The Flightline

Volume 36, Issue 12 Newsletter of the Propstoppers RC Club AMA 1042 December 2006

President's Message

Well the indoor flying went well. We had a good crowd. And the flying time segments for the different planes and helicopters work well.

As far as I know now, Christian academy will be closed at the end of the month. I will take the lock off Jan 1, 2007. But I will check with them in the spring.

I just received a letter from the township about COMMUNITY PRIDE DAY; SAT 5/12/2007 11:00----4:00 RAIN OR SHINE so we will have to give it some thought on what we want to do. (Make more noise; bring your un-muffled engines to run or fly; Ed.)

I would like to review the club byelaws at this meeting there is at least one change that should be made and maybe more.

If anyone has some new or old planes of interest bring them in

By the way, id anyone has any leads on a better field we are always interested. We never want to stop looking.

Hope to see you at the meeting on 11th December

Dick Seiwell, President

Agenda for December 11th Meeting
At Middletown Township Library;
Opens at 7pm meeting at 7:30 pm

1. Approval of the November Meeting Minutes
2. Membership Report
3. Flying Field Status
4. Finance Report
5. Byelaws review and update
6. Show and Tell

INSIDE THIS ISSUE

Minutes of the Propstoppers Model Airplane Club

14th November 2006 at the Middletown Library

Roll call found 16 members present.

Phil Oettinger gave the treasurer's report showing no income, and expenses for newsletter and field cut. The funds in the treasury are judged satisfactory, so the report was approved.

The printed minutes are not arriving as expected. Jess Davis said his were mangled in the mailing, Ray said he received Sam Rhood's, so it might be that Rhood did not get one (I must check the glue on the old label stock; Ed.)

Old business

It was noted that Jess is the Safety Officer. He in turn, indicated that everyone should act as a safety officer, or take it upon themselves to act as such when situations dictate. This may be likely if non-members are seen flying in unapproved fashion.

There was again some discussion about a club one-design. It was noted that the original suggestions included the scale Fokker, which may have been considered too much work for some members. Nearly every one already has a J-3, though, so it could be considered. Also offered was a 3-D foamie like the one Joe Mesko flies. There was no agreement.

Dave Bevan reported on the Widener analysis, research, and experimental approach to the SAE sponsored STOL payload R/C. This year's team needs much more prodding and repetitive instruction than the last two teams. They are flying a Hobbico stock model with the OS 61 FX every week end, and just ordered their balsa. They chose a Glasgow University airfoil with thickness well aft (maybe troublesome).

Doctor Mike reported that he spoke to the woman who owns Bridgeport, but she would not give permission to use the site.

Dick Seiwell mentioned that John Jenks is President of the South Jersey Silent Flyers. Their field is off Rte 73 at Mount Laurel. (This is a township owned "green space" and is only available for silent flight; Ed.)

Al Basualdo suggested that for indoor safety we should keep people off the floor, and perhaps assign time slots for R/C 3D, indoor rubber, and FF.

Show and Tell

Phil Oettinger showed a nice model.

Chuck Kime showed a small box, which when opened contained the mounted fragments of his diminutive Butterfly after skillful retrieval from the ceiling by Joe Mesko's helicopter at the November indoor meet.

The Meeting was adjourned at 8:45pm.

Dave Bevan, Vice President

Editor's Note

Due to my travel to England and then on to California I was unable to attend either the November meeting or the December indoor. And of course I was not able to fly at our fields either. Consequently I have little club matter to report this month as I write this from California. Therefore I beg your indulgence when I include an edited copy of my Boehle Giant Build Blog from my website.

Wishing you all a happy holiday, with many new toys to bring to the January indoor, (which will be on 5th January).

Dave Harding

Calendar of Events

Club Meetings

Regular Meeting at Middletown Township Library: opens 7 pm, meeting 7:30 pm Tuesday 11th December, 2006

Next Meeting Tuesday 9th January 2007

Tuesday Breakfast Meeting
The Country Deli, Rt. 352 Glenn Mills
9 till 10 am. Just show up.
Flying afterwards at Sleighton Field

Regular Club Flying

At Middletown / Sleighton Field
Monday - Friday;
10 am until dusk- Electric Only
Saturday
10 - 3pm-for FUEL PLANES and
10 - Dusk for Electric
Sunday - 12 - Dusk – Electric Only

At Christian Academy; Electric Only
Monday through Friday after School till dusk
Saturday 10 am till dusk
Sunday, after Church; 12 pm till dusk

Indoor Flying

At Tinicum School; Fridays; Jan. 5, Feb 2 and Mar. 2

Special Club Flying

Saturday mornings 10 am Sleighton Field
Tuesday mornings 11 am Sleighton Field

Note; only electric powered airplanes. Beginners using due caution and respecting club rules may fly GWS Slow Stick without instructors.

