#167

INTERSTATE COMMERCE COMMISSION.

REPORT OF THE CHIEF INSPECTOR OF SAFETY APPLIANCES COVERING HIS INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE MOBILE & OHIO RAILROAD NEAR BUCKATUNNA, MISS, ON OCTOBER 19, 1913

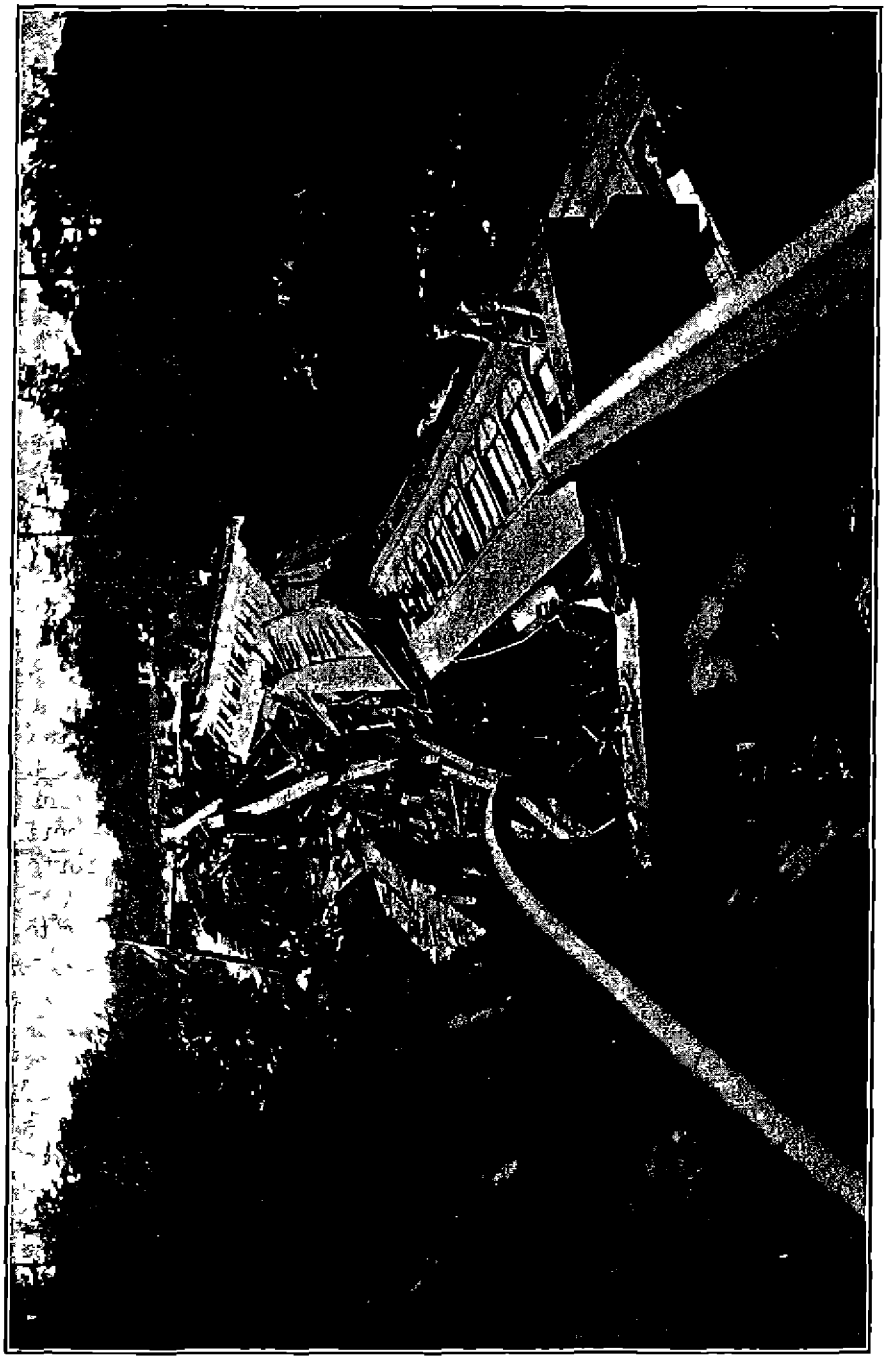
NOVEMBER 28, 1913

TO THE COMMISSION

On October 19, 1913, there was a derailment on the Mobile & Ohio Railroad near Buckatunna, Miss, resulting in the death of 17 passengers, and in the injury of 139 passengers and 6 employees After investigation as to the nature and cause of this accident I beg to submit the following report

