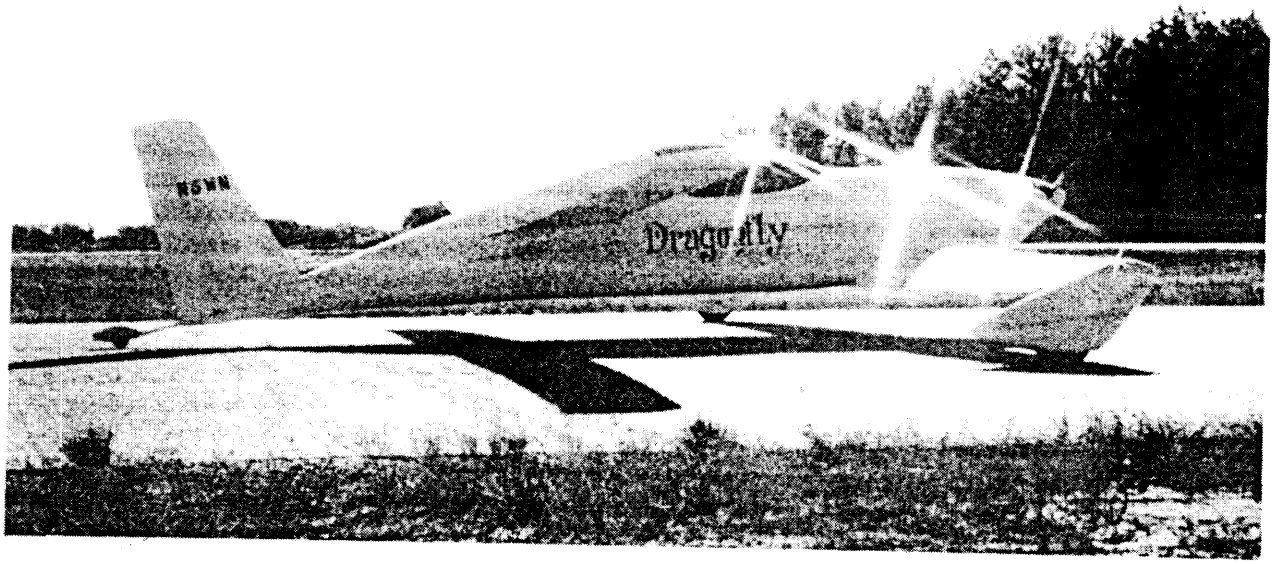

DRAGONFLY NEWSLETTER
#7 Summer 1982

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by
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The DRAGONFLYER is the only method for disseminating information concerning plans changes for the Dragonfly. All builders must subscribe. A one years subscription is included in the price of the construction manual. The DRAGONFLY is based at Foley, Alabama. Flight demonstrations are scheduled from time to time; however, the staff of Viking Aircraft is generally very busy processing paperwork and is not at the airport most of the time, so be sure to call ahead of time rather than just drop by the airport.

ERRATA SHEET Before each newsletter is published, the errata sheet is up-dated to include all the significant plans changes. This means that it is not necessary for new builders to have all the back issues of the DRAGONFLYER in order to obtain the current plans changes. This is not to say that the updated errata sheets contain each and every building hint, but they are an up to date source of plans changes and alterations. For the information of you non-plansholders, these changes are all of a minor nature such as dimension errors, typos, minor omissions, etc. They do not include major alterations to the airframe, nor do we anticipate any such changes. For you early plans purchasers, it is not necessary to have the updated arrata sheet since all the plans changes are published in the DRAGONFLYER. Just be sure to keep your subscription current.

HAVE YOU MOVED? If you move, please notify us of your new address. We have lost track of one or two builders who have moved and can no longer be located. In case of a manditory plans change, we must be able to contact you, so keep us advised of your address.

OSHKOSH 1982 June finds us getting ready for another Oshkosh convention. It seems that we have just recovered from Sun 'N Fun and here it is time to hit the road again. Although promoting an aircraft at a fly-in takes a lot more effort than just looking at all the displays, it gives us a chance to get out of the office for a week or two and Ching and I really enjoy ourselves. I'm scheduled to give a forum on Tuesday the 3rd in tent number 2 from noon to 1:15. It will be a combination of building techniques and a question and answer session. If you can't make it to the forum on Tuesday, be sure and stop by to see us on the flight line. Keep in mind that by the second day it seems like we've answered the same questions a million times, the sun has overheated our brains, and we're starting to get a little bit crazy. Ching usually holds up better than I do and she is likely to remember who you are when you walk up to say hello. On the other hand, I am normally so zonked out that I wouldn't recognize my own father. In fact, my dad did show up at Lakeland this year and my first reaction was: "There's a fellow who looks vaguely familiar". The point is, don't be surprised if you get a blank stare from me. Just keep reminding me of who you are and where we met and I'll gradually get the message. We'll have plenty of DRAGONFLY pins to give away, so make sure to pick one up. Stan and Marge Kalishman have booked the group of DRAGONFLY builders into SCOTT HALL at the university all on one floor. I'd like to see an informal bull session there one evening, so be sure to check with Ching or me on the flight line so that we can plan a time convenient to most builders. Several builders have been threatening to have their projects finished in time to fly

to Oshkosh, but time is getting short. Nevertheless, we're hoping to see a few DRAGONFLYS on the line this year and a whole bunch of them in 1983. We'll be awarding a trophy to the best DRAGONFLY, but unlike most of the other "best" awards, this trophy may not necessarily go to the fanciest aircraft. Since the whole idea of the DRAGONFLY is a low cost, fun aircraft a simple, well built aircraft that didn't cost an arm and a leg to build is likely to beat out an equally nice aircraft that is loaded down with $5000 worth of nav/com equipment.

