AIR BRAKE & TRAIN HANDLING INSTRUCTIONS & RULES

THIRD EDITION

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GENERAL RULES AND RESPONSIBILITIES

100. General Responsibilities

Engineers and conductors are responsible for complying with federal regulations regarding certification and also complying with company instructions and rules pertaining to the safe and efficient handling of trains and engines that do not conflict with federal regulations. All qualified individuals involved in the movement and repair of trains, engines or cars are responsible to perform required air brake tests and equipment inspections when required by regulation or rule.

COMPLIANCE WITH THE RULES AND REGULATIONS IS A CONDITION OF CONTINUED EMPLOYMENT.

101. Certification and Qualification Requirements

Engineers are responsible for complying with federal and company rules and regulations. Engineers must be certified according to company policy and in compliance with federal regulations as defined by 49 CFR Part 240. Engineers must sign acknowledgement indicating they are competent and qualified prior entering service. Any engineer may request additional training or remove themselves from service at any time they do not believe they are qualified.

Conductors are responsible for complying with federal and company rules and regulations. Conductors must be certified according to company policy and in compliance with federal regulations as defined by 49 CFR Part 242. Conductors must sign acknowledgement indicating they are competent and qualified prior entering service. Any conductor may request additional training or remove themselves from service at any time they do not believe they are qualified.

Individuals who are not certified engineers or conductors must be properly trained and qualified if they are involved with any air brake test or other required equipment inspection. Individuals performing periodic inspections or repairs to equipment must be properly trained and qualified to do the required work.

Engineers and conductors who have not operated over a territory or segment of main track at least two round trips in more than a year are no longer considered to be qualified on the physical characteristics of that territory or segment. The following procedures will be used to initially qualify or re-qualify on the physical characteristics of a territory or segment of main track:

a) To initially qualify on a territory or segment of main track, a qualified pilot will be used, except as noted in section d of this rule. The qualified pilot must be a currently certified engineer to assist another engineer, or a certified conductor to assist another conductor, and must not be an assigned member of the regular crew. The engineer or conductor being qualified must make a sufficient number of trips, in both directions under typical conditions, to become reasonably familiar with the territory. Proper authority may further require a minimum number or additional trips.

b) To re-qualify on a territory or segment of main track that a conductor or engineer was previously qualified, a qualified pilot will be used except as noted in section c. To assist an engineer in re-qualifying, the qualified pilot will be a person that is not a member of the regular crew. To assist a conductor in re-qualifying, the qualified pilot may be any person presently qualified on the physical characteristics of the territory, including a member of the regular crew if it does not interfere with their ability to perform safety sensitive duties.

c) A qualified pilot under section b of this rule is not required to re-qualify when the movement is on a section of track with an average grade of less than 1% over 3 continuous miles, and:

- The track is other than a main track; or
- The maximum distance the engine or train will be operated does not exceed one mile; or
- The maximum authorized speed for any operation on the track does not exceed 20 miles per hour; or
- Operations are conducted under operating rules that require every engine and train to proceed at a speed prepared to stop within one half range of vision of the engineer.

A person assigned the duties or position of a brakeman or switchman is not required to be qualified on a territory or segment of track.

d) On newly acquired track, or track being returned to service after an extended closure, a qualified pilot will be used. If a qualified pilot is not available, be governed by instructions of proper authority as to the method to be used to initially qualify.

As used in this rule, in addition to other stated requirements, when a pilot is used they must be currently qualified in the physical characteristics of that territory or segment of main track.

Employees called for or assigned as conductors or engineers that may not be qualified or their qualifications may have expired on the physical characteristics for the segment of main track or territory must immediately notify proper authority if they require a pilot or are otherwise unable to comply with this rule.

102. Responsibility to Perform Air Brake Tests

Brake equipment on locomotives and cars must be inspected and tested according to FRA regulations. Those regulations are contained within these rules. Employees are required to be trained on those portions of the regulations that are expected to pertain to their duties. Such training will include classroom and field elements. Employees must be retrained at intervals not exceeding three years.

To ensure that air brakes are properly tested, the order of events when specified for air brake tests must be rigorously adhered to and must not be modified.

All persons engaged operating or mechanical functions are responsible for properly performing the required tests and inspections as required by these rules and FRA regulations.

103. Not Covered by Rule

These rules cannot cover all possible arrangements of braking equipment, train handling and securement scenarios, mechanical situations or unusual circumstances. When doubt or uncertainty exists, consult proper authority for additional explanation or instructions.

104. Good Faith Challenge

An employee's rights and responsibilities regarding a "Good Faith Challenge" per Rule 1.4.1 apply to the application of these rules.

AIR BRAKE PRESSURES, TESTS AND INSPECTIONS

200. Air Pressures

Charge an empty brake system for the appropriate amount of time to ensure that the system functions as needed. When charging the system:

Do not charge or control a train brake system with more than one automatic brake valve cut in (except in DPU mode).

Do not increase diesel engine RPM to maintain main reservoir pressure unless the pressure fails to stay 10 psi above the standard brake pipe pressure. If engine RPM must be increased, do not exceed throttle position 4.

Air pressure regulating devices on locomotives must be adjusted for the following range of pressures:

a) Main Reservoir:

Minimum ..... 120 psi*

Maximum ..... 140 psi*

Safety Valve ..... 15 psi above maximum pressure

*Air compressor governor must be adjusted to cut in or out within 5 psi of the maximum or minimum pressure, and not cut out until main reservoir pressure has increased by at least 10 psi.

Main reservoir pressure must be not less than 15 psi above standard brake pipe pressure before beginning movement and while running.

b) Brake Pipe:..... psi

c) Independent Brake Cylinder:

Standard independent brake cylinder pressure will be indicated in the cab or on the control stand for the individual locomotive. Engineers are prohibited from adjusting the brake cylinder pressure higher.

201. Operative Brakes

Air brakes on all cars must be operative when departing the initial terminal unless cars are being move for repair with the proper tagging by a qualified mechanical inspector. If brakes fail en route:

- At least 85% of the cars in a train must have operative brakes.
- Comply with the instructions and restrictions in Rule 602 when cutting out the air brakes on cars.

The percentage of operative brakes in a train shall be determined using the number of control valves in a train. Divide the number of control valves cut in by the total number of control valves in the train. Cars and locomotives shall be considered when determining this number. (No more than one control valve in seven shall be cut out to maintain the 85% requirement.)

202. Brake Pipe Integrity (Leakage Test)

Test brake pipe integrity using either the Air Flow Method (AFM) or Brake Pipe

Leakage Method when conducting any of the following:

- Class I Brake Test (Initial Terminal)
- Class II Brake Test (Cars Picked Up Enroute)
- Standing Locomotive Air Brake Test

Air Flow Method (AFM)

When properly equipped, AFM will be used to qualify brake pipe integrity and the train must be equipped as follows:

- The controlling locomotive has pressure maintaining type automatic brake valve.
- The controlling locomotive has a calibrated air flow indicator or air flow meter (maximum 60 cfm air flow allowed).
- The train must be equipped with an operative end of train telemetry device or gage.

Procedure for Conducting AFM Test

i) Charge the air brake system to within 15 psi of the pressure at which the regulating valve is set as indicated by an accurate gauge or EOT device at rear of train.

ii) Measure air flow as indicated by a calibrated AFM indicator. Once the flow is below 60 CFM, brake pipe integrity is qualified.

Procedure for Conducting Brake Pipe Leakage Test

i) Charge the air brake system to within 15 psi of the pressure at which the regulating valve is set as indicated by an accurate gauge or EOT device at rear of train.

ii) When instructed to apply brakes, make a 20 psi brake pipe reduction.

iii) Allow brake pipe exhaust to stop and wait one minute.

iv) Cut out the automatic brake valve.

v) Wait one minute to allow brake pipe pressure to equalize.

vi) Observe brake pipe leakage for one minute. If leakage does not exceed 5 psi, brake pipe integrity is qualified. If the leakage exceeds 5 psi, notify the qualified person that the train must be inspected for leakage and retested.

vii) When instruction to release brakes is received, move the automatic brake valve handle to the RELEASE position, then cut in automatic brake valve.

203. <u>Class I (Initial Terminal) Brake Test and Inspection</u>

A Class I Brake Test must be performed on all cars in a train:

i) Where the train is originally assembled.

ii) Where the train is received in interchange unless the train is received with run-through power that has remained on the train, and a previous air test has occurred within 1000 miles and can be verified.

iii) Where the make-up of the train is changed except by:

(a) Picking up a single or solid block of pre-tested cars that have not been off air for more than 24 hours.

(b) Setting out a single or solid block of cars.

(c) A combination of above.

iv) Where a unit train has traveled 1,000 miles since its last test.

Procedure for Inspection

Before or during the brake test, perform the following:

a) Inspect angle cocks and verify in proper position.

b) Inspect air hoses and verify properly coupled and in good condition for service.

c) Inspect system for leakage, making necessary repairs to minimize.

d) Inspect retaining valves and verify in exhaust position.

e) Inspect each side of every car to observe proper functioning of all moving parts of the brake system.

f) Verify piston travel meets requirements as prescribed in Rule 614.

g) Inspect brake rigging to determine it does not bind or foul.

h) All parts of the brake system are properly secured.

i) Brakes on train apply and remain applied on each car until instruction is given to release. Any car whose brakes failed to apply or remain applied may be retested once. During re-test, the brakes must remain applied not less than 3 minutes.

Procedure for Test

a) Charge brake system to within 15 psi of regulating valve setting, as indicated by an accurate gage or EOT device at the rear of train.

b) When instructed to apply brakes, make a 20 psi brake pipe reduction. Notify inspector brakes have been applied.

c) Perform brake pipe integrity test as prescribed by Rule 202.

d) After verifying brakes applied, and remained applied on each car brakes may be released after receiving instruction from inspector and Rule 202 test is complete. Notify inspector when brakes have been released.

e) After release, verify brakes on each car have released. This test may be accomplished by "rolling-by" or moving train past inspector at less than 10 mph.

Written Record

A written record of a Class I test is only required where the train was originally assembled and must be retained on the controlling locomotive until the train reaches its destination or the next location where the entire train receives a Class I test. Cars picked up, inspected and air tested en route by a train crew do not require written documentation and therefore the number of cars on the written documentation may not be the same as the number of cars in the train.

204. <u>Class II (Picking Up Cars En route) Brake Test and Inspection</u>

Perform this test at locations other than the initial terminal of a train on the following equipment:

- Each car or solid block that have not previously received a Class I brake test or has been off air for more than 24 hours.
- Each solid block of cars comprised of cars from one previous train and have not remained continuously and consecutively coupled together with the train line remaining connected since being removed from the previous train.
- Each solid block of cars comprised of cars from more than one previous train.

Procedure for Test

a) Charge brake system to within 15 psi of regulating valve setting, as indicated by an accurate gage or EOT device at the rear of train.

b) When instructed to apply brakes, make a 20 psi brake pipe reduction. Notify inspector brakes have been applied.

c) Perform brake pipe integrity test as prescribed by Rule 202.

d) After verifying brakes applied, and remained applied on each car, brakes may be released after receiving instruction from inspector and Rule 202 test is complete. Notify inspector when brakes have been released.

e) After release, verify brakes on each car have released. This test may be accomplished by "rolling-by" or moving train past inspector at less than 10 mph.

205. Class III Trainline Continuity (Set & Release) Test and Inspection

A Trainline Continuity Test must be performed when the configuration of the train has changed by any of the following:

- Any locomotive in the consist is changed.
- Only one solid block of cars are set out from the train.
- At a point other than the initial terminal for the train, where a solid block of cars is added to the train that have previously received a Class I or II test and have not been off air for more than 24 hours.

