The Chairman 651

ADOPTED Oct 21/19

IN RE INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE WABASH RAILROAD, AT ST. LOUIS, MO., SEPTEMBER 18, 1919.

October 17, 1919.

On September 18, 1919, there was a derailment of a Wabash Railroad switch locomotive at Merchants Bridge, St. Louis, Mo., which resulted in the death of 2 employees. After investigation of this accident, the Chief of the Bureau of Safety reports as follows:

The Merchants Bridge Co. is operated by and as a part of the Terminal Railroad Association of St. Louis, movement of trains being governed by means of block signals. It is a double track line with two double track approaches from the St. Louis side, one from the north and one from the south, forming a wye. The approach from the north is on a 4-degree curve to the left about 760 feet long, the track being on a fill, followed by a trestle, with an ascending grade of 1.6% to the east. The track is laid with 90-pound rails, tie plated and single spiked, with about 28 ties under each rail. The ballast on the approach to the bridge is of crushed stone, and the track is well maintained.

The train involved was a switch or transfer train of 50 cars, which left Luther Yard of the Wabash Railroad, about 2 miles north of the point of accident, at 1.00 p.m., en route to East St. Louis. It was being pulled by T.R.R.A. locomotive 152 and pushed by Wabash locomotive 509, in charge of Engineman Notestine and Fireman Ainesworth, assisted by

Wabash locomotive 550.

In moving a train of this length and tonnage over the bridge, it was customary to have three engines assist in pushing the train up the grade to the bridge, and arrangements had been made for three pusher engines. The third engine was expected to cut in behind the caboose and ahead of engine 509 at Prairie Avenue, and continue with the train across the bridge. When the transfer train started from Luther Yard, engine 509 was immediately behind the caboose, travelling in backward motion, but the coupler pin was not in place, so that the coupling was not locked. Immediately back of engine 509 was engine 550, also operated backing up. When Prairie Avenue was reached, it developed that the third Wabash engine would not assist, on account of the crew of this engine stopping for lunch, and this engine did not cut in as arranged. When the train was a part of the way up the approach and was slowing down, T.R.R.A. engine No. 49, also operating backward, coupled on behind engine 550 and assisted the train a short distance, making in all, three engines behind the train. After pushing the train some distance, the two rear engines, T.R.R.A. engine 49 and Wabash engine 550, cut off and proceeded to drop back down the approach preparatory to returning to the yards. Engine 509 continued pushing until it reached a point on the trestle, about 120 feet beyond the end of the fill, where it was derailed by the breaking of the right side rod at No. 2 crank pin, and fell off the trestle to the ground below, a distance of about 43 feet.

In falling from the trestle on the right side in the

direction in which it had been moving, the engine apparently turned over in the air, the dome of the engine striking against one of the concrete bases of the bridge with sufficient force to shear off all the rivets in the dome and result in its being blown a distance of 90 feet by the force of the explosion which followed. The engine came to rest in an upright position, with the driving wheels partly resting on the frame of the tender, which was lying upside down. The drawbar between the engine and tender was badly twisted and bent, but did not give way under the strain. The tank cistern was torn from the frame and was wedged between the engine and one of the columns of the south approach to the bridge. The employees killed were the engineman and fireman.

The first mark on the ties was on the north side, 68 feet beyond the end of the fill, and was an indentation 4½ inches in width on the top of a tie. The impact had cut off the corner of the tie, evidently when the back end of the right side rod broke and dropped off the crank pin. The second mark was 19 feet, 9 inches east of the first mark and was very similar in appearance. Three and one-half feet farther east there were two more marks, 15 inches apart, then there were a series of ties bearing marks as though the rod had been striking them until the fifth column of the trestle was reached; the two ties

directly over this point were splintered on their north ends. The ties on the left or south side were more or less splintered by the engine in falling, the ends of 7 of them being broken off and the track tilted up on the inner or north side.

The indications were that the back end of the right side rod dropped down and made the first mark at the point 68 feet east of the west end of the bridge approach and then bounced along the ties, making the marks described. It is believed, however, that the front section of the rod did not drop down from the pin until the locomotive reached the point where the ties were splintered, which was 40 feet from the first mark on the ties. With the locomotive moving backward, the end of the rod was thrust violently against the ties, and as the engine continued to move backward the front end of the locomotive was raised off the track and shifted toward the left so that when it dropped back on the trestle work, the driving wheels on the left side were entirely off the trestle, or so far over that the unequal distribution of weight was sufficient to overturn the engine.

Foreman Talliferro, conductor of the transfer train, stated that when they left Luther Yard with Wabash engines 550 and 509 at the rear of the train, they had put a stick in the pin lifter of the coupler of engine 509 so that engine 509 could cut off without having to lift the pin, as it was expected that a third Wabash engine would cut in next the caboose, assist them over the bridge and follow the train entirely over. After reporting the train and receiving permission to make the move, they

proceeded with the two engines pushing. The foreman of the third Wabash engine had advised them his engine would be ready to assist them by the time the train reached Prairie Avenue, but did not show up. When the train slowed down a second time while on the approach, and it was evident they would not make the grade, T.&.R.A. engine 49 backed in against engine 550 and assisted until it was seen that the train would be able to get over the grade. Engine 550 continued some distance further before cutting off, leaving engine 509 continuing to push. At the time of the accident, he, with his rear brakeman, was standing on top of the 7th car from the caboose watching engine 509 and listening to its exhaust, which could be heard above that of the other engines. He saw the engine when it tipped, but did not realize at that time that it had left the track.