FOLLOW THE PLANS I had hoped by this point that all builders would have gotten the word about following the plans. Most have done pretty well, but we are still getting a call from time to time that begins with: *"I goofed up by not following the plans. My neighbor suggested I do such and such, but it didn't work out so well. How do I repair the damage?"* This type of call is my least favorite and it makes my Rolaids bill go up. I'm already using industrial strength Rolaids at an alarming rate. Now I'm not saying that the plans are perfect by any means. With the help of you builders, we're gradually debugging the construction manual, but the changes are almost all related to minor dimensional typos or the addition of a paragraph to better explain a particular point. We do not see any reason to make major changes to the way the aircraft is constructed. The procedures in the plans worked well for me when I built the prototype and they are working well for other builders. Why then, would anyone want to make a major procedural change based on advice from his neighbor? Some points are only made once in the plans because I naively assumed that builders would get the message the first time. For example, the plans do not warn you to specifically follow the procedure to put the wing skins over the spar cap before the spar cap cures; however, it is very important to have a wet-to-wet bond between the skins and spar cap. Do not peel ply the carbon fiber and then do the skin lay up later. Do not allow anything to come between the carbon fiber and skins such as micro, flox, foam, etc. If you have the urge to make any sort of major changes either to the aircraft itself or to the construction procedures, please give us a call or write us a letter first. It will probably save you a lot of time and frustration when I explain to you why your neighbor's ideas won't work. By the same token, if you really have come up with a better way to do something, I want to know about it so I can pass the information on to other builders. I get the impression that most folks have gotten the message on materials substitution (don't substitute) and structural modifications (don't modify). If we can get the word out about not making procedural changes, my job will get a little easier.

DOW FOAM DOW Chemical company is concerned that their foam products are being used in aircraft construction. They have sent notices to all their outlets as well as to all homebuilt designers that state the official company position. It boils down to the fact that the market is tiny and the potential liability is great, so they would prefer that people would not use DOW foam in anything that goes higher than one would want to fall. This does not mean that DOW foam is not suitable for use as a core material in homebuilt wings. It is just that DOW would rather not be associated with those crazy folks who think that you can actually build a real airplane in your garage. If you tell your local foam retailer that you want to use his foam in a homebuilt aircraft, don't be surprised if he hesitates to sell it to you.

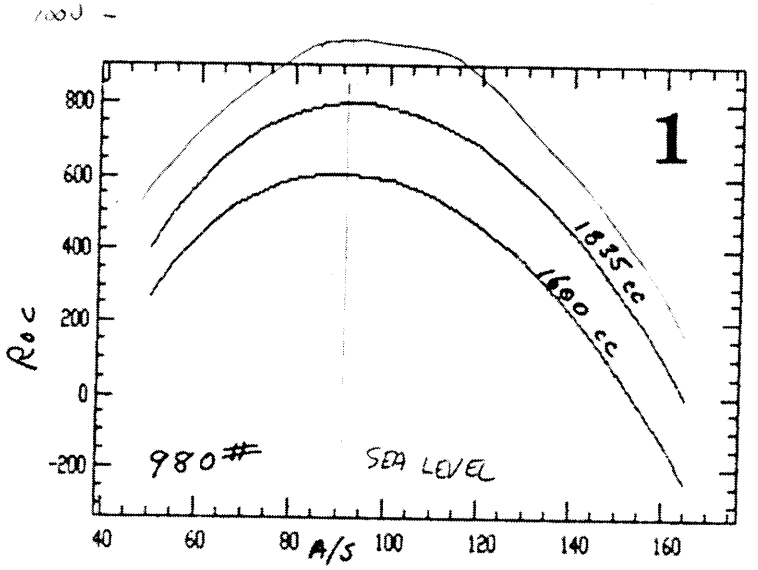
CUSTOM SPINNER: Because the DRAGONFLY has a nice looking cowling, I wanted to have a good match up between the spinner and cowling. I looked at a great number of existing spinners, but none of them had the exact curve I was looking for. Consequently, I was forced to invest in a set of custom spinner tooling. The proper spinner is manufactured by the same folks who make the spinners for MONNETT AIRCRAFT. Since I didn't want to get into the materials business, John Monnett was nice enough to agree to market the spinner. The price is reasonable and the spinner is of good quality. Most importantly, the curve of the spinner blends perfectly into the top curve of the cowling. The reason I mention this, is that several builders have purchased spinners from sources that claim to have special DRAGONFLY spinners. Many of these builders have complained to me that these so called custom spinners do not fit, are expensive, and are heavy. To my knowledge, MONNETT is the only company that is selling a spinner made from tooling that was specifically fabricated to match the cowling. Naturally it is not impossible that other spinners might match, but the MONNETT spinner is the only one that I've seen that really fits nicely.

BACK ISSUES: We've been telling people that back issues of the DRAGONFLYER are available for $1.50 each except for issue number one. Well.....the other day Ching was doing some inventory and discovered a big box of issue number one, so if any of you folks are interested in completing your newsletter collection, now is your chance. By the way, back issues are not mandatory to keep up with plans changes.

