

INTERSTATE COMMERCE COMMISSION

WASHINGTON

REPORT OF THE DIRECTOR

BUREAU OF SAFETY

ACCIDENT ON THE

ILLINOIS CENTRAL RAILROAD

TOONE, TENN.

SEPTEMBER 15, 1936

INVESTIGATION NO. 2100

SUMMARY

Railroad: Illinois Central
Date: September 15, 1936
Location: Toone, Tenn.
Kind of accident: Derailment
Train involved: Freight
Train number: No. 75
Engine number: 1812
Consist: 45 cars, caboose
Speed: 35-40 m.p.h.
Track: 2° 40' curve to left
Weather: Clear
Time: 1:52 p.m.
Casualties: 2 killed; 1 injured
Cause: Believed to have been due to a stuck wedge on right front driving box of the engine

November 5, 1936

To the Commission:

On September 15, 1936, there was a derailment of a freight train on the Illinois Central Railroad near Toone, Tenn., which resulted in the death of 2 employees and the injury of 1 employee.

Location and method of operation

This accident occurred on the Jackson District of the Mississippi Division, which extends between Frogmoor, near Jackson, Tenn., and Water Valley, Miss., a distance of 115.7 miles, and is a single-track line over which trains are operated by timetable and train orders, no block-signal system being in use. The accident occurred at a point 4,453 feet south of the depot at Toone; approaching this point from the north, the track is tangent for a distance of 2,921 feet and then there is a 2°40' curve to the left 1,000 feet in length, followed by more than 1 mile of tangent. The initial derailment occurred on the above-mentioned curve at a point 410 feet from its southern end, while the final derailment occurred 1,055 feet south of that point. The grade for south-bound trains is descending, varying from 0.318 to 0.91 percent, being at its minimum at the point of accident.

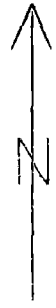
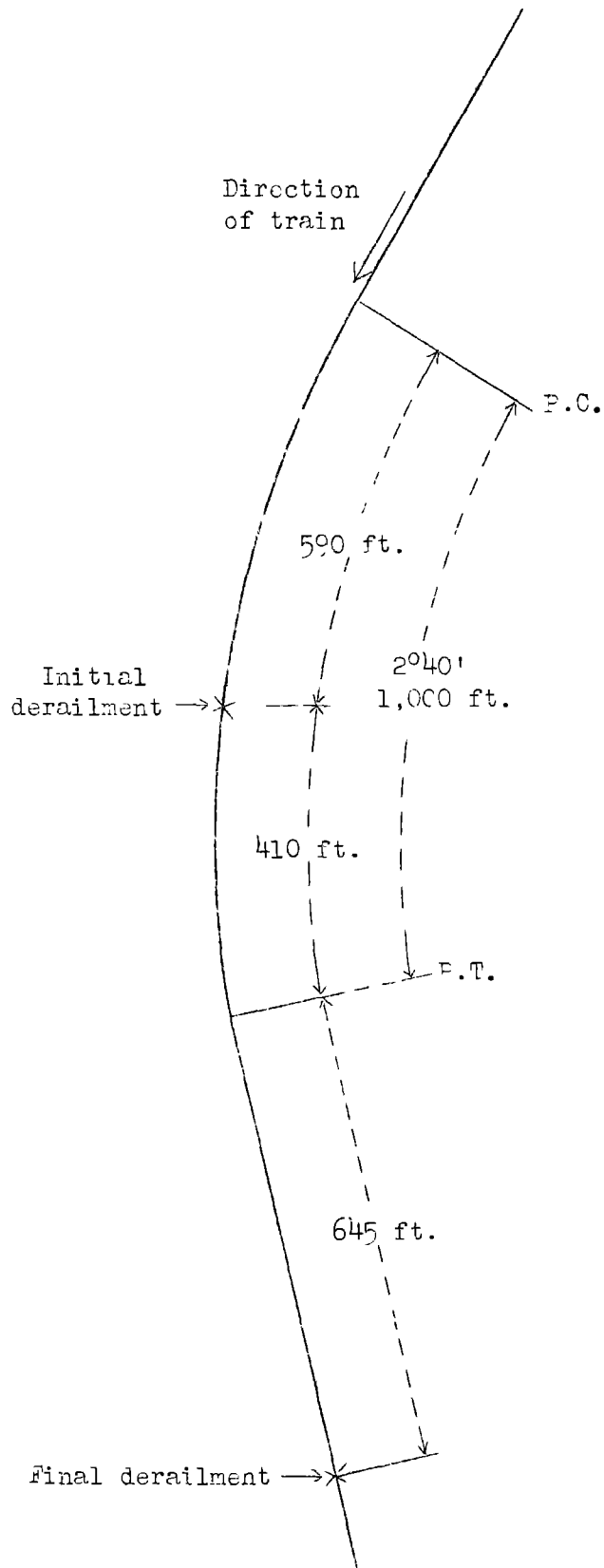
The track is laid with 90-pound rails, 30 feet in length, with 18 ties and 6 rail anchors to the rail length, fully tie-plated, single-spiked on tangents and double-spiked on the inside on curves, and ballasted with slag to a depth of about 6 inches under the ties. The maximum superelevation of the outside rail of the curve involved is $4\frac{3}{4}$ inches, while the maximum authorized speed for freight trains on this district is 40 miles per hour.

