

RAILROAD ACCIDENT INVESTIGATION

Report No 3802

THE CHESAPEAKE AND OHIO RAILWAY COMPANY

THURMOND, W VA

JUNE 22, 1958

INTERSTATE COMMERCE COMMISSION

Washington

SUMMARY

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DATE	June 22, 1958	
RAILROAD	Chesapeake and Ohio	
LOCATION	Thurmond, W Va	
KIND OF ACCIDENT	Rear-end collision	
TRAINS INVOLVED	Passenger	Freight
TRAIN NUMBERS	1	Extra 7049 West
LOCOMOTIVE NUMBERS	Diesel-electric units 4021 and 4028	Diesel-electric units 7049, 7542, 7531, and 7046
CONSISTS	12 cars	143 cars, caboose
ESTIMATED SPEEDS	Standing	12 m p h
OPERATION	Timetable, train orders, and automatic block-signal system	
TRACKS	Double, 1°45' curve, 0.08 percent descending grade westward	
WEATHER	Raining	
TIME	1 34 a m	
CASUALTIES	7 Injured	
CAUSE	Failure to operate following train in accordance with signal indications, and failure of train-brake system to function properly as a result of partially closed angle cock	

INTERSTATE COMMERCE COMMISSION

REPORT NO 3802

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

THE CHESAPEAKE AND OHIO RAILWAY COMPANY

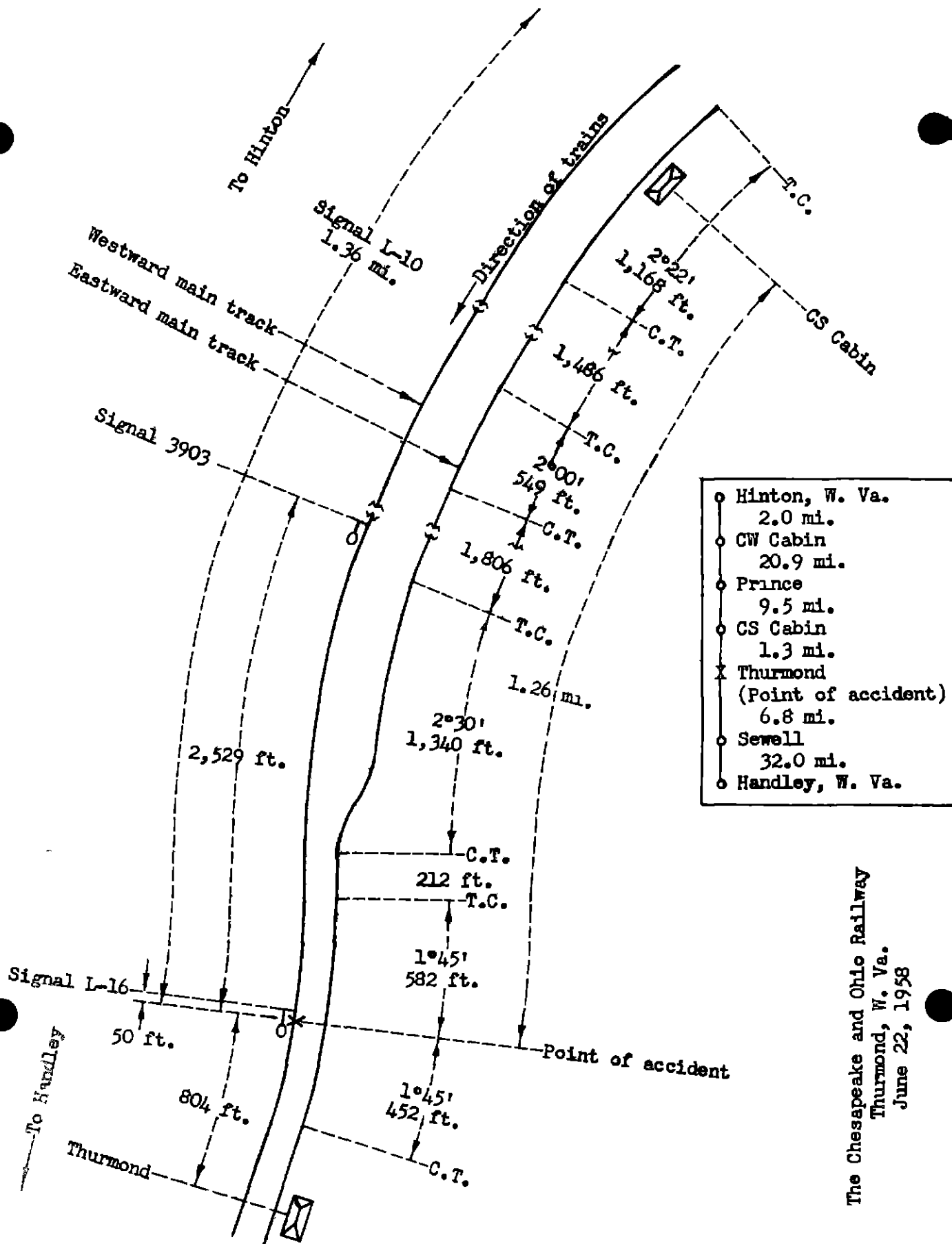
September 2, 1958

Accident at Thurmond, W Va , on June 22, 1958, caused by failure to operate the following train in accordance with signal indications, and by failure of the train-brake system to function properly as a result of a partially closed angle lock

REPORT OF THE COMMISSION¹*TUGGLE, Commissioner*

On June 22, 1958, there was a rear-end collision between a passenger train and a freight train on the Chesapeake and Ohio Railway at Thurmond, W Va , which resulted in the injury of 1 passenger, 1 sleeping-car porter not on duty, 2 dining-car employees not on duty, and 3 train-service employees

¹Under 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



The Chesapeake and Ohio Railway
 Thurmond, W. Va.
 June 22, 1958

Location of Accident and Method of Operation

