Report of the Chief Inspector of Safety Appliances Covering his investigation of an accident which occurred on the Central of Georgia Railway near Clayton, Alabama., on November 13, 1913.

December 13, 1913.

To the Commission:

On November 13, 1913, there was a derailment of a passenger train on the Central of Georgia Railway about 4 miles east of Clayton, Ala., resulting in the death of 9 passengers and the injury of 389 passengers and 1 employee. After investigation as to the nature and cause of this accident, I beg to submit the following report:

The Ozark district of the Central of Georgia Railway, upon which this accident occurred, is a single-track line extending between Eufaula and Ozark, Ala., a distance of 60 miles. Trains are operated by the time-table and train-order system, no block signals being in use. The derailed train was passenger train No. 18, which is scheduled to leave Ozark at 5:30 a.m. daily.

On the day of the accident train No. 18, in charge of Conductor Goodroe and Engineman Cox, left Ozark about 5:40 a.m., 10 minutes late. It was hauled by locomotive No. 1501 and consisted of 5 cars located in the following order from the engine back; Combination car No. 380, coaches Nos. 124, 37, 117, and 233. It arrived at Clayton about 7.25 a.m., approximately on time, and left that place some time between 7.30 and 7.40. It is impossible definitely to state the leaving time, as no record of the arrival and departure of trains is made at any of the stations on this District, except at Eufaula and Ozark. Engineman Cox said the train left Clayton at 7:30 a.m., Conductor Goodroe placed the time at 7.32, while Station Agent Sammons is

positive in stating that it was 7.40. The ordinary consist of this train is a locomotive and two cars, but on the date of the accident three extra cars were used to accommodate excursionists attending a fair at Eufaula. At the place of the derailment the track is on a fill about 25 feet high. The weather at the time of the accident was clear and cool.

The three rear cars left the track, and as a result of the derailment the rear platform, a portion of the end sill, the coupler, and draft timbers were torn from the second car in the train, and remained attached to the third car. The third and fourth cars were derailed on the south side of the track, torn from their trucks, and thrown down the embankment, remaining coupled together by the safety chains and coming to rest at the foot of the fill top side up. The forward end of the third car was about 397 feet from the point of derailment and 23 feet from the track. The rear end of the fourth car was 276 feet from the point of derailment and 40 feet from the track. Both sides and the forward end of the third car were broken away from the roof and underframe and lay flat along the ground, the roof falling and resting on the seats along the north side of the car. The north side of the fourth car was broken away from the roof and underframe and lay along the ground beside the car. The roof dropped back away from the south side and rested on the seats along the north side of the car about 6 feet to the rear. The south side and the east end of the car remained upright. The northwest side of the west end from the door was crushed out toward the north side and lay along the ground. The rear car in the train was on the north side of the track. It was torn from its trucks and turned over down the

embankment, coming to rest with the top side up at the bottom of the fill, the rear end being 176 feet from the point of derailment and 30 feet from the track, while the forward end was 35 feet from the track. The north side of this car was broken away from the roof and underframe and lay along the ground beside the car. Both ends and the south side of the car remained upright. The roof was torn from the body and rested diagonally across the top from the southwest to the northeast corners, the east end of the roof being inside the car resting on the seats on the north side. The condition of the third car after the accident is shown in illustration No. 1, Illustrations 2 and 3 show the rear car and illustration No. 4 is view of the track after the accident, showing the engine and two cars which remained on the track, and the rear car at the foot of the embankment to the left. These were all wooden cars, their weights and dates of construction being as follows:

	Year built	Weight, pounds
Car No. 380	1909	59,900
Car no. 124	1889	50,600
Car No. 87	1889	51,750
Car No. 157	1889	49,900
Car No. 223	1883	55,300

Each of these cars had received general repairs in the company's shops since July, 1912.

Approaching the scene of the derailment from the west there is a tangent about 800 feet in length followed by a 2° $15'$ curve to the left about 1,2600feet long. This curve is followed by a tangent about 1 mile in length, the west end of which is on a fill about 800 feet long and about 36 feet high at its highest point. The train was derailed on the tangent at a point about 77 feet east of the east end of the curve, near the beginning of the fill. From about one

fourth of a mile east of Clayton eastward to the point of derailment the track is on a descending grade, the maximum of which is 2.4 per cent. At the place of derailment the grade is 1.47 per cent.

The derailment was caused by a broken rail on the north side of the track. After the accident the receiving or west end of the broken rail was found intact for a distance of 24 feet. The initial fracture was a square break 6 feet from the leaving end of the rail. A second square break occurred 2 feet from the leaving end of the rail, resulting in a 4-foot piece being broken out of the body of the rail. This 4 foot piece was found a little to the east of its original position in the track, with its east end driven into the ground about 2½ feet, its west end sticking out of the ground and inclining toward the west at an angle of about 80° from the horizontal. The 2-foot piece at the leaving end of the rail was found about 4 feet to the north of the track, nearly opposite its original position in the track. This 2 foot piece had a small crescent-shaped piece broken out of its base on the inside as it lay in the track. This crescent shaped break was caused by the rail base being struck by a brake shoe as a result of the derailment. After the accident the piece of rail base which fitted into this crescent-shaped break and the brake shoe which caused it were dug out of the ground at about the same point where the 2 foot piece of rail was found. The next rail to the east of the broken rail was bent outward at the west end and lay on the north side of the track about 3 feet from its original position in the track.

