NS-1

RULES FOR EQUIPMENT OPERATION AND HANDLING

EFFECTIVE APRIL 15, 2023

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RULES FOR EQUIPMENT OPERATION AND HANDLING

NORFOLK SOUTHERN CORPORATION

Further instructions may be issued by proper authority.

PAUL DUNCAN
Executive Vice President and Chief Operating Officer

EFFECTIVE: APRIL 15, 2023

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APPENDIX TABLES AND DIAGRAMS

GENERAL NOTICE

Employees whose duties are prescribed by these rules must provide themselves with a copy and have it accessible to them while on duty. Conditions not covered by these rules demand the exercise of sound judgment to maintain safety, efficiency and economy. Past practices not in conformity with these rules are unacceptable as an excuse for noncompliance.

Paul Duncan

Executive Vice President and Chief Operating Officer

AIR BRAKES

A-1. AIR PRESSURE SETTINGS

Standard air pressure settings are as follows:

(a) Main reservoir ..... 130–140 PSI

The minimum main reservoir pressure should be at least 15 PSI above regulating valve or equalizing reservoir setting. If the pressure falls below this figure, with the locomotive standing, open generator field switch and advance the throttle to an intermediate position, not greater than notch 4, to help restore main reservoir pressure. On GE locomotives, place in Notch 1 and on SD70-2 and newer EMD series locomotives, place in Notch 2.

(b) Brake Pipe Pressure: Regulating valve or equalizing reservoir setting will be adjusted to the pressure indicated for the service in which a locomotive is to be used.

1. Road freight, Remote Control, and Terminal Transfer ..... 90 PSI

a. When a run-through train is received in interchange and the train consist remains intact, it may be operated at the same brake pipe pressure used by the delivering road but not less than 90 PSI.

b. To avoid a potential overcharge, when handling cars that are to be attached to rear of another train and brake pipe pressure is not 15 PSI below that authorized for the train, the engineer must make a 35 PSI or greater reduction before detaching.

2. Yard service ..... 75 PSI

A-2. VERIFYING THE ACCURACY OF HAND-HELD GAUGES

(a) Train service personnel will have accessible while on duty a hand-held air gauge to determine the brake pipe pressure at the rear of a train. Use of the hand-held gauge is required in the absence of a caboose equipped with an air gauge or an End-Of-Train Device.

(b) The accuracy of the hand-held gauge must be verified at least 1 time every 90 days.

(c) The employee in possession of the hand-held gauge will record the date the gauge was checked and the difference, if any, on one of the following in a timetable in his/her possession: 1) a page formatted to record this information, 2) a page marked "Notes," or 3) the inside back cover page.

(d) A hand-held gauge that varies from the locomotive brake pipe gauge reading by more than ±3 PSI or has been physically damaged must be replaced. Replacement gauges may be obtained from the employees' immediate supervisor.

A-4. PERCENTAGE OF OPERATIVE AIR BRAKES

Prior to departure from the initial terminal, the number of operative air brakes must be 100%. For trains operating with the PTC system active, at no time must the number of operative air brakes be less than 95%. For all other trains, at no time must the number of operative air brakes be less than 85%.

A-6. CLASS I BRAKE TEST — INITIAL TERMINAL INSPECTION

Each train and each car in the train must be given an inspection and test by a qualified person at the following points:

(a) Where the train is originally assembled (Initial Terminal).

(b) Where the train consist is changed other than by:

1. Adding a single car or a solid block of cars.

2. Removing a single car or a solid block of cars.

3. Removing a "bad order(s)" car(s).

4. A combination of the changes listed in **Items 1.** through **3.**

NOTE: Each car or solid block of cars that has not received a Class I brake test or has been off air for more than 24 hours must receive a Class I brake test when

added to a train. A Class III Train Line Continuity Inspection must then be performed on the train.

(c) Where a train is off air for a period of more than 24 hours.

(d) Where a unit or cycle train has traveled 3,000 miles since its last Class I brake test.

(e) Where a consist is received in interchange, if the train consist is changed other than by:

1. Removing a car or solid block of cars from the train.

2. Adding a previously tested car or solid block of cars to the train.

3. Changing the locomotives.

4. Removing or changing the caboose.

5. Any combination of changes listed in **Items 1.** through **4.**

(f) Where a solid block of cars comprised of cars from only 1 previous train is added to another train, the cars must remain continuously and consecutively coupled together. The train line must remain connected except for removing defective equipment or when necessary to separate into multiple solid blocks due to track constraints. The solid block of cars must have previously received a Class I brake test and must not have been off air for more than 24 hours.

Multiple solid blocks of cars must be added to a train in the same relative order as when removed from the previous train except for the removal of defective equipment.

(g) Train air brake system must be charged to the required air pressure, angle cocks and cut out cocks must be properly positioned, air hoses must be properly coupled and must be in condition for service. An examination must be made for leaks and necessary repairs made to reduce leakage to a minimum. Retaining valves and retaining valve pipes must be inspected and known to be in condition for service.

(h) Train air brake system must be charged to the pressure at which the train will be operated, and the pressure at

the rear of the train must be within 15 PSI of the regulating valve or equalizing reservoir setting, but not less than 75 PSI, as indicated by a gauge or End-Of-Train Device at the rear of the train. **NOTE:** When using yard air supply, brake pipe pressure at rear of train must be at least 60 PSI for a freight train and not less than 70 PSI for a passenger train.

(i) The brakes on each car must apply in response to a 20 PSI brake pipe service reduction and must remain applied until a release of the air brakes has been initiated from the controlling locomotive or yard test device. The brakes must not be applied or released until the proper signal is given. A car found with brakes that fail to apply or remain applied may be retested and remain in the train if the retest is conducted at an air pressure that is within 15 PSI of the pressure in which the train will be operated. The retest may be conducted from either the controlling locomotive, at the head end of the consist, or from a suitable test device positioned at the car(s) being retested. The brakes must remain applied until a release is initiated after a period that is not less than 3 minutes. If the retest is performed at the car(s) being retested with a suitable device, the compressed air in the car(s) must be depleted prior to disconnecting the hoses between the car(s) to perform the retest.

(j) The integrity of the brake pipe must be tested by performing:

1. AIR FLOW METHOD TEST (AFM)

The Air Flow Method Train Brake test must be used on trains when the controlling locomotive is equipped with an operative:

- Self-lapping, pressure maintaining locomotive brake equipment;
- Air flow indicator;

The AFM test will be conducted as follows:

a. Observe brake pipe flow indicator and note that the indicator is at or below 60 CFM. . For trains equipped with at least one distributed power unit or an air repeater unit providing a source of brake pipe control air from two or

more locations, must not exceed a combined flow of 90 CFM.

b. Make a 20 PSI brake pipe service reduction after receiving the proper signal. (Do not cut out brake valve cut out cock.) Employees assisting the test will observe the car or cars of the train for the application of the brakes as required by the type of test being performed. After the proper signal, the Engineer will release the brakes and each brake will be inspected to see that all have released. Train may proceed upon indication that brakes have released, air pressure is increasing and air flow is decreasing.

If at any time the air flow indicator becomes inoperative, the Engineer will revert to a brake pipe leakage test.

2. BRAKE PIPE LEAKAGE TEST

a. When signal is given to apply brakes for test, a 20 PSI brake pipe service reduction must be made. After the service exhaust stops blowing, the brake valve must be lapped or cut out; then, allow 1 minute to permit pressure equalization. During the second minute, the brake pipe gauge must be observed to note that leakage does not exceed 5 PSI.

b. When the leakage test has been completed, the brake pipe cut out must remain in the cut out position during the inspection of the application.

c. When the inspection has been completed:

- Move cut out cock to IN position.
- Release brakes. Each brake must be inspected to see that all have released.

(k) Each side of each car must be inspected to determine that:

1. Angle cocks and cut out cocks are properly positioned.

2. Brakes are applied on each car.

3. Piston travel is observed to be correct, as follows:

a. for cars equipped with 8-1/2 inch or 10 inch diameter brake cylinders, piston travel must be within 6 to 9 inches. (Per FRA waiver) If piston travel is less than 6 inches or more than 9 inches, adjust to 7-1/2 inches.

b. for cars not equipped with 8-1/2 inch or 10 inch diameter brake cylinders, piston travel must be within the limits indicated on stencil, sticker, decal or badge plate.

c. for truck-mounted brake cylinders, the minimum brake cylinder piston travel must be sufficient to provide proper brake shoe clearance.

4. Brake rigging does not bind or foul and that all parts of the air brake equipment are properly secured.

NOTE: The inspector must take a position on each side of each car at sometime during the inspection to be able to examine and observe the functioning of all moving parts of the brake system on each car.

(l) Before proceeding, it must be known that the brake pipe pressure as indicated at the rear car of the train is being restored.

NOTE: When the controlling locomotive or yard test device initiates a release, the brakes on each freight car must be inspected to verify the release. This may be performed by a “roll-by” inspection. When a “roll-by” inspection of the brake release is performed, train speed must not exceed 10 MPH. The successful completion of the release portion of the brake test must be noted by the Operator of the train and made part of the required record that the brake test was successfully performed.

(m) The Engineer must be notified that the Class I brake test was satisfactorily performed. A written or electronic record of the information must be retained in the cab of the controlling locomotive until the train reaches its destination. The record must contain the date, time, number of freight cars inspected, the name of the person(s) performing the tests, and the location where the Class I brake test was performed.

A-7. NOTIFICATION OF A CLASS I BRAKE TEST

Each crew taking charge of a train must be informed of and maintain record of the following information in the cab of the controlling locomotive until the train reaches destination:

(a) **Documentation of a class I brake test.** A qualified person participating in the test and inspection or who has knowledge the test was made must notify the Engineer that the Class I brake test was satisfactorily performed, based on the following:

1. **Class I brake test performed on the entire train:** If documentation is not provided, the crew will document this information according to item 3 below.

2. **Class I brake test performed on blocks of cars added enroute:** This information will be recorded on the reverse of the train's Form 1043-BT (or equivalent form) in the spaces provided.

3. Class I brake test documentation must contain the date, time, number of freight cars inspected, the name of the person(s) performing the test, and the location where the Class I brake test was performed.

(b) The total weight and length of the train, based on available information.

(c) Any special weight distribution that would require special train handling procedures.

(d) The number and location of cars with cut out or otherwise inoperative brakes and the location where repairs will be made.

(e) If a Class I or Class 1A brake test is required prior to the next crew change point, the location where the test will be performed.

(f) Any braking problems encountered by the previous crew of the train.

A-8. CLASS IA BRAKE TEST — 1,000 MILE INSPECTION

Except as provided in the extended haul brake test provision, each train will receive a Class IA brake test by a qualified person at a location that is not more than 1,000 miles from the point where any car in the train last received a Class I or Class IA brake test. The most restrictive car or block of cars in the train will determine the location of the test.

When a train will be operated in excess of 1,000 miles, a Class IA brake test must be made at designated locations, within limits not to exceed 1,000 miles to determine that:

(a) Air flow does not exceed 60 CFM or brake pipe leakage does not exceed 5 PSI per minute.

The air brake system must be charged to the pressure at which the train will be operated. The pressure at the rear of the train must be within 15 PSI of regulating valve equalizing reservoir setting, but not less than 75 PSI, as indicated by a rear car gauge device. Tests of air brakes must be made on the entire train.

(b) The brakes on each car must apply in response to a 20 PSI brake pipe service reduction and must remain applied until a release of the air brakes has been initiated from the controlling locomotive. A car found with brakes that fail to apply or remain applied may be retested as prescribed in Rule A-6(i).

NOTE: If the brakes fail to remain applied when retested, the defective car may be moved only in accordance with instructions for movement of defective cars for repair (C-113).

(c) Brake rigging is properly secured and does not bind or foul. All parts of the brake equipment must be properly secured.

NOTE: The inspector must take a position on each side of each car at sometime during the inspection to be able to examine and observe the functioning of all moving parts of the brake system on each car.

(d) All brakes have released, air pressure is increasing and air flow is decreasing. The release inspection may be made either while standing or as the train departs at a speed not exceeding 10 MPH to allow inspection of entire train.

When a train remains intact except for detachment of the locomotive and is not kept charged, and the total time between the relief of 1 crew and the taking charge of the train by another crew is 24 hours or less, **Rule A-10** will govern. If the time exceeds 24 hours, the train must be tested as required by **Rule A-6** or **Rule A-11**, as applicable.

A-10. CLASS III BRAKE TEST — TRAIN LINE CONTINUITY INSPECTION

(a) A Class III brake test must be performed on a train by a qualified person at the location where any of the following changes in the make-up of the train occurs:

1. Where a locomotive or a caboose is changed.

2. Where a car or block of cars is removed from the train with the consist otherwise remaining intact.

3. At a point other than the initial terminal for the train, where a solid block of cars that is comprised of cars from only 1 previous train is added to another train. The cars must remain continuously and consecutively coupled together with the train line remaining connected except for removing defective equipment or when necessary to separate into multiple solid blocks due to track constraints. The solid block of cars must have previously received a Class I brake test and must not have been off air for more than 24 hours.

Multiple solid blocks of cars must be added to a train in the same relative order as when removed from the previous train except for the removal of defective equipment.

4. At a point other than the initial terminal for the train, where a car or a solid block of cars has received a Class I brake test at that location, prior to being added to the train and has not been off air for more than 24 hours.

5. Whenever a car or block of cars, which have been pre- charged and pretested in accordance with Rule A-6, are added to a train at a terminal.

(b) A Class III brake test consists of the following requirements:

1. The train brake system will be charged to the pressure at which the train will be operated, and the pressure at the rear of the train must be within 15 PSI of the regulating valve or equalizing reservoir setting, but not less than 75 PSI, as indicated at the rear of the train by an accurate gauge or End-Of-Train Device (EOTD).

2. The brakes on the rear car of the train must apply in response to a 20 PSI brake pipe service reduction and will remain applied until the release is initiated by the controlling locomotive.

3. When the release is initiated, the brakes on the rear car must be inspected to verify the release.

4. Before proceeding, it must be known that the brake pipe pressure at the rear is being restored, as indicated by an increase in brake pipe pressure of at least 5 psi.

(c) As an alternative to the rear car brake application and release portion of the test, it must be determined that the brake pipe pressure of the train is being reduced, as indicated by a rear car gauge or End-Of-Train Device, and the brake pipe pressure of the train is being restored, as indicated by the rear car gauge or End-Of-Train Device. If an electronic or radio communication link between a controlling locomotive and a remotely controlled locomotive coupled to the rear end of the train is utilized to determine that brake pipe pressure is being restored, the Operator of the train must know that the air brakes function as intended on the remotely controlled locomotives.

(d) When the continuity of the brake pipe is broken or interrupted and the train consist remains unchanged, it must be determined that the brake pipe pressure of the train is being restored as indicated by a rear car gauge or End-Of-Train Device prior to proceeding. In the absence of a rear car gauge or End-Of-Train Device, it must be determined that the brakes on the rear car of the train apply and release from the controlling locomotive*.*

A-11. EXTENDED HAUL TRAINS

(a) A train designated as an Extended Haul Train may be moved up to, but not exceeding, 1,500 miles between brake test and inspection.

(b) Trains designated as Extended Haul Trains are required to have the following:

1. A Class I brake test must be performed at the initial terminal for the train by a qualified mechanical inspector.

2. A freight car pre-departure inspection must be

conducted by an inspector designated under part 215.11.

3. All freight cars having a condition not in compliance with the above pre-departure inspection at the initial terminal for the train must be either repaired or removed from the train.

4. The train must have no more than 1 pickup and set out en route, except for the set out of defective equipment.

5. Cars added to the train en route must be inspected pursuant to **Items 1**. through **4.** of this section at the location where they are added to the train.

A-12. TRANSFER TRAIN BRAKE TESTS

Transfer trains, not exceeding 20 miles, must have the air brake hoses coupled between all cars, and after the brake system is charged to not less than 60 PSI as indicated by a gauge at the rear, a 15 PSI brake pipe service reduction must be made. An inspection must be made by a qualified person to determine that the brakes on each car are applied and remain applied until the release is initiated from the controlling locomotive. A car found with brakes that fail to apply or remain applied may be retested and remain in the train if the retest is conducted as prescribed in **Rule A-6(i)**.

Cars added to transfer trains en route must be inspected pursuant to the requirements contained in this rule at the location where the cars are added to the train.

Transfer train movements exceeding 20 miles must have a Class I brake test.

A-13. YARD AIR SUPPLY

(a) Brake Test from Yard Air Supply

The following instructions govern when a train air brake system is tested from a yard air supply:

1. The train's air brake system must be charged and tested according to the requirements of a Class I brake test.

2. An Engineer's brake valve, or a suitable test device must be used to provide an increase and a reduction of brake pipe pressure at the same or slower rate as an Engineer's brake valve.

3. If the yard air test device must be connected to the end of the cars opposite from the controlling locomotive, a 35 PSI brake pipe reduction must be made once the locomotive(s) has been attached to the head-end of the train, by placing the automatic brake valve handle in the "over reduction" position (to the right of "suppression") allowing brake pipe pressure to exhaust and stabilize. Once this reduction is complete, the train can be recharged by releasing the automatic brake valve and required train brake tests can be performed.

4. Yard air pressure must be at a minimum 60 PSI at the end of the cars opposite from the yard test device and must be within 15 PSI of the regulator valve setting on the yard test device.

5. If the air pressure of the yard test device is less than 80 PSI, then an air flow or brake pipe leakage test must be conducted at the operating pressure of the train when the locomotives are attached.

(b) After the Brake Test is Completed

1. When practicable, the cars should be kept charged until the locomotive consist is coupled. After coupling, a Class III brake test must be performed.

2. Cars that are off air for more than 24 hours must be retested in accordance with the requirements of a Class I brake test.

(c) Removing the Yard Air Supply

When the yard air supply is removed and the equipment will be left:

Unattended – Brake pipe pressure must be reduced to zero (0) PSI at no less than a service rate. Once the yard air supply has been removed at least 1 end angle cock must remain open. The cars must be properly secured.

Attended – If the outbound crew is physically present to couple directly to the cars the brake pipe may remain charged by closing the angle cock prior to removing the yard air supply. The handbrakes must not be released until after the locomotives are coupled.

After coupling and properly connecting the end hoses, the angle cock must be opened and a Class III brake test performed.

A-14. TOTAL LEAKAGE AMOUNT

When a train is made up of two or more cuts and a leakage test is required, the highest leakage value noted for the given cut will determine the total leakage for the complete train when assembled. Amount of leakage noted for each of the cuts is not to be added together for determining total train brake pipe leakage. Maximum leakage permitted is 5 PSI per minute measured during the second minute of a prescribed leakage test.

A-16. BRAKE PIPE

Air Flow must be noted at the time of a train's departure and attention given to any increase thereafter. While en route, a train must be stopped at the next available location and inspected for leaks in the brake system if either:

- The brake pipe gradient is greater than 15 PSI, or
- The air flow exceeds 60 CFM when an air flow method test was used during the train's initial terminal brake inspection. For trains equipped with at least one distributed power unit or an air repeater unit providing a source of brake pipe control air from two or more locations, the air flow must not exceed a combined flow of 90 CFM.

A-17. GENERAL INSPECTION OF TRAINS ON ARRIVAL

At points where inspectors are employed to make a general inspection of train upon arrival at terminals, visual inspection must be made of retaining valves and retaining valve pipes, release valves and rods, brake

rigging, safety supports, hand brakes, hose and position of angle cocks and make necessary repairs or mark for repair tracks any cars to which yard repairs cannot be promptly made.

A-20. RUNNING BRAKE TEST – INCLEMENT WEATHER

Periodic running tests must be performed to ensure proper braking effort is being provided. When snow is up to or above the top of the rail or during inclement weather conditions which may cause snow or ice build up to occur between brake shoes and wheels, and trains are approaching heavy descending grades, meeting or waiting points, or have received a signal indication requiring the train to approach a location prepared to stop, the Engineer must make an automatic brake application sufficiently in advance of the location to determine that brakes are working properly.

If brakes do not provide sufficient braking effort, the train must be stopped by a full service brake application with dynamic brake fully applied. If, in any crewmember's judgment, circumstances require an emergency brake application, this is to be done without hesitation. After stop is made, train will be inspected to determine that brake shoes are free of snow and ice buildup before proceeding. Additional running tests on freight trains may be required as specified in Timetable Special Instructions.

A-23. EMERGENCY BRAKE APPLICATION

(a) When the speed of train cannot be controlled properly from use of the dynamic and/or service brake application, an emergency brake application must be initiated without hesitation.

(b) Any train descending a grade of 1% or greater over a distance of 3 continuous miles must be immediately brought to a stop by an emergency brake application, if necessary, when the movement exceeds the maximum authorized speed at that location by more than 5 MPH.

(c) If an emergency brake application is initiated from the automatic brake valve or emergency brake valve in the Operator's cab of a locomotive, the two-way EOTD, if so equipped, must be activated to initiate an emergency brake application from the rear.

(d) After experiencing a train line initiated emergency brake application, if the EOTD pressure has not reduced to zero, an emergency application of the EOTD must immediately be initiated.

(e) A running release must not be made after an emergency brake application. When the PC switch activates following an emergency application, the automatic brake valve must be placed in emergency position and left in that position until the train stops.

A-24. CONDUCTOR/BACK-UP VALVES & HOSES

At points where conductor valves, backup valves, or backup hoses are used, brakes must be tested by placing the train in emergency using the valve or hose.

Conductor valves, backup valves or backup hoses may be used only in an emergency to stop a train or cut of cars from the end opposite the locomotive by promptly moving the valve to a fully open position.

A-26. RETAINING VALVES

Where the timetable or special instructions require the use of retaining valves, it must be known that they are in the proper position.

The handle positions are designated by raised letters on the retaining valve body as follows:

EX — Exhaust — Vertical downward (normal exhaust, non-retain)

HP — High Pressure — 45° below horizontal (retain 20 PSI)

SD — Slow Direct Exhaust — 45° above horizontal (slow exhaust, non-retain)

A-27. CUTTING OUT BRAKE

The brake on the rear car must be cut in and operative.

A brake must not be cut out unless necessary, and when cut out, the proper authority must be notified.

The brake must not be cut out on more than 2 consecutive cars. Multi-unit articulated cars are equipped with a multiple brake system. Concerning the application of this rule, each individual brake system is considered to be 1 car.

On articulated cars equipped with more than 1 control valve consecutive control valves must not be cut out. If 2

consecutive individual control valves on 1 car are inoperative, the car must be set out. Also, if an end control valve on an articulated car must be cut out, it must not be coupled to an adjacent car with the control valve cut out.

A-29. WORKING ON BRAKE RIGGING

Before working on brake rigging, cut out cock in brake pipe branch must be closed and air reservoirs must be drained. When cut out cocks are provided in brake cylinder pipes, these cut out cocks only may be closed and air reservoirs need not be drained.

A-30. BRAKE CYLINDER RELEASE VALVE

Brake cylinder release valve or “bleed rod” on freight cars must not be blocked or bent to hold valve open.

Air bleeders or other employees must not cut out air brakes on locomotive trucks when bleeding air on trains in yards.

A-31. END-OF-TRAIN DEVICE

(a) Requirements for Two-Way End-Of-Train Devices (EOTDs)

1. An EOTD is required for:

a. All freight trains operating at speeds greater than 30 MPH.

b. Freight trains operating with 4,000 trailing tons or less over a section of track with an average grade of 2% or greater over a distance of 2 continuous miles.

c. Freight trains operating with greater than 4,000 trailing tons over a section of track with an average grade of 1% or greater over a distance of 3 continuous miles.

d. Freight trains (includes locals) handling 20 or more tank car loads of crude oil.

2. The following freight trains are not required to have an EOTD:

a. Trains with a locomotive consist at the rear of the train that is capable of making an emergency brake application either through a two-way device or by a crewmember in radio contact with the controlling locomotive.

b. Trains with an operational caboose equipped with an emergency brake valve. The caboose must be

placed at the rear of the train and must be occupied with one or more crewmembers who are in radio contact with the controlling locomotive.

c. Local trains that:

- Perform switching enroute, and
- Operate with 4,000 trailing tons or less, and
- Do not operate over a section of track with an average grade of 2% or greater over a distance of 2 continuous miles.

