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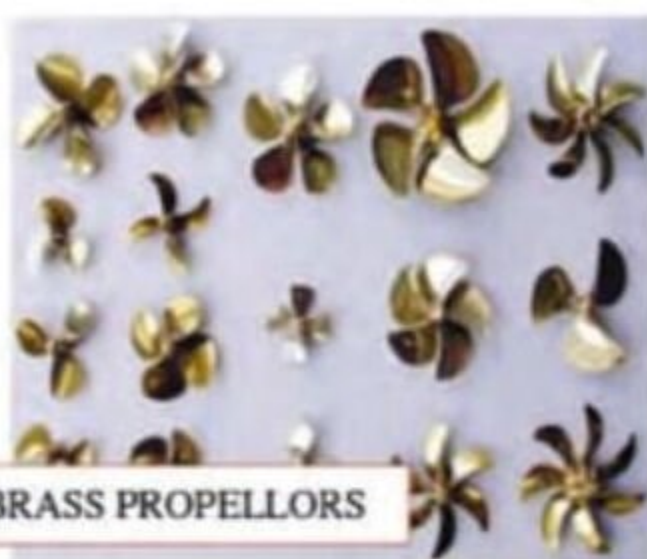
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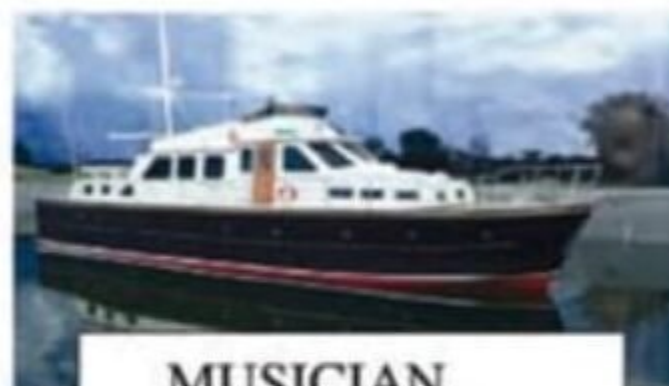
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10

contents

8 Compass 360

A round up of the latest hobby/industry news

10 Princess Victoria

Peter Binns chronicles the build of his 1:18 scale steam-powered 1907 Cornish twin-screw passenger steamer

18 Wonderful Radio London

Nick Santon treats us to a nostalgic look back at when pirates went pop, as he records his 1:48 scale build of the radio ship *MV Galaxy*, recently awarded 'Best Engineered Model' at the Waterways Model Boat Club Show...

26 USS Keats Sound

Glynn Guest documents his build of this 'stand-off scale' model based on the US Navy seaplane tenders of World War II

30 Monturiol's Masterpiece

John Parker dives into the little-known history of *Ictineo I* and *II*, and the options for modellers

34 Retro fitting

Drawing on personal experience, Nev Wade encourages others to explore the joys of building backwards!

38 Save money with a subscription

Check out the latest deals and get your favourite magazine for less, delivered directly to your door!

42 LCVP Mk.5 Part 2

Dave Wooley concludes the step-by-step guide to constructing a 1:16 Royal Navy assault landing craft from last month's free plan

26



18



30



54 Smit Nederland

Brian Knight shares his experience of building this Billing Boats' 1:33 scale tug kit, with some handy tips and tricks thrown in along the way

60 Little Urchin

Dave Wiggins explains why getting less than he bargained for prompted this month's trip down Memory Lane...

62 Boiler Room

Richard Simpson encounters a very unusual plant

67 Your Models

More VIBs (Very Impressive Builds) showcased

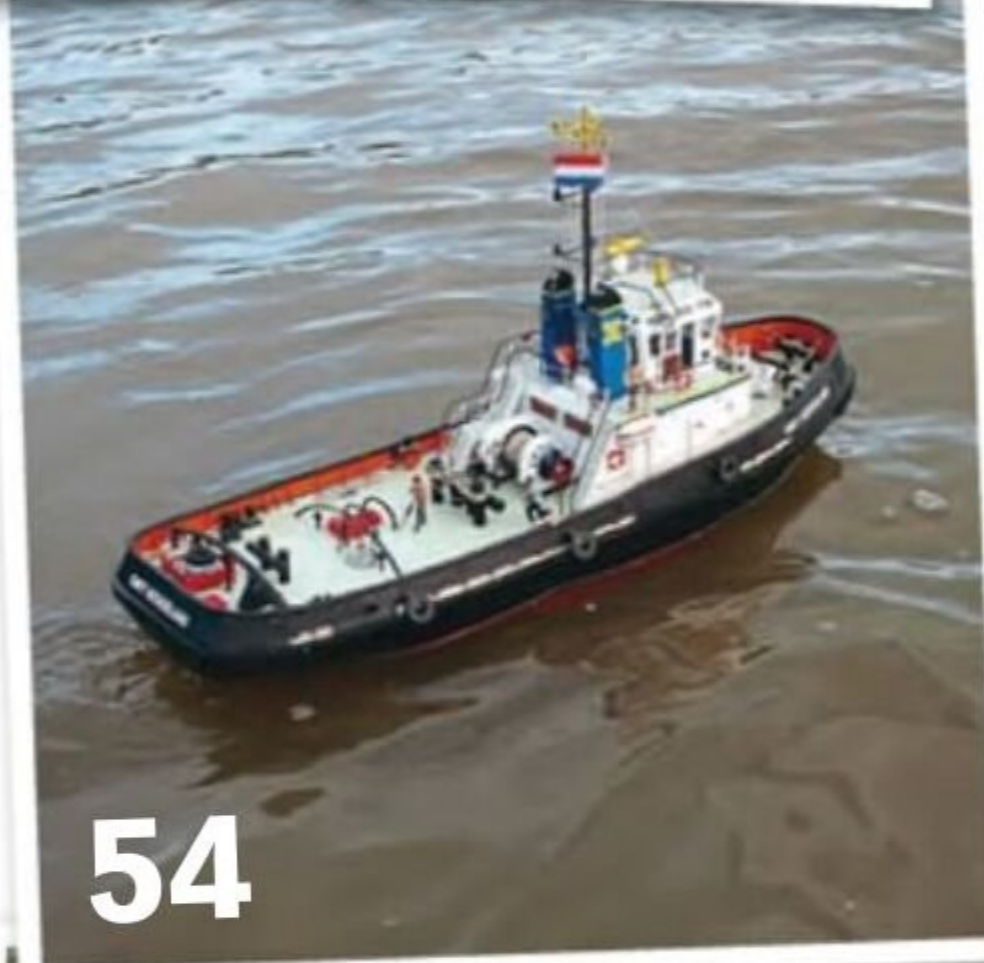
72 Your Letters

Views aired and info shared

74 Next Month...

Just three of the reasons why you won't want to miss the March 2024 issue of Model Boats

54



62



42



This morning's dog walk was cold, wet, blustery, muddy and miserable (for me at least – for Luna, being a Husky, not so much!), and, while I've now thawed out and have a hot cup of coffee to hand, as I sit writing this column it's clear from the leaden skies and the way the branches of the big chestnut tree outside are swaying around that there's unlikely to be any let up today. There's even been some talk of snow by the end of the week. So, here in good old Blighty it's certainly not the perfect weather for a spot of leisurely sailing right now.

There will no doubt be those die-hards amongst you braving the elements regardless, but for those of you trying to stay warm and cosy indoors (a bit of a challenge with the heating bills as they currently are, so this may simply just involve an extra jumper and a thicker pair socks!) hopefully you'll find plenty to entertain you in this latest issue of Model Boats – in between, of course, continuing with whatever builds/projects you currently have on the go. Perhaps put the radio on and have some music while you work? I bet Nick Santon did this while constructing his 1:48 scale award winning model of MV *Galaxy* (see feature starting on page 22)!

Alternatively, if you have a YouTube, Spotify or similar account, you could put together your very own tailor-made boat/ship related play list. I've started one myself (including classics such as *Sitting On The Dock Of A Bay* by Otis Reading, *Sloop John B* by the Beach Boys, *Wooden Ships* by Crosby, Stills, Nash & Young, *My Ship Is Coming In* by the Walker Brothers, *Into The Mystic* by Van Morrison, *Albatross* by Fleetwood Mac, *All at Sea* by Jamie Cullum, to name but a few) but am always open to suggestions from fellow music lovers. Perhaps, just for fun, we could start a thread on one of the MB social media platforms or occasionally include a little 'jukebox' section in Your Letters?

Too much time on my hands in between work and dog walks? Probably, but we all have to find ways to while away the winter days when it's dark by 5pm! I know from all the fantastic submissions to the Your Models section of the mag, though, that most of you are using your time far more practically and productively, so please keep the info about, and images of, your brilliant builds coming.

Enjoy your read,

Lindsey

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Compass 360

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



John Aliprantis's completed build of Victory, based on the Billing Boats' kit but with some very unique touches, designed by John, added.



2,200 individual pieces of copper plate were painstakingly applied to the hull of John's Victory.

A remarkable *Victory*

Master modeller John Aliprantis's build of a unique and highly detailed 1:75 scale version of HMS Victory based on Billing Boats' kit (Ref. BB 490) is now complete.

John explains: "I built this model with the full cooperation and support of Billing Boats but incorporated many extra little touches I designed myself along the way. Besides all the features you'd expect to see, such as cannons, cannon ports, etc, my model incorporates:

- A copper hull, consisting of 2,200 individual pieces of copper plate
- 20 sails
- The use of different types of coloured (black, brown and tan) rope, each chosen to match a specific purpose (e.g., for standing or running rigging, etc)

- Seven ship's boats
- Yellow LED lighting inside the four lanterns (three on the stern and one on the main mast)
- Yellow LED lighting in all the lower decks
- Officers' quarters (self-designed)
- Hammocks
- A power supply inside the stand base (self-designed)".

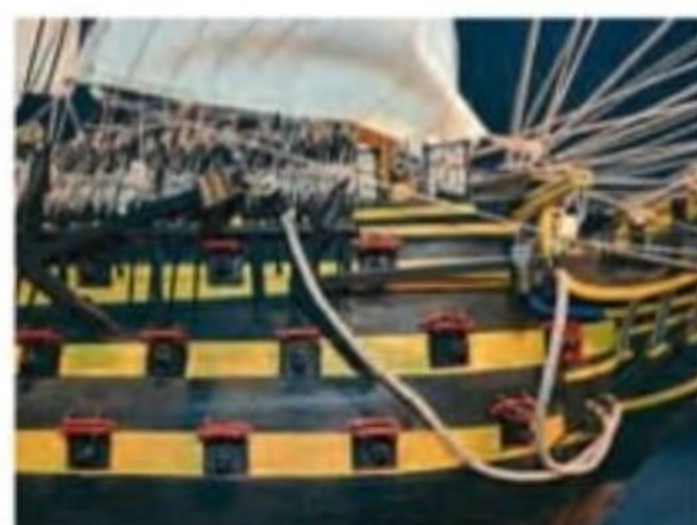
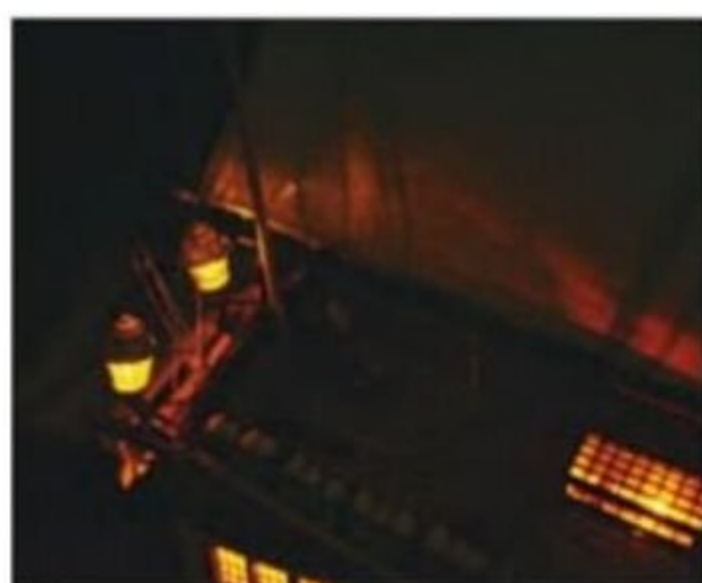
Every stage of this model's construction has been documented on video in a series of regular posts to John's YouTube channel (<https://www.youtube.com/channel/UCvNxDG6MgbFikbTM89Hod2g>), the playlist for which can be accessed by keying the following link into your browser: <https://www.youtube.com/watch?v=Ttw-DUH0Cao&list=PLmoS1cmOImgjyV1liE25qaCr09XPD7yfJ> into your

browser. Alternatively, you can simply click on the link that will appear on Billing Boats' own website, <https://www.billingboats.com/index.php/modelboats-footer/77/120/boats/the-expert/P-bb498-hms-victory>.

A useful step-by-step photographic reference gallery to complement the YouTube footage can be also accessed via the following link: https://docs.google.com/document/d/e/2PACX-1vRcld8VsnNeKBvpXypHn0ovTtIlejeLjm53ammNblfC_Nn6LBkQYMGfXnK6NzhUMtQK5jsR6fEmE9I3/pub



Installed within the base of the model's stand is a power supply for illumination.



