

IN RE INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE
PENNSYLVANIA RAILROAD, NEAR LANCASTER, PA.,
NOVEMBER 17, 1919.

January 7, 1920.

On November 17, 1919, there was a derailment of a freight train on the Pennsylvania Railroad near Lancaster, Pa., which resulted in the death of two employees and the injury of one employee. The wreckage fouled the adjoining tracks and a passenger train collided with the wreckage shortly afterwards, resulting in the injury of six passengers and six employees. After investigation of this accident the Chief of the Bureau of Safety reports as follows:

That part of the Philadelphia Division of the Pennsylvania Railroad on which this accident occurred is known as the Lancaster Cut-Off; this cut-off is north of Lancaster and it extends in a general direction of east and west between DV Block Tower and CG Block Tower, a distance of 3 miles. The accident occurred near CG Tower, where the cut-off joins the main line east of Lancaster.

The Lancaster Cut-Off consists of three tracks which are designated, starting from the north side, as westward main, middle, and eastward main tracks. The middle track terminates a short distance west of CG Tower and from CG Tower eastward to ES Tower, the line is double-tracked. Movement of trains over these tracks is governed by an automatic block signal system.

The signals are of the semaphore type, 3-position, upper quadrant, and are located on bridges spanning the tracks, each signal being over the track it governs. At CG Tower there is a mechanical interlocking plant which controls the signals and switches at the junction of the line to Lancaster and the Lancaster Cut-Off.

The distant signals governing the approach of eastbound trains to CG Tower on both the eastward and middle tracks of the Lancaster Cut-Off are located on a signal bridge 4,797 feet east of DV Tower and 5,620 feet from the home signals at CG. The home interlocking signals for this line at CG Tower are semi-automatic and these signals are also located on a signal bridge.

In the eastward main track, at a point 269 feet east of the home signals, is located a derailing switch which is interlocked with the home signals and operated from CG Tower, the purpose of which is to prevent eastbound trains on the eastward main track from running past the fouling point of the middle track, when the route from the middle track to the eastbound main track is lined up. There is no derailing switch in the middle track.

At a point about 20 feet west of the distant signal governing the approach to CG Tower, an overhead highway bridge spans the track, parallel with the signal bridge. This overhead highway bridge obscures the view of the distant signal when an engineman is about 200 feet west of it and for this reason it is difficult for an engineman to observe this signal, especially when the range of vision is limited as in foggy weather. Its indication must be caught as the engine is passing under the highway bridge or between it and the signal bridge. Approaching the point of accident from the west the track is tangent for about 2 miles, with a grade slightly descending. At the time of the accident there was a heavy fog which limited the vision to about 100 or 150 feet.

Eastbound freight train extra 1137, en route from Harrisburg, Pa., to Jersey City, N. J., consisted of engine 1137, 39 cars and caboose, in charge of Conductor Womelsdorf and Engineman Flynn. It left Marysville Yard, Harrisburg, at 2:50 a. m., as extra 3400, being hauled by engine 3400, and proceeded to Columbia Yard, where, on account of a hot pony truck, engine 1137 was substituted for engine 3400. The train left Columbia Yard at 6:41 a. m., and at about 7:46 a. m., while traveling at a speed estimated to have been about 20 miles an hour, the engine and 9 head cars were derailed by running off the end of an open derailing switch about 180 feet west of CG Tower. The locomotive came to rest about 200 feet east of the switch, lying on its side to the right of the eastbound track; the wreckage of the 9 cars was spread out so as to obstruct both adjacent tracks. Engineman Flynn was killed and Brakeman McNally, who was riding on the engine, was fatally injured.

Eastbound passenger train No. 576 consisted of engine 3570, 1 mail car, 1 combination passenger and baggage car, 1 passenger coach, 2 Pullman cars and 1 dining car, in the order named, and was in charge of Conductor Stephens and Engineman Shaw. It left Harrisburg at 6:55 a. m., on time, passed DV Tower at 7:44a.m. 1 minute late, and at about 7:47 a. m., while running on the middle track, collided with the wreckage from extra 1137 which obstructed the middle track. The speed of train No. 576 at the time was estimated at from 5 to 8 miles an hour. The collision resulted in the derailment of overturning of engine 3570 and the derailment of the front truck of the mail car.

