

INTERSTATE COMMERCE COMMISSION
WASHINGTON

INVESTIGATION NO 2534
THE HUDSON & MANHATTAN RAILROAD COMPANY
REPORT IN RE ACCIDENT
AT EXCHANGE PLACE STATION,
JERSEY CITY, N. J., ON
APRIL 26, 1942

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SUMMARY

Railroad: Hudson & Manhattan

Date: April 26, 1942

Location: Exchange Place Station,
Jersey City, N. J.

Kind of accident: Derailment

Train involved: Passenger

Train number: East-bound Newark to New York

Motor number: MU 1972

Consist: 6 cars

Estimated speed: 17-50 m. p. h.

Operation: Automatic block-signal and automatic
train-stop system and interlocking

Track: Double; 38°45' curve; 0.5 percent
descending grade eastward

Weather: Accident occurred in lighted tunnel

Time: 10:48 p. m.

Casualties: 5 killed; 191 injured

Cause: Accident caused by excessive
speed on sharp curve

Recommendation: That the Hudson & Manhattan Railroad
Company install time signals in the
territory involved in this accident

INTERSTATE COMMERCE COMMISSION

INVESTIGATION NO. 2584

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

THE HUDSON & MANHATTAN RAILROAD COMPANY

July 9, 1942.

Accident at Exchange Place Station, Jersey City, N. J., on
April 26, 1942, caused by excessive speed on sharp
curve.

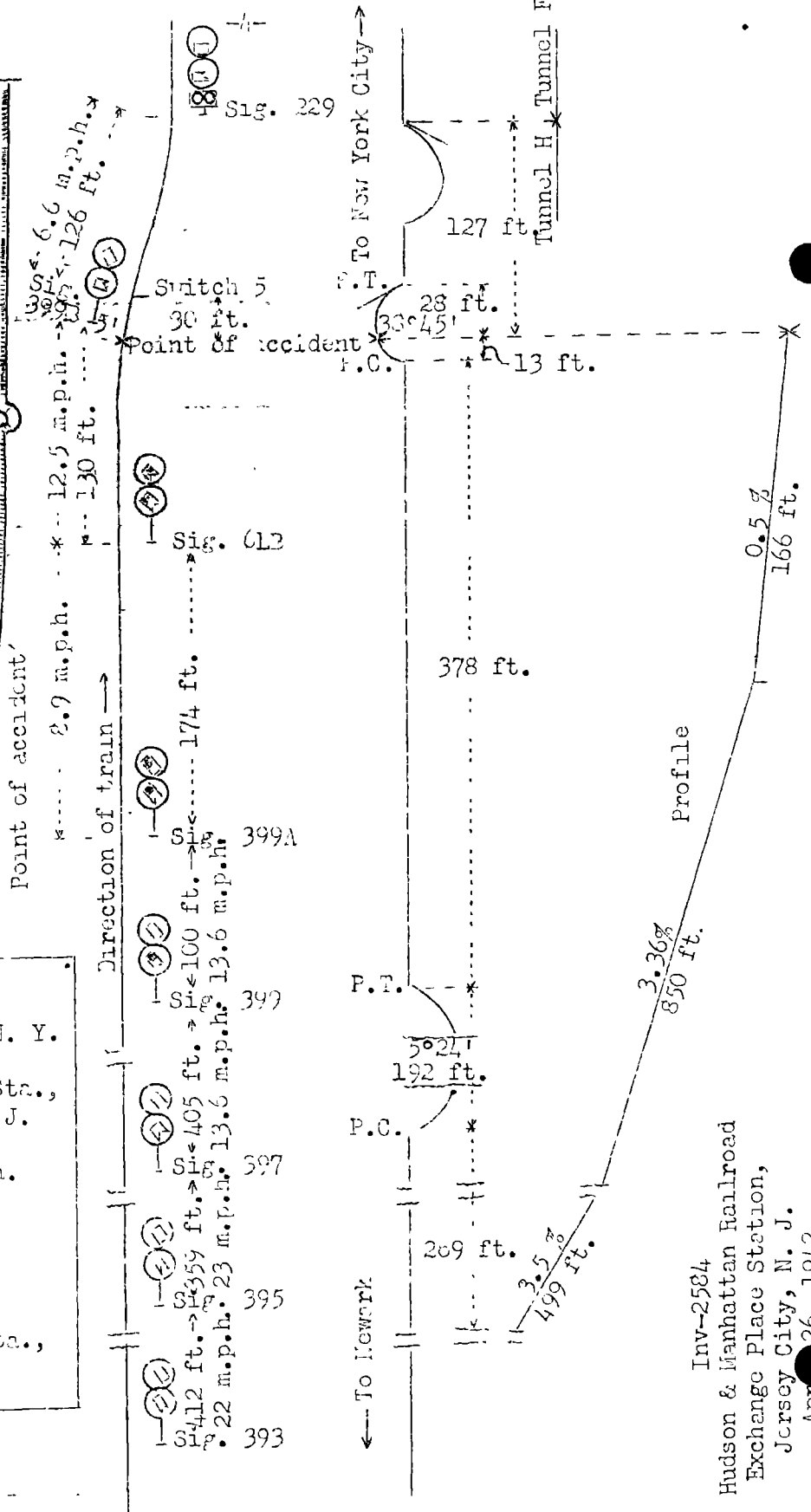
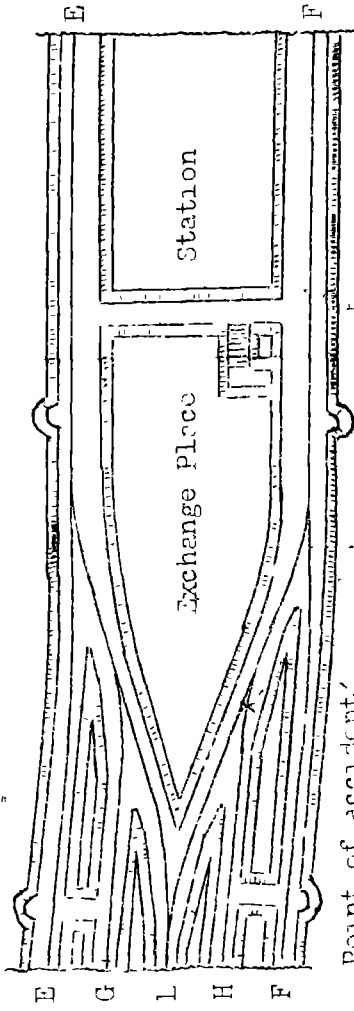
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REPORT OF THE COMMISSION

