INTERSTATE COMMERCE COMMISSION

REPORT OF THE DIRECTOR OF THE BUREAU OF SAFETY CONCERNING AN ACCIDENT ON THE WESTERN PACIFIC RAILROAD NEAR RED ROCK, CALIF., ON JUNE 9, 1935.

July 30, 1935.

To the Commission:

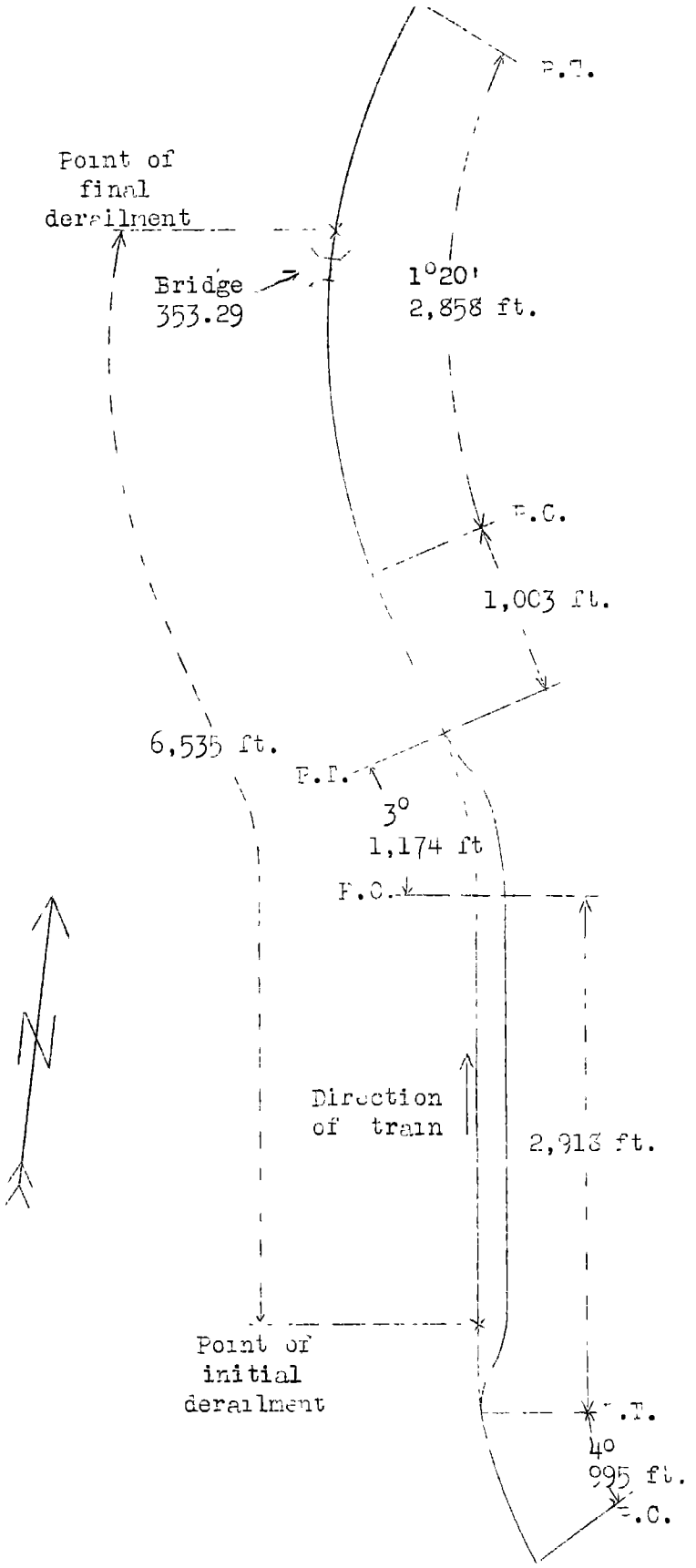
On June 9, 1935, there was a derailment of a freight train on the Western Pacific Railroad near Red Rock, Calif., there were no casualties as a result of this accident.