Towerman Harmon, on duty at CG Tower at the time of the accident, stated that the weather was very foggy and he could not see clearly a distance of more than 100 or 150 feet from the tower. He was positive that the signal system and interlocking plant were working properly both before and after the accident. He stated that the distant signal on the eastbound track was in caution position, the home signal was in stop position and the derail open from the time he had come on duty at 7:00a. m., and at no time did extra 1137 have a signal to proceed.

He had clear signals displayed for train No. 576. The signal indicators showed that the home signal for the eastbound main track was in stop position, but he had no indicator to show the position of the distant signal, although conditions were such that that signal was without doubt in caution position. Extra 1137 passed DV Tower at 7:41 a. m., and he observed the approach indication, showing that that train was approaching on the eastbound track, but he had no way of knowing at just what point it was. He stated it was 7:46½ a. m. when extra 1137 passed the home signal at danger; his attention was first attracted by a jar on the interlocking machine and levers, and, looking out of his window, he saw engine 1137 turning over. He stated that when extra 1137 passed the fouling point of the eastbound track, the home signal on the middle track at CG Tower automatically went to stop position, but as soon as he saw that extra 1137 had been derailed, he threw the levers to get the home signal on the middle track to stop position, as an extra precaution in case the signal had not automatically assumed that position. Train No. 576, running on the middle track, passed DV Tower at 7:44 a. m., having been given clear signals, and collided with the wreckage of extra 1137 at 7:47 or 7:47½ a. m. He stated that only 30 or 45 seconds intervened between the derailment and the collision, but he entered it on his records as one minute.

Conductor Wemelsdorf, of extra 1137, stated that the last stop made by his train was at Columbia Yard, where engine 1137 was substituted for engine 3400, after which a road test of air brakes was made; there was no occasion to use the brakes thereafter. The train proceeded very slowly on account of an unusually dense fog, which restricted the vision to about 2 car lengths, and he did not notice any of the signals. They had been running about 8 miles an hour from Long Park, west of the point of derailment, before entering automatic block territory, but after passing DV Tower the speed had been increased two or three times and it appeared to him that Engineman Flynn was more familiar with the territory protected by automatic block signals. He said they were approaching CG Tower at a rate of speed between 15 and 20 miles an hour, and estimated the speed at that time of derailment at 15 miles an hour. He was riding in the caboose and when he was 30 or 40 car lengths from the home signal, he felt what he thought was a heavy service application of the brakes, followed by the shock of sudden stop. He went out on the front platform of the caboose, but could not get off on the left side because of train No. 576 passing on the middle track. He said the engine of train No. 576 had already passed when he came out of the caboose and estimated its speed at between 20 and 30 miles an hour. He heard the air being applied on that train and soon afterward, the crash of collision. This was Engineman Flynn's first trip with him and he could give no reason for his passing the signal in stop position. Up to the time of the accident he had handled the train very carefully.

Fireman McManus, of extra 1137, stated that this was his second trip on this division. Because of his unfamiliarity with the track and his efforts to keep a hot fire, he did not observe any of the signals and was not certain as to the location of his train. He stated that they had been traveling about 7 or 8 miles an hour before getting on the main line, but thereafter the speed was increased to 15 or 20 miles an hour. As the train was passing through a number of switches, some conversation took place between Engineman Flynn and Brakeman McNally, the two having been calling clear signals. He could not say positively at what point Engineman Flynn called a clear signal, but to the best of his recollection, it was at DV Tower. He estimated that about 15 minutes had elapsed when Engineman Flynn called to him to jump, and at the same time applied the brakes in emergency, just before the engine left the tracks. No signal had been called to him in the meantime and no brake application had been made previous to the emergency application, at which time there was a loud exhaust of air from the brake valve, indicating that the brakes were operating properly. When the engineman called to him, he jumped from the left side of the engine, fell to the eastward track, being stunned in falling, got up and crossed the track, climbed up the embankment, over a fence and was part way across a field when he heard the crash of train No. 576 against the wreckage.

