

# Getting the most from your Club 500

Club 500 racing has now been running for a few years at Thorpe Lea and has proved very popular with marine members and fliers alike. We regularly have eight or nine boats racing and occasionally have had to split the field into two heats to keep the mayhem at the first buoy under control.

This popularity is because of the low cost and close racing resulting from the identical specification of the boats. They must be built from the Model Slipway kit which is complete with motor, coupling, shaft, prop and rudder assembly. All one has to add is 2 channel radio, rudder servo, electronic speed controller (Mtroniks Viper Marine 25) and 2s 2200mAh Lipo drive battery.

Although Club 500 racing continues throughout the winter this is the traditional building season. Some members are refurbishing existing models, some will be building a spare and hopefully some will be building for the first time so as to join in the fun. I thought it was therefore an appropriate time to share some of the acquired wisdom of our more experienced racers for the benefit of all.

## **Build it straight**

This is by far the most important rule. It is vital that the motor, coupling and prop shaft are aligned in an absolutely straight line. The flexible coupling will cope with some misalignment but this will absorb precious power and create vibration. Some members with machining facilities have turned up a solid dummy coupling for alignment purposes. This fixes firmly to the motor and shaft and creates a single rigid component for installation purposes. Once the motor and prop shaft have been fixed in place the alignment jig is replaced with the flexible coupling. I don't have lathe facilities but have managed perfectly well by wrapping the flexible coupling with cartridge paper to form a stiff and close fitting tube. This keeps the coupling straight during installation. It is also worth checking that your coupling is true. Most members have had no problems but the couplings are "under engineered" and Steve Solomon has transformed his boat's performance by replacing his out-of-true coupling. Finally make sure that the angle of the prop shaft is as shallow as possible so that the thrust line is pushing the boat forwards rather than trying to lift the stern. The prop should clear the bottom of the hull by no more than 2mm.

## **Build it light but strong**

The Club 500 boat as designed is quite strong enough for the normal rough and tumble of racing and there is no point in adding significant extra weight. However a couple of minor reinforcements are recommended. An additional layer of plasticard cemented to the first 7 cm or so of the hull inside of the bow strengthens this area in the case of the usual front end impact. A similar layer under the rudder support moulding in the stern adds stiffness. This resists damage in the event of an impact to the rudder, and also reduces the chance of distortion if the rudder tube retaining nut is over tightened. Some builders have added a short length of 15mm plastic plumbing pipe inside the rudder support moulding to further resist the compression effect of the retaining nut. The only other reinforcement I have found worthwhile is below the boss through which the aerial tube passes. Before joining the hull and deck I have cemented a small piece of plasticard in place to create a dam 5mm or so deep below the boss which I have

then filled with epoxy. When drilled this provides much better support for the aerial tube which is vulnerable to a rear end impact.

The hull to deck bond is the most critical for an impact resistant boat. Some have used plasweld or similar plastic modelling cement which has the effect of partially dissolving the surfaces and effectively fusing them together as the solvent evaporates. I have found 30minute epoxy to give an excellent bond provided the mating surfaces are thoroughly abraded with coarse sandpaper or emery cloth beforehand.

### **Making things easier on race day**

A few further modifications will make life easier on race days which in turn will reduce the likelihood of making mistakes under the pressure of an imminent start. When cutting out the access hatch in the deck leave a 10mm flange all around the inside. Reinforce the two long sides from underneath with strips of plasticard to prevent undue flexing. A thin piece of clear Perspex can then be hinged in position along one side with electrical tape, and taped easily along the other three sides to waterproof the hull for racing. This is much easier and faster than trying to tape all the way around the cabin superstructure and I have found that one set of tape can be carefully unpeeled and restuck several times, often lasting three or four race days before needing replacement.

Placing the battery box on Velcro™ rails rather than cementing permanently in place will enable you to adjust the centre of gravity to prevent porpoising, and to remove the box for improved access to the motor and coupling. The battery is quite heavy and has considerable inertia in the event of a “racing incident”. To minimise the chance of it shifting retain the battery box with heavy duty Velcro™ (available from Halfords) which has much more grip than the material normally sold by your local model shop.

I have also found that the heat generated in the battery during a race will soften the adhesive used on normal modelling Velcro™ which sometimes peels off when the battery is removed. I have now switched to Velcro™ straps which pass right around the battery box and don't rely on adhesive to hold the battery in place. I guess that this removal of a double layer of material from under the battery also lowers the C of G very marginally which will do no harm.

