

INTERSTATE COMMERCE COMMISSION
WASHINGTON

INVESTIGATION NO. 3168
NORFOLK AND WESTERN RAILWAY COMPANY
REPORT IN RE ACCIDENT
AT GENNETT, OHIO, ON
FEBRUARY 20, 1948

SUMMARY

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Railroad:	Norfolk and Western
Date:	February 20, 1948
Location:	Gennett, Ohio
Kind of accident:	Derailment
Train involved:	Passenger
Train number:	26
Engine number:	607
Consist:	6 cars
Speed:	77 m. p. h.
Operation:	Timetable, train orders and automatic block-signal system
Tracks:	Double; tangent; 0.3 percent ascending grade eastward
Weather:	Clear
Time:	11:17 a. m.
Casualties:	1 killed; 44 injured
Cause:	Train entering turnout to siding at excessive rate of speed, as result of failure to obey automatic block-signal indications

INTERSTATE COMMERCE COMMISSION

INVESTIGATION NO. 3168

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

NORFOLK AND WESTERN RAILWAY COMPANY

April 6, 1948

Accident at Gennett, Ohio, on February 20, 1948, caused by a train entering a turnout to siding at an excessive rate of speed, as a result of failure to obey automatic block-signal indications.

REPORT OF THE COMMISSION¹

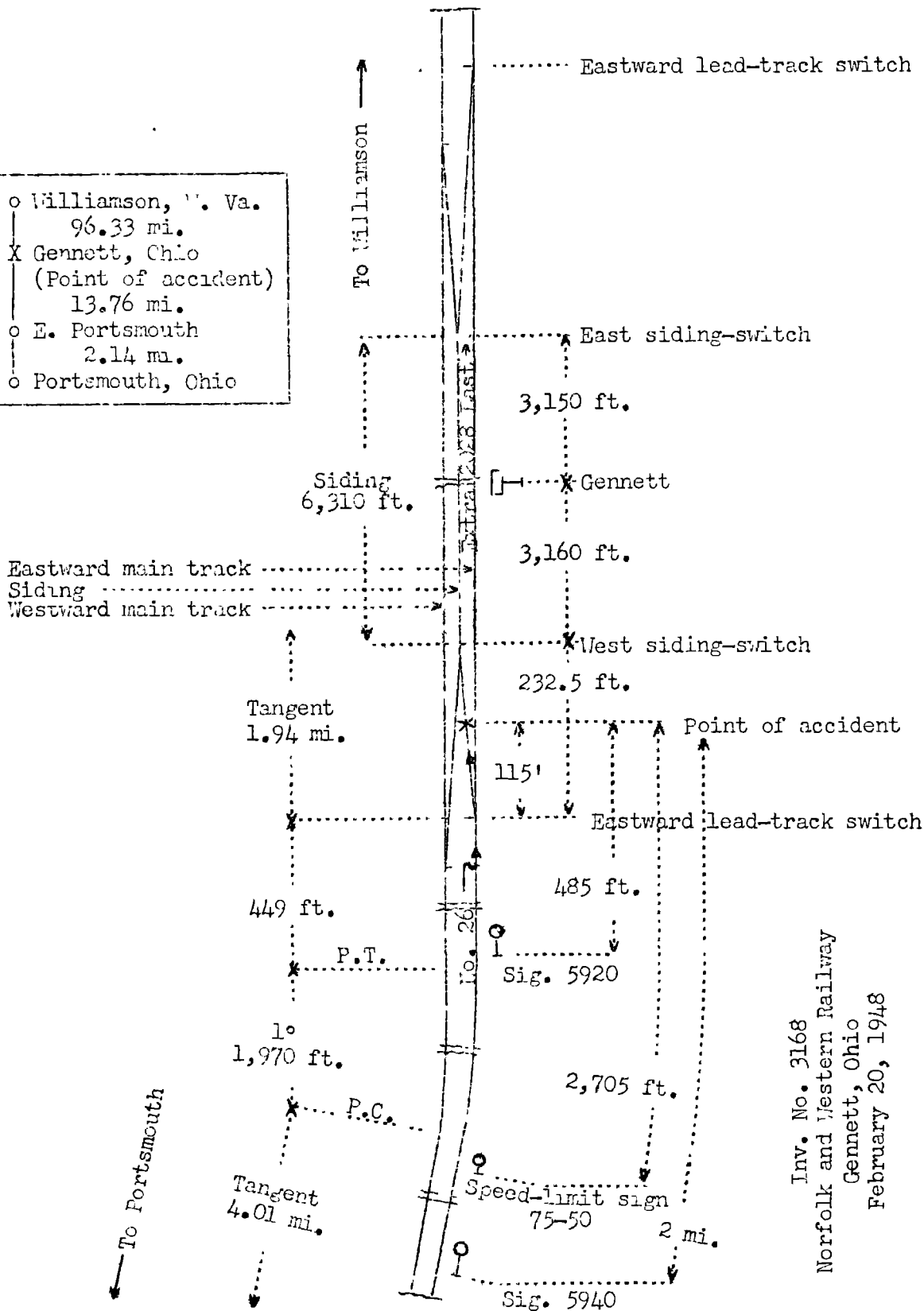
PATTERSON, Commissioner:

On February 20, 1948, there was a derailment of a passenger train on the Norfolk and Western Railway at Gennett, Ohio, which resulted in the death of 1 train-service employee, and the injury of 36 passengers, 5 dining-car employees, 1 tavern-car attendant, and 2 train-service employees. This accident was investigated in conjunction with representatives of the Public Utilities Commission of Ohio.

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Under 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.

- o Williamson, W. Va.
96.33 mi.
- X Gennett, Ohio
(Point of accident)
13.76 mi.
- o E. Portsmouth
2.14 mi.
- o Portsmouth, Ohio



Inv. No. 3168
Norfolk and Western Railway
Gennett, Ohio
February 20, 1948

Location of Accident and Method of Operation

This accident occurred on that part of the Scioto Division extending between Portsmouth, Ohio, and Williamson, W. Va., 112.23 miles, a double-track line, over which trains moving with the current of traffic are operated by timetable, train orders and an automatic block-signal system. At Gennett, 15.9 miles east of Portsmouth, a siding 6,310 feet long lies between the main tracks. The west and the east switches of the siding are, respectively, 3,160 feet west and 3,150 feet east of the station sign. Two lead-tracks at each end of the siding extend from the ends of the siding to the main tracks. The eastward lead-track at the west end of the siding is 232.5 feet long. The derailment occurred on the eastward lead-track at the west end of the siding, at a point 115 feet east of the eastward lead-track switch. From the west on the eastward main track there are, in succession, a tangent, 4.01 miles in length, a 1° curve to the left 1,970 feet and a tangent 449 feet to the eastward lead-track switch and 1.94 miles eastward. The grade is 0.3 percent ascending eastward.

The structure of the eastward lead-track where the accident occurred consists of No. 12 turnouts at each end, rail-bound manganese frogs, 22-foot switch rails and 131-pound rail sections, and 13-foot guard rails. The curvature of each turnout is $5^{\circ}21'$, and the angle of each frog is $4^{\circ}46'19''$. The lead-track is laid on 131 switch ties. No superelevation is provided. Six adjustable gage braces and 20 rail braces are provided at each switch. The distance between the frog points is 41 feet 9 inches. The distance between the centerline of the siding and the centerline of each main track is 13 feet. The structure of the eastward main track consists of 131-pound rail, 39 feet in length, laid during 1943 on 24 treated ties to the rail length. It is fully tieplated with double-shoulder canted tieplates, spiked with 4 spikes per tie plate, and provided with 6-hole joint bars 36 inches in length, and 12 rail anchors per rail length. The eastward main track and the eastward lead-track are ballasted with crushed stone to a depth of 24 inches below the ties. The switches of the lead-track are hand-operated. The switchstands of the lead-track switches are of the low-stand type, and are provided with electrically lighted switch lamps located 18.5 inches above the tops of the rails, and single-vane targets. When the eastward lead-track switch is lined for entry to the siding a red light and a yellow oval-shape target are displayed.

Automatic signals 5940 and 5920, governing east-bound movements on the eastward main track, are mounted on masts at points, respectively, 2 miles and 485 feet west of the point of accident. These signals are of the three-indication position-light type, and are continuously lighted. The center of the aspect of each signal is 18.4 feet above the level of the tops of the rails and 12.8 feet south of the centerline of the eastward main track. The involved aspects and corresponding indications and names are as follows:

<u>Signal</u>	<u>Aspect</u>	<u>Indication</u>	<u>Name</u>
5940	Three amber lights in diagonal position to the right	Prepare to Stop at Next Signal. Trains exceeding Medium Speed Must at Once Reduce to That Speed	Yellow Block
5920	Three amber lights in horizontal position	Stop and Proceed	Red Block

The controlling circuits of these signals are so arranged that when the block between signal 5920 and the next signal eastward is occupied, or if the eastward lead-track switch is lined in reverse position, signal 5940 displays proceed-prepared-to-stop-at-next-signal and signal 5920 displays stop-and-proceed.

