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May 2026
Vol. 76 No. 906

model Boats

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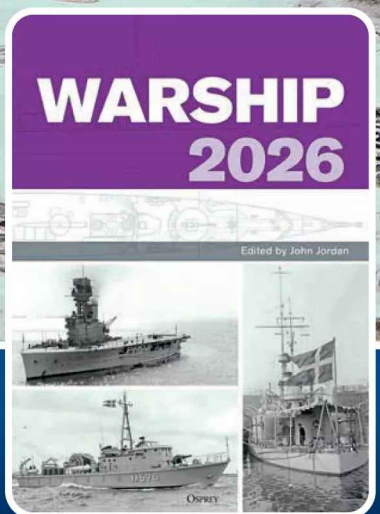

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NEWSAGENT RESERVATION (SEE PAGE 82)

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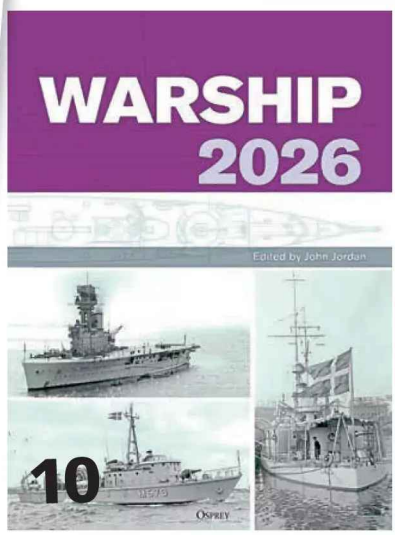

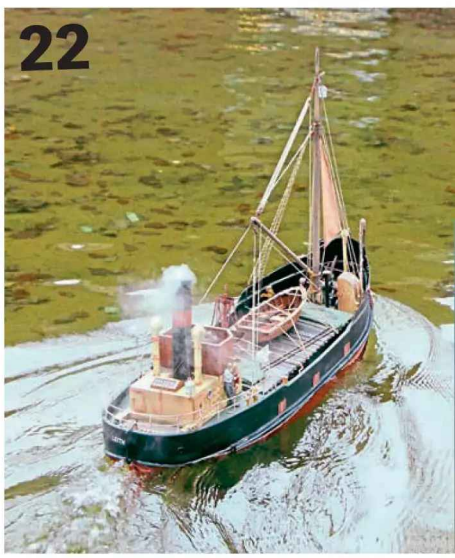

WELCOME TO THE MAY 2026 ISSUE OF MODEL BOATS

As well as the free pull-out plan for a 'grab-it-and-go' Type 31 frigate model featured in this issue, we're also delighted to include not just one, but two exclusive prize draws.

Courtesy of Osprey Publishing, we have a copy of *Warship 2026* – the very latest edition of this highly regarded annual, which isn't actually due for release until May – up for grabs.

We're also able to offer you the opportunity to win Billing Boats' wonderful 1:25 scale wooden kit of the Oseberg longship, accompanied by Tomasz Klyszynski's step-by-step guide showing how you, too, can channel your inner Floki (if you've never watched the Netflix series *Vikings*, be warned – it's addictive!). You may even decide to follow Tomasz's lead and get this exquisitely crafted, striking Viking out on the water.

Sandwiched between this Dark Ages Norse beauty and the still-in-development Type 31 frigate (please note that Mike Payne's design is intended as a representation rather than a scale replica) are some charmingly nostalgic 20th-century working vessel build ideas.

As always, these features include plenty of transferable tips and tricks.

Then, for those of you who avidly follow Richard Simpson's steam basics Boiler Room series, in this month's instalment he responds to the frequently asked question of whether or not a model's gas tank should be lagged, while Dave Wiggins serves up another reminder of how far R/C technology has come in his latest stroll down Memory Lane. Plus, in a hobby where the 'waste not, want not' philosophy is very much still alive and kicking, Glynn Guest has some savvy salvaging suggestions.

Ahead of all this is our Compass 360 news section, flagging up some noteworthy events taking place this May, while last – but certainly not least – comes the *Your Models/Your Letters* section of the magazine, where, among many other great contributions from your fellow readers, there's a very generous antique model yacht offer. Partially restored to a very high standard before its former owner, Nigel O'Hare, sadly passed away recently, a new home for this lovely old yacht is now being sought, in accordance with Nigel's wishes, by his brother Tom. Naturally, the hope is to find someone with the workshop space and requisite skills to finish what Nigel started. Due to the size and weight of the model, it will need to be collected from the Sheffield area. However, for the right individual – or perhaps a group of model club members – it could be a dream project. So, if you are interested, please get in touch with contact details that I can pass on to Tom. It would be fantastic to eventually receive some photos of the fully restored model on display or, better still, being sailed once again in Nigel's honour.

Enjoy your read,

Lindsey

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If you have a news story for these pages, please contact the Editor, Lindsey Amrani, via e-mail at editor@modelboats.co.uk

OUT AND ABOUT

Robinson's Pond Yacht Regatta

A family-friendly pond yacht only event *(i.e.*, no R/C, steam-powered, *etc*, models allowed) is planned for Sunday, May 31, 2026, between 11am and 2pm at the Centenary Boating Lake, Crowborough, East Sussex TN6 2TN. All are welcome to attend, so if you're within striking distance, why not pack a picnic and enjoy a lovely, relaxing late spring/early summer day out.

Gresford Sailing Club Open Day

From 10am to 3pm on Saturday, May 2, the Gresford Sailing Club at The Flash, Old Wrexham Road, Gresford, Wrexham LL12 8TY, will be hosting a 'try your hand at sailing' event organised by the members of its very active model boat section (who build and sail all sorts of scaled down watercraft). For further details, visit https://gresfordsailingclub.com/ or email secretarygresfordsc@gmail.com

Mayhem will return to Wicksteed Park in Kettering, Northamptonshire NN15 6NJ, over the weekend of Saturday, 23/Sunday, 24 May. This free sailing event (meaning you can join in the fun and get your own models on the water) will open every day from 10am to 5pm – although stall holders will be able to get set up from 12pm on Friday, May 22.

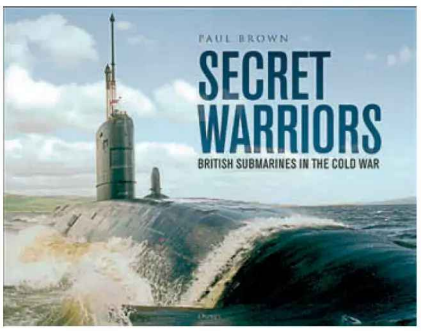
This year, in a nostalgic nod to one of the show's original model boat competitions, members of the Victoria Model Boat Club will be putting on displays of Straight Running boats, while, for the first time, the amphitheatre site next to the model boating lake will be given over to demonstrations of R/C cars and crawlers.

Entry will remain free of charge, although donations towards the upkeep of the Mayhem forum will be gratefully accepted. *Please note:* the cost of onsite parking will be determined by the duration of your stay, with the variable rates capped at £7.50 for the entire day. For those wishing to make a weekend of it, onsite camping plots can be booked in advance online at www.wicksteedpark.org/your-visit/camping-at-wicksteed-park/.

For further information and updates, visit https://www.modelboatmayhem.co.uk/

PRIZE DRAW ANNOUNCEMENT

Winner revealed



In the exclusive prize draw we ran in the February 2026 edition of Model Boats we were able to offer you, courtesy of the kind folk at Osprey Publishing, the chance to win a copy of the newly released title *Secret Warriors, British Submarines in the Cold War.* We can now reveal the lucky winner as: David Healey of Illminster, Somerset. Congratulations, David!

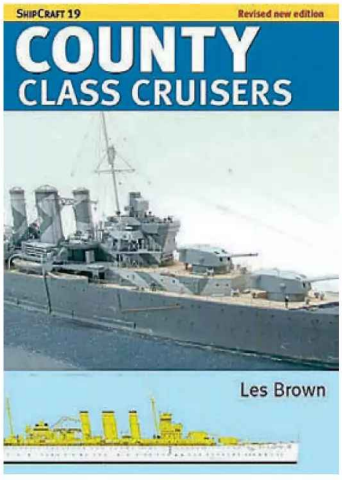
OUT AND ABOUT

Popham Model Show 2026

Although the annual model show at Popham Airfield, Winchester SO21 3BD, remains primarily aircraft focused, in recent years its scope has been broadened to include model boats (with an undercover static display tent and a dedicated pop-up pond) and R/C model cars/military vehicles/*etc.* Planned for the weekend of Saturday, May 9/Sunday, May 10, this year, tickets can be purchased via https://fixr.co/event/model-show-2026-public-tickets-947000984/tickets?ref=popham. For those wishing to make a weekend of it, camping plots can also be booked in advance online. As well as enjoying all the numerous displays, demonstrations and attractions, visitors will be able to browse numerous trade stands and select from a wide variety of food and drinks offered for sale in the catering 'village'.

BUY THE BOOK

Shipcraft 19: County Class Cruisers



This revised and updated edition in the Shipcraft series (which provides in-depth information about building and modifying model kits of famous warship types) is due for release on June 30, 2026. The book, published in paperback format and including 130 illustrations, made up of both black & white and colour photographs and detailed line drawings, will retail at £18.99. Those reserving their copies via www.pen-and-sword.co.uk, however, can currently take advantage of an introductory price of £13.29. Alternatively, pre-orders can be placed with at all local bookstore when quoting ISBN 9781036157043.

OUT AND ABOUT

Sailing with Dolphins

The Dolphin Model Boat Club has now announced dates for the Sunday sailing sessions it hosts on Orpington Pond (BR5 3RX – just off the A224, Kent Road/Cray Avenue) for the remainder of the year. Each of these sessions will start at 10am, and all are welcome to attend (please note, no IC or petrol-fuelled boats can be accommodated), with non-members simply being asked to pay a £2 (per boat) admission fee. It should also be pointed out that while off-road parking will be available on club days, there are no other facilities onsite – so be sure to 'go' before you go and perhaps take a flask or pack a little picnic!

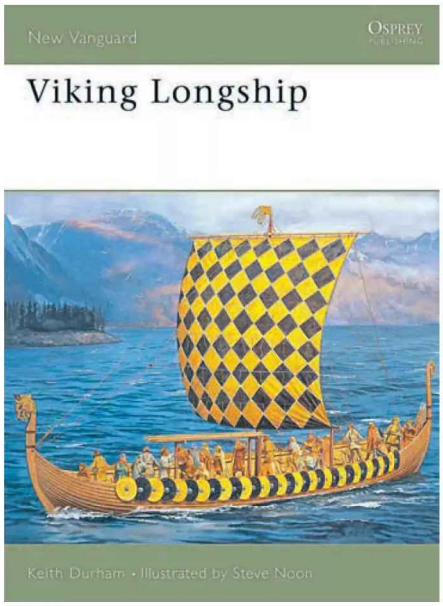
- April 5
- April 26
- May 17
- June 7
- June 28
- July 19
- August 9
- August 30
- September 20
- October 11

For further details, visit http://www.dolphinmodelboatclub.com/ or email dolphinmodelboatclub@live.co.uk

BUY THE BOOK

Viking Longship

As a little aside to our Billing Boats' kit build review and prize draw offer this month, Keith Durham's *Viking Longship* book, published in paperback format as part of the New Vanguard series (ISBN 9781841763491), is currently being offered at a 10% discount on its £12.99 RRP (Recommended Retail Price) when ordered directly from www.ospreypublishing.com.



WIN! A COPY OF *WARSHIP 2026*

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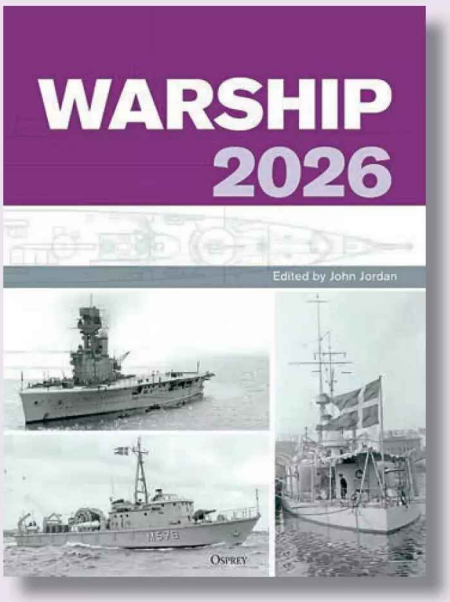

Courtesy of the kind folk at Osprey Publishing, this month we're delighted to be able to offer you the opportunity to win a copy of *Warship 2026*, due for release on May 7 this year.

For over 45 years, *Warship* has been the leading annual resource on the development and deployment of the world's combat ships, featuring a broad range of articles from a select panel of distinguished international contributors. Detailed and accurate information is the hallmark of all *Warship*'s articles, which are fully supported by plans, data tables and stunning photographs.

This year's annual will include feature articles on:

- The French 450-tonne destroyers of the early 20th century
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This hardback format title (ISBN 9781472872593) from Osprey Publishing (part of Bloomsbury Publishing plc), will carry an RRP (Recommended Retail Price) of £45. A saving of £4.50 can, however, be made by taking advantage of the 10% discount currently being offered when pre-ordering a copy of *Warship 2026* directly from www.ospreypublishing.com

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Warship 2026 Prize Draw,
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Kelsey Media, Media Centre, Morton Way,
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Please note, the closing date for entry submissions will be Friday, May 29, 2026.

***Warship 2026* Prize Draw**

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N.B. For this particular prize draw we can only accept entries from those residing in UK mainland and Northern Ireland. The competition closes on Friday, May 29, 2026. There are no cash alternatives available. Terms and conditions apply. To view the privacy policy of Kelsey Media (publisher of Model Boats) please visit https://shop.kelsey.co.uk/terms-and-conditions.

How to become a Viking shipbuilder

Tomasz Klyszynski recommends going Norse with the build of Billing Boats' wonderful 1:25 scale wooden kit for the Oseberg longship

The Oseberg longship on which Billing Boats' kit is based was discovered near Tønsberg in Norway in 1903, and its excavation from a large burial mound by archaeologists began in 1904. Concealed in a chamber within the boat were the remains of two women. To this day, they remain unidentified, but the very nature of their prestigious burial would have meant that at least one of them was a woman of considerable status. While carbon dating of the ship suggests it was buried no earlier 834AD, certain parts of its structure date from as early as 800AD, while others may be even older. After careful conservation and some reconstruction, the ship was, in 1926, moved to a museum in Oslo. Those interested in viewing her themselves will be interested to learn that the museum is due to reopen again in 2027.

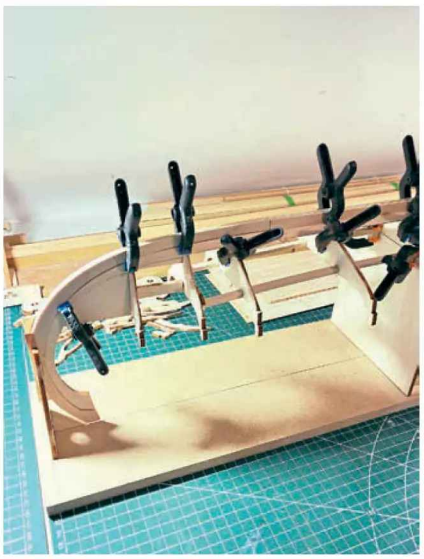
In popular culture, the Oseberg longship inspired the vessels built for the films/series *Outlander* and *Ragnarok*, something avid fans will probably be well aware of – so there's a good chance many of them may already have an example of this model on their shelves, but if not, I hope they will after this article! The attention to detail and exquisite aesthetics of the replica that can be built from Billing Boats' kit, though, is sure to appeal to a much wider audience.

Billing Boat's 1:25 scale Oseberg longship model box

The contents of the box.

The metal and plastic accessories included.

The sail cloth, deck planks, etc.



The first plank being laid.

The hull framework.

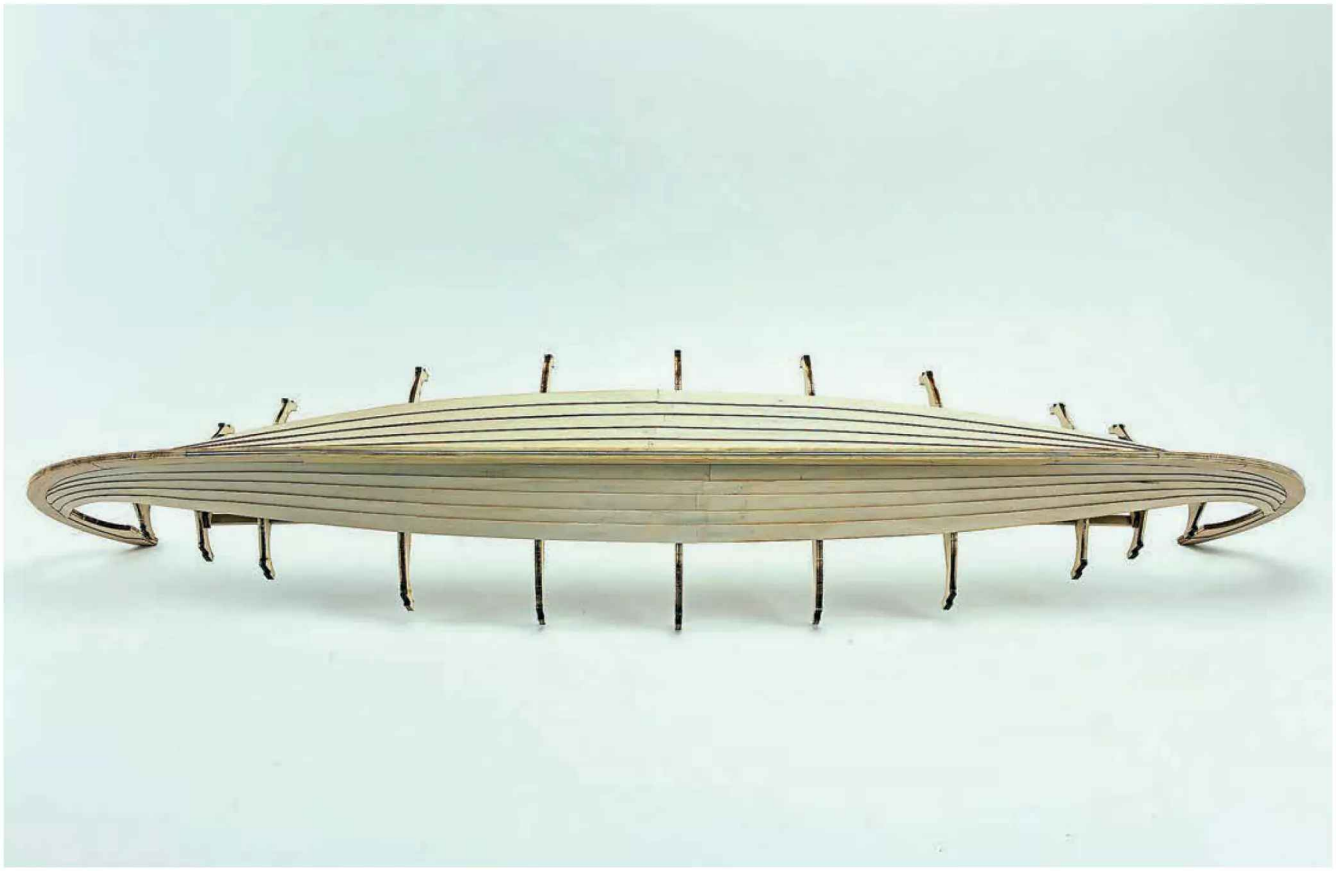
"The planking supplied is cut from very flexible 1mm plywood"

I'm not a fictional Viking epic enthusiast myself but, having now constructed this kit and got the resulting model out on the water, I'm sold! So, here's my step-by-step to the build…

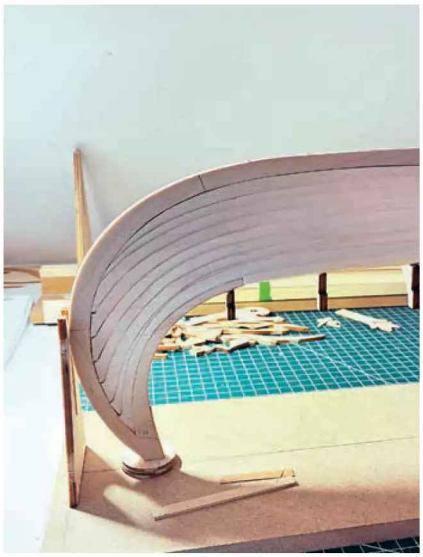
Raiding the box

On lifting the lid of the fairly large model box, the first thing we see are sheets of plywood (in various thicknesses) featuring the laser-cut parts. Also contained is a sizable piece of cloth for the sail and a template for making it, metal and plastic accessories for rigging and shields, instructions, and a helpful 1:1 scale drawing.

The planking supplied is cut from very flexible 1mm plywood, and the planks come pre-shaped (the only thing we need to be mindful of while gluing them onto the hull is the plank-over-plank overlap).



Planking being laid with overlap.



Hull planking.

Shaped planking.

Installing the ornamental elements.

Getting stuck in

The framework for the hull is made up from thick frames and a keel. A slipway from Billing Boats will prove beneficial during this process (for those interested: Building Slip BB397), as it will help keep the frames square to the keel and the keel line straight, thereby ensuring no bows and curves while working on it. It will also come in handy while gluing your planking later on in the process.

After making the hull framework and a few reinforcements in the form of long wooden strips, we then have to sand the frames to create a good contact surface for the planking. Here, care needs to be taken not to rip the frames out of the keel or overdo the sanding, thus resulting in less surface area for gluing the planking to.

With the sanding is done and the hull placed on the slipway, with the included slipway insert added, planking can commence.

Because the planks are cut from flexible plywood, they lay down very easily, even when dry, If we use warm water to gently soften them, though,

The ornaments at the stern.

Installing the deck planks.

Deck planks fitted to the hull.

Starting the colouring of the deck.

Ornaments covered with an additional layer of stain.

they becomes more responsive still to *our* suggestions of shape. Often the planks supplied in kits will bend with a will of their own. Fortunately, that isn't the case, here.

When it comes to applying the glue used to affix this planking, however, aim for exacting precision. Why? Well, most woodstains simply won't penetrate glue, but glue will often quickly penetrate wood – so unless we're extremely careful our faithful replica of a Viking ship could end up looking as spotty as a Dalmatian dog! Considering the hardships of Viking life, and the physical graft building a real longship with only hand tools would have demanded, though, we can hardly complain about the challenges of aqueous dispersion of polyvinyl resin!

The final stage of the planking involves the ornamental elements at the bow and stern that really give the hull its Viking look. These are engraved in plywood and, before and after gluing, we must sand their edges.

With the hull turned over again, we can, if necessary, reinforce the planking at any vulnerable points with some extra support – we don't want any supports added, however, to be visible above the deck line and, once again, care must be taken so that the glue used to affix them doesn't later interfere with achieving a consistent, blemish free, wood stain finish. We should also, if planning to actually sail the model, apply a coat of water-resistant sealant to the interior.

Let's now turn our attention to the deck. This is made up from 1.8mm thick wooden strips. Practically every plank has to be cut to length; the drawing of the boat's layout included with the kit will be your friend here.

"Most woodstains simply won't penetrate glue, but glue will often quickly penetrate wood – so unless we're extremely careful our faithful replica of a Viking ship could end up looking as spotty as a Dalmatian dog!"

Moving on, after once again checking for any glue spots or bleeds that could cause the kind of problems mentioned earlier, work on the finish can finally begin. The results it's possible to achieve with a couple of coats of woodstain in an oak colour, supplied by the kit manufacturer, can be seen in my photos. To further protect my model, I sealed the woodstain with an almost clear waterproof varnish, which really brought out the grain in the wood, giving it a bit more depth.

While everything is drying, the sail, which is really quite large, can be prepared. I found the easiest way to trace its design from the template onto the fabric was to mount both on a window pane. If opting to use this little hack, however, don't forget to cleanly remove all the tape and finger marks from the glass afterwards to avoid domestic disputes!

With the sail's stripes traced out, we can now move on to painting them. Thinned down or airbrush paint works well here. Obviously, we want nice, straight lines. As masking tape can sometimes result in bleeds, our best bet here is probably going to a slow, steady hand.

The mast and yard supplied in the kit come as simple dowels for us to shape (reference Billing Boats' drawing to achieve the basic shapes here, and

The hull after a couple of coats of oak coloured woodstain.

The finish after all coats of oak coloured woodstain have been applied.

Panels sketched on the sail.

then sand to refine), finish (with a few coats of woodstain, allowing time to dry) and glue into place.

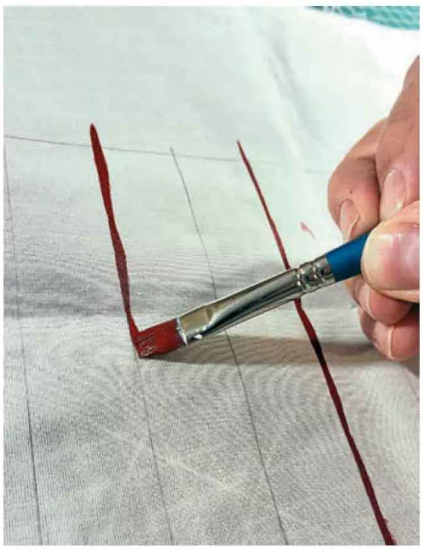
Before starting the rigging, however, there are a few additional elements, in the form of cleats, hooks for rigging and supports for the oars, that must be added to the hull. We need to allow some a fair bit of time for making the shields and the previously mentioned oars, too – as there are quite a few, so it's probably going to take a while.

"The cleats allow us to 'dry fit' everything, something worth taking advantage"

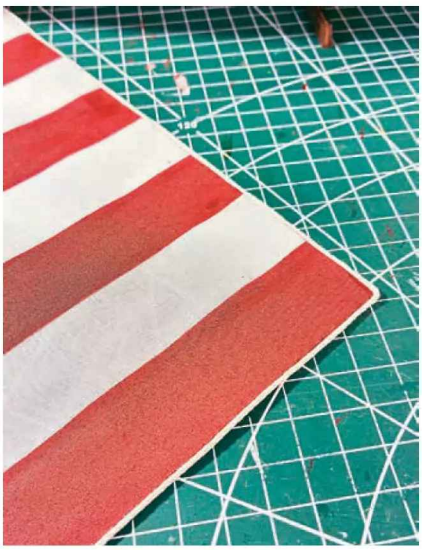
This done, we can move on to the sail and rigging. The kit supplied cord comes in a natural colour but takes dye well. The fact that we don't get plastic thread is a big plus. Even so, I decided to leave mine in its original colour because of the contrast with the hull this gave me.

The sail must be joined to the yard, so needle and thread enter the game. The manufacturer's main drawing indicates how the spacing of the cord is predetermined. The sail needs to be carefully attached, with the tension controlled so it doesn't 'float' on the yard. The aim here is that the sail fits evenly and gently along the entire length of the yard. The securing rope needs to be prepared, too.

Once the mast is dry and stable, we can install the standing rigging for it; a fairly quick task, as there's only about six 'strings'.



Paint diluted down with water or specially produced for an airbrush will work well for decorating the sail.

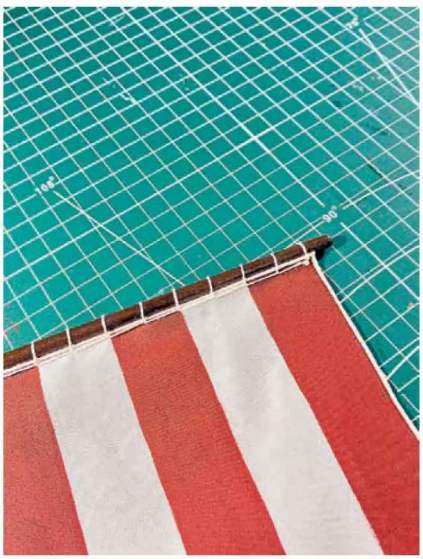


The painted sail.

The mast support and oar holders.

Shields that will later end adorn the ship's sides.

The sail with yard.



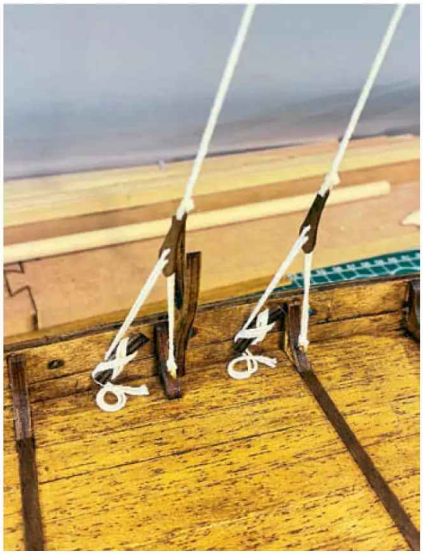
Sewing the sail to the yard.

The cleats included in the kit are plastic and come in a brown colour. Luckily, they're not particularly noticeable on this model, but if anyone finds them particularly offensive they can be painted, although they will fist need 'scuffing' with fine sandpaper. While we're working on the mast rigging, it's important we constantly control the rope tension so that the mast stays vertical and doesn't lean to one side. The cleats allow us to 'dry fit' everything, something worth taking advantage.

Our next job is the installation of the sail and the auxiliary lines. Fitting the sail through the drilled hole in the mast is one of the most satisfying stages of the build, and really adds to the euphoria as you draw close to completing the model. The size of the sail, of course, prompts an important question: where will the model be displayed/stored? Well, the good news is the space this model takes up on a shelf can be reduced by changing the angle of the sail. We can set it straight, at 90 degrees to the mast, or angle it so it will 'hide' within the hull's outline. Remember, the cleats allow us to test-fit before making any permanent fixing. We can also choose to first assemble everything without using glue. Cleats mounted on the hull make this possible, and basic knowledge of tying lines will help us, too.

Fit for seafaring warriors

Once our sail finds its place, we're ready to add the 'final touches', *i.e.*, the shields and oars, which can be neatly and appropriately sited on the model. However, this kit has



Mast rigging.

Mast rigging cleat.

The sail fitted.

Shields and oars in situ.

The finished build.

"This kit has huge potential for customisation"

huge potential for customisation so, if we're prepared to put in the extra research, time and effort, we can, for instance, opt to create a more lived-in during a long voyage look, perhaps even adding some fearsome Viking figures.

A striking Viking

Deciding to build this model was somewhat of a departure for me, as my interest has always been firmly rooted in diesel and oil-fuelled vessels rather than in the almost mythical craft of the Dark Ages. However, I'm a great believer in trying some a bit different and stepping outside of my comfort zone every now and then, and, in this case, I'm really glad I did. I thoroughly enjoyed the project, in fact, so much so, I would now definitely consider further builds of a similar nature. I may even give some thought to visiting the Viking museum in Oslo when it re-opens following its refurbishment next year!

WIN! BILLING BOATS' 1:25 OSEBERG LONGSHIP KIT

This month we're delighted to be able to offer you the chance to win Billing Boats' exquisite 1:25 scale wooden kit for the Oseberg longship.

Aimed at the more experienced modeller, on completion, this striking Viking measures 86 cm in length, 21cm in width and 45cm in height, and can be constructed either as a very impressive display piece and talking point or, if suitably sealed, can venture out on water looking so formidable it's sure to turn a lot of heads (see Tomasz Klyszynski's build review on pages 11-19).

Fancy trying your hand at becoming a Viking ship builder? Then get ready to engage your inner Floki!

To further explore the Billing Boats' extensive range, including the 1:50 scale mini kit for the Oseberg longship – aimed at the novice builder, or indeed anyone looking for a quick, easy but ultimately rewarding project, please visit: www.billingboats.com

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To be included in the draw, all you need to do is complete the entry form included on this page, cut it out (photocopies of the form will be accepted from those of you not wishing to deface your magazine) and mail it back to us at:

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Please note, the **closing date for entry submissions** will be **Friday, May 29, 2026.**

Good luck!

BB Viking Ship Kit Prize Draw

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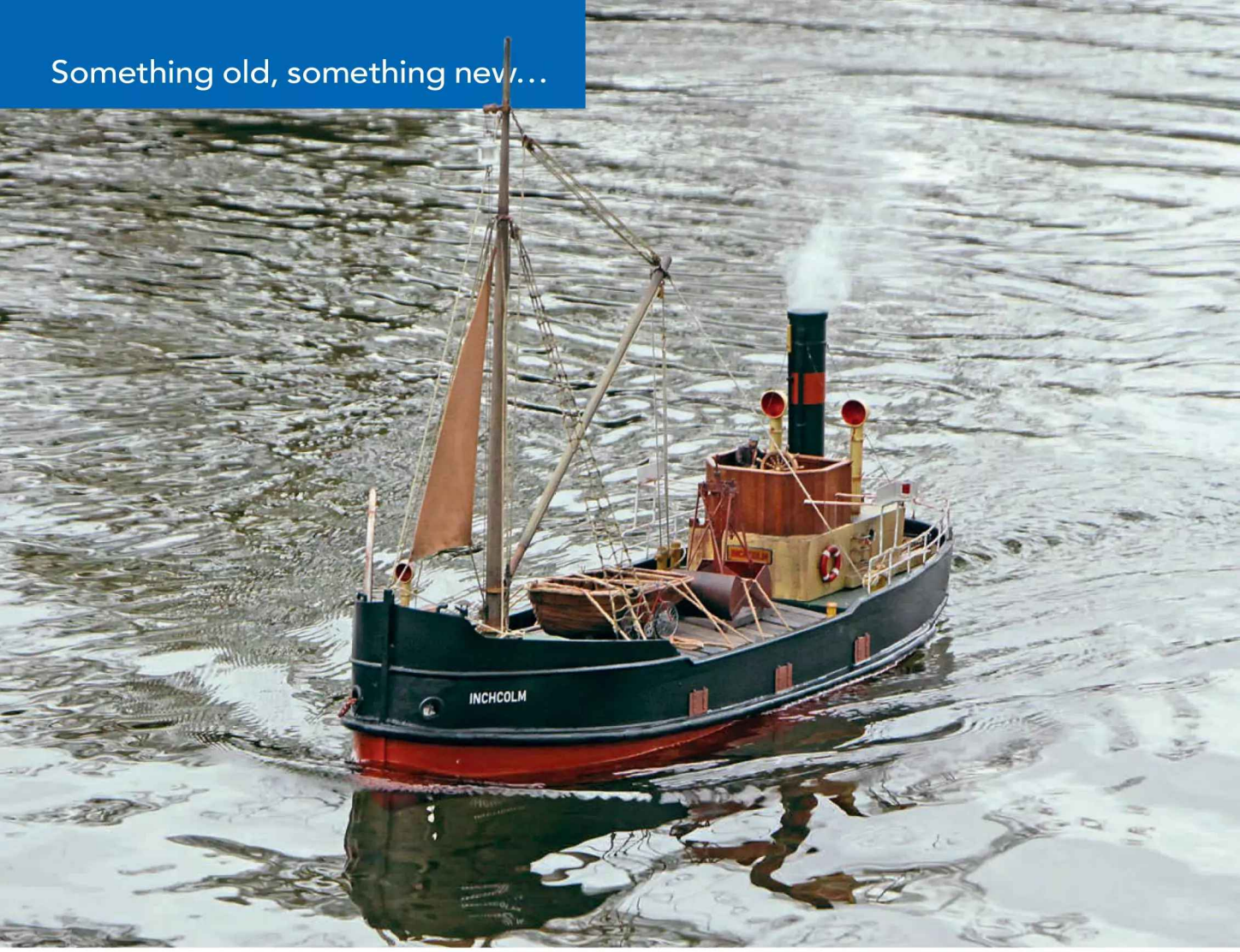

Inchcolm, second time around

Peter Koch-Osborne revisits a Clyde puffer he first modelled half a century ago!

Some 50 years ago I built the Clyde puffer *Inchcolm*. This was of course well before the internet had been invented; there's since been a revolutionary change in the sheer variety of materials, adhesives and parts available, to say nothing of the experience I've gained through a lifetime of making models. Reflecting on all this, therefore, I felt it was time to have another go at this characterful vessel.

