Inv-2441

INTERSTATE COMMERCE COMMISSION

WASHINGTON

REPORT OF THE DIRECTOR

BUREAU OF SAFETY

ACCIDENT ON THE

ILLINOIS CENTRAL RAILROAD

MARTWICK, KY.

AUGUST 4, 1940

INVESTIGATION NO. 2441

SUMMARY

Inv-2441

Railroad:	Illinois Central
Date:	August 4, 1940
Location:	Martwick, Ky.
Kind of accident:	Derailment
Train involved:	Passenger
Train number:	104
Engine number:	1196
Consist:	9 cars
Speed:	30 miles per hour
Operation:	Timetable, train orders and automatic block system
Track:	Single; 6° curve; 1.42 percent descending grade northward
Weather:	Clear
Time:	4:38 a.m.
Casualties:	44 injured
Cause:	Tire of right trailer-truck wheel becoming displaced

September 27, 1940.

To the Commission:

On August 4, 1940, there was a derailment of a passenger train on the Illinois Central Railroad at Martwick, Ky., which resulted in the injury of 44 passengers.

Location and Method of Operation

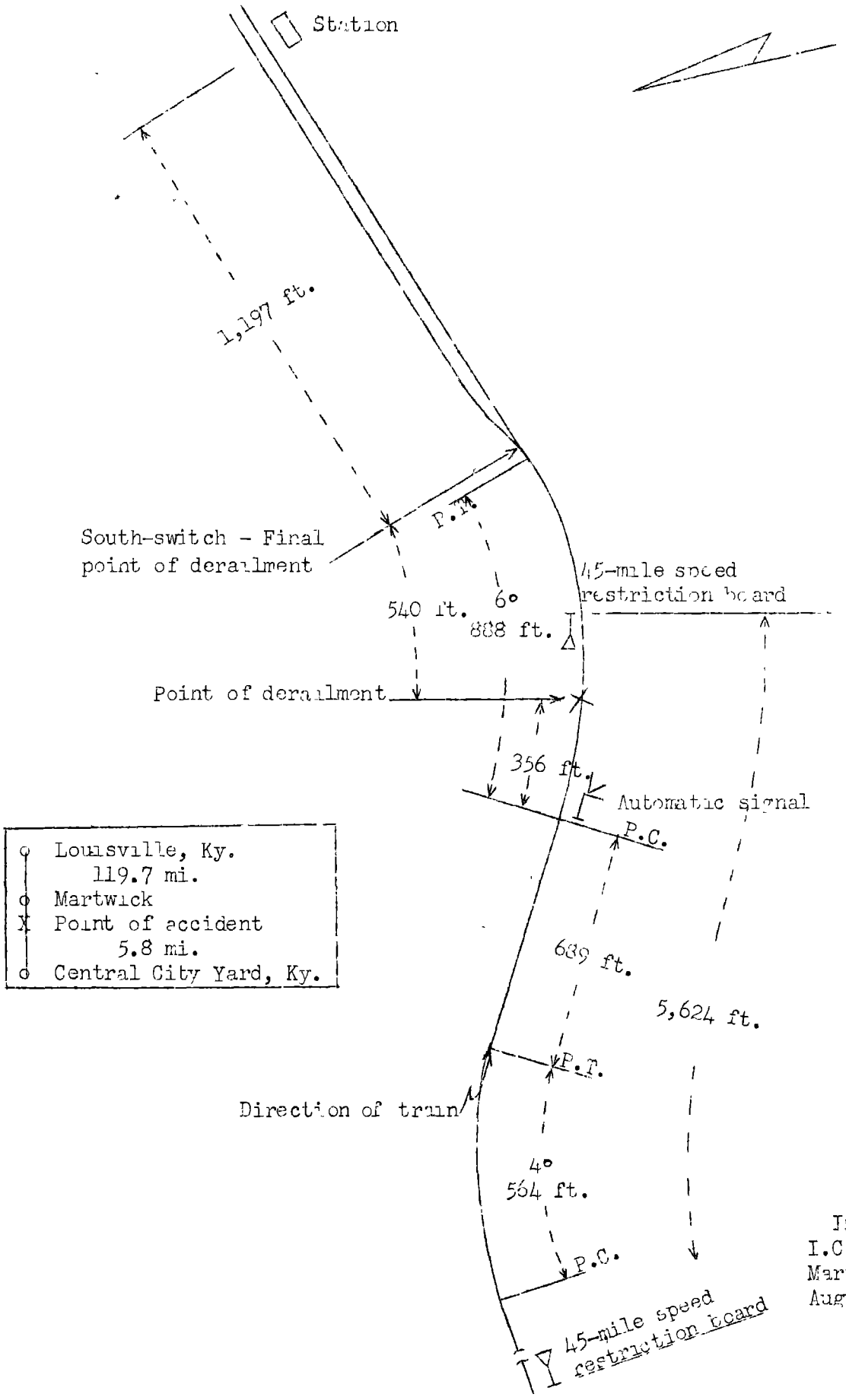
This accident occurred on that part of the Kentucky Division designated as the Louisville District which extends between Central City Yard and Louisville, Ky., a distance of 125.5 miles. This is a single-track line over which trains are operated by timetable, train orders and an automatic block system. The derailment occurred at a point 540 feet south of the south switch of the siding at Martwick. As the point of accident is approached from the south there are, in succession, a 4° curve to the right 564 feet in length, a tangent 689 feet in length, and a 6° curve to the left 888 feet in length; the derailment occurred on the latter curve at a point 356 feet from its southern end. The grade for north-bound trains varies from 1.10 to 1.42 percent descending a distance of 2,500 feet to the point of accident and is 1.42 percent at the point of accident.

