INTERSTATE COMMERCE COMMISSION

WASHINGTON

REPORT NO. 3286

CHICAGO AND NORTH WESTERN RAILWAY COMPANY

IN RE ACCIDENT

AT AMES, IOWA, ON

OCTOBER 3, 1949

SUMMARY

Date:	October 3, 1949
Railroad:	Chicago and North Western
Location:	Ames, Iowa
Kind of accident:	Derailment
Train involved:	Passenger
Train number:	101
Engine number:	Diesel-electric units 5016B, 987C and 5010B
Consist:	15 cars
Estimated speed:	45 m. p. h.
Operation:	Timetable, train orders and automatic train-control system
Track:	Double; tangent; 0.467 percent ascending grade westward
Weather:	Clear
Time:	2:56 a. m.
Casualties:	1 killed; 25 injured
Cause:	Inadequate clearance between derailment safety-guide and top surface of track rail

INTERSTATE COMMERCE COMMISSION

REPORT NO. 3286

IN THE MATTER OF MAKING ACCIDENT INVESTIGATION REPORTS UNDER THE ACCIDENT REPORTS ACT OF MAY 6, 1910.

CHICAGO AND NORTH WESTERN RAILWAY COMPANY

December 6, 1949

Accident at Ames, Iowa, on October 3, 1949, caused by inadequate clearance between a derailment safety-guide and the top surface of a track rail.

REPORT OF THE COMMISSION[1]

PATTERSON, Commissioner:

On October 3, 1949, there was a derailment of a passenger train on the Chicago and North Western Railway at Ames, Iowa, which resulted in the death of 1 passenger, and the injury of 22 passengers and 3 dining-car employees. This accident was investigated in conjunction with representatives of the Iowa State Commerce Commission.

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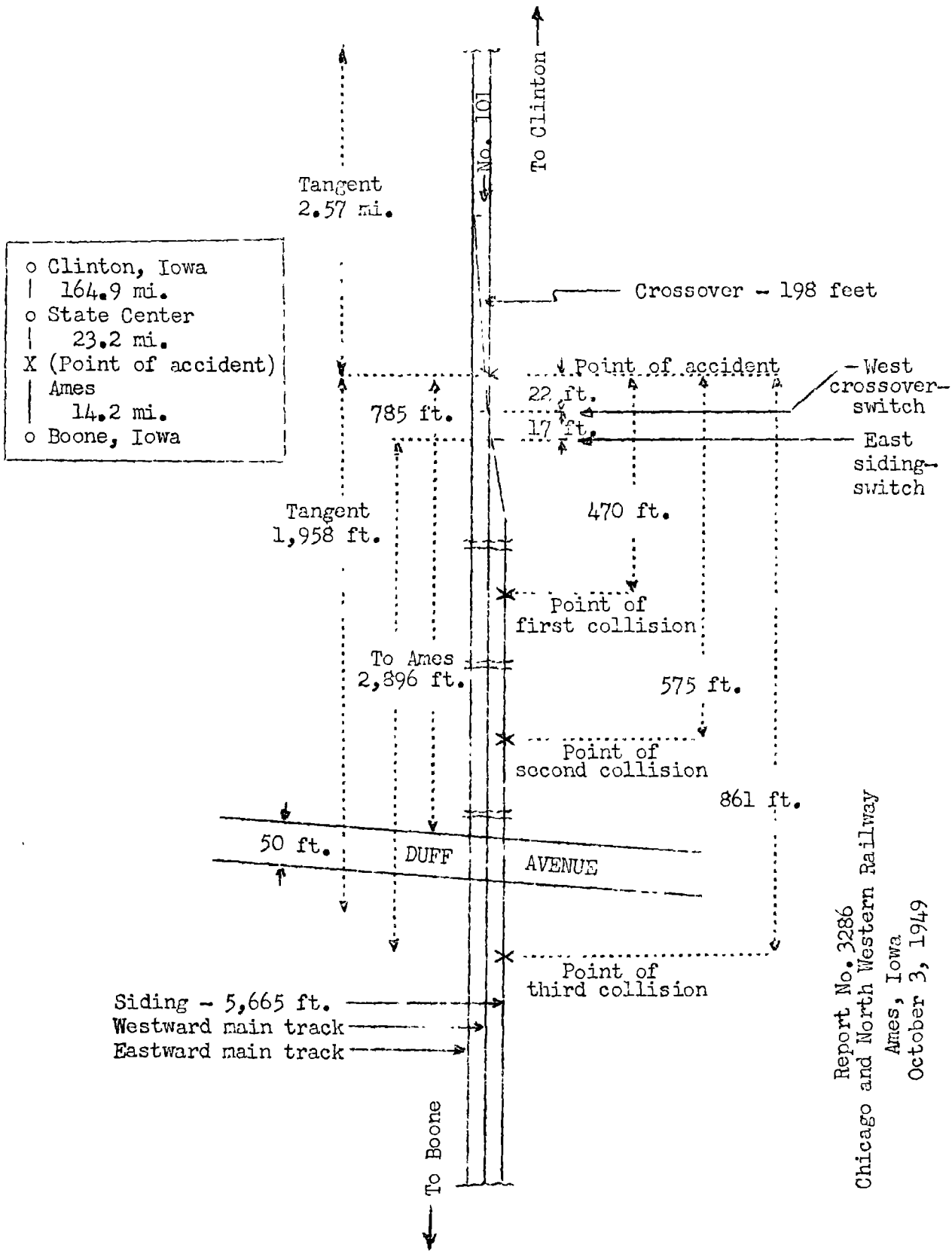
[1] Under authority of section 17 (2) of the Interstate Commerce Act the above-entitled proceeding was referred by the Commission to Commissioner Patterson for consideration and disposition.