This accident occurred on that part of the Hinton Division extending between Hinton and Handley, W Va , 72.5 miles. In the vicinity of the point of accident this is 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. The accident occurred on the westward main track at a point 33.7 miles west of Hinton and 804 feet east of the station at Thurmond. From the east on the westward main track there are, in succession, a 2°22' curve to the left 1,168 feet in length, a tangent 1,486 feet, a 2°00' curve to the left 549 feet, a tangent 1,806 feet, a 2°30' curve to the left 1,340 feet, a tangent 212 feet, and a compound curve to the right, having a maximum curvature of 1°45', 582 feet to the point of accident and 452 feet westward. Throughout a distance of 7,182 feet east of the point of accident the grade for westbound trains is an average of 0.097 percent descending and is 0.08 percent descending at the point of accident.

Semi-automatic signal L-10, automatic signal 3903, and semi-automatic signal L-16, governing westbound movements on the westward main track, are located, respectively, 1.36 miles, 2,529 feet, and 50 feet east of the point of accident. These signals are of the color-light type and are continuously lighted. All units are equipped with spreadlight lenses. Semi-automatic signal L-10 is controlled from the interlocking at CS Cabin, 1.26 miles east of the point of accident, and semi-automatic signal L-16 is controlled from the station at Thurmond. The aspects applicable to this investigation and the corresponding indications and names are as follows:

Signal	Aspect	Indication	Name
L-10	Green-over-red	Proceed	Clear
	Yellow-over-green	Approach next signal at not exceeding medium speed	Approach-Medium
3903	Green-over-number-plate	Proceed	Clear
	Yellow-over-number-plate	Proceed prepared to stop at next signal, train exceeding medium speed must at once reduce to that speed	Approach
L-16	Green-over-red	Proceed	Clear
	Red-over-red	Stop.	Stop

The controlling circuits are so arranged that when the block of signal L-16 is occupied, signal L-10 displays an Approach-Medium aspect, signal 3903 displays an Approach aspect, and signal L-16 displays a Stop aspect.

