

INTERSTATE COMMERCE COMMISSION
WASHINGTON

INVESTIGATION NO. 3235
ERIE RAILROAD COMPANY
AND
NEW YORK CENTRAL RAILROAD COMPANY
REPORT IN RE ACCIDENT
AT MARION, OHIO, ON
FEBRUARY 27, 1949

SUMMARY

Date: February 27, 1949

Railroads: Erie; New York Central

Location: Marion, Ohio

Kind of accident: Derailment

Train involved: N.Y.C. freight

Train number: Extra 2949 East

Engine number: 2949

Consist: 64 cars, caboose

Speed: 32 m. p. h.

Operation: Signal indications; interlocking

Tracks: Double; tangent; 0.48 percent
ascending grade eastward

Weather: Clear

Time: 2:22 a. m.

Casualties: 1 killed; 1 injured

Cause: Irregularities in surface and
alinement of movable center-point
crossing

INTERSTATE COMMERCE COMMISSION

INVESTIGATION NO. 3235

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

ERIE RAILROAD COMPANY
AND
NEW YORK CENTRAL RAILROAD COMPANY

April 29, 1949

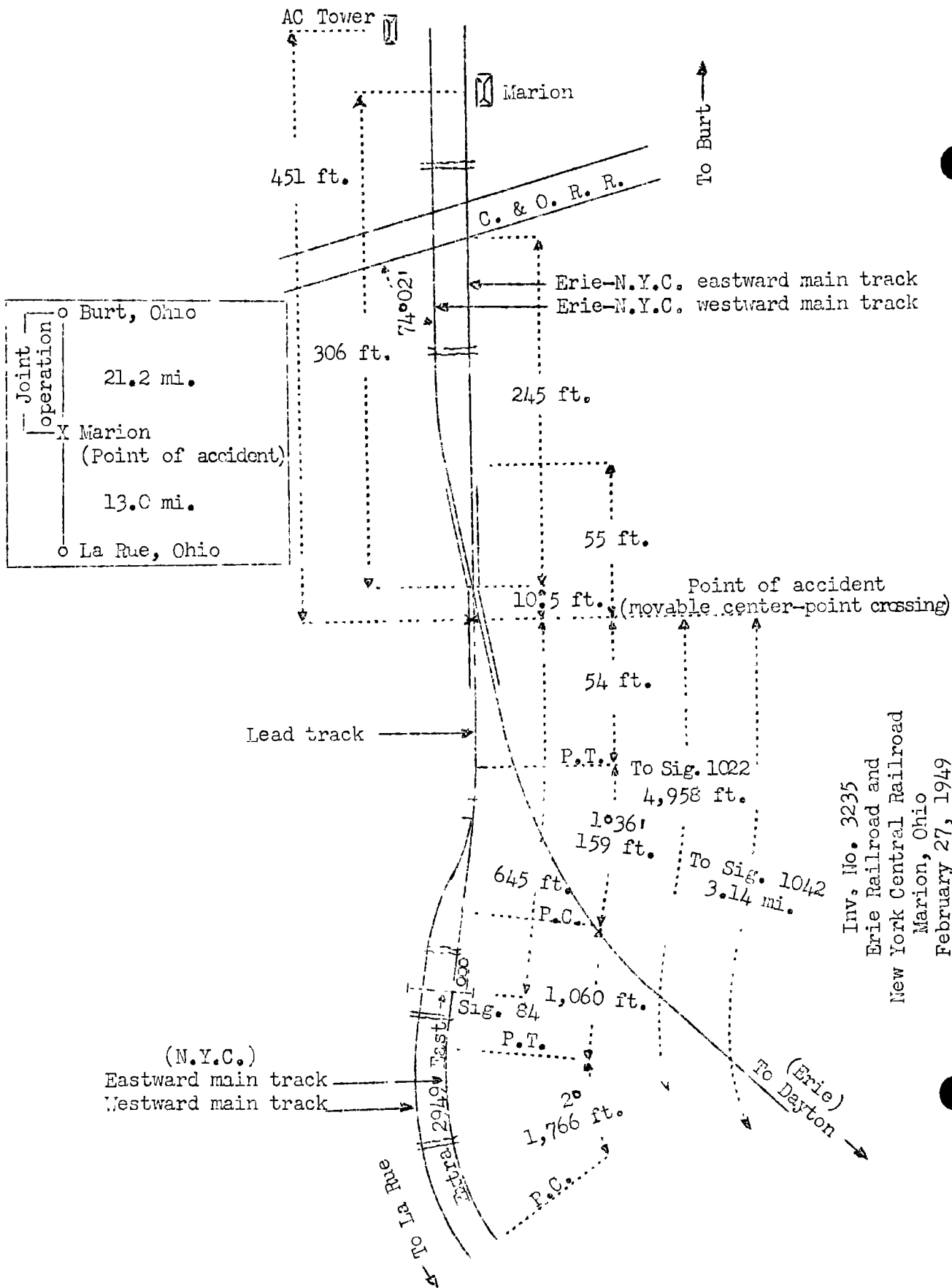
Accident at Marion, Ohio, on February 27, 1949, caused by
irregularities in the surface and alinement of a
movable center-point crossing.

