

Inv-2356

INTERSTATE COMMERCE COMMISSION
WASHINGTON

REPORT OF THE DIRECTOR
BUREAU OF SAFETY

ACCIDENT ON THE
MISSOURI-KANSAS-TEXAS RAILROAD

RHINELAND, MO.

MAY 27, 1939

INVESTIGATION NO. 2356

SUMMARY

Inv-2356

Railroad: Missouri-Kansas-Texas
Date: May 27, 1939
Location: Rhineland, Mo.
Kind of accident: Derailment
Train involved: Passenger
Train number: 6
Engine number: 703
Consist: 3 baggage, 1 combination mail and
baggage, 1 chair car, and 1 Pullman
sleeping car
Speed: 38-40 m.p.h.
Operation: Timetable and train orders
Track: Single; 3° curve to the right; 0.363
percent descending grade
Weather: Cloudy
Time: 4:14 a.m.
Casualties: 2 injured
Cause: Spread track, account of inadequate
maintenance

Inv-2356

June 30, 1939.

To the Commission:

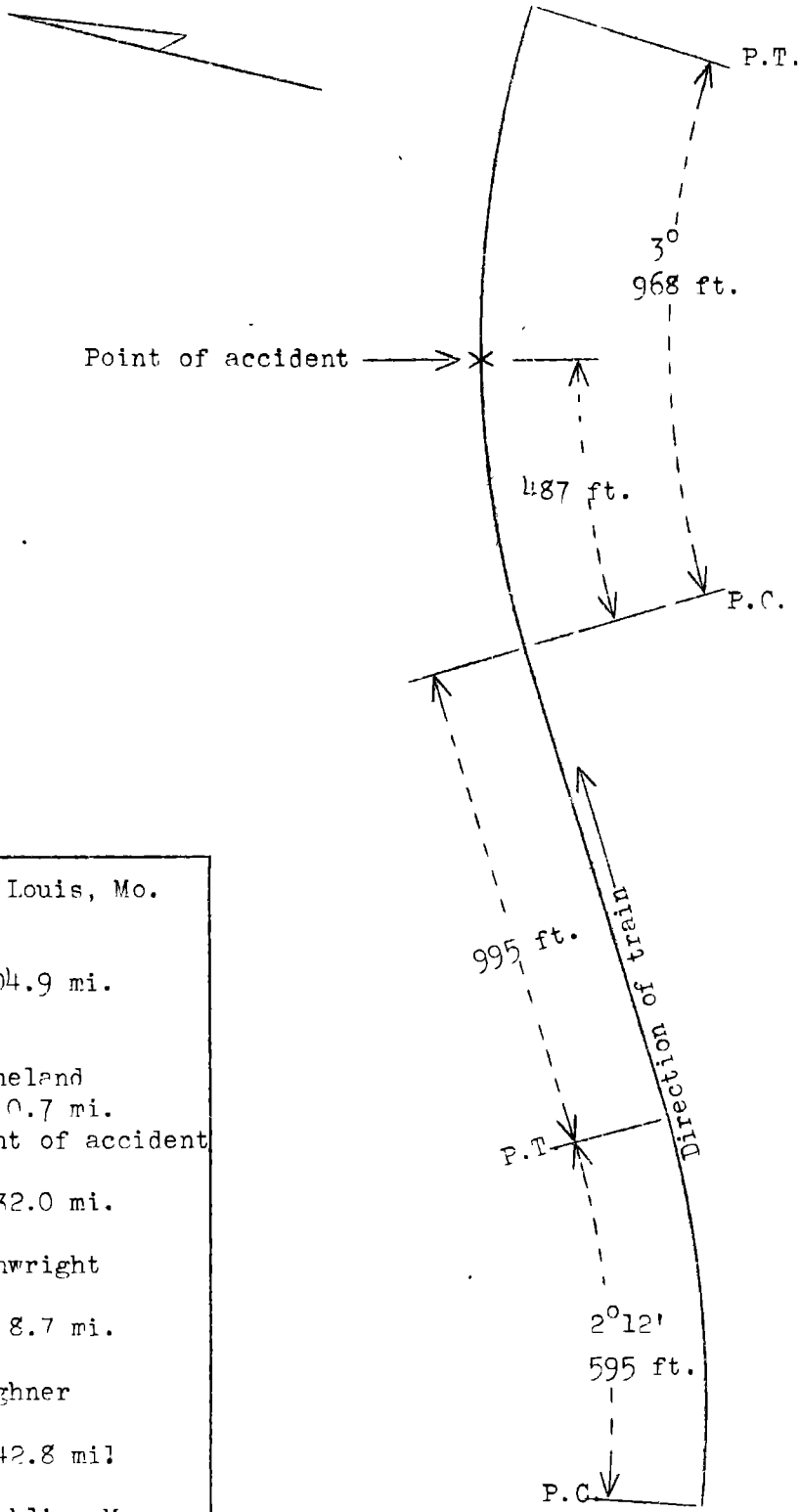
On May 27, 1939, there was a derailment of a passenger train on the Missouri-Kansas-Texas Railroad near Rhineland, Mo., which resulted in the injury of two employees.

