CSX

Air Brake

and

Train Handling Rules

Effective July 1, 2004

Stock Control Number
480-9000186-2

Air Brake

and

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Notice

The rules presented in this book:

- Are effective July 1, 2004.
- Are effective on properties owned and/or operated by CSX.
- Govern the operation, testing, and inspection of various aspects of railroad rolling equipment.
- Are written primarily for the guidance of conductors, engineers, trainmen, and hostlers, but may apply to other employees as well.

Employees whose duties are prescribed by these rules must:

- Be conversant with them.
- Have a copy of this book accessible to them while on duty.

Conditions not covered by these rules and instructions demand sound judgement for the application of correct principles of safety, efficiency, and economy.

Table of Contents

Section 4

Section 5

5000 Air Brakes - General

5001 Preventing Air Line Contamination

Any employee coupling a yard line or locomotive to a train must first slightly open the shut off valve or angle cock to blow condensation, debris, and other contaminants from the yard line or brake pipe.

5002 Maintaining the Required Minimum Percentage of Operating Brakes

A. Considering Air Brakes Inoperative while En Route

The air brake on a car must be considered inoperative when it has a brake cylinder piston travel in excess of 10.5 inches.

B. Exempting Scale Test Cars

Scale test cars not equipped with air brakes are exempt from the requirements of this rule.

C. Operating while En Route

While en route, each train must have:

- Operative air brakes on at least 85% of the cars in the train. (See the following table.)
- An operative air brake on the rear car, except as provided by Rule 4203 (Ensuring Safe Movement when the Last Car in the Train has its Air Brake Cut Out).

Number of Air Brakes that can be Cut Out in a Train While Still Maintaining the Required 85% Operating			
Cars in Train	**Inoperative Brakes Permitted**	**Cars in Train**	**Inoperative Brakes Permitted**
7 to 13	1	106 to 112	16
14 to 19	2	113 to 119	17
20 to 26	3	120 to 125	18
27 to 33	4	126 to 132	19
34 to 39	5	133 to 139	20
40 to 46	6	140 to 145	21
47 to 53	7	146 to 152	22
54 to 59	8	153 to 159	23
60 to 66	9	160 to 165	24
67 to 73	10	166 to 172	25
74 to 79	11	173 to 179	26
80 to 86	12	180 to 185	27
87 to 93	13	186 to 192	28
94 to 99	14	193 to 199	29
100 to 105	15	200 to 206	30

When calculating the number of operative air brakes, count each:

- Locomotive as a car.
- Control valve on articulated equipment as a car.

D. Limiting the Number of Consecutive Control Valves Cut Out

Comply with the following, in addition to the above requirements.

1. Non-Articulated Cars

Verify that a non-articulated car with its air brake cut out is not coupled immediately next to:

- More than one other non-articulated car with air brakes cut out.
- An articulated car with one control valve when that control valve is cut out.
- The same end of an articulated car that has an end control valve cut out.

2. Articulated Cars
   Make certain that an articulated car:
   - That has more than one control valve, does not have two (2) consecutive control valves cut out. When there are two consecutive control valves cut out, set the car out.
   - With a control valve cut out on one of its ends, does not have the end with the control valve cut out coupled immediately to:
     - A non-articulated cars with its air brake cut out,
     - An articulated car with one control valve when that control valve is cut out, or
     - The same end of another articulated car that has an end control valve cut out.

5003 Working On Brake Equipment

Cut out the air brake on a car before repairing or adjusting brake equipment on that car in accordance with Rule 4200 (Cutting Out Air Brakes).

5004 Standard Brake Pipe Pressure

Adjust brake pipe pressure as follows:

Standard Brake Pipe Pressure	
Type of Service or Train	**Pressure**
Passenger, including Amtrak's "Auto Trains"	110 PSI
Road Freight	90 PSI
Trains with freight and passenger cars, excluding Amtrak's "Auto Trains"	90 PSI
Yard or Transfer	90 PSI

5005 Avoiding an Overcharge Condition

A. Doubling Cars or Coupling Cars to a Train

When doubling cars or coupling cars to a train, make a full service brake pipe reduction after the coupling is made and before the angle cock is opened.

B. Charging Train From Other Than Head End

When charging a train from other than the head end, adjust the brake pipe pressure to 15 PSI below the standard pressure for that train.

C. Attaching Cars to the Rear of a Train

When handling cars that will be attached to the rear of a train:

1. Before cutting air into cars, adjust the brake pipe pressure to 15 PSI below the standard pressure for the train being coupled to, and
2. Make a full service brake pipe reduction after coupling to but before the angle cock is opened to the main body of the train.

5006 Reducing an Overcharge Condition

To reduce an overcharged air brake system, follow the steps below:

Reducing an Overcharged Air Brake System	
Step	**Action**
1	Charge the brake pipe to the standard pressure for at least three (3) minutes.
2	Place the automatic brake in the EMERGENCY position
3	Wait 90 seconds and place the automatic brake in the RELEASE position
4	When 20 PSI of brake pipe pressure develops, place the automatic brake in the HANDLE OFF position for 90 seconds
5	Place the automatic brake in the RELEASE position

5007 Adjusting Air Brake Controls

While the train or engine is moving, do not:

- Adjust the regulating valve on the controlling locomotive.
- Cut out a brake valve on the controlling locomotive.

5050 Locomotive Air Brake Equipment

5051 Applying Train Brakes

When applying train brakes, monitor equalizing reservoir pressure because the brake pipe pressure will reduce at a slower rate.

5052 Monitoring Locomotive Air Gauges

Monitor all air pressure indications to detect changes that may affect the operation of the locomotive or train.

5053 Adjusting Equalizing Reservoir Pressure

To ensure accuracy, make adjustments to equalizing reservoir pressure with the automatic brake in the RELEASE position and cut OUT.

5054 Cutting In the Automatic Brake

Make certain that the automatic brake is in the RELEASE position and equalizing reservoir pressure is not increasing before placing the automatic brake cut-out valve to the IN position.

5055 Reporting Excessive Locomotive Brake Cylinder Piston Travel

Block 10 of Form FRA-F6180-49A (blue cab form) shows the maximum piston travel. When the actual piston travel is within 2 inches of the maximum piston travel shown in block 10, report the condition on the Locomotive Work Report, and to the train dispatcher, yardmaster, or mechanical desk.

5056 Ensuring Proper Brake Cylinder Pressure

The amount of locomotive brake cylinder pressure that should develop when the independent brake is fully applied is posted inside the locomotive cab by a stencil, badge plate, or decal.

If the pressure reading differs from the posted pressure by 3 PSI or more, report the condition on the Locomotive Work Report. Do not alter the locomotive brake cylinder pressure adjustment.

5057 Blocking Independent Brake

Do not block the independent brake so that it actuates the air brakes continuously.

5058 Positioning 3-Position Automatic Brake Cut-out Valves

Do not use the “PASS” position of a 3-position automatic brake cut-out valve in freight service.

The “PASS” position of a 3-position brake cut-out valve may only be used when:

- In passenger service, and
- Each car’s control valve is set for graduated release.

5059 Verifying Type of Brake Valve on Controlling Locomotive

Except for yard operations and passenger trains, the controlling locomotive must be equipped with 26/30 or electronic air brake valves.

5060 Managing Main Reservoir Air Pressure

Main reservoir air pressure should be between 130 and 145 PSI and must be at least 15 PSI more than brake pipe pressure for the air brake to work properly.

A. Monitoring

Monitor the main reservoir air pressure and:

- If the locomotive is stopped, do not move the locomotive when the pressure is within 15 PSI of brake pipe pressure.
- If the locomotive is moving and the main reservoir pressure falls to within 10 PSI of the setting of the regulating valve:
  1. Stop the movement. Comply with Rule 5555 (Stopping) if cars are attached to the locomotive.
  2. Secure the equipment in accordance with Operating Rules.
  3. Report the condition and the circumstances to the train dispatcher.
- Note on the Locomotive Work Report instances when main reservoir pressure is outside the 130- to 145-PSI range for extended periods of time.

B. Increasing Air Compressor Output

Do not increase air compressor output unless main reservoir pressure is within 15 PSI of the regulating valve setting.

To increase the air compressor output on a locomotive consist that contains a Dash 8, Dash 9, GE AC, or SD80AC locomotive, center the reverse lever and place the throttle in position #1.

To increase air compressor output with a locomotive consist that does not contain a Dash 8, Dash 9, GE AC, or SD80AC locomotive:

- Center the reverse lever and use only sufficient throttle to maintain a 15-PSI differential between main reservoir pressure and the regulating valve setting.
- Do not leave the throttle in any position that causes excessive vibration.
- Do not place the throttle in any position higher than #4.

C. Supplying Air to Main Reservoirs on Dead Locomotives

1. Dead-in-Tow

When handling dead-in-tow locomotives, make certain that the dead engine feature has been cut in to provide main reservoir air pressure. Only Mechanical Department personnel should operate the dead engine feature.

2. Dead-in-Consist

When handling dead-in-consist locomotives, condition the locomotives in accordance with Rule 5353 (Coupling Locomotives).

5100 Air Brake Tests – General Requirements

5101 Complying with FRA Regulations

Air brake equipment on locomotives and cars must be inspected and tested in accordance with the rules of this section, which are based on Federal Railroad Administration (FRA) regulations.

5102 Employee Responsibility

Supervisors are jointly responsible with inspectors, engineers, hostlers, and trainmen for the condition of air brake and air signal equipment on locomotives and cars to the extent it is possible to detect defective equipment by the required air brake tests.

5103 Operating Air Brake Controls

Do not operate the air brake controls on a locomotive for the purpose of performing train air brake tests unless you have been instructed and qualified.

5104 Determining Rear Car Air Pressure

During air brake tests, use the most efficient of the following methods to determine the air pressure at the rear of the train or cut of cars:

- Telemetry that has been qualified in accordance with Rule 5751 (Qualifying Telemetry for Air Brake Tests).
- Air gauge on a locomotive coupled to the rear of train or cut of cars.
- Air gauge in the EOT or marker unit.
- Accurate hand-held air gauge.

5105 Determining Application and Release of Rear Car's Air Brake

When making air brake tests, determine that the air brakes at the rear of the train have applied and released by:

- Telemetry that has been qualified as accurate through Rule 5751 (Qualifying Telemetry for Air Brake Tests),
  - A 5-PSI brake pipe reduction indicates application.
  - A 5-PSI brake pipe increase after an application is made indicates release.
- Observing that the brake cylinder piston properly responds to air brake operation.
- Observing that a brake pipe gauge at the rear of the train responds to air brake operation.

5106 Restoring Brake Pipe Pressure

After an air brake test, make certain that brake pipe pressure is being restored at the rear of the train before proceeding.

5150 Making Locomotive Air Brake Tests

5151 Making a Locomotive Consist Air Brake Test

The requirements of this rule are in addition to Rule 5152 (Standing Locomotive Air Brake Test) and Rule 5153 (Running Locomotive Air Brake Test).

A. When Required

Perform this air brake test when a locomotive consist is made up or added to.

B. Procedure

To make a Locomotive Consist Air Brake Test, follow the steps below:

Making a Locomotive Consist Air Brake Test	
Step	**Action**
1	Secure locomotive consist against movement
Testing Independent Brake	
2	Place independent and automatic brakes in RELEASE position.
3	Confirm that the air brakes are released on all locomotives.
4	Place independent brake in FULL APPLICATION position.
5	Confirm that the air brakes are applied on all locomotives.
6	Place independent brake in RELEASE position.
Testing Automatic Brake	
7	Confirm that the air brakes are released on all locomotives.
8	Make certain air brake application and acceptable brake pipe leakage by: 1. Making a 10-PSI brake pipe reduction. 2. After brake pipe exhaust stops, cut out the automatic brake. 3. Measure brake pipe leakage to make certain that it does not exceed 5 PSI per minute.
Testing Air Brake Actuation	
9	Confirm that the air brakes are applied on all locomotives.
10	Actuate brake cylinder pressure.
11	Confirm that the air brakes are released on all locomotives.
12	Properly position air brake controls as required.

C. Re-testing the Locomotive Consist

If the air brakes do not respond properly, or if brake pipe leakage is more than 5 PSI per minute, stop the test and make corrections. After making corrections, re-test the locomotive consist.

D. Documenting the Locomotive Brake Test

Review or record pertinent information in Section 1 of the brake test certificate to verify that a qualified employee has performed a brake test on the locomotive consist that is to be 1) added to a train consist, or 2) a main track lite locomotive(s) movement.

5152 Making a Standing Locomotive Air Brake Test

A. When Required

Make a Standing Locomotive Air Brake Test:

- When initially taking charge of a lite locomotive, or
- After changing ends or controlling units on a lite locomotive consist, or
- Before making an initial movement with a lite locomotive when cutting away from a train.

B. Conducting A Standing Locomotive Air Brake Test

Make certain that the locomotive remains stationary with the:

1. Independent brake in the FULL APPLICATION position,
2. Reverse lever in the FORWARD or REVERSE position,
3. Generator field switch in the ON position, and
4. Throttle in position #1.

C. Failure of Air Brakes During Test

If the locomotive moves and the test reveals holding power ineffective:

1. Place throttle in the IDLE position.
2. If necessary, movement must be stopped by:
   a) Using hand brake (if conditions permit), or
   b) Placing the reverse lever in the position opposite the direction of movement and placing the throttle in position #1.

5153 Making a Running Locomotive Air Brake Test

A. When Required

Make a Running Locomotive Air Brake Test as soon as operating conditions permit when:

- Making initial movement of a lite locomotive, or
- Making any change to a locomotive consist, or
- Changing ends.

B. Testing Procedure

To make a Running Locomotive Air Brake Test, follow the steps below:

Making a Running Locomotive Air Brake Test	
Step	**Action**
1	Begin moving the locomotive consist.
2	Place the independent brake to a point in the application zone that creates a retarding effect.
3	Verify brake cylinder pressure and retarding of the locomotive.
4	Place the independent brake in the RELEASE position.
5	Make certain that the brake cylinder pressure reduces to zero and the retarding effect is eliminated.
6	Make a 15-PSI brake pipe reduction.
7	Verify brake cylinder pressure and retarding of the locomotive.
8	Actuate the brake cylinder pressure
9	Make certain that the brake cylinder pressure reduces to zero, and the retarding effect is eliminated.
10	If at this point a heavy retarding effect develops, stop movement and make sure MU connections are made properly. If a retarding effect is not developed, test is complete. Position air brake controls as required.

5200 Making Train Air Brake Inspections and Tests

5201 Meeting Pre-Test Requirements

Before beginning a brake test, make certain that:

- Air hoses are properly coupled and in a serviceable condition.
- Angle cocks, end cocks, and cutout cocks are properly positioned.
- Brake circuit cables are properly connected (if the train is equipped with cables *and* will be operated with electro-pneumatic brakes).
- The regulating valve is adjusted to the standard pressure for the train being tested.

5202 Testing Brake Pipe Leakage

When these rules require a test of brake pipe leakage, comply with the following.

A. Air Flow Method (AFM)

Use the AFM when the train's controlling locomotive is equipped with 26/30 or electronic air brake equipment and an air flow indicator.

1. Procedure

To make an Air Flow Method Test, following the steps below.

Step	Action
1	Charge the brake pipe pressure at the rear car to 75 PSI for freight trains and 95 PSI for passenger trains.
2	Verify that the airflow indicator shows 60 CFM or less (air flow indicators not measuring air flow in CFM will have a red arrow at the 60 CFM position).
At this point the leakage test is complete. To test air brake operation, continue with Step 3.	
3	Obtain the required signal to begin the test.
4	Make a 20-PSI brake pipe reduction and allow brake pipe exhaust to stop.
5	Receive the required signal before releasing the air brakes.

B. Brake Pipe Leakage Method

If your train is not equipped to permit an Air Flow Method Test, make a Brake Pipe Leakage Test by following the steps below:

Step	Action
1	Charge the brake pipe pressure at the rear car to 75 PSI for freight trains and 95 PSI for passenger trains.
2	Obtain the required signal to begin the test.
3	Make a 20-PSI brake pipe reduction and allow brake pipe exhaust to stop.
4	Cut out the automatic brake.
5	Wait one minute and note brake pipe pressure
6	Measure brake pipe leakage for one minute.
7	If brake pipe leakage exceeds 5 PSI per minute, notify the employee inspecting the cars.
8	Receive the required signal before releasing the air brakes.

C. Addressing Excessive Leakage

If the leakage test reveals air flow greater than 60 CFM or more that 5 PSI leakage, examine the brake pipe for leaks and make the repairs necessary to reduce leakage to the required minimum.

D. Documenting Brake Pipe Leakage

Verify or enter information on the brake test certificate regarding brake pipe leakage. Information should be recorded as "AFM" when the airflow has been determined to be 60 CFM or less, or recorded as the amount of leakage per minute when the brake pipe leakage method has been used.

5203 Making a Class I Brake Test

A. When Required

Make a Class I Brake Test where:

- The train is originally made up.
- The train's consist is changed, unless the only change is either one or both of the following:
  - A car or a solid block of cars is added or removed.
  - Removing one or more defective cars from the train.
- The train has been off air for more than four hours.
- A cycle train has traveled 3,000 miles since its last Class I brake test and will be designated in special instructions.
- The train is received in interchange and the train's consist is changed.
- Cars are being picked up at an intermediate location, unless special instructions designate otherwise.
- The train is an extended haul train having traveled 1,500 miles as designated by special instructions. A qualified mechanical inspector will perform an inbound brake inspection at destination.

NOTE: A Class I Brake test is *not* required when:

- The train consist is changed by any combination 1, 2, 3, or 4 below:
  1. Removing a car or a solid block of cars from the train.
  2. Adding a previously tested car or solid block of cars to the train
  3. Changing motive power.
  4. Removing or changing the caboose.

- Changes other than those contained in 1, 2, 3, or 4 above are made to the train consist received in interchange where the train will move 20 miles or less. In this case, perform a Transfer Train Brake Test on cars added to the train.

B. Procedure

1. Trains not Previously Tested

Test brake pipe leakage in accordance with Rule 5202 (Testing Brake Pipe Leakage).

A) Inspecting Components during Test

While the train's air brakes are being tested, make certain that:

- Brakes apply on each car. If a car's air brake is not applied when examined, comply with Rule 5211 (Retesting Air Brakes).
- Air brake cylinder piston travel is correct when determined to be:
  - 7 to 9 inches on body-mounted brakes,
  - a maximum of 6 inches on truck-mounted brakes, or
  - as specified by the badge plate on the car).
- Brake rigging does not bind or foul.
- Brake equipment is properly secured.
- Retaining valves are in the EXHAUST position.
- Retaining valve pipes are in serviceable condition.
- Both sides of the car must be examined sometime during the inspection process to observe the functioning of all moving parts of the brake system.

