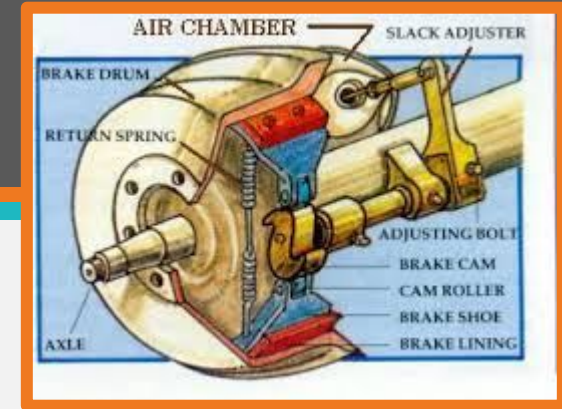


Albemarle County School Transportation Services

Air Brakes



Air brakes are 3 different braking systems:



1. **Service Brake:** brake pedal used for normal driving
2. **Parking Brake:** A brake control knob always used when the vehicle is parked
3. **Emergency Brake:** used to stop the truck or bus in a brake system failure

Air brakes use compressed air to make the brakes work,
which is the safest and best way to stop large vehicles.

The Air Compressor & Air Compressor Governor

The air compressor pumps air into the air storage tank (reservoirs)

The governor controls WHEN the air compressor will pump air into the air storage tanks.

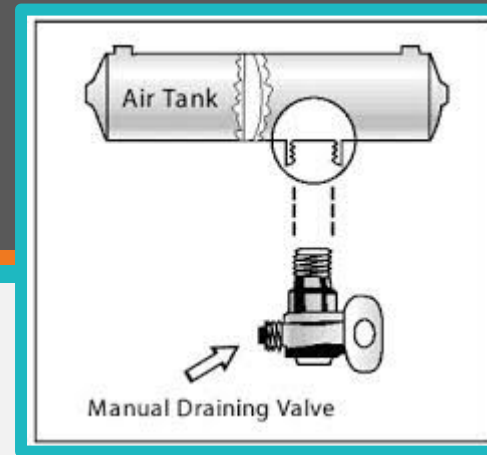
Air storage tanks are used to hold compressed air.

When the air pressure in the tank rises to around 125 psi, the governor will “cut out” meaning it will stop the compressor from pumping air into the tank.

When the air pressure in the tank falls to around 100 psi, the governor allows the compressor to start pumping again.

Governor “cut-out” = 125 psi & Governor “cut-in” = 100 psi

Air Tank Drains



Compressed air usually has some water and compressor oil in it which is not good for the air brake system.

- Water can freeze which can lead to brake failure
- Oil & Water can collect in the bottom of the air tank
- Air tanks MUST be drained daily to keep them in working order. (Some tanks have automatic draining valves, and some need to be drained manually.)

Some air brake systems have an alcohol evaporator to put alcohol into the air system which reduces the risk of ice forming in the air brake system.

- The first air tank has a **Safety Valve** (not to be confused with the governor) that is set to open at **150** psi. This protects the tank and the rest of the system from too much pressure, so if the safety valve opens...something is wrong. Have the problem fixed by a mechanic.

The Brake Pedal

- The service brake pedal works similarly to your car brake pedal, except when you apply the brake, air is released.

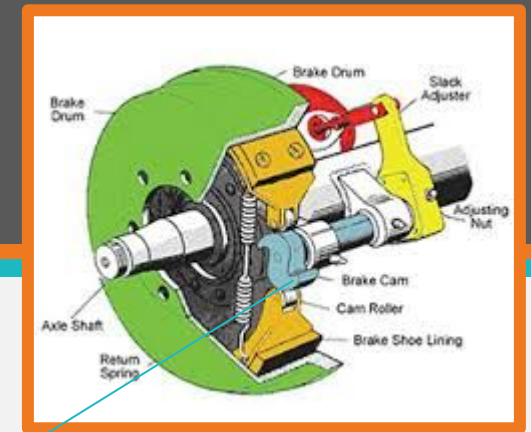


**Pressing and releasing the brake pedal unnecessarily may let out air from the brake system faster than it can be replaced...if the pressure gets too low...the brakes will no longer work.

