INTERSTATE COMMERCE COMMISSION

REPORT OF THE DIRECTOR OF THE BUREAU OF SAFETY IN RE INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE SOUTHERN RAILWAY SYSTEM, LINES WEST, NEAR SHANNON, GA., ON JULY 18, 1928.

April 23, 1929.

To the Commission.

On July 18, 1928, there was a derailment of a passenger train on the Southern Railway System, Lines West, near Shannon, Ga., resulting in the death of 1 passenger and the injury of 21 passengers and 2 employees.

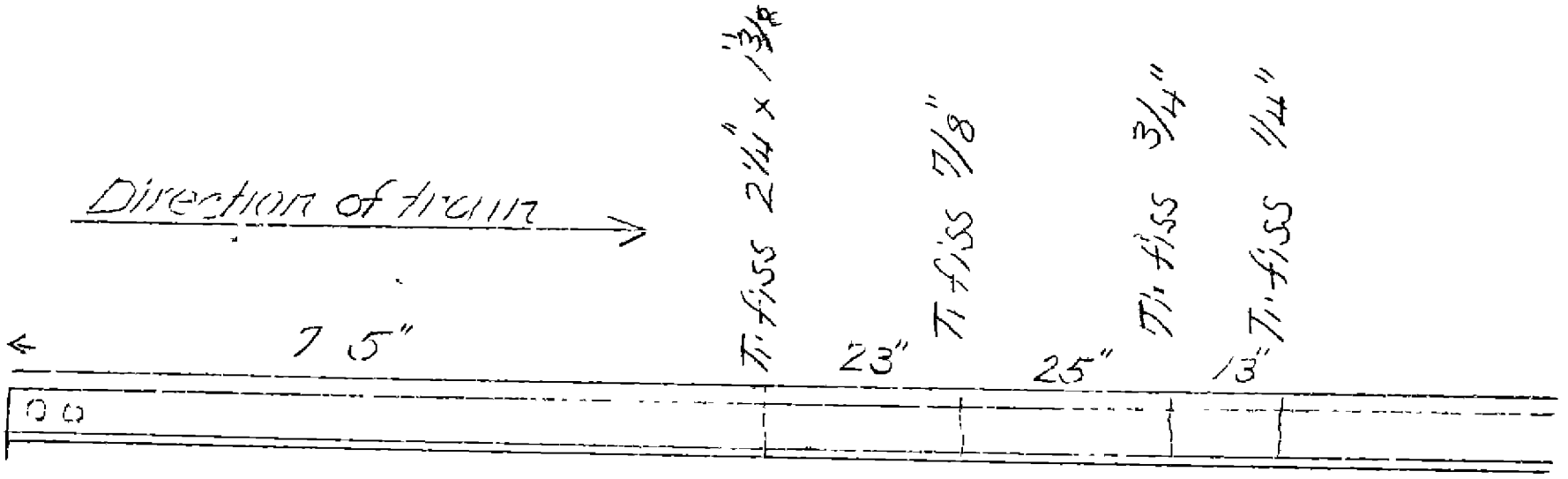
Location and method of operation

This accident occurred on that part of the Queen & Crescent District, Atlanta Division, extending between Atlanta, Ga., and Chattanooga, Tenn., a distance of 152.7 miles, in the vicinity of the point of accident this is a single-track line over which trains are operated by time-table, train orders and an automatic block-signal and train-control system. The accident occurred at a point about 2 miles south of the station at Shannon, or approximately 451 feet south of mile post 73-H; approaching this point from the south there is a 1° 12' 06" curve to the right 573.5 feet in length, followed by 1,772.5 feet of tangent track, this tangent continuing for a considerable distance beyond the point of accident. The grade for northbound trains is 0.3 per cent ascending at the point of accident. The track was laid with 85-pound rails, 39 feet in length, with about 24 oak ties to the rail-length, tie-plated, single-spiked and ballasted with slag to a depth of 8 inches. The track was well maintained.

The weather was clear at the time of the accident, which occurred at about 3.25 p. m.

Description

Northbound passenger train No. 2 consisted of one postal car, two mail storage cars, one combination baggage and passenger car, one coach, one dining car, five Pullman sleeping cars and ore Pullman observation car, in the order named, all of steel construction, hauled by engine 1405, and was in charge of Conductor Alcutt and Engineman Williams. This train passed



Broken rail 85 lbs TCI&RR Co. Nov 1926 Heat S44378

Accident on the Southern Ry near Shannon, Ga

July 18. 1928

Forrestville, the last open office, 7.1 miles south of Shannon, at 8.18 p. m., according to the train sheet, six minutes late, and was traveling at a speed estimated to have been between 40 and 55 miles per hour when the last three cars were derailed as a result of a broken rail.

All three cars were derailed to the right or east, the tenth and twelfth cars coming to rest on their right sides, while the eleventh car remained upright. The rear end of the twelfth car was 275 feet north of the point of derailment, the rear end of the eleventh car was 111.5 feet north of the twelfth car, and the front end of the tenth car was 200 feet from the rear portion of those cars in the train which were not derailed, the train also was separated a distance of 150 feet between the sixth and seventh cars.

Summary of evidence

Engineman Williams stated that he noticed nothing unusual when the engine passed over the section of track where the rear end of his train derailed. A light throttle was being worked and he estimated the speed of his train to have been about 40 miles per hour when the air brakes applied in emergency from the rear, at first he thought either that the train had broken in two or that an air hose had burst. He said that the air brakes worked properly, that the headlight was burning brightly and that all signals from Rome, 8.8 miles south of Shannon, to the point of accident displayed clear indications. The statements of Fireman Burroughs corroborated in substance those of Engineman Williams.

