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In re investigation of an accident which occurred on the
Illinois Central Railroad at Granger, Ill.,
on January 28, 1918.

February 25, 1918.

On January 28, 1918, there was a derailment of a passenger train on the Illinois Central Railroad at Granger, Ill., resulting in the death of 4 passengers and the injury of 111 passengers, 12 employees and 4 other persons. After investigation of this accident the Chief of the Bureau of Safety reports as follows:

The Freeport District of the Wisconsin Division of the Illinois Central Railroad on which this accident occurred is a single-track line, extending between South Addison, Ill., and West Junction, Ill., a distance of 94.5 miles. The movement of trains is governed by time table and train orders, no form of block signals being in use. From a point one mile west of the point of derailment and proceeding east the track is tangent except for a 1° curve to the right, 850 feet in length, the east end of which is about 860 feet from the point of derailment. The grade is at first ascending at the rate of .5%, followed by a stretch of level track 1,200 feet long, after which it descends at the rate of .5% for 3,900 feet to the point of derailment. A fill begins just west of the initial point of derailment and increases in a distance of 800 feet to a height of about 25 feet at a bridge over a highway. Following the derailment of a westbound train on December 2, 1917, 1,800 feet of track in this vicinity was relaid with new 90-pound steel rails, 33 feet in length, rolled in November, 1917. New nine-treated pine ties were used, about 20 to the rail, with 12 to 18 inches of gravel ballast.

The train involved was eastbound passenger train No. 12, en route from Omaha, Neb., to Chicago, Ill. It consisted of 10 cars and locomotives 1085 and 1134, and was in charge of Conductor Benkert and Enginemen Rieger and Meyers. This train arrived at Freeport at 6.02 a.m., but was held until 11.55 a.m., as the track was blocked by snow. At Rockford, 30 miles east of Freeport, it received an order to run 6 hours and 30 minutes late, passed Manger at 2.08 p.m., and was derailed at Granger, 1.5 miles east of Manger at about 2.12 p.m. At the time of the accident it was running at an estimated speed of 35 to 40 miles per hour. The last trains to use the track prior to train No. 12 were a snow plow train and a double-headed extra, the latter being 1 hour and 15 minutes ahead of train No. 12. The weather was clear and cold.

The leading engine, No. 1085, was not derailed, and came to a stop on the east side of the highway bridge still coupled to the second engine, No. 1134, which stood on the bridge with all wheels except its

pony truck derailed. The mail car went off on the south side, running a distance of 300 feet, and landed on the highway in an upright position. The baggage car turned on its side, and the first chair car tilted over to the right at an angle of 75° , but the second chair car remained upright at the bottom of the fill. The five sleepers and the dining car went off the track to the north, the head sleeper stopping about 600 feet from the point of derailment, nearly down to the highway; the first four of these cars were on their sides and the last two listed to the left, the rear truck of the last car in the train remaining on the roadbed but was derailed. All these cars were of steel construction except the dining car. The track was torn up for a distance of 300 feet.

Examination of the engines showed that no damage was done to the leading engine, and it was at once returned to service. On engine 1134, the brakes were torn off the tender trucks, and the spring planks broken. The pony truck drivers and trailer on this engine were to gauge and nothing was found that could have caused the accident, but an examination showed that the pony truck had been off the track and down between the rails, both wheels on the right hand side being ground off on the outer edge of the tread.

An examination of the track showed that immediately preceding the point of derailment and extending 38 feet eastward the south rail had been forced out, reaching a maximum displacement of $1\frac{1}{4}$ inches. At the end of that distance the rail was again to gauge for a distance of 32 feet, when it was again forced outward, reaching a displacement of $3\frac{1}{2}$ inches in a distance of 36 feet, where the track was broken at a joint. The north rail was found forced outward, the displacement starting 8 feet before the first displacement of the south rail ended, and extending 48 feet, the maximum displacement being $1\frac{3}{8}$ inches, or 8 inches beyond the beginning of the second displacement of the south rail, from which point the north rail was torn out. At the break in the track the bolts of the angle bar were sheared off and forced partly out; the inside angle bar was missing and the outside one was bent out. There were no marks on the ties but at a point 8 feet from the break in the track a mark was found on a spike inside of the south rail, and there was a mark on the west or receiving end of the first rail beyond the break. None of the rails were broken and they remained upright where forced out. The outside spikes were bent, while the inside spikes were bright under the head, showing that they had been in contact with the rail. For a distance of 30 feet west of the point of initial displacement, the south rail was found to be about 1 inch lower than the north rail.

Both engines on train No. 12 are of the 4-6-2 type. Engine 1134 had a weight on drivers of 154,000 lbs. and a total weight of 247,500 lbs. The tender weight loaded was 180,100 lbs. additional and it had a capacity of 9,000 gallons of water and 16 tons of coal.

