HYDRAULIC BRAKING

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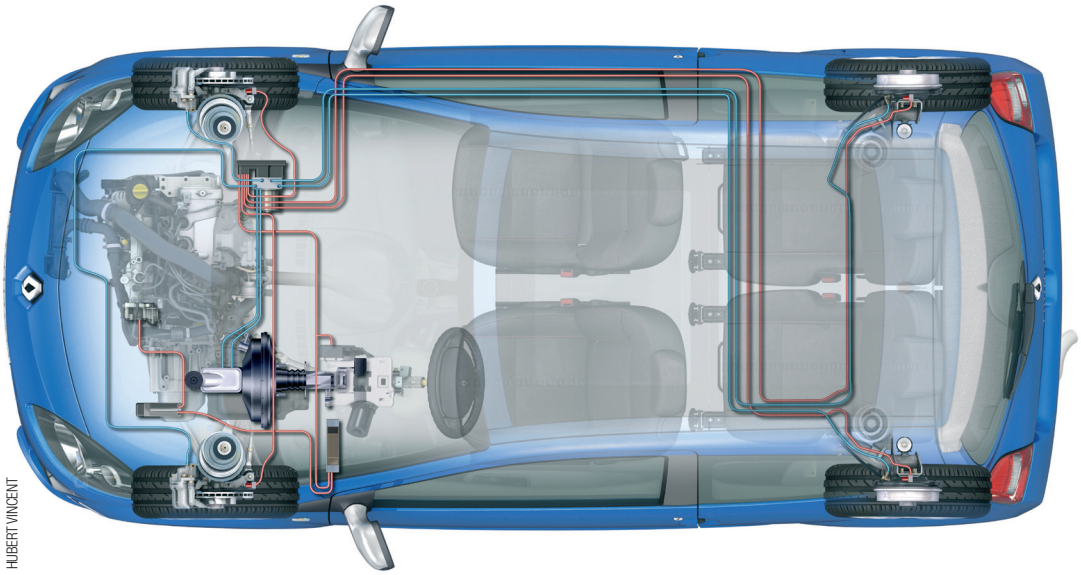
Hydraulic braking constituted a significant advance in comfort and safety.
The principle consists of replacing brake cables by a hydraulic circuit.
As it is easier to act on fluid pressure than on cable tension, **this technology rapidly enabled the appearance of power-assisted braking,** also originally called “servo-brake”, and then complex systems such as ABS and ESC.



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BASIC FACTS

The basic concept of the hydraulic braking system is to replace the cables which originally connected the pedal to the brakes with a hydraulic system containing an oil of very low viscosity. This solution also enables wheel braking to be optimised and balanced. This was a delicate or impossible operation using cable systems. Finally, after the force boosters used in assisted braking, the hydraulic braking system has enabled current systems such as ABS and ESC (see sheets) to be developed. It is much easier for an electronic system to act on fluid pressures by means of solenoids (electronically controlled valves) than to pull on cables.

IN SHORT

IN A HYDRAULIC BRAKING SYSTEM, A FLUID REPLACES THE CABLES TO TRANSMIT THE FORCE EXERTED BY THE DRIVER ON THE BRAKE PEDAL TO THE WHEELS.

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HOW DOES IT WORK?

The heart of the system is the master cylinder. It is this cylinder which compresses the brake fluid when the driver presses on the pedal. It operates similarly to a syringe: compression is obtained by a moving piston. The system includes a special feature which enables automatic adjustment of wear on the brake pads or linings. As these parts wear down, their thickness diminishes. They have to be pushed “further and further” during braking. Again, as it is pistons which command this movement, this means that the quantity of brake fluid contained increases gradually as the wear on the pads or linings increases. Without an adjustment system, the driver has to push the brake pedal further and further to compensate for this wear in order to brake effectively. The automatic wear adjustment system is a response to this phenomenon. The end of the master cylinder, where the piston lies when the brake pedal is fully released, includes a light. It is connected to a small tank of brake fluid. Hence, when the pedal is fully released, the piston gives off light and, if necessary, the braking circuit automatically tops up the fluid.

In order to be effective and above all to ensure proper stability of the rear suspension, braking must be distributed unevenly between the car’s front and rear wheels. Generally, the front wheels carry about 70% of braking and the rear wheels only participate 30%. A pressure distributor follows the master cylinder and adjusts the pressure applied on each suspension. A set of rigid pipes and hoses carry the braking fluid to the wheels. If the wheels are fitted with disk brakes, pistons housed in the callipers move in to tighten the pads. For drum brakes, the principle is identical. The only difference is that here, the pistons operate the jaws.

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