

INTERSTATE COMMERCE COMMISSION
WASHINGTON

REPORT OF THE DIRECTOR
BUREAU OF SAFETY

ACCIDENT ON THE
PENNSYLVANIA RAILROAD

FARMINGDALE, N. J.

JUNE 9, 1940

INVESTIGATION NO. 2431

SUMMARY

Inv-2431

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| Railroad: | Pennsylvania |
| Date: | June 9, 1940 |
| Location: | Farmingdale, N. J. |
| Kind of accident: | Derailment |
| Train involved: | Passenger |
| Train number: | 834 |
| Engine number: | 1381 |
| Consist: | 2 cars |
| Speed: | 45 m. p. h. |
| Operation: | Timetable, train orders and manual-block system |
| Track: | Single; tangent; foot of 0.105 percent descending and 0.44 percent ascending grades westward |
| Weather: | Light rain |
| Time: | 8:40 p. m. |
| Casualties: | 2 killed; 25 injured |
| Cause: | Washout |

Inv-2431

July 16, 1940

To the Commission:

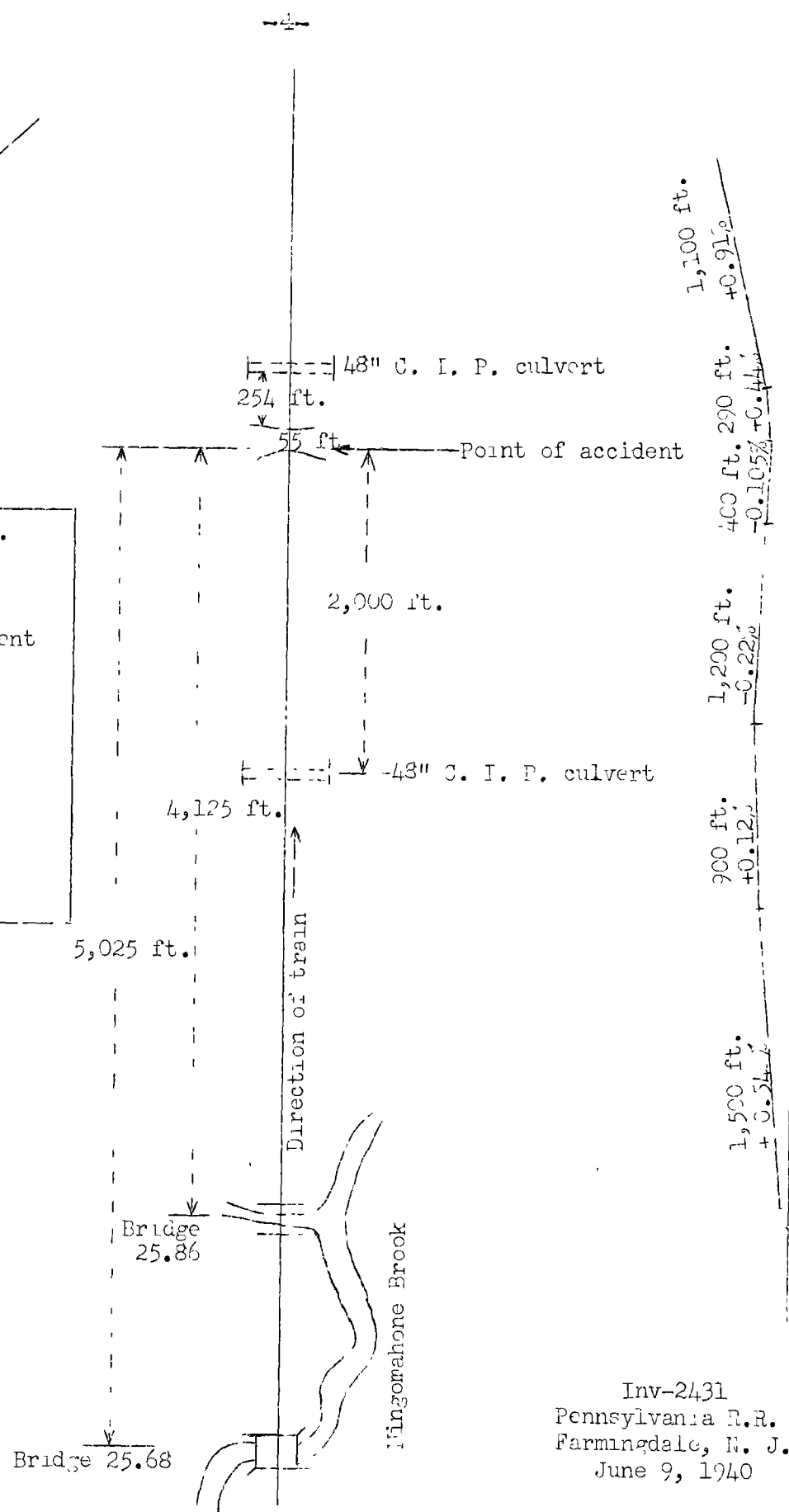
On June 9, 1940, there was a derailment of a passenger train on the Pennsylvania Railroad near Farmingdale, N. J., which resulted in the death of 2 employees and the injury of 25 passengers. The investigation of this accident was made in conjunction with representatives of the New Jersey Board of Public Utility Commissioners.