B) Inspection of the Train to Ensure Proper Release

Inspect each car to make sure that its air brake has released. If both sides of train have received a visual inspection before the signal is given to release the brakes, a roll-by inspection may be made past a qualified employee where train's speed does not exceed 10 MPH. The locomotive engineer must be notified of the results of the roll-by inspection.

2. Testing Trains that have been Previously Tested

A) When Test has been Made Using the Outbound Locomotive

Trains tested using the outbound locomotive need no further testing.

B) When Test has been Made Using an Air Source other than the Outbound Locomotive

Trains tested using an air source other than the outbound locomotive and kept on charge must be given an additional test after the outbound locomotive is attached, as follows:

Step	Action
1	Charge the brake pipe pressure at the rear car to 75 PSI for freight trains and 95 PSI for passenger trains.
2	Obtain the required signal to begin the test.
3	Make a 20-PSI brake pipe reduction.
4	Make certain that the air brake applies on the rear car.
5	Receive the required signal before releasing the air brakes.
6	Place the automatic brake in the RELEASE position.
7	Make certain that the air brake releases on the rear car.

5204 Making a Class II Brake Test

A. When Required

Make a Class II Brake Test only when directed by special instructions or verbal instructions to do so. Once instructed, make a Class II Brake Test when the following equipment is added to a train at a location other than the train's initial terminal:

- A car or solid block of cars that has:
  - not received a Class I Brake Test.
  - been off air for more than four (4) hours.
- Inoperative air brakes and cars are tagged with defective equipment tags (Form 1113EC) on each car side.

B. Procedure for Making a Class II Brake Test

When making a Class II Brake Test, follow the steps below:

Step	Action
1	Test brake pipe leakage in accordance with Rule 5202 (Testing Brake Pipe Leakage) on the entire train.
2	Make certain that the air brake on each car picked up and the rear car of the train applies and remains applied until released. If the car's air brake is not applied when examined, comply with Rule 5211 (Retesting Air Brakes). If car's air brake fails to apply or remain applied for 3 minutes during the retest, comply with instructions for reporting, tagging, and moving the car with inoperative air brake, if required.
3	Make certain that the air brake on each car picked up and the rear car of the train releases. Inspection may be performed as the train "rolls by", provided the train's speed does not exceed 10 MPH. The engineer must be notified of the results of the roll-by inspection.

C. Procedure for Additional Testing Following a Class II Brake Test

- Cars given a Class II Brake Test must receive a Class I Brake Test at the next forward location where facilities are available to perform a Class I Brake Test.
- In addition, note the location where the Class I brake test will be required on the brake test certificate.

5205 Making a Class III Brake Test

A. When Required

Perform a Class III Brake Test when:

- The train has been separated and recoupled without any change to the train's consist.
- A locomotive or caboose is changed.
- A car or solid block of cars is removed from the train.
- Any one of the following changes are made to the train at a location other than the train's initial terminal:
  - A car or solid block of cars that has been previously given a Class I Brake Test and has not been off air for more than four hours is added to a train and the car or solid block of cars has not been added to or switched, except to remove defective cars, since it was set off. (Note: It is permissible to pick up the cars from more than one track, providing the cars were picked up in the same order as they were set off.).
  - Car or solid block of cars is added to a train that has received a Class I or Class II Brake Test and has not been off air for more than 4 hours.

B. Procedure for Making a Class III Brake Test

1. Class III – Trainline Continuity

If the reason for performing this test is because the train has been separated and recoupled without any changes to the train's consist, make certain that the brake pipe pressure at the rear car is being restored. When you cannot determine that the brake pipe pressure is being restored through Rule 5104 (Determining Rear Car Air Pressure), determine the rear car's air brake applies and releases through Rule 5105 (Determining Application and Release of Rear Car's Air Brake).

2. Class III – Train Consist Change

When making a Class III Brake Test for reasons other than what is listed in B -1 above, follow the steps below:

Step	Action
1	Charge the brake pipe pressure at the rear car to 75 PSI for freight trains and 95 PSI for passenger trains.
2	Make a 20-PSI brake pipe reduction.
3	Make certain that the air brake on the rear car of the train applies.
4	Place the automatic brake in the RELEASE position.
5	Make certain that the air brake on the rear car releases.

5206 Making a Transfer Train Air Brake Test

A. When Required

Make a Transfer Train Air Brake Test before making a transfer train movement not to exceed 20 miles, unless the cars have been previously tested.

B. Procedure

To make a Transfer Train Air Brake Test, follow the steps below:

Step	Action
1	Charge the brake pipe pressure at the rear car to 75 PSI.
2	Make a 20-PSI brake pipe reduction.
3	Make certain that the air brake applies on each car.
4	A car brake that fails to apply or remain applied may be retested per Rule 5211 (Retesting Car Air Brakes).
5	Defective equipment may be moved to the nearest location where repairs can be made if the defective car has been properly tagged.

5207 Making a Helper Service Air Brake Test

A. When Required

Make a Helper Service Air Brake Test anytime a helper locomotive is added to a train.

B. Procedure

To make a Helper Service Air Brake Test, follow the steps below:

Step	Action
1	Receive confirmation from the engineer of the helper locomotive that the helper locomotive is properly coupled to the train.
2	If the train brake is applied, make an additional 10-PSI brake pipe reduction. If the train brake is released, make a 2-PSI brake pipe reduction.
3	Make sure the brake pipe exhaust stops.
4	Make certain the air brakes on the rear of the train apply.
5	Place the automatic brake in the RELEASE position.
6	Make certain that the air brakes on the rear of the train releases.
7	A helper locomotive(s) that do not develop a brake application shall not remain in a train unless repaired.

5208 Making a Class IA Air Brake Test

A. When Required

Make a Class IA Air Brake Test at points designated in Special Instructions.

B. Procedure

To make a Class IA Air Brake Test, follow the steps below:

Step	Action
1	Charge the brake pipe pressure at the rear car to 75 PSI for freight trains and 95 PSI for passenger trains.
2	Test brake pipe leakage in accordance with Rule 5202 (Testing Brake Pipe Leakage).
3	Make a 20-PSI brake pipe reduction.
4	Make certain that: • An inspection of both sides of the car is done sometime during the inspection process • the air brake applies on each car. • Brake rigging on each car is properly secured and does not bind or foul
5	A car whose brake that fails to apply can be retested per Rule 5211 (Retesting Air Brakes). The car failing a retest may be moved to the nearest location where repairs can be made after being properly tagged.

5209 Making a Back-up Hose / Back-up Valve Air Brake Test

A. When Required

Make a Back-up Hose / Back-up Valve Air Brake Test when:

1. A back-up hose or back-up valve will be used to control movement.
2. The consist of a train using a back-up hose or back-up valve is changed.

B. Procedure

To make a Back-up Hose / Back-up Valve Air Brake Test, follow the steps below:

	Who Does It	Action
1	Trainman	Verifies that the air hoses are coupled from the locomotive to the back-up valve.
2	Trainman	Informs the engineer that a brake test will be made from the back-up valve.
3	Engineer	Charges the air brake system.
4	Engineer	Cuts out the automatic brake.
5	Trainman	Opens the back-up valve to exhaust air pressure at a service rate.
6	Engineer	Observes brake pipe and brake cylinder gauges to make certain that the: • Brake pipe pressure reduces, and • Air brake applies on the locomotive.
7	Engineer	Communicates the results of the test to the trainman.
8	Trainman	Closes the back-up valve.
9	Engineer	Restores air brake equipment to normal operating position.

B. Back-up Running Air Brake Test for Passenger Train Equipment

In addition to the requirements of Paragraph B, above, make the following test, as conditions require.

Step	Who Does It	Action
1	Engineer	Begins movement and authorizes test.
2	Trainman	Opens the back-up valve to reduce brake pipe pressure at a service rate and verifies that air pressure is exhausting freely.
3	Crew	Verifies that a retarding effect is created.

5210 Making a Passenger Train Running Air Brake Test

A. When Required

Make a Passenger Train Running Air Brake Test when:

- Departing the train's initial terminal.
- Locomotive, engine crew, or train crew has been changed.
- A brake pipe angle cock has been turned, except for cutting cars from the rear of the train.
- Electro-pneumatic brake circuit cables between power units and/or cars are disconnected.
- The train has struck debris on the track.
- In accordance with Rule 5953 (Making Necessary Substitution for Telemetry with an En Route Failure).

B. Procedure

To make a Passenger Train Running Air Brake Test, follow the steps below:

	Action
Begin the test as soon as the train speed is high enough to prevent stalling.	
1	Keep the locomotive brake released during the test.
2	While using enough power to keep the train stretched, apply the train air brakes with sufficient force to make sure they are operating properly.
3	If the train brakes create a noticeable retarding force, release the brakes and proceed.
4	If the train brakes do not create a noticeable retarding force: 1. Stop the train. 2. Inspect the brakes. 3. Correct the problem. 4. Perform this procedure again.

5211 Retesting Air Brakes

If you discover an air brake that has not applied or does not remain applied, retest the air brake as follows:

Step	Action
1	Charge the brake pipe pressure at the rear car to 75 PSI for freight trains and 95 PSI for passenger trains.
2	Make a 20-PSI brake pipe reduction.
3	Measure the time the air brake is applied.
4	If the air brake remains applied for three (3) minutes, consider the air brake as operating. If the air brake does not remain applied for at least three (3) minutes, consider the air brake as non-operating.
5	When freight car fails the retest: • At the train's originating location, set the car out. • At an intermediate location, once tagged, may be moved to the nearest repair location.

5212 Documenting the Air Brake Test

Engineer Notification of Class I or IA Brake Test

A. Required Notification

The engineer must be notified that the air brake test has been satisfactorily performed. This notification must include the:

- Date and time the inspection was made.
- Number of freight cars inspected.
- Name of the qualified person performing the test or ID number if Class I or IA test.
- Location where the test was performed.

If the notification is provided verbally, the engineer must record the required information on the brake test certificate.

Review brake test certificate information when taking charge of locomotive(s) and/or train. The engineer may review one or more sections for documentation of power brake law items:

- Section 1 – Locomotive Brake Test
- Section 2 – Head End Train Device Test
- Section 3 – Dynamic Brake Status, Total Dynamic Brake Axles, and the number of Locomotives Tagged Defective
- Section 4 – Train Brake Test
- Section 5 - Rear End Train Device Test
- Section 6 - Train Air Brake Test Information including number of cars with air brakes inoperative or cut out, repair location for these cars, and position of such cars in the train.
- Section 7 - Power Brake Related Problem(s) Explanation.

List information relating to occurrences of Power Brake related problems.
Example 1: A locomotive that has developed an inoperative dynamic brake en route and not previously reported.
Example 2: A freight car that has had the air brake cut out due to brakes sticking.

B. Transferring Notification

Leave any brake test written documentation on the engineer's control stand of the controlling locomotive for the relieving engineer. This form, unless recreated, or updated, must remain on the controlling locomotive to the train's destination.

The engineer must record pertinent information, as necessary, to keep the air brake certificate up-to-date.

The locomotive engineer who changes or adds motive power to a previously Class I brake tested train will see that the brake test certificate information is placed in the controlling locomotive's operating cab.

The conductor, when updating train documentation, will note pertinent information relating to Class I, IA, II, or transfer brake tests given to the train or any car or block of cars added to the train.

C. Notification of Air Brake Test relating to Cars being Set Out.

Leave written documentation in the knuckle with the car or block of cars, or verbally notify the yardmaster or train dispatcher when cars have received a previous test and have been kept charged. This information is critical to avoiding further unnecessary testing on such cars. Information must include:

- Date, time, the inspection was made.
- Number of freight cars inspected.
- Name of qualified employee (or ID number of qualified employee if test is Class I or IA) that performed the air brake test of car(s) being set out of the train.

D. Replacing Air Brake Test Certificate Information

Review the train documentation for air brake test information. If information is not found, contact the yardmaster or train dispatcher to report the absence of a record or an air brake test certificate relating to your train. The originating Class I brake test information may be retrieved from the CSX mechanical department. Be governed by instructions from the yardmaster or train dispatcher for replacing the air brake test certificate.

5300 Locomotives

5301 Ensuring Locomotives are Inspected

Each locomotive in use must be inspected once each calendar day.

A. Engineer Responsibility

The engineer must make sure that the locomotive consist in his/her charge has received the required calendar day inspection.

B. Inspection Made by Mechanical Department

The engineer must accept the results of any inspection performed by the Mechanical Department.

5302 Determining if Inspection is Required

A. When the Locomotive will not be Used in Service

Do not inspect a locomotive that will not be used in service. If the locomotive is due a calendar day inspection, comply with Rule 5307A (Completing and Placing Non-Compliance Tag).

B. When the Locomotive will be Used in Service

Review the Calendar Day Inspection Report upon taking charge of a locomotive. When taking charge of run through power, check the lead locomotive's Calendar Day Inspection Report and look for Calendar Day Inspection Tags placed in accordance with Rule 5304 (Tagging a Locomotive due an Inspection at a Different Time). Be governed as follows:

1. When a Calendar Day Inspection is not Required

When the previous calendar day inspection was made on the current day, do not make another inspection.

2. Making a Calendar Day Inspection Before Using the Locomotive

Make a Calendar Day Inspection before using the locomotive if:

- The Calendar Day Inspection Report can not be found.
- The last calendar day inspection was not made on either the current day or on the previous day.

3. Making a Calendar Day Inspection Before 2359 Hours on the Current Day

If the last calendar day inspection was made on the previous day, the inspection must be made on the current day before 2359 hours.

5303 Securing Authorization to Perform Calendar Day Inspection

When a locomotive requires a calendar day inspection in accordance with Paragraph B3 above, secure authority to make the inspection in accordance with the following.

A. When Your Tour-of-Duty Began at 1200 Hours or Later

When a calendar day inspection will be required on the current day, secure instructions regarding where the calendar day inspection should be conducted.

Under no circumstances can a locomotive requiring a calendar day inspection be operated past 2359 hours.

B. When Your Tour-of-Duty Began before 1200 Hours

When a calendar day inspection will be required on the current day, make the inspection before leaving the train, unless:

- Doing so would cause a violation of the Hours-of-Service Act.
- Instructed by a proper authority that another employee will make the inspection before 2359 hours.

C. When Setting Out a Locomotive En Route

When a locomotive being set out en route requires a calendar day inspection on the current day, make the inspection unless instructed by a proper authority that another employee will make the inspection before 2359 hours.

5304 Tagging Locomotives due an Inspection at a Different Time

When any locomotive in the consist is due a calendar day inspection before the lead locomotive is due its inspection, complete a Calendar Day Inspection Tag and attach it to the isolation switch of the lead locomotive.

5305 Performing a Calendar Day Inspection

When a calendar day inspection is required, inspect the locomotive for "non-complying conditions".

The locomotive must be considered as having a non-complying condition when any of the conditions listed below are not met, and the locomotive must be handled in accordance with Rule 5308 (Moving Locomotives with Non-Complying Conditions).

A. Inspecting the Operating Cab

- Floors and passageways must be free of slip and/or trip hazards.
- Fusees and torpedoes must be in the container provided.
- Cab seats must be secure.
- Traction motors on DC-powered locomotives must be cut in.
- Windows on the lead locomotive must permit a clear view.
- The following must be operational on, or from, the lead locomotive:
  - Front headlight (at least one bulb in the headlight to the front of the locomotive consist)
  - Rear headlight (at least one bulb in the headlight to the rear of the locomotive consist when the locomotive is used in yard service or in road service and is regularly required to run backward for any portion of its trip other than to pick up a portion of its train or to make terminal movements)
  - Horn
  - Crossing bell
  - Gauge lights (must permit accurate readings of gauges)
  - Engineer's cab light (must provide sufficient illumination for reading necessary documents)

B. Inspecting the Walkway and Engine Compartment

- Walkways must be free of slip and/or trip hazards.
- Handrails, hand holds, steps, ladders, and guards must be secured and ready for service.
- Guards for electrical and rotating equipment must be in place.
- Safety chains must:
  - Provide a continuous barrier between locomotives.
  - Provide a continuous barrier across the front and the rear of the locomotive consist.
  - Be connected high enough to permit safe passage.

C. Making a Ground Inspection

- Sanders must deposit sand on the rails in front of the consist's lead wheels (in the direction of movement) and the consist's rear wheels.
- Fuel tank must not have any leaks.
- Brake cylinder piston travel must be at a:
  - Minimum - sufficient to permit the brake shoes to clear the wheels when the brakes are released.
  - Maximum – not more than the total piston travel displayed in Block 10 of Form F6180-49A minus 1 1/2 inches.
- Brake shoes must be secured and aligned with the wheel.
- Brake rigging must not bind or foul.
- There must be no cracks, or broken or missing parts on any:
  - Locomotive truck
  - Wheel
  - Gear case
  - Draft gear
  - Coupler or coupler carrier
- Jumper cables must:
  - Not be frayed or damaged.
  - Be stowed if unused.
  - Have each end connected to a working receptacle or a dummy receptacle.

5306 Making a Report of the Calendar Day Inspection

Complete a Calendar Day Inspection Report and leave it on the locomotive inspected.

5307 Reporting Non-Complying Conditions

When a non-complying condition exists on a locomotive, the engineer must comply with the requirements of this rule.

A. Completing and Placing a Non-Compliance Tag

When a non-complying condition exists on a locomotive, complete a Non-Compliance Tag indicating the non-complying condition(s). Attach the appropriate part of the tag to the isolation switch of the non-complying locomotive and the other part to the isolation switch of the controlling locomotive. The Non-Compliance Tag must remain on the affected locomotive to provide notification for the next engineer.

Complete and attach a non-compliance tag as required by Rule 5302A (Locomotive that will not be Used in Service) even though the locomotive has no defect (s).

Both copies of the Non-Compliance Tag must be placed on the non-complying locomotive if it is set off.

B. Discovering the Condition during a Calendar Day Inspection

In addition to Paragraph A of this rule, record the details of the non-complying condition on the Calendar Day Inspection Report when the condition is discovered during the performance of a calendar day inspection.

C. Discovering the Condition While En Route

In addition to Paragraph A of this rule, record the details of the non-complying condition on the Locomotive Work Report when the condition is discovered en route.