The train involved in this derailment was the second section of northbound train No 4 and consisted of 1 baggage car and 3 coaches, hauled by locomotive No 353, and was in charge of Conductor Pruitt and Engineman Beasley The baggage car had a steel underframe while the coaches were all of wooden construction This train was conveying a detachment of troops from Fort Morgan, Ala, to the Alabama-Mississippi Fair at Meridian, Miss It left Mobile, Ala, at 12 03 p m, passed State Line, the last telegraph station south of the point of derailment and nearly 5 miles distant therefrom, at 1 45 p m, and at about 1 50 p m was derailed at a point about 300 feet south of bridge No 67–B, which was about 3 miles south of Buckatunna

The engine was not derailed and passed over the bridge, coming to a stop at a point 932 feet beyond the initial point of derailment The tender, the forward wheels of which were the first to leave the rails, remained on the roadbed until the bridge was reached It is probable that the derailed wheels of the tender then caused the ties on the bridge to become bunched and broken, thus weakening the structure to such an extent that it collapsed under the weight of the cars, throwing them to the bed of the creek In the meantime the tender had broken away from the engine and come to a stop on the outside of the curve at a point about 350 feet south of the engine Sixty feet south of the tender the baggage car came to rest with its forward end jammed into the bank of the creek This car was badly damaged The three coaches lay immediately behind the baggage car, the rear end of the first coach being telescoped by the forward end of the second coach for a distance of about 10 feet All of these cars came to rest on their right sides, and on the outside of the curve.



View looking north from southern end of bridge, showing derailed cars and manner in which ties on end of bridge were broken

The illustration shown herewith is a view looking in the direction in which the train was moving and shows the position in which the coaches came to rest after the collapse of the bridge This view also shows how the ties of the bridge were broken by the derailed wheels, and the manner in which the first and second coaches telescoped each other All of the coaches were so badly damaged as to be practically destroyed The greatest loss of life occurred in the baggage car and in the first coach, only one passenger being killed in the third coach In the baggage car many of the casualties were caused by an iron express safe and the heavy baggage and equipment of the troops being thrown from one end of the car to the other by the shock of the derailment The speed of this train at the time of the derailment is believed to have been about 55 miles per hour The weather was clear

This part of the Mobile & Ohio Railroad was a single-track line No block signal system was in use, trains being operated under the train-order system, orders being transmitted by telegraph The bridge in question was located in about the middle of a curve of 3° leading toward the left, about 750 feet in length The track in this vicinity was laid with 75-pound rails 33 feet in length, rolled and laid in 1905 There was an average of 20 untreated pine ties under each rail, single spiked and braced on the curves, there being from three to five braces to each rail length The ballast was of cement gravel from 2 to 4 inches deep under the ties and was put on in 1906 In the center of the track the ballast reached the tops of the ties, sloping away on each side toward the ends of the same The construction of the bridge was substantial, and under ordinary circumstances it undoubtedly would not have collapsed under this train, its destruction being caused by the derailed cars There were no inside guard rails on this bridge, but it is doubtful whether their presence would have mitigated the results of this derailment inasmuch as the derailed wheels were about 2 feet from the rails by the time the bridge was reached Approaching the point of derailment from the south the grade was descending for about 4 miles, the average being about one-half of 1 per cent The track section on which this accident occurred contained 7 miles of track and was in charge of a section foreman who had the assistance of from five to six section men, all of these men being regularly employed on this section

Examination of the track after the derailment showed the first mark of derailment to be located at a point 299 8 feet south of the southern end of bridge No 67–B This mark was a flange mark on the ball of the inside rail seven-eighths inch from the gauge side This mark was 7 feet in length and showed that the derailed wheel had run that distance along the ball of the rail before dropping off the outside of the same, as shown by a flange mark on a rail joint The mark then extended a distance of 2 feet 4½ inches to where the flange struck a rail brace At this point the derailed wheel or wheels began to run on the