Location and Method of Operation

This accident occurred on that part of the New York Division which extends between Midway and Sea Girt, N. J., a distance of 33.3 miles. In the vicinity of the point of accident this is a single-track line over which trains are operated by timetable, train orders and a manual-block system. The accident occurred at a point approximately 2 miles east of Farmingdale. The track is tangent from Farmingdale eastward to the point of accident and some distance beyond. The grade for east-bound trains is, successively, 0.54 percent ascending a distance of 1,500 feet; 0.12 percent ascending, 900 feet; 0.22 percent descending, 1,200 feet; 0.105 percent descending, 400 feet to the point of accident; 0.44 percent ascending, 290 feet; and 0.91 percent ascending, 1,100 feet.

In the immediate vicinity of the point of accident there is swamp land on each side of the track, but from 1/4 to 1/2 mile on the north side the terrain rises to a higher level. The roadbed is on a fill of sand and gravel about 4 feet in height. The drainage is from the north to the south side of the track. Bridge 25.68, about 21 feet in length, and bridge 25.86, about 15 feet in length, located, respectively, 5,025 feet and 4,125 feet west of the point of accident, and two 4-foot cast-iron-pipe culverts, located 2,000 feet and 309 feet, respectively, west and east of the point of accident, provide drainage through the fill. Two branches of Mingomahone Brook pass under the bridges. Each bridge and each culvert drains a definite area. The area drained by the culvert 309 feet east of the point of accident is approximately 1 square mile. The flow-line of this culvert is at the lowest point of ground on the north side, but the lowest point of the track is 282 feet west of this culvert; the accident occurred at the latter point. Drainage ditches are provided on each side of the track.

- o Sea Girt, N. J.
0.6 mi.
- o Monasquan
5.3 mi.
- X Point of accident
2.0 mi.
- o Farmingdale
7.6 mi.
- o Freehold
4.7 mi.
- o Englishtown
6.8 mi.
- o Jamesburg
5.8 mi.
- o Midway, N. J.



Inv-2431
 Pennsylvania R.R.
 Farmingdale, N. J.
 June 9, 1940

The track structure consists of 130-pound rail, 39 feet in length, laid on 22 hardwood ties to the rail length; it is spiked with two anchor and two holding spikes per tie, fully tieplated, and ballasted with about 18 inches of cinders. The track is well maintained.

Rule 829 of the Book of Operating Rules reads in part:

(Track Foremen)

* * * and during heavy storms he must detail sufficient force to watch the railroad and take every precaution to prevent accidents.

* * *

The maximum authorized speed for passenger trains is 60 miles per hour.

A light rain was falling at the time of the accident, which occurred about 8:40 p. m.

