

# T.W.I.T.T. NEWSLETTER



(This is a sample of Mike Brown's construction journal. See inside for more.) Here are both scraps cut properly, taped correctly to one another in the form of the rib profile, and placed on their respective curves to be certain they're just right. This accurate profile of a complete rib can now be traced to a solid piece of card stock. Once this is completed for all ribs, we will have a permanent set of outlines from which we can trace the rib profiles on our rib board. These card stock profiles, following use for their purpose, will be carefully stored in case they are needed at any time in the future. They are made with great accuracy.

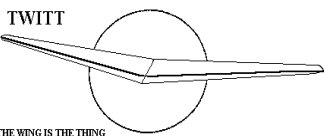
## T.W.I.T.T.

The Wing Is The Thing  
P.O. Box 20430  
El Cajon, CA 92021



The number after your name indicates the ending year and month of your current subscription, i.e., 0103 means this is your last issue unless renewed.

Next TWITT meeting: Saturday, March 17, 2001, beginning at 1:30 pm at hanger A-4, Gillespie Field, El Cajon, CA (first hanger row on Joe Crosson Drive - Southeast side of Gillespie).



**THE WING IS  
THE THING  
(T.W.I.T.T.)**

T.W.I.T.T. is a non-profit organization whose membership seeks to promote the research and development of flying wings and other tailless aircraft by providing a forum for the exchange of ideas and experiences on an international basis. T.W.I.T.T. is affiliated with The Hunsaker Foundation which is dedicated to furthering education and research in a variety of disciplines.

**T.W.I.T.T. Officers:**



**President: Andy Kecskes**  
(619) 589-1898

**Vice Pres:**

**Secretary: Phillip Burgers**

(619) 279-7901

**Treasurer: Bob Fronius**

(619) 224-1497

**Editor: Andy Kecskes**

The T.W.I.T.T. office is located at:

Hanger A-4, Gillespie Field, El Cajon, California.

Mailing address: P.O. Box 20430

El Cajon, CA 92021

(619) 596-2518 (10am-5:30pm, PST)

(619) 224-1497 (after 7pm, PST)

**E-Mail: twitt@home.com**

**Internet: <http://www.members.home.net/twitt>**

Subscription Rates: \$20 per year (US)  
\$25 per year (Foreign)

**Information Packages: \$3.00 (\$4 foreign)**  
(includes one newsletter)

**Single Issues of Newsletter: \$1 each (US) PP**

**Multiple Back Issues of the newsletter:**  
\$0.75 ea + bulk postage

**Foreign mailings: \$0.75 each plus postage**

Wt/#Issues	FRG	AUSTRALIA	AFRICA
1oz/1	1.00	1.00	1.00
12oz/12	5.00	6.75	5.00
24oz/24	9.00	12.25	9.00
36oz/36	14.00	19.50	14.00
48oz/48	16.75	23.00	16.75
60oz/60	21.75	30.25	21.75

**PERMISSION IS GRANTED to reproduce this publication or any portion thereof, provided credit is given to the author, publisher & TWITT. If an author disapproves of reproduction, so state in your article.**

Meetings are held on the third Saturday of every other month (beginning with January), at 1:30 PM, at Hanger A-4, Gillespie Field, El Cajon, California (first row of hangers on the south end of Joe Crosson Drive, east side of Gillespie).

**TABLE OF CONTENTS**

**President's Corner .....1**  
**This Month's Program .....2**  
**Letters to the Editor .....2**  
**Building a Mitchell B-10.....5**  
**Available Plans/Reference Material.....10**

**PRESIDENT'S CORNER**

**W**ell, I am looking forward to the March program. It should be a special event since Bob has arranged for some of his friends to bring in aircraft related to the work of Bill Bennett, along with some other types of hang gliders. Make sure you have March 17<sup>th</sup> free to attend this one.

With the recent rise in US postal rates and the outlook that there will be another raise in the near future, we have been forced to re-evaluate our subscription rates. This has hit us hardest in the foreign mailing area and may result in an increase in the coming months. However, we are also exploring alternate delivery methods that would reduce your costs and provide quicker service. I have written to our foreign members that I know have e-mail addresses, but there may still be some of you that have e-mail but just haven't contacted us through that means. If you are in this later group, I would appreciate you sending me a message with your address so I can get your opinions on the methods we are considering.

