

INTERSTATE COMMERCE COMMISSION
WASHINGTON

INVESTIGATION NO. 3100
SOUTHERN PACIFIC COMPANY
REPORT IN RE ACCIDENT
AT GUASTI, CALIF., ON
APRIL 27, 1947

SUMMARY

Railroad: Southern Pacific
Date: April 27, 1947
Location: Guasti, Calif.
Kind of accident: Derailment
Train involved: Passenger
Train number: 6
Engine number: 4438
Consist: 18 cars
Speed: 65 m. p. h.
Operation: Timetable, train orders, and
automatic block-signal system
Track: Single; tangent; 0.514 percent
ascending grade eastward
Weather: Clear
Time: 9:48 p. m.
Casualties: 77 injured
Cause: Broken switch-rail

INTERSTATE COMMERCE COMMISSION

INVESTIGATION NO. 3100

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

SOUTHERN PACIFIC COMPANY

June 5, 1947

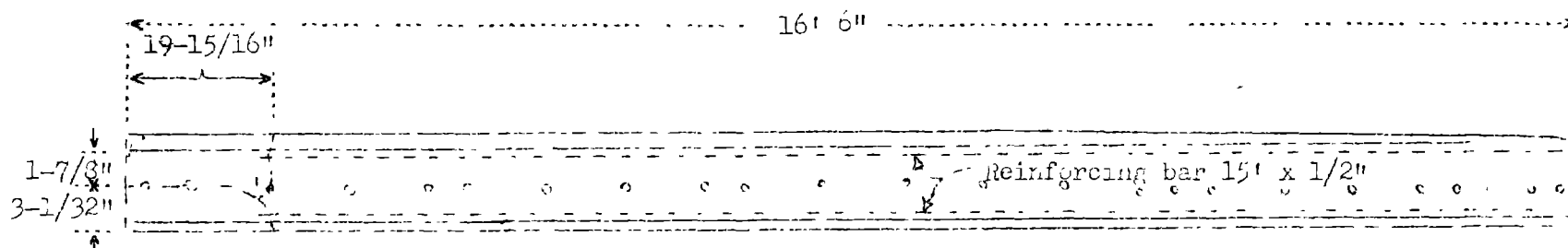
Accident at Guasti, Calif., on April 27, 1947, caused
by a broken switch-rail.

REPORT OF THE COMMISSION¹

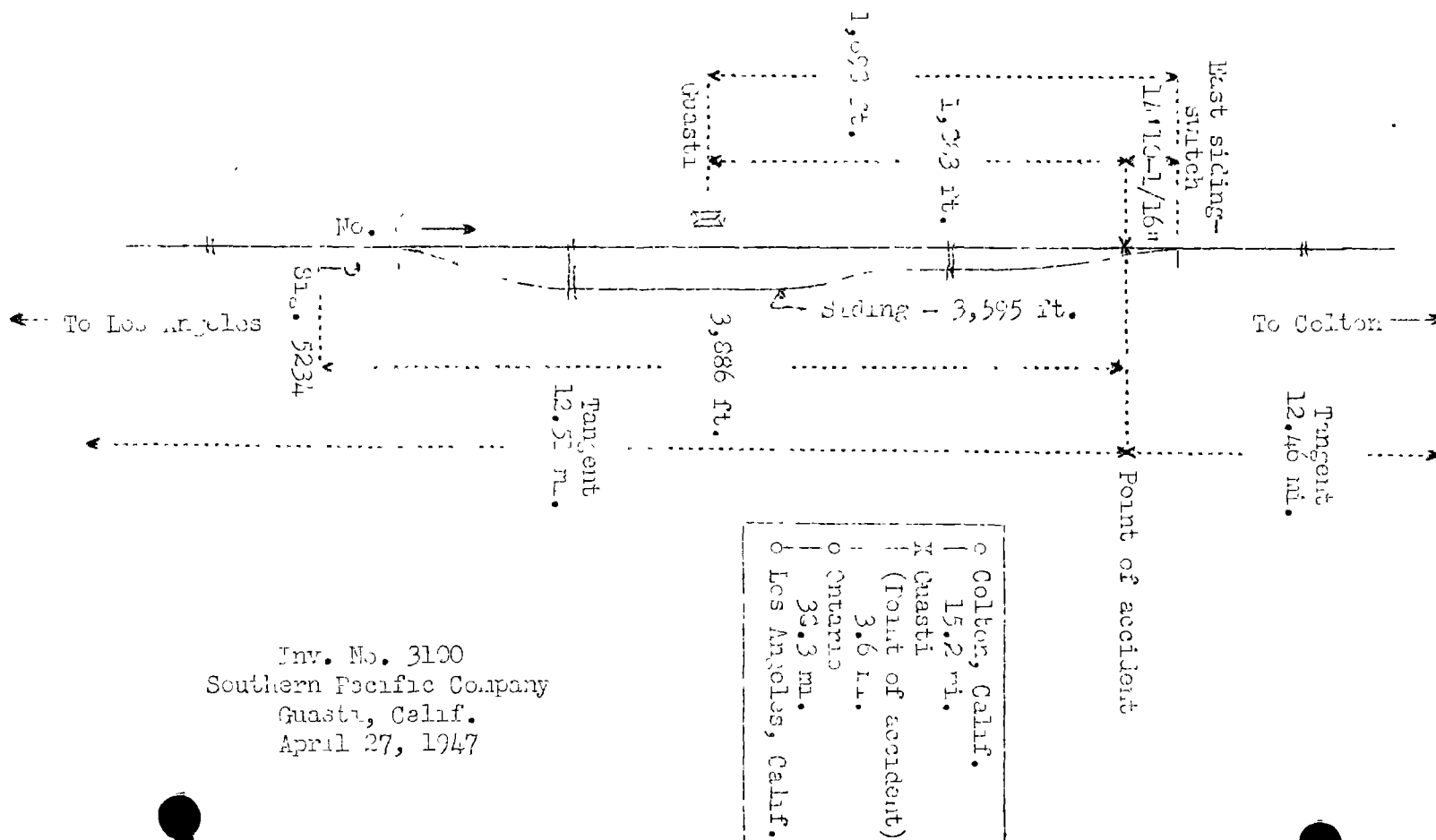
PATTERSON, Commissioner.

