

# FLYSWAPPER

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\$40	\$36	\$32	\$28	\$24	1/2
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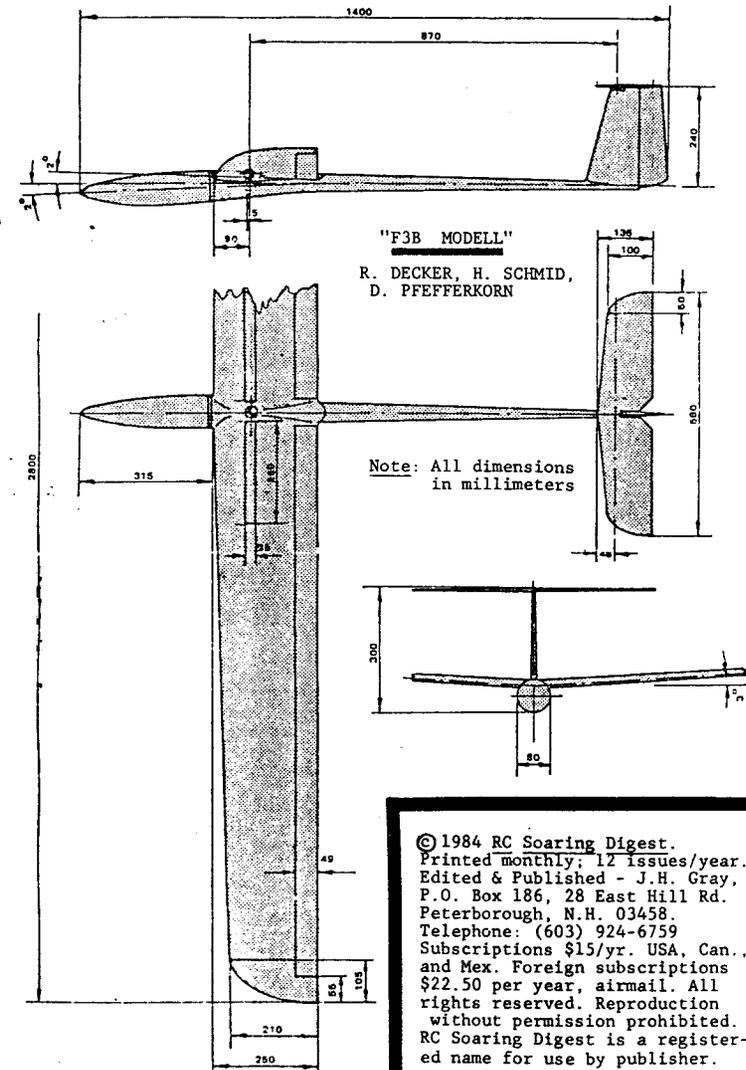
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# Soaring RC Digest

VOLUME 1 NO. 1

JANUARY 1984

## 1983 F3B CHAMP



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## WHAT'S UP?

1

## HI START

RC Soaring Digest is a dream, a challenge, and a long-time ambition of mine...a monthly newsletter devoted to RC Soaring and Sailplanes - and to the pilots who fly them.

Before telling you about my plans as editor and publisher, I'd like to tell you a little about myself. First, I love the sky and all manner of things that fly. I've been a pilot of full-size aircraft since I was 16 years old, and I have flown many hours in both sailplanes and powered aircraft over the past 40 years.

I've been a model builder since I was 8 years old, and I've enjoyed many phases of that wonderful hobby; free flight, scale, RC, rubber power, glow fuel power, sailplanes, kites...and plenty more. During those years, I've not won much of anything, but I have gained something far more important to me than trophies - friends!

In 1972 I discovered something new and different - RC Soaring. I had just sold my full-size sailplane and was looking around for something new and different. Well, I found it...and have been challenged, absorbed, frustrated, and fascinated by it ever since.

In 1976 I began a column in Model Airplane News for the then editor, Walt Schroder. He decided to call the column Soar Subjects, and it's been going ever since, although it's now called Soaring News.

In every pilot's life there comes a time to 'solo', to strike out on one's own, whether it be flying alone for the first time, flying a new type of aircraft for the first time, or starting a new and untried venture like RC Soaring Digest.