At the request of Bob, and thanks to Al Bowers, we have a copy (albeit not a good one) of the Farnborough Hants Royal Aircraft Establishment technical paper on the Horten designs. This is an extensive work with lots of pictures and drawings. Unfortunately, the pictures are beyond reproduction, but the drawings were salvageable. I have begun recreating the text material and putting it out on the website for the rest of you to enjoy. It will take some time to get everything out there, so come back to this part of the page every so often to see what's been added. I have included an index table with add-on dates to help you.



**MARCH 17, 2001  
PROGRAM**

**W**e are extremely pleased to have Bill Bennett as our speaker for March. Bill has been involved in hang gliding for over 31 years that have included being a designer, builder and flyer. He began in Australia with water ski kites and progressed up into the Rogallo type wings that had much better performance and were safer. At one point he had teamed up with Bill Moyes, who later became a well known designer in his own right, to thrill crowds with their dare devil antics.



In the 70's, Bill contracted with Rich Picarrelli to produce the first workable backup system (parachute) which went on to save hundreds of lives over the coming years.

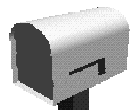
Bill's done a lot for the hang gliding movement over the years and he will be telling us about many of these achievements. If you are a hang glider enthusiasts or would just like to learn more of its history, this is your type of meeting. Make sure to tell your friends about it and bring them along.

respecting the plans, but mostly to satisfy my personal curiosity about structural and flight characteristics of the design itself and, some of the background regarding Don Mitchell and his fascinating life's work in building these very unique aircraft. At this point, let me say I am very impressed, not only with Richards knowledge of his product but because of his close relationship with Don Mitchell, his ability to recall many interesting details of Mitchell's life's work and personal philosophies. At this point in my life, I find the details of how a designer thought and the trials of bringing his craftsmanship to fruition at least as interesting as the tangible design itself, and Richard provides at this time, possibly the only living link to Don Mitchell's "hands-on" portion of his life. Fortunately, for those of us who are Don Mitchell admirers, Richard has a pleasant and forthcoming personality and is very willing to share his experiences freely and with abundance. I would heartily recommend anyone contemplating buying a set of what I consider these "historical" plans, do so with the complete confidence Richard will support their efforts by answering any questions completely to their satisfaction.

Insofar as beginning construction myself, I've been very busy cleaning up various racecar design problems for some customers since receiving the plans, and thus, been forced to study them off and on in a rather hit and miss fashion. None-the-less, I now feel I have a complete grasp of all the steps necessary to assemble the individual components, the jigs which I plan to build to make construction go smoothly, and what materials will be needed. Many of the materials I already have on hand as surplus stock from other airplane projects so it's pretty much a matter of getting the decks cleared by winding up these other matters and then to begin.

What has impressed me most so far about the plans study is the brilliance of Don Mitchell's ability to conserve materials in the interest of saving weight without sacrificing safety. It's one thing to put wood into a wing, for example. It's yet another to put wood into a wing WHERE IT COUNTS! With the latter, of course, there is no extraneous weight being carried about which doesn't contribute to strength. It became very clear to me from the first reading of the plans that Don Mitchell had spent years and countless hours of deep thought in design of aircraft prior to developing this one. His mastery of the concepts of strength, stiffness, yet lightweight is abundantly evident when one begins to study the plans. These are definitely the work of a seasoned artist in every sense of the word and it's now clear to me why the design won so many awards and is so highly praised by those who fly the wings built from it. I expect to begin construction of some parts very soon now, so will probably have an update on some actual components within the next 30 days.