Extensive research through books and the internet revealed very little information to add to the Model Maker Plans Service drawing. However, as the build progressed an old photograph came to light depicting *Inchcolm* with the more conventional and typical puffer arrangement of the funnel forward of an enclosed wheelhouse. One can only assume the vessel was either altered to keep the skipper out of the weather or this was another vessel with the same name.

I did learn that *Inchcolm* was built in 1909 at Leith and named after the island in the Firth of Forth. She was first owned by A.F. Henry and J. MacGregor of Leith and then, from 1921 onwards, had several Glaswegian owners before was being broken up in 1950 at Port Glasgow.

My first model of *Inchcolm* was somewhat underpowered and cumbersome in the water; she demolished an oil rig in a steering competition, which did not endear her to members of the club I was a member of at the time! This was partly due to her homemade propeller and my lack of experience in such nautical matters. Eventually, as career and family commitments took precedent, the model was sold at auction.

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Scaling up

Once I had studied my new set of plans, I decided to scale these up. The hull lines were scanned, printed out and every dimension increased by 35%, so that the resulting model, at a scale of 1:20, would be around a metre in length, 290mm across the beam and weigh in at just over 27kg. Unlike *Chieftain*, the paddle tug, and my last build, I could incorporate as much weight as I wanted, and still more!

Getting the build underway

The bulkheads were cut out of 9mm plywood and mounted upside down on an oak floorboard, using solid blocks screwed in from beneath to allow removal (see **Photo 1**). A keel was let into these formers, ply at bow and stern, mahogany amidships. For planking I used 2mm x 10mm (2mm x 6mm around the bilge curves) mahogany; these planks were steamed where necessary and stopped short of the solid timber 'bread and butter' sections at bow and stern. Brass strip was installed to provide rudder pivots and provision made for the propeller tube (see **Photo 2**).

"Once I had studied my new set of plans, I decided to scale these up. The hull lines were scanned, printed out and every dimension increased by 35%, so that the resulting model, at a scale of 1:20, would be around a metre in length, 290mm across the beam and weigh in at just over 27kg"

Planking proceeded slowly, using wide rubber bands to hold each plank in place until the waterproof PVA glue set (see **Photos 3 and 4**). With planking complete to the gunwales, the bulkheads were trimmed above decks to the correct profile to fit under the top rail. The rubbing strakes are mahogany strip topped with a hollow 'D' section of rubber intended for car door seals. The bow spray guard is aluminium sheet cyano-glued to the top rail.

The bow and stern sections were built up using solid blocks of softwood and carved into shape before sanding to blend seamlessly into the planking, as shown in **Photo 5** (stern) and **Photo 6** (bow).

The rudder was fabricated from sheet brass and of soldered construction; this simply hooks in place using 2mm brass rivets as hinges.

The hull was then 'bath tested' and ballasted with scrap metal, from my metals recycling bin, encapsulated in household filler and resin. The hull was later fitted with lifting handles, one a dowel across the forward end of the hold and the other a webbing strap and handle emerging from the deckhouse recess. It is just about a manageable lift with the hatch covers off and the battery removed.

While I still had full access to the interior of the hull, I gave it a couple of coats of two-pack clear epoxy resin. (The hull was later painted

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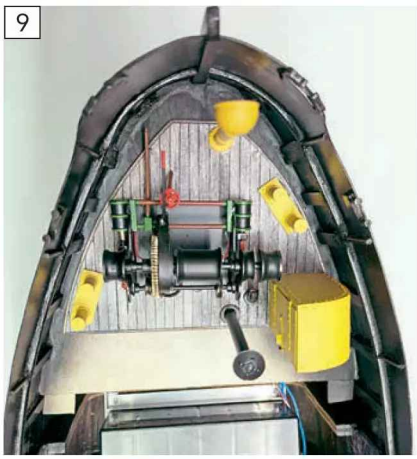

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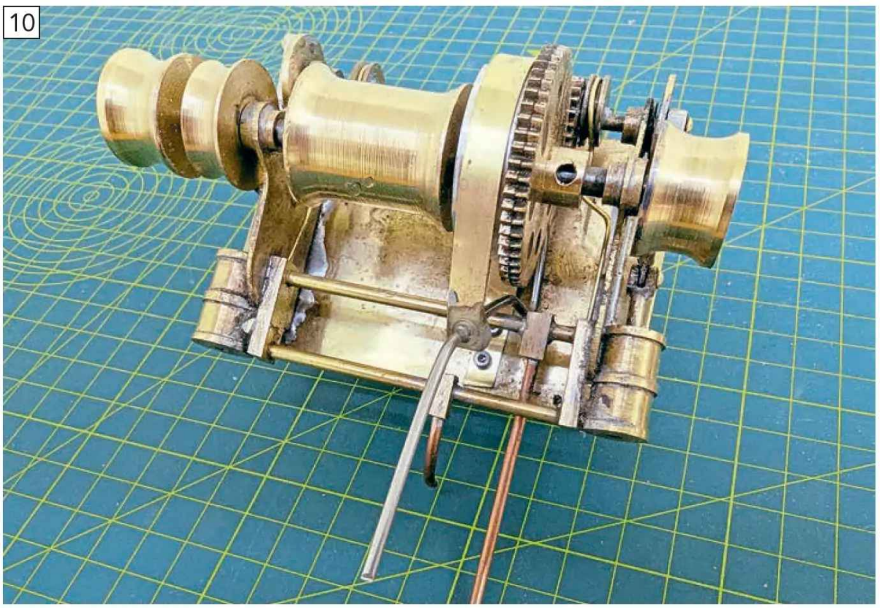

"This makes it easier to see components while carrying out any maintenance required below deck"

white internally; this makes it easier to see components while carrying out any maintenance required below deck.). Externally, the hull was sanded before a fine glass fibre mesh was incorporated into the first coats of primer paint to seal and strengthen it.

The drive

I could then sort out the motor and drive. It was recommended that I use a 12v Torpedo 850 motor (this is a big boat!). This motor, however, runs off load at around 9000 rpm, which, following discussions with the Prop Shop, led to the realisation I would need a scale sized 60mm propeller running at around 1000 to 3000 rpm. Further research led me to source an inexpensive 3D-printer drive and pulley system from an outlet that markets spare parts for 3D printers. The pulleys are aluminium and the belts are rubber. Mounting the motor on 3mm studding rails to allow adjustment for pulley size would give me the options of either a 2:1 or 3:1 reduction, so I opted firstly for the 3:1 ratio (see **Photos 7 and 8**).

With this sorted, work could proceed with the decks and the top sides of the cargo hold, which were simply made from 2mm and 4mm ply respectively, although with the added complication of fabricating the stern grating from laminated sections of 2 x 4mm beech, fixed to a jig and steamed for the bent section. The fore and aft timber deck sections are ply, overlaid and planked with lime and lightly treated with ebony stain. The bow section is removable for access to the working winch (see **Photo 9).**

The winch

As I generally make life difficult for myself, I decided to fabricate a working winch. This arose out of not being able to source a winch large enough, so as I was going to have to make one myself, I figured it may as well work (see **Photo 10).** I used a sheet brass base, while the brake and winding drums were lathe turned, also in brass. The cylinders and dummy pistons all work together, with proper eccentrics for the dummy steam valves. Meccano gears take the drive from below decks where a 'Clearbox' motor/gearbox assembly is arranged, with another 3D-printer timing belt drive connected in turn to the Meccano gears. A small ESC controls the motor from a 4.5v (3 x AA batteries) battery pack; this is only run for demonstration purposes (the 'Clearbox' was both too fast and too noisy with all those spur gears at its rated 6v). All this is mounted above and below a removable section of foredeck.

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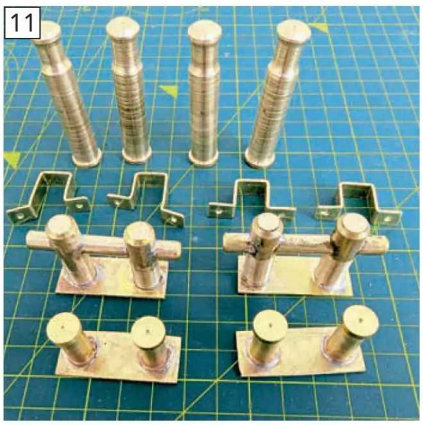

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"As I generally make life difficult for myself, I decided to fabricate a working winch"

Superstructure, fittings and finish

All the ship fittings, rudder, bollards, lights and pulley blocks were scratch built (see **Photos 11 to 16**). These were mostly turned and fabricated from brass, with the exception of the three vent tops (3D prints); the two figures (Modelu 3D prints); the mast base casting (overflow pipe and plastic card); the funnel (waste pipe); ships wheel (a kit); plus commercially produced lifebelts, anchors, chains, and turned dowel for the tapered mast.

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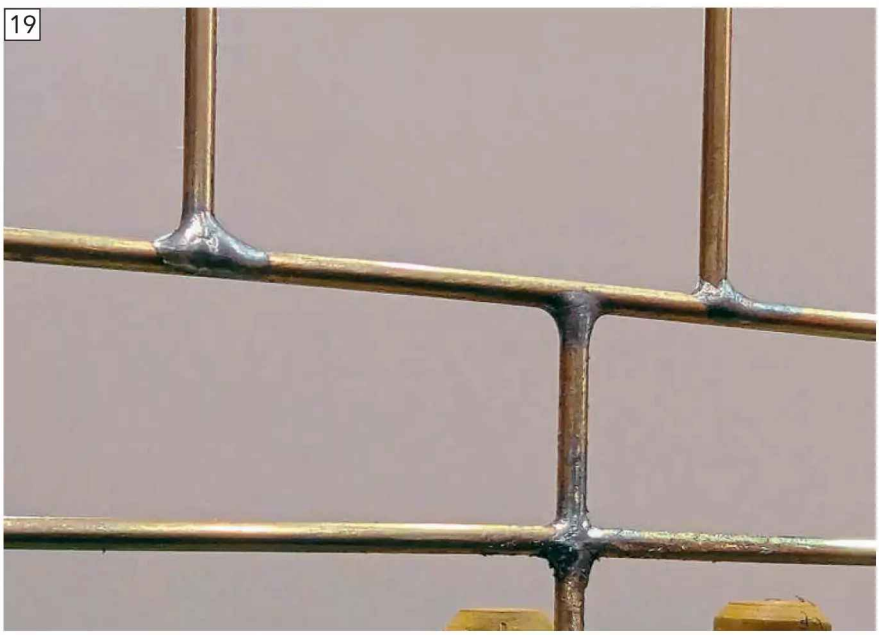


"This simple technique proved surprisingly effective"

The deck house is basically a plywood box with a bridge constructed from mahogany strip wood. The portholes were turned, with rivets created by applying tiny spots of Card Roket glue with a cocktail stick (this simple technique proved surprisingly effective) ahead of painting. Clear acrylic was then inserted into the portholes to glaze them.

The cargo hold cover was made from 5mm plywood, with hardwood hatch covers glued on, and was finished with a tarp from the rag box.

The dinghy proved a mini project in itself, as all the stages of interpreting hull lines and building formers had to be carried out in miniature form to construct its clinker-built hull (see **Photo 17**). It was then completed with brass rowlocks, timber seats and kebab stick oars.

The bicycle I added to the deck is of soldered construction and was created from brass wire of various gauges up to 2mm for the frame and 3mm copper tube wheel rims. The rims had to be drilled for the spokes before bending into an exact circle; very fiddly! Very fine brass wire was used for soldering the spokes in, with each wheel held on a jig so that the hub stayed central (see **Photo 18**).

Handrails were formed in 2mm brass wire and also soldered. The navigation lights and supports lift off with the deckhouse for access (see **Photo 19).**

I have my wife, Rosemary, to thank for the jib sail, as she kindly made this for me; I know when to ask for help!

The sand grab bucket was added after my research revealed puffers being used for dredging; these buckets were also used for loading and unloading coal and aggregates. Construction here was mostly from plastic card and strip, with chains added.

I wanted the boat to look as cluttered as possible, consistent with the images I came across through the Clyde Puffers Facebook Group, and, to reinforce the scale of the boat, two crew members have been strategically positioned (see **Photo 20**).

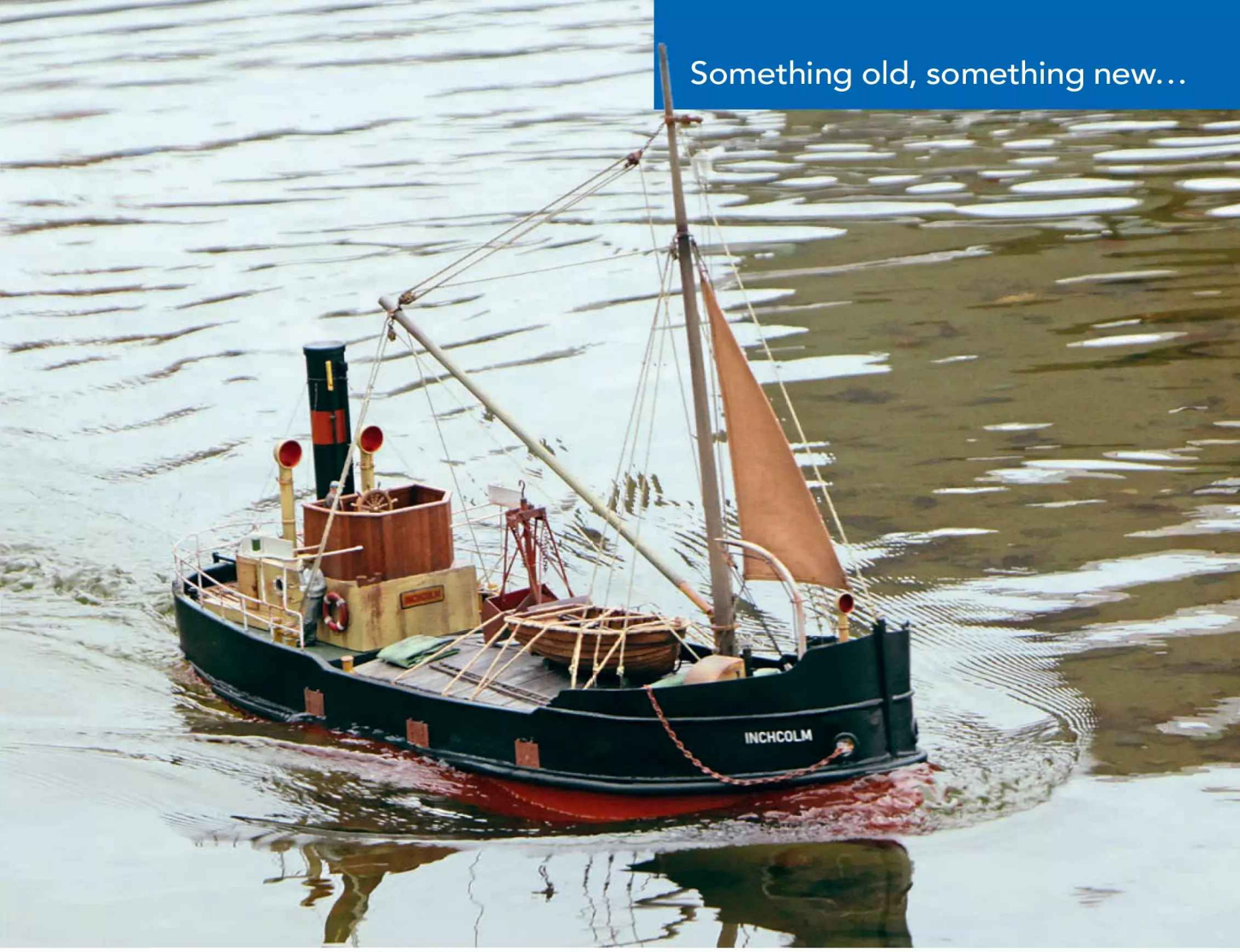
A modified sonic 'smoke' unit sits in the deckhouse controlled by a separate switch and battery pack (again, 3 x AA cells). The overflow pipe extends the mist outlet to near the top of the funnel.

Power is provided by an enormous 18Ah lead acid battery, which can be removed by simply lifting the cargo hold cover and then unplugging and extracting it. Available as a good deal, this serves as additional ballast. An

electronic speed controller controls the motor. A conventional servo controls the rudder with an extended arm and fishing nylon tensioned by a spring which is fed through 3mm copper tube (as a Bowden cable, but 'pull' only) to the rudder arm, hidden by the cosmetic chain which, on the real thing, would have operated the rudder from the wheel.

My first Clyde puffer model, all those years ago, was heavily criticised for being weathered, so was repainted before I sold it. However, although Clyde puffers were maintained with pride, they were rarely pristine – after all, they could hardly retain a perfect glossy finish working year-round in Hebridean waters. Today, of course, most model boat builders/enthusiasts look more favourably on weathering (something that's long been the norm in model railway circles), so I decided to, once again, to opt for a more authentic and realistic-looking finish.

Something old, something new…



"Although Clyde puffers were maintained with pride, they were rarely pristine – after all, they could hardly retain a perfect glossy finish working year-round in Hebridean waters"

After the glass fibre matting had been adhered on to the hull, a coat of red oxide primer was applied and, once dry, the hull smoothed with wet-and-dry papers. (The hull should probably have steel plates and rivet detail, but the lack of information on the hull construction precluded this). Red oxide was applied to the lower hull, followed by a coat of matt lacquer. This area was then masked and more lacquer applied to prevent the next coat (black for the topsides) seeping under the masking tape. Cream was used for the deckhouse and the woodwork varnished then dry brushed for the weathering. Lights and other details were painted white before weathering. Most of this work was carried out using auto 'rattle cans' but some details were brush painted.

Lettering transfers were homemade on my computer using printable transfer paper.

The rigging and ropes were created from a mixture of commercially available materials and string, which I soaked in tea and coffee to effect a well-used and weathered look.

On the water

My model boat transport trolley was modified to suit the puffer and a derrick built to launch her. This was intended to avoid me losing my balance while struggling with a sizeable and heavy model and following the vessel into the model boating pond – been there, done that, and it's not an experience I wish to repeat. However, with some help, and by installing the battery only once Inchcolm is the water, this is not strictly necessary.

The 'maiden voyage/trial sail proved this model to be somewhat over-powered, but still far better/easier to handle than my original build of *Inchcolm*.

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SS *Unity*–based tramp steamer

Part 1

Nick Ward takes a break from building and flying R/C aircraft and rediscovers his love of model boat building…

I'll be honest, I'm better known as a model aircraft enthusiast, and I probably get as much (if not more) from scratch-building planes as I do from flying them. Since returning to regular modelling activities about 15 years ago, I've built and flown around 20 remote control/control-line planes, using an equal mix of glow and electric power. The largest and most time-consuming of these was a 102in wingspan David Boddington Centurion, which took (on-and-off between other smaller projects) around three years to finish. It has proved to be a great model to fly, totally worth the time and energy invested. Having 'maidened' it, however, I found myself with a dozen or so airworthy airframes yet feeling the need for a break from building model aircraft.

Because I always have at least one build project of some description on the go, I then started looking around for alternatives. I initially considered 'getting ahead' with wooden toy-making for grandchildren but then stumbled across some YouTube footage of model steamboats, which led to me to investigating the possibility of making one myself. As I don't own a lathe, the steam part of the project didn't get any further, but I was reminded that as a teenager/young adult I had in fact built as many model boats as aircraft, and that I had dozens of plans squirreled away in files in the loft. These ranged in size from 13in to 54in and included designs from Vic Smeed, Glynn Guest, and the Lesro/Aerokits classics.

I hadn't tackled an R/C boat for some time, so I wanted something that could be easily constructed and fitted with bits of R/C gear I already had. While researching the steamboat idea I had found, in my 'stash' of old plans, Vic Smeed's steam-driven SS *Unity*. Having studied this and given the project some serious thought, I decided to build an enlarged (125%) electric rather than steam-powered version (which both the plan and a related article written by John Stroud's and published in a 1980s' issue of Model Maker magazine suggested would be possible), but which I would detail (thanks to some inspiration from a thread on the Model Boats' forum discussing the build of the 1929 steam vessel *Baron Vernon*) to look a little like an early 20th century three-island tramp steamer.

This project would serve as an educational platform, allowing me to revise and extend my limited boat-building knowledge, particularly in regards exploring the scratch-building of fittings, *etc* (more on which next month).

The hull, basic superstructure and R/C installation

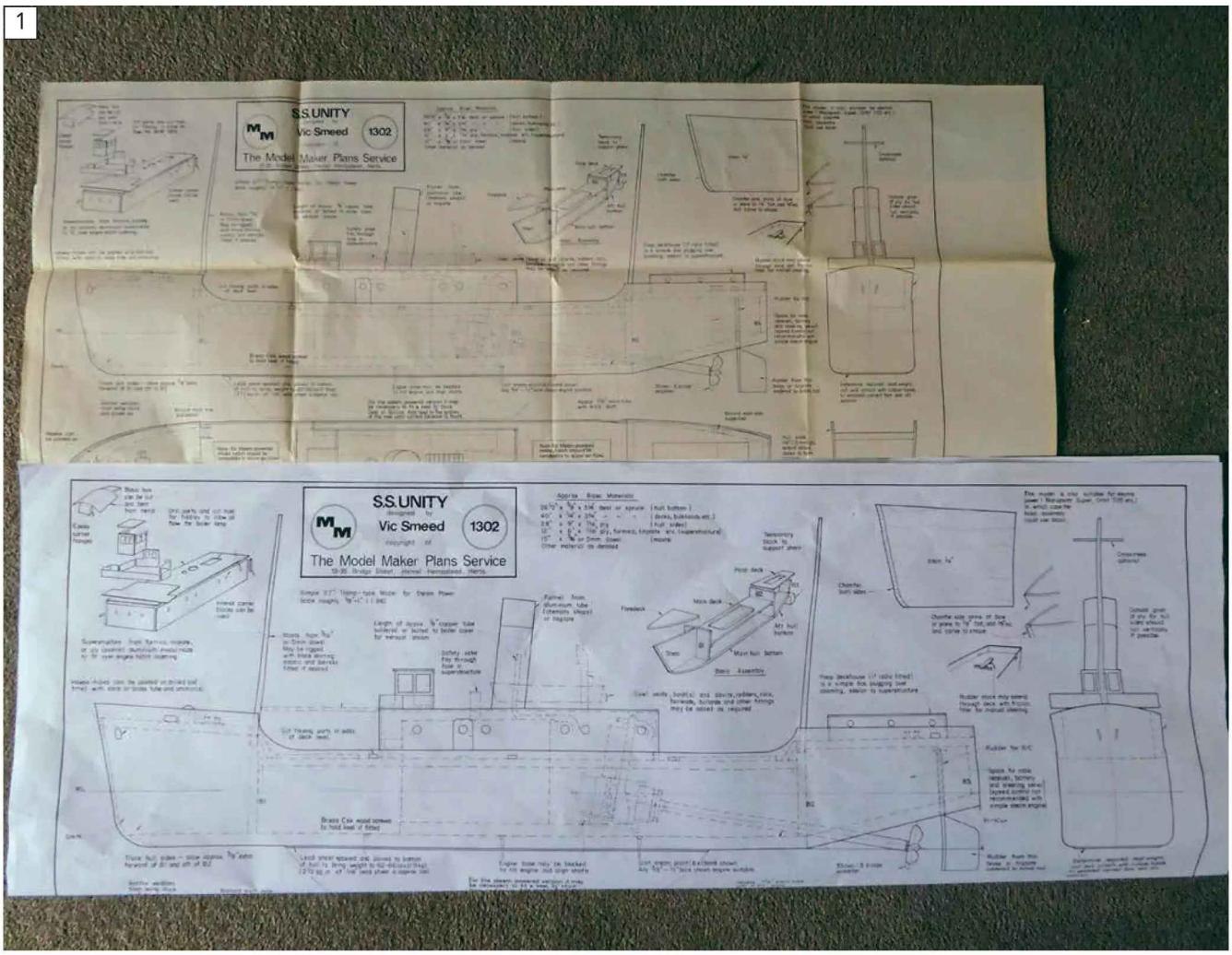
The build is probably best documented by the sequential series of photos and captions that follow, but I should perhaps first share details of the materials and bits and bobs used to complete this stage of the project…

I opted to use some 12mm/10mm pine for the basic frame rather than balsa, with hull sides from 3mm bass sheet. The original used 1/16in ply for the hull sides, but as I didn't have any and bass sheet was considerably cheaper, I went this way instead. Exterior grade PVA was used for most of the wood-to-wood joints, supplemented with 5-minute/24 hour-epoxy and, very occasionally, CA glue. If balsa was used, tissue and dope covering would toughen it up, as often described in many of Glynn Guest's smaller model build features.

The RS370 motor/gearbox assembly was one I had acquired some years before as a spare for an early small 'foamie' RC trainer. I knew I needed some weight in the hull so a 6V 4.5 amp-hour lead acid gel battery was planned. The R/C gear was to be a 'retired' early Futaba 2.4GHz set I had that was still functional and for which I also had two compatible receivers and 3003 servos.

I had to splash out (no pun intended) for the 200mm M4 propshaft and 3-blade 40mm plastic prop but decided to have a go at fashioning my own rudder assembly from brass sheet/tube and piano wire.

1



Vic Smeed's plan for SS Unity was blown up to 125%, increasing the model from 27 inches to approximately 34 inches in length, this allowing the beam to just fit on 4-inch wide balsa sheets; however, Nick later decided to use a combination of pine for the carcass and bass for the hull sides to replace the (more expensive) 1/16inch ply sides of the original.

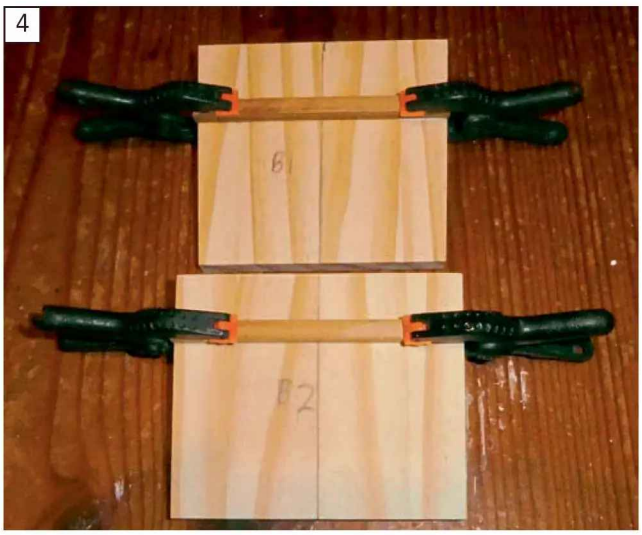
2

Hull frame pieces traced onto 12mm and 10mm pine and cut out (Nick used the pin-thru-plan method

3

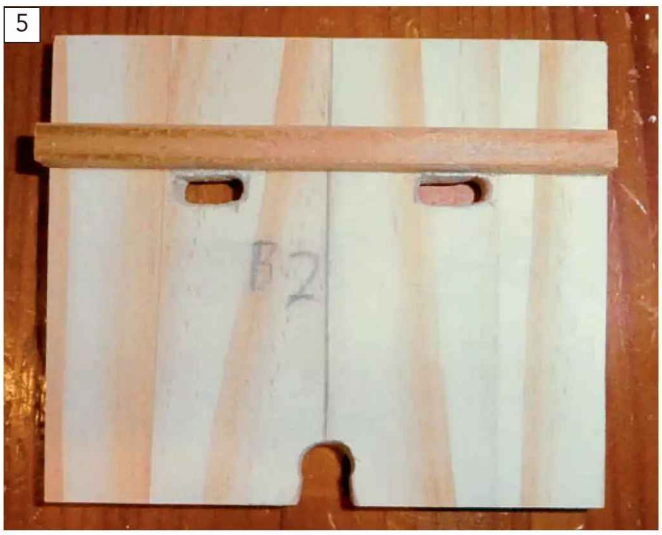
The hatch openings cut out using jigsaw/file and grit paper.

4



6mm square spruce deck support pieces glued into position on bulkheads.

5



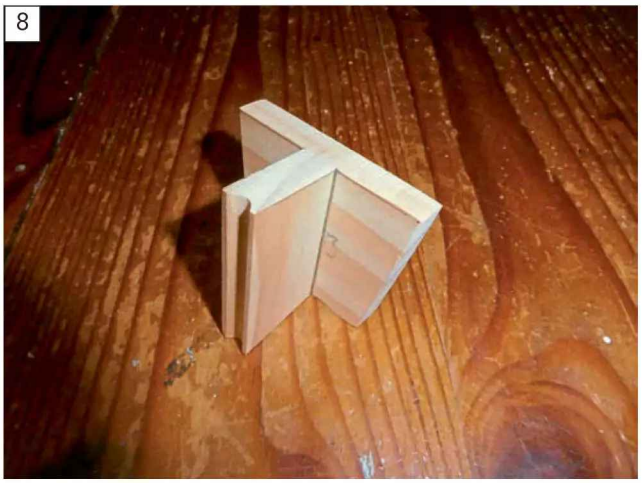
Holes drilled and filed out for prop shaft and servo connections.

6

7

The pine frame bulkheads glued to the hull bottom and middle deck with exterior-use PVA, checked for squareness and then clamped/weighted overnight to cure.

8



The rudder tube support filed and glued to Bulkhead 3/transom.

9

The foredeck glued to stem, and rudder tube support glued to rear deck piece.

10

11

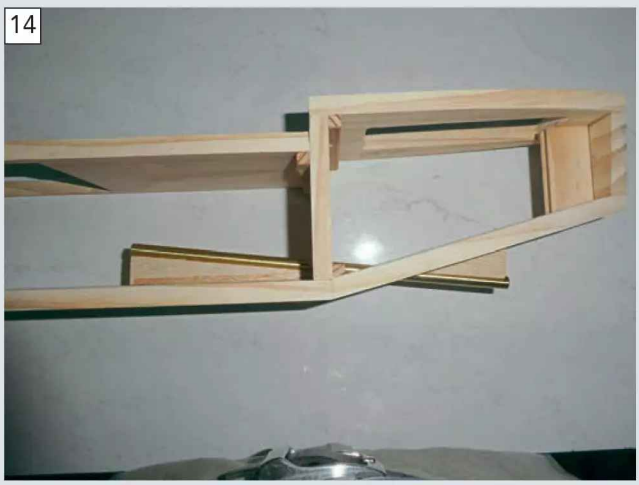
The stern pieces of carcass placed together and clamped, without glue, so the prop tube hole can be marked, drilled, alignment checked, then filed out.

12

13

Stern section now glued together, alignment re-checked, 'pinned' with small screws and left to cure. Note the slight slope of the rear deck piece.

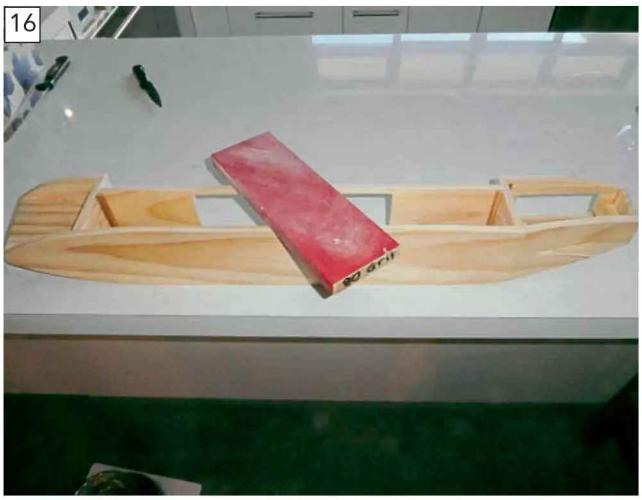
14



15

The prop tube inserted and internal support & skeg cut/filed to shape before gluing.

16



Carcass sides course-sanded/shaped to ensure good fit of side sheeting.

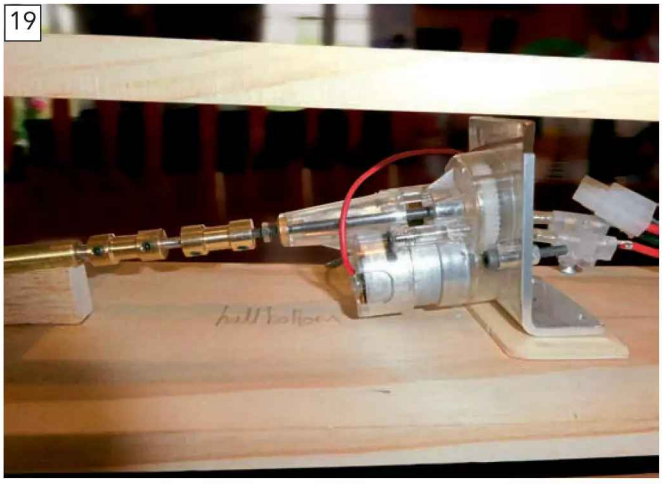
17

200mm x 4mm brass prop tube epoxied into position while connected to motor via solid coupling to ensure correct alignment.

18

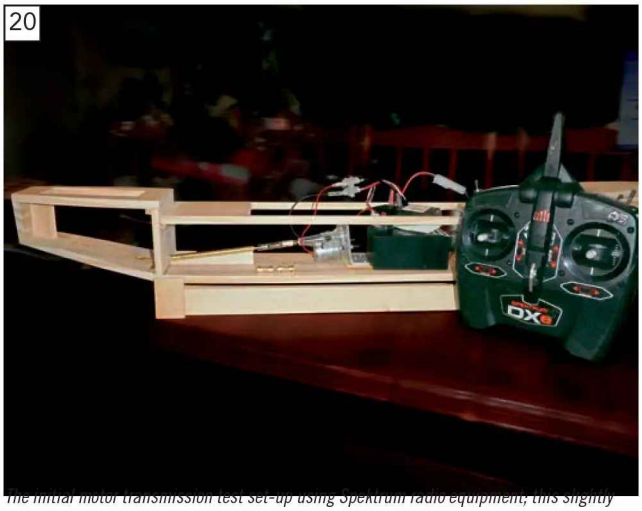
The 0.5mm brass sheet rudder cut out, filed, cleaned with rubbing alcohol and soldered to flat-filed end of a 4mm piano wire shaft – this having been cut to length and another flat filed on the opposite end to fit the repurposed aircraft nose wheel steering arm with grub screw. Also shown is the brass rudder tube of 4mm internal diameter cut to length.

19



Motor/shaft /coupling installation set-up ready for testing before the hull sides are sheeted. The repurposed R/C aircraft RS 370 motor/3:1 reduction gearbox assembly has been positioned using rigid double coupling (this would later be tested with a universal jointed double coupling, not shown in this photo). The motor mount you see was cut, drilled and bent to shape from 3mm aluminum sheet.

