R/C Soaring DIGEST

November, 1994
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FRED "CORNFED" RETTIG AT THE TEXAS NATIONAL TOURNAMENT (TNT) IS LAUNCHING HIS SUPER V

See about the cover on page 1. Photo by Jerry Slates.

R/C SOARING DIGEST

A Publication for the R/C Sailplane Enthusiast!

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The Soaring Site

About the Cover

Yes, that's Fred "Cornfed" Rettig of Mobile, Alabama on the cover this month. He's launching a Super V, designed and kitted by Mark Levoe of Levoe Designs, at the Texas National Tournament (TNT), where he took first place overall. His timer is Tim Foster, President of the soaring club in Atlanta, Georgia. Congratulations, Fred!

Congratulations also go to Joe Wurts who took second, to Fred Weaver, who took third, and to all the other participants who attended, organized, or helped out at this event.

Fred Rettig is talking his plane through its turns. Or is it the other way around? His timer, Tim Foster, looks on. Slates photo.

An Update from DUST

Last month, Buzz Waltz (President of DUST) sent us information about the First Annual Winter Soaring Festival. The cover photo-

Joe Wurts (top) and Alan Schwerin (below) flew in the hand launch event at the TNT. Photos by Jerry Slates.

graph was the Empire Polo Club's Flight Park in Indio, California, where the event will be held on December 10th and 11th. Buzz has FAXed us an exciting update on this event.

"As an update on what is going on, I have been in touch with Mr. Wayne Spani, who is the Western Vice President for the Vintage Sailplane Association (VSA): the full scale guys. He tells me that he is going to fly his 1938 BABY BOWLUS in and land it on our field for the opening of the contest. He has also told me that he is in contact with other fliers and he will see what he can do to get them to fly in some other vintage sailplanes.

"Wayne's BOWLUS is a one of a kind that he found several years ago in a building in 29 Palm, California, and being an avid sailplane restorer, and after almost two years of work restoring it to its original condition, he now flies it in many of the VSA events.

"He tells me that this sailplane was originally owned by the famous Avaitores "Pancho" Barns in 1938, and it was first registered in 1951. Wayne has won many awards with his BOWLUS including the SILVER "C", and has been at many historical dedications for flying, including the dedication of TORREY PINES as a historical site."

Trainer Court

After years of chasing lines, Kitty Pearson is now learning to fly sailplanes, and her Flight Instructor is her husband, Phil Pearson of Issaquah, Washington. Well, Kitty wrote up a recent experience, and Phil encouraged her to send it in to *RCSD* as filler. Unfortunately, or fortunately, we yelled, "No way is this filler," and promptly asked Kitty if she would like to try her hand at writing on a more frequent basis, which does not necessarily mean every month. She agreed, and with this issue, Kitty will begin to tackle the subject of learning to fly; her column is called "Trainer Court". Please give her your encouragement and support as she has never done any writing like this before, although she is a Documentation Specialist. She loves to teach kids to ride horses and had thought that her first try at writing would be on that subject, instead. *(P.S. We promised no tomatoes, too!)*

"World's Vintage Sailplanes: 1908-1945"

The Archivist for the Vintage Sailplane Association, Raul Blacksten, has been running an ad in *Bungee Cord*, that we thought would be of interest to those of you who want to obtain Martin Simons' book "World's Vintage Sailplanes: 1908-1945". Rather than have to order from Australia, the book is available for $55 (check or money order), post paid in the U.S.A. Raul Blacksten's address is PO Box 307, Maywood, CA 90270. According to the ad, if he is out of stock, "it may take 3 to 4 weeks for delivery".

S.O.A.R. July 23 & 24 F3B qualifier. Photo courtesy of Ron Kukral.

S.O.A.R. July 23 & 24 F3B qualifier. Photo courtesy of Ron Kukral.

A note from Illinois

We received the following note from Ron Kukral of New Lenox, Illinois.

"Enclosed are some pictures of our July 23 & 24 F3B qualifier. We had 10 fliers and great weather. Sorry, but I don't have the results, other than one airplane was eaten by a lonely tree on the fence line. Things are going well for S.O.A.R. We are trying to sanction more events every year to bring in more fliers. Your listing of our club contacts has brought us six new members since the listing started running. Thanks for your help."

There are two listings for S.O.A.R. in the "R/C Soaring Resource" section if any of you are looking for a contact in Illinois. Ron's note also reminded us that the list may be missing contact names. If any of you sent us information that was intended for this list, and you do not see it in this section yet, please let us know as we keep the list up to date every month. We do plan on merging our publications listing with the resource listing in the near future.

D.V.S.S.

We received the following note from Don Whiteside of Lafayette, California.

"The Diablo Valley Soaring Society (DVSS) is a RC soaring club that flies at the Alameda County fairgrounds in Pleasanton, California. On Saturday 9/10/94, the wild rumor circulated that a reporter from a local newspaper was coming to take pictures and do a story on our wonderful sailplanes and hobby! Everybody showed up, having bathed and combed their hair, with some of their best and prettiest planes. The reporter never showed up (I used a copy of the newspaper later that day to wipe the oil off my garage floor with.), but a good time was had by all. Here are some of the pictures my daughter, Lisa, and I took that day."

Thanks for sharing the photos, Don!

Harry Edwards holding his scale Grob 103. Whiteside photo.

Brian Whiteside, part of the future of this sport. Whiteside photo.

Don Whiteside with his beater "Gentle Katie". Whiteside photo.

Alpha USA Inc.

Alpha USA Inc., importers of scale R/C gliders direct from Germany, moved awhile back which may be the reason that a rumor has been circulating that they "aren't there anymore". If you wish to visit them, please call their 800 number and make arrangements, first. While mail is still being picked up at their old address, their new mailing address is: Alpha USA Inc., 600 Martin Ave. Suite 206, Rohnert Park, CA 94928.

Year-Over-Year Costs

Last month, we said that we wanted to share a cost analysis of *RCSD*, but we ran out of room. Lee Murray took our statistics, made a trip to the library, and prepared the detailed analysis you see here, inflation, and all! The analysis speaks for itself.

In the eleventh hour while preparing the October issue, we made the decision to phase out third class. We made a quick estimate on the number of calls we receive a year that are directly related to this service, and the decision was right behind it. We receive an average of three calls + FAXs a day, which is 100 a month, which is 1200 a year!

How do we phase out? All the new renewal notices mailed will be at the first class rates, only. (We will still accept renewal notices returned for third class subscriptions that we mailed out prior to October 1, but you will still get third class service until your next renewal notice goes out.) This will cause the third class mailing to get smaller every month. At the end of 1995, in either November or December, the number of copies should be insufficient to meet postal requirements, and we will have to merge the existing third with the first class and pay the extra cost for first class service.

If any of you want to upgrade to first class service now, particularly if you have been having postal delivery problems in your area, you don't have to wait to receive a renewal notice. The cost is an additional $.75 per month, or $9.00 a year, which is all in postage costs.

Happy Flying!
Jerry & Judy

U.S.A. Subscription Costs

Date	Cost/Yr	Pgs/Mo.	Pgs/Yr[1]	Cost/pg
January, 1984	$15.00*	12	144	$.10
January, 1985	$16.00*	16	192	.08
January, 1986	$16.00*	20	240	.07
January, 1987	$16.00*	28	336	.05
January, 1988	$16.00*	28	336	.05
January, 1989	$17.00*	28	336	.05
January, 1990	$17.00**	32	384	.04
January, 1991	$19.00**	48	576	.03
January, 1992	$19.00**	64	768	.02
January, 1993	$19.00**	80	960	.02
September, 1993	$19.00**	80	960	.02
October, 1993	$21.00**	80	960	.02
January, 1994	$21.00**	80	960	.02

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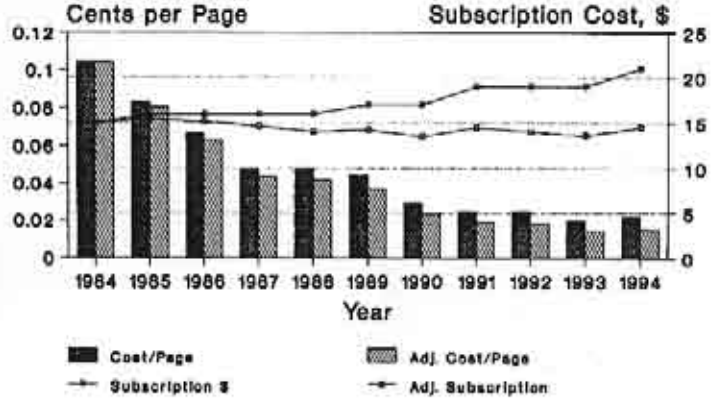
[1]Approximate in early years, based on pages/month times 12.
[2]Note: taxes are required in home state - not included above.
[3]There is a 567% increase in the number of pages per month or year while the cost has only increased by 40%.

R/C Soaring Digest
Cost of Subscription Analysis



Inflation Data from Bureau of Labor Statistics, Monthly Labor Review

Cost/Yr	Pages per – Month	Pages per – Year	Cost/Page	Consumer Price Index (All Items)	Change in Consumer Price Index	Adjusted for Inflation Cost/Page	Adjusted for Inflation Cost/Yr
$15	12	144	$0.104	103.9	4.3%	$0.104	$15.000
$16	16	192	$0.083	107.6	3.6%	$0.080	$15.450
$16	20	240	$0.067	109.6	1.9%	$0.063	$15.168
$16	28	336	$0.048	113.6	3.6%	$0.044	$14.634
$16	28	336	$0.048	118.3	4.1%	$0.042	$14.052
$17	32	384	$0.044	124.0	4.8%	$0.037	$14.244
$17	48	576	$0.030	130.7	5.4%	$0.023	$13.514
$19	64	768	$0.025	136.2	4.2%	$0.019	$14.494
$19	64	768	$0.025	140.3	3.0%	$0.018	$14.071
$19	80	960	$0.020	144.5	3.0%	$0.014	$13.681
$21	80	960	$0.022	~150.3	~4.0%	$0.015	$14.517

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KRC 94

I have been going to the Keystone RC (KRC) for years, and I have been amazed at the number of electric planes of all shapes and sizes. This year was no exception. I've said it before, and I'll say it again, "If you are into electric, you have to try to attend the KRC."

Bob Aberle, M.A.N. editor, with modified electric 55E.

Kirk Massey of RC Creations.

Father and son team of Mike (L) and Shelby Gray.

Chris Bowis with electric hand launch.

John Mountjoy, electric columnist for R/C Report, *with Aura.*

Pilot Stephan Hess (L) and Mike Popescue (designer and manufacturer), with electric Esteem.

This year, besides all the planes, pilots and spectators, I met many of my fellow electric columnists: Bob Aberle and Tom Hunt of *Model Airplane News*, Ted Davey from *Radio Control Modeler*, Tom Atwood (Editor) of *Model Airplane News*, and John Mountjoy of *R/C Report*.

John McCullough from North Carolina with E. Hawk.

Exhibitors came from all over the country: Kirk Massey from Texas, Bob Boucher (Astro Flight) from California, Charlie Sylvia (CS Flight Systems), Joe Utasi (Jomar), Larry Sribnick (SR Batteries), and many more.

This year, the weather was great, with only some rain Saturday night. Besides great flying during the day, there was some really neat night flying on Friday night. Larry Sribnick organized this event and also donated the chemical lights some of the pilots used, while others had electric lights on their planes. Chemical lights were also used

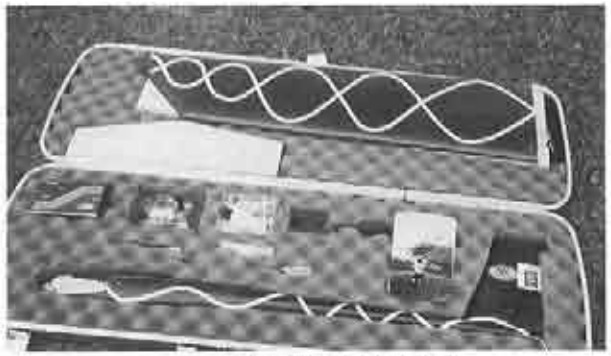
Ted Davey, columnist for R.C.M.

Bob Boucher of Astro Flight.

R.P.V. video plane took video from the air at the KRC.

to mark out a runway. Loops, rolls and touch and go's were all done without a mishap. There was some really fine flying and it was truly amazing to watch.

There were so many neat things at the KRC that it would be hard to write about them all, but a couple of things really interested me. One was Chris Bovais' speed 400 powered handlaunch that he made so that he could take it on trips. Everything was made to fit in a travel case. Really neat and clever... The other was Bob Aberle's Falcon 550E that Bob



Chris Bovais' travel case.

Hunt made a built-up, extended wing for. I got a chance to fly this and the climb and thermal capabilities were amazing; so much so, that I am going to build one. With enough interest, maybe Tom Hunt will write an article about it.

Next year, try to get to the KRC. It is well worth it. I think the pictures will tell the rest.

Good Flying! ■

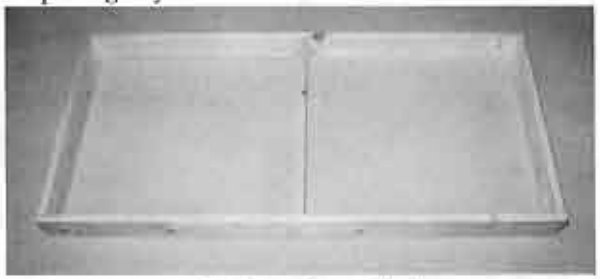
Jer's Workbench

Parting Tray

Now that the work on the plug is complete, it is time to make the layout or parting tray. For the lack of a better name, I will be referring to this project as the parting tray.

Even though the parting tray will only be used once, great care is required in its construction. It must be perfectly flat or the result will be that the seam on the completed mold will be curved and the fuselage will look like it is bent.

The parting tray is a simple project. First, I made a simple 1 x 4 frame. The top is a pre-painted particle board from a local Home Depot. Another choice for the top would be to use a kitchen counter top. Whatever is used, it must have a hard, smooth surface that can be sealed and waxed. When epoxy is applied it should not soak in, so that the mold can be removed when it is completed.

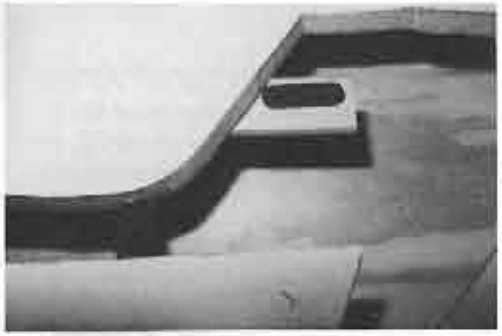


1 x 4 frame for parting tray.

Pre-painted particle board top on parting tray.

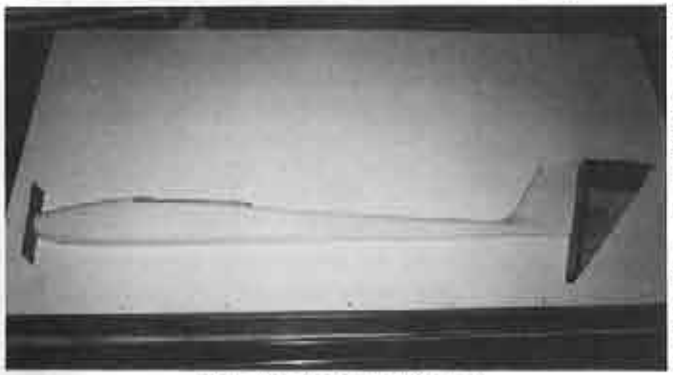
When the parting tray is completed, the completed plug with the added dams (as discussed previously) is placed on the parting tray. The outline of the plug is then carefully traced onto the parting tray. Using a saber saw, the plug profile is then cut out of the tray. The hole/plug profile with the added dams should be about 1/16 inch larger than the plug, so that it will easily drop through

Parting tray with plug profile cut out.



Stops/supports with added clay pads to parting tray.

the parting tray. Next, stops will be added to support the plug. I use three stops or supports: one to support the nose and two to support the tail. The plug is then placed back onto the parting tray. At this point the plug will drop in past the centerline of the plug and it must be raised a bit. A small amount of clay on the stops or supports is used to raise the plug to its centerline.

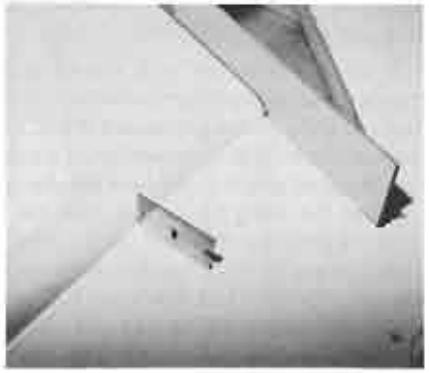


Plug installed in parting tray.

Now for the caulking around the plug. Great care should be exercised here, in order to obtain a better edge on the completed mold, which means a better seam on the completed fuselage. There are several materials that can be used for caulking, one being clay. I use spackling. Whatever is used, it should NOT dry super hard, or the plug will become permanently stuck in the tray. After the caulking has been applied and dried, a razor blade is used to clean off any excess caulking. The caulking is then examined very carefully, and any voids that are detected are filled.

Caulking plug into parting tray.