D. Reporting a Non-Complying Condition

When a non-complying condition is discovered, promptly report the details of the condition, including any restrictions placed on the locomotive, to:

- Train dispatcher or yardmaster
- Mechanical Desk
- All other crew members

5308 Moving Locomotives with Non-Complying Conditions

Comply with the requirements of this rule when a condition described in one of the following rules exist:

- Rule 5305 (Performing a Calendar Day Inspection)
- Rule 5411 (Ditch Lights)
- Rule 4153 (Flat Spots Meeting a Non-complying Condition for a Locomotive)

A. Discovering the Condition during a Calendar Day Inspection

1. If possible, bring the locomotive into compliance by switching the consist or correcting the condition.

2. If the locomotive can not be brought into compliance through 1, above, the engineer or other qualified employee must determine whether the locomotive is safe to move.

A) Handling a Non-Complying Locomotive that is Safe to Move

If the non-complying locomotive is safe to move, it may only be moved either:

- Lite or dead within a yard, not exceeding 10 MPH, or
- In a locomotive consist not attached to cars, or
- Isolated or shut down (temperature permitting) when attached to cars.

B) Reporting a Non-Complying Locomotive that is not Safe to Move

If the locomotive is not safe to move, notify the train dispatcher or yardmaster.

B. Discovering the Condition While En Route

1. If possible, bring the locomotive into compliance by switching the consist or correcting the condition.

2. If the locomotive cannot be brought into compliance through 1, above, the engineer or other qualified employee must determine whether the locomotive is safe to move.

A) Handling a Non-Complying Locomotive that is Safe to Move

If the locomotive is safe to move, it may only be operated until the earlier of:

1) The performance of the next Calendar Day Inspection, or
2) Reaching the next forward point where the necessary repairs can be made.

B) Reporting a Non-Complying Locomotive that is Not Safe to Move
If the locomotive is not safe to move, notify the train dispatcher or yardmaster.

C) Positioning of a Non-Complying Locomotive
When a locomotive is isolated or shutdown en route due to a non-complying condition, do not permit the locomotive to remain in the controlling or lead position after the performance of the next calendar day inspection.

5309 Locomotive Work Reports

A. Completing a Locomotive Work Report

Complete a Locomotive Work Report for the locomotive consist, for each trip or tour-of-duty, detailing:

- The locomotive(s) initials and numbers
- The information required lines 1 through 4 of the report
- Problems
- Unusual occurrences
- Defects
- Non-complying conditions discovered en route

The Locomotive Work Report may be used by more than one engineer, if space permits.

B. Completing a Locomotive Work Report when Setting Out a Locomotive

When setting out a locomotive, complete a Locomotive Work Report detailing the information required in Paragraph A of this rule, and leave it on board the set-off locomotive.

5310 Reporting Locomotive Defects

Promptly report defects discovered en route to:

- The train dispatcher or yardmaster
- The Mechanical Desk
- All other crew members

When reporting locomotive defects to the train dispatcher, yardmaster, or Mechanical Desk, use the three-letter code with the accompanying color code, as listed on the cover of the Locomotive Work Report tablet.

Telephone numbers for the Mechanical Desk are RNX system 8-388-5540 or 8-388-5555 and Bell system 1-800-624-8385.

5350 Locomotive Conditioning

5351 Starting Diesel Engines

A. When Starting a Diesel Engine is Prohibited

Do not attempt to start a diesel engine when any of the following conditions exist:

- Hot engine and low lube oil indications are displayed at the same time.
- Crankcase over pressure device is tripped.
- An indication of a governor shutdown (low lube oil) occurs two consecutive times.

B. Starting a Diesel Engine

To start a diesel engine, follow the steps below. When the instructions below conflict with the decal posted inside the cab of a SD70AC, SD80AC, or SD90AC locomotive, comply with the instructions on the decal.

Starting a Diesel Engine	
Step	**Action**
Locomotive Cab	
1	Place the isolation switch in the START position.
2	Make certain that the battery knife switch is closed.
3	Reset any tripped circuit breakers and place the control/fuel pump switch to the ON position.
4	Make certain that the fuses are properly positioned.
5	Make certain that the throttle or the MU shutdown button is not in the STOP position.
Engine Room	
6	Reset engine protective devices that are tripped, *except do not reset a crankcase over pressure device.*
7	Check the engine lube oil, cooling water, and air compressor lube oil levels. • If any of the levels is at or below the LOW level, do not start the engine and contact the Mechanical Desk. • If all of the levels are above the LOW level, start the engine.
Starting Engine	
8	Prime the fuel system. Note: The following conditions indicate the fuel system is primed: • Sight glass is full of fuel, • Pressure gauge (if equipped) indicates at least 30 PSI, or • System has been primed continuously for 30 seconds.
9	Crank the diesel engine until it starts, but not longer than 30 seconds. Notes: • Hold the layshaft lever (on diesel engines so equipped) at 1/3 travel • There may be a delay of up to 15 seconds before a GE diesel engine begins to crank • If the diesel engine fails to start, repeat this procedure. If it does not start after a second attempt, contact the Mechanical Department.

5352 Shutting Down Diesel Engines

A. Performing an Emergency Shutdown

Shut down the diesel engine as soon as possible in an emergency situation, as follows.

1. Shutting Down the Entire Consist
Shut down all diesel engines on-line by either:

- Placing the throttle in the STOP position on upright control stands, or
- Depressing the STOP button on the overhead console (on locomotives with a desk-top control stand).

2. Shutting Down Individual Locomotives
Depressing any emergency fuel cut-off switch will immediately shut down the diesel engine.

Depressing any emergency fuel cut-off switch on an apu-equipped locomotive will immediately shut down the locomotive diesel engine and shutdown or disable the apu engine.

B. Performing a Normal Shutdown

Operate the diesel engine at less than throttle position 8 for at least 30 minutes before shutdown.

To shut down a diesel engine, follow the steps below. When the instructions below conflict with the decal posted inside the cab of a SD70AC, SD80AC, or SD90AC locomotive, comply with the instructions on the decal.

Shutting Down a Diesel Engine	
Step	**Action**
All locomotives except CW60AC	
1	Place the isolation switch in the START position.
2	Stop the engine by pressing the engine stop button.
3	Open the radio circuit breaker
4	Open the battery knife switch
CW60AC locomotives	
1	Place the isolation switch in the START position.
2	Stop the engine by pressing the engine stop button.
3	Depress and hold the computer reset off button at least 2 seconds. • The computer screen will display "Please wait. Computer shutdown in progress." • After 15 seconds the computer screen will display "No external video."
4	Open the radio circuit breaker
5	Open the battery knife switch

5353 Coupling Locomotives

When coupling locomotives, secure 3-Step Protection in accordance with Rule 2053A (3-Step Protection) before fouling the equipment when the locomotive engineer is in the cab or if one of the locomotives is being operated remotely.

When coupling locomotives, make certain that the couplers are locked by stretching the coupling and complete the following tasks:

- Position the controls, switches, and air brake valves on the controlling locomotive.
- Position the controls, switches, and air brake valves on the trailing locomotives. Make certain that the engine run, control/control and fuel pump, and generator field switches are in the OFF position.
- Position the walkways and safety chains to provide safe movement from one locomotive to the other.
- Install the jumper cables.
- Make the following air hose connections:
  - Brake pipe hose
  - Main reservoir equalizing hose
  - Actuating hose
  - Independent application and release hose
- Open angle cocks and end cocks for the coupled air hoses

5354 Uncoupling Locomotives

When uncoupling locomotives, secure 3-Step Protection in accordance with Rule 2053A (3-Step Protection) before fouling the equipment when the locomotive engineer is in the cab or if one of the locomotives is being operated remotely.

Complete the following tasks when uncoupling locomotives:

- Secure the locomotive(s) to be left standing.
- Disconnect and reposition the safety chains.
- Position the walkways.
- Close the angle cocks and the end cocks where necessary.
- Disconnect and store the jumper cable(s).
- Position the controls, switches and air brake valves on the locomotives to be left standing.

> **NOTE:** Do not break air hose connections by hand. Allow those connections to be broken as the locomotives part.

5355 Changing Ends

When required to operate from a different locomotive in the consist, follow the steps below to change ends:

Changing Ends	
Step	**Action**
Cutting Out	
1	Make certain that the independent brake is in the FULL APPLICATION position.
2	Remove and properly store the reverse lever.
3	Make a full service reduction and make certain that the brake pipe exhaust stops.
4	Cut out the automatic brake and put it in the HANDLE OFF position.
5	Cut out the independent brake and put it in the RELEASE position.
6	Set the switches and controls for trailing operation.
7	Proceed promptly to the locomotive to be cut in.
Cutting In	
1	Place the independent brake in the FULL APPLICATION position and cut in.
2	Position the switches and controls for lead unit operation.
3	Place the automatic brake in the RELEASE position and adjust the equalizing reservoir pressure if necessary.
4	Cut in the automatic brake.

5356 Securing the Locomotive Consist

Engineers securing a locomotive consist must apply the number of hand brakes required by operating rule and make certain that the consist will not move.

A. Operating a Hand Brake

When applying a hand brake, operate the mechanism until all slack is removed from the chain and the brake shoes to which the hand brake is connected are tight against the wheels.

On locomotives with underslung brake cylinders equipped with brake cylinder release valves, make certain that the brake cylinder between the L1 and L2 wheels is IN (released).

B. Operating an Electric Parking Brake

With the exception of this rule an electric parking brake will be considered the same as a hand brake.

1. EMD SD80 MAC Equipment

a. Applying Electric Parking Brake

To apply an electric parking brake, follow the steps below:

Applying an Electric Parking Brake	
Step	**Action**
1	Make certain that the parking brake circuit breaker is in the ON position.
2	Rotate the collar of the parking brake switch clockwise to align the indicator mark with the position marked “apply”.
3	Press and hold the push button until the needle indicator on the parking brake meter moves to the extreme right position of (and remains steady in) the applied zone. (This may take 45 to 50 seconds). Notes: • If the indicator needle does not move after the push button has been pressed for 30 seconds, the parking brake must be operated manually. • Do not hold the push button in for more than 15 seconds after the indicator needle reaches and remains steady in the applied zone.
4	Test the parking brake’s effectiveness in accordance with Paragraph C (Verifying Hand Brake Effectiveness).

b. Applying Electric Parking Brake – Manually

To apply an electric parking brake manually, follow the steps below:

Applying an Electric Parking Brake – Manually	
Step	**Action**
1	Place the parking brake circuit breaker to the OFF position.
2	Remove the hand crank from the container adjacent to the parking brake unit, which is located on the left side of the front truck.
3	Apply the hand crank to the manual drive shaft of the parking brake unit and rotate it clockwise until the brake shoes are firmly against L2 and L3 wheels.
4	Remove and store the hand crank.
5	Place the parking brake circuit breaker to the ON position.
6	Test the parking brake's effectiveness in accordance with Paragraph C (Verifying Hand Brake Effectiveness).

c. Releasing Electric Parking Brake

To release an electric parking brake, follow the steps below:

Releasing Electric Parking Brake	
Step	**Action**
1	Rotate the collar of the parking brake switch counter-clockwise to align the indicator mark with the position marked "Release."
2	Press and hold the push button until the indicator needle on the parking brake meter moves to the extreme left position of (and remains steady in) the release zone (this may take 45 to 50 seconds). Notes: • If the indicator needle does not move after the push button has been pressed for 30 seconds, the parking brake must be operated manually. • Do not hold the push button in for more than 15 seconds after the needle indicator reaches and remains steady in the release zone.

d. Releasing Electric Hand Brake – Manually

To release an electric hand brake manually, follow the steps below:

Releasing Electric Parking Brake – Manually	
Step	**Action**
1	Place the parking brake circuit breaker in the OFF position.
2	Remove the hand crank from the container adjacent to the parking brake unit, which is located on the left side of the front truck.
3	Rotate the hand crank counter-clockwise until the brake shoes for L2 and L3 wheels are away from the wheels when the parking brake and air brakes are released.
4	Remove and store the hand crank.

2. SafeSet™ Locomotive Parking Brake Equipment

SafeSet parking brake equipment is a ratchet brake type design retrofitted onto older locomotives. This equipment can be operated either electrically or manually. The system can be set electrically and released manually or set manually and released electrically.

a. Applying a SafeSet™ Parking Brake

Applying a SafeSet™ Parking Brake	
Step	**Action**
1	Make certain parking brake circuit breaker is turned on.
2	Press and release the SET (upper) button on the face of the hand brake housing.
3	Once hand brake is set, the BLUE LED portion of the button will illuminate for 5 seconds. NOTE: Manually apply parking brake in accordance with part c. (Applying a SafeSet™ Parking Brake – Manually) upon observing one of the following: • Blue LED flashes continuously – over voltage indication – operation may be disabled. • Both blue and green LEDs flash in an alternating pattern – brake motor problem • No LED illumination – No power supply and parking brake circuit breaker is on.
4	Test parking brake effectiveness in accordance with Paragraph C (Verifying Hand Brake Effectiveness).

b. Releasing a SafeSet™ Parking Brake

Releasing a SafeSet™ Parking Brake	
Step	**Action**
1	Make certain parking brake circuit breaker is turned on.
2	Press and release the RELEASE (lower) button on the face of the hand brake housing.
3	Once hand brake is released, the GREEN LED portion of the button will illuminate for 5 seconds.
4	NOTE: Manually release parking brake in accordance with part d. (Releasing a SafeSet™ Parking Brake – Manually) upon observing one of the following: • Green LED flashes continuously – under voltage indication – operation may be disabled. • Both blue and green LEDs flash in alternating pattern – motor problem. • No LED illumination – No power supply and parking brake circuit breaker is on.

c. Applying a SafeSet™ Parking Brake – Manually

Applying a SafeSet™ Parking Brake – Manually	
Step	**Action**
1	Parking brake circuit breaker can be positioned on.
2	Manually operate hand brake ratchet lever until brake is set. Manual setting will take more strokes than when applying a traditional ratchet type hand brake.
3	Test parking brake effectiveness in accordance with Paragraph C (Verifying Hand Brake Effectiveness).
4	Report reason for not being able to electrically apply parking brake.

d. Releasing a SafeSet™ Parking Brake - Manually

Releasing a SafeSet™ Parking Brake – Manually	
Step	**Action**
1	Parking brake circuit breaker may be positioned on.
2	Manually pull hand brake release lever one time.

C. Verifying Hand Brake Effectiveness

1. Testing a Hand Brake
After applying the hand brake, follow the steps below to make certain that the locomotive consist will not move:

Testing Hand Brake Effectiveness	
Step	**Action**
1	Place the independent and the automatic brakes in the RELEASE position.
2	Place the throttle in the #1 position under power.
3	If the locomotive does not move, consider the hand brake effective.
4	If the locomotives moves, place the throttle in IDLE position and be governed as follows: • If the locomotive stops within 10 feet, consider the hand brake effective. • If the locomotive does not stop within 10 feet, place the independent brake to the FULL APPLICATION position and comply with Paragraph 2 (Performing Test when a Locomotive is not Equipped with a Hand Brake *or* when the Hand Brake does not Prevent Movement).

2. Performing Test when a Locomotive is not Equipped with a Hand Brake or when the Hand Brake does not Prevent Movement

When a locomotive is not equipped with a hand brake or when its hand brake does not prevent movement, place a chock or chain to the front and rear of the number R2 wheel and follow the steps below to make certain that the locomotive consist will not move.

Testing Effectiveness of Chock or Chain	
Step	**Action**
1	Place the independent and the automatic brakes in the RELEASE position.
2	If the locomotive remains stationary, consider the chock or chain effective.
3	If the locomotive moves, stop the locomotive and apply additional chock(s) or chain(s) and repeat steps 1, 2; and, if necessary, 3.

5357 Leaving Locomotives Unattended

When leaving a locomotive consist unattended, comply with Rule 5356 (Securing the Locomotive Consist) and position the controls on the controlling locomotive as indicated below:

- Independent brake cut in and in the FULL APPLICATION position.
- Automatic brake cut in and in the:
  - FULL SERVICE position, if the locomotive is coupled to a train.
  - RELEASE position, if the locomotive is not coupled to a train.
- Throttle in the IDLE position.
- Reverse lever removed and stored.
- Control/fuel pump switch in the
  - ON position, if the engine is running.
  - OFF position, if the engine is shut down.
- Generator field switch in the OFF position.
- Engine run switch in the OFF position.
- Isolation switch in the ISOLATE position.

In areas of high vandalism, special instructions on securing locomotive(s) may differ to allow the removal of removable brake handles.

5400 Locomotive Operation

5401 Conserving Fuel

A. Using Fuel Conservation Methods

Use fuel conservation methods at all times, as follows:

- Place the reverse lever in the CENTER position anytime the locomotive is stationary.
- To the extent possible, avoid using the stretch braking method of speed control.
- Avoid having more locomotives on-line than those required to maintain the maximum speed permitted.
- Empty coal train movements will use only the locomotives necessary to move the train. Trailing locomotives will be isolated and, when weather permits, shutdown.
- When handling lite locomotive movements, use only the lead locomotive for power. Trailing locomotives will be isolated and, when weather permits, shutdown.
- Unless instructed otherwise by train dispatcher or yardmaster, shut down the diesel engines in locomotives when:
  - The locomotive will not be used for fifteen (15) minutes or more, and
  - Ambient temperature is above forty (40) degrees Fahrenheit.

Engineers must ask the train dispatcher, yardmaster, or work train employee-in-charge to determine the anticipated length of time the locomotive will not be used.

If necessary to do so, you may allow one diesel engine to idle in order to maintain an air supply to the train.

B. Checking and Reporting Fuel Levels

When taking charge of locomotive(s), check the fuel levels on them.

Report fuel levels of less than 1000 gallons promptly to the Mechanical Desk. You can contact the Mechanical Desk through mobile radio access or by telephone by:

- Company phone at 8-388-5540 or 8-388-5555
- Bell system at 1-800-624-8385

C. Manual Shutdown

Until further notice, perform a manual shutdown on all locomotives consistent with ABTH Rule 5352 B excluding units CSXT 4701 through 4850 and any foreign line locomotives with an AESS (Automatic Engine Start and Stop System).

When performing a shutdown on APU-equipped locomotives, do not turn off the maintenance breaker.

5402 Safety Control Devices

A. Prohibiting the Annulment of a Safety Control Device

This rule and federal regulations prohibit unauthorized annulment of a safety control device. Holding down a pneumatic foot (deadman) pedal with anything other than your foot will be considered unauthorized annulment.

B. Getting Authorization to Annul a Safety Control Device

The locomotive engineer must request permission from the train dispatcher to cut out a safety control device if it becomes defective and prohibits normal train movement. When a safety control device is cut out, report doing so on the Locomotive Work Report.

