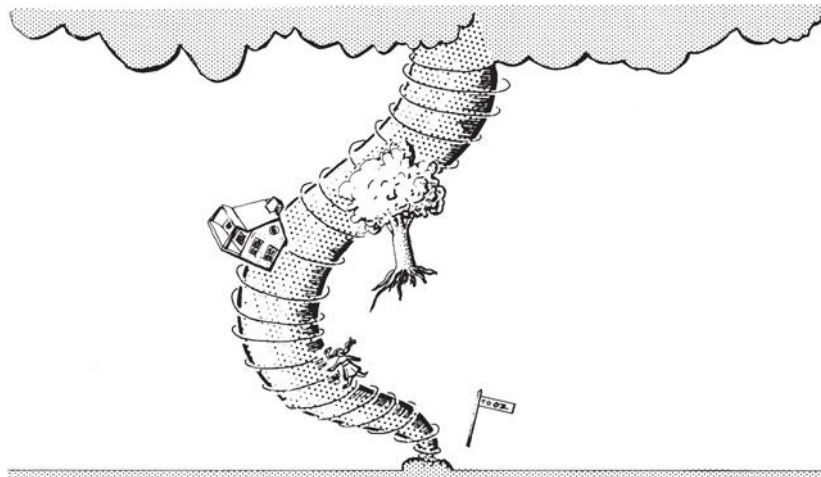


SPINNING



A spin is a condition of stalled flight in which the aircraft makes an uncontrolled descent, losing height rapidly. During a spin the aircraft is moving simultaneously in the rolling, yawing and pitching planes, and it cannot be controlled in the ordinary way until recovery has been made.

Most gliders will spin under the right circumstances, but the form of spin varies. Many gliders will come out of a spin if the controls are centralised, but recovery may be slow. The position of the centre of gravity affects the spinning characteristics of any glider; the further back the centre of gravity, eg, the lighter the pilot, the easier it is to cause a spin, and the slower may be the recovery.

How a Spin Occurs

An aircraft may spin if it stalls with yaw present, or conditions are such that the stall itself will lead to a yawing movement.

If the aircraft is moving in the yawing plane when a stall occurs, the outer wing is moving faster than the inner wing. Consequently, the inner wing will be more stalled, and will drop (ie. roll). As it drops, it meets the airflow at a still greater angle of attack (AoA), and this aggravates the stall.

The aircraft thus continues to move in the rolling plane; the inner wing produces more drag than the outer, because it is at a higher angle of attack, causing the yawing movement to continue. This situation, known as "autorotation", may be quite stable, ie unchanging. Unless the pilot acts, only the ground will intervene.

When you first deliberately spin a glider having been taught by your instructor how to do so, you might wonder how a spin can occur inadvertently. Here's an example of how lack of care on the part of a pilot may bring the aircraft to a condition when an accidental spin is possible. If the aircraft is getting too low, the pilot may be tempted to fly too slowly and may use too much rudder in the final turn rather than turn steeply close to the ground. As the nose drops, the pilot tries to hold it up by using the elevator. When the stall occurs, the aircraft is yawing, and so the conditions are ideal for a spin.

How to Recover from a Spin

At the start of a spin the nose drops (pitches down) sharply because it is stalled and the aircraft starts to rotate because of the increased drag on the down-going wing. It must be emphasised that

the normal instinctive use of the controls at this point may only aggravate the spin. If the ailerons are used to try and level the wings, the down-going wing is further stalled, and the yaw is made worse by the effect of aileron drag; the use of the elevator will not keep the nose up if the aircraft is stalled.

It is extremely important, therefore, that the pilot should learn to recognise the start of a spin and be able to take the proper action to prevent a full spin developing. To recover from a spin:

- Full opposite rudder - to reduce the amount of yaw, and indirectly (as a result of roll coupling) to help pitch the nose down.
- Centralise the ailerons - to reduce the down-going wing's AoA.
- Move the stick progressively forwards until the rotation stops - to unstall the glider, even though the nose is already pointing steeply downwards.
(Note - in powered aircraft it is usual to pause between applying opposite rudder and moving the stick forward. In gliders this is not necessary)
- Centralise the rudder when the rotation stops to prevent a spin in the other direction, and also to prevent high sideways loads on the fin as the speed increases
- Recover from the ensuing dive

Practice Spins

As mentioned above, it is important that you should be able to recognise the start of a spin and take the appropriate corrective action. This involves learning how to recognise and recover from spins in a number of scenarios. Practicing spinning is nothing to worry about. Your instructor will show you everything you need to know, including carefully checking that adequate height is available.

The HASLL checks mentioned in the stalling section of course apply here too.

Always refer to the Aircraft Flight Manual to ensure that you are aware of in-flight limitations.

If you feel uncomfortable when experiencing spin training, please tell your instructor. He or she will completely understand and adapt the lesson accordingly.

Why Spin Training?

The speed at which the glider achieves its minimum rate of sink is quite low, so a glider is often being flown at speeds which are within 5 to 10 kts of the stalling speed. This is quite unlike powered aircraft that usually operate at speeds significantly higher than their stall speed.

Your spin training is vitally important as it will equip you to recognise a potential stall/spin situation and to avoid the associated loss of control. If one day you do find yourself in a glider that has departed into a spin, your training will have taught you to recognise what is happening and how to recover the glider back to controlled flight with minimum loss of height.

End.