The weather was clear at the time of the accident, which occurred about 1:52 p.m.

Description

Train No. 75, a south-bound freight train, consisted of 45 cars and a caboose, hauled by engine 1812, of the 2-8-2 type, and was in charge of Conductor Wheeler and Engineman Hartwell. This train left Frogmoor, 13.5 miles north of Toone, at 1 p.m., according to the train sheet, 1 hour 15 minutes late, passed Toone at 1:49 p.m., 1 hour 19 minutes late, and was derailed while traveling at a speed estimated to have been between 35 and 40 miles per hour.

o	Frogmoor, Tenn.
	18.5 mi.
o	Toone, Tenn.
X	(Point of accident)
	97.2 mi.
o	Water Valley, Miss.



Inv. No. 2100
Illinois Central RR,
Toone, Tenn.
Sept. 15, 1936

The engine, with its right front driving wheel derailed, ran a distance of 1,055 feet to the point where the track was torn out for a distance of 317 feet, and finally stopped bottom up, down a 10-foot fill on the west side of the track, with its front end 1,362 feet south of the initial point of derailment. The tender remained attached to the engine, while the first 19 cars were piled up on both sides of the track within a space of 300 feet behind the engine; the next 2 derailed cars remained upright on the roadbed. The employees killed were the engine-man and fireman, while the employee injured was the head brakeman.

Summary of evidence

Head Brakeman Hudson stated that prior to starting the trip he rode engine 1812 from the roundhouse to the yard, a distance of about 2 miles; during this movement he rode in the deck and while standing there he did not notice anything unusual or any indication of rough riding. It was his practice to ride on the engine en route over the road, but before leaving Frogmoor he was asked by Flagman Noel, who had acted as head brakeman on a previous trip, whether he had ridden engine 1812, and on telling the flagman that he had not, the flagman told him that it was "the roughest you have ever been on," with the result that the head brakeman rode in the first car, an empty box car. He said he was sitting in the doorway of the box car, on the left side, and that nothing unusual happened until a point just south of Toone was reached, when he noticed rocks flying from under the engine, apparently from under the trailer, while coal was falling off the east side of the tender. The head brakeman started to cross over to the west side of the car in order to look out on that side, and while he was making this movement the air brakes were applied in emergency, apparently by the engine-man. Head Brakeman Hudson did not notice anything wrong with track conditions, nor did he know what caused the accident.

