



PLANE TALK GREENHORN CHAPTER 808 EAA

**MEETING: SECOND WEDNESDAY EACH MONTH 7:15 PM, FREMONT COUNTY AIRPORT, East of Canon City, CO on Highway 50. ANNEX BUILDING #2.
BREAKFAST EACH SUNDAY MORNING 9:00 AM SPITFIRE Grill at PUEBLO MEMORIAL AIRPORT TERMINAL BUILDING.**

OFFICERS 2009-2010

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WEBPAGE ADDRESS: WWW.EAA808.ORG LOOK IT OVER!!!

Dues: \$15.00 a year; due June 1 of each year, \$20.00 if not received by July 1st. Mail to: Leonard Mino, 2013 Hesperus Dr. Pueblo West, CO 81007

If you are receiving this newsletter by U.S. Mail and now have an e-mail address available, please let the editor know your new address.

Randy's Shop Notes

Hello Everyone, I thought I would pry myself lose from hanging on to the hangar as winds seem determined to wipe Fremont County Airport off the face of the earth. I have never seen such wind! Everyday around 10:00a.m. like a freight train it roars thru the valley. I'm sure I don't need to tell you folks in Pueblo West about the wind! I have memories of praying

for even a breath of wind. Dad and I built a hang glider out of aluminum tubing and an old cargo chute while he was stationed in Aviano, Italy. We hauled our Rogallo wing to the top of a three hundred foot hill and after sweating and pulling and hefting the bulky twenty foot glider up the hill, we stood there with dreams of soaring out over the grape orchards and patch work farm fields. Every once in a while a small gust would tease us and fill the sail and you could feel the kite tug at your seat and strain to pull you off the ground. It would thrill me, this young 15 year old

novice pilot ready like Icarus to fly into the sun. But alas, it would just as quickly vanish, the sail would droop and I would once again be trying to hold the 60 pound bulky glider. To make matters worse, our brightly colored orange and white hang glider attracted many of the local Italians. We got lots of help from eager hands to push me off the hill. Dad knew Basta for stop and Andalay for Let's go. Every time a small breeze filled the sail, the anxious Italians would start pushing me down the hill! Dad would shout Basta! Basta! as I dug my heels in trying to stop the edge of the steep hill from taking me and the gangly contraption I was strapped into over. Oh, what we would have given for some real wind! Now with my Thorp T-18 with a fresh annual ready to go flying, the wind comes in huge, battering, never ending, prize fighter blows.

I have met some great pilots this month and invited them to attend our meetings, I hope they show up. I need to remind everyone that the Barnstormer restaurant is staying open late on meeting night to accommodate our chapter and guests. Let's take advantage of the good food and good atmosphere and support our airport cafe in these hard times.

Randy

FEBRUARY 2009 MINUTES

Call to Order 7:12 PM

Introductions:

- Jim and Mary Carter from Pueblo West

Old Business/Previous Action Items:

January minutes read, approved with minor clarification to Treasurer's report, specifically : the \$760 January income consisted of \$60 from Calendar sales and \$700 from the Christmas dinner.

New Business:

1. **Treasurer Report**

Leonard Mino

Balance in checkbook \$ 2195.47

2. **Date set for Fly-in Breakfast** :

May 2, to coincide with Apple Blossom festival

Breakfast volunteers:(so far):

Leonard Mino (Grant to assist)

Allan Melendy/ Beth Hayden

3. The Hangar party/ chapter meeting (tentatively scheduled for the Giffen hangar on May 13th), was tagged for the “bring a friend” night.

4. The website domain registration is coming due and since EAA is offering to host chapter sites, the chapter should consider dropping the existing domain with its attendant costs. All agreed that Grant Schemmel should be consulted before any action was taken.

5. Four calendars remain to be sold at \$10 each.

ADJOURNED 7:31 PM

Chapter entertainment program

Dean Baird made a visual presentation about his early days in crop-dusting. His stories about fellow pilots, the planes and the industry at the time were fascinating. The movies showing crop-dusting and crop spraying flight close to people, terrain, and telephone wires while spewing poisonous chemicals were astounding.

Thanks Dean,

Upcoming Events

Date	Event
03/11/09	EAA 808 Chapter Mtg. FASSTeam Presentation by Zoan Harclerode
03/21/09	Young Eagles Rally, EAA Chapter 540, Los Lunas, NM
04/08/09	EAA 808 Chapter Mtg.
04/18/09	EAA 43 Snowbuster Fly-in, Erie, CO (www.eaa43.com)
04/20/09	JAA Italian Breakfast Fly-in, Broomfield, CO (cq7014@aol.com)
4/21/09-4/26/09	Sun 'N Fun, Lakeland, FL
05/02/09	EAA 808 Blossom Festival Fly-in (Tentative)
05/13/09	EAA 808 Hangar Party/Chapter Mtg., Giffin Hanger
05/27/09	Air Force Thunderbirds at the U.S. Air Force Academy
06/03/09	EAA B-17 Tour stop in Denver
06/10/09	EAA 808 Chapter Mtg.

