

INTERSTATE COMMERCE COMMISSION  
WASHINGTON

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REPORT NO. 3482  
CHICAGO, BURLINGTON & QUINCY  
RAILROAD COMPANY  
IN RE ACCIDENT  
NEAR CRIVA, WYO., ON  
SEPTEMBER 4, 1952

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SUMMARY

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Date: September 4, 1952

Railroad: Chicago, Burlington & Quincy

Location: Oriva, Wyo.

Kind of accident: Derailment

Train involved: Freight

Train number: Extra 6108-6160 East

Engine numbers: 6108 and 6160

Consist: 2 auxiliary water cars, 56 cars,  
caboose

Speed: 27 m. p. h.

Operation: Timetable and train orders; manual  
block-signal system for following  
movements only

Track: Single; 3°01' curve; vertical curve

Weather: Clear

Time: 5:35 p. m.

Casualties: 2 killed; 3 injured

Cause: Broken rail, as a result of a  
crosshead wrist pin on engine 6108  
working loose and being struck by  
side rod

INTERSTATE COMMERCE COMMISSION

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REPORT NO. 3482

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

CHICAGO, BURLINGTON & QUINCY RAILROAD COMPANY.

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November 4, 1952

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Accident near Oriva, Wyo., on September 4, 1952, caused by a broken rail, as a result of a crosshead wrist pin on engine 6108 working loose and being struck by a side rod.

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REPORT OF THE COMMISSION<sup>1</sup>

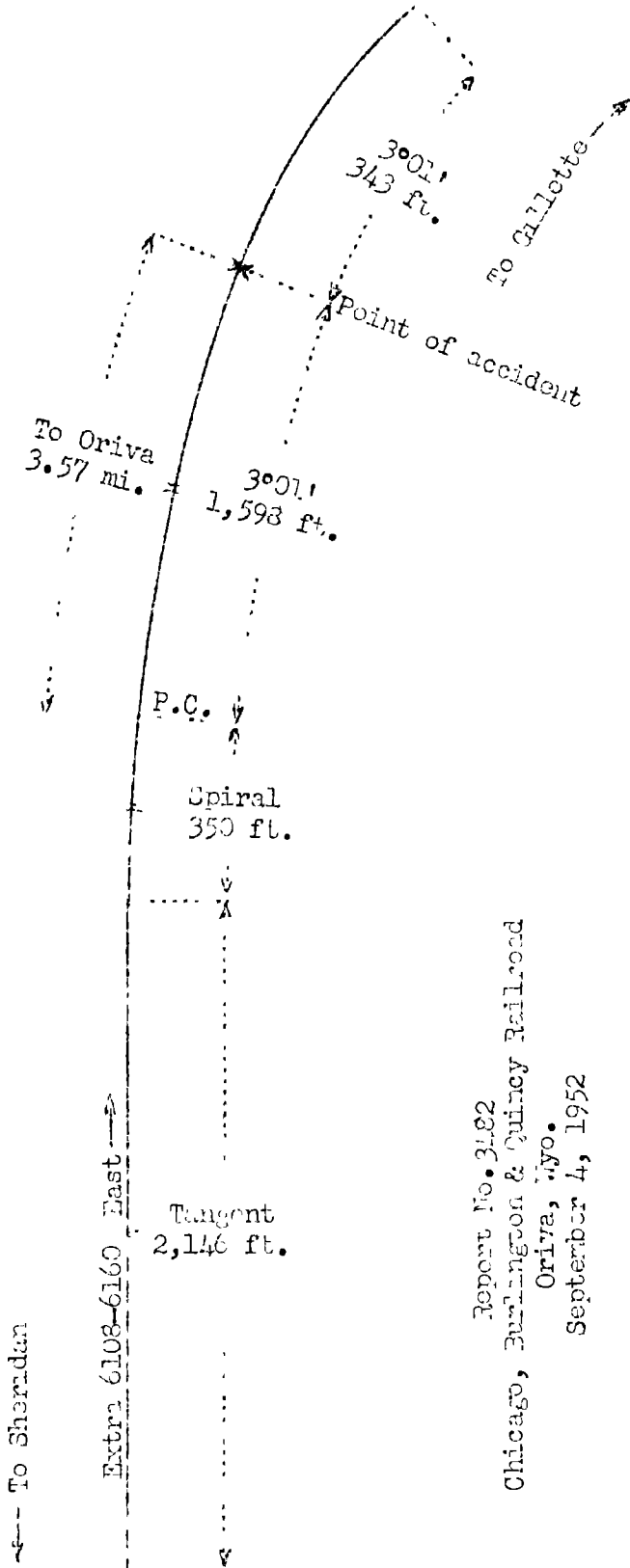
PATTERSON, Commissioner:

On September 4, 1952, there was a derailment of a freight train on the Chicago, Burlington & Quincy Railroad near Oriva, Wyo., which resulted in the death of two train-service employees, and the injury of three train-service employees.

