EAA Chapter 100
November 2016 Newsletter
http://eaa100.org

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EAA Chapter 100 is a nonprofit association involved in the promotion of aviation through adult and youth education, hands-on training, building and maintenance of experimental aircraft, and through community awareness programs.

Reader submissions and comments are strongly encouraged.

EAA Chapter 100 Upcoming Events:

- **IMC Club Meting**
  - November 9th
  - 1900L to 2000L
  - Autopilot Failure in the Soup
  - RST Terminal Building.
  - Click here for details and to sign up.
  - During this hour-long event we will discuss different ideas on handling an IMC situation where an autopilot failure happened and what decisions had to be made. Considering: Peer Pressure, Mind Set, Get-There-Ites etc. We will discuss how each of us would have handled a similar type situation in our own aircraft. The idea is to gain knowledge by thinking about potential IFR problems and listening to fellow pilot's ideas.
  - Attendees will receive 1 Wings Credit for Basic Knowledge, Topic 3
  - http://eaa100.44rf.com/imcclub/imcclub.htm

- **Chapter 100 Meeting**, Friday November 11th 1900L. Dodge Center Airport.
  - November starts the Chapter's winter schedule.
  - The program will consist of information and discussion on the new Volk airspace, when to avoid and ways to stay safe in special use airspace, as well as what goes on in that airspace. We will also discuss ADS-B airspace, Class A, B, C, D, E, G and other restrictive airspace. Attendees will receive ½ a FAA WINGS credit for advanced knowledge topic 2.

- **Chapter 100 Business Meeting**, Tuesday November 29th 1830L. Byron Bears Den. Everyone is invited but only current members can vote.

Chapter 100 Business Meeting Minutes:
The Sept. 27, 2016 Business Meeting was brought to order at 1830 by President Jeff Hanson ; 8 members present. There were 2 agenda items; Tool Policy and Hangar Lease Termination Notice.

With the caveat of "Keeping things simple ", both items were unanimously approved as follows:

- **Chapter Tool Policy**
  - Chapter tools are for member use only.
  - Tools are expected to be returned in the condition in which they were checked out.
  - Tools are to be checked out for a maximum of 30 days.
  - Tools must be checked back in before they will be made available to the next member.

- Members will check tools in and out through the tool coordinator or a chapter officer in the “tool Coordinator’s absence. Gordy Westphal has agreed to serve as the chapter tool coordinator as he has regular access to the tools at TOB. A “Tool Coordinator” position will be added to the “Chapter Leaders” on the left side of newsletters including a new email address of ToolCoordinator@EAA100.org..
- The tool inventory will be posted on the cabinet at TOB. We also talked about making it available in hard copy for any member that wants it as well. The goal is to try to encourage members who want to use chapter tools to be active chapter members as well and if somebody outside the chapter wants access to them, that the conversation should first start with "How can I become a member of the Chapter?"

- **Hangar Tenant Lease Termination Notice**
  - The required hangar tenant lease termination notice was amended from 90 to 30 days’ notice.

- The meeting was adjourned by 19:30

- We then reminded all about our next Membership Meeting, Oct. 8th at KTOB. Wayne Trom will host with his annual Open House and Art Howard will present about his multi - week flying trip to Alaska.

Respectfully Submitted, Tom Hall - Secretary / Treasurer
PS - Looks like the Chapter’s hangar is full again. Greg Edlund will “stay through the winter “. Tom T.

New “Slow Flight” procedures for training and testing: Read more here
The FAA has issued a Safety Alert reminding instructors, students and other general aviation pilots that the advised procedure for practicing slow-flight maneuvers has changed. The FAA’s new advice intends to correct “inconsistencies” in the previous standard for maneuvering during slow flight, as outlined in the Airplane Flying Handbook published in 2004, and the latest Private Pilot Airplane Test Standards, which took effect on June 15. The 2004 AFH advised students to practice the slow-fight maneuver at “the slowest airspeed at which the airplane is capable of maintaining controlled flight without indications of a stall—usually 3 to 5 knots above stalling speed.” Yet for most Part 23 airplanes, the stall warning would be activated at those speeds, which is considered an indication of a stall. The new test standard says private pilots should demonstrate slow flight at 5 to 10 knots above stall speed, or just above the stall-warning threshold, and recover before the warning activates.