People are important to me as persons; that is, individuals. I'm going to try to meet all of you in one way or another as soon as possible; at shows, at meets, and through the pages of this newsletter. I hope that you plan to write to me, because I want you to know that this venture is yours, too; and that your ideas, opinions, suggestions and criticism are important to its success. Together, we can make it go.

Happy Soaring



Jim Gray, Editor and Publisher

In this and future issues RC Soaring Digest will make every effort to bring you the latest, best, and most up-to-date information about this hobby/sport of ours. It will, like any good newspaper, cover the who, the what, the where, the how, and the why of RC Soaring and Sailplanes. We'll talk about airfoils, about new designs, about F3B, about 2-meter sailplanes; and we'll try to bring you soaring personalities and 'guest spots.' There will be some contest reports, and a contest calendar, if possible, covering at least the major events. We will have a beginner's corner with simple ideas, building hints, and help for the newcomer to RC Soaring. You will find a lot of information from abroad...with the reasons behind why they do what they do, and how it's different from our approach. I'll make a real effort to bring theory and practice closer together, but I'll need your help to even come close to these goals.

As most of you know, a DIGEST (like the Reader's Digest) is a source of information that takes information from many sources, edits that information, condenses it, and republishes it for the benefit of its readers. Therefore, much of the information that you see in RCS D will be republished from newsletters around the country. For anyone who hasn't had the benefit of seeing dozens of newsletters each month, the information would seem overwhelming. There is just so much that is worthwhile and of interest to all RC Soaring pilots published, but not seen by the majority of fliers. That's because the distribution of club newsletters is necessarily limited to perhaps a few dozen members. RCS D will bring you the best information from each of these. We have scores of them all marked and saved for you, ready for printing. Each month will bring your RCS D with this information, PLUS individual contributions not seen elsewhere.

NOW, FOR A BIT ABOUT THE MAKEUP THIS MONTH.

The RC Soaring Digest logo was designed by Don Typond, formerly the editor of Model Airplane News. Thanks, Don...it's beautiful!

As you can see, we've decided to go for a book-size format. This makes for easier holding and reading. It may change in the days to come. We'll try it this way for awhile and see how it's liked. In the centerfold, we will publish a three-view and perhaps other things like airfoils, etc. It will always be special. THIS MONTH IS F3B

THE FOLLOWING RULES CHANGES WERE PROPOSED BY THE USA IN PARIS

- \* Require frequency-changing capability for man-on-man at W.C.
- \* Require organizer-supplied winches and 80 Kg braided nylon line.
- \* Contestant to be responsible for own, but specified, battery.
- \* Require 1 meter of 40-Kg monofilament line (as weak link).
- \* Reduce distance to turnaround from 200 to 175 meters.
- \* Permit only one "attempt" at distance task.

In addition, West Germany proposed to remove the 12-lap distance limit, and change speed task back to two laps. Denmark proposed dropping the distance task altogether and add a spot landing requirement after speed. Dan Pruss (USA representative to CIAM) proposed new provisional rules for a cross-country racing event. The rules provided for the usual tasks flown by full-size sailplanes: distance to goal; broken leg distance to goal; out and return; closed course; and free distance.

The CIAM meeting in Paris was held December 1st and 2nd, and the following results were achieved.

F3B RULES IN EFFECT AS OF JANUARY 1984 WILL BE 'FROZEN' UNTIL 1988!

1. The 175-meter line length allowance for hand towing, and the 40 - 50 Kg (88 to 110 lb.) weak link for winch towing.
2. Man-on-man was accepted - barely - and it was the German proposal over the American proposal that won out. Nobody wanted the group scoring method proposed by the USA. General feeling was that the USA-proposed method penalized the top scorers while it rewarded mediocre scorers.
3. The proposal for organizer-supplied winches was voted down, mainly by those who have just gotten used to winches.

Those were the big proposals and changes; and with the 'freeze' the man-on-man rules are PROVISIONAL (which means that they can be used and tested at the local level of F3B contests...including the USA team-selection finals - if acceptable to the organizing committee.

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Cross-country racing was approved. Several European countries have tried the S.O.A.R. "Great Race" rules, and couldn't believe how simple such a contest could be run. The newly-accepted rules are also PROVISIONAL and a bit more complicated than we are used to. They don't qualify for World Championship status until THREE INTERNATIONAL MEETS involving FIVE COUNTRIES are held.

