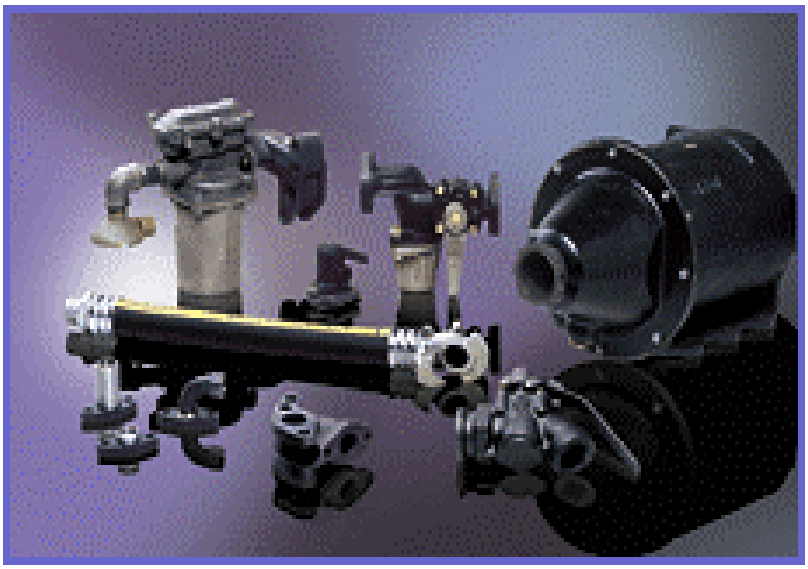
Chapter 11

Brake System Safety Standards For Freight & Other Non-Passenger Trains & Equipment: End-of-Train Devices Part 232



Air brake components.

Introduction:

The Power Brake Regulations were revised and issued January 17, 2001, with an effective date of April 1, 2001. In order to give the railroads and contractors sufficient time to develop and provide the required training to their employees, the implementation date for the majority of the provisions was April 1, 2004.

The following guidelines and interpretations have been developed to aid Federal and State Inspector(s) conducting inspections for compliance with part 232. It is important that agency interpretations and policies be adhered to by every Inspector when conducting these inspections, so that uniformity of compliance activity is achieved. Reports of power brake inspections are made on the Motive Power and Equipment Inspection Report, **F6180.96.** Violations are to be submitted on the MP&E Violation Report - FRA **F 6180.109**.

Strict liability applies to the use or haul of equipment with a defective power brake condition, and appropriate enforcement action must be taken unless the equipment has been properly tagged and is being moved to the nearest repair location for the purpose of repair. In order to establish a violation of part 232, FRA must prove that the equipment was "used or hauled" with a non-complying condition. Thus, evidence of an actual "haul" of the

defective equipment in a train is sufficient and needs to be included to support a violation. Additionally, FRA considers a piece of equipment "in use" as long as the railroad has or should have completed its required tests and inspections and the equipment is deemed ready for service, prior to any movement or the actual departure. Defects found at this time are subject to potential civil penalties. Therefore, the Inspector is not required to wait for a car with a defective power brake to depart or engage in an actual "haul" in order to assess a violation. If Inspectors rely on the above "in use" interpretation, the violation report must establish that the railroad had completed or should have completed all necessary inspections capable of discovering the defective condition(s). Therefore, evidence must be included in the violation report that establishes the Inspector's basis for this finding. Be as specific as possible, to include the names of individuals involved with releasing the equipment, if available. If a roll-by inspection is part of the inspection process at a location, then the violation cannot be assessed until the inspection process is completed. Remember, this is added enforcement flexibility and may not be the best or appropriate approach in certain situations. In many circumstances the best approach is to establish actual use or movement of the equipment.

Inspectors are expected to use sound judgment, along with the procedures and guidance provided in both this manual and the General Manual when assessing the need for appropriate enforcement actions regarding any non-compliance with part 232.

In the past, questions were raised concerning the method of compiling air brake inspection data. Therefore, a variety of activity codes and source codes were developed for power brake inspection activities. There are codes that distinguish whether cars are "on-air" or "off-air" when inspections for air brake compliance, Part 232, are performed. For the purposes of this discussion, "on-air" means the car has sufficient brake pipe pressure to operate the air brake pistons, and the car is inspected with the brakes applied. This could be either with a full service or an emergency brake application. "Off-air" means the car is inspected without the brakes applied. FRA Inspectors routinely examine cars that are not "on-air" to inspect for the securement of the brake equipment, the position of the retainers, condition of the brake pipe and valves, the operation of angle cocks, etc. Such inspections are included in the car count under the activity code for Part 232. However, many functions of the brakes cannot be observed; *i.e.* piston travel limits, binding or fouling, audible air leaks, etc.

FRA also needed to distinguish between "inbound" and "outbound" extended haul inspections, and there was a need to separate inspection activities of MP&E Inspectors and OP Inspectors. Therefore, to accomplish the above, Inspectors shall use the following activity or source codes for Part 232 inspection activities:

Activity Code	Inspection Activity
232	Any car inspected for Part 232 compliance that does not have the brakes applied.
232A	Any car inspected for Part 232 compliance that has the brakes applied by either a service reduction or an emergency application, so that the functionality of the brakes and piston travel limits can be observed.
232T	Anytime a train air brake test is observed.
232E	An inspection of the End-of-Train Device is conducted.
232S	Monitoring a single car or repair track air brake test.
232O	OP Inspectors observing an Initial Terminal brake test in the cab of the locomotive only.
232X	OP Inspectors conducting inspections for securement of freight locomotive equipment.
Source Code	
Z	Outbound Extended Haul train inspections.

Inspectors are also reminded that they need to verify the number of cars inspected before entering the number on the inspection report. Do not rely solely upon the representation of railroad personnel or train consist sheets to determine how many cars are inspected There are several methods Inspectors could use, including counting the cars with hand-held counters, or using the train consist and checking off the cars as they are inspected.

§ 232.3 Applicability:

Part 232 applies to all freight and other non-passenger train brake systems and equipment. Subpart E—End-of-train devices, applies to both freight and passenger train operations.

Circus trains are required to comply with part 232. Tourist, scenic, historic or excursion operations that are part of the general railroad system of transportation have to comply with the provisions of part 232 as it existed prior to the issuance of the new rule. The text of the old rule is found in Appendix B of the new rule.

Private cars: As private cars are designed to carry passengers and are generally hauled in both freight and passenger trains, FRA intends that these types of cars be covered by both the recently issued Passenger Equipment Safety Standards, part 238, and this final rule. For example, these types of cars will be subject to the maintenance and equipment standards applicable to passenger equipment, but will be covered by the inspection requirements contained in this rule when hauled in a freight train.

Maintenance of way (MoW) trains have to comply with part 232. This includes passenger MoW trains.

§ 232.5 Definitions:

This regulation contains an extensive set of definitions that are intended to clarify the meanings of important terms used in the text of the final rule. The text of the definitions was carefully worded to minimize the potential for misinterpretations. However, a few terms elicited further questions that will be addressed as follows:

Air flow indicators: As the definition states, the indicator face must display markings from 10 cubic feet per minute (CFM) in increments of 10 CFM or less. It must also display numerals indicating 20, 40, 60 and 80 CFM. If an indicator is marked with numerals of 2, 4, 6, 8, 10, 12, it is not an indicator that can be used to qualify the brake pipe pressure of a train, in lieu of conducting a brake pipe leakage test. It may be still used by the engineer for the purpose of operating a train and it must be tested for accuracy within the prescribed time periods.

Brake, effective: means a brake that is capable of producing its nominally designed retarding force on the train. Inspectors often find instances where only the top or bottom half of a brake shoe is in contact with the wheel, and question whether this is an effective brake. FRA conducted studies with the AAR and found that this condition does **not** render a brake ineffective. Therefore it is not, and should not be considered a defective condition.

Off air: means not connected to a continuous source of compressed air of at least 60 pounds per sq. inch (psi). If the automatic brake valve is drawn down below 60 psi, the train would be off air.

Previously tested equipment: Equipment that has received a Class I brake test and has not been off air for more than four hours. If equipment is charged to 60 psi and recharged every three hours and 45 minutes, then the equipment would **not** be considered off air.

Qualified mechanical inspector (QMI): The only time an inspection or test requires a QMI is the inspection requirements found in § 232.213 for extended haul trains.

Qualified person: An Inspector should observe the performance and outcome of an individual conducting an inspection or test, and ask appropriate questions to determine if an individual is a qualified person. If there are questions concerning the knowledge, skills, or ability of an individual, notify the Regional Specialist for further instructions on how to obtain the training records to determine if the training requirements have been fulfilled. The agency does not want every inspector requesting training records on individuals. This should be done by the Regional Specialist or Headquarters Specialist.

"Roll-by" inspection: this is only applicable for the "release of brakes" portion of the inspection. It does not constitute an inspection of one side of the train for the purpose of satisfying the requirement of inspecting both sides of the train during a brake inspection.

Switching service: is defined as the classification of cars according to commodity or destination; assembling of cars for train movements; changing the position of cars for purposes of loading, unloading, or weighing; placing of locomotives or cars for repair or storage; or moving of rail equipment in connection with work service **that does not constitute a train movement**. Thus, a train engaged in switching service carries the potential of requiring a brake test, if the movement it will be engaged in is considered a "train movement" rather than a "switching movement." FRA's determination of whether the movement of cars is a "train movement," subject to the requirements of this section, or a "switching movement" is and will be based on the voluminous case law developed by various courts of the United States.

FRA's general rule of thumb as to whether a trip constitutes a **"train movement"** requires five or more cars coupled together that are hauled a distance of at least one mile without a stop to set off or pick up a car and not moving for the purpose of assembling or disassembling a train. However, FRA may consider movements of less than one mile "train movements" if various circumstances exist. In determining whether a particular movement constitutes a "train movement," FRA conducts a multi-factor analysis based upon the discussions contained in various court decisions on the subject. See e.g. United States v. Seaboard Air Line R. R. Co., 361 U.S. 78 (1959); Louisville & Jeffersonville Bridge Co. v. United States, 249 U.S. 543 (1919). The following factors are taken into consideration by FRA: the purpose of the movement; the distance traveled without a stop to set out or pick up cars; the number of cars hauled; and the hazards associated with the particular route traveled (e.g., the existence of public or private crossings with or without crossing protection, the steepness of the grade, the existence of curves, any other conditions that minimize the locomotive engineer's sight distance, and any other conditions that may create a greater need for power brakes during the movement). The existence of any of these hazards would tend to weigh towards the finding of a "train movement," since these are the types of hazards against which the power brake provisions of the Federal rail safety laws were designed to give protection.

Transfer train: may pick-up and set-out cars while enroute. Any cars picked-up will have

to receive, at a minimum, a transfer train brake test. However, this does not start a new 20-mile transfer train unless a transfer train brake test is performed on the entire train at that particular location. Yes, a train could travel 100 miles as a transfer train, if a transfer train brake test is performed at every 20 mile segment of the trip.

Unit or Cycle train: must remain coupled as a consist and continuously operates from location A to location B and back to location A. FRA will not take exception if the train is separated for the purpose of loading/unloading, as long as the cars are not off-air for more than 4-hours and the consist remains in the original order. A block of cars can be added and removed as long as the cars added are given a Class I brake test before the block of cars are added to the train.

§ 232.9 Responsibility for compliance:

This section contains the "use" or "haul" language as previously discussed. It basically states that any train, railroad car, or locomotive covered by this part will be considered "in use" prior to departure, but after it receives or should have received the necessary tests and inspections required for movement. FRA will no longer necessarily wait for a piece of equipment with a power brake defect to be hauled before issuing a violation report and recommending a civil penalty. FRA believes that this approach will increase FRA's ability to prevent the movement of defective equipment that creates a potential safety hazard to both the public and railroad employees. If Inspectors relies on the "in use" provision, the violation report must establish that the railroad has completed or should have completed all necessary inspections capable of discovering the defective condition(s). Therefore, evidence must be included in the violation report that establishes the Inspector's basis for this finding. Be as specific and thorough as possible. Remember, this is added enforcement flexibility and may not be the best approach in certain situations.

At interchange, a railroad can refuse to accept equipment with a non-complying condition. In this scenario, if a railroad elects to receive the defective equipment and the equipment is not properly tagged, both the offering railroad and the receiving railroad can be held liable.

Paragraph (c) states that any "person" that performs any function or task required by this part will be deemed to have consented to FRA inspection of the person's operation to the extent necessary to ensure that the function or task is being performed in accordance with the requirements of this part. This provision is intended to put railroads, contractors, and manufacturers that elect to perform tasks required by this part on notice that they are consenting to FRA's inspection for rail safety purposes of that portion of their operation that is performing the function or task required by this part. In most cases, this function or task involves a contractor's performance of certain required brake inspections or the performance of specified maintenance on cars, such as conducting single car or repair track tests on behalf

of a railroad. FRA believes that if a person is going to perform a task required by this part, FRA must have the ability to view the performance of such a task to ensure that it is conducted in compliance with federal regulations. If an Inspector encounters a location that prohibits access on the property to perform an inspection, the Regional Specialist should be immediately notified, who will then contact Headquarters for further instructions.

§ 232.11 Penalties:

This section identifies the penalties that may be imposed upon a person, including a railroad or an independent contractor providing goods or services to a railroad, that violates any requirement of this part. While the responsibility for non-complying equipment is usually applied to the hauling railroad, if a contractor is performing one of the required inspections and/or tests, the responsibility can be placed on either the contractor or the railroad, or both. The Inspector should consult with the Regional Specialist to determine where the enforcement action should be directed. The schedule of civil penalties is listed in Appendix A to this rule.

§ 232.15 Movement of defective equipment:

This section contains the provisions regarding the movement of equipment with defective brakes without civil penalty liability.

Paragraph (a) of this section contains various parameters which must exist in order for a railroad to be permitted to haul a piece of equipment with defective brakes for repairs without civil penalty liability. The rule contains language in the provisions that accurately reflect the language contained in the existing statutory provisions pertaining to the movement of equipment with defective brakes.

The statutory provisions contained in 49 USC § 20303 (previously 45 USC Section 13) govern the movement of equipment with defective or insecure safety appliances, which includes power brakes. This only allows the railroad to move the defective equipment from the place where the defect is first discovered to the **nearest** location where the necessary repairs can be made. This movement can either be on the railroad where the defect is first discovered or on the line of the connecting railroad, only if the connecting railroad has elected to accept the non-complying equipment and the point of repair on the connecting railroad's line, where the equipment will be repaired, is no further than the point where the repairs could have been made on the line where the equipment was first found to be defective. A railroad can refuse to accept a defective car at interchange. Until the receiving railroad accepts the car by either moving it or otherwise exercising control over it, it is not liable for civil penalties nor is it required to make any repairs. <u>It should be noted, that the delivering railroad remains liable for each defective car it tenders in interchange unless the car is properly tagged</u>.