NOTE: EOTD requirement remains for locals handling 20 or more tank car loads of crude oil.

d. Work trains that:

- Operate with 4,000 trailing tons or less, and
- Do not operate over a section of track with an average grade of 2% or greater over a distance of 2 continuous miles.

e. Trains that must be divided into 2 sections in order to traverse a grade (e.g., doubling a hill). This exception applies only to the extent necessary to traverse the grade and only while the train is divided in 2 for such purpose.

(b) Operational Status for Trains Using EOTDs

The EOTD must be armed and operable from the lead and controlling locomotive from the time the train departs the point where a device was installed until the train reaches its destination.

(c) Inspection and Testing of EOTDs

1. The Engineer must determine that the identification code entered into the HOTD is identical to the unique identification code on the EOTD before the train departs.

2. The Engineer must compare the air pressure displayed on the HOTD with the air pressure displayed on the EOTD before the train departs. The EOTD must not be used if the difference between the 2 readings exceeds 3 PSI.

3. The EOTD must be tested at the initial terminal or other point of installation to ensure that the device can initiate an emergency brake application from the rear end of the train.

4. If the test of an EOTD is conducted by a person other than a member of the train crew, the Engineer must be notified that the test was performed. A written or electronic record of the notification must be maintained in the cab of the controlling locomotive and will include the date and time of the test, the location where the test was performed, and the name of the person conducting the test. The requirements set forth above must be recorded on Form 1043-BT.

5. End of Train Devices (EOTDs) must be calibrated annually. Prior to each installation, the affixed calibration sticker must be checked to ensure the device being used is within 1 year of the calibration date. If the date on the sticker is illegible, it should be considered out of date.

(d) Train Air Brake Tests

1. The air-powered EOTD must be properly installed and operable before performing the Air Flow Method (AFM) pre-departure brake test.

2. Brake pipe flow indicator must remain at or below 60 CFM while performing the AFM test.

(e) Use of the End-Of-Train Device to Ensure Continuous Train Line Pressure when Trains Stop

1. The Engineer will make a brake pipe reduction sufficient to hold the train, minimum 10 PSI.

2. Determine that the train line pressure is reducing as indicated on the HOTD.

3. When the train is ready to proceed, release brakes and determine that the brake pipe pressure is increasing by indication on the HOTD display.

4. After the train starts, observe for an end-of-train unit signal loss or pressure reduction of 5 PSI or more on the HOTD display.

(f) Cutting Away

When cutting away from a train, the Engineer will observe the HOTD to ensure that brake pipe pressure on the rear car is reduced to zero (0) PSI to determine that an angle cock is not closed on the portion of train to be left standing. If zero (0) pressure is not displayed by the HOTD after locomotive is detached, the Engineer must immediately arrange to have the portion of the train left standing inspected for improperly positioned angle cock(s).

(g) Helper Locomotives

Helper locomotives coupled ahead of the original hauling consist are not required to be armed to the train's EOTD provided employees on the helper locomotives establish and maintain two-way voice radio contact with employees on the original hauling consist. Employees must confirm radio contact before train resumes operation or reaches crest of grade. If radio contact is lost, the train must be stopped. If radio contact cannot be maintained, the helper locomotive must be armed to the train's EOTD and tested to ensure an emergency function can be initiated before proceeding.

(h) Removal, Handling, Use and Transport of EOTDs

1. Trains Arriving at Terminals and Yards:

a. When a train arrives at its final terminal, the EOTD must be removed and stored within 4 hours.

NOTE: The EOTD may be left in place for 8 hours if that portion of the train will continue through on an outbound train.

b. When a train terminates in forwarding, receiving or classification yards, the appropriate Transportation Department supervisor will coordinate with the Mechanical Department for the timely removal and storage of the device.

c. Upon removal of an EOTD, the device will be placed on the appropriate storage rack within the designated storage area. The employee placing the

EOTD on the storage rack will promptly report the EOTD's initial and number to the Mechanical Department or to the designated transportation supervisor.

d. When a Mechanical or Transportation Department employee observes an unassigned EOTD within the terminal or yard, the employee must immediately notify either the mechanical or appropriate transportation authority who will arrange for the EOTD to be delivered to the designated storage area within 4 hours.

2. Handling, Use, and Transportation

a. The use of multiple EOTDs to facilitate either yarding or making set outs or pickups, is prohibited.

b. An EOTD will not be stored in or on a:

- Locomotive operating compartment, engine room, running board, or walkways
- Building where access to the device may be restricted.
- Vehicle.

c. An EOTD, if properly mounted or secured, may be transported on or by a:

- Coupler
- Bracket specifically designed for EOTDs.
- Vehicle

3. At locations where Transportation or Mechanical Department personnel are not assigned, the inbound Conductor is responsible for the proper handling of the EOTD.

(i) Failure of an EOTD

1. The Engineer will promptly report any EOTD malfunction to the Train Dispatcher.

2. If a loss of communication occurs at the location where the device is installed, the train may depart the location at Restricted Speed for a distance of no more than 1 mile in order to establish communication.

When communication is established, the Engineer must compare the air pressure displayed on the HOTD with the air pressure displayed on the EOTD before the train departs. The EOTD must not be used if the difference between the 2 readings exceeds 3 PSI. The device must be tested unless the test was performed prior to installation.

3. If EOTD signal is lost or a loss of brake pipe pressure of 5 PSI or more is observed on the HOTD display, the Engineer or train crew will:

a. Inspect the train to ensure continuous train line pressure through the rear car, and

b. Determine that the EOTD is in place.

EXCEPTION: Inspection is not necessary for freight trains if EOTD or HOTD fails, and:

- The train is a Triple Crown train operating in any type of territory, or
- The train is operating on Rule 251, 261, or 271 Main Track, on a signaled siding, or on a yard track.

(j) Freight Train Operations with a Failed EOTD

1. Train speed must not exceed 30 MPH if an EOTD fails enroute.

2. The train must not operate over a section of track with an average grade of 2% or greater over a distance of 2 continuous miles, unless one of the following alternative measures is provided:

a. The Engineer on the head end of the train must initiate and maintain two-way voice radio communication with the helper locomotive Engineer or a train service employee in the caboose; this contact must be verified just before the head end passes the crest of the grade.

b. The brake pipe of the helper must be connected and cut into the train line or the caboose must have a functioning brake valve capable of initiating an emergency brake application from the caboose.

NOTE: As an alternative, a radio-controlled locomotive at the rear of the train under continuous control of the Engineer on the head end but only if such radio- controlled locomotive is capable of initiating an emergency application on command from the controlling locomotive.

c. If there is a loss of communication with the helper locomotive or caboose before descending the grade, the head end Engineer and helper Engineer or a train service employee in the caboose must immediately take action to stop the train until they resume voice communication, if this can be done safely.

d. If there is a loss of communication once the train has begun descending the grade, the helper locomotive Engineer or a train service employee in the caboose and the head end Engineer must act to stop the train if the speed cannot be controlled properly.

NOTE: If an EOTD fails while the train is operating over a section of track with an average grade of 2% or greater for a distance of 2 continuous miles, the train must be brought safely to a stop at the first available location in accordance with the rules.

ELECTRONICALLY CONTROLLED PNEUMATIC (ECP) BRAKES

E-1. AIR BRAKE TESTS AND INSTRUCTIONS

(a) Trains operating in ECP brake mode shall receive a Class I brake test and pre-departure inspection by a Qualified Mechanical Inspector (QMI) at initial terminal.

(b) Except for a unit or cycle train, a train operating in ECP brake mode shall not operate a distance that exceeds its destination or 3,500 miles, whichever is less, without receiving another Class I brake test and pre-departure inspection by a QMI.

(c) A unit or cycle train operating in ECP brake mode shall receive a Class I brake test and pre-departure inspection by a QMI at least every 3,500 miles.

(d) When performing brake tests on ECP equipped trains, the following will govern:

1. 85 % ECP application = 20 PSI reduction on conventional

2. 80 % ECP application = 15 PSI reduction on conventional

(e) When performing a Class III brake test on ECP equipped trains, the operator shall verify that the brakes have applied and released on the rear car by:

1. **RUN MODE** — observing the ECP brake system's display in the locomotive cab, or

2. **SWITCH MODE** — visually observing the last car application / release.

(f) A freight train operating in ECP brake mode shall receive a Class I brake test by a qualified person (QP) at a location where the train is off air for a period of more than 24 hours or 80 hours if the train is located at an "Extended Off-Air Facility".

(g) ECP equipped cars added to a train operating in ECP brake mode while en route must receive a Class I inspection by a QP unless all of the following are met:

1. The car(s) have previously received a Class I brake test and pre-departure inspection by a QMI within the last 3,500 miles.
2. The prior brake test information is furnished to the train crew.
3. The car has not been off air for more than 24 hours or 80 hours if at an Extended Off-Air Facility.
4. A visual inspection of the car's brake system is conducted to ensure the brake system is intact and secured.

ECP equipped cars added to a train en route must be documented on the back of Form 1043-BT or applicable document. The documentation must include the name and craft (QP or QMI) of the inspector performing the brake test.

E-2. INITIALIZATION

(a) ECP equipped trains must be initialized when ECP is powered on and when performing any of the following:
1. Class I brake test.
2. Class III brake test.

(b) ECP equipped trains shall be initialized in sequential order, and
1. The Engineer must ensure the Load/Empty status is correct on the ECP display.
2. When flood loading, the train status is to be set for "LOAD" when the head car is first spotted under the load-out.

(c) After an ECP train is initialized, the total number of cars on the printed Wheel Report must correspond with the total number of cars identified by the ECP system. If the ECP system indicates fewer cars than the printed Wheel Report, the printed Wheel Report will govern. When this occurs, the Engineer must use the onboard functions of the ECP system to increase the total number of cars in the train consist to reflect the same as the printed Wheel Report.

NOTE: No changes are necessary if the ECP system indicates more cars than the printed Wheel Report.

(d) Cars that fail to initialize on the Engineer's display must be visually inspected, tagged, pneumatically cut out and

the reservoirs completely drained.

(e) When necessary to cut the air out of an ECP car, cut out cock must be closed and all pressure released from the reservoir.

To ensure all air is depleted from the system, hold the release rod in the open position for 5 seconds after the sound of exhausting air is no longer audible.

E-3. EQUIPMENT HANDLING

(a) Before coupling or uncoupling ECP intercar cables, employees must receive confirmation from the Engineer that protection is in place. The Engineer must establish protection by:

1. Placing the locomotive brake handle in the full service position.

2. De-energizing the electrical train line by switching power to “OFF”.

(b) An ECP equipped train must not be left unattended with locomotives attached, until:

1. The train and locomotive(s) are properly secured.

2. The ECP system status is placed in “Switch Mode”.

3. The ECP intercar cable is disconnected between the lead car and the locomotive consist.

4. The locomotives are shut down in accordance with current fuel conservation instructions.

(c) ECP trains must be properly secured prior to deactivating the ECP system. To prevent an unintentional brake release on all cars in the train simultaneously, the “End ECP” function key must not be activated until:

1. The locomotives are detached, or

2. The train has been placed into emergency from the lead locomotive.

(d) A locomotive capable of performing the same functions as an ECP EOTD may be used in lieu of an ECP EOTD as the rear vehicle in the consist.

(e) Extended operation of ECP equipment in Switch Mode without train line power and an active ECP EOTD can

shorten the battery life on the ECP equipment being handled.

When this occurs and the battery is discharged to a certain level, the air brakes will electronically cut out on the affected car(s) causing them to be ineffective in other than an emergency brake application.

To prevent this from occurring, ECP equipped cars must not be operated in excess of 1 hour without both train line power and an active ECP EOTD attached.

E-4. MOVING DEFECTIVE EQUIPMENT

(a) At locations where a Class I brake test is required on the entire train, ECP equipped trains must not depart with less than 95% effective and operative brakes.

(b) An ECP equipped freight car, or locomotive operating in ECP brake mode, discovered with inoperative or ineffective brakes during a Class I brake test, or en route, may be moved to destination not to exceed 3,500 miles.

If the ECP brake system is not able to display the location of the car with defective or inoperative brakes, the car must be visually inspected, tagged, pneumatically cut out and the reservoirs completely drained.

It is permissible for a car equipped with defective or inoperative ECP brakes to be considered electronically tagged if the ECP brake system is able to display the location and identification of the equipment.

(c) A freight car equipped with an ECP brake system that is known to have arrived with ineffective or inoperative brakes at the initial terminal of the next train which the car is to be included or at a location where a Class I brake test is required shall not depart that location with ineffective or inoperative brakes unless:

1. The location does not have the ability to conduct the necessary repairs.

2. The car is hauled only for the purpose of repair to the nearest forward location where necessary repair can be performed.

(d) An ECP equipped train in “Switch Mode” may be

moved to the nearest or nearest forward location where necessary repairs or changes to the consist can be made, provided:

1. The train is visually inspected.

2. The brakes apply and release on the rear car.

3. A qualified employee determines it is safe to move.

(e) ECP equipped train line cables shall be considered defective if any of the following exists:

1. Badly chafed or broken insulation.

2. Broken plugs, receptacles or terminals.

3. Broken or protruding strands of wire.

(f) The brakes must not be pneumatically cut out on more than 2 consecutive cars on ECP trains.

(g) The brakes must not be electronically cut out on more than 5 consecutive cars or control valves on ECP trains.

(h) ECP cars with brakes cut out must not be the rear car of the consist.

(i) Inoperative cars, electronic or pneumatic, must be documented on the Form 1043-BT and reported to the Mechanical Operations Center.

(j) An ECP car found with a “Dormant” CCD shall have its brakes pneumatically cut out and the reservoirs completely drained. A CCD is dormant if the electronics are not functioning and the car is not identifiable on the engineer’s display screen.

CARS

C-100. FREIGHT CAR INSPECTION

At each location where freight cars are added to a train which have not been inspected at that point, in addition to making required air brake test, the car(s) must be inspected by the train crew for the following conditions:

(a) Carbody

- **1.** Leaning or listing to side.
- **2.** Sagging downward.
- **3.** Positioned improperly on truck.
- **4.** Object dragging below.
- **5.** Object extending from side.
- **6.** Door insecurely attached.
- **7.** Broken or missing safety appliance.
- **8.** Lading leaking from a placarded hazardous material car.

(b) Insecure coupling.

(c) Overheated wheel or journal.

(d) Broken or cracked wheel.

(e) Brake that fails to release.

(f) Any other apparent safety hazard likely to cause an accident or casualty before the train arrives at its destination.

When performing inspection of freight cars in compliance with this rule, the train crewmember(s) must inspect both sides. If an inspection cannot be safely made of both sides of the equipment because of terrain, a one-side inspection is acceptable. The train may be moved to the nearest available location where the necessary inspection of the opposite side can be performed.

This inspection MUST NOT be performed while the freight cars being inspected are moving.

NOTE: Employees must not make a Rule C-100 inspection while riding on a locomotive, freight car, caboose or other On-Track equipment.

C-102. EQUIPMENT LEFT UNATTENDED

Air brakes must never be depended upon to hold unattended standing equipment.

When equipment is left unattended, the following procedure must be performed to determine that the applied hand brakes will secure the equipment with the air brakes released.

Prior to leaving the equipment unattended, all crewmembers must have verbal communication to confirm that the equipment has been properly secured."

EXCEPTION: Division or Terminal instructions will govern where it has been verified that the required number of operative hand brakes will secure the equipment with the air brakes released. However, this provision does not apply to Key Trains or cars meeting the definition of a Key Train. When securing Key Trains or cars meeting the definition of a Key Train, a test must always be performed to determine the applied hand brakes will secure the equipment with the air brakes released.

(a) Securing unattended cars with locomotives detached.

1. When cars are left unattended, at least 1 end angle cock must remain open to ensure that an undesired brake release does not occur.

2. Make a brake pipe reduction sufficient to hold the equipment if the cars are being handled with operative air brakes.

3. Apply sufficient number of hand brakes to secure the cars left standing.

4. Test the effectiveness of the hand brakes on the cars left standing:

a. On a grade descending AWAY from the location where the train separation will be made, or on level grade:

1) Release the automatic brake, if applicable, and locomotive brakes and advance throttle, if necessary, to slowly bunch or push the slack in at the coupler where the uncoupling is to be made.

2) Apply the locomotive brakes when slack has been observed bunched.

3) Observe the car(s) to be left standing for 1 minute to determine that the slack does not pull out or stretch indicating that the hand brake(s) is effective and the car(s) will remain secured.

b. On a grade descending TOWARDS the location where the train separation will be made:

1) Release the automatic brake, if applicable, and advance throttle, if necessary, to slowly stretch or pull the slack out at the coupler where the uncoupling is to be made.

2) Apply the locomotive brakes when slack has been observed stretched.

3) Observe the car(s) to be left standing for 1 minute to determine that the slack does not push in or bunch indicating that the hand brake(s) are effective and the car(s) will remain secured.

c. When grade or tonnage will not permit releasing the automatic brake, after stopping with the slack positioned as required:

1) Close the angle cock in front of the cars to be left standing.

2) Bleed the brake system on the cars behind the closed angle cock.

3) Observe the car(s) to be left standing for 1 minute to determine that the slack does not adjust indicating that the hand brake(s) are effective and the car(s) will remain secured.

d. When grade or tonnage will not permit releasing the automatic brake, after stopping and unable to position the slack as required:

1) Sufficient hand brakes must be applied on the cars that will NOT be left standing to permit the release of the automatic brake to adjust the slack as required.

2) Apply the locomotive brakes when slack has been observed adjusted as required.

3) Observe the car(s) to be left standing for 1 minute to determine that the slack does not adjust with the grade, indicating that the hand brake(s) is effective and the car(s) will remain secured.

5. After determination is made that the hand brakes are effective, the equipment may be uncoupled from the cars to be left standing.

6. When grade and tonnage conditions permit, Engineers will reduce brake pipe pressure to 20 PSI above zero (0) with the automatic brake before locomotive is cut off or any angle cock is turned, when:

a. Trains or cuts of cars being handled with operative air brakes arrive at a terminal where facilities are available and instructions provide for immediate brake inspection.

b. Locomotive is to be detached from any train when the temperature is below 32°F.

(b) Securing unattended cars with locomotives attached.

When cars are left unattended with locomotives attached:

1. Make a brake pipe reduction sufficient to hold the equipment if the cars are being handled with operative air brakes.

2. Apply sufficient number of hand brakes to secure the cars left standing. All locomotive parking brakes must remain in the off or unapplied position until the completion of the testing.

3. Release the automatic brake, if applicable, and allow the train slack to adjust.

4. Gradually release the Independent brake allowing slack between locomotives and cars to adjust according to grade conditions.

5. After the slack has fully adjusted, observe the equipment for 1 minute to determine that there is no movement indicating that the hand brakes are effective and the equipment will remain secured.

6. After determination is made that the hand brakes are effective, the independent and automatic brakes must be fully applied and all locomotives properly secured.

EXCEPTION: If there are an equal number or more locomotives than cars in the equipment to be tested, or if locomotive tonnage is greater than train tonnage where hand brakes on cars will not hold the entire consist, after applying a sufficient number of hand brakes to hold the cars the instructions in part (c) "Securing unattended locomotives without cars attached" will govern the test.

(c) Securing unattended locomotives without cars attached. NOTE: Locomotives that are shut down or otherwise unable to move under their own power must be secured and tested in accordance with C102(a) above.

Before locomotives are left unattended on any track the effectiveness of the parking brakes must be tested as follows:

1. Apply the parking brake on each locomotive.

2. Place the Independent and the Automatic brakes in the RELEASE position. The locomotive consist must remain stationary for 10 seconds.

3. Place throttle in the No. 1 power position or higher, if necessary, until movement occurs.

NOTE: If the locomotive(s) is standing on a grade, the movement must be in a descending direction.

4. Place the throttle in IDLE when the locomotive consist begins to move. Locomotive consist must stop within 25 feet.

If the locomotive consist:

- stops within 25 feet, reapply the Independent and the Automatic brakes (Consider the parking brake(s) effective)
- does NOT Stop within 25 feet, place the Independent brake in FULL APPLICATION.

If the locomotive consist does not:

- stand for the required 10 seconds
- stop within 25 feet

immediately notify the Network Operations Center and arrange for an alternate means of securement or a different location to leave the locomotive consist.

(d) Securing and Testing Remote Control Locomotives

To test the effectiveness of hand brakes on Remote Control Locomotives:

1. Apply parking brake(s) on locomotive(s).
2. Leave the locomotive in Remote status while performing this test.
3. Place locomotive isolation switch to isolate position.
4. Place reverser in desired direction, then:
   - depress reset button
   - move OCU speed selector from stop position to couple speed position
   - verify locomotive(s) brakes release
   - locomotive(s) must remain stationary for 10 seconds
5. Move OCU speed selector from COUPLE speed position to STOP position.
6. Place locomotive isolation switch to “run” position.
7. Depress reset button, move OCU speed selector from stop position to couple speed position or higher, if necessary, until movement occurs.
8. Move OCU speed selector from the couple speed or higher position to coast position (no power and no brakes), applied hand brake(s) must stop locomotive(s) within 25 feet.
9. Move OCU speed selector from coast position to stop position (independent brakes apply) when locomotive(s) stop.

(e) Securing unattended Triple Crown trains (with locomotives attached).

1. Apply the parking brake on each locomotive.
2. Place the Independent and Automatic brakes in the RELEASE position, allowing slack to adjust according to grade conditions.
3. After the slack has fully adjusted, observe the equipment for 1 minute to determine that there is no movement, indicating that the locomotive parking brakes are effective and the equipment will remain secured.

4. If the equipment remains stationary, consider the locomotive parking brakes effective to secure the equipment left standing.

5. Fully apply the independent brake and make a full service automatic brake pipe reduction.

6. If the equipment does not remain stationary, immediately notify the Manager Train Operations and arrange for an alternate means of securement or a different location to leave the train.

C-103. HAND BRAKE RELEASE

While checking train at initial terminal or along line-of-road, employees will see that all hand brakes are released. If painted hand brake chain links are not visible, then it must be determined if the hand brake is released. Painted links hidden from view is not an indication of a fully applied hand brake.

Hand brakes must be released before cars are moved unless necessary to control movement. When handling cars with air, the hand brakes must not be released until it is known that the air brake system is properly charged.

Many types of cars are equipped with a hand brake wheel or lever at more than one location on the car. When checking to determine if hand brakes are released on such cars, all locations must be observed.

C-107. RAPID DISCHARGE DUMP SYSTEM

(a) All dump system air hoses on trains consisting entirely of air-operate quick-dump (rapid discharge) hopper cars operating in unit train service, loaded or empty, must be coupled.

EXCEPTION: Unit trains received without dump system air hoses coupled may continue to a location designated by special instructions where the dump system air hoses will be coupled.

(b) Prior to departing any loading or unloading facility with an air-operated quick-dump (rapid discharge) unit coal train, loaded or empty, crews must ensure the locomotive cut-out cock is closed by cutting out the main reservoir hose connected to the dump line. The dump system will not be charged until the loaded train arrives at the unloading facility.

C-108. PASSENGER / EXCURSION CAR DIAPHRAGMS

To prevent damage to passenger car diaphragms, such equipment must not be coupled to by:

(a) The snowplow end of locomotives so equipped unless specifically authorized by the Mechanical Department. **EXCEPTION:** Does not apply to Research Cars NS-32, NS-33, NS-34, NS-36, and NS-37.

(b) Tank cars or other cars having couplers with top and bottom shelves.

C-111. HOT JOURNAL — FORM ME-569

When a car (or locomotive) is set out account a hot journal, a journal tag (reverse side of LOCOMOTIVE ISOLATION OR SHUT DOWN REPORT, FORM ME-569) must be completed by a crewmember and attached to or as close as possible to the defective journal.

C-113. MOVEMENT OF DEFECTIVE CARS FOR REPAIR

(a) A freight car with one or more defective components or defective air brakes may be moved to the nearest available location where necessary repairs can be performed after the following procedure has been complied with:

1. A qualified person has determined a) that moving the car is safe and b) the maximum speed and other restrictions necessary for safe movement.

2. The person in charge of the train in which the car is to be moved will be notified by a copy of the “Home Shop” tag (NS Form ME-613).

The person in charge of the train will notify all other crewmembers of the presence of the defective car. All crewmembers will be informed of the maximum speed and other restrictions determined under **Item (a) 1**.

NOTE: If the person in charge of a train in which the car is being moved is relieved before the completion of a trip, that person must arrange to deliver the copy of the “Home Shop” tag to the relieving person. If the copy of the “Home Shop” tag cannot be personally delivered, the person in charge will leave the copy of the “Home Shop” tag in an envelope at a location specified by the Train Dispatcher.

