Inv-2229

INTERSTATE COMMERCE COMMISSION

WASHINGTON

REPORT OF THE DIRECTOR

BUREAU OF SAFETY

ACCIDENT ON THE

BURLINGTON-ROCK ISLAND RAILROAD

NORMANGEE, TEX.

NOVEMBER 30, 1937.

INVESTIGATION NO. 2229

SUMMARY

Inv-2229

Railroad:	Burlington-Rock Island
Date:	November 30, 1937
Location:	Normangee, Tex.
Kind of accident:	Derailment
Train involved:	Tank car being set out on spur track
Train number:	93
Engine number:	2313
Consist:	28 cars, caboose
Speed:	6-8 m.p.h.
Track:	6°30' curve
Weather:	Clear
Time:	3:52 p.m.
Casualties:	1 killed
Cause:	Lack of side bearing clearance at the leading end of a car being shoved, combined with a wrong truck-side in the leading truck and irregular elevation of the high rail of a curve.

To the Commission:

On November 30, 1937, there was a derailment of a tank car on a spur track of the Burlington-Rock Island Railroad at Normangee, Tex., which resulted in the death of one employee.

Location and method of operation

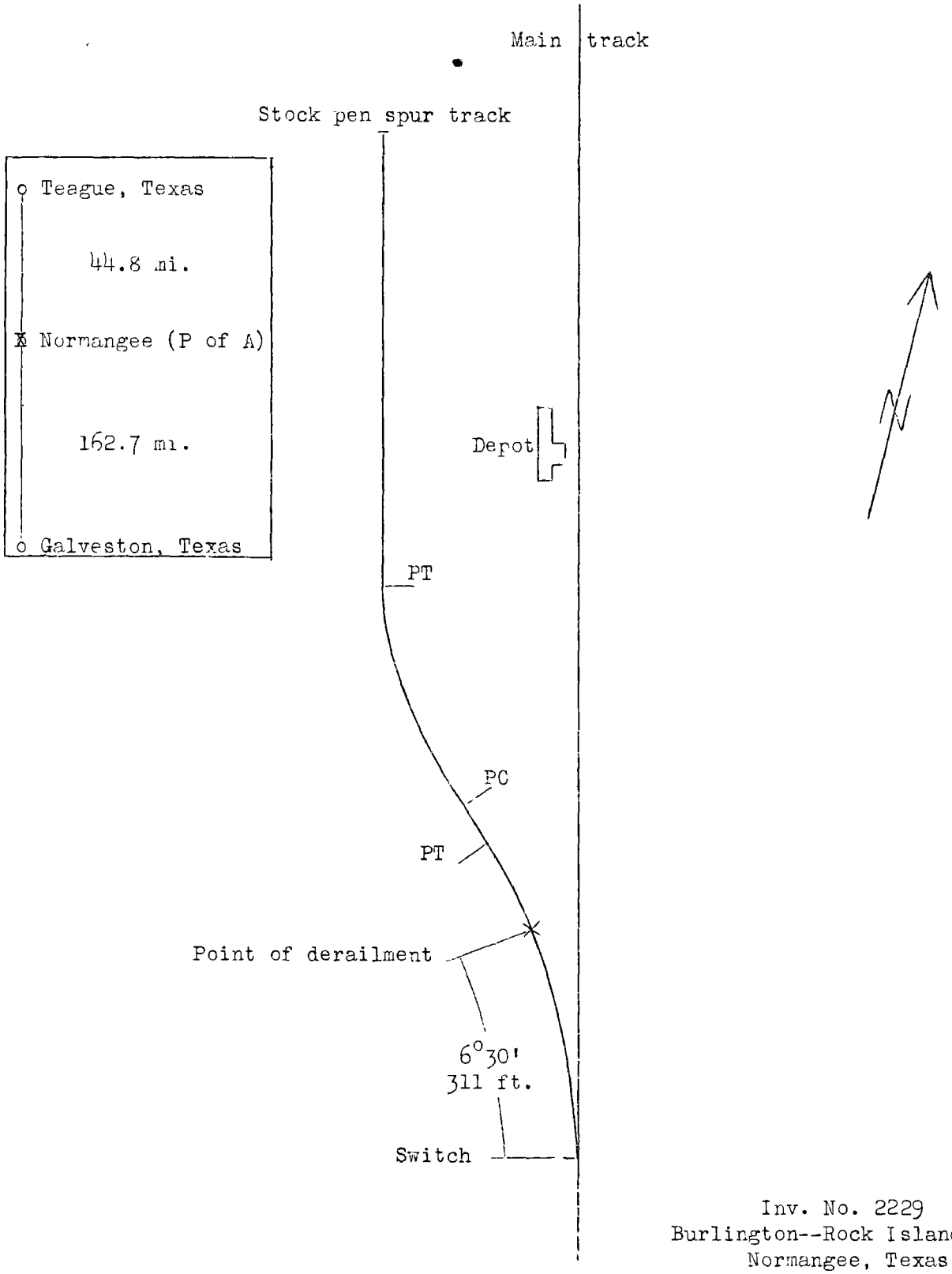
This accident occurred on the Teague Subdivision which extends from Teague to Galveston, Tex., a distance of 207.5 miles. The point of derailment was on the stock pen spur track which lies west of the main track at Normangee and is 1,600 feet long.

