

IN RE INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE  
LOS ANGELES & SALT LAKE RAILROAD NEAR MANIX, CALIF.,  
ON OCTOBER 30, 1920.

February 3, 1921.

On October 30, 1920, there was a derailment of a passenger train on the Los Angeles & Salt Lake Railroad near Manix, Calif., which resulted in the death of 1 passenger, 1 employee on duty, 1 employee off duty, and 1 person carried under contract, and the injury of 25 passengers. The investigation of this accident was conducted jointly with the Railroad Commission of California. As a result of this investigation the Chief of the Bureau of Safety reports as follows:

This accident occurred on the second subdivision of the Los Angeles Division, which extends between Yermo, Calif., and Las Vegas, Nev., a distance of 171 miles. In the vicinity of the point of accident this is a single-track line over which train movements are governed by time-table and train orders, no block-signal system being in use. The accident occurred 230 feet west of bridge 178.75, which is located 4,705 feet east of Manix. Approaching the point of accident from the west the track is straight for approximately 8 miles, the grade is slightly descending for several thousand feet, being .2 per cent at the point of accident. The track is laid with 90-pound rails, 33 feet in length, with 20 ties to the rail, tie-plated and single-spiked, ballasted with stone. Bridge 178.75 is a 12-bent, floor-ballasted trestle, 180 feet in length and 15 feet in height, there are no guard rails on this trestle. The western approach is on a fill,

which is about 15 feet high at the point of accident. No slow order was in effect, the only speed restriction being Special Rule 6 in the current time-table, restricting the speed of delayed passenger trains to 50 miles an hour. The weather at the time was cloudy.

Eastbound passenger train No. 102, en route from Los Angeles, Calif., to Salt Lake City, Utah, consisted of engine 3402, 1 baggage car, 1 smoking car, 1 chair car, 1 tourist sleeping car, 1 dining car, 1 standard sleeping car, and 1 observation sleeping car, in the order named, and was in charge of Conductor White and Engineman Trout. The cars were all of wooden construction with steel underframes, except the smoking car, which was of all-wooden construction, and the observation car, which was of all-steel construction. This train left Yermo, its initial station on this subdivision, at 5:45 p.m., 50 minutes late, passed Manix, 14.6 miles east of Yermo, and was derailed at about 6:18 p.m. while running at a speed estimated to have been about 35 miles an hour.

The engine broke away from the remainder of the train and stopped in an upright position with its pilot 783.5 feet east of the initial point of derailment. All of the wheels of the engine and tender were derailed except the forward pair of wheels of the engine truck. The engine wheels which were derailed came to rest on the south or right side of the rails and the tender wheels on the north or left side. All of the cars were derailed to the south with the exception of the rear truck of the rear car which was not derailed. The baggage car was torn from its trucks, turned over, and

finally came to rest in an upright position at the eastern end of the bridge, 50 feet from the track. The next three cars fell from the bridge and came to rest on the bed of the stream, the smoking and chair cars turning over on their sides; the smoking car was so badly damaged that it was afterwards destroyed, while the other two were considerably damaged. The dining car was partly turned over, its eastern end resting on the rip rapping at the western end of the bridge; the next two cars remained practically upright. The employees killed were the baggageman, and a cook who was deadheading.

Engineman Trout had passed over this section of track on westbound passenger train 2nd No. 101, which arrived at Yermo at 5:10 p.m., and at that time he had noticed a low spot about 300 feet west of the point where the accident occurred. On the trip which terminated in this accident he had reduced speed on account of this low spot, applying the brakes as the train was passing through Manix and releasing them at about the time the engine reached the low spot, he estimated that the speed had been reduced from 45 to 35 miles an hour, and said he noticed the engine roll, but it had straightened up and was riding smoothly when he felt it drop down on the right side; there was no indication that the wheels had climbed the rail. He expressed the opinion that the driving wheels were the first to be derailed. Engineman Trout thought his engine was 2 or 3 car-lengths west of the bridge when it was derailed, while the fireman knew only that it occurred at a point west of the bridge. According to the statements of both engineman and fireman, they were riding on their seat boxes looking ahead,

but had noticed nothing irregular in the alignment of the track; the fireman had not noticed any rough spots or any rolling of the engine. Both of these employees said the engine was in good condition, and when examining his engine after the accident Engineman Trout failed to find anything which could have contributed to the derailment.

Conductor White and Rear Brakeman West were in the next to the last car when the accident occurred. The conductor felt a lurch of the car followed by a jar which he said resembled a very hard coupling, while the rear brakeman said he first felt an emergency application of the air brakes followed by the running in of the slack.

