Spin training in Canada

The leading cause of soaring fatalities in Canada is due to the stall/spin.

- Many spins in single seat gliders have been fatal. Why? Spinning too low for recovery? Inadequate understanding or technique? Inadequate training?
- Surprise can lead to stress reactions: the aircraft responds differently than you expect and adrenaline increases heart rate to the point that the pilot has an inability to concentrate, or an inability to physically move the controls.

FTSC has recommended a three pronged approach to spin training in Canada.

AWARENESS

AVOIDANCE

RECOVERY

Awareness: understanding the dynamics of the spin and the 15 spin scenarios identified by the OSTIV Training Safety Panel. You should be able to identify them. By knowing how pilots have gotten into stall/spin scenarios you can avoid these scenarios or approach them with caution. Familiarity and practice with these scenarios will help reduce stress reactions.

Avoidance: a spin requires an aerodynamic stall and a yaw component (loss of lateral dampening). Being able to sense an approaching stall and lowering the nose will prevent the stall from occurring in most situations. If you do stall, recovering from the wing drop stall will prevent the spin. To recover from a wing drop stall immediately lower the nose to reduce the angle of attack, level the wings normally and recover from the dive.

Recovery: if the rotation has developed sufficiently and the wing drop recovery is not effective, use the spin recovery method from the POH/AFM if different from the standard method. The standard spin recovery is (as outlined in SAC training materials) which is based on CS-22. Practice for minimum height loss, and prevent stress reaction with stress inoculation using Scenario Based Training exercises.

The standard recovery method in SAC manuals: centralize the ailerons, and apply **full** rudder against the rotation of the spin; pause – only a short pause of about one second is needed; move the stick **steadily forward** until the **rotation stops;** centralize the rudder; ***look up*** and pull out of the dive. Start the pull-up earlier before the speed starts to build up excessively.

Technique Notes:

- The words "**full rudder"** instead of **"**opposite rudder" has been added to SAC manuals to emphasise that the rudder should be against the mechanical stop, against (opposite) the rotation of spin. Also emphasis is on "direction of rotation" vs position of rudder. Many pilots underestimate the amount of force this may require. The pilot seating position should be set such that the knees are slightly bent so that the quadriceps muscle can be engaged during the rudder push and not using only the calf muscle. In a two seat glider, another pilot's feet on the

pedals may be enough interference to prevent full rudder. If rotation does not stop when you move the stick forward, you likely don't have full rudder or have brought the stick forward too soon and blanked the rudder, or didn't center the ailerons immediately, or the C of G may be too far aft. Repeat the recovery sequence with stick all the way back when you center the ailerons and use more rudder force (leaning forward if necessary).

- The "pause" in CS-22 is implied by the word "sequentially" so that applying opposite rudder is done before moving the stick forward. The word "pause" in SAC manuals was added to emphasise that rudder must be applied (with ailerons centered) before moving the stick forward.

- The stick movement forward should only be enough to stop the rotation. Should rotation stop at any time the aircraft will be un-stalled and the recovery from the dive should be immediate, moving the stick forward beyond this point will only steepen the dive angle and possibly invert the glider, hence the CS-22 reference to "ease" the stick forward. However, the stick may also have to go all the way forward to stop the rotation depending on weight and balance and particular design of glider.

- The normal pull out of the dive is achieved by "**looking up"** at the horizon, with wings level to prevent non symmetric stress on the wings (ailerons not centered), and raising the nose **smoothly** (CS-22 uses the term ease) and reacting early enough to prevent high airspeed build up is critical. It is better to increase the wing loading to 3-4 g while the airspeed is lower rather than attempting later when the airspeed is higher. The old practice of using the dive brakes to limit speed in the recovery is to be avoided, as it can overstress the outer wing sections.

- Not centering the rudder during the recovery from the dive can lead to a spin in the opposite direction.

- Soft seat back cushions have prevented full rudder from being applied as pilot compresses them. In addition, pilots have leaned back in steep nose down spins on soft cushions preventing stick forward despite arm fully extended. Spacer cushions must be made with hard materials such as denser upholstery foams or harder materials, not soft foam.

- Low altitude spins must be avoided by flying at the minimum approach speed below 500' agl. FTSC recommends the formulas (1.3 x Vs + Vw for basic two seat trainers and 1.5Vs +½Vw + Vgust for higher performance single seat gliders) only if the approach speeds are not specified in the POH.

- Expect low level wind shears that might stall a wing when surface winds exceed winds aloft or major changes in wind direction, terrain elevation changes are evident, tree lines or buildings are present that may disrupt the airflow. Upslope winds in mountains have had similar effect creating abrupt angle of attach changes to stall the wing.

- If your glider is not approved for intentional spins you can get a Puchacz type spin checkout or other two seat glider with similar spin characteristics to most single seat gliders, as it will prepare you for inadvertent spins in your own glider. Incorporate adequate spin recovery training as part of you spring or annual checkouts.

Spin Scenarios : You should be familiar with these 15 scenarios . You can familiarize with the higher risk scenarios on a simulator:

- Final turn onto approach
- Thermalling (inside turn spin)
- Thermalling (outside turn spin)
- Climbing turn into thermal from high speed entry
- Attempting to center a thermal core
- Contest finish or low pass over terrain
- Pear turn on final to runway centerline
- Rope break on tow/winch launch interruption
- Wing drop stall recovery (spin opposite direction)
- Spin off of secondary stall
- Opposite spin from spin recovery
- Abrupt direction change in circuit
- Abrupt direction change in thermal
- Low altitude circling of landmark
- Low altitude turn illusions created by drift