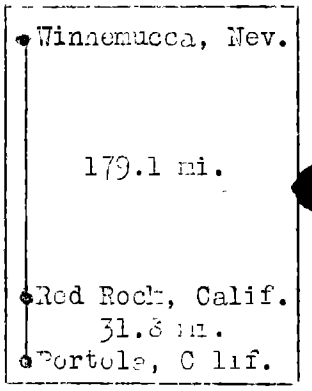
Location and method of operation

This accident occurred on the First Subdivision of the Eastern Division, which extends between Portola, Calif., and Winnemucca, Nev., a distance of 210.9 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. There is a passing track at Red Rock which is located on the south side of the main track and extends eastward from the station board; this passing track is 3,946 feet in length and the initial derailment occurred 84 feet east of the west switch, while the final derailment took place 6,535 feet farther east. Approaching from the west, there is a 4° curve to the right which is 995 feet in length and extends almost to the west switch of the passing track; the track then is tangent for a distance of 2,918 feet, followed by a 3° curve to the left 1,174 feet in length, 1,003 feet of tangent, and then a 1°20' curve to the right which is 2,858 feet in length, the final derailment occurring on the last-mentioned curve at a point approximately 1,600 feet east of its western end. The grade for east-bound trains is descending, being 0.70 percent at the initial point of derailment and 0.75 percent at the point of final derailment.

The track is laid with 85-pound rails, 33 feet in length, with 19 or 20 ties to the rail length, tieplated and double-spiked on curves, and ballasted with about 8 inches of gravel below the bottoms of the ties. The speed of freight trains in the vicinity of the point of accident is restricted to 30 miles per hour.

The weather was clear at the time of the accident, which occurred about 4:15 a.m.





Inv. No. 1968
Western Pacific R.R.
Red Rock, Calif.
June 9, 1935.

Description

Train No. 82, an east-bound second-class freight train, consisted of 64 cars and a caboose, hauled by engine 336, and was in charge of Conductor Miller and Engineman Lampson. This train passed Reno Junction, 10.8 miles from Red Rock, at 3:47 a.m., according to the train sheet, 9 hours and 6 minutes late, and was derailed east of Red Rock while traveling at a speed thought to have been from 10 to 15 miles per hour at the point of final derailment.

The engine and first 51 cars remained coupled and were not derailed; the fifty-second car was derailed to the right and stopped on its right side clear of the main track at a point about 50 feet east of the final point of derailment. The next threecars also were derailed, passing the first derailed car before coming to a stop across or alongside the track. Fire broke out in the wreckage and resulted in serious damage to the derailed cars and their contents.

Summary of evidence.

Engineman Lampson said that in controlling the speed of the train on the descending grade he had been applying the brakes frequently; as the train approached Red Rock he received a proceed signal from the rear end, and he reduced speed until he could see that the track was clear between the switches at Red Rock and then released the brakes. When about 20 car lengths west of the east switch he again applied the brakes, releasing them when the engine was about half way between the switch and bridge 353.29, which is about 2,200 feet beyond the switch, and about this time he looked back and saw a red fusee at the rear of the train. Engineman Lampson then noticed that the brake-pipe pressure was going down and at once lapped the brake valve and allowed the train to stop; he estimated the speed to have been about 25 or 30 miles per hour when he placed the brake-valve in lap position. Engineman Lampson did not examine the track at the rear of the train and was unable to make any examination of the derailed equipment on account of the intense heat from the fire.

Fireman Jenner heard the engineman tell the brakeman that the train had broken in two, this being about the time the engineman lapped the brake valve, and on looking back he saw the reflection of fire toward the rear of the train.

Head Brakeman Rablen said he had been watching the train and was able to observe the entire right side of it at Red Rock, but was unable to see the running gear on account of dust and the fact that it was not fully daylight. When the engine was

between the east switch and bridge 353.29 he felt a jerk in the train and upon looking back on the right side he saw a red fusee at the rear end. Head Brakeman Rablen did not examine the track or equipment after the accident.

Conductor Miller said that after leaving Chilcoot he was riding in the body of the caboose checking way-bills and did not know there was anything wrong until Rear Brakeman Spaulding came down out of the cupola and said fire was flying from the train at a point 10 or 12 car lengths ahead of the caboose. Conductor Miller immediately went to the rear platform and on seeing a lot of dust on the track behind the train he decided that there was something wrong and opened the back-up valve on the caboose platform. After taking this action, Conductor Miller was able to see marks on the ties between the rails and then opened the valve wide until the train stopped. Conductor Miller was unable to examine the derailed equipment on account of the heat from the fire but on examining the track he found marks on the rail braces at the west switch and concluded that something had been dragging. He thought the speed at the time of the accident was between 10 and 15 miles per hour.

