

## So you Want to Build a Soling?

### **Introduction**

It came as a nice surprise when the editor of Radio Waves asked me to write a story on Building the Soling One Meter RC Yacht. Most of you will have read some of my articles in Radio Waves and Marine Modelling International Magazine with respect to the Soling, but as the class starts to increase in size around Australia it might be timely to revisit the history of the class and to take at a look at building a Soling.

The Soling One Meter (yes that's the way that our American friends spell meter!) is a low cost kit, one design RC yacht which targets new skippers. It is basically the Sabot or Mirror Dinghy of RC Yachting, it allows new skippers to become involved in RC Yachting for very little cost when compared to some of the other classes raced in Australia. It also allows a new skipper to become involved in close competitive one design racing without having to worry about some of the more intricate adjustments of the more sophisticated or faster boats.

The Soling was introduced into the American Model Yachting Association in 1993 and since then has gone on to become one of the largest classes in America. The boat was first introduced into Australian RC yachts clubs via Jack Lee of the Sydney Maritime Modellers Club (SMMC), NSW in 1998 (now the largest RC Yacht club in Australia with approximately 50 members). At that time Rob Hales (President of the New South Wales Radio Yachting Association) and myself were looking around for an entry level boat for new skippers and the Soling seemed to fit the bill perfectly. It was a One Design that performed well in all conditions unlike some of the current toy boats that some manufacturers produce, It is commercially available from any hobby shop, price was nice and low and there was already a published set of rules and building tips on the American Model Yachting Association (AMYA) website so we decided to give it a go and have never looked back.

Originally there was some opposition to adopting another class of RC Yacht in NSW with individuals stating that they were finding it difficult enough to raise interest in the current classes as it was, without starting another class. This has proved to be incorrect as the clubs that adopted the Soling One Meter

as their novice entry level boat have gone on to increase their club numbers substantially. For example the Sydney Maritime Modellers Club maintains a large fleet of Soling One Meters and recommends this boat to all new members that are looking to become involved on RC Yachting for the first time. The club has an active Soling Group with a good technical support and knowledge base. New skippers are assisted in the building, set up and racing of their boats and this makes their induction or transition into RC Yachting moderately painless, so much so that most Soling skippers in the SMMC then go on to build or buy an International One Meter (IOM).



*The Authors Soling One Meter (SIM) romping along on a Port Tack.*

So as you can see the Soling is not only good for new skippers but also good for RC Yachting clubs, other classes of RC yachts and for your State/National Association. Recently another club in NSW that had been sailing 10 Raters for many years decided to adopt the Soling One Meter as their entry level boat. They now have some 12 Solings racing in their club and some of those new skippers are now going on to race 10 Raters. Seasoned campaigners such as Rob Hales of the NSWRYA also race a Soling One Meters and enjoy it.

### **Prerequisites**

- Well enough of the sales pitch lets get you started. The first thing that you will have to do is get yourself a kit. Kits are available from the 'H Store' in Miranda (Sydney) for approximately \$289.00 at the time of printing. H Store contact is a

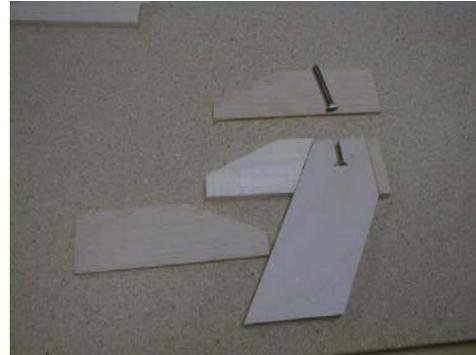
David Perry, e-mail [david@hstore.com.au](mailto:david@hstore.com.au) or phone (02) 9525 7540. For those of you that live outside of Sydney or Interstate your local Hobby Store can order them from the importer (Hobby Headquarters, Unit 32/398 The Boulevard Kirrawee 2232, ph (02) 9545 1090).