C. Resetting Air Brake Equipment Tripped by a Safety Control Device

To reset air brake equipment after a safety control device operates and train stops:

1. Place the throttle in the IDLE position or the dynamic brake lever in the OFF position.
2. Place the automatic brake in the SUPPRESSION position.
3. Make certain that the brake pipe exhaust has stopped for 20 seconds.
4. Place the automatic brake in the RELEASE position.

5403 Speed Indicators

A. Checking the Accuracy of the Speed Indicator

Check the accuracy of the speed indicator on the controlling locomotive at locations indicated in Special Instructions.

Report the results of a speed indicator accuracy check on the Locomotive Work Report.

B. Speed Indicator Requirements

1. A locomotive used as a controlling locomotive at speeds above 20 MPH must be equipped with an operative speed indicator, which must be accurate within:
   - 3 MPH at speeds of 10 to 30 MPH, or
   - 5 MPH at speeds above 30 MPH.

2. If a speed indicator on a controlling locomotive fails en route, the locomotive may continue as a controlling locomotive at normal track speed to the next repair facility.

Speed Table					
Time		Speed	Time		Speed
Min	Sec	MPH	Min	Sec	MPH
0	44	80	1	30	40
0	48	75	1	43	35
0	51	70	2	00	30
0	55	65	2	24	25
1	00	60	3	00	20
1	05	55	4	00	15
1	12	50	6	00	10
1	20	45	12	00	5

5404 Complying with Short-Time Ratings

The "short-time rating" for a locomotive is established by its manufacturer and is the maximum time the locomotive can operate at the given output in throttle 8 without risking heat damage to the traction motors. Short-time ratings do not apply to SD60, SD70, Dash 8, Dash 9, or AC locomotives.

A. Operating Locomotive Consist Below Minimum Continuous Speed

Avoid continuous operation at speeds lower than the minimum continuous speed for the locomotive consist.

The minimum continuous speed for the locomotive consist is the highest minimum continuous speed of any of the on-line locomotives in the consist.

B. Preventing Excessive Operation in Short-Time Rating Zone

Do not exceed the “available time” in short-time ratings.

Operation outside the short-time rating zone for 20 minutes or more restores maximum allowable time.

C. Calculating Available Time in Short-Time Ratings

The most restrictive short-time rating zone reached during operation dictates the maximum allowable time to operate in short-time ratings.

Calculate available time in short-time ratings by subtracting the total time operated in short-time ratings from the time permitted by the most restrictive zone in which the locomotive has operated.

EXAMPLE 1: If a locomotive operates in the one hour zone for 15 minutes and then operates in the 30 minute zone, available time the locomotive can be operated in short-time ratings is 15 minutes.

The most restrictive zone reached -	30 minute
	minus
The amount of time in short-time ratings -	15 minutes
Available time in short-time ratings -	15 minutes

If the result of the subtraction is zero or less, available time has expired and short-time ratings have been exceeded.

EXAMPLE 2: If a locomotive operates in the one-hour zone for 15 minutes and then operates outside the short-time rating zone for less than 20 minutes. The locomotive returns to the one-hour zone, the available time in the one-hour zone is 45 minutes.

The most restrictive zone reached -	1 hour
	minus
The amount of time in short-time ratings -	15 minutes
Available time in short-time ratings -	45 minutes

Operation outside of the short-time rating zone less than 20 minutes does not restore maximum allowable time.

D. Cooling Traction Motors

When available time in short-time rating has expired, cool the traction motors

To cool traction motors, follow the steps below:

Cooling Traction Motors	
Step	**Action**
1	Stop Movement.
2	Place the reverse lever in the CENTER position.
3	Place the generator field switch to the OFF position.
4	Place throttle in position #4 for 20 minutes. Note: If it becomes necessary to cool the traction motors twice while on the same grade, a 40-minute cooling time will be required, unless instructed otherwise by the train dispatcher.

5405 Caring for Equipment

All crew members are equally responsible for the care of the locomotives being used. Crew members must:

- Not place their feet on any wall, window, or equipment.
- Not write on, mar, or deface any window, wall, or equipment.
- Deposit trash in litterbags.
- Keep tools in their proper location.
- Make certain that all doors (engine room, electrical cabinet and locomotive cab) are closed.
- Make certain that all windows are closed and the cab lights are turned off on trailing locomotives when not in use.

5406 Protecting the Diesel Engine from Freezing

A. Setting the Controls on a Standing Locomotive

When a locomotive, in your charge, is standing and the temperature is 25 degrees Fahrenheit or less, place the:

1. Reverse lever in the CENTER position,
2. Generator field switch to the OFF position, and
3. Throttle in position #3.

B. Setting the Controls when the Ambient Temperature is below 40 degrees Fahrenheit

When the locomotive consist contains more locomotives than can be used under Rule 5401 (Conserving Fuel), isolate the excess locomotives with the diesel engine running.

C. Draining the Diesel Engine

When the temperature is at or near freezing and the engine will not run, drain the diesel engine cooling system on a locomotive not equipped with an operable auxiliary power unit.

If you have any doubt about how to drain the cooling system, contact the Mechanical Desk. You can contact the Mechanical Desk through mobile radio access or by telephone by:

- Company phone at 8-388-5540 or 8-388-5555
- Bell system at 1-800-624-8385

Warning: Always vent the cooling system pressure before opening a drain valve or removing the pressure cap.

5407 Inspecting to Make Certain Locomotive Wheels are Turning

Make certain that the locomotive wheels turn freely anytime excessive tripping of the ground protective relay causes a:

- Locomotive to be isolated
- Traction motor to be cut out

5408 Reporting a Hot Traction Motor Support Bearing

When a traction motor support bearing is suspected of being hot:

1. Stop movement.
2. Report the bearing to the train dispatcher and the Mechanical Desk.
3. Comply with the instructions you receive.

5409 Protecting Traction Motors from Water Damage

Do not operate a locomotive over track submerged by water, unless the momentum of the train prevents stopping short of the submerged area.

If the train's momentum prevents stopping short of the submerged area, do the following before reaching the water, place the:

1. Reverse lever in the CENTER position.
2. Generator field switch to the OFF position.
3. Throttle in position #8.

5410 Adding Cooling Water to a Diesel Engine

When it is necessary to add water to a diesel engine, follow the steps below:

Do not add water when a HOT ENGINE indication is displayed. Consult the Mechanical Desk for instructions.

Adding Water to a Diesel Engine	
Step	**Action**
1	Note the water level in the water sight glass.
2	If the diesel engine is running, shut it down. If the diesel engine is not running go to step 3.
3	Wait four (4) minutes.
4	Make certain that the water level in sight glass is not rising.
If a water fill nozzle with a water hose adapter is provided, then:	
5	Operate the spring-loaded filler relief valve to vent pressure for one minute (if water is discharging at the end of the one minute period, do not add water – the system may be overfilled).
6	If the system is not overfilled, attach the water hose and fill to proper level
If a water hose adapter is not provided, then:	
5	Operate the pressure relief valve for one minute (if water is discharging at the end of the one minute period, do not add water – the system may be overfilled).
6	If the system is not overfilled, remove the pressure cap.
7	Add water to the proper level.

Make a report on the Locomotive Work Report and notify the Mechanical Desk anytime that it is necessary to add water to a diesel engine.

5411 Ditch Lights

When a locomotive is not equipped with ditch lights, do not exceed 20 MPH while the locomotive operates over a highway crossing at grade.

When a locomotive is equipped with ditch lights, make certain that the ditch lights are operational before the train leaves its initial terminal.

When a ditch light fails after departing the train's initial terminal, respond as follows:

- If one ditch light fails:
  - Proceed at normal speed
  - Do not proceed beyond the location where the next calendar day inspection is made unless the ditch light is repaired or the locomotive is switched to a trailing position.
- If both ditch lights fail:
  - Do not exceed 20 MPH while the locomotive operates over a highway crossing at grade.
  - If the locomotive remains in the lead, do not proceed beyond the next location where the necessary repairs can be made.
  - Comply with Rule 5308 (Moving Locomotives with Non-Complying Conditions)

5500 Fundamentals of Train Handling

5501 General

A. Planning Ahead

Train handling requires proper planning and use of the safest and most efficient train handling procedures.

B. Controlling Train Slack

Do not make slack changes quickly or harshly.

C. Considering Factors Affecting Train Handling

When planning and executing train handling procedures, consider the following factors:

- Locomotive consist capabilities
- Train speed, weight, and length
- Number and position of loaded and empty cars
- Amount of brake pipe leakage
- Physical characteristics (grade, curves, turnouts, and location of fixed signals)
- Authorized speed
- Weather

5502 Tractive Effort

A. Limiting the Number of Powered Axles

The number of powered axles in use must not exceed:

- 24—for the operating locomotives that are pulling a train or cut of cars.
- 15—when all operating locomotives are shoving a train or cut of cars totaling more than 50 cars, and every locomotive in the consist and within twenty cars of the consist are equipped with alignment control devices. If any locomotive in the consist or within twenty cars of consist is not equipped with alignment control devices, comply with Paragraph B(1) below.
- 12—on a helper locomotive when the helper locomotive is shoving a train.

When calculating powered axles, count AC locomotives as 9 axles.

When a reduction of powered axles is necessary, isolate locomotives from the rear of the consist forward.

B. Making Back Up or Shoving Movements

When making back up or shoving movements:

- Use no more power than is necessary to start the movement smoothly.
- Use the least power possible when moving through sharp curves and turnouts, or across bridges.
- Pay close attention to the locomotive load indicator and avoid excessive loading.
- Reduce throttle as locomotive load increases and speed decreases when slowing or stopping.

1. Shoving or Backing up with Non-Alignment Control Locomotives

When any locomotive in the consist or within twenty cars of the consist is not equipped with alignment control devices, do not permit more than one locomotive to be on-line. If the locomotive on-line is an AC locomotive, do not use more than 100,000 pounds tractive effort while making the movement.

5503 Sanding

Use sand as provided below:

1. Use sand only when necessary to improve traction, which includes “sanding the rail.”
2. When conditions require, use sand as the train is stopping to avoid wheel slipping when starting.
3. Use trainline sanding only when front/lead truck sanding proves inadequate.

5504 Throttle Handling

A. Making Throttle Position Changes

Make throttle position changes as follows:

1. Increasing Throttle Positions:
   When increasing throttle positions:
   - Make changes one position at a time allowing sufficient time to elapse between changes for in-train forces to adjust.
   - Make changes gradually to avoid developing excessive tractive effort.
   - Do not make changes to accelerate a train having long cars in the head one-third of its length while those cars are passing through sharp curves, crossovers, or turnouts.

2. Reducing Throttle Positions
   When operating conditions permit, make throttle reductions one position at a time to allow sufficient time for in-train forces to adjust.

3. Handling a Locomotive Consist with 20 or More Powered Axles
   When handling a locomotive consist with 20 or more powered axles:
   - If possible, avoid throttle position #8 at speeds below 12 MPH.
   - Use extreme care when changing throttle positions at speeds below 20 MPH.

B. Handling the Throttle at Railroad Crossings at Grade (Diamonds) and Drawbridges

Comply with the following when your locomotive consist contains one or more DC-powered locomotives.

At speeds above 25 MPH, adjust the throttle, as indicated below, at least 8 seconds before reaching a railroad crossing at grade (diamond) or the lift rails of a drawbridge.

- If the throttle is in a position above #4, reduce to position #4.
- If the throttle is in position #4 or lower, reduce to the next lower position.

The throttle may be advanced after the locomotive consist passes over the railroad crossing (diamond) or drawbridge.

5505 Train Braking

Use the automatic, independent, and dynamic brakes in accordance with the rules and procedures in this rule book.

A. Independent Brake - General

The following instructions govern use of the independent brake:

- Any time the locomotive is standing, fully apply the independent brake to prevent movement.
- When operating locomotive consists that have 20 or more axles:
  - Keep brake cylinder pressure below 25 PSI when controlling speed or stopping.
  - Use extreme caution at speeds below 15 MPH.
  - Where possible, use the automatic brake in conjunction with the independent brake to minimize in-train forces.
- Do not use the independent brake when the same results can be obtained with the dynamic and/or train air brakes.
- Do not use the independent brake and the dynamic brake at the same time, unless doing so momentarily while transferring from one form of braking to the other.
- Except as specifically provided in these rules, do not use the independent brake at speeds above 15 MPH to control or retard the movement of a locomotive consist with cars attached.
- Avoid prolonged use of locomotive air brakes or excessive brake cylinder pressures, especially at high speeds. Such actions cause burned and damaged brake shoes and overheated wheels.

B. Independent Brake – Actuating

- Actuate 4 seconds for each locomotive in the consist to make sure brakes are released on trailing locomotives.
- When using the dynamic brake and the train brakes at the same time, actuate frequently.
- When using the automatic brake and locomotive brake cylinder pressure is desired, actuate while placing the independent brake in the position that will develop the required locomotive brake cylinder pressure.

C. Automatic Brake - General

Comply with the following when using train brakes.

When using train brakes, stop the train if and when you feel the train brake is not holding or slowing the train's speed properly. Should it be necessary, stop the train using an emergency brake application from the automatic brake and, if equipped, using two-way telemetry.

1. Making the Initial Brake Pipe Reduction

The initial brake pipe reduction must be:

- 6 to 8 pounds when the train brake system is fully charged.
- At least 3 pounds greater than the total previous reduction when the train brake system is not fully recharged.

NOTE: Indications that the train's brake system is not fully charged are:

- Air flow indicator reading higher than what it had been before the previous air brake application
- Brake pipe pressure on rear car is lower than what it was before making the previous brake application
- A shorter brake pipe exhaust than when the brake system was fully charged

2. Intermediate Brake Pipe Reductions

When operating conditions permit, wait at least 20 seconds after the initial brake pipe reduction before following it with additional reductions (2 to 3 pounds each).

3. Preventing Excessive Brake Pipe Reduction

Except to put train brakes in EMERGENCY, do not place automatic brake beyond SUPPRESSION position to apply train brakes.

4. Final Brake Pipe Reduction

Just prior to stopping, make a sufficient brake pipe reduction that will result in an exhaust from the brake pipe as stop is completed.

When stopping passenger trains, you may use the graduated release feature.

5. Equalization of Train Air Brake Pressures

Except for emergency applications or when required by rule, avoid making brake pipe reductions after brake pipe pressure reaches the point of equalization. Doing so:

- Provides no additional braking effort.
- Serves only to waste air pressure.
- May eliminate the ability to make an emergency application.

The following chart shows the point of equalization for certain regulating valve settings.

Brake Pipe Equalization Chart		
Regulating Valve Setting	**Reduction Required for Equalization (Full Service**	**Pressure in Brake Pipe and Brake Cylinder**
70 PSI	20 PSI	50 PSI
80 PSI	23 PSI	57 PSI
90 PSI	26 PSI	64 PSI
100 PSI	29 PSI	71 PSI
110 PSI	32 PSI	78 PSI

D. Dynamic Brake Operation - General

1. Positioning Switches and Circuit Breakers

In order for the dynamic brake to operate, the following switches and circuit breakers must be positioned as indicated:

- Dynamic brake control circuit breaker on the controlling locomotive must be in the ON position.
- Dynamic brake cut out switch must be in the IN position.
- Brake transfer circuit breaker must be in the ON position.

2. Determining Dynamic Brake Status

The locomotive engineer will be informed of the operational status of the dynamic brakes on all locomotives in the consist:

- at the initial terminal for a train, and
- at other locations where a locomotive engineer first begins operation of a train.

If not known, test the dynamic brake at first opportunity and provide information pertaining to the dynamic brake operation on the brake test certificate. This information is to include locomotive engine number, dynamic brake cut-out switch position, total sum of dynamic brake axles, and the total sum of locomotives with inoperative dynamic brakes.

Note any problem on the locomotive work report relating to the dynamic brake.

Discovery of a locomotive having an inoperative dynamic brake requires attaching a tag labeled Inoperative Dynamic Brake to the isolation switch. This tag must contain the following:

- Locomotive number
- Name of discovering carrier
- Location and date where condition was discovered
- Signature of the person discovering the condition.

Once tagged, you may continue to use such locomotive for up to 30 calendar days following the discovery of its inoperative dynamic brake status. Spare tags will be found in the operating cab.

3. Dynamic Brake Axle Value

As indicated in the following chart, each locomotive class has a dynamic brake axle value.

Dynamic Braking Axles			
Locomotive Class	**Axle Value**	**Locomotive Class**	**Axle Value**
All 4-axle units except B40-8	4	SD70AC, SD70M	8
B40-8	5	SD80AC, CW44AC	9
All 6-axle units except SD60/M/I, SD70M, C/CW40-8, CW44-9, and ACs	6	SD70ACe	10
SD60/M/I, C/CW40-8, CW44-9	7	CW60AC	11

a) Maximum Dynamic Brake Axle Value

Do not exceed the maximum dynamic brake axle value for the locomotive consist. Those maximum values are:

- 24—when all units have alignment control couplers.
- 20—when any unit has coupler limiting blocks.
- Do not use dynamic braking when any locomotive in the locomotive consist does not have alignment control couplers or coupler limiting blocks.

NOTE: All CSXT locomotives have alignment control couplers except those indicated with a “(B)” under Dynamic Brake Type in the Locomotive Data Guide.

b) Restricting the Dynamic Brake Axle Value

When restricting the dynamic brake axle value, the engineer must:

- Place the dynamic brake cut-out switch in the OUT position.
- Leave the dynamic brake on the controlling locomotive cut in.
- Report status of the dynamic brake cut-out switch position in Section 3 of the brake test certificate.

4. Using Dynamic Brake Through Turnouts and Crossovers

When the head one-third of the train is passing through turnouts or crossovers and the dynamic brake axle value exceeds 12, do not exceed dynamic brake position #4.

5. Dynamic Brake Warning Light

If the dynamic brake warning light comes on, gradually reduce dynamic brake output until the light goes out.

5550 Conventional Train Handling

5551 Starting Trains

When starting a train:

1. Allow sufficient time for the train air brakes to release, as indicated in the chart below.
2. Keep the locomotive speed steady and do not exceed 2 MPH until the entire train is moving.
3. Avoid using excessive tractive effort, which could cause a break-in-two or the stringlining of a curve.

5552 Controlling Speed

Handle the train in a safe and fuel-efficient manner; take full advantage of throttle adjustments and dynamic braking when conditions permit.

