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 TOLEDO JUNCTION, OHIO, ON MARCH 23, 1930

April 19, 1930

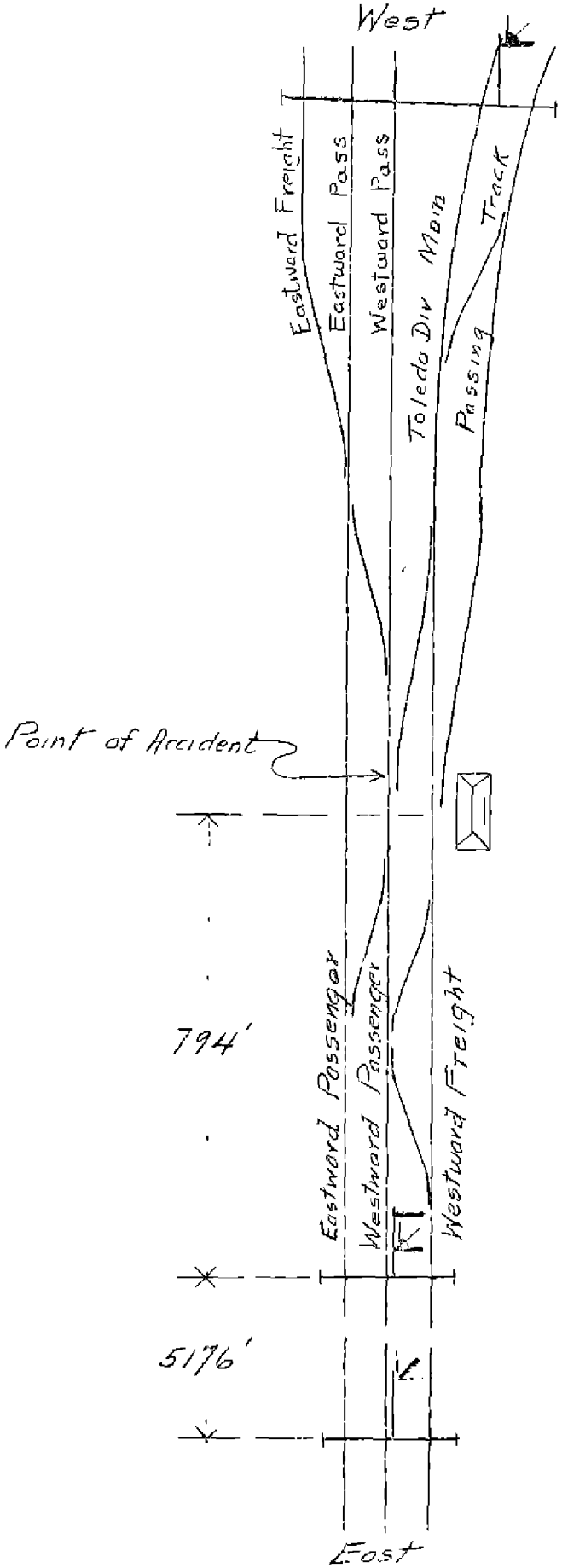
To the Commission:

On March 23, 1930, there was a derailment of a passenger train on the Pennsylvania Railroad at Toledo Junction, Ohio, which resulted in the death of one employee, and the injury of two passengers and one employee The investigation of this accident was made in conjunction with representatives of the Public Utilities Commission of Ohio

Location and method of operation

This accident occurred on the Fort Wayne Division, which extends between Ross, Ohio, and Clark, Ind , a distance of 271 8 miles, and in the vicinity of the point of accident is a three-track line, the tracks being numbered, from south to north, 1, 2, and 3 Trains are operated on tracks 1 and 2 by time-table, train orders, and an automatic block-signal system, and trains on track 3, the westward freight track, are operated by time-table, train orders, and a manual block-signal system At Toledo Junction the Toledo Division connects with the Fort Wayne Division by a series of crossovers, the Toledo Division being a single-track line and extending in a northwesterly direction The accident occurred at the east switch of a facing-point crossover leading from track 2 to the main track of the Toledo Division, which is practically a continuation of track 3, approaching this point from the east, the track is tangent for a distance of more than 1 mile, followed by a 1° 30' curve to the left 868 feet in length, and then tangent for a distance of 1,519 feet, the accident occurring on the latter tangent at a point 717 3 feet from its eastern end The grade at the point of accident is 0 15 per cent ascending for westbound trains. The maximum speed permitted for passenger trains is 70 miles per hour