Respecting Don Mitchell himself, I was also delighted to receive the tapes ordered from TWITT. These, of course, are the tapes of Don Mitchell's addresses/lectures to SHA in 1991 and the TWITT membership in 1992. I had studied the plans somewhat prior to receiving the tapes, and formed excellent impressions in my mind of the creator of the design as you have just read. You can imagine my excitement to hear the enthusiastic words of "the master" himself, as he spun forth the details and anecdotes of his



**LETTERS TO THE  
EDITOR**

2/14/01

TWITT:

**T**hought I might send an update on my pleasant experiences thus far with the Mitchell Wing B-10 project.

As written on Jan. 1, I sent for a set of plans from Richard Avalon of U.S. Pacific. Much to my delight the plans were received within three or four days of my sending for them. Everyone appreciates prompt service and Richard provided the very best. Since receiving the plans, I've spent about four hours at various times in telephone conversation with Richard, discussing a few minor points

life of aircraft design. He's an excellent storyteller in his own right, but more importantly to me, in the tapes, he provides detailed explanations of the choices he made in his designs, why he made the choices, and the results. He tells of his successes and failures, a "warts and all" approach, which only elevated my esteem for him as a unique individual. We are all too familiar these days with those who have learned the art of "spin" and how boring are their speeches lauding their so-called achievements. How refreshing it is by comparison, to listen to Don Mitchell's simple and beautifully honest descriptions of his hard work, and recognize his constitutional core of pure honesty. It's little wonder he was so eminently successful in his life's desire for creativity. I would have to recommend these as a truly inspiring and educational set of tapes for anyone interested in flying wings. With Don Mitchell's passing, we indeed lost a treasure of a man.

Those words pretty much sum my thoughts and impressions to this point. I once more want to extend my personal gratitude for the efforts you and other TWITT members have put forth in preserving this very unique segment of aviation history. I fully realize were it not for the "grass roots" efforts of you and your members in the past, those such as myself who have just now found our way to this fascinating area, would probably have little or nothing to find once there! As it now stands, however, as a direct result of your efforts, anyone who wants to begin construction of the simple but elegant flying wing the B-10 represents, has immediate valuable assets in Richard Avalon's and your organization.

Best regards,

Mike Brown

*(ed. – Thanks for the wonderful letter on your impressions of the B-10, Mitchell and Avalon. I am pleased that you have found this such a pleasant experience so far. I haven't had much contact with Richard, but know he and Don did a lot of work together and that he would be a good source of information on the B-10. I have been a little surprised that Don's designs haven't been built by more enthusiasts, but this may be a result of not many aircraft options available and everyone having a unique vision of what they want.*

*We all look forward to your future updates on the actual building progress. My hope would be that it shows everyone that it can be done with a little dedication and a lot of sweat, but well worth it in the end. See page 5 for more on Mike's building project.)*

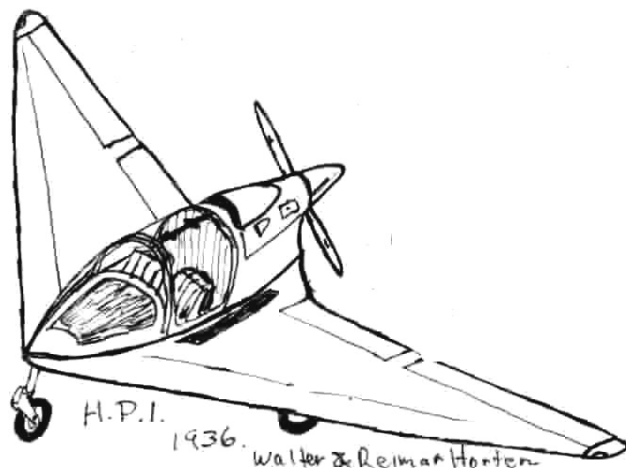
2/4/01

TWITT:

**H**aving found a February 1996 Pacific Ultralights magazine with a tribute to the Horten brothers, written by Rob Germon of New Zealand, it featured the fabulous H.P. 1. The H.P. 1 was a side-by-side two-seater with a baggage load of 90 lbs., a range of 615

nm., and a top cruise speed of 165 kts., on 90 hp. It had flaps with a stall speed of 38 kts, rate of climb of 1050 fpm at gross load.

Apparently a Rotax version had also been flown with a 532, cruising at 130 kts, and a single seater with a 447 Rotax with a cruise speed of 110 kts. I believe that there is a video covering all these aircraft flying; would it be possible through TWITT or its members for me to obtain same.



I believe that the H.P. 1 could be developed from its original all aluminum construction to a modern composite ultralight aircraft much cheaper than the normal 3-axis trainers like the Drifter and Thursters in a much more economical operating costs in the ultralight field. Just looking at its drag free shape even with fixed undercarriage it must be better than all other ultralights. Are there any plans available?

