THE AUSTRALIAN HOMEBUILT SAILPLANE

Editor: James Garay

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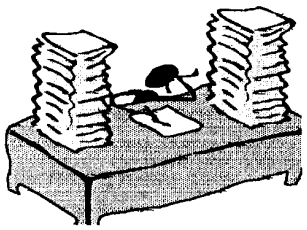

EDITORS CORNER

G'day folks!

I'm glad you think it's very nice to receive this humble journal every three months, even if you don't realise that I've been struggling and begging for some articles from you to be included in this issue.

My information folders are completely emptied and I don't have any thing to print for the next ***Christmas Issue*** which is due in the first week of December, 2002. Yes!...hasn't time passed us by very quickly and I haven't even had a chance to notice the time that has already past.

So...again, one more time I am asking you & each and every member of this group of interest to get a piece of paper and pen and write something that you think could be of interest to our group. It could even be a bit of gossip about your girlfriend, mistress or even mother in law will do. Write it all down and send it to me as soon as possible, I will do my best to include it in our next Christmas issue. But...you need to do it right now.

I must tell you that the issue you are reading now, has been produced with the help of Peter Champness and The Erudite, Peter Raphael, to whom I have to thank for their assistance...as always.

Also, Peter Champness has in mind to form a group of interest to build several "MONARCH" ultralight gliders designed in the USA by Jim Marske. Read the full project inside this issue and if you're interested in being a part of it, give Peter a call or write to him personally. Alternatively you could contact me and I will pass on the information.

On a personal note...I have to tell you that we have some curious people in our group, various people have asked me how old I am, at the moment I'm not going to tell you, and I will leave it to your imagination, all that can I say is that I'm young at heart and my health is in very good shape for my age!...and, yes...I'm married and I have three children aged 44, 41 and 33 years old and I also have several grand children...*make and take your own conclusions!*

James Garay
Editor

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Inside This Issue

MAIL BOX

Dear Ed,

Sorry to be late again with the subs you tracked me down again to my new address and new wife Edna of 18 months already. As I am still on my honeymoon quite a few things have been left a little undone. Anyhow it was good to talk to you on the phone again, except you made a remark that I was having a good time, you are probably jealous, but please don't tell the rest of them, as my hair is starting to fall out and my sight is growing dim. The Pope did warn us all years ago...we all should do our best to prove him wrong. Your turn next!!!

The tale of the ion engine sure was verging on the plausible impossible, but good clear fun.

Here is another with credit to Chris Deardin of S.A a good pilot of both hang gliders and sailplanes.

At last the Nambus 4 has passed all the static tests and is ready for his first test flight. It was developed by the combined efforts of several Germans Universities and glider manufacturers. The design alone cost several millions Euro and the building twice as much. The test pilot was none other than the great (late) Bulshish Schishenhausen of the Beerhausen Club.

All the tests exceeded the expectations and the glide angle exceeded the curvature of the Earth. So in the flight it actually gained height over most of the speed range. Unfortunately after four hours when it had reached 12000 feet and no Oxygen, as they did not expect this, they commanded the test pilot to operate the dive brakes and return to the airfield. Unfortunately the sad ending is that they malfunctioned and would not extend. He tried everything but nothing worked, gaining height all the while. Soon he lost contact and it is assumed that he is lost somewhere in space at the point of equilibrium, who knows. Such a great loss gliding will never seek such progress again. Vale Bulshish Shishenhausen and Nambus 4. *Regards K. Nolan.*

Dear Ed,

The American Eaglet Kit had spar splices supplied at only 12 to 1 ratio when the originally came to Australia. NOT AIRWORTHY. If they have not gone to 16 to 1 or better, it is better not to build or get a stress man to design a suitable modification. The example I saw was imported in the early 1970. *Regards. K. Nolan.*

Dear Ed,

After much searching I have managed to come into possession of a project meeting the following criteria:
Safe, Self launching, L/D 30:1 or greater. Affordable (meaning homebuilt!.) Perhaps I have bitten off more than I can chew, but my backyard now contains a huge box in which sits a ¾ built Strojnik S-2-A, obtained from Mark Fisher in NSW. The project contains 90% of parts required to complete it, including all of the hard to get parts, including a complete spare central spar with fittings.

Being a long way from the nearest gliding club, I intend to build under the AUF regulations, but being a glider I hope can met some useful contacts with the Australian Homebuilt Sailplane fraternity.

I welcome any contact from people interested in the project. Current efforts are focussed towards obtaining a building partner, but if unsuccessful I intend to complete it myself. There is somewhere between5-700 man hours remaining but a lot has already been done, fuselage pod made, ribs fitted to spar ready for skinning, rudder, flaps, ailerons also built and ready for skins.
Enclosed is a cheque for my subscription and I look forward to hearing from you or any member. *Regards. M. Habner.*

Dear Ed,

Please find enclosed cheque for the annual subscription. I would like to have back issues of the magazine if they are available, especially the last issue. I hold a Silver "C". I am keen to build a flying wing to my own design. *Regards, Lin Olen.*

Dear Ed,

Congratulations to you and your "WOODY-ROO" and all the happy flying hours to come in the future. My renewal for AHS is in it's way to Down Under.

Our Summer is in good progress and about two weeks early this year. On the first of June I did an out and return to a field near by (40 km) with our Grob 109B with the propeller feathered.

In the Easter weekend the club's SF-25C used the "Ottsjo-elevator" up to 5300 metres. Resulting in a nice background image on the club's computer. The yearly wave champ at Ottsjo produced several altitude gain over 6000 metres this year.

The EAA FLY-IN includes a talk about small jet engines in the range of 33 to 220 Hp for self launching. A very small jet device was on display. I did not manage to receive the trust figures.

My aerodynamic program has been improved, so it will plot the polar and optimal speeds curve automatically. The plot is saved in file text so any program can take it up and do a nice layout of it. Help is included inside the program.

The LG-1 glider data I needed, was found in your December 2000 Issue 18 it is a back and forward calculation, making it possible to use such data, Due to some internal secrets about DO and DI (zero drag and induced drag) it is possible to do it just right. It is a five minute job and the stall speed tells the Cl max for calculation. In this case, the stall gives no warning, because there is no downdraft before the stall. .Eg: the curve usually drops off in lower speed range before stall.
Thanks, for an interesting Newsletter and for all the new things involved. Many happy landings to all of you.. *Neil-Ake Sandberg. Sweden*

Dear Ed,

A week or so ago I got a phone call from someone whom I felt was a member of AHS telling me about U-2 Mitchell wings and Marske "Monarch". It would appears that the caller is interested in a group of people who'd like to build a "Monarch" each. I said that I know someone who is a carbon fibre expert who,d be willing to manufacture the spars for the group.

That same caller was to send me a set of U-2 plans for perusal and said that he knew of a U-2 kit where about. I am still waiting.

As you may have gathered by now I am keen on flying wings and very interested in obtaining a U-2 in any form, plans, kit, unfinished or damaged and yes I am also interested in Jim Marske Monarch and more so on the Pioneer -II-D.

Should you know the gentleman mentioned above, please.. ask him to call me again and if you would please form an advert out of the above in the next newsletter. Also wanted to know the where about of AHS members in QLD as well as the where about of any Mitchell wings especially U-2.

I know this is a big ask; however I have introduced several peoples to AHS it is now up to them to joint and as an aircraft builder (Amateur) I am willing to help any member who needs help in my general area.

Well that is all for now (at last), Bye for now, mon ami James. Happy landings, good thermals in your new sailplane. *Andre Maertens.Qld.*

Dear Ed,

Thought I'd pop the Lilydale Airport Newsletter in the mail for you, after our little chat on the phone the other day.