The designation of the train, date, location and signature of the person leaving the "Home Shop" tag will be shown on the envelope.

(b) A copy of the "Home Shop" tag will be attached to each side of the defective car and must contain the following information:

1. Car initial and number.

2. Name of the inspecting railroad.

3. Inspection location and date.

4. Nature of each defect.

5. Movement restrictions.

6. Destination for shopping or repair.

7. Name and job title of the inspector.

8. Signature of the person making the inspection under **Item (a) 1**.

(c) Handling of "Home Shop" tags.

1. Only a Mechanical Department employee may remove a "Home Shop" tag.

2. A record or copy of each tag attached to or removed from a freight car will be retained for 90 days.

3. Each tag removed from a car will contain a notation stating the date, location, reason for its removal and the signature of the person who removed the tag from the car.

NOTE: "Home Shop" tags are to have a notation of "moving under 215.9" for cars with Freight Car Safety Standard Defects or "moving under 232.15" for cars with air brake defects.

4. "Home Shop" tags are not required for cars moving within a terminal for repairs.

(d) When necessary, Transportation Department employees will complete (reverse side of NS Form ME-569) and attach the defective air brake tag to each side of a car with defective air brakes. If NS Form ME-569 is not available, a similar foreign line tag may be used.

(e) A defective freight car loaded with Hazardous Material or containing Hazardous Material residue may not be placed for unloading or purging unless:

1. Necessary for the safe repair of the car.

2. A qualified person has determined:

a. That moving the defective car is safe.

b. The maximum speed and other restrictions for safe movement.

(f) When a bad order tag, Form ME-597 (orange tag), is attached to a trailer or container loaded on a flat car, the flat car will be considered to be bad ordered and must not be moved in a train. When a bad order tag is applied to a trailer or container, the tag will be attached to the nose end.

C-114. TRAIN OR AIR HOSE SEPARATION

(a) If a train separates or air hoses come uncoupled twice between the same 2 cars, both cars are to be set out at a point authorized by the Train Dispatcher.

EXCEPTIONS: 1) If there is clearly a defect on 1 car (such as a defective air hose support on the car), only that car will be set out; 2) if a Mechanical Department representative inspects the cars and finds them suitable for movement, the cars may continue in the train.

(b) All train or air hose separations must be reported to the Train Dispatcher.

(c) Information concerning train or air hose separations must be furnished to the relieving crew at designated crew change points or if trains receive a new crew en route.

C-115. FLAT SPOTS

If a flat spot on a wheel of a car (or locomotive) develops en route, a member of the crew must inspect it. Upon completion of inspection, the train will be governed as follows:

(a) Proceed at Authorized Speed: The train may continue at Authorized Speed if no other defects affecting movement are observed, AND if:

1. The flat spot is less than 2-1/2 inches in length.

2. If there are 2 adjoining spots, each is less than 2 inches in length.

(b) Proceed at 10 MPH: If a flat spot is found in excess of either of the above dimensions, but less than 4 inches, and no other defect is observed, 2 actions must be taken:

1. Speed must not exceed 10 MPH.
2. A report must be made promptly to the Train Dispatcher.

(c) Remain Stopped: If a flat spot of 4 inches or greater is found, the train must remain stopped until a report is made to the Train Dispatcher. When determined safe for movement, the car (or engine) must be set out at the first available siding or terminal.

C-116. PLACEMENT OF SHIFTABLE LOADS

(a) Poles or similar loads on a flat car or in open-top equipment loaded above ends of cars must not be handled in trains next to open shipments subject to damage by shifting loads on adjacent cars.

(b) Any open type car where lading may shift and fall to track surface (such as loaded regular flats, gondolas loaded above sides or ends) must not be used as rear car of any train being operated without a caboose.

(c) The equipment listed below must not be placed and handled in a train immediately behind an occupied locomotive or immediately ahead of an occupied caboose:

1. Open end flat cars loaded with poles, pipe, lumber, or similar lading that might shift and protrude beyond the car ends.
2. Open-top cars or bulkhead flats loaded with similar lading that extends above the car ends or beyond the car sides.
3. Flat bed or stake-body trailers loaded with similar lading when the open end is toward the locomotive or caboose or when the lading extends above the end toward the locomotive or caboose.

C-117. BANDS

Cars equipped with chain tie-down devices must not be moved unless chains are properly secured. Cars with bands improperly secured are not to be moved.

LOCOMOTIVES

L-201. REPORTING DEFECTS / FAILURE

(a) Engineers and remote control operators must immediately report all locomotive failures, defects, or any other abnormal conditions regarding locomotives, including unusual odors or excessive smoke by contacting the Mechanical Operations Center (MOC) via radio DTMF Code 1-2-3.

NOTE: Locomotive failures that will result in a delay to operations should first be reported to the train dispatcher if on the main track or to the yardmaster or supervisor if on non controlled track. Immediately thereafter, MOC should be notified.

(b) The MOC Desk will capture all details of the delay and assist in troubleshooting any potential fixes in addition to dispatching local Mechanical Department forces to fix diagnosed problems.

L-202. TAKING CHARGE OF LOCOMOTIVES

(a) Calendar Day Inspection (Form ME-65)

Engineers are responsible for ensuring all locomotives in their charge are inspected each calendar day the locomotive is used. On multiple locomotive consists, a current ME-65 on the controlling locomotive indicates a current Calendar Day Inspection on all locomotives, including DP power.

1. When assembling a locomotive consist, the engineer will ensure the ME-65 on all trailing locomotives is dated the same or more recent than the leading locomotive.

2. Locomotives picked up en-route must be inspected if the ME 65 is older than the controlling locomotive.

3. Locomotives set out en-route must be inspected if the ME-65 is not dated for the current calendar day.

(b) When performing a calendar day inspection, locomotive piston travel, unless otherwise indicated, must not exceed 6½ inches.

(c) Before moving locomotives, it must be known that:

1. The independent brakes are in operative condition by observing an application and release of the brakes;

2. The hand brakes are released.

(d) Prior to departing the initial terminal or when changing the lead locomotive:

1. The alerter on the controlling locomotive shall be tested to ensure an application of the automatic brake at a penalty rate in response to the expiration of the warning cycle timer.

2. Each controlling locomotive must have an operable radio and horn.

(e) When a locomotive consist is received from a mechanical facility, the presence of a current and properly completed form ME-114 (Gold Card) will indicate that the required tests and inspections have been successfully completed.

L-203. TESTING LOCOMOTIVE BRAKES

(a) If the brake equipment on a locomotive or a locomotive consist is changed by: 1) uncoupling or coupling MU hoses, 2) adding one or more locomotives to the consist, or 3) removing other than the rear locomotive(s) from the consist, the following brake test must be performed after securing the locomotives with at least one hand brake:

1. Locomotive Brake test:

a. Release independent brake and observe that locomotive brakes release.

b. Make a 20 PSI reduction with the automatic brake valve and observe that locomotive brakes apply.

c. Bail brakes off with the independent brake valve and observe that locomotive brakes release.

d. Make a further automatic brake reduction to reapply the locomotive brakes.

e. Return the automatic brake valve to the release position and observe that the locomotive brakes release.

f. Apply independent brake and observe that the locomotive brakes apply.

2. Single employee locomotive brake test:

a. Fully apply independent brake and observe that brakes on each locomotive are applied.

b. Place the automatic brake handle in suppression position. On locomotives equipped with electronic air brake equipment, cut out the automatic brake. Release and bail the independent brake. Fully apply then fully release the independent. Observe that brakes are released. Cut in the automatic brake, if applicable (cutting out the automatic brake is necessary to suppress the alerter to observe the release of brakes by a single crewmember).

c. Make a further reduction of the automatic brake until cylinder pressure develops, then observe that brakes are applied.

d. Release and cut out the automatic brake. Place the automatic brake handle in suppression position. Observe that brakes are released. Cut in the automatic brake.

After reapplying the brakes, release the hand brake(s).

(b) When changing operating ends of the consist only, consists previously tested in accordance with Items 1 or 2 above must be re-tested by use of the locomotive gauges instead of a visual inspection of the locomotive consist.

(c) Engineers will make a running test of the automatic and independent air brakes and dynamic brakes (if equipped) as soon as speed and conditions permit.

L-205. SPEED INDICATORS AND EVENT RECORDERS

(a) Speed Indicator Requirements

1. A locomotive used as a controlling unit at speeds above 20 MPH must be equipped with a speed indicator accurate within:

- ± 3 MPH at speeds between 10 and 30 MPH
- ± 5 MPH at speeds above 30 MPH

2. Any on board system may be used as a speed indicator.

3. If all speed indicators on a controlling locomotive fail en route, the locomotive may continue as the controlling locomotive:

   - To the nearest forward point where repairs can be made or until the next calendar day inspection, whichever occurs first.
   - Not exceeding 20 MPH, or where maximum authorized speed is 31 MPH or greater, not exceeding 10 MPH below the maximum authorized speed.

4. All speed indicator failures must be reported immediately to the Mechanical Operations Center at radio DTMF tone 123.

(b) Speed Indicator — Test For Accuracy

The Engineer must check the accuracy of the speed indicator on the controlling locomotive at a measured mile, reporting any inaccuracies, and adjusting the speed accordingly.

(c) Event Recorder Requirements

1. Locomotives not equipped with event recorders may not be operated as a controlling locomotive in road service.
2. The PTC breaker must be in the on or closed position anytime a locomotive is operating under power in a locomotive consist, including distributed power consists.

L-206. SHORT TIME RATING

While newer locomotives are self protected, SD40-2, GP40-2 and GP38-2 locomotives are not. For train consists containing these locomotives when train speed remains below:

- 11 MPH for consists containing GP38-2 & GP40-2 locomotives, or
- 9 mph for consists containing SD40-2 locomotives,

for more than 10 minutes continuously with throttle in maximum position (No. 8), there is danger of damaging the traction motors.

On locomotives so equipped, observe short time operation plate instructions or loadmeter, which has been graduated to show the time in minutes that various loads may be carried. Operation for the lowest short time rating of any locomotive in consist will govern the maximum load to be carried.

The maximum continuous current rating and the short time operating limits were developed for throttle 8 operation. These values must be decreased at lower throttle positions because engine speed and consequently, traction motor cooling air is reduced.

If short time ratings are exceeded, movement must be stopped, reverser centered and throttle advanced to the maximum position (No. 8) for at least 10 minutes to cool traction motors.

L-207. LOCOMOTIVE AXLE LIMITS UNDER POWER

(a) No more than the equivalent of 27 conventional axles may be operated under power on the head end of a train, except:

- Solid loaded unit coal trains are authorized to use the equivalent of 32 conventional powered axles on the head end.
- Other than coal trains, solid loaded bulk commodity unit trains not exceeding 100 cars (plus any required buffer cars) are authorized to use the equivalent of 32 conventional powered axles on the head end.
- Other trains as designated by Special Instructions.

High adhesion axles are equivalent to 1-1/3 conventional (non-high adhesion) axles. Alternating Current (AC) traction motor-equipped axles are equivalent to 1-1/2 conventional (non-high adhesion) axles.

(b) When operating at 10 MPH or less with a locomotive consist with the equivalent of 24 or more conventional axles on line, Engineers must limit maximum tractive effort (TE) to 140 KLBS or 1776 amps as shown on the load meter of the controlling locomotive.

Engineers should further restrict maximum tractive effort when the head 1/3 (one-third) of the train is in any turnout, crossover or curve and contains any empty car or platform

or any car longer than 85 feet (loaded or empty).

(c) The throttle must not be advanced to the next higher position until the load meter reading has stabilized from the last throttle advance.

L-208. TRACTION MOTORS

(a) Damage to Traction Motors

1. When starting a train, after the brakes are released, the throttle should be advanced to a notch at which the locomotive begins to move.

2. Continued application of power to traction motors when locomotive is not moving and is prohibited.

3. Reversing locomotive(s) to hold train standing on a grade is prohibited.

4. The reverser handle must not be moved when the locomotive is in motion.

5. Engineers must avoid the slipping of wheels to the extent possible.

(b) Mechanical Shock to Traction Motors

When consists containing DC locomotives are operated in power or dynamic braking at a speed in excess of 25 MPH, mechanical shock, which can damage traction motors and trip ground relay, may occur at railroad crossings. Throttle must be reduced to Notch 4 or lower at least 8 seconds in advance of a railroad crossing and must not be increased until all locomotives have passed over the crossing.

For any locomotive consist configuration, railroad crossings that are not subject to mechanical shock and do not require throttle reduction will be designated by timetable.

L-210. DYNAMIC BRAKE

(a) Use of Dynamic Brake — The dynamic brake is the first priority brake for controlling train speed.

When dynamic brake is to be used, prior to moving dynamic brake handle to “Set Up’ the locomotive must have been in idle for at least 10 seconds.

The dynamic brake must be increased gradually, allowing slack to bunch safely against the locomotive.

The dynamic brake must not be released in severe undulating (rip-rap) terrain or on a heavy descending grade. It can be released with train on level grade or at bottom of grade with the locomotive on ascending grade. When releasing dynamic brake, time must be allowed for slack to adjust before applying power.

(b) Axles of Dynamic Brake

1. Not more than the equivalent of 18 conventional axles of dynamic braking may be used on the head end of a train.

EXCEPTION: The equivalent of 32 conventional axles of dynamic braking may be used for solid loaded bulk commodity trains when the equivalent axles are allowed in power.

High Capacity, DC axles are equivalent to 1-1/3 conventional axles. Alternating Current (AC) traction motor- equipped axles are equivalent to 1-1/2 conventional (non- high capacity) axles.

2. When moving through any turnout or crossover restricted to 25 MPH or less and using more than the equivalent of 14 conventional axles of dynamic brake, retarding force must not exceed 400 AMPS or 40 Klbs. until the lead half of the train is through the turnout or crossover.

EXCEPTION: This restriction does not apply to solid loaded bulk commodity trains or mixed trains with solid block of bulk commodities comprising the leading half of the train.

3. When making a planned stop with other than solid loaded bulk commodity trains and using more than the equivalent of 14-axles dynamic brake the dynamic brake must not exceed 400 AMPS or 40 Klbs. braking effort when applying the train air brake.

(c) Operational Status of Dynamic Brakes — The Engineer must be informed of the operational status of the dynamic brakes on all locomotive(s) in the controlling consist at the initial terminal or point of origin for a train and at other locations where a locomotive Engineer first begins operation of a train. The Engineer will:

- review the completed Form ME-112 that has been left in the cab of the controlling locomotive
- complete a new Form ME-112 indicating the status of the dynamic brake of each locomotive in the controlling consist before going off duty. Any

locomotive checked “Inoperative” must also be tagged with Form ME-109

- leave the form in the cab of the controlling locomotive in the consist
- discard any previously completed forms

(d) Inoperative Dynamic Brakes — A locomotive discovered with inoperative dynamic brakes must have a Form ME-109, “Inoperative Dynamic Brake” tag securely attached and displayed on the isolation switch in the cab of the locomotive.

The tag must contain the following information:

- locomotive initial and number
- name of the discovering railroad
- location and date where the condition was discovered
- signature of the person discovering the condition

(e) Inoperative Dynamic Brakes En Route — If a locomotive consist is intended to have its dynamic brakes used while in transit, a locomotive with inoperative dynamic brakes or not equipped with dynamic brakes must not be placed in the controlling (lead) position of a consist unless the locomotive has the capability of:

- controlling the dynamic brake effort in the trailing locomotives in the consist that are so equipped
- displaying to the locomotive Engineer the deceleration rate of the train or the total train dynamic brake retarding force

L-211. WHEEL SLIP WARNING LIGHT

An intermittent flash of the wheel slip light indicates a wheel slip has occurred in the locomotive consist.

A wheel slip light constantly lit or consistently flashing at any speed, may indicate a locked wheel or slipped pinion gear. When this occurs, reduce the throttle or dynamic brake until the light goes out. If the light remains illuminated, or continues to flash after the throttle or dynamic brake has been reduced, stop immediately and perform a roll by inspection to ensure all axles in the locomotive consist are turning freely.

L-212. ALIGNMENT CONTROL DRAFT GEAR

(a) When the consist includes more than one locomotive that

does not have alignment control draft gear, extreme caution must be exercised when applying locomotive or dynamic brake or handling the throttle in back up or shoving movements to prevent locomotives from jackknifing.

(b) Locomotive(s) not equipped with alignment control draft gear, when moving dead-in-tow in a locomotive consist or train, must not be coupled to another locomotive that does not have alignment control draft gear.

EXCEPTION: This restriction does not apply to a light locomotive movement.

(c) NS locomotives without alignment control draft gear can be identified by a white stripe painted beneath the locomotive number on the outside of the cab.

TOWED OR INOPERATIVE LOCOMOTIVES

L-213. MULTIPLE LOCOMOTIVE SET-UP

Multiple locomotive consists must be set-up as follows:

(a) Connect MU jumper cables between all locomotives.

(b) Connect and cut in one each of the following hoses between all locomotives:

1. Main Reservoir

2. Actuating

(c) Connect and cut in one each of the Application and Release hoses between all locomotives ahead of the locomotive containing the 36th axle.

L-214. TOWING LOCOMOTIVES

(a) Locomotives moving dead-in-tow, when not handled as trailing locomotives in the locomotive consist, must be placed and handled within the head 10 cars of the train, unless specific instructions are received from the Mechanical Department to handle on the rear.

(b) SW1500, SW1001 AND MP15DC LOCOMOTIVES

1. Only one SW1500, SW1001 or MP15DC locomotive may be towed on the head end of a train.

2. SW1500, SW1001 and MP15DC locomotives must not be pushed by more than the equivalent of 14 conventional powered axles, nor towed immediately behind a consist exceeding the equivalent of 14 axles of dynamic brake.

(c) MOVEMENT OF FOREIGN DEAD-IN-TOW OR PRIVATE OWNERSHIP LOCOMOTIVES

Before accepting a foreign dead-in-tow locomotive at interchange, or before moving a private ownership locomotive dead-in-tow, the crew must know that a Mechanical inspection has been made by the NS Mechanical Department and be informed of any restrictions necessary for its safe movement documented on a Transportation Notice issued by the NS Clearance Group.

A crewmember must notify the Manager Train Operations when a Transportation Notice authorizing movement, issued by the NS Clearance Group, is not available. Until authorization is received, the crew must not move the locomotive.

(d) NO. 6 OR NO. 14 EL LOCOMOTIVE BRAKE

When a locomotive, which has either the No. 6 or No. 14 EL type locomotive brake is to be towed, the locomotive should be shut down and the main reservoirs drained below 25 PSI. The independent and automatic brake valves must be placed in running position. The brake pipe cut out cock for the automatic brake valve must be cut out and the dead engine feature must be cut in. The dead engine feature is located near the distributing valve between the main reservoir and brake pipe.

L-217. GENERAL INSTRUCTIONS

(a) The controlling locomotive will remain on line unless mechanical difficulties require otherwise.

(b) Employees must not place their feet upon or otherwise damage windows, display screens or any other equipment. Trash must be deposited in trash containers.

(c) Locomotive windows and cab entrance doors must be kept closed on all unoccupied locomotives. All carbody doors must be kept closed while locomotive is in service.

(d) Walkway safety chains on coupled locomotives must be positioned to permit passage between locomotives or secured to prevent passage if no locomotive is coupled at that end. To prevent damage, safety chains must be secured in closed position before coupled locomotives are separated.

L-218. AIR HOSES AND LOCOMOTIVE JUMPER CABLES

(a) Air Hoses

Locomotive air hoses not in use will be attached to a dummy coupling or placed in pocket where provided.

(b) Jumper Cables

1. Locomotive jumper cables, when not in use, must be stored in the place provided.

2. When not in use, permanently attached jumper cables are to have the free end(s) secured in the proper dummy receptacle(s).

3. When a locomotive is set out at an outlying point or on line-of-road, a jumper cable must be left with the locomotive or at that location, if practicable. If this is not possible for any reason, the Train Dispatcher must be notified promptly.

L-219. BATTERY KNIFE SWITCH

The battery knife switch is to be opened when locomotives are shut down. Prior to opening or closing the battery knife switch, all circuit breakers, except those covered by a hood or shield,

must be in the open or off position.

Locomotives shut down and moving in a consist must have the battery knife switch opened, unless tagged otherwise.

L-220 LOCOMOTIVE DAMAGE PREVENTION

(a) Locomotives must not be operated over humps, car retarders or other special tracks unless it is known there is proper clearance.

(b) Locomotives must not be stopped and permitted to stand over open flame switch heaters or other burning heat sources.

(c) Locomotives must not pass through water which is deeper than 2 inches above the top of the rail. When passing through water over the rail but less than 2 inches above the top of rail, speed must not exceed 3 MPH.

(d) Locomotives that cannot be left running when temperatures are expected to drop below 32 degrees must have all water systems drained

EXCEPTION: Locomotives plugged in to a track side charging station.

L-222. FIRE EXTINGUISHERS

Engineers must be familiar with the location of fire extinguishers on locomotives and how to use them.

Whenever fire extinguishers are used, their use must be reported to MOC. A locomotive must be isolated and shut down before attempting to extinguish a fire in the high voltage cabinet.

L-223. SHUT DOWN IN AN EMERGENCY

In case of emergency, all engines of a locomotive consist can be shut down by using MU or Emergency Stop buttons or Throttle Stop position. The Emergency Stop buttons and the Throttle Stop position are not to be used except in an emergency. Engineers must know the location of the stop devices for the different classes of locomotives and how to start the engines after an emergency stop.

In case of fire, fuel oil supply to diesel engine must be shut off by operating the “Emergency Fuel Cut-Off” device.

L-225. ADDING LOCOMOTIVE COOLING WATER OR OIL

Prior to adding oil or water to a locomotive, the Engineer must contact the Mechanical Operations Center (MOC) for instructions. If unable to communicate with the Mechanical Operations Center, the Engineer will contact the Train Dispatcher who will contact MOC.

If it is necessary to add water to the diesel engine cooling system, this should be done with the engine idling. On locomotives with pressurized cooling systems, the pressure must be relieved before attempting to remove the pressure cap or water tank plugs.

L-227. GROUND RELAY

(a) If the ground relay trips, it may be reset. If ground relay trips 3 times within a 30 minute period, the locomotive must be isolated.

(b) On locomotives equipped with automatic ground relay resetting devices, a reset lockout is provided to prevent reset after ground relay trips 3 times. When this occurs, the device must be reset by maintenance personnel. With locomotives equipped with traction motor cut outs, the locomotive need not be isolated until ground relay trips 2 additional times after all traction motor cut out positions have been tried.

(c) The tripping of a ground relay must be reported to the Mechanical Operations Center (MOC), identifying the locomotive on which the ground relay tripped, the location on the road where tripping occurred, the approximate speed at the time and the operation should also be reported.

(d) Under no circumstances should the ground relay cut out switch be opened without first obtaining approval from the Mechanical Operations Center (MOC).

L-228. CRANKCASE OVERPRESSURE PROTECTION DEVICE

If the crankcase overpressure protection device trips on a locomotive so equipped, the engine can be restarted only 1 time. Before restarting the locomotive, it must be known that the cooling water level is normal and the engine has not experienced a crankcase explosion.

L-229 PROTECTION AND SAFETY DEVICES

(a) Except in the case of an emergency and only when properly authorized by the Mechanical Operations Center (MOC), locomotive and engine protection devices and locomotive safety control devices must not be nullified.

(b) Blocking of the independent brake handle in quick release or bail position on the controlling locomotive or any other locomotives in the engine consist with hoses coupled is prohibited.

(c) Engine run, generator field and control and fuel pump switches on trailing locomotives in a locomotive consist must be in open or off position.

(d) When locomotives are picked up as trailing locomotives on line-of-road, after connecting MU cable, Engineers must see that control and fuel pump switch is left in "OFF" position.

(e) When locomotives equipped with annunciator panels (generally located inside of the electrical cabinet, to indicate malfunctions of equipment or systems on a locomotive) experience a failure, the annunciator lights should not be reset. Resetting the annunciator will not correct or reset the fault.

L-231. ISOLATED LOCOMOTIVE(S)

(a) When a locomotive in a head end consist is shut down or isolated for any reason, the locomotive must be observed at frequent intervals while en route to determine that all wheels are turning freely.