Sincerely,

Terry (The Tiger) Baxter

*(ed. – From the drawing you included this looks very much like the PUL-10 that is currently being developed in Germany. We have presented material on this in past newsletters and as far as we know there are no homebuilder plans available at this time. I think the plan was for kits to be made once all the bugs were worked out, but the program is behind schedule.*

*I put your question to Reinhold Stadler who has some involvement with the PUL-10 project. He returned the following:*

*"Never heard of a HP1. It really looks similar to the PUL 10. I would bet, it refers to the first project ideas discussed by Reimar Horten and Siegfried Panek. That would fit to the HP abbreviation. The original layout was with metallic tubular frame, so it could fit. This must have been done in the 80ties in Argentina? The wing shape is similar to the PUL 10, but with a little Horten-tail (a feature introduced with the H IV). Anyway, I cannot remember either Reimar Horten nor Siegfried Panek mention a HP 1 to me.*

What is puzzling me is the reference in the drawing "H.P.I. 1936 Walter and Reimar Horten". If the design is really from 1936, it would have been a H ?, but surely no HP. Even the later airplanes, built by someone else had the original H for Horten, nothing else (e.g. the Go 229 was a Ho 229, even GWF used the Ho abbreviation). As far as I could find out, Walter was not involved in the PUL 10 project. The layout does not fit to the layout used by the Hortens in 1936. Maybe the idea started at that time, but the lookalike would have been different, I guess. The big single-piece windshield was not possible for the Hortens at the time and, no tricycle landing gear was common. The big fuselage was used on the H XII first, if I remember right. At least the text is not done by Reimar or Walter, the number one is written different in Germany. Maybe that is a sketch done by somebody else who got a secondhand description of that project? I have to admit that there are - of course- Horten projects that are unknown to me, so why not? But for the moment I have nothing at hand to verify this. If you find out anything else it could be interesting! Sorry, that I can not say more about this nice-looking little project.")

2/4/01

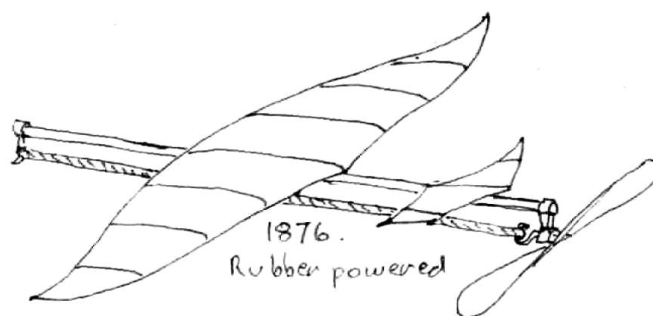
TWITT:

Having in my possession a drawing of French inventor Pernaud's first model aeroplane which he built and flew in 1871, I was further intrigued by his twin-propellered monoplane, patented in 1876. This remarkable machine of single control column, retractable undercarriage and amphibious into the bargain must have been the forerunner offer of the later Facets. It also shows the elevator, fin and rudder.

In the attached drawing notice the fixed rear wheel acting as a help to directional steering below the hull and the main part of the wheel retracting into a center case, the balanced rudder effect with guys from the aft end of the swivel point of the rudder to the straight part of the wings trailing edge. Also note that the four bladed paddle props operate in opposite directions counteracting prop torque. It must be admitted if this concept had been built in the 1800's, it would have flown???

It is my intention to build a rubber powered model of this design using the complete transverse spars as shown with thin bamboo strips crossing the spars as ribs and papering the whole wing with the elevators attached to the trailing edge as shown in the drawing with the fin in situation to the wing also. Notice the aerofoil shape of both the rudder and elevators. I do not believe the landing wires are necessary in the model. Although this concept only had yaw and pitch control, the low CG due to the hull shape and wheel weight it should have been stable in perfect conditions for flying related to the power source which I would surmise would be a belt driven by a light weight steam engine of those days. Even the spring tail skid for rudder protection for land takeoff was a good thought as the aerofoil shape would have kept the craft in ground effect for some time.

I intend to make my model approximately 30" in wing span, and as the aspect ratio is only about 3:1, I would only have about 10" of rubber for each prop, but with the high ground clearance into the wind I should get lift off. There will be only fixed undercarriage.