Hope you find it interesting reading etc. Concerning the "XIMANGO" exploits with the wave flying. I only found what "XIMANGO" means the other day- it's Spanish for Eagle (I'm probably the last to learn this one)
It would be nice to indulge, only for the big out lay in dollars etc. No harm in dreaming eh ! Jim,,, Any how I hope you enjoy what I've sent over and will keep keep you up to date on any development out this way.

I hope to catch up with you out at the Marsh one of these days and looking forward to seeing your "WOODY-ROO" flying. Leave some thermals for me. Regards. Doug Cole..

Editor's Note.
Spanish written " Chimango " is an Argentinian bird of prey very similar to an Eagle body in dark color spots mixed with vanilla and white colours, it is not an Eagle but belongs to the same family, it is smaller than an eagle (In Spanish..Aguila..!)

Dear Ed,

Enclose is my susbcription cheque. I am still flying The Carbon Dragon although not very often these days as I have started training for my G.A license I soloed not long ago in fact this process will take me a year or two no doubt depending on money. Perhaps one day I might get a tow rating. It is quite a bit different to gliding which I will always do but hopefully it might allow me and my wife and friends to get away for week ends and things so keep up the good work James, hope to catch up you again one day. *Regards. G Betts.*

Dear Ed,

My cheque is included. I was very pleased to hear that your Woody-Roo has flown. You may have heard through the grape vine that I have been relieved of my Woodstock plans to a guy in SA Alan Bradley, who was already well on the way with building his. I am still involved with hang gliding and I am in the process of designing (more like modifying) a self launching power pack for my hang glider. I have recalculated the stresses on the load bearing parts and the shears on the bolts for my own comfort. I am now redrawing the plan to fit my body and wing type.. I have enjoyed my affiliation with the AHGA and wish to continue, we have a lot to share. *Cheers. D. Hasse.*

Dear Ed,

Thanks you for your prompt answer to my request. I hope that three friends have since become members of AHS. I am refering to Lindsay Olen of Wooli.NSW. Jerry Leach of Murwillumbah.NSW and Raymond Tolhurst of Camden.NSW. I have a couple more possible at our local soaring club. Lindsay is a Silver C sailplane pilot (He has not been flying for years due to and accident that near killed him. Soon he will restart flying).Jerry is a motor glider pilot and Ray used to be an instructor at Camden, he is busy building aeroplanes and he is not doing any soaring at the moment but he will get back to it.

I had a call the other day from Dr.Peter Champness, sounds like a nice man. I am expecting a set of plans from him any day now (for perusal only at this stage).

By the way Ray Tolhurst is the man to talk to for carbon fiber spars and exotic fiberglass compounds. He is right next to a sailplane repair shop at Camden airport in fact they share a large WW-2 hangar.

Anticipating one of your lovely Newsletter (soon..?) Keep the good work, James.. no one can do it better. By the way my son tried the NET to contact the University of Aachem in Germany referring the propulsion system mentioned in a recent newsletter with no contact possible!

A few back issues of the newsletter would be welcome to try to increase the membership here in Gympie. Please.

Take care my friend, happy hours flying your Woody-Roo and many happy landings too. May all the thermals be mild. Bye for now. *Andre Maertens.*

TECHNICALITIES

STICK 'EM UP... or Glue Joints and How to Perfect Them.
By Malcolm Bennett.

These can be wood to wood, aluminium to aluminium or a

combination of dissimilar materials, and the basis for successful joints is the same. Joints should be close fitting and the surfaces should have clean, prepared faces before the application of the appropriate adhesive.

In the case of wood the surface must be clean but it is also important that the surface pores of the cell structure of the wood are open and not compressed. Ply straight from the manufacturer presents a fundamentally closed surface after production and requires preparation before gluing.

In this case it is essential to abrade the surface with sharp sandpaper to deglaze the surface film, a wipe with acetone or lacquer thinner will remove any oils natural or otherwise and any sanding dust likely to inhibit glue penetration. An important feature of wood epoxies is their ability to penetrate the fibres and create a bond stronger than the timber itself.

In the case of bonding aluminium, you must abrade the surface with aluminium oxide paper and degrease with acetone or lacquer thinner and then wipe off it with clean paper towel, repeating until the paper comes away clean. Obtain a copy of GFA /AN 68, it provides some valuable advice on the techniques for successful metal bonding.

The adhesive is mixed and applied with the least lost time possible so the surface does not oxidize before being covered with epoxy. Clamp the surfaces together without so much pressure that you force out all the adhesive. It is important here to select a glue that is suitable to the task. As with the cliché that "oils 'aint oils", so it is that "epoxies 'aint epoxies". 'Hysol' is a good adhesive for aluminium and one that has been successfully used in the construction of bonded aluminium gliders such as Dick Schreders HP series and John Monnett's designs.

An ideal epoxy for wood is Epicraft's Epiglue, as when it mixed and applied it will not run or drip, and is easily spread. It has good gap filling properties (not to be substituted for good joints) and has established itself in the boatbuilding industry as a marine wood epoxy.

If you use the Boatcote or West Epoxy systems then a thickening agent is required to be added to stop the glue running off the area it is applied to if it is not horizontal. These glue systems are well documented and it is important to observe the manufacturers recommendations. Use of inappropriate glue fillers may well result in joints substantially weaker than the substrates themselves.

Epiglue can be had in two curing temperature ranges. This is dependent on the selected hardener. Whatever adhesive you choose to use it should be spread on both faces so that when the joint is clamped up, a small squeeze out is present along each edge of the joint. The joint open time should not be overlooked as this will have a significant effect on glue penetration and final joint strength.

Curing should be carried out at an optimum temperature, as advised by the manufacturer of the chosen glue, Temperature management can be achieved by tenting and using a hot air heater blowing up into the tent or in the case of wing skins and large areas, by covering with electric blankets and leaving them on overnight. This is probably the best option as about 20 c even all over the area can be achieved and does not dry out the wood in the way a hot air heater will. If you're really lucky the wife might not even miss the electric blanket for a night or two. Buy a cheap digital Indoor/Outdoor thermometer to keep track of the temperature and maintain clamping until minimum clamping time has been achieved.

To check the joints when finished a visual inspection should be conducted to confirm that the joints are closed and squeeze out exists. In inaccessible areas such as inside wings, a mirror or a small TV camera can be used to observe squeeze out.

In the case of plywood skins, when the glue is cured you can check the bond line with a tap test carried out with a small plastic handled screwdriver, tapping along the glue line with the handle. A keen ear will recognise any hollow unbonded areas and these can be made good by drilling a hole and injecting adhesive with a plastic syringe to fill the cavity

You can also check glue lines on ply gussets by a finger nail test. This test is a recommended procedure when inspecting older wood aircraft assembled using adhesives less tolerant than epoxies. Hook your fingernail under the ply and gently lift. If it does not lift, the glue joint is probably satisfactory. If your fingernail comes off then you are probably trying too hard!

Sample glue joints should be made using off cuts of the materials being joined. Use the same preparation techniques and glue from the same batch. Later, tests can be carried out on these samples to make sure that the total cure has taken place. Date and identify locations for where each sample of glue went on the structure.

ALUMINIUM ALLOYS

Courtesy Alcoa Aluminium Handbook

INTRODUCTION

Aluminium alloys where developed over 60 years ago when it was found that the introduction of small amount of alloying elements such as, copper, magnesium, manganese, iron and silicon greatly increased the strength of pure aluminium.

Since the total amount of these alloys is approximately six per cent, this strength increase is achieved without appreciably increasing the weight. A tensile strength greater than the mild steel can be easily obtained.