Cars set out from only one previous train are still considered a "solid block" when divided into smaller segments to accommodate trackage constraints and placed back in the same order as when removed from the previous train.

Procedure for Test

a) Charge brake system to within 15 psi of regulating valve setting, as indicated by an accurate gage or EOT device at the rear of train.

b) Make a 20 psi brake pipe reduction.

c) Determine that the brakes apply and release on the rear car.

d) Before proceeding it must be known that the brake pipe pressure is being restored.

206. Transfer Train Brake Test

When a train's movement will not exceed 20 miles in one direction a Transfer Train Brake Test may be used. Cars added to a transfer train en route must be tested by the same requirements. Trains travelling farther than 20 miles in one direction must have a Class I test performed.

Procedure for Test

a) Ensure air brake hoses are coupled between cars and angle cocks are properly positioned.

b) Charge air brake system to not less than 60 psi as indicated by an accurate gauge or EOT device at rear of train.

c) Make a 15 psi brake pipe reduction

d) Determine that brakes have applied on all cars.

207. Kept Charged

A train is considered "kept charged" unless the train as been off air or the source of air supply is less than 60 psi for 24 hours. If the entire train is not kept charged, perform a Class I Brake Test. If a portion of the train is not kept charged, perform the brake test only on that portion.

208. Electronic Verification of Set and Release

When conducting any air brake test, it may be determined that the brakes apply or release on the rear car by checking the reading transmitted to the Head End Device from an End Of Train Device at the end of the train indicating the following:

- When the rear brake pipe pressure decreases by at least 5 psi, the brakes are applied.
- When the rear brake pipe pressure increases by at least 5 psi, the brakes are released.

Do not use an EOTD if the difference between the brake pipe pressure reading on the EOT and HED exceeds 3 psi.

209. <u>Standing Locomotive Air Brake Test</u>

Conduct a Standing Locomotive Air Brake Test when:

- Taking charge of a locomotive.
- Making up a locomotive consist.
- Adding or removing locomotives, except when cutting off the rear locomotive of a consist.
- Changing controlling ends of a locomotive consist.

Procedure for Test

a) The preferred method is with a second employee acting as an inspector on the ground, observing that each locomotive's brakes apply and release during the following procedure. If assistance is not available, engineer must make ground inspection on both sides of locomotive observing that all brake cylinders are cut in and brakes are applied. Engineer may observe gages to determine that engine brakes apply and release in response to automatic and independent brake valves. On multiple unit consists, proper function of the air brakes must be determined by observation of each engine's brakes or a running engine air brake test.

b) Release independent and automatic brake – observe brakes release (engine may roll if on a grade and handbrake is not applied)

c) Make a 10 psi automatic brake pipe reduction – observe that brakes apply

a) Actuate – observe that brakes release. Keep actuating long enough to determine that hoses are not crossed.

d) Increase automatic brake pipe reduction to 20 psi – observe that brakes reapply

e) Perform a Rule 202 Break Pipe Integrity Test.

f) Release automatic brake – observe that brakes release

g) Apply independent brake – observe that brakes apply

h) If multiple locomotives in consist, verify that the rear headlight is operable and each engine properly responds to the throttle.

210. Running Light Locomotive Brake Test

When practical, a running light locomotive test should be performed whenever a standing locomotive brake test has been performed. Speed will be kept low enough during the test to allow alternate means to be used to stop in case or a malfunction.

Procedure for Test

b) Release independent brake and begin initial movement – observe brakes release and locomotive(s) roll freely.

c) Make a 10 psi automatic brake pipe reduction – observe that brakes apply and the expected retarding force is developed.

d) Actuate – observe that brakes release and locomotive(s) roll freely. Keep actuating long enough to determine that hoses are not crossed.

e) Increase automatic brake pipe reduction to 20 psi – observe that brakes reapply and the expected retarding force is developed.

f) Release automatic brake – observe that brakes release and locomotive(s) roll freely.

g) Apply independent brake – observe that brakes apply and the expected retarding force is developed.

h) If equipped and conditions allow, test dynamic braking.

211. Rear End Device

A functioning two-way rear end of train device is NOT required when one or more of the following conditions are met:

a) Train will not operate over heavy grades and speed does not exceed 30 mph.

b) While a train is divided into two sections in order to traverse a grade "doubling the hill"; but only when necessary to traverse the grade and while the train is divided in two for such purpose.

c) For a local train assigned to perform switching en route which operates with 4,000 trailing tons or less, that does not operate over heavy grades, and travels between a point of origin and a point of final destination that is no greater than that which can normally be operated by a single crew in one tour of duty.

d) For a work train (non-revenue) which operates with 4,000 trailing tons or less and does not operate over heavy grades.

e) When a caboose or engine is on the rear of the train with a member of the train crew capable of initiating an emergency brake pipe application and is in radio communication with the engineer.

For purposes of this rule, a "heavy grade" is defined:

- For a train operating with 4,000 trailing tons or less, a section of track with an average grade of two percent or greater over a distance of three continuous miles; or

- For a train operating with greater than 4,000 trailing tons, a section of track with an average grade of one percent or greater over a distance of three continuous miles.

Installation and Testing:

If the train does not qualify under the exceptions from requiring a functioning two-way end of train device listed above:

i. The rear unit batteries shall be sufficiently charged at the initial terminal or other point where the device is installed and throughout the train's trip to ensure that the end-of-train device will remain operative until the train reaches its destination.

ii. After each installation of either the front or rear unit of an end-of-train device, or both, on a train and before the train departs, the employee(s) performing the test shall determine that the identification code entered into the front unit and is the same as the installed rear unit.

iii. After each installation of either the front or rear unit of an end-of-train device, or both, on a train and before the train departs, the functional capability of the device shall be determined, after charging the train, by comparing the quantitative value of the air pressure displayed on the front unit with the quantitative value of the air pressure displayed on the rear unit or on a properly calibrated air gauge. The end-of-train device shall not be used if the difference between the two readings exceeds three pounds per square inch.

iv. That device shall be armed and operable from the time the train departs from the point where the device is installed until the train reaches its destination. 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 one mile in order to establish communication. Unless it has been already successfully tested, the required tests will be performed once communication is established.

v. A two-way end-of-train device shall be tested at the initial terminal or other point of installation to determine that the device is capable of initiating an emergency power brake application from the rear of the train. If this test is conducted by a person other than a member of the train crew, the locomotive engineer shall be notified that a successful test was performed. The notification required by this paragraph may be provided to the locomotive engineer by any means determined appropriate by the railroad; however, a written or electronic record of the notification shall be maintained in the cab of the controlling locomotive and shall include the date and time of the test, the location where the test was performed, and the name of the person conducting the test.

Enroute Failure:

In the event of an enroute failure where a functioning two-way end of train device is required (including a system indication of loss of communications link), train speed must not exceed 30 mph. In addition, a train must not proceed down a grade of 2% or greater for more than 2 continuous miles, unless one of the following alternatives are used:

- An occupied caboose in radio communications with the head end equipped with an emergency brake valve.
- A manned helper locomotive in radio communications with the head end.
- A radio controlled (DPU) locomotive at the rear of the train capable of making an emergency brake application initiated from the lead locomotive of the train.

INSPECTIONS

300. Compliance with FRA Regulations

Inspect and test equipment on locomotives and cars according to Federal Railroad Administration (FRA) regulations. These rules comply with those regulations, additional information at ecfr.gov, Title 49, Part 200+.

301. Taking Charge of a Locomotive

When first taking charge of a locomotive, if a daily inspection has already been completed, the engineer should perform a brief walk around to ensure locomotive is properly set up.

302. Daily Locomotive Inspections

Every locomotive in service must be inspected each day between 0001 and 2359 hours. When first taking charge of a locomotive, if found to not to have been inspected the previous day, it must be inspected before movement beyond an engine servicing track.

If a locomotive is due inspection in the calendar day an engineer operates the locomotive, the engineer will perform the daily inspection before going off duty unless it is agreed that the assigned relieving engineer will perform the inspection, or before the daily inspection is overdue (2359 hours), whichever occurs first. Whenever possible, inspections should be done during daylight hours.

When a daily locomotive inspection is required, a Locomotive Inspection Report form must be filled out for each locomotive inspected and filed in the designated office at first opportunity. The Daily Inspection Cab Card will be updated to reflect the inspection was completed for that locomotive. Write the location, time, date and signature of inspector on form and cab card.

When an electronic record system is used in place of a paper form, the required report must be promptly entered into the electronic system upon completion of a daily locomotive inspection. If unable to enter the report in a timely manner (no later than end of shift) due to lack of communications or inability to enter it into the system, an alternate record must be created, the information must be electronically entered at first opportunity, or another method such as fax, sending a legible image or email with the required form or information will be sent to the designated recipient(s). If not required to do an inspection, upon filling out their Hours of Service/Time Slip record, an assigned engineer must indicate a valid reason why they did not perform a locomotive daily inspection (foreign power in industrial switching, locomotive already inspected and signed off by another engineer or mechanic, etc.)

303. Daily Locomotive Inspection Procedure

Inspect to determine that no defects exist that would endanger safety and ensure:

- Mechanical Inspection Card (Blue Card) and required inspections are current.
- Cab floors and walkways are free of tripping/slipping hazards and excess trash.
- Cab seats are properly secured.
- Horn and bell are operational.
- When connected in multiple, trailing locomotives must respond to the controlling locomotive (does not apply when double-heading or locomotives being moved dead).
- Mechanical parts, relays, switches and high voltage equipment do not present safety hazards.
- Lead locomotive has pilot plate or snow plow that is between 3 and 6 inches above each rail.
- Uncoupling levers operate properly.
- Multiple unit or other jumper cables are not broken, unsecured, chafed or left hanging with one end free.
- Brake piston travel does not exceed 1-1/2" less than the maximum total travel as indicated on the Blue Card. Brake shoes do not overlap in excess of 1/4" or grooved. Minimum brake shoe thickness is 1/2" on cast iron and 3/8" for composition shoes.
- Air brakes must operate correctly and maintain the specified pressures. Brake pipe leakage must not exceed 5 pounds per minute, and there may not be excessive air leaks anywhere in the system. The main reservoirs must not be leaking from the tank structure itself, and if so must be immediately cut out and drained.
- No defects such as cracks, broken, missing or loose parts (including fasteners) on steps, grab irons, trucks, wheels, gear cases, couplers, draft gear, springs and shock absorbers or journal bearings. New or excessive flat spots on wheels must be reported. Flat spots 2½ inches or more, or adjoining flat spots of 2 inches or more, excessive gouge in flange, sharp flange or broken rims are wheel defects and locomotive may only be moved further with permission of proper mechanical authority.
- Safety appliances (steps and handholds) must not be bent, loose or damaged. Grab irons (vertical or horizontal) must have a minimum of 2½ inches of handhold clearance in the applicable area. Handrails must not be damaged, and the crossover openings on each end platform must either be closed off, or have the ramps down (if equipped) and the safety chains connected to the next locomotive. (49 CFR §231.29 & 30)
- The locomotive may not continue to be used if there are electrical issues such as unusual arcing, flashing, overheating or ineffective insulation is found.

- Engine protective devices must be in working order and functioning. Ground relay, crankcase pressure, low water, overspeed, wheel slip/slide and other protective devices must not be blocked or nullified, unless specifically permitted by the rules.
- The engine room may not have any excessive oil, grease, fuel or flammable materials present. The diesel engine vee may not have excessive oil or exhaust leaks from the engine or exhaust system. Fuel or excessive oil leaks are prohibited, as are any coolant or other leak sufficient to be considered a hazard.
- Any other conditions that may cause an imminent threat to the safe operation of the locomotive or train are prohibited.