Location and Method of Operation

This accident occurred on that part of the Northern District designated as the St. Louis Division which extends between St. Louis and Franklin, Mo., a distance of 189.1 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 form of block system being in use. The accident occurred at a point 3,796 feet south of the station at Rhineland. Approaching from the south there is a series of short curves and long tangents, followed by a $2^{\circ} 12'$ curve to the left 595 feet in length, a tangent 995 feet long, and a 3° curve to the right 968 feet in length; the accident occurred on this last-mentioned curve at a point approximately 487 feet from its southern end. The grade for north-bound trains is slightly descending more than 1 mile; it then varies from 0.471 to 0.162 percent ascending a distance of 1,900 feet, followed by 0.363 percent descending a distance of 1,100 feet; the accident occurred at the beginning or southern end of the last-mentioned grade.

The track structure consists of 90-pound rail, 39 feet in length, laid on an average of 21 to 24 treated pine, gum, and red oak ties to the rail length; it is single-spiked, fully tie-plated, and ballasted with crushed limestone to a depth of from 4 to 6 inches under the ties on a sub-ballast of gumbo and cinders 6 inches in depth. In the immediate vicinity of the point of accident the track is laid in a slight cut. The track in this vicinity was not well maintained.

Between Machens and Mokane, a distance of 96.2 miles, within which territory the accident occurred, Bulletin No. 5 restricts the speed to 50 miles per hour for engines of the type involved handling a passenger train.



o	St. Louis, Mo.
	104.9 mi.
o	Rhineland
	0.7 mi.
x	Point of accident
	32.0 mi.
o	Mainwright
	8.7 mi.
o	Boughner
	42.8 mi.
o	Franklin, Mo.

Inv. No. 2356
M-K-T R.R.
Rhineland, Mo.
May 27, 1939

The Rules and Instructions for the maintenance-of-way and structures provide in part as follows:

Rule 670 provides that 24 ties shall be used per 39-foot rail.

Rule 670-A. The minimum spacing between ties side to side shall be $10\frac{1}{2}$ inches; except that where rails are slot spiked joint ties shall conform to slotting. Where necessary the number of ties per rail length as specified in Rule No. 670 shall be reduced accordingly.

Rule 734. In main tracks on curves of three degrees or over, use six spikes per tie. The extra spike shall be used in tie plates on inside of rail. ***

Rule 768. Track shall be laid and maintained to standard gage on tangents and on curves eight degrees and under. ***

Rule 784 provides that the elevation of the outer rail on a 3° curve for a maximum speed of 50 miles per hour shall be 4-7/8 inches.

The weather was cloudy at the time of the accident, which occurred at 4:14 a.m.