IDENTIFICATION

Aluminium alloys found in gliders currently operating in Australia will have been produced in either, England, France, Czechoeslovakia, or the U.S.A. Worlds main source. Unfortunately they are not completely interchangeable and the glider manufacturer must be consulted when equivalent specifications are required.

Each country has a system of identification for wrought aluminium alloys as follows:

England. The British Standards Association identifies aluminium alloys with the letter L followed by two digits, e.g. L65, this is

purely a serial number in the Standards. Similarly, before the alloy is accepted into the Standards the Directorate of Technical Development identifies it by the letters DTD followed by three digits e.g. DTD363.

France. Alloys from France are identifieds by the letters AU followed by two digits and another letter, e.g. AU146.

Czechoslovakia. Insufficient details are available at this time to describe the system in use.

U.S.A. Since 1954 a four digits index system has been used; where the first digit identifies the alloy type, the second digit indicates specific alloy modifications, the last two digits identify the specific aluminium alloy or indicates the aluminium purity, e.g. 2024.

In the case of British and American sheet materials the designation is printed with a dye on one side of the sheet. American alloys also show the temper designation which is"0" for led wrought materials and "T" followed by one or more numbers for heat treated alloys..

HEAT TREATMENT

The temper of an aluminium alloy is one of the major factors governing strength, hardness and ductility, as well as other mechanical and physical properties.

Some aluminium alloys are hardened and strengthened by cold working or strain hardening which is accomplished by cold rolling, drawing and stretching. Other aluminium alloys are heat treated and their properties improved by what is termed solution heat treatment.

Any operation that may change the properties drastically should be avoided unless subsequent heat treatment is possible.

Hardened aluminium alloys may be annealed(softened) and worked further, however there are very few heat treatment facilities available in Australia to carry out this process.

The heat treated alloys uses on skins and strigers in gliders are most likely to have received one of the following treatments.

T-3 Solution heat treatment followed by strain hardening. Different amounts of strain hardening of the heat treated alloy are indicated by a second digit.

T-4 Solution heat treatment followed by natural aging at room temperature to a substantially stable condition.

T-5 Artificially aging after an elevated temperature, rapid-cool fabricating process such as casting or extrusions.

T-6 Solution heat treatment followed by artificial aging.

HARDENING

Following heat treatment some aluminium alloys harden naturally when the material is allowed to stand for several days at room temperature; other alloys however will not age harden sufficiently at ordinary room temperature and require an artificial aging treatment at an elevated temperature to produce maximum strength and hardness.

TYPICAL ALLOYS

There are two types of aluminium alloys in common usage in current glider structures namely aluminium/copper which is of lower strength and more ductile than the aluminium/zinc alloy. Typical values are shown below.

Alloy and Temper	Strength p.s.i.		Elongation %
	Ultimate.	Yield	
2024 - T3	65,000	45,000	18
7075 - T6	76,000	67,000	11

ADVANTAGES AND DISADVANTAGES OF ALUMINIUM ALLOYS

Aluminium Alloys have many advantages as a material for fabricating gliders structures. It is easy to machine, bend, etc and hence only lightweight tools are necessary.

Structurally it is fairly efficient, having an ultimate tensile strength to specific gravity ratio slightly greater than steel e.g., the ratio for 2024 is 25 x 10(cubic) compared wit to 23 x 10(cubic) for 4130 chrome moly steel.

Also aluminium is quit a clean material to work with, care must be taken in treating scratches on the hands to prevent infection.

Unlike steel, aluminium alloys have no fatigue limit, in other words no matter how small the fluctuating stresses may be, the material will ultimately fail by fatigue cracking. Also it is sensitive to notches and scratches, scribers must not be used for marking out, a soft lead pencil is normally used.

After cutting or working, all sharp edges must be removed by deburring.

Pure aluminium is corrosion resistant and needs no protection in ordinary environments. However aluminium alloy is not only subject to oxidation, but can suffer inter granular corrosion under stressed conditions. Hence sheet material is protected by a very thin layer of pure aluminium and in this condition is designated Alclad.

Further protection is often provided in the form of oxide coatings formed during an Electrolytic process known as Anodising, this can be applied in different colours and form a satisfactory finish, nevertheless it is highly desirable to paint all aluminium alloys with an etching compouns such as zinc chromate.

During manufacture and repair it is good practice to coat mating surfaces, e.g. skin joints, rib flanges and bolt shanks tc., with Barium Chromate. If both these schemes are employed problems of corrosion will be minimised, but not entirely eliminated.

WHAT'S NEW

NEW SUBSCRIBER

Lindsay Olen. 15 Olen Close. WOOLY. NSW. 2462
Christian Trewern. 37 East Gate Way. WYNDHAMVALE VIC.3024.

THE LATEST FROM JIM MAUPIN LTD

Note from The Editor

Following a rumor that there is no longer plans available for the Woodstock and Windrose, both designed by the late Jim Maupin, I sent an E-Mail to "maupinwood"<maupinwood@attbi.com>

Could you tell me if the Woodstock plans are still available? James Garay.

***Here's the answer**: Sorry, my mother, Margaret Maupin, who is the owner of Jim Maupin Ltd has decided, at age 82, to retire from the business and close it down. Janice Maupin.*

HINTS & TIPS

MINIMUM TOOLS REQUIRED IF YOU INTEND TO BUILD A SAILPLANE

By Peter Raphael (The Erudite)

Our illustrious editor has asked me to write about what I think would be the minimum requirements that a Sailplane Homebuilder would need in his workshop to build a glider or an aircraft.- My first thoughts were of one thing only.... A chequebook...! - Of course, in reality the items one needs to build a glider or aircraft will depend primarily on the medium one chooses to use.

The requirements for building in composites will vary significantly to the equipment you will require at hand to build in metal. Most people who consider a project will have experience in a particular medium that leads them to choice and will already have these basic requirements.

However to draw on my experience as a builder of wooden aircraft I would like to share with you what I see as the basic requirements for wood building, in order to make the best use of the time that you have available.

Obviously, a selection of basic woodworking hand tools is a must. These will comprise of hand planes, wood chisels measuring apparatus such as squares and straight edges along with the majority of items in a home handymans kit of course you can never have enough clamps, both spring and screw types, but these will accumulate as you go along.

BAND SAW

The bandsaw I would suggest, is an indispensable assistant in any woodworking project as it can handle a wide range of cutting operations. With the appropriate blade at hand a variety of materials can be cut, from the stripping of thin ply to the roughing out of 4130 steel components, certainly the fabrication of aluminium and plastic parts are well within the scope of most reasonably priced bandsaws.

Maintaining a selection of blades and changing them where appropriate will extend their life and return the best results for the job at hand. There is a wide range of blade types and a visit to the local saw serviceman will familiarize you with them.

Main considerations are:

- Teeth per Inch, this is dictated by the material thickness and feed rate the aim being to have several teeth in contact with the material at the one time. This will also have a bearing on the quality of the cut.
- Width of the blade, this is important when we want to control maneuverability in curved cuts without bending or to maintain straight cuts when ripping lengthwise.
- Tooth Style, there are a number of different blade sets, the most common being the raker set with one tooth left, one central or raking and one right, however in the finer metal cutting blade a waver set is common.

DISC SANDER

The disk sander is my next favorite "must have" as this is usually the next port of call for work done on the band saw.

