JULY 2022

UK Civil Aviation Authority

LOSS OF CONTROL

STALL & SPIN AWARENESS

SAFETY SENSE

SS30

YOUR SAFETY SENSE LEAFLET FOR:
LOSS OF CONTROL
STALL & SPIN AWARENESS

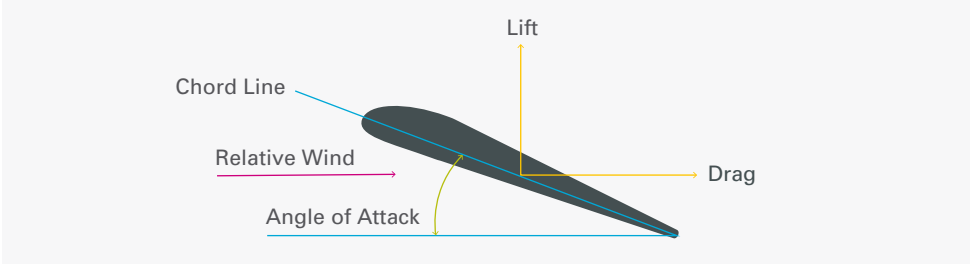
Loss of control through stalling or entering a spin remains one of the leading causes of General Aviation accidents.

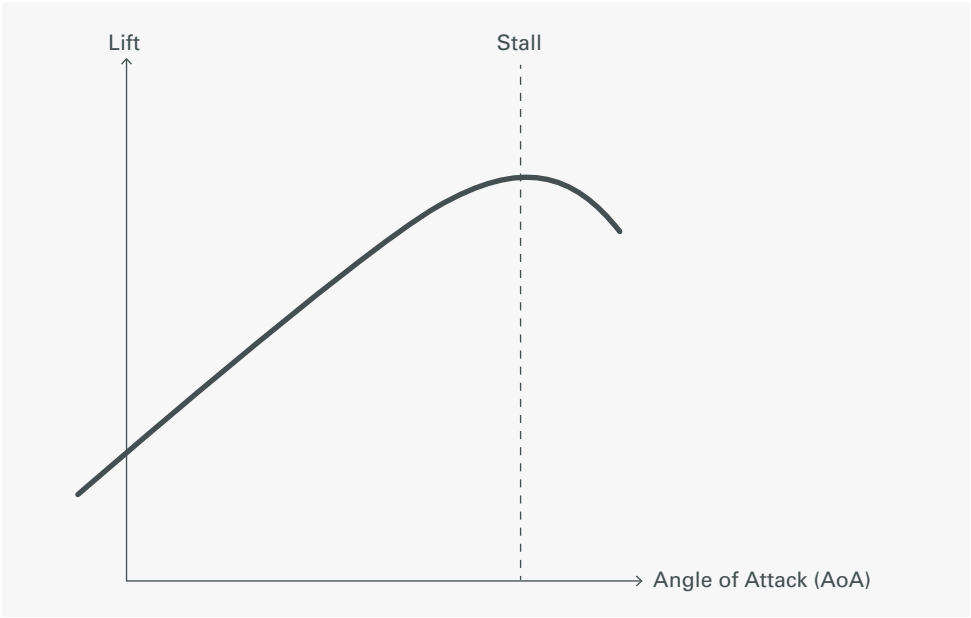
When an aircraft stalls, a spin can develop, which at low level may be impossible to recover from. Pilots therefore must be vigilant for the symptoms of an impending stall and the focus should be the avoidance of a stall condition in the first place.

LOSS OF CONTROL – STALL & SPIN AWARENESS

Aerodynamics of the stall

The aircraft's stall is governed by the angle of attack (AofA) of the wing to the relative airflow and can occur at any flight attitude or airspeed and in conditions of high control force.





Remember that the stall speed will increase by the square root of the load factor (g-load or force). G-loading or 'force' refers to the level of gravitational acceleration the aircraft is experiencing, relative to the normal state of **1g (9.8m/s²)** in unaccelerated flight.

G-loading may increase when manoeuvring the aircraft, for example a level turn with a **60°** angle of bank will generate a **2g** loading and the stall airspeed will increase by **√2 = 1.4**.

If the normal unaccelerated stall speed is **50kts**, the stall speed is now **50 x 1.4 = 70kts**.

Why does loss of control happen?

