

BALSA- its Selection, Care and Feeding

by Guppy, NAR 13005

(Adapted from the August, 1974, "Journal of the MIT Rocket Society".)

Model rocketry, like other "flying" hobbies, relies heavily on balsa as a primary building material. With the recent use of balsa in floatation tanks of huge ships has come a shortage of good wood for modeling. Now, more than ever, a modeler must choose carefully (often to the point of rejecting a whole rack of wood) which piece of wood to buy.

Balsa is a highly anisotropic material; that is, it is stronger in some directions than in others. The cellular nature of balsa takes credit for this. The balsa cells should be oriented on the axis of maximum anticipated stress; i.e., spanwise on a fin or wing (old adage restated).

What really gives you the key to the properties of a given piece of wood is the growth rings. Yes, like all trees, balsa has growth rings, but they don't look like rings, just lines (unless you buy by the log). You, too may observe growth rings. Take any sharp razor blade and make a short, smooth cut across the end grain. (See Figure 1.)

You should see something roughly corresponding to Figure 2. Remember, if the grain is mostly vertical, the piece is A-grain; if it is horizontal (or close to horizontal) it is C-grain.

C-grain has the property of being stiff across the width; that is, in a wing it resists warping. Hence, it is well sought after. A-grain is less desirable but eminently usable. It will warp easily across the width, and thus A-grain is perfect for rolling balsa tubes. These grains may also be distinguished by external appearance: C-grain has a mottled surface, while A-grain's surface is covered with long, straight grain lines.

To build light gliders, use light wood. To help you identify light wood, we present a balsa chart. Take a scale to the hobby store, and choose carefully. As a guide to which wood or densities to get, I use up to 6.5 lb/ft³ for wings, 6 to 8 lb/ft³ for stabs, and 12 to 15 lb/ft³ for fuselages.

Build light!

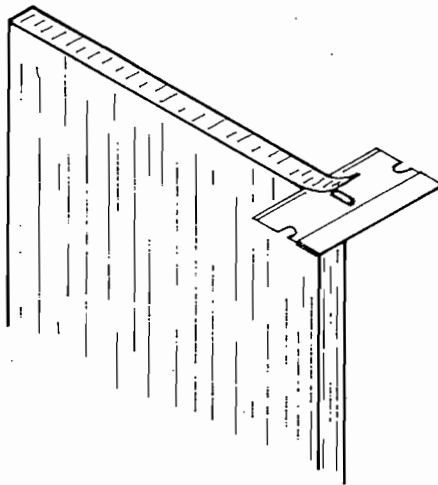


Figure 1

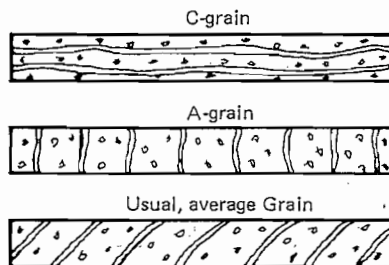


Figure 2

BALSA CHART

Length of wood - 36 inches. All masses in grams.

Lbs/Ft ³	3	4	5	6	7	8	9	10	11	12
Inches										
1/32 x 3	2.65	3.54	4.42	5.31	6.18	7.07	7.96	8.84	9.73	10.60
1/32 x 4	3.54	4.72	5.90	7.08	8.26	9.44	10.60	11.80	13.00	14.15
1/16 x 3	5.32	7.08	8.86	10.60	12.40	14.15	15.90	17.70	19.50	21.30
1/16 x 4	7.08	9.44	11.80	14.15	16.50	18.90	21.30	23.60	25.90	28.30
3/32 x 3	7.52	10.55	13.20	15.80	18.45	21.10	23.70	26.40	29.03	31.70
3/32 x 4	10.80	14.20	17.80	21.30	24.80	28.30	31.90	35.40	38.90	42.40
1/8 x 3	10.80	14.20	17.80	21.30	24.80	28.30	31.90	35.40	38.90	42.40
1/8 x 4	14.15	18.80	23.50	28.30	33.00	37.60	42.30	47.10	51.80	56.40
3/16 x 3	15.55	21.30	26.60	31.50	37.20	42.60	47.80	53.20	58.50	63.80
3/16 x 4	21.20	28.30	35.30	42.40	49.40	56.60	63.60	70.70	77.80	84.80
1/4 x 3	21.20	28.30	35.30	42.40	49.40	56.60	63.60	70.70	77.80	84.80
1/4 x 3	28.30	37.70	47.20	56.70	66.10	75.60	85.00	94.40	104.00	113.40

NAR in Action

by Ron Wright

It was evident to us from the considerable discussion involving the NAR's One-Time Membership program carried on by those present at the last Association meeting, held at NARAM 16, that there is some confusion as to what the One-Time Membership (OTM) is and is not. The general concept of the OTM was developed several years ago by the Board of Trustees as a means of attracting new members. One of the more important aspects of the program was to allow schools and related organizations to participate in model rocketry programs by making available the NAR's liability protection at a fraction of the normal cost. This function has been taken over by the NAR's Educational Program, however, but this can still be a valuable tool which sections can use to recruit new members.

The OTM offers the NAR's liability protection (\$1,000,000) for a term of one day for a fee of 25¢ per person. Anyone desiring an application for OTM should write to NAR Headquarters requesting one and specifying the dates for which OTM will be sold. By return mail you will receive a package containing an insurance claim form with the name of the NAR's insurance carrier and the policy number of the current policy, accompanies with an authorization designating the applicant as a membership agent for the NAR. In addition to these, a roster form is included on which to place the names of the One-Time Members.

On the day of the launch the following procedure should be followed: (1) collect the 25¢ from the prospective member and enter his name on the roster; (2) at the end of the launch the roster along with the money is sent to the address enclosed with the material. It is very important that the roster and money are post-marked on the day of the launch as there is a question of insurability in the event of an accident if this is not complied with. Needless to say, in addition to these requirements, NAR safety rules must be observed.

The OTM can be a boon to sections which are concerned with the liability of non-members participating in their launches. Now they can provide liability protection, without requiring prospective members to plunk down the full NAR membership fee until they are sure they wish to join. Some sections have put on demonstrations and contests in which non-NAR rocketeers in the area are invited to participate. One club challenged local radio DJ's to a model rocketry contest as a promotional device.

One major question arising with the OTMs has been if they can compete in NAR sanctioned competition. Jim Barrowman, NAR Trustee and Chairman of the Contest Board, has indicated that he has no objection to OTMs competing in contests, provided that if they placed their names would not be submitted on the point award sheet in application for national contests points. He stated that this was only fair in that one of the benefits of a full NAR membership was the right to compete and to be awarded contest points. He did state that OTMs could not hold major meet official positions such as RSO, Contest Director or Coordinator, or Chief Scale or R & D Judge, but he saw nothing wrong with using them to help tract, do data reduction, time, etc., as long as they were competent. Care should be taken in using OTMs in record trials as there are specific requirements which apply. ⌋