The broken rail was a steel rail, 30 feet long, rolled by the Bethlehem Iron Co. in 1883. It weighed 56 pounds to the yard, and from the best information obtainable was purchased and laid in the track sometime during the year it was rolled. It was stated by

Chief Engineer Lawrence that the annual report of the company for the fiscal year 1894-95 shows that all of the rails on a 7 mile section of track, covering the point where this derailment occurred, were laid during the months of February, March, and April of that year, these rails having been removed from the track on another portion of the road for the purpose of relaying heavier rails. The 56 pound steel rails were substituted for 50 pound iron rails which had previously been used in this track. The rails in the vicinity of the accident are laid on untreated pine and cypress ties, averaging 16 to the rail. The ties are single spiked and no tie plates or rail braces are used. The track is not ballasted, the ties being tamped and surfacing done with the material composing the roadbed, which is a sandy soil.

Section No. 44, on which this accident occurred, is 9 miles long. Section Foreman Beasley stated that he had an inadequate force of men for the service he was required to perform. He had but 2 men employed at the time of the accident. The regulations permitted him to hire 4 men when he could get them. Most of the time, however, he had but 2 or 3 men. He had been in charge of this section 16 days and had had 4 men only 2 or 3 days. The company's record shows that between October 22 and November 19, 1913, 14 broken rails were found on this section, only 1 of which was removed from the track, 13 being repaired and left in the track. One method of repairing these broken rails is shown in illustration No. 5. Another method is to bolt a strap to one broken end, leaving the other end of the strap to engage the other broken end without bolts.

As a result of the derailment the track was torn up for a distance of about 300 feet, 12 new rails and 200 new ties being

required to repair the damage. The condition of the fragments of the destroyed ties (see illustration No. 4) showed that a majority of them were in a badly decayed condition. The track was inspected for a distance of 1,200 feet east of where it had been reconstructed as a result of the accident, and for a distance of 1,320 feet west of the broken rail which caused the derailment, the ties being carefully checked as to their condition. Only those ties which were so badly decayed as to be absolutely unserviceable and unable to support the rails or give a secure spike hold were designated as bad ties.

In the 240-foot section of track immediately west of the point of derailment 24 bad ties were found, and under one rail at the joint five spikes were pulled out by hand. From the west end of this 240-foot section to a point 240 feet farther west the bad ties in the track had recently been replaced by new ones and the track surfaced. Continuing westward, 81 bad ties were found in a distance of 630 feet. In this 630-foot section of track as many as eight bad ties were found under one 30-foot rail; two rails each had six bad ties, and six rails each had five bad ties. In several places there were two or three bad ties together. From the west end of this 630-foot section to the end of the 1,320-foot section inspected, a distance of 210 feet, new ties had recently been substituted for bad ones and the track surfaced. In repairing this 210-foot section 53 new ties were used.

In this 1,320-foot section of track six broken rails were found. One of these broken rails was in three pieces, the shortest of which was but 2 feet long. Three of these broken rails were spliced together in the manner shown in illustration No. 5, short pieces of fishplate being bolted through the fracture. Inspection of the track was con-

tinued to a point about 1 mile west of the derailment. This 1-mile section of track contained 16 broken rails. No check of ties was made beyond the end of the 1,320-foot section above referred to, but careful observation indicated that the ties throughout the mile were in about the same condition as were those on the section of track that was checked, with the exception of portions aggregating about 1,250 fee in which new ties had recently been placed and the track surfaced. Illustrations 5, 6, 7, and 8 show the track conditions existing in this 1-mile section.

In the 1,300-foot section of track east of where the track ha been reconstructed as a result of the derailment, 94 bad ties were found, as many as six being under each of three 30-foot rails. In several places two or three bad ties were found together. At three joints the spikes were pulled out by hand.

Track Supervisor Mainor stated that the track where the wreck occurred was reasonably safe and not particularly in need of attention. He considered it safe to permit four to six rotten ties under a rail providing they were not together. He said that just west of the point of derailment the rotten ties averaged about five to the rail. He said that a 2-mile section of track extending east and west of the place of derailment was the worst track on section No. 44, and four men was not force enough to enable the foreman to get the track up from its existing bad condition but was sufficient to keep it up. He said that he had received reports of 20 or 25 broken rails since September 1, and thought that very bad for a place where there is no more traffic than there is on this branch, there being ordinarily but two trains each way per day, namely, a 2-car passenger train and a mixed train of possib. 20 cars.

