

Inv-2267

INTERSTATE COMMERCE COMMISSION
WASHINGTON

REPORT OF THE DIRECTOR
BUREAU OF SAFETY

ACCIDENT ON THE
MISSOURI PACIFIC RAILROAD

LITTLE ROCK, ARK.

APRIL 17, 1938.

INVESTIGATION NO. 2267

SUMMARY

Inv-2267

Railroad: Missouri Pacific
Date: April 17, 1938
Location: Little Rock, Ark.
Kind of accident: Derailment
Train involved: Freight
Engine number: Rock Island switch engine 1864
Consist: 7 cars
Speed: 6-9 m.p.h.
Track: 5°40' curve
Operation: Yard
Weather: Clear
Time: 8:20 a.m.
Casualties: 3 killed, 1 injured
Cause: Uneven track; defective shim, without lubrication, between center plates on car truck.

May 19, 1938.

To the Commission:

On April 17, 1938, there was a derailment of a Chicago, Rock Island & Pacific Railway freight transfer on a Missouri Pacific Railroad interchange track at Little Rock, Ark., which resulted in the death of one employee and the injury of one employee.

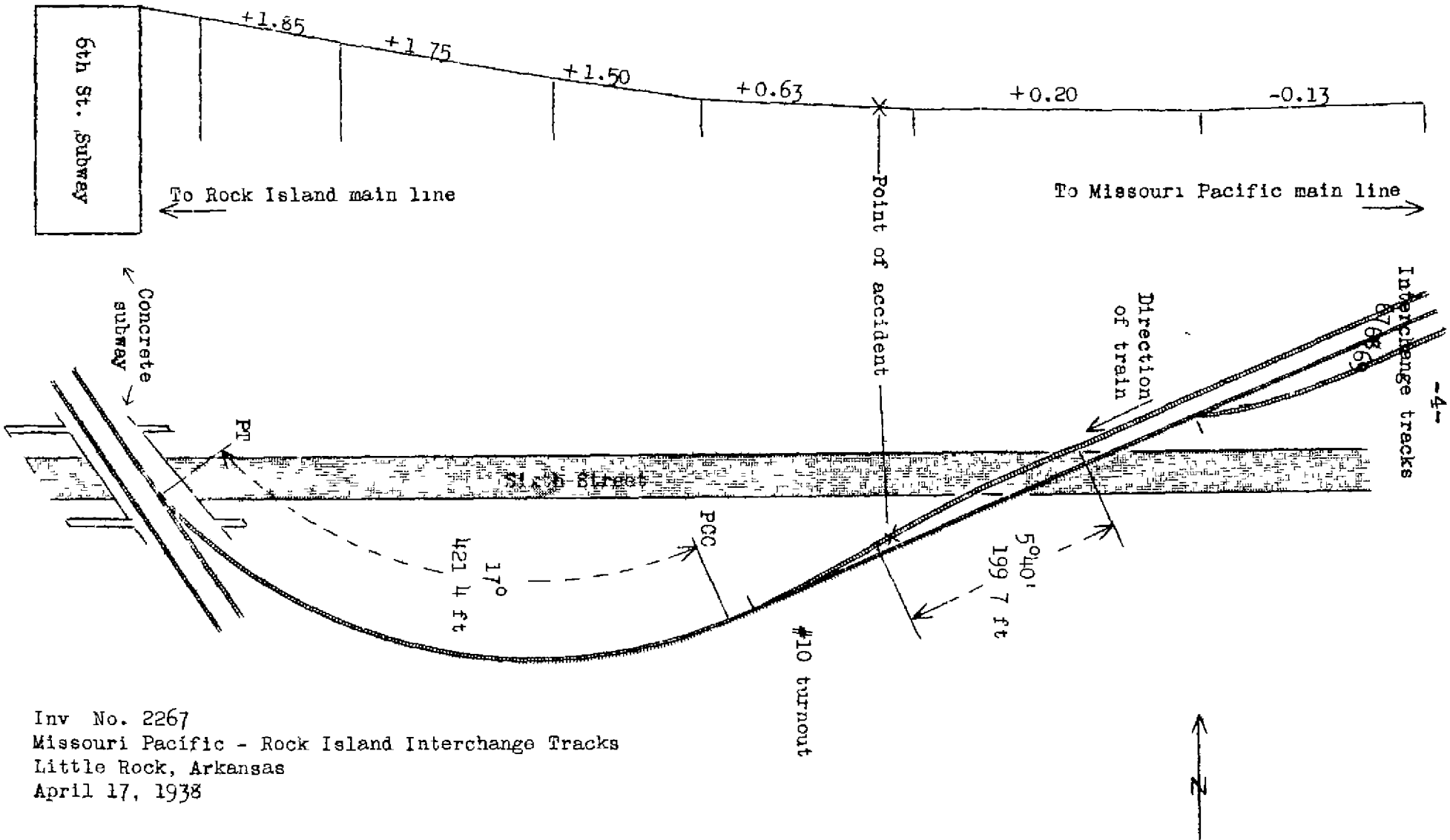
Location and method of operation

This accident occurred in the East Little Rock yard of the Little Rock Terminals of the Missouri Pacific Railroad. Three tracks extending practically east and west, numbered south to north 69, 68, and 67, are provided for the interchange of cars between the Missouri Pacific and the Chicago, Rock Island & Pacific Railway, the latter being hereinafter referred to as the Rock Island. Movements over these interchange tracks are made by special instructions. The accident occurred on track No. 67, which is 967.3 feet in length, near Sixth Street Crossing. Approaching this point from the east track No. 67 is tangent for 319 feet, followed by a compound curve to the left 199.7 feet in length, with a maximum curvature of $5^{\circ}40'$; the derailment occurred on this curve at a point 7.2 feet from its western end near the heel of the frog of the trailing-point switch which connects with track No. 68. West of this switch there is a 17° compound curve to the right 420.5 feet long. At the point of derailment the grade is ascending westward, varying from 0.63 percent to a maximum of 1.85 percent on the approach to Sixth Street Subway.

The trailing-point switch involved consists of a #10 turnout; the initial derailment occurred 102.9 feet east of the switch points, at a compromise rail joint in the north rail of track No. 67, where the rail-section changes from 85 pound to 75 pound.

The Missouri Pacific delivers cars to the Rock Island on track No. 67, and vice versa on track No. 69, while track No. 68 is left clear except when either road delivers more cars than one track will hold.