The siding parallels the main track on the west. The south switch is facing-point for northward movements and has a No. 10 turnout; the switch-stand is located on the west side of the track.

The track structure consists of 90-pound rails, 33 feet in length, laid on 18 treated ties to the rail length; it is single-spiked on tangents and double-spiked on the gage side of the rails on curves; it is tie-plated, has 6 rail anchors to each rail, and is ballasted with rock to a depth of 12 inches under the ties. The track is well maintained. At the south switch of the siding the track is laid on a fill, the maximum height of which is 10 feet and which extends northward approximately 1,700 feet.

The maximum authorized speed for passenger trains is 60 miles per hour; however, between points 1/2 mile south and 1/2 mile north of the point of accident the speed on curves is restricted to 45 miles per hour.

The weather was clear and day was breaking at the time of the accident, which occurred about 4:38 a.m.



Inv-2441
I.C.R. R.
Martwick, Ky.
August 4, 1940

Description

No. 104, a north-bound passenger train, with Conductor Perkins and Engineman Smith in charge, consisted of engine 1196, of the 4-6-2 type, two express-refrigerator cars, one mail-express car, two baggage-express cars, two compartment coaches and two Pullman sleeping cars, in the order named. The first two cars were of steel underframe construction and the remaining seven cars were all-steel construction. This train departed from North Yard, Paducah, Ky., 106 miles south of Martwick, at 1:23 a.m., according to the train sheet, on time, left Central City Yard, 5.8 miles south of Martwick, at 4:29 a.m., 2 minutes late, and, when approaching Martwick, became derailed while moving at a speed estimated to have been approximately 30 miles per hour.

The engine and the first five cars remained on the track and stopped with the front end of the engine 1,378 feet north of the point of derailment. The sixth car was derailed but remained coupled to the head portion of the train. The three rear cars, remaining coupled, stopped on their right sides to the right side of the track, at the foot of the embankment, in general line with the track, approximately 100 feet south of the sixth car and 110 feet north of the switch.

Summary of Evidence

Engineman Smith stated that he inspected engine 1196 when he took charge of it at Paducah; the air brakes were tested and functioned properly en route. As his train was approaching Martwick and moving at a speed of about 45 miles per hour he heard a peculiar noise as though something was dragging. He immediately made a brake-pipe reduction and the speed had been reduced to 30 miles per hour as the engine passed over the south switch of the siding. He made a further reduction and the engine stopped near the station; he did not know at that time that an accident had occurred. Examining the engine he found the inside retaining ring and the tire off the right trailer-wheel; however, they remained on the axle. The wheel-center was on the rail. He had operated this engine many times, the last time being on his previous trip, and it was never necessary to report any unusual condition concerning its riding qualities.