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<sup>1</sup> 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.

- o Gillette, Wyo.
- | 5.63 mi.
- X Point of accident
- | 3.57 mi.
- o Oriva
- | 14.95 mi.
- o Echeta
- | 77.17 mi.
- o Sheridan, Wyo.



Report No. 3482  
 Chicago, Burlington & Quincy Railroad  
 Oriva, Wyo.  
 September 4, 1952

Location of Accident and Method of Operation

This accident occurred on that part of the Sheridan Division extending between Sheridan and Gillette, Wyo., 101.37 miles, a single-track line, over which trains are operated by timetable and train orders, and a manual block-signal system for following movements only. The accident occurred on the main track at a point 95.69 miles east of Sheridan and 3.57 miles east of Oriva. From the west there are, in succession, a tangent 2,146 feet in length, a spiral 350 feet, and a 3°01' curve to the right 1,598 feet to the point of accident and 343 feet eastward. The accident occurred about 250 feet east of the summit of a vertical curve, 1,600 feet in length, which connects an 0.88-percent ascending grade and a 0.56-percent descending grade for east-bound movements.

In the vicinity of the point of accident the track structure consists of 90-pound rail, 33 feet in length, laid on an average of 20 ties to the rail length. The low rail on the curve on which the accident occurred was originally laid on the high side of the curve in 1917. At a later date, when this rail became slightly curve worn, it was moved to the low side of the curve. The rail on the high side of the curve was laid new in 1930. The track is fully tieplated with single-shoulder tieplates. The high rail on the curve is single-spiked, and the low rail is single-spiked on the outside and double-spiked on the inside. The track is provided with 4-hole joint bars and an average of eight rail anchors per rail, and, in this vicinity, it was surfaced and ballasted with 7-1/2 inches of rock ballast during July, 1952. The super-elevation at the point of accident is 3-1/2 inches.

The maximum authorized speed for freight trains in the vicinity of the point of accident is 25 miles per hour.

Description of Accident

Extra 6108-6160 East, an east-bound freight train, consisted of engine 6108, 1 auxiliary water car, engine 6160, 1 auxiliary water car, 56 cars, and a caboose, in the order named. This train departed from Sheridan at 11:10 a. m., departed from Echeta, 77.17 miles east of Sheridan and the last open office, at 4:44 p. m., and while it was moving at a speed of 27 miles per hour both engines and tenders, both auxiliary water cars, and the first nine cars were derailed at a point 95.69 miles east of Sheridan and 3.57 miles east of Oriva.

The right engine-truck wheel of the first engine remained on the south rail. The engine and tender stopped approximately in line with the track, with the front end of the engine 170 feet east of the point of derailment. They leaned to the south at an angle of approximately 45 degrees, and were considerably damaged. The first auxiliary water car was turned end for end, and it lodged between the left back corner of the tender of the first engine and the right side of the smoke box of the second engine. It was demolished. The second engine stopped on the track structure and at an angle of about 20 degrees to the track. It leaned to the right at an angle of approximately 45 degrees. The cab and dock were demolished, steam pipes were broken, and the engine was otherwise badly damaged. The tender stopped at an angle of about 90 degrees to the engine. The tender tank was separated from the underframe. The derailed cars stopped in various positions on or near the track. The second auxiliary water car and the first two cars were destroyed, and the third to the seventh cars, inclusive, were considerably damaged.

The engineer and the fireman of the second engine were killed. The engineer and the fireman of the first engine and the front brakeman were injured.

The weather was clear at the time of the accident, which occurred at 5:35 p. m.

Both engines are of the 2-10-2 type. The weight of each engine in working order is 379,500 pounds. The weight on driving wheels is 307,600 pounds. The specified diameters of the engine-truck wheels, the driving wheels, and the trailing-truck wheels are, respectively, 33 inches, 59 inches, and 42-1/2 inches. The rigid wheelbase is 20 feet 9 inches, the total wheelbase is 40 feet 1 inch, and the total length of each engine and tender is 89 feet 3-7/16 inches.

Engine 6108 was provided with crosshead wrist pins which, when new, were 13-7/16 inches in length, 5 inches in diameter at rod fit, with large crosshead fit 5-1/8 inches maximum diameter. Both large and small crosshead fits were tapered 1/4 inches in 5 inches. The outer end of the pin was 3 inches in diameter and had 8 threads per inch. The pin was inserted from the inner side of the crosshead and was secured by a pin nut and a grip nut against a 1/2-inch by 5-3/4-inch circular plate, which was in contact with the outer face of the crosshead. Two 9/32-inch cotter pin holes were drilled in the outer end of the pin, which was reduced to a 2-1/2-inch diameter beyond the threaded portion. The pin was constructed of

carbon steel, had grease chamber with fitting at outer end and was prevented from turning in the crosshead by a 5/8-inch key in the large taper fit.