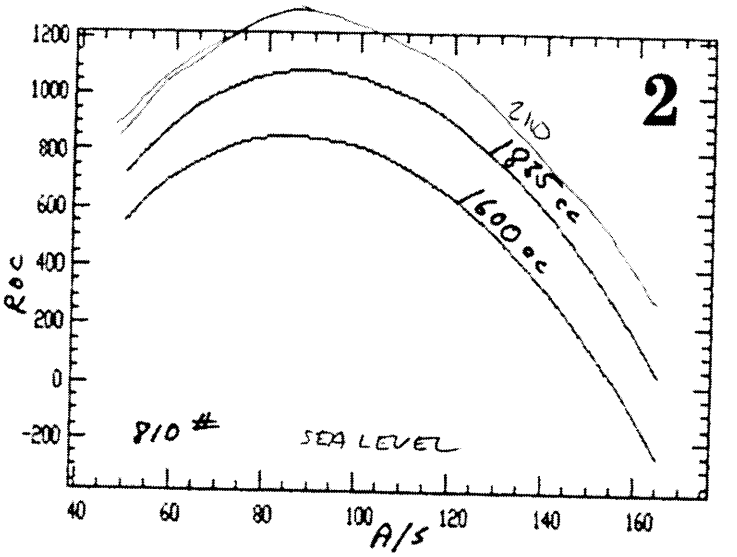
PERFORMANCE GRAPHS: As most of you know, Floyd (the computer) helps me with word processing for things like answering letters and writing this newsletter. He also keeps track of the mailing list, prints mailing labels, and tries to help me with things like taxes. About a year and a half ago I taught Floyd a little bit about aerodynamics and aircraft performance. By inputting some information about Mother Nature and some

information about the measured performance of the DRAGONFLY, Floyd is able to draw curves and/or print out data based on that input. It was nice to be able to review this information quickly, since prior to owning Floyd I had to make most of these caculations using paper, pencil, and hand held calculator. It is interesting to note that if all I tell Floyd is information based on the ideal formulas of theoretical aerodynamics, he is able to draw some pretty fantastic curves. I am able to feed him info on various combinations of power, drag, wing area, aspect ratio, and all the other parameters that effect performance. By being just a tad optimistic about prop efficiency, drag area, power available, etc. the performance graphs really look impressive. Of course all this can be done by hand also and it is pretty obvious by reading some advertising copy that that's just what some folks have done. Even Floyd laughs at some of this garbage, and he doesn't have a very good sense of humor. By telling Floyd the actual measured performance of the DRAGONFLY he is able to draw these corrected performance graphs in such a way so as to reflect the real world rather than the theoretcial optimum. That is what is shown below. Keep in mind that these curves are measured from the prototype which is a reasonably simple (in other words light weight) aircraft and it has a pretty smooth (but not fantastic) finish. If you load your aircraft up with a lot of junk like IFR com/nav equipment, transponders, etc, or if you get in a hurry during the finishing stages and settle for a bumpy finish, you will not get this kind of performance.

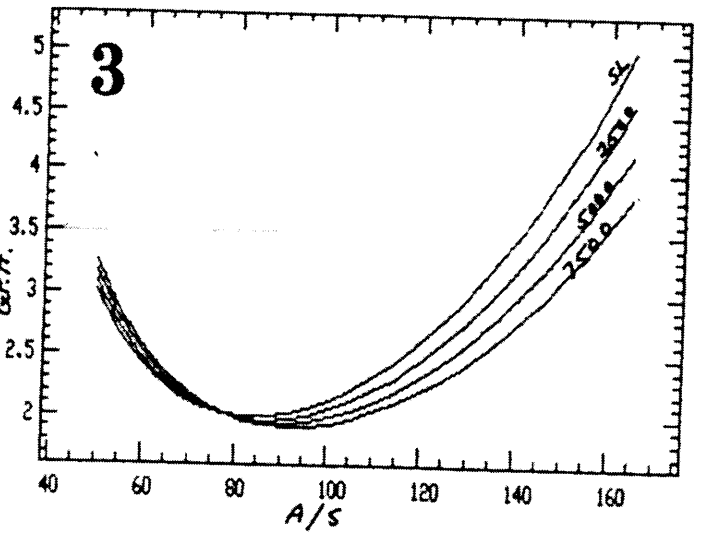
Graph number one shows the sea level rate of climb versus airspeed for both the 1600 and 1835cc engine at a gross weight of 9800 (dual).



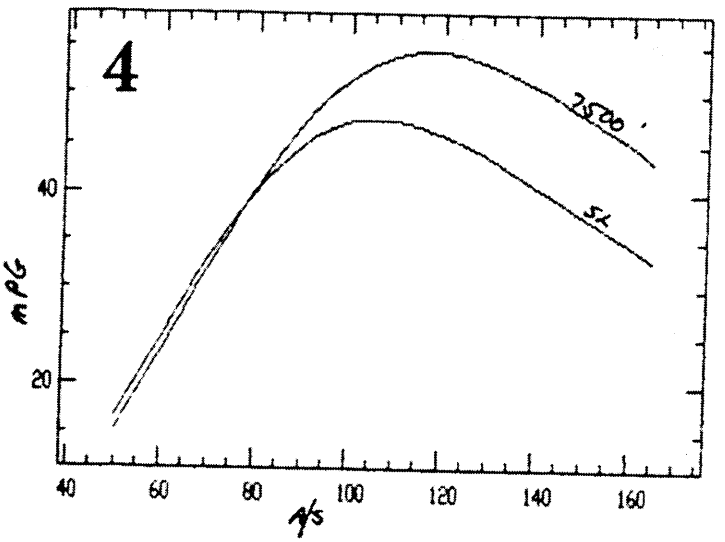
Graph number two shows the sea level rate of climb versus airspeed for the 1600 and 1835 at a gross weight of 8100 (solo). Note the improvement in maximum rate of climb over the dual graph. This points up the desirability of keeping the aircraft as light as you can.



