

Inv-2334

INTERSTATE COMMERCE COMMISSION  
WASHINGTON

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REPORT OF THE DIRECTOR  
BUREAU OF SAFETY

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ACCIDENT ON THE  
CHICAGO, ROCK ISLAND & PACIFIC RAILWAY

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BRANDT, S. DAK.

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FEBRUARY 20, 1939.

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INVESTIGATION NO. 2334

SUMMARY

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Inv-2334  
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Railway. Chicago, Rock Island & Pacific  
Date: February 20, 1939  
Location: Brandt, S. Dak.  
Kind of accident: Derailment  
Train involved: Mixed  
Train number: Extra 1581 East  
Engine number: 1581  
Consist: 7 freight cars and 1 combination  
baggage and passenger coach.  
Speed: 25 m. p. h.  
Operation: Timetable and train orders  
Track: Single; tangent; 0.667 percent  
ascending for westward trains  
Weather: Clear and cold  
Time: 9:20 a. m.  
Casualties: 1 killed, 1 injured  
Cause: Ice on track

Inv-2334

March 27, 1939.

To the Commission:

On February 20, 1939, there was a derailment of a mixed train on the Chicago, Rock Island & Pacific Railway near Brandt, S. Dak., which resulted in the death of one employee and the injury of one employee. This accident was investigated in conjunction with a representative of the South Dakota Board of Railroad Commissioners.

#### Location and Method of Operation

This accident occurred on that part of the Cedar Rapids Division designated as Sub-Division 22 which extends between Elsworth, Minn., and Watertown, S. Dak., a distance of 125.8 miles. This is a single-track line over which trains are operated by timetable and train orders, no block-signal system being in use. The accident occurred at a point 1.3 miles east of Brandt. Approaching from the west there is a tangent of almost two miles extending to and about 900 feet beyond the point of accident. The grade for eastward trains is 0.661 percent ascending to within 10 feet of the point of accident where it is practically level.

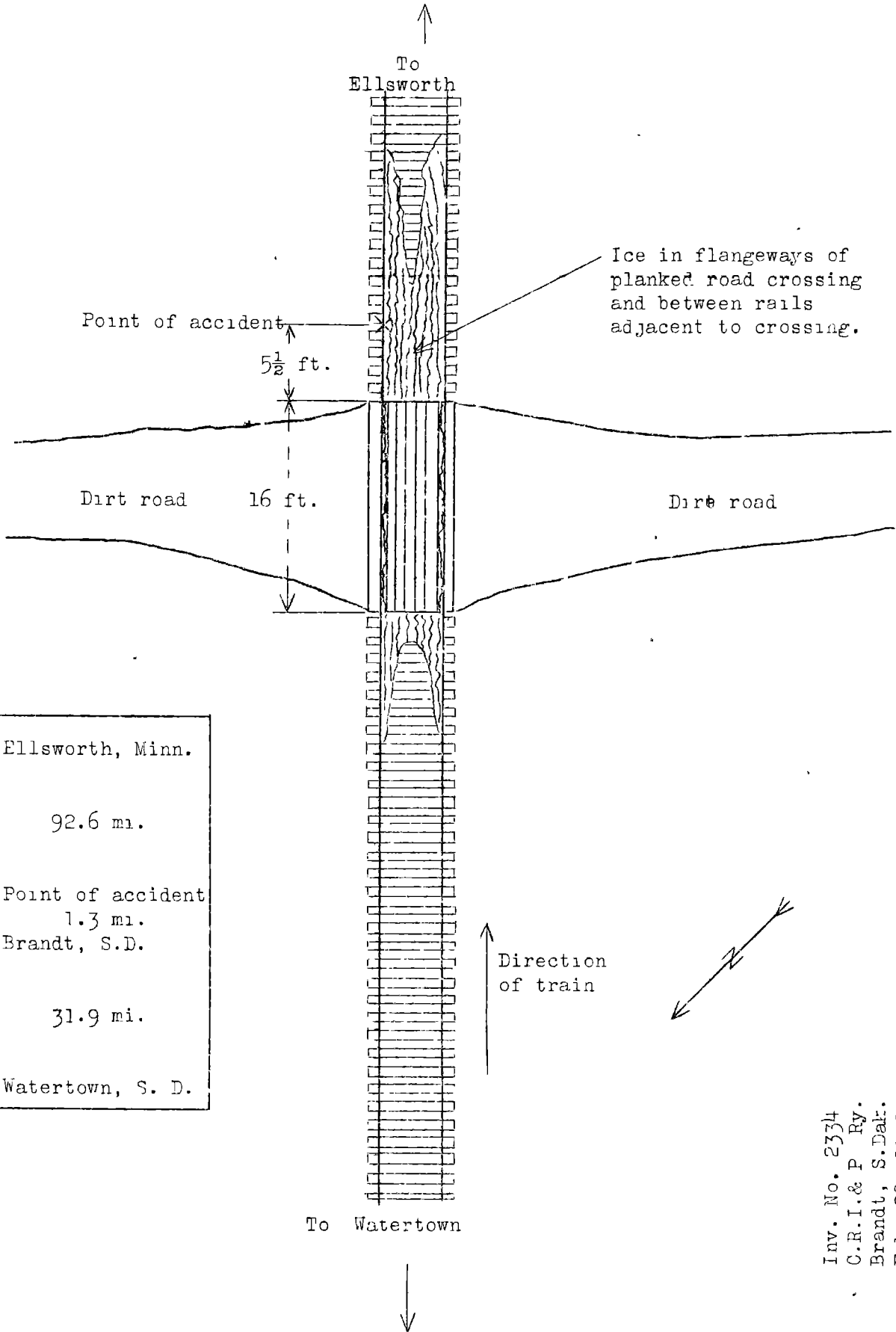
The track structure consists of 56-pound rail, 30 feet long and rolled in 1884, laid on an average of 17 ties to the rail length, about 90 percent of which are treated; it is single-spiked, provided with a few tieplates, ballasted with from 3 to 6 inches of sand and gravel faced with cinders and is fairly well maintained. Speed for mixed trains is restricted to 25 miles per hour.

