

INTERSTATE COMMERCE COMMISSION
WASHINGTON

INVESTIGATION NO. 2978
THE ATCHISON, TOPEKA AND SANTA FE
RAILWAY COMPANY

REPORT IN RE ACCIDENT

AT MELVERN, KANS., ON

MARCH 11, 1946

SUMMARY

Railroad: Atchison, Topeka and Santa Fe
Date: March 11, 1946
Location: Melvern, Kans.
Kind of accident: Derailment
Train involved: Baggage-mail-express
Train number: Second 20
Engine number: 1313
Consist: 8 cars
Estimated speed: In excess of 90 m. p. h.
Operation: Signal indications
Track: Double; 4°10' curve; 1.03 percent descending grade eastward
Weather: Clear
Time: 4:03 a. m.
Casualties: 2 killed; 3 injured
Cause: Excessive speed on curve

INTERSTATE COMMERCE COMMISSION

INVESTIGATION NO. 2978

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

THE ATCHISON, TOPEKA AND SANTA FE RAILWAY COMPANY

April 22, 1946.

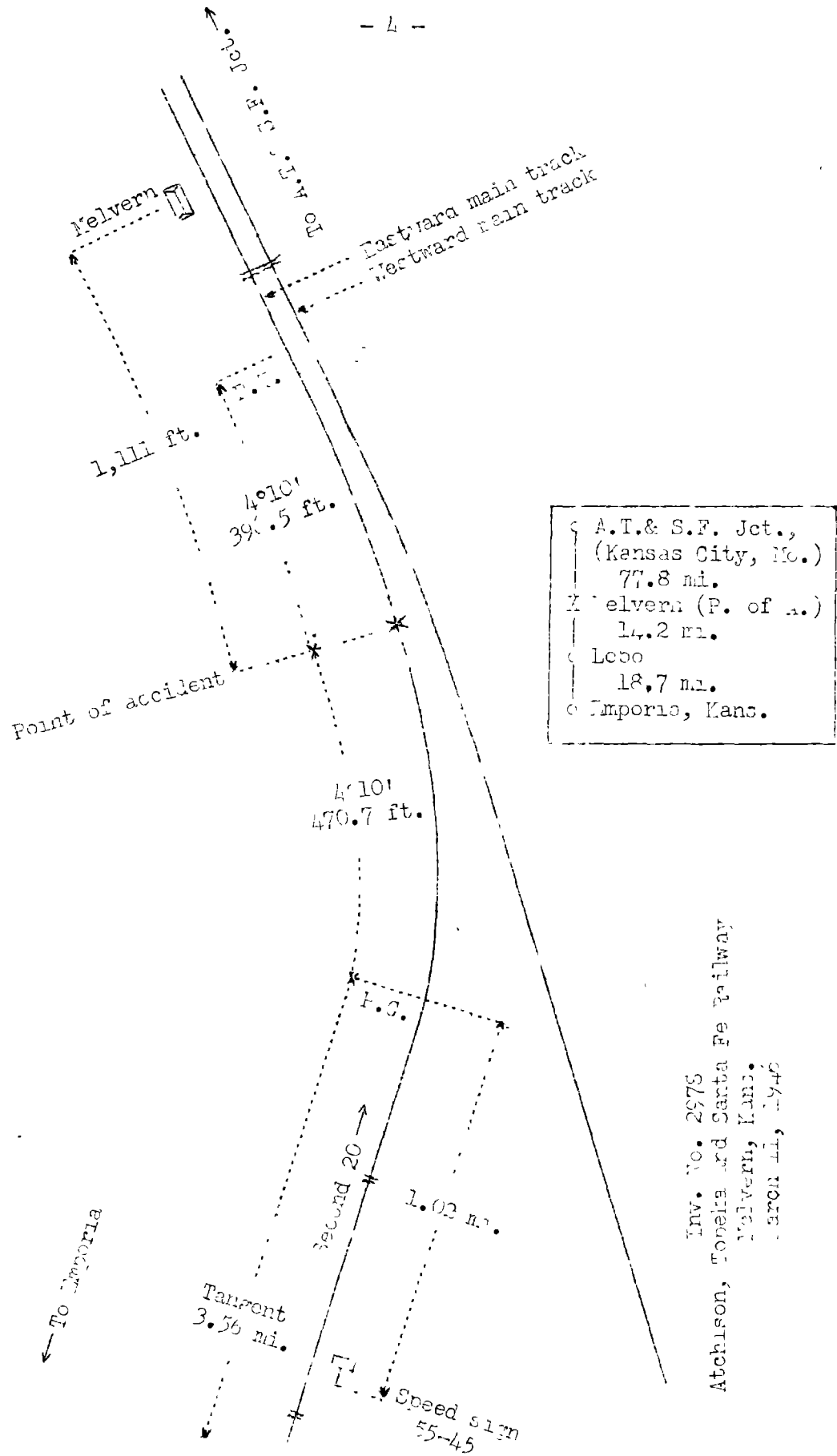
Accident at Melvern, Kans., on March 11, 1946, caused by
excessive speed on a curve.

