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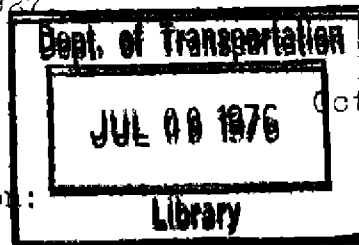
U. S. Interstate Commerce Commission

Railroad Accident Investigation

Report No. 1351

INTERSTATE COMMERCE COMMISSION

REPORT OF THE DIRECTOR OF THE BUREAU OF SAFETY IN RE
INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE
PENNSYLVANIA RAILROAD AT TERRE HAUTE, IND., ON
AUGUST 5, 1927.



October 13, 1927.

To the Commission:

On August 5, 1927, there was a derailment of a freight train on the Pennsylvania Railroad at Terre Haute, Ind., resulting in the death of one employee and the injury of three employees.

Location and method of operation

This accident occurred on that part of the St. Louis Division extending between Effingham, Ill., and Terre Haute, Ind., a distance of 67.9 miles. In the immediate vicinity of the point of accident this is a double-track line over which trains are operated by time-table, train orders and a manual block-signal system. The accident occurred within the yard limits of Terre Haute at the frog of a facing-point switch which leads off the eastward main track through a No. 8 turnout to the north or left to the eastward freight main track. Approaching the switch from the west the track is tangent, while the grade is practically level.

In the vicinity of the point of accident the track is laid with 100-pound rails, 33 feet in length, with about 19 treated hardwood ties to the rail-length, tie-plated and spiked with from two to four spikes in each tie, ballasted with gravel to a depth of about 12 inches. The mangar se frog, 13 feet 4 inches in length, was installed in the track in 1922. On the day of the accident an old guard rail was removed from the gauge side of the north rail of the freight main track, opposite the point of the frog, and a new guard rail, an Ajax, style-B, 8 feet 9 inches in length on top, made in 1926, was installed in its place, this work having been completed at 11.30 a.m.

The weather was cloudy at the time of the accident, which occurred at about 10.05 p.m.

Description

Eastbound freight train second No. 44 consisted of 33 cars and a caboose, hauled by engine 8702, and was in charge of Conductor Crittenden and Engineman Rood. This train passed "K" Cabin, about 3,100 feet west of the switch, at 10.03 p.m., entered the switch and was derailed about opposite the frog while traveling at a speed estimated to have been about 12 miles per hour.

Engine 8702 came to rest on its left side with its head end about 183 feet east of the point of derailment. The tender, the first car, and the forward truck of the second car were also derailed. The employee killed was the fireman.

Summary of evidence

Engineman Rood stated that a proceed indication was displayed at the position light signal governing the movement through the turnout; he shut off steam, at which time the speed was about 12 miles per hour, and permitted the train to drift, with the result that the speed decreased slightly. The engine passed the switch points and reached the guard rail, at which point the engine truck derailed, followed by the turning over of the engine. The engine apparently was in excellent condition, and he said he had no warning of anything wrong until the derailment occurred.

Conductor Crittenden stated that he was riding on the rear platform of the caboose and that the first knowledge he had of anything wrong was when the accident occurred, at which time the speed was about 12 miles per hour. The air brakes applied in emergency and the train stopped suddenly, so quick in fact that he was thrown against the back end of the caboose and rendered unconscious. The statements of Flagman Cox corroborated in substance those of Conductor Crittenden; immediately after the accident Flagman Cox went back to flag.

Switch Tender Woerner stated that he lined the switch for the movement from the eastward main track to the eastward freight main track and then gave train second No. 44 a proceed indication by setting the electric signal to govern this movement. He watched the train as it approached and said that it was moving at a lower rate of speed than was ordinarily the case. He noticed nothing unusual, no sparks flying or anything to indicate that there was anything wrong with the engine or cars, and the first he knew of any trouble was on hearing the noise made by the derailed engine as it bumped along on the ties.

At the time the Commission's inspectors examined the track at the point of accident the ties that had been removed from the track east of the frog had been disposed of, but the marks on the frog indicated that the engine had derailed to the right or south. The new guard rail that had been installed on the day of the accident had been removed and placed in a storeroom, where examination of the guard rail also indicated that the derailment was to the south. The first flange mark on the guard rail started at a point 11 inches from its western end and extended diagonally across the top of the rail for a distance of 5 feet $\frac{1}{2}$ inch to the point where the wheel dropped off on the gauge side of the guard rail; at a point about 7 inches east of where this mark ended there was a mark on a side brace of the guard rail, about 2 inches from the top of the guard rail, also apparently made by a wheel flange. Measurements made at 7 a.m. on the second day after the accident disclosed that the gauge of the track at the frog was 4 feet 9 $\frac{1}{16}$ inches, but the worn surfaces of the ties under the rail opposite the guard rail indicated that the gauge had been 4 feet 9 $\frac{5}{16}$ inches before the tie plates had been pulled in and respiked. These marks on the ties on the outside of the south rail were adjacent to the joint of the south rail at the western end of the frog, this joint being 5 $\frac{1}{2}$ feet west of the point of the frog, and the west end of the guard rail which was in the track at the time of the accident would have been about opposite this joint or immediately east thereof. Ordinarily this condition might not have had an immediate bearing on the occurrence of the accident, but with the short Ajax guard rail which was in use at the time the accident occurred, it appeared possible that the side thrust of engines at this point in the south rail resulted in the engine truck wheels crowding to the south far enough to allow the left or north wheel to strike the wing at the western end of the guard rail at its weakest point, bending it just enough to obstruct the free passage of the wheels around the wing into the throat of the guard rail; it was at this point that the first flange mark appeared on the top of the guard rail, crossing diagonally to the gauge side of the same, and in turn permitting the wheels on the opposite end of the axle to come in contact with the point of the frog. The curved side of the guard rail, next to the stock rail, was not a true curve, having four distinct straight sides or tangents; starting from the wing at the west end, they were 14, 18, 49 and 15 inches in length. There was a slight bump at the beginning and ending of each tangent, while the first section, instead of curving outward towards the stock rail, had a concave curve its full length, the depth being $\frac{1}{4}$ inch from a straight edge.

