ACRO SPORT Newsletter

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Forming The Leading Edge Skin

or at Least, How I Did It!

By Neil Sidders, 235, Rowland Rd., Monroe, LA 71203-8502, (318) 343-3885, EAA Technical Counselor #1784
Photos by Becky Sidders

Most of the time we humans get really worked up and worried about things we have never tried or have never seen done. Once we do it, we wonder what we were so worried about. The forming of the leading edge skins is no different. The skins being formed in the photos are for a SONEX, but that doesn't matter. I've used this method on my Sonerai - II and on the Acro Sport as well.

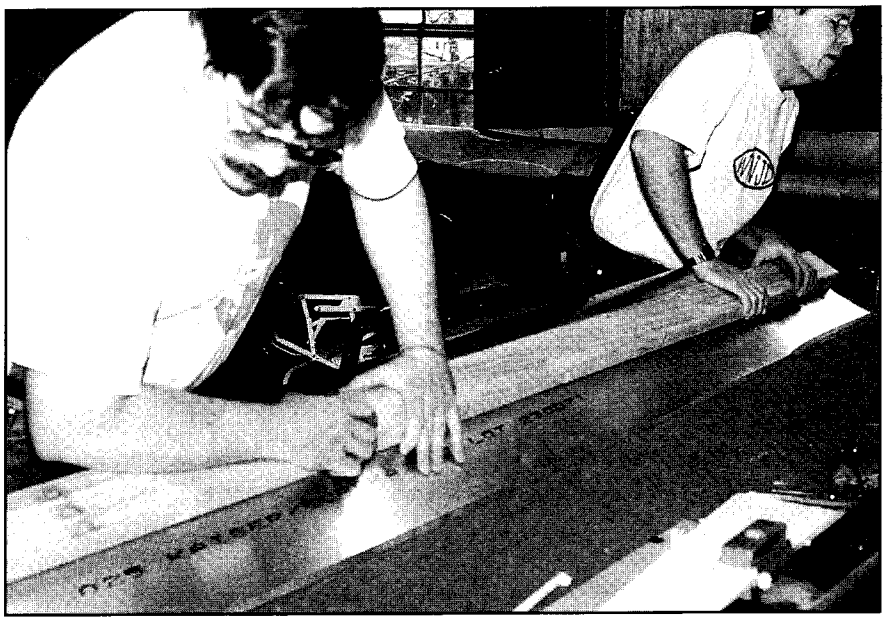
When I ordered the material for the skins I had the supplier, Wicks Aircraft Supply, shear the material to size. They did so for a very reasonable cost. although 2024-T3 is called out in the plans, you could use 6061-T6. It is a little easier to form and is more corrosion resistant. I personally wouldn't consider the 6061 unless I lived in a region with a salt-air climate. Since the 6061 is easier to form, it is also easier to dent!

The only special tools you need are a table as long as the part you will be forming, and a 2x4 that is as long or longer. You will also need one other caring person. The caring person is essential for preventing the condition shown in Photo #3. If you attempt to push the aluminum sheet over without the full length support of the 2x4's a very unsightly kink is guaranteed.

Start by locating the center of the leading edge radius. On the Acro II you will find the tap half of the skin to be about 1/4 inch longer than the bottom. Clamp some form of stop 1/4 inch on to one edge of the skin. With this edge lying away from you on the table, push the other edge over to meet the stops using the 2x4. Now, slowly work the 2x4 back toward you forcing the metal down. Release the metal periodically and check the resulting radius with a nose rib or pattern. The part will end up "V" shaped but will pull down to the shape of the ribs.

As far as methods of drawing the skin into position on the wing, the method used by Steve Manweiler in Newsletter #52 is as good as any. Steve made several female forms of the leading edge profile and used them to draw the skin tightly against each rib. He used a length of rope with a sliding knot to tighten them into place. You could make this a lot more complicated if you really want to, but the end result should be the same. You must make sure the wing is jigged square and flat before you nail the skin on or it will want to maintain whatever misalignment you have built into it.

Here are some thoughts on the nails used to secure the skin to the wing. Some builders try to pierce the aluminum with the nails as they go. I haven't had much luck with this



The first bending step is to push the edge of the bottom half of the skin over to the stops that are clamped to the edge that is against the table. Note that the table is carpeted.

Here we have worked the 2x4 back close to the radiused area. Pressing down at this point is where the radius gets formed. The caring person on the far end is Rev. Dave Fortuna who is building the Sonex that these skins are for.

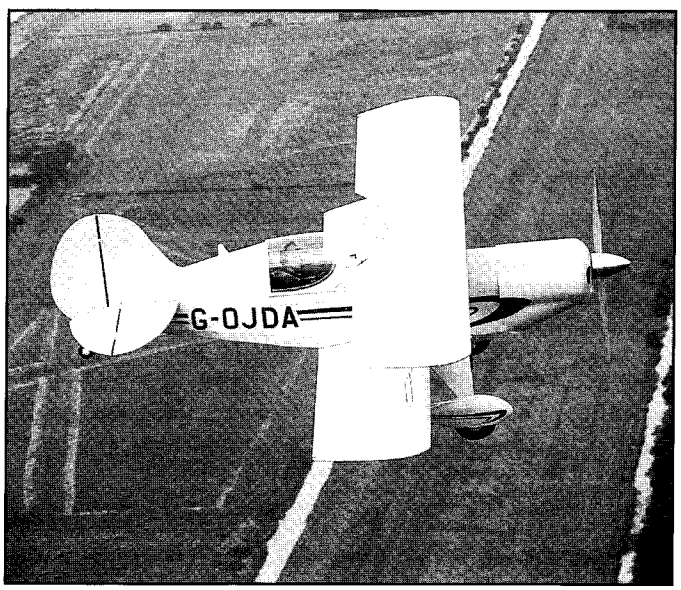
This is a leading edge skin for an ACRO II after an un-educated helper just couldn't resist a little push by hand. Instruct your help before you start!

method. First of all, the metal is hard to pierce and second, it scrapes all the coating from the glue-coated nails. How often have you heard of the nails in aluminum leading edges working up? The condition is somewhat common on Pitts Specials, but I consider this to be a result of wing twist that occurs in some part due to the fact that the Pitts doesn't have flying wires on the rear spar. The Acro Sport series of biplanes have a very rigid wing platform. Anyway, I drill the aluminum skins for the nails in hopes of the glue coating doing its job.

There is one other thing to consider when installing the leading edge. Now don't laugh, I know some old timers who swear by this. If at all possible, install the skin during the heat of summer, and only after leaving the skins out in the sun for a couple of hours. The theory is to attempt to expand the skin to its maximum length just before installation to minimize the slight buckling that can sometimes be seen on airplanes that are parked in the sun for long periods of time. I have seen this occur, and airplanes with dark colors on the leading edge are more prone to this condition. You decide if it is worth the trouble.

