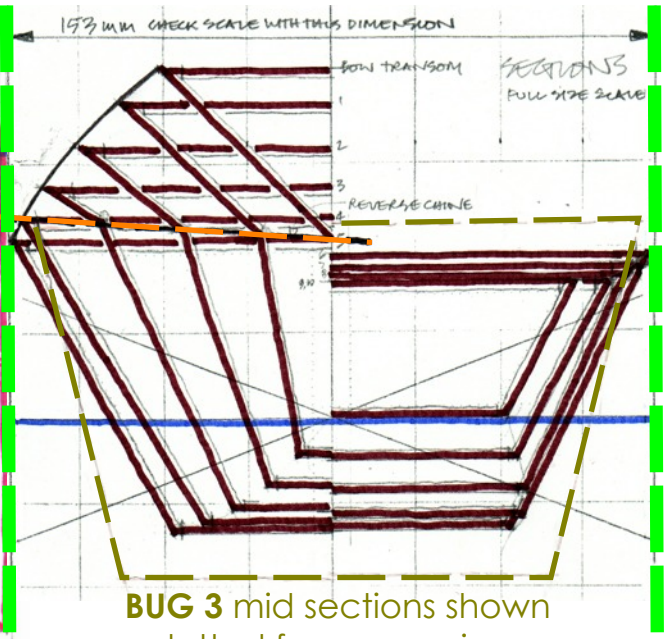
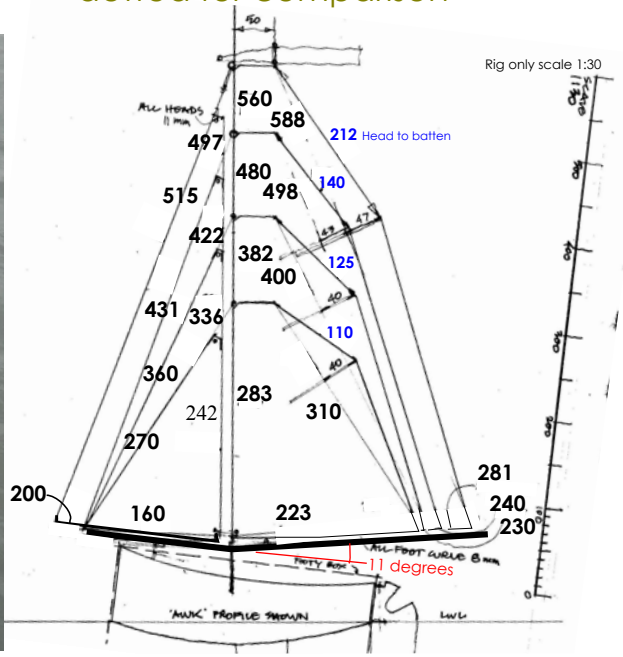
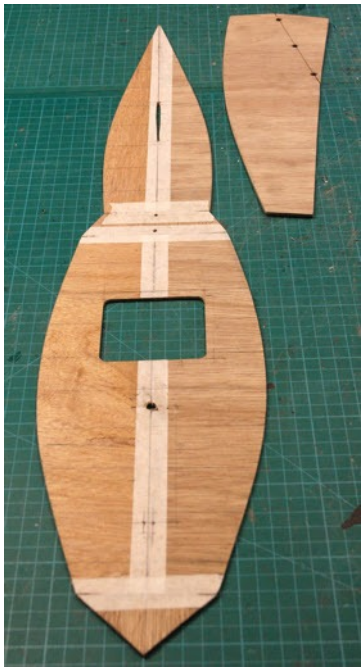


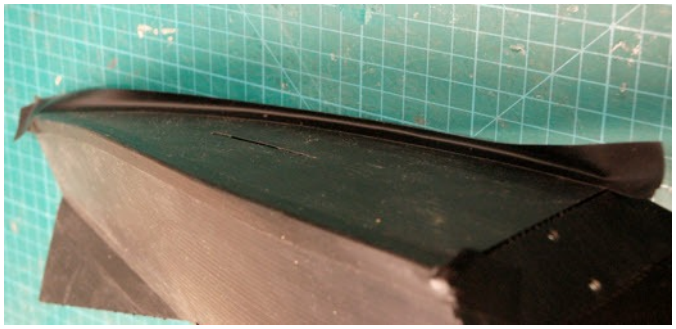
BUG 3 mid sections shown dotted for comparison

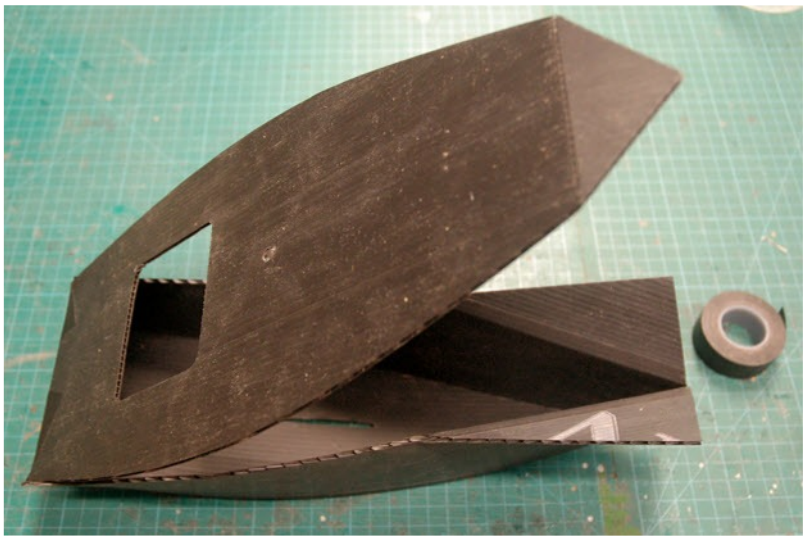


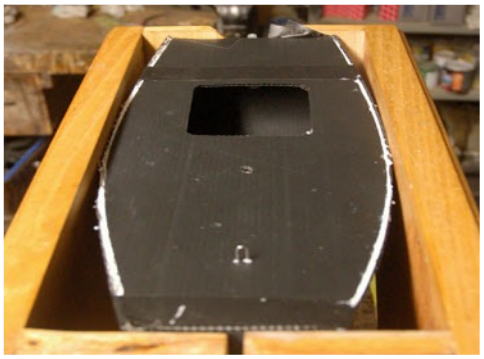
SUPABUG

'BUG 3' update - 300 grams lighter, less rocker & aft freeboard; finer bow, deeper keel, more upper volume & stability. Uses AWK/ICE foils, rigs, radio cassette; Correx/tape construction easier with 'concave' upper chine.