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AUSTRALIA WAS NAMED TO HOST THE 1985 F3B WORLD CHAMPIONSHIPS -

probably in the spring (April). There will be an effort by some groups to charter an aircraft, probably, to carry a large American contingent to the meet. More on this later.

Ralf Decker of West Germany is in the habit of winning contests. To be sure, he didn't win the contest in Belgium, but he came very, very close...finishing second just behind A. Wackerle... He is a fierce competitor and a skilled flier. His team mates, Reinhard Liese and Helmut Quabeck, are also skilled fliers and highly competitive, but - then - so are many other world-class soaring pilots. What, then, makes the difference between a World Champion and an also-ran?

There is no one answer to this question, but there are several factors involved. Perhaps the most important is consistency, and making fewer mistakes than the other pilots. The next might well be teamwork and the competitive spirit...never once dulling the fine edge honed by practice and more practice. Finally, the sailplane itself. Let's take a closer look at that: Ralf, H. Schmid and D. Pfefferkorn-designed.

THE SAILPLANE

Decker's sailplane has no name other than "F3B Modell." It is a derivative of the sailplane which brought him second place in Belgium. That ship was later kitted in Germany, as the Optima. The new sailplane is less a revolutionary design than an evolutionary design, and it is a thoroughbred. Ralf's sailplanes began with the design he used in South Africa in 1977, and that evolved into the ship he used in Belgium, which - in turn - evolved into the Sacramento machine...thought by many to be the full equal of the famous Swiss Spartakus. Now, Ralf clearly has a winner, as proved in York. The following three-view, and the table of specs and dimensions in the centerfold can't do it justice. It is super-clean aerodynamically, and constructed of fiberglass, carbon fiber, and Rohacell plastic foam. There is no balsa anywhere in its construction; in fact, no wood of any kind. The control functions are modifications of those used in former ships, but found wanting for one reason or another.

