INTERSTATE COMMERCE COMMISSION

REPORT OF THE DIRECTOR OF THE BUREAU OF SAFETY CONCERNING AN ACCIDENT ON THE CHICAGO, ROCK ISLAND & PACIFIC RAILWAY NEAR BLAND, MO., ON AUGUST 12, 1935.

October 15, 1935.

To the Commission:

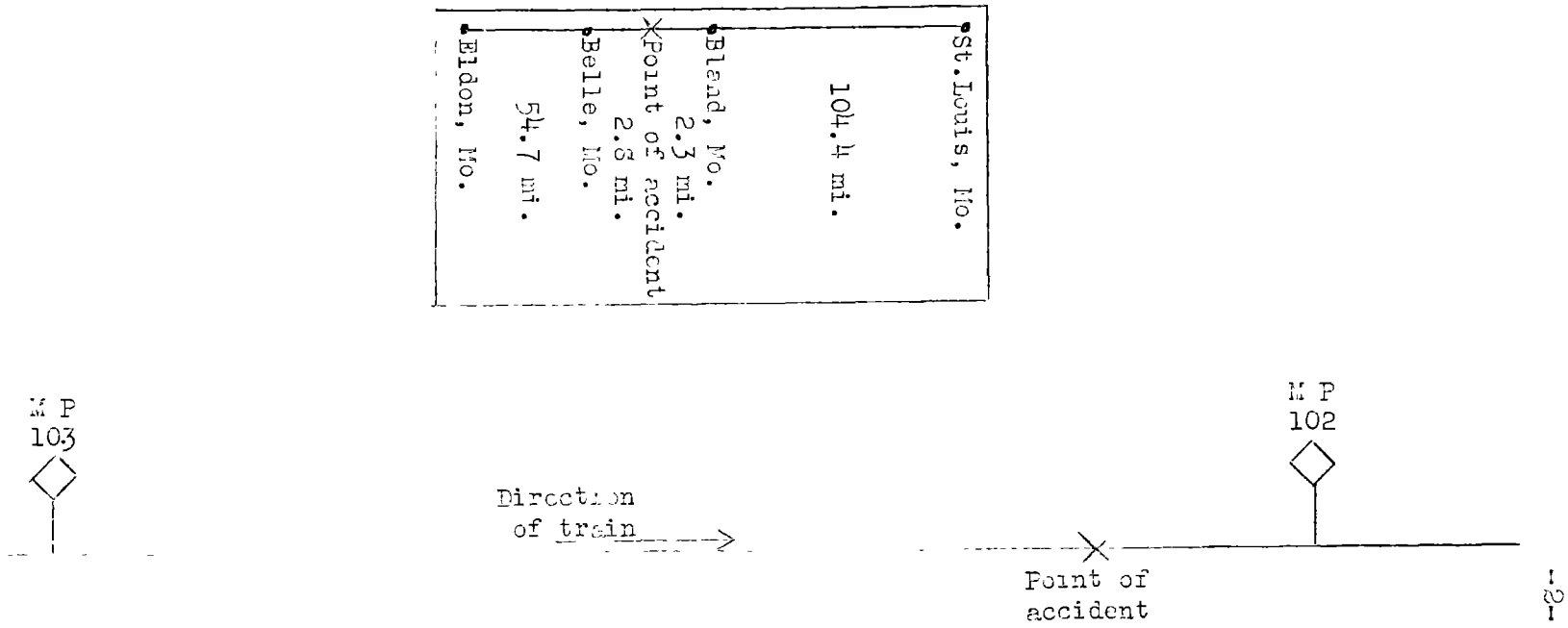
On August 12, 1935, there was a derailment of a freight train on the Chicago, Rock Island & Pacific Railway near Bland, Mo., which resulted in the death of 1 trespasser.

