INTERSTATE COMMERCE COMMISSION

WASHINGTON

INVESTIGATION NO. 2626

THE CLINCHFIELD RAILROAD COMPANY

REPORT IN RE ACCIDENT

AT NEW KAOLIN, N. C., ON

SEPTEMBER 8, 1942

Inv-2626

SUMMARY

Railroad:	Clinchfield
Date:	September 8, 1942
Location:	New Kaolin, N. C.
Kind of accident:	Derailment
Train involved:	Freight
Train number:	97
Engine numbers:	412-400
Consist:	35 cars, caboose
Speed:	25-35 m. p. h.
Operation:	Timetable and train orders
Track:	Single; 14° left curve; 0.24 percent descending grade northward
Weather:	Clear
Time:	5:35 p. m.
Casualties:	1 killed
Cause:	Accident caused by irregularity in alinement of track combined with excessive speed on snarp curve

INTERSTATE COMMERCE COMMISSION

INVESTIGATION NO. 2626

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

THE CLINCHFIELD RAILROAD COMPANY

November 12, 1942.

Accident at New Kaolin, N. C., on September 8, 1942, caused by irregularity in alinement of track combined with excessive speed on sharp curve.

REPORT OF THE COMMISSION[1]

PATTERSON, Commissioner:

On September 8, 1942, there was a derailment of a freight train on the Clinchfield Railroad at New Kaolin, N. C., which resulted in the death of one employee.

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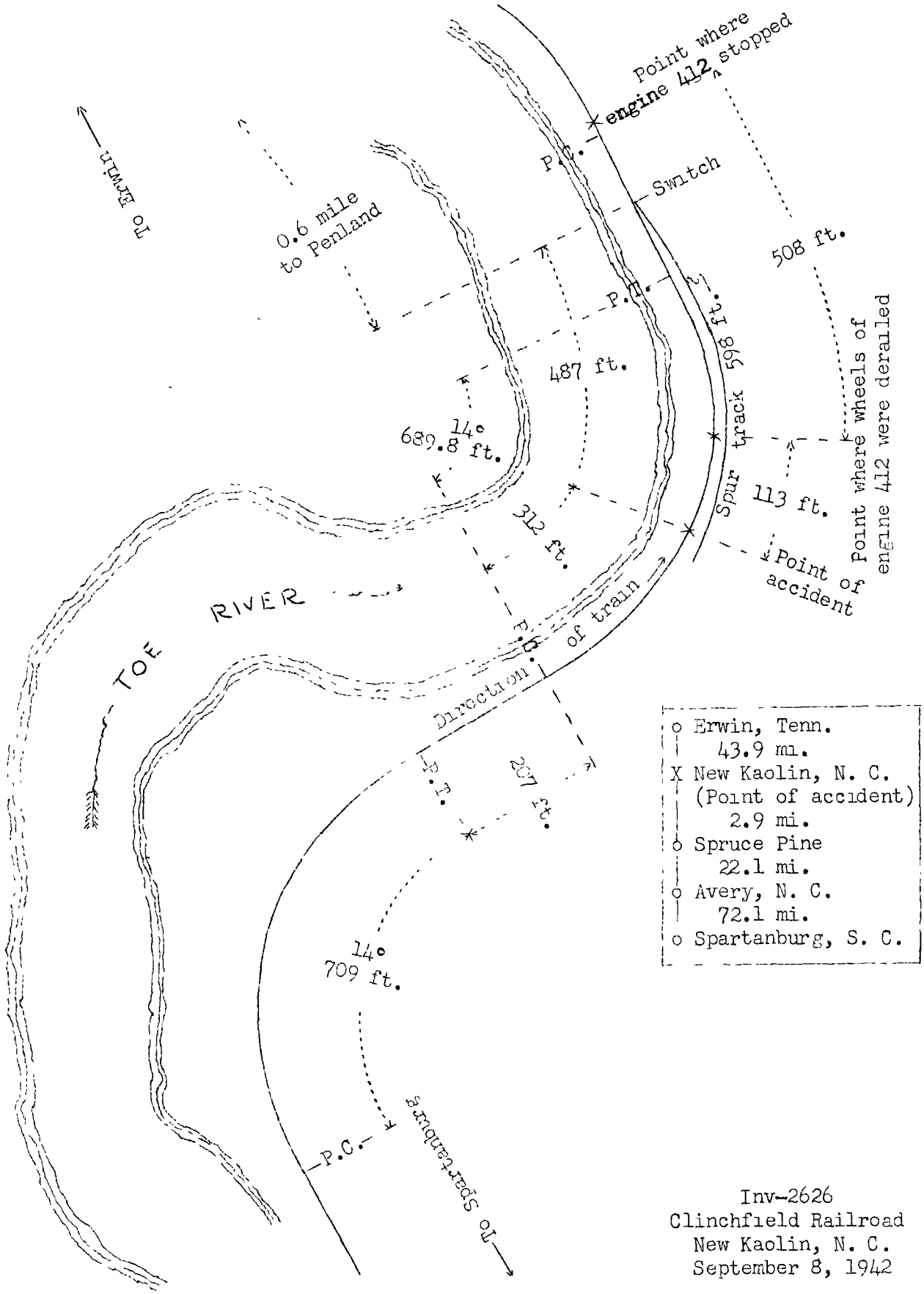
[1]Under authority of section 17 (2) of the Interstate Commerce Act the above-entitled proceeding was referred by the Commission to Commissioner Patterson for consideration and disposition.