Propstoppers RC Club of Delaware County, Pennsylvania.

Club Officers

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Heat Treating Music Wire

By Roy Vaillancourt

The music wire used by modelers to make landing gear and cabin struts is medium carbon steel heat-treated to spring temper or about 45 on the Rockwell C scale of hardness (RC45). On this scale, RC20 is soft, RC45 is tough, and RC60 is hard. Tough wire can be bent and cut using the proper tools and techniques, but sometimes it's just too difficult to work with.

One way to soften steel music wire is to heat it, which makes it easy to bend and form. But after heating and forming, the subsequent cooling -- often at an uncontrolled rate -- can make the finished wire too hard or too soft since its hardness is determined by the rate at which it cools. For some parts, the final hardness isn't critical. But a landing gear formed from wire softened too much won't spring back to its original position; and a gear made from wire cooled to a harder than normal state will snap on its first use. To restore the wire to its original specific spring temper, it must be heat-treated a second time and cooled at a controlled rate.

To form wire easily, first anneal it; next, form or bend it to the desired shape; and then heat- treat the part back to spring condition -- that is, temper it. First the wire should be annealed at the location to be bent. To anneal it, heat the wire with a torch until it becomes a bright cherry red -- about 1400 degrees Fahrenheit. Let it cool completely to the touch. Don't quench it or blow on it. Just let it cool naturally away from any drafts. The wire should now be in the RC25 soft range, and it will bend easily. After forming once again heat the wire with a torch until it becomes bright cherry red, but this time quench it -- that is, cool it rapidly by immersing it in room temperature water. Plunge the steel into the water with a twisting, swirling motion to keep water vapor from insulating the wire against the cooling action of the water.

At this point the wire should be very hard, probably above RC60. To test the hardness, try to make a mark on the worked area with a file. The file should slide off without cutting into the steel at all. If it cuts the wire, try the heat and quench cycle again. If the file still cuts the wire, it isn't high carbon steel. Get another piece of wire and start over -- you won't be able to add the necessary carbon to low-carbon steel.

When the file test signals success, the wire is ready for the final step; but not for use because it's very hard and quite brittle, and will probably snap off. The final step is to temper the wire back to the desired hardness. Tempering is a form of annealing but is controlled so that the steel achieves a specific hardness.

Start by sanding the wire with steel wool or emery cloth. Then heat it gradually with the torch. Watch for the following colors as a guide: straw color (350 degrees), followed by dark blue (600 degrees), and then medium blue (750 degrees). At this point, remove the wire from the heat and allow it to cool slowly. Don't quench it or blow on it; just let it cool naturally in still air. Once the steel returns to room temperature, it should be at the target RC45 hardness, which has a good spring temper.

Try the file test again. You should be able to make a mark now, but only with some effort. If it passes this test, the wire is properly tempered. Besides parts for model planes, tempered music wire can also be used to make special purpose tools. Instead of tempering to 750 degrees (medium blue), stop at the straw color stage. The wire will be at about RC60, which is still very hard, but not brittle. Wire at this temper can be used to drill wood and plastics, and most aluminum and copper.

Notes;

1. Rockwell hardness testing, named after Stanley Rockwell who made his first testing machine in 1921, is a general method for measuring the bulk hardness of metallic and polymer materials. Although hardness testing does not measure performance properties, hardness correlates with strength, wear resistance, and other properties. Rockwell hardness testing is an indentation testing method. An indenter is impressed into the test sample at a pre- scribed load to measure the material's resistance to deformation. A Rockwell hardness number is calculated from the depth of permanent deformation of the sample after application and removal of the test load. Various indenter shapes and sizes combined with a range of test loads form a matrix of Rockwell hardness scales that are applicable to a wide variety of materials. The Rockwell B and C scales are used for metallic substances.
2. Anneal: To heat and then cool (as steel or glass) usually for softening and making less brittle.
3. 3. Quench: To cool (as heated metal) suddenly by immersion (as in oil or water).

Dave's Boehle Giant Build Blog

Seeing Glen Poole's 75% Boehle Giant at the 2006 Muncie Champs and hearing World Glider Record Holder, Jack Hiner, say "it is the best flying Old Timer he has ever flown" started me on one of those lusts; I gotta have one! I had been thinking about it for some time.

