

RAILROAD ACCIDENT INVESTIGATION

Report No 3865

NORFOLK AND WESTERN RAILWAY COMPANY

THOMAS, VA

DECEMBER 15, 1959

INTERSTATE COMMERCE COMMISSION

Washington



Front end of helper-locomotive 386 shown at right

SUMMARY

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DATE	December 15, 1959	
RAILROAD	Norfolk and Western	
LOCATION	Thomas, Va	
KIND OF ACCIDENT	Collision	
EQUIPMENT INVOLVED	Front portion of train	Helper-locomotive with caboose
TRAIN NUMBER	Extra 369 East	
LOCOMOTIVE NUMBERS	Diesel-electric units 369, 311, 641	Diesel electric units 386, 348, 650, 795
CONSISTS	185 cars	Caboose
SPEEDS	Standing	32 m p h
OPERATION	Signal indications	
TRACK	Double, tangent, 1 72 percent descending grade eastward	
WEATHER	Clear	
TIME	5 03 a m	
CASUALTIES	1 killed, 1 injured	
CAUSE	Failure properly to control the speed of helper-locomotive and ca- boose on a descending grade	
RECOMMENDATION	That the carrier immediately take such measures as may be neces- sary to insure that an emergency brake application initiated at any point or originating from any cause either on the locomotive or in the train-brake system of associated equipment will result in an emergency application of the pneumatic brakes of the lo- comotive	

INTERSTATE COMMERCE COMMISSION

REPORT NO 3865

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

NORFOLK AND WESTERN RAILWAY COMPANY

March 10, 1960

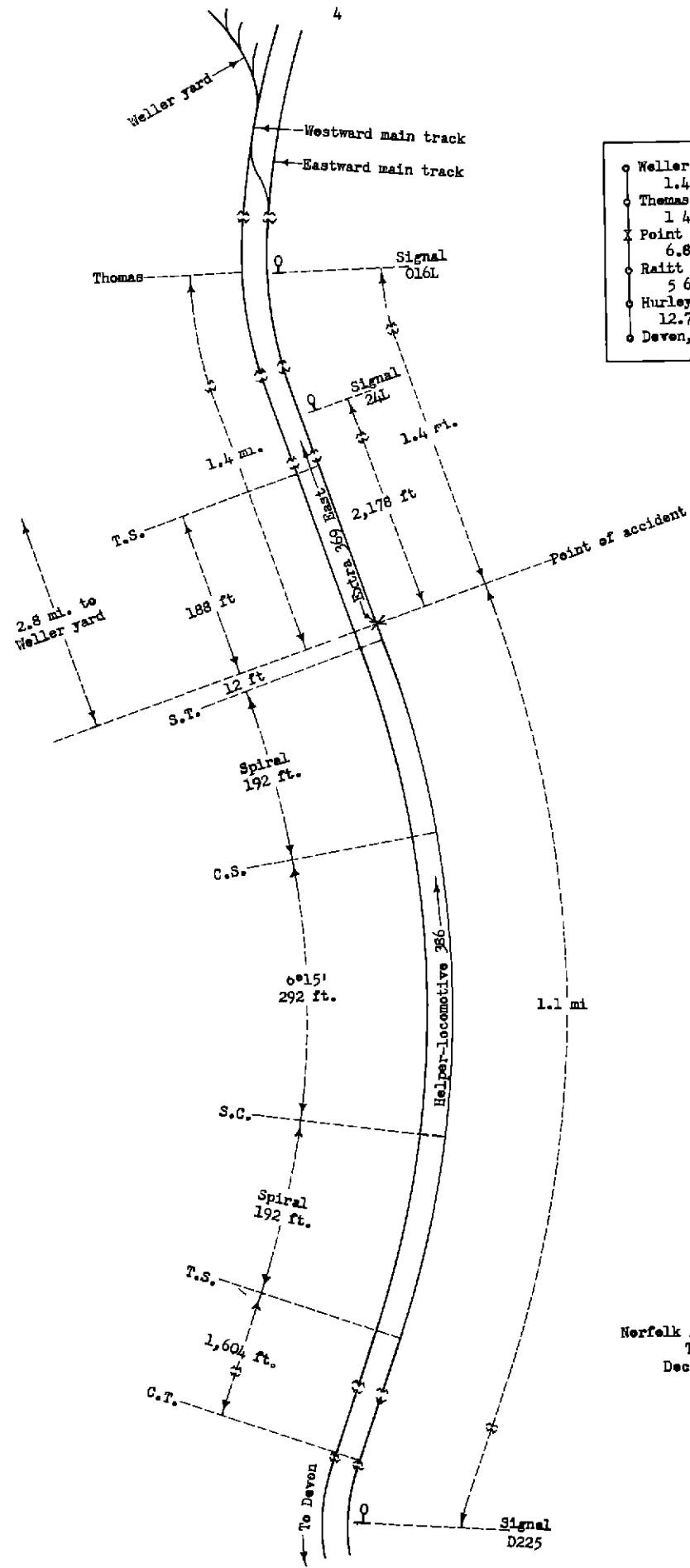
Accident near Thomas, Va , on December 15, 1959, caused by failure properly to control the speed of helper-locomotive and caboose moving on a descending grade

