



Fig. 4-5. *Air inlets of older and newer aircraft cowling.*

Engine Heat Management

As an engine's power increases, so does its heat output. Unfortunately, it often is the case that the times of greatest aircraft engine heat output also are the times least conducive to cooling airflow. Situations such as engine runup, taxi, takeoff, and climb are particular problems for larger engines because the cooling airflow is at its lowest. To permit precise control of engine temperature, such airplanes have a pilot-controlled cowl flap cooling system as depicted in Figure 4-6. This door may be adjusted from the cockpit to aerodynamically control air pressure under the cowling. The lower the pressure (cowl flap open), the greater the airflow through the engine compartment, providing maximum cooling for the engine.

As a pilot, your primary engine concern in flight is to make sure it continues to run damage-free. Excess heat is one of your engine's greatest enemies. The most critical heat-related hazard is damage to, or failure of, a piston, ring, or cylinder head. Therefore, it stands to reason you should be most concerned about the actual temperature of the cylinder and primarily the cylinder head. Unfortunately, most light, single-engine aircraft are equipped only with an oil temperature gauge. While it is true that oil, in addition to lubricating the engine, contributes significantly to cylinder cooling, oil temperature is only an indicator of cylinder temperature. Likewise, the exhaust-gas temperature gauge (EGT), with sensors installed in the exhaust stacks 4 to 6 inches downstream from the cylinders, senses engine exhaust temperature only. Too coarse to measure cylinder-temperature variations, the EGT primarily is a fuel-management device.

The primary instrument for engine heating/cooling reference is the cylinder-head temperature (CHT) gauge. The more sophisticated and expensive (CHT) systems will have a temperature probe for each cylinder, but less expensive, single-probe units still can provide the necessary basic information. If your aircraft is equipped with the more accurate bayonet-type multiprobe system, you will see temperature variations between