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

DEFINITIONS

SPEEDS

MEDIUM SPEED — One half maximum authorized speed but not to exceed 30 miles per hour

OPERATING RULES

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

35 The following signals will be used by flagmen

* * *

Night Signals—A red light,
A white light,
Torpedoes and fuses

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 fuses. When recalled and safety to the train will permit, he may return. When the conditions require, he will leave the torpedoes and a lighted fusee

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Except in emergency, * * * fuses and torpedoes will not be used by trainmen in automatic block signal territory

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RULES GOVERNING THE MOVEMENT
OF TRAINS WITH THE CURRENT
OF TRAFFIC ON TWO OR
MORE TRACKS BY
BLOCK SIGNALS

D-251 On portions of the road so specified on the timetable (or by special instructions), trains will run with the current of traffic by block signals whose indications will supersede timetable superiority

Timetable special instructions require that trains be operated in accordance with rule D-251 between Hinton and Sewell, 40.5 miles west of Hinton

The maximum authorized speed is 50 miles per hour for passenger trains and 35 miles per hour for freight trains

Description of Accident

No. 1, a westbound first-class passenger train, consisted of diesel-electric units 4021 and 4028, coupled in multiple-unit control, 1 mail car, 1 baggage car, 2 coaches, 3 sleeping cars, 1 dining car, 1 coach, 2 sleeping cars, and 1 business car, in the order named. The 3rd to the 11th cars, inclusive, were of lightweight steel construction and were equipped with tightlock couplers. The other cars were of conventional all-steel construction. This train departed from Hinton at 12:28 a. m., on time, departed from Prince, 22.9 miles west of Hinton, at 1:03 a. m., 6 minutes late, passed signal L-10, which displayed a Proceed aspect, passed CS Cabin, the last open office, at 1:15 a. m., 5 minutes late, passed signals 3903 and L-16, which displayed Proceed aspects, and stopped at the station at Thurmond at 1:18 a. m. About 16 minutes later the rear end was struck by Extra 7049 West.

Extra 7049 West, a westbound freight train, consisted of diesel-electric units 7049, 7542, 7531, and 7046, coupled in multiple-unit control, 143 cars, and a caboose. This train departed from CW Cabin 2 0 miles west of the station at Hinton, at 12 40 a m, passed signal L-10, which displayed an Approach-Medium aspect, passed CS Cabin at 1 32 a m, passed signal 3903, which displayed an Approach aspect, passed signal L-16, which displayed a Stop aspect, and while moving at an estimated speed of 12 miles per hour it struck the rear end of No 1.

No 1 was moved westward a distance of 112 feet by the force of the impact. There were no separations between units of the train. The rear trucks of the 3rd and 4th cars, all trucks of the 5th to the 8th cars, inclusive, and the rear truck of the 12th car were derailed. These cars stopped up-right and in line with the track. The 12th car was heavily damaged. The 1st car, and the 3rd to the 9th cars, inclusive, were considerably damaged. The 9th to the 11th cars, inclusive, were slightly damaged. The front truck of the 1st diesel-electric unit of Extra 7049 West, and the 71st car to the 73rd car, inclusive, were derailed and stopped on or near the track structure. Separations occurred at both ends of the derailed cars. The 72nd car was destroyed, and the 1st diesel-electric unit was heavily damaged. The other diesel-electric units, and the 71st car, 73rd car, and 74th car were slightly damaged.

The engineer of No 1, and the engineer and the front brakeman of Extra 7049 West were injured.

It was raining at the time of the accident, which occurred about 1 34 a m.

The diesel-electric units of Extra 7049 West were equipped with 24-RL brake equipment. The regulatory devices were adjusted to maintain a maximum main-reservoir pressure of 140 pounds and brake-pipe pressure of 80 pounds. The 1st and 4th diesel-electric units were equipped with speed-recording devices but the devices were not provided with speed-recording tapes.