Other names for the brake pedal: treadle valve or foot valve.



Foundation Brakes & Gauges



- Foundation brakes are used at each wheel
- The most common foundation brakes are s-cam brakes
(shaped like the letter "S")
- All vehicles with air brakes have a supply pressure gauge connected to the air tank to let you know how much pressure is in the tank.
- Application Pressure Gauge: shows you how much pressure you are applying to the brake...if you need to keep increasing pressure to hold the same speed -the brakes are failing.



Spring Brakes

Front wheel braking is good under all conditions.

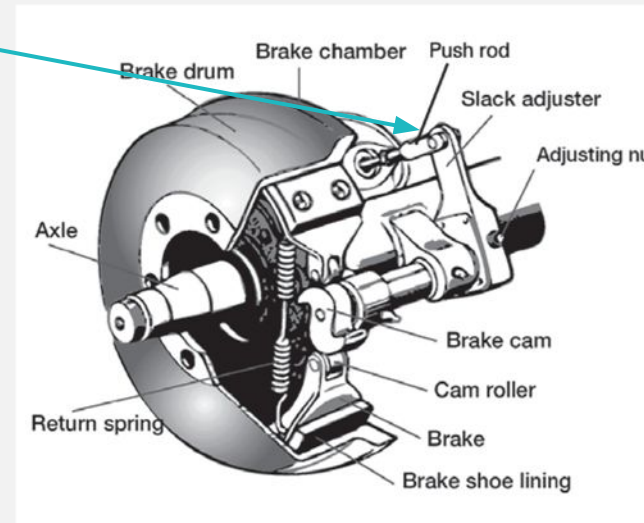


- Because air pressure can eventually leak away, all trucks, tractors, and buses must be equipped with spring-held emergency brakes and parking brakes.
- Spring Brakes: Brakes with powerful springs held back by air pressure will cut on if the air pressure is removed.
- The parking brake is a yellow, diamond shaped push-pull knob. It pulls out to set the brake.
- In some vehicles, spring brakes can be applied gradually by using a modulating control valve.

No Slacking! Inspecting Air Brake Systems...

Slack adjusters on s-cam brakes must be checked.

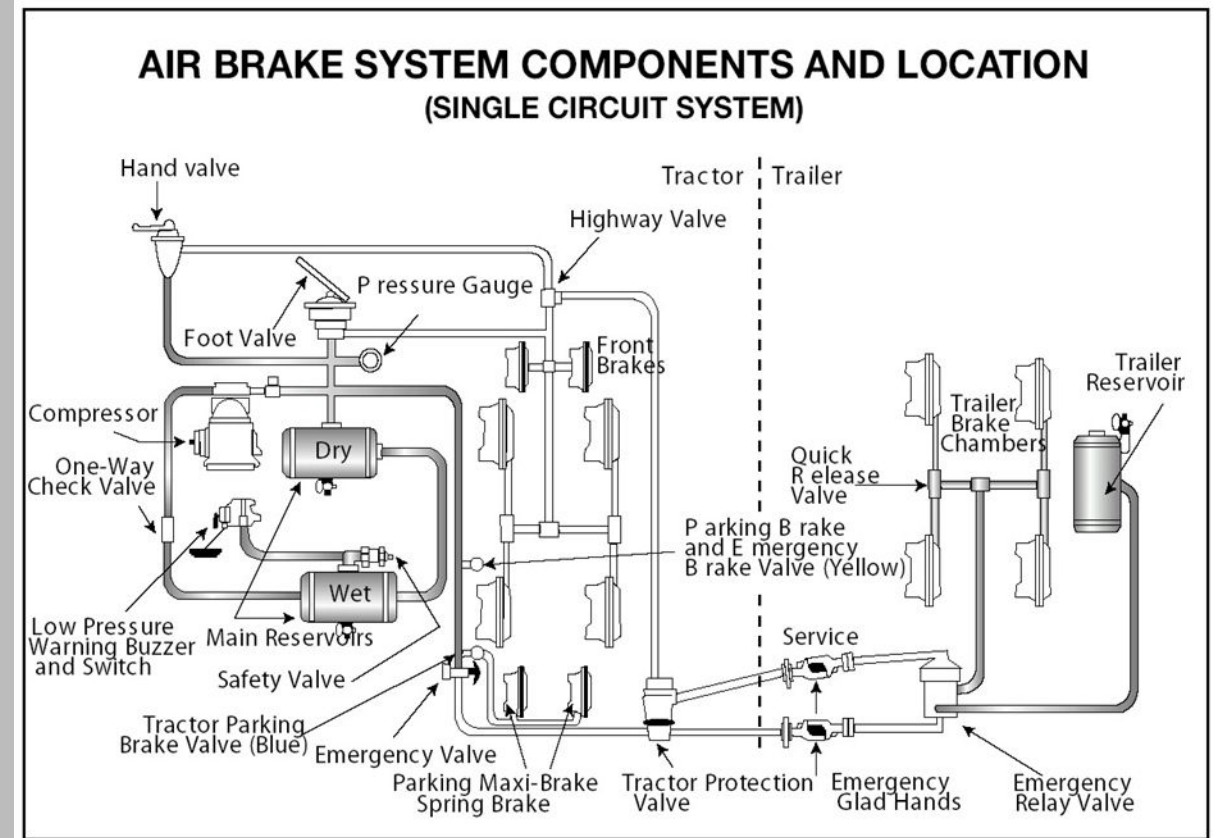
If a slack adjuster moves more than about one inch where the push rod attaches to it, it probably needs adjustment.



