NEXT CLUB MEETING: MON FEB 26th

Club meetings are held at 7:30pm on the third Monday of the month, except for legal Monday holidays, at the Pyle Adult Community Center, at the southwest corner of Rural & Southern in Tempe. Contests are held on the second Sunday of every month at Rodeo Park at the southeast corner of Ray & Val Vista Roads in Gilbert.

Wingtips is CASL’s monthly newsletter and as such always encourages members to submit articles for publication. All material must be given to the editor no later than the monthly contest. The editor also encourages other clubs to use any material from this newsletter, provided proper credit is given.

CHANNELS #16 & #17 have experienced problems at Rodeo Park. Use at your own risk.

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JAN ’01 EDITION
Well here it is the first of the year and the first of the new millennium! Boy it just seems like yesterday that it was the good old twentieth-century. I can remember back in high school that the next century seemed a very distant time away. Funny how things have a way of speeding up on you, as you get farther along in life.

Lots of things are planned for this upcoming year and I hope we get a good participation level from the club. First off we have been very fortunate that in the last couple of months quite a few new people have joined CASL. I am including the latest and greatest phone list. Sorry it is so small but I was trying to get it on one sheet of paper. For the new people that just joined you may not be aware but our club has a List Server for informal communication. If you would like to be part of that, just email Erich Van Sanford a note and he will put you on it. His address is erich@asu.edu. This is a great way to keep up with some of the things that go on during the month that I do not put in the newsletter. Like who is going out what weekend and flying.

This is the final reminder about our annual Southwest Classic. We have a full slate of entrants this year; two hundred pilots have signed up to fly. So we are going to be very busy this year. For all of you that volunteered to help the Contest Committee greatly appreciates it. It is quite obvious that this contest would not be able to run if it were not for the volunteer helping from the membership. For your information, the starting time to show up, if you are planning to work a full day, is no later than 7:00am each day. That will give us the extra amount of time to show what needs to be done and how we are going to do it. If you are unsure of the exact directions to the contest site please go to the web site and download the map. Basically, you just take Rittenhouse Rd. south as far as it will go. Make a left at the end of the road, go over the Railroad tracks, then make a left at the first road you come to and you will see the tents of all the contestants. The map has the best directions. The field is literally at the very edge of Maricopa County. Don’t forget that there will be a catering company at the field serving breakfast, lunch and dinner. So if you forget your food you should be okay. Of course if you forget your money than you are in trouble. For all the people that are flying do not forget your 2001 AMA cards they will be checked. From what I understand, the Raffle Booth will be filled with plenty of great items, so bring plenty of money for tickets. Some of our club members have in the past made out like bandits in winning some great prizes, just talk to Adam Johnson or George Hoffer or Rick Palmer. Plus the vendors are always willing to sell you hobby items if you so desire. So just plan on bringing a wad of cash with you that weekend. Somebody will be more than happy to take it from you. This is really a lot of fun, even if there is some work involved. We get some of the very best flyers in the world showing up to compete, and that is no exaggeration. Joe Wurts, Daryl Perkins, and Mike Reagan are scheduled to fly at this contest. If you want to see some great flying these guys will be doing it. Also Joe and Daryl and Mike are probably some of the neatest people to sit down and talk to. They are more than willing to give you some flying tips if you just ask them. In fact I would say that just about everybody that comes to these contests are just like that. It has been great to see some of the same faces for over ten years coming to this contest. So if you were not planning on coming out to the contest make the drive and see what it is all about. In fact, this year we are putting on the second largest single event contest in country. We are even larger than the power events. Not bad for a contest that started out just 13 years ago with just 14 flyers. Just goes to show you that with a great venue and some very dedicated workers you can really make it happen.

Again, just another reminder that this month’s club meeting will be held on the 22nd of the month. Pyle is closed for MLK Day. Next month will be the same for President’s Day. I will assume that at the meeting we will discuss the SWC and take care of any loose ends for that. Plus we will try to get some type of tech topic together. One thing I am still looking for is articles for this newsletter. If you have some construction idea or flying idea that you would like to share with the club please write it up and I would more that grateful to publish it for you. It would be great if we could start sending out homegrown articles and share them with the other clubs across the country.