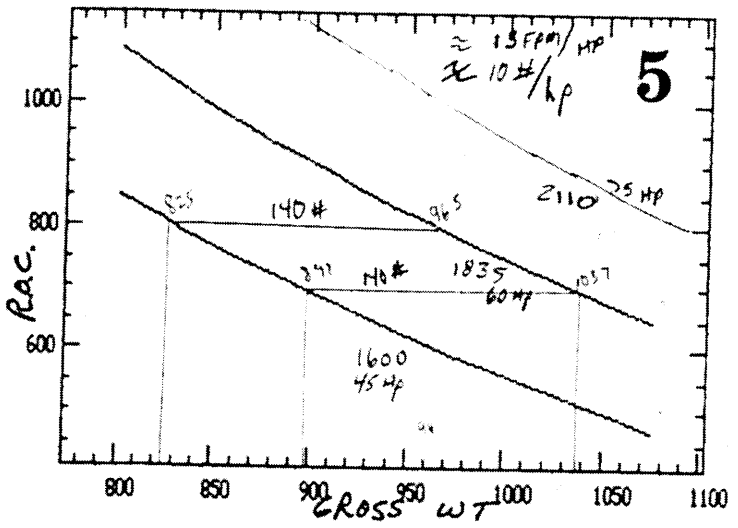
Graph number three indicates gallons per hour versus airspeed at altitudes of sea level, 2500', 5000' and 7500' using the 1835cc engine at a gross weight of 9800 (dual). Incidentally, these fuel burn figures assume the engine is leaned to produce good economy, but not overheated valves. In other words, you shouldn't have to lean your engine to within an inch of its life to achieve these figures.



Graph four shows miles per gallon versus airspeed for altitudes of sea level and 7500' using the 1835cc engine at a weight of 9800 (dual). By the way, the fuel burn figures for other sized engines will be very close to these shown here at the same speed. The big differences between engine sizes show up in top speed, rate of climb, and, naturally, cost.

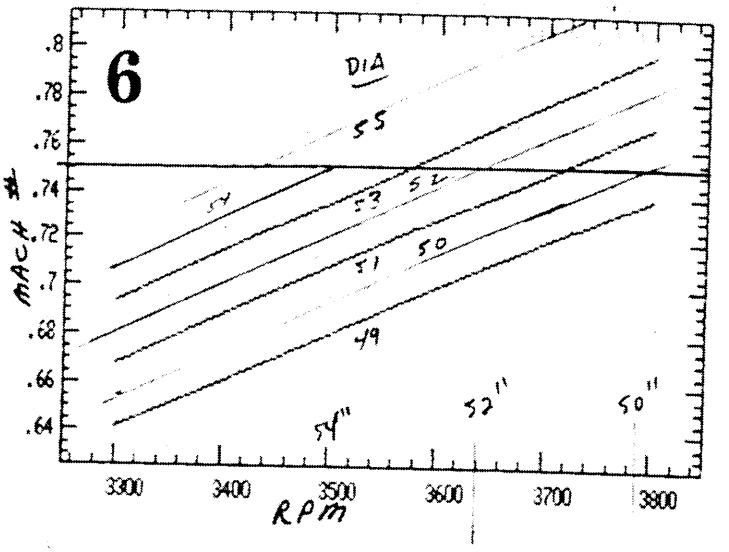


Graph five shows the sea level rate of climb at 90 mph (normal climb speed) versus gross weight for both the 1600 and 1835. Once again, note the rather dramatic performance difference with gross weight changes. KEEP IT LIGHT !!

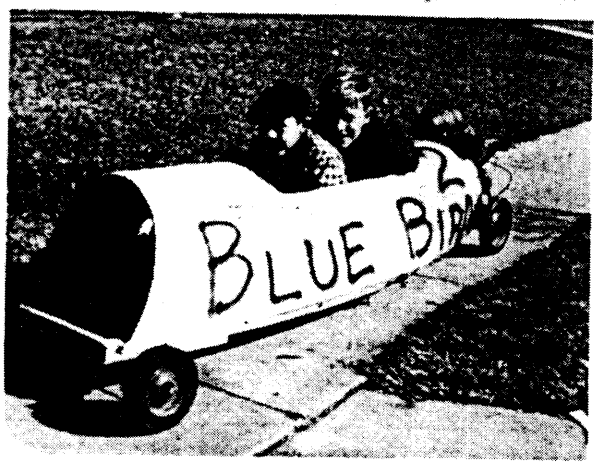


The last graph shows prop tip mach number versus rpm at prop diameters of 49", 51" and 53". There is some difference of opinion about the maximum tip speed, but most people agree that .75 is fine. You can see that since 3600 rpm is the maximum you will normally see in a high speed dive, that 53 inches will be satisfactory. The 51" prop gives a bit more ground clearance while the 49" version is too short for good efficiency.

