The Mail Pouch

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September 2025

MEETING NOTICE

The next meeting will be held on Thursday, October 9th, 2025. The meeting will begin promptly at 7:00pm and will be held at The Museum's Taylor Annex. For directions or additional information, please contact James Taylor at (540) 295-2974.

October Meeting Agenda

•—***Brief Update on recent progress at the Museum's cars and displays.***

•—***Discussion of future projects and needs.***

•—***Entertainment TBD.***

Cover: Virginian Railway EL-C #138 and EL-2B's sit on display during the National Railway Historical Society's convention in Roanoke, Virginia during 1957. John Stith photo.

A monthly publication of the
Rappahannock Railroad Museum

Rappahannock Railroad Museum, Inc.
11700 Main St.
Fredericksburg, VA 22401

Museum Officers and Staff

Web Site: www.RRMuseum.org

THE PRESIDENTS 1/2 PAGE

No message for this edition.

James (Jake) Taylor
President
Rappahannock Railroad Museum

EDITOR'S NOTE

The Museum and the Editor can use your help to fill the pages of the Mail Pouch. If you have a subject you would like to share, photos or just about any other information, please consider submitting it for publication in our Mailpouch. There are a lot of exciting things happening at the Museum, I would be glad to publish personal notes from those who are making the changes and updates at the museum. All submissions will be included in the Mail Pouch (unless restricted by copywrite laws).

Thank you all for your support.

Jim Keehner
Editor
Rappahannock Railroad Museum

9/22/2025 Boy Scouts build platforms and benches at Deep Run Station.

UPCOMING EVENTS

Rappahannock Railroad Museum EVERY SATURDAY MORNING TRAIN RIDE – EXCURSION. Ride the rails along Historic Deep Run Creek in Spotsylvania Co. on open rail maintenance cars and experience how the railroad workers of the mid 20th century rode to their worksites. Every Saturday 9AM to Noon – weather and conditions permitting. To ensure you get aboard the last train run, please be at the museum by 10:30AM. We attempt to board all parties on a first come basis but boarding is conducted on the platform by our station conductor and train crew so first come first aboard may not always occur. All children under 12 or those needing intensive supervision must be accompanied by a responsible adult. They must be seated together. Departing from the Rappahannock Railroad Museum, 11700 Main Street, Fredericksburg,Va. 22408. Donations accepted.

Monthly Meetings:
October 9, 2025
November 13, 2025
December 11, 2025
January 08, 2026
February 12, 2026

CHAPTER TRIP: We will pick a Friday to ride the last VRE train into Union Station in the morning and we can do the Postal Museum or the American History Museum to see Southern Railway 1401. After lunch, we will return on the first VRE train back to Fredericksburg. Please email Andy Sentipal at asentipal@gmail.com for further information or to sign up. I will contact all that showed interest and we can pick a Friday that works for the majority.

NMRA NATIONAL CONVENTION
2026 NMRA NATIONAL CONVENTION – CHATTANOOGA, TN JULY 27 TO AUGUST 2, 2026, https://www.nmra2026.org

NATIONAL NARROW GAUGE CONVENTION
Collinsville, IL / St Louis, MO • September 3 - 6, 2025, www.45thnngc.com

HARRISBURG NARROW O SUMMER MEET
Harrisburg, PA • June 12 - 13, 2026, More info to follow!

GREENBERG TRAIN SHOWS
Nov. 1-2 - Monroeville, PA
Nov. 22-23 - Wilmington, MA
Nov. 29-30 - Edison, NJ
Dec. 6-7 - Timonium, MD
Dec. 20-21 - Chantilly, VA
Jan. 3-4 - Monroeville, PA
Jan. 10-11 - Oaks, PA
Jan. 17-18 - Richmond, VA
Feb. 7-8 - Hampton, VA
Mar. 14-15 - Rochester, NY
Mar. 21-22 - Wilmington, MA
Mar. 28-29 - Edison, NJ

Prince William County Model Railroad Club Schedule - PWMRC.org
Prince William Library, Bull Run Library, Sep 12 & 13, 2025
Great Scale Model Train and Railroad Collectors Show Oct 25-26, 2025
Richmond Science Musuem, Nov 28-30, 2025
Prince William Library, Central Library, Dec 11-13, 2025

RAPPAHANNOCK MODEL RAILROADERS
October ?? - Historic Appomattox Railroad Festival (N gauge only)
October TBD - Marine Corps Museum, O, Lego
October 25 - Shannon Harvest Festival Fly-in, All Gauges, Shannon Airport
November 8-9 - Spotsy Towne Centre Holiday Kickoff, O, N, Next to the Food Court
December 13-14 - Annual Train Show, All Gauges, Fraternal Order of Eagles Lodge, 21 Cool Springs Rd, Fredericksburg, VA

Editor's Note: *If anyone has any other Organizational information that they would like to see in the "Upcoming Events", please forward that information to the Editor for inclusion. I try to get a spread of regional and National events, but I cannot research every organization that is out there, so if you belong to or are interested in something that is not included here, please send me the information.*

MONTHLY RECAP

08-02-2025 - VERY BUSY DAY! Morning all. I am little late with update info as I have been off line for a while. Updated my system from Windows 7 to Windows 11. Wow, I have a lot to relearn.

