IN RE INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE LOUISVILLE & NASHVILLE RAILROAD AT HUBERS, KY., ON JUNE 9TH, 1918.

July 5, 1918.

On June 9th, 1918, there was a derailment of a passenger train on the Louisville & Nashville Railroad at Hubers, Ky., resulting in injuries to 52 passengers. After investigation the Chief of the Bureau of Safety reports as follows:

The Louisville Division of this road extends between Louisville and Bowling Green, Ky., a distance of 113.6 miles. It is for the most part a single-track line, but from Louisville to Lebanon Junction, a distance of 39.7 miles, the track is double. It was on this double-track section, about 15.5 miles south of Louisville, that the derailment occurred. On this division trains are operated under a time interval and dispatching system, no block system being used.

The train involved in this accident was southbound passenger train No. 7, en route from Cincinnati, Ohio to New Orleans, La., and consisted of locomotive 230, 1 mail car, 1 express car, 1 baggage car, 4 day coaches, 1 Pullman chair car and 1 Pullman sleeping car. These cars were of steel construction, except 1 baggage car and 1 day coach, which were of wooden construction, and the Pullman sleeping car and one of the day coaches, which had steel underframes. This train was in charge of Conductor Keen and Engineman Palmer and left Louisville at 3:33 p.m., 27 minutes late, passed Brooks, the last open train order office, at 3:55 p.m., 32 minutes late, and at about 4:00 p.m.,

was derailed at a point about one-half mile south of Hubers, while running at a speed estimated at 35 to 40 miles per hour.

From the point at which the first indication of derailment was observed, the train travelled 415 feet, when the last four coaches became uncoupled from the rest of the train, and the locomotive and first five coaches continued a further distance of 528 feet before coming to a stop. The rear four cars were derailed and fell to the left over the adjacent northbound track, except the last coach in the train, which became detached and fell to the right or outside of the curve, striking the clay bank of the cut and demolishing the wooden superstructure of the car, wherein most of the injuries were sustained. The locomotive and first four coaches remained on the track, while the fifth coach in the train was derailed, but remained upright.

The derailment occurred about 100 feet north of the south end of a 4°18' curve to the west, 3000 feet in length, the track at this point being laid in a cut, clay banks rising on each side to a height of about 20 feet. The track at the scene of the derailment and on the tangent approaching the same is level. The track is laid with 80 lb. rails, 33 feet in length, laid in 1904, with 18 ties to the rail section, single-spiked, with tie plates on curves and ballasted with crushed stone. The outer rail of the curve has a superelevation of 1½ inches. The weather was clear and hot, temperature being 84 degrees.

Engineman Palmer of train No. 7 stated that there was nothing wrong with the engine or cars when he left Louisville.

When he passed the south switch at Brooks he was running 20 minutes late. He noticed nothing unusual while running over the half-mile curve just north of the station, approaching Ruberg, but as he went around the curve south of the station, at speed he estimated at from 35 to 40 miles per hour, he noticed the engine give a little lunge, which was no more unusual than when passing around other curves on that road; shortly after that he felt a jerk and after about a half-mile was passed, he felt another jerk and the emergency brakes went on, caused by the train line parting. He shut off steam immediately. The fireman looked out and said: "We are in the ditch." Acting under instructions of his conductor and accompanied by the conductor of a north bound train, the locomotive was cut off and sent to Shepherdsville to secure assistance, later returning to the scene of the accident.

Conductor Keen of train No. 7 stated that at Louisville he received a train order to run 20 minutes late from Louisville to Bowling Green and his train left Louisville at 3:33 p.m., 28 minutes late, the accident occurring at 4:03 p.m. He assumed that their speed at the time of the derailment was not over 40 miles per hour. At the time of the derailment he was in the third car from the rear end when he felt a sudden jerk or lurch forward, as if the cars ahead were off the track, then felt a lurch backward, when the car he was in seemed to raise off the track and begin falling to the left of the track and struck the northbound main track. The train immediately stopped and he was knocked down, but crawled through the window. He saw the fireman and directed him to go to the rear of the train and protect it, then

requested the conductor of a northbound train to accompany his engineman on the engine to Shepherdsville to obtain assistance and extra coaches. While waiting for assistance he examined the locomotive and the cars remaining on the track to see if he could determine the cause of the accident, but found no defects visible. He went back and examined the track, but found no marks on the ties. Due to the fact that for about a half-mile back the track had been lifted up and placed above the ballast, together with the fact that a good many of the ties were old and worn and consequently were not strong enough to hold the train without ballast, his opinion was that the derailment was caused by a spreading rail.

Fireman Routt, of train No. 7 stated that while going around the curve south of Rubers station, at a point he estimated as about 40 or 50 feet from where the derailment occurred, and while running at a speed of 45 to 50 miles per hour, he noticed the engine rocking. It was unusual enough to cause him to look back at the train and he saw one of the coaches had been derailed and was on the northbound main track, whereupon he told his engineman that they were off the track and he applied the brakes and stopped the train.

Flagman Webb, of train No. 7 stated that he was riding in the second car from the rear of the train; the first thing he noticed was the air going on in emergency and the cars commenced rolling around. When they stopped, he got out of the window and went back to protect the train. He estimated their speed at about

45 miles per hour and saw nothing which could have caused the accident.