(b) A locomotive in a remote DP consist must not be intentionally shut down. If a locomotive in a remote DP consist:

- must be shut down,
- has shut down and will not restart, or
- is known not to restart via the AESS or other fuel conservation system,

the locomotive must be either switched to the head end and all MU hoses and jumper cables connected or set out at the first available location. Unless the locomotive

in the remote consist is under direct observation, the train must not exceed a speed of 15 MPH until the locomotive is either on the head end of the train or set out.

(c) A Norfolk Southern locomotive in a remote DP consist may be isolated and allowed to shut down via AESS or other fuel conservation system, provided the breakers and knife switch remain in a closed or powered position.

Foreign line locomotives must not be isolated or shut down in a remote DP consist.

(d) To ensure a remote consist on a Distributed Power train is capable of transmitting an alarm/alert message to the controlling locomotive, only locomotives rated as Group 4 or higher may be used in the remote DP consist.

If an alarm/alert message from the remote DP consist is transmitted to the controlling locomotive, the train must be stopped as soon as possible consistent with safe train handling procedures. The Distributed Power consist must be inspected to determine the cause of the alarm/alert message and that all locomotive wheels are rotating freely.

L-232. SHUT DOWN OR ISOLATION OF DIESEL ENGINE

(a) LOCOMOTIVE ISOLATION OR SHUT DOWN REPORT Form ME-569, is to be applied to the Isolation Switch on a locomotive when the diesel engine is shut down or isolated and the engine should not be restarted or placed back on line. The Engineer must state the reason(s) for shutting down or isolating the engine on the report.

(b) DRAINING LOCOMOTIVES — The Engineer must contact the Train Dispatcher immediately to determine if draining the locomotive is necessary when a diesel engine is shut down and the danger of freezing is present.

The Engineer must contact the Mechanical Operations Center for draining instructions applicable to the NS Road Locomotive or Foreign Locomotive that is shut down. If unable to contact the Mechanical Operations Center (MOC), the Engineer must contact the Train Dispatcher who will communicate with MOC and advise the crew of the procedure for draining the cooling water.

L-234. INSPECTION AFTER ACCIDENT OR DERAILMENT

When a locomotive is involved in an accident or after a derailed locomotive has been re-tracked, if there is possibility of damage to traction motors, gear cases, brake rigging, fuel tank or other equipment that would prevent its safe movement, the locomotive must be inspected by a qualified supervisor or inspector before proceeding.

Locomotive should be moved to determine if all wheels rotate freely. If a speed restriction is required for safe movement, the qualified supervisor or inspector will designate that speed.

L-236. SECURING LOCOMOTIVES

(a) Before a locomotive is left unattended:

1. Place throttle in idle position.
2. Make a service application with the automatic brake
3. Fully apply the independent brake
4. Remove reverser handle.
5. Open generator field switch or circuit breaker.
6. Place isolation switch in “START” or “ISOLATE” position.
7. Apply the parking brake (manual hand brake or electric brake) on all locomotives.
8. Locomotives must be locked when left unattended at:
   - outlying points
   - remote points within yard or terminal limits

   If locomotive cannot be locked, a crewmember must promptly notify the Network Operations Center, Yardmaster or other designated person who will notify Mechanical Department personnel.

EXCEPTIONS:

1. Where authorized by bulletined instruction, apply the parking brake on only the controlling locomotive when the consist is left on engine servicing track.

2. When the lead locomotive consist is detached from a Distributed Power train, the Distributed Power locomotives left unattended in the train are not governed by the requirements of this Item provided the locomotives are properly configured in “SET OUT”

mode. A sufficient number of parking brakes must be applied to secure the equipment left standing.

3. To prevent freezing of the water lines, anytime the temperature is 10 degrees or below, or anticipated to drop to 10 degrees or below, except when other means of freeze protection are provided, all unattended locomotives must be left running and:

- Place the reverser in neutral position with the lever inserted.
- Open generator field switch or circuit breaker on each control stand.
- Place the isolation switch in “RUN” position.
- Place throttle in Position 2.

The Yardmaster or Train Dispatcher should be contacted as necessary for weather updates.

(b) If necessary to leave a locomotive on line-of-road on other than a track designated for tying up or setting off locomotives, permission must be obtained first from the Manager Train Operations.

(c) When a Remote Control Locomotive is left unattended:

1. Each OCU programmed to the RCL must be turned off. The OCU must be secured and stored properly or maintained in the RCO’s immediate possession.

2. If going off duty, the locomotive must be placed in manual operation and properly secured unless another RCO is physically present to take control of the RCL.

L-238. FUEL CONSERVATION PROCEDURES

The Train Dispatcher or Yardmaster should be contacted as necessary for weather updates concerning the current and expected temperatures.

(a) General Instructions

1. Even if equipped with a fuel conservation system such as Automatic Engine Start / Stop System

(AESS), when the temperature is anticipated to remain above 32˚F:

a. Locomotive(s) at any location that will not be utilized within 30 minutes must be shut down.

b. During meal periods, shift changes, and crew changes, shut down all locomotives unless a relieving crew member is present to immediately begin utilizing the locomotive.

c. Locomotives on an attended train not required for power must be shut down.

2. When the temperature is 32˚F or below or anticipated to drop to 32˚F or below, locomotives which are shut down must be restarted.

3. On an unattended train, when there is a need to retain air brake system pressure for greater than 24 hours, the lead locomotive in the consist may be left running and the Automatic Engine Start / Stop System (AESS) must be allowed to function. When a train or cut of cars will be left for less than 24 hours, all locomotives must be shut down.

4. At locations with personnel available, trains expected to be left for more than 24 hours should be shut down and restarted before the expiration of the 24 hours to ensure maintenance of the brake pipe. Once recharged, the locomotives must again be shut down.

(b) Train Operations

1. When a train or locomotive(s) is stopped, the reverser handle must be centered to activate the low idle feature.

2. When any attended train is stopped, the AESS will be allowed to control the locomotive consist engine run status.

3. On an attended train, the lead locomotive may be kept running by utilizing the AESS override or AES reset located on the back panel or the locomotive display

screens.

a. AESS reset must not be blocked or otherwise tampered with to cause continuous reset.

b. AESS operation or locomotive shutdown must not be prevented by use of any locomotive controls, features, or functions to include the reverser, throttle, or braking systems. When stopped, the throttle must be in idle, automatic brake applied, and independent brake fully applied.

c. Pusher locomotives must be isolated or shut down if temperature permits, at the first stop after determining power is not needed.

4. Locomotives in a DP remote consist will be left running and isolated and will not be shut down, when not required for tonnage.

(c) Light Locomotives

1. On light engine movements, all locomotives not required to safely control the movement will be isolated or shut down if temperature permits.

2. When leaving locomotive servicing areas, only the controlling locomotive will be on line. Trailing locomotives in the working consist will be isolated. Locomotives in tow will be handled as set up at the servicing area.

3. On inbound trains, all working locomotives except the controlling locomotive will be shut down after yarding the train. Upon arrival at either a locomotive facility or designated area where Mechanical Department personnel are on duty, all locomotives will be shut down when the temperature is above 32°F unless Mechanical Department employees are physically present to mount and take immediate control of the locomotives.

(d) Energy Management (EM) systems

Norfolk Southern operates two different energy management systems, **Wabtec Trip Optimizer and New**

York Air Brake Leader. These systems operate in two different modes:

- Stand Alone mode (applicable to Trip Optimizer only) - used on trains operating on non-PTC track, locations where we do not have end to end PTC-mapped track, and specific foreign line locomotives. There is not a stand-alone version of Leader.

- PTC Interface (integrated) - used on PTC active track, Leader EM is integrated with PTC, runs on the PTC CDU screen, and is reliant on PTC for operation.

Trip Optimizer runs on the locomotive smart display in two operating modes. The Stand Alone mode is completely independent of signal systems. The TO/PTC IM or PTC Interface mode (Integrated) receives all operating information from the PTC system and is reliant on PTC being initialized. Unlike Leader, all Trip Optimizer information and keys will be on the locomotive smart display.

1. Energy Management (EM) systems must be initialized by crew members on the lead locomotive (including foreign locomotives, if equipped) prior to departing the terminal or immediately upon taking charge of a train on line of road.

2. During EM initialization, crew members must verify that the train and locomotive consist are setup properly and the maximum train speed is set to reflect any equipment speed restrictions for the train.

3. Auto control mode must be used when operating conditions permit.

4. Report any EM initialization problems to the ATC Operations Center.

5. Crew members must verify the train consist is correct and update the EM system when the consist changes or if the consist is not accurately reflected. All train consist changes must be made in the MTR app. If operating EM in standalone mode, not

integrated with PTC, the trains consist must be changed in both the MTR app and in the standalone EM screen.

6. Crew members must verify the locomotive consist and operating status in both power and dynamic brake are correct. Locomotive Consist operating status changes such as lead locomotive orientation (FRONT or BACK), locomotive HPT status (RUN or ISOLATE), and Equipment Speed Restriction must be made in the PTC and/or stand-alone EM screen, if so equipped.

7. Crew members must not prevent EM auto control mode operation on Trip Optimizer locomotives by operating the train with the Power Mode screen open longer than necessary to make any changes required.

8. The EM system is operating as intended when the actual speed is within 5 mph of the planned speed, as indicated by the green or white line on the Trip Optimizer screen.

9. When necessary to disengage the EM system, match the current throttle position or DB notch and press the “disengage” or “manual” soft key.

10. Some EM equipped locomotives have technology that will automatically idle trail locomotives when they are not needed for tonnage or terrain. This can be seen in the consist window of the locomotive screen. When disengaging from EM, to ensure Smart Consist / Smart HPT has not left any locomotives idled and all locomotives are available for power and dynamic brake in manual operation, a crew member must:

- **a.** Press “restore consist” soft key, or
- **b.** Increase the throttle by at least one notch for at least 5 seconds, or
- **c.** Place the throttle handle in idle.

11. In Energy Management systems, the conditional speed function and/or the action of setting maximum

train speed below track speed is intended to allow for continued operation in auto control mode when conditions exist that would otherwise require manual operation at a speed that is below EM planned speed. It must never be used to prevent auto control mode operation or to operate at speeds below maximum authorized speed unless specific conditions exist requiring its use to remain in auto control mode.

a. Do not set a conditional speed below 20 mph,

b. Conditional speeds must be removed or maximum speed set back to maximum authorized speed (based on territory, train type or equipment restriction) after conditions that warranted the change no longer exist.

12. While in auto control mode, manual control of the train must be resumed when:

a. EM directs manual control,

b. Operating conditions change which will require the train to operate at speed below the EM (TO) trip plan and the Conditional Speed setting cannot be used,

c. Operating on signals that require the train to approach the next signal prepared to stop, or

d. The EM System functions in a manner inconsistent with safe train handling practices. Instances of this nature must immediately be reported to the RFE desk.

13. Crew members must log out of the Energy Management system at the completion of their trip.

14. HPT locomotive instructions contained in the Wheel Report provide the EM status of each locomotive in the consist, concerning its Energy Management system type, health, and required action in accordance with rules and practices, as follows:

Energy Management System	Energy Management System Health	Engineer Actions
GETO (GE Trip Optimizer)	Healthy	Auto Use Required
Leader	Healthy	Auto Use Required (When PTC in Use)
GETO or Leader	Unhealthy	No Help Desk Contact Required
No EM		No Help Desk Contact Required

(e) Horsepower Per Ton (HPT)

The following HPT instructions do not apply to trains that are initialized and actively operating Trip Optimizer.

HPT instructions are train-specific based on the train's actual locomotive consist and scheduled route. The HPT requirements are provided on the outbound wheel report with a listing of the train's symbol and locomotives with a "RUN" or "ISO" designation for the route.

At locations where the train is stopped, a crew member must make necessary changes to locomotives in use to comply with HPT requirements. Locomotives not needed according to HPT values must be shut down in accordance with this rule.

EXCEPTION: Additional locomotives more than what is specified by HPT, but not exceeding powered axle limits may be placed on line ("RUN") at the direction of the MTO, the CRFE desk, or for deadhead employees in inclement weather.

- Employees deadheading by train should occupy locomotives that are on line for HPT purposes.
- During inclement weather, if no on line locomotives are available for deadhead employees, an additional

locomotive, not indicated as required by HPT, may be placed on line for the purpose of cab heat.

- Additional locomotives placed on line for the above purposes must be reported to the CRFE desk.

An example of HPT Locomotive Instructions, provided as a reference:

*** HPT LOCOMOTIVE INSTRUCTIONS ***

Train ID 385A316

NS 001842	RUN	- LEADER	- Healthy	-Auto Use Required (When PTC in Use)
NS 009538	ISO	- NO EM		-No help desk contact required
NS 004184	RUN	-GETO	- Healthy	-Auto use Required

LOCATION	*				
BIRMINGHAM	*	NS 001842	RUN	RUN	
	*	NS 009538	ISO	RUN IF >	9520
	*	NS 004184	RUN	RUN IF >	4760
RYAN	*	NS 001842	RUN	RUN	
	*	NS 009538	ISO	RUN IF >	12711
	*	NS 004184	ISO	RUN IF >	6355
SELMA	*	NS 001842	RUN	RUN	
	*	NS 009538	ISO	RUN IF >	11920

	*	NS 004184	ISO	RUN IF >	5690
MCINTOSH	*	NS 001842	RUN	RUN	
	*	NS 009538	ISO	RUN IF >	36941
	*	NS 004184	ISO	RUN IF >	18470

HPT Instruction does not supersede the maximum permissible powered axle limitations contained in NS-1 Rule L-207

Trailing units not needed for power according to HPT but occupied by deadhead employees may be left running and online during inclement weather.

Dynamic brake and powered axle limits must not be exceeded.

Notify the RFE desk when this condition arises.

- For Train 385A316, the lead and 3rd locomotive, NS 1842 and NS 4184 are designated as “RUN” at the origin terminal, Birmingham, due to the train’s tonnage being between 4760 and 9520 tons.
- If there are no changes to the train’s consist, locomotives must be added or isolated, when the train is stopped, to comply with the instructions in each successive section of the instructions.
- Additional locomotives may be added if work events result in the tonnage being greater than the tonnage values indicated in the HPT table. For example, if the train’s tonnage at Selma is “greater than” 5,960 tons, NS 4184 must be placed in “RUN” status. If the tonnage at Selma is “greater than” 11,920 tons, NS 9538 must be placed in “RUN” status.
- Locomotives must be isolated if work events result

in the tonnage being lower than the tonnage values indicated in the HPT instructions. For example, if the trains tonnage between Birmingham and Ryan was reduced and is “less than” 4970 tons, the NS 4184 should be isolated.

L-239. YARD SERVICE LOCOMOTIVES

SW1500, SW1001 and MP15DC type locomotives will be handled as follows:

(a) MP15DC type locomotives are not equipped with traction motor shunting and must not be operated under power in the eighth notch at speeds above 20 MPH. MP15DC type locomotives may be operated at maximum authorized speed up to 50 MPH in seventh notch or lower.

(b) Must be used as lead when operated in road service in multiple due to not being equipped with dynamic brakes.

L-240. LOCOMOTIVE CALENDAR DAY INSPECTION AND REPORTING

(a) Calendar Day Inspection

1. Each locomotive in use must be inspected once each calendar day. When taking charge of locomotives, Engineers or Remote Control Operators will determine if an inspection is required by examining Form ME-65 located on each locomotive. An inspection record, Form ME-65, must be completed and maintained on each locomotive indicating:

a. Date

b. Time

c. Location

d. Signature of inspecting employee

e. Compliance

When a Calendar Day Inspection is not in date and Mechanical Department employees are not assigned to inspect, Engineers or Remote Control Operators will inspect each locomotive and at the time the inspection is performed, complete the (above) appropriate lines on Form ME-65.

NOTE: Printed names in the signature column on Form ME-65 are not permitted. Signatures must be legible.

(b) Locomotive Calendar Day Inspection and Reporting System (LCDI)

All Engineers or Remote Control Operators are required to report the status and condition of their locomotive consist(s). Completion of the LCDI Report is mandatory:

1. At the completion of tour of duty, the Engineer or Remote Control Operator must review the LCDI System and confirm that all defects reported have been properly entered into the LCDI System.

a. Prior to being relieved under HSL, every effort should be made to notify the LCDI / MOC Desk of any defects.

b. Engineers or Remote Control Operators, who have reached their HSL and are unable to complete the electronic LCDI Report, must verify and complete the LCDI Report at the beginning of their next tour of duty.

2. If reported defects are not present on the LCDI reporting screen, it is the Engineer or Remote Control Operator's responsibility to enter the defects.

3. All defects identified and reported must be identified by their FRA classification of defect. The Defect Category, as determined during required reporting to LCDI / MOC Desk personnel, should be marked with an "F" to indicate a FRA Non-Complying Condition or a "D" to indicate all other reported defects.

L-241. CRESTING AND DESCENDING GRADE

(a) As the locomotive consist crests the summit, the throttle must be reduced to maintain a safe level of forces in those couplers at the crest of the grade.

(b) Descending Steep Grades (1% or More)

1. Timetables or special instructions will identify the section of track with an average grade of 2% or greater over a distance of 2 continuous miles or 1% or greater over a distance of 3 continuous miles.

2. Determine the number of Effective Dynamic Brake

Axles (EDBA) including the EDBA value of Distributed Power locomotives and / or pusher locomotives (with operable dynamic brakes)

3. Select the Steep Grade chart available in the appendix that corresponds to the percent grade (up to 2.50%), train type and tonnage to find the minimum number of Effective Dynamic Brake Axles (EDBA) required and the maximum speed the train may descend the grade. If the grade exceeds 2.50%, refer to local instructions for maximum operating instructions.

4. Prior to descending the grade the air brake system must be charged within 15 PSI of the regulating valve or Equalizing Reservoir setting

5. Trains NOT meeting the Effective Dynamic Brake Axle requirement:

a. The train may descend the grade but must NOT exceed a speed of 15 MPH

b. If an automatic brake pipe reduction greater than 18 PSI must be maintained for more than two miles:

1. the train must be stopped and immediately secured with sufficient number of hand brakes.

2. the air brake system must be charged within 15 PSI of the regulating valve or Equalizing Reservoir setting before proceeding.

3. hand brakes may remain applied on loaded cars until the train safely descends the grade.

6. Partial or Complete Loss of Dynamic Brake While Descending Grade:

If a train experiences a partial or complete loss of its dynamic brakes, which results in fewer EDBA than originally calculated,

a. Train speed must be reduced to comply with the lower speed shown for the current number of EDBA.

b. If EDBA fall below the minimum indicated, the train must be handled in accordance with instructions for Trains NOT meeting the effective dynamic brake axle requirements.

L-242. BACK UP OR SHOVE MOVEMENT

Prior to making a back up or shove movement, consideration must be given to tonnage, train length, position of heavy and light cars, grade conditions, track curvature, turnouts, locomotive type and number in the consist.

(a) Train air brakes are to be fully released before applying maximum power.

(b) Amperage must be limited to a safe level throughout the movement.

(c) Where equipment and track conditions indicate a high risk for jackknifing, rail turnover or pushing cars off the outside of sharp curves, no more than the equivalent of **18 powered axles** should be used.

(d) Back up movements must not be made account inability to start a forward movement.

(e) If the back up movement cannot be started after taking slack, other arrangements must be made.

(f) No more than the equivalent of 12 powered axles may be used to make a back-up or shove movement with Remote Control Locomotives.

EXCEPTION: The equivalent of **18 powered axles** may be used to make a back-up or shove movement when humping cars with Remote Control Locomotives in compliance with special instructions at the following hump classification yards:

- Moorman Yard - Bellevue
- Brosnan Yard - Macon
- Spencer Yard – Linwood
- Norris Yard – Birmingham
- Elkhart Yard - Elkhart

L-243. USE OF LOCOMOTIVE BRAKE

The independent brake may be used only in switching, handling a light locomotive, starting a train on descending

grade or in an emergency.

Brake cylinder pressure may be allowed to apply to a safe level from an automatic brake application when there are more locomotives than cars or in a very short train when slowing or stopping. Brake cylinder pressure is to be bailed off during automatic brake application on other trains.

EXCEPTION: When using the dynamic brake to make a planned stop, the independent brake may be used to complete the stop, provided that:

1. No more than 20-axles are in the locomotive consist, including locomotives in tow,
2. Slack is bunched throughout the train and terrain will keep slack bunched after stop is completed.
3. Dynamic brake is released and independent brake is applied simultaneously.
4. Stop is not being made with train in a turnout or crossover. (Does not apply to solid loaded bulk commodity trains.)
5. Speed is decreased to 3 MPH or less with dynamic brake fully applied

L-244. LOCOMOTIVE BRAKE IN SWITCHING OPERATIONS

When relying entirely on the locomotive brakes to control speed in a switching operation, the independent brake must be applied gradually to a safe level to control slack run in or run out. Consideration must be given to rail condition, weight of cars, distance required for stopping and number and type of locomotives.

When locomotive brake is not sufficient to control the movement, the crew must couple air and determine that brakes are operative on a sufficient number of cars.

When operating a locomotive moving away from a hump with cars at or near the crest of the hump, the independent brake may only be applied to a maximum of 15 PSI until slack is bunched.

When equipped with clasp type brake rigging, brake cylinder pressure must not be permitted to exceed 25 PSI at

speeds in excess of 10 MPH.

L-245. USE OF TRAIN AIR BRAKE

The air brake is to be used with or without dynamic brake for better management of slack and improved train handling, when the dynamic brake is not available, or in an emergency.

(a) Slowing or Stopping a Train

An initial brake pipe reduction of 5 to 8 PSI should be made while working power or maintaining dynamic brake, keeping the locomotive brake released. After the air brakes have taken effect throughout the train, the throttle setting should be reduced gradually, keeping the train stretched or the dynamic braking effort maintained as necessary to prevent head end run out. Additional brake applications of 2 to 3 PSI may be made to further reduce speed, keeping the locomotive brake released.

(b) Re-application of Train Air Brakes

After releasing an automatic brake application and another brake application will be required to further control the movement prior to the train brake system becoming fully recharged, additional applications must be at least 3 PSI GREATER than the previous reductions to ensure the brakes reapply.

EXCEPTION: Not applicable when using 100% retainers

(c) The locomotive regulating valve or Equalizing Reservoir setting must not be adjusted or used in making train air brake applications or releases.

(d) Brake pipe cut out valve on the controlling locomotive of the consist will be in the “IN” position except while:

1. Performing brake pipe leakage test.

2. Operating as a helper locomotive and coupled to the train.

(e) Light locomotive consist will operate with the automatic brake valve handle in the “release” or “running” position.

(f) When one or more locomotive(s) are coupled to a train, all automatic brake valves must be cut out except the one from which the train brakes are operated.

(g) Air Brake Use When Train Has Stopped and Train Air Brakes Will be Required to Safely Control the Movement

1. When a train:

- is stopped with a brake application of 18 PSI or more, or
- receives an emergency brake application,

and another brake application will be required as grade is descended:

a. Immediately apply sufficient hand brakes to secure the train.

b. Release air brakes.

c. Charge air brake system to within 15 PSI of regulating valve or equalizing reservoir setting as indicated by a gauge at the rear of the train and wait at least 10 minutes before proceeding.

d. Hand brakes may remain applied until the train safely descends the grade.

2. When a train has stopped to remove pusher locomotive:

a. Drape and hold the train with the independent brake if possible.

b. Brake system must remain fully charged.

c. Remove pusher locomotive from the train at the bottom of the grade if the train is not draped and held or the brake system is not maintained fully charged.

NOTE: Do not remove pusher locomotive on a grade unless brake system remains fully charged.

(h) Unintentional Brake Release

If an unintentional brake release occurs while the brakes are applied, an additional brake pipe reduction of at least 5 PSI below the last effective brake pipe reduction must be made. If a subsequent brake pipe reduction is not effective, immediately place the train's brakes in emergency. Following any unintentional automatic brake release, crew members must immediately notify the Chief Dispatcher.

L-246. RUNNING RELEASE

(a) After the air brake is applied, a running release MAY be made when the last brake pipe application has become effective on the rear car of the train, and a total reduction of 10 PSI but not exceeding 15 PSI has been made, provided:

1. Brakes on the entire train have been released before the train speed is reduced to 10 MPH.

2. Sufficient dynamic brake can be maintained to prevent slack run-out, or the locomotive tractive effort (power) is maintained or reduced while the brakes are releasing.

3. The train length is not over 6,250 feet unless the terrain is such that it will allow the slack condition to remain constant during release.

EXCEPTION: 15 PSI or less reduction does not apply when cresting or descending heavy grades, to Distributed Power, to ECP trains or to trains less than 3,700 feet in length.