6/13/09-6/14/09	Blue Angels at the Front Range Airport
6/22/09-6/23/09	Rocky Mountain EAA Fly-in, Jeffco Airport
06/26/09	EAA 808 Young Eagles Rally
07/11/09	EAA 1267 Fly-in, Kremmling, CO (www.eaa1267.org)
7/27/09-8/2/09	EAA Airventure, Oshkosh, WI

Tips 'N Tricks

This month we are presenting the 3rd of the 4 part series on airfoils by Chris Heintz of Zenith Aircraft. This presentation is available both from the EAA website and from www.exp-aircraft.com

About the author, Chris Heintz

Aeronautical engineer Chris Heintz, the designer of Zenith Aircraft Company's line of kit aircraft, is one of the most qualified and knowledgeable light aircraft designers today. With prior experience from Aerospatiale, de Havilland, and Avions Robin (France), Heintz has designed and introduced more than 12 successful kit aircraft designs. Recently, the ZENITH CH 2000 design was put into production as a standard FAA type-certificated production aircraft.

Heintz regularly shares his design and construction expertise as a speaker to aviation groups and students of aeronautical engineering, and is a regular speaker at both the EAA Oshkosh and Sun 'n Fun fly-in conventions. An aeronautical engineer, Heintz has the unique ability of being able to simplify design concepts and to clearly explain and illustrate light aircraft design and construction.

Chris Heintz' articles were published in the Experimental Aircraft Association's (EAA) Light Plane World or Experimenter publications.

Part 3

In Part 1 of this series, we introduced our discussion of airfoils with a study of relative flow, Reynolds numbers, boundary layers and airfoil geometry, in Part 2, we took a look at the forces acting on an airfoil - lift, drag and moment and some of the trailing edge devices used to increase lift without too much penalty in drag, moment and/or building complication. In this third part, we will try to get a better understanding of the leading edge high lift devices, boundary layer control and stall.

To get our discussion started, let's ask this question: *why do we get the behavior shown in Figure 1; ie., why does the lift increase when we lower the flaps and increase further when we cut leading edge slots?*

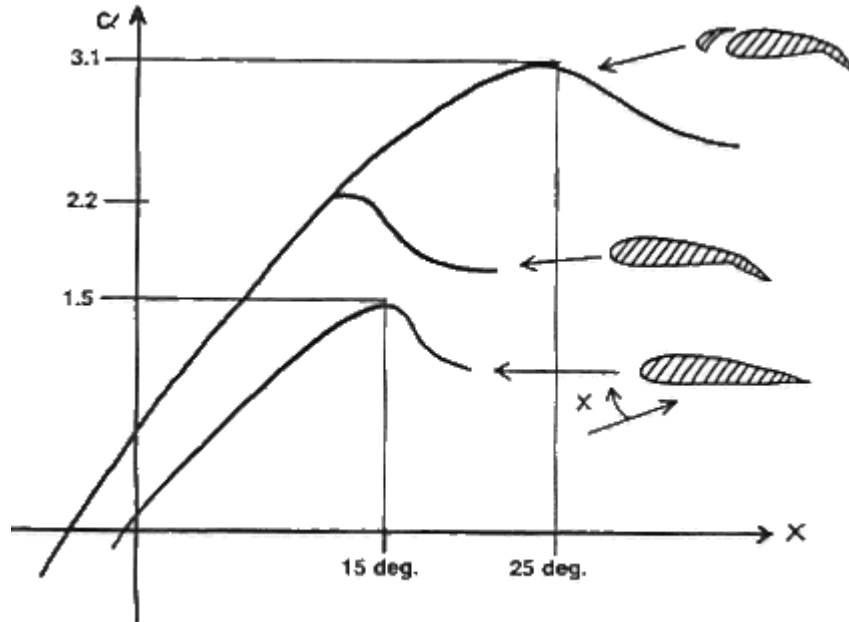
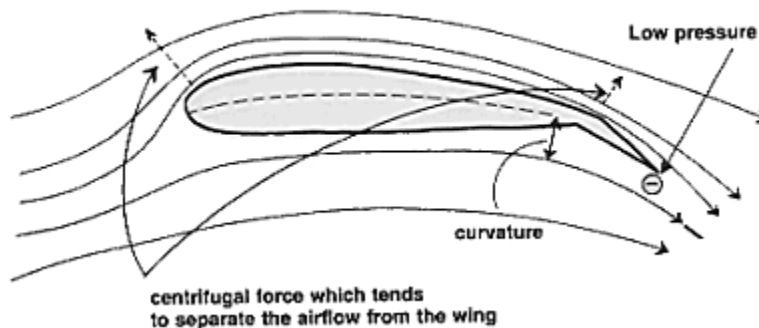


Figure 1

In changing from a plain airfoil to an airfoil with flaps we have created an increase of curvature of the airfoil which gives part of the extra lift, but we have also created a depression, a low pressure near the trailing edge, which sucks the air over the upper part of the airfoil and helps it to overcome the centrifugal forces present when the air flow has to come around the nose of the wing. It is like a pull acting from the trailing edge and pulling the air around the leading edge, thus preventing separation (see Figure 2).