REPORT OF THE COMMISSION¹

PATTERSON, Commissioner:

On March 11, 1946, there was a derailment of a baggage-mail-express train on the Atchison, Topeka and Santa Fe Railway at Melvern, Kans., which resulted in the death of two train-service employees, and the injury of one express messenger and two train-service employees.

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	A.T. & S.F. Jct., (Kansas City, Mo.)	77.8 mi.
o	Melvern (P. of A.)	14.2 mi.
o	Lobo	18.7 mi.
o	Emporia, Kans.	18.7 mi.

Inv. No. 2975
 Atchison, Topeka and Santa Fe Railway
 Melvern, Kans.
 March 11, 1946

Location of Accident and Method of Operation

This accident occurred on that part of the Eastern Division extending between Emporia and A.T.& S.F. Jct., near Kansas City, Mo., 110.7 miles, a double-track line in the vicinity of the point of accident, over which trains moving with the current of traffic are operated by signal indications. The current of traffic is to the left. The accident occurred on the eastward main track at Melvern, 32.9 miles east of Emporia, at a point 1,111 feet west of the station. From the west on the eastward main track there is a tangent 3.56 miles in length, which is followed by a 4°10' curve to the left 470.7 feet to the point of derailment and 396.5 feet eastward. The grade for east-bound trains varies between 0.40 percent and 0.70 percent descending 1.67 miles, then it is 1.03 percent descending 1,247 feet to the point of accident and 551 feet eastward. In the immediate vicinity of the point of accident, the distance between the centers of the eastward and westward main tracks is 25 feet, and the eastward main track is 4.16 feet higher than the westward main track.

On the curve on which the accident occurred, the track structure consists of 131-pound rail, 39 feet in length, laid new in February, 1945, on 24 treated ties to the rail length. It is fully tieplated with double-shoulder canted tieplates, spiked with 4 spikes per tieplate, provided with 4-hole angle bars and an average of 10 rail anchors per rail length, and is ballasted with crushed stone to a depth of 12 inches. The maximum superelevation on the curve was 8-1/3 inches, and the gage varied between 4 feet 8-1/8 inches and 4 feet 8-3/4 inches. At the point of derailment the superelevation was 4-11/16 inches, and the gage was 4 feet 2-3/8 inches.

Time-table special instructions prescribe the maximum authorized speed for the train involved as 90 miles per hour on tangent track and 55 miles per hour on the curve on which the derailment occurred. A rectangular speed-limit sign, 16 inches by 36 inches and bearing the numerals 55-45 in black on a yellow background, is located 7.5 feet south of the south rail of the eastward main track at a point 1.02 miles west of the west end of the curve.

Description of Accident

Second 20, an east-bound first-class baggage-mail-express train, consisted of engine 1313, five baggage cars, one coach, one express-refrigerator car and one coach, in the order named. The second, third and seventh cars were of steel-underframe construction, and the remainder were of all-steel construction. This train passed Lebo, the last open office, 14.2 miles west of Melvern, at 3:56 a. m., 1 hour 41 minutes late, and while it was moving at a speed estimated to have been in excess of 90 miles per hour the engine, the first seven cars and the front truck of the eighth car were derailed.

The engine stopped on its right side against the wall of a cut, about 28 feet south of the eastward main track and practically parallel to it, with the front end 408 feet east of the point of derailment. The tender was torn loose from the engine, and stopped in reverse direction on its left side and against the engine. Separations occurred between all cars of the train. The first to third cars, inclusive, stopped in a general tangential line, with the front end of the first car 193 feet east of the engine and about 35 feet south of the eastward main track. The first and second cars leaned against the wall of the cut. The third car remained upright. The fourth car telescoped the tender and leaned to the south at an angle of about 45 degrees. The fifth and sixth cars stopped on their right sides, at the rear of the fourth car and about 20 feet south of the eastward main track. The seventh car stopped upright, 148 feet east of the point of derailment and 14 feet south of the eastward main track. The second car was demolished. The engine and the first, third and fourth cars were badly damaged. The rear four cars were slightly damaged.

The weather was clear at the time of the accident, which occurred about 4:08 a. m.

The engineer and the fireman were killed. The conductor and the flagman were injured.