(b) Following a penalty application, a complete stop must be made before the train air brake is released.

L-247. MOVEMENT OF NON-COMPLYING LOCOMOTIVES

A locomotive with one or more conditions not in compliance with the Railroad Locomotive Safety Standards may be moved as a light locomotive or a dead locomotive after the railroad carrier has complied with the following:

(a) A qualified person must determine that:

- it is safe to move the locomotive
- the maximum speed and other restrictions necessary for safely conducting the movement

(b) The Engineer in charge of the movement of the locomotive must be notified in writing by a copy of Form ME-615 “Non-Complying Locomotive” and must inform all other crewmembers in the cab of the presence of a non-complying locomotive and the maximum speed and other restrictions determined under Item (a) of this rule.

(c) A Form ME-615, must be securely attached to the isolation switch or near the engine start switch on the non-complying locomotive.

(d) A locomotive that develops a non-complying condition en route may continue to utilize its propelling motors, if it is

safe to move the locomotive, until the earlier of:

1. The next Calendar Day Inspection.

2. The nearest forward point where repairs necessary to bring it into compliance can be made.

L-248. PUSHER SERVICE

The following procedures must be observed when pusher locomotives are used:

(a) After coupling locomotives to rear of train or cut of cars to be pushed, place the automatic brake valve in “HANDLE OFF” position, cut the automatic brake out, and allow train line air to be controlled by the lead locomotive.

(b) Couple train line hoses and open both angle cocks.

(c) A visual inspection must be made of each helper locomotive’s brake system to determine that the brakes apply in response to a 20 PSI reduction initiated from the controlling locomotive of the train.

(d) The locomotive coupled to the rear of the train must be unoccupied except:

1. when the rear car is loaded and equipped with a bottom shelf coupler, or

2. the rear car is loaded with a solid bulk commodity with or without bottom shelf couplers, or

3. only a single pusher locomotive is used.

(e) If a caboose or shove platform is ahead of the pusher locomotives, the caboose or shove platform must be unoccupied while pushing.

(f) When pusher service is no longer required:

1. the movement must stop and both angle cocks closed before pusher locomotives are uncoupled except where automatic uncoupling device is authorized.

2. Cut in automatic brake on the pusher locomotives, test independent brake and separate from train or cut of cars being pushed.

(g) No more than the equivalent of **18 powered axles** may be used in pusher service. Where authorized by Special Instructions, the equivalent of **24 conventional powered axles** may be used to push a loaded bulk commodity train.

(h) A locomotive must not be used as the controlling locomotive in a pusher consist unless it is known to be equipped with a Power Knockdown feature that reduces power or engine speed without delay following an emergency application of the air brakes initiated from any source other than the automatic brake valve.

The following test will be used to determine that the locomotive is equipped with an operative Power Knockdown feature:

1. Center reverser
2. Open generator field switch
3. Place automatic brake valve handle in HANDLE OFF position and cut automatic brake out.
4. Place throttle in notch 3
5. Open the conductor's emergency valve and determine that engine speed is reduced to idle

L-250. EMERGENCY BRAKE APPLICATION AND PENALTY BRAKE APPLICATION — PUSHER SERVICE

(a) In the event of an emergency brake application, the Engineer of the leading locomotive will immediately notify the Engineer of the pusher locomotive who will immediately place the automatic brake valve handle in emergency position.

(b) In the event of a penalty brake application, the Engineer of the leading locomotive will immediately notify the Engineer of the pusher locomotive who will promptly place the throttle in IDLE.

L-252. INSPECTION OF CAB SIGNALS AND LSL EQUIPMENT

Prior to considering any cab signal or LSL test complete, a visual inspection of the cab signal system receiver bar on the lead engine in the direction of travel must be made. Receiver bars should be mounted 6.5 to 7 inches above the top of the rail and must be inspected for:

- Bent or damaged frames
- Cut, nicked or bare cables
- Dangling or loose cables
- Loose or missing mounting bolts

DISTRIBUTED POWER (DP) OPERATIONS
DP OPERATING MODES

NORMAL – all remote traction and dynamic brake functions are enabled for control. All remote air brake functions are enabled and the brake valve cut in.

IDLE – the remote throttle remains in IDLE. All remote air brake functions are enabled and the brake valve may be cut in.

ISOLATE – the remote throttle does not respond to commands and remains in IDLE. The remote's emergency air brake application function and independent brake functions are enabled for control. All other brake functions are disabled and the brake valve is cut out. NOTE: This condition may automatically occur during a COMM LOSS.

SYSTEM MODE RUN – normal DP system mode. All throttle, dynamic brake, and air brake functions available. Synchronous and Independent control are available.

SYSTEM MODE IDLE – initial mode after linking. All airbrake functions are available. No throttle control is available. Successful brake pipe continuity test required before mode can be changed.

SYNCHRONOUS CONTROL – remotes duplicate traction, dynamic brake, and air brake commands from lead DP locomotive. Commands are sent instantly but may take up to 20 seconds to update on the controlling locomotive's screen.

SET OUT – the remote throttle does not respond to commands and remains in IDLE. The remote's throttle and dynamic functions are disabled and the brake valve is cut out. All other air brake functions are disabled and the brake valve is cutout. NOTE: This condition may automatically occur during a COMM LOSS.

ASYNCHRONOUS CONTROL (FENCED) – allows remote locomotive to be commanded independently of the lead locomotive. All automatic and independent braking remain under the control of the lead locomotive.

BV OUT – all remote traction and dynamic brake functions are enabled for control. The emergency and independent air brake functions are enabled for control. The remote automatic air brake functions are restricted by cutting out the brake valve.

MOMENTARY COMM LOSS (DP) - a loss of communication between a controlling lead locomotive and a controlling remote locomotive lasting less than 45 seconds. This type of

communication loss will be displayed on the controlling lead locomotive with the word “COMM” displayed in yellow letters above the controlling remote locomotive with which the controlling lead locomotive cannot communicate.

SUSTAINED COMM LOSS (DP) – a loss of communication between a controlling lead locomotive and a controlling remote locomotive lasting 45 seconds or longer, or in 10 seconds if an automatic brake application is made. A sustained COMM LOSS will be displayed on the controlling lead locomotive with the word “COMM” in red letters above the controlling remote locomotive with which the controlling lead locomotive cannot communicate.

TRAIN CHECK – an automated feature that ensures continuity and integrity of the brake pipe specifically for COMM LOSS communications.

DP-1. SET-UP

(a) Before beginning DP set up, each locomotive consist, lead and remotes must be set up as a lead consist for conventional train operation.

(b) The automatic brake handle on the controlling remote locomotive must be pinned (if equipped) and the seat locked or secured from contacting the controls.

1. The cab doors on the remote consist must be locked (if equipped).

2. Linking DP locomotive consists:

a. The train and locomotives must be properly secured.

b. After conditioning and linking consists, a DP Brake Pipe Test must be performed.

DP-2. VERIFICATION

After a link is established, a load test in FENCED mode must be performed individually on each remote consist to confirm each remote consist is loading in the intended direction. This test is not required if conditions such as grade or curvature could compromise safe train handling.

DP-3. AXLE LIMITS

Unless otherwise specifically authorized by special instructions:

(a) Powered axle count for remote DP consists must conform individually to axle limits under power as follows:

1. Mid-train – no more than the equivalent of 18 powered axles,

2. Rear of train – must conform to L-248 Helper/Pusher Service limits.

(b) Dynamic brake axle count for DP remote consists must conform individually to axle limits for dynamic brake as applicable for a head-end consist.

(c) Amperage restrictions applicable to head-end consists also apply to mid-train remote consists.

DP-4. DP OPERATION

(a) When utilizing DP, the operator must use the DP Screen to observe and monitor the remote locomotives.

(b) To improve train handling, normal DP operating mode is ASYNCHRONOUS CONTROL (FENCED). Engineers are responsible for the appropriate placement of the fence when operating multiple remote consists.

(c) Prior to entering locations of known communication loss, DP remote consist must be set up for operation through the communication loss, consistent with fuel conservation guidelines.

DP-5. MOVEMENT OF REMOTE LOCOMOTIVE CONSISTS

(a) Remote consists may not be operated from the lead consist unless the brake pipe is connected and open between the lead and remote consists.

(b) Remote locomotives must be unlinked and set up for conventional operation when necessary to move separate from the lead DP locomotive consist.

DP-6. TRAIN CHECK

(a) A TRAIN CHECK must be performed immediately before movement:

1. Anytime the train stops.

2. By the outbound crew at the initial terminal and at all crew change points.

(b) A TRAIN CHECK is not required:

1. During brief stops within yards/terminals.
2. On descending grades where train handling techniques require automatic air brakes to remain applied when initiating movement.
3. If movement of the train immediately follows a Brake Pipe Continuity test or DP Leakage Test.

(c) TRAIN CHECK Failure

1. No Communication Failure:

   a. Perform a second TRAIN CHECK. Train may proceed if a second TRAIN CHECK is successful.

   b. If the second TRAIN CHECK is unsuccessful, and there is no indicated communication failure, the train may proceed after:

   - Making a 10 PSI brake pipe reduction,
   - Placing all remote consists in BV OUT, verifying BV OUT, and returning all remote consists to NORMAL mode, and
   - Releasing the automatic brake and verify a rise of at least 5 PSI at the rear of the train.

   The Locomotive Help Desk must be notified if any remote consist brake valves do not cut back in with a rise in brake pipe pressure of at least 3 PSI.

   c. A failure of the above two methods indicates brake pipe blockage, excess brake pipe leakage, or an interruption in communications between the Lead and Remote(s). A visual inspection of the train is required. After correcting and reporting any defects, a new TRAIN CHECK must be performed.

2. Communication Failure or interruption:

   If necessary, the train may proceed, not exceeding 10 MPH, for a distance of no more than 2 miles in order to establish communication. Proper precautions must be taken to ensure remote locomotive brakes are released.

3. When communication is re-established, the train may proceed after a successful TRAIN CHECK is performed.

DP-7. USING REMOTE DP EQUIPMENT IN PLACE OF AN EOTD

(a) DP locomotives may be used as an EOTD when placed at the rear of the train. The location of the controlling DP locomotive in the remote consist does not affect use as a telemetry device.

(b) When utilizing a DP locomotive as an EOTD, a DP COMM LOSS is the same as a conventional EOTD COMM LOSS.

DP-8. SET OUT MODE

(a) Remote locomotives left unattended in the train must be left in SET OUT mode and are not required to be individually secured provided a sufficient number of brakes are applied to secure the equipment left standing.

(b) When the continuity of the brake pipe is broken or interrupted, the train must not be moved until any remote consists to be left are placed in SET OUT mode.

(c) Upon initial movement of the lead locomotive consist in SET OUT mode, the operator must confirm that the brake cylinder pressure remains at full application on the remote locomotives, and that the controlling remote locomotives are not:

1. Responding to the brake release, or

2. Developing tractive effort in response to throttle commands.

(d) After the train is back together, prior to cutting in the train's automatic brake, press NORMAL then EXECUTE and ensure the remote status changes from SET OUT to NORMAL. Three-step protection can now be initialized and train make up may be completed. After a 3 lb. rise in air pressure, verify the BV valve is automatically cut in.

DP-9. COMM LOSS

(a) While Moving

1. During DP COMM LOSS, the remote consist will continue to operate according to the last command received up to 90 minutes, OR:

a. Until communication is restored OR,

b. If the COMM LOSS occurred in power or idle, until there is a change in brake pipe pressure of

a minimum application from a fully charged brake pipe or an additional 10 PSI reduction from a non- fully charged brake pipe OR

c. If the COMM LOSS occurred while operating in dynamic braking, the train is brought to a stop and the brake pipe is reduced to zero via an emergency brake application and brake pipe pressure is restored.

2. After communication is re-established, the remote consist must be placed back in NORMAL. Releasing the automatic brake will cut the brake valve back in on the DP remote consist.

(b) While Stopped

1. Anytime COMM LOSS occurs while the train is stopped, the remote locomotives independent brakes will remain in the applied position. Before movement, the independent brakes must be released by reducing the brake pipe pressure to zero with an emergency brake application and the pressure restored.

2. If the COMM LOSS occurs after the remote consist has been placed in SET OUT mode, there is no procedure to release the independent brakes. Communication will have to be restored or the remote locomotives will need to be returned to a conventional state to release the independent brakes.

DP-10. ENDING DISTRIBUTED POWER

To end Distributed Power set up, consists must be unlinked and DP ended from the operator controls. The DP circuit breaker must not be opened until these steps are completed.

DP-11. AIR BRAKES — DISTRIBUTED POWER

Air brakes are not to be cut out on Distributed (mid-train) Power when bleeding air on trains in terminals or yards.

REMOTE CONTROL LOCOMOTIVES

RC-1. DAILY INSPECTION PROCEDURES

(a) Remote Control Locomotive

1. Daily inspection interval requirements of an RCL are the same as those of a conventional locomotive.

2. Daily inspection brake tests of an RCL must be completed with the locomotive in Remote Control. If the Remote Control System is inoperative at the time of the daily inspection brake test, the defect must be noted on the locomotive daily inspection report.

3. If the Remote Control equipment permanently mounted to the locomotive becomes defective, the defect must be noted on the locomotive daily inspection report.

(b) Operator Control Unit

1. When operating the Remote Control Locomotive, the OCU is an appurtenance to the locomotive.

2. An OCU found to be defective at any time may not be used.

3. A defective OCU does not need to be reported on the locomotive inspection report.

4. A defective OCU must be immediately removed from service, tagged, and reported to the proper authority.

RC-2. SET-UP AND TESTING

(a) Prior to operating an Operator Control Unit (OCU), the Remote Control Operator (RCO) must ensure that each OCU is properly setup and tested.

(b) The following tests are required each time an OCU is linked to a Remote Control Locomotive (RCL), at the beginning of each shift, and when a RCO relieves another RCO:

- Reset Safety Control (RSC) Test
- Tilt Test
- Emergency Test
- Running Test

If a second OCU is being used, pitch control to that OCU

and perform the RSC, Tilt, Emergency, and Running tests. Release the handbrake after all the tests are successfully completed prior to moving the locomotive.

(c) To perform the Reset Safety Control Test:

1. Place the Reverser selector in Neutral position.
2. Press the Reset button and then move the speed selector to Coast or Coast B.
3. After 50 seconds, determine that the OCU is operating properly by confirming that the:
   a. Pulse tone alarm sounds,
   b. full service brake application occurs after approximately 10 seconds.
4. Return the speed selector to Stop and recover the OCU.

(d) To perform the Tilt Test:

1. Tilt the OCU more than 45 degrees from its' normal position. If the OCU is operating properly, it will:
   a. Sound a continuous tone alarm after approximately one second and flash the Emerg LED,
   b. Cause a Tilt Time-out fault after approximately four seconds. An emergency brake application will occur.
2. Verify the emergency brake application.
3. Verify that the system broadcasts a "Tilt Timeout" message on the radio.
4. Recover the OCU.

The system will broadcast a "Brake recovery complete. Consist ready." talker message after the brake pipe has been recovered.

(e) To perform the Emergency Test:

1. Place the Independent Brake Selector in Emerg position. An emergency brake application will occur.
2. The system will not recover until 60 seconds after the emergency application.
3. Recover the OCU.

The system will broadcast a “Brake recovery complete. Consist ready.” Talker message after the brake pipe has been recovered.

(f) To perform the Running Test:

1. When making the running test, observe the location of the “F” mark on the RCL. The “F” designates the forward end and direction of movement when the OCU Direction Selector is placed in the FWD position.
2. Select a direction with the OCU.
3. Push the RSC button.
4. Move the Speed selector to Couple.
5. Verify that brakes release and unit moves.
6. Move the Speed selector to Stop.
7. Verify that brakes apply and unit stops.

RC-3. REMOTE CONTROL MODE TAG

The controlling Remote Control Operator on a Remote Control assignment must apply the prescribed tag on the throttle indicating the locomotive is being used in a Remote Control mode. Only the controlling Remote Control Operator may remove the tag when the locomotive is placed in manual mode.

RC-4. REMOTE CONTROL EQUIPMENT AND SYSTEMS

Remote Control Operators will advise their immediate supervisor of any problems or malfunctions with the Remote Control equipment or system.

RC-5. PROPER HANDLING AND SECUREMENT OF OCUs

(a) The employee using the OCU:

1. Is responsible for its proper use and handling.
2. Must sign the device out on the OCU Control and Transfer Form at the beginning of his/her tour of duty.
3. Must sign the device in on the OCU Control and Transfer Form at the completion of his/her tour of duty.

(b) The OCU when not in use must be:

1. Kept at a secure location specified by special instructions.

2. Stored in a designated locked storage area with the power off and battery removed.

(c) When the OCU is transferred to another Remote Control Operator, the employee being relieved must make a notation on the OCU Control and Transfer Form of the:

1. Name of the relieving employee.
2. Date.
3. Time.

NOTE: The Hours of Service must not be exceeded when entering the required information.

(d) The unauthorized removal from company property or disposal of an OCU is prohibited.

OPERATION OF TRIPLE CROWN EQUIPMENT

T-400. REVERSE MOVEMENTS

Reverse movements with Triple Crown Service Rail Compatible Vehicles (RCV), when in a yard or on line-of-road, must be made only when absolutely necessary and then only under the following conditions:

(a) Speed may not exceed 10 MPH.

(b) The controlling locomotive will be on line. All other locomotives must be isolated unless terrain and tonnage require additional power.

(c) The amperage/tractive effort must be limited to a safe level when starting a reverse movement. If more than one locomotive must be used, the throttle must be slowly advanced and amperage/tractive effort constantly monitored for any abnormal changes.

(d) **Coupling** — A member of the crew must be positioned to watch the rear end of the movement. Prior to coupling to any other standing Triple Crown Service Rail Compatible Vehicle (RCV), a stop must be made within 5 car lengths prior to the coupling. The movement must be stopped again no closer than 10 feet from the equipment to be coupled to.

The relative height between the tongue and pocket must be correct before the movement is allowed to couple.

T-401. BRAKE PROCEDURES

The truck mounted spring parking brake functions very differently from a conventional rail car hand brake. The spring parking brake cylinder contains a heavy coil spring that acts to extend the brake cylinder piston any time brake cylinder pressure to the truck is lost. Spring parking brakes also apply after an emergency brake application to keep the train from rolling away if air brake cylinder pressure bleeds off.

(a) Locomotive independent brake and dynamic brake must be used with caution to minimize longitudinal forces on Triple Crown Service Rail Compatible Vehicles (RCVs).

(b) Air brakes on Triple Crown Service Rail Compatible Vehicles (RCVs) will be cut out according to **Rule A-27**.

(c) The acceptable length for Rail Compatible Vehicle (RCV) trains during cold weather will be determined from the "temperature- to length" chart. (See **Rule A-32**) Rail Compatible Vehicle (RCV) trains are limited to a maximum of 150 vehicles and are not to exceed 5,200 trailing tons behind the head RCV unless otherwise restricted by local instructions.

(d) Sticking Brakes:

1. Cut out brake valve at the truck.

2. Pull the brake release handle to bleed all air from the brake system.

3. Check to ensure that brakes have released.

(e) Any vehicle bypassed with a run-around hose must be set out at the next Triple Crown terminal.

(f) Do not bypass a bogie unless absolutely necessary. If a bogie must be bypassed, the spring brake must be caged or otherwise disabled.

(g) Manually releasing ("Caging") spring parking brakes — When moving a Rail Compatible Vehicle (RCV) trailer mounted on a rail bogie without brake pipe pressure to the truck, the spring parking brake must be released manually prior to movement of the equipment. NOTE: The "caging" procedure will be performed only by specially qualified personnel.

(h) The brake cylinder piston travel for Mark V RoadRailer® equipment, using a standard swing motion truck, will be set as follows:

Initial Terminal 1-1/4 to 3-1/2 inches

A piston travel in excess of 3-5/8 inches will be considered an ineffective brake.

T-402. DETACHING LOCOMOTIVES OR SEPARATING RAIL COMPATIBLE VEHICLES (RCVS) ON LINE-OF-ROAD

The following procedure must be followed before detaching locomotives or separating Rail Compatible Vehicles (RCVs):

(a) Reduce train line pressure to zero (0) with an emergency brake application.

(b) Inspect 20% of the equipment (no less than 10 vehicles) to ensure that brakes are applied.

NOTE: If equipment is left standing on a grade of 1% or more, 50% of the equipment (no less than 10 vehicles) must be inspected to ensure that the brakes are applied.

(c) When making a cut between Rail Compatible Vehicles (RCVs), check the landing gear of the trailer behind the cut to ensure that the nose of the trailer is fully supported.

(d) Leave the train line open to the atmosphere.

NOTE: This procedure does not apply when detaching locomotives from Rail Compatible Vehicles (RCVs) in yards or at other locations designated by bulletin or special instructions.

T-403. GENERAL INSTRUCTIONS

(a) Set Out Trailers Whenever:

1. Highway tires are on the rail and cannot be properly secured.

2. Dragging equipment cannot be secured.

3. The unit has a hot or damaged journal.

4. A rail wheel is detected with either of the following:

a. A flat or shelled spot that is 2-1/2 inches or more in length.

b. Two adjoining flat or shelled spots each of which is 2 inches or more in length.

(b) Adjusting Coupler Height — To adjust coupler height, raise or lower the landing gear on the unit being coupled to.

(c) Highway Operation — If a Rail Compatible Vehicle (RCV) unit is set out of a train along line-of-road and is to be picked up by a highway tractor, ensure that the mode valve is in the highway mode before dispatching the trailer over the highway.

T-404. ASCENDING OR DESCENDING GRADES

When Triple Crown Service Rail Compatible Vehicle (RCV) trains are stopped on an ascending or descending grade due to an emergency brake application of the air brakes, regardless of the cause, the automatic brake valve must not be released to charge

the air brake system until the crew has determined that a sufficient number of locomotives axles with operative brakes are on the head end of the train to prevent unintentional movement. If there are not an equivalent number of locomotive axles with operable brakes to secure the Triple Crown Service Rail Compatible Vehicle (RCV) train on the grade while charging the train line, the crew must immediately notify the Train Dispatcher.

T-405. DETACHING LOCOMOTIVES IN YARDS

When detaching locomotives from Rail Compatible Vehicles (RCVs) in yards or at other locations designated by Bulletin or Special Instructions, Engineers will reduce the brake pipe pressure to 20 PSI above zero (0) (70 PSI automatic brake reduction) before locomotive is cut off or any angle cock is turned.

T-406. BRAKE RELEASE TIME

A Triple Crown Service Rail Compatible Vehicle (RCV) train stopped due to an emergency brake application of the air brakes must not proceed, until:

(a) Proper train inspection, if required, is performed and brake pipe pressure is being restored on the rear of the train, and

(b) Brake pipe flow indicator, if equipped, has stabilized at or below 60 CFM.

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DEFINITIONS

ACCELEROMETER

An indicator that displays in MPH per minute the rate of increase/ decrease of speed.

AC LOCOMOTIVE

Alternating Current (AC) locomotives are equipped with AC traction motors and are not affected by maximum continuous current ratings or short time operating ratings. AC traction motors are considered 1.5x standard for both power and dynamic brake.

ACTUATING

Feature of the independent brake valve to charge the actuating pipe from the main reservoir and prevent or release a locomotive brake application from a brake pipe reduction.

AIR BRAKE

A system of compressed air devices, controlled manually, electronically or pneumatically, that makes the car or locomotive slow down or stop.

AIR FLOW INDICATOR (AFI)

An instrument that indicates the volume of the air in cubic feet per minute (CFM) flowing through the automatic brake valve into the brake pipe.

ALERTER SAFETY CONTROL

A safety control system that senses the activity of the Engineer. As the Engineer goes about normal activities, any such changes will reset the control and start a timing circuit. If, during the timing period, no additional activity is detected, an audible and/or visual alarm occurs. If activity still doesn't occur for another period, approximately 6 seconds, a penalty brake application is initiated.

ALIGNMENT CONTROL COUPLER

Specially equipped couplers, installed on most locomotives that only allow the coupler in buff to move laterally within certain limits. This equipment minimizes rail turnover, wheel climb and jackknifing.

BIND

The intended movement of one or more brake system components is restricted by reduced clearance, by obstruction, or by increased friction.

BRAKE INDICATOR

A device that indicates the brake application range and indicates whether the brakes are applied and released.