5553 Braking Trains

A. Dynamic Brake

When used by itself, dynamic braking may not be sufficient to slow, stop, or control train speed. If you doubt that the train speed is being slowed, stopped, or controlled properly while using dynamic braking, supplement the dynamic brake with train brakes.

Comply with the following requirements when using the dynamic brake:

1. Planning

Plan the use of the dynamic brake to avoid maximum braking through heavy curvature, crossovers, and turnouts.

2. Applying

a) Make certain that the throttle is in the IDLE position for at least 10 seconds before moving the dynamic brake lever or selector lever.
b) Allow time for the train's slack to adjust.
c) Apply the dynamic brake gradually to complete train slack adjustment smoothly.
d) Make necessary adjustments gradually to maintain or achieve the desired speed.

3. Releasing

a) Release the dynamic brake gradually to allow the train's slack to adjust.
b) When releasing the dynamic brake and the train brakes, keep the dynamic brake applied until train brakes fully release.

4. Stopping

a) When stopping, the dynamic brake becomes less effective. Gradually apply the independent brake while moving the dynamic brake lever to the OFF position.

B. Train Brakes

Unless governed by Rule 5555A (Stopping with Slack Bunched), begin braking far enough in advance of the objective point to allow a split service application.

1. Using Train Brakes without Power

When using the train brakes without power being applied, comply with the following:

a) Reduce the throttle to the IDLE position, and allow the slack to adjust gradually.

b) If necessary, use the dynamic brake (or the independent brake if the dynamic brake is not available) to adjust the slack prior to making the initial brake pipe reduction.

2. Using Train Brakes with Power

When using the train brakes with power being applied, comply with the following:

a) Advance throttle, if necessary, to adjust train slack.
b) Observe locomotive output when making the initial brake pipe reduction.
c) Make additional brake pipe reductions as necessary.

Actuate frequently to release locomotive brake cylinder pressure.

Prevent an increase in locomotive output and use only enough power to control the slack.

5554 Releasing Train Brakes

A. Running Release

After the desired braking has been accomplished, train brakes may be released, if:

- Brake pipe air is not exhausting.
- You have made at least a 10-PSI brake pipe reduction.
- Brakes on the entire train will be released before the train speed is reduced to 10 MPH.

B. Releasing When Train Slack is Bunched

When the train slack is bunched, prevent a run out of slack until the train brakes are fully released.

C. Releasing When Train Slack is Stretched

When the train's slack is stretched, do not permit the locomotive's output to increase while the brakes are releasing. If necessary, reduce the locomotive's output slightly to prevent a run out of slack that may have accumulated.

D. Standing Release of Train Brakes

If operating conditions permit, make a full service brake pipe reduction and make certain that brake pipe exhaust has stopped for at least 20 seconds before releasing the train brake.

At locations where locomotive brakes will not hold the train, apply sufficient handbrakes to secure the train during recharge time.

5555 Stopping

The speed and weight of the train, and the severity of the grade you are operating on, are the three most important factors affecting stopping distance.

A. Stopping with Slack Bunched

To make a planned stop with slack bunched, follow the steps below:

Stopping with Slack Bunched	
Step	**Action**
1	Reduce the throttle to the IDLE position, allowing slack to bunch gradually.
2	Apply the dynamic brake (or the independent brake if the dynamic brake is not available) to complete bunching the slack.
3	Increase the dynamic braking output to the desired level.
4	Use the train brake, if necessary, to complete the stop. If your train speed is: • Below 10 MPH, use a continuous service application. • Above 10 MPH, use a split service application

B. Stopping with Slack Stretched

To make a planned stop with slack stretched, follow the steps below:

Stopping with Slack Stretched	
Step	**Action**
1	Advance throttle, if necessary, to stretch the slack.
2	Make an initial reduction and actuate
3	As the speed decreases: • Make additional brake pipe reductions as necessary and actuate. • Gradually reduce the throttle to prevent developing excessive locomotive output.
4	As the movement stops: 1. Make sure air is exhausting from the brake pipe. 2. Place the independent brake to the FULL APPLICATION position. 3. Place the throttle to the IDLE position.

C. Stopping a Shoving Movement with Slack Bunched

Do not use this rule when gathering slack and starting a train on a grade. Use Rule 5651 (Gathering Slack and Starting Trains on Grades), instead.

To make a planned stop of a shoving movement with the slack bunched, follow the steps below:

Stopping a Shoving Movement with the Slack Bunched	
Step	**Action**
1	Advance the throttle, if necessary, to bunch the slack.
2	Make an initial reduction and actuate
3	As the speed decreases: • Make additional brake pipe reductions as necessary and actuate. • Carefully control locomotive output, using only sufficient output to keep the slack bunched.
4	As the movement stops: 1. Make sure the throttle is in at least position #2. 2. Place the independent brake in FULL APPLICATION position when the movement stops. 3. Place the throttle in the IDLE position.

D. Stopping a Shoving Movement with the Slack Stretched

Do not use this rule when gathering slack and starting a train on a grade. Use Rule 5651 (Gathering Slack and Starting Trains on Grades), instead.

To make a planned stop of a shoving movement with the slack stretched, follow the steps below:

Stopping a Shoving Movement with the Slack Stretched	
Step	**Action**
1	Reduce the throttle to the IDLE position, allowing the slack to stretch gradually.
2	Apply the dynamic brake (or the independent brake if the dynamic brake is not available) to complete stretching the slack.
3	Increase the dynamic braking output to the desired level.
4	Use the train brake if it is necessary to complete the stop, comply with the following: 1. Make an initial reduction. 2. Make additional brake pipe reductions of 2 to 3 PSI, as necessary. 3. Keep the dynamic brake or the independent brake applied.

5556 Conditioning Brakes

A. While Stopped

Maintain a brake pipe reduction of at least 10 PSI, but not more than full service, until the train is required to move.

B. Leaving Train Unattended

Apply train brakes with a full service application when a train will be left unattended.

C. When Detaching Locomotive or Cars

When cutting away from and leaving cars, follow the steps below:

Cutting Away From And Leaving Cars		
Step	Who Does It	Action
1	Engineer	Makes a full service brake pipe reduction**
2	Engineer	Verifies that the brake pipe exhaust stops.
3	Engineer	Notifies the trainman to uncouple.
4	Trainman	Closes the angle cock on the last locomotive or car to be detached, leaving the angle cock open on the first of the cars to be cut away from.
5	Engineer	After cutting away, place train in EMERGENCY with two-way telemetry, if equipped. Verify brake pipe pressure drops to 0 PSI.
**NOTE: When cutting away from a train that is due an inbound inspection of air brakes, reduce brake pipe pressure to 20 PSI at a service rate.		

After cutting away make sure the equipment is secured as required by Operating Rules.

5557 Switching

Follow these switching movement rules when switching:

- When starting or stopping movements, adjust slack gradually to limit buff and draft forces.
- When the locomotive brakes are not sufficient to control movement, couple the brake pipe air hoses and charge the air brakes on sufficient cars to control the movement.
- Do not change the position of the reverse lever unless the movement is stopped.

5558 Operating Through an Area with a Temporary Speed Restriction

If possible, when operating through an area with a temporary speed restriction:

- Release the train air brakes before entering the restriction.
- Use the lowest possible throttle position for starting or moving the train.
- Do not exceed dynamic brake position #4.
- Minimize changes in train speed or slack condition.
- Limit locomotive brake cylinder pressure.

5559 Steep Grade (1% or more) Train Handling

A. Descending Steep Grades

- Be mindful of the severity of the grade your train is on and take appropriate action to control train speed.
- Make certain that the air brake system is charged to the required pressure before starting to descend a steep grade.
- When conditions warrant, apply train brakes and dynamic brakes before the movement begins.
- If it becomes necessary to reduce the brake pipe pressure by 18 PSI or more, do not:
  - Pull the train for more than 2 miles
  - Exceed 20 MPH.
- Place train in EMERGENCY as soon as it becomes apparent that the speed of the train can not be maintained at or below maximum allowable speed
- Apply train brakes with at least a 6 to 8 PSI brake pipe reduction in conjunction with dynamic braking when:
  - Operating in territories where both dynamic braking and pressure maintaining are required in lieu of retainer valves being set, and
  - Train speed is between 20 and 35 MPH

1. Identifying Steep Grade Locations

Average grade locations of 1% for 3 continuous miles, or of 2% for 2 continuous miles are identified on the following chart. The average per cent grade of the track segment will define 1) the minimum number of effective (operable) dynamic brake axles required, and 2) the maximum speed to

enable a specific type of train (unit vs. manifest or intermodal) with a set amount of tonnage to descend a specific grade. After determining the track section's average grade, use the chart that corresponds to the per cent grade, train type and train tonnage, in order to calculate the necessary EDBA .

Average Grades on CSXT			
1% or more for 3 miles, but less than 2%			
Division	Subdivision	Milepost Location	Average Grade
Albany	Berkshire	QB 125.00 to QB137.50	1.33
	Berkshire	QB 142.00 to QB 147.80	1.41
Baltimore	Hanover	BAS 2.30 to BAS 6.60	1.59
	Hanover	BAS 33.80 to BAS 37.00	1.13
	Hanover	BAS 83.40 to BAQS 89.00	1.67
	Hanover	BAS 93.10 to BAS 99.80	1.46
	Keystone	BF 239.40 to242.90	1.09
	Keystone	BF203.10 to 209.80	1.47
	Keystone	BF 196.20 to BF 200.50	1.31
	Keystone	BF191.80 to 195.30	1.68
	Lurgan	BAE 92.50 to BAE 88.00	1.01
	Metropolitan	BA 33.10 to BA 37.30	1.05
Huntington	Allegheny	CA 305.50 to CA 291.40	1.08
	Blue Ridge	Z 187.70 to Z 207.50	1.09
	CC	00C 148.50 to 00C 152.00	1.31
	Coal Run	CMP 3.90 to CMP 7.20	1.20
	Coal Run	CMP 27.70 to CMP 31.00	1.53
	Cowen	BUC 108.60 to BUC 115.60	1.77
	Cowen	BUC 97.30 to BUC 105.20	1.36
	Cowen	BUC 61.30 to BUC 56.90	1.27
	Cowen	BUC 52.30 to BUC 56.90	1.44
	CV	0PC 227.00 to 0PC 23.50	1.37
	CV	0SF 212.30 to 0SF 215.70	1.47
	CV	0SC 217.60 to 0SC 220.80	1.36
	CV	0WH 265.50 to 0WH 271.10	1.32
	CV	0CV 253.70 to 0CV 258.50	1.19
	E & BV	CMO 34.70 to CMO 39.80	1.86
	EK	0VB 191.50 to 0VB 194.70	1.00
	Georges Creek	BAI 31.50 to BAI 18.70	1.20
	KD	00C 217.70 to 00C 223.00	1.05
	KP	Z 1.00 to Z 5.80	1.21
	KP	ZF 21.30 to ZF 14.60	1.54
	Mountain	BA 261.00 to BA 267.00	1.87
	Mountain	BA 254.50 to BA 258.90	1.99
	Mountain	BA 251.20 to BA 253.20	1.12
	Mountain	BA 242.50 to BA 251.20	2.11
	Mountain	BA 219.00 to BA 224.30	1.39
	Mountain	BA 207.80 to BA 219.00	2.21
	North Mountain	CA 192.20 to CA 203.90	1.36
	OD	00W 66.30 to 00W 71.00	1.11
	Stony River	BUA 8.70 to BUA 12.30	1.56
	Stony River	BUA 0.20 to BUA 8.70	1.48
	Thomas	BAH 61.80 to BAH 63.10	1.23
	Thomas	BAH 47.30 to BAH 56.00	1.16
	Thomas	BAH 29.00 to BAH 35.30	1.5

Average Grades on CSXT continued.			
1% or more for 3 miles, but less than 2%			
Division	Subdivision	Milepost Location	Average Grade
Florence	Aberdeen	S 225.50 to S 228.50	1.01
	Hamlet	S 293.90 to S 297.20	1.20
	Hamlet	S 301.10 to S 304.70	1.21
	McCormick	AK 464.60 to AK 467.60	1.06
	Monroe	SG 388.50 to SG 392.00	1.10
Louisville	Cincinnati Term.	BD 25.80 to BD 26.90	1.25
	Indianapolis	BD 26.90 to BD 30.00	1.23
	LCL	00T 42.80 to 00T 48.50	1.14
	LCL	00T 97.90 to 00T 102.00	1.13
	Main Line	000 34.10 to 000 38.80	1.31
	Main Line	000 152.70 to 000 157.20	1.24
	Richmond	CI 27.60 to CI 31.50	1.07
Nashville	Chattanooga	00J 94.00 to 00J 90.00	1.91
	Chattanooga	00J 90.00 to 00J 87.00	1.53

2. Calculating the Effective Dynamic Brake Axles Necessary for a Train to Descend a Grade

a) Determine the correct number of effective dynamic brake axles (called EDBA) needed.
The minimum total number of operable dynamic brake axles (including helper locomotives, if attached) are displayed in the following tables for the total trailing tonnage and maximum speed indicated.

Total trailing tonnage will include the weight of any locomotives not operating in dynamic brake mode (including helper locomotives).

b) Trains not meeting the minimum effective dynamic brake requirements must meet one of the following:
- Train must obtain additional locomotives (including helper locomotives) to meet the EDBA value prior to proceeding.
- Train speed will not exceed 15 MPH as long as automatic brake pipe reduction does not attain 18-pound or higher for a distance of 2 miles or more.

c) Trains having distributed power locomotives (with operable dynamic brakes) in the train can add the EBDA value of the distributed power to the EDBA of the lead locomotive consist to attain the minimum number of EDBA to descend the grade.
When balancing the grade, use dynamic braking in combination with train braking. Whenever possible, use more dynamic braking combined with lighter automatic brake pipe reductions.

d) The following four grade charts: 1.0 to 1.5, 1.51 to 1.75, 1.76 to 2.00, and 2.0 and greater, will define the minimum EDBA value needed for the train type and tonnage to be able to operate at a particular speed.

- **1.0% to 1.5% Grade Requirements**

Total Trailing Tonnage (including Locomotives not in Dynamic Brake	Maximum Speed for Loaded Unit Trains (coal, grain, etc.)			Maximum Speed for Intermodal / Manifest Trains (including Empty Unit Trains)		
	20 MPH	**25 MPH**	**30 MPH**	**25 MPH**	**30 MPH**	**35 MPH**
	Minimum EDBA	Minimum EDBA	Minimum EDBA	Minimum EDBA	Minimum EDBA	Minimum EDBA
2000 or less	4	4	4	4	4	4
2001 to 3000	4	6	6	4	4	5
3001 to 4000	5	6	8	5	6	6
4001 to 5000	6	8	8	6	6	7
5001 to 6000	7	8	9	6	8	8
6001 to 7000	8	9	10	7	8	9
7001 to 8000	8	9	11	8	9	10
8001 to 9000	9	10	12	8	9	11
9001 to 10,000	9	10	13	9	10	12
10,001 to 11,000	10	11	14	9	11	13
11,001 to 12,000	11	12	15	10	12	14
12,001 to 13,000	11	13	16	11	13	15
13,001 to 14,000	12	14	17	11	14	16
14,001 to 15,000	12	15	18	12	15	17
15,001 to 16,000	13	16	19	12	16	18

Note: Dashes displayed in a tonnage rating category means the designated train type containing that tonnage is not permitted to operate at that speed on the descending grade.

- **1.51% to 1.75 Grade Requirements**

Total Trailing Tonnage (including Locomotives not in Dynamic Brake	Maximum Speed for Loaded Unit Trains (coal, grain, etc.)			Maximum Speed for Intermodal / Manifest Trains (including Empty Unit Trains)		
	20 MPH	**25 MPH**	**30 MPH**	**25 MPH**	**30 MPH**	**35 MPH**
	Minimum EDBA	Minimum EDBA	Minimum EDBA	Minimum EDBA	Minimum EDBA	Minimum EDBA
2000 or less	4	4	6	4	4	6
2001 to 3000	4	5	7	4	6	8
3001 to 4000	6	6	8	6	6	9
4001 to 5000	6	7	9	6	7	11
5001 to 6000	7	8	11	8	8	12
6001 to 7000	8	9	12	8	9	13
7001 to 8000	9	11	14	9	10	15
8001 to 9000	10	12	16	10	11	17
9001 to 10,000	11	13	17	11	12	19
10,001 to 11,000	12	14	18	11	13	20
11,001 to 12,000	13	15	20	12	14	22
12,001 to 13,000	14	16	22	12	15	24
13,001 to 14,000	15	17	24	13	16	---
14,001 to 15,000	16	18	---	14	17	---
15,001 to 16,000	17	20	---	14	18	---

- **1.76% to 2.0 % Grade Requirements**

Total Trailing Tonnage (including Locomotives not in Dynamic Brake	Maximum Speed for Loaded Unit Trains (coal, grain, etc.)			Maximum Speed for Intermodal / Manifest Trains (including Empty Unit Trains)		
	20 MPH	**25 MPH**	**30 MPH**	**25 MPH**	**30 MPH**	
	Minimum EDBA	Minimum EDBA	Minimum EDBA	Minimum EDBA	Minimum EDBA	
2000 or less	4	6	6	4	6	---
2001 to 3000	4	6	8	4	6	---
3001 to 4000	6	8	10	6	8	---
4001 to 5000	8	9	12	7	9	---
5001 to 6000	9	11	14	8	10	---
6001 to 7000	11	12	16	9	11	---
7001 to 8000	12	14	18	10	13	---
8001 to 9000	13	16	20	11	14	---
9001 to 10,000	14	17	23	12	15	---
10,001 to 11,000	15	18	24	13	16	---
11,001 to 12,000	16	19	---	14	17	---
12,001 to 13,000	17	20	---	15	20	---
13,001 to 14,000	19	21	---	16	21	---
14,001 to 15,000	20	22	---	17	23	---
15,001 to 16,000	22	24	---	18	24	---

- **2.01 % and above Grade Requirements**

Total Trailing Tonnage (including Locomotives not in Dynamic Brake	Maximum Speed for Loaded Unit Trains (coal, grain, etc.)		Maximum Speed for Intermodal / Manifest Trains (including Empty Unit Trains)	
	20 MPH	**25 MPH**	**20 MPH**	**25 MPH**
	Minimum EDBA	Minimum EDBA	Minimum EDBA	Minimum EDBA
2000 or less	4	6	4	4
2001 to 3000	6	8	4	6
3001 to 4000	7	9	5	7
4001 to 5000	9	11	6	8
5001 to 6000	11	13	6	9
6001 to 7000	12	15	7	11
7001 to 8000	14	16	8	12
8001 to 9000	15	18	9	13
9001 to 10,000	17	20	10	14
10,001 to 11,000	18	22	11	15
11,001 to 12,000	20	24	12	16
12,001 to 13,000	22	---	13	17
13,001 to 14,000	24	---	14	18

3. Partially or Completely Losing Dynamic Brake While Descending Grade

a) If the train experiences a partial or complete loss of dynamic braking resulting in fewer EDBA than those permitted by the lowest speed for the train type and tonnage displayed in one of the grade charts in 2 d) above, the train must be stopped immediately with the train brakes using emergency if necessary.