A car or locomotive with a defective brake condition cannot be tagged and moved from a location that has the capability to make the necessary repairs. Nor can a car or locomotive with a defective brake condition be tagged and moved in a train that receives a Class I brake test on the **entire** train, irrespective of whether it is at a location where repairs cannot be made.

The statutory provision contained in 49 U.S.C. §20303 is an affirmative defense to be established by the railroad. There are seven elements which must be established:

1. The car was properly equipped with power brakes
2. The car became defective while being used by railroad on its line.
3. The railroad discovered the defect prior to movement.
4. The movement was from the place where the defect was first discovered.
5. Repairs could not be made at the location where the defect was first discovered.
6. Movement was necessary to make the necessary repairs.
7. The car moved only to the nearest available point where the necessary repairs could be made.

Paragraph (b) of this section contains the specific requirements regarding the tagging of equipment found with defective brake components. The requirements contained in this paragraph are very similar to the tagging requirements contained in part 215, regarding the movement of equipment not in compliance with the Freight Car Safety Standards. This paragraph also permits the use of an automated tracking system in lieu of directly tagging the equipment if the automated system is approved for use by FRA. If and when a procedure is approved, Inspectors will be notified by a Technical Bulletin issued by Headquarters. Any automated tracking system approved for use by FRA must be capable of being reviewed and monitored by FRA at any time, 24/7. There must be security features specific to monitoring and tracking defective equipment with which the system is outfitted. There has to be procedures in place in the event that the electronic tracking system were to experience a breakdown or malfunction and become unavailable to railroad personnel. As both the statute and the regulation permits the interchange of defective equipment, in specified circumstances, FRA finds it unrealistic to believe that a railroad will not take advantage of this flexibility. Therefore, there would have to be a method on how a foreign railroad that receives equipment at interchange will have knowledge that it is receiving defective equipment without access to the railroad's automated tracking system at the interchange location. Also, how it will handle defective equipment being delivered to it in interchange by another railroad would have to be addressed. There are no tagging requirements for safety appliance defects.

Paragraph (c) restricts the movement of a vehicle with defective brakes for the purpose of unloading or purging, unless it is necessary for the safe repair of the car. Therefore, cars with defective brakes cannot be moved to a location to be loaded or unloaded until the defective condition is corrected, unless the location is the location where the repairs will be made.

Paragraph (e) contains the guidelines for train placement. Multi-unit articulated equipment with a defective brake cannot be placed in a train if more than two control valves are cut-out. Multi-unit articulated equipment cannot be placed at the rear of the train if the rear control valve is cut-out.

Paragraph (f) contains general guidelines that FRA will consider when determining whether a location is one which should be considered a location where brake system repairs must be made. FRA expects a railroad to consider the guidance contained in this paragraph when making its decisions on where equipment containing brake defects will be repaired. The guidance contained in this paragraph is based upon, and consistent with, the voluminous case law which exists that establishes the guiding principles for determining whether a location constitutes a location where the necessary repairs can be made, and whether a location is the nearest location where such repairs can be effectuated. These guidelines are equally applicable to determining such repair locations for all safety appliance defects. The guidelines must be applied on a case-by-case basis to determine if the railroad acted in good faith in moving defect equipment. The following guidelines should be used to determine if a location should be considered:

- Locations with an operative repair track or repair shop; and
- Locations where railroad performs mechanical repairs other than safety appliance and/or power brake repairs.
- A repair truck(s) stationed there or do they come from another location?
- Is the locations where a mobile repair truck originates or is permanently stationed;
- Is the locations where a mobile repair truck is used on regular basis (*This needs to be fully explained in the narrative of a violation report*)
- To be a location where a mobile repair truck (RT) is used, trackage availability needs to be discussed in the narrative.
- If location is a RT location, where is nearest major facility and how far is it? (i.e. repair shop or location where RT permanently stationed or originates)
- Discuss the type of repair facility, to include what types of repairs are made at the location and any other pertinent information

While FRA acknowledges that every location where a mobile repair truck is capable of making repairs should not be considered a repair location, FRA firmly believes that locations where repair trucks are used in virtually the same manner as a fixed facility should be considered when determining whether the location is capable of making the necessary repairs

In determining whether a location, noted above, is capable of making a particular repair the following factors must also be considered:

- The accessibility of the location to persons responsible for making repairs;
- The presence of hazardous conditions that affect the ability to safely make repairs

of the type needed at the location;
- The nature of the repair necessary to bring the car into compliance;
- The need for railroads to have in place an effective means to ensure the safe and timely repair of equipment;
- The relevant weather conditions at the location that affect accessibility or create hazardous conditions;
- A location need not have the ability to effectuate every type of safety appliance or power brake repair in order to be considered a location where some safety appliance or power brake repairs can be made;
- A location need not be staffed continuously in order to be considered a location where safety appliance repairs can be performed;
- The congestion of work at a location shall not be considered.

In addition to considering the factors noted above, the following factors must be considered in determining if the location is the nearest location where the necessary repairs can be made:

- Distance to the location -- although this is a key factor it should not be the determining factor. This must be considered in conjunction with all the factors previously noted as well as the following safety considerations:
- The safety of the employees responsible for getting the equipment to or from a particular location, and
- The safety hazards involved in moving the equipment in the direction of travel necessary to get it to a particular location.

Inspectors need to address the items discussed in Paragraph (f) in the written narrative if civil penalties are being pursued.

Paragraph (g) provides a method by which a railroad may designate locations where various brake system repairs will be conducted. See Appendix B of the Compliance Manual for the railroads that have designated locations where brake system repairs will be conducted. This not only provides the railroad, but the list of locations designated by the railroad.

§ 232.17 Special approval process:

This section contains the procedures to be followed when seeking to obtain FRA approval of a pre-revenue service acceptance plan under § 232.505 for completely new brake system technologies or major upgrades to existing systems or when seeking approval of an alternative to the test standard incorporated in §§ 232.305 or 232.307.

§ 232.103 General requirements for all train brake systems:

This section contains general requirements that are applicable to all freight and non-passenger train brake systems. This section specifically includes certain basic train brake system practices and procedures that form the foundation for the safe operation of all types of trains.

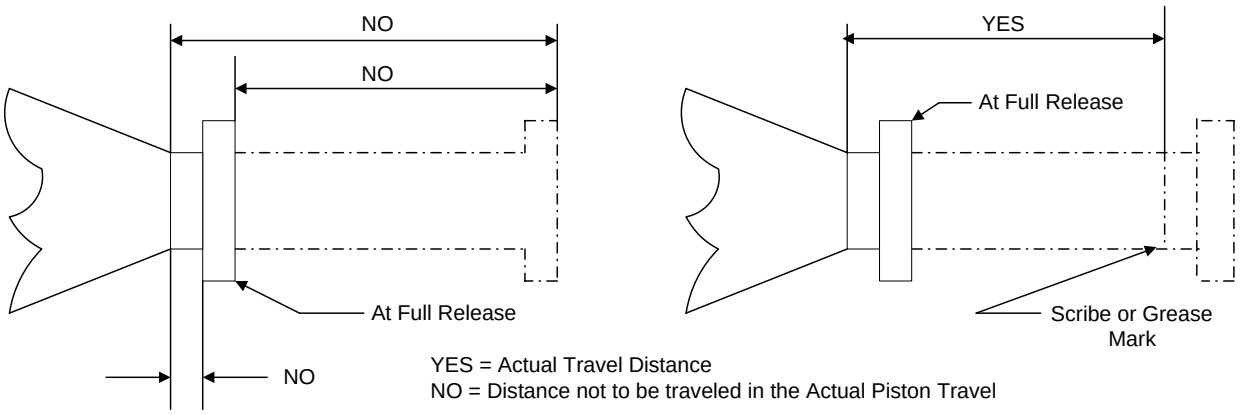
Paragraph (d) requires 100% operative brakes where a Class I brake test is required to be performed. This applies only when the Class I test is performed on the **entire** train. It does not apply at locations where a railroad elects to perform a Class I brake test on cars that are picked-up enroute and added to an existing through-train. Therefore, it is permissible to conduct a Class I brake test on cars picked-up enroute and move a car with defective brakes from that location under the provisions of § 232.15 - Movement of defective equipment. Although FRA recognizes that the 100 percent requirement may be somewhat burdensome for some railroads at certain locations, FRA believes that the number of locations involved is relatively low and should be formally handled on a case-by-case basis through the existing waiver process. Railroads applying for such waivers must be able to establish a true need for the exception and must be willing to provide alternative operating procedures that ensure the safety of the trains being operated from those locations.

Paragraph (g) requires the piston travel limits be indicated by either a stencil, sticker, or badge plate on all cars except for cars equipped with nominal 12-inch stroke (8 ½ and 10-inch diameters) brakes cylinders. **Note:** there are some applications of 12 x 10 inch brake cylinders that have a 5-inch range. For these applications, a stencil, sticker, or badge plate would have to convey that information.

Often there are inquiries concerning the proper method for measuring brake cylinder piston travel on freight cars. In order to achieve consistent compliance, the following procedure will be used to measure piston travel.

The actual movement of the piston is the distance that must be measured. To determine this measurement, the longstanding practice of measuring piston travel from the front of the brake cylinder (non-pressure head) to the grease mark on the hollow rod will be used. If a grease mark is not evident, a line scribed on the hollow rod would suffice. If there is confusion as to what the piston travel should be on a particular car, refer to either the badge plate or stenciling located in a conspicuous place near the brake cylinder.

The following sketches should clarify the issue.



Paragraph (h) requires that all cars built after April 1, 2004, be designed so that an inspector does not have to place himself or herself on, under, or between components of the equipment to observe brake application or release. This paragraph also allows railroads the flexibility of using a reliable indicator in place of requiring direct observation of the brake application or piston travel because the designs of some freight car brake systems make direct observation extremely difficult unless the inspector places himself or herself underneath the equipment. Although the rule permits the use of an indicator for purposes of determining piston travel, the individual inspecting such equipment would be required to inspect all components of the brake system for proper operation.

Paragraph (n) addresses the securement of unattended equipment by means of applying handbrakes, venting brake pipe to zero and leaving the angle cock open on one end of a cut of car(s), and requiring the railroad to develop and implement procedures to verify that the equipment is secure. Unattended equipment is equipment left standing and unmanned in such a manner that the brake system of the equipment cannot be readily controlled by a qualified person. When assessing this situation for compliance, the Inspector should take into account the following factors:

- Can a person take corrective action if the equipment should start to roll away?
- Can the individual readily mount the car and apply the handbrake or can the individual safely open an angle cock should the equipment start to roll away?
- Can the individual readily mount the locomotive and either apply the handbrake or operate the brake handles or emergency brake valve to stop the unexpected movement?
- Is the qualified person focused on the situation? If the individual is eating lunch or

> in the bathroom, full attention is not being given to the equipment. If the individual is in a crew room or talking on the phone, full attention is not being given to the equipment.

If an engineer and crew gets off of their train to watch a passing train, and remains in close proximity of their locomotive consist, handbrakes would not have to be applied on the locomotives, as long as someone is close enough to readily mount the locomotive and apply an emergency brake or handbrake, should the locomotives or train start to roll-away. If the engineer and crew got off their train and positioned themselves between the passing train and their train, handbrakes would have to be applied, as their train would be considered unattended.

FRA will not take exception to a train crew cutting away from a cut of cars, initiating an emergency brake application on the cut of cars, and then closing the angle cock for the sole purpose of taking the locomotives to the opposite end of the cut of cars to either: (1) couple the locomotives to the cars; or (2) open the angle cock at the other end and leave the angle cock open and vented to atmosphere as required under 49 CFR 232.103(n)(2). However, if the locomotive cuts away from the cars and closes the angle cock without going "directly" to the other end to either open the angle cock or couple the locomotives to the cars, the railroad would be in violation of 49 CFR 232.103(n)(2). The emphases is **"directly"** because even though it may be the train crews intent to go “directly” to the opposite end of the cars to take the appropriate action, if a train dispatcher, or whomever, directs the crew to perform another job task before they “directly” go to the opposite end of the cars, a violation is committed. It is only with the understanding that the train crew goes "directly" to the other end of the cars to take the appropriate action that FRA will permit this type of activity.

The term “Yard Limits” as used in the context of this paragraph for the securement of equipment means:

> A system of tracks, other than main tracks and sidings, used for classifying cars, making up and inspecting trains, and/or storing cars.

The securement requirements contained in this rule do not apply to distributed power locomotives when they are placed in a train. However, if locomotives are left in a yard or siding waiting to be used as distributed power and they are unattended, appropriate handbrakes have to be applied.

A locomotive consist is one or more locomotives coupled together. They do not have to have the electrical cables connected, nor do they have to have the air hoses coupled. As long as the locomotives are coupled together via the coupler, it is a locomotive consist.

Locomotives located in a locomotive servicing area under the control of mechanical forces

do not have to have handbrakes applied while mechanical personnel are preparing them for service. However, once the mechanical people are finished and/or have placed them on "ready tracks" for the train crew or hostler, appropriate handbrakes would have to be applied. Also, train crews have to apply appropriate handbrakes on locomotives they leave in servicing areas, unless mechanical personnel are in place to take immediate control of the locomotives. Anytime mechanical forces are not on duty at a service track location, appropriate handbrakes have to be applied.

In yard environments where there is active switching activity, there must be a sufficient number of cars secured on both ends of a yard track. The unattended, unattached railcars between the secured ends do not have to be secured. In sidings along the right-of-way, cars must be secured to prevent any car, or group of cars, from rolling out of the siding.

Paragraph (n)(1) includes a performance-based requirement that a sufficient number of hand brakes be applied to hold the equipment and that railroads have to develop and implement a process or procedure to verify that the applied hand brakes will sufficiently hold the equipment when the air brakes are released. This requires a railroad to develop appropriate operating rules to verify the sufficiency of the handbrakes applied, which can be tailored to the specific territory and equipment operated by the railroad. This can be as elaborate as the use of a sophisticated matrix or some other type of "set calculations" that specify exactly how many handbrakes have to be applied on specific numbers of cars; or it can be as simple as having the engineer release the pneumatic brakes after the handbrakes have been applied, to determine if the equipment is secure. To simply have instructions that state "a sufficient number of handbrakes have to be applied" does not satisfy the intent of the regulation, unless there is the provision that the pneumatic brake have to be released to determine the equipment is secure.

§ 232.105 General requirements for locomotives

This section contains general provisions related to locomotives. It does not include provisions related to the inspection and maintenance of the locomotive braking systems, as these requirements are adequately addressed in part 229. The exception is the locomotive handbrake or parking brake, which has to be inspected and necessary repairs made as often as service requires, but no less frequently than every 368 days. The date of the last inspection must be entered on Form FRA F 6180-49A or suitably stenciled or tagged on the locomotive. Transport Canada's Cab Form 22, Item 8(a) includes this same information. The information in Item 8(a) of Transport Canada Cab Form 22 satisfies FRA's requirements.