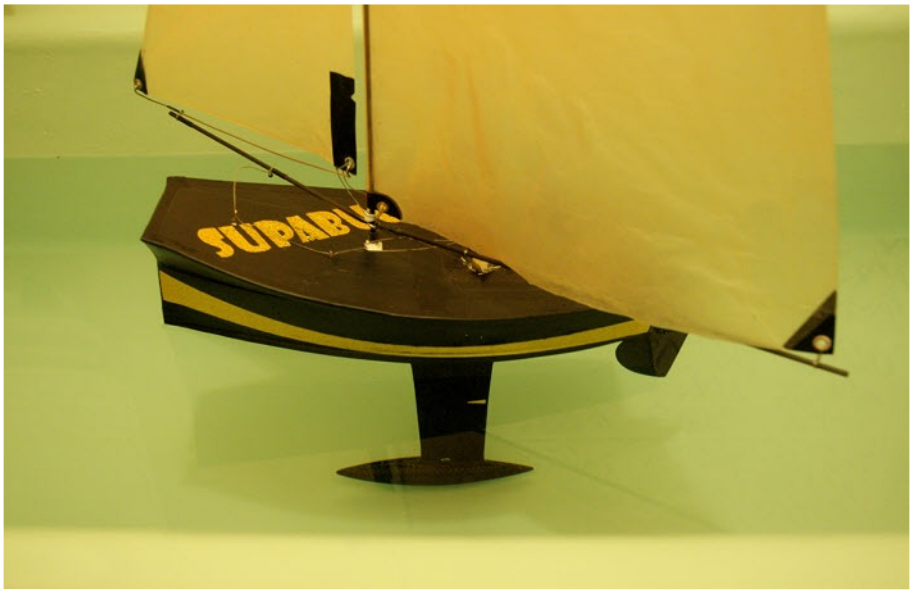




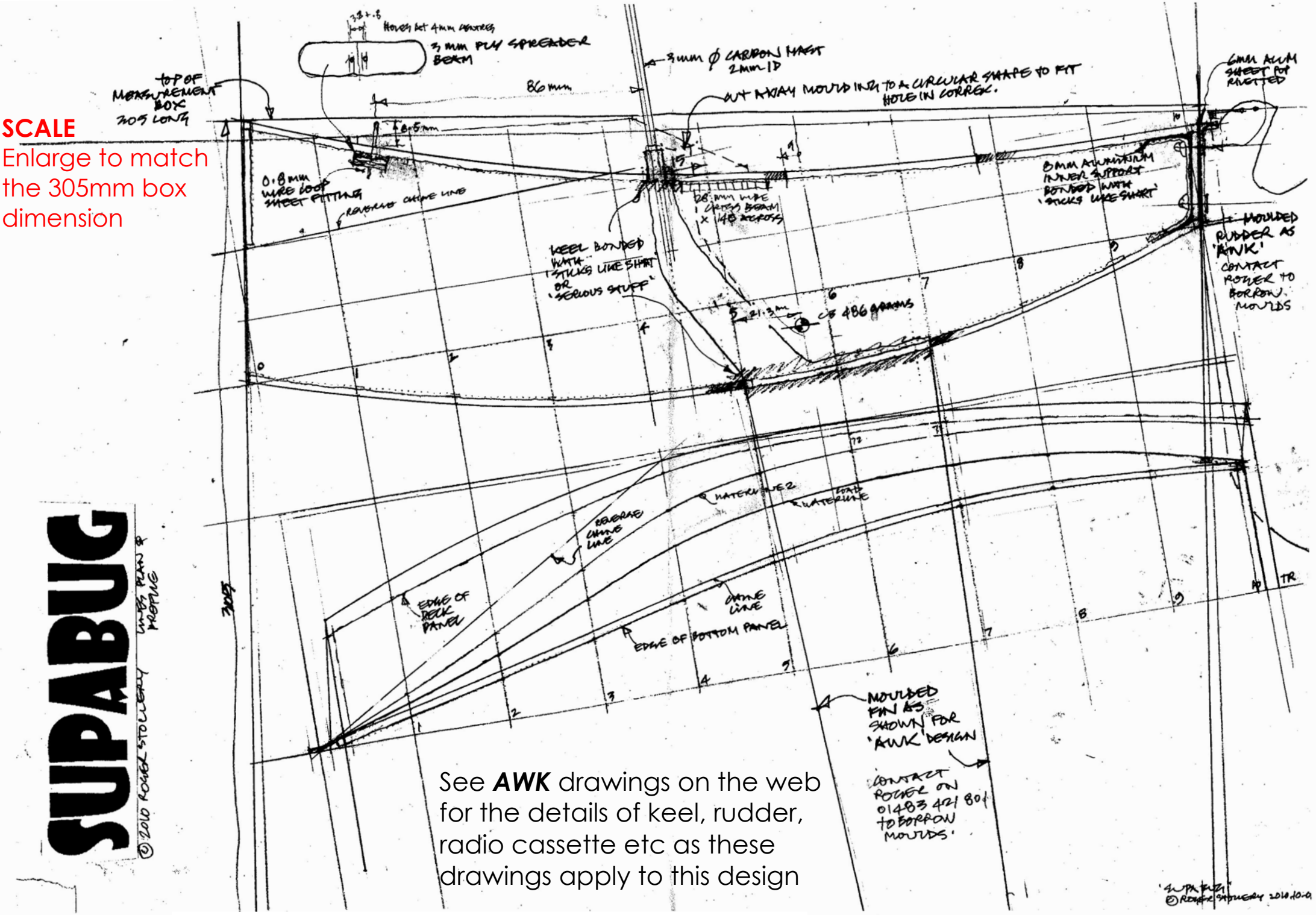
Built 2010-10-21 to 2010-10-24

SUPABUG

Launched 2010-10-26



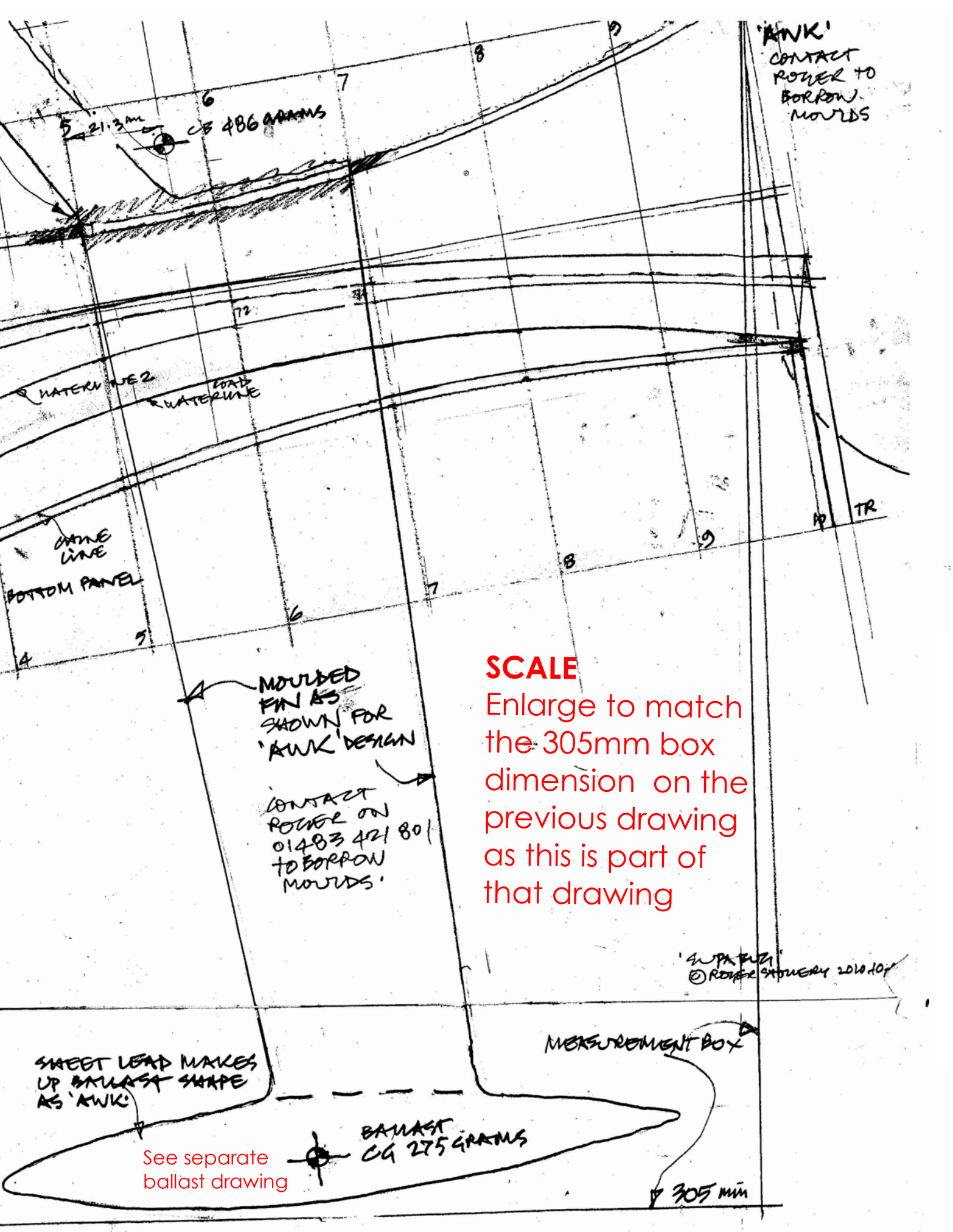
SCALE
Enlarge to match the 305mm box dimension

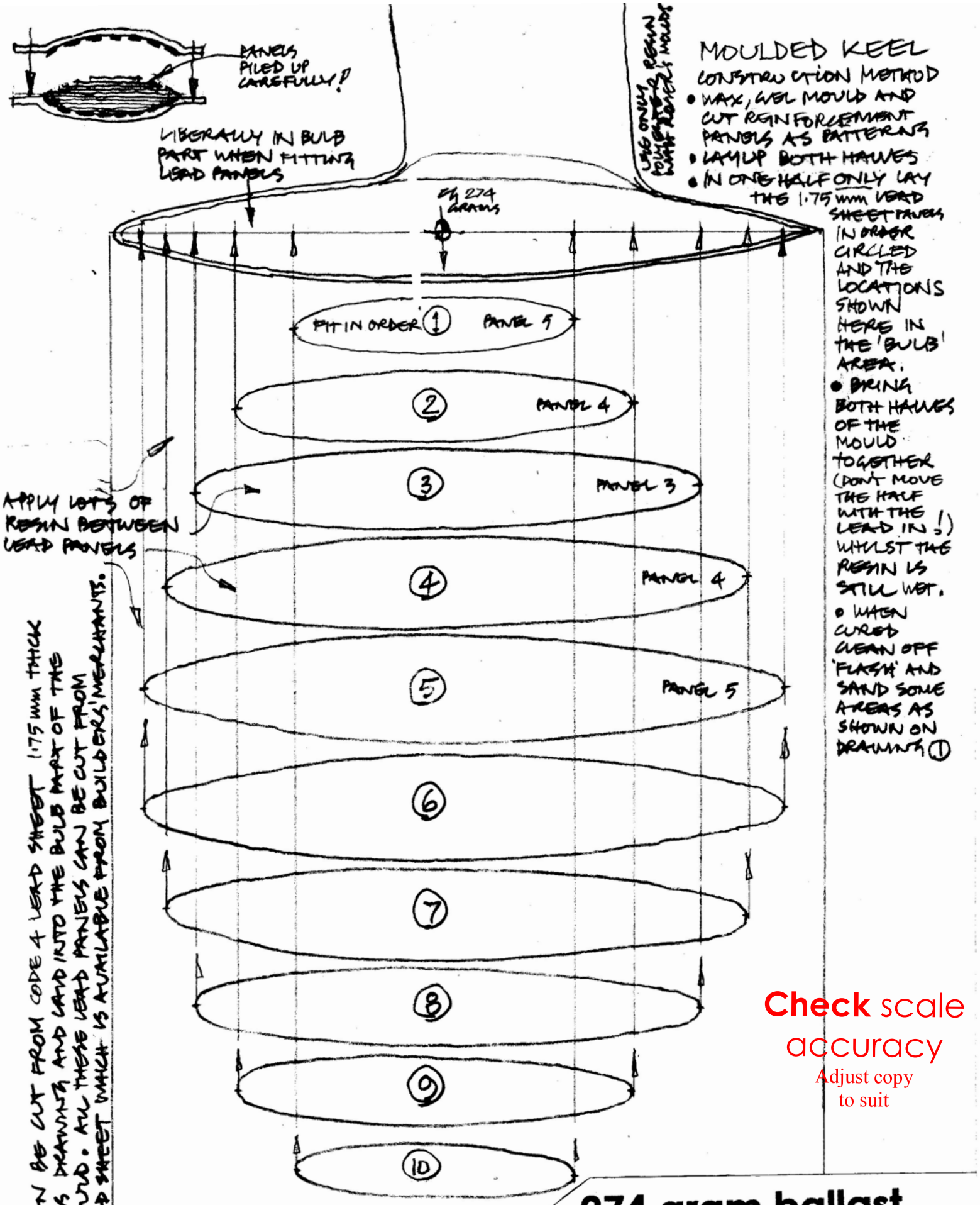


SUPABUG

© 2010 ROGER STOLLERY UNDER PLAN B LICENCE

See ***AWK*** drawings on the web for the details of keel, rudder, radio cassette etc as these drawings apply to this design


'AWK'
CONTACT ROGER TO BORROW MOULDS
21.3mm
CG 486 GRAMS
WATERLINE
LOAD WATERLINE
CENTRE LINE
BOTTOM PANEL
AP
TR
MOULDED FIN AS SHOWN FOR 'AWK' DESIGN
CONTACT ROGER ON 01483 421 801 TO BORROW MOULDS.
SCALE
Enlarge to match the 305mm box dimension on the previous drawing as this is part of that drawing
'SUPA FLEET' © ROGER STOWELL 2010
MEASUREMENT BOX
SHEET LEAD MAKES UP BALLAST SHAPE AS 'AWK'
See separate ballast drawing
BALLAST CG 275 GRAMS
305 min



MOULDED KEEL CONSTRUCTION METHOD

- WAX, GEL MOULD AND CUT REINFORCEMENT PANELS AS PATTERNS
- LAY UP BOTH HALVES
- IN ONE HALF ONLY LAY THE 1.75 mm LEAD SHEET PANELS IN ORDER CIRCLED AND THE LOCATIONS SHOWN HERE IN THE 'BULB' AREA.
- BRING BOTH HALVES OF THE MOULD TOGETHER (DON'T MOVE THE HALF WITH THE LEAD IN!) WHILST THE RESIN IS STILL WET.
- WHEN CURED CLEAN OFF 'FLASH' AND SAND SOME AREAS AS SHOWN ON DRAWING 1

USE ONLY POLYESTER RESIN WITH TIMBER MOULDS

THE BALLAST CAN BE CUT FROM CODE 4 LEAD SHEET 1.75 mm THICK AS SHOWN ON THIS DRAWING AND LAID INTO THE BULB PART OF THE 'BUG' KEEL MOULD. ALL THESE LEAD PANELS CAN BE CUT FROM 1.50 x 1.50 OF LEAD SHEET WHICH IS AVAILABLE FROM BUILDERS' MERCHANTS.