- Once you have got your kit unwrap it and examine all the contents so that you can become familiar with them. Unroll the sails and hang them up on the wall in the shed with masking tape so that the creases drop out. The next thing you should do is log onto the American Model Yachting Association's Website ([www.amya.org](http://www.amya.org)) and download yourself a set of the rules, building tips, cradle building tips and tuning instructions for reference. If you do not have internet access then do not hesitate to drop me a line and I will send you a copy in the mail. You will also need to purchase some number 9 or 8 shotgun lead shot from a gun shop (it usually comes in ten pound bags but you will use about 6 1/4 pounds). This is used to fill the hollow fin to provide the ballast for the boat. You will need 500ml of West Systems Part A Epoxy Resin 105 and Part B Hardner 206. (Note: do not use polyester resin as it generates too much heat and can melt the plastic). This resin is used to glue the ballast into your fin and to seal timber components such as the fin box from water damage. You will need a small bottle of polystyrene glue (the type used for plastic models from the hobby shop, get the one with the needle style applicator). This is used for the plastic to plastic joints in the boat and finally some Selley's Super Strength Araldite which is used for gluing the timber servo support structure into the boat and for gluing the various fittings to the mast and booms.
- Lastly you will need some sort of servo for sail control. The recommended servo is the Hitec HS 815 BB lever arm servo. Again the H Store in Sydney seems to have the best price.

### Starting to Build Hull

I will not try and cover the whole building process in this article as it would go on for too many pages, but here are some pertinent points that might be of assistance so that you can build some extra strength and serviceability into your boat.

- I used Polystyrene cement for all plastic to plastic joints (note ensure that all plastic joints are sanded lightly prior to gluing)
- Ensure that all timber has a good coat of waterproofing such as epoxy resin

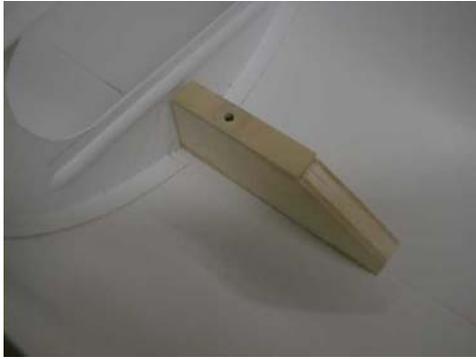


*Preparing Fin Tongue and Finbox*



*Finbox Assembly being glued together after having been coated on the inside with epoxy resin and sanded smooth*

- The AMYA website provides a set of drawings to produce a hull assembly jig, this is a good way to ensure that your finbox, fin and hull are all in alignment during assembly
- Tack glue finbox into hull using Zap-A-Gap superglue and the afore mentioned jig (Note: Vaseline the finbox tongue so that you do not accidentally glue the fin into the boat) , once dry remove fin and then apply a fillet of Epoxy Resin thickened with Microballoons around the base of the finbox.



*Finbox tack glued into hull and Fwd Bulkhead in position*

- Once dry glue in two buttress type supports down each side of the fin box (I used 8mm X 8mm Balsa wood and then gave them a coating of epoxy resin)



*Balsa Wood painted in epoxy resin buttress supports, note drain holes in Fwd Bulkhead and rear crescent frame to allow water to drain to rear of boat.*

- Ensure that the front and rear bulkheads have drainage holes drilled into the bottom of them. This allows water to pass from the bow to the stern where the drain plug will be situated. I also used the small self tapping screw provided for sidestay attachment to provide lateral support for the front of the fin box. I drilled a small hole through the bulkhead into the front of the finbox front post and placed this screw into this position.



*Finbox support screw as viewed from forward side of front bulkhead, ensure that it is not too long as to interfere with the fin tongue sliding into the finbox*

- I have replaced all the self tapping cup hooks used in the hull with Pekabe or Sails etc eyebolts available from Radio Yachting Supplies in Queensland.
- Add a small flange of plastic or timber just inside the inside line of where the transom will be situated. This will give you a flange to push the transom up against while gluing the transom into position
- Add lateral support structure either side of the Rudder Shaft Block inside the hull. I used 2.5mm liteply for this.



