

INTERSTATE COMMERCE COMMISSION

REPORT OF THE DIRECTOR OF THE BUREAU OF SAFETY IN RE
INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON
THE WESTERN PACIFIC RAILROAD NEAR SHAFTER, NEV.,
ON JULY 13, 1925.

December 11, 1925.

To the Commission:

On July 13, 1925, there was a derailment of a passenger train on the Western Pacific Railway near Shafter, Nev., which resulted in the injury of 14 passengers and 5 dining car employees.

Location and method of operation.

This accident occurred on the Third Sub-division of the Eastern Division which extends between Elko, Nev., and Wendover, Utah, a distance of 140.9 miles; in the vicinity of the point of accident this is a single-track line over which trains are operated by time-table and train orders, no block-signal system being in use. The accident occurred on a fill, $4\frac{1}{2}$ feet in depth, within yard limits, at a point 5,753.4 feet east of the station at Shafter, this point being about 300 feet west of mile post 767 and just west of the east yard-limit board, the track is tangent for several miles in each direction from the point of accident, while the grade at the point of accident is 0.079 per cent ascending for eastbound trains.

The track is laid with 85-pound rails, 33 feet in length, with about 18 to 19 untreated ties to the rail-length, and is single-spiked, the spikes being staggered. There were about 12 inches of gravel ballast below the ties, with 6 inches of the same material filled in between and level with the tops of the ties. Four-hole angle bars were in use, but there were no tie-plates or rail anchors in the vicinity of the point of accident.

The weather was clear and it was hot at the time of the accident, which occurred at about 10 38 a. m.

Description

Eastbound passenger train No. 2 consisted of one baggage car, one coach, one Pullman car, one dining car, three Pullman cars, and one observation car, in the order named, hauled by engine 99, and was in charge of Conductor Scofield and Engineman Morton. This train arrived at Shafter about 10 25 a. m., and after completing station work pulled

down to the coal chute, just east of the station. After taking on coal the train departed, at about 10 34 a.m., four minutes late, and on reaching a point about 1 1 miles east of the station the third car in the train was derailed while traveling at a speed estimated to have been ^{not} in excess of 20 miles an hour

The third car came to rest astride the south rail, leaning to the right at an angle of about 45°, the fourth and fifth cars were on their right sides, south of the track and at the bottom of the fill, the sixth car was also derailed but remained on the roadbed, leaning to the right at an angle of about 45°, while the seventh car remained on the rails with the exception of the north lead wheel of the east truck, none of the other equipment was either derailed or damaged

Summary of evidence

Engineman Morton stated that when approaching the point of accident he was riding on his seat box, with his hand on the brake valve, and he noticed several section men standing on either side of the track, apparently having been engaged in renewing ties. As the engine passed the section men the speed was not in excess of 20 miles an hour; he noticed no unusual condition or movement of the engine, such as a side thrust, that would throw the track out of alignment, and the first knowledge he had of anything wrong was on feeling the engine jerk, apparently on account of the cars being derailed and at about the same time some one opened an emergency valve in one of the cars. After the engine had stopped Engineman Morton examined the track and found that the south rail was torn out, while there was a noticeable kink in the north rail, this rail being 6 or 8 inches out of line for about two rail-lengths, apparently a result of the derailment, he was not sure whether the kink was to the north or the south; he also noticed that seven or eight new ties had been installed at the point of derailment. His examination both of track and engine did not develop any defects which in his opinion could have caused the accident. The statements of Fireman Fuller corroborated in substance those of Engineman Morton

Conductor Scofield, who was in the third car at the time of the accident, said the first he knew of anything wrong was when the accident occurred. He afterwards looked over the track and equipment but found nothing that in his opinion would have caused the accident, and he expressed the opinion that the accident might have been caused by a sun kink, due to hot weather.

Head Brakeman Birchell was riding in the second car; he felt a jerk and it appeared to him as though the rear end of the day coach had become derailed, and he therefore applied the air brakes by opening an emergency valve. Flagman McClothlen was riding in the rear car and the first intimation he had of anything wrong was when the car came to a very sudden stop; he immediately went back to flag, and when on his way back he looked carefully for wheel marks on the ties, but saw nothing of this character. After he was relieved of flagging he made an examination of the track and equipment, about one-half hour after the occurrence of the accident, but found nothing that in his opinion would have caused the accident.

