

INTERSTATE COMMERCE COMMISSION
WASHINGTON

INVESTIGATION NO. 2811
THE ATCHISON, TOPEKA & SANTA FE RAILWAY COMPANY
REPORT IN RE ACCIDENT
NEAR MAINE, ARIZ., ON
JULY 3, 1944

SUMMARY

Railroad: Atchison, Topeka & Santa Fe
Date: July 3, 1944
Location: Maine, Ariz.
Kind of accident: Derailment
Train involved: Passenger
Train number: 19
Engine number: 3774
Consist: 14 cars
Estimated speed: In excess of 70 m. p. n.
Operation: Automatic block-signal system
Track: Double; 4°45' curve; 1.1333 percent descending grade westward
Weather: Clear
Time: About 11:33 p. m.
Casualties: 4 killed; 126 injured
Cause: Excessive speed on curve, as a result of failure of the railroad to provide adequate safeguards to prevent excessive speed on curves

INTERSTATE COMMERCE COMMISSION

INVESTIGATION NO. 2811

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

THE ATCHISON, TOPEKA & SANTA FE RAILWAY COMPANY

August 19, 1944.

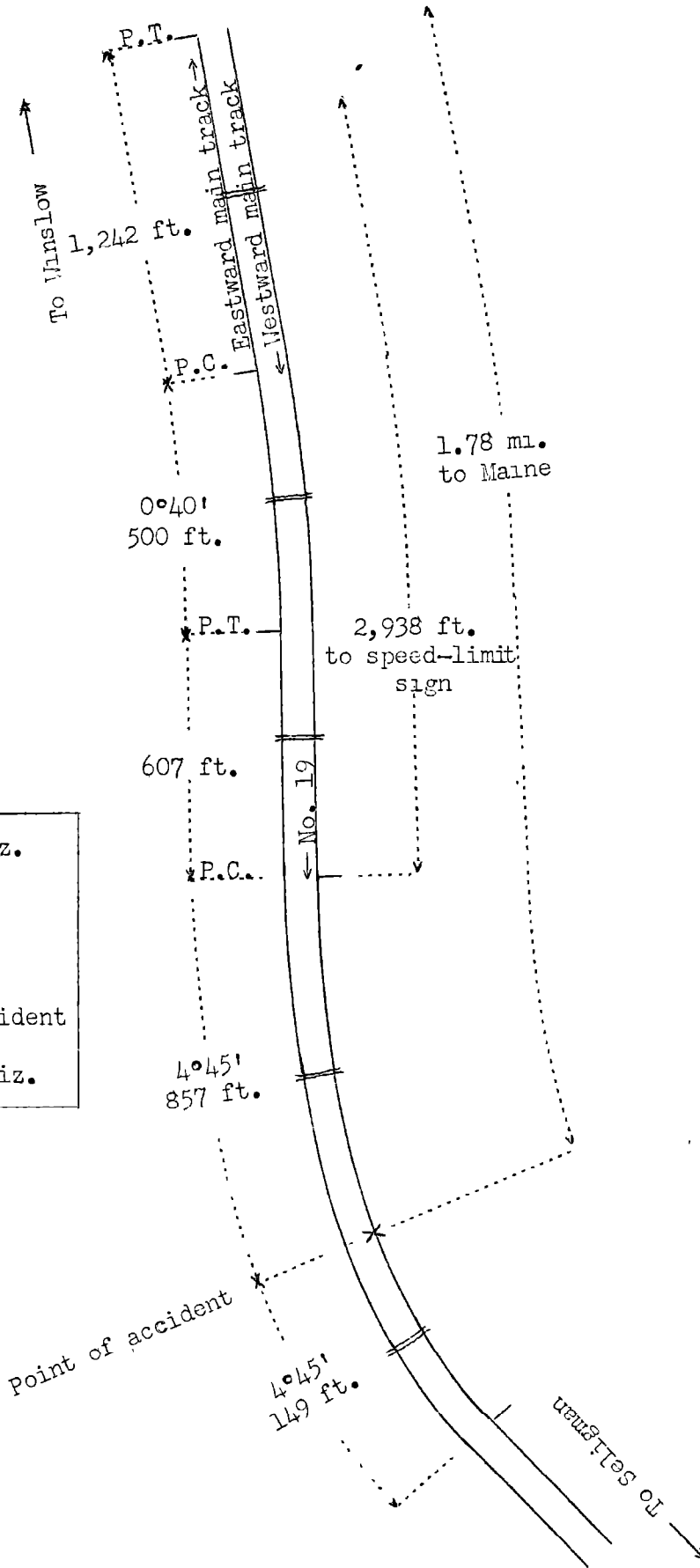
Accident near Maine, Ariz., on July 3, 1944, caused by excessive speed on a curve, as a result of the failure of the railroad to provide adequate safeguards to prevent excessive speed on curves.