ties The first tie to be marked was the eighth tie north of the beginning of the mark on the ball of the rail The mark on this tie was hardly noticeable, but as the derailed wheels traveled in a northerly direction the marks on the ties increased in prominence until they extended into the ties to the depth of the flange During this time the derailed wheels had been working toward the outside ends of the ties, as shown by the marks on the same, until they reached a point 28 feet beyond the initial mark of derailment At this point the outside flange mark was 18 inches from the outside of the base of the inside rail of the curve, while the right-hand wheels of the derailed truck were traveling on the ties on the inside of the opposite rail a corresponding distance from the same The derailed wheels apparently then ran in this approximate position for a distance of about 8 rail lengths to the southern end of the bridge Between the initial point of derailment and the bridge, none of the ties was broken or badly damaged, and no repairs had to be made to this part of the track after the derailment As the derailed wheels reached the ties on the bridge the latter were bunched and broken, resulting in the ultimate collapse of the bridge The first mark made on the ties by the right-hand wheel appeared on the fourth tie north of the first mark on the ties made by the left-hand wheel As in the case of the marks on the opposite side of the track, this tie was very faintly marked, while each succeeding tie showed marks of increasing prominence The right-hand wheels apparently were carrying the greater portion of the weight of the forward end of the tender, as the marks made by the right-hand derailed wheels were deeper and more prominent than those made by the left-hand wheels

The initial point of derailment was on the curve at a point about 37 feet north of the southern end Approaching this curve was an easement curve 165 feet in length Examination showed that the gauge of the track at the southern end of this easement curve was 4 feet $8\frac{3}{8}$ inches for a distance of about 35 feet, while from this point north to the southern end of the bridge the gauge varied from 4 feet $8\frac{1}{2}$ inches to 4 feet $8\frac{7}{8}$ inches The maximum superelevation of the curve was $4\frac{1}{8}$ inches, the superelevation where the first marks of derailment appeared being $3\frac{1}{2}$ inches None of the spikes or braces were started from the ties at any point south of the bridge, and the only marks found south of the bridge were those described above

Careful examination of the wheels of the engine and tender failed to disclose anything about them which could have contributed to the derailment The engine was of the 4–6–0 type, and weighed 167,500 pounds, while the weight of the tender loaded was 141,500 pounds At the time of the derailment the tender held about 10 tons of coal and 5,000 gallons of water, its normal capacity was 15 tons of coal and 7,000 gallons of water

Leaving Mobile train second No 4 had an order to run 50 minutes late to Waynesboro, a point 83 miles north of Mobile and 15 miles north of the derailment, and to run 40 minutes late from Waynesboro to Meridian, 52 miles beyond Waynesboro Between Mobile and the point of derailment this train made two stops, one at Citronelle, 32 7 miles from Mobile, at which point water was taken, and the other for a railroad crossing at Vinegar Bend, a point 14 3 miles beyond Citronelle and 20 miles south of the point of derailment The train sheet shows that this train left Mobile at 12 03 p m , arrived at Citronelle at 12 59 p m , left there at 1 03 p m , stopped at Vinegar Bend at 1 24 p m , left that point at 1 25 p m and made the run of 15 6 miles to State Line, the last telegraph office south of the point of derailment, in 20 minutes, passing there at 1 45 p m The derailment is believed to have occurred at about 1 50 p m at a point nearly 5 miles beyond State Line

Bridge No 67–B was of wooden construction 225 feet in length and 24 feet above the ground at its highest point It had 19 pile bents, made up of from four to six piles each The caps were 12 by 14 inches, 14 feet in length, drifted to each pile with three-fourth-inch bolts 22 inches in length Two-ply stringers measuring 8 by 16 inches were used, drifted to each cap with three-fourth-inch bolts The bridge ties were 7 by 8 inches, 10 feet in length, laid on 14-foot centers The second, third, and fourth bents on each end were braced with two sway braces, and the eight higher bents in the center were double braced The guard timbers were 7 by 8 inches, 20 feet in length, located at a distance of 16 inches from the outside of the ball of the rail, being fastened by lag screws to every second tie The bridge was well constructed and maintained, and had received frequent attention in the way of necessary renewals and repairs

Engineman Beasley stated that this was the second time he had ever run a passenger train His train left Mobile at 12 12 p m , and he thought that it was running at a speed of about 35 miles per hour when the jumping of the tender and the noise made by it indicated that it was derailed He at once reversed the engine and applied the air brakes in emergency, at which time the pilot of the locomotive had nearly reached the bridge He stated that the engine was not working steam at the time, as he had shut off steam at milepost No 66, more than a mile south of the point of derailment On previous trips over this part of the road it had been his practice to slow-down at this curve, but on this occasion he did not do so The only application of the brakes made by him between State Line and the point of derailment was a slight application of about 5 pounds just beyond milepost No 66, and on this occasion he merely applied the brakes and at once released them He further stated that he timed the speed of the train between mileposts Nos 65 and 66 and found that it traveled the distance in 1 minute and 35 seconds In obeying a

slow order received at Mobile he had had to reduce speed to 20 miles per hour at three different places between Mobile and the point of derailment, and he thought that his train lost about a minute at each slow-down He did not know the maximum speed at which passenger trains were allowed to run, but did not think his train ran at a speed in excess of 40 or 45 miles per hour at any place between State Line and the point of derailment