§ 232.107 Air source requirements

This section contains requirements directed at ensuring that freight brake systems are devoid, to the maximum extent practical, of water and other contaminates which could conceivably deteriorate components of the brake system and, thus, negatively impact the ability of the brake system to function as intended.

Paragraph (a) requires railroads to adopt and comply with a plan to monitor all yard air sources to ensure that the yard air sources operate as intended, are in proper condition, and do not introduce contaminants into the brake system of freight equipment. FRA intends to make clear that the inspections required under this paragraph are to be thorough inspections of the entire yard air source. This inspection would include not only the compressors, but all piping, hoses, valves, and any other component or part of the yard air source to ensure it is in proper condition and operates as intended. This also means that corrective action must be taken on any component that does not operate as intended, such as replacing desiccant in air dryers, and/or tightening pipe connections in the yard to stop air leaks, and replace defective valves and hoses.

These inspection requirements apply to any air compressor that is capable of introducing contaminants into the brake pipe of a car or locomotive. Shop compressors, rental compressors, and portable air compressors will have to receive the periodic inspections and repairs, along with a written plan and records.

Railroads must maintain records (either electronically or in writing) related to yard air monitoring plans. FRA believes that these records are necessary to ensure that railroads are properly conducting the required inspections and are taking timely and appropriate remedial action when a problem air source is detected.

The monitoring plans apply to any yard air source, either a stationary or portable air compressor, that is used to introduce compressed air into cars and/or locomotives.

While this rule does not contain requirements regarding the use of air dryers on either locomotives or yard air sources, it is FRA's position that air dryers must be properly maintained. Therefore, if an Inspector finds an air dryer that is inoperative or has contaminated desiccant, appropriate enforcement action should be taken. For locomotives, § 232.105(a) "safe and suitable" should be cited. If the defective condition is found on a yard air source, the Inspector should review the air monitoring plans and records for compliance.

Paragraph (e) retains the proposed requirement that a railroad adopt and comply with detailed written operating procedures tailored to the equipment and territory of the railroad to promote safe train operations during cold weather situations.

§ 232.109 Dynamic brake requirements

Paragraph (a) requires that a locomotive engineer be informed of the operational status of the dynamic brakes on the locomotives the engineer will be required to operate. This information is to be provided to the locomotive engineer at a train's initial terminal and at other locations where a locomotive engineer first begins operation of a train. While it allows railroads to provide a locomotive engineer with the required information by any means they deem appropriate, the rule is clear that a written or electronic record of the information provided shall be maintained in the cab of the controlling locomotive. This will ensure that relief or other oncoming engineer will have the information that was provided to the previous locomotive engineer. The information required has to inform the engineer of exactly how many units have operating dynamic brakes. This is only required on railroads that use or operate locomotives with dynamic brakes.

Paragraph (b) requires that a locomotive with inoperative dynamic brakes must be repaired within 30 days of being found inoperative or at the locomotive's next periodic inspection, whichever occurs first. If the locomotive is not in a shop that can effectuate the dynamic brake repairs at either the 30 day time period or the locomotive's periodic inspection, the locomotive must be tagged and moved as prescribed in § 232.15, as this is a power brake defect. It cannot be tagged and moved under the provisions of § 229.9. If the locomotive happens to be on a foreign railroad when either the 30 day time period or periodic inspection is due and the movement would require the locomotive to pass several repair locations before it could be returned to the owning railroad, the foreign railroad must make the repairs or ask FRA for permission to move the locomotive past the repair points.

Paragraph (c) contains the requirements related to the tagging of a locomotive found with inoperative dynamic brakes. This should be done when the defective condition is initially identified. Since the locomotive engineer generally discovers this defect, he/she should properly fill out the tag and apply it to the locomotive.

Paragraph (e) contains the provision permitting a railroad to declare a locomotive's dynamic brakes "deactivated" if the following requirements are met: (I) the locomotive is clearly marked with the words "dynamic brake deactivated" in a conspicuous location in the cab of the locomotive; and (ii) the railroad has taken appropriate action to ensure that the deactivated locomotive is incapable of utilizing dynamic braking effort to retard or control train speed. It should be noted that FRA intends for this provision to be a permanent application and not used as a solution to circumvent or delay the repair of a defective dynamic brake.

The provisions of § 232.109 are intended to apply to those trains that utilize their dynamic brakes during the train movement. Thus, if the involved run is one on which dynamic brakes are usually employed then all of the requirements of § 232.109 would apply. Similarly, if

the train operation is one where dynamic brakes are not used then the provisions like §§ 232.109(f) and (g) would not be applicable. Sections 232.109(f) and (g) do not apply to trains used in helper service.

Q: Is it permissible to depart a location where a train originates or a terminal where locomotives can be rearranged, without the controlling unit having Dynamic Brakes?

A: Yes, but only in two limited circumstances:
1. The locomotive consist is not intended to have dynamic brakes used while in transit (if the run generally requires or usually utilizes dynamic brakes, then this would not apply);
2. The controlling locomotive is capable of controlling the dynamic brakes on trailing units **and** is equipped with either an accelerometer or a dynamic brake indicator.

Q: If a train departs location A with all of the Dynamic brakes working and prior to arrival at an intermediate terminal (crew change point), the Dynamic brake fails on the lead unit, does the unit have to be swapped or repaired prior to departure from the crew change point?

A: If the unit is equipped as stated above, then NO. If not so equipped, then the unit needs to be switched out where it is safe to do so, this may or may not be the crew change point depending on the track availability.

Q: If a Train consist that departed an Initial Terminal with working dynamic brakes and arrives at its destination with defective dynamic brakes, can it depart if there are no other locomotives available?

A: Only if the controlling locomotive is capable of controlling the dynamic brakes on trailing units **and** is equipped with either an accelerometer or a dynamic brake indicator. If none of the units had an operative dynamic brake, FRA would still require an accelerometer, if this train operated over a route that required the use of dynamic brakes.

§ 232.111 Train information handling

This section contains the requirements regarding the handling of train information. This information has to be updated whenever a new train crew takes charge of a train. This information is applicable to trains receiving a transfer air brake test and operating as transfer train movement. However, this information would not have to be on a transfer move made within the confines of a yard, as defined as: a system of tracks, other than main tracks and sidings, used for classifying cars, making up and inspecting trains, and/or storing cars.

§232.203 Training requirements

This section contains the general training requirements for railroad employees and contractor employees that perform the inspections and tests required by this part. Each railroad is responsible for training its employees and maintaining the required records. Likewise, the contractor is responsible for providing appropriate training to its employees and maintaining the required records and information. However, this does not relieve the railroad from potential civil penalties for, e.g., failure to perform a proper Class I brake test, if the employees of a contractor are found not to be qualified to perform the task for which they are assigned responsibility. Both the railroad and the contractor would remain liable for potential civil penalties if the employees used to perform a particular task were not properly trained and qualified in accordance with the training requirements contained in this rule.

For purposes of this section, a "contractor" is defined as a person under contract with a railroad or car owner, or an employee of a person or company under contract with a railroad or a car owner.

The training that an employee is required to receive need only address the specific skills and knowledge related to the tasks that the person will be required to perform under this part. Thus, a railroad or contractor may tailor its training programs to the needs of each of its employees based on the tasks that each of its employee will be required to perform. If an individual never performs a single car test, the railroad would not have to train for this task. If the railroad never performs a Class II brake test, the railroad would not have to train for Class II brake inspections.

Training consists of both classroom and "hands-on" instruction. FRA will accept either the traditional classroom setting with an instructor instructing the students, or an inter-active computer-based training (CBT). For the CBT to be accepted, it must be inter-active with questions and problem solving activities embedded into the program. It cannot be a computer program that reads information to an individual or displays text that must be read by the individual without methods to access the individual's progress. FRA will not accept videos or printed material as the only medium for training. There must be some form of interaction with the person being trained. Each person must be tested on the knowledge received from such training and the test scores must be documented.

The "hands-on" portion of the training can be a structured, formal exercise monitored by an individual, or structured efficiency tests can be used, provided such testing is properly documented and covers the necessary tasks to ensure retention of the knowledge and skill required to perform the employee's duties required by this part.. Either method must be properly documented.

The rule requires that refresher training be periodically provided. The refresher training has

to consist of both classroom and "hands-on" training. FRA does not intend for such training to be as lengthy or as formal as the initial training originally provided, but believes that the training should re-emphasize key elements of various tasks and focus on items or tasks that have been identified as being problematic or of poor quality by the railroad, contractor, or its employees through the periodic assessment of the training program.

FRA believes that in order for a supervisor to properly exercise oversight of an employee's work, the supervisor must be properly trained and qualified to perform the tasks for which they have oversight responsibilities. Therefore, supervisor's have to receive some level of training that has to be documented.

Paragraph (e) requires that each railroad or contractor adopt and comply with a plan to periodically assess the effectiveness of its training program. Although FRA agrees that a formal audit process may not be necessary, FRA continues to believe that railroads and contractors should periodically assess the effectiveness of their training programs. However, rather than require a formal internal audit, FRA believes that periodic assessments may be conducted through a number of different means and each railroad or contractor may have a need to conduct the assessment in a different manner. The use of efficiency tests or periodic review of employee performance could be methods for conducting such reviews. FRA agrees that many railroads, due to their small size, are capable of assessing the quality of the training their employees receive by conducting periodic supervisory spot checks or efficiency tests of their employees' performance. However, FRA continues to believe that on larger railroads the periodic assessment of a training program should involve all segments of the workforce involved in the training.

§ 232.205 Class I brake test–initial terminal inspection

This section describes the circumstances that mandate the performance of a Class I brake test and outlines the tasks that must be performed when performing this inspection. Basically a Class I brake test is the functional equivalent to the "initial terminal brake inspection" of the old rule.

A Class I brake test is required at locations where more than one "solid block of cars" is added to or removed from a train. It should be noted that the rule permits both the addition and the removal of a "solid block of cars" at a location without requiring the performance of a Class I brake test on the entire train. However, depending on the make-up of the block of cars, certain inspections will have to be performed on that block of cars at the location where it is added to the train. A railroad can add a single block of cars to a train that is composed of cars from numerous different trains, as long as the railroad assembles the cars into one block and performs a Class I test (or at least a Class II test) on the solid block of cars before adding the block to the train. Remember, this chapter of the manual only

addresses the brake test requirements. Anytime cars added to a train, a pre-departure inspection (part 215) must be performed on the cars.

When a through-train arrives at a location and splits into multiple sections, the railroad can only designate one of the sections as being the continuing train. The other sections of the train would require applicable air brake tests, depending on whether they are added as a solid block of cars to another **through-train** and have not been off air for more than four hours, or they are part of a new train. If the railroad adds a locomotive to one of the sections, FRA considers this to be a new train, thereby requiring at a minimum a transfer brake test or a Class I air brake test. If the section added to a train is being made-up at that location, then the cars would have to receive the same test as the train that is being built. This would be the originating point of this type of train.

The rule permits trains received in interchange to have a previously tested solid block of cars added to the train without requiring the performance of a Class I brake test. Previously tested means that the cars had to have received a Class I brake test and have not been off air for more than four hours.

Paragraph (a)(3) permits trains to remain disconnected from a source of compressed air ("off air") for four-hours without triggering the requirement to perform a Class I brake. This would permit a railroad to recharge a train before four hours elapse, so the train would retain its on-air status. This could be accomplished by either using a locomotive or yard air.

Railroads are permitted to remove defective equipment at any location, at any time, without triggering the requirement to perform a Class I brake test on the entire train. This also includes the location where the Class I test is performed. If the inspection reveals a defective car, The regulations do not require that another Class I Test be performed after the car is removed from the train.

The rule permits using an EOT to verify rear car brake pipe pressure during a Class I brake test, provided the reading of the rear car air pressure is from the controlling or hauling locomotive of the train. Under no circumstances may the rear car brake pipe pressure be read from a remote highway vehicle, another locomotive not attached to the train, or from any other location such as a remote unit installed in an office or shop.

Handheld gauges that are used to verify the rear car brake pipe pressure are required to be accurate. That said, there are no Federal requirements that they be calibrated on a periodic basis. FRA expects a railroad to have some method in place to ensure their accuracy. This applies to all handheld gauges used for any and all brake tests.

At a minimum, the inspector must observe both sides of the equipment sometime during the inspection process. FRA continues to believe that both sides of the equipment must be

observed sometime after the occurrence of activities that have the likelihood of compromising the integrity of the brake components of the equipment, such as: hump switching; multiple switching; loading; or unloading.

The rule requires that an adequate inspection of the brake components be conducted on both sides of the equipment sometime during the inspection process. This can occur before brake pipe is charged and before hoses are connected. Both sides of the equipment do not have to be inspected while the brakes are applied. However, one side of the equipment must be inspected while the brakes are applied and the piston travel on each car must be inspected while the brakes are applied, which could require the individual conducting the inspection to cross the car to observe the piston travel. If an Inspector observes a railroad employee conducting the brake application portion of the inspection, and some of the pistons are mounted on the opposite side of the equipment and no attempt is made to cross over the equipment to observe the piston travel, then appropriate enforcement action (either an exception or violation based on the extent of non-compliance) should be considered for a "partial failure to inspect." Similarly, if an inspection is being conducted from a vehicle, then the railroad employee should be observed getting out of the vehicle to observe the piston travel on a truck mounted brake arrangement unless an indicator is plainly visible from the vehicle.

The presence of numerous power brake defects can be used as proof of a railroad's failure to perform a required brake test. However, if the only evidence offered to establish a "partial failure to perform" a required inspection is the presence of one car with inoperative brakes, for which a separate recommendation for violation is sought, then it would be **inappropriate** to submit a separate violation for a "partial failure to perform" the involved inspection. Generally, in order to proceed with a violation for both a failure to perform a required inspection and for the underlying defective equipment, FRA would prefer additional direct evidence that some portion of the inspection was not performed (i.e., actual observation, witness statement), or the presence of numerous non-complying cars. Otherwise, it is FRA's policy to only assess a civil penalty for either the substantive defects or a failure to perform the required inspection, not both.

Similarly, the regulation requires trains to have 100 percent operative brakes unless being properly hauled for repairs. Thus, if the only evidence offered to establish less than 100-percent operative brakes is the presence of one or two cars with inoperative brakes, for which separate recommendations for violation are sought, then it would be **inappropriate** to submit a separate violation for the train having less than 100-percent operative brakes. Common sense dictates that if a freight car brake is inoperative or ineffective under 232.103(f) at the initial terminal, then the involved train would not have 100-percent operative air brakes at the Class 1 inspection under 232.103(d). It is FRA's policy not to assess multiple violations that are based solely on the same defective condition. However, if a high number of cars are found with inoperative brakes or if a pattern of non-compliance

is fully established, then it may be appropriate to pursue separate recommendations for violation on the individual cars as well as the train for having less than 100-percent operative brakes.