David Almey's G-OJDA

By Chris Kinnaman



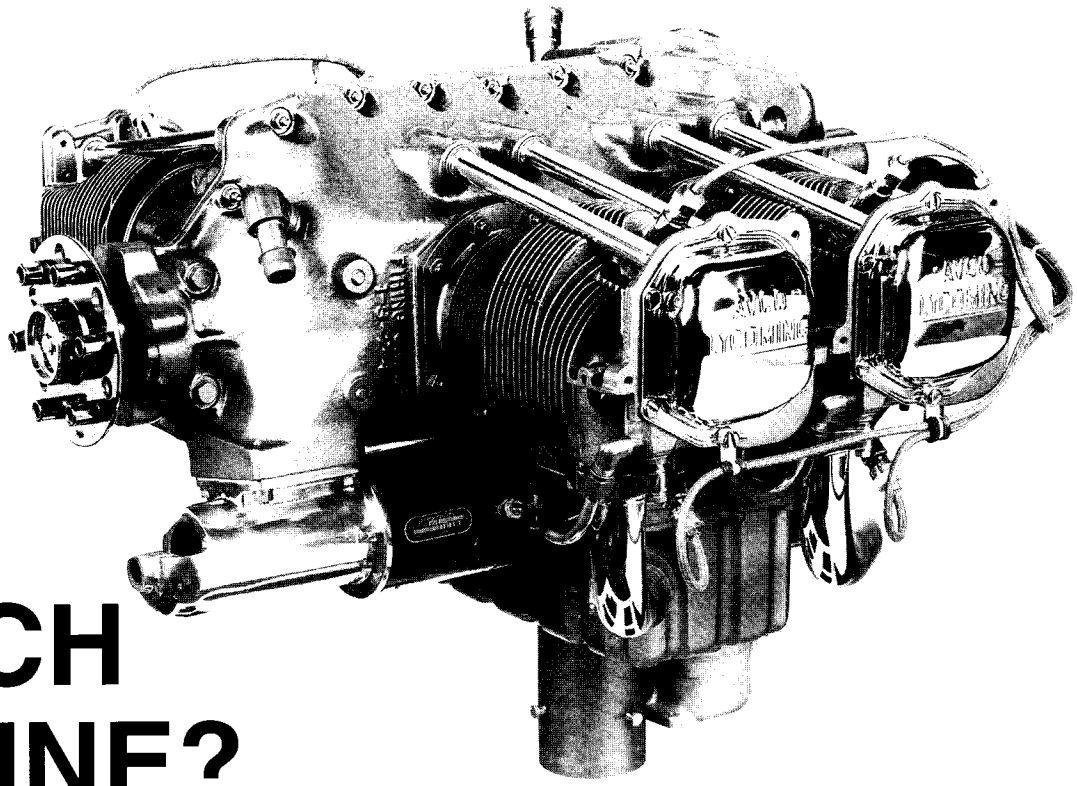
We last saw David Almey's Acro II nearing completing a few issues back. Well, he has finished and has been racking up awards on the fly-in circuit in Europe. David and Jane have won the Air Squadron Trophy for Best Plans-Built Aircraft as well as the Pilot trophy for the Concours D'Elegance at Great Britain's Popular Flying Association Rally this past summer. This award is equivalent to EAA's Gold Lindy! Flying across the English Channel to Espinal, France, they scored the RSA Avion Etranger Cup, awarded to the best foreign visiting aircraft.

David completed his Acro II from plan set #883 in two and one half years - an inspirational feat. The high level of build standard to which David adhered has been rumored - and Bill Fisher confirms this, writing, "These awards show the very high standard of workmanship that has gone into the aircraft and prove you do not need to start with a pack of part completed assemblies from the factory to produce an excellent homebuilt aircraft."

David has been flying "straight and level" as G-OJDA is certified as non-aerobatic. Barry Tempèst, an international aerobatic competitor, will be flying the aircraft for the issue of its Aerobatic Permit To Fly. Things are different in the UK!

The airplane is finished in Diatex and painted with Sky-Tech 2 pack Polyurethane finish in brilliant yellow. David and Jane sell both these products through their company, Sky Craft Ltd. David Almey can be reached at: David Almey, "Kestrel" Broadgate, Weston Hills, Spalding. Lincs. PE12 6DP. Great Britain.

Thanks to Bill Fisher for contributing material and the photos for this story. Photos were shot from a Piper Super Pacer 160, Pilot Barry Tempest.



WHICH ENGINE?

by Neil Sidders, 235 Rowland Road, Monroe, LA 71203

When searching for an engine, it becomes a task that can be quite simple if the designer is specific as to which engine can be used. However many designs are very open and if you are not careful that bargain engine could be a very costly purchasing error.

Here's an example. You are building a slick low-wing airplane and someone offers you a deal on a O-320-E2D. You take a sizable chunk of your airplane building stash and tuck that little gem away in the corner of your shop thinking your engine needs are taken care of. The day comes to start your firewall forward part of your project so you dust off the engine and fit it to the mount. That went OK so you start looking at the systems you need to install. Hey- there's no fuel pump. There's not even a place for a pump. The carburetor is in the way of the nose wheel, I really need a constant speed prop and there's no place to put a governor. I was going to upgrade to 160 HP, but the factory doesn't recommend that because this particular version utilizes a front main bearing from the O-235 series. Oh yeah, those plain steel cylinders didn't fare too well while it was stored.

Suddenly you realize that super deal you got is just taking up space in your shop and you still need an engine.

Now I'm not picking on the O-320-E2D, it's a good engine. The E2D was configures for a simple gravity feed installation at minimum cost to the customer. If you are building a Super Cub replica or similar sport plane it might be a good choice. The most complicated thing about this engine is the type 1 dynafocal mount.

When it comes to engine mounts, my personal choice is the conical style. As much as 12 pounds can be saved depending on which dynafocal mount you are comparing to and a complete set of mounting bushings is about $30.00.

The following is presented as an aid to give you a place to start your search. after all, there are over 200 engines to choose from in the 140 to 200 HP range from Lycoming alone!

Example: LTIO(prefix) -360(displacement) -A1A6D(suffix)

Prefix

O - Opposed
I - Injected
V - Vertical installation
H - Helicopter
L - Left-hand rotation
M - Military drone, single mag.
A - Aerobatic
AE - Aerobatic equipped
T - Turbocharged

Suffix

First character - Horsepower and Mount

Second Character - 1 - Constant Speed
2 - fixed pitch
3 - Larger prop bolts
4 - Solid Crank

Third character - Mag type and sump type

Fourth character - Counterweight

Fifth character - Dual mag

O-340 - All the engines in this series are conical mount, carbureted engines rated at 160-170 HP. They have been out of production for about 30 years. Basically a O-320 with a 1/4 inch longer stroke.

Standard Case (narrow deck) - uses internal wrenching cylinder base nuts. Low compression engines are not recommended to convert to high compression. High compression narrow deck engines cylinder base reinforcement plates.

Wide deck case - uses external wrenching (hex) cylinder base nuts. OK to convert to high compression pistons.

