

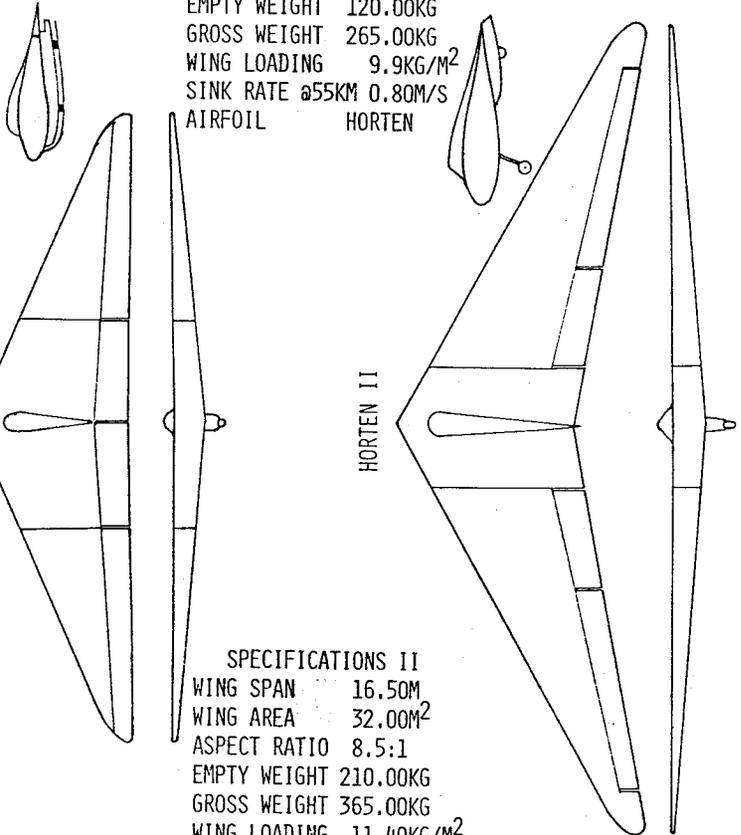
# Soaring RC Digest

VOLUME 1 NO. 11

NOVEMBER 1984

## Horten's Wings

SPECIFICATIONS: I  
 WING SPAN 12.40M  
 WING AREA 21.20M<sup>2</sup>  
 ASPECT RATIO 7.3:1  
 EMPTY WEIGHT 120.00KG  
 GROSS WEIGHT 265.00KG  
 WING LOADING 9.9KG/M<sup>2</sup>  
 SINK RATE @55KM 0.80M/S  
 AIRFOIL HORTEN



SPECIFICATIONS II  
 WING SPAN 16.50M  
 WING AREA 32.00M<sup>2</sup>  
 ASPECT RATIO 8.5:1  
 EMPTY WEIGHT 210.00KG  
 GROSS WEIGHT 365.00KG  
 WING LOADING 11.40KG/M<sup>2</sup>  
 SINK RATE @56KM 0.73M/S  
 AIRFOIL HORTEN

**AHEAD OF THEIR TIME**

## FLYSWAPPER

### CLASSIFIED ADVERTISING:

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1 Issue	3 Issues	6 Issues	9 Issues	12 Issues	Sz.
\$10	\$9	\$8	\$7	\$6	1/8
\$20	\$18	\$16	\$14	\$12	1/4
\$40	\$36	\$32	\$28	\$24	1/2
\$80	\$72	\$64	\$56	\$48	1

Note: Dimensions of ads - 1/8th page - 1/4th-page - 1/2-page

Full: 12" H x 7" W    3" H x 3.5" W    6" H x 3.5" W    6" H x 7" W

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POSTMASTER: ADDRESS CORRECTION REQUESTED

Not surprisingly, last month's editorial about the RENO NATS has drawn some comments from subscribers and readers. I was particularly pleased to receive letters from John Grigg (President) and John Worth (Executive Director) of AMA. Rather than quote their letters in full, I will paraphrase and summarize. Basically, both of these gentlemen agree that the '84 NATS left a lot to be desired, particularly with respect to the RC Soaring events.

HOMEWORK NEEDED...