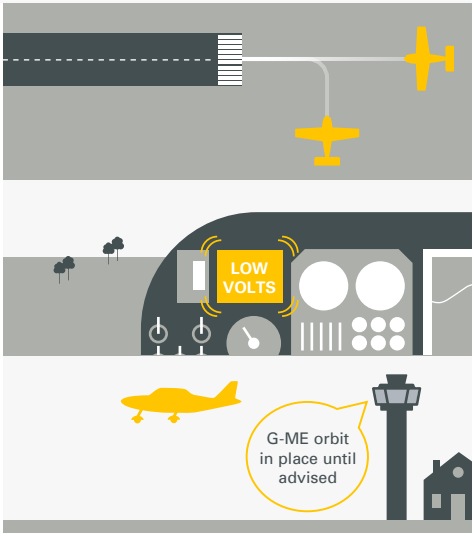
Many accidents involving a stall and loss of control happen at low level. They often occur due to distraction or influence by external factors that draw the pilot's focus away from the core task of flying the aircraft. The aircraft may subsequently lose airspeed and/or enter an inappropriate attitude for the phase of flight. Failing to maintain an appropriate airspeed and flight attitude during takeoff, approach and go-arounds feature in many instances.

Distraction

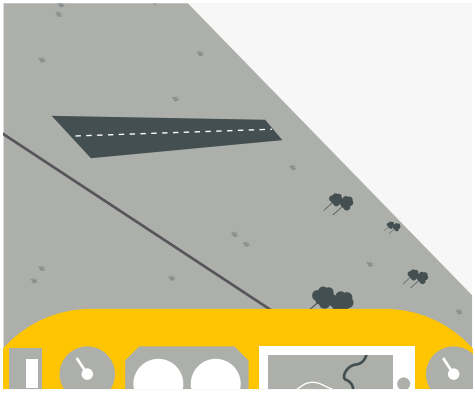
Possible causes of distraction include:

- **Having to slow down and/or manoeuvre around other aircraft in the circuit**
- **A cockpit warning or other aircraft problem**
- **Unexpected ATC instruction**

Whatever the situation, it is important to keep monitoring the flight path of the aircraft. With your attention elsewhere, you may inadvertently apply increased back pressure on the control column, or the aircraft may divert from its intended flight path.



Fixation



In the traffic circuit you may be executing a turn (for example base leg to final) and become fixated on the runway. If the final turn was commenced late, you may be tempted to apply a greater bank angle – unless the pitch attitude is also reduced, the increased bank angle will increase the 'G-loading' and stall speed.

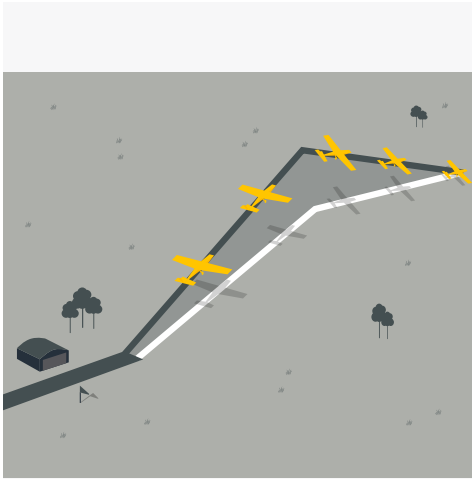
We are all familiar with '**Aviate, Navigate, Communicate'**, but flying requires a constant shift in attention between all three. The most important point is to be constantly aware of the aircraft's attitude and airspeed. Whatever the other demands on your attention are, ensure you return your focus to the aircraft's flight path.

Why does loss of control happen?

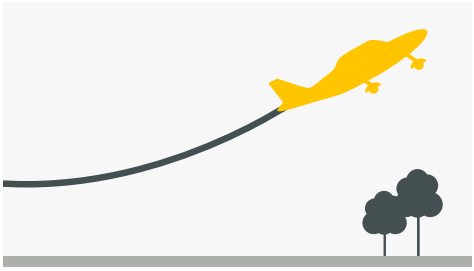
Engine failure on takeoff

On departure the aircraft will have a low airspeed and high nose attitude. An engine failure or partial loss of power will lead to a rapid deceleration and increasing angle of attack. To maintain a safe airspeed and avoid stalling, the pilot must promptly select a lower nose attitude. If the aircraft has already decelerated below the recommended gliding speed, this will initially require a lower attitude than normal.

Stalls are often caused by pilots attempting a 'turn back' manoeuvre to the runway and losing airspeed during the turn and/or trying to 'stretch the glide' to the runway. Maintaining a safe speed above the stall and landing ahead is a much safer option.

