**Understanding Brakes:** Air brake systems are used on heavy trucks for safety, efficiency and reliability. One major advantage to an air brake system is that since air never runs out, the air brake system can always be replenished. An air brake system is marginally functional even with a small leak. But don’t read that as; it is safe to drive your mixer with an air leak.

**Three in One:** The air brake system is actually three separate systems - Service Brake, Parking Brake and Emergency Brake. The various components of an air brake system work together to create and maintain a supply of compressed air and convert air pressure energy into mechanical force.

**Service Brake:** This system applies and releases the (service) brakes when the driver pushes/releases the brake pedal. Pushing the brake pedal, opens a valve to let air flow from the air tank through the airlines to a brake chamber. This air forces a pushrod out, which in turn pushes a slack adjuster, turning the camshaft, twisting the S-Cam forcing the brake linings to make contact with the brake drum. This causes friction, which slows the vehicle. One drawback to air brakes is brake lag, which is the time required for air to flow through the lines and force the engagement of the linings to the drum. Though the travel time is less than a second, air brakes do not apply immediately after the driver pushes the brake pedal, as they do in a car.

**Parking Brake:** To park the vehicle, a driver applies the spring brakes by pulling out the yellow valve on the dash. This releases air from the brake chamber which allows the brake spring to expand and forces the pushrod out which pushes a slack adjuster that turns the camshaft, twisting the S-Cam and forcing the brake linings against the brake drum.

**Emergency Brake** brakes are held off by air pressure inside the brake chamber, which holds back a very powerful spring. When there is insufficient air in the system to keep the spring in the chamber restrained, the emergency brakes automatically engage. When air pressure falls below 60 psi, a low pressure warning light will come on along with an audible buzzer. If air pressure continues to fall, the emergency brake will automatically apply when air pressure drops to 20-45psi.

The fail safe engineering of air brakes will not allow you to control activation of the emergency brake so look for a safe place to pull off the roadway as soon as the low pressure warning activates.

Note - Parking and emergency brakes control only the tandem axles.
Supply System Components

The **Air Compressor** pumps air into the air tanks supplying the compressed air to power the air brake system and other air operated devices such as the water tank, Tire Boss, chute lock, tilt hopper, etc. It is lubricated by engine oil and is usually gear driven.

The **Air Compressor Governor** controls when the air compressor will pump air into the tanks. When air tank pressure rises to the set maximum, or the “cut out” level, (around 125 psi) the governor stops the compressor from pumping air. When the tank pressure falls to the “cut in” pressure (around 100 psi), the governor allows the compressor to start pumping again.

An **Air Dryer** helps to keep the system free of contaminants. A filter, typically containing a desiccant, is installed between the compressor and air tank to remove moisture and oil from the air.

**Air Tanks** store compressed air. The tanks will hold enough air to allow the brakes to be used several times even if the compressor stops working. The tractors supply air tank receives air from the compressor and delivers it to the primary and secondary air tanks. The tank closest to the compressor is commonly referred to as the “wet tank” because that is where most moisture condenses.

**Drain Valves** manually or automatically purge the air tanks. Compressed air usually has some water and oil in it, which tends to collect in the bottom of the tank. The water can freeze in cold weather and lead to brake failure. Do not depend on the automatic drain valve – Manually drain the air tanks at the end of each driving day.

The **Air Supply Gauge** on the dash indicates how much pressure is in the air tank.

Note - Brakes out of adjustment are the #1 violation at weigh stations and the leading cause of braking inefficiency in an air brake system. The manual adjustment of an automatic slack adjuster to bring a brake pushrod stroke within legal limits is masking a mechanical problem and not fixing it. The manual adjustment should only be used as a temporary measure to correct the adjustment in an emergency situation as it is likely the brake will soon be back out of adjustment. Manual adjustment of slack adjusters is dangerous because it can give the operator a false sense of security about the effectiveness of the braking system.

**AS A TITAN MIXER DRIVER, YOUR NUMBER ONE RESPONSIBILITY IS DRIVING SAFELY**
Air Brake Test
Ensuring the brakes are in peak operating condition is easily the single most important part of your truck inspection – Your life and the lives of others depend on being able to stop when you need to. The below guide will help you develop a proper routine when completing the daily safety inspection of your mixer truck.

Titan Air Brake Test Procedures
The test must begin with the following assumptions:
1. Air tanks were drained during the previous post trip. Drain valves are closed.
2. Tire Boss equipped trucks - Wheel valves closed. Reopen the wheel valves upon completion of the brake test to allow the system to inflate/deflate as needed.

Air Compressor Build Rate:
✓ Start the engine and allow the air pressure to increase to 85 PSI. When the air pressure gauge reaches 85 PSI, adjust the engine speed to 900 RPMS.
✓ To satisfy this check, the air pressure must reach 100 PSI within 2 minutes

Air Leak Test:
Before starting this check, the air system must be at full system pressure which is usually between 125-140 PSI. Rev the engine to 1200-1400 RPMs and watch the air pressure gauge. When the air system is fully pressurized, the pressure gauge will stop climbing and the compressor governor will kick out followed by a “psssst” air release. Complete the following steps:
✓ Release parking brake
✓ Shut off engine
✓ Depress the brake pedal as you would in an emergency situation and hold the pedal down for the count of one minute.
✓ After the initial drop in air pressure from depressing the brake pedal, the truck must not lose any air as detected by hearing or movement of the air pressure gauge.

Low Air Warning:
✓ Turn the key to the RUN position – Do not start the engine
✓ Fan the brake pedal off and watch the air pressure gauge. The low air warning light on the dash and the buzzer must sound before the air pressure reaches 60 PSI.

Emergency Brake Pop Out:
✓ Turn off the key to stop the low air warning buzzer
✓ Fan the brake pedal while watching the parking brake knob. The knob must pop out before all of the air is bled from the system – Usually about 20 PSI.

Brake Hold or Tug Test:
- Manual transmission – Start the truck. With the parking brake set, and your foot off the throttle, slowly release the clutch. If the brakes are working properly, the truck should not move.
- Automatic transmission Start and rev the engine to 1200-1400 RPMs until the air pressure gauge reads at least 100 PSI. Drive forward at 3-5 MPH and set the parking brake. The truck should quickly come to stop.

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