Description

No. 834, an east-bound passenger train, with Conductor Thompson and Engineman Ford in charge, consisted of one baggage-passenger car and one coach, hauled by engine 1381, of the 4-4-2 type. This train departed from Midway, 24.9 miles west of Farmingdale, at 8:03 p. m., according to the train sheet, left Farmingdale at 8:34 p. m., on time, and, at a point about 2 miles beyond, was derailed at a washout while moving at a speed estimated to have been 45 miles per hour.

The engine with tender attached stopped on its left side at the north side of the track opposite the culvert located 309 feet east of the point of derailment; the engine struck and demolished the masonry head-wall of the culvert and broke off a section of the culvert. The engine was badly damaged; the main frame of the engine was broken on each side just ahead of the cylinders; the engine truck became disengaged, continued on the track, and with only the front wheels derailed stopped 231 feet beyond the engine. The first car stopped 8 feet north of the track with its front end 48 feet to the rear of the tender; this car leaned at an angle of 45 degrees and was parallel to the track. The second car stopped in upright position on the roadbed 18 feet to the rear of the first car and about 10 feet east of the washout.

The employees killed were the engineman and the fireman.

Summary of Evidence

Conductor Thompson stated that at Trenton, the initial terminal for his train, the air brakes were tested, and they functioned properly en route. He had not received any order or instruction to run carefully or to look for high water. He did not observe any indication of rain until his train reached Englishtown, 12.3 miles west of Farmingdale, at which point he observed that the platforms were wet. A light rain was falling at Farmingdale. The train was moving at a speed of about 45 miles per hour when it became derailed. He did not feel an application of the air brakes prior to the derailment. Immediately after the accident he observed that the water was up to the ties. He had worked in this territory 30 years and during this period there had not been any trouble with high water.

The statement of Baggage man Reynolds practically corroborated that of the conductor. After the accident he observed that the track to the rear of the train was washed out and water was rushing through the washed-out area. He had deadheaded on No. 835 from Long Branch, 20.1 miles east of Farmingdale, to Trenton on the afternoon of the day of the accident. It was raining at 4:50 p. m., when the train left Long Branch, and the rain was unusually heavy between that point and Sea Girt, 8.4 miles east of Farmingdale. Between Asbury Park and Avon, 6.1 miles and 4.2 miles respectively east of Sea Girt, the water was running over the track, but the storm was not so severe between Sea Girt and Farmingdale, and he did not observe any high water as the train passed through Farmingdale at 5:42 p. m. After No. 835 left Freehold, 7.6 miles west of Farmingdale, he observed a dark cloud. The last point where he observed rain on that trip was at Englishtown. Before No. 834 departed from Trenton he told the engineman about the flood condition at Asbury Park.

The crew of No. 835, a west-bound passenger train, the last train prior to No. 834 to pass the point of accident, stated that as their train left Long Branch there was a hard rain, which increased as the train proceeded westward on the New York & Long Branch Railroad to Sea Girt. Slow orders were received at two points en route on this line on account of water over the track, and high-water conditions extended practically the entire distance to Sea Girt. From Sea Girt to Farmingdale there was a continuous downpour, but there was no high water, and no rough condition of the track. The operator at Farmingdale inquired concerning conditions on the New York & Long Branch Railroad, and he was advised that the water was above the track.

Clerk-Operator Shinn, at Farmingdale, stated that he went on duty at 2:45 p. m. The weather was threatening but it did not rain until 5 p. m., at which time there was a light rain that continued until No. 835 arrived at 5:42 p. m. Immediately after this train departed, although it was not raining at Farmingdale, he could see that rain was falling in torrents about 1/2 mile southward on the Central Railroad of New Jersey, which crosses the Pennsylvania Railroad at right angles at Farmingdale. At 6:33 p. m., when C. R. R. of N. J. No. 4262 arrived at Farmingdale, the crew reported a heavy storm at Lakewood, 7.2 miles south of Farmingdale and 6.5 miles southwest of the point of accident. The operator reported this information to both the P. R. R. dispatcher and the C. R. R. of N. J. dispatcher. The rain was intermittent at Farmingdale, and there was a light rain at the time No. 834 departed, but at no time was there any abnormal condition. At 8:40 p. m. the operator, hearing a tingle on his telephone, discovered that it was out of order; sometime later he learned of the accident.

