Established 1936
SKY-SCRAPERS BKLYN NY
AMA Club Charter 470

FLYOFF

Round 18 / Summer 1992

The **SKYSCRAPERS** Quarterly

Edited by Bob Hatschek

What's Up? XVIII

It was a great party!

What party? The Skyscrapers' annual dinner, of course, in Stamford way back on Mar. 7. Manero's served a fine meal, and most of the Skyscrapers came with their ladies.

Guest of honor was Joe Beshar, new District II vice president, who brought his First Lady. Joe also brought along a trophy he won for first place at the Skyscrapers' First Annual Contest in 1939.

Newer trophies were awarded to the club's high point scorers of 1991, Jack Nix, Jean Pailet, and Mal MacLean in 1-2-3 order. And the special presentations were made:

The Outstanding Modeler Award went to Jean Pailet. In addition to a strong competitive year, Jean also spearheaded the Galeville cleanup effort and represented free-flighters at the AMA Nats planning session at Westover AFB in Chicopee.

The Royal Order of the Purple Shaft was presented in absentia to last year's co-president, Jim Boccinfuso, for "not quite winning—or placing—in most of the many 1991 contests he entered." He really is a better competitor than his record showed, and it's expected that he'll really turn it on this year, now that the workshop is working in his new Virginia home.

Finally, one surprise award was made. The Geritol Tired Blood Award has been revived by Hank Cox—who created it originally in 1957. For anybody who has never seen it, believe me, it's a beauty! About 20" tall, it consists of a gilded wooden base into which is inset a small bottle of the "fortified elixir of therapeutic potency" for which the trophy is named. The base is surmounted by a 12" high-wing monoplane with tired blood. Wings droop, prop blades sag, body and stab seem to be melting. It's as limp as Salvador Dali's sagging watches!

This magnificent award was presented to your editor—I can't imagine why—and it is now proudly displayed in the Hatschek living room.

Galeville Maintenance Fund, 4/24/92

Previous Balance (1/10/92)		**$740.00**
New Contributions	**Amount**	**Balance**
Skyscrapers		
Larry Davidson, 2/92	100.00	
Bob Lipori, 2/92	100.00	
Clark Darling, 2/92	50.00	
Bob Langellus, 4/92	100.00	
Anonymous, 4/92	125.00	
		1215.00
Non Skyscrapers		
Tom Fennell, 2/92 & 4/92	100.00	
AMA Exec Council, 2/92	500.00	
The Brainbusters, 3/92	50.00	
Joe & Alex Dashko, 3/92	50.00	
Toby Feuer, 3/92	25.00	
Don Krus, 3/92	25.00	
Gil Morris, 4/92	50.00	
Abram Van Dover, 4/92	50.00	
		2065.00
New Expenditures		
None, as of 4/24/92	—	
Balance to 4/24/92		**$2065.00**
Pledges Outstanding		
Eastern FF Conference, 11/91	750.00	

We welcome further contributions for continued maintenance and improvement of the field. Funds are kept in a separate account reserved for this use and full accounting will be published in *FLYOFF*. Please send donations (payable to "Skyscrapers") to Tom Waddington, 3504 Carol Ct, Yorktown Hts, NY 10598. Thank you!

Update your Contest Calendar

Because the 1992 Contest Calendar in Round 17 was rather more extensive than previous ones, we will save the space and not repeat the season's remaining free flight events in this issue. But we do want to update a few entries. You are still cautioned to confirm all information here and in Round 17 before departing on any major safari!

Any Nats contestant who reserved a room at the Quality Inn (296 Burnett Rd., Chicopee), which was later taken over by Howard Johnson, will have to make new arrangements. That motel has apparently been "taken over by the bank" and closed down completely—and there was no notification to people with reservations. Furthermore, there is another "convention" (American Craft Society, or something) in the Springfield-Chicopee area at the same time, so rooms are scarce.

Also at the Nats—in addition to the revised schedule of indoor events published in Round 17—the NosGas events will now be held on Saturday AND Sunday (with ignition events on Sunday). It is further understood that SAM events will also be spread over Saturday and Sunday.

For info and entry to AMA and NFFS events at the USOC, contact man and CD Phil Sullivan has a new address: 5151 E. Memorial Dr., Muncie, IN 47302. His phone number is 317/289-4236.

There are no changes for the SAM contact (Don Sachtjen) or the FAC contact (Lin Reichel) for those events at the triple-header Muncie meet over the Labor Day weekend.

[Continued on page 8]

How to cover with Mylar

by Jim Brooks, MAAC 1813

Mylar is a superior covering for most free-flight models. It goes on easier and faster than tissue or silk and dope. There's no odor or mess. It's more durable and puncture resistant. It's easier to repair, cheaper to buy, and models covered with Mylar are more likely to hold their trim—as long as the basic structure is designed to be torsionally rigid.

