

T-CRAFT AERO CLUB

MONTHLY NEWSLETTER

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Photos courtesy Bill Zervas, Garden Valley, Idaho, 18 July 2009

General Information

For those who couldn't come to the Garden Valley Fly-in this month, we hope your conversations with other members who were able to attend helps you plan for next year's event. We had a ball! The weather was perfect, and because of the hard work and dedication of Bill Zervas, Chad Kinkela, and Jim Hudson, our flying and stomachs were well tested. Bill was kind enough to haul up most of the shade and cooking gear, Chad brought his cooking "A" game, and Jim invited the Idaho State Bureau of Aeronautics to come and confirm our takeoff performance. So much more went into this project than we can even imagine. We'll have to make sure to thank these gentlemen for their love and devotion to flying, and for their contributions to T-Craft. (I might add that Jim Eyre made sure the birds were behaving well.)

Thanks again, guys!



Left: High anxiety as club members await opportunities in our Take Off Contest. **Right:** Frank Lester, from the Idaho Dept. of Aeronautics, with our pre-flight briefing.

Fuel re-imburement for July 2009: \$3.80/gal. Dennis Wheeler has worked out pricing with our on-field fuel supplier. Beginning with the August 2009 billing, and until further notice, fuel re-imburement will be \$3.57 per gallon. Watch your e-mail closely concerning notices involving fuel cost increases/decreases.

Current flying rates: 152 @ \$51.00/hr wet, 172s @ \$72.00/hr wet, and 182s @ \$98.00/hr wet.

Next **Board Meeting:** 11 August 2009, 7:00 p.m., T-Craft Hangar Offices.

Next **General Membership Meeting:** 29 September 2009, 7:00 p.m., EAA/CAP Hangar, Nampa, Idaho. **NOTICE:** the Board Members may call a *Special General Membership Meeting* to discuss operational issues. Please pay special attention to future T-Craft e-mail communications for more details.

**From the
Membership
Director**

Weight and Air Speeds

While out practicing solo, one of my students asked me why the airspeed was so slow just prior to stalling as compared to when I was with him. My answer prompted the following discussion on the relationship between important air speeds and weight.

Most POH's in our aircraft give important air speeds only at gross weight, with the exception of takeoff and landing tables. Most of us probably do not fly at gross weight, and if so, only for a short time after takeoff. To obtain maximum performance and maintain safe operations, especially maneuvering speed, it is essential you know how these speeds change as weight is reduced.

Maneuvering Speed

The formula for determining maneuvering speed at reduced weight is the following.

$$Va_1 = Vav \sqrt{W_1 / Wg}$$

The maneuvering speed at the reduced weight Va_1 equals Va (at gross weight) times the square root of the actual weight W_1 divided by max gross weight Wg .

For our C172's

Assume you are flying solo (me @ 215#) and 16 gal of fuel; the weight would be close to 1800#, or 78% of gross weight. Va at max gross wt of 2300# = 112 MPH

$$Va_1 \text{ at } 1800\# = 112 \times \sqrt{1800/2300} = 112 \times .884 = 99 \text{ MPH.}$$

You must fly at or below the maneuvering speed adjusted for weight when encountering turbulence or performing maneuvers specified to be done at or below maneuvering speed, or you risk structural damage, i.e. the possibility of ripping the wings off!

Stall Speeds

The POH stall table shows stall speeds in different flap and bank configurations, but only at maximum gross weight. In addition, the stall speeds listed are for minimum power and usually only for aft CG. Some models show both forward and aft CG stall tables.

The formula for determining stall speeds at reduced weight.

$$Vs_{o2} = Vso \sqrt{W_2 / Wg}$$

Vso - landing configuration stall speed with full flaps, power reduced, at Max Gross weight - Wg

Vs_{o2} - landing configuration stall speed with full flaps, power reduced at the actual weight - W_2 .

Stall Speeds for C172's.