Description

No. 6, a north-bound passenger train, known as the "Katy Flyer," consisted of three baggage cars, one combination mail and baggage car, one chair car, and one Pullman sleeping car, in the order named, hauled by engine 703, of the 2-8-2 type, and was in charge of Conductor Bowman and Engineman Truitt. The cars were of all-steel construction except the first car, which was of steel under-frame construction. At Franklin the crew received, with other orders and a clearance card, train order No. 333, Form 19, stating: "Heavy rains reported McBaine to St. Charles. Lookout for slides and places that might be affected." This train departed from Franklin, 84.2 miles south of Rhineland, at 1:15 a.m., according to the train sheet, on time, left North Jefferson, the last open office, 38.4 miles south of Rhineland, at 3:00 a.m., 15 minutes late, and was derailed when approaching Rhineland while traveling at a speed estimated to have been 38 or 40 miles per hour.

The entire train was derailed. The engine, badly damaged, stopped on its left side practically parallel to and 27 feet west of the center of the track, and approximately 530 feet north of the first mark of derailment. The tender, coupled to the engine, stopped in upright position at an angle of about 45 degrees to the track; the tender trucks were torn off and stopped between the engine and the track. The trucks of the first two cars were torn off; the first car stopped in upright position across the track, and the second car stopped with its front end down the embankment on the right side of the track. The third to sixth cars, inclusive, were derailed to the right and stopped in general line with the track, leaning slightly toward the right. The track was torn up a distance of about 450 feet.

The employees injured were the engineman and the fireman.

Summary of Evidence

Engineman Truitt stated that an air-brake test was made before leaving Franklin and a running test was made after leaving that point. In addition to the train order stating there had been heavy rains between McBaine and St. Charles, he received slow orders covering two points south of Rhineland. He was about 20 minutes late leaving Bluffton, 5.9 miles south of Rhineland, and was working a light throttle; the speed was about 38 or 40 miles per hour. The headlight was burning and, because in the past the track had been covered with water at that point, he was keeping a careful lookout ahead and had just made a 6 or 7-pound brake-pipe reduction to reduce the speed for the curve when he saw the engine truck wheels become derailed; he immediately placed the brake valve in emergency position. He observed nothing unusual in the riding qualities of the engine. He said that the track on this division is slightly rough, but there appeared to be nothing unusual prior to the time of derailment. He did not see any obstruction and, as he was looking directly at it, he was certain that the engine truck was the first to become derailed.

Fireman Snell stated that he did not observe any irregularities in the track except at Boughner and Wainwright, situated south of Rhineland, points for which they held slow orders, because of the softening of the track on account of rain. About the time the engineman made a light application of the air brakes he saw fire flying from the engine truck. He estimated that the speed was about 38 miles per hour at the time of accident.

Conductor Bowman stated that he did not think the speed had been in excess of 45 or 47 miles per hour between Bluffton and the point of accident, and he estimated it to be 38 or 40 miles per hour at the time of accident.

Flagman Parmer stated that he went back to flag as soon as the train stopped. The track was torn up about two rail lengths to the rear of the rear car. He inspected the track a distance of about 1 mile south of the point of derailment and did not find any marks on the rails or the ties.

Section Foreman Finder, in charge of the adjoining section to the south, arrived at the scene of accident about 5:15 a.m. and was the first to make repairs to the track. Inspection of the track disclosed that at the point of derailment the joint on the east or low side was $\frac{1}{4}$ inch low and swinging and the gage was $\frac{1}{2}$ inch wide; a rail length south of this point the gage was 1- $\frac{1}{8}$ inches wide; the west or high rail had spread and the two adjoining rails on the north had turned over, but the angle bars had remained intact. These rails were slightly twisted and bore wheel marks on the inside web from about 2 feet from the south end of the first overturned rail to the end of the second rail. The track was torn up from a point 2 rail lengths north of the first mark of derailment. The general condition of the track was fair, and he considered it safe for the maximum speed of all trains. The last rain in that vicinity had been a light shower during the evening of May 25.