Check scale accuracy
Adjust copy to suit

274 gram ballast

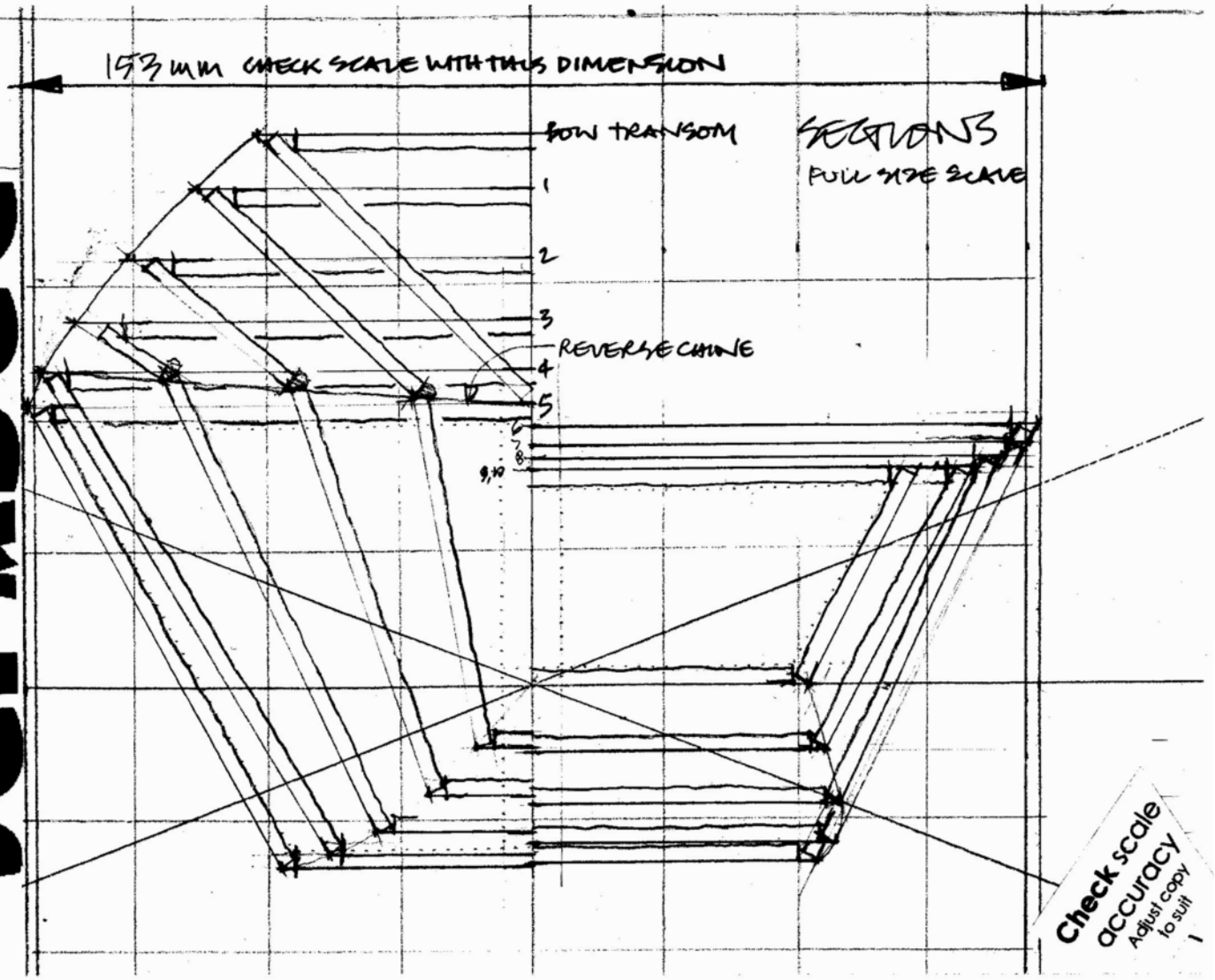
As used in moulded keels for BUG, ANT, AWK, ICE, SUPABUG etc. Alternatively these panels may be glued together and the surface filled with car body filler if a plywood fin is used. See separate drawing showing shape of plywood layers for the fin.

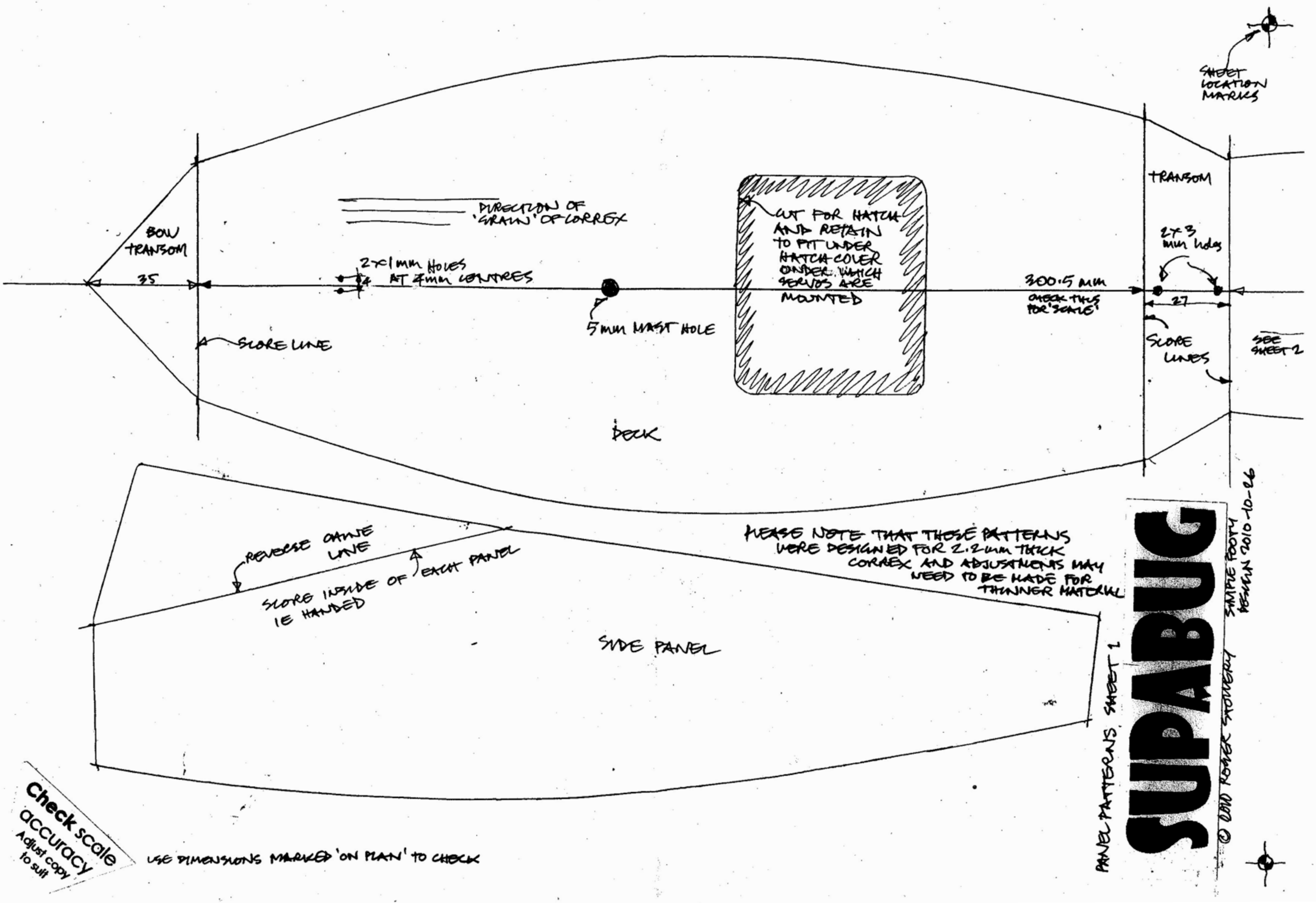
A Footy Class design © Roger Stollery FULL SIZE SCALE PRINTED AT A4 SIZE

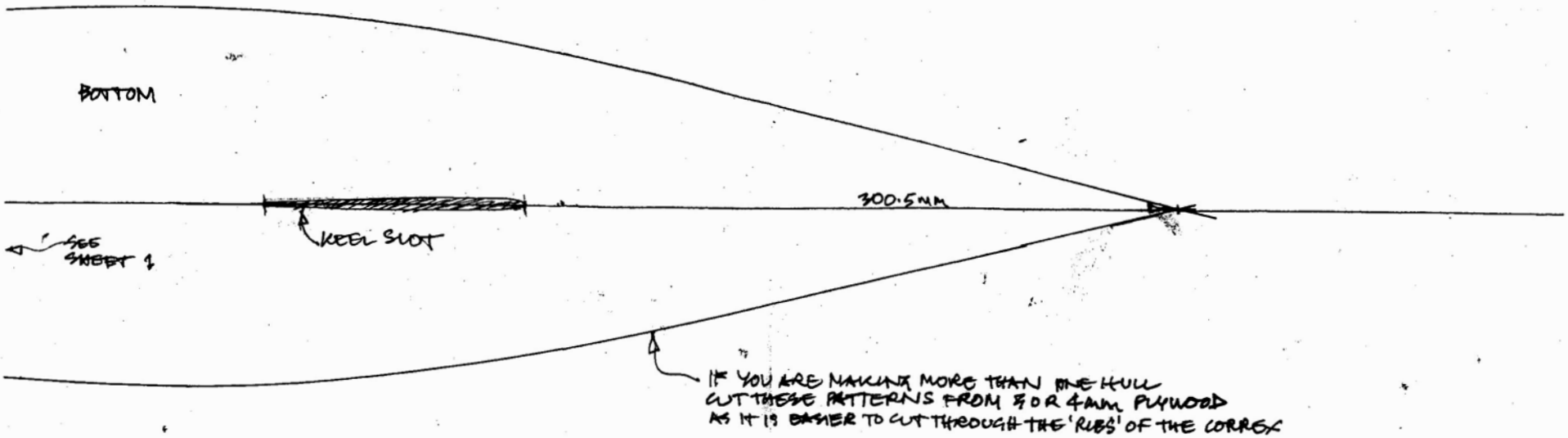
0 10 20 30 40 50 60 70 80 90 100 mm

RMS 2006-11-14

SUPABUG




SHEET LOCATION MARKS
TRANSOM
BOW TRANSOM
35
DIRECTION OF 'GRAIN' OF CORREX
CUT FOR HATCH AND RETAIN TO FIT UNDER HATCH COVER UNDER WHICH SERVOS ARE MOUNTED
2×1MM HOLES AT 4MM CENTRES
5MM MAST HOLE
SCORE LINE
300·5 MM
CHECK THIS FOR 'SCALE'
2×3 mm holes
27
SCORE LINES
SEE SHEET 2
DECK
REVERSE CHINE LINE
SCORE INSIDE OF EACH PANEL IE HANDED
PLEASE NOTE THAT THESE PATTERNS WERE DESIGNED FOR 2.2MM THICK CORREX AND ADJUSTMENTS MAY NEED TO BE MADE FOR THINNER MATERIAL
SIDE PANEL
SUPABUG
PANEL PATTERNS SHEET 1
© 2010 ROGER STOLLERY
SIMPLE FOOTY DESIGN 2010-10-26
Check scale accuracy
Adjust copy to suit
USE DIMENSIONS MARKED 'ON PLAN' TO CHECK



