INTERSTATE COMMERCE COMMISSION

WASHINGTON

REPORT OF THE DIRECTOR

BUREAU OF SAFETY

ACCIDENT ON THE

MISSOURI-KANSAS-TEXAS RAILROAD

TRYON, OKLA.

JANUARY 4, 1938.

INVESTIGATION NO. 2242

SUMMARY

Inv-2242

Railroad:	Missouri-Kansas-Texas
Date:	January 4, 1938.
Location:	Tryon, Okla.
Kind of accident:	Derailment
Train involved:	Freight
Train number:	No. 273
Engine number:	752
Consist:	1 water car, 13 freight cars and caboose
Speed:	About 35 m.p.h.
Track:	2°59'15" right curve; 2,900 feet of 0.690 percent descending grade, then 290 feet of level track.
Weather:	Clear
Time:	About 11:35 a.m.
Casualties:	1 killed, 1 injured
Cause:	Probably due to the wheels of a tank car climbing the outside rail of a curve because of excessive side-bearing clearance and irregularities in track surface, the car trucks being held rigid by an application of the brake made on straight track and retained while the train was on the curve.

To the Commission:

On January 4, 1938, there was a derailment of a freight train on the Missouri-Kansas-Texas Railroad near Tryon, Okla., which resulted in the death of one trespasser and the injury of one trespasser.

Location and method of operation

This accident occurred on the Oklahoma Division of the Southern District, which extends between Osage and Oklahoma City, Okla.,a distance of 98.7 miles. In the vicinity of the point of accident this is a single-track line over which trains are operated by timetable and train orders, no block-signal system being in use. The accident occurred at a point approximately two miles north of the station at Tryon; approaching this point from the north the track is tangent for 4,106.5 feet, followed by a 2°59'15" curve to the right 1,764.6 feet in length, the derailment occurred at a point about 673 feet from the south end of this curve. The grade for south-bound trains is 0.690 percent descending for a distance of 2,900 feet, followed by 900 feet of level track; the accident occurred at a point about 290 feet south of the north end of this level section.

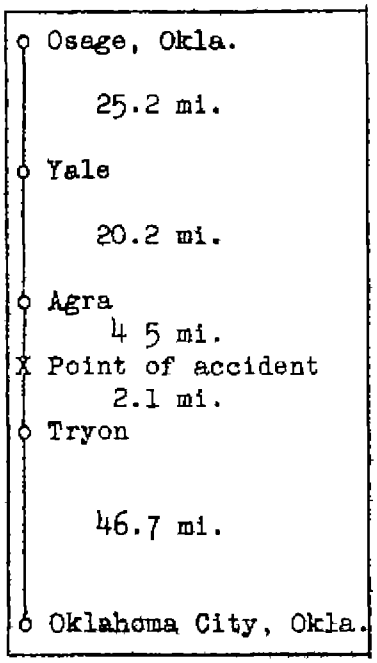
The track is laid on a fill which reaches a maximum height of 22 feet, and is 6 feet high at the point of derailment; 85-pound rails, 31 feet in length, are used on an average of 20 ties to the rail length. It is single-spiked on the inside of the low rails and about 50 percent double-spiked on the outside of the high rails on curves and is fully tie-plated. The rails are secured by 4-hole angle irons with 4 bolts in each iron. The track is ballasted with chatt to a depth of about 12 inches and is fairly well maintained.