The spur track switch is a facing-point switch for northward movements and leads off the main track through a #11 turnout which is built of 90-pound track material. Beyond the turnout rails the spur track is laid with 75-pound rail, on 20 ties per 33-foot rail; it is single-spiked and fully tie plated, and is ballasted with oyster shells to a depth of approximately 6 inches under the ties. At the point of derailment the spur track is on a fill approximately 2½ feet in height. Starting at the frog of the switch and proceeding northward along the spur, there is a 6°30' curve to the left which extends to a point 418 feet north of the point of switch. The derailment was initiated on this curve at a point 311 feet north of the switch. At the point of derailment the grade is approximately 0.3 percent descending northward. The superelevation varies from zero at the ends of the curve to 5½ inches at its center and is 1 7/8 inches at the point of derailment. The main track is tangent and level in each direction from the spur track switch. General maintenance of the spur track is good; at no point was the gauge more than 3/8 inch wide, except at a public road crossing located a short distance south of the derailment, where it was 3/4 inch wide. Speed on the spur track is restricted to 15 miles per hour. A stock pen is located to the west of the spur track between points about 350 feet and 450 feet north of the switch.

The weather was clear at the time of the accident, which occurred about 3:52 p.m.

Description

No. 93, a south-bound freight train, consisted of 28 cars and a caboose, hauled by engine 2313, of the 2-8-2 type, and was in charge of Conductor Brunazzi and Engineman Simpson. This train arrived at Normangee at 3:50 p.m., according to the train sheet,



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Burlington--Rock Island RR,
Normangee, Texas
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and stopped on the main track with the engine about 1,100 feet north of the spur track switch for the purpose of setting tank car MPCX 309, the first car in the train, on the spur track. While the engine, backing up, was shoving this tank car northward upon the spur track at a speed estimated to have been between 6 and 8 miles per hour the car was derailed.

MPCX 309 became uncoupled from the engine and stopped on its west side at right angles to and across the spur track, at a point 89 feet north of the initial point of derailment. The north truck lay at about the center of the car, and the south truck lay about one-half car length southward, partly under the rear end of the tender. None of the wheels of engine 2313 or its tender was derailed. The employee killed was the head brakeman.