PANEL PATTERNS SHEET 2

SUPABUG

SIMPLE FOOTY DESIGN
2010-10-26

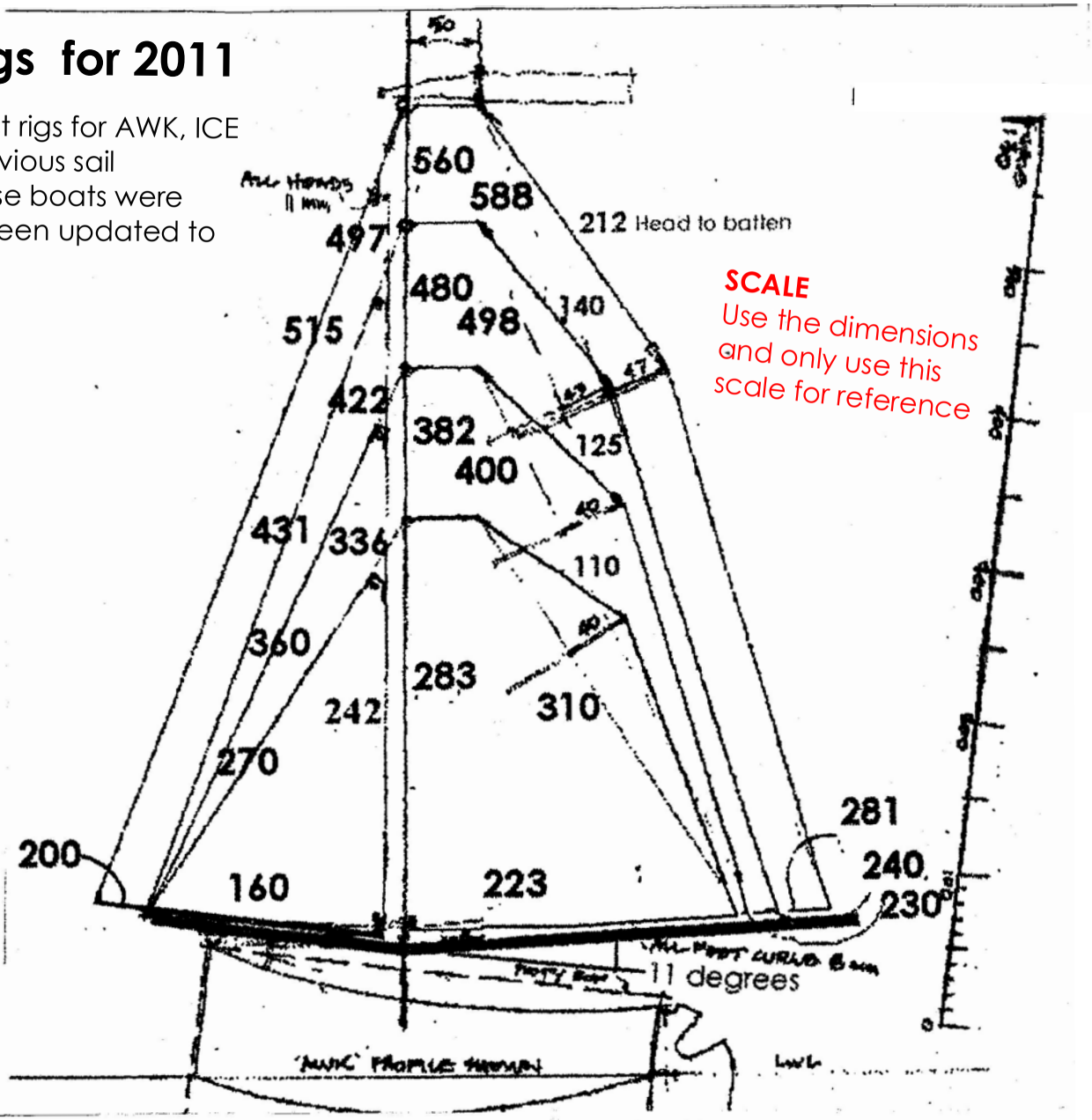
USE LENGTH DIMENSION ON SHEET 1

Check scale accuracy
Adjust copy to suit

SHEET LOCATION MARKS

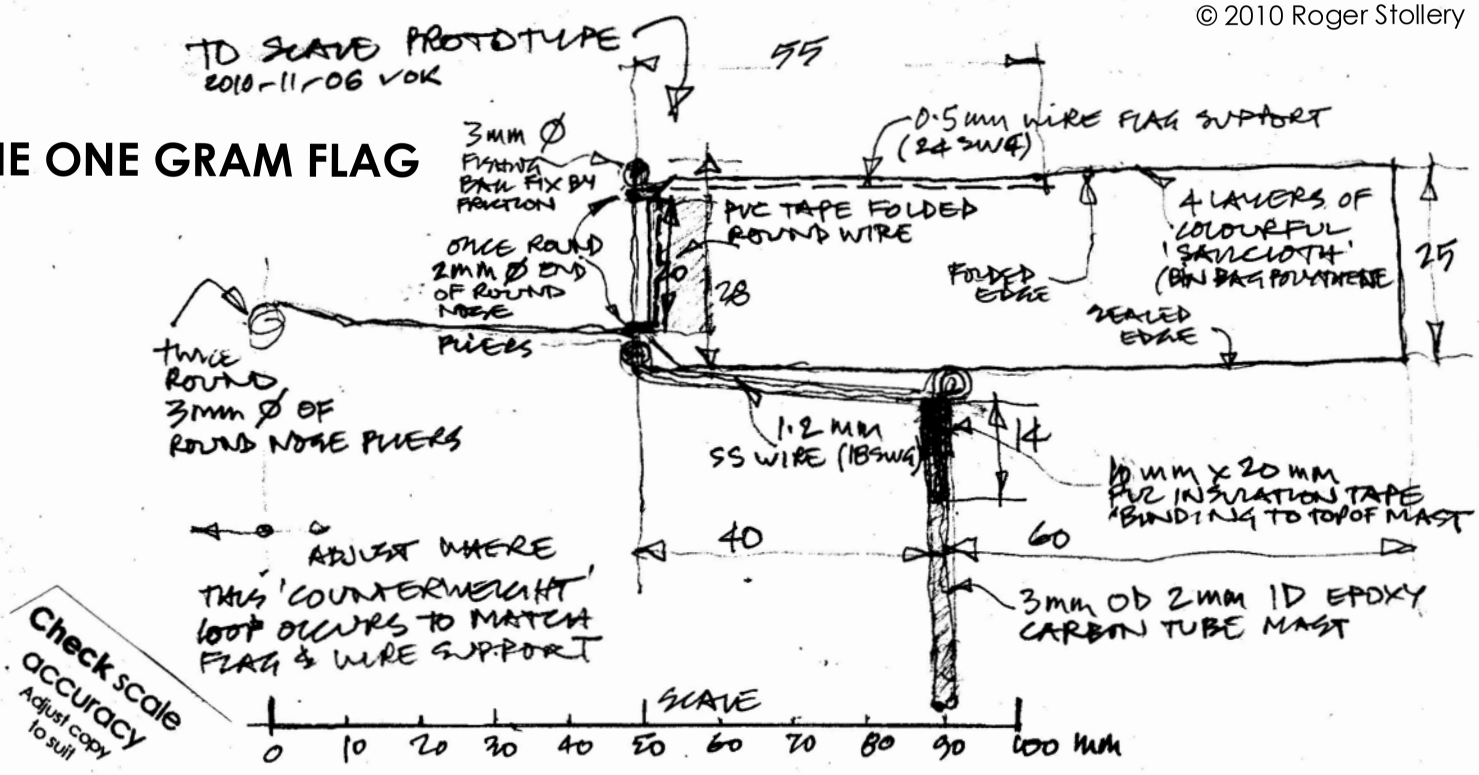
Rig drawings for 2011

These are the latest rigs for AWK, ICE and SUPABUG. Previous sail dimensions for these boats were similar and have been updated to current rig details.



SCALE
Use the dimensions and only use this scale for reference

THE ONE GRAM FLAG



FOOTY SWING RIGS

suitable for Roger Stollery's ANT, AWK, ICE & SUPABUG designs

All that a beginner building a Footy for fun needs initially is the 500 high rig, as this will cover all light to moderate winds. 400 rig is useful to prevent your boat being overpowered and difficult to sail in moderate to strong winds. This would be the 2nd rig to make. If you want to race keenly the next rig to make is the 550 rig, which will help in very light winds, but only on rare occasions will be 300 rig be required, unless you sail on exposed waters. As Swing Rigs are balanced rigs they can be used as an alternative to the balanced Una rigs using the same mast hole, making any boat easier to sail.