The rule permits a retest on a car that has a "no set." The brakes on a retested car must remain applied until the release is initiated and that the release be initiated no less than three minutes after the application of the brakes. A car can be retested with the use of a suitable device positioned at the car being retested, rather than from the head of the consist or from the controlling locomotive, as long as the proper procedures are followed; brake pipe pressure charged and a 20 psi reduction made. An emergency application is not accepted. The practice of gradually opening the angle cock to initiate an application of brakes is not accepted. How many times may a railroad retest a car? As many times as they want, as long as the appropriate brake pipe pressures and reductions are made for each retest.

Paragraph (c)(5) retains the proposed and current requirement that piston travel be adjusted during the performance of a Class I brake test, if it is found outside the nominal limits established for standard 8-1/2 inch and 10-inch diameter brake cylinder or outside the limits established for other types, which will be contained on a stencil, sticker, or badge plate. FRA recently modified the provision that establishes piston travel limits on cars equipped with 12-inch stroke (eight and one-half (8 ½) or ten (10) inch diameter) brake cylinders. The new limit is 6 to 9 inches. If piston travel is found to be less than 6 inches or more than 9 inches when conducting the Class I brake test, the piston travel shall be adjusted to nominally 7 ½ inches. This change is based on a waiver, docket number 2004-19402, which was granted to the AAR on August 30, 2005.

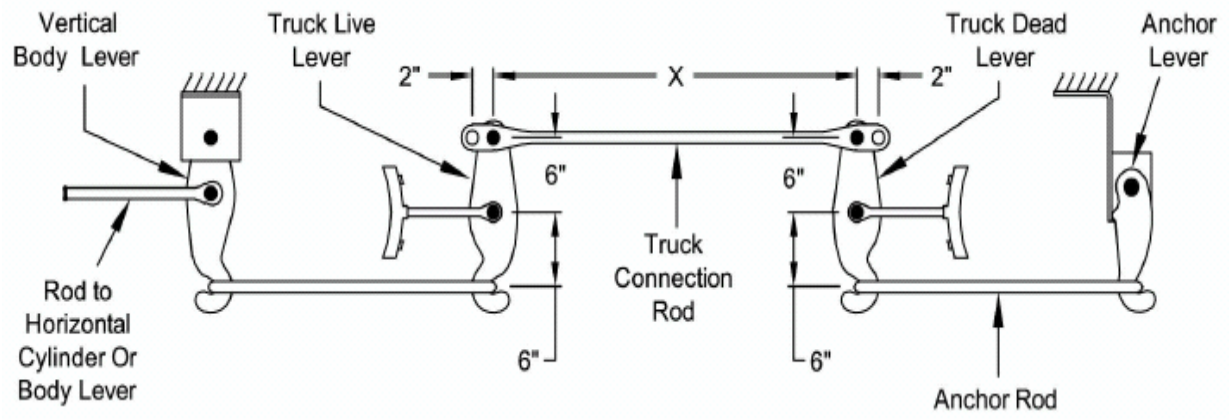
A "roll-by" inspection of the brake release is permitted, but it does not constitute an inspection of that side for purposes of inspecting both sides during the inspection. When conducting the "roll-by" inspection, the person on the ground only has to position themselves on one side of the equipment. There must be communication between the person on the ground and the locomotive engineer, so that the engineer can be told to stop the train if there are any problems.

Paragraph (c)(6) states that brake rigging shall be properly secured and shall not bind or foul or otherwise adversely affect the operation of the brake system. All types of brake rigging is subject to wear and/or damage that will cause brake rigging to bind and foul. The hook and eye arrangement is a type of brake rigging that will bind and foul when the components wear and the angularity is changed.

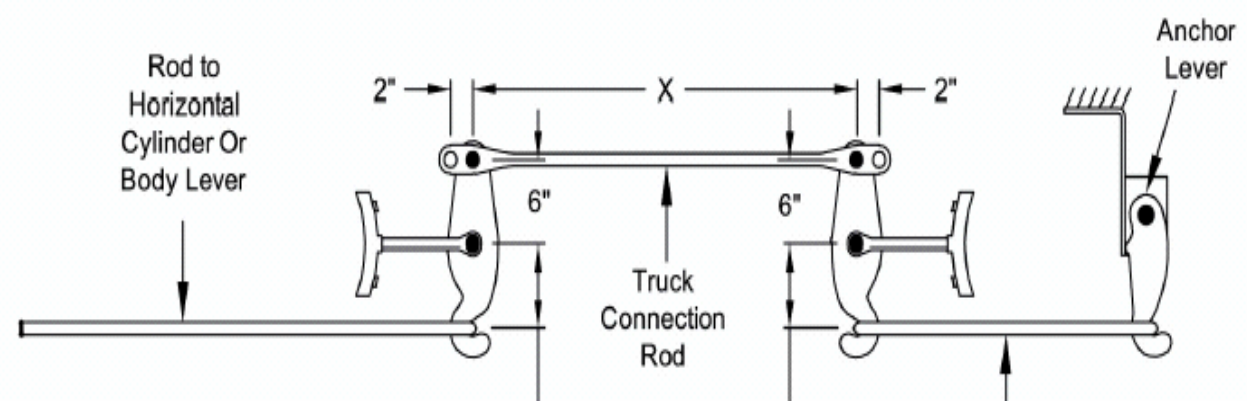
Hook and Eye Brake Rigging

Types of Hook and Eye Brake Rigging:

There are two types of Hook and Eye brake arrangements commonly found on freight equipment, (1) Rigging with a Vertical Body Lever and (2) Rigging without a Vertical Body Lever.



Hook and Eye Brake Arrangement with Vertical Body Lever



Hook and Eye Brake Arrangement without Vertical Body Lever

Hook and Eye Brake Rigging Fouling Conditions:

Brake rods and levers which "foul" or interfere with brake rigging performance can render a brake system ineffective. Some examples are shown below.

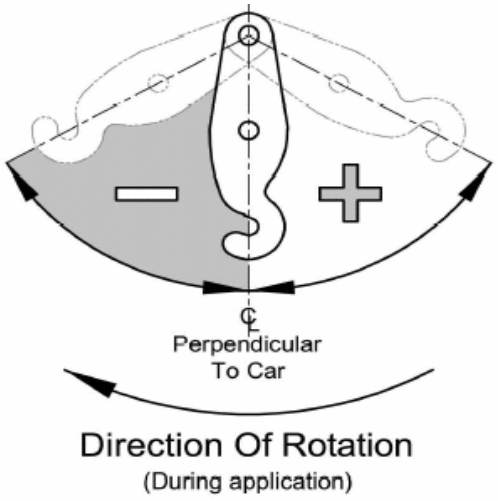
Brake Lever Fouling Brake Beam

What to look for?

The only real observable indication of serviceability in the field is: Piston Travel, Brake Shoe Wear, and Fouling. Fouling of the brake rigging will reduce brake performance to an unacceptable level. An alert inspector should look for signs of brake shoes ineffective when brakes applied, brake shoe orientation, how close the rigging is to a worn condition, and whether the rigging is fouling or binding.

Hook and Eye Brake Rigging Lever Angularity:

To determine brake rigging wear the brake beam lever angularity must be observed. Brake lever angularity can be either positive (+) or negative (-).

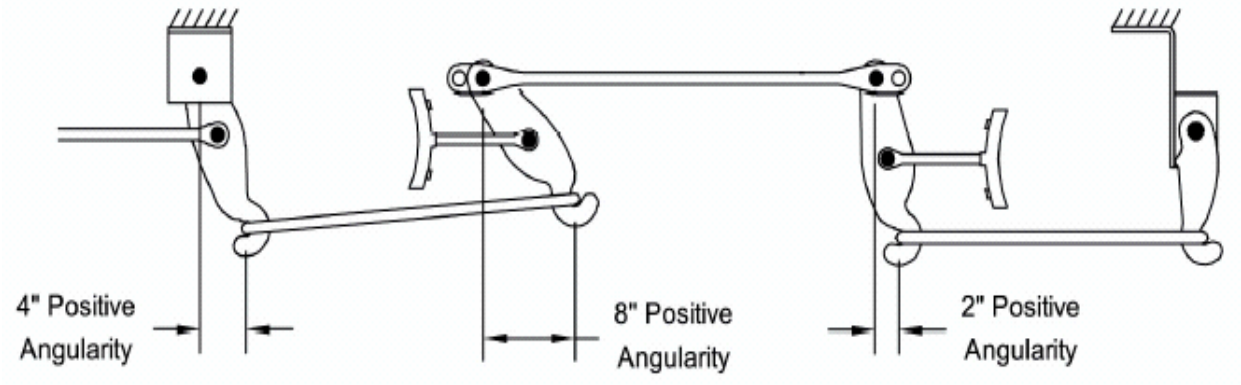


Brake Lever Angularity Showing Positive and Negative Angularity

Hook and Eye Brake Rigging New Car Condition vs. Full-Worn Condition:

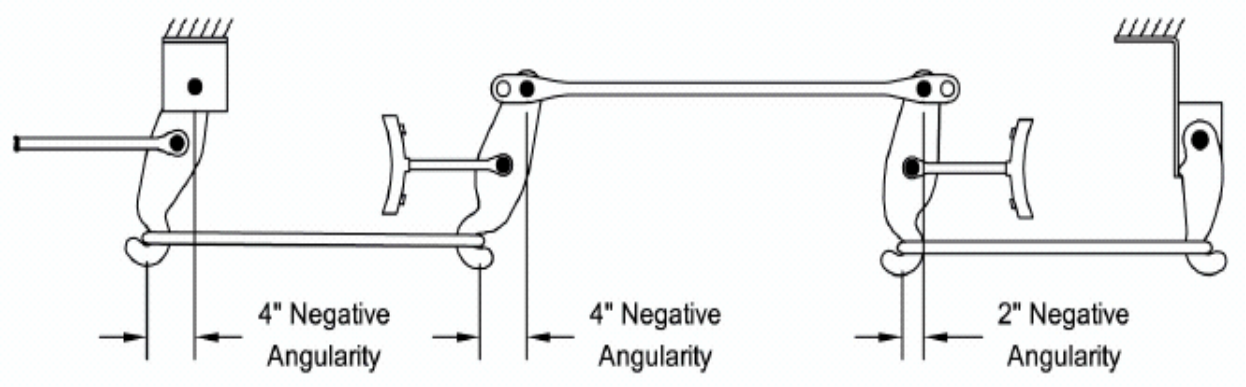
A freight car which has been recently built will have brake lever angularity in the Positive (+) condition as shown below.

Note that all three (3) levers have Positive (+) angularity.



A freight car which has been in service and has a full worn brake rigging condition will have brake levers with a Negative (-) angularity.

Note that all three (3) levers have Negative (-) angularity.



Field Inspection Criteria:

If a freight car has a Hook and Eye brake rigging arrangement and,

- The brake shoes are serviceable
- The brake rigging is not binding or fouled

then the brake rigging is performing as designed and the brakes are in serviceable condition.

If the brake rigging is binding or fouled, the inspector should take a violation with the appropriate activity/violation code. If the brake angularity is in the negative condition, the inspector should note that in the comment section of the inspection report.

Paragraph (d) contains the provision stating that a carman alone will be considered a qualified person if a railroad's collective bargaining agreement (CBA) provides that carmen are to perform the inspections and tests required by this section. FRA lacks the authority to issue binding interpretations of CBA's, or settle a dispute between a railroad and its employees as to which group of its employees is to perform what work. FRA intends to make clear, that in order for FRA to proceed with enforcement action under this provision, a decision from a duly authorized body interpreting the relevant agreement, specifically identifying the involved location, and adequately resolving all of the interpretative issues is necessary for FRA to conclude that the work belongs to a particular group of employees. Without such a binding decision, FRA cannot make a case that the work belongs to one particular craft of workers.

Paragraph (c)(1)(i)(D) requires that the individual conducting the leakage test must wait 45 - 60 seconds before noting brake pipe leakage, as indicated by the brake pipe gauge in the locomotive, which shall not exceed 5 psi per minute. When FRA Inspectors are observing this test, they need to make sure that the 45 to 60 second window is followed by the person performing the test.

Paragraph (c)(1)(iii) contains the calibration requirements for the air flow indicator. Non-compliance with the required periodic calibration requirements for air flow indicators is an on-going issue. The non-compliance is often the result of either using the wrong test orifice, testing at the wrong brake pipe and/or main reservoir pressure, or simply not performing the calibration test.

Air flow indicators used to conduct air flow method tests are required to be tested and calibrated every 92-days. The following guidance is written for FRA Inspectors to use when observing railroad personnel qualifying air flow indicators:

1. Brake pipe (BP) leakage must be below 2 psi, in order for the air flow indicator to be accurately tested and calibrated.

2 Air Flow Method (AFM) indicators shall be tested and calibrated at 90 psi BP, utilizing the correct calibrated orifice. The calibrated orifice should be marked with the 90 psi BP pressure, serial number, and manufacturer's part number. Verify that the correct calibration orifice is being used to perform the test. Since the manufactures recommend that test orifices should be calibrated annually, inquire about the last calibration date. If it is beyond one year, advise the railroad supervisor in charge that the orifice should be calibrated as recommended by the manufacturer and notify the regional MP&E Specialist.

- Currently, there are two calibration orifice products that are available for testing and calibrating AFM indicators at 90 psi BP. They are:
  Wabtec's Model # 0650756-0090 and Strato's Model # BOC500-20-70.

- There is also a calibrated orifice supplied by Wabco, Model # 0650756-0100, which is used for BP pressure set at 100 psi. If this orifice is being utilized for testing and calibration, the feed valve setting must be set at 100 psi and then verify that BP is being maintained at 100 psi.

3. To conduct the test, the correct test orifice must be applied to the BP hose glad hand (preferably the front.) The angle cock is then opened to allow BP to exhaust through the orifice.

4. It is very important that BP be maintained at 90 psi (or 100 psi if using the 100 psi test orifice) during the test. Therefore, it may be necessary to adjust the feed valve setting in

order to maintain BP at 90 psi. **NOTE:** The railroad should be testing at BP pressure it normally uses for train operations.

5. It is also critical that the main reservoir is capable of obtaining a main reservoir (MR) pressure of 130 psi during the test. Ideally, the test reading should be taken at 130 psi MR on the MR pressure rise. It may be necessary to increase engine speed on locomotives that have mechanical driven air compressors, in order to achieve an MR pressure of 130 psi.