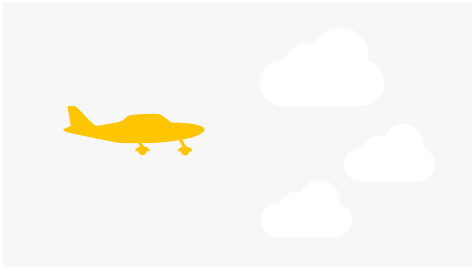


Go around



A go around involves an abrupt change in pitch and power setting which can be disorientating. Even with full power applied it is possible for the airspeed to drop towards the stall. The high power setting will keep the nose attitude high. Monitor airspeed trends and lower the nose as required to accelerate.

VFR flight into IMC



Entry into Instrument Meteorological Conditions (IMC) without holding an instrument rating often results in spacial disorientation and loss of control, including stalling and spinning. Avoid flight in IMC unless qualified. In the event of unintentional entry, maintain focus on the aircraft's attitude indicator and execute a 180° turn to re-establish visual conditions.

LOSS OF CONTROL – STALL & SPIN AWARENESS

Stall avoidance

Stall avoidance is preferable to recovery, so always:

- **Select the appropriate power and visual attitude for the phase of flight**
- **Trim the aircraft so that it maintains the desired attitude and speed**
- **Regularly monitor aircraft attitude and airspeed**

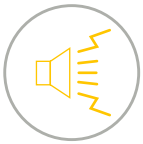
If an external influence or distraction occurs, assess the situation but verify the aircraft's flight path and airspeed before taking further action.

Symptoms of the approaching stall

Increasingly high nose attitude

Reducing airspeed

Possible 'buffet' through controls



Possible stall warning device activation

Note the above symptoms apply during level, unaccelerated flight. During turns and/or higher 'g loading' there may be reduced warnings of the approaching stall.

Pilots should take recovery action as soon as they recognise the signs of an approaching stall, either from a warning system or other indications. If prompt action is taken – for instance when the stall warning device first sounds, the loss of altitude during recovery will normally be minimal.

Developed stall

Airspeed remains low

Nose attitude may drop

More pronounced buffet through controls and airframe

Aircraft may roll and/ or yaw to one side

The controls will feel ineffective

Rate of descent will increase, even if nose attitude remains high

If significant yaw is present, the aircraft may enter a spin. A spin requires considerably more altitude to recover from than a stall, so the focus should be on avoidance.

Training

Even alert pilots may allow their aircraft to approach a stalling condition – it is therefore important for the recognition and recovery actions to be instinctive.

Practice regularly at safe altitudes to keep your handling skills current.

Read and understand the Flight Manual/POH for your aeroplane.

Seek advice from a Flight Instructor if you are unsure of any techniques.

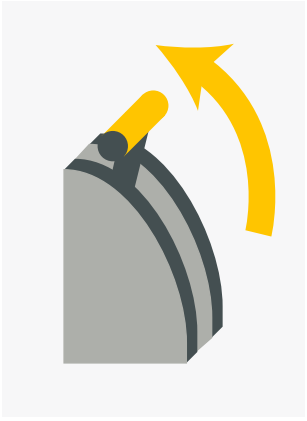
Recovery technique

Be ready to apply immediate recovery action whenever you perceive the aircraft is approaching a stall or not responding correctly. Follow the stall and/or spin recovery technique recommended in the AFM or POH.

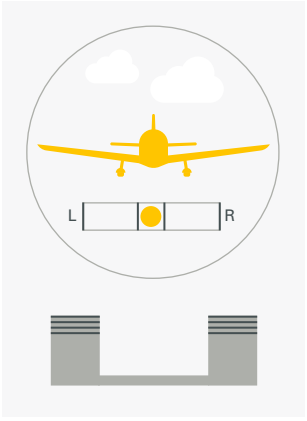
The following is the correct stall recovery technique for most light aircraft:

Move the control column centrally forward to reduce the angle of attack

Apply full power (if available), counter any pitch up tendency



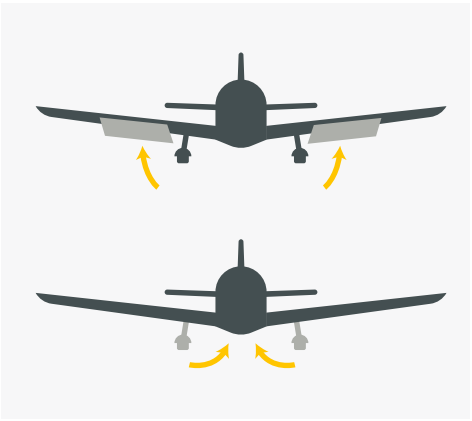
Maintain balance using the rudder, but do not apply aileron until the angle of attack has been reduced



Once the angle of attack has been reduced and the aircraft is no longer stalled:

Level the wings with aileron

Accelerate, retracting flaps/landing gear as required



Once the situation is stabilised, review what happened and why.