Engine 1313 is of the 4-6-2 type. The total weight of the engine in working order is 277,000 pounds, distributed as follows: Engine truck, 55,500 pounds; driving wheels, 167,500 pounds; and trailer truck, 54,000 pounds. The specified diameters of the engine-truck wheels, the driving wheels, and the trailer-truck wheels are, respectively, 33 inches, 73 inches and 50 inches. The rigid wheelbase of the engine is 13 feet 8 inches long, the total length of the engine wheelbase is 35 feet 1 inch, and the total length of the engine and tender is 77 feet 2-15/16 inches. The tender is rectangular in shape and is equipped with two 4-wheel trucks. Its capacity is 9,000 gallons of water and 3,129 gallons of fuel oil. The weight of the tender loaded is 135,400 pounds. The center of gravity of the engine is 76 inches above the tops of the rails. The center of gravity of the tender, with the calculated amount of water and fuel oil at the time of the accident, was estimated as 69-5/8 inches above the tops of the rails. The engine is provided with No. 6-ET brake equipment, and the regulating devices were adjusted for brake-pipe pressure of 110 pounds and main-reservoir pressure of 130 pounds. The last quarterly engine repairs were completed and the last monthly certificate was issued on February 20, 1946. The last trip-inspection and repairs were made at La Junta, Colo., 461.9 miles west of Melvern, at 5:20 a. m., March 10, 1946.

Discussion

Second 20 was moving on a 4°10' curve to the left when it was derailed. The engine overturned to the right and stopped on its right side 408 feet beyond the point of derailment. The maximum authorized speed for this train on the tangent immediately west of this curve was 90 miles per hour and on the curve it was 55 miles per hour.

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. Because of damage to the interior of the engine cab, the position of the reverse lever, the throttle 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.

As the train was approaching the point where the derailment occurred, the conductor and the flagman, and a brakeman who was off duty, were in the rear car. These employees said that this car had been riding smoothly prior to the accident, and the first they were aware of anything being wrong was when the brakes became applied in emergency immediately prior to the derailment. They were unable to give an accurate estimate of the speed of the train, or to give definite information as to whether a service application of the brakes was made immediately prior to the time the brakes were applied in emergency. The brakes of this train had been tested and had functioned properly en route. The engineer and the fireman were killed in the accident.

The surface, alinement and gage of the track on the curve were well maintained for the maximum authorized speed of 55 miles per hour. Examination of the track after the accident disclosed that the inside spikes of the high rail had been forced upward throughout a distance of about 100 feet immediately east of the west end of the curve, then the track was undisturbed about 100 feet. Beginning at a point 73 feet west of the point of derailment the inside spikes of the high rail had been forced upward sufficiently for the base of the rail to roll free of the spike heads at the point of derailment. The succeeding high rails were twisted outward and were pushed off the ends of the ties throughout a distance of 45 feet. There were no marks on the ties to indicate that the engine had marked the track structure either between the rails or on the rails. However, there were numerous flange marks on the ties from the point of derailment eastward as a result of the derailment of the cars. The first marks identified with engine 1313 were portions of the jacket of the boiler, which had been torn off by contact with the westward main track, at a point 100 feet east of the point of derailment and 32 feet south of the eastward main track.

The division engineer said that the theoretical overturning speed on the curve for engine 1313 was 98 miles per hour. The estimated overturning speed for the tender, with the amount of fuel oil and water it was calculated to have had at the time of the accident, was 101 miles per hour. The drawbar and the safety-bars between the engine and the tender were twisted, at the engine end, about 90 degrees to the right, which condition indicated that the engine was the first unit to be overturned. The first indication that the tender had slid on its side was found 13 feet eastward from the first mark made by the engine.

The road foreman of engines said that it is customary to operate engines, of the same class as engine 1313 on the descending grade in the territory involved, with a heavy drifting throttle. In his opinion, no application of the brakes was made by the engineer when Second 20 was moving on the descending grade and, as a result, the speed was in excess of 90 miles per hour when the engine entered the curve. The engine was not equipped with a speedometer.

The marks of derailment indicate that the engine was moving at slightly less than the theoretical absolute overturning speed when it entered the curve. The canted condition of the high rail at the west end of the curve indicates that when the engine entered the curve it thrust heavily against the high rail, leaned considerably outward and almost overturned at that point. Following this, it thrust against the low rail and then rebounded outward where the high rail again was canted outward, and then the engine overturned.

Cause

It is found that this accident was caused by excessive speed on a curve.

Dated at Washington, D. C., this twenty-second day of April, 1946.

By the Commission, Commissioner Patterson.

(SEAL)

W. P. BARTEL,
Secretary.