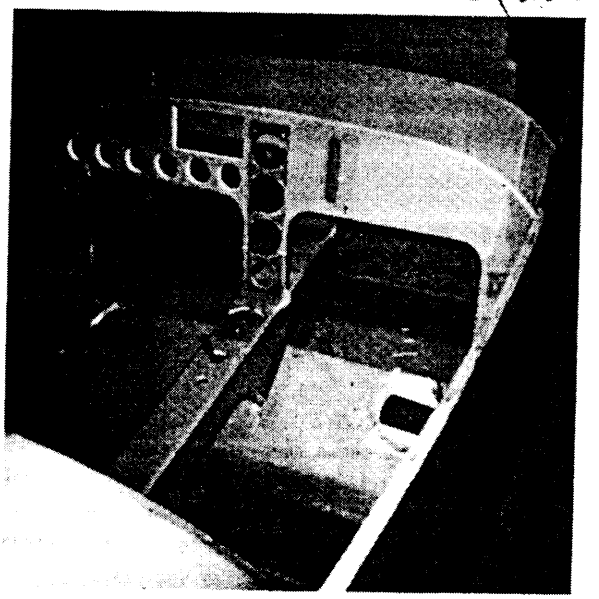
While Floyd can't do everything, he is pretty good at this sort of stuff. If there is a particular set of parameters that you are interested in seeing, please drop a line and let me know what you want. Don't ask to see what would happen if the span were increased to 45 feet or the engine power increased to 150 hp. Be reasonable please.



BOB WALTERS AND HIS FIRST DESIGN



ED SWAN'S FUSELAGE (and 2803V's)



PLANS CHANGES: Viking Aircraft cannot enforce "Mandatory" plans changes or modifications to your aircraft in the same way as the manufacturer of a certificated aircraft can. Each builder is the manufacturer of his aircraft and as such, is able to heed or ignore any plans changes as he wishes (or he may heed or ignore any or all of the plans for that matter). However, in the interest of safety, it is strongly recommended that the changes or advice published in the DRAGONFLYER be carefully considered for incorporation into your construction manual and/or your aircraft.

Newlsetter 6, page 6, column 1, paragraph 2, Change: The correct reference should be Chap 4, Pg. 1, Col. 2, Para. 2, Sentence 1 (not Sentence 2).

Chapter 1, page 6, column 2, paragraph 2, Add: Be sure that the peel ply material has a shiny surface, rather than a soft cotton "T" shirt type finish. Test your peel ply on a small part to be sure it releases properly. Do not remove peel ply until the part has cured for at least 24 hours.

Chapter 4, page 6, column 2, paragraph 2, Add: Don't forget to attach 2 "level" boards (one is a spare) with Bondo to the top skin of the canard before you remove it from the jig. Use the same procedures you used when attaching the level boards to the wing.

Chapter 7, page 12, Add the following dimensions to the rudder pedal assembly drawing: Fabricate the tubular bellcranks that attach to the rudder cables from tubes 4 1/4" long. Cut a one inch long slot in the top of the tube and weld in a tab fabricated from a piece of 3/4" x 2" x .063 steel. Drill a hole to accept the rudder cable shackle such that the overall length from the pivot point on the rudder pedal cross tube to the attach hole is 5 1/8".

Chapter 2, Page 4, Column 2, Paragraph 3, Add: Where it is necessary to join two pieces of cloth, overlap them at least 2 inches. These overlaps may be made at 45 degrees relative to the water line in order to conserve cloth. Save the triangular pieces of cloth produced where each ply ends and use as much of this cloth as possible in areas such as the tail. Save the remainder for glassing small pieces later on.

Chapter 8, Page 6, Column 1, After Sentence 2, Add: Naturally this hole must be just aft of the aft face of the canard drag spar. In order to make as fair a lead as possible from the inboard end of the brake conduit to the brake pully it will be necessary to remove some of the foam in the canard hinge fairing adjacent to the conduit for a distance of about 5 or 6 inches outboard of the end of the fairing that is next to the fuselage. Use a long thin chisel or knife blade to remove the foam. Carefully bend the conduit aft so that the cable will clear the aft face of the canard drag spar. Install a wedge of scrap foam with micro in order to fasten the conduit in position at the proper angle.

Chapter 6, Page 4, Change: The proper radius for the elevator and aileron hinge parts is .25" (not .5")

Chapter 13, Page 3, Note: The aluminium engine mount extrusions in this drawing are shown upside down. Simply ignore this error, but be sure to install the extrusions as directed in the verbage.

Chapter 7, Page 11, Note: The rudder bearings are not fully dimensioned, but they are shown full size in these drawings. Simply reproduce them as shown.

Chapter 8, Page 5, Column 1, Paragraph 2, Add: The Azuza wheels and brakes are light and inexpensive; however, they are not manufactured to close tolerences. Expect to fiddle with the brake drums in order to get the drums and wheels to run true. It may be necessary to do some filing and fitting. Non-concentric brake drums will cause unsatisfactory braking action.