The schedule time of train No. 18 between Ozark and Eufaula averages 21.8 miles per hour. The minimum running time between stations, as indicated by the time card, shows the highest speed that is permitted to be 33 1/3 miles per hour. Over that portion of the road where this accident occurred the maximum speed permitted as indicated by the minimum time between stations, is approximately 30 miles per hour. Section Foreman Beasley stated that when the train passed him, about 1 mile west of the scene of the accident, it was running from 40 to 45 miles per hour. Engineman Cox stated that he reduced speed to 5 miles per hour at a trestle east of Clayton where a slow order was in effect and did not work steam after shutting off for this slow down but allowed the train to drift from there to the poin of derailment. He said that at a point about 1 mile west of the place of derailment, near where the section foreman noted his speed, he applie the brakes and reduced speed to some extent and did not work steam after releasing the brakes. Fireman Richardson (colored) said the train was running about 25 or 30 miles per hour at the time of the derailment. He said that Engineman Cox reduced speed to 5 miles per hour three times between Clayton and the place of derailment, and did not use steam to get the train in motion after any of these slow downs.

On the other hand, three of the passengers who were riding on the train stated that they did not observe anyslow-downs. They remarked about the excessive speed at which the train was running, and spoke to Conductor Goodroe about it. Owing to the discrepancy in the statements of Engineman Cox, Conductor Goodroe, and Station Agent Simmons regarding the time when the train left Clayton, it is impossible to say how much time elapsed between the departure of train No.

18 from Clayton and the derailment, which occurred about 7.45 a.m./ but from the statements of these passengers, the distance the cars ran after the derailment, and other external evidence, it seems evident that the train was running at a higher rate of speed than is permitted by the rules, and certainly at an unsafe rate of speed considering the condition of the track.

It will be noted that the rear end of coach 157 came to rest 276 feet east of the point of derailment. The engine and two cars that were attached, with the emergency brakes set, ran at least 770 feet from the point of derailment before coming to a stop, as Engineman Cox indicated a point 770 feet from the derailment as the place where he got off the engine after it stopped. The passengers before mentioned, however, who got off the coach that was attached to the engine after it stopped, indicated a point 1,293 feet from the point of derailment as the place where the coach stopped. The identification of this point by these passengers was positive, as in each instance they described the location beforehand exactly as it was found to be, none of them having been near the scene of the accident between the time of its occurrence and November 15, 1913, on which date they returned to the scene of the accident and verified their statements. Engineman Cox's statement of the distance the engine ran after the accident, as well as his statement that he did not use steam at any time after shutting off at the summit of the hill, even after reducing speed to 5 miles per hour, is hard to reconcile with the positive statements of these passengers, all of whom are reputable men of high standing in the community.

Conductor Goodroe placed the time of the accident as about 7.42.

Owing to the unusual crowd which boarded his train at Clayton, he was very busy taking up tickets, and did not pay any attention to the speed. He could not say whether any slow-down was made or not. He said that the point where the engine stopped after the accident was from 100 to 150 yards from the broken rail, but he did not measure this distance nor count the rails. He said that none of the passengers called his attention to the speed of the train.

Engine 1501 is a standard eight-wheel engine weighting 139,000 pounds complete, the weight being distributed as follows: 49,300 pounds on drivers, 28,000 pounds on engine trucks, and 61,700 pounds on tender. Superintendent of Motive Power Gaines said that he made a careful examination of this engine after the accident, and found it in good condition. The engine was properly counterbalanced and rode smoothly. There were no bent axles, flat wheels, badly worn wheel treads, nor sharp flanges on the engine or tender. He also examined the trucks of the derailed cars, and found them in good condition.

As shown by the illustrations accompanying this report, the derailed cars were badly broken up, the damage being confined almost entirely to their superstructure. The roofs and siding were broken by the cars turning over and rolling down the bank. The sills were not materially damaged, and the trucks, wheels, and flanges were in good condition.

While the direct cause of this accident was a broken rail, bad track conditions and speed inconsistent with safety were material contributing causes, both of the derailment itself and of its distressing results. The track in the vicinity of this accident was in a deplorable condition. Foreman Beasley had been in charge of section No. 44

but 16 days, during which time he had found 14 broken rails, 13 of which he had patched and left in the track. Considering the traffic on this branch, but two trains each way per day, and the weight of the cars and engines using the track, it is evident that these rails have outlived their usefulness. The method of repairing these numerous breaks indicates that material is not furnished for making repairs in a proper manner. When rails of this character are used on rotten ties, without ballast, and with an inadequate force of men to patrol the track and perform necessary work, as this investigation shows was the condition existing on this branch, accidents of this character may be expected to occur.

With the kind of track existing in the vicinity of this derailment it is doubtful if trains could be run with safety even at the comparatively low speed allowed by the schedule. The maximum speed permitted, as shown by the minimum time between stations, certainly is not safe. Furthermore, the method of indicating this maximum speed is not such as surely to enforce the desired result, as there is nothing to prevent an engineman from running 60 or more miles per hour over portions of the road, provided only that he does not exceed the minimum allowed between stations. The speed limit on this branch should be definitely stated in miles per hour, and it should be placed low enough to insure comparative safety in moving trains over the patched rails and rotten ties composing this track.

The employees involved in this accident were experienced men, and were not working in violation of any of the provisions of the hours-of-service law.

Respectfully submitted.

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Chief Inspector of Safety Appliances