This carrier's operating rules read in part as follows:

DEFINITIONS

* * *

Fixed Signal--A signal of fixed location indicating a condition affecting the movement of a train or engine.

Note to Definition of Fixed Signal--The definition of a "Fixed Signal" covers such signals as * * * block, * * * slow boards, or other means for displaying indications that govern the movement of a train or engine.

* * *

Restricted Speed--Proceed prepared to stop short of train, obstruction, or anything that may require the speed of a train to be reduced.

Medium Speed--One-half the maximum authorized speed, but not to exceed 30 miles per hour.

15(a). In automatic block signal territory fuseses and torpedoes * * * will not be used by freight trainmen except in emergency.

34. All members of engine and train crews must, when practicable, communicate to each other by its name the indication of each signal affecting the movement of their train or engine.

34(a). In registering the indication of automatic and interlocking signals, the following words should be used, irrespective of the type of the signal: "Red Block," "Yellow Block," * * *

35. The following signals will be used by flagmen:

Day signals--A red flag,
Torpedoes and
Fuseses.

* * *

73. Extra trains are inferior to regular trains.

86(a). In automatic block signal territory, inferior trains will clear the time of superior trains five (5) minutes.

99. When a train stops under circumstances in which it may be overtaken by another train, the flagman must go back immediately with flagman's signals a sufficient distance to insure full protection, placing two torpedoes and, when necessary, in addition displaying lighted fuseses. When recalled and safety to the train will permit, he may return.

* * *

102(b). * * *

Trains having trouble will flag following superior trains around with least delay.

805. When a signal indicates Stop, stop must be made before reaching the signal, except that trains approaching meeting or passing points and finding "Stop and Proceed" signal in stop position, may proceed at restricted speed without stopping for such signal when the signal is located at the pull-in switch, provided the pull-in switch is open and proceed signal is given by person handling the switch.

In the territory involved there is no specified maximum speed for passenger trains on tangent track. The maximum authorized speed for passenger trains on the curve immediately west of the siding at Gennett is 75 miles per hour, and through the eastward lead-track 25 miles per hour. A circular speed-limit sign, 20 inches in diameter and bearing the numerals 75-50 in black on a yellow background, is mounted on a mast 10 feet south of the south rail of the eastward main track at a point 2,705 feet west of the point of accident.

Description of Accident

Extra 2028 East, an east-bound freight train, consisting of engine 2028, 178 cars and a caboose, stopped on the eastward main track at Gennett about 10:45 a. m., with the rear end standing about 1,050 feet east of the eastward lead-track switch at the west end of the siding. Soon afterward, the switches of the eastward lead-track and the siding were lined for No. 26 to proceed through the siding to pass Extra 2028 East.

No. 26, an east-bound first-class passenger train, consisted of engine 607, a 4-8-4 type, two coaches, one dining car, one tavern-lounge car and two coaches, in the order named. All cars were of conventional all-steel construction. This train passed E. Portsmouth, the last open office, 13.76 miles west of Gennett, at 11:02 a. m., passed signal 5940, which displayed proceed-prepared-to-stop-at-next-signal, passed the speed-limit sign, passed the flagman of Extra 2028 East, passed signal 5920, which displayed stop-and-proceed, and while moving at a speed of 77 miles per hour it entered the eastward lead-track switch at the west end of the siding at Gennett, and the engine and the first five cars were derailed.

The engine and the tender, remaining coupled, stopped on their left sides on the siding and the westward main track, with the front end of the engine 755 feet east of the eastward lead-track switch and 10 feet north of the centerline of the eastward main track. The rear end of the engine and the bottom of the tender were on the westward main track and about 20 feet north of the eastward main track. A separation occurred between the tender and the first car, as a result of a broken coupler guard arm on the first car. All cars except the third were equipped with type H tightlock couplers. The derailed cars stopped practically upright on the siding and in line with it, with the front end of the first car 26 feet west of the rear of the tender and the rear of the sixth car 120 feet east of the eastward lead-track switch. The left sides of the engine and the tender were considerably damaged. Both trucks of the tender were torn loose and stopped in the vicinity of the second car. The trucks of the first five cars and appurtenances below the underframes were considerably damaged, as a result of the derailment.

