THE AUSTRALIAN HOMEBUILT SAILPLANE

Editor: James Garay

Volume 6 Issue 21 **June 2001**

G'day folks ... with this issue I have completed my fifth year as Editor of this magazine. I took the task from our founder Mark Stanley in June 1996, it was a very sad moment when we all heard that he was not able to continue as Editor. He devoted much of his time and effort to get the group up-and-running that it seemed like a pity that the group might cease to exist if no one wanted to take over as the newsletter Editor. So...I raised my hand and volunteered for the task, without knowing how demanding it was going to be. At the beginning it was very hard for me, I had to have everything done in time and I had to ask for some help, fortunately there was Peter Raphael, to whom I respetuosly call him The Erudite, helped me along side with members of my family, my son Eddie my daughter Virginia and my friend Sergio Jacobi to whom I thank very much.

It seems only yesterday, but in reality its been five years!

Besides, I was building the Woodstock which it is now finished and as I said before and I always, will do, if I did not have the help of Malcolm Bennett and Peter Raphael it was never going to be finish because I was stuck and worried on how to attack the next step.

Now my Woody-Roo is finished thanks to my friends and at the moment I am working on the trailer to make it road worthy and making the fixtures to accommodate the glider inside the trailer.

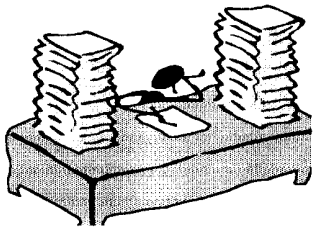
I contacted GFA (Gliding Federation of Australia) - Mike Valentine, Senior Technical Officer Airworthiness, for an initial C of A inspection and initial registration.. After paying the correspondent fee AUD$511.00 (Yes...! fellows, all my pocket money is gone) I was given the registration VH-IKL

The matter is now in John Ashford's hands (CTO/A). I expect to test flight it at Tocumwal airfield as soon as all the paper work is done.

Malcolm Bennett's Woodstock is very well advanced in the construction phase. Also, another Carbon Dragon is under construction in NSW by a very enthusiastic gentleman named Simon Bleuler. Soon another Woodstock will be born in the hands of Brian Berwick.

If you receive this Journal with the remark "COMPLIMENTARY COPY" it is your final issue unless you renew your subscription. At the moment my folder is empty and I need your contribution in the form of articles that can fit into any section of our newsletter.

James Garay
Editor



Address all correspondence to:
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Australia

Inside This Issue

MAIL BOX

Dear Ed,

Please find my A.H.S renewal form. At present I am setting up a low temperature gas fired oven in an attempt to blow mould a Perspex canopy for my LSI sailplane and also for my partly made Maupin Windrose.

Soon I will know if this project is viable then I will send you an article detailing the method. If... successful!.

I find the A.H.S Newsletter very interesting and informative. Keep up the good work. Regards. Vic Kruhse.

Dear Ed,

Please find my A.H.S renewal form. Have you flown your "Woody-Roo" yet? I would love to see you flying it.

I could not get to the Vintage A.H.S week in January. It was too hot and the UV was to strong for my skin-cancer complaint. I hope to do some gliding when the milder weather arrives-if ever!.

Keep up the great work with the A.H.S You do a B$^{\#@*\$}$y great job. All the best - J. Biggs.

Dear Ed,

Thanks for the copy of Dec 2000 magazine. Great reading! Please enroll me for a year.

Have you any information whatever on a side by side 2 place twin engine motor glider? I have heard that in the USA there is one with a pair of Rotaxs.

I did slope soar . The places down here (Tasmania) definitely are too risky with only one donk to avoid a long swim or worse. Regards, John Williams.

Dear Ed,

The crash involving a Windrose featured in the last AHS issue was an interesting story and made me reconsider my recent flight in a Canadian ultra light called a Lazair.

It has a very low sink rate (have to do some more tests) but a poor L/D so a glide to the strip has to be planned with caution. On active days the Lazair certainly does go so dancing and I am always careful to limit the angle of bank because of gust loads and handling.

I am still looking for a set of plans for a self launcher with a possible L/D around 20:1 and wonder if you had any knowledge on the latest "Swift" or the kit planes like the "Silent" Regards, John Thirwall.

Dear Ed,

Enclosed is an article about establishment of the Australian Gliding Museum for publication in your magazine. I have prepared this at the request of Alan Patching.

It is hoped that it is in a form suitable for publication, however if there are any problems please let me know.

I would appreciate receipt a copy of the magazine in which it is published in due course. Yours faithfully. Graeme Barton.Secretary.

Dear Ed,

Thanks for the newsletters. I am interested in putting a note in the newsletter for people to contact me with information about "American Eaglet" home built sailplane. I have purchased one that is 90% complete and would like to finish it. Also I want to know how to register the glider as a Homebuilt Experimental.
P.S. The GFA told me they have 3 Eaglets on their register. They are self launching. Thank you Phil Alaban. Port Macquarie.
Eds Note: *See the classifieds section. On reference regarding the American Eaglet, Mike Valentine from GFA. Told me that there is only one in their register owned by P.Wood. 112 Nicholson St. Greenslopes. Queensland.*

Dear Ed,

As mentioned to you on the phone I have decided to go ahead with Woodstock with upgraded spar to cater for a motor and 13 Mts. wing.
The seating will be moved forward some 75-100 m/m to cater for what I am told is a tail heavy tendency for the standard fuselage.
To date I have worked from a borrowed drawings and have completed all wings and tail ribs and the 1/4" fuselage bulkheads.
I need to obtain a set of drawings with an unused " construction approval number" and thought I would ask if anyone knows of an unused set in Australia that the owner may like to sell.
If not, I will send to the USA when I return from our winter holiday.
Thanks to those in AHS who have helped we to select The Woodstock. Regards. Alan Bradley. S.A.

Eds Note. *See the classifieds.*

TECHNICALITIES

WING RIBS AND GALLO SALAMI

by Joseph P. Alvarez

An excerpt from Sailplane Builder. With thanks.
(Sailplane Builder is the Official publication of the Sailplane Homebuilders Association. A Division of the Soaring Society of America)

An extremely light composite structure for flying surfaces can be designed and built using composite materials using a system that occurred to us when we were slicing salami. It actually was a Gallo salami. We joked about it and the name stuck. The basic idea is to make a very thick rib block and then proceed to slice it (like a salami) into ribs of different thickness, with the thickness determined by rib location in the structure and the resulting loads at each location.

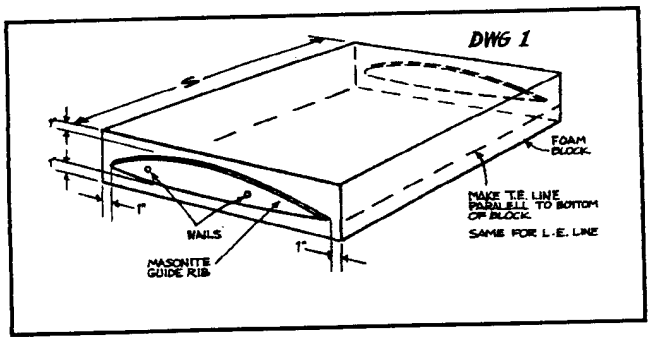
A simple stress analysis determines the rib thickness parameters.

For an experienced builder, the whole process for building about 60 high quality ribs should take about 4 working days. Structurally, if carbon fibers are used, a rib cap of 100"x .125" is equivalent to a stick of spruce 1.00" x 1.25"

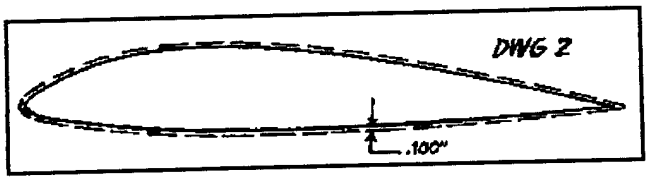
There are two cases where this system can be used:
Rectangular surfaces (constant chord)
Tapering surfaces (single and double taper)

Let's start with the simplest system, the constant chord wing. We will need two identical rib templates. They must have very smooth edges to prevent the cutting hot wire from "dinging." (Dinging is caused by an interruption of the smooth, constant movement of the hot wire. It happens when the wire gets hooked on an imperfection on the pattern edge, and then when the tension increases to the point where the imperfection cannot hold it any longer, the wire goes "ding" and catches up with the rest of the cutting). During the short period of time that the travel was interrupted at the imperfection, the hot wire has damaged the surface of the airfoil by cutting a groove in it.