This is a flat motorised disk spinning in the vertical plane and with abrasive paper glued on it. An adjustable table is incorporated allowing work to be presented at the required angle. Some commercial units also incorporate a flat linisher, like a belt sander. I would suggest a minimum 12 inches diameter for a disk and if you are not prepared to buy a commercial unit then a little ingenuity can return an acceptable alternative. A description of how I built mine was published in an earlier homebuilding newsletter.(Volume-1.Issue 4 available from our editor if you send a self stamped envelope size A-4)

ROUTER

Next on the list is a router. With this tool it is possible to flush trim ply skins, radius frames and follow accurately, templates to give that professional touch. Reasonably priced bit sets can be found at tool sales and I would recommend that you lean towards the carbide ones as they will repay their investment in a long working life and are more tolerant of glue and abrasive timbers.

While the bandsaw will accommodate the majority of cutting tasks there are instances where interior cuts must be made, as it is in the case of ply frames and ribs. While this is not impossible to achieve with a bandsaw the methods involved are extreme.

JIGSAW

The hand jigsaw comes in to is own in this instance and like its big brother has a range of blades available to suit a multitude of tasks. There is certainly no definitive list of tools required. or perceived to be required by the homebuilder, and perhaps half the fun in building a project is finding the best way of doing things. In the course of a building project there are many opportunities (birthdays, fathers days) to add to your requirements.

Have fun.....! and.....Happy building!.

BAND SAW BLADES JOINTING

By D. Delahoy

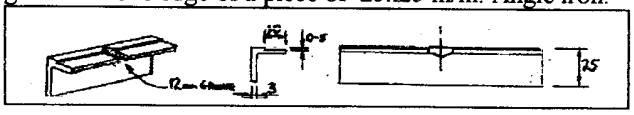
Courtesy Newsletter of the Melbourne Society of Model and Experimental Engineers. Issue number 45.

The following is the procedure, I use to make my own band saw blades for my small band saw machine. The blade material is sold in 30 meter continuous lengths and I cut it to suit my machine. Butt welding may be technically better but..! I don't have a butt welding machine.

All my blades using this system have lived a long and laborious life and retoired due to wearing out rather than breaking, so I don't see the need to butt weld blades. I have made a small joining/blade holder from a piece of 25x25x3 mm steel angle.

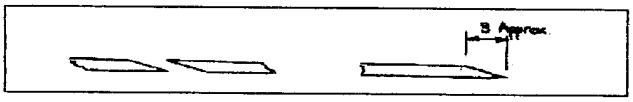
The English magazine Model Engineer has featured blade joining over the years and I found several articles on this subject. As a final note on wearing out, I have cut 75x20-304 stainless steel with a blade using this joining method and after over 20 cuts and 5to 6 hours of continuous use, the blade was on the way out but it showed no signs of breaking.

O.A soldering jig is constructed by grinding a shallow groove on one edge of a piece of 25x25 m/m. Angle iron.

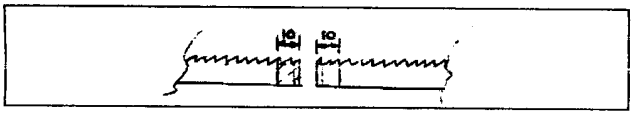


1. Cut band saw blade with old tin snips. (length to suit machine).

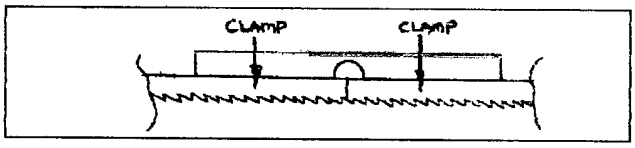
2. Angle grind a bevel on both ends opposite relief on each end.



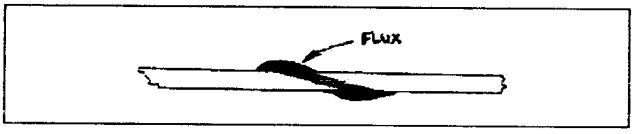
3. Rub fine emery paper about 10mm back from each end to clean up before welding



4. Clamp both ends of cut blade on angle iron jig



5. Paste joint with silver solder flux



6. Heat evenly and silver solder joint together with low temperature silver solder stick. Use just enough silver solder to cover joint.

7. File excess silver solder off with an old file, and rub joint with fine emery paper till smooth.

8. Re-heat to a brown/dark blue color to anneal joint and let cool naturally (Very important).

9. Another blade made ready for action.

SHOP TALK

Microlift Soaring and Homebuilt Sailplanes

By Peter Champness

Microlift Soaring is a term we have begun to hear a little bit about recently but what does it really mean? What sort of glider is required to exploit microlift soaring? Why would anyone want to anyway?

Piero Morelli in a recent article titled "Light and Ultralight Sailpanes" published in Australian Gliding and Skysailor April 2002 mentions microlift soaring and credits its discovery to Gary Osoba the owner of the prototype of the Carbon Dragon ultralight sailplane. The Carbon Dragon was designed by Jim Maupin as a foot launchable glider but with much better performance than the foot launchable hang glider. Gary discovered that he was able to exploit weak and variable soaring conditions, often quite close to the ground, and hence enjoy extended soaring flights when other gliders were unable to sustain flight.

Piero Morelli identifies the performance requirements to exploit microlift soaring as:

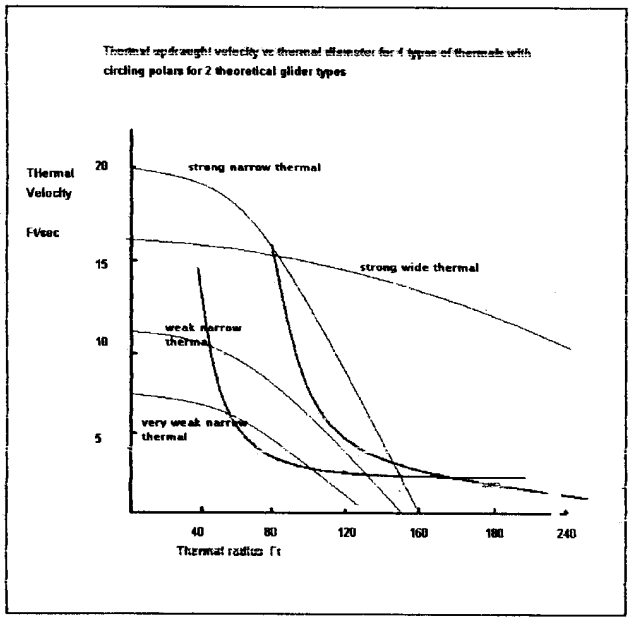
1. Low sink rate of the order of 0.5 metres per second
2. The capacity to turn in small radius circles of about 15 metres radius

The more conventional glider has a low sink rate of about 0.5 m/s but a much larger minimum circling radius whereas the hang glider can turn in the required 15 m radius but has a relatively high sink rate of 1-2 m/s. Neither can satisfactorily sustain flight in microlift soaring conditions (although the hang glider pilots may find that they can enjoy these conditions as the meteorology becomes better understood).

Conditions for microlift soaring have barely been explored so far. Apart from the reports from Gary Osaba and the few other owners of Carbon Dragons we have to look elsewhere to understand these conditions. The soaring birds appear to have been using microlift conditions long before the development of ultralight gliders. On many occasions I have observed Eagles make use of the early morning thermals whilst driving to the gliding club in Benalla. Possibly this is the best time to see them from the ground because the thermals are not going very high!

Information about the performance of soaring birds is rather scanty. An English Ornithologist and glider pilot Colin Pennycuick has published a number of articles based on his study of birds observed from a motor glider. The performance of motor gliders is fairly ordinary in most cases but the

surprising result of his study is that the performance of gliding birds is far worse! Vultures and Condors are about the best of the land based gliding birds with L/D ratios of about 15. Their sink rate is approximately 2-3 feet per second ie 0.7-1 m/s. What is more they are quite slow by gliding standards with average speeds of about 25 knots. They can however turn in quite small circles even though they rarely use bank angles of more than 30 degrees. The importance of small circles suggests that thermals in weak conditions are probably quite narrow especially close to the ground.