Examination of the track showed that the first mark was on the gauge side of the head of the south or right-hand rail, which mark continued on the head of the rail for a distance of about 6 feet, gradually working downward and then continued along the bottom of the head for a distance of 13 feet, gradually growing more pronounced, slightly splintering the rail at one point and making a fin at the bottom of the head. This mark continued to the angle bar, on the top of which there were marks of a severe blow, while near the base of the angle bar there were marks which might have been made by flangers. Beginning 14 feet east of the first marks, there was a mark on the web on the same side of this rail. This mark extended eastward a distance of about 2 feet, or to within about  $1\frac{1}{2}$  feet of the angle bar; it next appeared on the angle bar, while the angle bar bolts had been sheared off. The leaving end of this rail was bent slightly outward for a distance of about 2

feet, while the base did not rest horizontally on the tie plates, but had a tendency to turn toward the ends of the ties. There was evidence of a very recent outward movement of this rail, not only on the inside edges of the tie plates, but also at the outside edges, where the tie plates had dug into the ties, splintering the tops of them. The next rail bore numerous marks on its head and web, one of which was apparently a continuation of the mark on the web of the first rail. The receiving end of this second rail remained nearly in gauge, but beginning at about the center the leaving end was torn loose and partly turned over. Flange marks were found on the end of the third rail, which also bore marks on the gauge side even more pronounced than those on the first two rails, the side of the head being splintered at various points through out its length. The next 6 or 7 rails on the south side of the track were torn out and more or less damaged in the accident. The rails on the north side of the track on the bridge were pulled in toward the center of the track a distance of about one foot.

During this investigation measurements of the gauge were taken every 10 feet, beginning at a point 604.5 feet west of the first mark on the south rail. Out of a total of 61 such measurements within this distance, the gauge was found to be in excess of 4 feet  $8\frac{1}{2}$  inches at 57 points; of these 57 instances of wide gauge, there were 19 where the gauge was wide a distance of  $\frac{1}{4}$  inch or less, 29 where it was  $\frac{1}{2}$  inch, 6 where it was  $\frac{3}{4}$  inch wide, and 3 where it was 1 inch or more wider than standard. This wide gauge, however, was not uniform,

and appeared to have resulted from the rails having been pushed outward for short distances, first on one side of the track and then on the other. Further examination of the track within this same distance showed that at 3 points in the south rail the angle bars and joints were not properly supported, these points being located approximately 604, 566 and 534 feet west of the point of accident. The following defects were noted in the north rail, at the approximate distances indicated from the point of derailment: loose rail, the rail being off the tie plates and the tie plates loose, 515 feet; spike missing and broken tie, 505 feet, also 495 feet; loose spikes and rail loose, with a tendency to turn over, 25 feet, several broken ties and no spikes on outside of rail joint, 16 feet. At the time of this examination a great many of the spikes had been driven down, as evidenced by fresh marks on the heads of the spikes.

Section Foreman Cameron, who was in charge of the section on which this accident occurred, had not been over this portion of his section for a period of 9 days preceding the date of the accident, although he said his track walker had been over it early in the afternoon on the day of the accident.

Section Foreman Knoezer, in charge of the adjoining section on the west, had worked from October 21 to October 25 on the section on which this accident occurred, this work including surfacing, aligning and gauging the track in the vicinity of the point of accident. On October 25 he gauged the track, found one point on each side of the bridge where the gauge was  $\frac{3}{4}$  inch wide, and made the necessary repairs.

Section Foreman Knoezer regarded the track as safe for a speed of 50 miles an hour, and when after the accident several places were found where the track was considerably out of gauge he said he was sure this condition did not exist at the time he was last over the track.

Engineman Shepard passed the point of accident on east-bound passenger train second No. 2, which left Yermo at 2:50 p.m., and at that time noticed that the track was rough and that his engine rolled badly, the speed of his train at this time was 40 or 45 miles an hour. While he did not consider the track to be dangerous, Engineman Shepard said that when returning on westbound passenger train first No. 101, which arrived at Yermo at 5:00 p.m., he operated his train over this section of track at a speed of 30 miles an hour.

Examination of engine 3402 disclosed that on the truck wheels on both sides of the engine and on all of the driving wheels on the right side there were marks near the outer edges of the tires which indicated contact with angle-bar bolts or spike heads. On the right front driving wheel there was also a mark which extended evenly around the outer edge of the tire. Measurements of the lateral motion showed that it was within the required limits. In his examination of the derailed equipment, after the accident, Roadmaster Schrader noticed a broken pedestal brace on what he thought was the forward truck of the baggage car. He said the break looked like an old one, but that it might have become rusty on account of coming in contact with sand. No other defects of any kind were found which could have contributed to the occurrence of this accident.

This accident was caused by the track not being maintained in proper condition for the safe operation of trains at schedule speed.

Many theories were advanced as to the cause of this accident, but it is believed that the marks on the engine-truck and driving wheels and on the gauge side of the south rail, the tendency of the rail first marked to turn outward, the irregular gauge of track varying from  $1\frac{1}{4}$  inches excess gauge to points where the rails were so close together that they would not take the gauge, loose and missing spikes, defective ties, and the presence of two loose rails on the north side of the track, one of them being within 25 feet of the point of derailment, coupled with the fact that the engineman reduced speed on account of rough track noticed by him about an hour previously when on a westbound train, which rough track had also been noticed by another engineman, clearly indicate that track conditions alone are responsible for this accident.

The members of the crew of train No. 102 were experienced men; at the time of the accident they had been on duty about 8 hours, after 40 hours or more off duty.