Next, attach the smooth waxed templates to the 1lb. per cu. ft. Styrofoam block with two nails per pattern. Make sure you have at least one extra inch of foam all around the templates. See DWG 1. Make sure that both templates have the same angle of attack with no twist!



Remember that the foam block is going to be covered with unidirectional fibers (graphite or glass). For a 2 ft. chord, to be used on a small sailplane or light airplane, .080" is more than sufficient. That means that we must cut the foam blank .080" under size. All the popular CAD systems will automatically deduct the "cap" thickness at your command.



In our particular case, we do not have to consider just the thickness of the cap but also the thickness of the leading edge "D" tube, a.k.a. "Taco Shell." Let's suppose that we need two plies of #7781 glass, or better yet two of #282 graphite. At .010" each ply, we need to reduce the patterns by another .020" all around.

So .080" + .020": .100"

To determine the "span" of the foam block, "S", we must know how many ribs we are going to need, how thick they are going to be and how much the saw blade is going to take with each cut.

Example:
We need 56 ribs x .100" = 5.600"
Blade: .055 x 55 cuts = 3.330"
Total = 8.930" = 9.00"

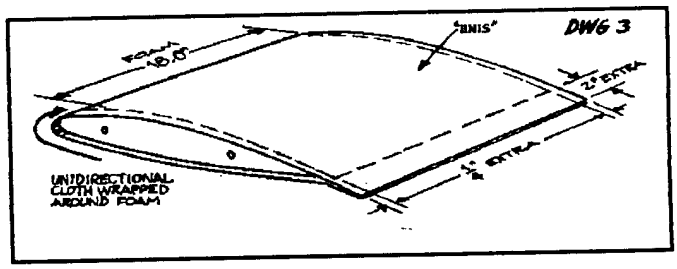
If it is your first time, we suggest you use at least double that or 18.00". (We used 36.00"). Because it takes
some time to set the guide of the band saw to cut a rib of even thickness (and remember you are going to
get a lot of requests for free samples) a larger than necessary block is a good investment!

You many also want to use two ribs, about 2" apart, at the end of a surface, covering them with the customary two ply cap strip to prevent the fabric cover from pulling on the end ribs. Also you may want a properly sized, stronger and stiffer rib where you are anchoring controls, struts, hinges, pogo sticks, etc.

Cut the foam using any of the popular hot wire techniques. Do not remove the templates

Use a light coat of spackle to fill the imperfections on the surfaces. Sand lightly. Remove the dust.

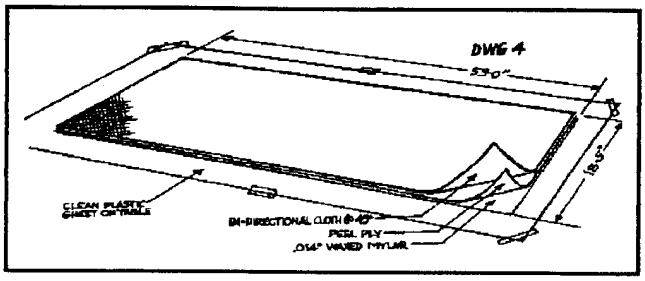
Cut two rectangular pieces of cloth at _+45ø, long enough to do the following:
Starting at the trailing edge (T.E.) with an extra 2" hanging out, go around the block, the leading edge (L.E.)
and back to the T.E. You should have 2" extra.



Now let's suppose that the cloth wrap measures 18.50" in width and 53.00" in length. We will need two of them (at _+45ø) and also the unidirectional cloth, called unis. In our case, the required thickness for the unis came to .080". Size them at 18.50" x 53.00".

On top of the clean laminating table, lay a piece of plastic drop cloth .004" thick and about 30" x70" in size. You will need two of them.

On the center of this clean, clear plastic sheet, lay one sheet of .014" waxed Mylar, 18.5" x 53". Over it position a section of peel ply of the same size. Continue with one ply of bi-directional (bid) cloth. Make sure that the bid fibers run at _+45ø and that the ply measures 18.5" x 53". See Dwg 4.



Cover with enough unidirectional (unis) cloth to get the required .080", making sure that the fibers are straight and run in the chord direction (0ø). Do not disturb the bi-directional cloth below! We will refer to this unidirectional layer as I ply.

Lay the last (bi-directional) ply directly on top of the unis, being careful not to disturb the 2 plies below. Again, be sure that the fibers in this last ply are oriented at _+45ø.

Measure your resin and hardener carefully, according to the manufacturer instructions. In a very well ventilated area, mix with a modified tongue depressor. Turn the mixing container between your fingers, making sure that the squared tips of the mixing stick reach the corners of the cup. Five minutes of mixing will do.

Pour part of the mixed epoxy over the three plies of cloth and peel ply. Using a clean squeegee, spread the resin over the cloth. Add more resin if necessary.

Cover the wet lamination with the second sheet of clear plastic drop cloth.

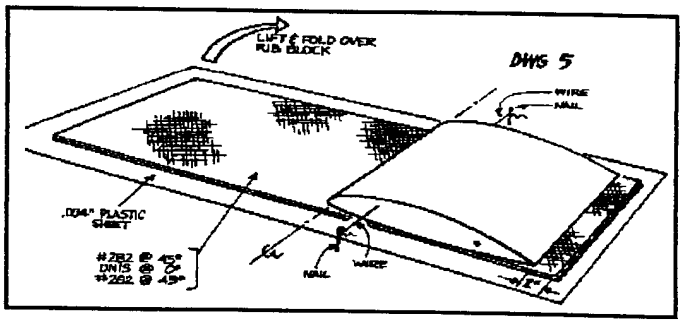
Move the resin into the cloth by going over the part with a clean, dry squeegee. Flop the whole sandwich over and continue to squeegee until all the plies are wet through.

Squeegee the excess resin out of the lamination. Starting at the center of the rectangle and pressing hard, use your squeegee to remove all the air bubbles and as much of the resin as possible from the sandwich. Keep working from the center toward the edges until you can not get out any more excess epoxy.

Use a marker to draw the rectangle section the correct size to be used to cover the foam rib. Do not trim off the extra 2.00" at the T.E! Cut off the excess around your 18.5" x 53" rectangle with sharp scissors.

Remove the top plastic sheet. Discard. Put the foam rib core over the wet laminations making sure you leave the 2.00" extra at the T.E. See Dwg 5.

Pulling from the other end of the lamination, fold it over the rib block.



Note: We clamp the T.E. section of the wet lamination to the table so we can pull as hard as possible around the L.E., making sure that there are no wrinkles on the unis over the entire lamination.

Wiggly fibers do not carry compressive or tension loads very well try pushing on wet spaghetti.

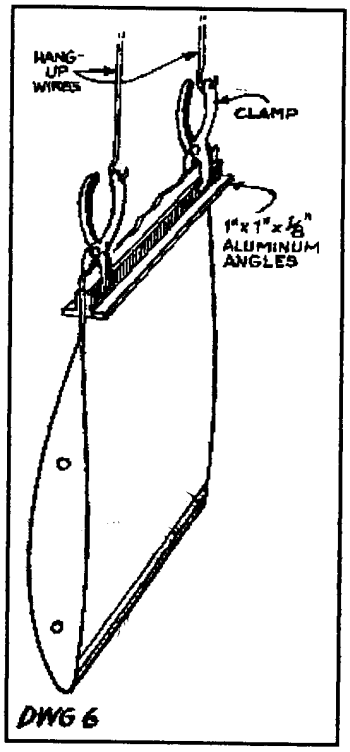
If you measured, cut and laminated carefully, the lamination on the top should end at the T.E., over the one in the bottom, with about 2.00" extra.

Now we have a big fat rib with the two Masonite templates affixed to the foam, one at each side, covered with three plies of composites, a peel ply, a .014' thick Mylar and a .004" plastic drop sheet. Remove the drop shoot and discard.

If necessary, "massage" the sheet lamination through the Mylar sheet to smooth out any bump, wrinkle or imperfection. We use an aluminum bar, just longer than the foam box. Go from the L.E. toward the T.E.