Note the use of different types of coloured (black, brown and tan) rope, each chosen to match a specific purpose (e.g., for standing or running rigging, etc).



OUT AND ABOUT

The 2024 South West Model Show

Scheduled for the weekend of February 10/11 is the 2024 South West Model Show, hosted by the Tank Museum in Bovington, Dorset BH20 6JG. Doors will open from 9.30am to 5pm on both days and the museum's standard admission tickets (for full details visit www.tankmuseum.org) and annual passes will be valid for the event.

Visitors will be able to view a huge variety of models (which, as well as model boats/ships, will include aircraft, trains and, of course, tanks) and modelling demonstrations, attend

specialist talks and tours, and browse numerous trade stands.

New for this year will be the South West Model Show Competition, and this will include a 'Ships of All Scales' category. There will be just 20 spaces in each competition category and all entries must be registered on the museum's website before the closing date of Sunday, February 4. Entrants must commit to taking their models to the show on February 11, where judging will take place. A fee of £2 will be attached to competition entry, along with the cost of a ticket to the show.

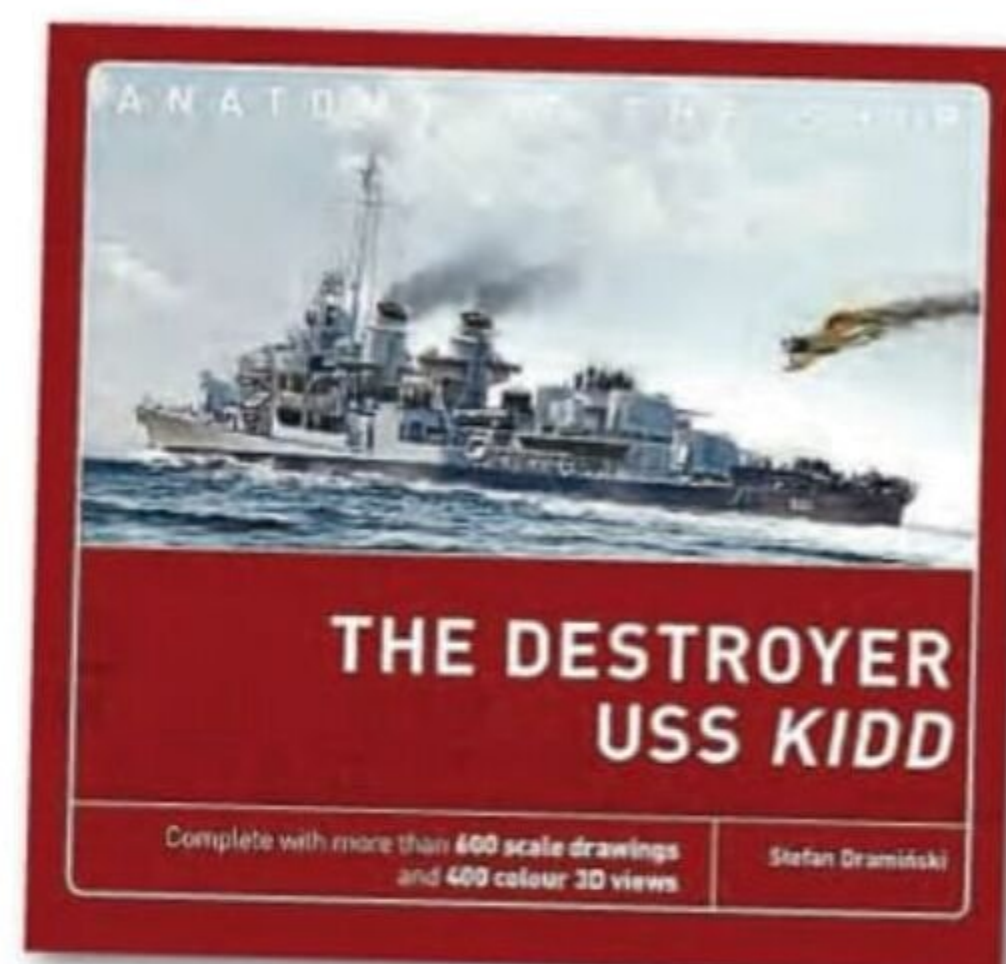
BUY THE BOOK

The Destroyer *USS Kidd*

Drawing on author Stefan Draminski's new research and making use of his acclaimed 3D illustration techniques, this forthcoming new book, due for release on February 29, 2024, reconstructs and dissects the Fletcher-class destroyer USS Kidd, the only US World War II destroyer to have retained its original configuration. *Kidd* saw action throughout the Pacific, actively engaged in the Marshall Islands, Marianas, and Philippines campaigns. In early 1945, *Kidd* joined Task Force 58 for the invasion of Okinawa, and post-war served in the Korean War. Since 1982 USS *Kidd* has been a museum ship at Baton Rouge, Louisiana.

Due for publication in hardback format as the latest addition to the Anatomy of the Ship series, the book will include a complete set of detailed line drawings with fully descriptive keys and full-colour 3D artwork, supported by technical details, photographs, and a concise history of the ship's construction and service.

Carrying an RRP (Recommended Retail Price) of £45, pre-orders at a discounted price of £40.50 are now being taken by Osprey Publishing – visit www.ospreypublishing.com. Alternatively, copies can be ordered from all good bookstores quoting ISBN 97814 72827418.



OUT AND ABOUT

WOMEN OF THE RNLI EXHIBITION

March 2, 2024 will see a new exhibition, entitled Women of the RNLI, open at the National Maritime Museum, London, to mark the bicentenary of the Royal National Lifeboat Institution (RNLI). This exhibition will celebrate the lives and experiences of current women volunteers, as well as those that have paved the way in areas such as fundraising, campaigning, technological innovation, training and as volunteer lifeboat and shore crew. Featuring striking photography, personal testimony and breathtaking film footage, the exhibition will offer a window into the lives of volunteers across the UK and Ireland.

Open daily from March 2 through to December 1, 2024, admission will be free of charge, but tickets must be booked online in advance at www.rmg.co.uk/rnli



Princess Victoria

Peter Binns chronicles his 1:18 scale, steam-powered, build of this 1907 Cornish twin-screw passenger steamer





Living in Cornwall, I have a passion for building model boats of local and/or historical significance. While looking for a new project in early 2021, a friend lent me a book *Passenger Steamers of The River Fal*, containing some fascinating old photographs of the many locally built vessels which served the river route to Truro, then still an active inland port, and also provided coastal excursions. One in particular, the *Princess Victoria*, took my fancy and was, in fact, the longest-serving Fal River passenger steamer, until requisitioned by the War Office in 1942 and never seen again.

All I had, however, was a handful of blurry black and white pictures and a tiny silhouette of the *Princess Victoria*, but with both the National Maritime Museum Cornwall and The Royal Cornwall Museum on my doorstep, I felt sure of finding some plans with ease. I was wrong and had almost abandoned the project when it occurred to me that maybe the shipbuilders occupying the yard once used by Cox & Co (who built the *Princess Victoria* back in 1907) today retained an archive that would yield something. An enquiry to A&P Shipbuilders on the Tyne confirmed my hunch and within a week or so its Falmouth yard had furnished me with copies of the original ship's plans (see **Photo 1**). I could not have asked for a better result!

After scanning, enlarging to 1:18 scale and printing the deck general arrangement, side elevation and the all-important ship's lines, I was ready for this build journey to begin.

Constructing the hull

I am not a fan of building on pre-formed hulls, and in any event, the specific design of the *Princess Victoria* demanded a plank-on-frame (or in this case, plate-on-frame) method of hull construction. The first step was to fabricate the keel in 8mm thick pine, notching it carefully to attach the eleven bulkhead cross-member frames in their correct positions.



Princess Victoria. Photograph: E.A. Bragg, AK Collection, as published in Passenger Steamers of the River Fal by Alan Kittridge, Twelveheads Press 1988.

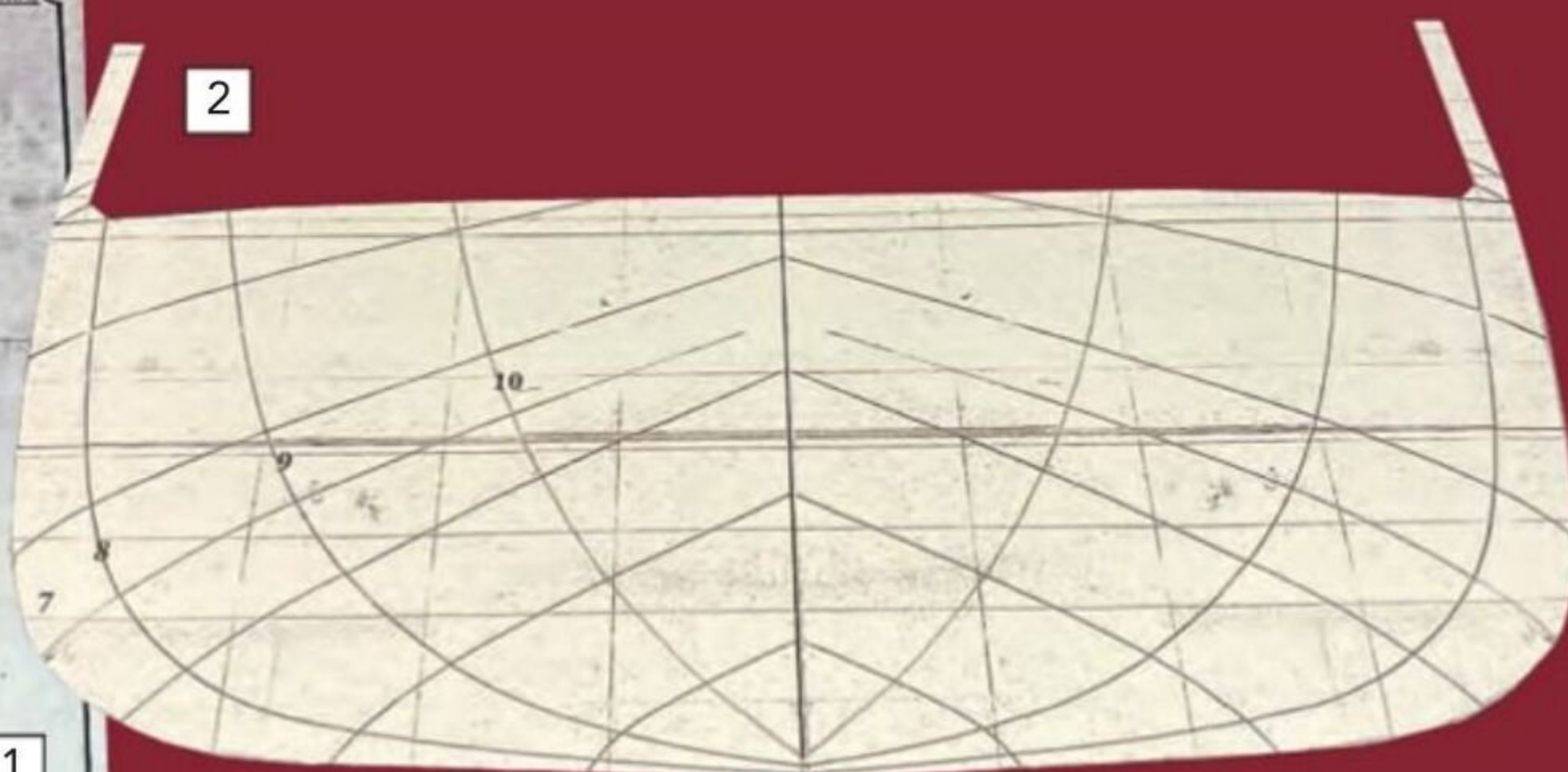
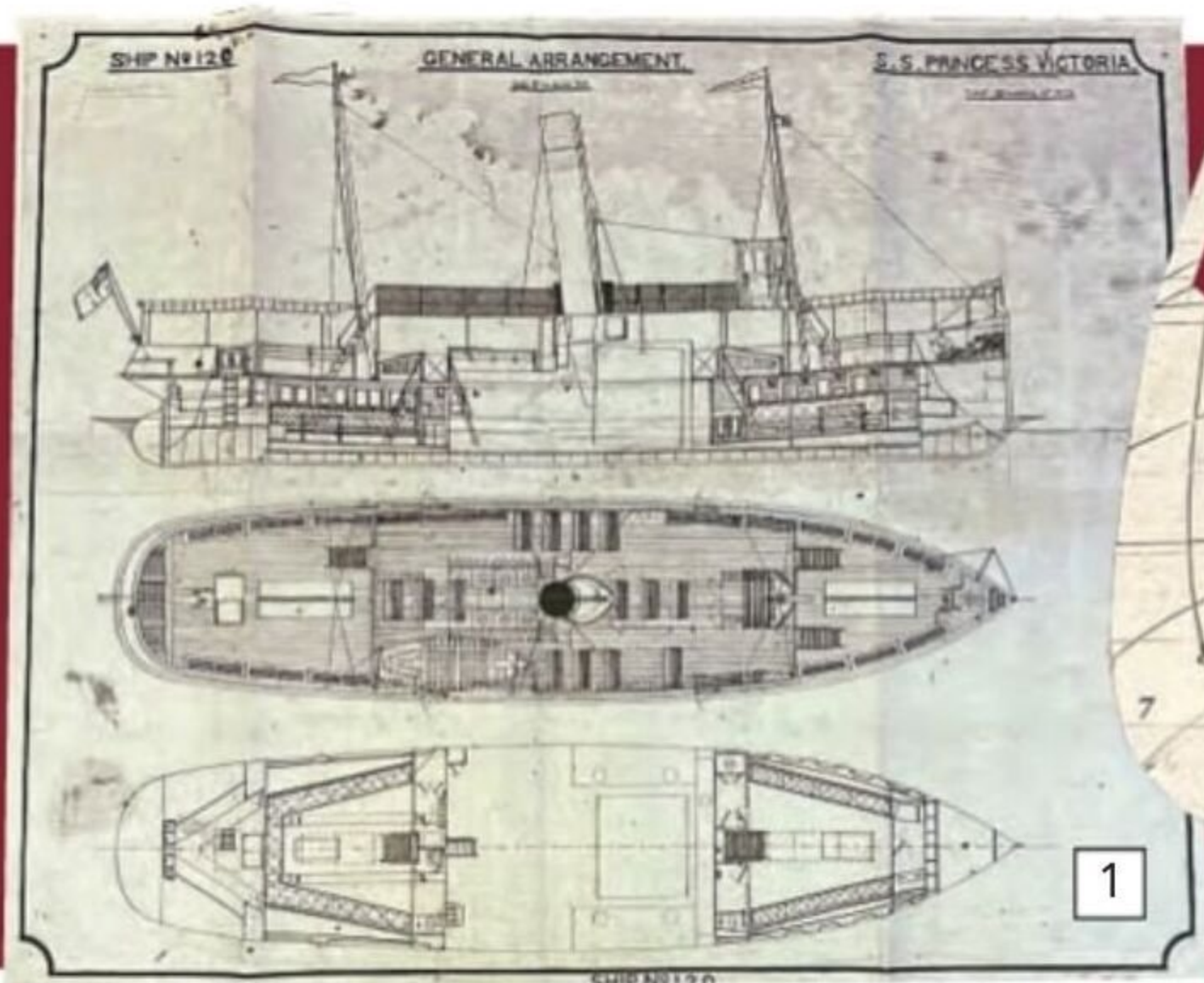
From the block plan, I printed multiple copies on thin cardboard from which I cut templates for each of the eleven bulkhead cross-member frames (see **Photo 2**). These were then traced onto good quality 5mm thick birch ply sheet and cut out using my trusty scroll-saw. Most of the frames needed to be 'open' in the centre to allow for the positioning of the steam plant, control electronics, steering gear, ballast and other necessary items. I therefore allowed a minimum 10mm width at the sides and for the cambered deck support at the top, but maintained a common lower deck support level sufficient to achieve the required floor width for the steam plant, etc.