Engineer Rieger, on the leading engine of train No. 12, stated that he passed Manger about 2.08 p.m. and shut off steam before he reached the curve west of Granger, as he had an order to reduce speed to 25 miles per hour between mile posts 31 and 32, east of Granger. When he reached the straight track he felt the engine lurch toward the left and immediately set the air brakes in emergency. He then opened the cab window but could see nothing on account of the steam and smoke. At the time he felt the engine lurch he estimated the speed to be 35 or 40 miles per hour, but he did not know there had been a derailment until the train had stopped. He went over this track the night before on the leading engine of train No. 11 at a speed of about 50 miles per hour, but noticed no bad condition in the track.

Fireman Gray on the leading engine of train No. 12 stated that when they were passing through Granger he felt the engine give a swing to the left which was severe enough to throw him off his seat, and on looking back after the train stopped he saw the cars down the bank. He looked at his watch immediately after the accident, and it was between 2.12 and 2.13 p.m., and as they left Manger at 2.09 p.m., they consumed about 3 minutes making the two miles, which would be at a rate of 35 or 40 miles per hour. He had gone over this track on train No. 11 the night before at a speed of 50 or 55 miles per hour, and noticed nothing unusual.

Engineer Meyer, on engine 1154, the second engine of train No. 12, stated that he had an order to run 6 hours and 30 minutes late between Rockford and Chicago, and thought they left Coleman about 8 minutes late on that order. He could not see the leading engine, as the front cab window was boarded up, but he frequently looked out of the side window. They were running about 35 or 40 miles per hour and nothing out of the ordinary had taken place up to the time of the derailment. There first seemed to be a slight lurch to one side and then a severe drop, after which it was rough riding until they stopped. It seemed to him that the drop he felt was about a rail length or two west of where the derailment took place, but he could not say what part of his engine was first derailed, although it seemed to him that it had all been off and partly rerailed. There was no apparent "noising" of his engine, and he thought it was running unusually ^{well} for a double-header. It was cloudy and a strong wind was blowing, causing the snow to whirl badly on his side of the engine. When he knew there was something wrong he reversed his engine and applied the straight air brake, as the head man was controlling the train brake. He had been over this track on train No. 15 at the rate of 50 or 55 miles per hour the day previous and had never had any trouble with that piece of track.

Conductor Benkert of train No. 12 said he had received an order at Rockford to run 6 hours and 30 minutes late, and was running pretty close to time on that order. He did not know the scheduled speed of this train, but it was not running very fast, as he knew the snow plow was ahead and they were gaining on it. To the best of his judgment the speed was 35 to 40 miles per hour.

FlagmanAMENT of train No. 12 said that in going back to flag after the derailment he noticed no marks on the ties indicative of anything dragging.

Engineman McMurray of engine 1777, the leading engine of the snow plow train, which preceded train No. 12 about 1 hour and 15 minutes, stated that they were moving at about 25 or 30 miles per hour through Granger and that he noticed nothing unusual. On account of the snow he could not see the plow ahead of him.

Fireman Pinnow of engine 1777 stated that he felt a swing to the engine in the vicinity of Granger but is not certain where and it was nothing unusual.

Engineman Blanchard of the second engine on the snow plow stated he felt a little rough spot after getting around the curve west of Granger but there was nothing out of the ordinary.

Trainmaster Bought stated that he went east with the snow plow over this track ahead of train No. 12, the train consisting of a Russell snow plow ahead, pushed by two Mikado type engines, with two cabooses in the rear. He was in the cupola of the rear caboose going through Granger, and noticed nothing unusual in the riding of the train. He was notified of the accident on arrival at Broadview, and reached the scene of the accident about 2 hours after it occurred. On arrival he examined the track, in company with the roadmaster, and found that both rails had been forced out and that the track was broken at a joint. There were no flange marks on the ties except east of the broken joint, at which place there was a mark on the head of a bolt, and there was a slight chip off the west end of the first disconnected rail, as if something had struck it. The rail had not been turned over, but remained upright after it was forced out, and no rails were broken. The angle bars were not broken but bent and the bolts from the rail east of the break were missing. He stated further that both wheels on the right side of the engine truck on engine 1134 showed signs of having rubbed against something. He stated that he had been over this territory with the snow plow 6 or 8 times during the ten days previous to the accident and had noticed nothing wrong, nor had he received any information from crews as to any bad track in this vicinity. He estimated the speed of the snow plow as about 20 miles an hour.