If any extra epoxy was still in the laminations, it should be out by now.

Following Dwg 6, clamp the excess material at the T.E. using two aluminum angles approximately 1" x 1" x 1/8". Use C clamps. Hang as shown and allow it to cure.



After proper cure, remove the clamps, aluminum angles and Mylar. Do not remove peel ply!

If you have access to a table saw big enough to cut the height of the rib in one pass, set the side guide at the thickness you desire (less 100", the desired rib thickness).

If you cannot use a big table saw, use a band saw. Once the saw is set, use a piece of wood or foam to make some trial runs. Measure the thickness of the sample part and the width of the saw blade cut. Measure both ends with a micrometer. Make the necessary adjustments and make another cut on your test block.

When you are happy with the results; start cutting the ribs. Start the cut at the L.E. Feed block into blade at a constant speed. Do not force, because this will misalign the blade, especially a band saw blade.

Measure that first rib. Is it .010" thick? Is the thickness constant? How is the Styrofoam holding up? Do you notice any abnormality? When you are happy with the results, cut all the ribs.

Note: If you are still getting ribs that are slightly thicker at one end after all the effort to adjust the saw and the guide, cut the rest of them but alternate the direction of the slicing: #1, L.E. first, #2, T.E. first, etc. Remove the peel ply from each rib.

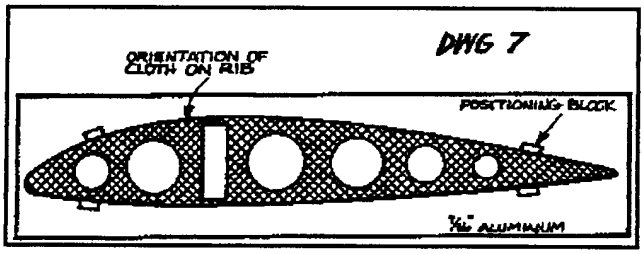
Remember, if you need special ribs for the purposes discussed earlier, cut them now. Always cut extras.

Rib Webs

Now we have a foam rib that has enormously strong caps, but nothing to carry the shear loads between them. We must add webs, or in other words, we must cover both sides of the ribs with cloth. In order to carry all the loads efficiently between the rib caps, the "taco shell", the trailing edge and the spar, we must orient the web fibers at +45ø.

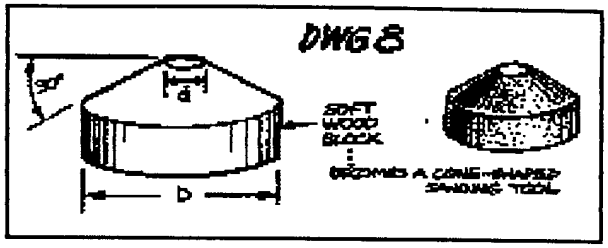
Ribs in close proximity to hard points or heavily loaded areas will need stronger webs. Examples: Root ribs, control surfaces, hinges, bellcranks, pulleys, struts, etc. Ask some engineer type with composite experience about this.

We are always searching for a way to reduce weight, so we are going to cut lightening holes in the webs. We also must cut openings for spars, fuel lines, controls, wiring, etc. For this purpose, prepare an aluminum template. See Dwg 7.

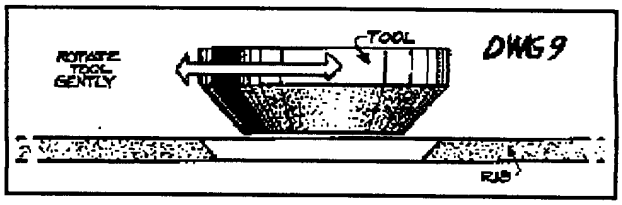


To use it, lay the rib to be cut on a piece of particle board. (Do not use plywood or wood because the grain is going to "derail" your X-Acto blade, making it go in all the wrong directions.) Slowly, using a new #11 X-Acto blade, cut away the Styrofoam visible through the openings in the template shown in Dwg 7.

The round holes must have their periphery sloped at 30ø. To do this quickly, we use a special tool. See Dwg 8 & Dwg 9.



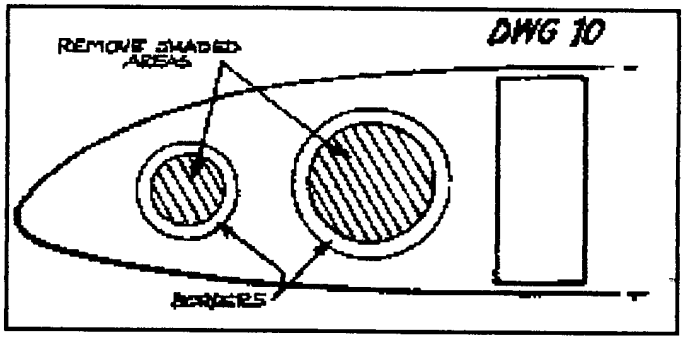
Where D= biggest hole in the rib + 1/2" and d= smallest hole in the rib - ½"



Any piece of softwood will do. Machine the conical area, dunk the conical surface in epoxy, shake excess and sprinkle with sand. After it has hardened, you'll have a very handy, 30ø sanding tool. Holding the sanding cone with your fingertips, rotate the tool into rib holes with very light, even pressure...just enough to produce a 30ø sloped edge. See Dwg 9.

Using the same method for wetting cloth between two sheets of plastic, wet one ply of #120 glass or Kevlar over a strip of peel ply. Brush some resign on the rib's webs and laminate both sides of the rib with the #120 cloth at the 45ø orientation. For a better finish, a stronger structure and lower weight, vacuum bag the lay-up at no more than 6" of vacuum.

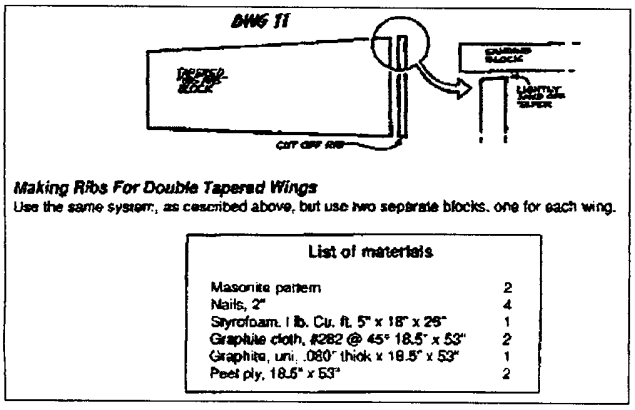
After the epoxy has cured, remove from bag, trim all around the rib with a razor blade and remove the fiberglass from the lightening holes except for a .25" border. See Dwg 10. Now you can go and show your newly completed rib to everyone in sight!



Making Ribs For Tapered Wing Surfaces, Single Taper

Calculate how thick the rib block has to be, considering these things: Number of ribs required Thickness of all ribs
Extra material needed for the saw blade cut.

Add all three amounts and multiply by 2, since we need a right and a left wing. Proceed as indicated above, separate the ribs, numbering them. Separate in two groups. Even numbers for the left wing and odd numbers for the right. This will give you an even, progressive taper. After the wing has been assembled, and before bonding the T.E., the taco shell and the cap strips, remove the small exaggerated angle at the top and bottom of the ribs. Use a long sanding block, at least 3.5 rib spaces long. See Dwg 11.



Making Ribs For Double Tapered Wings

Use the same system, as described above, but use two separate blocks, one for each wing.

List of materials

Masonite pattern	2
Nails, 2"	4
Styrofoam, lib. Cu. ft. 5"x 18"x 26"	1
Graphite cloth, #282 @ 45ø 18.5" x 53"	2
Graphite, uni, .080" thick x 18.5' x 53"	1
Peel ply, 18.5" x 53"	2

MORE ABOUT CANOPIES - ANNEALING

By Peter Raphael

Annealing means that plastics parts are first heated up and then cooled down slowly.

Plastic withstand considerable tensile stress as long as they are not exposed to corrosive media at the same time.

Causes for tensile stress are, for example:

* Machining operations like sawing, milling, turning and grinding
* Thermoforming
* Varying heat levels
* Shrinkage of adhesive
* Distortion during installation (clamps, drill holes, screws)
* Shrinkage after local overheating due to incorrectly ground tools or polishing.
* Impeded thermal expansion
* In case of Plexiglass XT and Makrolon, an especially with tubes, internal stress caused by the extrusion process.
* External loads.

