CSX

Air Brake & Train Handling

Updated through August 1, 2024

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Chronological List of Rule Changes

Rule ID	Effective Date
5003.5	08-01-2024
5708.3	06-01-2024
5601.4	06-01-2024
5708.15	06-01-2024
5553.4	04-15-2024
5401.7	04-15-2024
5203.6	02-01-2024
5904.9	10-01-2023
5213.3	09-01-2023
5704.1	09-01-2023
5213.1	09-01-2023
5051.2	06-02-2023
5203.7	05-01-2023
5505.1	03-03-2023
5656.2	02-02-2023
5656.1	02-02-2023
5652.10	02-01-2023
5411.1	02-01-2023
5655.1	02-01-2023

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Chapter 1 - Air Brakes, General

5001 - Preventing Air Line Contamination

5001.1 Prior to coupling yard air or locomotive(s) to a train, employees must partially open the shut off valve or angle cock to allow for condensation and/or debris to blow from the yard air-line or brake pipe.

5002 - Maintaining Required Minimum Percentage of Operating Brakes While Enroute

5002.1 Each train must have:

1. Operative air brakes on 85% of the cars in the train, and
2. Operating air brake on the rear car except when the rear car air brake is cut out.

5002.2 To ensure safe movement of the train when the last car in the train has its air brake cut out and there are no operative control valves, ensure:

1. The car has an operative hand brake,
2. Air hoses are coupled and the angle cocks are positioned to have brake pipe pressure in the car, or in the hoses between the cars if the rear car has a broken brake pipe,
3. The car is secured from separation from the train or if the car is a passenger car that a qualified employee is in position to operate a hand brake, and
4. At the first opportunity the car is switched ahead of at least one car with operative brakes, or set out.

5002.3 When brake cylinder piston travel exceeds 10.5 inches, air brakes on cars must be considered inoperative.

5002.4 When calculating the number of operative air brakes, count each:

a. Locomotive as a car, or
b. Control valve on articulated equipment as a car.

5002.5 When necessary to cut out air brakes, do not cut out two consecutive control valves.

5003 - Working on Brake Equipment

5003.1 Cut out airbrakes on a car:

a. If the brake does not release when it should, or
b. When the car must be moved with an overheated bearing, or
c. Prior to repairing or adjusting the brake equipment on a car.

5003.2 To cut out an air brake on a car:

1. Close the cut-out cock in the brake pipe branch pipe by placing the handle in line with the pipe,
2. Release all air pressure from reservoirs by holding the brake cylinder release rod to its fullest travel until the air has exhausted,
3. Verify that the brake cylinder piston retracts into the brake cylinder, and
4. Verify that the brake shoes are away from the wheels.

5003.3 After cutting out the air brakes on a car, or when picking up a car that has been tagged due to inoperative air brakes:

1. Notify the locomotive operator and the train dispatcher,
2. Apply a completed Air Brake Cut-Out Tag to the brake pipe branch pipe cut-out cock,
3. Check for the presence of a completed defective equipment tag on both sides of the freight car when picking up a car known to have inoperative brakes, and
4. Provide information regarding the location of a freight car(s) having inoperative air brakes in Section 6 of the brake test certificate and on CSXT train documentation.

5003.4 When the car’s air brakes have been cut out while enroute:

1. Set the car out at the next point where it can be repaired, and
2. If the next point is beyond the end of your run, notify the train dispatcher about the car.

5003.5 Cut out the airbrakes on a locomotive only when instructed to do so by a Mechanical Department employee.

5003.6 To cut out the airbrakes on a locomotive:

1. Contact the Mechanical Department and be governed by their instructions,
2. If not coupled to other equipment that is secured, apply the handbrake and test,
3. Close the locomotive truck cutout cocks,
4. Verify brakes have released,
5. Complete a Non-Compliance tag and hang on isolation switch,
6. Update the applicable brake slip, and
7. Notify the Mechanical Department by recording in:
    a. CLIP, or
    b. The Calendar Day workbook with notification to the Mechanical Department.

5004 - Standard Brake Pipe Pressure

5004.1 Standard Brake Pipe Pressure must be adjusted to:

a. 110 PSI on Passenger Trains, including Amtrak's "Auto Trains", or

b. 90 PSI on all other trains including trains with freight and passenger cars.

5005 - Avoiding an Overcharge Condition

5005.1 When doubling cars or coupling cars to a train:

a. Not on yard air: Make a full service brake pipe reduction after coupling is made and before the angle cock is opened, or

b. On yard air: After coupling, place the automatic brake handle in the release position and wait for air to restore before the angle cock is opened.

5005.2 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.

5005.3 When attaching cars to the rear of a train:

1. Prior to 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

5006.1 To Reduce an Overcharge Condition, follow these steps:

1. Charge the brake pipe to the standard pressure for at least three 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, and
5. Place the automatic brake in the RELEASE position.

5007 - Adjusting Air Brake Controls

5007.1 Do not adjust the regulating valve or cut out a brake valve on the controlling locomotive while the train or locomotive is moving.

Chapter 2 - Locomotive Air Brake Equipment

5051 - Monitoring Brakes

5051.1 When applying train brakes, monitor equalizing reservoir pressure because the brake pipe pressure will reduce at a slower rate.

5051.2 Monitor all locomotive air pressure gauges and indications to detect changes that may affect the operation of the locomotive or train. Train crews should not expect a service rate or emergency brake application to indefinitely maintain application of a train's air brakes.

5051.3 If a train experiences brake pipe flow of greater than 60 CFM (or 90 CFM combined while operating DP) or brake pipe gradient greater than 15 PSI while en route and the moveable pointer does not return to acceptable limits within a reasonable amount of time, the train shall be stopped at the next available location and be inspected for leaks in the brake system.

5052 - Adjusting Brake Equipment

5052.1 When adjusting equalizing reservoir pressure the automatic brake handle must be placed in the RELEASE position with the automatic brake valve cut OUT.

5052.2 When cutting in the automatic brake:

1. The automatic brake handle must be placed in the RELEASE position, and
2. Note equalizing reservoir pressure is not increasing before placing the automatic brake cut-out valve to the IN position.

5053 - Ensuring Proper Brake Cylinder Pressure

5053.1 Excessive Locomotive Brake Cylinder Piston Travel must be reported when the actual piston travel is within 2 inches of the maximum piston travel shown in block 10 on Form FRA-F6180-49A.

5053.2 If the locomotive brake cylinder pressure reading differs by 3 PSI or more from posted plate or decal inside the cab when brake is fully applied, report the condition on the Locomotive Work Report.

5053.3 The locomotive brake cylinder pressure adjustment must not be altered.

5053.4 Do not block the independent brake so that it actuates the air brakes continuously.

5054 - PASS Position

5054.1 Do not use the “PASS” position on a 3-position automatic brake cut-out valve in freight service.

5054.2 The “PASS” position on a 3-position brake cut-out valve may only be used when:

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

5055 - Managing Main Reservoir Air Pressure

5055.1 Main reservoir pressure should be maintained between 130 PSI and 145 PSI. Note on the Locomotive Work Report instances when pressure is outside that range for extended periods of time.

5055.2 Monitor main reservoir air pressure and:

a. If the locomotive is stopped, do not move when pressure is within 15 PSI of brake pipe pressure, or

b. If the locomotive is moving and pressure falls to within 10 PSI of regulating valve setting:

    1. Stop the movement,
    2. Secure the equipment,
    3. Report the condition to the train dispatcher, and
    4. Note condition on the Locomotive Work Report

5055.3 When increasing air compressor output ensure that main reservoir pressure is within 15 PSI of the regulating valve setting.

5055.4 When increasing air compressor output on a locomotive consist containing at least one electrically driven air compressor, center the reverser and place the throttle in position 1.

Exception: Full air compressor output is achieved at idle on CXST 3000 through 3474. It is not necessary to increase throttle position when one of these locomotives is in consist.

5055.5 When increasing air compressor output on a locomotive consist that does not contain at least one electrically driven air compressor:

1. Center the reverse lever,
2. Use sufficient throttle not exceeding position #4 to maintain at least a 15 PSI differential between main reservoir pressure and the regulating valve setting, and
3. Reduce throttle if excessive vibration occurs.

5055.6 When supplying air to main reservoirs on dead locomotives, condition the locomotives as follows:

a. For Dead-in-Tow, dead engine feature has been cut in to provide main reservoir air pressure. Note, only Mechanical Department personnel can operate the dead engine feature, or

b. For Dead-in-Consist, condition in the same manner as locomotives in service.

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Chapter 3 - Air Brake Test, General Requirements

5101 - Performing Air Brake Tests

5101.1 Only qualified personnel may operate air brake controls on a locomotive for the purpose of performing air brake tests.

5101.2 When performing air brake tests, air pressure must be determined at the rear of the train or cut of cars by:

a. Telemetry that has been qualified, or

b. An air gauge on a locomotive coupled to the rear of the train or cut of cars, or

c. An air gauge in the EOT or marker unit, or

d. An accurate hand-held air gauge.

1. An accurate gauge is one that has been calibrated within the last 92 days, and
2. To calibrate a hand-held air gauge:
    1. Attach gauge to any lead locomotive and cut in the air,
    2. Compare the PSI reading from the hand gauge with that of the lead locomotive's train line gauge
    3. Readings must be within 3 PSI of the locomotive gauge or the gauge must be removed from service until repaired, and
    4. If within 3 PSI of the lead locomotive gauge annotate the date and your initials on the back of the gauge.

5101.3 When performing air brake tests, it must be determined that air brakes on the rear of the train or cut of cars have applied and released by:

a. Qualified Telemetry, or

b. Observing that the brake cylinder piston properly responds to air brake operation, or

c. Observing that a brake pipe gauge at the rear of the train responds to air brake operation.

Note: When an air brake test is performed, a 5 PSI brake pipe reduction indicates application and a 5 PSI brake pipe increase after an application is made indicates a release.

5101.4 After an air brake test, make certain brake pipe pressure is being restored at the rear of the train before proceeding.

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Chapter 4 - Performing Locomotive Air Brake Tests

5151 - Locomotive Consist Air Brake Test

5151.1 Perform a Locomotive Consist Air Brake Test when a locomotive consist is made up or added to.

5151.2 To perform a Locomotive Consist Air Brake Test, follow the steps below:

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 brake are released on all locomotives,
4.	Place the independent brake in the FULL APPLICATION position,
5.	Confirm that the air brakes are applied on all locomotives, and
6.	Place the independent brake in the RELEASE position.
	Testing Automatic Brake
7.	Make a 10 PSI air brake pipe reduction and cut out the automatic brake after exhaust stops,
8.	Confirm that the air brakes are applied on all locomotives, and
9.	Measure brake pipe leakage, making certain that it does not exceed 5 PSI per minute.
	Testing Air Brake Actuation
10.	Confirm that air brakes are applied on all locomotives, and then actuate brake cylinder pressure,
11.	Confirm that the air brakes are released on all locomotives, and
12.	Properly position air brake controls as required.

5151.3 If air brakes do not respond properly, or if brake pipe leakage exceeds 5 PSI per minute:

1. Stop the test and make corrections, and
2. Re-test the locomotive consist.

5151.4 Review or document 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:

a. Added to a train consist, or

b. Operating as a light locomotive consist movement.

5152 - Standing Locomotive Air Brake Test

5152.1 Perform a Standing Locomotive Air Brake Test on a light locomotive consist:

a. When initially taking charge, or

b. After changing ends or controlling units, or

c. Before making an initial movement when cutting away from a train.

5152.2 When conducting a standing locomotive air brake test on conventional equipment, make certain 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.

5152.3 If the locomotive moves:

1. Place throttle in the IDLE position, and
2. If necessary, stop movement by:

    a. Using a hand brakes if conditions permit, or

    b. Place the reverse lever in the position opposite the direction of movement and place throttle in position 1.

5153 - Running Locomotive Air Brake Test

5153.1 Perform a Running Locomotive Air Brake Test on conventional light locomotives as soon as operating conditions permit, when:

a. Making initial movement, or

b. Making any change to a consist, or

c. Changing ends.

5153.2 To perform a Running Locomotive Air Brake Test, follow the steps below:

Step	Action
1.	Begin moving the 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 effect,
4.	Release the independent brake verifying brake cylinder pressure is at zero and the retarding effect is eliminated,
5.	Make a 15 PSI brake pipe reduction and verify brake cylinder pressure and retarding of the locomotive,
6.	Actuate the brake cylinder pressure verifying that brake cylinder pressure returns to zero and retarding of the locomotive is eliminated, and
7.	Properly position air brake controls as required.

5153.3 If air brakes do not respond properly or the retarding effect is not eliminated after actuating brake cylinder pressure to zero, stop the movement and make sure MU connections are made properly.

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Chapter 5 - Performing Train Air Brake Inspections and Tests

5201 - Inspection of Brake Equipment

5201.1 Prior to performing a brake test, make certain that:

1. Air hoses are in serviceable condition and properly coupled,
2. The regulating valve is adjusted to the standard pressure for the train being tested,
3. Angle cocks, end cocks, and cutout cocks are properly positioned, and
4. If the train is equipped with electro-pneumatic brakes, brake circuit cables are properly connected.

5202 - Methods for Testing Brake Pipe Leakage

5202.1 When equipped with an air flow indicator use the Air Flow Method (AFM) to test brake pipe leakage by:

1. Charging the brake pipe pressure at the rear car to 75 PSI for freight train and 95 PSI for passenger trains,
2. Verifying that the airflow indicator shows 60 CFM (or 90 CFM combined while operating DP) or less,
3. Obtaining the required signal to begin test,
4. Making a 20 PSI brake pipe reduction and allow brake pipe exhaust to stop, and
5. Receiving the required signal before releasing the air brakes.