Rear Brakeman Spaulding watched the rear two-thirds of the train as it passed him when departing from Portola but did not see anything wrong. He rode in the cupola of the caboose on the right side between Portola and the point of accident and had his head outside the window until the train rounded the curve approaching Red Rock but did not see any fire flying. After passing the west switch at Red Rock the swing brakeman, who was on the opposite side of the cupola, said there was fire flying about 15 car lengths ahead of the caboose. Both brakemen immediately left the cupola and notified the conductor, the rear brakeman picking up a fusee as they went to the rear platform and displaying it on the engineman's side as a stop signal. Rear Brakeman Spaulding estimated the speed to have been about 25 miles per hour when the trouble was discovered and said he did not apply the brakes at once by using the conductor's valve because he had been criticized for doing so on a previous occasion. After the train stopped, Rear Brakeman Spaulding went back to flag and saw marks on the south rail and on rail braces and also marks on the ties near the west switch which he thought had been made by something dragging; the first marks were on the frog of the west switch.

Swing Brakeman Nelson watched the entire train pull by him when leaving Portola and said that it seemed to be in good running condition; he was on the left side of the cupola and when about 20 car lengths west of the east switch at Red Rock he saw fire flying and notified the rear brakeman. He estimated the speed to have been about 25 or 30 miles at the time and said he did not use the conductor's valve as he was not sure that a car had been derailed.

Car Inspector Bates, on duty at Portola, said he inspected the south side of Train No. 82 when it arrived at that point, this inspection beginning at 12:27 a.m. and ending at 1:05 a.m., and it included a careful inspection of all arch-bar trucks, including UTLX tank 16995, subsequently involved in the accident at Red Rock. He was unable to find anything wrong at the time of his inspection, nor did he observe any rough handling when the train was being switched at Portola. Car Inspector Norman, who inspected the north side of the train at Portola, practically corroborated the statements of Car Inspector Bates.

After the accident Car Foreman Wright found a broken arch bar on the south side of the rear truck of UTLX tank 16995, while he said the top arch bar and also the tie strap had been bent upward about 6 inches. He examined the track and reached the conclusion that the arch bar had broken in the vicinity of the west switch at Red Rock; there was a mark on two spike heads and two guards, and finally a wheel on the south side had become derailed to the south, the wheel on the north side dropping to the ties between the rails and marking the ties up to the point of final derailment.

Road Master Maynard said he found marks on the turn-out rail 14 feet 10 inches from the switch point, these marks continuing for a distance of about 6 feet; the next mark was at the frog housing of the spring slides and then there was a mark on the wing rail, while two or three spikes had been partly pulled as a result of pressure against the stock rail. A broken rail was found near the east switch, while altogether there were about 750 ties which were broken and 3,000 which were wheel-marked.

Examination of the track by the Commission's representative showed that the stock rail at the west switch had been scraped on the south side, beginning 15 feet from the switch point. Similar marks were found on the guard rail of the frog, extending to the end of the guard rail, 84 feet from the switch points.

These marks evidently had been made by box bolts, while several spikes on the south side of the stock rail showed evidence of having been partly pulled as a result of pressure against the rail. The first flange mark was on the running surface of the south main-track rail beginning 14 feet 10 inches from the point of frog and extending diagonally across the running surface for a distance of 14 feet 6 inches. Flange marks then were found on spike heads and ties on the south side of the south rail. The ties were cut deeply as the marks gradually worked toward the ends of the ties for a distance of about 350 feet, beyond which point there were only occasional marks on the ties on the outside of the south rail but the ties were heavily marked between the rails, about 20 inches inside of the north rail, these marks continuing to the point of final derailment. It appeared that at the east switch the north rail of the passing track caused the derailed truck to go between the switch points, the derailed wheel on the south side passing over the passing-track rail; the derailed wheels then resumed their former positions with respect to the main track until they reached bridge 353.29 where the guard rail was encountered and caused the derailed wheels to swing back toward the rails. After passing over the bridge the derailed wheels once more resumed their former positions for a distance of 230 feet east of the bridge, or to the point where the final derailment occurred.