Section Foreman Oni, with his crew, was working at the point of accident when it occurred, having installed seven new ties, four of them were put in at a point just west of a rail joint, then two old ties were left in the track at the joint, following which three new ties were installed east of the joint. He said it was customary to put the new ties where the old ties originally rested, unless they had slewed, that in this particular case some of the seven new ties were placed on old beds, while new beds had been made for others, that these ties had been tamped before the arrival of train No. 2, dirt had been placed between the rails, and that all of the new ties except one had been spiked. He was standing on the south side of the track, within 9 or 10 feet of the joint, watching the new ties as train No. 2 started to pass over them, moving at a speed of about 25 miles an hour. The engine and first two cars passed over all right and then he noticed the rails kink toward the south at the joint where the old ties were located, both rails moving about 20 inches, and springing back 8 or 9 inches after the train stopped. Immediately after the accident he examined the track and found the rails to be bent at the rail joint, there were no wheel marks on the ties west of the rail joint, and he did not know what caused the accident.

Trainmaster Curtis said the indications were that the track kinked toward the south, starting at the joint near where the seven new ties had been installed; both rails pointed toward the south at an angle of almost 45°. The east truck of the seventh car stood just west of the rail joint, which was in the south rail, and the bend in the rail had its extreme curvature near the joint. He also stated that there was no pressure at the joint in the north rail when the track was out in order to construct a detour around the wreckage.

Superintendent Beem examined the derailed equipment in company with Trainmaster Curtis, but found no defect

that in his opinion would have caused the accident. After the two rear cars were pulled back he examined the track and found that the south rail had moved out at the rail joint, taking with it the north rail and six or seven ties, then the north rail apparently broke loose and did not move as far as the south rail. There were no indications of wheel marks on the ties west of the joint at the initial point of derailment. After making his inspection, following the rails down under the cars as far as he could, and talking with the section foreman as to the nature of the work being done prior to the accident, it seemed to him that a sun kink had occurred at the point where the new ties had been installed.

Roadmaster Barnett had only been in charge of the district on which the accident occurred for a period of 13 days and said he had not had an opportunity of thoroughly inspecting the track. At the point where the rails were bent to the south, just east of the seventh car, the south rail appeared to be bent more than the north rail, but in his opinion this difference in the amount of bend in the two rails was a result of the accident rather than the result of any track condition existing prior to the accident. He was of the opinion that the accident was caused by a sun kink, basing his opinion on the statements of the section foreman. Rail creeping had given him some concern but he did not know the maximum amount of movement on each side of the point of accident as he had not had an opportunity of checking it. This section of track was not equipped with anti-rail creepers and he thought the only place tie plates were used was at the top of the hill, this point being a considerable distance away. In order to prevent a recurrence of a similar accident he suggested that the track in this district be equipped with tie plates and rail anchors.

Car Foreman McNabb and Master Mechanic Stapp found no defects about the equipment that would have caused the accident.

Assistant Engineer Simmons stated that a policy was being followed of installing rail anchors and fully tie-plating the track, as much of the work as could be afforded being done each year and that within the last four years about 500,000 rail anchors had been installed, together with an enormous number of tie plates. Tie renewals were a part of the regular maintenance program, 12 or 13 per cent of the ties being renewed yearly. He stated that the renewals on the particular section where the accident occurred were a little higher in 1924, and had been for the past several years, than the average for the entire division and in his opinion the track was in very good condition. He also said that rail creeping had been reduced on track that was

tie-plated and fully anchored, but apparently it could not be eliminated.

Inspection of the track, starting at the west switch of the detour track around the wreckage and proceeding westward for a distance of 1,452 feet, to the east switch at Shafter, developed the following conditions: 8 ties with the ends broken off at the rail seats, 3 ties with broken centers, 75 ties with ends horizontally and vertically split and checked so that the ties would not hold spikes, 7 suspended joints supported at one end by 1 tie, and 21 joints not properly spiked, there being from 1 to 4 spikes missing. In addition 90 spikes were found with the spike heads 1 inch above the flange of the rail, 59 with spike heads 2 inches above the flange, and 3 with spike heads 3 inches above the flange, while 5 spikes were pulled out by hand. In two cases, each for a distance of three rail-lengths, the spikes were $\frac{1}{2}$ inch or more above the flange of the rail. At 6 different rail joints, and at 10 different points between rail joints, the ties were slewed badly, a result of the rails creeping toward the east, this creeping amounting to a maximum of 2 inches in the north rail and $5\frac{1}{2}$ inches in the south rail, this last measurement being observed at a point approximately 500 feet west of the point of accident. An inspection of the track was also made from the east switch at Shafter, westward to the station, a distance of 3,905 feet, and similar track conditions were disclosed, while the base of the rail at 14 joints in the south rail was $\frac{1}{2}$ inch or more above the ties, the spikes being missing on from 3 to 5 successive ties at some of these joints. At a point about 2,600 feet east of the station it was observed that the eastward creep in the south rail showed a well-defined movement of 8 inches, while for a distance of four rail-lengths the heads of the spikes were from $\frac{1}{2}$ inch to $1\frac{1}{2}$ inches above the flanges of the rails while the bases of the rails in several places were $\frac{1}{2}$ inch or more above the ties, this latter condition occasionally existing with several ties in succession.