Locomotives with the following defects may continue to be used subject to the specified restrictions:

- Failed, missing, inaccurate (in excess of ±3 mph @ 10-30 mph) or not equipped with a speed indicator: If a controlling unit, not to exceed 20 mph; as trailing unit, no restrictions.
- If controlling locomotive is not equipped with a functioning alerter speed is limited to 25 mph; trailing unit no restrictions.
- Inoperative: headlights, both ditch lights, horn, bell or window cracks that obscure view or cab seats not properly secured: may be used as trailing unit only
- A locomotive with defective: weather stripping, windshield wiper, tripped ground relay or safety valve on air compressor or main reservoir popping off: not a defect that prevents use, report on inspection form.
- Sanders must be known to work properly (deposit sand in front of the leading wheels on each locomotive) and have a sufficient supply of sand leaving initial terminal or whenever a Class 1 (Initial Terminal Air Brake Test) is required. Sanders that failed enroute must be repaired upon arrival at terminal where repairs can be made, or at 92 day inspection if it occurs first but not exceeding 7 days from discovery.
- Locomotives overdue for inspection may be moved dead in train or in locomotive consist not under power to an available inspection point.
- A locomotive must have at least one headlight bulb functioning in the leading direction of movement.
- A locomotive must have at least one ditch light bulb (if equipped) functioning in the leading direction of movement.
- A burned out or defective headlight or ditch light bulb must be repaired before leaving an initial terminal, or before the next calendar day inspection.
- Locomotives not having any functioning ditch lights in direction of travel must not exceed 20 mph approaching grade crossings until fully occupied.

- Cab lights must illuminate sufficiently to allow engineer or helper to read orders, and gauges must be sufficiently illuminated as to be visible at night on control stand of controlling unit.
- Safety devices (if equipped) must be cut in and operable where required. If malfunctioning, they may be cut out with permission of proper authority, and any resulting restrictions must be observed.
- A malfunctioning Remote Control Unit must not be used and marked as defective. The locomotive may continue to be used in conventional mode.
- A malfunctioning radio or similar device (such as a head-end device for the EOT) is to be reported, power removed and marked as defective. Missing radios and similar devices where one is normally found are to be reported. When such devices are not available for use, see rules for any additional restrictions.
- A defective heater or air conditioner by itself is not a defect and must be reported. If the cab heating system is incapable of maintaining a temperature of at least 60 degrees above the seat, then that is a defect and the locomotive may only be used as a trailing unit. A locomotive with a defective air conditioner (if equipped) may continue in service but must be repaired before or at the next 92 day inspection.
- Locomotive must not be used if traction motor(s) are cut out unless the wheel slip/slide alarm system continues to function normally (specific to a limited number of locomotive models).
- Dynamic brakes (if equipped) must function properly, but may be cut out to comply with dynamic brake axle restrictions. Locomotives with defective dynamic brakes must be reported as such, cut out and tagged as defective, and locomotive may continue in service for no more than 30 days or the next 92 day inspection.

Defects on locomotives found during the daily inspection or enroute must be noted on the daily inspection form. If not able to be immediately corrected by the crew and signed off as corrected, proper authority must be notified in a timely manner to arrange for repairs. Any uncorrected defects affecting movement or conditions preventing operation must be reported on bad order tag attached to isolation switch.

Locomotives with other defects affecting their ability to be safely moved subject to permission and instructions from proper mechanical authority. If necessary to move as a single unit, it may be moved without cars within a yard not exceeding 10 mph, or outside of a yard not exceeding 20 mph. Movement outside of a yard may only be made if restrictions are listed on bad order tag. Engineer must be advised of movement restrictions of any trailing unit or locomotive dead in train.

Note that defects exist from the time they occur, and unless a specific time allowance to repair is indicated or movement/use is otherwise allowed, defects must be corrected before movement begins or continues.

The above is a list of "FRA defects" and are to be reported as such. Other existing or potential issues that may prevent the continued operation of a locomotive are to be noted as a mechanical issue. Other existing or imminent issues that prevent the

operation of the locomotive are to be reported to proper authority in a timely manner, and on bad order tag attached to isolation switch.

Out Of Service (OOS) locomotives will be noted as such, and the specific reason (FRA defect, dead and drained, missing parts, etc.) Performance or possible maintenance issues will be noted separately and are not considered defects (such as loading poorly, running rough, weak batteries, etc) that prevent the locomotive's use.

In addition, fluid levels such as fuel, lube oil (engine, governor, air compressor and APU/Hot Start), journal boxes with oil and coolant are to be checked to determine they are sufficient for the intended shift with a moderate reserve. Low or excessively decreasing levels are to be promptly reported and noted on the inspection. Diesel engines with insufficient fluid levels are not to be operated.

304. Freight Car Inspection

When personnel are not on duty primarily to inspect freight cars, other qualified employees can perform pre-departure inspection of freight cars. Each car placed in a train must be inspected for:

- Leaning
- Sagging
- Improper position of the truck
- Objects hanging or dragging from the car or extending from the side
- Insecurely attached doors
- Broken or missing safety appliances
- Insecure coupling device
- Overheated wheel or journal
- Broken or cracked wheel
- Brake that fails to release
- Any apparent hazard that could cause an accident

In addition, placarded hazardous materials cars must be checked for:

- Contents leaking
- Proper markings, labels and placards
- All closures secured

A freight car with any condition that makes movement unsafe must be corrected or not added to a train. A bad order freight car that is safe to move may be moved to the nearest car repair point with proper documentation. The conductor will inform other crew members of the restrictions.

Whenever inspection of freight cars is required the cars must be stationary and both sides of the cars must be inspected.

When an air brake test is required, freight car inspections may be done at the same time, however, a roll-by inspection may not replace a stationary inspection.

305. Wheel and Axle Numbering

Face the "B" end of the car (hand brake end) and count away from yourself using your right and left side for reference. On mulit-platform cars face the "B" platform end and count away from yourself referencing the right and left side. The axles numbering ends at 9, then changes alphabetically backwards to Z, Y, X and so forth.

Locomotives, face the same direction of the front of the locomotive, as designated by the letter "F" located on the frame, and reference the right side and left side. Count axles back from the front of the locomotive starting with "1".

TRAIN HANDLING

400. Train Handling – General Procedures

SAFETY is the most important train handling principle. Safety is maximized when in-train and track-train forces are minimized. It is the engineer's responsibility to properly manage these forces. Good train handling prevents injury, damage to track structure, equipment and lading. Good train handling also promotes efficiency which is vital to the continued success of the company and your continued employment.

Follow these general instructions:

- Plan ahead for expected stops to control speed and slack.
- Make only incremental / gradual throttle and brake adjustments
- Control speed using throttle manipulation to the greatest extent possible
- Select and adjust the throttle, dynamic brake, and air brake in a manner that minimizes in-train and track-train forces
- Allow slack to gradually adjust within the train before increasing throttle, dynamic brake, or air applications

The engineer will utilize techniques that promote fuel conservation and efficiency, but proper control of slack and safe train handling always takes precedence over fuel conservation methods that may be incompatible.

401. Powered Axle Limitations

Unless otherwise specified, the maximum number of powered axles permitted in a single consist in power is 18. When shoving cars, no more than 12 powered axles may be used.

If consist includes AC powered or DC high-adhesion locomotives, contact General Manager or Operations Manager for additional restrictions that may apply.

402. Monitoring Rear Brake Pipe Pressure

When a train is equipped with an end-of-train (EOT) device, monitor the head-end (HED) device frequently to detect any changes in brake pipe pressure at the rear of the train.

Before cresting a long or mountain grade, confirm that the brake pipe pressure at the rear of the train is a sufficient amount to continue safely down the grade.

If pressure falls to a unacceptable level or is not in the expected range, immediately stop train and do not resume movement until cause has been determined and the brakes are fully recharged.

403. Use of Throttle

Make throttle changes one notch at a time. After the train is moving, do not move the throttle to a higher position until the amperage or tractive effort remains steady or decreases.

Regulate tractive effort in high curvature territory to reduce the possibility of "stringlining" which can occur when excessive lateral forces exist.

Do not apply power to hold a train stationary on a grade.

To prevent traction motor flash-over when operating over a railroad crossing at grade or moveable span of a drawbridge, handle the throttle as follows:

- Reduce throttle to RUN 4 at least 8 seconds before crossing or span
- If already in RUN 4 or lower, reduce throttle by one position
- If operating conditions permit, throttle may be increased after all units have passed the crossing or span.

404. Use of Automatic Brake

Use incremental (split) reductions (service application) for planned slowdowns and stops.

Actuate while making a MINIMUM reduction (6 to 8 psi). Continue to actuate for 5 seconds per locomotive in consist.

Actuate and make additional brake pipe reductions in 2 to 3 psi increments spaced 30 seconds apart, as required.

Exception: Without dynamic brakes in operation and it is desired to allow engine brakes to apply, actuating or bailing off the brakes is not required except to limit brake cylinder pressure and to control slack.

If equipped, monitor the brake pipe pressure as indicated by the HED before and during a service application to ensure that the appropriate brake pipe pressure reduction is occurring at the rear of train.

If you do not have a fully charged brake system or after an undesired brake release occurs, the subsequent brake pipe reduction should be not less than 2 psi less than the previous reduction.

405. Potential Loss of Emergency Braking During Cycle Braking

To ensure an emergency application of the brakes remains available, the brake pressure must be not less than 50 psi when the emergency brake application is initiated. Below 50 psi brake pipe pressure an emergency brake application will not be effective throughout the entire train. If at any time while running, the brake pipe pressure drops below 70 psi, and the train is not coming to a definite stop, make an emergency brake application without further delay. After stopping, apply sufficient handbrakes to prevent movement and do not move train until brake pipe pressure is restored, brake system is fully charged and the cause of the previous loss of brake pipe pressure or need for an excess brake pipe reduction is resolved.

In all instances of loss of air brake control, suspected or actual, a full written report must be made before end of shift and sent to the Operations Manager or General Manager. If

cause cannot be clearly determined and corrected, or if any doubt exists as to the ability to safely and properly control the movement and that the brake systems are functioning properly, the Operations Manager or General Manager must be contacted and further instruction received before proceeding.

406. Winter Operation - Conditioning Brakes

Whenever ice buildup is possible, engineers must consider the need for increased stopping distances. It may be necessary to apply the air brakes at sufficient intervals to keep braking surfaces free of ice and snow. Take into account terrain and planned braking when considering when and where to condition brakes.

Prior to cresting a long or mountainous grade, the brakes must be applied sufficiently in advance to clear ice and snow from wheels, brake shoes and rigging.

Prior to the movement of a light locomotive or while switching, the independent brakes must be applied sufficiently in advance to clear ice and snow from wheels, brake shoes and rigging and become effective.

During freezing weather, to prevent car vent valves from freezing open, reduce brake pipe pressure at a service rate to 40 psi, allow to equalize, before closing angle cock and cutting off cars.

407. Not used

408. Emergency Brake Applications / Undesired Emergency Application

When conditions warrant, there is an immediate threat to human life, or in the event of an undesired emergency brake application (UDE) follow these procedures:

a) When equipped with a working two-way EOT device, immediately activate the emergency toggle switch on the HED to initiate an emergency brake application from the rear of the train.

b) Immediately move the automatic brake valve handle to EMERGENCY and leave in that position until the train stops.

c) Move the throttle to IDLE.

d) After the train has stopped, wait for the PCS to reset, then move the automatic brake valve handle to the RELEASE position. When it is safe to do so, recharge the brake system. If necessary, apply sufficient handbrakes to prevent movement.