If corrosive media are additionally present-eg, solvents and thinners during printing or painting or painting, monomer vapours during laser cutting, plasticiser from PVC insulation material, sealants, foils and aggressive cleaning agents-crazing may be the result and the parts become useless, even though the same media do not harm parts which are free from stress. Therefore the simultaneous presence of tensile stress and corrosive media is to be prevented.

Since it is impossible to rule out that the material will be exposed to harmful substances in use, any tensile stress should be eliminated by annealing. To this end the parts of PLEXIGLASS GS.PLEXIGLAS XT or MAKROLON are put into suitable ovens and are heated to a temperature below their softening point for a period of time depending on their thickness, Then they are cooled down slowly. Fast cooling results in a cold, stiff exterior skin, and more tensile stress is built up since the material shrinks on the inside during cooling.

The following annealing conditions apply:

Temperatures

PLEXIGLAS GS. 80 C (unformed parts up to 100 C)

PLEXIGLAS XT. 70 to 80 C (unformed parts up to 85 C

MAKROLON. 80 to 95 C (embrittlement sets in above 100 C)

Annealing time

PLEXIGLAS GS and PLEXIGLAS XT the material thickness in m/m divided by 3 is the annealing period in hours, but the minimum is 2 hours.

MAKROLON " overnight" at least 8 hours or longer.

Cooling

The cooling time in hours is the material thickness in m./m divided by 4. The cooling rate to be strictly observed is 15 C per hour. The temperature on removal from the oven must not exceed 60 C.

CLEANING AND CARE

Only clear water is needed to clean and preserve PLEXIGLASS GS, PLEXIGLASS XT and MAKROLON.
If the dirt pick-up is more pronounced, the water should be warm and contain a mild household detergent. Dry rubbing is to be avoided in all cases. Before drying the material-eg. With a sponge, shammy leather or glove lining fabric-care must be taken that all dirt particles have been removed.

Especially after intensive rubbing, plastic become statically charged, whereupon they attract dust. Therefore they should be treated with the antistatic cleaning and preserving agent by BURNUS, which is sprayed directly onto clean and slightly soiled material (or after careful cleaning) and spread with a soft cloth without wiping the material dry. The dust repellent effect lasts for a good while.

Windows and other glazing areas can be cleaned by means of high-pressure spray-cleaning until, if necessary with the addition of some dish-washing liquid.

WHAT'S NEW?

Actual status of the Manque glider

By Alejandro Ramirez Pineiro

Both moulds, RH and LH leading edges are finished. The leading edges will be one piece, 7.2 m long each one. Prior to build the final parts, we need to do a vacuum test for each mould to verify that there does not exist leaks.

At the moment we have not decided about the material to be used in the leading edges; can be glass or carbon sandwich with a 3 mm thick, 70 kg/m^2 PVC foam.
To decide what combination we'll use, we made some test. Here are the data and results:

Material	Symbol	Weight
Glass, style 120	G	105 gr/m^2
Carbon	C	163 gr/m^2
PVC foam core, 3 mm	PVC	210 gr/m^2
Epoxy resin		1.1 gr/cm^3

Sandwich	Weight
G + G + PVC + G	1090 gr/m^2
G + PVC + G	890 gr/m^2
C + PVC + C	1080 gr/m^2

According to the German standard LN 9128, the 0.8 mm (1/32") plywood should have a maximum weight of 760 gr/m2. If we add the weight of Dacron fabric (60 gr/m^2) and dope (100 gr/m^2) needed to make a good finish (without painting), we can get a total weight of 920 gr/m^2 (without including the material needed for joining the sheets), for the original leading edge of the Carbon Dragon.

Having this for reference, we can see that the better alternatives are:

- C + PVC + C with 1080 gr/m2, and
- G + PVC + G with 890 gr/m2

The inertia and stiffness of the new skins are a lot higher than the original plywood. This feature will allow us to reduce the number of ribs. Maybe no ribs at all, only the ones needed for the water tank.

We have made the foam core templates for the leading edge. This work will allow us to save a lot of men hours in foam cutting.

To optimize materials and processes, the ailerons and flaps will be produced with the same configuration as the leading edges. The aileron/flap mould is finished.

The mould for the main spar is almost done. The spar will be done with bi-directional carbon for the web, PVC foam for the core (12 mm) and carbon rovings for the caps or longerons. The mould will allow us to apply vacuum.

For the wing assembly the leading edge moulds will be used like jigs. This conception saves time and money when you want to build more than one glider.

Pictures of parts and processes can be found at www

AUSTRALIAN GLIDING MUSEUM

by Graeme Barton

Early in 1999, a small group of long term gliding enthusiasts commenced planning the establishment of a national gliding museum. Since the initial meeting, the Australian Gliding Museum has been incorporated under the Victorian Associations Incorporation Act, it has become affiliated with the Gliding Federation of Australia, it has been admitted as an institutional member of Museums Australia, the national body for museums in Australia, links have been established with overseas gliding museums and with other Australian aviation heritage groups, and it has received endorsement from the Australian Taxation Office as a Deductible Gift Recipient. This means that donations of $2 and upwards are allowable deductions from taxable income by the donor.

The aims of the Museum include the establishment of a permanent exhibition of gliders and associated items of equipment and memorabilia for public display, to refurbish and return to flying status where possible examples of Australia's gliding heritage, to hold regular demonstration flights of refurbished historical gliders, and to provide displays for exhibition throughout Australia. Fundamental to these aims is the encouragement of greater participation in the adventure of flight.

A definite site for the Museum has not yet been established, but we are hopeful that, along with other aviation historical groups, it will be at Point Cook. The Committee of the Australian Gliding Museum has been an active participant in a group working for the retention of the RAAF base at Point Cook as the national aviation heritage site. An announcement on the future of Point Cook is awaited.

There has been widespread support from the gliding fraternity for the establishment of the Australian Gliding Museum. To date we have approximately 30 gliders which we are following up for acquisition by the Museum either on a gift basis or loan basis and we are confident of acquiring the majority of these aircraft. They range in condition from pristine condition to badly damaged condition. Where possible, it is the intention to restore these aircraft to flying condition, and, if this is not possible or desirable, to static display condition. In addition, a significant collection of gliding memorabilia is being acquired and the development of a scale model display of gliders which have featured prominently in Australia's gliding history has commenced.

If any reader of this article is aware of the location of any vintage glider or significant items of gliding memorabilia, irrespective of condition, we would appreciate your advice.

A program of refurbishment of gliders in the collection has commenced. Currently, refurbishment of a Primary glider, which has involved fitting of new fabric to the aircraft, is close to completion. Work is about to commence on refurbishment of an Olympia sailplane, which was designed originally to compete

at the 1940 Olympic Games which were never held, and on the Schneider ES50 Club 2 seater, the first aircraft to be produced by Edmund Schneider in Australia following his arrival here in 1951. Refurbishment of a Flying Plank to static display condition is well advanced.

Refurbishment of a Schweizer TG3, a 2 seater type which was used extensively for glider pilot training by the US military in the second World War, a Slingsby Austral T35 2 seater (believed to be now the only one of its type in the world), and a Slingsby T31 2 seater will commence as soon as resources are available to work on these projects. A number of other projects can be commenced as soon as resources are available.

Currently the refurbishment programs are only being undertaken in the Melbourne and Benalla areas. It is hoped that the program can also be extended to some interstate locations as we move further down the track. We are urgently in need of more workshop space in the Melbourne area and would appreciate offers of assistance.

The refurbishment of these aircraft can only take place through voluntary effort and through cash donations. Teams are being set up under the guidance of experienced aircraft workers to carry out the work. This is an ideal opportunity for those wishing to improve their aircraft woodworking and fabric skills. Should you be interested in becoming involved in this exciting project, please contact the Australian Gliding Museum secretary, Graeme Barton, at 2 Bicton Street, Mount Waverley, Vic, 3149, or phone 03 9802 1098. Membership of the Museum is available for an annual subscription of $15 which covers the financial year through June 30.