Chapter 8, Page 4, Column 2, Paragraph 1, Add: Note that these structural plys are installed with the largest ply applied first, and the narrowest ply last. Make certain that these plys cover the axle hole and wrap up and forward on the side of the wheel pant, up around the corner, and onto the surface of the canard. It will not be possible to make these plys align spanwise as they go onto the canard surface. Expect them to lie at about a 30 degree angle relative to the span. Do the best you can to get as much of these re-enforcing plys on the pant and canard and trim the excess off at the lower edge of the wheel pant and leading edge of the canard. The idea is to pick up the loads at the axle and transfer them to the upper (or lower) surface of the canard.

Chapter 9, Page 6, Note: The drawing calls for an AN960HT-6P rod end. The correct part number is AN490HT-6P.

Chapter 2, Page 1, Column 1, Paragraph 3, Add: Keep in mind that the firewall must be fabricated from 1/4" plywood. Use care when laying out the re-enforcing inserts to insure that the remaining plywood will be of sufficient size.

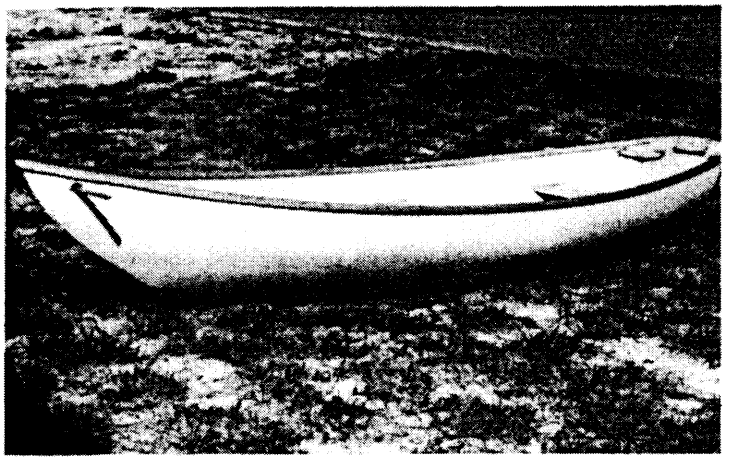
SALES TAX: The Florida sales tax has increased from 4% to 5%. If you are ordering plans or an info pack that will be mailed within the state of Florida, please enclose the appropriate tax. The Governor needs the money.

NEW PRESIDENT: The San Diego Builders group has elected J.M. Hoogervorst as this year's president. All you folks in the Southern California area should consider joining this group. It offers the advantages of bulk materials purchases, mutual support, and a fine social program. Contact J.M. Hoogervorst, 2550 E. Valley Parkway, Escondido, CA 92027 Phone # (714) 743-3550

INTRODUCTORY KIT: ALPHA PLASTICS, Route 1, Box 231, West, Texas 76691 (817) 826-3639 has developed an introductory composite kit. The idea is to give builders a chance to try their hand at fabricating the test and practice pieces as outlined in the education section of the plans without investing a lot of money. The kit contains: a quart of resin, a pint of hardner, several types and weights of cloth, Clark foam, carbon fiber, cups, gloves, mixing sticks, etc. In other words, just about everything you need. The current cost is $35, so all you guys who have been wondering what working with this stuff is like, now's your chance to find out.

STYRENE FOAM: If you are having trouble finding DOW foam (product number 81770), contact the EXTOL CORP. 1414 First Street, Sandusky, OH 44870 (419) 626-8643 (ask for Doug or Robin). The current price is $32.50 F.O.B. Sandusky and they will ship to anywhere in the U.S.

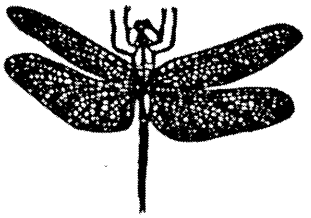
THE DORY SKIFF



BOAT PROJECT: In the last newsletter, I mentioned that I was working on a small boat project. Well.....I finally finished it a couple of months ago. It is 12.5' long and seats up to 3 adults. The shape is similar to a dory skiff. It has a flat bottom that makes it sit upright on the beach (that's the dory part) and a transom that can accept a small outboard (that's the skiff part). Unlike conventional boats that used to be made out of lumber, and are usually now made from plywood, this boat is made from foam/fiberglass (naturally). By using the scored Clark foam, I was not constrained by the material and I was free to design a boat with compound curves. Most people picture the "banks type" when the word dory is mentioned. This is the large, heavily built fishing boat with straight sides that is so often seen in romantic paintings of fishing off the east coast. They were built like this because many of these boats used to be mass produced and some were made to nest together on the deck of a large ship. A more sophisticated model gradually evolved that retained the flat bottom, but had a knuckled or multi chined side. This type, of which the Swampscott dory is the best known example, was usually of lighter construction and was often used for recreation. The shape is a compromise between ease of construction and the desire to achieve a true curved cross section.

