

# 14

## Hydraulic Systems

**T**HE SCIENCE OF HYDRAULICS DATES BACK TO THE SEVENTEENTH century and the French mathematician Blaise Pascal. He noted that the pressure of a static liquid at any given point is the same in every direction and exerts equal force on equal areas. Figure 14-1 illustrates this principle by showing that an incompressible fluid can transmit a force, and more importantly multiply it, anywhere throughout the system.

Most pilots are familiar with the basic hydraulic system that operates aircraft brakes. It is simple, straightforward, and easy to understand, but don't let it fool you. Hydraulic systems can be as beguiling and inscrutable as the most complex electrical systems, and while they won't bite you if you touch the wrong place, they have a nasty habit of making a mess, defying common sense, and going awry at the absolute worst possible time.

### **OPEN VERSUS CLOSED SYSTEMS**

There are two kinds of hydraulic systems: open and closed. Windmills and waterwheels are examples of open systems. The fluid passes by, or through, them and is not otherwise restricted. The force of the fluid causes the windmill or waterwheel to rotate which in turn performs some specific task while the fluid goes on its way.