Conductor Wheeler stated that he also was on the engine en route from the roundhouse to the yard, sitting on the fireman's seat box, and while the engine rode a little roughly he did not think it was much rougher than other engines; he told the fireman to sit down but the fireman said it was too rough, having reference to the riding qualities of the engine, although the engine-man did not say anything to him about the engine not being in proper condition. After leaving the yard, nothing unusual occurred until the train reached Toone, but shortly after passing the depot a light application of the brakes was made, followed in from 10 to 20 car lengths by an emergency application, the train coming to a sudden stop; the

conductor thought the speed was about 35 or 40 miles per hour when the accident occurred. Conductor Wheeler started ahead, and after walking about a car length he saw a mark on a tie on the gauge side of the east rail, this mark continuing for a distance of about four car lengths, and on crossing over to the west side of the train he saw that bolts had been sheared off and the spikes looked as if something had run over them; he thought this must have been done by the pony truck of the engine, and after reaching the engine he saw that the pilot had been bent backward and the pony truck scarred and also bent backward. Conductor Wheeler had not noticed any irregular track conditions either on this trip or on the previous north-bound trip, and he said that both he and the flagman had looked over the train while rounding curves en route but had not seen anything wrong.

Flagman Noel's statements relative to the occurrence of the accident were similar to those of Conductor Wheeler. The flagman, also stated that he rode engine 1812 as head brakeman on Train No. 74 on September 13, north-bound; the engine rode roughly and he told the conductor, brakeman, and fireman about it. The engine would rock and buck up and down, and was shaken up to a considerable extent. He did not know at what speed it was worse, except to say it was not the same at low speed as at high speed.

Engineman Ramey, who was in charge of engine 1812 on the north-bound trip on Train No. 74 the night of September 12-13, stated that this engine did not ride any rougher than some of the others, and he took no exceptions to its riding qualities, saying that he considered it about an average Mikado-type engine. He also said that his fireman on that trip was the one who was killed in this accident and that the fireman did not make any complaint about the riding qualities of the engine, nor did he hear any comments in this connection from anybody else. Brakeman Givens said that he was the head brakeman on Train No. 74 arriving at Jackson on the morning of September 15, and that he rode the engine from Water Valley to Jackson on the brakeman's seat box, ahead of the fireman; he did not find anything wrong with the engine and it did not ride any rougher than other Mikado-type engines, except that it jolted up and down a little more than some of the others. He did not hear the engineman or fireman say anything about the engine riding roughly.

Statements of various other employees, including machinists, boilermen and engine workers, who performed work at different times on engine 1812, were to the effect that they had not heard anyone say anything about this engine riding roughly, and during

the performance of their work, and their inspections of the engine, they did not see anything wrong. Machinist Inspector Weir, on duty at Jackson, said that in the event a wedge had been stuck on the engine he would not have detected it, unless the engineman reported it, but if the brass on the front driving wheel had been 5/8 inch above the journal he would have detected it by climbing up on the guide and looking over on the inside of the wheel with a flash light, which inspection he made on the morning of September 15, saying that he tapped some of the wedges with a hammer to see if they were tight.

Traveling Engineer Harrington and General Car Foreman Rowley arrived at the scene of the accident within an hour after its occurrence and saw the marks of derailment on the track as described by the conductor and later on the traveling engineer returned with Track Supervisor Watts. The ties on the inside edge of the east rail were flange-marked, and the ties on the outside of the west rail did not show any flange marks. Examination of the overturned engine showed that the engine-truck pedestal bars had been broken and that the bottom of the pedestal was bright, indicating that it had been sliding on the rail for some distance and that the pedestal had held the wheel from marking the ties. The following morning the traveling engineer went to the scene of the accident with General Foreman Rodenbaugh and Machinist Knight and checked the engine tires for flange and tread wear and spread of engine trucks, drivers and trailers, also the lateral; everything was found to be all right. Traveling Engineer Harrington did not think that track conditions or speed had any bearing on the accident; he was of the opinion that the engine truck was the first to be derailed, but was unable to reach any conclusion as to the cause.

Track Supervisor Watts and Section Foreman Wilkinson made statements to the effect that there was nothing about track conditions that would have contributed to the accident. Track Supervisor Watts thought that a front driving wheel was the first to be derailed, while Section Foreman Wilkinson said that from the marks on the front driving wheel, and from the way the track was thrown out of line and the rails bent south of the initial point of derailment, looking as though they had been run through a bender, he thought the front pair of driving wheels had been off the track while the engine truck and the other driving wheels remained on the track. Both of these men thought the accident was caused by something being wrong with the front driving wheel of the engine.

