RAILROAD ACCIDENT INVESTIGATION

Report No 3783

HUDSON & MANHATTAN RAILROAD COMPANY

JERSEY CITY, N J

SEPTEMBER 16, 1957

INTERSTATE COMMERCE COMMISSION

Washington

SUMMARY

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DATE	September 16, 1957	
RAILROAD	Hudson & Manhattan	
LOCATION	Jersey City, N J	
KIND OF ACCIDENT	Rear-end collision	
TRAINS INVOLVED	Passenger	Passenger
CONSISTS	4 electrically propelled passenger units	6 electrically propelled passenger units
SPEEDS	Standing	Undetermined
OPERATION	Signal indications	
TRACK	Double, tangent, 0 8 percent descending grade eastward	
WEATHER	Clear	
TIME	5.00 p m	
CASUALTIES	22 injured	
CAUSE	Failure to operate following train in accordance with signal indications, and failure of intermittent mechanical-trip train-stop device to function as intended	

INTERSTATE COMMERCE COMMISSION

REPORT NO 3783

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

HUDSON & MANHATTAN RAILROAD COMPANY

April 11, 1958

Accident at Jersey City, N J , on September 16, 1957, caused by failure to operate the following train in accordance with signal indications, and failure of an intermittent mechanical-trip train-stop device to function as intended

REPORT OF THE COMMISSION[1]

TUGGLE Commissioner

On September 16, 1957, there was a rear-end collision between two passenger trains of the Hudson & Manhattan Railroad at Jersey City, N J , which resulted in the injury of 22 passengers This accident was investigated in conjunction with representatives of the New Jersey Board of Public Utility Commissioners

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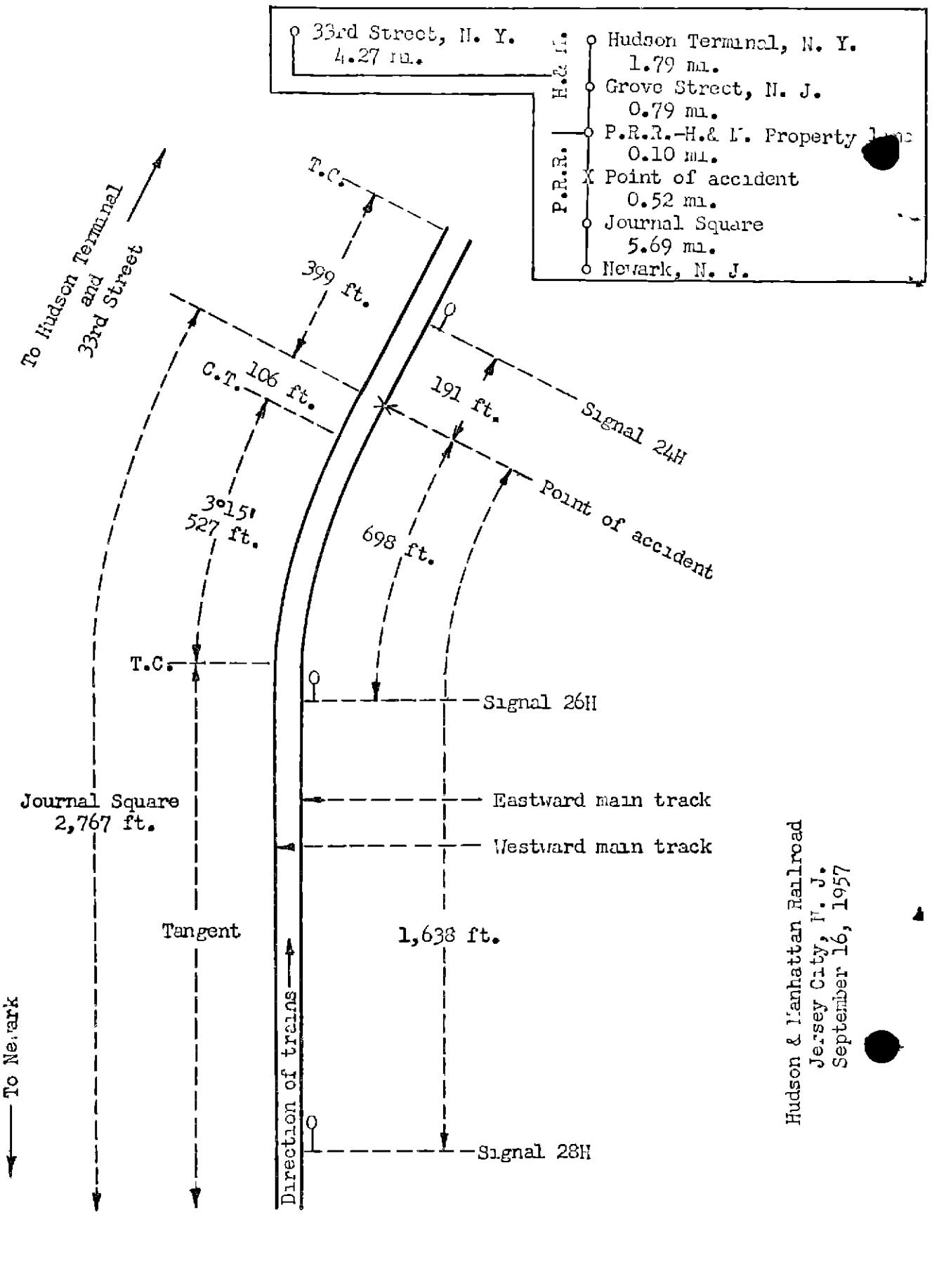
[1] Under authority of section 17 (2) of the *Interstate Commerce Act* the above-entitled proceeding was referred by the Commission to Commissioner Tuggle for consideration and disposition