Consider chart which was adapted from an article by Patrick Squires in Technical Soaring April 1977. The chart depicts 4 different types of thermals described as narrow thermals (very weak, weak and strong) and a strong wide thermal. The circling polars are supposed to represent a high performance conventional glider and an ultralight glider similar to a Carbon Dragon. The strong wide thermal is easily exploited by any type of glider and possibly represents typical thermals at the peak of the summer soaring season in Australia. Turn radius is not very important in this type of thermal since the core is very wide and the rate of climb does not decrease significantly until the turn radius exceeds 200 ft. The narrow thermals however are not so easily used and require the use of small turn radii. The strong narrow thermal can be used by gliders with turn radii of 160 ft but the rate of climb is severely reduced compared with what might be achieved at a turn radius of 80 ft.

The weak thermal accentuates the importance of a small turn radius even more. A heavy glider with a turn radius of 120 ft and a sink rate in level flight of 2 ft/sec (Nimbus 2) will barely sustain altitude in this thermal but a light glider with a turn radius of 80 ft and a relatively poor sink rate of 5 ft/sec (hang glider) will be able to climb at 5 ft /sec. The very weak narrow thermal can only be used by a light efficient glider with a small turn radius and also a low sink rate (Carbon Dragon).

Thermals close to the ground however may be even narrower than than the chart would suggest. I remember on one occasion watching a small eagle working a small thermal only slightly above the height of some nearby trees. Despite the eagle's small turning radius it was only able to gain height in one half of its turn suggesting that the thermal was only about 15 m wide. After making 10 or 11 turns like this the eagle had climbed to about 3 times the height of the trees and then began to make better progress.

The key to turning in small circles clearly is the ability to fly slowly, which in turn is dependent on wing loading. The difference between aerofoils in terms of maximum lift coefficient is by comparison relatively limited. The wing loading of soaring birds is in the same range as that of hang gliders (about 6-9 kg/sq m). By comparison the wing loading of a typical fiberglass glider (standard cirrus) is about 33 kg/sq m. The modern tendency is to push the wing loading up even further with obvious benefits for fast cross country flying in strong thermal conditions but the downside is loss of the capacity to sustain flight in weak conditions.

The other benefit of a low wing loading is the capacity to manouvre closer to the ground without unacceptable loss of safety. A heavy glider with a stalling speed of 40 knots requires quite a bit of height to regain speed in the event of a stall and also needs quite a lot of flat land to touch down and stop. For this reason we are taught to stop looking for thermals by 1000 ft AGL and be established in the landing pattern by 800 ft AGL. A light glider with a stalling speed of only 25 knots however needs much less height to recover from a stall and the landing options are more extensive. This is of very great importance if one is seeking to sustain gliding flight in thermals which are only going to 1000 ft.

So what has all of this to do with homebuilt gliders? Most of our homebuilt gliders are in the lower wing loading class. A Woodstock may not be able to sustain flight in the microlift environment but it can easily outclimb other gliders in weak narrow thermals. I have had some personal experience of this. One day at Nagambie I shared a thermal with Peter Raphael who was flying his Woodstock. I had my Foka banked as steeply as I could and very close to the edge of a stall. The Foka has a reputation for exceptional climbing ability in thermals and for a few turns I was doing OK. Soon however Peter got the better of me and had climbed above me. When I asked him about this later he said that it was easy! The Woodstock can turn inside the Foka. If he saw that I was going up relative to him, he would come over to share my part of the thermal. If however I seemed to be going down he would not go there but turn inside me staying in the more rapidly rising air. Eagles do this even more effectively. On several occasions when I have found an exceptionally strong thermal I have been joined by eagles who have spotted my good fortune. Once they have found the same thermal however they quickly find rapidly rising cores within the thermal and within a few turns have climbed above. They usually then like to get in position above the tail of the glider which is a little disconcerting, as they may have evil intentions!

For those readers, with internet access, who would like to read more about microlift soaring techniques Gary Osoba has written two articles titled "Toward a 20 Hour Work Week" and "More on Microlift Soaring Techniques" which may be accessed at reference 3.

Extending the concept a bit further I have recently been looking at the Marske Monarch light weight glider on the Marske web site and I have committed myself to the expense of purchasing a set of plans for the Monarch G (carbon fibre version). The flying reports of some pilots who have flown the Monarch suggest that they have been doing some microlift soaring. The concept seems interesting. When completed I hope to be able to report on the potential for a greatly extended soaring season in microlift conditions.

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1. Light and Ultralight Sailpalnes: Pierro Morelli, Australian Gliding and Skysailor April 2002
2. Configuration Optimization of a 13-meter-span Sport Sailplane: Patrick Squires, Technical Soaring, Vol IV 1977.
3. www.isd.net/sadkins/20hourworkweek.htm

4.-Bird Flight –how the masters do it: Colin Pennycuick, Vol libre 2/94. nb. Vol- libre is the journal of the Soaring Assoc of Canada. The articles are available on the internet

Marske Monarch.
By Peter Champness.

The Marske Monarch is a flying wing, open cockpit light weight glider. The wing has a modest forward sweep, similar to the other Marske flying wing designs and is a cantilever design augmented by a strut on each side. The pilot sits upright in a rather narrow fuselage, somewhat reminiscent of a primary glider with a partial nose fairing.

The airfoil is the famous NACA 43012 which seemed familiar when I read it. It has been previously used on the Mitchell wing B10 and U2 flying wing gliders. The 43012 has a fairly abrupt leading edge, maximum thickness well forward and a reflexed trailing edge. The reflex is on the lower surface only and is not apparent when looking at the upper surface of the wing. Stabilty of the glider in the pitch axis is dependent on the airfoil which is pitch stable assisted by the low centre of gravity in relation to the high wing position.

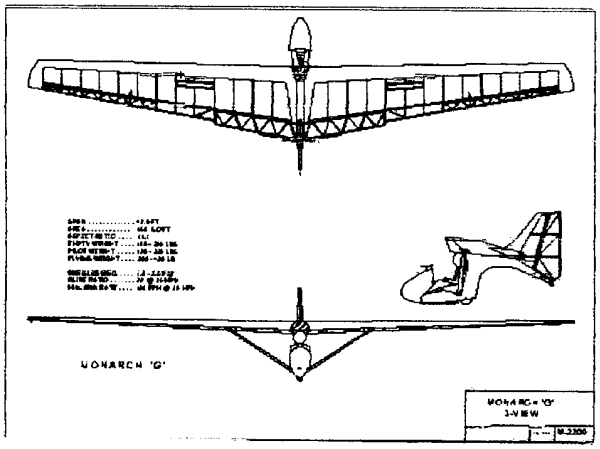
As with other flying wings the C of G range is quite narrow. The wheel has been placed just aft of the allowed C of G position. When the glider is properly balanced it should rest lightly on the nose skid. If the glider sits on its tail with the pilot on board the C of G is too far aft and take off must not be attempted.

A recent development has been the addition of a windscreen extending from the nose fairing to the leading edge of the wing which improves pilot comfort without loss of the open air sensation of the open cockpit design. The windscreen has also apparently improved the gliding performance slightly. The gliding performance could probably be improved further by the addition of a fully faired streamlined pilot enclosure. Mat Redsell , the CEO at Marske Aircraft says that the enclosed cockpit has not been adopted so far because he enjoys flying the glider as it is. He also says that the capacity to detect slight changes in air movement, temperature and smells in an open cockpit enhances the microlift soaring capabilities.

The following comparative table was downloaded from the internet.