5202.2 If your train is not equipped to permit an AFM test, make a Brake Pipe Leakage Test by:

1. Charging the brake pipe pressure at the rear car to 75 PSI for freight train and 95 PSI for passenger trains,
2. Obtaining the required signal to begin the test,
3. Making a 20 PSI brake pipe reduction and allow brake pipe exhaust to stop,
4. Cutting out the automatic brake and wait one minute,
5. Noting the brake pipe pressure and measure brake pipe leakage one additional minute, and
6. Receiving the required signal before releasing the air brakes.

5202.3 If leakage test reveals air flow is greater than 60 CFM (or 90 CFM combined while operating DP) or exceeds 5 PSI per minute:

1. Notify employee inspecting cars,
2. Inspect the brake pipe for leaks,
3. Make necessary repairs, and
4. Retest.

5202.4 Verify or enter brake pipe leakage information on the brake test certificate. Information must be recorded as “AFM” when the airflow method has been used or the amount of leakage per minute when the brake pipe leakage method has been used.

5203 - Class I Brake Test

5203.1 A Class I brake test must be performed on the entire train:

a. Where the train is originally assembled, or

b. At the train's point of origin (initial terminal) regardless of where the cars were assembled except trains received at interchange, or

c. When the train has been off of air more than 24 hours, or

d. When adding or removing more than one solid block of cars, or

e. When a unit or cycle train designated in special instructions, has traveled 3,000 miles since its last Class I test, or

f. By a qualified mechanical inspector at destination, when an extended haul train is designated in special instructions and has traveled 1,500 miles.

5203.2 A Class I brake test is not required on the entire train:

a. When removing a single car or one solid block of cars, or

b. When adding a previously tested car or one previously tested solid block of cars, or

c. Removing defective cars regardless of the number or location of defective cars, or

d. Change in locomotive consist or EOT, or

e. Any combination of the above.

5203.3 Before being added to a through train at an intermediate location, a solid block of cars must:

1. Receive a Class I brake test, and
2. Not be off air for more than 24 hours.

5203.4 A through train may pick up previously tested cars from multiple tracks at an intermediate location without having to perform a Class I brake test on the entire train so long as the tracks are doubled together as a solid block before any of the cars are placed in the train.

5203.5 If a solid block of cars receives a Class I brake test as one solid block and is then placed in multiple tracks, a through train may pick up these cars without having to perform a Class I Brake Test so long as the cars are:

1. Not off air more than 24 hours, and
2. Reassembled in the same standing order prior to being added to the through train.

5203.6 When a train is split at a location, only one section of the train may be designated as a continuing train. The other sections of the train:

a. May be added as a solid block of cars to a through train after safety mechanical inspection has been completed as required by rule 116.6, or
b. Must have a Class I brake test if the section becomes another originating train or part of an originating train.

5203.7 At locations where a qualified carman is on-duty and has been designated to perform tests and inspections, the carman alone will be considered to be a "qualified person" and must be utilized accordingly.

5204 - Class III Brake Test

5204.1 Perform a Class III brake test when cars have not been off air for more than 24 hours:

a. Class III Train Line Continuity test when the train has been separated and recoupled without any change to the train's consist, or
b. Train Consist Change test when:
    a. A locomotive or caboose is changed, or
    b. A car or solid block of cars is removed from the train, or
    c. At locations other than the train's initial terminal, and cars added from a previous train have remained coupled in same order with the train line remaining connected unless:
        a. Removing defective equipment from the solid block, or
        b. Separated into multiple blocks due to track constraints and the cars will be re-coupled in the same order as removed.

5205 - Transfer Brake Test

5205.1 Perform a Transfer Train brake test on cars not previously tested when making a transfer train movement that will not exceed 20 miles.

5206 - Helper Brake Test

5206.1 Perform a Helper Service brake test anytime a helper locomotive is added to a train.

5207 - Class IA Air Brake Test

5207.1 Perform a Class 1A brake test at points designated in Special Instructions.

5208 - Additional Inspections

5208.1 In addition to the inspections required when adding cars to a train, the following must be inspected when performing a brake test:

1. Air brake cylinder piston travel is correct when determined to be:
    a. 6-9 inches on body mounted brakes, or
    b. A maximum of 6 inches on truck-mounted brakes, or
    c. As specified by the badge plate of the car.
2. Brake rigging does not bind or foul,
3. Brake equipment is properly secured,
4. Retaining valves are in the EXHAUST position,
5. Retaining valve pipes are in serviceable condition, and
6. Both sides of the car are examined during the inspection process to observe the functioning of all moving parts of the brake system.

5209 - Air Brake test Procedures

5209.1 Comply with the following chart when performing required brake test:

Action	Class I	Class IA	Class III Train Line Continuity	Class III Train Consist Change	Transfer	Manned Helper
Pre-Test & Start of Test						
Safety Inspection	X	X		X	X	
Charge brake pipe to within 15 PSI of regulating valve setting	X, X[5]	X		X	X	
Obtain required signal to begin test	X, X[5]	X				
Leakage Test	X	X				
20 PSI Brake Pipe Reduction	X, X[5]	X		X	X	X, [1]
Brake Application and Inspection on Rear Car						
All Cars	X	X			X	
Rear Car	X[5]			X		X[2]
Release Brakes						
All Cars	X, X[4]					
Rear Car	X[5]			X		X[3]
Brake pipe restored on rear as indicated by gauge	X	X	X	X		

X[1]	If train brake is already applied, make additional 10 PSI brake pipe reduction.
X[2]	Rear car or Helper locomotive(s) with visual inspection on each helper locomotive that brake system operates from a 20 PSI reduction initiated from controlling locomotive.
X[3]	Rear car or Helper locomotive at the rear of the train.
X[4]	Roll-by inspection permitted at speeds not exceeding 10 MPH and results must be communicated to the locomotive operator.
X[5]	When test has been made using air source other than outbound locomotive.

5210 - Back-up Hose/Back-up Valve Air Brake Test

5210.1 Perform a Back-up Hose / Back-up Valve Air Brake Test when:

a. A back-up hose or back-up valve will be used to control movement, or

b. The consist of a train using a back-up hose or back-up valve is changed.

5210.2 To perform a Back-up Hose / Back-up Valve Air Brake Test, comply with the steps below:

Step	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 locomotive operator that a brake test will be made from the back-up valve,
3.	Locomotive Operator	Charges the air brake system and then cuts out the automatic brake,
4.	Trainman	Opens the back-up valve to exhaust air pressure at a service rate,
5.	Locomotive Operator	Observes brake pipe and brake cylinder gauges and verifies that brake pipe pressure reduces and air brake applies on the locomotive,
6.	Locomotive Operator	Communicates the results of the test to the trainman,
7.	Trainman	Closes the back-up valve, and
8.	Locomotive Operator	Restores air brake equipment to normal operating position.
Additional Steps for Back-up		
9.	Locomotive Operator	Begins movement and authorizes test,
10.	Trainman	Opens the back-up valve to reduce brake pipe pressure at a service rate and verifies that air pressure is exhausting freely, and
11.	Crew	Verifies that a retarding effect is created.

5211 - Passenger Train Running Air Brake Test

5211.1 Perform a Passenger Train Running Air Brake Test when:

a. Departing the train’s initial terminal, or

b. Locomotive, engine crew, or train crew has been changed, or

c. A brake pipe angle cock has been turned, except for cutting cars from the rear of the train, or

d. Electro-pneumatic brake circuit cables between power units and/or cars are disconnected, or

e. The train has struck debris on the track, or

f. An en route failure of two-way telemetry occurs unless the train has a radio-equipped crewmember positioned in the rearmost car containing an accessible emergency brake valve.

5211.2 To perform a Passenger Train Running Air Brake Test, comply with the steps below:

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

5212 - Retesting Air Brakes

5212.1 When air brakes need to be retested:

1. Charge the brake pipe pressure at the rear car to within 15 PSI of the regulating valve setting,
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 3 minutes, consider the air brake as operating, and
5. When the air brake fails the retest:
    a. At the trains originating location, set the car out, or
    b. At an intermediate location, once tagged and brakes have been cut-out, may be moved to the next point where it can be repaired.

5213 - Brake Test Certificate

5213.1 Whenever a Class I or Class IA brake test is performed on the entire train, the locomotive operator must be notified and a brake test certificate completed. Notification may be made verbally. If notified verbally, the locomotive operator must complete the brake test certificate with the information provided. The certificate must be kept on the controlling locomotive until the train reaches its final destination. The certificate must contain the following information:

1. Air brake test was satisfactorily performed,
2. Date and time the brake test was performed,
3. Number of cars inspected,
4. Name or ID number of the qualified person who performed the test, and
5. Location where the test was performed.

NOTE: Items 2-5 of this rule must not be altered on the brake test certificate.

5213.2 When taking charge of locomotive(s) and/or train, the locomotive operator must review information on certificate for:

1. Locomotive brake test,
2. Head end train device test,
3. Dynamic brake status including the total number of dynamic brake axles and locomotives tagged defective,
4. Train brake test,
5. Rear end train device test,
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 train, and
7. Power brake related problems with explanation.

5213.3 Locomotive Operators are responsible for:

1. Placing the brake test certificate on any new locomotive added to a previously Class I tested train when that locomotive is the controlling locomotive, and
2. Leaving any written brake test documentation on the control stand of the controlling locomotive for the relieving locomotive operator or until the train reaches its destination.

5213.4 When setting out cars, leave written documentation in the knuckle of the car or block of cars, or verbally notify the supervisor or train dispatcher that the cars have received a brake test and will be kept charged. Documentation must include:

1. Date and time the inspection was made,
2. Number of cars inspected, and
3. Name or ID number of qualified employee who performed test.

5213.5 If the original Class I brake test certificate cannot be located, contact a supervisor or train dispatcher. The originating Class I brake test information can be retrieved from the CSX Mechanical Department. Be governed by instructions from the supervisor or train dispatcher for replacing the brake test certificate.

Chapter 6 - Locomotive Calendar Day and Work Reports

5301 - Locomotive Operator Responsibilities

5301.1 Locomotive Operators must ensure that each locomotive in their charge, including any locomotive picked up en route, is inspected each day the locomotive is in service.

5301.2 Other responsibilities include:

1. Verify that the locomotive consist, including any DP remote consist has received the required calendar day inspections,
2. Accept the results of any inspection performed by the Mechanical Department,
3. Keep all doors on the locomotive(s) closed when not being used,
4. Keep cab windows and doors of unoccupied and trailing locomotives closed,
5. When a locomotive is due a Calendar Day Inspection but will not be used in service, complete and place a non-compliance tag on the locomotive(s) isolation switch, and
6. Unless notified by Mechanical that a test has been performed, test the Alerter on the controlling locomotive prior to departing the initial terminal or when the controlling locomotive has been changed en route.

5302 - Required Calendar Day Inspections

5302.1 Perform a Calendar Day Inspection on a locomotive used in service when the:

a. Last Calendar Day Inspection was not performed on the current day including locomotives set out enroute, or

b. Tour of duty extends into the next calendar day, or

c. Calendar Day Inspection report cannot be found.

5302.2 Secure authorization to perform a Calendar Day Inspection when your tour of duty began:

a. At 1200 hours or later, contact the Supervisor, or Train Dispatcher to determine where to complete the inspection, or

b. Before 1200 hours make the inspection before leaving the locomotive(s) unless:

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

5302.3 If unable to perform a required Calendar Day Inspection because doing so would violate the Hours of Service Act, the Locomotive Operator is required to notify a supervisor or train dispatcher.

5303 - Tagging Locomotives Due Calendar Day Inspection

5303.1 When any locomotive in the consist is due an inspection before the lead locomotive is due:

1. Complete a Calendar Day Inspection tag, and
2. Attach the tag to the isolation switch of the lead locomotive.

5304 - Performing a Calendar Day Inspection

5304.1 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 below are not met:

a. Inspections from the operating cab:
    1. Floors and passageway must be free of slip and/or trip hazards,
    2. Fusees must be in the container provided,
    3. Cab seats must be secure,
    4. Traction motors on Non-GE DC powered locomotives must be cut in,
    5. Windows on the lead locomotive must permit a clear view,
    6. At least one bulb on front headlight is operational,
    7. At least one bulb on the rear headlight is operational in yard service or road service if required to regularly run backward for any portion of the trip other than to pick up a portion of its train or make terminal movements,
    8. Horn and crossing bell must operate,
    9. Gauge lights must permit accurate readings, and
    10. Light on Locomotive Operator side must provide sufficient illumination for reading documents.

b. Inspections from the walkway and engine compartment:
    1. Walkways free of slip and/or trip hazards,
    2. Handrails, hand holds, steps, ladders, and guards must be secured and ready for service,
    3. Guards and electrical and rotating equipment must be in place, and
    4. Safety chains must provide a continuous barrier between locomotives, across the front and rear of the locomotive consist and be connected high enough to permit safe passage.

c. Inspections from the ground:
    1. Sanders must deposit sand on the rails in front of the consists lead wheels in the direction of movement,
    2. Fuel tank must be free of any leaks,
    3. Brake cylinder piston travel must be sufficient to permit the brake shoes to clear the wheels when the brakes are released,
    4. Brake cylinder piston travel must not exceed 1 1/2 inches less than the total possible piston travel displayed in block 10 of Form F6180-49A when brakes are applied,
    5. Brake shoes must be secured and aligned with the wheel,
    6. Brake rigging must not bind or foul,

7. There must be no cracks, broken or missing parts on:
    a. Locomotive truck or wheel, or
    b. Gear case, or
    c. Draft Gear, or
    d. Coupler or coupler carrier.
8. Jumper cables must be:
    1. Free of fraying or damage,
    2. Stowed if unused, and
    3. Connected to a working receptacle or dummy receptacle.
9. Remote Control Locomotives or Platforms working in Remote Control Service must have:
    1. Operational strobe lights,
    2. Emergency Stop buttons in place and pulled out, and
    3. Mobile Control Cabinet (MCC) or Locomotive Control Unit (LCU) toggle switches, pushbuttons and levers are free of damage that would prevent use or operation of device.

5304.2 When performing Calendar Day Inspections, Locomotive Operators must complete the report and leave it on the locomotive inspected.