There is an interlocking plant at Toledo Junction, the tower being located north of track 3 and opposite the point of accident The signals involved are a two-arm,



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three-position, upper-quadrant, home interlocking signal, located 794 feet east of the tower, and a one-arm, three-position, upper-quadrant, automatic signal, located 5,176 feet east of the home signal

In the vicinity of the point of accident the track is laid with 130 pound rails, 39 feet in length, with an average of 23 treated hardwood ties to the rail-length, fully tie-plated, and single-spiked except that the stock rails at switches are double-spiked and provided with rail braces, the track is ballasted with crushed rock to a depth of from 18 to 24 inches. The crossover involved was a No 20 turnout, with switch points 30 feet in length

The weather was clear at the time of the accident, which occurred about 3 44 a m

Description

Westbound passenger train No. 105 consisted of four express cars, one baggage car, two coaches, and six Pullman sleeping cars, all of steel construction, hauled by engine 3800, and was in charge of Conductor Shea and Engineman Dell This train departed from Mansfield, 6 6 miles east of Toledo Junction, at 3.32 a m , two minutes late, en route to Detroit on the Toledo Division, and on passing the distant signal east of Toledo Junction, an "approach" indication was displayed, this meant that the train should approach the next signal prepared to stop, and also reduce speed immediately, to not more than one-half its maximum authorized speed The home signal was displaying a "clear-restricting" indication, meaning that the train could proceed at not more than one-half its maximum authorized speed, but in any event not exceeding 30 miles per hour, and was derailed at the crossover while traveling at a speed variously estimated to have been from 20 to 40 miles per hour

The engine came to rest nearly on its right side, 505 feet beyond the point of derailment, and was not badly damaged The tender, the first two cars, and the forward truck of the third car, were also derailed, but they remained upright and did not sustain serious damage The employee killed was the engineman, and the employee injured was the fireman

Summary of evidence

Fireman Jensen stated that a car was picked up at Mansfield and after making a brake test the train departed, while a running test was made which appeared to have the proper effect He did not pay particular attention to the

speed of the train, but did not think it was more than 50 miles per hour at any point The distant signal east of Toledo Junction was displaying an approach indication and speed was reduced to between 25 and 30 miles per hour Due to the fact that the home signal was displaying a restrictive indication, the engineman again applied the brakes before reaching it, and they were still applied at the time of the accident; as soon as the engine started to derail, the engineman moved the brake valve into the emergency position The fireman estimated the speed at the time of the accident at 30 miles per hour, and said he had noticed nothing unusual about the riding of the engine en route, and that his first intimation of anything wrong was when the front end of the engine dropped, followed immediately by the derailment of the entire engine

Baggageman Sawyer stated that he felt the air apply on the baggage car when making the running test of the brakes after departing from Mansfield As there were no windows in the car, the fifth car in the train, he could not determine his location at any time, neither could he estimate the speed of the train Coming into Toledo Junction, however, he felt a service application of the brakes, which was followed shortly afterwards by an emergency application, he estimated that the train traveled a distance of 350 or 400 feet between these two brake applications, and then moved an additional distance of from 300 to 350 feet before the car came to a sudden stop

Conductor Shea stated that two cars were picked up at Mansfield, after which a terminal test of the brakes was made and he was informed by the car inspector that all of the brakes were in working order, while the running test made when departing from Mansfield, reduced the speed properly He was riding in the eighth car from the engine approaching the point of accident, and when he felt a heavy service application of the brakes he opened the vestibule door, looked out, and noticed that this car was then a short distance east of the home signal, he then closed the door, and less than a minute later the brakes applied in emergency, while he was obtaining tickets from one of the sleeping car porters He estimated the speed at 40 miles per hour at the time the service application was made, and did not believe this speed was reduced to any extent on account of the short interval between the two applications, and he further stated that although he realized the speed was excessive at the time he looked out, yet the brakes went into emergency before he had time to take any action

Brakeman Walters was riding on the rear platform of the seventh car, and when the train passed under an overhead bridge, located approximately 2,000 feet east of the tower at Toledo Junction, he noticed that the train was traveling at a speed of not less than 40 miles per hour, and to his knowledge the brakes had not been applied up to that time When this car was about even with the home signal bridge, there was a sudden jar which appeared as though the train had parted, causing the brakes to apply in emergency, and at that time the train was still traveling at least 40 miles per hour He did not think the speed was too high when the train passed the overhead bridge, as the speed is usually reduced rapidly as it approaches the crossover, but a few seconds prior to the accident he became alarmed as to the safety of the train