REPORT OF THE COMMISSION¹

PATTERSON, Commissioner:

On February 27, 1949, there was a derailment of a New York Central freight train on a line operated jointly by the Erie Railroad and the New York Central Railroad at Marion, Ohio. This accident resulted in the death of one railway-express employee, and the injury of a maintenance-of-way employee off duty. The accident was investigated in conjunction with a representative of the Public Utilities Commission of Ohio.

¹
Under 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.



Inv. No. 3235
 Erie Railroad and
 New York Central Railroad
 Marion, Ohio
 February 27, 1949

Location of Accident and Method of Operation

This accident occurred on that part of a line operated jointly by the Erie Railroad and the New York Central Railroad extending between Marion and Burt, Ohio, 21.2 miles. In the vicinity of the point of accident this is a double-track line, over which trains moving with the current of traffic are operated by signal indications. The main tracks are designated from south to north as eastward and westward. Within interlocking limits and at a point 306 feet west of the station at Marion, a single-track line of the Erie and a single-track lead which connects a double-track line of the N.Y.C. with the eastward main track of the joint-track line converge at a double-slip movable center-point crossing. This crossing connects the lead track for through movements to the eastward main track of the Erie-N.Y.C. line, through movement from the Erie-N.Y.C. westward main track to the Erie single-track line, and diverging movements from the Erie line to the Erie-N.Y.C. eastward main track, and from the Erie-N.Y.C. westward main track to the lead track. The derailment occurred on that part of the crossing extending from the lead track to the Erie-N.Y.C. eastward main track at a point 10.5 feet west of the center of the movable-point crossing.

From the west on the double-track line of the N.Y.C. and thence on the lead track there are, in succession, a 2° curve to the right 1,766 feet in length, a tangent 1,060 feet, a 1°36' curve to the left 159 feet, then a tangent through the crossing 54 feet to the point of derailment and 55 feet beyond. The grade for east-bound trains on the N.Y.C. varies between 0.25 and 0.67 percent ascending throughout a distance of 1.71 miles west of the crossing, where it is 0.48 percent ascending.

A double-track line of the C. & O. R.R. crosses the Erie-N.Y.C. line at an angle of 74°02', at a point 245 feet east of the movable center-point crossing.

Immediately west of the crossing, the structure of the N.Y.C. eastward main track and the lead track consists of 127-pound rail, 39 feet in length, laid new during 1935, on an average of 24 treated ties to the rail length. It is fully tieplated with double-shoulder canted tie plates, spiked with 4 spikes per tie plate, provided with 6-hole 36-inch joint bars, and 8 rail anchors per rail length. It is ballasted with crushed stone to a depth of 12 inches below the ties. At the point of derailment the gage was 4 feet 8-1/2 inches, and the south rail was 3/8-inch higher than the north rail.

