

INTERSTATE COMMERCE COMMISSION
WASHINGTON

INVESTIGATION NO. 2521
THE NEW YORK, NEW HAVEN AND HARTFORD
RAILROAD COMPANY
REPORT IN RE ACCIDENT
NEAR KENT, CONN., ON
AUGUST 28, 1941

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SUMMARY

Railroad: New York, New Haven and Hartford
Date: August 28, 1941
Location: Kent, Conn.
Kind of accident: Derailment
Train involved: Passenger
Train number: Extra 1307 South
Engine number: 1307
Consist: 6 cars
Estimated speed: 40-55 m. p. h.
Operation: Timetable, train orders and
manual-block system
Track: Single; 7°14' curve to left;
grade level
Weather: Clear
Time: About 11:08 a. m.
Casualties: 2 killed; 27 injured
Cause: Accident caused by excessive
speed on sharp curve

INTERSTATE COMMERCE COMMISSION

INVESTIGATION NO. 2521

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

November 3, 1941.

Accident near Kent, Conn., on August 28, 1941, caused by
excessive speed on a sharp curve.

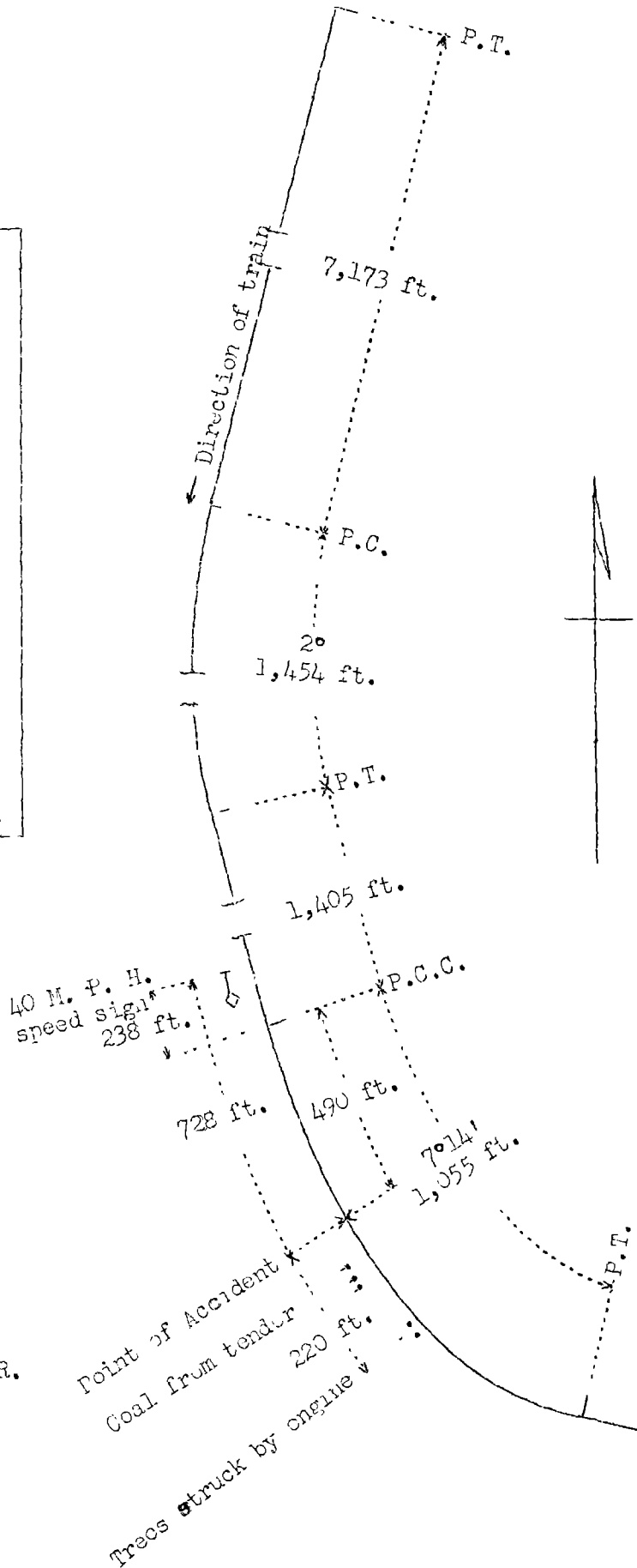
REPORT OF THE COMMISSION¹

PATTERSON, Commissioner:

On August 28, 1941, there was a derailment of a passenger train on the New York, New Haven and Hartford Railroad near Kent, Conn., which resulted in the death of 2 train-service employees, and the injury of 25 passengers, 1 railway employee and 1 train-service employee. This accident was investigated in conjunction with a representative of the Connecticut Public Utilities Commission.