Well that is about it for another month and another newsletter. Hope to see you at the meeting or the big contest. Until next month!
FEB 18, 2001
RODEO PARK
RAY & VAL VISTA RD's in GILBERT
SUNDAY
ADD-EM-UP
OPEN & 2 METER
TASK: 21 Min 4 Rnds 7 Min Max
LANDING: Tape - Tape
START TIME 10:00 a.m.
ENTRY FEE:
$3 FOR ONE
$5 FOR BOTH
AMA '01 RULES APPLY
AMA CARD REQUIRED
LAUNCH DEVICES: 12V WINCHES
WITH "BIG WHEEL" RETRIEVERS
AWARDS
1st - 3rd
C.D.: Bill Roseberry
PHONE: 602-939-3909

MAR 11, 2001
RODEO PARK
RAY & VAL VISTA RD's in GILBERT
SUNDAY
TRIATHALON
OPEN & 2 METER
TASK: 3 Rnds 10 Min Max
LANDING: BULLS-EYE CIRCLE
START TIME 9:00 a.m.
ENTRY FEE:
$3 FOR ONE
$5 FOR BOTH
AMA '01 RULES APPLY
AMA CARD REQUIRED
LAUNCH DEVICES: 12V WINCHES
WITH "BIG WHEEL" RETRIEVERS
AWARDS
1st - 3rd
C.D.: DAVE CLARK
PHONE: 520-472-8020
January 2001 Contest Report
Darwin Barrie C.D.

The January contest came off with nice weather, reasonably consistent lift, and lots 'O mud. The new scooter was debuted as well. We had 24 entries in Open and 9 in 2METER. This was a great turnout for day that started out real cold and ended up T-shirt temperature.

Three rounds were flown, 3 minute PD with double penalty points up or down, 5 minute PD and a 7 PD. We ran two winches. Thanks to all those who took care of the broken lines and tangles that kept things moving. For the first time in as long as I can remember there were no crashes. Mark Russell had a close call when his transmitter failed to function properly. Craig was unable to finish due to a servo problem.

Thanks to all who participated and helped get everything setup and torn down

OPEN

1. ROBERTSON, J 1174 13. HANSON, G 1007
2. STIDHAM, J 1167 14. BINGHAM, S 915
3. BARRIE, D 1160 15. BERGSTROM, K 910
4. LAIRD, J 1134 16. RICHARDS, S 811
5. POEHLS, V 1127 17. WENZLICK, D 806
6. PLUMMER, S 1099 18. MOOR, M 464
7. HITZEL, J 1087 19. HOFFER, G 451
8. RUSSELL, M 1066 20. ROBERTS, B 417
9. CLARK, D 1047 21. BRISTER, P 398
10. WILLCOX, S 1040 22. TROUT, C 265
11. ROSEBERRY, B 1037 23. SLEPAK, D N/A
12. BOUNDS, H 1009

2METER

1. ROBERTSON, J 1171 6. POEHLS, V 610
2. STIDHAM, J 1077 7. ROSEBERRY, B 550
3. BARRIE, D 903 8. TROUT, C 241
4. HITZEL, J 740 9. BERGSTROM, K 234
5. SLEPAK, D 735

FEBRUARY’S MONTHLY CONTEST

Do not forget! We are scheduling February’s contest a week later than normal to give us some breathing room from the SWC. So if you show up at Rodeo Park on the second Sunday in February you’ll be doing some fun flying with all the others that forgot.

The contest will be the 18th of the month.
Balsa trees grow naturally in certain forests in South America. The Balsa tree resembles a Cottonwood tree with leaves as large as three feet across. The best balsa comes from plantations in Ecuador due to the ideal soil conditions, abundance of moisture, and low wind conditions. The tree grows at the amazing rate of about 40 feet the first year followed by a dozen feet annually. They are usually harvested after six to ten years, attaining a height of 90 feet and 25” in diameter. Being almost all water, after harvesting, the tree is extremely heavy. Therefore, the logs are kiln dried (inferior quality is sun dried) close to the growing site. After drying they are cut into large blocks, rough graded and shipped.

Balsa, which is really a hardwood, has one of the strongest weight to strength ratios of any wood including the heaviest, ebony. Balsa is composed of very thin, barrel shaped, air filled cells. The strength of the wood is derived from the cells as there is almost no liquid in the tissues, but the wood is pure cellulose. About 90% of the cell is space and the remainder is substance.