REPORT OF THE COMMISSION¹

PATTERSON, Chairman:

On July 3, 1944, there was a derailment of a passenger train on the Atchison, Topeka & Santa Fe Railway near Maine, Ariz., which resulted in the death of 3 passengers and 1 train-service employee, and the injury of 113 passengers, 2 dining-car employees, 8 Pullman employees and 3 train-service employees. This accident was investigated in conjunction with representatives of the Arizona Corporation Commission.

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



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|---|-------------------|-----------|
| ○ | Winslow, Ariz. | 70.60 mi. |
| ○ | Bellefont | 6.00 mi. |
| ○ | Maine | 1.78 mi. |
| X | Point of accident | 64.32 mi. |
| ○ | Seligman, Ariz. | |

Inv-2811
 Atchison, Topeka & Santa Fe Railway
 Maine, Ariz.
 July 3, 1944

Location of Accident and Method of Operation

This accident occurred on that part of the Albuquerque Division extending westward from Winslow to Seligman, Ariz., 142.7 miles. In the vicinity of the point of accident this was a double-track line over which trains moving with the current of traffic were operated by an automatic block-signal system, the indications of which superseded time-table superiority. The current of traffic was to the left. The accident occurred on the westward main track 78.38 miles west of Winslow, at a point 1.78 miles west of the station at Maine. From the east there were, in succession, a tangent 1,242 feet in length, a $0^{\circ}40'$ curve to the right 500 feet, a tangent 607 feet and a $4^{\circ}45'$ curve to the left 857 feet to the point of accident and 149 feet beyond. The grade for west-bound trains varied between 0.40 percent and 1.86 percent descending about 1.57 miles to the point of accident, and was 1.1333 percent descending at that point.

On the curve the track structure consisted of 131-pound rail, 39 feet in length, laid new in May, 1944, on 25 treated hardwood ties to the rail length. It was fully tieplated, double-spiked, provided with 7 rail anchors per rail length, and was ballasted with volcanic cinders to a depth of 10 inches. The maximum superelevation was 5-1/4 inches and the gage varied between 4 feet 8-3/8 inches and 4 feet 8-5/8 inches. At the point of accident the superelevation was 2-3/8 inches and the gage was 4 feet 8-1/2 inches.

Special time-table rules read in part as follows:

7. Rule 10 (A): * * *

Permanent slow boards, painted yellow with black numerals, will be located not less than 2500 feet in advance of locations where speed of trains must be permanently reduced. The numerals thereon nearest the track indicate the maximum speed for passenger trains and on the field side the maximum speed for freight trains.

Indicated speeds must not be exceeded until rear of train has passed a permanent resume speed board painted green. There may be more than one yellow board in advance of a green board, in which case the reduced speed shown on each yellow board must be observed in succession until the rear of train has passed the green board.

The maximum authorized speed on the curve was 55 miles per hour. A speed-limit sign 15 by 36 inches, bearing the numerals "40-55," was located 2,938 feet east of the east end of the curve and 10.8 feet south of the south rail of the westward main track. The numerals were 10 inches high, in black, and on a yellow background. The approximate locations of speed-limit signs were indicated in bulletin instructions. On tangent track the maximum authorized speed was 90 miles per hour.

Description of Accident

No. 19, a west-bound first-class passenger train, consisted of engine 3774, a 4-8-4 type, three mail cars, one club-baggage car, four Pullman sleeping cars, one lounge car, one dining car and four Pullman sleeping cars, in the order named. This train departed from Winslow at 9:35 p. m., 25 minutes late, passed Bellemont, 6.0 miles east of Maine and the last open office, about 11:28 p. m., 37 minutes late, and while it was moving at a speed estimated to have been in excess of 70 miles per hour the engine and the first 12 cars were derailed.

The engine and tender were derailed to the right, and stopped on their right sides, across the main tracks and at an angle of about 15 degrees to them, with the front end of the engine about 585 feet west of the point of derailment. The first four cars stopped practically upright and south of the main track, with the front end of the first car about 200 feet west of the engine. The fifth car stopped against the tender. These cars were not telescoped but were badly damaged when they came into contact with the engine and tender. The third, fourth and fifth cars were considered to be damaged beyond repair. The sixth to twelfth cars, inclusive, stopped practically upright and in various positions across the tracks. The sixth, seventh, eighth and ninth cars were badly damaged, and the tenth and eleventh were slightly damaged.

The first, third, fourth, ninth and tenth cars were of stainless-steel construction, and were streamlined. The second was of conventional carbon-steel construction. The fifth, sixth, seventh, eighth, eleventh, twelfth, thirteenth and fourteenth cars were of alloy steel, and were streamlined. The first, third, fourth, ninth and tenth cars had type E controlled-slack couplers, the second car had type D couplers, and the fifth, sixth, seventh, eighth, eleventh, twelfth, thirteenth and fourteenth cars had tight-lock couplers. The shank of the front coupler of the sixth car, the shanks of both couplers of the seventh car, and the shank of the rear coupler of the eighth car were broken during the derailment.

