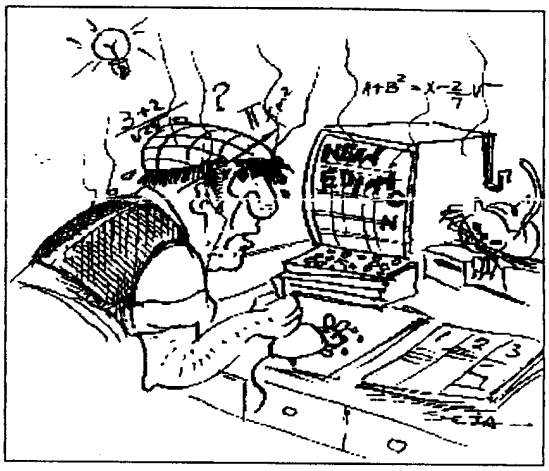
THE AUSTRALIAN HOMEBUILT SAILPLANE ASSOCIATION

Volume 4 Issue 13 **June 1999**

G'day!



Well, here I am again, back from my trip to South America where I went with my wife. During this trip I had the opportunity to meet an interesting person in Chile. His name is Alejandro Ramirez Pineiro who is building a Carbon Dragon ultralight glider with another friend. They were very interested in our movement here in Australia and I gave them some clues on how to start a similar movement in Chile.

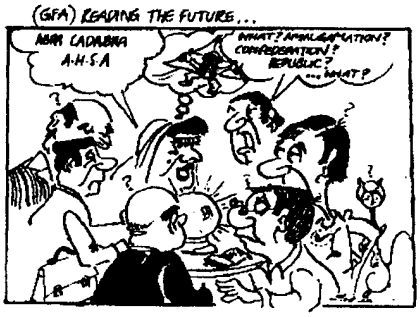
Also, I found a very interesting "Vintage" glider, a Minimoa , which I think is not flying but is hanging from the roof in the Chilean Airforce Museum. I had a very good time indeed!!

If you are not a GFA member you may not be aware that the GFA and HGFA (Hang Gliding Federation of Australia) have been engaged in an extensive process of consultation to formulate a proposal to amalgamate the two organisations. The details of the proposal have been published in Australian gliding, the GFA website as well has various forums in all regions.

You are now being asked to participate in postal vote of members to determine whether the GFA can proceed with the process of amalgamation with the HGFA. In the case of the GFA this postal vote will constitute a plebiscite. If the affirmative vote is 75% or more of the votes received, the a General Meeting of members will be called to put the proposition in accordance with the requirements of the GFA Memorandum of Articles of Association.

Some time ago we sent to every AHSA member a letter asking them their authorisation to publish a list of interest. We sent out 71 forms but we only have replies from those members who are listed at the end of this journal. *Interrogation!...* what about the rest of you?? Where are your forms??

James Garay



Inside This Issue

President's Corner
From the oval Office

By Gary Sunderland.

Who are we, and where are we going?

Jim Garay and I discussed our situation recently, and I pointed out that we do accept any person interested in home built gliders as a member, although we do encourage our Australian members to join the GFA.
Our current membership is made up of about 80% GFA members and 20% non GFA, of whom a fair proportion are overseas.
This seemed to cause a lot of difficulties to the Victorian Soaring Association(VSA) in dealing with us, which seems strange.
Most GFA clubs have associate members, and other types of non GFA members, so they already deal with this situation within their affiliated clubs. Our members seem to be interested, at the moment, with the following sorts of activities:-

(1) Building and flying the classic home built, wooden, plans built sailplanes(eg.BG-12,Duster,Woodstock).
(2) Building and flying kit sailplanes(eg. Monerai, American Falcon)
(3) Building and flying motor self launch sailplanes (eg. Windrose, Solitaire, etc.) To which I would add less specific interest in:
(4) Ultra light gliders(eg. Carbon Dragon and Windancer)
(5) World Class sailplane (PW-5 home built versions).
(6) Local designs(MOBA2 and ???)

This is a big enough list to keep us all interested for the next hundred years.
Of all these activities, the one with the most potential to shape our future, is the ultra light. Assuming that it goes ahead, it bridges the gap between the current hang glider and the world Class sailplane even if the proposed GFA/HGFA amalgamation does not go ahead, there is no reason why we(the AHSA) should not take a major part in fostering interest in this class of future sailplane.
The practical development of these U/L sailplanes, will be away from foot launching, and into the weight and performance class of the H-17, Joey, Spruce Goose, Woodstock type of sailplane. Given that they will be home built, from plans or kits, then they are right in our area of interest.
The potential builders, whether from GFA or HGFA, will really need the sort of information and expertise, in building and flying, that the AHSA is able to provide.
They will need our help, and they will be welcome new members for our organization, as it heads into the next millenium.
Congratulations to the Editor of the first combined magazine produced by the GFA and HGFA. As past editor of Australian Gliding may a suggest the name for the new magazine should be AUSTRALIAN SOARING. As the March 1999 issue contents demonstrates so well, soaring in Australia is and will remain, the common denominator to our shared experience. Whether we are flying a simple hang glider or megabuck self launching sailplane, we are all devoted to the art and joy of the sport of soaring.

Even if the proposed amalgamation does not succeed, I certainly hope that the GFA and HGFA will remain in a close business association, and continue to produce a monthly magazine covering the soaring scene in all its aspects.

In the March issue John Ashford also had some nice things to say about the homebuilt sailplane movement, but missed on one important detail. Actually the Australian Homebuilt Sailplane Association is not restricted to GFGA members, but we welcome any person who is interested in the construction of gliders, by amateurs, for education and recreation.

We do have members who are not members of the GFA and indeed some members reside in other countries.

Naturally members of the HGFA are more than welcome to join our association. We are very interested in the" new" class of light sailplanes being developed to fill the gap between normal hang gliders and current sailplanes.

Many people will recall that I presented Jim Maupin's OSTIV paper, on the design of the Carbon Dragon, during the FAI World Championships at Benalla in 1987. Several Australians also participated in the specification for the FAI World Class Sailplane, which developed from the Australian Gliding 13 metre class competition here.

So you see we have many people devoted to the affordable end of the price versus performance equation, which should be of interest to most GFA and HGFA members.

The last several issues of our AHSA Newsletter included a series of articles on foot launched gliders by Dr Peter Champness, and also the WINDANCER ultraligfht sailplane by Dan Armstrong.

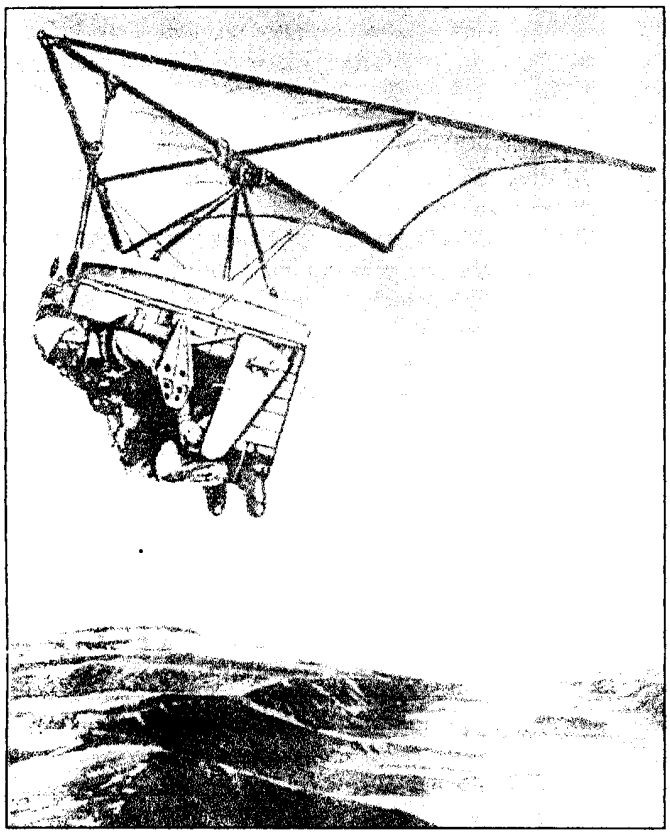
MAIL BOX

Dear Ed,
Monsieur Dominic Lowe sent me this note recently with one excellent picture of Rogallo Kites and Dr.Frank Rogallo. You might like to publish them in our magazine. P.Champness.