Next month is the lay-up and completion of the mold. ■



Cleaning excess caulking from parting tray.

on the Wing

P.O. Box 975
Olalla, Washington
98359-0975

Four Basic Concepts
Part 2

As promised, this month we begin our examination of the effects of specific airfoils and sweep angles on the wing twist needed for a predefined amount of stability and predetermined design C_L. For all of the cases examined here, the static margin (stability factor, sf) is 0.035 and the design C_L is 0.6, a value larger than would likely be used in practice.

Bill Kubiak, instigator of this exercise, was specifically interested in the effects of sweep on twist when the airfoil used is a flat-bottomed section, but as a reference point we will first look at using a symmetrical section. Graph 1 depicts the case where both the root and tip airfoil are symmetrical. In this case the specific symmetrical airfoil used is unimportant, as both the pitching moment and zero lift angle of any symmetrical section are equal to zero. (Symmetrical section: $C_m = 0.0$, $\alpha_{l0} = 0.0$)

Hans Jürgen Unverferth used a symmetrical Quabeck section for his "Just in Time", a high performance swept wing design. The major problem with using symmetrical sections on swept tailless designs has always been their relative inability to provide large amounts of lift. Until recently, this shortfall was also true of non-symmetrical sections with very low pitching moments. This situation is changing, however, and there are now very low pitching moment sections easily capable of $C_l = 1.0$ and more. The EH series of airfoils provides several excellent examples of the state of the art and will be discussed later.

Turning to the specific case of a flat bottomed section, we chose the Eppler 205 for both the root and tip sections. (E 205: $C_m = -0.046$, $\alpha_{l0} = -2.37$) The results are shown in Graph 2.

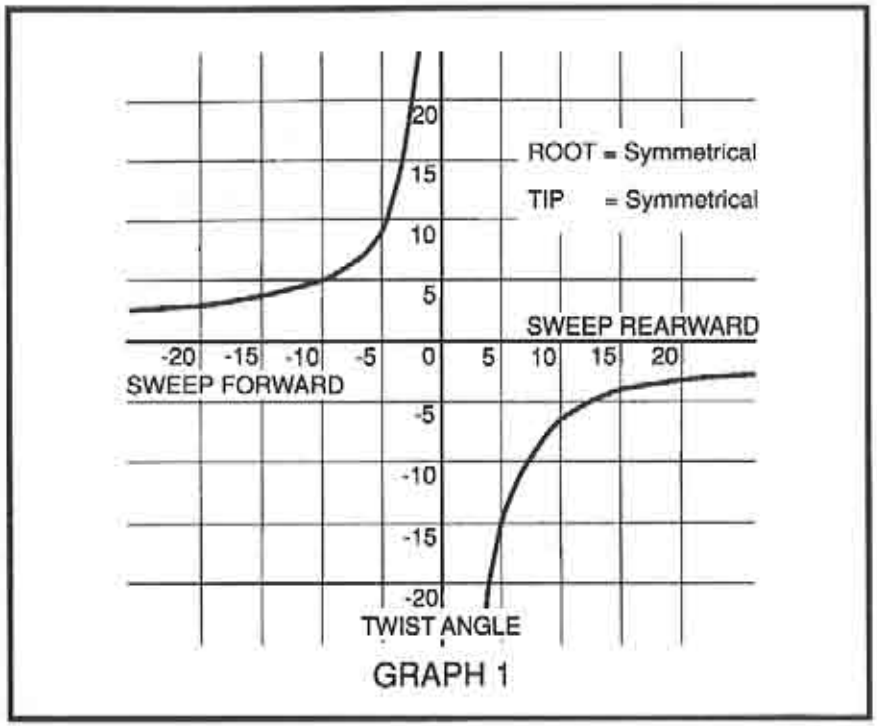
There are a few things to be learned here:

• For equal angles of forward and rearward sweep, twist angles are of nearly identical magnitude. In fact, if Graph 1 was based on the 1/4 chord line instead of the leading edge, the magnitudes would be exactly equal for equivalent sweep angles. This is due to the root and tip sections having identical zero lift angles. As the zero lift angles become more dissimilar, differences in twist magnitudes become larger.

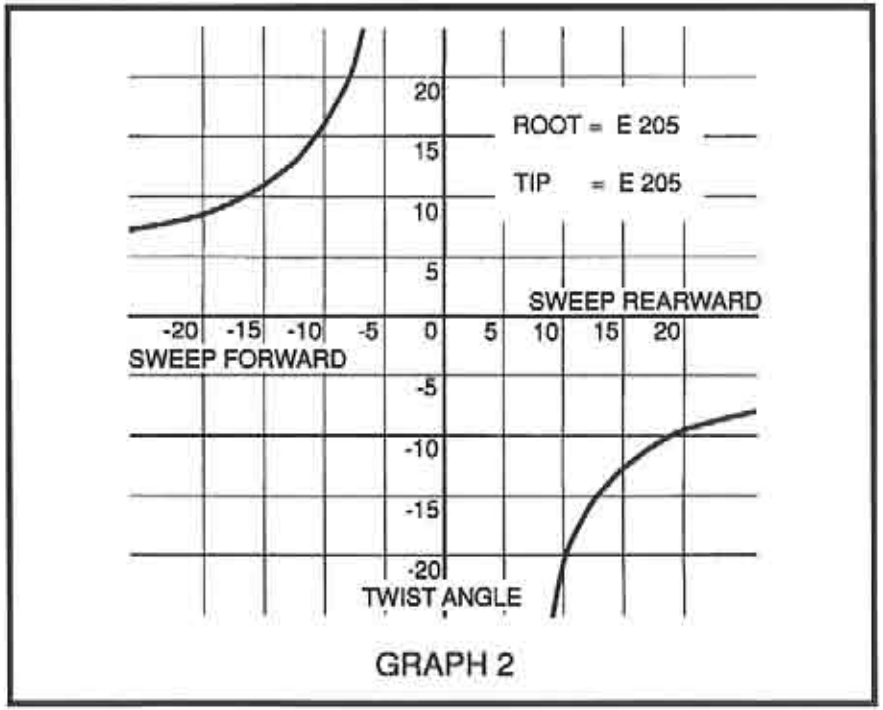
• As the sweep angle approaches zero degrees the twist angle approaches a truly unmanageable value. Since the twist angle is extremely large as the sweep angle becomes less than 20 degrees, we are driven to find another method of obtaining needed stability when the sweep angle is less than this value. We'll focus on this point later.

• The twist angle decreases as sweep angle increases, but the twist angle never reaches zero degrees. Additionally, the twist angle is large even when the sweep angle is over 20 degrees. Such large sweep angles make winch launches extremely difficult, as we mentioned previously, and cross-span flow becomes a major problem during certain flight regimes. With rearward sweep the tip section is at a severe negative angle. This may lead to stalling of the lower surface under some conditions.

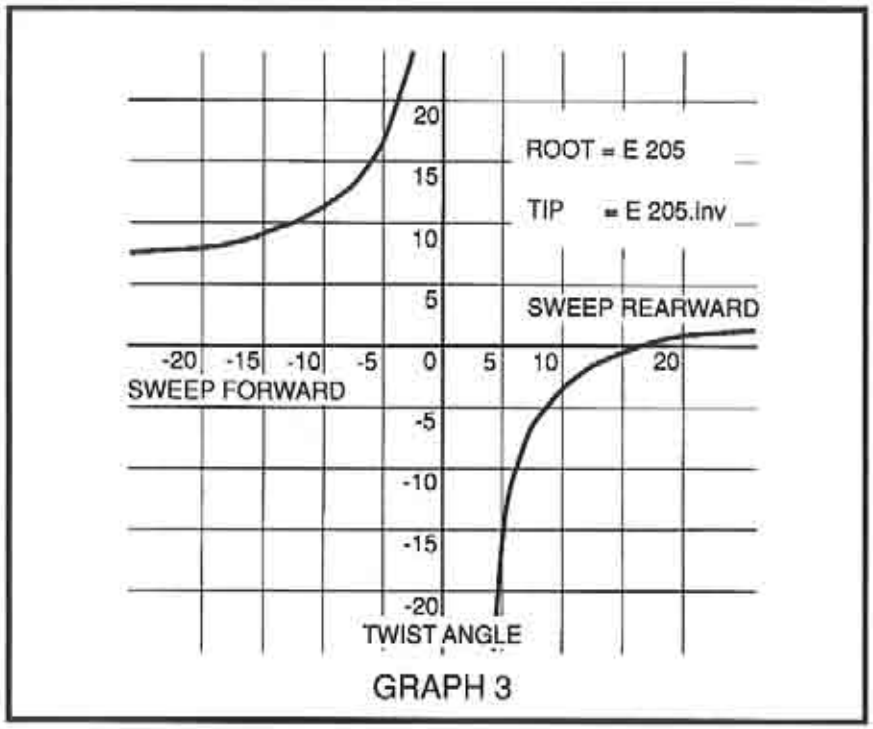
• In the case of sweep back, the wing tip must provide a down force which can both overcome the pitching moment of the root section and hold the root section at a positive angle of attack to achieve the design C_L. But the wing tip in this case has a negative pitching moment, so it contributes, along with the wing root, to rotating the wing forward and downward. This is the reason such a very large twist angle is needed when both the root and tip utilize



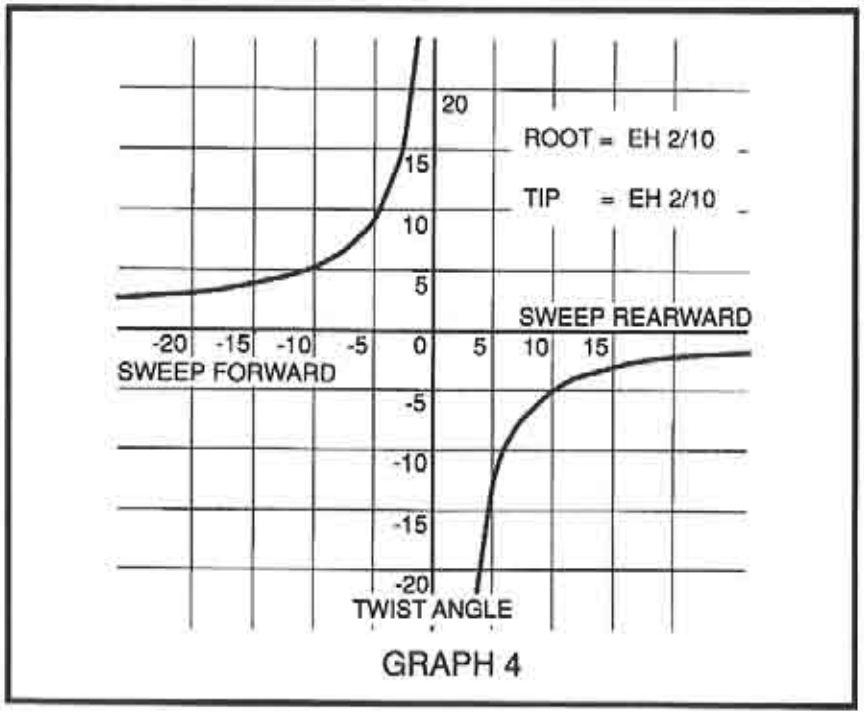
GRAPH 1



GRAPH 2



GRAPH 3



GRAPH 4

the E 205 section.

• The negative pitching moment of the wing tip is also a detriment when the wing is swept forward.

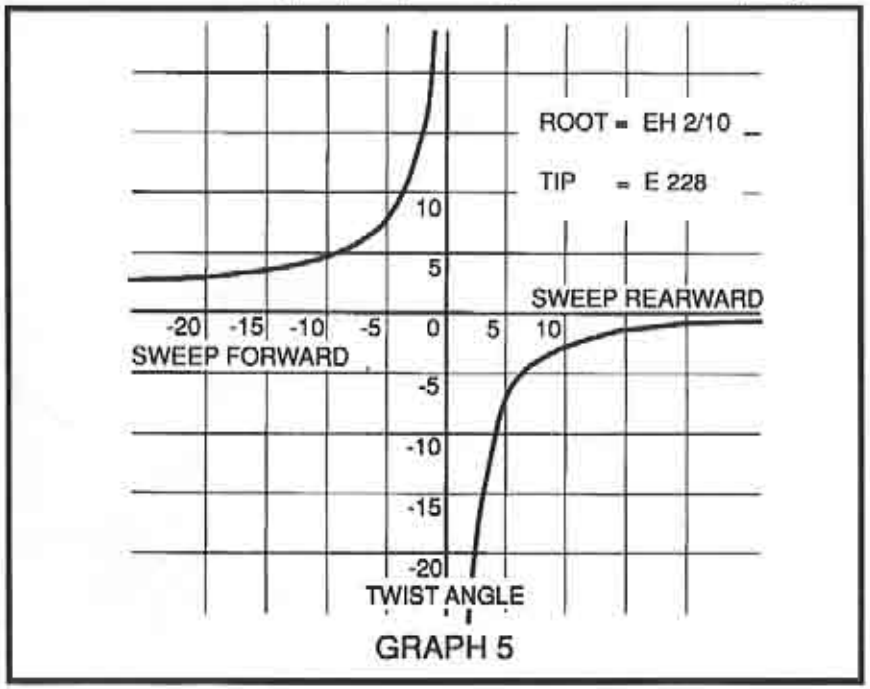
The most obvious difficulty in using the E 205 section for both the root and tip is the large amount of wing twist required for wings with sweep back. This problem can be minimized by using a tip section having a positive pitching moment and which is capable of providing significantly more negative lift. A positive pitching moment, combined with an ability to produce a large amount of negative lift provides the potent downforce required by the chosen root section.

All of this can be accomplished by inverting the E 205 tip section. The pitching moment of the inverted section is positive and this contributes to stability and assists in holding the wing root at the proper angle of attack. Additionally, the airfoil is now capable of producing very large amounts of downward lift because the camber line is oriented appropriately. (E 205.inv: $C_m = +0.046, \alpha_{l0} = +2.37$) See Figure 4.

Graph 3 shows the startling effects of this simple change of tip section. The twist angle becomes 0° when sweep back is at about 17°, and actually becomes positive for larger sweep angles.

A surprising outgrowth of using the inverted E 205 for the tip section is the reduced twist required for the forward sweep configuration. This is due to the positive pitching moment of the inverted section. Note, however, that the required twist is approximately eight degrees for the case of 20° leading edge sweep; this is probably beyond the point where the relatively flat upper surface will be stalled.

The relationship between pitching moment and required wing twist has been demonstrated to be an important consideration during the design process. As we've seen, a change of tip section can easily bring wing twist values down to manageable levels. However, using a root



GRAPH 5

section with a very low pitching moment is an attractive alternative because very little twist will be required to obtain needed stability. The trick is to choose an airfoil with a near zero pitching moment which is capable of high lift. This is not possible with the symmetrical sections, but the EH series which we mentioned previously provides some excellent candidates.

We'll use the EH 2/10 for both the root and tip sections. (EH 2/10: C_m = 0.00165, α_{l0} = -0.74) Graph 4 depicts twist angle versus sweep angle for this airfoil combination.

Note the small twist angles required — about 25% of the twist angle required for the E 205 - E 205 combination. Additionally, we can anticipate very low drag for the EH 2/10 - EH 2/10 configuration, and, as is typical of low pitching moment airfoils, only very small increases in drag for various trim conditions.

We previously noted a reduction in required wing twist when the inverted E 205 was substituted for the E 205 as the tip section. If the EH 2/10 is used at the root and a section with a substantial positive pitching moment is used for the tip, we can predict a similar reduction in required twist. Graph 5 depicts the case in which the root section is the EH 2/10 and the tip section is the E 228. (E 228: C_m = +0.0143, α_{l0} = +0.34)

The E 228, with its slightly positive pitching moment, is capable of providing a large stabilizing force at very low wing twist values. We would therefore expect to see twist requirements diminish further if the E 230 were used as the tip section. (E 230: C_m = 0.025, the pitching moment advocated by Dr. Panknin rather than the value published in *MTB* 1/2, α_{l0} = 1.73)

Next month we'll tackle the case of the plank — the nonswept 'wing — and present some conclusions. ■

Fixing a "V" Problem

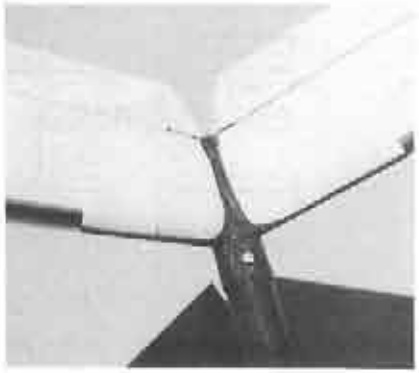
...by Walt Good
Port Richey, Florida

I'm still flying the 2M DUCK, which is very rugged and easy to fly, and also the 11 foot MAGIC with the "V" tail.

