

INTERSTATE COMMERCE COMMISSION
WASHINGTON

INVESTIGATION NO. 2621
THE BALTIMORE & OHIO RAILROAD COMPANY
REPORT IN RE ACCIDENT
NEAR DORFEE, W. VA., ON
AUGUST 23, 1942

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SUMMARY

Railroad: Baltimore & Ohio
Date: August 23, 1942
Location: Dorfee, W. Va.
Kind of accident: Derailment
Train involved: Freight
Train number: 87
Engine number: 2814
Consist: 25 cars, cabooses
Speed: 25 m. p. n.
Operation: Timetable and train orders, and
manual-block system for trains
following passenger trains
Track: Single; 4° curve; 0.03 percent
descending grade westward
Weather: Cloudy
Time: About 7:55 p. m.
Casualties: 3 killed
Cause: Accident caused by undermining of
a bridge pier by flood water

INTERSTATE COMMERCE COMMISSION

INVESTIGATION NO. 2621

IN THE MATTER OF MAKING ACCIDENT INVESTIGATION REPORTS
UNDER THE ACCIDENT REPORTS ACT OF MAY 6, 1910.

THE BALTIMORE & OHIO RAILROAD COMPANY

October 26, 1942.

Accident near Dorfee, W. Va., on August 23, 1942, caused
by the undermining of a bridge pier by flood water.

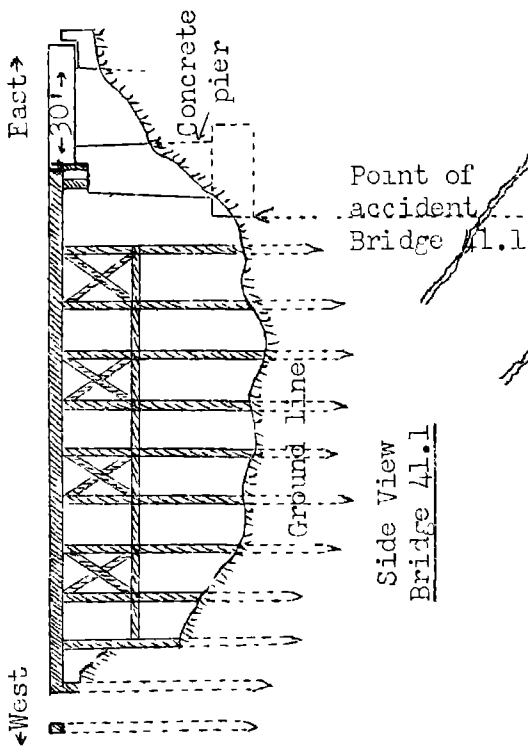
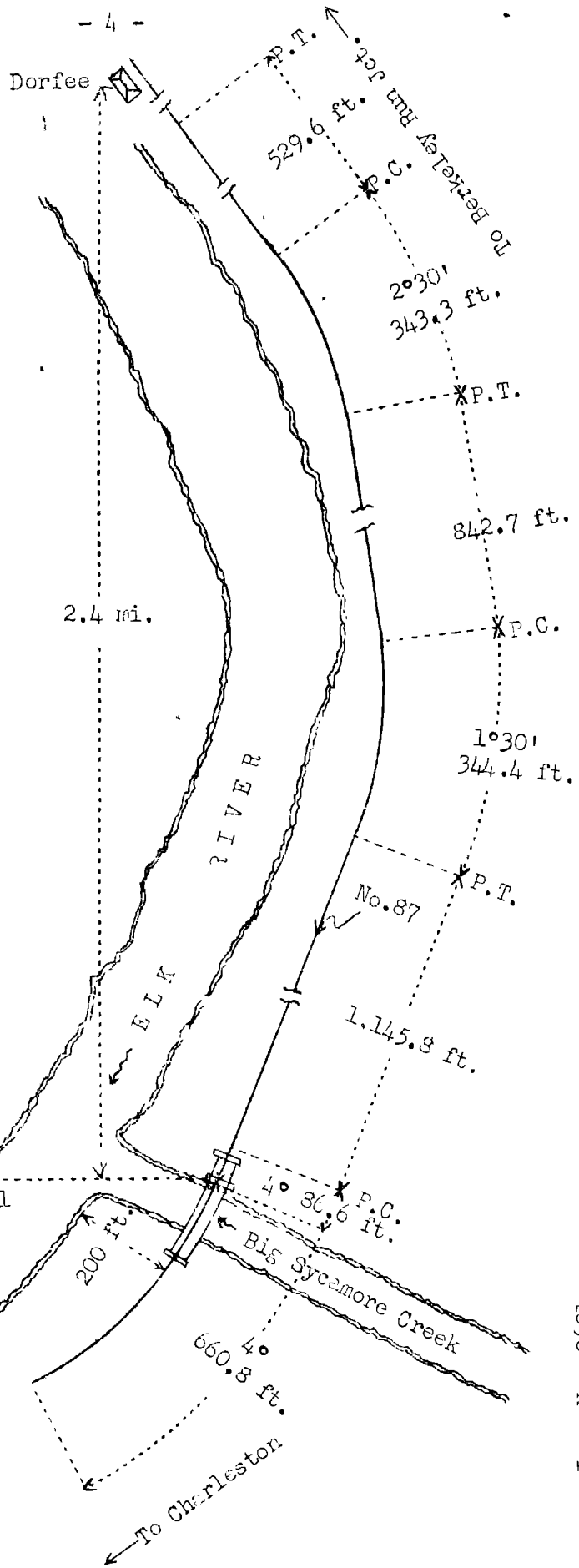
REPORT OF THE COMMISSION¹

PATTERSON, Commissioner:

On August 23, 1942, there was a derailment of a freight train on the Baltimore & Ohio Railroad near Dorfee, W. Va., which resulted in the death of three employees.

