

In re investigation of an accident which occurred on the Atchison, Topeka & Santa Fe Railway, near Kingman, Ariz., on September 20, 1916.

On September 20, 1916, there was a derailment of a passenger train on the Atchison, Topeka & Santa Fe Railway near Kingman, Ariz., which resulted in the death of 4 employees and the injury of 6 employees and 2 passengers. After investigation of this accident the Chief of the Division of Safety reports as follows:

The accident occurred on the First District of the Arizona Division of the Atchison, Topeka & Santa Fe Coast Lines, which district extends between Seligman, Ariz., and Needles, Calif., a distance of 149.2 miles. Westward from Seligman to Yampai, Ariz., a distance of 23.2 miles, the line is double track, then is single track to Topeka, Ariz., 113.8 miles farther west, from which place it is again double track, to Needles, Calif., a distance of 12.2 miles. The derailment occurred on the single track portion of this district. The automatic block signal system is in use on the double-track portion only, train movements over the single-track line being governed by train orders.

Approaching the point of accident from the east, the track is tangent for a distance of 2,829.7 feet on a grade of 1.8% descending westerly, to the beginning of what is known as curve 103, which, commencing at its eastern end, is composed of the following series of curves, all leading to the right: one of 2 degrees, 474.2 feet in length; one of 8 degrees, 892 feet in length; one of 5 degrees 20 minutes, 114 feet in length, and one of 2 degrees 40 minutes, 100 feet in length. The 2-degree curve is on a grade of 1.7% descending westerly, and the 8-degree curve is on a similar grade of 1.4%. The accident occurred 275.6 feet west of the eastern end of the 8-degree curve.

Westbound passenger train No. 3, known as the "California Limited," en route from Chicago, Ill., to San Francisco, Calif., consisted of 1 combination baggage and buffet car, 1 dining car, and six Pullman sleeping cars in the following order: Chanute, Eagle Pass, Querino, Francisco, Calsona and La Junta, hauled by locomotive 1329. All of the cars in the train were of all-steel construction, with the exception of the combination baggage and buffet car, which had a wooden superstructure and steel underframe. This train was in charge of Conductor Wilkins and Engineman Ghelson, left Seligman at 11:27 p.m., September 19th, on time, and at about 1:54 a.m., September 20th, was de-

railed at a point approximately 6,700 feet east of Kingman, Ariz., which station is 67.7 miles west of Seligman. At the time of derailment the train was about four or five minutes late.

The track is laid with 85-pound rails, 33 feet in length, with 22 oak ties under each rail, and in the immediate vicinity of the accident is laid on a fill of varying depths, there being a 15-foot embankment on the outside of the curve at the point of derailment. Four-hole angle bars and three-spike tie plates are used in fastening the ends of the rails. The superelevation on the curve on which the accident occurred is 4-1/2 inches and the track is well maintained in all respects. At the time of the accident the weather was clear.

The locomotive came to rest on its left side, 284 feet from the point of derailment and 60 feet from the track, on the outside of the curve. The tender remained coupled to the locomotive by two of the three drawbars used; these drawbars were bent into a semi-circular shape, and the tender came to rest in a position approaching a parallel with that of the locomotive, the bottom of the tender facing the bottom of the locomotive. The pony truck of the locomotive became disconnected, its center pin being found on the right cylinder of the locomotive, covered with dirt and with its lower half bent in an angle of about 45 degrees; and the first marks made by that truck were found on a slight elevation, 82 feet beyond the point where the locomotive came to rest, the truck continuing on an additional distance of 160 feet. The engineer and fireman were killed in the accident. The first three cars in the train were also derailed, but remained coupled together and came to rest with the first car in an upright position and its head end turned slightly to the left, the other two cars turning over on their left side without being thrown out of alignment with each other. The first car passed the overturned locomotive before coming to rest and evidently encountered the right cylinder thereof, the front end and more than half the left side of this car being torn away; its steel underframe also sustained considerable damage. When the second car, the dining car, turned over, it fell with the front end of its roof against the front end of the bottom of the overturned locomotive, breaking open the roof of the car, through which opening steam and hot water from the locomotive entered, resulting in the fatal scalding of two dining car employees. The third car, Pullman car Chanute, was not seriously damaged. When the train parted at the point of derailment, the drawbar on the rear of Pullman car Chanute was torn out and hung from the car following, Pullman car Eagle Pass, which car, together with the four remaining cars, continued on the track to a point 1,013 feet beyond the initial point of derailment. At this point the

