

INTERSTATE COMMERCE COMMISSION
WASHINGTON

INVESTIGATION NO. 3255
UNION PACIFIC RAILROAD COMPANY
REPORT IN RE ACCIDENT
NEAR EMORY, UTAH, ON
MAY 20, 1949

SUMMARY

Date: May 20, 1949

Railroad: Union Pacific

Location: Emory, Utah

Kind of accident: Derailment

Train involved: Passenger

Train number: 1

Engine numbers: Diesel-electric units 704, 703B
and 606

Consist: 11 cars

Speed: 53 m. p. h.

Operation: Signal indications

Tracks: Double; tangent; 0.82 percent
descending grade westward

Weather: Clear

Time: 3:38 p. m.

Casualties: 1 killed; 9 injured

Cause: Inadequate clearance between derailment
safety-guide and top surface of track
rail

INTERSTATE COMMERCE COMMISSION

INVESTIGATION NO. 3255

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

UNION PACIFIC RAILROAD COMPANY

July 25, 1949

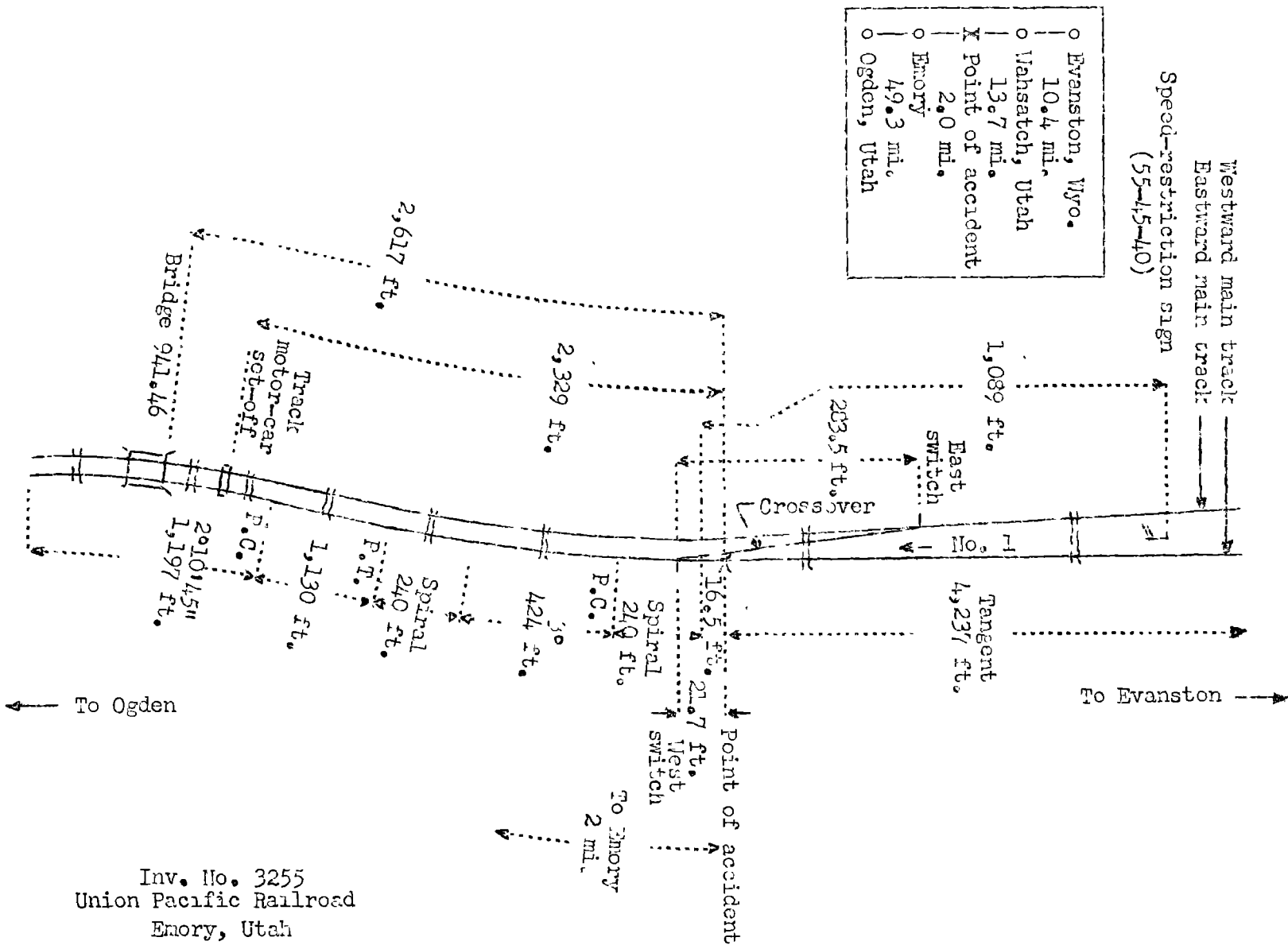
Accident near Emory, Utah, on May 20, 1949, caused by
inadequate clearance between a derailment safety-
guide and the top surface of a track rail.