My Wakefield wings use .0009" aluminum bonded to 1/32" balsa to form a D-box for the first 30% of the section. The leading edge is one carbon tow in thinned 5-minute epoxy. The straight ribs aft of the D-box are 1/16" balsa on 2" centers and are capped with .003" carbon, as is the 1/4" x 1/16" balsa trailing edge. At 247 sq inches, the bare frames weigh 43 to 50 grams and are extremely rigid.

Another way to get a good D-box is to build a conventional balsa box from 1/32" light balsa, 1/16" ribs, 1/8" leading edge, and a carbon-capped (.007") 1/8" main spar. Cover the box with .75-ounce glass or Kevlar laid at 45° to the span and stick it down with thin CyA. This is easier than aluminum and almost as rigid, but slightly heavier.

Mylar covering adds 7 grams, while tissue and dope adds 8 grams. An entire contest season flown with these Mylar-covered wings required minimum repair and *virtually no retrimming at all*. At the 1991 Skyscraper Challenge at Galeville *[Which Jim won!—Ed.]* I was able to use all four models in the box—all but one of which had not been flown in six weeks. Their performance was uniformly consistent and dependable, which adds a tremendous boost to your confidence at a contest. Lose one in a tree (which I did) or have the wind increase (which it did) and all you have to do is switch to another model and keep on flying.

The stabs on these models use a variety of construction methods from simple diagonal ribs to full multiple geodetic and even the least rigid of them did not change throughout the season. The only difference noted was that it was possible to induce a warp in the stab with heat while the wings were impervious; you have to build the warps in—or out.

The very lightest aluminized Mylar comes from FAI Model Supply or Model Research Labs (MRL) *[The editor has used 1/4-mil aluminized Mylar from Mike Woodhouse in England, and believes it to be the lightest.—Ed]*, while very light clear is available from Branford Hobbies. These films do not have any adhesive coating, so Balsarite, Sig Stix-It, or thinned contact cement is required to adhere the Mylar to the framework.

The material I prefer is clear Mylar from MRL. It is slightly heavier than the other clear or the aluminized since it has an adhesive on it and is thicker at 1/2 mil. On earlier Wakefields covered with tissue it would not be uncommon to find 20 or more patches from stubble and the models were always going out of trim. With Mylar and the aluminum D-boxes, the things rarely go off trim and they have at most one or two small punctures that are very easily repaired.

It is relatively easy to apply Mylar if you follow a few simple procedures. First, make sure you are in the right heat range. The adhesive melts at a lower temperature than the ideal heat for shrinking, so make sure that you have the iron no hotter at first than is necessary to stick the film to the framework. Experiment to find this heat setting. If your iron is too hot at this point, you will get excessive shrinkage before the Mylar is stuck down and plenty of wrinkles will result.

Lay the film on the panel as smoothly and wrinkle-free as possible. Using just the tip of the iron, tack the film in several places around the perimeter. Distribute these tacks evenly and go from side to side and end to end. You don't want to activate the film before it is stuck down. Keep the hot body of the iron away from the untightened film and just use the tip. If you see any large wrinkles developing, loosen the offending tack, pull out the wrinkle, and retack. Once the tacking is complete, go on to stick the film down securely all the way around, but don't concentrate the heat too much in any one place. I also stick the film to the ribs, top and bottom, working from the center to the ends and edges.

The best shrinking temperature is higher than your tacking and sealing setting. Find out what that is on your iron. For a film like Lite Span there is a very narrow range. If you are too cool the film won't shrink enough, and if you are too hot you will cook the film and ruin the job. MRL film has a much broader range and can be shrunk at the highest setting on my Monocoat iron. It's important that you find out what setting on your iron does the job and not use more heat than needed.

Stubborn small wrinkles can often be removed by remelting the adhesive and dragging the film tight with the iron applied to the frame.

I use Pactra RC Car Racing Finish spray bombs of fluorescent red, orange, or yellow to colour *[Jim's a Canadian, remember.—Ed.]* the underside of the wing tips only. First I pin down a sheet of Mylar, then fog on a thin coat of colour on the inside surface and let it dry thoroughly. The paint either blends with the adhesive or becomes the adhesive and does not debond. This provides excellent visibility on the ground and in the air at minimum added weight. Letters and numbers can be traced onto the inside of the top surface after it has been shrunk and before the bottom surface is covered. Just make up a mirror-image pattern and tape it in place outside, then trace out the design in any colour marker which suits your fancy. It's cheap, light, and permanent.

This year I have used MRL Mylar for all my new Wakefields and for an A1 glider. On my new Coupe and a 470-sq-in. dawn Open Rubber model I am using the lighter clear Mylar. I don't plan on using the aluminized film since it seems to disappear into whatever it is lying in, although Mathews and Rowsell have had great success with it. I have used the Lite Span but it is too hard to apply and is not any more durable than tissue, but it is light and pretty.

Some sources for materials

Ken Happersett, 11687 Azalea, Fountain Vally, CA 92708—.0009" aluminum foil (18' roll 32" wide).

Jim Bradley Model Products, 1337 Pine Sap Ct, Orlando FL 32825—carbon laminates .003" and up.

FAI Model Supply, P.O. Box 3957, Torrance, CA 90510 — aluminized Mylar.

