INTERSTATE COMMERCE COMMISSION

REPORT OF THE DIRECTOR OF THE BUREAU OF SAFETY IN RE INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE CHICAGO & NORTH WESTERN RAILWAY NEAR PRINCETON, WIS., ON JULY 15, 1929.

November 11, 1929

To the Commission:

On July 15, 1929, there was a derailment of a passenger train on the Chicago & North Western Railway near Princeton, Wis., which resulted in the death of one employee and the injury of nine passengers, three employees and one mail clerk. The investigation of this accident was made in conjunction with a representative of the Railroad Commission of the State of Wisconsin.

Location and method of operation

This accident occurred on Sub-division 4 of the Lake Shore Division, which extends between Tower PR, near Fond du Lac, and Marshfield, Wis., a distance of 121 miles, and is a single-track line over which trains are operated by time-table and train orders, no block-signal system being in use. The derailment occurred at a point approximately 4 miles west of Princeton, where a state highway crosses the track at an angle of about 20°. The track runs north and south according to compass direction, but east and west, respectively, according to time-table direction, the latter direction being used in this report. Approaching from the west there is a 1°30' curve to the right 1,343.3 feet in length, followed by tangent track for a distance of 3,310.1 feet, the accident occurring on the tangent track at a point 1,226.1 feet from its eastern end. The grade is slightly descending for eastbound trains, being 0.44 per cent at the point of accident. The track is laid with 72-pound rails, 30 feet in length, with an average of 18 ties to the rail-length, tie-plated, and ballasted with cinders to a depth of about 12 inches. The track is maintained in good condition.

At the crossing where the accident occurred there is a 4" x 8" plank laid close to the outside of each rail, with its top surface even with the top of the rail. Flangeways about $2\frac{1}{2}$" wide are provided on the inside of each rail by having a 60-pound rail laid on its side with the head against the web of the track rail. Another 4" x 8" plank is laid along the inside of each of these flangeways, with its upper surface even with the top of the rail, and highway gravel is laid up to the outside planks and between the inside planks. Approaching this crossing on the highway from the south there is a slight descending grade. There was a standard 7-span pile bridge, 91 feet in length, located 366.5 feet east of the highway crossing.

The weather was clear and the sun was shining at the time of the accident, which occurred between 6.30 and 6 40 a m.

Description

Eastbound passenger train No. 6 consisted of one combination mail and baggage car and three coaches, all of steel construction, hauled by engine 198, and was in charge of Conductor Brown and Engineman Hassman. This train departed from Wisconsin Rapids, 60.5 miles west of Princeton, at 4.58 a m. eight minutes late, according to the train sheet, and was derailed at the highway crossing approximately 4 miles west of Princeton while traveling at a speed estimated to have been between 35 and 40 miles per hour.

The entire train was derailed to the right or south of the track with the exception of the rear truck of the last car, the engine demolishing the bridge east of the crossing and coming to rest on its left side in the bed of the creek at about a right angle to the track, the rear end laying against the east abutment of the bridge. The tender remained upright across the wreckage of the bridge, and the cars remained upright in a straight line at an angle of about 30° with the track, headed down the embankment, the head end of the first car resting against the cylinders of the engine. The engine and first car were considerably damaged, while the second car sustained slight damage. The employee killed was the fireman, while the employees injured were the engineman, conductor and baggageman.

Summary of evidence

Engineman Hassman stated that before leaving Marshfield, their initial terminal, the air brakes were tested and found to be working properly. He thought they were about eight minutes late in leaving Neshkoro, 9.72 miles west of Princeton, and he was operating the train at the usual speed, reducing it to about 30 miles per hour on the curve just west of the point of accident, and had increased it to 35 miles per hour as he approached the highway crossing. As the engine reached the crossing the front end jumped up, he applied the air brakes in emergency and he judged they traveled a distance of about 15 or 20 feet before the engine dropped off on the ties. Engineman Hassman stated that he thought the truck wheels struck some obstruction in the flangeway on the crossing - possibly a stone covered by sand. He further stated that his engine was in good condition upon departing from Marshfield, the wheel flanges were in first-class condition, and he last inspected the engine at Wisconsin Rapids.

Conductor Brown stated that they were about three or four minutes late in departing from Neshkoro and were traveling at a speed of about 35 miles per hour when the accident occurred. After the accident he inspected the track at the crossing and found a great deal of sand and gravel in the flangeways, which in his opinion was the cause of the derailment. He noticed the first marks of derailment were on the ties about 15 or 20 feet beyond the crossing. He found no signs of anything dragging from the engine. He also said that the air brakes worked properly en route

Brakeman Keup stated that his inspection of the track after the accident disclosed a flange mark on the ties at a point about 12 feet from the crossing. He did not notice any indication of dragging equipment or any obstructions, and was of the opinion that there was not enough sand or gravel in the flangeways on the crossing to cause any damage. He estimated the speed of the train at the time of the accident to have been about 35 miles per hour.

Baggageman Foshay made no examination of the track after the occurrence of the accident. He stated that the train was traveling at a speed of about 40 miles per hour at the time of the accident. Flagman Larson and Mail Clerk Sommers stated that they noticed gravel and sand in the flangeways on the crossing, and the mail clerk thought it might have caused the derailment.

