INTERSTATE COMMERCE COMMISSION

REPORT OF THE DIRECTOR OF THE BUREAU OF SAFETY IN RE INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE CHESAPEAKE & OHIO RAILWAY NEAR CONVERSE, IND., ON JUNE 8, 1925.

September 28, 1925.

To the Commission:

On June 8, 1925, there was a derailment of a freight train on the Chesapeake & Ohio Railway near Converse, Ind., which resulted in the death of 13 employees and the injury of 5 employees. The investigation of this accident was made in conjunction with representatives of the Public Service Commission of Indiana.

Location and method of operation

This accident occurred on that part of the Chicago Division extending between Peru and Boston, Ind., a distance of 105.6 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 a manual block-signal system. The point of accident was about 1 mile east of Converse; approaching this point from the east there are 3,700 feet of tangent, followed by a 7° 30' curve to the right having a total length, including spirals, of 780 feet, the accident occurring on the curve at a point about 355 feet from its leaving end. The grade is descending, and then practically level for a distance of about 1,500 feet, followed by an 0.84 per cent descending grade 480 feet in length on which the accident occurred. The curve extends through a cut about 15 feet in depth, limiting the range of vision to about 360 feet, while just beyond the western or leaving end of the curve, the track is spanned by a three-track bridge of the Pennsylvania Railroad.

The track at the initial point of derailment was laid with 90-pound rails, 33 feet in length, with from 17 to 18 ties to the rail-length, single-spiked, and ballasted with about 18 inches of gravel; tie-plates and anti-rail creepers were in use on the curve. Freight trains handling loaded high hopper cars, such as were in the train involved in this accident, are restricted to a speed of 30 miles an hour, while there is also a permanent slow board, located about 1,050 feet east of the point of accident, governing the movements of westbound trains while passing around the curve this slow board, however, does not specify to what extent speed should be reduced, this being a matter left to the judgment of the enginemen.

The weather was clear at the time of the accident, which occurred at about 7.40 a. m.

Description

Westbound freight train No. 83 consisted of 56 cars and a caboose, hauled by engine 1169, and was in charge of Conductor Smithson and Engineman Grose. It passed Marion, Ind., the last open office, 11.3 miles from Converse, at 6.58 a. m., set off four cars at Phoenix, 9.7 miles from Converse, departing from that point at 7.12 a.m., and was derailed while rounding the curve east of Converse at a speed variously estimated to have been between 15 and 30 miles an hour.

The engine came to rest in an upright position with only the right trailer-truck wheel off the rail. The wheels on the right side of the tender were derailed while the first car remained attached to the tender in an upright position, with all wheels off the track. The second and third cars came to rest leaning against the north abutment of the Pennsylvania bridge, while the next 11 cars were at right angles to and directly across the track immediately east of the bridge; the fifteenth car in the train was also derailed but remained upright. The employees killed were a brakeman and 11 track laborers; the laborers were engaged in laying new rail and a majority of those killed were caught between the second and third carsand the north abutment of the Pennsylvania bridge.

Summary of evidence

Engineman Grose said that when approaching the cut in which the accident occurred he made a 10-pound application of the air brakes, reducing the speed to 15 or 18 miles an hour. He released the brakes just after passing the slow board, at which time the speed was about 15 miles an hour, and when within the length of the engine and tender from the bridge he felt a side swing of the engine and then felt the right trailer-truck wheel drop off the rail; he said he at once applied the air brakes in emergency but was doubtful whether an emergency effect was obtained on account of the short interval of time which elapsed since the previous application was made. Engineman Grose estimated that the engine stopped within a distance about equal to three times the length of the engine and tender. On examining the engine shortly afterward he found that the right trailer-truck wheel was on the inside of the right rail, this being the only wheel of the engine which was then off the rails, and he said that at no time had he felt anything that would indicate that one of the driving wheels had been derailed nor did he afterward notice marks on any of the driving wheels to indicate that this had been the case.

Engineman Grose said he also found the wheels on the right side of the forward tender truck to be derailed on the inside of the right rail while the wheels on the left side of the rear tender truck were derailed on the inside of the left rail; he was not positive, however, about the position of the wheels on the right side of the rear truck. It appeared to him that the accident was due to spread rails.

Fireman Olinger said an application of the air brakes had been made when approaching the curve at Converse and that he thought the speed was from 13 to 15 miles an hour. His first knowledge of anything was when the engine jumped around as it passed under the Pennsylvania bridge, the engineman at once applying the air brakes in emergency. Fireman Olinger did not know at what point the brakes had been released prior to the emergency application except to say that it was before the train reached the bridge. Fireman Olinger had talked over the matter with the engineman but had not formed any opinion as to the cause of the accident.