The hobby industry demands the highest quality balsa but accounts for only 10% of the market. The largest user is the composite marine industry. In the 1940's the U.S. Navy's PBY flying boat is an example. Over 3 million water craft have been cored with various forms of balsa. Other industries using balsa are transportation, aerospace, surf boards, and motion picture props. The supply is virtually unlimited as the trees seed themselves long before the time they are harvested.

Even though the hobby industry demands the highest quality, the quality within the industry varies greatly. Perfect, flawless wood, with exact density desired, accounts for ½ of the finished hobby product. The remaining half (which is considered scrap) is plagued with defects and saw kerf loss. Some of these defects affect the integrity of the wood while others are superficial. Some defects are:
- Density variations
- Irregular Grain Pattern
- Worm Holes
- Discoloration
- Knot holes
- Cracks
- Wind Checks
- Warps
- Irregular Consistency
- Dents
- Splits
- Size Variations

Balsa is purchased in 20 and 40 foot containers from several plantations in Ecuador. We can specify balsa quality, width and length. Thickness varies from an inch or two to as much as 6" to 8". Specifications of grain, density, flatness, and color are usually random and up to the supplier.

After a month or two from ordering, the container of Balsa arrives at the port in Long Beach where it is sent to customs. At that point, customs decides whether or not to inspect the container, as shipments from Central and South America are suspicious of concealing drugs. If customs inspects the shipment, they can do serious damage to the Balsa, like drilling out core samples and pounding the Balsa blocks to listen for hollow sounds. This procedure causes extensive dents. Inspections could take up to six weeks, which we pay for.

After the Balsa is delivered to Superior, the raw blocks go through a series of grading and manufacturing processes. The initial grading is one of the most important steps requiring an experienced operator with considerable knowledge in the characteristics of Balsa.

Each block of Balsa is separated and graded for density, quality, defects, and grain pattern. At that point one side of the block is carefully selected for certain characteristics, and then run through the joiner to provide a true surface for the next operation.

After joining, the block of wood is rough sawn into sheets varying in thickness from 1/16” to 1”, on large industrial type band saws which run continuously. They generate so much saw dust, they require their own dust collection system. The sheets of rough-cut balsa are then put through an impressive looking machine, called a double-sided, wide belt, belt sander. This machine sands the rough band-sawn cut sheets into the final thickness, as required. Tolerances are held to within a few thousandths over the length and width of the sheets, which can be up to 12” wide and up to six feet in length. For this reason, the belt sander undergoes constant maintenance.

After sanding, sheets are trimmed to length and undergo another critical inspection, for density, grain, and quality. The quality of our product is not what the customer gets, it’s what the customer does not get! At this intermediate grading, Balsa is separated into premium, commercial, and utility grades.

Selected sheets are cut into sticks of various sizes using specially designed slitting saws. Warped sticks are rejected. Sticks may be further processed into special shapes such as, triangles, ailerons, trailing and leading edges. This operation uses shapers and specially designed cutter blades.
WEIGHT/DENSITY - Balsa, being a product of nature, is intrinsically inconsistent. The weight range is wide, ranging from 3 to 30 pounds per cubic foot, with the average about ten pounds. (Balsa less than 4.5 lb. is difficult to manufacture) Another factor taken into account is density distribution. A block or sheet of balsa that is light on one end may be heavy at the other end, or in the middle. There are no industry standards for density or weight groups but at Superior the following is used:

<table>
<thead>
<tr>
<th>Density</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pounds</td>
<td>per cubic foot</td>
</tr>
<tr>
<td>Ultra Light</td>
<td>Under 4</td>
</tr>
<tr>
<td>Very Light</td>
<td>4 - 6</td>
</tr>
<tr>
<td>Light to medium</td>
<td>6 - 8</td>
</tr>
<tr>
<td>Medium to Heavy</td>
<td>8 - 12</td>
</tr>
<tr>
<td>Heavy</td>
<td>12 - 15</td>
</tr>
<tr>
<td>Very heavy</td>
<td>16 and over</td>
</tr>
</tbody>
</table>

THE DEFECTS AND HOW THEY AFFECT QUALITY

DENTS: are usually caused by improper handling, not by nature. Strapping used to hold the bundles during shipping, are a major cause for this defect. Other dents are caused by tools and rough handling (Customs) or during the process of cutting down the tree and during the manufacturing process. Balsa being so soft doesn't take much abuse!