The crossing involved is a No 2 double-slip crossing having opposed pairs of movable center-points, and is laid on 34 treated switch ties, and can be lined for four routes. It is normally lined for movement from the N.Y.C. lead track to the Erie-N.Y.C. eastward main track. Its diagonal length along the axis between the points of the outer rigid-type frogs is 76 feet 1-3/4 inches. The angle of each frog is 7°09'10", and they are protected by guard rails. The structure of the crossing consists of 127-pound rail sections, four switch rails operating in unison at each end, and two opposed pairs of movable center-points in the center of the crossing. The switch rails are 16 feet 6 inches in length. The center-point rails are 10 feet 3-1/2 inches long, and are chamfered to fit the angles of their respective knuckle rails. The north and the south inner stock-rails of the crossing are knuckle rails 21 feet 6 inches long having knuckle angles of 7°09'10", and are reinforced on the outside of the knuckle angle by easer rails. Three reinforcing braces are located between the easer rail and the outside slip rail on each side. The north and the south outer slip rails are curved and braced. The inner slip rails are curved. The outer and the inner slip rails are 21 feet 4-7/8 inches long, and their mid-points are about opposite the center-points. The switch points are arranged for a throw of 4-3/4 inches, and the movable center-points are arranged for a throw of 4 inches. Each set of these points is maintained in proper relation and gage by three switch rods at each location. The switches and the movable center-points of the double-slip crossing are power operated and are controlled from the interlocking machine at AC Tower located 451 feet east of the point of accident.

Automatic signals 1042 and 1022, and semi-automatic interlocking signal 84 located, respectively, 3.14 miles, 4,958 feet, and 645 feet west of the point of accident, govern the movement of east-bound N.Y.C. trains moving on the N.Y.C. eastward main track, on the lead track, and entrance to the Erie-N.Y.C. eastward main track. These signals are of the color-light type, and are approach lighted. Their involved aspects and corresponding indications are as follows:

<u>Signal</u>	<u>Aspect</u>	<u>Indication</u>
1042) 1022)	Green-over- red, staggered	Proceed.
84	Green-over- red-over-red	Proceed.

The interlocking controlling the crossing involved in this accident is governed from an electro-mechanical machine installed in AC Tower. The machine is provided with 72 working levers in an 84-lever frame. Time and indication locking, electric switch locking, and mechanical lever locking are provided. The controlling circuits are so arranged that when the route is lined for through movement over the movable center-point crossing from the N.Y.C. eastward main track to the lead track, and then to the Erie-N.Y.C. eastward main track, when the block east of signal 84 is unoccupied, and when the switches and the movable points of the crossing are properly aligned and locked, signals 1042, 1022 and 84 indicate Proceed.

Timetable special instructions prescribe the maximum authorized speed for the train involved as 50 miles per hour and 30 miles per hour over rail-street grade crossings within the corporate limits of Marion.

Description of Accident

Extra 2949 East, an east-bound N.Y.C. freight train, consisting of engine 2949, 64 cars and a caboose, passed La Rue, the last open office, 13 miles west of Marion, at 2:05 a. m., passed signals 1042, 1022 and 84, which indicated Proceed, entered upon the movable center-point crossing at the entrance to the Erie-N.Y.C. eastward main track, and while it was moving at a speed of 32 miles per hour the front pair of wheels of the rear truck of the first car became derailed. These wheels continued in line with the track 255.2 feet to the C. & O. crossing, where the general derailment occurred.

The engine stopped on the eastward main track, with the front of the engine 868 feet east of the point of derailment. A separation occurred between the tender and the first car. The first car stopped upright, about 50 feet behind the tender and in line with the eastward main track. The front truck of this car remained on the rails, but the rear truck became detached from the car. The next four cars were derailed. They stopped in various positions across the eastward main track. The second and fourth cars were badly damaged, and the first, third and fifth cars were considerably damaged. The derailed cars damaged structures adjacent to the eastward main track and south of it, and the casualties resulted in or near these structures.

The weather was clear at the time of the accident, which occurred about 2:22 a. m.