¹Under authority of section 17 (2) of the Interstate Commerce Act the above-entitled proceeding was referred by the Commission to Commissioner Patterson for consideration and disposition.

○	Berkeley Run Jct, W. Va.	95.5 mi.
○	Gassaway	40.9 mi.
○	Clay	8.0 mi.
○	Dorfee	2.4 mi.
X	Point of accident	40.5 mi.
○	Charleston, W. Va.	



Inv. No. 2621
 Baltimore & Ohio Railroad
 Dorfee, W. Va.
 August 23, 1942

Location of Accident and Method of Operation

This accident occurred on that part of the Monongah Division designated as the Grafton and Charleston Sub-division and extending between Berkeley Run Jct. and Charleston, W. Va., a distance of 127.3 miles. In the vicinity of the point of accident this is a single-track line over which trains are operated by timetable and train orders, and a manual-block system for trains following passenger trains. The accident occurred at Bridge 41.1, which spans Big Sycamore Creek at a point 2.4 miles west of Dorfee. As the point of accident is approached from the east there are, in succession, a tangent 529.6 feet in length, a $2^{\circ}30'$ curve to the right 343.3 feet, a tangent 842.7 feet, a $1^{\circ}30'$ curve to the right 344.4 feet, a tangent 1,145.8 feet, and a 4° curve to the right 86.6 feet to the point of accident and 660.8 feet beyond. The grade for west-bound trains is, successively, 0.19 percent descending 500 feet, 0.015 percent ascending 1,000 feet, 0.23 percent descending 600 feet, and 0.03 percent descending 1,698.8 feet to the point of accident.

Immediately east of Bridge 41.1 the track structure consists of 85-pound rail, 33 feet in length, laid on 18 treated ties to the rail length; it is fully tieplated, single-spiked on tangents and double-spiked on curves, and is laid on 12 to 18 inches of cinder ballast.

In the vicinity of the point of accident the track parallels the south bank of Elk River. At a point 200 feet north of Bridge 41.1 Big Sycamore Creek empties into Elk River.

Bridge 41.1, reconstructed in 1939, was 156.6 feet long. The east end of the bridge consisted of a 30-foot open-deck steel-girder span supported on an abutment and a pier. The abutment was of masonry construction 4.4 feet by 12 feet. The pier was of masonry construction encased in reinforced concrete, and was 17.8 feet high above the footing, 15 feet wide at the top and 22 feet wide at the bottom, 10 feet thick at the top and 14 feet thick at the bottom. The footing was 26 feet long, 19.6 feet wide and 5.5 feet thick, and extended 2.5 feet below the ground line. The girder was constructed of web plates 48 inches wide and $3/8$ inch thick, with cover plates $1/2$ inch by 12 inches, and was braced with four 3-inch by 3-inch by $3/8$ -inch angle cross frames and three longitudinal braces 3-inch by 3-inch by $3/8$ -inch. Each end of the span rested on an 8-inch by 16-inch treated timber 11.9 feet long. The remainder of the bridge, which extended westward from the pier to the west bank, a distance of 126.6 feet, was of timber construction and consisted of a pony bent 6 feet high resting on the pier, and 10 bents spaced from 11.09 feet to 14 feet apart. Each bent consisted of 4 treated piles driven to a penetration of 20 to 25 feet. The bents were sway braced. The caps were 12 inches by 14 inches by 14 feet. Three-ply stringers were used throughout, except on the north side between the pier and the first bent

and between bents eight and nine where 4-ply stringers were used. The ties were spaced 14 inches center to center. The maximum height of the trestle was 34 feet. All wooden members of the trestle except a few stringers were treated.

Instructions governing the maintenance-of-way department read in part as follows:

TRACK FOREMEN

128. (b) He has charge of the repairs on his section, and is responsible for the safety of the track, tunnels, bridges and culverts.

* * *

(g) * * * during heavy storms he must detail enough men to watch the road and take every precaution to prevent accident.

* * *

In the vicinity of the point of accident the maximum authorized speed for freight trains is 25 miles per hour.

Description of Accident

No. 87, a west-bound third-class freight train, departed from Gassaway, 48.9 miles east of Dorfee, at 4:15 p. m., according to the dispatcher's record of movement of trains, 2 hours 45 minutes late. After some cars were set out and others added, this train, consisting of engine 2814, 14 loaded and 11 empty cars and a caboose, departed from Clay, 8.0 miles east of Dorfee, at 7:30 p. m., 4 hours 14 minutes late, passed Dorfee, and while moving at an estimated speed of 25 miles per hour it was derailed at Bridge 41.1.

