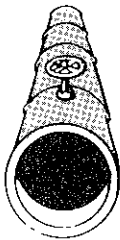
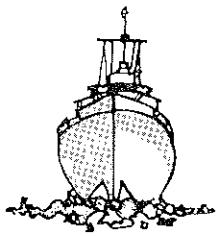
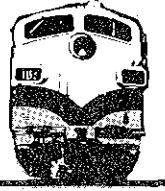
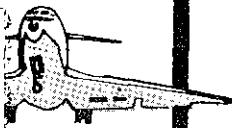


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# NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C. 20594

## RAILROAD ACCIDENT REPORT

HEAD-ON COLLISION OF TWO NORFOLK &  
WESTERN RAILWAY COMPANY FREIGHT TRAINS  
NEW HAVEN, INDIANA  
OCTOBER 19, 1976

REPORT NUMBER: NTSB-RAR-77-6

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<p>About 9:15 p.m., on October 19, 1976, at New Haven, Indiana, Norfolk &amp; Western Railway Company (N&amp;W) freight train Extra 1376 West collided head-on with N&amp;W yard locomotive unit No. 3363, which was pulling 55 freight cars. One locomotive unit, a caboose, and one car of Extra 1376 West, and the yard locomotive and one car were derailed. The brakeman on the locomotive of Extra 1376 West was killed and four crewmembers were injured. The estimated cost of damages was \$168,400.</p> <p>The National Transportation Safety Board determines that the probable cause of this accident was the failure of the crewmembers of Extra 1376 West to couple the airbrake hoses between the fifth and sixth cars from the rear, and to test the brakes as required by N&amp;W rules and the Federal Power Brake Law of 1958.</p> <p>As a result of its investigation, the Safety Board submitted one recommendation to the Norfolk and Western Railway Company.</p>			
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NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D.C. 20594

RAILROAD ACCIDENT REPORT

Adopted: August 5, 1977

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HEAD-ON COLLISION OF TWO  
NORFOLK & WESTERN RAILWAY COMPANY  
FREIGHT TRAINS  
NEW HAVEN, INDIANA  
OCTOBER 19, 1976

SYNOPSIS

About 9:15 p.m., on October 19, 1976, at New Haven, Indiana, Norfolk & Western Railway Company (N&W) freight train Extra 1376 West collided head-on with N&W yard locomotive unit No. 3363, which was pulling 55 freight cars. One locomotive unit, a caboose, and one car of Extra 1376 West, and the yard locomotive and one car were derailed. The brakeman on the locomotive of Extra 1376 West was killed and four crewmembers were injured. The estimated cost of damage was \$168,400.

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the crewmembers of Extra 1376 West to couple the airbrake hoses between the fifth and sixth cars from the rear, and to test the brakes as required by N&W rules and the Federal Power Brake Law of 1958.

INVESTIGATION

The Accident

About 5:55 p.m., on October 19, 1976, Norfolk & Western Railway Company (N&W) freight train Extra 1376 West departed Blair Yard, Fostoria, Ohio, westbound for Fort Wayne, Indiana. The train consisted of one locomotive unit, a caboose behind the locomotive, and eight cars. An initial terminal airbrake test made at Blair Yard before departure disclosed no defects. Extra 1376 West was operating as the westbound return portion of the local switching assignment between Fort Wayne, Indiana, and Fostoria, Ohio, known as the Blair Turn. This assignment had originated in Fort Wayne earlier in the day.

About 6:10 p.m., Extra 1376 West stopped at North Findlay, Ohio, and picked up seven cars which were added to the rear of the train. The flagman connected the airhoses between the seventh and eighth cars from the rear and then opened the angle cock on the former rear car. He then made a walking inspection of the additional seven cars but did not couple the airbrake hoses between the fifth and sixth cars from the rear. When he was in the vicinity of the main track about 200 feet from the rear car, he gave a hand signal to the engineer to move the train to the main track. When the train stopped, the flagman, while walking toward the locomotive, signalled the engineer to set and release the brakes on the train. He was near the ninth car from the rear end when he saw the brakes release.

The conductor was obtaining instructions from the dispatcher by telephone during the assembling of the train and did not observe any of the airbrake tests. The conductor got on the caboose as the train proceeded west about 6:35 p.m.