5304.3 When a non-complying condition is discovered, the Locomotive Operator must promptly report the details of the condition, including any restrictions placed on the locomotive to:

1. Train Dispatcher or Supervisor,
2. Mechanical Desk, and
3. All other crew members.

5304.4 When a non-complying condition exists on a locomotive, the locomotive operator must:

1. Complete a Non-Compliance tag indicating the non-complying condition,
2. Attach the appropriate part of the tag to the isolation switch of the non-complying locomotive,
3. Attach the other part of the non-complying tag to the isolation switch of the controlling locomotive, and
4. Leave the non-compliance tag(s) on the affected locomotives to provide notification to other employees until the condition is corrected.

5305 - Moving Locomotives with Non-Complying Conditions

5305.1 Non-complying conditions are:

a. Items discovered during Calendar Day Inspection, or

b. Locomotives restricted due to the absence of ditch lights or the failure of both ditch lights, or

c. Flat spots on locomotive wheels that:

   a. Measure 2 ½ inches or longer, or
   b. Multiple flat spots of at least 2 inches or more and are within 1 ½ inches of each other.

5305.2 When a non-complying condition is discovered:

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

b. If the condition was discovered during a Calendar Day Inspection and cannot be corrected, the Locomotive Operator or other qualified employee must determine whether the locomotive is safe to move. If safe to move, it must only be moved:

   a. Light or dead in tow within a yard, not exceeding 10 MPH, or
   b. In a locomotive consist not attached to cars, or
   c. Isolated or shut down when attached to cars.

c. If the condition was discovered en route and cannot be corrected, the Locomotive Operator or other qualified employee must determine whether the locomotive is safe to move. If safe to move, it must only be operated until the earlier of:

   a. The performance of the next Calendar Day, or
   b. Reaching the next forward point where the necessary repairs can be made.

d. If the condition cannot be corrected and is not safe to move, notify the train dispatcher or supervisor.

5305.3 When a locomotive is isolated or shutdown en route due to a non-complying condition, the locomotive must not remain in the controlling or lead position after the performance of the next Calendar Day Inspection.

5306 - Testing the Alerter

5306.1 When testing the Alerter, ensure equipment is secure, and:

1. Place the reverser in the forward or reverse position,
2. Release the independent and automatic brakes,
3. Allow the warning cycle to expire, and
4. Verify an automatic brake application at a penalty rate.

5307 - Reserved

5308 - Reserved

5309 - Locomotive Work Reports

5309.1 Complete a Locomotive Work Report on the locomotive consist for each trip. Locomotive(s) set out en route must have a separate Locomotive Work Report completed. Locomotive Work Reports must include:

1. Any unusual occurrences,
2. Non-complying conditions discovered en route,
3. All locomotive(s) initials and numbers,
4. Information on lines 1 through 4, and
5. Any locomotive problems or defects.

   Note: The Locomotive Work Report may be used by more than one locomotive operator, if space permits.

5309.2 Promptly report locomotive defects, using the three-letter code with the accompanying color code as listed on the cover of the Locomotive Work Report, to:

1. Train dispatcher or supervisor,
2. Mechanical Desk (RNX 388-5540 or RNX 388-5555 or Bell 1-800-624-8385), and
3. All other crew members.

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Chapter 7 - Locomotive Conditioning

5351 - Starting Diesel Engine

5351.1 Do not attempt to start a diesel engine when:

a. Hot engine and low lube oil indications are displayed at the same time, or

b. Crankcase over pressure device is tripped, or

c. An indication of a governor shutdown (low lube oil) occurs two consecutive times.

5351.2 When starting a diesel engine without instructions posted on a decal inside the cab comply with the steps below:

Step	Action
	Locomotive Cab
1.	Place the isolation switch in the START position,
2.	Make certain 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 throttle or the MU shutdown button is not in the STOP position,
	Engine Room
5.	Reset engine protective devices that are tripped, except for Crankcase over pressure device,
6.	Check the engine cooling water sight glass,
7.	If the level is at or below the LOW level, do not start and contact the Mechanical Desk,
8.	If the level is above the LOW level, start the engine,
	Starting Engine
9.	Prime the fuel system unless: a. Sight glass is full of fuel, or b. Pressure gauge (if equipped) indicates at least 30 PSI, or c. System has been primed continuously for 30 seconds.
10.	Crank the diesel engine until it starts, but not longer than 30 seconds, and
11.	If the diesel engine fails to start, repeat procedure. If it does not start on second attempt, contact the Mechanical Department.

5351.3 When initially taking charge of a GE locomotive that is shutdown and the temperature has been below 45 degrees within the last 12 hours, ensure cooling water is visible in the sight glass prior to starting the locomotive.

5352 - Shutting Down Diesel Engine

5352.1 Shut down the diesel engine as soon as possible in an emergency situation.

5352.2 When shutting down the entire consist during emergency situations:

a. Place the throttle in the STOP position on upright control stands, or

b. On locomotives with a desk top control stand, depress the STOP button on the overhead console.

5352.3 When shutting down an individual locomotive due to an emergency situation, depress any emergency fuel cut-off switch.

5352.4 When performing a normal shutdown, ensure the diesel engine has not been in throttle position 8 for at least 30 minutes.

5352.5 When shutting down a diesel engine without instructions posted on a decal inside the cab comply with the steps below:

Step	Action
	All Locomotives except CW46AC
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, and
4.	Open the battery knife switch.
	CW46AC Locomotives
1.	Place the isolation switch in the START position,
2.	Stop the engine by pressing the stop button,
3.	Press and hold the computer reset off button at least 2 seconds verifying 1. The computer screen displays "Please wait. Computer shutdown in progress.", and 2. After 15 seconds the computer screen displays "No external video."
4.	Open the radio circuit breaker, and
5.	Open the battery knife switch.

5353 - Coupling and Uncoupling Locomotives

5353.1 When coupling locomotives, ensure that couplers are locked by stretching the coupling, then:

1. Position the controls, switches, and air brake valves on the controlling locomotive;
2. Position the walkways and safety chains providing safe movement from one locomotive to another;
3. Position the controls, switches, and air brake valves on trailing locomotives making certain that the engine run, control fuel pump and generator field switches are in the OFF/OPEN position;
4. Install jumper cables;
5. Connect the Brake Pipe hose, Main Reservoir Equalizing hose, Actuating hose and Independent Application and Release hose; and
6. Open angle cocks and end cocks for the coupled air hoses.

5353.2 When uncoupling locomotives:

1. Secure the locomotive to be left standing,
2. Disconnect and reposition the safety chains,
3. Position the walkways,
4. Close the angle cocks and end cocks when necessary,
5. Disconnect and store the jumper cable(s),
6. Position the controls, switches and air brake valves on the locomotives to be left standing, and
7. Allow air hoses to disconnect naturally by separating the locomotives.

5354 - Changing Ends

5354.1 When required to operate from a different locomotive in the consist, change ends as follows:

Step	Action
	Cutting Out
1.	Fully apply the Independent brake,
2.	Remove and properly store the reverser,
3.	Make a full service brake pipe reduction ensuring the brake pipe exhaust stops,
4.	Cut out the Automatic brake and put in in the HANDLE OFF position,
5.	Cut out the Independent brake and place in the RELEASE position,
6.	Configure switches and controls for trailing position, and
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, and
4.	Cut in the Automatic brake.

5355 - Leaving Locomotives Unattended

5355.1 When leaving locomotive consist unattended, position the controls as follows:

Note: Locomotive Shutdown Instructions do not apply to locomotives actively engaged in Distributed Power Operations unless otherwise instructed by the supervisor or train dispatcher.

Step	Component	When engine is to continue idling	When engine is manually shut down
		Controlling Unit	
1.	Independent Brake	Cut in and fully applied	Cut in and fully applied
2.	Automatic Brake	Full Service - When coupled to cars Release - Not coupled to cars	Full Service - When coupled to cars Release - Not coupled to cars
3.	Throttle	Idle	Idle
4.	Reverser	Centered & Removed	Centered & Removed
5.	Local Control Switches	Engine Run - ON Generator Field - OFF Control Fuel Pump - ON	Engine Run - OFF Generator Field - OFF Control Fuel Pump - OFF
6.	Isolation Switch	START/STOP/ISOLATE or as directed	START/STOP/ISOLATE or as directed
7.	Battery Knife Switch	Closed	Opened
7 a.	AESS OR APU	Closed	N/A
		Trailing Unit(s)	
1.	Independent Brake	Cut out and released	Cut out and released
2.	Automatic Brake	Cut out and HANDLE OFF	Cut out and HANDLE OFF
3.	Throttle	Idle	Idle
4.	Reverser	Centered & Removed	Centered & Removed
5.	Local Control Switches	Engine Run - OFF Generator Field - OFF Control Fuel Pump - OFF	Engine Run - OFF Generator Field - OFF Control Fuel Pump - OFF
6.	Isolation Switch	START/STOP/ISOLATE or as directed	START/STOP/ISOLATE or as directed
7.	Battery Knife Switch	Closed	Opened

Step	Component	When engine is to continue idling	When engine is manually shut down
7 a.	AESS OR APU	Battery knife - Closed, and MU'ed to a controlling locomotive that has both Control Fuel Pump and Engine Run turned ON.	N/A

5355.2 When operating a locomotive handbrake, 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.

5355.3 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).

Chapter 8 - Locomotive Operations

5401 - Fuel Conservation

5401.1 Fuel conservation methods must be followed at all times.

5401.2 On locomotives being left unattended and temperature permits, shut down a locomotive's diesel engine, unless instructed otherwise by a train dispatcher, supervisor, or other proper authority.

Unattended Locomotive Shutdown Decision Chart		
Temperature is:	Actual or forecast of 35 degrees F or below	Above 35 Degrees F
Action:	Permit idling and when equipped have AESS or APU enabled shut down	Shut down (See note below for exception)

Note: The noted operations above do not apply to following locomotive classes:

1. All GE Locomotives: CM40-8, CW40-8, CW40-9, CW44AC, CW44AH, CW46AH, ES40DC, ES44AH, ET44AH
2. Select EMD Locomotives: GP38-3, GP40-3, SD40-3, SD40E3, SD50-3, SD70AC

When one of the locomotives listed above is left unattended or is a trailing unit not needed to handle tonnage, isolate the locomotive and allow AESS to function.

5401.3 When locomotives are in the care of the locomotive operator, comply with the following chart:

Locomotive Handling Decision Chart			
Operation			**Action**
A.	Locomotive Service Center		Use one locomotive for transporting locomotive consist to a train or first track to be coupled to.
B.	Locomotives are part of a train enroute (See note below for exception)		Shut down or isolate trailing locomotives not needed to handle tonnage or safe movement including train size reductions.
C.	When delayed enroute	1.	Permit one locomotive to idle for air supply to train brake system.
		2.	Center the reverser and manually shut down or isolate locomotives without fuel saving systems such as AESS, APU, Smart HPT etc.
		3.	Allow separate Distributive Power locomotive consist to idle
		4.	When work trains, transfer trains, yard assignments, or helper locomotives will be delayed more than 30 minutes must shut down or isolate after proper securement.
D.	Yarding a train	1.	Shut down or isolate trailing locomotives not needed to handle tonnage or safe movement including train size reductions.
		2.	When train is to be held an extended period of time in a terminal or yard, permit one locomotive to idle or substitute yard ground air to keep train brake system charged.
E.	Leaving locomotive(s) unattended (See note below for exception)	1.	If personnel, transportation or mechanical are not taking charge of the locomotive consist, shut down or isolate locomotives.
		2.	Isolate locomotives equipped with an air starter or AESS and permit the AESS to function as intended.

Note: The noted operations above do not apply to following locomotive classes:

1. All GE Locomotives: CM40-8, CW40-8, CW40-9, CW44AC, CW44AH, CW46AH, ES40DC, ES44AH, ET44AH
2. Select EMD Locomotives: GP38-3, GP40-3, SD40-3, SD40E3, SD50-3, SD70AC

When one of the locomotives listed above is left unattended or is a trailing unit not needed to handle tonnage, isolate the locomotive and allow AESS to function.

5401.4 When a locomotive has a fuel level less than 1,000 gallons, promptly report to the dispatcher or the Mechanical Desk at 1-800-624-8385.

5401.5 The Engine Control switch must not be left in the jog position with the diesel engine running without permission from the mechanical desk.

5401.6 When stopped, the throttle must be placed in the idle position with the reverser centered unless the main reservoir pressure is less than 15 PSI above the regulating valve setting.

5401.7 To prevent AESS from becoming disabled, when a train with Distributed Power (DP) arrives its final destination and locomotives are removed from the train, the DP link must be ended on both the lead and remote (DP) units prior to the locomotives being left unattended.

5402 - Trip Optimizer (T.O.) Utilization

5402.1 Locomotive Operators must initialize and use T.O on territories that have been approved for T.O. operation when the CSXT, BNSF, KCS, OR NS lead locomotive is equipped with T.O.

5402.2 T.O. Auto mode must not be used during conventional helper service operations.

5402.3 Locomotive Operators must initialize T.O. prior to departing the terminal or when relieving a train along the line of road, and report any initialization problems to the General Electric Trip Optimizer Help Desk at 1-321-435-7456.

5402.4 During initialization, verify that the train and locomotive consist are setup properly and the max train speed reflects any equipment speed restrictions for the train.

5402.5 Locomotive operators must permit T.O. to function in AUTO mode when operating conditions permit. Consist control must not be disabled.

5402.6 While in Auto mode, the Locomotive Operator must resume manual control of the train when:

1. T.O. directs the operator to move from auto to manual control,
2. Operating conditions change which will require the Locomotive Operator to reduce the train speed below the T.O. trip plan,
3. The T.O. System functions in a manner inconsistent with good train handling, and
4. Operating on signals that require the train to approach the next signal prepared to stop.

5402.7 T.O. reports are to be completed with specific details when:

a. T.O. fails to control the train consistent with good train handling, or

b. The T.O. system fails to initialize, or

c. Inconsistencies are discovered when comparing dispatcher messages with restrictions presented by T.O.

