INTERSTATE COMMERCE COMMISSION

REPORT OF THE DIRECTOR OF THE BUREAU OF SAFETY CONCERNING AN ACCIDENT ON THE CHICAGO & NORTH WESTERN RAILWAY AT MONICO, WIS., ON FEBRUARY 8, 1934.

April 24, 1934.

To the Commission:

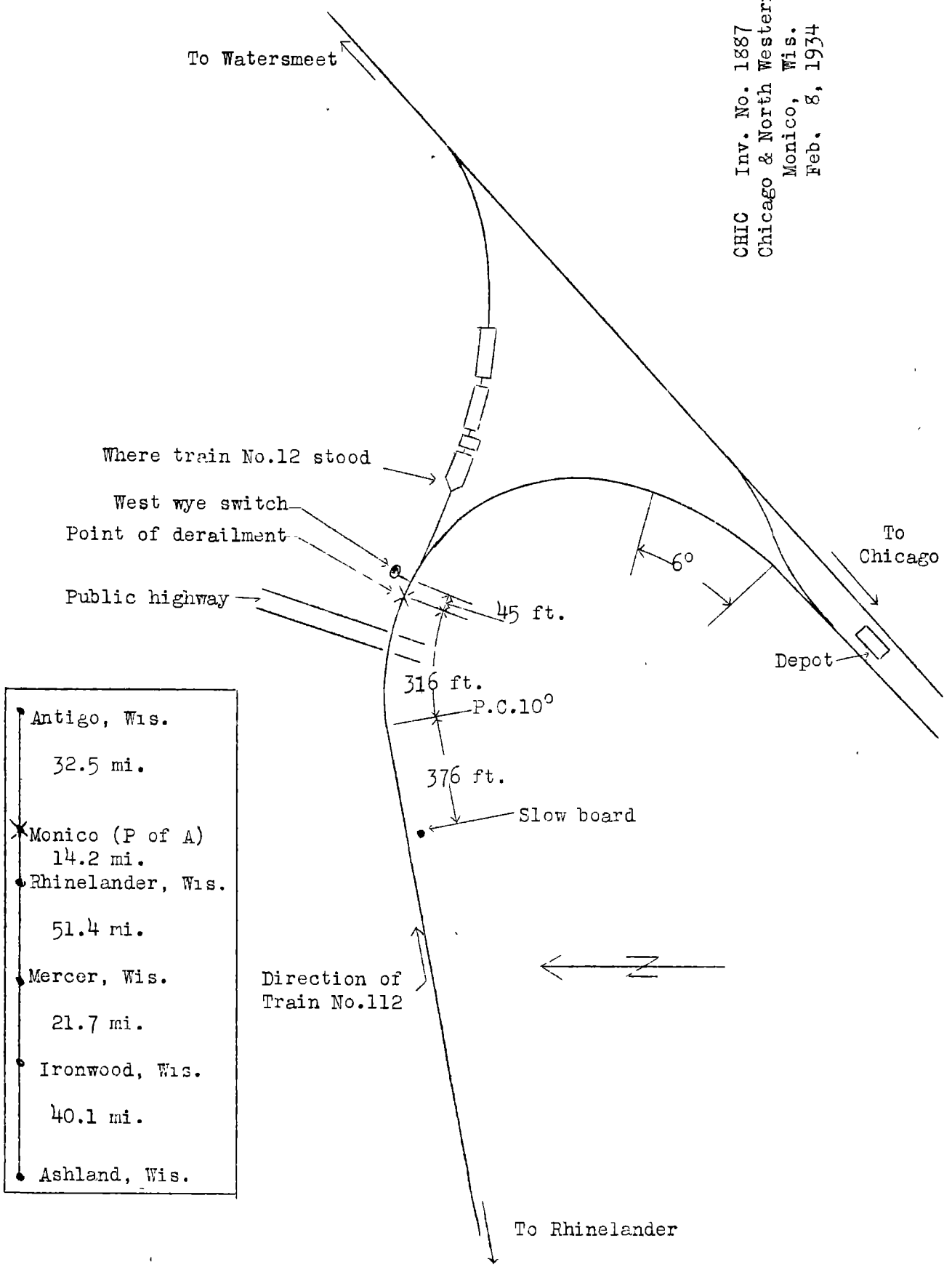
On February 8, 1934, there was a derailment of a passenger train on the Chicago & North Western Railway at Monico, Wis., following which the first car in the train struck another passenger train standing on an adjacent wye track, resulting in the death of 2 employees, and the injury of 10 passengers, 2 mail clerks, 3 employees, and 1 cook.

