

INTERSTATE COMMERCE COMMISSION
WASHINGTON

INVESTIGATION NO. 3061
SOUTHERN RAILWAY COMPANY
REPORT IN RE ACCIDENT
AT BURKE, VA., ON
JANUARY 11, 1947

SUMMARY

Railroad: Southern
Date: January 11, 1947
Location: Burke, Va.
Kind of accident: Derailment
Train involved: Passenger
Train number: 45
Engine numbers: Diesel-electric units
2912-2909
Consist: 13 cars
Speed: 40 m. p. h.
Operation: Timetable, train orders and automatic
block-signal system
Track: Double; 2° curve; 0.43 percent
descending grade southward
Weather: Clear
Time: 9:20 a. m.
Casualties: 1 killed; 46 injured
Cause: Broken journal

INTERSTATE COMMERCE COMMISSION

INVESTIGATION NO. 3061

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

SOUTHERN RAILWAY COMPANY

February 21, 1947.

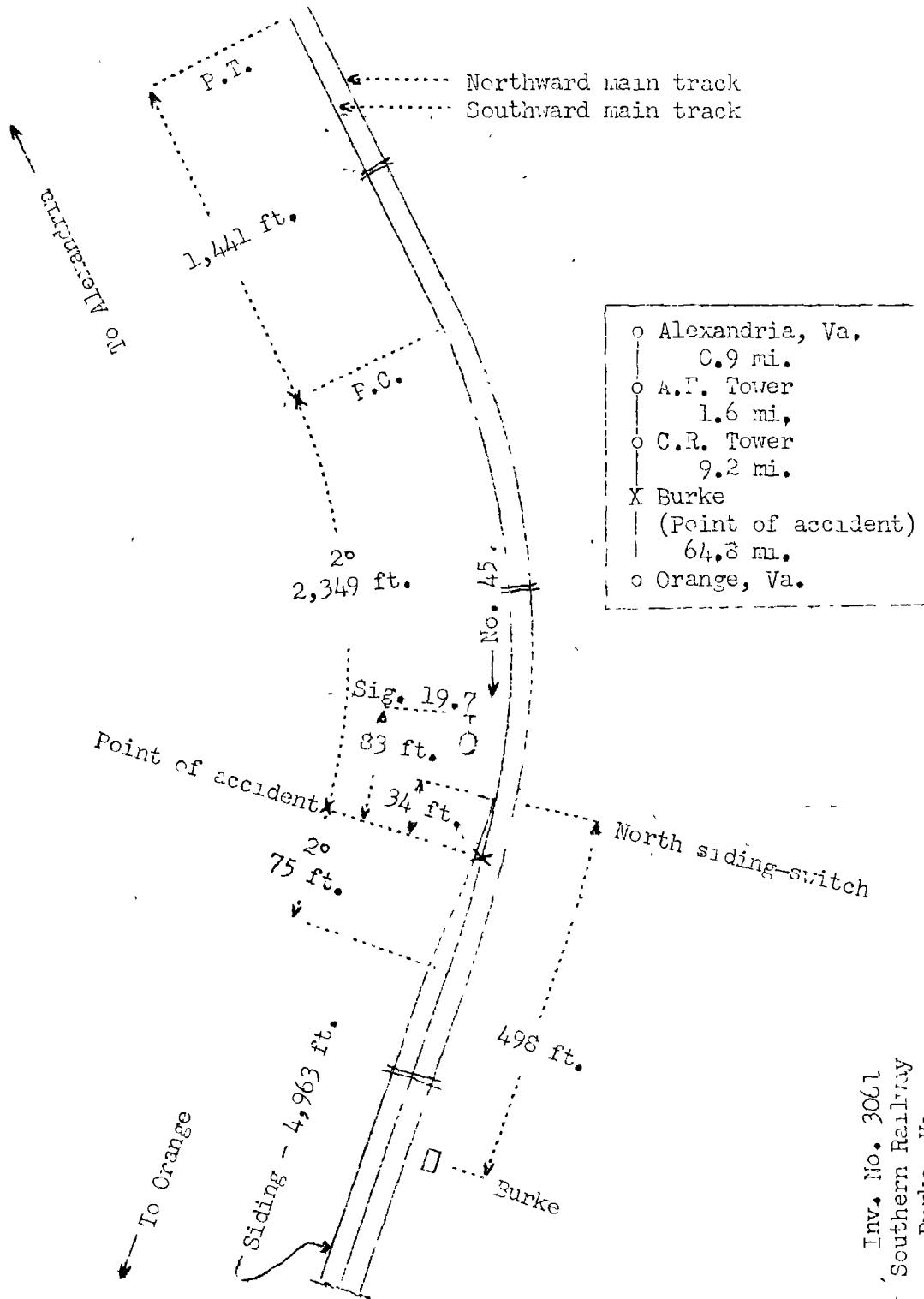
Accident at Burke, Va., on January 11, 1947, caused by
a broken journal.