Report No. 3286
Chicago and North Western Railway
Ames, Iowa
October 3, 1949

Location of Accident and Method of Operation

This accident occurred on that part of the Iowa Division extending between Clinton and Boone, Iowa, 202.3 miles, a double-track line, over which trains moving with the current of traffic are operated by timetable, train orders and an automatic train-control system. The current of traffic is to the left. At Ames, 188.1 miles west of Clinton, a siding 5,665 feet in length parallels the main tracks on the south. The east switch of this siding is located in the westward main track 2,896 feet east of the station. It is facing-point for west-bound movements. The west switch of a trailing-point crossover, 198 feet in length, is located in the westward main track 17 feet east of the east siding-switch. The accident occurred on the westward main track at a point 22 feet east of the west switch of the crossover. From the east the main track is tangent 2.57 miles to the point of accident and 1,958 feet westward. At the point of accident the grade is 0.467 percent ascending westward.

The structure of the westward main track consists of 110-pound rails, 39 feet in length, laid new in 1931 on an average of 24 treated ties to the rail length. It is fully tieplated with single-shoulder tie plates, single-spiked, and is provided with 26-inch, 4-hole, head-free joint bars, and an average of 8 rail anchors per rail length. It is ballasted with gravel to a depth of 18 inches below the ties.

The structure of the west turnout of the crossover consists of a 110-pound rigid frog, 110-pound switch rails 19 feet 6 inches in length, 110-pound lead rails and 2 guard rails. The lead is 84 feet 5 inches in length and the curvature is 7°36'30". It is laid on 65 treated switch ties, and is fully tieplated and double-spiked. The construction of the east turnout of the siding is similar to that of the west turnout of the crossover.

Duff Avenue crosses the railroad at grade at a point 785 feet west of the point of accident. This crossing is 50 feet in width and is surfaced with planking to the approximate level of the tops of the rails.

The maximum authorized speed for the train involved was 90 miles per hour, but it was restricted to 50 miles per hour in the immediate vicinity of the point of accident.

Description of Accident

No. 101, a west-bound first-class passenger train, consisted of Diesel-electric units 5016B, 987C and 5010B, coupled in multiple-unit control, one baggage car, one mail car, one baggage-dormitory car, two coaches, one chair car, two dining cars, one lounge car and six sleeping cars, in the order named. All cars were of lightweight all-steel construction. This train departed from Clinton at 12:10 a. m., 2 hours 26 minutes late, passed State Center, the last open office, 26.2 miles east of Ames, at 2:37 a. m., 2 hours 27 minutes late, and while it was moving at an estimated speed of 45 miles per hour the rear truck of the fourth car was derailed at a point 22 feet east of the west switch of the crossover. The following cars were derailed at the frog of the east turnout of the siding. Three cuts of freight cars, consisting, from east to west, of 2, 3 and 14 cars, were standing on the siding. The east end of the most easterly car of each cut was standing, respectively, 470 feet, 575 feet and 861 feet west of the point of accident. After the derailment occurred, the left rear portion of the fourth car and the left front portion of the fifth car struck the east ends of the three cuts of cars which were standing on the siding. The sixth to the eleventh cars, inclusive, were derailed at the rail-highway grade-crossing, and the train stopped with the front end of the first Diesel-electric unit 2,385 feet west of the point of derailment. All cars remained upright, and all cars stopped in line with the westward main track, except the fourth and the fifth cars. The east end of the fourth car and the west end of the fifth car stopped on the siding. All units of the train were equipped with tightlock couplers. There were no separations between the units. The fourth and the fifth cars were badly damaged. Practically all the casualties occurred in the fifth car. The third, the sixth, and the twelfth to the fifteenth cars, inclusive, and six freight cars standing on the siding were slightly damaged.