Model Research Labs, 25108 Marguerite #160, Mission Viejo, CA 92692—carbon for spars; 1/2-mil and aluminized Mylar; carbon, Kevlar, and glass cloth; ultralight indoor Mylar.

Mark Castiglione, Branford Hobbies, 609 Boston Post Rd, Branford, CT 06405—lightest outdoor Mylar (.75 g/ft^2)

F1B for Juniors—and others

by Tom Ioerger, Baltimore Aerocraftsmen

Back in 1989, after the Junior Team had been selected, including my son, and Bob Sifleet had been chosen as the team manager, he and I discussed what might be done to improve the chances for success for our junior flyers. Bob knew that I had been developing a simple but high performance Wakefield and that my son Rod, who was 13 at the time, could fly the design effectively.

I told Bob that I could put together a kit of the design, along with building and flying instructions and a set of plans, and that I thought the model would be relatively easy to assemble into a high performance airplane. Bob found a contributor willing to fund the enterprise and he gave me the go-ahead. I believe he also found some ways to help the power and glider flyers.

I obtained three sets of machined balsa and spruce wing panels and three sets of machined balsa propeller blade blanks to my design from Joe Maxwell in Scotland. I also ordered three Montreal-stop F1B front ends from Marjan Klenovsek in Yugoslavia and three F1B carbon-fiber motor tubes from Ron Pollard in England. When all the pieces arrived, I included some carbon fiber spar stock, a spool of bead thread for turbulators and invigorators, and the plans and instructions and mailed them off.

At the SOKO Cup (an open international meet for all age groups) and at the Junior World Champs Chris Pelatowski and Rod flew the kit models and did pretty well, although less than inspired air-picking in the difficult conditions kept us out of the medals. Dave Warren also did well in the Junior World Champs flying a slightly different version of the kit design.

F1B Instructions

This model is designed in accordance with the French ideas of thrust line through the CG, wing mounted very low and negative to the fuselage (-1.5°), rear fin, and low aspect stab (4.5). The high aspect ratio wing with a full set of turbulator and invigorators comes from my attempts to max the early morning 4-min. round at the FAI team finals. The 12% thick fin and the stab with a lot of upsweep to the airfoil leading edge comes from experiments by Bob Sifleet and myself to make our power models more controllable. The sliding wing mount and the stab mount are for safety on the stab and adjustability on the wing. I assume that builders of this model will have had prior experience building high performance rubber models.

Fuselage— Use the tapered carbon fiber motor tube with the largest diameter at the nose. Sand the nose to 2.5° down and 2.5° right thrust. Epoxy the aluminum ring in after thrust and prop fold are aligned with the whole airplane. Reinforce the rear of the motor tube with 1/64" plywood and drill for the rear rubber peg. I use two layers of telescopic aluminum tube flared at one end and held with a hitchpin at the other. The tailboom should be rolled from light A grain balsa. The taper is up to you. Assemble the motor tube and tail boom so that their tops are in line. The stab mount is built with no leading edge stop except the rubber bands and the stab has no keys. This prevents disasters. I use a small maple block drilled and tapped for a 2-56 nylon screw at the rear of the stab mount. I also use a d/t line tube from behind the adjustment block to the front of the tail boom. It stops CG changes and stress on the stabilizer. The fin is built up "Union Jack" style or made from very light solid balsa. The 12% thickness is important and should be used. The wing mount is built up of 1/16" hard sides with 1/8" x 1/16" spruce strips across the top as stiffeners and wing hold-down pegs. The wing sits at negative 1.5° to the fuselage. This is very important! Put some balsa doublers above the spruce strips to make rails for the wing to sit on. The wing mount cross pieces are two layers of 1/16" balsa glued cross-grain and faced on both sides with 1/64" plywood. These formers are under high stress. Slot the formers for the 3/32" square spruce key. Glue a soft balsa block inside the wing mount to hold the d/t fuse snuffer tube. Add the d/t band hook and the four fuselage band hooks all from GEM clips doubled and bent to shape. Glue them on with Hot Stuff and silk. The stab mount should be glued on with silk reinforcement with the stab tilted a little more than parallel with the inboard wing panel for a right glide. The fin should be glued on with a very slight right turn. This should be just enough to cause a slight right turn when the model speeds up after a stall. Cover the boom with silk and the fin with Jap tissue.