Dear Ed.

After reading your piece in the AHSA newsletter, I thought you may be interested in these images from the Penguin Book of Kites. I have a copy if you'd like better photocopies some time.
The twin jet-powered ejector seat is a Bell Aerospace proposal from the 70s.Puts you in the hot seat. Regards. Monsieur D. Lowe.

Dear Ed,
Sorry about the delay in getting this year subscription to you.
I have started on my wing spars incorporating Mike Burns modifications. Regards. B. Berwick.



Dear Ed,
Please find money order for $ 15.oo for a one year subscription to AHSA. Neil Tyson.

Dear Ed,
Just back from Narromine Nats fly 99. Please find my membership fees and renewal for 1999, at present I am building a house at Bowen QLD. And hope to be back flying by October this year and I will commence work on my home built sailplane, will send details and photos of progress if it is of interest to you. Keep up the good work. Regards. Des Muir. ***Ed's note:*** Des, any contribution for the journal is always welcome.

Dear Ed,
Sorry for the delay but I have been away. I think my main interest is in the WOODSTOCK and WINDROSE and would like more information on the Windrose. Can you advise where to go or to whom I should speak. Regards Alan A. Bradley.

Dear Ed,
Enclosed please find cheque for $20 for subs. Keep the good work, it is appreciated. Keith Nolan.

Dear Ed,
Thank you for your kind invitation to attend the AHSA symposium during October 30/31 at Smithfield. Unfortunately I am unable to bring the Carbon Dragon Down. But I can bring the plans, pictures, video etc.etc. I would be happy to answer any questions.Regards. G.Bett

Dear Ed,
Well my motor glider is coming along well as I am working on it every day at the moment. All the wing moulds went to the tip as the sandwich skins weren't working out and now ply wood looks good and an easy way to go at the moment The tail and fin and rudder are being closed up this week. The cockpit canopy frame is made. Seat pan. just the arm rest, to go. Next month the wing spars will be fitted to the fuselage and ribs etc for wings. Regards, Gary Morgan

"A.H.S.A" EDITOR'S NOTE

In reference to the President's Corner article by Gary Sunderland in the last March edition I have received a few letters of complaint saying that we shouldn't have printed the article. *Well, being the Editor for the Newsletter, which is a very demanding task, it is very hard to satisfy everybody when somebody has something to say or wants to express their points of view. I have received many letters telling me to* ***"do this or do that"*** *and even suggesting how to do it better or worse, but nobody sends me a letter offering help in one way or another to make the production of this journal more easy. We are a bunch of people who are taking everything for granted! As I said before, the people behind me who are truly faithful to the cause (the AHSA servants) deserve a big applause for encouragement and for doing it free of charge.*

So Please...! Do not send me letters complaining about this or that. This polemic is closed and we will try to live in harmony, playing the same tune and dancing with the same music. The door is open to any member wanting to take on the job of "AHSA" Editor, providing you are computer literate, have plenty of time at your disposal, work hard free of charge and even have a family not very demanding of the time you spend producing the journal. I will be looking forward to and waiting for the offers.

TECHNICALITIES

PERSPEX

I.C.I. Technical Information
Courtesy J. Ashford

Perspex is the registered trade name for Polymethyl Methacrylate sheets and rods manufactured by I.C.I. (Imperial Chemical Industries Limited)

THE CEMENTING OF PERSPEX

Methods of jointing "Perspex" acrylic materials are required for four main reasons:
1. The shape of an acrylic article or component may be such that is impossible to make it as a single piece shaping which can be removed from the tool or mould, and it has to be made in sections which are subsequently joined together.
2. The conditions of use of the acrylic article or component may require hermetic sealing of the cut edges.
3. The conditions of use of the completed article may require the fixing of an acrylic component to other components made from other materials.
4. Damaged articles or components may be rendered serviceable by cementing repairs into position. Generally speaking " Perspex" acrylic materials can be jointed to themselves satisfactorily by the use of cements, but when they are to be joined to other materials cements are more difficult to employ with success.

CEMENTING PERSPEX TO PERSPEX

There are three types of cement for jointing Perspex acrylic materials to themselves.
They are:
1. Pure solvents(e.g. Chloroform, ethylene dichloride, acetic acid)
2. Solutions of methacrylate polymer dissolved in a solvent(Tensol cement # 6)
3. Solutions of methyl methacrylate polymer dissolved in its monomer (Tensol cement # 3)
The strength, weathering properties, resistance to the attack of moisture and the ease of preparation of the joints vary with the type of cement used. Joints made with pure solvent are the most easily prepared but give the poorest properties, whereas the monomer/polymer methyl methacrylate cements produce the strongest joints with the best resistance to weathering and moisture, but require more care in preparation.

IMPORTANT - SAFETY

Most solvents used for jointing acrylic material or preparing acrylic cements may have toxic effect or may be inflammable.Continuous breathing of small quantities of the vapor might have a cumulative effect and cause serious illness. Cementing therefore should be carried out in a well ventilated area in which smoking is prohibited. This area should preferably be totally enclosed and provided with an efficient extraction ventilating system, and as the solvent vapors are heavier than air there should be some extraction at floor level. Contact between the cements and solvents an the skin should be avoided.

CURING PERIOD

An essential feature of the cementing of Perspex is that attack by the solvent on the acrylic surface must take place before a satisfactory bond can be obtained. As result of this attack the surfaces to be cemented are softened, so that when they are brought together under light pressure they begin to adhere to each other. A curing period is then necessary, during which the solvent in the joint evaporates and disperses within the acrylic material or, with the all-acrylic cement, polymerization takes place. After the curing period, the joint can be handled.

MASKIN ADJACENT AREAS

Since solvent attack is an essential feature of the cementing process, it is often necessary to protect the Perspex surfaces adjacent to the joint in order to prevent the excess cement flowing over and attacking them. Protection is particularly necessary with solvent/ polymer and monomer/polymer cements, but when using solvents, adequate ventilation of the exposed surfaces is generally all that necessary.
Protection can be obtained by masking the surfaces with lead foil held in position with soft soap or with adhesive film which is not attacked by the cements and has no effect on the Perspex.

VENTILATION OF PERSPEX ENCLOSURES

Where cemented articles include an enclosed or semi enclosed space (e.g. double skin aeroplane canopies or museum specimen jars), trapped solvent vapor may cause crazing of the Perspex. This crazing may not become apparent immediately, but only at some future date when the article is subjected to mechanical stress. To avoid this risk it is necessary to remove the solvent vapors by forced ventilation
of the enclosure during and immediately after cementing. In a totally enclosed space it is necessary to drill two small vent holes in the walls,(preferably one at each end), and force air through it by connecting one of the vents to a compressed air line or to a vacuum system. It may be necessary to continue blowing air through for some hours to ensure that all trace of vapor has been removed. Where possible, the vent holes are incorporated in the design of the finished article and left open, but where a completely seals space is required, mechanical closing of the holes is preferred to filling with a cement plug.

CLAMPING

When making a joint, care must be taken in bringing together the two softened surfaces. This operation should be done gently and without working the two surfaces into one other. Some clamping pressure is necessary to exclude air bubbles, but it should be light (about 1-5 lb.per sq.in. (70-350 gm/sq.cm) and evenly applied.
Heavier pressures cause the softened material or cement to exude out of the joint and lead to dry, weak joints, while uneven application of pressure may cause star-like crazing over the areas of the interface which are unduly stressed. During the curing stage shrinkage of the cement takes place (arising from either evaporation of solvent or from polymerization), and it is essential therefore to use a clamping system which can follow up this contraction, at the same time maintaining the pressure. To meet these requirements either gravity loading or spring loading is necessary.