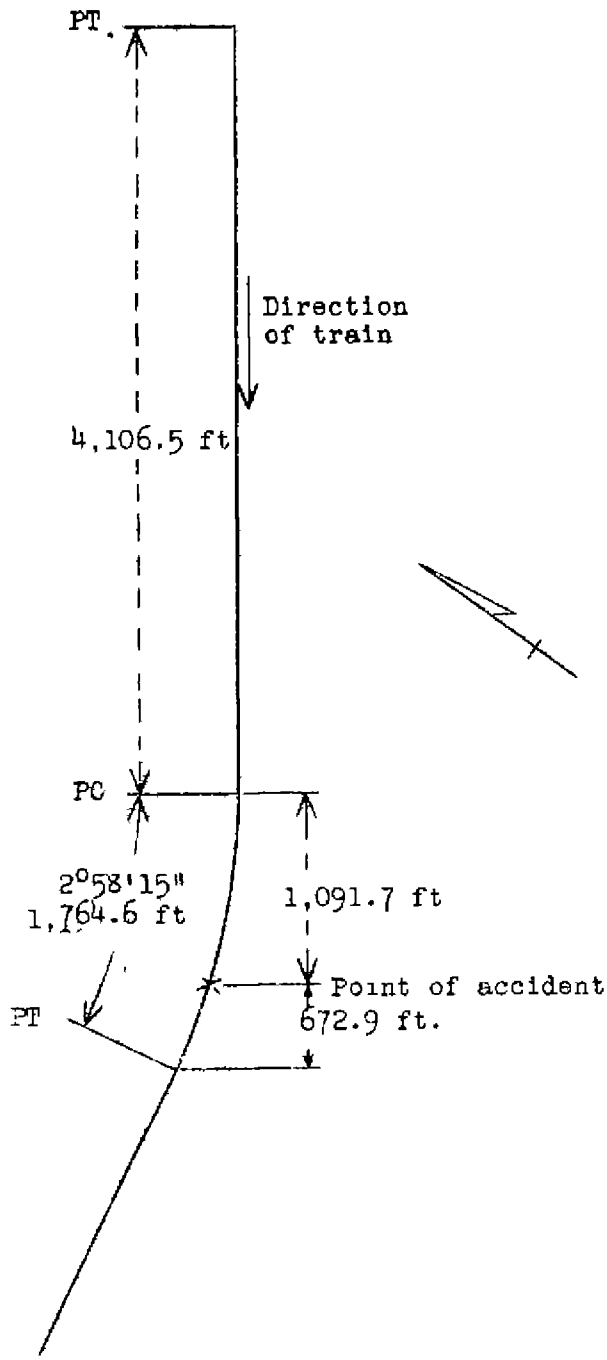
The maximum authorized speed for freight trains on tangent track is 40 miles per hour and on curves 30 miles per hour.

The weather was clear at the time of the accident, which occurred at about 11:35 a.m.

Description

No. 273, a south-bound third-class freight train, consisted of 1 water car, 11 loaded and 2 empty freight cars and a caboose, hauled by engine 752, and was in charge of Conductor Friddell and Engineman Swirczynski. This train departed from Osage, 50 miles north of the point of accident, at 9:25 a.m., according to the train sheet, 2 hours 25 minutes late, passed Agra, approximately 4.5 miles north of the point of accident, at 11:30 a.m., according to the train sheet, 2 hours 14 minutes late, and was





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derailed while traveling at a speed estimated to have been between 30 and 40 miles per hour.

The train parted between the fifth and sixth cars, a distance of approximately 330 feet separating the two portions when both stopped. The engine and 5 leading cars were not derailed. The sixth car, P.A.R.X. tank car 603, stopped with its north end about 254 feet south of the initial mark of derailment, parallel to and 21 feet to the left of the track and in reverse position to that which it had in the train. The trucks of this car stopped at points 181 feet and 212 feet south of the initial point of derailment and about 8 feet and 22 feet, respectively, to the left of the track; the car body was badly damaged but the trucks were only slightly damaged. The body of the seventh car, M.K.T. box car 76520, stopped at right angles to the track 393 feet south of the first mark of derailment with its nearest end 12 feet east of the track. The body of eighth car, M.K.T. box car 95022, stopped with its south end about 15 feet from the side of the track and against the seventh car. The ninth and tenth cars were derailed but remained upright and in line with the track. The leading truck of the eleventh car was derailed. Several trucks were grouped east of the track at the north end of M-K-T 95022.

Summary of evidence

Engineman Swirczynski stated that after the proper air-brake test had been made his train left Osage at 9:25 a.m. and proceeded without incident, passing Agra at 11:29 a.m. When a point 12 telegraph pole spaces north of the point of accident was reached the speed was about 37 or 38 miles per hour, at this time he made a 6-pound brake-pipe reduction, which was followed by another reduction of about 2 pounds as they entered the curve upon which the accident occurred, and the speed was reduced to about 35 miles per hour. The brakes were still applied when he looked back over the train and saw a tank car leaving the track about midway of the curve, he immediately moved the brake valve to emergency position but the speed was still about 35 miles per hour at point of derailment. About five minutes after the occurrence of the accident, he went toward the rear to ascertain the cause. He found a wheel with a broken flange, but did not know whether this caused the derailment. Other than this he did not observe anything about the cars that would have caused the derailment. The brakes functioned properly en route; there was no unusual slack action in the train; and he did not notice any unusual rolling or rocking of the engine or cars just prior to the derailment. He stated that the speed