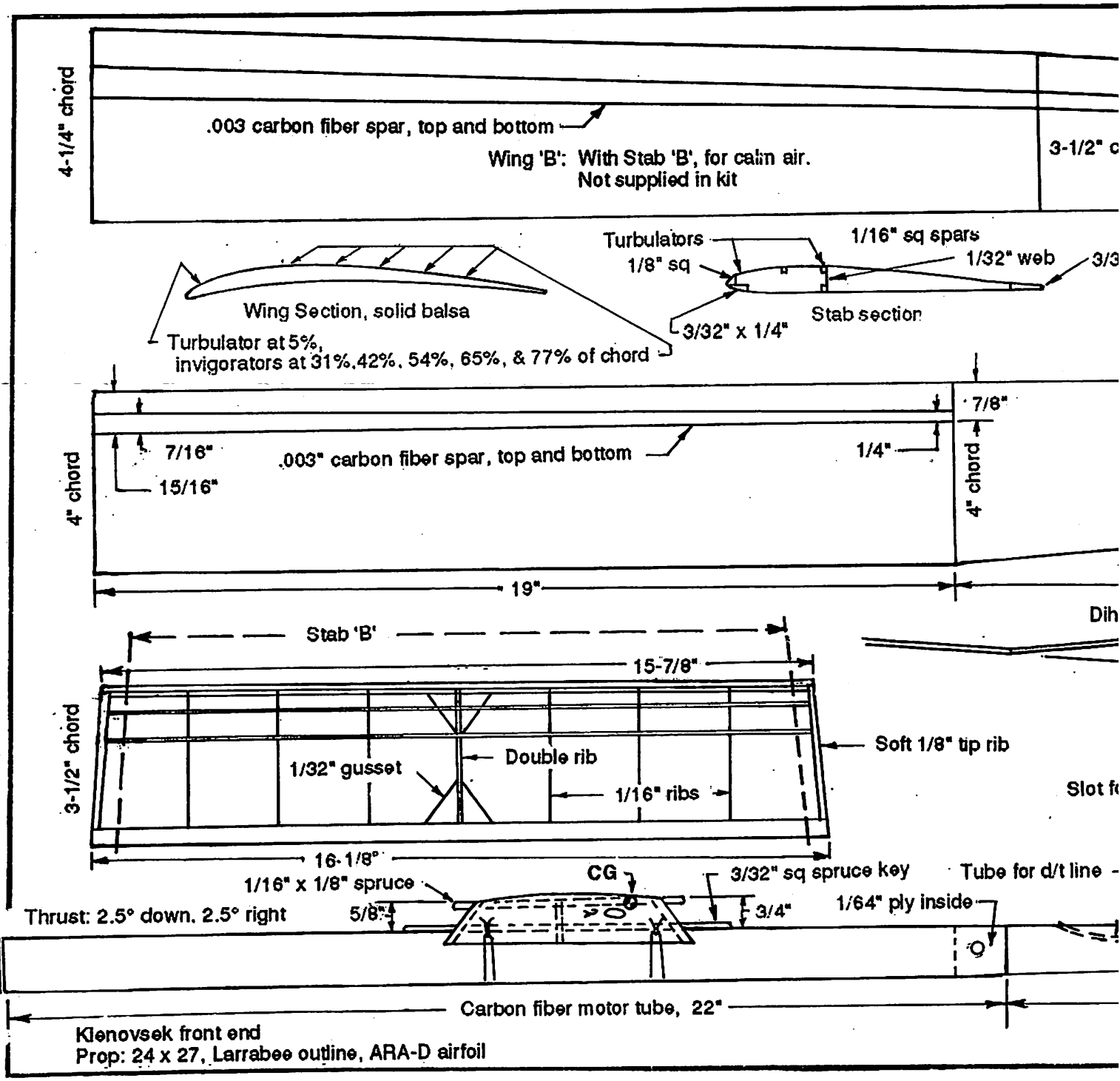
Front End and Propeller—The front end provided is very simple and trouble free. It has two adjusting screws for fine tuning thrust. There are brass washers on the prop hanger wires to solder the prop holders in place. Do not allow the spinner to touch the prop hanger wires. The propeller blade blanks are undercambered and need only sanding on the bottom surface. The tapered prop spars should be cross drilled in several places with a small drill and then slotted into the bottom of the blade blank. I use thick Hot Stuff for this. The prop airfoil should be an ARA-D type with a 9% thickness and a high point at 35% of chord from the maximum blade width out to the tip. The blade thickness should taper from full depth at the root to the 9% at max width. Finish the prop blades with two coats of thin Hot Stuff rubbed on with a paper towel. Set up the front end so that the prop blades balance on each side of the fuselage when streamed back under air pressure. Do not use rubber bands to close the blades. Use a turbulator at 8% and at the high point of the airfoil on the prop blades. Turbulator thread is provided [*"Bead thread," available in most craft shops.—Ed*]. Use the drawing included to set the prop pitch with the jam nuts on the prop spars. This propeller is my version of a design by Carrol Allen. It is meant to spin fairly rapidly and needs a motor with max turns of 400 to 420 when wound to the last gasp. If you don't blow a few motors, you are not winding them all the way.

Stabilizer— Build the stab with the highly upswept leading edge and flat bottom. Both are important. The low aspect ratio is important, too. Use the outline shown on the drawing. Use some boron or carbon fiber on the 1/16" square spars and don't omit the web. Use the thread provided for the two turbulators. Do not omit them! Cover with Jap tissue.