W.& L.E. 23327, the first car of Extra 2949 East, is a box car of all-steel construction. It was built new in December, 1944. Its lightweight, capacity and load limit are, respectively, 45,300 pounds, 100,000 pounds, and 123,700 pounds. The height above the tops of the rails is 13 feet 1 inch, the outside width is 10 feet 5 inches, and the length over the pulling faces of the couplers is 43 feet 9-1/2 inches. The trucks were of 4-wheel design. They were provided with cast-steel sideframes, having integral journal-boxes, a cluster of double-coil truck springs and a snubber at each end of each bolster, 33-inch cast-iron wheels, and 5-1/2 by 10-inch journals. The wheelbase of each truck was 5.5 feet long, and the distance between truck centers was 30 feet 10 inches. The centerplates were cast integrally with the bolster, and were 12 inches in diameter. The body-bolster centerplate was 11-1/2 inches in diameter. The side-bearings were of the roller type. At the time of the accident this car was loaded with 11,700 pounds of merchandise.

The sideframes of the rear truck of W.& L.E. 23327 were manufactured October 19, 1944, and the wheels were cast during August, 1944. The last repacking of the journal boxes was completed December 31, 1947. No further shop records of this car were available. Apparently, the truck assembly was applied new to the car during December, 1944.

Discussion

Extra 2949 East was moving at a speed of 32 miles per hour, as indicated by the tape of the speed-recorder with which the engine was equipped, in territory where the maximum authorized speed was 50 miles per hour, when the front wheels of the rear truck of the first car were derailed to the left at a double-slip movable center-point crossing.

Prior to the time of the derailment, the engine and the cars were riding smoothly. Examination after the accident did not disclose any indication of defective equipment having existed prior to the derailment, or of any obstruction having been on the track. As this train was approaching Marion, the speed was about 49 miles per hour, and the enginemen and the front brakeman were in their accustomed locations in the cab and were maintaining a lookout. The other members of the train crew were in the caboose. The first that any of these employees were aware of anything being wrong was when the brakes became applied in emergency at the time of the general derailment. The brakes of this train had been tested and had functioned properly en route. Signals governing the movement

over the crossing indicated Proceed, and the members of the crew on the engine called the indications. The engineer said that when the engine was about 2 miles west of the crossing he eased off the throttle so that the speed of the train would be reduced on the ascending grade to comply with the speed restriction of 30 miles per hour over the street-rail crossings through Marion. The headlight was lighted. The engineer said that when the engine entered upon the movable center-point crossing it thrust laterally, then he opened the throttle to a heavier pulling position so that maximum authorized speed would be maintained on the ascending grade. When the engine reached a point about 245 feet east of the movable center-point crossing, the engine lurched, and the members of the crew who were on the engine felt the brakes become applied in emergency.

Examination after the accident disclosed no evidence on the track structure of dragging equipment west of the point of derailment. Examination of the equipment after the accident disclosed that the first car, W.& L.E. 23327, apparently was the first to be derailed, and that the front pair of wheels of the rear truck was the only pair of wheels derailed at the movable center-point crossing. The front truck was in place under the car, in good condition, and its wheels remained on the rails. The rear end of this car stopped 350 feet east of the most westerly rail of the C.& O. crossing. The rear truck became dislodged and stopped adjacent to the C.& O. crossing. When this truck struck the rails and frogs of the C.& O. crossing, the left rear wheel was broken into two pieces. The front pair of wheels was found 18 feet east of the C.& O. crossing. As a result of the derailment the right wheel on this axle had a piece of flange about 4 inches long broken out. The rear pair of wheels of this truck was considerably battered, and a piece was chipped from the flange of the left rear wheel. Both pairs of wheels were free from the remainder of the truck, which was practically dismembered. The center pin and the truck sideframes were bent. All breaks were new, and, except for a small piece of broken flange, all broken parts were found in the ballast adjacent to the truck sideframes. Because of damage, the concentricity or unbalanced condition of these wheels could not be determined. As indicated by wear spots on the column guides of the sideframes, both ends of the truck bolster moved freely and proportionately to proper spring deflection. The side bearings bore no evidence of improper clearance, or of having been in continuous contact. The male centerplates of each body bolster mated properly with the female centerplates of each truck bolster,

and there was no indication of binding or excessive wear. After repairs to the rear truck were completed, it was applied to the west, or A, end of the car. Measurements disclosed that the center of each coupler was 34 inches above the plane of the tops of the rails. The coil springs were 5-7/26-inch by 8-1/4-inch, and they compressed 1/4-inch at all spring locations. Both truck bolsters moved freely in the column guides. The centerplates fitted, with 1/4-inch clearance to a depth of 1-1/2 inches. The side-bearing clearances varied between 1/8-inch and 1/4-inch. The lading was evenly distributed at each end of the car, and consisted of packaged merchandise at the front, or B, end, properly secured by bulkheads, and a water column, with related attachments at the rear end. The water column was sufficiently blocked to prevent shifting.

