

NAPA AUTOMOTIVE CAREER TRAINING

THE AUTOMOTIVE BRAKE SYSTEM

The purpose of automotive brakes is to enable the driver of the car to stop it or slow it down. There is a separate brake assembly in each of the four wheels and they stop the car by applying friction to the rotating wheels. It is like rubbing a stick against the rim of the wheels of a child's wagon.

Two types of brake systems are used in today's automobiles - the drum brake and the disc brake. Regardless of whether the car is equipped with drum brakes, disc brakes, or a combination of the two, they are controlled simultaneously by the driver through a hydraulic system that connects the brake pedal to each of the four wheel brakes.

This hydraulic system also serves another function - it transfers the pressure placed on the brake pedal by the driver to each wheel. To make it easier for the driver to stop the car a power assist mechanism can be added to the brake system. When this is done the car is said to be equipped with power brakes.

On the adjacent page is a diagram of a typical automotive braking system.

HYDRAULIC BRAKES

History of Automotive Hydraulic Brakes

In the 17th century, Blaise Pascal, French philosopher and mathematician, announced the principle of hydraulics; that a liquid in a closed vessel transmits pressure equally in all directions. This principle, as

related to automotive brakes, was not applied until the 1920's. The first car to use a hydraulic brake system was the 1921 Duesenberg. In 1928, Chrysler Corporation adopted and installed hydraulic brakes on their cars. In 1934, General Motors equipped the Oldsmobile with a hydraulic brake system. Within the next six years, all other car manufacturers followed suit, Ford being the last to change in 1940.

Principles of Hydraulics

The word hydraulic as it is used in connection with the brake system refers to the use of a non-compressible liquid as a means of transmitting pressure applied at the brake pedal, through the brake lines to the brake shoes. Pressure exerted at any point upon a confined liquid is transmitted by the fluid equally in all directions. In this fashion, pressure applied by the master cylinder piston causes the hydraulic fluid to be distributed equally to the wheel cylinders.

It is important to recognize that air and other gases are compressible. If air is allowed to enter a hydraulic brake system, it will be compressed when the brakes are applied. The force applied to the master cylinder will then be largely taken up in compressing the air. This leaves little pressure for applying the brakes and results in poor brake performance and a "spongy" pedal.