

INTERSTATE COMMERCE COMMISSION
WASHINGTON

INVESTIGATION NO. 3070

THE CHICAGO, ROCK ISLAND AND PACIFIC
RAILWAY COMPANY

REPORT IN RE ACCIDENT

NEAR MAUMELLE, ARK., ON

FEBRUARY 5, 1947

SUMMARY

Railroad: Chicago, Rock Island and Pacific
Date: February 5, 1947
Location: Maumelle, Ark.
Kind of accident: Derailment
Train involved: Passenger
Train number: 112
Engine number: 4021
Consist: 7 cars
Estimated speed: 25 m. p. h.
Operation: Timetable and train orders
Track: Single; 8°40' curve; level
Weather: Clear
Time: 2:21 a. m.
Casualties: 1 killed; 4 injured
Cause: Defective engine truck

INTERSTATE COMMERCE COMMISSION

INVESTIGATION NO. 3070

IN THE MATTER OF MAKING ACCIDENT INVESTIGATION REPORTS
UNDER THE ACCIDENT REPORTS ACT OF MAY 6, 1910.

THE CHICAGO, ROCK ISLAND AND PACIFIC RAILWAY COMPANY

March 18, 1947

Accident near Maumelle, Ark., on February 5, 1947, caused
by a defective engine truck.

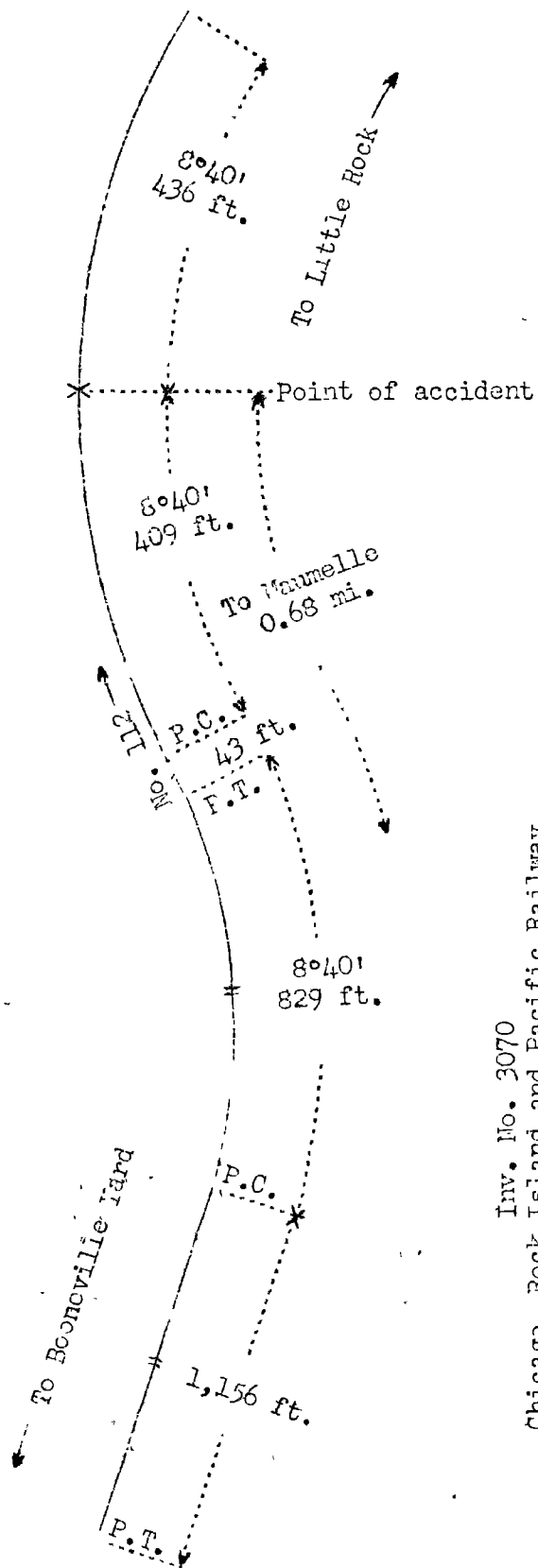
REPORT OF THE COMMISSION¹

PATTERSON, Commissioner:

On February 5, 1947, there was a derailment of a passenger train on the Chicago, Rock Island and Pacific Railway near Maumelle, Ark., which resulted in the death of one train-service employee, and the injury of two passengers, one dining-car employee and one train-service employee.

¹Under authority of section 17 (2) of the Interstate Commerce Act the above-entitled proceeding was referred by the Commission to Commissioner Patterson for consideration and disposition.

o	Little Rock, Ark.
	16.52 mi.
X	Point of accident
	0.68 mi.
o	Maumelle
	21.70 mi.
o	Bigelow
	80.00 mi.
o	Booneville Yard, Ark.



