

INTERSTATE COMMERCE COMMISSION

REPORT OF THE DIRECTOR OF THE BUREAU OF SAFETY IN RE
INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE
ATLANTIC COAST LINE RAILROAD NEAR FREMONT, N.C.,
ON JANUARY 23, 1930.

February 28, 1930

To the Commission:

On January 23, 1930, there was a derailment of a passenger train on the Atlantic Coast Line Railroad near Fremont, N.C., which resulted in the injury of two employees and four passengers.

Location and method of operation

This accident occurred on the Wilmington District of the First Division, extending between Contentnea and Wilmington, N. C., a distance of 104.6 miles, in the vicinity of the point of accident this is a single-track line over which trains are operated by time-table and train orders, no block-signal system being in use. The accident occurred at a point 3,542 feet north of the station at Fremont; approaching this point from the north the track is tangent for a distance of about 8 miles and the grade at the point of accident is 0.72 per cent ascending for southbound trains.

The track is laid with 85-pound rail, 33 feet in length, with an average of 18 ties to the rail-length, single-spiked and about 90 per cent tie-plated. It is ballasted with cinders to a depth of about 12 inches and is well maintained.

It was dark and raining at the time of the accident, which occurred at 5.54 a.m.

Description

Southbound passenger train No. 41 consisted of one express car, one baggage car, one combination mail and baggage car, two coaches, one Pullman sleeping car, one combination dining and parlor car, two Pullman sleeping cars and one official car, all of steel construction, in the order named, hauled by engine 469, and was in charge of Conductor Hollingsworth and Trainmen Grimes. This train passed Contentnea, the last open office, 9.7 miles

north of Fremont, at 5.40 a.m., five minutes late, and was approaching Fremont when it was derailed by a broken rail while traveling at a speed estimated to have been between 45 and 50 miles per hour.

The third car in the train was the first to be derailed, it came to rest on the left side of and parallel to the track at a point about 500 feet south of the initial point of derailment. The engine and first two cars continued on down the track a short distance. The fourth to the eighth cars, inclusive, followed in line with the third car, but were leaning against a clay bank at various angles, while the rear trucks of the ninth car and the tenth car remained on the track. None of the equipment was seriously damaged. The employee injured was a train porter.

Summary of evidence

Engineman Grimes stated that upon approaching Fremont the engine was working steam and he had his hand on the brake valve preparatory to making a stop at that point when he felt a jerk and the air brakes applied in emergency, he thought the engine and first two cars traveled a distance of about 300 or 400 feet before coming to a stop. He immediately got off with a flashlight and inspected the engine and found nothing wrong. Engineman Grimes estimated the speed of his train at the time of the accident to have been about 45 or 50 miles per hour.

Fireman Chestnut stated that he was putting in a fire when the accident occurred. He felt a slight dip toward the left, like a rough spot in the track, and almost immediately the brakes applied in emergency. As soon as the engine stopped he got down with his torch and assisted the engineman in inspecting the engine but could find nothing wrong. Fireman Chestnut also estimated the speed of the train at the time of the accident to have been 45 or 50 miles per hour.

Conductor Hollingsworth stated that the air brakes had been tested at South Rocky Mount and that the train had been running smoothly up to the point of accident. He was riding in the fourth car from the engine when he felt the car hit the ground and bounce along on the ties. After assisting the passengers he went to the forward portion of the train which remained on the track, but could find nothing wrong.

Section Foreman Hicks, in charge of the section on which the accident occurred, stated that on arriving at the point of accident he found 11 rails torn out on the east side and the ties and ballast torn up for this distance. Starting at the north end he found the first rail broken in 8 or 10 pieces, the first break appearing at a point about $3\frac{1}{2}$ feet from its receiving end. His examination of the track north of this broken rail disclosed no marks on the ties or on the rail.

Roadmaster Groom of the Wilmington District was a passenger on train No. 41 at the time of the accident and he stated that he inspected the track north of the point of accident and found the general condition to be good and saw no marks of any kind on the ties or rail north of the broken rail. He did not, however, examine any of the pieces of the broken rail. The statements of General Roadmaster Chandler, who arrived at the scene of the accident about two hours after its occurrence, corroborated those of Section Foreman Hicks and Roadmaster Groom as to the condition of the track north of the broken rail. He further stated that he found about 16 pieces of the broken rail which showed indications of transverse fissures.