Wing—The wing panels should be sanded lightly and carefully to remove the machining marks. Cut the carbon spars from the material provided, sand them to remove mold release, and glue them in place using thick Hot Stuff. Make sure that they are lined up top and bottom to prevent

heat warps. Butt glue the tips to the main panels with thick Hot Stuff, making sure of the 3° tip washout that is machined in. Butt glue the center joint with thick Hot Stuff and then cover the joint with the Kevlar provided, using one 2" layer on top and one 1-1/4" layer covered by a 2" layer on the bottom. Glue the Kevlar on with thin Hot Stuff and rub it down with wax paper. Cover the wing with cross-grain Jap tissue using absolute no-shrink dope, such as Sig Lite Coat. This is important! Use the thread provided for the turbulator and invigorators. Do not omit these! Your Wake won't perform without them!

Assembly— The wing should mount square to the fuselage both in tilt and skew. Put a key on the right leading edge and left trailing edge. Use split 1/16" dowels. This arrangement and the half round dowels will help prevent damage. The stab should be tilted for a right glide. Set the CG, with the prop blades folded and a rubber motor installed, at 3/4" forward of the wing trailing edge. Once everything looks right, carefully glue the wing mount key to the motor tube. The wing mount is held in place with friction and rubber bands. The easiest way to get the wing mount set up is to wrap sandpaper around the motor tube and rub the wing mount on it until it fits the curve of the motor tube and has the proper negative angle. The stab should be set to pop up about 60° for d/t.



Flying— The idea in trimming this design is to balance CG position, stab incidence, glide turn, and thrust offsets to get a right-right pattern. All of the above are already set about right so only small variations should be required. Set up the glide over grass using hand launches and adjusting the stab screw. When the glide looks okay, start with low turns on the motor (50%) and look for an easy right turn under power and glide. Correct too tight or too open turns using thrust offset for power and stab tilt for glide. If the stab tilt is not effective, you may have to move the CG back slightly to give the stab more power. If the model stalls and dives straight ahead or left, then add a little right rudder using reversed trailing edge on the fin. Do not slow the glide too much, since the invigorators will prevent a stall even when the airfoil is in a high-drag attitude with attendant high sink rate. Similarly, do not let the model hang on the prop. The high aspect ratio wing is low drag! The model should move out under power. Under full power, the French force arrangement gives a straightaway climb at a very steep angle like a VIT-equipped airplane, so launch it steep and throw it hard.

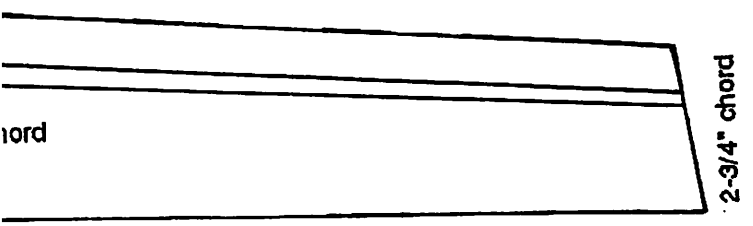
I recommend the FAI tan rubber and the aluminum rubber hooks made by Champion Model Supply. My home phone number is 301/498-9777 if you have any questions.

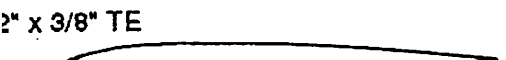
Tom Ioerger

F1B for Juniors—and others

By Tom Ioerger, Baltimore Aerocraftsmen

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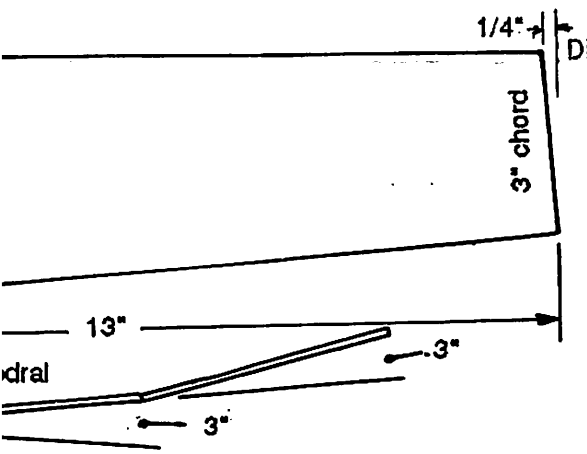


Fin section, 12% symmetrical

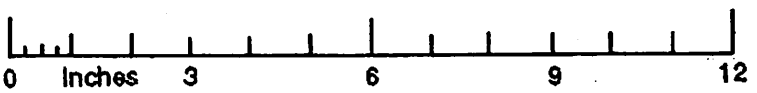
Weights

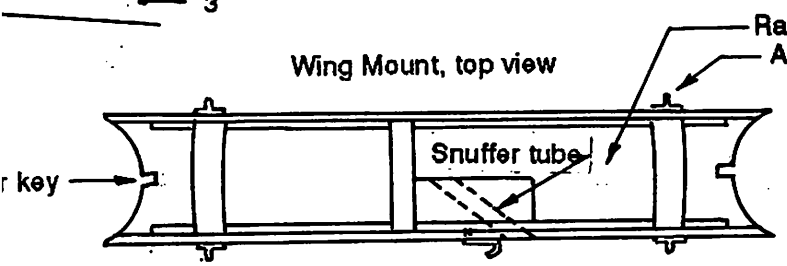
Wing	62 grams
Stab	7
Prop unit	44
Fuselage	72
Radio	5
	190