O-320-E series - uses series O-235 front main bearing. Designed as a low-cost engine for production aircraft. Utilizes plain steel cylinders. Engines produced for gravity feed applications do not have provisions for a fuel pump.

C-Conical mount Engine	I-Type I dynafocal Mount	II-Type II dynafocal Horsepower
O-320-A	C	150
O-320-B	C	160
O-320-C	C	150
O320-D	I	160
O-320-E	I	140/150
O-320-H	I	160
IO-320-A	II	150
IO-320-B	II	160
IO-320-C	II	160
IO-320-D	I	160
IO-320-E	I	150
IO-320-F	I	160
LIO-320-B	II	160
LIO-320-C	II	160
AIO-320-A	I	160
AIO-320-B	I	160
AIO-320-C	I	160
AEIO-320-D	I	160
AEIO-320-E	I	150

Engine	Mount	Horsepower
O-360-A	I	180
O-360-B	I	168
O-360-C	C	180
O-360-D	C	168
O-360-E	I	180
IO-360-A	I	200
IO-360-B	I	180
IO-360-C	I	200
IO-360-D	II	200
IO-360-E	II	180
IO-360-F	I	180
VO-360-A	C	180
VO-360-B	C	180
HO-360-A	II	190
HO-360-B	C	190
HIO-360-A	C	180
HIO-360-B	C	180
HIO-360-C	II	205
HIO-360-D	C	190
HIO-360-E	II	190
LHIO-360-C	II	190
AIO-360-A	I	200
AIO-360-B	I	180
AEIO-360-A	I	200
AEIO-360-B	I	180
AEIO-360-H	C	180
IMO-360-A	C	180
IMO-360-B	C	230@3500 RPM

Engines with horizontal induction

O-320-DID

IO-320-A1A, B1E, C1B - rear mount

IO-320-B1C, B1D - adapter to rear mount

A1O-320-B1D - Front mount

O-360-A1C, A1G, A1G6, A1G6D

LO-360-A1G6D

O-360-C2B,C2D horizontal with pressure carb

O-360-C1F

O-360-F1A6, G1A6 - sump for nose wheel

IO-360-B1C, B1E, B2E - rear injector

IO-360-C1A, C1B, C1D6 - rear inlet

IO-360-C1C, C1C6, C1E6D, C2F-rear inlet w/14 degree adapter

IO-360-D1A, E1A, F1A - rear inlet

AIO-360-B1B - front injector

Not all were specific as to being front or rear inlet in the information I have available, however I believe them to be rear inlet unless otherwise specified.

This list is not to be considered complete. Some engines have been configured according to the requirements of kit plane manufacturers and these engines do not appear on the list of type certified engines.

The Acro II prototype used an O-360-A4A. It was fitted with a Bendix PS5C pressure carburetor and a Christen inverted oil system. The propeller that was on the airplane when I flew it was a 76 X 60 Sensenich metal unit.

The O-360-A4A is a 180 HP Type engine with a solid crankshaft. This was once considered the "standard" aerobatic engine when equipped as it was on the prototype.

This is also the engine - equipment combination recommended on the early Pitts Special plans. The O-360-A4A is the engine used on the Piper Cherokee 180.

Sun & Fun Forums

David Hintenlang, Professor at the University of Florida, was the moderator of the Acro Sport forum at Sun & Fun. Wally Weber of Hastings, MN and Maynard Engel of Leola, PA also spoke. Wally and Maynard have completed their Acro II's and David is well along with his own. Thanks to all who participated.

Be sure to check out David's Acro Sport Mailing List online. His email address is:dhinten@ufl.edu

You will find good information on methods of accomplishing the various difficult aspects of building from plans.

Alright, Bill!

Bill Blake, premier draftsman for many of the Acro Sport plans, now holds the post of Vice President in EAA chapter #32, the Spirit of St. Louis Chapter. Congratulations, Bill, we know you'll do an outstanding job.

National Biplane Expo

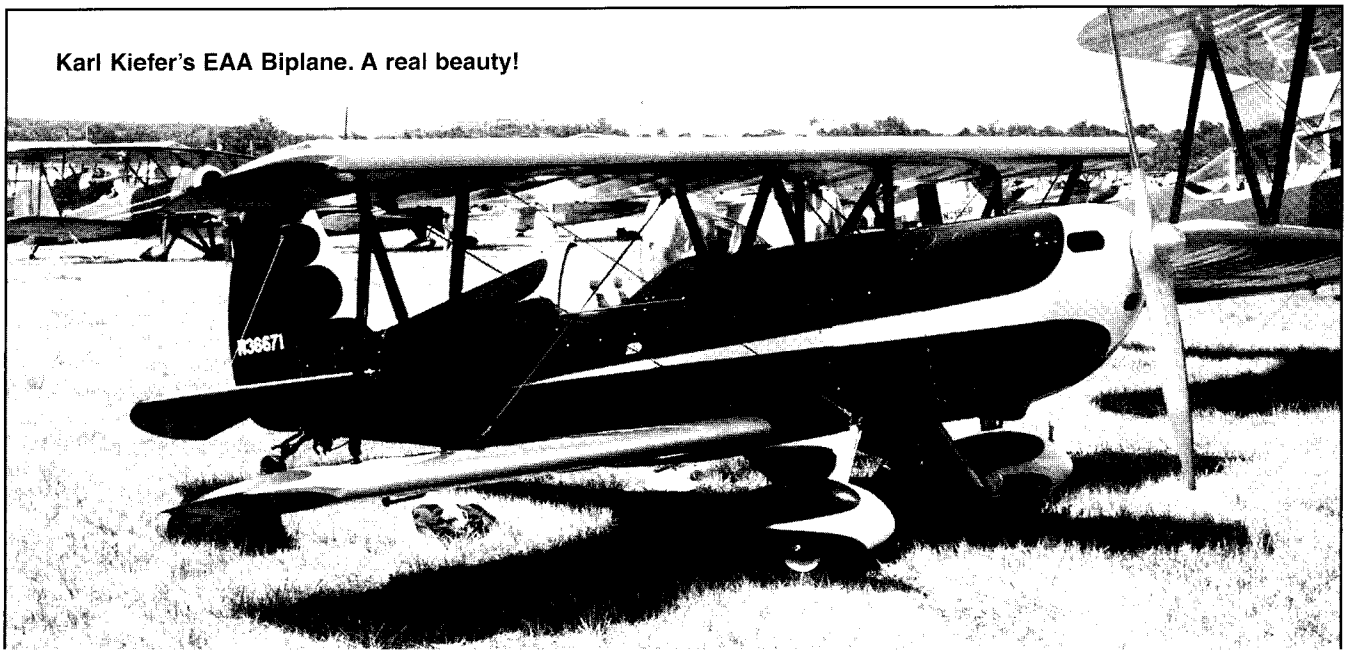
Many thanks Steve Manweiler, Acro II builder and award winner, who conducted a forum for a group of interested builders and enthusiasts at the National Biplane Expo in Bartlesville OK. Steve says he uses his Acro II to share the joy of aviation with others, and he certainly does - he has flown over one hundred Young Eagles and every one of them has flown the airplane for a bit! He reports that "Lonesome Linda" cruises a bit slower than a friend's Skybolt, but the Acro II has a greater rate of climb.