REPORT OF THE COMMISSION¹

PATTERSON, Commissioner:

On May 20, 1949, there was a derailment of a passenger train on the Union Pacific Railroad near Emory, Utah, which resulted in the death of one passenger, and the injury of nine passengers.

¹Under 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.



Inv. No. 3255
 Union Pacific Railroad
 Emory, Utah
 May 20, 1949

Location of Accident and Method of Operation

This accident occurred on that part of the Utah Division extending between Evanston, Wyo., and Ogden, Utah, 75.4 miles. In the vicinity of the point of accident this is a double-track line, over which trains moving with the current of traffic are operated by signal indications. The current of traffic is to the left. A trailing-point hand-operated crossover 283.5 feet long, which connects the main tracks, is located 2 miles east of Emory. The accident occurred on the westward main track at a point 21.7 feet east of the west switch of the crossover. From the east, the westward main track is tangent 4,237 feet to the point of accident and 16.5 feet beyond, then there are, in succession, a spiral curve to the right 240 feet, a 3° curve to the right 424 feet, a spiral curve to the right 240 feet, a tangent 1,130 feet, and a 2°10'45" curve to the left 1,197 feet. Throughout a considerable distance east of the point of accident, the grade for west-bound trains is generally descending, and, throughout one mile immediately east of the crossover, it varies between 0.49 and 0.82 percent descending to the point of accident, where it is 0.82 percent.

The structure of the westward main track consists of 131-pound rails, 39 feet in length, laid on an average of 22 treated ties to the rail length. It is fully tieplated and spiked, provided with 6-hole joint bars, and an average of 12 rail anchors per rail length. It is ballasted with crushed stone to a depth of 8 inches below the ties. The specified gage is 4 feet 8-1/2 inches.

The structure of the turnout at the west end of the crossover consists of a 131-pound No. 10 spring-rail type frog, 131-pound rails and switch rails, and two guard rails. The lead is 80 feet 3-5/8 inches long, and is laid on 50 switch ties. A gage plate is provided at the point-of-switch and also on the third tie west of the point-of-switch. Switch plates extending under each stock rail and its respective switch rail and under each main-track rail and its respective lead rail are provided on the first 19 ties east of the point-of-switch. The guard rails and stock rails are adequately braced, and rail anchors are provided in each direction east and west of the switch point.

A track motor-car set-off, constructed of planking and extending through both main tracks, is located 2,329 feet west of the point of accident. Bridge 941.46, a double-track through-plate girder bridge, is 50 feet in length. Its east end is located 2,617 feet west of the point of accident. The south

girder of this bridge is 7 feet south of the center-line of the westward main track, and its top coverplate is 2 feet 3-3/4 inches above the level of the base of the rail.

Timetable special instructions prescribe the maximum authorized speed for the type of equipment involved in the accident as 75 miles per hour on tangent track, and 45 miles per hour on the curve immediately west of the point of accident. A permanent speed-restriction sign is located 1,072 feet east of the point of accident. It was erected for the curve immediately west of the point of accident, is arranged vertically on a mast and bears the numerals 55-45-40.