John Grigg pointed out that AMA deserves the criticism it got because it simply did not do its job properly, but that there were some extenuating circumstances; namely, that (1) the site that was finally used was the result of a mixup in contract negotiations. It seems that the person AMA contracted with owned only 10% of the land, while a holding company owned the remaining 90%; and (2) that during the October and November 1983 preparatory meetings in Reno, AMA was promised over 100 people from that area for support. By March 1984, an additional 75 people from outside the area had been signed up to work at the NATS. When the NATS were about to start, only about 50 people showed up - but the show had to go on. To the everlasting credit of those who did show up and work, the NATS was a success. John would like to see every affected interest group someday take over and run their own event at the NATS, much like PAMPA has taken over and run the CL Aerobatics event. Further, John encourages NSS input for the 1985 and subsequent RC Soaring events at the NATS.

A BRIDGE TOO FAR...

In his letter, John Worth made some good points, too. First, there was a decent soaring site available, but it wasn't used! A large ranch, south of the city, became available. Late rains flooded a part of it, but a mile-square area across a creek that runs through the ranch was dry, and a heavy-duty plank bridge had been constructed to make that area accessible. The RC Soaring people chose not to use it (nor did the free-flight groups).

Manpower was absolutely beyond the control of AMA when the time came to put on the NATS, because the promised help just did not show up in the numbers agreed upon. AMA assumed (incorrectly, it turns out) that a large reservoir of soaring interest on the west coast would provide the needed volunteers - but it just didn't happen. John says that the AMA is us, collectively; and if those who love any aspect of the activity don't support it by working for it, then who will? A good question.

The dates for the 1985 NATS are July 27th through August 4th... one day more than usual...with RC flying likely to start on Sunday rather than Monday. Springfield (Chicopee) Massachusetts will be the location, as in 1983..

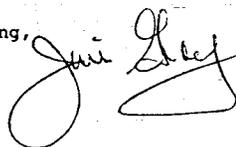
The 1986 NATS have been approved for Lake Charles, Louisiana, but the RC Soaring events may be held 30 miles away in Jennings, La., at the local airport. Before these plans go too far, John Worth asks that soaring interests check out the site well in advance. Anyone interested in helping out is invited to call John at AMA Headquarters for more information. The telephone number is: (703) 435-0750. You can write AMA at 1810 Samuel Morse Drive, Reston, VA 22090. DO IT!

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SOARTECH #3 Now Available...

Many of you are aware of SOARTECH, a technical journal covering all phases of RC soaring activity. To date, 13 issues have been put out. Each is about 100 pages or so in length, and costs \$5.00. If you wish to have issue #2 or issue #3, send \$5.00 for each issue to Herk Stokely, editor; 1504 N. Horseshoe Circle, Virginia Beach, VA 23451. Subjects include Optimum 2-meter design parameters by Martin Simons, information on airfoils, controllability, computer design, and much more. Quite technical, some math needed, but not overly heavy. Packed with good info that you need. \*(Issue #1 no longer available)

Happy Soaring,



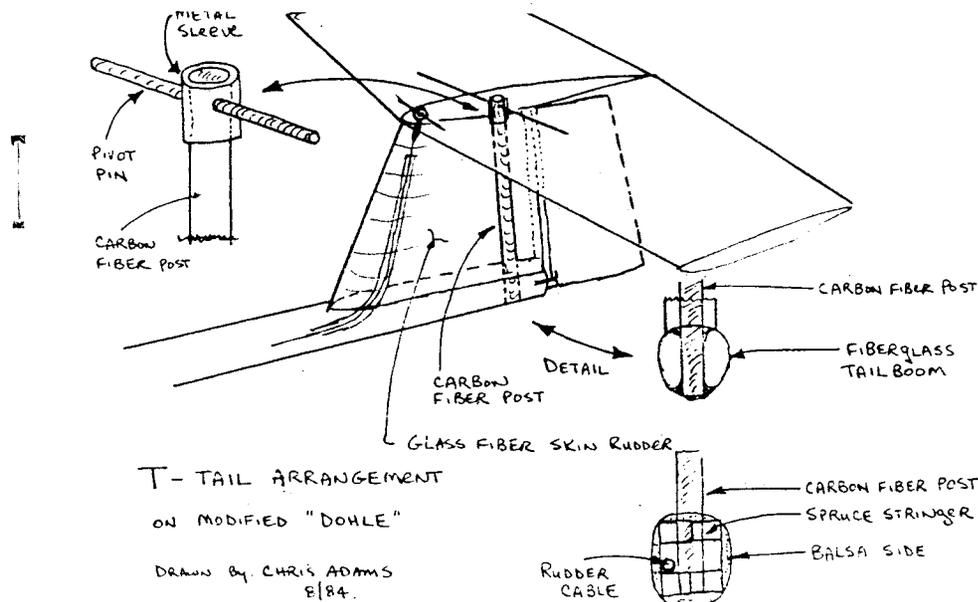
Bob Champine sent an interesting letter, which you may find helpful when choosing your next sailplane. Bob says: "I've just completed an Ed Slobod 'Gemini' and have started a second one. Please mention in RC Soaring Digest that this is an excellent kit which assembles very easily and produces an airplane that is easy to fly - and does so with good performance. Its main feature is that it 'free flights' really well! This means it will fly in a stable manner without control inputs while one walks out to the landing circle, and/or while one just lets it circle up in a thermal by itself. The size of the rudder/fin and amount of dihedral are such that it has a positive spiral stability. Also, the size of the stabilizer and the c.g. location make the Gemini easy to control in the pitch mode. This makes for good landings, too - one great sailplane!