20

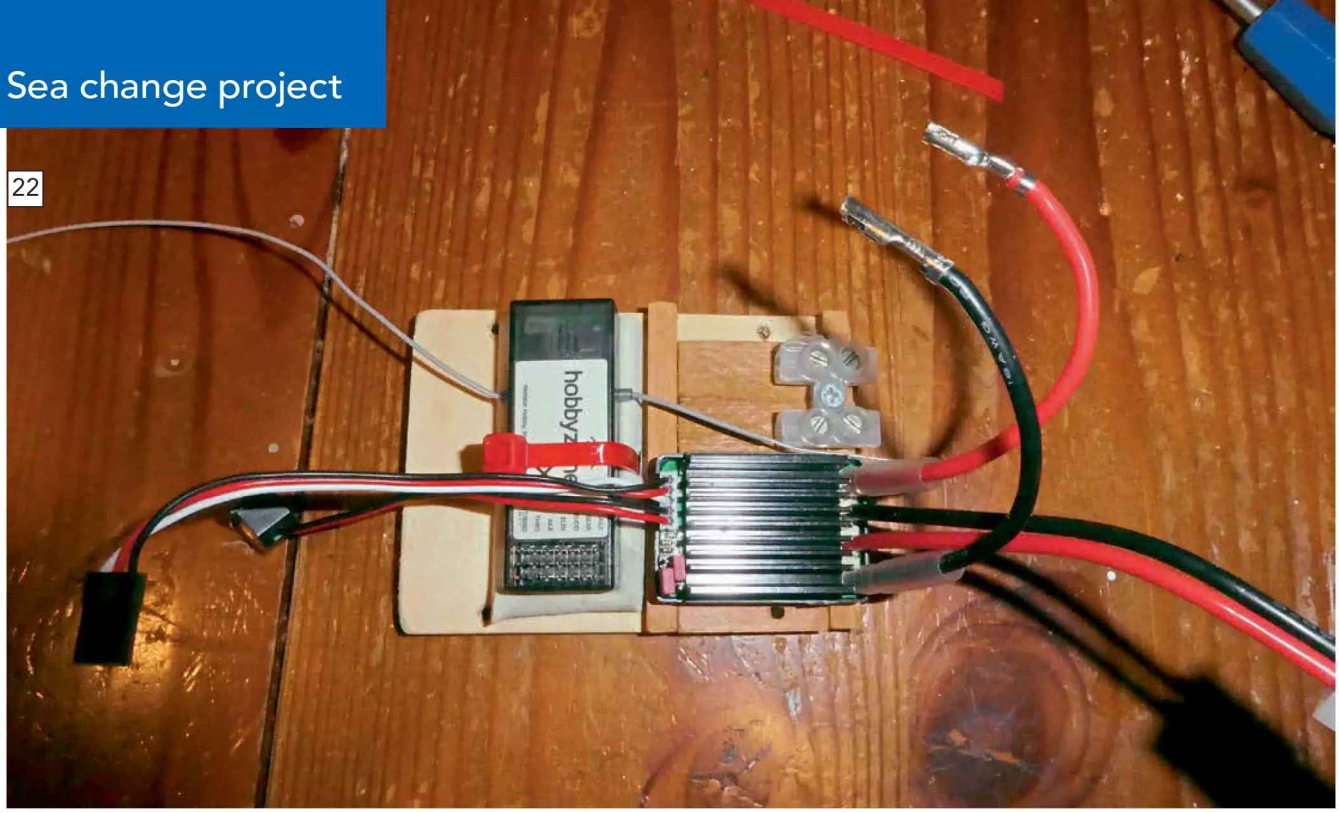


The initial motor transmission test set-up using Spektrum radio equipment; this slightly dodgy old RX from an old 'foamie' trainer prompted a later swap out for an even older but more reliable Futaba receiver. Shown also is a rigid coupling swapped for a universal jointed coupling to test smooth running under power before adding the hull sides – highly recommended!

21

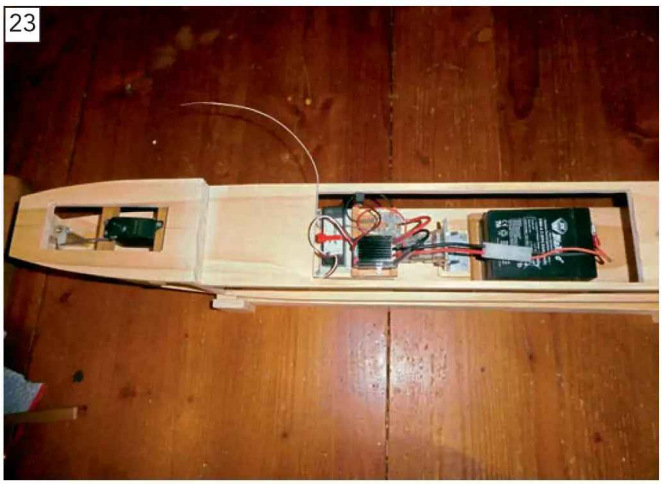
6mm square spruce battery position frame glued in front of the motor mount (as close as possible to 'guesstimated' CoG position), with scrap plywood mounts either side of the coupling/shaft to support the RX/ESC mounting plate.

22



RX/ESC mounting plate (made up from 3mm ply/6mm sq spruce); note, this RX was later swapped for a Futaba RX.

23



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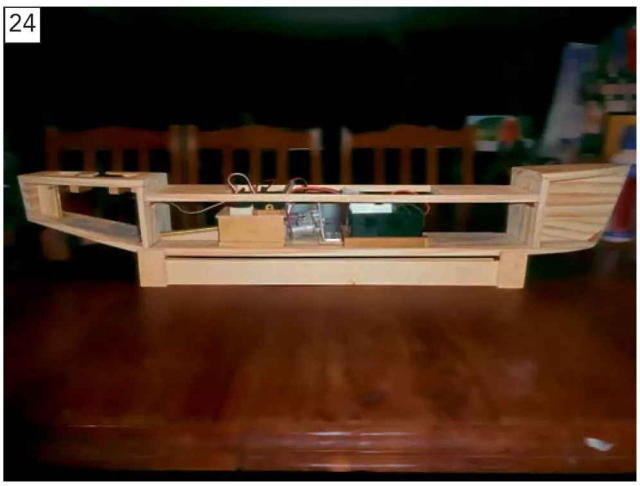
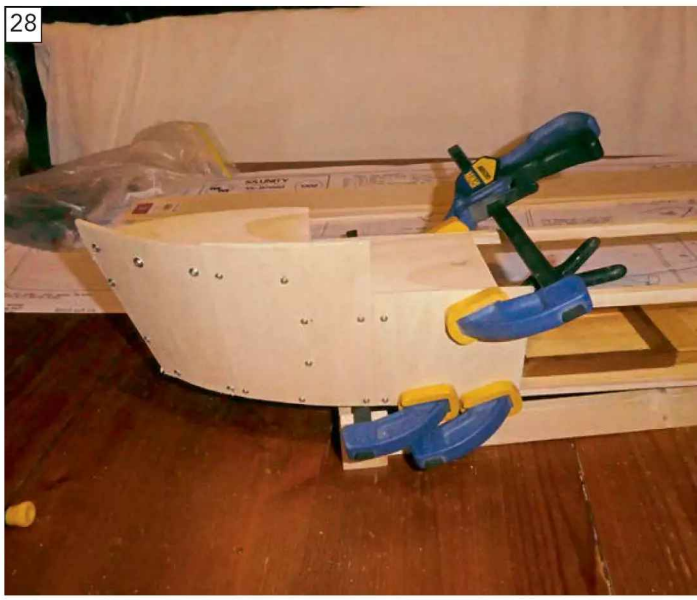


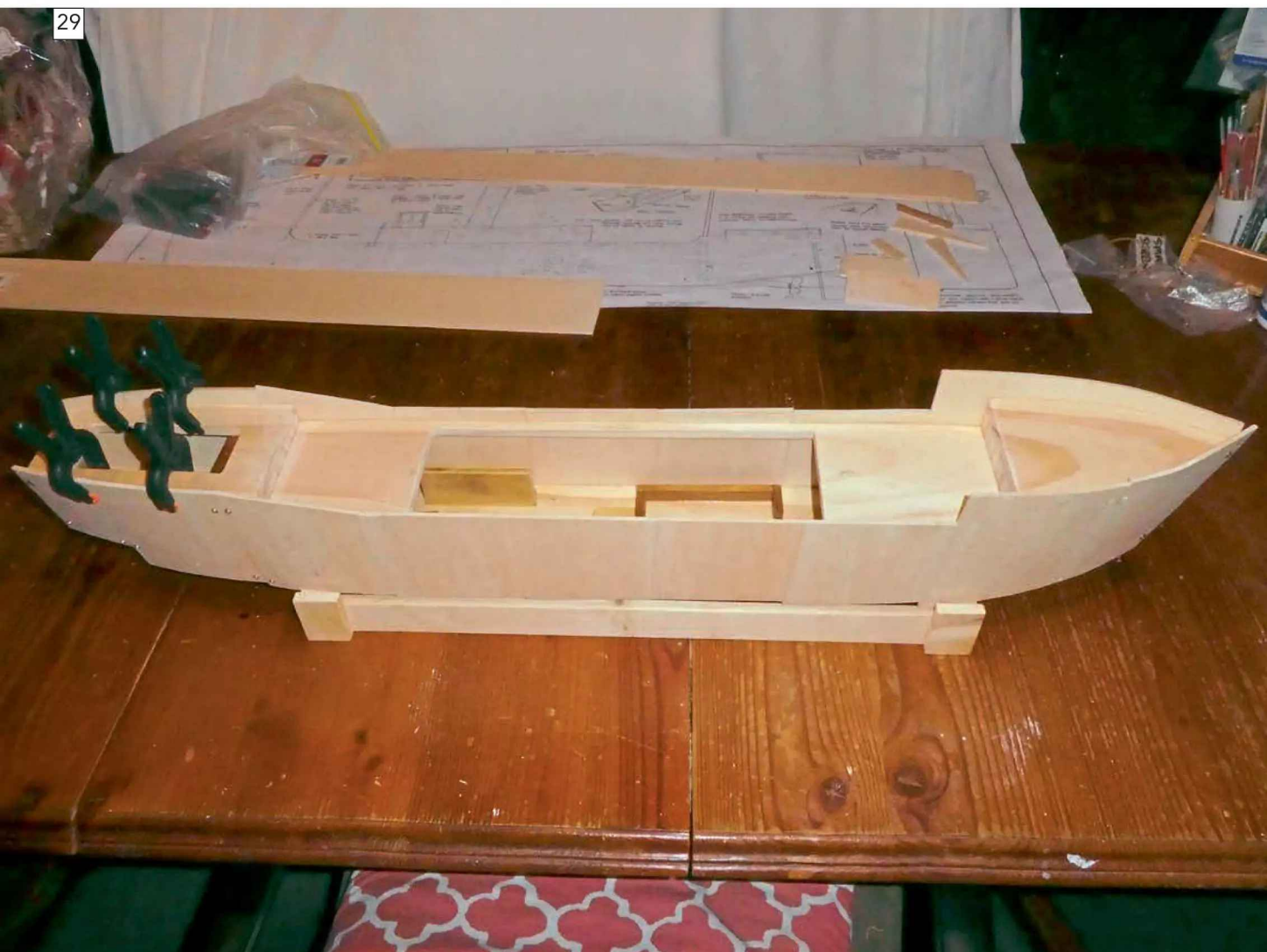
With the rubber tube now epoxied in position, the complete radio-control motor and steering set up is now installed and ready for testing - again, highly recommended, since it's much easier to make adjustments before the hull has been sheeted.

25

26

All R/C equipment removed, and the hull's internal surfaces sealed with polyurethane varnish for the waterproofing of otherwise inaccessible areas/places prior to side sheeting (with care taken not to avoid any surfaces where glue is later to be applied). Note, this was done in the shed, not on the dining room table!





The hull sides from 3mm bass sheet (grain vertical), glued, clamped and screwed into position until the glue sets. Note the extension above deck to form gunwales. Screws will be removed from curved pieces and holes plugged once the glue has cured.

30

The gunwales reinforced with 1/16in bass strip, with the grain at 90-degrees to that of the side sheets, ensuring better strength around the freeing ports.

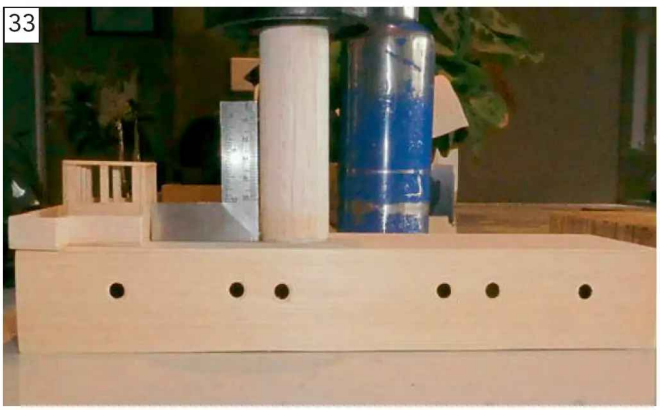
31

The hull sides trimmed to intended gunwale line, screw-holes filled and sides rough-sanded to remove any unevenness between hull side sheets. The freeing ports will be drilled and filed around the gunwales as suggested by plan and then the hull sanded smooth (240-400 grit paper) in preparation for sealing/painting.

32

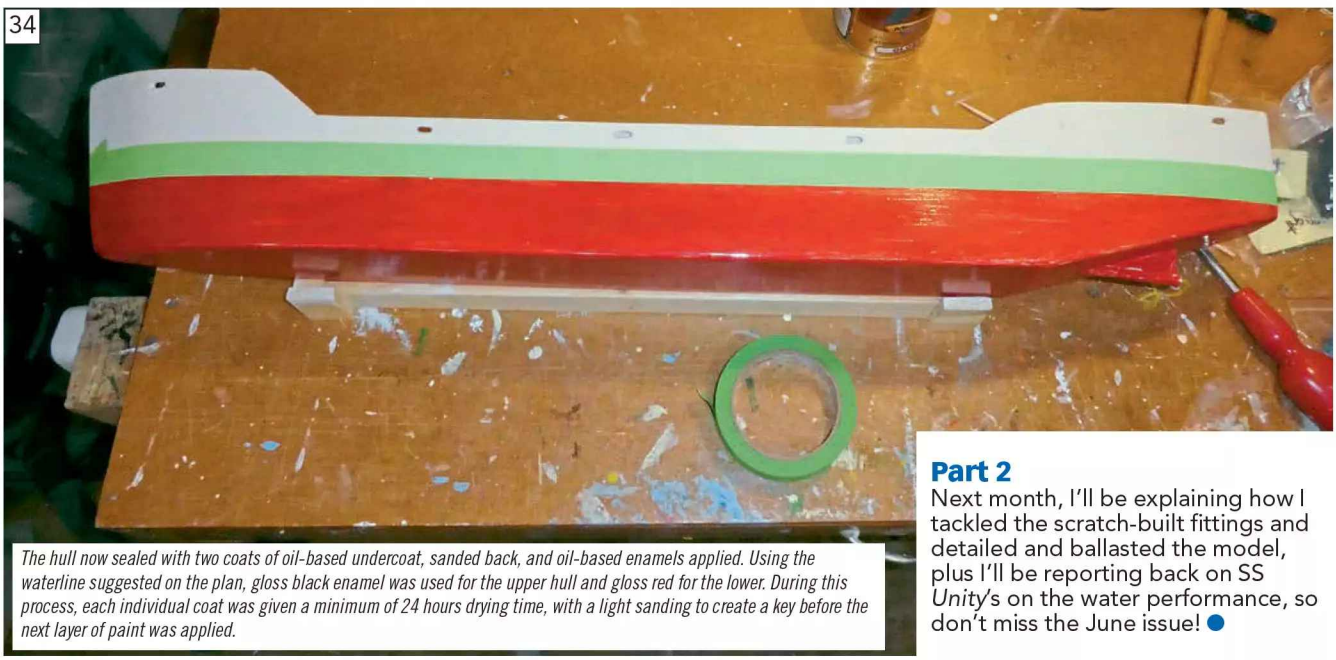
Hatch coamings from 1/16in basswood glued and clamped. The inside corners of the coaming will later be reinforced with scrap 6mm square spruce.

33



The superstructure, made from a combination of 3mm/1.5mm bass and 1/32in ply. Having been checked for 'squareness', the funnel, built up from 3mm scrap balsa strips around circular formers is now glued to the superstructure. The portholes have been carefully drilled/filed out to avoid splitting the wood.

34



The hull now sealed with two coats of oil-based undercoat, sanded back, and oil-based enamels applied. Using the waterline suggested on the plan, gloss black enamel was used for the upper hull and gloss red for the lower. During this process, each individual coat was given a minimum of 24 hours drying time, with a light sanding to create a key before the next layer of paint was applied.

Part 2

Next month, I'll be explaining how I tackled the scratch-built fittings and detailed and ballasted the model, plus I'll be reporting back on SS *Unity*'s on the water performance, so don't miss the June issue! ●

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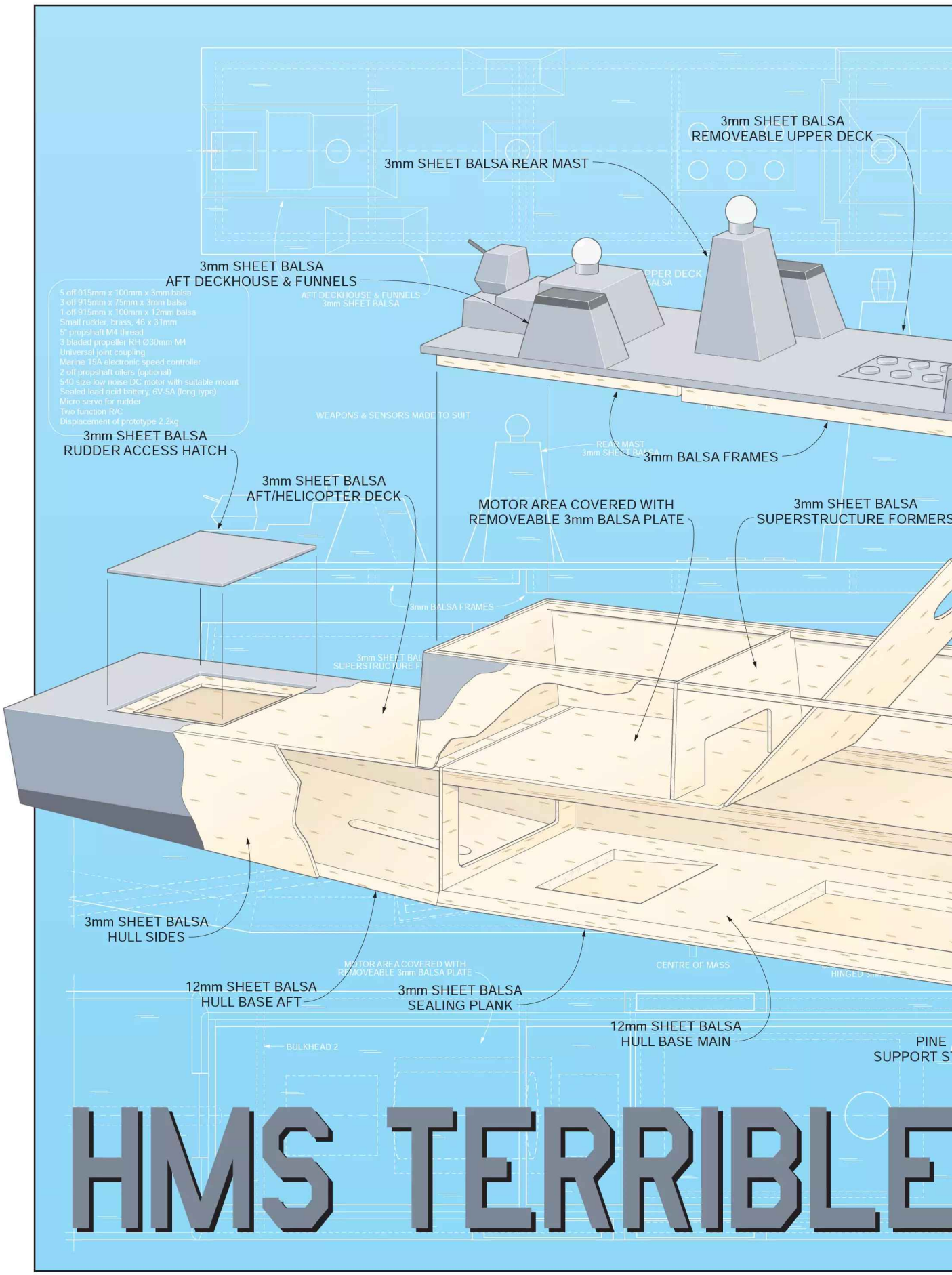
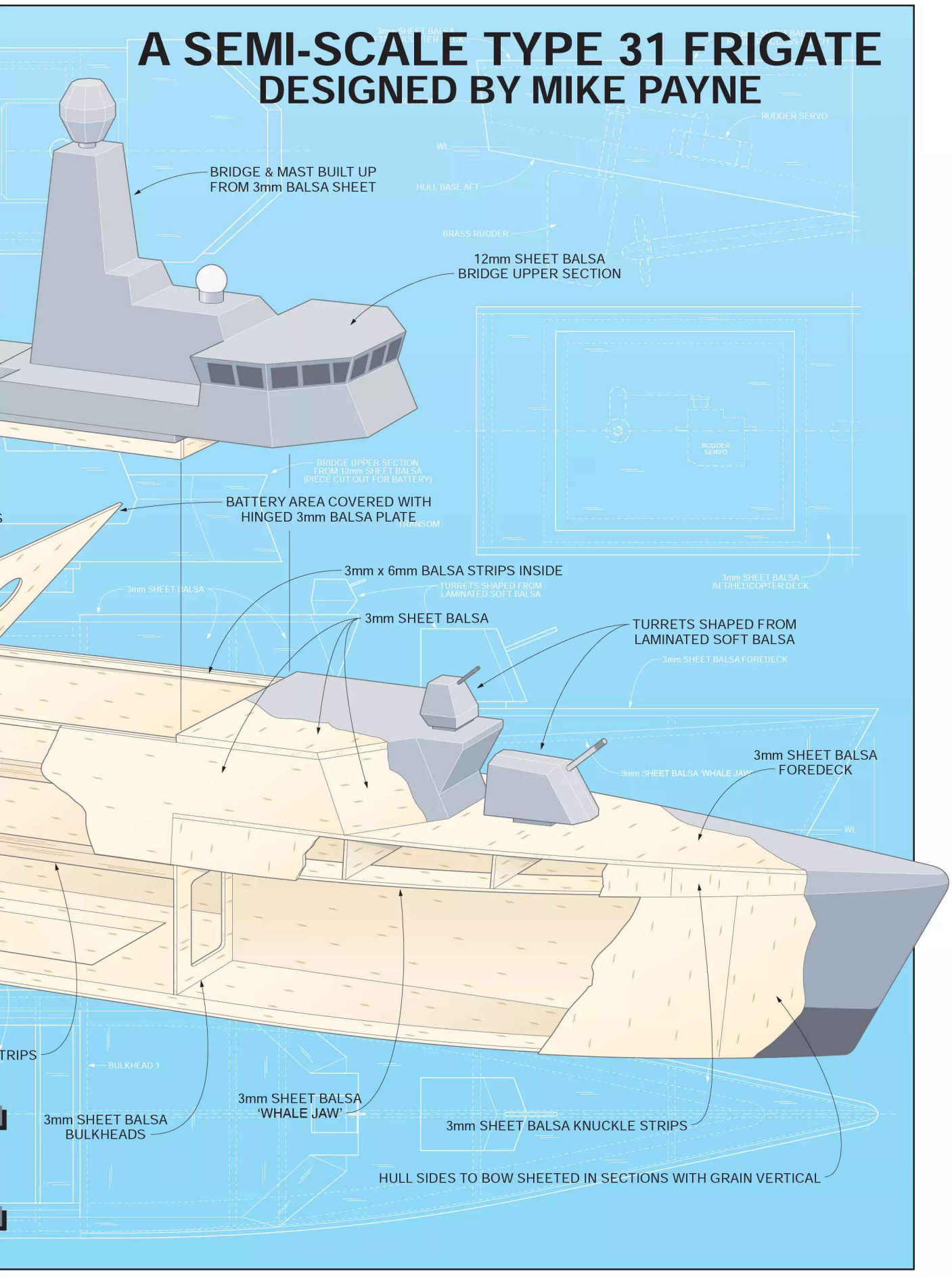
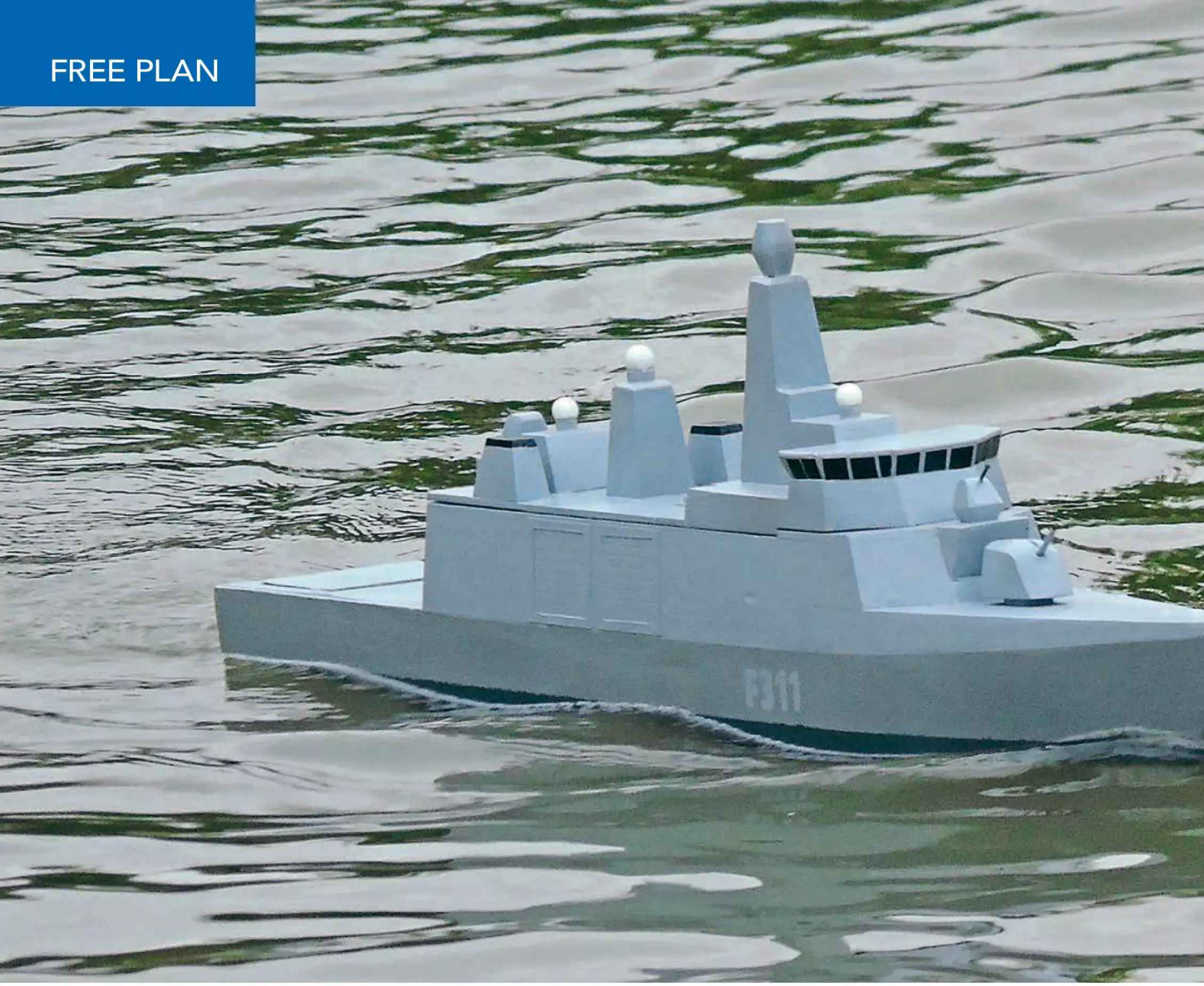

3mm SHEET BALSA
REMOVEABLE UPPER DECK
3mm SHEET BALSA REAR MASS
3mm SHEET BALSA
AFT DECKHOUSE & FUNNELS
5 off 915mm x 100mm x 3mm balsa
3 off 915mm x 75mm x 3mm balsa
1 off 915mm x 100mm x 12mm balsa
Small rudder, brass, 46 x 31mm
5" propshaft M4 thread
3 bladed propeller RH Ø30mm M4
Universal joint coupling
Marine 15A electronic speed controller
2 off propshaft oilers (optional)
540 size low noise DC motor with suitable mount
Sealed lead acid battery, 6V-5A (long type)
Micro servo for rudder
Two function R/C
Displacement of prototype 2.2kg
WEAPONS & SENSORS MADE TO SUIT
3mm BALSA FRAMES
3mm SHEET BALSA
RUDDER ACCESS HATCH
3mm SHEET BALSA
AFT/HELICOPTER DECK
MOTOR AREA COVERED WITH
REMOVEABLE 3mm BALSA PLATE
3mm SHEET BALSA
SUPERSTRUCTURE FORMERS
3mm SHEET BALSA
HULL SIDES
12mm SHEET BALSA
HULL BASE AFT
3mm SHEET BALSA
SEALING PLANK
12mm SHEET BALSA
HULL BASE MAIN
CENTRE OF MASS
BULKHEAD 2
HMS TERRIBLE

A SEMI-SCALE TYPE 31 FRIGATE
DESIGNED BY MIKE PAYNE





A Terrible idea

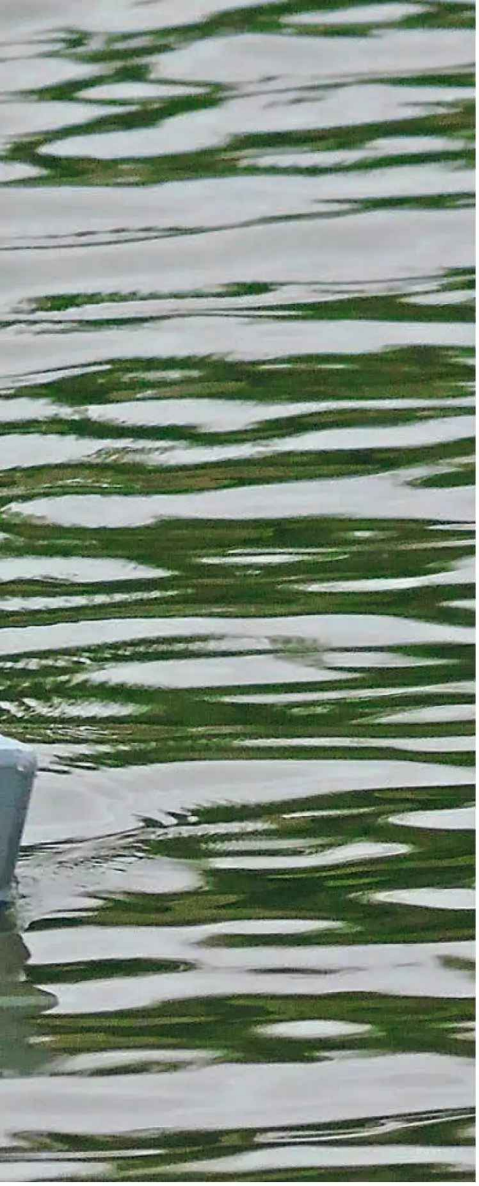
Warminster MBC member **Mike Payne** provides a build guide for his simple to construct from this month's free pull-out plan Type 31 frigate, along with a few tips on sailing her gleaned from his own personal experience with the prototype

So, there I was cogitating the need for a 'grab it and go' boat, basically, a model that could just potter around the lake.

While seeking a suitable candidate, I came across a free semi-scale frigate plan by Martin Garrett (still listed by Sarik Hobbies UK) for HMS *Kincardine* in a pile of old model boating magazines. While 'semi-scale', this is clearly based on the Royal Navy Type23 frigate, with a target displacement of 2.4kg. Coincidentally, I had recently taken delivery of two 6V 5Ah lead-acid batteries of a long and narrow form which would fit the *Kincardine* design.

Then, however, I spotted a silhouette diagram on the web comparing the T23 with its Royal Navy future replacement, the T31, noting how similar in size they were. Although the latter was still at the in-construction stage, there were plenty of images of the proposed shape, illustrating it from all angles, so a reasonable (but not definitive) model should be possible.

Bearing in mind that others may also be interested in an easy to build 'grab it and go' version of this vessel, I decided to keep its design simple enough for even the novice scratch builder to consider.



Also included in the pile of tomes was a design for HMS *Sheffield* by Glynn Guest, and for that model he suggested building on a base of 10mm thick balsa. Given that a large number of model boat constructors don't have a shipyard within which to build their creations, and many probably have to clear the table or go without dinner, I knew that any T31 design would have to be not only simple (relatively) but also robust. I have included a design review at the end of this article.

I wanted to give my prototype a suitably appropriate name, something that would be a nod to the Royal Navy's illustrious past. The Royal Navy Field Gun Competition, or Gun Run (impressive footage of which in its pre-1999 format can be viewed on YouTube), replicates an incident involving two ironclads: HMS *Powerful and Terrible*. *Terrible* it was, then!

I decided to make full use of the standard sizes of Balsa plank, notably the 75mm (3in) and 100mm (4in) wide variants, all 3mm (1/8 in) thick.

A design feature of the full size T31 (and most modern naval vessels) is the avoidance of right angles to promote radar stealth. I have no idea what the correct angles should be but selected five degrees off vertical for most of the superstructure features, while, for simplicity, the lower hull sides are vertical – I did consider a five-degree reverse camber but decided it was unnecessarily.

The prototype build

Component parts for the prototype were as follows:

- Five sheets of 915mm x 100mm x 3mm Balsa,
- Three sheets of 915mm x 75mm x 3mm Balsa,
- One sheet of 915mm x 100mm x 12mm Balsa,
- Small Rudder, Brass, 46 x 31mm
- Caldercraft Standard 5-inch Propshaft M4 Thread
- 3 Bladed Propeller RH 30mm M4
- Universal Joint, Black
- Plain Coupling Insert, 3.2mm
- Plain Coupling Insert 4mm
- Mtroniks TIO Marine 15A Electronic Speed Controller
- Radioactive Propshaft Oiler for 8mm Propshaft, 2-Pack
- MFA RE-540 Low Noise DC Motor, No Mount
- Caldercraft 500-600 size Motor Mount
- Aliphatic Rapid Glue, 250ml
- Sealed Lead Acid Battery, 6V-5AH (Long Type)
- Micro Servo for the rudder
- Two channel radio set

A quick word about bulkheads

These are defined as a dividing wall or barrier between separate compartments inside a ship, aircraft, or other vehicle. In this case I refer to them as formers, because they will rarely serve to separate compartments but rather provide shape and stability to an assembly. Here for example, in the main hull they will separate and support the two sides and have vertical edges, while in the superstructure they will still separate the sides but will have edges five degrees from the vertical to form the necessary slopes. The most complex arrangement is within the bridge assembly, with its multiple slopes.

My method for making the formers involves measuring the necessary width and height. A set square is used to cut out a rectangle to size and then if the sides are sloped you trim off at the appropriate angle (in this case 5, 10 or 20 degrees). This construction method works irrespective of the width, height or angle of the former.

I normally use a waterproof PVA (white glue) for assembly, but this time tried a sandable rapid aliphatic glue, which accounts for the occasional yellow tinge you might notice in the pictures. I found it formed an excellent bond, and as this build involves a lot of sanding I suggest when selecting your adhesive you ensure this characteristic is included.

Stage 1: The main hull

I cut my two baseplates from 12mm sheet and removed the prop tube, motor mount and battery 'slots' carefully, saving the latter bits for use later. The rudder assembly hole was also drilled. I strongly advise making a template for half the bow curve. You'll need to cut six identical curves eventually, so a (cardboard?) template will aid both consistency and appearance. Next, I cut out the two hull sides from 3mm sheet (see **Photo 1**).

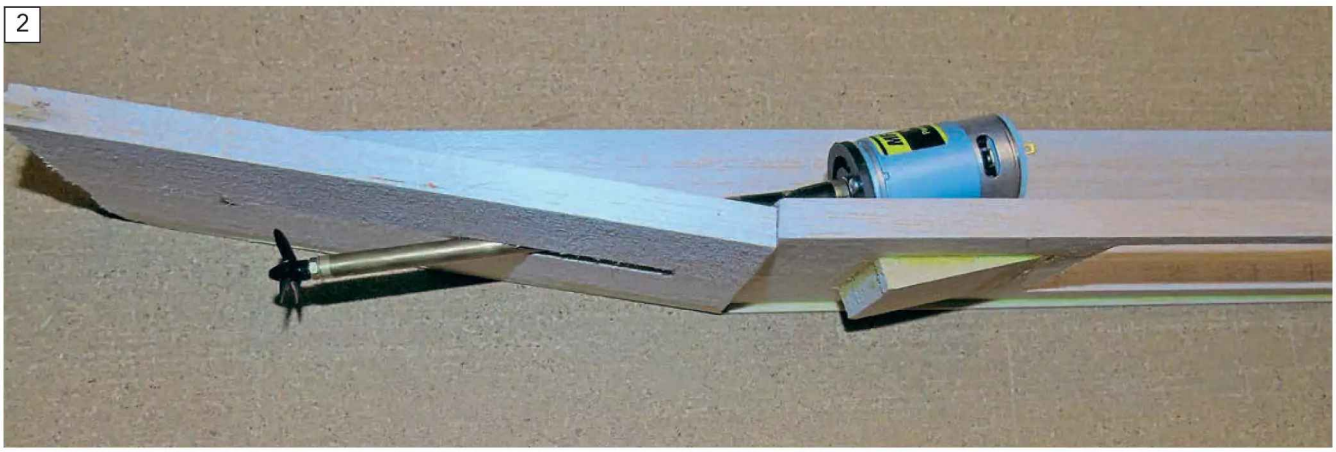
Because I used standard 12mm planks with 'square' sides, I could lay one hull side on a flat board and position the two baseplates with some confidence in such a way that the angle formed would be square (check it with a set square). While the rising (rearward) base was fitted flush with the side's lower edge, the main base was raised 3mm above that edge to allow the later fitting of a sealing plate, but please note my comments about this in the design review.