*Lateral Rudder Block support bracing*

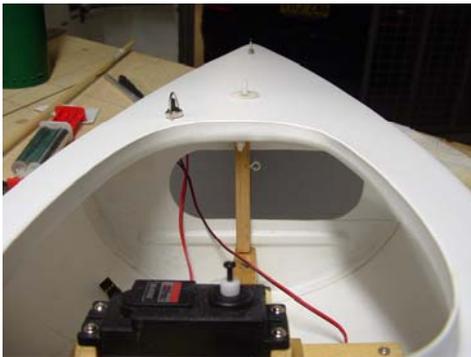
- Make sure that you have got all your internal fittings and electrics sorted out prior to putting the deck on. The Soling has quite a large hatch and I have set up my Winch and Rudder Servo Support Tray in such a fashion that I can remove

the whole lot through the hatch to affect any internal repairs or equipment replacement. You will also need to provide some sort of hole or fairlead to pass the antennae through.



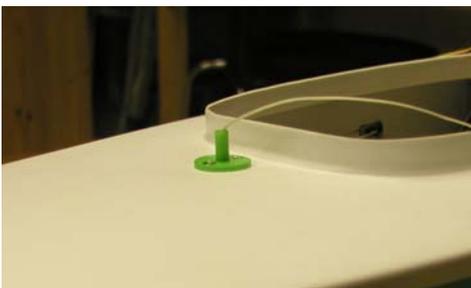
*Internal timber servo support tray being test fitted*

- Another modification that is worth the effort is to make a removable mast support post that sits on top of the finbox and is held in place at the bottom with a small locating pin and at the top with a nut and bolt or split pin.



*Removable Mast Support Post*

- Through Deck Fairleads are a must for the Jib and Mainsail Sheets, Pekabe through deck fairleads from Radio Yachting Supplies in Queensland are ideal as they fit the height restriction in the rules.



*Locally produced plastic through deck fairleads*

- Ensure that you tape the deck down when gluing it onto the hull and allow it to dry overnight. Check for any small gaps that did not glue properly the next day and insert some glue into these positions. (Note the syringe style applicator in your polystyrene glue bottle makes it is easy to apply a bead of glue in between two mating surfaces). (Note do not use too much polystyrene cement as it will melt the plastic and distort the hull, this is a plastic welding process).



*Taping deck to hull after glueing with polystyrene glue*

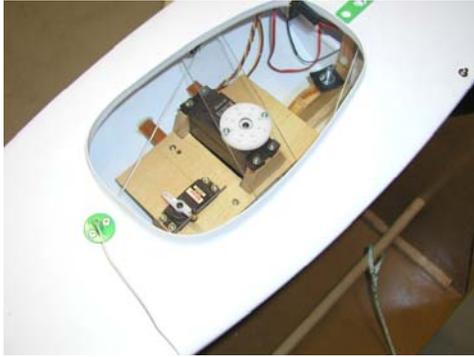


*Method for holding rear of deck and deck flanges to rear of hull after glueing*

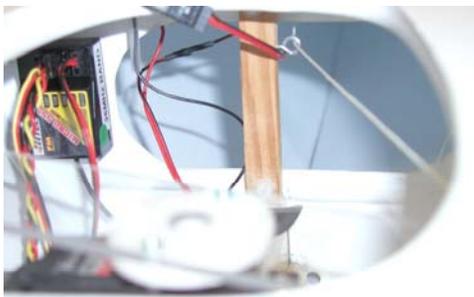
#### **Lead Ballast and Fin**

- Filling the fin with lead can be quite a messy project, ensure that you have some spare paper towel or old rags present to mop up any spills. Ensure that you have run some masking tape round the edge of the fin so that the resin does not leak out of any small cracks etc.. A small piece of dowel comes in handy to tamp down the lead shot into the resin as you are filling the fin. A small plastic funnel for the lead and one for the resin is also helpful. Once you have put in all the lead and resin tamp it down and let it set overnight. Once final completed ready to sail weight can be checked (10lbs) you may then fill the void

space at the top with resin thickened with microballons until flush with the top. The fin weight when completed for a Soling using a Hitec HS815BB Lever Arm Winch, a 5 cell 6 volt battery pack and built as per this article should be about 6 1/2 pounds. Sand the completed assembly with 1200 wet and dry sandpaper ready for painting.