"The main feature of my GEMINI is that it incorporates my own full-span flaps (-10 degrees to + 45 degrees on the kit airfoil) which gives a very wide speed range, improved thermalling (+3 degrees of flaps) and good speed control during landing approach. The flap can be raised slightly at the proper moment for spot landings. Therefore, spoilers are not needed at all!"

Bob is a member of the Tidewater Model Soaring Society in Virginia, and has a lot of experience with both full-size and model aircraft. He is the designer and flier of BIG RED, a cross-country giant which we plan to feature soon in RCSD. The GEMINI has passed through several versions under Ed Slobod's capable hands. The current version is the GEMINI MTS (Multi-Task-Sailplane) that employs a Mike Bame 'thick' airfoil. If you need more information, you can write to Ed Slobod, c/o Pierce Aero, 9626 Jellico Avenue, Northridge, CA 91325. Ed is also the author of some very funny quotations which we'll pass along later. Champine's address is 205 Tipton Rd., Newport News, VA 23606.

MODIFIED 'DOHLE'

Chris Adams, in the October 1984 issue of the San Fernando Valley Silent Flyer showed how to use a Carbon fibre rudder post as a structural support on some European T-Tail, F3b glider designs. According to Chris, the support shows good torsional rigidity as well as forgiveness in hard landings...An important design feature is the use of a metal sleeve on the outside of the post at the pivot point. This prevents the post from shattering or splintering under adverse loads. The post is attached through the fuselage and is epoxied in place. This feature lends itself to built-up fuselage designs with spruce stringer supports (see drawing). European modelers then use a glass fiber rudder/fin shell for lightness, as no additional strength is needed. The overall result is a light, strong, and dependable tail group.



Drawn by CHRIS ADAMS  
8/84.

In the Greater Detroit Soaring and Hiking Society newsletter Ray DeNoble showed a slick and easy method for making sharp trailing edges on built-up wings. Read and enjoy...

#### Easy Method For Making 'Knife Edged' Trailing Edges

Ray DeNoble

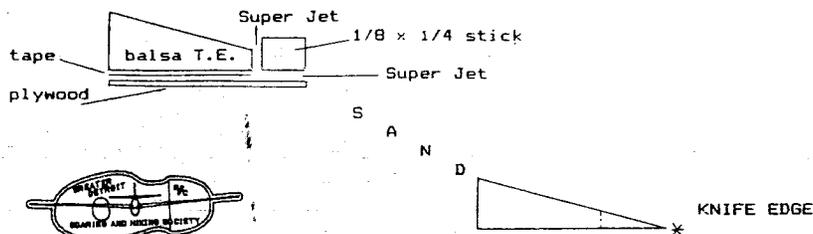
Here's a slick and easy method for making 'knife' edged trailing edges ala the Sagitta 900. The Sagitta was one of the first to use sharp trailing edges for improved performance, and we all know of the Sagitta's flying ability. The standard Sagitta trailing edge is made by gluing a Spruce cap (3/32 x 1/4) to the aft edge of the tapered Balsa trailing edge material and carefully sanding the Spruce to conform to the balsa edge dimension while forming the knife edge at the extreme trailing edge. This is a good system but time consuming and the results are not always as intended. However, many Sagitta's are flying with Spruce caps so it must be O.K. Sanding hard Spruce and soft balsa has its drawbacks, but with care it can be done. Fred Schaufle has developed a neat method of sanding/shaping the Spruce before he attaches it to the balsa trailing edge. Others have razor planed the Spruce then finished up by sanding.