### **Don't build in electrical resistance**

You don't want to waste any of your battery power. Keep the wiring simple and the leads as short as is practical. Use thick, high grade low resistance cables as used by the car racing fraternity. Minimise the number of connectors used and replace all connectors with 4mm gold banana plugs and sockets and take care when soldering to avoid “dry” joints. You need a shiny silver finish on the joint, not a dull grey. In my experience in-line fuses are unnecessary. I have not applied the watts meter in my high tech test tank (bath) but have calculated that the motors only draw about 10amps and in over a year's racing have only seen a speed controller burn out once. This spectacular exception was David Wall at the marine open day and appears to have been the result of a major short circuit. Neil Wiltshire was struggling for months to make his boat competitive and changed most of the key components before turning his attention to the wiring loom. Hey presto, Neil's boat is now well up with the leaders.

Club 500 boats can be raced with a micro switch instead of an electronic speed controller. However modern ESC's are very reliable and have minimal resistance. I take the view that the ability to reduce speed to avoid a "racing incident", or even to reverse in exceptional circumstances to free leaves from the prop, makes their use well worthwhile. I use the 20amp Msonic marine ESC's which are waterproof and have proven well up to the rigours of Club 500 racing.

The usual rules about keeping radio and power wiring as well separated as possible to avoid interference obviously apply here too.

## **Race preparations**

It's a well known and over used phrase, but none the less true, that "to finish first you first have to finish". In other words building reliability into your boat will pay dividends on race day. Clean and dry the boat after each days racing, check for any damage and make repairs. Remove the prop shaft from time to time and re-grease the tube. Grease should be applied to the rudder tube too, and a small washer of silicon fuel tube around the rudder shaft and squashed just below the rudder arm will further reduce the likelihood of water entering up the tube. Discharge your battery pack as described earlier. I like to polish my boat with a little car polish. I don't think it makes it any faster but it keeps it clean and shiny and may give you a psychological edge over drivers with scruffy craft. It is also worth decorating your boat in a distinctive manner. The kits come in a limited number of colours and can be easily confused in a brief lapse of concentration. As Liam will confirm you would not be the first to believe you are driving immaculately at the front of the field when in fact your boat is actually heading at full throttle under the jetty!

Take the trouble to trim your boat out properly. Firstly adjust the position of the battery pack on the Velcro™ rails. Move the battery box back until the boat begins to porpoise and then move it forward again until the porpoising stops but make sure you don't foul the motor coupling. My boats have a distinctly nose down attitude when stationary on the water, but run nicely when up on the plane. Run the boat away from you at full throttle and adjust the rudder trim on the transmitter until it tracks straight. Then run it back directly towards you and check it again. Ideally do this on a calm day when the effect of a crosswind is minimal. When it is tracking straight, bring it back in and correct the rudder linkage by the amount of the trim adjustment. Centre the trims and try again. Keep tweaking until it runs straight with the trim centred. This should be repeated after each time the rudder is removed for greasing.

Water and electricity don't mix. The boats are surprisingly seaworthy and remain quite dry but I always put some folded kitchen towel along the starboard side and in the stern to absorb any water that may be shipped and prevent it sloshing around the electrics. I also put electrical tape around the seams on the rudder servo before securing it in place and pop the receiver into a party balloon sealed with a rubber band.

I fully fast charge my battery packs at home the evening before a race day. I then put my race battery on trickle charge at the lake to top it up, and put it in the boat at the very last minute. The tape system on the deck cut out mentioned earlier speeds things

up and really helps here. This means that the battery is slightly warm and will deliver full punch for the all important charge to the first buoy. Don't, whatever you do, try a quick spin around the lake just to check that all is well. You will take the edge off your battery pack. After the race allow the pack to cool before recharging. That is why it is better to have a minimum of two batteries for racing.

## **Driving**

If you have built and prepared your boat accurately and carefully its performance will be competitive. Whether you win or not will then be down to your driving ability and as we have noted before, "to finish first ...etc. etc". A demolition derby may be fun but will not usually win a race. The boats are surprisingly seaworthy and quite stable, but can be flipped over in a coming together. They don't self right and so your race is then over. This is most likely to happen at the first buoy and it is really frustrating when your race finishes after five seconds! If you can't outstrip the pack on the first leg it is often better to back off slightly, make a good turn and pick up places as the others bash each other about.

Practice your driving when you get the chance. These boats do not turn on a sixpence like many of the faster electric classes and seem to perform best with a smooth approach to cornering which maintains momentum. Try to set yourself up for a smooth curve which passes close to the buoy but don't overdo it. A cut buoy incurs a penalty of 5 seconds which is difficult to make up in such a closely matched class. If you are too fierce with the rudder, especially on a windy day, there is a distinct possibility that your boat will spin out which again costs you time.

## **Have fun**

At the end of the day this is what Club 500 racing is all about. In my modelling experience it is just about the most enjoyment per pound spent that you can have. You can't go out and spend a lot more to make your boat quicker. It really is all about building accurately and then driving well. If you do this you will be competitive. Give it a try. You'll be glad you did.

*Roger Hobbs*