BRAKE PIPE

The system of piping (including branch pipes, angle cocks, cut out cocks, dirt collectors, hoses, and hose couplings) used for connecting locomotives and all railroad cars for the passage of compressed air.

BRAKE PIPE GRADIENT (psi)

The difference in brake pipe pressure between the controlling locomotive air supply and the rear car of the train when the brake system is fully charged under existing leakage and temperature conditions.

BRAKE PIPE PRESSURE

The air pressure contained in the brake pipe.

NOTE: When an End-Of-Train Device is being used, the term brake pipe pressure is being:

- reduced – Means a pressure reduction of at least 5 PSI
- restored – Means pressure increase of at least 5 PSI

CALENDAR DAY INSPECTION

The Federally required inspection a locomotive must undergo each day it is in service. The results of the locomotive inspection must be recorded in LCDI system.

CFM

Cubic Feet per Minute

CONTROLLING LOCOMOTIVE

Locomotive from which the Engineer exercises control over the train.

CYCLE OR UNIT TRAIN

A train that except for the changing of locomotive power and the removal or replacement of defective equipment remains coupled as a consist and continuously operates from location A to location B and returns to location A.

DC LOCOMOTIVE

DC locomotives are equipped with DC traction motors and are affected by maximum continuous current ratings or short time operating ratings.

DEAD ENGINE FEATURE

A device near the locomotive control valve that is used when the locomotive is handled dead-in-train. When the dead engine cut out cock is opened, the main reservoirs are charged from the brake pipe to operate the engine brakes.

DEAD LOCOMOTIVE

A locomotive that does not have any traction device supplying tractive power.

DISTRIBUTED POWER

One or more locomotive consists that are remotely controlled from the lead locomotive.

DYNAMIC BRAKE

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

Extended Range — Dynamic braking system, which provides maximum retarding force between 6 MPH and 25 MPH. Retarding force **decreases** as speed decreases below 6 MPH or increases above 25 MPH.

Flat — Dynamic brake system that provides retardation that is controlled solely by the position of the dynamic brake lever. Maximum retardation occurs at Position 8.

High Capacity — Dynamic braking system, which provides approximately 13,500 lbs. of effort per axle instead of 10,000 lbs. per axle as other dynamic brake systems. High capacity dynamic braking axles count as 1.33 standard axles.

Standard Capacity — Dynamic braking system, which provides maximum retarding force between 18 MPH and 25 MPH. Retarding force, decreases as speed **decreases** below 18 MPH or increases above 25 MPH.

Taper Dynamic Brakes — Dynamic brake system that provides retardation relative to both speed and dynamic brake handle position. The higher the speed, the greater the retarding force developed for a given handle position. At higher speeds, full dynamic brake effort is reached at Position 4.

DYNAMIC BRAKE HOLDING FEATURE

A feature of the lead, controlling locomotive that allows dynamic braking effort when a PCS open condition exists.

DYNAMIC BRAKE INTERLOCK (DBI)

A device that will automatically keep the locomotive brakes from applying when automatic brakes are applied during dynamic braking.

END-OF-TRAIN DEVICE

A device that (a) provides an emergency brake application command to an emergency air valve at the rear of a train and sends an acknowledging message to the Head-Of-Train Device and (b) determines the rear car brake pipe pressure and transmits that information to a device located in the cab of the locomotive controlling the train. The emergency brake application command is initiated from a manually operated switch in the controlling locomotive on the front of the train. A two-way End-Of-Train Device is composed of 2 devices: a Head-Of-Train Device (HOTD) and an End-Of-Train Device (EOTD).

END-OF-TRAIN DEVICE (EOTD) ENROUTE FAILURE

A loss of communication between the HOTD and EOTD will be considered an enroute failure only if the loss of communication is for a period greater than 16 minutes and 30 seconds. NOTE: The display to an Engineer of a message that there is a communication failure indicates that communication has been lost for 16 minutes and 30 seconds or more.

END-OF-TRAIN DEVICE (EOTD) FAILURE

A two-way device will be classified as “failed” if the HOTD on the controlling locomotive is unable to initiate an emergency brake application from the rear of the train due to certain losses of communication or due to other reasons. An EOTD has failed when any of the following messages are displayed:

- DEAD BAT — Battery Voltage is too low to consistently transmit
- REPL BAT — Battery Voltage is too low to consistently transmit
- VALVFAIL — Emergency Valve function in improperly
- DISARMD — EOTD/HOTD not ARMED to each other
- FR NOCOM — HOTD has not been able to communicate with the EOTD in 16 minutes and 30 seconds

NOTE: Message RF NOCOM does not indicate a failure of the device.

Any of these messages indicate that the device is unable to initiate an emergency application at the rear of the train from the controlling locomotive.

EXTENDED OFF-AIR FACILITY

A designated location controlled by a sole shipper or consignee which restricts access to the train and provides sufficient security to deter vandalism.

FOUL

Any condition, which restricts the intended movement of one or more brake system components because the component is snagged, entangled, or twisted.

FULL SERVICE APPLICATION

A brake pipe reduction made only to the point at which the auxiliary reservoir and brake cylinder pressures equalize. Any further reduction in the brake pipe pressure, except an emergency application, will not affect the amount of pressure in the brake cylinder. Therefore, air is being wasted from the brake pipe (over reduction).

When rules require a full service reduction, a service brake pipe reduction must be made as indicated below:

Regulating Valve Setting	Brake Pipe Reduction
75 PSI	22 PSI
80 PSI	23 PSI
90 PSI	26 PSI
100 PSI	29 PSI
110 PSI	32 PSI

INOPERATIVE DYNAMIC BRAKE

A dynamic brake that, for any reason, no longer provides its designed retarding force on the train.

LIGHT LOCOMOTIVE

A locomotive or a consist of locomotives not attached to any piece of equipment or attached only to a caboose.

LOADED BULK COMMODITY UNIT TRAIN

A train made up entirely of loads of coal, grain, ore, potash, molten sulfur, soda ash, phosphate rock, oil, taconite or other bulk commodities.

LOCOMOTIVE CALENDAR DAY INSPECTION AND REPORTING SYSTEM (LCDI)

A computer based electronic reporting system designed to record Calendar Day Inspections and track locomotive serviceability. LCDI computer generated forms or reporting screens are completed by employees prior to the end of their tour of duty.

MU CUT OUT (MU-2-A)

A device for cutting in or out the independent brake valve.

OFF AIR

Not connected to a continuous source of compressed air.

OVERCHARGE

Brake equipment charged to a higher pressure than the regulating valve is adjusted for or can maintain. In such a condition, brakes on a portion of the train may not release.

PARKING BRAKE

A brake that can be applied by:

- hand
- spring
- hydraulic or air pressure when the brake pipe air is depleted
- electrical motor

PENALTY BRAKE APPLICATION

An automatic full service brake application caused by various safety devices.

PERCENT OF OPERATIVE POWER BRAKES

The percentage must be determined by dividing the number of control valves that are cut in by the total number of control valves in the train. A control valve will not be considered cut in if the brakes controlled by the valve are inoperative. Both cars and locomotives will be considered when making the calculation.

PNEUMATIC CONTROL SWITCH (PCS)

An air-operated switch, activated by an emergency or penalty brake application, that drops the engine speed to idle on

EMD locomotives or throttle notch 1 on GE locomotives.

PRESSURE MAINTAINING FEATURE

A system designed to overcome brake pipe leakage both in the RELEASE and SERVICE positions of the automatic brake valve. This allows a constant brake application to be held as long as needed.

PREVIOUSLY TESTED

Equipment that has received a Class I brake test pursuant to **Rule A-6** and has not been off air for more than 4 hours.

PUSHER

One or more locomotives added to a train to assist movement.

PSI

Pounds per Square Inch

QUALIFIED MECHANICAL INSPECTOR (QMI)

A person who has received training in one or more of the following functions: troubleshooting, inspection, testing, maintenance or repair of the specific train brake components and systems for which the person is assigned responsibility. This person shall also possess a current understanding of what is required to properly repair and maintain the safety-critical brake components for which the person is assigned responsibility. Further, the qualified mechanical inspector shall be a person whose primary responsibility includes work generally consistent with the functions listed in this definition.

QUALIFIED PERSON (QP)

A person who has received required training and has been determined to have the knowledge and skills necessary to perform the required function for which the person is assigned responsibility.

REDUCTION (of the brake pipe)

A decrease in brake pipe pressure at a rate and of an amount sufficient to cause a train brake application to be initiated or increased.

REGULATING VALVE

The valve that reduces air pressure from the locomotive's main reservoir to the desired pressure in the brake pipe. The regulating valve will automatically maintain that pressure when the automatic brake valve is in the RELEASE position.

RETAINING VALVE

A manually operated valve used on cars to exhaust brake cylinder pressure completely or to maintain a predetermined pressure.

ROLL-BY INSPECTION

An inspection performed while equipment is moving at a speed not exceeding 10 MPH.

SERVICE APPLICATION

When brake pipe pressure exhausts at a service rate to apply the train brakes.

SERVICE REDUCTION

A decrease in brake pipe pressure, usually from 5 PSI to 25 PSI, at a rate which will move the operating valve to the service position but not at a rate which will move the operating valve to the emergency position.

SLACK ACTION

Movement of part of a coupled train at a different speed than another part of the same train.

SLUG

A locomotive with traction motors but no diesel engine and incapable of propelling itself. The locomotive receives electrical power through a power cable from an adjacent, specially equipped locomotive. Slugs are used where low speeds and high tractive effort are needed.

SOLID BLOCK (of cars)

Two or more cars coupled together that:

- are added to or removed from a train as a single unit
- are charged or have not been off air for more than 4 hours
- have been tested as outlined in **Rule A-6** (Class I Brake Test)

TRACTIVE EFFORT

The force exerted by a locomotive on the track to move a train. Tractive effort is measured in pounds and decreases as speed increases.

TRANSFER TRAIN MOVEMENT

A movement of an engine and one or more cars between a point of origin and a point of final destination not exceeding 20 miles. Such trains may pickup or set out while en route to destination.

UNATTENDED EQUIPMENT

Means equipment left standing and unmanned in such a manner that the brake system of the cars and/or locomotives cannot be readily controlled.

YARD AIR

A source of compressed air other than from a locomotive.

YARD AIR SUPPLY

A system of piping and fittings that supplies air at convenient locations to charge and to test cars without a locomotive.

APPENDIX

TABLE OF RECOMMENDED TRAIN LENGTH - COLD WEATHER

When the ambient temperature is 34°F or less, recommended train lengths are indicated below. Distributed power operations should take these lengths into account as distance from nearest air source.

TRAINS WITH HEAD END BRAKE PIPE SUPPLY ONLY

Ambient Temp. °F	Feet
32° to 34°	10,000 feet
29° to 31°	9,250 feet
26° to 28°	8,750 feet
20° to 25°	8,000 feet
15° to 19°	7,500 feet
10° to 14°	7,000 feet
5° to 9°	6,500 feet
0° to 4°	6,000 feet
-1° to -5°	5,500 feet
-6° to -10°	5,000 feet
-11° to -15°	4,500 feet
-16° to -25°	4,000 feet

REFERENCE L-205 SPEED INDICATORS AND EVENT RECORDERS - TABLE FOR DETERMINING TRAIN SPEEDS:

Sec. Per Mile	Miles Per Hour	Sec. Per Mile	Miles Per Hour	Sec. Per Mile	Miles Per Hour	Sec. Per Mile	Miles Per Hour	Sec. Per Mile	Miles Per Hour
45	80.0	58	62.1	72	50.0	98	36.7	124	29.0
46	78.3	59	61.0	74	48.6	100	36.0	126	28.6
47	76.6	60	60.0	76	47.4	102	35.3	128	28.1
48	75.0	61	59.0	78	46.2	104	34.6	130	27.7
49	73.5	62	58.1	80	45.0	106	34.0	135	26.7
50	72.0	63	57.1	82	43.9	108	33.3	140	25.7
51	70.6	64	56.3	84	42.9	110	32.7	145	24.8
52	69.2	65	55.4	86	41.9	112	32.1	150	24.0
53	67.9	66	54.5	88	40.9	114	31.6	180	20.0
54	66.7	67	53.7	90	40.0	116	31.0	240	15.0
55	65.5	68	52.9	92	39.1	118	30.5	360	10.0
56	64.3	69	52.2	94	38.3	120	30.0	720	5.0
57	63.2	70	51.4	96	37.5	122	29.5		

TABLE FOR DETERMINING MAXIMUM TONNAGE THAT CAN BE HELD ON VARYING GRADES PER LOCOMOTIVE AXLE

Grade	Number of Locomotive Axles with Operable Brake											
(%)	1	4	6	8	10	12	14	16	18	20	22	24
<0.45	867	3,468	5,202	—	—	—	—	—	—	—	—	—
0.50	693	2,772	4,158	5,544	—	—	—	—	—	—	—	—
0.60	495	1,980	2,970	3,960	4,950	5,940	—	—	—	—	—	—
0.70	385	1,540	2,310	3,080	3,850	4,620	5,390	—	—	—	—	—
0.80	315	1,260	1,890	2,520	3,150	3,780	4,410	5,040	5,670	—	—	—
0.90	267	1,068	1,602	2,136	2,670	3,204	3,738	4,272	4,806	5,340	—	—
1.00	231	924	1,386	1,848	2,310	2,772	3,234	3,696	4,158	4,620	5,082	5,544
1.10	204	816	1,224	1,632	2,040	2,448	2,856	3,264	3,672	4,080	4,488	4,896
1.20	182	728	1,092	1,456	1,820	2,184	2,548	2,912	3,276	3,640	4,004	4,368
1.30	165	660	990	1,320	1,650	1,980	2,310	2,640	2,970	3,300	3,630	3,960
1.40	151	604	906	1,208	1,510	1,812	2,114	2,416	2,718	3,020	3,322	3,624
1.50	139	556	834	1,112	1,390	1,668	1,946	2,224	2,502	2,780	3,058	3,336
1.60	128	512	768	1,024	1,280	1,536	1,792	2,048	2,304	2,560	2,816	3,072
1.70	120	480	720	960	1,200	1,440	1,680	1,920	2,160	2,400	2,640	2,880
1.80	112	448	672	896	1,120	1,344	1,568	1,792	2,016	2,240	2,464	2,688
1.90	105	420	630	840	1,050	1,260	1,470	1,680	1,890	2,100	2,310	2,520
2.00	99	396	594	792	990	1,188	1,386	1,584	1,782	1,980	2,178	2,376
2.20	89	356	534	712	890	1,068	1,246	1,424	1,602	1,780	1,958	2,136
2.40	81	324	486	648	810	972	1,134	1,296	1,458	1,620	1,782	1,944
2.50	77	308	462	616	770	924	1,078	1,232	1,386	1,540	1,694	1,848
2.60	74	296	444	592	740	888	1,036	1,184	1,332	1,480	1,628	1,776
2.80	68	272	408	544	680	816	952	1,088	1,224	1,360	1,496	1,632
3.00	63	252	378	504	630	756	882	1,008	1,134	1,260	1,386	1,512

For grades that fall between those listed, the maximum tonnage for the next steepest grade will govern.

NS-1 **Rule L-207** governing the locomotive axle limits under power and **Rule L-210** dynamic brake requirements remain in effect.

NORFOLK SOUTHERN
SYSTEM LOCOMOTIVE SERIES TABLE

ROAD NO'S	MODEL	DYNAMIC BRK / PWRD AXLE TYPE	EQUIV CONV DYNAMIC BRK AXLES IN DB	EQUIV CONV POWERED AXLES	HP	POWER GROUP CODE
911	SD60E	EXT HC HA	8	8	4000	5
1000 to 1215	SD70ACe	AC	9	9	4300	6
1400 to 1409	SD70ACT4	AC	9	9	4300	6
1625 to 1652	SD40-2	STD	6	6	3000	Y,3
1700 to 1705	SD45-2	STD	6	6	3000	Y,3
1800 to 1851	SD70ACc	AC	9	9	4500	6
2501 to 2580	SD70/M/M2	EXT HC HA	8	8	4000	5
2800 to 2806	SD75M	EXT HC HA	8	8	4300	5
3000 to 3070	GP40-2	STD	4	4	3000	Y,1
3071 to 3102	GP40-2	EXT	4	4	3000	Y,1
3201 to 3328	SD40-2	EXT	6	6	3000	Y,3
3329 to 3376	SD40-2	STD	6	6	3000	Y,3
3377 to 3491	SD40-2	EXT	6	6	3000	Y,3
3492 to 3496	SD40-2	STD	6	6	3000	Y,3
3497 to 3584	SD40-2	EXT	6	6	3000	Y,3
3600 to 3680	ET44AC	AC	9	9	4400	6
3830	RP20CD	EXT	6	6	2100	Y,3
4000 to 4274	AC44C6M	AC	9	9	4400	6
4609 to 4661	GP59/E	EXT HC HA	5.33	5.33	3000	Y,2
4662 to 4727	GP33ECO	EXT HC HA	5.33	5.33	3000	Y,2
5000 to 5253	GP38-2	EXT	4	4	2000	Y,1
5257 to 5361	GP38-2	STD	4	4	2000	Y,1
5601 to 5837	GP38-2	EXT	4	4	2000	Y,1
5900, 5901	GP22ECO	EXT	4	4	2000	Y,1
6073 to 6206	SD40-2	STD	6	6	3000	Y,3
6210 to 6223	SD33ECO	EXT	6	6	3000	Y,3
6300 to 6357	SD40E	EXT	6	6	3000	Y,3
6548 to 6815	SD60/I/M/E	EXT HC HA	8	8	3800	5
6900 to 7035	SD60E	EXT HC HA	8	8	4000	5
7100 to 7150	GP60	EXT HC HA	5.33	5.33	3800	2
7200 to 7228	SD80MAC	AC	9	9	5000	6
7229 to 7339	SD70ACu	AC	9	9	4300	6
7500 to 7719	ES44DC	EXT HC HA	8	8	4400	5
8000 to 8184	ES44AC	AC	9	9	4400	6
8314 to 8467	D8-40CW	EXT HC HA	8	8	4000	5
8500 to 8513	C40-8.5	EXT HC HA	8	8	4000	5
8893 to 9978	D9-40CW	EXT HC HA	8	8	4400	5

AXLE TYPE KEY
STD = STANDARD
ER = EXTENDED RANGE
HC = High Capacity
AC = AC LOCOMOTIVE
HA = HIGH ADHESION

POWER GROUP CODE
Y = Locomotive for Yard and Local Service
1 = Conventional 4-Axle Locomotive
2 = High Adhesion 4-Axle Locomotive
3 = Conventional 6-Axle Locomotive
5 = High Adhesion 6-Axle Locomotive
6 = AC Locomotive 6-Axle Matched Sets Only

TRACTIVE EFFORT CONVERTER

BRAKING EFFORT TO AMPS CONVERTER

Braking Effort — lbs.	MPH									
	26	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**	**70**
5,000	243	261	282	302	320	337	354	369	384	399
10,000	344	369	399	426	452	477	500	522	544	564
15,000	421	452	489	522	554	584	612	640	666	691
20,000	486	522	564	603	640	674	707	739	769	798
25,000	544	584	631	674	715	754	791	826	860	892
30,000	596	640	691	739	783	826	866	905	920	920
35,000	643	691	746	798	846	892	920	920		
40,000	688	739	798	853	905	920				
45,000	729	783	846	905	920					
50,000	769	826	892	920						
55,000	806	866	920							
60,000	842	905								
65,000	877	920								
70,000	910									

Value indicated at the intersection of speed and braking effort is Amps.

NOTE: Data provided for GE locomotives with 42 inch wheels. Reprinted with permission.

TRACTIVE EFFORT TO AMPS CONVERTER

Tractive Effort (lbs.)	Amps (A)
5,000	177
10,000	257
15,000	326
20,000	392
25,000	456
30,000	515
35,000	577
40,000	639
45,000	700
50,000	759

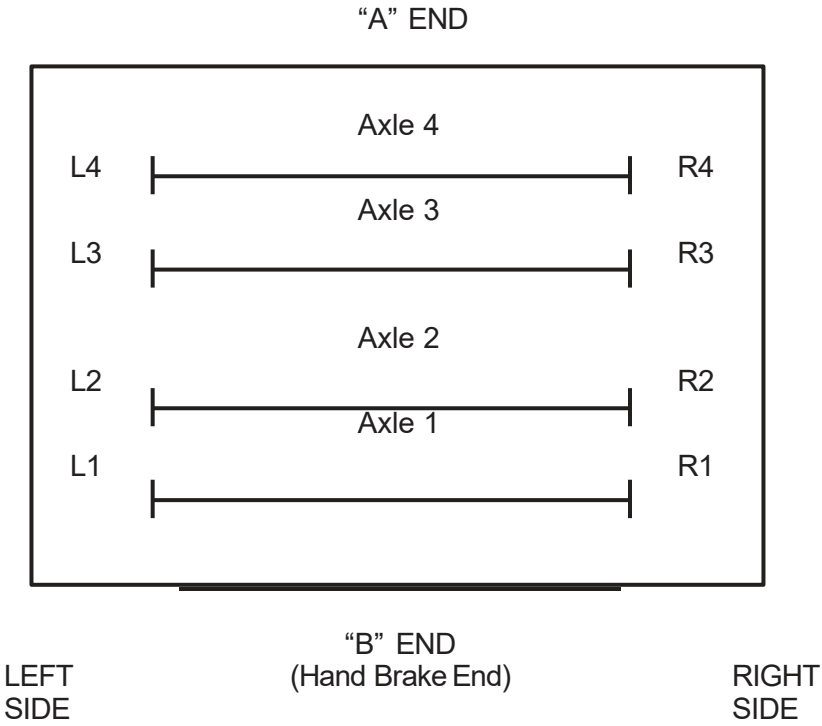
Tractive Effort (lbs.)	Amps (A)
55,000	816
60,000	878
65,000	937
70,000	993
75,000	1,051
80,000	1,107
85,000	1,162
90,000	1,215
95,000	1,269
100,000	1,320

Tractive Effort (lbs.)	Amps (A)
105,000	1,370
110,000	1,424
115,000	1,485
120,000	1,545
125,000	1,604
130,000	1,662
135,000	1,720
140,000	1,776

NOTE: Data provided for GE locomotives with 42 inch wheels. Reprinted with permission.

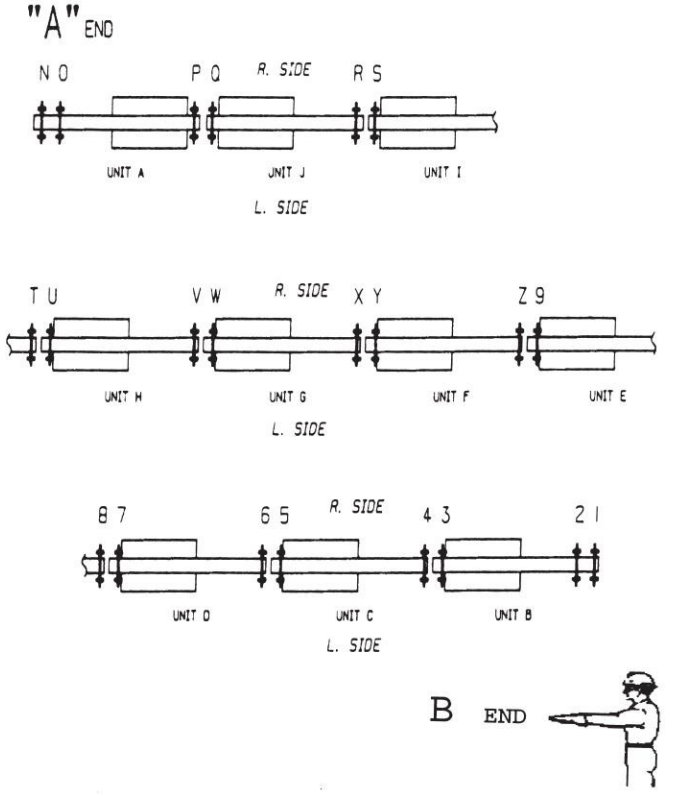
FREIGHT CAR AXLE, JOURNAL AND WHEEL MECHANICAL IDENTIFICATION DIAGRAM

To determine axle number, journal number and wheel number on a car, stand facing the hand brake end of the car (the B end) and count the closest axle as number one and the wheels and journals on right and left sides as R1, R2, ... etc. and L1, L2, ... etc. respectively as shown in diagram. If the car is equipped with 2 hand brakes, then the piston extends towards the "B" end.