Location and method of operation

This accident occurred on Sub-division 34 of the St. Louis-Kansas City Division, extending between Elden and St. Louis, Mo., a distance of 164.2 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 at a point about 3.3 miles west of Bland; approaching from the west the track is tangent for a distance of 5,467 feet to the point of accident and for a considerable distance beyond, while the grade for east-bound trains is 0.571 percent descending in the vicinity of the point of accident.

The track is laid with 85-pound rails, 33 feet in length, with an average of 30 ties to the rail-length, single-spiked, tieplated and ballasted with gravel to a depth of about 18 inches; the track is maintained in fair condition. The gauge was practically uniform, varying from 4 feet 8-3/8 inches to 4 feet 8-3/4 inches, and was standard, 4 feet 8-1/2 inches, at the point of accident. Measurements taken of cross levels for a distance of 19 rail lengths west of the point of derailment, at rail joints and centers, the joints being staggered, using the south rail as the base line, showed a maximum variation of one inch below level in the south rail and 1-3/4 inches below level in the north rail; the maximum variation in the north rail prevailed at the rail joint located on that side of the track and immediately west of the rail joint in the south rail where the derailment occurred, the variation at the point of derailment being the maximum for the south rail of the track, one inch. The speed of freight trains is limited to 40 miles per hour on tangent track, and 25 miles per hour on curves.

The weather was clear at the time of the accident, which occurred about 6:38 p.m.



Inv. No. 2004
Chicago, Rock Island & Pacific Ry.,
Bland, Mo.
August 12, 1935

Description

Train No. 96, an east-bound freight train, consisted of 28 loaded cars, 1 empty car, and a caboose, hauled by engine 2710, and was in charge of Conductor Carr and Engineman Marvin. This train left Belle, the last open office and 5.1 miles west of Bland, at 6:22 p.m., according to the train sheet, 2 hours 25 minutes late, and on reaching a point approximately 2.8 miles beyond Belle it was derailed while traveling at a speed estimated to have been between 35 and 40 miles per hour.

The engine and first 14 cars were not derailed, and the train parted behind the fourteenth car; the fifteenth car, E.O.R.X. tank car 1687, loaded with kerosene, to the twenty-seventh car, inclusive, were derailed and badly damaged. The rear two cars and the caboose were not derailed nor damaged.

Summary of evidence

Engineman Marvin stated that he was working a light throttle, descending the hill at a speed of about 35 or 40 miles per hour, when suddenly the train was derailed and parted, causing the air brakes to apply in emergency from the rear, following which the forward portion of the train traveled a distance of about four pole lengths, about 525 feet, and then stopped, The accident occurred at 6:38 p.m. He went back to the scene of the wreck and noticed particularly that the coupling was not broken between the first car derailed and the following car, both of these cars being tank cars, which remained upright on the roadbed. The air brakes were tested at Eldon and operated properly en route, and the engine was in good condition. Engineman Marvin said that he had been running and firing on this division since 1903; on this trip he noticed nothing unusual about the riding qualities of the engine, it was riding well, and while rounding curves he looked back along the train but did not notice the cars swaying more than usual; he held the train on bad curves. He said that the light train being handled was about 1,340 tons, whereas the tonnage drag rating of engine 2710 was 2,250 or 2,300 tons. He thought that the track in this vicinity was good for a speed slightly in excess of the 40-mile-per-hour limit permitted, but said that there was a low spot in the track on the north rail, west of the point of accident, which possibly caused the engine to rock slightly, and that this low spot had existed for a long time, also that there were numerous places along the line where the engine would rock, but not badly. Engineman Marvin said that the loaded tank car involved passed over a piece of track laid on damp clay, west of Eldon, without incident, considerably rougher than the track at the point of derailment; however, that piece of track was protected by a slow board. In his opinion the loaded tank car

involved probably was bouncing at the place where the accident occurred, and there might have been some roughness in the track that he did not feel, with the result that the car was caught, while swinging, just at the proper time to cause it to get off the track. Fireman Hyre and Head Brakeman Gump gave testimony similar to that of Engineman Marvin; the fireman said that this piece of track has been a little bad, soft at times, and he did not think that there was any section of track between Eldon and Bland that might be considered worse than that at the point of accident.

