

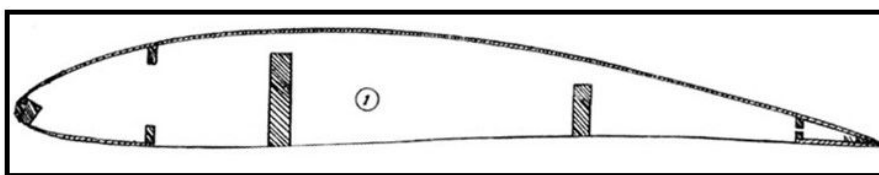
From: "Tandy Walker" <rdb435021@icloud.com>
 To: "Tandy Walker" <rdb435021@icloud.com>
 Date: 12/1/2017 9:51:01 AM
 Subject: 7 Lancer 850 - Redesign of Wing Structure

New Cyclone Lancer 850

December 1, 2017

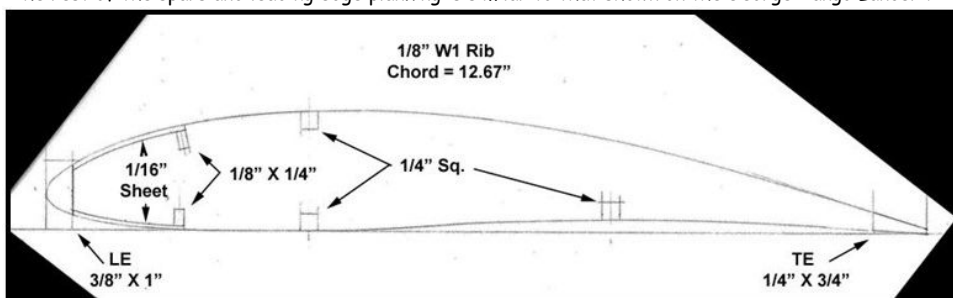
The structural design of the new Lancer 850's wing has been a joint effort between myself and Alfredo Herbon who lives in Argentina. Alfredo is not only a skilled engineer, but very proficient at using his AutoCAD program called ACDC. Alfredo has been generous with his support and frequently made constructive suggestions through this effort. I hope you will find this report interesting as you see how we progressed through this redesign process.

The picture below is a copy of the Lancer 72 original 11" root rib No. 1 showing the design of the LE, TE, and various spars, which I chose not to use.

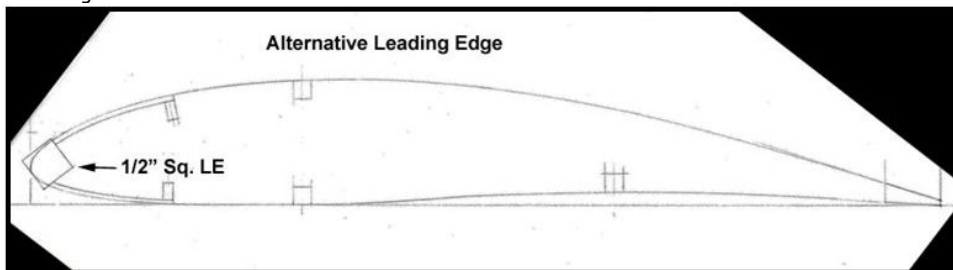


To start with, I developed two different designs that I share with Alfredo for his comments. First I carefully traced the perimeter of the scaled up Lancer 850 full size rib on an 8-1/2 X 11 piece of vellum. I had to do the tracing diagonally on the vellum sheet because of the length of its 12.67" chord. Then I redesigned the LE, TE, and various spars. I made a full size PDF file for Alfredo and converted the drawing to the .jpg image shown below.