Inv. No. 3070
Chicago, Rock Island and Pacific Railway
Maumelle, Ark.
February 5, 1947

Location of Accident and Method of Operation

This accident occurred on that part of the Arkansas Division extending between Booneville Yard and Little Rock, Ark., 119.2 miles, a single-track line in the vicinity of the point of accident, over which trains are operated by timetable and train orders. There is no block system in use. The accident occurred on the main track 102.38 miles east of Booneville Yard and 0.68 mile east of the station at Maumelle. From the west there are, in succession, a tangent 1,156 feet in length, an $8^{\circ}40'$ curve to the left 829 feet, a tangent 43 feet and an $8^{\circ}40'$ curve to the right 409 feet to the point of accident and 436 feet eastward. The grade is level.

On the curve on which the accident occurred, the track structure consists of 90-pound rail, 39 feet in length, relaid in August, 1945, on an average of 23 treated hardwood ties to the rail length. It is fully tieplated, double-spiked, provided with 4-hole angle bars and an average of 8 rail anchors per rail length. It is ballasted with crushed rock to a depth of about 8 inches. The specified curvature was $8^{\circ}40'$ and the specified superelevation was 5-1/2 inches. The accident occurred 409 feet east of the west end of the curve, where the curvature was $8^{\circ}40'$, the superelevation was 5-1/2 inches and the gage was 4 feet 8-1/2 inches.

The maximum authorized speed for the train involved was 60 miles per hour on tangent track and 25 miles per hour on the curve involved.

Description of Accident

No. 112, an east-bound first-class passenger train, consisted of engine 4021, a 4-8-2 type, one baggage car, one mail-baggage car, three coaches, one dining car and one sleeping car, in the order named. All cars were of steel construction. This train departed from Bigelow, the last open office, 22.38 miles west of the point of accident, at 1:40 a. m., 10 minutes late, passed Maumelle, and while it was moving at an estimated speed of 25 miles per hour the engine and the first four cars were derailed.

The engine and tender, remaining coupled, stopped against an embankment immediately south of the track, with the front of the engine 328.5 feet east of the point of derailment. The right side of the cab was demolished, steam pipes within the cab were broken and the engine was otherwise considerably damaged. The derailed cars stopped practically upright and in line with the track. The first car was somewhat damaged.

The engineer was killed, and the fireman was injured.

The weather was clear at the time of the accident, which occurred about 2:21 a. m.

The total weight of engine 4021 in working order is 364,000 pounds, distributed as follows: Engine truck, 55,500 pounds; driving wheels, 249,500 pounds; and trailer truck, 59,000 pounds. The specified diameters of the engine-truck wheels, the driving wheels, and the trailer-truck wheels are, respectively; 33, 74 and 43 inches. The driving wheelbase is 19 feet 10 inches long, the total length of the engine wheelbase is 41 feet, and the total length of the engine and the tender is 89 feet 9-3/8 inches. The No. 1 pair of driving-wheel journal boxes is equipped with a lateral-cushioning device, and the trailer truck is equipped with a centering device. Radial buffers are provided at the rear of the engine and the front of the tender, and a floating block is arranged between the chafing plates. The engine truck is of the 4-wheel type, its wheelbase is 7 feet long, and the distance between the center of the engine truck and the No. 1 driving axle is 8 feet 2 inches. The journal boxes are mounted inside the wheels. Two equalizing bars extend between the journal boxes on each side of the truck. They curve upward at each end and are seated upon the tops of the journal boxes. Semi-elliptic springs, which are cambered downward, are arranged longitudinally on hangers between the sets of equalizer bars on each side of the truck, and are seated against the lower surfaces of the truck side frames. The engine truck is provided with a swing bolster having a female centerplate cast integrally on the top surface and machined inclined-plane rocker bearings on the bottom surface. The rocker bearings provide for a 6-inch lateral movement to either side of the centerline of the engine and for a total lift of 1-31/32 inches. The lateral motion between the bolster and the truck frame is restrained by two constant-resistance rockers mounted transversely to the bolster and near each end of it. The rockers are heart-shape, arranged inversely, and are 7-1/8 inches high and 19-1/2 inches long. The tops of the rockers engage the bearings on the swing bolster, and the lower ends, which have two rounded projections 3 inches long by 1 inch high, engage slots on the cross-members of the frame. Each rocker is secured in place by links, which are attached at one end to an eccentric arrangement on the rocker cross-member and at the other end to the bolster. When the engine truck is mounted in working order the male center plate, which is bolted to the cylinder-saddle, engages the female center plate of the truck bolster. The arrangement of the center plates, the rockers and the bolster permits the engine truck to pivot and to move to either side of the centerline of the engine proportionately to the curvature of the track. The bolster assembly is arranged for the bolster to rise, during movement around a curve, at the same rate at each end and to

resist lateral movement with respect to the center plate proportionate to the force required to deflect the engine from a tangential line.

The tender is rectangular in shape and is equipped with two 4-wheel trucks. Its capacity is 10,000 gallons of water and 5,000 gallons of fuel oil. The weight of the tender loaded is 206,800 pounds.

The last class 5 repairs were completed during October, 1945, the last monthly inspection and repairs were completed on January 15, 1947, and the last trip repairs were completed at 9 a. m. on February 4, 1947. The accumulated mileage since the last class repairs was 91,418 miles.