Conductor Alcutt had just passed from the sixth car to the seventh car, taking up tickets, when the air brakes applied in emergency, while Flagman Hughes was riding in the car ahead of the last car when the accident occurred. On going back to flag the flagman found the broken rail which caused the accident, and on reaching the first northbound automatic block signal he noticed that it was displaying a stop indication. Conductor Alcutt rendered assistance to the injured and then went to Shannon and made a report of the accident; on his return he saw the broken rail and it was his opinion that the rail broke under the train.

Maintenance of Way Engineer Bennett was riding in the last car at the time of the accident, while Master Mechanic Shults was riding in the tenth car; the master mechanic estimated the speed of the train to have been between 50 and 55 miles per hour at the time of the accident. On going back to the initial point of derailment together they saw the broken rail on the east side of the track the break having been due to transverse fissures. Mr. Bennett said that the rail broke into seven pieces, measuring from the receiving end to the leaving end as follows. 7'4", 1' 11¼", 2' 1¼", 1' 1½", 2' 8½", 2' 0½" and 21' 9".

Section Foreman Pierce stated that he personally patrols his section two or three times a week and that he thoroughly inspects the rails on these occasions. At about 7:30 or 8 a. m. on the day of its occurrence he passed over the portion of the track where the accident occurred and at that time everything appeared to be all right. Section Foreman Pierce further stated that since the automatic block signals were installed, about one and one-half years prior to the accident, he had found about five or six broken rails, and that each time the signals displayed stop indications on both sides of such rails. He also said that while he did not rely on signal indications to detect broken rails he did notice that while patrolling the track on the day of the accident all signals displayed clear indications.

Roadmaster Bradley said that Supervisor Carper also passed over the portion of the track where the accident occurred, between 1 and 2 p. m. the day of its occurrence, and that nothing unusual was noticed. Roadmaster Bradley further stated that the rail involved showed the presence of transverse fissures; that it had been laid elsewhere in December, 1926, taken out of that location in April, 1928, when heavier rail was laid, and relaid at the point where the accident occurred in May, 1928. It also appeared from his statements that since automatic block signals were installed about 40 or 50 broken rails have been found on this division but none were of the same heat number as the one involved in this accident, although transverse fissures were found in some of them.

Signal Supervisor Hinds stated that he thought there had been 35 or 40 cases of broken rails between Chattanooga, Tenn., and Macon, Ga., during the one and one-half years preceding the accident, where the automatic block signals assumed the stop position, the rail being found in every instance before it caused an accident.

The evidence indicated that this accident was caused by a broken rail. The fragments of this rail were examined by Mr. James E. Howard, engineer-physicist, whose remarks upon them immediately follow:

Remarks of the engineer-physicist

It is clearly evident that the cause of the derailment was a broken rail, due to the presence of a number of transverse fissures. Four fissures were displayed at the time of the accident At the first break in the rail, 7 feet 5 inches from the receiving end, the largest transverse fissure was shown. It covered the greater part of the area of the head and had a darkened surface. This fissure had reached the peripheral surface, admitted air and caused the discoloration of the faces of the fissure. The other three transverse fissures were smaller in diameter and presented faces of a silvery lustre common to fissures in their development previous to the time they are exposed to the air. These fissures were progressively smaller in diameter, according to their distance from the principal one. No special importance, however, attaches to this progressive diminution in size. Examples are frequently met where large fissures are located between smaller ones. The rate of growth depends upon track conditions, but every part of the length of the head is exposed to conditions which tend toward the formation of transverse fissures. Maximum stresses and local minor variations in strains probably account for the position and size of individual fissures. It would seem more reasonable to infer that variations in the conditions of exposure of individual rails account for differences in the sizes of transverse fissures rather than that they are due to primitive variations in strength along different parts of the lengths of the rails. There is probably a relation between the ages of transverse fissures and their sizes in the same rail. No reason has yet been established why a transverse fissure should not originate in any part of the length of the rail. This feature is mentioned as a suggestion to those who will undertake the extension of knowledge concerning the inception of this type of fracture. If perchance a reason is found for the loci of transverse fissures in the same rail, the next step would be to establish why some heats are, or are alleged to be, more prone to display transverse fissures than others. Efforts should be made to obtain information upon tangible objects of inquiry, having to do with this menacing type of fracture.

The present rail presents no features which have not been met in many other examples, but its display of transverse fissures at the early age of one year and eight months is disquieting. The determination of the physical properties of a rail, like the present example compared with conditions of exposure with other rails which have shown greater longevity should furnish opportunities for useful investigations.

As a matter of routine the following data concerning the present rail are presented the rail was rolled by the Tennessee Coal Iron and Railroad Company, in November, 1926, heat number 844378, ingot letter B, weight per yard 85 pounds. It was laid in the track in December, 1926.

Chemical composition

Analysis	C.	Mn.	P.	S.	Si.
Ladle	.73	.82	.023	.042	.27
So. Ry. O.	.76	.78	.017	.042	--
So. Ry. M.	.77	.78	.017	.042	--

The top of the head was planed off to the depth of the nuclei of the transverse fissure and then pickled in hot hydrochloric acid in quest of shrinkage cracks, or shattered zones, so-called. None were found The cross section of the rail was in good shape, showing limited amounts of wear.

Respectfully submitted,

W. P. BORLAND,

Director.