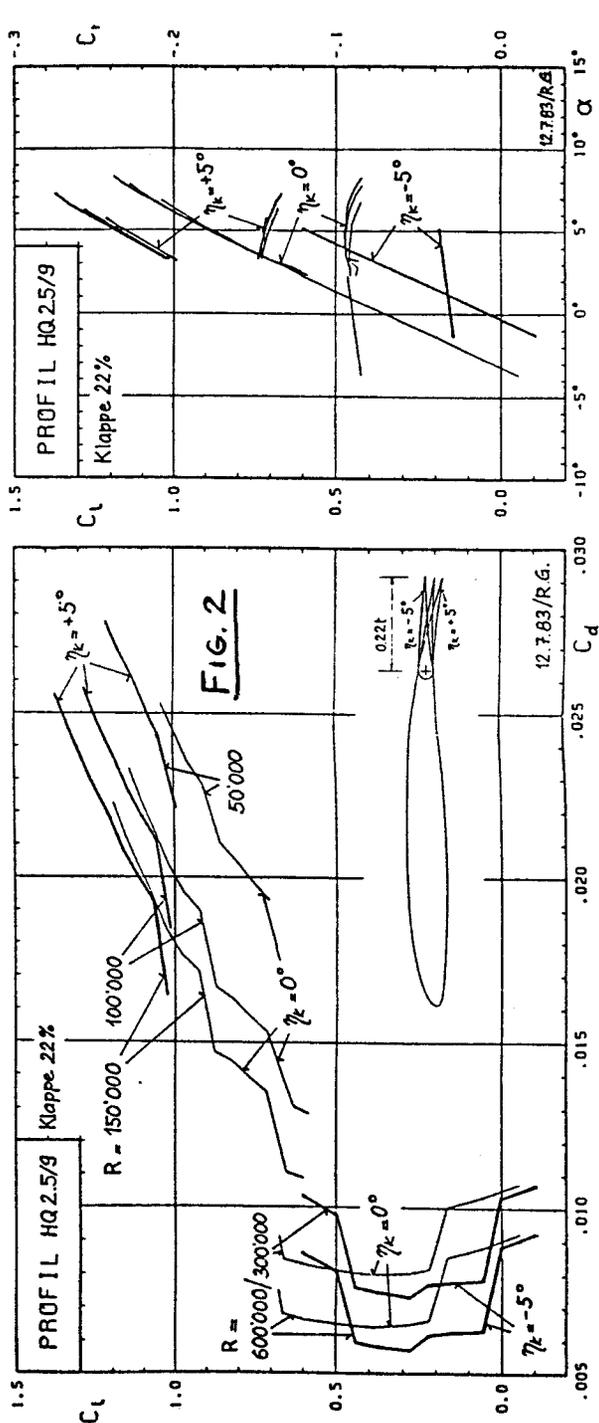
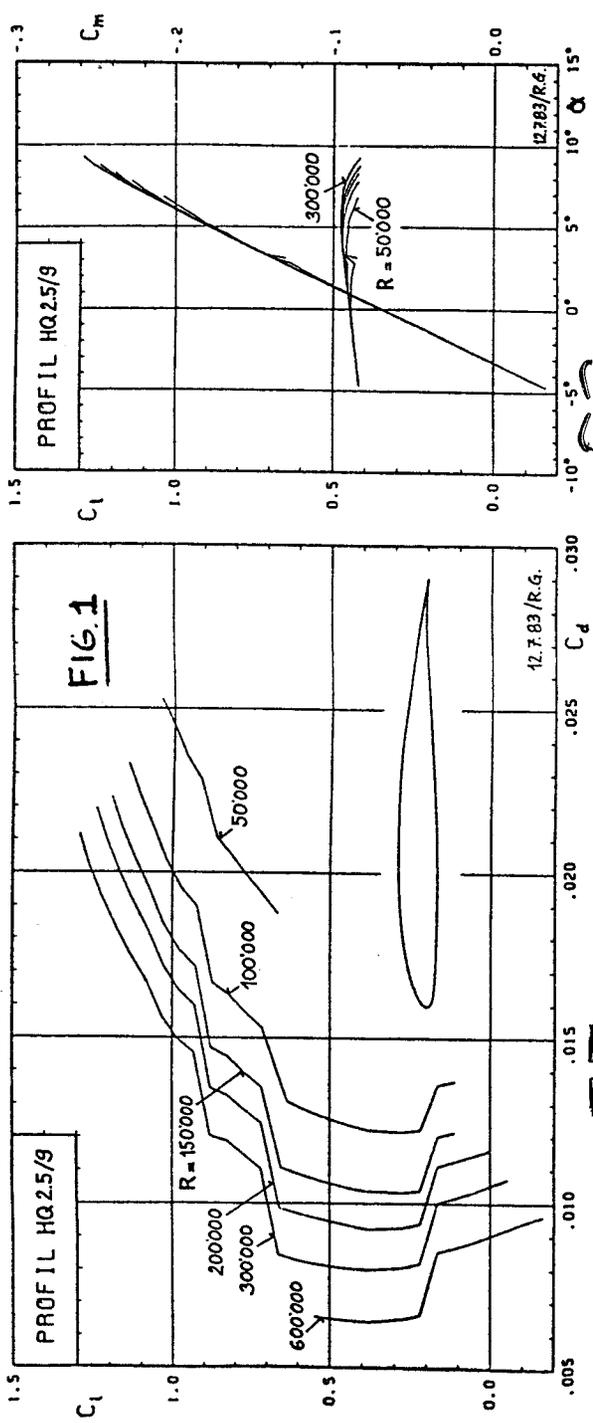
The wing is one-piece, consisting of an upper and a lower surface made in separate molds which, after the addition of a carbon fiber reinforced plastic spar, are joined together as one unit. There are no center-section joining pins as in the ordinary two-piece wings. The airfoil is one designed by team mate Helmut Quabeck, following computer-design techniques bolstered by wind-tunnel testing...in much the same manner used by Dr. Richard Eppler for his famous profiles. The wing has an internal ballast tube just ahead of the main spar. The upper-surface skin is, in reality, two skins of fiberglass separated by a layer of foam plastic called Rohacell, in a "sandwich" construction method, much like that used in full-size sailplanes. Likewise the bottom skin is a three-piece sandwich. This technique gives great stiffness and helps maintain the airfoil contours under load. The wing itself is capable of withstanding 40-G bending loads; over 300 pounds at normal flying weight! The flaperon has a tubular leading edge made from aluminum arrow shaft material, which snugly fits into the half-round mating concavity of the wing trailing edge. Robart-type pin hinges are used to attach the flaperon to the wing. An S-shaped piece, acting as a stiffener, is placed ahead of the spar and aids in taking compression loads to maintain constant separation between upper and lower skins, acting somewhat like a D-tube spar web. Flaperon actuating horns are placed inside the fuselage.

