FACT SHEET

Module 4.1 Braking Systems

BRAKING SYSTEMS

The brake system permits the driver to slow or stop the rotation of the tires. The friction of the tires against the road surface will then slow and/or stop the vehicle. Traction is measured by the ability to stop a car in straight-ahead motion on a wet surface.

Modern vehicles are equipped with two braking systems:

- Dual hydraulic brake system.
- Mechanical brake system (parking or emergency brake).

Good brakes are essential for the safe operation of a vehicle. The life expectancy and performance of a vehicle's brakes depend on how they are used and maintained.
The basic components of a brake system include:

Disc brakes—superior brakes (cool faster) that utilize a pinching action on a metal disc to slow or stop tire rotation of the tire. Disc brakes are usually at the front wheels. The front brakes do 70% of the braking. Disc brakes are available as an option at all four wheels.

Drum brakes—brake shoes push outward on a rotating drum. Because they are enclosed, they retain heat.

Anti-Lock Brakes--- When a driver operating a four-wheel ABS-equipped vehicle steps firmly on the brake pedal, the system automatically modulates the brake pressure at all four wheels, adjusting pressure to each wheel independently to prevent wheel lock-up.

Dual Master Cylinder—brake pedal applies pressure on two pistons that pressurize the brake fluid. The fluid transmits this pressure to each wheel where it activates the disc or drum brake mechanism. A reservoir (sometimes two) supplies extra fluid when needed. The dual systems operate independently in case one should fail.

Brake lines—double-walled steel tubes full of brake fluid that conduct the hydraulic pressure.

Power brake—an engine-activated booster unit that reduces the effort required to apply the hydraulic brakes. The power brake will operate one more time if the engine should stop functioning.

Parking brake—a lever or foot pedal that mechanically (cables and levers) activates the rear brakes only (most vehicles). Can be used for parking and if the hydraulic brakes fail.

Indicator light—comes on if one of the dual hydraulic brake systems should fail or, in some vehicles, if the brake fluid is low. If this occurs, have a service technician check the problem.

Braking distance is the distance a vehicle travels once the brakes are applied. A driver's experience and skill in braking, the kinetic energy of the vehicle, the mechanical condition of the vehicle, and road conditions all come into play. What does this mean?

- A vehicle going 20 mph can stop within 20 feet.
- A vehicle going 40 mph takes 80 feet to stop.
- A vehicle going 60 mph stops at 180 feet.

Notice the vehicle in the last two examples increased by 20 mph each and how much further the vehicle traveled in the braking distance.

Other factors that affect braking distances:

- **Vehicle condition**—a poorly maintained vehicle takes longer to stop.
- **Roadway surface**—rain, snow, ice, dirt, wet leaves, and gravel reduce road traction and increase stopping distance.
- **Hills**—braking distance increases when driving downhill.
- **Loads**—heavy loads increase your braking distance.

Antilock Braking System (ABS)

If the vehicle has ABS, the driver can better control steering while braking. In a hard braking situation, the pedal will vibrate or chatter. This is normal. The driver's foot must stay firmly planted and the pedal depressed to the floor for the ABS brakes to work properly.