The viability of this exciting project is dependent on voluntary effort. You can support the project by:

- Becoming a member of the Museum.
- Making tax deductible cash donations to the Museum.
- Assisting in the refurbishment of aircraft.
- Advising the location of any vintage gliders or significant gliding memorabilia, irrespective of condition, of which you are aware.
- Advising the location of any suitable workshop space in the Melbourne area which could be made available for use by the Museum.

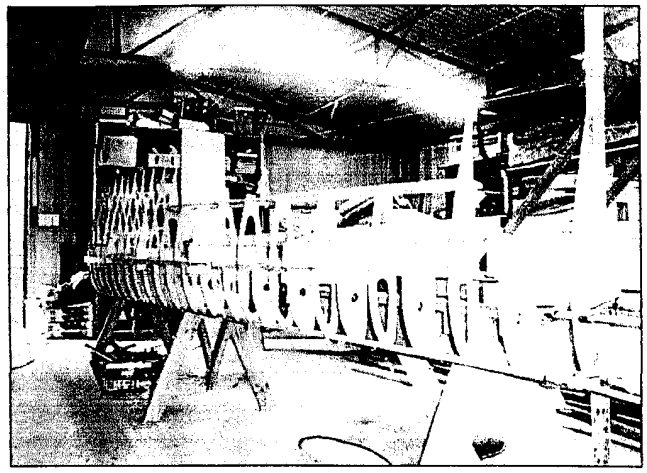
There is a limited window of opportunity available for the preservation of Australia's rich gliding heritage. We must not miss this opportunity.

SHOP TALK

ABOUT MY WOODSTOCK
by Brian Berwick

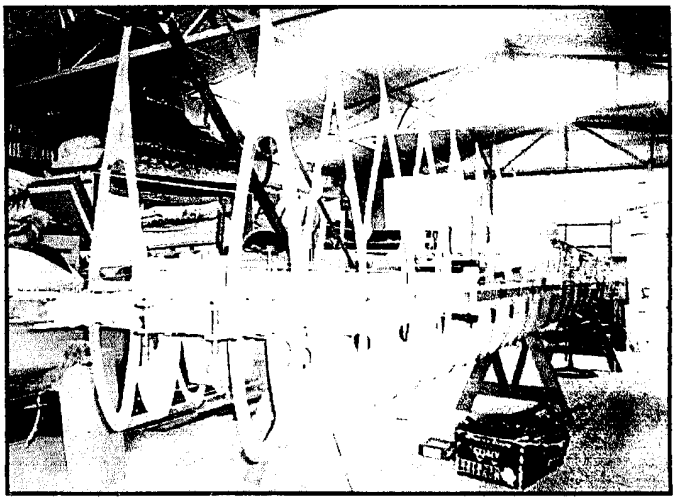
As promised, here is an outline of activity (or lack of) with my Woodstock during the past six months.

We've had quite a good seasons gliding at Leongatha, so that has eaten into some building time. Another major distraction has been the extra time spent at work with the Ansett B767 debacle since Christmas.



I have had no contact with our group since the fly-in at Bacchus Marsh. What a great day that turned out to be, nice to see the Duster flying at last, a truly great effort.

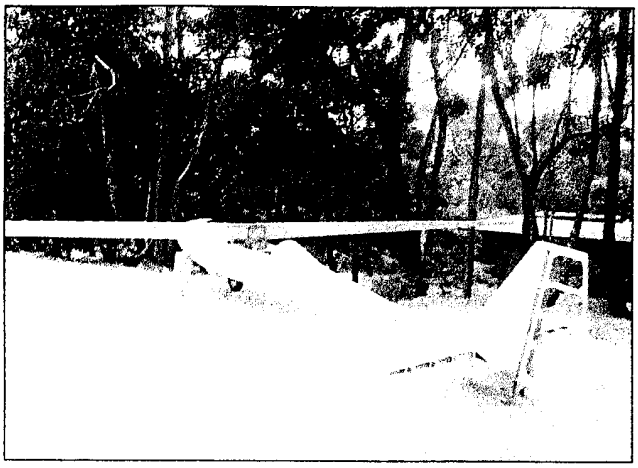
I was fortunate enough to get in a couple of flights with our friends from the Vintage Glider Association. One in Kookaburra GRN with Ian Patching, (a bit squeeze for two of our size). And the highlight of my flying season, a flight with Kevin Sedgeman in K4 KKI.

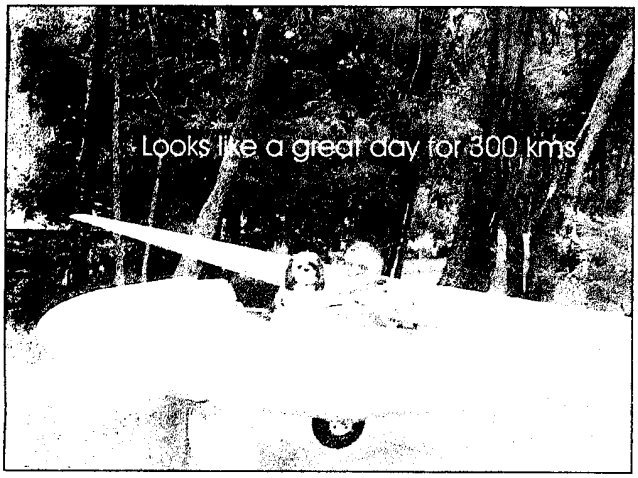


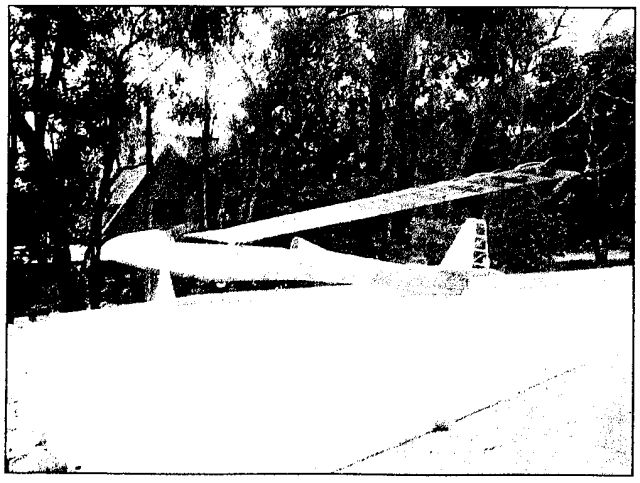
Neither of us were sure of the controlled air space around Bacchus so we smiled as we got on radar, cracked the spoilers and still went up!! It was a privilege to fly with him and something I shall treasure for years to come

Back to the Woody, I needed to rearrange my workshop so I took the opportunity to take some photos with it loosely assembled out in the garden. With the wings now back in the jig, I have started construction of the aft of spar area. One wing has all ribs and the aileron spar in. The other is alongside awaiting the same treatment, I have used the first side as a pattern so the second should go together a bit quicker.

Well that is a very brief report of happenings here in Belgrave, I wish you well with your imminent test flight, I would like to be a witness, please let me know when it is planned . Back to sawing.







MY LATEST PROJECT

By Malcolm Bennett

I acquired a part build Woodstock from our founder Mark Stanley of South Australia some time ago and as we have now finished Jim Garay's Woodstock I will be concentrating on my project and here is my report requested by our Editor.

When bought the project the fuselage was at boat stage with open tail feathers; to this time it is now finished with cables, pulleys, tail feather ply and fabric covered. Fairing for the fuselage to the elevator complete. Rear wheel mounted and faired.

Instrument panel is made and ready to be bolted in place. Nose cone complete including flush access door to enable any ballast and the battery mounted in the nose to be charged without removal of the nose.

Nose cone has ventilation duct build in such that when the nose is fitted it connects to canopy ducting automatically.

All wing ribs are made and ready to be glued in place. Spars are just about ready to take the ribs.

When some of the aircraft in my workshop have been removed I will permanently set the table and construct the wings.

Completion hopefully about 18 months away for another Woodstock in the air.