You will also note that the frames included thin (but subsequently removable) temporary gunwale support ribs. This was to facilitate

the later addition of the gunwales to the hull above the main deck line, where attempting to angle the hull skin inwards and curve it at a 90-degree angle at the same time would have been too great a challenge!

On the building board, I find the best way to keep the keel upright and straight is to use cabinet jointing blocks, available from any DIY outlet. These permit the work to be clamped tightly along its length but are easily removable when no longer required. The eleven bulkhead cross-member frames were notched on the bottom at midships to make a firm joint with the keel. Each bulkhead frame was then glued in place, the joint wrapped in clingfilm and square blocks clamped in each right angle to ensure the joint remained true. It was also important to ensure the frames remained vertical (see **Photo 3**).

"On the building board, I find the best way to keep the keel upright and straight is to use cabinet jointing blocks, available from any DIY outlet. These permit the work to be clamped tightly along its length but are easily removable when no longer required"





I learned from previous bitter experience that it's vital to keep checking that the frames are in perfect alignment while the adhesive cures. Apart from judging by eye, you can use lengths of flexible wooden strip to see how well the frames describe a smooth curve and maintain the correct deck line.

Once everything was set hard, I turned over the assembly, keel uppermost, and used $\frac{1}{8}$ " square section spruce strip to clamp in position and mark on the frames where to notch to accept the stringers. With all notches cut using a fine razor saw, the stringers were glued in place on both sides in turn to avoid warping. The hull was really starting to take shape now (see **Photo 4**).

After a good sanding down to remove high spots and proud joints, the hull frame was then ready to 'skin' with 2mm thick birch ply. This is quite flexible and can be steam-bent (with a kettle) to achieve fairly tight curves. Deck-to-keel sections, or 'plates' were glued, pinned and clamped in place, using the edges of the 5mm thick frames to joint sections together (see **Photo 5**). The sections could span two, three or even four frames, depending on hull shape and complexity. The complex shape of the cruiser stern aft of the last bulkhead frame was achieved by shaping balsa blocks either side of the keel.

All plate joint gaps and other imperfections were filled with waterproof wood filler and the skinned hull was sanded, then filled

and sanded again to as smooth a finish as possible. A coat of Z-Poxy finishing resin and fine fiberglass cloth was applied, sanded smooth and followed by a second coat of resin only. Once dry, this was sanded again with fine wet-or-dry abrasive to leave a glass-like, strong and waterproof surface ready to paint (see **Photo 6**).

The *Princess Victoria* had a riveted steel hull, so, to simulate the rows of rivets where the plates joined, I asked our model boat club's 3D printing guru if he could make me a quantity of wafer-thin strips with hemispherical rivet heads, correctly sized and spaced to scale. From photographs of the actual boat, I drew the joint lines of the plates on my hull and applied the strips accordingly with CA glue (see **Photo 9**). The effect was very successful and, when the hull was painted in French grey, the very thin base is hardly noticeable (see **Photo 7**).

Designing and installing the steam plant

Like the actual vessel, my *Princess Victoria* had to be steam powered. I cut my teeth with live steam when I built my *Waverley* paddle steamer a few years back, so the prospect was not quite so daunting. With two large propellers I needed a two-engine set-up with one large boiler, so turned again to Clevedon Steam who supplied the plant for my *Waverley*. Even more fortuitously, its

proprietor, Jerry Watson, moved his business to Cornwall a few years ago.

I decided to invest in two vertical Libra two-cylinder oscillating steam engines fed by a Taurus boiler, the largest in Clevedon Steam's range. The plant also includes twin gas burners, one at each end of the boiler, a refillable gas tank, twin condensers, an automatic gas control system which cuts the gas supply to a pilot light whenever it is not required, and a steam whistle.

The boiler came complete and with a pressure test certificate but had to be clad with timber strips and brass bands, and all the various unions, blanking plugs, pressure gauge, and the water sight gauge had to be fitted. The two Libra engines came in kit form. I am no engineer, but with clear instructions and great care not to scratch any facing surfaces, assembly proved straightforward.

With a steam-powered boat, where all the plant is below deck and enclosed within the superstructure, you need plenty of space for operating, adjusting and fixing problems. I therefore planned for the most generous engine room floor area I could, and the largest possible 'lift-off' section of the superstructure and upper deck to maximise access. Keeping the weight of the steam plant equal either side of the centre point of the boat, the various parts were bolted or screwed in position and the steam supply and exhaust pipes connected up (see **Photo 9**).



At this point I also tackled the always nerve-wracking task of piercing the hull for the propeller shaft tubes and installing them as accurately as possible to ensure perfect alignment with the steam engine output shafts. Having always used two-part 'cardan' flexible joints, thinking they were universal joints and wondering why they still made so much noise, I obtained some three-part full universal joints. Because high temperatures are transferred from the output shafts, I didn't want any plastic parts melting or de-forming, so the joints were entirely made of stainless steel (good old China!).

Once the R/C receiver had been installed and connected to the throttle servos I was able to test-run the steam plant in situ on the bench. I'd like to say it went brilliantly first time, but I did have few problems with leaking union joints and sluggish performance. After consulting with my steam guru, Jerry, however, everything worked perfectly.

I do have one regret... As the ship's plans gave no detail about the depth of the propellers below the waterline, and whether the shafts were horizontal or slightly inclined, I positioned the steam engines as low as possible in the hull and kept the shafts horizontally aligned (see **Photo 10**). Consequently, the 50mm diameter 3-blade props are not as far below the waterline as I would have liked, but hopefully that won't interfere with the boat's performance.

Constructing the main deck

Having already laid and cut the necessary apertures in a birch ply base for the main deck, the next task was to add the gunwales (the 'walls' around the edge of the deck). These were fabricated from 2mm thick birch plywood and Lite-ply, shaped and steam-bent as near as possible to the eventual shape, making gluing the gunwales to the deck edge and the temporary upright supports

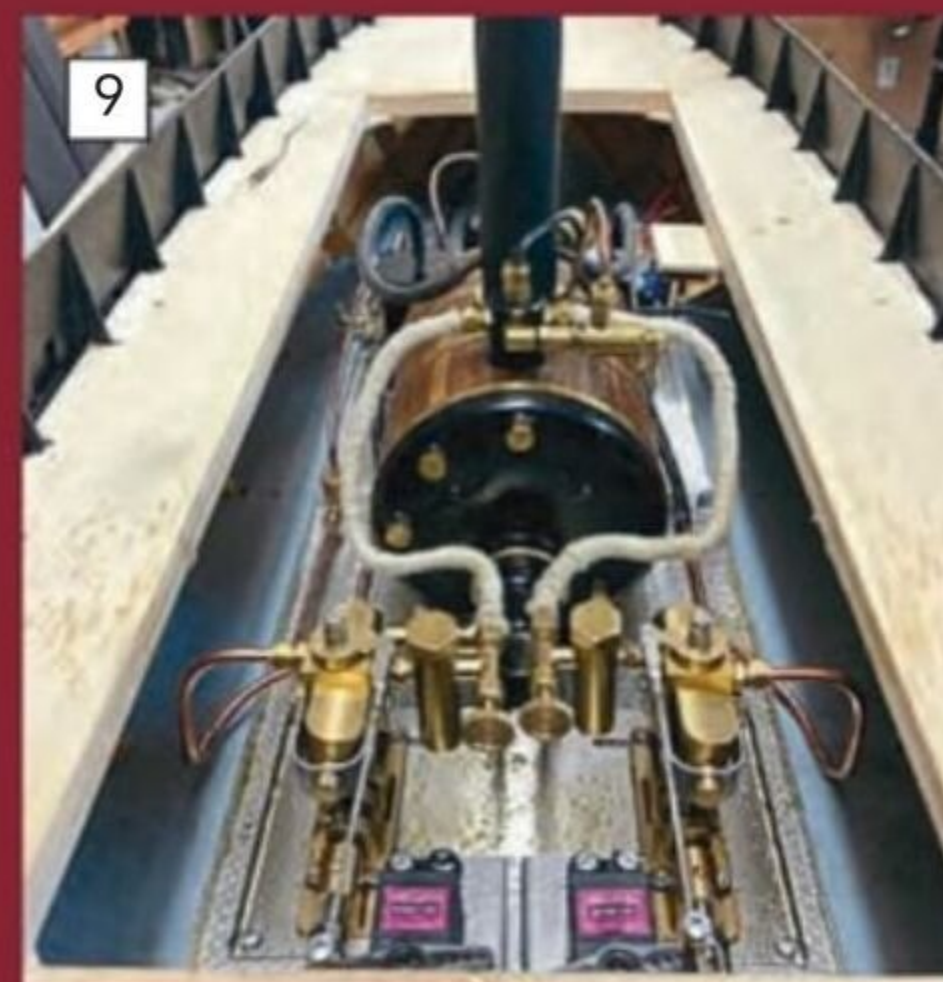
as easy and as accurate as possible. Once the gunwales were fixed firmly in position the temporary upright supports could be removed and replaced by closer and more regularly spaced triangular web supports. As per the ship's plans, the gunwales were painted 'off black' both outboard and inboard (see **Photo 11**).

I then moved on to creating the housing covering the top part of the boiler and making the funnel out of a length of thin-walled aluminium tube. I also incorporated a shroud to fit snugly over the boiler pressure relief valve from which a copper pipe runs up the front of the funnel. The assembly was fixed to the removable section of the main deck and would form the main support for the upper deck (more on this later). Before going on to make the six other structures on the main deck (forward bench, forward companionway, engine room skylight and companionway, midships companionway, aft bench and aft companionway), it had to be planked. Call me a masochist, but I actually enjoy laying and caulking deck planking. No drawn planking effects for me!

I used to be able to get tulip wood strip for deck planking, which simulated weathered teak very well, but for the *Princess Victoria*

I chose the alternative of 7mm x 1.5mm African walnut and used 10mm wide strips for the edges against the gunwales and around companionways. Working from the centre and alternating between port and starboard for each 200mm-long plank laid, the planks were superglued in position, interleaved with thin strips cut from an A4 sheet of 0.5mm thick black styrene, end-on, to simulate caulking (see **Photos 12 and 13**). Once the main deck was completely planked and caulked, the excess black styrene was pared off using a sharp broad chisel and the whole deck sanded smooth before sealing with matt water-based varnish.

The companionways, benches and engine room skylight were made from mahogany sheet and strip, fitted with brass portholes, etc, and well-varnished (see **Photo 14**). Only the engine room skylight and forward companionway were glued in position: the other four structures remaining as a push-fit so as to permit access to the steering servo, receiver batteries and on/off switch, the lighting switch and removable ballast below the fore and aft deck benches. All the non-fixed structures were 'tethered' to the hull with nylon fishing line in (the unlikely) case of capsizing.