Saturday was busy from before 9 until after noon. We had a total est. of 107 for the day. But our membership attendance was very low. We did welcome all visitors but no one had any breaks. Members THANK YOU for a job well done! We did make four full runs to main line.

Security: Remember when opening combo locks remove numbers before setting lock down. Also when locking up always give lock a tug to make sure it is LOCKED.

Keep Area Neat: Please feel free to pick up trash anywhere in area, put in trash cans and at end of day trash cans need to be dumped and see that you or someone takes trash away. We have a vacuum in closet if you see a need use it. That goes for annexes and display cars, (kids crawl around on floor and clean floors make parents happy).

Cut weeds & grass: With all the heat and rain weeds and grass have been on steroids. Please feel free to cut any you feel like (don't cut our scrubs). If you cut during Saturday BE SAFE around visitors, if you cut during week be sure you have a Safety person on standby. Thanks to those who are cutting.

I fully understand none of us can be at Museum every Saturday, but please attend when you can, we need you especially on busy days. Trying to keep up, HELP!

08-09-2025 - LOTS OF FAMILIES ATTENDING. Rather nice day good attendance with total est. of 91. Able to discuss projects that need attention. Made four trips to Main line and one trip saw two trains. It was good to see more members helping with operations. Never a dull minute as there is always something new to learn, improve on or learning from our visitors.

Museum Advertizing: We have had several visitors put positive messages on face book about their visit and now the State of Virginia added us to their "Places to Visit" that is very nice try it if you like.
https://dailywise.com/state/virginia/this-open-air-train-ride-through-virgin

These post seem to be a positive for people attending, as our attendance has been growing lately. See you Thursday at Meeting.

08-16-2025 - LOTS OF VISITORS! It was a little hot Saturday but families showed up by the train load. We made four trips to main line (also one short run). We had an total est. of 133 attending. On each trip we had to leave a few at station because all cars were full. All visitors were understanding and enjoyed tour and ride. Traffic was heavy at crossing we gave them a pleasant break while they waited for traffic lights (not us) that had traffic backed up in both directions. Even a touring group of motorcycles (25) gave a lot of racing motors and friendly waves in response to our toots when waiting for us to cross road. GOOD DAY!

We were a little short on members but it was great as all stood their post and even helped as needed in other operations. Great Job Members!

Our Monthly meeting went well Thursday. Lots of discussions on operations and a nice program on trains at Disney World. Wish more could attend but understand. Wow we had a very heavy rain for short time when arriving for meeting! But Dry and cool inside.

Safety Update: If remote fails at RT.2 crossing. One flagman will manually activate gates, stay at crossing for train to return. Conductor will call museum and request a signal maintainer (safety vest on) to come to crossing. So train will have full crew on way back to station. Signal Maintainer stays on scene for next run If remote not repaired that morning. At no time will train or any person cross road without proper protection.

Security: All members are encouraged to drive by or in Museum anytime for a look around. If you see a problem let someone know as we can check cameras before they over write and take any needed action. We have no problem with families just walking around safely. If you feel safe talk with them and invite them to return on Saturday morning. Never challenge anyone if you are alone be Safe.

We are doing very well at Museum but we must expect little events to come up, it is called progress. We will cure any problems that arrive in a safe way working together. Building future with History.

08-23-2025 - AUGUST GREAT ATTENDANCE MONTH. Great weather, scheduled group arrived at 9:00 for tour, train was waiting, train left station on time. We had a total est. of 107 people attending Museum. LYT train made four trips to CSX Main line with a well trimmed right of way. Fall leaf runs should be great traveling thru a tunnel of color. With a good turnout of members we also had a chance to get a few projects completed and plans for improvement.

Short but happy Update. Let’s keep presenting History together. It is great seeing Members enjoying their special interest in the different categories of the Railroad Hobby and helping each others as needed to make our Museum the best family Museum anywhere. See you Saturday.

08-30-2025 - DEEP RUN STATION BUSY! Wow, what a way to finish August, think families decided to enjoy time locally and stay off the interstate. We had total est. of 167 people attend the Museum Saturday. We made four FULL trips to CSX Main line (ran one as extra, guess we need a couple of white flags). We will update operations for days like this so loading passengers will be controlled better (load by simple ticket numbers). What a great problem to have, standing room only at station.

Members: You did a great job of handling the big crowd in all sections of museum, welcome, tours, modeling, train operation. I know all were tired at end of day. We can handle anything when we work (play) together. THANK YOU ALL !

North Annex operating procedures REVISED! They are posted in operational manual, posted in North Annex. READ AND SIGN before you operate any model trains in north annex. The team has worked very hard correcting and planning layouts if you try to make corrections you only cause more problems, follow operation rules so all members can enjoy our layouts. This is for ALL members.

Safety: All members watch out for visitors as they tour Museum. Most have never been near or in a railroad yard. If you see an unsafe act correct it and politely explain reason. Always have station attendant (member) on duty when train arriving station. ALL personal must by clear of track and aware of approaching train.

