

INTERSTATE COMMERCE COMMISSION
WASHINGTON

INVESTIGATION NO. 2516
THE SOUTHERN RAILWAY COMPANY
REPORT IN RE ACCIDENT
AT SLOANS VALLEY, KY., ON
AUGUST 12, 1941

- 2 -

SUMMARY

Railroad:	Southern
Date:	August 12, 1941
Location:	Sloans Valley, Ky.
Kind of accident:	Derailment
Train involved:	Freight
Train number:	Extra 6326 North
Engine number:	6326
Consist:	46 cars, caboose
Speed:	35-40 m. p. h.
Operation:	Timetable, train orders and automatic block-signal and automatic train-stop system
Track:	Single; 4°30' right curve; vertical curve
Weather:	Cloudy
Time:	About 7:30 p. m.
Casualties:	2 killed; 3 injured
Cause:	Accident caused by slack action and a wheel moving inward on the axle combined with improper adjustment of side-bearing clearance and irregularity in surface of track

INTERSTATE COMMERCE COMMISSION

INVESTIGATION NO. 2516

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

THE SOUTHERN RAILWAY COMPANY

October 1, 1941

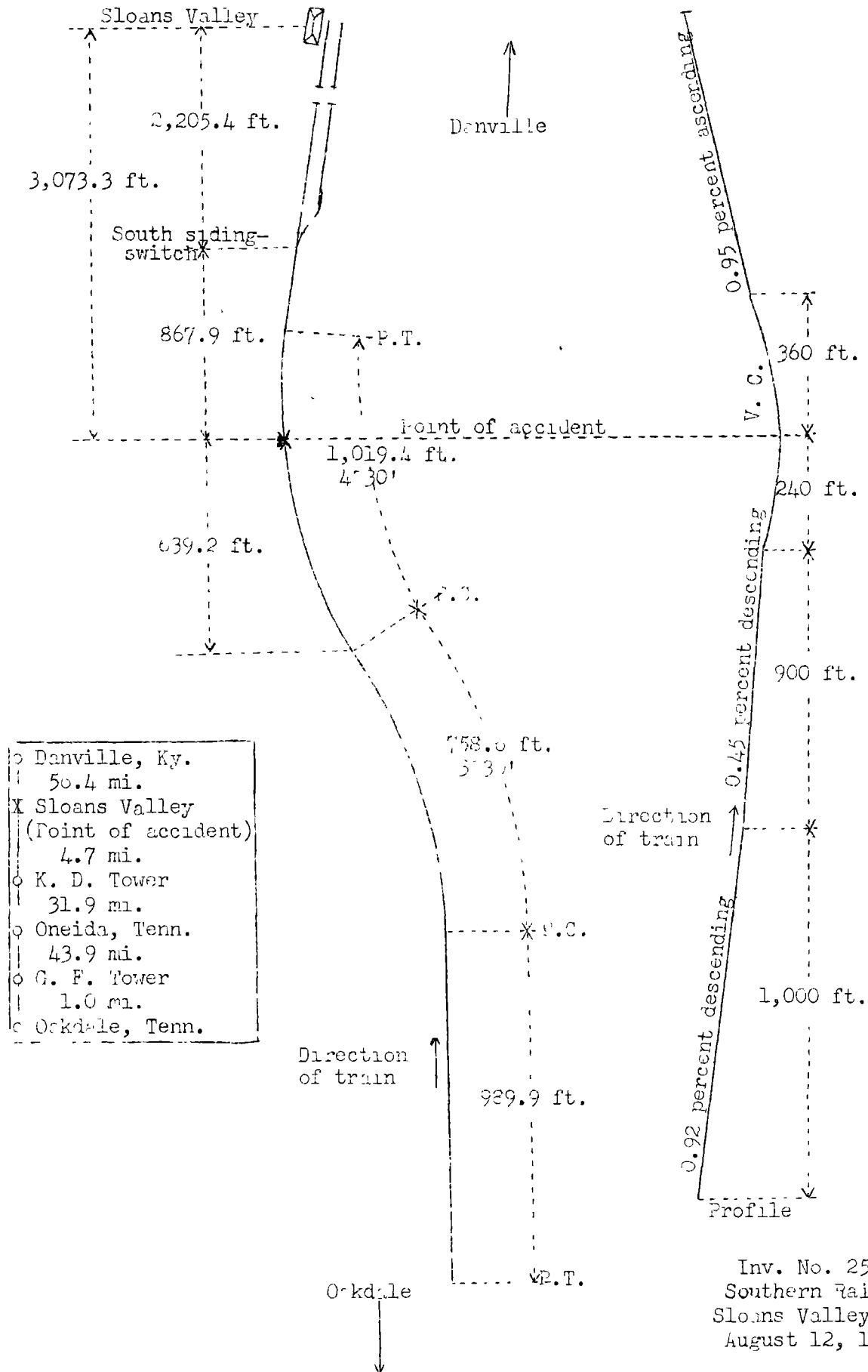
Accident at Sloans Valley, Ky., on August 12, 1941, caused
by slack action and a wheel moving inward on the axle
combined with improper adjustment of side-bearing
clearance and irregularity in surface of track.