Steve's Acro II was the only Acro Sport design present at the National Biplane Expo, though a predecessor, an EAA Biplane, was flown in by Karl Kiefer of Conroe, Texas. Steve received the Designer's Award from Paul Poberezny at Airventure '99.

Congratulations, Steve!

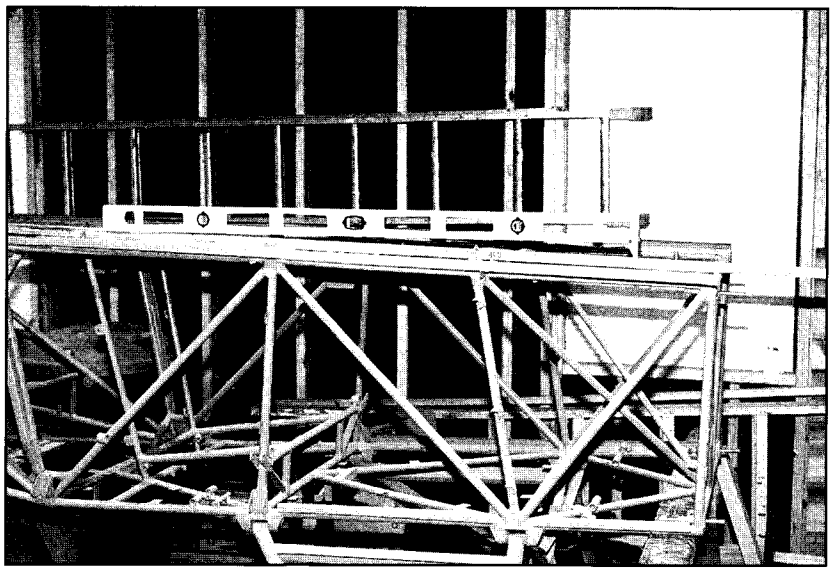
Above - Steve Manweiler answers questions about the Acro Sport at the Biplane Expo held at Bartlesville, OK. Below - Steve Manweiler and Zeb Walschmidt with "Lonesome Linda". Steve reported that the trip to the Expo took longer than expected because of Zeb's repeated request for loops.

Karl Kiefer's EAA Biplane. A real beauty!

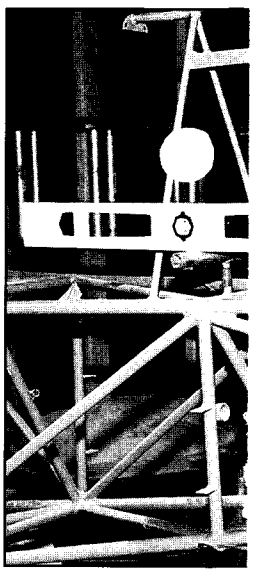


Rigging the Center Section and Horizontal Stabilizer

by Neil Sidders



NOTE: The wood blocks between the lower attach point were used to spring the struts out to print dimensions. They are being forced less than 1/16". A 4 foot level with a 1 1/4" shim used to set the fuselage at 1 1/2° nose down.



Stabilizer spar set lev reports suggest this

As a Technical Counselor, I'm often asked how much tolerance is allowed when building a welded tube fuselage. My standard answer is NONE! While it is true that building a welded tube structure that is dimensionally perfect is near impossible, that doesn't mean you can get sloppy and make up for errors with stringers and fabric. The wing cell on our Acro Sports is a case in point. If the wing attach zones aren't square and parallel, you will have an airplane that is difficult to rig.

Those of you who are long time readers of the newsletter know that we started building 3 Acro IIs. All three of us are Tool and Die makers and therefore we each placed a high demand for accuracy on each other. The accuracy in airplane building deals more with symmetry and parallelism that it does with pure dimensional accuracy, although the latter is still important.

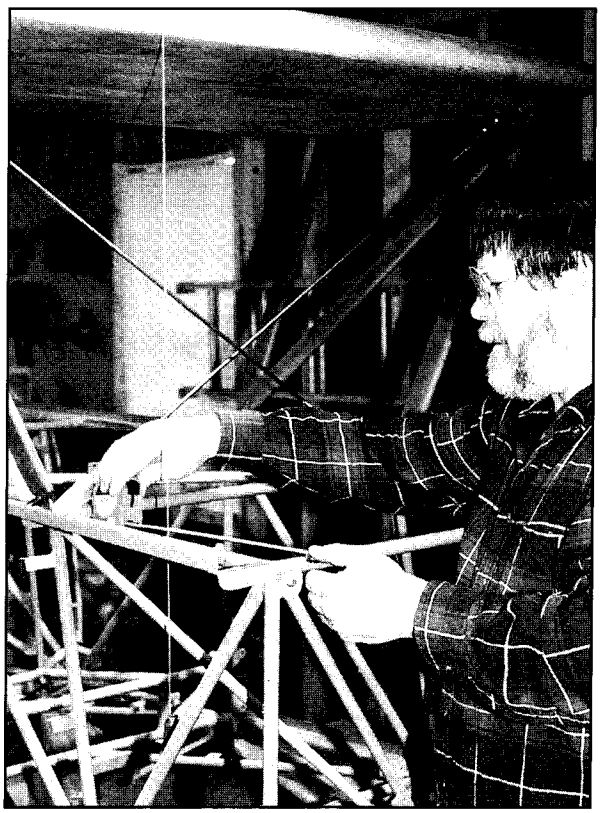
My point to this is, your attitude toward accuracy in the first part you make will have a key role in how your airplane flies once it is finished.

When it was time to build the struts for the center section, it was evident from the newsletters that most builders were having to use the adjustable fork to rig the wing properly. This sent up a Red Flag and we attacked the drawings with TRIG and found the rear up-right was about 1/8" too long. The newer plans have this correction on them. This was also in newsletter #32/33.

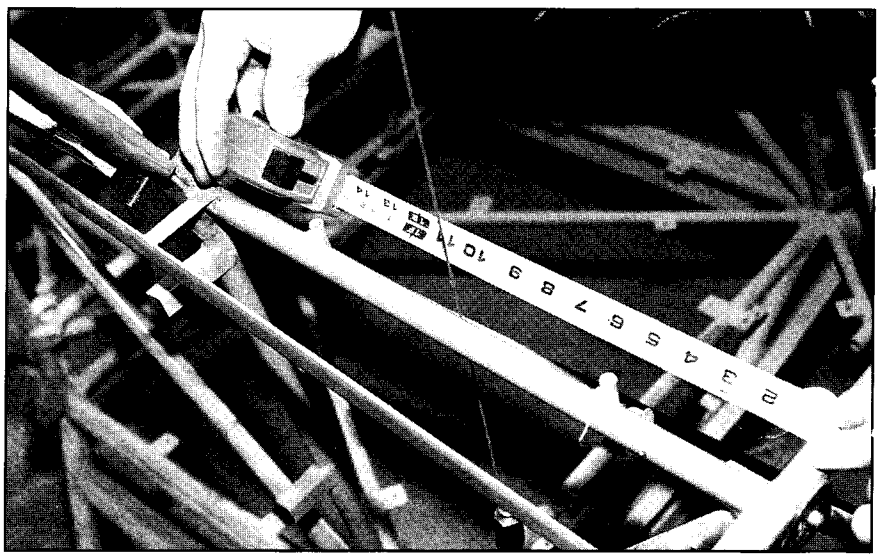
We built a simple jig and built "N" struts for 4 of the 5 Acro's being built in the area.