The train later stopped at Continental and Payne, Ohio, and Edgerton, Indiana, to set out and pick up cars. At each stop the seven cars picked up at North Findlay were not changed. All cars which were subsequently added or set out were located between the locomotive and these last seven cars. The traincrew stated that they never saw the brakes set or release on the last car of the train during any of the airbrake tests.

At 9:04 p.m., when the train left Edgerton with the locomotive, caboose, and 11 cars, one of the crewmembers radioed the dispatcher that they had completed their work and would be coming straight into the yard. The dispatcher acknowledged the message by saying "all right." The dispatcher had already activated signal circuits to allow Extra 1376 West to come as far as the west switch of the New Haven, Indiana, passing track.

Previously, the East Wayne yardmaster had received authority from the dispatcher to send yard engine 3363 with 55 cars east to the New Haven passing track. At 9:09 p.m., the dispatcher activated the circuit to cause eastbound signal 10R at the west switch of the New Haven passing track to change from a "stop" to a "proceed" aspect and lined the west passing track switch for the passing track. This action caused the westbound signal 10L at the west switch to display "stop," caused westbound signal 12L at the east switch of the passing track to display "approach," and caused the westbound signal 360.9 to display "advance approach." (See figure 1.)

The engineer of Extra 1376 West stated that after he saw that signal 12L displayed "approach," he made a full service brake application while his train was still 1,500 feet east of the signal, and he reduced throttle as the train passed the signal. However, Extra 1376 West passed signal 12L while moving about 60 mph and continued west for about 3,000 feet while reducing its speed less than 10 mph.

The crewmembers in the caboose stated that they felt the slowing of the train and, consequently, they felt no special action was necessary. When the engineer felt that the train was not slowing adequately, he asked the brakeman on the other side of the cab what speed was shown on his speed indicator because at times the engineer's speed indicator was sticking. The brakeman replied "50 mph." However, the engineer stated that the brakeman's speed indicator was not functioning properly, and would indicate 50 mph when the train was actually travelling 60 mph. The engineer then made an emergency brake application and told the brakeman that they were in trouble. The brakeman radioed yard engine 3363: "eastbound at New Haven, stop your train. We don't have any air." He then ran onto the rear platform of the locomotive.

The crew on the yard engine jumped from their train when they heard the radio message from Extra 1376 West. They were about 250 feet west of signal 10R

and still moving about 10 mph. Extra 1376 West passed signal 10L, which displayed "stop", and continued west 990 feet where it collided with yard locomotive 3363. The trains collided about 9:15 p.m., 6 feet west of the point of switch at the west end of the New Haven passing track, while both were moving about 10 mph. (See figure 1.)

The collision caused the east end of the locomotive unit of Extra 1376 West to jackknife to the north. The caboose was crushed between the south side of the locomotive and a loaded covered hopper car. A fire began in the caboose after the collision when the caboose stove oil ignited. Yard locomotive 3363 and the first car derailed.

The single main track is straight for about 3 miles to the point of collision and for 1 mile westward. A turnout connects the west end of the New Haven passing track with the main track 2.3 miles east of East Wayne Yard. The grade for westbound trains averages 0.17 percent, descending, for three-fourths of a mile east of the accident point and is nearly level for 1 1/4 miles farther east.

#### Injuries to Persons

Injuries	Crewmembers	Passengers	Other
Fatal	1	0	0
Nonfatal	4	0	0
None	3	0	

#### Damage

The locomotive unit of Extra 1376 West was damaged on both ends. The center sill and the end of the covered hopper car was bent. The caboose was destroyed. The yard locomotive unit 3363 was moderately damaged on both ends and the center sill of a boxcar, the first car, was damaged.

The collision damaged 130 feet of track, part of one switch, a switch machine, and some signal and communication cable. Cost of the damages was estimated as follows:

Locomotive	\$120,000
Car	25,000
Track & Signal	23,400
Total	<u>\$168,400</u>

#### Crewmember Information

The engineer of Extra 1376 West was 62 years old. His last physical examination, in May 1976, disclosed no defective physical conditions. He had been employed by the N&W for 37 years and had been operating locomotives for 33 years. He had been operating a locomotive in yard service since April 1975. His last instruction on the N&W operating rules was in May 1975.