My method uses 1/64 Plywood and balsa and takes about 10 minutes to completely finish all 100 inches of trailing edge to an absolute knife edge. The materials needed are:

- 1/64 plywood, cut to size (1/4 inch wide for a Sagitta)
- 1/8 x 1/4 soft balsa 'stick'
- double sided 'sticky' tape (Foam wing skinning type)
- Super Jet or any slow CA

Here's how: Tape the 1/4 ply to the bottom of the balsa T.E. Super Jet the 1/8 x 1/4 balsa stick to the ply and balsa T.E. Sand to shape with your sanding block and 150 paper.

The plywood offers a sanding resistance when the edge is correct.



Speaking of the GDSHS, here's something to think about, gang: (and it sure could be fun - especially where slopes abound)

#### ONE METER SAILPLANE DESIGN CHALLENGE

At the September G.D.S. & H.S. Club meeting, John Trim issued a challenge for other members to design, build, and fly a one meter sailplane. This size sailplane should be relatively inexpensive and quick to build and should be an excellent diversion from all of those cross-country projects which are under construction. The winner would be determined in a two part process. First will be a static judging, probably at a regular spring meeting, on the merits of design and workmanship. Second will be a flying event as part of one of our monthly contests. Rules have been discussed and will be kept as simple as possible.

Tentative rules:

1. Wingspan of one meter maximum
2. Maximum surface area 300 sq. in. (Wing and stab)
3. Controls limited to two servos.
4. Launch to be either winch or hi-start.

For further information, contact John at 545-0868 and come to our next meeting for the finalization of rules.

#### How to Make the Best Choice on Duration Flights for R/C Soaring.

The following article by Stan Shaw of the Central Ontario Glider Group appeared in the C.O.G.G. newsletter, The Gull, issue #5, 1979.

"Here is a simple mathematical plan that can help you win the next contest, choose the right restaurant...and, for you gals, help you to marry the right person.

You are launching your RC soaring model into strange air, and it's time for a max flight. You want to choose the best possible air and yet you realize that once you've passed over any location, you will not be willing to fly back to it unless you hit a thermal. You are committed to a 'search and find' pattern. How can you improve your chances of choosing the best air?

There is a simple way to increase your chances dramatically. It is based on a complex mathematical theory, but in practice it's easy. Let's say you'll consider the flying site and decide there are eight possible sources of lift nearby; be they a plowed field, a pasture, a runway, etc. You 'look' at the first three, but don't stop flying over them unless you discover lift. You then continue flying and stop at the next location that looks better than the best of the first three. Chances are that you will have found the best lift of all eight locations you were prepared to consider.

This method is based on an interesting theory whose solution has far wider applications than are obvious at first glance. Many academics have written papers on it. Dr. H. Robbins and Dr. Y.S. Chow of Columbia University have produced the most refined results. Mr. Robert L. Brown formulated the version on which this article is based.

The solution in its most general form is as follows: If you are faced with trying to make the best choice out of 'n' random possibilities (where 'n' stands for the number of possibilities) you should choose 's' candidates and then choose the first subsequent possibility that is better than the best candidate. The value of 's' can be found by dividing 'n' by 'e', the natural logarithm whose value is 2.7183. Having done so, the probability will never be less than .368 (or 36.8%) that you have made the best choice.

That's a little rough for non-mathematicians, so let's set theory aside and go through a simple example which may convince you the theory has merits. Consider the situation where there are only three possible restaurants: A (the best), B (good), and C (the worst). They can be arranged in six ways which are equally likely. Theory says that you should look at one candidate, but not stop, and then choose the first restaurant that is better than the candidate. The system works as shown below:

Order of Rest's.	Theory's Selection
C-B-A	B
C-A-B	A
B-A-C	A
B-C-A	A
A-C-B	B
A-B-C	C

The last order forces you to eat at restaurant C (the worst) because you cannot go back. Note that the theory produces the best choice three times out of six and the worst only once out of six. A random selection will find the best only one time in three, but also the worst one time in three.

The following example applies to a single girl who decides it's time to get married. She figures that she can get a maximum of ten men to propose marriage to her while she's still young, but once she has rejected a proposal, the man will probably not try again. What strategy should she follow to maximize her chances of accepting the best man, and what are her chances of success?

