

STALLING

In an earlier chapter, we explained the meaning of the term "stalling," and outlined one set of circumstances in which an aircraft might be stalled.

A glider is often being flown at speeds which are within 5 to 10 kts of the stalling speed. It is therefore important for you to be able to recognise the approach of a stall, and if you should stall inadvertently to recover with the minimum loss of height.

It will be remembered that an aircraft stalls when the angle of attack (AoA) of its wing is brought past the stalling angle. This happens in steady flight at the "stalling speed"; under increased loading it occurs at some higher speed.

An aircraft may be accidentally stalled:

- (a) If the speed is allowed to reduce to the "stalling speed" in straight flight.
- (b) If the loading is increased (eg, a turn is commenced) when flying only slightly above the stalling speed.
- (c) As the result of a harsh manoeuvre (eg, an over-enthusiastic pull out from a dive can cause a high-speed stall).

A stall is only a hazard if it occurs at a low altitude, when flying with other gliders, or if it is allowed to develop into a spin.

How to detect the approach of the stall

Some, but not necessarily all, of the following symptoms may be evident:

- the nose attitude higher than normal
- airspeed slow or reducing
- change in airflow noise
- flickering ASI
- "buffeting" of the fuselage and tail (as the air breaks away from the wing)
- changed effectiveness of the flying controls
- unusual stick position for the phase of flight
- high rate of descent

When the glider is stalled, it will sink rapidly. The nose may drop **despite the stick being moved backwards**. This nose-drop despite the stick being moved backwards is a guaranteed sign that the glider is stalled and the pilot needs to promptly take the correct recovery action.

Recovery from a stall

The recovery action if any of the stall symptoms are experienced is to ease the stick forward enough to regain the required airspeed and then return to the normal gliding attitude. If the stick is moved forward too far during the recovery, an unnecessarily steep dive results, and considerable height may be lost. Since the aim is to recover with the minimum loss of height learning the right amount of forward movement for any given stall is very important.

If one of the wings should 'drop' (ie the glider rolls) when you are carrying out a stall, no attempt should be made to 'pick it up' with aileron. As already pointed out, the ailerons are ineffective in a stall, and use of them will make things worse. The correct procedure is to carry out the recovery

from the stall in the normal manner. Only after flying speed has been regained can the wings be returned to the desired angle of bank in the normal way.

Reminding ourselves how the ailerons work will show why they should not be used at the stall. The lowered aileron normally lifts a wing because it is presenting an increased angle of attack to the airflow. If the wing is already at the point of stall, lowering the aileron will merely stall it more.

In addition, the effect of aileron drag will be to cause a yaw in the direction of bank. If this occurs at the stall it may give rise to a spin (see later). You must therefore resist the instinctive tendency to use the ailerons during a stall recovery.

Pre-stalling checks

It is good practice to carry out a thorough check before exercises such as stall, spinning or aerobatics. A mnemonic will help to remind you of the things to check, eg HASSLL;

H Height is adequate for the exercise, the recovery and subsequent flight. Bear in mind the distance from the airfield.

A Airframe: you should know the limiting speeds, especially for any critical configuration such as flaps extended.

S Straps: make sure that the straps are tight.

S Security: make sure there are no loose articles in the cockpit.

L Location: it is preferred to be over open countryside and not over the airfield or local villages and towns.

L Lookout: make "clearing turns" to the left and right to make sure there is no other aircraft below you. (If you circle other gliders may think that you are in rising air and come to join you.)

If a succession of stalls is being carried out, then repeated checks may be required. Your instructor will advise.

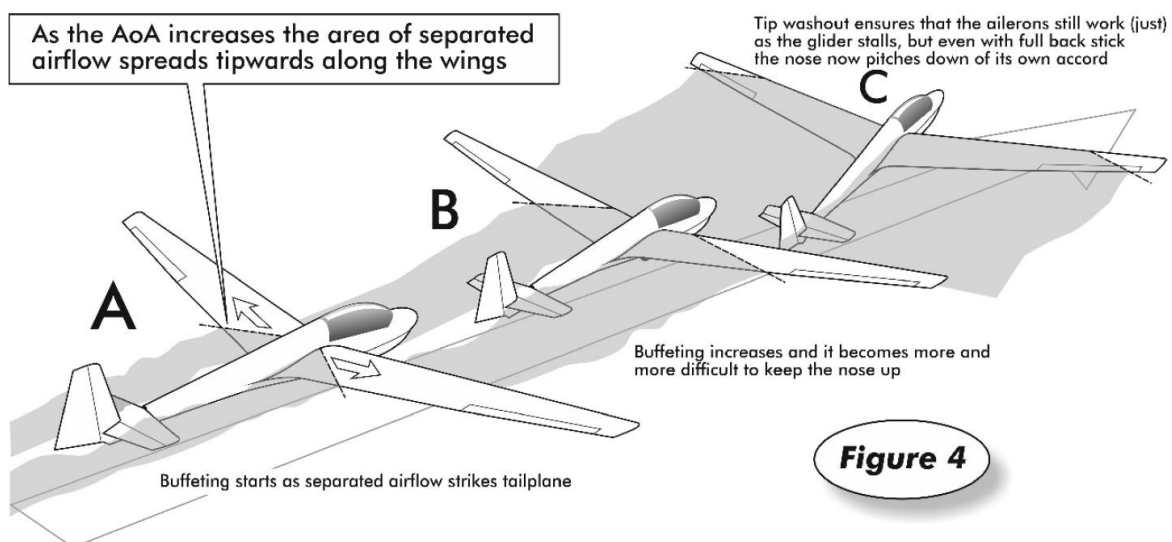


Diagram from the BGA instructor manual showing how as the AoA increases at the stall the separated air causes buffet and spreads tipwards along the wings.