6. The air flow indicator must read 60 cubic feet per minute (CFM) and be accurate within ±3 CFM. On mechanical indicators that is equivalent to the width of the pointer.

7. If the air flow indicator is not accurate within ±3 CFM, the indicator must be calibrated. The railroad may elect to perform this function on the locomotive or remove the indicator and send it out for calibration.

When conducting inspections at locations that perform periodic locomotive maintenance, special attention should be given to performance of air flow indicator testing and calibration procedures, as well as the testing and calibration of locomotive air gauges and displays. Inspectors should verify that the tests are properly performed by randomly checking locomotives that are released from the shop after undergoing a periodic maintenance. On the random checks, request that the railroad properly perform a re-test, and if the air flow indicator is not in compliance, appropriate enforcement action should be taken. If a location has a high incidence of non-compliance with air flow indicators and/or air gauges, immediately notify the Regional MP&E Specialist to determine what additional enforcement action(s) should be taken. **(MP&E 04-01)**

Paragraph (e) When a Class I test is performed on an entire train, the rule requires that the engineer be notified of the successful test. Most of the time this notification is provided to the engineer in writing, but it can be provided via a hand held radio, a cellular telephone, or communication with a train dispatcher, as long as it is provided to the crew prior to the train's departure and a written or electronic record is created and maintained in the cab of the controlling locomotive until the train either reaches destination or another Class I test is performed on the entire train. If a relieving crew takes charge of a train and the information is not available for the oncoming crew, then a violation of the regulation has occurred. Inspectors should apply appropriate enforcement action based on whether this is a systemic or reoccurring problem on a case-by-case basis. In order for the railroad to advance the train beyond the point where the information is not available to the oncoming crew, the railroad would have to obtain the correct Class I test information via fax, telephone, etc. and provide that information to the crew, or conduct another Class I brake test and provide the crew with the new Class I information.

The rule requires that the identity of the person(s) performing the Class I test be entered on

the Class I test information. FRA will except a full name, the first initial-last name, or an employee ID number to satisfy this requirement. FRA will not except just initials or "carmen in north yard" or "foreign line" for this requirement. Inspectors should take appropriate enforcement action when this is discovered. Inspectors should also make sure that the crew does not have a computer print-out that indicates the conductor of that crew as the individual making the Class I test, unless that individual performed the test.

The Class I brake test information is relevant only to the Class I test when it is performed on the entire train. The information does not have to be updated as cars are added to or removed from the train while the train is enroute. Since the regulation requires the information to remain with the train until it reaches destination or another Class I test is performed on the entire train, the information shall not be altered. If a railroad changes the number of cars on the original slip, Inspectors should take appropriate enforcement action to correct the problem.

Paragraph (f) contains the requirements relating to the adding of cars or blocks of cars while a train is en route. This paragraph informs railroads that cars picked up en route that have not been previously tested and kept connected to a source of compressed air are to receive a Class I brake test when added to the train. Alternatively, a railroad may elect to perform only a Class II brake test at the time that a car is added to the train en route, but FRA intends to make clear that when this option is elected, the cars added in this fashion must be given a Class I brake test at the next forward location where facilities are available for providing such attention.

§ 232.207 Class IA brake tests--1,000-mile inspection.

For Class IA test locations, the most restrictive car or block of cars in the train will determine the location where this test must be performed. For example, if a train departs point A and travels 500 miles to point B where it picks up a previously tested block of cars en route which has travelled 800 miles since its last Class I brake test and the crew does not perform a Class I brake test when entraining the cars, then the entire train must receive a Class IA brake test within 200 miles from point B even though that location is only 700 miles from point A.

Defective equipment may be moved from or past a location where a Class IA brake test is performed, only if all of the requirements contained in § 232.15 have been satisfied. If the location is one meeting the criteria found in §232.15, the car should not be moved until the repairs are completed.

As with the Class I brake test, in order to properly perform a Class IA brake test, both sides of the equipment must be observed sometime during the inspection process.

Paragraph (c) contains the provision that requires railroads to designate and maintain a list of locations where Class IA inspections will be performed. This list shall be made available to FRA upon request. If an Inspector needs this information, then the Regional office must be contacted so that the Regional office can make this request to the railroad in writing..

A railroad cannot just designate a major city, if there are multiple locations in and around the city that can perform the Class 1A test. Specific yard locations need to be identified or mile markers. FRA requires that it be notified at least 30 days in advance of any change to the list of Class IA test locations. FRA realizes that there may be occurrences or emergencies, such as derailments, that make it impossible or unsafe for a train to reach a location that the railroad has designated as a Class IA inspection site. Consequently, the rule permits railroads to bypass the 30-day written notification requirement in these instances provided FRA is notified within 24 hours after a designation has been changed. This paragraph also makes clear that failure to perform a Class IA brake test at a designated location will constitute a failure to properly perform the inspection.

§ 232.209 Class II brake tests–intermediate inspection

A Class II brake test is intended to ensure that the brakes on those cars added apply and release and that the added cars do not compromise the integrity of the train's brake system. Therefore, a leakage or air flow test must be performed when the cars are added to the train to ensure the integrity of the train's brake system.

Both sides of the equipment must be observed sometime during the inspection process. The brakes shall apply on each car added to the train and remain applied until a release is initiated and a retest is allowed on those cars found with brakes not applied. It should be noted that, defective equipment may be moved from or past a location where a Class II brake test is performed only if all of the requirements in § 232.15 have been satisfied.

Paragraph (b) also requires that the release of the brakes on those cars added to the train and on the rear car of the train be verified and allows railroads to conduct "roll-by" inspections for this purpose.

Paragraph (c) permits an alternative to the rear car application and release portion of this test. This alternative permits the locomotive engineer to rely on a rear car gauge or end-of-train device to determine that the train's brake pipe pressure is being reduced by at least 5 psi and then restored by at least 5 psi in lieu of direct observation of the rear car application and release.

Paragraph (d) contains the requirements relating to the inspection of cars or blocks of cars added to a train while a train is en route. This paragraph makes clear that if cars are given a Class II brake test when added to a train, then the cars added must receive a Class I brake

test at the next forward location where the facilities are available for performing such an inspection.

§ 232.211 Class III brake tests–trainline continuity inspection

The purpose of a Class III brake test is to ensure the integrity of the trainline when minor changes in the train consist occur. Basically, a Class III brake test ensures that the train brake pipe is properly delivering air to the rear of the train. This inspection is designed to be performed whenever the continuity of the brake system is broken or interrupted.

When a car or locomotive is added or removed from a train, the Class III test must be performed as prescribed in paragraph (b), which requires that the test cannot be performed until the BP pressure at the rear of the train is at least 60 psi, as indicated by an accurate gauge or end-of-train device, and a 20-psi brake pipe reduction made.

When the continuity of the brake pipe is broken or interrupted with the train consist otherwise remaining unchanged, it must be determined that BP pressure is being restored to the rear of the train as indicated by a rear car gauge or end-of-train device prior to proceeding. In the absence of a rear car gauge or end-of-train device, a visual application and release of the rear car's brakes can be made **only** if the train consist remains unchanged, which includes cars and locomotives.

§ 232.213 Extended haul trains

Railroads are permitted to designate trains as extended haul trains, which allows such trains to be operated up to 1,500 miles between brake inspections.

The designation of such trains must be in writing to the Associate Administrator for Safety. The designation must include the originating location and destination of the extended haul portion for each train. As trains are added and/or deleted, the railroad must submit the revisions to the Associate Administrator for Safety. Headquarters will provide the updated lists electronically to the regions as they are submitted. Once a train is designated as an extended haul train, it must be operated as an extended haul train until the official list is revised and properly submitted to FRA. Changes cannot be made on a daily basis by a train dispatcher. All changes must be made in writing to the Associate Administrator for Safety as explained above. A railroad cannot make changes through a Regional office.

Extended haul trains are permitted one pick-up and one set-out enroute. If more than one pick-up and/or one set-out occurs, the Inspector should submit a violation for each occurrence. Also, a Qualified Mechanical Inspector (QMI) must perform the appropriate

inspections of all pick-ups and set-outs.

At no time will the FRA penalize a railroad for setting out a defective car during the extended haul train movement. These types of set-outs do not count against the one set-out rule.

At a location where a car(s) is pick-up enroute, as long as a QMI has performed the appropriate inspections of the car, the train crew can add the car to their train and only have to perform a Class III brake test. The QMI does not have to be at the location to simply add the car(s) to the train.

If a train is operating on two extended haul segments, another extended haul outbound inspection must be conducted by a QMI. Cars can be added and/or removed at this location, but it would have to count as one of the permitted pick-ups or set-outs enroute. Whether this is done before the inbound/outbound inspection is performed is important as to compliance with the “one” pick-up/one set-out rule.

At the termination point of the extended haul portion of the extended haul run, unless this location is the final destination for the run, a Class I inspection of the train must be performed before the train can continue any further.

§ 232.215 Transfer train brake tests

A "Transfer train" is defined in § 232.5 of this rule as a train that travels between a point of origin and a point of destination, located not more than 20 miles apart. The definition makes clear a transfer train may pick up or deliver freight equipment while en route to its destination.
Cars may be added to a transfer train while the train is en route, provided a transfer train brake test is performed on the cars added. The train is limited to a total of 20 miles from its point of origin, not from the location where new cars are added.

It is possible to operate a train for a distance of 60 miles on transfer train brake tests, provided a transfer brake test is performed on the entire train at each 20 mile interval.

While the rule permits that transfer test to be conducted when the brake pipe is charged to 60 psi as indicated by a gauge at the rear of the train, with a 15 psi brake pipe reduction, it is permissible to conduct the test at 90 psi brake pipe pressure. However, if 90 psi is used, FRA expects a 20 psi brake pipe reduction be made since the 15 psi allowance was for the lower brake pipe pressure.

Please note, the retest of a car for a brake application during the transfer test should be made using the same brake pipe pressure that is used during the original transfer test. If the

transfer test is performed at 60 psi brake pipe pressure, then the retest can be made after the car is charged to 60 psi with a 15 psi reduction. If the transfer test is performed at 90 psi brake pipe pressure, then the retest shall be made at 90 psi with a 20 psi reduction.

§ 232.217 Train brake system tests conducted using yard air

When Inspectors encounter a location where the yard air is not capable of producing the air pressure at which the train will be operated, they must ensure the leakage or air flow test is conducted at the proper brake pipe pressure after the locomotives are attached.

While paragraph (d) contains the calibration requirements for yard test devices, it is FRA's intent that only the gauge be tested and calibrated every 92 days. Industry devices such as the "Time-O-Test" and/or individual railroad manufactured devices use a fixed 1/4-inch or 5/16-inch orifice to increase air pressure and a 1/4-inch orifice to reduce brake pipe pressure. FRA does not believe that these orifices need to be calibrated unless there is physical evidence of damage to the device.

§ 232.219 Double heading and helper service

Although the brake system on locomotives are required to be inspected on a daily basis, FRA continues to believe that a visual confirmation of the proper operation of a helper locomotive's brakes should be made each time the locomotive is added to a train

A helper locomotive found with inoperative or ineffective brakes is to be repaired prior to use or else removed from the train. If it cannot be repaired it must be tagged and taken to the nearest location for repairs.

Subpart D - Periodic Maintenance and Testing Requirements

This subpart provides the periodic brake system maintenance and testing requirements for equipment used in freight and other non-passenger trains.

Inspectors need to periodically monitor the activities of car repair facilities to ensure compliance. Check that the shop is capable of obtaining the single car test dates and that single car test are being performed on cars that have not received a single car test within the past 12 months.

Check that handbrakes are being inspected and tested. If the brake shoes do not apply against the wheel when the handbrake is applied, the railroad should take corrective action

or appropriate enforcement action should be taken by the Inspector.

Monitor that single car tests are being properly performed on cars that require such tests and that the daily and periodic testing is being performed on the single car test devices.

A single car test is required to be performed on a car at least once every five years (eight years for new and rebuilt cars) or within the past 12 months if the car is on a repair track. Also, any car that is removed from a train with a defective air brake must receive a single car test. Inspectors can request the railroad to provide the single car test dates for cars, preferably using the UMLER system. If a railroad cannot provide this information, the Inspector should notify the Regional Specialist, who in turn shall notify Headquarters. Additionally, Inspectors are encouraged to request a test date on each car that is being considered for civil penalty. If a car has not had a single car test within the five year period, another violation should be taken against the car. Inspectors should also periodically run a list of cars that have received attention in a shop or repair track to see if a car has received a single car test within the past 12 months. If not, a violation should be considered.

Paragraph 232.305(b)(1) requires that a single car test be performed on a car that has its brakes cut-out or inoperative when removed from a train.... This means that if the car is properly tagged with an inoperative brake and it is set-out of the train, it must have a single car test. If the railroad removes the car from the train with the brakes cut-out (with or without a defect tag) and the Inspector observes this, a single car test would have to be performed on that car. However, if the Inspector finds a car in a yard or siding with the brakes cut-out, the burden of proof is on the Inspector to establish whether the car was set out of a train with the brakes cut-out or some yard crew cut the brakes out as they were switching the car in a yard. The Inspector cannot assume the brakes were cut out when the car was set-out of the train. A defect tag or witness statement would suffice.

Paragraph 232.305(b)(5) identifies the various wheel defects that trigger a single car test on the car. This requirement applies when the railroad removes the wheel from the car for the defective wheel condition. This is especially true for the built-up tread condition, as there is no Federal regulations addressing built-up tread. The “why-made” code on the AAR billing record would have to be used for any enforcement action regarding non-compliance with performing a single car test for a built-up tread condition.

Paragraph 232.305(e) requires a single car test performed on every new or rebuilt car before it is placed in service. Inspectors should periodically monitor this activity at car manufacturing plants.

When a car is on a shop or repair track, the piston travel must be checked. The limits for the piston travel range on cars equipped with 12-inch stroke (eight and one-half (8 ½) or ten (10) inch diameter) brake cylinders has been changed. The new limit is 6 to 9 inches. If piston

travel is found to be less than 6 inches or more than 9 inches when testing the brakes on the shop or repair track, the piston travel shall be adjusted to nominally 7 ½ inches. This change is based on a waiver, docket number 2004-19402, which was granted to the AAR on August 30, 2005. Furthermore, the waiver also requires that these cars shall have the empty/load valve tested, if so equipped, as prescribed in AAR Standard S-486-04, Sections 4.6.1 through 4.6.5, anytime a single car test is performed on the car, irrespective of whether the valve has been changed or not. Please note that this test is not required if the car is loaded, since the test can only be performed when the car is empty.

Inspectors should ensure that railroads are conducting an inspection of the accuracy and operation of any brake indicators on cars so equipped. If the indicator is broken or unreadable, FRA expects corrections to take place while the car is on the shop or repair track.