Footy Swing Rig details/cutting list: 2012

RIG	300	400	500	550	MATERIAL
Mast length	334a	427b	528b	598a	3 X 2 MM CARBON TUBE
Fore yard	130d	130d	137d	170d	3 X 2 MM CARBON TUBE
Aft yard	220c	225c	235c	280c	3 X 2 MM CARBON TUBE

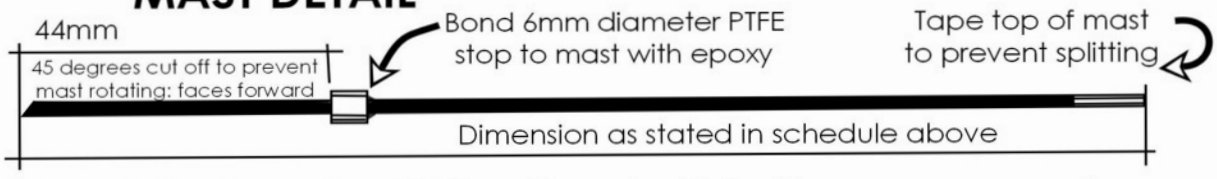
Letters refer to economical cutting of 4 no. 1 metre long carbon tubes sufficient for 4 rigs

Jib boom	153	153	153	195	1.2MM SS WIRE
Jib boom pivot from front	35	41	41	50	

MAINSAILS					Lightest bin bags: flip bin size
Head width	50	50	50	50	
Luff	283	382	480	560	
Leech	310	400	498	588	
Roach (aft head point to clew)	40	40	40	50	
Batten length	90	90	90	110	
Aft head point to batten	110	125	140	212	
Foot - all foot round 8mm	223	230	240	281	

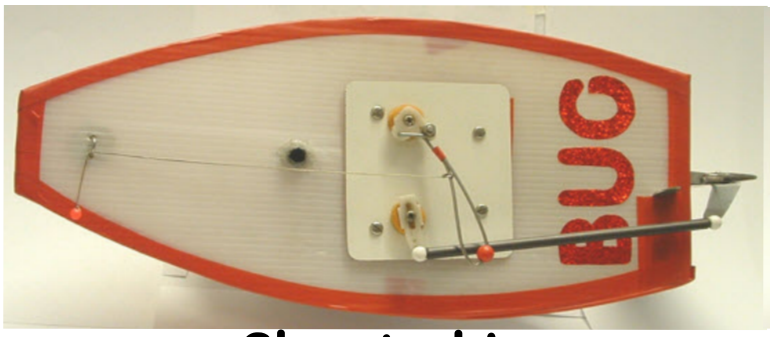
HEADSAILS					Lightest bin bags: flip bin size
Head width	11	11	11	11	
Luff	270	360	431	515	
Leech	242	336	422	497	
Foot	160	161	161	200	
Foot round	3	3	3	3	

MAST DETAIL

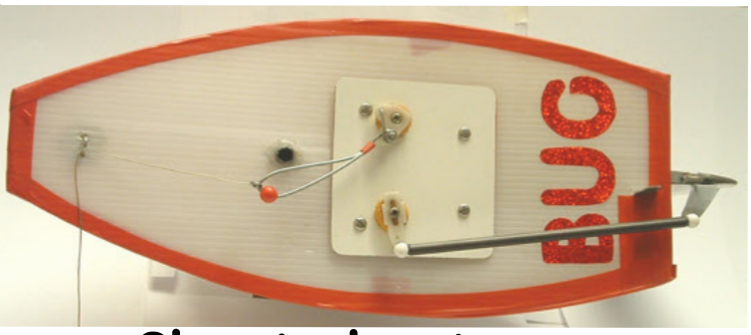


Carbon tube for all spars, 3mm OD X 2mm ID, can be obtained from www.easycomposites.com

Details updated 2012-01-01



Sheeted in

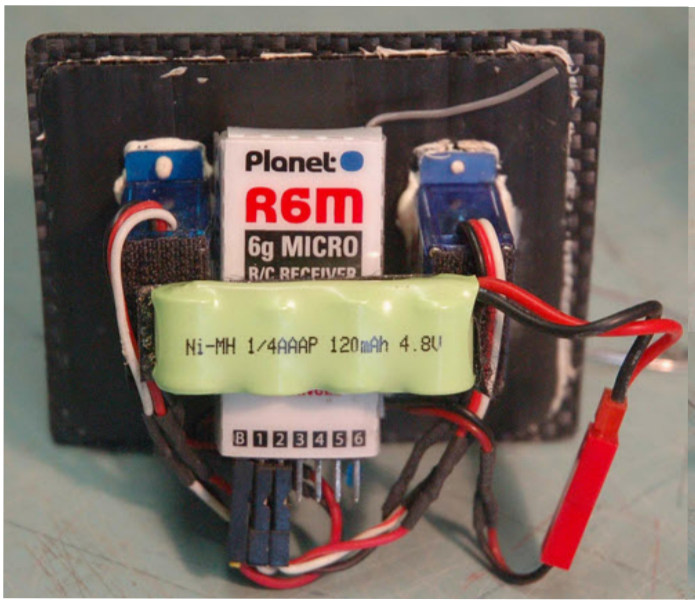


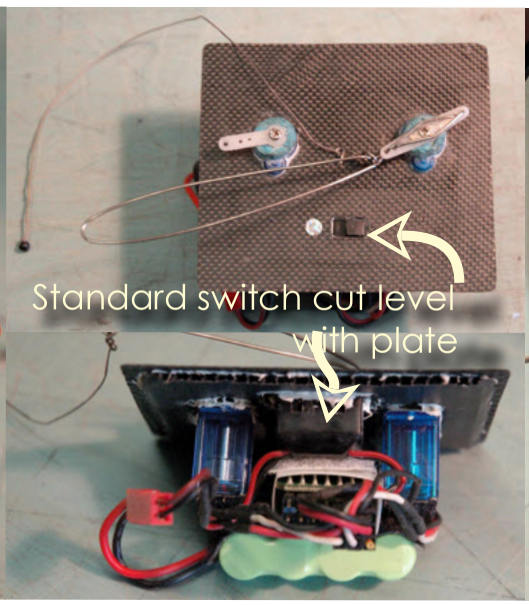
Sheeted out

Cassette Radio Installation

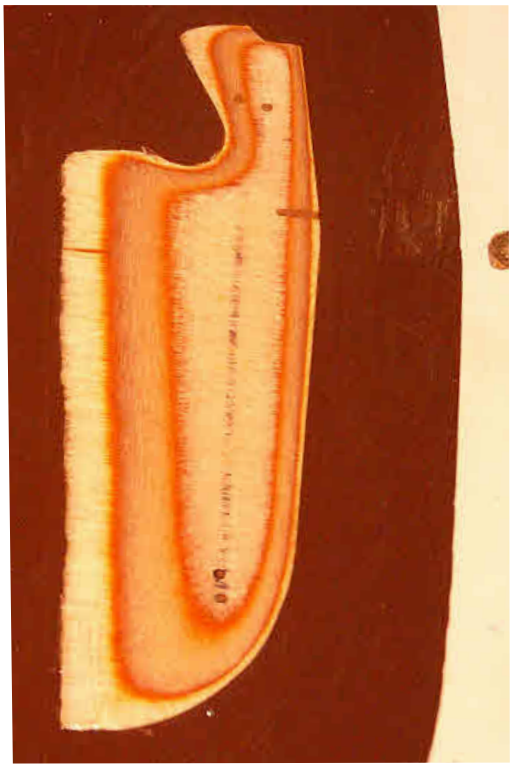
The principle shown here is that the radio gear is not fixed to the boat, but to a thin flat plate just bigger than the 70 x 60 mm long hatch shape and taped to the deck. The servos are mounted by bolting to the underside of the plate, which is located in the deck by the Correx piece cut out for the hatch. The servos operate through the plate and are waterproofed by a silicone grease laden kitchen sponge washer under the horn. The sheet is operated by a Powerlever, which is shown operating on the BUG above. The sheet is attached to a ring which slides on the Powerlever: when sheeting out, it travels to the full extent of the lever to give the travel for the running trim and sheeting in, the ring is pulled towards the servo so increasing power on the sheet without strain on the servo. In the BUG cassette there are two basic servos pulling 2.5kg/cm or so.

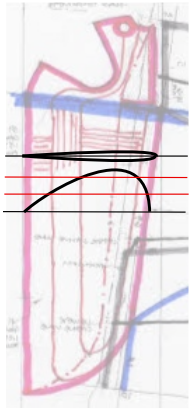
With this design principle and the balance of forces in the Swing Rig it is possible to use much smaller and lighter servos . The later ANT, AWK & ICE hulls use the cassette design below in the same 70 x 60mm deck hole, with two HD1800A 8 gram servos with a stall load of 1.3 kg/cm available from Howes Models. See servo details on www.chd.hk. These are just bonded to the underside of the plate with 'Sticks Like Sh*t' as used to seal the inside of the Correx hull chines. A standard switch has the switch projection cut level with the top of the plate. It is also stuck to the underside, operated through a slot in the plate and covered with tape to waterproof it. There is no readable detail drawing available to date, but the photos below show the general arrangement used on the later designs. The Powerlever is 0.8mm or 21 swg stainless steel wire. The RX shown is used with the Planet T5 TX also from Howes Models. The 4.8v Ni-MH 120mAh 15 gram rechargeable battery pack from The Component Shop is Velcroed to the bottom of the servos. In light conditions the charge will last about an hour.





Moulding foils





Introduction

The moulding process for foils is in comparatively easy and quick compared to making a rudder out of timber. The advantage is that in just a few minutes a beautifully shaped and finished moulding that needs no painting, won't warp, delaminate and will remain close to the desired accurate cross section. This is important to reduce the drag particularly for classes with long fins. Moulding is an ideal club activity where one mould can be used over and over again and make the investment of time in making the mould very worthwhile.

Moulding a rudder

The example shown is a small transom hung rudder for a Footy. Assuming that you have made or borrowed a mould, the creation of which will be covered later, the first thing is to wax the mould with a release agent such as 'Mirror Glaze'. Mix a small quantity of polyester gelcoat resin and carefully paint onto the polished surfaces of the mould. If any resin gets onto the centre line surfaces, wipe it off with a cloth wrapped around your finger. Whilst allowing that to cure, cut two fabric panels, one for each side from the carbon reinforcing cloth and a small piece of Cormat to form a solid section at the top. When the gel coat is cured, paint the rudder surfaces with polyester laminating resin and lay in the carbon fibre, carefully aligning the cloth with the front and top of the rudder. Carefully stipple/paint the surface with the brush to bring up the resin from below and add more resin where it looks dry, painting it from the more resin rich areas if possible. Repeat on the other side. Wet up on a piece of polythene, the small Cormat panel and 'stitch in' a waxed 16 swg wire pin along the line on that pattern and lay in one half of the mould. This will form a hole for the pintle. Add a little resin all round the edges of both halves. Don't worry about resin getting onto the centreline surfaces this time because when these are carefully placed together and bolted up the resin will be squeezed out and will appear as flash to be cleaned off the edges of the moulding. This part always appears to be a bit of a messy crude process. Add a few clamps to ensure that the two halves are in good contact along the edges.

