INTERSTATE COMMERCE COMMISSION

WASHINGTON

INVESTIGATION NO. 2525

THE ATCHISON, TOPEKA & SANTA FE RAILWAY COMPANY

REPORT IN RE ACCIDENT

AT BUCHANAN, N. MEX., ON

SEPTEMBER 19, 1941

SUMMARY

Railroad:	Atchison, Topeka & Santa Fe
Date:	September 19, 1941
Location:	Buchanan, N. Mex.
Kind of accident:	Derailment
Train involved:	Freight
Train number:	Extra 5004 East
Engine number:	5004
Consist:	102 cars, caboose
Estimated speed:	45-50 m. p. h.
Operation:	Timetable, train orders and automatic block-signal system
Track:	Single; 2° right curve; 0.544 percent descending grade eastward
Weather:	Cloudy
Time:	8:30 p. m.
Casualties:	2 killed; 1 injured
Cause:	Accident caused by rock being on high rail of curve

INTERSTATE COMMERCE COMMISSION

INVESTIGATION NO. 2525

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

THE ATCHISON, TOPEKA & SANTA FE RAILWAY COMPANY

November 10, 1941.

Accident at Buchanan, N. Mex., on September 19, 1941, caused by a rock being on high rail of curve.

REPORT OF THE COMMISSION[1]

PATTERSON, Commissioner:

On September 19, 1941, there was a derailment of a freight train on the Atchison, Topeka & Santa Fe Railway at Buchanan, N. Mex., which resulted in the death of two trespassers and the injury of one employee. This accident was investigated in conjunction with a representative of the State Corporation Commission of New Mexico.

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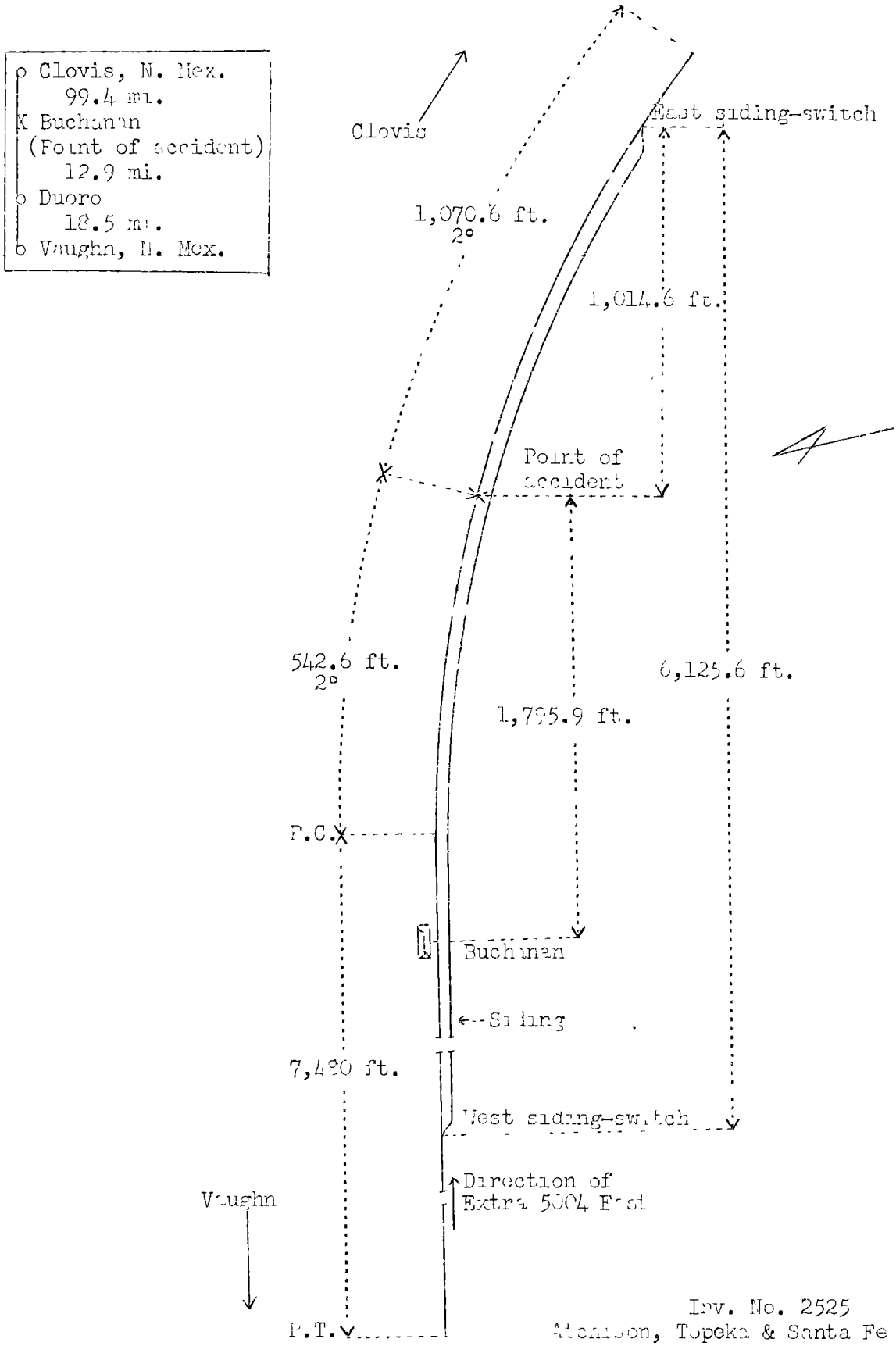
[1]Under authority of section 17 (2) of the Interstate Commerce Act the above-entitled proceeding was referred by the Commission to Commissioner Patterson for consideration and disposition.