On April 27, 1947, there was a derailment of a passenger train on the line of the Southern Pacific Company at Guasti, Calif., which resulted in the injury of 73 passengers, 1 Pullman employee, 1 person carried under contract and 2 train porters. This accident was investigated in conjunction with representatives of the Public Utilities Commission of California.

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.



Sketch showing broken switch-rail



Location of Accident and Method of Operation

This accident occurred on that part of the Los Angeles Division extending between Los Angeles and Colton, Calif., 57.1 miles, a single-track line in the vicinity of the point of accident, over which trains are operated by timetable, train orders and an automatic block-signal system. At Guasti, 41.9 miles east of Los Angeles, a siding 3,595 feet in length parallels the main track on the south. The east switch of this siding is 1,898 feet east of the station. The accident occurred on the main track 1,983 feet east of the station and 14 feet 10-1/16 inches west of the switch points of the east siding-switch. The main track is tangent throughout a distance of 12.51 miles immediately west of the point of accident, and 12.46 miles eastward. The grade is 0.514 percent ascending eastward.

At the point of accident the structure of the main track consists of 112-pound rail, 39 feet in length, laid new in 1937, on an average of 24 treated ties per rail length. It is fully tieplated with double-shoulder tie plates, single-spiked, and provided with 4-hole angle bars. Between points about 80 feet immediately west and 80 feet immediately east of the points of the siding-switches there is an average of 40 rail anchors per rail length. The track is ballasted with crushed rock and gravel to a depth of about 14 inches.

The turnout of the east siding-switch is provided with a spring-rail type frog and 112-pound switch-rails and rail sections. The switch-rails are 16.5 feet in length, laid on 9 sliding plates, and are constructed of full rail section at the heel ends. The base and the head of the switch-rails are planed and the points chamfered in such manner that these rails fit properly against the stock rails. Cast-iron heel-blocks are provided between the heels of the switch-rails and the ends of the closure rails on one side, and the stock rails on the other side. Reinforcing bars 15 feet long and 1/2-inch thick are attached to the gage side of the web of the switch-rails by sixteen 7/8-inch rivets. The switch-rails, the stock rails and the closure rails are joined by four bolts and specially constructed angle bars at the heel-block locations to provide hinge motion at the heels of the switch-rails. The switch-rails are arranged for a 5-inch throw at the point ends. The involved switch-rail was manufactured by the Tennessee Coal, Iron and Railroad Company in 1936 and was placed in service during 1937. The number was 878559, Letter D.

Automatic signal 5234, governing east-bound movements, is 3,886 feet west of the point of accident. This signal is of the color-light type and is approach lighted.

In the vicinity of the point of accident the maximum authorized speed for the train involved was 65 miles per hour.

Description of Accident

No. 6, an east-bound first-class passenger train, consisted of engine 4438, one baggage-mail car, four baggage cars, four coaches, two sleeping cars, one dining car, one lounge car, four sleeping cars and one coach, in the order named. All cars were of heavy-steel construction. This train passed Ontario, the last open office, 3.6 miles west of Guasti, at 9:43 p. m., 9 minutes late, and while it was moving at a speed of 65 miles per hour the third to eighteenth cars, inclusive, were derailed.