The fuselage nose is covered by a tight-fitting shell which slips off to reveal all five servos mounted on the side of a longitudinal keel or crutch. Instant and easy access to the complete servo, receiver and battery system is thus available. The nose shell fits in an airtight manner and is secured by one screw. Two of the five servos actuate the flaperons (aileron and flap modes) and can be electrically coupled to the rudder servo for turns. The horizontal stabilizer is automatically trimmed to compensate for pitch changes when the flaps are deployed, and is operated in the all-moving manner by a fourth servo. The fifth servo operates spoilers and releasable towhook. Ballast slugs are retained within the fiberglass ballast tubes by means of threaded plugs that screw into the tubes...accessible through the spoiler bays. Everything fits together like a jewelled watch, with no slop. Hinge lines are almost invisible, and every effort is made to preserve laminar flow over the entire model. By making all of the components in molds, uniformity and reproducibility is guaranteed. Thus, several 'backup' ships, identical in all respects to the original, are readily, if not easily produced. Aspect ratio is 12.3 which, on a 110-in. span, yields an average wing chord of 9 inches.

# HQ 2.5/1.9

Upper Figure: Section characteristics - no flaps

Lower Figure: Section characteristics - with flaps



$\alpha$	HQ - 2.5/9		HQ - 2.5/10		HQ - 2.5/12	
	$Y_0$	$T_{90}$	$Y_0$	$T_{90}$	$Y_0$	$T_{90}$
0.0050	0.0084	-0.0027	0.0091	-0.0031	0.0115	-0.0070
0.0100	0.0115	-0.0091	0.0139	-0.0050	0.0159	-0.0119
0.0150	0.0112	-0.0116	0.0139	-0.0076	0.0188	-0.0151
0.0200	0.0139	-0.0139	0.0151	-0.0170	0.0219	-0.0235
0.0250	0.0119	-0.0139	0.0175	-0.0211	0.0263	-0.0283
0.0300	0.0136	-0.0136	0.0199	-0.0241	0.0308	-0.0326
0.0350	0.0603	-0.0125	0.0451	-0.0251	0.0372	-0.0313
0.0400	0.0627	-0.0125	0.0451	-0.0251	0.0372	-0.0313
0.0450	0.0640	-0.0140	0.0690	-0.0260	0.0424	-0.0360
0.0500	0.0537	-0.0113	0.0658	-0.0247	0.0391	-0.0345
0.0550	0.0547	-0.0042	0.0595	-0.0247	0.0391	-0.0345
0.0600	0.0444	-0.0004	0.0772	-0.0210	0.0423	-0.0375
0.0650	0.0312	0.0035	0.0729	-0.0032	0.0499	-0.0114
0.0700	0.0161	0.0038	0.0717	0.0000	0.0554	-0.0035
0.0750	0.0161	0.0038	0.0717	0.0000	0.0554	-0.0035
0.0800	0.0161	0.0038	0.0717	0.0000	0.0554	-0.0035
0.0850	0.0161	0.0038	0.0717	0.0000	0.0554	-0.0035
0.0900	0.0161	0.0038	0.0717	0.0000	0.0554	-0.0035
0.0950	0.0161	0.0038	0.0717	0.0000	0.0554	-0.0035
1.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