REPORT OF THE COMMISSION¹

ARPAIA, Commissioner

On December 15, 1959, near Thomas, Va , there was a collision between the front portion of a freight train and a helper-locomotive with caboose, which resulted in the death of 1 train-service employee and the injury of 1 train-service employee

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



- Weller Yard, Va. 1.4 mi
- Thomas 1.4 mi
- X Point of accident 6.8 mi
- Raitt 5.6 mi
- Hurley, Va 12.7 mi
- Devon, W. Va.

Norfolk And Western Railway
 Thomas, Va.
 December 15, 1959

Location of Accident and Method of Operation

This accident occurred on that part of the Pocchontas Division extending between Devon, W. Va., and Weller Yard, Va., 27.9 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 signal indications. The accident occurred on the eastward main track at a point 2.8 miles west of Weller Yard and 1.4 miles west of Thomas, Va. From the west there are, in succession, a tangent 1,604 feet in length, a spiral to the left 192 feet, a 6°15' curve to the left 292 feet, a spiral to the left 192 feet, and a tangent 12 feet to the point of accident and 188 feet eastward. In this vicinity the average grade is 1.63 percent descending eastward, and the grade is 1.72 percent descending eastward at the point of accident.

Controlled signals 20L, 14L, 10M, and automatic signals D209 and D225, governing eastbound movements on the eastward main track, are located, respectively, 6.4 miles, 5.2 miles, 4.4 miles, 2.7 miles and 1.1 miles west of the point of accident. Controlled signals 24L and 016L, which also govern eastbound movements on the eastward main track, are located, respectively, 2,178 feet and 1.4 miles east of the point of accident. These signals are of the position-light type and are continuously lighted. The aspects applicable to this investigation and the corresponding indications and names are as follows:

Signal	Aspect	Indication	Name
016L 20L	Three amber lights in horizontal position over one amber light	Stop and Stay	Stop and Stay
20L 14L 10M 24L D209	Three amber lights in diagonal position to the right	Proceed preparing to stop at next signal. Train exceeding medium speed must at once reduce to that speed.	Approach
D225	Three amber lights in horizontal position	Stop, then proceed at low (restricted) speed	Stop and Proceed

The circuits are so arranged that when signal 016L is caused to display a Stop-and-Stay aspect, signal 24L displays an Approach aspect. When the block of signal D225 is occupied, that signal displays a Stop-and-Proceed aspect and signal D209 an Approach aspect. Signals 20L, 14L and 10M each display an Approach aspect if their respective block is unoccupied and the block of the next signal in advance is occupied or the next signal in advance is caused to display a Stop-and-Stay aspect.

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

DEFINITIONS

Low (Restricted) Speed -- A speed that will permit stopping short of another train or an obstruction, but not exceeding 15 miles per hour.

Medium Speed -- One-half the maximum authorized speed, but not to exceed 30 miles per hour.

AUTOMATIC BLOCK SYSTEM RULES

340 When a signal indicates Stop, stop must be made before reaching the signal,
* * *

342 A train stopped by a Stop and Proceed signal may proceed at once, but must run at low (restricted) speed, expecting to find a train * * * or other obstruction in the block

The carrier's rules governing the operation and handling of equipment read in part as follows

72 The automatic brake may be used when dynamic brake is being used. The dynamic brake interlock, when dynamic brake is in use, prevents the automatic brake valve from applying air brakes on the locomotive. The independent brake valve will apply air brakes on locomotive when dynamic brake is in use and must not be applied when dynamic brake is being used.