Description of Accident

No. 1, a west-bound first-class passenger train, consisted of Diesel-electric units 704, 703B and 606, coupled in multiple-unit control, one dormitory car, two coaches, one dining car, one lounge car, and six sleeping cars, in the order named. All cars were of steel construction. This train departed from Evans-ton at 3:05 p. m., 15 minutes late, passed Wahsatch, the last open office, 13.7 miles east of the point of accident, at 3:16 p.m., 13 minutes late, and while it was moving at a speed of 53 miles per hour the front wheels of the rear truck of the rear car were derailed 21.7 feet east of the west switch of the crossover.

The derailed wheels continued in line with the track 2,229 feet to the track motor-car set-off, at which point the rear pair of wheels also became derailed. The rear end of the rear car veered toward the south, and struck the south girder of Bridge 941.46. At this point the rear truck was torn loose from the car. When the train stopped, the rear end was 4,157 feet west of the point of derailment. The front truck of the rear car was not derailed. The rear truck was considerably damaged. All of the units of the train remained coupled. The fourth, sixth, seventh, tenth and eleventh cars were equipped with tightlock couplers.

The weather was clear at the time of the accident, which occurred about 3:38 p. m.

The eleventh, or rear, car of No. 1, a sleeping car of lightweight high-tensile steel construction, was built during May, 1942, and is 84 feet 9 inches long between inside coupler faces. It is designed with one vestibule, which was next to the tenth car. Its light weight is 139,800 pounds. The car is provided with two 4-wheel trucks, spaced 59.5 feet between truck centers.

The wheelbase of each truck is 9 feet long. The specified diameter of the wheels is 36-1/2 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 tiebars. 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. They extend between the journal boxes on each side of each truck, are curved upward at each end, and are seated upon the tops of the journal boxes. The spring arrangement consists of two helical springs seated upon each equalizer bar near each end, and helical springs 10 inches in diameter at each end of each bolster. The centers of the bolster side bearings are spaced 4 feet 7-1/2 inches apart.

The pedestal tiebars are 24 inches long, 6 inches wide, 3/4-inch thick, and are secured by 7/8-inch machine bolts and U-shape clips. At the time of the accident, each pedestal tiebar of the rear car was arranged with a device designated as a derailment safety-guide. This device is welded to the bottom surface of the tiebar 3/8-inch inward and parallel to the outer edge. These guides are 15-3/16 inches long at the bottom and 3/4-inch thick. They project downward 1-1/4 inches. The purpose of the derailment safety-guide is to guide the truck close to the rail in case of derailment. The carrier's specifications provide that the lower edge of the derailment safety-guide be not less than 4-1/2 inches above the tops of the rails when the truck wheels are of full diameter and the equalizer springs are under normal compression. The outer edge of the derailment safety-guide is 14 inches outward from the throat of the flange of the wheel at that pedestal.

Discussion

As No. 1 was approaching the crossover where the derailment occurred, the enginemen were in the control compartment of the first Diesel-electric unit, the electrician was in the second unit, the conductor was in the fifth car, the flagman was in the rear end of the tenth car, and a roadmaster was inspecting the track from the rear end of the rear car. The brakes of this train had been tested and had functioned properly en route. As No. 1 was moving on tangent track about 1 mile east of the crossover, the speed was 72 miles per hour, as indicated by the speed-recording device. The engineer made a service brake-pipe reduction to comply with the speed restriction in effect on the 3-degree curve immediately west of the crossover. When the front of the

first unit reached the west switch of the crossover, the engineer moved the brake valve to running position. At this point the speed was 53 miles per hour. When the rear car passed the west switch of the crossover, the roadmaster felt the car lurch, and saw pieces of ballast being thrown into the air alongside the car. The car continued to lurch, and he immediately proceeded to the second car from the rear to warn the flagman. The conductor's valve in the second rear car then was opened, and the communicating signal was sounded, and about that time the rear car struck Bridge 941.46. The engineer said that when the engine was a short distance west of Bridge 941.46, he heard the communicating signal whistle sound. He then observed that the brake-pipe pressure was decreasing rapidly, and he placed the brake valve in lap position. An emergency application of the brakes followed immediately. The train then stopped about 1,540 feet west of the bridge. Until after the train stopped, the flagman was the only member of the crew who was aware that any of the equipment was derailed.

