INTERSTATE COMMERCE COMMISSION

REPORT OF THE DIRECTOR OF THE BUREAU OF SAFETY IN RE INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE RAILWAY AT CHIPPEWA FALLS, WIS , ON DECEMBER 20, 1924.

January 19, 1925.

To the Commission:

On December 20, 1924, there was a derailment of a passenger train on the Minneapolis, St. Paul & Sault Ste. Marie Railway at Chippewa Falls, Wis., resulting in the death of eight passengers, and the injury of five passengers and two employees. This accident was investigated jointly with the Railroad Commission of Wisconsin.

Description

The accident occurred on the Northern District of the Chicago Division, which is a single-track line over which trains are operated by time-table and train orders, no block-signal system being used.

The train involved was train No. 2, en route from Minneapolis, Minn., to Chicago, Ill. It consisted of engine 2719, three mail and express cars, one baggage car, two coaches, one sleeping car, and one cafe-observation car, in the order named, all cars except the baggage car being of steel construction. This train left Minneapolis at 7.45 a.m., on time, passed Irvine, 1.5 miles west of Chippewa Falls and the last open telegraph office, at 12.32 p.m., 1 hour late, and at 12.34 p.m., while running at a speed of about 25 miles an hour, the rear truck of the rear car was derailed at a switch located approximately 0.8 mile east of Irvine. After derailment the rear car ran a distance of 885 feet to approximately the center of Chippewa River bridge, where it broke loose from the remainder of the train and plunged over the side of the bridge into the river 40 feet below. This car alighted upside down in 6 or 7 feet of water. All of the killed and most of the injured passengers were in the rear or observation end of the car which appeared to have struck the water first. At the time of this accident the weather was clear and the temperature was 20° below zero.

The point of initial derailment is on a curve of 6° 6' to the right and a 3 per cent grade ascending for eastward trains. The track consists of 85 pound rail laid new in 1917, tie-plated and double-spiked, with 19 hardwood ties to the rail length. At the switch the elevation was 3½ inches and the gauge ½ inch wide. The track appeared to be well maintained. At the time of the accident there were about 6 inches of snow on the ground Speed at this point is restricted by rule to 30 miles per hour.

The switch at which the derailment occurred is operated by a high switchstand, with a connecting rod of 1½ inch round wrought-iron. A number 10 frog is used, the switch-points, 15 feet in length and reinforced by 3/8 inch plates 13 feet in length, are spaced by a head-rod and a tie-bar, both 2½ by 3/4 inches, attached to switch-rod clips of the transit type by 7/8 inch bolts. The head-rod is 8 inches from the points and 3 ft. 3 in. from the tie-bar. There are stop brackets between the switch points and the stock rails 4 feet from the heel of the points.

After the accident the bolt which had been used to connect the north switch point to the head rod was missing. Neither the nut, the bolt, nor any part of it was found.

This switch is located 504 feet west of the western end of the Chippewa River bridge. The total length of the bridge is 771 feet, comprising a concrete abutment and arch at the west end 88 feet in length, 5 steel spans on concrete piers having a total length of 588 feet, and a concrete abutment and arch at the east end 95 feet long. After the accident the derailed car lay in the river bed nearly parallel with the railway and at a point opposite the second concrete pier from the west bank of the river, the east end of this car being 293 feet from the west end of the steel bridge. The concrete abutments are somewhat wider than the steel spans, and there are concrete walls on both sides of the track On the steel spans of the bridge there are both inside and outside guard rails, the outer guard rails consist of 6 by 8 timbers which are notched over the ties; the inner guard rails are 5 by 5 by 5/8 inch angle iron and begin at a point on the concrete abutment 52 feet from the western end of the first steel span.

The first marks of the derailed truck on the ground were 19 feet east of the switch at the left of the switch rails. It appeared that the derailed truck was further deflected to the left in passing the south rail of the old main line, from which the line crossing the bridge diverges, and by the right hand wheels engaging the left center-guard rail, the outward movement of the car was temporarily

halted by the concrete wall or coping on the abutment of the bridge, but after passing this wall it ran along on th ends of the ties on the steel spans until the coupler broke, a section of the outer guard rail was torn out, and the car plunged into the river. The remainder of the trai came to a stop on the east end of the bridge, the distance from the rear end to the derailed car being 330 feet.

Cafe-observation car 1706 was of steel construction, built in 1914, having six-wheel trucks. It was turned out of North Fond du Lac Shops in January, 1924, after general repairs had been made to both the body and the trucks, including the applying of two pairs of new wheels and the turning of four pairs. The rear truck received further attention August 14 and September 27, 1924, at which times all three pairs of wheels were turned. Close examination and guaging of the rear tnuck and wheels both at the scene of the accident and subsequently failed to show any wear or other defective condition that might be responsible for the accident. At the time of this investigation the leading truck had not been recovered. The car was practically destroyed. The damage to the track and structures was not sufficient to interfere with traffic, though bridge-ties and the outside guard-rail for some distance required replacement,

Summary of evidence

Engineman Caldwell stated that passing Irvine his train was running at the rate of about 15 miles per hour. East of that point the grade is slightly ascending and he used steam, increasing speed to about 25 miles per hour. He had a good view of the switch near the west end of the bridge, saw no one in the vicinity of it and noticed nothing unusual as his train passed over this switch. The first intimation he had that anything was wrong was when the air brakes were applied in emergency from the rear end. He placed the brake valve in lap position and closed the throttle and the train stopped in a distance of about 3 car lengths. The fireman looked back and told him a car was in the river.