PERPETUAL MOTION

A new Scientific Theory(An excerpt from the Internet)
Courtesy by W. Wood

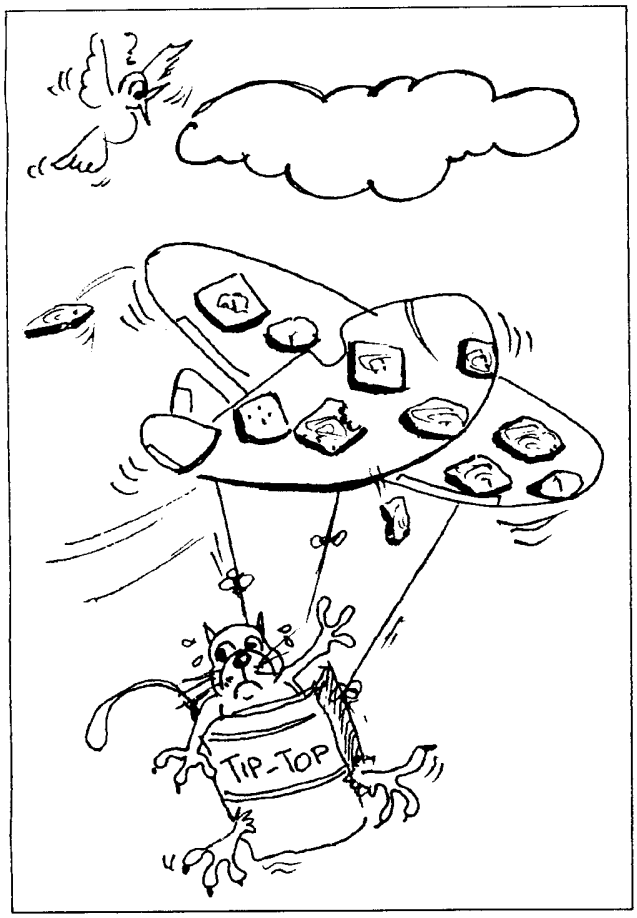
When a cat is dropped, it always lands on its feet, and when a toast is dropped, it always lands buttered side down, Therefore, if a slice of toast is strapped to a cat's back, buttered side up,

and the animal is then dropped, the two opposing forces will cause it to hover, spinning inches above the ground.

If enough toast-laden felines were used, they could form the basis of high-speed monorail system or the same system in a home built glider like the "Woodstock" will achieve an L/D=Infinite, making it very hard to beat in any World Championship.

I have been thinking about this cat/toast business for a while.

In the buttered toast case, it is the butter that cause it to land buttered side down it does not have to be toast, the theory works equally well with Arnott water crackers. So to save money you just miss out the toast and butter the cat.



Also, should there be an imbalance between the effects of cat and butter, there are other substances that have a stronger affinity for carpet.

Probability of carpet impact is determined by the following simple formula:

p=s* t(t)/t©
where
p= the probability of carpet impact,
s= the "stain" value of the toast-covering substance-an indicator of the effectiveness of the toast topping in permanently staining the carpet.

Chicken Tikka Masala, for example, has a very high "s" value while the "s" value of water is zero..
t (c) and t (t) indicate the tone of the carpet and topping the value of p being strongly related to the relationship between the color of the carpet and topping, as even chicken tikka massage will not cause a permanent and obvious stain if the carpet is the same color.

So it is obvious that the probability of carpet impact is maximized if you use chicken tikka masala and white carpet- in fact this combination gives a p value of one, which is the same as the probability of a cat landing on its feet.

Therefore a cat with chicken tikka masala on its back will be certain to hover in mid air, while there could be problem with buttered toast as the toast may fall off the cat, causing a terrible crash of the monorail or the glider resulting in nauseating images of candidate for the prime minister visiting accidents victims in hospital saying it would not happened if their party was in power as there would be more investment in cat toast glue research.

Therefore it is in the interest not only of public safety but also public sanity if the buttered toast on cats idea is scrapped, to be replaced by a monorail or the glider (Woodstock) powered by cats smeared with chicken tikka masala floating above a rail made from white shag pile carpet.

By the way better results have been achieved if the breed of the cat is Siamese or Burmese but they are expensive to buy, another cheaper alternative could be a tortoise shell for free in the Melbourne Trading Post.

MORE ON THE WINDROSE ACCIDENT

By Mike Burns

Dear James,
Many thanks for sending up all the information on the Windrose accident in the U.S.A I had not caught up with the

full story. I followed that up with a full check of the Internet and absorbed all of the published comments and opinions.

As the GFA(Gliding Federation Of Australia) Chief Technical Officer through the 1980's my job brief required me to "approve" new home built types for Australian construction. That process was tempered by the practice of issuing a full Certificate of Airworthiness for each home built when finished so we expected similar standards to production types to be achieved and certainly to incorporate all of the airworthiness and construction lessons, collectively learnt by the GFA system since 1952.

The Windrose gave a lot of concern when I processed it for Paul Johnson, it differed greatly from conventional sailplane design, its aim of simplicity leaning it towards "ultralight" design, which in the mid 1980's was trying to re-invent the wheel.

However that is the spirit of home building to be different and experiment, to a degree. We knew of the Windrose's debut at the Sailplane Design Competition in the USA and its problem with rear boom stiffness, that and a number of other items, resulted in the package applied to the Windrose to give it construction approval. I re-designed the rear boom for Paul as part of that package.

I knew that the basic package was just that and as the construction progressed a lot of other items would need sorting out. I left the CTO/A position before its construction was completed and had no more to do with it.

However my sense of responsibility remained, with the regret that I could not have finished the project right through to pre-flight inspection etc. Such thing as final boom stiffness,(now my responsibility), control circuit stiffness, weight and balance both overall and control surface, plus the all flying tailplane characteristics were my concerns.

I had the chance to meet with Jim Maupin and Irv Culver (the Windrose designer) and wen through all those areas with them. Most items discussed were agreed on but very little of it drained back to the construction drawings sold to keen homebuilders.

Irv Culver was fairly strong willed when it came to his work, at the same time he was a "flutter specialist" so things like flexible rear boom seemed out of context to me. (Remember that GFA also found the Woodstock rear fuselage to be too flexible, that was fixed on the drawings).

The Windrose appears to have been too simple or too "crude" for sailplane enthusiasts with only a small number completed and flown, that means there is a very small data base to use for "Safe History of Operation" to assess the final product's good and bad points.

Janice Maupin has endeavored to keep her father's work alive and that has been to the benefit of home building work wide. Janice now finds the company in a difficult position not knowing just what the true problems are. To their credit they have suspended sales of Windsor drawings until a final statement can be made on the USA accident. That will require several things, firstly a statement or final finding from the USA NSB investigation into the accident and secondly a full assessment of the Windrose design by one or more consultants.

Australia will help with that work, Jim Maupin's contribution to home building warrants that and it will be in the best interests of those people world wide with drawings or partly finished projects who now, do not know what to do. I will keep you up to date!.

TERRY (The Tiger) BAXTER REPORT

I thank James Garay for the article by Boris M Doikarevitch of Russia – Possible Future of Gliders! From my Out of Body experirnces while under life support from a serious accident where my lady friend from the Philippines also lost her life, I communicated with aviator long since dead. This is how my Ornithopter idea originated, also by breeding the "Ornithropter Piamus" a large species of butterfly.

Having watched the Pacific Gulls hovering at the cliff faces on the Casuarina Beach and laying on my back taking photos of the under plan view of their wings and a rear view horizontally, I came up with a proportional wing shape of about 28 feet wing span sloping forward 2 feet to the 20 foot mark with 1 foot of dihedral returning horizontal 1 foot backwards and with a chord of 12 feet at the root end remaining parallel most of the length returning at the tips. More or less a plank wing.

