

INTERSTATE COMMERCE COMMISSION  
WASHINGTON

---

INVESTIGATION NO. 2985  
THE NEW YORK, NEW HAVEN AND HARTFORD  
RAILROAD COMPANY

REPORT IN RE ACCIDENT  
AT READVILLE, MASS., ON

APRIL 21, 1946

---

SUMMARY

---

Railroad: New York, New Haven and Hartford  
Date: April 21, 1946  
Location: Readville, Mass.  
Kind of accident: Head-end collision  
Trains involved: Passenger : Passenger  
Train numbers: 134 : 535  
Engine numbers: 1344 : 1401  
Consists: 6 cars : 9 cars  
Estimated speeds: 25 m. p. h. : Standing  
Operation: Interlocking  
Tracks: Single; 3° curve; : Three; tangent;  
practically level practically level  
Weather: Clear  
Time: 10:15 p. m.  
Casualties: 3 killed; 478 injured  
Cause: Failure to operate No. 535 in  
accordance with interlocking  
signal indications

INTERSTATE COMMERCE COMMISSION

---

INVESTIGATION NO. 2985

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

THE NEW YORK, NEW HAVEN AND HARTFORD RAILROAD COMPANY

---

June 26, 1946.

---

Accident at Readville, Mass., on April 21, 1946, caused  
by failure to operate No. 535 in accordance with  
interlocking signal indications.