Flagman Cooper stated that when his train reached the overhead bridge east of Toledo Junction, he went out on the rear platform of the last car to watch for signal indications, and noticed at that time that the train was moving at a speed of about 40 miles per hour He then reentered the car and had almost reached the forward end of it when he felt the air brakes apply in emergency, at which time the car was about 10 or 12 car-lengths east of the tower, this was the first brake application he had felt after the running test which was made west of Mansfield

The statements of Enginemen Bloom and Mauer, who were riding on the train at the time of the accident, were to the effect that they did not pay particular attention to the speed or the handling of the train Engineman Bloom felt the brakes apply, which seemed like a service application, followed almost immediately by the crash, while Engineman Mauer stated that his first knowledge of anything wrong was when the train began to lurch, which appeared to be caused by an emergency application of the brakes

Operator-Leverman Wilcox, on duty at Toledo Junction tower at the time of the accident, stated that when train No. 105 was reported to him at 3 34 a.m , he lined the crossover leading to the Toledo Division and then lined the interlocking signals for the train to pass through the plant He observed the train approaching when it was in the vicinity of the home signal, but could not say how fast it was traveling. When it reached a point about midway between the home signal and the tower, he noticed sparks flying from the brakes, and he estimated that the engine passed the tower at a speed of about 30 miles per hour, although he was not positive as to this estimate

Signal Foreman Marquardt stated that on his arrival at the scene of the accident, he found the east crossover switch locked in reverse position He examined the switch point and noticed it was chipped, back from the point, for a distance of about 12 inches, most of the chipped places being new breaks The chip farthest from the point was the deepest, and appeared to have been broken recently, although it was slightly rusted A flange mark appeared on top of the rail, extending from this point for a distance of about 6 feet to where the wheel dropped off behind the heel block It also appeared from the signal foreman's statements that he had received a report on February 18, showing the switch point and stock rail as being in fair condition, and a report of March 5, showing the stock rail as good and the switch point as poor, but did not notice the discrepancy He had last inspected the switch on March 13, and at that time the point was slightly chipped It might be noted here that this chipped point was the new point installed on March 8

Signal Maintainer Frost said that on March 5, the stock rail was good, but the point was in poor condition A new point was installed on March 8, fitting up properly at the time, but about 3 p m March 22, or 13 hours prior to the accident, he found the point chipped for 4 or 5 inches, and it was also in a worn condition, yet he said it seemed to be safe.

Section Foreman Snyder, on whose section the accident occurred, stated that when he arrived at the point of accident, he inspected the east switch of the crossover and found several small pieces broken out of the running surface of the south or left switch point, which covered a space 18 inches from the point, and rust showed along the edge of the break, indicating that a crack had pre-existed At the west end of this chipped section, there was a mark which indicated that an engine-truck wheel had mounted the point He had inspected this switch daily, the last inspections having been at 7 40 a m and 3 45 p m , March 22, and at those times he noticed nothing unusual except three small niches in the south switch point which extended back about 3 inches, these niches having been in the point since March 10, he did not consider these defects as being dangerous This switch point was placed in the track on March 8, 1930, to replace a point that was installed in September, 1929 The top of the point did not fit against the face of the stock rail by possibly 1/16 inch, on account of the ball of the rail being slightly beveled from wear The stock rail was not renewed at the time the switch point was installed in March, 1930, however, because of the fact that the stock rail had been reversed in September, 1929, together with the fact that he had ordered a new stock rail about February 1, and it had not arrived at the time he

placed the point in the track on March 8 He had experienced difficulty with switch points at this location and had reported the matter to the supervisor It was his opinion that the worn condition of the stock rail, coupled with the engine striking the point hard, was what caused the point to break

Supervisor Knight stated that he last inspected this crossover switch on March 5, and at that time the point was badly worn and the stock rail slightly worn, although the point fitted snugly On the same day he received a joint inspection report from the section foreman and the signal maintainer, which contained a notation that the switch point was poor, but the stock rail was good A new switch point was installed on March 8, but he did not inspect it afterwards, as the foreman had advised him that it fitted properly To the best of his knowledge, the foreman had not requested a new stock rail and there was no need for doing so, as there were three emergency rails on his section, one of which could have been used for this purpose In his opinion, the accident was caused by high speed and a worn flange on the engine truck, although he did not think the derailment would have occurred had the switch point been in good condition and fitted properly against the stock rail