Rear Brakeman Norton, of extra 1137, stated that he assisted in making the air brake test at Marysville and was positive the brakes were operative throughout the train. A road test of the brakes was made after engine 1137 was coupled on at Columbia. He stated that the speed was increased after leaving DV Tower and they were approaching CG Tower between 15 and 18 miles an hour when the train came to a sudden stop. As soon as he could, he went out to flag. The passenger train was coming right behind, and he so on heard the crash of collision.

Engineman Shaw, of train No. 576, stated that after a terminal test of the air brakes was made at Harrisburg, he was notified that all the brakes in the train were working. He had made no stops between Harrisburg and the point of accident, but had slowed down almost to a stop approaching DV Tower; it was very foggy and at this point he could see ahead only about 100 feet and it was almost impossible to see signals. Coming into the cut-off at DV Tower he received a clear signal and also at the stockyard, where he and the fireman both called the signal. He stated that he shut off at that point and was drifting when approaching CG Tower. His train was running about 25 miles an hour when he passed the distant signal on the middle track; he was unable to catch the signal indication before passing under the highway bridge, but instead had to catch it between the highway bridge and the signal bridge, while looking up at an angle of about 45 degrees. He stated that the distant signal, No. 678, was in the clear position, which indicated to him that he had right of track to ES Tower, and he expected to find the home signal dis-

playing either clear or caution; approaching CG Tower he had his hand on the brake valve, ready to apply the brakes in case the signal at that point should be displaying a caution indication. He also stated that when passing signal 678, he noticed the indication displaying for the eastward main track, and it was stop. He was not aware of extra 1137 being on the eastward track until his train overtook it, at which time he looked out and noticed that it had come to a standstill. When he approached near enough to the home signal to see its indication through the fog, it was in stop position. He immediately applied the air brakes in emergency, felt them apply, and although the speed was checked considerably, there was not sufficient space in which to stop his train before colliding with the wreckage of extra 1137. He stated that his engine was not more than 1-1/2 car lengths from the signal when he made the emergency application and he did not see the wreckage of extra 1137 until after passing the signal.

Fireman Dadd, of train No. 576, stated that the weather was very foggy and while at times they could see a few car lengths ahead, at the time of the accident they were not able to see much over a car length ahead of the engine. He was looking out for signals and approaching DV Tower they came almost to a stop in order to see the signal indication. He stated that he caught the indication of distant signal 678 just before their engine passed the overhead bridge, and the signal indicated clear. He estimated they were running 25 or 30 miles an hour when the train passed extra 1137, when the latter train was between the water plug and the home signal. The caboose of the extra appeared to him to be just barely moving when they passed it. His engine was about 2 car lengths from the home signal when he saw it was in stop position and the head end of the engine was immediately under the signal bridge when Engineman Shaw applied the brakes in emergency. He estimated they were 3 or 4 car lengths beyond the signal when they struck the cars of extra 1137 and thought their speed at that time was 15 miles an hour. He was unable to get off the engine before it turned over.

Conductor Stephens, of train No. 576, stated that a terminal test of the air brakes was made before leaving Harrisburg and he and the engineman were advised that all the brakes were operating. He said the brakes were used in approaching DV Tower, which they passed at a speed of about 5 miles an hour; the fog was very thick and they almost stopped. The brakes appeared to hold well when approaching DV Tower and also at the time of the accident. Because of the fog he did not notice the signal indications. He was riding in the third car and was not aware that there was a freight train on the adjacent track until after the accident, the first intimation of which was when the brakes were applied in emergency when they were running about 25 miles an hour.

Brakeman Waters, of train No. 576, stated that the fog restricted the vision to about 1-1/2 car lengths. He had noticed

the freight train on the adjacent track, but when he had observed it, it looked to him as though it was standing still.

Brakeman Hoover, of train No. 576, stated that he was riding in the third car of the train with the conductor. He estimated the speed at about 30 miles an hour when the brakes were applied.

Air Brake Inspector Doyle and Mader, employed at Harrisburg engine house, stated that engine 3570 was given a thorough air brake test when on the inspection pit, the driving brake having a piston travel of 5 inches and the tender 6 inches; the brakes were in good condition.