To prevent wheel slide or excessive in-train (buff or draft) forces after an emergency brake application, use the following procedure to immediately regulate locomotive brake cylinder pressure, when conditions allow engineer to safely do so:

- If emergency brake application occurs while slack is stretched (likely under power) or in a neutral condition, actuate independent brake handle to bail off independent brakes and continue to actuate. Just prior to movement coming to a stop, gradually apply independent brake limiting pressure to control slack while continuing to actuate.
- If emergency brake application occurs while slack is bunched or dynamic brake is in use, actuate independent brake handle to bail off independent brakes but keep

independent brake applied a sufficient amount to keep slack bunched while continuing to actuate.

Depending on locomotive design, an emergency brake application may cause the immediate loss of dynamic braking effort requiring immediate action to modulate locomotive brake cylinder pressure. On some locomotives, the dynamic brake may not be interrupted or its loss delayed.

409. Penalty Brake Application

A penalty brake application occurs when one of the locomotives safety control devices (such as locomotive overspeed or an alertor trip) is activated and not reset within a specified period of time.

Once a penalty brake application is initiated, the following occurs:

- Brake pipe pressure will reduce to at least a 20 psi reduction at a service rate
- The PCS light will illuminate
- The load meter will indicate no load (some units have a 20 second delay)
- The engine will return to idle regardless of throttle position

To recover from a penalty brake application, perform the following steps:

a) Move the automatic brake valve handle to SUPPRESSION position

b) Move the throttle to IDLE position

c) Wait until either the PCS light extinguishes, or penalty brake message on the operator display screen disappears

d) If conditions do not allow a running release, wait for train to come to a complete stop.

e) Move the automatic brake valve handle to the RELEASE position, and confirm that brake pipe pressure is being restored.

410. Unintentional Release

Identify brake status by closely monitoring the HED and flow meter if equipped. An unexpected air flow or brake pipe exhaust from automatic brake valve other than during a brake pipe application is probably an indication of an unintentional release of the train brakes. When an unintentional release has occurred, make an immediate brake pipe application not less than 5 psi of the previous brake pipe reduction. On mountainous grades or approaching a required stop, immediately use an emergency brake application. Train may only proceed with caution at reduced speed if safe to do so unless the cause of undesired release is determined and corrected.

411. Use of Independent Brake

NO ELEMENT OF BRAKING CAN CREATE MORE SEVERE SLACK ACTION than the improper use of the independent brake. Do not use the independent brake alone to control, slow, or stop a train, unless while switching, specific train handling procedures allow or they are required in an emergency situation. EXCEPTION: This does not apply to locomotive(s) running light, when the number of locomotives exceeds the number of cars in a train. When available, use the dynamic brake instead of the independent brake.

On consists of more than 12 axles of independent braking in effect, sufficient braking effort may be created to cause a train to jack-knife. Limit brake cylinder pressure in proportion to number of axles in excess of 12.

Apply the following guidelines when using the independent brake:

- Do not, under any circumstance, block or wedge the independent brake handle in the actuating position.
- Use minimal independent brake to control wheel slip at speeds below 15 MPH.
- Control brake cylinder pressure to prevent excessive slack action and high in-train forces, and to avoid overheating and/or sliding the locomotive wheels.
- Simultaneous use of the independent brake and the dynamic brake is not allowed or wheels will slide. Exception: At speeds under 5 mph the independent brakes may be applied to control slack as dynamic braking effort fades or to control slack while starting train until dynamic brake becomes effective.
- The independent brake and an automatic brake pipe reduction must not be used in combination to increase the independent brake cylinder pressure above the normal maximum or sufficient enough to slide wheels on a moving locomotive.
- When poor rail adhesion conditions may exist, care will be taken to limit the locomotive brake cylinder pressure to prevent sliding the wheels.

EXCEPTION: These rules do not apply when emergency braking is necessary to protect life. The use of maximum available braking effort may be required in such situations.

412. Use of Dynamic Brake

Dynamic brake (DB) is a preferred method of speed control (if available and not otherwise restricted), but is capable of generating high in-train forces. To avoid excessive force, it may be necessary to use a combination of DB and automatic brake, and or to implement speed control procedures further in advance. See ABTH rule 413 for DB limitations.

DB is most effective between 8 and 28 MPH. Standard DB can develop 10,000 pounds of retarding force per axle. Standard range DB force normally generally peaks at about 21 mph and proportionally produces less retarding force as speed drops. Extended range DB maintains a high retarding force down to 6 MPH before fading. High-capacity DB can develop 13,500 pounds of retarding force per axle.

Generally, "-2" type locomotives are equipped with extended range DB. All high horsepower (3,400 HP or greater) built after 1984 are equipped with high-capacity DB.

OPERATION:

To allow for electrical current decay and to prevent a surge in dynamic braking:

a) After the throttle is in idle, wait 10 seconds before operating selector or DB handle.

b) If necessary, use a light application of the independent brake to start bunching slack.

c) Move DB handle into SET/UP or throttle position 1, to begin bunching the train. Make small incremental changes to handle position, allowing the slack to bunch. Release independent brake if applied.

d) Once slack has bunched, make further adjustments of the DB handle or throttle in a smooth and steady manner.

If wheel slip or brake warning light comes on, reduce the dynamic braking effort until the light goes out. If the light does not go out, stop the train and inspect the locomotive consist.

To prevent slack from running out when coming to a stop, gradually apply the independent brake as retarding force from dynamic brake fades just before coming to a stop. Move the DB handle to the OFF position (or throttle to IDLE) after the train stops.

Prevent locomotive brake applications during dynamic braking by actuating at least 5 seconds per locomotive in consist when making an automatic brake application, and when coming out of dynamic brake when an automatic brake application is in effect.

Dynamic Brake Interlock (DBI) arrangement may vary by locomotive, and may include bailing off an independent brake application when dynamics are in use, nullifying the locomotive's brake cylinder pressure resulting from an automatic brake application but reapplying them after the release of the dynamic brake, or nullifying the dynamic brake when the locomotive's brake cylinder pressure exceeds a minimum amount. Locomotives not equipped with dynamic brakes may or may not be equipped with a DBI. Unless engineer knows that the DBI is functioning properly on all locomotives in the consist to prevent the application of the locomotive brakes due to a brake pipe reduction, the engineer will actuate to bail off the locomotive brakes.

413. Dynamic Brake Limitations

High buff force generated by DB retarding force may cause a derailment or damage the track structure. During normal operating conditions, limit the total operative dynamic brake to 18 axles.

When approaching and operating though turnouts or disturbed track areas, and where track conditions are poor, limit retarding force to 50% of maximum. Continue to limit the braking effort until at least half the train has passed through the restricted area.

Additional restrictions limiting or prohibiting the use of dynamic brakes in specific territories due to poor track conditions may be indicated by Special Instruction or General Order.

If locomotives with high capacity dynamic brakes or AC locomotives are in the consist, additional dynamic restrictions apply. Contact General Manager or Operations Manager for further instructions.

414. Sanding

Avoid sanding over movable parts of a switch, interlocking, or drawbridge. Do not apply sand to wheels that are violently slipping until throttle position is first reduced. Apply sand to increase adhesion only when conditions require.

415. In-Train Forces

The draft gear and couplers on an average car may not withstand the higher drawbar forces produced by multiple locomotive consists.

When operating through turnouts or temporary speed restrictions involving track conditions, avoid heavy brake applications and eliminate abrupt changes in train slack condition. When possible:

- Release air brakes before entering and passing through the turnout or restriction.
- Operate with lowest throttle position possible.
- Limit use of dynamic braking (DB). Use 50% or less where possible.
- Avoid changes in train speed within the limits

When using DB and air brakes together, and a running release of the train brakes is desired, maintain enough DB to control slack until the train brakes fully release. When operating in curved territory, keep the total braking effort at the minimum necessary to control the train.

When using the stretch braking method, and the desired speed has been achieved, reduce the throttle before releasing brakes. Do not advance throttle until the brakes have released throughout the entire train.

416. Starting a Train

On a Level Grade:

a) Release automatic brake, if necessary.

b) Move throttle to RUN 1. As amperage begins to increase, release independent brake. Maintain sufficient independent brake to control starting speed and prevent uncontrolled movement.

c) If the train does not start, move throttle to RUN 2 or higher, but never above RUN 4, until the train begins moving. If the train does not start moving in RUN 4, return the throttle to IDLE, apply the brakes and determine the reason for the train not starting.

On an Ascending Grade:

a) Advance throttle to RUN 1.

b) Release automatic brake, and reduce independent brake.

c) Incrementally increase the throttle, as necessary, to start train moving as the brakes release toward the rear of the train. Fully release the independent brake as the train starts to move.

d) It is important to keep the slack stretched. Heavier trains will therefore require higher throttle positions to start moving. To prevent stall burns, do not allow the locomotive to remain stationary under power.

e) If the train does not start, apply the independent brake, reduce the throttle to IDLE, apply the automatic brake if necessary to hold the train on the grade, and determine the reason for the train not starting.

Consider reducing train's tonnage or getting helpers to prevent possible train separation.

On a Descending Grade:

a) With the independent brake fully applied, release the automatic brake. When conditions require, allow sufficient time to fully recharge the train before proceeding.

b) Apply the dynamic brake (if available) the desired amount. Gradually reduce the independent brake to allow train to start moving.

c) To avoid run-out of slack once the entire train is moving, gradually reduce the independent brake until it is fully released, in coordination with the dynamic brake (if in use) depending on its effectiveness.

d) When conditions require, a prompt automatic brake application may be required to control speed soon after movement begins.

417. Shoving Movements

On a Level or Ascending Grade:

a) Release the automatic brake and allow slack to adjust.

b) Apply only enough power to start the train moving while reducing the independent brake.

c) Monitor load meter for any unusual changes indicating a possible train jackknifing. If train speed lunges suddenly, or if speed drops without a reduction in throttle, stop the train immediately to determine cause.

On a Descending Grade:

a) Ensure that the independent brake is fully applied.

b) Release the automatic brake and allow slack to adjust.

c) Gradually reduce the independent brake and allow the train to start moving. If the train will not roll by itself, use only enough throttle to start the locomotive moving.

d) If available, apply DB and slowly release the independent brake as the DB becomes effective.

418. Slowing or Controlling Speed

Dynamic Braking (DB) with Slack Bunched:

a) When in power, reduce throttle to IDLE. Wait 10 seconds before moving DB handle or selector lever and throttle to the Set/Up position.

b) Apply the DB, gradually bunching the slack.

c) Increase DB retarding force to desired level, keeping within the limiting guidelines contained in rules 413 & 415.

Throttle Modulation Method:

On an Ascending Grade:

Reduce throttle to maintain a slack stretched condition, allowing grade to slow train.

In a Sag:

a) Reduce throttle while approaching sag to slow train speed as necessary.

b) Make further throttle reductions as head-end of train begins descending grade.

c) Increase throttle as head end of train approaches ascending grade.

d) Continue to increase throttle as necessary.

Automatic Braking with Slack Stretched:

a) Limit throttle position by only using enough power to maintain a slack stretched condition. Braking should be done in RUN 4 or less.

b) At a sufficient distance from the restriction, actuate and make a minimum brake pipe reduction.

c) Reduce throttle, maintaining a slack stretched condition.

d) If needed, actuate and make further reduction(s).

419. Releasing Train Brakes

While running or standing:

To avoid sticking brakes, do not release train brakes until a positive brake pipe reduction has occurred on the last car of the train. This is determined by a minimum 6 psi reduction as indicated by the HED, or when sufficient time has passed after making a minimum reduction and brake pipe exhaust has ceased.

When practicable and it is not expected to reapply the brakes soon, increase brake pipe reduction to not less than 10 psi before releasing.