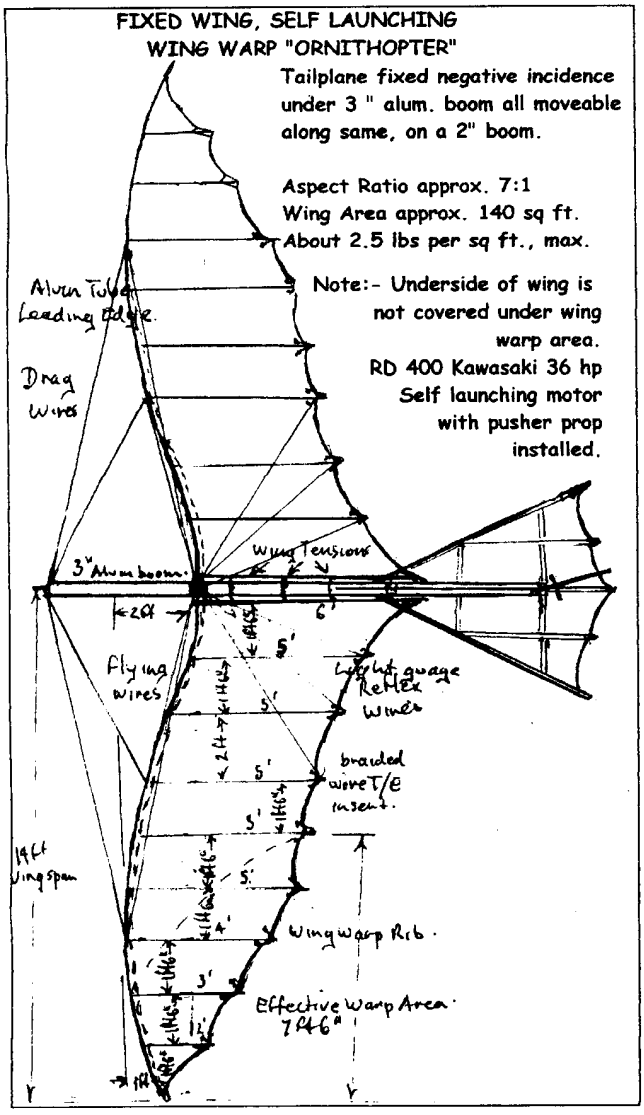
Originally I intended using blade skates down an incline for airspeed for take off but having leg braces from the accident and a back brace, I now intend using a RD 400 Kawasaki 3:1 reduction self – Launching motor. As I was informed in my out of body dreams, hand operated wing warping using bike brake handles for mechanical advantage, I could operate both handles together increasing angle of attack at the tips just as I observed the gulls at the beach doing, so having a flap effect for take off and landing. Combining weight shift control with the 2 axis control of normal aircraft with 100 lb compensation springs in the control lines by operating both wing warps together should obtain altitude in thermals the same way as birds flapping wings now and then to maintain height. As long as I have airspeed, and this is available because of the inherent weight of the ornithopter.

If I can maintain flight in the thermals with the motor just ticking over or stopped, I can restart the engine and return to any base. I have followed Doukarevich's ideas in general even before reading his article and as yet not even spent $100 in the manufacture of my Ornithopter, recycling anything that comes to hand , but all extremely strong.

I have manufactured the trike base out of my daughters mountain bike, a broken leaf of sons truck for suspension, the ply of a tea chest for the pod, a plastic chair from the Red Cross, a pump up air seat costing $14, Three salvaged wheels and the base of my massage table and other medical rehabilitation gear and the metal uprights from my daughters redundant swing set. My workshop has been the shaded area under a red flame tree with the lawn mowed at the front of my house actually out in the street; but that's normal in Darwin.

I have combined the weight shift control with in built rudder movement from foot operated steering gear for take off, in built negative incidence in the tail feathers to give the wing angle of attack at all times with wash out at the tips so they stall at a later date and can be controlled by the bike brake handles as flaps or for aileron effect. The rudder controls are connected to the go-cart steering of the front wheels so the control wires have to be reversed for the correct rudder effect.

I would appreciate any comments on wing span in relation to soaring, and is the gull shape of my wings feasible? I notice some of the flying wing gliders in the USA have a forward sloping leading edge and principally my Orni is a flying wing similar to a hang glider; maybe one day I will be able to join the soaring birds amongst the thermals.



MY CARBON DRAGON

By Simon Bleuler

I think it is about time that I wrote a bit of an update on my progress and what I have come across on my carbon dragon. I am happy to say we have finally started construction of the glider as of 1 month ago. It has been about six months of studying plans and talking to various people around the world that finally got us to this point.

We have found a few problems with the original that must be brought to the attention of future builders or even current owners, the first item that got our attention is the use of carbon tow in the main spar construction (thanks to previous articles in this mag) we wanted to know the compressive and tensile strength of the spars so we will be building our spars using carbon rods. Also concerning the main spar, at the wing root the wings are fixed together via a couple of alloy brackets which are bolted to the main spar. The problem arises from the bracket's bolt holes that are drilled straight through the carbon spar turning this section into a weak point. If you are planning to build the spar using carbon tow be sure to insert a tube and lay the carbon around the tube keeping it as straight as possible. Moving into the fuselage, the control pulleys are specified as 1 inch phenolic type, nothing wrong with the pulleys only the size. The 1 inch pulley cannot deflect the cable by more than 15 degrees and seeing how the cables for the rudder elevator and flaperons get deflected by nearly 80 degrees in some spots we needed to change to the 2.5 inch pulleys so as not to damage the cable.

On to construction

We decided to start with the fuselage the first step was to make the carbon tail boom skins, this was done in a half tube like mould made of ribs and lined with rigid plastic (a little hint: I used clear plastic to line the mould this allows you to see the finished surface when laying up, it also lets you see any air trapped between the mould and the first layer of carbon so as time can be spent in working this air out).

The shape of the glider has been changed to allow for a glass foam sandwich construction, which will make the overall structure stronger and intern safer. Most of the bulkheads are still in the same place with some changes made to the shape, all the bulkheads are placed in their correct station via a steel jig that sits on the table, and then filled between with high density polystyrene foam cut with a hot wire, so far the nose back to the wing tips has been filled and we are now working on the control linkages while we can get to them with ease. The next step is to fill the rest with foam and shape the foam.

That's about brought us up to speed with what has gone on so far, I want to have the fuselage finished in about 2-3 months so plenty of work ahead.

I am also going to fit an engine with a retractable prop to the glider, now that we have changed the shape it should fit in nicely above the wing.

That's about it for now, I will keep you informed of our progress.

Little Home-building news

By Colin Collyer

Having been asked if I could supply any information on scale models, I thought I might start with an event held at Bordertown SA last November. The Scale Soaring Association holds a flat field event at Bordertown every November, but this year (2000) they decided to promote the event, and invite a special guest from overseas. To say it was a success would be an understatement, over 120 sailplanes, from 1metre up to about 7 metres and from under 1 kg to about 25 kg. A lot of

them were models of modern sailplanes, I/We call them D.G. Thingamajigs, that start life as a fiberglass fuse /foam wing kit. Other are completely scratch built, including a 1/3 Nimbus 3, a 1/3 ASH 26E, a 1/3 Fauvette, 1/3 Golden eagle plus many others. As for homebuilt, a Monerai, 3 Woodstocks, Moba, Grunau Baby plus others. **ALL HOMEBUILT!!**

The format of the meeting is novel, in that "General Flying" and "The Comp" go on together, sharing Tugs, field, landing area etc. No problems, and in fact, some keen competitors entered 3 or 4 models in the Comp, to put that in perspective though, about 80% flew for fun only. The Comp was split between modern and vintage (pre Nov. '55) and static and flying scores, 3 flights each with 1 or 2 pilots choice maneuvers, plus all landings and takeoffs, all in all a relaxed event.
The Tugs present numbered about 11, but only about 6 did most of the work. Some were scale and some were purpose built Tugs, unattractive but effective! All had petrol motors from 38 to 100cc, more power equates to quicker towing and quicker turnaround. A tow to 1000 ft takes from about 30 seconds (small, light models), to about 3 minutes for the biggies, again not realistic, but effective. However, I did notice some people in the Comp selecting a Tug that matched their speed better, and that was a lot more realistic.
The social side of an event like this is also very good, highlighted with the talk by the overseas guest, Chris Williams, a modeling journo' from the UK. His talk was very good, giving an opinion on cheque book modeling and the satisfaction that scratch building gives, and then a little thought that scale glider people can build models as realistically as any power scale model, but we glider people get the sound exactly right! Nice One!