Saturday was good practice for our fall leaf runs. Now to end of year will be very busy time. Be sure you keep up with planning and helping to finishing projects. Looking forward to relaxing Christmas Party.

Start of new life in Philippi , WV for 501 and M1892

GEORGE WESTINGHOUSE
and
THE AUTOMATIC AIR BRAKE SYSTEM

George Westinghouse Jr. (October 6, 1846 – March 12, 1914) was a prolific American inventor, engineer, and entrepreneurial industrialist based in Pittsburgh, Pennsylvania. He is best known for his creation of the railway air brake and for being a pioneer in the development and use of alternating current (AC) electrical power distribution. During his career, he received 360 patents for his inventions and established 61 companies, many of which still exist today.

His invention of a train braking system using compressed air revolutionized the railroad industry around the world. He founded the Westinghouse Air Brake Company in 1869. He and his engineers also developed track-switching and signaling systems, which lead to the founding of the company Union Switch & Signal in 1881.

In the early 1880s, he developed inventions for the safe production, transmission, and use of natural gas. This sparked the creation of a whole new energy industry.

During this same period, Westinghouse recognized the potential of using alternating current (AC) for electric power distribution. In 1886, he founded the Westinghouse Electric Corporation. Westinghouse's electric business directly competed with Thomas Edison's, who was promoting direct current (DC) electricity. Westinghouse Electric won the contract to showcase its AC system to illuminate the "White City" at the 1893 Columbian Exposition in Chicago.

The company went on to install the world's first large-scale, AC power generation plant at Niagara Falls, New York, which opened in August 1895.

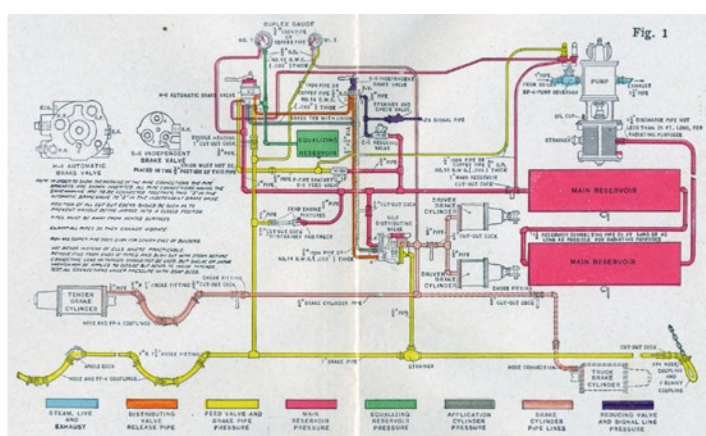
Ironically, among many other honors, Westinghouse received the 1911 Edison Medal of the American Institute of Electrical Engineers "for meritorious achievement in connection with the development of the alternating current system".

A railway air brake is a railway brake power braking system with compressed air as the operating medium. Modern trains rely upon a fail-safe air brake system that is based upon a design patented by George Westinghouse on April 13, 1869. The Westinghouse Air Brake Company was subsequently organized to manufacture and sell Westinghouse's invention. In various forms, it has been nearly universally adopted.

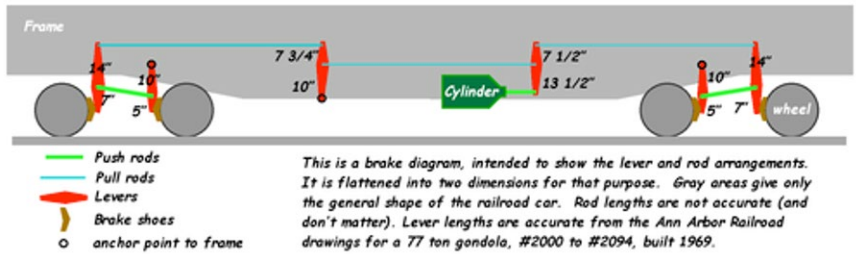
The Westinghouse system uses air pressure to charge air reservoirs (tanks) on each car. Full air pressure causes each car to release the brakes. A subsequent reduction or loss of air pressure causes each car to apply its brakes, using the compressed air stored in its reservoirs.

In the air brake's simplest form, referred to as a straight air system, compressed air is directed to a brake cylinder, causing its piston to apply force to mechanical linkage, which linkage is conventionally referred to as the brake rigging (see illustration at right). The brake rigging, in turn, is connected to brake shoes that are pressed against the car's wheel treads (some types of passenger cars instead use disc brakes). The resulting friction slows the car by dissipating its kinetic energy as heat. The brake rigging is often quite elaborate, as it is designed to evenly distribute the brake cylinder's force to multiple wheels.