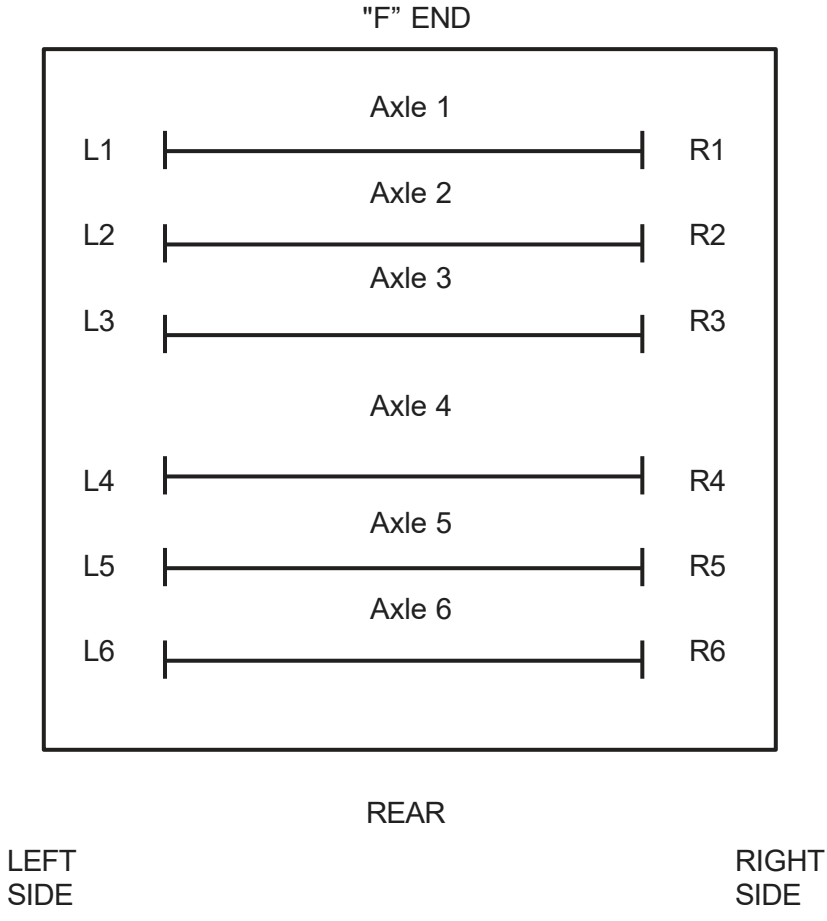
FREIGHT CAR AXLE, JOURNAL AND WHEEL MECHANICAL IDENTIFICATION DIAGRAM — ARTICULATED AND MULTI-UNIT CARS

To determine platform identification, stand facing the “B” end (a hand brake will be located on this end and the unit will be stenciled “B”). The furthest platform is the “A” unit and should be stenciled “A”. Intermediate platforms are designated as “C”, “D”, “E”, etc. until the “A” platform is reached. Use the following procedure to determine axle number, journal number, and wheel number on articulated or multi-unit cars. Stand facing the “B” end as shown in diagram below. Count the closest axles as numbers 1–9, then use letters in reverse order starting with “Z” for axles over 9. Count the wheels and journals on right and left sides as R1, R2, ... R9 and L1, L2, ... L9 respectively. For cars having more than 9-axles, continue the count as RZ, RY, RX, ... etc. and LZ, LY, LX, ... etc. respectively as shown in the diagram.

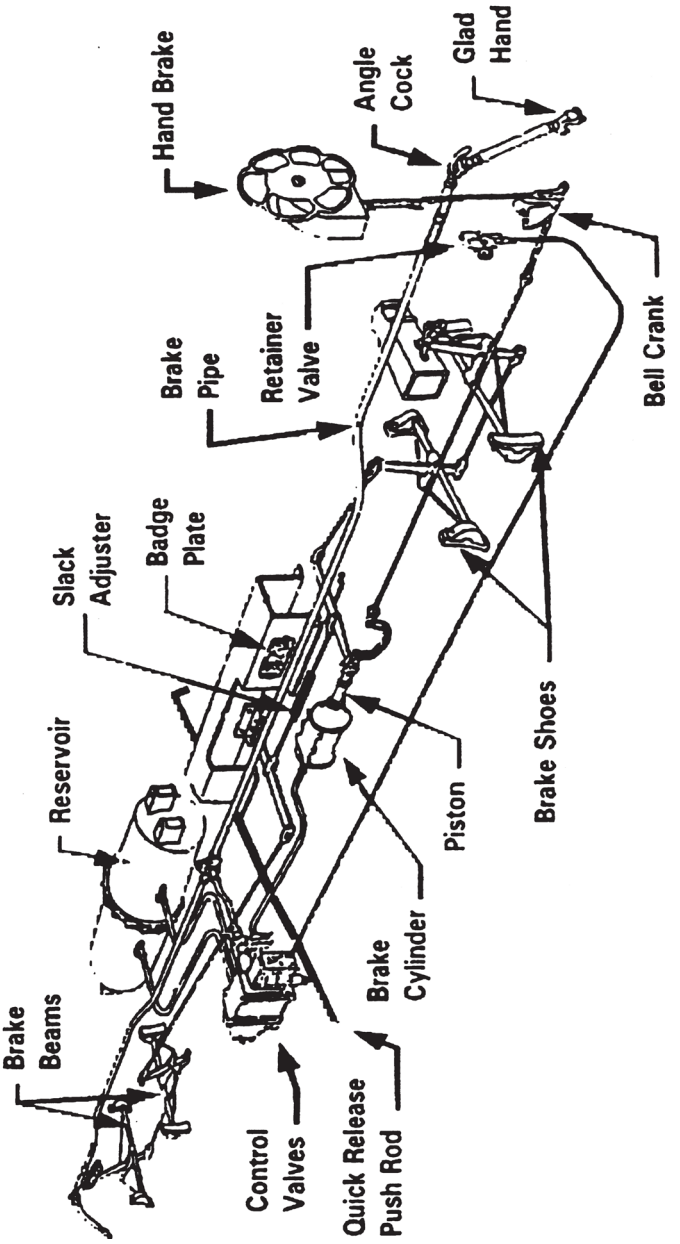


LOCOMOTIVE AXLE, JOURNAL AND WHEEL MECHANICAL IDENTIFICATION DIAGRAM

To determine axle number, journal number and wheel number on a locomotive, stand on the locomotive facing the end labeled “F” and count the closest axle on the “F” end as one and the wheels and journals on right and left sides as R1, R2, ... etc. and L1, L2, ... etc. respectively as shown in diagram.



STANDARD BODY-MOUNTED BRAKE SYSTEM



REFERENCE L-241 CRESTING GRADE, STEEP GRADE CHARTS

Total Trailing Tonnage (including Locomotives not in	1.0% to 1.25% Grade Requirements Maximum Speed for Loaded Unit Trains (coal, grain, etc.)							
	15 MPH MINIMUM	20 MPH MINIMUM	25 MPH MINIMUM	30 MPH MINIMUM	35 MPH MINIMUM	40 MPH MINIMUM	45 MPH MINIMUM	50 MPH MINIMUM
2000 or less	0	0	0	1	2	3	4	5
2001 to 3000	0	0	0	1	3	4	6	7
3001 to 4000	0	0	0	1	3	5	7	9
4001 to 5000	0	0	0	2	4	7	9	11
5001 to 6000	0	0	0	2	5	8	11	13
6001 to 7000	0	0	0	2	5	9	12	15
7001 to 8000	0	0	0	2	6	10	14	18
8001 to 9000	0	0	0	2	7	11	16	20
9001 to 10000	0	0	0	3	8	13	17	22
10001 to 11000	0	0	0	3	8	14	19	24
11001 to 12000	0	0	0	3	9	15	21	26
12001 to 13000	0	0	0	3	10	16	22	28
13001 to 14000	0	0	0	3	10	17	24	30
14001 to 15000	0	0	0	4	11	19	26	33
15001 to 16000	0	0	0	4	12	20	27	35
16001 to 17000	0	0	0	4	13	21	29	37
17001 to 18000	0	0	0	4	13	22	31	39
18001 to 19000	0	0	0	4	14	23	32	41
19001 to 20000	0	0	0	5	15	25	34	43
20001 to 21000	0	0	0	5	15	26	36	45
21001 to 22000	0	0	0	5	16	27	37	47
22001 to 23000	0	0	0	5	17	28	39	50
23001 to 24000	0	0	0	5	18	29	41	52
24001 to 25000	0	0	0	6	18	31	42	54
25001 to 26000	0	0	0	6	19	32	44	56
26001 to 27000	0	0	0	6	20	33	46	58
27001 to 28000	0	0	0	6	20	34	47	60
28001 to 29000	0	0	0	6	21	35	49	62
29001 to 30000	0	0	0	7	22	37	51	65

Total Trailing Tonnage (including Locomotives not in Dynamic Brake)	1.26% to 1.5% Grade Requirements Maximum Speed for Loaded Unit Trains (coal, grain, etc.)							
	15 MPH MINIMUM EDBA	20 MPH MINIMUM EDBA	25 MPH MINIMUM EDBA	30 MPH MINIMUM EDBA	35 MPH MINIMUM EDBA	40 MPH MINIMUM EDBA	45 MPH MINIMUM EDBA	50 MPH MINIMUM EDBA
2000 or less	0	0	1	3	4	5	6	8
2001 to 3000	0	0	2	4	6	7	9	11
3001 to 4000	0	0	2	5	7	10	12	15
4001 to 5000	0	0	2	6	9	12	15	18
5001 to 6000	0	0	3	7	11	14	18	22
6001 to 7000	0	0	3	8	12	17	21	25
7001 to 8000	0	0	3	9	14	19	24	29
8001 to 9000	0	0	4	10	16	21	27	32
9001 to 10000	0	0	4	11	17	24	30	36
10001 to 11000	0	0	5	12	19	26	33	39
11001 to 12000	0	0	5	13	21	28	36	43
12001 to 13000	0	0	5	14	22	31	39	46
13001 to 14000	0	0	6	15	24	33	41	50
14001 to 15000	0	0	6	16	26	35	44	53
15001 to 16000	0	0	6	17	27	38	47	57
16001 to 17000	0	0	7	18	29	40	50	61
17001 to 18000	0	0	7	19	31	42	53	64
18001 to 19000	0	0	8	20	32	45	56	68
19001 to 20000	0	0	8	21	34	47	59	71
20001 to 21000	0	0	8	22	36	49	62	75
21001 to 22000	0	0	9	23	37	51	65	78
22001 to 23000	0	0	9	24	39	54	68	82
23001 to 24000	0	0	9	25	41	56	71	85
24001 to 25000	0	0	10	26	42	58	74	89
25001 to 26000	0	0	10	27	44	61	77	92
26001 to 27000	0	0	11	28	46	63	80	96
27001 to 28000	0	0	11	30	48	65	82	99
28001 to 29000	0	0	11	31	49	68	85	103
29001 to 30000	0	0	12	32	51	70	88	106

1.51% to 1.75% Grade Requirements								
Total Trailing Tonnage (including Locomotives not in Dynamic Brake)	Maximum Speed for Loaded Unit Trains (coal, grain, etc.)							
	15 MPH MINIMUM EDBA	20 MPH MINIMUM EDBA	25 MPH MINIMUM EDBA	30 MPH MINIMUM EDBA	35 MPH MINIMUM EDBA	40 MPH MINIMUM EDBA	45 MPH MINIMUM EDBA	50 MPH MINIMUM EDBA
2000 or less	0	1	3	4	6	7	9	10
2001 to 3000	0	1	4	6	8	11	13	15
3001 to 4000	0	1	5	8	11	14	17	20
4001 to 5000	0	2	6	10	14	18	21	25
5001 to 6000	0	2	7	12	16	21	26	30
6001 to 7000	0	2	8	14	19	24	30	35
7001 to 8000	0	2	9	15	22	28	34	40
8001 to 9000	0	2	10	17	24	31	38	45
9001 to 10000	0	3	11	19	27	35	42	50
10001 to 11000	0	3	12	21	30	38	46	55
11001 to 12000	0	3	14	23	32	42	51	60
12001 to 13000	0	3	15	25	35	45	55	65
13001 to 14000	0	4	16	27	38	48	59	69
14001 to 15000	0	4	17	29	40	52	63	74
15001 to 16000	0	4	18	30	43	55	67	79
16001 to 17000	0	4	19	32	45	59	71	84
17001 to 18000	0	4	20	34	48	62	76	89
18001 to 19000	0	5	21	36	51	66	80	94
19001 to 20000	0	5	22	38	53	69	84	99
20001 to 21000	0	5	23	40	56	72	88	104
21001 to 22000	0	5	24	42	59	76	92	109
22001 to 23000	0	6	26	43	61	79	97	114
23001 to 24000	0	6	27	45	64	83	101	119
24001 to 25000	0	6	28	47	67	86	105	124
25001 to 26000	0	6	29	49	69	90	109	129
26001 to 27000	0	6	30	51	72	93	113	133
27001 to 28000	0	7	31	53	75	96	117	138
28001 to 29000	0	7	32	55	77	100	122	143
29001 to 30000	0	7	33	57	80	103	126	148

Total Trailing Tonnage (including Locomotives not in Dynamic Brake)	1.76% to 2.0% Grade Requirements Maximum Speed for Loaded Unit Trains (coal, grain, etc.)							
	15 MPH MINIMUM EDBA	20 MPH MINIMUM EDBA	25 MPH MINIMUM EDBA	30 MPH MINIMUM EDBA	35 MPH MINIMUM EDBA	40 MPH MINIMUM EDBA	45 MPH MINIMUM EDBA	50 MPH MINIMUM EDBA
2000 or less	0	2	4	6	8	10	11	13
2001 to 3000	0	3	6	9	11	14	17	19
3001 to 4000	0	4	8	11	15	19	22	26
4001 to 5000	0	4	10	14	19	23	28	32
5001 to 6000	0	5	11	17	22	28	33	38
6001 to 7000	0	6	13	19	26	32	38	45
7001 to 8000	0	7	15	22	29	37	44	51
8001 to 9000	0	7	17	25	33	41	49	57
9001 to 10000	0	8	19	28	37	46	55	64
10001 to 11000	0	9	20	30	40	50	60	70
11001 to 12000	0	10	22	33	44	55	66	76
12001 to 13000	0	10	24	36	47	60	71	83
13001 to 14000	0	11	26	38	51	64	76	89
14001 to 15000	0	12	28	41	55	69	82	95
15001 to 16000	0	13	29	44	58	73	87	102
16001 to 17000	0	14	31	46	62	78	93	108
17001 to 18000	0	14	33	49	66	82	98	114
18001 to 19000	0	15	35	52	69	87	104	121
19001 to 20000	0	16	37	55	73	91	109	127
20001 to 21000	0	17	38	57	76	96	114	133
21001 to 22000	0	17	40	60	80	100	120	140
22001 to 23000	0	18	42	63	84	105	125	146
23001 to 24000	0	19	44	65	87	109	131	152
24001 to 25000	0	20	46	68	91	114	136	159
25001 to 26000	0	20	47	71	94	119	142	165
26001 to 27000	0	21	49	73	98	123	147	171
27001 to 28000	0	22	51	76	102	128	152	177
28001 to 29000	0	23	53	79	105	132	158	184
29001 to 30000	0	24	55	82	109	137	163	190

2.01% to 2.25% Grade Requirements								
Total Trailing Tonnage (including Locomotives not in Dynamic Brake)	Maximum Speed for Loaded Unit Trains (coal, grain, etc.)							
	15 MPH MINIMUM EDBA	20 MPH MINIMUM EDBA	25 MPH MINIMUM EDBA	30 MPH MINIMUM EDBA	35 MPH MINIMUM EDBA	40 MPH MINIMUM EDBA	45 MPH MINIMUM EDBA	50 MPH MINIMUM EDBA
2000 or less	1	3	6	8	10	12	14	16
2001 to 3000	1	4	8	11	14	17	21	24
3001 to 4000	2	6	11	15	19	23	27	31
4001 to 5000	2	7	13	18	23	29	34	39
5001 to 6000	2	8	16	22	28	34	41	47
6001 to 7000	3	10	18	25	33	40	47	55
7001 to 8000	3	11	21	29	37	46	54	62
8001 to 9000	3	12	23	32	42	51	61	70
9001 to 10000	3	14	26	36	46	57	67	78
10001 to 11000	4	15	28	39	51	63	74	85
11001 to 12000	4	16	31	43	55	68	81	93
12001 to 13000	4	18	33	46	60	74	87	101
13001 to 14000	5	19	36	50	65	80	94	109
14001 to 15000	5	20	38	54	69	85	101	116
15001 to 16000	5	22	41	57	74	91	107	124
16001 to 17000	6	23	43	61	78	97	114	132
17001 to 18000	6	24	46	64	83	102	121	139
18001 to 19000	6	25	48	68	88	108	127	147
19001 to 20000	6	27	51	71	92	114	134	155
20001 to 21000	7	28	53	75	97	119	141	163
21001 to 22000	7	29	56	78	101	125	147	170
22001 to 23000	7	31	58	82	106	130	154	178
23001 to 24000	8	32	61	85	110	136	161	186
24001 to 25000	8	33	63	89	115	142	167	193
25001 to 26000	8	35	66	92	120	147	174	201
26001 to 27000	9	36	68	96	124	153	181	209
27001 to 28000	9	37	71	100	129	159	187	217
28001 to 29000	9	39	73	103	133	164	194	224
29001 to 30000	9	40	76	107	138	170	201	232

Total Trailing Tonnage (including Locomotives not in Dynamic Brake)	2.26% to 2.50% Grade Requirements Maximum Speed for Loaded Unit Trains (coal, grain, etc.)							
	15 MPH MINIMUM EDBA	20 MPH MINIMUM EDBA	25 MPH MINIMUM EDBA	30 MPH MINIMUM EDBA	35 MPH MINIMUM EDBA	40 MPH MINIMUM EDBA	45 MPH MINIMUM EDBA	50 MPH MINIMUM EDBA
2000 or less	2	4	7	9	12	14	16	19
2001 to 3000	3	6	10	14	17	21	24	28
3001 to 4000	4	8	13	18	23	28	32	37
4001 to 5000	5	10	17	22	28	34	40	46
5001 to 6000	6	12	20	27	34	41	48	55
6001 to 7000	7	14	23	31	39	48	56	64
7001 to 8000	8	15	26	35	45	55	64	73
8001 to 9000	9	17	30	40	50	61	72	83
9001 to 10000	9	19	33	44	56	68	80	92
10001 to 11000	10	21	36	49	62	75	88	101
11001 to 12000	11	23	39	53	67	82	96	110
12001 to 13000	12	25	43	57	73	88	104	119
13001 to 14000	13	27	46	62	78	95	111	128
14001 to 15000	14	28	49	66	84	102	119	137
15001 to 16000	15	30	52	70	89	109	127	146
16001 to 17000	16	32	55	75	95	115	135	155
17001 to 18000	17	34	59	79	100	122	143	165
18001 to 19000	18	36	62	84	106	129	151	174
19001 to 20000	18	38	65	88	111	136	159	183
20001 to 21000	19	40	68	92	117	142	167	192
21001 to 22000	20	41	72	97	123	149	175	201
22001 to 23000	21	43	75	101	128	156	183	210
23001 to 24000	22	45	78	105	134	163	191	219
24001 to 25000	23	47	81	110	139	170	199	228
25001 to 26000	24	49	85	114	145	176	207	237
26001 to 27000	25	51	88	118	150	183	215	247
27001 to 28000	26	53	91	123	156	190	222	256
28001 to 29000	27	54	94	127	161	197	230	265
29001 to 30000	27	56	97	132	167	203	238	274

Total Trailing Tonnage (including Locomotives not in Dynamic Brake)	1.0% to 1.25% Grade Requirements Maximum Speed for Mixed Freight Trains (including empty unit and intermodal)							
	15 MPH MINIMUM EDBA	20 MPH MINIMUM EDBA	25 MPH MINIMUM EDBA	30 MPH MINIMUM EDBA	35 MPH MINIMUM EDBA	40 MPH MINIMUM EDBA	45 MPH MINIMUM EDBA	50 MPH MINIMUM EDBA
2000 or less	0	0	0	0	0	1	2	3
2001 to 3000	0	0	0	0	0	1	3	4
3001 to 4000	0	0	0	0	0	1	3	5
4001 to 5000	0	0	0	0	0	2	4	6
5001 to 6000	0	0	0	0	0	2	5	7
6001 to 7000	0	0	0	0	0	2	5	8
7001 to 8000	0	0	0	0	0	2	6	10
8001 to 9000	0	0	0	0	0	2	7	11
9001 to 10000	0	0	0	0	0	3	7	12
10001 to 11000	0	0	0	0	0	3	8	13
11001 to 12000	0	0	0	0	0	3	9	14
12001 to 13000	0	0	0	0	0	3	9	15
13001 to 14000	0	0	0	0	0	3	10	16
14001 to 15000	0	0	0	0	0	4	11	18
15001 to 16000	0	0	0	0	0	4	11	19
16001 to 17000	0	0	0	0	0	4	12	20
17001 to 18000	0	0	0	0	0	4	13	21
18001 to 19000	0	0	0	0	0	5	13	22
19001 to 20000	0	0	0	0	0	5	14	23
20001 to 21000	0	0	0	0	0	5	15	24
21001 to 22000	0	0	0	0	0	5	15	25
22001 to 23000	0	0	0	0	0	5	16	27
23001 to 24000	0	0	0	0	0	6	17	28
24001 to 25000	0	0	0	0	0	6	18	29
25001 to 26000	0	0	0	0	0	6	18	30
26001 to 27000	0	0	0	0	0	6	19	31
27001 to 28000	0	0	0	0	0	6	20	32
28001 to 29000	0	0	0	0	0	7	20	33
29001 to 30000	0	0	0	0	0	7	21	35

Total Trailing Tonnage (including Locomotives not in Dynamic Brake)	1.26% to 1.5% Grade Requirements Maximum Speed for Mixed Freight Trains (including empty unit and intermodal)							
	15 MPH MINIMUM EDBA	20 MPH MINIMUM EDBA	25 MPH MINIMUM EDBA	30 MPH MINIMUM EDBA	35 MPH MINIMUM EDBA	40 MPH MINIMUM EDBA	45 MPH MINIMUM EDBA	50 MPH MINIMUM EDBA
2000 or less	0	0	0	1	2	3	4	6
2001 to 3000	0	0	0	1	3	4	6	8
3001 to 4000	0	0	0	1	3	6	8	11
4001 to 5000	0	0	0	1	4	7	10	13
5001 to 6000	0	0	0	1	5	8	12	16
6001 to 7000	0	0	0	1	5	10	14	18
7001 to 8000	0	0	0	1	6	11	16	21
8001 to 9000	0	0	0	1	7	12	18	23
9001 to 10000	0	0	0	1	7	14	20	26
10001 to 11000	0	0	0	1	8	15	22	28
11001 to 12000	0	0	0	1	9	16	24	31
12001 to 13000	0	0	0	1	9	18	26	33
13001 to 14000	0	0	0	1	10	19	28	36
14001 to 15000	0	0	0	1	11	20	29	38
15001 to 16000	0	0	0	1	12	22	31	41
16001 to 17000	0	0	0	1	12	23	33	44
17001 to 18000	0	0	0	1	13	24	35	46
18001 to 19000	0	0	0	1	14	26	37	49
19001 to 20000	0	0	0	1	14	27	39	51
20001 to 21000	0	0	0	1	15	28	41	54
21001 to 22000	0	0	0	1	16	30	43	56
22001 to 23000	0	0	0	1	16	31	45	59
23001 to 24000	0	0	0	2	17	32	47	61
24001 to 25000	0	0	0	2	18	34	49	64
25001 to 26000	0	0	0	2	18	35	51	66
26001 to 27000	0	0	0	2	19	36	53	69
27001 to 28000	0	0	0	2	20	38	55	71
28001 to 29000	0	0	0	2	20	39	57	74
29001 to 30000	0	0	0	2	21	40	58	76