It was at this point a trial fit the drive train was in order, as it would be the last time its alignment could easily be seen. (**Photo 2**)

My next consideration was the shaft

1

2



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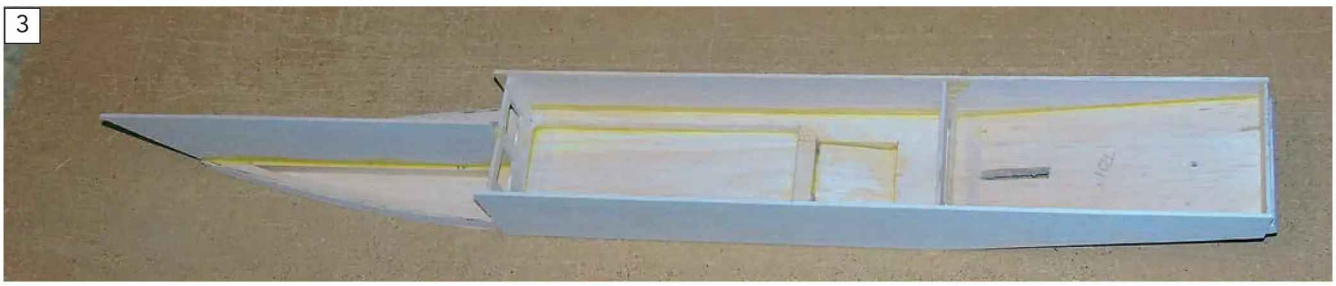

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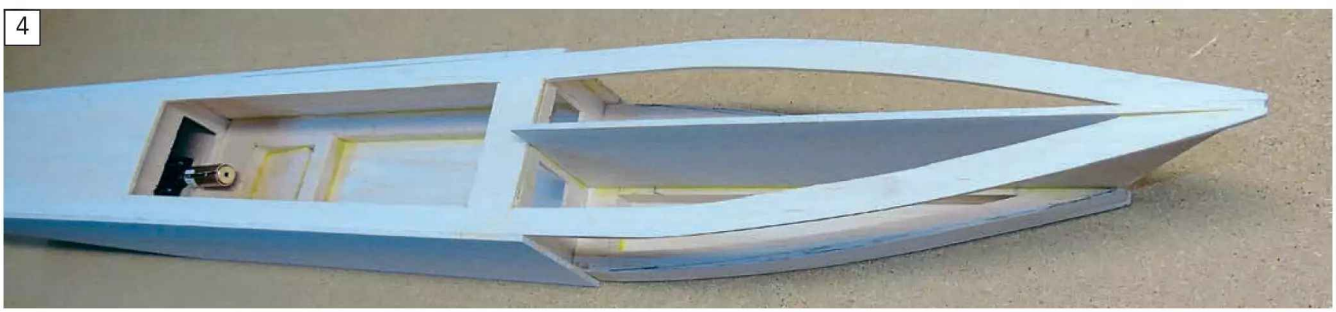

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oiler. I acknowledge the need and/or fitting of shaft oilers is open to debate and extends to questions of potential polution. Personally, I like to fit them, in the belief that the lubrication provided limits the wear on the lower shaft bearing, thus minimising any leakage into the environment. I am coming round to the idea that two per shaft (one fill and one vent) is the better engineering solution, but the decision is yours.

My temporarily assembled drive train was fitted making sure everything was in line, and with sufficient clearance between the rudder assembly and the propeller. Because this build was a prototype, the clearances were generous to allow the fitting of a range of propellers if necessary (see **Photo 2**). I used the cut-out section of the motor mount hole to form the sloping motor base, before sanding off the projecting section below to reform the flush base surface.

The hardware was then removed and the remaining side, bow former and two perforated formers fitted (**Photo 3**). Note that these latter formers must be 3mm short so the main deck can fit between the hull sides. The final 3mm base sealing sheet was carefully glued into position bounded by the hull sides. As this forms the base of the battery 'hole' a good bond was considered essential, and adhesive was not spared (see **Photo 3**). You may notice that I cut out the bow section of the main 12mm hull base to allow for ballasting. This, however, proved unnecessary, so is not worth the effort.

My next challenge was to address the bow section and work out how I would form the obvious 'knuckle' where the main deck sweeps upwards

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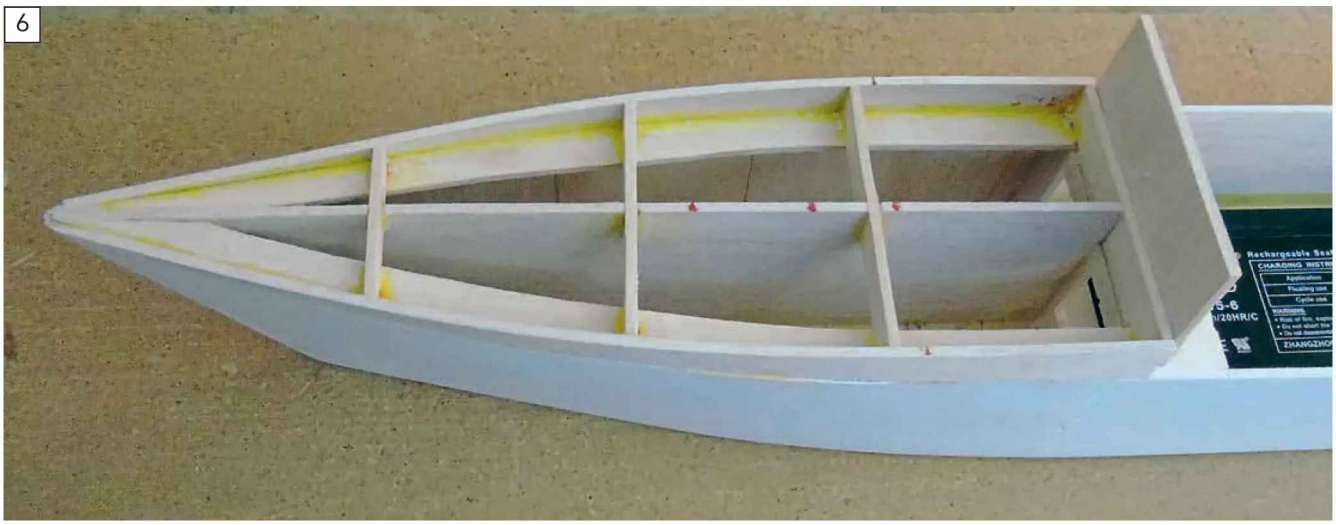

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to meet the foredeck. I did consider carving and sanding from the solid, but a fabricated solution sufficed.

A simplification here was that the foredeck is parallel with the base rather than having a slight rise to the bow. I formed the main deck from a standard plank, shaped using the bow curve template, stretching from the transom to 5mm beyond the bow (see **Photo 4**). To form the upward sweep, I cut out a 'whale jaw' and split the forward end. The rear of the jaw was nestled against the rear of the bow former and the forward projections flexed upward to the foredeck bow. I then filled the bow sides with short widths of 3mm with the grain vertical, all cut slightly oversize to allow shaping once set. So that these panels would sit flush, a little bit of careful sanding was necessary on both the hull base and the jaws (see **Photos 5 & 6**).

You will notice that at the time those pictures were taken I had decided that a whole main deck was unnecessary

"Shaping the sloping knuckle strips proved tricky and I recommend either making cardboard templates or using relatively small offcuts to achieve a fine curve"

and separated it into a bow section and a stern (helicopter) deck. Also evident are the four short formers which support both the foredeck and the sloped knuckle strips, these formers each being let into the bow former and resting on the jaws. At the rear of that section is also a former for the next level of superstructure. Shaping the sloping knuckle strips proved tricky and I recommend either making cardboard templates or using relatively small offcuts to achieve a fine curve.

I then temporarily re-installed the drive train and did a final check on both accessibility and alignment (see **Photo 7**). The main task at this point was to secure the propeller shaft in position, initially using two-part epoxy resin (having lightly roughened the outer tube where the glue was to be applied); once this was set, I faired off the slot within and without the hull. I used car repair resin paste because it sands nicely, but any good waterproof filler will do. Note the twin oiler fittings and the transverse beam above, drilled to accept the silicon tubes which will eventually connect to those oilers. Another beam was placed above the space between the motor and battery, making sure that, if necessary, there was enough clearance for the motor to be removed by sliding it into the battery void.

Later, I became concerned that the hull sides were a bit vulnerable to side impact, and toward the end of fitting out added a pine strip, about 10mm by 6mm, along the upper edge of the vertical sides. Any straight lightweight timber will do. If I was doing another build, this stage would be a better time to apply them, but ensure that the battery and its terminals, wiring, *etc*, (laid flat) will pass between.

Access to the bow area for ballasting was obviously going to be impossible later, so I fitted two ballast tubes made from lightweight plastic electrical conduit sealed at the bow end. The theory was that the two tubes would be secured low within the bow cavity, leading aft to an accessible position. Any necessary ballast could then be slid into them and the tubes packed to stop any further movement aft of the 'loose' ballast. Access to the tubes is via the battery compartment (see **Photo 8**).

After loosely packing some bubble wrap into the bow to provide limited emergency buoyancy, the foredeck was fitted, thus effectively sealing off the bow section and largely completing the hull.

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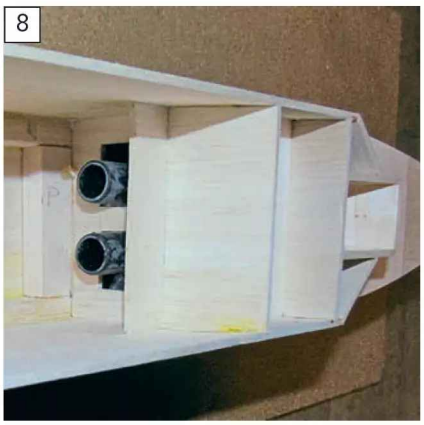

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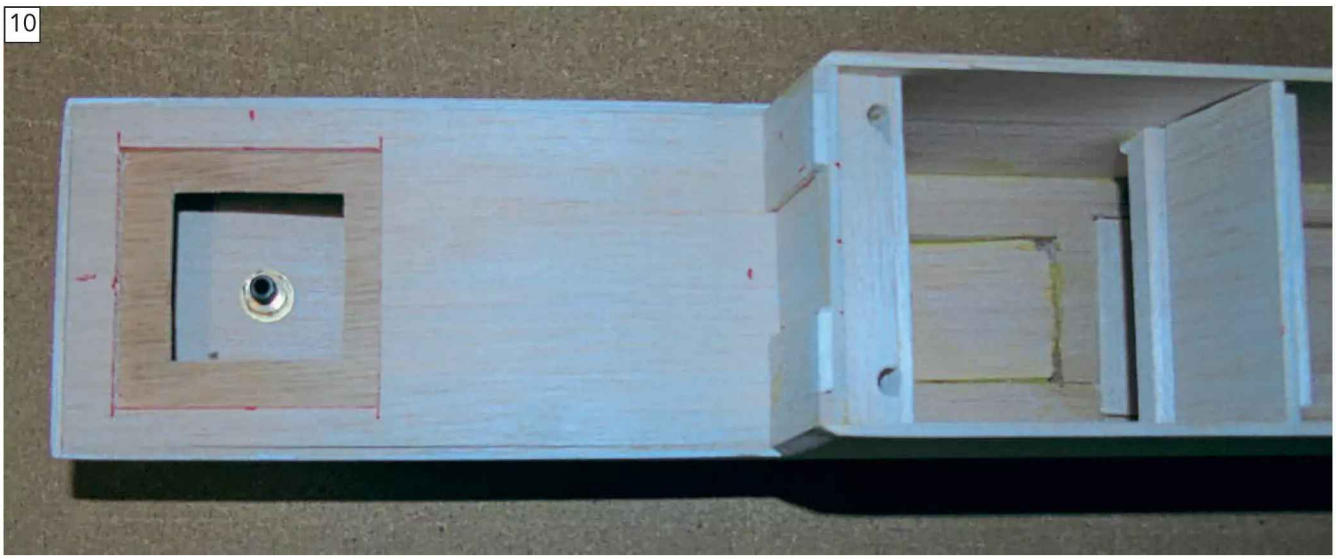

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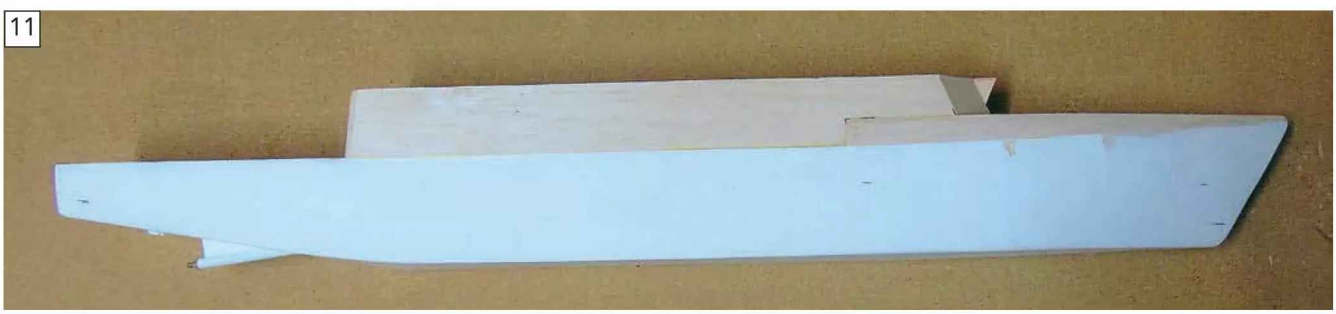

Stage 2: The stealthy superstructure

The superstructure is fundamentally yet another box. This time the complication is the angles of the forward face of the box. Initially, though, there are four transverse formers (see **Photos 8, 9 & 10**). These start with the aft face of the hanger, actually two thicknesses of 3mm to depict the recessed hangar doors that slope forward by 5 degrees. The next is sighted over the motor/battery separating former. The third is fitted where the foredeck starts, while the fourth fits just short of the superstructure side's leading edge. In all cases, of course, the sides of these formers slope inward by 5 degrees. The superstructure sides, as shown on the plan, will have to be shaped to fit your specific hull's foredeck until the entire upper edge runs parallel with the keel. With the sides fitted, close off the forward face of the box (see **Photos 9 & 11**) by constructing the two centre formers, with their projections, to support the gun platform, and add the remaining side/front faces. To finish off this box, fit a forward deck reaching back as far as the foremost battery stowage former. A reinforcing upper lip made from two laminated 3mm strips was fitted to the superstructure periphery of my prototype, the inner face sanded to vertical to form the upper deck/lid/access hatch opening.

My next task was to make a frame to fit into that hatch opening, so I reduced the aperture size by applying two layers of masking tape around the internal periphery. It was a simple matter to then carefully make another frame, 10mm deep, to fit (a sliding fit after painting) into the hole.

Stage 3: The lid

A 75mm X 3mm plank formed the upper deck from the hanger end to the battery storage former, and the frame was glued to the underside of that deck. With both the fixed part and

"Note that when fitted to the upper deck, the bridge assembly partly projects forward of the hatch"

the removable part of the upper deck in place, a flat upper surface extends along the whole length of the structure (see **Photo 11**).

The bridge assembly came next (see **Photo 12**), and the underside construction of the base, bridge upper section (windows), deckhouse and main mast is straightforward. Note that when fitted to the upper deck, the bridge assembly partly projects forward of the hatch. I eventually opted to use the spare 12mm thick Balsa saved from the battery slot to cut and sand the bridge upper section with its reverse sloped windows (see **Photo 13)**. To represent the 'windows' I used black self-adhesive electrical insulation tape. One issue worth mentioning here is that once the removable upper deck assembly is complete, the main mast provides an ideal lifting handle, being close to the point of balance (of that removable section of deck), so it's worth making this particular item very secure.

The remaining tasks were, by comparison, simple. The after mast is a shorter version of the main mast; the after deckhouse is a 'shaped' box, and the two identical funnels are simply tapered boxes.

The weapon and sensor fit seems to vary depending upon which illustration you choose to view, and which country might be buying some hulls. I elected to fit a main gun, and two smaller close quarters' turrets carved from solid (laminated) balsa, using nails as barrels. My six-chamber vertical launch missile silo is a cut down plastic pill container. The main mast sensor is another Balsa block pinned and glued securely into position, and the three radar domes are youngsters' spherical

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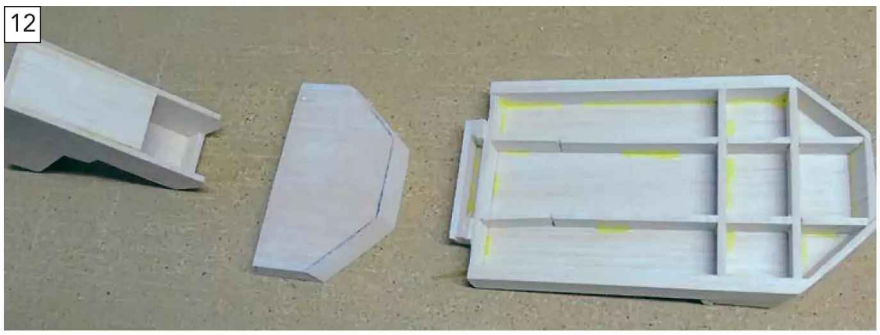

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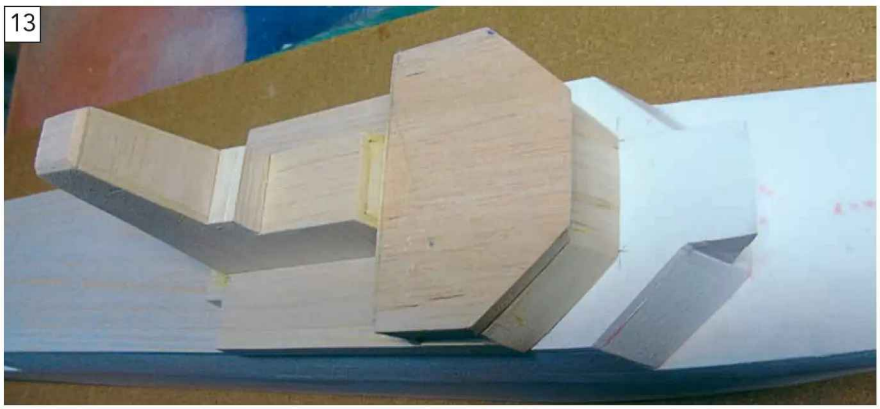

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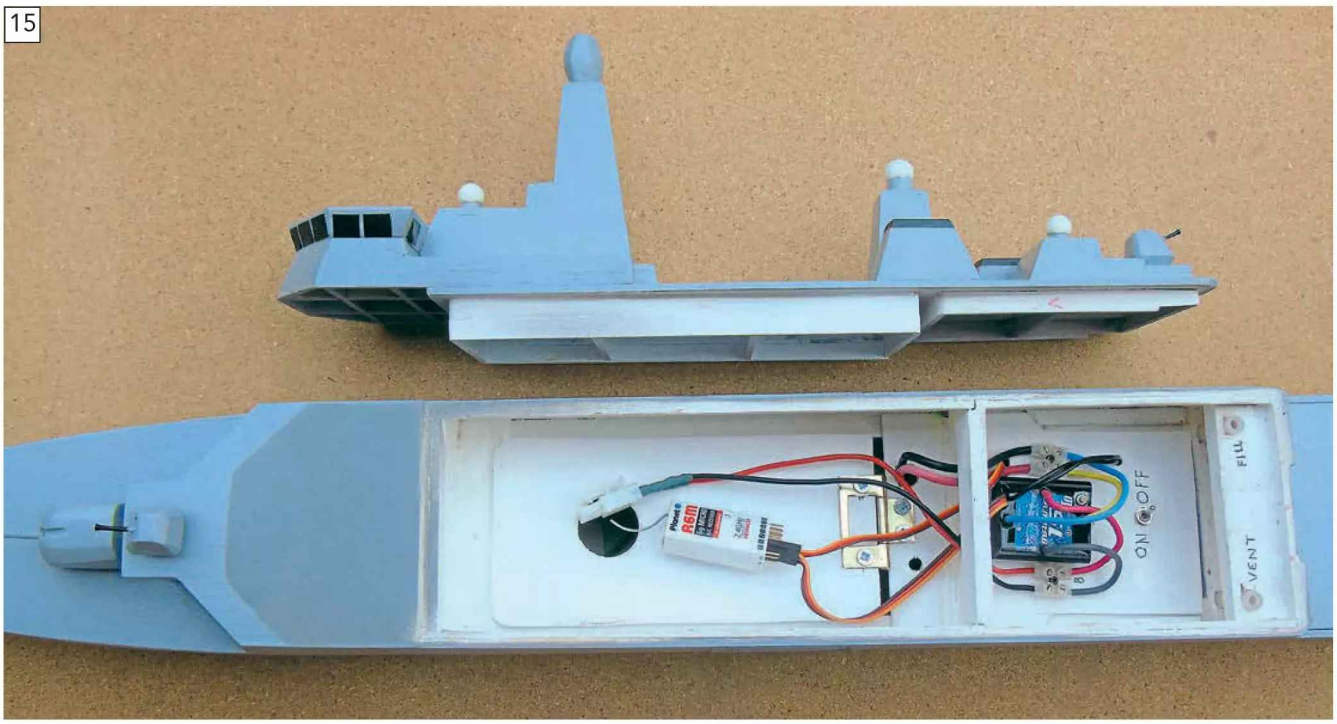

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plastic earrings mounted upon tubes. Whatever you choose to fit, keep everything on this deck as light as possible.

Initially I provided access to the rudder via a hatch in the helicopter deck, but after sea trials made the whole deck removable to give access not only to the rudder but also to the motor fasteners. As access is only rarely required, the deck was re-fitted with screws and sealed with a smear of grease – this being close to the waterline and therefore vulnerable when turning.

Stage 4: Colour scheme

Under normal circumstances I prefer to use one manufacturer's paint range throughout on a model to ensure compatibility but in this case, I slapped a coat of inexpensive domestic interior/exterior quality acrylic primer/filler/undercoat over everything as an experiment. While the finish wasn't perfect by any stretch, this worked surprisingly well, did not smell, dried quickly and of course afforded water clean-up. Three coats later, with a light sanding between each, I was ready for the colour coats.

"Whatever you choose to fit, keep everything on this deck as light as possible"

You might notice that illustrations of the T31 show a distinct change of tone below the main deck line, where the lower hull has a reverse slope and is therefore in slight shadow. This model, for simplicity, has a vertically sided hull, so I tried to create an optical illusion. Grey primer is offered in rattle cans by numerous manufacturers, and after a short hunt I managed to find two different shades, one being only slightly darker than the other. Everything above the main deck line was painted with the lighter shade, and I hope you agree the photographs show that the illusion worked. I went for a black waterline and a 'chocolate' underside that replicates that ruddy/brown shade of dirty anti-fouling. A couple of clear satin coats overall tied the whole finish together. I must add a name (just *Terrible*, no HMS) in red on both rear quarters.

"I suggest you limit the rudder throw using the various holes in the rudder/servo horns, otherwise you might need calming pills!"

Stage 5: The works

Of course, the hardware has to be installed. This was my next task, but as it's a fairly standard process I won't waste your time, other than to make a few observations. A micro servo moved the rudder quite successfully, this saving both weight and space. The battery, lying on its side, didn't have the expected uniform mass; it's slightly lighter toward the terminal face, which necessitated a countering ballast weight of 75 grams alongside it to counter a list. Given the only difference between a nice snug battery and a large hole in the bottom of a broken boat is 3mm of Balsa sheet, I fitted a ribbon loop to the hull internal floor to enable both the gentle placement of the (heavy) battery and its recovery for recharging. Note the positioning of the battery relative to the ESC (motor below), on/off switch and oiling tubes (see **Photos 14 and 15**), plus the shape of the 'lid's' retaining skirt. Note also the transverse stiffeners in the skirts structure, added to avoid any tendency for the upper deck to warp (being in places simply a single thickness of otherwise unsupported 3mm sheet).

This brings me to overall ballasting. The prototype's displacement as built and ready to go is 2.18 kg, and without further trimming she floats on the waterline very slightly stern down.

With a long narrow hull and tall superstructure, the model is stable in pitch but tender in roll, particularly during a hard turn at speed, so I suggest you limit the rudder throw using the various holes in the rudder/servo horns, otherwise you might need calming pills!

I found the bow ballast tubes required only 75gm pushed to the front to make the hull sit almost level, nominally bow high by half the painted waterline, so you will appreciate with the designed build and equipment fit there's not a lot of weight tolerance.

What you use as ballast will vary locally but I found some (12 mm) square steel bar in a local DIY store which proved both easy to cut and install and was uniform in length/weight.

This build is relatively easy, should suit newcomers to scratch building, and has proven both reliable and seaworthy. My only reservation is the vulnerability to flooding through any hatch in the helicopter deck if the model is used in lumpy water.

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Design review

Building the prototype was interesting, raising few problems to concern an inexperienced builder. Below is a synopsis of the lessons learned from practical experience using the design.

The roll characteristics, which are interesting but not heart stopping once you get used to them, could, with a bit of experimentation, be made into a real crowd stopper.

When I allowed a 3mm gap under the 12mm main base for the sealing plank I'd planned for that plank to be bounded by the hull sides. In hindsight, I think that was unnecessary. There

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is absolutely no reason why the main base should not finish flush with the lower face of the hull and the sealing plank be strongly glued centrally below, the resultant stepped corners being lightly rounded off later.

The effort involved in applying the paint scheme was significantly less than building the main hull with reverse camber sides, so I consider the straight sides' simplification fully justified.

Given this was never intended as a detailed scale project, the overall appearance is effective in providing a model of modern appearance within the probable skill range of newcomers to scratch building. I know that as built it will sail about for over an hour at full speed.

With the projected speed of the real platform being quoted as in excess of 28 knots, the more experienced will possibly want it to move more rapidly, and a different combination of motor, battery and range will no doubt achieve that result. The overall displacement, however, will still be just in excess of 2kg and the roll characteristics will not change.

I further experimented with 35, 40, 45 and 50mm three-blade propellers (and a five-blade 40mm), retaining the low noise motor and discovered that a slight increase in speed was obtained with the 40mm. There were negligible speed gains using the 45 and 50mm propellers.

A 30mm propeller gives reasonable speed and good endurance, and a 40mm probably achieves the natural hull speed. Since anything faster requires significantly higher power input, I suggest there's little to be gained from using the larger propellers.

Over to you…

I hope those of you who accept the challenge will enjoy the rock n' roll ride! There have been comments made by my peers that the prototype lacks detail. This is entirely true, and a lot could be added, but the objective of the design was simplicity and easy usage. If you have a go at building a Type31, how detailed your model becomes is entirely up to you.

My own *Terrible* experience

The afloat pictures (see **Photos 16-19)** mainly show the prototype in calm conditions, but I recently had opportunity to try her out in 'Roughers' and a brisk wind. I was quite content with the performance and clearly there is adequate front-end buoyancy. **Photo 20** shows her almost 'taking a greeny' over the bow but **Photo 21** shows how vulnerable the flightdeck hatch can become. Up until then she had remained a very dry boat but on recovery this time she had taken on some water, presumably through that hatch, and the motor was enjoying a shallow bath, luckily without apparent lasting distress – but be warned. Likewise, **Photo 22** shows HMS *Terrible* complete with modified flightdeck in the ice on New Year's Day – not an advised activity. She survived but being Balsa needed an anti-fouling repaint on recovery. ●

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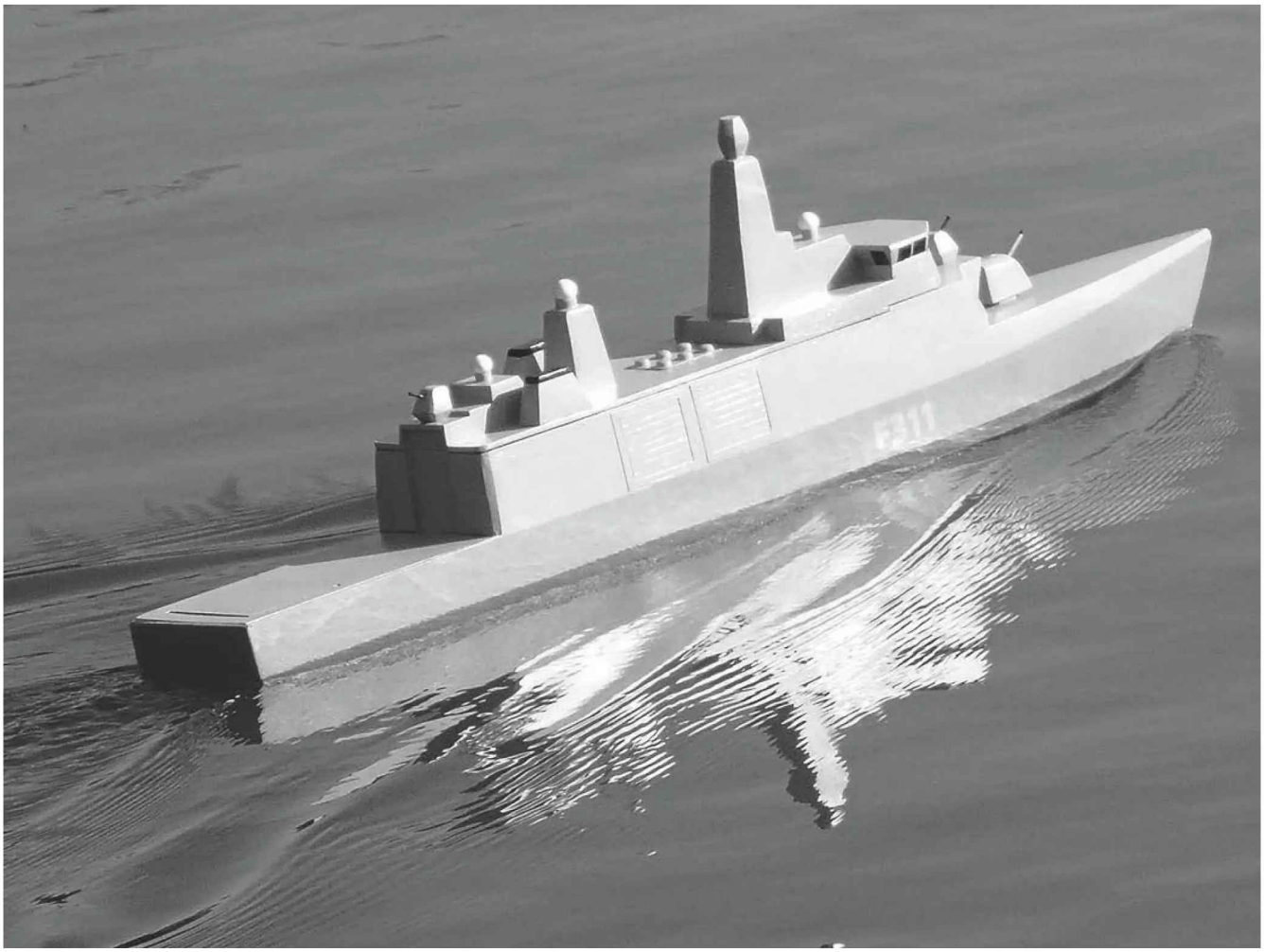

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Lindsey Amrani

Editor

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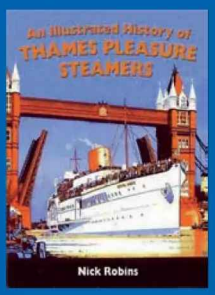

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The MV Wyuna (Image courtesy of A.C. Green, State Library of Victoria).

MV *Wyuna*

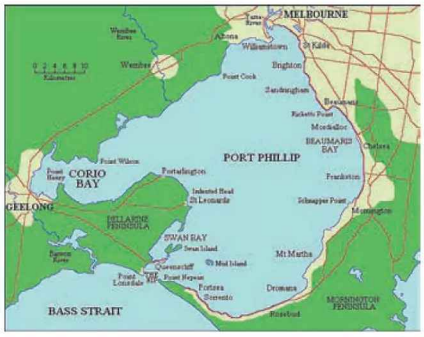
John Parker flags up a candidate worthy of consideration by scratch builders

The thousands of container vessels and other ships that come to Port Melbourne each year must enter and leave Port Phillip Bay through the 3.2-kilometre-wide gap between Point Lonsdale and Point Nepean. The immense tidal flows in and out of this narrow gap cause what is known as 'The Rip', and it is regarded as one of the most dangerous passages of water in the world. Testifying to this are the more than 200 shipwrecks that scatter this area of the coast. An efficient pilot service is therefore essential for safe passage, a service that was originally provided by whalers and sailing boats before giving way to motorised craft at the turn of the 20th century. By 1950 the Port Phillips Sea Pilots were seeking a dedicated pilot cutter.

Clear water ahead

Competitive tenders were requested from Holland, Hong Kong, Britain and Australia, with the winning bid coming from Ferguson Shipbuilders of Port Glasgow, Scotland. Launched in April 1953 and completed in August of that year, the ship, yard number 404, was christened *Wyuna* – which translates from Aboriginal as 'clear water'. Her graceful lines were penned by the architect Charles MacKinnon and resembled a scaled down version of the Royal Yacht *Britannia* built at around the same time.

"The immense tidal flows in and out of this narrow gap cause what is known as 'The Rip', and it is regarded as one of the most dangerous passages of water in the world… An efficient pilot service is therefore essential for safe passage"



Map of Port Phillip Bay
(Image courtesy of Adam Car, Wikipedia).

Detail of 'The Rip' (Image courtesy of Nick Carson, Wikipedia).

Wyuna *at Inspection Head, Tasmania, showing the additional bridge modification to suit use by the Australian Maritime College.*

A recent photo of the Wyuna *at Bells Bay, Tasmania.*

Of 1,313 GRT (gross registered tons) displacement and some 208 feet (63m) long, the *Wyuna* was diesel-electric powered – with three English Electric 4RKM 380KW diesel generators driving two electric motors of 700hp (522KW) each on twin shafts – and could maintain 13 knots. The different operating conditions were: 8 knots on one generator at 2.75 tonnes of fuel per day, 10 knots on two generators at 4.75 tonnes/day and 12 knots on three generators at 7 tons/day; the ultimate range was 12,800 nautical miles.

Once in service, ships seeking to enter Port Phillip Bay were required to come to a stop five kilometres from the heads. The *Wyuna* would then sail from its mooring at the pilot boarding ground outside the heads to meet the vessel and transfer its pilots using a five-metre work boat. In rough seas this could be a fraught procedure, with the pilots required to make a well-timed lunge onto a rope ladder let down from the ship requiring pilotage while both vessels remained stopped dead in the water to provide shelter.

"Wyuna's graceful lines were penned by the architect Charles MacKinnon and resembled a scaled down version of the Royal Yacht Britannia built at around the same time"

The pilots were apparently well pleased with the *Wyuna,* as she was an attractive vessel with a high standard of accommodation and dining facilities. One notable highlight of her 25-year career as a pilot cutter was shepherding the SS *Oriana*, the fastest and largest ship on the UK-Australia run, into Port Phillip Bay on her maiden voyage in 1960, with throngs of sightseers crowding every nearby vantage point. Less memorable was the occasion when she collided with the ferry *Bass Trader* in dense fog outside the heads.