Some of the Models attending were:
Pirat (2) yes, that pink fuse one
Foka 5 (2) and Foka 4
Condor (2) both built by Martin Simons, one repaired by many others.
Grunau Baby
ASK 13 ASK 8 (2)
Slingsby Tutor, Swallow, Skylark 4, Gull 4
Fauvette
ESK 6
Monerai
Spallinger S18 (polished plywood and see through covering)

RESULTS

Vintage

Collyer	Golden Eagle
Wills	Jaskolka
Goldman	Spallinger S18
Crouch	Kookaburra
Carpenter	ASK 18
De Kuyper	Slingsby Gull

Modern

Wills	Fauvette
Goldman	Foka 4
Copeland	Fox
Copeland	ASH26E
Crowe	ASK 13
Collyer	Moba
Voak	DG 500

HINTS & TIPS

CLEAR VIEW WINDOWS

By Peter Raphael. (The Erudite)

Having had the opportunity to assemble a few canopies I have developed my method of installing a sliding window in the side of the canopies. Anyone who has gone down the path of attempting this will realize that the rails alone are an expensive item, and besides we homebuilders know the satisfaction gained by doing the job ourselves.
First consideration should be given to the position of the window and this should be determined a number of factors

- Within easy reach for operation from inside the glider
- The ability to provide some forward vision should fogging become an issue
- Provide access to canopy latches from outside the glider
- Near enough to shout through when the tow rope needs to be hooked up.

Once the position has been determined then it will be necessary to decide on the size of the window, I usually build them about 6" x 4" or 100mm X 150mm and this can be marked out by positioning masking tape on the outside of the window. In most cases the canopy with have some curvature in the area that the window is to be placed. It is at this stage that an oversize blank of 5 mm Perspex is cut and softened by heating to be pressed in position on the inside of the canopy, in its intended position. When cool it should retain the shape and be a suitable replacement for the piece to be removed.
A pair of rails can be readily made from strips of 2 and 5 mm Perspex, laminated together to create 2 channels. If there is significant curvature in the window this should be factored in to the rails, and can be established by pressing them into position against the canopy after laying them up and waiting for the glue to dry.
The rails will be glued in position before cutting the opening, this will help to reinforce the acrylic, ensure accurate alignment and minimise the distortion likely with the cutout in place. Before this is done the rails should be shaped sanded and polished as it is impossible to do this once they are attached. My preferred method is to shape radius etc. on the disc sander then use a few of grades of wet and dry paper before finally polishing with "Brasso" metal polish. Flame brushing can also be used but this requires a little practice.
When gluing the window in position I create a spacer piece to be taped between the rails before offering it up inside the canopy. A couple of blocks resting on the frame will set the height above the sill. This is a one shot effort so it pays to have a rehearsal before applying the glue. A few props across the canopy should supply sufficient pressure to hold it all in place if you have the curvature fairly right.

Once the rail spacing is determined the window can progress. A rebate needs to be milled around the edge of the window at a depth equivalent to that of the canopy thickness. Far from beyond the scope of the amateur, this can be done easily under the humble bench drill. I use a broken drill, ground to serve as

an end mill and set up a jig that will determine the depth and width of the rebate. The panel is fed by hand and in stages until the desired rebate is achieved, a little sanding, filing and polishing is required to finish the job.

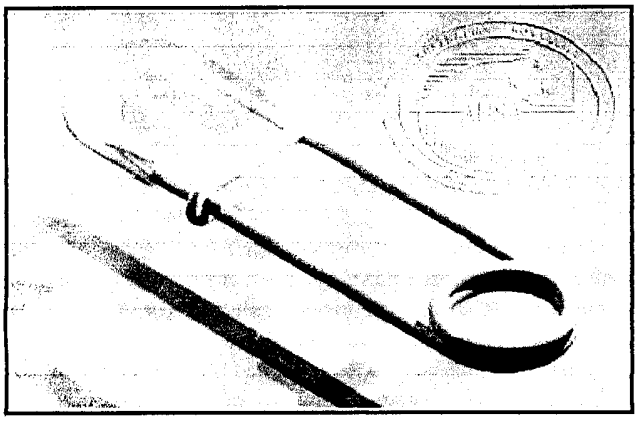
Once prepared the window can be slid into the tracks and positioned to allow the determination of the cutout. A holesaw is used to establish the radiused corners, be certain to use a backing block behind the holesaw and drill slowly to avoid cracking. Finally, cutting between the holes with a small angle grinder, a thin cut off disc is ideal and better than sawing, as this has the potential to cause cracks. The next step is to sand out the opening to provide a neat fit for the window. Patience and careful work is all that needed here to achieve a rewarding result.
All that remains to be done is to fabricate and attach 2 small leaf springs at the back of the window to hold it in position. Mine are generally made from 2024 strips 4 mm wide and attached by 2 handmade 3/32 countersunk soft aluminium rivets to the edge of the window frame.

Jim, tells me he has discovered an alternate source of a suitable spring. If you disassemble a VHS cassette case you will find a leaf spring designed to apply pressure to the top of the tape spools. With a little modification these can be utilised for the aforementioned purpose.

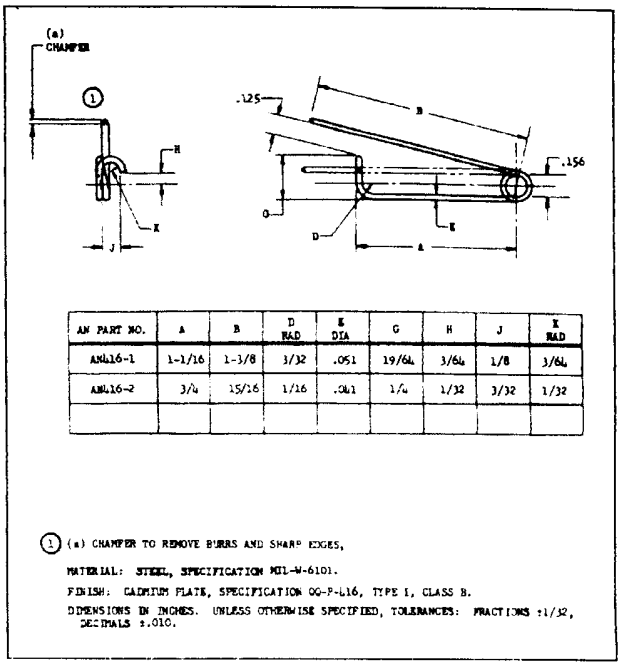
Finally a small perspex knob or grip is added to the inside of the window to allow it to be pulled inwards and slid back. At the end of this you should have a effective window at a fraction of the cost of a commercial unit

SAFETY PIN FOR CASTELLATE NUT

by Peter Raphael



Here's a great little idea extracted from the garay matter (sic) of your illustrious Editor. Most gliders have the odd castellated nut retained by a safety pin, designed for easy disconnection at rigging time. Jim has emulated the AN-416 aviation style pins by modifying the domestic safety pin. The picture is self-explanatory and with just a little modification you can achieve a rather attractive chrome plated accessory.



AN PART NO.	A	B	D RAD	E DIA	G	H	J	K RAD
AN416-1	1-1/16	1-3/8	3/32	.051	19/64	3/64	1/8	3/64
AN416-2	3/4	15/16	1/16	.041	1/4	1/32	3/32	1/32

1 (a) CHAMFER TO REMOVE BURRS AND SHARP EDGES,
MATERIAL: STEEL, SPECIFICATION MIL-W-6101.
FINISH: CADMIUM PLATE, SPECIFICATION QQ-P-416, TYPE I, CLASS B.
DIMENSIONS IN INCHES. UNLESS OTHERWISE SPECIFIED, TOLERANCES: FRACTIONS ±1/32, DECIMALS ±.010.

CLASSIFIEDS

We have a new subscriber to welcome to the group:

JOHN WILLIAMS P.O. Box 668 Port Arthur, Tasmania 7182

Phillip Alaban 33 Gordon St Port Macquarie. NSW 2444

WANTED - Completed or partially finished single sailplane preferably a self launcher.
WANTED - Study books and/or plans for gliders. Design Building etc.
John Thirwall.
P.O.Box 69
Northbridge 2063
Ph. 02 9958 7311
Fax 02 9958 0350

VINTAGE TIMES

Newsletter of the Vintage Glider of Australia. Editor Tighe Patching. 11 Sunnyside Crescent. Wattle Glen. Victoria 3096. Australia. Annual Subscription: AU $ 15

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21100 Angel Street Tehachapi, CA 93561 USA.

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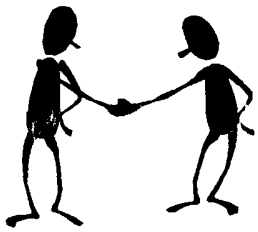

James Garay
Editor

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