Oral instructions of the carrier require engineers to use the dynamic brake in order to reduce wear on brake shoes of locomotives, except for short braking distances when the independent or automatic brake shall be used.

The maximum authorized speed in the vicinity of the point of accident is 20 miles per hour.

Description of Accident

Extra 369 East, an eastbound freight train, consisting of diesel-electric units 369, 311, and 641, coupled in multiple-unit control, 185 cars and a caboose, departed from Williamson, W. Va., 22.6 miles west of Devon, at 2:15 a. m., passed Devon at 3:09 a. m., and proceeded 12.7 miles eastward to Hurley, Va., where it was stopped at 3:45 a. m. to permit helper-locomotive 386 to be coupled into the train between the 185th car and the caboose. This train departed from Hurley at 4:10 a. m. and proceeded on an ascending grade to Raitt, Va., 5.6 miles east of Hurley, where the helper-locomotive with caboose was uncoupled from the train without a stop being made for that purpose. The front portion of the train continued eastward on a descending grade and, at 4:45 a. m., it stopped on the eastward main track with the front end short of signal 016L, which indicated Stop-and-Stay, and with the west end of the 185th car at a point 1.4 miles west of Thomas. About 18 minutes later, the 185th car was struck by helper-locomotive 386 with caboose.

Helper-locomotive 386 consisted of road-switcher type diesel-electric units 386, 348, 650 and 795, coupled in multiple-unit control. After being uncoupled from the 185th car of Extra 369 while moving eastward at Raitt, this locomotive with a caboose at the west end stopped a short distance east of signal 20L. It then moved westward to a point a short distance west of signal 20L and, about 4:45 a. m., when the aspect being displayed by that signal changed from Stop-and-Stay to Approach, it proceeded eastward en route to Weller Yard. The helper-locomotive with caboose passed signals 10M and D209, which displayed Approach aspects, passed signal D225, which displayed a Stop-and-Proceed aspect, and while moving at a speed of 32 miles per hour, as indicated by the tape of the speed-recording device, it struck the rear end of the front portion of Extra 369 East.

The front portion of Extra 369 East was moved 20 feet eastward by the force of the impact. The 180th to 185th cars, inclusive, were derailed and stopped in various positions on or near the track structure. Four cars were heavily damaged and two cars were somewhat damaged.

The helper-locomotive with caboose stopped with the front end 192 feet east of the point of accident. The front truck of the first diesel-electric unit was derailed. The east end of this unit was telescoped throughout a distance of about 17 feet by one of the derailed cars, and the superstructure, including the control compartment at that end of the unit, was destroyed. The 1st diesel-electric unit was considerably damaged as shown in PLATE 1, and the 2nd unit was somewhat damaged.

The engineer of helper-locomotive 386 was killed, and the fireman of that locomotive was injured.

Diesel-electric units 386 and 650, from east to west, respectively, the first and third units are provided with 26L, and the second and fourth units of the helper locomotive are provided with 24-RL brake equipment. All of these units are provided with dynamic brake equipment. As arranged for operation of the locomotive from the control compartment of unit 386, the dynamic brake interlock of the 26L brake equipment functions in such manner that any pneumatic application of the locomotive brakes, except by the independent brake valve, will be released and held off during dynamic brake operation. When the dynamic brake is applied an emergency brake application on the locomotive units can be obtained only by manual operation of the automatic brake valve to emergency position. Under these circumstances, while the dynamic brake is in operation and if the automatic brake valve has not been placed in emergency position, reduction of brake-pipe pressure at an emergency rate from any other cause such as operation of an emergency brake valve, or a broken air hose on any of the associated equipment of the train brake system will not cause the pneumatic brakes on the locomotive units to become applied. The independent brake will apply the pneumatic brakes on the locomotive units at any time whether or not the dynamic brake is applied, and by rule, must not be used while the dynamic brake is applied.

The weather was clear at the time of the accident which occurred about 5 03 a. m.