“This was always going to be the trickiest part of the build...”

Other features made and fitted to the main deck included a manual winch in the bow, the two masts (one pre-wired for a navigation light), the bench at the stern and the pennant mast flying the red ensign. The gunwales, except in the midships section where the upper deck would lift off, were fitted with varnished mahogany capping rails, steam-bent and secured with brass pins and CA glue. My 3-D printing guru came up trumps with the relief decoration on the gunwales at the bow, and the raised lettering on either side and on the stern were ‘tipped’ in old gold - perhaps a bit more ‘blingy’ than the original, but they look the part (see **Photo 15**).

Adding the upper deck

This was always going to be the trickiest part of the build. It was relatively straightforward to form the deck sub-surface in birch ply and attach it to the superstructure below, plank in 6mm African walnut, add the two forward and one aft mahogany staircases, fit Caldercraft two-hole railing stanchions and nickel-silver rails and simulate wire safety-netting. But how to avoid having to engage the dozen thin tubular supports with the underside of the upper deck every time it is removed and replaced? Been there - didn’t want to do it again!

After much head-scratching, the solution was to permanently and firmly locate these white-painted brass tube supports in both the underside of the upper deck, and in the same corresponding length of mahogany capping rail resting on but not attached to the gunwales (see **Photo 16**). This way, when the upper deck section is lifted off for access to the steam plant, etc, the supports and capping rails lift off with it.

In the very early stages, I had already made from scratch and painted the ship’s boat, but extended davits, tackle, a pair of oars and the deck supports still needed to be added and all fixed in position. The plans also called for a life-preserver bench, and 18 steamer benches - 14 with reversible backrests. My 3-D printing guru came to the

rescue again, making the 36 bench-ends and 28 backrest supports in black resin for me, and I cut and glued the mahogany slats and added brass wire ‘stretchers’. The last piece of construction was the wheelhouse in mahogany sheet and strip over a plywood carcass – a five-sided design housing a large ship’s wheel and telegraph (see **Photo 17**).

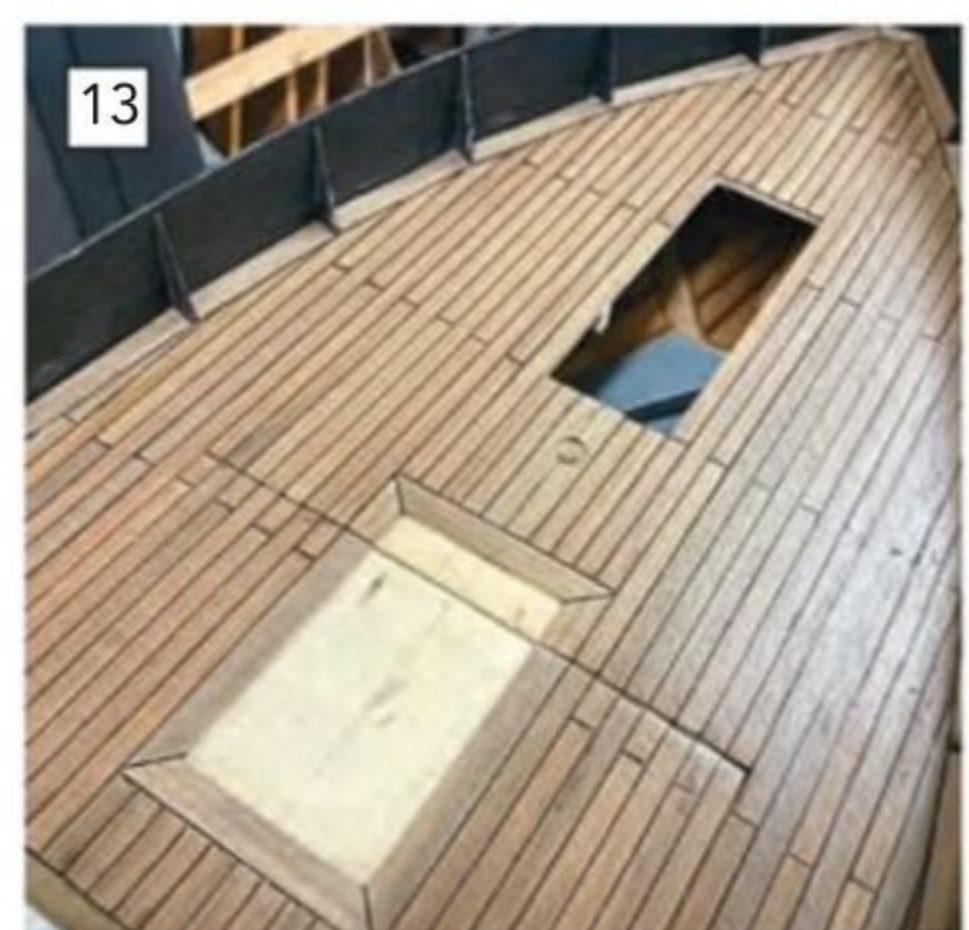
Rigging to support the masts and funnel was added using elasticated jewellery ‘wire’, five of the stays being detachable to permit removal of the upper deck section. Resin-cast lifebelts were painted, and computer-printed waterslide transfer lettering applied, before being fitted in their positions on the railings.

Lighting the way

Rather belatedly, I decided to install the navigation and deck lighting. Having already pre-wired the forward main mast, the navigation lighting was not so much of a problem, but I felt that there should be more main deck illumination beneath the upper deck. However, having already attached the upper deck to the lift-off section, access was very restricted. Finally, after a fair bit of cursing and a little ingenuity, I managed to wire eight 6v grain wheat bulbs (apologies to LED fans) to the underside of the upper deck in lantern lenses cut from some clear plastic tube, hiding the wires by using thin styrene trunking between the joists. Electrical connection between the main hull and the lift-off section was via a fixed modified 13A cable connector and round brass pins from a 5-amp plug. Power was supplied from a 6v lead acid battery under the forward deck bench.

Taking on ballast

From an early test-tank flotation, it was obvious that the *Princess Victoria* would need more ballast than the steam plant, lead-acid battery and the lift-off section would provide. However, the boat was already almost too heavy for safe handling by one person, so my ‘patented’ removable ballast system was employed. This uses lead shot decanted into





“It was obvious that the Princess Victoria would need more ballast than the steam plant, lead-acid battery and the lift-off section would provide. However, the boat was already almost too heavy for safe handling by one person, so my ‘patented’ removable ballast system was employed”

screw-top polythene bottles of various sizes, the advantage being the ability to transport them separately and install them only at the launching point. I had calculated that around 6 kgs of additional ballast would be required, 4 kgs of which was distributed midships either side of the steam plant in eight small, easily installable and removable bottles kept in position in wooden trays. The remaining ballast was distributed in the bow and stern in bottles (two in each), secured in the same manner.

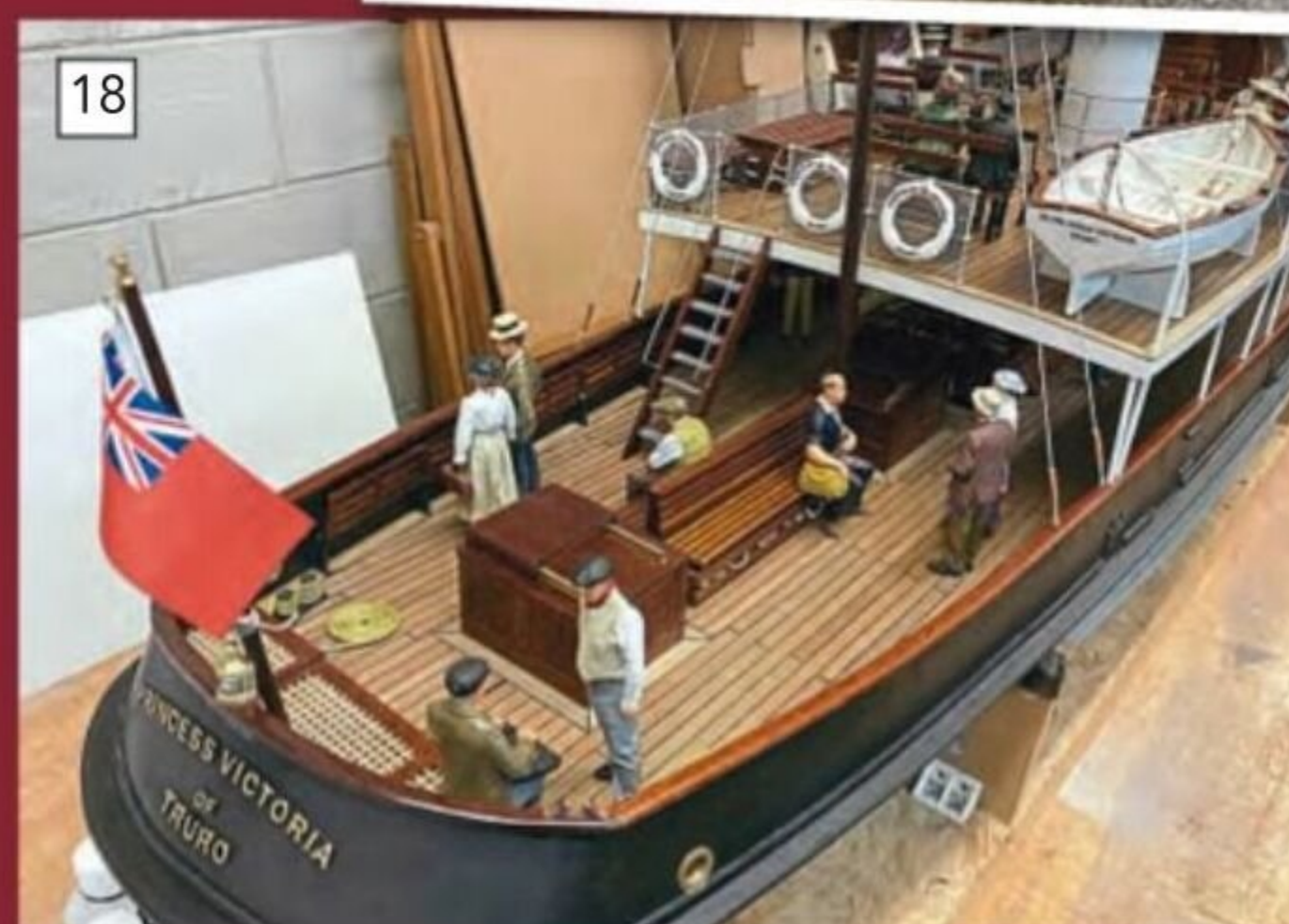
Life on board

For me, a model boat without crew and passenger figures is unthinkable, and unrealistic. The challenge with the Princess Victoria was that they should be Edwardian in appearance. I keep silicone moulds of around 30 1:18 scale figures for resin casting, but some were too modern to pass as early 20th



century, even with modification. Thankfully, with more and more 3D-printed figures now becoming available, I found nine very lifelike and excellent quality Edwardian-era male and female figures from Modelu in Bristol from which I moulded and cast duplicates to augment my crew and passenger list of 1907 to 30.

After many hours painting the four-inch figures using Model Color acrylic paints, they were set in place (see Photo 18) using a household silicone sealant from Wilko (R.I.P.), which can be used liberally but dries clear. Although firmly attached, the slight flexibility of this adhesive allows the figures to take small knocks without snapping off.



Taking to the water

With all work complete, and a final trial flotation, steam up and propulsion test in my tank in the workshop undertaken, a launch date was set. Fellow model boaters, friends and invited guests gathered at the Camborne Pond Hoppers Model Boat Club's home water at Coronation Park, Helston on a drizzly late November Sunday morning to give the Princess Victoria a fitting send-off on its maiden voyage.

Thankfully there were no last-minute hitches or technical issues and she steamed away from the lake edge at a very respectable pace. After cruising long enough to prove she wasn't going to sink, the Princess Victoria returned to shore, not least so that the boiler level could be checked. Several more controlled sailings would have to be conducted to establish a safe running time limit.

The one major learning from the launch was that even with a rudder to correct scale size and shape, the 'lunar orbit' turning circle needed addressing. Originally, anticipating this, I fitted an Mtroniks W-Tail mixer which varies the speed of each engine to aid steering when the rudder is turned, but found it difficult to achieve precise control of the mechanical throttle valves on the engines and therefore launched without it. After lengthy consideration, I decided to replace the small semi-circular rudder blade with a much larger round-cornered rectangular one. At almost two and a half times the surface area it should do the trick. ●



Acknowledgements

The author of this feature, Peter Binns, would like to thank the many people who helped and contributed towards the successful completion of the Princess Victoria, especially:

- David Baker of Constantine, near Falmouth, for the loan of the book that inspired Peter to build the Princess Victoria
- Penny Phillips and Richard Lawrance of A&P Falmouth Ltd for providing the original ship's plans
- Captain Ian Bosworth (Retired) of Constantine for his invaluable knowledge and advice on matters of

detail during the build

- Jerry Watson of Clevedon Steam for his advice and practical assistance in the installation and fine-tuning of the steam plant
- Kelvin Rusling of Trenear, Helston for his inventive support and collaboration on 3D printing
- Terry Swainsbury for the fabulous 'on water' shots of the Princess Victoria, as featured both in this article and on the front cover of the magazine.
- His wife, Evelyn, for patiently allowing him to spend half of the last 2½ years in his workshop!