“Advocating maneuvering the airplane just below the critical angle of attack with the stall warning activated is neither desirable nor intended,” the FAA says. The revised evaluation standard requires the pilot to maintain a speed referenced to the 1G stall speed. One way to set up for the maneuver is to slow the airplane to the stall warning in the desired configuration and note the airspeed. Next, pitch down slightly to eliminate the stall warning, adjust power to maintain altitude and note the airspeed required to perform the slow flight maneuver in accordance with the standard, the FAA said.

Links:

- A very good Aircraft Engine pamphlet… Great source for engine FAQs…… http://eaa100.44rf.com/newsletters/Engine_Ops.pdf.
- This link is near and dear to my heart as it’s a new system to save lives of F-16 pilots by pulling them out of near collisions with the ground. It uses database technology that knows where the ground is, not radar altimeter information (it’s actually more complicated than that). GLOC or “G-Loss of conciseness“ has been a big problem with the 9-G available in the F-16. Coincidentally, a new data number is now available on the Garmin G3X that tells the pilot his AGL altitude. http://m.aviationweek.com/air-combat-safety/auto-gcas-saves-unconscious-f-16-pilot-declassified-usaf-footage
- Joe Connell sent me this link with the comment that it revived memories of his installing his RV-9A avionics. www.youtube.com/watch?v=3XVtUUtfjJE. You won’t be able to get through it without a good laugh.
- On the more serious side of electronics is the FAA ban on flying with the Samsung Galaxy Note 7 on board. Don’t do it and advise your passengers of the same. To view the DOT Press Release and for questions or comments regarding this order, select this link: https://www.transportation.gov/briefing-room/dot-bans-all-samsung-galaxy-note7-phones-airplanes. To view the Emergency DOT Order select this

link. https://www.faasafety.gov/files/notices/2016/Oct/2016-25322.pdf.

- Gene Benson's "Vectors for Safety" -- another good read: https://www.genebenson.com/vectors-for-safety
- An alternative fuel powering a Husky's 200 hp Lycoming was more efficient, safer and cleaner than avgas – and also costs under a buck a gallon. http://www.planeandpilotmag.com/article/a-natural-gas-to-fly/#.V-q7fjKa2SM

Stall / Spin Thoughts

Below is a rather long article on one of the biggest problems we have. Stall/Spin. I thought it provided a very thought provoking idea and well worth the read.

One study found that turning and/or climbing flight preceded 85 percent of fatal stall-only accidents; in other words, while the pilots were maneuvering. Another study found that 93 percent of accidental spins began at or below traffic pattern altitude.

From this it appears most stall recovery is almost impossible. Maybe we should emphasize how not to stall in the first place. I have yet to see any discussion of what causes stall or how not to stall! _____

All texts say stall is caused by exceeding the critical angle-of-attack. Wrong! That is when stall occurs. The cause is the aircraft being pitched to the extent it attains the critical angle-of-attack, ie. pulling and holding the elevator control aft. The pilot causes stall!!

All texts say when turning, pull the control wheel to maintain level flight. Wrong! Added thrust will give the needed lift for level turn until reaching max thrust, approximately 35-40 degrees bank for most small aircraft.

Let's consider the Mar/Apr 2014 FAA Safety-Briefing, p.13 by Gene Hudson. From this you will likely wonder why we ever pull on the control wheel!

Central to the problem of the prevention of unintentional stalls is a general misunderstanding of how and why an aircraft will stall. Too often, we hear discussed the aircraft's stall speed; in fact, the aircraft stalls if, and only if, the wing exceeds the critical angle of attack.

Unintentional stalls, then, occur when the pilot applies enough backpressure on the yoke to overcome the natural stability of the aircraft, leave the trimmed angle of attack, and exceed the critical angle of attack. It would seem, then, that we could eliminate unintentional stalls by warning pilots to avoid applying excessive backpressure.