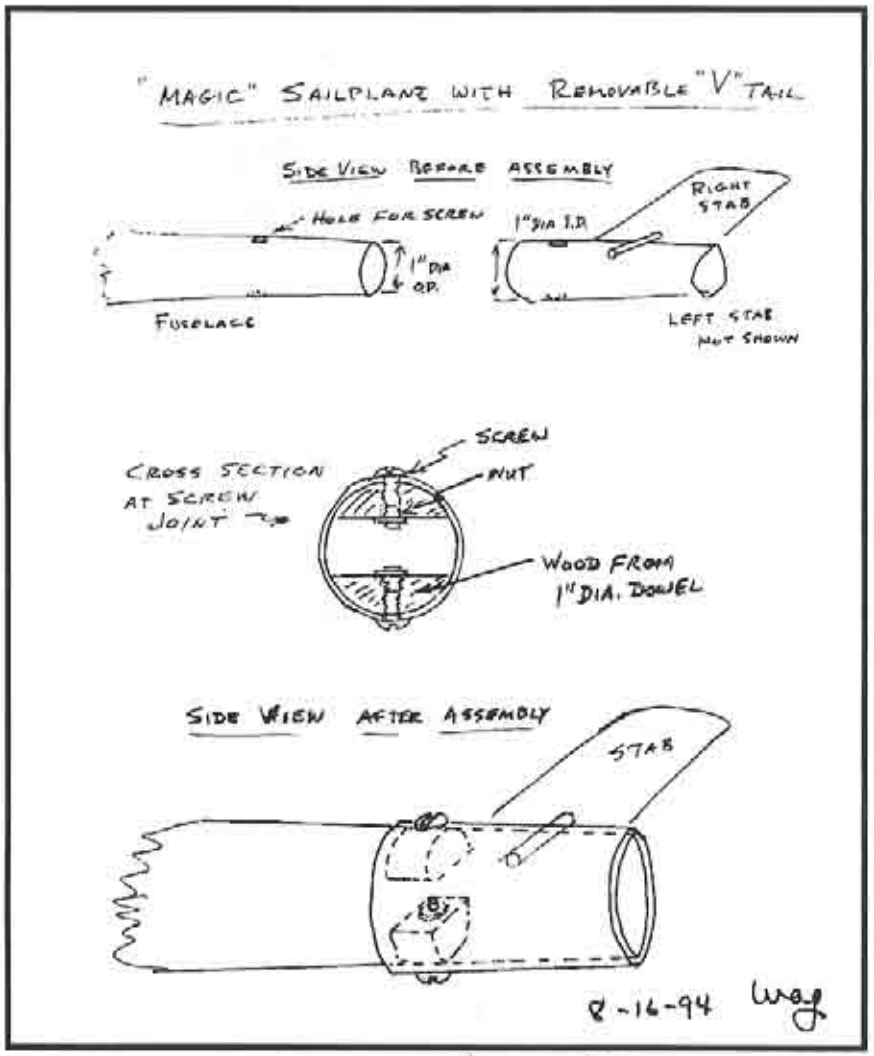
The "V" tail was new to me, but it works quite well. The mounting of the tail was a little difficult because the two tails must be butt joined to a short cylindrical tube which slides over the tubular fuselage.

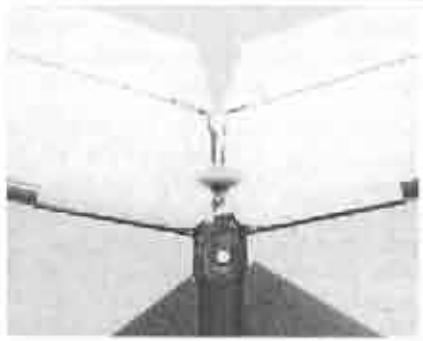
My first "V" problem arose when I secured the tail tube to the fuselage tube with a small, plastic screw. After the first several test flights to determine the elevator settings, I pushed the controls for more active response... This, unwise action, sheared the plastic screw and allowed the "V" tail to rotate plus or minus ninety degrees! It was at a good altitude, so I had time to use full "up elevator" and a delicate touch on the rudder, and "wallow" the plane to a soft plop-down landing on the thick grass with no damage!!

This first lesson displayed the need for a much stronger attachment between the fuselage and the elevator tubes. So, back to the bench to insert TWO metal screws into small blocks of half-round broom



Top view of Magic "V" tail before glass tube was added.





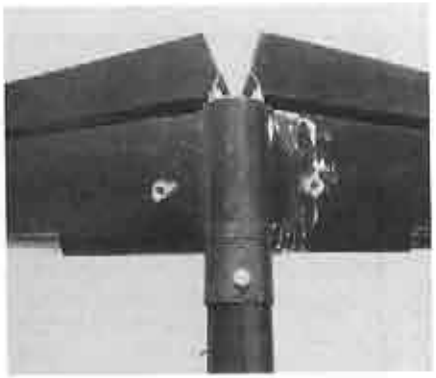
Top view of Magic "V" tail after glass tube was added.

Top rear view of tail after glass tube was added.

handle hard wood. This cure has worked well for over 80 flights.

The second problem was the attachment of the "V" tails to the mounting tube. Kevlar cloth was used to glue the two stabs to the "V" tail tube. This appeared to be adequate at first, but it was not as rigid as necessary. So, an addition of a 1/4 inch diameter glass fiber tube was inserted through the base of the two stabs as shown in the photos. The 3 inch tube was hollow and weighed 1/10th of an ounce, so it didn't add much weight to the tail!

The glass fiber tubes look like arrow shafts, which can be found in the archery department of most large sporting goods stores. ■



Bottom view of tail showing exit of glass tube ends.

On The Air With Cornfed

Fred Rettig
1778 S. Beltline Highway
Mobile, Alabama 36609
(205) 471-2507 (days)

ZIKA

Flight of Fear

By the time some of you folks read this article, it will be nice and cold. There might even be some snow on the ground, which means the flying season will be coming to a quick close. For myself, I'm able to fly year round. I just knock the frost off the ground where the turnaround goes and nail it down. Most of our cold air here in the south comes from the northwest. Now, I really love a sunny northwest wind for flying. The tail end of cold fronts are my most favorite flying days.

I remember one early December, a couple of years ago. I was flying a Synergy 91 on a cold, sunny, 15 mph day. I had a few flights under my belt that day. Ya'll know, I had knocked the edge off on the first flight of the day. Well anyway, I was gettin' ready to launch when I caught a glimpse of a hawk out in front. It looked to be a mile away. Might as well have been, as he was a long ways away. But I feared not, 'cause he was sliding back towards me with a thermal in tow.

'Bout then, I decided to take a dog break and love and pet on my two dogs 'til the time was just right. That old red dog won't let me love on the other dog too much. That dog is just a hog when it comes to lovin' and scratching her head. Well, the time was just 'bout right to launch, and I had it all figured out. With my sixth grade education and my great understanding of the outdoors, I knew that if I was to launch within the next half a minute and fly out to the outer limits of the plane, I might just hit the lift where it should be the strongest.

On the other side of my cousin's trailer park, sitting on the side of the hill, lift breaks away like nobody's business. (By the way, I might as well take time to advertise my cousin's trailer park. If ever you are passin' through and need a weekly rental, just call and I'll set it all up. Now, of course, I know they ain't too pretty; why just this summer I helped him paint those trailers by brush. At night, the colors don't look too bad! So, give me a call. Ya'll hear?)

Now where was I? Oh, yeah! The dogs started barking as the plane eased up the line and zoomed off like a rabbit runnin' down a dirt road. I flew that plane as far as I could. It was gettin' real skinny. Only thing I could figure out was that I had left the ground too soon. Where was the thermal? I turned the plane and hoped for the best, and the best was there for me. That thermal grabbed that plane like a kid takin' candy from a baby. I mean, that plane was gettin' slapped around and going up at the same time. I felt helpless. All I could try to do was keep the plane upright. My thumb was all over the box. That old thermal was *stealinggg* my plane! Fear was gripping my heart. I could hear poppin' and crackin' sounds coming from the plane. Thoughts were rollin' in my head tellin' me I should have stayed home and cut wood for the fireplace or somethin'. *"How much more stress can that plane take,"* I cried.

I knew the Synergy was a good plane, but was it goin' to make it? In a matter of seconds, that plane would be specking out. It was gettin' right down to decision time. I thought, "Maybe the flaps and elevator combo might work." You know, like as if I was going to land the thing. Without a second to lose, I pulled the lever. The plane slowed, only to drop down into what must have been the thermal core. Up it went again, climbin' stronger than before! I went to full elevator down and hard left rudder in an attempt to spin it back to earth. The plane only sped up in the spin, and looked to be flyin' at out of control speeds. It was comin' down in a hurry, shaking violently. Oops, there went the rudder. I knew I shouldn't have used Mamma's Christmas wrapping tape!

It looked like a blur. I had gone from one extreme to another, climbin' in lift out of control to spiralin' down out of control. I was at wits end. Sweat balls were poppin' out of my forehead. I had pulled all the tricks out of the bag just trying to figure out how to get the plane down, and now the bag was empty. The only thing left to do was pray, and man, was I prayin'. I ask for forgiveness for all my sins. And he must have heard my prayers!

At about tree top level, a cross wind hit the plane and leveled it off. I took no chances. I dropped the flaps and landed about 500 feet away. I ran to the plane, grabbed it up, and the dogs and I went straight home. The rest of the day was spent cuttin' firewood, needless to say.

Later that day, I stopped by my cousin's trailer park for a cup of coffee. I started to tell him about my flight of fear. I was still tryin' to figure out where that bad thermal had come from. Cousin said, "That ain't nothin'. Earl come by this morning about 11:30 and cleaned a deer he had killed. Cleaning the deer was no big deal, just how he got him. Said he tripped the deer with a rope, then killed him with a Swiss Army knife."

I said, "That's it!" And cousin stopped talkin'. Between that big thermal breaking away, my plane, being at the right spot at the right time, and Earl blowin' all that hot air 'bout how he got that deer, my plane never had a chance.

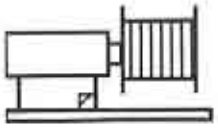
I said all that to say this. With cold air coming your way and warming mid-days this fall, them thermals will be downright dangerous. So, be careful this fall when you go out and fly where the lift is great.

Signing Off,
Cornfed

P.S. Don't stop praying and be thankful this Thanksgiving.

ATTENTION: Scott Meader, San Jose, California.

When training your new dog to fetch, smear a little BBQ on the stick and tie a rope to it just in case he decides he doesn't want to bring it back. Good thing he's not a big dog! ■



Winch Line

Gordon Jones, 214 Sunflower Drive,
Garland, Texas 75041; (214) 271-5334
After 5:00 P.M. CST

UIUC Update

As you read this the first full-blown testing will be taking place at the University of Illinois at Urbana-Champaign. The outcome, while a long ways off, will help the modeling community through the new airfoils that will be generated through these tests. We will also learn more about some of the airfoils that are currently in use to maximize their design. A slightly different approach is being taken in the testing efforts to further qualify measurements taken during the Princeton tests and validate the current testing. The tests have been refined and expanded from the Princeton tests and should produce some excellent data and interesting new airfoils.

The results of the testing will be published in new editions of "Soartech" periodically. They plan to provide information to Herk Stokley (the publisher of "Soartech") on a semi-regular basis and have it available during testing rather than waiting until the tests are completed, as they did with the Princeton tests.

Until the airfoils are available in "Soartech", if you see or hear of an airfoil that you are interested in for your particular interests, they will be available through Prof. Michael Selig. All you have to do is send a SASE with your request. Some of the results will be published in a periodically published Program Bulletin as they become available. The Program Bulletin will contain the results of testing such as airfoils tested and general information on the progress of the testing.

So, how do I get the bulletins you may ask? (Here comes the sales pitch.) Make a contribution to the airfoil tests either as a monetary contribution, or purchase one of the T-Shirts that are offered to help raise funds to support the testing, or both. The T-Shirts are offered for a suggested donation of $18 [$15 for the T-Shirt + $3 mailing - make checks payable to University of Illinois, AAE Dept. Write on the check Selig Wind Tunnel Testing/ AAE Unrestricted Funds.]. Or you can send a SASE for the bulletin to Michael Selig at the address below. There is an order form for the T-Shirts on another page.

In addition, if you are interested in presenting a discussion of the test program at a club meeting, a 25 page presentation with a brief narrative is available. For a copy of the presentation send a LSASE with $1.21 postage to Jim Guglielmo.

Jim Guglielmo
c/o Michael Selig
Dept. of Aero. and Astro. Eng.
University of Illinois at Urbana-Champaign
306 Talbot Laboratory
104 S. Wright Street
Urbana, IL 61801

For those that are interested in obtaining information on building a test section please contact Jim Guglielmo at the same address with your interests and the proposed method of construction. He is doing the majority of the coordination for scheduling and orchestrating the test schedule. His phone numbers are: (217) 244-0684 work, 367-1960 home, 244-0720 Fax, or e-mail: jjgug@uiuc.edu.

As information becomes available we hope to publish it in general form here in *RCSD*. It will be in an overview format that will contain the available information and items of interest from the wind tunnels tests. Support from the modeling community is paramount to the success of this project and I urge everyone to support this project in any way possible.

■

Hinge Tip

...by Etienne Dorig
Quebec, Canada

To hinge control surfaces, there are many different tapes that can be used and methods for doing it. One tape, that has been used for over a decade in Europe, is manufactured by 3M and is called "Blenderm". It is a surgical tape that can be found in any good drug store. It has the following characteristics: it is clear, very flexible, nearly tear-proof, and is very sticky as long as you don't put a dirty finger on the sticky surface. The tape is not expensive.

Experience has proved to us that this tape will last a very long time. Planes built over ten years ago still have the same hinges, and they still function properly. Give it a try. It is available in two widths, so you can accommodate large and small control surfaces. ■

UNIVERSITY OF ILLINOIS
at Urbana Champaign
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We/I understand that this donation is a gift to the UIUC Low-Speed Airfoil Test Program. _____
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* Hanes 100% cotton white T-shirts

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c/o Michael Selig
Department of Aeronautical and Astronautical Engineering
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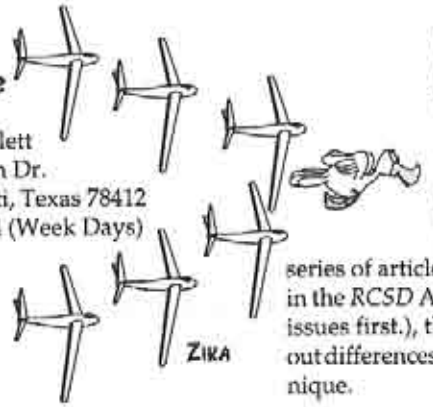
306 Talbot Laboratory
104 S. Wright St.
Urbana, IL 61801-2935

Thank you
for your support of the
University of Illinois Low-Speed
Airfoil Testing Program!

This Old Plane

...by Fred Mallett
334 Haroldson Dr.
Corpus Christi, Texas 78412
(512) 991-3044 (Week Days)



The Shred-Air

The name comes from the wind-surfing world, where shred means tearing up the water.

This plane tears up air over the slope. It was designed by Bobby Dumas, who also pops the fuselages from the mold. The plane was originally a mid-full-flying tail, with the 6060 foil, and swept wings. The planes seen in the pictures are the "newer" versions, with V-tail, and straight TE wings. They also use the RG14 foil which substantially improved inverted flight, as well as allowing a much slower landing speed. The RG-14 will fly in lighter winds faster than the 6060 on this plane. Due to the sleek fuselage, weight carrying capacity of the RG14, and clean lines, this plane has tremendous energy retention.

The construction technique I want to point out on this plane deals with the bagging of the wing. Bobby and I were out at the shop one day trying to come up with a better leading edge technique. The following description is a result of that session.

The goal was a wing that would not need painting or filling on the LE. Mostly because I wanted a pure carbon wing, without having to paint or fill. The picture of the trio of Shreds had the older design in the front center, with the T-Tail, my Shred is on the right, with the lazy man's square tips, and the designer's latest version, with swift type tips, RG-14 wing, and smaller area V-tail.

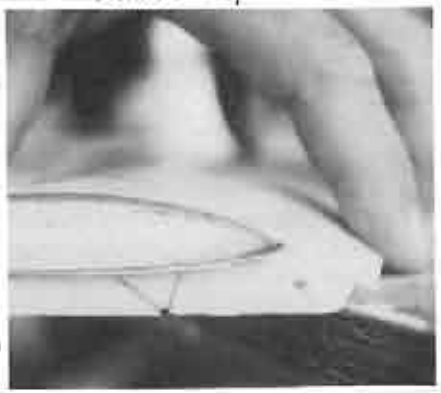
Construction

Assuming you are already familiar with glass bagging techniques (If not, read Gordon Jones' series of articles on "Composite Wings" in the *RCSD* August 1992 - January 1993 issues first.), the steps below only point out differences in bagging using this technique.

1) Prepare the core in the usual manner, 3m77'ing some LE glass re-enforcement, if desired.

2) Prepare the bottom bed by sanding to the shape shown picture 1. This is critical. The bed must smoothly taper down from where the LE of the core touched, and follow the outline of the top of the airfoil. That is, if you set the core in the bed, the top surface of the core should blend into the front part of the bed. This will allow the mylar to follow the top curve, and create a smooth LE right past the core.

Picture 1 - Prepare the bed.



Picture 2 - Mylars with leading edge overlap.

3) Cut the mylar very carefully, as the top mylar must be longer than the top of the core by at least 1/2" to allow ease of trimming later. The bottom mylar is very critical, and must come as exact as possible to the leading edge of the core. When the mylars are in place, and bent around the core when fitted in the beds, they should almost touch, as seen in picture 2. You must put marks on the core and mylars, to line them up when folding the mylar, carbon or glass, and epoxy around the core when placing in the bag.

4) When bagging, put some plastic wrap over the bed to prevent sticking, and use only the lower bed.

5) After bagging, cut the LE flashing with a saw or blade; then it will only take a few passes with the sanding block to remove the rest of the flashing. Picture 3 shows the top and bottom of wings fresh out of the bag. The wing on the right still has the mylar on; I use this as the guide to cut the flashing off. You should have no more than 1/16" of sanding on the top; the bottom surface sanding mark width depends on how close you were with the bottom mylar. Picture 4 shows a wing after LE sanding. With any modern epoxy, you should be able to polish the LE, and not have to paint at all if desired. My wing with the carbon cloth turns a beautiful bronze metallic when the sun glints off it.