Supervisor of Track Whitehouse stated that on the morning of June 7th, he took 3 section foremen and 18 laborers to Hubers for the purpose of lining the southbound track over to new center. The ballast was cleaned from between the ties for a distance of about 1,700 feet at the south end of the curve on which the derailment later occurred; in all they moved about 1,600 feet of track. In moving the track to the inside of the curve they did not remove all the ballast between the ties for the entire distance for which they were throwing track, but threw the track at each end a short distance where the ballast had been removed and the rest of the way cleaned out the ballast on bottom of ties. He estimated that, before aligning the track, the west, or inner rail of the curve had provision for expansion, 20 or 25 rail joints having openings of from 1/16" to 3/8". The east rail had but very little opening. For 54 rail lengths the track was aligned to new center stakes; for a short distance, not over 200 feet, it was thrown in as much as 3 feet, shortening the length of the curve 3-1/8", according to the statement of Roadmaster Hayden. He knew that moving track in and shortening the openings between rails would tighten it, but he did not consider that the movement would tighten track to the extent that it would be dangerous. He stated that the track was moved off its bearing and the bottom of ties were placed on new location, but that the tracks being empty would not interfere with full

full speed of train, as this road has mile after mile of surface that is empty. He finished lining the track about 2:00 p.m., and then spent the rest of the day, with the same number of men, in smoothing track and the rails and ties remained on top of the ballast, with practically no ballast between ties. Before leaving that night, he instructed the Section Foreman to work there with his men next day, smoothing track. While he admitted there were some defective ties in this stretch of track, he considered the track safe for passenger trains at high speed, and did not think defective ties would be found adjoining each other; he did not consider that the condition of the ties was in any way responsible for the derailment. He went over the track several times after lining it and found they still had some open joints in the west rail, but did not recall but one open joint in the east rail, which he estimated was located about four joints back from where the derailment occurred. The Supervisor of Track stated that he found the first wheel marks just a few feet north of the south end of the curve, about 33 feet from where they commenced stripping the track, which was near the point of curve and at which point they had thrown track but very little. The first marks were flange marks on the inside of the west or inner rail; about three feet north of that were indications that the wheel had dropped on inside of the east rail. He said he saw wheel marks on the inside of the east rail almost directly opposite the marks on the west rail. However, the marks found on the rails were not, in his opinion, at the original point of de-

railment. He thought the original point of derailment was south of the flange marks on the rails where the rails apparently had been torn apart, allowing some rear car to drop between them. He found no rails broken after the accident and said the indications were that both rails remained in an upright position, and that he saw no indications of spreading track. He did not know what caused the derailment, but said that, if the track caused it, the heat had something to do with it, which opinion he based on the fact that after the track work was done, trains passed over this stretch of track Friday night, Saturday and Sunday until the time of the accident. He admitted it is not uncommon for rails on double track to creep with the current of traffic.

Roadmaster Haydon stated that the stakes set by the Assistant Engineer showed that they had to get better alignment at the south end of the curve on which the derailment occurred, and that the track would have to be thrown inward about 6 inches, or a distance varying from zero to 24 inches. He said they postponed the lining of this track to correct center until they considered it necessary to lay new rails and renew cross ties. The north end of the curve was in good line, but the south end was slightly irregular. During the early part of the work, the ballast was cleaned out from between the ties so it could be properly lined, and on Friday the track was lined to proper location, leaving it practically empty for the greater part of the distance. The lining of this curve embraced a distance of 54 rail lengths and he assumed that the track was thrown as much as 24 inches at center, shortening it .26 feet, or 3-1/8 inches. Since there were

54 joints in this distance, it would mean the closing of each joint to the extent of 1/16 inch, which allows for a change in temperature of approximately 30 degrees. The records of the Weather Bureau show that the maximum temperature Sunday was only five degrees higher than on the two preceding days. Under these conditions a difference 5 degrees in temperature would amount to 5/8 inch expansion to the track involved.

Section Foreman Hawkins stated that the general condition of the ties in this section was fairly good and in safe condition to carry traffic. When he quit work on Saturday night he inspected the track and it did not appear to be out of line at any point, but he noticed that it was unusually tight on the inside of the curve; he objected to the track being so tight, and thought that track in that condition, when without any ballast justified protection by a slow order. The Supervisor of Track did not see this track on the day after it was lined to new location, and the section foreman said he did not report the condition of the tight track and the necessity of a slow speed order over it to him, because he thought the matter was left to the judgment of the Supervisor of Track. The section foreman thought the derailment was caused by the track buckling at a point just about where they stopped getting out ballast.

Trackwalker Wright stated that about 1:30 p.m. he passed over the track where the derailment occurred and noticed nothing wrong with it.

While the cause of this derailment could not be definitely ascertained, it is believed to have been caused by the rails expanding and buckling under the train.

The investigation disclosed that the track at this point had been moved to the inside of the curve approximately two feet and the openings between the rails were thereby reduced, without proper allowance being made for the tightening of the rails by expansion, and the track was left without sufficient ballast after this work was done.

Rule 367 of the Maintenance of Way Book of Rules was not observed, which provides that:

> "The ballast shall be flush with the top of the ties for its whole length and shall slope down from the ends of the ties at the natural slope of the material."

Rule 370 provides that:

> "Open track shall be avoided as far as practicable and such track shall be watched carefully."

Track left in such condition as was this section of track is unsafe for the passage of trains at high speed, and Track Supervisor Whitehouse and Section Foreman Hawkins were negligent in leaving the track in this condition without providing adequate protection, either by slow order or flag.

By time card rule, a speed of 60 miles per hour for passenger trains is permitted on this division. The evidence showed that train No. 7 was travelling at a speed well within this limitation.

While no fatalities resulted from this accident, the fact that nearly all of the injuries occurred in the wooden car,

the frail superstructure of which was crushed by striking the bank of the cut, emphasizes the importance of steel equipment for the safety of passengers.

All the train employees involved were men with good records and at the time of the accident had been on duty one hour and twenty-five minutes. Supervisor of Track Whitehouse has been employed by this road for a period of 18 years, 14 years in his present capacity, with a clear record. Section Foreman Hawkins has been employed for 13 years in his present capacity, with a fair record of service.

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