Finishing the rudder

After curing remove the rudder from the mould. Start by twisting, bending and distorting the mould with a bit of force and the cracking sounds will let you know that the moulding is being released. Opening up the mould is the most exciting and satisfying part. One 'new moulder' recently described it "as like giving birth". After this relatively crude process a beautifully light, polished product appears. Clean the flash from the edges with a pair of scissors and finally a sanding block.

Making a mould

Design of foils

Now assume that you want a special rudder shape or cross section and need to produce your own mould. It is not difficult, but it is time consuming. The design drawing is the starting point for making a plug for the mould because this will be made of 1/16" plywood. Each ply is 0.53mm thick, so as well as the profile, the 'buttock' lines are drawn 0.53mm apart from the centreline; thin vertical section slices through the rudder as shown adjacent. Briefly, this is done by drawing a NACA 0006 section shape on a 100mm length chord, but with the vertical scale drawn 10 times the true scale giving an exaggerated curve. This is then photocopied down to the various chord lengths for suitable sections of your rudder. Over these section copies draw parallel (buttock) lines 5.3mm from the centreline. Where these cut the curve sets points that make up the buttock line shape on the profile. This can be hand drawn as shown adjacent. The maximum thickness is less than 3.2mm overall so each half can be shaped from just one layer of ply.

Making the plug

Cut the ply to the rudder profile. The grain of the centreline layer MUST be across the rudder. Repeat for the other half. Most important for later registration of the two halves is drilling two 1.5mm holes towards the ends of the maximum thickness line. Make a support block the same profile shape as the rudder and drill this too with registration holes. Use 1.6mm stainless steel wire to pin the ply down to the support block. Sand the ply until the glue lines match the buttock lines. Glue the plug halves to a flat Formica baseplate projecting about 25mm beyond the rudder profile. Make sure that the very flexible tapered ply edges are held down flat to the baseplate. Drill registration holes in the baseplates and bond them temporarily to a flat melamine covered chipboard. Drill registration holes and push the pins down just below the rudder surface. Fill these 'big' holes with plastercine and finish flush. Do not worry if there are a few bits of the centreline ply missing that you cannot replicate with plastercine. Only make sure that there are NO bumps or projections. Hollows become bumps in the mould, which can easily be sanded off.

Making the mould

Wax the surfaces with an old-fashioned bees wax, like 'Simoniz wax for cars'. Spread the wax with a cloth in a circular motion to get it even and then polish it off with a clean cloth. Repeat until there are 5 applications.

Repeat the moulding process described for moulding the rudder, but with two thin polyester gel coats preferably in different colours and two layers of carbon either side of a 2mm Cormat layer. After curing remove the Formica from the melamine base, remove the pins and cut one set down in length to locate the Formica layers together. Clamp up and drill 2 bolt holes for bolts that will hold the mould parts together. Now remove the plug. This may be tricky if any resin has got under the edge of the plug. Go round the edges carefully and chip away this resin so that the whole profile of the ply is showing. Bend, twist and distort the mould and some part of the plug will release. Slide a thin flexible piece of plastic under this released bit and gently work it under the remaining parts of the plug. It won't look a good surface, but the finish is achieved by sanding with progressively finer wet and dry sandpaper up to at least 1200 grade and preferably 2000, until it is perfectly smooth with all bumps removed. Polish the surfaces with T-cut until it is a mirror finish. Patience and hard work is required, but it is worth it in the end, as all the subsequent mouldings will have this fine finish. This finishing process wants to be done as soon as possible after moulding, as the resin is much softer and less hard work.

Moulds

Some clubs have moulds that can be borrowed, so if your club has no moulding expert ask around as there is sure to be someone who can help you enjoy the pleasures of moulding.

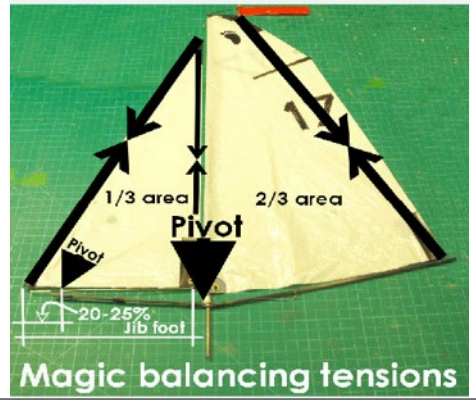
As an alternative to cutting panels and forming seams in drawing film, very adequate small sails can be made using soft sail material just folded over to form double-sided sails. These can be suitable for the smallest models like Footys up to BOTTLE boats with a sail area of 600 square inches.

Soft materials
Such soft materials include any sort of thin plastic bag materials such as bin, shopping or dry cleaning bags etc. The massive choice of colours allows a great deal of visual fun! As this thin soft material is flexible and stretchy, it is possible to create fullness within the sail very simply without needing panels or great DIY skills. Soft material immediately forms a slight curve when folded over and held with a bit of tension. It allows very good 'automatic' shape to form at the luff of jibs and mainsails, despite it being a flat sheet. However to achieve this it does need to be set up carefully.

Cutting the sails
After selecting the material, fold it over with the fold forming the front edge of the sail. Place on a laminate or similar cutting surface and tape it down with only just enough tension to get rid of major wrinkles. Either mark the plan of the sail or place a cardboard or ply pattern of the sail shape on the material with the straight luff on the fold line, or alternatively just use a straight-edge. Seal with a hot soldering iron along the back edge. With very thin material the leech shape may need to be a series of straight lines between corners and/or battens. Cut the foot and head shapes with a sharp knife, but don't seal the two surfaces together.

Finishing the mainsail
Add reinforcement tape, like electrical insulation tape, to the corners as shown in the photos with the number of layers dependant on the forces generated from the boat. Two layers is sufficient for Footy sails. Fit eyelets to the bottom corners, making sure that the tack eyelet allows the mast to fit within the sleeve in front of it. An important part of the design is a wide head shape at right angles to the mast. Stick head reinforcement tape up either side of the leech and fold it over the head and down the other side. Battens need only be fitted to one side. Any flexible thin plastic can be fixed with double-sided tape and reinforced by tape over the front end and around the sail at the aft end.

Finishing the jib
Add corner reinforcements and fit the eyelet for the clew, but don't add the eyelets to the tack or head until the luff line is fitted to take the rig forestay tension. Use a light (6 – 20 kg) Dyneema line and make a loop at the bottom to go inside the two sail surfaces and round the tack eyelet before you close that up. Thread the line up the luff using a bodkin or thin wire loop and pull close to the luff before fitting the head eyelet. Temporarily tape down the tack, remove wrinkles in the luff and apply a bit of tension in the luff line. Tie a single overhand, figure of eight or other stopper knot in the luff line about 10mm above the head. Apply more tension to the line and tape that down. To hold the jib up, form a loop between stopper knot and head eyelet with a separate short line, by passing one end through the head eyelet and 'blobbing' with a cigarette lighter. Pass this round the luff line above the stopper knot and tie a half hitch back onto the loop line. Carefully pull tight so that the blob and the stopper knot come together. Repeat with the other end of the line to form the loop and carefully adjust the length such that it is only just slack when the luff line is taut. Cut about 4mm from the knot and burn the end back to form a blob close to the knot. This loop will keep fullness in the luff of the sail when the luff line/forestay is under tension.



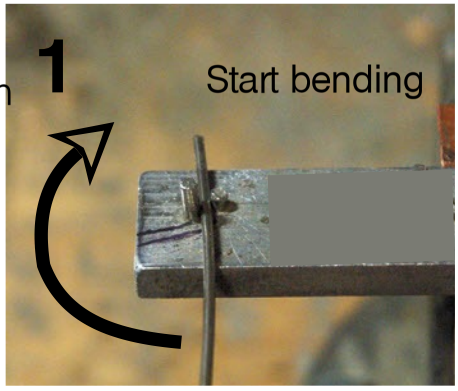
Setting up the sails on the rig
The photos show a simple Stollery Swing Rig where the mast is fixed and the yard rotates around it. The 3mm carbon yard spars are simply joined with 2mm bent wire and held against the upward pressure of the sails by a small PTFE block bonded to the mast. Camber in the mainsail is fully adjustable at both top and bottom in the normal model yachting tradition with a loose foot fixed to a boom or yard spar at the clew. There is no spar as such at the top, but a 50mm wide, 1.25mm diameter wire headstick, rotating about the mast, allows the head of the sail to be fixed at the aft corner and adjusted along the headstick to create or remove camber at the top of the sail. The fullness here also allows the mast to bend within the sleeve without creating major creases as the wind blows up. The photos show connection to the headstick by the tape reinforcement mentioned above, which can be adjusted by slitting the tape or shortening the slit with more tape to get a beautiful shape of any degree of fullness all the way up the sail.

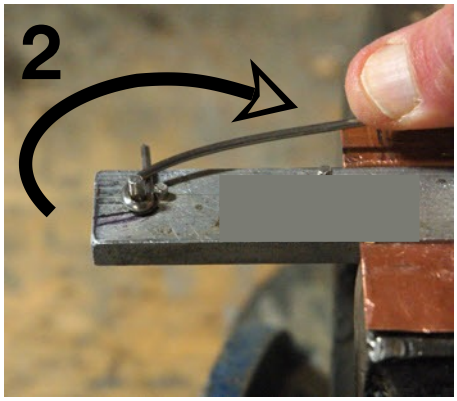
Adjusting Swing Rig tensions
With the unique and 'magic' balance of forces only possible with this design of Swing Rig, the only adjustment to tensions in BOTH sails to suit different wind strengths is the bowsie on the jib luff line. It automatically keeps perfect tension balance between main and jib leeches and makes setting up and maintaining a good trim very easy. The design principles of this rig are shown in the diagram and can be applied to a rig of any size.