Inv. No. 2525
Atchison, Topeka & Santa Fe Railway,
Buchanan, N. Mex.,
September 19, 1941.

Location of Accident and Method of Operation

This accident occurred on that part of the Pecos Division designated as the First District, which extends between Clovis and Vaughn, N. Mex., a distance of 130.8 miles. In the vicinity of the point of accident this is a single-track line over which trains are operated by timetable, train orders and an automatic block-signal system. At Buchanan a siding 6,125.6 feet in length parallels the main track on the south. The east siding-switch is 2,810.5 feet east of the station. At a point 1,795.7 feet east of the station and 1,014.6 feet west of the east siding-switch, a secondary highway crosses the railroad at grade. The derailment occurred on the main track at a point 29.7 feet east of the center-line of the crossing. As the point of accident is approached from the west there are, in succession, a tangent 7,420 feet in length, and a 2° curve to the right 542.6 feet to the point of derailment and 1,070.6 feet beyond. The grade for east-bound trains varies between 0.295 percent and 0.544 percent descending a distance of about 1 mile and is 0.544 percent at the point of accident.

On the curve involved the track structure consists of 112-pound rail, 39 feet in length, laid in 1936 on 24 treated ties to the rail length; it is fully tieplated, single-spiked, provided with 9 rail anchors to the rail length, equipped with 4-hole angle bars and ballasted with crushed stone to a depth of 10 inches, and is well maintained. The maximum superelevation was 4-5/8 inches and the gage varied between 4 feet 8-3/8 inches and 4 feet 8-5/8 inches. The superelevation at the point of derailment was 4-1/4 inches.

Between the highway grade crossing and the east siding-switch the main track is laid on a fill about 3 feet in height.

The crossing involved is 16 feet in width and is of solid plank construction. Flangeways 2 inches in width are provided inside each rail and are maintained by flangeway filler blocks of wood. Outside each rail are 2 planks 10 inches wide and 4 inches thick. The tops of the planks are 1/2 inch below the tops of the rails. All planks are beveled at the ends.

In the vicinity of the point of accident the maximum authorized speed for freight trains is 50 miles per hour.

Description of Accident

Extra 5004 East, an east-bound freight train, consisted of engine 5004, of the 2-10-4 type, 61 loaded and 41 empty cars and a caboose. At Vaughn, 31.4 miles west of Buchanan, a terminal air-brake test was made and the brakes functioned prop-

erly en route. This train departed from Vaughn at 7:40 p. m., according to the dispatcher's record of movement of trains, and passed Duoro, 12.9 miles west of Buchanan and the last open office, at 8:13 p. m. While the train was moving on a 2° curve to the right at an estimated speed of 45 or 50 miles per hour, the engine truck was derailed to the left.