The theory tells us that she should reject the first three proposals, remembering which man of the three was her favorite. She should then marry the first man who is more favorable than the best of the first three candidates. This gives her a 40% probability that she will marry the best man of the ten candidates! Not bad, eh?"

SCARF JOINTS  
by  
COULTER WATT

Since our local hobby shops don't carry 1/16" balsa sheeting 48" long and 10" wide, we are forced to join sheeting together. I have noted a few cases where club members have made scarf joints that looked good, but were not correct (See Figure #1).

To make a proper scarf joint, the object of which is to enlarge the gluing area, overlap the ends by twice the width of the sheeting, and make "V"-shaped cuts through both. (See Figure #2).

I've adopted a simplified version of this method and have found it strong enough - so far! (See Figure #3). The difference between the two methods is that in Figure #1 you have four pieces coming together at one point, but in Figure #3 you have only three pieces joining at one point - and one of the three is a straightedge - much stronger in my opinion. Not only that, but we can use 36" lengths.

How do we do it? So glad someone asked! First, working with 1/16" by 3" balsa sheeting, we mark 6" from one end, overlap the two pieces and tape the edges together (See Figure #4). I use masking tape, and do it on its edge so that it is straight. Tape both edges. Now lay the taped-together pieces flat on your workbench and make a diagonal cut (See Figure #5) with a single-edge razor blade and straightedge ruler. Do not move a thing until you are sure you have cut cleanly through BOTH top and bottom pieces.

Now, take the tape off the edges and use it to mark the edges "A". Do the same thing with the next two pieces and mark them "B", and again with "C". I do it this way, because you can wind up with six pieces of wood on the bench and not remember which two go together, or which pieces are top and bottom, to make it even more confusing.

When all pieces have been cut and marked, you are now ready to glue the scarf joints together. You will have 3 pieces of 1/16" x 3" x 66". With a 66" straightedge overlap and cut the length of the sheets. Be stingy - cut only 1/8" off each length - and again mark the edges: "1" to "1": "2" to "2", etc. Pin and glue together - on waxed paper of course.

Not a difficult task, but time consuming. Now you're ready to sheet a foam core or to sheet your aileron version Sagitta, as I did with mine.

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FLASH! FLASH! FLASH! LAST MINUTE RESULTS!

1984 FLORIDA CROSS-COUNTRY INVITATIONAL: RICH BONNELL - CD.

This 13-mile course was flown on October 7th at Cape Coral, Florida. Winds were averaging 20 miles per hour as the 11 teams vied for maximum distance on the out-and-back course. To make things more difficult, the far end of the course (6.5-mile turn point) was only about 1 mile from the Gulf Coast and the thermal-chilling sea breeze. Many teams tried several starts to continually improve their first attempts. When the dust had settled at the end of the day, the results were: Brian Agnew (Windsong) 13 miles and first place, Fort Myers team; Carl Raichle (Big Scooter) 6.5 miles and second place, Tampa Team; Frank Collins (Sagitta X-C) 6.2 miles and third place, Cape Coral Team; John Gunsaulus (Sagitta X-C) 5.2 miles and fourth place, St. Petersburg team.