Shred-Air
General Specifications

Span:	52"
Length:	33"
Weight:	20 oz min, 30 oz recommended
Type:	Slope Speedster + Turn Burner
CG as tested:	2.7" from LE
Loading:	10 - 15 oz/sq. ft.

Wing

Blue foam core,
uni-directional carbon/glass vacuum bagged

Area:	≈312 sq in, depends on tips (Should be Swift type. I was lazy.)
Root chord:	7"
Tip chord:	5"
Dihedral:	.75"
Airfoil:	RG -14

Tail

V-tail area:	38 sq in
Horizontal stab area:	40.5 sq"

Fuselage

Glass and carbon, joined out of mold

Tail arm:	13 in
Nose arm:	9 in

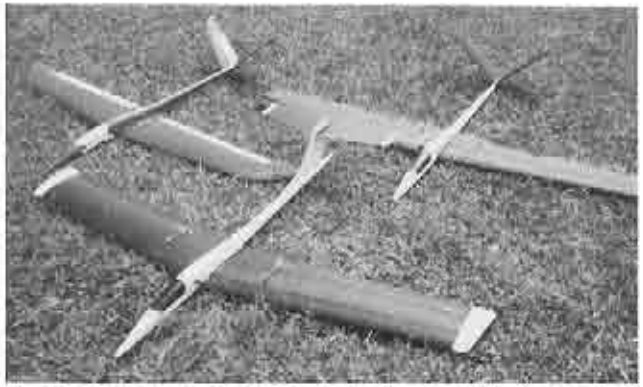
Controls

Spoileron - Elevator

Designer

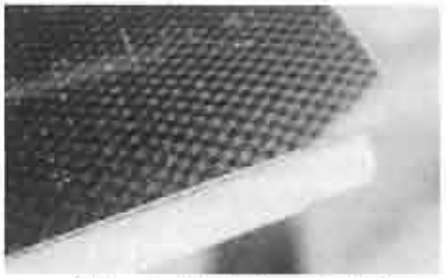
Bobby Dumas

Other than that, the plane is straight forward for a scratch builder. The V-tails are C/A'd, then glassed on. Special attention is paid to fairing the tails and wing saddle due to the need for speed from this plane. The tails are faired with epoxy fairing compound, then smoothed with an alcohol wetted finger in a glove to get a no sanding fair. The control tube exit for the elevators is installed first, so it also is faired in. The wind saddle is faired with the clear tape method: Install wing holddown mechanism. (We all use 2 nylon 4-40 bolts for crumple type protection.) Put clear tape over the top of the wing, then put fairing compound in the wing saddle. Bolt the wing in place, which squeezes the compound into the gap.



Shred-Air trio

Picture 3 - Fresh out of the bag, using painted mylar.



Picture 4 - Fine leading edge, before polishing.

Use the wet finger method to smooth the fairing compound. When it dries, the epoxy won't stick to the tape (You could wax or jelly the tape.), so you can pop the wing off.

With 2 servos in the wing, you can use spoilerons on this plane for landing. The shred-air takes some down trim with spoilers on or it will pop up. I am using 25% spoileron and 15% down trim on the landing switch, and from neutral trim I get a nice flare/mush on landing.

Flight

First launch with my Shred-Air went like all first flights with this design. Toss it into the privately owned southeast wind sites in a 20 MPH breeze, and hang the transmitter by your side. She flew straight and clean out over the water, with a slight turn to the left from the angle of launch. I did not touch the stick until the other end of the slope, and never touched trim levers for the entire flight. This flight was an eye opener. I had chased Shred-Airs all over the slope with my other planes, and never caught one. I learned why. The plane is fast, and has no bad characteristics. When pushed nose down for speed she stays there, and the controls can get touchy due to the speed. The plane does any maneuvers my thumb can do with energy to spare. (I don't dare use the "Aerobatic" word for fear of being Raskin'ized.) When built with carbon wing, and fuse of carbon/glass, it will take some amazing abuse. Yesterday, Bobby feathered his into the face of the cliff after an inverted dive that almost pulled up in time (about 18" short). The fuselage did a lawn jarte, and the wing went bouncing. After replacing two bolts, it was back in the air. We don't call scratches damage here in south Texas; we calls 'em medals.

The Shred-Air itself is not really kitted, but if you reaaalllly want one, call Bobby Dumas, at Boardworks, Corpus Christi, Texas at (512) 993-7444. ■

TRAINER COURT

Kitty Pearson
1075 Space Park Way #182
Mountain View, CA 94043
(415) 962-8048 (eve.)

Mission Impossible

Today was the moment of truth. After 29 years, my husband was going to teach me to fly one of his treasured gliders. I've paid my dues. I've spent more time chasing down the winch line than a greyhound spends running a rabbit. I can talk air, wind, thermals, wing loading, and CG with the best of them. Or, at least I know when to nod and smile.

We've done many things together. He's tried teaching me before. He yells, I cry. This time was going to be different.

He bought a transmitter trainer set. A cord from the trainee's transmitter plugs into the trainer's transmitter. His is equipped with a toggle switch which turns mine on or off. No more thrusting the controls at him when I panic or having him wrestle them from me when he panics. I just have to remember that there is an umbilicus between us. Where one goes so goeth the other.

We started on the ground (Yes, there were thermal pulses going past us unused.) with me moving the stick and seeing what actually moved on the plane, and to what degree. We set limits on what I was going to be doing. I would start with left turns, right turns, and centering in the thermal. We pretended that I was in the airplane and defined terms: left turn, right turn, up stick, down stick. Since the stick rotates in every direction, we called moves in accordance with a clock. So, for a left turn, I would move the stick to nine o'clock, which gave it the correct combination of rudder and elevator. Center meant "let go of all pressure". When I was flying, I'd call out which time I thought I was moving it to and what I thought I was going to accomplish. When he took the controls, he would call out so that I could visualize what was happening to control the plane. "It's mine," meant that he had the plane flying proud. "It's yours," meant that something dire was about to occur.

The oldest most destructible plane in your husband's fleet may not be the best trainer. It is important to be flying something which will respond quickly so that, as a new pilot, you will be able to see the results of the stick movements.

He launched, landed, and retrieved the plane and high start. I had a great time flying. We quit while he still had the energy to fetch the plane from the bottom of the slope where it wound up on the last flight. Queen for a day is fun.

No yelling; no crying. I had a good time. As soon as he is rested, I'm ready to go again. What time do you go to for a loop?

■

ZIKA

Photo 1 - Tow plane end

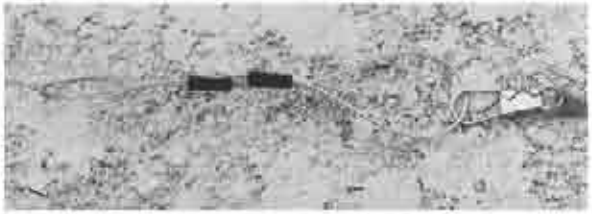


Photo 2 - Glider end

Photo 3 - Planer Board Tow Line

Towline for Air Tow
The Year of the "Flag"

...by Robin Lehman
New York City, NY

There have been quite a few articles about how to air tow gliders, but the towline itself has been practically ignored. What amazes me about air towing is that after all these years there are still ways of improving the system. This year has been no exception! This is the year of the "flag".

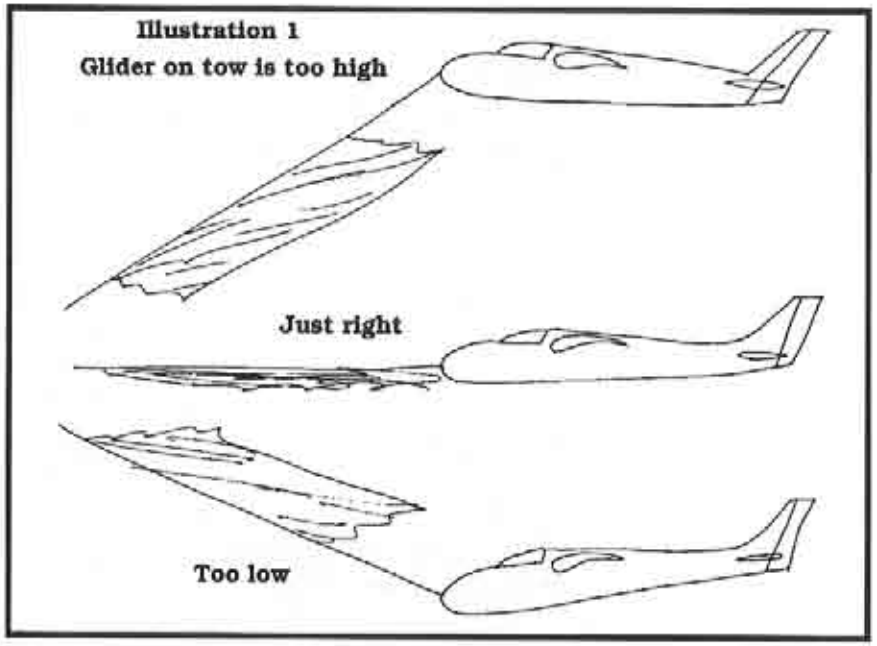
We regularly tow to 2,500 feet and above, and at that height the sailplane is often quite difficult to see. Sometimes, it's hard to tell if the sailplane is above or below the tug - and perhaps most important, it's very difficult to tell when and if the glider is actually released once you want to get off! You really do want to know when the glider is unhooked before the tow pilot dives for the ground to take another glider up.

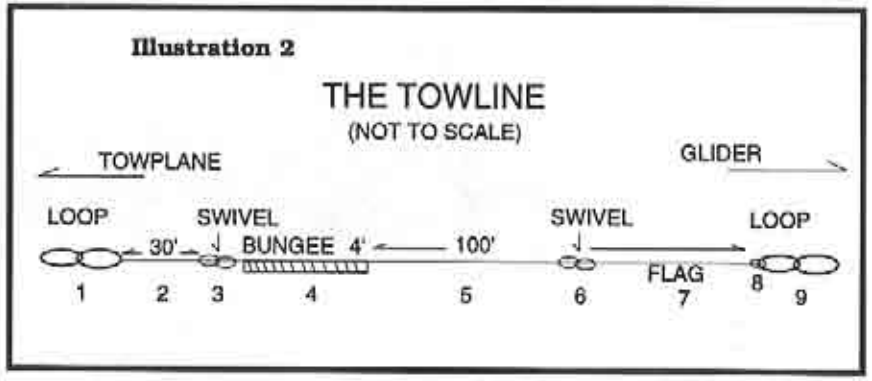
So, this spring, I thought I'd try a red "flag" about one foot wide and four feet long on the glider end of the towline. This has vastly improved our safety record — over 300 tows so far this year and not a single bad one. Not even any difficulty! Not only can we see whether or not we have actually released at height, but it's also very easy to tell when we need to add or subtract elevator trim on tow because the flag begins to fly like a banner if the glider is too high or too low. This is very helpful on a first flight with a new and untried sailplane (see illustration 1).

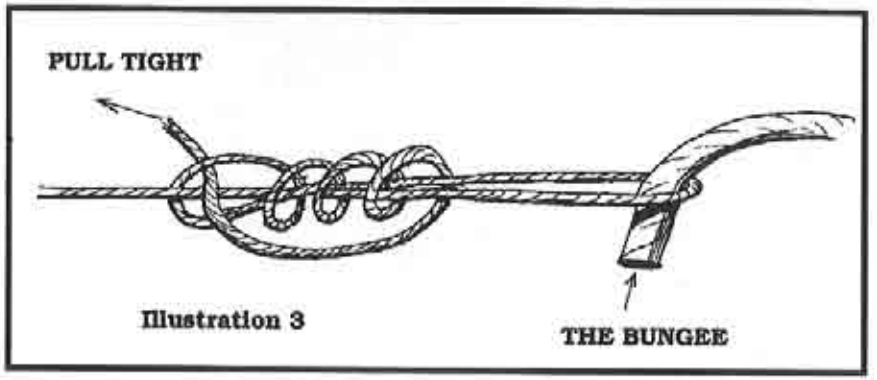
A side benefit of the "flag" is that (without the glider on tow) it keeps the towline higher and so less apt to snag on something when landing.

I can't believe we have been air towing for this long and not thought of a large "flag". (Up to now, in Europe, and elsewhere, it has been done with either a little "flag" or nothing at all on the end of the towline.)

For those of you that want to have a go at towing, the measurements of what we use are shown in illustration 2. A little







longer or a little shorter won't matter, but too long or too short makes it much harder to tow.

#1 & #9 - 80 lb. cable fishing leader put together with crimps (photos #1 & #2). On the tow plane end, I tape the crimps in case the tow plane has to release. This way, the tail feathers won't be damaged as the cable whizzes by. I make up a bunch of these as they sometimes fray and break. I always have one on hand for the next tow.

#2 - 30 feet of 150 lb. test planerboard dacron. It comes in nice day-glow orange and yellow and shows up very well on the grass (photo #3). If you tow small gliders, you can use a lighter towline. This towline serves us for everything from an Olympic 650 to almost half size 50 lb. sailplanes.

#3 & #6 - an 80 lb. swivel (photo 4).

#4 - Four feet of 1/4" bungee cord (photos 5 & 6) tied at both ends with a slip knot (photo 7). This is placed far enough back from the towline so as not to "slingshot" the towline into the prop if a glider is released under tension. If you put the bungee on the glider end, it tends to weight the towline down enough so as to drag on the ground before you land., If only the "flag" is on the glider end, the towline flies much higher and so you

Photo 4 - Swivel

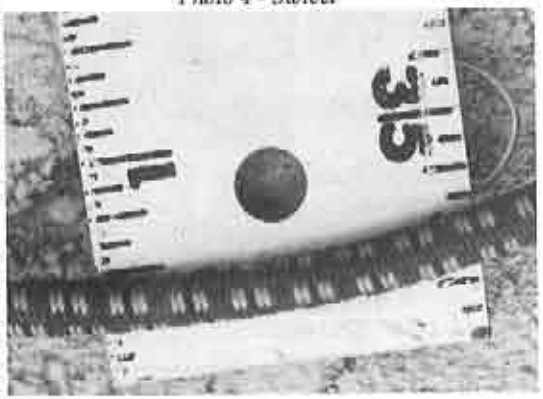


Photo 5 - Bungee

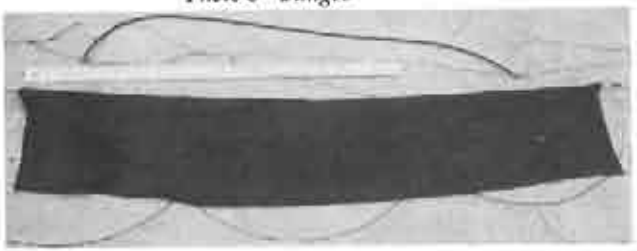


Photo 6 - Bungee & flag

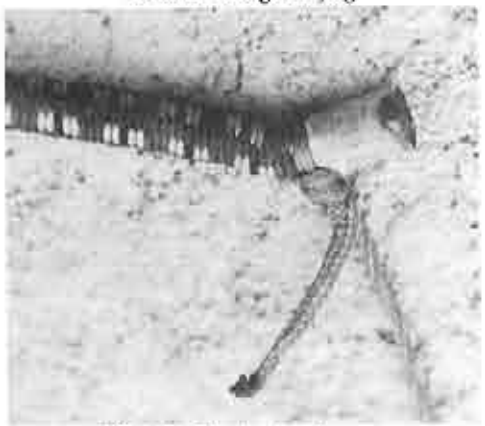


Photo 7 - Slip knot on bungee

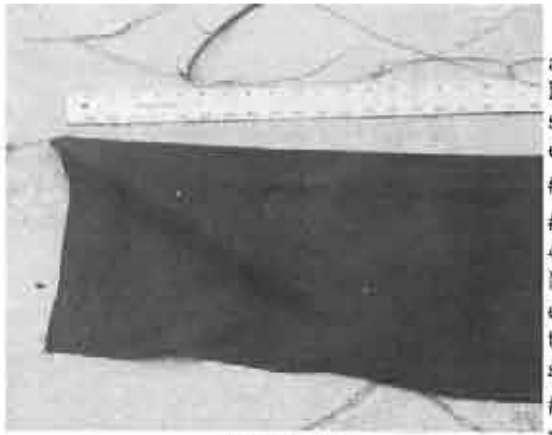


Photo 8 - Flag

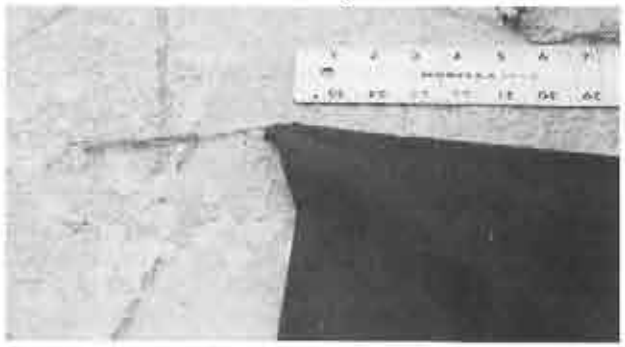


Photo 9 - Flag

Photo 10 - The "snap"

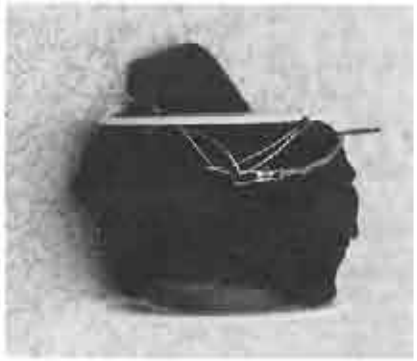


Photo 11 - Transport spool

are less apt to snag something on landing. This is only a problem in short fields with rough terrain at either end.