Location and method of operation

This accident occurred on Subdivision 2 of the Ashland Division, extending between Ashland and Antigo, Wis., a distance of 159.9 miles; in the vicinity of the point of accident this is a single-track line over which trains are operated by time table and train orders, no block-signal system being in use in the territory where the accident occurred. There is a wye at Monico, the main line forming the west leg of the wye and extending around a sharp curve to the right for east-bound trains, while the north leg of the wye consists of a short section of comparatively straight track at the point where the other passenger train involved was standing at the time of the accident. The west switch of the wye is located 149 feet east of a highway grade crossing, and is a facing-point switch for east-bound trains; the point of derailment was between the crossing and the switch, 45 feet west of the switch. Approaching this point from the west, the track is tangent for a distance of 3,120 feet, followed by a compound curve to the right consisting of 1,200 feet of 10° curve and nearly 500 feet of 6° curve, the initial derailment being on the 10° portion of the curve at a point 316 feet from its receiving end. The grade is practically level.

The track is laid with 90-pound rails, 33 feet in length, with an average of 22 ties to the rail length, double-spiked, tieplated, and ballasted with gravel to a depth of about 24 inches; four rail anchors are used to the rail length. The rail on the curve was laid new in 1928, and due to changes subsequently made the high rail was only slightly curve-worn at the time of the accident. The superelevation of the outside rail of the 10° portion of the curve varied from 2 to 2½ inches, and the

CHIC Inv. No. 1887
Chicago & North Western Ry.
Monico, Wis.
Feb. 8, 1934



gauge varied from 4 feet $8\frac{3}{4}$ inches to 4 feet $9\frac{1}{4}$ inches, the track being well maintained. Under speed restrictions contained in the current time table, the maximum speed for passenger trains in the territory where this accident occurred is 55 miles per hour, and on the curve speed is limited to 25 miles per hour. There is also a slow board located on the south or engineman's side of the track at a point 376 feet west of the curve.

The weather was clear and it was very cold at the time of the accident, which occurred about 10 p.m.

Description

East-bound passenger Train No. 112 consisted of 1 mail car, 1 express car, 1 baggage car, 1 coach, 1 chair car, 1 Pullman sleeping car and 1 dining car, in the order named, all of steel construction, hauled by engine 1626, and was in charge of Conductor Murphy and Engineman Hanson. This train left Rhinelander, the last open office, 14.2 miles west of Monico, at 9:35 p.m., according to the train sheet, 10 minutes late, and had nearly reached the west wye switch at Monico when the engine was derailed while traveling at a speed estimated to have been between 25 and 30 miles per hour.

Train No. 12 consisted of 1 combination mail and baggage car and 1 combination smoker and coach, hauled by engine 476, and was in charge of Conductor Nelson and Engineman Steber. This train had been standing on the north leg of the wye about 10 minutes, awaiting the arrival of Train No. 112, when the engine was struck by the detailed first car from that train.

Engine 1626, together with its tender, turned over to the left down a 4-foot fill and stopped nearly bottom up, north of and parallel to the north leg of the wye, partly submerged in a swamp; the rear end of the tender was 70 feet east of the west switch or 113 feet east of the first marks of derailment. The first four cars and the forward truck of the fifth car also were derailed; after being derailed, the head end of the first car collided with engine 476, of Train No. 112, at a point 247 feet east of the switch, was turned end for end, and stopped west of and opposite that engine, badly damaged; the second car was across and at right angles to the west leg of the wye; the third car was west of the first car and parallel with the north leg of the wye and the fourth and fifth cars were on the roadbed and in line with the west leg, with the head end of the fifth car opposite the head end of the engine. Engine 476 was turned over to the right on the north side of the north leg of the wye and was partly submerged in the swamp; its front end was badly damaged. Neither the tender nor the cars

in Train No. 12 were derailed or materially damaged. The switch stand at the west switch, located on the outside of the curve, was demolished but the switch itself was not damaged. The employees killed were the engineman of Train No. 12 and the fireman of Train No. 112, while the employees injured were the engineman of Train No. 113, and the fireman and brakeman-baggageman of Train No. 12.