restrictions in this territory are 35 miles per hour on curves and 40 miles per hour on tangents and he believed that he was observing these restrictions at the time of the accident. He also stated that a variation of as much as 5 miles per hour above the speed shown in the timetable is permitted due to the absence of speed recorders on the engines and that when rounding the curve in question he had in mind that 35 miles per hour was the maximum authorized speed on curves, which he considered to be safe in this instance. After referring to the current timetable he stated that the maximum authorized speed for freight trains was 30 miles per hour on curves and 40 miles per hour on tangents. He gave the time of accident as 11:36 a.m.

Fireman Lovelace corroborated the statement of the engineman concerning incidents up to the time of approaching the point of accident but said that the speed was about 40 miles per hour just prior to the air-brake application, which was made at a point about 20 car lengths north of the point of accident. The speed had been reduced to about 34 or 35 miles per hour at the time of the derailment. He also thought that the maximum authorized speed on tangents was 40 miles per hour and 35 miles per hour on curves but after referring to the current timetable he said that the speed on curves was limited to 30 miles per hour. At a point about 2 miles north of where the derailment occurred he looked back over the train and observed nothing wrong. He said there was no unusual slack action in the train just prior to the derailment and he did not observe any rocking of the cars. The speed in this instance was the usual speed of trains in the vicinity of the accident.

Head Brakeman Rubert stated that the speed was about 35 miles per hour when a brake application was made, this brake application being made about 10 or 15 telegraph-pole spaces north of the point of accident, and he estimated the speed to be 30 miles per hour at the time of the derailment. He did not notice any unusual rocking of the cars and had looked over the train from the right side of the gangway of the engine just before entering upon the curve on which the accident occurred, and he observed no unusual slack action. The speed in this instance was about the usual speed and he did not think that speed had any bearing upon the accident.

Conductor Friddell stated that the speed of the train was between 35 and 38 miles per hour at the time of the brake application, at which time he was located on the right side of the cupola, and this application reduced the speed to 30 or possibly 34 miles per hour and he estimated the speed at the time of the accident to have been between 32 and 34 miles per hour; this was about the usual speed. He said the maximum authorized

speed on curves was 30 miles per hour but that there is an allowable variation of 5 miles per hour above that shown in the timetable. After the accident occurred he made an inspection of the track behind the caboose and found a wheel mark on top of a rail from which it appeared that a wheel flange had passed over it a distance of about 10 feet. There was no indication that anything had been dragging under the train. He then inspected the equipment and found nothing that would have caused the derailment except a broken flange; the indications were that the break was new as the edges were sharp and clear. He had not observed any unusual rolling or rocking of the cars just prior to the accident and was of the opinion that speed had no bearing upon the accident. At first he formed no opinion as to the cause of the accident but later arrived at the conclusion that a swinging tank car was the cause of the derailment.

The statement of Rear Brakeman Parks corroborated that of the conductor and it produced no additional information of value.

Roadmaster Moody, who was in the left side of the cupola of the caboose approaching the point of accident, stated that the first air-brake application he felt was an emergency application which occurred about 1,000 feet north of the point of derailment, and he was of the opinion that the engine entered the curve at a speed of about 40 miles per hour. Immediately after the train stopped he and the rear brakeman walked a distance of 5 or 6 car lengths to the rear of the caboose and made an inspection of the track. They found no indication of anything having been dragging under the train. A short time later he and two other men took cross levels and gauge of the track northward, from the point where the marks first appeared on the rail, for a distance of 20 rail lengths. In checking the cross levels, which were taken every 15 1/2 feet, it was found that at a point 10 rail lengths north of the first flange mark there was a variation of one-half inch, and at the point of derailment there was a variation of three-eighths inch; between these points the variation did not exceed one-fourth inch. He said this method of taking cross levels did not reflect the surface of the individual rails. The gauge varied from 4 feet 8 1/2 inches to 4 feet 9 1/8 inches; however, there was one joint on this curve where the gauge was three-sixteenths inch tight but it was not rigid. He said an excess of one-half inch in the gauge was used on curves. There was a heavy flange mark, beginning about 4 feet from a rail-joint, on the inside of the ball of the outside rail of the curve and this mark gradually climbed until it reached the outside of the