#5 - 100 feet of line (same as #2).

#7 - Our "flag", which is a foot by 4 feet in length (photos 6, 8, and 9). Note that the line is tied on both ends and goes through a loop in the top of the "flag" (the 4 foot side).

#8 - A snap (photo 10) which makes it very easy to change the hook-up loop if it begins to fray. 10 to 15 tows a day with 30 lb. plus gliders puts a considerable strain on this set-up. So, it needs replacing every once in a while!

Last, but not least, the towline all gets wound up on a smallish spool for transport (photo11). The flag is the last thing to go on. Holes on the side of the spool are a good way to prevent the line from becoming unwound during transport. Push the wire loop through a hole and it will stay there. It's also a convenient way to store extra wire loops. ■

Airfoil Esteem

...by Steve Pasierb
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As the SD7037 continues to dominate the current kit market, serious inroads are being made by the RG15 and other "slicker" airfoils because of their potential to range further and travel faster while still performing thermally. But is there a middle ground that gives the thermal duration flyer both low and high speed efficacy? Here are my thoughts.

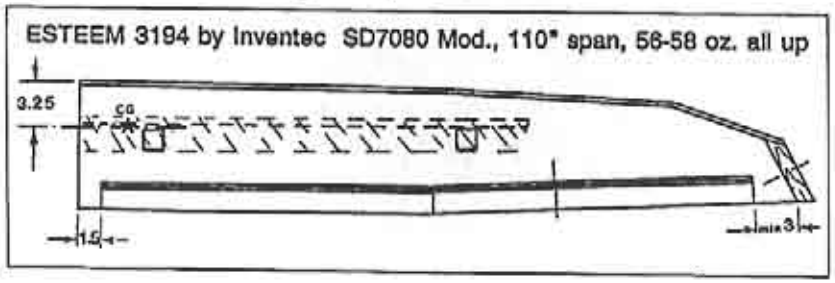
We're all in search of that airfoil which provides minimum sink, with a good speed range, and the ability to exploit the most out of every bubble of lift. Perhaps Frank Weston's blended WA001 as applied on the WACO Magic is the current best at delivering well on this combined goal. However, there is another possibility that the airfoil for which we have been searching is right under our noses. It might even be a basic slope airfoil.

Flash back to the S3021. A popular thermal airfoil as proven on such designs as early Falcons, the Pulsar and Whisper as well as many scratch builders' home designs. The S3021 was, and still is, a very popular multi-task airfoil designed to be the optimization of the Eppler 205. The Northeast Sailplane Products' Airfoil Survey describes it as having "...good low-speed performance and an excellent speed range. The stall is gentile and as the speed increases, the sink rate of a wing with this airfoil falls off gradually. These characteristics give a sailplane the ability to respond to lift well. Sailplanes with the 3021 tend to climb in lift rapidly. The drag at mid range is one of the lowest encountered in thermal sailplanes and results in a very flat glide with good penetration at higher speeds." All qualities we'd like to see in our sought-after airfoil.

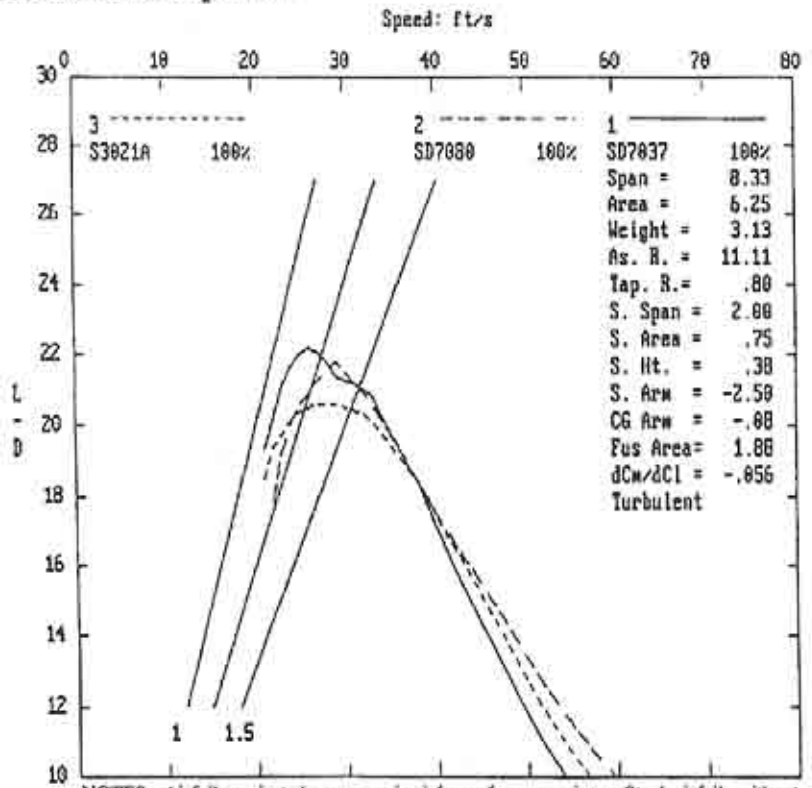
The Survey then identifies the S3021's key weakness offset by a strength. "Although its low speed, high lift performance is not quite as good as the better thermal duration airfoils such as the SD7032, its better overall speed range and mid-speed glide combine for excellent contest performance."

So, the S3021 has solid response to lift, reasonable speed range and performance at the mid-speed level. But it's not as good as the SD7032 at the low end. Okay, what about that SD7032? It performs like a tripped E214 which is good, but it needs reflex to gain speed which to me says it may give up a degree of altitude to gain speed. Not something we want. Probably why this airfoil was big, big news for awhile and was then driven off the front pages by the SD7037. (Not to say the SD7032 is not still in use in many designs including Harley Michaelis' new 140" span Genie sailplane that promises to be a world-beater.)

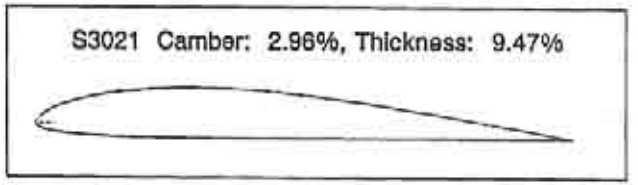
The SD7037's great sink rate and low drag, which yields high efficiency in low-speed thermaling, have made it the current favorite. It starts out faster than the SD7032 so we need not worry as much

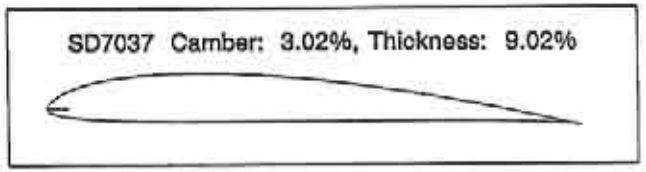


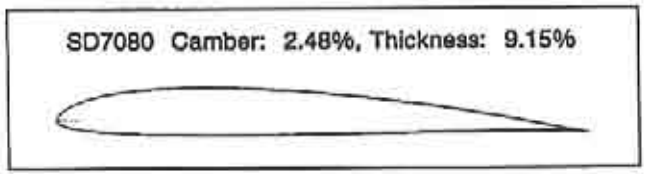
Stock Airfoil Comparison



NOTES: Airfoils projected on a generic airframe for comparison. Stock airfoils without modification or trip indicated. Does not reflect SD7080 Mod. as utilized on the Esteem.







about applying reflex with its loss of L/D performance. It also looks like a trip at 30 percent of cord may help. But best of all, the SD7037 benefits from the use of full span camber "droop" in thermal turns. Very basically put, camber increases lifting ability which is another of the qualities our sought-after airfoil should exhibit. The 7037 is a winner. So why isn't it the perfect airfoil?

Enter the SD7080. If you own an early Sparrow sloper, you know this airfoil. The Sparrow flies as well slowly as it does fast. Perhaps that is why it is so popular with beginners, yet advanced guys still may keep one around. Push the nose over and it gains speed nicely without giving up altitude. Slow it down and it's an absolute pussycat.

The Survey describes the SD7080 as follows, "The SD7080 is similar to the SD3021 but with thinner lower camber, the lift range is shifted downward. Therefore the SD7080 will not develop as much lift as the SD3021, but at higher speeds it will produce less drag. Beyond this, at low angles of attack the drag is quite low, which means excellent wind penetration."

The description continues, "Translated to flying, the SD7080 has a wide speed range and yet produces a fair amount of lift compared to more symmetrical slope airfoils. Used with a low drag planform and an airframe with reasonable light wing loading, it produces a sailplane that will thermal in light lift on the slope, penetrate in higher winds, and maintain good energy retention."

These are all qualities that we would like to add to our thermal airfoil. The SD7080's similarity to the SD7032, solid wind penetration, lift and energy retention are all good qualities, especially in a contest environment where long downwind searches often occur.

Now here comes the pitch. Sit still and consider the qualities we want and those I have just detailed before you burst out in laughter. Ready? Why not fly the SD7080 with full trailing edge camber? It could be used at a thickness the same as the SD7037 and what it lacks in camber can be made up with trailing edge droop. With 1/16" camber dialed in, the SD7080 looks nearly identical to the SD7037. Take out the camber and it should move forward like it's under power, all without giving up altitude because of its L/D capability. It might even benefit from a trip just like the 7037, but my understanding is that no hard trip data exists for the 7080. So, will it thermal? Yes. Will it travel with speed? Yes again. Does it have good L/D performance? Yes, with the camber dialed in. But is it a really a thermal airfoil? Why the heck not? Is any of this my idea? No.

Recalling the earlier mention of needing a "low-drag planform and light wing loading", our new darling airfoil, the SD7080 Mod., would have to be realized on a thermal sailplane of about 60-62 oz. with 900+ sq. in. of wing area. Perhaps it would also be a good idea to get the horizontal stab up out of the way by mounting it high or in a "T" format. Then fly the sucker and see if you're right.

Actually, you don't need to try it because someone already has. The model is called the "Esteem 3194" and it is the brainchild of an imaginative shop outside of Philadelphia called Inventec. Designed by Mike Popescu, it sports a 100" span modified SD7080 9% wing (triple taper LE, double taper TE) and delivers the needed under 60 oz. all up weight and 900 sq. in. in area. It features a serious 1/2" diameter carbon fiber spar linked by an aluminum rod or an optional titanium rod. The manufacturer promised ardent zooms and 600'+ launches as the rule. He wasn't lying! Punch a hole in the cloud of your choice. An F3B tow hook is also provided.

The trailing and leading edges sweep in at the aileron break and the computer-generated tip configuration is part of the reason why it can also fly so well slowly. It just doesn't want to tip stall. Overall it is definitely a very "different" looking ship — which it to say it is sleek and beautiful. It also sports a large T-tail.

Possible drawbacks include the 110" span which is a bit shorter that the current trend of 118" to 122" giving up 50-70 sq. in. A 122" wing option should be available soon which will eliminate this issue and provide the builder an alternative. Current flap area is about 20 percent of cord, and a 25 percent option will also be available. On these more aggressive versions, a keel, skeg or dolphin fin — whatever you want to call it — on the bottom of the fuselage keeps the flaps up off the ground and out of harm's way.

Next, there is the technically sensible but largely unproven airfoil. When charting the L/D performance of the 7037, 7080, 7032, 3021 with a computer airfoil program, the stock SD7080 shows a drop off in performance at max L/D (a sharp peak as opposed to a gentle curve). However, in practical application, the modified 7080 flies great! The Esteem has a superb speed range and thermals like a fiend. With 1/16" full TE camber dialed in, it slows nicely and climbs very well in lift. In limited contest use, I have entered thermals below the competition and out climbed them all — flying a swifter circle.

The Esteem is a somewhat rougher kit than those by Tekoa, Airtronics and Culpepper that have helped raise the industry standard, but overall produces a solid final result. There is no kevlar in the original fuselage design, however the fuse is designed (via a perfectly round cross-section) to bend and flex on landings rather than be rigid, resulting in a crack. So far, this has proven to be true. Daryl Perkins produced the "soft" fuselages for Inventec and they are absolutely beautiful with a scant few pin holes. Inventec now offers a "hard" option fuselage loaded with kevlar that might also make a good baseball bat between flying sessions.

There were no significant surprises during the construction process. Horizontal stab incidence did take a bit of refinement. The only complaint, which is minor, would be that very open grain sheeting was used. The final result, however, was extremely acceptable. I understand that the sheeting quality has taken a quantum leap forward on newer wings. Otherwise, it builds like the rest of the current gaggle of kits on the market. It certainly looks "right" with its triple/double taper and slick fuse. The net result is a gorgeous model on the ground that performs equally well in the air and at the landing tape.

So far personal experience and reports from the field say that Esteem delivers on the promise. Flown with the 1/16" camber it's as gentile and capable as the best of the SD7037 flock, yet still holds the trump card of agility and speed permitting extensive thermal searches and quick trips back home from far downwind with very little altitude loss.

One thing is certain, the standard is continually raised as more and more dedicated people create more and more ingenious designs — like Esteem. As airfoil research continues and Dr. Selig gears up for another run of low-speed wind tunnel tests, the future is bright.

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Frank Weston, Weston Aerodesign, 944 Placid Court, Arnold, MD 21012, 410/974-0968

Harley Michaelis, 26 S. Rosevelt, Walla Walla, WA 99362, 505/529-2562

Northeast Sailplane Products, 16 Kirby Lane, Williston, VT 05495, 802/658-9482

Daryl Perkins, 4234 Petaluma Boulevard, North Petaluma, CA 94952 ■

I Need a Timer! Take II

...by Pancho Morris
Mesquite, Texas

Over the years, I have seen something happen at contests that has always baffled me. When it is done by newcomers to contest flying, I have understood that it was due to the fact that they do not yet know how the system works. It has baffled me when I have seen seasoned contest fliers do it. I have seen several fliers do this over the years and several of them have had MANY years of contest flying experience.

Here's the scenario. The flier will get his airplane and go out to the winch line and wait to fly. As he is next in line, or stepping up to get the line, he begins to call out, "Timer, I need a timer!" If nothing happens, he will often start to yell, "What do I have to do to get a timer around here?"

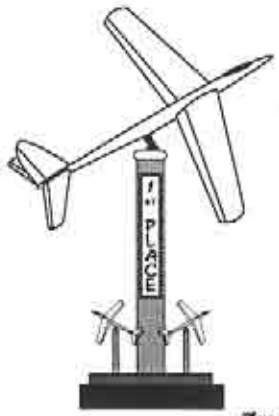
It is not the contest director's job to provide each flier with a timer. It is not the host club's duty to assign timers. It is the responsibility of each flier to arrange for a timer. The time to do this is not while you are hooking the winch line to your plane. This should be done between flights, before you pick up your plane to go to the winch queue. Many people have certain people who they like to have time for them. They will usually time for each other during the contest. At some contests, they require you to use a different timer for each flight.

Another one of the timer's duties is to be aware of what is happening during the landing. At times, during a contest, the landing area can become very active and crowded no matter how many tapes are out. If you have a period when there is down air all over, many planes will all be coming in at the same time. The timer should help make the flier and the other fliers and their timers aware of the situation, and the timers should be prepared to mark the landing and get the plane out of the landing area as quickly as possible. The landing should be measured after the traffic has cleared. This is a problem that usually cannot be avoided and is just part of contest flying. It is unfortunate to see planes damaged and landings missed because the timers were not on top of the situation and the fliers panicked when they shouldn't have. Flying contests is a team effort and we have to work together. ■

Pancho Morris is the Vice President of the Soaring League of North Texas (SLNT) and the owner of a hobby shop called The Hobby Counter which is located at 1909 Greenville Avenue, Dallas, Texas 75206. He can be reached at (214) 823-0208 during the work day.

We appreciate the fact that Pancho has been sending in his hints and tips to share with *RCSD* readers over the years. Most of his writings and more appear in *Update*, the newsletter of the SLNT which is currently edited by Gary Warner of Richardson, Texas.

Recently, we noted with interest an article called "Hand Launch Update" written by Bud Black that appeared in *Update*. Pancho was listed as flying a "Sorta Gnome". What sorta question should one ask to find out about a Sorta Gnome? *Ed.* ■



ZIKA

The F3B Scene in New Zealand

...by David Griffin
Christchurch, New Zealand

This is a story that I have been meaning to write for some months. The events of the last weekend have finally pushed me to the computer to write it!! Before I tell you what happened last weekend, let me briefly fill you in on the F3B scene in New Zealand over the last few years.

Four years ago, F3B was already popular, but very few people had done a speed run under 30 seconds or flown more than 17 laps. A friend came 5th at the Nationals flying a Spirit (highly strengthened); few models were "F3B style". Over the last few years, we have made major improvements with most competitors flying "F3B style" models, with most fliers posting distance scores in the high teens/early 20s. A new special record was set last year of 20.99 seconds, and most of the top 15 or so competitors were capable of speed times around 24 - 29 seconds.

In April, this year, we invited Joe Wurts down to compete in our Soaring Champs and to give a series of lectures on thermals and thermaling, F3B, radio set up, and construction. Joe also introduced us to slope combat (...Although we did have to take Joe and Jan aside at one stage to explain that... well, er... in New Zealand, "bonking" was something that not only slope combat models do!!)