The engine was in good mechanical condition and there was no indication of defective track or of dragging equipment. The specified curvature was 2° and the specified superelevation was 4 inches. At the point of derailment the curvature was 2°06' and the superelevation was 4-1/4 inches. The first mark on the track structure was a flange mark on the inside edge of the head of the high rail at a point 2 feet west of the center-line of the crossing. This flange mark extended diagonally eastward and outward. At a point 29.9 feet farther east it dropped to the outside of the rail. At a point 4.2 feet farther east a spike head was marked, and succeeding spike heads throughout a distance of 4.7 feet were marked. The next mark was on the top of a tie 9.6 feet farther east; then, throughout a distance of 889.6 feet, tieplates and spikes were marked. At a point 28.6 feet east of the first mark on the high rail there was a wheel mark on an angle bar inside the low rail. From this point eastward the tops of all ties were marked from 7 to 10 inches inside the gage side of the low rail throughout a distance of 911 feet. These marks indicated that only one pair of wheels was derailed at the crossing and these wheels continued in line with the rails until they encountered the frog of the east siding-switch and then the general derailment occurred. The switch frog, the switch and 327 feet of main track were destroyed.

The engine and tender were derailed to the left and stopped at an angle of 20 degrees to the track at a point 1,358 feet east of the point of derailment. The front end of the engine was 80 feet and the rear end of the tender was 38 feet north of the center-line of the track. The pilot and the foundation brake gear were damaged and the steam pipe to the right injector was torn off. The rear of the tender was crushed. The first 38 cars, 29 of which were destroyed, were derailed to the left and stopped at various angles to the track. The front truck of the thirty-ninth car was derailed. The engine, tender and derailed cars stopped within a distance of 428 feet.

It was dark and the weather was cloudy at the time of the accident, which occurred at 8:30 p. m.

The employee injured was the front brakeman.

Mechanical Data

After the accident an inspection of the engine disclosed that all flanges were of good contour and the height and thickness were within the prescribed limits, except that the flange of the left No. 1 driving wheel was nicked and grooved as a result of the derailment. The engine truck, center plate, rocker device, center bushing and post, the radius-bar braces and pivot conformed to the prescribed requirements. All driving-box wedges were well lubricated and moved freely. The radial buffer and floating block were well lubricated and moved freely, and the wedge was in proper position. The springs, spring-hangers, saddles and equalizers were in place and there was no indication of fouling. The top and the bottom clearances of all driving boxes conformed to the specifications. The back-to-back measurements of the engine-truck wheels and the driving-wheel tires were taken in four positions and were found to be within the prescribed limits. Measurements of the tread wear and lateral motion of the wheels of engine 5004 were as follows:

Wheel	Lateral	Tread Wear Left	Tread Wear Right
Engine truck	5/16 inch	None	None
No. 1 driving	*1-1/16 inches	1/16 inch	1/32 inch
No. 2 driving	1/2 inch	1/8 inch	1/8 inch
No. 3 driving	3/8 inch	5/32 inch	1/8 inch
No. 4 driving	7/16 inch	3/32 inch	3/32 inch
No. 5 driving	1/2 inch	3/32 inch	1/16 inch
Trailer truck			
Front pair	3/16 inch	None	None
Rear pair	7/16 inch	None	None

*The No. 1 pair of driving-wheel boxes were equipped with radial-motion devices. The front section of parallel rods on both sides were equipped with ball-and-socket bushings. These devices permit free adjustment of the rigid wheelbase to track curvature.

The total weight of engine 5004 in working order is 538,520 pounds, distributed as follows: Engine truck, 51,120 pounds; driving wheels, 371,990 pounds; and trailer truck, 115,410 pounds. The diameters of the engine-truck wheels, the driving wheels, and the trailer-truck wheels are, respectively, 37, 74, and 40 inches. The tender is rectangular in shape and is equipped with two 6-wheel trucks. The weight of the tender loaded is 396,246 pounds. The rigid wheelbase of the engine is 19 feet 3 inches, the total driving-wheel base is 26 feet 2 inches, and the total length of the wheelbase is 50 feet 2 inches. The total length of the engine and tender is 113 feet

6-5/16 inches. The last Class 5 repairs were completed at Albuquerque Shops, June 24, 1941. The accumulated mileage since the last class repairs was 22,150 miles. The center of gravity is 82-1/2 inches above the rails.