Initially I was interested because the new-for-2006 electric competition rules allow airplanes of any size to compete on an even basis. Well, even but bigger airplanes fly better and you can see them easier. Glen thought the same thing and decided to build the reduced size version, but I was thinking about a full-sized one. Nobody had a plan or kit that I could find so after the Champs I had a full-size plan made from a copy of Glen's plan and began this journey.

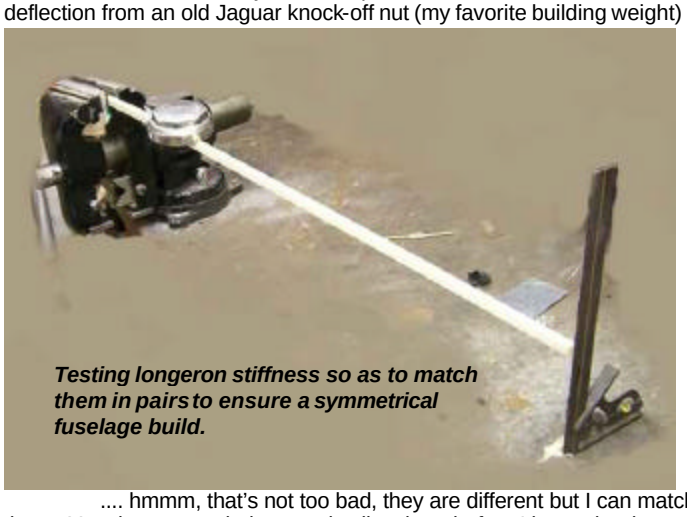
The first decisions were associated with transportation. I determined that if I made the fuselage in two pieces, the wing in four and removable stab halves and a removable fin; it might fit in a box 44 x 20 x 20 inches. Not bad.

I hadn't planned to launch into this thing, I was just dreaming, but you know how it goes; first the plan (Thursday, 12th October maybe?). Hey, that's interesting, how would I do that? Let me see, that airfoil looks interesting, let me scan it and then put it in Profili so I can make the tip rib templates and while I am at it, check out the aerodynamics too.

Profili will do the calculations at various Reynolds numbers; Wow, not bad, Cl of 1.34 at Re 150,000 and look at that drag bucket….all the way out to Cl of 1.0. .

I am going to need a bigger building board, so Saturday, 14th, morning I bought a new clean door and some ceiling tiles; hey, I have a plan and the board, what about wood. Hmmm.... Mick was talking about another order from Lone Star,.... how about that; a $157 order on the way, but what do I have on hand? Wow, enough 3/8 sq sticks, let's see if any are strong enough for longerons; seven...not enough, wait there is another. Ended up buying another batch from Hobbytown when they opened Sunday, I know I will get hard wood if they have it in the size you need.

Now those sticks are heavy enough but what about their relative stiffness? I don't want to build a banana because they differ in stiffness side to side. Easy test, clamp them in the vice and measure the deflection from an old Jaguar knock-off nut (my favorite building weight)

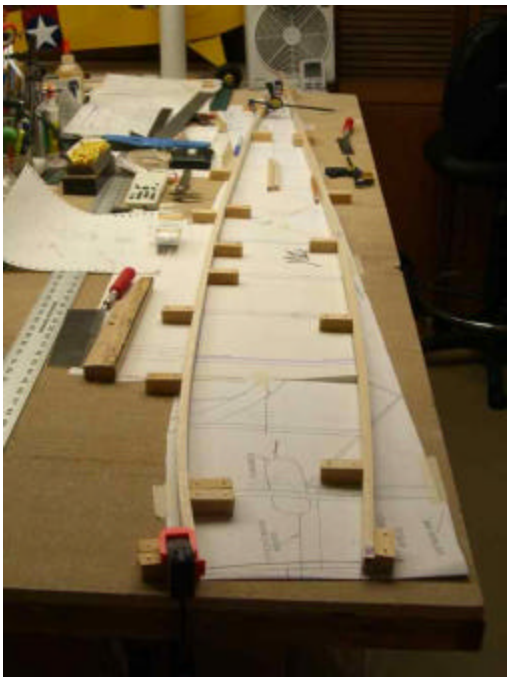


Testing longeron stiffness so as to match them in pairs to ensure a symmetrical fuselage build.

.... hmmm, that's not too bad, they are different but I can match them. Yep, better match them and splice them before I loose the data…. They have to be over 44 inches long.