Sailplane:	Carbon Dragon	Monarch	SuperFloater
Designers	Jim Maupin and Irv Culver	Jim Marske	Klaus and Larry Hill
Configuration	High wing Standard tail 3-axis control Enclosed cockpit Full span flaperons	Swept forward wing Flying wing 3-axis control Open cockpit	High wing Standard tail 3-axis control Open Primary glider
Contact	Jim Maupin, Ltd	Marske Aircraft Corp.	US Aviation_ Dan Johnson 612-450-0930
Address ...	24201 Rowel Ct.	975 Loire Valley Dr.	265 Echo Lane
....	Tehachapi, CA 93561	Marion OH 43302	So St. Paul MN 55075
Empty Weight	144 pounds	220 pounds	179 pounds
Gross Weight	300 normal 335 maximum	450 pounds	400 pounds
Wing Span	44 feet	42.6 feet	38 feet
Wing area	153 sq ft	185 sq ft	168 sq ft
Wing Loading	2.18 lb/sq ft	2.43 lb/sq ft	2.38 lb/sq ft
Aspect Ratio	12.9 : 1	9.5 : 1	8.44 : 1
Height	5' 9"	5 feet	5 feet
Length	19' 2"	12.5 feet	19 feet
Launch	Foot launchable Bungee (see photo above) automobile *ultralight*	60 hp ultralight automobile	Automobile Ultralight Super Cub (?)
Top Speed (Vne)	65 mph	70 mph	60 mph
Best L/D	26:1 at 35 mph	19 at 45 mph	15:1 at 35 mph
Number flying	35 according to Kitplanes	20 kits sold	?
Minimum sink	100 fpm or 1.67 fps at 26 mph	162 fpm or 2.7 fps 30 mph	180 fpm (120 fpm ??) at 27 mph
Altitude loss in 360 degree turn	25 feet	47 feet	47 feet
Stall Speed	21	24 mph	23
Kit	plywood parts from third party	yes, about $6,600	Was $5,995 ready to fly
Information Packet	$5	$8	?
Plans cost	$160 USA and Canada $180 overseas airmail order form	$170	CumulusMan@aol.com
Building time	1200 hours	200	n/a

The Super Floater is quite an old design. I ordered a set of plans in 1978, which I must still have somewhere. The designer Klauss Hill was killed in a gliding accident, I think whilst flying the SuperFloater. I did not get further than looking at the plans, partly because I was interested in hang gliding at the time and the SuperFloater did not enjoy the portability and storage capabilites that I thought were important.



The Monarch has a slightly higher stalling speed than the Carbon Dragon and a poorer L/D. However it is a heavier glider to start with and has a better load capacity which is important as I have put on some weight in recent years and would have been marginal in the Dragon even when I was thinner.

The Monarch has been redesigned since this table was published to be constructed in glass fibre (Monarch G) which has increased the top speed capability. The glider can also be constructed using carbon fibre with an increase in strength and a decrease in the empty weight. My plans for the Monarch G have now arrived. The next step is to get GFA approval to build the design. This should not be too difficult as the Monarch has already been approved for wooden construction. I also have to get my garage approved which will be a bit more difficult since I will have to clean it out first which will be a bit like the legendry labour of Hercules when he had to clean out the Augean stables. I think he found it easier to divert the river Styx through the stables and wash them out, which is not an option in my case the garage is full up with precious junk, which I might still want some day!

If any readers are interested in building a Monarch G please contact me. There may be savings in work and materials costs if several aircraft are constructed at one time. A builders group is also likely to share construction tasks, especially moulds which are required. Workshops could also be organised to help members through parts of the construction.

Peter Champness
66 Waterdale Rd
IVANHOE VIC 3079
Ph: 03 9497 2048

THE MONARCH ULTRALIGHT SAILPLANE

By J.Marske

Take a few minutes to watch a hawk soaring a ridge or maneuvering himself into a raising thermal current. Notice how tight he can circle and how low he sometimes gets before he finds another rising current to carry him once more high into the sky. I for one have often dreamed of soaring like this since I was a small boy. The Monarch sailplane was designed to full fill this dream.

It was meant to soar with the hawks and eagles at their performance level. With generous wing area and very light flying weight we can fly very slowly, even under 30 mph. We can make circles of 150 feet in diameter. Take off and land after a ground roll of 40 feet or less. Precision spot landings become routine by using the lift spoilers on landing approach.

Despite of the Monarch's unusual design configuration it is an exceptionally stable aircraft with controls that are well balanced and conventional in feel. As is the case with all our previous flying wing designs with forward sweep, the Monarch is highly stall and spin resistant.

Transporting the Monarch to flying site is best done by carrying it on it's own trailer. However, I have often slipped the fuselage into the back of my station wagon and strapped the wings down to the roof. Assembly time by two people requires 15 minutes and is a light job since each wing panel weighs 65 pounds.

The Monarch is not a hang glider and is capable of being flown to great heights for extended periods of time. Therefore, I would recommend that the Monarch be licenced by the GF. This would permit you to fly from airports and in standard aircraft space. The GF would license the Monarch in the Experimental Aircraft category as a home built
p.s. G.F. means Gliding Federation (in USA).

SUPER GOOSSE. EP-2. VH-IZZ

By David Howse

It was a thought that crossed my mind while working on Ian Patching's Kokaburra that my own Kookaburra was going to take quite some time to get into the air.

Hmmm! " Ian, wouldn't it be good to have some thing small and FLYABLE for the next year!"

Some thing like a Boomerang, Arrow or like. Well! Before I knew it (the next day I think) Ian rang me up with "Have I got a deal for you". He had tracked down the owner of one of the two SUPER GOOSE'S built. It had been stored on a open trailer in a hangar for 4 years and was in need of some TLC (tender loving care).
I arranged to have a look at it with the view that it would no take too much to get it back into the air. Under years of bird droppings and over 1.5 kg of wasp nests was a very well built low time wood glider. I was sold on it. "All I had to do was a form 2 inspection"! how wrong I was.

The SUPER GOOSE was the second design from Ted Pascoe of Adelaide. It is a 12 meter all wood homebuilt sailplane of Ka-6 construction. In the skilled hands of Ted the original SUPER

GOOSE was equal to many contemporary 15 meter sailplanes, and was dubbed the "Mini-Foka". Australian Gliding. October 1981 has a full report on the design and a report from Allan Higgins who had built the other EP-2 (now mine.VH-IZZ)

My first shock came when I went to change ownership. No! You do not need to do a Form 2- you need to do a 20 year inspection! Oh well ! I had intended to have a good look at it anyway. Under the guidance of the legendary home building guru Gary Sunderland the 20 yearly was started.

Out came all (I hope) the wasp nests, and in went the boroscope. What 1 found was a very good well build aircraft. The wasps had done no visible damage and the glue looked good. One problem was the balsa wood leading edge of the tail had shrunk causing the fabric covering it to bubble up, As the tail was of a laminar flow design this needed to be fixed by removing the fabric and building a fibreglass base over the balsa.

The next big problem was lots of cracking of the wing surface. Most of this was from the use of what I call "Auto-Bog" (automotive body filler). Where ever it was used the end result was cracking, and lot's was used all over. The only fix was to remove it all. Repairs were done and a better filler was used. This ended up putting me in a cloud of filler dust for over three months. All the other things needed for the 20 yearly (like pulling bolts) were done.