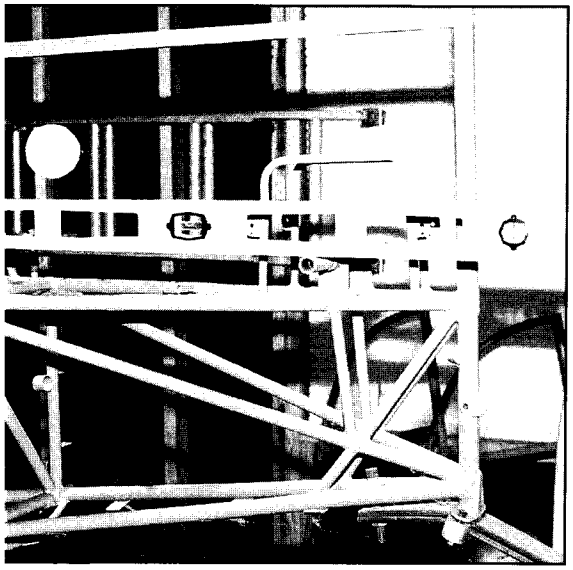
The photos in this article are of Bruce Owens airplane. Bruce built a new home and just finished his shop or he would be farther along.

The first step is to level the fuselage left to right, and front to rear. A four foot level works pretty good for this. We used a long straight board down the center of the frame to see if any one cross tube was high or low. This airplane proved very straight and true.

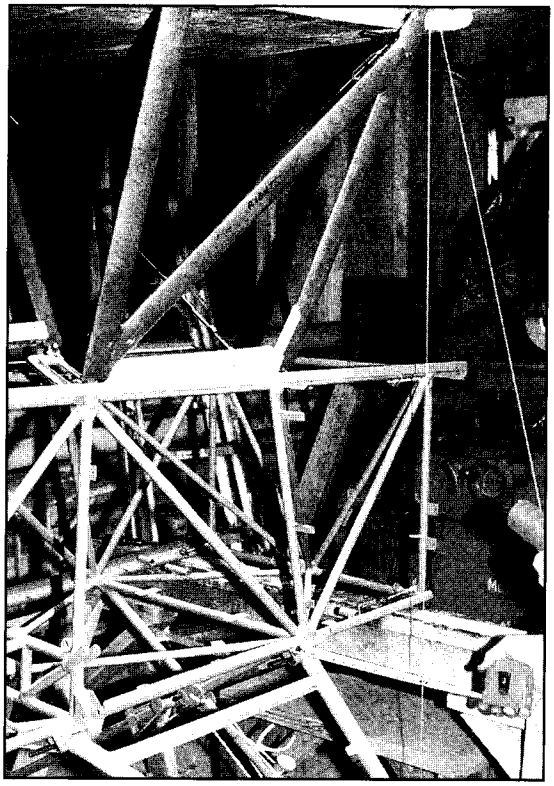


Left and Below - Using the front cross tube as the datum, a plumb line is dropped from the leading edge. Both sides measure exactly 10 1/2" proving the wing section is square to the fuselage.





l with fuselage jigged at 1½°. Builder-pilot a good place to start.



Left and Below - With the center section in place, center the wing section left to right. This airplane is exactly 12½" on each side and the center section checks level span wise.

We worked the horizontal stabilizer first. All you need is the rear spar carry through, and the "H" tube. These parts were all built to print dimension. With a level on both carry through tubes and no shims, the assembly was about 1° down in front. A 5/16 shim set the spars at 0 incidence.

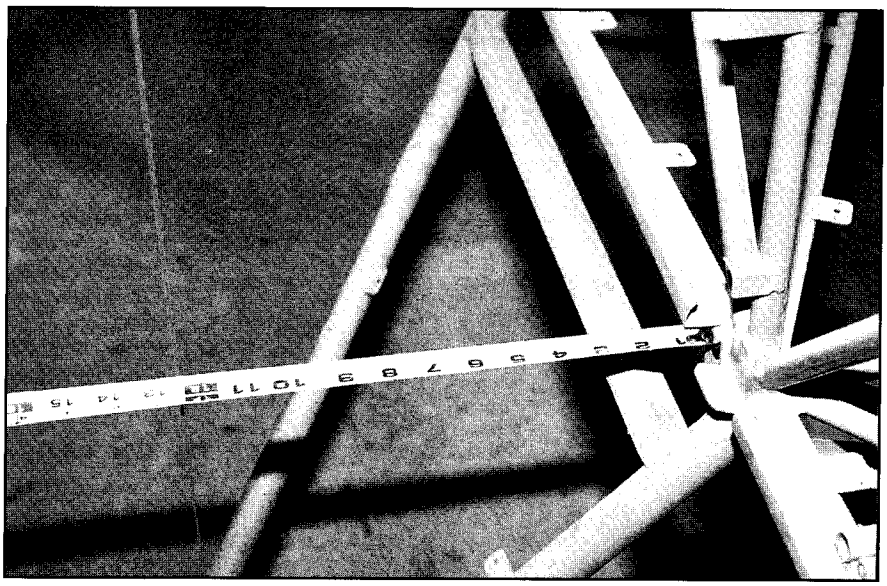
In newsletter #61 Don Baker gives some values for rise/run. These are actually sine values of the angles given. To know how much shim is required for a given change in incidence, multiply the sine times the length of the spar center lines. Simply put, to raise the stabilizer 1.5° multiply the sine of 1.5° (.026) times the spar center line (19") and you get .497". Call it 1/2". Since this airplane had to have 5/16" shim to get the 0 incidence, it required a total of 13/16" shim for 1.5° of lifting incidence on the tail. (leading edge up) Builder reports suggest that 1.5° is a good place to start.