$\alpha$	HQ - 1.5/9		HQ - 1.5/10		HQ - 1.5/12	
	$Y_0$	$T_{90}$	$Y_0$	$T_{90}$	$Y_0$	$T_{90}$
0.0050	0.0082	-0.0049	0.0090	-0.0036	0.0098	-0.0064
0.0100	0.0125	-0.0082	0.0144	-0.0094	0.0150	-0.0157
0.0150	0.0175	-0.0116	0.0200	-0.0142	0.0176	-0.0209
0.0200	0.0175	-0.0139	0.0215	-0.0235	0.0236	-0.0271
0.0250	0.0451	-0.0259	0.0493	-0.0272	0.0536	-0.0314
0.0300	0.0497	-0.0253	0.0535	-0.0284	0.0571	-0.0349
0.0350	0.0530	-0.0253	0.0583	-0.0301	0.0633	-0.0379
0.0400	0.0534	-0.0246	0.0594	-0.0306	0.0644	-0.0356
0.0450	0.0539	-0.0246	0.0598	-0.0293	0.0637	-0.0344
0.0500	0.0539	-0.0246	0.0598	-0.0293	0.0637	-0.0344
0.0550	0.0539	-0.0246	0.0598	-0.0293	0.0637	-0.0344
0.0600	0.0539	-0.0246	0.0598	-0.0293	0.0637	-0.0344
0.0650	0.0539	-0.0246	0.0598	-0.0293	0.0637	-0.0344
0.0700	0.0539	-0.0246	0.0598	-0.0293	0.0637	-0.0344
0.0750	0.0539	-0.0246	0.0598	-0.0293	0.0637	-0.0344
0.0800	0.0539	-0.0246	0.0598	-0.0293	0.0637	-0.0344
0.0850	0.0539	-0.0246	0.0598	-0.0293	0.0637	-0.0344
0.0900	0.0539	-0.0246	0.0598	-0.0293	0.0637	-0.0344
0.0950	0.0539	-0.0246	0.0598	-0.0293	0.0637	-0.0344
1.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

SERIES 2.5 ← SERIES 1.9 →

THE WORLD CHAMPION AND HIS SAILPLANE (Continued)...

Before taking a look at the airfoil itself, a brief run-down of general specifications for the model might be in order:

Span - 110.25 inches; aspect ratio - 12.3; avg. chord - 9 in.;  
 Area - 990.4 square inches; stab area - 102 square inches.;  
 Weight - 77 ounces, ballastable to 113 ounces.  
 Wing loading - variable (by ballast) - 11.3 - 16.4 oz./sq.ft.  
 Airfoil - Helmut Quabeck: 2.5/9 at root; 2-5/8 at tip.  
 Stab. airfoil- NACA 63A006

THE AIRFOIL (from an article by Rolf Girsberger, Ennetbaden, Switzerland...as reprinted from TMSS Technical Journal No. 19, "Section Characteristics for a Flapped Quabeck Airfoil").

TMSS COMMENTS:

At the 1983 World RC Soaring Championships at York, England, Ralf Decker astonished everyone by flying his first official 4-lap (sic.) speed run in 18.9 seconds. Later, it was discovered that he had flown the task with an incredibly low wing loading of only 14 ounces per square foot. The plane he flew was clean, but not remarkable as F3B models go, so the question became: "What is the airfoil?" Actually it was no secret. The West German model magazine FLUG+MODELLTECHNIK had published a series of articles by Dr. Helmut Quabeck on the subject of a series of airfoils he had developed to be especially efficient with flaps. In those articles the German team's airplanes were shown, and the HQ airfoils they used were listed. Decker and Liese used the 2.5/9 with some thinning along the span, and Quabeck himself used the 1.5/9. Decker won the meet, and Quabeck proved himself more than a theoretician by coming in second. Liese clinched the German team-win by coming in fourth behind Dave Worrall of England. Quabeck's best speed time was 21.4 seconds. Are these airfoils really that superior? I don't know, but they stole the show at York.

ROLF GIRSBERGER'S ARTICLE:

A family of successful flapped airfoil sections has been developed by H. Quabeck (1). Recently W. Thies has published theoretical section characteristics for two airfoils of this family, the HQ 2.5/8 and the HQ 2.5/9, calculated by Professor Eppler (2). These section characteristics hold only for the basic section (flap angle=0). In order to get insight into the behavior of the flapped airfoil, section HQ 2.5/9 has been recalculated with the program of Professor Eppler (3). The recalculations are based on the smoothed co-ordinates given in (2).

Figure 1 shows the calculated section characteristics of airfoil HQ 2.5/9 with the flap angle=0 for five different Reynolds Numbers (R). For the lowest R, only values for high lift are plotted; and for the highest R, only values for low lift. The curves shown are similar to those published by W. Thies (2) for identical Reynolds Numbers. Negligible differences stem from the fact that the angles of attack are not identical for both calculations.

Figure 2 shows the calculated section characteristics of airfoil HQ 2.5/9 when the flap (22% of the chord length) is deflected 5 degrees downward (flap angle +5 deg.) and 5 degrees upward (-5 deg.) respectively. The corresponding section characteristics of the unflapped airfoil are plotted into the same diagram for comparison. Downward deflection is of interest for low-speed flight and launch. For this reason, Figure 2 section characteristics are plotted for three lower R.N. and high lift. The flap is deflected upward only for higher flight speeds (flap angle negative). Thus, in Figure 2, the section characteristics of this configuration are plotted for two higher R.N. and low lift.

