INTERSTATE COMMERCE COMMISSION

REPORT OF THE DIRECTOR OF THE BUREAU OF SAFETY IN RE INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE LEHIGH VALLEY RAILROAD NEAR LATTIMER JUNCTION, PA., ON JULY 16, 1929.

November 23, 1929.

To the Commission:

On July 16, 1929, there was a derailment of a freight train on the Lehigh Valley Railroad near Lattimer Junction, Pa., resulting in the death of one employee.

Location and method of operation

This accident occurred on that part of the Evervale Branch of the Hazleton Division known as the Lattimer Colliery Branch, this is a single-track line, a mine track extending between Vexit Junction and Lattimer Junction, Pa., a distance of 1.28 miles and thence from Lattimer Junction to Lattimer Colliery, an additional distance of 0.7 mile. No directions are specified in the time-table, but it is generally understood that east is towards Vexit Junction. At Lattimer Junction, proceeding westward toward the colliery the main track leads off toward the right, at a point 1,380 feet from the junction there is a switch leading to a storage-yard lead track, which parallels this main track on the right, this is a facing-point switch for westbound movements, and the accident occurred at the frog of this lead-track switch located 60 feet west of the switch points. Approaching the switch from the east, beginning at Lattimer Jct., the track is tangent for a distance of 360 feet, and then there is a compound curve to the right, extending beyond the point of accident, the curvature of the turnout at the point of derailment is 17°. The grade for westbound trains is slightly ascending.

No scheduled trains operate over this mine track, the only train being an extra freight train, known as the "Mine Run", this train delivers empty cars to the mines, receives loaded cars, and does the necessary mine and colliery switching. No passengers are transported. Trains are operated between Vexit Junction and Lattimer Junction by train orders, but between Lattimer Junction and Lattimer Colliery they move without orders, crews protecting themselves.

In the vicinity of the point of accident the track is laid with old 90-pound, relaid rails, with about 20 ties to the rail-length, tie-plated, single-spiked, and ballasted with a mixture of cinders and mine slack

to a depth of about 12 inches, six-hole rail joints are used, with four bolts to the joint, the bolt heads being staggered. The track is not well maintained.

The weather was clear at the time of the accident, which occurred at about 10:30 a.m.

Description

Westbound freight train extra 332, which was the Line Run, in charge of Conductor Warning and Engineman Kleckner, consisted of engine 332, headed west, with its caboose coupled ahead of it, and it was shoving 13 loaded cars of unprepared coal through the lead-track switch toward the breaker at Lattimer Colliery at a speed estimated to have been between 9 and 12 miles per hour when the engine became derailed at the frog.

Engine 332, together with its tender, came to rest between the main track and lead track, upright, with the rear wheels of the tender on the frog, the caboose came to rest almost crosswise the main track, leaning toward the right. None of the other equipment was derailed or damaged. The employee killed was a trainman, who either jumped or was thrown from the top of the caboose.

Summary of evidence

Engineman Kleckner stated that his first intimation of anything wrong was when the forward end of the engine was on the ties, the airbrakes applied when the train parted and he applied the independent engine brake. Engineman Kleckner was certain that the caboose was derailed after the engine, he noticed no unusual swaying of the caboose and said that the four-wheel caboose usually rounded curves smoothly when being pushed by an engine with cars ahead of it. After the accident he examined his engine, but found nothing wrong, and the day's work was completed with it. On the day prior to the accident about five or six movements were made over the track at the point of derailment with the same engine and at about the same speed as was being made at the time of the derailment. Engineman Kleckner said that engines of the type of the one involved had been used on the Lattimer Colliery Branch for the last four years and that cars had become derailed at this particular location before, on one occasion an engine became derailed, but that derailment was due to a broken rail.

Conductor Warning was at Lattimer Junction when the derailment occurred. Subsequent to the accident the conductor made an examination of conditions in an endeavor to determine the cause of the accident. After

the engine had been derailed and while it was standing with the pony-truck wheels at point of derailment, he noticed that the left or outside pony-truck wheel did not make contact with the rail, being raised about one-sixteenth of an inch, and he could see plainly between the wheel and rail. He found nothing wrong with the engine or caboose and it was his opinion that the derailment was due to the short curve. Statements of other members of the crew developed nothing further.