Power: 26 strands of 1/8" FAI Tan, 400 turns

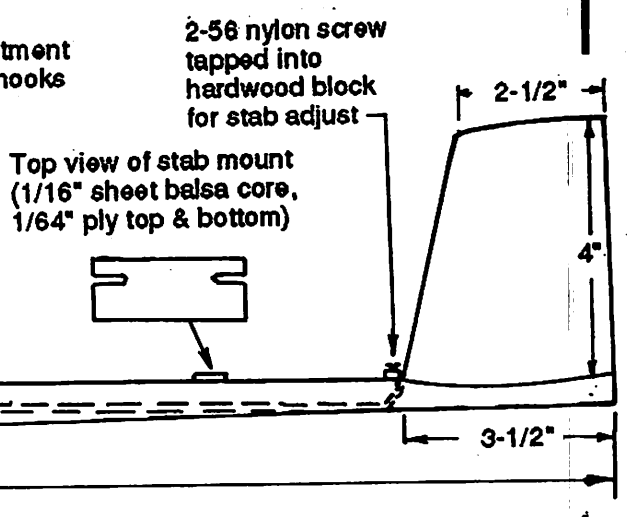


Dihedral 3-1/8" (3° washout)





Wing mount cross pieces are two cross-grain 1/16" balsa laminations faced on both sides with 1/64" ply



Comments on Delayed Prop Release
by Dick Quermann

[The author and the editor are one-time flying partners. Dick no longer competes, but he retains at least his academic interest in our sport and he is a topnotch analyst of miniature flying machines. He was especially active in Wakefield in the early 50s, and at one time he simultaneously held both the Junior and the Open records for indoor helicopters.—the Editor]

Bob Meuser's discussion in *FLYOFF 16* is long on direction but short on magnitude. That there is an advantage to increased launch velocity is undisputed. The question is how much. Meuser cites the extreme case of a VTO launch compared to a DPR at zero velocity. A far more realistic approach is to assume that the DPR occurs at the velocity at which the model would have been launched without DPR. The altitude at which DPR occurs is then a guaranteed improvement over the non-DPR. Further improvement can probably be achieved by selecting a more optimum velocity for DPR but that is much more difficult to quantify.

In order to evaluate the potential gain, I calculated the altitude vs velocity characteristic using a very simplified model. I assumed a vertical trajectory and a drag equal to a constant times the velocity squared. The result, unless my rusty calculus has betrayed me, is the somewhat messy expression:

$$h = \frac{W v_R^2}{Dg} \ln\left[\cos\left(\tan^{-1}\frac{V_0}{V_R}\sqrt{\frac{D}{W}} - \tan^{-1}\frac{V}{V_R}\sqrt{\frac{D}{W}}\right) + \frac{V_0}{V_R}\sqrt{\frac{D}{W}}\sin\left(\tan^{-1}\frac{V_0}{V_R}\sqrt{\frac{D}{W}} - \tan^{-1}\frac{V}{V_R}\sqrt{\frac{D}{W}}\right)\right]$$

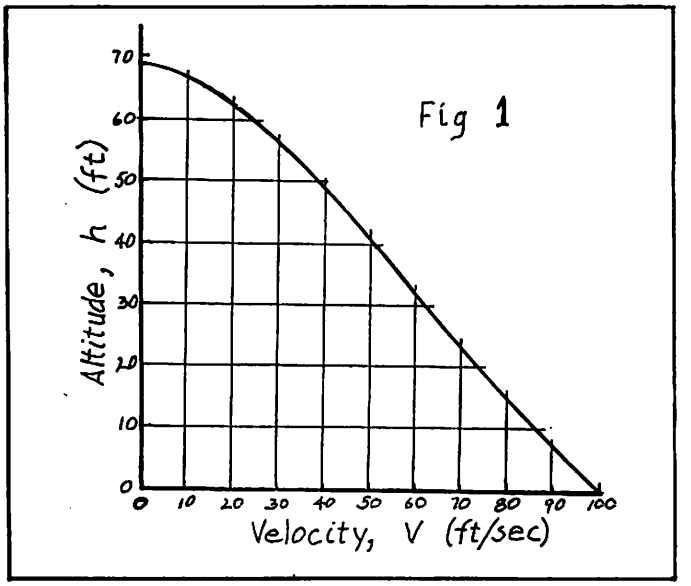
where: h = altitude when velocity = v
v_0 = launch velocity at h = 0
g = acceleration due to gravity (32 ft/sec^2)
D/W = drag/weight at some reference velocity v_R

As an example, I guesstimated a D/W of 1/12 at a reference velocity of 16 ft/sec. The resulting h vs v curve starting at an arbitrary 100 ft/sec is shown in Fig. 1 In order to find the DPR altitude increase, simply subtract the altitude for the DPR launch velocity from the altitude for the non-DPR launch velocity. For example, if you normally launch at 40 ft/sec but can increase this to 80 ft/sec with DPR, the increased altitude will be 49 – 15 or 34 ft.