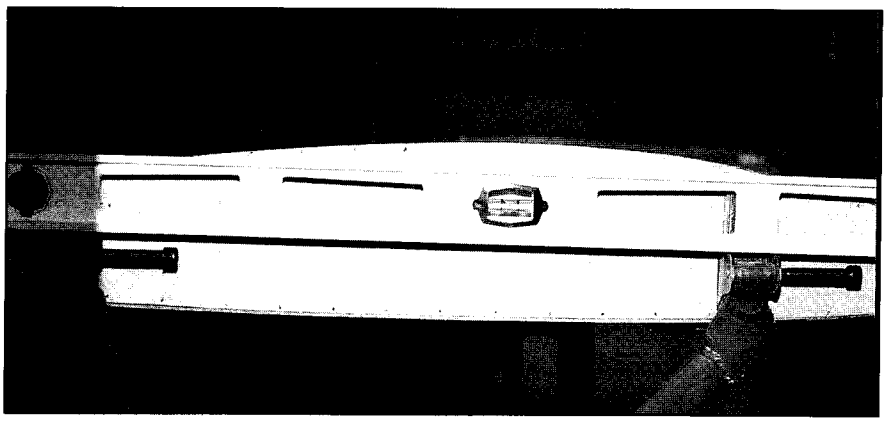
It's a good idea to set this incidence before you build the stabilizer sections. If you don't and find out later you need a lot of shim, it may put the bolts in the "H" tube in a bind.

Light weight engine/prop combinations may require more incidence where as a heavy engine with a C/S prop may need to be closer to 0° or even down loading incidence on the tail. A shorter motor mount would be a good idea with a heavy engine/prop combination.

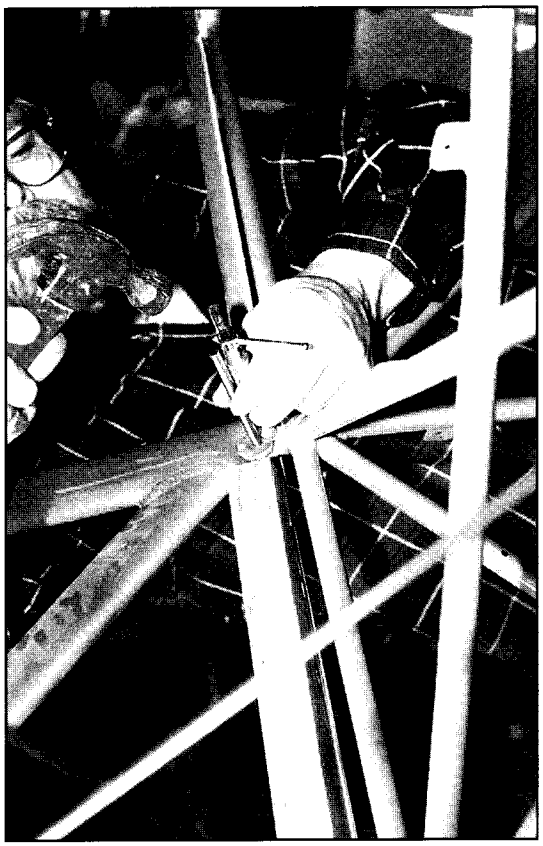
With tailplane incidence taken care of we can move on to the top wing center section. I don't like to work harder than I have to when setting angles so I would rather set an angle one time and then just level everything from that point.

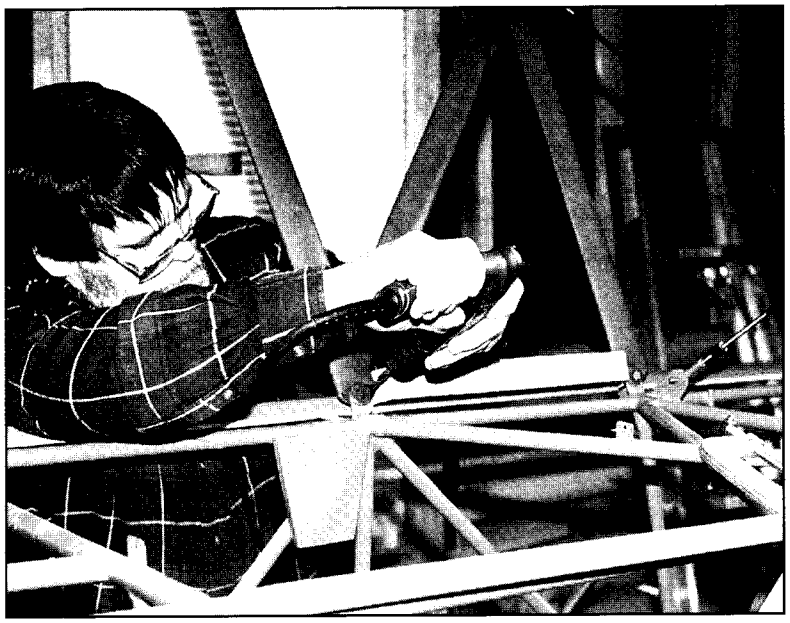
Use the same sine value of .026





With the wing section squared and centered left to right, a level is placed on the spar attach plates. Bolts are only in the forward fuselage attach point at this time. The wing section is shifted forward or aft until it reads level. Check both sides.





Left and Above - With the wing section set and the struts clamped, transfer punch, then drill the rear mounting holes.

times the length of your level. In this case 48". (.026 x 48 = 1.256) A 1 1/4" shim at the end of a 4 foot level is 1.5°.

Set your shimmed level on the fuselage and raise the tail until it reads level, then the wing attach points (both upper and lower) can be checked with a level.

Now, if you did an accurate job of building the top wing spar attach plates, and located them to the spars properly, the cord line will be parallel to the top of the wing attach fittings. With the fuselage jigged 1 1/2° tail high, set the level on top of the spar fittings. When the bubble centers, the incidence is set.

To get to this point we must first mount the struts to the fuselage. Locate one of the front strut holes in the strut tab on the fuselage. The first hole is going to be the "KEY" point for alignment. You must determine a datum line on the front of the fuselage that is perpendicular to the fuselage center line. If you built the tube structure accurately, you can use the front cross tube as the datum. If the right front strut tab is your KEY point, then what ever dimension it is from the datum you established must be duplicated precisely on the left tab. Yes, you must determine a datum for the height of the hole too. If these two KEY holes are not located symmetrically, the center section will be skewed to the center line of the airplane, and it will be impossible to get all four wings to rig properly.

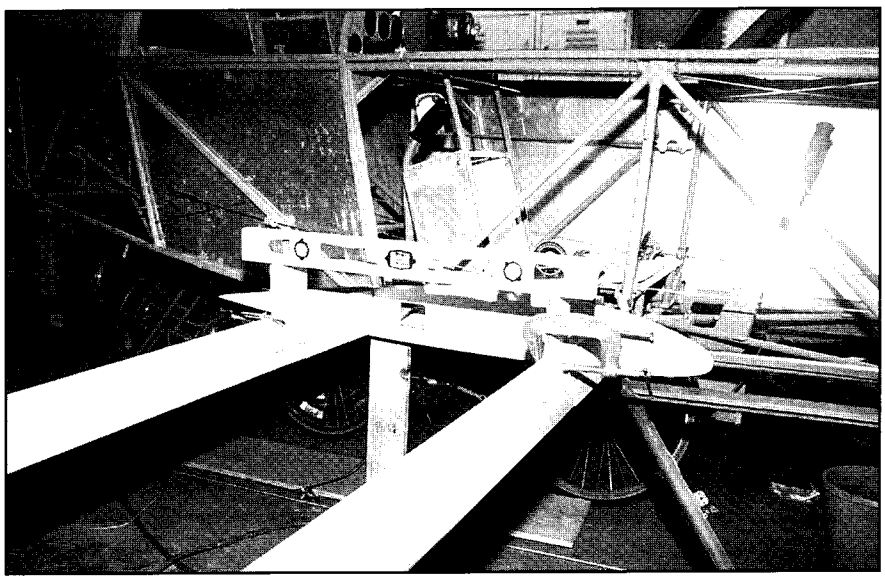
The CENTER SECTION is the HEART of a Biplane.

