

## INTERSTATE COMMERCE COMMISSION

REPORT OF THE DIRECTOR OF THE BUREAU OF SAFETY IN RE  
INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE  
ERIE RAILROAD NEAR CORNING, N. Y., ON JULY 11, 1929.

October 21, 1929

To the Commission.

On July 11, 1929, there was a derailment of a freight train, the wreckage of which was struck by a passenger train, on the Erie Railroad near Corning, N. Y., which resulted in the death of 2 employees, 2 mail clerks, and 2 trespassers, and the injury of 51 passengers, 9 employees, one of whom was deadheading, 3 Pullman employees, and 2 express messengers. This investigation was made in conjunction with a representative of the Public Service Commission of New York.

Location and method of operation

This accident occurred on that part of the Susquehanna Division extending between Hornell, N. Y., and Susquehanna, Pa., a distance of 139.7 miles. This is a double-track line over which trains are operated by time-table and an automatic block-signal and train-control system. The point of accident is approximately  $2\frac{1}{2}$  miles east of the station at Corning. There is a siding located between the eastbound and westbound main tracks which extends from a point 2,549 feet east of the point of accident to a point 2,986 feet west thereof. Approaching from the east the track is tangent for a distance of 3,100 feet, followed by a compound curve to the right 4,967 feet in length with a maximum curvature of  $1^{\circ} 54'$ , the accident occurring on this curve at a point 2,343 feet from its eastern end. Approaching from the west the track is tangent for a distance of 3,100 feet, followed by the curve on which the accident occurred. The grade for westbound trains is 0.142 per cent ascending at the point of accident.

The track is laid with 100-pound rails, 33 feet in length, with 18 ties to the rail-length, tie-plated, single-spiked, and ballasted with crushed stone to a depth of 10 inches. The general maintenance was good.

The weather was slightly hazy at the time of the accident, which occurred at 12.43 a.m.

### Description

Westbound freight train extra 3352, running as train second No. 91, consisted of 128 cars and 2 cabooses, hauled by engine 3352, and was in charge of Conductor Green and Engineman Belmer. This train passed Chertung Junction, 13.4 miles east of Corning at 12.25 a. m., according to the train sheet, and was approaching Corning when it was derailed by a broken rail while traveling at a speed estimated to have been between 35 and 40 miles per hour.

Eastbound passenger train No. 6 consisted of one express car, one mail car, one baggage car, one coach, one dining car, four Pullman cars and one coach, in the order named, hauled by engine 2917, and was in charge of Conductor Kinne and Engineman Blake. The cars were of all-steel construction with the exception of the first and fifth cars, which were of steel-underframe construction. This train departed from Corning at 12.39 a. m., two minutes late, and collided with the wreckage of extra 3352 which had fouled the eastbound track while traveling at a speed estimated to have been between 45 and 43 miles per hour.

The first, second, sixth and eighth cars of extra 3352 were derailed, the first car coming to rest about 1,600 feet from the initial point of derailment; the ninth to the thirty-third cars, inclusive, five of which contained gasoline, were badly damaged or burned up. The twenty-fourth car, which was one of the cars containing gasoline, fouled the eastbound main track, while three cars in the rear of the train buckled and fouled both tracks. Engine 2917 collided with the derailed twenty-fourth car of the freight train and came to rest on the passing track parallel with the main tracks; the first four cars in train No. 6 were badly damaged and immediately caught fire from the wrecked cars loaded with gasoline in extra 3352. The front truck of the fifth car was also derailed and the front end of the car burned; the remaining equipment in train No. 6 was not derailed. The employees killed were the engineman and fireman of train No. 6, and those injured were the baggageman and six dining car employees of train No. 6 and the conductor of extra 3352.

### Summary of evidence

Engineman Belmer, of extra 3352, stated that when he first saw train No. 6 approaching at a distance of about 30 car-lengths he got off of his seat and dimmed the headlight. He then looked out and at about that time he heard a tank wheel jump up, saw fire flying in streaks

along the train, and called to the brakeman, "We are piling; plug No. 6." It was then passing them, however, and he next heard an explosion and saw that the train had separated. He estimated the speed of his train at the time of the accident to have been about 35 miles per hour.

Fireman DeLap, of extra 3352, stated that he was sitting on the seat box at the time of the accident and his first indication of anything wrong was a light surge; he looked back and saw fire flying. The brakeman called for a fusee but Fireman DeLap was unable to get it out of his seat box before train No. 6 had passed them. It was his opinion, however, that even if the flagging equipment had been instantly available it would have been impossible to have warned train No. 6.