Total Trailing Tonnage (including Locomotives not in Dynamic Brake)	1.51% to 1.75% Grade Requirements Maximum Speed for Mixed Freight Trains (including empty unit and intermodal)							
	15 MPH MINIMUM EDBA	20 MPH MINIMUM EDBA	25 MPH MINIMUM EDBA	30 MPH MINIMUM EDBA	35 MPH MINIMUM EDBA	40 MPH MINIMUM EDBA	45 MPH MINIMUM EDBA	50 MPH MINIMUM EDBA
2000 or less	0	0	1	2	4	5	7	8
2001 to 3000	0	0	1	3	5	8	10	12
3001 to 4000	0	0	1	4	7	10	13	16
4001 to 5000	0	0	1	5	9	13	16	20
5001 to 6000	0	0	1	6	10	15	20	24
6001 to 7000	0	0	1	7	12	18	23	28
7001 to 8000	0	0	1	8	14	20	26	32
8001 to 9000	0	0	1	8	15	22	29	36
9001 to 10000	0	0	1	9	17	25	32	40
10001 to 11000	0	0	1	10	19	27	35	44
11001 to 12000	0	0	1	11	20	30	39	48
12001 to 13000	0	0	1	12	22	32	42	52
13001 to 14000	0	0	1	13	24	35	45	55
14001 to 15000	0	0	1	14	25	37	48	59
15001 to 16000	0	0	2	15	27	39	51	63
16001 to 17000	0	0	2	15	29	42	55	67
17001 to 18000	0	0	2	16	30	44	58	71
18001 to 19000	0	0	2	17	32	47	61	75
19001 to 20000	0	0	2	18	34	49	64	79
20001 to 21000	0	0	2	19	35	52	67	83
21001 to 22000	0	0	2	20	37	54	70	87
22001 to 23000	0	0	2	21	39	56	74	91
23001 to 24000	0	0	2	22	40	59	77	95
24001 to 25000	0	0	2	22	42	61	80	99
25001 to 26000	0	0	2	23	44	64	83	103
26001 to 27000	0	0	2	24	45	66	86	107
27001 to 28000	0	0	2	25	47	69	90	110
28001 to 29000	0	0	2	26	49	71	93	114
29001 to 30000	0	0	2	27	50	74	96	118

Total Trailing Tonnage (including Locomotives not in Dynamic Brake)	1.76% to 2.0% Grade Requirements Maximum Speed for Mixed Freight Trains (including empty unit and intermodal)							
	15 MPH MINIMUM EDBA	20 MPH MINIMUM EDBA	25 MPH MINIMUM EDBA	30 MPH MINIMUM EDBA	35 MPH MINIMUM EDBA	40 MPH MINIMUM EDBA	45 MPH MINIMUM EDBA	50 MPH MINIMUM EDBA
2000 or less	0	0	2	4	6	8	9	11
2001 to 3000	0	0	3	6	8	11	14	16
3001 to 4000	0	0	4	7	11	15	18	22
4001 to 5000	0	0	4	9	14	18	23	27
5001 to 6000	0	0	5	11	16	22	27	32
6001 to 7000	0	0	6	12	19	25	32	38
7001 to 8000	0	0	7	14	21	29	36	43
8001 to 9000	0	0	8	16	24	32	40	48
9001 to 10000	0	0	8	18	27	36	45	54
10001 to 11000	0	0	9	19	29	39	49	59
11001 to 12000	0	0	10	21	32	43	54	64
12001 to 13000	0	0	11	23	35	47	58	70
13001 to 14000	0	0	11	24	37	50	63	75
14001 to 15000	0	0	12	26	40	54	67	80
15001 to 16000	0	0	13	28	42	57	71	86
16001 to 17000	0	0	14	30	45	61	76	91
17001 to 18000	0	0	15	31	48	64	80	96
18001 to 19000	0	0	15	33	50	68	85	102
19001 to 20000	0	0	16	35	53	71	89	107
20001 to 21000	0	0	17	36	56	75	94	112
21001 to 22000	0	0	18	38	58	78	98	118
22001 to 23000	0	0	18	40	61	82	102	123
23001 to 24000	0	0	19	42	63	86	107	128
24001 to 25000	0	0	20	43	66	89	111	134
25001 to 26000	0	0	21	45	69	93	116	139
26001 to 27000	0	0	22	47	71	96	120	144
27001 to 28000	0	0	22	48	74	100	125	150
28001 to 29000	0	0	23	50	77	103	129	155
29001 to 30000	0	0	24	52	79	107	133	160

2.01% to 2.25% Grade Requirements								
Total Trailing Tonnage (including Locomotives not in Dynamic Brake)	Maximum Speed for Mixed Freight Trains (including empty unit and intermodal)							
	10 MPH MINIMUM EDBA	15 MPH MINIMUM EDBA	20 MPH MINIMUM EDBA	25 MPH MINIMUM EDBA	30 MPH MINIMUM EDBA	35 MPH MINIMUM EDBA	40 MPH MINIMUM EDBA	45 MPH MINIMUM EDBA
2000 or less	0	0	1	3	6	8	10	12
2001 to 3000	0	0	2	5	8	11	14	18
3001 to 4000	0	0	2	6	11	15	19	23
4001 to 5000	0	0	2	8	13	18	24	29
5001 to 6000	0	0	3	9	16	22	28	35
6001 to 7000	0	0	3	11	18	26	33	40
7001 to 8000	0	0	3	12	21	29	38	46
8001 to 9000	0	0	4	14	23	33	42	52
9001 to 10000	0	0	4	15	26	36	47	57
10001 to 11000	0	0	4	17	28	40	52	63
11001 to 12000	0	0	5	18	31	44	56	69
12001 to 13000	0	0	5	20	34	47	61	74
13001 to 14000	0	0	5	21	36	51	66	80
14001 to 15000	0	0	6	23	39	54	70	86
15001 to 16000	0	0	6	24	41	58	75	91
16001 to 17000	0	0	6	26	44	62	80	97
17001 to 18000	0	0	7	27	46	65	84	103
18001 to 19000	0	0	7	29	49	69	89	108
19001 to 20000	0	0	7	30	51	72	94	114
20001 to 21000	0	0	8	32	54	76	98	120
21001 to 22000	0	0	8	33	56	80	103	125
22001 to 23000	0	0	8	35	59	83	108	131
23001 to 24000	0	0	9	36	62	87	112	137
24001 to 25000	0	0	9	38	64	90	117	143
25001 to 26000	0	0	9	39	67	94	122	148
26001 to 27000	0	0	10	41	69	98	126	154
27001 to 28000	0	0	10	42	72	101	131	160
28001 to 29000	0	0	10	44	74	105	136	165
29001 to 30000	0	0	11	45	77	108	140	171

Total Trailing Tonnage (including Locomotives not in Dynamic Brake)	2.26% to 2.50% Grade Requirements Maximum Speed for Mixed Freight Trains (including empty unit and intermodal)							
	5 MPH MINIMUM EDBA	10 MPH MINIMUM EDBA	15 MPH MINIMUM EDBA	20 MPH MINIMUM EDBA	25 MPH MINIMUM EDBA	30 MPH MINIMUM EDBA	35 MPH MINIMUM EDBA	40 MPH MINIMUM EDBA
2000 or less	0	0	0	2	5	7	10	12
2001 to 3000	0	0	0	3	7	11	14	18
3001 to 4000	0	0	0	4	9	14	19	24
4001 to 5000	0	0	0	5	12	17	23	29
5001 to 6000	0	0	0	6	14	21	28	35
6001 to 7000	0	0	0	7	16	24	32	41
7001 to 8000	0	0	0	8	18	28	37	47
8001 to 9000	0	0	0	8	20	31	42	52
9001 to 10000	0	0	0	9	23	34	46	58
10001 to 11000	0	0	0	10	25	38	51	64
11001 to 12000	0	0	0	11	27	41	55	70
12001 to 13000	0	0	0	12	29	44	60	75
13001 to 14000	0	0	0	13	31	48	64	81
14001 to 15000	0	0	0	14	34	51	69	87
15001 to 16000	0	0	0	15	36	55	73	93
16001 to 17000	0	0	0	15	38	58	78	99
17001 to 18000	0	0	0	16	40	61	83	104
18001 to 19000	0	0	0	17	42	65	87	110
19001 to 20000	0	0	0	18	45	68	92	116
20001 to 21000	0	0	0	19	47	71	96	122
21001 to 22000	0	0	0	20	49	75	101	127
22001 to 23000	0	0	0	21	51	78	105	133
23001 to 24000	0	0	0	22	54	82	110	139
24001 to 25000	0	0	0	23	56	85	115	145
25001 to 26000	0	0	0	23	58	88	119	150
26001 to 27000	0	0	0	24	60	92	124	156
27001 to 28000	0	0	0	25	62	95	128	162
28001 to 29000	0	0	0	26	65	98	133	168
29001 to 30000	0	0	0	27	67	102	137	174

FORMS

FORM ME- 65 — SIDE 1

Norfolk Southern Railway Inspection Record

MONTH UNIT NO.

Date	Time	Location	Inspected By Signature	Complying Yes/No
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				

FORM ME-65 (rev. 4/06)
(Item No. 056001)

Norfolk Southern Railway

INSPECTION RECORD

THIS FORM IS TO BE KEPT WITH THE LOCOMOTIVE AND WILL BE CHANGED ONLY AT THE 92-DAY INSPECTION. EACH LOCOMOTIVE SHALL BE INSPECTED AT LEAST ONCE EACH CALENDAR DAY.

LOCOMOTIVE NUMBER

FORM ME- 65 — SIDE 2

MONTH ______________ UNIT NO. ______________ MONTH ____________ UNIT NO. ____________________ MONTH ____________ UNIT NO. ______________

Date	Time	Location	Inspected By Signature	Complying Yes/No	Date	Time	Location	Inspected By Signature	Complying Yes/No	Date	Time	Location	Inspected By Signature	Complying Yes/No
1					1					1				
2					2					2				
3					3					3				
4					4					4				
5					5					5				
6					6					6				
7					7					7				
8					8					8				
9					9					9				
10					10					10				
11					11					11				
12					12					12				
13					13					13				
14					14					14				
15					15					15				
16					16					16				
17					17					17				
18					18					18				
19					19					19				
20					20					20				
21					21					21				
22					22					22				
23					23					23				
24					24					24				
25					25					25				
26					26					26				
27					27					27				
28					28					28				
29					29					29				
30					30					30				
31					31					31				

FORM ME - 109

FORM ME109
ITEM # 533205

REV. 3-03

TIE TO LOCOMOTIVE
ISOLATION SWITCH

NS

NOTICE

Inoperative Dynamic Brake

Unit _____

Carrier Norfolk Southern

Location _____

Date _____

Tagged By _____

Signed _____

Note: All Information Must Be Provided. This tag must be applied in accordance with 49 CFR 232.109(c) and locomotive may be used for up to 30 days with this condition.

FORM ME-112 (6-03)
ITEM # 420-558525

Operational Status of Dynamic Brakes

Initial	Number	Status					
		OK	☐	Inoperative	☐	Cut-Out	☐
		OK	☐	Inoperative	☐	Cut-Out	☐
		OK	☐	Inoperative	☐	Cut-Out	☐
		OK	☐	Inoperative	☐	Cut-Out	☐
		OK	☐	Inoperative	☐	Cut-Out	☐
		OK	☐	Inoperative	☐	Cut-Out	☐
		OK	☐	Inoperative	☐	Cut-Out	☐
		OK	☐	Inoperative	☐	Cut-Out	☐

Date: _____ Number of units in consist: _____

Time: _____ Name: _____

Signature: _____

In accordance with 49 CFR 232.109(a), this form must be completed by the engineer going off duty and left on the lead locomotive in the consist. The completed form must indicate the status of the dynamic brake of each locomotive in the consist. All previously completed forms must be removed from the consist and discarded. Any locomotive checked "Inoperative" must also be tagged in accordance with CFR 232.109(c).

FORM ME - 112

FORM ME - 114

ME-114 CONSIST INSPECTION (Gold Card)

ME-114 is valid until next calendar day inspection or a consist change per L-203

Train Symbol:_____ **Location:**_____ **Date:**_____/_____/_____

Loco Consist: _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

The following have been checked on this consist per applicable NS-1 rules (reference graphic for work path):

1. Confirm calendar day inspection is completed/signed
2. Locomotives properly equipped with tools, supplies, ice & water
3. Toilet clean/functional - dumped if more than 3/4 full
4. MU hoses/cables, sand, head/ditch lights - confirmed GOOD
5. Completed Locomotive Air Brake Tests per NS-1 and checked alerter function
6. Radio & HOTD tested - If prelinked, EOTD ID#:_____Time Tested:_____am/pm
7. Completed Cab Signal Departure Test & form 12061 (where required)
8. Completed PTC Departure Test (as required) and checked ATC equipment for seals
9. Bell, horn - confirmed GOOD
10. Loaded properly, both directions - confirmed GOOD
11. Completed Dynamic Brake Test & ME-112 form per LDI 1-36
12. If designated as a DP consist, completed DP setup on remotes and lead unit per LDI 1-14, linked DP units: _____ _____ _____ _____
13. Opened unrequired light switches and checked if unit falls under fuel conservation/locomotive usage rules
14. Completed Non-complying Locomotive form ME-615 for defective locomotives being towed (if applicable)
15. Locomotives set up properly per NS-1 L-213 - confirmed GOOD
16. Leave a copy of this form on engineer's control stand

Name of person(s) inspecting: _____

ITEM # 300339 (REV 04/2018)

FORM ME - 569 – SIDE 1

FORM ME 569
ITEM # 567309

REV. 3/23

ATTACH TO LOCO
ISOLATION SWITCH
HOT JOURNAL
REPORT ON BACK

NORFOLK SOUTHERN

WARNING

LOCOMOTIVE ISOLATION, SHUTDOWN OR DEFECT REPORT

HOT JOURNAL REPORT ON BACK

UNIT _____ DATE _____
TRAIN _____ LOCATION _____
TAGGED BY _____
OCCUPATION _____

Select Reason For Tagging Locomotive:

- ☐ SHUT DOWN, DO NOT RUN
- ☐ ISOLATED, DO NOT USE IN POWER
- ☐ B-UNIT
- ☐ LEAVE RUNNING, WEAK BATTERIES

Reason For Above Selection:

_____
_____
_____
_____
_____

FORM ME - 569 – SIDE 2

HOT JOURNAL TAG

DATE: _____ TRAIN NO: _____ CAR/LOCOMOTIVE INIT./NO: _____

LOCATION OF HOT JOURNAL: R _____ L _____

HOW DETECTED? DETECTOR _____ CREW _____ OTHER _____

ATTACH THIS TAG TO THE DEFECTIVE BEARING OR AS CLOSE AS POSSIBLE.

DEFECTIVE AIR BRAKE EQUIPMENT TAG

INITIAL: _____ NUMBER: _____ INSPECTING RAILROAD: NS

LOCATION CAR FOUND DEFECTIVE: _____ DATE: _____

REPAIR DESTINATION: _____

DEFECT DESCRIPTION: _____

MOVEMENT RESTRICTION: _____ SPEED NOT TO EXCEED: _____ MPH

NAME: _____ OCCUPATION: _____

SIGNATURE: _____

A TAG MUST BE ATTACHED TO THE BLEED ROD ON BOTH SIDES OF THE DEFECTIVE CAR. THIS CARD MUST BE RETAINED 90 DAYS AFTER REMOVAL (FRA 49 CFR 232.15 (b)(3))

FORM ME- 611

US Department of Transportation
Federal Railroad

ME-611(REV. 11/88)
(578934)

LOCOMOTIVE INSPECTION AND REPAIR RECORD

In accordance with the Locomotive Inspection Act, 36 State, 913, as amended and the regulations issued pursuant to that Act, the parts and appurtenances of the locomotive unit have been inspected and all defects disclosed by the inspection have been properly repaired.

Reporting year 19 Check if new loco. ☐ If loco. renumbered give previous no.

1. OPERATED BY	RR CODE	2. OWNED BY *(Railroad)*	RR CODE

3. MODEL NO.	4. LOCO. NO.	5. YR. BUILT	6. PROPELLED BY **D-E**	7. HORSEPOWER	8. TYPE OF SERVICE: PASSENGER ☐ ROAD ☐ YARD ☐ OTHER ☐

9. STEAM GEN.	GEN. #1. **N/A** Working Pressure		GEN. #2. **N/A** Working Pressure
10. MAXIMUM PISTON TRAVEL inches	TYPE AIR BRAKE	11. OUT OF USE CREDIT	
12. LAST PERIODIC INSPECTION DATE		PLACE	

PERIODIC INSPECTIONS

13. DATE MO DAY YR	14. PLACE	15.* ITEMS	16. PERSON CONDUCTING	15.* ITEMS	16. PERSON CONDUCTING	17. CERTIFIED BY

15.* ITEM CODE: [1] BRAKES [2] RUNNING GEAR [3] CAB EQUIP. [4] MECH. EQUIP. [5] ELECT. EQUIP. [6] STEAM GEN. [7] SAFETY APPL.

TESTS	18. H & H TEST PRESSURE **DRILLED**	19. WAIVER PART–229	20. WAIVER–OTHER

TYPE	INTERVAL NOT MORE THAN	21. PERSON CONDUCTING	22. TEST DATE AND PLACE	23. CERTIFIED BY	24. PREVIOUS TEST DATE AND PLACE
METER	368 calendar days				
HAMMER AND HYDRO	736 calendar days				
AIRBRAKE 229.27	368 calendar days				
AIRBRAKE 229.29	NUMBER OF CALENDAR DAYS _____				

Certification of true copy.
I certify that this is a true copy of the inspection and repair record of locomotive no. _____

_____ DATE
(Officer-in-charge)

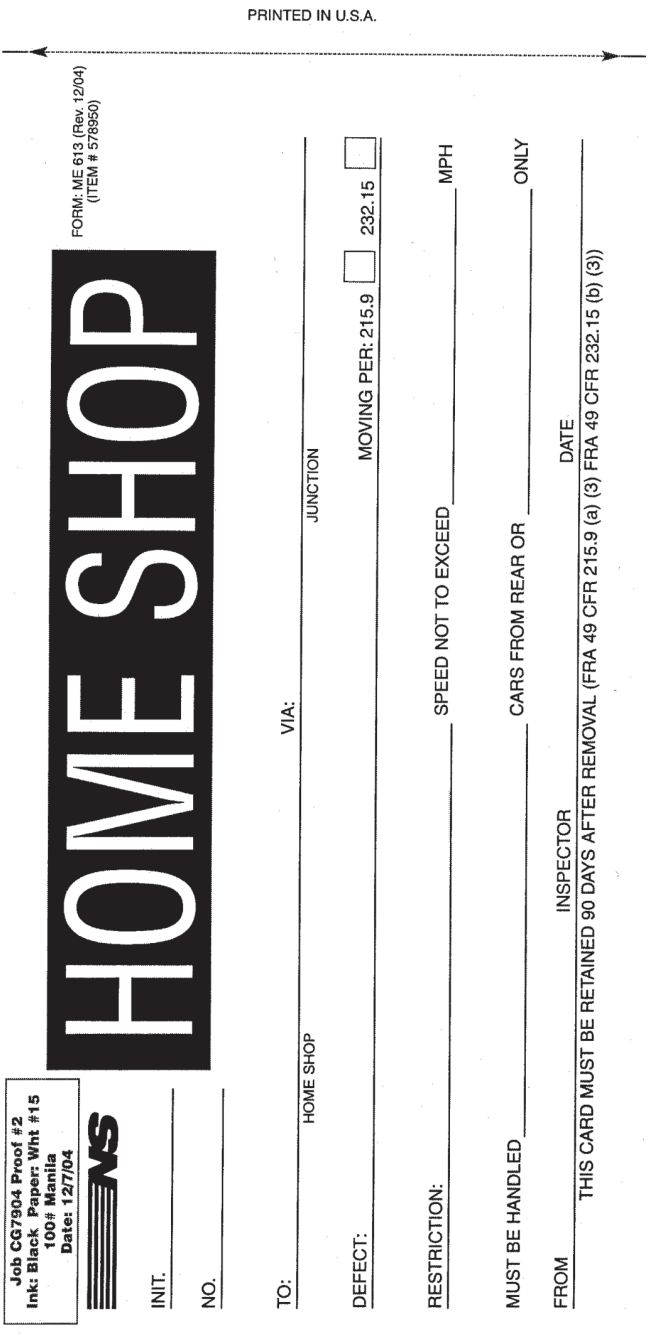
ATTENTION: *A false entry on this form is punishable by fine or imprisonment (U.S. Code, Title 18, Sec. 1001).*

FORM FRA F6180.49 A (3-85)

OMB Approval No. 2130-0004

GOVERNMENT PROPERTY DO NOT REMOVE

FORM ME - 613


PRINTED IN U.S.A.
FORM: ME 613 (Rev. 12/04)
(ITEM # 578950)
Job CG7904 Proof #2
Ink: Black Paper: Wht #15
100# Manila
Date: 12/7/04
NS
HOME SHOP
INIT.
NO.
TO:
HOME SHOP
VIA:
JUNCTION
DEFECT:
MOVING PER: 215.9
232.15
RESTRICTION:
SPEED NOT TO EXCEED
MPH
MUST BE HANDLED
CARS FROM REAR OR
ONLY
FROM
INSPECTOR
DATE
THIS CARD MUST BE RETAINED 90 DAYS AFTER REMOVAL (FRA 49 CFR 215.9 (a) (3) FRA 49 CFR 232.15 (b) (3))

FORM ME - 615

NORFOLK SOUTHERN

FORM ME-615
REV. 11-84
ITEM #579594

NON-COMPLYING LOCOMOTIVE

INIT. _____

NO. _____

INSPECTING RAILROAD _____

LOCATION INSPECTED _____ DATE _____

DEFECT: _____

RESTRICTION: _____ SPEED NOT TO EXCEED _____ MPH

DESTINATION: _____

SIGNATURE OF INSPECTOR _____

NORFOLK SOUTHERN

UNIT NUMBER TESTED

Cab Signal Test Delay Time _____

Signature _____

Location _____ Date _____ Time _____

Penalty Brake—Yes ☐ **No** ☐

LSL Test

Inspected Receiver Bars ☐

Signature _____

Original to stay with Locomotive. Copy to be filed at test location.

FORM ME - 12061

NS NORFOLK SOUTHERN

FORM 1043-BT (Rev. 3/04)
Item # (164056)

REPORT OF SATISFACTORY CLASS 1 BRAKE TEST (A6) PERFORMED
REPORT OF SATISFACTORY EOTD TEST PERFORMED

BRAKE TEST:

TRAIN _____ NO. CARS _____ DATE _____ TIME _____

LOCATION _____ LEAKAGE _____ EOTD NO. _____

ABOVE TRAIN WAS INSPECTED AND FOUND TO BE IN COMPLIANCE WITH CFR 49 PART 232 (CLASS 1 BRAKE TESTS-INITIAL TERMINAL INSPECTION) OF THE DEPARTMENT OF TRANSPORTATION'S POWER BRAKE REQUIREMENTS.

NAME OF PERSON REPORTING _____

EOTD TEST: EOTD NO. _____ (If not same as noted above, show number)

DATE _____ TIME _____ LOCATION _____

ABOVE EOTD WAS TESTED AND FOUND TO BE IN COMPLIANCE WITH CFR 49 PART 232 (INSPECTION AND TESTING OF END-OF-TRAIN DEVICES) OF THE DEPARTMENT OF TRANSPORTATION'S POWER BRAKE REQUIREMENTS.

NAME OF PERSON REPORTING _____

FORM 1043-BT – SIDE 1

FORM 1043-BT – SIDE 2

FORM 1043-BT Reverse (Rev. 3/04)
Item # (164056)

RECORD OF CLASS I BRAKE TEST(S) and INSPECTION(S) EN ROUTE

	DATE	TIME	NO. OF CARS INSPECTED	HEAD CAR	REAR CAR	LOCATION	NAME
1.							
2.							
3.							

CARS WITH CUT-OUT OR INOPERATIVE BRAKES

	NUMBER	LOCATION OF CAR(S)	INITIAL(S)/NUMBER(S)	NEXT REPAIR POINT
1.				
2.				

BRAKE SYSTEM and/or TWO-WAY END OF TRAIN DEVICE PROBLEMS/OTHER

ROLL-BY INSPECTIONS

RESULTS _____ LOCATION _____ RESULTS _____ LOCATION _____

FOR EMERGENCIES

INVOLVING NORFOLK SOUTHERN

TRACK OR EQUIPMENT

USE RADIO DTMF CODE

911

or

Call the Norfolk Southern

Police Communication Center

1-800-453-2530

(24 HOUR)

Please refer questions to the
Operating Rules Group at
NSOperatingRules@nscorp.com