The weather was clear at the time of the accident, which occurred at 2:56 a. m.

The fourth car of No. 101, a coach of lightweight high-tensile steel construction, was built in December, 1937. It is 84 feet 6 inches long between coupler faces, and its light weight is 115,480 pounds. This car is designed with one vestibule, which was next to the fifth car when the accident occurred. It is provided with two 4-wheel trucks,

spaced 59 feet 6 inches between truck centers. The wheel base of each truck is 9 feet in length. The specified diameter of the wheels is 36 inches. The truck side-frames and pedestals are cast integrally. The journals are 6 inches by 11 inches and are provided with roller bearings. The bottoms of the pedestals are closed by bolted pedestal tie bars designed to serve as derailment safety-guides. The trucks are equipped with single bolsters having integral centerplates. These bolsters are equipped with anchors and stabilizing devices. Shock absorbers are provided at each end of each bolster. The equalizers are of the bottom type and extend between the journal boxes on each side of each truck. They are curved upward at each end and are seated upon the tops of the journal boxes. The spring arrangement consists of two helical springs, 8 inches in diameter, seated upon each equalizer bar near each end, and two helical springs, 10 inches in diameter, at each end of each bolster. The centers of the bolster side-bearings are spaced 4 feet 4 inches apart.

The pedestal tie bar with derailment safety-guide is 24-1/8 inches long. It is 6-15/16 inches wide across the top, and has a vertical flange which extends downward 3-1/8 inches. The horizontal and the vertical portions are 3/4 inch thick. The derailment safety-guide is secured to the pedestal legs with turned bolts 1 inch in diameter, spring washers and U-shape safety clips. The purpose of the derailment safety-guide is to guide the truck close to the rail in case of derailment.

The front pair of wheels of the truck involved was applied on September 26, 1949, at Oakland, Calif. The flanges were of good contour and the tread wear was negligible. The diameter of each wheel was 34-3/4 inches. The rear pair of wheels was applied on September 22, 1949, at Oakland. The flanges were of good contour, the tread wear was negligible and the diamter of each wheel was 34-1/2 inches. The diameters of the wheels were less than those of new wheels but were well within the service limits prescribed by the carrier.

Discussion

As No. 101 was approaching Ames the headlight was lighted brightly, the throttle was in No. 8 position and the speed was about 88 miles per hour. The enginemen were maintaining a lookout ahead from their respective positions in the control compartment of the first Diesel-electric unit, the conductor

and the brakeman were in the front end of the sixth car and the flagman was in the rear end of the last car. When the train was about 3 miles east of Ames, the engineer initiated a brake application. As a result, the speed of the train was reduced to 80 miles per hour. The brakes then were released and the throttle was placed in No. 2 position. When the train was about 1-1/4 miles east of the point where the accident occurred, the engineer initiated a service brake application, and the speed was reduced to 45 miles per hour, in compliance with a speed restriction in effect through an interlocking. This brake application was released when the train was about 1,000 feet east of the crossover. The train was riding smoothly, the brakes were released and the throttle was in No. 2 position when the first Diesel-electric unit passed the crossover. When the front of the train was about 800 feet west of the crossover the enginemen felt an unusual movement of the train, and again when the train had moved about 500 feet farther west. The engineer then initiated an emergency brake application, and the train stopped with the rear end of the fourth car 1,837 feet west of the crossover. The brakes of this train had been tested and had functioned properly when used en route.