Track No. 67 is laid with 75, 85 and 90-pound rails; the 75-pound rails are 30 feet in length, and the others are 33 feet in length; there are about 17 and 20 ties respectively to the rail lengths. The track is single-spiked, tieplated on curves and ballasted with dirt mixed with a small amount of deteriorated cinders. At the point of derailment track No. 67 is on a fill approximately 2 feet in height. The superelevation of the curve involved varies from $1\frac{1}{2}$ inches above, to $2\frac{1}{2}$ inches below, level; except as to unevenness in cross levels the general maintenance



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 Missouri Pacific - Rock Island Interchange Tracks
 Little Rock, Arkansas
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of track No. 67 is good.

The speed through No. 10 turnouts is restricted to 10 miles per hour.

The weather was clear at the time of the accident, which occurred about 8:20 a.m.

Description

Rock Island switch engine 1864, of the 2-8-0 type, headed west, was in charge of Engine Foreman Wilkerson and Engineman Yates. It coupled to the west end of a transfer cut of 7 cars that stood on track No. 67 at a point about 200 feet east of Sixth Street Crossing. This transfer was composed, from west to east, of one empty box car, one empty tank car, one loaded box car, and four automobile cars loaded with bale cotton, namely, S.P. 68326, S.P. 67302, S.P. 61848 and S.P. 69135. The switch engine pulled the cars westward and stopped momentarily near Sixth Street Crossing to pick up a switchman. It then proceeded over the crossing and shortly thereafter the rear car was derailed while traveling at a speed estimated to have been between 6 and 9 miles per hour.

The fourth, fifth, sixth, and seventh cars were derailed. The seventh car, S.P. 69135, leaned to the right with its forward truck derailed; the right rear wheels of the rear truck remained on the north rail, while the left wheels were lifted above the south rail a distance of 1.2 feet. The fourth, fifth, and sixth cars were pulled off their trucks as they rounded the sharp curve to the right, the fifth and sixth cars stopping on their right sides, and the fourth car stopping upside down. Most of the trucks of the derailed cars remained upright and they held generally in line with the track. The employee killed was the engine foreman, and the employee injured was a switchman.