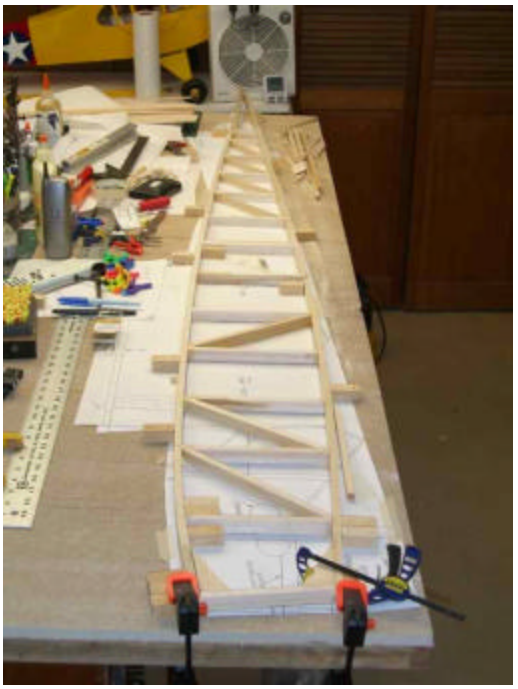
Cut the plan and tape it down. Wow, it hangs over the end! Make some sketches of the details of wing mounting, fuselage joint, frames (who would use acres of plywood anyway?) Need some form of pin/clamp wow, that 3/4 inch square pine I bought at the lumber yard along with the door and the 1 1/2 inch brads should work. Wow, I made a couple of dozen or so, isn't that bandsaw marvelous?

Hey, I have the longerons laid out and clamped.



Well, I suppose it wouldn't hurt to cut and glue some verticals.... yikes, I have finished the whole thing! Just look how pretty that pine to balsa splice for the highly loaded cabane mounting bolts.

Let's just peel it off the plan and have a look. Wow, only nine ounces so far against my estimate of 25 complete; not bad. Just have to sand off the surfaces on both sides before separating the two sides. But sanding is kinda noisy at midnight and the sounds from the basement shop percolate up the ducting to the bedroom and Jean has been asleep for a couple of hours; time to take a picture and go to bed myself!



Six am Tuesday, and Jean is still asleep and will be for an hour or so yet; can't finish the sanding job yet.

Thinking about sawing out the ribs when the wood arrives, but that won't be till next week; what will I do with myself? Hmmmmm… I do have enough wood for the stab and I could finish the fuselage and landing gear and maybe the controls… wait, I need some good servos, better order them right away.

Yikes, I am supposed to be painting the six new doors we are having installed in a couple of weeks…what am I doing with all this model building? Is this called a blog?

Ok, sides sanded and separated then sanded on the insides too. I have taken to building over the plans with no protective cover. Since I mostly use wood glue the wood sticks to the plan and I have to sand it off the lower surface side of the structure. Plan gets kinda messed up, but I don't usually build two of the same identical thing anyway. I save the plans and can re-trace them if necessary.

Alright, time to put the sides together. First to the frames and the few laterals between them, then pull in the tail end and align it. Add some more laterals keeping track of alignment. Pull in the nose to the thin ply former but don't glue it yet as there are details to be cut and added

(who needs thick ply formers? I will reinforce this one just where necessary)

Now add the details for the fuselage joint. I plan to have four 1/4 inch nylon bolts through aligning tubes running through 1/8 inch ply tongues at each longeron location. Make the structure first, fit the bolts and tubes then cut the longerons in two.
Let's see just how big this sucker is;
Wow, I can't stand it up without poking through the ceiling!
Let's see what it weighs now; 14.4 oz, right on target for the 25 ounce goal.
You know how it is, the initial framework goes easy, but the devil is in the details and it has taken a while to make and install all the elements of the fuselage-joint and the rest of the diagonals.

The joint is now complete but I will wait till the fuselage is just about complete before I cut the longerons. I have made all the detail beef-ups around the cabane mounting area; I don't want to tear the fuselage apart if I touch a wing tip on landing! Especially the tip of a 14 foot wing! Weight is up to 18 ounces.

Now I am working on the details at the tail end and front end. The stab will be all-flying for both vertical and horizontal and the parts removable for transportation. The servos will be mounted in the tail area between the stab halves. There will be an access hatch on top.

I am a bit worried about just how strong the servos should be. I don't expect the flight loads to be excessive as I mounted the pivots at the quarter-chord point, but the surfaces are big and I am worried about the handling loads feeding back to the gear train and causing undetectable harm. Well, undetectable until you lose control!
The torsional stiffness of the back-end seems adequate even without the upper surface structure; should be ok.