5402.8 The condition speed feature of T.O. is intended only for conditions that require T.O. to operate in AUTO control at speed that is below Plan speed. It must never be used to prevent T.O. auto operation.

DO NOT manually operate trains above the condition speed set by the operator.

5403 - Safety Control Devices

5403.1 Unauthorized annulment of a safety control device is prohibited.

5403.2 If a safety control device becomes defective and prohibits normal train movement, the Locomotive Operator must request permission from the train dispatcher to cut out a safety control device and report doing so on the Locomotive Work Report.

5403.3 To reset air brake equipment after a safety control device operates:

1. Stop train movement,
2. Place the throttle in the IDLE position or the dynamic brake lever in the OFF position,
3. Place the automatic brake in the SUPRESSION position,
4. Make certain that the brake pipe exhaust has stopped for 20 seconds, and
5. Place the automatic brake in the RELEASE position.

5404 - Reserved for PTC/Safety Devices/Cut-Out

5405 - Speed Indicators

5405.1 Check the accuracy of the speed indicator on the controlling locomotive at locations designated in Special Instructions and record the results on the Locomotive Work Report.

5405.2 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:

a. 3 MPH at speeds of 10 to 30 MPH, or

b. 5 MPH at speeds above 30 MPH.

5405.3 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.

5406 - Complying with Short-Time Ratings

5406.1 Short-time ratings do not apply to SD60, SD70, Dash 8, Dash 9, AC or AH locomotives.

5406.2 Avoid continuous operation at speeds lower than the minimum continuous speed for the locomotive consist. The minimum continuous speed for the locomotive consist must be figured by the highest minimum continuous speed of any of the online locomotives in the consist.

5406.3 Do not exceed the available time in short time ratings. Operation outside the short-time rating zone for 20 minutes or more restores the maximum allowable time.

5407 - Crew Responsibilities

5407.1 All crew members are equally responsible for the care of the locomotives being used.

5407.2 Crew members must:

1. Deposit trash in litterbags,
2. Keep tools in their proper location,
3. Make certain that all doors and windows are closed, and
4. Make certain that all cab lights are turned off on trailing locomotives when not in use.

5407.3 Crew members must not:

a. Place their feet on any wall, window, or equipment; or

b. Write on, mar, or deface any wall, window or equipment; or

c. Damage the operating cab.

5408 - Protecting the Diesel Engine from Freezing

5408.1 Reserved for future use.

5408.2 When the locomotive consist contains more locomotives than can be used under fuel conservation rules and the ambient temperature is below 35 degrees Fahrenheit, isolate the excess locomotives, leaving the diesel engine running.

5408.3 When the temperature is below 35 degrees Fahrenheit and the engine will not run contact the Mechanical Desk at 1-800-624-8385 for assistance.

5409 - Unusual Operating Conditions

5409.1 Make inspections to verify that locomotive wheels are turning freely anytime excessive tripping of the ground protective relay causes:

a. Locomotive(s) to be isolated, or

b. Traction motors to be cut out.

5409.2 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, and
3. Comply with instructions received from the train dispatcher and Mechanical Desk.

5409.3 Do not operate a locomotive over track submerged in water. If the train's momentum prevents stopping short of the submerged area, prior to reaching the water, place the:

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

5410 - Discovering a Low Water Condition

5410.1 When a low water condition is discovered, report the occurrence and record the incident on the locomotive work report.

5410.2 Never remove the water pressure cap while the engine is running. Before adding water to a diesel engine, shut the engine down and wait ten minutes to allow water to return to the storage tank.

5410.3 Be aware that cooling system water maybe hot and under pressure. When adding water, use the following steps:

1. Locate the pressure cap and vent valve by reviewing the labels on the carbody access doors.
2. Locate the vent valve exhaust location and remain clear while operating the vent valve. Operate the vent valve to vent pressure until water or vapor is no longer flowing from the vent valve exhaust for at least one minute.
3. Exhaust from the vent valve is an indication that pressure is still present and system is not fully vented. When no exhausting vapor is present, remove the spring-loaded cap by depressing and slowly turning the cap counter-clockwise.
4. Add water until the water level is at the proper level in the sight glass. Do not overfill.
5. Replace the pressure cap and make certain the vent valve is closed prior to restarting the diesel engine.

5411 - Locomotive Movements

5411.1 Movements of a locomotive(s) must only be made as follows:

a. As a single locomotive, or
b. A multi-unit connected consist of locomotives or other equipment, or
c. Dead-in tow within the head-end locomotive consist, or
d. A "remote" distributed power unit within the train or on the rear of the train, or
e. Manned helper locomotive within the train or on the rear of the train.

5411.2 For the brake system on locomotives to function, main reservoir air must be supplied to each locomotive by:

a. The air compressor supplying air on a single locomotive or multiple air compressors of a consist of locomotives, or

b. Air compressor supplying air on a remote distributed power locomotive(s), or

c. Brake pipe supplied air to the locomotive reservoir when the dead-in-tow feature has been cut in by the Mechanical Department.

5411.3 Locomotive operator must be able to confirm functioning of the air brakes by:

a. Operation of a locomotive or a consist of multiple locomotives, or

b. Remote monitoring of locomotives such as distributed power and remote control locomotives.

Chapter 9 - Fundamentals of Train Handling

5501 - General Train Handling Requirements

5501.1 Train Handling requires proper planning and use of the safest and most efficient train handling procedures, Locomotive Operators must not make rapid or severe slack changes.

5501.2 When planning and executing train handling procedures, the following must be considered:

1. Locomotive consist capabilities, including:
    a. Distributive Power, or
    b. Helper Locomotive
2. Train speed, weight, and length,
3. Number and position of loaded and empty cars,
4. Amount of brake pipe leakage,
5. Physical characteristics such as grade, curves, turnouts and fixed signals,
6. Authorized speed, and
7. Weather conditions.

5502 - Tractive Effort

5502.1 Maximum trailing tonnage for a train handled with head-end power only, will not exceed the tonnage rating for two (2) CW44ACs and one (1) C40-8 or CW40-8 locomotives.

5502.2 On grades where the tonnage limitation will be exceeded, trains must:

a. Have a rear-end helper, or
b. Have an appropriately positioned in-train helper, or
c. Reduce tonnage.

5502.3 The number of powered axles in use must not exceed 27 when pulling a train or cut of cars.

5502.4 When operating with a helper, the number of powered axles on the head end must not exceed the number of powered axles on the helper by more than 18. The number of powered axles on the helper must not exceed the number of powered axles on the head end by more than nine. Helper powered axles must never exceed:

Train Type	Cut-In Helper	Rear End Helper
Manifest	24	18
Intermodal	18	12
Loaded Bulk Unit	24	18
Empty Bulk Unit	9	9

5502.5 When calculating powered axles the locomotive operator must:

1. Count AC locomotives as 9 axles, and
2. When necessary to reduce powered axles, isolate locomotives from the rear of the consist forward.

5502.6 When making shoving movements:

a. On consists with alignment control devices:

1. Avoid using excessive power when:

a. Starting movements, or
b. Moving through sharp curves, turnouts and crossing bridges;

2. Closely monitor the locomotive load indicator and avoid excessive loading, and
3. Reduce throttle as the locomotive load increases and speed decreases when slowing or stopping.

b. On consists that contains at least one unit not equipped with alignment control device:

1. Limit use to one locomotive under power, and
2. Limit tractive effort to 100,000 pounds on an AC locomotive.

5502.7 When shoving with head end power only, exercise caution when exceeding 18 powered axles.

5503 - Sanding

5503.1 Use sand when:

a. Necessary to improve traction, which includes “sanding the rail”, or

b. Stopping the train and conditions require use of sand to avoid wheel slip with restart of the train.

5503.2 Use train-line sand only when the front or lead truck sand proves insufficient.

5504 - Throttle Handling

5504.1 When increasing throttle positions Locomotive Operators:

a. Must make changes one position at a time with sufficient time between changes to:

1. Allow adjustment of in-train forces, and
2. Avoid development of excessive tractive effort.

b. Must not make changes to accelerate when having long cars in the head one-third of the train while those cars are passing through sharp curves, crossovers or turnouts.

5504.2 When reducing throttle positions and operating conditions permit, make throttle reductions one position at a time allowing sufficient time for in-train forces to adjust.

5504.3 When handling locomotive consist with 20 or more powered axles, use extreme care when changing throttle positions at speeds below 20 MPH.

5504.4 When starting and accelerating a train with more than 24 powered axles:

1. When initiating movement, use only the power necessary to start the train moving at a slow uniform speed under 2 mph, and
2. When operating at speeds between 2 and 17 mph, advance the throttle one position at a time allowing for in train forces to adjust and the locomotive load meter to stabilize before increasing to the next throttle position.

5504.5 When the locomotive consist contains one or more DC-powered locomotives and is approaching a railroad crossings at grade (diamonds) or drawbridge at speeds above 25 MPH,

1. Locomotive Operators must:
    1. Make throttle adjustments at least 8 seconds prior to reaching the diamond or the lift rails of a drawbridge, and
    2. Reduce throttle position:
        a. To throttle position #4 if current position is higher, or
        b. To the next lower position if the current position is #4 or lower.
2. Locomotive Operators must not advance the throttle until after the locomotive consist clears the diamond or drawbridge.

5505 - Train Braking with Independent Brake

5505.1 When using the independent brake, Locomotive Operators must:

a. Fully apply the independent brake any time the locomotive is standing, or

b. When operating locomotive consists with cars attached:

1. Keep brake cylinder pressure below 25 PSI when controlling speed,
2. Use extreme caution at speeds below 15 MPH and when stopping,
3. Where possible, use the independent brake in conjunction with the automatic brake, and
4. Limit rapid or severe changes to brake cylinder pressure when employees are riding on equipment.

5505.2 When using the independent brake, Locomotive Operators must not:

1. Use the independent brake when the same results can be obtained with the dynamic and/or train air brakes,
2. Use in conjunction with the dynamic brake unless doing so momentarily while transferring from one form of braking to the other,
3. Use at speeds above 15 MPH to control or retard the movement of a locomotive consist with cars attached, and
4. Engage in prolonged use of locomotive air brakes or allow excessive brake cylinder pressure.

5505.3 Actuate the independent brake:

a. 4 seconds for each locomotive in the consist to ensure brakes are released on trailing locomotives, or

b. Frequently when using the dynamic brakes and the train brakes at the same time, or

c. In the position that will develop the required locomotive brake cylinder pressure when using the automatic brake and locomotive brake cylinder pressure is desired.

5506 - Train Braking with Automatic Brake

5506.1 When using the automatic brake, stop the train if and when you feel the train brake is not holding or slowing the trains speed properly. If necessary, stop the train using an emergency brake application and if equipped, using two-way telemetry.

5506.2 Initial brake pipe reductions must be:

a. 6 to 8 pounds when the train brake system is fully charged, or

b. At least 3 pounds greater than the total previous reduction when the train brake system is not fully recharged.

5506.3 When operating conditions permit, wait at least 20 seconds after the initial brake pipe reduction before making additional 2 to 3 pound intermediate brake pipe reductions.

5506.4 Locomotive Operators must not place the automatic brake beyond the suppression position to apply train brakes, except for placing train brakes in emergency.

5506.5 When making a final brake pipe reduction:

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

b. On passenger trains, the graduated release feature may be used.

5506.6 Except for emergency applications, or when required by rule, brake pipe reductions must not be made after brake pipe pressure reaches the point of equalization.

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

5507 - Dynamic Brake Operations - General

5507.1 In order for the dynamic brake to operate, the following switches and circuit breakers must be positioned as indicated:

Dynamic brake control circuit breaker, controlling locomotive	ON
Dynamic brake cut out switch	IN
Brake transfer circuit breaker	ON

5507.2 Locomotive Operators must determine the operational status of the dynamic brakes on all locomotives in the consist at:

a. The initial terminal for a train, or

b. Other locations where a Locomotive Operator first begins operation of a train.

5507.3 If status of the dynamic brakes cannot be determined, the Locomotive Operator must test the dynamic brakes at the first opportunity.

5507.4 Locomotive Operators must note any problem on the locomotive work report relating to the dynamic brake and provide information pertaining to the dynamic brake operation on the brake test certificate including:

1. Locomotive number,
2. Dynamic brake cut-out position,
3. Total number of dynamic brake axles, and
4. The total number of locomotives with inoperative dynamic brakes.

5507.5 When a locomotive is discovered as having an inoperative dynamic brake, a tag labeled Inoperative Dynamic Brake must be placed on the isolation switch. Once tagged the locomotive may continue in service for up to 30 days. The tag must contain the following:

1. Locomotive number,
2. Name of discovering carrier,
3. Location and date where condition was discovered, and
4. Signature of the person discovering the condition.

5507.6 Do not exceed the following maximum dynamic brake axle value for the locomotive consist**:**

a. 27 – when all units have alignment control couplers, or

b. 20 – when any unit has coupler limiting blocks, or

c. Do not use dynamic braking when any locomotive in the consist is not equipped with alignment control couplers or coupler limiting blocks.

Dynamic Brake Axle Value

Locomotive Class	Axle Value	Locomotive Class	Axle Value
All 4-axle units except B40-8	4	SD70AC, SD70M	8
B40-8	5	CW44AC, CW44AH, ES44AC, ES44AH, ET44AC, ET44AH	9
All 6 axle units except SD60/M/I, SD70M, C/CW40-8, CW44-9, and ACs	6	SD70ACE, ST70AH	10
SD60/M/I, C/CW40-8, CW44-9, ES44DC, ES40DC, ES44C4, ET44C4	7	CW46AC, CW46AH	11

5507.7 When restricting the dynamic brake axle value, the locomotive operator must:

1. Place the dynamic brake cut-out switch in the OUT position,
2. Leave the dynamic brake on the controlling locomotive cut in, and
3. Report the status of the dynamic brake cut-out switch position in section 3 of the brake test certificate.