Car Inspector Wagner and Byram stated that they inspected the brakes of train No. 576 while it was at the passenger station at Harrisburg. The piston travel did not exceed $7\frac{1}{2}$ inches on any of the cars, the brakes released properly, and the conductor and engineman were notified of the result of the test.

Engine Air Brake Inspector Heim, on duty at Columbia engine house, stated that engine 1137 was given regular engine house inspection of air brakes at 5 p. m. on November 16th. The gauge showed 70 pounds pressure after the test and he was certain that the brake cylinder pressure was normal in both service and emergency applications.

Signal Maintainer Eckman stated that he had inspected the switches at CG Tower at 7:00a. m., shortly before the accident. He had made an inspection in this territory on the 12th or 13th and had found everything all right. After the accident he first inspected the condition of the signals and later the interlocking machine. He found the signals set at stop and in proper working condition.

Signal Foreman of Maintenance Flowers stated that about 5 or 10 minutes after the accident he examined the signals at CG Tower, found them to be in proper position and the mechanisms in good condition. About 1 or $1\frac{1}{2}$ hours after the derailment the track circuit between the home and distant signals was tested out and he was convinced by the tests made that the apparatus was in proper working order, both before and after the derailment.

The investigation showed that the proper signals had been displayed governing the intended movement of these trains, and all testimony concerning the signal system was to the effect that it was working properly both before and after the accident. A thorough test made after the accident disclosed no irregularities which might have caused it to work improperly.

The members of the crew of extra 1137 testified that the fog was so dense that they were not certain of the location of

their train at the time the accident occurred. While the observation of the distant signal approaching the point of accident is made difficult by reason of the location of the highway bridge west of the signal, it was all the more difficult to observe the indication on the morning of the accident because of the heavy fog. This fact, taken in connection with the testimony of Fireman McManus, makes it appear highly probable that Engineman Flynn, who had made but a few trips over this portion of the road, either failed to observe, or mistook the indication of the distant signal and was not aware of the position of the home signal until his engine was directly at the latter signal, when he applied the brakes, but it was then too late to prevent his train from running off the derail.

This accident was caused by Engineman Flynn, of extra 1137, failing to observe the caution indication of the distant signal approaching CG Tower, and his failure to bring his train to a stop before passing the home signal, which was displaying a stop indication.

Due to his limited experience on this division, it is believed Engineman Flynn became lost in the fog. The heavy fog which existed at the time of the accident should have prompted him to operate his train with extreme caution, and if he had done so, he not only would have been less liable to miss the distant signal but he would no doubt have been able to bring his train to a stop after seeing the home signal in stop position and before reaching the derail. Had the distant signal on the eastbound main track been located in a more favorable position to have been seen from an approaching train, it is probable that Engineman Flynn, even under the unfavorable weather conditions, might have observed its indication; he then no doubt would have controlled his train properly, and the accident would have been averted.

This accident again calls attention to the necessity for some form of automatic train control device to guard against failure of enginemen to observe signals and to compel obedience to stop signal indications.

The evidence brought out at the investigation shows that about the time engine 1137 was derailed, train No. 576 was passing or had passed the rear end of extra 1137. This gave no opportunity for the trainmen of the extra to flag train No. 576, even had they known or suspected that their train was derailed and the middle track obstructed. Train No. 576 entered the block in which the accident occurred under a clear indication displayed by the distant signal and no means were available to warn Engineman Shaw of impending danger, such as would have enabled him to avert the collision of his train with the wreckage of extra 1137.

Engineman Flynn was promoted to engineman on the New York Division of this road in December, 1915. His service was

confined to that division until June, 1919, when he qualified on the physical characteristics of the Philadelphia Division. Since that time he had made one round trip each in the months of August and September, three round trips in the month of October, and was on the return lap of his first round trip in November at the time the accident occurred. Fireman McManus was making his second trip on this division.

The crew of extra 1137 had been on duty approximately 6 hours and 30 minutes, after a rest period of approximately 10 hours. The engine crew of train No. 576 had been on duty about the same length of time as the engine crew of extra 1137, but after a longer rest period. The train crew of train No. 576 had been on duty a little over 3 hours, with rest periods varying in individual cases from 12 to 20 hours.

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