Immediately west of the point of derailment a dirt road crosses the track at right angles; this crossing is surfaced with 7 planks 16 feet long, five of which lie between the rails and one on the outside of each rail; the eastern ends of these planks are located 5½ feet west of the point of derailment. The crossing approaches decline toward the track sufficiently that drainage water therefrom flows upon the track. A fill having a maximum height of 5 feet extends eastward about 650 feet from the point of derailment.

The weather was clear and it was 26 degrees below zero at the time of the accident, which occurred about 9:20 a.m.

#### Description

Extra 1581, an east-bound mixed train, consisted of seven freight cars and one combination mail, baggage and passenger coach, hauled by engine 1581, and was in charge of Conductor Dooley and Engineman Scholtes. This train departed from Brandt at 9:10 a.m., according to the train sheet, and was derailed



o Ellsworth, Minn.
92.6 mi.
X Point of accident
1.3 mi.
o Brandt, S.D.
31.9 mi.
o Watertown, S. D.

Inv. No. 2334  
 C.R.I. & P Ry.  
 Brandt, S. Dak.  
 Feb. 20, 1939

about 1.3 miles east of Brandt while traveling at a speed estimated to have been 25 miles per hour.

The engine was derailed toward the north and stopped on its right side 191 feet east of the first marks of the derailment, at right angles to and with its front end 89 feet from the track; the tender stopped on its right side behind the engine with its head end 48 feet from and at right angles to the track. The first three cars behind the tender were derailed toward the north but remained upright, the head end of the first car stopping on top of the overturned tender at an angle of 45 degrees to the track and the second and third cars in alignment with the first; the forward truck of the fourth car was derailed but remained in line with the track.

The employee killed was the engineman and the employee injured was the fireman.

#### Summary of Evidence

Fireman Green stated that an air-brake test was made before leaving Watertown, at which time the brakes functioned properly. He said that he had just completed putting in a fire and was still on the deck of the engine when the derailment occurred, at which time the speed was not in excess of 25 miles per hour. Approaching the point of accident the engineman was looking ahead through the closed window of the cab. The fireman felt no upward thrust of the engine before the derailment.

Conductor Dooley stated that a test of the air brakes was made at Watertown prior to departure and another at Clear Lake, about 9 miles west of the point of accident, and in each test the brakes functioned properly. He said that approaching the point of accident the train was traveling at a speed of about 25 miles per hour, and stopped in the manner a train does when snow is encountered on the track. Subsequent to the derailment he examined the track and found a broken rail; as he found no marks of derailment west of this point he thought the accident was caused by the broken rail. He saw no ice on top of the rails although between the rails and around the angle bars there was some ice which had been broken by the wheels. He estimated that the accident occurred at 9:20 a.m. On his last trip prior to the one involved in the accident he passed the point of derailment at 2:45 p.m., February 18, and he noticed nothing unusual at that time.

The statement of Brakeman Randolph corroborated that of the conductor.

Section Foreman Olson stated that he is in charge of 13 miles of main track and he has one laborer to assist him; he goes over his section daily except Sunday and he passed the point of accident

about 4 p.m., February 18, at which time it was thawing a little. When it rains or snow melts water sometimes flows down the road approaches and upon the track; this had never been in sufficient quantity to cause trouble and there was no water present when he made his last inspection. On February 19 it snowed and drifted. He arrived at the point of accident a few minutes after it occurred and found sufficient ice in the flangeways of the crossing and extending eastward 60 feet along the top of the rails to have caused the derailment. At this time he also found water present under the snow along the track which he thought was caused by the frozen ground preventing the water soaking into the earth and that such water had seeped up through the snow and formed ice on the track. He stated that at the point of accident he found four broken rails and saw flange marks on the ball of the rail about 15 feet east of the crossing; the first break in the rail occurred about 30 feet east of the crossing and about 15 feet east of the flange marks and he thought that perhaps the rail had broken under the pony truck although the rail was not broken where the flange marks appeared. There was no indication of the crossing planks having been disturbed.