loosened drawbar dropped onto the track and resulted in the derailment of the rear truck of Pullman car Eagle Pass and two wheels of the front truck of Pullman car Querino.

Examination of the track at the point of the accident disclosed only one mark, a scratch on the end of a tie on the outside of the curve, caused by some part of the equipment, there being no flange or wheel marks on the rails or ties.

Upon examination of the portion of the train which went over the embankment, it was discovered that the flanges and treads of all the wheels were in good condition, and that there was nothing about the equipment which might have caused the derailment.

Conductor Wilkins stated that he was riding in the combination baggage and buffet car when the accident occurred, and that as soon as he got out of the wrecked car he sent back his rear brakeman to protect against any following trains, and his head brakeman to Kingman to report the accident. He then looked at his watch and it was 1.57 a. m. Conductor Wilkins stated that the air brakes were tested twice at Yampai, that they seemed to take hold properly each time he felt them being applied, and that he did not feel any application of the brakes between Louise, 2.6 miles east of Kingman, and the point of accident, although he would not have noticed any but a severe application. He stated that this was Engineman Gholson's first trip with him, that at Seligman he asked him if he was familiar with the division, and received an affirmative reply. Conductor Wilkins stated that he heard the engine whistle being sounded at Louise, but did not remember hearing it afterward; that he noticed no change in the speed after passing Louise, and that, because of the darkness, he could not judge the speed of his train approaching the point of accident. He stated that he did not feel any lurch of the cars before the derailment occurred, and did not know what might have caused the derailment.

Head Brakeman Muncy, who was with Conductor Wilkins at the time of the accident, confirmed the latter's statements regarding the whistle being sounded at Louise and there being no noticeable reduction in the speed of the train between Louise and the point of accident.

Rear Brakeman Thacker stated that at the time of the accident he was riding in the rear end of the observation car, which was one of those which were not derailed. When the train came to a stop he thought that if anything unusual had occurred the engineman would whistle him out to flag, and he said that he first learned of the accident when Brakeman Muncy came and

told him that the head end of the train had been derailed, whereupon he went back to Louise to protect against following trains. Brakeman Thacker stated that he knew when his train passed Louise, that he did not know whether there had been any application of the brakes between that place and the point of derailment, that he noticed no reduction in speed, that the rear end came to a stop somewhat roughly, that at no time on this trip had it seemed to him that his train was traveling too rapidly around curves, although he was unable to make an estimate of the speed at the time of derailment, and that he had no idea of what caused the accident.

Fireman Holley, of a freight train which was waiting at Kingman for train No. 3, stated that Brakeman Muncy informed the crew of his train concerning the accident, that they then cut off the locomotive of their train and went to the scene of the derailment, and that, upon crawling through the cab window of the derailed locomotive, he found the body of Engineman Gholson. He said that he had previously worked with Engineman Gholson on another division of this road, and that he had always known him to be a very careful engineman in all respects. Fireman Holley stated that he felt certain that the derailment was caused by excessive speed, although, on account of the competency of the crew of the derailed locomotive, he was unable to understand why the speed had been allowed to become excessive.

