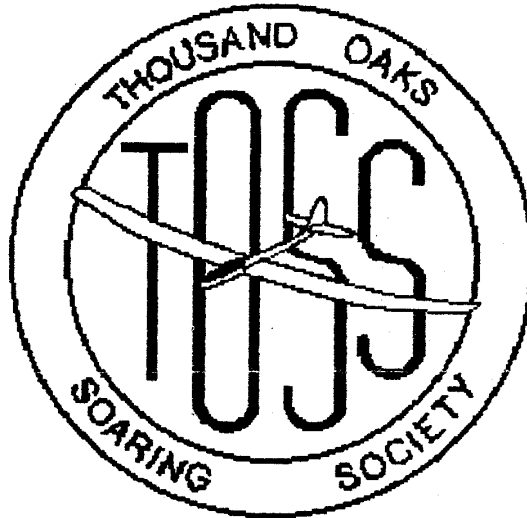


T O S S " U P



NEWSLETTER

SEPTEMBER 1989 T.O.S.S. P.O. BOX 1955 THOUSAND OAKS, CA. 91362

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Next Contest; Oct. 14 1989

C/D: Richard Hartman
Type: ???

Next Meeting: Sept 27th 1989

Place: Oaks Mall
Next to Bullocks
Hillcrest Dr. T.O.

Time 7:30 p.m.



**T.O.S.S
MINUTES OF AUG. 30, 1989
REGULAR MEETING No. 8**

There were twelve members present and one guest, Will Morrow.

Myles Moran called the meeting to order at 7:40 PM.

OLD BUSINESS

Eric noted that TOSS members held six out of the top ten places at the SCSC ("SC Squared") contest held at the TOSS field last August 27th out of a field of 37: first, second, third, sixth, eighth and tenth.

NEW BUSINESS

Inland S.S. and SWSA will host the next SCSC contest September 24th in Riverside.

A unanimous vote was received in favor of declaring the first Saturday of every month an official "TOSS Fun Fly Day" at the TOSS field.

Eric announced that he will C/D a "Cross-Country Seminar" at Taft, CA on November 4 & 5. A unanimous vote was received in favor of purchasing a new winch, retriever and battery for the club.

Ralph Morgan displayed some maps of a possible new soaring site near Somis that he is looking into for the club. A unanimous vote was received in favor of hosting next years' "Masters Event" as a joint venture with another club which will be determined in the future.

Eric announced that he will conduct a demo next meeting of the new Vision radio.

SHOW AND TELL

- Eric demonstrated:
1. how to use Futaba servos on an Airtronics Rx.
 2. a miniature 1700 mah Sanyo Rx battery.
 3. a rectangular tube which could be used

to make a nose skid.

Myles showed off his new \$300 Falcon 880 kit (which is still a kit).

RAFFLE

The Airtronics Vanguard radio was won by Will Morrow, guest.

BUILDING DEMO

Art McNamee demonstrated his masterful super monokoting technique to a large group of rapt, soon-to-be also masterful watchers.

The meeting adjourned at 9:30 pm.

Submitted by:

Ed Oldenburg

C/D's For the Year	
Jan 7th	Wayne Meridith
Feb 11th	Don McNamee
Mar 11th	Bob Goldsmith
Apr 8th	Eric Hendrickson
May 13th	Art McNamee
Jun 10th	Myles Moran
Jul 0th	Chuck Griswold
Aug 12th	Ed Oldenburg
Sept 9th	Bob Onstad
Oct 14th	Richard Hartman
Nov 11th	Ralph Morgan
Dec 9th	Don Northern



Soap Box Sept. 89

FIRST OF ALL, DON'T FORGET:

1) **SCSC** Inland Soaring Society Sunday Sept. 24th (map on reverse side of this sheet) By the way their regular contest day is the second Sunday of every month.

2) **YISALIA FALL SOARING FESTIVAL**. October 7th and 8th (if you don't know how to get there you're late, the sign up is over) but if you would like to go and watch the biggest soaring event this side of the AMA nationals call up a Board member we'd be happy to show you where it is. Yisalia is a big town.

3) **THOUSAND OAKS SOARING SOCIETY X/C SEMINAR** November the 4th and 5th at Taft, California. See Taft as you always wanted to see it. COOL! Contact Eric Hendrickson

4) **SOUTHWEST REGIONALS 1990** February 10th, 11th 1990 sailplane event Hosted by the CENTRAL ARIZONA SOARING LEAGUE. Lets get together and go, they're a nice bunch. The cactus and pucker bushes keep 'em humble. (information on the same page as SC squared.)

The beat goes on.

We have greatness, we have the humble, we have the common. But nowhere do we have the new-comer. Every single person in our club knows everything.