5507.8 When using dynamic brake through turnouts and crossovers and the dynamic brake axle value exceeds 12, do not exceed #4 position until the head one-third of the train clears turnouts or crossovers.

5507.9 If the dynamic brake warning light comes on, gradually reduce dynamic brake output until the light goes out.

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Chapter 10 - Conventional Train Handling

5551 - Starting a Train

5551.1 When starting a train:

1. Allow sufficient time for the train air brakes to release,
2. When possible, start movement one car at a time using the lowest throttle position needed,
3. Do not exceed 2 MPH until the entire train is moving, and
4. Avoid using excessive tractive effort.

5551.2 Locomotive operators must handle the train in a safe and fuel-efficient manner and take full advantage of throttle adjustments and dynamic braking when conditions permit.

5552 - Dynamic Braking

5552.1 If in doubt that the train speed is slowing, stopping or controlled properly, supplement dynamic brakes with train brakes.

5552.2 Plan the use of dynamic brakes to avoid maximum braking through heavy curvature, crossovers, and turnouts.

5552.3 When applying dynamic brakes:

1. Make certain that the throttle is in IDLE for at least 10 seconds before transition to dynamic brake SETUP,
2. Allow time for the train’s slack to adjust,
3. Apply the dynamic brake gradually allowing for slack to adjust, and
4. Make incremental adjustments to maintain or achieve the desired speed.

5552.4 When releasing dynamic brake:

1. Do so gradually, allowing for slack to adjust, and
2. When releasing the dynamic brake and automatic brake, keep the dynamic brake applied until the train’s air brakes have released.

5552.5 Just prior to stopping, gradually apply the independent brake while moving the dynamic brake lever to the SETUP or OFF position.

5553 - Use of Automatic Brake

5553.1 When braking:

1. Begin far enough in advance to allow for a split service application, except when stopping with the slack bunched, and
2. Actuate the independent brake frequently to release locomotive brake cylinder pressure.

5553.2 When braking **Without Power**:

1. Reduce the throttle to IDLE allowing the slack to adjust, and
2. If necessary, use the dynamic brake or independent brake, if the dynamic brake is not available to adjust the slack prior to making the initial brake pipe reduction.

5553.3 When braking **With Power**:

1. Advance throttle, if necessary, using only enough power to adjust slack,
2. Observe locomotive output when making the initial brake pipe reduction , and
3. Make additional brake pipe reductions as necessary.

5553.4 When making a running release:

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

    1. Brake pipe air is not exhausting,
    2. At least a 10 PSI brake pipe reduction has been made, or when prompted by Trip Optimizer to release, and
    3. Brakes on the entire train will be released before the speed has reached:
        a. 10 MPH for trains 120 cars or less, or
        b. 15 MPH for trains over 120 cars.

b. When slack is bunched, do not allow a run out of slack until the brakes have released, or

c. Do not increase locomotive throttle while the brakes are releasing.

5553.5 When making a standing release and operating conditions permit:

1. Make a full service brake pipe reduction,
2. Make certain that brake pipe exhaust has stopped for at least 20 seconds before releasing the train brake, and
3. In locations where the independent brake will not hold the train, apply sufficient handbrakes to secure the train during recharge time.

5554 - Stopping

5554.1 When stopping with **Slack Bunched**:

1. Reduce the throttle to IDLE, allowing slack to bunch gradually,
2. Apply the dynamic brake or the independent brake if the dynamic brake is not available, to complete bunching of slack,
3. Increase the dynamic brake to the desired level, and
4. Use the automatic brake, if necessary, to complete the stop with a:
    a. Continuous service application at speeds below 10 MPH, or
    b. Split service application at speeds above 10 MPH.

5554.2 When stopping with **Slack Stretched**:

1. Advance the throttle if necessary, make an initial brake pipe reduction, and actuate,
2. As speed decreases:
    1. Make additional brake pipe reductions as necessary and actuate, and
    2. Gradually reduce the throttle to prevent developing excessive locomotive output.
3. As the movement stops:
    1. Make sure air is exhausting from the brake pipe,
    2. Place the independent brake to the FULL APPLICATION position, and
    3. Place the throttle to IDLE.

5554.3 When stopping a shove movement with **Slack Bunched**:

1. Advance the throttle if necessary, make an initial brake pipe reduction, and actuate,
2. As the speed decreases:
    1. Make additional brake pipe reductions as necessary and actuate, and
    2. Carefully control locomotive throttle, using only sufficient throttle to keep the slack bunched.
3. As the movement stops:
    1. Maintain a throttle position sufficient to keep slack bunched,
    2. Place the independent brake in FULL APPLICATION when the movement stops, and
    3. Place the throttle in IDLE.

5554.4 Stopping a shove movement with the **Slack Stretched**:

1. Reduce the throttle to IDLE, allowing the slack to stretch gradually,
2. Apply the dynamic brake, or the independent brake if the dynamic brake is not available to complete the stretching of slack,
3. Increase braking to the desired level,
4. Use the train brake if it is necessary to complete the stop, complying with the following:
    1. Make an initial reduction,
    2. Make an additional brake pipe reductions of 2 to 3 PSI, as necessary, and
    3. Keep the dynamic brake or the independent brake applied.

5555 - Conditioning Brakes

5555.1 When the train is stopped, a brake pipe reduction of at least 10 PSI, but not more than full service must be made and maintained until the train is required to move.

5555.2 When leaving a train unattended, apply the automatic brake with a full service application.

5555.3 Reserved for future use.

5555.4 When cutting away from a train that is due an inbound inspection of air brakes place the automatic brake handle into the over reduction zone, reducing brake pipe pressure to 20 PSI.

5556 - Switching

5556.1 When starting or stopping movements, adjust slack gradually to limit buff and draft forces.

5556.2 When locomotive brakes are not sufficient to control movement:

1. Couple brake pipe air hoses on a sufficient amount of cars, and
2. Charge the air brakes.

5556.3 Do not change the position of the reverser lever unless the movement is stopped.

5557 - Approaching and Operating Through Areas with Temporary Speed Restrictions

5557.1 When conditions permit, Locomotive Operators must:

1. Release the train air brakes before entering the restriction,
2. Minimize changes in train speed or slack condition, and
3. Limit dynamic brake position to #4.

5558 - Steep Grade (1% or more) Train Handling

5558.1 When approaching and descending steep grades, Locomotive Operators must:

1. Ensure the air brake system is charged to the required pressure before starting the descent,
2. Know the severity of the grade the train is on,
3. Take appropriate action to control train speed, and
4. When conditions warrant, apply train brakes and dynamic brakes before the movement begins.

5558.2 If necessary to reduce the brake pipe pressure by 18 PSI or more, do not:

1. Pull the train for more than 2 miles, and
2. Exceed 20 MPH.

5558.3 If the speed of the train cannot be maintained at or below authorized speed, immediately place the train in EMERGENCY.

5558.4 Apply train brakes using at least a 6 to 8 PSI brake pipe reduction in conjunction with dynamic braking when:

1. Operating in territories where both dynamic braking and pressure maintaining are required in lieu of retainer valves being set, and
2. Train speed is between 20 and 35 MPH.

5558.5 Use steep grade charts in the Time Table Special Instructions to identify steep grade locations and operating instructions.

5558.6 When calculating Effective Dynamic Brake Axles (EDBA) consider:

1. Helper or DP locomotives with working dynamic brakes as added EDBA value, and
2. Total trailing tonnage will include the weight of any locomotives not operating in dynamic brake mode.

5558.7 When controlling train speed on descending grade, use dynamic braking and if necessary, supplement with the automatic brake.

5558.8 Trains not meeting the minimum effective dynamic brake requirements must meet one of the following:

a. Before proceeding, train must obtain additional locomotives, including helper locomotives to meet the EDBA value, or

b. Train speed will not exceed 15 MPH and the automatic brake pipe reduction does not attain 18 PSI or higher for a distance of 2 miles or more.

5558.9 Utilize the TTSI charts to define the minimum EDBA for the type of train and tonnage to be able to operate at a particular speed.

5558.10 If the train experiences any loss of dynamic braking resulting in fewer EDBA than required, the train must be stopped immediately with the automatic brake using emergency.

5558.11 When a train requires an 18 PSI or greater brake pipe reduction to control speed, the train must:

1. Be stopped immediately with the train brakes using emergency if necessary,
2. Have an additional 6 PSI brake pipe reduction made,
3. Have each car inspected to determine that brakes are operating properly,
4. Have all retainers set in:
    1. High pressure position before continuing, and
    2. Direct Exhaust position when the train reaches the bottom of the grade.

    Note: Trains using retainers may need to be stopped on grade to allow wheels to cool depending on length of grade.

5558.12 If a train is stopped on a steep grade using an 18 PSI or greater brake pipe reduction, the train must be secured and air brake system recharged before proceeding.

5558.13 Trains stopped for the purpose or recharging train air brakes 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 minimum reduction to hold the train while hand brakes are released.

5558.14 When ascending steep grades at speeds below 15 MPH with head-end power only:

1. Gradually reduce throttle to at least position #6 just before the locomotive crest the grade, and
2. Refrain from increasing throttle position until train has crested the grade and the speed increases.

5558.15 The following speeds apply to lite locomotive movements (one or more locomotives not attached to rail cars) with operable dynamic brakes on heavy descending grade:

a. 1.0% - 1.75% must not exceed 30 MPH, or

b. 1.76% and above must not exceed 25 MPH.

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Chapter 11 - Helper Service

5601 - Responsibilities

5601.1 Locomotive operators must maintain radio communication with each other at all times while handling the train and from the leading locomotive consist:

1. Operate the train brakes, and
2. Make certain that all other Locomotive Operators are informed of planned speed changes, signal indications, and any other condition which may affect train movement.

5601.2 The helper operator must comply with instructions from the leading locomotive operator.

5601.3 Ensure that the helper locomotive is properly positioned and all crew members have a clear understanding of:

1. Loads, empties, tonnage and any restrictions for the train, and
2. Number of cars and tons that the helper locomotive is cut in ahead of.

5601.4 During shoving operations, helper crews utilizing Helper Link, must ride in the lead locomotive of helper consist facing the direction of travel while the train is being shoved**.**

5602 - Restrictions

5602.1 Helper locomotives must be equipped with alignment control couplers.

5602.2 When reverse movement exceeds one mile, the locomotive operator on the helper locomotive coupled to the rear of a train must control the train air brakes.

5602.3 Passenger trains carrying passengers must not be assisted by pushing from the rear of the train.

5602.4 Helper crews must uncouple from their own train, if coupled to a train prior to coupling to the train being assisted.

5603 - Adding Helper

5603.1 When adding a helper locomotive to a train without helper link, the helper crew must:

1. Make certain the assisted train has stopped,
2. After coupling, stretch slack to ensure coupling has been made,
3. Apply a Full Service brake pipe application and wait for the brake pipe exhaust to stop,
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. Place the Independent Brake valve handle in the RELEASE position, actuating to fully release the helper locomotive consists brakes, and
7. Notify the lead locomotive operator that the helper is coupled.

5604 - Operating a Helper Equipped Train

5604.1 The Locomotive Operator on the leading end will direct the starting movement of the train.

5604.2 When accelerating the locomotive, throttle should be increased gradually. Do not place the helper locomotive throttle in # 8 until the entire train is clear of turnouts or crossovers.

5604.3 When slowing or stopping the train, the locomotive operator on the helper unit must:

1. Make throttle adjustments that prevents an increase in locomotive output, and
2. Actuate locomotive brake cylinder pressure when the train brakes are applied.

5604.4 During an emergency stop, the locomotive operator on the helper unit must control brake cylinder pressure to 25 PSI to minimize in-train-forces.

5604.5 During train movement, if it is necessary for the helper locomotive operator to initiate an emergency brake application, the automatic brake must be placed in emergency position.

5605 - Detaching Helper

5605.1 Train movement must be stopped to detach the helper locomotive, unless equipped with a “Helper Link” or similar device.

5606 - Helper Link

5606.1 After installing the Helper Link or taking charge of a locomotive equipped with a Helper Link, a visual inspection and test must be made to ensure that all hoses and jumper cables will not interfere with the operation of the lift chain which is connected to the coupler.

5606.2 Helper Link must be inspected and tested as follows:

1. Knuckle on the locomotive end with helper link box must be closed;
2. The trainline power-reduction feature on the helper locomotive must be positioned to full power;
3. Turn on the Engine Run, Generator Field and Control Fuel Pump switches;
4. Reverser must be placed in either Forward or Reverse;
5. Position the Power Reduction switch to “trainline power reduction” (all units);
6. Inspect to verify that the knuckle has been operated by the coupler-lift mechanism, and
7. Turn the trainline power reduction switch to the OFF position.

   Note: If the coupler pin did not lift, verify the main reservoir equalizing hose, the end cock and jumper cable connections are connected from the helper locomotive to the helper link and repeat steps 2 through 6.

5607 - Operating a Helper Link

5607.1 Prior to coupling to the rear of a train, the helper crew must verify that the knuckle on the helper locomotive is open on the end to be attached to the train.

5607.2 After coupling to the rear of the train:

1. Stretch slack to ensure the coupling has been made,
2. Apply a full service brake pipe application and wait for the brake pipe exhaust to stop,
3. Cut out the automatic brake, and place the handle in HANDLE OFF, and
4. Make a visual inspection from the walkway of the helper unit ensuring that telemetry device is still in place and none of the hoses will be affected by the coupler once movement begins.

5607.3 To arm, open the helper link box lid and:

1. Verify the thumbwheel switch assembly numbers are the same as the ID code number on the end of train device,
2. Press the comm/check pushbutton to test communications between the helper link and the end of train telemetry device,
3. Press the enable button to start the electronic signal,
4. Note that the “enable” light is illuminated and close the helper link box lid,
5. Return to the cab and note brake pipe pressure reading,
6. Release the independent brake,
7. Notify the Locomotive Operator on the lead locomotive that the helper is ready for a Helper Service brake test, and
8. Verify that brakes apply and release on the helper unit when the Locomotive Operator performs the brake test from the lead locomotive.