Summary of evidence

Engineman Yates stated that only slow movements can be made over the interchange tracks at any time, and he did not notice any difference in track conditions on the day of the accident. When his engine entered the interchange track Switchmen Gold and Payne remained in the vicinity of the main-track switch; Switchman Upton stationed himself at Sixth Street crossing and Engine Foreman Wilkerson coupled the engine to the cars which were to be moved from the interchange. It was not necessary to make any couplings between the cars of the cut or to connect the air hose as they did not intend to cut in the air brakes. After the engine foreman had looked over the other couplings he gave a proceed signal from the vicinity of the rear of the cut. Engineman Yates moved ahead to Sixth Street where he stopped to pick up Switchman

Upton. He then started again and moved up the steep grade at a speed of 8 or 9 miles per hour until he felt a sudden jerk. He immediately applied the engine brakes, looked back and he saw the fourth and fifth cars turning over. The train separated between the third and fourth cars. He did not know what caused the accident, but thought that the rear car was derailed first and pulled the other cars off the track.

The statement of Fireman Duchesne agreed with that of his engineman. He further stated that he had intended sanding the flues while the engine was making the pull up the hill but was unable to do so because the engine was not working hard enough.

Switchman Upton corroborated the statements of the engineman and fireman. He also stated that during the last 26 years numerous accidents have occurred on this curve. In a derailment which occurred 4 or 5 months ago a tank car turned over.

Switchmen Gold and Payne were so located that they did not know of the accident until the engine stopped.

Roadmaster Smith, of the Missouri Pacific, stated that the only work done on track upon which the derailment occurred during the past year was cross-tie and switch-tie renewals and joining up track, but it was in good condition and adequately maintained for the maximum authorized speed of 10 miles per hour. He stated that he had made a visual inspection of the track 15 days prior to the accident, and found it satisfactory for service requirements. After the accident he did not see any evidence of dragging equipment or other condition that would have contributed to the cause of the accident. He thought that the rear car was derailed first, and that the derailment was not caused by rocking of the car but was due to speed considerably in excess of that permitted.

Section Foreman Maher stated that two days prior to the accident he made a visual inspection of the interchange track involved. He did not notice any evidence of churning at the compromise joint, or anything different about the track condition from that which usually prevailed. He stated that in its present condition the track is safe for movements at a speed of 10 miles per hour.

General Car Inspector Jackson, of the Missouri Pacific, made an inspection of S.P. 69135 on the Rock Island repair track on April 18, at which time he found nothing that in his opinion would have caused the accident. The center casting on the A-end was very dry and the bottom center plate had a 3/16 inch metal shim in the bottom of the plate; this shim was in two pieces, and the edges were worn thin. The inside surfaces of the center castings appeared to be worn fairly regular; however, the inside of the flange of bottom center plate was worn bright and showed

heavier contact on the side toward the center of the car. The side bearing clearance at A-R location was $\frac{1}{4}$ inch, and at A-L location $\frac{1}{8}$ inch, and this was sufficient clearance; at the B-L location the clearance was $\frac{3}{8}$ inch while at the B-R location there was no clearance. The wheels were in good condition and showed very little wear. An inspection was also made of the three cars that were turned over and this inspection disclosed nothing which in his opinion would have caused the derailment. Twisted couplers, and marks in the knuckles and couplers of some of these cars, indicated that they were twisted off the track by a force exerted from the rear of the cut.