---

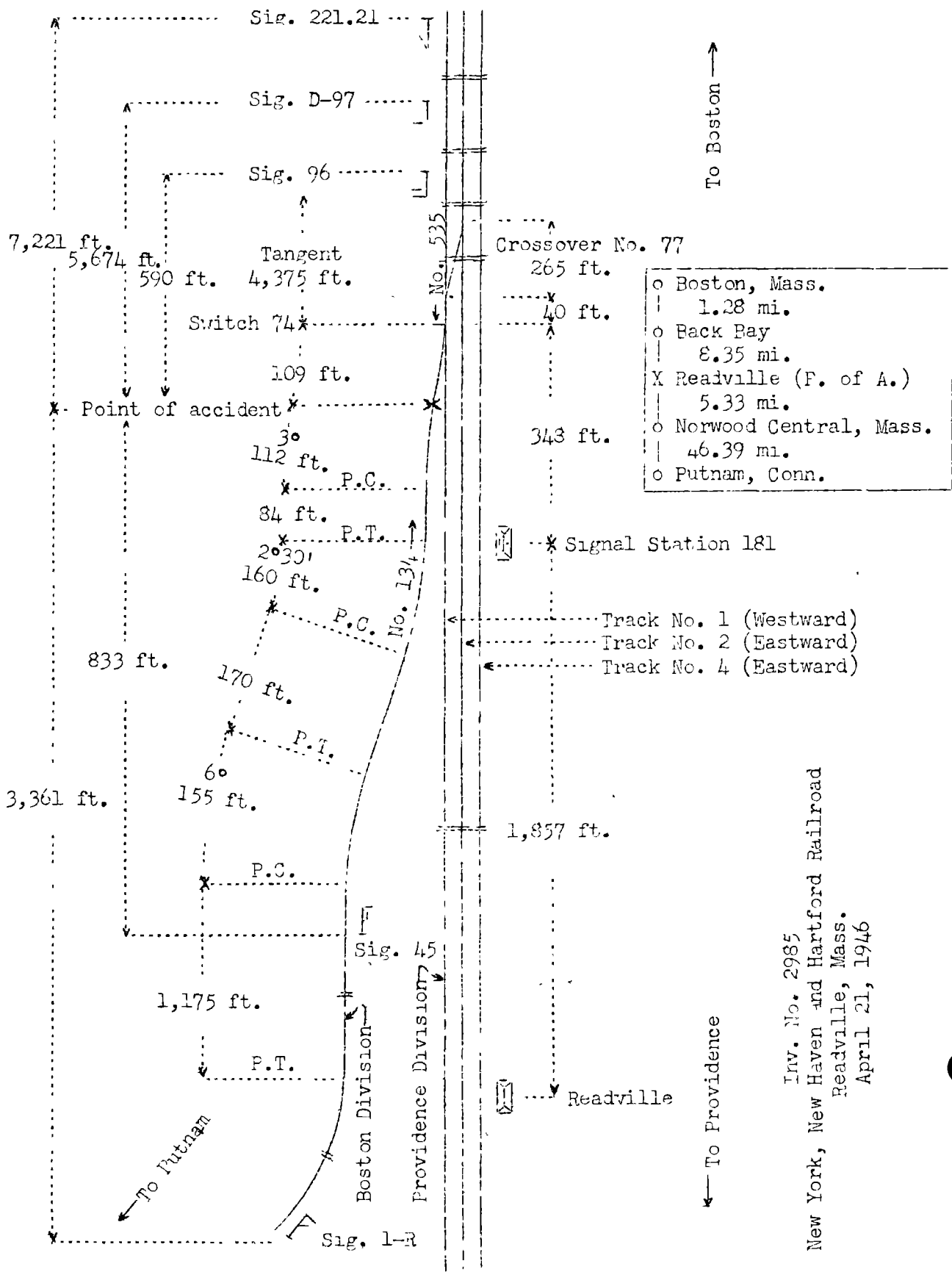
REPORT OF THE COMMISSION<sup>1</sup>

PATTERSON, Commissioner:

On April 21, 1946, there was a head-end collision between two passenger trains on the New York, New Haven and Hartford Railroad at Readville, Mass., which resulted in the death of 2 train-service employees and 1 traveling fireman, and the injury of 461 passengers, 2 railway-mail clerks, 12 train-service employees on duty and 3 train-service employees off duty. This accident was investigated in conjunction with representatives of the Massachusetts Department of Public Utilities.

---

<sup>1</sup>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.



Inv. No. 2985  
 New York, New Haven and Hartford Railroad  
 Readville, Mass.  
 April 21, 1946

Location of Accident and Method of Operation

This accident occurred on that part of the Boston Division extending between Putnam, Conn., and Boston, Mass., 61.35 miles. Within interlocking limits at Readville, 51.72 miles east of Putnam, a single-track line of the Boston Division and a three-track line of the Providence Division converge and extend eastward 9.63 miles to Boston as a three-track line of the Boston Division. From north to south the main tracks of the three-track line are designated as No. 1, westward, and Nos. 2 and 4, eastward. On the single-track line trains are operated by timetable, train orders and an automatic block-signal system. Trains moving with the current of traffic on the three-track line are operated by signal indications. The single-track line connects with track No. 1 at switch 74, located 348 feet east of Signal Station 181. Crossover No. 77 is 265 feet in length and connects tracks Nos. 1 and 2. The west switch of crossover No. 77 is 40 feet east of switch 74. The accident occurred on the single-track line at a point 109 feet west of switch 74. From the west on the single-track line there are, in succession, a tangent 1,175 feet in length, a 6° curve to the right 155 feet, a tangent 170 feet, a 2°30' curve to the left 160 feet, a tangent 84 feet, and a 3° curve to the right 112 feet to the point of accident and 109 feet eastward. From the east on track No. 1 there is a tangent 4,375 feet to switch 74 and a considerable distance westward. The grade is practically level.

Semi-automatic home signals 1-R and 45, governing east-bound movements from the single-track line to the three-track line, are located, respectively, 3,361 feet and 833 feet west of the point of accident. Automatic signals 221.21 and D-97 and semi-automatic home signal 96, governing west-bound movements on track No. 1, are located, respectively, 7,221 feet, 5,674 feet and 590 feet east of the point of accident. Signals 1-R, 45, and 96 are of the two-arm, semaphore type, and signals 221.21 and D-97 are of the one-arm, semaphore type. These signals are continuously lighted. The involved night aspects and corresponding indications and names of these signals are as follows:

<u>Signal</u>	<u>Aspect</u>	<u>Indication</u>	<u>Name</u>
1-R	Red over yellow	Proceed through cross-over or turn-out at medium speed preparing to stop at next signal.	Medium approach signal.
45	Red over green	Proceed through cross-over or turn-out at medium speed.	Medium clear signal.
221.21	Green	Proceed.	Clear signal.
D-97	Yellow	Proceed preparing to stop at next signal. Train exceeding medium speed must at once reduce to that speed.	Approach signal.
96	Red over red	Stop.	Stop signal.

The interlocking at Signal Station 181 consists of an electrical machine having 17 working levers in a 35-lever frame and a mechanical machine having 48 working levers in a 60-lever frame. Approach, route and mechanical locking are provided. Time releases in connection with approach locking are provided. An illuminated track diagram is provided and is so arranged that when the interlocking home signals display proceed, green lights are displayed on the track diagram, and track occupancy is indicated by red lights. The controlling circuits are so arranged that, when the route is lined for movement from the single-track line through crossover No. 77 to track No. 2, signal D-97 displays proceed-preparing-to-stop-at-next-signal, and signal 96 displays stop, and, if the track immediately east of signals 1-R and 45 is unoccupied, signal 1-R displays proceed-through-crossover-at-medium-speed-preparing-to-stop-at-next-signal and signal 45 displays proceed-through-crossover-at-medium-speed. The approach-locking circuit on track No. 1 extends 13,308 feet east of signal 96. The time release is arranged to operate in 2 minutes 30 seconds.