Before the throttle is advanced following any release of the automatic brake, allow sufficient time for brakes to fully release at rear of train except when necessary to take slack.

While running:

Do not attempt a running release of the train brakes unless it can be done safely and a complete brake release can be obtained without stalling the train. When practicable and it is not expected to reapply the brakes soon, increase brake pipe reduction to not less than 10 psi before releasing.

A running release MUST NOT be attempted when speed is:

- 15 MPH or less on train lengths 6500 to 9000 feet
- 20 MPH or less on train lengths over 9000 feet

If necessary, trains subject to above restrictions must be stopped before releasing the brakes. These restrictions do not apply to fully loaded non-hazardous unit trains.

Before the throttle is advanced, or dynamic brake retarding force is reduced following any release of the automatic brake, allow sufficient time for brakes to release at rear of train. If equipped, use the HED to determine release as indicated by a 3 psi or greater increase in pressure displayed on the HED and then waiting an additional 30 seconds.

420. Cresting Grade

When handling heavy trains at speeds below 15 MPH, gradually reduce throttle as the locomotive crests grade. Use a throttle position that will prevent an increase in speed until at least half the train has crested the grade.

This will reduce the tractive effort to sufficiently compensate for the additional draft force created by the weight of the locomotive(s) and head-end cars as they crest the grade. Do not advance throttle until the train speed increases.

Before cresting heavy or long grades at speeds above 15 mph, reduce speed to 5 mph below maximum authorized speed before leading end crests grade and maintain reduced speed until the entire train is on the descending grade.

421. Stopping Train

Slack Bunched Method with Dynamic Brake

Level and Descending Grades:

a) Reduce throttle to IDLE.

b) Wait 10 seconds before moving DB handle or selector and throttle, then gradually apply DB to gently bunch up slack.

c) Increase DB retarding force to desired level, keeping within the limiting guidelines contained in rules 413 & 415.

d) At a sufficient distance from stop location, actuate, and make a minimum brake pipe reduction.

e) Make further reduction(s) as needed and actuate.

f) As speed drops below effective DB range, supplement with independent brake as necessary as dynamic braking effort fades to keep slack bunched. (Be aware that the DBI should keep the engine brakes from applying so it will be necessary to apply the independent brake to control slack.)

g) As train comes to a stop, make final brake pipe reduction.

Slack Bunched Method without Dynamic Brake

On Level and Descending Grades:

a) Reduce throttle to IDLE and allow slack to adjust.

b) At a sufficient distance from stop location, actuate, and make a minimum brake pipe reduction.

c) Make further reduction(s) as needed and actuate.

d) As train comes to a stop, make final brake pipe reduction and allow locomotive brakes to apply.

Throttle Reduction Method

On an Ascending Grade:

a) Reduce throttle one notch at a time maintaining a stretched slack condition. Allow the grade to slow the train.

b) If conditions require to keep train from rolling back, make a minimum brake application and bail off brakes while still working power.

c) As grade stalls train, fully apply independent brake to prevent locomotive from rolling back into train prior to reducing throttle to IDLE.

d) If necessary, increase brake application to hold train on grade,

422. Stopping Train: Shoving Movements

On an Ascending Grade:

a) Gradually reduce power while maintaining a slack bunched condition.

b) At a sufficient distance from the stop, make a minimum brake pipe reduction and bail off.

c) Continue to reduce throttle keeping slack bunched. If needed, make further reduction(s) and bail allowing train to stall.

d) As train comes to a stop, fully apply the independent brake and move throttle to IDLE.

On a Level or Descending Grade:

a) Reduce throttle to IDLE.

b) If necessary, depending on train make-up, gradually apply DB or independent brake to further stretch slack. Use great care to avoid sudden or severe run-out of slack to protect trainman riding shove.

c) At a sufficient distance from the stop, make a minimum brake pipe reduction, making further reduction(s) as necessary.

d) As an alternative, the method for stopping a shoving movement on an ascending grade as described above may be used.

Automatic brake applications, independent brake applications and throttle should be modulated to control slack and to prevent high or excessive buff forces.

423. Unplanned or Surprise Stop

When reacting to an unplanned stop or unexpected situation requiring an immediate stop, avoid using an emergency brake application unless conditions require. When determining if an emergency application is necessary consider the following:

- Potential risk to life, or to a lesser extent, property
- Location, terrain, visibility, sight distance and train make up

424. Train Rollback Protection

When a train is stopped with slack bunched, it is important to protect against train rollback when releasing brakes. In this situation follow this procedure:

a) Release train brakes.

b) As brakes begin releasing from head end, advance the throttle.

c) Gradually stretch out the slack in the train.

d) If equipped, observe the HED for indication of rear car brake release and movement.

e) Control speed to keep it very low until it is known the slack is stretched and the entire train is moving.

425. Switching Movements

Switching frequently involves handling cars without the use of the automatic airbrake system. If the locomotive brake is note adequate to control movement, there must be a sufficient number of cars with air brakes in service to control the movement.

Do not move the locomotive reverser to change direction while the locomotive is in motion except in an emergency situation.

426. Wheel Slip

The wheel slip light will illuminate in the lead locomotive when any wheel in the consist is slipping, or sliding. If the load meter on the lead locomotive does not indicate a loss of power when the wheel slip warning is given, one of the trailing locomotives is in a wheel slip condition. Use trainline sanding only when lead truck and automatic sanding proves to be inadequate.

Manual Wheel Slip/Slide Correction Procedure

If the wheel slip detection system does not correct the wheel slip, perform the following procedure:

- Reduce throttle position if in power, dynamic brake effort if in dynamics, until wheel slip indication ceases.
- Apply sand, if possible. (Not required if automatic sanding is effective.)
- Do not increase power until wheel slip stops.

If a wheel slip light remains on or is blinking during locomotive operation, wheels may be sliding. Stop the locomotive immediately and perform a roll-by inspection to ensure all wheels are rotating freely.

Slipped Pinion

An intermittent wheel slip light, slipped pinion warning, or brake warning will signal a possible slipped pinion condition. The load meter will also be fluctuating. On newer high HP locomotives, the alarm bell may sound. Cut out affected traction motor and ensure all wheels are rotating freely before continuing.

427. Manned Helper Service

Helper engines may be added at the head end, within the train or at the rear. The number of powered axles at the head end may not exceed ABTH rule maximum powered axles (Rule 401). When helpers are mid-train, number of powered axles in helper set may not exceed number of powered axles on head end of train before helpers were added.Helpers on the rear of the train must not exceed 8 axles under power.

Responsibilities

Because of risk of jackknifing and derailment careful consideration must be given placement of helpers in train and use of throttle on the helper locomotive consist. Take into account train make-up and terrain.

The engineer on the leading locomotive of the train being assisted is in charge of the train movement and will:

a) Control the train's air brakes.
b) Communicate with, and direct, the other locomotive engineer(s).
c) Identify any approaching speed restrictions and or locations where a stop is to be made.
d) Communicate the name and aspect of signals.

When DB is used on both lead and helper consist:

- Allow constant DB retarding force to be maintained by the helper.
- Allow the lead locomotive engineer to control variations in train speed.

Do not cut off helper consist while train is moving.

Adding Helper to Train

When adding helper locomotive(s) to a train standing on a grade, and to prevent an unintentional release, make a sufficient reduction on the helper consist before cutting in trainline air.

After coupling the helper consist to the train but before opening the angle cocks:

a) Reduce brake pipe pressure to the same pressure as the rear brake pipe pressure of the train being assisted. If the train's brake pipe pressure is unknown, make a full service reduction.

b) Cut out the automatic brake.

c) Move the automatic brake valve handle to HANDLE OFF position.

d) Make sure the equalizing reservoir pressure reduces to 0 psi.

e) Open the angle cock.

f) To verify continuity, observe brake pipe gage on helper locomotive for a rise in pressure when the train brakes are released.

Detaching Helper from Rear-End

When detaching helper consist from rear of train:

a) After train stops, apply train brakes, making at least a 10 psi brake pipe reduction.

b) Close the angle cock between the helper locomotive and train.

c) Detach the helper locomotive.

d) Release the brakes on the train and observe the HED for an increase in brake pipe pressure on the rear of the train or otherwise comply with Rule 205.

Detaching Helper from Head-End:

a) After train is stopped, make at least a 10 psi brake pipe reduction.

b) Close the angle cocks and detach the helper locomotive.

c) With brakes applied, the road locomotive engineer will move their automatic brake valve in order to reduce the equalizing reservoir pressure slightly below brake pipe pressure before cutting in the automatic brake valve.

d) To verify continuity, observe HED for a rise in pressure upon release or otherwise comply with Rule 205.

428. Mountain and Heavy Grade

The following guidelines apply in mountain and heavy grade territory specified in the Special Instructions:

a) When available, use dynamic brake in conjunction with the automatic brake to control train speed on descending grades.

b) When DB is not available, independent brake may be used on shorter trains when there is not sufficient braking effort from freight cars.

c) When independent brake is used on mountain and heavy grade territory for shorter trains or light engine moves, to avoid overheating brake shoes, do not exceed 12 MPH, 30 PSI brake cylinder pressure or prolong use exceed 2 miles.

If at any time movement exceeds the maximum authorized speed by 5 MPH, the movement must be brought to an immediate stop. Use an emergency brake application if necessary. Movement must not proceed until it isdetermined that adequate braking performance is restored.

429. Brake Fade

Brake fade is the reduction in stopping power that can occur after repeated application of the brakes, especially in heavy tonnage and/or high speed conditions. Excessive heat generated between the shoe and the wheel results in a gradual and sustained loss of brake shoe friction.

When brake fade occurs, train speed with increase slightly even though the brakes are applied. The normal response to maintain speed control when this occurs is to apply additional braking force. This, however, only contributes to higher brake shoe temperature and additional loss of braking performance.

To avoid brake shoe fade, the speed of the movement must be closely monitored and controlled below the authorized maximum speed limits at all times.

This is especially critical on long heavy / mountain grade territory where loss of train control could result in runaway.

If the speed of the movement exceeds the maximum authorized speed by 5 MPH, the movement must be brought to an immediate stop. Use an emergency stop if necessary. Movement must not proceed until it is determined that adequate braking performance is restored and wheels have been allowed to cool a minimum of 10 minutes.

430. Locomotive Emissions and Fuel Conservation

To conserve fuel, avoid excessive locomotive idling whenever possible. When conditions require idling of unattended units, try to avoid doing so near residential areas whenever possible.

When handling multiple unit locomotive consists and all locomotives are not necessary to move train over the route, isolate and/or shut down unnecessary units unless cold weather or poor battery conditions require otherwise.

LOCOMOTIVES

500. Emergency Devices

All train crew members must know the locations and operation of the emergency fuel cut-off devices and emergency brake valves on locomotives.