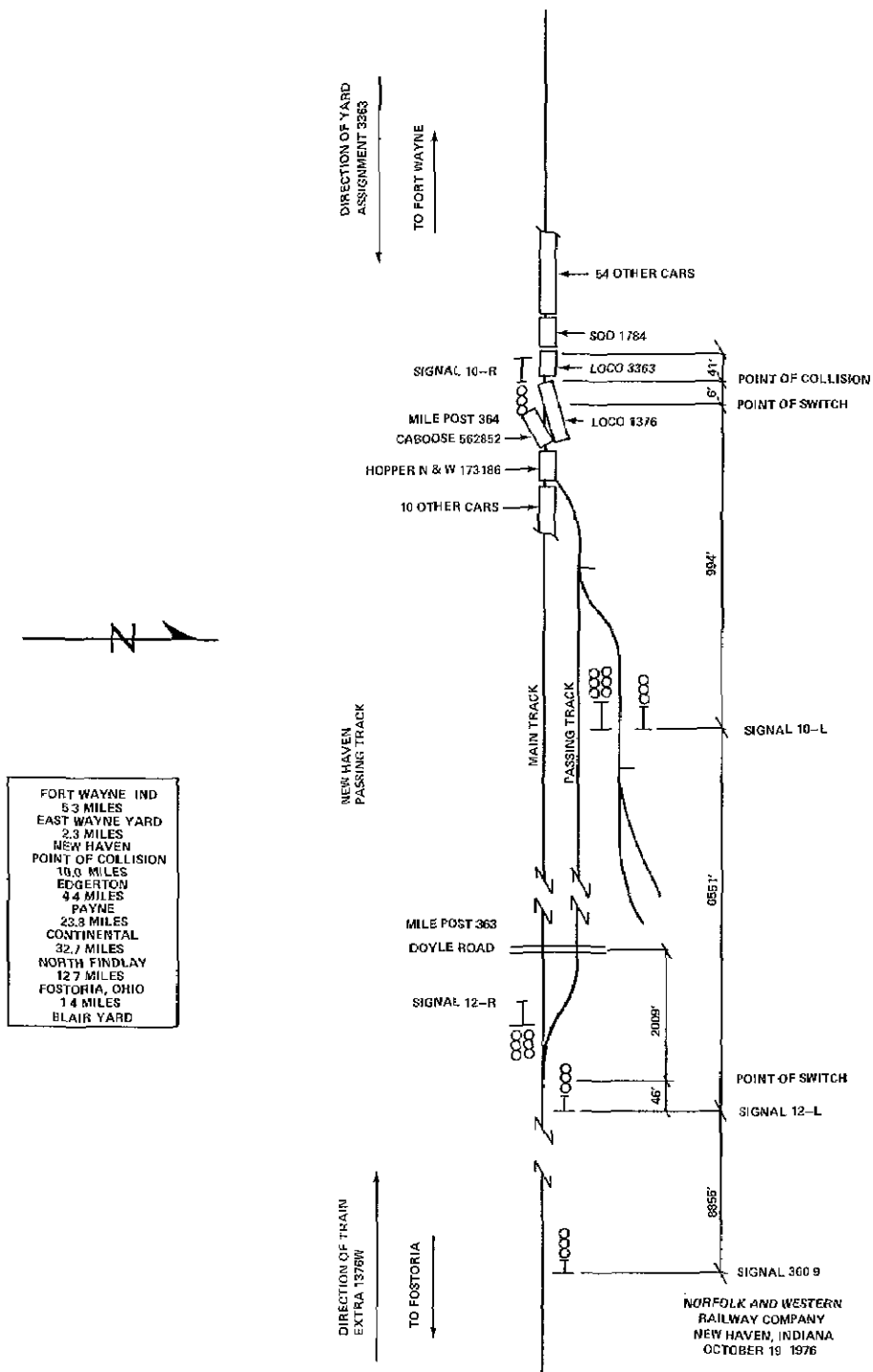


Figure 1. Track layout at and near accident site.

The engineer was assigned the run between Fostoria and Fort Wayne on October 6, 1976, and he took the required N&W territory familiarization run between these cities with another engine crew shortly before assuming his position. N&W rules did not require him to operate a locomotive in road service in the presence of a N&W supervisor or to pass any rules examination, written or oral, prior to changing his job assignment.