Summary of evidence

Engineman Simpson stated that when the cut was made behind the car which was to be placed on the siding, the first car in the train, the air brakes were left cut in. After Head Brakeman Wylie opened the spur track switch, which was located on the west side of the track, he boarded the north end of the tank car. The car was backed around the spur at a speed of about 6 or 8 miles per hour, and when a point about half-way between the switch and stock pen was reached Brakeman Wylie moved across the north end of the tank car from the west side toward the east side. Shortly afterwards, while the engine was drifting, Engineman Simpson saw the tank car running on the ties and veer away from the track, whereupon he immediately applied the air brakes in emergency, and the engine stopped within a distance of not more than one-half car length. In order to prevent ignition of the gasoline which flowed from the overturned car he instructed Fireman Johnson to move the engine southward. During this movement the south truck of the tank car, which had caught on the back end of the tender as a result of the accident, was dragged along the ties until it finally hung to the west rail and broke loose. In addition to the engine crew, the head brakeman was the only employee involved in making the set-out movement. The statement of Fireman Johnson agreed with that of Engineman Simpson.

Conductor Brunazzi and Flagman Lindsey were in the caboose when the train stopped on the main track at Normangee and neither witnessed the derailment.

Section Foreman Smith stated that he gauged the track before making any repairs and found the gauge good. The only track repairs made after the accident consisted of aligning the spur track somewhat in one place near the stock pen chute and replacing about 10 ties that were broken by the derailment; the broken ties

had started to decay, but were good enough to hold the spikes and maintain the gauge.

Section Foreman Rogers stated that he gauged the spur track 11 days prior to the accident. He described the maintenance of that track as good. Neither foreman found any track condition that would have caused the accident.

Car Inspector Baccus inspected the east side of No. 93 on its arrival at Teague from Fort Worth on November 30. He did not notice anything wrong with the side bearing clearance on the B-end of tank car MPCX 309 at thattime, but side bearing clearance is not closely checked during the course of ordinary train inspections.

General Car Foreman Tuley stated that he was passing through the yard when No. 93 arrived at Teague at 12:50 p.m., November 30th. The consist shows that tank car MPCX 309 was in that train. When Car Inspector Baccus started to inspect the east side of the train he took the west side and went the full length of the train with Baccus. Although a thorough inspection was made no defect was discovered on the car involved in the derailment. While there was a difference in the shapes of the truck sides on the west side of this tank car,yet they were so similar in appearance as not to attract attention during the course of ordinary inspection and this condition was not discovered until actual measurements were taken. After the accident the wrecked car was moved to the shop at Teague, and was there inspected by him. This inspection disclosed that the truck sides at the B-end were not mates. The truck side on the east side was a Bettendorf type 1595, measuring 9¾ inches from top of rail to bottom of sand board, while the opposite truck side was a Bettendorf type 1596, measuring 8¼ inches from rail to bottom of sand board. There was no shim to compensate for this variation in height of sand board from the rail, thus making the same variation from top of truck bolster to top of rail, measuring directly over the rail. The side bearing clearance at the A-end was 5/16 inch.

Superintendent of Motive Power Maupin inspected the track at the point of derailment and found marks as described by other witnesses; he also inspected the trucks of the car involved. There was nothing broken on the trucks which would have caused the derailment; contour of wheel flanges was proper and the wheels were in gauge. Measurements taken of the center plates and side bearings,while the car was jacked up, showed that all three contacted, and the side bearings appeared to have a solid bearing and to have been in contact for some time. He thought that the truck at the north or B-end of car was first to be derailed probably due to some object on the high or outside rail of the sharp curve that could have bounced the wheels on to the top of

the rail and derail the truck, but he found nothing to support this theory. With center plate and side bearings in contact, the curvature of the spur track was also a probable factor in the derailment.