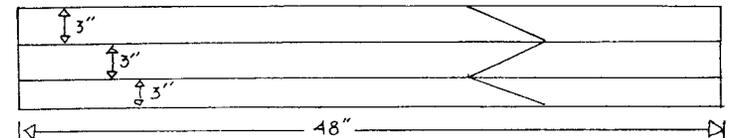


FIG. 1

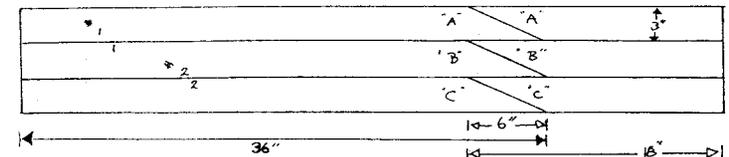


FIG. 3

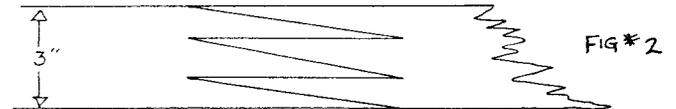


FIG. 2

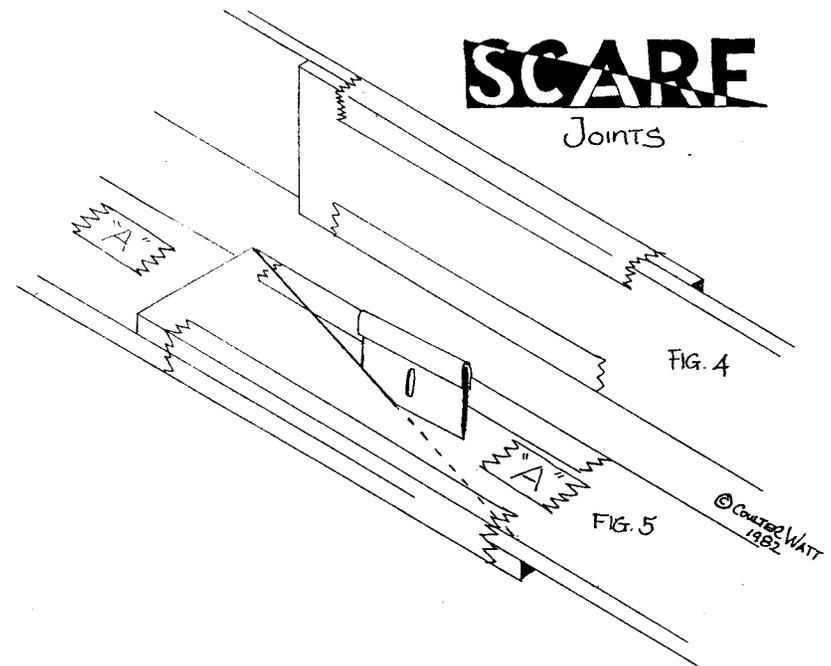


FIG. 4

FIG. 5

© Coulter Watt  
1982

This article appeared in The Spoiler, March '84 newsletter of the Pikes Peak Soaring Society. Here's how to make sure you have it right.

"The recent article in Flying Models which describes a very simple test to determine correct C.G. position on your sailplane has started a lot of people thinking in our club. The test is to trim your sailplane for its lowest sinking speed configuration and then to put it into a long shallow dive by holding forward pressure on the stick. Release the pressure on the stick and note the model's response. A nose-heavy model (C.G. too far forward) will zoom up into a stall. A tail heavy model (C.G. too far aft) will continue the dive and might tuck its nose down even more. A sailplane with its C.G. properly set will return to level flight with very little overshoot (i.e. porpoising). The best C.G. for your model would be somewhere between that shown by test results (2) and (4) in Figure 1. The sailplane with its C.G. at position (2) will have a better sink rate and penetration performance. That is the good news. The bad news is that the model will be very easily upset by rough air, and might be prone to diving in a turn. In other words, you will have to be very quick on the sticks. The additional control deflections will result in increased drag that will more than take away any performance gain.

"The model with C.G. position (4) will have 'neutral' stability; that is to say, it will recover from rough air pitch displacements with no pilot action. Its overall performance in the real world air of thermals, wind, ect. will be better than the (2) sailplane because it will require less drag-producing inputs (from the pilot).

"How does this relate to tail volume, you ask? Well, if you make a few simple measurements on your model, you should be able to establish a C.G. position in the comfort of your shop that is very close to that which will produce a result like (4). Proceed as follows:

- Measure the total area of the horizontal stabilizer/tail, and record this as St.
- Measure the projected area of the wing, including the area that is inside the fuselage if your model has plug-in wings. Record this as Sw.
- Find the mean aerodynamic chord of the wing. This is the average chord, so you can determine this value by dividing the area Sw by the projected span. ( $MAC = Sw / \text{projected span}$ ). Record as MAC.
- Find the tail arm length. This is the distance from the leading edge of the MAC to the 25% point of the MAC of your horizontal tail. Record this as Lta.
- Using your calculator, solve the following equation:

(See Figure 2)

$$Tvo = \text{Tail Volume} = \frac{St \times Lta}{Sw \times MAC}$$

"The result will most likely be a number less than unity. For example, an OLY 650 has a Tail Volume of 0.47.

"Now comes the fun part: Locate your tail volume on the graph of Tvo vs. C.G. position (Figure 3). Note that the C.G. position is a percentage of MAC - not the root chord! So now you can quickly find the 'neutral stability' point. For your model, the C.G. position will be indicated by the stable/unstable line. For the OLY II, that would be 43% of the MAC. Note that the kit position is forward of that point at 30% (approximately).