1 - Before proceeding, the train must be secured and air brake system fully recharged per item 6 (Ensuring Train Remains Stationary During Recharge) below.
2 - Trains may only proceed using one of the following:

- After receiving additional locomotives to regain the required EDBA for the speed shown in the table, or
- At a maximum speed not exceed 15 MPH and if the train can be controlled with less than an 18 PSI automatic brake pipe reduction until the train reaches the bottom of the grade. If it is anticipated or determined that the train will require an 18-pound or greater automatic brake pipe reduction to control speed, all retainers must be set per item 6 (Ensuring Train Remains Stationary During Recharge) below.

4. Stopping on a Grade for Any Reason
If a train must be stopped on a grade for any reason using an 18 pound or greater automatic brake pipe reduction, before proceeding, the train must be secured and air brake system recharged as described in item 6 (Ensuring Train Remains Stationary During Recharge) below.

5. Using an 18-Pound or Greater Automatic Brake Pipe Reduction While Descending Grade
Under any conditions, if a train requires an 18 pound or greater automatic brake pipe reduction to control speed to balance the grade:

- train must be stopped immediately with the train brakes using emergency if necessary.
- Before proceeding, refer to item 6 (Ensuring Train Remains Stationary During Recharge) below.
- In addition, a 6-pound automatic brake pipe reduction must be made and each car inspected to determine that brakes are operating properly.
- All retainers must be set in "high pressure" position before train continues. All retainers must be placed in "direct exhaust" position when the train reaches the bottom of the grade. Trains using retainers may need to be stopped on grade to allow wheels to cool depending on length of grade.

6. Ensuring Train Remains Stopped During Recharge
When the train is stopped as described in items 3, 4, or 5 above, before releasing train brakes and recharging, the train must be secured with sufficient hand brakes to hold the train.
After the train air brake system is recharged and retainers are set, if needed, make at least a 6-pound automatic brake pipe reduction to hold the train while the hand brakes are being released.

7. Limiting Speed of a Lite Engine Movement on Heavy Grade
The following speeds apply to lite engine movements with operable dynamic brakes on each heavy descending grade:

1.50% or lower:	30 MPH for single unit, 35 MPH for multiple units (when track speed permits).
1.51% to 1.75%:	30 MPH
1.76% to 2.00%:	25 MPH
2.01% and above:	25 MPH

B. Ascending Steep Grades

- When ascending steep grades, take appropriate precautions to prevent break-in-twos or stringlining.
- When operating a locomotive consist with 8,000 horsepower or more at speeds below 15 MPH, gradually reduce throttle to at least position #6 just before the locomotive crests the grade. Do not increase the throttle position until the train speed increases.

5600 Helper Service

Apply these rules when using more than one locomotive consist to move a train.

5601 Responsibilities

A. Engineer

- The engineer of the leading locomotive consist operates the train brakes.
- Other engineers must comply with the instructions of the lead engineer.
- All engineers must maintain radio communication with each other at all times while handling the train.
- The lead engineer must make certain that all other engineers are informed of planned speed changes, signal indications, and any other condition, which may affect train movement.

B. Conductor

- The conductor must make sure that the helper locomotive is properly positioned.
- The conductor must inform engineers of:
  - Loads, empties, tonnage, and any restrictions for the train.
  - Number of cars and tons that the helper locomotive is cut in ahead of.

5602 Restrictions

A. Alignment Control

Only locomotives equipped with alignment control couplers may be used as helpers.

B. Maximum Axles

Comply with Rule 5502A (Limiting the Number of Powered Axles).
When more axles than permitted under Rule 5502A (Limiting the Number of Powered Axles) are needed to move train, cut the helper locomotive into the train with approximately 70% of the helper locomotive tonnage rating behind the helper locomotive.

C. Back-up Movement

When a back-up movement exceeds one mile, the engineer of a helper locomotive coupled to the rear of a train must control the train air brakes.

D. Shoving Passenger Trains

Do not assist a passenger train carrying passengers by pushing from the rear of the train.

5603 Adding Helper

A helper crew must comply with the following procedure when adding the helper locomotive to the train. The crew of a train instructed to help another train must uncouple from its own train first.

Adding Helper To A Train	
Step	**Action**
1	Make certain that the train has stopped.
2	Make certain that the couplers lock.
3	Make a full service brake pipe reduction and make certain that the brake pipe exhaust stops.
4	Cut out the automatic brake, and place the handle in HANDLE OFF.
5	Couple the brake pipe hoses and open the angle cocks.
6	Notify the lead engineer that the helper is coupled.

5604 Operating a Helper Equipped Train

A. Starting Train

The engineer on the leading end will direct the train's starting.

B. Operating Over-the-Road

1. Accelerating

Locomotive output should be increased gradually. When the train is on crossovers or turnouts, do not place the throttle in position #8 until the entire train is clear of the turnouts or crossovers.

2. Reducing Train Speed and Stopping

The helper engineer will make throttle adjustments to prevent an increase in locomotive output as train speed slows.

Actuate locomotive brake cylinder pressure on the helper locomotive when the train brakes are applied.

3. Emergency Stop

Control brake cylinder pressure on the helper locomotive to 25 PSI to minimize in-train forces.

5605 Detaching Helper

Stop the train to detach the helper locomotive, unless equipped with a “helper link” or similar device.

5650 Special Train Handling Procedures

5651 Gathering Slack and Starting Trains on Grades

When on grades that prohibit gathering of slack without using train brakes, follow the steps below:

Gathering Slack And Starting Trains	
Step	**Action**
1	Make a brake pipe reduction sufficient to hold the train with the independent brake released and actuated.
2	Gently apply power to adjust the slack.
3	When the slack is adjusted on the whole train: 1. Stop movement by making brake pipe reductions of 2 to 3 PSI and actuate. 2. Make sure the throttle is in at least position #2. 3. Place the independent brake in FULL APPLICATION position when the movement stops. 4. Place the throttle in the IDLE position.
4	Increase brake pipe reduction until the brake pipe pressure is 10 PSI below the point of equalization and wait for the brake pipe exhaust to stop.
5	Start the train by releasing train brakes and using enough power to start the cars one at a time as the train brakes release.

5652 Loss of Dynamic Brakes

To prevent harsh slack action and rapid increase in train speed if the dynamic brake fails while in use, follow the steps below:

A. Apply independent brake immediately to avoid rapid run-out of slack.

B. If necessary, make brake pipe reduction (s) sufficient to control the speed and compensate for the loss of dynamic braking force.

5653 Emergency Brake Applications

Use emergency brake applications in situations when a stop must be made in the shortest possible distance, or when required by rule.

A. Initiating Emergency Air Brake Application

Immediately place the automatic brake in the EMERGENCY position and stop the train when:

- Operating conditions require.
- Brake pipe pressure at the rear of a moving train drops to 45 PSI or below.
- Brake pipe pressure is reduced 18 pounds or more from the standard brake pipe pressure while descending any grade and the train cannot be controlled at the authorized speed.

B. Automatic Brake Initiated

When an emergency application is initiated from the automatic brake on the controlling locomotive, leave the brake valve in the EMERGENCY position, and:

1. Promptly place the throttle in the IDLE position.

2. Control the locomotive brake cylinder pressure to provide the maximum retarding force without sliding the locomotive wheels or creating excessive buff forces.

C. Other than Automatic Brake Initiated

When an emergency application is initiated by other than the automatic brake, keep the train slack in the same condition as it was before the emergency happened, as follows:

Note:
1. Many Conrail locomotives are not equipped with the "Power Knockdown" feature that automatically reduces the locomotive to idle after 20 seconds due to a train line initiated emergency application of the brakes.

2. Locomotive engineers must take the appropriate action to reduce the throttle to idle when Conrail locomotives are used as the controlling unit of a consist.

1. Slack Stretched

a) Actuate locomotive brake cylinder pressure. (Continue to actuate locomotive brake cylinder pressure until the train stops.)
b) Maintain throttle position until the train speed begins to reduce.
c) Adjust the throttle to prevent an increase in locomotive output.

2. Slack Bunched

a) Maintain the dynamic brake position if available.
b) Actuate locomotive brake cylinder pressure (Continue to actuate locomotive brake cylinder pressure until the train stops.)
c) If required to use the independent brake, comply with Rule 5505A (Train Braking / Independent Brake – General).

Control locomotive brake cylinder pressure to provide retarding effect while preventing sliding the locomotive wheels or excessive buff forces.

3. While Operating an In-train or Rear-end Helper

When operating an in-train or rear-end helper, immediately place the throttle in the IDLE position.

D. Activating Two-Way Telemetry during Emergency

When an undesired emergency application occurs, or when an emergency situation arises and it becomes necessary to place the train air brakes in emergency, operate the two-way EOT emergency toggle switch as quickly as possible.

5654 Service Applications from an Unknown Cause

Undesired service applications are indicated by:

- An increase in the indication of the air flow indicator.
- The sound of excessive regulating valve operation.
- A drop in brake pipe pressure.
- A decrease in train speed or increase of locomotive output without a known cause.

When a service application occurs from an unknown cause, keep train slack in the same condition as it was before the air brake application occurred.

A. Slack Stretched

1) Actuate locomotive brake cylinder pressure (Continue to actuate locomotive brake cylinder pressure until the train stops.)
2) Place the automatic brake in the MINIMUM REDUCTION position.
3) Maintain throttle position until the train speed begins to slow.
4) As the train speed slows:
   - Make additional 2 to 3 PSI brake pipe reductions.
   - Adjust the throttle to prevent an increase of locomotive output.

B. Slack Bunched

1) Maintain or increase dynamic brake position if available. (If you must use the independent brake, comply with Rule 5505A (Train Braking / Independent Brake – General.)
2) Place the automatic brake in the MINIMUM REDUCTION position.
3) Make additional 2 to 3 PSI brake pipe reductions as the train speed slows.
4) Comply with Rule 5505A (Train Braking / Independent Brake – General) by substituting the independent brake for the dynamic brake.

5655 Inclement Weather Train Braking

During inclement weather conditions which may cause snow or ice build up to occur between brake shoes and wheels, follow the steps below to make sure the brake shoes are not frozen or iced over:

A. Using Train Brakes

When using train brakes in inclement weather, apply the train brakes sooner than you normally would for the given circumstance.

B. Testing Air Brake Effectiveness

Perform running tests to make sure proper braking effort is being provided.

Perform brake effectiveness tests:

- Periodically, as operating conditions permit
- Before descending steep grades

To perform the test:

1. Use a split-service application; make a 10-PSI brake pipe reduction.
2. Make certain that the train brakes are effective.

If the test precedes a steep grade, allow sufficient time for total recharge of the brake pipe before cresting the grade.

If you cannot perform the test before descending the grade, apply the brakes as the train begins to crest the grade.

C. Responding to Ineffective Air Brakes

If the train does not brake properly:

1. Stop the train (use the EMERGENCY position if necessary).
2. Determine and correct the cause of the failure.
3. Repeat the test.

D. Setting Cars Off

When setting cars off:

- Apply air brakes on cars while moving to remove ice and snow buildup.
- Make certain that no ice or snow is between brake shoes and wheels after handbrakes are applied.

5656 Reporting Train Separations or Stalls

Engineers must have a blank copy of the Train Separation Report and the Train Stall Reports (available in the Engineers' Reading File) before beginning a trip or tour-of-duty.

When a train that you are operating has a separation or stalls, complete and forward the appropriate report to the road foreman of engines as soon as possible.

5700 Telemetry - Equipping Trains

All trains, except as noted in Rule 5701 (Freight Train Exceptions), Rule 5702 (Passenger Train Exceptions), Rule 5703 (Inspection Train Exceptions), and Rule 5950 (En Route Failures), must be equipped with properly armed, tested, and operable two-way telemetry.

NOTE: Where used in these rules:
- 2% grade means a grade designated as 2% in Special Instructions
- 1% grade means a grade designated as 1% in Special Instructions

5701 Freight Train Exceptions

Freight trains that meet any one of the conditions listed below do not require two-way telemetry.

- Trains able to initiate an emergency brake application from the rear third of its length.
- Lite engines.
- Local trains and work trains not operating on 2% grades.
- Trains with 4,000 trailing tons or less and:
  - operating on less than 2% grade, and
  - not exceeding 30 MPH.
- Trains with more than 4,000 trailing tons and:
  - operating on less than 1% grade, and
  - not exceeding 30 MPH.

5702 Passenger Train Exceptions

Passenger trains that meet any one of the conditions listed below do not require two-way telemetry:

- Trains in which all cars are equipped with accessible emergency brake valves.
- Trains that have a rear car with an emergency brake valve accessible to a radio-equipped crewmember.
- Trains with 24 cars or less, equipped as described in the following chart and operated as required in Paragraph 1 (Requirements of Crew Members) of this rule.

Passenger Train Exception Matrix			
Emergency Brake Valve must be within the rear one-half of the train		**Emergency Brake Valve must be within the rear one-third of the train**	
Cars	Emergency Brake Valve In, or in a Car Behind, This Car	Cars	Emergency Brake Valve In, or in a Car Behind, This Car
4	2nd	13	9th
5 - 6	3rd	14 - 15	10th
7 - 8	4th	16	11th
9 - 10	5th	17 - 18	12th
11 - 12	6th	19	13th
		20 - 21	14th
		22	15th
		23 - 24	16th

1. Requirements of Crew Members

a) Prior to descending 2% grade, the engineer must confirm through the conductor that a radio-equipped crewmember is stationed in the rearmost emergency brake valve-equipped car, and

b) While descending 2% grades, the crewmember must maintain constant radio communication with the engineer, until the train has descended the grade.

5703 Inspection Train Exceptions

Inspection trains operating with passenger equipment do not require two-way telemetry.

5750 Telemetry Qualifications

When the following conditions are met, you can use telemetry to perform air brake tests and meet two-way telemetry requirements:

5751 Qualifying Telemetry for Air Brake Tests

To perform air brake tests using telemetry, the train must be equipped as follows:

- The controlling locomotive must have an operative HTD,
- The rear car must have an operative EOT, and
- Readouts from the EOT and the HTD must not differ by more than 3 PSI.

5752 Qualifying Telemetry for Two-Way Operation

To comply with the requirements to have two-way telemetry capability, the train must be equipped as follows:

- Except as noted in Rule 5753 (Coupling Helper Locomotive to Head End), the controlling locomotive must have an operative HTD capable of two-way operation,
- The rear car must have an operative EOT capable of two-way operation, and
- The readouts of the EOT and the HTD must not differ by more than 3 PSI.

5753 Coupling Helper Locomotive to Head End

When a helper locomotive is coupled to the train ahead of the "hauling" locomotive, the helper locomotive is not required to be equipped with an HTD capable of two-way telemetry or to be armed to the EOT, as long as:

- Two-way radio communication is established and maintained between the engineers of the helper locomotive and the hauling locomotive.
- Engineers confirm radio communication before:
  - Train resumes operation
  - Reaching the crest of the grade
- The train is stopped if and when radio communication is lost.

5800 Arming Telemetry for Two-Way Capability

To arm two-way telemetry, follow the steps below:

Arming Telemetry for Two-Way Operation	
Step	**Action**
1	Enter the ID Code of the EOT into the HTD.
2	Press the TEST button on the EOT
3	Press the appropriate "ARM NOW" button of the HTD.
4	Make certain that emergency capability is established as indicated by an "EMERG ENABLED" or "ARMED" message.

5850 Testing Two-Way Telemetry Emergency Capability

Make certain the emergency capability of two-way telemetry when either or both devices are installed.

5851 Bench Testing

Consider emergency capability successfully tested when informed so by the Mechanical Department.

5852 Performing Test

Follow the steps below after charging the brake pipe when testing emergency capability.

Testing Two-Way Telemetry Capability	
Step	**Action**
1	Arm the telemetry.
2	Close the angle cock between the rear car and the EOT.
3	Activate the emergency feature.
4	Make certain that the air pressure exhausts from the EOT and the readout on the EOT reduces to zero.
5	Open the angle cock and make certain that brake pipe pressure is restored.

5900 Disarming Emergency Capability

Disarm two-way telemetry when the locomotive is cut off and will no longer be the controlling locomotive on the train.

To disarm emergency capability:
1. Change the EOT ID code to “00000”.
2. Press the appropriate button to disarm.

5950 En Route Failures and Defects

5951 Failures

Consider two-way telemetry as having failed en route when you cannot successfully arm it at a location other than the point of train origination or when any of the following messages are displayed:

- DEAD BAT (dead battery)
- REPL BAT (replace battery)
- VALVFAIL (valve failure)
- DISARMD (disarmed)
- FRNOCOM (front-to-rear no communication)

> Note: "RFNOCOM" is not a failure message.

5952 Restricting Train Movement due to an En Route Failure

When two-way telemetry fails, comply with the following restrictions unless the conditions specified in Rule 5953 (Making Necessary Substitution for Telemetry with an En Route Failure) are met.

A. Freight Trains

- Do not exceed 30 MPH, and
- Do not move the train on 2% grades

B. Passenger Trains

- Do not move the train on 2% grades.
- Correct the condition when reaching the first location where:
  - Necessary repairs can be conducted, or
  - An air brake test is required.

5953 Making Necessary Substitution for Telemetry with an En Route Failure

Do not apply Rule 5952 (Restricting Train Movement due to an En Route Failure) under the following conditions.

A. Freight Trains

Do not apply Rule 5952 if:

1. Either an occupied helper locomotive or occupied caboose/shoving platform capable of initiating an emergency application of train brakes is coupled to the rear and the employees at the front and rear:
   a) Establish and maintain two-way voice radio communication with each other.
   b) Verify communication just prior to cresting grade.
   c) Stop the train, if safe to do so, if communications fail before cresting grade.
   d) Place the train brakes in EMERGENCY if train speed exceeds the maximum speed authorized by 5 MPH.
2. A radio-controlled locomotive, capable of initiating an emergency application on command from the controlling locomotive, is in the rear one-third of the train and under the control of the head end engineer.

