

INTERSTATE COMMERCE COMMISSION

REPORT OF THE DIRECTOR OF THE BUREAU OF SAFETY IN RE
INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE
ST. LOUIS-SAN FRANCISCO RAILWAY NEAR LINTON, KANS.,
ON JUNE 28, 1923.

July 20, 1923.

To the Commission:

On June 28, 1923, there was a derailment of a passenger train on the St. Louis-San Francisco Railway near Linton, Kans., resulting in the death of 1 employee, and the injury of 27 passengers, 3 mail clerks, and 4 employees.

Location and method of operation.

This accident occurred on the Kansas City Sub-Division of the Northern Division, extending between Kansas City, Mo., and Ft. Scott, Kans., a distance of 98.6 miles, in the vicinity of the point of accident this is a single-track line over which trains are operated by time-table, train orders, and an automatic block-signal system. The accident occurred at a point 7,006 feet south of the station at Linton, approaching this point from the north the track is tangent for 2,711 feet, followed by a 2-degree 2-minute curve to the right 1,593 feet in length, the accident occurring on this curve at a point 483 feet from its northern end. The grade is descending for southbound trains, varying from 0.2 to 0.6 per cent to within practically 1,200 feet of the point of accident, from which point it is 0.25 per cent ascending. The track is laid with 85-pound rails, 33 feet in length, single-spiked, with about 20 ties to the rail-length, about 80 per cent of the ties being untreated white oak and 20 per cent creosote-treated hardwood, and ballasted with chats, about 12 inches in depth. No tie-plates are used. The surface and alignment of the track are only fairly well maintained. The speed of passenger trains is limited to 60 miles an hour. The weather was clear at the time of the accident, which occurred at about 2.42 p.m.

Description.

Southbound passenger train No. 117 consisted of one baggage car, one combination mail car and coach, one coach, one chair car, and one Pullman sleeping car, in the order named, all of all-steel construction, hauled by engine

1054, and was in charge of Conductor Churchill and Engineman Mead. This train passed Pleasanton, 4.9 miles north of Linton, at 2.33 p.m., five minutes late, made a stop for the Missouri Pacific crossing located 0.4 miles beyond, passed Linton at 2.40 p.m., three minutes late, and after having proceeded approximately $1 \frac{1}{3}$ miles from this point was derailed while traveling at a speed estimated to have been about 50 miles an hour.

The entire train, with the exception of the rear truck of the last car, was derailed to the left, and came to rest parallel with the track, the head end of the engine being 379 feet from the initial point of derailment. Engine 1054, its tender, and the first two cars came to rest on their left sides, considerably damaged. The employee killed was the fireman.

Summary of evidence.

Engineman Mead stated that shortly after passing Linton he felt the engine leave the rails, at which time the speed was about 50 miles an hour, and he applied the air brakes in emergency, but did not shut off steam. He said the engine was the first to be derailed, and that it did not seem to climb the rail but rather to drop down on the ties. His examination immediately after the accident disclosed that the outer rail was turned over at an angle of about 45° , beginning under the rear truck of the last car, the spikes on the gauge side of this rail being pulled up from about $\frac{1}{2}$ inch to full length. He also examined the flanges and wheels of that part of the engine exposed to view, and found them to be in good condition. Engineman Mead further stated that he had made a general inspection of engine 1054 before starting on this trip, noticed no excessive lateral motion in the engine en route, observed no abnormal irregularities in the track, and considered the track conditions at the point of derailment to be as good as at any place on this district, he also said the train was traveling at the usual rate of speed at this point, and that the air brakes worked properly en route. Conductor Churchill stated the first knowledge he had of anything wrong was when the air brakes were applied in emergency. He examined the track shortly after the accident, beginning at the rear truck of the last car and proceeding southward, but found no marks until he reached the forward end of this car, at which point the angle bars on the outer rail were disconnected, the one on the gauge side being near the rail, and the outside one missing, he did not find any of the bolts or nuts, and stated the rails at this joint were separated about 3 feet and partially covered with ballast. On the second tie north of this rail joint there was a mark, apparently made

by a wheel flange, about 6 inches outside of the base of the rail, and a corresponding mark on the tie on the gauge side of the inside rail. Neither of these employees was able to say what caused the accident.

Superintendent Brown stated that three of the holes in the angle bars at the point where the outer rail was separated showed that the bolts had sheared off as they pulled through, he also saw three of the bolts, one being missing. In the immediate vicinity of this joint there was some lateral wear in the ties at the base of the rail.