Division Engineer Funda, of the Rock Island, in company with a representative of the Missouri Pacific, examined the track and equipment and took measurements. The rear car was leaning northward at an angle of about 20° ; the front truck was entirely derailed, with the left forward wheel directly opposite and resting on the north switch point, and the right wheel buried in the dirt and resting against the east head block tie, both being slued westward; the right rear wheel of the front truck was about one foot off the end of the ties and buried in the roadbed, and the left wheel was resting on the north switch point, which was partly turned over. Examination of turnout rails of track No. 67 indicated that a wheel started mounting the north rail at an 85-75 pound supported compromise rail joint; the mark was plainly visible and started at a point about 1 inch west of the receiving end of the 75-pound rail. This mark continued diagonally across to the north side of the rail for a distance of 6 feet, at which point the flange of the wheel dropped outside the rail. The next mark on the north side of the north rail was on a tieplate of the fifth tie westward, and the first tie mark was on the sixth tie. The first mark of the south wheel started on the fifth tie; from these points wheel marks, evidently caused by the leading wheels, showed on the ties from the fifth to the twenty-fourth tie westward. Marks made by the left front wheel continued on top of the ties between the fifth and twenty-ninth ties. The first marks caused by the rear pair of wheels of the leading truck began on the eighteenth and nineteenth ties, and practically followed the path of the leading wheels. Inspection of the track disclosed that the north ends of the first 3 ties east of the point of derailment, as well as the first 5 ties west thereof, inclusive, had been churning, permitting considerable vertical movement of the north ends of these ties as wheels passed over them. The roadbed was soft in the immediate vicinity of the compromise joint where the wheel mounted it due to lack of drainage. Cross levels taken at this joint indicated that, without load, the north rail was $1\frac{3}{4}$ inches lower than the south rail, and under load a difference of $2\frac{1}{2}$ inches existed, this variation was due to the fact that without load there was a space under the north ends of these ties. Continuing eastward for a span of 9 ties from the point where the wheels

mounted, or 15.8 feet, the rails were found to be level under load, and without load the north rail was 1/8 inch higher than the south rail. At a point 40 feet eastward the north rail was 1 inch higher than the south rail under load, and without load it was 1-1/8 inches higher. The total cross level variation between the twenty-fourth tie eastward and the tie at the compromise rail joint was 3 1/2 inches. Westward from the point where the wheels mounted the rail a distance of 7 ties, the cross levels of the track under load showed the north rail to be 1/4 inch higher than the south rail. The effects in these differences in cross levels would have a tendency to lift the front trucks of the most easterly car when the rear trucks are opposite the twenty-fourth tie east; also, the effect of the rear truck in the preceding car when about opposite the seventh tie west would have a tendency, due to the difference in cross levels, to raise the following car to the point where the wheels would mount the tops of the rails. At the turnout curve east of the switch the measured superelevation averaged almost 1 inch, the maximum of 1 1/2 inches being at the thirty-third tie east. The required superelevation for a 5°40' curve at 10 miles per hour is 1/2 inch, for equilibrium speed. The excess elevation in the turnout curve had a direct effect at the point of derailment, tending to throw the center of gravity of the car to the south of the center line of the track. At the compromise joint at which the wheel mounted the rail on the gauge side rail wear of 1/8 inch was indicated. The gauge side of the two rail ends in the joint were flush. From the marks and position of the equipment after the accident, he was of the opinion that the front wheels of S.P. 69135 were the first wheels to become derailed, followed by the rear wheels of the leading truck and after being derailed and reaching a point opposite the straight lead rail, the entire truck and leading end of this car continued in a direction to the right of the path taken by the car ahead of it, causing the sixth car to become derailed which movement was transmitted in turn to the fifth and fourth cars. He stated that he did not make a mechanical inspection of the equipment, but it was his opinion that track conditions as previously described were the primary cause of the derailment.

Observations of the Commission's Inspectors

Inspection of track No. 67 east of the point of derailment did not disclose any indication that defective or broken equipment would have contributed to the cause of the accident. The track was in good condition as to rails, spikes, ties and gauge; however, the cross levels from the point of accident to a point about 250 feet therefrom were very irregular and found to be substantially the same as described by the division engineer.

The car involved was automobile car S.P. 69135, of all-steel construction, built and equipped as follows:

Built 10-28.
Capacity 100,000 lbs.
Light weight 60,100 lbs.
Cubical capacity 4,359 ft.
Length inside 50 feet 1 inch.
Width inside 9 feet 2 inches.
Height inside 10 feet.
Height of floor above top of rail (car loaded)
3 feet 9 inches.
Length center to center of body bolsters 40 feet 4 inches.
Length over buffer blocks 51 feet 5 inches.
Length inside to inside face of knuckles 53 feet 5 inches.
Body bolsters built up.
Center plates cast steel riveted to body bolster.
Side bearings cast steel with steel plates riveted
to body bolster.
Couplers ARA type "D", 6 by 8 inch shanks.
Space for coupler shanks, 7 inches vertical and
11 inches horizontal.