B. Passenger Trains

Do not apply Rule 5952 if a radio-equipped crewmember is positioned in the rear most car containing an accessible emergency brake valve.

Make periodic brake tests in accordance with Rule 5209 (Passenger Train Running Air Brake Test) until the failure is corrected.

5954 Reporting Telemetry Device Defects

Immediately report the EOT number and the condition to the train dispatcher or yardmaster when any of the following conditions affects the telemetry's normal operation:

- Low or failed battery
- Loss of communication between devices
- Loss or lack of emergency capability
- A defective or inoperative:
  - Marker
  - Motion detector
  - Air pressure sensing equipment

Report any HTD-related problem to the train dispatcher or yardmaster, Mechanical Desk, and on the Locomotive Work Report.

Setting up Locomotive Air Brakes

1. Automatic Brake Positions

A. 26/30 and Electronic Air Brake (EAB) Valves

Release - Charges equalizing reservoir to the setting of the regulating valve, which also releases the train's air brakes. Locomotive air brakes will release unless applied by independent brake.

Minimum Reduction - Reduces equalizing reservoir pressure – and thereby brake pipe pressure - by 6 to 8 PSI.

Service Zone - The smooth area of the brake valve between the MINIMUM REDUCTION position and the FULL SERVICE position used to reduce equalizing reservoir pressure in measurable increments by moving the handle toward the FULL SERVICE position. Moving the handle toward the MINIMUM REDUCTION position while in this zone will not increase equalizing reservoir pressure, unless the brake cut-out valve is in the PASS position.

Full Service - Reduces equalizing reservoir pressure to the level required for a full service brake application.

Suppression - Used to reset penalty brake applications

Handle Off (Continuous Service) - Reduces equalizing reservoir pressure to zero at a service rate. The brake valve must be in this position when it is cut out.

Emergency - Used to create and reset emergency applications. An emergency application can be made using this position with the brake valve cut out.

B. 24RL Brake Valves

Release – Charges the equalizing reservoir to the setting of the feed (regulating) valve. If the brake valve is equipped, the selector cock must be positioned in the FEED VALVE (FV) position.

Running – Charges the equalizing reservoir to the setting of the feed (regulating) valve. The brake valve must be placed in this position when it is cut out.

First Service - Reduces equalizing reservoir pressure by 6 to 8 PSI at a service rate. Leaving the handle in this position will result in continued equalizing reservoir reduction at a slower rate. When the first service cut-out cock is cut out, this position become another LAP position.

Lap - Prevents air from entering or leaving brake pipe at the brake valve, which holds a brake application applied. This position is also used to reset the brake equipment after a penalty or an emergency application.

Service - Reduces equalizing reservoir - and thereby brake pipe - pressure at a service rate as long as the brake valve is in this position. The brake valve must be placed in LAP position to stop the reduction of equalizing reservoir pressure.

Emergency – Causes an emergency application of air brakes regardless of whether the brake valve is cut in or cut out.

2. Independent Brake Positions

Release - Releases locomotive brakes, except when the brake application is a result of a reduction of brake pipe pressure. This position must be used when the independent brake is cut out.

Actuate - Releases any brake cylinder pressure resulting from a reduction of brake pipe pressure.

Full Application - Applies locomotive brakes fully.

Application Zone - This zone extends from the RELEASE position to the FULL APPLICATION position and is used to increase or decrease locomotive brake cylinder pressure as needed.

3. Positioning and Setting Up Air Brake Equipment

A. Positioning 26/30 Equipment

Positioning 26/30 Equipment					
Mode Of Operation	Automatic Brake		Independent Brake		
	Handle	Cut-Out Cock	Handle	Mu-2-A Valve	Dual-Ported Cock
Lead Or Single	Release	In (Open)	Full Application	Lead Or Dead	In (Open)
Trailing	Handle Off	Out (Closed)	Release	Trail 24 Or 6 (See Note)	Out (Closed)
Helper (Lead)	Handle Off	Out (Closed)	Full Application	Lead Or Dead	In (Open)
NOTE: Place valve in "Trail 24" when two pipes are trainlined through to the locomotive (Application & Release and Actuating Pipes). Place valve in "Trail 6" when one pipe is trainlined through to locomotive (Application & Release).					

B. Setting up 26/30 Equipment

Setting-Up 26/30 Air Brake Equipment	
Step	**Action**
Cutting In	
1	Place the independent brake in the FULL APPLICATION position
2	Place the MU-2-A valve in the LEAD or DEAD position or the double-ported cut-out cock to the IN or OPEN position
3	Place the automatic brake in the RELEASE position
4	Allow the equalizing reservoir to charge to the setting of the regulating valve adjust the regulating valve setting, if necessary, and place the brake cut-out valve to the IN position
Cutting Out	
1	Place the independent brake in the FULL APPLICATION position
2	Make a full service reduction and ensure that the brake pipe exhaust stops
3	Place the MU-2-A Valve in proper TRAIL position (See NOTE above) or the double-ported cut-out cock to the OUT or CLOSED position
4	Place the brake cut-out valve to the OUT position
5	Place the independent brake in the RELEASE position
6	Place the automatic brake in the HANDLE OFF position

C. Positioning EPIC Electronic Air Brake Equipment

Epic Electronic Equipment				
Mode Of Operation	Automatic Brake		Independent Brake	
	Handle	Set-Up	Handle	Set-Up
Lead Or Single	Release	Cut In	Full Application	Lead
Trailing	Handle Off	Cut Out	Release	Trail
Helper (Lead)	Handle Off	Cut Out	Full Application	Lead

D. Setting up EPIC Electronic Air Brake Equipment 0n EMD Locomotives

Setting Up Epic Equipment On EMD Locomotives	
Step	**Action**
Cutting In	
1	Place the independent brake in the FULL APPLICATION position
2	Place the automatic brake in the RELEASE position
3	Press AIR BRAKE SET-UP
4	Press LEAD / TRAIL for LEAD (Cuts in independent brake)
5	Press ACCEPT NEW twice. (equalizing reservoir pressure increases)
6	Press AIR BRAKE SETUP
7	Press CUT IN / CUT OUT for CUT IN (cuts in automatic brake)
8	Press ACCEPT NEW twice.
9	If the equalizing reservoir pressure requires adjustment, press AIR BRAKE SETUP
10	Press EQ RES SETUP
11	Use the preset key for 80, 90, 100 or 110 PSI setting
12	Press ENTER
13	Press ACCEPT NEW twice
Cutting Out	
1	Place the independent brake in the FULL APPLICATION position
2	Make a full service reduction and ensure that the brake pipe exhaust stops
3	Press AIR BRAKE SETUP
4	Press LEAD / TRAIL for TRAIL (cuts out both automatic and independent brakes)
5	Press ACCEPT NEW twice
6	Position the brake valve handles
7	Press EXIT

E. Setting up EPIC Air Brake Equipment on GE Locomotives

Setting Up Epic Equipment on GE Locomotives	
Step	**Action**
Cutting In	
1	Place the independent brake in the FULL APPLICATION position
2	Place the automatic brake in the RELEASE position
3	Press AIR BRAKE SETUP
4	Press CHANGE SETUP
5	Press LEAD/TRAIL for LEAD (cuts in the independent brake)
6	Press SAVE SETUP
7	Press DO IT. (equalizing reservoir pressure increases)
8	Press CHANGE SETUP
9	Press CUT IN/CUT OUT for CUT IN (cuts in the automatic brake)
10	Press SAVE SETUP.
11	Press DO IT
12	If the equalizing reservoir pressure requires adjustment, press CHANGE SETUP
13	Press FEED VALVE SET
14	Use UP or DOWN arrow keys to adjust the pressure setting
15	Press SAVE SETUP
16	Press DO IT
Cutting Out	
1	Place the independent brake in the FULL APPLICATION position
2	Make a full service reduction and ensure the brake pipe exhaust stops
3	Press AIR BRAKE SETUP
4	Press CHANGE SETUP
5	Press LEAD/TRAIL for TRAIL (cuts out both the automatic and the independent brakes)
6	Press SAVE SETUP
7	Press DO IT
8	Position the brake valve handles
9	Press EXIT

F. Positioning Knorr Air Brake Equipment Brake Equipment

Knorr Electronic Equipment				
Mode Of Operation	Automatic brake		Independent brake	
	Handle	Set-Up	Handle	Set-Up
Lead Or Single	Release	Cut In	Full Application	Lead
Trailing	Handle Off	Cut Out	Release	Trail
Helper (Lead)	Handle Off	Cut Out	Full Application	Lead

G. Setting up Knorr Air Brake Equipment

Setting Up Knorr Equipment	
Step	**Action**
Cutting In	
1	Place the independent brake in the FULL APPLICATION position
2	Place the automatic brake in the RELEASE position
3	Press AIR BRAKE SETUP
4	Press CHANGE SETUP
5	Press LEAD / TRAIL for LEAD (cuts in the independent brake)
6	Press SAVE SETUP
7	Press DO IT. (equalizing reservoir pressure increases)
8	Press CHANGE SETUP
9	Press CUT IN / CUT OUT for CUT IN (cuts in the automatic brake)
10	Press SAVE SETUP.
11	Press DO IT
12	If the equalizing reservoir pressure requires adjustment, press CHANGE SETUP
13	Press FEED VALVE SET
14	Use UP or DOWN arrow keys to adjust the pressure setting
15	Press SAVE SETUP
16	Press DO IT
Cutting Out	
1	Place the independent brake in the FULL APPLICATION position
2	Make a full service reduction and ensure that the brake pipe exhaust stops
3	Press AIR BRAKE SETUP
4	Press CHANGE SETUP
5	Press LEAD / TRAIL for TRAIL (cuts out both the automatic and the independent brakes)
6	Press SAVE SETUP
7	Press DO IT
8	Position the brake valve handles
9	Press EXIT

H. Positioning 24RL Brake Equipment

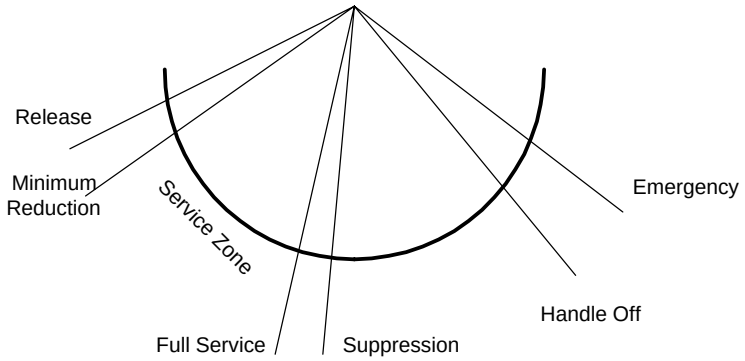
24RL Equipment				
Mode Of Operation	Automatic Brake		Independent Brake	
	Handle	Cut-Out Cock	Handle	Rotair Valve
Lead Or Single	Running	In	Full Application	Passenger
Trailing	Running	Out	Release	Passenger Lap
Helper (Lead)	Running	Out	Full Application	Passenger

I. Setting up 24RL Air Brake Equipment

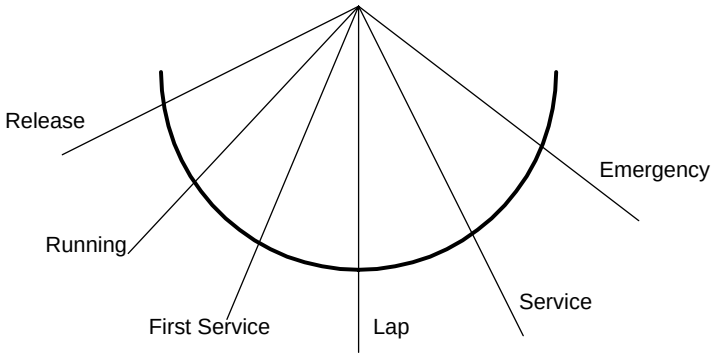
Setting Up 24RL Air Brake Equipment	
Step	**Action**
Cutting In	
1	Place the independent brake in the FULL APPLICATION position
2	Place the rotair valve in the PASS position
3	Place the automatic brake in the RUNNING position
4	Slowly move the brake valve cut-out cock to the OPEN position, pausing briefly half-way
Cutting Out	
1	Place the independent brake in the FULL APPLICATION position
2	Make a full service reduction
3	Place the rotair valve in the PASS LAP position
4	Place the automatic brake to the RUNNING position
5	Place the independent brake in the RELEASE position

Illustrations of Brake Valve Handle Positions

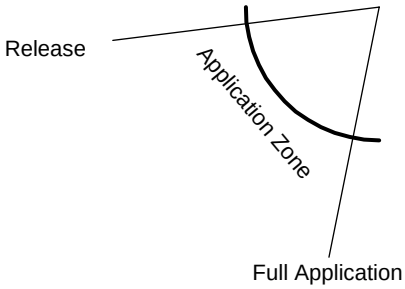
26/30



24RL



Independent Brake



No job is so important, no service so urgent that we cannot take time to perform all work safely.

Locomotive Speed Limiter (LSL) Departure Test

A test of the LSL system on each locomotive operating in LSL designated territory is required either on departure of the locomotives initial terminal or, if the apparatus was cut out at the time of departure from initial terminal, prior to the time the locomotive enters LSL designated cab signal territory, including Amtrak's Northeast Corridor. Only one departure test is required in any 24-hour period, as long as the apparatus has not been cut out since the previous test.

I. Departure Tests are Required as Follows:

- On a single locomotive unit equipped for operation in the forward direction, make the test in the forward direction only.
- On a consist of two or more locomotives, make the test on both ends of the consist.

II. Set Up - Lead Unit:

- Automatic brake cut IN and handle in the RELEASE position.
- Independent brake cut IN and in the FULL APPLICATION position.
- Reverse lever in the FORWARD position.
- Generator field switch in the ON position (GE locomotives only).
- Isolation switch in the RUN position.
- Air cut-out cock locked in the OPEN position.
- ATC breaker in the ON position.
- Logic box cut-out switch in the ON or the LSL/CS position and locked.

III. Set Up - Trail Unit(s):

- Automatic brake cut OUT, and in the HANDLE OFF position.
- Independent brake cut OUT, and in the RELEASE position.
- Reverse lever removed and stored.

IV. Perform LSL System self-test by pressing the mode switch to advance the indicator to "Self Test" mode.

NOTE 1: When "do Air" message appears, the LSL SYSTEM will wait indefinitely until the engineer recovers the air by moving the automatic brake to the RELEASE position and the independent brake to the FULL APPLICATION position.

NOTE 2: Test mode cannot be exited without running a successful self-test.

The LSL will run its self-test, which takes about 30 seconds. During this test, the LSL will:

1. Display software version number for five (5) seconds (Version 2.00 or higher). *(Make a note of this number.)*
2. Display any faults from prior running for two (2) seconds for each fault. *Do not* press the mode button at this time. This will cause the system to abort the test and go the "Cab Signal Test" mode.
3. Light all LED's one at a time, check brightness, and then turn them off one at a time. Watch for burned out lights and digit segments.
4. Test the LSL alarm.
5. Test the Logic Box electronics.

Test No.	Test	Fault Number Displayed
03	Horn Test (Audible Warning Sounds)	
04	RAM Test (Electronics Self Test)	08
05	System Watchdog (Electronics Self Test)	29

6. De-energize magnet valve causing a penalty brake application. Engineer must recover from penalty in normal manner. (See Note 1).

When the System LSL self-test has been completed and the system is free of faults, the display will read "run", indicating that the system passed the self-test. The unit will automatically exit to the "Non-Cab" mode in five (5) seconds.

If the LSL fails any test during self-test, it will display an associated fault code and an error code "err" upon completion.

If a fault appears, make a note of the fault code on the Locomotive Work report.

Appendix C

Critical Faults (Display "C"):

If the fault is a Critical Stop fault, the locomotive will receive a penalty brake application if you try to move.

If the fault is a Critical Limited Fault, do not exceed restricted speed regardless of cab signal indication.

Fault codes and their levels of severity are as follows:

Fault Number	Fault Severity		
	Software 2.09 / 2.18 / 4.18	**Version 2.1.3 / 4.13 / 4.13**	**Applies 2.01 / 2.02 / 3.04**
01	Limited	Limited	Limited
02	Limited	Limited	Limited
03	Stop	NA	Limited
04	Limited	Stop	Limited
05	Limited	Stop	Limited
06	Limited	Stop	Limited
07	Limited	Stop	Limited
08	Limited	Stop	Limited
09	Stop	Limited	Limited
10	NA	Limited	Limited
11	NA	Limited	Limited
12	Limited	Limited	Limited
13	Limited	Limited	Limited
14	Limited	Limited	Limited
15	Limited	Limited	Limited
16	Stop	Stop	Information
17	Information	Information	Information
18	Stop	NA	Limited
19	NA	NA	Limited
20	Limited	Limited	Information
21	NA	Information	Information
22	Stop	Stop	Information
23	Stop	Stop	Stop
24	NA	NA	Information
25	Limited	Stop	Stop
26	Limited	Stop	Limited
27	Limited	Stop	Limited
28	NA	Limited	Stop
29	NA	Stop	Limited
30	Limited	Limited	Limited
31	Stop	Stop	Stop
32	NA	Limited	Limited
33	NA	Limited	Limited
34	NA	Limited	Limited

Fault Number	Fault Severity		
	Software 2.09 / 2.18 / 4.18	**Version 2.1.3 / 4.13 / 4.13**	**Applies 2.01 / 2.02 / 3.04**
36	NA	Limited	Limited
37	NA	Limited	Limited
38	Stop	Stop	Stop
39	Stop	Stop	NA
40	Stop	Stop	NA
41	Stop	Stop	NA

Record all fault numbers on the Locomotive Work Report.

Repeat the self-test to clear the fault by pushing the mode button once. Fault cannot be cleared without running a self-test. Test mode cannot be exited without running a successful self-test.

Move the automatic brake to the SUPPRESSION position and the independent brake to RELEASE position. Push the mode button to the “Self-Test” mode.

The display should show software version and a “do Air” message will appear. The “do Air” message will remain until you move the automatic brake to the RELEASE position and the independent brake is in the FULL APPLICATION position.

Return the automatic brake to the RELEASE position and apply the independent brake, LSL will run another self-test. Upon completion, it will exit to “Non-Cab” mode.

Departure Test of Cab Signals and Automatic Train Stop

I. Set Up:

To set up the equipment for a test of cab signals and automatic train stop

1. Visually inspect the pickup bars for physical damage and to insure they are not distorted.
2. Automatic brake cut IN and in the RELEASE position.
3. Independent brake cut IN and in the FULL APPLICATION position.
4. Reverse lever in the direction of travel for test.
5. Isolation switch in the RUN position.
6. Circuit breaker in the CUT IN position.
7. Air cut-out cock locked in the OPEN position.