Roadmaster Cooper arrived at the scene of accident shortly after its occurrence and found that the outside rail on the curve was turned over, the spikes on the gauge side of this rail having been pulled up and bent back on the outside of the rail, indicating the accident was not caused by a spread rail. There were marks on the webs on the gauge side of the displaced outer rails apparently caused by the outside of the rims of the engine wheels. The cross level of the rails was taken for a distance of 500 feet north of the point of derailment, the maximum variation being 5/16 inch. Although he examined the track for more than a mile northward for indications of dragging equipment, no marks of any description were found, and was of the opinion the accident was caused by an overturned rail.

Roadmaster Cooper further stated that during the time he was in charge of this particular section of track, about 6 years and 5 months, no trouble had been experienced, and there had been no occasion for the issuance of slow orders, also that this section of track had been given a general resurfacing in October, 1922, at which time all bad ties were renewed, 165 being replaced on the curve in question.

At the time of the arrival of the Commission's inspectors much work had been performed in repairing the track, obliterating considerable evidence, however, examination of the track at this time disclosed the first indication of a derailment to be an overturned rail on the outside of the curve, some of the original outside spikes at the receiving end of this rail, as well as at the leaving end of the adjacent north rail, showing they had been forced outward and upward. The spikes on the gauge side of this rail had been replaced and a new angle bar had been installed connecting these two rails. Beginning at the fourth tie under the leaving end of the east rail north of this replaced angle bar, there was outward lat-

eral rail wear of $\frac{3}{8}$ inch on the top of the tie, and south of this point-this outward lateral wear on each succeeding tie was as follows: $\frac{5}{8}$ ", $\frac{1}{2}$ ", 1", $\frac{3}{4}$ ", $\frac{7}{8}$ ", 1", $\frac{5}{8}$ ", 1", $1\frac{1}{8}$ ", 1", $1\frac{1}{8}$ ", ~~$\frac{3}{4}$ "~~ $\frac{1}{8}$ ", $\frac{3}{4}$ ", $\frac{5}{8}$ ", $\frac{7}{8}$ ", $\frac{5}{8}$ ", $\frac{1}{2}$ ", $\frac{1}{2}$ ", $\frac{7}{8}$ ", $\frac{3}{4}$ ", $\frac{5}{8}$ ", and $\frac{7}{8}$ ". The outside rail on the curve had an elevation of $3\frac{1}{2}$ inches. The track was examined for more than a mile north of the point of accident and found to be only fairly well maintained, several new ties being found that were not spiked, and at numerous places many spikes were loose, while others had broken heads, and some had receded from their original position in the ties.

Engine 1054 is of the 4-6-2 type, having a total weight, engine and tender, of 425,500 pounds, its driving wheel base is 12 feet 6 inches, and total wheel base, engine and tender, 65 feet $11\frac{3}{4}$ inches. On June 22, 1923, this engine was released from the Kansas City shop after receiving the following repairs: new tires on all driving wheels, new journal brasses, new spring-hanger pins, and a new trailer complete, including axle, new rear wheels were also applied to the engine truck. Subsequent to receiving these repairs the engine had run only 890 miles prior to beginning this trip. The wheels and wheel flanges of this engine were gauged and found to be in good condition, while the lateral was within the limits, and careful examination failed to disclose the presence of any defect which could have contributed to the occurrence of this accident.

Conclusions.

This accident is believed to have been caused by an overturned rail, due to the track structure being too weak to support the movement of the train at speed.

Apparently as the engine rounded the curve at a high rate of speed a severe side thrust was exerted on the outside rail, causing this rail to cant outward, allowing some of the engine wheels to drop on the gauge side of the east rail, the wheel treads running on the flange of the base of this rail, and the edge of the wheel rims marking the web, while the opposite wheels remained in normal position on the west rail, which accounts for the absence of flange marks on the ties on the gauge side of this rail. The track conditions disclosed in the vicinity of the point of accident, there being ties installed without being spiked, spikes with broken heads, numerous loose spikes, and also spikes that had been forced backward from their original positions, coupled with lateral wear on the tops of the ties under the base of the east rail in the immediate vicinity of the point of derailment, probably account for the overturning of the rail under the engine moving at high speed.

All of the employees involved were experienced men; at the time of the accident none of them had been on duty in violation of any of the provisions of the hours of service laws.

Respectfully submitted,

W. P. BORLAND,

Director.