Discussion

As No 1 was en route from Hinton to Prince the fireman observed sparks flying in the vicinity of the 2nd car of the train. Examination of the car after the train stopped at Prince disclosed that the brake shoes of the rear truck remained in contact with the wheels after the brakes of the train were released. Arrangements were made to have the brakes adjusted at Thurmond. When the train stopped at Thurmond, the flagman alighted on the south side with flagman's signals and stood at the front end of the 11th car. While repairmen were adjusting the brakes of the 2nd car, the engineer applied and released the brakes at their request. He sounded the locomotive horn to indicate the application and release. The flagman said that when he heard the release signal sounded he thought the train was ready to depart. The collision occurred as he was boarding the 11th car at the front end. When the collision occurred the engineer and the fireman were in the control compartment of the 1st diesel-electric unit, and the conductor and the baggageman were in the 2nd car.

As Extra 7049 West was approaching the point where the accident occurred the enginemen and the front brakeman were in their respective positions in the control compartment of the 1st diesel-electric unit, and the conductor and the flagman were in the caboose. The brakes of this

train had been tested at Hinton and no exceptions were taken. The rotair valves of the 1st and 4th diesel-electric units, and the controlled emergency cocks of the 2nd and 3rd diesel-electric units were positioned for freight operation. The engineer said that the speed of the train was controlled en route by use of the dynamic brake and that the automatic brake was not applied between Hinton and CS Cabin. He said that he applied the dynamic brake when the train was approximately 1 mile east of signal L-10 and that the speed of the train was reduced from 36 miles per hour to 21 miles per hour. Signal L-10 displayed an Approach-Medium aspect and the indication was called by members of the crew on the locomotive. The engineer said that the speed of the train was about 20 miles per hour when it passed the signal. Signal 3903 displayed an Approach aspect and the indication was called by the members of the crew on the locomotive. The engineer said that he initiated a 15-pound brake-pipe reduction when the train was approximately 650 feet east of signal 3903 but the exhaust of brake-pipe air from the brake valve was of short duration. He kept the dynamic brake applied and operated the sander valve. He said that the speed of the train was 18 miles per hour when the locomotive passed signal 3903. He said he observed that signal L-16 was displaying a Stop aspect when the train was approximately 2,000 feet east of that signal. He immediately initiated an emergency application of the brakes but he said that the application was ineffective. He estimated that the speed of the train was approximately 6 miles per hour when the collision occurred. Both the fireman and the front brakeman said that the speed of the train was about 30 miles per hour when it passed signal L-10, and that the engineer initiated a service brake application before passing signal 3903. They said that the engineer made the emergency brake application when the train was approximately 1,200 feet east of signal L-16. The brakeman said that the speed of the train was between 20 miles per hour and 25 miles per hour when the locomotive passed signal 3903. Both the fireman and the front brakeman estimated that the speed of the train was approximately 12 miles per hour when the collision occurred. The first the conductor and the flagman became aware of anything being wrong was when the brakes became applied in emergency as a result of the separations which occurred between the derailed cars.

Inspection of the cars of Extra 7049 West approximately 3 hours after the accident occurred disclosed that the brake-pipe angle cock at the front end of the 64th car was partially closed. The angle cock was sealed in the position in which it was found and removed from the car. The brakes of the undamaged cars were tested and it was found that the brakes of 5 cars were inoperative and that the brake-cylinder piston travel of 3 other cars was in excess of 10 inches.

The investigation disclosed that Extra 7049 West was assembled at Clifton Forge, Va., 79 miles east of Hinton, and that the train consisted of the locomotive, 73 cars, and the caboose. The car on which the partially closed angle cock later was found was then the 54th car in the train. The brakes of this train were tested at Clifton Forge and no exceptions were taken. The train was stopped at Covington, Va., 67 miles east of Hinton, by use of the dynamic brake and the independent brake. After the train stopped, a 10-pound brake-pipe reduction was made and 10 cars were added to the front end of the train. The engineer took no exception to the length of time required to exhaust brake-pipe air from the brake valve during the 10-pound reduction. The automatic brake was not used either to stop or to control the speed of the train between Clifton Forge and Hinton, and the stop at Hinton was made by use of the dynamic brake and independent brake. Sixty cars were added to the rear of the train at Hinton.