Separations occurred between the sixth and the seventh cars, between the ninth and the tenth cars, and between the eleventh and the twelfth cars. The engine and the first six cars stopped with the front end of the engine 2,233 feet east of the point of derailment. The third to sixth cars remained upright, with the third car on the roadbed and the rear of the sixth car about 10 feet north of the main track. The seventh to ninth cars were practically upright, about 15 feet north of the main track and parallel to it, with the front of the seventh car 765 feet west of the sixth car. The tenth car was practically upright, on the roadbed and at an angle of 15 degrees to the track, with the front end against the front end of the ninth car. The eleventh car stopped practically upright and in line with the track. The twelfth to sixteenth cars were in an irregular line, with the twelfth car standing upright and across the track and at an angle of 15 degrees to it. The thirteenth and fourteenth cars were parallel to the track and about 8 feet north of it, and the fifteenth and sixteenth cars stood across the roadbed and at an angle of about 8 degrees to it. The remainder of the derailed cars were upright on the roadbed and in line with it. The rear of the eighteenth car was 40 feet east of the point of derailment. The third to sixteenth cars were badly damaged, and the remainder of the cars were considerably damaged. The right side of the ninth car was torn out the entire length of the car.

The weather was clear at the time of the accident, which occurred about 9:48 p. m.

Discussion

No. 6 was moving on tangent track at a speed of 65 miles per hour, as indicated by the tape of the speed recorder with which the engine was equipped, in territory where the maximum authorized speed for this train was 65 miles per hour, when the derailment occurred. The headlight was lighted brightly, and the enginemen were maintaining a lookout ahead. The conductor and the front brakeman were in the seventh car, and the flagman was in the rear car. The last automatic signal west of the point of accident displayed proceed for this train. Prior to the time of the accident, the engine and the cars had been riding smoothly, and there was no indication of defective equipment or track, nor of any obstruction having been on the track. The first that any member of the crew was aware of anything being wrong was when the engineer observed a gradual brake-pipe reduction, which was followed by a severe surge. Then the brakes became applied in emergency and the general derailment occurred.

After the accident the south switch-rail of the east siding-switch at Guasti was found overturned toward the center of the track. It was broken into five pieces, four of which were recovered. The first break was an irregular break at a point 2-5/8 inches east of the heel of the switch-rail. This break extended diagonally downward and westward to a point where it broke out at the heel-end 1-7/8 inches below the head of the rail. The other breaks were a result of a horizontal fracture in the web which started at the heel-end and progressed eastwardly in an irregular line through both angle-bar bolt holes and the most westwardly of the rivet holes for securing the reinforcing bar. This rivet was located 19-1/2 inches east of the heel-end of the switch-rail. At this latter point the break separated into two legs, one of which progressed upward through the head of the rail in practically a square break at a point 19-15/16 inches east of the heel, and the other extended downward at a slight angle through the base of the rail at a point about opposite the break through the head. The receiving end of the second break through the head of the switch-rail was considerably battered by the flanges of wheels. The surfaces of the horizontal break were somewhat battered and were so polished by friction that it could not be determined if a progressive fracture had existed. However, there was some discoloration of metal on the surfaces of the horizontal fracture in the area between the two angle-bar bolt holes. Prior to the accident, this discoloration had not reached the

outer surfaces of the web of the rail. The remainder of the breaks were new. The division engineer said that in his opinion a hair-line horizontal fracture had existed between the angle-bar bolt holes and had progressed until breaks occurred through the head, the web and the base of the switch-rail at a point 19-15/16 inches east of the heel-end. Apparently, the portion above the horizontal fracture dropped inward during the passage of the wheels of the engine and the first two cars of No. 6, then the front wheels of the third car became derailed.

An east-bound passenger train, moving at a speed of 60 miles per hour, passed over the switch involved about 13 minutes before the derailment occurred, and the crew of this train observed no indication of defective track. However, the fracture could have existed prior to the passage of No. 6, as the portions of the rail might have been held in place some time by the heel-block and the inside angle bar and the reinforcing bar.

The switch-rail involved was last tested by a detector-car on April 15, 1947. This test did not disclose any defect in the switch-rail in question. On April 14, 1947, the roadmaster and the section foreman removed the angle bars at the heel-block and examined the switch-rail, but found no defective condition. On April 25, the section foreman observed the switch during the passage of a freight train, and there was no indication of looseness or other condition which might have produced unusual stress in the heel of the switch-rail. The specifications of this carrier permit a minimum of 320 million tons to pass over a switch of the type in question before the switch is replaced. The switch-rail that failed was placed in service during 1937, and, according to the carrier's estimate, since that time 266.4 million tons had passed over it.

Cause

It is found that this accident was caused by a broken switch-rail.

Dated at Washington, D. C., this third day of June, 1947.

By the Commission, Commissioner Patterson.

(SEAL)

W. P. BARTEL,

Secretary.