FAASTeam
Safer Skies Through Education

FAA Aviation Safety

Stall, Spin, and Upset Recovery Training

Through its research on general aviation accident data, the General Aviation Joint Steering Committee (GAJSC) suggests that proficiency training and education in aircraft stalls, spins, and upsets, including unusual attitudes, can help reduce the incidence of Loss of Control (LOC) and associated accidents. The information provided here will help pilots understand and recognize what an aircraft upset is and explore ways to mitigate, recover and be more proficient in these situations.

What is an Airplane Upset?

An airplane upset is defined as an airplane in flight that unintentionally exceeds the parameters normally experienced in line operations or training. In other words, the airplane is not doing what it was commanded to do and is approaching unsafe parameters.

While specific values may vary among airplane models, the following unintentional conditions generally describe an airplane upset:

- Pitch attitude greater than 25 degrees, nose up
- Pitch attitude greater than 10 degrees, nose down
- Bank angle greater than 45 degrees
- Within the above parameters, but flying at airspeeds inappropriate for the conditions

Understanding Stalls, Spins, and Unusual Attitudes

There are many factors that can cause or contribute to an airplane upset, including flight control or systems issues, weather or turbulence, and improper control inputs. Learning how to recognize these factors, as well as having a better understanding of how and why an aircraft stalls, can go a long way towards preventing a loss of control accident.

It is important for the pilot to understand that a stall is the result of exceeding the critical angle of attack (AOA), not of insufficient airspeed. The term “stalling speed” can be misleading, as this speed is often discussed when assuming 1G flight at a particular weight and configuration. Increased load factor directly affects stall speed (as well as do other factors such as gross weight, center of gravity, and flap setting). Therefore, it is possible to stall the wing at any airspeed, at any flight attitude, and at any power setting.

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Every year, stall/spin accidents account for an alarming number of GA accidents. A majority occur in the traffic pattern and most of the rest involve maneuvering — usually operating too slow and too close to the ground for recovery. To prevent these types of accidents, it's important for pilots to have upset prevention and recovery training (UPRT), which helps equip them to promptly recognize an escalating threat pattern or sensory overload, and quickly identify and correct an impending upset. Part of this training should include practicing certain stick-and-rudder skills like slow flight, stalls, spins, and unusual attitudes.

A stall is an aerodynamic condition which occurs when smooth airflow over the airplane's wings is disrupted, resulting in loss of lift.

When practicing slow flight — an excellent exercise to get you in tune with your airplane — you'll want to configure for an airspeed at which any increase in angle of attack, load factor, or reduction in power, would result in a stall warning. During stall training, practice with power on and off, in turns, and with cross controls, always recovering to controlled flight at a pre-determined altitude. During unusual attitude training maneuvers, note your pitch attitude. Are you nose-high with decreasing speed? Or are you nose-low with speed rapidly increasing? Know and practice the appropriate recovery steps for each of these scenarios. With these skills under your belt, you may consider getting some spin training and/or aerobatic training to help fine tune your airplane upset recovery skills even more.

"Developing stick-and-rudder skills to the point where the mechanics of flying become automatic will give you the confidence to respond correctly to an impending LOC," says Master Instructor Rich Stowell, who specializes in spin and aerobatic training.

Where Can I Get Stall, Spin, and Unusual Attitude Training?

A good place to start is with the International Aerobatic Club, the National Association of Flight Instructors, and the Society for Aviation Flight Educators. These organizations can provide you with a list of aerobatic flight instructors in your area. Even if you don't want to do any maneuvers except stalls and spins, aerobatic flight instructors are a great option. They will have hundreds of hours teaching spins, and they'll know where to rent aerobatic airplanes in your area.

Be sure to also leverage the FAA's WINGS Pilot Proficiency Program to sharpen your upset recovery skills. You can work with an instructor to build realistic, relevant, and unexpected scenarios to help you better analyze and resolve an impending upset.

Finally, be sure to check out all the excellent resources listed below to help better your understanding of upset prevention and establish a foundation for development of situational awareness, insight, knowledge, and skills.

Resources

Airplane Flying Handbook, Chapter 5, Maintaining Aircraft Control (PDF)

Hands Off!: Preventing Stalls with the Proper Use of Trim, Mar/Apr 2014 p. 13 (PDF)

Stall? Who, Me?, Mar/Apr 2014 p. 27 (PDF)

Keeping an UPRighT Attitude, Mar/Apr 2012 p. 15 (PDF)

Don't Get Upset!, Mar/Apr 2012 p. 26 (PDF)