There are a few comments before we judge the results. The program accounts for the influence of flow separation near the trailing edge by a rough approximation only. In particular, the additional drag is not included. High angles of attack are affected in particular. Experience has shown, however, that the calculated maximum lift coefficient compares quite satisfactorily with experimental values. Figure 3 shows schematically how the calculated section characteristics are to be interpreted at high lift. In addition, the program cannot account for the effects of laminar separation bubbles.

The calculations indicate that a critical R.N. well below 100,000 can be expected for airfoil HQ 2.5/9. The maximum section lift coefficient is approximately 1.1 for flap angle=0/ It rises to about 1.25 with flap angle= +5 degree. The low-drag region (laminar flow bucket) is moved to lower lift coefficients by a value of -.2 when the flap is deflected upward to -5 deg. Deflection further upward is not recommended. Altogether these calculations confirm typical behavior of a flapped airfoil for F3B models intended to fly (very fast).

THE WORLD CHAMPION AND HIS SAILPLANE (Continued)...References:

- (1) H. Quabeck Profile fur Wolbklappenflugel (airfoils for flapped wings) Flug+modelltechnik 1+2 1983
- (2) W. Thies Polaren fur Quabeck-Profile (section characteristics for Quabeck airfoils) Flug+modelltechnik 7 1983
- (3) R. Eppler/D. Somers A computer program for the design and analysis of low speed airfoils NASA technical memorandum 88210

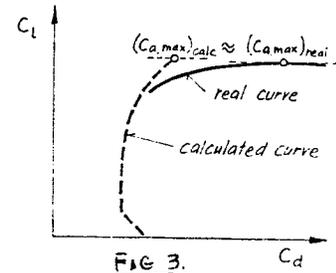


FIGURE 3 (Left) is a schematic plot of the differences between the section characteristics of the calculated airfoil and the actual airfoil at high angles of attack. Note good agreement at low angles of attack (high-speed).

SOARTECH AVAILABLE :

Herk Stokely, 1504 Horseshoe Circle, Virginia Beach, VA 23451 announces the availability of Volume 1, No 2 SOARTECH, the RC technical soaring symposium collection of papers. Issue #1 has been totally sold out at this time, but new subscribers may order Issue # 2 by writing to Herk and sending \$5.00 US, \$5.50 Canada, \$6.00 foreign(surface) and \$10 foreign (airmail). Original subscribers will get No. 2 free.

No. 2 covers such subjects as: Strength of Balsa; Lateral Control; Horten Wings; Aerodynamic Center; Flapped Eppler Airfoils; A New Airfoil for F3B Gliders; SECTION CHARACTERISTICS FOR A FLAPPED QUABECK AIRFOIL (see this issue of RCSD); Lateral-Directional Stability; Vee-Tails; Design of Standard Class Sailplanes; and The System RC Sailplane. This is a terrific source of much-needed information, so get yours today!

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HELP WANTED COLUMN

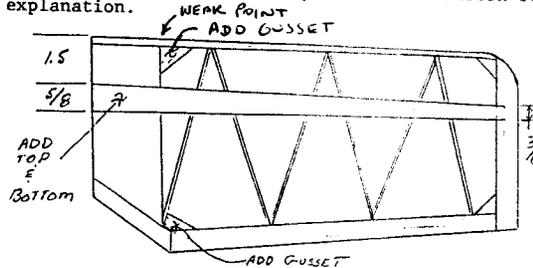
I'd like to start a column in RC Soaring Digest aimed at helping those who write in with knotty problems or questions to which they can't find ready answers. If you will write me your question, I'll put it in the first available issue. Then, we will ask someone out there among our readers to answer the question...and we'll print it.