Summary of evidence

Engineman Hanson, of Train No. 112, stated that the air brakes were tested at Ashland and the train left on time, 5:30 p.m., but that shortly after leaving the station an air hose parted and stopped the train, entailing considerable delay. The air brakes were tested again before leaving this point and they worked properly while making slow downs and stops en route. Engineman Hanson said that he slightly overran the customary stop at Rhinelander, due to misjudging the distance. He was thoroughly familiar with the physical characteristics of the road, however, understood the speed restriction requirements, and was aware of his location at all times. Approaching the curve at Monico the speed was about 50 miles per hour and he made a brake-pipe reduction of about 20 pounds at the usual place when the reflection from the headlight shone upon the slow board, at which time the engine was about 8 or 10 car lengths from it, and he said this always had given him plenty of time in which to bring the speed within the required limits. He kept the brakes applied, saying that in his opinion the speed was reduced to the required 35 miles per hour on entering the curve, and he was ready to make a graduated release but before rounding the curve far enough to do so, there was a sudden lurch on the left side of the engine, about the time it reached the road crossing, and then the engine turned over; it felt as if something might have been on the rail, although the lurch might have been due to the derailment of the engine. The engine was in good condition and rode all right, with no excessive rocking when approaching the curve, nor were there any steam leaks or any other condition to distract his attention from keeping a lookout ahead and he saw the switch lamp displaying a green indication.

Conductor Murphy, of Train No. 112, stated that after the air hose had been recoupled on leaving Ashland, nothing unusual occurred en route prior to the accident and the speed was not excessive at any point. Approaching Monico he was collecting transportation in the chair car and did not notice whether the speed was reduced when approaching the curve; the first knowledge he had of anything wrong was on feeling a very sudden jolt caused by a heavy application of the brakes, at which time the speed was between 25 and 30 miles per hour. Conductor

Murphy could not say whether this application of the brakes was made by the engineman or was due to the parting of the train line as a result of the accident.

Baggageman Young said that he felt the air brakes applied by the engineman about at the road crossing, or about two car lengths before the baggage car gave a lurch and then was derailed. He thought the speed at that time was about 28 or 30 miles per hour, but on seeing the condition of the equipment after the accident he thought that the speed must have been considerably higher than 35 miles per hour and he thought the engineman did not begin to reduce speed for the curve as soon as was customary. Brakeman Moore estimated the speed to have been about 25 miles per hour just prior to the accident, while Flagman Brismaster said that the speed did not seem to be any higher on this occasion than usual; the brakes functioned properly en route, and the engineman applied them at the customary place when approaching Monico.

Fireman Kruse, of Train No. 12, stated that he was sitting on his seat box watching Train No. 112 as it approached, but he was unable to estimate its speed as the headlight was shining in his eyes, nor was he able to say just how far Train No. 112 was from the west end of the curve when the air brakes were applied although he knew they were applied as he saw fire flying from the wheels; he had heard the whistle sounded for the road crossing and also for the station. The headlight on his own engine was not burning. Conductor Nelson, of Train No. 12, observed the reflection from the headlight of Train No. 112 when that train was about $\frac{1}{2}$ to $\frac{3}{4}$ mile away and judging from the time which elapsed before the accident occurred it was his impression that it was traveling faster than 25 miles per hour, but how much faster he was unable to say; it was his opinion the train entered the curve at too high a rate of speed to make the movement in safety.

Following the accident Road Foreman of Engines Ellsworth, in company with Master Mechanic Ramer, made a thorough inspection of engine 1626 but did not find any defect that would have caused or contributed to the accident. The engine had received class 5-P repairs in January and went back into service on January 18. Road Foreman of Engines Ellsworth was of the opinion that the maximum speed at which a passenger train could be handled around the curve would be between 30 and 35 miles per hour and he thought that Train No. 112 approached and rounded the curve at excessive speed. He had known Engineman Hanson for 33 years, considered him to be an excellent engineman, and had never had occasion to caution him about observing speed restrictions.

Section Foreman Solvig inspected the track between the

depot and the highway crossing west of the west wye switch during the afternoon of the day of the accident and found it to be in good condition. There was a small amount of snow in the flangeway at the crossing, but not enough to warrant removing it. After the accident he observed that the switch points of the switch were in proper position and that the north point fitted tightly against the rail; at this time one of the rear cars in the train stood upon the switch points. He gauged the track where the derailment occurred and found it to be all right, with no low joints. There were flange marks on top of the north or high rail about 50 feet west of the switch and also on the ties outside of the high rail, but he did not see any marks of derailment between the rails.

