First, at the indication of a stall, the pitch attitude and AOA must be decreased positively and immediately. Since the basic cause of a stall is always an excessive AOA, the cause must first be eliminated by releasing the back-elevator pressure that was necessary to attain that AOA or by moving the elevator control forward. This lowers the nose and returns the wing to an effective AOA. The amount of elevator control pressure or movement to use depends on the design of the glider, the severity of the stall, and the proximity of the ground. In some gliders, a moderate movement of the elevator control—perhaps slightly forward of neutral—is enough, while others may require a forcible push to the full forward position. An excessive negative load on the wings caused by excessive forward movement of the elevator may impede, rather than hasten, the stall recovery. The object is to reduce the AOA, but only enough to allow the wing to regain lift. *[Figure 7-33]*

If stalls are practiced or encountered in a self-launching glider, the maximum allowable power should be applied during the stall recovery to increase the self-launching glider's speed and assist in reducing the wing's AOA. Generally, the throttle should be promptly, but smoothly, advanced to the maximum allowable power. Although stall recoveries should be practiced with and without power, in self-launching gliders during actual stalls, the application of power is an integral part of the stall recovery. Usually, the greater the applied power is, the less the loss of altitude is. Maximum allowable power applied at the instant of a stall usually does not cause overspeeding of an engine equipped with a fixed-pitch propeller, due to the heavy air load imposed on the propeller at low airspeeds. However, it is necessary to reduce the power as airspeed is gained after the stall recovery so the airspeed does not become excessive.

When performing intentional stalls, pilots should never allow the engine to exceed its maximum designed rpm limitation. The maximum rpm is marked by a red line on the engine tachometer gauge. Exceeding rpm limitations can cause damage to engine components.

Whether in a towed glider or self-launching glider, stall recovery is accomplished by leveling the wings and returning to straight flight using coordinated flight controls. The first few practice sessions should consist of approaches to stalls with recovery initiated at the first airframe buffet or when partial loss of control is noted. Using this method, pilots become familiar with the initial indications of an approaching stall without fully stalling the glider.

Stall accidents usually result from an inadvertent stall at a low altitude in which a recovery was not accomplished prior to contact with the surface. As a preventive measure, stalls should be practiced at an altitude that allows recovery at no lower than 1,500 feet AGL and within gliding distance of a landing area.

Different types of gliders have different stall characteristics. Most gliders are designed so the wings stall progressively outward from the wing roots (where the wing attaches to the fuselage) to the wingtips. This is the result of designing the wings so the wingtips have a smaller angle of incidence than the wing roots. When exceeding the critical angle of attack results in a stall, the inner wing does not support normal aerodynamic flight, but the outer part of the wing does retain some aerodynamic effectiveness. Wings are designed in this manner so aileron control is available at high AOA (low airspeed) and to give the glider more stable stalling characteristics. When the glider is in a stalled condition, the wingtips continue to provide some degree of lift, and the ailerons still have some control effect. During recovery from a stall, the return of lift begins at the tips and progresses toward the roots. Thus, the ailerons can be used to level the wings.

Using the ailerons requires finesse to avoid an aggravated stall condition. For example, if the right wing drops during the stall and excessive aileron control is applied to the left to raise the wing, the aileron that deflects downward (right wing) would produce a greater AOA (and drag). Possibly a more complete stall would occur at the tip, because the critical AOA would be exceeded. The increase in drag created by the

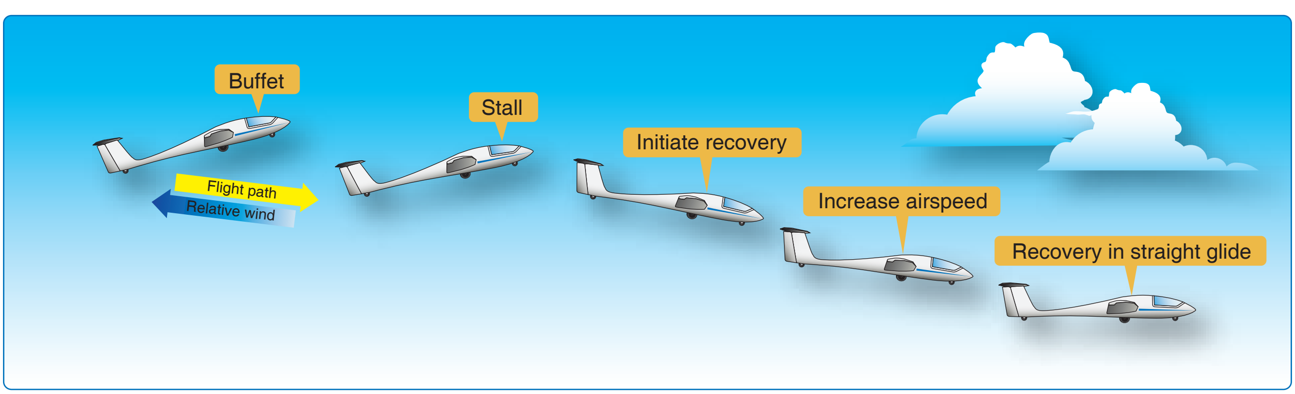

Figure 7-33. *Stall recovery.*