The fireman of No. 26 was killed, and the engineer and the flagman were injured.

The weather was clear and the wind was from the north at the time of the accident, which occurred about 11:17 a. m.

The total weight of engine 607 in working order is 494,000 pounds, distributed as follows: Engine truck, 101,600 pounds; driving wheels, 288,000 pounds; and trailer truck 104,400 pounds. The specified diameters of the engine-truck wheels, the driving wheels, and the trailer-truck wheels are, respectively, 36, 70 and 42 inches. The driving wheelbase is 18 feet 9 inches long. The total length of the engine wheelbase is 47 feet 3-1/2 inches and the total length of the engine and tender is 109 feet 2-1/4 inches. All journals of the engine and the tender and all bearings of the rod assembly of the engine are equipped with roller bearings. The engine is equipped with a magneto-type speedometer.

The tender is rectangular in shape, and is equipped with two 6-wheel trucks. Its capacity is 35 tons of coal and 20,000 gallons of water. The weight of the tender loaded is 378,600 pounds. It was estimated that the tender contained 9 tons of coal and 10,000 gallons of water at the time of the accident.

The last class repairs were completed on October 6, 1947. The last trip inspection and repairs were completed on February 19, 1948. The accumulated mileage since the last class repairs was 61,069 miles.

The center of gravity of the engine is 84 inches above the tops of the rails. The center of gravity of the tender, with the calculated amount of fuel and water remaining at the time of the accident, was estimated as 64-1/2 inches above the tops of the rails. The overturning speed is 74 miles per hour for engine 607 moving on a 5°21' turnout without superelevation, and 85-1/2 miles per hour for the tender.

The engine of No. 26 is provided with No. 8-ET brake equipment. At the time of the accident the regulating devices were adjusted for brake-pipe pressure of 100 pounds and main-reservoir pressure of 110 pounds. Of the cars of No. 26, one was provided with UC-12-BC valve, and the remainder with D-22-AR valves. The third car was provided with one brake shoe per wheel, and remainder with clasp brakes.

Discussion

Extra 2028 East was approaching Gennett when the conductor, from the left side of the caboose cupola, observed smoke coming from a car near the middle of the train. He immediately opened the conductor's valve, and the train stopped on the eastward main track at 10:45 a. m., with the rear end standing 1,050 feet east of the eastward lead-track switch at the west end of the siding. When Extra 2028 East stopped, the conductor proceeded eastward and released the brake on the one-hundred-fourth car, which was found to be sticking. The front brakeman proceeded to a telephone near the east end of the siding and the flagman remained near the rear of the train. The front brakeman informed the train dispatcher by telephone about the delay, and the train dispatcher instructed him to make arrangements for No. 26 to move through the siding at Gennett to pass Extra 2028 East. The conductor said that he did not communicate with the train dispatcher by telephone until after the accident occurred, but that he had instructed the flagman to line the switches for No. 26 to move through the siding, if Extra 2028 East should be delayed at Gennett so that it could not proceed and clear the time of No. 26. At 10:53 a. m., the conductor decided that insufficient time remained for his train to proceed eastward to clear for No. 26, and gave hand signals for the flagman to line the switches for No. 26 to enter the siding. About 11:05 a. m., after lining the switches, the flagman proceeded westward and

stationed himself at a point about 1,000 feet west of the eastward lead-track switch. The flagman said that from this location he could see that signal 5920 displayed a stop-and-proceed indication. About 11:15 a. m. he observed No. 26 about 3 miles distant, and gave stop signals with a red flag. He continued to give stop signals until the engine of No. 26 passed him. His signals were not acknowledged by the engineer of No. 26, and there was no indication that the brakes had been applied. Smoke and steam were trailing from the smokestack downward along the right side of the engine. However, the flagman saw the engineer seated in his usual position on the right side of the cab and looking forward, and he shouted to attract the engineer's attention as the engine passed him.