Head Brakeman Peters, who was riding on the left side of engine 3352, stated that he felt a surge and the engine began slowing up, and on looking out he saw fire flying from the head car. After obtaining a fusee and light he got off immediately to flag train No. 6, but it was then going by.

Conductor Green, of extra 3352, stated that he was riding in the caboose when he felt the air brakes apply in emergency just as the accident occurred. He started toward the head end of the train and when he was about 15 cars from the caboose he found three cars derailed and blocking the eastbound main track. He instructed Brakeman Duygan who was with him to go ahead and protect the eastbound track. He himself opened the switch to throw signal in the eastbound track and went to a phone nearby but could get no communication, and then proceeded to the head end of the train. Brakeman DeWitt went to the rear of his train to flag and Brakeman Duygan went toward the head end, and did not learn that train No. 6 had collided with the wreckage until he arrived at the scene of the wreckage.

Conductor Kinne, of train No. 6, stated that he was sitting in the rear seat of the coach, the fourth car from the engine, and had no warning whatever before the crash. He estimated the speed of their train at the time of the accident to have been about 45 miles per hour. He also stated that the brakes had not been applied prior to the accident. Head Brakeman Roach, who was riding in the fourth car, Baggage-man Chase, who was riding in the third car, and Flagman Bennett, who was in the rear car, also stated that they felt no application of the air brakes prior to the accident.

Track Supervisor Ruby, who had supervision of the sub-division on which this accident occurred, stated that the accident was caused by a broken rail. He had been over the track on the day previous to the occurrence of the accident and had noticed nothing wrong. He stated that they had found split-head rails at different locations on that division and that such rails had been removed immediately. He further stated that the rails in that vicinity were worn to the extent that they were to have been removed and replaced with new ones as soon as they could be reached on the program which had been mapped out. It was his opinion that the defective rail, involving a hidden defect, could not have been detected by an ordinary track inspection.

Track Foreman Reynolds stated that the rail at the point of derailment was classed as first-class relaying rail when laid in 1927. About five weeks prior to the occurrence of the accident he did some resurfacing and fixed up the joints, and also took the gauge and elevation in that vicinity. It was his opinion that the accident was caused by a broken rail, saying that it was a piped rail.

Track Walker Moore made an inspection of the track in the vicinity of the point of accident on the day previous to the occurrence of the accident and noticed nothing wrong. Subsequent to the accident he saw the broken rail and he also was of the opinion that its defective condition could not have been discovered by ordinary inspection.

An inspection of the engine and cars of extra 3352 disclosed no defects which could have caused the accident.

The investigation indicated that this accident was caused by a broken rail. An examination of this rail was made by Mr. James E. Howard, engineer-physicist, whose remarks immediately follow:

#### Report of the Engineer-Physicist

The accident near Corning, N. Y., July 11, 1929, was due apparently to a split head rail, the low rail of a 1° 54' curve. The rail was branded "Lackawanna 10031 8 1917 100# ARA-A OH". Heat number 15970, ingot letter B or D. It was fractured 24 feet 11 inches from its receiving end, then followed by a gap of 5 feet 9 inches, representing fragments which were not accounted for, followed by a fragment 28 inches long which represented the leaving end of the rail, aggregating 33 feet in all.

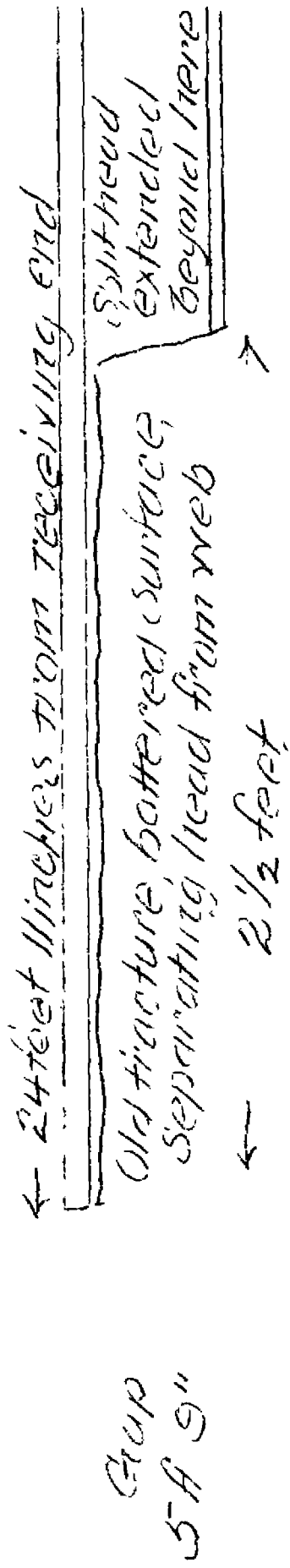
The leaving end of the long fragment displayed a split head fracture, while the receiving end of the short fragment also displayed a split head fracture. The fracture in the short fragment was probed to a depth of 16 inches. In the long fragment the fracture under the head was visible for a length of 2 feet 7 inches. The rail was sawed apart a few inches beyond, the split head fracture still being in evidence.

