Attention

I can't cause a stall when I have full throttle…right?

Objective

To understand how stalls happen, how to prevent them, and how to recover if they do happen.

Schedule

Ground instruction – 10 minutes

Reference Material

Airplane Flying Handbook FAA-H-8083-3B
Boldmethod.com

What

A stall is an aerodynamic condition which occurs when smooth airflow over the airplane's wings is disrupted, resulting in loss of lift. Specifically, a stall occurs when the AOA—the angle between the chord line of the wing and the relative wind—exceeds the wing's critical AOA. It is possible to exceed the critical AOA at any airspeed, at any attitude, and at any power setting.

Material

Impending Stall - an impending stall occurs when the AOA causes a stall warning, but has not yet reached the critical AOA. Indications of an impending stall can include buffeting, stick shaker, or aural warning.

Full Stall - a full stall occurs when the critical AOA is exceeded. Indications of a full stall are typically that an uncommanded nose-down pitch cannot be readily arrested, and this may be accompanied by an uncommanded rolling motion. For airplanes equipped with stick pushers, its activation is also a full stall indication.

Stall Recognition

A pilot must recognize the flight conditions that are conducive to stalls and know how to apply the necessary corrective action. This level of proficiency requires learning to recognize an impending stall by sight, sound, and feel.

Feel - the pilot will feel control pressures change as speed is reduced. With progressively less resistance on the control surfaces, the pilot must use larger control movements to get the desired airplane response. The pilot will notice the airplane's reaction time to control movement increases. Just before the stall occurs, buffeting, uncommanded rolling, or vibrations may begin to occur.

Vision - since the airplane can be stalled in any attitude, vision is not a foolproof indicator of an impending stall. However, maintaining pitch awareness is important.

Hearing - as speed decreases, the pilot should notice a change in sound made by the air flowing along the airplane structure.

Kinesthesia - the physical sensation (sometimes referred to as “seat of the pants” sensations) of changes in direction or speed is an important indicator to the trained and experienced pilot in visual flight. If this sensitivity is properly developed, it can warn the pilot of an impending stall.

Fundamentals of Stall Recovery

Depending on the complexity of the airplane, stall recovery could consist of as many as six steps. Even so, the pilot should remember the most important action to an impending stall or a full stall is to reduce the AOA. There have been numerous situations where pilots did not first reduce AOA, and instead prioritized power and maintaining altitude, which resulted in a loss of control. This section provides a generic stall recovery procedure for light general aviation aircraft adapted from a template developed by major airplane manufacturers and can be adjusted appropriately for the aircraft used.

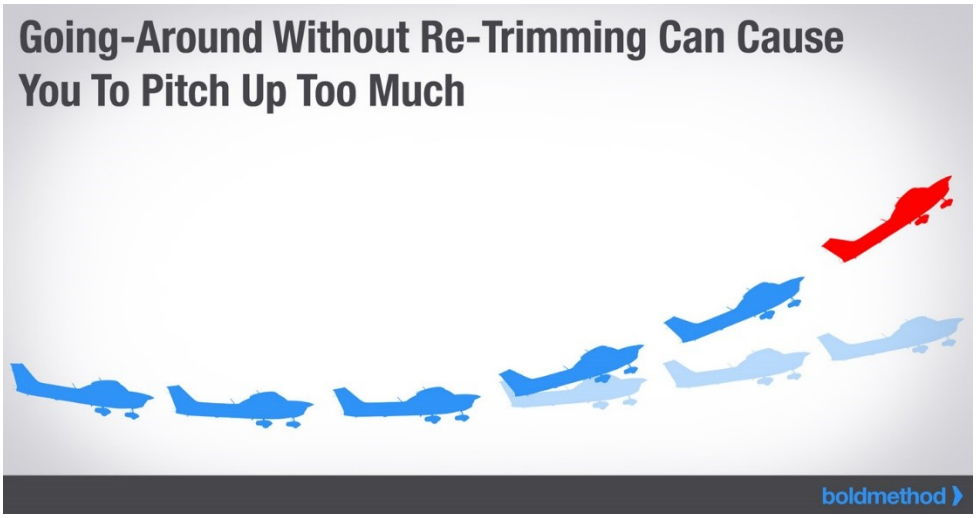
Basic steps:
Disconnect the wing leveler or autopilot.
Pitch nose-down control.
Trim nose-down pitch.
Level wings.
Add thrust/power.

Times a Stall is Likely

Takeoff – If you pull back the controls way too far, way too quickly. If for some reason you are not using full throttle, and you pitch too high. If you are doing a short field takeoff, and you try to take off too soon.

Landing – You are already coming in slow and for some strange reason you decide to pull back more.

Going around - When you throttle up for a go-around, you have aerodynamics working against you. On final approach, you're trimmed for landing speed, which is almost always slower than Vy (or Vx for that matter). When you add full power and your airplane starts accelerating, it starts pitching up too.


Going-Around Without Re-Trimming Can Cause You To Pitch Up Too Much
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