The front brakeman was 22 years old and had been employed by the N&W for 3 1/2 years. The conductor was 53 years old and had been a conductor for 25 years. The flagman was 57 years old, had been employed by the N&W for 23 years, and was a promoted conductor for 18 years. Their last instruction on the N&W rules was during the latter months of 1975.

The crewmembers had been off duty for about 12 hours when they reported for the Blair Turn assignment at the East Wayne Yard at 10:30 a.m. on October 19, 1976. Other N&W employees reported that the crewmembers of Extra 1376 West appeared to be well rested and fit for duty.

### Train Information

The GP-40 diesel-electric locomotive unit of Extra 1376 West had dual operating controls which enabled the engineer to sit on the right-hand side of the cab when operating the locomotive in either direction. The unit had dynamic brakes, No. 26-L airbrake system, crew call-type safety device, a speed indicator on each side of the cab for use with the dual operating controls, speed recording equipment, and a radio with which the locomotive crewmembers could communicate with crewmembers on the caboose, on other trains, and with the train dispatcher.

Yard engine 3363 was a SW-9 diesel-electric locomotive with No. 6-BL airbrake system and a radio similar to the one on Extra 1376 West. The locomotive unit was not equipped with dynamic brakes or a speed indicator. The crewmembers were not provided with portable radios or a caboose.

The caboose of Extra 1376 West was equipped with a radio similar to the radio in the locomotive unit. The crewmembers were not provided with a portable gauge for measuring brake pipe air pressure or a speed indicator in the caboose.

### Method of Operation

Trains operate over the 80.5-mile section of single track line between the East Wayne Yard and Blair Yard by signals of a traffic control system. The controlled signals and switches are operated by the dispatcher at the East Wayne Yard in Fort Wayne, Indiana. The dispatcher is permitted to radio train orders to traincrews; all radio communications with the dispatcher are recorded.

The maximum authorized speed for freight trains in the area is 60 mph.



### Meteorological Information

The pickup of seven cars at North Findlay occurred at dusk while it was raining. The collision occurred in darkness while overcast with light rain. Visibility was about 2 miles, and the temperature was 42° F.

### Survival Aspects

The brakeman, who radioed the yard crew and then ran from the locomotive cab of Extra 1376 West, was killed. He was crushed on the rear platform of the locomotive when the west end of the caboose raised upward and telescoped into the south corner of the locomotive. The engineer of Extra 1376 West sustained hip and wrist injuries when the collision impact threw him from his seat against the locomotive control panel. He had to evacuate the locomotive through his cab window because the closed cab doors became jammed in the collision.

The conductor of Extra 1376 West incurred a concussion, laceration of scalp and elbows, and second-to third-degree burns on about 25 percent of his body. He was knocked unconscious when he apparently hit his head on the caboose desk at which he was seated. The crewmembers of the yard crew rescued him from the burning caboose. The flagman of Extra 1376 West, who was on the rear steps of the caboose, was thrown from the steps and sustained bruised ribs and lacerations when he hit the ground. The yard crew conductor injured his right shin when he jumped to the ground from the moving yard locomotive.

### Tests and Research

An inspection of Extra 1376 West about 1 hour after the collision disclosed that the angle cock was closed on the air line on the east end of the sixth car from the rear of the train, and the airhoses were not connected. It was also found that the brakes were not set and there was no air in the brake system of the last five cars.

The braking system of the undamaged cars and the airbrake components of the locomotive unit 1376 were tested and no defects were found. An examination of the speed recorder tape disclosed that it was not recording properly at the time of collision.

Stopping distance tests were performed with a train similar to Extra 1376 West, using variations in speed and airbrake applications but on a section of track with a different track grade. The tests revealed that, traveling at 60 mph and with full service brake application, the train could stop in 3,482 feet on dry track with brakes applied on the engine and all cars, in 4,179 feet with no brakes applied on the last five cars, in 6,695 feet with no brakes applied on the engine and last five cars, and in 4,081 feet under an emergency brake application with no brakes on the last five cars. A test also revealed that, traveling at 30 mph and with a full service brake application, a train could stop in 1,182 feet with no brakes on the last five cars. (See appendix B.)

Tests performed on the signal system revealed the signals were functioning as intended before the accident.