**METRICK MODS**  
by  
Ross Swenson  
(MRCSS)

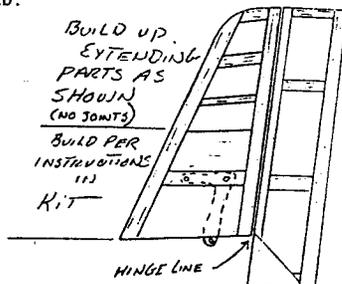
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Recently I completed a Top Flite Metrick two-meter sailplane. During construction I made a few modifications to increase performance and durability of the plane; at least I think they helped. Anyway, here they are:

1. **Stabilizer Assembly:** Add a 1/16" sheet spar over the stabs after completing per kit instructions. I felt that there was a weak point at the transition from the solid center areas to the built-up areas. See sketch below for explanation.



2. **Rudder/Fin Assembly:** Recently there has been much discussion about so-called balanced rudders. Most of the talk recommends eliminating the forward portion of the rudder to lessen stalling tendencies and increase turn response. I have made this change to my Sagitta 900 and it does make a difference. For example, my Aquila is very mushy in turns. Typically the plane is five seconds behind any rudder command and requires much more movement than should be needed. This is most noticeable while thermalling at altitude and moving near stall speed. Also a product review of the Metrick in M.A.N. brought up the sluggish turn response so I figured anything that I could do to decrease this tendency would be worthwhile. The sketch should be self explanatory. By the way: when building the fin do not use the solid piece of wood furnished for the forward part of the rudder. Instead, extend the built-up lower portion. The weight saving, while small, will help offset the weight added by the spars in the stab.



These were the changes I made to the kit, but a couple of other things could be noted also. Use stranded cable instead of the plastic push rods furnished, and install a piece of yellow Nyrod to house the antenna. Oh yes, one more thing; reverse the positions of the servos and the receiver from what is shown on the plans. The plane will balance with much less weight, and mine balanced with only about one ounce added to the nose.

P.S.: The change to the stab was proven by my first hand launch during trimming (before the change was made) when a not-so-hard landing broke the stabs at the point I mentioned earlier. Save the repair; - do it first!

**SKYWRITERS:**

Those of you who have written to me about RCSD, telling me what you'd like to see in each issue, and giving me an indication of the type of things you like, and the kind of soaring you do, have been extremely helpful. I thought maybe you'd like to see what your peers had to say, so here goes. At the time of this writing, RCSD has 62 subscribers... and more coming in at the rate of about 5 each day! The interests expressed follow, in order of magnitude:

1. Soaring Directory. This means that we will have a directory in '84.
2. All phases - general interest, or no particular interest
3. Thermal duration contests
4. Slope soaring and sport soaring - tied
5. Cross-country soaring
6. Fun flying
7. Low-key competition
8. Construction
9. F3B
10. Sources, building plans, three-views, electric, how-to features, kit reviews (unbiased), and airfoils ... about the same interest.

From this information, I'll be able to plan the next issue more closely around the readers' interests. There is a tremendous amount of material on hand from which to present good, factual, and interesting information. However, I really would like each of you to submit anything that you think we might use. I'll re-type, if necessary, and do any editing required...so don't worry about "not being a writer!" At the moment, we haven't set up for photos, but we will soon, so don't be afraid to send 'em...I'll figure a way to use 'em!

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**WINGTIPS:**

Someone asked me about the turnaround for winch launching, and wondered why instead of just the axle, hub, and fork structure of a bicycle wheel, we didn't use the front wheel itself? I couldn't answer that question, but it makes sense to me. Consider it this way: when the line is being hauled in at high speed, the poor little hub on the turnaround has to turn faster than it really can do easily, just to accommodate line speed on such a short radius. If the whole wheel were used, with the line riding on the rim, rotation speed to keep up with the line would go way down. Isn't that so? Well, who has tried it out there? If you have, and it either works or doesn't work, PLEASE LET US KNOW.

Bob Cheney suggested that you might find one of those cast-aluminum sheaves (pulleys) from an old clothes dryer drum. This could be removed and placed on the axle fork of the bike wheel, and used instead of the bike wheel. It would be a somewhat smaller diameter than the bike wheel, and just might be the hot setup for turnarounds. What do you think? (By the way, be sure it's a junk dryer - not your mom's, wife's or some such).

**FEBRUARY ISSUE PROGNOSTICATIONS:**

Peter Carr has written a fine article on slope duration; how to prepare for it, what you need, what to look out for, what things are most likely to fail, and -above all- how to do it successfully. This is a terrific leg up for those who contemplate any of the LSF slope duration flights - particularly the 4 and 8-hour ones. Watch for it!

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