ELIMINATION OF AIR BUBBLES

One of the main difficulties associated with cementing acrylics is to avoid air bubbles within the joint. Careful workmanship, meticulous cleanliness and attention to detail will all help to produce a good joint. One of the important details is to avoid the presence of dissolved air in the cementing medium, which therefore, should not be shaken immediately before use. Indeed, in many instances, it is desirable to purge the cement of air by evacuation.
To be continued.

WHAT'S NEW?

Spirit Builders Do Static Wing Load Tests
By Ralph Luebke(Courtesy Sailplane Builder)

Janice Armstrong.Editor's Note.' Thanks, Ralph, for sharing this article and the great cover shot with us. Ralph can be reached at.' 5923 Macleod Drive, Memphis, TN 38119. Telephone 901-767-0495. Via e-mail.' rluebke460@aol, com .

The flight safety of the American Spirit, kit built, sailplane was a primary concern to a number of sailplane homebuilders. As the sailplanes reached completion, the news of some cracks appearing during a load test was reported by Sailplane Builder, in August, 1995. This occurred at 3 G loading, using a selected non-lifting load of 576 pounds. This 576 pound test load included the fuselage and non lifting parts and a pilot weight of 265 pounds was

included. The kit manufacturer, ASC, Advanced Soaring Concepts, provided a reinforcement kit and the test was repeated on another reinforced ship, successfully raising the test load to 5.8 G, September 1995.
Subsequently a complete reinforcement kit was provided by ASC and another wing set was tested to 7.5G.
We then proceeded to reinforce and test several of our own aircraft using 600 pounds as the nonlifting load. Using the ASC load distribution, the load tests were conducted using a test stand/fixture to support the wing and sand bag weights. All weights were weighed with an electronic scale, marked and placed on stations that were laid out on each wing.
The first test was performed on Ray Watson's Spirit wing set to 6 G. The second test was loaded to 6.5 G on Ralph Luebke's Spirit. The third test, on Mick Luckey's Spirit wing set was raised to 6.9 G. This test load was 4180 pounds.
It is interesting to note that at JAR 22 load standards, this load test is equivalent to 7.8 G and if a typical Spirit fuselage, non-flying weight of 290 pounds with a 220 pound pilot is used, the G load is equivalent to 8.2 G.
After this series of tests, we are of the opinion that the American Spirit is a safe aircraft. We are pleased with the performance, handling and the demonstrated safety of our ASC Spirits. We consider that early development problems have been resolved and look forward to may years of happy landings.

FIRST CONCRETE GLIDER FLIES!

" What is 16 metres long, looks like concrete, and flies short distances?"
" A concrete hang-glider " according to the winner of this year's Young EngineersAustraliaNationalPublicPresentation Competition.
Shane Geha of Sydney Division gave the presentation " It floats and it flies" on the history and future of concrete design.
" Since beginning of time, concrete has been man's inseparable companion. From the days of the great pyramids and an early form of concrete to the skyscrapers of Chicago, concrete has traveled the full journey from the stone age, to the middle age, to the modern age, " said Geha.
So special is this relationship that man has bestowed upon this material some very human -like characteristics: you will have heard the terms stress and strain; it sags, it weeps ,it bleeds- it even suffers from cancer like we do."
Geha said that up until recently, this " relationship was exclusive terrestrial": " concrete could not go up in the sky; it could not go in the water," he said.
" But where there's a will there's a way" said Geha, who told the audience about *Aurora Australis*, the world's most amazing concrete canoe" constructed using a process Geha calls " concrete origami".
The boat was made from a single slab of concrete cast in situ on the ground and later folded into shape". This process is possible thanks to a Sydney University researcher who developed a very lightweight concrete comprising around one third cement, a super-plasticiser, and an aggregate made from " very tiny, glass-like balls".
Geha explained that the boat's hull was a mere 1 mm in thickness. The boat was cast in Sydney, "then it was rolled up and one bloke took it to Sweden on an airplane. Once in Sweden he contacted one AHSA member Neil Ake Sandberg who lives in Sundsvall area who gave him a full support.
When they got to Sweden, they folded the canoe into shape and covered with sealant to prevent it leaking.
Geha also talked about Sydney University's concrete hang-glider called ***Icarus***. Made from 0.6 mm concrete " smeared" onto large wire mesh reinforcing, this devise has achieved a distance of 47 m.
The concrete used in ***Icarus is a new material called autoclave aerated concrete, or AAC***. It is about one fifth the weight of ordinary concrete and is now finding uses in industry, including in fire-prevention.
Because structures made from AAC can be easily transported and quickly erected, another possible use is in the construction of emergency housing.

NEW MEMBERS.

We have a new member to welcome to the group:

Neil Tyson. 15 Walker Grove Cheltenham.Vic.3192.

Alan A. Bradley.28 Tolmer Court.Victor Harbor.S.A. 5211.

Scott Johnson. 9 Fitzroy Place. Karalee. Queensland 4306.

WELCOME ABOARD Fellow! And we look forward to a long and mutually association.

10 NEW WOODSTOCKS TO BE BUILT.

By Sir Colin Collyer.

As a club project, members of the Victorian Association of Radio Control Model Soaring (VARMS) are to build one quarter scale WOODSTOCKS. It looks like between 6 or 10 will be built, and that is why the plea for information of overseas Woodstocks, as local ones are a little thin on the ground.
Why a WOODSTOCK?...I have loved the WOODY advert in soaring magazine that shows structure, and see through covering. That is what got my attention and the subject of a club model came up, some others features are ideal for a " First scale Model" such as size(about 10feet or 3 metres} Shape (Pleasant to the eye} Structure Ie.Wooden and not unfamiliar methods to aeromodellers. Fixed wheel adds simplicity. Flat canopy does like-wise. Big enough to be a "Real Scale Model" and still enough to fit in a car.
When James Garay came up with the full size plans, it just had to be done.
We had had our first meeting, to discuss concepts, methods, etc. and to make a start on the fuselage. At present. The plans are basically outlines, and the individual will put the structure in as they go Formers are drawn, and the basic fuselage builds very quickly to" boat stage" then will come the tailplane and fin because if a removable tail is to be fitted(Recommended) the fittings are easier to get right, before the top decking goes on.

The wings will have a flat bottom section and probably an Aluminium tube wing joiner(Remember it is a first scale model) Some of the builders have never built up a wing before, so it's all new to them, as is the sandwich method of ribs, one chap even wants to do a foam wing(Hope he does not plan on using see through fabric).

I do not have strong feelings about the " PURIST" part of scale modeling, if some one wants to do it their way, I will try and show them the best way to do it "Their Way). For example Aileron servos in fuselage and wings. Both systems have pros an cons, the important thing is that it is done properly.

When finished, we hope to have a properly documented plans, showing the different ways people did the things.

A super scale model these wont be, but at 500 feet, they should look just like Peter Raphael's Woody at 2000 feet.

I'd like to see that..!

BOOK REVIEW.

Sailplanes by Schweizer.A history.

By Paul Schweizer and Martin Simons.
Reviewed By Raul Blacksten

The Schweizer brothers have been known to US and Canadian pilots for over 65 years now. Since WW 2, nearly every new glider pilot in North America was trained in a Schweizer glider. What was unknown to many was the history behind these gliders.

In 1988, Paul Schweizer published his compendium on soaring in America Like Eagles: The story of soaring in the United States. In 1991, William Schweizer went into more depth with Soaring with Schweizer: The 50 year history of their aviation adventures.

It appears though, that something was missing. That "something" has been found and explained in this book.

