

INTERSTATE COMMERCE COMMISSION

REPORT OF THE DIRECTOR OF THE BUREAU OF SAFETY IN RE
INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE
LOUISVILLE & NASHVILLE RAILROAD NEAR MUNFORDVILLE,
KY., ON OCTOBER 3, 1930

October 25, 1930.

To the Commission:

On October 3, 1930, there was a derailment of a passenger train on the Louisville & Nashville Railroad near Munfordsville, Ky., which resulted in the injury of 47 passengers.

Location and method of operation

The accident occurred on that part of the Louisville Division extending between Louisville and Bowling Green, Ky., a distance of 113.7 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 system. The accident occurred at a point 4,075 feet south of the station, approaching this point from the south, there is a 10° 55.5' curve to the left 1,545 feet in length, followed by 2,151.9 feet of tangent track to the point of derailment, this tangent extending for some distance beyond. The grade for northbound trains is 0.705 per cent ascending at the point of accident.

In the vicinity of the point of accident, the track extends through an earth cut averaging 16.5 feet in depth for a distance of approximately 1,000 feet. It is laid with 100-pound rails, 39 feet in length, with 32 treated oak ties to the rail-length, single-spiked, and fully tie-plated, about 9 rail anchors are used to each rail. The track is ballasted with 2½-inch limestone to a depth of about 30 inches and is well maintained.

Automatic block signals Nos. 742 and 752 are located 4,735 and 8,215 feet, respectively, south of the point of accident.

The weather was clear at the time of the accident, which occurred at 5 12 a.m.

Description

Northbound passenger train No. 4 consisted of one postal car, one express car, two baggage cars, two coaches, four sleeping cars, and one coach, all of steel construction, hauled by engine 409, and was in charge of Conductor Summers and Fireman Brightwell. This train departed from Bowling Green at 4.31 a.m., on time, passed Cave City, 11.7 miles south of Murfreesboro at 5 a.m., according to the train sheet, two minutes late, and was derailed by a broken rail near Murfreesboro while traveling at a speed estimated to have been approximately 50 miles per hour.

The engine and first three cars were not derailed, although the couplers broke at the rear ends of the first and third cars, the engine and first car continued to the station, the second and third cars, coupled, stopped about 2,000 feet south of the station, and the remaining eight cars were derailed to the right against the bank of the cut at an angle of about 45°, parallel to the roadbed, and coupled together, except that the sixth car passed the preceding car about 20 feet, jamming against it, but remaining upright. The rear car stopped 38 feet north of the broken rail.

Summary of evidence

Engineman Brightwell stated that the train was traveling at a speed of about 50 miles per hour when he felt the engine jerk, and at once applied the air brakes in emergency, but he did not hear any exhaust from the brake valve. He then looked back and on seeing fire flying from the wheels, he placed the handle of the independent brake valve in the release position and held it there until he reached the station, where he brought the engine to a stop. He then saw that he had only one car coupled to the engine. Engineman Brightwell stated that the headlight was burning, the air brakes were working properly, and that signals 75.2 and 74.2 were in the clear position when his engine passed them. An examination of the engine after the accident disclosed no defects that could have contributed to the derailment. The statements of Fireman Crubbs furnished no additional information of importance.

Conductor Summers stated that he was riding in the fifth car, and his first indication of danger was when the cars left the rails. He estimated the speed of the train at the time of the accident to have been about 50 miles per hour. After assisting passengers and reporting the accident, he made an examination of the track and found a broken rail south of the last car in the train.

Flagman Mountjoy stated that when he went back to flag immediately after the accident, he saw the broken rail, south of that point he found no marks of any kind on the track, as he passed signal 74.2 he noted that it showed a stop indication. The statements of Baggageman Ostertage brought out nothing additional of importance.

Section Foreman Brown, who has charge of the track in the vicinity of the point of derailment, stated that he was last over this section of track at noon on the day previous to the accident and found it in good condition, stating that there was no visible defect in the rail at that time. He said that the breaking of the rail was due to a transverse fissure.

Track Supervisor White stated that he inspected the track in the vicinity of the point of accident on the afternoon prior to its occurrence, there was no visible defect at that time, although during his 46 years of experience in track work he has found that transverse fissures in 100-pound rails, even when penetrating through to the surface of the rail, were barely discernible to the naked eye under the most careful scrutiny, he had, however, located many of them in lighter and smaller rails.