The last class 5 repairs to engine 6108 were completed in March, 1951. The last monthly inspection and repairs were completed on August 14, 1952, and the last trip inspection and repairs were completed on September 3, 1952. The accumulated mileage since the last class 5 repairs was 31,000 miles.

### Discussion

As Extra 6108-6160 East was approaching the point where the accident occurred the speed was 27 miles per hour, as indicated by the tape of the speed recording device. The enginemen of the first engine and the front brakeman were maintaining a lookout ahead from their positions in the cab of the first engine, the enginemen of the second engine were on that engine, and the conductor and the flagman were in the caboose. The brakes of the train had been tested and had functioned properly when used en route. The employees on the first engine said that there had been nothing unusual about the operation of the engine during the trip. These employees said that as the train was closely approaching the point where the derailment occurred they heard a severe pounding on the right side of the engine. At the same time the engineer saw sparks flying from the front of the engine, and he immediately placed the automatic brake valve in emergency position. The derailment occurred before the speed of the train had been reduced.

Inspection of the track after the accident occurred disclosed that a rail in the south side of the track had been shattered by a severe vertical impact. Several other rails were bent, and two of them were broken. It appeared that the derailment occurred at the point at which the rail was shattered and that the other rails were broken during the derailment.

Inspection of engine 6108 after the accident occurred disclosed that the right crosshead wrist pin had moved inward from its normal position in the crosshead and had been struck by the front side rod. When the engine stopped the inward end of the pin extended over the top of the side rod a distance of approximately 3 inches and the top of the side rod was lodged against the under side of the pin. The wrist-pin nuts and washer were missing. The cotter pins were in place, but they were bent outward and the nuts had passed

over them. The right front side rod collar was torn off. Both the top and the bottom of the front end of the right front side rod were battered by contact with the end of the crosshead wrist pin. The right main rod, the crosshead, the piston rod, the No. 1 driving axle, and the pedestal binder of the right No. 1 driving box were bent. The wrist-pin nut was found about 20 feet south of the track and 2,724 feet west of the point of derailment. The washer was found about 20 feet east of the nut. The grip nut was not found. The side rod collar was found 6,358 feet west of the point of derailment. It was badly battered.

The engineer said that he inspected the engine at Echeta, the last point at which the train stopped before the accident occurred, and that both the wrist-pin nut and the grip nut were in place at that time. The locations at which the parts were found and the position of the wrist pin after the engine stopped indicate that both nuts worked off the wrist pin after the train departed from Echeta and the pin then worked inward and came in contact with and tore off the front side rod collar. Apparently the rail in the south side of the track was shattered by a severe vertical impact, which occurred when the wrist pin worked inward sufficiently to arrest the motion of the side rod.

The last trip inspection of engine 3108 prior to the time of the accident was made at Sheridan on September 3. The locomotive inspection report for the engine on that date included, among others, the following items:

Reported by engineer:  
"Tighten right wrist pin."

Reported by inspector:  
"Nuts loose on right wrist pin."  
"Put wearing plates in right crosshead."

After the inspection was completed the right wrist pin was removed in order to apply lateral collars between the main rod and the crosshead. After the pin was removed, the machinist who examined it found that the outside tapered portion of the pin showed indications that it had been working in the crosshead. The pin was placed in a lathe and 3/16 inch of metal was turned off the shoulders. The inside tapered portion of the pin was filed while the pin was in the lathe. The machinist said that he cleaned the wrist-pin threads with a wire brush and that the threads were in good condition. When he replaced the pin he tapped it into the crosshead with a sledge hammer. He said that before applying the washer and nuts he observed that the distance between the outside



shoulder of the pin and the outside face of the crosshead was approximately 1/4 inch. He thought that a clearance of 1/4 inch was sufficient to permit the pin to be drawn tightly into the crosshead. After the nuts were tightened he was satisfied that the pin was fitted properly, and he did not consider it necessary to loosen the nuts and inspect the clearance or the tightness of the fit. He said that he made an inspection to determine the distance between the inside face of the wrist pin and the inside face of the crosshead, but he did not use a feeler gauge to determine the tightness of the inside fit. The machinist signed for this work after it was completed, and the report was approved by the foreman. The foreman did not examine the wrist pin after it was applied.

From the manner in which the accident occurred it appears that either the pin was not properly fitted or not properly tightened when it was applied.

Cause

It is found that this accident was caused by a broken rail, as a result of a crosshead wrist pin on engine 6102 working loose and being struck by a side rod.

Dated at Washington, D. C., this fourth day of November, 1952.

By the Commission, Commissioner Patterson.

(SEAL)

GEORGE W. LAIRD,  
Acting Secretary.