The collaboration is remarkable and is possible the best book to be produced yet by the authors. The title gives you an excellent knowledge of what is inside. The book is about gliders, not the helicopters ,not the Teal Amphibian or other ventures by the Schweizer company. Just the gliders.

Written in a polished, conversational style, the book is told from the view point of Paul Schweizer with assistance and edited from Martin Simons.
Each Schweizer glider is given it's own chapter. The thought processes used and problems they faced and how they resolved them are discussed fully.

Accompanying each chapter is a 3-view drawing, sometimes more than one depending on model changes. At the end of the chapter is a " virtual statistic" box.

It is in B & W photography where this book really shines. The archival photos make the book a treasure-trove for those who love the history of soaring.

The concluding chapter is a worthy summation of both before and ahead, business decisions that were made and pilot safety and protection.

This is truly a marvelous book. Schweizer and Simons have used it to tell those in other parts of the world about Schweizer sailplanes. I can only imagine what the Swiss will make of it though, as a Schweizer is a person from Switzerland.

HINTS & TIPS

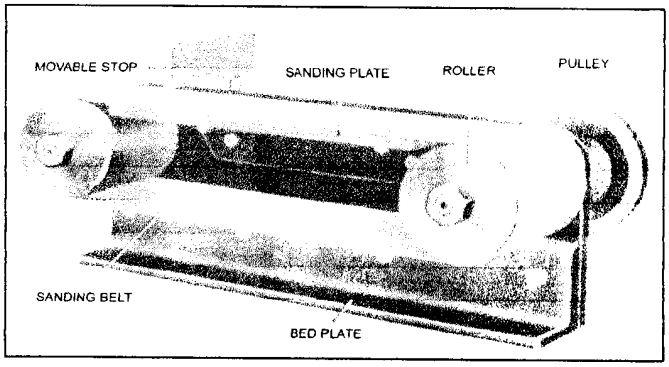
HOME MADE BELT SANDER.

Following the saga from our Erudite secretary Peter Raphael on how to do it easy with de correct machine now we present this simple belt sander, the measurements and materials are not critical and you can adapt it as you wish.

This is a must machine tool to your home shop -- a power driven, belt sanding machine. Designed to use the smallest standard-size sanding belt, the machine will greatly speed and simplify finishing work on your home built glider or other projects.
This tool necessarily requires some accurately made components -- turned steel rollers, phosphor-bronze bearings and lock-nut assemblies and mild steel shafts. Unless you are lucky enough to run a suitable metal-turning lathe in your workshop, these parts will have to be made up for you.
However, the "chassis" or bed plate, the sanding plate, etc., can be simply made from standard black iron strip and angle sections as the drawings show.

BED PLATE

The Bed Plate is made of a piece of black iron strip 6in. x 1/2in. x 16in. long and a 16in. length of angle from 2 1/2in. x 2 1/2in. x 5-16in.
The corners on the side plate of the original machine were Cut round with an oxyacetylene torch and then finished on an emery wheel. This is, of course, not necessary. But gives a more workmanlike finish. Most garages would do this job for you at small cost. It would be as well, if you have no equipment for drilling metal easily, to have the large holes which carry the bearings, cut out at the same time

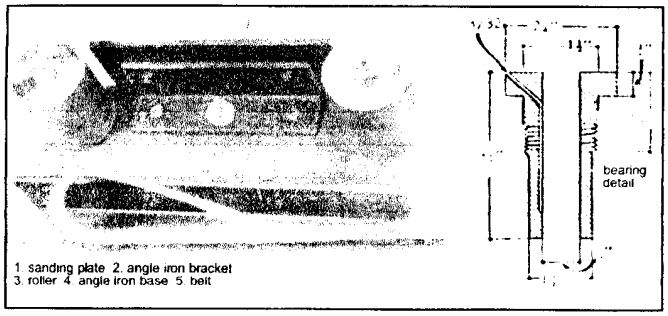


Begin by marking out with a scriber the centers for the holes to be drilled in the angle iron and in the side plate. (All nuts and bolts used in the original were 5-16in. Whitworth thread, 1 1/4in, long).
The four 5-16in. holes along the bottom of the plate should correspond with the four drilled through one side of the angle iron. It is perhaps easier to drill the holes in one component first and then line it up with the other, so that the holes in the second component can be accurately punched before drilling.

Drill two holes in the opposite side of the angle iron to take the holding-down bolts.

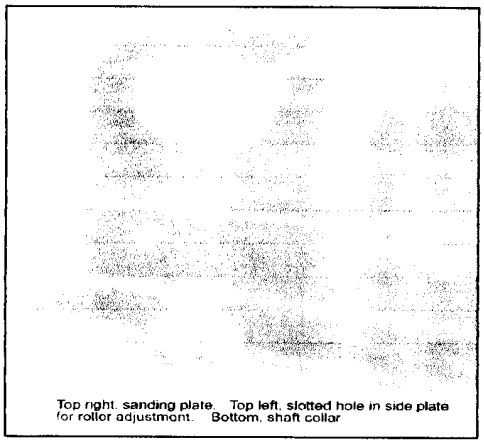
Next drill the two 5-16in. holes near the top of the side plate to take the bolts to hold the angle piece securing the sanding plate. These holes, if desired, can be vertically slotted to enable the sanding plate to be raised or lowered slightly to conform to the running of the sanding belt
The second angle bracket is made from a section of 2in. x 3in. x 5-16in. angle iron, 8in. long. The sanding plate is made from a piece of black Iron or bright steel (preferable) 4in. x 3/8in. x 10in. long.
The sanding plate is drilled where shown and the holes on the upper surface countersunk so that the bolt heads are well below the surface. If black iron is used for this plate it is as well to rub it down with emery cloth

to give it as smooth a surface as possible to lessen belt friction.



The most difficult job, perhaps, in the construction of the bed plate, is the drilling of the two large holes to take the bearings.
This was done on the original by scribing two circles 1 1/2in, in diameter with centres as shown in the drawings. Holes 1/4in, in diameter were then drilled round inside scribed mark and ,the large hole finally made filed out to the required diameter with large rat tail and half-round files.

The somewhat slotted hole -- designed to allow the belt to be tightened by moving the bearing and roller further towards the edge of the plate--was also made in this way.
This sounds rather a task, particularly in metal 1/2in. thick, but patience is the secret, plus a little care and accuracy!
The "chassis" is now ready for assembly and can be bolted together to take the rollers and bearings.


Top right. sanding plate. Top left. slotted hole in side plate for roller adjustment. Bottom. shaft collar

BEARINGS AND ROLLERS

The bearings are turned out of phosphor bronze, or other suitable material, and in the original were made fairly substantial so as to withstand long use. The bearing surface proper is 31/2in. long, and a small oil hole and duct were provided as shown. A mild steel locking ring, threaded to suit that turned on the bronze section, holds the assembly firmly. Four holes were drilled in the perimeter of the lock ring so that a small "tommy bar" could be used for moving the ring.
The two rollers were turned from 4 1/4in. lengths of mild steel rod, 3 1/2in. diameter. The insides of the rollers were turned out to a depth of 2 1/4in. to take the extension of the bearings and 5/8in. holes were drilled through the centres to take the shafts. The surfaces of the two rollers were then cambered 1-16in. on either Side of the centres, as shown, to prevent excessive side movement of the sanding belt when the machine is in operation.
The shafts are 9in. lengths of 3/4in. bright steel rod turned at the ends down to 5/8in. for a distance of 2 3/4in. The smaller sections are then threaded to take 5/8in. Whitworth nuts. Two 3/4in. shaft collars are used, as shown, to secure the shafts and rollers in the bearings.
Standard sanding belts 4in. wide and 36 1/2in long can be obtained or made up as required.

SHOP TALK

Report on the V.G.A. A.H.S.A. G.F.A. Meeting. Meeting 16-4-99.

By Gary Sunderland.