Discussion

Weller Yard is a terminal for engine crews of helper locomotives assigned to assist the movement of eastbound trains between Hurley and Raitt, and the movement of westbound trains between Weller Yard and Raitt. When assisting a train, the helper-locomotive is placed between the caboose and the last car of the train and is removed from the train on arrival at Raitt. If a helper-locomotive is assisting an eastbound train and is due to continue eastward to Weller Yard it is detached from the last car of the train on arrival at Raitt, after which the helper-locomotive with the caboose of the train follows the front portion of the train to Weller Yard. On the day preceding the date of the accident the engineer and the fireman of helper-locomotive 386 reported for duty at Weller Yard at 8 45 p. m., after having been off duty more than 48 hours. They then assisted in the movement of three westbound trains from Weller Yard to Raitt, after which they were instructed to assist in the movement of Extra 369 East from Hurley to Raitt and to return to Weller Yard. The helper-locomotive proceeded to Hurley, where it was coupled into Extra 369 East between the 185th car and the caboose, and it then assisted in the movement of that train to Raitt. Upon arrival at Raitt, the helper-locomotive was detached from the 185th car while the train was in motion, and the front portion of the train continued eastward toward Weller Yard while the helper-locomotive with the caboose of the train stopped at a point a short distance east of signal 20L.

As the front portion of Extra 369 East was approaching the point where the accident occurred the engineer were in the control compartment of the first diesel-electric unit, and the front brakeman

was in the control compartment of the second unit. There were no other crew members of Extra 369 East on this portion of the train, and there was no light on the rear end of the 185th car. About 4:50 a. m., this portion of the train stopped short of signal 016L, which indicated Stop-and-Stay, and at that time it was occupying the blocks of signals 24L and D225. The collision occurred about 5:03 a. m., after the front brakeman had alighted from the locomotive and proceeded to a wayside telephone to ask the operator of the traffic control machine at Weller Yard the cause of the indication of signal 016L.

When helper-locomotive 386 with caboose was detached from the 185th car of Extra 369 East while the train was moving at Raitt, it stopped a short distance east of signal 20L and then moved to a point west of that signal. About 4:45 a. m., approximately 10 minutes after being detached from the train, the helper-locomotive with caboose proceeded eastward toward Weller Yard after the engineers observed the aspect displayed by signal 20L change from Stop-and-Stay to Approach. The engineers were in the control compartment at the front of the first diesel-electric unit, and the conductor and the flagman were in the cupola of the caboose. The headlight was lighted brightly. The brakes of the locomotive and the caboose had functioned properly when used previously. The fireman said that as the helper-locomotive with caboose was approaching signal 14L, which displayed an Approach aspect, he and the engineer called the aspect of the signal, and that the engineer then applied the dynamic brake. He said that the dynamic brake remained applied until it was observed that signal 10M was displaying a Stop-and-Stay aspect, at which time the engineer released the dynamic brake in preparation to stop. As the helper-locomotive with caboose was closely approaching signal 10M, the aspect changed to Approach and at that time the engineer again applied the dynamic brake. The fireman said that shortly after passing signal 10M an indication was received that an engine in a trailing unit was off the line. The engineer then requested him to make an inspection of the rear three diesel-electric units. He said that because signal D209 was not within his range of vision and could be first observed from his position in the control compartment, he waited until that signal came into view before proceeding to inspect the rear three diesel-electric units. He said that when signal D209 came within his range of vision, he observed that it was displaying an Approach aspect, which he called. The fireman then proceeded to make the inspection requested by the engineer. The conductor said that the speed of the helper-locomotive with caboose was about 22 miles per hour as it passed signal D209, and that he then observed signal D225 was displaying a Stop-and-Proceed aspect. He said that the helper-locomotive with caboose passed this signal without stopping, and that as it was passing a point slightly more than a mile west of the point of accident he operated the conductor's emergency brake valve located in the cupola of the caboose. He said he thought that the speed increased slightly after he operated the emergency air-brake valve. The fireman said that after he had restarted the engine of the second diesel-electric unit, he heard the exhaust of an emergency brake application and immediately returned to the control compartment of the first unit. He said that when he reentered the control compartment he informed the engineer, who was sitting at the controls, that all the diesel-electric units appeared to be operating properly. He said that the engineer did not make a response, and that he then went to his own position in the control compartment, and looked forward and immediately observed the rear end of the front portion of Extra 369 East standing on the eastward main track at a distance of about 150 feet. He said that the collision occurred before he was able to take any preventive action.