501. Coupling and Uncoupling Locomotives

Preparing units for multiple unit control:

a) Couple units and stretch twice to insure couplers are locked.

b) Clean out all MU and brake pipe hoses before coupling to other hoses.

c) When conditions require, blow out brake pipe and main reservoir air hoses with system air before coupling to other hoses.

d) Couple the necessary hoses as shown in the diagram. It is only necessary to couple mu hoses on one side of the adjoining locomotives, but in freezing weather both main reservoir equalizing hoses should be coupled.

e) Open brake pipe angle cocks and end cocks where hoses are coupled between units.

f) Position walkway safety chains and walkways.

g) Ensure multiple unit cables are properly connected between locomotives. Be certain that the receptacle cover lug engages the recess in the jumper cable. Secure cable to underside of walkway in a manner it will not be pinched or crushed. WARNING – Be sure that the throttle is in idle, generator field switch is off and reverser centered or removed on all locomotives before connecting a multiple unit cable between them.

h) When lead and trailing locomotives in the consist are equipped, and jumper cables are not connected to another locomotive, place one end of the jumper cable into the dummy receptacle. If there are two dummy receptacles, use both. Otherwise, remove unused jumper cables and properly stow them on locomotives.

i) Determine that controls on lead unit are in proper position:

- Automatic Brake Valve = RELEASE
- Automatic Brake Valve Cutout Valve = IN or FRT
- Independent Brake Valve = APPLIED
- MU-2A Valve or dual ported cutout = LEAD or DEAD

j) Determine that controls on trailing unit(s) are in proper position:
   - Automatic Brake Valve = HANDLE OFF
   - Automatic Brake Valve Cutout Valve = OUT
   - Independent Brake Valve = RELEASED
   - MU-2A Valve or dual ported cutout = TRAIL

Procedure for separating units:

a) Insure units to be left standing are secured against movement.
b) Position cab controls of the controlling unit left standing.
c) Disconnect walkway safety chains. Secure unused walkways and safety chains in their stored position.
d) Remove unused jumper cables and place in dummy receptacles if equipped.
e) Close brake pipe angle cocks and end cocks at locations where hoses are to be uncoupled between units. Never uncouple brake pipe hoses by hand.

502. Changing Operating Ends (26L and 30CDW Brake Equipment)

Operating ends on a locomotive consist are to be changed as follows:

From Lead to Trail:

a) Move the independent brake valve handle to FULL APPLICATION.
b) Make a 20 PSI brake pipe reduction.
c) Place automatic brake cutout valve in OUT position.
d) Place automatic brake valve handle in HANDLE OFF position.
e) Position MU-2A or dual ported cutout valve in TRAIL or OUT position.
f) Move independent brake valve handle to RELEASE position.
g) Engine Run, Generator Field, and Control & Fuel Pump switches OFF.
h) Properly position headlight control switches.
i) Proceed without delay to the other end of the consist.

From Trail to Lead:

a) Move the independent brake valve handle to FULL APPLICATION.
b) Position MU-2A or dual ported valve in LEAD or DEAD or IN position.
c) Place automatic brake valve handle in RELEASE position.
d) Position automatic brake valve cutout valve in IN or FRT after the equalizing reservoir pressure rises above brake pipe pressure.
e) Check air gauges and note proper pressure is being maintained.
f) Control & Fuel Pump switch ON.
g) Properly position headlight control switches.
h) Perform a Standing Locomotive Air Brake Test.

503. Starting Diesel Engine

Failure to follow the proper procedure for starting can result in damage to the diesel engine and other locomotive components. Before starting perform Engine Room and Locomotive Cab Inspection:

a) Check levels of engine and air compressor lube oil, governor oil and engine cooling water.

b) Check all diesel engine protective devices to ensure none are tripped.

c) Check all circuit breakers and fuses to ensure they are properly positioned, and throttle or emergency shutdown switches are not in STOP position.

d) If engine has not been running in previous 48 hours, open cylinder cocks, use pre-lube system if available, and blow out cylinders before attempting to start. Close cylinder cocks and follow starting procedure. If excess moisture or coolant blows out of any cylinder, or an unusual noise or surge is felt, do not start engine. Tag engine out of service until inspected by proper mechanical authority.

Starting the Engine (Smart Start or AESS not in effect):

a) Place isolation switch in START position.

b) Prime engine (if equipped). If equipped with pre-lube system, follow instructions posted on locomotive to pre-lube engine when required.

c) Hold start switch in ENGINE START position. DO NOT CRANK ENGINE FOR MORE THAN 20 SECONDS. If engine does not fire after 20 seconds, wait 5 minutes before attempting to start.

d) If engine start station is near lay shaft, push lay shaft in approximately one-third its travel until engine fires. Never use lay shaft to excessively rev engine during or after starting process.

e) After engine has started, recheck lube oil and water levels.

f) Place isolation switch in RUN position prior to use.

g) Turn on locomotive radio after engine is idling normally.

If ZTR "Smart Start" or other AESS system is available and use is desired, follow posted instructions on locomotive to enable system before starting.

DO not operate locomotive under heavy load until engine coolant temperature has reached a minimum of 120° F.

504. Shutting Down Diesel Engine

Unless otherwise instructed, when it is known that locomotive(s) will not be used for a period of 20 minutes or more, and the temperature is not expected to drop below 40 degrees Fahrenheit, locomotives must be shut down. If coupled to a train, one engine may be left running to keep air brake system charged. Check with proper authority to determine if engine should be left running for more than two hours to keep air brake system charged.

Unless otherwise instructed, locomotives equipped with functioning Smart Start or AESS systems are considered in compliance with this rule. Turn off all unnecessary lights to allow the Smart Start or AESS to function properly.

Emergency Shut Down:

In an emergency, all on-line units can be shut down immediately from the controlling unit on a console style control stand by pulling the throttle outward (away from control stand) and then moving the throttle past the IDLE position to the STOP position. On a desktop control stand, depress the ENGINE STOP or SHUTDOWN button.

In an emergency, a single unit can be shut down by tripping any of the three emergency fuel cut-off pull rings or switches. One is located in the cab and one located on each side of the frame near the fuel tank.

Normal Shut Down (Smart Start or AESS not in effect):

a) Turn off locomotive radio and unnecessary lights.

b) Place isolation switch in START position.

c) Depress the engine stop button and hold until engine stops.

d) Open main battery switch. Exception: On turbocharger lube pump equipped units the battery switch must be left on to allow the turbo lube pump to cool the turbocharger bearings unless the engine has only been in idle or low throttle in the 30 minutes prior to shutdown.

Do not shut down if necessary to protect from freezing or if locomotive is known to have weak batteries.

Normal Shut Down (Smart Start or AESS in effect):

a) Turn of locomotive radio and all possible lights. If too many lights are left on, locomotive may not shut down.

b) Place isolation switch in start position.

c) Leave engine running and battery switch in.

d) Verify engine status is correct. System will automatically shut down and restart engine as conditions allow or require.

Restarting Engines Shut Down by Smart Start or AESS:

a) Place isolation switch in RUN.

b) Insert reverser and move to FORWARD or REVERSE position.

c) System should begin restarting sequence.

d) Engine will not load immediately after restart.

e) Position additional switches and controls as needed.

Note that in most instances an engine must be shut down by a functioning Smart Start or AESS system that remains active for system for it to automatically restart engine.

505. Handling Light Locomotives

Before movement, check air gauges for proper pressure, release all hand brakes and remove any wheel chocks/skates from the rail.

When required, perform a standing locomotive air brake test before moving locomotive(s).

506. Handling Dead Locomotives

When handling locomotives dead-in-train use DEAD ENGINE FEATURE:

a) Brake pipe hose coupled and angle cocks open.

b) Automatic Brake Valve Cutout Valve in OUT position.

c) Automatic Brake Valve in HANDLE OFF position.

d) MU-2A or dual ported valve in LEAD/DEAD or IN position.

e) Independent Brake Valve in RELEASE position.

f) Dead Engine Cock OPEN.

g) Independent application/release and actuating cocks open on one end of locomotive.

Typically the dead engine feature will only charge the No 2 main reservoir to a low pressure. When picking up dead engines, allow sufficient tome for main reservoir to charge off brake pipe pressure. With dead engine feature cut in, by design the brake pipe leakage may be excessive until at least two minutes after reduction was made while No 2 main reservoir fully recharges from brake pipe after supplying air to the brake cylinders.

If handling locomotives dead-in-consist then make usual multiple unit air and electrical connections, unless otherwise instructed.

Locomotive MUST have functioning air brakes to be moved in train, unless proper authority instructs otherwise.

507. Loss of Locomotive Brakes

In the event in becomes impossible to stop a light locomotive with air brakes, if conditions permit, apply hand brake(s). In an emergency situation where death, injury, derailment or collision is imminent, reverse locomotive and place throttle in RUN 1 position. Locomotive must be removed from service until traction motors are inspected and cause of braking loss is determined. This procedure will not work on AC traction locomotives.

508. Locomotive Safety Control Devices

Locomotive, engine or electrical system protection devices must not be blocked, tampered with or rendered inoperative. If safety control device becomes defective enroute notify supervisor at first opportunity and follow supervisor's instructions.

Unless otherwise specified, protective devices (other than alerter) may not be reset more than three times in any shift.

509. Crankcase Protector

If a crankcase protector button trips, it must NOT be reset. Notify proper authority immediately. Crankcase protector is only be reset by qualified mechanical personnel after inspection. Do not make any attempt to inspect, disturb or open any cover on diesel engine for two hours following a crankcase protector trip.

510. Ground Relay

The ground relay protects the electrical equipment from damage by unloading the main generator and returning the diesel engine to idle. Under no circumstances should anyone operate a locomotive with ground relay switch open or bypassed. After a ground relay trips 3 times, isolate locomotive and notify supervisor. Follow mechanical supervisor's instructions.

Locomotives equipped with automatic ground relay reset device may be used until device locks out. Do not reset device without mechanical supervisor's permission.

511. Unattended Locomotives

When securing locomotives:

a) Controlling independent brake valve must be cut in and fully applied.

b) Apply the handbrake on each locomotive.

c) Chock/skate wheels if necessary to prevent movement.

d) Place isolation switch in START/STOP/ISOLATE position on all locomotives.

e) Open generator field switch (OFF position).

f) Remove reverser handle and place in designated storage unless necessary to protect locomotive from freezing following ABTH Rule 519.

g) Make a 20 PSI brake pipe reduction using automatic brake valve unless locomotive consist is coupled to a train to keep charged.

h) Leave automatic brake cutout valve in the IN or FRT position.

i) Close and lock all windows and doors.

If engineer is outside of the cab of the controlling locomotive for a minimal period of time or off of the controlling locomotive, the reverser must be centered or removed, generator field switch turned off, and independent brake fully applied and an automatic brake application in effect (Exception: If necessary while performing a brake test, applying the air brakes is not required is the consist is otherwise secured from movement). If locomotives are to be left unattended, the previous procedure applies.

512. Locomotive Cabs

Employees occupying locomotive cabs must keep them neat and orderly, and:

- Must not place feet on windshields, control stand, or otherwise damage equipment in the cab.
- Deposit trash in litterbags.
- Not spit on floor or anywhere on equipment.
- Keep access doors to engine room and electrical cabinets closed.
- Keep floor clear of tripping hazards.

513. Cab Windows and Doors

Locomotive windows and cab entrance doors must be kept closed on all unoccupied units. All carbody doors must be kept closed while locomotive is in service, except when making inspections, repairs or adjustments.

514. Fire Extinguishers

Crew members must been familiar with the location of fire extinguishers on locomotives and how to use them. If crewmember discharges extinguisher, supervisor must be notified at first available opportunity.

515. Malfunctions

When a locomotive develops problems which could affect the safe and efficient operation of the train, the crew must contract supervisor at first available opportunity. If necessary, immediately isolate locomotive from creating power or shut down engine. If a malfunction creates an immediate risk to safe operation of the train the crew must take immediate action to stop the train.

516. Operational Status of Dynamic Brakes

A locomotive equipped with dynamic brakes that are determined to be inoperative is to have a tag displayed in the locomotive cab affixed to the isolation switch with the words "inoperative dynamic brake".

Dynamic brakes cut out to comply with axle restrictions must use the appropriate cut out position or tagged as such.

517. Checking Speed Indicators

The engineer on each trip must check the speed indicator for accuracy at the first opportunity and at locations designated in the timetable. Train must be operated at a constant speed during check. Controlling locomotives operating at speeds of greater than 20 MPH must be equipped with a speed indicator that is accurate to plus or minus 3 MPH at speeds of 10 to 30 MPH and plus or minus 5 MPH at speeds greater than 30 MPH.