Present: Roger Mac Rury (Chairman Technical Committee)
John Asford9 CTO/A. GFA).
Alan Patching(President V.G.A.)
Gary Sunderland (President A.H.S.A.)

Affiliation:

The current situation and likely future developments were reviewed and it was agreed that the GFA Executive should be approached with a view to the VGA and AHSA becoming formally recognised as part of the GFA organisational structure.
This would enable responsibilities to be assigned and support to be made available as for other interest groups(eg. Contest pilots) within the GFA. This would eventually have to go to GFA Council for implementation. Direct Affiliation to the GFA or via a State Association was not considered possible, even with the proposed amalgamated structure the mechanism available is the GFA committee structure.

Fees and subsidies.

Fees were discussed, and we made the point that any fees charged should be related to the service provided.
If the interest groups(VGA and AHSA) covered their own activities, then they would have less need of GFA services, and consequently, fees or cost recovery.
As information providers, our groups are in an excellent position to assist current and potential GFA members, and also save the time of paid GFA officers. Hence we will deserve(future) support!

Liability and Insurance.

Because the V.G.A conducts flying regattas they probably need to become incorporated and obtain insurance for each event.(The liability otherwise lies with their office holders ie.President and Secretary)

In the case of the AHSA, we do not need to take this step, given that our only rallies at the moment, are as part of the VGA Rally. All of our normal flying is club flying, and we are covered by the B.B.L. while doing this.
Our other activities(eg.Symposiums should not generate litigation, we hope! If you cut off a finger in the band saw, please have your own medical insurance perhaps our invitations to the symposium should repeat the disclaimer we have in the newsletter. The AHSA takes all care but accepts no responsibilities!.

WINDANCER

By Daniel Armstrong

Design and development of the WinDancer ultralight sailplane has been continuing steadily with some design changes resulting from testing and analysis. This update describes these changes and some items of interest on materials and processes.
The basic goal for the WinDancer has been to develop a simple good flying ultralight sailplane with a broad range of launching capabilities that can be built from plans. As the cockpit and control

system were being designed, the goal for a simple design was found to be in conflict with the foot-launching capability. The control system location and routing, landing gear doors and canopy installation became fairly complex and had negative effects on the strength, weight, operational ease and comfort. I decided that the basic simplicity of the cockpit area was more important than the ability to foot launch. I still plan on flying the glider from hang gliding sites and flight parks, but I will bungee launch it instead of foot launching.

In addition, I found that the forward sweep made the spar more difficult to build and increased the torsion loads in the wing skins. The forward sweep was incorporated to get the proper center of gravity location while giving excellent visibility. A few sketches showed that the wing could be made straight with the pilot in a notch in the leading edge and have the proper cg range. The visibility is a little worse, but still on par with a 1-26. The glider will have to be flown with the canopy in place or the performance will suffer substantially. This is not a problem for me as the thermal heights in our area usually go high enough that hypothermia becomes a problem for open cockpit gliders. A nice advantage of the changes to the cockpit and wing is that the maximum glide ratio should be around 31 and the minimum sink rate under 120 feet per minute.

The last significant change is to the flying surface structures. After developing and testing vacuum bag molding processes for flying surface skins, I found that I could obtain a very smooth and stiff skin using a composite sandwich of carbon cloth or glass cloth and Divinycell PVC foam. The weight was quite favorable and the number of ribs could be reduced by about 80 %. The constant chord surfaces allow building relatively short female molds to make the wing and horizontal in sections and then bond them together.

The results of these changes can be seen in a revised 3-view shown on the next page.

A number of items of interest to the homebuilder have been found while developing the materials and processes for the WinDancer. Some materials of interest include Divinycell foam, Dow "BlueBoard" Styrofoam and pultruded carbon rods from Avia Sport and Jim Marske. The processes include hot wiring Styrofoam using the "Feather-Cut" machine by Tekoa and mixing epoxy using the "Sticky Stuff Dispenser".

Divinycell is being used as the core of the sandwich skins for the WinDancer. At the same density as Styrofoam, Divinycell has much higher compression strength and allowable temperatures. Styrofoam begins to change shape at temperatures that can be reached on a hot ramp in the sun during the summer.

Dow "Blue-Board" is approximately 1.8 pounds per cubic foot Styrofoam used for insulation. It can be obtained in sheets 4 inches thick by 2 feet wide by 8 feet long. It is being used for plugs on the WinDancer and can be hot wired very nicely. The flotation billet recommended for moldless composite construction comes in 10 inch thickness, but has a coarse grain structure. The "Blue-Board" can be sanded to a very smooth finish, requiring less finishing. I have been using a "Feather-Cut" hot wire machine that is designed for modelers. It uses a falling weight or arm to pull the hot wire through the foam and does a superb job of producing a smooth plug. My previous experience with hand drawn hot wire bows always had ridges or wire lag imperfections. The "Feather-Cut" machine can be obtained from Composite Structures Technology at (805) 8224162. It is highly recommended for hot wire cutting of foam.

I have bought 1000 feet of 1/8 inch diameter carbon pultruded rods from Jim Marske to use in the wing spar. It looks good and is amazingly stiff.

The "Sticky Stuff dispenser" epoxy measuring machine accurately mixes hardener and resin at the right ratio and saves a lot of time weighing and mixing epoxy. It can be obtained Aircraft Spruce and is also recommended. (*see windancer picture on page 15*)

Windancer update from Armstrong Aviation, LLC
Dan and Janice Armstrong

Thanks to all of you who viewed our display at the SSA Convention in Knoxville recently. We appreciate the enthusiasm of so many of you for the WinDancer, and are working hard to complete the prototype.

As a result of feedback from many of you in Knoxville, we will be offering full kits for sale, in addition to plans and components. We anticipate taking plan orders after flight testing the prototype, currently scheduled for late summer.

The WinDancer design and construction is now under "full steam ahead". Fabrication of plugs and moulds is in progress. This ultralight sailplane, with its classic racing glass look, will be launchable by traditional sailplane aerotow, autotow, bungee launch, and ultralight aerotow. The design has been worked and reworked to meet the design goals of a easy-to-fly, excellent handling lightweight yet durable composite glider with many launch options.

We are also pleased to announce a permanent location for Armstrong Aviation, LLC. We are building a new hangar at Mountain Valley Airport, in Tehachapi, California. The hangar will be utilised as a location to store and showcase the WinDancer and our upcoming other products, such as motorgliders and two place sailplanes. We hope to have the hangar up and operational by the end of the summer.

Mountain Valley Airport is a privately-owned sailport, the home of Skylark North, a soaring FBO. In addition, it is the home base for a number of SHA and VSA members. There is a nice collection of vintage sailplanes there. Mountain Valley Airport has hosted the SHA Western Workshop since the first Western wmk~hup ill 1981, mid hos~s the VSA Western Regatta, in addition to the Blue Feather Fly-In and RESCO's Dust Devil Dash.

FOOT LAUNCHED GLIDERS. Part 5.
By Peter Champness

In the last article I discussed the advantages of the Rogallo type hang glider. The most important of these was the ease of transport since the glider folds into a narrow bundle which can be strapped onto car roof racks. Other important advantages are its light weight, simple rugged airframe, and lack of control surfaces (and the associated complex control linkages). The problem of lack of suitable hills and appropriate prevailing winds have been largely overcome by the use of car towing or aerotowing from flat land sites.