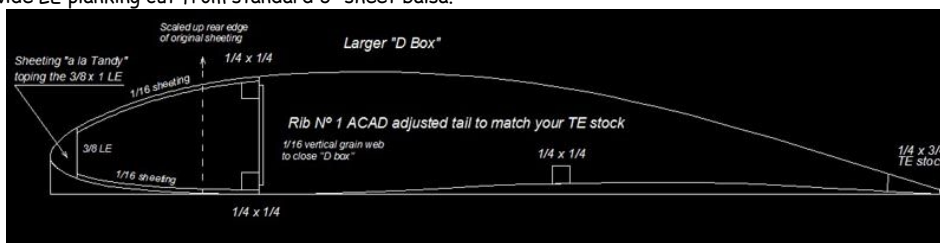
1. I chose a 3/8" X 1" leading edge so I could pin it down on the plan like a fence (so to speak) to butt the front of the rib up against for gluing.
2. Several years ago I had a company cut 100 nonstandard 1/4" X 3/4" X 36" balsa trailing edges for when I was building Lanzo Bombers. One-hundred was the minimum number they would cut. I prefer this solid balsa trailing edge to the Lancer's complicated multi piece design.
3. The rest of the spars and leading edge planking is similar to that shown on the George Tango Lancer 72 plan.



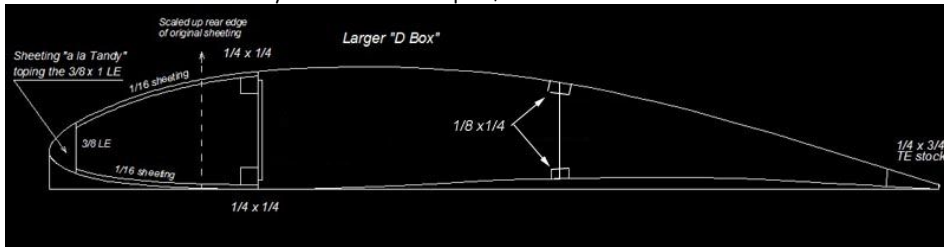
Next I used a 1/2" square diagonal balsa leading edge as an alternate design as shown below. However, the LE would have to be added later after the ribs were glued to the bottom spar and trailing edge. We both agreed the "fish mouth" rib design should be abandoned in favor of the one above.



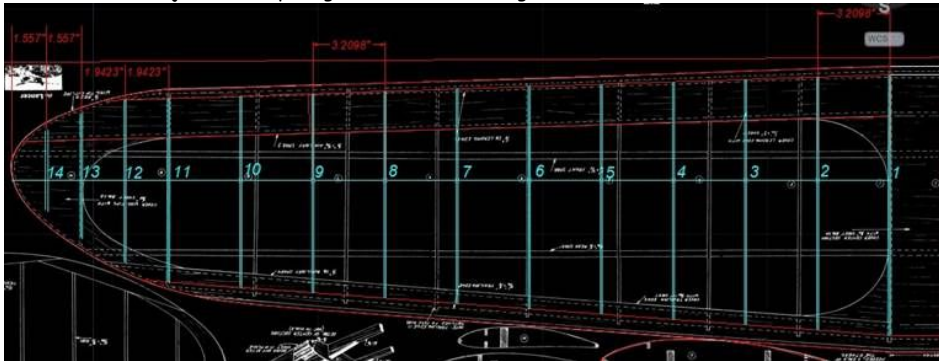
Alfredo responded with a great revision to my design using a D-Box as shown below. The D-Box was designed using 2.75" wide LE planking cut from standard 3" sheet balsa.