Examination of the westward main track throughout a distance of several miles immediately east of the point of derailment disclosed that the surface, gage and alinement were well maintained for the maximum authorized speed. There was no indication of any obstruction having been on the track, or of dragging equipment east of the crossover. The first mark on the track structure was an abrasion on the south side of the head of the south rail of the crossover. It extended westward a distance of 4 feet 11-1/2 inches from a point 12 feet 11-1/2 inches east of the point of frog, where the distance from the gage side of the north rail of the westward main track to the outside of the head of the crossover rail was 13-3/8 inches. At that point the crossover rail was 1/2 inch higher than the main-track rail. Similar marks appeared on the south side of the head of the north crossover rail at a point 14 feet 2-3/8 inches east of the point of derailment. These marks extended to the heel of the switch rail of the crossover turnout. At the point where these marks first appeared, the top of the crossover rail was 7/8 inch higher than the top of the main-track rail, and the distance from the gage side of the main-track rail to the outside edge of the crossover rail was 12-7/8 inches.

Between these latter marks and the point of derailment, the north rail of the crossover was canted outward. One spike on the north side of the crossover rail was broken and other spikes were partially withdrawn. The first flange mark appeared on the gage side of the south main-track rail at a point 21 feet 11 inches east of the switch point. This mark extended diagonally upward to the top of the rail and it continued on top of the rail a distance of 9 feet 2 inches, then the mark continued outside the rail. The first mark of derailment on the north side of the track was a flange mark on a switch plate inside the north rail about 11 feet east of the west crossover switch. Flange marks then appeared on rail braces and on tie plates. The south lead-rail of the east siding-switch was broken, and flange marks continued to the frog of the siding turnout. The frog was broken. The general derailment occurred at the broken frog. Between a point 30 feet east of the frog and the rail-highway grade-crossing, a distance of about 700 feet, the north rail of the westward main track was overturned and was lying on the ballast north of the ties.

Examination of the equipment of No. 101 disclosed that the derailment safety-guides were missing from the right front and the left rear pedestals of the rear truck of the fourth car. The shock-absorber bracket on the right side was bent, and the equalizer springs at the rear were unseated. With these exceptions, all pedestal springs, bolster springs, bolster anchors, stabilizers and shock absorbers were in good condition. A derailment safety-guide was found on the westward main track 405 feet west of the point of derailment. Examination showed that it had broken from the right front pedestal of the rear truck of the fourth car. It was scored and burned on the outer face by its having been in contact with a track rail. These marks extended the full length of the guide and to a height of 1-1/4 inches from the bottom edge. They were 1/4 inch deep at the front end. The front end of the guide was bent.

The marks on the west turnout of the crossover and the corresponding marks on the derailment safety-guide indicate that the right front safety-guide first came in contact with the rails of the turnout at points where the gage side of the north rail of the westward main track was about 14 inches distant. After the outside vertical face of the safety-guide came in contact with the gage side of the north lead-rail of the turnout, a force was exerted by the north lead-rail against the outside face of the safety-guide. This force increased as the distance between the north

lead-rail and the north main-track rail progressively decreased, then the south rail was canted outward, the flange of the left front wheel of the truck climbed to the top surface of the south rail and at a point 9 feet 2 inches westward the wheel dropped outside the rail. At the point of derailment the north lead-rail of the turnout was 7/8 inch higher than the north rail of the westward main track. At this point the gage of the main track was 4 feet 8-7/8 inches. There was no variation in the cross level of the two main-track rails.

According to the specifications of the carrier, when the truck springs are under normal compression and the wheels are of full diameter, the bottom surface of the derailment safety-guide should be not less than 4-1/2 inches above the level of the top surface of the rails upon which the car moves, and a minimum clearance of 3-3/4 inches must be maintained at all times. Measurements taken after the accident, with the involved truck standing on the westward main track at the point of derailment and the springs under normal compression, disclosed that there was only 1-1/8 inches clearance between the bottom of the safety-guide and the top of the crossover rail. When this type of equalizer spring is under normal compression, it is possible to compress it an additional distance of at least 2 inches before it is fully compressed. The maximum compression would occur when the car was rolling laterally when the train was in motion. At the maximum compression the bottom surface of the derailment safety-guide would be at least 7/8 inch lower than the top surface of the crossover rail.

The car in question was en route from Chicago to San Francisco, Calif., and had traversed 327 miles from Chicago to the point where the accident occurred. This car was inspected at several points en route, the last of which was at Clinton, Iowa, 188.1 miles east of Ames, and no defective condition was observed.

Since the accident occurred the carrier has issued instructions to remove derailment safety-guides from pedestal tie-bars of all Chicago and North Western Railway equipment.

Cause

It is found that this accident was caused by inadequate clearance between a derailment safety-guide and the top surface of a track rail.

Dated at Washington, D. C., this sixth day of December, 1949.

By the Commission, Commissioner Patterson.

(SEAL)

W. P. BARTEL,

Secretary.