Figure 2-27. Flare on landing typically increases the angle of attack.

Porpoising Creates Variations in AOA

Another slight variation in the angle of attack is the swinging pendulum action of the PPC when high thrust engines provide strong and immediate full thrust of the propeller. This extra thrust swings the cart through the pendulum arc relative to its position under the wing. This is why many times you will see the PPC take off and porpoise until it stabilizes. This is a good example of the dynamic pendulum effect. As the propeller thrust swings the cart out front, the cart peaks then swings back to center. The cart successively swings back and forth, continuing to reduce oscillations until it stabilizes in a climb. This porpoising is most common with a high power engine. This can be eliminated by using gradual throttle increases so as not to create a dynamic pendulum effect entering a climb.

Stalls: Exceeding the Critical Angle of Attack

The critical angle of attack is the angle of attack at which a wing stalls regardless of airspeed, flight attitude, or weight. The drawings in Figure 2-28 show airflow over a typical rectangular PPC wing. The first shows a laminar, smooth, lift-generating airflow—one that is typical when the angle of attack is within the flight range. The second depicts an exceeded angle of attack, turbulence and loss of the lifting force. [Figure 2-28]

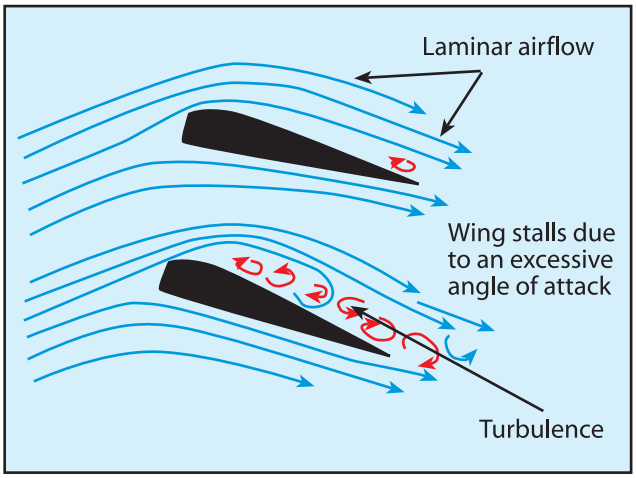

Figure 2-28. Wings stall due to an excessive angle of attack.

Unlike a fixed-wing aircraft that takes constant awareness of angle of attack to prevent a stall, the powered parachute wing is designed by the manufacturers to maintain a specified range of angle of attack and airspeeds. It is resistant to stalls because for all practical purposes, it is designed to fly at a constant normal operating range. This range is maintained if the operator flies within the operating limitations specified in the POH. Flying the PPC within the limitations specified in the POH and avoiding turbulence means you will not exceed the critical angle of attack and stall the wing.

However, situations that could contribute to a stall are:

- A large increase in wing drag (full-flare) — which the PPC pilot controls by pulling the wing back, thus increasing the AOA. (Note: A full-flare is normally used and recommended only for landings.)
- A quick full RPM throttle input, creating a climbing dynamic pendulum effect loading the wing.
- A quick reduction of throttle during a high pitch angle climb. This quickly turns a high pitch climb into a high angle of attack. The wing is initially pitched high, climbing the inclined plane under full power, then quickly changes to a gliding flight path when the throttle is reduced, just like an airplane.
- A wind gust from flying in turbulent air.

To prevent a stall, do not go to full-throttle while holding a full-flare, or as specified in the POH. Note: For explanation of a stall recovery, see Chapter 12: Night, Abnormal, and Emergency Procedures.