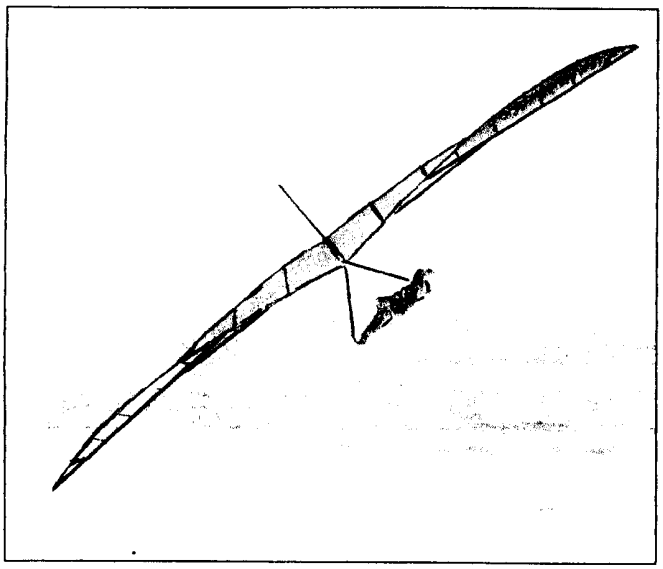


Illustration 1

Rogallo hang glider seen from behind. The substantial sail billow and resulting large washout at the tips is quite obvious.
Despite the relatively poor performance quite long cross country flights are made quite regularly. One reason for this is that hang glider pilots do not have to overcome the psychological barrier which inhibits other glider pilots. Months or years of training condition a pilot to fly within gliding distance of the airfield. After this it is quite hard to turn ones back on the security of the airstrip and head off toward the possible dangers of a paddock outlanding. The hang glider pilot almost never lands at the take off point and is out of range of his paddock on the first turn so the idea of "getting back" never enters his head.
The difficulties of retrieving a glider after the outlanding are also substantial. By the time the glider pilot has organised his retrieve crew, been found, unrigged the glider into its trailer and driven back to the airfield the cross country hang glider pilot has been home, had dinner and gone to bed.
One cause of poor aerodynamic performance of the Rogallo hang glider is the sail shape which is formed by its own tension. This results in a billow of the trailing edge which results in a large wash out toward the tips which may be more than 30 degrees (illustration 1). Thirty degrees of washout would imply that the wing root region is stalled when the angle of attack at the tip is zero. The billow also causes marked span wise airflow toward the outer wing as the airflow below the wing is funnelled into the apex of the billow. Attempts to straighten out the billow by increasing the tension cause very large compression forces in the cross bar, which may break unless it is made very strong and heavy. Increasing the aspect ratio by widening the nose angle exacerbates the problem.
The loose sail can also deflate under some circumstances such as encountering a downdraft or in a steep dive leading to loss of control.
Two similar designs which overcome both these problems are the Manta Fledgling and the EF5 (designed by the Australian Ewan Fegan). The advantages of a simple structure, light weight and a folding airframe are retained.
In these designs the cross bar is eliminated. Two tubular spars are required in each wing, one forming the leading edge and the other at about 2/3 chord. Two compression struts separate the spars. The sail shape is formed by ribs which are shaped to the required aerofoil section. The ribs are simple sail battens which slide into pockets in the sail. Great tension is not required to maintain the sail shape. The compression forces in the spars are quite low. The lift and weight forces are transferred to the top and bottom bracing wires.

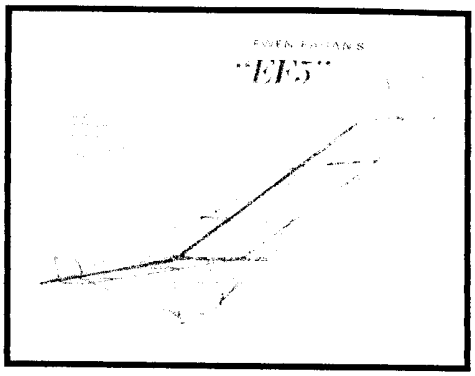
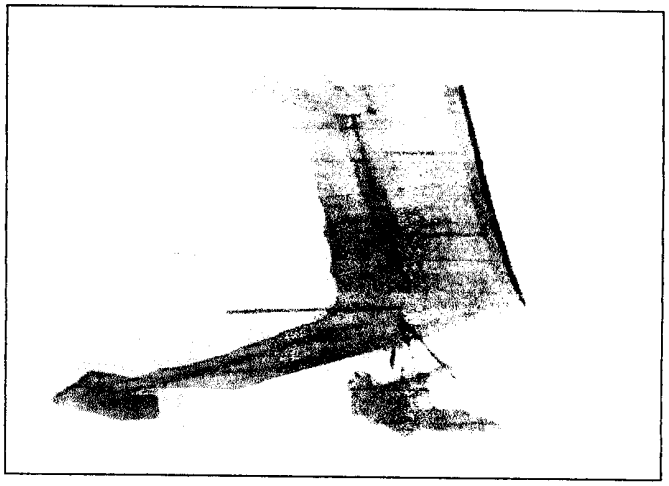


Illustration 2

EF5 Airframe. Sweep back of the wing is not so obvious in this diagram but is similar to the fledgling.

Illustration 3



The Manta fledgling. Note the reflexed aerofoil at the tips.

The wing is constant chord from root to tip which results in much better lift distribution than the Rogallo wing and hence better glide performance. Washout is controlled by the rigging wires to the front and rear spars. There is no sail billow in these wings except for the small billow between ribs. Washout could be reduced to zero but is probably set at about 5 degrees.

The result of these changes is a better L/D ratio and a better speed range.
One consequence of the greater effective aspect ratio which results from eliminating the sail billow is that roll control by weight shift is reduced. Lateral control however is restored by the addition of wingtip rudders which also act as vertical fins for yaw stability and as end plates at the wing tips. The rudders can only be deflected outward by a single cable and returned to the straight position by air pressure and a light spring. If both tip rudders are deflected simultaneously they act as airbrakes for glide slope control. To be Continued...

Smile!

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1. A beer doesn't get jealous when you grab another beer
2. When you go to a bar you know you can always pick up a beer.
3. A beer won't get upset if you come home and have beer on your breath.
4. You don't have to wine and dine a beer.
5. If you pour a beer right you'll always get good head.
6. Hangovers go away.
7. When you're finished with a beer , the bottle is still worth five cents.
8. You don't have to wash a beer before it tastes good.
9. A beer always goes down easy.
10. You can share a beer with your friends.
11. Beer is always wet.
12. You always know you're the first one to pop a beer.
13. A frigid beer is a good beer.
14. You can have more than one beer and not feel guilty.
15. You can enjoy a beer all month long.

Ed's Note: Please don't write me letters complaining that I shouldn't print things like this!

STOP PRESS

G.Sunderland.

The Chairman of the Technical Committee presented our concerns to the GFA Executive Meeting held in Melbourne, 17th & 18th April 1999. The minutes of this meeting have now been issued and, at item 3.18. records as follows:

3.18 Special Interest Group Gliding Associations. Roger Mac Rury advised that he had some preliminary approaches and discussions as to the legal status of the Vintage Glider Association and The Australian Homebuilt Sailplane Association. The matters relate to the legal standing of these associations and their relationship if any with the Gliding Federation of Australia. Further discussions should take place with the reps of these associations and members of the Executive to clarify the situation..

This is not much progress after several years, but at least the Executive now acknowledge that we exist.
Lets hope we don't have to wait too long for these "further discussions"

The Gliding Federation of Australia has a new person as Chief Technical Officer-Airworthines his name is TOBIAS GEIGER We hope to count on him with a mutually cooperation in the same manner that we had with J. Shand..

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GLIDER PILOTS DO IT QUIETLY! Come and fly with Mangalore Gliding Club at Locksley Airfield
Ph.(03)57985525/0412 297 177(from Hume Fwy 11 Km N Avenel, turn L to Locksley, follow signpost 4 Km).
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VINTAGE TIMES.

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

" SAILPLANE BUILDERS "
Official publication of The Sailplane Builders Association U.S.A. Regular Membership (third class mail) US $ 21.
All other countries (Surface mail) US $ 29
Overseas Air Mail US$ 46.
Make cheque payable to Sailplane Homebuilders Association.
Mail To: Dan Armstrong, Sec/Treas.
21100 Angel Street
Tehachapi, CA 93561 USA.