With the holes located in the two front tabs, we can install the struts and center section. If you have your roll wires you can install them or make up some means by which to adjust the center section left to right. (I have used hay, OK, safety wire and looped it through the anchor points then twisted it with a stick.)

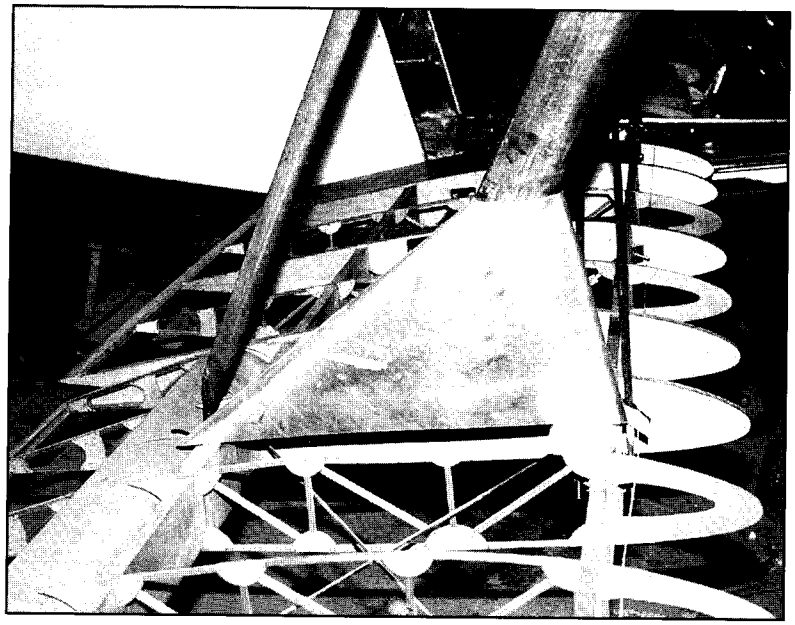
Drop a plumb line from the spar fitting and measure in to the longeron. This airplane measured 12 1/2" on each side and the center section checked perfectly level when the level was placed span-wise across the ribs. After setting the left to right location, move the level to the top of the spar fittings and pivot the struts on the front bolt untilth bubble centers. C-clamp the strut to the tab and then do the other side. Check everything again, then transfer punch and drill the rear holes.

If you think that an irregularity exists from one front strut to the other, drill only one KEY hole and clamp the other strut to its' front tab. Center the wing section as previously explained. Since we suspect some error we must check the alignment of the wing section for square to the fuselage. This can be done one of several ways. Here are two.

Pull a string down the center line of the fuselage and drop a plumb line from the center of the center section leading



Fuselage 1 1/2" tail high. Equal length plates were clamped to the spars so a level could be placed on top. If you have a second set of hands you can just hold the level against the bottom of the spars. Once the spars are set square and level the rib locations can be laid out.



Left - Proof of an accurately built "N" strut. The first upright should check 90 to the top of longeron. If the rear strut is too long the front strut will lean back on top.

Above - Back to my own airplane. One of the very early issues of the Newsletter has an Acro I in it that used aluminum fairing on the I struts. I like the way it looked and I'm considering it for mine.

edge and a line from the center of the trailing edge. They should line up. Working with the free (un-drilled) front strut, move it back or forward to correct square, and up or down to correct level.

The second method is to drop a plumb line from the leading edge and measure forward to the datum line you established in the beginning.

I used a method of laying out the bottom wing that allowed them to absorb any irregularity or lack of parallelism that may exist in the welded fuselage. After making all the wing parts, but prior to assembly, I positioned the fuselage directly over a line on the shop floor with a perpendicular line exactly under where the front spar of the lower wing would be. (The fuselage is still $1\frac{1}{2}°$ tail high.) Nail but don't glue the plywood doublers to the root end of the spars and drill all the mounting holes $\frac{1}{4}$". When you make the wing attach fittings that weld to the fuselage, drill them $\frac{1}{4}$" also. You will drill them out to $\frac{5}{16}$ later. Slip some ribs on to the spars and clamp the attach fittings to the fuselage. Adjust the front spar to line up with the line on the floor using a plumb bob. Do both wings at the same time so there won't be any stagger between the bottom wings. Set the spars level (no dihedral) and jig the root and tip rib level. (remember the fuselage is set to $1\frac{1}{2}°$) This is easily done by holding the level against the bottom of the spars since the cord line of both spars is the same from the bottom. With both sets of spars set square to the fuselage center line, lay out the rib locations on the front spar only. This could have been done with the spars on the bench. Now use a carpenter's framing square to transfer the rib locations to the rear spar. Tac weld the wing attach fittings to the fuselage. Now the incidence is set and the wings will assemble square to the fuselage.

I have known builders who built the wings and fuselage without any interaction between the two, then had to use the internal brace wires to force the wings into alignment. This is not unacceptable, but it sure is nice if you don't have to force things into alignment.

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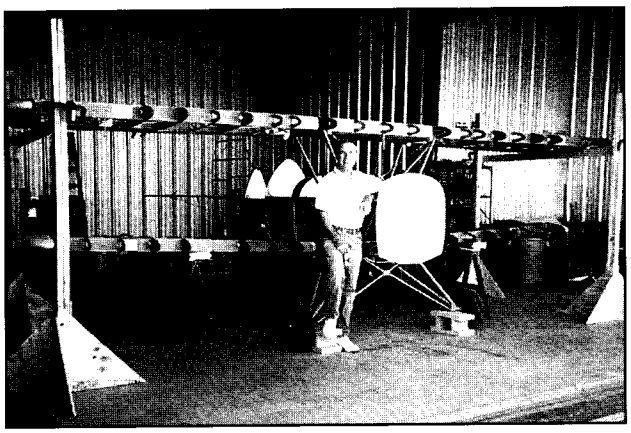

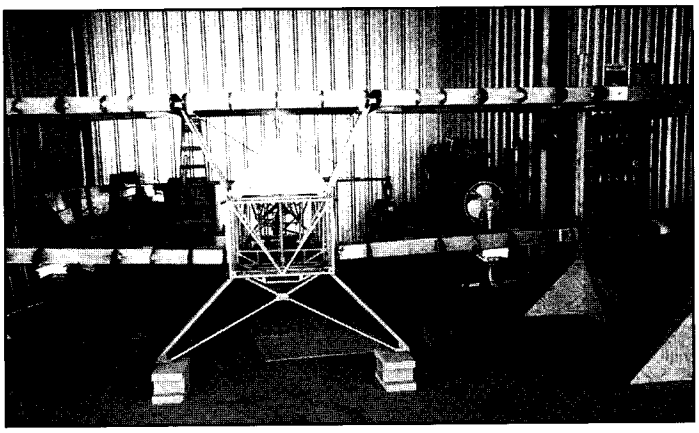

Left - Donald Champlin with his Acro II project. Fuselage is leveled and blocked for rigging.