Out-of-adjustment brakes are the most common problem found in roadside inspections.

Dual Air Brakes

- A dual air brake system has **one** set of controls, but it has **two** separate air brake systems.
- Before driving, allow time for the air compressor to build up to **100** psi in both the primary and secondary systems.
- Before the pressure drops below **60** psi in either system, a warning light will come on.
 - If this happens, you will need to stop right away and safely park your vehicle, because this means either the front or back braking systems are not operating fully.



Stopping with air brakes

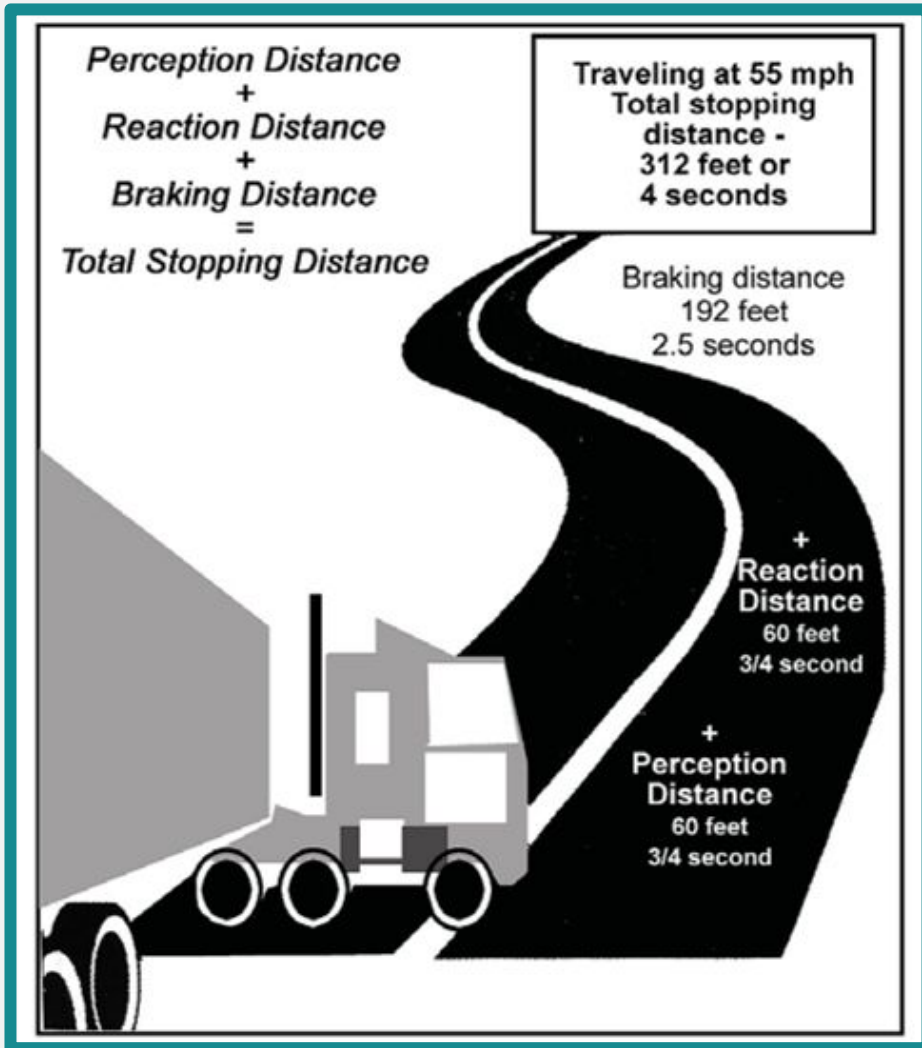


- In normal traffic or conditions, stop as you normally would –keeping in mind that trucks & buses are much larger and heavier than other vehicles and require more time and space to come to a complete stop.

Steep Grades & Emergency braking:

- **Controlled Braking:** Apply the brakes as hard as you can without locking the wheels & keep steering movements very small.
- **Stab Braking:** Apply the brakes all the way and release brakes when wheels lock up. As soon as the wheels start rolling, apply the brakes fully again.

It all adds up to more time....



HEAVY VEHICLE FORMULA

For timed interval following distance

- 1 second required for each 10 feet of vehicle length at speeds under 40 MPH
- Above 40 MPH use same formula, then add 1 second for the additional speed

40 foot truck (under 40 MPH) = 4 seconds

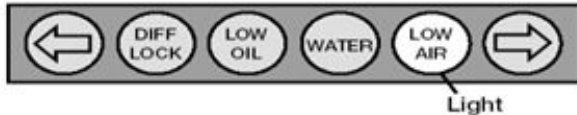
50 foot truck (above 40 MPH) = 6 seconds

60 foot truck (under 40 MPH) = 6 seconds

Low Air Pressure Warning Devices



LOW AIR PRESSURE WARNING DEVICES



LOW PRESSURE WARNING



Some vehicles are equipped with a "Wig-Wag" that drops into the driver's view, and will not stay up in place until the desired air pressure is restored.