One would think this would work. History tells us, however, that it does not. Discovering the reason for this paradox requires bringing some outside knowledge into play. In particular, I find it helpful to consider the 19th century contributions of German anatomist and physiologist Ernst Heinrich Weber (1795-1878), and his student, physicist and philosopher Gustav Theodor Fechner (1801-1887).

These two scientists developed the theory of perception, defining the "just noticeable difference (JND)," or, in other words, the minimum change in a stimulus required to trigger perception.

Several features of this is important to flight operations. First, any stimulus (yoke pressure) which is constant will fade from perception over a short time. A pilot who is flying in an out-of-trim condition will soon lose the ability to perceive that he or she is applying any elevator pressure at all. The out-of-trim condition becomes the new zero; the pilot cannot trim it off, because they do not perceive that it is there...see the attached file!

This leads to the concept of "hands-off" flight control. Few Pilots know or understand the aircraft is designed to fly all by itself. We just steer. It is possible to fly from beginning of taxi to landing approach roundout without touching the control wheel. Just power and rudder control. Try it, you will like it!

I don't see any improvement in Loss of Control studies likely until we decide to define the real problem...how to apply control!

PHYSIOLOGY OF MANUAL FLIGHT CONTROL

From Page 13 of the 2014 March/April FAA Flight Safety-Brief

http://www.faa.gov/news/safety_briefing/2014/media/marapr2014.pdf

Gene Hudson an Assistant Chief Flight Instructor at Trade Winds Aviation at Reid-Hillview Airport, San Jose, Calif. He has been a flight instructor

since 1987 and has logged over 17,000 hours in over 100 aircraft types.

Year after year, stall/spin events account for a disturbing number of general aviation accidents. According to the Air Safety Institute's Nall Report, "failure to maintain airspeed" appears as a proximate or contributing cause in roughly 40 percent of the fatal accidents. This statistic persists in spite of stalls, stall recovery, and stall prevention having been taught — *ad nauseam* — to virtually every candidate for every certificate, rating, flight review, insurance checkout, and type certificate over the last half-century, or more.

Someone once defined insanity as "doing the same thing over and over and expecting a different result." It is the opinion of this author — a long-time flight instructor — that the results demonstrate that we in the flight instruction profession are not giving our customers an adequate methodology for dealing with this problem. Specifically, we do not provide a sufficiently clear and effective means of preventing unintentional stalls. This article is an attempt to define such a methodology.

Central to the problem of the prevention of unintentional stalls is a general misunderstanding of how and why an aircraft will stall. Too often, we hear discussed the aircraft's stall speed; in fact, the aircraft stalls if, and only if, the wing exceeds the critical angle of attack. That this will occur at a particular speed is only true given a closely defined set of conditions. Any stall speed is only valid at a particular combination of weight and load factor; the critical angle of attack does not change as long as the flap configuration is constant.

A second poorly understood concept is the issue of trim and stability. Pilots tend to think that the aircraft trims to an airspeed; this, also, is only true under particular circumstances. The static stability of an airplane tends to drive it back to a trimmed angle of attack. This will correspond to a particular airspeed only under steady-state conditions.

The stability of the aircraft can be used to the pilot's advantage with regard to stall prevention. In a nutshell, let go of the controls. Once releasing the controls, the aircraft will return to the trimmed angle of attack (regardless of the airspeed) within a little more than a second. Most aircraft will not trim to an angle of attack that exceeds the critical angle of attack; thus, with very rare exception, an aircraft loaded forward of the aft center of gravity limit cannot be stalled in hands-off flight.

Unintentional stalls, then, occur when the pilot applies enough backpressure on the yoke to overcome the natural stability of the aircraft, leave the trimmed angle of attack, and exceed the critical angle of attack. It would seem, then, that we could eliminate unintentional stalls by warning pilots to avoid applying excessive backpressure.

One would think this would work. History tells us, however, that it does not. Discovering the reason for this paradox requires bringing some outside knowledge into play. In particular, I find it helpful to consider the 19th century contributions of German anatomist and physiologist Ernst Heinrich Weber (1795-1878), and his student, physicist and philosopher Gustav Theodor Fechner (1801-1887).