rail, dropping off the outside 29.9 feet south of the beginning of the mark; it continued on the ties for a distance of 47 feet, at which point marks made by the rear pair of wheels appeared. Both trucks were forced from the roadbed 49 feet farther south and the track was destroyed for a distance of about 139 feet beyond. The inspection of the derailed cars disclosed that the leading truck of P.A.R.X. tank car 603, the sixth car in the train, was lying about 22 feet to the left of the track-center at a point approximately 212 feet south of the first flange mark and the rear truck was 20 feet farther south and 8 feet 6 inches to the left of the track-center. The tank stopped about 300 feet south of the first flange mark and about 20 feet to the left of the track-center. There was a piece of badly cracked flange 6 or 8 inches in length on a wheel of one of these trucks and a section 3 or 4 inches long was broken off from the same wheel. He observed that a piece 9 inches long was missing from a truck of another derailed car. It was his opinion that these fractures were caused during the derailment. It was also his opinion that the sixth car was the first car to become derailed; the brakes being applied on straight track, and remaining applied as the car entered upon the curve, tended to hold the trucks rigid and did not allow them to curve; this was a large tank car with a high center of gravity having some excess side-bearing clearance, causing the car to lean toward the inside of the curve and create a lifting tendency on the wheels on the outside of the curve. Some difficulty had been experienced in the past with tank cars of this type being derailed. Subsequent to the accident the roadmaster had a conversation with two trespassers who were on the tenth car of the train and they informed him that the sixth car was the first to become derailed and said they heard a grinding sound before that car left the track. Roadmaster Moody stated that the indications were that the leading wheels of the south track were the first to climb the rail because they were deflected from the rail within a short distance. He said the curve in question was safe for a speed of 35 miles per hour and was of the opinion that speed did not cause the derailment.

Section Foreman Bogue, on whose section the accident occurred, stated the last time work had been done on this curve, which consisted of spotting and lining, was 3 or 4 days prior to the accident and in his judgment the track was safe for the authorized speed. There had been no recent rains in this vicinity to cause soft spots in the track. His inspection of the track subsequent to the accident disclosed no low places.

Car Foreman Hornback stated that he was in charge of the wrecking train which arrived at the scene of the accident at 3:35 p.m. He found the sixth car derailed in the manner described by the roadmaster and, in addition, found the seventh,

eighth, ninth, tenth car, and the leading truck of the eleventh car derailed. He observed a broken rim and a broken flange on the wheels of the rear truck of the sixth car and a broken flange on another car but these were a result of the derailment. The following day the sixth car was rerailed and placed on its original trucks and taken to Tryon where the sidebearing clearance was measured. The clearance on the "B", or forward end, was five-eighths inch, and one-fourth inch on the "A" end. The center plates had worn spots which showed they were in contact and the side bearings were also worn, indicating the car was free on the bearings. The top side bearings, which were of pressed steel, were secured to the body bolsters with bolts. The side bearings of one truck were cast integrally with the truck bolster while the bearings of the other truck were secured to the bolster with rivets. The side bearings and center plates were in good condition. The truck sides were of the Andrews type and they bore no indication of being out of line or bent. The wheels in these two trucks showed very little flange wear. There was nothing about any of the other derailed cars that would have caused or contributed to the derailment. He stated that the permissible side-bearing clearance on tank cars similar to P.A.R.X. 603, according to M.K.T.R.R. standard practice card, was a minimum of one-fourth inch and a maximum of one-half inch total clearance. He also stated that in an ordinary inspection it would be difficult to detect the variation of one-eighth inch, and it could only be detected by actual measurement. He said that it had been his experience that in the case of cars equipped with built-up bolsters the side-bearing clearance is always less when the car is loaded than when empty. It was his opinion that the accident was caused by slight track irregularities, the tendency of tank cars to rock, and the difference in side-bearing clearance.

Mechanical Foreman Burris corroborated the statement of Car Foreman Hornback in all essential details.

Car Inspectors Taber and Moritzky made an inbound inspection of P.A.R.X. 603 at Osage and noted no defects. Car Inspectors Shoemaker and Taylor made an outbound inspection of this car at Osage and noted no defects.