Chief Engineer Broome stated that the ties destroyed during the derailment would have lasted at least one year longer before renewal would have been necessary. His examination of the track disclosed that the first mark of derailment was a flange mark which started approximately 1 inch from the gauge side of the east rail and extended diagonally across the rail for a distance of 6 feet where it disappeared off the outside of the rail. At a point approximately 18 inches north of that point a mark started on the ties just outside the east rail. Several feet ahead there was a heavy gouge on the gauge side of the east rail approximately 15 inches in length and becoming heavier from south to north, and then a diagonal mark about 3 or 4 inches long extending across the top of the rail; apparently these marks were made by some projection on the bottom of one of the trucks as it passed over that point. From the point where the first wheel mark mentioned above could be seen, it was possible to follow the path of that pair of wheels, as there was a corresponding mark made by the west wheel of that same pair. Apparently the first pair of wheels of the lead truck made these two marks. Several other wheel marks also appeared on the ties, extending over a distance of 89 feet from the initial flange mark. His inspection of the car failed to disclose any defects that he considered as contributing to the derailment. In his opinion the variation in the superelevation, from 7/8 inch near the ends of the $6^{\circ}30'$ curve to $5\frac{1}{2}$ inches at its center, would not contribute to the derailment of a car moving at 15 miles per hour or less. He thought, too, that the fact that the first flange mark on top of the rail started approximately 1 inch from the gauge side of the east rail indicated the possibility that something might have been on the rail to cause the wheel to climb and drop down on the rail that distance from the gauge side; however, diligent search failed to disclose any object with any appearance of having been run over by a pair of wheels.

Observations of the Commission's Inspectors

Examination of the spur track south of the point of derailment to the switch point disclosed that it was in good condition as to rails, spikes, ties, tie plates, ballast and gauge. However, the superelevation was very irregular; it dropped from $5\frac{1}{2}$ inches to 1 7/8 inches within the 45 feet just south of the point of derailment, and within the 23 feet immediately south of the point

of derailment there was a variation downward of 2 7/16 inches. Marks of derailment were practically the same as those previously described by Chief Engineer Broome.

MPCX 309, the tank car involved, loaded with 8,020 gallons of gasoline, had short side sills and end platforms, as well as the following characteristics and equipment:

Class II
Built 10-1911
Capacity 8,042 gallons; 80,000 pounds
Load limit 132,000 pounds
Light weight 36,900 pounds
All steel underframe
Body bolsters built up pressed steel
Length inside to inside face of knuckle, 35 feet 6 inches
Length over end sills, 33 feet
Length center to center of trucks, 23 feet
Length of cistern, 29 feet 7½ inches
Diameter of cistern, 8 feet 11 inches
Height of cistern above top of rails, 11 feet
Height of end platforms above top of rails, 3 feet 10½ inches.

Trucks

Bettendorf type
Wheel base, 5 feet 6 inches
Bolsters built up pressed steel
Wheels cast iron, 33 inches in diameter
Journals, 5 x 9 inches

The bottom side bearings are riveted to the truck bolsters, while the top side bearings are secured to the body bolsters with bolts; side bearing clearance is adjusted by the use of metal shims between the top side bearings and the body bolsters. The side bearings are spaced, center to center, 51½ inches.

Inspection of the car disclosed that there was a misfit Bettendorf truck side at the B-end, and also that the car was down on side bearings at that end. Both truck sides on the A-end truck and that on the left or east side of the B-end truck were of the Bettendorf pattern 1595, while the one on the right or west side of the B-end truck was of the pattern 1596. On the B-end truck the bottom of the spring channel was 9¾ inches above the top of the rail on the east side of the car and 8¼ inches above top of the rail on the west side of car; the tops of the bottom side bearings measured 29½ inches and 28½ inches above the top of rail on the east and west sides, respectively. The variation between the bottom of spring channel and top of rail had been compensated for to the extent of ¼ inch by wooden shims placed on

top of the truck springs on west side of truck. Measurements of the side bearing clearance at B-end of car showed a three-point contact, namely, on center plates and side bearings, of each side. A hard scale 1/8 inch thick covered all of the bearing surface of the bottom of the top center plate. The bearing surface of bottom center plate did not show any indication of having been rubbed by the top center plate; the side bearings did not show signs of having been rubbed, all of which indicated that this condition was of long duration. Apparently the contact of the side bearings was so close that the bearings were being held rigid and only the lateral motion and the general flexibility of the truck permitted it to move around curves without becoming derailed. There was no indication that the contacting of the side bearings was due to damage sustained by the car. The top center plate did not show indications of having caved upward; the body bolster was securely riveted to draft sills and did not show any sign of being loose at any point, nor could it have been sprung as the circular blocks were tight with the exception of one, which had a space of 1/8 inch between it and tank, and appeared to have been loose for a long time. It was apparent that the side bearing clearance had not been adjusted since December 15, 1936; the car was painted by the Magnolia Petroleum Co., at Chaison, Tex.,at that time and the paint which was applied to the bolts securing the top side bearings had not been broken.