Superintendent Shcaffer stated that subsequent to the accident, a thorough inspection of engine 3800 showed that the flange of the left front engine-truck wheel was wearing vertical, due to the truck wheels being 3/32 inch out of train, but the flange had not reached the condemning limit The engine had been run 36,000 miles since it was previously shopped for class 3 repairs, having left the shop on November 23, 1929 He said that from all of the evidence that could be secured, the accident occurred while the train was traveling at an estimated speed of 35 miles per hour, and that the primary cause of the accident was the chipped switch point

Measurements of the track by the Commission's inspectors disclosed a variation of 3/8 inch in elevation and 1/4 inch in gauge for a distance of 121 feet eastward from the east crossover switch The track was found to be in good condition, with the exception of the south switch point, the stock rail, and the next rail east of it The running surface of the switch point, which was rolled in August, 1929, was chipped off to a depth of from approximately 3/8 inch to 9/16 inch for a distance of $14\frac{3}{4}$ inches, and the metal varied from bright and slightly rusted, to dark rust at two or three locations, which latter condition indicated that cracks had existed in the metal prior to the accident The switch point also showed a flange mark on the ball,

beginning about 4 inches west of the fractured surfaces, and extending a distance of about 6 feet to where the flange dropped off on the outside of the point The stock rail was worn off 3/8 inch on the gauge side at its receiving end, and tapered to its natural width within a distance of 6 feet, 9 inches from the receiving end, which latter point was 13 inches west of the end of the switch point. A corresponding wear was also noted on the leaving end of the rail east of the stock rail, which worn condition extended eastward a distance of 9 feet to where the rail was at its original width The worn condition of these two last-mentioned rails resulted in a poor fit at the switch point

An inspection of engine 3800 showed that the lateral motion in no case was in excess of 7/16 inch All of the treads and flanges of the wheels were good, except the left front wheel of the engine truck The flange of this wheel was worn to the extent that it would take the 15/16 gauge to a point 1/2 inch above the tread This wheel was 1/16 inch less in diameter than its mate wheel measured at a point 2 inches from the flange, and when measured at a point 1/4 inch from the outside edge of the tread, it was 1/8 inch less in diameter There were indications that the flange had climbed a rail, and there also were heavy indentations in the flange at various points which indicated that it had plowed its way through or over heavy metal objects Four separate measurements were taken between the engine truck-wheel centers on the right and left sides, the engine truck being moved on the track each time, and it was found that the variation was from 3/16 to 1/4 inch in each instance, with the shortest distance on the left side in each case Measurements taken of the cast steel engine-truck frame showed that it was 3/32 inch longer on the right side than on the left side, and various other measurements indicated that it was out of true The swing castings, swing pins, and cradle pins, on the engine truck showed some wear, but were in fair condition. The cradle pins were slightly bent, although this may have been a result of the accident, but they were not bent sufficiently to have prevented them functioning properly The right cradle pin key was nearly sheared off It is also to be noted that cradle pins working out had been reported on several occasions since March 1, on two occasions the side was not indicated, and on [illegible] two occasions it was on the right side

Conclusions

This accident was caused primarily by a chipped switch point

The evidence indicates that a new switch point was installed at the east crossover switch 15 days prior to the accident and that due to the stock rail being worn, the switch point did not fit snugly against the rail. Two days after the installation of this point, the section foreman noticed that three small pieces were broken out of it, but he did not consider it in a dangerous condition, subsequent inspections up to within 12 or 13 hours of the accident showed that several inches of the point had been chipped away. An examination of this point subsequent to the accident disclosed rust along the edges of some of the fractured parts, indicating that cracks had existed previous to the final failure of the point, which is believed to have occurred under the engine of train No. 105. The section foreman said he did not remove the worn stock rail at the time the switch point was installed on March 8, because he had ordered a new rail and was expecting it at any time, although the supervisor could not remember having received an order of this kind, in fact the supervisor stated that it was unnecessary to have ordered another rail for this location as there were three spare rails on the section at the time. The statements of the witnesses made it clearly apparent that a defective condition had existed for some time, and there is little excuse for allowing it to continue until an accident resulted.

The investigation also developed that there was a defective condition of the engine truck of engine 3800. It was out of true, and this condition apparently had caused the flange of the left leading wheel to wear, as well as giving it a tendency to crowd to the left. Under such a condition, it was easier for the flange to pick a switch point than would have been the case were the flange in proper condition. Like the defective track conditions, the worn condition of this wheel should have been detected and corrected before an accident focused attention upon it.

The employees involved were experienced men and at the time of the accident the crew had been on duty 44 minutes after having been off duty for periods ranging from 10 hours and 15 minutes to more than 7 days.

Respectfully submitted,

W. P. BORLAND,

Director