Road Foreman of Engines Ledger, who was at Kingman at the time of the accident, in a report to Master Mechanic Armstrong upon his investigation, stated that he arrived at the scene of the accident 40 minutes after its occurrence, and immediately went to the locomotive, where he found Engineman Gholson lying on top of the boiler, his body being cold and stiff. The body of the fireman, which was found at daybreak, lying in the water and oil back of the locomotive, was limp and not yet cold. He stated that he therefore assumed that Engineman Gholson was dead before the derailment occurred, probably as a result of heart failure or ~~some~~ paralytic stroke, and that the fireman, in trying to help him, overlooked the speed of the train until too late to avert the accident. Road Foreman of Engines Ledger further stated that he found the throttle within two notches of being wide open, and the reverse lever four notches forward from the center of its quadrant, this being about the position of these levers when a train of this character reaches the summit of the grade approaching the point of accident. He also found the brakes on the wheels of the locomotive set, the double-heading cutout cock on the engineman's brake valve open, both the automatic and the independent brake valve handles in the running position, the steam and air gauges at zero, and the brake rigging on the locomotive and on the pony truck intact. He stated that the pony truck had evidently

become detached at the point where the locomotive came to rest, that the trailer truck was also detached and lay to the rear of the locomotive and under the frame of the tender, and that the tank was torn from the frame of the tender. He stated that there were no marks on the track at the point of derailment, which fact indicated that the speed of the train was so great that the locomotive and first three cars leaped clear of the track. He stated that Engineman Gholson had made but a few trips on this district, and he did not know whether or not he was familiar with it, but that the fireman knew the road well. He said that the air brakes in train No. 3 had been tested at Seligman and Yampai on this trip, having been found in satisfactory condition each time, that it was the practice for enginemen to try the air brakes on their train when it started down the heavy grade toward the point of accident, and that, even if a train were traveling at a high rate of speed, with only 50 pounds brake pipe pressure, if the brakes were set in emergency the speed of the train could be sufficiently reduced to enable it to round the curve in safety, in the case of equipment such as that in this train. He stated that he examined the flanges, tread wear and lateral on the pony truck, driving, trailer and tender wheels and found all of this equipment in first class condition.

During the investigation, in a discussion of the accident, Road Foreman of Engines Ledger, and Engineman Cole, Crooks and Gallagher, employed on the district on which this accident occurred, all stated that trains such as train No. 3 usually pass the top of the 1.8 percent grade, about two-thirds of a mile from the point of derailment, at a speed of 50 miles an hour and reduce it to about 35 miles an hour before reaching the 8-degree curve, and that a speed of 45 miles an hour would destroy the margin of safety on that curve. They also stated that if a train passed the summit at 50 miles an hour and the brakes were not applied down the grade, the speed would be from 75 to 90 miles an hour when it reached the point of derailment.

On the curve on which the accident occurred, there is a superelevation of 4-1/2 inches, the usual speed of trains such as train No. 3 around the curve, according to the statements of employees, being 35 miles an hour. The only speed regulations are those contained in time-table rule 20, which reads in part as follows:

"The speed of passenger trains will ordinarily be that prescribed in the schedule, but in cases of delay, requiring greater speed in order to enable trains to make meeting points or to secure connections, the speed may be so moderately increased above that prescribed in the schedule, as in the judgment of the conductor and engineman in charge of the train, may be safe and prudent, due consideration being always given to condition of track and all the circumstances."

The flanges of all the wheels in train No. 3 were found to be in good condition, the air brakes appeared to have been operating effectively, and there was only a slight mark on the outer edge of a tie where the train left the rails, the track itself being in first class condition. It is believed, however, that the derailment must have been caused by train No. 3 rounding the 8-degree curve at an excessive rate of speed resulting in the locomotive and first three cars leaping entirely clear of the track.

It was impossible to determine the reason for the excessive speed, inasmuch as both members of the engine crew were killed in the accident. It is, therefore, impossible to definitely state the cause of this derailment.

Engineman Gholson was 32 years of age, was employed as a switch engineman February 15, 1912, and was promoted to road engineman on the Arizona Division October 13, 1912. His experience on the district on which this accident occurred was three trips as engineman on a helper locomotive in passenger service, and three trips with freight trains. Fireman Osborne was employed February 8, 1911. The records of both of these employees were good. At the time of the accident they had been on duty 2 hours 27 minutes.