Section Foreman Pluer stated that he arrived at the scene of the accident about half an hour after its occurrence and upon inspecting the crossing he found it was clean, he did not think there was a good handful of sand in both of the flangeways. He noticed no marks on the rails and he judged the first mark of derailment on the ties was about 17 feet from the crossing. He stated the track was perfect as to surface, gauge and alignment. Inspections of the track are made daily except Sundays and holidays, and it is necessary to clean the flangeways about four or five times a week, the sand and gravel on occasions being even with the ball of the rail. He stated that on Sunday, the day previous to the occurrence of the accident, he was in that vicinity and walked over the crossing, and found it to be the same as when he left it the day previous.

Roadmaster Friess stated that he and Division Engineer Dyer inspected the track and found it in good condition as to grade, alignment and gauge, the gauge taken for a distance of 600 feet west of the crossing showed only 1/4 inch wide at any point and 1/4 inch out of level at any point. Roadmaster Friess stated that in his opinion there was some obstruction in the flangeway of the crossing that caused the truck wheel to climb the rail. He further stated that previous to the time this road was graded and graveled for a state highway, they experienced no trouble of any kind on this crossing. During the time the road was being graveled, and for some time afterwards, they had to watch this crossing very closely on account of the loose gravel working onto the crossing, due to the highway sloping down toward the track from the south.

Master Mechanic Hoffman stated that he arrived at the scene of the accident about five hours after its occurrence and found the flangeways still filled with ground-up rocks and gravel. His inspection of the track disclosed the first mark of derailment to be on the outside base of the right rail, 19 feet east of the east end of the crossing, and it appeared that the No. 1 engine-truck wheels left the ends of the ties at a point 153 feet from the center of the crossing. He then made an inspection of the engine truck

and driving wheels and none of the flanges would take the gauge One of the No. 1 engine-truck wheels showed slight flange wear and the No. 2 engine-truck wheel flanges were badly marked due to the derailment. The driving-wheel flanges were in good condition and the treads showed 3/32 inch wear. The axles on the engine truck wheels and also the front driving wheels were sprung, caused by the derailment, and the engine truck itself was demolished. Master Mechanic Hoffman stated that he was of the opinion that the derailment was caused by rocks, sand and gravel in the flangeways on the crossing, due to the fact that there had been no traffic over the crossing on the railroad from 8.45 p.m. Saturday, to 6.30 a.m. Monday, the day of the accident. He further stated that while at the scene of the accident he went to the crossing several different times, there being heavy automobile traffic over the crossing, and each time he found a great deal of sand and gravel in the flangeways on account of the fact that the automobile traffic pulled it down the grade from the south, which he said was about a 3 per cent descending grade Master Car Builder Byrne and Road Foreman of Engines Simmons, who examined the engine truck and driving wheels with Master Mechanic Hoffman, also stated that their examination disclosed nothing that could have caused the derailment.

Superintendent Rice stated that when he reached the highway crossing, about five hours after the accident, there was considerable gravel in the flangeways, some of it up to the top of the ball of the rail, and on the outside and ends of the flangeways there was just enough to show that wheel flanges had traveled in it. The heaviest gravel lay in the flangeways on either side of the point where wheels of automobiles passed over the crossing. The gravel in the flangeways ranged in size from sand to approximately 1 inch, while there were stones on the highway from $1\frac{1}{2}$ to $2\frac{1}{2}$ inches in size. His examination of the track disclosed a mark on the top of the right rail about 3/4 inch from the gauge side, beginning at the east end of the crossing, which appeared to have been made by a blunt flange. This mark was not a sharp cut, because the flange of this engine-truck wheel was rounded and did not have the sharp edge that is found in the center of most flanges. This mark was plain for about 24 inches, continuing toward the outside of the rail for 15 or 16 feet, where it left the rail about $2\frac{1}{2}$ feet west of the point where the flange of the wheel first struck the base of the rail. From this point the wheel ran on the ties, traveling toward the end of the ties, for about 40 feet, when the wheel dropped to the shoulder and traveled in this

position about one rail-length, when the opposite wheel began breaking the ties It was his opinion that this accident was caused by some obstruction in the highway crossing, causing the lead truck wheels of the engine to lift and ride the ball of the rail, finally dropping to the outside.

The investigation disclosed that while there were no distinct flange marks along the top of the rail to assist in determining the exact point where the engine wheels were first derailed, a straight line drawn along the marks of the derailment on the ties and extended to the crossing would indicate that the initial point of derailment was about the center of the crossing. The first mark of derailment was on the base of the outside of the right rail about 30 feet from the center of the highway and was located about 18 inches from the leaving end of a rail. From this point the marks diverged gradually from the rail for a distance of about 135 feet, when cutting on the inside of the right rail began, and a short distance beyond this point the inside of the head of the right rail was subjected to severe gouging, suggesting that the flange of one of the engine-truck wheels was binding against it, the track was then torn up as far as the bridge, which was demolished. There were no marks to indicate that the driving wheels left the track before they reached the point where the track was torn up, neither were there any marks caused by dragging equipment or marks to indicate that the engine had run over any obstruction on the rail. The engine truck being demolished, examination had to be confined to the wheels, and except for marks resulting from the derailment they were found to be in good condition.

Conclusions

This accident was caused by the flangeways at a highway crossing being filled up with gravel

There was a conflict in the testimony as to the exact conditions found to exist immediately after the occurrence of the accident. It did appear, however, that the flangeways at the crossing seemed to fill up quickly, due to automobile traffic and the section foreman said that it was necessary to clean out the flangeways on this crossing four or five times a week, due to the fact that there are no trains operated over this territory from Saturday night to Monday morning, it seems probable that the flangeways became filled with sand and gravel over the week end to such an extent that the flanges of the engine-truck wheels were unable to clean out the flangeways, but rode over the gravel and thus became derailed.

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,

W P. BORLAND,

Director.