Has anyone ever carried out this exercise before and does any member who has input please write to me. It can be seen from the drawing that side movement of the stick moved the rudder left or right and forward movement or back operated the elevators so control attachment to the trailing edge could have accounted in the concept, but washout is noted at the rear of the wing at the fuselage, and to the wing tips. Let's face it, early inventors did have the concepts for flight.

Terry (The Tiger) Baxter  
79 Mueller Road, Malak  
Darwin, Northern Territory 0812  
AUSTRALIA  
(08) 8927 6019

*(ed. – Some very interesting drawings. We would be interested to see pictures of your completed model, hopefully in successful flight. Keep us informed of your progress.*

*If any other members out there have tried this project, we would like to hear from you. If anyone has any more information on this particular aircraft, we would be interested to hear what you know.)*

2/14/01

TWITT:

I think all your options are ok. For us (Switzerland) e-mail is no problem, I just have problems in printing in color for right now. By the way I sent you (by snail-mail) a picture of the new LEA 23. Unluckily I have no papers yet in English, but I will translate the story for you if there is any sense in doing so. The thing behaves fine in the air, but I ran into problems connected with the radio controls, so I had a crash and I am now rebuilding the whole thing.

Regards,

Tom (Bircher)

(ed. – Thanks for the picture of the LEA 23 I have included below. If we get any response from the members wanting more information on this design, I will let you know that it might be worth doing a short piece on it in English.)



-----  
2/17/01

TWITT:

**T**hank you very, very much for your report of the January meeting on pages 2 to 6, and congratulations for the size, that's great, really, to follow a little bit from 5000 miles away, what happened!

But I believe, that there are some errors, type-errors or misunderstandings in this report:

Page 3, right column, 4th paragraph, first line: It should be 50's, not 60's. As well, remember that Raspet passed away the early 60's, and he got the Phoenix for the measurements, for which Georgyfalvy helped, it was Raspet, the head and spiritus rector! of these flight measurements and tests.

Page 4, 2nd paragraph, line 17: Performance Enhancement of Sailplanes is written by Peter Masak, not Massic. Masak put together all the knowledge others had developed over the years, so this gives a good summary of all that could be done, but this isn't his invention at all. Even the winglets Peter promoted and brought to success at first with the Ventus (that's true!), came out of the brain of David Marsden!!, and not Peter himself, as sometimes it looks like, if you follow the publications.

Page 6, line 6: fs-29 not SF-29, it's a plane of the Akaflieg Stuttgart (fs), not built by the Scheibe company (SF).

Anyway, a very good report - thank you!  
Best regards, sincerely

Peter (Selinger)

(ed. – Thanks for the updates. I had Bruce read the material over before publication, but in the limited time he apparently missed a few of the items you noted. It's nice having people around who remember all of this and can pass it along to the rest of us.

Below is some additional information Peter felt needed to be added to Bruce's presentation material.)

“After the first Witcomb results had been discussed in public, there happened also tests with sailplanes, the first one has been the Akaflieg Darmstadt with their D-37 motorglider. But they couldn't measure any improvement. Later in Braunschweig at University and DLR (German NASA) they tried it again with a very large winglet, shark-fin geometry-like, also without success. The French came to World Gliding championships 1981 at Paderborn Germany with their ASW 20FP in 15m-class (F for license built in France and P for "penne", the French designation of winglets), and for the first time it seems they spend an advantage. But know body knew why. Then David Marsden (Edmonton, Canada, well known by his Sigma developments a.s.o.) fit the 22,9 m Nimbus 3 of Dick Brandt (flown by Ray Gimmey '7V') with small winglets with obviously good result, although Ray didn't do well in Hobbs, NM during the 83 WGC there. But, working with these size and arrangement, David recognized the basics of their application and the conditions to place it at the wingtips, and made a pair of winglets for the (old) Ventus of Peter Masak, the break-through! Then Peter and showed it to Klaus Holighaus (and later sold them himself as well), and the rest of the story is well known, the victory of the winglet had started in all classes and sizes of sailplanes, even those with 31 m span, as the 'eta', have it now. The role and part David Marsden played and has to be honored for always seems to be forgotten, that's why I insist on it. Sure, there are others too with other configurations and improvements they created later, o.k., but David spent us the initiation of the success, for this he earns great merits and honors!”