Observations of Commission's Inspector

Three distinct flange marks across the ball of the east rail and on the ties between the rails were discernible. On the east rail the first of these started with a rubbing mark on the inside of the ball of the rail at a point 1,091.7 feet south of the north end of the curve; the second started at a point 58

feet farther south, and the third 31 feet beyond the second. The first marks between the rails started at a point approximately 30 feet south of the first mark on the east rail; the second mark started at a point about 31 feet south of the first mark and the third mark started about 33 feet beyond the second. All of these flange marks were directed toward the east and terminated when the trucks left the ties; judging by these marks the rear truck left the ties at a point approximately 164 feet south of the first visible mark on the east rail.

The rails were slightly curve worn. There was no evidence of the ballast churning at the joints.

Examination of the damaged equipment was made at Osage. P.A.R.X. 603 is a tank car without end sills; it was built in November, 1917. The light weight is 45,300 pounds and the capacity 100,000 pounds, or 10,168 gallons. This car was loaded with gasoline. The height from top of rail to top of tank, but not of dome, is 11 feet 3 3/4 inches. The length of the car from buffer block to buffer block is 35 feet 7 inches; the distance of buffer block to center of side bearing is 5 feet 1 1/2 inches; longitudinal distance between centers of side bearings is 25 feet; the side bearings on "A" end are 4 feet 11 1/2 inches apart and on the "B" end 4 feet 11 inches apart. In all other details the inspection of this car disclosed the same facts as stated by the car foreman. The total side-bearing clearance was measured after jacking up the car on one side and the clearance on the "B" end was thirteen-sixteenths inch and five-eighths inch on the "A" end. The fractures of the wheels appeared to have occurred during the derailment. There was no other condition about any of the cars that appeared to have caused or contributed to the derailment.

Discussion

The evidence indicated that the leading or "B" end truck of P.A.R.X. 603, the sixth car in the train, was the first truck to become derailed; this occurred 1,091.7 feet south of the north end of the curve and the flange mark at this point showed abrasion on the inside of the ball of the rail and a mark extending for a distance of approximately 29 feet across the ball of the outside rail. The evidence indicates that the forward end of this car had an excessive amount of side bearing clearance. The total clearance on the forward end of the car when jacked up on one side was thirteen-sixteenths inch, while that at the rear end was five-eighths inch. The standard requirements of this railroad for cars of this type are a maximum of one-half inch and a minimum of one-fourth inch total clearance. This car was given inbound and outbound inspection at Osage and no defects were noted. There was nothing about any of the other cars that would have caused or contributed to the derailment.

There was no evidence of excessive slack action in the train. The members of the crew estimated the speed at the time of the accident to have been not in excess of 36 miles per hour, while the roadmaster estimated it to have been 40 miles per hour. The roadmaster did not think high speed was the cause of the accident. The maximum authorized speed on curves was 30 miles per hour but it appeared from the evidence that an additional 5 miles per hour is permitted.

The superelevation appeared to be ample for the curve in question with a speed of 40 miles per hour, the highest estimated. For a distance of 20 rail lengths extending north of the point of derailment the cross levels varied from 4 1/2 to 5 1/2 inches. The greatest variation from one rail joint to an adjacent joint was on the outside of the curve in the ninth rail north of the point of derailment, this variation was one inch. The gauge was not more than five-eighths inch in excess of the standard gauge and the rails were only slightly curve worn. There was no indication that anything had been dragging under the train.

The evidence is to the effect that the brakes were applied in service before entering the curve and were kept applied, an emergency application being made at about the time of derailment. The fact that the brakes were applied probably had the effect of making the trucks rigid and the rubbing action of the wheel flange at the point where the flange marks became visible indicates that rigidity of the leading truck of P.A.R.X. 603 contributed to the cause of derailment. The car foreman stated that cars of the type to which this car belonged are easily set to rocking and the slight irregularities in the cross levels of the track on the curve may have produced excessive rocking. The various breaks in the wheels were evidently the result of the derailment.

While none of the employees considered that speed contributed to the cause of this accident, the evidence is to the effect that the speed of the train when approaching the curve and at the time of accident was approximately or possibly somewhat in excess of the maximum authorized speed.

Conclusions

It is believed that this accident was caused by the wheels of a tank car climbing the outside rail of a curve because of excessive side-bearing clearance and irregularities in track surface, the car trucks being held rigid due to the brakes being applied when this car approached and entered upon this curve.

Respectfully submitted,

W. J. PATTERSON, Director.