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.

o	Pittsfield, Mass.
	10.75 mi.
o	Lee
	5.90 mi.
o	Stockbridge, Mass.
	21.05 mi.
o	Canaan, Conn.
	5.67 mi.
o	Falls Village
	6.13 mi.
o	West Cornwall
	4.10 mi.
o	Cornwall Bridge
	0.41 mi.
o	Belsprings
	8.18 mi.
o	Kent
	2.88 mi.
X	Point of Accident
	21.04 mi.
o	Berkshire Jct., Conn.



Inv-2521
 N. Y., N. H. and H. R. R.
 Kent, Conn.
 August 28, 1941

Location of Accident and Method of Operation

This accident occurred on that part of the New Haven Division which extends between Pittsfield, Mass., and Berkshire Junction, Conn., a distance of 86.11 miles. In the vicinity of the point of accident this is a single-track line over which trains are operated by timetable, train orders and a manual-block system. The accident occurred at a point 2.87 miles south of Kent. As the point of accident is approached from the north there are, in succession, a tangent 7,173 feet in length, a 2° curve to the left 1,454 feet, a tangent 1,405 feet, and a compound curve to the left 1,055 feet in length, the curvature of which is 4°47'30.5" for 220 feet, 7°14' for 479 feet and 4°14' for 356 feet. The accident occurred on this latter curve at a point 490 feet south of its northern end where the curvature is 7°14'. The grade for south-bound trains is, successively, 0.20 percent descending 3,420 feet and level 3,680 feet to the point of derailment.

On the curve involved the track structure consists of 107-pound rail, 39 feet in length, rolled in February, 1926, and relaid in May, 1936, on an average of 22 treated ties to the rail length; it is fully tieplated with single-shoulder plates, single-spiked, provided with six rail anchors per rail length, and is ballasted with gravel to a depth of 18 to 24 inches. The maximum superelevation was 6 inches and the gage varied between 4 feet 8-7/16 inches and 4 feet 9-5/16 inches. At the point of derailment the superelevation was 5-5/8 inches and the gage was 4 feet 8-7/8 inches.

In the vicinity of the point of accident the track is laid in a rock cut. The south end of the west bank of this cut is about 75 feet south of the point of derailment. South of the rock cut the track is laid on a fill and parallels generally the east shore of Hatch's pond. At the time and place of the accident the shore-line was about 15 feet horizontally distant from the center-line of the track.

Operating rules read in part as follows:

DEFINITIONS

Pilot.--An employee assigned to a train when the engineman or conductor, or both, are not fully acquainted with the physical characteristics or rules of the railroad, * * * .

On this line the maximum authorized speed for passenger trains is 50 miles per hour and on the curve involved, 40 miles per hour. A speed-limit sign bearing the numerals "40" is located 238 feet north of the north end of the curve.

Description of Accident

Extra 1307, a south-bound passenger train, consisted of engine 1307, of the 4-6-2 type, and six coaches. All cars were of steel construction. The brakes of this train were tested at Pittsfield, 62.19 miles north of Kent, and they functioned properly at all points where used en route. This train departed from Pittsfield at 8:40 a. m., according to the dispatcher's record of movement of trains, departed from Falls Village, 18.82 miles north of Kent, at 10:43 a. m., passed Cornwall Bridge, 8.59 miles north of Kent, at 10:57 a. m., passed Kent, the last open office, at 11:05 a. m., and, while moving on a curve to the left at an estimated speed of 40 to 55 miles per hour, it became derailed to the right at a point 490 feet south of the north end of the curve.