-----  
3/3/01

TWITT:

Hi there! Wow! Now it is getting more and more interesting for me as a "Horten-lover"... I am from Vienna, Austria, fell into tailless aircraft as I was something like twelve-dreaming of "getting" wings; took me a very long time to realize that this was already done by others a long time ago - a nice story anyway - and if somebody wants I'll tell it later on.

So far after hanging out in Nurflugel's newsgroup - that is a very fine resource, as a matter of fact - I came by again and realized, that there are new things here, like the technical report a of the Hortens (wonderful work with lots of new things to me, thanks to you) – still can't wait the following- especially the H Xb and the H XV (Urubu)- why? I am on the way to make a H Xb 1/1 scale plane - because

one day i want to fly my own Horten... being towed by a double-decker of a friend of mine (he is on the way to mount a tow gear).

How can I join from Austria?

And say my best wishes to Mike Brown!

Victor Riviera

*(ed. – I sent a message back to Victor letting him know how to send his membership fee in. I also asked him to let us know if and when he begins his H Xb project, since I think that would be of interest to many people if he has any success with it at all.)*

**MIKE BROWN'S JOURNAL  
BUILDING A MITCHELL B-10**

*(ed. – I am very pleased to announce that Mike Brown has agreed to do an on-going journal of his progress in constructing a Mitchell B-10. This has now become a new page on the website, however, for those of you who don't have access to the Internet, I will include the more important and interesting items in the newsletter as he goes along.*

*This month I will include the portions of his introduction that don't duplicate what he has said in his original letter and, a couple of the pictures from his first installment on transferring the rib profiles onto a jib.*

*I am very excited about this whole project, since we get to sort of participate in it from start to finish. Hopefully, it will inspire some of you to take that final step toward actually starting your own building project, whether it's a full size aircraft or a model. Enjoy.)*

**H**ello everybody. My name is Mike Brown and I joined TWITT on Jan.1, 2001. (I believe in starting the New Year off right!) I discovered the TWITT website while involved in a search for flying wing aircraft, a search which begun only about three weeks before. I'd always been fascinated with the concept of the powered flying wing. I believed in my own mind such a device could be successfully built and would not only have all the obvious advantages of vastly reduced weight and parasite drag with no fuselage, empennage, etc. to carry about, but would also be inherently stable. I was amazed to learn the tremendous amount of hard work already completed by various brilliant pioneers who had actually brought this concept to complete fruition.

While I enjoyed reading of the Horten's, the works of Jack Northrop, Fauvel, and all the other brave designers who struggled in this unique field, it was the work of the late Don Mitchell to which I could immediately relate. Don Mitchell's later designs were produced for the "common man" on a "common budget" and with "common" building experience. To me, they reflected uncommon "common sense". Not only that, it became very clear, very quickly, Don Mitchell understood design from the perspective only acquired by a man with vast hands-on experience. He'd

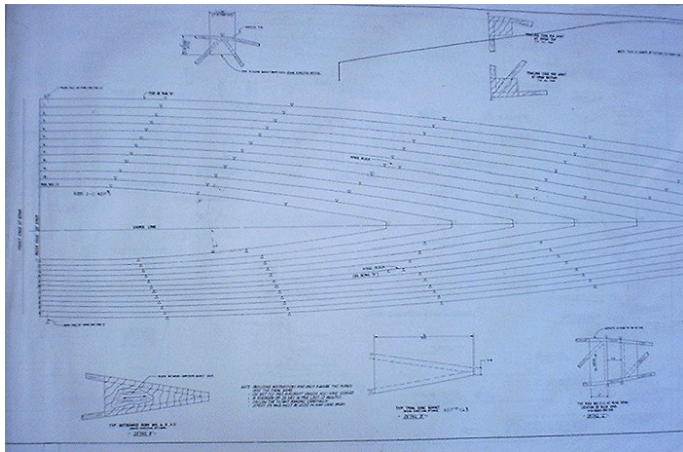
earned an excellent theoretical background from Boeing School of Aeronautics, then developed an unprecedented practical background as a protege of the famous Hawley Bowlus, living and working with Hawley and his family for 12 years in the beginning of their relationship and off and on thereafter for most of Hawley's productive life. Don Mitchell's is the background of a man whose designs I felt I could trust for efficiency and safety. For the aspiring home flying-wing builder, his legacy is truly unprecedented in the annals of aviation history and a wonderful gift to us all.