Operating rules read in part as follows:

DEFINITIONS.

\* \* \*

MEDIUM SPEED.--A speed not exceeding 30 miles per hour.

\* \* \*

34. Immediately upon seeing a signal affecting the movement of their train or engine, the engineman and fireman must, and when practicable the trainmen will, call its indication to each other.

98. Trains must approach \* \* \* junctions \* \* \* prepared to stop, unless the switches are properly lined, signals indicate proceed and track is clear. \* \* \*

663. Unless otherwise provided, trains or engines must not pass an interlocking signal indicating stop, \* \* \*. Enginemen or trainmen must not proceed on hand signal or Clearance Form K until after their train or engine has been brought to a stop. \* \* \*

The maximum authorized speed for the east-bound train through the crossover was 30 miles per hour, and the maximum authorized speed for the west-bound train on track No. 1 was 70 miles per hour.

#### Description of Accident

No. 134, an east-bound first-class passenger train, was en route from Putnam to Boston via Readville. This train consisted of engine 1344, one baggage car and five coaches, in the order named. The first car was of steel-underframe construction and the remainder were of all-steel construction. This train departed from Norwood Central, the last open office, 5.33 miles west of Readville; at 10:07 p. m., 16 minutes late, passed signal 1-R, which displayed proceed-through-turnout-at-medium-speed-preparing-to-stop-at-next-signal, passed signal 45, which displayed proceed-through-crossover-at-medium-speed, and while moving on the single-track line at an estimated speed of 25 miles per hour it collided with No. 535 at a point 109 feet west of switch 74.

No. 535, a west-bound first-class passenger train, was en route from Boston to Providence, R. I., via Readville. This train consisted of engine 1401, one coach, two baggage cars and six coaches, in the order named. The second and third cars were of steel-underframe construction and the remainder were of all-steel construction. This train departed from Back Bay, Boston, the last open office, 8.35 miles east of Readville, at 10:04 p. m., on time, passed signal D-97, which displayed proceed-preparing-to-stop-at-next-signal, passed signal 96, which displayed stop, ran through the west switch of crossover No. 77, which was lined against No. 535, entered the single-track line at switch 74 and stopped 109 feet west of the switch. Immediately afterward No. 535 was struck by No. 134.

The force of the impact moved No. 535 backward about 80 feet. The engine of No. 535 was derailed but remained upright

on the roadbed, The front end of the engine was badly damaged. The cab of the engine of No. 134 was demolished and the tender was badly damaged. The superstructure of the first car was demolished.

The weather was clear at the time of the accident, which occurred about 10:15 p. m.

The engineer and the fireman of No. 134, and a traveling fireman who was on No. 134, were killed. The conductor and four brakemen of No. 134, and the engineer, the fireman, the conductor and four brakemen of No. 535 were injured.

Engine 1401, of No. 535, is equipped with a feedwater pump, in the charge of the engineer, and a non-lifting injector, in the charge of the fireman. These appliances supply the boiler with feedwater. This engine is equipped with one 8-1/2-inch cross-compound compressor and No. 8-ET brake equipment. The regulating devices were adjusted to supply brake-pipe pressure of 110 pounds and main-reservoir pressure of 130 to 140 pounds. Of the cars of this train, two were equipped with control valves of the UC type, two with PM types, and five with PC types.

#### Discussion

The rules governing operation on this line provide that a train receiving a proceed-preparing-to-stop-at-next-signal indication must immediately reduce to a speed not in excess of 30 miles per hour and be prepared to stop short of the next signal. A train must stop short of an interlocking signal displaying stop, and must not pass the signal until the signal indicates proceed, or proper authority from the leverman has been received. All trains must approach junctions prepared to stop unless the switches are properly lined, the signals indicate proceed, and the track is clear.

The investigation disclosed that about 10 p. m. the leverman at Signal Station 181 placed the controlling levers in position for home signal 96, governing west-bound movements on track No. 1, to display stop and signal D-97 to display proceed-preparing-to-stop-at-next-signal. The leverman said that, as No. 134 was running about 15 minutes late on its schedule and No. 535 was about on time, he was not certain which train would reach the interlocking first, and at that time he did not line any route through the interlocking. The approach of No. 134 was the first to be indicated on the track diagram, and about 10:14 p. m. he lined crossover No. 77 for movement from track No. 1 to track No. 2, and switch 74 for movement from the single-track line to track No. 1 so that No. 134 could proceed eastward from the single-track line to track No. 2. Then he placed the controlling levers in position for home signal 1-R to display proceed-through-turnout-at-medium-speed-preparing-to-stop-at-next-signal, and for home signal 45 to display



proceed-through-crossover-at-medium-speed.