Examination of the tracks, the switches and the movable center-point crossing immediately after the accident disclosed that the route was properly lined for through movement from the lead track to the Erie-N.Y.C. eastward main track, and that all switches and center-points were in proper relation and were locked. The first mark of derailment was a flange mark on the top surface of the north knuckle rail at a point 3 inches east of the heel of the switch rail, 10.5 feet west of the center of the crossing, and 3/4-inch outward from the gage side of the rail. This mark extended diagonally outward and eastward 4 feet 11-3/4 inches to the point where the wheel dropped outside the knuckle rail. At a point 2 feet eastward a companion mark appeared on bolts between the south curved rail and the south trailing movable-point rail. Then marks appeared intermittently on braces and plates outside the north knuckle rail and between the south curved rail and the south facing movable-point rails. The heel brace at the east end of the south facing movable-point rail was broken, and 17 inches east of this break a wheel mark crossed the top of the adjoining rail diagonally outward and dropped outside the rail in a distance of 7 inches. Eastward from the east end of the double-slip movable center-point crossing, single flange marks appeared north of the north rail and inside the south rail of the Erie-N.Y.C. eastward main track a distance of 217 feet to the most westerly rail of the C. & O. crossing. At the point of derailment the specified gage was 4 feet 8-1/2 inches, and there was no specified difference in the crosslevel. Measurements of the track taken throughout a distance of 105 feet immediately west of the point of derailment disclosed that the gage varied between 4 feet 8-1/2 inches and 4 feet 9-1/4 inches. The greatest variation in gage was 3/4-inch between two adjacent stations located 15 feet and 17 feet

west of the point of derailment. The crosslevels indicated that the south rail varied between 1/2-inch low and 3/8-inch high. The greatest variation in crosslevels, 7/8 inch, was between the point of derailment and a point 27 feet west thereof. These points were, respectively, 3/8 inch high and 1/2 inch low. Between stations 3 feet and 33 feet east of the point of derailment, the south rail varied between 3/8-inch high and 1/4 inch low. At the point of derailment the north rail had a permanent set downward and the south rail had freedom of vertical movement. In addition, all joint-bar bolts and rail braces were loose. Joint-bar bolts varied between 1/2-inch to 3/4-inch loose horizontally, and were considerably worn vertically. Rail holding spikes had been raised to about 3/4 inch above the base of the rails, and there was considerable deflection of track under the movement of engines and cars. The double-slip movable center-point crossing was surfaced during December, 1948, was inspected and spot surfaced February 23, 1949, and was last inspected by a signal maintainer on February 26, 1949. The supervisor of track of the Erie Railroad said that in his opinion the crossing was safe for normal operation, and said that 1/4-inch movement of joint-bar bolts is permissible.

Considering the irregularities in both the gage and the crosslevels of the track, that the car in question was lightly loaded, that the bolsters and centerplates moved freely, that the steel body of the car was rigid, together with the marks of derailment, it is apparent that the spring-borne weight of the car was momentarily shifted to the left front side bearing and the right rear side bearing when the car was moving over the center of the crossing. The torsional twist resulting from this momentary shifting of weight combined with the lateral movement and the rolling of the car resulting from irregularities in alinement and surface of the track caused the left front wheel of the rear truck to mount the rail.

Cause

It is found that this accident was caused by irregularities in the surface and alinement of a movable center-point crossing.

Dated at Washington, D. C., this twenty-ninth day of April, 1949.

By the Commission, Commissioner Patterson.

(SEAL)

W. P. BARTEL,
Secretary.