Master Mechanic Conahan made a careful examination of engine 333 at the scene of the accident, but found no defect that would have caused or contributed to the derailment. After the engine was derailed it was operated forward and backward over the frog and it tracked all right, on being brought to a stop with the pony-truck wheels at the point of derailment the left wheel was one-fourth of an inch above the rail, enabling him to pass his rule between the wheel and the top of the rail. The wheel flange was tight against the rail, and the right wheel rested on the rail properly.

Superintendent Hitten in his report, stated that the right pony-truck wheel crossed over the guard rail 2 feet in advance of the point of frog, and that the flange on the opposite wheel took the wrong side of the frog point and followed in the frog groove, resulting in the derailment. He further reported that after a thorough inspection on the ground with this same engine, the indications were that the derailment was due to a No. 10 frog set in a 16° curve, which condition, with the long wheel base of this class of engine, permitted the pony-truck wheel to raise sufficiently to cross over the guard rail.

The first mark of derailment was a light flange mark which appeared on top of the north guard rail, 22 inches in advance of the point of frog; this mark crossed the guard rail diagonally for a distance of 30 inches, where it dropped off on the south side. Deep flange marks appeared on the ties, 13 inches inside of the right rail, commencing with the fifth tie beyond the point of frog, and continuing to where the pony-truck wheels stood when the engine came to rest. By the time the thirty-third tie was reached the derailed wheels had crossed to the left far enough to encounter and overturn the left rail. There were corresponding marks made by the wheels on the left side of the engine. The first marks made by the wheels of the caboose appeared on the forty-eighth tie beyond the point of frog, the indications being that the caboose was pulled off the track by the derailed engine.

Engine 332 is of the 2-8-2 type, class N-3; with a total weight, engine and tender loaded, of-

477,200 pounds. The weight is distributed as follows: pony-truck, 39,000 pounds, No. 1 driving wheels, 58,000 pounds, No. 2 driving wheels, 58,400 pounds, No. 3 driving wheels, 60,000 pounds, No. 4 driving wheels, 58,600 pounds, trailer wheels, 48,000 pounds. The engine wheel-base is 35 feet 3 inches, the rigid driving wheel-base 16 feet 6 inches, and the total wheel base, engine and tender, 67 feet 11½ inches. Engine 332 received class 2 repairs in June, 1927, and class 5 repairs in November, 1928. It is designed to operate over a main-track curvature of 16° and over wye tracks and sidings with a curvature of 18°. This particular engine has been used at various times on the Lattimer Colliery Branch for the past several years, while engines of this class have been used regularly on this branch for the past four years. The pony-truck wheels gauged 53 1/8 inches at four points, the flanges were only slightly worn and were well within the allowed limits, while the wheels swung free on the center pin and bearing. Careful inspection of the engine failed to disclose any defect that would have caused or contributed to the accident.

In the vicinity of the point of accident there is a large mine-refuse pile, and water constantly seeps from this pile into the track ditch on the north side of the track, standing therein from 2 to 3 inches deep and at the level of the bottoms of the ties. The track is out of gauge and has an uneven curvature, while the elevation varies and is not proportionate to the curvature. On the curve there were 32 loose bolts. The rail heads are badly worn, in one rail there is an old split in the head, one-half inch wide at the open end and 9 inches long, which apparently extends deep into the head, about 1½ inches of unbroken head remains above the split. About 40 per cent of the spikes are pulled from 1/8 to 1 inch, however, the spikes still hold firmly in the ties. There is some wave motion in the track under a moving train, where the spikes are partly pulled, the rails lift under the spike heads and where the spikes are firmly holding the rail on the ties, the ties lift up from the ballast.