Division Engineer Husemeier stated in his report to Engineer Maintenance Peabody that engine 1626 left the track at a point about 45 feet west of the west wye switch and traveled a distance of 7 feet before dropping to the ground. The snow between the rails at the point of derailment and up to the switch points showed no sign or mark of wheels, and the switch points and tie rods were in good condition and showed no sign of wheels running over or through them. The division engineer considered it evident that when engine 1626 left the rails it was leaning considerably to the left, with only the left wheels of the engine on the ground, in which position the engine traveled approximately 111 feet to the shoulder of a 4-foot fill along the north side of the north leg of the wye, tipped over into the swamp and slid about 80 feet further, stopping in 7 feet of muck about 20 feet from the center of the wye track. There were no marks of the right wheels of the engine or following cars having touched the ground after the engine left the track. The highway crossing was in proper condition, with no indications of derailment upon it. Division Engineer Husemeier was of the opinion that the accident was the result of exceeding the maximum permissible speed of 25 miles per hour on the curve.

At the time the Commission's inspectors examined the track there had been no repairs or changes in the main line with the exception of the renewal of one rail east of the frog of the switch. The track was in good condition, and after sweeping the snow from between the rails an examination was made in an endeavor to find flange marks or other marks of derailment between the rails but none could be found. Examination also was made for some distance west of the point of accident to see if there were uneven joints which could have caused the engine to rock excessively, but nothing of the kind was discovered. Careful examination also was made of engine 1626 and its tender, both before and after being rerailed, but no defects were found nor were there any marks either on wheel treads or the rails to indicate that the engine had run over any obstruction on the

rails. The first marks of derailment were flange marks on the high rail of the curve which continued diagonally across the rail for a distance of 7 feet to the point where they passed off on the outside. The next mark was a flange mark on the north end of a tie 26 inches farther east, 9 inches from the base of the rail; flange marks then continued along the ends of the ties, in a diagonal direction, for a distance of 32 feet; then they could be seen in the frozen road bed for a distance of 72 feet to where they passed off the shoulder of the 4-foot fill and the engine overturned. The switch stand was broken off and the connecting rod bent around the end of a tie in such a manner as to hold the switch points securely in their original position. The first track damage was a broken rail east of the frog, or about 120 feet east of the first marks of derailment, where the mail car apparently became derailed.

Conclusions

This accident apparently was caused by Train No. 112 entering a 10° curve at a rate of speed for which the elevation of the outer rail did not provide an adequate margin of safety.

The maximum permissible speed for passenger trains on the 10° curve involved is 25 miles per hour and the estimates of the crew as to the speed varied between 25 and 30 miles per hour. Apparently the speed was high enough, however, to cause the engine to turn over from centrifugal force without first being derailed, there being no flange marks between the rails which would have been present had the wheels on the right side of the engine been derailed before the engine overturned. Marks on the ties and ground on the outside of the outer rail indicated that the engine traveled a distance of approximately 111 feet with only its left wheels on the ground, overturned on a 4-foot fill into a swamp, and slid about 80 feet further and stopped with the boiler submerged in the frozen swamp; the first car in the train was not derailed until 100 feet or more beyond the first flange marks and then continued until it struck engine 476, of Train No. 12, with sufficient force to turn that engine over into the swamp, the mail car then turning end for end and stopping with its nearest end nearly 200 feet beyond the point where it became derailed. This evidence indicates that Engineman Hanson and the other members of the crew were mistaken in their estimates as to the speed at the time of the accident, and that the accident in fact was due to speed in excess of the maximum permissible speed of 25 miles per hour allowed on the curve. There is a question, however, whether the elevation on this curve was adequate to provide a reasonable margin of safety for the prescribed speed limit. The elevation averaged 2 inches, while the recommended practice of the American Railway Engineering Association calls for an elevation of 4 1/8 inches

on a 10° curve for a speed of 25 miles per hour. In the interest of safety, either the elevation should be increased or the maximum permissible speed limit should be reduced.

Respectfully submitted,

W. J. PATTERSON,

Director.