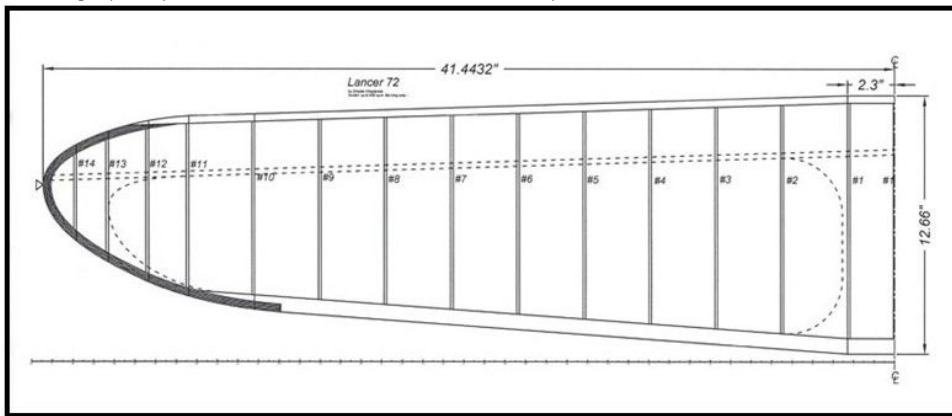
We also decided to use two secondary rear 1/8" X 1/4" spars, one over the other as shown below.



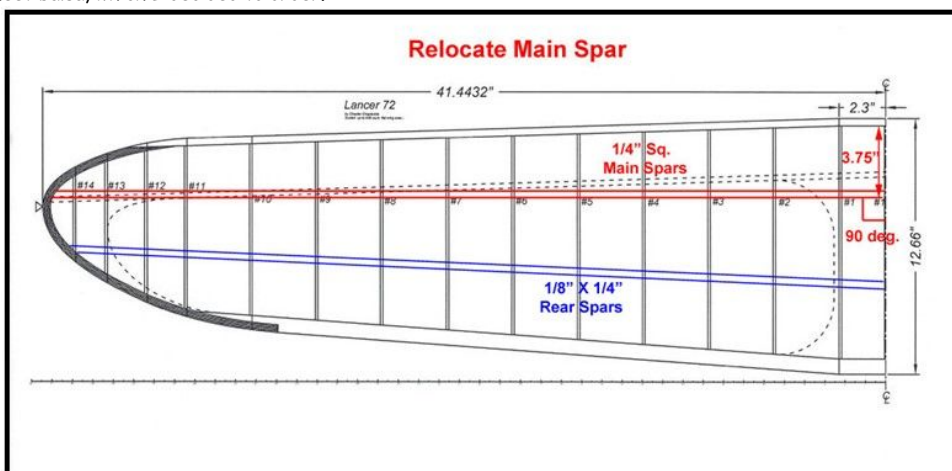
After some e-mail discussion, we decided to increase the number of wing ribs from 10 up to 14. The ACDC drawing below shows the adjusted rib spacing for the 14 rib configuration.



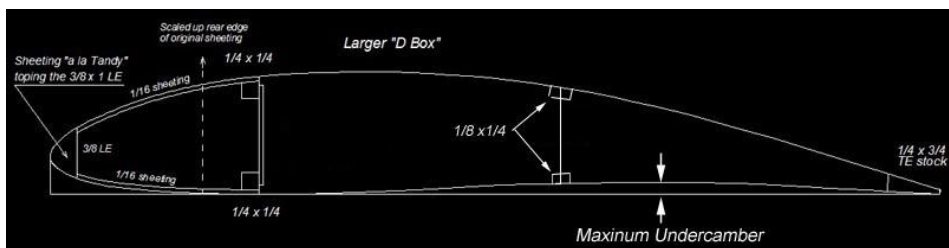
Then Alfredo provided the ACDC drawing of the left wing half for review. We decided on a 3/8" X 3/8" square laminated wing tip composed of six 1/16" X 3/8" X 36" balsa strips.



I suggested a straight main spar as opposed to the inclined main spar as it is easier to brace the dihedral joint. To make the main spar straight as shown below would require using 3.75" LE planking cut from special 1/16" X 4" X 48" sheet balsa, which I decided to order.