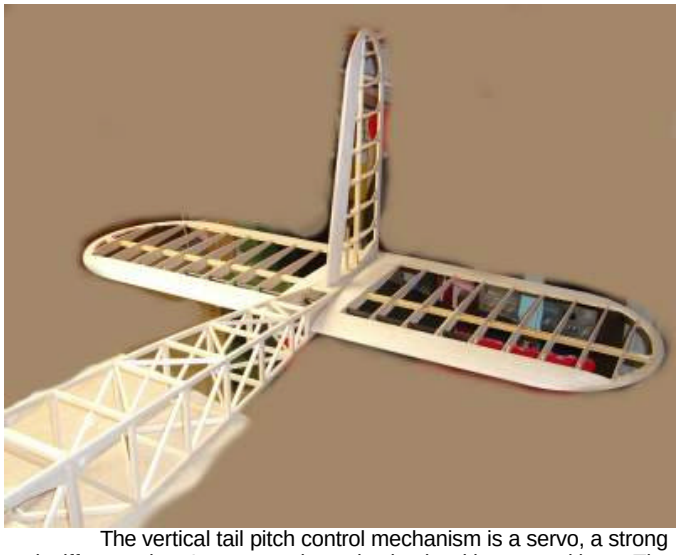
Thursday 26th October
Spent the week finishing the fuselage, including the tail controls; making them smooth to operate, making the engine/motor mount and fairing, adding landing gear mounts and making the screw-in part of the fuselage two-piece joint. Sheeted in the aft end and added the mounting for the tail skid.

With an all-flying tail, the 18 inch chord horizontal has to be kept out of the grass. In fact I am becoming quite concerned about the handling and landing loads on the servos. I bought some servos but I think I will buy some extra strong types, like the new Hitec with metal and reinforced plastic gears. As we all know, all this *takes* much more time than laying out the basic framework. Weight is now up to 27.5 ounces, a little over weight.

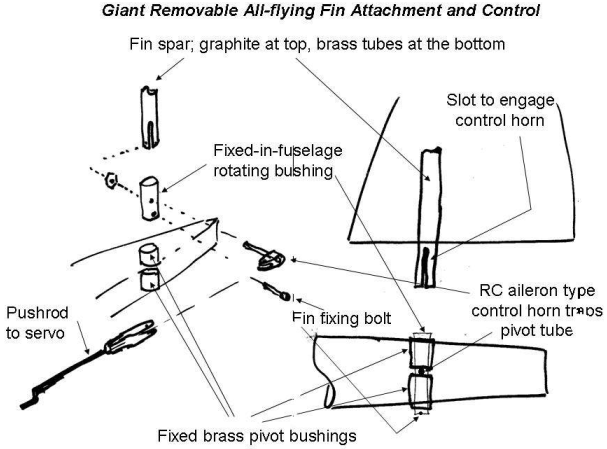
Next came the vertical tail and its pivot spar. This has to take all the bending loads into the rear fuselage socket. I had a nice graphite tube which seemed ideal but then; horrors, I remembered that you not only make things strong but you must at least address the flutter problem. You see the vertical tail is quite tall and the rear fuselage quite small. This leads to concerns about the lateral bending stiffness of the vertical tail mounted on the fuselage. Then there is the concern about the stiffness of the control loop from pivot through control horns to the servo itself. If these are somewhat soft they can play together to allow flutter at high speeds, well, hopefully high speeds, indeed speeds outside the flight envelope. But once I put it together it seemed somewhat softer than I had hoped so I elected to double up the pivot spar with another graphite tube within the basic tube. Of course I had to find a stack of tubes that would allow the two to fit closely together. Naturally the tubes didn't fit so I had to assemble them onto the inner tube then machine them to fit into the outer!
Then it was time to cut the ribs and fit the two spars; graphite pivot and 3/8 square main spar.
Here is the final assembly of the tail in its right place. It feels much stiffer now. But I am still worried about the whole approach of flying stabs on this model. The Fin is very tall and the horizontal stab is huge with an 18 inch chord. Trouble is, if it doesn't work I won't get the chance to fix it as the failure mode will be catastrophic, so I had better get it right from the start.

The vertical weighs almost three ounces with that heavy spar. It looks like the horizontal stab will weigh about the predicted value of 12 ounces.

Still mulling the issues with the vertical tail.
I am worried about the whole thing in terms of; will it flutter; will the control be strong enough and should I / could I add redundancy to protect against some of the possible failure modes?



The vertical tail pitch control mechanism is a servo, a strong and stiff one, when I get around to selecting it, with a control horn. The servo horn will have only about ½ inch arm to match the arm on the pivot and give the correct control throw. This pivot arm, which is already made and in place, is limited in length by clearance to the fuselage sides. Did I mention that the controls for the all-flying tail will be hidden within the aft fuselage?



