

LOW CEILING TRIMMING – PART 2

By Bob Bailey 2014

FINE TUNING

This is the stage at which big gains in duration are usually achieved.

First, a quick note on rubber batches. If you acquire rubber from different sources then you must assume that the batches are different - this is true of rubber which may be labelled with a given year and month ie. the usual TanII rubber. Many of you will know about the 'super batches' eg. May 99 and March 02 Tan II but even these can vary considerably in their characteristics from one box to another!

Matching weight to thickness

This is the process of ensuring that the cruise torque is at the mid point of the rubber torque curve ie. the number of turns left on landing should be roughly equal to the number backed off before launch.

If the number left exceeds the number backed off by less than about 30%, shorten the motor by about 5% and repeat the flight, using the same number backed off. The model should climb higher, fly for longer and use up more turns. The reason for this is that the model was slightly underpowered for its weight and removing some of the rubber improves the match between power and weight. If the number left exceeds that backed off by more than about 30%, you will need a thicker motor of the same or similar weight. Aim for an increase in thickness of about 5% if possible.

If the number of turns left is less than that backed off, you will need to use a longer motor of the same thickness ie. with the same weight per unit length or a slightly thinner motor (**not more than 5%**) of the same weight. For the next trial, adjust the back off to give slightly more launch torque to compensate for the reduction in power or increase in weight otherwise the model won't climb as high as before.

You will find that once you have removed these large mismatches, the duration will have increased quite considerably, particularly when the

number backed off and the number left on landing are within about 10%. You will now have a good feel for what sort of duration you can expect to achieve.

Variation of Motor weight

When the available altitude is somewhat less than usual, you will clearly need to back off more turns to control the maximum height. This means that less turns are available for flight. If the number of turns used in flight is less than $\frac{1}{2}$ of the number wound on, there is a lot of energy you can't use; this is effectively dead weight which can therefore be minimized.

Reduce the rubber weight by say 10 % with a small reduction in thickness to compensate. The chances are that you will get an increase in duration once you have matched the motor weight and thickness as above.

Conversely, for a somewhat higher ceiling than normal, you may be able to increase the rubber weight slightly if the required back off is 10% of turns applied or less. You will get a slightly longer climb due to effectively eliminating the burst which gives a rapid climb and obviously have more turns available for flight.

Change of conditions

The most difficult change to adapt to is when the conditions are somewhat more buoyant than usual. You will find it much more difficult to keep the model out of the ceiling with the usual motor size. It will happen that you are backing off a very large number of turns to keep the model down, so much so that there aren't many left for flying!

It is not always obvious when this problem is present; the main aid to recognizing it is knowing how well your model performs. I've seen this happen many times, particularly with Living Room Stick where the rubber is so thin that making accurate small changes to motor thickness is very difficult to achieve!

When this happens, you must change to thinner rubber, again by around 5%. Remember that the motor thickness (weight/unit length) is critical!

The procedure for fine tuning is the same as before; the main difference is the need to start with thinner rubber at about the same weight as usual.

There is no substitute for flying the model and accumulating performance data. For each good flight, I note the rubber batch, motor weight, thickness ie g/m, launch and land turns and height achieved (or number of ceiling hits). In addition, it's worth noting any changes to the model trim eg elevation or downthrust.

As various sportsmen have commented 'the more I practice, the luckier I get'

Good luck!