It was clear at the time of the accident, which occurred about 11:33 p. m.

The fireman was killed. The engineer, the conductor and the front brakeman were injured.

The total weight of engine 3774 in working order was 499,600 pounds, distributed as follows: Engine truck, 90,480 pounds; driving wheels, 286,890 pounds; and trailer truck, 122,230 pounds. The diameters of the engine-truck wheels, driving wheels and trailer-truck wheels, were, respectively, 37 inches, 80 inches and 40 inches. The tender was rectangular in shape and equipped with two 6-wheel trucks. Its weight when loaded was 396,246 pounds. The rigid wheelbase of the engine was 13 feet 10 inches long. The total length of the engine and tender was 112 feet 1-1/4 inches. The center of gravity was about 83 inches above the tops of the rails.

The engine was equipped with a speed recorder but it was not operative for the reason that the magneto of the assembly was defective. A witness for the railroad stated that the railroad had been unable to procure magnetos because of war conditions.

Discussion

No. 19 was moving on a 4°45' curve to the left when the engine and the first 12 cars were derailed. The engine overturned and stopped 585 feet beyond the point of derailment. The maximum authorized speed on the tangent immediately east of this curve was 90 miles per hour and on the curve it was 55 miles per hour. As the train was approaching the point where the accident occurred the members of the train crew were in various locations throughout the cars of the train. The cars had been riding smoothly, and the first these employees knew of anything being wrong was when the derailment occurred. They were unable to give an accurate estimate of the speed of the train, or to give definite information as to whether an application of the brakes was made immediately prior to the accident. An employee of the railroad, who was looking to the west from an open door on the left side of the first car as the train was moving on the curve, estimated the speed as being in excess of 70 miles per hour. He was not aware of anything being wrong until just prior to the accident, when he observed the engine suddenly lurch to the right, then the derailment occurred. It could not be determined when the enginemen first became aware of anything being wrong, as the fireman was killed in the accident and the engineer was so critically injured that he was unable to make a statement at the time of the investigation.

Apparently the speed was not reduced when the train was approaching the curve, as no member of the train crew felt an application of the brakes. The speed recorder was not operative, the engineer could not see the speed-limit sign after the engine was within 300 feet of the sign, and the bulletin covering the approximate locations of speed-limit signs was posted on bulletin boards but engineers were not provided with copies of bulletins. Under these conditions compliance with the prescribed speed restriction was dependent upon the engineer's knowledge of the physical characteristics of the track and his ability to see the speed-limit sign about 11 feet to the left of the track and several hundred feet in advance of his train which was running at high speed.

Except for the inoperative speed recorder, there was no defective condition of the engine prior to the accident. There was no indication of dragging equipment, defective track, or of any obstruction having been on the track. The brakes had been tested and had functioned properly en route. Because of damage to the engine, the position of the throttle, the reverse lever and the brake valves at the time of the accident could not be determined. There was no condition found that would prevent the proper application of the train brakes.

The first mark of derailment was 5 inches outside the base of the high rail. Although the first mark was on the leaving portion of the curve, the curve was only approximately 1,000 feet in length and in view of the speed of the train the overturning process started as the train entered the curve or on the portion having the maximum curvature. Apparently the first mark on the track structure was made by the outer edge of the tread of a wheel which was canted outward. A short distance beyond this the ballast between the two main tracks was gouged to a depth of 8 inches below the bottoms of the ties, and it was apparent that the right cylinder gouged the ballast after the engine overturned and was sliding on its right side.

According to A. R. E. A. tables, the overturning speed on the curve for engine 3774 was about 92 miles per hour. No one definitely estimated the speed to be that high. Based upon the passing time at the last reporting station and the time the telephone and telegraph lines were knocked down during the accident, the average speed throughout 7.78 miles immediately east of the point of derailment was approximately 93 miles per hour. It is evident that the train was moving at overturning speed, as the engine overturned to the outside of the curve without marking the rails, and slid on its right side to the point where it stopped. On the curve the alinement varied from $4^{\circ}45'$ to $3^{\circ}50'$ and then to $4^{\circ}30'$ within a distance of 62 feet just east of the point of derailment. Between adjacent stations 31 feet apart the greatest variation in both surface and gage was $1/4$ inch. These variations in curvature, surface and gage would tend to cause the engine to overturn at a speed somewhat less than 92 miles per hour.

Cause

It is found that this accident was caused by excessive speed on a curve, as a result of the failure of the railroad to provide adequate safeguards to prevent excessive speed on curves.

Dated at Washington, D. C., this nineteenth day of August, 1944.

By the Commission, Chairman Patterson.

(SEAL)

W. P. BARTEL,
Secretary.