The source of high-pressure air needed to operate the system is an air compressor mounted in the locomotive, the compressor being driven by a Diesel locomotive's prime mover, or by a cross-compound steam engine on a steam locomotive. Compressors of electric locomotives are usually driven by

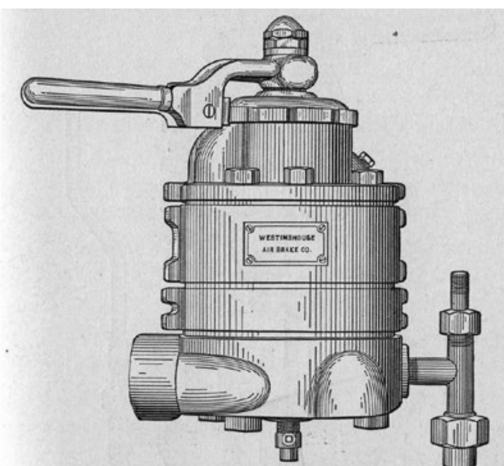


Piping diagram from 1909 of a Westinghouse 6-ET Air Brake system on a locomotive their own electric motor. The output of the air compressor is stored in a tank, also mounted on the locomotive, this tank being referred to as the main reservoir. Air from the main reservoir is piped to a manually operated brake valve in the locomotive's cab. When the brake valve is opened to apply the brakes, air under pressure is conveyed to the brake mechanism.



A simplified diagram of a freight car brake system

A critical weakness of the straight air braking system is that any failure in the piping, such as a blown air hose. that results in a loss of pressure will render the brakes inoperative. For this reason, train brakes do not employ straight air for operation, as there is no redundancy in the event of such a failure. However, straight air is used to operate locomotive brakes, as redundancy is provided by the ability of a locomotive to come to a stop by reversing propulsion in an emergency, a procedure referred to as "plugging".



Control handle and valve for a Westinghouse air brake

Locomotive brakes are controlled by an independent brake valve, so-named because the locomotive brakes may be applied or released independently from the train brakes.

In order to design a braking system without the shortcomings of the straight air system, Westinghouse invented an arrangement in which each piece of railroad rolling stock was equipped with a dual-compartment, compressed-air reservoir and a triple valve, also known as a control valve. A pipe referred to as the brake pipe was fitted to each car to act as a passage for the compressed airneeded to make the system function. The brake pipes were fitted with hoses at each end of each car and locomotive for creating a continuous brake pipe connection throughout the train.

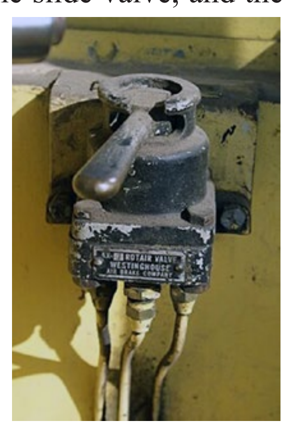
Unlike the previously described straight air system, the Westinghouse system uses a reduction in brake pipe air pressure to indirectly apply the brakes. 1918 drawing of a triple valve

In his patent application, Westinghouse refers to his 'triple-valve device' because of the three component valvular parts comprising it: the diaphragm-operated poppet valve feeding reservoir air to the brake cylinder, the reservoir charging valve, and the brake cylinder release valve. Westinghouse soon improved the device by removing the poppet valve action. These three components became the piston valve, the slide valve, and the graduating valve.

The Westinghouse system functions as follows:

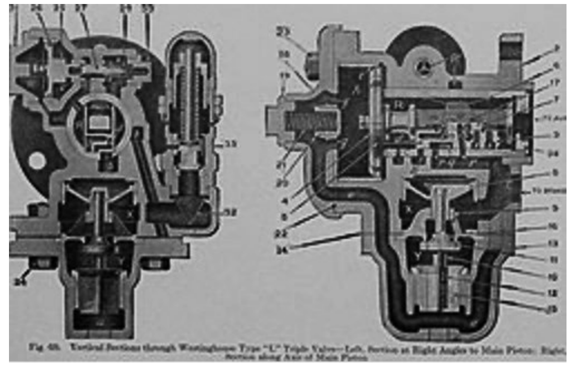
When brake pipe pressure is reduced below car reservoir pressure at a controlled rate(referred to as a "service reduction", which is usually initiated by the train operator to slow or stop the train), the triple valve will close the brake cylinder exhaust port and open a port connecting the service compartment of the (dual-compartment) reservoir to the cylinder, charging the latter with air from the former and causing a brake application. Cylinder charging will continue until brake pipe and reservoir pressures have equalized, at which time the triple valve will seal ("lap off") the reservoir-to-cylinder port to maintain cylinder pressure.

When brake pipe pressure is increased above car reservoir pressure, the triple valve will open the brake cylinder exhaust port, venting the cylinder to the atmosphere and hence releasing the brakes. Simultaneously, the triple valve will open a port from the reservoir



Rotair Valve from the Westinghouse Air brake Company.

to the brake pipe, causing both reservoir compartments to be recharged. When reservoir and brake pipe pressures have equalized, the triple valve will close the port connecting the brake pipe to the reservoir. The reservoir will be sealed off from both the brake pipe and the brake cylinder, and should be able to maintain pressure until needed again.


1918 drawing of a triple valve

When brake pipe pressure is reduced below car reservoir pressure at an uncontrolled rate, an emergency brake application will occur. The triple valve will open an unlapped port connecting the emergency compartment of the car's reservoir to the brake cylinder. The resulting sudden application of full reservoir pressure to the brake cylinder will produce the maximum amount of braking force that is possible (occasionally causing wheel slide). At the same time, the triple valve will locally vent the brake pipe to the atmosphere, which behavior will increase the rate at which the sudden pressure loss will propagate throughout the train.