Section Laborer Klemm stated that mild weather in that vicinity on February 18 caused the snow to melt from about 11 a.m. until 4 p.m., when it began to turn colder and continued until the morning of the accident when the temperature reached 26 degrees below zero.

Division Engineer Bragg stated that he arrived at the point of accident about 24 hours after its occurrence. The first mark of the derailment was  $5\frac{1}{2}$  feet east of the crossing planks and this was a flange mark, 10 or 12 inches long, in a diagonal line from the gage side across the ball of the north rail where it dropped to the outside of the rail; the second mark was on the same side,  $49\frac{1}{2}$  feet east of the first mark, and showed heavy flange pressure; the third mark, 16 feet east of the second, was apparently caused by terrific outward flange-pressure which broke the rail at a point about 6 feet from the joint and also broke the angle bar which held it to the adjoining rail. He found no marks on the leading engine-truck wheel but on the second wheel there were rough places around its entire circumference, indicating that it had been rubbing hard against metal; between the first and second marks, which he thought were made by the first and second engine-truck wheels, respectively, the rail at the top of the gage side showed flange wear which was light at the first and quite heavy at the second mark. The first break in the rail occurred at the third mark east of the crossing and was  $65\frac{1}{2}$  feet east of the first mark of the derailment; it apparently was caused by driving-wheel pressure. There was no indication that dragging equipment might have been responsible for the accident.

Road Master Perkins stated that his last inspection of the track involved in the accident was made on February 14 and 15;

at that time there was no snow of any consequence for a distance of two miles east of Brandt. He arrived at the point of accident at 2:50 p.m. and found conditions to be as described by the division engineer. There was ice in the flangeways of the crossing and between the rails and at that time there was water under the snow and over the top of the south rail, the source of which was drainage water from a place located south of the track and about 9 inches above the top of the rail. It was his opinion that the ice on the track caused the accident.

According to data submitted by officials engine 1581 is a 4-6-0 type carrying a weight of 44,520 pounds on the truck and 138,200 pounds on the drivers, or a total weight of 182,720 pounds; it has a truck wheel-base of 6 feet 4 inches, a driver base of 15 feet and a total wheel-base of 26 feet 6 inches.

#### Observations of Commission's Inspectors

Inspection by the Commission's inspectors of the track and equipment involved in this accident disclosed no defect which might have caused or contributed to the accident. A flange mark, starting on the flange side of the north rail  $5\frac{1}{2}$  feet east of the road-crossing planks, extended about 12 inches diagonally across the ball of the rail and then continued on the ties parallel with the rail for  $50\frac{1}{2}$  feet where a second flange mark appeared on the gage side of the rail and led to the outside; both marks then continued on the ties for 16 feet to a point where the north rail was broken and overturned by a thrust or impingement of the driving wheels. At this point the locomotive turned over on its left side and stopped at right angles to the track. Between the flange marks on the rail, there appeared heavy abrasions on the gage side of the ball of the rail which, owing to the front engine truck wheel being derailed, were apparently caused by the rear left engine truck wheel on which corresponding abrasions were found. The break in the rail showed no previous fracture but indicated that it was caused by outward pressure against its gage side. The derailment of the leading truck wheel was evidently caused by the formation of ice in the flangeways and on top of the rails adjacent to the road crossing.

#### Discussion

According to the evidence the first mark of derailment was a flange mark beginning on the gage side of the rail and extending diagonally a distance of about 12 inches across the ball of the rail at a point  $5\frac{1}{2}$  feet east of the plank ends of a road crossing. About  $50\frac{1}{2}$  feet farther east a second flange mark across the ball of the rail appeared and 16 feet east of this second mark the first break in the rail, obviously from driving-wheel flange pressure, occurred. Since the first rail fracture was located at a point about 65 feet east of the first mark of derailment it is apparent the broken rail was a result of the accident rather than its cause.

Drainage water, some of which was the result of previous mild weather, accumulated in the natural drainage along the track and, hidden by an overburden of snow, was not discovered until after the accident. Some of this water ran down the road-crossing approaches into the flangeways of the planked crossing where, because of the subzero weather, it froze. The crossing planks had not been disturbed and were intact; there was no evidence of defective or dragging equipment or excessive speed. A track force of a foreman and one man made track inspections daily except Sunday over approximately 13 miles of track, weather conditions permitting. The track involved was inspected by the section foreman in the late afternoon two days prior to and by the road master five days prior to the day of the accident and no dangerous or unusual conditions were in evidence. The last train prior to the accident passed over the track two days previously. No trouble of this nature had been experienced previously in this vicinity.

#### Conclusion

This accident was caused by the engine-truck wheels being raised sufficiently for the flanges to pass over the rail, because of ice in the flangeways and along the rails adjacent to a planked road crossing.

Respectfully submitted,

W. J. PATTERSON,

Director.