The frog involved is an old No. 10, 90-A, solid manganese frog. It was a relaid frog when placed in the track following an accident which occurred on March 16, 1927, it is 11 feet 7 inches in length, extends over five ties, rests on tie-plates, and is single-spiked, several of the spikes have been pulled by the wave motion of the track. On the tie at the toe of the frog the spike on the left or main track side was pulled 3/8 inch and the spike on the right or lead track side was pulled 1/4 inch, the spikes on the second and third ties were pulled in a similar manner; both spikes on the fourth tie were pulled 1/4 inch, on the fifth tie,

under the heel of frog, the spike heads were down firmly on the base of the rail. The frog was secured to the main rails by six-hole rail joints, fully bolted. The first 2 inches of the point of frog had been battered and broken until there was no bearing surface, and a small freshly-chipped piece of the point was found after the accident. The tongue, near the point, was worn down 3/8 inch below the unworn surface of the wing rails, the wing rails had been worn from 1/16 to 1/4 inch by the treads of wheels. There were thin cracks along each side of the point of frog, at the bottoms of the flangeways, the cracks started at the point and were 9 inches long on the right side and 8¾ inches long on the left side. The point had been forced over to the left and was ½ inch nearer the left wing rail than it was to the right wing rail, the flangeway at the point of frog on the right side measuring 2¼ inches and on the left side 1¼ inches. The gauge of the track was standard at the point of frog and at a point 22 inches in advance thereof, at the toe of frog it was 5/16 inch open, the elevation of the outside rail at these locations was 1 9/16 inches, 1 3/4 inches and 1 7/8 inches. Under the weight of a train the frog settled 3/4 inch at the point of frog and 5/8 inch at the heel.

The guard rail opposite the frog is 15 feet long and extends over 11 ties, it is supported by four rail braces and is connected to the right lead-track rail with two rail clamps. The guard-rail flangeway opposite the point of frog was 2 inches wide and extended for a length of 4 feet, the guard rail bends out at each end, toward the opposite side of the track. The top of the guard rail was 5/8 inch higher than the top of the main rail. Under the weight of a train the guard rail and main rail settled 1/4 inch.

On July 29, a test was made with engine 321, which is of the same class as engine 333. With the engine standing so that the pony-truck wheels rested at the point of derailment, the left wheel had a full bearing on the rail, at 2 miles per hour it still had a full bearing, at 4 miles per hour there appeared to be uneven pressure, with the greatest pressure at the inside edge of the rail, at speeds from 6 to 10 miles per hour the wheels passed by without making any impression on a small pad composed of six sheets of paper, although the amount of lift was not noticeable to the eye In all of these tests, the right wheel held to the rail, and appeared to have full bearing This tendency of the left wheel to clear the rail was the same as that noted by the Master Mechanic with engine 333 on the day of the accident.

The derailment on March 16, 1927, previously mentioned, involved engine 305, of the same type as

engine 352, that derailment was attributed to the engine truck having mounted the point of frog on the sharp curve. Engine 321, also of the same type, was operated over the frog on the afternoon of the day of that derailment, but did not become derailed. The division engineer, in his report covering the 1927 accident, said, it was difficult to drain the turnout, owing to the amount of water coming down from the breaker, and with the frost coming out of the ground at that time of the year, conditions must have been such that the engine truck mounted the frog. It was after that derailment that the frog was changed from a No. 8 to a No. 10.

Conclusions

This accident was caused by poor track conditions. The track on the curve was not maintained in good condition, the roadbed did not provide a firm foundation for the track, the surface was not well maintained, and the elevation of the outside rail was not proportionate, or sufficient, to compensate for the curvature. The failure to provide sufficient widening of gauge to compensate for the sharp curvature allowed the wheels to crowd against the outside rail and increased the tendency to climb the rail, it also prevented the guard rail from fully serving its intended purpose of keeping the wheels away from the outside rail and thereby preventing extreme lateral pressure against the gauge side of the outside rail and permitting free movement of the wheel to follow the curvature of the track. The derailing tendency due to the excessive curvature was greatly increased by the bad track conditions and the worn condition of the frog. While all these conditions are probably no worse than is general to many mine tracks on this and other railroads, yet it is obvious that they do not provide a sufficient margin of safety. Steps toward remedying such conditions, not only at this particular point but at other points where a similar situation may exist, should be taken immediately.

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

Respectfully submitted,

W. P. BORLAND,

Director.