Inv-2626
Clinchfield Railroad
New Kaolin, N. C.
September 8, 1942

Location of Accident and Method of Operation

This accident occurred on that part of the railroad which extends between Spartanburg, S. C., and Erwin, Tenn., a distance of 141 miles. In the vicinity of the point of accident this is a single-track line over which trains are operated by timetable and train orders. There is no block system in use. At New Kaolin, a spur track 598 feet in length parallels the main track on the east. Entry to this track is made through a trailing-point switch for north-bound movements. The accident occurred on the main track at a point 487 feet south of the switch. As the point of accident is approached from the south there are, in succession, a 14° curve to the right 709 feet in length, a tangent 207 feet and a 14° curve to the left 312.5 feet to the point of accident and 377.3 feet beyond. Throughout a distance of 2.9 miles immediately south of the point of accident the grade for north-bound trains averages 0.25 percent descending, and is 0.24 percent at the point of accident.

On the curve involved the track structure consists of 100-pound rail, 39 feet in length, laid on an average of 22 ties to the rail length; it is fully tieplated, the west rail is double-spiked on the outside and single-spiked on the inside, and the east rail is single-spiked. Rail anchors are not provided. The east and west rails were laid new, respectively, in 1939 and in June, 1942. A guard rail, which is 2-1/2 inches inside the west rail, extends throughout the length of the curve. The track is provided with 6 gage rods per rail length, and is ballasted with stone to a depth of 12 inches. In the center the cribs were about two-thirds full of ballast, and at the ends of the ties the ballast extended about 2 or 3 inches above the bottoms of the ties. At the point of derailment the superelevation was 4-1/2 inches and the gage was 4 feet 8-1/2 inches. Track repair work was performed on the curve involved three days prior to the occurrence of the accident. In the vicinity of the point of accident the track is laid on a hillside cut and parallels the east bank of the Toe River.

Bulletin Notice No. 8751, dated November 15, 1941, reads in part as follows:

ALL ENGINEERS AND FIREMEN:-

> Track signs are being erected at the approach to some curves where speed should be reduced below the speed applying to territory in which the curve is located.

These boards show the letter "C" and where speed is to be reduced over two or more curves located close together the figure (2) or (3) is shown below the letter "C" and means that this board applies to two or three successive curves.

* * *

Between * * * Toecane and Berry Gap, the maximum speed on curves protected by guard rails will be * * * for freight trains twenty (20) miles per hour.

On the curve involved the maximum authorized speed for freight trains is 20 miles per hour.