The engine was in good mechanical condition and there was no indication of dragging equipment or of any obstruction having been on the track. At the point of derailment the specified curvature was 7°14' and the specified superelevation was 5-5/8 inches. The first mark on the track structure was a flange mark which indicated that a wheel climbed upward to the head of the high rail, crossed diagonally to a point 7.5 feet farther south, then dropped outside the head of the rail, and at a point 2.6 feet farther south it dropped to the outside base of the rail. At a point 3 feet farther south there was a flange mark on the head of a spike. From this spike southward a flange mark extended diagonally outward on the ties a distance of 16 feet to the end of a tie. From this point southward throughout a distance of 145 feet the track was destroyed. From the first mark of derailment to the point where the track was destroyed there was no mark of derailment on the low rail or between the rails.

Engine 1307 became derailed, overturned to the right and slid on its right side to a point 220 feet south of the first mark of derailment, where it struck two trees 12.5 feet west of the track; then it returned to upright position, overturned to the left, and stopped on its left side in the pond and at an angle of 45 degrees to the track. The front end was 309 feet south of the point of derailment and 33 feet west of the center-line of the track. The rear end was 62 feet west of the track. The smokebox and the front-end appliances, the cab and the pilot were demolished. All the jacket and the lagging were stripped from the boiler. At the side center-line of the boiler the right side of the first, second and third boiler courses were dented inward about 1 inch. About 480 square inches of the area of the firebox wrapper sheet was dented inward, and a total area of 1,500 square inches was damaged. This damaged area was bounded by the throat-sheet seam in front, the fifteenth longi-

tudinal row of staybolts at the top, the twelfth transverse row of staybolts at the rear, and the fifth longitudinal row of staybolts at the bottom. Starting at the throat-sheet seam and extending toward the back-head a distance of about 27 inches, the wrapper sheet was torn along the twelfth longitudinal row of staybolts. About 100 staybolts were loosened and 26 were pulled out. The right side-sheet was bulged in the area opposite the damaged area of the right wrapper sheet. The back flue-sheet was bent at the seam with the right side-sheet. The right No. 1 engine-truck pedestal was broken. The engine-truck frame, the trailer-truck frame, and the tail casting were bent. The engine truck became detached and stopped in the pond about 27 feet south of the engine and 50 feet west of the track. The tender frame remained attached to the engine and stopped, demolished, at right angles to the engine. The drawbar and the safety bars were considerably twisted. Both tender trucks were detached and stopped about 200 feet south of the point of derailment. The trucks were reversed and the right wheels were between the rails and the left wheels were outside the right rail. The cistern was torn from the frame and stopped, demolished, 52 feet south of the frame and 105 feet west of the track. Coal was spilled from the tender at points 40 feet, 44 feet and 65 feet south of the point of derailment, and 12 feet west of the track. The first car was derailed and stopped, badly damaged, upright and partially submerged, at the rear of the engine and at right angles to it. The front end and the rear end were, respectively, 100 feet and 20 feet west of the track. Both trucks were detached, the front vestibule was demolished, the rear vestibule was crushed, and the front coupler was broken. The left side-sill, the end-sills, the left side-sheets, the floor supports, and the bolsters were bent. The second car was derailed to the right and stopped on the shore of the pond, practically upright, parallel to the track and 18 feet west of it. Both trucks were detached and both vestibules were badly damaged. The right side-sheets and the right side-sill were bent. The third car was derailed and stopped, upright, to the rear of the second car, with its front end in the pond and 50 feet west of the track and its rear end on the roadbed. The right side-sheets, the right side-sill, the right side-plate, and the left inside deck-sill were bent. The rear vestibule end-sheets were torn and the end-sill was bent. The front truck was detached. The front truck of the fourth car was derailed to the left and the car leaned against the east wall of the rock cut. The fifth and sixth cars were not derailed but were slightly damaged.

The weather was clear at the time of the accident, which occurred about 11:08 a. m.

The train-service employees killed were the engineer and a pilot engineer, and the train-service employee injured was the fireman.

Mechanical Data

After the accident an inspection of the engine and the tender disclosed that all flanges were of good contour and there was no indication of cutting. The engine-truck castings were well lubricated and conformed to the prescribed requirements. After the engine was replaced on the track all springs were level and the springs, spring-hangers and equalizers were in good condition. All driving-box shoes and wedges were well lubricated and moved freely.