Paragraph (e) contains the provisions permitting cars to be moved from a location where necessary repairs are made to a location where a single car or repair track air brake test can be performed, only if it cannot be performed at the same location where the repairs are conducted. FRA disagrees with the assertions of many railroads that air brake repairs should not be required at locations that lack the ability to perform single car or repair track air brake tests. Therefore, Inspectors should not entertain such rhetoric.

Section 232.309(b) states that mechanical test devices such as pressure gauges, flow meters, orifices, etc., shall be calibrated once every 92 days. § 232.309(d) requires that the test equipment and single car test devices placed in service shall be tagged or labeled with the date its next calibration is due. A tag or label can be affixed to a single car test device and a brake cylinder test gauge, but there is difficult to tag or label a test coupling. If the test coupling is chained or cabled to the single car test device, then it would be considered as a "unit" if the single car test device and test coupling are both calibrated per S-486 by the same facility and the railroad can produce documentation to support that a successful test and calibration was performed. FRA will also except a test coupling that has an identifying mark or number (that is unique) inscribed on it that would be the same as a unique number or mark inscribed on the test device, that would make it a "unit" as discussed above. The tag or label on the test device would apply to the entire "unit."

Subpart E - End-of-Train Devices (MP&E 98-63)

On May 31, 2001, Subpart E, *End-of-Train Devices,* became effective. There have been numerous inquiries concerning the inspection and testing requirements of the devices, as well as issues involving enroute failures. The purpose of this bulletin is to answer questions and provide guidance for uniform application and enforcement of this new rule.

When does the device have to be armed?

The device has to armed and operable from the time the train departs the point of installation, until the train reaches destination. If communication cannot be established at the location where the device is installed, the train may move up to one mile from that location at restricted speed, in order to establish communication. If communication is not established within the one-mile movement, the train must be stopped and the device must be either repaired or replaced and communication established before the train can continue, or train orders issued that restricts that train from exceeding 30 mph for the entire trip, provided the train does not traverse any defined heavy grade. If communication is established, the train must be stopped and the appropriate inspection and testing requirements of §232.409 (a) - (c) must be satisfactorily performed before the train can continue.

What tests have to be performed at the point of installation?

It must be understood that installation includes both the front and rear device. When either of these devices are installed and before the train departs, the following must be performed:

1. It must be determined that the identification code entered into the front unit is identical to the unique code of the rear unit.

2. Determine that the quantitative value for brake pipe pressure displayed on the front unit is within 3 pounds per square inch of the reading displayed from either the rear EOT unit or a properly calibrated air gauge at the rear of the train. This reading must be compared after the train is charged.

3. A test has to be made to ensure the device is capable of initiating an emergency power brake application from the rear of the train.

What is the test procedure to ensure the device is capable of initiating an emergency power brake application from the rear of the train?

There are currently four acceptable methods of performing this test. The first three methods requires attaching the rear-of-train device to the last car of the train, establishing brake pipe pressure, and arming the device.

1. In the first method, the controlling locomotive would transmit an emergency brake application signal with the front unit manual switch causing an emergency application to be initiated from the rear of the train, thereby dumping the whole train into emergency.

2. The second method requires closing the angle cock on the last or second-to-the-last

car of the train, and then have the controlling locomotive transmit an emergency brake application signal with the front unit manual switch. Under this method only the last one or two cars of the train will effectuate an emergency brake application.

3. Using the third method, an individual would close the angle cock between the rear-of-train device and the last car. Then have the controlling locomotive transmit an emergency brake application with the front unit manual switch, so that an individual at the rear of the train can determine whether the emergency valve functions properly by either observing the emergency indicator pop out, or observing brake pipe pressure at the rear device go to zero while hearing the exhaust of air from the device.

4. The final acceptable method of inspection is a bench test of the device (front and rear) which would be performed within a reasonable time period prior to the device being armed and placed on the train.

Can anyone perform these tests?
Any qualified individual can perform the test. If anyone performs these tests, without the involvement of a train crew member, the locomotive engineer has to be informed that the test (both front and rear device) was successfully performed. This can be by any means determined by the railroad to be appropriate. However, a written or electronic record of the notification has to be maintained in the cab of the controlling locomotive for the engineer at the point of installation. The notification must include the location, date and time the test was performed, and the name of the individual(s) who performed the test. If one individual tested the front device and another individual tested the rear device, the notification would have to include information for the two separate tests. This written information is not required at subsequent crew change points.

Would these tests apply to a train using a distributive power unit (DPU) at the rear of the train?
No. This type of train is excepted from the two-way EOT requirements, provided the train has a locomotive located at the rear of the train, capable of making an emergency brake application through a command effected by radio telemetry, or by a crew member in radio contact with the lead (controlling) locomotive.

What is a bench test?
The purpose of this particular test is to ensure that the front unit will transmit an emergency brake application signal to the rear device and that the rear device is capable of initiating an emergency brake application from the rear of the train. The bench test has to consist of testing both the front and rear units (devices) that will be used on the train. They can be

tested independently of each other, as long as the test is performed at the location where the device will be installed on the train.

Testing the rear unit requires applying air pressure to the device and then transmitting an emergency brake application from a front unit using the front unit manual switch. The individual performing the test would determine that the emergency valve functions properly by either observing the emergency indicator pop out or by observing the brake pipe pressure displayed on the gauge on the rear device go to zero and hearing the exhaust of air from the device.

The front unit that will be used on the controlling locomotive of a train would be tested by transmitting an emergency brake application from the device using the front unit manual switch, and a rear device would have to successfully receive the signal and activate the emergency air valve.

Both tests must be performed within a reasonable time period prior to the device being armed and placed on the train.

What is a reasonable time period?
A reasonable time period must be determined on a case-by-case basis, based on the factual situation at a specific location, as there are numerous factors that impact the notion of "reasonable." The following discussion is intended as general guidance for Inspectors to consider in determining whether a bench test at a particular location was conducted within a reasonable time of its installation on a train. This discussion is not intended to create or establish any strict time requirements. The following factors should be considered:

- The environment where the device is tested and stored:
  - Free from weather elements?
  - Free from excessive dust?
  - Free from dirt and grease?
  - Accessible to possible tampering?
- Physical treatment of the device after a successful bench test.
- Railroad's tracking and monitoring of devices after testing.
- Use of the locomotive after the testing of the front unit.
- Past effectiveness of bench testing procedures at the particular location.

For example, if the devices are tested and stored in a controlled environment, that is free from weather elements, excessive dust, grease, and dirt, then a reasonable amount of time between the testing and installation of the device might be 8 hours or more. Whereas, in circumstances where the devices are haphazardly thrown into a corner of a shop or are placed in the rear of a truck to be bounced around a yard after being tested, then a reasonable amount of time may be one hour or less. Furthermore, the effectiveness of a railroad's bench

testing procedures should always be considered in determining what constitutes a reasonable time period. Consequently, Inspectors should provide detailed evidence and fully describe a railroad's bench testing procedures in order to support any determination that the time period between the bench test and installation of a device on a train was not reasonable.

Can devices be bench tested and taken to other locations for application?
No, because 232.409(c) requires the device shall be tested at the initial terminal or other point of installation. This implies that the device must receive the bench test at the location or yard where it will be installed on the train.

What are the testing requirements if locomotive power is changed and a different front unit is used?
At the point of installation, whether it is the front or rear device, all testing requirements apply. If the locomotive power is changed and a new front device is installed on the train, all testing requirements apply. If the front device is replaced with a device from a trailing locomotive, all testing requirements apply since this is a new installation of the front device.

What about the calibration requirements?
Both the front and rear units have to be calibrated for accuracy according to the manufacturer's specifications and procedures at least once every 368 days. The test shall include testing radio frequencies and modulation. The 368 days does not include up to 92 days of shelf-life prior to placing the unit in service. The date of the calibration, the location where the calibration is made, and the name of the person performing the calibration has to be legibly displayed on a weather-resistant sticker or other marking device affixed to the outside of the device (both the front unit and rear unit.) It is the railroad's responsibility to account for the shelf-life by either entering an in-service date on the sticker or the number of days of shelf-life on the sticker. If the device is integrated into the computer of the locomotive, the sticker information can be entered on Form FRA F6180-49A. The sticker information must be accessible to both FRA Inspectors and train crewmembers. Therefore, it cannot be locked in cabinets, out of view.

Are railroads required to keep spare batteries at specific locations?
No, it is within the railroad's discretion to determine when and where batteries will be kept and charged. There are sufficient incentives for railroads to ensure that the batteries are sufficiently charged at all times: because of the speed restrictions imposed on trains that develop failures en route; and strict liability for failure of the batteries en route. If an Inspector can determine that a battery failed enroute, submission of a violation should be strongly considered.

What actions have to be taken when the device develops a failure en route?
If the device develops a failure en route, the speed of the train is restricted to 30 mph. In addition to observing the 30 mph speed restriction, the train is <u>not</u> permitted to operate over

a section of track with an average grade of two percent or greater over a distance of two continuous miles, unless the conditions contained at 232.407(g) are met.

On some units, front-to-rear failures and rear-to-front failures are displayed. Are both of these failures considered an en route failure?
Since the intent of the rule is to have the capability of initiating an emergency brake application at the rear of the train, only the front-to-rear failure is considered an enroute failure. The rear-to-front failure does not affect the ability of the device to initiate the emergency from the rear of the train. If the engineer is unable to determine if the communications failure is front-rear or rear-front, then any communications failure must be considered an enroute failure and corrective action must be taken.

Is an intermittent communication failure considered an en route failure?
No, there has to be a continuous loss of communication between the front and rear unit of at least 16 minutes and 30 seconds. However, based on existing designs of the devices currently used, anytime the display indicates a "**comm loss**," the 16 minutes and 30 seconds have elapsed and the locomotive engineer must comply with the restrictions required for the failure enroute requirements.

Can a train proceed over a heavy grade with a defective device?
A train cannot proceed over a heavy grade unless the defective device is replaced with a fully operational device, or one of the following alternative methods is used:

1. An occupied locomotive helper is attached to the rear of the train with the brake pipe connected and tested to ensure brake operation. The helper engineer will initiate and maintain two-way voice radio communication with the engineer on the head end of the train. If communication is lost prior to passing the crest of the grade, the train should be stopped until communication has been restored, if this can be done safely. If communication is lost once the descent has begun, the helper locomotive engineer and the head end engineer will act to stop the train if the train reaches a predetermined rate of speed that indicates a need for emergency braking. The predetermined rate of speed is established by the railroad and should be indicated in the railroad's timetable;

2. An occupied caboose is attached to the end of the train with a tested, functional brake valve capable of initiating an emergency brake application from the caboose. The occupant of the caboose must establish and maintain radio voice communication with the head end engineer in the same manner as prescribed for the occupied locomotive helper;

3. A radio-controlled locomotive is located at the rear of the train, and is under continuous control of the head end engineer by means of telemetry, and if the radio-controlled locomotive is capable of initiating an emergency brake application from the lead (controlling) locomotive.

Does this mean the train would have to stop on a grade if a failure occurs?
Whenever a failure occurs enroute, the train is prohibited from operating over a section of track with an average grade of two percent or greater over a distance of two continuous miles. If the train develops the failure while traversing the grade, the engineer should safely continue down the grade or to a specific siding, in accordance with the railroad's operating procedures for bringing the train to a stop at the first available location, rather than bring the train to an immediate stop.

If a helper locomotive is used on the head end of a train, does it have to be linked to the two-way EOT?
If a locomotive helper is attached to the front of the train to help the train over a grade, it would not have to be linked to the two-way EOT *provided* that the locomotive that was originally controlling the train is still armed and capable of initiating an emergency brake command to the rear device and two-way voice radio is initiated and maintained by the helper locomotive engineer with the engineer of the original lead locomotive until the move is completed. If communication is lost, each engineer will immediately act to stop the train if the train reaches a predetermined rate of speed that indicates a need for emergency braking. The predetermined rate of speed is established by the railroad and should be indicated in the railroad's timetable. This only applies to the extent necessary for the helper unit to provide power to get the train over the grade.

If a train were to have problems and stalled in a tunnel where communication is lost, and it took longer than 16 minutes and 30 seconds to correct, could the train move out of the tunnel so that communications could be re-established, or is this a communications failure requiring other corrective measures?
If this incident occurred, the train would be allowed to move out of the tunnel. Once out of the tunnel, if communication is not re-established, the train would have to be brought to an immediate stop. Corrective action for a communication failure would have to be taken.

If a train has to be cut because it has insufficient power to get over a hill, what has to be done with regard to the two-way EOT?
If a train has to be cut because there is insufficient power to pull it over a hill or grade, the device may remain in place on the car at the rear of the train. It does not have to be advanced to the moving section of the train. This only applies to the extent necessary to

traverse the grade and only while the train is divided for this procedure.

Can a "Local Train" that is not equipped with a two-way EOT operate above 30 mph?

A local train as defined in 232.407(a)(3), that does not operate over a section of track with an average grade of 2 percent for 2 continuous miles, can run at authorized track speed without a two-way EOT. In many cases, this could be above 30 mph.

Can a "work train" operate above 30 mph if it is not equipped with a two-way EOT?
A work train as defined in 232.407(a)(4), that does not operate over a section of track with an average grade of 2 percent for 2 continuous miles, can run at authorized track speed without a two-way EOT. This could be above 30 mph.