When pirates went pop!

Wonderful *Radio* *London*

Nick Santon treats us to a nostalgic look back at when pirates briefly ruled Britannia's airwaves as he records his 1:48 scale build of the radio ship *MV Galaxy*, recently judged 'Best Engineered Model' at the Waterways Model Boat Club Awards...





While the great British public was used to the BBC and the music it put out on the Light Programme, by the 1960s young people were crying out for a more modern style of radio. The BBC was only allowed very restricted needle time, i.e., time allocated for the playing of records as opposed to in-house recordings; word has it this was primarily due to bureaucracy and union demands. Something, however, was inevitably going to happen to fill the void for the baby boomer generation, and thus pirate radio was born.

Back then, the term pirate radio was coined because these offshore stations didn't pay royalties for the music they transmitted. Even so, the artists loved them, grateful for the increased exposure. The record companies loved them, as the records they played then sold like hot cakes. And the advertisers loved them as an exciting new way of promoting their products and targeting a younger demographic.

On December 23, 1964, history was made as *Radio London* began broadcasting on medium waveband (266 metres) from the *MV Galaxy* anchored in the North Sea, three and a half miles (5.6 km) off Frinton-on-Sea. Run by Philip Birch, the MD of a company called Radlon Sales (who latterly went on to create the very successful Piccadilly Radio in Manchester), the station was modelled on Radio KLIF in the United States. Its jingles were specially created by PAMS in Dallas and its DJs recruited from around the country, indeed the world, turning names like Paul Kay, Ed Stuart, Norman St. John, John Peel, Tony Blackburn, Keith Skues, and, of course, the incredibly popular Dave Cash and Kenny Everett, into household names.

Within months *Radio London* (which also became known as Big L and Wonderful *Radio London*) had accumulated an estimated 12 million listeners. I was one of them, tuned in on my Philips transistor radio under the bed covers every night, thrilled by the records being played and the sometimes somewhat irreverent comments of the station's DJs. It was all so new and fresh. We had never experienced anything like it!

“Within months Radio London had accumulated an estimated 12 million listeners. I was one of them, tuned in on my Philips transistor radio under the bed covers every night”

The government was not at all happy about the increasing popularity of pirate radio stations though, which were a) challenging the existing order of things, and b) couldn't be taxed, so they had to go. Enter Tony Benn who, as Postmaster General, was instructed by the then Prime Minister Harold Wilson to close them down. Consequently, on August 14, 1967, the Marine Offences Act came into force. This would result in the demise of the 'pirate' radio ships operating off the British coasts.

Radio London Limited, however, still exists today and I am indebted to the current MD Chris Payne for his permission to use the *Radio London* logo and for all the help he has given me.



The ship

To start at the very beginning of this story, however, we must venture back even further, to when, just prior to World War II, the US Navy realised it needed more ships, including minesweepers, for the probable forthcoming war with Germany.

A minesweeper class was designed, namely the Admirable Class, which could be deployed in the clearance of mines to allow shipping to progress should it come to it. The brief was that these vessels could be quickly and economically built by various shipyards to a standard design, and indeed a total of 126 such ships were built.

On March 21, 1942, a keel was laid down at the Tampa Shipbuilding Company in Florida, numbered AM218. The resulting ship, named USS *Density*, was launched on February 6, 1944, by a Miss M. Farmwald. Despite best efforts, I've been unable to find any further information on Miss Farmwald, so can only presume she was the daughter or wife of someone prominent either in the shipyard or in Tampa.

Delivered to US Navy on June 15, 1944, the USS *Density* went on to be awarded three battle stars for her service in the Far East during World War II, after which she remained a brave but otherwise fairly unremarkable ship – until later life.

After the war, in 1946, she returned to Galveston, Texas, and was placed in reserve.



Making the plug. The individual bulkhead templates were produced and attached to ply, which was cut out and glued to the building board.



Having covered the bulkhead templates with thin ply, the whole was then smoothed over with filler.



Making the mould in fibreglass.

“Delivered to US Navy on June 15, 1944, the USS Density went on to be awarded three battle stars for her service in the Far East during World War II, after which she remained a brave but otherwise fairly unremarkable ship – until later life”

She was later sold to two Greek brothers, renamed the MV Manula, and used as a cargo ship. Following some financial difficulties, she was to be sold by a Florida court.

Now, in the early 1960s' America commercial radio was big business. Two American businessmen from Texas, Tom Danaher (a VW car franchise holder) and Don Pierson, both applied for, and obtained, cable TV franchises. They went on to form a partnership and when Don Pierson happened to hear about a successful radio operation (Radio Caroline) being operated in the UK by an Irishman, Rohan O'Rahilly, they decided to explore the possibility of launching another radio station to compete.

After researching the idea, they searched for a suitable ship and came across the MV Manula. Although she needed serious repairs, they paid \$60,000 dollars to purchase her. They then renamed her as the MV Galaxy and registered her in Honduras – she was also granted a radio transmission licence by the Honduran authorities, although the British government later had this revoked.

Back in Miami, Florida, they fitted a generator to power her radio, a 50 Kw RCA Ampliphase transmitter and a mast, plus a studio and all the radio equipment that DJs would need, all inside four months. On October 22, 1964, Captain Kou Walters set sail for Madeira where he would fuel and supply the ship, before then heading on to the North Sea, eventually dropping anchor 4½ miles off Walton on the Naze.

After some trials, broadcasting began. From here, the story gets a bit difficult to substantiate, as no-one kept proper records of actual power output or even such details as the exact height of the broadcasting mast. Suffice to say that while a lot of the smaller pirate stations enjoyed a degree of success, it was Radio Caroline and Radio London which became the two main players.

Following the enforced shut down, Galaxy was moved to Holland, where a consortium planned to refit her and use her once again as a base for radio broadcasting. By this stage, though, she was found to be in a such poor state – mainly held together by layers of paint – that the project was abandoned and instead she was towed to a breakers yard at Keil in Germany where she unceremoniously sank. She was used for a while as a training ship for divers, but then raised and scrapped when concerns were expressed about pollution from her fuel and oil tanks.



Because of the vertical inwards taper of the hull, the mould needed to be made in two halves bolted together that could later be split to release the hull.



Modifications had to be made – just like when the real conversion was undertaken – to change a gun mount into a wall for the transmitter house.



Amidships there is a workshop below the old gun mount which is lit by a flickering LED to simulate welding.



The model

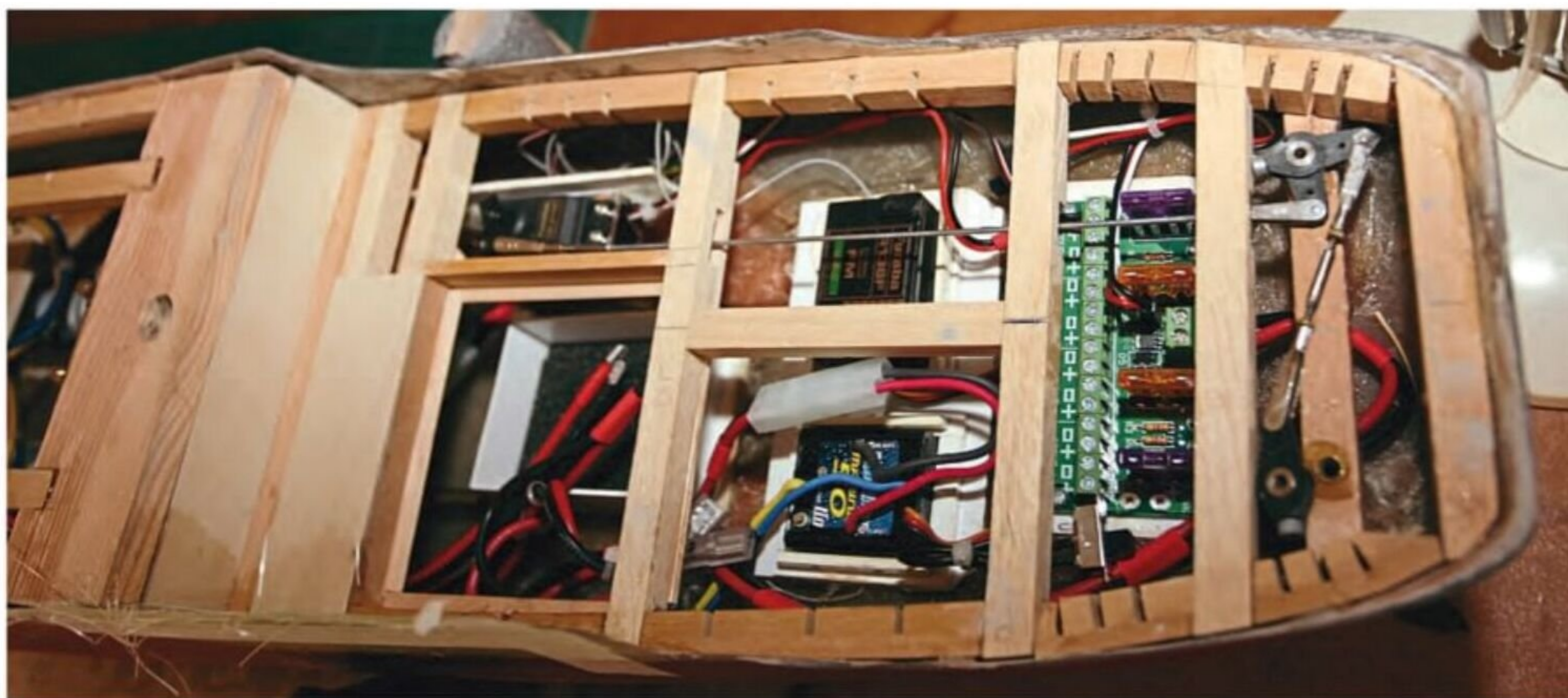
Fast forward to 2014, and I was in the finishing stages of my second model boat and looking for my next project... I had built two kits previously but really wanted to try my hand at tackling something a bit more unusual. It was at this point the idea of modelling the 'Radio London' ship came to mind.

I started my research in January 2004 by emailing the Tampa Port Authority to ask about the Tampa Shipbuilding Company and was put in touch with the Hillsborough County Library. Unfortunately, I was told the shipyard had closed just after the war, and that no records were available.

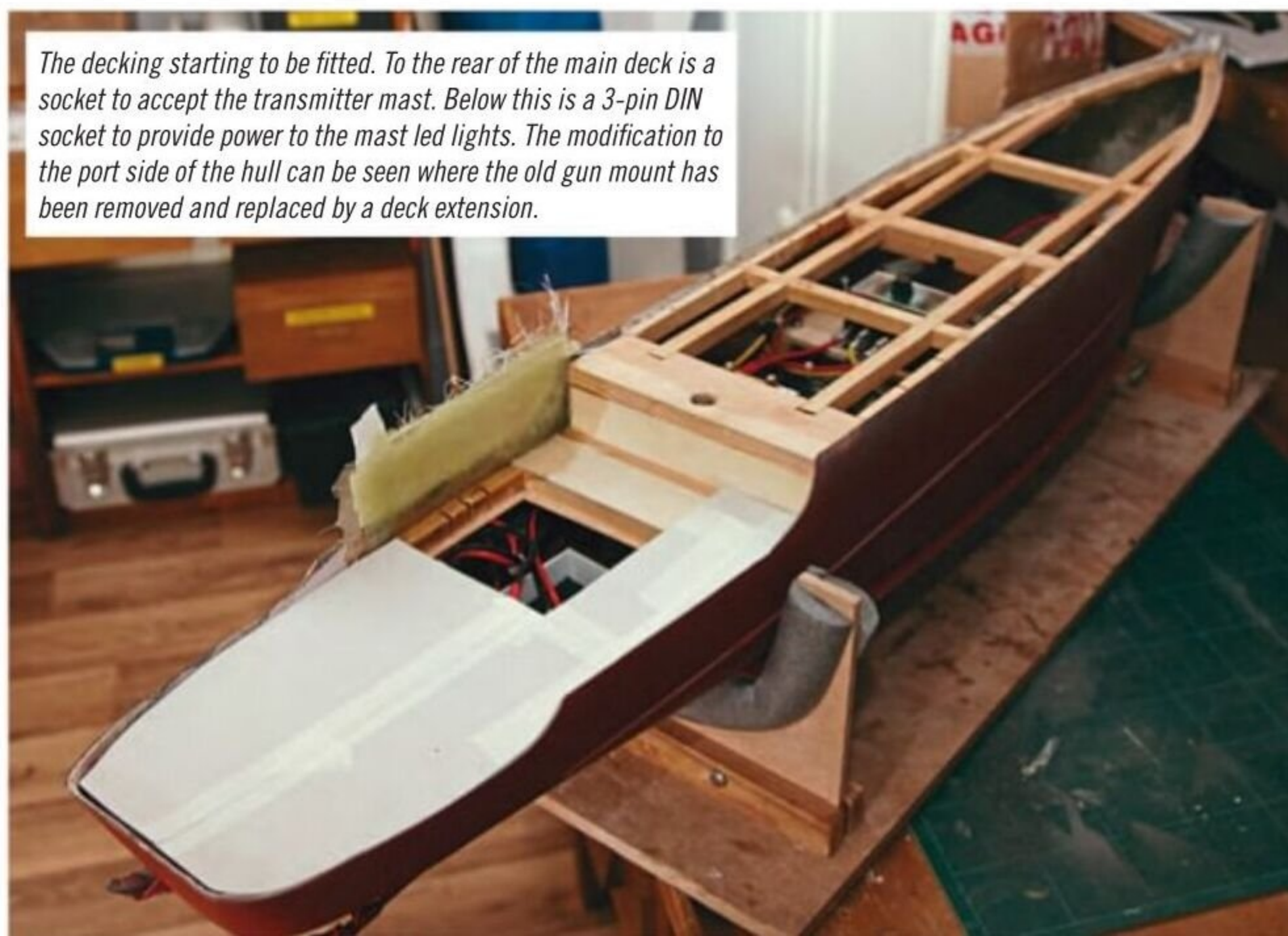
I then tried the secretary of the USS Density Shipmates Reunion Society, but he could only put me in contact with Tom Danaher, who didn't have the type of plans I needed. In fact, there never were any plans of the conversion, and even the height of the mast has many different estimates.