On the afternoon of the day following the accident tests were made with engines of different types operated through the turnout, the engines being moved at a low rate of speed, from about 2 to 4 miles per hour. Engine 8702, the engine involved, was snoved through by another engine and when the left lead wheel of the engine truck reached the west wing or receiving end of the guard rail it mounted the guard rail and was derailed. An engine of the 2-8-0 type was then operated through the turnout but it remained on the rails. Engine 8642, of the same type as engine 8702, was then moved through the turnout, and, as was the case with engine 8702, the left lead wheel of the engine truck mounted the guard rail and was derailed. The division engineer then had the Ajax guard rail removed and an old style guard rail 15 feet in length was installed. Engines 8702 and 8642 were then operated through the turnout and passed safely through with no signs of the wheels tending to mount the rail.

Track Foreman Mahoney stated that during the morning of the day of the accident an old guard rail, of the common type and made out of a piece of rail, 15 feet in length, was removed on account of a derailment occurring to a westbound train the day prior to the accident. That derailment tore out the guard rail and a small portion of the track but did not damage the guard rail, the new Ajax guard rail was then installed, this work being completed at 11.30 a.m., August 5. He noticed that the new guard rail had distinct straight lines on the throat side of the rail, instead of a perfect curve, and said this was the case with the new guard rails then being received. He supposed, however, that these new guard rails were safe for service in sharp turnouts, but after witnessing the tests above referred to he was convinced that while the guard rail would be safe to use at points where turnouts are not so sharp, yet it was not long enough to use on a No. 8 turnout, on account of the bend in it at the wing of the receiving end. Track Foreman Mahoney further stated, however, that from his experience in track work he thought the derailment was caused by the engine truck not properly taking the curve.

Supervisor Oglesby, Master Mechanic Wright and Trainmaster Kelly were of the opinion that the guard rail was defective and that the peculiar bend in it at the receiving end probably occurred at sometime during the process of manufacture, while Division Engineer Johns was of the opinion that there was nothing other than the condition of the guard rail which could have caused the derailment.

Engine 8702 is a passenger engine of the 4-6-2 type, having a total weight, engine and tender loaded, of 409,900 pounds. The weight is distributed as follows: Engine truck, 49,700 pounds; No. 1 driving wheels, 54,400 pounds, No. 2 driving wheels, 58,400 pounds; No. 3 driving wheels, 54,400 pounds, trailer wheels 46,100 pounds. The engine wheel-base is 34 feet $8\frac{1}{2}$ inches, the driving wheel-base 13 feet 10 inches, and the total wheel-base, engine and tender, 66 feet $9\frac{3}{8}$ inches. Careful inspection of the engine failed to disclose any defect that would have caused or contributed to the accident.

Between the time the Ajax guard rail was installed in the turnout and the time at which the derailment occurred, approximately $10\frac{1}{2}$ hours, the turnout had been used by nine engines with a wheel-base of 24 feet 9 inches, two engines with a wheel-base of 25 feet $9\frac{1}{2}$ inches, one engine with a wheel-base of 27 feet 3 inches and one engine with a wheel-base of 36 feet $4\frac{1}{2}$ inches, engine 3160, of the L-1-S type. The engine with the wheel-base of 36 feet $4\frac{1}{2}$ inches passed at about 6.30 p.m., after which five engines with shorter wheel-bases used the turnout prior to the occurrence of the accident. While it is possible that the end of the guard rail was bent by the left lead wheel of the engine truck of the engine with the longest wheel-base, the tests indicated that the guard rail was too short for use on a No. 8 turnout with the class of engines being operated in this territory.

Conclusions

This accident was caused by the defective condition of a guard rail.

The company officials were of the opinion that the defective condition of the guard rail was due to manufacturing conditions; on the other hand the slight bend in the west wing of the guard rail could have been caused by engine 3160 or by the derailed engine. In either event, the tests made subsequent to the occurrence of the accident clearly demonstrated that the guard rail as it then stood was not safe for use by all the various types of engines which used the turnout. This particular guard rail was one of several which had been received recently by the section foreman, and was of a different type from those formerly in use, having a series of straight sides on the throat side of the rail instead of curving gradually from one end to the opposite end. It

did not appear to the section foreman, however, that there was any element of danger connected with its installation at this particular point, and it is probable its use on tangent track would not have presented any difficulties; on the sharp curve of the turnout, however, the binding of the left lead wheel of the engine truck against the straight or slightly concave side of the guard rail would result in the wheel climbing the rail. It was not determined to what extent, if any, this condition was aggravated by any slightly wide gauge in the track which may have existed at the time of the accident.

The existence of a situation such as is disclosed by this investigation warrants a thorough inquiry, not only by this railroad but also by other railroads, with a view to eliminating any possibility of the occurrence of other accidents of a similar nature.

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.