PATTERSON, Commissioner:

On April 26, 1942, there was a derailment of a passenger train on the Hudson & Manhattan Railroad at Exchange Place Station, Jersey City, N. J., which resulted in the death of 5 passengers, and the injury of 188 passengers and 3 employees. This accident was investigated in conjunction with representatives of the New Jersey Board of Public Utility Commissioners.

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.

- 5.69 mi. → Hudson Terminal, New York City, N. Y.
- 3.20 mi. X Exchange Place Sta., Jersey City, N. J.
- Grove Street Sta.
- Journal Square
- Harrison
- Market Street Sta., Newark, N. J.



Inv-2584
 Hudson & Manhattan Railroad
 Exchange Place Station,
 Jersey City, N. J.
 Apr 26, 1942

Location of Accident and Method of Operation

This accident occurred on that part of the railroad which extends between Journal Square, Jersey City, N. J., and Hudson Terminal, New York City, N. Y., a distance of 3.2 miles. The line is equipped with a power rail for the electric propulsion of trains. In the vicinity of the point of accident this is a double-track line over which trains are operated by an automatic block-signal and train-stop system. At the western end of Exchange Place Station there are five tunnels parallel to each other and designated from south to north as F, H, L, G and E. The track of Tunnel H converges with the track of Tunnel F at a trailing-point switch located 207 feet east of the west end of the station. The track of Tunnel H and the track of Tunnel L converge at a trailing-point switch, designated as switch 5 and located 110 feet east of the west end of the station. The accident occurred within interlocking limits in Tunnel H at a point 30 feet west of switch 5. As the point of accident is approached from the west in Tunnel H there are, in succession, a tangent 441 feet in length, a $2^{\circ}52'36''$ curve to the left 122 feet, a tangent 269 feet, a $5^{\circ}24'$ curve to the left 192 feet, a tangent 378 feet and a No. 4 turnout to the right, which has a curvature of $38^{\circ}45'$. The accident occurred on this turnout at a point 13 feet east of its western end. The grade for east-bound trains is descending, successively, 3.5 percent a distance of 499 feet, 3.36 percent 850 feet and 0.5 percent 166 feet to the point of derailment.