The deck supports were all made using 10mm square wood jointed to provide access points for the wiring, motors, etc. Below: The radio receiver, speed controller and power distribution board for the lighting circuits.

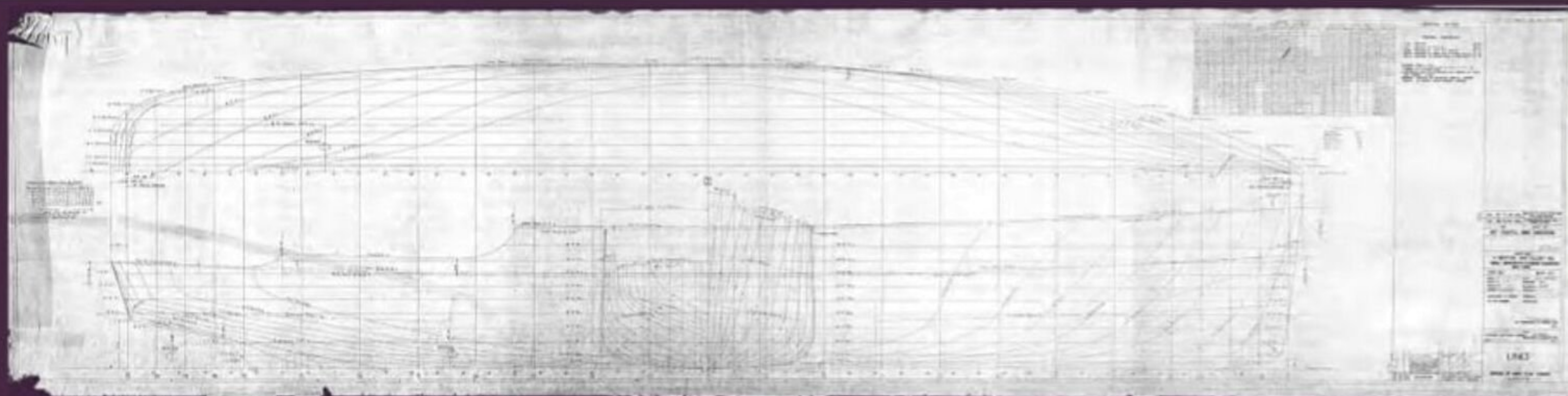


The decking starting to be fitted. To the rear of the main deck is a socket to accept the transmitter mast. Below this is a 3-pin DIN socket to provide power to the mast led lights. The modification to the port side of the hull can be seen where the old gun mount has been removed and replaced by a deck extension.

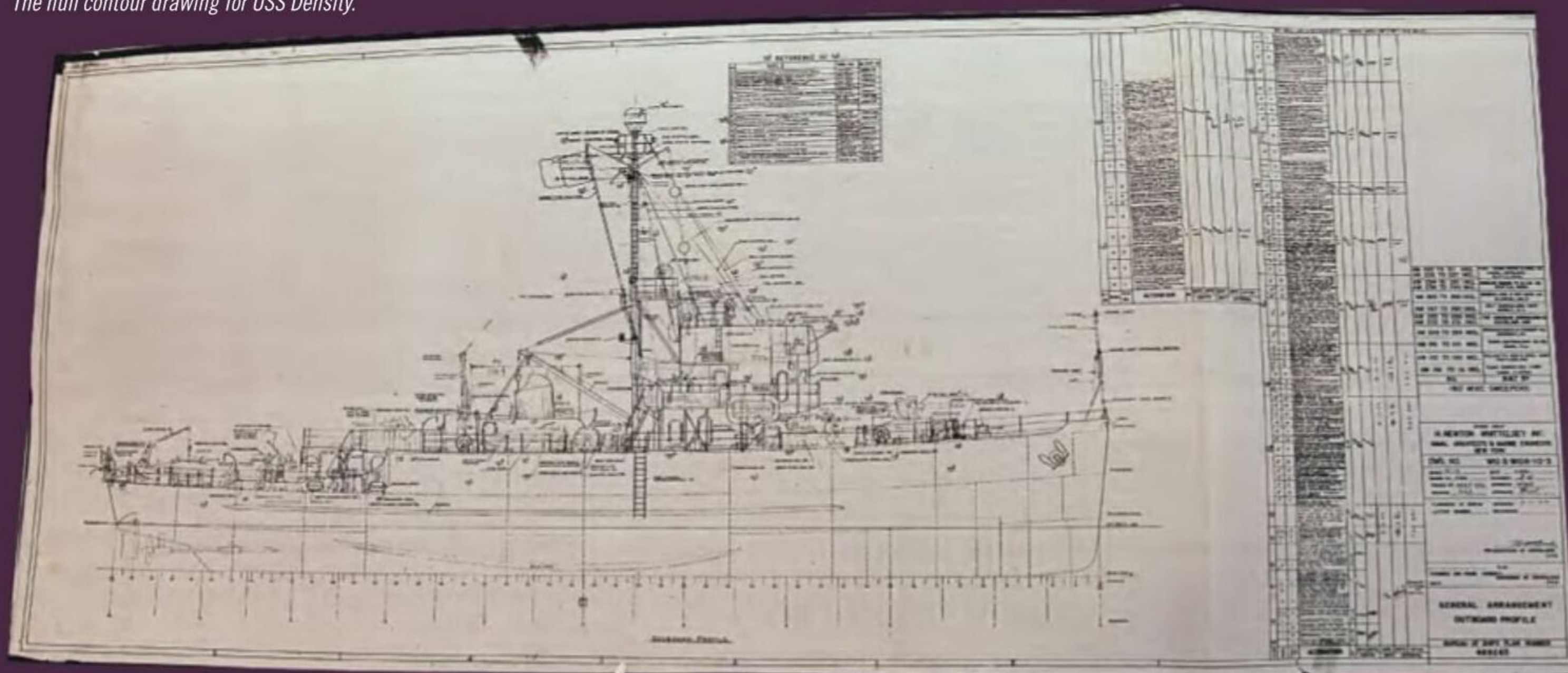


The library then brought to my attention that the US Navy has a special department dedicated to the history of the Navy and its ships, but as this department didn't have the drawings either, I was, in turn, referred to the United States National Archive.

Staff there kindly agreed to check the microfiche records but could find nothing relating to the USS Density. A few days later, however, they made contact again with the exciting news that a batch of drawings, which included the original drawings of USS Density, had come into their possession. The US National Archive, though, is in Maryland, USA, and I was in the UK. The only solution would be to ask one of its authorised graphics agencies to request release of the drawings so that copies to be made. Hmm, I could see lots of dollars leaving my bank account!



The hull contour drawing for USS Density.



The side elevation of USS Density – no drawings of MV Galaxy were ever made.

I therefore contacted four agencies for quotes. Three of them turned me down flat, due to their equipment not being large enough (these drawings are ten feet long!). One of them, however, 'Do You Graphics' of Maryland, did have a sufficiently large flatbed scanner. We agreed on a price of \$204 (yes, ouch, but this was 2004) and a brilliant job was done. The drawings were scanned and copied to a CD so that on arrival I could then get the drawing office at work to print them out again at a scale 1:48, thereby enabling me to make a start on my model.

I first made a wooden 'plug' and from that a fibreglass mould, so that I could make as many Admirable class minesweepers as I wanted. Tampa shipyard was again in operation in my model boat workshop!

The challenge was that while I now had the hull and military General Arrangement drawings, *Galaxy* looked very different to *Density*. As a naval ship, she had gun emplacements not generator houses, transmitter rooms, fuel oil tanks and loads of other stuff I'd have to research and reproduce with no accurate measurements. Thank heavens for the many photos I was able to find in books and on the internet.



Superstructures in the process of being built, showing (stern to bow) the minesweeping winch, transmitter room, funnel and below decks access doors, main ship's mast and, lastly, the ship's main superstructure.



The front sea protection shroud was made from a strip of steel, bent and rolled to suit.



The upper superstructure requiring the observation pods to be fabricated.

Ironically, I needed to make as many modifications to my build as Tom Danaher had made to the actual ship, e.g., removing gun mounts and welding in panels to permit a large transmitter house to be constructed. The original minesweeping equipment still had to be modelled, too, as this remained in situ on *Galaxy*, even though it had not been used for nearly 20 years.

So, the hull was built, along with the deck which has a fairly traditional wooden support structure beneath it. The superstructure I made from ply, with some other parts fabricated from metal. The mast was fashioned from sections of brass tube sequentially soldered together to create a tapered effect. Perhaps surprisingly, one of the most taxing conundrums was the funnel, with its compound curves; in the end, the top from an aerosol provided a suitable base I was able to modify to suit.

Another issue, discovered in the test tank (or bath if you prefer), that needed addressing was that my model was a bit top heavy and could easily capsize if provoked, so I made a deep keel with a substantial weight at the bottom. As for the most part she will be on static display, this keel was designed to be easily detachable, with two 6mm threaded sockets located in watertight compartments.

What's more, modifications made to the *Galaxy* while at sea, seemingly rather haphazardly, had resulted in her going from having no portholes on the port side to having loads in totally random places. Likewise, the ship's *Radio London* repaint was also undertaken at sea, apparently by hanging some poor crew member over the side in a bosun's chair – hence the wavy lines and bad signwriting!

As my model is likely to be sailed and positioned at anchor, I wanted the ship's lights to be a feature, so lighting has been installed using a mixture of grain of wheat bulbs and LEDs.

“Modifications made to the Galaxy while at sea, seemingly rather haphazardly, had resulted in her going from having no portholes on the port side to having loads in totally random places. Likewise, the ship's Radio London repaint was also undertaken at sea, apparently by hanging some poor crew member over the side in a bosun's chair – hence the wavy lines and bad signwriting!”



An Iveco Stralis model was the donor for a diesel engine to power an auxiliary generator, placed on the port observation post.



The completed model. Nick hadn't realised just how tall the final model would be, what a handful it would be to display or what a nightmare it would be to transport to his local sailing pond!



The Radio London logo was the absolute icing on the cake, thanks to Chris Payne of Radio London. The flag was custom made by printing the logo onto silk by Scale Flags & Ensigns.



Nick used a mixture of LED and grain of wheat bulbs for lighting his model, but definitely favours LEDs due to the availability of bright or warm white as well as a good variety of colours.

The rather oversize
but effective
removable keel.

All set to make waves again...

I spent about a year on research, a couple of years making the plug, mould and the base hull, then about seven years building and finishing the model, with large intervals in between while tied up with work, moving house, etc. I finally got her finished in 2021, just 17 years after I got started!

She got her bottom wet for the first time in 2023, thanks in no small part to my friends at the Waterways Model Boat Club in Great Yarmouth. Yes, she stayed upright, and, yes, she sailed.

I am hopeful that one fine day soon, when the sea becomes mirror smooth – as in summer it sometimes does, *Radio London* will take to the North Sea once more. ●



USS Keats Sound

Glynn Guest documents his build of this 'stand-off scale' model based on the US Navy seaplane tenders of World War II

USS Keats Sound is a model is based on seaplane tenders built for the US Navy in World War II, which used a modified merchant ship design. It was built to an approximate scale of 1:144 so that commercial plastic model kits could be used for the aircraft associated with these vessels, which produced a model about 40 inches (102 cm) long and weighing around 10 pounds (4.5 kg).

The hull was constructed mainly from sheet balsawood, with the superstructure built from a combination of balsa and card. The prototype was powered by a single 'Rock Climber' type of 500 motor and a 6-volt battery. A 'bow thruster', using a reversible auto windscreen washer pump, was added to give extra versatility while sailing under radio-control.

History in the making

The US Navy was fortunate on entering World War II in that a large programme of shipbuilding had been commenced in the 1930s to rebuild America's merchant marine. This gave the Navy a large number of vessels to fulfil the auxiliary tasks that were perhaps less exciting but nonetheless essential to keep its warships functioning.

Some were used more or less as originally intended as cargo transports, but almost certainly with the addition of some defensive weapons, while others were modified for different duties. Many became 'tenders', that is they acted as mobile bases which

could support and offer maintenance/repair facilities to warships. One only has to look at the sheer size of the Pacific Ocean to realise that having such tenders close to the fighting zones was a much better idea than requiring warships to travel hundreds, if not thousands, of miles back for shore-based repair and maintenance.