Local venting action is necessary because without it, the rate at which brake pipe pressure can be reduced through the automatic brake valve (if the engineer (driver) initiated the emergency application) or a blown or disconnected air hose might not be fast enough to trigger an emergency response on more than a few cars. If the pressure loss was due to, for example, a blown air hose at the front of a 100-car freight train and there was no local venting, the triple valves of many of the cars farther back in the train might not produce an emergency response, or the response might be significantly delayed. Cars nearest to the front would forcefully apply their brakes well before the cars farther back, causing a "run-in", an abrupt and violent bunching of train slack that could lead to a derailment.

Due to its design, the Westinghouse system is inherently fail-safe, in that any uncommanded loss of brake pipe pressure, such as the aforementioned blown air hose, will cause an immediate brake application.

Modern air brake systems serve two functions: Service braking applies and releases the brakes during normal operations. Emergency braking rapidly applies the brakes in the event of a brake pipe failure or an emergency application by the engine operator or passenger emergency alarm/cord/handle. When the train brakes are applied during normal operation, the engine operator makes a "service application" or a "service rate reduction", which means that the brake pipe pressure reduces at a controlled rate. It takes several seconds for the brake pipe pressure to reduce and consequently takes several seconds for the brakes to apply throughout the train. The speed of pressure changes during a service reduction is limited by the compressed air's ability to overcome the flow resistance of the relatively-small-diameter pipe and numerous elbows throughout the length of the train, and the relatively-small exhaust port on the head-end locomotive, which means the brakes of the rear-most cars will apply sometime after those of the forward-most cars apply, so some slack run-in can be expected. The gradual reduction in brake pipe pressure will mitigate this effect.

Modern locomotives employ two air brake systems. The system which controls the brake pipe is called the automatic brake and provides service and emergency braking control for the entire train. The locomotive(s) at the head of the train (the "lead consist") have a secondary system called the independent brake. The independent brake is a "straight air" system that makes brake applications on the head-of-train locomotive consist independently of the automatic brake, providing for more nuanced train control. The two braking systems may interact differently as a matter of preference by the locomotive builder or the railroad. In some systems, the automatic and independent applications will be additive; in some systems the greater of the two will apply to the locomotive consist. The independent system also provides a bail off mechanism, which releases the brakes on the lead locomotives without affecting the brake application on the rest of the train.

In the event the train needs to make an emergency stop, the engine operator can make an "emergency application," which will rapidly vent all of the brake pipe pressure to atmosphere, resulting in a faster application of the train's brakes.

An emergency application also results when the integrity of the brake pipe is lost, as all air will also be immediately vented to atmosphere.

An emergency brake application brings in an additional component of each car's air brake system. The triple valve is divided into two portions: the service section, which contains the mechanism used during brake applications made during service reductions, and the emergency section, which senses the faster emergency reduction of train line pressure. In addition, each car's air brake reservoir is divided into two sections—the service portion and the emergency portion—and is known as the "dual-compartment reservoir". Normal service applications transfer air pressure from the service section to the brake cylinder, while emergency applications cause the triple valve to direct all air in both the sections of the dual-compartment reservoir to the brake cylinder, resulting in a 20 to 30 percent stronger application.

The emergency portion of each triple valve is activated by the higher rate of reduction of brake pipe pressure. Due to the length of trains and the small diameter of the brake pipe, the rate of reduction is highest near the front of the train (in the case of an engine operator-initiated emergency application) or near the break in the brake pipe (in the case of loss of brake pipe integrity). Farther away from the source of the emergency application, the rate of reduction can be reduced to the point where triple valves will not detect the application as an emergency reduction. To prevent this, each triple valve's emergency portion contains an auxiliary vent port, which, when activated by an emergency application, also locally vents the brake pipe's pressure directly to atmosphere. This serves to more rapidly vent the brake pipe and hasten the propagation of the emergency reduction rate along the entire length of the train.

Use of distributed power (i.e., remotely controlled locomotive units mid-train and/or at the rear end) somewhat mitigates the time-lag problem with long trains, because a telemetered radio signal from the engine operator in the front locomotive commands the distant units to initiate brake pressure reductions that propagate quickly through nearby cars.

Distributors

Many modern air brake systems use distributors[clarification needed] instead of triple valves. These serve the same function as triple valves, but have additional functionality such as the ability to partially release the brakes.

The locomotive's air compressor typically charges the main reservoir with air at 125–140 psi (8.6–9.7 bar; 860–970 kPa). The train brakes are released by admitting reduced and regulated main reservoir air pressure to the brake pipe through the engineer's automatic brake valve. In America, a fully charged brake pipe typically operates at 90 psi (6.2 bar; 620 kPa) for freight trains and 110 psi (7.6 bar; 760 kPa) for passenger trains. The brakes are applied when the engineer moves the automatic brake handle to a "service" position, which causes a reduction in brake pipe pressure.