### ANALYSIS

The seven cars picked up at North Findlay only had the airbrakes applied on the two lead cars when they were coupled to the existing eight cars of the train. Since the airhoses were not connected between the fifth and sixth car from the rear, and since the angle cock was closed on the east end of the sixth car, the flagman could not have seen the brakes apply and release on the last five cars of the train when he later gave the engineer a signal to apply and release the brakes. His subsequent observation of the brake cylinder release on the ninth car from the rear, while walking toward the locomotive, does not indicate that the air was applied throughout the entire train. Because the brake system functioned properly from the locomotive up to the fifth car from the rear, the engineer was not aware that the last five cars did not have brakes.

The Federal Power Brake Law requires that the brakes on each car added to a train must be inspected to determine among other things, that each applies and releases. (See appendix C.) In addition, the law requires that after the adding or setting out of cars in the train, an application and release of the brakes on the last car must be observed to determine that the brakes on all cars can be controlled by the engineer.

While Extra 1376 West performed its switching assignments at Continental, Payne, and Edgerton, the seven cars picked up at North Findlay remained coupled together at the rear of the train. Consequently, with the caboose remaining coupled to the locomotive unit, and the switching of cars being done between the last seven cars and the locomotive, the traincrew riding in the caboose did not observe whether the airbrakes on the rear car of the train functioned. Neither was a test made as required by the Federal Power Brake Law, to determine whether the brakes on all cars were under control of the engineer.

The N&W has prescribed rules for crewmembers responsible for performing necessary airbrake tests. (See appendix D.) According to these rules the crewmembers of Extra 1376 West were responsible for performing their train airbrake tests between terminals. The conductor, who has general charge of the train, should see that the brake tests are performed properly. The engineer, who is responsible for the safe operation of the locomotive, depends upon the trainmen to see that necessary brake tests on the cars are satisfactorily performed. The engineer should receive proper hand signals or radio communication from other crewmembers for applying and releasing the airbrakes during a test. A "proceed" signal is given the engineer upon completion of the tests, indicating to him the test has been satisfactory. The proceed signal was given the engineer of Extra 1376 West each time after switching and brake-testing cars at stations between North Findlay and the collision point.

The N&W rules do not describe how crewmembers will specifically comply with the Power Brake Law when the caboose is placed in a train other than on the rear. The crewmembers of Extra 1376 West failed to comply with the requirements of 49CFR232.13(d)-(1) when they did not determine the air pressure on the rear of the train before starting the brake test and failing to observe the application and release of the brakes on the rear car. If it is desirable to place the caboose in a position other than on the rear, some form of a portable gauge must be provided so that compliance with the Power Brake Law can be achieved.

For many years the N&W has placed the caboose directly behind the locomotive and ahead of the cars on the Blair Turn assignment. The N&W advised that this arrangement facilitates moving the train between terminals and makes switching moves easier by eliminating the need to uncouple the caboose before adding cars to the train and by having the crewmembers in the vicinity of the head end. However, regardless of the location of the caboose, the rules still require that the crewmembers insure that the train brake system has adequate air pressure before starting the brake tests and that they observe the rear car of the train after adding cars at intermediate points to see if the brakes apply and release. If the crewmembers had been furnished a portable air gauge or if the caboose with its air gauge had been located at the rear of Extra 1376 West, the crewmembers should have noticed that the airhoses were not coupled between the fifth and sixth cars from the rear.

Because of the small size of Extra 1376 West, there was no need for its engineer to take any physical action to immediately comply with the "advance approach" signal indication as the train passed signal 360.0. N&W operating rule 282-A permitted the engineer to proceed while preparing to stop at the second signal. The full-service brake application, which the engineer made 1,500 feet east of the next signal (12L), and the throttle reduction made while passing the signal should have been satisfactory for a train with a consist like that of Extra 1376 West to comply with the rules, since the stop signal (10L) was 8,051 feet west of the point of initial brake application.

Tests indicated that a train similar to Extra 1376 West, but with full braking capabilities, should have stopped in about 3,500 feet after a full-service brake application. With brakes on all cars, an engineer would not have needed to apply the brakes in full service until the locomotive was 3,000 feet past the "approach" signal to comply with signal 10L. The tests also indicated that a train with a consist similar to that of Extra 1376 West, but with the brakes on the rear five cars inoperative and the engine brake released, required about 6,700 feet to stop with a full-service brake application from 60 mph. This indicates that the engineer did not apply the brakes at the point he claims.