Statements of other train employees were to the effect that the train left Mobile at 12 05 p m and that their first knowledge of anything wrong was when the brakes were applied in emergency Their estimates as to the speed of the train at the time of derailment varied, the conductor and fireman estimating it to have been from 30 to 35 miles per hour, while the flagman thought it was between 40 and 45 miles per hour The general agent of the passenger department, who was riding in the train, estimated it to have been between 35 and 40 miles per hour

Lieut Cunningham, one of the officers connected with the detachment of troops, stated that there was considerable discussion among the men about the speed at which the train was traveling, many of them thinking it was excessive Leaving Vinegar Bend the speed seemed to increase, and he was sure that a few minutes before the derailment occurred the speed increased decidedly

Pvt Thompson stated that at the time of the derailment he was riding on the rear platform of the last car timing the train, having been there about 20 minutes A friend was holding a watch, while he himself called the mileposts The last 2 miles south of the derailment were traveled in 65 seconds and 64 seconds, or at the rate of 55 38 and 56 25 miles per hour, respectively At that time he remarked on the speed being attained by the train, saying that the next mile would probably be covered in an even 60 seconds There were then six men on the rear platform, all of whom were watching the speed and commenting upon it

Pvt Walker was also riding on the rear platform of the last car, and corroborated the statements of Pvt Thompson relative to the speed of the train He stated that he had ridden on the rear platform for a considerable distance, and that after passing State Line the speed increased He further stated that the last mile previous to the point of derailment was traveled in 65 seconds

Roadmaster Mulvoy stated that when he reached the scene of the derailment he examined all of the broken ties which he could find They were all bridge ties, broken near the center, and the wood in the interior was in good condition, which was also the case with the bridge timbers Although he made a careful examination of all the bridge timbers, piling, etc , he found nothing in any way defective The section on which this accident occurred was considered the prize section when the last annual inspection was made, No trouble had

ever been experienced with this part of the road, and it was considered to be perfectly safe for the speed at which passenger trains were allowed to run

Supervisor of Bridges Bennett stated that the last general inspection of bridges was on July 17, 1913, at which time bridge No 67–B was found to be in good condition On September 24 another inspection was made, at which time it was also in good condition

Section Foreman Brennan stated that he was last over the track on the Friday preceding the day of the derailment, which occurred on a Sunday, and at a point about one-quarter of a mile south of the bridge he gauged the track and found it to be all right The joints were also found to be tight and in good condition at this time

Superintendent Pigford stated that the trainmaster examined Engineman Beasley on the rules for road service in May, 1913, and reported to him that the engineman passed a first-class examination It will be noted, however, that Engineman Beasley was not familiar with the speed limit at which passenger trains were allowed to be operated This limit was fixed by operating rule No 91–D, which provided in part that in no case should the speed of a first-class train exceed 50 miles per hour

From all the information obtained in the investigation of this accident there seems to be no doubt that in general the track on this part of the Mobile & Ohio Railroad was well maintained, that bridge No 67–B was of substantial construction, its collapse being a result of and not the cause of the derailment, and that, so far as could be determined, there was nothing about the running gear, wheels, brake rigging, etc , of the engine and tender which could have caused the derailment There was, however, a wide difference of opinion as to the speed at which the train was running at the time of the derailment, but after considering all the statements and facts in connection therewith, especially the testimony of the soldiers on the rear end of the train, the fact that the train had been running on a descending grade for about 4 miles, with but a short application of 5 pounds of air, and the additional fact that the distance of nearly 5 miles from State Line to the point of derailment had been traveled in about 5 minutes, it is believed that the speed was not less than 55 miles per hour at the time of the derailment

While the cause of this derailment could not be ascertained with certainty, it is believed to have been due to the excessively high rate of speed at which the train was being operated while rounding the curve The curvature was 3°, while the superelevation of the outside rail at the point of derailment was only 3½ inches This was not sufficient either for the speed at which this train was running or to provide an adequate margin of safety for trains operated at the maximum speed of 50 miles per hour allowed by rule On account of the high speed and the insufficient superelevation on this curve, it

is probable that the wheels on the left side of the tender were lifted from the rails, due to the high center of gravity of the tender and the surging of the water to one side of the cistern, and that when the tender rocked back the flanges of the wheels on the left side came down on the ball of the rail, running along in that position a short distance before dropping off on the outside