No doubt the fragments representing the 5 feet 9 inches gap contained split head fractures over their entire lengths. The estimated aggregated length of the split head fracture at the time of the accident was not less than ten feet.

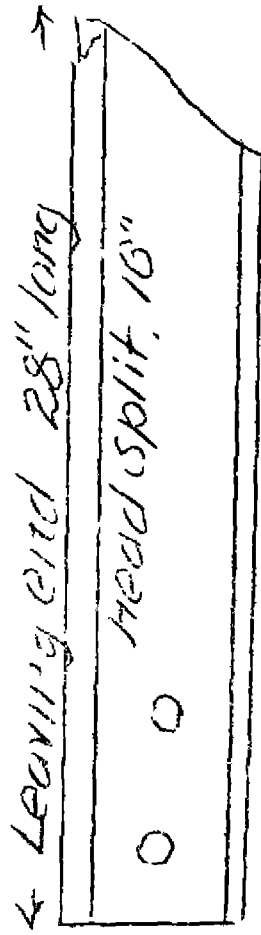
Two feet and 7 inches of the leaving end of the long fragment displayed a fracture under the split head, separating it from the web. The surface of the fracture was worn and battered, indicating that it existed prior to the time of the accident. The split head fracture originating a short distance below the running surface of the head, had extended downward through the depth of the head, bifurcated and reached the surface at the fillets of the web, and thus completely separated the head from the web. This no doubt represented the condition of the rail when the train which was derailed entered upon it. The split head fracture had reached the surface at the fillet of the web of the 28-inch fragment, leading to the belief that over a considerable part or the whole of the length of ten feet the fracture had been in sight prior to the accident.

The fractured surface separating the head from the web was thus described in the transcript of evidence furnished by the railroad: - "The head of the rail was broken away from the base and web in a fresh longitudinal fracture along the base of the ball where same joins the web." The worn and battered condition of this fracture appears to have been interpreted as a fresh fracture whereas its characteristics denoted a fracture of comparatively long standing.

The dimensions of the split head fracture, as exhibited a few inches beyond the receiving end of the 28-inch fragment, were in width, at the top, two-tenths of an inch, and having a depth of one and four-tenths of an inch. These fractures are widest at the top tapering to zero at the bottom. They originate at the top and as they extend are necessarily of zero width at the bottom.