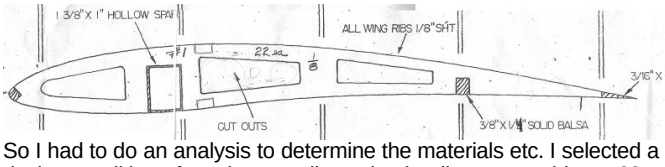
So the initial concern is the strength of the slotted tube at the bottom end of the fin spar. It is a 3/8 inch brass tube slotted for a 6-32 bolt; 0.157 inch diameter. Now if the joint fails it can be a clean break; unlikely, but if it did the fin could depart upwards. Or it could just sit there and feather; eliminating any stabilizing force and, of course, providing no control. If it binds on failure it will still provide stability but no control, and at an undetermined trim position. Therefore, the idea of driving a separate, redundant control of a servo-tab would not be effective under most of these circumstances. Indeed, if it were set up as a servo tab to protect against a control "open" failure, it would have the opposite control sense for a jammed fin pivot! Although you could deal with that to just steer the model.

Oh well, maybe I am unduly worrying, and this stuff is all built!

But on further consideration and consultation with the Tuesday breakfast brain trust, I have decided to do a flutter test of the whole aft end when it is finished. I will build some form of mount to hold the fuselage in the flight attitude on a boom off the side of my van. More on this later. Is this beginning to sound like a new airliner program?

Tuesday 31st October

Now to the wing. Initial problems are that I need to design the spar to be strong enough. This model will be over twice the weight of Boehle's model, not that we know how he made his main spar. The plan only shows that is large but hollow;



So I had to do an analysis to determine the materials etc. I selected a design condition of maximum pull-up wing loading at an arbitrary 60 mph. This would be the diving out of lift condition.

The upper spar element needs to be spruce although the lower can be 11 pcf balsa, but I will probably put a layer of graphite uni in the lower spar as insurance. Also the inboard spar web has to be plywood. I will use 1/16 inch ply on each side of the box at the root end.

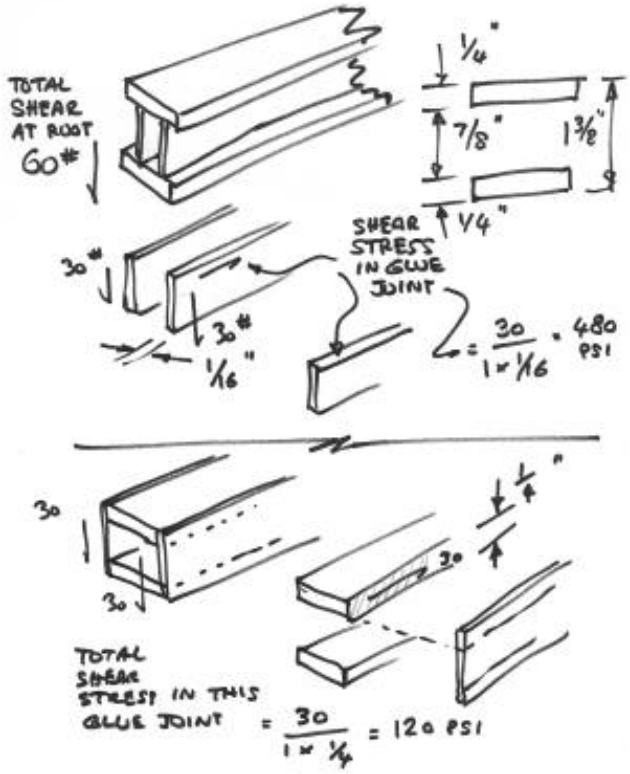
I have done other analyses to determine the necessary structure for the outboard spar. I will make the wing in four pieces so there will be a joiner in the center of the wing and another at the middle of each wing panel. Having decided on the overall spar construction and geometry I was able to draw the outboard wing ribs with the tapered spar cavity.

I used Corel Draw to take the basic wing section that I had originally scanned then traced using Corel Trace. From the plan, I measured the chord dimension at each rib location. Then I made another spreadsheet to calculate the dimensions of the outboard tapered spar at each rib location. I drew each rib by taking the master rib and scaling it to the chord dimension. Then I could draw the spar slot. I plan to lay down and shim the LE and spar, then glue the ribs in place followed by the TE.

Now, I want to get out of the "office" and back to the shop. I have made my decisions and will start on the spars.