As No. 26 was approaching Gennett the speed was 77 miles per hour, as indicated by the speedometer with which the engine and the first car were equipped. The enginemen were in their usual positions in the cab and maintaining a lookout ahead, the front brakeman was in the first car observing the speedometer, the conductor was in the fifth car and the flagman was in the sixth car. The throttle was in half-open position, the reverse lever was in position for short cut-off in forward motion and the blower was open. The engineer said that steam from the smokestack trailed downward on the right side and obscured his view ahead, and that he saw only two automatic signal indications between Portsmouth and Gennett. Because of this condition, he depended upon the fireman to see signal indications and to communicate these indications to him. He said that when the engine was approaching signal 5940 the fireman called "clear block," and the engineer responded. When the engine passed this signal the engineer could see the base of the signal mast, but could not see the aspect. When the engine was approaching signal 5920 the fireman called "clear block," and the engineer again responded. When the engine was near the east end of the 1° curve immediately west of signal 5920, the engineer observed the flagman of Extra 2028 East giving stop signals from a point south of the eastward main track and opposite the cab window. At this time the fireman called "red block," and the engineer closed the throttle and moved the brake valve to emergency position as his engine passed signal 5920. Because of trailing steam he was unable to see the aspect of the signal. Immediately afterward, the engine entered the eastward lead-track switch, lurched hard to the right, then to the left and overturned. The fireman was killed in the accident. The members of the train crew said that they were not aware

of anything being wrong until the brakes were applied in emergency. The front brakeman said that the speed was 77 miles per hour at the time of the derailment. The brakes of this train had been tested and had functioned properly en route. In tests after the accident the brakes functioned in accordance with the requirements of the carrier.

The first mark on the track structure was a shifting of the lead-track southward about 6 inches between the west switch points and the first frog, as a result of severe thrusting by the engine as it entered the turnout. No mark identified with the engine appeared on the track structure from the first frog eastward to the point where the engine turned on its side. Starting at a point 115 feet east of the west switch, the lead-track and the siding were destroyed throughout a distance of 618 feet eastward. The drawbar and the safety bar between the engine and the tender were twisted about 20 degrees to the left at the engine end, which condition indicated that the engine was the first to overturn and that the tender was dragged from the track by the engine. The overturning speed was 74 miles per hour for the engine and 85-1/2 miles per hour for the tender.

Under the conditions present, signal 5940 should have displayed proceed-prepared-to-stop-at-next-signal and signal 5920 should have displayed stop-and-proceed for No. 26. These signals were displaying their proper indications immediately after the accident. Tests were made of the signal apparatus and controlling circuits immediately after the accident, and no defective condition was found.

The investigation disclosed that in the territory involved it is customary practice under similar conditions for long freight trains to occupy the main track at sidings and to line the switches of the siding for use of first-class trains to pass the freight trains. The superintendent said that such movement does not constitute an emergency, therefore, the use of fuses and torpedoes is not required, unless storm or fog conditions prevail. The flagman of Extra 2028 East so understood, and, under the conditions present, thought the flag protection provided was adequate, since the movement involved was in automatic block signal territory.

Action should have been taken at signal 5940 so as to stop No. 26 short of signal 5920. The engineer of No. 26 said that the fireman, who was killed in the accident, was the only member of the crew that saw the indications displayed by these signals. Until the engine reached a point a short distance west of signal 5920, the engineer operated his train as though a proceed indication was displayed. A test made on

the day after the accident disclosed that the indication displayed by signal 5940 could be seen a distance of 4,000 feet from the left side of the cab of an engine of the same class as engine 607, and 3,700 feet from the right side. The stop-and-proceed indication of signal 5920 could be seen 2,700 feet from the left side and 530 feet from the right side. The signals of a flagman stationed at a point 1,167 feet west of the point of derailment could be seen 360 feet from the left side and 370 feet from the right side.

On the day of the accident wind was blowing from the north. The engineer who was operating No. 26 at the time of the accident, and the enginemen who operated the same train and engine between Cincinnati and Portsmouth, said that steam from the smokestack obscured the view of signals from the right side of the cab. The investigation disclosed that it is customary for engineers, when the view on the right side of an engine is obscured, to depend upon the fireman to observe signals and to call their indications, and, under similar conditions on the left side, for firemen to depend upon the engineers.

Cause

It is found that this accident was caused by a train entering a turnout to siding at an excessive rate of speed, as a result of failure to obey automatic block-signal indications.

Dated at Washington, D. C., this sixth day of April, 1948.

By the Commission, Commissioner Patterson.

(SEAL)

W. P. BARTEL,
Secretary.