Of all the different types of tenders, those intended to support seaplane operations most appealed to me. Again, the size of the Pacific resulted in the US Navy making great use of aircraft to scout and patrol the ocean. Many Pacific islands offered sheltered waters from which seaplanes could operate, so seaplane tenders which could move to accommodate changing battle lines were an obvious answer. Without them, it would have been difficult to keep aircraft, which can be maintenance hogs, operational.

Glacial designing

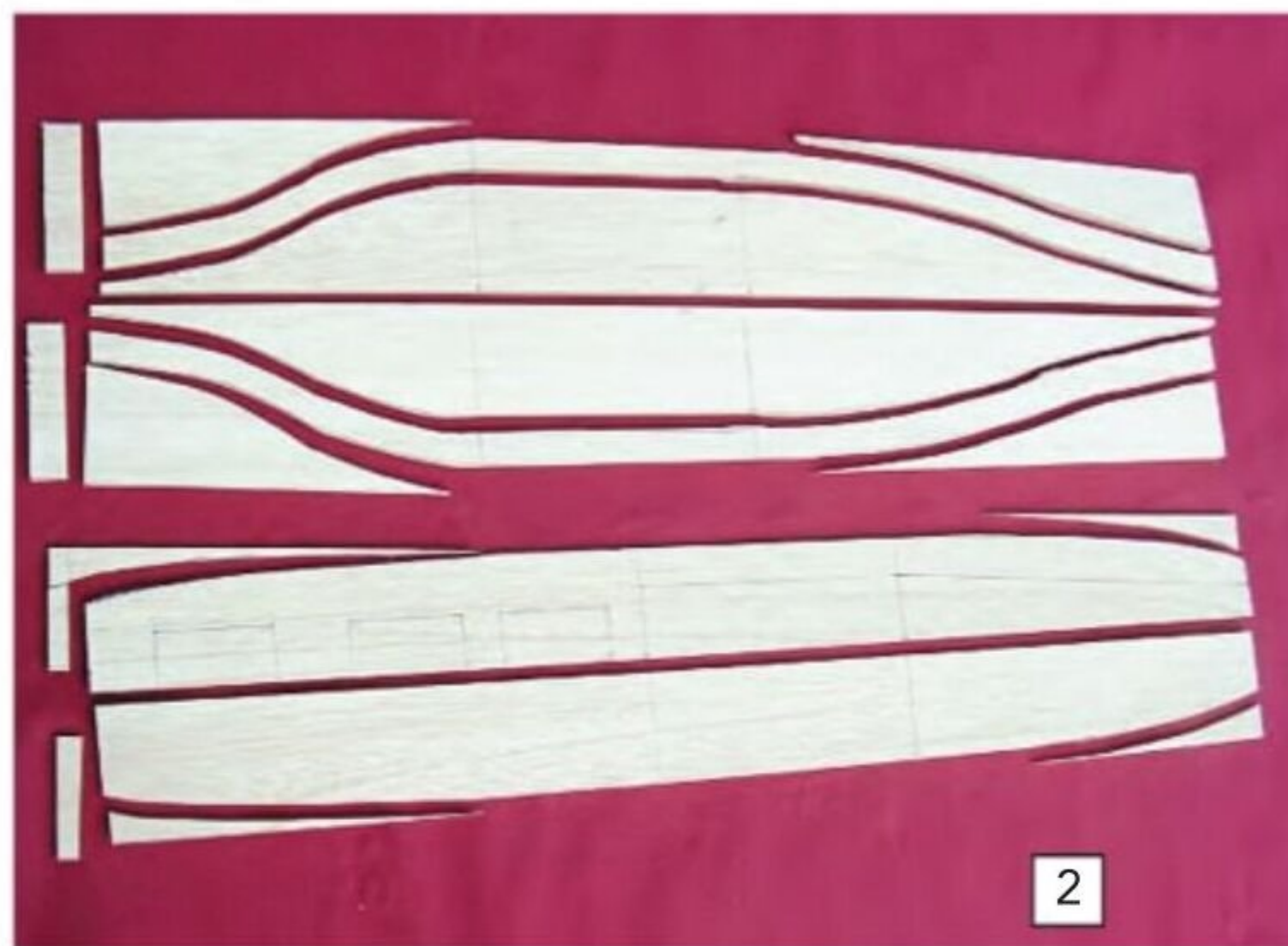
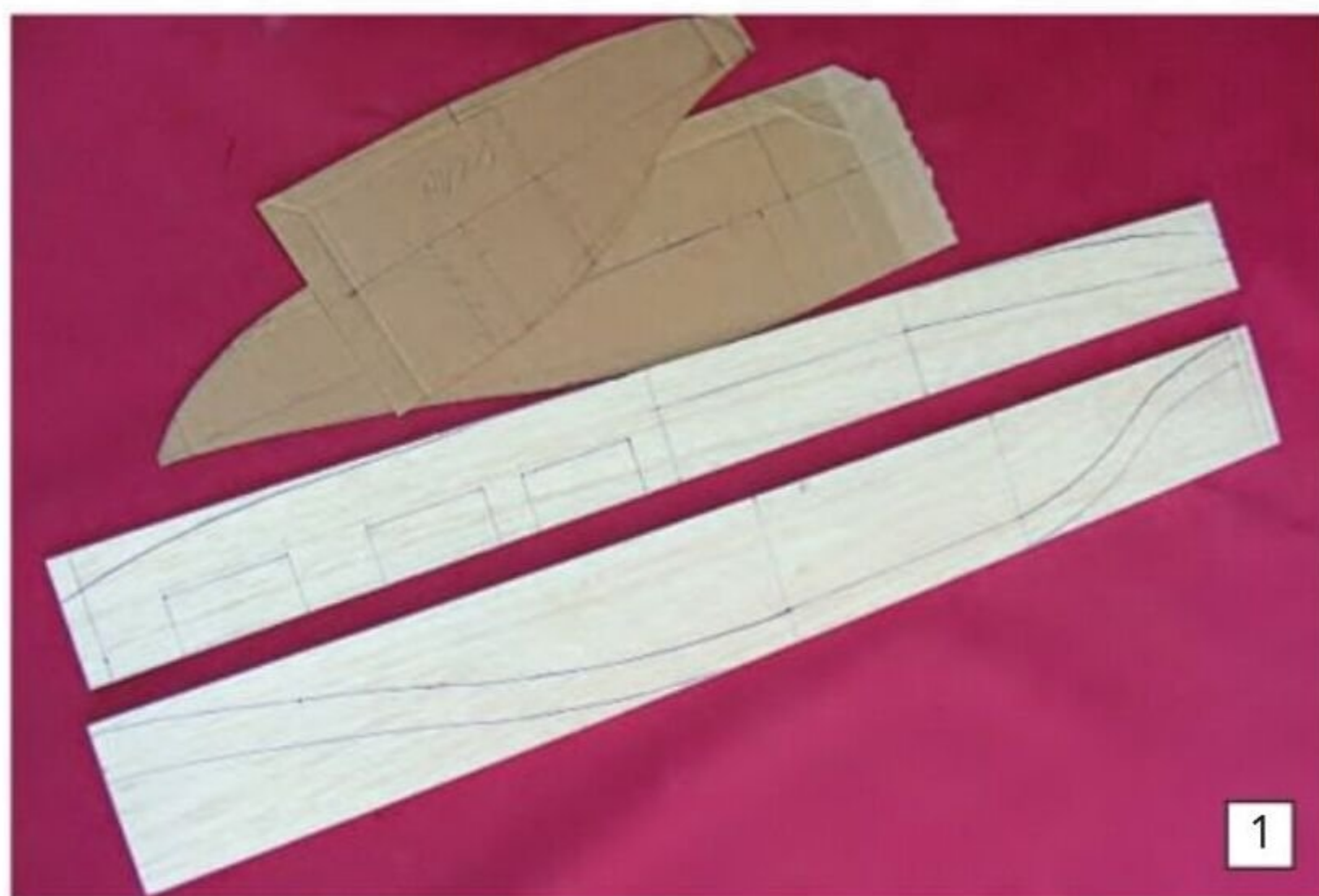
Having discovered these intriguing vessels, it only took me some three decades to get around to building a model based upon

them! A possible design was sketched out early on, but I was hindered by the very limited information then available.

The vessels I was interested in had been based on the Maritime Commissions Type C3 cargo designs, and by one of those fortunate occurrences a friend had sent me a batch of plans which actually included one for these C3 ships. While the plan was of a civilian vessel, this admittedly simple drawing did at least give me the basic hull shape and layout.

Then along came the internet and photos of many warships became far easier to access. However, not being dashing warship types, seaplane tenders were something of a poor relation. Having said that, a few photos could be found, which proved a great help. The model, though, was to be built in a wartime configuration and many of photos taken during the conflict were, understandably, of poor quality. Of course, those that were better inevitably failed to show the details and features I wanted to see!

"The US Navy was fortunate on entering World War II in that a large programme of shipbuilding had been commenced in the 1930s to rebuild America's merchant marine. This gave the Navy a large number of vessels to fulfil the auxiliary tasks that were perhaps less exciting but nonetheless essential to keep its warships functioning"



If you wait until all the information is available then little, if anything, will be achieved. This model was, therefore, started knowing it would, at best, fall into the 'stand-off scale' class – that is, it ought to look OK and be recognisable as what it's supposed to be while sailing but would never stand microscopic scrutiny. It would also be something of a 'mongrel' and combine features from different vessels.

Balsa, again

I do like working with balsa sheet; being easy to cut and shape is an obvious attraction, although my aeromodelling origins probably play a major factor in this material bias. Against sheet balsa might be its perceived weakness, but sensible design and competent building skills can produce a robust model. Not one suitable for dragging along the ground as you walk towards your sailing water, nor ramming everything in sight when sailing and leaving it full of water between sailing sessions, but who would admit to doing such things?

One fair criticism when making model boat hulls out of sheet balsa is that it is sometimes difficult to reproduce curves, especially the compound ones that usually exist underwater. I will confess that my models have often featured greatly simplified hull shapes but, hopefully, never to the point where their sailing appearance and performance suffered. Over the years, hulls that are more curvaceous have been built using sheet balsa with some success; the best compliment received being when I actually had to open a model up in order to convince a doubting spectator that my hull of my model had indeed been built just from balsa sheets!

In this model, a more scale-like underwater hull shape was the target. This resulted in the use of thick balsa sheets ($\frac{3}{8}$ inch [9 mm]) for some hull parts, along with doublers of the same thickness. This allowed the removal of more material at corner joints between the sheets and so produced the desired curved sections without weakening the structure. Concave sections at the stern were made with a combination of scrap lengths of balsa strip glued into place, then sanded to shape



along with, I confess, the aid of a tube of ready mixed domestic filler.

Before going any further, though, a word of warning... No matter how appealing this model may be, I cannot recommend it to novice builders or anyone unfamiliar with working with balsa wood. It's not hard to build but needs the right 'feel' to avoid difficulties.

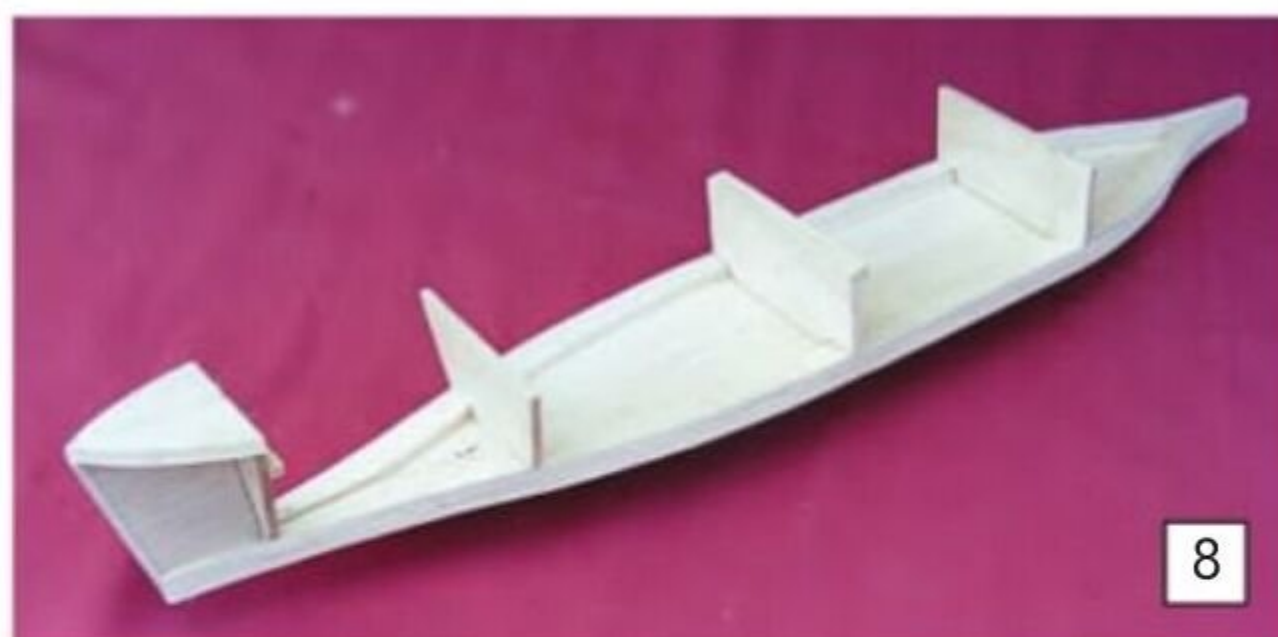
Materials & tools

All my balsa sheets were selected with some care. They had to be flat with no warps or twists and have square cut edges. The visible wood grain needed to be uniform without any, no matter how attractive they look, 'swirly' patterns that can lead to difficulties when cutting parts out and bending them.