Discussion

No. 112 had just traversed an 8°40' curve to the left, and was moving on an 8°40' curve to the right at an estimated speed of 25 miles per hour when the engine and the first four cars were derailed. The engine was derailed to the right and stopped against an embankment, at a point 328.5 feet east of the point of derailment. The maximum authorized speed for this train on the curve on which the derailment occurred was 25 miles per hour.

As No. 112 was approaching the curve on which the accident occurred the headlight was lighted brightly, and the enginemen were maintaining a lookout ahead. The members of the train crew were in various locations throughout the cars of the train. Prior to the accident the engine and the cars had been riding smoothly. The fireman said that the first he knew of anything being wrong was when he felt the rear of the engine drop. At that time the engineer moved the throttle lever to closed position and moved the brake valve to emergency position. The engineer was killed. The brakes of this train had been tested and had functioned properly en route.

Beginning at the west end of the curve involved, there was a spiral 248 feet in length, and the superelevation gradually increased to 5-3/4 inches at the point of the full curvature of 8°40'. At the point of derailment the superelevation was 5-1/2 inches, the curvature was 8°40', and the gage was 4 feet 8-1/2 inches. Examination of the track throughout a considerable distance westward from the point of derailment disclosed that the surface, alignment and gage were well maintained for the maximum authorized speed. There was no indication of dragging equipment, or of any obstruction having been on the track. The track on the curve was last resurfaced about 11 days prior to the accident. It was last inspected by the section foreman on the day preceding the accident, and no unusual condition was observed. A west-bound passenger train passed over this track at a speed of 25

miles per hour about 16 minutes before the derailment occurred, and there was no indication of defective track.

The first indication of disturbed track was at a point 383 feet east of the point of spiral and 135 feet east of the point of full curvature. At this point the low, or south, rail was canted outward, and the degree of cant progressively increased until the rail was overturned at a point 39 feet eastward. The inside spikes were pulled sufficiently for the rail to become free, but the outside spikes were in normal position. From this point eastward throughout a distance of about 225 feet the south rails were overturned outwardly, then throughout a distance of 90 feet the south rails were off the ends of the ties. The first mark on the track structure was a flange mark across the top of a tie, 6-1/4 inches south of the gage side of the high rail, at a point 27.5 feet east of the first indication of cant in the south rail. Opposite the first flange mark on the tie, flange marks appeared on the web of the south rail. Eastward a distance of 12 feet 2 inches from the first flange mark single flange marks appeared across the ties inside the high rail and in the web of the south rail, then two flange marks appeared on the ties about 8-1/2 inches inside the high rail and in the web of the south rail throughout a distance of 9 feet eastward. From this point eastward the track structure was displaced or torn up to the point where the engine stopped.

Examination of the engine disclosed that the tops of the flanges of all wheels had been in contact with the track structure. The counterbalances of the left Nos. 2 and 3 driving wheels were badly battered and scored and the inner surfaces of the tires of the right Nos. 2 and 3 driving wheels bore scraping marks throughout their circumferences. Examination of the engine-truck assembly disclosed that the flanges of the left No. 1 and right No. 2 wheels were considerably flange-worn. The male and female center castings and their shims were not lubricated. The bolts which secured the male casting to the cylinder saddle were loose, and the bushing of the center castings was worn 1/4-inch in a tapered shape. The top of the left inside engine-truck equalizer bar and the bottom surface of the truck cross-member had been worn by being in contact with each other. The 1/2-inch plate over the right engine-truck spring was broken and the companion plate over the left engine-truck spring was missing. The bearings on the lower surface of the swing bolster were not lubricated and were worn to depths of 1/8 to 3/16-inch. The slotted bearings in the cross-members on which the constant-resistance-rockers were seated were fouled with an accumulation of dirt and grease. The link securing the left rocker in place was disconnected. Considering the marks on the track structure and the marks on the wheels of the engine, together with the condition of the engine-truck assembly, it is apparent that when the engine

entered upon the 8°40' curve to the right the lack of lubrication on moving parts of the pivoting assembly and the constant-resistance-rocker assembly, and the defective condition of the left rocker, resulted in the binding of the truck on the left side sufficiently to hold it rigidly. As a result of this condition, the rigid wheelbase of the engine was extended to a length of about 28 feet and its mid-point was 14 inches ahead of the No. 2 pair of driving wheels. With a wheelbase of this length moving on an 8°40' curve, either the track would shift to the left immediately ahead of the engine, the left No. 1 engine-truck wheel would mount the high rail, or the low rail would overturn. In this case the low rail was overturned outward by pressure exerted by the right Nos. 2 and 3 driving-wheel flanges then the right No. 4 driving wheel and the right trailer wheel ran in the web of the rail, and the left No. 4 driving wheel and the left trailer wheel dropped inside the high rail.

Cause

It is found that this accident was caused by a defective engine truck.

Dated at Washington, D. C., this eighteenth day of March, 1947.

By the Commission, Commissioner Patterson.

(SEAL)

W. P. BARTEL,
Secretary.