Roadmaster Leeds stated that he arrived at the scene of the accident about four hours after its occurrence, and his examination of the rail, which was on the right or east side, disclosed a transverse fissure at a fracture 8 feet 7 inches from its receiving end, there were then three pieces 1 foot 6 inches, 1 foot 10 inches, and 2 feet 2 inches, in length, respectively, and at the end of this last piece, or at the fourth break, there was another fissure about half the size of the first one. The remainder of the rail was shattered into a great many pieces, some of which were not recovered. Roadmaster Leeds stated that the fissure at the first break from the receiving end no doubt caused the derailment, as the short piece of rail immediately north of this fissure had a decided indentation on top of the ball which could only have been made by the flanges of wheels striking against it, and this force, in turn, probably caused the remainder of the rail to break up, allowing the cars to be derailed to the east. He thought that the rail broke under engine 409, and that subsequent fractures were brought about by the battering effect of the engine, tender, and first three cars that were not derailed. Examination of the first car to be derailed disclosed no defects that could have contributed to the cause of the

accident, nor did inspection of the track south of the point of derailment show any evidence of dragging equipment. The track was damaged for a distance of about 700 feet, 10 rail-lengths of which were destroyed. The rail that failed was from heat number 874012, letter C, Ingot 1, rolled in November 1926, manufactured by the Tennessee Coal and Iron Company, and was laid in the track in December, 1926. Roadmaster Leeds stated that it had been their practice where transverse fissures had developed in two rails from the same heat, to remove from the high sides of curves all rails from that particular heat, and when four fissures had developed in a heat, all rails from that heat were removed. In December, 1929, however, a Sperry transverse fissure detector-car was operated over this division, and between mileposts 5 and 113 there were found 15 rails containing transverse fissures, all of which were immediately removed from the track, these rails being broken subsequently to disclose the fissures. Subsequent to the operation of this car over this division, the removal of rails of heats which had displayed fissures, in accordance with the former practice, was discontinued on account of the disclosures made by the detector car of other failures in certain heats. Under date of August 28, 1930, however, the former practice of removing rails of heats displaying the specified numbers of transverse fissures was resumed, and this is the present practice. No rails of the heat number involved in this accident were found defective by the Sperry test car, although in the ten months since that test, four rails with this heat number had broken as a result of transverse fissures, this one being the fifth such failure. As a result of this accident another rail of the same heat number, farther north in the track, was broken and also disclosed a transverse fissure, the sixth known for heat No. 874012. During the interval when the former practice of removing rails of certain heats had been suspended the specified number of fissures had developed in a considerable number of heats and this necessitated an enormous amount of detail work in checking the rails to be removed, as rails of the same heat are widely scattered over several different miles and on various divisions. Roadmaster Leeds said he had completed the preliminary work required as a result of reviving the former practice, involving about 500 rails, and that upon receipt of the necessary replacement material the work would be taken care of as promptly as possible. To all external appearances, the rails that are to be removed from the track are just as good and sound as rails that have not developed transverse fissures, but the replacements are made as an additional precaution.

The rail involved, which was on the east, or right side of the track for northbound trains, showed a fresh, clean, vertical break 8 feet 7 inches from its receiving end, the second break was at a slightly oblique angle, the third was vertical to the middle of the web, and then bifurcated to the base, the next break was vertical, and the remainder of the rail was shattered into pieces, although all breaks were clean, fresh and clear. The transverse fissure found at the north end of the first piece was oval-shaped, 1 3/4 inches in length, extending from the gauge side of the ball to a point beyond the center of the head, being not more than 1/64 inch from the running surface, and within 1/8 inch of the lower side of the ball at its juncture with the web, its appearance was bright, showing a silvery luster. Another fissure was found at the north end of the fourth break, or the 2 feet 2 inch section, this fissure being less than half the area of the first fissure. The south end of the second rail section, 1 foot 6 inches in length, showed evidence of heavy battering and flange marks on top of the ball of the rail.

Conclusions

This accident was caused by a broken rail, due to a transverse fissure.

The rail probably broke under the engine of this train and the pounding of the following wheels of the engine, tender, and first three cars, against the next adjoining piece of rail, as evidenced by flange marks on the ball, shattered the rail and created an opening in the track through which the remaining eight cars were derailed. The breaks in the rail were fresh, clean and bright, and the presence of the large transverse fissure which had almost reached the running surface of the rail was the direct cause of its failure.

Several months prior to the occurrence of this accident the rails in the track on this division were examined by means of the Sperry transverse fissure detector and a number of rails found to contain transverse fissures were removed. Instances are known in which transverse fissures have developed in shorter periods than that which elapsed between this examination and the occurrence of this accident, and it is reasonable to believe that the transverse fissure which resulted in this rail failure developed after the Sperry tests were completed. Relatively little information is now available as to the rate of growth of transverse fissures, although observations and tests are now in progress to obtain data on

this point By means of the device which has been developed to detect transverse fissures, a large number of defective rails have been discovered and removed from the track It has not been determined, however, how frequently such examinations must be made to provide immunity from disastrous failures of this character.

All of the employees involved were experienced men, and at the time of the accident none of them had been on duty in violation of any of the provisions of the hours of service law.

Respectfully submitted,

W. P. BORLAND,

Director.