*Rudder and Sail control servos fitted, perspex servo arm*



*RC Receiver fitted to bulkhead with velcro and note jib sheet fairled on mast support post made by using small self tapping screw eye from original kit. This stops the jib sheet from chaffing on the bulkhead cutout.*



*Lever arm pulley attached to lever arm.*

### **Rudder**

- Fill the rudder with epoxy resin to the top and sand the complete assembly with 1200 wet and dry sand paper ready for painting.

### **Painting**

- Painting of the hull, fin and rudder is straightforward. I used Tamiya Acrylic from the local hobby store. Ensure that you use Tamiya Acrylic paints with the prefix TS. This means that you can use it on polystyrene plastic.
- Alternatively the automotive paints from your local Repco, Big W or Kmart are quite OK and a little cheaper. Stay away from metallics if possible as they seem to oxidise and fade over a few months of operation. You can always finish off with a clear coat of gloss acrylic over the top to give your boat that super shine. I use White Knights Acrylic Clear Gloss Lacquer available from Bunning's Hardware

### **Rig**

- At first glance you might think that they have forgotten to send you your mast but it is in two pieces and needs to be glued together. Use Araldite or Epoxy Resin. Score the mating faces of the joint slightly and then apply some resin. Push the whole lot together and wrap in glad wrap and then clamp it between two pieces of wood and place it flat on the workbench overnight.
- Mark out and drill all of the rig attachment points for the Gooseneck, Mainsail Luff, Jib Attachment Point and Diamond Stays. Dry fit everything first to ensure correct fit. Once your happy sand them smooth and give them a coat of sanding sealer to prime the bare timber. Once dry give it a sand and then paint your mast and booms, I usually paint my rig black as this contrasts with the white sails and shows up well at a distance). Alternatively you may wish to varnish the timber for a natural finish.
- I replaced the self tapping cuphooks for the diamond stays with Pekabe long eyebolt screws and epoxied them into the mast at a slight angle opposing the force being applied to them. The self tapping cuphooks supplied in the kit are OK for the sheet and sail attachments but not for items that have a bit of force applied to them when sailing.



*Pekabe Eyebolt epoxied into mast for strength*



*Jib Attachment replaced with a Pekabe Eye Bolt. Note self adhesive rubber bow bumper*



*Pekabe Eyebolts (slightly opened) used on the bow for the jib attachment*

- The gooseneck assembly in the kit was replaced with an after market product available from the boat manufacturer "Victor Model Yachts" the Large Gooseneck/Vang Assembly listed on their website was the one I used (Note: the link to the Victor website is available on the AMYA Soling page). It is a good item and well worth the \$25.00 that I paid for it. Alternatively you could use bent stainless steel welding wire or push bike spokes to make a reliable gooseneck/vang assembly and utilising a sails etc.. sidestay tensioning screw as a boom vang.



*Victor Gooseneck/Vang Assembly, Sails etc..brand Stainless Steel Sidestay Tensioners*



*Another view of above showing also the through deck, waterproof on/of switch*



*Simple Gooseneck/Vang Assembly manufactured from a Sails etc..brand large stainless steel sidestay tensioner and bent stainless steel welding wire gooseneck/van pivot epoxied into mast*

- I replaced the bowsies in the kit with Sails etc.. bowsies from Sails etc.. in the United Kingdom, Radio Yachting Supplies or Hales Micro in Australia. Pekabe style bowsies could also be used.



*Back Stay bowsie from Sails etc.. product. Also note eyebolt placed through transom and bolted into position prior to assembly*

- Sail corners were reinforced using stickyback sailcloth as per the rules and I also made my sail logo and sail numbers out of this material as well.