Division Engineer Pittman did not think that track conditions had any bearing on the accident, and said there was no indication of dragging equipment. In his opinion the front

driving wheels were the first to be derailed, but he did not know the reason, although he thought there must have been some defect or irregularity in the engine.

General Foreman Rodenbaugh said that after the engine was moved back to the roundhouse the distance between the brass and journal on the right front driving box measured $\frac{5}{8}$ inch, the wedge being stuck and the indications were that the engine had been moved back from Toone to Jackson, after the accident, without the right front driving box brass contacting the journal; by loosening the wedge bolt one-half turn, the engine dropped down on the journal. In his opinion, the front driving wheels were the first to be derailed, and this resulted in a severe jar and caused the box to jump up and come in contact with the shoulder at the top of the shoe, where it became stuck.

Master Mechanic Kuhns examined the engine at the point of accident, noticed abrasions on the rim of the left front driver and marks on the flange of the right front driver, and thought the front driving wheels were the first to be derailed and that they were the only wheels derailed until the final derailment occurred. He was present when measurements were taken, and said the wedge on the right front driving box was so tight it held the driving box bearing $\frac{5}{8}$ inch from the bearing of the journal; it required one-half turn of a $1\frac{1}{4}$ -inch nut before loosening it, the box then coming down to its proper place. While he did not make any inspection of the track, he felt that the stuck wedge was only a contributing cause of the accident, the primary cause being excessive speed, as evidenced by the manner in which the derailed equipment piled up within a short distance, coupled with track irregularities.

Examination of the track at the initial point of derailment by the Commission's inspectors disclosed that it was in good condition, with no indication of anything dragging or of any track condition that would have contributed to the accident. The first mark appeared on the gauge side of the east rail and had the appearance of having been made by the rim of a wheel dropping off the ball of rail. At a point 8 feet 6 inches from the beginning of this mark there was a distinct but light flange mark on two ties, $5\frac{3}{4}$ inches from the rail, while at the first joint, about 25 feet south of the beginning of this mark, the receiving end of the angle bar was badly scarred and particles sheared off, and two angle-bar bolts had been broken. On the west rail there was a mark, apparently made by the flange of the corresponding wheel, on the ball of the rail, $\frac{1}{2}$ inch from the outside of rail and 17 inches south of the beginning of the one on the east rail; this mark ran diagonally toward the outside of the rail and dropped off within a distance of 9 inches, then

at the joint 10 feet from the beginning of this mark the receiving end of the angle bar was scarred and sheared, and two angle-bar bolts broken off. There was a light flange mark about $\frac{5}{8}$ inch from the outside edge on the base of the west rail, which appeared at intervals on the curve only, from a few inches to several feet in length, having intervening spaces of from 2 to 15 feet where the mark did not appear. The track at the first joint of the west rail south of the initial point of derailment was knocked slightly out of line; at the first joint in the east rail the distance was about $1\frac{1}{2}$ inches and at the next joint the track was about 6 inches out of line toward the east. The conditions as represented by the flange mark on the ties above mentioned, striking a few ties and missing a few ties, the damage to the angle bars and bolts, and track knocked out of line at joints from $1\frac{1}{2}$ to 6 inches, continued for a distance of 1,055 feet to the point of final derailment, where the track was completely torn up; within that distance all of the angle bars on the east rail and 25 bolts in the 34 angle bars on the west rail were broken off.

Examination of engine 1812 by the Commission's inspectors on September 17, in its overturned position at the point of accident, showed heavy abrasions all around the rim of the left front driving wheel and light abrasions all around on the back of the flange of the front right driving wheel, but no marks were found on any other wheels. Subsequent examination made on the same date, after the engine had been rerailed and moved to Toone, disclosed that the top rail of the engine frame was nearly contacting the top of the right front driving box, indicating something wrong at that location. The engine was moved from Toone to Jackson, Tenn., a distance of about 21 miles, and on September 18 a thorough inspection was made of it at that point; during the course of that inspection it was found that the journal bearing of the front driving box was $\frac{5}{8}$ inch above the journal and that the top of the box was $\frac{3}{16}$ inch below the bottom of the top bar of the engine frame, being in the same position as it was at Toone on the previous day, and on pulling the wedge down with the wedge-adjustment bolt the engine dropped with a heavy thud. The shoe and wedge were then removed and it was found that about 50 percent of the bearing surfaces of the shoe, wedge, and both sides of the box were dry and that the lubricant which had been on them was burned and carbonized, both the shoe and the wedge showed very little wear. The lubrication is supplied by an Alemite system to a cavity on each side of the box, and thence to the shoe and wedge, and when removing the Alemite fittings it was found that there was a quantity of thin grease in the cavities. On dropping the wheels and removing the box, neither the journal nor its bearing showed any indication of having been hot recently, nor was any of the grease melted out of the cellar.