Rear Brakeman Morhaus, of engine 509, stated that he was on the second step of the front platform of the caboose. He could tell by the slack of the train when engine 550 cut off, but could not say whether or not engine 509 worked steam thereafter, as it was but a moment until he felt a sudden jerk in the train and on looking back, saw engine 550 but could not see engine 509. He heard an explosion and then observed steam arising from below the bridge.

Engineman Foley, of engine 550, stated that his engine cut off from the transfer train after assisting it as far as the semaphore at the end of the fill, which was their working limit, and estimated that engine 509 had proceeded 40 or 50 feet fur-

there when it overturned. He did not think the engine was working steam at the time it turned over, but that it was drifting at a speed of about 3 miles an hour. He looked back over the top of the tender tank and saw engine 509 rise up and tip off the trestle head end first, the tank following.

Fireman Kloth, of engine 550, stated that engine 509 was 20 or 30 feet ahead of their engine. He was looking toward it when he saw it make one or two slight moves; the second time it rose higher than the first time, then on the third move it rose up and tipped over and he saw it turn over in its fall. He was positive that it was not working steam when it fell from the trestle.

Switchman Jones, with engine 550, stated that he had been riding on the rear end of the tender of engine 550 while it was assisting the train up the approach. At about the time engine 550 shut off steam he stepped off in order to board the front end of the engine. As he got on the foot-board engine 509 looked to have been derailed; he said it was 25 or 50 feet away when he saw it start to turn over and that it headed down and made one turn. He did not think it was working steam at the time.

Operator Quinn, on duty at Tower "3" at the time of the accident, stated that the transfer train was about by the tower and he was in the act of reporting it when he heard a crashing noise, and, turning around, saw engine 509 off the track and it was only a moment until the tender appeared to

swing out over the bridge, the engine following it, and a second or two after striking the ground, it exploded. He stated that engine 609 was working steam up to the time it turned over and estimated its speed at 8 miles an hour.

Bridge Cleaner Hill, who was working on the bridge at the time of the accident, stated that he heard an unusual noise and looked around just in time to see the engine and tender rise up in a V-shape and then plunge over the trestle. He heard a crash and a few seconds later, the sound of the boiler exploding.

Locomotive 609 was a switcher of the 0-6-0 type, with a total weight, including tender, of 231,565 pounds. The cylinders were 19 x 28 inches and it carried a steam pressure of 185 pounds. It was equipped with Westinghouse air brakes, with one 9½ inch pump. An examination of the broken side rod showed its bore to have been 6-9/16 inches in diameter, while blue prints showed that the standard size hole for this rod is 6 inches, so that there was an increase of 9/16 of an inch in the diameter of the hole, with a proportionate reduction of sectional area at the upper portion of the rod. A boss 1-1/16 inches thick had been welded to the bottom of the rod, indications being that this boss had been applied by autogenous welding. This gave the rod a thickness of 3 inches at the point of fracture; however, flaws existed in the material at this point and the surfaces at the top point of the fracture were practically smooth, indicating that the fracture had existed

for some time previous to the accident. A collar 8-7/8 inches in diameter was used on this pin and extended almost to the top of the rod. A grease cup screwed into the top of the rod and covered all but ⅛ of an inch on either side. These conditions would probably have prevented, in a large measure, the detection of a crack in the rod at this point.

The records show that on April 21, 1919, the right side rod of engine 509 was sent from Brooklyn enginehouse, where the engine was in service at that time, to Decatur, Ill., for repairs on account of being broken at No. 2 connection. The rod was returned and the engine replaced in service on April 28, 1919. No record could be found of this rod having been removed since that date. The engine had been in service in St. Louis since August 21, 1919. Daily inspection reports for the last 30 days were checked but there appeared no reference to any material defect in the side rod in question. However, daily inspection reports for 6 days, viz., August 23, 24, 29, September 1, 9 and 18 (the last named being the day of the accident) could not be located, although the engine dispatcher's record shows the engine to have been in service on these dates. The last inspection report was dated September 17, 2 p.m., at which time the engine was taken to Luther enginehouse for coal, water, cleaning of fire, etc. The record shows that the engine was again placed in service at 6.10 p.m. on the 17th, came to Luther enginehouse again at 12.15 p.m. on the 18th, at which time no inspection report was made out, the engine returning

to service as soon as supplied with necessary fuel.

This derailment was caused by the breaking of the right side rod of engine 509 at the No. 2 pin, or middle connection, permitting the forward end of the rod to drop down and come in contact with the ties, resulting in the overturning of the engine. While it is probable that the manner in which the crank pin collar and grease cup were applied on this rod may have rendered this defect difficult to detect in the course of an ordinary roundhouse inspection, it is believed that a more rigid inspection might have revealed the defect.

The trainmen involved were experienced men with good records. The engine crew of the derailed locomotive had been on duty 6 hours after a period off duty of 15½ hours.

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