Examination of the partially closed angle cock, a self-locking type, disclosed no defective condition of the self-locking features, indicating that the handle was not properly positioned in open

position when the train was assembled at Clifton Forge. It was found that the area of the opening of the angle cock in the partially closed position was equivalent to the area of a 25/32-inch orifice. The area of the opening of the angle cock when fully open is equivalent to the area of a 1-1/8-inch orifice. Tests disclosed that at 80 pounds pressure the rate of flow of air through the partially closed angle cock to atmosphere was 161 cubic feet per minute. At 80 pounds pressure the rate of flow of air through the fully opened angle cock to atmosphere is 1,308 cubic feet per minute.

The partially closed angle cock was applied to the front end of the 64th car of a cut of 143 cars, the consist of Extra 7049 West when it departed from Hinton. A 10-pound brake-pipe reduction was made after the air-brake system was fully charged. It was found that the brake-cylinder pressure of the 143rd car was 10 pounds after 10 seconds indicating that the rate of propagation of the quick-service application was normal throughout the length of the train. During the test the brake-valve handle was placed in emergency position 45 seconds after the initial reduction. It was found that an emergency rate of flow through the partially closed angle cock could not be obtained and, as a result, an emergency brake application was not obtained on the cars to the rear of the angle cock. Brake-cylinder pressure and brake-pipe pressure on the 143rd car were 50 pounds and 64 pounds, respectively, 4 minutes 15 seconds after the initial reduction and 3 minutes 30 seconds after the emergency application. It is apparent that the build up of the brake-cylinder pressure at a service rate on the cars to the rear of the partially closed angle cock was impaired to some extent.

Signal L-10 indicated Approach-Medium when Extra 7049 West passed it. Signal 3903 indicated Approach and signal L-16 indicated Stop for this train. Under these circumstances Extra 7049 West was required to approach signal 3903 at not exceeding medium speed, or less than 18 miles per hour, and the indication of that signal further required the speed to be so controlled that the train could be stopped short of signal L-16. Tests made after the accident disclosed that an application of the brakes could be effected throughout the train by a brake-pipe reduction made at the service rate with the engineer's brake valve. It was also found that because of the partially closed angle cock full control of the brakes of the rear portion of the train was impaired. Signals L-10, 3903, and L-16 are so spaced that, under normal conditions, the speed of Extra 7049 West, when approaching signal L-10 at the maximum authorized speed, could be controlled to comply with the indications of those signals by use of a service brake application. It is apparent that the train passed signal 3903 in excess of medium speed. The engineer then underestimated the stopping distance under the conditions existing in approach to signal L-16 and at the time he moved the brake valve handle to emergency position the train could not be stopped short of signal L-16. However, it is possible that this train could have been stopped short of the point of collision if the emergency application of the brakes had been effective throughout the cars of the train.

Rule 99 has not been modified by written instructions. Train-service employees have been instructed by officials of the carrier that the flagman of a passenger train is not required to proceed beyond the rear car of the train in automatic block-signal territory when the train is stopped at a station shown in the timetable schedule. Thurmond is scheduled as a conditional stop for No. 1 in the timetable and it is due to leave that point at 1 12 a. m. During the time that No. 1 was delayed at this station the flagman remained in the vicinity of the front end of the 11th car.

Cause

This accident was caused by failure to operate the following train in accordance with signal indications, and by failure of the train-brake system to function properly as a result of a partially closed angle cock

Dated at Washington, D C , this second
day of September, 1958

By the Commission, Commissioner Tuggle

(SEAL)

HAROLD D McCOY,

Secretary