5607.4 If the EOT or helper link box malfunctions, the alarm bell will ring in the helper locomotive cab indicating a problem. If this occurs and the trouble cannot be corrected, the train must be stopped and the brake pipe hose connected for conventional operations.

5607.5 To detach while the train is moving the helper Locomotive Operator must:

1. Communicate to the Locomotive Operator on the leading end that the helper crew is planning to detach,
    a. On AC locomotives equipped with power reduction:
        1. From the IFC screen, select “speed control”,
        2. Select “power reduction” and set power to 100%,
        3. Push the key under the switch on the screen to set to “MU”,
        4. Adjust throttle to #2 position or higher, and
        5. Locate the key under the on-off switch and push to “on”.
    b. On AC Locomotives equipped with Hump Control:
        1. From the IFC screen, access the speed control menu,
        2. Access the “hump control” and set to 100%,
        3. Set to “MU” mode,
        4. Adjust throttle to #1 or higher, and
        5. Push the “on” key.
    c. AC Locomotive equipped with Slow Speed:
        1. From the IFC screen, access the speed control menu,
        2. Go to “Slow Screen”,
        3. Select any setting, light, med or heavy,
        4. Set speed to any setting between 0-10,
        5. Adjust throttle to #1 or higher, and
        6. Push the “on” key.
           Note: For helper link to work in slow speed screen, train speed must be 10 MPH or less.
    d. On all other locomotives:
        1. Turn the power reduction knob to full power, and
        2. Position the switch to “trainline power reduction”.
2. After receiving an audible alarm, gradually reduce power allowing time for slack to stretch and helper locomotive to detach,
3. Gradually apply the independent brake, controlling brake cylinder pressure to prevent sliding of locomotive wheels,
4. After stopping, place the automatic brake valve handle in RELEASE and cut in the brake valve cutout valve, and
5. Notify the Locomotive Operator on the leading end of the train that you have successfully detached.

5607.6 If the Helper Link fails to lift the coupler pin and detach properly:

1. Notify the locomotive operator on the head end, instructing to stop the train in a safe manner,
2. Once all movement has stopped, manually detach the helper locomotive from the standing train, and
3. Notify the standing train that the helper locomotive has properly detached.

Chapter 12 - Special Train Handling Procedures

5650 - Gathering Slack and Starting Trains on Grades

5650.1 When operating on grades that prohibit gathering slack without using train brakes, follow the steps below:

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.

5651 - Loss of Dynamic Brakes

5651.1 To prevent harsh slack action and rapid increase in train speed if the dynamic brake fails while in use follow the steps below:

1. Apply the independent brake immediately to avoid rapid run-out of slack, and
2. If necessary, make brake pipe reduction (s) sufficient to control the speed and compensate for the loss of dynamic braking force.

5652 - Emergency Brake Applications

5652.1 Use emergency brake applications in situations when a stop must be made in the shortest possible distance, or when required by rule.

5652.2 When initiating an emergency air brake application immediately place the automatic brake in the emergency position and stop the train when:

a. Operating conditions require, or

b. Brake pipe pressure at the rear of a moving train drops to 45 PSI or below, or

c. Brake pipe pressure is reduced 18 PSI or more from the standard brake pipe pressure while descending any grade and the train cannot be controlled at the authorized speed.

5652.3 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 IDLE, and
2. Control the locomotive brake cylinder pressure to provide the maximum retarding force without sliding the locomotive wheels or creating excessive buff forces.

5652.4 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:

5652.5 With slack stretched:

1. Actuate locomotive brake cylinder pressure, continuing until the train stops,
2. Maintain throttle position until the train speed begins to reduce, and
3. Adjust the throttle to prevent an increase in locomotive output.

5652.6 With slack bunched:

1. Maintain the dynamic brake position if available,
2. Actuate locomotive brake cylinder pressure, continuing until the train stops, and
3. If required to use the independent brake, control the locomotive brake cylinder pressure to provide retarding effect while preventing sliding the locomotive wheels or excessive buff forces.

5652.7 Locomotive Operators must reduce the throttle to IDLE when operating from a locomotive not equipped with the “Power Knockdown” feature.

Note: Some former Conrail locomotives are not equipped with the “Power Knockdown Feature”.

5652.8 Operating an In-train or Rear-end Helper, immediately place the throttle in the IDLE position.

5652.9 When an undesired emergency occurs, or when an emergency situation arises and it becomes necessary to place train air brakes in emergency, operate the two-way EOT emergency toggle switch as quickly as possible.

5652.10 If a train is stopped with air brakes set, and the train begins moving, the crew should immediately apply the emergency brake. After the train is stopped:

1. Report the occurrence to the train dispatcher and mechanical desk, and
2. Set a sufficient number of handbrakes to secure the train from further unintended movement before releasing the brakes and recharging the train?s air brake system.

5653 - Service Applications from an Unknown Cause

5653.1 When a service application occurs from an unknown cause, the train shall be stopped and inspected for leaks. When stopping, keep the train slack in the same condition as it was before the air brake application occurred.

Note: Undesired service application are indicated by:

a. An increase in the indication of the air flow indicator, or

b. The sound of excessive regulating valve operation, or

c. A drop in brake pipe pressure, or

d. A decrease in train speed or increase in locomotive output without a known cause.

5653.2 With slack stretched:

1. Place the automatic brake in the MINIMUM REDUCTION position,
2. Actuate locomotive brake cylinder pressure, continuing until the train stops,
3. Maintain throttle position until the train speed begins to slow, and
4. As the train speed slows, make additional 2 to 3 PSI brake pipe reductions and adjust the throttle to prevent an increase in locomotive output.

5653.3 With slack bunched:

1. Maintain or increase dynamic brake position if available,
2. Place the automatic brake in the MINIMUM REDUCTION position, and
3. Make additional 2 to 3 PSI brake pipe reductions as the train speed slows, and
4. If required to use the independent brake, control the locomotive brake cylinder pressure to provide retarding effect while preventing sliding the locomotive wheels or excessive buff forces.

5654 - Inclement Weather Train Braking

5654.1 During inclement weather conditions such as ice or snow, follow the steps below to ensure the brake shoes are not frozen or iced over:

1. When using train brakes, apply the train brakes sooner than you normally would for the given circumstance, and
2. Perform running test to make sure proper braking effort is being provided.

5654.2 Perform brake effectiveness test:

1. Periodically, as operating conditions permit, and
2. Before descending steep grades.

5654.3 If the train does not brake properly:

1. Stop the train, using the EMERGENCY position if necessary,
2. Determine and correct the cause of the failure, and
3. Repeat the test.

5654.4 When setting cars off:

1. Apply air brakes on cars while moving to remove ice and snow buildup, and
2. Ensure that no ice or snow is between brake shoes and wheels after handbrakes are applied.

5655 - Unintended Brake Release (UBR)

5655.1 Unexpected air flow may be an indication of an UBR of the train air brakes. If this occurs while the train is moving:

1. Make an additional reduction, including emergency application if needed to control the movement and stop the train if necessary,
2. Report the occurrence to the train dispatcher and mechanical desk, and
3. If the condition cannot be corrected, inspect the train.

5656 - Reporting Train Separations or Stalls

5656.1 Train crews must immediately report any train separation or stall to the dispatcher.

5656.2 Locomotive operators must record and provide the following information to the dispatcher:

A. Train Separations at time of emergency:
    1. Speed of train,
    2. Status of Trip Optimizer,
    3. Throttle or Dynamic Brake position,
    4. Amount of brake pipe reduction, if any, and
    5. Any unusual occurrence, including excessive slack or run-in.

B. Train Stall:
    1. Throttle position,
    2. Sanders, working or not,
    3. Locomotive(s) performance, including number of units on-line,
    4. Weather conditions, and
    5. Any unusual occurrence that contributed to stall.

Chapter 13 - Distributed Power Operations

5701 - Setting Up and Linking Distributed Power (DP) Locomotives

5701.1 When conditioning locomotives for distributed power, do so in the following order:

1. Set up the remote units,
2. Set up the lead unit,
3. Link to remote(s) from the lead unit,
4. Perform a brake pipe test, and
5. Select Run FTE from mode function.

5701.2 From the controlling remote unit in each consist, verify that the PCS and all air brake faults are reset and then condition as follows:

1. Switch and Handle Positions:

DP & MTB breakers	CLOSED/ON
Isolation Switch	RUN
Dynamic Brake breaker	CLOSED/ON
Control & Fuel Pump	CLOSED/ON
Engine Run	CLOSED/ON
Generator Field	OPEN/OFF
Reverser	Center or Removed
Automatic Brake	CUT IN & Handle Off
Independent Brake	LEAD & Fully Applied

2. Setup procedure on locomotive operator display screen:
    1. Select the DIST POWER key from menu options,
    2. Select the REMOTE SETUP key,
    3. Enter the controlling lead locomotive number,
    4. Designate the direction of the remote unit as either SAME as or OPPOSITE of the lead unit,
    5. Select DONE,
    Note: Once setup is complete and you've selected done, the system will open the PCS and cutout the automatic brake.
    6. Ensure the independent brake valve handle is in RELEASE,
    7. Ensure the automatic brake handle is in the HANDLE OFF position, and
    8. Allow PCS to stay open as the penalty application will be recovered from the lead unit.

5701.3 From the controlling lead locomotive condition as follows:

1. Switch and Handle Positions:

DP & MTB breakers	CLOSED/ON
Isolation Switch	RUN
Dynamic Brake breaker	CLOSED/ON
Control & Fuel Pump	CLOSED/ON
Engine Run	CLOSED/ON
Generator Field	OPEN/OFF (until ready to move)
Reverser	Center or Removed
Automatic Brake	CUT IN
Independent Brake	LEAD & Fully Applied

2. Setup procedure on locomotive operator display screen:
    1. Select the DIST POWER key from menu options,
    2. Select the Lead Setup key,
    3. Enter the RR initials and road numbers for each of the controlling remote locomotives, and
    4. Select the Link key:
        a. This must be done for each controlling remote locomotive individually.
3. Verify that the equalizing reservoir is adjusted to the required pressure and all air brake faults are reset.

5701.4 Locomotive operators experiencing issues setting up, linking or any other problems regarding DP locomotives and cannot be resolved must contact the Distributed Power Operations help desk at 800-624-8385 and selecting option #2 or contacting the train dispatcher for assistance.

5702 - Distributed Power Brake Pipe Test

5702.1 A successful brake pipe test is required before the DP system will allow the operator to place the system in Run. To initiate a brake pipe test:

1. Recover air brake system from the power-up penalty,
2. Place the automatic brake handle in the release position,
3. Fully apply the independent brake,
4. After air flow reaches 30 CFM or lower, select the BP Test key,
5. Select the Execute key,
6. When prompted, make a minimum reduction of the automatic brake,
7. After successful completion of the brake pipe test, select the Mode key, and
8. Select the Run FTE, then execute to place the DP equipment to Run.

5703 - Unlinking and Ending Distributed Power

5703.1 When necessary to unlink, do so from the Lead unit first by selecting:

1. DP Main Menu key,
2. System key,
3. Unlink key, and
4. Execute key.

5703.2 Ending Distributed Power can be done on both the lead and the remote locomotives by selecting:

1. DP Main Menu key,
2. End Dist. Power key,
3. Execute key, and
4. Restore locomotive air brakes to proper position.

5704 - Train Check

5704.1 Perform the Train Check operation for the following conditions:

a. Anytime the trains brake pipe may have been compromised, or
b. Just prior to departure from a stop, including a crew change, or
c. When temperature is below zero degrees Fahrenheit, execute and complete just prior to departure.

5704.2 The following conditions must be satisfied before a Train Check can be initiated:

1. Train stopped,
2. Reverser centered,
3. Throttle in idle,
4. Independent brake fully applied,
5. Automatic brake properly conditioned, and
6. Good DP radio communication.

Note: Do not perform a train check when there is an intermittent or complete communication loss with the DP locomotive(s).

5704.3 To initiate the Train Check function, the operator must:

1. Make an Automatic Brake Pipe reduction of not less than 10 PSI,
2. Allow the brake pipe exhaust to stop,
3. Select the DP Main Menu key,
4. Select the System key,
5. Select the Train Check key,
6. Select the Execute key,
7. Once prompted, release the Automatic Brake, and
8. Verify “Train Check OK” message before proceeding.

   Note: If “Train Check Fail” message is displayed, repeat test or perform a BPToD. If these are unsuccessful, visually inspect train for issues such as closed angle cocks.

5704.4 Train Check is not required when:

a. On descending grades that require automatic air brakes to remain applied, or
b. After building, conditioning and performing air brake test on train at origin, followed by immediate brake release and movement to depart, or
c. When required to stop and line switches such as, entering or departing yard track or siding, followed by an immediate movement.

5705 - Brake Pipe Test on Demand (BPToD)

5705.1 A Train Brake Continuity Integrity Test is required any time a change is made to the trains consist. This test can be done using the BPToD or Train Check.

5705.2 The following conditions must be met before a BPToD can be initiated:

1. Train stopped,
2. Reverser centered,
3. Throttle in IDLE,
4. Independent brake fully applied,
5. Automatic brake released, and
6. Good DP radio communication.

5705.3 To initiate a BPToD the operator must select:

1. DP Main Menu key,
2. System key,
3. Brake Pipe Test key, and
4. Execute key and when prompted make a minimum reduction of the automatic brake.

   Note: After successful completion of the brake pipe test, the operator must increase the automatic brake pipe reduction to 10lbs prior to releasing the automatic brake.

5705.4 In the event of a failure of the Brake Pipe Test, the system will not automatically return the system mode to Run. The Locomotive Operator must manually place the system back to Run mode.