The statement of Fireman Singery was substantially the same as that of the engineman.

Conductor Perkins stated that his train was moving at a speed of 45 miles per hour when approaching Martwick and as

the train rounded the curve south of the siding he felt an application of the air brakes. He did not know whether there was another application of the brakes. He was in the seventh car; he felt it strike the ties and thought it moved about 200 feet before it stopped. After the accident he went back to inspect the track and found the first mark of derailment a short distance north of the last automatic signal passed, which is located at the southern end of the curve involved.

Flagman Simmons stated that he was in the rear car and felt a heavy application of the air brakes just before the train reached Martwick. He thought the train was going to stop at the station. He heard a grinding noise and the train had practically stopped when the rear car turned over. On his way back to flag he observed that the track at the switch was torn up and he saw marks on the ties which indicated that two wheels had been derailed.

Baggageman Hicks stated that he was in the sixth car and he estimated the speed of the train to have been between 30 and 35 miles per hour when the sixth car passed over the switch and became derailed. He did not know that the rear portion had separated from the front portion until after the train stopped.

Master Mechanic Fox stated that at the scene of accident he found the right trailer-wheel tire loose and the retaining-ring rivets freshly sheared off. He said that the purpose of the retaining ring is to prevent a loose tire from coming off the wheel-center. It was his opinion that if the tire had come loose on tangent track the retaining ring would have held it in place; however, as the wheel rounded reverse curves the rivets were sheared off and the tire was permitted to drop to the inside. All the rivets on the outside of the wheel were intact. The retaining rings were of the Mansell type and were secured by 11 rivets 3/4 inch thick. The lateral motion in the trailer wheels was 25/32 inch and that in the driving wheels from front to rear was 1/4 inch, 3/8 inch, and 1/4 inch. The back-to-back measurement between the rims of the wheel-centers was 54-1/8 inches and the overall measurement of the rims of the wheel-centers was 63 inches. Both trailer tires were 2-3/16 inches thick and the flange wear was 1/8 inch; this thickness was well within the limit for service. The lubrication of chafing irons between engine and tender was good. Engine 1196 was given class 3 repairs at Paducah Shop during October 1937, and the records show that new tires 3-15/16 inches thick were applied; however, these wheels are interchangeable but no record is kept of wheels interchanged or of new tires applied, so he did not know whether this was the same pair of

trailer wheels to which the new tires were applied when the engine was in the shop. This engine last received class 4 repairs at Memphis, Tenn., in September 1939. It was dispatched in No. 103, August 2, 1940, and before its departure it was given both outside and pit inspections. The regular steel hammer test was used to test for any loose rivet, retaining ring, or tire. Another inspection was made at Fulton, Ky., on August 3; the tires were sounded with a steel hammer and the retaining-ring rivets were checked. Outside and pit inspections were made. The engine tank also was inspected and the side-bearing clearance was found in good condition; no excessive slack in the coupling between the engine and the tender was found. New trailer tires were applied to this engine at Central City, Ky., after the accident, and the engine was returned to service without further repair. Engines of this type have been used on this district for more than 15 years.