(Payment may be made directly in Australian Dollars to : Colin R. Owers. Pudman St .Boorowa. NSW 2586, saving bank charges)

"Acrifix 192" **Acrylic cement.** Peter Raphael still has some of well known stuff, if you want some for canopy repairs, give

Peter a call, he is selling it at AU $ 15 a tube plus postage. Peter Raphael. 34 Ivan Ave.Edithvale. Vic.3196.Ph.(03) 97723929.

Attention " Woodstock" Builders...here is the good stuff..! "Woodstock" sailplane sketchbook illustrated construction manual US $ 25. Also available are drawings for simple jig used to construct various components. Package deal of sketchbook and jig drawings US 85. Overseas customers add US $ 15 for Air Mail delivery. Send SASE for more information to: Clint Brooks. 2231 Vuelta Grande. Long Beach CA. 90815 U.S.A.

The Australian Homebuilt Sailplane Association

home Page can be found at:
http://www.geocities.com/CapeCanaveral/hangar/3510
Webmaster: Peter Raphael - pete_raph@yahoo.com
This new medium will be used to periodically include new information regarding our association as it comes to hand.

Thus far, it includes:

- A builder's profile- Peter Raphael and Terry Whitford's " Woodstock" VH-HNW and Malcolm Bennet's " MONERAI" VH-HDF. And shortly we will have Paul Johnson's "WINDROSE" VH-UII(Please feel free to send your" profile" for inclusion.
- A list of approved (in Australia) types for home construction.
- Graphic images.
- Subscription information
- Links to the Gliding Federation of Australia and other Gliding related Web sites
- E-mail

If you have any suggestions on what else we may include on our Web Page please E-mail or write a letter to James Garay.

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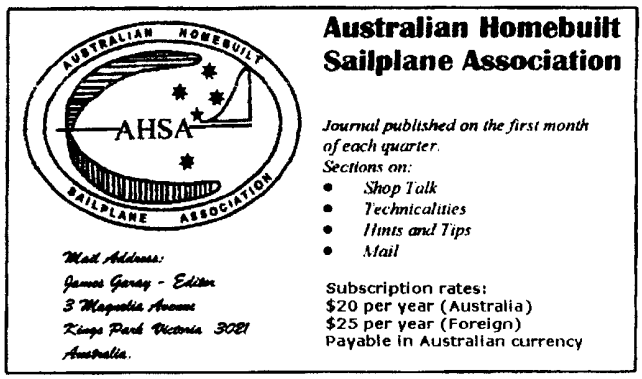
Ultralight and Light Self-Launching Sailplanes by Bruce Carmichael. 8 x 10 soft cover, 70 pgs, 44 illustrations, 243 views. Characteristics of 22 U/L and 13 light. Data on 18 Sustainer plus 56 Self Launch engines. Reducing prop drag, available plans/kits, safety. 34795 Camino Capistrano, Capistrano Beach CA 92624 USA $ 15.00 includes postage. $ 18.00 Canada/Mexico. $ 22.00 Other Countries. Also from the same author Personal Aircraft Drag Reduction.



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Personal Details	Contact Methods	Interests/Skills
Gary Sunderland	☎ Ph. 035675374 ✉ 70 Underbank Rd. Bacchus Marsh 3340	Design , Manufacture and Maintenance of gliders
Peter Dall	💻 peter.dall@casa.gov.au	Ultralight Sailplanes e.g. Carbon Dragon. Rigid wing hang gliders . Timber construction and gluing. Composite construction methods. Flutter, fatigue, structured
Victor Kruse	✉ P.O.Box 38713 Winnellie N.T. 0821	Homebuilding light aircraft 30 years practical fibreglass repair and fabricating of innumerable items
Malcolm Bennett	☎ Ph. 0395803557 82 Mc Donald St.Mordialloc VIC. 3195.	Wood , glass, metal. Monerai.Woodstock. Duster.
Alex Adam	18 Angurie Crescent Taylors Lake Vic.3038	General interest in gliders and general aviation
James Garay	☎ 0393673694 ✉ 3 Magnolia Ave. Kings Park 3021	Currently building Woodstock Interested in vintage gliders Some woodworking skills
Keith Nolan	☎ 03542822525 evenings ✉ 13 Peters rd. Gisborne 3437	Form 2 surveys. Repairs, rebuilds, mods etc to mostly wooden gliders. Also setting pneumatic instruments and plumbing etc. Proof loading
Garry Morgan	☎ 0418253466 ☎ 0295800838 ✉ 5/50 Oxford St. Mortdale NSW 2223	Motor Glider Ultralights Fibreglass
Harold Walton	💻 woodhang@ozemail.com.au ☎ PO Box 224 Woodside SA 5244	GA Grade 1 Instructor Ultralight Instructor and Examiner Glider Instructor and Examiner, Cof A Inspector Professional Aeronautical Engineer specialising in Flight Test and Weight and Balance
John Ashford	✉ 6 Griffith St. Bacchus Marsh 3340	Aircraft certification and design, JAR22,OSTIVAR etc. German ultralight glider certification
Doug Vanstan	✉ 33 Franklin St. Bacchus Marsh Vic 3340	Built Cherokee 2, repaired and rebuilt many wooden gliders Interested in vintage gliders, power aircraft and ultralights Flown over 50 different aircraft types
Paul Daiziel	☎ 0746302156 ✉ MS 1497 Lot 10 Mt Rascal rd. Toowoomba Qld. 4350	Owner of Woodstock HNH built by Les Squires
Rod Dash	☎ 0266897269 ✉ "Hidden Valley" Barkers Vale via Kyogle NSW 2474 💻 hidvally@mpx.com.au	Some woodworking skills Interested in Self launching sailplanes i.e. Windrose and S2A I'm willing to assist other builders where practical. (I live in a fairly isolated area 1 hr from Lismore, ¾ hr Kyogle)
Tim Berkes	☎ 0393311196 ☎ 0412575625	Woodstock, Carbon Dragon, ULF1 and anything under $10,000
Boz Ilic	☎ 0299223633 ✉ 14 Coral rd. Woolooware 2230	Interested in building the Carbon Dragon

Personal Details	Contact Methods	Interests/Skills
J Hancock	☎ 0267657987 ✉ P.O.Box 136 South Tamworth NSW 2340	Ex-CASA approved TIG Oxy-Acet Welder Unlicenced LAME(A.M.E.) General interest in homebuilt rotorcraft and gliders (motor preferred). Open minded-not locked into the idea of 'it won't work and can't be done Good skills, general workshop practices. Ex spray painter.
Des Muir	☎ 0747866556 ✉ P.O.Box 1257 Bowen Qld. 4805	Currently building an S2A strojnik self launching 15m sailplane Glass fibre experience and plug and mould making
Dominic C Lowe	☎ 0394176108 ✉ 42 Albert St. East Melbourne 3002 💻 dominic@mulga.cs.mu.oz.au	Interests: Flying wings Variable geometry wings General sailplane design/aerodynamics Skills: Limited glassfibre/ moulding skill Limited design skills
Wayne Rhodes	💻 w_v_rhodes@bigpond.com.au ✉ 11 Nola Ave. Scarborough WA 6019	Windrose clone (95-10 ultralight) FRP experience GFA form 2 rating
Allan Ash	☎ 0397660146 ✉ 2 Heath Ave. Frankston 3199	Historical data collection Writing about gliding
Alan Patching	☎ 0398175362	Over 50 years of experience in Airworthiness of gliders and aeroplanes including inspection , repair and structural testing
Mike Burns	☎ 0358742920 ph ☎ 0358742914 ph/fax ✉ P.O.Box 139 Tocumwal NSW 2714 💻 glomic@hdc.com.au	BG12B builder/owner Design approval signatory Specialist in sailplane repair modification design and certification skilled in wood, metal and FRP materials/structure Tailless and electric power are special interests.
Graham Betts	☎ 0298711090 H ☎ 0294393137 W ☎ 014974163 ✉ 30 Murray Farm Rd. . Carlingford NSW 2118	I have built a Carbon Dragon lightweight sailplane and I am happy to help anyone interested in this sailplane.
John Biggs	☎ 0393165823	Builder of Taylor monoplane Knowledge of wooden A/C construction I would love to design build and fly an ultralight powered all metal sailplane . I would be happy to assist builders or potential builders of wooden gliders
Chris Runeckles	☎ 0894548977 ph/fax ✉ 4 Snipe crt. High Wycombe WA 6057	Form 2 Inspector- All types Survey rated- All types FRP repair rated Building Advanced Soaring American Falcon FRP kit sailplane (approx 70% complete). Rebuilt LS3 from write-off including gel coat removal and reprofile of wings and repaint.
Peter Raphael	☎ 0397723929 ✉ 34 Ivan Ave. Edithvale Vic 3196 💻 pete_raph@hotmail.com	Co-builder Woodstock HNW Co-builder Duster BJ-1B Minor/Major wood repair Happy to assist with information on these or similar projects
Peter Pilbeam 32 Helen St. St Albans 3021	☎ 0393660705	Wooden Aircraft Building Jodel Sky King