Extra 1376 West passed a stop and stay signal (10L) when the yard locomotive was about 300 feet west of the point of collision and still moving at 10 mph. The related slight damage to both trains verifies the fact that this was a low-speed collision. A test made of the emergency stopping distance with a train similar in consist to Extra 1376 West, with no brakes on the last five cars, stopped in 4,081 feet from 60 mph. This test indicated that the engineer of Extra 1376 West applied the brakes in emergency 3,960 feet east of the point of collision which is 2,970 feet

east of the stop signal 10L. This indicated that the engineer did apply the brakes at a point where the train would have stopped short of the collision point if Extra 1376 West had brakes on all units.

Crewmembers aboard yard locomotive 3363 operated their train in accordance with N&W rules. They received the radio information about poor braking from Extra 1376 West too late to take any action which would have prevented the collision.

The conductor and flagman of Extra 1376 West felt the train slowing as it passed the approach signal and assumed that the engineer was handling the train properly. However, the conductor had no device in the caboose to indicate the speed of the train; he had to rely on his judgment and could not monitor the engineer and the front brakeman.

The Federal Railroad Administration is currently processing a citation against the Norfolk & Western Railway Company for violation of the Federal Power Brake Law.

## CONCLUSIONS

### Findings

1. The airhoses were not coupled between the fifth and sixth cars from the rear of Extra 1376 West and the angle cock was closed on the east end of the sixth car from the rear of the train when Extra 1376 West left North Findlay.
2. The traincrew of Extra 1376 West did not determine if the train brake system was properly charged as indicated by a gauge at the rear of the train after switching cars at stations between North Findlay and New Haven.
3. The traincrew of Extra 1376 West did not determine if the brakes would apply and release on the last car of their train after switching cars at stations between North Findlay and New Haven.
4. The N&W did not provide means for the crewmembers to comply with the requirements of the Federal Power Brake Law of 1958 to determine after adding cars, that the train brake system was charged properly as indicated by a gauge on the rear of the train.
5. The uncoupled airhoses and closed angle cock would have been found by the crewmembers of Extra 1376 West if company rules and Federal inspection requirements had been followed.
6. An initial full-service automatic brake application was not made 1,500 feet east of signal 12L.
7. An initial automatic brake application 1,500 feet east of "approach" signal 12L for Extra 1376 West was not required according to rule 282-A.

8. The reaction of the engineer to the inadequate braking of Extra 1376 West was too late to prevent the collision by an emergency brake application.
9. There was sufficient distance for Extra 1376 West to have stopped before the collision point when the emergency brake application was made if the train had had full braking capability.
10. The crewmembers of the yard locomotive operated their train in accordance with the rules of the N&W and could not have prevented the accident.

#### Probable Cause

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the crewmembers of Extra 1376 West to couple the airbrake hoses between the fifth and sixth cars from the rear, and to test the brakes as required by N&W rules and the Federal Power Brake Law of 1958.

#### RECOMMENDATIONS

As a result of this investigation, the National Transportation Safety Board submitted the following recommendation to the Norfolk & Western Railway Company:

"Establish policy and procedures that will insure that all trains are operated in compliance with the company's rules and the Federal power brake regulations.  
(Class II, Priority Followup)(R-77-25)

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ WEBSTER B. TODD, JR.  
Chairman

/s/ KAY BAILEY  
Vice Chairman

/s/ FRANCIS H. McADAMS  
Member

/s/ PHILIP A. HOGUE  
Member

/s/ WILLIAM R. HALEY  
Member

August 5, 1977

APPENDIX A  
INVESTIGATION

The accident described in this report was designated a major accident by the National Transportation Safety Board under the criteria established by the Safety Board's regulations.