A new career

By the early 1970s, times were changing as experiments with fast launches showed that the transfer of pilots could take place while a ship was still underway. When this became standard procedure in 1979, it rendered the *Wyuna* redundant. She was sold to the Australian Maritime College in Launceston, Tasmania and began a second career as a training vessel, with modifications including a wide lower bridge that more closely

One of the Wyuna's *three engines.*

"By the early 1970s, times were changing as experiments with fast launches showed that the transfer of pilots could take place while a ship was still underway. When this became standard procedure in 1979, it rendered the Wyuna redundant"

resembled current ship design. That phase of the *Wyuna*'s career ended in 2004 when the ship's propulsion system was considered no longer relevant to modern shipping.

Wyuna was sold to Mineralagy Pty Ltd for planned use as an accommodation vessel but that never eventuated. Her next owner was a Perth-based businesswoman who initially intended to convert her to a luxury yacht but instead ended up donating her to the Western Port Oberon Association in 2013 for display alongside the Oberon class submarine HMAS *Otama* at Crib Point, Victoria; alas, that scheme also fell through due to lack of funding. The *Wyuna* now faces an uncertain future moored at Bell Bay in Northern Tasmania, although hope remains that a suitable wet berth can be found and funded in Victoria so that this historic ship can be preserved.

Current status

Rosey Kendall of the Illawong Model Boat Club was always attracted to the lines of the *Wyuna*. She remembers making a simple model of it when she was an eight-year-old girl staying at Queenscliff in 1968. 40 years later, with the help of her partner Brian, she completed a more elaborate R/C model of the *Wyuna*. That model still makes regular appearances at local lakes, but Rosey now has a larger project to occupy her time – she is a volunteer with the Victorian Maritime Centre and is helping to restore the real *Wyuna*. Once or twice a year, she makes the

Rosey Kendall at the bow of the Wyuna *when she was in AMC colours.*

The restoration team at work.

Fresh paintwork between decks.

Wyuna *depicted in a choppy sea* (AI generated image.)

pilgrimage across the Bass Strait to Tasmania to join the restoration crew at Bell Bay.

While *Wyuna*'s general condition is fairly sound, there was a recent set back. Having undergone restoration in preparation for the planned return to Melbourne under her own power, she'd become stranded, since 2015, at Beauty Point when the promise of a berth fell through. Then one morning, in 2024, she broke free

"The vision is for her to become a seaworthy platform to assist in the wellbeing of veterans, crewed and maintained by the veterans themselves"

Rosey Kendall's beautifully detailed R/C build of the Wyuna *together with (inset top right) the model she made when she was eight years old.*

"Plans drawn up by Adrian Brewer of Float-a-Boat are now helping to rescue the Wyuna from obscurity"

from her mooring and went on an unmanned voyage across the Tamar River before running aground. It took an emergency response by two tugs to secure her and moor her again safely alongside a wharf in Bell Bay. Inevitably, much of the renovation work that had been completed will have to be re-done.

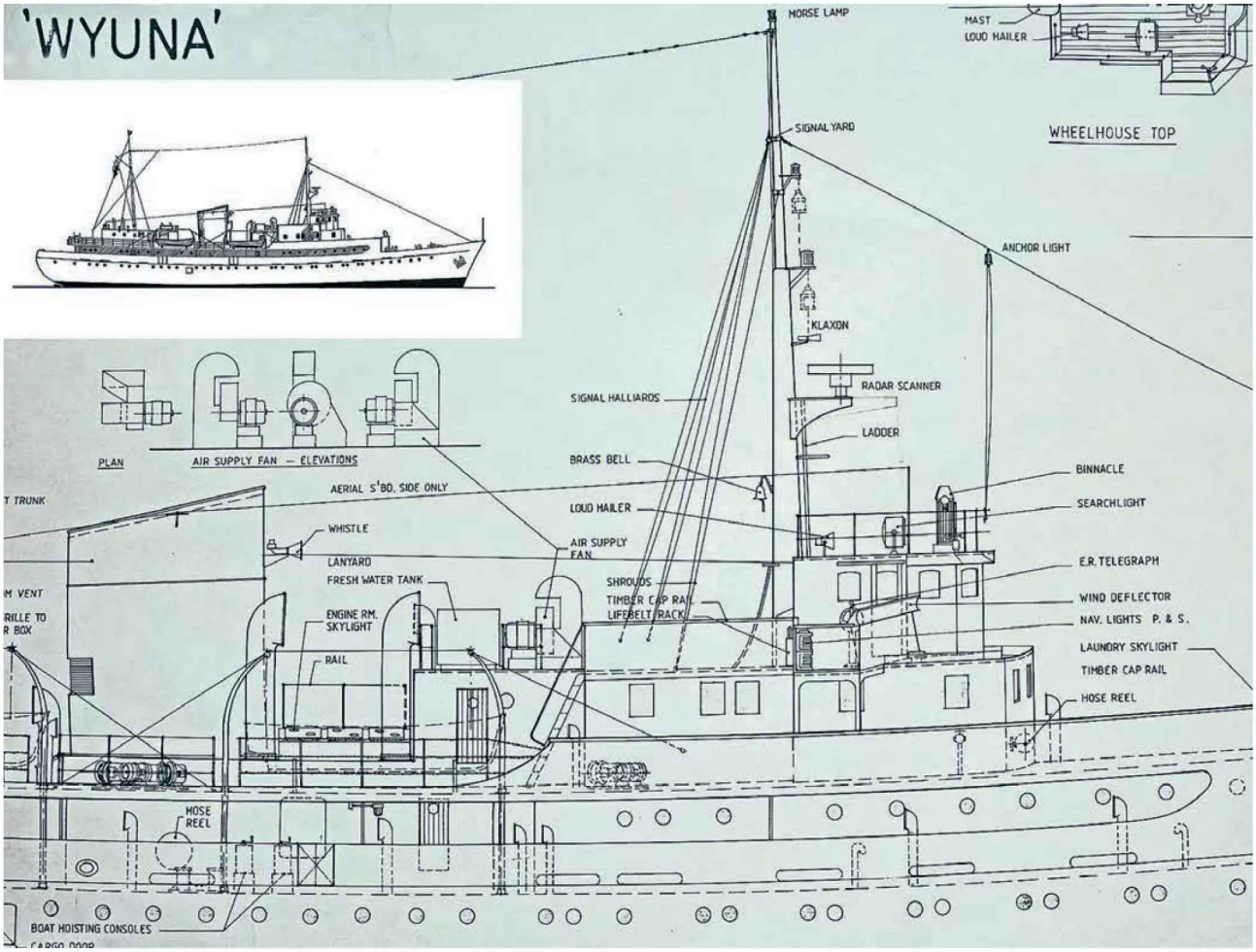
Wyuna is now back in her original yellow colour scheme and restoration work centres upon repair of innumerable items of equipment on her decks, electrical work on communications gear, re-magnetisation of number two generator, attending to various tank leaks, and so on. Above all, there is an ongoing need for paint chipping and clean up, just ask Rosey!

She is just one of the passionate team helping to publicise *Wyuna*'s plight. A fund raising page (https://www.givenow.com.au/wyuna) has been set up, as well as a Facebook page (https://www.facebook.com/MV.Wyuna),with a view to making the *Wyuna* seaworthy for her return to Victoria. There, the vision is for her to become a seaworthy platform to assist in the wellbeing of veterans, crewed and maintained by the veterans themselves.

Modelling the *Wyuna*

When the *Wyuna* was in her prime, the now defunct *Argus* newspaper made simple plans available for her in 1955 (see Flotsam & Jetsam, November 2021 Model Boats). Today, the model maker is better served, though he or she will need to be able to build from scratch as I know of no kits in any medium. Plans drawn up by Adrian Brewer of Float-a-Boat (https://floataboat.com.au/product/s-s-wyuna/) are now helping to rescue the *Wyuna* from obscurity. They consist of general arrangement profile, deck plans and lines on three sheets to 1:48 scale and result in a model 1315mm long.

Making the *Wyuna* should present few difficulties to the experienced modeller. Having an appearance reminiscent of a mini ocean liner, there is a surprising amount of detail to be incorporated, and the continuous sheer of the hull means that angles in the superstructure will always be a few degrees either side of 90-degrees to keep things vertical. With twin screws and a single rudder, having independent motor control or using a mixer may be worthwhile to improve turning circle and docking behaviour. Low KV brushless motors will be able to turn the large propellers efficiently without the need for gearboxes and provide the authority needed to cope with the effects of wind on such a large model. ●



Float-a-Boat's plan for the Wyuna.

Osprey 1:24

Boston Typhoon 1:32

Danny Boy 1:24

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BOILER ROOM

Richard Simpson addresses that frequently asked question: "*Should I lag my gas tank?*"

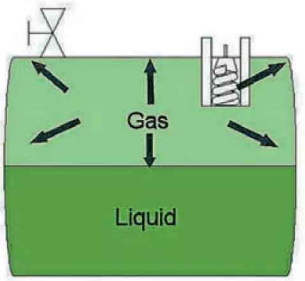
Considering how long the Boiler Room series has now been running, the subject we'll be looking at in this instalment has, not surprisingly, been explored before, but as questions relating to the topic crop up time and time again at the pondside, and via correspondence forwarded on by the editor, I think it's one well worth revisiting every now and then. Before we dig into how we can accommodate the effects of the gas cooling, both by design and by operation, though, let's get the theory out of the way. Then maybe we can finish off by addressing the matter of whether we should be lagging our gas tanks.

The theory

Without getting into the realms of quoting gas laws and trying to keep the explanation that little bit easier to understand, I always find the best starting point is to consider a tank half full of liquified gas. The tank is sat on your workbench in what we consider a state of equilibrium, *i.e.*, nothing is changing. Theoretically, assuming there are no leaks, it should remain in the same state indefinitely, with the same level of liquid and the same amount of gas in the tank. The gas is in what we refer to as a *saturated state*, meaning the liquid has evaporated into the space until the pressure has reached a point where no further liquid will evaporate. The pressure in the tank is now called the saturation vapour pressure, which is dependent on the specific gas and the temperature, but, again, assuming nothing is changing, the pressure remains constant (see **Diagram 1).**

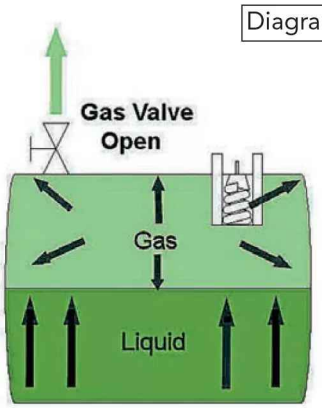
Now we are going to change the conditions and upset the equilibrium by opening the outlet valve. Don't forget, this is purely theoretical, so let's not get too excited about filling our workshop with a highly flammable gas, nor am I actually suggesting that anyone needs to actually do this.

Diagram 1



A gas tank in a state of equilibrium. The gas space is at saturation vapour pressure and the gas, liquid and tank are all at the same temperature with nothing changing.

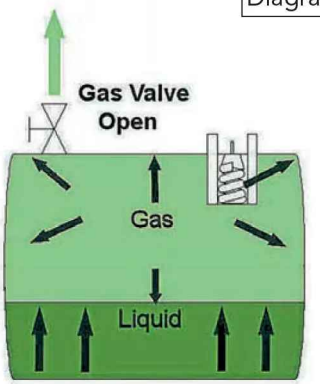
Diagram 2



Open the outlet valve and you upset the equilibrium. The gas pressure drops, so the liquid now has to evaporate to replace the lost gas as it attempts to regain the equilibrium state.

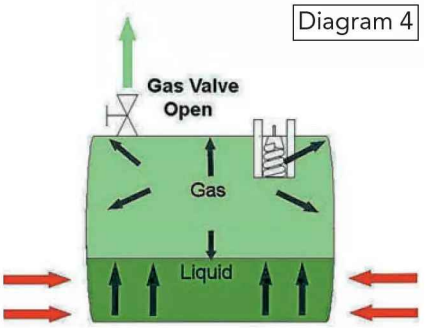
It's simply going through a thought process. Opening the outlet valve will release gas. This will have the effect of reducing the saturation vapour pressure of the gas in the space above the liquid so, all of a sudden, more liquid now has to evaporate as it attempts to revert to the balanced state of equilibrium (see **Diagram 2)**. As more liquid now starts to evaporate we have to consider what's happening at a molecular level. All the molecules of gas in the liquid have very slightly varying levels of energy and it will be the molecules with the slightly higher levels of energy that will break free of the surface of the liquid to evaporate into gas. The more this continues, the more higher energy level molecules evaporate into gas

Diagram 3



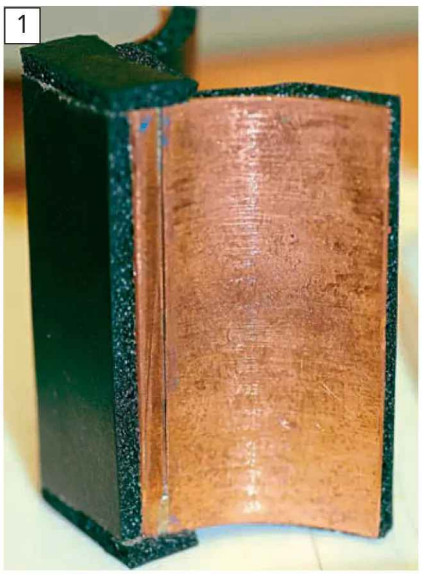
As the liquid continues to evaporate, the energy of the remaining liquid falls, as the higher energy molecules are the first to change into a gas. Consequently, the temperature falls.

Diagram 4



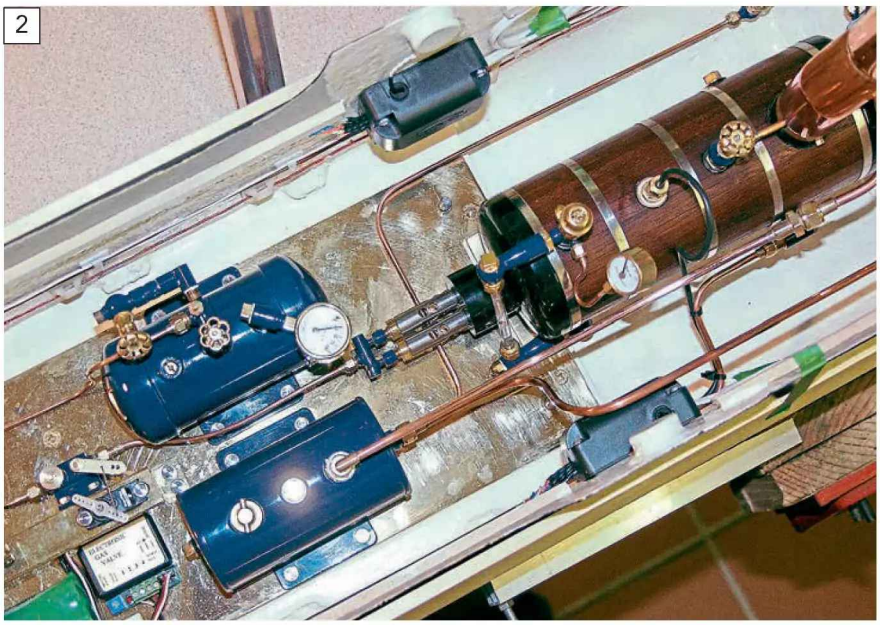
To prevent the temperature continuing to drop, the lost heat must be replaced to stabilise the temperature of the remaining liquid. Failure to do this will result in evaporation rates and pressure to the burner falling.

1



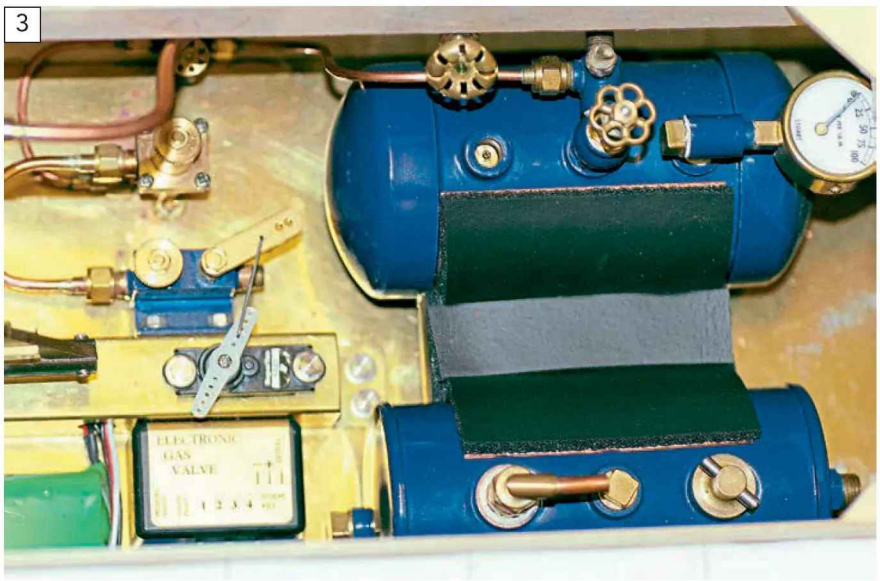
A copper saddle made from a chunk of electrical bus bar soft soldered to two pieces of copper pipe. All external surfaces have been insulated to prevent heat loss and get the most to transfer from the separator to the gas tank.

2



Right from the start here, the design of the plant deliberately placed the separator and the gas tank close together so they could be connected by a heat shunt. A copper saddle was used to maximise the heat transfer.

3



Richard's saddle neatly sits between the two tanks and can be fitted or removed according to the ambient temperature requirements. Since this photograph was taken, the saddle has been cut into two pieces (one 1/3 the length and the other 2/3 the length) to give even more control.

and the lower the total energy level remaining within the liquid becomes. The result is that, as the total energy contained within the liquid falls, then the temperature starts to fall as well (see **Diagram 3**). As long as gas continues to escape, the temperature of the liquid continues to fall. If we were to close the outlet valve again, the liquid would keep evaporating until the gas pressure rose back to the saturation vapour pressure, at which point, evaporation would cease, and the temperature would stop falling.

Now we have to consider the effects of this drop in temperature of the liquid. Whenever gas is being used, condensation soon becomes visible on the outside of the gas bottle where the liquid inside is cooling. As the temperature gets even lower this condensation will freeze and a coating of frost will then be visible up to the liquid gas interface. What does this mean for us? Unfortunately, the biggest challenge is that as the temperature of the liquid falls then the evaporation rate falls with it, and as the evaporation rate falls then the pressure of the gas also falls, and therefore we start to see the results of this as the burner suffers from the pressure drop. The burner flame reduces with this drop in pressure and, before we know it, the boiler pressure starts to fall to the point where the engine performance noticeably reduces. As the flame gets lower there's a possibility it may get blown out by a slight breeze, but at the very least we have a boat that is sluggish in performance and prone to being pushed around by the slightest breath of wind.

So, now that we have a better idea of what's going on, we should be that bit more capable of deciding what to do about it. The two main areas to consider are the design and the operation of the model.

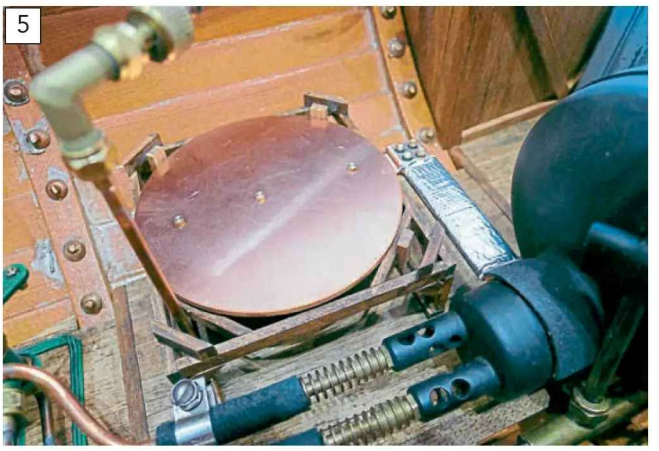
Design considerations

One thing we can consider doing to counteract the effects of gas cooling is to replace the heat that's being lost from the evaporation process (see **Diagram 4**). Manufacturers have experimented in the past with such things as coils in the base of a gas tank to run exhaust steam through, and

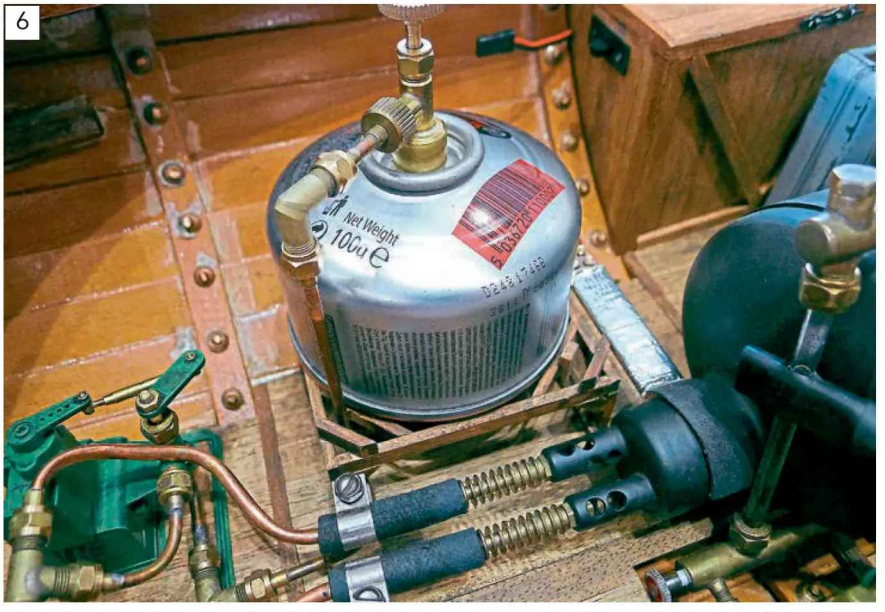
"There's waste heat all around our plant – so we simply have to think of the best way of transferring it"

even electric heaters, neither of which have, to date, gone into production for a number of reasons. But one of the most effective things we can do is to transfer some waste heat from the plant into the gas tank. There's waste heat all around our plant – from the boiler shell to the pipework, and even the separator tank – so we simply have to think of the best way of transferring

Another design of heat shunt, this time taking the heat from the burner throat of the adjacent boiler and transmitting it to the gas tank, again through a chunk of copper. Note the external surfaces are insulated to help prevent losses.



The heat shunt simply drops into place, with the saddle sitting over the burner throat.



The gas tank sits on the warming plate. Richard admits to being quite surprised at how warm the plate actually gets, doing a good job of slowing down cooling of the disposable tank until such time as it can be replaced by a fresh one.

it. Here we can use what is known as a heat shunt, which is basically a chunk of copper that sits on the hot surface of the plant to absorb some heat as the other end sits on the gas tank to transmit that heat, by conduction, into the gas tank. I have used heat shunts in the form of a saddle (see **Photo 1**), when the separator and the gas tank were situated close to each other (see **Photo 2**), allowing easy transfer of heat from the separator tank into the gas tank (see **Photo 3**), and in the form of a heating plate (see **Photo 4**) – as described in April 2023 instalment of Boiler Room– when I connected the burner throat to a warming plate with a brass bar (see **Photo 5**) for the tank to sit on (see **Photo 6**). Both worked surprisingly well and transferred enough heat to significantly reduce the cooling effect and help maintain normal gas pressure. Another very useful arrangement is to place the gas tank on a brass or copper base, common with the boiler. The base plate then transfers heat from the boiler through to the gas tank, and this heat, again, offsets the cooling effect as the gas evaporates (see **Photo 7**). When the model is being initially designed, the location of the gas tank and its proximity to a suitable source of waste heat should be considered, along with how transferring it might be achieved. With my model of the *Ben Ain*, I knew from the start that I wanted the gas tank situated next to the separator and therefore a saddle type of heat shunt should be used. I even have a degree of control with this arrangement, as the heat shunt was eventually cut into two pieces of 1/3rd and 2/3rds, so I can transfer heat through either 1/3rd, 2/3rds, or, using both pieces, the entire length.

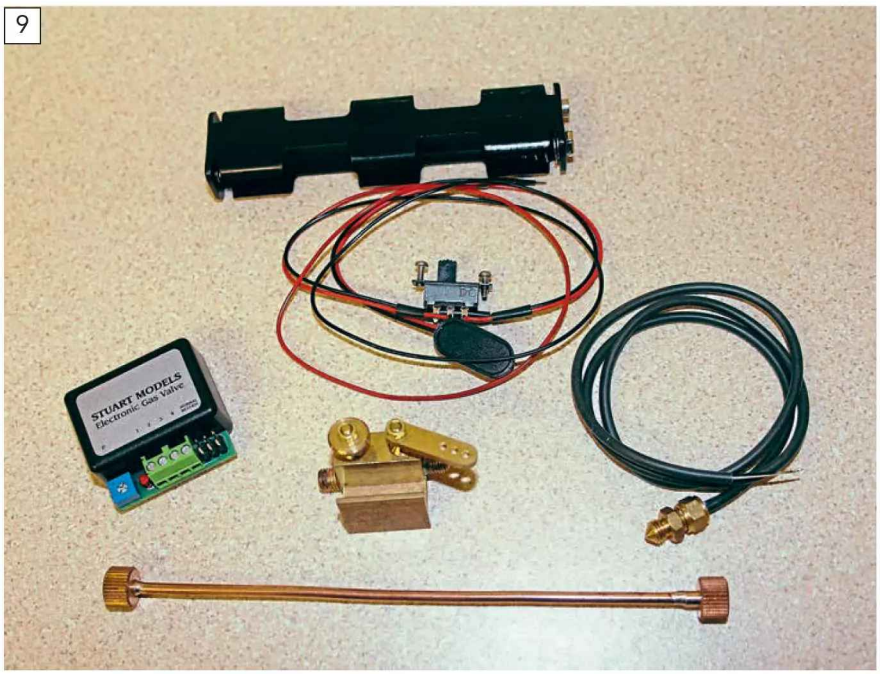
Another design consideration is to think about how we can reduce the gas consumption, which will then reduce

Sitting the gas tank on a brass base common with the boiler is an excellent way of using some waste heat to warm the tank. Keeping the tank close to the boiler also helps. Both, again, being things that need to be considered during the design of the plant layout.

8

A mechanical attenuator valve, like this one from Forest Classics, maintains a constant boiler pressure. This means that the burner is only providing the heat that the engine needs so minimizes gas consumption and hence the cooling effect on the tank.

9



An alternative to a mechanical attenuator value is an electronic gas control valve, such as the one shown here from Stuart Models or the unit from Denes Designs. Both, again, minimise gas consumption to reduce the tank cooling, but require a power supply to operate and an additional servo-operated gas valve.

the demand on the gas tank and the evaporation rate of the liquid. There are a couple of ways of doing this: one is to use a mechanical gas attenuator valve, as shown in **Photo 8**, attached directly to the boiler shell (which in this case is a Cheddar boiler), and the other is to use an electronic gas valve, like the one sold by such companies as Denes Designs and Stuart Models (see **Photo 9**). Both devices control the boiler pressure by controlling the burner flame, so you are only using the gas that you need for the engine rather than having the burner going at the same rate all the time. This saves gas and therefore reduces the cooling effect in the gas tank. Both these devices are very effective in helping to reduce the cooling of the gas tank, as well as preventing unnecessary gas use and expense.

Finally, something to maybe consider is using a burner that does not use liquified pressurised gas as a fuel but straight liquid fuel. This can either be in the form of a simple methylated spirits burner, as found in many Mamod, older Stuart Turner (see **Photo 10**) and Wilesco type boilers, or, for a bit more performance, the pressurized liquid burner types, such as those produced by Saito (see **Photo 11**). These work in precisely the same way as the old paraffin plumber's burners, *i.e.*, by pressurising the liquid fuel to force it to the burner where it evaporates and burns. This is described in more detail in the July 2024 instalment of Boiler Room.

"What can we do operationally to minimise the cooling of the liquid gas? Well, more than you might think..."

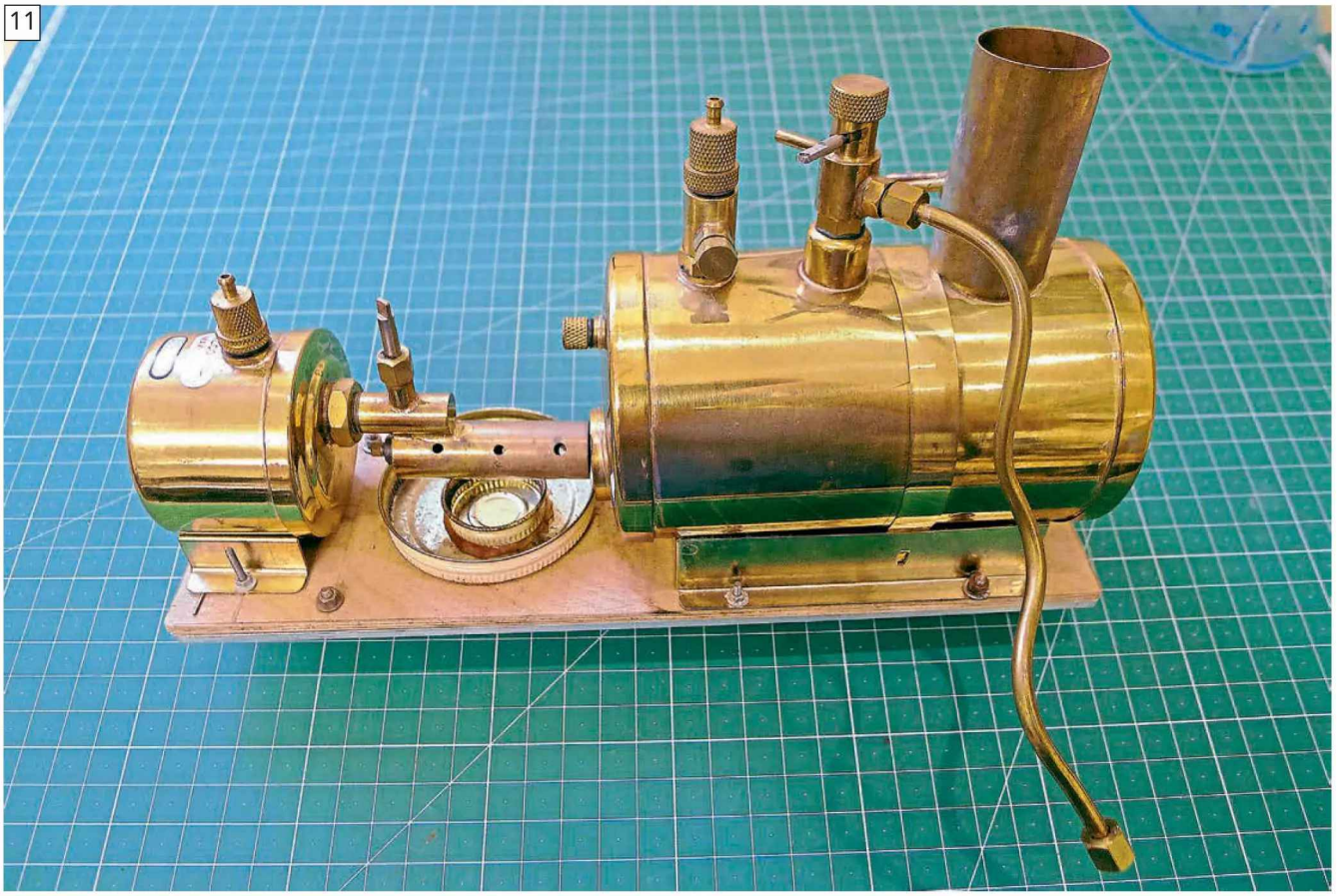
Operational considerations

So, what can we do operationally to minimise the cooling of the liquid gas? Well, more than you might think. First of all, again thinking along the lines of minimising the use of gas, we could reduce the steam pressure that we run the engine at. If we have fitted an attenuator valve or an electronic gas regulating valve, then all we have to do is reduce the set point and the engine will run at a lower pressure. Obviously, this will affect the performance, but you might be surprised at how a reduction in operating pressure saves on gas yet with little noticeable effect on performance. Another useful operational consideration is whether we use disposable gas tanks or refillable gas tanks (see **Photo 12**). Refillable gas tanks are pretty much what-you-see-is-what-you-get and any reduction in temperature has to be accepted. The only course of action is to add heat to the tank. Using disposable tanks, however, gives the option of changing tanks frequently to enable swapping

10

A traditional methylated spirit burner, as used on all Stuart Turner boilers for many years. The liquid fuel evaporates at the wick, so there's no variation in flame. Sometimes the old ways still have advantages!

11



The Saito boiler and burner use pressurized liquid fuel, which doesn't evaporate until it's in the burner. This way, the fuel remains at a constant temperature, and using the fuel doesn't affect the burner performance.

12

Using disposable gas tanks gives you a lot of flexibility in terms of operation and minimising the effects of gas cooling. The disadvantage is the cost of the 100g gas tanks.

a cold tank out for a warmer one. For instance, I always raise steam at the pondside ready to put the model in the water then, just before I do, I replace the tank with a fresh one. This way all the temperature reduction created by raising steam is negated by putting a new tank in. Another advantage is that these reserve tanks can be kept in a toolbox or insulated box with some sort of low-grade heat source, such as hand warmers or microwaveable hand muffs to ensure that the tanks start out in the model at above ambient temperature. Bringing the model in after around 20 minutes or so to top up the boiler, empty the separator and fill the lubricator also allows you the opportunity to swap the gas tank out for a fresh one; the removed cold tank can be placed into your warm toolbox to recover. The cost of using these small 100g disposable gas tanks will, however, be noticeably higher than using a large refillable tank.

To lag or not to lag...

I hope this review of the gas cooling effect has been useful to some of you. It remains probably one of the biggest single challenges of operating gas fired boilers in our model boats, especially in winter when the model temperature is already depressed before you get started. It's worth taking these things into consideration during the design of a model, and, likewise, operating the model in a way that helps minimise the effects can also be very beneficial. A combination of both should help you run your model, even on a cold winter's day, reliably and without problems.

Finally, let's address that frequently asked question, "*Should I lag my gas tank?*". I hope it's now a bit easier to understand why you shouldn't. Preventing the ingress of heat into the gas tank to counter the cooling effect of evaporation is actually going to make the situation considerably worse. You should also avoid hiding a gas tank in an enclosed locker or box, as this will also have the effect of preventing heat flowing back into the tank. ●

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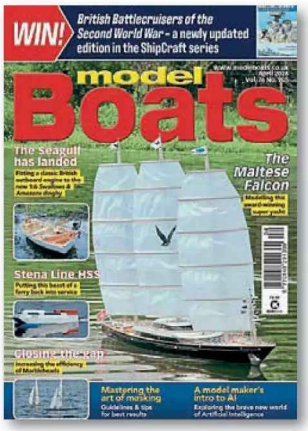

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Savvy salvaging

Glynn Guest has a tip before you skip…

The refusal to print any colour other than black forced me to replace a printer with a new and hopefully more obliging model. This proved to be too optimistic since it took me a few hours before an internet search located the means to make printer and computer communicate with each other. The instructions that came with the printer had clearly been written by someone who, at best, must have a wicked sense of humour; for example, they failed to mention the 'hidden' On-Off switch at the back of the printer.

The old printer was headed for the local recycling centre but, before that, I thought it worth looking inside the thing. Over the years, this has become standard practice for me when my wife and daughters are planning on discarding something because "*It's broken*". The problem is often something simple and easily repaired, such as a loose connection – although my family don't always seem as happy as I am when a quick fix saves us from having to buy a replacement.

The old printer was something else. Opening it up didn't reveal any obvious problem, at least not on the macro-mechanical scale that I'm comfortable in working (the micro-electronic world is something else). However, two neat model-size motors were seen and quickly removed before the trip to the tip. Connecting these to a model battery pack showed that they both worked in a smooth fashion and so demanded proper testing to see if they had any potential use in our hobby.

The large motor looked like a typical 500/600 type, with an external soft iron ring but no air-cooling slots in the casing. The shaft was the standard 3.2 mm (1/8- inch) diameter that you expect with these motors, but a useful length of shaft extended from both ends of the case. Although the armature was not visible, rotating the shaft suggested it had five poles. Testing on 6 Volts produced a speed of 1085 rpm, free running (no load) current of 0.06A, and a stall current of 0.75A. Testing on 12 Volts gave the following values: 2314 rpm, 0.07A and 1.60A. Hardly a 'rip snorting' type of motor, but with potential for a leisurely scale model.