Description of Accident

No. 97, a north-bound first-class freight train, consisted of engines 412 and 400, coupled, 26 loaded and 9 empty cars and a caboose. At Spartanburg, 97.1 miles south of the point of accident, a terminal air-brake test was made and the brakes functioned properly en route. This train departed from Avery, 25 miles south of New Kaolin, at 4:18 p. m., according to the dispatcher's record of movement of trains, on time, and while moving at an estimated speed of 25 to 35 miles per hour on a 14° curve to the left the Nos. 1 and 2 pairs of driving wheels of the first engine became derailed to the left at a point 374 feet south of the spur-track switch at New Kaolin. The general derailment occurred 113 feet farther south.

Engine 412 stopped upright with the left Nos. 1 and 2 pairs of driving wheels derailed outside the low rail and the companion wheels inside the high rail, and with the front end of the engine 508 feet beyond the point where these wheels became derailed. No other wheel of this engine was derailed. Engine 400 and its tender were derailed to the right. The engine stopped, badly damaged, on its right side on the spur track, with its front end 313 feet north of the point where it was derailed. The pilot, engine truck, front-end deck casting, main frame and cab were badly damaged. The first 12 cars were derailed and stopped, badly damaged, in various positions across the main track. The fifth and seventh cars were destroyed. The wreckage was contained within a distance of 341 feet.

The weather was clear at the time of the accident, which occurred about 5:35 p. m.

The employee killed was the engineer of engine 400.

Mechanical Data

After the accident an inspection of engines 412 and 400 disclosed that all flanges were of good contour, and the height and thickness were within the prescribed limits. All driving-box shoes and wedges and the radial buffers were well lubricated. The floating blocks moved freely and the wedges were in place. The lateral motion of all wheels and the back-to-back measurements of the driving-wheel tires and the engine-truck wheels conformed to the prescribed requirements. The spring riggings were in suitable condition for service. The engine-truck center plate, the rocker device and the center post and bushing of engine 412 conformed to the requirements. The engine truck of engine 400 was damaged as a result of the accident but there was no indication of any condition which could have contributed to the accident. The top and bottom clearances of all driving boxes of both engines conformed to the specifications.

Both engines are of the 2-8-2 type. The total weights in working order of engines 412 and 400 are, respectively, 317,700 pounds and 307,160 pounds. The diameters of the engine-truck wheels, driving wheels and trailer-truck wheels of both engines are, respectively, 33, 63 and 45 inches. Both tenders are rectangular in shape and are equipped with two four-wheel trucks. The rigid wheelbase of each engine is 16 feet 6 inches. The center of gravity of each engine is 72-3/4 inches above the top of the rails.

Track Data

After the accident, measurements of the track taken between points 451 feet and 59 feet south of the point of accident were as follows:

Distance south of point of accident	Track displacement eastward	Superelevation	Gage
Feet	Inches	Inches	
451			4'8-1/2"
432			4'8-1/2"
412			4'8-1/2"
393		3/4	4'8-1/2"
373		1	4'8-1/2"
354		1-1/2	4'8-1/2"
334		2	4'8-3/4"
315		2-3/4	4'8-3/4"
295		2-3/4	4'9"
276		3	4'8-1/2"
256		3-1/2	4'9"
237		3-3/4	4'8-1/2"
217		4	4'8-3/4"
198		4-1/8	4'8-1/2"
178		4	4'8-3/4"
159		4	4'8-3/4"
139		3-3/4	4'8-3/4"
120		3-1/2	4'8-1/2"
107	1/2		
102	3		
100		3-1/2	4'8-3/4"
98	6		
91	9		
83	12		
74	12		
67	14		
59	10		

Discussion

No. 97 was moving at an estimated speed of 25 to 35 miles per hour on a curve to the left when the Nos. 1 and 2 pairs of driving wheels of the first engine derailed to the left. Simultaneously the second engine was derailed to the right at a point 113 feet south of the point where the first engine became d railed. The maximum authorized speed for freight trains on the curve was 20 miles per hour. The specified curvature was 14 degrees and the superelevation approximately 4-1/2 inches. There was no defective condition of either engine prior to the accident, and there was no indication of dragging equipment or of any obstruction having been on the track.