The engine and its tender, remaining coupled, stopped on their left sides on the creek bed about 80 feet west of the west face of the pier, at an angle of about 30 degrees to the track and with the driving wheel assembly against the east pile of the ninth bent. The engine pilot, the front deck casting and the engine-truck frame were demolished and the engine and tender were otherwise badly damaged. The first car stopped on its right side on the creek bed with its front end about 85 feet east of the west face of the pier and 30 feet south of the bridge. The third and fifth cars stopped upright with their east ends on the cab and boiler of the engine and at right angles to the bridge. The second car stopped on its right side on top of the tender and at right angles to the bridge. The sixth car stopped on its right side on top of the second car and at an angle of about 15 degrees to the bridge. The fourth car stopped upright on the creek bed at right angles to the bridge and immediately behind the second car. The seventh car

stopped upright on the pier at an angle of about 45 degrees to the bridge. The eighth car stopped upright on the creek bed about 6 feet north of the north side of the pier and in line with the bridge. The ninth and tenth cars stopped upright on the creek bed, east of the east face of the pier and at right angles to the bridge. The eleventh car stopped upright on the creek bed with its front end about 18 feet south of the south side of the pier. The trucks of the 11 derailed cars were detached and 8 pairs were on the creek bed west of the pier and 14 pairs between the pier and the east abutment. All the derailed cars were considerably damaged.

It was cloudy at the time of the accident, which occurred about 7:55 p. m.

The employees killed were the engineer, the fireman and the front brakeman.

Data

The watershed drained by Big Sycamore Creek contains 32.2 square miles. Usually the creek carries little water; however, prior to the accident there was a heavy rainfall and at the time of the accident the water at Bridge 41.1 rose to a height of 15 feet below the base of the rails.

According to information furnished by the railroad, the bridge involved consisted originally of three girder spans, but in 1932 the west two girders were washed out, and a pile trestle was substituted. During 1939 four bents of the bridge failed because of high water.

Discussion

No. 87 was moving on a 4-degree curve to the right at an estimated speed of 25 miles per hour, which is the maximum authorized speed for freight trains in the territory involved, when the engine and the first 11 cars became derailed. The conductor and the flagman, who were the only surviving members of the crew, stated that as their train was approaching the point where the accident occurred the train was riding smoothly, and that the track immediately east of the bridge was in good condition. The brakes became applied in emergency just prior to the time the train was derailed at Bridge 41.1.

After the accident, the pier supporting the west end of the girder span leaned to the west at an angle of about 30 degrees and the west end of the girder was at the bottom of the east face of the pier. About 4 feet of the top of the pier was broken off. The piling and the decking of the bridge were destroyed, except the two most westerly bents. The front deck-casting and the engine-truck frame of the engine were demolished. The trucks of the 11 derailed cars were detached. The condition of the bridge and the positions of the engine and the equipment after the accident indicated that at the time the engine moved

upon the bridge the pier leaned to the west sufficiently to unseat the west end of the girder, and the girder slipped downward and was suspended between the east face of the pier and the east abutment. Apparently the engine truck struck the upper part of the pier and the pony bent, and then the general derailment followed. The investigation disclosed that flood water had undermined the pier a considerable distance below its footing. The bottom of the footing of this pier extended about 3 feet below the normal ground line.

Throughout a distance of 1,145 feet east of Bridge 41.1, there was an unobstructed view of the bridge. Since both enginemen and the front brakeman were killed in the accident it could not be determined when they first became aware of the defective condition of the bridge, but apparently the engine was close to the east end of the bridge as the brakes were not applied until just before the accident occurred.

During an inspection of the track in the vicinity of the point of accident the section foreman passed over Bridge 41.1 about 4 hours 30 minutes prior to the time the accident occurred. Water was rising in Big Sycamore Creek, but no unusual condition of the bridge was observed. Extra 2912 West passed over Bridge 41.1 about 4 hours prior to the time the accident occurred and the crew of that train found the bridge to be in normal surface and alinement. Two near-by residents were at the west end of Bridge 41.1 about 30 minutes before the accident occurred. They said that the creek had risen to flood stage at that time and that a considerable amount of debris was lodged against the piling. One of these residents saw the pier start to lean westward, and made an attempt to notify the section foreman, but the accident occurred before he was able to do so.

The level of the water at flood stage in the vicinity of the bridge was considerably higher than the level of the water in Elk River, about 200 feet distant, because Elk River had not risen above its normal level. Undoubtedly this difference in levels caused the water in Big Sycamore Creek to flow rapidly and to scour the footing of the pier.

Cause

It is found that this accident was caused by the undermining of a bridge pier by flood water.

Dated at Washington, D. C., this twenty-sixth day of October, 1942.

By the Commission, Commissioner Patterson.

(SEAL)

W. P. BARTEL,
Secretary.