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With regard to pressure stimulus (such as force on the yoke), the JND is a change of approximately 14 percent of the pressure already present. Today, the relationships they defined are referred to as the Weber-Fechner law, or the W-F law. It is common knowledge in physiology but, unfortunately, not so well known in aviation.

Several features of the W-F law are important to flight operations. First, any stimulus (yoke pressure) which is constant will fade from perception over a short time. A pilot who is flying in an out-of-trim condition will soon lose the ability to perceive that he or she is applying any elevator pressure at all. The out-of-trim condition becomes the new zero; the pilot cannot trim it off, because they do not perceive that it is there.

Second, a constant stimulus (i.e., steady backpressure to compensate for being out-of-trim) will elevate the just-noticeable-difference. If the pilot is holding a constant 20 lbs. backpressure, the minimum pressure change he or she can feel on the yoke is now 2.8 lbs., in any direction.

Every attempt to make a "small" input will become a "small" input plus 2.8 lbs. of additional pressure that the pilot has no way to know he or she is applying. The result is over-controlling; small, precise inputs are impossible.

Also, the pilot will tend to make unintended inputs, in pitch and roll, across a 5.6 lb. "dead spot" in his or her perception. This can be

especially vexing when the pilot is attempting to accomplish non-flying tasks, such as reading a chart, or dialing a radio frequency; he or she will apply an unknown and unintended input up to the limits of the JND.

A pilot flying in this manner is much more at risk of inducing an unintentional stall. Too many pilots are in the habit of flying the aircraft with large control pressures, far away from the trimmed angle-of-attack. The elevated JND makes it easy to apply the control forces accidentally that are necessary to overcome the stability of the aircraft and drive it to and past the critical angle of attack.

What can we do?

To avoid the unintentional stall, we need to develop the habit of flying the aircraft in trim and hands off. An airplane which is in trim and flown hands off is (with rare exception) impossible to stall. The natural (static) stability will drive it to and hold it at the trimmed (not stalling) angle of attack; flying hands-off ensures the pilot will not force the aircraft away from the trimmed (not stalling) condition.

Getting into a perfectly trimmed condition is not always as easy as it sounds. For most pilots, it requires a change in the way we touch the controls. Due to the physiology, it is virtually impossible for pilots to trim an aircraft precisely if their hands are still on the yoke.

Trimming, then, requires that we trim the aircraft to the limits of our perception (trim off the pressure), and then let go. Only with the hands off the yoke can we observe the change in pitch attitude and vertical speed, which is the clue to the remaining out-of-trim condition that existed below our ability to perceive.

Once observed, the change should prompt the pilot to pitch (with the yoke, not the trim) back to the desired pitch attitude and rate of climb, trim slightly against the error, and try again. Only when the aircraft will stay at the desired pitch attitude and vertical speed for five to 10 seconds in hands-off flight can it be considered to truly be in trim.

Once in trim, the pilot should endeavor to avoid violating that trim. That is, “if it isn’t broke, don’t fix it.” Said another way, the pilot should not touch the yoke unless there is presently an error in pitch that needs correction. If the airplane is doing what it should, there is no need to touch it!

All transitions in airspeed, power setting, and configuration will induce some trim change. Immediately address any change in the trimmed condition to bring the aircraft back to the desired trim. Once regaining the trim, maintain it by flying hands off to the maximum possible extent.

It is important to realize that the oft-repeated advice “use a light grip” is, unfortunately, a misnomer. Another principle of physiology, the grab-and-grip reflex, makes this so.

Under stress, the reflex induces us to unconsciously grab hold (of the yoke) and grip with increasing pressure. Over time, the light grip will invariably escalate to the famed white knuckles condition we see so often, and create all of the same problems as an out-of-trim condition.

Thus, when a pilot does have to make a control input, it is important to avoid setting up a grip condition; it is better to touch the yoke, rather than to grip it. Use the minimum pressure required to achieve the desired correction, and then go back to hands off.

If you’ve developed the uneasy feeling that this methodology involves a radical change in the way we fly, you would be correct. It requires discipline, thought, and practice to achieve truly in-trim and hands-off flying skills, but the rewards are worth it: better stall resistance, smoother ride for the passengers, more precise control of the aircraft, and lower pilot workload.

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