SSF Soaring Safety Foundation

The dreaded Stall/Spin Accident
By Richard Carlson – SSF Chairman

We have all heard the words, 'He stalled and spun the glider". Why do these two words "stalls" and "spins" strike such fear and foreboding into a large number of pilots? Is it because they don't understand the aerodynamic forces acting on the glider? Is it because the maneuver seems chaotic and it can be disorienting? Is it because they don't know how to fly the glider out of a stall or spin? What ever the cause, like them or not, stalling and spinning a glider close to the ground is one sure way to shorten your soaring career.

According to the data recorded in the National Transportation Safety Board's (NTSB) aviation database, there were 305 non-fatal and 69 fatal accidents between November 1, 2001 and October 31, 2013. This means that 18.45% of the 374 total number of accidents resulted in fatal injuries to at least 1 person. Looking closer at these fatal accidents the NTSB concluded that a stall/spin was the causal factor in 27 of the (39.1%) of these accidents, 10 (14.5%) were a loss of control, and 9 (13.0%) were controlled flight into terrain.

Clearly not every stall or spin results in a fatal accident. Glider pilots routinely practice stall/spin recognition and recovery during primary training. Most pilots will also receive recurrent training during flight reviews. No, to make these stall/spin accidents fatal they must begin when the glider is operating close to the terrain.

When do we operate close to the terrain? Obviously during the take-off, and landing we are forced into this position. It can also happen if we attempt to make a low altitude save or we operate in mountainous terrain. Again just operating close to the terrain isn't enough to get us into a stall or spin. It is operating at a high angle of attack that will lead to a stall, it is stalling the glider in an asymmetric yaw condition that will lead you into a spin.

So if the glider is capable of stalling and yawing, it is capable of spinning. The question then is what is the pilot doing with the flight controls that leads to this stalled/yawed condition? The answer is, that typically depends on which phase of flight (launch, cruise, or landing) the glider pilot is operating in.

During launch the stall/spin accident begins shortly after a low-altitude release. Either the rope breaks, or, more likely, the glider pilot pulls the release because the glider is out of position. For the past 50 years or so it has been commonly accepted that under most conditions the glider pilot can perform a 180 deg turn from something above 200 ft AGL and land downwind on the take-off runway. We practice this maneuver and teach it to students.

The problem is, that some pilots get impulsive and the instant the rope is gone they slam the stick to the right and begin a steep coordinated turn to head back to the runway. As we all know, the steeper the bank angle the higher the stall speed. In their rush to get the glider into the turn the pilot fails to establish a pitch attitude that will keep the glider flying. So the airspeed starts to decay as the bank angle increases. At some point the glider exceeds the critical angle of attack and it stalls. Being in a turn the moment the lower wing stalls the drag on that wingtip increases. That action provides the yawing motion needed to start the spin. Being surprised and near 200 ft, the usual result is the glider strikes the ground in a nose down attitude. Notice that the nose of the glider never goes above the horizon, and there is little or no warning when the stall/spin occurs.

The way to prevent this accident is to develop a different reaction to the rope break. The immediate reaction is not to turn, but to lower the nose and establish a pitch attitude that will keep the glider flying. Then take a second or two and think about what to do next. A minute ago you just went through a set of options about what to do if the rope broke. Take a second or two now and think about what you said you would do. Now smoothly move the stick and rudder pedals to put your plan into action.

As I tell my students, after establishing the proper pitch attitude 'wind your watch'. A quick look at your gliders polar will confirm that you have plenty of time to think! Even the venerable Schweizer 2-33 is losing less than 5 feet per second at 60 mph. If you can't afford to lose 10 or 15 ft while you think about things you can't afford to turn anyway. Land straight ahead! Making sure the glider has enough speed to safely make a turn will make it harder for you to become a fatal launch accident statistic.

Now that you have the theory go practice the recovery procedures at a safe altitude with your instructor until you become proficient at recognizing and recovering from the launch stall/spin accident. Next month we will examine the landing and cruise stall/spin accident scenarios. While the outcome is the same, the stall entry is different.