Examination of the track east of the point of accident also revealed the presence of similar irregularities although they were not so pronounced as between the point of accident and the station. It was noted, however, that the rails had crept toward the west, whereas the creep on the opposite side of the point of accident had been toward the east; at a point about 1,100 feet east of the point of accident the creep to the west in the case of the north rail was about 3 inches while in the case of the south rail it was $6\frac{1}{2}$ inches. At another point, about 4,500 feet distant, the north rail had crept 5 inches and the south rail a distance of about 12 inches, the flanges of the rails in some

places being worn bright iron contact with the spikes. Within a short distance east of the point of accident all the joints in the south rail were tight, apparently being under considerable pressure, while at one point the base of the rail was 2 inches above the ties and for seven successive ties the base of the rail averaged 1 inch above the ties. Undoubtedly most of this creeping was the result of daily expansion and contraction due to the hot desert sun and the comparatively cool nights. The creeping of the rails had resulted in many cases in practically destroying the holding qualities of the ties, many of which were split at the points where the spikes had been driven, while others had been damaged by slewing, resulting in the flanges of the rails cutting into them quite deeply.

Examination of the ties which had been in the nine rail-lengths of track damaged by the derailment, approximately 171, showed that only 79 or about 46 per cent could be classed as sound ties. Two old ties had been left in the track by the section foreman at the joint in the south rail where the track kicked out under train No. 2. The west tie of this pair had its lower half entirely decomposed, this decomposed portion remaining in the roadbed. The south end of the upper half of this tie could not be identified, but the north end of the tie, which remained in the roadbed, showed it to be rail-cut and devoid of spike holding qualities. The eastward tie of these two, while not decomposed, had lost its spike-holding qualities, was rail-cut and split both vertically and horizontally. Immediately adjacent to and west of these two old ties there were four ties which had just been placed in the track. It was plainly evident that one of these new ties was neither tamped or spiked and it was questionable whether or not the others had been tamped. Spikes had been started in them, but apparently had not been fully driven, since the spikes on the outside of the south rail were found laying practically their full length parallel with the length of the ties after the rail had been torn loose from the ties. The spikes on the north ends of these three ties had been driven deeper than the ones on the south ends of the ties.

The temperature record maintained by the railroad agent at Shafter showed the temperature on July 13 to have been 80° F at 8 a m, 92° F at noon; and 86° F at 6 p.m., these readings were from a thermometer located in the shade.

Conclusions

This accident was caused by rails kicking out under the train, due to excessive creeping.

The weather conditions on the morning of the accident were not in any way unusual, and it is not believed that a sun kink can be held to be the reason for the occurrence of this accident. On the other hand, the investigation indicated that the rails west of the point of accident had been creeping toward the east, while the rails east of the point of accident had been creeping toward the west; at a point 500 feet west of the point of accident the south rail had crept toward the east a distance of $5\frac{1}{2}$ inches, while at a point approximately 4,500 feet east of the point of accident the south rail had crept toward the west a distance of 12 inches, the north rail had been creeping in a similar manner although not to the same extent. This creeping of the rails was evidenced by the damaged condition of ties, tight rail joints, the elevation of the bases of the rails until some of them were more than $\frac{1}{2}$ inch above the ties, and by worn spots on the flanges of the rails as a result of moving back and forth under the spike heads. The creeping of these rails as above described undoubtedly was responsible for the creation of a pressure so great as to cause the track to kick out at a point of least resistance, this being the point where repairs were being made. The existence of such a condition directs the attention of the engineering department of this railway to the necessity for thoroughly anchoring track where creeping has occurred, or is liable to occur in the future, and to the advisability of installing tie plates whenever conditions permit.

The employees involved in this accident were experienced men; at the time of the accident they had been on duty from $3\frac{1}{2}$ to $7\frac{1}{2}$ hours, after from $10\frac{1}{4}$ to $16\frac{3}{4}$ hours off duty.

Respectfully submitted,

W.P. BORLAND,

Director.