TRUCKS

Dalman.
Bolsters cast steel (Dalman).
Side bearings A-end, 1 with roller, 1 with rocker;
B-end, 2 with rollers, (rollers apparently
standard to car), housing of all riveted to
bolster and spaced center to center 52 inches.
Center plate cast integral with bolster.
Wheels, cast iron, 33 inches in diameter.
Journals 5½ by 10 inches.
Wheel base 5 feet 6 inches.

Inspection of this car disclosed that the left top side bearing at the A-end, had a longitudinal cavity worn in it to the depth of ¼ inch, which showed indications of having been in that condition for a long time. The bottom side bearing at that location was of the rocker type, and 4½ inches in height, while the one at the A-end, right side, was of the roller type and 4½ inches in height. Side-bearing clearance was 1/8 inch at A-end, left side, and ½ inch at A-end, right side. There was a 3/16 inch shim between the center plates, which had originally been cut very irregularly and did not fit snugly to rim or center dowel of bottom center plate; it was broken in several pieces, and edges of pieces where they had become overlapped were mashed and badly worn. The back of the top center plate was rubbing heavily against the inside face of the rim at the back of the bottom center plate and the rim at that point had about 3/8 inch worn off. Both plates and pieces of shim were dry and devoid of any lubricant. No other part of car or trucks showed

any defects that might have contributed to the accident. Only the truck at the A-end showed marks indicating that it had been derailed. This car was loaded with 104 bales of compressed cotton, of which 81 bales were in the bottom tier, standing on ends and tightly fitted in the car, and 23 bales were in the top tier, lying on sides and evenly distributed over the bottom tier. The top of load measured 7 feet 4 inches above the top of the floor of the car.

Inspection of the three cars that were turned over did not disclose any defects or marks on the trucks indicating that they had been derailed. These cars were of practically the same dimensions as the seventh car; their coupler shanks were twisted to the right.

Discussion

The irregularity of cross levels in the track approaching the point of accident would cause the cars to rock more or less, especially the higher cars. It is apparent that the west or lead truck of the seventh car was the first to become derailed and the indications were that it was the lead wheel on the north side of that truck that mounted the rail at the compromise joint. It was stated by witnesses that there had been derailments near this location at previous times. Long cars do more pivoting on center plates than shorter cars. The defective shim between the center plates of the seventh car and the lack of lubrication in the center plates probably prevented the truck from pivoting freely. The improper side bearing apparently did not contribute to the cause of the accident for, although it was $\frac{1}{2}$ inch higher than the one on the opposite side of the truck, that condition was compensated for by the cavity in the top side bearing at that location.

When the derailed west truck of the seventh car came in contact with the turnout rail of track No. 68 it is probable that the rear end of the sixth car was forced sidewise off center, became overbalanced and then turned over. The twisted couplers were conclusive evidence that when the sixth car turned over the fifth car also started to turn and then the fourth car followed.

There was some testimony to indicate that excessive speed might have been involved, and it was the practice to sand out the engine flues when pulling this interchange; however, in this instance the engine was not worked hard enough to take the sand. The derailed car coming to a stop with the front end over the head blocks of track No. 67 indicated that it had been moving at a low rate of speed, and further where the first wheel left the rail there was a light mark showing that it fell to the level of the bottom of the base of the rail within a distance of 10 inches.

The slack was stretched on the upgrade and the rear car was moving on the 5°40' portion of the left curve at the No. 10 turnout of the trailing-point switch, connecting with track No. 68, while the forward portion of the train was rounding the 17° compound right curve and ascending the heavier part of the grade; the cross-pull thus exerted by the drag of the derailed forward truck of the rear car evidently was of sufficient force to result in the sixth car being pulled off the track.

Conclusions

This accident was caused by uneven track; a contributing cause probably was a defective shim, without lubrication, between the center plates of the leading truck of the seventh car.

Respectfully submitted,

W. J. PATTERSON

Director.