From Joe we learned many of the tricks of the trade for F3B. I think many of us were skeptical of Joe's ability to thermal as well in our skies after the whopper thermals we hear about in California. The truth is that there are thermals out there all the time. You just have to learn to find them and ride them for all they are worth. Something that impressed all of us was that all of the ideas and methods that Joe talked about he actually did in the air the next day: 2 x 17 sec. speed runs, 23 & 24 laps. In the same air, we would manage 16 sky high launches; on the same winch, I could only manage about 70% of the height that Joe got!!

In two weeks, we learned what evolution would have taken us years. We learned about maximizing launch height, reading the air, exploring large acres of sky in search of lift, and how to use height efficiently, and to anticipate turns during distance and speed runs. (Even during the distance task, it was pretty amazing to see Joe turn 90 degrees and head 200 metres off course in search of lift during a 24 lap distance flight.)

Joe commented that most of our models (mainly home grown) could fly a 17 second speed run, fly 24 or more laps, and all we really need is PRACTICE, PRACTICE, and more PRACTICE!!!!

Since then, almost all 80 soarers who listened and watched Joe, report major improvements in their flying from slope to thermal and F3B.

So, what happened last weekend? Well, 15 enthusiasts flew F3B in Auckland. Our duration, landing, and distance performances were all greatly improved. In speed, not one, but five competitors broke the old record with times between 20.7 and 18.4; four were less than the psychological 20 second barrier. The fastest time was the last flown in the speed round. There was great jubilation amongst all fliers and helpers. In fact, if the contest had ended then, I think no one would have cared!! We'd finally done it.

From here, there is still much improvement to be made, but F3B in New Zealand is coming of age. One day it will be worth going to the World Championships.

Thanks, Joe. ■

Group photo. Total of 34 entries although not everyone is in the photo.

(L - R) Novice winners: Joe Byrd, Kelvin Hooi

Seventh Annual NASF Fall Soar Hosted by the North Alabama Silent Flyers (NASF)

...by Ron Swinehart
Huntsville, Alabama

The above contest was held in Huntsville, Alabama on 27 August under clear skies with near perfect soaring conditions. Temperatures reached near 90 by mid day, with the breeze being light and variable. Thirty four contestants from Memphis, Nashville, Tullahoma, Oak Ridge, Birmingham, and Huntsville made this a very enjoyable contest for all. Gallon Williams came all the way from South Carolina to fly with us. The contest format was the same as that used during the 2nd Mid South Soaring Champs: five rounds of percussion duration consisting of rounds of 3, 5, 7, 9, & 11 minute duration, flown in any order. Each flight was worth 900 points with landings being worth an additional 100 points based on the results as measured by a graduated 25 foot tape.

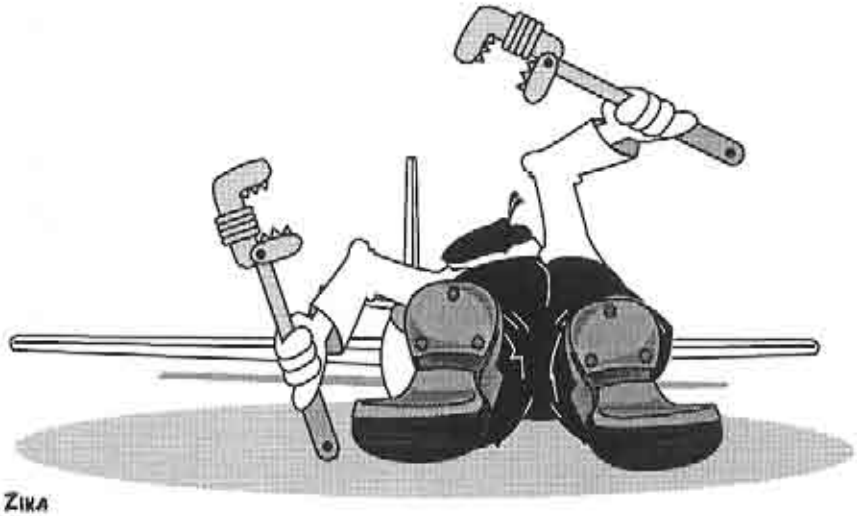
Competition has gotten tough at our club, Tullahoma, and at Memphis with the likes of Bob Sowder, RoyceSalom (both LSF Level V's), in addition to Kendall McDonald and Tom Towery of Tullahoma. At Least six of our club members (NASF) are working on Level V, with nearly every one having at least one win. Cliff Smith has completed all of the required three wins, one of which includes last year's MSSC's win on Saturday over 98 flyers. Now to make matters worse, Brian Smith, formally of Ohio and last years second place winner at the MSSC's has retired and moved to Tullahoma.

(L - R) Sprotsman class winners: Ben Cleveland, David Godfrey, Bruce Lewis

Cliff Smith shows good landing form with his aileron equipped SAGITTA.

(L - R) Expert class winners: Russ Behr Cliff Smith, Bob Sowder, Rob Glover

We gave out ten plaques (5 Expert, 3 Sportsman, & 2 Novice), all identical, except for the wording, which were solid walnut with a very nice lazer cut, hand painted eagle in full flare, signed by the artist. These were obtained from Jennings Products of Hendersonville, TN. ■



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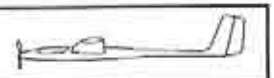

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evenings after 7:00 PST

Follow Through in the Throw

I've been throwing hand launch for long enough that I stopped thinking about it. I've gotten used to throwing with my elbow locked straight to prevent further damage to my shoulder; aside from that I haven't paid much attention to how I throw. Coincidentally, I've resigned myself that I'll never be a gorilla arm, and that the only way I'll really be competitive in a contest is if I have someone who has such an arm throw for me.

About two weeks ago I was throwing as usual. For some reason, I decided to pay attention to what my wrist and hand were doing during the throw. Surprise! Not much. I then decided to flip my wrist at the top to impart more energy and see what it did for my launch height. To my surprise, there was substantial improvement. Hmm. What if I put some concentration into the throwing finger, also. There was more noticeable improvement.

I've been told by gorilla arms that great launch height is much more technique than strength. I believed them then. I really believe them now.

I'm going to work on using my body to twist around during the throw to gain even more advantage. What I've also discovered is that, just because you "will" your body to do something doesn't necessarily mean that it will do just what you want very well. But practice helps. As one thing you are practicing to do well becomes automatic, you have opportunity to concentrate on another.

Riddle

A handlaunch plane with rudder/elevator controls and polyhedral wing is thrown with such force that the fin falls off during the throw. What will the glider do? What should the pilot do? What will the pilot probably do?

I invite you to write or call me with plausible answers. The "best" answers will be published in the January issue. ■

Reasons Given Not to Launch During a Down Air Cycle and Methods of Sandbagging

...by Bill Miller, Cal Posthuma, and Manny Tau from the RC Soaring section of MODELNET on Compuserve
...edited by Lee Murray
Appleton, Wisconsin

1. I was in the outhouse and didn't hear my name called. Optionally: I heard my name called, but I was in the outhouse.
2. Give me a minute, my elevator clevis is loose.
3. I forgot my sunglasses. I'll be back in a minute.
4. I'm getting some interference here, let me check the radios in impound.
5. I'm ready, but I can't find my timer.
6. Wait a minute. My timer's watch isn't working. Followed by: Yeah!, I see the birds. I'm ready to launch.
7. I lost my computer program on the transmitter. Optionally: I think my rubber ducky lost the computer program on my tx.
8. My flaps need adjusting.
9. My spoilers are not even. I need to adjust.
10. I was in my car listening for a weather report.
11. Hey! I'm assessing the air.
12. Discuss a technical point with a bystander while holding your frequency pin.
13. Hold the frequency pin and look at your notes as to when the next cycle should arrive.
14. I have to patch a hole in the Monokote that just came to your attention.
15. The Shuffle Method: Slowly walk up to the winch, then set the glider down, then set the tx down, then walk to the winch line, then walk back with the winch line... or get it from the winch operator, then pick up the glider, then attach the tow-ring, then bend over and pick up the tx, then get into the launch stance, then wiggle the sticks, then look up and around for traffic, then call out "launching", then launch... all of this with focus and methodical deliberation.
16. Go to the winch with the longest waiting line.
17. Go to a broken winch first.
18. Change waiting lines frequently.
19. Encourage newcomers to go first.

■

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Visiblity

...by George G. Siposs
Costa Mesa, California

Your plane is up, far away, it is circling and then... You lose sight of it! A few harrowing moments later it reappears but, from then on, you keep puckering because you're never sure when you'll lose it again. Many beautiful models are finished all-white or light blue and they look great on the ground but, against the sky or a cloud, they can be lost very easily.

A lot has been written about colors, color combinations and visibility at great distances. I have made an extensive study and found that, yes, some colors can be seen from father away, but eventually they all become black. Even a black object against a blue sky can be lost if you're not careful. So what do you do?

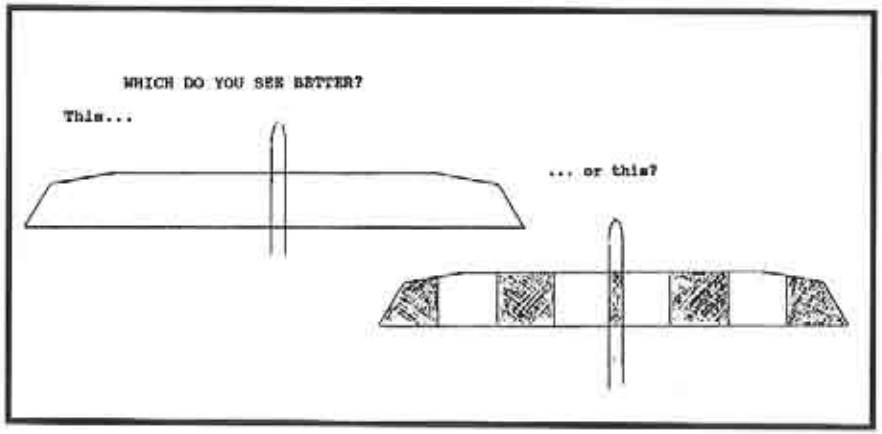
After repairing some models with non-matching covering, I noticed that the models were now highly visible. Tettered models can be seen much better! Upon further study I found the reason why large objects on land (e.g., water towers, structures, etc.) are painted alternately red and white. It is not the red that counts, it is that they are striped that makes them stand out.

If you want a highly visible plane do the following:

Alternately paint (or cover with mylar of appropriate color) the underside of the wing so that there is a one-foot wide black stripe alternating with one-foot wide light colored stripe. On an 8-foot model I paint the underside of the wingtip black for a distance of one foot. Next to it is a one-foot wide white strip and then a black strip and so on. The underside of the fuselage where the wing sits should also be black to carry on the scheme. Red or dark blue will also do, at a distance it doesn't matter, it's the striping that is highly visible. On old models where the Monokote is semi-transparent, the dark stripes are especially visible against the sky. You'll be surprised.

It is also a good idea to put a 1 inch-wide metallic stripe on the leading edge of the wing and vertical fin (1/2-inch on each side). As the plane turns, the metallic paint emits a flash of light and gives you an indicartion where the plane is, but it is not as effective as the continuous visibility of a striped wing.

The upper surface of the wing can be painted or covered to display your artistic ability. That's what your friends will be admiring when the plane sits on the ground. But when in the air, wide stripes, on the underside, are best. ■



Getting R/C Soaring Digest Index from Compuserve

...by Lee Murray
Appleton, Wisconsin

Assuming you are a Compuserve subscriber, regular or trial member, you can use this procedure. The Compuserve Information Manager makes it very easy to use these days. Go to MODELNET (outside of the basic services), click on the Library pull down menu to the Search Option. This opens a window which has several fields you can put something into to see the options which meet your criterion. To find the listing for *R/C Soaring Digest* you can enter the file name into the title (RCSD84.*) to shown RCSD84.ZIP which is a compressed file with the title "Index of RCSD for '84-'93". You can also put "Index" into the "Keywords" field to come up with this and other magazine indices. This is a 105K binary file. Select the option to download the file. This will take about 20 minutes with a 2400 baud modem. You will need to decompress the file using PKUNZIP or one of the several products by PK Software. PKUNZIP is available from a number of sources as shareware. PKZIP and PKUNZIP are also is in the library of files you can download from Compuserve.

As an alternative, you may order the index from Lee Murray, 1300 Bay Ridge Rd., Appleton, WI 54915 for $10 on our choice of 3.5" or 5.25" floppy discs. The index can be provided in a number of formats including:

- ASCII format
- Word Perfect Version 5.1 format
- SuperWorks database file complete with a demo version of SuperWorks which will read and display the items in the database using the "Find" or "Record Selection" commands which will find a word or phrase anywhere in the database. On line helps make this a snap to use. SuperWorks is an IBM DOS version of Appleworks. An example of a search for articles in 1993 and 1994 containing information about winches using SuperWorks gives:

File: RCSD9394
Page 1
Report: Summary
Selection: Key Words contains WINCH

Vol: 10 No: 1 Jan-0-93 Pg: 54
Contributor: Nicholson, Brian
Key Words: Launching, Winch
Stationary bike conversion stand for standard bike provided a way to make Brian's bike a human powered launching machine. Gorilla launch you say!

Vol: 10 No: 10 Oct-0-93 Pg: 42
Contributor: Kuhlman, B^2
Key Words: Launching, Winch, Batteries
Deep cycle batteries are better suited. New Die-Hard models provide visual indicators of charge and electrolyte level. Old batteries require more H^2O.

Vol: 10 No: 11 Nov-0-93 Pg: 48
Contributor: Boyd, Doug
Key Words: Product Release, Winch
Special bearings and brush holders for Ford long shaft motors. These provide cooler running, low friction and longer life. $98 503-692-0363

Vol: 11 No: 5 May-94 Pg: 15
Contributor: Jones, Gordon
Key Words: Winch, launching, Construction
A cart is shown which holds the winch, battery and some other essentials. It is fashioned after F3b designs.

Vol: 11 No: 8 Aug-94 Pg: 42
Contributor: Condon, David
Key Words: Launching, Winch
Elevating winch and turn around reduced line breaks and made contests run smoothly. Turn around designs must handle line being dropped past it. ■

NEW PRODUCTS

The information in this column has been derived from manufacturers press releases or other material submitted by a manufacturer about their product. The appearance of any product in this column does not constitute an endorsement of the product by the *R/C Soaring Digest*.

ESTEEM 122 EL

...from Inventec Corporation

The basic ESTEEM 122 inch wingspan is now available in an electric sailplane version. Esteem 122 EL is fit with a 200 watt electric motor, and has a gear reduction of 3.5 to 1. Using 10 cells of 1000mah and a folding propeller 11/7, the plane is capable of climb rates of up to 800 feet per minute. This combination allows the plane to remain below the weight standard in its class; the wing loading is 9.2 oz./sq. ft. Tested through the summer of 1994, Mike Popescue, the designer and an executive with Inventec Corporation says, "The Esteem 122 EL is a great sailplane that can be towed high enough to meet with the thermals." Kits are available for immediate delivery. Conversion back to summer "pure sailplane mode" instruction is included. Most complete kit policy applies. For more information, please call Slegers International at (201) 366-0880 or Inventec Corporation at (215) 953-1736. ■

Cannon Radio Control

...from Sky Bench Aerotech

Sky Bench Aerotech has become the dealer for Cannon Radio Control, the world's smallest R/C systems. The onboard flight pack weighs 1.83 oz. (51.9 gr.) consisting of a .52 oz., 2 channel Rx, two CE-9D servos (.35 oz. each), 50mah flight battery with switch and charge jack attached. This system is perfect for handlaunch gliders, thin wings with ailerons, and electric models. Many other applications become possible such as R/C assist free flight, rubber free flight, out doors and indoors, wherever weight savings is at a premium.

The CE-9D servo is the world's smallest servo (29/64x31/32x1-3/32") and has 24 oz. in. torque rating. 100 degree transit time is 0.4 sec. Static drain is 6ma. 150 degree servos (CE-9DRT) are available for longer throw applications.

The MICRO-ELITE System can be purchased as a full system including the Tx, dual charger, Rx (2 to 5 channels), and choice of flight battery with switch and charging jack attached (50, 110, 270mah), or as a flight pack only (everything but the charger and Tx). Both packages utilize AM (amplitude-modulation) modes, only. The airborne systems can be used with other brand Tx's. The transmitter is extremely rugged; small size and light weight makes it perfect for flying HL gliders. Transmitter control sticks are the new Dunham "Soft-Touch" controls, open gimbals designed to give optimum "feel" and best control response. Standard features are servo reversing on all channels and servo end point adjustments. Options are dual rate with desired throw adjustments and circuit mixing. The receiver antenna is only 24" long for easy installation in small models.

Currently, there is a backlog of orders approximately six weeks long. Cannon Radio Control has been in business since 1953 and has enjoyed a fine reputation for personalized R/C equipment. Sky Bench Aerotech is marketing these products at discount prices. Write for a free catalog.

Sky Bench Aerotech, 58030 Cyrenus Ln., Washington, MI 48094; (810) 781-7018. ■

BAe Hawk

...from TLAR Enterprizes

The BAe Hawk, used by the Navy and better known in the U.S. as the T-45 Goshawk is the first Power Scale Slope kit produced by TLAR Enterprizes. Designed for the prevalent pilot and the slope environment, the Hawk flies well in a broad range of lift conditions and doesn't require time consuming repairs with each landing. Requiring a minimum amount of time to construct, it tracks well and has good energy retention. With the necessary materials and hardware, the kit includes a fiberglass fuselage, CAD drawings, foam core wings and stabs, and Obechi sheeting. Adhesives, paint, covering and radio equipment are the only items needed to complete.