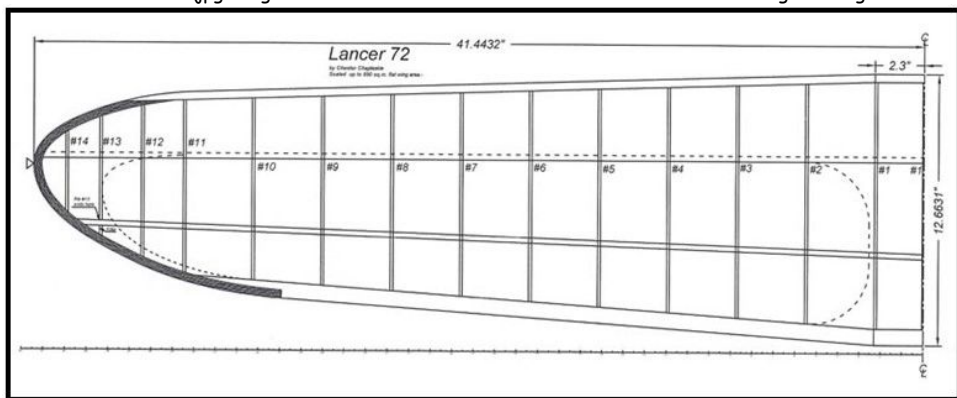


The maximum undercamber on the bottom edge of the W1 rib occurs pretty far aft as shown below. A more aft position of the secondary spar will help the covering to adhere to the bottom of the ribs and will also help to increase the trailing edge rigidity.

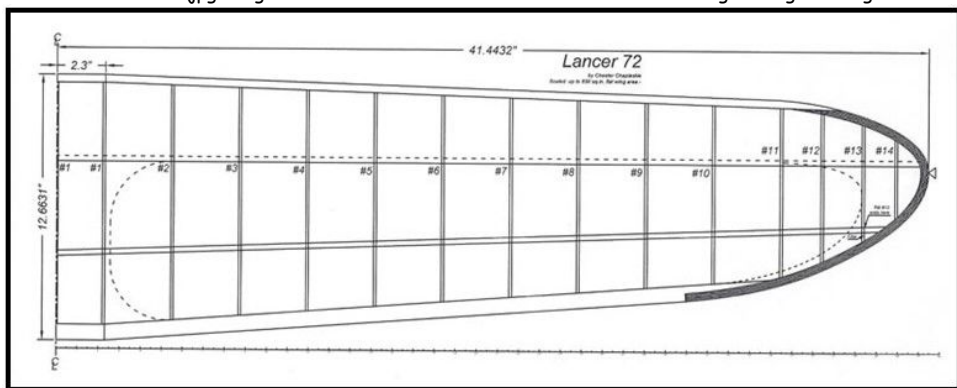


Alfredo and I went through several iterations before we settled on the final location of the rear secondary spars that looked proportionally right. At this point the structural redesign of the Lancer 850 wing was complete. Alfredo proceeded to develop the final wing planform drawings and wing rib drawings on his ACDC program which are shown below.

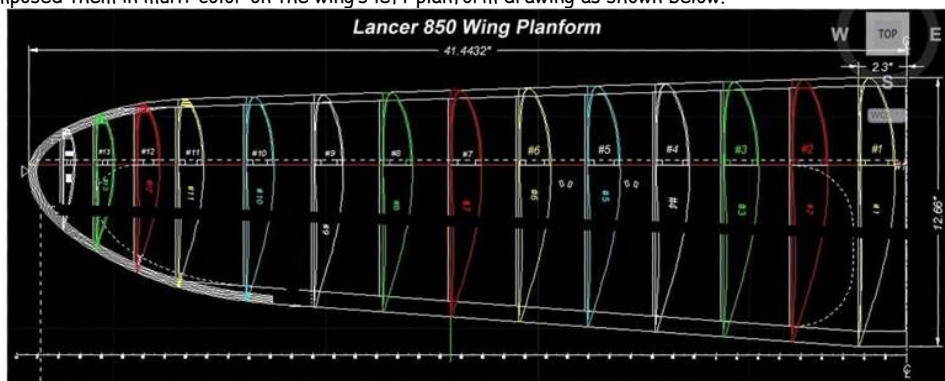
This is a .jpg image of the .DWG file for the final ACDC full size left wing drawing