II. Test From Track Side Apparatus Test Loop

A. Cab Signal Test:

1. Set the test apparatus to give a CLEAR signal. The audible indicator should not sound.
2. Change to APPROACH MEDIUM signal. Audible indicator should sound until acknowledgment is made.
3. Change to APPROACH signal. Audible indicator should sound until acknowledgment is made.
4. Change to RESTRICTING signal. Audible indicator should sound until acknowledgment is made.

B. Automatic Train Stop Test:

1. On change from APPROACH to RESTRICTING, do not acknowledge. After the expiration of a time period not exceeding eight (8) seconds, observe that a penalty application occurs.
2. To reset place automatic brake handle in the SUPPRESSION position until the PCS is reset.
3. After the PCS is reset, acknowledge cab signals.
4. Brakes can be released when desired.

III Departure Test For Locomotives Equipped With Cab Signal Self Test:

A. LSL-Equipped Units:

Cab signal test can be performed in either the “CS Only” mode or the “LSL/CS” mode.

NOTE: Cab Signal Test mode cannot be exited without running a successful cab signal self-test.

1. To enter the cab signal self-test, the automatic brake must be in the RELEASE position and the independent brake must be in the FULL APPLICATION position. If the locomotive air brake controls are not set up properly, the LSL will display a “do Air” message until the air brake controls are set up. The reverse lever must be in the FORWARD position and the generator field switch must be in ON position (GE units ONLY).

2. Press the mode button to advance into “Cab Signal Self-Test.”
   The LSL display will display the following:
   a) Software version CR 2.0 or higher.
   b) “PS NOR” (press mode button once to advance).
   c) “PS LO” (press mode button once to advance).
   d) “50 CLR” (“90 CLR” on E8 locomotives only).
   e) “30-A” (acknowledge cab signal change).
   f) “20 APP” (acknowledge cab signal change).
   g) “20 RES” (acknowledge cab signal change).
   h) “50 CLR” (“90 CLR” on E8 locomotives only).
   i) “50 LO” - (“90 LO” on E8 locomotives only) - Do not acknowledge cab signal change.
   j) Locomotive goes into penalty braking after the expiration of a time period not exceeding eight (8) seconds.
   k) LSL displays “do Air.” The “do Air” message will be displayed indefinitely until engineer recovers air.
   l) Engineer must place automatic brake handle in SUPPRESSION position until PCS is reset and acknowledge cab signals.
   m) Air is recovered, test continues.
   n) “-1-(receiver bar coil resistance test).
   o) “run.”
   p) Automatically exit to Non Cab Mode.

3. If any faults were encountered during this test (faults 32 through 37), an error message will be displayed at the end of the cab signal self-test. Make a note of the faults and repeat the cab signal self-test by pushing the mode button once.

4. When no faults are found, the display will read “run” on completion of the self-test. System will automatically exit to Non Cab Mode.

5. The proper form must be completed, dated, and signed indicating that the cab signal system was tested and functioned properly.

B. “EH” Equipped Units:

1. Locate the push button marked “Departure” to the right of the reverse lever on the control stand. Fully apply the independent brake and place the reverse lever handle in the FORWARD position. The automatic brake should be in the RELEASE position.
2. Push and hold the departure test button. The red light below the aspect lights will light at the code rate being tested. The departure test button must be held in for approximately 90 seconds to complete the test.
3. After the aspect changes form CLEAR to APPROACH-MEDIUM to APPROACH, acknowledge with the foot pedal.
4. When the aspect changes from APPROACH to RESTRICTING, do not acknowledge. A full service brake application will occur. It will not be possible to reset the brakes for at least 70 seconds because of an electronic timing function.

Locomotive Data Guide											
NUMBER	CLASS	LOCOMOTIVE		MIN CONT SPEED (MPH)	DYN BRAKE TYPE	NUMBER	CLASS	LOCOMOTIVE		MIN CONT SPEED (MPH)	DYN BRAKE TYPE
		HORSE POWER	WGT X000					HORSE POWER	WGT X000		
1-496	CW44AC	4400	412	N/A	E	5101-5122	CW44AC	4400	432	N/A	E
497-599	CW44AC	4400	432	N/A	E	5500-5581	B30-7	3000	266	12	E
600-699*	CW60AC	6000	420	N/A	E	5808-5925	B36-7	3750	274	12	E
600-699*	CW44-6	4400	420	N/A	E	5930-5949	B40-8	4000	288	N/A	E
700-789	SD70AC	4000	428	N/A	E	5950-5961	B40-8	4000	287	N/A	E
800-812	SD80AC	5000	420	N/A	E	6000-6365	GP40-2	3000	277	12	S
1006-1017	MT-6	NONE	376	3	N/A	6388-6392	GP40-2	3000	261	12	S
1021-1068	SWMATE	NONE	268	6	N/A (B)	6393-6399	GP40-2	3000	264	12	S
1100-1119	SW1500	1500	253	11	N/A (B)	6400-6461	GP40-2	3000	277	12	S
1122-1128	SW1001	1000	233	7	N/A	6462-6499	GP40-2	3000	265	12	E
1130-1139	MP15AC	1500	258	10	N/A	6595-6828	GP40	3000	277	12	S
1140-1149	MP15	1500	258	11	N/A	6897-6899	GP60	4000	400	12	E
1150-1194	MP15AC	1500	255	10	N/A	6900-6947	GP40-2	3000	277	12	S
1200-1241	MP15T	1500	253	10	N/A	7001-7088	C30-7	3000	384	10	E
1500-1524	GP15-T	1500	244	10	S	7116-7140	C36-7	3600	395	12	E
1534-1563	GP15-1	1500	246	10	N/A	7300-7396	C40-8W	4000	392	N/A	E
2200-2350	RDMATE	NONE	262	12	E	7480-7488	C39-8	3900	389	N/A	E
2402	SD20-2	2000	386	8	N/A	7489-7646	C40-8	4000	395	N/A	E
2411-2441	SD40-2	3000	378	12	E	7650-7929	CW40-8	4000	395	N/A	E
2450-2454	SD38-2	2000	386	7	N/A	8000-8132	SD40-2	3000	385	12	E
2456-2466	SD38	2000	388	7	N/A	8133-8162	SD40-2	3000	415	12	E
2500-2555	GP38-2	2000	266	11	S	8176-8211	SD40-2	3000	378	11	E
2556-2559	GP38-2	2000	246	11	N/A	8212-8241	SD40-2	3000	380	12	E
2560-2650	GP38-2	2000	256	11	E	8242-8261	SD40-2	3000	396	12	S
2651-2814	GP38-2	2000	264	11	S	8302-8488	SD40-2	3000	390	12	E
3185-3188	B23-7R	2250	262	12	S	8499-8676	SD50	3500	390	10	E

Locomotive Data Guide											
NUMBER	CLASS	LOCOMOTIVE		MIN CONT SPEED (MPH)	DYN BRAKE TYPE	NUMBER	CLASS	LOCOMOTIVE		MIN CONT SPEED (MPH)	DYN BRAKE TYPE
4280-4299	GP39	2300	277	12	S	8700-8721	SD60	3800	390	N/A	E
4300-4319	GP39-2	2300	277	12	S	8722-8755	SD60I	3800	395	N/A	E
4400-4452	GP40-2	3000	277	12	S	8756-8786	SD60M	3800	395	N/A	E
4601-4621	SD40	3000	359	11	N/A	8787-8790	SD60	4000	390	N/A	E
4675-4699	SD70M	4000	390	N/A	E	8800-8889	SD40-2	3000	389	12	E
4701-4830	SD70AC	4300	428	N/A	E	8954-8976	SD45-2	3600	392	12	S
4831-4850	SD70ACe	4300	428	N/A	E	9000-9052	CW44-9	4400	406	N/A	E
5000-5016*	CW60AC	6000	420	N/A	E	9992-9993	F40PH2	3000	270	17	S
5000-5016*	CW44-6	6000	420	N/A	E						
Dynamic Brake Code – E = extended range, S = standard range, (B) = coupler limiting blocks											
All AC locomotives are equipped with steerable trucks with exception of units 1-200, 602, and 4831-4850. These units are equipped with non-steerable trucks.											
* = Certain locomotives in this numbering group have been reduced to 4400 HP. The classification for the modified locomotives has been changed to CW44-6.											

Glossary of Terms

Actuate: To release locomotive brake cylinder pressure that was developed as the result of a brake pipe reduction while leaving the train's air brakes applied.

Air Flow Indicator: The device that measures the rate of air flow through the automatic brake into the brake pipe.

Alignment Control Couplers: Couplers installed on some locomotives that will allow limited lateral movement.

Alternating Current (AC) Locomotive: A locomotive equipped with alternating current (AC) traction motors.

Angle Cock: A valve located at each end of a locomotive or car used to open or close the brake pipe.

Articulated Car: A car whose adjacent platforms (car bodies) are connected by sharing a common truck.

Automatic Brake: A manually operated valve on the engineer's control stand that controls the flow of air into and out of the brake pipe.

Automatic Brake Cut-Out Valve: A device used to cut in or cut out the automatic brake valve. This device is either located on the automatic brake or accessed through onboard computer screens.

Back-Up Hose: A portable hose and valve assembly that when properly connected to the brake pipe can be used to apply air brakes.

Back-Up Valve: A valve on the caboose/shoving platforms and some types of passenger cars that is connected to the brake pipe and used to apply brakes.

Battery Knife Switch: The electrical switch which opens or closes the circuit from the batteries to other electrical equipment.

Brake Cylinder: A device on cars and locomotives which converts the force of compressed air into a mechanical force to move brake shoes against the wheels.

Brake Cylinder Pipe: The pipe on a car which extends from the car's control valve to the car's brake cylinder.

Brake Pipe: The pipe extending the length of a car, locomotive, or train through which air brakes are charged, applied, and released.

Brake Pipe Branch Pipe: The pipe on a car which extends from the brake pipe to the control valve. The branch pipe cut-out cock is located on this pipe.

Brake Pipe Exhaust: The sound made as the air pressure is leaving the brake pipe through the automatic brake.

Brake Pipe Leakage: The amount of air pressure, as expressed in pounds per minute, that leaks from the brake pipe.

Brake Pipe Pressure: The air pressure contained in the brake pipe.

Branch Pipe Cut-Out Cock: A device used for cutting in and cutting out the control valve on a locomotive or car.

CFM: Cubic feet per minute.

Continuous Service Application: An air brake application made to stop a train moving at speeds below 10 MPH. Brake pipe exhaust must occur from the time the air brake is initially applied until the train stops.

Controlling Locomotive: The locomotive from which the train or locomotive consist is being operated.

Coupler Limiting Blocks: Devices located inside the coupler pocket on each side of the drawbar of a locomotive which are designed to limit the lateral travel of the coupler.

Crankcase Over Pressure Device: A device that shuts down the diesel engine when excessive positive pressure is detected in the crankcase.

Calendar Day Inspection: The FRA-required inspection a locomotive must undergo each day it is in service.

Glossary of Terms

Dead Engine Feature: A device on a locomotive for charging main reservoirs from the brake pipe when a locomotive is hauled dead-in-tow.

Dead-in-Consist: A dead locomotive that has its main reservoir being charged from another locomotive.

Dead-in-Tow: A dead locomotive that does not have its main reservoir being charged from another locomotive.

Dead Locomotive: A locomotive whose diesel engine is not running.

Dynamic Brake Axle Value: A value used to indicate the relative retarding force a locomotive's dynamic brake may develop. The value is obtained by dividing the locomotive's total dynamic brake retarding force by 10,000.

Dynamic Brake Warning Light: A lamp on the engineer's control stand which when lit indicates the dynamic brake is automatically protecting itself by reducing output.

Dynamic Braking: A method of retarding locomotive and train speed by using the locomotive's traction motors as generators.

Electric Parking Brake: An electrically-operated mechanical brake on a locomotive used to secure the locomotive against movement.

Electronic Air Brake (EAB): Air brake equipment mounted on the engineer's control stand that provides microprocessor electro-pneumatic control of the air brakes.

Emergency Brake Application: A rapid, uncontrolled reduction of brake pipe pressure, which produces 15% to 20% more braking effort than a full service application.

Emergency Fuel Cut-Off Switch: An electrical switch that when activated causes the diesel engine to shut down and stops the fuel pump motor from operating.

Engine Protective Device: Any device that protects a diesel engine from the damage that would occur if the diesel engine was permitted to continue operation.

Engineers Reading File: A computer-based library (found in the CCBB screen on the CSXT mainframe) of important information relative to locomotive engineer responsibilities.

Equalizing Reservoir: A small reservoir to hold compressed air. The air pressure in it is controlled by the setting of the regulating valve and is used to control brake pipe pressure.

Event Recorder: A device on a locomotive that records pertinent information about the operation of the locomotive.

Fuel Sight Glass: A device in the fuel system of a diesel engine through which fuel can be seen as it flows from the diesel engine back to the fuel tank.

Full Service Application: The term used to describe an application of the automatic brake to the point that the auxiliary reservoir and brake cylinder pressures are equalized.

Generator Field Switch: A switch on the engineer's control stand that must be turned on to permit the locomotive to develop output.

Ground Protective Relay: A device on a locomotive which causes the diesel engine to go to IDLE speed and prevents locomotive output when it detects an electrical ground.

Hand Brake: A mechanical device on a locomotive or car used to secure the locomotive or car against movement. A hand brake is also used to slow or stop the movement of a locomotive or car as necessary.

Independent Brake: A manually-operated device on the engineer's control stand used to apply and release the air brakes on the locomotive independently of the train's brakes.

Initial Brake Pipe Reduction: The first brake pipe reduction made when applying the train brakes. This brake pipe reduction must be at least 6 PSI.

Initial Terminal: The location where a train originates.

Glossary of Terms

Isolation Switch (Engine Control Switch on GE locomotives): An electrical switch, normally found on the engine control panel, that must be properly positioned to:

- Start or Stop the diesel engine.
- Permit the diesel engine to not respond to throttle commands.
- Permit the diesel engine to respond to throttle commands and for the locomotive to develop output.

Layshaft: A hand-operated device that can be used to stop or control the revolutions per minute of the diesel engine.

Lite Locomotive: A locomotive consist without cars attached to it.

Local Train: (This definition applies to two-way telemetry requirements only) A train assigned to perform switching en route which operates with 4,000 trailing tons or less and travels between a point of origin and point of final destination for a distance that is no greater than that which can normally be operated by a single crew in a single tour-of-duty.

Locomotive Consist: A locomotive, or combination of locomotives properly coupled for multiple unit operation and operated from a single control.

Locomotive Output: The effort being developed by the locomotive, as expressed in amperes or kilopounds.

Main Reservoirs: Storage volumes on a locomotive for holding compressed air directly from the air compressor.

Mechanical Desk: An office located at the CSXT Operations Center in Jacksonville, Florida, through which advice and/or instructions relative to locomotives and locomotive conditions can or must be obtained.

Minimum Continuous Speed (MCS): The minimum speed at which a locomotive may operate continuously under heavy load conditions without damaging the traction motors; or, if the locomotive is self-protecting, without derating its output.

MU Connections: The necessary air hose and electrical connections needed to permit a group of locomotives to be operated from a single control.

MU Shut Down Button: An electrical button-type switch located on the overhead console in locomotives with the "wide-body" cab configuration. The switch has two positions: RUN and STOP.

Off Air: When the air brake system on a car or cars is/are not being supplied with air pressurized to 60 PSI or more.

Overcharge: The term used to describe a situation in which the air brake equipment is charged to a higher pressure than is maintained by the brake pipe pressure.

PSI (Pounds per Square Inch): The measurement of air pressure within a reservoir, pipe, etc.

Penalty Application: An application of train brakes caused by the operation of a safety control device

Piston Travel: The distance, measured in inches, that a brake cylinder piston moves when the air brake is applied.

Point of Equalization: When during air brake usage the air pressures in the brake pipe, brake cylinder, and auxiliary reservoir are equal. When the point of equalization is reached, additional brake cylinder pressure cannot be developed unless the air brakes are put into EMERGENCY.

Powered Axle: An axle of a locomotive through which output developed by the locomotive is transferred to the rail.

Pressure Maintaining: A feature of the automatic brake that maintains brake pipe pressure against brake pipe leakage during a service application. It will not compensate for a leak in the equalizing reservoir.

Proper Authority: A train dispatcher, yardmaster, or company official in the Transportation Department.

Regulating Valve (Feed Valve): The valve through which equalizing reservoir pressure is adjusted.

Reverse Lever: A removable three-position lever (forward, center, reverse) on the engineer's control stand used to select the direction of travel of the locomotive. Placing the reverse lever in CENTER position prevents movement of the locomotive and conserves fuel.

Run-through Power: A locomotive consist that is not changed from the time it arrives at a terminal until it departs the same terminal. The consist may or may not remain attached to the same train.

Glossary of Terms

Sanding the Rail: A term used to describe the act of putting sand on a rail in advance of an anticipated train movement to ensure greater adhesion when movement begins.

Selector Lever: The device on some control stands that the operator uses to change locomotive operation between power and dynamic braking.

Service Application: An application of air brakes through brake pipe reductions made at a service rate.

Shoving Platform: A rail car used to provide a means for employees to safely ride during shoving movements.

Split Service Application: A split service application consists of making an initial brake pipe reduction and following it with further reductions as required.

Stretch Braking: The act of applying the train's brake while using the locomotive to pull the train.

Stringlining: Excessive lateral forces resulting in wheels lifting over the low rail or the rail rolling over.

Telemetry: The combination of a head-of-train device (HTD) on the controlling locomotive and an end-of-train device (EOT) mounted on the rear car of a train. Telemetry communicates train-related information to and from the controlling locomotive.

Tractive Effort: The force exerted by the locomotive wheels to the rail for the movement of a train.

Transfer Train: A train with an engine and one or more cars that may pickup or setoff at an intermediate location(s) between a point of origin and destination not exceeding 20 miles.

Two-Way Telemetry: Telemetry whereby the locomotive engineer has the capability to cause an emergency air brake application at the rear car of the train.

Work Train: (This definition applies to two-way telemetry requirements only) A non-revenue service train of 4,000 trailing tons or less used for the administration and upkeep of the railroad.

Yard Line: An air supply line used in yards and other areas to charge car air brake systems for testing purposes. A yard line may also be used to supply air to a train or block of cars that have already been tested.