The back-to-back measurements of the wheels of the engine were as follows:

<u>Wheel location</u>	<u>Position 0°</u>	<u>Position 90°</u>	<u>Position 180°</u>	<u>Position 270°</u>
Engine truck				
No. 1	53-5/32"	53-3/16"	53-7/32"	53-3/16"
No. 2	53-3/16"	53-13/64"	53-7/32"	53-13/64"
No. 1 driving	53-3/32"	53-7/64"	53-5/32"	53-7/64"
No. 2 driving	53-5/32"	53-11/64"	53-3/16"	53-11/64"
No. 3 driving	53-3/32"	53-1/8"	53-9/16"	53-1/8"
Trailer truck	53-3/32"	53-7/64"	53-9/64"	53-7/64"
No. 1 tender truck*	53"	---	53-1/2"	---
No. 2 tender truck	53-5/32"	53-11/64"	53-3/16"	53-11/64"
No. 3 tender truck*	53-1/16"	---	53-9/16"	---
No. 4 tender truck	53-3/16"	53-3/16"	53-13/64"	53-3/16"

*Tender trucks remained on roadbed and were struck by derailed cars. The axles were bent as a result of the derailment.

Measurements of lateral motion and tread wear were as follows:

<u>Wheel location</u>	<u>Lateral</u>	<u>Tread wear</u>		<u>Diameter</u>	
		<u>Left</u>	<u>Right</u>	<u>Left</u>	<u>Right</u>
Engine truck					
No. 1	1/4"	1/64"	1/64"	32-9/16"	32-9/16"
No. 2	5/16"	1/64"	1/64"	32-41/64"	32-5/8"
No. 1 driving	7/32"	1/32"	1/32"	72-11/16"	72-11/16"
No. 2 driving	3/8"	1/32"	1/32"	72-23/32"	72-11/16"
No. 3 driving	5/16"	1/32"	1/32"	72-23/32"	72-11/16"
Trailer truck	3/8"	1/64"	1/64"	42"	42"
No. 1 tender truck	---	1/64"	1/64"		
No. 2 tender truck	---	1/64"	1/64"		
No. 3 tender truck	---	1/64"	1/64"		
No. 4 tender truck	---	1/64"	1/64"		

The total weight of engine 1307 in working order is 251,500 pounds, distributed as follows: Engine truck, 49,000 pounds; driving wheels, 154,000 pounds; and trailer truck, 48,500 pounds. The diameters of the engine-truck wheels, the driving wheels, and the trailer-truck wheels are, respectively, 33, 73, and 42 inches. The tender is rectangular in shape and has two four-wheel trucks. The weight of the tender loaded is 132,600 pounds. The rigid wheelbase of the engine is 14 feet 1 inch, and the total length of the wheelbase is 35 feet 5-1/2 inches. The total length of the engine and tender is 70 feet 1/8 inch. The engine and tender are provided with No. 6-ET brake equipment. The last Class 3 repairs were completed on June 21, 1941, at Readville Shop, and the last monthly certificate was issued at Danbury, Conn., on August 27, 1941. The accumulated mileage since the last class repairs was 7,748 miles. The center of gravity of the engine is 73-5/8 inches above the rails. The center of gravity of the tender loaded is 77-1/4 inches. According to A. R. E. A. superelevation tables, the overturning speed of engine 1307 on the curve involved is 74.5 miles per hour, and of the tender, 72.3 miles per hour.

Track Data

Measurements of the track taken from the northern end of the curve involved to the point of derailment, a distance of 490 feet, were as follows:

<u>Stations</u>	<u>Distance north of point of accident</u>	<u>Degree of Curve</u>	<u>Super- elevation</u>	<u>Gage</u>
P.C.C.	490 feet	0°45'00"	1-5/8"	4' 8-7/16"
1	459 "	1°00'00"	2-1/8"	4' 8-7/16"
2	428 "	2°07'30"	2-1/4"	4' 8-5/8"
3	397 "	2°52'30"	3"	4' 8-15/16"
4	366 "	3°45'00"	4-3/8"	4' 8-11/16"
5	335 "	5°52'30"	4-7/8"	4' 8-15/16"
6	304 "	5°22'30"	5-1/2"	4' 8-11/16"
7	273 "	6°07'30"	5-5/8"	4' 8-15/16"
8	242 "	7°37'30"	5-1/4"	4' 9-5/16"
9	211 "	7°15'00"	5-5/8"	4' 9-1/4"
10	180 "	6°30'00"	6"	4' 8-7/8"
11	149 "	7°07'30"	6"	4' 8-3/4"
11.5	133.5 "	---	5-3/4"	4' 9-1/16"
12	118 "	6°45'00"	5-7/8"	4' 8-7/8"
12.5	102.5 "	---	5-1/2"	4' 9-1/16"
13	87 "	7°45'00"	5-3/8"	4' 9-1/8"
13.5	71.5 "	---	5-3/8"	4' 9-5/16"
14	56 "	8°03'45"	5-3/4"	4' 8-15/16"
14.5	40.5 "	---	5-5/8"	4' 8-15/16"
15	25 "	7°00'00"	5-3/4"	4' 9"
15.5	9.5 "	---	5-5/8"	4' 9-5/16"
P. of D.	6.0 "	7°14'00"	5-5/8"	4' 8-7/8"