Now all you have to do is replot the curve for your own W/D value and measure your launch velocities to get a realistic value for DPR improvement.

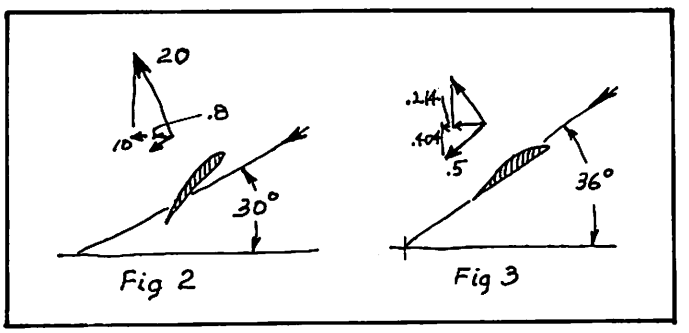
The validity of Meuser's comments on propeller efficiency at higher than design speed and his recommendation of instant prop release (IPR) depends upon how much faster than design speed the launch is. The torque required to drive a prop is proportional to N^2D^5, where N is rpm and D is diameter. For peak efficiency, a propeller must operate at a particular v/ND, where v is velocity. Thus, at peak efficiency the drive torque must be proportional to v^2. If the prop is designed for peak efficiency at 16 ft/sec with a drive torque equal to half the peak torque at launch, then launch velocity for peak efficiency would be $16\sqrt{2}$ or 22.6 ft/sec.

At higher speeds there is insufficient torque available to achieve peak efficiency. The angle of attack of the blades



is reduced and the prop spins faster but generates proportionally less thrust. Eventually it reaches zero efficiency when the net thrust is zero. At still higher speeds the prop is driven by the slipstream in addition to the rubber and produces negative thrust.

I am not about to undertake a rigorous analysis of a propeller to determine the velocity for zero efficiency. However a simplified look at a typical (hopefully) blade element is more enlightening than no look at all. Consider an element operating at peak efficiency with an advance angle of 30° and an L/D of 20/1 (Fig 2). The torque-producing component of the forces is 10 from the lift and .8 from the drag for a total of 10.8.



If the drag drops to .5 and the advance angle rises to 36° at zero efficiency (Fig 3) and net thrust is zero, the torque component due to lift must drop to $.5[(\sin 36°)^2/\cos 36°]$. Adding to the torque component due to drag of .5 cos 36° gives a total of .618. This element sees an airspeed of $v_p/\sin 30°$ at peak efficiency and $v_0/\sin 36°$ at zero efficiency. In relative terms, equating the torque components times (airspeed)^2 gives $10.8(v_p/\sin 30°)^2 = .618(v_0/\sin 36°)^2$, from which $v_0 = \sqrt{10.8/.618}\,(\sin 36°/\sin 30°)v_p$. As shown previously, at launch the velocity for peak efficiency is 22.6 ft/sec. The speed for zero efficiency would be 4.9 x 22.6 or 111 ft/sec.

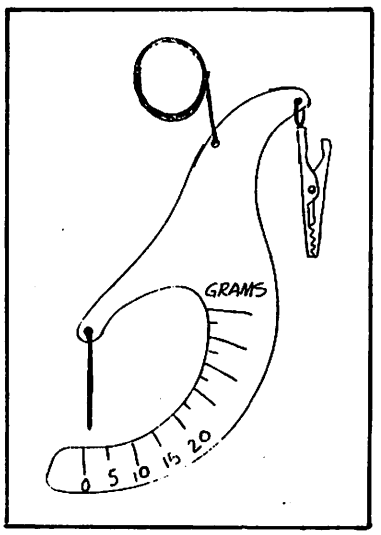
From this I would conclude that the propeller efficiency at world class launch velocities is likely to be very low indeed and instant prop release significantly inferior to a properly executed DPR. By this I mean releasing the prop near the velocity for peak efficiency and not the near zero velocity postulated by Meuser.

Buying balsa on the road

By Walt Rozelle, TTOMA

Some of the best balsa I have ever come across was purchased from hobby shops I scouted while out on business trips.

Although some people have the magic touch and can accurately estimate the weight of a piece of wood merely by picking it up, that talent escapes me. So I make sure that I pack my pocket-size postal scale and my billfold-size wood-density chart. You will find the scale at almost any office-supply or stationery store for about $5. For the the price of a dinner at Nino's Restaurante, sweet Dolores sewed me a nice little bag for the scale—and it even has a reinforced flap where I can store a few straight pins (which I can surreptitiously stick into the wood as a gripping point for the scale's alligator clip).



Here are a couple of hints for out-of-town wood shopping:

(1) Always call ahead. Make it clear that you want to select some wood. Some RC-oriented hobby dealers don't comprehend your preoccupation with weight and might resent your desire to go behind the counter. Also, many shops are on a fragile economic footing—so don't be too surprised if you get a "disconnected" recording when you dial the number in the Yellow Pages.