"As a rule of thumb, I would set the C.G. at least 10% forward of the stable/unstable line value, for starters. Never go aft of this max. value. For example, if your model has a Tvo of 0.62, it would have a max aft limit of 50% (if we chose a safe 10% forward of max aft location, we would get 40%). Start with the C.G. at 40% and flight test your model. You should be very close to the (4) case. Adjust your C.G. (forward or back) to obtain best results, but NEVER exceed the 50% maximum limit! On a cool spring morning with no wind, you might obtain very satisfying results with a C.G. at 50% or even slightly greater, but when the thermals start (if you leave the C.G. at 50%) you will be looking for the Hot Stuff!

Editor's note: It is possible to geometrically locate the point on the wing where the MAC is located, even if the wing is tapered. See sketch below:

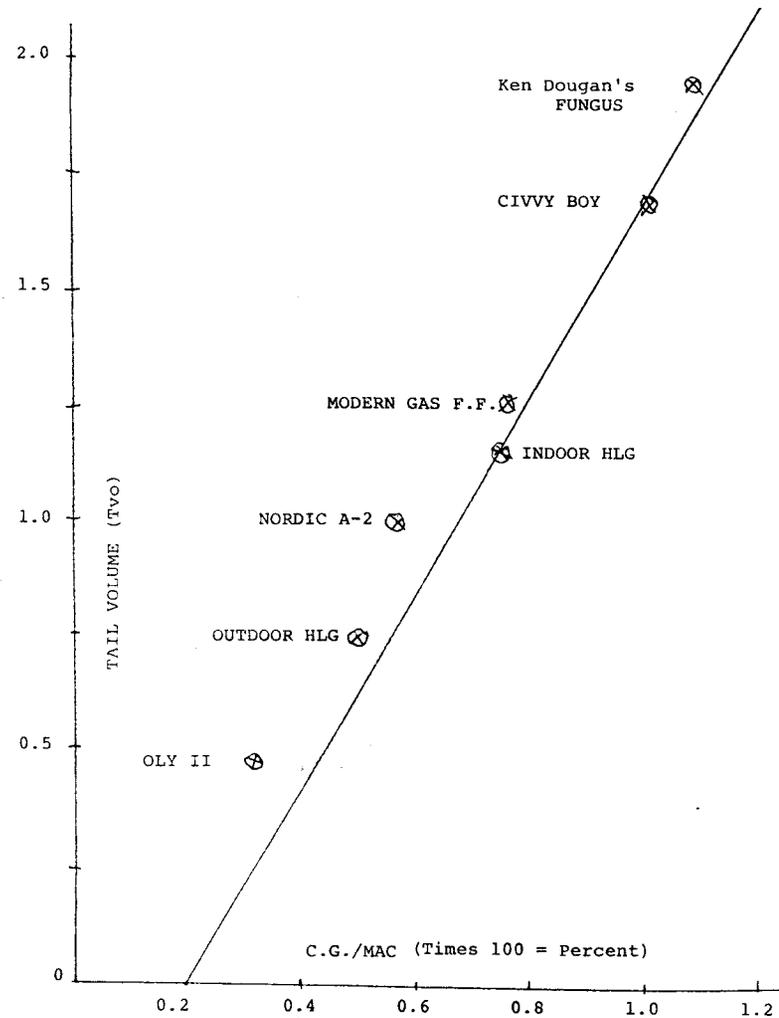
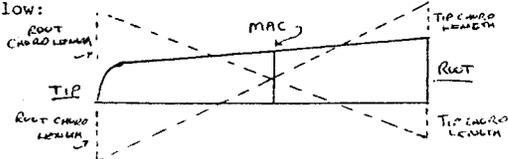


FIGURE 3 - Tail Volume(Tvo) vs. C.G.

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YET ANOTHER FINISHING TECHNIQUE.....Rob Caso....Hear Ye, May '84

Want a smooth finish on that scratch built balsa cowl or wing? I used the following technique on my Storch and obtained good results fairly quickly.