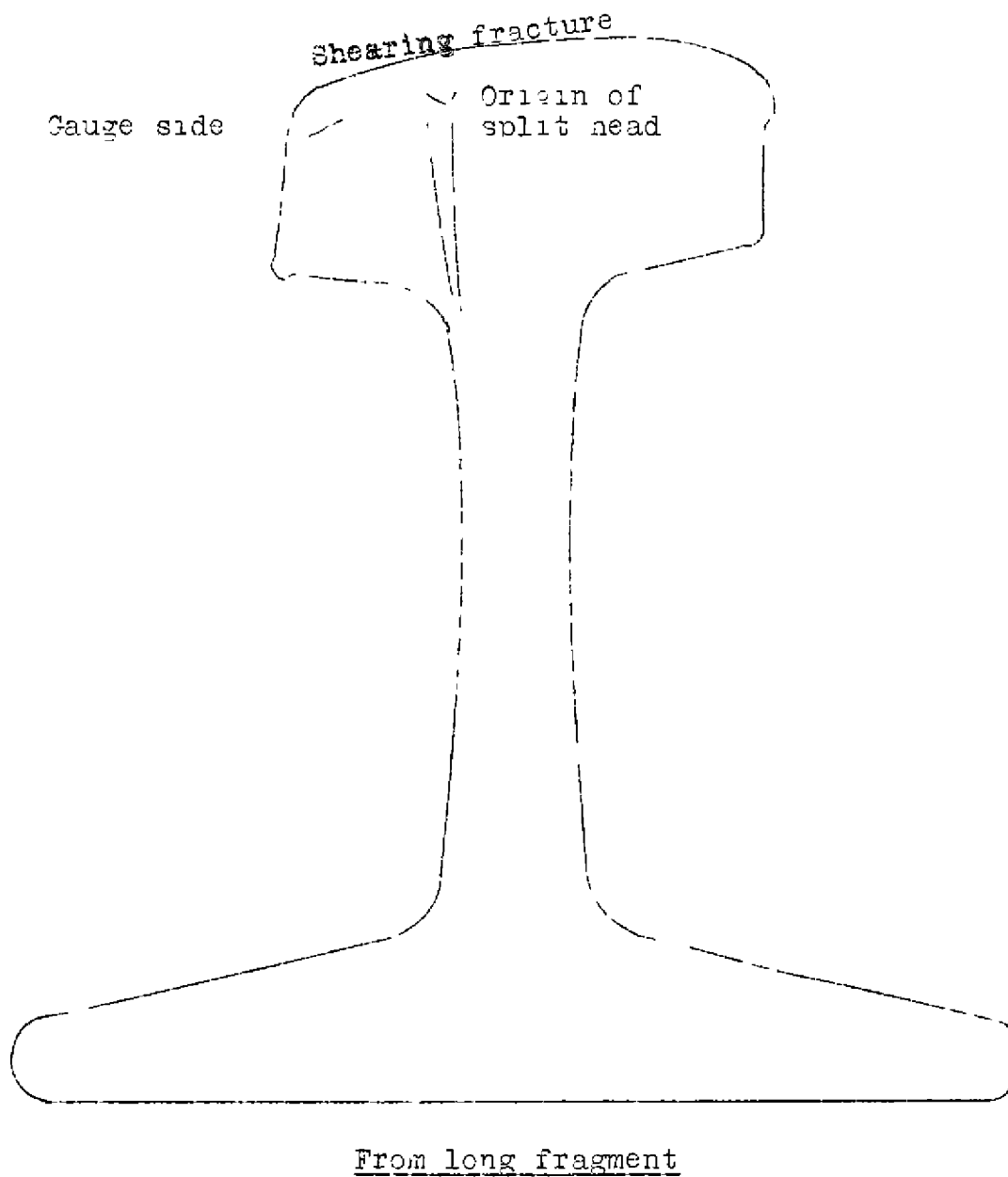


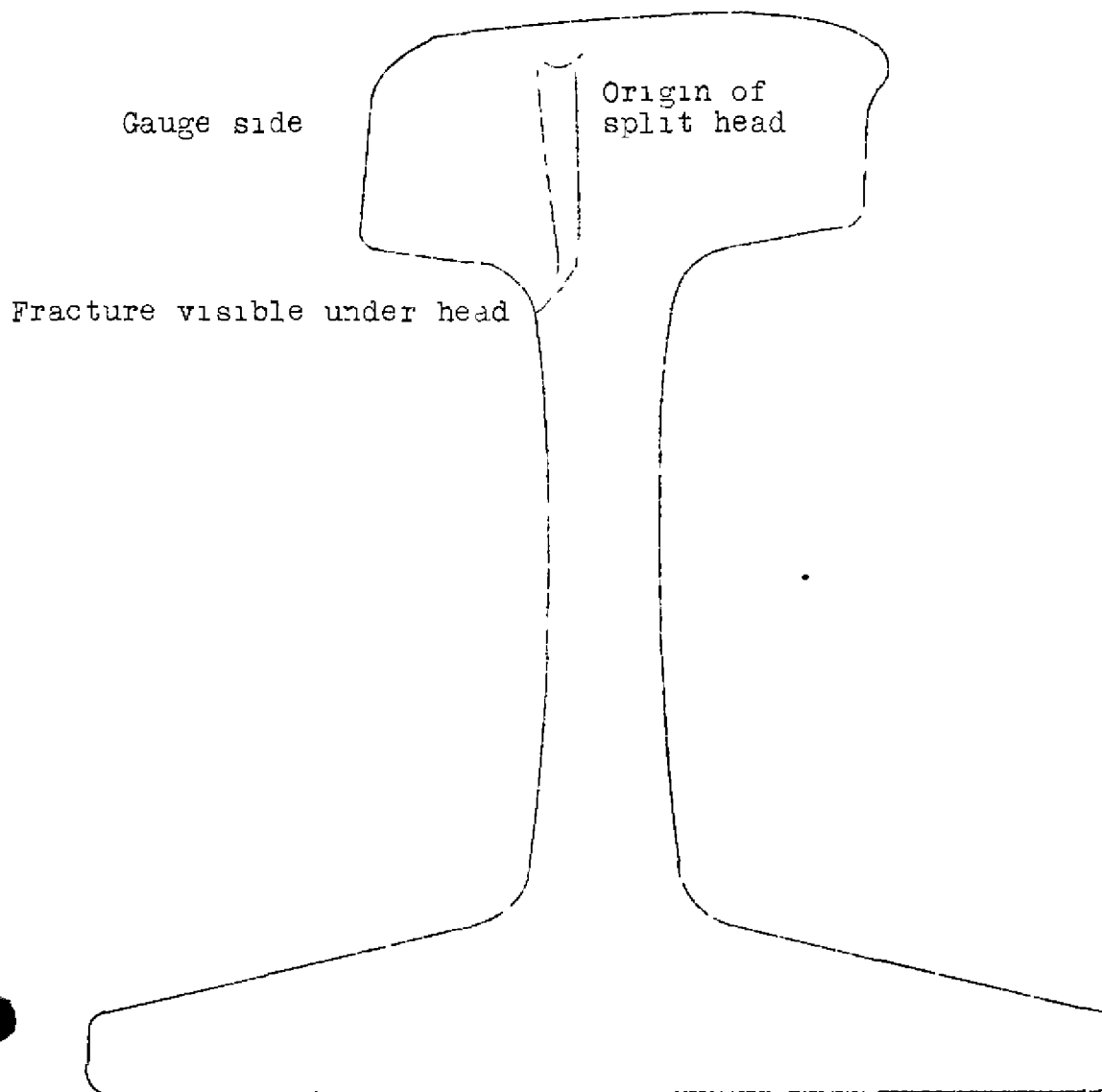
Total length of split head estimated over 10 feet



Gap 5' 9"

Fragments not recovered





From short fragment.

The longitudinal fracture of this rail began about a quarter of an inch below the running surface, but from its point of inception oblique shearing fractures formed which passed upward. About fifteen-hundredths of an inch of unfractured metal remained above the shearing fractures. The metal immediately below the running surface of a rail shows flattening of the grain of the steel, due to the lateral flow of the metal under the wheel pressures. When this lateral flow of metal encounters a longitudinal streak or acicular seam in the upper part of the head an opportunity is presented for the inception of a split head fracture.

A distinction will be made between a split head fracture and a piped rail. They result from different causes, independent of each other. Split head fractures result from acicular seams which are located near the peripheral surface of the cross section of the rail, in its head and base. In certain parts of the cross section the seams appear as short dashes, under the varying influence of the rolls during fabrication.

Little attention is called to the seams or streaks in those parts of the rail which are not subjected to a lateral flow of metal under service conditions. The seams in the upper part of the head as stated afford opportunity for the display of split head fractures.