An analysis of the tapes of the speed-recording devices from units of helper-locomotive 386 disclosed that throughout a distance of about 3 miles west of the point of accident, the speed of the helper-locomotive with caboose gradually increased from 9 miles per hour to 32 miles per hour at the point of accident.

After the accident, an examination of the brake equipment on the helper-locomotive and the

caboose disclosed no defective condition of the brakes on the caboose and diesel-electric units 348, 650 and 795. The brake equipment of unit 386 was badly damaged and could not be tested.

After the accident occurred, the caboose of Extra 369 East and four diesel-electric units similar to those comprising helper-locomotive 386 on the day of the accident were used in tests to determine the effect of an emergency application of the air brakes initiated from the caboose while the dynamic brake was applied. The four diesel-electric units were operated under power on the descending grade in the vicinity of the point of accident until a speed of about 26 miles per hour was attained. The dynamic brake was then applied and the speed was permitted to increase to 32 miles per hour where it was maintained by increasing the dynamic brake application. While the units were moving at 32 miles per hour, an emergency application of the air brakes was initiated by operating the conductor's emergency brake valve in the caboose. The air brakes did not apply on the diesel-electric units, and the speed decreased only to 24 miles per hour in the distance of about one mile. The test was terminated and the movement was stopped by an application of the independent brake.

The Stop-and-Proceed indication of signal D225, as the helper-locomotive approached, required that the locomotive be stopped before it passed the signal and after entering the block of this signal that it be operated at low speed and in such manner that it could be stopped short of the forward portion of the train. The engineer was killed in the accident and it could not be determined why he failed properly to control the speed and to stop the locomotive before it passed the signal. Under the circumstances it appears that he became physically incapacitated while the fireman was making the inspection of the three rear electric units. The conductor operated the emergency brake valve in the caboose immediately after the locomotive passed the signal and entered the block in which the accident occurred. The dynamic brake was applied at this time, and because the emergency application had not been initiated by movement of the automatic brake valve of the locomotive to emergency position, the dynamic brake interlock as arranged on this equipment functioned in such manner as to nullify the emergency application of the pneumatic brakes on the locomotive units. Such additional retardation as resulted solely from the application of the brakes of the caboose in emergency was insufficient on the descending grade to effect any material reduction in the speed before the collision occurred. It is evident that if the pneumatic brakes of the locomotive units had been permitted to apply at the time the conductor took action to apply the brakes by operation of the emergency brake valve in the caboose, this accident would have been averted.

In the instant case the second and fourth units of the helper-locomotive were provided with 24-RL brake equipment. The dynamic brake interlock in the brake equipment of these units is so arranged that when the operational and brake controls are positioned for the operation of a locomotive from the control compartment of a diesel-electric unit so equipped and the dynamic brake is applied, this device functions in such manner that it will nullify the application of the pneumatic brakes on the locomotive units during a service application of the brakes. However, if the brake-pipe pressure on the locomotive is reduced or depleted at an emergency rate from any cause either on the locomotive or on associated equipment in the train-brake system, dynamic braking is immediately terminated and the pneumatic brakes on the locomotive units are permitted to become applied. If either of these units had been in the position from which the brakes of the helper-locomotive were controlled, the pneumatic brakes of the locomotive units would have become applied in emergency immediately after the conductor opened the emergency-brake valve in the caboose which reduced brake-pipe pressure at an emergency rate on both the caboose and the locomotive units, and the accident would have been averted.

Cause

This accident was caused by failure properly to control the speed of helper-locomotive and caboose on a descending grade.

Recommendation

It is recommended that the carrier immediately take such measures as may be necessary to insure that an emergency brake application initiated at any point or originating from any cause either on the locomotive or in the train-brake system of associated equipment will result in an emergency application of the pneumatic brakes of the locomotive.

Dated at Washington, D C , this tenth
day of March, 1960

By the Commission, Commissioner Arpaia

(SEAL)

HAROLD D McCOY,

Secretary