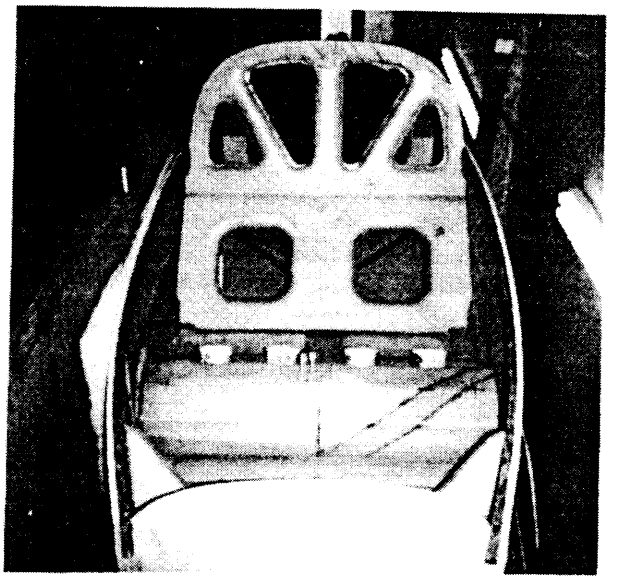
My little skiff was designed to meet the following needs. I wanted an inexpensive boat that was large enough for my wife and I to fish from. It had to be light enough so that we could lift it on top of our van, but strong enough to hold up to some rough treatment. It had to be seaworthy, row well, and be able take a small outboard. I also wanted it to look good. I think this boat meets all these criteria, plus it was easy and fun to make. The technique is similar to those used on the **DRAGONFLY** and some folks might be interested in constructing this skiff for educational purposes. A builder would learn a lot with a minimum investment and have a useful item at the end of the project, rather than just a bunch of test samples.

The boat is made mostly from 1/2" Clark foam and 6 oz cloth using Polyester resin. It is built over a male form that is very similar in concept to the female jig used for the **DRAGONFLY** fuselage construction. This method produces a very nice looking boat with lines that are quite fair. A lot of people think that my boat is a commercial product produced in a mold, but they quickly realize that it isn't when they discover that the whole thing weighs only 54 pounds! That's the beauty of homebuilding in foam/glass. You can produce a high performance product at a fraction of the cost of a factory product if you are willing to put in a few man hours of work. I haven't drawn up plans yet, but I may do so in the near future if there is enough interest. Drop me a post card and let me know if you're interested, but please don't ask me endless questions about how to build this boat. Full details will be published if enough people want to build it, but I simply do not have the time to coach each person on an individual basis, especially during the busy summer months.



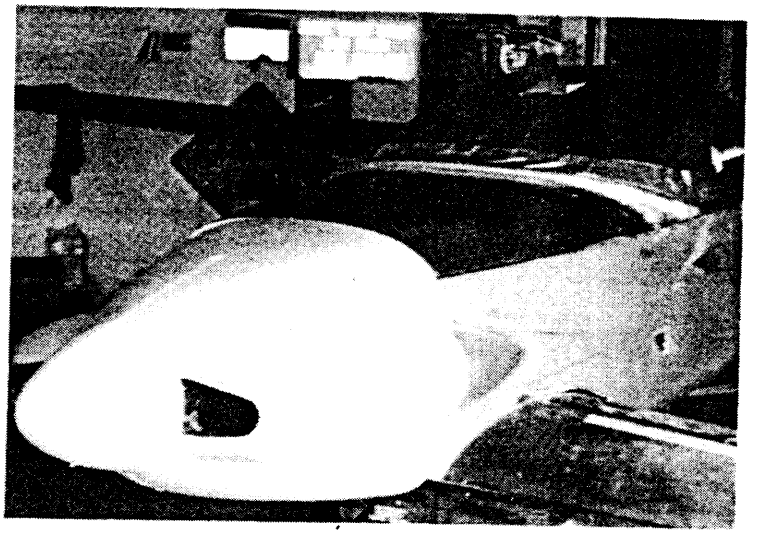
CAFE 400: The CAFE 400 race this year was held only a couple of days prior to this newsletter going to press. I talked to one of the officials by phone to get the preliminary results, but I didn't have a chance to get all the details. As you know, the CAFE race is an efficiency contest that measures aircraft speed, passenger carrying ability, and fuel consumption. This information is fed into a formula that produces a "CAFE" number or a fuel efficiency number. The higher the number, the more efficient the airplane. Last year (when the race was 250 miles long rather than 400 miles) the Q2 won by a suprisingly wide margin. Floyd (the computer) studied the results and he was shocked by the numbers that resulted from the performance of the Q2. In fact, Floyd has been feeling uncomfortable about these results for a whole year. Floyd thinks the DRAGONFLY is a pretty efficient airplane, but he doesn't think the DRAGONFLY can produce the kind of results that the Q2 apparently produced last year. No one seemed to have an explanation for this sort of thing. I told Floyd during his learning phase that "you can't fool Mother Nature". My dad told me the same thing when I was a kid and I believed it; however, last year's results seemed to prove that Mother Nature could indeed be fooled. Floyd and I discussed the fact that fuel consumption is measured by weighing the airplane before the event and again after landing, with the fuel burn being the difference in weight. Any addition of unmeasured weight between the two weighings would show up in the results as unburned fuel. Since the distance is short, and most of the aircraft are small and don't burn much fuel anyway, a small amount of weight would make a big difference in the apparent fuel consumption. As little as 10 pounds error in the weighings would make the difference between a fantastic win and a middle of the pack finish.