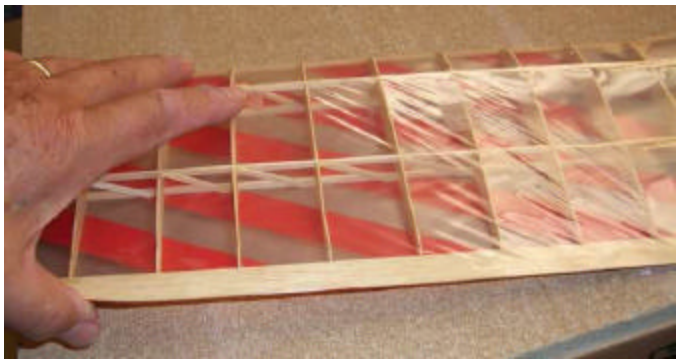
Having done this analysis and written about it in my on-line blog, I received an e-mail from one of our SAM flying buddies on the issue of shear web design and construction. The issue is whether to trap the shear webs between the upper and lower spar caps, so they are glued along their edge, or glue them to the sides of the caps, so the glue joint is on their surface. My buddy said the only way to go is trapped and edge glued. I didn't understand why this would be better so I did some more analysis and thinking about the issues.

Here is my analysis of the glue joint stresses;

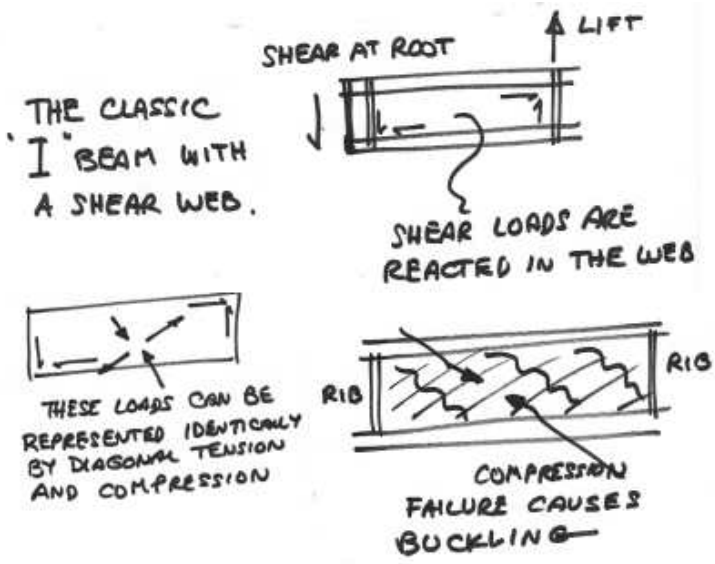


As you can see from the figure the stresses on the side mounted shear web are ¼ thos e of the edge mounted design. But there is more to it as the behavior of the shear web under the design load is a

factor too. Shear loads are such that a modest shear web is usually sufficiently strong, but thin shear webs can buckle or wrinkle like the skin on my Miss America wing shown below.



Such wrinkling causes a tearing action in the surface-mounted glue joint and indeed the joint can fail despite the calculated average stresses being well below the glue strength. So the issue is; does ***my*** shear web buckle?



Now you can do calculations here too, but they are very complicated; however, there is an alternative way of verifying the design; just build and test it!

That was easy. Cut two spar caps from good clean pine, cut two 1/16 inch ply shear webs then add pine blocks to pad the ends for testing grips and two balsa "ribs" to stabilize the spar caps and shear webs. Ok glue it all together, wait a while (have dinner etc.).

Also Mick came over with the next load of balsa from Lone Star; always a sort of holy moment, opening a big box of balsa and feeling it piece by piece…….

Alright, how am I going to test this thing? The objective is to see if the shear webs will shuck themselves off the spar caps by buckling. The design shear load is 60 pounds at the root. Now how am I going to apply a 60 pound load, and know it is 60 pounds? I know, I could get Jean to stand on it, she is 100 pounds. Nah, that won't work, she is not feeling well; probably wore her self out making that quilt as well as doing housework. Well, nothing for it, I will just have to slowly apply a load of 210 lb. (calibrated on a bathroom dynamometer)

Well, the result; no drama, nothing happened, despite the load being over three times the design case. Too much margin and excess weight here. What to do? I know, cut down the spar dimensions so the weight decreases and the shear stresses connecting the shear web to the spar caps increases. So I cut down the spar caps in thickness from 1/4 inch to 3/16th; tested again and still no failure. This design must work. Move on.