Figure 2



It is obvious that by slowly increasing the angle of attack "x", there is a limit beyond which the centrifugal forces, either near the leading edge or close to the flap hinge point, can no longer be overcome by the trailing edge suction and the airfoil flies in separated air; in other words, is stalled and supplies a lower lift (see Figure 1 again).

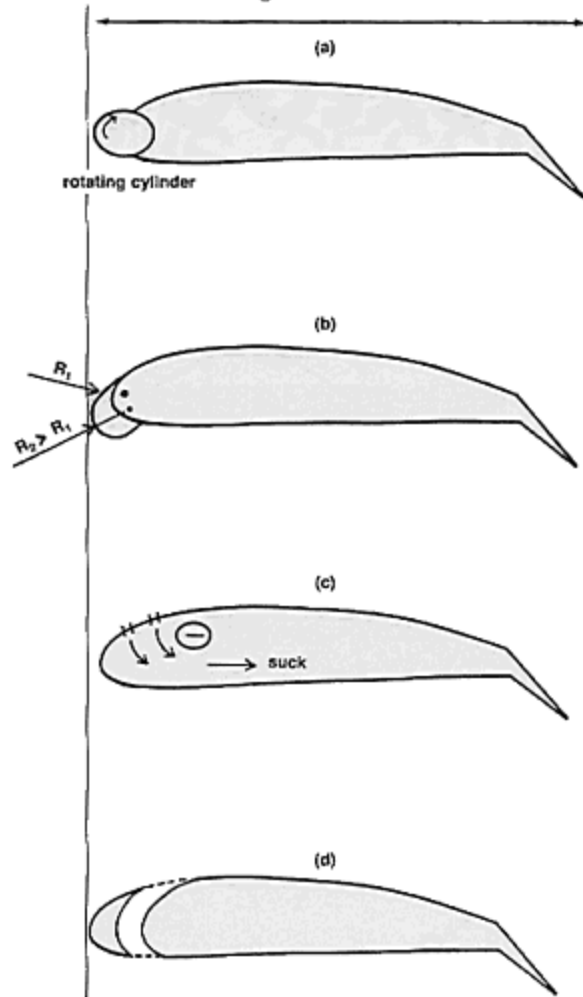
In order to be able to further increase the lift by delaying the stall to even higher angles of attack, we have to limit the flap deflection so that the stall will first occur at the leading edge and then provide a force which neutralizes the centrifugal force. This can be done in various, more or less practical ways:

Help the air move around the leading edge with a roller. This is very effective (CL of up to 5), but not at all practical (see Figure 3a).

Increase the leading edge radius because the centrifugal force is proportional to $1/R$, ie. by increasing R we decrease the force wanting to pull the air away from the airfoil (see Figure 3b). This is quite simple and an easy, effective "add on." The sharper the original radius, the more effective the modification will be. For example, Steve Wittman gained some 10 mph on his "Tailwind" with a "sharp" original leading edge, whereas on a Zodiac CH-600, which already had a blunt nose, the gain was negligible. Note that this "drooped" nose also increases the curvature and, unless it is movable, there will be a drag penalty in cruise (small angle of attack). Note also that this modification alters the wing chord and as a result the center of gravity range so be careful.

Simply create a depression where required; ie., some holes through which the air is sucked inside the wing (see Figure 3C). This again is not very practical.

Figure 3



The most practical solution is to choose one area as a suction point and build the airfoil in such a way that suction can be obtained automatically (see Figure 3d). You know that when a given amount of air is accelerated (its speed increases), the pressure drops. It follows that if we guide air through a narrowing slot (a funnel) it must go faster and faster to get through and if the exit is smaller than the entrance we have a definite suction at the exit. So, if we cut a slot near the leading edge with a funnel shape and further orient the exit lips so that the fast air runs out tangent to the air foil, this will help reactivate the boundary layer and will allow us to increase the lift on our wing up to CL equivalent to 3 to 3.1, which is over twice the original plain airfoil value of 1.5.

We should also keep in mind the following:

The chord is measured from leading edge to trailing edge and the *the slot is not added* but the slot *is cut in* the airfoil; in other words, if you add the slots to an existing wing you will alter the chord and center of gravity to such an extent that you will also have to modify the tail area (which will create additional stresses in the rear fuselage). You'd