The track structure consists of 85-pound rail, 33 feet in length, laid on an average of 22 treated ties to the rail length; it is fully tieplated, secured by two lag screws at each end of the ties, provided with six rail anchors per rail length, and is ballasted with crushed rock to a depth of 6 to 8 inches. On sharp curves 100-pound guard rails are used. At the frog of switch 5 the gage was 4 feet 8-5/8 inches.

The automatic train-stop system is of the intermittent, mechanical-trip type. The signals are of the color-light type and the circuits are arranged with one block overlap so that aspects for two blocks in advance are displayed. Signals 393, 395, 397, 399, 399A and 6LB, governing east-bound movements in Tunnel H, are located, respectively, 1,575, 1,163, 804, 399, 299 and 125 feet west of the point where the accident occurred. Signal 399B is located 5 feet east of the point of accident. Signal 229, governing east-bound movements in Tunnel F, is located 131 feet east of the point of accident and 46 feet east of switch 5. All signals enumerated are located south of the track except signal 399B, which is north of the track. Signals 399A, 6LB and 399B are equipped with time control which is effective only under certain conditions.

Signal 229 is a time-controlled signal. The interlocking machine at Exchange Place Station is of the electro-pneumatic type, and the switches and train-stop trip arms are operated by compressed air. The aspects and corresponding indications displayed by the signals involved are as follows:

<u>Aspect</u>	<u>Indication</u>
Red-over-yellow	Stop
Green-over-yellow	Proceed prepared to stop at next signal
Green-over-green	Proceed

Operating rules read in part as follows:

103. DEFINITIONS

TIME SIGNAL.--A fixed signal giving the same indications as Home and Distant Signals. A Time Signal will go to clear position only when an approaching train operates at a speed not exceeding the rate of speed for which the Time Signal is set. The Normal position of certain Time Signals is "Stop".

MOTORMEN

213. Should the air brakes become ineffective, the Motorman must notify the Conductor at once and arrange for the use of hand brakes.

226. They must not run trains at a rate of speed exceeding forty (40) miles per hour. Speed must be reduced on all curves signalled by "REDUCE SPEED" Signals and where there are no "Reduce Speed" Signals, they must run cautiously. * * *

Note:-There is no reduce-speed signal between signals 393 and 399B.

In the immediate vicinity of the point where the accident occurred the maximum authorized speed is 12.5 miles per hour.

Description of Accident

The train involved was an east-bound passenger train and consisted of six multiple-unit coaches. All cars were of steel construction. This train was operated from the control station of MU coach 1972, the front unit of the train. A terminal air-brake test was made at Newark, 5.69 miles west of Journal Square,

and the brakes functioned properly at all points where used west of Exchange Place Station. This train departed from Newark at 10:32 p. m., on time, entered the tracks of the Hudson & Manhattan Railroad at Journal Square and departed from that point at 10:42 p. m., according to the records, and while moving at an estimated speed varying from 17 to 50 miles per hour it became derailed on the turnout leading from Tunnel H to Tunnel F.

MU coach 1972 was derailed to the north. It demolished signal 399B and stopped upright and in line with the track, with its front end standing 303 feet east of the first mark of derailment. The first and second cars were separated a distance of 65 feet. The left front corner and the right front corner-post of the first car were damaged as a result of striking the tunnel wall and the signal equipment, and the left side was scraped near the rear end as a result of rubbing against the station platform, which is 3 feet 6 inches above the level of the rails. The second car became detached from its trucks and stopped, badly damaged, in line with the track and leaned to the north at an angle of 45 degrees. The third car became detached from its trucks and stopped, badly damaged, behind the second car. The front end of the fourth car overrode the station platform a distance of about 20 feet, and the rear end remained on its truck but was disengaged from the center plate. This car stopped against the third car, and the third car telescoped the right side of the fourth car a distance of about 3 feet. The rear two cars were neither derailed nor damaged. The track at the west entrance of the station was destroyed.

