



**Figure 3-11.** *Stabilator components.*

### Landing Gear

The landing gear is the principal support of the airplane when parked, taxiing, taking off, or landing. The most common type of landing gear consists of wheels, but airplanes can also be equipped with floats for water operations or skis for landing on snow. [Figure 3-12]

Wheeled landing gear consists of three wheels—two main wheels and a third wheel positioned either at the front or rear of the airplane. Landing gear with a rear mounted wheel is called conventional landing gear.

Airplanes with conventional landing gear are sometimes referred to as tailwheel airplanes. When the third wheel is located on the nose, it is called a nosewheel, and the design is referred to as a tricycle gear. A steerable nosewheel or tailwheel permits the airplane to be controlled throughout all operations while on the ground. Most aircraft are steered by moving the rudder pedals, whether nosewheel or tailwheel. Additionally, some aircraft are steered by differential braking.

### The Powerplant

The powerplant usually includes both the engine and the propeller. The primary function of the engine is to provide the power to turn the propeller. It also generates electrical power, provides a vacuum source for some flight instruments, and in most single-engine airplanes, provides a source of heat for the pilot and passengers. [Figure 3-13] The engine is covered by a cowl, or a nacelle, which are both types of covered housing. The purpose of the cowl or nacelle is to streamline the flow of air around the engine and to help cool the engine by ducting air around the cylinders.

The propeller, mounted on the front of the engine, translates the rotating force of the engine into thrust, a forward acting force that helps move the airplane through the air. A propeller



**Figure 3-12.** *Types of landing gear: floats (top), skis (middle), and wheels (bottom).*

is a rotating airfoil that produces thrust through aerodynamic action. A high-pressure area is formed at the back of the propeller's airfoil, and low pressure is produced at the face of the propeller, similar to the way lift is generated by an airfoil used as a lifting surface or wing. This pressure differential develops thrust from the propeller, which in turn pulls the airplane forward. Engines may be turned around to be pushers with the propeller at the rear.

There are two significant factors involved in the design of a propeller that impact its effectiveness. The angle of a