During normal service, the pressure in the brake pipe is never reduced to zero and in fact, the smallest reduction that will cause a satisfactory brake response is used to conserve brake pipe pressure. A sudden and substantial pressure reduction caused by a loss of brake pipe integrity (e.g., a blown hose), the train breaking in two and uncoupling air hoses, or the engineer moving the automatic brake valve to the emergency position, will cause an emergency brake application. On the other hand, a slow leak that gradually reduces brake pipe pressure to zero, something that might happen if the air compressor is inoperative and therefore not maintaining main reservoir pressure, will not cause an emergency brake application.

Electro-pneumatic or EP brakes are a type of air brake that allows for immediate application of brakes throughout the train instead of the sequential application. EP brakes have been in British practice since 1949 and also used in German high-speed trains (most notably the ICE) since the late 1980s; they are fully described in Electro-pneumatic brake system on British railway trains. As of 2005, electro-pneumatic brakes were in testing in North America and South Africa on captive service ore and coal trains.

Passenger trains have had for a long time a three-wire version of the electro-pneumatic brake, which gives up to seven levels of braking force.

In North America, the Westinghouse Air Brake Company supplied high-speed control brake equipment for several post-World War IIstreamlined passenger trains. This was an electrically controlled overlay on conventional D-22 passenger and 24-RL locomotive brake equipment. On the conventional side, the control valve set a reference pressure in a volume, which set brake cylinder pressure via a relay valve. On the electric side, pressure from a second straight-air trainline controlled the relay valve via a two-way check valve. This "straight air" trainline was charged (from reservoirs on each car) and released by magnet valves on each car, controlled electrically by a three-wire trainline, in turn controlled by an electro-pneumatic master controller in the controlling locomotive. This controller compared the pressure in the straight air trainline with that supplied by a self-lapping portion of the engineers valve, signaling all of the "apply" or "release" magnets valves in the train to open simultaneously, changing the pressure in the straight-air trainline much more rapidly and evenly than possible by simply supplying air directly from the locomotive. The relay valve was equipped with four diaphragms, magnet valves, electric control equipment, and an axle-mounted speed sensor, so that at speeds over 60 mph (97 km/h) full braking force was applied, and reduced in steps at 60, 40 and 20 mph (97, 64 and 32 km/h), bringing the train to a gentle stop. Each axle was also equipped with anti-lock brake equipment. The combination minimized braking distances, allowing more full-speed running between stops. The straight-air (electro-pneumatic trainline), anti-lock, and speed graduating portions of the system were not dependent on each other in any way, and any or all of these options could be supplied separately.

Later systems replace the automatic air brake with an electrical wire which runs in a circle round the whole train and has to be kept energized to keep the brakes off. In the UK it is known as a train wire. It is routed through various "governors" (switches operated by air pressure) which monitor critical components such as compressors, brake pipes and air reservoirs. If the train divides, the wire will be broken, ensuring that all motors are switched off and both portions of the train have an immediate emergency brake application.

More recent innovations are electronically controlled pneumatic brakes where the brakes of all the wagons (cars) and locomotives are connected by a kind of local area network, which allows individual control of the brakes on each wagon, and the reporting back of performance of each wagon's brakes.

The Westinghouse air brake system is very reliable but not infallible. The car reservoirs recharge only when the brake pipe pressure is higher than the reservoir pressure. Fully recharging the reservoirs on a long train can require considerable time (8 to 10 minutes in some cases), during which the brake pipe pressure will be lower than locomotive reservoir pressure.

If the brakes must be applied before recharging has been completed, a larger brake pipe reduction will be required in order to achieve the desired amount of braking effort, as the system is starting out at a lower point of equilibrium (lower overall pressure). If many brake pipe reductions are made in short succession ("fanning the brake" in railroad slang), a point may be reached where car reservoir pressure will be severely depleted, resulting in substantially reduced brake cylinder piston force, causing the brakes to fail. On a descending grade, the result will be a runaway.

In the event of a loss of braking due to reservoir depletion, the engine driver may be able to regain control with an emergency brake application, as the emergency portion of each car's dual-compartment reservoir should be fully charged—it is not affected by normal service reductions. The triple valves detect an emergency reduction based on the rate of brake pipe pressure reduction. Therefore, as long as a sufficient volume of air can be rapidly vented from the brake pipe, each car's triple valve will cause an emergency brake application. However, if the brake pipe pressure is too low due to an excessive number of brake applications, an emergency application will not produce a large enough volume of air flow to trip the triple valves, leaving the engine driver with no means to stop the train.

To prevent a runaway due to loss of brake pressure, dynamic (rheostatic) braking can be utilized so the locomotive(s) will assist in retarding the train. Often, blended braking, the simultaneous application of dynamic and train brakes, is used to maintain a safe speed and keep the slack bunched on descending grades. Care is then given when releasing the service and dynamic brakes to prevent draw-gear damage caused by a sudden run out of the train's slack.

Another solution to loss of brake pressure is the two-pipe system, fitted on most locomotive-hauled passenger stock and many freight wagons. In addition to the traditional brake pipe, this enhancement adds the main reservoir pipe, which is continuously charged with air directly from the locomotive's main reservoir. The main reservoir is where the locomotive's air compressor output is stored and is ultimately the source of compressed air for all connected systems.