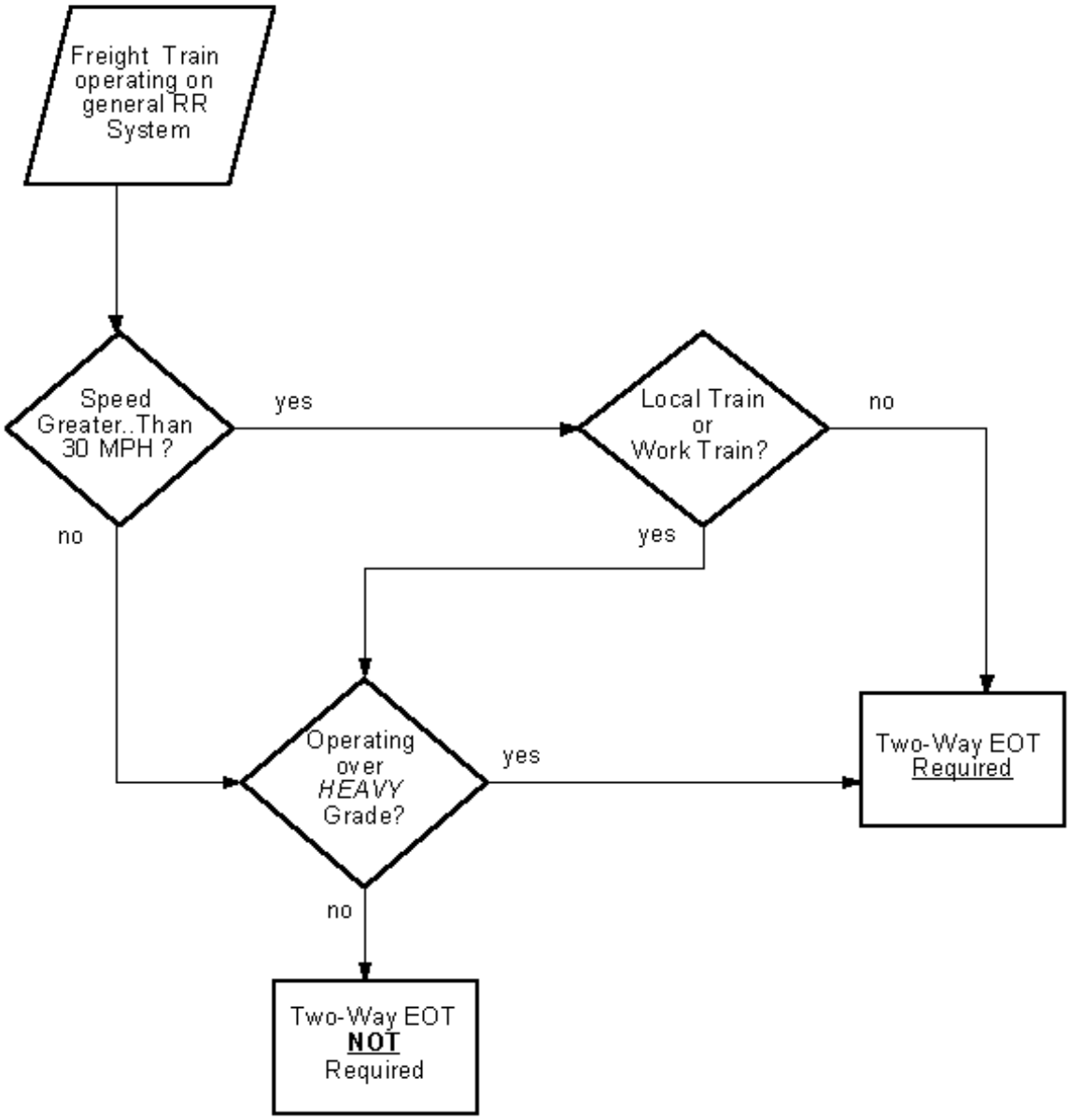
Can any train be dispatched without a two-way EOT if it does <u>not</u> exceed 30 mph?
Only if the train will not travel over a heavy grade as defined in Part 232.407(a)(1), or is specifically excepted from the requirements found at 232.407(e).

If a train is equipped with an electronically controlled brake system (ECP), would an EOT be required?
Yes, because the ECP train sets that are currently operating are an overlay system of regular pneumatic brakes. Since these trains can be run in either electronic or regular pneumatic mode, a two-way EOT device would have to be on the rear of the train. If the train is all electronic, the two-way EOT requirements will be covered by the waiver permitting this type of operation.

<u>Two-Way End-of-Train Device Flowchart</u> (MP&E 98-62)

The following flowchart was developed to provide a better understanding of when a two-way end-of-train device is required. All trains operating over the general railroad system have to comply with this regulation, unless a specific waiver is in effect for a particular operation.

TWO WAY END OF TRAIN DEVICE REQUIREMENTS



ECP Brake Systems:

On September 4, 2007, FRA issued a Notice of Proposed Rulemaking (NPRM) regarding the use and operation of electronically controlled pneumatic (ECP) brake systems. The NPRM will add a new subpart (Subpart G) to part 232 addressing ECP brake systems on freight trains. The proposed regulations are designed to provide for and encourage the safe implementation and use of ECP brake system technologies. The proposal contains specific requirements relating to design, interoperability, training, inspection, testing, handling defective equipment, and periodic maintenance related to ECP brake systems. The document also identifies provisions of the existing regulations and statutes where FRA is proposing to provide flexibility to facilitate the introduction of this advanced brake system technology.

The ECP brake system radically improves the operation of the automatic air brake by using electrical transmissions to signal the application and release of brakes on each car in a train while still using compressed air to apply the force of the brake shoe against the wheel. ECP brakes also greatly simplify the brake system by eliminating multiple pneumatic valves used by conventional brakes and replacing them with a printed circuit board and microprocessor, one electrically activated application valve, and one electrically activated release valve, with feedback on brake cylinder pressure for control.

ECP brake technology requires equipping locomotives and cars with special valves and electronic equipment that are unique to the operation of ECP brakes. While this system still requires a brake pipe to supply compressed air from the locomotive to each car's reservoir in a train, there are currently two known methods to send the electronic signal for ECP brake operations from the locomotive to each car in the train. These methods include using a hard wire electrical cable running the length of the train, or a radio-based technology requiring a transmitter and a receiver installed on the cars and locomotives. At this time, it appears that the railroad industry has chosen to use a cable-based system for ECP brake operation. Therefore, the proposed rules are limited to operations involving cable-based ECP brake systems.

ECP brake systems still employ the automatic air brake system's basic concept where the locomotive supplies compressed air to each car's reservoir via the conventional brake pipe. Each car's brake valve reacts to a signal to apply the brakes by directing compressed air from the reservoir to the brake cylinder or to release the brakes by releasing air from the brake cylinder. The similarities between the conventional pneumatic and ECP brake systems end here. Instead of utilizing reductions and increases of the brake pipe pressure to convey application and release signals to each car in the train, ECP brake technology uses electronic signals, resulting in an almost instantaneous application and release of brakes on each car in the entire train. Since the brake pipe pressure no longer serves as the communication medium in ECP braked trains, the brake pipe is constantly supplied or charged with compressed air from the locomotive regardless of whether the

brakes are applied or released. In addition, ECP brake equipped trains offer graduated release, where a partial brake release command provides a partial, proportional brake release.

The basic ECP brake system is controlled from the Head End Unit (HEU) and each car is equipped with a Car Control Device (CCD), an electronic control device that replaces the function of the conventional pneumatic service and emergency portions during electronic braking. The CCD acknowledges and interprets the electronic signals from the HEU and controls the car's service and emergency braking functions and brake releases. The CCD also controls reservoir charging and sends a warning signal to the locomotive in the event any component fails to appropriately respond to a braking command. Each CCD has a unique electronic address located in the Car ID Module, which is keyed to a car's reporting mark and number.

Each car connects to the locomotive via special connectors and junction boxes. More specifically, an ECP brake equipped train's train line cable–a two-conductor electric cable (#8 A-WG and a shield)–connects the locomotive and cars and carries train line power to operate all CCDs and ECP brake system's end-of-train (ECP-EOT) device and communicates network signals via the power voltage. A Power Supply Controller (PSC)–mounted within the locomotive and providing 230 VDC of electricity–interfaces with the train line cable's communication network, provides power to all connected CCDs and ECP-EOT devices, and controls the train line power supply as commanded by the HEU. Under the AAR standards, a single power supply shall be capable of supplying power to an ECP brake equipped train consisting of at least 160 CCDs and an ECP-EOT device.

On March 21, 2007, FRA granted a waiver, docket number 2006-26435, that allows BNSF Railway and Norfolk Southern Railway to install ECP brake systems on pilot trains to demonstrate the safety and efficacy of the technology in revenue service. Under the waiver, trains equipped with ECP brakes will be able to safely travel up to 3,500 miles without undergoing certain routine brake inspections, more than double the distance currently allowed by federal regulations. It is expected that the railroads will use the waiver to test ECP brakes on intermodal trains from West Coast ports to Chicago and on unit coal trains operating in the Allegheny coal fields, and from the Powder River Basin coal fields in Wyoming to southern or eastern power plants.

FRA placed several conditions on the waiver, including requirements that the railroads: clearly define a process for handling brake problems discovered en route; ensure that ECP brake inspections be performed by qualified individuals; and provide appropriate training to crew members. The waiver ensures that proper safeguards will be in place and will permit FRA to gather extensive data. Furthermore, FRA will carefully monitor the railroad's compliance with the waiver using unannounced audits and inspections of trains subject to the waiver.

A copy of the FRA waiver approval letter can be found in Appendix B of this manual.

Guidance for Appendix B to Part 232 —
Part 232 Prior to May 31, 2001 as Clarified Effective April 10, 2002

Train Brake Inspections (MP&E 98-59)

When performing an initial terminal train air brake test under 49 CFR §232.12(c)-(j), an inspection of the train brakes shall be made to determine that the brakes are applied on each car, the piston travel is correct, brake rigging does not bind or foul, and that all brake equipment is properly secured. The 1,000-mile train air brake test under 49 CFR §232.12(b) also requires that the brakes apply on each car in response to a 20-pound service brake pipe pressure reduction and that the brake rigging is properly secured and does not bind or foul.

Although the regulation does not specify the physical actions necessary to conduct a proper inspection, a railroad may fulfill the inspection requirement only when its inspectors position themselves in a way that permits the required observations noted above to be made. Obviously, a railroad inspector can visually inspect only what he or she is in a position to see. As the vast majority of all freight cars are equipped with air brake equipment (brake cylinders, brake indicators, brake rigging, etc.) that cannot be observed when inspections are made from only one side of the car, ***a proper initial terminal or 1,000-mile train airbrake inspection shall be performed by inspecting both sides of every car in the train.***

The following inspection practice would satisfy the regulations. After cars are assembled, a qualified individual, while connecting the air hoses on one side, performs an inspection of the brake equipment to ensure that brake components are properly secured, the brake rigging is not binding or fouling, and that brake shoes are in proper condition. The brake system is then charged and the air pressure at the rear of the train is checked to ensure it is at the required level. At that point, the brakes are applied and the qualified individual then performs a brake inspection on the other (second) side of the train to ensure that the brake components and rigging are properly secured and do not bind or foul, and that the brake shoes are against the wheel. During this inspection the individual will also check for proper piston travel, crossing over the cars to side one if the piston travel cannot be observed from side two. At the conclusion of this inspection, the brakes are then released and the individual then walks the release of the brakes or observes the brake release as the train rolls by at a low speed. If a roll-by inspection of the brake release is performed, the individual performing the inspection must have some method of communicating with the train crew the results of the inspection. FRA believes that an inspection of the brake components, rigging, and shoes must be conducted on both sides of virtually every car sometime during the inspection process.

A moving utility vehicle may be used in the performance of these inspections. However, these inspections must be made at a speed and in a manner that will permit the qualified person to clearly observe and determine the condition of the air brake equipment and that

the piston travel is within limits.

Train air brake tests that are not conducted in compliance with this interpretation shall be considered to be in non-compliance with the regulations. However, as with any regulatory requirement, inspectors should exercise discretion in how §232.12 is enforced so that our limited resources can be focused on matters likely to produce the greatest safety benefit. The general criteria for determining when enforcement action is appropriate, and which action to take, are set forth in 49 CFR Part 209, Appendix A. A railroad's history of compliance with the relevant set of regulations, especially at the specific location involved, must be considered along with the kind and degree of potential safety hazard a condition poses in light of the immediate factual situation. Where compliance with train air brake testing requirements is poor, and improper inspections or no inspections are being performed, the failure to inspect or improper inspection can — along with the physical defects found on the cars—be strong enforcement candidates. Conversely, if a railroad is generally doing a good job in terms of compliance with the train air brake testing requirements at a particular location, the one-time failure to conduct a proper inspection at that point more likely is not a condition that poses a significant safety hazard.

Violation reports alleging an improper train air brake test due to the failure to inspect both sides of the train as outlined above must specify precisely how the inspection was improper and include supporting evidence for review (e.g. detailed evidence that the brake equipment on one or more cars in the train—citing the specific component or components—could not be properly observed from only one side of the train).

Initial Terminal Air Brake Tests at Remote Locations (MP&E 98-45)

This technical bulletin provides guidance to Inspectors regarding the performance of initial terminal air brake tests at remote locations. There appears to be some confusion as to what is required when a railroad performs initial terminal brake tests at these remote locations. It has been brought to FRA's attention that some trains at these remote locations, after receiving an initial terminal brake test pursuant to 49 CFR 232.12, are departing locations with cars having inoperative or cut-out air brakes.

The regulation requires 100% operative brakes on trains departing initial terminals. FRA does not believe safety would be advanced by allowing something less than this at these remote locations. Therefore, when initial terminal brake tests are performed at these remote locations FRA expects the requirements contained in 232.12 to be followed. Consequently, if a car is found to have defective or inoperative brakes when the initial test is performed, the car must either be repaired or set-out of the train before the train departs.

Clarification for Initial Terminal Road Train Air Brake Tests - Section 232.12(d)(1) (MP&E 99-01)

Periodically, FRA receives inquiries concerning the amount of brake pipe reduction required when performing an initial terminal brake test. In 1982, FRA issued a technical bulletin (TB) stating FRA's policy. The following information from the earlier TB is still in effect and should clear up any misunderstandings regarding this matter. Inspectors should be governed accordingly.

In recognition of the objectives of the train air brake tests, the pressure-maintaining characteristics of the 26L locomotive air brake equipment, the greater sensitivity of modern control valves on freight cars, and good practice with respect to cutting the brake pipe pressure-maintaining feature out and in, an alternative brake pipe reduction sequence will provide an equally acceptable Initial Terminal Air Brake Test when 26L type equipment is utilized.

A single brake pipe reduction of a minimum of 20 pounds, but not to exceed a full service reduction, will produce similar results and may be made in place of the specified sequence required in Section 232.12(d)(1) of a 15-pound reduction followed by an increase to full service.

Enforcement Guidance for Inspecting and Testing Brakes on Cars while on Shop or Repair Track (MP&E 00-01)

The following guidance was developed to alleviate confusion over the testing and repairing requirements of brakes on cars that are repaired on a shop or repair track. Particularly, when a mobile repair vehicle is involved.

49 CFR 232.17(a) contains certain inspection and testing requirements of a car's brake system, when a car is on a "shop" or "repair" track. For example; an application and release of brakes must be performed, piston travel must be inspected and adjusted (if necessary), and certain brake system components must be inspected to ensure they are properly positioned and secured. In addition, such cars must receive periodic attention in accordance with the requirements of the currently effective AAR Code of Rules for cars in interchange. AAR rules require that any car on a shop or repair track receive a repair track air brake test if such attention has not been provided to the car within the previous twelve months.

The current regulation does not define what constitutes a shop or repair track. Although AAR's Field Manual of Interchange Rules contains a definition of shop/repair track, FRA believes that AAR's definition is too narrow and does not adequately delineate what constitutes a repair track for the purposes of §232.17(a). FRA believes the definition fails to adequately consider locations where mobile repair vehicles serve in the same capacity as a fixed repair facility and locations where railroads designate tracks as "expedite" or "light repair" tracks for the purpose of performing minor repairs.