Fireman Kakaska stated that after statting across the bridge he got upon his seat box. When he felt the brakes applied he looked back and saw that a car had toppled over into the river.

Conductor Ray stated that the speed of his train at Irvine was about 15 miles per hour and after passing that point it was increased to 25 or 30 miles per hour. At the time of the accident he was in the rear end of the first coach; he did not know that anything was wrong until the

brakes were applied, the train stopped and he then got off and saw the car in the river. According to his records there were 13 passengers in the parlor car at the time of the accident After the accident he walked back to the switch but by that time repairs had been made. Head Trakeman Stuart was also in the first coach and his statement added nothing of importance to the information furnished by Conductor Ray.

Flagman Richmond stated that he was in the rear seat of the sleeping car preparing to go out to flag for the station stop at Chippewa Falls, and he thought the speed of the train at the time of the accident was not over 30 miles per hour. The first knowledge he had of the accident was when he felt a lurch and heard the roar of escaping steam; he jumped up, ran into the passageway and opened the emergency brake valve. Looking out he could see nothing except escaping steam, but he thought the rear car had fallen from the bridge and the brakes applied before he opened the emergency valve. After the train stopped he went back to flag and summon aid. He saw marks of derailment near the switch at the west end of the bridge but did not stop to examine the switch as he passed it. He saw no one near the switch at that time.

Superintendent Urbahns stated that instructions had been issued providing that when an observation car is handled in a passenger train the flagman will ride in the first car ahead of the observation car. This was done because the odor of the flagman's lanterns was disagreeable to passengers in the observation car and by being in the car next to the observation car they could get out and do their flagging, leaving their lanterns in the vestibule.

The two employees who were injured were a porter and a cook who were on duty in the car which was derailed. Neither of them noticed anything unusual in connection with the speed of the train or the operation of their car prior to the derailment. The porter stated he was in the passageway leading to the observation compartment when the derailment occurred; the car was thrown about in such a way that there was no opportunity to operate the emergency brake valve. He knew where the valve was located but did not remember clearly whether he thought of it before the car fell from the bridge. The cook tried to get out of the kitchen and had just succeeded in getting into the dining compartment when the car fell into the water.

Section Foreman Franz stated that on December 17, three days prior to the accident, he removed the north switch point because it was badly worn and installed another switch point, he used the old clips but as the old bolt was somewhat worn he replaced that with a new one.

The bolt was inserted from the bottom, with a nut and cotter key on top in accordance with standard practice. At about eight o'clock on the morning of the accident he passed over and examined this switch and found it to be in proper condition. He was eating lunch when notified of the accident, and followed a switch engine to the scene. When passing over the switch he saw that the switch rod was out of place, the head rod bolt which had been used to fasten the head rod to the clip being missing and the point being open about 1 inch. He looked for the missing bolt but did not find it, and then replaced the rod and slipped another bolt in as temporary repairs and proceeded to the bridge. A short time later he installed a standard 7/8 inch switch-rod bolt. Further search was made for the missing bolt but it was not found. After the accident there was some play in the tie rod and its connections but he said this was not present after he renewed the switch point on December 17. He stated that new stock rail was installed at this switch about nine months previously and it was not badly worn.

Prior to the accident this switch was used by switch engine 2110 at about 11.20 a.m., and again at about 11.55 a.m., 40 minutes before the accident occurred. The foreman and two switchmen who operated this switch stated that the switch operated properly and seemed to be in perfect order. The switch is kept locked and it was locked when they left it. So far as they knew, the switch was not used again prior to the accident.

Roadmaster Dixon stated that he arrived at the switch about 15 minutes after the accident occurred. The section foreman was then installing a temporary bolt and he instructed him to get a bolt of the proper size and install it. He looked for the missing bolt but was unable to find it. The switch point looked as if wheel flanges had struck it, and because of the missing bolt he thought it quite possible that the point had been open an inch or more and with pressure on the heel of the switch point it could be forced open as much as $2\frac{1}{2}$ inches. He thought the bolt might have been broken either by pressure on the heel of the switch point or by a wheel flange passing between the partly open switch point and the stock rail.

Assistant Engineer Henderson stated that approaching the switch from the west the alinement of the track was good. Gauge measurements were taken at intervals of 25 feet for a distance of 200 feet on each side of the switch. Measurements west of the switch varied from 1/4 to 3/4 inch wide. The elevation varied from 3 to $3\frac{1}{2}$ inches. The marks on the ground indicated that all three pairs of wheels of the rear truck split the switch and dropped to the ground just to the rear of the heels of the switch points.

Conclusions

This accident was caused by a switch point being disconnected from the head rod, due to the absence or failure of the head-rod bolt, which resulted in the derailment of the rear truck of the rear car in the train. The cause of the failure or absence of the head-rod bolt was not definitely ascertained.

All of the employees involved in this accident were experienced men, and none of them was on duty in violation of any of the provisions of the hours of service law.

Respectfully submitted,

W. P. Borland,

Director.