Time for the re-weight. Allan Patching and Gary Sunderland showed me how it was all done as I stood back and let them at it (the aircraft that is). More good news, I did not have to go on a diet. All was in place for the test flight, except the weather at Bacchus Marsh. Over a month later and two attempts I had at last locked Gary into the cockpit ready to go.{On one of the failed attempts 1 had Gary in is parachute ready to go when last light fell on us} Five months, on the 11th of May, at last it flew, and quite well said Gary. So next was my turn. Ahhh! what a nice flyer she is. For all its small size it feel quite stable and controllable. Pitch is light but not as light as say a Hornet. The rudder is strong but the ailerons are a bit heavy compared to the other controls.

At this time I am getting to know my new girl and hope to bring she to the next Vintage Gliders Australia rally at Stonefield next January so look for her there.

THIRTY YEARS LATER,REFLECTIONS ON THE BJ-1b DUSTER

By Hank Thor, Designer.

This is an excerpt from Sailplane Builder Issue #2-2002. Official Publication of the Sailplane Homebuilders Association. A Division of the Soaring Society of America.

When the Duster appeared on the soaring scene in the early 70s, it was at a pivotal time in sailplane development. The state-of-the-art was experiencing rapid improvement. New airfoils and the use of fibreglass was beginning to make meaningful performance possible.

However, it was apparent early-on to sailplane designers that as performance improved, the problem of obsolescence would become ever more pervasive, and this fueled a lively debate at the time. Perhaps to alleviate that problem, the idea of one-design competition, as in the world of yachting, was put forth, first as an Olympic ideal (soaring was to be included in the 1940 Olympics, but was subsequently cancelled by World War II), but changed over time to the Standard Class concept.
To be a one-design competitor requires a mindset that minimizes the importance of relative sailplane performance and recognizes pilot performance as the important element.

A fine idea, but not popular with the sailplane manufacturer, because noble as it was to keep cost down by slowing obsolescence, it was far better for business to keep improving the product, thus requiring the latest toy to be competitive.

Ultimately sports class handicap racing became the logical solution to the problem of obsolescence. It allowed (more or less) a leveling of the playing field for the competitor, while leaving the manufacturers free to continue product development.

But what about the little guy for whom last year's glass was still far to expensive? What about the ex-model builder (with family) who wanted to fly and who knew what pride of authorship meant, but who would have to build a sailplane that could share the garage with the lawnmower? That was the guy the Duster was designed for.

Sailplane design is not rocket science. The trick is knowing where to draw the line on the dollar spent, so as to optimize the $/LD (the ratio of dollar per point of Lift over Drag) and yet raise the bar on cross-country performance just enough to make it fun to leave the home field and push your limits.

I think the Duster succeeded quite well in achieving that goal, and although thirty years later wood has become the "endangered species" the concept of the simplified medium-performance sailplane is a valid as ever.

A LITLE BIT OF AUSTRALIAN GLIDING

By Allan Ash

Government Subsidy for Gliding

During 1932 the Victorian Gliding Association actively pressed the Federal Government for a subsidy for gliding similar to that already granted to aero clubs. The Association proposed the subsidy be paid on the basis of gliding certificates earned — £2 for each A certificate, £2 for each B and £10 for each C certificate.

In 1933, the Government agreed to grant an annual subsidy of £600 to assist the gliding movement. This decision was welcomed by the Association and its member clubs, though it compared rather poorly with the decision of the British Government in the same year to grant £5,000 a year for five years to assist the gliding clubs in Britain.

The Australian Government's thoughts, however, went beyond the mere granting of money. The Civil Aviation Department pro posed that clubs in each State should be affiliated into State associations with the idea that eventually a national association of clubs could be formed. It was envisaged that State

associations should supervise the airworthiness of gliders, qualifications of instructors, the issue of gliding certificates and other matters of national concern. It was also proposed that State technical committees should be formed to work in con junction with the Civil Aviation Department to issue Type Approval for new gliders and licenses for pilots. It was recognized by the Department that some form of national control was desirable for the safe development of the sport. The proposals showed considerable foresight by the authorities of the day and many of these proposals gained the support of leaders of the gliding movement but the plan was before its time and failed to eventuate because the gliding movement at that time was too small and too dismembered to play its part.

In fact, even the cash subsidy proved almost impossible to administer. For very proper legal reasons, since it was handling public money, the Government decreed that the subsidy should be paid 'only to responsible and properly incorporated organisations'. In addition, it ruled that only one body in each State would receive subsidy and it was the responsibility of that body to distribute it to the eligible clubs within its State. Even this relatively straightforward administrative task proved beyond the ability of the gliding movement of the time. In the then-current economic depression, few clubs had the money to become legally incorporated, so the Government never was faced with the need to distribute the whole £600 in any one year. Generally, only about half this amount was claimed each year by the clubs.

Sources: John Newman, Ted Palmer, Aircraft magazine, Melbourne Age

A Publicity Stunt

To support their 1932 submission for a Government subsidy and to gain favourable publicity for gliding generally, the Victorian Gliding Association decided to demonstrate the value of glider training by having a glider pilot with no previous power experience graduate to solo in a light aircraft after no more than two hours of power instruction.

Ted Palmer, of Warrnambool, was selected as the student pilot and Ray Garrett acted as instructor. The event was given good publicity and a crowd gathered at the Coode Island aerodrome to watch the event. Among the visitors were appropriate officials of the Federal Government. After two hours of circuits in an Avro Avian, Palmer duly soloed, to the acclaim of everyone present.

The stunt had no immediate result, but it may have contributed in a small way to the Government's 1933 decision to grant an subsidy.

Howard Morris and the Baker-McMillan Cadet

Percy Pratt sent to the USA during 1930 for the constructional drawings of a glider called the Baker-McMillan Cadet. He began building it at Geelong early in 1931. The Cadet was classed as a utility glider. It was rugged enough to withstand elementary training at the hands of inexperienced pilots but could be soared quite well in a moderate wind. The fuselage had a framework of steel tubing, covered with fabric. The strut-braced wooden wings were 38 feet span and 160 square feet area and were nicely tapered at the tips. Empty weight of the aircraft was 220 pounds. Performance figures gave an estimated glide ratio of 15 and a minimum sinking speed of 3.5 feet a second.

The Cadet was completed in mid-1931 and flew successfully. The most spectacular flights in it were made by Howard Morris who used it to set several duration records. On 11 October 1931, at Lake Wangoom, near Warrnambool, he exceeded Ray Garrett's record of 1 hour 54 minutes by soaring the Cadet for 2 hours 15 minutes in a brisk south-west wind. Take-off was at 4 p.m. and the flight ended only because of approaching darkness and the intense cold. Maximum height during the flight was 150 feet above the crest of the ridge.

Encouraged by this effort, Morris decided to make an attempt to raise the British Empire duration record, which had been set at 3 hours 28 minutes several months earlier by Major Petrie in England. On 28 October, Morris was bungied off the hill at Lake Wangoom in a strong westerly wind. Conditions were good for a while and he soared well at 500 feet above the ridge, but later the wind began to drop and Morris was forced to land after only 2 hours 40 minutes. Though it failed to exceed the Empire record, the flight had raised the Australian duration record to a figure that was not exceeded for many years.

Morris made several other soaring flights during the next few years in the hope of raising his record but was not successful.

Sources: Aircraft magazine, Melbourne Herald, Tom Thompson, John Newman, Ted Palmer, Eric Morris (Junior).

The ups and downs of Percy Pratt

Percy Pratt, who, as we have seen, had played a major role in the formation of the Geelong Gliding Club and built Zogling gliders, had a serious accident during 1931. He had arranged to give a demonstration of gliding at an agricultural show at Camperdown, in south-west Victoria, which was to involve the attending public. On the day, however, the wind blew down the hill and the other members of the Geelong Gliding Club who were to launch him advised against making the flight. But Percy didn't want to disappoint the show organisers who were counting on the spectacle and he didn't want to miss the opportunity to gain publicity for gliding, so he insisted on making the planned flight.