Dispatcher Kiley stated that the operator at Farmingdale advised him of the rain at that point, but at no time had he received any information concerning track conditions or heavy rainfall that would affect the movement of trains between Farmingdale and Sea Girt. He had been advised about the high-water conditions in the Long Branch territory. Between 8 and 9 p. m. the operator at Sea Girt informed him that there had been but little rain at that point.

Track Foreman Brown, in charge of the section on which the accident occurred, stated that he resides at Manasquan, 5.8 miles east of the point of accident, and that he was at his home on the day of the accident. It started to rain about 3 p. m., and there were intermittently heavy and light showers until about 7:30 p. m., but the rainfall did not appear sufficient to require patrolling of the track. Between 5:30 and 6 p. m. he saw black clouds. He arrived at the scene of the accident about 9:15 p. m. and found that 50 feet of track had been washed out; from his observations he was of the opinion that there had been a cloudburst. He had patrolled the track on the day prior to the accident and observed that the culvert just east of the point of accident was clear and in good condition. He had been in charge of this section 32 years and during this period there had not been a washout at that point.

Track Supervisor Tuohey stated that he resides at Jamesburg, about 19 miles west of Farmingdale. On the day of the accident the rainfall at Jamesburg was not sufficiently heavy to cause him any concern about the track. Track foremen are instructed to patrol the track whenever they consider it necessary to do so.

Division Engineer Fox stated that the washout extended along the track a distance of 55 feet; the ballast and the sub-grade fill were washed out to the level of the ground, a depth of 4 feet. All the ties were missing, and the rails were spread and broken. When he arrived the water had fallen to some extent; the water was passing through the washed-out area at a level of about 3 feet below the original location of the top of the rail. Levels taken indicate that the base of the rail at the point of washout, which was at the lowest point of grade, was higher than the top of the inside of the 4-foot culvert located 309 feet east of the point of derailment and about 12 inches higher than water marks on poles east and west of this culvert. He stated that the water had risen only 2.88 inches above the top of the culvert; this indicated that the culvert was taxed only slightly above its capacity. He thought that probably the water collected in the area east and west of the point of washout, ran along the fill to the low point of the grade, and scoured the ballast section; this action resulted in the weakening of the track structure. The cribs were well filled and the ballast was practically against the base of the rail. The track was well drained and in satisfactory condition for the authorized speed. The area drained by the culvert involved is approximately 1 square mile. Based upon a rainfall of 2 inches per hour, which should cover unusual storms and which, according to the Climatic Summary of the United States, was exceeded slightly only twice between 1915 and 1930, and using a coefficient of 0.15, which is proper for the character of the surface drained, the rate of discharge is 80 cubic feet per second; this volume of water would require a pipe 4 feet in diameter, as was provided in this case. Division Engineer Fox stated that later he traveled on the roads around the entire drainage area and saw no unusual condition other than evidence of a very heavy rainfall. Two residents of Carmerville, which is located a short distance north of the washout, stated to him that the heaviest rain they had ever seen in that locality fell between 5 and 6 p. m. An earth dam retaining a pond 50 feet wide, 100 feet long, and 3 feet deep had washed out. This area drains to the culvert involved. A garage attendant at Farmingdale told him that during the height of the storm he had not noticed anything unusual, but when called to assist stranded cars on the road south of the track he found cars standing hub deep in water; this indicated that the storm was localized east of Farmingdale. The result of conversations with persons living in the vicinity of Allaire and Allenwood, located respectively 1.25 miles and 3 miles east of the point of accident, indicated that the center of the storm was west of those points.

Signal Maintainer Gibson, who lives at Manasquan, stated that about 6:15 p. m. he departed in his automobile to check the bells and flashing lights at road crossings, in accordance with instructions to make a check after each electrical storm. He inspected the crossings in the surrounding country and did not see any evidence of high water, but at no time was he closer than 1 or 2 miles to the point of accident. Learning of the accident, he proceeded to the point of washout. The conditions indicated that a cloudburst had occurred in the immediate vicinity.