At this time, it may be appropriate to briefly introduce a glimpse of my aviation background so the reader may get a feel for the level at which I'm beginning construction. I've held FAA Airframe and Powerplant certification for about 25 years. During this time, I started and ran a successful aircraft repair business in which general maintenance was done on most conventional aircraft up to the 12,500 lb. category. I've also had the privilege to be heavily involved in many antique aircraft restoration projects. In 1984, a Stearman upon which we completed a frame-up restoration won first in it's category at Oshkosh. While I've since wound down the business and gone into semi-retirement, I've been involved on a continual basis in building or rebuilding light aircraft and British sports cars. Keeping this background in mind, the reader might understand as he follows the progress of this project, just why things are done by me in a certain way. Some techniques will probably not differ from those employed by a person who is at an "entry" level in home aircraft building. However, others will be a bit more involved and explanations for this will be provided as we go along.

For those who might be interested, the reasons for selection of the B-10 are as follows. First of all, while elegant when completed, due to the keen foresight by Don Mitchell of the average homebuilder's level of ability, it's about as simple in construction as one could hope to achieve in a flying wing. Despite it's lightweight, it's very strong. While I've never flown one, every report I've been able to read or hear praises its efficiency and excellent flight characteristics. It holds several records, those of George Worthington perhaps being most noteworthy. I felt it would be very easy on the budget, and represented a relatively low-stress "entry" into what I felt I needed at this point to begin my "learning curve" of flying wing knowledge.

As a final thought, given my personal heavy involvement throughout the past two or three decades in construction or reconstruction of aircraft and racing car frames, etc., I must confess to harboring a slight sense of conceit as I awaited receipt of the B-10 plans. I had studied the photos on U.S. Pacific's website and thought surely "I" could take the basic plans and "improve" on matters here and there with benefit to the design. Please let me state for the record right now that I stand appropriately humbled for this bit of presumption! The measure of a brilliant designer might be summed by the fact his design is so excellent, it's exceedingly difficult to improve upon. Don Mitchell's B-10 meets this criterion with no question in my mind whatsoever. Following hours of

study, it became increasingly clear this man had thought of every possible angle of efficiency from the standpoint of strength, lightweight, ease of construction and economy to the builder. As I began to realize there was no way I could improve in any of these areas, my awe for Don Mitchell's genius reached even greater heights of respect. This level of design competence can only instill great confidence and with this, I became even more eager to begin construction.



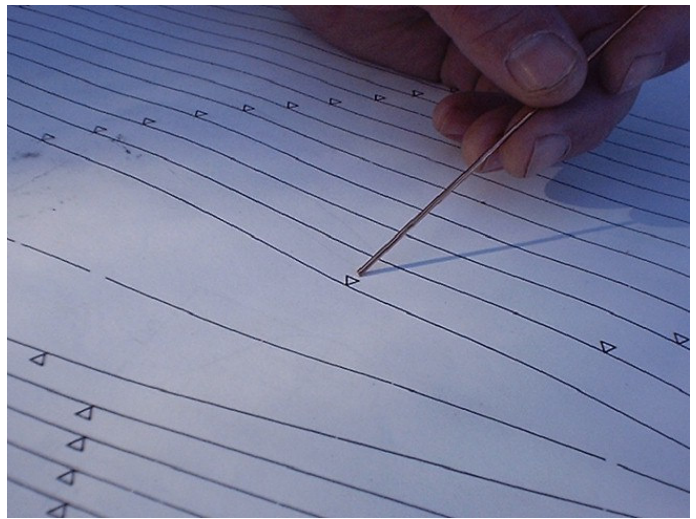
**WING RIBS -- Obtaining accurate profiles.**

In building a home-built aircraft, it's pretty much established one of the best places to start is with the wing ribs. Investment in terms of time and money for these is quite low so if the builder gets these completed and then decides the project is just too overwhelming, he hasn't lost all that much. And, if he's done a nice job, he can probably sell these to someone who's building a project and will appreciate the timesaving. It also provides a nice psychological sense of gratification to see the airfoil taking shape beneath one's hands, rib by rib, since, after all, the airfoil, especially with a flying wing, is truly the "heart" of the science of flight. Once all the ribs are completed, they may be stored compactly and won't take up a lot of space, an advantage for those who are faced with such problems...perhaps most of us.