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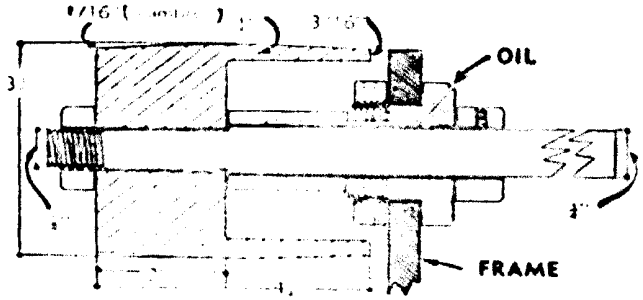
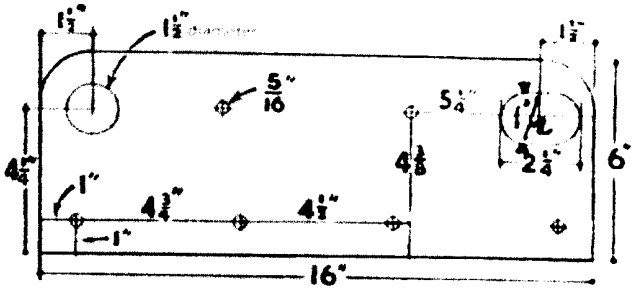


Detail of the Roller.



Plan of Side Plate

QUANTITIES

Black Steel Strip.
½ in. x 16 in.
One piece 6 in.

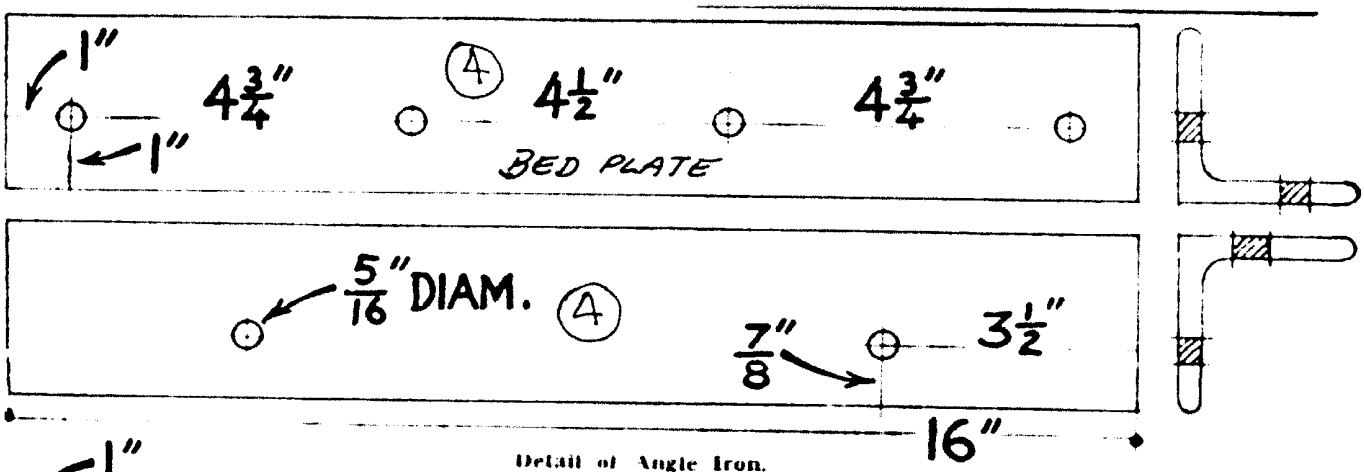
⅜ in. x 10 in.
One piece 4 in.

Angle Iron.
2½ in. x 2½ in. x 5/16 in.
One 15 in. length.

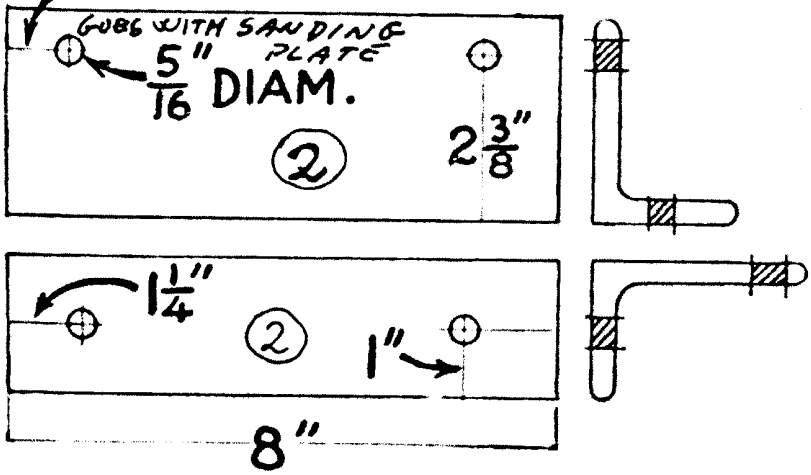
Bright Steel Rod
3½ in diameter
Two 4¼ in lengths
2⅛ in diameter.
One 2 in. length (for lock rings).
¾ in diameter
(In 9 in lengths for shafts.)

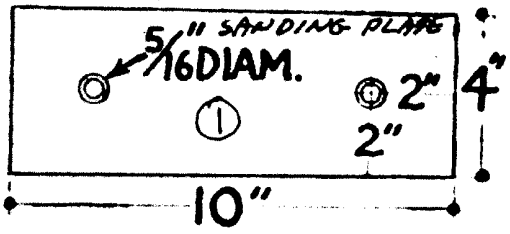
Bronze
2¼ in diameter rod (for bearings)

Nuts, Bolts, etc.
Six 5/16 in. x 1½ in. Whit. bright steel hexagon head nuts and bolts.
Two 5/16 in. x 1¼ in. Whit. countersunk nuts and bolts.
Two ⅝ in. Whit. bright steel hexagon nuts
Two collars to suit ¾ in. shaft



Detail of Angle Iron.





Sanding Plate Detail.

WinDancer

Description

Wingspan	**40 feet**
Area	**112.3 square feet**
Aspect Ratio	**14.2**
Empty Weight	**less than 155 pounds**
Max Pilot Weight	**242 Pounds**
Min Pilot Weight	**121 Pounds**
Wing Airfoil	**Eppler 656**
Hor. Airfoil	**DU86-137/25**
Ver. Airfoil	**Eppler 297**

Performance

Maximum L/D	**31:1 @ 46 mph**
Minimum Sink	**117 fpm @ 35 mph**
Velocity (6fps)	**82 mph**

Ultralight Glider
Armstrong Aviation, LLC