The smaller motor was of similar external appearance but without the soft iron ring and the shaft only protruding from one end: its size and shaft diameter matching the 400 type of motors. It proved to be a little livelier than its larger cousin was, and on 6 Volts had a speed of 3000 rpm, with free running current of 0.09A and stall

Motors salvaged from the Guest family's broken printer.

The motor and gearbox Glynn retrieved from a discarded electric screwdriver, sitting alongside an old chair motor also fit for repurposing.

1.03A. On a 12 Volt supply, the values were 6100 rpm, 0.11 and 2.00A. Again, not a 'powerhouse' but quite capable of finding employment in a model.

Further candidates for repurposing

Since then, a few more motors have been 'recovered', one from a 12 Volt car tyre inflator and another from an electric screwdriver, along with its handy gearbox. Perhaps the most unusual source was an office chair which had several small motors embedded inside to give over stressed executives a relaxing massage.

Rescue and reward

The moral of this tale, therefore, is always inspect items before discarding them; they may well contain parts worth salvaging for modelling purposes. And then, if complimented while sailing a model containing such recycled parts, you will be able to say, with no false modesty, "*Thank you. Glad you appreciate it, because there are parts of it that would be rubbished by some!*". ●

TEST & MEASUREMENT KITS

Dave Wiggins examines a few of the small, but invaluable, test kits that were available to model boat enthusiasts during the 1950s and '60s

The little 'Avo-minor' was the junior instrument in AVO's range of professional measuring instruments.

An example of the professional AVO model 8.

Let's start with two absolutely essential bits of kit for anyone who was building his/her first radio transmitter or receiver back in the late 1950s/early 1960s. Nothing could be achieved without a test meter which meant, here in Britain, either a very simple homemade multi-meter for measuring voltage and current built using an ex military meter movement plus a few resistors and parts (mine was one such) or, better, and if in possession of sufficient funds, a commercially-built professional instrument like one of the two AVO meters illustrated here.

AVO's entry level 'Avo-Minor' (AVO stood for Amps, Volts and Ohms) would have been entirely adequate for anything R/C-related, or indeed for a simple home-build transistor broadcast portable radio project or domestic electrical work. Its top line 'AVO Model 8' unit was *the* fully professional laboratory or repair workshop instrument of its era in Britain, but few R/C constructors or repairers (and certainly not this one!) could have afforded such a

A nicely made Japanese transistor checker from the mid '70s.

A smaller model transistor tester, again from 1970s' Japan.

This home-built signal strength meter has been invaluable to Dave since about 1970.

fine instrument for home use. All of these instruments were, of course, analogue.

Transmitter testing at home

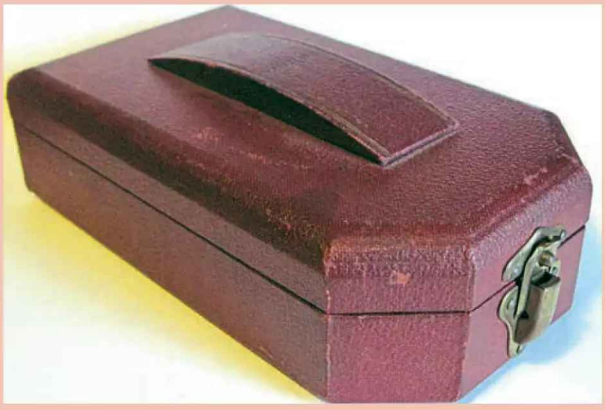
The next essential on the list for the home R/C transmitter builder was a field strength meter. I am illustrating my own home build – not my first, but a very simple bit of early '70's kit that has served me for very many years now, and which has been used for the RF alignment of pretty much every R/C set I've ever owned or serviced, whether on 27, 35 or 40MHz (but not 2.4GHz) frequency bands.

Such home-built instruments were hyper simple in every way, basically being just a 'crystal-set' radio receiver driving a meter movement rather than a pair of earphones. In the absence of an oscilloscope or ideally but most unlikely back then a spectrum analyser, one of these units was absolutely vital for aligning any Tx–RF section. If a simple 'scope could be afforded, it's almost certain that it would have been a single beam model with very limited frequency response/bandwidth, incapable of viewing high frequency signals; my own unit back then was specced at just 3 MHz, for example. For such a 'scope to 'see' a high frequency (say, 27MHz) signal, a demodulator was necessary, and this handy gadget was (and is) almost as simple as a field strength meter to home-build, being a virtually identical circuit.

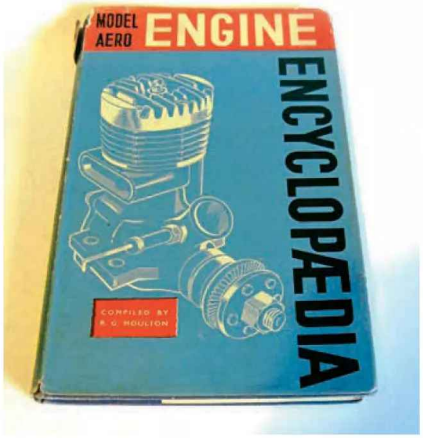
"As the semiconductor era dawned, however, affordable home testing of the first semiconductor transistors became more viable"

Testing early transistors

During the valve era, which extended even into the mid 1960s, home valve testing was simply impossible, as the necessary instrument – made in Britain by either AVO or Mullard Ltd – was the province of a commercial business, such was its price. As the semiconductor era dawned, however, affordable home testing of the first semiconductor transistors became more viable. Illustrated are two models which are still obtainable today, and at low cost. When you purchase one you will find that, being of 1960s' vintage, it will only have the necessary socket for the earliest linear base transistors, but adding a modern TO5 or TO18 socket is simple enough on the bigger panels. On the smaller model illustrated, it's just as easy to make up such adaptors on a flying lead.



A fine example of the once famous 'Smiths' tachometer.



Dave's copy of Model Aero Engine Encyclopedia (MAP Books, 1958), edited by Ron Moulton. This features a section that discusses early (pre-Opto) rev counters for model engines and includes an illustration of a homemade vibro type rev counter and data on dynamometer testing. The title is now long out of print, but secondhand copies do occasionally pop up for sale online.

Checking your 'Revs'!

Leaving the radio side of modelling for a moment, another parameter that always required accurate measurement was the rpm (revs per minute) of your model's engine or motor, equally important for both aircraft and boats. From the 1950s into the '60s, *the* finest tachometer available was the directly driven British 'Smiths' precision mechanical instrument (a nice, cased example is illustrated). These really were laboratory items, but examples did find their way to the pondside, being especially favoured by tethered hydroplane racers once airscrew hydros became popular and speeds in excess of 100mph began to be achieved.

For those without access to such a fine instrument, an economy-priced alternative was the vibrating reed techo' – a sort of R/C receiver's reed-bank in reverse (as it were!). These only gave very approximate indications of rpm but were widely available and affordable and thus much favoured and used. Their mode of operation is different. The unit's frame is held against the engine crankcase in order for vibrations to be transmitted from engine to instrument and thus cause the reeds to tremble in sympathy – an explanatory illustration of this appears in the excellent *Model Aero Engine Encyclopaedia.*

A more modern rpm meter/optical tachometer made by Skyleader of Croydon.

Thankfully, by the mid to late 1970s electronics came to the rescue of the model engine user in the form of optical tachometers, like the British Skyleader unit pictured here – my own. These obviously require no mechanical link to the drive shaft, which was/is their biggest advantage.

Moving on...

In the next instalment of Memory Lane, we will be taking a look at a German R/C model boat set that was widely available in UK model shops during the 1970s, so, for another hit of nostalgia, be sure to tune in. ●

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Show & tell

Now fully retired, I took a 6-month subscription last year to catch-up with the world of model boats. Much has changed since I left the hobby in the early 1980s, in particular in the fields of radio transmitter technology, electric motor and battery technology, laser cutting, and now 3-D printing.

Though aeromodelling is my principal interest, in fact aeromodelling was the precursor to my studying and qualifying in aeronautical engineering, I have constructed and operated a number of model boats. I have attached some photos depicting a couple of my journeys in the world of model boats which may be of interest.

The first photo is of the original Aerokits Sea Queen, a 46-inch Cabin Cruiser which was a bit of an undertaking at the time. It was demanding work shaping the wooden bow blocks with a Stanley Surform plane! I installed a water-jacked Merco 49 twin plug 2-stroke IC engine. The photo was taken at the Black Park Lake, Iver Heath, Buckinghamshire. This lake (near Wexham) is electric propulsion only now, I believe. My mum always contributed something to my models, and for this model she knitted the bow and side fenders. The model was finished entirely with International polyurethane paints which, at the time, were available in smaller quantities and I found to be fuel-proof.

In his article entitled '40-Year Flash Back' in your sister magazine *RCM&E* (January 2026) Shaun Garrity mourned the loss of 'Big Shows', including the annual Sandown Park Symposium and the Model Engineer Exhibition, with which I sympathised. Though the latter exhibition was perhaps not at first sight of so much interest to the aeromodeller, with a bit of lateral thinking the retails outlets supporting the event had so much to offer, there always being a cross-over in application for their tools and products. I would use the comparison of sweets in a traditional sweet shop.

My claim to fame was a silver medal at the 1978 Model Engineer Exhibition at Wembley for my 10-Rater Yacht. The hull, mast and sails were Nylet items. If my memory serves me, my elder brother purchased the parts and lost interest before starting. For some reason that eludes me now, I offered to build it with the exhibition in mind. Once you have applied to enter the competition there is no going back; quite a mad decision looking back. There is nothing like a target to focus the mind. I remember being up most of the night preceding the morning we had to drop off the exhibit at the some of the rigging (lay straight multi-strand control line wire). I went to bed circa 4am!

The deck planking was, I think, walnut and lime. The name given the yacht *Souimanga* comes from the French for Sunbird, which my late mum also suggested (she was Swiss). You will see I embedded a pair of sunbirds in the deck above the transom. This was done by using a jeweller's piercing saw to cut out the birds in a pre-assembled panel of deck planking and then filling the opening with plastic wood (neutral), followed by sanding level and finishing.

The hatches for access to the sail winch and R/C system were fabricated from mahogany veneered birch plywood, using mahogany planks to form a raised surround and form the curved surface. A particular point of

Keith's build of the original Aerokits Sea Queen, a 46-inch cabin cruiser.

Keith was awarded a silver medal at the 1978 Model Engineer Exhibition at Wembley for the 10-Rater yacht he named Souimanga (French for Sunbird).

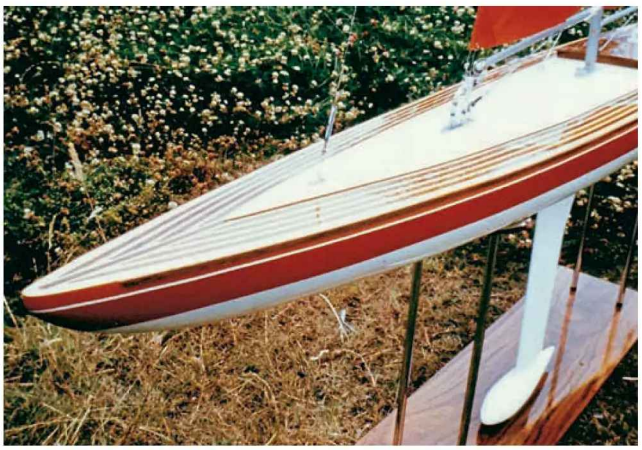
Top left and above: Keith and Souimanga. Some close up shots of the model, including the lovely touch of the pair of sunbirds that grace the deck above the transom, can be viewed on the next page.

Souimanga on the water. Note the Skyleader SI transmitter in Keith's hand.

interest regarding the hatches was the use of 'Dzus' fasteners to retain them. Wikipedia reminds me the Dzus fastener, also known as a turnlock fastener or quick-action panel fastener, was invented by William Dzus in the early 1930s for application in the aircraft industry. I purchased a version of these from the American model accessory company Du-Bro and fitted two to each hatch. The important thing with these fasteners was that the hatch could be retained with some pressure against a sponge sealing strip between the underside of the hatch and top edge of the raised surround to the apertures in the deck. These fasteners only required a quarter turn with a screwdriver to lock and unlock them. Their design is such that they pull the two components together as you turn the fastener.

The finish was sprayed K&B Super Epoxy, with the decking and hatches sprayed with Furniglass Hardcote (acid catalysed lacquer) that was used in the furniture industry. The latter was a mistake as it cracked over time. A lesson learned was that I should have used the K&B Super Epoxy clear coat, which I subsequently used on an aeroplane that is still in near perfect condition today, with no cracking or yellowing.

With the date of the exhibition approaching fast, I realised I needed a display stand for the model which would not detract from its appearance. To that end the local DIY store came to the rescue with some unfinished teak veneered particle board and chromed steel tubing. I formed a couple of support cradles for the hull from laminated 1/64 plywood taped to the hull while the glue



dried. The base and support cradles were drilled to accept the chromed steel tubing and after assembly were finished with Furniglass Hardcote.

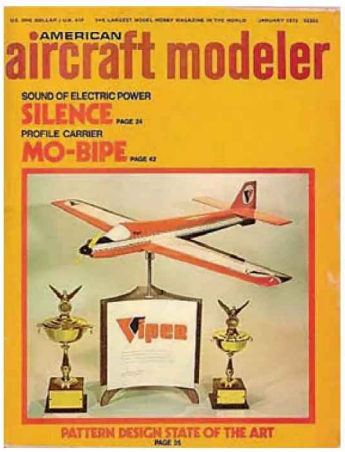
You may know that in the past, we used to the term 'homers' to refer to artifacts created by employees using company resources for personal use. Well, I made many of the yacht fittings from sheet brass with silver soldered joints. These were cleaned up and polished on a polishing wheel attached an old Dremel jig saw. At the time I was working at the BAC Weybridge factory for a period of 'Industrial Attachment' during my studies. One of my acquaintances there arranged for the 'Night Shift' to nickel plate them. The fittings were copper plated initially and then nickel plated. It was an Aladdin's cave of large, hot, bubbling tanks of lethal chemicals in the 'Plating Shop' – happy days!

The photos of the yacht sailing were taken on Elstead Moat near Guildford. In his article in Model Boats July 2025, your scribe Dave Wiggins discusses vintage radio items, in particular Skyleader. In my photo at Elstead Moat, you will just be able to see the Skyleader SL transmitter in my hand. Of course, this was overkill for a yacht, but back then I used to transfer the entire radio system from model to model in readiness for the next weekend's activities, be it flying or boating. I do remember meeting Mr Uwins manning the reception desk in his industrial unit at the former Croydon Airport, regrettably on more than one occasion following a serious aircraft crash.

I am also sharing some pics of a Viper power boat model I based on a fibreglass hull that a friend of mine had moulded but then didn't know what to do with. I, therefore, offered to come up with something. Note in the pictures my mum's knitted fenders and the skirting board stand! I borrowed the colour scheme from a Joe Bridi R/C pattern aircraft exhibited at the Concours elegance category at the Toledo Model Show in Ohio, USA, circa January 1973, as seen on the front cover of the January 1973 issue of *American Aircraft Modeler* magazine.

KEITH CHERRINGTON
EMAIL

Love this little glimpse of the late 1970s, Keith. I am sure others reading will also have fond memories of the 'big shows' back then. Ed.



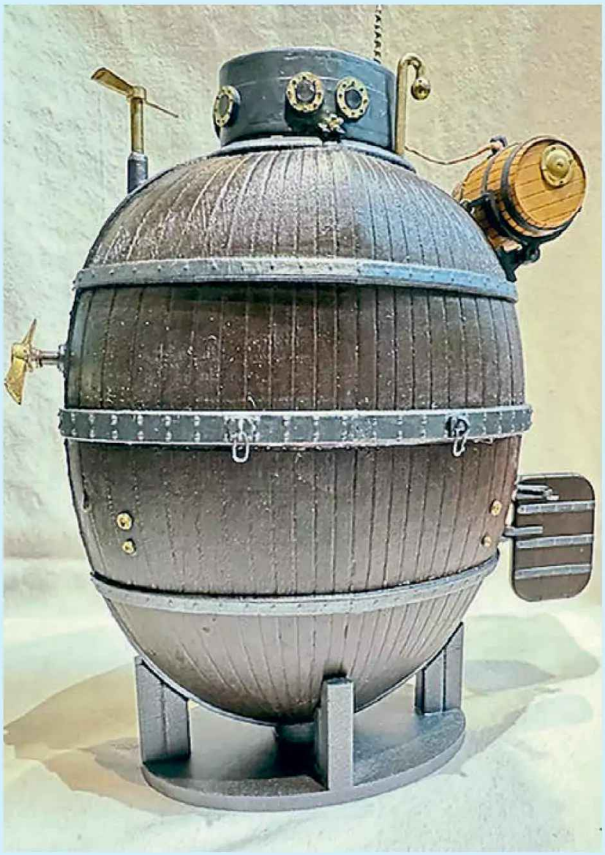
Keith's Viper power boat model based on a fibreglass hull moulded by a friend, its colour scheme copied from model aircraft featured on the front cover of a 1973 issue of AAM magazine.

3D-printed Bushnell *Turtle*

I thought I would send you some pics of my just completed version of the Bushnell Turtle submersible of the late 18th century. I 3D-printed this from files purchased from The Nautilus Drydocks in Texas. I modified most of the files to put my 'personal stamp' on the design. It has passed the bathtub trials and is now waiting for spring weather.

GEOFF FAIRFAX
EMAIL

What a sensational job you've done of capturing this historic submersible, Geoff. Although it does make me shudder when I think about how absolutely terrifying being inside that dark cramped interior would have been! Ed.



Ongoing work on HMS *Sheffield*

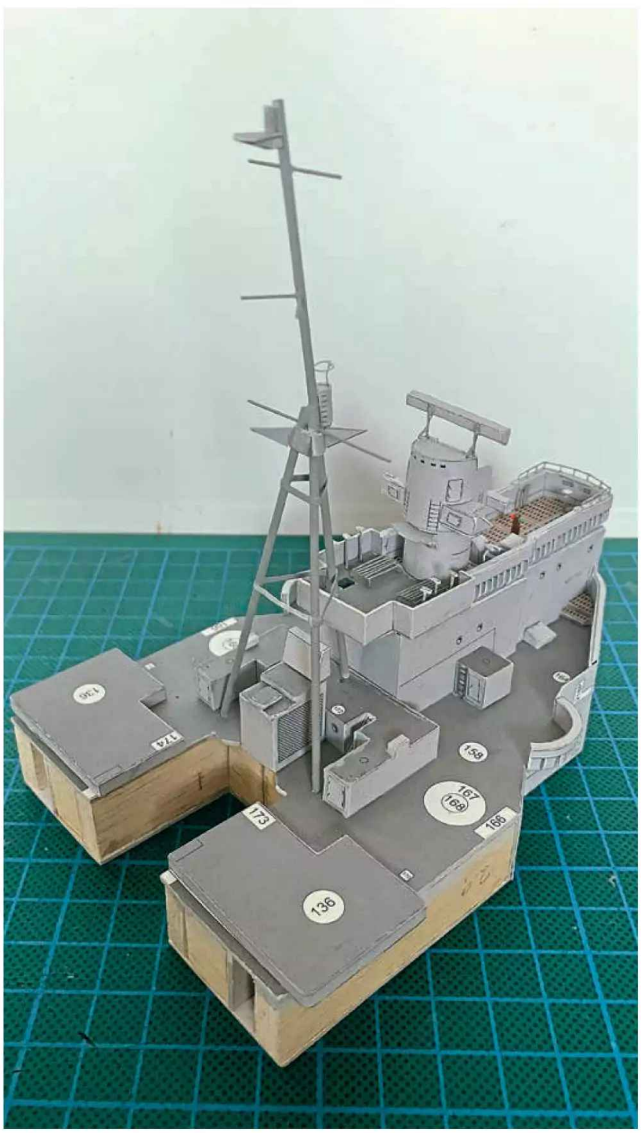
As you were kind enough to publish my previous correspondence, I am now sending a few photos showing how my Modelik 1:200 scale build of HMS *Sheffield* is coming along. Some components are not yet attached but it's encouraging to see the progress thus far.

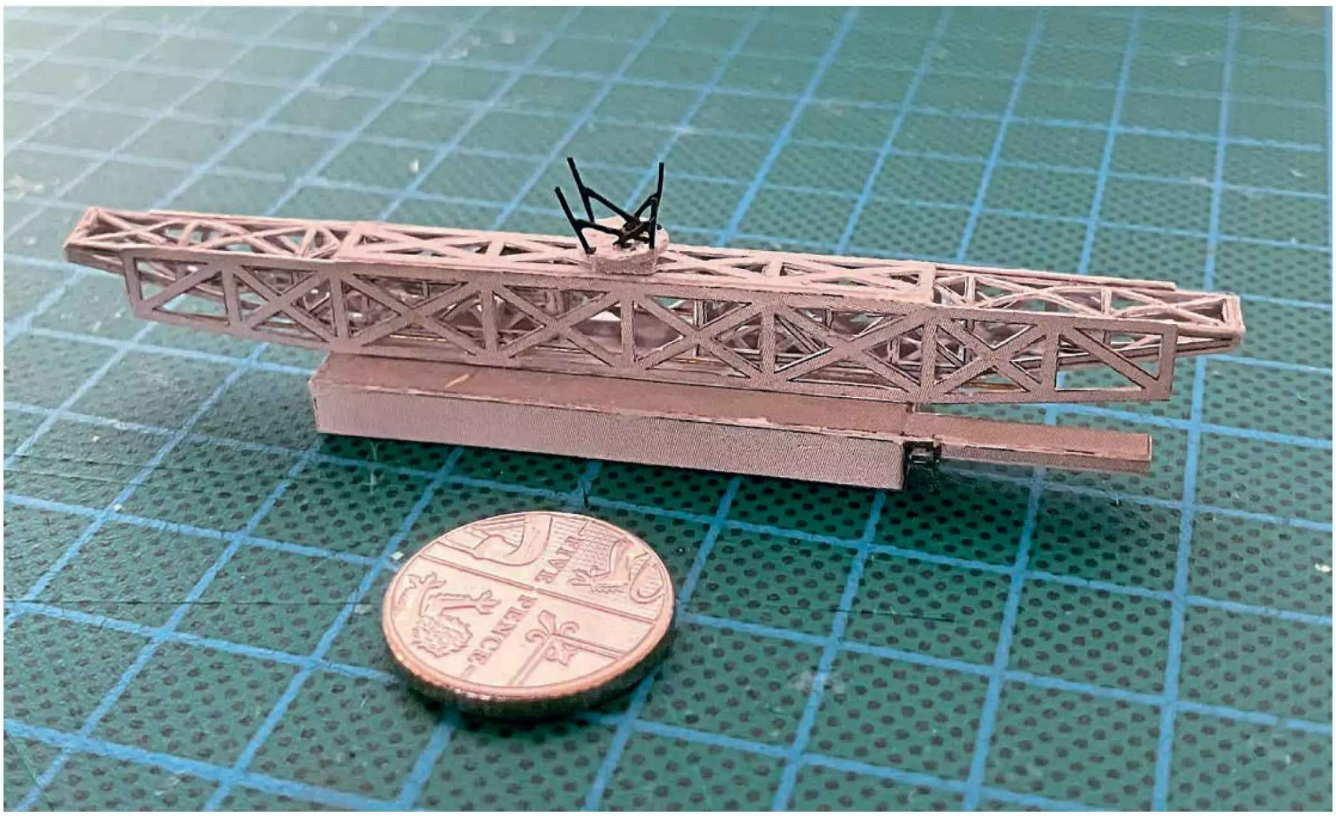
As a matter of interest, the catapult lattice took me about a week to cut out and assemble – life in the old dog yet (I'm 81)! The mast is a composite of metal and paper.

Thanks for the array of articles which make Model Boats such an interesting magazine (or comic, as my wife calls it!)

TREVOR BRIGGS
EMAIL

These builds within a build are shaping up nicely, Trevor. Really looking forward to seeing the finished ship. Ed.





Work in progress of Trevor Briggs' build of the Modelik 1:200 scale kit for HMS Sheffield, including the time consuming to cut out and assemble catapult lattice.

Bluebird of Chelsea

Almost a year has passed since you showed my rendition of the *Oldenburg* ferry in' our magazine', so now my new creation…

I found a copy of the plans for the *Bluebird of Chelsea* drawn by D.J. Metcalf in 1991. This project has been a challenge from start to finish, but I'm now almost there. She's been built from scrap material that I had lying around the shed. Improvisation can be a wonderful thing when you don't have access to certain items you want/need. We 'Kiwis' have a 'can do' attitude to getting the job done!

This will be about the 15th boat I have built – almost time to call it quits. Love the mag and look forward to each and every issue as I especially enjoy seeing the other builders' creations. Cheers!

LAWRIE ROBERTS
EMAIL

Another really lovely model, Lawrie, and one that suggests your 'can do' Kiwi spirit is nowhere near calling it quits yet! Ed

Your Letters

Got views to air or information to share? Then we want to hear from you!

Letters can either be forwarded via email to **editor@modelboats.co.uk** or via post to **Readers' Letters, Kelsey Media Group, Media Centre, Morton Way, Horncastle, Lincs LN9 6JR**

Aim achieved

I recently designed and made my own rotating water joint for model fireboat monitor jets. This was a project born of necessity as my research failed to find any commercially available options of a size suitable for the restricted space within my tug. Aim achieved, I can now point my model fireboat monitor jet in any direction I want.

As I haven't seen anything like this on the market, I am hoping it may be of interest/assistance not only fellow modellers but perhaps also to manufacturers (being retired now, I have not looked into obtaining a patent – way too expensive – or manufacturing the product myself, but I would happily be involved on a consultancy basis).

The components required are as follows:

- Two ball bearing races
- A shaft seal
- A main body
- Stainless-steel output tube
- Brass water inlet with 'O' ring seal
- Two 0.5 Mod gears (tooth count to be finalised)
- An acrylic housing (this could be 3D-printed to suit)
- A small 180-degree servo for testing

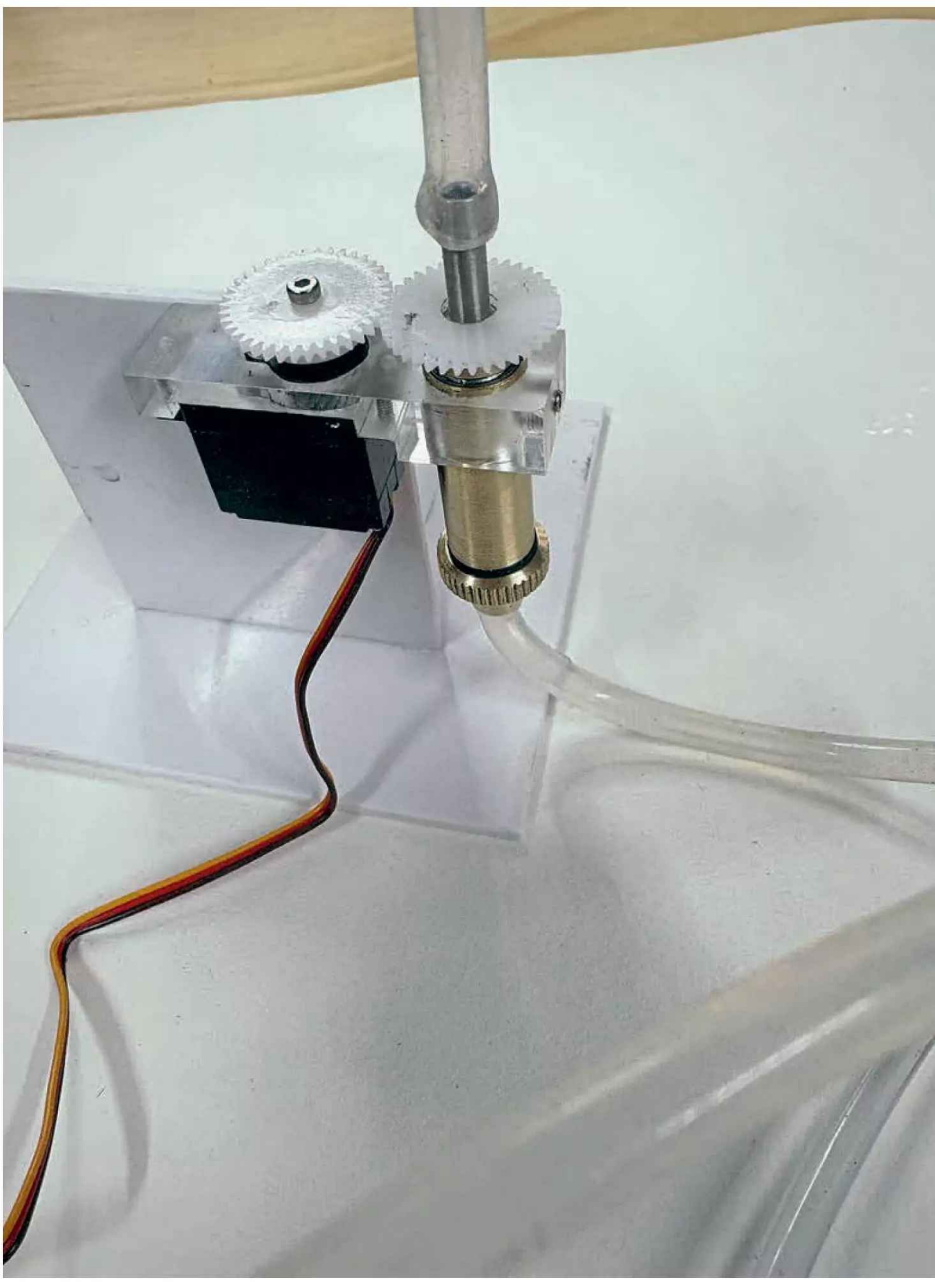
The water output tube rotates but the main body and water inlet remain fixed; this allows for a full 360-degrees of rotation if required.

The body of the joint is secured within its specially designed housing (which, again, could be 3D printed).

A small servo is incorporated in the housing, and the two gears are mounted, one on the servo and the second on the water joint output tube – these must be accurately positioned to ensure they rotate freely.

KEVIN LITCHFIELD
DERBY MODEL BOAT CLUB MEMBER

Bravo – and thank you so much, Kevin. Obviously, I can't include the little working demo video clip you sent here, but I'll be more than happy to share it with anyone interested via email or social media. Ed



Keith Litchfield's self-designed rotating water joint.

Antique yacht offer

Acting on the wishes of my recently deceased brother, Nigel, a skilled woodworker and keen sailor, I wish to donate an antique model sailing boat he'd been in the process of restoring to someone who'd be willing to finish the job.

The exact age of the model is unknown, but it is depicted in a photograph taken in Scotland which is dated 1910. It measures 5 feet tall, 5 feet long and 9 inches wide.

The boat is in Sheffield and, due to its size, would need to be collected.

DR TOM O'HARE
EMAIL

The exact age of the model is unknown, but this charming photograph, taken in Portwilliam, Scotland, in 1910, reveals it to be well over a century old.

Firstly, Tom (hope it's OK to address you by your first name), my sincerest condolences.

The offer your brother has entrusted you to make is so very generous, and I am sure there will modellers with the necessary skills reading who will gladly volunteer to collect this beautiful old yacht and complete her restoration. I will, of course, forward any/all enquiries/correspondence on to you so a decision can be reached and arrangements made. Hopefully, whoever takes on the project will eventually send some photos of her either on displayed in all her glory or, better still, back out on the water again being sailed in Nigel's honour. Ed.

Dr Tom O'Hare is now hoping to find someone prepared to complete the restoration work started by his late brother Nigel and get this gorgeous yacht back on the water.

Next month in Model Boats

In the June 2026 issue of Model Boats, on sale from Friday, May 22, don't miss…

▲ SRC-90E
A Special Operations mission in 1:16

▲ Go Dutch…
with this gorgeous working model

▲ Plank-on-frame *Fame*
A historic pilot brig beauty

PLUS A thematically varied selection of feature-length articles, all your favourite regular pages – including Your Models, Your *Letters, news, reviews – and lots more* *(Please note: content may be subject to change)*

You will find more about the exciting content coming next, features of particular interest you may have missed in past editions and details of the very latest subscription offers on our website at www.modelboats.co.uk

You can, of course, order you copy of the June 2026 issue, which goes on sale at all good newsagents from Friday, May 22, 2026, now, but why not treat yourself to an annual subscription, as monthly copies will then be delivered directly to your door.