Road Foreman of Engines Hess stated that he inspected engine 1381 at the scene of accident and found the throttle three-fourths open and the automatic and independent brake-valves in running position; these facts indicated to him that the engineman did not see the washout in time to take action to stop the train.

Information furnished by the official weather observer at Freehold, N. J., for June 9, 1940, showed that the rainfall for about 60 minutes was as follows: Freehold, 1.21 inches; Long Branch, negligible; and Asbury Park, 2.75 to 3 inches. Apparently the storm moved westward from Asbury Park and through a point about 1 mile south of Farmingdale. Records for the past 10 years indicate that the heaviest rainfall at Freehold in a 24-hour period was 4.51 inches.

Observations of the Commission's Inspectors

The Commission's inspectors observed that about 8 inches of water was passing through the culvert east of the washout. There was no evidence of a culvert block at this point; on each side of the track the ground was dry in most of the area. Several persons residing at Carmerville stated that between 5 and 6 p. m. the heaviest rainfall they had ever experienced occurred in that locality.

Examination of the track a distance of 1 mile east and 1 mile west of the washout disclosed the track to be in good condition. There was no evidence of the roadbed or the ballast being washed out except at several points where the edge of the cinder-ballast shoulders were scoured slightly by water. There was evidence that the drainage ditches had been carrying a considerable amount of water. The ties from the washed-out section of track were found south of the washout; the spikes were partly withdrawn.

Discussion

According to the evidence, No. 834 was moving at a speed of 45 miles per hour when the derailment occurred. The maximum authorized speed in this territory was 60 miles per hour. The members of the crew did not have an order advising them of

any abnormal track condition. Subsequent to the accident a section of the fill 55 feet long was found to be washed out to a depth of 4 feet; water was flowing from the north side to the south side of the track through this section. After the accident the brake valves on the locomotive were found to be in running position and the throttle was found to be about three-fourths open; these conditions indicate that the engineman and the fireman, who were killed in the accident, did not observe the abnormal condition in time to take action to stop the train.

Several railroad employees observed rain at various points a few miles distant from the point of accident but the rainfall was not excessive. No railroad official or employee had knowledge of the extent of rainfall in the vicinity of the point where the accident occurred. As the result of observations made subsequent to the accident, it was disclosed that a storm of cloudburst proportions had occurred in a small area which included the scene of the accident. Persons residing nearby stated that this was the heaviest rainfall experienced in that vicinity.

According to the Climatic Summary of the United States, 2 inches of rainfall per hour in the area involved was exceeded slightly only twice between 1915 and 1930. Officials of the carrier computed the size of the drainage opening through the fill on the basis of 2 inches of rainfall per hour. A culvert 4 feet in diameter, which the division engineer said was sufficient for this volume of water, had been provided. Prior to the day of the accident this culvert had been adequate, and during the past 32 years there had not been a washout at this point. On the day before the accident the section foreman inspected the culvert involved and found it to be clear and in good condition. In this instance it appears that the culvert was not adequate for the excessive amount of rainfall; marks found subsequent to the accident indicated that the water had risen 2.83 inches above the opening in the culvert. The washout occurred at the foot of a 0.105 percent descending grade and a 0.44 percent ascending grade. Since the culvert involved was on the 0.44 percent ascending grade and was 262 feet distant from the lowest point of the track surface, it follows that the surface of the track at the culvert was 1.23 feet higher than the surface of the track at its lowest point. Since there were indications that the water had scoured the north edge of the ballast section from the culvert involved to the point of washout, it appears probable that the water in excess of that which could pass through the culvert was diverted along the north side of the track toward the lowest point in the grade, during which process it scoured and weakened the sand and gravel subgrade and the cinder ballast to such extent that the fill was washed out a distance of about 55 feet.

Conclusion

This accident was caused by a washout.

Respectfully submitted,

S. N. MILLS,
Director.