5706 - Brake Pipe Leakage Test

5706.1 The following conditions must be met prior to initiating a DP Brake Pipe Leakage Test:

1. Train stopped,
2. Reverser centered,
3. Throttle in idle,
4. Independent brake fully applied,
5. Automatic brake released, and
6. Good DP radio communication

5706.2 To initiate the DP Brake Pipe Leakage Test:

1. Select DP Main Menu key,
2. Select the System key,
3. Upon receiving proper signal from inspector, select the Leakage Test key,
4. Select Execute key,
5. Observe display to verify that test is running,
6. When prompted, make a Full Service application of the automatic brake,
7. When prompted, release the automatic brake, and
8. At completion of test, verify leakage shown on display.

5707 - Remote Mode Set Out

5707.1 The SET OUT mode is used to condition and help secure a remote consist left standing uncoupled or separated from the front portion of a train operating in DP. A change to this mode must only be made with the train stopped.

5707.2 When remote locomotives are unattended for the purpose of setting off, picking up, or switching trains:

a. In the body of a train or cut of cars they must be left in SET OUT mode and are not required to be secured with hand brakes provided a sufficient number of hand brakes are applied and tested to that equipment left standing, or

b. Not coupled to cars, must be placed in SET OUT mode with:

    1. The unattended controlling remote locomotive EC switch in ISOLATE, and
    2. Hand brake(s) applied and tested to the unattended remote locomotive consist

c. Coupled to the head of a train or cut of cars must be left in SET OUT mode with:

    1. The unattended controlling remote locomotive EC switch left in ISOLATE, and
    2. Hand brakes applied and tested on the unattended remote consist and sufficient number of cars.

5707.3 Upon initial movement of the lead locomotive consists in SET OUT mode, the operator must confirm that the brake cylinder pressure remains fully applied on all remote locomotives and that the controlling remote locomotive(s) are not:

a. Responding to the brake release of the lead locomotive consists, or

b. Developing tractive effort in response to throttle commands.

5707.4 To initiate SET OUT Mode:

1. Make a Full Service brake pipe reduction to the automatic brake and allow brake pipe pressure to stabilize,
2. Select the DP Main Menu key,
3. Use the arrow key to highlight the controlling remote to be placed in Set Out Mode,
4. Select Set Out key,
5. Select Execute key, and
6. Verify the display shows the brake valve is cut out on the controlling remote placed in Set Out Mode.

5707.5 To return a remote consist to NORMAL after re-coupling train:

1. Select DP Main Menu key,
2. Use the arrow key to highlight the controlling remote to normalize,
3. Select Normal key,
4. Select Execute key,
5. Verify brake valve is cut in on DP controlling remote after release, and
6. Return the unattended controlling remote locomotive EC switch from ISOLATE to RUN.

5708 - Distributed Power Operating Instructions and Restrictions

5708.1 When operating with DP, the total number of powered axles must not exceed:

1. 18 more on the head end than the DP/helper consist , and
2. 9 more on the DP/helper consist, than the head end.

5708.2 The number of powered axles in use must not exceed:

Train Type	Cut-in DP/Helper	Rear end DP/Helper
Manifest	24	18
Intermodal	18	12
Loaded Bulk Unit	24	18
Empty Bulk Unit	9	9

5708.3 When used for power, DP remote consist(s) must be placed:

DP Configuration	Minimum Distance from Lead Locomotive	Maximum Distance from Lead Locomotive	*Maximum Distance w/LXA on all linked units	Placement in train, % based on train length
DP Mid Train	1,250 feet	7,400 feet	10,000 feet	50% - 75%
DP Rear of Train	1,250 feet	7,400 feet	10,000 feet	N/A

Note(s):

1. *When both locomotives linked in the headend and DP consist are equipped with LXA (enhanced DP Radio), the maximum distance from the lead locomotive in the headend consist to the Linked locomotive in the DP consist must not exceed 10K feet.
2. *To determine which locomotives are equipped with LXA, search in Operations Portal under Locomotives/Inquiry/Features and also on the Gateway or employee tablet in Safety Training Materials/Locomotive Operator Reading File.
3. Trailing tonnage behind the last DP Remote Consist must not exceed the tonnage rating for that remote consist.
4. When two bulk/unit trains (loaded or empty) are doubled together, DP remote consist can be placed directly between the two trains as long as they are at least 1,250 feet behind the lead locomotive consist. If one of the two trains is an empty, it must be placed at the rear of the combined trains.
5. DP remote consist must be placed in IDLE mode if unable to comply with placement rules. If in IDLE, those locomotives will be considered as loaded equipment.
6. When a Manned Helper is needed to assist a standing train, it is permissible to couple directly to the DP remote consist placed on the rear of standing train.

5708.4 After a distributed power train has been properly set-up and the system has been placed in the run mode, the system is now configured with all remote units in synchronous mode and controlled from the lead unit throttle. If possible, operate all remote units in synchronous mode when the train is operating on:

a. Level or minimal undulating grades, or

b. Continuous descending or ascending grades without severe undulation.

5708.5 To improve train handling, when operating on severe undulating grades or when cresting a grade, use independent mode.

5708.6 When starting a train on level or ascending grade, less than one percent and operating in:

a. Synchronous mode; use conventional train handling methods, or

b. Independent mode;

1. Place the remote DP consist in independent mode (put up the fence),
2. Move the automatic brake valve handle to release and use the independent brake valve to reduce brake cylinder pressure to near zero. The brake cylinder pressure is the same on all DP units and should be reduced according to grade conditions, train makeup and number of units in each consist,
3. Apply sand as necessary,
4. Using the soft keys, place DP remote consist in throttle 1 and increase throttle as necessary ensuring train moves as soon as possible.
5. Slowly release remaining brake cylinder pressure, careful to prevent runout on the head portion of the train,
6. Advance the lead throttle and DP remote consist one position at a time, and
7. Keep DP remote consist one or two throttle positions above the head end consist during acceleration.

5708.7 When starting a train on an ascending grade of one percent or more and operating in:

a. Synchronous mode; use conventional train handling methods, or

b. Independent mode;

1. Place the remote DP consist in independent mode (put up the fence),
2. Release the independent brake to the desired amount,
3. Apply sand as necessary,
4. Using the soft keys, place DP remote consist in throttle 1,
5. Advance the throttle on the DP remote consist one position at a time until enough power is developed to prevent the rear of the train from rolling back,
6. Release the train's automatic brake, and
7. Advance the lead and DP remote consist throttle one position at a time to start the train.

5708.8 When starting a train on undulating grade where a train requires continuous braking, utilize the following train handling procedures:

1. If the DP remote consist is on an ascending grade, place in independent mode (put up the fence),
2. Place the lead consist in dynamic brake before starting,
3. Reduce the locomotive brake cylinder pressure to the desired amount and release the automatic brake,

   Note: On severe undulating territory, leave the train brakes applied until the DP remote consist has developed enough tractive effort to prevent rollback.
4. Apply sand as necessary,
5. Using the soft keys, place the DP remote consist in throttle 1,
6. If throttle 1 does not close slack and start the train, advance the DP remote throttle one position at a time until the train has started,
7. Control brake cylinder pressure with the independent brake to prevent the wheels from sliding and slack running out, and
8. Move the independent brake handle to release once train speed reaches a speed in which the dynamic brakes become effective.

5708.9 When the entire train is standing on a descending grade of 1 percent or more, start the train as follows:

1. Place the train in synchronous mode (DP remote consist in front group),
2. Place the lead consist in dynamic brake before starting,
3. Release the automatic brake and slowly reduce the independent brake cylinder pressure to allow gravity to start the train,
4. Apply sand as necessary,
5. Control brake cylinder pressure with the independent brake to prevent the wheels from sliding and slack running out,
6. Move the independent brake handle to release once train speed reaches a speed in which the dynamic brakes become effective, and
7. Use the train air brakes to supplement the dynamic brake when dynamic brakes cannot maintain authorized speed.

5708.10 When possible, use the dynamic brake to control or reduce speed as follows:

a. On level or minimal undulating grades use synchronous mode; or

b. On severe undulating grades or when cresting a grade use independent mode as follows:

1. Slowly reduce power on the lead consist and the DP remote consist, leaving the DP remote consist one or two notches above the lead consist, until the lead consist is in idle,
2. Apply the dynamic brake on the lead consist as follows;
    1. Control speed by varying the dynamic brake effort on the lead consist, and
    2. Apply power on the DP remote consist to keep the slack closed between the lead consist and the DP remote consist,
3. If additional dynamic braking effort is needed, slowly reduce the DP remote consist throttle to idle, wait 10 seconds, and
    1. Select DB on the control console ensuring DB 1 is displayed, and
    2. Slowly increase dynamic braking on the DP remote consist as needed.

4. Use the train air brakes to supplement the dynamic brake when dynamic brakes cannot maintain authorized speed.

Note: Never apply the dynamic brake on the lead consist to a position lower than the dynamic brake on the DP remote consist.

5708.11 When stopping on level or descending grade less than one percent and operating in:

a. Synchronous mode, use conventional train handling techniques; or

b. Independent mode, handle as follows;

1. Slowly reduce power on the lead consist and the DP remote consist, leaving the DP remote consist one or two notches above the lead consist, until the lead consist is in idle,
2. Apply the dynamic brake on the lead consist allowing the slack to adjust gently, then slowly increase dynamic brake effort,
3. Slowly reduce the DP remote consist to idle and wait 10 seconds,
4. Place the DP remote consist in dynamic brake position 1 and slowly increase effort as needed,
5. Make a minimum brake application with the automatic brake ensuring that brake cylinder pressure is actuated,
6. Make additional brake pipe reductions as necessary to complete the stop,
7. Use the independent brake as dynamic braking becomes ineffective near the stopping point and apply enough brake cylinder pressure to prevent the head end from surging,
8. Make a final brake pipe reduction to complete the stop, and
9. Move the dynamic brake to off on both head end consist and DP remote consist then fully apply the independent brake after stopping

5708.12 When stopping on a descending grade of one percent or more and operating in:

a. Synchronous mode, use conventional train handling techniques; or

b. Independent mode when the dynamic brakes on both the lead and DP remote consist are controlling speed, with or without air brakes applied:

1. Make brake pipe reductions using the automatic brake to stop at desired point.
2. Reduce the dynamic brake on the DP remote consist before reducing the dynamic brake on the lead consist, when the dynamic brake effort is less than maximum,
3. Apply enough independent brake cylinder pressure to prevent a surge and move the dynamic brake to the off position as dynamic braking becomes ineffective near the stopping point, and
4. Make a final brake pipe reduction to complete the stop and fully apply the independent brake.

5708.13 If a penalty brake application occurs during distributed power operation:

1. Control the lead locomotive consist brake cylinder pressure to prevent excessive buff or draft forces,
2. Move the automatic brake to suppression,
3. Place the lead and DP remote consist throttle in idle, and
4. Move the automatic brake handle to release after the train has stopped and the PCS has been reset on the lead unit.

5708.14 If an emergency brake application occurs during distributed power operation:

1. Move the automatic brake handle to emergency,
2. Control the lead locomotive consist brake cylinder pressure to prevent excessive buff or draft forces,
3. Place the lead and DP remote consist throttle in idle, and
4. Move the automatic brake handle to release after the train has stopped and the PCS has been reset on the lead unit.

5708.15 The following car placement requirements must be adhered to when operating with one or more DP Remote consist in the train:

Train Type	DP Remote consist	Placement Requirements
Mixed Freight & Intermodal including auto rack trains carrying auto parts on the rear of the train	Single locomotive	No restriction
	More than one locomotive	5 Loads placed directly ahead of an DP Remote consist
Trains operating with Spine cars	Single or more than one locomotive	Spine cars must be buffered with min of 5 Loaded cars and/or platforms (non-spine cars) placed ahead of and behind any DP Remote consist.
Solid bulk, loaded or empty	Single or multiple	No restrictions.

5708.16 Unless occupied, locomotives in the DP remote consist are to be locked in a manner that prevents unauthorized entry and cab windows closed while enroute.

Chapter 14 - Remote Control Operations

5901 - Transferring Operational Control Manual to Remote

5901.1 From the controlling locomotive:

1. On Remote Control Locomotive (RCL) position as follows:

RCO Breaker	CLOSED/ON
Isolation Switch	RUN
Engine Run	CLOSED/ON
Generator Field	CLOSED/ON
Control & Fuel Pump	CLOSED/ON
Headlight Controls	OFF
Locomotive Radio	Man-Down Channel
RCO Tag	ON Throttle

2. Verify that the automatic brake is properly set up in manual mode by observing that:
    1. Both equalizing reservoir and brake pipe gauges register 90 PSI, and
    2. PC light is extinguished or extinguishes when the PC reset is pushed.
3. On RCL position air brakes in the following manner:

Automatic Brake Handle	FULL SERVICE & wait for exhaust to stop
Automatic Brake Cutout Valve	OUT
Automatic Brake Handle	HANDLE OFF
Independent Brake	FULLY APPLIED
Independent Brake Cutout	CLOSED/TRAIL
Independent Brake	RELEASED
On RCL II, place the manual air brake transfer valve	REMOTE and insert pin

4. On Remote Control Platform (RCP) position brakes & switches in the following manner:

Independent Brake on RCP-Locomotives	CLOSED/TRAIL
Independent Brake	RELEASED
Circuit Breakers	CLOSED/ON
Radio	Man-Down channel

5902 - Testing Requirements

5902.1 The locomotive handbrake must be applied before making required safety test.

5902.2 Operator Control Units (OCU) must be tested before:

1. Performing a Standing Locomotive Brake Test, and
2. Initial movement of the locomotive.

5902.3 To perform a standing locomotive air brake test:

1. Release the handbrake,
2. Place the Independent Brake Override lever in FULL,
3. Place the Direction Toggle switch in either forward or reverse,
4. Press either vigilance switch and place the Speed Select lever in COUPLE position,
5. Observe that locomotive does not move when electrical output is produced, and
6. Place Speed Select lever in the STOP position.