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 point of derailment. The first mark on the track structure was a mark on the south rail of the crossover 12.5 feet east of the point-of-frog. At this point the distance between the gage side of the north rail of the westward main track and the outside edge of the south rail of the crossover was about 14 inches. The next mark appeared on the gage side of the north lead rail 31.5 feet east of the point of switch and 14 inches from the gage side of the north rail of the westward main track. Between points 2.5 and 7.5 feet west of this latter mark, the south side of the north lead rail was heavily scored. The metal bore burn marks, and flakes of foreign metal adhered to these burns. Opposite this point, marks indicated that a flange had mounted the south rail of the westward main track 21.7 feet east of the point of switch, then crossed diagonally outward and dropped outside the south rail within a distance of 33.9 feet. The north wheel dropped inside the north rail opposite this point. Single flange marks then appeared both inside the north rail and outside the south rail throughout a distance of 2,329 feet westward to a track motor-car set-off, where the other pair of wheels of the truck became derailed. The truck then struck the south girder of Bridge 941.46, 288 feet west of the track motor-car set-off. At this point the rear truck of the rear car became detached from the car.

Examination of the truck disclosed that the center-pin was broken, the front axle was bent and numerous parts of the truck

were broken, as a result of its contact with the bridge. The outer face of the right front derailment safety-guide bore marks of its having rubbed heavily against a rail. The derailment safety-guide and the right equalizer bar were heavily scored on their inner surfaces. These marks indicated that these devices had held the truck in line with the track between the point of derailment and the motor-car set-off.

From the marks on the west turnout of the crossover and on the derailment safety-guide, it is apparent that the right front derailment safety-guide 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 derailment 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 derailment safety-guide. This force increased as the distance between the north lead rail and the north main track rail progressively decreased. It became sufficient to force the flange of the left front wheel to the top surface of the south rail, at a point 21.7 feet east of the point-of-switch, and then it dropped outside the rail 27.2 feet westward. At the point of derailment, the north lead rail of the turnout was 1 inch higher than the north rail of the westward main track. The gage of the main track was 4 feet 8-1/2 inches, and the south rail was 1/8-inch higher than the north rail. The point of derailment was on tangent track 16.5 feet east of the east spiral of a 3-degree curve to the right.

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 top surface of the rails upon which the car moves. When the equalizer springs are fully compressed the height should be not less than 2-1/2 inches above the rails. The front pair of wheels of the truck involved were applied on May 9, 1949, at Los Angeles. The flanges were of good contour, and the tread wear was negligible. The rim thickness of each wheel was 1-3/8 inches. The rear pair of wheels were applied on May 4, 1949, at Los Angeles. The flanges were of good contour, and the tread wear and the rim thickness of each wheel were, respectively, 1/16-inch and 1-7/16 inches. The diameters of the wheels were considerably less than that of new wheels but were within the service limits prescribed by the carrier. Examination of all pedestal springs, bolster springs, bolster anchors, stabilizers and shock absorbers disclosed that they were in good condition. Because of damage incurred by the truck during the derailment, the clearance between the derailment safety-guide and the track rail before the accident occurred could not be determined.

However, the lead rail of the crossover was 1 inch higher than the main track rail and adequate clearance was not provided to prevent contact between the derailment safety-guide and the lead rail.

The car in question was en route from Minneapolis, Minn., to Los Angeles, Calif., and had traversed 1,318 miles from Minneapolis to the point of accident. This car had been inspected at several points en route, and by the flagman on duty at the time of the accident, and no defective condition was observed.

Since the accident, the carrier has issued instructions to remove derailment safety-guides of the type involved from all passenger-train cars, and, in addition, to maintain a minimum clearance of 3-3/4 inches above the tops of the track rails.

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 twenty-fifth day of July, 1949.

By the Commission, Commissioner Patterson.

(SEAL)

W. P. BARTEL,

Secretary.