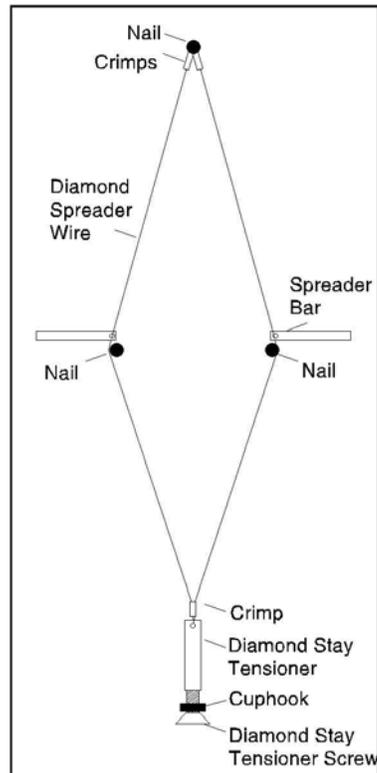


*Corner reinforcements, class logo, numbers and sail battens all made from stickyback sail repair cloth*

- Diamond stays and sidestays were all produced using a jig on the work bench consisting of a few nails hammered into a piece of wood. This enables the stays to be set up with equal tension as they are being crimped and then when they are assembled onto the mast and when tensioned the mast will remain straight. I used a pair of Sails etc.. sidestay tensioning screws (same as IOM class) to replace the suggested method of tensioning the sidestays. The mast support ram is set at four turns and left there and the sidestays are then tensioned using the side stay tensioning screws. This ensures mast verticality even if you made one your siudestays a little longer than the other.



*Sidestay manufacturing jig made from a piece of timber and a couple of nails*



*Diamond stay building jig, similar to above*

- I used a longer screw (a spare out of my servo mounting fittings) to attach the side stays to the mast.



*Sidestays attached with a long self tapping servo screw or similar*

- All crimped fittings were covered in heat shrink available from most electronics shops such as Dick Smith, Jaycar or Tandy. This ensures that there are no sharp pieces of wire sticking out to cut your finger on when rigging your boat. (isn't it amazing how you bleed more in winter than in summer?)



*Crimped terminal fittings covered in heatshrink used in electronics work*

### **Final Assembly**

- The rig was assembled as per the kit instructions and the fin and rudder attached to the hull. Mount the mast onto the boat and when assembled I find a measurement of 48 – 48.5 inches from bow to jib attachment point will set your rig up pretty well spot on for your first sail.
- When setting up your sheet travel you will need to have the mainsail boom pointing at the rear quarter of the boat (at the point where the transom meets the side of the hull) and the jib set a few degrees further out than the main. In light conditions just nip the backstay as too much tension will close up the slot between the mainsail and the jib which will result in your boat slowing down. Allow about two fingers width between the sail and the boom on the mainsail and three fingers for the jib

and about two-three inches of twist in the mainsail using the boom vang. Also do not put too much tension onto the luff tensioners for the jib and the main. Basically the Soling's sails being flat non panelled sails need to breathe so don't pull everything on too tight.



*Rubber drain plug, Backstay adjuster and antennae tube made from RC model aircraft plastic fuel tube held into deck as a push fit into a plastic Ramset Nail Guide which is internally glued into the deck.*



*Completed boat sitting in transport cradle. I used the shapes from the two centre bulkheads from the building jig to manufacture the transport cradle. Timber dowel between front and rear of cradle allow me to lean the boat to*

*simulate sailing position when heading into the wind allowing me to trim and set my sails prior to sailing*

### **Sailing and Tuning**

OK lets hit the water. Power up your boat, (I use 6 volt 1700Mah AA batts from Sanyo in a sealed pack, these being placed inside a balloon or small plastic container for waterproofing and placed down alongside the finbox) ensure that the rudder is in the neutral position when viewed from the rear of the boat, and chuck it in! If your boat rounds up into the wind when heading to windward rock your rig forward by letting off the backstay and shorten the forestay and do the opposite if your boat falls of the wind. Remember not too much backstay pressure until the wind picks up to at least an IOM B rig blow!



*Note curvature of sails along the foot (bottom of sail) also offset and position of Main Boom, Jib Boom relevant to the centre line of the boat. Allow the main boom to point at the back corner of the boat when hauled hard in.*



*A view of another boat showing a good sail set.*

Extra items mentioned in this article are available from Sales etc.. in the United Kingdom, Radio Yachting Supplies in Queensland Australia or Hales Micro in Sydney Australia

For any advice or technical help please contact John Bartram, Soling One Meter Coordinator NSWRYA, e-mail: [bartram@unwired.com.au](mailto:bartram@unwired.com.au) or (02)9630 3770.

John Bartram  
NSWRYA