1/12 scale provides good visibility and a size that is launchable by the pilot. Wing and stab area were increased to allow flying in lighter lift conditions, while the leading and trailing edge sweeps depict the full scale. Full size servos, that keep cost down, may be used in the wings for spoileron/flaperon control as shown in the drawings.

The fiberglass fuselage provides scale appearance, minimum drag and maximum durability. Two openings provide access for radio and control system installation and increase durability. A large faired-in flange to cradle the wing and absorb loads is one of the openings, the exhaust outlet is the other. Air intakes and the canopy outline are molded and faired-in to minimize drag and further enhance structural integrity. Forethought in fitting and finishing will assist the builder in accuracy and speed of construction. For example, plywood wing mounts and lite ply stab bearings are bonded during the lay-up process. Pre-bent and machined wires allow quick removal of stabs for transporting or storing. Two nylon screws remove the wing.

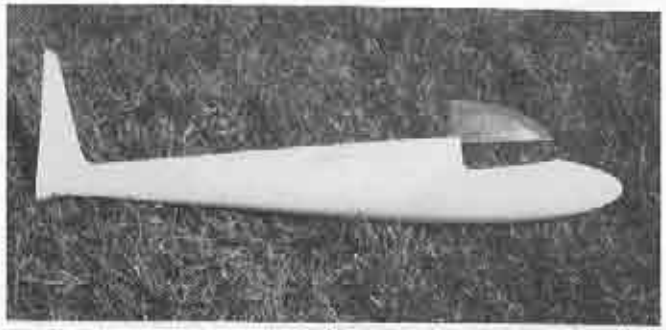
Specifications: Wing span - 47.5", Wing area - 336 sq. in., Weight - 35 oz.±. The price is $120.00 plus shipping. TLAR Enterprizes, 14221 45th Pl. W., Lynnwood, WA 98037; (206) 743-9358 PST. ■

KP-SOAR

...from SCANLOGIC

KP-SOAR, connected to an unusual channel between the Rx and battery, reports battery voltage by rudder deflection and beeps when you flip a switch on the Tx. If the voltage is high, the plane turns right, or left, if low. When the voltage is dangerously low, the KP-SOAR automatically swings the rudder for your attention. Regardless of the altitude, this ultimate monitor gives you the updated Rx battery conditions. Other features include: clear frequency indicator, lost plane siren, servo jam warning, Tx-off-Rx-on warning, 4 or 5 cell Rx pack operation, PCM/FM/AM operation and auxiliary battery connector. The cost is $49.99 + $4.00 S&H.

SCANLOGIC, 1933 O'Toole Ave., Suite A202, San Jose, CA 95131; phone (408) 943-1238, FAX (408) 943-1808. ■



Ka-6c

ASK-21

Ka-6e 2m & ASK-21
2m Fuselages
...from ICARE Sailplanes

ICARE Sailplanes is pleased to offer two new scale fuselages for the scratch builder.

The original full size Ka-6e was produced in the early seventies, and proved to be one of the most popular Standard Class Sailplanes. The offered reproduction will span 2m (80"). The fuselage length is 36", and the wing fairings carry the NACA 6409 airfoil, which is a high cambered, slow flying airfoil.

The original full size ASK-21 is a T-tail, two seater performance glider for instruction, training, aerobatics, and cloud flying. It is still in production. The reproduction features a 2m (80") span. The fuselage length is 39", and the wing fairings are carrying a Ritz airfoil which provides the versatile flying ability of its big brother.

The fuselages are white gelcoated and made from fiberglass reinforced epoxy. The price includes a clear canopy and a three view drawing. Building plans are available on request. The price for either the Ka-6e or the ASK-21 is: US$80.00 + US$10.00 S&H.

For more information about our products, send a SASE or $1.00 to: ICARE Sailplanes, Etienne Dorig, 381 Joseph-Huet, Boucherville, Qc J4B 2C5, Canada; (514) 449-9094 EST. ■

Schedule of Special Events

Date	Event	Location	Contact
Oct. 8-9	TPG Flaa Speed Festival	Torrey Pines, CA	Erik Larson, (619) 793-7640
Oct. 8-9	2m - Unl	W. Palm Beach, FL	J. Wilson
Oct. 9	SASS Novice Classic	Seattle, WA	Sherman Knight, (206) 455-2345
Oct. 9	1.5M Hi-Start Contest	Washington, MI	Ray Hayes, (810) 781-7018
Oct. 8-9	S.O.A.R. Fun Fly	Plainfield, IL	Stan Watson, (708) 448-6371
Oct. 15	1.5M Hi-Start Contest	Washington, MI	Ray Hayes, (810) 781-7018
Oct. 15-16	Last Fling of Summer	Tulsa, OK	Perry Gilstrap, (918) 455-1203
Oct. 22-23	2m - Unl	Morriston, FL	Bob Wargo, (813) 938-6582
Oct. 23	S.O.A.R. Contest	Illinois	Wayne Fredette, (708) 532-3904
Oct. 29-30	World HL Jamboree	Poway, CA	Steve Strickland, (619) 741-1037
Nov. 6	S.O.A.R. Turkey Shoot	Illinois	Tom Blood, (708) 377-8641
Nov. 25-27	Tangerine	Orlando, FL	Ed White, (407) 321-1863
Dec. 3	Hand Launch	Poway, CA	Bill West, (619) 222-5296
Dec. 10-11	Winter Soaring Festival	Indio, CA	Buzz Waltz, (619) 327-1775
1995			
Jan 13-15	18th Annual IMS	Pasadena, CA	Anita Northrop, (702) 896-2162
Feb. 5-6	Southwest Winter Soaring	Gilbert, AZ	Iain Glithero, (602) 839-1733
June 15-18	Mid-South Champs	Huntsville, AL	Ron Swinehart, (205) 883-7831
	(International Contact)		Tom Ernst, (901) 767-9518
1998	World Soaring Jamboree		

If there are contests missing from this schedule, that you feel should be added, please ask the CD or a spokesman to let us know via phone, FAX, or a quick note.

MSSC

The Memphis Area Soaring Society and the North Alabama Silent Flyers co-host a yearly event called The Mid-South Soaring Championships (MSSC) which alternates between Huntsville, Alabama and Memphis, Tennessee. In 1994, the 3rd annual MSSC event was 4 days, and included Cross Country, Hand-Launch, and Unlimited Sailplane for 100 contestants of all experience levels. In 1995, this event is scheduled for June 15 - 18, and will be held in Huntsville, Alabama.

June 15 - Cross Country
June 16 - Cross Country
June 16 - Handlaunch
June 17 - Thermal Duration
June 18 - Thermal Duration

They are extending an invitation to anyone who reads this to come fly with them and join in the fun.

For additional information on this event, the International Coordinator is Tom Ernst, 507 South Yates Road, Memphis, Tennessee 38120 U.S.A. His phone numbers are: 901-767-9518 (home), 901-572-3060 (work), 901- 575-6249 (pager), and 901-572-5102 (FAX).

Ron Swinehart's home phone is (205) 883-7831 and his work number is (205) 722-4311. ■

R/C Soaring Resources

The contacts listed here have volunteered to answer questions on soaring sites or contests in their area.

Contacts & Soaring Groups

Arizona - Central Arizona Soaring League, Iain Glithero, (602) 839-1733.

Arizona - Southern Arizona Glider Enthusiasts, Bill Melcher (contact), 14260 N. Silwind Way, Tucson, AZ 85737; (602) 325-2729. SAGE welcomes all level of flyers!

California - California Slope Racers, John Dvorak, 1063 Glen Echo Ave., San Jose, CA 95125; (408) 259-4205.

California - Northern California Soaring League, Mike Clancy (President), 2018 El Dorado Ct, Novato, CA 94947; (415) 897-2917.

California - Desert Union of Sailplane Thermalists, Buzz Waltz, 3390 Paseo Barbara RD, Palm Springs, CA 92262; (619) 327-1775.

Canada - Southern Ontario Glider Group, "Wings" Program, dedicated instructors, Fred Freeman, (416) 627-9090, or David Woodhouse (519) 821-4346.

England (BARCS & Europe), Jack Sile (Editor), 21 Bures Close, Stowmarket, Suffolk, IP14 2PL, England; Tele. # 0449-675190.

Florida - Florida Soaring Society, Ray Alonzo (President), 3903 Blue Maidencane Pl., Valrico, FL 33594; (813) 654-3075 H, (813) 681-1122 W.

Georgia - North Atlanta Soaring Association, Tim Foster, (404) 978-9498 or Tom Long, (404) 449-1968 (anytime).

Illinois (South & Southwest) - Silent Order of Aeromodeling by Radio (S.O.A.R.), Jim McIntyre (contact), 23546 W. Fern St., Plainfield, IL 60544-2324; (815) 436-2744.

Illinois (North & Northwest) - S.O.A.R., Bill Christian (contact), 1604 N. Chestnut Ave., Arlington Heights, IL 60004; (708) 259-4617.

Iowa - Eastern Iowa Soaring Society (Iowa, Illinois, Wisconsin, Minnesota), Bob Baker (Editor), 1408 62nd St., Des Moines, IA 50311; (515) 277-5258.

Kansas - Wichita Area Soaring Association, Pat McCleave (Contact), 11621 Nantucket, Wichita, KS 67212; (316) 721-5647.

Maine - DownEast Soaring Club (Northern New England area), Steve Savoie (Contact), RR#3 Box 569, Gorham, ME 04038; (207) 929-6639.

Maryland - Baltimore Area Soaring Society, Bill Cavanaugh (President), 1428 Park Ave., Baltimore, MD 21217; (410) 523-0778.

Michigan - Great Lakes 1.5m R/C Soaring League & "Wings" Flight Achievement Program & Instruction. Ray Hayes, 58030 Cyrenus Lane, Washington, MI 48094; (810) 781-7018.

Minnesota - Minnesota R/C Soaring Society, Tom Rent (Contact), 17540 Kodiak Ave., Lakeville, MN 55044; (612) 435-2792.

Nebraska - B.F.P.L. Slopers, Steve Loudon (contact), RR2 Box 149 E1, Lexington, NE 68850; (308) 324-3451/5139.

Nebraska - S.W.I.F.T., Christopher Knowles (contact), 12821 Jackson St., Omaha, NE 68154-2934; (402) 330-5335.

Nevada - Las Vegas Soaring Club, Jeff Burg (President), 853 Shrubbery Lane, Las Vegas, NV 89110; (702) 459-8100.

North Carolina - Wayne Parrish, (919) 362-7150.

Northwest Soaring Society (Oregon, Washington, Idaho, Montana, Alaska, British Columbia, Alberta), Roger Breedlove (Editor), 6680 S.W. Wisteria Pl, Beaverton, OR 97005; (503) 646-1695 (H) (503) 297-7691 (O).

Ohio - Dayton Area Thermal Soarers (D.A.R.T.S.), Walt Schmoll, 3513 Pobst Dr., Kettering, OH 45420, (513) 299-1758.

Oklahoma - Central Oklahoma Soaring, George Voss, (405) 692-1122.

Texas - Texas Soaring Conference (Texas, Oklahoma, New Mexico, Louisiana, Arkansas), Gordon Jones, 214 Sunflower Drive, Garland, Tx 75041; (214) 271-5334.

Utah - Intermountain Silent Flyers, Bob Harman, (801) 571-6406.. "Come Fly With Us!"

Washington - Seattle Area Soaring Society, Waid Reynolds (Editor), 12448 83rd Avenue South, Seattle, WA 98178; (206) 772-0291.

Australia - Southern Soaring League, Inc. (SSL), Mike O'Reilly, Model Flight, 42 Maple Ave., Keswick SA 5035, Australia. Phones: ISD+(08) 293-3674, ISD+(08) 297-7349, ISD+(018) 082-156 (Mobile). FAX: ISD+(08) 371-0659.

Reference Material

Still a few copies available of some issues of the printed transcripts of talks given on RC Soaring at the Previous Annual National Sailplane Symposium. Prices reduced to clear out stock. Talks were on thermal meteorology, flying techniques, hand launch, cross country, plane design, airfoil selection, vacuum bagging, plastic coverings, flying wings, etc., etc. Send SASE or call for flyer giving details. Many copies of most recent (1992) transcript left. Clubs have found them good for raffle prizes, gifts, etc. Al Scidmore, 5013 Dorsett Drive, Madison, WI 53711; (608) 271-5500.

BBS

BBS: SLOPETECH, Southern California; (714) 525-7932, 2400 - 8-N-1

BBS: South Bay Soaring Society, Northern California; (408) 281-4895, 8-N-1

Seminars & Workshops

Free instruction for beginners on construction & flight techniques, Friday & week-ends (Excl. contest days), Bob Pairman, 3274 Kathleen St., San Jose, CA 95124; (408) 377-2115.

NASSA
NORTH AMERICAN SCALE SOARING ASSOCIATION

The North American Scale Soaring Association is an organization of scale soaring enthusiasts dedicated to the furtherance and enjoyment of scale soaring in North America. Membership dues are $10.00 a year or $5.00 after August 1st, and provide for sponsorship of NASSA Scale Fun Flys & Rallies, and for the implementation of a National Scale Building and Soaring Achievement Program. Join NASSA and join a network of scale soaring enthusiasts that influence the direction of scale sailplanes in North America. Please provide your address, phone #, and AMA #, and we will send you a membership card and membership roster. A bi-monthly column keeping NASSA members up to date is included in *RCSD*, with additional information available periodically direct from NASSA. Help promote and support the continuation of scale soaring by sending $10.00 (or $5.00 after Aug. 1st) to: NASSA, P.O. Box 4267, W. Richland, WA 99352.

F3B/USA • F3F/USA
RC Sailplane Technical Journal

F3B/USA is a bi-monthly publication dedicated to the sports of F3B and F3F. The journal is intended for the beginning as well as experienced multi-task soaring enthusiast. Articles cover a wide variety of areas including: technical data issues, description of techniques, and articles written by and about the top people in the sports.

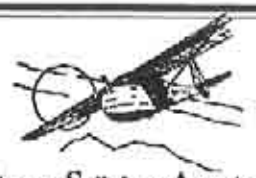
Subscription Rates: $14 per year (6 issues)
For More Info Write: F3B/USA,
87 1/2 N. Catalina, Pasadena, CA 91106

LSF

The League of Silent Flight (LSF) is an international fraternity of RC Soaring pilots who have earned the right to become members by achieving specific goals in soaring flight. There are no dues. Once you qualify for membership you are in for life.

The LSF program consists of five "Achievement Levels". These levels contain specific soaring tasks to be completed prior to advancement to the next level.

League of Silent Flight
10173 St. Joe Rd.
Ft. Wayne, IN 46835



The Vintage Sailplane Association

Soaring from the past and into the future! The VSA is dedicated to the preservation and flying of vintage and classic sailplanes. Members include modelers, historians, collectors, soaring veterans, and enthusiasts from around the world. Vintage sailplane meets are held each year. VSA publishes the quarterly BUNGEE CORD newsletter. Sample issue: $1.00. Membership is $15.00 per year. For more information, write to the:

Vintage Sailplane Association
Route 1, Box 239
Lovettsville, VA 22080

T.W.I.T.T.

(The Wing Is The Thing)

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. Full information package including one back issue of newsletter is $2.50 US ($3.00 foreign). Subscription rates are $18.00 (US) or $22.00 (Foreign) per year for twelve issues.

T.W.I.T.T., P.O. Box 20430
El Cajon, CA 92021

You are invited to join the
NATIONAL SOARING SOCIETY

• OFFICIAL AMA SOARING "SPECIAL INTEREST GROUP" • YEARLY NSS "SOAR-IN" TOURNAMENTS • NATION'WIDE "EXCELLENCE AWARDS PROGRAM" • EXCELLENT BI-MONTHLY NEWSLETTER • NSS FULLY SUPPORTS THE F3B SOARING TEAM & LSF SOARING PROGRAM • NSS IS INVOLVED IN THE ORGANIZATION AND OVERSEEING OF THE SOARING PORTION OF AMA NATS (INCLUDING AWARDS BANQUET) • YEARLY DUES ARE $15 U.S.A. AND $20 OVERSEAS (SPECIAL FAMILY RATES) • NSS OFFICERS ARE FROM ALL 11 DISTRICTS

For Info., Contact NSS Secretary/Treasurer
Robert Massmann
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Understanding Sailplanes

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Elementary Stressing Part II (Part I was in August, 1994)

The steps in stressing

(1) Take the weight of everything except the wing of the model (fuselage, tail, radio, batteries, undercarriage, engine, fuel etc). If you do not know the weight, estimate it on the basis of experience with other models of similar size and the same type of construction. Leave the wing off and weigh the rest. (The wing normally supports itself in flight and does not add to the bending load on itself.) If the model is a sailplane to be launched by a powerful winch, the breaking load on the winch line may be the most important factor. It is possible (though perhaps not very likely) that a sailplane launched with a 50 kgf (490 Newtons) winch line might have to withstand this load applied to the towhook just before the line breaks.

Make sure that the same consistent unit system is used throughout. For instance, if using metric units, weights will be in kilogrammes force, distances in metres, and fractions. If using SI units, weights and all other forces will be in Newtons, pressures in Pascals or Newtons per square metre. If using British Empire units or the United States Customary System, masses in slugs, weights in pounds, distances in feet and inches.

