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"GUEST EDITORIAL" FROM CHRIS

The past year has been challenging for us and for many of our builders, pilots and friends as we have all had to cope with the repercussions of a number of unfortunate accidents as well as their consequences (including "groundings" in a number of countries). I would like to join Zenith and Zenair in thanking all of you who have patiently awaited the outcome of the investigations as well as of the various tests that should help us better understand the contributing factors that led to these very unfortunate losses.

Please know that Zenair has actively participated with every involved civil aviation authority (CAA) and accident investigation boards to the extent that they are able to; I have personally answered questions and provided design data to a number of different authorities, and I have just recently traveled to Germany to meet with engineers from various agencies. A number of key reports are in and preliminary findings are very encouraging. As much as it pleases me that the much-anticipated and thorough ground vibration tests (GVT) analysis (flutter test) is confirming my original design and flight tests (no flutter tendencies on the properly built and maintained Zodiac), we must face the fact that if there are no outstanding issues with the aircraft design, then there may be issues with how we build, maintain and fly the aircraft.

It is important to ensure the on-going airworthiness of our planes, and this includes making sure that we check our control cables periodically to ensure proper tension is maintained (see Zenair Service Bulletin ZE-2008-001). But as pilots, we must also always be aware of the various design limitations for our specific aircraft. This is particularly important when we fly powerful, light-weight, responsive, low-inertia aircraft like the Zodiac and many of the other new high-performance Light Sport Aircraft (LSA or Advanced Ultralight) that are available today.

In an attempt to convey the significance of some of these limits and how they apply to our flying, I would like to propose the following extracts from my soon to be released new book: "FLYING ON YOUR OWN WINGS – a Complete Guide to Understanding Light Aircraft Design" that I have been working on these past few years. Regardless of the aircraft type you fly, please take a moment to read and understand this important information. We all need to be aware of these essential points so that we can adequately respect the operational limits of our aircraft and continue to enjoy the open skies for years to come.

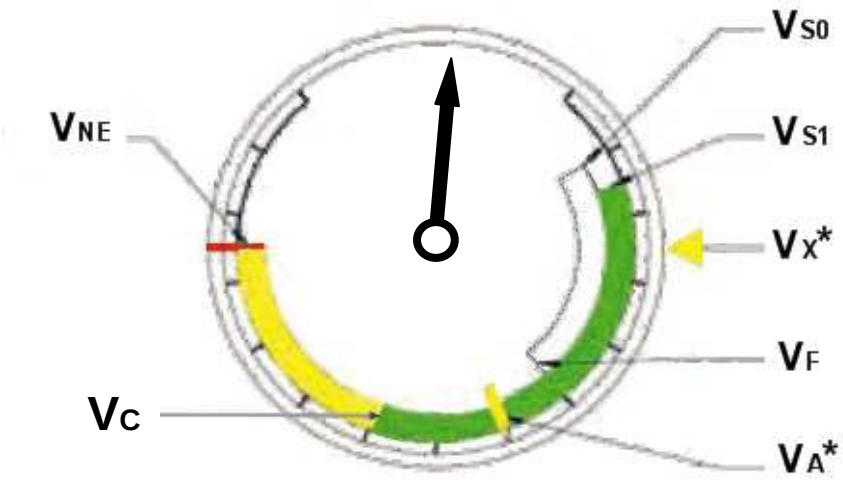
Chris Heintz
May 22, 2009

In response to the NTSB's safety recommendation memo (dated April 14, 2009) a team of FAA engineers visited the Zenith Aircraft Co. factory in Mexico, Missouri, on May 21, 2009, pictured here with the Zenith's red and white Zodiac XL aircraft. FAA engineers and officials also visited AMD in Eastman, Georgia, and plan to visit Zenair Ltd. in Canada and Europe, as part of its response to the NTSB.

Flying Within the Aircraft's Limits:

When preparing for our pilot's license, we all learned to not fly higher than 12,000 feet (4 km) for too long (see page 71) and to reduce our cruise speed in gusty conditions. As responsible pilots, however, we need to fully understand and to respect numerous other limitations, and many of these are related to speed.

Every **airspeed indicator (ASI)** provides a reading of **Indicated Airspeed (IAS)** and must be marked with internationally recognized colored arcs as follows:



* **VX** and **VA** are not required markings in all countries.

Vso = Stall speed - flaps extended } White arc

VF = Max. allowable speed with flaps extended

Vs or **Vs1** = Clean stall speed } Green arc

(**VA** = Design maneuvering speed)** (yellow line)

Vc = Max. cruise speed in gusty conditions

VNE = Never Exceed Speed (red line) } Yellow arc

** VA is an important speed limit to remember (it is easy to memorize and/or to figure out), yet it is not usually marked on our airspeed indicators!

For our type of aircraft, the design maneuvering speed (V_A) is usually equal to twice the stall speed (2 × Vs) at the design limit load factor n_1 (see page 232):

$$V_A = \sqrt{n_1} \times Vs = \sqrt{4} \times Vs = 2 \times Vs$$

Understanding speed, load factor, and control deflection limits:

1) Flaps extended:

When flying with flaps extended, the limit load factor is ½ × n_1 = 2 positive (if n_1 = 4) and 0 negative (see page 243). Therefore, respect the above values in calm weather and stay well below them in gusty conditions. When flaps are extended, always keep your speed within the range of the white arc on your ASI!

Remember: n_1 = limit load factor; (ultimate = 1.5 × limit load factor).

2) Flaps up (no flaps):

Because our light airplanes have relatively little inertia and because the control forces needed to fly them are usually quite low (see page 128), it can be quite easy to inadvertently exceed the limits of the aircraft if we fly them in a rough, agitated or impulsive manner. Aerobatic aircraft aside, with most light planes, the control stick only needs to be held lightly and all inputs can be very gentle. When flying through turbulent air, it is usually best (and a lot less tiring) to slow down and to let the aircraft ride out small jolts rather than try to correct for every bump. Stay calm, forget trying to maintain a very specific altitude or direction, focus on minimizing the loads on your airframe.

When flying your airplane, remember that V_A is the maximum speed at which the controls may be fully deflected. When they are, the resulting loads should not exceed ¾ of the limit load factor for an aircraft designed to the ASTM standards for LSA (the limits are lower still for ultralights designed to the German LTF-UL (2003) regulations). For ASTM compliant aircraft, the limit load factor at fully deflected controls is:

.75 × n_1 = .75 × 4 = 3 “g” (see page 243)

Therefore, when flying, use appropriate caution: The controls should not be deflected abruptly (or too fast) to their limits. They must be moved smoothly and slowly enough to make sure the aircraft does not exceed V_A (and its related load factor). Such maneuvers must only be attempted in calm air and in the speed range of the green arc up to V_A (which is approx. 2 x Vs). Never perform a high “g” maneuver in gusty weather as a sudden gust could add very substantial additional loads to the ones already imposed on the airplane by your maneuver!

At speeds in the range of the yellow arc, the structural integrity of the aircraft is limited to smaller gusts (approx. 25 ft/sec. or 8 m/sec.) while in the green arc, the plane can handle more significant turbulence (gusts to 50 ft/sec. or approx. 15 m/sec.). As a rule, recreational pilots should stay well out of the yellow arc when weather conditions “shake” the airplane and we should certainly all avoid high “g” maneuvers in rough air.

Of course, one should never exceed the red line (VNE) on the ASI!