Track Data

Measurements of the track taken throughout a distance of 636.9 feet west of the point of derailment were as follows:

Distance west of point of derailment	Superelevation	Gage	
Feet	Inches	Feet	Inches
636.9	0	4	8-3/8
617.4	1/4	4	8-3/8
597.9	1/4	4	8-3/8
578.4	1/2	4	8-3/8
558.9	1/2	4	8-3/8
539.4	5/8	4	8-1/4
519.9	3/4	4	8-3/8
500.4	1-1/4	4	8-7/16
480.9	1-1/4	4	8-7/16
461.4	1-3/8	4	8-3/8
441.9	1-5/8	4	8-1/2
422.4	2-1/8	4	8-3/8
402.9	2-1/2	4	8-1/2
383.4	2-3/4	4	8-5/8
363.9	2-7/8	4	8-9/16
344.4	3	4	8-7/16
324.9	3-1/8	4	8-1/2
305.4	3-1/4	4	8-3/8
285.9	3-1/8	4	8-9/16
266.4	3-3/8	4	8-7/16
246.9	3-3/8	4	8-5/8
227.4	3-7/8	4	8-1/2
207.9	4-1/4	4	8-1/2
188.4	4-1/4	4	8-7/16
168.9	4-3/8	4	8-5/8
149.4	4-1/8	4	8-1/2
129.9	4-1/8	4	8-3/4
110.4	4-1/4	4	8-7/16
90.9	4-1/4	4	8-5/8
71.4	4-3/8	4	8-1/2
51.9	4-1/2	4	8-5/8
32.4	4-5/8	4	8-1/2
12.9	4-1/4	4	8-5/8
Point of derailment	4-1/4	4	8-1/2

Discussion

The engine-truck wheels became derailed to the left when the train was moving at a speed of 45 or 50 miles per hour on a curve to the right. The maximum authorized speed for freight trains in this vicinity was 50 miles per hour. The specified curvature for this curve was 2°, and the specified superelevation was 4 inches. At the point of derailment the curvature was 2°06' and the superelevation was 4-1/4 inches. The crossing was well maintained and the tops of the planks and the bottoms of the flangeways were below the tops of the rails a sufficient distance to prevent contact with the wheels of the engine. According to A. R. E. A. superelevation tables, at the point of derailment the equilibrium speed, the maximum safe speed and the overturning speed were, respectively, 55, 85, and 131 miles per hour. The track was in good surface and alinement and the engine was riding smoothly. There was no defective condition of the engine and there was no indication of dragging equipment.

As the train was approaching the point where the accident occurred, the headlight was burning brightly and the enginemen were maintaining a lookout ahead from their respective sides of the cab. When the engine was passing over the road crossing involved the engineer observed fire flying from beneath the right cylinder. He started a service brake-pipe reduction; then, becoming aware that the engine truck was derailed, he moved the brake valve to emergency position. No other wheel was derailed until the engine reached the frog of the east siding-switch 911 feet beyond the point of derailment.

Immediately after the occurrence of the accident, crushed and small pieces of rock were found on the high rail near the center-line of the crossing. There were some small pieces of this rock in the flangeway and on the crossing plank outside the rail. This rock was different from that used as ballast. Several pieces of the rock bore grease smudges, and were 1 to 1-1/2 inches thick and about 3 inches square. The aggregate amount of the rock indicated that before it was crushed it was about 10 inches by 1-1/2 inches. Several inches beyond the point where the pieces of rock were found on the rail, a mark indicated that the left engine-truck wheel, which would be bearing against the gage side of the high rail, had been raised high enough for its flange to mount the rail. It had then crossed diagonally to the outside of the rail within a distance of about 29 feet and dropped outside the high rail, and its companion wheel dropped inside the low rail.

No. 23, a west-bound passenger train, the last train to pass over the point involved before the accident occurred, passed at 6:26 p. m. at a speed of 50 miles per hour. There

was no indication of irregular track or of any obstruction on the track when this train passed over the crossing.

This investigation disclosed that workmen from a near-by ranch had been engaged in hauling caliche rock over the crossing involved on the day of the accident. The truck used for hauling this material was not provided with a rear endgate. In one statement these workmen said they made their last trip over the crossing after No. 23 passed over it, but in another statement they said their last trip was completed before No. 23 passed the crossing; however, the rock found on the rail was the kind that was being hauled by the workmen. Apparently a piece of this rock fell from the truck and stopped on top of the left rail and the left flangeway where it was struck by the left engine-truck wheel.

Cause

It is found that this accident was caused by rock being on the high rail of a curve.

Dated at Washington, D. C., this tenth day of November, 1941.

By the Commission, Commissioner Patterson.

(SEAL)

W. P. BARTEL,

Secretary.