MATERIALS NEEDED:

- Clear epoxy/thinner (reducer)
- A wide, soft, good brush
- CA glue
- Micro balloons
- Paper towels for clean-up
- Wet or dry sandpaper - 320, 400, 600
- A firm sponge laminated to a piece of 1/4" sheet balsa

Start by applying CA non-gap filling glue to the base of the bristles on the brush to prevent them from pulling out. Mix up some clear epoxy reduced about 10% and apply about 2 or 3 coats to seal the wood, dry sanded with 320 in between each coat. fold a piece of 320 around the sponge and staple to the 1/4" balsa and use sponge for all your sanding on this job. Mix in some micro bal-

loons to the 10% reduced epoxy clear - use about 25% to 30% micro balloons and brush on about 2 to 3 coats. Wet sand in between each coat. (Note - don't wet sand unless the balsa is completely sealed, otherwise you'll swell the wood and eventually create ragged low spots in the surface.) Apply another 2 to 3 coats of 20% reduced epoxy using less and less micro balloons, wet sanding with 400 in between each coat. Now reduce the epoxy 50% or more and apply 2 to 3 coats, wet sanding with 400 - finish with 600 wet sanded. If you can spray the epoxy for the last 3 coats, so much the better. Resist the temptation to sand using your fingers, this may create uneven spots in the finish. Use the sponge! Note that epoxy will 'keep' longer if you put it in your refrigerator, but don't forget to mark it properly! I used 'Hobby Pox' on my cowl/nose section, but people tell me that K&B sands better and dries faster, so this may be a better alternative.

10

- ① & ② = CG too FAR AFT
- ③ = CG too FAR FWD
- ④ = IDEAL CG POSITION

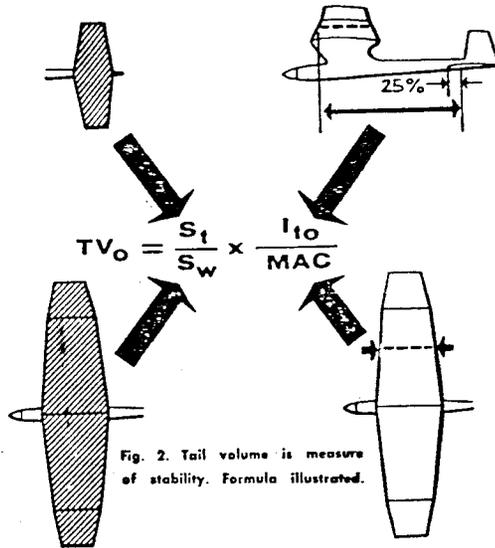


Fig. 2. Tail volume is measure of stability. Formula illustrated.

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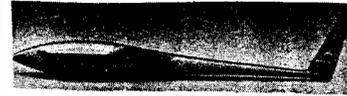
DON'T MISS THIS "GOODIE".....SAN FERNANDO VALLEY SILENT FLYER TECHNICAL ANTHOLOGY

Now available! A lot of hard work has gone into the preparation of the SFVVF anthology - 70 pages in length, and containing 27 articles that have appeared in Silent Flyer between 1978 and 1982. Cost is \$12.50 (includes postage and handling). Send to: Jim Wichert, 1971 Glenview Avenue, Simi Valley, CA 93063. Don't forget to include your name and address with your check! Orders will be filled promptly.

For those of you who may not be familiar with this newsletter and its contents, prepare to be enthralled. The thick-wing/thin-wing controversy appeared here; many airfoil and design articles by members of the SFVVF; techniques for vacuum-bagging lamination of wings; measurement of sailplane performance; and many other great articles. GET IT TODAY!

## VIKING MODELS USA

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LATE-BREAKING NEWS \*\*\*\*\* CIAM - FAI PROPOSAL \*\*\*\*\*

### SOUTH AFRICA PLANS F3H INTERNATIONAL CONTEST IN NOVEMBER 1985

The FAI F3H is a provisional designation for CROSS-COUNTRY RC SOARING, and will be tried for the first time on an international basis in Bloemfontein, South Africa, November 17-23, 1985, according to spokesman Andy Keil, one of the organizers. The meet is being organized by the SCCRI Committee on behalf of the South African Association of Radio Flyers and the Aero Club of South Africa. Each National Aero Club affiliated with the FAI will be invited to attend by entering a team of 2 pilots. In addition to this, individual entries will be accepted from pilots who wish to compete in the event.

For more information, write to: Soaring Cross Country International, P.O. Box 283, BERGVLEI 2012, Republic of South Africa. Telephone Johannesburg 659-1133 or Pretoria 323-3500

## THE PROPHET HAS RETURNED!

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