518. Isolated Locomotives

When a unit in a locomotive consist is isolated or has a traction motor cut out for any reason, wheel slip protection may be nullified, and it must be observed at frequent intervals while enroute to determine that all wheels are turning freely.

519. Freezing Weather Operations

To prevent damage to locomotives during cold weather operation:

- Keep cab doors and windows closed unless being used.
- Engine room doors on all units closed and latched.
- Cab heater water valves (aplicable only to hot water type) fully open and blower fans on LOW position in trailing units or sufficient electric type heaters in use to keep cab warm.

To prevent standing locomotive from freezing when the air temperature is forecast to be 10 degrees Fahrenheit or lower:

a) Be sure all generator field switches are in the OFF position (open).

b) Place isolation switch in the RUN position on each affected locomotive.

c) Install and center the reverser handle on controlling locomotive.

d) Place throttle in position number 3 on the controlling locomotive.

e) If leaving unit unattended, comply with the balance of ABTH Rule 511.

It is not necessary to follow steps b through d to place locomotive in Run 3 when:

- Locomotive is equipped with a "winter isolate" switch or position on the isolation switch, this position is to be used instead of isolate which will throttle up that locomotive as necessary.
- Locomotive is equipped with properly functioning Smart Start or AESS system. it should throttle up that locomotive as necessary.

If locomotive consist includes any locomotive that is not equipped with a protection system: follow all steps except only follow step b on each locomotive not otherwise protected.

When conditions require, if a locomotive cannot be left running or protected from freezing by a Smart Start/AESS or standby heating system, it must be properly drained to prevent possible damage to it.

520. Hot Journal or Traction Motor Support Bearing

When a hot journal or traction motor support bearing is detected by smoking, noise, odor or defective equipment detectors, locomotives must be stopped and inspection made. Contact supervisor and follow instructions.

521. High Impact

If a locomotive is involved with a coupling of 8 MPH or greater, it must be shut down immediately and supervisor contacted. A qualified mechanic must inspect the locomotive before it is placed back into service.

522. Rerailing

When locomotives are rerailed with blocks or rerailers, care must be taken to avoid damage to traction motors, gear housing and brake rigging and other parts of the locomotive.

523. Circuit Breakers

Circuit breakers are used to protect electrical circuits from excessive electrical current. The circuit breaker will work automatically. If tripped:

a) Place isolation switch in START position.

b) Move circuit breaker to OFF position.

c) Move circuit breaker to ON position.

If a circuit breaker trips repeatedly, place it in the OFF position and notify supervisor. Locomotive may continue to be used as leading unit, developing power or engine running only if safe to do so without operation of affected circuit.

524. Fuses

Fuses are used to protect electrical circuits from an excessive flow of electrical current. Fuse element will melt when overloaded thereby breaking the circuit.

A fuse test block is located in the electrical cabinet near the switch and fuse panel. To test or change a fuse follow this procedure:

a) Place isolation switch in START position.

b) Remove jewelry which may come in contact with electrical circuits.

c) Remove suspected fuse. Do not touch or expose hands to metal portion of fuse or fuse clips when removing fuse as they may be hot.

d) Turn on test light switch

e) Place fuse on test terminals. If light does not light, fuse must be replaced.

f) Fuses must be replaced only with one of with correct ampere value.

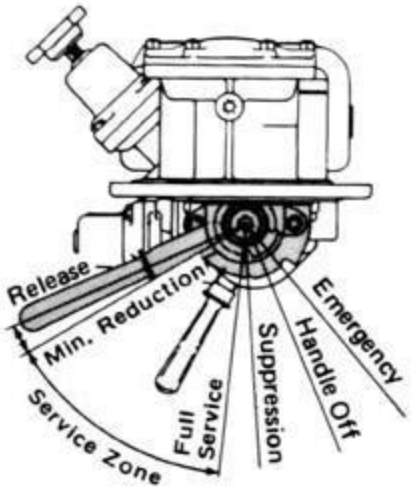
525. Engine Coolant System

Add water through the fill pipe at the water storage tank or through the fill pipe under the pressure cap. NEVER REMOVE PRESSURE CAP WHEN ENGINE IS HOT. Serious burns or other personal injury could occur.

To drain water from locomotive open water drain valve in engine sump and open any other drain valves as indicated by instructions posted in cab or as otherwise instructed.

526. 26 Brake Equipment

The 26-C automatic brake valve is a self-lapping valve that regulates the brake pipe pressure that controls both the locomotive and train brakes. When cut in, the automatic brake valve maintaining feature maintains constant brake pipe pressure. The regulating valve controls the supply and exhaust of air pressure to the equalizing reservoir, which in turn regulates brake pipe pressure.

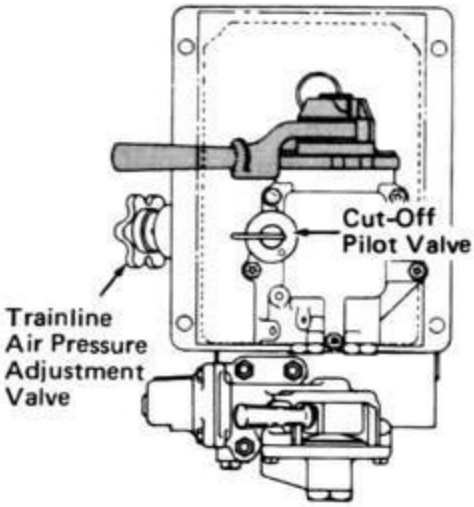


The automatic brake valve handle has six positions with a SERVICE ZONE arranged from left to right as follows::

RELEASE - For charging the brake pipe to the regulating valve setting and releasing the locomotive and train brakes. The brake valve handle is located at the extreme left.

MINIMUM REDUCTION - For reducing bake pipe pressure 6 to 8 PSI. The brake valve handle rests against the first raised portion to the right of RELEASE.

SERVICE ZONE - For reducing brake pipe pressure varying amounts between MINIMUM and FULL SERVICE. To reduce pressure at greater amounts, move the brake valve handle to the right through the zone that begins at MINIMUM.



FULL SERVICE REDUCTION - For reducing brake pipe pressure approximately 26 PSI.

SUPPRESSION - For recovering control of the locomotive after a safety brake application. The brake valve handle must be placed in this position for 60 seconds. The position is with the brake valve handle against the second raised portion to the right of RELEASE.

HANDLE OFF / CONTINUOUS SERVICE - For reducing brake pipe pressure at a service rate to almost zero. Trailing locomotives, locomotives being hauled dead-in-tow, and helper locomotives must be set in this position.

EMERGENCY - For reducing brake pipe pressure at an emergency rate with the automatic brake valve either cut in or out. The EMERGENCY position is with the handle at the extreme right. An emergency brake application is available whether or not the brake valve is cut in.

The automatic brake cutout valve cuts the automatic brake valve in and out. Because the handle is spring-loaded, it must be pushed in before it can be turned. The valve has two or three positions, IN and OUT, or IN, FRT, and PASS. The IN or FRT position provides

direct release operation and equalizing reservoir pressure can only be increased when the automatic brake valve handle is in the RELEASE position.

If equipped with a PASS position, this position may be used to keep trains charged while train is left standing with an application for extended periods of time, otherwise it must be in the FRT position when cut in except as provided in Rule 527.

527. Equalizing Reservoir

There can be no leakage from the equalizing reservoir on locomotives and related piping, unless the system is capable of maintaining the set pressure at any service application with the automatic brake valve cut-out valve in the IN or FRT position. If equalizing reservoir leakage is detected enroute, the train may be moved only to the nearest forward location where the problem can be corrected. If cutout valve is equipped with the PASS position, it may be used with caution to reach nearest repair point. Note that any movement of the brake valve handle to the left may cause an undesired brake release, so any movement of the brake handle to the left must be all the way to the RELEASE position.

528. SA-26 Independent Brake

The SA-26 independent brake valve controls locomotive brake cylinder pressure independently of the automatic brakes. The positions of the handle are:

RELEASE / ACTUATE - Normal position of the handle to release the locomotive brakes. To completely release the locomotive brakes while an automatic brake application is in effect, depress the handle (ACTUATE or BAIL) while it is in the RELEASE position. To apply or maintain variable amounts of locomotive brake cylinder pressure, depress the handle while in the application zone.

APPLICATION ZONE - Movement of the handle through this area increases or decreases locomotive braking effort. Move the handle to the right to increase braking and to the left to decrease braking.

FULL APPLICATION - For maximum braking move the handle completely to the right into the notch to prevent the handle from moving easily out of this position when stopped.

529. MU-2A / Dual Ported Cutout Cock

The handle for the MU-2A cutout cock is spring-loaded and you must push it in before changing positions. The positions of the MU2A or dual ported valve are:

LEAD or DEAD - Engages control of the independent brake. Use when a locomotive is a single unit, controlling unit, or is being hauled dead-in-train.

TRAIL or TRAIL 24-26 or TRAIL 6-26 or TRAIL 26 or TRAIL 2 PIPE – Disconnects control of the independent brakes from the independent brake valve. Use when a locomotive is a trailing unit in a multiple unit consist.

530. Regulating Valve

Regulating valve may only be used for adjusting equalizing reservoir pressure and resulting standard brake pipe pressure.

Adjusting the regulating or feed valve to control (apply and release) the train brakes is strictly forbidden.

TRAIN EQUIPMENT AND OPERATION

600. Detaching Locomotive(s) and/or Cars

When detaching locomotives or cars:

a) Make a 20-PSI brake pipe reduction.

b) Secure equipment as required, including any TT/SI instructions per Rule 7.6 or Rules 700-706 .

c) After exhaust has stopped, close angle cock on rear of cars to remain with locomotive. Leave angle cock open on the portion left standing.

d) Detach and allow brakes on standing equipment to apply in emergency.

e) When available, use HED to verify brake pipe pressure drops to zero. If zero pressure is not displayed after detaching, engineer must notify trainmen immediately. Trainmen must inspect to determine cause and take corrective action.

601. Angle Cocks

Angle cocks have two positions OPEN and CLOSED. They must never be left in-between these two positions. When cutting in the air, open the angle cock slowly to prevent an emergency application.

602. Cutting Out Air Brakes

Cut out control valves or other air brake devices only if they are defective or if the brake rigging or system is being serviced. If air brake devices must be cut out enroute, notify supervisor with car number(s) and any other pertinent information.

To cut out a control valve or automatic vent valve, close the branch pipe cutout cock. When cutting out a control valve, always drain the air reservoirs completely by operating the brake cylinder release valve ("bleed rod").

The rear car of a train must have operative brakes. However brakes become inoperative enroute, test the handbrake before moving. With a crew member on the car near the brake, move the car to the first location where it can be switched from the rear of the train or set out for repair. Be prepared to set hand brake if car becomes detached from train. To ensure emergency brakes on train apply if cars become separated, make sure the brake pipe is connected to rear car and angle cocks arranged to allow for emergency operation should cars separate. If brake pipe is damaged on rear car, couple hoses between rear and next ahead car, closing the angle cock on the head end of the rear car.

Placement of cars with cut out air brake equipment:

- Ensure not more than two adjacent control valves are cut out.
- If necessary to cut out a third control valve, separate it from the other two control valves by at least one car at the first opportunity.
- If one air brake device/control valve is cut out on a car with multiple control valves, consider the brakes on that car to be operative.
- Comply with Rule 201 regarding the maximum number of brakes cut out.

603. Moving and Tagging Defective Equipment

Defective equipment may be moved from the location where defect is discovered to the nearest location where repairs can be performed. It cannot be moved from a location where a Class I air brake test is required. Before moving the equipment, place a tag on both sides of equipment identifying that the car is bad ordered. The tag can only be removed by the authority of the individual making repair.