The instructions which accompany the drawings (see example, bottom left) encourage the builder to use the page shown as an actual working surface for building the ribs themselves. The builder is instructed to affix the drawing to a piece of 3/4 in. plywood, cover with a sheet of clear plastic, then one sheet of wax paper beneath each set of ribs built. The drawing and protective clear plastic remain attached to the plywood permanently, the wax paper is removed as each set of ribs is built from it. (Of course, two of each rib are built...one for the right wing, one for the left.) The wax paper is merely to prevent spilled glue from sticking to the plans or plastic cover.

Following placement of these items on the plywood, for each set of ribs, small nails are to be driven at strategic points along the airfoil outlines both top and bottom to hold the capstrips and diagonals which form the truss of each rib in perfect alignment. Gussets are then

glued and stapled at the joints of each rib, the staples being those of an ordinary office stapler. Rib materials are 1/4 in. square spruce for capstrips and diagonals, 1 mm. birch aircraft plywood for the gussets.

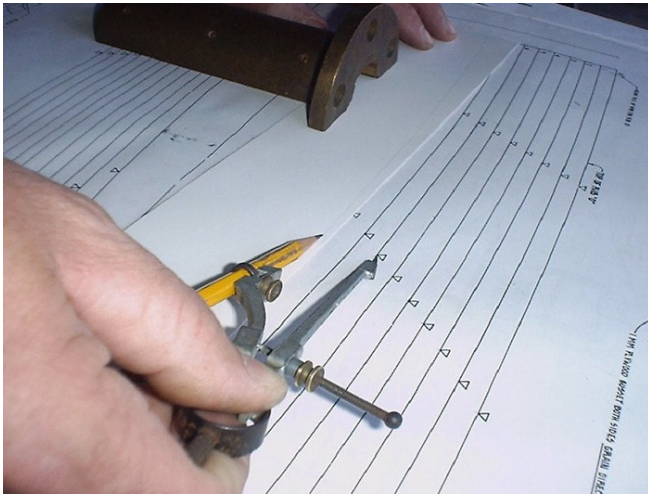


This method is excellent for the beginning builder who does not wish to construct rib jigs and is interested in completing one project only. However, I decided to go the one step further, and while it takes a bit more time and effort, construct permanent rib boards for each rib. That way, in the future, a second or more set of ribs can be built in a very short time should. To build jigs, it's first necessary to first obtain profiles of each rib outline and I chose to draw these on card stock.

Here (above), I'm pointing to one of the triangles printed on the rib profile forms in the plans. These triangles represent the junction of vertical or diagonal truss bracing with the upper and lower cap strips. They are transferred to the rib profiles we've just constructed so they may, in turn, be located on the rib boards when the time comes.

Another method commonly used to obtain rib and other profiles from a drawing is to place a piece of card stock beneath the selected profile, and with a needle or other fine sharp object, prick holes along the original lines at intervals such as 1/2 in. or so. This is an excellent method of transferring lines, but it does then require tracing of the pinpricks by pencil, then cutting along the lines. As it also perforates the working drawings, I prefer to not use this method over the spiling method (two photos in left column on next page)), which I consider a bit more elegant. I also find it saves me a bit of time to spile the lines, rather than "punch" them, but again, that is simply personal preference. As stated earlier, a person purchasing their own plans and following the directions supplied by U.S. Pacific does not need to construct profile patterns as we have done here. But I included the process as that's what I decided to do and it may serve as useful information for other members who wish to do the same at some time or other.





This photo (below) depicts all the profiles of the ribs, which comprise the outboard wing sections of the Mitchell Wing. These are laid upon what will soon become the rib board for these ribs. At this time, we've placed the profiles on the board at what we think "may" be their correct order. When we actually construct the jigs, placement will probably be altered slightly for best fit.

*(ed. – This gives some idea of what be going on over the months to come. I look forward to following Mike's progress.)*