The launching crew did its best but the down wind take-off resulted in insufficient speed being obtained for the Zogling to become airborne. It skidded out of control, down the hillside and overturned in a heap of wreckage. Percy received a severe injury where a piece of wood from the splintered seat entered his left leg, behind his knee. He was given first aid but refused to be taken to hospital or doctor. He had arranged to go to Mansfield the following day to give another demonstration of gliding and he didn't want doctors telling him he was not to fly.

Despite severe pain in his leg, Percy boarded the train at Geelong the next morning and travelled to Mansfield. On arrival he was so sick he had to be carried off the train and taken to the local hospital where the doctors diagnosed blood poisoning. For several days he was seriously ill and delirious while the hospital staff fought to save his life. At one stage the doctors were preparing to amputate his leg.

Gradually, he recovered his strength and after several weeks was discharged from the hospital. As a result of the accident, however, he was left with a permanently stiff knee and ankle.

He was also very depressed and railed loudly against gliding and against the medical profession. His mood was not improved by the down turn in aviation business which caused him to close down his aircraft servicing and flying training business at

Geelong. He passed through a period of strong bitterness and virtually retired from the aviation scene for about two years.

It was in the early months of 1933 that Percy Pratt found his interest in the sport reviving. To enable him to fly with his stiff leg, he designed a light leather stirrup to attach his left shoe to the rudder bar and this enabled him to fly with his old skill and daring.

He was incensed at the lack of assistance given to gliding by the Federal Government and pointed to the assistance handed out by the Government to the aero club movement. In June 1933 he wrote a strongly-worded letter to the Minister for Defence, Sir George Pearce, arguing the case for assistance for gliding, reviewing his own contribution to the sport in the past and offering to begin production of a two-seater training glider for Australian clubs if financial assistance was given to reactivate his company. Though the Government did grant a small subsidy to gliding during 1933, it was directed, as we have seen, to the clubs and there was nothing for hopeful glider manufacturers.

Despite this official snub, Percy Pratt persisted with his plan to build a training two-seater and the prototype made its first flights during 1934. The design was extremely crude and basic, comprising a box-section fuselage with open tandem cockpits and a rectangular parasol wing of 40 feet span which was attached to the fuselage by four parallel metal struts and a group of cabane struts. The glider, which was never graced with any name other than 'the Pratt two-seater', boasted neither windscreens nor instruments. The undercarriage consisted of a pair of air-wheels at the front and a metal tail-skid behind. Construction was entirely of timber, plywood and fabric. Despite its crudity, the machine flew without vices and was a distinct improvement on the primary gliders then in popular use. During the next few years, three of four of the two-seater gliders were built.

Having thus led the way in the move toward dual training for glider pilots, Pratt saw that it was not satisfactory for such pilots to move on to solo flying in primaries, so he set about designing a suitable solo machine. The design was little more than a single-place version of the two-seater. It had the same boxy fuselage and rectangular parasol wing, the same lack of instruments and windscreen and the same brick-like performance but it served its purpose and gave pilots something to look forward to. The first of the type, designated the Pratt Utility, made its maiden flights during 1936 and a small number was built over a period of two or three years.

Early in 1937 Pratt conceived the idea of being the first Australian glider pilot to loop a glider. He did not consider any of the existing gliders suitable for the Stunt, SO built a modified version of the Utility with the span reduced from 40 feet to 33 feet. This version was known as the *Stunter*. On Thursday afternoon, 1 April 1937. Pratt was given a car tow launch to about 700 feet at Geelong's Belmont Common aerodrome and looped the glider beautifully, to the delight of an admiring throng of spectators.

Early versions of the utility were fitted with twin wheels for landing, similar to the two seater, but later versions had twin skids, one mounted beneath each bottom longeron. The tail skid was retained. This system worked well on the Utility and the Stunter, each of which weighed about 250 pounds empty.

With his two-seaters and Utilities, Pratt established a gilding school at Geelong which proved very popular and attracted student pilots from Melbourne and nearby country towns as well as from Geelong. Many of the students were girls.

Sources: Tom Thompson, Aircraft magazine

SO YOU WANT TO BUILD A SAILPLANE

by Bill Carlson

This is an excerpt from "SOARING" The Journal of the Soaring Siciety of America. Volume 44, Number 5, May 1980. With thanks.

With the cost of modern day sailplanes spiraling upwards faster than ever more and more soaring enthusiasts are turning to homebuilding as a means of acquiring the sailplane that they might otherwise not to be able to afford.

The Experimental Aircraft Association says that only one out of every ten homebuilt aircraft started ever reaches completion to flying status.

Having just completed my own ship, I realize the pitfalls that could easily discourage the first time builder. With this in mind, let us discuss what it takes to " beat the odds" and get your ship out of the shop and into the sky.

Building your own sailplane will be less expensive than buying a new factory ship- but it will hardly qualify as cheap. While people are constantly calling for cheaper sailplanes, instruction, and rental. I think we have to realize we have chosen an expensive sport. To lower costs one would have to lower the quality, and that is one thing that is sacred in flying. I know of very few flight schools or manufacturers that are making exorbitant profits. A set of plans will cost between AU.$ 200 to 500. Material cost will vary according to your ability to scrounge and the type of material you are going to use. Sailplane kits are also expensive and do not include paint, instruments and cover material. A trailer also is expensive depending on the sailplane chosen.

The idea of building your own sailplane has a romantic appeal to it. Wanting to own a sailplane, and the idea of saving a little money while building it, is probably not enough to carry you through the trials and tribulations of homebuilding- what is really needed is a very strong desire to build and fly an aircraft that you have built. Evaluate your own mechanical skills and do it honestly.

Are you qualified? A lot can be learned while building, but a good knowledge of tools and their use is a must. Look around your home for any of those projects you started but never completed. Or how about that new sporting equipment that you just had to have and used only one season? If any of the aforementioned cautions have you the least bit hesitant, you had better reevaluate your plans to build, because it takes a very strict discipline and determination to see construction through to the end.

To be continued in the next issue...

CLASSIFIEDS

AUSTRALIAN GLIDING MUSEUM

If you wish to join this project and if you have any question or wish to discuss any aspect of the Proposal or wish to volunteer to assist with any of the Museum's projects, please do not hesitate to contact .

Graeme Barton, 2 Bicton Street, Mount Waverley, Victoria 3140 Australia. Phone: (03) 9802 1098.

Membership AU $ 15 .

WANTED - Study books and/or plans for gliders. Design Building etc. Contact: 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

"SAILPLANE BUILDERS "

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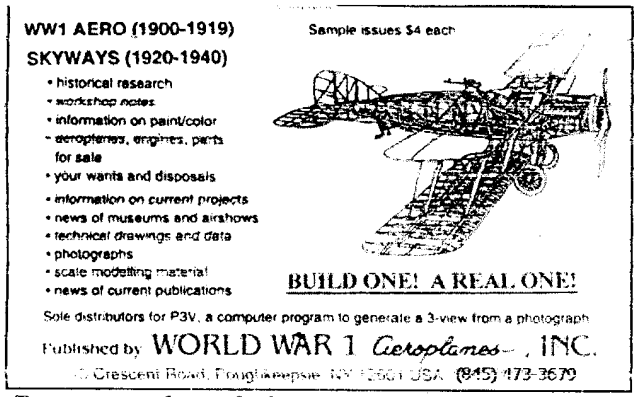

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WANTED - Information on "American Eaglet " home built sailplane. I have purchased one that is 90% complete and I would like to finish it. P.J. Alaban. 33 Gordon St. Port Macquarie 2444 email: famousphil@hotmail.com

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