33rd Street, N. Y.
4.27 mi.
H.& M.
P.R.R.
Hudson Terminal, N. Y.
1.79 mi.
Grove Street, N. J.
0.79 mi.
P.R.R.-H.& M. Property line
0.10 mi.
Point of accident
0.52 mi.
Journal Square
5.69 mi.
Newark, N. J.
To Hudson Terminal and 33rd Street
T.C.
399 ft.
C.T.
106 ft.
191 ft.
Signal 24H
Point of accident
3°15'
527 ft.
698 ft.
T.C.
Signal 26H
Journal Square
2,767 ft.
Eastward main track
Westward main track
Tangent
1,638 ft.
To Newark
Direction of trains
Signal 28H
Hudson & Manhattan Railroad
Jersey City, N. J.
September 16, 1957

Location of Accident and Method of Operation

Tracks of the Hudson & Manhattan Railroad extend eastward from a point 3,272 feet east of the station at Journal Square, Jersey City, N. J., to Hudson Terminal, New York, N. Y., 3.20 miles. At Grove Street Station, Jersey City, 1.41 miles east of Journal Square, tracks diverge northward from these tracks and extend to 33rd Street Station, New York, 4.27 miles. H. & M. trains operating between Journal Square and 33rd Street Station operate over tracks of the Pennsylvania Railroad between Journal Square and the west end of H. & M. tracks, and trains operating between Newark, N. J., 5.69 miles west of Journal Square, and Hudson Terminal operate over P. R. R. tracks through Journal Square between Newark and the west end of H. & M. tracks. The P. R. R. tracks extending between Journal Square and H. & M. tracks are used exclusively for H. & M. operations. In the vicinity of the point of accident this is a double-track line over which trains are operated by signal indications supplemented by an intermittent mechanical-trip, automatic train-stop system. A power rail is provided for the electric propulsion of trains. The accident occurred on the eastward main track at a point 2,767 feet east of Journal Square. From the west there are, in succession, a tangent over 1,000 feet in length, a 3°15' curve to the right 527 feet, and a tangent 106 feet to the point of accident and 399 feet eastward. In the vicinity of the point of accident the grade is 0.8 percent descending eastward.

