fill and rested in an upright position with the rear truck on the roadbed.

After the accident it was found that the knuckle pin had worked out of the forward end of the left back side rod on the locomotive, the forward end of the rod dropping down and catching between the north main rail and the crossover rail, which resulted in the tearing out of the spring rail, the wing rail, the filler and the spreader blocks, completely destroying the crossover frog. In addition to the complete destruction of the crossover frog after the accident there were found 3 broken rails, while 8 rails on the south side of the east end main track were torn out. An examination of the left side rod and connections disclosed that the middle connection bushing was missing entirely, while the discoloration of the main pin and main rod connection and the condition of the main rod brass bore evidence that the bushing had been hot. The main pin at the middle connection confirmed this condition. The metal seams were full of brass, indicating that bushing ran hot and was pounded out by the rod. The bushing bore in the side rod was elongated to the extent of three-quarters of an inch vertically, indicating that the engine had run a considerable distance after the bushing was destroyed. Broken parts of the bushing eight inches long and three-quarters of an inch wide were found on the right of way $3\frac{1}{2}$ miles west of Villisca, conclusively showing that the bushing was destroyed prior to arrival at that point. These broken parts of the bushing were found $32\frac{1}{2}$ miles west of the point of accident.

Locomotive 2959 is of the 4-6-3 type, built in September, 1915, and has a total weight of engine and tender of 439,940 pounds; up to the day of the accident it had traveled 105,649 miles. An examination of the wheels, flanges, driving boxes, guides, rods, rod brasses, etc., developed that, with the exception of the defective left side rod and connection, the engine was in first-class condition.

Work reports of engine 2959, both at Lincoln and Oreston, made by Enginemen O'Rourke and others, from January 20th to February 2d, the date of the accident, show that no work was reported on this side rod during that period.

Engineman O'Rourke stated that he inspected his locomotive very thoroughly before leaving Lincoln and found it in perfect condition in every particular. He was delayed about 2 minutes at Villisca on account of having to put a stick of grease in the main connection on the left side. This was not, however, the connection which broke and caused the derailment. This rod had been giving no trouble and was not worn at Villisca, but the engineman stated that he screwed all the grease cups there and found this grease plug going down too far and for that reason put in more grease. He noticed nothing else wrong with the locomotive at Villisca and at no time after leaving that point did he hear any pounding sound. Upon reaching the frog east of the station at Oreston, however, he heard a loud crash as though some part of the machinery had given way and he applied the brakes and stopped within about 1,000 feet. Engineman O'Rourke stated that he did not at first realize that the rear portion of his train had gone down the embankment, but thought the train had parted. He examined the locomotive and found the knuckle pin had worked out of the left back side rod and that the forward end of the rod was down and bent. The engineman could not account for his failure to detect sooner the defective condition of the side rod, as he thought it would necessarily have resulted in a pounding sound which could have been heard a half mile away. It was his opinion that the working out of the knuckle pin was due to the poor condition of the threads in the pin rather than to the breaking of the bushing as a result of its becoming too hot. He stated that he thought the bushing was intact when he filled the grease cup at Villisca, but the weather was very cold at the time and the engine may have been standing so that he could not have readily seen it.

Fireman Selander stated that this was his first trip over the division on a passenger locomotive. He stated that the window on his side of the engine was closed and while he thought the window on the engineman's side was open, he did not hear any pounding at any time, his first intimation of the accident being when the tender jumped the track. He did not know until the day of the investigation that the engine had lost the middle connection brass bushing and he gave no opinion as to what caused the derailment.

This accident was caused by the left middle connection brass bushing becoming heated, breaking it up and destroying it entirely, which resulted in the side rod knuckle pin pounding out, the nuts working loose, stripping the threads on pin and nuts; also resulting in shearing the cotter pin, permitting the forward end of the back side rod to drop down and catch between the north main rail and the crossover rail,

tearing up the track and derailling the train.

The fact that broken parts of the bushing, 8 inches long and three-fourths of an inch wide were found 32 miles west of the point of accident, and the fact that the bushing bore was elongated three-fourths of an inch vertically, established conclusively that the locomotive had been running in this defective condition for that distance. A locomotive in this condition would undoubtedly pound heavily and why Engineman O'Rourke did not discover its condition prior to the time of the accident seems inexplicable.

Engineman O'Rourke, with whom the responsibility for this accident rests, entered the service of the Chicago, Burlington & Quincy Railroad on August 1, 1888, as an engineman. He has been in passenger service for 12 years with the exception of the period from October 16, 1906, to January 25, 1908, when he was barred from passenger service for responsibility in running off a derail; otherwise his record is a fairly good one. Fireman Selander was employed as fireman on July 6, 1916. His service is a limited one, and he had had no passenger experience prior to this trip.

At the time of the accident the engineman and fireman had been on duty 13 hours and 7 minutes, prior to which the engineman had been off duty 32 hours and the fireman 16 hours and 30 minutes.

Attention is directed to the fact that all of the cars going down the fill were of all-steel construction, except the dining car, which had a steel underframe; while all of the fatalities occurred in an all-steel car, they were partly due to the passengers falling out of windows, which were broken when the car turned completely over. There were a large number of passengers in the sleeping cars, and the substantial construction of these cars undoubtedly contributed largely to the safety of the passengers.