A special notice held by the crew of Extra 1307, dated August 26, 1941, provided that a summer-camp special train would be operated on August 28, 1941, and would leave Stockbridge, Mass., 45.54 miles north of Kent, at 9:45 a. m., and would arrive at Danbury, Conn., 26.97 miles south of Kent, at 11:30 a. m. On the day of the accident, Extra 1307 was being operated as this summer-camp special train.

Discussion

Extra 1307 was derailed to the right when the train was moving at an estimated speed of 40 to 55 miles per hour on a compound curve to the left, on which the maximum authorized speed was 40 miles per hour. At the point of derailment the curvature was 7°14' and the superelevation was 5-5/8 inches. According to data submitted by the carrier the overturning speeds of the engine and tender on the curve involved are, respectively, 74.5 and 72.3 miles per hour. According to A. R. E. A. tables, the maximum safe speed on a 7°14' curve having a superelevation of 5-5/8 inches is about 49 miles per hour. There was no defective condition of the engine, no dragging equipment, and no obstruction on the track.

The first mark of derailment indicates that a wheel was thrust hard against the head of the high rail, climbed to the top of the rail, moved diagonally a distance of 7.5 feet and dropped outside the rail. There was no corresponding mark between the rails at these points. Apparently the tender was the first to become derailed. The fireman was on the deck of the engine and observed the tender swing to the left, then thrust hard to the right and overturn. An assistant trainmaster, who was in the first car, observed through the end door the low side of the tender rise immediately before the derailment occurred. The engine did not move in a tangential direction after it became derailed; this fact combined with the fact that coal from the tender was on the ground only 40 feet south of the point of derailment indicates that the tender was the first to be derailed and that the engine was then pulled from the track by the derailed tender.

According to the statement of the fireman, because the engineer in charge was not operating the train fast enough for it to arrive in Danbury, about 27 miles south of Kent, at 11:30 a. m., as planned for the movement of this train, the pilot engineer took charge of the engine about 8 miles north of the point where the accident occurred. After the pilot took charge of the engine the speed was increased. On a curve north of the one involved the speed was greater than the maximum authorized speed. As the train was approaching the curve involved the speed was about 55 miles per hour and the pilot made two brake-pipe reductions and the throttle was half-open. Just as the engine entered the curve the fireman indicated to the pilot that the speed was high, but the pilot did not reply. The fireman was not certain whether the brakes remained applied. In a later statement the fireman said that the throttle was closed and the speed was reduced to about 40 miles per hour as the engine entered the curve. Other members of the crew estimated that the speed did not exceed 40 miles per hour; however, statements of some of the passengers indicate that the speed was about 55 miles per hour. Since apparently all factors that could cause or contribute to the cause of the derailment, except the factor of speed, are eliminated, undoubtedly the estimates of speed given by members of the crew were lower than the actual speed of the train. Apparently the speed was sufficiently high for the tender to sway and to lurch laterally enough for one of the right wheels to climb to the head of the high rail. It could not be determined why proper action was not taken to control the speed of the train, as both the engineer and the pilot were killed in the accident.

The maximum authorized speed for this train in the territory immediately north of the curve involved was 50 miles per hour. The sign limiting the speed to 40 miles per hour on this curve was located only 238 feet north of the north end of the curve. It is apparent that it is necessary to take action at some point north of the sign to reduce speed before an engine moving at a speed of 50 miles per hour enters the curve.

Cause

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

Dated at Washington, D. C., this third day of November, 1941.

By the Commission, Commissioner Patterson.

(SEAL)

W. P. BARTEL,

Secretary.