In 1994, FRA provided guidance in Technical Bulletin MP&E 94-18, that only light or minor repairs are to be conducted on tracks designated as "expedite" or "light repair" tracks. Currently, FRA does not require railroads to perform air brake related inspections and tests, pursuant to §232.17(a), on cars receiving minor repairs (i.e. straighten safety appliances, replace handholds, replace air hoses, adjust lading, replace coupler knuckle pin, knuckles, etc.), provided the repair work is performed on tracks located outside of a repair shop area. Nor does FRA require the performance of these inspections and tests on a car if a mobile repair vehicle is sent to a remote location to make necessary repairs to the equipment.

However, at locations where a railroad has designated specific tracks to perform repairs on a regular and consistent basis, and when the repairs conducted on those tracks include major repair work (i.e., wheel change, coupler replacement, draft gear repair, repairs requiring an air jack, etc.), FRA considers those tracks to be repair tracks for the purposes of §232.17(a). This includes locations where mobile repair vehicles have replaced a fixed repair facility or serve in the same capacity as a fixed repair facility. FRA believes it is both illogical and inconsistent with the intent and meaning of the existing regulations to exempt tracks at locations where repairs of all types are regularly and consistently performed, from being considered repair tracks merely because they are serviced by a mobile repair vehicle. Furthermore, it would be inconsistent with previous guidance provided by FRA to allow major repair work to be performed on the "expedite" or "light repair" tracks, merely because the repairs are performed by a mobile repair vehicle. It should be stressed that FRA does not intend to prevent a railroad from designating certain tracks for conducting minor repairs and certain tracks for conducting major repairs at the same location.

Consequently, FRA considers the provisions of §232.17(a) applicable to fixed repair facilities and any location where repairs of all types are regularly and consistently performed, regardless of whether a mobile repair vehicle is used to conduct the repairs. FRA does not consider tracks that are designated only for minor repairs to be a repair track pursuant to §232.17(a); provided such track is used only to conduct minor repairs. However, if a major repair is performed on a car located on a track designated for minor repairs, then the car is subject to the provisions of §232.17(a) before it can be placed in service.

1000 Mile Interpretation - 49 CFR 232.12(b) (MP&E 98-40)

Trains must receive an intermediate inspection at points not more than 1,000 miles apart. It is the carrier's responsibility to designate the points where the 1,000 mile inspection will be made and provide this information to FRA personnel upon request.

All mileage accumulated from the point of the initial terminal air brake test will count toward the 1,000-mile requirements in Section 232.12(b). It should be noted that mileage accrued in Canada and Mexico will count toward the 1,000-mile requirements. When cars are received in interchange, the receiving railroad is responsible for knowing the distance

that all of the cars have travelled since their last inspection.

Handling of Defective Cars at Intermediate Inspection Locations (MP&E 98-46)

The following provides guidance to Inspectors when considering enforcement action for the improper handling of cars found with inoperative or cut-out air brakes at locations where intermediate air brake inspections are performed. FRA is concerned that some railroads are moving cars found with inoperative or cut-out air brakes during intermediate brake inspections from that inspection location, when repairs of those cars could possibly have been made at that location. Therefore, FRA feels that some general guidelines should be provided to Inspectors in the field to aid them in determining whether the location is a place where the repairs could be effectuated.

The statutory provisions contained in 49 USC § 20303 (previously 45 USC Section 13) governs the movement of equipment with defective power brakes. This only allows the railroad to move the defective equipment from the place where the defect is first discovered to the nearest location where the necessary repairs can be made. This movement can either be on the railroad where first discovered or at the option of the connecting railroad, on the line of the connecting railroad if the move is no farther than the location on the line where the defect was first discovered. Thus in order to properly move a car for repairs, the railroad must know the defect exists. Although the new regulations provide for tagging requirements in 2004, there are currently no tagging requirements for power brake defects. At interchange, a railroad can refuse to accept a defective car. Until the receiving railroad accepts the car by moving it or otherwise exercising control over it, it is not liable for civil penalties nor is it required to make any repairs. It should be noted, however, that the delivering railroad remains liable for each defective car it tenders in interchange.

The statutory provision contained in 49 U.S.C. § 20303 is an affirmative defense to be established by the railroad. There are seven elements which must be established:

- The car was properly equipped with power brakes in the beginning.
- The car became defective while being used by railroad on its line.
- The railroad discovered the defect prior to movement.
- The movement was from the place where the defect was first discovered.
- Repairs could not be made at the location where the defect was first discovered.
- Movement was necessary to make the necessary repairs.
- The car moved only to the nearest available point where the necessary repairs could be made.

The final rule on freight power brakes contains guidelines to be considered by FRA Inspectors and railroads in determining what constitutes the nearest location where necessary

repairs can be performed. See 49 CFR § 232.15(f). The guidelines are equally applicable to determining such locations for all safety appliance defects. The guidelines must be applied on a case-by-case basis to determine if the railroad acted in good faith in moving defect equipment. The following locations should be considered when applying the guidelines discussed in detail below:

- Locations where a mobile repair truck is used on regular basis;
- Locations where a mobile repair truck originates or is permanently stationed;
- Locations with an operative repair track or repair shop; and
- Locations where railroad performs mechanical repairs other than power brake repairs.

In determining whether a location, noted above, is capable of making a particular repair the following factors must be considered:

- The accessibility of the location to persons responsible for making repairs;
- The presence of hazardous conditions that affect the ability to safely make repairs of the type needed at the location;
- The nature of the repair necessary to bring the car into compliance;
- The need for railroads to have in place an effective means to ensure the safe and timely repair of equipment;
- The relevant weather conditions at the location that affect accessibility or create hazardous conditions;
- A location need not have the ability to effectuate every type of safety appliance repair in order to be considered a location where some power brake repairs can be made;
- A location need not be staffed continuously in order to be considered a location where power brake repairs can be performed;
- The ability of a railroad to perform a single car test at a location shall not be considered; and
- The congestion of work at a location shall not be considered.

In addition to considering the factors noted above, the following factors must be considered in determining whether the location is the nearest location where the necessary repairs can be made:

Distance to the location — Although this is a key factor it should not be the determining factor. This must be considered in conjunction with all the factors previously noted as well as the following safety considerations:

- The safety of the employees responsible for getting the equipment to or from a particular location, and
- The safety hazards involved in moving the equipment in the direction of travel necessary to get it to a particular location.

If the location where an intermediate inspection is performed is not a location where the necessary repairs can be made, then the car may be moved for repair. This movement for repair must be made in accordance with 49 U.S.C. § 20303.

§ 20303. Moving defective and insecure vehicles needing repairs

(a) General — A vehicle that is equipped in compliance with this chapter whose equipment becomes defective or insecure nevertheless may be moved when necessary to make repairs, without a penalty being imposed under section 21302 of this title, from the place at which the defect or insecurity was first discovered to the nearest available place at which the repairs can be made—

(1) on the railroad line on which the defect or insecurity was discovered; or

(2) at the option of a connecting railroad carrier, on the railroad line of the connecting carrier, if not farther than the place of repair described in clause (1) of this section.

(b) USE OF CHAINS INSTEAD OF DRAWBARS.— A vehicle in a revenue train or in association with commercially-used vehicles may be moved under this section with chains instead of drawbars only when the vehicle contains livestock or perishable freight.

(c) Liability.—The movement of a vehicle under this section is at the risk only of the railroad carrier doing the moving. This section does not relieve a carrier from liability in a proceeding to recover damages for death or injury of a railroad employee arising from movement of a vehicle with equipment that is defective, insecure, or not maintained in compliance with this chapter.

Bottom Rod Safety Support (MP&E 98-6)

"Bottom rod safety supports" are only required on those cars that have the bottom rod or handbrake bottom rod below the bolster. There are normally three types of bottom rod safety supports in use. The most common is the heavy wire type (Creco) that fits over the brake beam, with underslung loops to cradle the bottom rod should it become disengaged from the rest of the rigging. The handbrake bottom rod used with the brake beam mounted cylinder, generally has a loop or strip attached to each side of the truck bolster. This allows the handbrake to operate freely and acts as a safety guard. There is an older type that can be attached to the spring plank and a newer cable type.

Air Brake System - Reservoir Connecting Pipes (MP&E 98-8)

There have been incidences where Inspectors have detected freight cars in-service that have reservoir connecting pipes incorrectly applied. The auxiliary portion of the reservoir was connected to the emergency portion of the brake valve and the emergency portion of the reservoir was connected to the service portion of the brake valve. Inspectors should be alert to this condition and take appropriate action when detected.

Testing of Handbrakes on Locomotives Equipped with an Air Release Valve (MP&E 98-11)

On some locomotives, the application of the handbrake actuates an air release valve to the brake cylinder on the side of the truck where the handbrake functions. This system is necessary because the brake cylinder body has to be moved by the application of the handbrake and if the piston is extended, the cylinder body cannot be moved. When the release valve is functioning properly, it will relieve the pressure and allow the piston to retract so that the application of the handbrake will force the cylinder body toward the wheel. If the release valve does not function as intended and the handbrake is applied with the piston extended, the locomotive will not have any holding brakes when the air leaks off. FRA has been advised that there have been incidents of roll-away locomotives because of the failure of this release valve. In many cases, employees have applied the handbrake and shut down locomotives, only to discover later that the handbrake was not applied after the air leaked off.

All Inspectors are reminded that they are not to involve themselves in the manipulation of any apparatus that may cause or allow an adverse condition in any way. Testing for the above described condition must be done only by carrier personnel.

Conditional Use of Air Flow Method For Train Air Brake Qualifications as an Alternative To the Leakage Test For Trains (MP&E 98-15)

The following conditions were given to the Association of American Railroads for use of the air flow method (AFM) for train air brake qualifications:

1. Each controlling locomotive on a train qualified by the AFM shall be provided with an operational air flow indicator;

2. Participating railroads shall provide an operational end-of-train device (see 49 CFR Section 232.19 - 232.25) on all trains except transfer and yard trains with movements not exceeding 20 miles;

3. The AFM will apply only to trains using locomotives that are equipped with an air flow indicator that conforms with FRA's conditions, AAR specifications and calibration procedures, and 26-L freight locomotive air brake equipment;

4. When the AFM is used for train air brake qualifications, the air brake system shall be charged within 15 psi of the highest locomotive feed valve pressure used by that railroad and air flow shall not exceed 60 cubic feet per minute (CFM);

5. The air flow indicator must be calibrated for accuracy at periodic intervals not to exceed 92 days;

6. The air flow indicator shall be clearly visible and legible in daylight and darkness from the engineer's normal operating position;

7. The air flow indicator gauge shall be clearly and uniformly marked to indicate direct reading of air flow in 10 CFM increments from at least 10 CFM to 80 CFM, with numerals indicating, at a minimum of 20, 40, 60, and 80 CFM for continuous monitoring of the air flow into the brake pipe.

8. The air flow indicator calibration test orifices shall be calibrated at temperatures of not less than 20 degrees Fahrenheit;

9. When a train qualified by the AFM is in operation and experiences an increase in brake pipe air flow and/or an increase in brake pipe gradient and the movable pointer does not return to the limits established in the initial terminal train air brake test within a reasonable time, the train crew shall stop the train for inspection and repair leaks, if detected. If unable to make repairs the crew should arrange to set out defective cars and/or proceed with due caution to the next location where corrective action can be taken;

10. All participating railroads shall provide FRA a list of locations where calibrations will be performed and of locations which will be provided with test orifices. Changed, deleted, or additional locations will be reported to FRA within 92 days; and

11. All personnel involved with the AFM of testing of train's air brake systems and operating such trains must be given training and be aware of and understand the conditions of the waiver.

Locomotive Handbrakes -Stencil Requirement for Canadian Railroads - (MP&E 98-27)

Title 49, CFR, Section 232.10(f)(2) requires that locomotive handbrakes be inspected and

repaired as often as service requires with the date suitably stencilled or tagged. Transport Canada's Cab Form 22, Item 8(a) includes this same information. The information in Item 8(a) of Transport Canada Cab Form 22 satisfies FRA's requirement of having "the date suitably stencilled or tagged."

Locomotive Brake Cylinder Pressure (MP&E 98-41)

To address questions concerning the minimum locomotive brake cylinder pressure required by the Federal regulations, the following guidance applies.

Section 229.55(c) states:
The minimum brake cylinder pressure shall be 30 pounds per square inch.

Section 232.10(n)(8) states:
Air pressure regulating devices must be adjusted for the following pressures: Self-lapping portion for independent air brake (full application pressure) 30-50 pounds. These regulations were written when cast iron brake shoes were the standard and the brake cylinder relay air valve delivered 100 percent of the control pressure to the brake cylinders. With the advent of the high friction composition brake shoe, various relay valves have been used depending on whether the rigging was designed for cast iron or composition shoes. To best match the stop distance of cast iron, a two-step relay valve is used for composition shoes. One level is used for the automatic brake where speeds are generally above "switching" speeds and a higher level for the independent brake which is normally used in switching. By tailoring the relay valve to the locomotive, a standard independent brake valve setting can be used universally on a railroad. This setting is usually 45 psi. The resulting brake cylinder pressure may vary 27 psi (with a 60 percent relay) to 72 psi (with a 160 percent relay). The 60 percent relay valves (J-46 or J-64) are normally found on older locomotives which were converted from cast iron shoes with clasp rigging to composition shoes with clasp rigging. FRA considers such locomotives to be in compliance with the regulations.

Brake Hoses on Cars Equipped with 15" End-of-Car Cushioning Units (MP&E 98-55)

It has been brought to FRA's attention that some freight cars have undergone modifications that includes the installation of a 15" end-of-car cushioning unit, which if not properly installed and maintained, can develop a crimped brake hose condition. Often when the draft system is converted or improperly maintained, brake hose free play can be reduced, thus causing the brake hose to bind in either full buff or full draft positions.

Inspectors need to be vigilant for signs of brake hose deterioration, especially on cars with modified draft systems. If such conditions are found, immediately report them to the railroad. Also forward these findings to the Regional MP&E Specialist, so data can be collected to determine if a widespread problem exists with a specific series of cars.

Sloan Model 3050-A and 3200-A Angle Cocks (MP&E 98-56)

Sloan Model 3050-A and 3200-A Angle Cocks have caused injuries to several railroad employees. Several railroad employees have experienced personal injury when a Sloan angle cock handle and ball assembly forcefully flew apart, from train line pressure, when turned past the prescribed closed position due to a broken body stop (a.k.a. mechanical stop) for the handle.

FRA contacted the AAR regarding this safety hazard. In response, AAR re-issued instructions for the proper handling/repairing of Sloan Model 3050-A and 3200-A angle Cocks (Maintenance Advisory, (c-8502) MA-27, dated March 14, 1996).

During routine inspections, all field personnel should be alert to the potential safety hazard and verify that all angle cocks have an effective body stop for the handle.