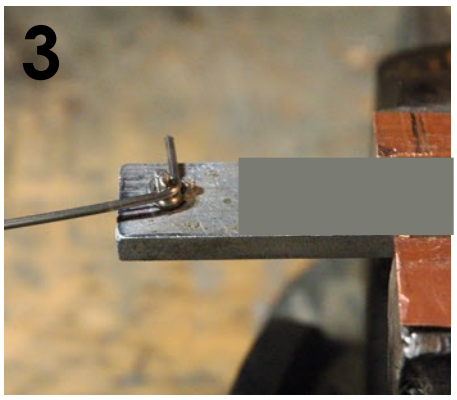
Wire bending for Footy Swing Rigs

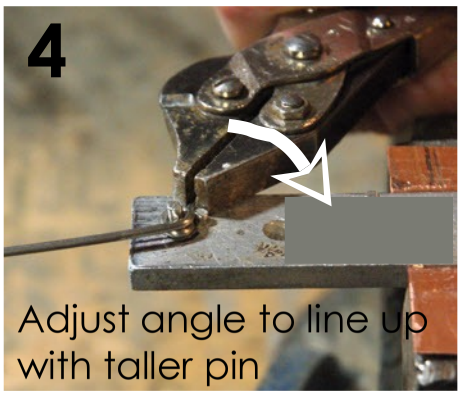
Yard fitting

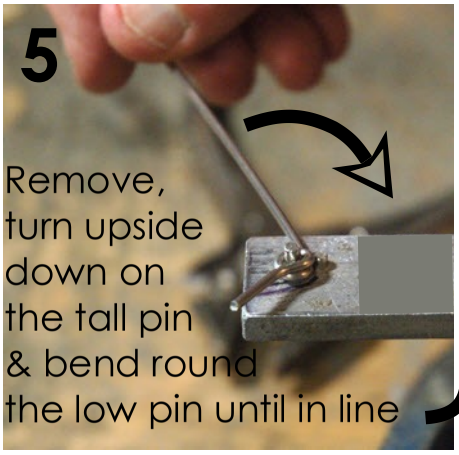
For joining 3mm OD x 2mm ID carbon tubes use 2mm hard stainless steel wire bent round the jig shown here.

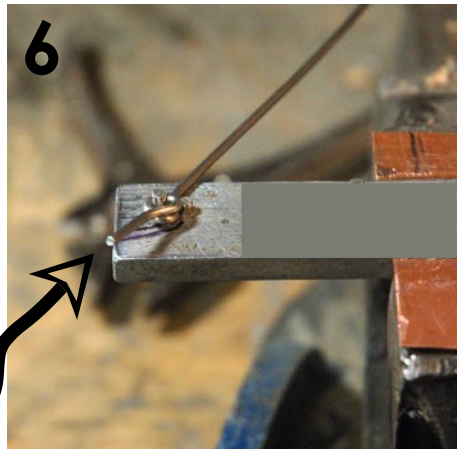


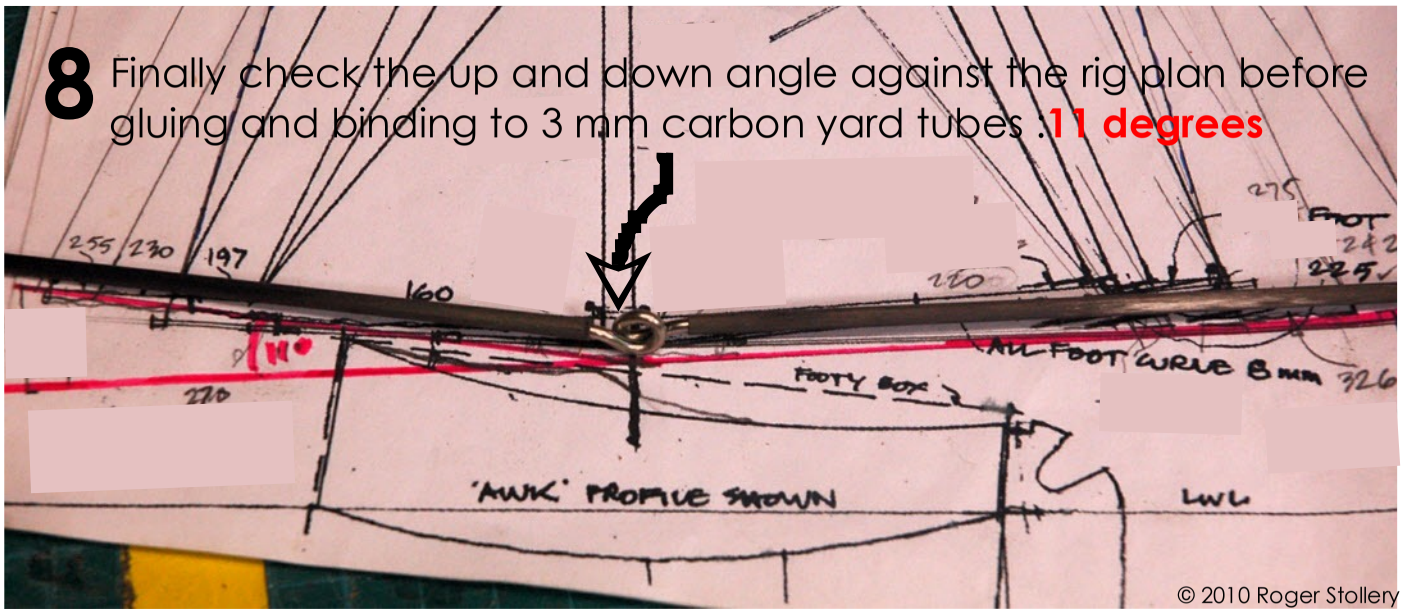








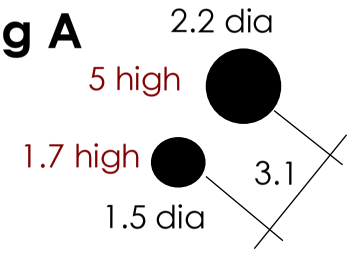




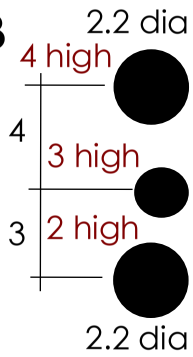
Sail flow adjusters

For adjusting flow for mainsail & combined jib sheet/main downhaul use 0.5 mm (24swg) hard stainless steel wire bent round two sets of pins. **When bending wire round pins keep plenty of tension on the wire at all times.**

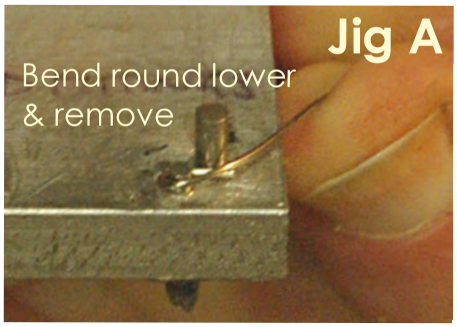
Jig A

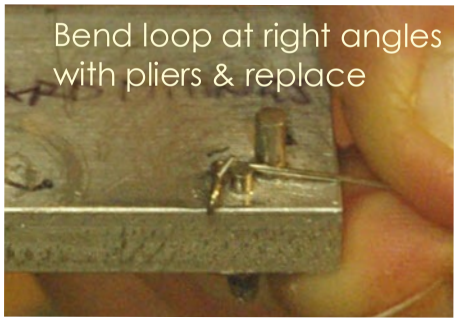


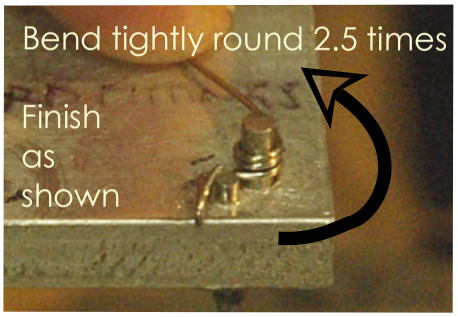
Jig B

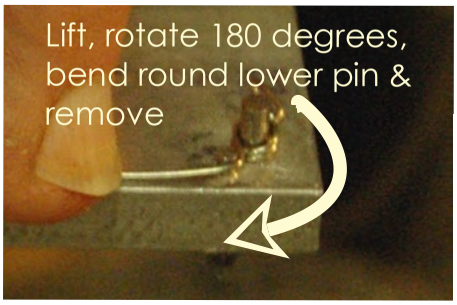


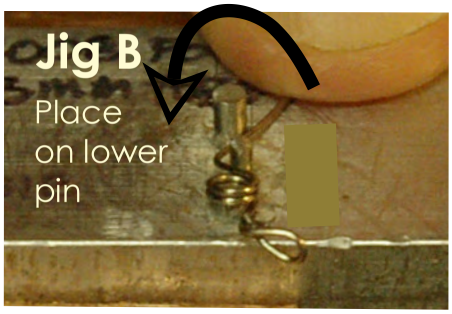
All dimensions mm





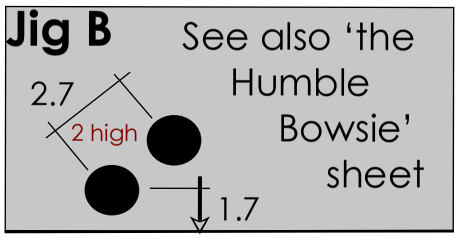


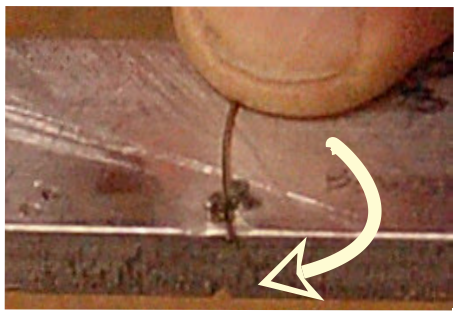


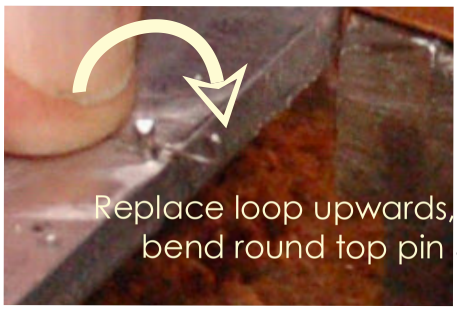


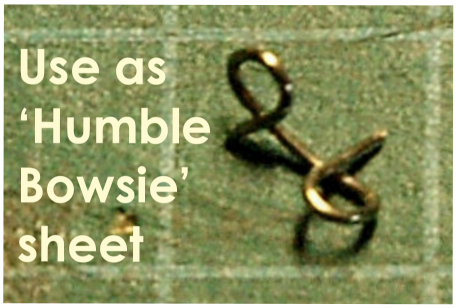
Bowsies

Use 0.5 mm (24swg) stainless steel wire bent round two pins









The Humble Bowsie

by Roger Stollery

Up to the introduction of DYNEEMA, polyester line was used for running rigging and this had a relatively coarse texture and so did not slip through bowsies like the typical plastic ones shown in the diagram. Also polyester was relatively easy to thread, by creating a point on the end, after melting with a cigarette lighter. This is the traditional form of line adjuster as used for decades on models, tent lines etc.