Above - The Acro II with firewall removed. Note plywood and 2x4 supports for wings. These jigs should make rigging and I-strut installation much simpler and accurate.

Letters

Dear Paul,

Thank you for your kind response to my questions about the engine mount for the ACRO SPORT II when I called you last week. I have started cutting and fitting the tubing for the mount to the jig I have attached to the fuselage. With all of the compound angles involved fitting the tubing to the mount spools I'm doing it slowly with hacksaw, round files and grinder but it's working out OK. The notes for the plan sheet that gives the diagram for the mount suggests tack welding the mount while it is attached to the fuselage and then removing it for final welding. The jig I'm using is quite rigid and I'm inclined to think I'd be better off doing the final welding with it attached to the fuselage since I have the firewall mount spools and the fuselage spools bolted together and that way I can be sure of correct final alignment. (Don't want the thing "walking around on me" during final welding!) It will require some overhead welding on my knees or back but I've done that before.

The enclosed pictures were taken at my hanger in Avra Valley Airport outside Tucson about a month ago. Since they were taken I completed the I struts and the aileron interconnects. I purchased a Lycoming 0-360-CIC with only 100 hours since MOH from John Merak, a local acrobatic competitor. He had it in a Pitts until he retired from acro competition a couple of years ago. Now his Pitts (less engine) hangs in the entrance to Tucson International airport. The engine was ported, balanced, and generally souped up by the folks out in Mena, Arkansas when it was overhauled and turns out around 190 BHP so it should do nicely in the ACRO II.

I started my ACRO back in 1988 when I bought plans SN 2025 after having fallen in love with a picture of your prototype. My acro is completely plans built and what an experience it has been. Along the way I went to school and got an A&P and learned how to gas weld, do sheet metal, you name it. The FAA says homebuilt aircraft are for recreation and education and I can sure attest to that!

It has been a longer process than planned; for nearly six years I didn't work on the ACRO when personal priorities forced other use of my spare time. Last year I moved from Oregon to Arizona and finally was able to get back to my favorite pastime...the ACRO II. I hope to have her flying by July of next year.

Thanks again for your time and help.

Sincerely,
Donald Champlin
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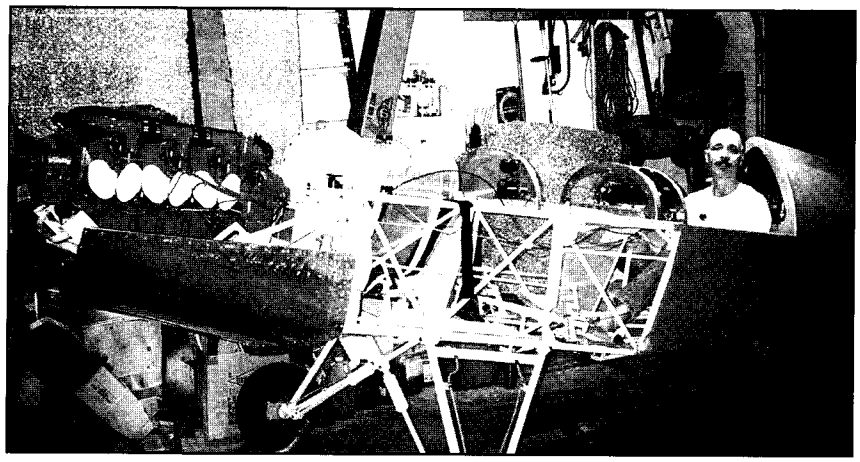
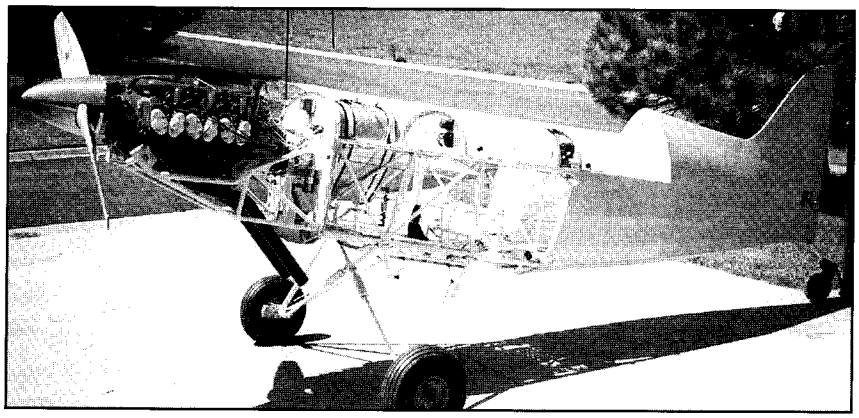
Darryl Flager's "Miss Ginger"





Top - Darryl Flager tries it on for size. This was January 1999. He's well on the way to Oshkosh 2000.

Bottom - Notice long nose and lean profile that the 6-cylinder engine give to Darryl's Acro II

I started N327DF, Miss Ginger, in March of 1988 when I received my plans for my fortieth birthday. Life begins at 40! I named her after my wife. When I need more parts I just tell my wife "Nothing is too good for Miss Ginger!"

1850 hours and 11 years later I have started the engine - a continental IO-360A six cylinder of 195 HP. It purrs like a kitten. I hope to paint within the next few weeks. I still have to build the engine baffles and install the wheel pants (and a million other little things). Maybe Oshkosh 2000?

I have only made a couple deviations from the plans. I changed the brake pedals to move in harmony with the rudder pedals as did the late Dick Henry as shown in Newsletter #58. I also extended the aileron well lips to close the gaps between the well and the aileron, similar to what Kurt Schwabauer did as shown in Newsletter #58. We will see how that works.

The biggest "uh-oh" during the building process was the sheet metal brackets that run most of the length of and are welded to the lower longerons. The plans are not clear here and I had to cut them totally off, rebuild and lower them to line up with the firewall. All better now.

I was very fortunate to have had Steve Mannweiler's beautiful Acro II, "Lonesome Linda" only 75 miles away to study as he was building which was a tremendous help whenever I got "lost". Words and pictures don't compare to seeing up close in detail. I would recommend a new builder locate other Acros to study periodically. Steve has been a tremendous help to me.

I would be glad to answer any questions from new builders though I am far from an expert.

Better get back to building!

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Paul Poberezny doing what he enjoys doing most - building aircraft.

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