DISCOLORATION is a grayish color in the grain ranging from a few spots to complete coverage. It's caused naturally by minerals in the water absorbed by the tree. Although there is no structural weakness, the balsa just doesn't look good. Very light balsa exhibits discoloration. Discoloration can also be caused by a tree that was lying on its side on the wet forest floor for a period of time causing rotting. In this case the rotted portion is very soft and has no structural integrity. It is unusable.

CONSISTENCY - Just because a block of balsa is light and the grain looks fairly straight, that doesn't mean every piece of balsa within the block is usable. One end of the block may be light, but the other end may be heavy. The same is true with the grain and other natural occurring irregularities. The larger the block, or the larger the final sheet or strip, the more the effect of inconsistency.

KNOT HOLES can vary in size from 1/16" diameter on up. A knot hole of any size is cause for reject. Fortunately, the sheet of wood can be recycled by cutting down the width or length of the wood eliminating the defect. After the balsa is imported, Superior, or any of the other Balsa converters, has little to say about the quality, except to specify for the highest quality available at the time. Like fine wine, seasonal variations in the weather effect the quality of balsa. If there was a long drought, one would expect a few years afterwards when the trees are harvested, the industry would be plagued with heavy wood. On the other hand, if the rainy season was exceptionally wet, we would be inundated with very light wood. When a trailer load of wood is received from the exporter, properties range widely. Therefore, grading and sorting the wood is the most important step in the manufacturing process, which accounts for most of the labor cost. The hobby industry uses various misleading adjectives to describe the quality of balsa. These terms or phrases are totally subjective in their meaning. Terms such as, Contest Grade, AAA Grade, Super Light, Virgin Quality, Light to Medium Weight, and Hand Selected, are only marketing oriented. There are no industry standard specific numbers placed on these terms.

GRAIN PATTERN - Balsa is usually described as A, B, or C grain. Contrary to the opinion, which says A grain is Excellent quality, C grain is bad, and B grain is average, or somewhere in-between, this is NOT TRUE. A, B, and C, grain, actually designate the grain pattern and the way in which the block was cut from the log. If the log was cut so the annular rings run across the thickness, this is termed "A" grain. The cut is made tangent to the side of the log. If the annular rings run throughout the thickness, this is "C" grain. "B" grain is a cross between "A" and "C". "B" grain accounts for most of the grain found in balsa blocks. Since we are dealing with a product of nature, "A" grain may exhibit swirls, or the grain may not run parallel to the long side.
### SPECIFIC USES FOR A, B, & C GRAIN

<table>
<thead>
<tr>
<th>Grain</th>
<th>Description</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Long lines - Flexible across the sheet</td>
<td>Tight curves surfaces - Wing leading edges - Tube forming</td>
</tr>
<tr>
<td>B</td>
<td>Short grain lines - Slight flexibility across the grain</td>
<td>Fuselage sides - Trailing &amp; leading edges - Ribs - formers - planking for slow curves</td>
</tr>
<tr>
<td>C</td>
<td>Mottled - Stiff across the grain - Splits easily</td>
<td>Straight sheeting - ribs - formers - Flat surfaces</td>
</tr>
</tbody>
</table>

Now, why don't kit manufacturers use the best density and grain structure for the intended purpose. The answer is an easy one; economics and availability.

Again, balsa being a product of nature, grain structure is not consistent. A sheet of balsa may contain mixed grain, that is, some of each, A, B, and C. The larger the sheet, the likelihood of mixed grain increases. Therefore, when a customer specifies 'A' grain, the likelihood of that sheet being 100% "A" is remote unless the customer is willing to pay for the sorting and selection process.

Picture this scenario. A thermal glider kit manufacturer needs 1000 - 1/16" x 4" x 48" sheets of 4 - 6 pound per cubic foot, clear, 'A' grain balsa to be used on the wing leading edge. This would make a beautiful wing but to provide wood to those specifications would probably require sorting through 10,000 blocks. After the block is cut into sheets each sheet would again require weighing and inspection for clear "A" grain. And, still, the order may not be filled. Why? Consider this. 5% of the balsa will be 4 - 6 pounds. Of that, 25% would be true "A" grain. Also, light wood has a tendency to contain spots and stains therefore only 50% of the remaining balsa would be usable. Other reject criteria (table 1) would reduce the yield to practically zero. In other words, perhaps 200 - 300 sheets of balsa may be found in an entire boxcar load to meet that specification. And at what cost, obviously so high that the manufacturer could not be competitive.