P. R. R. automatic signals 28H, 26H, and 24H, governing eastbound movements on the eastward main track, are located, respectively, 1,638 feet west, 98 feet west, and 191 feet east of the point of accident. These signals are of the position-light pedestal type and are continuously lighted. Signals 28H, 26H, and 24H display 4 aspects, 3 aspects, and 2 aspects, respectively. An automatic train-stop tripping device is associated with each of these signals. A cut-section is provided between signals 26H and 24H. The insulated joints of this cut-section are located approximately 487 feet east of signal 26H. The aspects of the signals applicable to this investigation, and the corresponding indications and names are as follows:

Signal	Aspect	Indication	Name
28H	Two white lights in vertical position	Proceed	Clear
28H 26H	Two white lights in diagonal position to the right over two white lights in vertical position	Proceed approaching next signal at Medium speed	Approach-medium
28H 26H 24H	Two white lights in diagonal position to the right	Proceed prepared to stop at next signal. Train exceeding Medium speed must at once reduce to that speed	Approach
26H 24H	Two white lights in horizontal position over one white light	Stop, then proceed at restricted speed	Stop-and-proceed

The control circuits are so arranged that when the blocks of signals 28H, 26H, 24H, and the signal in advance of signal 24H are unoccupied, signal 28H indicates Proceed, signal 26H indicates Proceed-approaching-next-signal-at-medium-speed, and signal 24H indicates Proceed-prepared-to-stop-at-next-signal, which is the most favorable aspect this signal can display In the event that the power being supplied to the control circuits of the signal in advance of signal 24H is interrupted and the blocks of signals 28H, 26H, and 24H are unoccupied, signal 28H indicates Proceed-approaching-next-signal-at-medium-speed, signal 26H indicates Proceed-prepared-to-stop-at-next-signal, signal 24H indicates Stop-then-proceed-at-restricted-speed, and the automatic train-stop tripping device of signal 24H is in tripping position In the event that the power being supplied to the control circuits of the signal in advance of signal 24H is interrupted and the block of signal 26H is occupied between the east end of the cut-section and signal 24H, signal 28H indicates Proceed-prepared-to-stop-at-next-signal, signals 26H and 24H each indicate Stop-then-proceed-at-restricted-speed and the automatic train-stop tripping device of both signals is in tripping position *In the event that a train passes signal 26H while the automatic train-stop* tripping device of that signal is in tripping position, the tripping device will move to non-tripping position about 2 seconds after the track circuit is shunted

P R R operating rules read in part as follows

DEFINITIONS

SPEEDS

MEDIUM SPEED--Not exceeding one-half the speed authorized for passenger trains but not exceeding 30 miles per hour

RESTRICTED SPEED—Not exceeding 15 miles per hour prepared to stop short of train, obstruction or switch not properly lined and to look out for broken rail

P R R timetable special instructions read in part as follows

Manual Release of Automatic Train-Stops (Trippers)

1299-A2 Release mechanism is located in case adjacent to signal

When a train equipped with automatic train stops (trippers) is stopped by a signal at which an automatic train stop is located, to enable the train to proceed the Conductor or Engineman, or such person as may be designated, must be governed as follows

Place P R R switch key in slot in small iron case and turn key to right, holding for five seconds or until it is known automatic train stop is down, key may then be removed and train proceed in accordance with signal indication * * *

The maximum authorized speed in the vicinity of the point of accident is 40 miles per hour

Description of Accident

Trains operating over the H & M are not assigned numbers but are designated by the departure time from the initial terminal At the time the accident occurred eastern daylight saving time was being used by the H & M , and that time is used in this report

The 4 57 p m train from Journal Square, an eastbound passenger train consisted of four

electrically propelled passenger units, coupled in multiple-unit control These units are of all-steel construction This train departed from Journal Square approximately on time, passed signal 28H, which indicated Proceed, passed signal 26H, which indicated Proceed-approaching-next-signal-at-medium-speed, and stopped at signal 24H, which indicated Stop-and-proceed-at-restricted-speed A short time later the rear end of this train was struck by the 4 49 p m train from Newark The accident occurred at a point 2,767 feet east of Journal Square

The 4 49 p m train from Newark, an eastbound passenger train consisted of six electrically propelled passenger units, coupled in multiple-unit control These units are of all-steel construction This train departed from Journal Square at 4 59 p m , on time, passed signal 28H, which should have indicated Proceed-prepared-to-stop-at-next-signal, passed signal 26H, which indicated Stop-and-proceed-at-restricted-speed with the automatic train-stop tripping device in tripping position, and while moving at an undetermined speed it struck the rear end of the 4 57 p m train from Journal Square

The preceding train was moved eastward a distance of about 20 feet as a result of the collision No equipment of either train was derailed The second unit of the preceding train was somewhat damaged, and the third and fourth units were considerably damaged The first unit of the following train was heavily damaged