Example: Art McNamee started, what I thought was a great idea on basic electronics. He answered everything from the idiotic to the specific. Today at our meet, Art said "Well, I guess that no-one wanted to know anything about electronics." Well, I guess they didn't. I certainly wasn't flooded by mail or phone calls. I felt so bad that I could barely think of a wise crack. (That's almost unthinkable, to pass Art and not give him a bad time).

I did publish one very provocative letter from an old timer. Not one peep out of anyone in the club. Sorry Bob, I will assume that our worries were unfounded. We won't change a thing.

So, Art! I would like to know how to find the length of an antenna. I periodically glue one to the inside of the fuselage with hotstuff. By the time that I get the R/X out of the fuse the antenna looks like a drowned rat. I got the roll of stranded 26 gage wire, but I might be missing a inch or two from the end of the original antenna.

I also understand that Eric Hendrickson would like to know how to cycle the batteries in his Airtornics Vision super duper know all radio. I guess the radio can do everything except cycle the batteries.

Now just to keep the lines of communication open: Please! if any of you have a comment, would like to make a suggestion or just bitch - Please drop me a note. I promise that it will get into the next newsletter, documented or not. This column needn't have a 2/3 majority in order to publish. If you wait until the meeting to bring up your point you might have it hammered to death by anyone that likes to talk. This way, you will be able to tell the whole story before having to defend it. I promise, if I can read it - I'll print it.

By for now.

Chuck



STRONGER WING SPARS BOB BAYARD S.B.S.S.

Built-up wings sometimes fold on launching, I'm told. I've been curious about how to beef them up using fiberglass or carbon fiber on the spars, so I made up some test sections recently and broke them at the SBSS April meeting. This is a summary of the results.

The test sections consisted of redwood spar caps with 1/8" balsa vertical grain shear webs, glued with aliphatic resin. Redwood is, I have found, about the same weight as spruce and, if straight grained, also about the same strength. And I have a lifetime supply of redwood and a table saw, so you know why the spar caps were redwood.

Most spar cap dimensions were 1/8"x 1/2", with changes made in some of the top or bottom caps to explore the effects of the changes. The test sections were all 2 1/2" long, typical rib spacing on built-up wings, and the spar caps beyond the test sections were glued to one foot long solid wood pieces which were used to apply the bending forces to the test sections. Many test sections had carbon fiber epoxyed to the bottom spar cap. The material used was Dave Brown tow, measuring about 7 mils thick, and the full 1/2" dimension of the bottom spar cap was covered with this material. In some earlier preliminary tests I had also put carbon fiber on the top, or compression, spar cap, but found that this made no difference because it simply buckled. Thus none of these test sections had carbon fiber on the top. Two test sections had fiberglass instead of carbon fiber.

I was guided in selecting the various test sections by some thoughts given to me by other SBSS members. Oscar Rico pointed out that carbon and wood fibers have very greatly different moduli of elasticity- stretch for given force per unit area- with the consequence that if carbon fiber of any substantial amount is attached to wood, the wood will be essentially unstretched by the time the carbon fiber breaks. I believe he is right, so that if a substantial layer of carbon fiber is put on a piece of wood,

forget the wood as far as strength is concerned. In these test sections the thickness of the wood is about 25 times that of the equivalent solid carbon, so maybe in these cases the wood might contribute a little to the strength. I decided to see. Two of the test sections had only 1/16" of wood in the bottom spar cap instead of 1/8", the carbon fiber being the same, to see if the wood added anything. It does add some, as you will see.

Some preliminary tests I had done earlier showed that while un-strengthened test sections broke in tension in the bottom spar cap, when carbon fiber was added, the bottom caps did not break. Instead, the tip spar cap just crunched. I had tried an exotic fix of the top cap which did no good at all. Fred Weaver said, "Just beef it up. Make it thicker." These test sections incorporate his idea and, as you will see, it works very well.

Fiberglass, especially the kind in the usual glass cloth, is quite weak compared with carbon. As you will see, it is actually worse than the bare wood alone!

RESULTS Wood Only.

In total, I broke five samples of the standard configuration without any fiber strengthening. The breaking forces ranged from 30 to 33 lbs for three straight-grained samples. Of these three, two broke in tension in the bottom spar cap and the third in compression on the top. The compression break was a local crushing of fiber and was typical of the breaks of other straight-grained test sections that failed in compression. It thus appears that the strength of the wood spar is pretty evenly balanced, at least in the configuration of these test samples, between compression and tension. Two other samples with mildly-angled grain, about 1/8" slope in about 3 inches, broke by splitting the top cap along the grain. The breaking forces in these two samples were 27 and 28 lbs, slightly weaker than the straight grain samples.