Discussion

As tank car, MPCX 309, loaded with gasoline, was being backed around the 6°30' curve, it was the leading piece of equipment, and the B-end of the car was to the north, or leading end. Under these circumstances a free movement of the truck at the leading end of the car is essential, and any condition which results in a diminished flexibility of the truck tends to destroy the piloting efficiency of the truck and to render it more suspectible to influences tending to derail the car.

The evidence indicates that the top and bottom side bearings on both sides of the body and truck bolsters at the leading end of this car were in solid contact, and at the same time a misfit truck side on the west side of this truck permitted a variation of $1\frac{1}{4}$ inches in the level of the tops of the bottom side bearings. The effect of the side bearings being in contact was to make the truck and the body a rigid unit, and the effect of the misfit truck side was to cause a concentration of weight at the west front corner of the car. This combination of conditions probably caused a resistance to the pivoting of the truck greater than the resistance offered by the rail against the flange of the wheel and

derailment was the consequence. A rapid rate of change in the elevation of the outside rail existed at the point of derailment and this constituted another condition influencing the truck to follow the straight line rather than the curve.

This car was in the Magnolia Petroleum Co.'s shop at Chaison, Tex., during the month of December,1936; at that time,in addition to other work, it received four second-hand truck sides,two pairs of wheels, one pair of which was at the R-1 and L-1 location and was also repainted. It was again in that shop on August 13,1937, when the air brakes were cleaned. It was on the St. Louis Southwestern Railway repair track at Hodge, Tex., on July 10, 1937, at which time the car was jacked up on B-end and a pair of wheels applied at the R-1 and L-1 location, and it was on the Texas & New Orleans Railroad repair track at Miller, Tex., on October 11, 1937, where it was jacked up and a center pin applied at the A-end.

Apparently proper care was not exercised in the application of truck side to this car by the Magnolia Petroleum Co. at Chaison, Tex., in December, 1936. Even though the similarity in shape and detail might have made detection of the discrepancy difficult yet it appears that the difference in pattern numbers should have been noticed during some of the operations necessary to apply the truck side to the car. It is evident that the car was down on the side bearings when it arrived at the Magnolia Petroleum Co. shop at Chaison, Tex., in December, 1936. The pair of wheels removed from the R-1 and L-1 locations at that time because of a vertical flange, was manufactured in January, 1936, and could not at the most have been under the car much longer than 10 months. Since wheels do not ordinarily develop vertical flanges, requiring removal, in such a short period of time unless there is something wrong with the truck or side bearing clearance,this was an indication which should have been heeded. It is evident, too, that the car was still down on side bearings when it left the shop at Chaison, since an inspection made shortly after the derailment showed no indication that the body bolster had failed or had become distorted in any manner which would have altered the respective levels of the bearing surfaces. There were indications that the top side bearings had not been adjusted since the car was shopped in December, 1936; the coat of paint that was applied to the adjusting plates and bolts at that time was unbroken. The above evidence makes it apparent, too, that the defective condition existed when the car was in the other shops listed above. Had the car been thoroughly inspected on these repair tracks the defective condition would have been detected and it could then have been corrected.

Since speed was restricted to 15 miles per hour on the spur track, there was no apparent necessity for providing a superelevation of 5½ inches.

Conclusion

This derailment was caused by a lack of side bearing clearance at the leading end of a car being shoved, combined with a wrong truck-side in the leading truck and irregular elevation of the high rail of a curve.

Respectfully submitted,

W. J. PATTERSON,

Director.