Roadmaster Boland stated that he had passed over this piece of track once or twice daily for two weeks, most of the time in the cupola of the snow plow, and at no time had noticed any bad conditions at Granger. He was riding in the cupola of the snow plow on the day of the accident, directly over the north rail, and was looking for irregularities in the track, as the snow plow being without springs, is very sensitive. The flange shoes were up passing through Granger, on account of the crossings, and as the rail was clear of snow on the day of the accident, any irregularity in the track or anything out of the ordinary would have been noticed. He returned to the scene of the accident with Trainmaster Hought, who was present when the gauge was checked, at no point was the gauge more than 1/4 inch out. The line and surface approaching the point of derailment were good. His examination of the track showed that the south rail had been forced out for a distance of 50 feet as much as 1-1/4 inches; the north rail had then been forced out for an equal distance, the two distances overlapping about 10 feet. The south rail had then been forced out for a distance of 56 feet from 1 inch to 3-1/2 inches, at which point the track was broken. The bolts in the broken joint had the appearance of having been sheared off by a wheel and had been forced through the holes remaining in the angle bar that was on the outside of the rail. At the time of his inspection the inside angle bar was missing. The ties were all new, with the exception of 6 or 8 which were better than the average tie in the track, and which were about 110 feet west of the first mark showing that the wheels were on the ties. The track on which the derailment took place had all been rebuilt in the past 7 weeks, 90 lb. rails and new pine and oak ties having been used. Continuous rail joints were used on this track and were fully bolted. He stated that when track spreads from poor maintenance or construction, the spikes are usually forced over and not bent, but if the rail is forced out by some unusual strain, the spike is bent double. The outside spikes at Granger were found bent to an "U" shape, while the heads of the inside spikes were bright, showing contact with the rail.

Road Supervisor Pierce stated that he was riding in the cupola of the snow plow, directly over the south rail, and from this position any irregularity in the track would have been noticed by him. He had been over this track a number of times recently and was on train No. 11 on the Wednesday previous to the accident, at which time they were running about 50 miles per hour. The track then rode first-class and no irregularities had been reported to him by any engineers. He was present when the track was examined, and there were marks on the ties showing that the rail had been seated to gauge prior to the accident. No track level was used on the track on the night of the accident, but the surface of the track was taken on the morning following for a distance of one half mile west of the point

of derailment. He further stated that after the train was derailed in December all the track passed over by the wheels was relaid with new material whether the rails were damaged or not, 348 new ties being used and about 1,800 feet of track being thus replaced, starting 800 feet east of the curve. He surfaced the track personally the first time after it was laid and had an extra gang surface it later. He considered it a perfect piece of track and had found no indications of it getting rough in passing over it since it was relaid. The section foreman, who had been in charge of this section about two years, was considered a reliable man, no unusual conditions having been found in his territory.

Section Foreman Ringer stated that after the derailment to the train on December 2nd, most of the work in replacing the track had been done by extra foremen, but he had been over the track and tightened the bolts. He had had no trouble in holding this track in line, and in walking over this track the day before the accident, had observed no unusual conditions. He was at Kanger when train No. 12 passed him, at a speed he estimated as 65 miles per hour, and learning there that the train had been derailed, walked to Oranger, arriving not more than an hour after the accident happened. He looked over the track, found the rails forced out, but did not examine the spikes to see if they were bent. He had had no spread track nor track out of line or surface on his section, nor had he had any trouble with track heaving through Oranger. His instructions were to gauge up the track as soon as the snow plow passed, but he had noticed no bad effects since the plows have been operating. He had received no complaint about the track in this vicinity.

The investigation developed that the track in the vicinity of the derailment was in good condition and had been well maintained. As new ties and rails were laid through here in the early part of December, and the track had been kept in good condition, it seems probable that there could have been any failure of the track. The evidence of the crew on the snow plow, and of the crew on the train following the snow plow ahead of train No. 12, as well as the crews on high speed west-bound trains, indicated nothing unusual in the track.

The speed of train No. 12, which all agree as not being over 40 miles per hour, was not excessive and was well within the speed limit of 60 miles per hour permitted by time card rule.

This accident was caused by the track spreading, resulting in the derailment of the second engine and all the cars of train No. 12. What caused the spreading of the track was not determined.

The position of the rails which were not overturned but remained upright, indicated that they had been forced out bodily, either by something on the derailed train, or one of the preceding trains. As it is obvious that considerable force would be required to spread track

that was in as good condition as this track apparently was, only some of the larger parts of a car or engine could have done the damage. A close inspection of the locomotives showed no such part deranged, and the only marks indicating a derailment were on the truck wheels. It is not believed that the low spot noted just west of the point of derailment would have in itself caused the accident, but it might have been sufficient, in conjunction with some other cause which could not be definitely ascertained.

The crews of train No. 12, at the time of the accident, had been on duty about 3 hours.