Conductor Smithson thought the train started around the curve approaching the point of accident at a speed of 15 or 18 miles an hour, and he said his first knowledge of anything wrong was when he felt a jerk at the rear of the train, and he remarked to the flagman that either an air hose had burst or the train had been derailed. He estimated that the caboose traveled a distance of about eight car-lengths before coming to a stop. Some time after reaching the head end of the train he made an examination of the track and equipment but did not ascertain what caused the accident. The statements of Flagman Redd did not develop any additional facts of importance.

Conductor Troyer, of eastbound train first No. 92, stated that his train was flagged at Converse, and after the train had been placed on a side track the engine was cut off and run to the scene of the accident. On reaching there he found the right trailer-truck wheel of engine 1169 on the inside of the rail, which appeared to be tightly spiked although slightly turned outward. A retracker was placed under the derailed wheel and the engine moved ahead, thus rerailing the wheel, and Conductor Troyer said that as soon as this had been done the rail straightened to its proper position; this particular rail was double-spiked and was also tie-plated.

New 100-pound rails were being laid in this vicinity, the men so engaged working from west to east, and on Friday, June 5, the new rails had been laid in the south or outer rail to a point 78 feet east of the center of the

Pennsylvania bridge, while the new rails on the north side of the track extended to a point 94 feet east of this bridge At these points the 100-pound rails were connected to the old 90-pound rails with temporary joints, two bolts being placed through the 100-pound rails, with no bolts securing the ends of the 90-pound rails; the spikes were also drawn from every other tie on the curve on which the accident occurred. On Saturday, June 6, a hole was drilled in each 90-pound rail and one bolt applied, while the spikes which had been removed from every other tie were replaced for a distance of three or four rail-lengths east of the temporary joints; the spiking of the new 100-pound rail was also completed and additional material distributed but the crew did not lay any more new rails on this day. On the following day, which was Sunday, no work was done, while the track was not patrolled between the end of the day of June 6 and the beginning of work on the Monday morning of the accident. On this day the track laborers had arrived at the scene and were waiting for train No. 83 to pass before opening the track for the purpose of laying more new rails.

It further appeared that some previous difficulty had been experienced by the track being knocked out of line in this immediate vicinity, resulting in surveyors being sent there for the purpose of placing center stakes, and Section Foreman Cunningham stated that since that time the track had been kept lined to the center stakes and that he had not had any further difficulty east of the Pennsylvania bridge, although a little farther to the west the track had kicked out to some extent. Section Foreman Cunningham did not know what part of train No. 83 was the first to be derailed, but said that it occurred at a point east of the temporary joints, and he thought the accident was due to high speed. Both Section Foreman Cunningham and Extra Gang Foreman Bartgen said the spikes had been pulled from every other tie on the curve on which the accident occurred, prior to laying new rails, and Foreman Bartgen said he had been doing this ever since he began laying rails, a period of about 10 years. He estimated the speed of train No. 83 to have been about 30 miles an hour.

Section Laborer Coffey said he was at the eastern end of the Pennsylvania brdige as train No. 83 approached, and from his position on the inside of the curve he saw a truck off the rail under the fourth or fifth car in the train, at a point 10 or 12 car lengths east of the temporary joints; the engine was then about opposite him and was not derailed at this time. He did not think the speed was anything unusual, being about 30 miles an hour, and he said the train stopped within a distance of about 100 yards after he first noticed the derailed truck. Afterward he examined the track east of the point where it was torn up and found it to be in good gauge.

Section Laborer Muller, who was standing on the outside of the curve near the abutment of the Pennsylvania bridge, said he heard an unusual noise and then saw that some of the trucks were off the track, and in his opinion they were west of the temporary joints when he first noticed them. He was unable to say which was the first car to be derailed, and did not notice that the engine was derailed at the time it passed him. Section Laborer Kaufman was also on the outside of the curve as the engine approached the point where he was standing. He saw fire flying from under the train, this being before the engine had passed him; he thought the fire first appeared at a point four or five car-lengths east of the temporary joints, but did not know under what particular car in the train. He was unable to say whether or not the engine was derailed when it passed him.

Section Laborer Muller said the ballast would not be very good in wet weather, but that in the dry weather prevailing it was all right and would not cause trouble. The first thing he noticed in connection with the derailment was the noise made by cars running along on the ties, and he expressed the opinion that the first car to be derailed was the second or third car from the engine, at a point seven or eight car-lengths east of the temporary joints; the engine was not derailed when it passed him. He estimated the speed of train No. 83 to have been about 20 or 25 miles an hour. Section Laborer Burk also thought the derailment occurred at a point six or eight rail-lengths east of the temporary joints, and estimated the speed to have been 20 or 30 miles an hour. He also stated that there had always been more or less difficulty of holding the track on this particular curve.