Section Foreman Greer, in charge of the section on which the accident occurred, stated that he last inspected the track about 9 a.m., May 26, the day prior to the accident, and the last work had been performed about a month previously when the curve had been spotted, lined and gaged; the gage was found to be from $\frac{1}{2}$ inch to $\frac{3}{4}$ inch wide a distance of a full rail length. A Barslow track gage had been operated over his entire section on January 16 and 17, and at that time no unusual variation or wide gage had been detected by this machine. The ties were of soft wood, but appeared to be good. The drainage was fair but there were a few soft places; however, he considered the track safe for the maximum authorized speeds of trains. His section consists of 6 miles of track, and since December, 1938, his force consisted of himself and two laborers which he did not consider sufficient to maintain the track properly. He had experienced difficulty in maintaining the track in proper condition, but slow orders had not been placed on his section because of failure properly to maintain it. He said that a light rain had fallen on May 26.

Roadmaster Humphrey arrived at the scene of accident about 8 a.m. and no repairs had been made to the track at that time. He inspected the track a distance of about 700 feet south of the point of derailment and did not find any marks indicating that anything had been dragging. Measurements of super-elevation disclosed that it varied slightly, the cross levels were fair, and at one point the gage was 1-1/8 inch wide. He had never experienced any trouble with soft spots on this curve, but there were some soft ties which he had planned to change but he had not yet reached that point in renewing ties. He did not consider the wide gage due entirely to the condition of the ties. He had ridden over this track on No. 5 the morning of May 26, and later the same morning on a motor car and he did not observe anything wrong.

District Engineer Dunlay stated that his inspection of the track disclosed that the first mark of derailment was on a spike head on the gage side of the east rail and a light mark on the top of the tie; on the next tie, 18 inches north, a flange mark appeared on the top of the tie 6 inches inside the base of the east rail; this flange mark continued on the following ties a distance of 40 1/2 feet northward to the point where the track was torn up. There was no mark outside the west rail preceding the point where the track was torn up. At a point 3 1/2 feet south of the first mark near the east rail, the west rail had been kinked and turned to the left, and 5 feet 7 inches north of the first mark of derailment a flange mark appeared on the inside web of the west rail; this mark extended from a point 31 inches from the south end of the rail to the north end of the rail. This rail had been removed from the track prior to his inspection. At a point 34 feet north of the first mark of derailment a flange mark was found on the top of a tie 5 1/2 inches inside the base of the west rail. This mark appeared on the next three ties, and from a point one tie beyond the track was torn out a distance of 468 feet northward. Prior to his inspection the rail immediately south of the point of derailment had been gaged inward from 1/2 to 1-3/4 inches. The ties were in fair condition. It was his opinion that the wide gage contributed to the cause of the accident, and that when the application of the air brakes was made about the time the engine reached the spot where the wide gage existed, there was a tendency to throw additional weight against the high rail, causing it to turn over.

Trainmaster Stocker stated that the indications were the track had spread, and it was his opinion that the wide gage and possibly the soft ties contributed to the cause of the accident. He did not think that speed or the air-brake application just prior to the derailment contributed to the derailment. He did not observe any defects in the engine or in the equipment that might have contributed to the accident.

Chief Mechanical Officer Warden made an examination of the flanges of the wheels of the engine as it lay on its side and also after it had been rerailed, and all flanges were found to be in good condition, and there was practically no tread wear. The lateral of the engine truck was approximately one-half inch, and that of the driving wheels was three-eighths inch. Examination of the trucks of the equipment indicated that they had been in good condition, with the exception of the trucks which were so badly damaged in the accident that it was impossible to determine their condition prior to the accident. Detailed inspection of engine 703 after it had been brought to Franklin did not reveal any defects. This engine was released March 7, after having received Class 5 repairs at Parsons Roundhouse, and was placed in passenger service on March 9.