Engineman Beasley began railroad service when he was 14 years of age, and had been employed as storeroom helper, oil boy, call boy, machinist, fireman, and engineman He had been a fireman 3 years and 8 months, chiefly in road service, and had been employed as an engineman in yard service for 2 years and 8 months, and in road service since May 18, 1913 This was his second trip as an engineman on a passenger train He was second out on the spare list, but on account of the first man out not being available, Engineman Beasley was called for the run While he was a yard engineman he had been demerited on two occasions, once for responsibility for a slight collision and once for running through a switch During his employment as an engineman in road service he received 30 demerits for operating a freight train at an excessive rate of speed on August 3, 1913 Engineman Beasley was called for duty on this trip at 9 30 a m , after having been off duty for a period of 13 hours and 40 minutes

Attention has heretofore been called to the fact that excessive speed has been a contributing factor in many derailments The following table shows the derailments investigated since July 1, 1911, in which the speed of the train was either the primary cause or a contributing cause of the accident

Railroad	Date	Number killed	Number injured	Cause
Oregon Trunk	July 10, 1911	5	35	Excessive speed on curve engineman did not observe slow order
Lake Erie & Pittsburgh	Sept 13, 1911	4	16	Backing up over new track at excessive speed
New York Central & Hudson River	Mar 13, 1912		48	Spread rails on curve due to track structure failing to support heavy train at high speed
New Orleans & North Eastern	May 6, 1912	9	58	Soft and uneven roadbed and excessive speed in view of this condition
Chicago & Alton	June 8, 1912		24	Track unsafe for speed permitted low spot
Nashville, Chattanooga & St Louis	June 12, 1912	3	75	Excessive speed on curve
Illinois Central	do		9	Excessive speed over bad track
Southern	July 17, 1912	1	52	Excessive speed on curve
Chicago, Milwaukee & Puget Sound	Aug 12, 1912	5	10	Do
Cincinnati, Hamilton & Dayton	Aug 25, 1912	1	25	Track unsafe for speed permitted
Southern	Sept 5, 1912	1	25	Excessive speed on curve low spot
New York, Chicago & St Louis	Sept 10, 1912		29	Excessive speed in view of existing track conditions, track being repaired
Louisville & Nashville	Oct 12, 1912	2	38	Excessive speed on curve
Norfolk & Western	Oct 20, 1912	1	13	Do
Houston & Texas Central	Feb 1, 1913	2	9	Defective engine equipment, excessive speed in view of existing track conditions
Northern Pacific	May 12, 1913	4	7	Excessive speed in view of existing track conditions, track being repaired, spread rails

Of the 16 derailments shown, 7 occurred on straight track and 9 occurred on curves With 3 exceptions all of the trains involved were being operated either within the speed limits allowed at the point of derailment or under no restriction whatever These cases were the first, thirteenth, and fourteenth accidents shown in this table, and the speed limits were 10, 45, and 25 miles per hour, respectively Had these restrictions been heeded the accidents no doubt would have been averted In the other 13 cases, however, there were no speed restrictions whatever in effect, although the investigations of these accidents disclosed the need of such restrictions As stated in a previous report, a study of the conditions surrounding several of the derailments investigated "emphasizes the fact that in many places and on many roads in this country track is not properly constructed or sufficiently well maintained to provide for the safe operation of trains at high speed It is believed that means should be taken to ascertain the limit of speed at which trains can be safely operated and to provide an adequate margin between this limit of safety and the highest speed permitted or attained"

Eleven of the derailments shown were what are known as tender derailments, the forward tender wheels usually being the first to leave the rails Derailments of this kind form one of the most perplexing problems with which operating and mechanical officers have to contend They result from a number of causes, and often occur under such circumstances that the real cause is never definitely determined On account of its comparatively short wheel base and high center of gravity, as well as the movement of water in the cistern, surging back and forth and from side to side, the tender is subjected to forces with which it is particularly difficult to deal and which are aggravated by any irregularity which may exist in the track Derailments of this kind occur more or less frequently on every large railroad in this country Such derailments should be given the closest possible study with the view of definitely ascertaining their causes and of eliminating them as far as practicable

Respectfully submitted

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Chief Inspector of Safety Appliances

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