The accident occurred about 10:48 p. m.

The employees injured were the conductor and two trainmen.

Track Data

Throughout a distance of approximately 200 feet immediately west of the point of derailment, the gage varied from 4 feet 8-3/8 inches to 4 feet 8-3/4 inches. The greatest variation in surface between any two adjacent stations 33 feet apart was 9/16 inch.

According to information furnished by officials of the railroad, the maximum safe speed on the 38°45' curve involved is 19.8 miles per hour, and the overturning speed, 39 miles per hour.

Brake Data

The MU cars involved are equipped with electro-pneumatic and automatic air brakes, schedule AML-E. A safety-control

feature actuated by a contact plunger on the controller handle is provided. If pressure on this plunger is released, the train brakes will apply. Each car is equipped with an automatic train-stop device mounted on the third-rail shoe-beam. If the tripping device at a signal location engages the device mounted on the shoe-beam, the brakes on the train will become applied. The dates that the air brakes on the cars involved were last overhauled varied from January 14 to March 10, 1942.

After the accident, examination of the triple valves of the first four cars disclosed all brakes to be in application position. Before the controller was unlocked, electrical energy was applied to the first car and the brake-valve handle was placed in operating position. The compressor immediately responded and, as the pressures increased, the brake-cylinder piston moved outward. The service and the emergency application of the brake and release therefrom were effected by means of the brake-valve handle involved in the accident, and also by another brake-valve handle. In each instance the brake functioned properly when applied by means of either the electro-pneumatic or the automatic feature. The safety-control feature was tested and functioned as intended.

Discussion

The train involved was moving at a speed variously estimated from 17 to 50 miles per hour when the first unit was derailed to the left on a turnout to the right, the curvature of which was almost 59 degrees. Prior to the time of the accident there was no indication of defective track or equipment, nor of any obstruction on the track. The first mark of derailment was a flange mark across the head of the outside rail. The maximum authorized speed on this turnout was 12.5 miles per hour. The maximum safe speed was 19.8 miles per hour and the overturning speed was 39 miles per hour. Apparently the speed at the time of the accident was more than 19.8 miles per hour but less than 39 miles per hour, because the first mark of derailment indicated that the first unit was not overturned when it crossed the outside rail.

All signals between Newark and the point of accident displayed proceed for this train. Signal 399B, located 5 feet east of the point of derailment, displayed an aspect which required that the train be operated prepared to stop short of signal 229, which was located 126 feet east of signal 399B. The grade in this vicinity was 3.5 percent descending. The motorman said that when his train was at a point about 1,350 feet west of signal 399B, the speed was about 20 miles per hour and he used the electro-pneumatic feature to reduce the speed, but the brakes did not respond. When the train was

about 400 feet west of the point where the derailment occurred, at which point the grade was 3.36 percent descending, the speed had increased considerably, and he placed the automatic brake valve in emergency position, but the speed was not materially reduced. He did not state why he did not use the automatic feature immediately after he found that the electro-pneumatic feature was not effective. The motorman said that the brakes functioned properly when the train stopped at three stations between Newark and the point of accident. During tests made after the accident, the brakes functioned properly. The motorman had worked as a motorman for 16 years in the territory involved.

The signal system was so arranged that if a train exceeded an average speed of 6.6 miles per hour between signals 399B and 229, the train would receive a stop indication at signal 229 and the automatic train-stop system would cause the brakes to become applied if the train passed signal 229 while this signal was displaying stop. Since signal 229 was located east of the point of accident, this signal did not protect movement over the sharp turnout involved. If the signals on the descending grade west of signal 229 had been time signals under all conditions, the train-stop system would have caused the brakes of the train involved to become applied whenever the authorized speed between two signals was exceeded, and undoubtedly this accident would not have occurred.

Cause

It is found that this accident was caused by excessive speed on a sharp curve.

Recommendation

It is recommended that the Hudson & Manhattan Railroad Company install time signals in the territory involved in this accident.

Dated at Washington, D. C., this ninth day of July, 1942.

By the Commission, Commissioner Patterson.

(SEAL)

W. P. BARTEL,
Secretary.