The engineer of the first engine said that when his train passed Spruce Pine, 2.88 miles south of the point where the accident occurred, he made a 10-pound brake-pipe reduction and,

when the speed was about 18 miles per hour, he released the brakes. As his train was approaching the point where the accident occurred, the speed was about 25 miles per hour, the throttle was in drifting position, the fireman and he were maintaining a lookout ahead, and the engine was riding smoothly. The first the engineer knew of anything being wrong was when the engine reached a point about 400 feet north of the south end of the curve where the front end seemed to thrust to the right and then to thrust hard to the left. After the second thrust, the Nos. 1 and 2 pairs of driving wheels became derailed, and he immediately moved the brake valve to emergency position. The fireman of the first engine said that his engine thrust to the right and the driving wheels on the left side appeared to rise above the rail, and then the engine righted itself. Both enginemen said that the manner in which the engine thrust indicated that the track was out of normal alinement prior to the time their engine entered the curve. The fireman did not observe any defective track ahead of the engine. The front brakeman, who was in the brakeman's booth on the left side of the tender, was maintaining a lookout ahead from the side window and observed the first engine thrust to the left and at the same time the tender thrust to the right. Immediately afterward he looked toward the rear and saw the second engine overturn to the right. The front brakeman said that the speed was 30 or 35 miles per hour at the time of the derailment, but he was not alarmed as that was the speed usually maintained on the curve involved. The fireman of the second engine said that when the first engine thrust to the right the left driving wheels rose about 4 inches above the rail and then dropped to the rail, and immediately afterward the second engine overturned to the right. The last train to pass over the track involved was a south-bound freight train, which passed about 1 hour 35 minutes prior to the time of the accident. The crew of this train stated the speed was about 20 miles per hour and that they observed no abnormal condition of the track.

The first abnormal marks on the track structure were six flange marks which crossed the head of the high rail diagonally in a distance of about 3 feet, at the point where the second engine was derailed to the east. From this point northward 82 feet of track was destroyed. Measurements of the track throughout a distance of 451 feet south of the point of derailment disclosed that spikes had vibrated loose and the joints were tight. At the south point of curve, 312.5 feet south of the point of derailment, the rails had moved northward under the heads of the spikes a distance of 11 inches. Rail anchors were not provided. On the curve, the greatest variation in superelevation between stations 20 feet apart was 1/2 inch. The gage varied between 4 feet 8-1/2 inches and 4 feet 9 inches. At the point of derailment the gage was 4 feet 8-1/2 inches and the superelevation was 4-1/2 inches. About 64 feet south of the point of derailment the track was displaced 14 inches

eastward. At the center of the track the cribs were about two-thirds full of ballast and at the ends of the ties the ballast extended upward on the sides and ends about 2 or 3 inches.

At the point where the track was shifted outward 14 inches, the curvature was about 28 degrees. According to A.R.E.A. tables, the maximum safe speeds on a 14-degree and a 28-degree curve having a superelevation of 4-1/2 inches are, respectively, 33 and 24 miles per hour, and the overturning speeds are, respectively, 51 and 36 miles per hour. It is possible that some of the deflection occurred when the engines of No. 97 were traversing the curve. Since the highest estimate of the speed was less than the overturning speed, some factor in addition to speed was involved. The track had been raised and surfaced three days before the accident occurred. Apparently loose ballast and the lack of rail anchors and sufficient ballast permitted the rail to creep northward on the descending grade and then to buckle outward. As a result of the movement of the track, there were sharp deflections in the alinement, which caused the engines to thrust laterally with sufficient force to cause flanges of wheels to be lifted high enough to cross the head of the rail.

The investigation disclosed that on curves provided with guard rails the maximum authorized speed for freight trains is 20 miles per hour. On curves where speed is restricted to less than that authorized by the timetable, speed signs are required. In this instance, no speed sign restricting the speed on the curve involved was provided. The engineer of the first engine understood that the maximum authorized speed on the curve involved was 25 miles per hour.

Cause

It is found that this accident was caused by irregularity in alinement of track combined with excessive speed on sharp curve.

Dated at Washington, D. C., this twelfth day of November, 1942.

By the Commission, Commissioner Patterson.

W. P. BARTEL,

(SEAL)

Secretary.