Carbon Fiber

With carbon fiber reinforcement on the 1/8" thick bottom spar cap, all but one of the test sections failed in compression of the top cap. With a 1/8" thick tip cap, the breaking force was 32 lbs. and with 3/16" this increased to 50 lbs, both failing in compression. The 1/4" thick upper cap gave the strongest spar of all, breaking at 60 lbs, but in this case the bottom cap broke. This test section wasn't quite "fair" in that it was made by gluing another 1/8" piece of redwood on tip of a standard test configuration. Thus the section thickness was 1 1/8" instead of 1", which would give it more strength, perhaps by that ratio or a little more. Also, the two pieces glued together would have different grain configurations, and might be stronger for that reason- less likely to split. I suspect that a "fair" test section like this one would have broken at between 50 and 60 lbs and in the bottom cap. Again the top and bottom seem to be fairly well balanced in strength when the top cap is 3/16" thick and the 1/8" bottom cap has carbon fiber.

Thinner wood (1/16" thick), although better than the 1/8" wood without carbon, gave poorer results than did the 1/8" wood with carbon, and both of the thinner sections broke in tension in the bottom cap. Thus it seems that in this range of the ratio of carbon to wood thickness, the wood is still contributing to the strength.

Upper Spar Cap Cross-section

I thought that making the upper spar cap flat (1/2"x 1/8") would be better than the same cross-sectional area but square (1/4"x 1/4") for a couple of reasons. Even though a square column would ordinarily be better in compression than a flat skinny one, this column is supported by the shear web in the skinny direction. Also, for a given wing thickness, the square spar cap will on the average be closer to the bottom spar cap than a thin one would, and thus be under greater stress for a given bending force. However, the square cap sample was no weaker. The particular sample was, in fact, a

bit stronger.

The way the samples broke seems to suggest that the shear web didn't contribute all that much to the strength of the top cap because the cap lifted off the cap-shear web glue line at the breakpoint, shedding some redwood splinters in the process. A subsequent test was done on a standard carbon fiber section (1/8" x 1/2" wood top and bottom) but with two pieces of 3/16" rectangular balsa glued in the corners between the upper edge of the shear web and the bottom surface of the top spar cap, to give more glue surface holding the web and cap together. This sample gave a slightly better performance than the original similar sample - 35# vs 32#- and the failure occurred at the very end of the test section (i.e., at the "rib")

For all of these stronger spars there was no evidence of any failure of the shear web from being crushed by the forces on it. I could believe that with a really strong spar cap top and bottom, like thick carbon for example, a 1/8" shear web would cry uncle. With this moderate strengthening though, 1/8" webs are OK.

Fiberglass

The two fiberglass samples were quite differently constructed. One simply had a piece of 1/2" strapping tape stuck on the surface of the bottom spar cap. It failed in compression. The other sample was made similar to the carbon fiber samples but using about the same volume of type E fiberglass fiber (the kind in ordinary cloth) and it failed in tension. Despite these differences they had on thing in common- they were worse than the plain wood samples! How can that be? I don't know. It's a mystery I leave with you.

SUMMARY

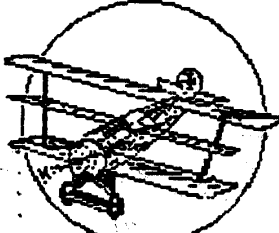
To beef up your wood wings, carbon fiber on the bottom spar cap will help a lot. Fiberglass won't- it actually hurts. To take advantage of the help from carbon, make the top cap thicker, perhaps as much as twice as thick. And use the straightest grain wood you can get!



There may be a slight advantage in making the top cap more nearly square and/or in making a larger area glue joint between the shear web and the upper spar cap, like using balsa fillets. Shear webs of 1/8" balsa are plenty good enough. The weight increase to strengthen the middle half of a six foot wing would be less than 1/2 ounce, and it would be at least 50% stronger than plain wood. Such a wing could stand a launch pull of about 40 lbs before breaking.

Bob Bayard

**The
Red Baron**



**Radio Control
Model Hobbies**
77 Daily Drive
Camarillo, CA.
(805) 482-0250

		TOTAL	AUG	SEPT	OCT	NOV	DEC				
1	MORGAN	TOSS	1955	1000	955	0	0	0	0	0	0
2	D HENDRICKSON	TOSS	1947	947	1000	0	0	0	0	0	0
3	SYET	TOSS	1614	972	642	0	0	0	0	0	0
4	GOLDSMITH	TOSS	1328	535	793	0	0	0	0	0	0
5	INES	SCSA	829	829	0	0	0	0	0	0	0
6	VOSS	SCSA	744	744	0	0	0	0	0	0	0
7	KOVACH	SCSA	722	722	0	0	0	0	0	0	0
8	VANHAMERSYELD	TOSS	401	0	401	0	0	0	0	0	0

SPORTSMAN CLASS NORMALIZED TO 1000