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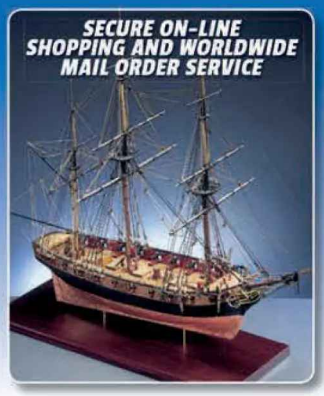

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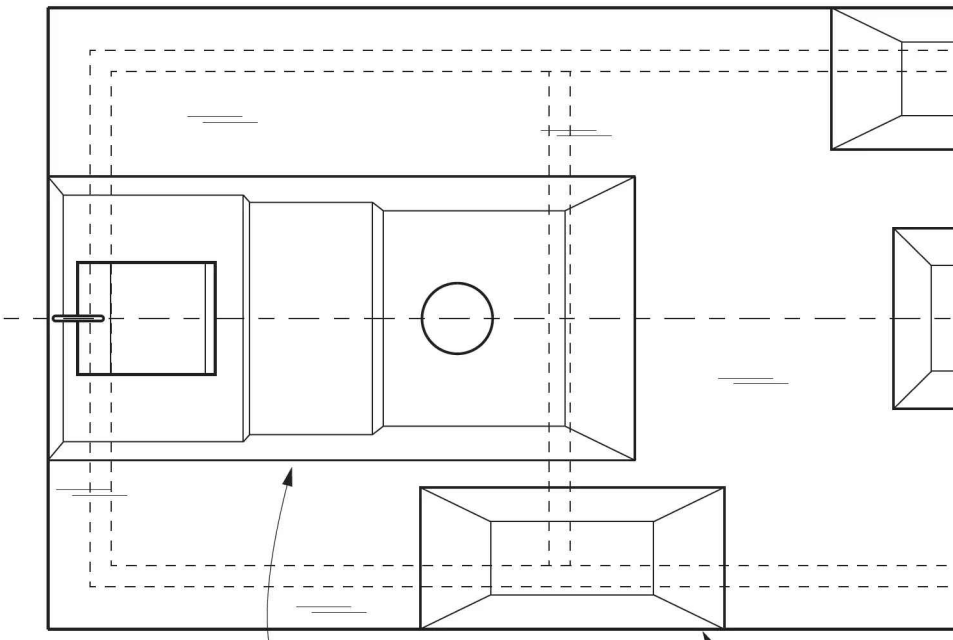
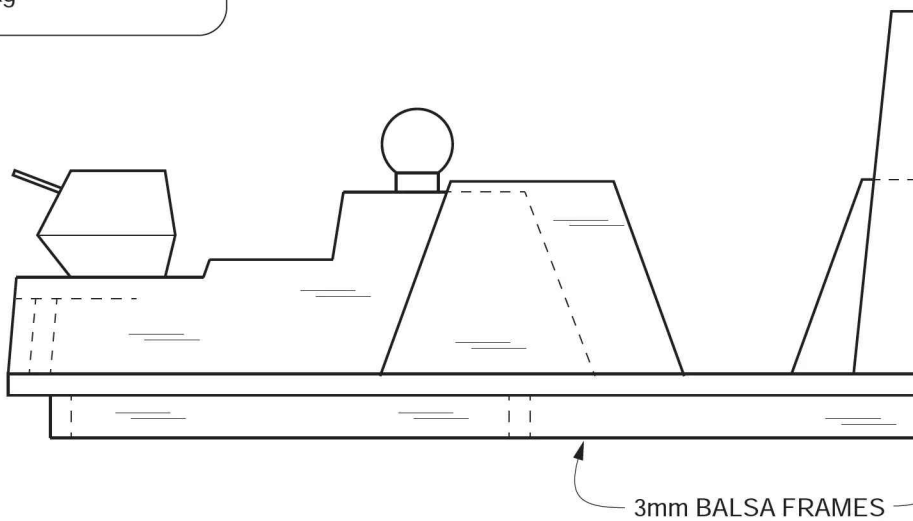
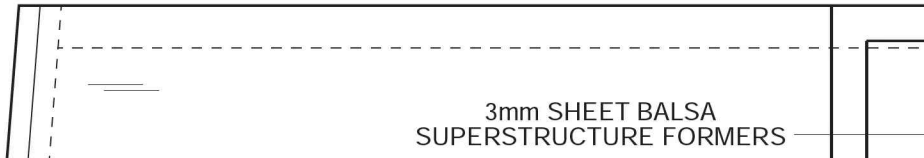
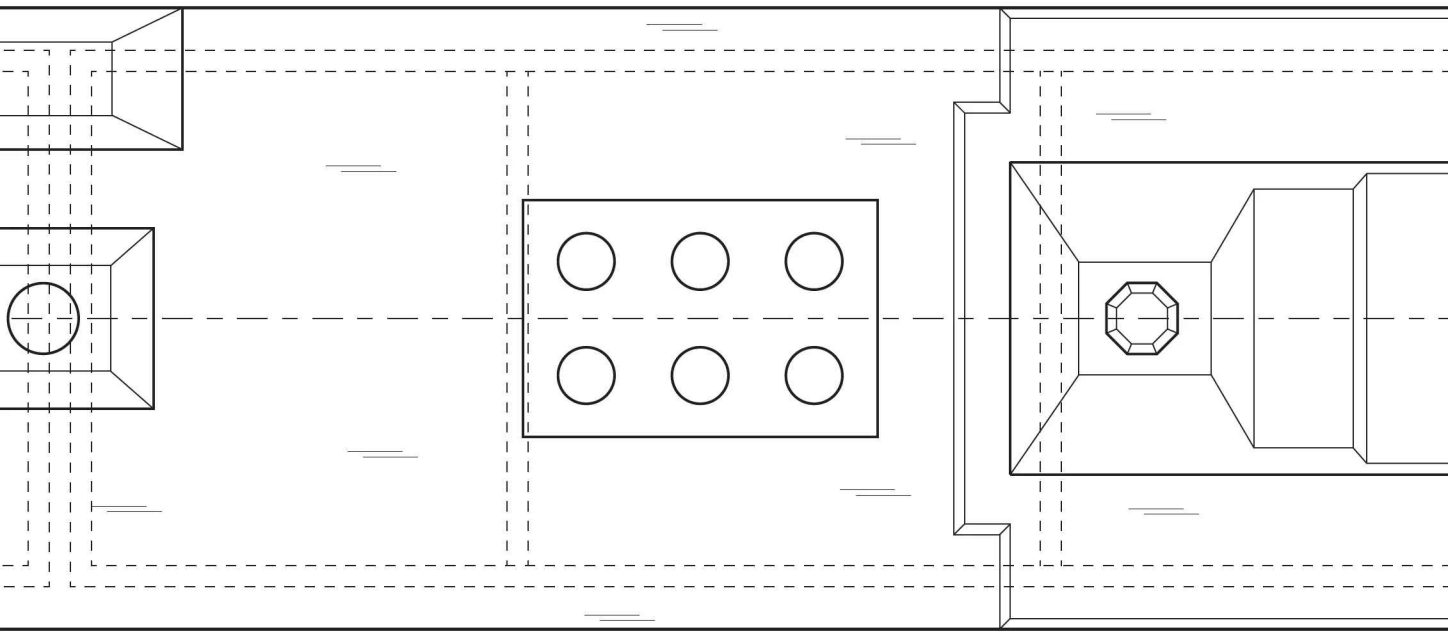


5 off 915mm x 100mm x 3mm balsa
3 off 915mm x 75mm x 3mm balsa
1 off 915mm x 100mm x 12mm balsa
Small rudder, brass, 46 x 31mm
5" propshaft M4 thread
3 bladed propeller RH Ø30mm M4
Universal joint coupling
Marine 15A electronic speed controller
2 off propshaft oilers (optional)
540 size low noise DC motor with suitable mount
Sealed lead acid battery, 6V-5A (long type)
Micro servo for rudder
Two function R/C
Displacement of prototype 2.2kg

WEAPONS & SENSORS MADE TO SUIT



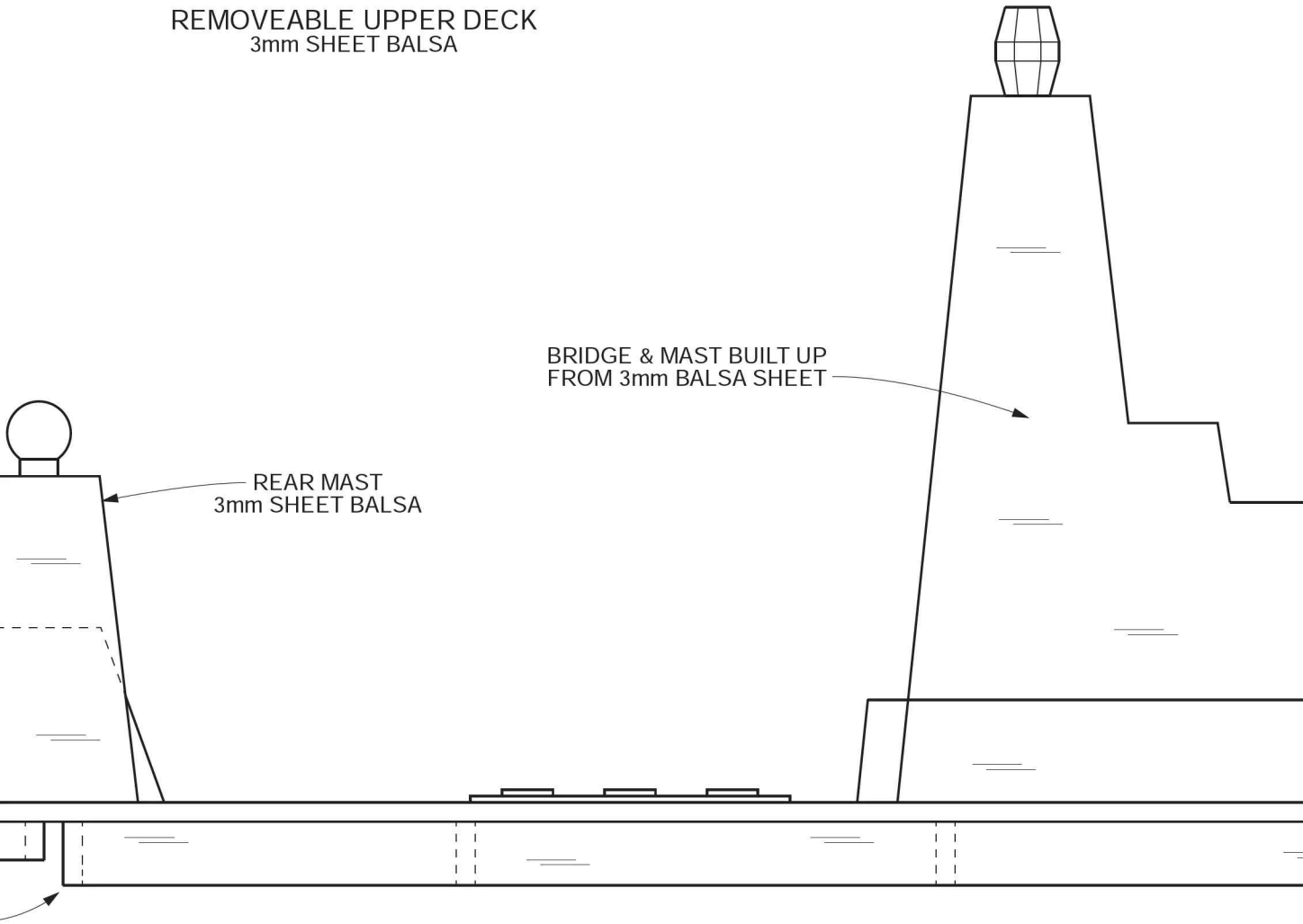


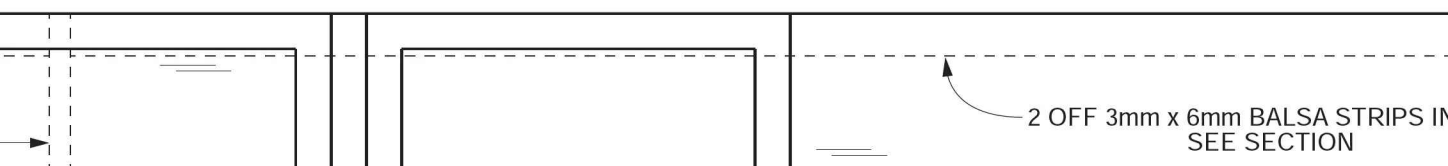


REMOVEABLE UPPER DECK
3mm SHEET BALSA

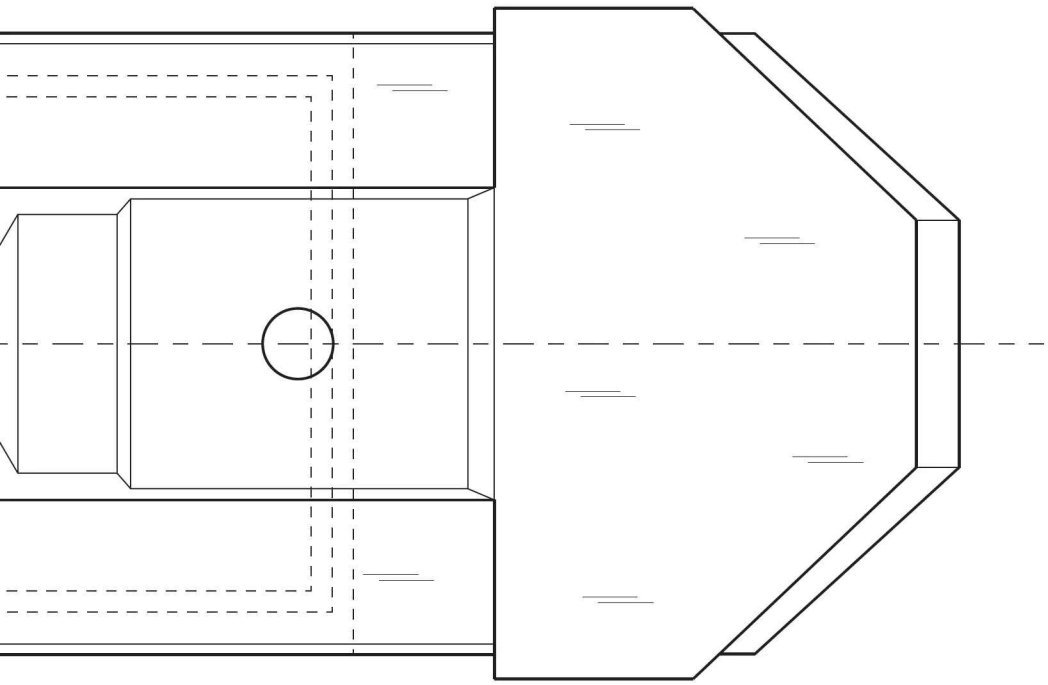
BRIDGE & MAST BUILT UP
FROM 3mm BALSA SHEET

REAR MAST
3mm SHEET BALSA





2 OFF 3mm x 6mm BALSA STRIPS IN
SEE SECTION

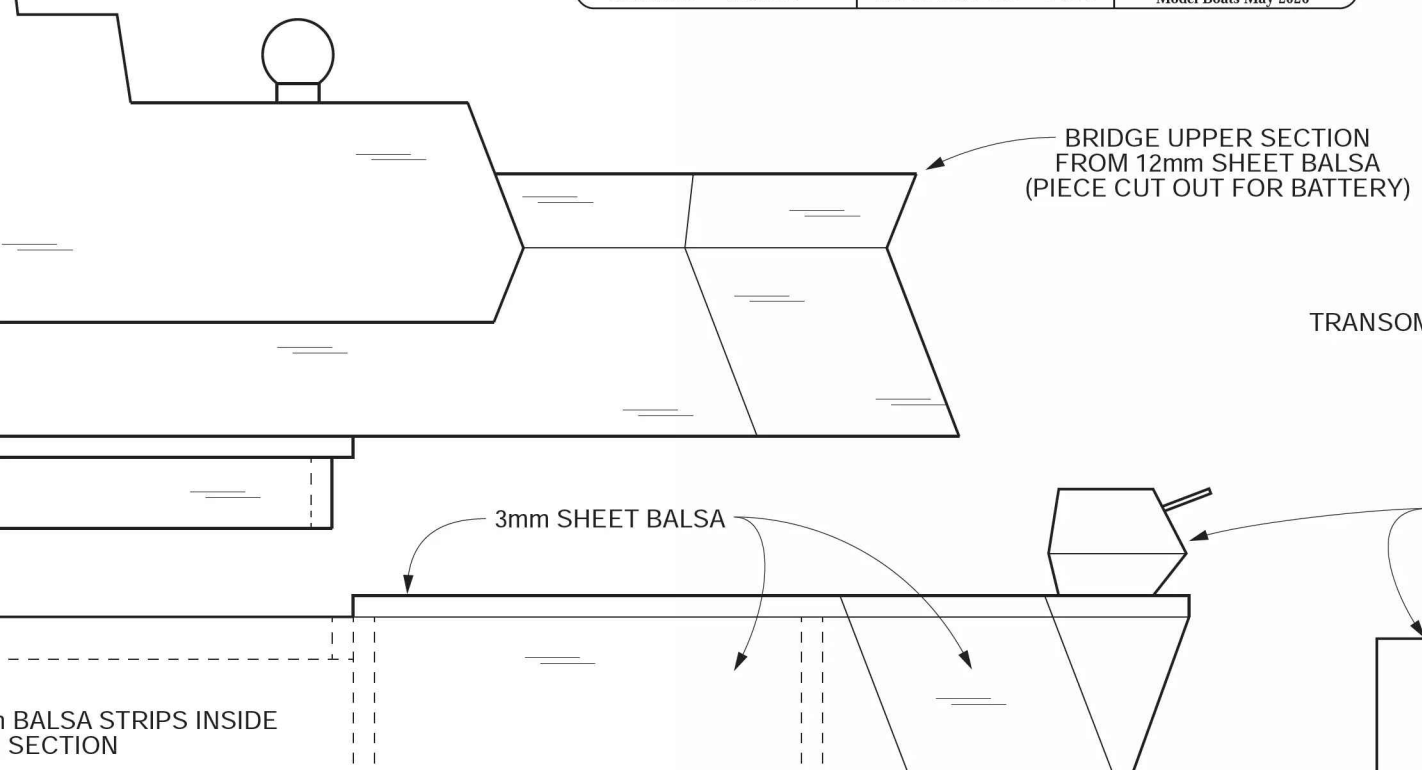


HMS TERRIBLE

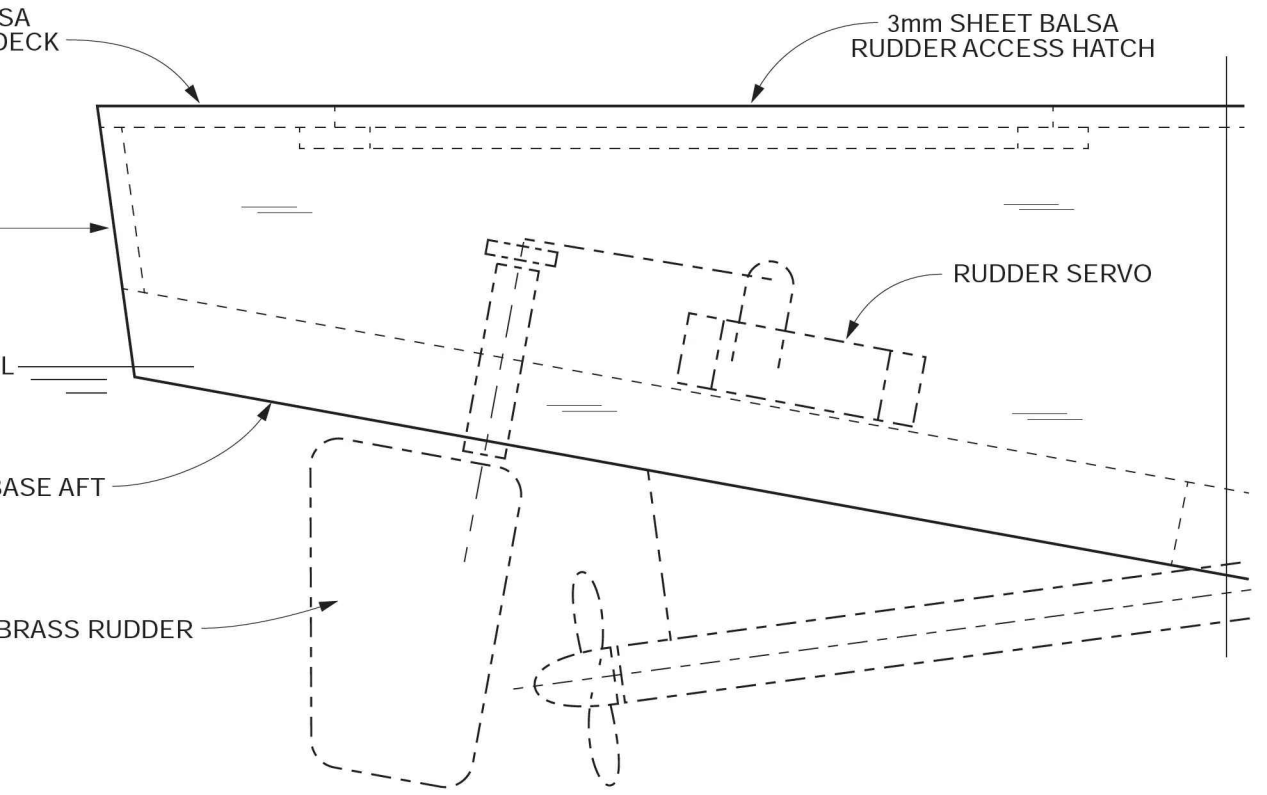
SEMI-SCALE TYPE 31 FRIGATE

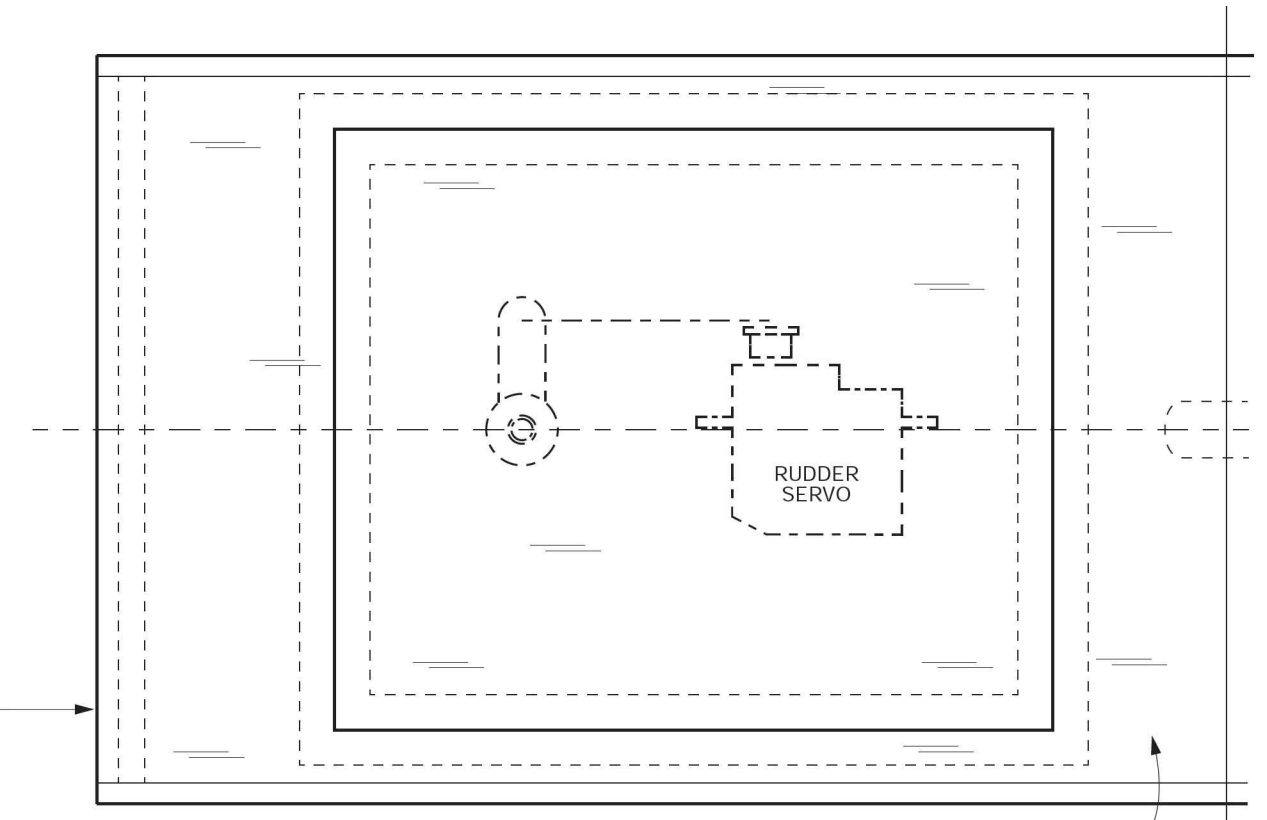
BY MIKE PAYNE

PLAN No: MM2186	No. OF SHEETS: 1 OF 2	First published in Model Boats May 2026



SCALE
INCHES

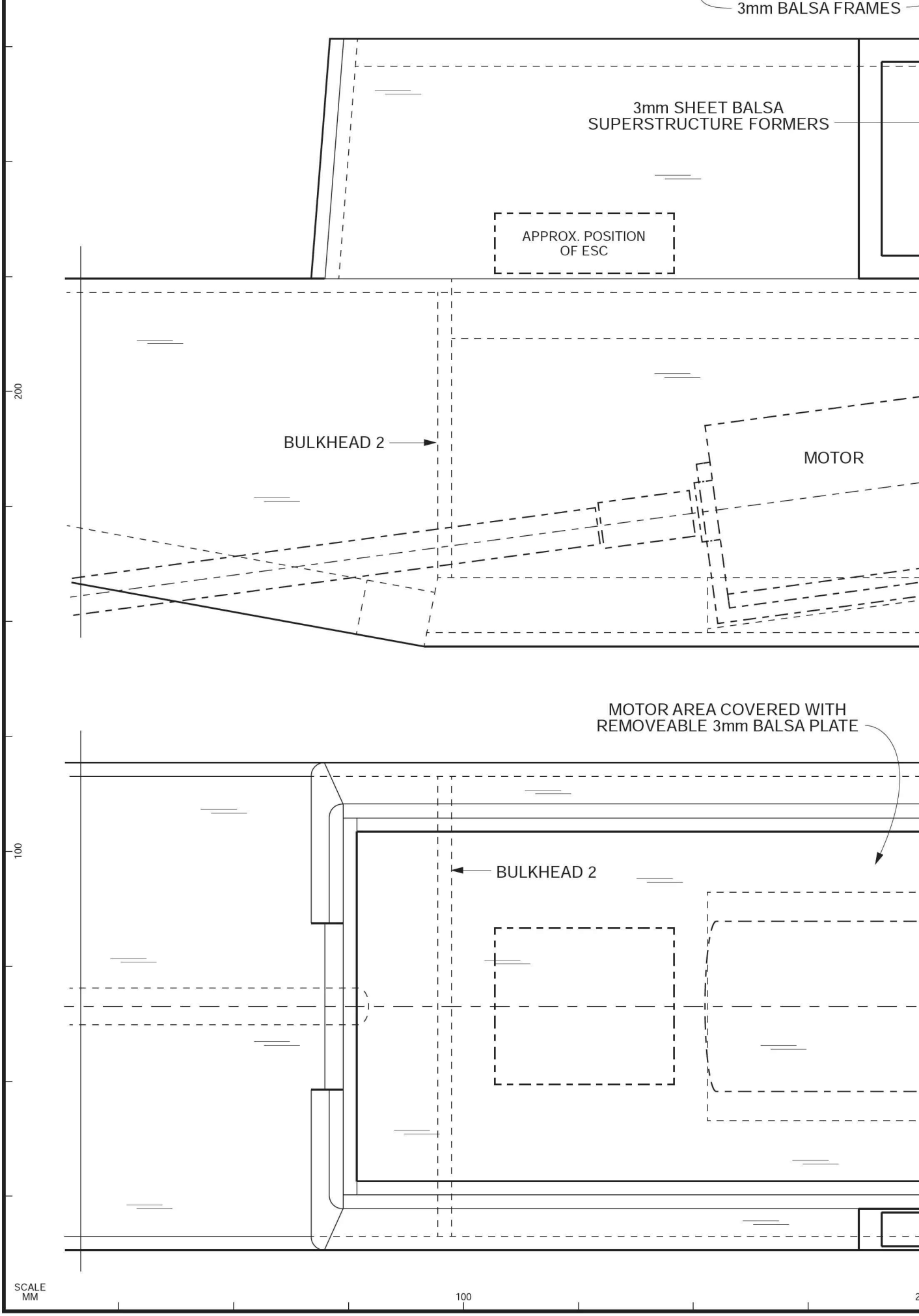


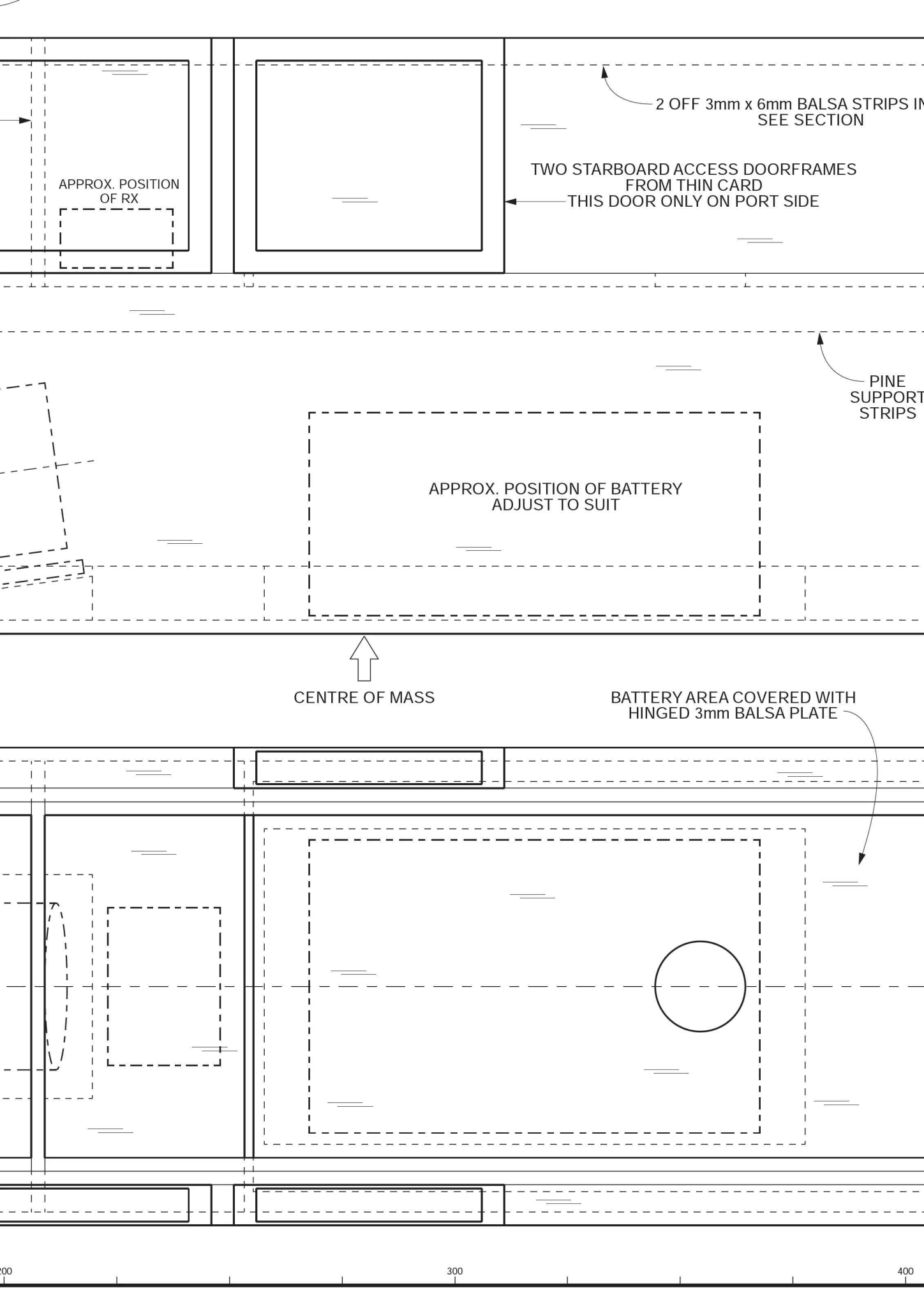


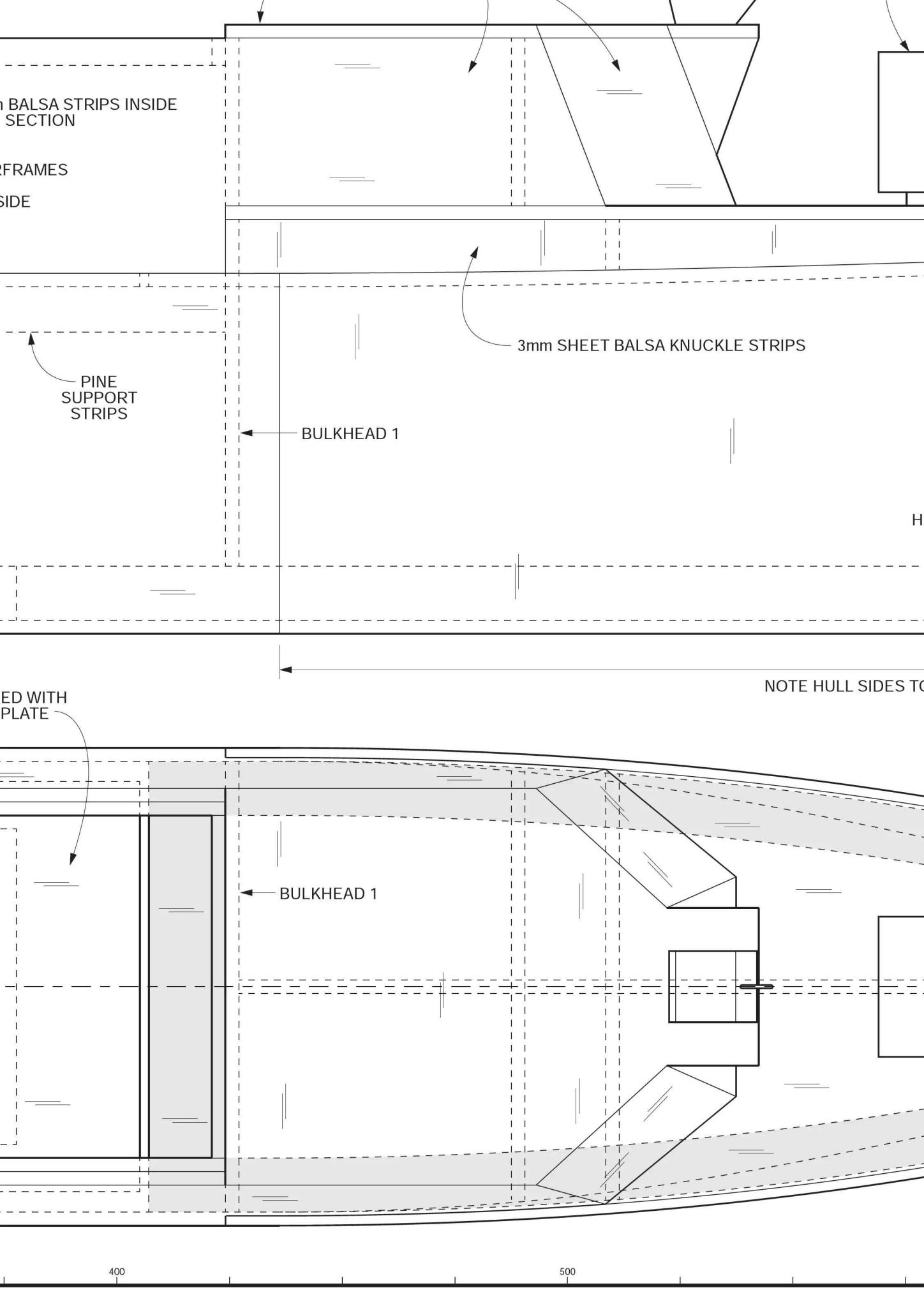
URRETS SHAPED FROM
LAMINATED SOFT BALSA

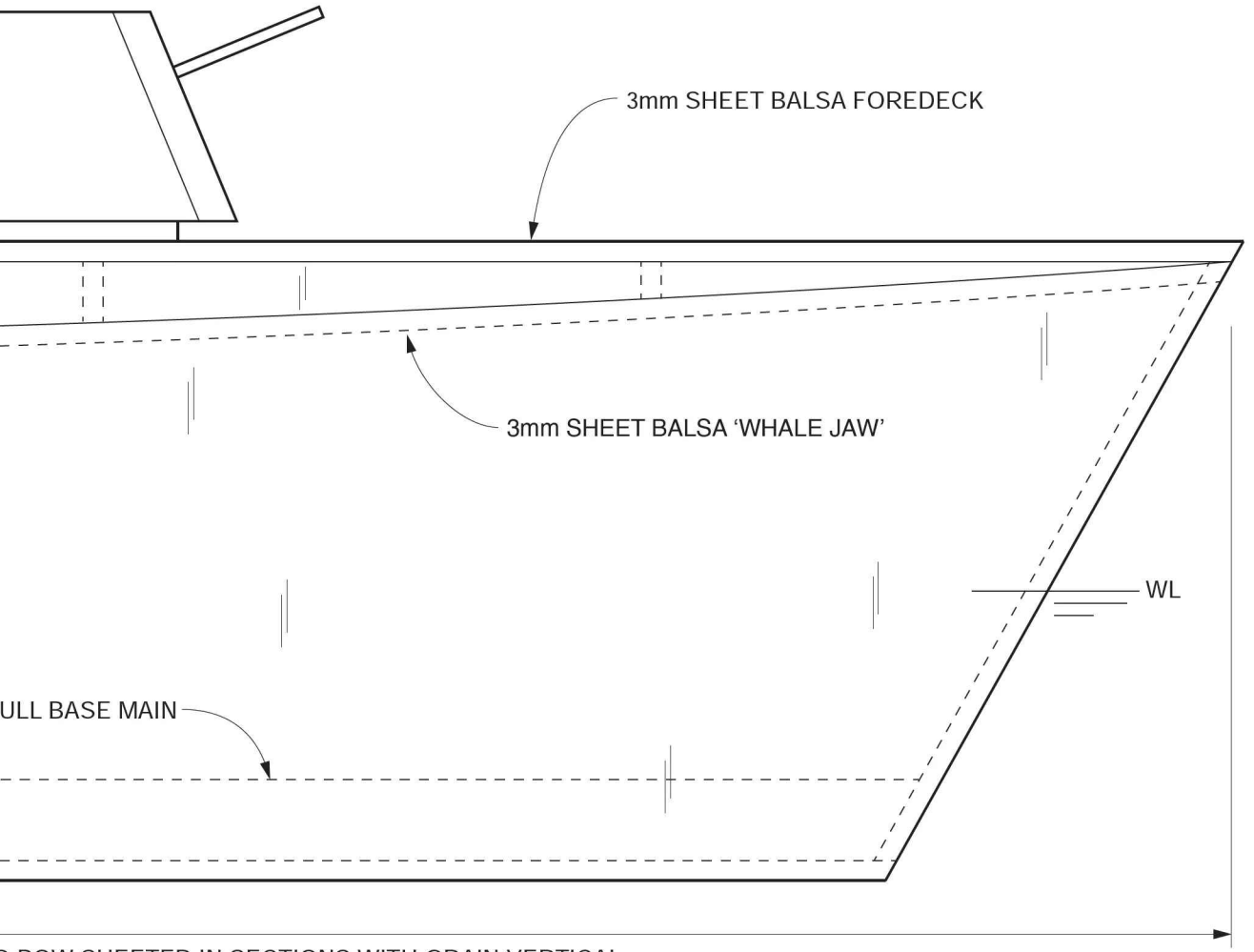
3mm SHEET BALSA
AFT/HELICOPTER DECK

3mm SHEET BALSA FOREDECK

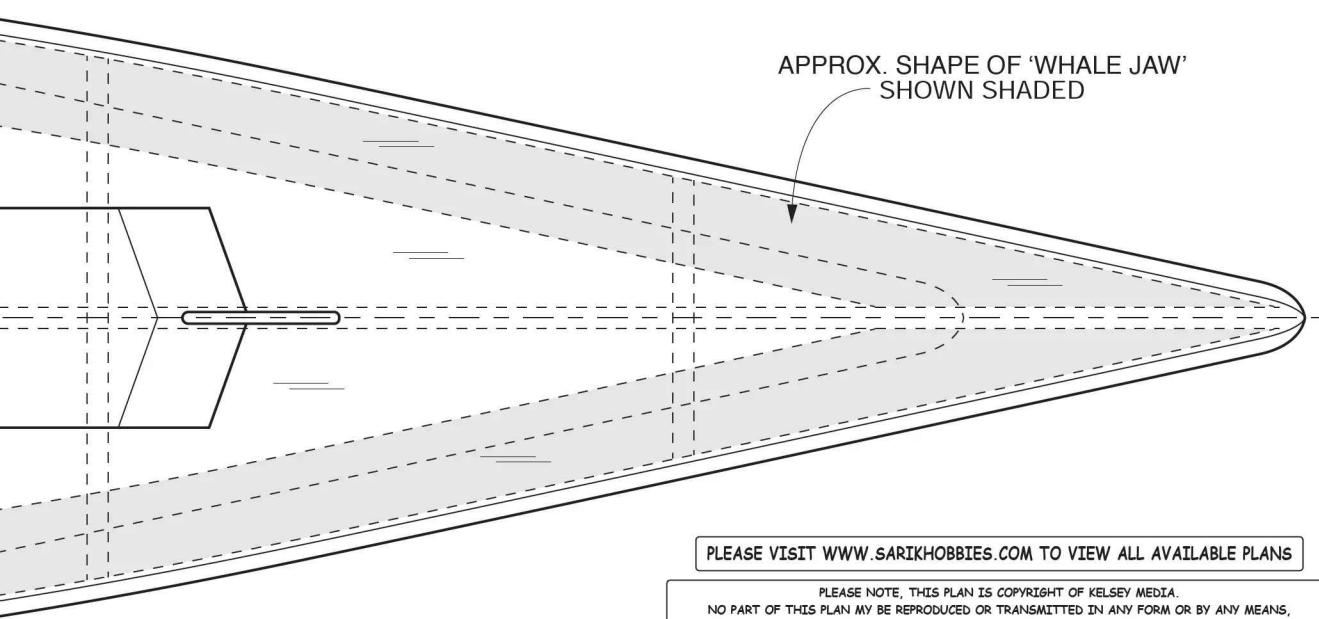

3mm BALSA FRAMES
3mm SHEET BALSA
SUPERSTRUCTURE FORMERS
APPROX. POSITION
OF ESC
BULKHEAD 2
MOTOR
MOTOR AREA COVERED WITH
REMOVEABLE 3mm BALSA PLATE
BULKHEAD 2
200
100
SCALE
MM
100