(2) Divide the 'extra to wing' weight by half because each wing of the model carries only half the load.

(To give a numerical example, suppose the half weight extra to wing is 0.7 kgf. With the towline loaded sailplane, add half the line breaking strength.)

(3) Multiply the half weight by the length of 45% of the semi span. The result is a moment, expressed as a weight force multiplied by a distance in whatever system of units is being used. Kilogramme-metres, Newton-metres, or pound-feet, and so on. This gives a very close approximation to the **bending moment at the wing root in level flight.**

(Continuing with the example, if the span is 4 metres, the semi span is 2 metres, 45% of that is 45 ÷ 100 x 2 = 0.9 m, i.e. 90 centimetres. The moment is 90 x 0.7 = 63 kgf - cm. If the sailplane is being launched on a 50 kgf line, the moment is 90 x (25 + 0.7) = 2313 kgf - cm.)

(4) Multiply the root bending moment figure so discovered by whatever G and safety factor seems necessary. The safety factor is to allow for errors of construction, faulty materials and hidden faults of other kinds. 7 G with a safety factor of 1.5 is about right for ordinary flying. i.e., 7 x 1.5 = 10.5. If the model is fully aerobatic and is to be treated roughly, a larger G figure may be used. Do not be tempted to think that if the model will be very small and light it will be safe to use small load factors. Even a lightweight model can experience high G in steep turns (See Figure 4). The line launching case may be regarded as having a top limit already incorporated since the line will break at the maximum load. There is no point then in mutliplying this by a G factor but the safety factor of 1.5 should still be used. (Note, the wing will stall at any airspeed, if the angle of attack is too great. This in practice sets a top limit to the possible G loads, even in the most severe aerobatics.)

(In the numerical example, the BM in level flight is 63 kgf - cm, multiplied by 10.5 = 662 kgf - cm. For the line launch, 3470 kgf - cm, equivalent to 55G.)

(5) Using the factored Bending Moment figure just worked out, refer back to the three arrowheads in Figure 1: take half the root BM value at quarter span, *(in the example 331)* quarter value at half the span *(165)* and run down progressively to zero at the tip. The bending moment to be resisted at several points along the wing span has been found with sufficient accuracy for our needs.

Figure 1. A generalised bending moment diagram for simple cantilver wings.

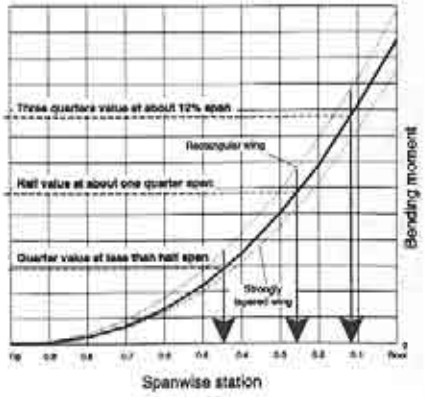
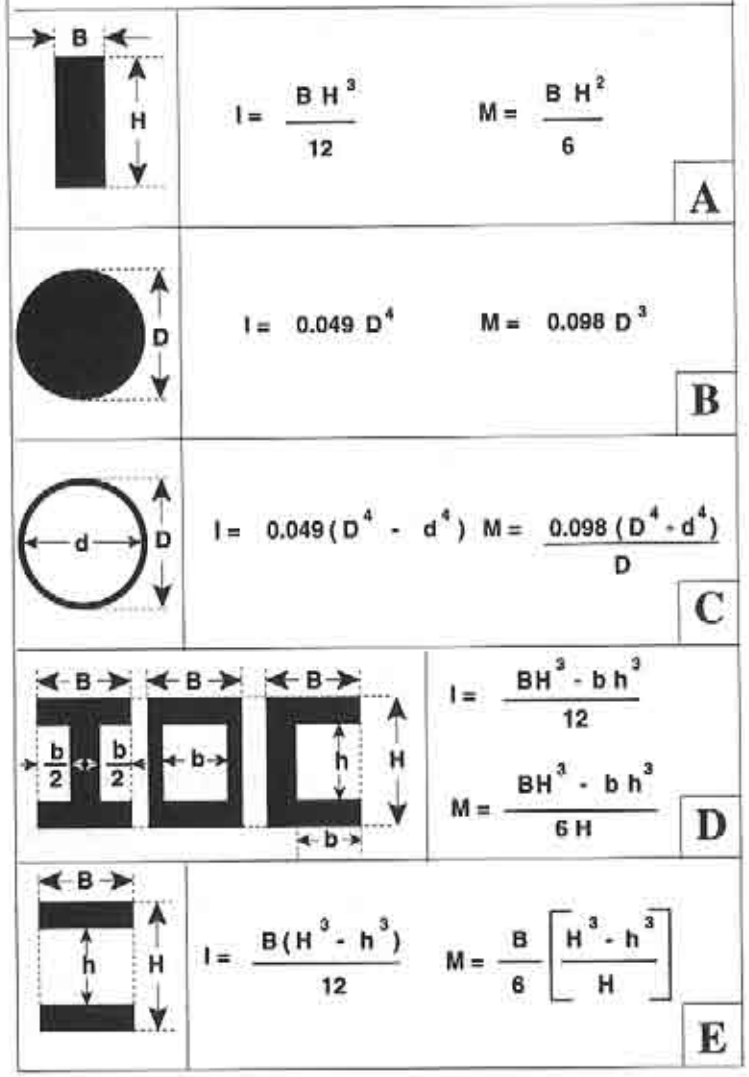


Figure 2 Resistance to bending. Section moment of inertia and section modulus



(6) Refer to Figure 2. Select your wing spar structure. Type A represents a simple rectangular spar or, more importantly, a steel strip wing joiner of the type often used for sailplanes. Type B is a simple round rod, again, likely to be used for a sailplane, and Type C is a metal tube. All the sections shown as Type D, I section, box, and C section spars are treated the

same way as far as bending is concerned. (They are not the same in torsion.)

Type E is a two flange spar without shear webs. This type of spar is not recommended as a rule but the diagram may be used to make a **very approximate** estimate of the bending strength of a foam cored, veneer skinned wing. Use judgment and experience to estimate how much of the wing skin will be involved in resisting bending loads. Conservatively, about a quarter of the chord width may be taken as dimension **B.**

Measure the depth of the foam three times, at the thickest point on the wing, at about one eighth of the chord aft of this point and about one eighth of the chord forward of it. Take the average of these three measurements and count it as **h.** Take the thickness of the skin, add twice this to **h** to arrive at **H.** (The skin is assumed the same thickness above and below the wing. With glass cloth, Kevlar™ and carbon fibre skins, make an estimate.)

(7) M stands for the section modulus and this must be found by arithmetic, using the formulae given in Figure 2. Unfortunately there is no escape from this but the work is relatively easy to do.[1]

(For example, if the spar is one of type D (the most complicated) and if B is 1 cm, H 2 cm, h 1.4 cm, and b 0.8 cm, the section modulus is found as follows:

$$M = (BH^3 - bh^3) \div 6H = [(1 \times 2 \times 2 \times 2) - (0.8 \times 1.4 \times 1.4 \times 1.4)] \div (6 \times 2)$$
$$= (8 - 2.2) \div 12$$
$$= 5.8 \div 12 = 0.48)$$

Suppose a 1.2 cm diameter steel rod wing joiner is to be used for the sailplane.. The section modulus is $M = .098 \times D^3 = 0.17$.

(8) Knowing the section modulus, now refer to the table of materials in Figure 3 to find the permissible bending strength of the material. Check that the units are consistent.[2]

(9) Multiply the section modulus found in step **(7)**, by the allowable yield stress of the material from step **(8)** Compare this result with the bending moments to be resisted, which were found in step **(4)** above. If the bending moment figure is larger than the figure just arrived at, the wing will not be strong enough. If the other way round, the spar can be reduced in weight. (Note. Depending on which reference is used, allowable strengths for materials in bending vary a good deal. If there is any doubt, with metals, consult the manufacturer. The yield stress is the figure which, if exceeded, will result in some damage to the aircraft, such as bending a wing joiner without breaking it. With timbers, it is always possible, by careful selection, to find wood that will be better than the figures given. With composites such as glass and carbon fibre in epoxy resin, the figures given are particularly doubtful since so much depends on the ratio of plastic matrix to fibre and on the method of manufacture. Carbon fibre is very strong in simple tension but not necessarily so good in bending.)

(In the numerical example, suppose the material is spruce, the allowable bending stress is 350 kgf/sq cm. Multiply this by M: 0.48 x 350 = 168 gives the bending resistance in kgf - cm. The bending moment to be met was 662 kgf - cm. This spar is seriously under strength for the wing root, but would be adequate at half the semi span where the moment to be resisted is about 165 kgf - cm.

The allowable load for mild steel is 2548 kgf/sq cm., so if using this material the wing joiner will withstand 2548 x 0.17 = 432 kgf - cm bending load. The proposed wing joiner is not strong enough for normal flight, let alone fast winch launching. A larger diameter rod and preferably better quality steel would be required.)

Stressing for the serious reader

The problem is approached now in a more systematic way to demonstrate that the above short cut is supportable by sound argument. The methods are outlined mainly in the Figures 4 to 8. The following text is explanatory. Some simplifications have been made but the results are accurate enough for practical purposes and there is very little point in seeking to refine them further for most ordinary model aircraft.

Loads and safety factors

Refer to Figure 4. When an aircraft, whether aeroplane or glider, is in level flight it is supported by aerodynamic reaction forces generated by the wing's motion through the air. The mass of the aircraft is acted on by the acceleration due to gravity, known as G, to produce the weight force. In level flight the aircraft experiences 1 G.

Timber: good quality, straight grained	Allowable bending strength		
	KG/Cm ^{2}	MPa	PSI
Spruce	350	34	5000
Oregon Pine	400	39	5688
Kiefer	425	41	6043
Douglas Fir	500	49	7110
Birch	400	39	5688
Birch plywood	450	44	6399
W Red Cedar	300	29	4266
Poplar Plywood	300	29	4266
Poplar	250	24	3555
Ash	400	39	5688
Oak	425	41	6043
Maple	400	39	5688
Klinki Pine	350	34	5000
Hoop pine	350	34	5000
Beech	450	44	6399
Balsa (Hard)	183	18	2609
Balsa (Med)	105	10	1500
Balsa (Light)	60	6	860

Metals Check with supplier	Yield strength in compression		
	KG/Cm ^{2}	MPa	PSI
Mild steel	2548	250	36238
Carbon steel	5500	539	78210
Wire (Shop)	7000	686	99540
Spring (quality)	15300	1500	217430
Dural rod	4000	392	56880
Dural tube	4060	398	57733
Aluminium	1900	186	27018
7075 T - 6 Alloy	4711	462	67000
S Glass/epoxy*	4000	392	56880
Carbon/epoxy*	3975	390	56532

* Unidirectional rovings, ultimate compression strength.

To convert Kg per sq cm to pounds per square inch multiply by 14.22

To convert Kg per sq cm to MegaPascals multiply by 0.0981

Figure 3
Tables giving typical figures for bending strength of materials used in model aircraft. In all cases, a good deal of variation is to be expected.
Yield strength figures, when exceeded, will leave some permanent distortion. Ultimate compression strength, if exceeded, fractures the structure.

In order to turn an aircraft, the wing has to be banked. The wing in a banked turn, accurately flown without skid or slip, not only has to produce the supporting reaction against the weight, but also the force which turns the aircraft against centrifugal force (inertia), as shown in the small sketch near the top left of Figure 4. The combined upward supporting force and the lateral turning force create an increased load on the wing. As the diagram shows, a bank angle of 60 degrees doubles the G load. At bank angles above 80 degrees the G load is more than 6. (Speed of flight and radius of turn are not relevant here. The G depends only on the bank angle, a point frequently misunderstood.)

If the bank angle is increased to 90 degrees an impossibility arises. The G load in such a case would be infinite. (Cos Ø for 90 degrees is zero.) In practice when an aircraft banks to 90 degrees or even beyond the vertical, there is some yawing or slipping, and possibly also loss of height, so infinite G is never even approached.

The wing also experiences G forces in level flight when struck by heavy gusts, and the wing of a model sailplanes launched by towline also has to withstand loads, equivalent to G, and limited

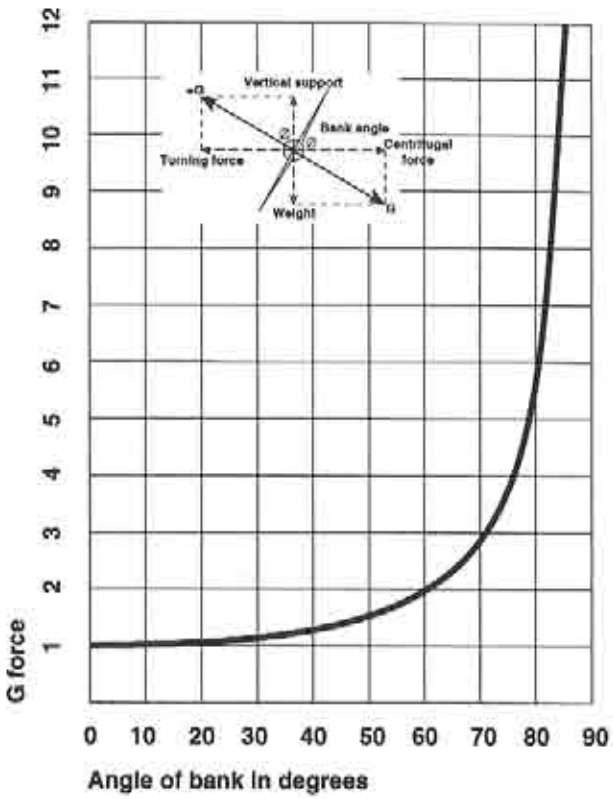


Figure 4. How the G force rises with the angle of bank in correctly flown turns (No slip or skid and no upward force from the thrust.) Airspeed and radius of turn are not relevant. The G force is equal to 1/Cos ø, where ø is the angle of bank.

chiefly by the breaking strength of the towline. In inverted flight or, more importantly perhaps, in heavy landings, the wing bends down. Most if not all these various cases can be covered for design purposes by assuming some value of G as the highest the aircraft is ever likely to reach. The loads tending to bend the wing upwards are described as positive G loads and those bending it down are negative G.

It is a matter of some argument as to what actual G values are reached in model flight and there is not much reliable data. The maximum figure obviously depends on the kind of flying done.

Fortunately, an aerodynamic factor comes into play before very extreme values of G can be reached. In order to produce the increased aerodynamic reaction required to meet high G, the wing must be brought to a high angle of attack. This is obvious in steep turns when the elevator has to be up to keep the model turning without rapid loss of height. If the angle of attack is too great the airflow separates and the wing stalls. The same applies in aerobatics. The stalling angle represents a limit to the useable flight envelope. If the G is too high the wing stalls and the G does not increase further. Problems of another kind may arise, of course.

In full sized civil aeronautics a moderate figure, often about 5 G, is usually taken as the maximum for stressing purposes because the pilot of the aeroplane or glider cannot be expected to remain conscious if the G force is very high. Aerobatic and military aircraft, flown by healthy people with training and preparation, and possibly 'G' suits, are designed to higher load specifications than this. A Hawker Hunter jet fighter, for example, reached 7.5 G occasionally when monitored continuously during a total flying time of 431 hours. The pilot wore a 'G' suit. Experienced aerobatic pilots without G suits can remain in control of their aircraft at 7 G providing this load does not last more than a few seconds. Even they can be rendered unconscious if the load comes on unexpectedly.

In a radio controlled model there is no pilot to black out and it is likely that 7 G is reached sometimes. It is of course possible to design a model for a higher G figure, if 7 seems too low.

It is normal in all engineering to apply a safety factor to allow for faults in construction, variability of materials and unexpected shock loads such as heavy landings. A safety factor of 1.5 applied to an aircraft designed nominally for 7 G, would bring the G load for design purposes to 7 x 1.5 = 10.5. To say that an aircraft is designed for 10.5 G does not usually mean that it is expected often to reach such a figure, but if under very unusual circumstances it does so, providing it is constructed of materials fully up to specification and with no faults in construction or unsuspected damage, it would survive.

In Step 4 above, it was assumed that the wing of the model is to be designed for a load factor of 10.5, that is, in normal operations it is assumed to experience 7 times the bending loads of level flight and will survive them with a safety margin of 1.5.

[1] At risk of insulting some readers, brackets mean that whatever is inside the brackets must be worked out before multiplying by whatever is outside the brackets. The horizontal lines represent division signs; everything above such a line must be worked out first and then divided by what is below the line. The small superscripted figures, such as ^{2}, ^{3}, ^{4}, etc, mean that the number must be squared [multiplied by itself], cubed [multiplied by itself twice] or raised to the fourth power. So, $3^4 = 3 \times 3 \times 3 \times 3 = 81$. 6H means 6 x H, B H^2 means B x H x H.

[2] In the case of metals and special qualities of timber, it may be necessary to consult the supplier to get more reliable figures. These now will often be quoted in Pascals or Megapascals. A Pascal is equivalent to 1 Newton of force on 1 square metre of area, i.e., 1 Pascal = 1 Newton per square metre. One Newton is equivalent to 0.102 kg force or 0.225 pounds force. A Megapascal is 1 million Pascals. ■

Part III of III will be in the next issue. *Ed.* ■

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