REPORT OF THE COMMISSION¹

PATTERSON, Commissioner:

On August 12, 1941, there was a derailment of a
freight train on the Southern Railway at Sloans Valley,
Ky., which resulted in the death of two trespassers and
the injury of three trespassers.

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.



Location of Accident and Method of Operation

This accident occurred on that part of the Cincinnati, New Orleans & Texas Pacific Railway designated as the Second District, which extends between Oakdale, Tenn., and Danville, Ky., a distance of 137.9 miles. In the vicinity of the point of accident this is a single-track line over which trains are operated by timetable, train orders and an automatic block-signal and automatic train-stop system. Time-table directions, which are north and south, are used in this report. At Sloans Valley a siding 3,415.4 feet in length parallels the main track on the east. The south siding-switch is 2,205.4 feet south of the station. The derailment occurred on the main track at a point 867.9 feet south of the south siding-switch and 3,073.3 feet south of the station. As the point of accident is approached from the south there are, in succession, a tangent 989.9 feet in length, a 3°30' curve to the left 759.6 feet, and a 4°30' curve to the right 1,019.4 feet; the derailment occurred on the latter-mentioned curve at a point 639.2 feet from its southern end. The grade for north-bound trains is, successively, 0.92 percent descending 1,000 feet, and 0.15 percent descending 900 feet; then there is a vertical curve 240 feet to the point of accident and 360 feet beyond, which is followed, successively, by a 0.04-percent ascending grade 600 feet and a 0.95-percent ascending grade a considerable distance beyond.

The track structure consists of 130-pound rail, 39 feet in length, laid on an average of 24 treated ties to the rail length; it is fully tieplated with double-shoulder tieplates, double-spiked on the inside of the rail and single-spiked on the outside, provided with 8 rail anchors to the rail length, ballasted with crushed limestone to a depth of 8 to 10 inches, and well maintained.

In the vicinity of the point of accident the maximum authorized speed for freight trains is 60 miles per hour.

Description of Accident

Extra 6326 North, a north-bound freight train, consisted of engine 6326, 32 loaded and 14 empty cars and a caboose. This train departed from G. F. Tower, Tenn., 80.5 miles south of Sloans Valley, at 4:40 p. m., according to the train sheet, and at Oneida, Tenn., 36.6 miles south of Sloans Valley, seven cars were added to the front end of the train. A terminal air-brake test had been conducted at Oakdale and the brakes of the cars added to the train at Oneida were tested when in the position in which they were hauled in the train. The brakes functioned properly en route. The train passed K. D. Tower, 4.7 miles south of Sloans Valley and the last open office, at 7:21 p. m. When

this train was approaching Sloans Valley and while moving on a 4°30' curve to the right at a speed estimated from 35 to 40 miles per hour, the front pair of wheels of the rear truck of the sixth car was derailed to the right at a point 639.2 feet north of the south end of the curve.

There was no indication of defective track, dragging equipment, or of any obstruction having been on the track. The specified curvature was 4°30' and the specified superelevation was 4-1/2 inches. The first mark of derailment on the track structure was a flange mark on the head of the low rail about 1 inch inward from the outside edge and extending diagonally northward and outward a distance of 2 feet 4 inches. At a point 7.2 feet farther north flange and wheel marks appeared outside the low rail on top of a tie, and a spike head was mashed. Starting at a point 5.2 feet farther north a flange mark appeared on the tops of eight successive tieplates but the next 3 ties were unmarked. Starting at a point 25.6 feet north of the first mark, flange marks appeared on the top of a tie 9 inches outside the rail and in a distance of 32 feet similar marks progressed outwardly to a distance of 18 inches outside the rail. Northward from this latter point and throughout a distance of 814 feet, the tops of the ties were marked intermittently. At a point 3.8 feet north of the first mark on the low rail a flange mark appeared 7 inches inside the high rail and in a distance of 86.3 feet flange marks progressed diagonally to a point 27 inches inside the rail. Opposite the first mark inside the high rail there was an abrasive mark on the outer edge of the head of this rail 1 foot 1-1/2 inches in length, then throughout a distance of 801.6 feet flange marks 27 inches inside the high rail were continuous. At a point 867.9 feet north of the first mark on the low rail, the wheels encountered the south siding-switch and the general derailment occurred. The switch frog was damaged and 341 feet of the main track and 484 feet of the siding were destroyed.

