Tips On Trimming and Flying a Catapult Glider

by Bob Eberle (from New York Indoor Times)

Now that there are two new indoor catapult glider classes, and there is still an outdoor catapult class, you guys **can't** use the excuse that your arm isn't any good anymore! Now all you need to do is pick up your old broken Wakefield, or Bostonian motors, and make a little loop for your catapult (1/4" dowel works nicely) and tie it on, pick up your glider, pull back, and let go! No more running twenty-five yards, lunging and throwing your arm out of its socket all day long, then complaining you're not getting any height. No, now all you need to do is add another loop of 1/4" tan II and let fly!

Keep in mind, many of these tips will also apply directly to a hand launch glider, in fact that's where many of them came from. So if there are any other brave souls that have caught the age old, highly contagious, HLG disease, keep your ears open.

First let's start before you even leave the workshop. Pick your glider up, and hold it so you're looking at the side of the fuselage. Now take a very true straight edge and put it on the underside of the wing so that it extends back to the stab. Are the ruler and stab parallel? If not, then you have a decalage problem! If this doesn't get fixed, your plane will either balloon tremendously, or dive on launch. This is one of the most common problems I see with many gliders, and there is nothing else you can do to the trim that will fix it, except for making the wing and stab parallel. Don't try trimming it out of the model, believe me I have done everything known to man other than and wasted days doing so with no luck!

Now that you have zero decalage you can go about trimming the plane many ways, if you have a way that works, go for it, but I'll give a brief description of my way if you don't. First I set the stab tilt according to the way in which I wish my glider to circle, but keep in mind this is very little tilt (1/4" max on big gliders). Next I set the rudder to the desired position, this can be done by warping or if you're confident of your plane, by gluing it on at an angle. Again, very little offset will do. Now, if you have a drawing of the model set the C.G. accordingly or if it's your own design, pick one! Once this is done, I add noseweight until I get the plane to balance at the C.G.

The next step is optional, if you fly indoors I would recommend it, but if you're flying an outdoor plane it isn't necessary. I take the tips of my wings and warp the last half inch up about an eight of an inch, but before you do this, your tips **must** be thin enough to flatten on launch! What this will do is after the launch speed slows down, the tips will return to the warped position and will "push" the glider over the top, allowing you to launch the glider very steeply and have it transition into the glide without much loss of altitude.

Now you're ready to fly, so grab your launch catapult, and your glider and lets head out to the contest.

The first thing I do at the flying site is to test glide it. This is done by banking the plane into the direction it will glide, and giving it a little push with the nose level, not pointed up or down. If it dives into the turn, the plane is trying to turn so tight that it is trying to roll. First check the stab and make sure that it isn't warped too much, meaning if you trim your plane for a roll out by warping one side of the stab up and the other down that it isn't more than maybe 1/16 of an inch. Once this is fixed, if it still dives into the turn, look at the wing and see if any of the panels are

warped up or down (excluding the tips). The desired warp at this point is to have the innermost panel of the wing on the inside of the turn warped downwards slightly (if you have polyhedral...otherwise it's the inboard half of the wing on the inside of the turn.) What this will do is to provide more lift on the inboard wing and will hopefully keep it from diving into the turn. If it continues to dive, the final solution is to add a bit of clay to the outboard wing tip, and glide test it until you get a smooth glide out of your hand.

Now that the plane glides I get the catapult and give the plane a straight ahead launch with no bank about 1/3 power, again keeping the nose level. The model should come off the catapult and start into a climb while assuming its own bank, then gradually the climb slows and the plane goes into a smooth transition to the glide. If the plane dives or balloons directly off the launch, check your decalage again. If it rolls over too far into the turn to go into it's glide correctly, give it a little bank in the opposite direction on the 1/3 power launch. Continue this process until the 1/3 power launch is perfect, then try the same thing at 1/2 power, and 3/4 power, increasing your launch angle each time until you are ready for an almost vertical full power launch. Keep in mind you will need to play with the amount of bank you put into the glider on launch as the power increases.

You should be all set for that first perfect launch!

Now that you are ready to trounce the competition, I have to go and build something new so you guys don't go and beat me! Just remember that each glider will fly a little bit different and everyone will have a different way of trimming their models, some may have better ways that I've outlined here. Actually, most of the information I've given to you is from other people and I merely took the best methods and put them together with many of my own ideas. This is one of the better trimming methods I have yet to find (Aside from Karl Von Buere, that is, trimming methods are more of an art than a method. In fact, all of my success with gliders is thanks to Karl since he got me addicted to this sick, insane end of the hobby, which we all love so much!)

Anyway have fun, and let me know how you're doing.

Catapult Rules

There are two categories (quoting the 1994/95 AMA Competition Regulations) and they are:

Standard Class - Projected span must not exceed 12 inches and chord must no exceed 3 inches. Area of stab must not exceed 50% of projected wing area. Monoplanes only.

Unlimited Class - Projected area of supporting surfaces must not exceed 100 sq. in.

Both - Surfaces fixed except for flexing. No folding etc. A max 6" launching stick with unlimited rubber. Both stick and glider must be held by contestant.