REPORT OF THE COMMISSION¹

PATTERSON, Commissioner:

On January 11, 1947, there was a derailment of a passenger train on the Southern Railway at Burke, Va., which resulted in the death of 1 bystander, and the injury of 38 passengers and 8 dining-car employees.

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.



Inv. No. 3061
Southern Railway
Burke, Va.
January 11, 1947

Location of Accident and Method of Operation

This accident occurred on that part of the Washington Division extending between A.F. Tower, near Alexandria, and Orange, Va., 75.6 miles, a double-track line, over which trains moving with the current of traffic are operated by timetable, train orders and an automatic block-signal system. At Burke, 10.8 miles south of A.F. Tower, a siding 4,963 feet in length parallels the main tracks on the west. The north switch of this siding is 498 feet north of the station. The accident occurred on the southward main track at a point 34 feet south of the north siding-switch. From the north on the southward main track there is a tangent 1,441 feet in length, which is followed by a 2° curve to the right 2,349 feet to the point of accident and 75 feet southward. The grade is 0.43 percent descending southward.

Between the clearance points of the southward main track and the siding the distance between the centerlines is 13 feet. The track structure of the southward main track consists of 100-pound rail, 39 feet in length, laid new during May, 1939, on an average of 22 treated hardwood ties to the rail length. It is fully tieplated with single-shoulder tieplates, spiked with 4 spikes per tieplate, provided with 4-hole angle bars, an average of 12 rail anchors per rail length, and is ballasted with crushed stone to a depth of about 18 inches. The turnout of the north siding-switch consists of 100-pound switch-points 15 feet in length, 100-pound rails and a No. 10 spring-type frog, laid on 60 switch ties. Rail braces and guard rails are provided.

Automatic signal 19.7 governing south-bound movements on the southward main track, is 33 feet north of the point of accident. This signal is of the color-light type, and is continuously lighted.

In this vicinity the maximum authorized speed for passenger trains is 55 miles per hour.

Description of Accident

No. 45, a south-bound first-class passenger train, consisted of Diesel-electric units 2912 and 2909, coupled in multiple-unit control, one mail car, one baggage-express car, one baggage-dormitory-coach, three coaches, one dining-car, two coaches, one observation-tavern car and three sleeping cars, in the order named. The third car and the sixth to tenth cars, inclusive, were of lightweight-steel construction, and the remainder of the cars were of conventional standard all-steel construction. This train passed

C.R. Tower, the last open office, 9.2 miles north of Burke, at 9:09 a. m., 10 minutes late, passed signal 19.7, which displayed proceed, and while it was moving on the southward main track at a speed of 40 miles per hour the rear truck of the sixth car and the seventh to thirteenth cars, inclusive, were derailed.

The Diesel-electric units and the first six cars, remaining coupled, stopped with the front end of the first Diesel-electric unit 2,218 feet south of the point of derailment. The right truck-side of the rear truck of the sixth car was broken as a result of its striking the base of a water column, located between the southward main track and the siding at a point 848 feet south of the point of derailment. The seventh to thirteenth cars, inclusive, remaining coupled, stopped practically upright and in line with the track, with the seventh to ninth cars, inclusive, on the roadbed of the siding, the ninth to twelfth cars, inclusive, between the southward main track and the siding, and the thirteenth car on the roadbed of the southward main track. The front end of the seventh car and the rear end of the thirteenth car were, respectively, 364 feet and 81 feet south of the point of derailment. One of the rails of the siding entered the floor of the eighth car near the rear truck and passed diagonally upward through the roof. Another rail entered the right side of the body of the ninth car about 12 feet back of the front end of the car and passed horizontally through the left side. The sixth to eleventh cars, inclusive, were considerably damaged, and the twelfth and thirteenth cars were slightly damaged.

The seventh car, Southern 3303, a dining-car of light-weight-steel construction, was built in 1941 and placed in service May 17, 1941. It is 85 feet long between the pulling faces of the couplers, and consists of a kitchen compartment 25 feet 11-1/2 inches long, a buffet compartment 6 feet long, a dining compartment 39 feet 1/2 inch long, and a locker compartment 8 feet 5 inches long. Its lightweight was 123,900 pounds. The car is provided with two 4-wheel trucks, spaced 59.5 feet between the truck centers, 5-1/2-inch by 10-inch journals at the dining compartment end, 6-inch by 11-inch journals at the kitchen compartment end, and 36-inch multiple-wear steel wheels. The truck-sides are provided with journal-box pedestals cast integrally with the truck-sides, and the bottoms of the pedestals are secured by bolted tie-bars. Pedestal liners are provided to maintain the journal boxes in proper alignment. The journals are equipped with roller-bearings. These bearings consist of two assemblies of solid rollers inserted in bronze cages. They rotate around an inner

race and within an outer race. The inner race is secured to the journal by shrinkage. The outer race is pressed into the journal box. Lateral motion of the axle is controlled by lateral-thrust blocks at the outer end of each journal. The journal-box housing is sealed against leakage of oil and the entrance of water or foreign matter. The journal-bearing assembly is lubricated by oil, which circulates from a reservoir at the bottom of the journal box. The equalizer bars are of the bottom type, extending between the journal boxes on each side of each truck, curved upward at each end, and seated on top of the journal boxes. The spring arrangements consist of an assembly of twin-coil springs seated upon each equalizer near each end, and a quadruple-assembly of elliptical springs on each side of each truck at the bolster location. Each wheel has two brake shoes. The roller-bearing assembly involved was last cleaned on November 21, 1945, and the axle was last tested by the magnaflux method on February 18, 1946. Oil was last placed in the journal box on January 7, 1947. The last trip inspection of the car was made about 10 p. m., January 10, 1947.