Since the main reservoir pipe is kept constantly pressurized by the locomotive, the car reservoirs can be charged independently of the brake pipe, this being accomplished via a check valve to prevent backfeeding into the pipe. This arrangement helps to reduce the above-described pressure loss problems, and also reduces the time required for the brakes to release, since the brake pipe only has to recharge itself.

Main reservoir pipe pressure can also be used to supply air for auxiliary systems such as pneumatic door operators or air suspension. Nearly all passenger trains (all in the UK and USA), and many freights, now have the two-pipe system.

The enormous weight and inertia of a train, coupled with its very low rolling resistance and that freight (goods) trains often transport hazardous materials, makes a brake failure an extremely dangerous event. Brake failure may result in a runaway train and a disastrous wreck that leads to significant loss of life, property damage and/or environmental destruction.

Ironically, properly-functioning brakes may lead to trouble as well. During an emergency brake application, the brakes on empty freight (goods) cars ("empties") may lock wheels and cause them to slide on the rails. If the train is traveling at sufficient speed, sliding wheels will rapidly wear down, causing a loss of tread profile (a condition referred to as a "flat wheel"), as well as overheating. Overheated wheels may weaken and fracture, triggering a derailment.

Empties in the middle of the train that derail due to damaged wheels may take the following cars with them, resulting in a major wreck.

Brake failure may be the result of human error or mechanical malfunction, or a combination of both, as will be seen in following discussion.

At both ends of each car or locomotive, there are valves that join the brake pipe to the air hoses, said valves being referred to as angle cocks due to their characteristic shape. When opened at both ends of the car or locomotive, the angle cocks allow air flow through the brake pipe, as well as to the brake equipment. When both are closed, the brake pipe is sealed off, preventing air flow. When only one angle cock is opened, air can only flow in or out from one end of the brake pipe. This last condition is especially significant, as it can inadvertently cause a partial or near-total loss of braking capacity.

During routine train operation, the angle cocks on the rear end of the last car and the forward end of the lead locomotive or car will be closed to seal the brake pipe and maintain air-tight integrity. On a train equipped with an automated end-of-train device (ETD) the angle cock on the rear end of the last car will be opened so brake pipe pressure will be applied to the ETD—the ETD acts to seal the brake pipe.

While conducting switching operations, one or more angle cocks are closed to isolate sections of the brake pipe when the train is separated to set out or pick up cars. Failure to close the correct angle cock before separating the train will cause an unintended emergency brake application when air hoses are disconnected at the point at which cars have been uncoupled. The emergency application will create a safety hazard if the train is on the mainline and operating under timetable orders, as the authority to occupy the mainline may expire before the train can recharge the brakes, get underway and move into the clear as another train approaches.

Excepting the two end angle cocks mentioned above, all other angle cocks must be opened to create brake pipe continuity throughout the train. If an angle cock on an intermediate car is closed, part of the train's brake pipe will be isolated from the locomotive or control car. Benignly, such a situation may result in the brake pipe downstream from the closed angle cock losing pressure due to leakage, leading to an uncommanded brake application on the affected cars. More seriously, if the isolated segment is able to maintain pressure, a loss of braking in the affected cars will occur.

If a closed angle cock is very close to the head end of the train and the isolated brake pipe is able to maintain pressure, most of the train will be without braking capability and the engineer (driver) may be unable to control the train's speed, especially on a descending grade. Such a situation resulted in the 1953 Pennsylvania Railroad train wreck involving the Federal Express. A similar wreck was the Gare de Lyon rail accident, in which a valve was accidentally closed by a crew member, isolating part of the brake pipe and causing a significant loss of braking capacity.

GEORGE WESTINGHOUSE
and
THE AUTOMATIC AIR BRAKE SYSTEM

There are a number of safeguards that may be taken to prevent human error and mechanical problems from leading to a brake failure. Most railroads have strict government-approved procedures for conducting air brake tests during train makeup in the yard, or when picking up or setting out cars while en route.

In North America, a typical yard procedure during train makeup, after all air hoses have been connected and angle cocks opened or closed as necessary, is:

The independent brake in the lead locomotive is applied to keep the train stationary during the following tests. Both main reservoir and independent brake pressures are observed to see that they are in the prescribed ranges.

The automatic brake valve in the lead locomotive is moved to the "brakes released" position to fully charge the system—the charging process may take upwards of 10 minutes with a long train whose cars have depleted reservoirs.

Brake pipe pressure is observed to see that it reaches the prescribed level once the system is fully charged. As the system charges, the engineer (driver) may also observe the rate at which the brake pipe pressure increases. A too-rapid increase in a long train may indicate that an intermediate angle cock is closed, causing a loss of brake pipe continuity.

Upon attaining full brake pipe pressure, a small service reduction is made to apply the train brakes. Cars are visually inspected to verify that a brake application has occurred. Particular attention is usually paid to the rearmost car, either by manual inspection or via telemetry from an automated end-of-train device, to ensure that brake pipe continuity exists to the end of the train. The individual(s) inspecting the cars will also listen for the sounds of an air leak—leakage may result in sticking brakes following an intentional brake application, or an uncommanded brake application while the train is underway.