This report is based on facts obtained from an investigation conducted by the Safety Board with the assistance of other agencies. The Safety Board wishes to acknowledge the excellent cooperation extended by the following agencies during the investigation of this accident and the taking of witnesses' statements at Fort Wayne, Indiana, beginning on February 24, 1977:

Indiana Public Service Commission  
Federal Railroad Administration  
Norfolk & Western Railway Company  
Brotherhood of Locomotive Engineers  
United Transportation Union





APPENDIX C

Excerpts from Code of Federal Regulations,  
Title 49, Chapter II - Federal Railroad Administration,  
Part 232 - Railroad Power Brakes and Drawbars

\*\*\*\*\*

232.1 Power brakes: minimum percentage.

On and after September 1, 1910, on all railroads used in interstate commerce, whenever, as required by the Safety Appliance Act as amended March 2, 1903, any train is operated with power or train brakes, not less than 85 percent of the cars of such train shall have their brakes used and operated by the engineer of the locomotive drawing such train, and all power-brake cars in every such train which are associated together with the 85 percent shall have their brakes so used and operated.

\*\*\*\*\*

232.13 Road train and intermediate terminal train air brake tests.

(a) Passenger trains: Before motive power is detached or angle cocks are closed on a passenger train operated in either automatic or electro-pneumatic brake operation, except when closing angle cocks for cutting off one or more cars from the rear end of train, automatic air brake must be applied. After recoupling, brake system must be recharged to required air pressure and before proceeding and upon receipt of proper request or signal, application and release tests of brakes on rear car must be made from locomotive in automatic brake operation. If train is to be operated in electro-pneumatic brake operation, this test must also be made in electro-pneumatic brake operation before proceeding. Inspector or trainman must determine if brakes on rear car of train properly apply and release.

(b) Freight trains: Before motive power is detached or angle cocks are enclosed on a freight train, brakes must be applied with not less than a 20 pound brake pipe reduction. After recoupling and angle cocks are opened, it must be known that brake pipe air pressure is being properly restored as indicated by the caboose gauge and that brakes on rear car are released. In the absence of a caboose gauge, air brake test must be made as prescribed by that portion of paragraph (a) of this section pertaining to automatic brake operation.

(c) (1) At a point other than initial terminal where locomotive or caboose is changed, or where one or more consecutive cars are cut off from rear end or head end of train with consist otherwise remaining intact, after train brake system is charged to within 15 pounds of feed valve setting on locomotive but not less than 60 pounds as indicated at rear of freight train, and on a passenger train to at least 70 pounds, a 20 pound brake pipe reduction must be made and it must be determined that brakes on rear car apply and release properly.

(2) Before proceeding it must be known that brake pipe pressure as indicated at rear of freight train is being restored.

\*\*\*\*\*

(d) (1) At a point other than a terminal where one or more cars are added to a train, and after the train brake system is charged to not less than 60 pounds as indicated by a gauge at the rear of freight train and on a passenger train to not less than 70 pounds, tests of air brakes must be made to determine that brake pipe leakage does not exceed five (5) pounds per minute as indicated in the brake pipe gauge after a 15 pound brake pipe reduction. After the leakage test is completed, brake pipe reduction must be increased to full service, and it must be known that the brakes on each of these cars and on the rear car of train apply and release. Cars added to train which have not been inspected in accordance with 232.12(c)-(j) must be so inspected and tested at next terminal where facilities are available for such attention.

\*\*\*\*\*

APPENDIX D

Excerpts from Norfolk & Western Railway  
Company "Operating Rules" and "Rules for  
Equipment Operation and Handling"

\*\*\*\*\*

A-4. Each train must have the air brakes in effective operating condition, and at no time shall the number of operative air brakes be less than 85 percent. When piston travel on a car is in excess of 10 inches, the air brakes on the car cannot be considered in effective condition.

\*\*\*\*\*

A-12 When the locomotive of a freight train has been detached and after recoupling to the train, it must be known that the brake pipe pressure is being restored as indicated by a gauge at the rear of train and that the brakes have released on the rear car.

In the absence of a gauge at the rear end of a train, air brake test must be made to determine that brakes on the rear car can be applied and released from the locomotive automatic brake valve and observed by inspector or trainman before proceeding.

A-13 At a point other than initial terminal, after setting off one or more consecutive cars from the rear end or head end, or changing the locomotive, and the remainder of the train consist is otherwise intact, the train air brake system must be charged to within 15 pounds of the feed valve or regulating valve setting on locomotive, but not less than 60 pounds as indicated at the rear of freight trains, and on a passenger train to not less than 70 pounds.