Engine 1812 is of the 2-8-2 type, built in 1918; it has a total weight, exclusive of tender, of 282,700 pounds, with 212,500 pounds on the driving wheels, of which 52,400 pounds were on the front pair of driving wheels. It was turned out of the Paducah shops on April 4, 1936, after receiving Class-3 repairs; since being turned out it had traveled 23,293 miles up to the time of the accident. The wedge involved is of brass, 19 inches in length, having a flat bearing surface of 8 inches on the box side and a taper of 1 inch in 19 inches lengthwise the wedge on the pedestal side, and is adjusted by means of a bolt $1\frac{1}{4}$ inches in diameter fitted to a provided slot in the bottom of the wedge. As there was no indication of heating from the interior of the box, apparently the heating of the shoe and wedge resulted from frictional heat and lack of lubrication, first starting in small places, and progressing until the lubricant on 50 percent of the bearing surfaces was burned and nearly carbonized, by which time the metals had expanded sufficiently to stick the wedge and hang the box toward the top of the pedestal, the dry surfaces of the shoe, wedge and box, and the carbonized lubricant, sealing the box in that position.

General Superintendent of Motive Power Mays, in a letter dated September 23, 1936, stated that his personal inspection of the engine failed to detect any defect that would have contributed in any way to the cause of the accident. According to Mr. Mays' letter, when the engine stopped on its back it released the entire front section of the spring rigging, leaving the front driver entirely free, and he noticed that the right front driving box had dropped the entire distance to the top of the frame while the left front box had dropped to within approximately 2 inches of the frame. Considerable grit and ballast had been thrown over the front part of the engine after it became derailed and Mr. Mays said that when it was rerailed the right front box remained approximately one-quarter inch above the journal, due to the grit on the shoe and wedge not allowing the box to be free. Mr. Mays understood that subsequently it was decided to have the wedge pulled down, the box coming down to its normal position after half a turn of the nut had been made, this slight pull indicating that the wedge was not stuck, but merely tight, due to grit and dirt that had accumulated after the derailment occurred. General Superintendent of Motive Power Mays further stated that he personally knew that the wedge was not stuck, saying that had it been stuck, the box could not have dropped to the top of the frame after the engine overturned, nor could the wheel have dropped to the ties immediately after leaving the rail.

Discussion

The evident indicated that the front driving wheels of engine 1812 were the first to be derailed, and that after being derailed to the right they ran along close to the rails, breaking angle bars and angle-bar bolts and knocking the track out of line, until they reached the point where the final derailment occurred, at which point the track was entirely torn up and the engine and cars derailed. Subsequent examination of the track failed to disclose any condition which could have caused the accident, nor was it believed that the speed was sufficiently in excess of the maximum limit for freight trains of 40 miles per hour to have been a cause. On the other hand, however, examination of the engine after it had been rerailed and moved to Jackson, a distance of about 21 miles, showed that the brass in the right front driving box was $5/8$ inch above the journal, the wedge being stuck, and it must have been tightly stuck for it to have remained in that position while the engine was being moved that distance to the shop. While it is probable that no definite statement can be made as to when the wedge became stuck, the presence of this stuck wedge, coupled with the evidence indicating that the driving wheels were the first to be derailed, justifies the belief that the stuck wedge probably was the primary cause of the accident.

Conclusion

It is believed that this accident was caused by a stuck wedge.

Respectfully submitted,

W. J. PATTERSON,

Director.