Approx Weight (grams) of 36" balsa sheets

Thick ⇒	1/32		1/16		3/32		1/8		3/16		1/4	
Width ⇒	2	3	2	3	2	3	2	3	2	3	2	3
Density												
4	2	4	5	7	7	11	9	14	14	21	19	28
5	3	4	6	9	9	13	12	18	18	27	24	35
6	4	5	7	11	11	16	14	21	21	32	28	43
7	4	6	8	12	12	19	17	25	25	37	33	50
8	5	7	9	14	14	21	19	28	28	43	38	57
9	5	8	11	16	16	24	21	32	32	48	43	64
10	6	9	12	18	18	27	24	35	35	53	47	71
11	6	10	13	19	19	29	26	39	39	58	52	78
12	7	11	14	21	21	32	28	43	44	65	57	85

(2) Be patient. You may find some surprises if you look "where the good wood doesn't belong." The finest sheets of 1/16 x 4 x 48 I ever bought (for rolled Mulvihill fuselages) were in a Midwest "RC wood" bin at a shop in Greensboro, N.C. The most beautiful piece of balsa I ever found was in a shop in Mobile, Ala. It was a sheet of Sig 3/32 x 3 with perfect "A" grain and it weighed an incredible 4.1 lb/cu ft. And it was stamped "8-12 lb RC wood." I sent that one where it belonged: to a top indoor flyer.

And sometimes you just want to sit down on the floor and cry! I recently spied some strange-looking 1/4 x 1, very light in color and straight of grain. I bought eight pieces and took them home for accurate weighing. Each piece was under 5-lb density! Experiences like that make me want to shoot the idiot running the saw that desecrated such magnificent lumber.

(3) Postal scale weights are guesstimates. And the chart weights are only approximate. But in an exercise like this you don't really care! If you find a nice piece of "C" stock that weighs between 4- and 7-lb/cu.ft, you're going to buy it anyway. Right?

When not traveling, I keep the scale and chart in my car, so it is always handy when I dart into a hobby shop. I try always to take a turn around the wood bin when visiting any hobby shop.

Another note: I have noticed displays of balsa showing up in a number of unsuspected places lately. Like hardware stores and art-supply houses. I even found some prime 3/16 trailing edge stock in one of the latter!

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[Continued from page 1]

The Eastern Canada Open at Gananoque Airport has been rescheduled. New dates are Sept. 19-20, and official flying starts at noon Saturday. That contact man has also moved. Jerry McGlashan's new address is 170 Fairhaven Ave., Pointe Claire, Quebec H9S 4A7, Canada. His phone number, however, remains the same: 514/695-7415.

The Brainbusters have settled on Oct. 18 for their Fall meet at Petersburg, Va. This meet was originally listed for either Oct. 4 OR 11.

The 1991 Sympo is out

"Without data and analysis, you're just another loudmouth with an opinion."

That anonymous quotation sets the appropriate tone for the latest edition of the NFFS Sympo—finally published almost a year behind schedule. That's not the fault of its editor, Les Garber, who took on the formidable task just about when the book was supposed to be issued. This paragraph is not to carp about tardiness, but rather as background for what appears to be an excellent stratagem to eliminate the cause: editors are being named several years in advance. The '92 Sympo will be edited by Paul Masterman; the '93 by George Xenakis and John Oldenkamp; the '94 by Bob Meuser; and the '95 by Bill Bogart.

All of the above except Masterman are well-known US free-flighters who have edited previous Sympos. And Masterman, a British free-flighter whom I have known personally for some years, is both literate and a highly capable modeler.

I look forward to really topnotch Sympos from all of the above. But the basic content will depend on the contributors—as will the publication schedule.

Now, what about the '91 Sympo? It leads with an excellent David Aronstein piece, "Indoor Model Design: Going Back to Basics." Outdoor modelers should read it, too! Three articles are devoted to props: an update on Fred Rash's computer design program (in BASIC) for rubber model props; Jean Pailet's static thrust test results on 10 different 1/2A props run on TeeDees and Shurikens; and Bob Hatschek's report on his 1991 high-aspect rubber model props (originally published in *FLYOFF 13*, which was scheduled to be published simultaneously with Sympo '91). Dick Huang gives us a computer analysis of an Old-Timer's flight performance and backs it up with actual test flight data. Bob Critchlow presents his torque meter winding stooge which cleverly utilizes standard boating hardware, such as an oarlock, to eliminate most of the machining that might otherwise be necessary. Most impressive paper in the Sympo is the 18 pages by Kochkarev and Makarov describing their computer analysis on bunt-launching Nordic gliders. The math is way beyond me. But the depth of detail is awesome.

The Ten Models of the Year reflect an especially good job done by the selection committee (chaired by Bruce Augustus). The variety is delightful—ranging from Thorkildson's Astrostar 600 to Archer's Xenon 1/2A and from Lanzo's 1938 Wakefield to Piserchio's #33 F1B. And the Special Award to David Aronstein for his indoor ducted fan is particularly meritorious.