Piped rails have structural planes of weakness in the upper part of the web and lower part of the head. They result from a pipe, a shrinkage cavity in the upper part of the ingot. There is no pipe in the lower part of the ingot, consequently no piped rails come from that part of the ingot. Split head rails, on the other hand, may come from any part of the ingot, since slag inclusions have been found in the lower as well as in the upper parts of the ingot.

A piped rail is not necessarily a weak rail. The web, being exposed chiefly to vertical compressive stresses, possesses sufficient strength to sustain the wheel loads. The intense impinging pressures at the running surface are distributed when they reach the web and lower part of the head, diminished to unit stresses which the metal of the rail has the ability to successfully endure.

It is desirable to use a terminology in the description of fractures which correctly describes them, the loose use of inapplicable terms retards instead of promotes progress in the elimination of remediable causes in rail fractures. Calling a fractured rail a piped rail is generally a misnomer.

### Conclusions

No doubt attaches to the cause of the present accident, that it was due to the presence of a split head rail. Furthermore that the fractured head, prior to the accident, was of unusual extent, believed to have covered a length of rail not less than ten feet.

Since fractures of this kind are discoverable when displayed to the extent witnessed in this rail, and also of very much less degree, the contention that the fracture was not discoverable prior to the accident is not supported by the evidence presented.

Respectfully submitted,

W. P. BORLAND,

Director.