The weather was clear at the time of the accident, which occurred about 5 00 p m

Two types of automatic train-stop valves are in use on equipment operating over the H & M The type provided for units operating between Newark and Hudson Terminal consists of a valve body with a plunger for actuating the valve mechanism, and a timing reservoir It is so constructed that brake-pipe air is vented to the atmosphere at an emergency rate when the plunger is moved upward by a vertical force The length of time that the venting valve remains open is governed by the volume of the timing reservoir, and in the instant case is about 22 seconds Guards are provided at the front and rear of the plunger to prevent the operation of the plunger by any force not not directed vertically upward One valve is mounted on the shoe-beam beneath each control compartment of the unit and when properly adjusted the plunger will engage the tripper of the automatic train-stop tripping device when the device is in tripping position

The wayside automatic train-stop tripping devices are operated electropneumatically The operating mechanism of each device is located between the rails A shaft extends at right angles to the track and to the outside of each rail The tripper arms for the type of automatic train-stop valve involved in this accident are located on the right side of the shaft relative to the direction of the current of traffic In non-tripping position the tripper arms are at an angle of approximately 45 degrees In moving to tripping position the shaft turns through an angle of approximately 45 degrees placing the tripper arms in vertical position

Discussion

As the 4 57 p m train from Journal Square was approaching signal 24H a power failure occurred interrupting the power being supplied to the control circuits of the signal in advance of signal 24H causing signal 24H to indicate Stop-then-proceed-at restricted-speed and the automatic train-stop device of that signal to move to tripping position In order to pass the signal without receiving an automatic brake application the tripping arm of the train-stop device is required to

be in non-tripping position The motorman of the 4 57 p m train from Journal Square was engaged in manually securing the tripping arm in non-tripping position when the collision occurred

As the 4 49 p m train from Newark was approaching the point of accident the motorman was in the control compartment at the front end of the first unit The brakes of this train had functioned properly when used en route The motorman said that signal 28H indicated Proceed and that the speed of the train was about 35 miles per hour when it passed that signal He said that because of the sun shining on the lenses of signal 26H he could not distinguish the aspect until the train was about 100 feet west of the signal When he observed that the signal indicated Stop-then-proceed-at-restricted-speed he initiated a service brake application He said that the automatic train-stop valve was not actuated on the first unit of the train when that unit passed the tripping device He said that he then initiated an emergency brake application and that he placed the controls in reverse position before the collision occurred

After the accident occurred tests were performed in the vicinity of signal 26H using the units of the following train involved in the accident in the same order as at the time of the accident It was found that either an emergency application or an electropneumatic service application of the brakes initiated at a point 100 feet west of the signal while the train was moving at an estimated speed of 35 miles per hour would stop the train short of the point of collision Three test runs were made with the automatic train-stop tripping device of signal 26H in tripping position In each instance the tripping device failed to actuate the train-stop valve of the first unit of the train, and in one instance it failed to actuate the train-stop valves of the first two units When the train was operated over the tripping device in tripping position at an estimated speed of 35 miles per hour and an emergency application was obtained by actuation of the train-stop valve of the second unit, the train stopped with the front end 142 feet east of the point of collision

Examination of the equipment after completion of the tests disclosed that the automatic train-stop valve located on the right side at the front end of the first unit of the train was 1/4 inch higher than permitted by the specifications of the carrier and, as a result, the valve was not actuated when the unit moved over the tripping device of signal 26H This condition was not in conformity with Section 136 560 of the Commission's Rules, Standards and Instructions, which became effective on October 1, 1950

Inspection and tests of the signal apparatus in the vicinity of the point of accident were begun by forces of the P R R signal department about 1 hour after the accident occurred No condition was found which would have caused an improper operation of the signal system

It is apparent that the motorman of the following train was mistaken and that signal 28H indicated Proceed-prepared-to-stop-at-next-signal instead of Proceed when the train was approaching the point of accident

Cause

This accident was caused by failure to operate the following train in accordance with signal indications, and failure of an intermittent mechanical-trip train-stop device to function as intended

Dated at Washington, D C , this eleventh day of April, 1958

By the Commission, Commissioner Tuggle

(SEAL)

HAROLD D McCOY,

Secretary