604. When Stopped on a Grade

Leave train brakes applied unless conditions require the recharge of the system. Do not proceed down a grade unless the air brake system has been given the opportunity to sufficiently recharge. If independent brake will not hold train for recharge, set sufficient handbrakes. After system recharge, make a sufficient brake pipe reduction to hold train while handbrakes are released.

605. Running Through Water (additionally restricts GCOR Rule 6.21.2)

When water above the rail is observed, engineer should stop train using good train handling practices, before entering water if possible. Do not enter water without direction from supervisor. Never enter water if deep enough to contact traction motors. When passing through water do not exceed 3 MPH. If water is encountered and distance is too short to stop, immediately reduce throttle to idle. Before entering water, open generator field switch and advance throttle to position 8. Never use dynamic brakes in water. Once locomotive(s) are out of water, leave generator field switch open and continue blowing air through traction motors with throttle in position 5. After a few minutes, return throttle to idle and close generator field switch. Using extreme care, reapply power being alert for ground relay action on all locomotives in the consist.

606. Flat Spots on Wheels (additionally restricts GCOR Rule 1.34)

When flat spots are indicated by feel or sound, stop must be made to examine running gear. If a single flat spot exceeds 2-1/2" in length or two consecutive flat spots exceed 2" in length, do not exceed 5 MPH and set equipment out at first available location where repair can be made.

607. Telemetry Devices

Trains must be equipped with two-way telemetry devices if train exceeds 25 MPH or operates in heavy grade territory as designated in Timetable unless train has occupied locomotive or caboose at rear of train, or does not exceed 4,000 tons.

Telemetry device must be capable of initiating an emergency brake application from the head end. Device must be fully functioning, with an inspection date that is not older than 368 days, and a variance between head and rear end air pressure display greater than 3 PSI.

After each installation of either the HED or EOT device, before the train departs the system must be armed, and emergency feature tested.

If HED or EOT fails enroute, immediately reduce speed if travelling faster than 25 MPH. Train may not operate over track with a descending grade of 2% or greater for two or more miles. If train is operating in such grade territory when device fails, train must immediately reduce to and not exceed 10 MPH.

608. Hand Gauges

Hand gauges in use must be calibrated every 92 days and documented on the gauge to be considered an "accurate gauge" when required by the rules. To calibrate:

a) Attach hand gauge to locomotive brake pipe and cut in the air.

b) Compare the psi reading from the hand gauge with the brake pipe pressure gauge on the locomotive.

c) Readings must be within 3 psi or the gauge must be removed from service until repaired.

d) If within 3 psi of locomotive gauge, apply updated calibration date sticker to back of hand gauge.

609. Retaining Valves

The retaining valve on each car controls brake cylinder pressure exhaust. All freight cars have retaining valves. During brake release the retaining valve can be positioned to allow all brake cylinder pressure to exhaust to atmosphere unrestricted, or retain some pressure while the system is recharged.

DIRECT EXHAUST (EX) - The normal running position. Handle turned straight down. This exhausts all brake cylinder pressure to without restriction.

HIGH PRESSURE (HP) - Handle turned 45 degrees below horizontal. This restricts rate of brake cylinder exhaust while retaining 20 psi of brake cylinder pressure.

SLOW DIRECT EXHAUST (SD) - Handle turned 45 degrees above horizon. Exhausts brake cylinder pressure for approximately 86 seconds and continues to exhaust until all pressure is vented (takes approximately twice as long for brakes to release.)

The Slow Direct position will be used on all empty cars. If car is not equipped with the current standard retainer and does not have Slow Direct, use the Low Pressure (LP or 10 psi) position.

The High Pressure position is to be used on loaded cars only, though in some cases the Special Instructions may require or allow the Slow Direct position to be used instead.

Unless otherwise instructed by Special Instructions or General Order, when retainers are in use they will be applied beginning on the head end as follows:

a) Retainers on empty or loaded cars; followed by

b) Additional retainers (if any) on Slow Direct; followed by

c) Cars (if any) with retainers in the normal Exhaust position.

If necessary to turn down retainers previously applied on cars due to overheating or stuck brakes, a sufficient number of additional retainers shall be applied.

Timetable / Special Instructions provide direction pertaining to locations and conditions where retaining valve use is necessary, or when necessary in judgment of the engineer. Unless required, trains should always operate with retaining valves in EX position.

610. Correcting Overcharges

If brake equipment of cars or locomotives is charged to a higher pressure than the regulating valve setting, reduce overcharge as follows:

a) Train must be standing.

b) Adjust regulating valve to desired pressure.

c) Make a full service brake pipe reduction.

d) Wait 30 seconds after brake pipe exhaust stops.

e) Release automatic brake.

f) Repeat as necessary upon release of brakes once for each 10 psi of overcharge.

Do not operate train in an overcharged condition.

611. Piston Travel Limits

Follow the piston travel limit requirements that are stenciled on the car, or on locomotives, noted on the blue card. If piston travel limits are not indicated, follow these guidelines for truck or body mounted brake cylinders on freight cars:

- Truck Mounted - Piston travel must provide for brake shoe clearance when brakes are released and must not exceed 4" travel where piston acts directly on the brake beam.
- Standard Body Mounted - At initial terminal, piston travel must be adjusted between 7" and 9". At intermediate inspection locations, piston travel must not exceed 10-1/2".
- Non-Standard Body Mounted - 12"x 10" cylinder travel must be 5" - 7"at initial terminal and not to exceed 8-1/2" at intermediate.
- 7-5/8" x 12" cylinder travel must be 5" - 6" at initial terminal and not to exceed 7-1/2" at intermediate locations.

SECURING UNATTENDED CARS and ENGINES

700. Securing Cars

Do not depend on air brakes to hold a train, engine, or cars in place when left unattended. Apply a sufficient number of hand brakes to prevent movement. If hand brakes are not adequate, block the wheels.

When the engine is coupled to a train or cars standing on a grade, do not release the hand brakes until the air brake system is fully charged.

When cars are moved from any track, apply enough hand brakes to prevent any remaining cars from moving.

When practical, cars and engines should be coupled together on the same track.

When switching with air cut in, a single car must not be left cut off unless hand brake is applied, wheels are chocked, or car is immediately attended on near level track.

701. Required Number of Handbrakes

Under all circumstances, a sufficient number of handbrakes, in combination with blocking, skates or chains, must be used to prevent undesired movement.

After kicking cars, care must be taken to prevent cars from rolling back or out of tracks. Before leaving cars unattended, hand brakes must be applied at both ends of track (unless one end of track has sufficient grade to keep cars from rolling out) to secure cars from rolling out of track.

Handbrakes should not be applied with excessive force sufficient to cause wheels to slide.

When applying handbrakes, the following additional factors should be taken into account in determining the number of handbrakes to apply:

- If the rail or wheels are covered in ice, snow or other contaminants that may reduce adhesion, additional handbrakes will be applied.
- Apply additional handbrakes when the possibility exists that additional cars may be added or roll into cut of cars being secured.

702. Minimum Required Number of Handbrakes

Use the following as a starting point to determine the number of hand brakes to apply:

- On generally level track or in a bowled track: Not less than 1 in 8 cars, with a 2 hand brake minimum.
- On grades not to exceed 1%: Not less than 1 in 4 cars.
- On grades not to exceed 2%: Not less than 1 in 2 cars.

On grades not specified, use the guidelines above to establish a proportional amount.

703. Testing Handbrakes on Cuts of Cars to be Left Unattended

When any question arises as to if a sufficient number of handbrakes have been applied, use the following methods to test the effectiveness of the hand brakes:

a) After securing cars but before detaching engine, release automatic air brakes and allow car air brakes to fully release.

b) Allow weight of engine and any cars to remain with engine to attempt to force the secured cars to begin to roll. If weight or grade is insufficient, briefly use power from engine to push or pull cars in the direction of the descending grade (if any).

c) If cars begin to roll and are incapable of quickly stopping themselves, apply additional handbrakes and retest.

704. Applying Handbrakes and Blocking

Handbrakes should not be applied with excessive force sufficient to cause wheels to slide.

Whenever possible, handbrakes will be applied from the descending end of a cut of cars, and the slack left bunched against the cars with applied brakes. When necessary to apply handbrakes from the ascending end, slack is to be left stretched.

Only appropriately sized wood in good condition, skates or chocks designed for securing rail equipment, or appropriately sized chain will be used to block equipment. The use of rocks, spikes, or metallic items other than appropriately sized chain (unless specifically designed for that purpose) to block wheels is prohibited. Blocking, chocks, chains or skates must not be used in place of an available effective handbrake.

If equipment with a defective handbrake is to be set out, it must be coupled to sufficient equipment with effective handbrakes or be otherwise secured by use of blocking, chocks, chains or skates.

Blocking, chocks, chains and skates should not be used to block wheels on the outside rail with substantial curvature.

705. Handbrakes on Engines

Handbrakes on engines must not be counted as handbrakes applied to secure attached cars. Exception: When an engine is coupled to a single car, that will be considered as compliance with the two handbrake minimum requirement.

Handbrakes must be applied on all unattended engines.

Single engines, or engines left on a grade without cars will be additionally secured by use of blocking, chocks, chains or skates.

Engines without cars left on a main track, or on other than a main track that descends towards the main track and is not protected by a derail or inside switch must be also skated or otherwise additionally secured.

Avoid placing skates or other blocking where they might get caught up in brake rigging or sanders.

706. Releasing Handbrakes

Handbrakes must not be released on trains until air brake system has been sufficiently charged.

Handbrakes must be fully released during movement except:

- When needed to control speed during a gravity switch move.
- When handbrake is being tested for securement.
- During short switching moves (wheels may not slide).
- To control slack or in an emergency.

Remote Control Operations

800. Qualified and Precautions

Only those qualified or a designated student under the immediate supervision of a qualified RCO may operate any locomotive under remote control. The necessary precautions must be taken to ensure safe operation. During extended road movements, or when otherwise practical, locomotive should be controlled in conventional operating mode.

801. Limits

Trains operating in Remote Control mode will only do so when the necessary point protection or Remote Control Zone can be established.

Movements under Remote Control are limited to:

- Locomotive(s) utilizing no more than eight axles.
- Train length or length of cars being switched will not exceed 3,000 feet. Trains greater than 3,000 feet in length will require a second train crew member if the entire train needs to be shoved.
- Train or switching speed is not to exceed 10 mph.
- When operating a train with more than 1,000 tons per locomotive, any weight beyond a 1:1000 radio will require an additional 5 operative rail car brakes cut in with the brake pipe.
- All movements will only be made when safe to do so in a manner consistent with good train handling.

802. Controls

Employees will follow manufacturers' procedures for changing from conventional to remote, and back to conventional control. While in remote control, the reverser handle(s) will be centered and removed, and the independent and automatic brake handles pinned in the proper position or removed. A tag will be placed on the control stand indicating the locomotive is under remote control.

Except when necessary by qualified workmen to test the remote control system itself, before performing repairs, adjustments or placing locomotives under Blue Signal protection (Rule 5.13), the remote control system must be deactivated.

Unless relieved by another RCO, at the end of shift the locomotive will be returned to conventional manual operation mode and remote control equipment properly secured.

803. Required Tests

Before each shift or after linking an Operator's Control Unit, the following items must be tested in remote control mode:

- Control of the air brakes; and
- The alerter and tilt switch safety features; and

- The man down and tilt automatic emergency notification system.

The remote control units must be inspected and known to be functioning properly before use, and are subject to the daily locomotive inspection requirements. Damaged or malfunctioning remote control equipment must not be placed in service or continue to be used.

(End of Rules)