Conductor Carr and Flagman Scott were in the caboose and were not aware of anything wrong until the accident occurred, at which time they estimated the speed to have been about 35 miles per hour. After the accident the conductor went forward to ascertain what had occurred; he found no mark on top of the rail and it was his opinion that the accident was caused by tank car E.O.R.X. 1687, the fifteenth car in the train, loaded with kerosene, jumping the track; he did not know the cause of derailment and there was nothing wrong with the car that he could see. Flagman Scott examined the track, but did not see anything that would cause derailment. He saw no indication on the rails where the wheels left, but about three car lengths behind the caboose there was a mark on the ties evidently caused by a derailed car. He could not say what caused the accident.

District Chief Car Inspector McBrain arrived at the scene of the accident about 16 hours after its occurrence. He found that the forward pair of wheels of the lead truck of tank car E.O.R.X. 1687 was the first to be derailed, as indicated by a considerable amount of track gravel on the east or front end of this car. Wheel marks on the north side of the front draft sill showed that the left front wheel of the forward truck was against the draft sill, and marks on the south side showed that the right rear wheeel of the forward truck was against the draft sill, the indications being that the truck slued shortly after it was derailed and then ran a considerable distance in its slued position, as the flanges were cut; there was a pronounced mark in the center of the track, about 4 inches wide, made by the slued truck. He said that the Rock Island Lines prescribe a maximum side-bearing clearance of 3/8 inch, and that their standard is from 1/4 to 3/8 inch. Check made of the side-bearing clearance of the tank car involved showed it to have 3/8 inch on the north side of the front end, and no side-bearing clearance on the other side; on the rear end of the car, south side, there was 1/2 inch clearance and on the north side 1-1/16 inches, a total of 1-9/16 inches on this end. The car was equipped with Andrews cast steel truck frames; the wheels were in good condition, with only one flange slightly worn on the rear truck,

R-3 wheel. The bottom rod safety support which is riveted to the spring plank was bent over and apparently had been riding on the rail, which kept the wheels on the south side from going down into the ballast and ties more than they did. The north draft sill on the front end had been bent northward approximately 1/2 inch by the coupler pulling over on the car ahead, indicating that the tank car was starting to leave the rail but that the car ahead was holding it and keeping it from doing so. There was an abrasion on the outside of the lower portion of the truck frame on the B-end of the car, about 12 inches long, caused by rubbing against the inside face of the north rail after the wheels left the track. Tank car E.O.R.X. 1687 is an 8,044 gallon tank; it was loaded with kerosene, shell full, none in the dome. He saw nothing to indicate that the wheel climbed the rail, but there was a distinct mark on top of the south rail, about 1/2 inch from the gauge side. He said that the excessive side-bearing clearance existing in the car should have been easily detected by the car inspectors at points en route when the car was standing, and that the car should have been carded and set out on the repair track. This condition was not due to wear, but probably was developed by riveting a plate of iron under a center plate and not making proper adjustment of the side bearings. The defect had existed since the car was last repaired, but when and where it was repaired he did not know. He thought that the difference in side-bearing clearance, 3/8 inch at the forward end of the tank car and 1-9/16 inches at the rear end, would cause a rocking motion, and that this excessive side-motion on the rear truck possibly helped to rock the car off the track; also that excessive side-bearing clearance in the rear of A-end of the car was a contributing factor. He could not say whether track conditions or speed had anything to do wit causing the accident.