At max gross wt of 2300#

$Vso = 47$ MPH IAS - bottom of white arc

$V_{s1} = 54 \text{ MPH IAS} - \text{bottom of green arc}$

$V_{s02} = 47 \times \sqrt{1800/2300} = 47 \times .884 = 42 \text{ MPH.}$

$V_{s1-2} = 54 \times .884 = 48 \text{ MPH.}$

With power the stall speeds are even further reduced due to prop-wash creating lift over the wings. It would not be surprising that by yourself, with relatively low fuel, full power and full flaps; as in slow flight maneuver, that you could get the stall speed below 40 MPH.

In this case, lower weight results in lower stall speeds, which may give a little extra margin of safety.

Best Glide

The best glide ratio is that which results in the most horizontal distance traveled per vertical distance dropped when your plane turns into a glider. The lift over drag ratio (L/D) does not change due to the weight; It is a function of the shape of the wing. However, as weight is reduced, airspeed must be reduced to maintain the best glide ratio. The typical POH gives the speed at which the best glide ratio occurs only at maximum gross weight. In order to maintain the best glide ratio, airspeed must be reduced accordingly as weight is reduced. If the best glide ratio is not maintained, the glide distance will be less than ideal. With less weight and airspeed, you will have more time to go the same distance. If the correct airspeed is not maintained, you will not glide as far.

The same formula as above can be used to determining best glide at weights less than gross weight.

For the C172's best glide is 80 MPH at maximum gross weight of 2300#

Best glide at 1800# = $80 \times \sqrt{1800/2300} = 80 \times .884 = 71 \text{ MPH.}$

Pitching for best glide, normal cruise pitch attitude will get you close to the correct best glide speed adjusted for weight. Full up trim also puts you very close to best glide speed with power off.

Other Speeds

Reduced weight also affects all other speeds such as V_x , V_y , V_r . The POH takeoff and climb performance tables show conditions at several weight and altitude combinations. Climb rate tables usually show conditions only at gross weight. You can reduce these speeds by approximately 1/2 of the percent weight reduction.

Using the C172 example, reduction from gross weight at 2300# to 1800# is a reduction of 500# from gross or 22% reduction. V_x , V_y , V_r and pattern air speeds could be reduced by 11%

V_x at sea level and max gross wt = 68

V_y at sea level and max gross wt = 91

Reducing these numbers by 11% yields:

V_x at sea level at 1800# = 61

V_y at sea level at 1800# = 81

These speeds must be adjusted accordingly for altitude as per the POH performance tables.

Summary

The point of this discussion is to remind you of the fact that all airspeeds are affected when the weight is lower than maximum gross. The most important of these is maneuvering speed, you really need to be aware of this if you encounter turbulence or perform maneuvers specified at or below maneuvering speed, and reduce your speed according to weight. Let me know if you have any question or comments.

Fly Safe and Have Fun,

Jim Hudson

T-Craft Safety & Membership Director

**Special
Announcements**

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We'd like to be sure to recognize Jamie Hastings for his securing his IFR and Commercial License. Great job!