Road Foreman of Engines Quarles arrived at the point of the accident about five hours after its occurrence, at which time the engine and the first two cars had departed. He made a detailed examination of all the derailed cars, especially the first derailed car, and there were a couple of center pins broken and other damage which resulted from the derailment, but he found no equipment defects that could have caused the accident.

At the time of this investigation 14 pieces of the broken rail were found, one section 2 feet 7 inches in length was missing. Inspection of the track in the vicinity of the point of accident showed the gauge and alignment good. The track north of the point of derailment showed no indications of wheel or flange marks or of anything dragging. An examination of the equipment that was derailed showed all draft attachments, brake rigging and wheels in good condition and the general condition of the cars was good except for the damage sustained by the derailment.

The fragments of the broken rail were examined by Mr. James E. Howard, Engineer-Physicist, whose remarks upon them immediately follow:

The derailment of southbound passenger train No. 41 near Fremont, N. C., was caused apparently by the presence of a number of transverse fissures in an 85-pound rail. The rail was branded "O.H. Tenn 3540 A S C.E. 1-1919" Ingot letter C, Heat number 37210.

The rail was broken into short fragments, ranging in length from 9 inches to 5 feet 10 inches. Fourteen fragments were recovered, immediately following the derailment. A fragment 2 feet 7 inches long, missing at the time, was subsequently found.

Several of these fragments displayed transverse fissures, in different stages of development. There was a transverse fissure in the rail at a point 3 feet and 10 inches from its receiving end, this fissure was one and one-half inches in diameter. This was probably the first fracture to be completed under train No. 41. There were two other transverse fissures displayed by adjacent fragments, one-half inch and one-eighth inch diameters respectively.

Intermediate fragments showed fractures starting in the base and passing upward through the web and the head, and still others originating in the head and presenting a starting effect. Nearer the leaving end of the rail there were two additional transverse fissures of one and three-fourths inch and three-fourths inch diameters respectively, and finally a last fracture from the base upward.

The appearance of the transverse fissures was common to fractures of this type. Such a fissure starts at a nucleus in the interior of the head, increasing in size from that point. In its earlier stages, prior to reaching the peripheral metal of the head, it presents a bright silvery lustre, a burnished surface. When air is admitted the surfaces become darkened.

Eventually a transverse fissure reaches the surface of the head of the rail on the curve side and under the head at the fillet of the web. A rust streak may precede the actual separation of the metal, where the steel is being strained and oxidation facilitated. In the track, that constitutes the first visible evidence presented of the presence of a transverse fissure, and such evidence only comes after the rail has been greatly weakened by the fissure.

The attached sketch indicates the length of the fragments and the nature of the fractures separating them.

Receiving End.	31-101	Trans. Fissure 1 1/2 inch	21-7 ⁿ	Trans. Fissure 1/2 inch	21-10 ⁿ	Trans. Fissure 1/8 inch	11-9 ⁿ	Fracture from base up.	11-1 ⁿ	Starring.
	21-7 ⁿ	Trans. Fissure 1 3/4 in.	21-9 ⁿ	Fracture from base up.	0-9 ⁿ	Fracture from base up.	11-4 ⁿ	11-10 ⁿ	Leaving End.	
	21-2 ⁿ	Trans Fissure 1 3/4 in.	21-3 ⁿ	Trans Fissure 3/4 in.	11-7 ⁿ					

A. C. L., Fremont, N.C., Jan. 23, 1930.

Transverse Fissures.

1 1/2ⁿ 1/2ⁿ 1/8ⁿ 1 3/4ⁿ 3/4ⁿ
 in the Order of their Occurrence.

O.H. Tenn. 8540 ASCE 1-1919 Ingot C Heat 37210

Conclusions

This accident was caused by the fracture of a rail due to the presence in it of transverse fissures.

The rail apparently fractured under the train which was derailed, as the engine and first two cars passed safely over the defective rail. The presence of defects of this character in the interior of the rail cannot be detected by ordinary visual track inspection. Extreme vigilance in inspecting the inner face and under surface of the head of the rail may disclose rust streaks where fissures have reached the surface, but it is only comparatively recently that test apparatus has been developed for detecting and locating such defects in the interior of the rail before they have reached the surface. From examination of the rail after the accident it did not appear that any of the transverse fissures in the rail which failed had reached the surface prior to the accident.

All of the employees in the crew of the train involved in this accident were experienced men, and none of them was on duty contrary to the provisions of the hours of service law.

Respectfully submitted,

W.P. BORLAND,
Director.