The engine and first five cars remained coupled and stopped with the engine standing about 3,070 feet north of the point of derailment. The sixth to thirty-first cars, inclusive, were derailed and stopped, badly damaged, at various angles to the track. Nine of these cars were destroyed. The front truck of the thirty-second car was derailed and the car was slightly damaged. The sixth car stopped 1,000 feet to the rear of the fifth car. The wreckage was contained within a distance of 703 feet.

It was dark and the weather was cloudy at the time of the accident, which occurred about 7:30 p. m.

Mechanical Data

The car involved was a Southern Railway all-steel hopper car. Its light weight, capacity and load limit were, respectively, 41,500 pounds, 110,000 pounds and 127,500 pounds. At the time of the accident this car was loaded with coal and its gross weight was 150,700 pounds. The rear truck was equipped with Bettendorf truck sides, standard Southern Railway bolster, and a spring plank upon which were mounted four coil springs at each side of the truck. The wheels involved were 33 inches in diameter, single-plate one-wear cast iron, and were manufactured on September 12, 1935, by the Pullman-Standard Car Manufacturing Company for the Illinois Central Railroad Company. Apparently the wheels had been pressed on the axle in a shop of the Illinois Central Railroad but there was no record available to establish this definitely. There was no record available to show whether the front wheels of the rear truck had been applied by the Southern Railway or by another railroad.

After the accident the left front wheel of the truck involved was off its axle and was broken into five pieces; however, about two-thirds of the wheel was intact and the hub was not damaged. Measurements disclosed that the flange was 1-7/16 inches thick, gaged at a point 5/8 inch above the base-line. From the back of the flange to the outside face of the tread the wheel was 5-11/16 inches wide. The tread was 1-3/4 inches in thickness and there was practically no tread wear. The hub was 8 inches in length. The bore at the front of the hub was 6.936 inches in diameter and the bore at the back of the hub was 6.951 inches. At a point 1-1/2 inches inward from the outer end of the wheel seat the diameter was 6.939 inches and it increased to 6.941 inches at a point 1-1/8 inches from the black collar. The large piece of the wheel containing the hub was first pressed to its proper position on the wheel seat by a pressure of 10 tons, then was moved inward to the black collar by a pressure of 25 tons. When the wheel was against the black collar the distance between the outside face of the left wheel and the gaging point of the front of the flange of the right wheel was 4 feet 11 inches. There was no mark on the wheel seat to indicate that the wheel revolved on the wheel seat prior to the accident. The surface of the wheel seat was not smooth and it was poorly machined. It bore evidence that moisture had been admitted a considerable time prior to the accident. The wheel was later pressed off its seat by a pressure of 20 tons.

Track Data

Measurements of the track taken throughout a distance of 643.7 feet south of the point of derailment were as follows:

Distance south of point of derail- ment	Point of	Superelevation	Gage
643.7 feet	spiral	0 inches	4 feet 8-1/2 inches
624.2 feet		0-1/2 inches	4 feet 8-1/2 inches
604.7 feet		1-3/8 inches	4 feet 8-1/2 inches
585.2 feet		1-7/8 inches	4 feet 8-1/2 inches
565.7 feet		2-1/4 inches	4 feet 8-1/2 inches
546.2 feet		2-3/8 inches	4 feet 8-5/8 inches
526.7 feet		2-3/4 inches	4 feet 8-5/8 inches
507.2 feet		3-1/2 inches	4 feet 8-7/8 inches
487.7 feet		4-1/8 inches	4 feet 8-1/2 inches
468.2 feet		4-3/8 inches	4 feet 8-1/2 inches
448.7 feet		4-5/8 inches	4 feet 8-5/8 inches
429.2 feet		4-3/8 inches	4 feet 8-3/4 inches
409.7 feet		4-1/2 inches	4 feet 8-3/4 inches
390.2 feet		4-3/8 inches	4 feet 8-7/8 inches
370.7 feet		4-1/2 inches	4 feet 8-3/4 inches
351.2 feet		4-1/4 inches	4 feet 8-3/4 inches
331.7 feet		4-5/8 inches	4 feet 8-1/2 inches
312.2 feet		4-1/8 inches	4 feet 8-3/4 inches
292.7 feet		4-1/2 inches	4 feet 8-3/4 inches
273.2 feet		4-3/8 inches	4 feet 8-3/4 inches
253.7 feet		4-5/8 inches	4 feet 8-1/2 inches
234.2 feet		4-5/8 inches	4 feet 8-5/8 inches
214.7 feet		4-5/8 inches	4 feet 8-3/4 inches
195.2 feet		4-1/4 inches	4 feet 9 inches
175.7 feet		4-3/8 inches	4 feet 8-5/8 inches
156.2 feet		4-3/8 inches	4 feet 8-5/8 inches
136.7 feet		4-3/4 inches	4 feet 8-3/8 inches
117.2 feet		4-3/8 inches	4 feet 8-7/8 inches
97.7 feet		4-1/2 inches	4 feet 8-3/4 inches
78.2 feet		4 inches	4 feet 9 inches
58.7 feet		4-1/2 inches	4 feet 8-3/4 inches
39.2 feet		4-5/8 inches	4 feet 8-3/4 inches
19.7 feet		4-3/4 inches	4 feet 8-5/8 inches
Point of derailment		4-1/4 inches	4 feet 8-7/8 inches