Superintendent Kern arrived at the scene of accident about 8 a.m. He found the first mark at a point about 30 feet north of the last automatic signal passed; this mark, which had been made by something other than a flange, was on a tie about 9 inches inside the right or outer rail of the curve, and within a distance of 65 feet similar marks appeared in three other places. The first flange mark was 65 feet north of the first mark just described; this was a light mark just inside the left rail, and two spikes on the same tie on the gage side of this rail had been struck, apparently by the tread of the trailer wheel. Directly opposite, light marks on the right rail indicated the point where the wheel-center passed over the outside of the head of the rail and struck the south end of an angle bar. The wheel marks inside the low rail were continuous from this point to the south switch of the siding, and the marks outside the high rail also were continuous but less distinct. The marks inside the high rail being intermittent and irregular indicated that the tire and the retaining ring, which made these marks, were running loose on the axle. The left switch-point had been struck in such a way that the reinforcing strap, fitted between the head and the base to stiffen the switch point, had been torn outward, presumably by the action of wheels passing over the lug which was attached to the switch point. Apparently the wheels of the first five cars opened this point sufficiently for the sixth car to become derailed. This car apparently tore out the guard rail on the right side of the track, broke a rail and caused the rear three cars to become derailed. The left wing of the frog also was torn out.

According to data furnished by the carrier, engine 1196 is of the 4-6-2 type, having a loaded weight of 281,215 pounds; the weight on the trailer wheels was 56,215 pounds. The rigid wheel-base is 13 feet and the total wheel-base is 34 feet 4 inches.

Locomotive trip inspection report concerning the engine involved filed at Louisville on July 31 shows that the flange of the right trailer-tire was cutting; the flange was examined and found serviceable by the roundhouse foreman. The report for August 2 specifies that the left trailer end-plate studs be tightened; this report indicates that the repair was made.

Observations of the Commission's Inspectors

Inspection of the track by the Commission's inspectors revealed the marks to be as described by the superintendent. Inspection of the track for more than 1 mile south of the point of accident indicated that it was well maintained. Measurements furnished by the carrier indicated the gage was uniform and the superelevation on the curve involved 5-1/2 inches. All the rivets that secured the inside retaining ring to the wheel involved had been sheared off; this condition indicated that after the tire became loose on the wheel-center the rivets had been subjected to considerable strain, apparently because of the curvature of the track. The rivet holes were true and did not show any indication of wear that would be caused by rivets being loose over a period of time. The tire had been secured on the wheel-center by the shrinking process and was held by an inside and an outside retaining ring; these rings were 7/16 inch thick and 2 inches wide and were fastened to the wheel by eleven 3/4-inch rivets. There was no indication that shims had been used in securing the tire to the wheel-center. There was no braking appliance on this trailer truck.

Discussion

According to the evidence, as the train was proceeding at a speed of 45 miles per hour the engineman and the fireman heard a peculiar sound as though something was dragging under the engine. The engineman made a brake-pipe reduction which reduced the speed to about 30 miles per hour as the engine passed the south siding-switch at Martwick; he made another brake-pipe reduction and the train stopped near the station. After the engine stopped it was found that the tire of the right trailer-wheel and the inside retaining ring had been displaced and were on the axle. Throughout a distance of 65 feet south of the point of derailment irregular marks, indicat-

ing that they had been made by a loose tire, appeared intermittently on the ties about 9 inches inside the right rail. At the point of derailment marks inside the left rail indicated that the left trailer-wheel had dropped inside the rail at that point and, directly opposite, marks on the right rail indicated that the wheel-center had passed over the head of the right rail and dropped to the outside of that rail. The left trailer-wheel damaged the left switch-point of the south siding-switch; this condition combined with vibration caused by the tender and the first five cars passing over this point undoubtedly permitted the sixth car to enter the siding, and then the general derailment occurred.

After the accident, the rivets which secured the inside retaining ring were found to have been recently sheared. This condition would indicate that after the tire became loose the movement of the engine on the numerous reverse curves which had been encountered en route caused the rivets to be sheared off and permitted the inside retaining ring and the tire to be entirely displaced from the wheel-center.

According to the evidence, the engine involved was given both outside and pit inspections on August 2 and also on August 3; during these inspections no exception was taken to the condition of the tires. Recent locomotive inspection reports indicated that the flange of the right trailer-wheel tire was cutting and the end-plate on the left side of the trailer truck was working loose. Although the trailer truck was considered serviceable by the mechanical department, it appears that there was an abnormal condition in this truck.

Conclusion

This accident was caused by the tire of the right trailer-truck wheel becoming displaced from its wheel-center.

Respectfully submitted,

S. N. MILLS.

Director.