Supervisor Ryan thought the track had been weakened about 30 per cent by pulling the spikes from every other tie, but he did not think the heavy traffic over this portion of the road between the time the track forces stopped work on Saturday and the time of the derailment Monday morning would have caused the track to have spread enough to allow the wheels of train No. 83 to drop on the inside of the rails. In his opinion a rigid truck under one of the cars in train No. 83 might have spread the track. Mr. Ryan also stated that he had been under the impression that a broken rail caused the accident, although at the time of the investigation he said he had nothing upon which to base his opinion.

Engine 1169 is of the 2-8-2 type, having a total weight, engine and tender loaded, of 577,100 pounds. Examination of this engine failed to disclose the presence of anything broken or dragging which could have caused the accident, while the flanges of all wheels under both engine

and tender were in good condition and nothing was discovered which was thought could have had any bearing on the accident. It clearly appeared, however, that the right forward driving wheel, the left back driving wheel, and the right trailer-truck wheel, had been running on the inside of the rail, although according to the testimony all the wheels were on the rail immediately after the train stopped, with the exception of the right trailer-truck wheel. The 100-pound rails west of the temporary joints were joined together by angle bars having a shoulder extending about 1 inch beyond the ball of the rail. Heavy marks on two of these angle bars, one on the right and one on the left side of the track, were thought to indicate where the driving wheels had rerailed themselves, although it could not be definitely proved that this was the case.

On account of the conflicting nature of the testimony, it was difficult to locate the exact point of derailment, and to determine what part of the train was first derailed. The engineman stated that when within the length of the engine and tender from the bridge he felt the right trailer-truck wheel drop off the rail, while some of the section men said they saw trucks derailed under the cars in the train at a point several rail-lengths east of the temporary joints. As nearly as could be determined the derailment occurred at a point approximately 280 feet east of the bridge, or between five and six rail-lengths east of the temporary joints, and the right forward driving wheel appeared to have been the first wheel to be derailed.

Measurements of the track east of the point of derailment showed that between the point on the curve at its eastern end and the approximate point of derailment, a distance of about 380 feet, the gauge was open varying from 1/8 inch to 11/16 inch; immediately east of the point of derailment the gauge was 4 feet $8\frac{3}{4}$ inches. The elevation within this distance of 380 feet was fairly uniform, varying between 3 7/8 inches and 4 5/8 inches, being 4 inches immediately east of the point of derailment; according to the recommended practice of the American Railway Engineering Association the elevation on a curve of 7° 30' for a speed of 30 miles an hour would be 4.455 inches. The curvature when measured with a 62-foot cord showed some variations, the distance between the cord and the gauge side of the rail varying from $5\frac{3}{4}$ inches to 8 9/16 inches; it was only 4 7/8 inches immediately east of the point of derailment, but this measurement was made with one end of the cord on track which had been disturbed by the accident. Measurements taken at 25-foot intervals at five points immediately to the east varied between $6\frac{1}{2}$ inches and 7 11/16 inches.

Examination of the track for a distance of 800 feet east of the assumed point of derailment showed that in addition to having the spikes removed from every other tie the track was further weakened by the presence of split, damaged, or broken ties. Within this distance of 800 feet there were 427 ties, of which 72 or 16.86 per cent were classified as split, damaged or broken.

Conclusions

This accident is believed to have been caused by spread rails.

Examination of the equipment failed to disclose anything which could have caused the accident, nor does it appear that excessive speed was a factor. On the other hand, the track was materially weakened by the fact that the spikes had been pulled from every other tie nearly the entire length of the curve, this weakened condition being accentuated by the fact that nearly 17 per cent of the ties were split, broken or decayed, resulting in their holding qualities being materially reduced. The elevation was fairly well maintained, but the gauge was somewhat uneven, which was also the case with the alignment. On a curve as sharp as the one on which this accident occurred it is of vital importance that the track be in good condition in order to withstand the strain placed upon it; such was not the case in this instance, and it seems apparent that the weakened condition of the track, coupled with such irregularities in gauge and alignment as existed, resulted in the spreading of the rails sufficiently to allow a wheel or wheels to become derailed, tearing up the track and causing the general derailment.

The employees involved were experienced men; at the time of the accident they had been on duty about 8 hours, previous to which the engine crew had been off duty nearly 13 hours and the train crew nearly 33 hours.

Respectfully submitted,

W. P. BORLAND,

Director.