

trusses, I-beams, tubing, or other devices, including the skin. The wing ribs determine the shape and thickness of the wing (airfoil). In most modern airplanes, the fuel tanks either are an integral part of the wing's structure, or consist of flexible containers mounted inside of the wing.

Attached to the rear, or trailing, edges of the wings are two types of control surfaces referred to as ailerons and flaps. Ailerons extend from about the midpoint of each wing outward toward the tip and move in opposite directions to create aerodynamic forces that cause the airplane to roll. Flaps extend outward from the fuselage to near the midpoint of each wing. The flaps are normally flush with the wing's surface during cruising flight. When extended, the flaps move simultaneously downward to increase the lifting force of the wing for takeoffs and landings.

EMPENNAGE

The correct name for the tail section of an airplane is empennage. The **empennage** includes the entire tail group, consisting of fixed surfaces such as the vertical stabilizer and the horizontal stabilizer. The movable surfaces include the rudder, the elevator, and one or more trim tabs. [Figure 1-7]

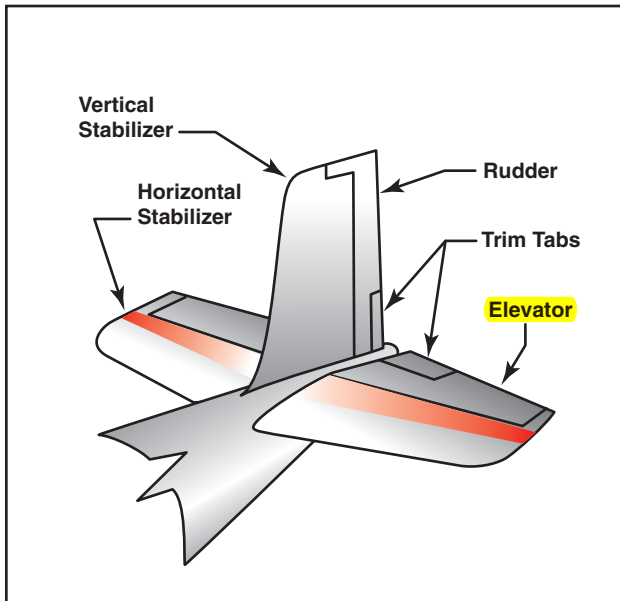


Figure 1-7. Empennage components.

Empennage—The section of the airplane that consists of the vertical stabilizer, the horizontal stabilizer, and the associated control surfaces.

A second type of empennage design does not require an elevator. Instead, it incorporates a one-piece horizontal stabilizer that pivots from a central hinge point. This type of design is called a stabilator, and is moved using the control wheel, just as you would the elevator. For example, when you pull back on the control wheel, the stabilator pivots so the trailing edge moves up. This increases the aerodynamic tail load and causes the nose of the airplane to move up. Stabilators have an antiservo tab extending across their trailing edge. [Figure 1-8]

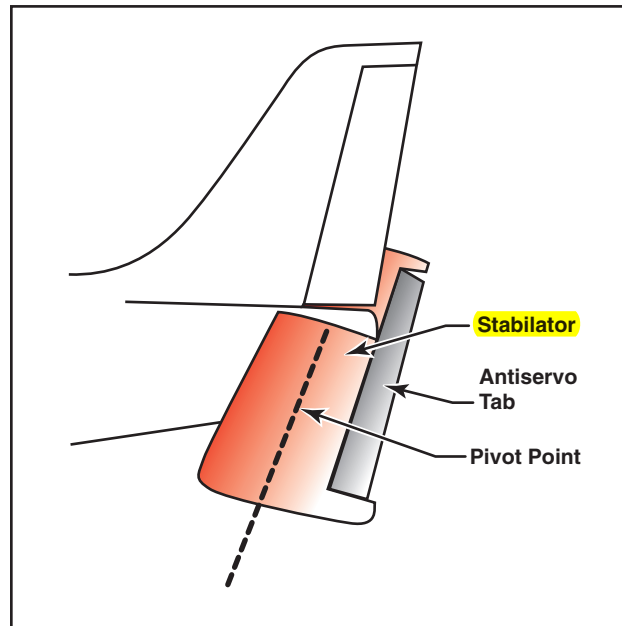


Figure 1-8. Stabilator components.

The antiservo tab moves in the same direction as the trailing edge of the stabilator. The antiservo tab also functions as a trim tab to relieve control pressures and helps maintain the stabilator in the desired position.

The rudder is attached to the back of the vertical stabilizer. During flight, it is used to move the airplane's nose left and right. The rudder is used in combination with the ailerons for turns during flight. The elevator, which is attached to the back of the horizontal stabilizer, is used to move the nose of the airplane up and down during flight.

Trim tabs are small, movable portions of the trailing edge of the control surface. These movable trim tabs, which are controlled from the cockpit, reduce control pressures. Trim tabs may be installed on the ailerons, the rudder, and/or the elevator.

LANDING GEAR

The landing gear is the principle support of the airplane when parked, taxiing, taking off, or when landing. The