While the train brakes are applied, the engineer (driver) will observe that the independent brake pressure has increased and will also verify that depressing the independent brake lever will "bail off" (release) the independent brake, a function that is essential to proper train handling.

Finally, the automatic brake valve is returned to the released position and brakes are inspected to verify that they have released. Also, the fully charged brake pipe pressure is again checked to verify that it has reached the prescribed level.

When setting out or picking up cars en route, a usual practice is to run a modified test—the exact procedure, of course, will be dictated by railroad operating rules and legal requirements.

If a car or a group of cars, referred to as the cut, is set out from the middle of the train, the test following the rejoining of the train usually involves observing the car that is immediately behind the cut point to verify proper brake operation.

If a set-out removes the last car in the train, the angle cock of the car that was immediately ahead of the cut will have been closed by the switchman to maintain brake pipe pressure. Typically, testing is limited to observing that full brake pipe pressure is attained when the brakes are released.

If a cut is picked up, a brake test similar to that conducted in the yard will be carried out, but usually with observation limited to the cut, as well as the check for brake pipe continuity.

When a train is equipped with an ETD, the switchman relocates it to the last car of what is left of the train when a cut that includes the last car is set out. Similarly, if a cut is picked up and attached to the rear of the train, the ETD is relocated to the last car of the cut.

Assuming that brake pipe continuity is known to exist, an observed brake failure on one or more cars during testing is usually indicative of malfunctioning triple valves. More rarely, the brake rigging may be at fault. Depending on the train's location during the test, the repair facilities that are available, and regulations governing the number of cars with inoperative brakes permitted in a train, the malfunctioning cars may be set out or taken to the next terminal for repairs.

PHOTOS

Top Left and Right: How things change and be careful what you wish for, 2016 !!

Upper Middle Left and Right, Lower Middle Left: Let's start planning for fall leaf run's now. Photos from 2014.

Lower Middle Right: First trip ready to leave Deep Run Station 8/23/2025.

Bottom Left: Remember you are a member of a living history Museum and really operate historical equipment. What a privilege.

MEMBERSHIP APPLICATION

Membership Application/Renewal Form

Rappahannock Railroad Museum, Inc.
Please type or print legibly

New Renewal if renewal Updated information Y N

Name: ______________________________

Street Address: ______________________________

City: ____________ State: ______ Zip: ____________

Phone: ______________________________

Email: ______________________________

Family Membership(S) if Joining: ______________________________
Membership

Regular $15.00____________________ , can Vote, can hold office

Family $1.00 each ____________________, cannot vote, cannot hold office.

Museum Donation______________________________

Total:____________________

Please mail to the following address or hand in at meeting.

Rappahannock Railroad Museum, Inc.
11700 Main Street
Fredericksburg, VA. 22408

I agree to be a member in good standing and follow safety rules of the Rappahannock Railroad Museum, Inc.
Membership dues for January 1, 2025 to December 31, 2025

Signature:______________________________ Date: ____________________

"Promoting Railway History and Preservation"

SEPTEMBER MONTHLY MEETING AGENDA

Saturday	September 6th	Meet at our Museum Site 9:00am to 12:00pm for tours and train rides, construction and upgrades(weather permitting). Members continue to improve displays and area.
Thursday	September 11th	**MUSEUM MONTHLY MEETING IN THE TAYLOR ANNEX.** Monthly meeting starting promptly at 7:00pm. Important discussion on Museum future activities.
Saturday	September 13th	Meet at our Museum Site 9:00am to 12:00pm for tours and train rides, construction and upgrades(weather permitting). Members continue to improve displays and area.
Saturday	September 20th	Meet at our Museum Site 9:00am to 12:00pm for tours and train rides, construction and upgrades(weather permitting). Members continue to improve displays and area.
Saturday	September 27th	Meet at our Museum Site 9:00am to 12:00pm for tours and train rides, construction and upgrades(weather permitting). Members continue to improve displays and area.
		Additional work days may be scheduled on an as needed basis.

Mother nature is adjusting her color palette to Fall,
Making the Train Ride impressive for all;
Improvements at the museum keep visitors returning,
Volunteers are getting things done and keep their interest burning.

"Promoting Railway History and Preservation"

SUBMISSIONS NOTE: Any items that you wish to have published in ***The Mail Pouch*** must be submitted as a complete package, articles must have all supporting images and diagrams at time of submission. Items to be published that are "borrowed from other publications" must have the proper credits noted to avoid copyright violations. Any items that you wish to have published in ***The Mail Pouch*** must be submitted to the Editor in electronic format (Text Files for articles and separate Digital Photos) prior to the **20th** of the proceeding month. Items not in an electronic format (items needing scans or typesetting) must be submitted prior to the **15th** of the proceeding month. Articles, Photos and other items may be submitted in person on Saturday mornings at the Museum, or electronically at jkeehner67@hotmail.com, **subject line EDITOR**. *All items submitted after the deadlines of the month will be held for publication in the following months Newsletter.*