Aircraft Maintenance

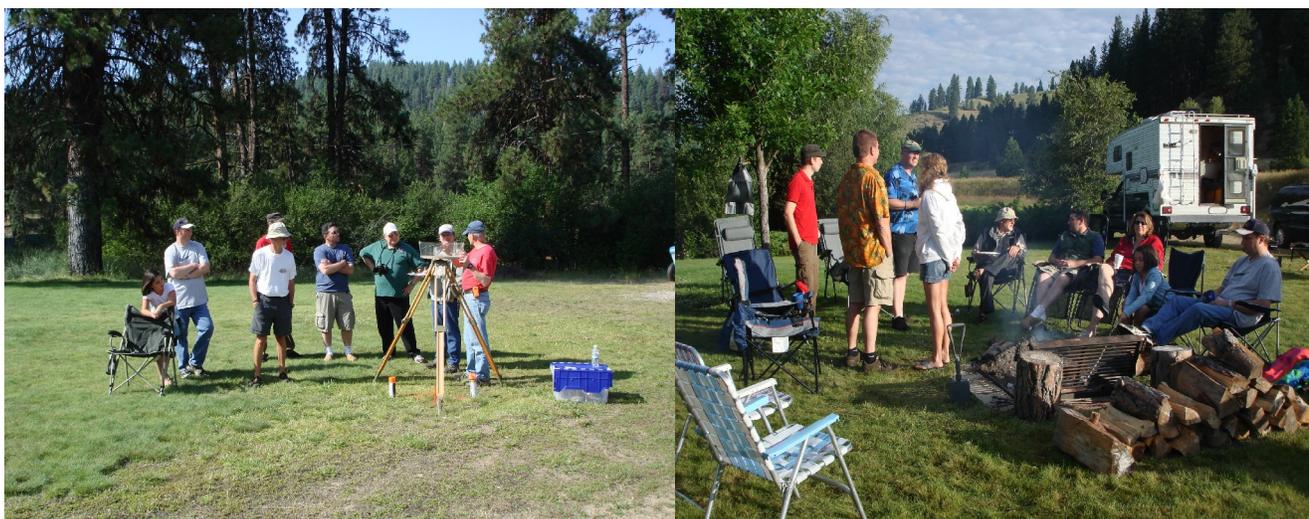
WARNING: Information below may or may not be accurate. Consult Schedule Master and clipboards on hangar wall for the most recent information concerning your aircraft.

Got a squawk? Write the tachometer time on the Squawk Sheet. Sign your name, and include a phone number where you can be contacted. Document Hobbs time for all other recordings.

Use good judgment adding oil to an engine. Read "Aircraft Oil Usage" on the T-Craft Website for more information.

From the Board

Many thanks to all who participated in our July 2009 Garden Valley Fly-in. We were especially glad that Frank Lester, from the Idaho Bureau of Aeronautics, made time in his very busy schedule to come and observe our take off clinic, using his Theodolite. Please call or write to thank him and his assistant.



The Board would also like to thank those members who helped ferry our aircraft into and out of Garden Valley for this event. That was done at your own expense, so we don't want to forget you for your contribution. (Photos courtesy Bill Zervas, Garden Valley, Idaho, 2009)

Ask any Board Member for a copy of any of the Minutes, or you can e-mail the Secretary (jlvanho@msn.com), and have a copy sent right to your home.

Got something aviation **you want to sell**? Post it in the T-Craft Newsletter. Send your advertisement to the Secretary, jlvanho@msn.com.

Upcoming Local and Regional Events

Bomber Days, Warkhawk Museum, 8-9 August 2009 (T-Craft invited to attend and Display).

Thunder Over Nampa, Nampa Airport, 11-12 Sept. 2009.

Ontario Air Faire Fly-in Breakfast, Aerobatics, car show, live music and free breakfast to each pilot flying in, 12 September 2009.

T-Craft Plane Wash, T-Craft Hangar, 16 September 2009, 4:00 p.m.

Share events in your Newsletter with Members by sending them to the Secretary at: jlvanho@msn.com

Reminders

Answers concerning our Club, Policies, or even locating a **New Member Application Form** for your friend or family member can be found on the T-Craft website: www.t-craft.org.

T-Craft Business Cards and Pamphlets are available. Share them friends and acquaintances in the pilot community who may be looking for piloting opportunities.

Limited quantities of **T-Craft Gift Certificates** are still available. Contact the Board of Directors for more information.

Properly sign out your aircraft, including the correct designation; for example, Local, Cross Country, Maintenance, Replacement Aircraft Search, etc. If an aircraft moves, breathes, or sneezes, it **MUST** be correctly documented for maintenance and billing.

Delete the remainder of any unused flight time from **Schedule Master** immediately after landing. Somebody may be able to use that time.

T-Craft Members are responsible for keeping their contact information (phone numbers, email addresses, postal address) updated in **Schedule Master**. To check or update your information, login to Schedule Master, click the "User" tab at the top, then click the link that says "Click here to edit your user info".