Section Foreman Roehrs stated that he had been on the St. Louis-Kansas City Division since 1911 and had been stationed at Belle for about 2 years. He maintained 7.8 miles of track and his crew consisted of 5 men, including himself, during the months of July and August. The track at the point of accident is in a cut, which extends 500 or 600 feet westward from where the derailment occurred; on Saturday, two days prior to the accident, he raised the track in the cut and put the level board on it and he planned to return and perform additional work about Tuesday or Wednesday; he had not recently performed work anywhere in the immediate vicinity of where the tank car got off the track. On the day of the accident he passed over the track involved on a motor car, about 7:30 a.m. and again at 3:55 p.m., but noticed no track conditions sufficiently serious to cause concern, although it was getting a little wavy. He thought the track was in shape for normal train operation at the speed permitted and he did not consider it necessary to have a slow order

issued to cover it. Between mile posts 102 and 103, within which territory the accident occurred, nearest mile post 102, he had put in all the ties he had requested this year to cover that area, about thirty-six. A subgrade of clay beneath the ballast makes the track soft and in need of draining; some of the cuts on his section were ditched with the ditcher in recent years and he had installed about nine drains at different locations within the past two or three years, sinking them to a depth of about 5 feet and going below the ballast about 1 foot. Some of the ties are out of place in this vicinity, due to expansion and contraction of the rails; however, the rail had not been creeping recently. The general condition of the weather during the month of August was dry. Section Foreman Roehrs had not formed any opinion concerning the cause of the accident.

Roadmaster Simpson stated that he had been roadmaster on this division for twenty-six years. He was last over this piece of track three days prior to the accident, riding on the rear of the caboose of a local freight train, but he noticed nothing at that time which required corrective measures. The track in this vicinity has been somewhat of a problem to maintain as the roadbed lies in pockets; the cut involved was well ditched in 1933, the ties are in good condition and the rail is fair. There is some creeping of rails; the track is undulating and the rails can not move very far; in the soft spots probably there are some loose ties, which possibly get down a little and the rails get out of the grooves in the tieplates. Some of the pine ties are cut by the tieplates; soft wood ties are placed on the straight track only. In some places the ballast goes down 3 or 4 feet, and in other places only $1\frac{1}{2}$ feet, indicating soft spots, and drains about $2\frac{1}{2}$ feet wide were being installed in these places. He has thirty-five section foremen under his supervision and it has been his policy to leave to the judgment of the foremen where to perform necessary work on their sections, and to place the responsibility for maintenance upon them. The first indication of derailment at the initial point of accident was a slight fin mark on top of the ball of the south rail, about one inch from the gauge side of the rail, extending diagonally outward for a short distance, where it dropped off. He saw no mark on the gauge side of the south rail, and it looked like this track had jumped up slightly. On the opposite side, when the left wheels struck the ties a very large flange mark started toward the center of the track. He thought that irregularity of the track in the vicinity of the point of accident contributed to the accident in some degree, and that the side-motion condition prevalent in the tank car, coupled with the slightly irregular track, would cause the tank car to leave the rail at a speed of 35 or 40 miles per hour.

Examination of the track by the Commission's inspectors disclosed numerous ties shifted from normal position and deeply cut by tieplates. Track levels taken at rail joints and centers for a distance of 19 rail lengths westward from the point of accident showed a variation from level to one inch low in the south rail, and from level to $1\frac{3}{4}$ inches low in the north rail; within this distance there were 14 low spots in the south rail, 13 in the north rail, and at 9 points the track was level. The first evidence of derailment was an indentation which appeared on top of the ball and near the gauge side of the south rail; this mark ran diagonally across the rail for a distance of about 15 feet. A short distance east of where this mark terminated there was a mark on the ties between the rails which started near the gauge side of the north rail and extended a distance of about 23 feet toward the center of the track; there was a corresponding mark on the outside of the south rail, and when the mark between the rails reached a point 36 inches from the gauge side of the north rail it straightened and then two parallel marks continued eastward almost in a straight line a distance of about 745 feet. Beyond this point 430 feet of track was displaced, and the fifteenth car behind the engine, E.O.R.X. 1687, the tank car involved and the first to be derailed, stopped at a point 115 feet east of this damaged track.