The weather was clear at the time of the accident, which occurred about 9:20 a. m.

The bystander killed was struck by a piece of rail near the station.

Discussion

No. 45 was moving on the southward main track at a speed of 40 miles per hour, as indicated by the speedometer with which the first Diesel-electric unit was equipped, in territory where the maximum authorized speed was 55 miles per hour, when the derailment occurred. The enginemen were maintaining a lookout ahead from the control compartment at the front of the first Diesel-electric unit. The members of the train crew were in various locations throughout the cars of the train. Prior to the time of the accident, the Diesel-electric units 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 the members of the crew were aware of anything being wrong was when the brakes became applied as a result of the derailment. After the accident a scraping mark was found on the outer surface of the head of the west rail at a point 5,293 feet north of the point of derailment. From this point southward to the north siding-switch scraping marks appeared on the outside of the rails and on the angle bars, and the rail-bond wires were broken. At the north siding-switch, the rail braces and the

angle bars outside the stock rail were badly battered. At a point about 30 feet south of the switch points, flange marks appeared on the top of the west rail of the southward main track and beginning about 4 feet southward, flange marks appeared on the tops of the ties between the stock rail of the turnout and the west rail of the southward main track, and between the rails of the southward main track. From this point southward the siding and the southward main track were torn up or displaced throughout a distance of about 450 feet.

The right No. 1 journal of the front truck of the seventh car of No. 45 was broken. The right equalizer bar at this location was bent outwardly at an angle of about 20 degrees. The bottom edge and the inside face of the equalizer bar bore marks as a result of its having been in contact with the track structure. These marks indicate that the journal failed at the point where the first mark appeared on the track structure, and the derailment occurred when the equalizer bar came in contact with the turnout of the north siding-switch. The car involved had last been inspected at 10 p. m., January 10, 1947, by the mechanical forces of the Washington Terminal Company in the coach yard at Washington, D. C., 19.9 miles north of Burke, and no defective condition was observed. The members of the crew of No. 45 had observed the equipment as it moved on curves en route, and no defective condition was observed.

Examination after the accident disclosed that the wheels on the No. 1 axle of the front truck of the seventh car had good flange and tread contour, and there was no indication that they were out of round. The axle was in conformity with the dimensional mounting specifications of the Association of American Railroads. The break in the journal occurred at a point 8-5/8 inches inward from the end of the journal and 1-1/4 inches inward from the inside edge of the inner journal-bearing race. Approximately 70 percent of the cross-sectional area of the break was a progressive fracture, which extended to the outer surface but was concealed from detection by visual inspection. The remainder of the break was new. The outer portion of the journal remained in place in the roller bearing assembly, and there was no indication of cutting nor of overheating. The end of the journal remaining attached to the axle was worn in an oval-shape stub, as a result of its having been in contact with the top of the journal box. The roller-bearing assembly was dismantled and the rollers, the roller-cages and the races were found to be in conformity with the requirements, and were well lubricated. The inner race was pressed off and this portion of the journal was tested by the magnaflux method, and no sub-surface or surface fractures were found in this portion.

The Association of American Railroads does not prescribe specifications relative to the length of time axles may be continued in service on passenger-train cars. The mechanical department of the Southern Railway issued instructions on October 6, 1943, requiring that all axles in service on passenger-train cars for a period of 3 years be scrapped, and that no axle would be used for mounting new wheels unless the age of the axle was known. These instructions were modified on February 7, 1945, to permit the use of axles which had been in service for a period of 3 years, provided that the axle bore the date of manufacture, the identification of the manufacturer, and that the axle had been tested by the magnaflux method. According to the records of the carrier, the axle was manufactured in December, 1940, and was inspected at the point of manufacture by an inspector of the carrier on January 2, 1941. At that time analysis and test of the metal indicated that it was in accordance with carrier's specifications. The axle was tested by the magnaflux method and new wheels were mounted on the axle on February 12, 1946, and, at that time, there was no indication of the presence of a fracture. According to a report of the Engineer of Tests of the Southern Railway, examination of the metal of the broken journal immediately adjacent to the fracture indicates that the structure of the journal was of good formation and the metal was free of flaking or segregation. In conclusion, the report stated that the cause of the failure of the journal was fatigue of metal.

Cause

It is found that this accident was caused by a broken journal.

Dated at Washington, D. C., this twenty-first day of February, 1947.

By the Commission, Commissioner Patterson.

(SEAL)

W. P. BARTEL,
Secretary.