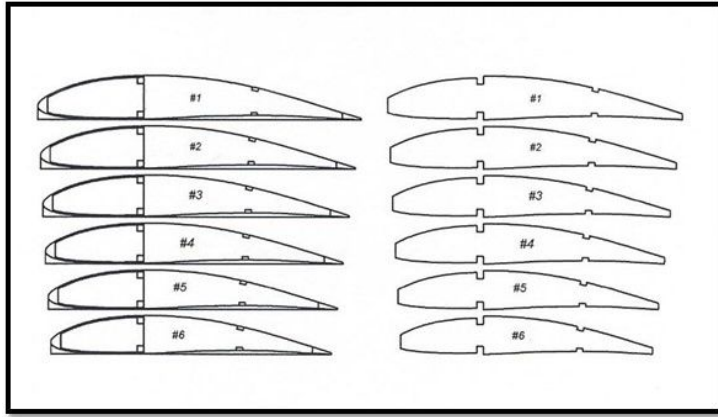
This is a .jpg image of the .DWG file for the final ACDC full size right wing drawing



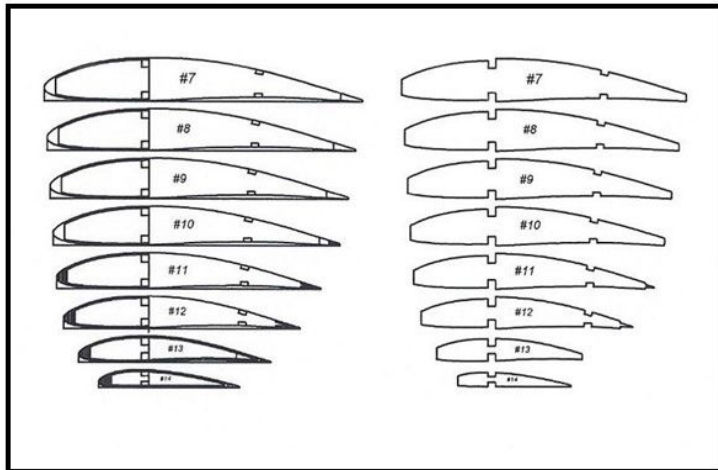
With all our design decisions agreed to, Alfredo developed all 14 of the wing ribs on his ACDC program and superimposed them in multi-color on the wing's left planform drawing as shown below.



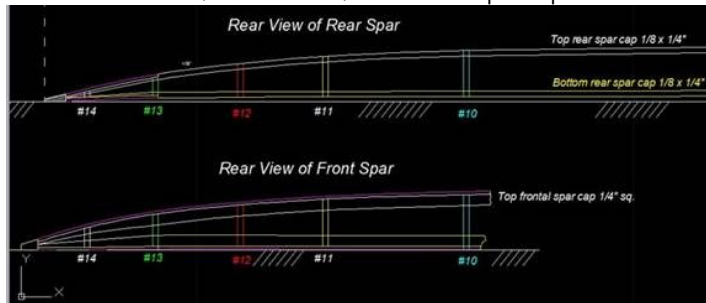
This is a .jpg image of the .DWG file for the full size ribs and their patterns Alfredo developed on ACDC for wing ribs 1 through 6.



This is a .jpg image of the .DWG file for the full size ribs and their patterns Alfredo developed on ACDC for wing ribs through 14.



This picture shows the details of how both the front and rear spars taper down out at the wing tip.



The wing planform and rib .DWG drawings will be taken to the copy center today for Victor Quintero to print them out as wing plans and rib patterns. In closing, let me say that I do indeed feel fortunate to have a skilled and talented friend like Alfredo Herbon to communicate with in order to arrive at such a functional and well-designed wing structure.....Tandy