This year the distance was 400 miles, the scales were much more accurate, and the impound proceedures were more strict. The results were also much more reassuring to Floyd. A Varieze was first, second, and third, with a Long Ez in fourth place. A Q2 was fifth with a speed of 135 mph and a fuel burn of 31.1 mpg compared to last years 140 mph and 42.3 mpg. Apparently the Q2 prototype made a emergency landing shortly after the start after the Revmaster engine destroyed itself; however, it managed to make it back to the runway. Dick Rutan won the 3 seat division in a Long-Eze. I can't wait to hear how he got 3 people in a Long-Eze. Keep in mind that these results are preliminary and subject to change. Look for the full story which should be out in *SPORT AVIATION* in the near future. Next year we hope to see a couple of DRAGONFLYS in the contest.



WALTER MC CLARY'S FUSELAGE

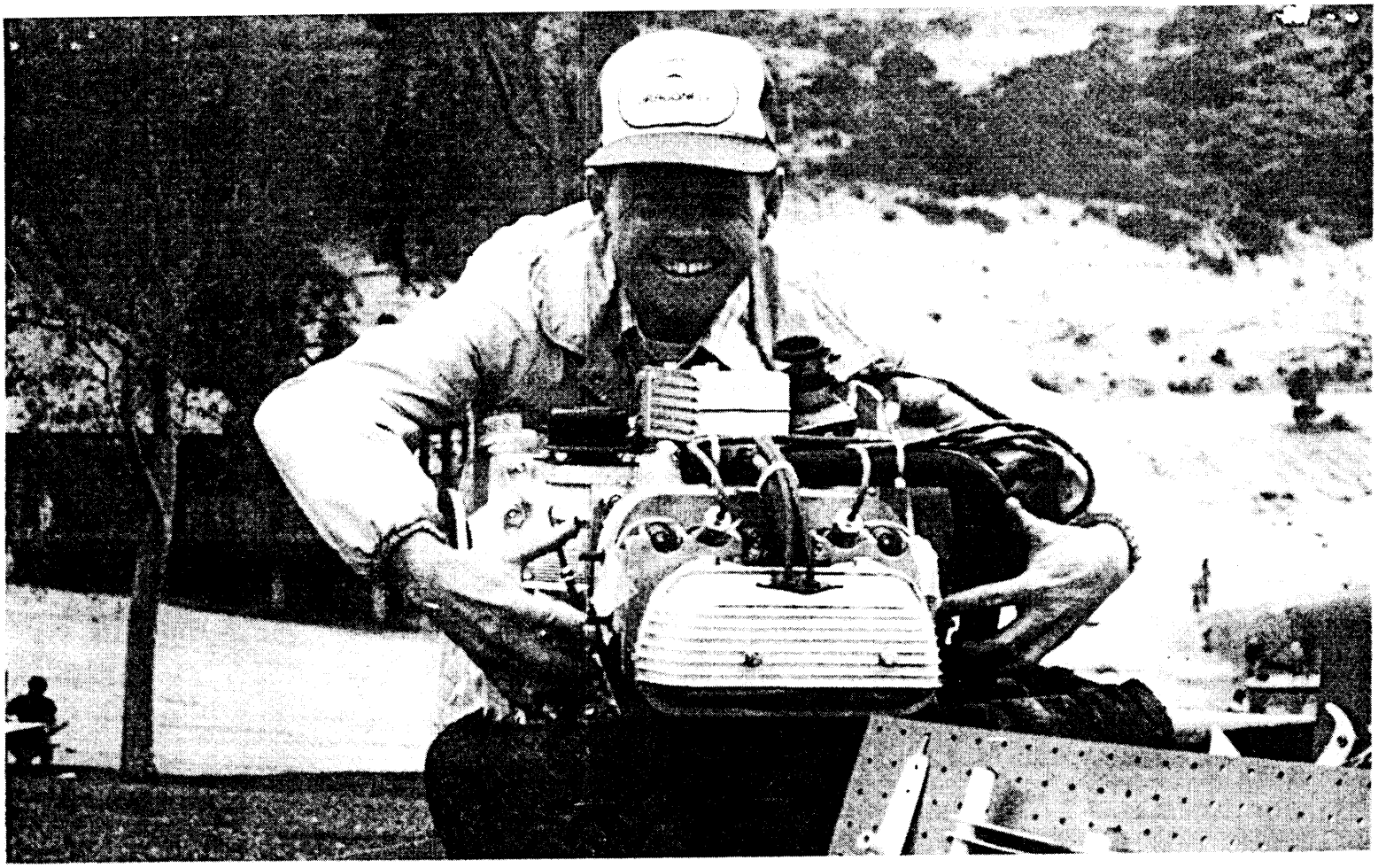
JIM NALLY'S PROJECT



ITEMS AVAILABLE FROM VIKING

PLANS- $175 ($185 overseas) includes 1 yr. subscription to the quarterly newsletter. INFORMATION PACKAGE- $7.50 ($8.50 overseas) includes color lithograph. QUARTERLY NEWSLETTER- $6.00/yr ($7.00 overseas) ALL PRICES INCLUDE AIRMAIL POSTAGE. FLORDIA RESIDENTS PLEASE ADD 5% STATE SALES TAX. OVERSEAS CUSTOMERS PLEASE SUBMIT U.S. FUNDS ONLY.

contact:
VIKING AIRCRAFT
5825 GRAND LAGOON BLVD.
PENSACOLA, FLORIDA 32507
PHONE (904) 492-2727



TOM LYNCH FROM SAN DIEGO

VIKING AIRCRAFT
5825 GRAND LAGOON BLVD.
PENSACOLA, FLORIDA 32507 USA

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