Tank car E.O.R.X. 1687 is owned by the Empire Oil & Refining Company; it was built in December, 1918, and had a capacity of 80,000 pounds, a total weight 39,700 pounds, equipped with two four-wheel Andrews trucks with cast-steel side frames. At the time of the accident it was loaded with 8,044 gallons of kerosene and was en route from Ponca City, Okla., to Alton, Ill., and on this trip it passed Rock Island Lines inspection points at Enid, Caldwell, Herington, Kansas City and Eldon. According to the record this car was repaired by the Empire Oil & Refining Company on their repair track at Ponca City, Okla., July 6, 1935 considerable miscellaneous work being performed at that time, and the last record of installing a center plate in the A-end of the car was at their shop at Chicago, Ill., July 20, 1933.

The manual of standard and recommended practice of car construction, Association of American Railroads, adopted 1920, revised 1927, 1934, item #8, provides that:

> Side bearing clearance shall be adjusted within the limits of 1/8 to 1/4 inch per bearing and shall be measured at each bearing with car on level tangent track with car body level. Total side bearing clearance at BR and AL corners must be made the same as total clearance at BL and AR corners with permissible variation not to exceed 1/8 inch.

Under the standard practice of the mechanical department of the Rock Island Lines, instructions No. 27, issued April 1, 1912, relative to clearance between side bearings, freight equipment, it is provided that:

> When freight cars receive repairs in shop or yards the side bearing clearance should be carefully determined, and if found to exceed 3/8 of an inch or to be less than 1/4 of an inch, the bearings shall be adjusted until a clearance is obtained between these limits.
>
> Side bearing clearance will be understood to mean the vertical distance between the side bearing blocks, measured on either side of a light car standing level.

In checking the center plates and side bearings of the tank car involved it was found that on the leading or B-end of the car the thickness of the center plate was 5/8 inch and the total side bearing clearance was 3/8 inch. On the trailing or A-end the center plate was 1-5/8 inches thick and the total side bearing clearance was 1-9/16 inches, or 1-5/16 inches in excess of the standard as adopted by the Association of American Railroads.

Discussion

The evidence indicated that the front pair of wheels of the leading truck under the B-end of the fifteenth car, tank car E.O.R.X. 1687, loaded with kerosene, were first to be derailed, and then the rear pair of wheels of this same truck also were derailed. The indications were that when the front pair of wheels encountered the low spot of $1\frac{3}{4}$ inches in the north rail of the straight track it caused the car to rock, due to excessive side-bearing clearance, which measured 3/8 inch in the forward end and 1-9/16 inches in the rear end of the car, and was caused by failure to make proper adjustment in the side bearings after a plate of iron was riveted under the center plate. When the second low spot of one inch was encountered in the opposite or south rail of the track, probably it caused the front pair of wheels to be lifted off the track by swaying of the car and rebound of the truck; then the rear pair of wheels of this truck was derailed, the truck slued astride the south rail and was temporarily held in this position, as the left forward wheel could not pass under the draft sill and the car ahead was holding the forward end of the tank car in line with the track, following which the slued truck damaged and tore up the track, resulting in the accident. There was a considerable amount of track gravel on the east or front end of the tank car

which indicated that it was the first to be derailed.

On this trip the tank car passed five Rock Island Lines inspection points; proper inspection of the car at these points should have disclosed the excessive side-bearing clearance and the car should have been repaired. The improper side-bearing clearance existing in this car should have been corrected when the car was repaired and the plate of iron riveted under the center plate in the A-end of the car.

Conclusions

This accident was caused by a tank car rocking off irregular track, due to low spots in the track and to swaying caused by improper side-bearing clearance of the car.

Respectfully submitted,

W. J. PATTERSON,

Director.