Examination of the broken arch bar showed that it broke at the bottom edge of the front column casting, there being evidence of two crescent-shaped fractures at the upper edge of the break. One was located about 3/4 of an inch from the outer edge of the bar and was about 1 inch in length and 1/2 inch in depth, while the other was about 2 inches in length and 1/2 inch in depth and extended to the outside edge of the bar. Apparently the breaking of this arch bar resulted in the lead pair of wheels becoming derailed near the west switch, the steel center sill of the car contacting the flange of the flued north wheel and preventing any further movement of the truck to the south until the final derailment took place, probably as a result of breaking off 8 inches of the flange of the rear wheel on the south side of the same truck, thus allowing the rear wheels to leave the rails and precipitating the final derailment. The box and column bolts were intact, tight, and secured with lock washers, with no evidence of their having been loose at any recent time. The broken arch bar, however, which measured 1 3/8 by 5 1/2 inches, had been reduced to a thickness of 1 1/4 inches under the sand plank. UTLX tank 10995 was loaded with gas oil having a net weight of 55,050 pounds; the light weight of the car was 41,800 pounds and its stenciled capacity was 80,000 pounds. The car was built in November, 1916.

Discussion

The evidence indicates that an arch bar failed on the right side of the rear truck of the fifty-second car in the train and that probably this arch bar broke in the vicinity of the west switch at Red Rock, causing the lead wheels of the truck to become derailed to the right, in which position the car continued until it reached the point of final derailment. The brakeman riding on the left side of the caboose cupola was the first to notice anything wrong, this being after the caboose had passed the station, at the west switch, at which time he saw fire flying and notified the rear brakeman who in turn notified the conductor; apparently the application of the brakes made by the conductor resulted in decreasing the speed of the train to a considerable extent before the final derailment took place. This train had been inspected by car inspectors when it arrived at Portola, and members of the train crew were on the ground watching the train as it pulled by them on departing from Portola, but nothing wrong was discovered by any of these employees.

Attention is called to the fact that the failed arch bar measured 1 3/8 by 5 1/2 inches and was only 1 1/4 inches in thickness at one point, whereas under the Manual of Standard and Recommended Practice, Mechanical Division, Association of American Railroads, issue of 1935, it is provided that for 40-ton trucks the arch bars shall be either 1 3/4 by 4 1/2 inches or 1 1/2 by 5 inches.

The failures, weaknesses and the hazards of arch-bar trucks are referred to in the proceedings of the American Railway Association over a long period of years prior to the date of any action by that organization which was designed actually to curtail their use. As early as 1921 the question of eliminating arch-bar trucks was considered by the Committee on Car Construction and advocated by some members of the committee and also in discussions by other members of the association. At that time, however, the Committee on Car Construction was engaged in designing a standard cast-steel side frame, with due consideration for previous developments which had been made by the manufacturers, the Master Car Builders Association, and the designs which had been put into use by the United States Railroad Administration. It is to be noted that cast-steel truck side frames were used on approximately 100,000 new freight cars built under the United States Railroad Administration and also that cast-steel side frames were specified for all necessary renewals on existing equipment. The activities of the American Railway Association culminated in the adoption of the cast-steel side frame as recommended practice in 1923.

The design was revised in 1925, and in 1927, Rule 3(t) was passed making it mandatory that cast-steel truck side frames, conforming to American Railway Association specifications, be applied to all interchange freight cars built on or after July 1, 1928.

At various times many attempts have been made to improve and strengthen arch-bar truck design, but with the increased load capacities and increased train speeds this type of truck continued to fail, and proved to be such a hazard in operation that additional mandatory rules were promulgated by the American Railway Association to eliminate it entirely from interchange service. In 1928 a rule was adopted by the American Railway Association, effective January 1, 1929, to the effect that new trucks would be equipped with cast-steel side frames when applied to new or rebuilt cars on or after October 1, 1929. In 1929 a rule was adopted, effective January 1, 1930, requiring that new trucks applied to any car on or after March 1, 1930, and second-hand trucks applied to new or rebuilt car bodies on or after January 1, 1930, would be equipped with cast-steel side frames; and a rule effective January 1, 1931, provided that trucks with arch bars would be prohibited in interchange effective January 1, 1936; this effective date, however, has since been extended to January 1, 1938.