Another problem with grain is consistency. It's rare indeed when a sheet of balsa contains one type of grain structure. The larger the sheet the more likely it will contain mixed or cross grains. So a sheet of balsa can contain A, B, and C, grain and combinations of each.

Another factor that effects quality is the uniformity of grain, that is, are the grain lines more or less equally spaced or do they have a swirled pattern. Grain uniformity effects warpage. Sticks cut from non uniform grain patterns will warp or twist. This warp is due to internal stress in the balsa. If used in a structure, the resulting structure will eventually warp.

At Superior balsa is selected for its intended use. Long straight grain wood of medium to hard density is ideal for the smaller sticks. The larger the stick we use more of a medium weight. These properties will insure that the stick will not warp. Sticks found in retail outlets are almost invariably bent. This bending is due in part to the internal stresses of the wood and humidity. But most likely, because the balsa manufacturer did not take the effort to select balsa of the proper characteristics.

**SIZE** - Balsa is purchased from the mill in blocks of wood ranging in size from 2" x 2" x 24" to 4" x 6" x 60". The larger the block, the more the cost per board foot. Example, the 2" x 2" block may cost $1.00 per board foot, whereas the 4" x 6" may cost $2.00 per board foot. When specifying balsa for purchase, two of the three dimensions may be specified. The third dimension is random. In most cases, the width, either 3" or 4", and the length, either 36 or 48" is specified and the width is random. This width varies from 2" to 6" or more, however wide blocks are becoming scarcer.

The 3" or 4" dimension (used for sheets of 3" & 4" wide) is controlled by the mill. If incorrect the block must be reworked and used for a smaller size. Stick sizes and sheet thickness are controlled by the manufacturing process and pose no problem as it is under the manufacturers control.

**WORM HOLES** - Obviously caused by nasty little creatures that like to use balsa as a home. Worm holes vary in size from tiny pin holes to holes 1/4". Sometimes the holes are not visible on the surface of the block and they only manifest themselves after the block is cut into sheets. The manufacturer has several options to deal with worm holes. The portion of the sheet containing the hole can be cut out making a smaller sheet, the wood can be sold as a factory reject, or if need be, just ignored. If there is only one small pin hole in a large sheet, the problem is sometimes ignored as the sanding process tends to fill the hole with balsa dust and the pin hole is invisible.
**SPLITS** - A split usually occurs at the end of an "A" grain sheet, perhaps by the manufacturing process or naturally. If the sheet is not handled, the split may not even be visible. It sometimes is found when the ultimate user it

**WIND CHECKS** - When the wind blows a little too hard in the rain forest, the balsa tree may bend just enough to crack. This crack is usually healed with time but unfortunately will show up during the manufacturing process.

**IN SUMMARY**

But, do these defects described in the article really effect the aerodynamic or the structural integrity of models. Do we really need perfect balsa?

If you are a modeler, the answer lies in the ultimate use you have for the wood;  
A. What type of model is being built?  
B. Where in the structure is the balsa being used?  
C. What type of builder are you targeting?

If your a kit manufacturer you would like your customers to open the box and say “WOW, look at this wood. And check out the die cutting. It's clean and straight.” But manufacturers of covered ARF's generally use balsa of lower quality as the ultimate customer may see what lies underneath.

**Sitka Spruce versus Common or White Spruce**

Sitka Spruce can be recognized by its close grain pattern and yellowish color. The more common type of Spruce (the lumber yard variety) is much lighter in color, the grain meanders, and is coarse.

For the last 20 years, SUPERIOR has been selling top grade Sitka Spruce. Only this species of spruce can be certified for use in full scale aircraft as it flexes well and has a high strength to weight ratio. In past years SUPERIOR has been charging double the cost of Balsa for Spruce because raw Sitka Spruce has been about double the cost of balsa. That has now changed. The wholesale cost of raw Sitka Spruce is now roughly four times that of Balsa. High quality Sitka Spruce is getting more difficult to get. I know of no SUPERIOR competitors who sell high quality Sitka Spruce.

High grade Sitka Spruce is used in pianos, aircraft, and acoustical musical instruments. Bulk buyers overseas are paying top dollar. Small domestic users get what is left over. To add to the high initial cost, the amount of scrap, or unusable material, is getting very high because the quality of the raw Spruce is not as good as it used to be. Old growth Spruce trees from the Northwest forests are not available. We now get Sitka Spruce from the Northeast. These trees are not as large and of course transportation charges to the West Coast are high.