As No. 134 was approaching Readville, the speed was about 35 miles per hour and the members of the train crew were in various cars throughout the train. Several of these employees said that as their train approached signal 45 they felt a service application of the brakes, which was released soon afterward. Then there was slack action similar to that produced by the opening of an engine throttle. These employees were assured by these actions that signal 45 displayed an indication more favorable than stop. The first they were aware of anything being wrong was when the collision occurred. The speed was about 25 miles per hour at the time of the accident. The brakes of this train had been tested and had functioned properly en route. The engineer and the fireman were killed in the accident.

As No. 535 was approaching Readville, the speed was 76 miles per hour, as indicated by the tape of the speed recorder with which the engine is equipped. The headlight was lighted brightly and the enginemen were maintaining a lookout ahead. These employees said that signal 221.21 and D-97 displayed proceed for their train and that they called the indications. When their train was about 4,000 feet east of signal D-97, the engineer partially closed the throttle to avert excessive speed, and at that time the safety valves opened and vented excess steam. The feedwater pump was not supplying the boiler with sufficient feedwater and the engineer instructed the fireman to operate the injector to assist in maintaining a safe level of water in the boiler. The fireman was not familiar with the operation of the type of injector with which the engine was provided and was unable to manipulate it so that water would be supplied to the boiler. The engineer proceeded to the left side of the cab to assist the fireman in the proper manipulation of the injector. When the engine was closely approaching signal D-97 the fireman warned the engineer that the signal indication had changed from proceed to proceed-preparing-to-stop-at-next-signal. The engineer said that he immediately returned to the right seat-box and looked out as the engine passed under the signal. He closed the throttle and made a 20-pound brake-pipe reduction. Soon afterward he placed the brake valve in service position, which resulted in a continuous brake-pipe reduction. In his opinion these reductions were sufficient to stop his train short of signal 96. When the engine was about 2,000 feet east of signal 96, he observed that the signal displayed stop and, as the speed was not being properly controlled, he placed the brake valve in emergency position and the reverse lever in position for backward motion in an attempt to stop his train short of signal 96. However, No. 535 passed signal 96, stopped on the single-track with the front of the engine at a point 590 feet west of the signal, and immediately afterward No. 535 was struck by No. 134.

Examination immediately after the accident disclosed that crossover No. 77 was lined for movement from track No. 1 to

track No. 2, and that the engine and first car of No. 535 had trailed through the west switch of the crossover. The controlling circuits of the interlocking are so arranged that when the route is lined for movement from the single-track line through switch 74 to track No. 1, thence through crossover No. 77 to track No. 2, signal D-97 displays proceed-preparing-to-stop-at-next-signal and signal 96 displays stop. Considering that the approach-locking circuit for signal 96 extends 13,308 feet east of that signal, that the operation of the time release required 2 minutes 30 seconds, and that the speed of No. 535 was an average of 75 miles per hour throughout a distance of 10,300 feet and from 75 miles per hour to about 35 miles per hour throughout 3,008 feet, No. 535 would traverse the distance between the east end of the approach circuit and home signal 96 in about 2 minutes, or less than the time-release interval. Therefore, during a period of 2 minutes 30 seconds immediately preceding the time of the accident, the route could not have been lined for No. 535 and then lined for No. 174. In tests after the accident the interlocking functioned properly.

In a test after the accident, a train similar to No. 535 passed signal D-97 at a speed of 71 miles per hour, which, according to the engineer's statement, was the speed of No. 535 as it passed that point on the night of the accident. Immediately after the engine passed signal D-97, the engineer closed the throttle to drifting position, made a 20-pound brake-pipe reduction and placed the brake valve in lap position. As soon as the brake-pipe exhaust ceased, the engineer placed the brake valve in service position, where it remained until the train stopped at a point 260 feet east of home signal 96 and 850 feet east of the point of accident. The engineer of No. 535 may have been confused since it appears that the brake application made on the night of the accident was started at a point considerably west of signal D-97.

#### Cause

It is found that this accident was caused by failure to operate No. 535 in accordance with interlocking signal indications.

Dated at Washington, D. C., this twenty-sixth day of June, 1946.

By the Commission, Commissioner Patterson.

(SEAL)

W. P. BARTEL,  
Secretary.