5902.4 If the RCL fails to stop, stop movement by:

a. Using a hand brakes if conditions permit, or

b. Place the Direction Toggle switch in the position opposite the direction of movement and place Speed Select lever in COUPLE position.

5902.5 A locomotive handbrake test is required when leaving equipment unattended, and prior to transferring to manual mode.

5902.6 To perform a locomotive handbrake test:

1. Apply handbrake on all units in consist,
2. Release both the independent and automatic brake overrides,
3. Place the direction select toggle switch in forward or reverse,
4. Press either vigilance switch and place speed select lever in COAST, and
5. Observe for one minute with air brakes released:

    a. The hand brake is sufficient if no movement occurs after one minute, or

    b. Hand brakes are not sufficient if movement occurs. Stop the movement by moving the speed select lever to Stop

5903 - Transferring Operational Control From Remote to Manual

5903.1 Locomotives must be configured for manual operation at the end of a tour of duty except when performing a direct handoff.

5903.2 When transferring from Remote Control to Manual Mode:

1. Apply and test the locomotive handbrake,
2. Turn off OCU(s),
3. Place in Manual Mode:
    a. On RCL II by:
        1. Placing the RMS switch to manual position, and
        2. Moving the Manual Air Brake Transfer valve to manual position,
    b. On Beltpack by:
        1. Placing changeover switch to manual position,
        2. Waiting one minute and turning off Radio, Lights, Headlight and Generator Field breakers, and
        3. Leaving the Control, Remote, Air Dryer and AUX breakers turned on.
4. Place the independent brake in the FULL APPLICATION position and cut in,
5. Place the automatic brake handle in the RELEASE position,
6. Cut in the automatic brake, recovering from emergency application if necessary, and
7. If the locomotive is attached to a train or cut of cars with the brake pipe connected make a FULL SERVICE reduction.

5904 - Remote Control Operations

5904.1 When initiating a movement from stop, the Locomotive Operator must:

a. Normal movements:
    1. Select the COUPLE speed setting,
    2. Allow slack to adjust, and
    3. Wait for the entire train to move before selecting 4 MPH.
b. Kicking cars:
    1. Select the COUPLE speed setting to adjust slack, and
    2. Select either 7 or 10 MPH to obtain necessary momentum to complete the action.

5904.2 When wheel slip occurs:

a. Stop movement and then restart, or
b. If wheel slip reoccurs, stop movement and check for:
    a. Failed wheel slip protection system or other locomotive problems, or
    b. Derailed equipment, or
    c. Poor track conditions, or
    d. Excessive tonnage.

5904.3 To prevent a rollback use the Independent Brake Override by:

1. Applying the Independent Brake Override to a position that prevents the equipment from moving,
2. Select the desired Speed Select position, and
3. Release the Independent Brake Override when:
    a. Cars start to move, or
    b. The locomotive is loading sufficiently.

5904.4 The following steps must be taken to handle a brakes dragging alert:

a. For an automatic brakes dragging alert:
    a. Decrease the selected automatic brake override to RELEASE, or
    b. Decrease the speed selection to COUPLE or a lower position.
b. For an independent brakes dragging alert:
    a. Decrease the independent brake override to LOW or RELEASE, or
    b. Decrease the speed selection to COUPLE or a lower position.

5904.5 When an emergency situation occurs, immediately stop the movement by making an emergency application of the air brakes. Initiate an emergency application by:

a. Place the Independent Brake Override in Emergency from any linked OCU, or
b. Activate either E-Stop button located on either side of the RCL or RCP, or
c. Place the locomotive’s automatic brake valve in EMERGENCY.

5904.6 If movement is not responding to commands during an emergency situation:

1. Place the Independent Brake Override lever in EMERGENCY,
2. Turn off the OCU, and
3. Remove the battery from the OCU.

5904.7 When leaving locomotives unattended for a period of time not to exceed 30 minutes:

1. Apply and test locomotive handbrakes,
2. Turn off OCU(s) and
    a. On RCL II, place the RMS switch to Manual position and turn off radio circuit breaker, or
    b. On Beltpack, turn off MCC and radio circuit breakers.
3. Configure Locomotives:
    a. Left running:
        1. Place the Isolation switch in ISOLATE, and
        2. Open or turn off the Generator Field switch, or
    c. Shut down:
        1. Stop engine using the engine stop button,
        2. Open or turn off the Control Fuel Pump, Generator Field, and Engine Run switch, and
        3. Open the battery knife switch.

5904.8 When leaving locomotives unattended for periods of time exceeding 30 minutes:

1. Apply and test locomotive handbrakes,
2. Configure the locomotive for manual operation,
3. Remove batteries from OCU(s), and
4. Secure OCU(s).

5904.9 Reserved for future use.

5905 - Humping Operations

5905.1 To activate Hump Mode with one operator, the Locomotive Operator must:

1. Verify the Tower OCU is on,
2. Speed Select lever in STOP, and
3. Press Hump pushbutton and verify;
    1. OCU LEDs turn red,
    2. OCU LEDs turn green when communications is re-established,
    3. Tower OCU “communicating with locomotive LED” flashes green, and
    4. “HUMP MODE ACTIVE” displayed for 10 seconds.

5905.2 To activate Hump Mode with two operators:

1. OCU “A” must be primary operator,
2. Tower OCU must be turned on,

3. Speed select lever in STOP,
4. Press Hump pushbutton and verify:
    1. Primary OCU LEDs turn red,
    2. LEDs turn green when communications is re-established,
    3. Tower OCU “communicating with locomotive LED” flashes green, and
    4. “HUMP MODE ACTIVE” is displayed for 10 seconds.
5. Turn off secondary OCU (OCU “B”).

5905.3 To deactivate Hump Mode with one operator, the Locomotive Operator must:

1. Place Speed Select lever in STOP,
2. Press Hump pushbutton, and
3. Verify “HUMP MODE CANCELLED” is displayed.

5905.4 To deactivate Hump Mode with two operators:

1. Place Speed Select lever in STOP,
2. Turn on secondary OCU (OCU “B”),
3. Press Hump pushbutton and verify that “HUMP MODE CANCELLED” message is displayed, and
4. Recover from Full Service Penalty Brake on both OCU(s).

5905.5 When required to retrieve cars from a bowl track or to re-hump a cut of cars, the Locomotive Operator must transfer the RCL from hump operation to standard remote control operation.

5905.6 If the locomotive operator is required to stop humping and reverse movement, the operator must make a speed selection appropriate for conditions using a speed selection other than H1.

5906 - Positive Stop Protection (PSP)

5906.1 When using PSP, cut air into cars when required by special instructions or conditions require train brakes in addition to the remote control locomotive brakes and do not exceed:

a. Pullback entry speed which is defined by local instructions, or

b. Tonnage restrictions.

Appendix A

Automatic Brake Positions

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. Reversing 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.

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.

Positioning and Setting Up Air Brake Equipment

A. 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:

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 automatic brake in the HANDLE OFF position and pin when available
6	Place the independent brake in the RELEASE position

C. Positioning EPIC & Knorr Electronic Air Brake 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:

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

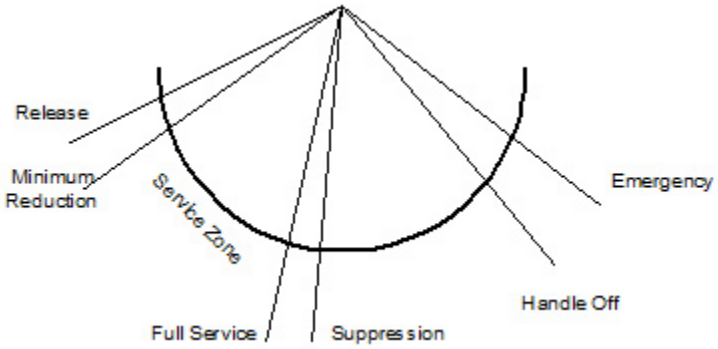
E. Setting up EPIC Air Brake Equipment on GE Locomotives & Knorr Air Brake Equipment:

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 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 automatic brake valve handle in Handle Off and pin when available
9	Position the independent brake valve handle in Release
10	Press EXIT

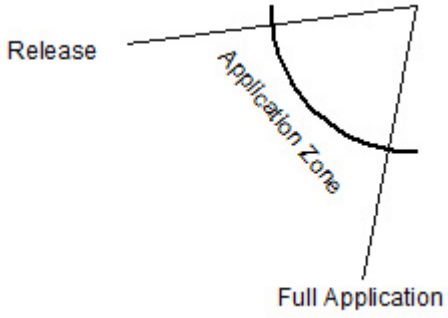
Appendix B

Illustrations of Brake Valve Handle Positions

26/30



Independent Brake



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Appendix C

Class	Horsepower	Weight X000	Min. Cont. Speed (MPH)	Dynamic Brake Type	Dynamic Brake Value
CW44AC	4400	412	N/A	E	9
CW44AH	4400	432	N/A	E	9
CW46AC	4400	432	N/A	E	11
CW46AH	4400	420	N/A	E	11
ES44AH	4400	432	N/A	E	9
ET44AH	4400	432	N/A	E	9
MT6	None	376	3	N/A	N/A
SWMT	None	268	6	N/A(B)	N/A
SW1500	1500	253	11	N/A(B)	N/A
SW1001	1000	233	7	N/A	N/A
MP15AC	1500	258	10	N/A	N/A
MP15	1500	258	11	N/A	N/A
MP15T	1500	253	10	N/A	N/A
3GS21B	2100	268	10	N/A	N/A
3GS21C	2100	420	10	E	6
2GS14B	1400	279	10	N/A	N/A
RP20BD	2000	279	10	E	4
RP20CD	2000	420	10	E	6
GP15T	1500	244	9	S	4
GP15	1500	246	10	N/A	N/A
GP38-3	2000	264	11	E	4
GP38-2S	2200	277	11	S	4
RDSLUG	0	262	9	E	N/A
GP39	2300	278	11	S	4
GP39-2	2300	278	11	S	4
GP40	3000	278	11	S	4
GP40-2	3000	278	11	S	4
GP40-3	3000	278	11	S	4
GP60	3800	400	12	E	4
SD38	2000	388	7	N/A	N/A
SD38-2	2000	380	7	E	6
SD38-2S	2200	378	11	E	6
SD40	3000	396	11	S	6
SD40-2	3000	378	11	E	6
SD40-3	3000	378	11	E	6
SD50	3500	389	10	E	6
SD50-2	3000	390	10	E	6
SD50-3	3000	389	10	E	6
SD60	3800	390	N/A	E	7
SD60I	3800	395	N/A	E	7
SD60M	3800	395	N/A	E	7
SD70AC	4000	428	N/A	E	8
SD70M	4000	400	12	E	8
SD70ACE	4300	428	N/A	E	10
ES40DC	4000	432	11	E	7
B20-8	2000	287	N/A	E	4
B40-8	4000	288	NA	E	5

Class	Horsepower	Weight X000	Min. Cont. Speed (MPH)	Dynamic Brake Type	Dynamic Brake Value
CW40-8	4000	393	N/A	E	7
C40-8	4000	390	N/A	E	7
CW40-9	4000	412	N/A	E	7
GP40WH	3000	279	19	E	4
F40PH2	3000	256	17	E	4

Dynamic Brake Code – E = extended range, S = standard range, (B) = coupler limiting blocks

AC AND AH locomotives are equipped with steerable trucks with exception of units 2-168, 170, 173, 602, 3200 - 3474, and 4831-4850. These units are equipped with non-steerable trucks.

Glossary

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.

Ampere (Amperage, Amps) - The standard unit for measuring electric current.

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.

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

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.

DC Locomotive - Equipped with DC traction motors and are affected by maximum continuous current ratings or short time operating ratings.

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 Locomotive - A locomotive whose diesel engine is not running.

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.

Distributed Power - One or more locomotive consist that are remotely controlled from the lead, locomotive.

Distributed Power Independent Mode - DP remote consist operated independently by locomotive operator from lead DP locomotive in head end consist (putting up the fence).

Distributed Power Synchronous Mode - DP remote consists duplicate throttle, dynamic brake, and air brake commands from lead DP locomotive in head end consist.

Dynamic Brake - An electrical device that converts some of the energy developed by a moving locomotive into an effective retarding force.

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.

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.

Helper - Distributed power or manned helper added to a train to assist movement.

Helper Link - A device designed to permit helper locomotives to be attached and detached from trains without making brake pipe connections between the rear car and the helper consist. This also enables the helper consist to detach from the train while still moving.

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.

Isolation Switch (Engine Control Switch on GE locomotives) - A generic term that refers to the electric switch normally located on the engine control panel and labeled Isolation Switch on certain EMD and Gen Set Locomotives or Engine Control Switch on GE Locomotives. The selective positioning of this switch, may limit the diesel engine's ability to respond to throttle or dynamic brake commands resulting in elimination of tractive effort, braking effort or both. For simplicity the term Isolation Switch will refer to both switch names.

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

Light 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 Operator Reading File - A computer-based library (found in the CCBB screen on the CSXT mainframe and on the CSX Gateway via My Work/Division/Locomotive Operator Reading File) of important information relative to locomotive operator responsibilities. Locomotive Operators must read and understand topics contained in their Division and System Locomotive Operator Reading Files.

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

Main Reservoir - s 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.

Minimum Reduction (First Service) - The first position of the automatic brake valve that initiates a service application of 6 to 8 PSI.

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.

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.

Pneumatic Control Switch PCS - An air-operated switch, activated by an emergency or penalty brake application, that drops the engine speed to idle.

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.

Power Knockdown Feature - A feature that automatically reduces the locomotive to IDLE after 20 seconds due to a penalty application of the brakes or train line initiated emergency application of the brakes. (Note: This feature is overridden when an emergency application is initiated by the DP locomotive (Distributive Power Locomotive).

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.

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

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.

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.

Solid Block (of cars) - Two or more freight cars coupled together and added to, or removed from a train as a single unit.

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.

Throttle Modulation - The action of adjusting the throttle on notch at a time between idle and position 8 to control train speed without the application of air brakes.

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.