Note: At the point of derailment the west rail was curve worn 5/32 inch.

Discussion

The front pair of wheels of the rear truck of the sixth car became derailed when the train was moving at a speed estimated between 35 and 40 miles per hour on a 4°30' curve to the right having a superelevation of about 4-1/2 inches. The front portion of the train was on a vertical curve and was about to

ascend a 0.95-percent grade and the rear portion was on a 0.92-percent descending grade. The equilibrium speed on this curve is approximately 38 miles per hour. About the time the car involved was closely approaching the point where it later became derailed, the engineman opened the throttle in order to maintain speed on the ascending grade ahead. The car was in that portion of the train where slack adjustment would occur at the time it was passing the point where the front pair of wheels of the rear truck became derailed. Although the normal action of a car truck moving in excess of equilibrium speed on a curve to the right is for the left front wheel to bear heavily against the high rail, the first mark of derailment was a flange mark made by the right front wheel on the top of the head of the low rail at a point about 1 inch from the outer edge. Since there was no mark from the gage side of the rail to the beginning of the flange mark, it is apparent that the right front wheel of the rear truck was suddenly thrust laterally to the right. After the accident occurred, it was observed that when north-bound trains were passing the point of derailment the flanges of the right wheels were thrust against the gage side of the low rail when the slack was being stretched.

The superelevation on the curve involved was specified as 4-1/2 inches. According to measurements taken after the occurrence of the accident, the superelevation at three adjacent stations located at points 97.7 feet, 78.2 feet and 58.7 feet south of the point of derailment was, respectively, 4-1/2 inches, 4 inches and 4-1/2 inches. The variation between a point 19-1/2 feet south of the point of derailment and at the point of derailment was 1/2 inch.

The marks on the ties indicated that the left front wheel of the rear truck was not broken until after it struck a switch frog about 865 feet north of the point of derailment. After the accident this wheel was off its axle, but marks on the axle indicated definitely that this wheel had moved inward on the axle a distance of about 1-1/8 inches. There was no indication that it had turned on its axle. When the wheel was replaced on its seat and moved inward against the black collar, the gage of the wheels was still too wide for either wheel to drop inside its rail; however, the reduction of the gage of these two wheels would permit a greater lateral movement, which would cause the flange of the right wheel to be thrust to the head of its rail with greater force. The car involved had been inspected 37 miles south of the point of accident but no defective condition was found. The wheel seat for the left wheel was not properly machined and the bore of the wheel had very little bearing surface on the wheel seat. All wheels of the front truck and the rear wheels of the rear truck were Southern Railway wheels but the two wheels involved were Illinois Central

Railroad wheels. There was no available record to establish when and where the Illinois Central wheels were applied to the rear truck and no record concerning when and where these wheels were fitted to the axle.

The side-bearing on the right side of the truck involved was rusted and bore no indication of friction, but the left side-bearing showed that considerable friction had existed. This condition indicates that a greater part of the spring-borne weight of the sixth car was on the high rail and only a small portion on the low rail. The reduction of the normal load on the low rail would increase the chances of a wheel on the low side being raised high enough and thrust laterally far enough for its flange to drop on the head of the rail. When the throttle was opened and the slack was stretched, the cars had a tendency to assume a straight line and move toward the low rail, which action together with the additional lateral movement because of the left wheel moving inward on its axle combined with lateral rolling on account of irregularity in the surface of the track and the concentration of loading on the left side resulted in the right front wheel being raised high enough and thrust laterally far enough for its flange to drop on the low rail.

Cause

It is found that this accident was caused by slack action and a wheel moving inward on the axle combined with improper adjustment of side-bearing clearance and irregularity in surface of the track.

Dated at Washington, D. C., this first
day of October, 1941.

By the Commission, Commissioner Patterson.

(SEAL)

W. P. BARTEL,

Secretary.