When superpolyethylene came along, as DYNEEMA or SPECTRA, it was immediately favoured because for the same breaking strain it was a lot thinner and was very soft, smooth and silky, so reducing windage and going through fairleads with less friction. However this gave some problems: it slipped through traditional bowsies and cigarette lighter 'blobs' could not be sharpened to go through small holes. So something new was required to solve these problems. Also continuing the objective to reduce windage for jib halyards etc, I wanted something more aerodynamic with less drag. The result is the design shown to scale, compared to the traditional form shown below.

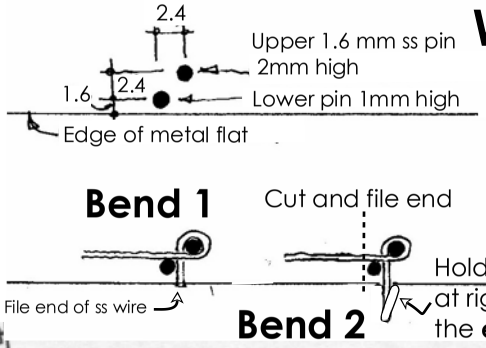
My solution was to reject plastic, even when fibre filled, because once the bowsie wears or slips, it has a reduced load capacity. The Stollery bowsie uses fishermans' knotting experience of achieving friction by going round something rather than through it. The bent wire bowsie is quick and easy to make and thread. The 'blobbed' Dyneema goes through the 'big' wire eyes easily and the line cannot wear away the bowsie. It can be made with round nosed pliers or better round the jig shown on the 'jig diagram', which is also very easy to make; just 2 stainless steel pins bonded with epoxy into a metal plate, close to its edge. A 5mm diameter plastic ball allows fingers to grip the bowsie, but not the line! The design was developed in the late 90s for the BOTTLE boat using 0.8 mm stainless steel rigging wire. This technology is now used for general applications on both bigger and smaller boats.

Gripping the bowsie is achieved without the ball, by the projecting ends of the eyes at right angles forming the contact with the fingers. It has great flexibility by using different wire diameters to suit the load and it can be threaded with extra turns round the wire to suit lines which need to be adjustable, but which are not continuously loaded. You can adjust the number of turns so that the line can flap around and yet not loosen.

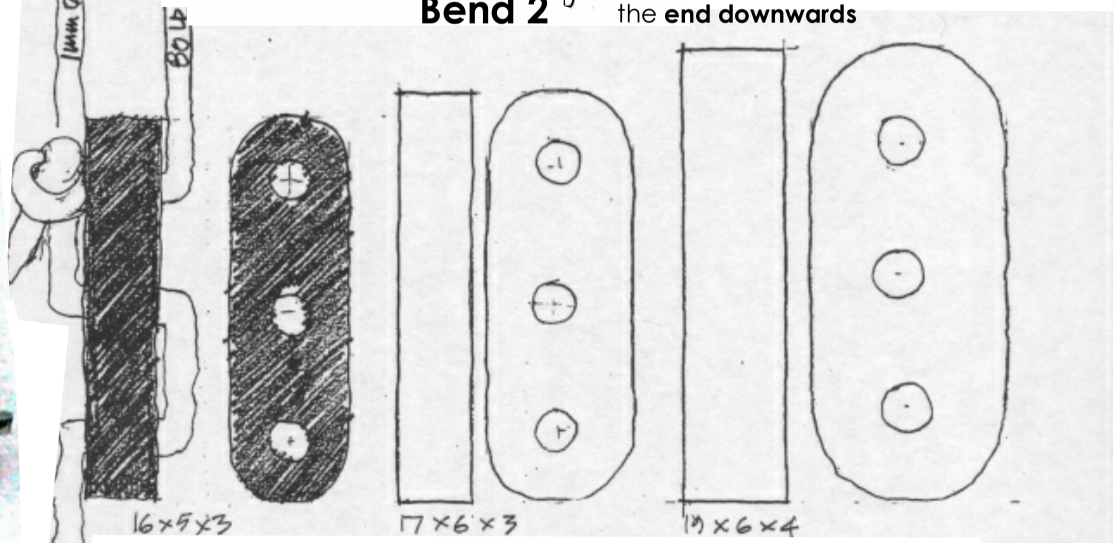
Low drag wire bowsie

Thread bowsies carefully, always going in or coming out of the 'eyes' in the same way. Finish by tying just single half hitch and pull up against the 'blob'; no need for glue

Wire bowsie jig



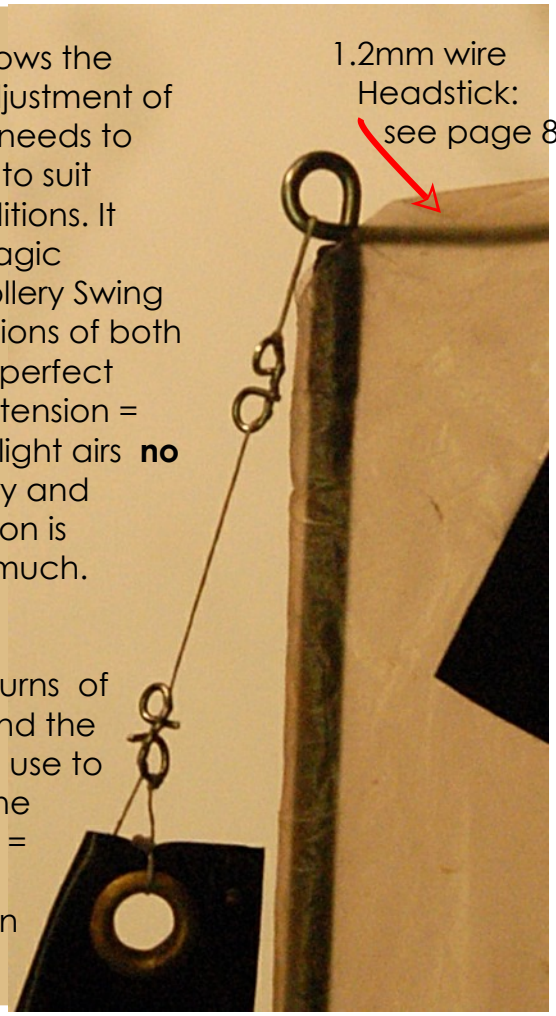
0.8mm (21swg) stainless steel wire for most models, even for high loads on Marbleheads. Use 0.56mm (24swg) for Footys etc



Typical plastic bowsies suitable for polyester line

The top bowsie allows the most important adjustment of the whole rig and needs to be adjusted often to suit varying wind conditions. It controls, by the magic balance of the Stollery Swing Rig, the leech tensions of both jib and mainsail in perfect relationship; more tension = tighter leeches. In light airs **no tension** is necessary and generally less tension is preferable to too much.

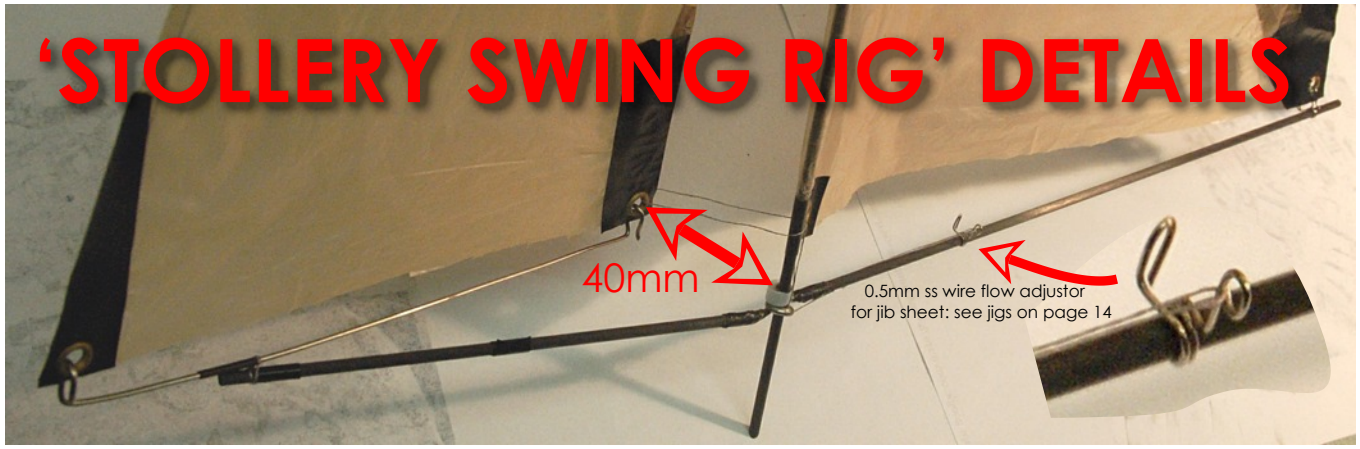
This bowsie has 4 turns of Dyneema line round the wire for infrequent use to adjust fullness at the jib luff; less tension = more fullness. See threading detail on previous page



See wind indicator on page 8

0.5mm ss wire flow adjuster:
see jigs on page 14 or bend with round nosed pliers

'STOLLERY SWING RIG' DETAILS

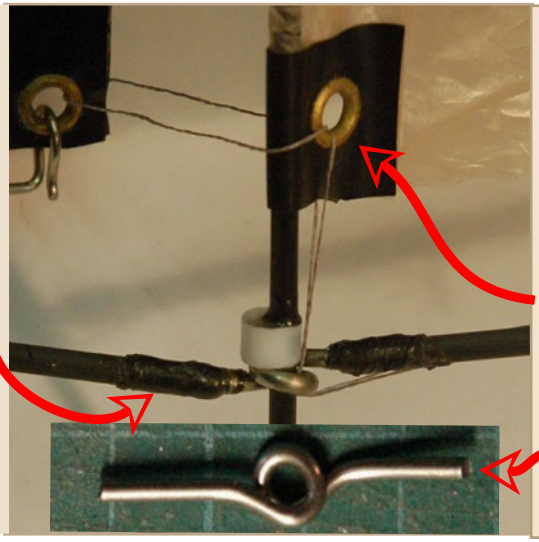


This is a critical dimension, approximately 25% of jib boom length. See guide dimensions on page 9. Adjust so that the twist of both main and jib leeches relate, ie look the same, when viewed from behind with sails full.

Shrink wrap tube allows adjustment of the fixing point for the 20kg (45lb) Dyneema line tied as short as possible by 'constrictor' knots. Dyneema line is available from Dave's Tackle, the Precinct Gosport, www.davestackle.co.uk

PVC electrical tape to locate jib boom and sheet on yard

Carbon yards fitted over ss yard fitting and bound with carbon tow or Dyneema and resin.



0.5mm stainless steel wire adjuster for jib sheet, which is a continuous loop of 20kg Dyneema. It also acts automatically as a downhaul or Cunningham for the mainsail luff tension.

2mm ss wire yard fitting as p14. Fits round 3mm mast loosely.