Friday 3rd November

I decided on the inboard spar caps; two layers of 1/8 inch basswood with one layer of .007 inch uni graphite sandwiched for the inboard uppers, and a similar lay-up, except with hard balsa, for the inboard lowers. The outboard will be some combination of 1/8 inch hard balsa with possible doublers inboard. The outboard spar will taper in overall depth and the caps may taper too. Don't you just love the little touch of beef that a strip of graphite allows you to make? I stocked up on out-of-date uni-graphite and glass when I retired; probably enough for a lifetime.

So I made the spar caps. The picture shows the clamp-up of a cap assembly using one layer of graphite uni, another layer of graphite is shown in the picture under the scissors, together with the other two reinforced caps. Total measured cap weight for the whole a/c about 13 ounces. I expect the total spar assembly without joiners to be about 20 ounces out of a total wing budget of 66 ounces.

Oh, what am I going to do with the Giant? And how will I power it?

First, this will be a great fun glider to fly at our field. Then I will fly it in SAM competition in two classes; Electric Texaco and Classic Texaco.

For the former I decided to use the same Mega 15/16/3 brushless I currently use in my big Stardust Special electric Texaco, only with a custom made 15:1 gearbox turning a 24-inch prop. I will make the gearbox using an electric helicopter 150 tooth main gear and a 10 tooth pinion. I want to do it in one stage as I believe I can make it more efficient than a multi-stage unit. The 2006 rules allow the battery to be a NiCad up to 25% of all up weight and since the Giant is going to be about 12 lb the battery can be 3 lb. I plan to use four packs of 14 cell AUL 1500's in parallel. Kind of a lot of old cells, but what are you going to do? Worse, next year the rules will probably change again so I will have to change the pack again. What price Glory?

I also plan to fly the model with an ignition engine in the Classic Texaco class. I believe I could use the Ohlsson 60 from my Bomber based on my experience at this year's Champs, but more on this later. It would also be great if I could figure out how to take it to Europe next summer for the Euro RC SAM Champs in Slovakia. Dick and I are planning to go with our families but the Giant is probably just too much of a hassle to transport, or maybe just very expensive. I would also have to develop a whole new powerplant for it as the Europeans have different rules for their Texaco class. They allow much less fuel than the US SAM event. Most of them use big diesel engines, tuned to a hair's breadth of lean-running and requiring ages of warm-up before launch.

Anyway, the current problem is that in the middle of this project I went to England to spend two weeks with my mother, so Giant progress was halted, and when I returned I found that I had to go immediately to California, where I am as I write this.

So, things will be on hold for another couple of weeks; darn, I was only a few days away from cutting the ribs and making the wings. But while observing, on the SAM Talk discussion group, on how difficult I find holding the knife vertical while cutting ribs, I receive an offer from Bob Holman to laser cut my ribs. Well, I wanted to make this thing all myself but what with the travel induced delays I accepted their offer and during the two day layover I was able to get the wing section and other dimension data to Jim O'Reilly who makes the CAD files for Bob Holman. I hope the ribs will be there when I return in late December.

And there will be another diversion after Christmas when Dick Bartkowski and I go to Eloy Arizona for the Southwest Regionals, and then I go on to California for some more housework.

But the SAM Champs are not until next October so I have plenty of time to finish the Giant and work out the bugs. I hope our fields are big enough to handle it!

Dave *www.dhaerotech.com/giantblog.htm for more later.*

Dave Harding – Editor
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Propstoppers R.C. M.A.C

Follow-on to the very successful Spektrum Dx6 "Park Flyer" 2.4 GHz "Cell Phone Technolgy" Radio, is the Spektrum Dx7 with full range and seven channels. As they say, just go to the field, any field, turn on and fly. No more interference and channel-conflict worries. If you have a high-end Futaba or JR, just replace the frequency module and the receiver and fly with your old settings too.
Hope this graphic does not offend!

December Indoor Fun Fly Report

The December indoor session was held at Tinicum from 6:30 to 9 on Friday Dec 1st. It was well attended and there were a lot of helicopters flown by Basualdo, Mesko, Tripier, and two flyers from South Jersey Silent Flyers. The Air Hog biplanes were numerous, about eight! Rubber ROG and Delta Darts were flown too. Al Basualdo put on some great 3D exhibitions. Good time was had by all. Make a note of the January meet for Friday 5th. Be there!

Membership Renewal For 2007

Membership renewal for 2007 is now available. You can renew by mail or at the club meeting in December

Bring cash or check and your AMA card.
Dues are $60.

Ray Wopatek
1004 Green Lane
Secane, PA. 9018
Please enclose a ***copy*** of your current A. M. A. Membership card,
And Please, Please enclose a Stamped self- addressed envelope.
Ray Wopatek Membership Chairman