The number of accidents investigated by this Bureau in which the failure of arch-bar trucks has been involved has increased considerably during the past year. During the 5-year period ended June 30, 1935, investigations were made of 14 accidents involving arch-bar trucks, these 14 accidents resulting in the death of 23 persons, the injury of 24 persons, and a cost of damage to track and equipment and clearing wreckage amounting to approximately $275,000. Seven of these 14 accidents, including the accident here under investigation, occurred during the year ended June 30, 1935, and in the reports covering several of these accidents attention has been called to the necessity for eliminating arch-bar trucks from service.

The use of arch-bar trucks is not confined to freight equipment; in fact, figures obtained in connection with the investigations of several recent accidents show that on some roads a large percentage of locomotive tenders are equipped with arch-bar trucks, and in the case of the Western Pacific it appears that all of its passenger locomotive tenders are so equipped. Attention is further directed to the fact that tank cars have been involved in many accidents caused by the failure of arch-bar trucks and it frequently happens that such tank cars are loaded with gasoline or other dangerous or inflammable articles and that fire breaks out in the wreckage and adds to the destructive results of the accident.

The figures previously given, indicating an expense of approximately $275,000 as a result of the 14 accidents investigated by the Commission, represent only a small percentage of the expense to the railroads of the country as a result of using arch-bar trucks. Several railroads do not keep records which enable them to determine what expense they are incurring for repairs to arch-bar trucks, but in some cases where such records are kept the expense so incurred is very large; on the Missouri Pacific, for example, it was found that in 1 year the cost of repairs and the cost of accidents involving arch-bar trucks amounted to $185,817, this amount being divided about equally between cost of repairs and expense of accidents.

The facts above set forth indicate that for many years it has been recognized by the railroads that arch-bar trucks are not satisfactory; their use has resulted in many serious accidents, coupled with loss of life and injury to persons and large property loss, and undoubtedly it is a conservative statement that they are costing the railroads of the country millions every year for accidents and repairs. Some railroads are taking the only effective step which can be taken to combat this situation; they are eliminating, and in some cases already have eliminated, such trucks from service. On the other hand, however, little if any progress is being made by many railroads and private-car lines, and in view of the accumulated record of failures surrounding the use of these trucks it is apparent that more effective measures must be taken to avoid the continual hazards incident to the use of arch-bar trucks.

In the case of the accident here under investigation, information was furnished by the Western Pacific Railroad concerning the amount of system equipment using arch-bar trucks. Out of a total of 6,137 freight cars, exclusive of ballast cars, cabooses and miscellaneous equipment, there were 5,399 cars equipped with arch-bar trucks as of January 1, 1935, or 87.97 percent; data compiled by the Association of American Railroads as of June 30, 1935 shows an average of total railroad-owned cars equipped with arch-bar trucks of 30.5 percent. None of these Western Pacific cars had been set aside for dismantling as of January 1 and none were scheduled to be dismantled during the current year; neither was it anticipated that any of these cars would be equipped with steel truck sides during the current year. It was stated, however, that 1,114 cars equipped with arch-bar trucks were now out of commercial service and it was estimated that 1,500 such cars would be removed from revenue service within the next 3 years. The number of arch-bar trucks repaired during 1934 amounted to 606, but no figures were available to show the cost of these repairs. It also appeared that there had been two accidents during 1934 caused by the

failure of arch-bar trucks; these two accidents resulted in the injury of one person and in an estimated total cost of $26,000. Data furnished with respect to engines is as follows:

	Switch	Freight	Passenger	Total
Number of engines	16	118	35	169
Number with arch-bar trucks	12	66	35	113
Percent equipped with arch-bar trucks	75	56	100	66.8

Conclusions

This accident was caused by a broken arch bar.

Recommendations

1. That arch-bar trucks be removed from service at the earliest practicable date.

2. That until arch-bar trucks can be eliminated from service, a reduction sufficient to guarantee safety of operation should be made in the permissible load limit on cars equipped with such trucks.

3. That inflammables, explosives or other dangerous articles should not be transported in cars which are equipped with arch-bar trucks.

4. That provision be made in interchange rules whereby a receiving line may refuse to accept from a connecting line any car equipped with arch-bar trucks.

Respectfully submitted,

W. J. PATTERSON

Director.