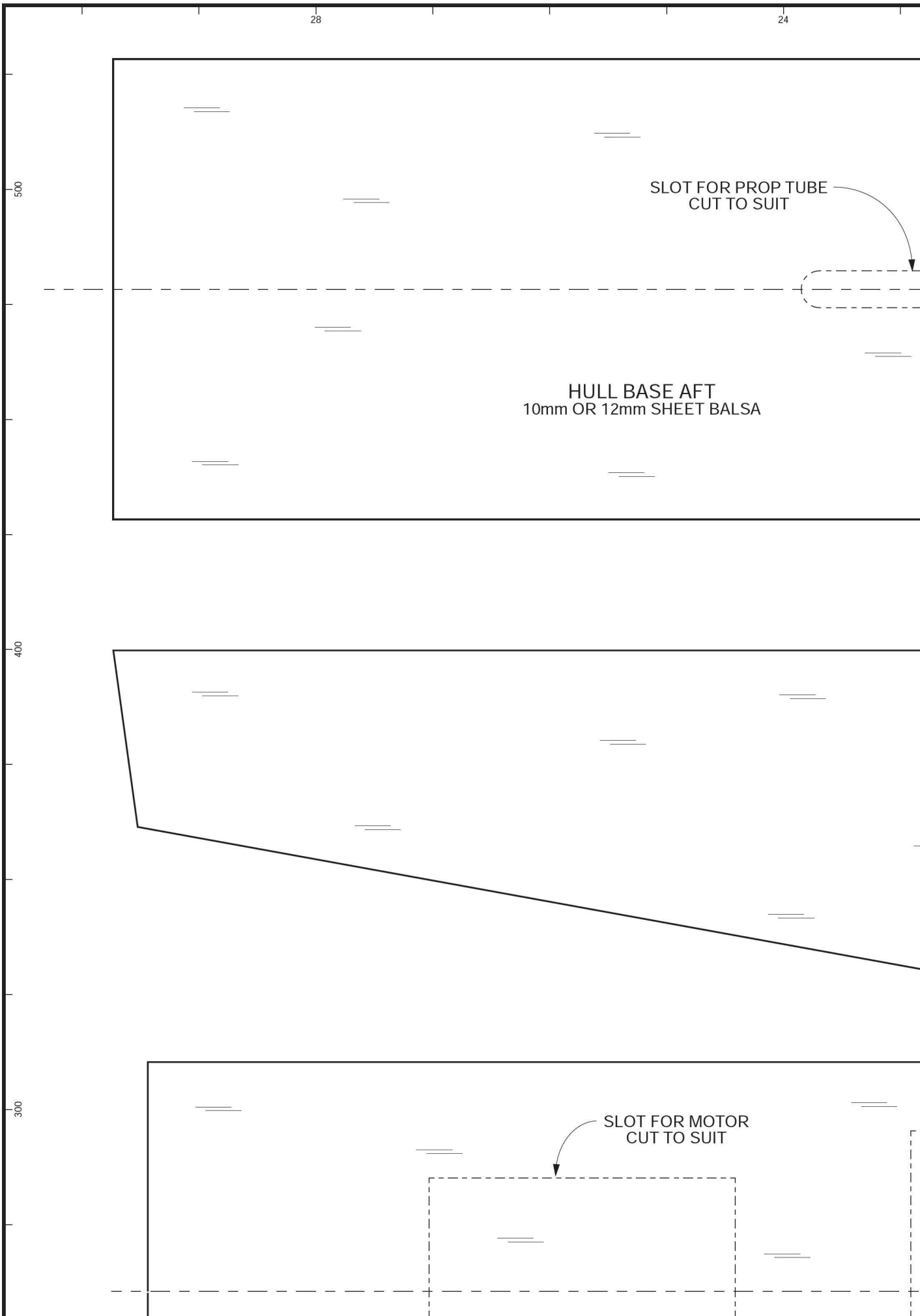

2 OFF 3mm x 6mm BALSA STRIPS IN
SEE SECTION
APPROX. POSITION
OF RX
TWO STARBOARD ACCESS DOORFRAMES
FROM THIN CARD
THIS DOOR ONLY ON PORT SIDE
PINE
SUPPORT
STRIPS
APPROX. POSITION OF BATTERY
ADJUST TO SUIT
CENTRE OF MASS
BATTERY AREA COVERED WITH
HINGED 3mm BALSA PLATE
200
300
400

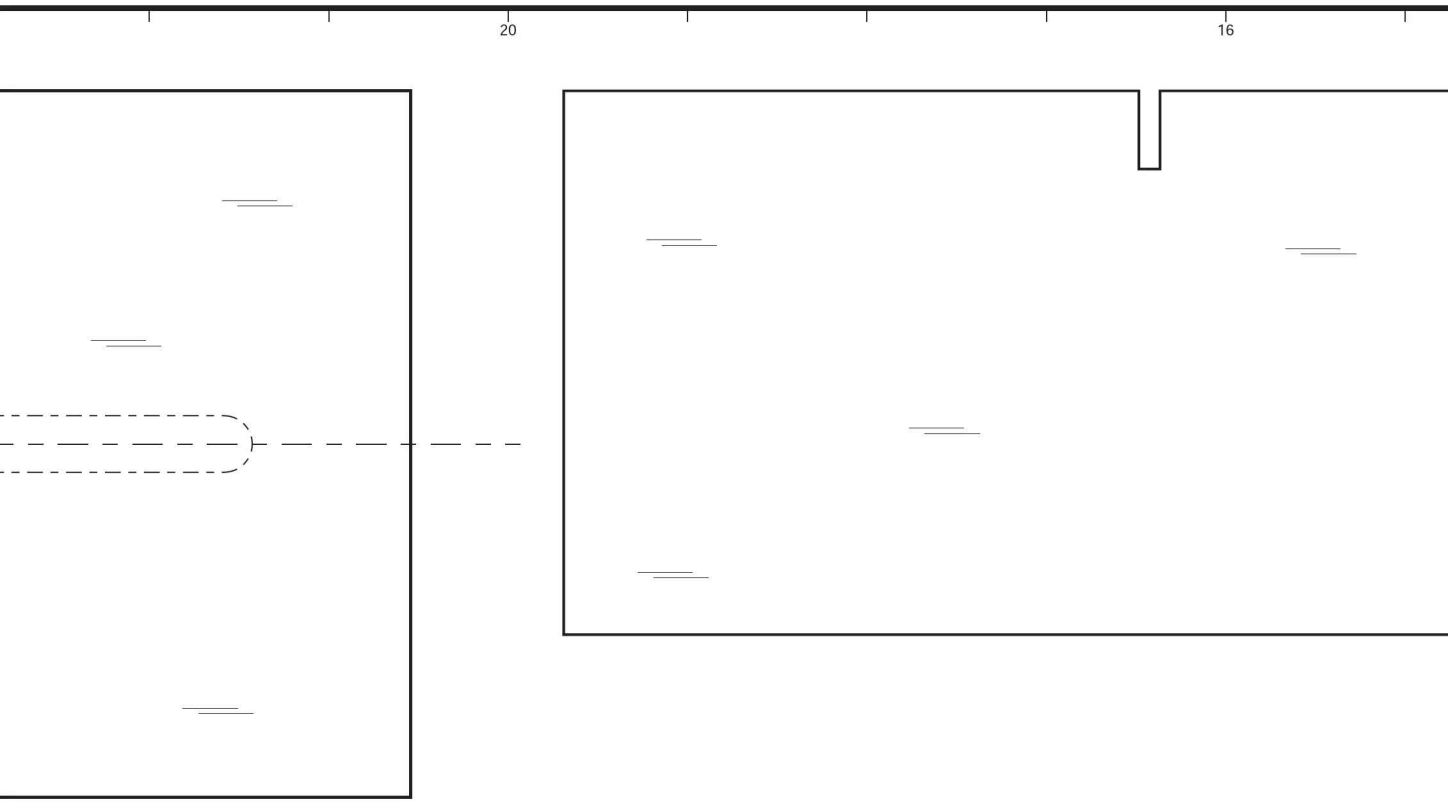

n BALSA STRIPS INSIDE
SECTION
RFRAMES
SIDE
3mm SHEET BALSA KNUCKLE STRIPS
PINE
SUPPORT
STRIPS
BULKHEAD 1
H
NOTE HULL SIDES TO
ED WITH
PLATE
BULKHEAD 1
400
500



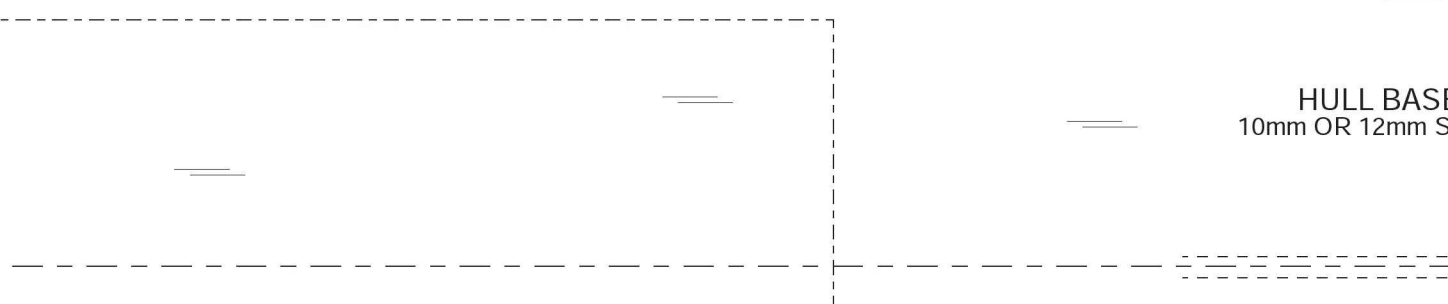
D BOW SHEETED IN SECTIONS WITH GRAIN VERTICAL




28
24
500
400
300
SLOT FOR PROP TUBE
CUT TO SUIT
HULL BASE AFT
10mm OR 12mm SHEET BALSA
SLOT FOR MOTOR
CUT TO SUIT



HULL SIDES
3mm SHEET BALSA



HULL BASE
10mm OR 12mm S

12

8

BOW FORMER
3mm SHEET BALSA

model Boats

HMS TERRIBLE

SEMI-SCALE TYPE 31 FRIGATE

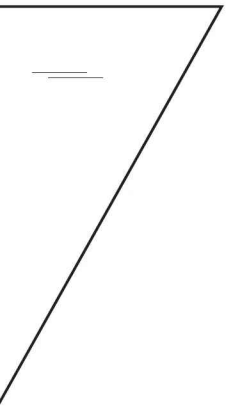
BY MIKE PAYNE

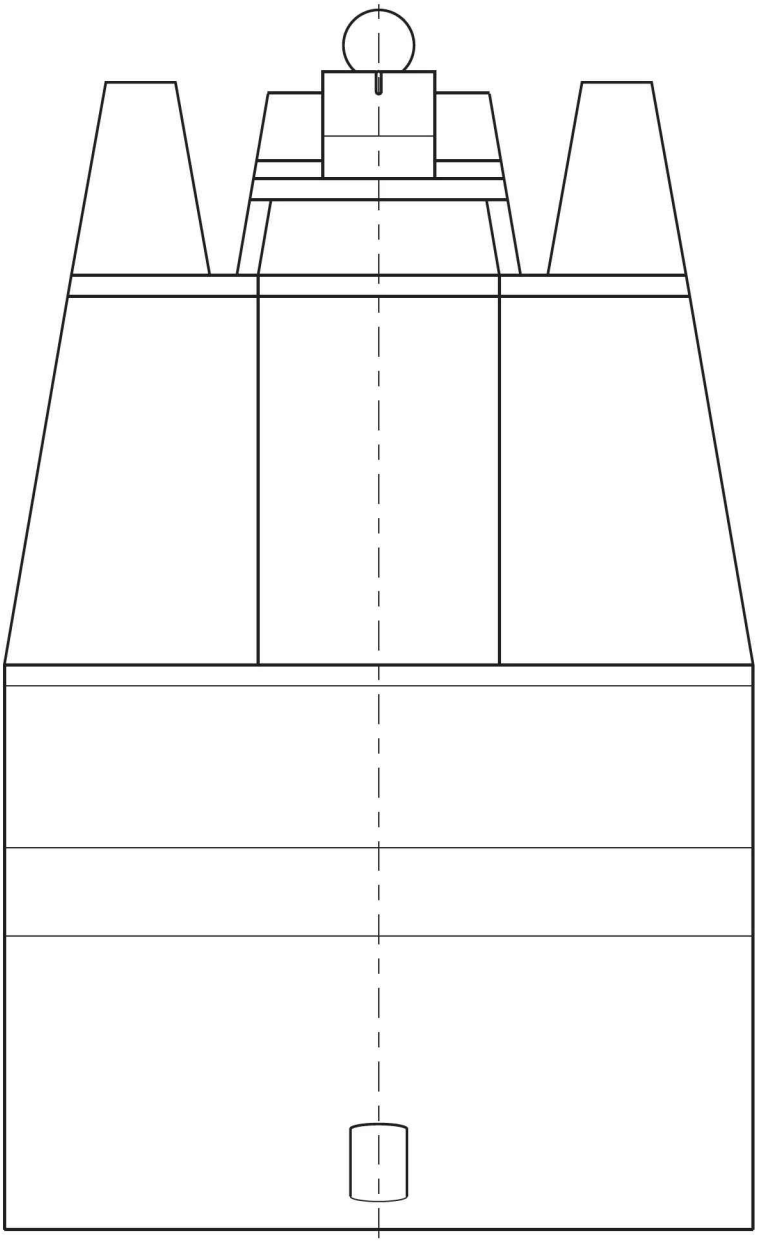
PLAN No: MM2186	No. OF SHEETS: 2 OF 2	First published in Model Boats May 2026

ES
ALSA

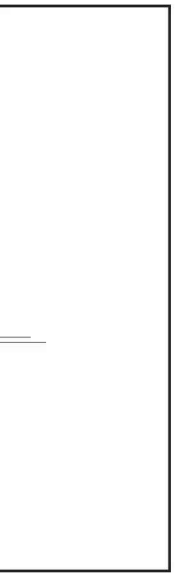
HULL BASE MAIN
10mm OR 12mm SHEET BALSA

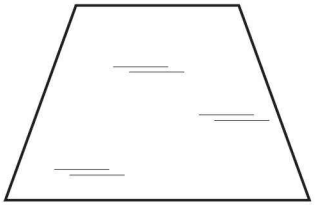
SCALE
INCHES



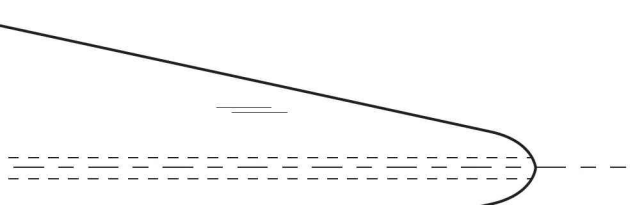


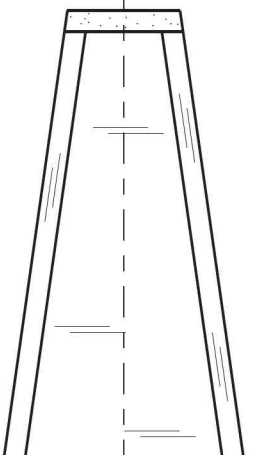
VIEW OF HULL FROM REAR



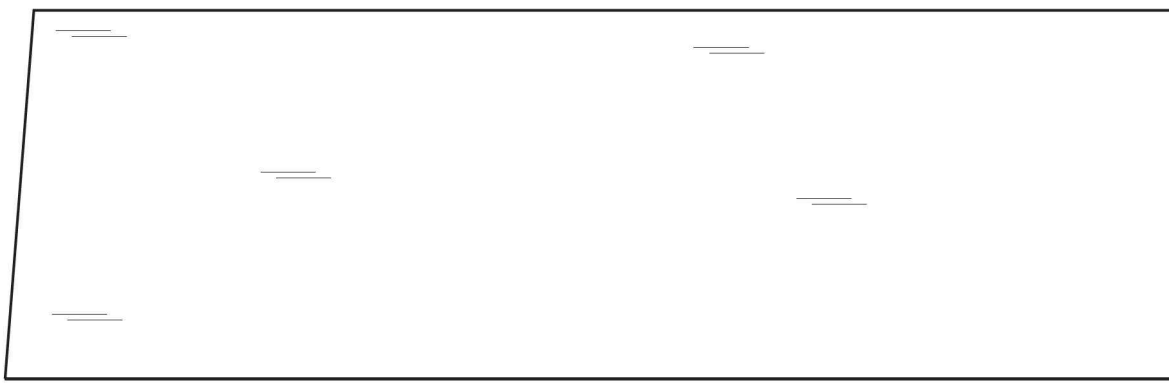


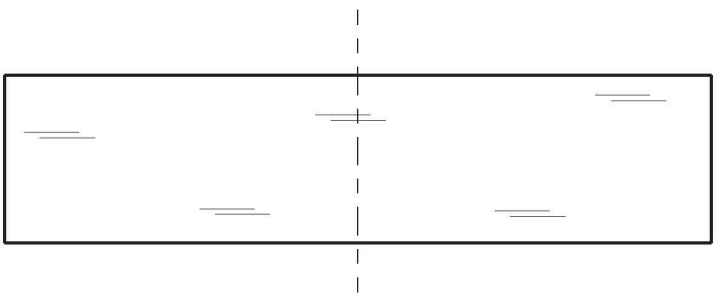
FUNNEL SIDES
3mm SHEET BALSA



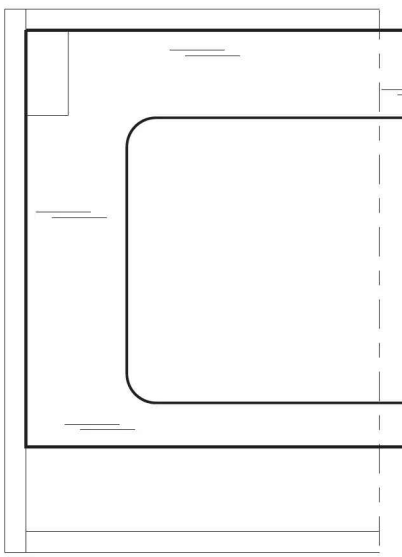


KEEP THIS PIECE TO
MAKE BASE FOR
MOTOR MOUNTING





TRANSOM
3mm SHEET BALSA



BULKHE
3mm SHEET

SCALE
MM

200

100

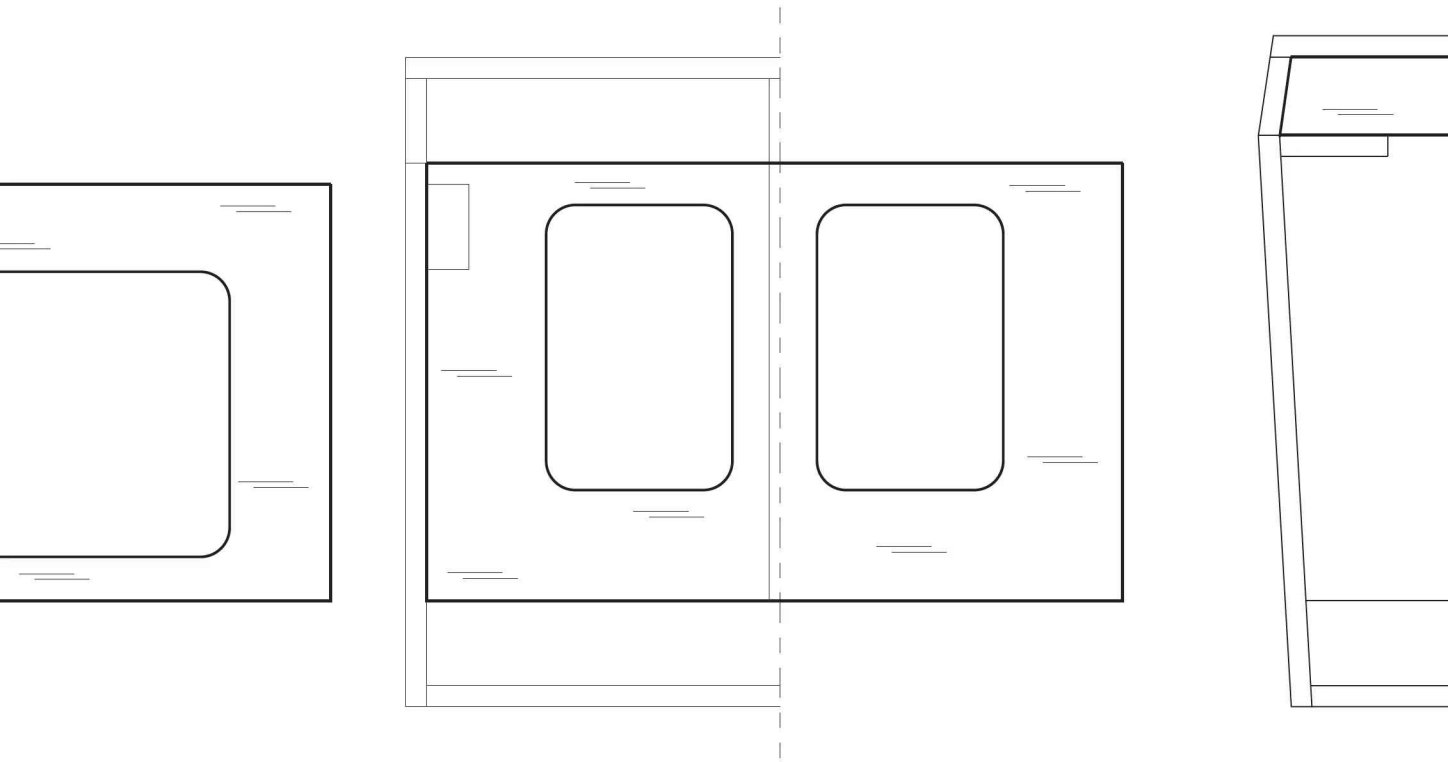
100

HULL BASE
10mm OR 12mm S

KEEP THIS PIECE TO
MAKE BRIDGE UPPER SECTION

SLOT FOR BATTERY
CUT TO SUIT

SUPERSTRUCTURE SIDES
3mm SHEET BALSA



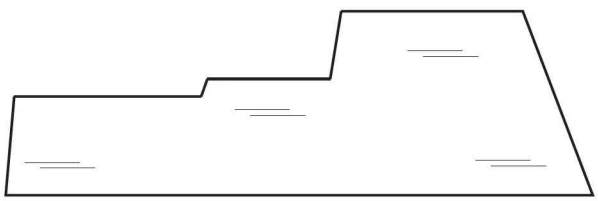
EAD 2
T BALSA

BULKHEAD 1
3mm SHEET BALSA

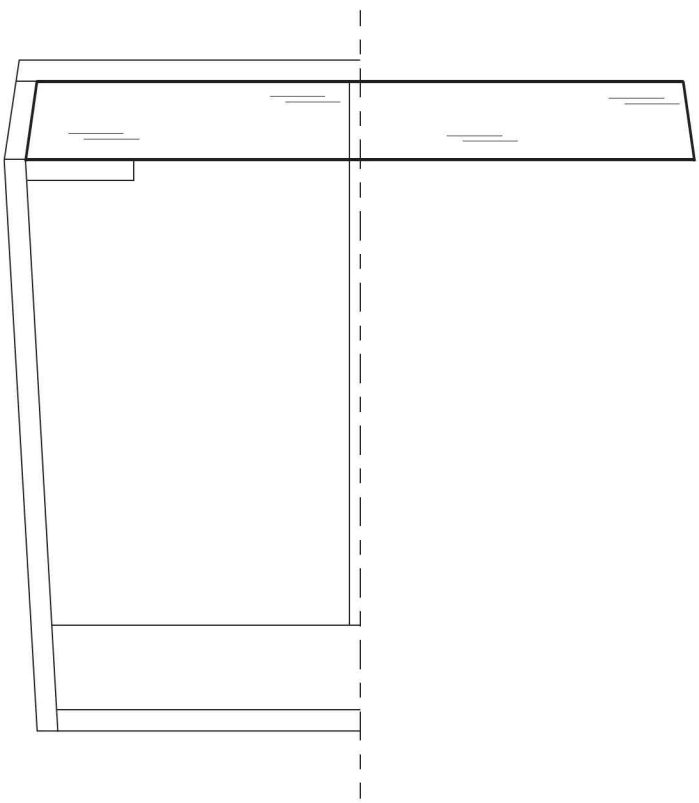
200 300 400

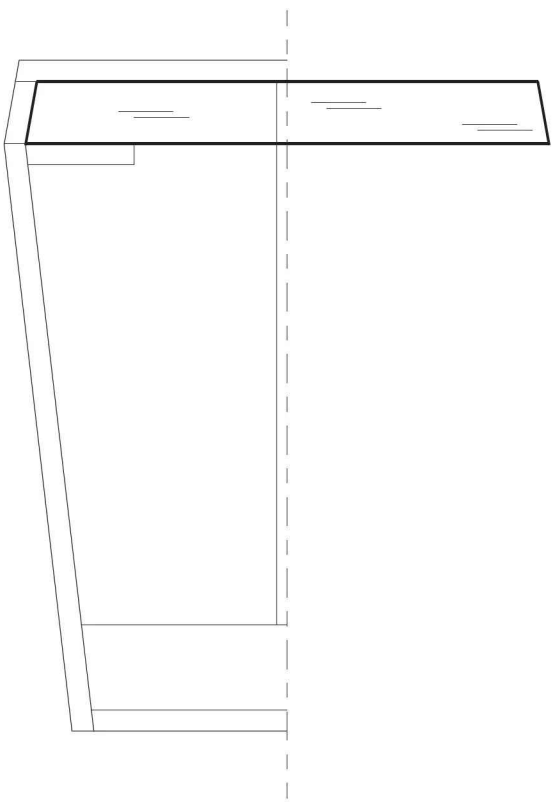
HULL BASE MAIN
10mm OR 12mm SHEET BALSA

POSITION OF BOW FORMER



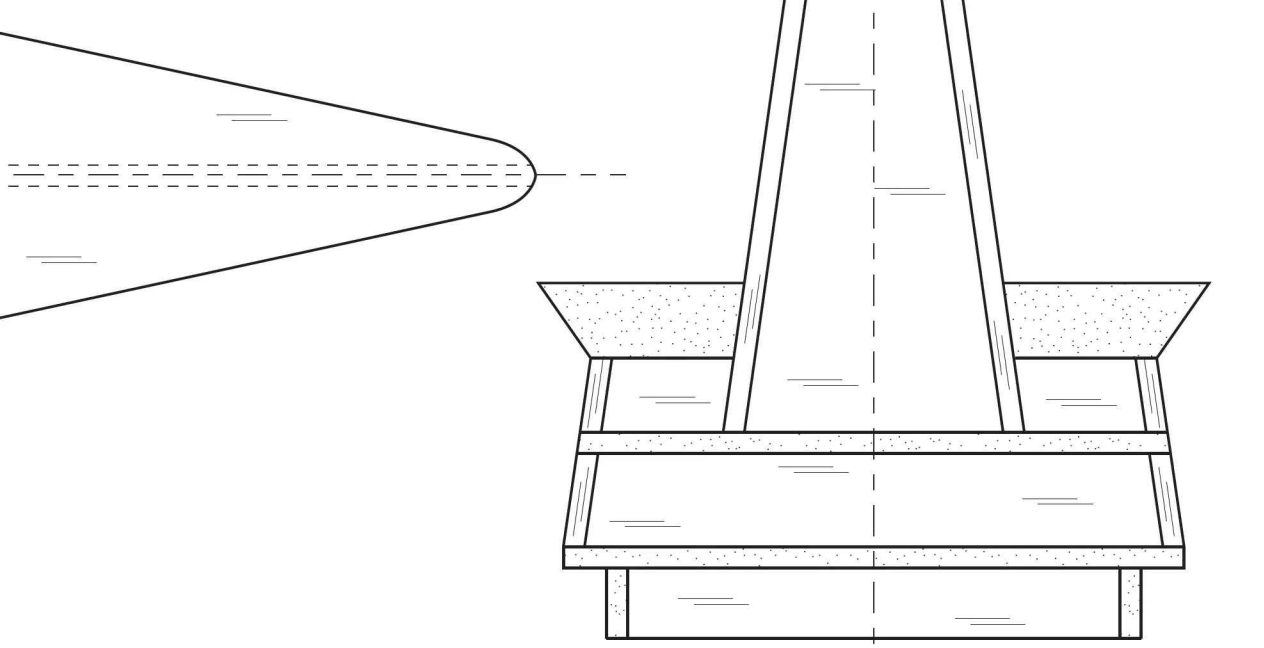
AFT DECKHOUSE SIDES
3mm SHEET BALSA



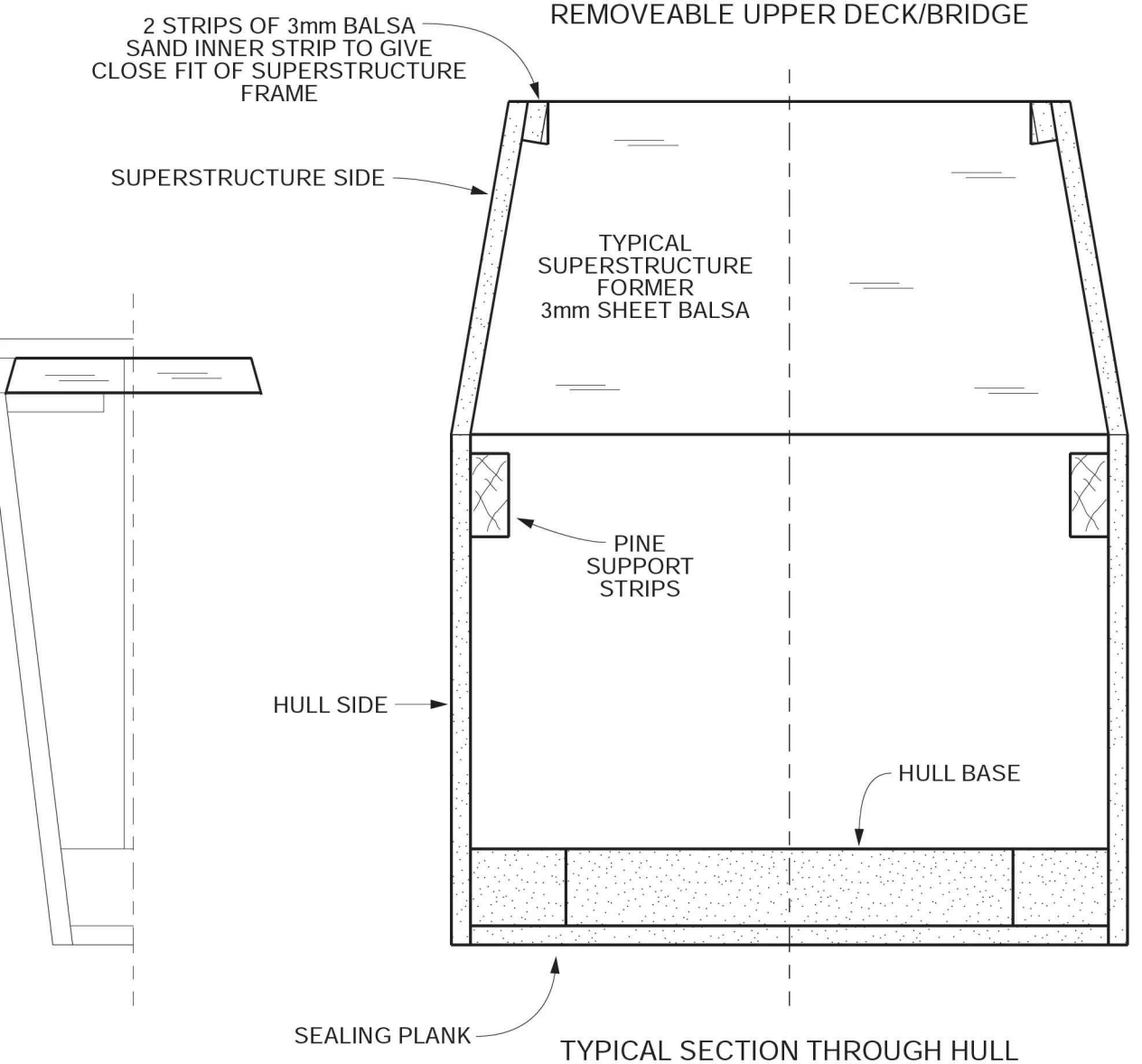


FORMERS TO SUPPORT FOREDECK
3mm SHEET BALSA
MAKE CARD TEMPLATES & CUT TO SUIT

400 500



TYPICAL SECTION THROUGH
REMOVEABLE UPPER DECK/BRIDGE



TYPICAL SECTION THROUGH HULL