After the required brake pipe pressure is obtained, a 20-pound service brake pipe reduction must be made to determine that brakes on rear car apply and release. Before proceeding, it must be known that brake pipe pressure as indicated at rear of freight train is being restored.

A-14 At a point other than a terminal where one or more cars are added to a train, and after the train brake system is charged to not less than 60 pounds as indicated by a gauge at the rear of freight train and on a passenger train to not less than 70 pounds, tests of air brakes must be made to determine that brake pipe leakage does not exceed five (5) pounds per minute as indicated by the brake pipe gauge after a 15-pound brake pipe reduction. After the leakage test is completed, brake pipe reduction must be increased to full service, and it must be known that the brakes on each of these cars and on the rear car of train apply and release. Cars added to train which have not been inspected in accordance with Rule A-6 must be so inspected and tested at next terminal where facilities are available for such attention.

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A-34 Crew members on the caboose must observe the caboose gauge frequently and where such observations indicate danger, they must take prompt action to stop the train.

A-35 Air brakes must not be cut out on two consecutive cars in a train.

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## CONDUCTORS

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555. They have general charge of the train to which assigned and all persons employed thereon are subject to their instructions.

They must, when necessary, instruct other members of their crew as to the proper performance of their duties.

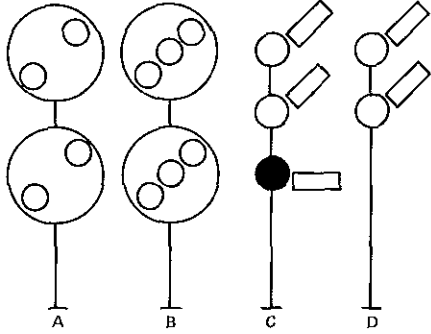
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## ENGINEMEN

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588. The engineman will be held responsible for the safe and efficient operation of the engine in his charge. The engineman must not leave the engine during his tour of duty, except in case of necessity, and then only when necessary precautions have been taken to protect the equipment.

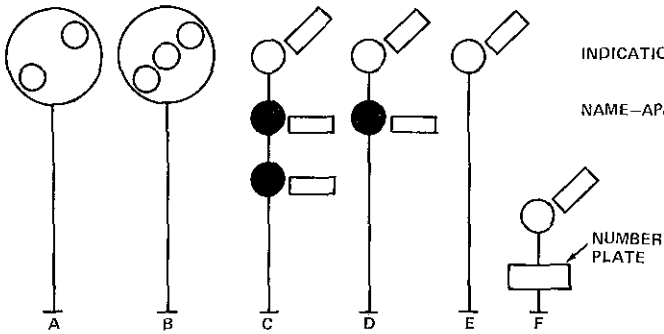
**Rule 282—A**



NOTE: ● INDICATES COLOR RED  
○ INDICATES COLOR YELLOW

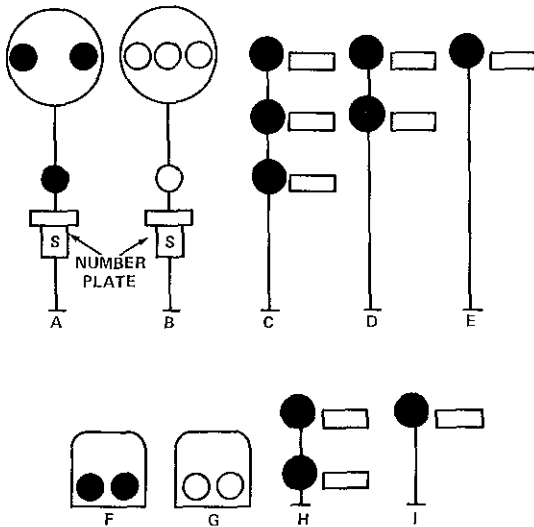
INDICATION— PROCEED PREPARING TO STOP AT SECOND SIGNAL  
NAME—ADVANCE APPROACH

**Rule 285**



INDICATION—PROCEED PREPARING TO STOP AT NEXT SIGNAL  
IF EXCEEDING MEDIUM SPEED IMMEDIATELY TAKE  
ACTION TO REDUCE TO THAT SPEED  
NAME—APPROACH

**Rule 292**



INDICATION—STOP AND STAY  
NAME—STOP AND STAY