Measurements were made by the railroad officials of cross levels and gage a distance of 699 feet south of the point of derailment. The measurements were taken at the joints and centers or at 19.5-foot stations, the joints being staggered; out of the 39 points at which measurements were taken, the gage was found to be standard at only 18 points; at 3 points it was from 1/16 to 1/8 inch less than standard, and at 15 points it varied from 1/16 to 1-3/16 inches wide, there being 2 points at which it was more than 1 inch wide. At the point of derailment and 2 points south thereof the track had been properly gaged. Cross levels on the tangent a distance of 212 feet to the beginning of the spiral showed that the track was level at only four places; the east rail was high at two places, varying from 1/8 to 5/16 inch, and low at four places, varying from 1/8 to 1/4 inch. The west rail was low in two places from 1/8 to 5/16 inch. Beginning at the spiral the superelevation varied from 1/8 to 1 inch, the maximum variation being at a point 251 feet south of the point of derailment; the superelevation was normal at only two points. Measurements also were taken with a 700-class engine on the track, the measurements being made at the tip of the pilot. On the tangent the west rail varied from 1/8 to 5/8 inch low and the east rail was from 5/16 inch high to 1/8 inch low, there being only two places where the track was level. The superelevation on the curve varied, the maximum variation between any two adjacent stations being 1-5/16 inches; these stations were located 172 1/2 and 192 feet south of the point of derailment. The superelevation was normal at only four points.

Observations of Commission's Inspectors

Inspection of the equipment was made by the Commission's inspectors and no defects were found that could have contributed to the derailment. Inspection of the track a distance of 1 mile south of the point of accident indicated that nothing had been dragging. The marks of derailment were found as described by the railroad officials. From the point of derailment southward

a rail length the gage had been from $\frac{1}{2}$ to 1-3/4 inches wide. The first mark of derailment was inside the east rail; opposite this point the west rail marks on the ties indicated that the gage had been 1-3/4 inches wide and continued to the first joint 46 inches northward. The two rails adjoining this rail on the west, which had been removed, bore flange marks on the inside web from a point 31 inches from the receiving end of the first rail and continued to the north end of the second rail. From a point $40\frac{1}{2}$ feet north of the first mark of derailment, the track had been torn up and was entirely rebuilt. Most of the ties were pine or gum, there being a few red oak; all were treated and in fair condition. In the vicinity of the point of accident there were only 21 or 22 ties to the rail length. The irregularity of the superelevation and a few soft spots resulted in a more or less rough track condition at this point.

Discussion

The evidence indicates that the track had spread which allowed the right engine-truck wheel to drop inside the low rail and this in turn caused the west or high rail to turn over. The first mark of derailment was on the inside of the low rail; the high rail at a point $3\frac{1}{2}$ feet south thereof had kinked and turned outward, and at a point $5\frac{1}{2}$ feet north of the first mark of derailment a flange mark extending for practically the entire length of two rails appeared on the web of the high rail. After the accident the track was found to be in poor condition. The gage was irregular; within a distance of 699 feet south of the point of accident it was more than 1 inch wide at several places, and 1-3/4 inches wide at the point of derailment. Cross levels taken under load on the tangent preceding the curve indicated a variation of 5/8 inch low to 5/16 inch high, and the superelevation on the curve varied as much as 1-5/16 inches between two adjacent stations and it was normal at only four points within a distance of 487 feet. There were a few soft spots because of poor drainage at the ends of the ties, and only 21 or 22 ties per rail were used in the vicinity of the point of accident, instead of 24 ties per 39-foot rail, as required by the rules of the maintenance-of-way and structure. Some of the ties which had been marked for removal were found to be in a soft condition.

Inspection of the equipment did not disclose any defects that would have caused or contributed to the accident. The speed was considerably less than the maximum authorized speed, on account of heavy rains having been reported on a portion of that division, although only a light rain had fallen in the vicinity of the point of accident. No doubt the variation in the superelevation caused the engine to rock laterally which

would cause the engine to thrust laterally; this condition combined with wide gage and some soft ties apparently permitted the engine-truck wheel on the low side to drop inside the low rail which in turn caused the high rail to turn over.

Conclusion

This accident was caused by sprcad rails, on account of inadequate track maintenance.

Respectfully submitted,

W. J. PATTERSON,

Director.