DROP ARM "WIG-WAG"

Check that spring brakes come on automatically: step on and off the brake to reduce tank pressure - this should cause the spring brakes to pop on.

Check the rate or air pressure buildup: When the engine is At operating rpms, the pressure should build between 85-100 Psi within 45 seconds in dual air systems

Test air leakage rate: with a fully charged system, (approx. 125 psi), turn off the engine, release the parking brake, and time the air pressure drop.

Brake Fade or Failure

The use of brakes on a long, steep downgrade is only a supplement to the braking effect of the engine.

- **Brake fade** Although brakes are designed to take a lot of heat, they can fail under excessive heat caused by braking too much and not relying on the engine's braking effect. The brakes may start to fade until the vehicle cannot be slowed or stopped.
- **Proper Braking Technique** – Place the vehicle in a lower gear
 - Apply the brakes just hard enough to feel a slow down
 - Reduce your speed to 5 mph below your “safe” speed
 - Repeat until you are safely down the hill



If your “safe” speed is 40 mph, brake until your speed is around 35 mph and gradually increase back up to 40 mph. Repeat this process until you are Safely down the hill.

Parking Brakes



Any time you park, use your parking brakes except...

- When you have just come down a very steep downgrade and the brakes are hot – using the parking brake may cause damage
- The brakes are very wet in freezing temperatures – brakes can freeze together and “lock” in place.

Other Options...

- Chock the wheels to secure the vehicle
- If the brakes are wet, drive slowly using the brakes lightly until they dry off
- **NEVER leave your vehicle unattended without applying the parking brake or chocking the wheels**



Click to advance to quiz. Complete quiz and click submit.

[LINK](#)