Balsa can come in a wide range of strengths and hardnesses. This model did not require exceptionally strong grades, nor were the softer (potentially easier to damage) types used. Luckily, the strength of balsa is closely related to its weight. If you are fortunate enough to have a local hobby shop, you could try weighing each piece before purchase, although I'm not sure how that would go down in a busy shop! If, however, you are ordering online, simply specifying 'medium' grade from firms like SLEC in the UK has never let me down.



"Before going any further, though, a word of warning..."



“If you don’t already have one, add it to your next Christmas or birthday list!”

Puzzling over the draft model plans, the following the following 36-inch (914mm) long balsa sheets seemed to be enough to build the hull.

Two $\frac{3}{8}$ x 4-inch (9 x 100 mm) sheets
One $\frac{3}{8}$ x 3-inch (9 x 75 mm) sheet
Two $\frac{1}{4}$ x 3-inch (6 x 75 mm) sheets
One $\frac{1}{4}$ x 4-inch (6 x 100 mm) sheet
Three $\frac{1}{8}$ x 3-inch (3 x 75 mm) sheets

Material for the superstructure depended on what was to hand, and I had a lot of balsa in my scrap box. Card was used for non-structural parts of the superstructure. The latter has the advantage of cutting and gluing well, takes a good finish when painting and, not unimportantly, is cheap (maybe even free?).

As for the adhesive, everyone has their favourites – and will probably be delighted to tell you about them. I stuck with a weatherproof wood adhesive (Everbuild 502) from my local hardware store. This is of exterior and interior grade, which means it is not recommended for continuous immersion in water. So, all you modellers who leave your creations full of water between sailing sessions ought to use something else. It claims to be high strength and dries clear, both qualities I can confirm. Finally, to keep Mrs Guest happy, any accidental drops or spillages can be removed with a damp cloth. Many similar and suitable adhesives are available, but the one litre bottle I bought over a year ago looks like it will last me through several more models.

At this point, let’s talk tools. Balsa sheets can be cut with a mechanical saw, but I’ve always preferred to use a knife, as this seems to give me better control. The trick to using any knife is to always have a sharp blade; either sharpen or replace a blade as soon as it ceases to cut with minimum effort. Another tip is to make several light controlled cuts for accuracy rather than one heavy-handed cut! Two other cutting tool essentials are a metal rule and a suitable surface for cutting on. A wooden rule is easily damaged by the



cutting blade, quickly rendering it useless. The purchase of one of those self-healing cutting mats a few years ago was something of a revelation to me, in that it made the tips of my cutting blades last much longer. If you don’t already have one, add it to your next Christmas or birthday list!

Sanding has to be done using sanding blocks. Mine are no more than scrap pieces of timber with flat surfaces around which the sanding papers are wrapped. Trying to sand with a handheld sheet of sandpaper will not produce flat surfaces and will likely as not dig into your model and gouge the odd chunk out.

Holding balsa parts together while the glue sets can be done with pins, but clamps make things easier. When parts need to be kept flat while gluing, such as with the hull bottom and deck pieces in this model, then suitable weights are also handy. Mine are no more than old, sealed lead acid batteries which no longer have any use in electrical circuits but instead lend their shape and mass to a new role.

Finally, to prevent glued joints sticking when held down on flat surfaces, I usually place a thin plastic sheet under them. I seem to have acquired a stack of plastic document wallets that prove ideal for this job.

First stage of hull construction

This started with cutting the hull bottom, doubler and deck pieces out of balsa sheets.

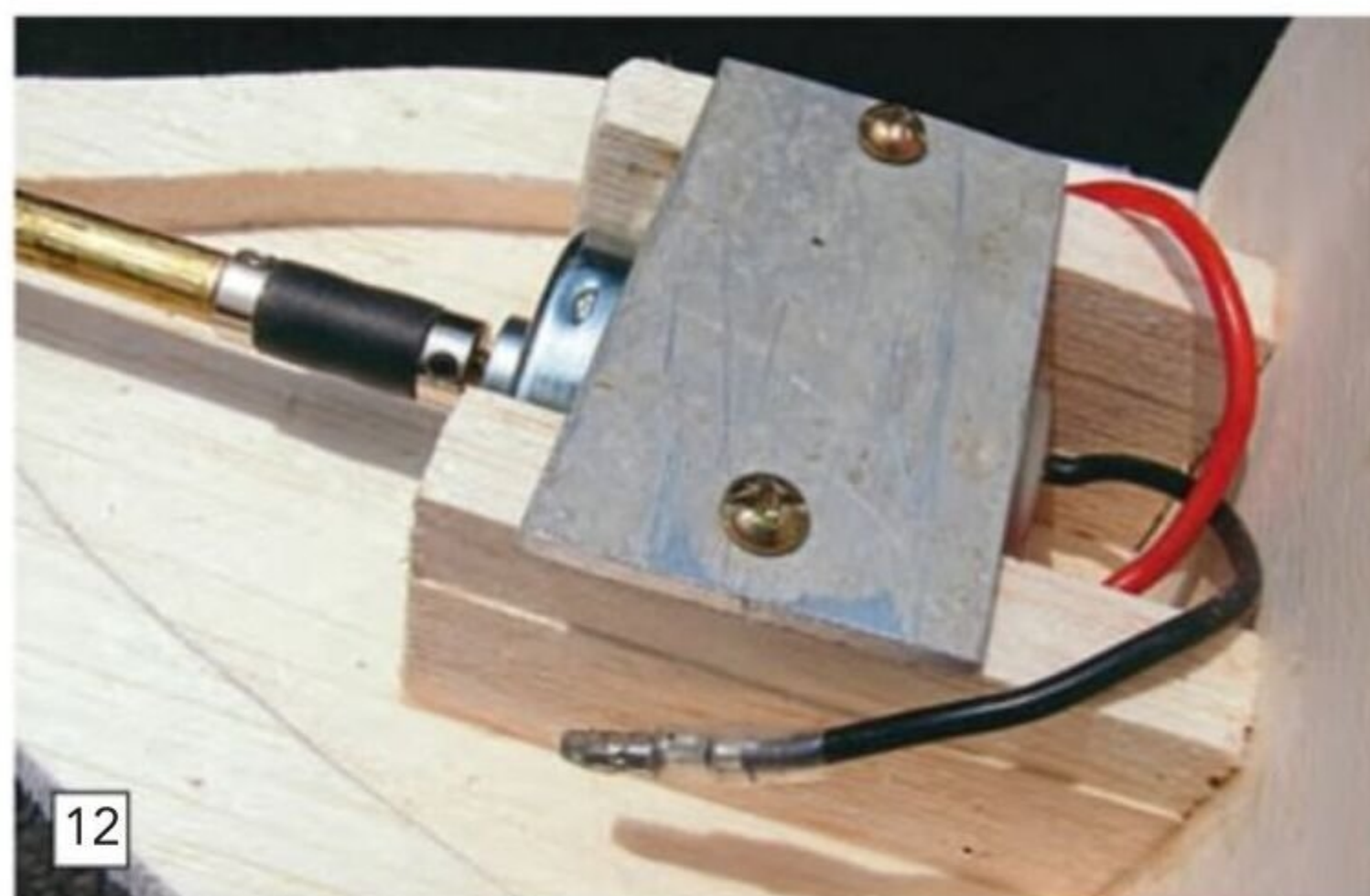


Templates were drawn up and cut from some scrap cardboard to act as guides for this task (see **Photos 1** and **2**). The bottom and deck pieces were then glued together and held flat until dry (see **Photo 3**). The bow deck pieces were cut from the spare balsa left from cutting the bottom and doublers out and glued together.

I did not cut out the access openings in the deck sheet at this stage. This is important to note, as doing so would have made the deck weak and possibly prone to damage during subsequent handling. Instead, they were simply drawn onto the deck, only finally being cut out after completion of the hull’s construction.

The bottom doublers were then glued to the edges of the hull bottom (see **Photo 4**). They were positioned to make a $\frac{1}{4}$ inch (6 mm) gap at the bows into which the stempiece would slot (see **Photo 5**) but joined together at the stern (see **Photo 6**). Again, the structure was held flat until the glue had set.

After cutting the stempiece and bulkheads out of $\frac{1}{4}$ inch (6 mm) sheet, they were checked for fit into the hull bottom (see **Photo 7**). A deck support strip was glued across the rear face of Bulkhead 1. Once happy, I glued these parts to the hull bottom ensuring that they stayed upright while the glue dried. The bow deck piece was added across the top the stempiece and Bulkhead 1 (see **Photo 8**).



“This is important to note...”

Motor and shaft installation

Having been caught out many times struggling to install motors and propeller shafts into models, usually due to not having fingers long or flexible enough to do the job nor being able to see what I was doing inside the hull, I now try to do this as soon as possible.

A 'Rock-Crawler' type of motor had been selected to power this model. Mine came from Blacksmithproducts, an internet trader. These motors look like standard 540 type but have poles wound with 70 turns of wire which result in modest rotational speeds but lots of torque, thus making them ideal for the sport of rock climbing with R/C vehicles and also for many of our model boats. The energy would be supplied by a 6-volt 12 Ah sealed lead-acid battery, which would give the model more than enough duration and also add some useful ballast. The propeller was to be a 40 mm diameter, three-bladed Robbe item (No. 1466). As the motor was planned to fit behind the fourth bulkhead, a propeller tube about 6 inches (150 mm) long was needed.

With the motor body lying on the hull bottom, its shaft was correctly aligned with the propeller shaft courtesy of a little packing placed between the tube and bottom doublers where it exited the hull (see **Photo 9**). A tube support block was then built up around the tube using scrap balsa, ensuring that the tube remained correctly positioned but at this stage not glued in (see **Photo 10**) – the reason for this being that it would be easier to work on finishing and shaping the hull without it in place.

To prevent a loose motor rattling around inside the hull (don't laugh, I know of a modeller this happened to) some means of securing it was needed. It could have simply been stuck to the hull bottom with suitable adhesives or sealants, but this can be a little too permanent. I, therefore, made up two pieces of balsa and glued them to the hull bottom and Bulkhead 4 so that the motor could slide snugly in between them (see **Photo 11**).

To secure the motor, a plate was placed across the top of the motor (I used a handy



“This was one of the more demanding aspects of the model's construction, and one which leads me to reiterate my earlier words of caution”

piece of aluminium, but plywood would be just as good) and secured with screws into balsa pieces (see **Photo 12**).

There was a small gap between the aluminium plate and motor body on my model. This was filled by sandwiching some foam rubber between motor and plate and then firmly screwing the plate down. The compressed rubber secured the motor to prevent any fore or aft movement or rotation from torque reaction.

Finishing the hull structure

The motor, coupling and propeller shaft/tube were removed before doing any further work on the model. This avoided them getting jammed up with sawdust, wood shavings and glue.

The stern bottom pieces had been cut out and glued together in the same fashion as the hull bottom pieces (see **Photo 13**). They were offered to the hull with the aim of fitting up against Bulkhead 4, with the lower edge touching the bottom doubler. The top of the tube support block needed sanding to the correct height and angle. A degree of 'sand and try' was employed, removing material in stages until the fit was right (see **Photo 14**). This was one of the more demanding aspects of the model's construction, and one

which leads me to reiterate my earlier words of caution about this not being a build I'd recommend to the novice modeller.

Moving swiftly on, the main deck was then glued to the bulkheads. It had to be flat between Bulkheads 3 and 4 but rise up slightly towards Bulkhead 1 (see **Photo 15**). Having not cut the deck access openings yet, I only applied glue to the outer edges of Bulkhead 4. Applying glue across the whole of this edge would stick the access cut-out piece to the bulkhead, definitely something to avoid!

Some sanding was needed in order to fit the transom between the stern bottom and deck, and, while probably not required, some balsa strips were added to the joints between the underside of the deck and the bulkheads. Again, only the strips at the edges of Bulkhead 4 were glued in place.

Now, no matter what the advice is for the glue you use, I recommend leaving the hull structure for a generous time to ensure the glue has fully set. Otherwise, things might come apart in your hands during the heavy sanding session that comes next.

Part 2

Next month, prepare for dust, lots of it, plus a whole lot more as the build continues... ●



Replica of Ictineo I (Wikipedia).
Inset: Narcís Monturiol i Estarriol (Wikipedia).

MONTURIOL'S MASTERPIECE

John Parker dives into the little-known history of *Ictineo I* and *II*, and the options for modellers

The visionary Spanish inventor Narcís Monturiol i Estarriol rarely gets a mention in books charting the history of submarine development. Yet to this Communist revolutionary, lacking in any engineering qualifications, can be credited the first workable submarine – one that embodied several innovations now seen as crucial in the development of the modern submarine: the first double hull, the first air scrubber, the first to be built to modern

engineering principles and incredibly, the first air-independent combustion engine for propulsion.

Conception

Born the son of a cooper (barrel maker) in 1819, Narcís trained as a lawyer but never practised as one. Instead, he wrote poetry, painted portraits and published socialist newspapers which the government, wary of his revolutionary activities, sought to

suppress. When his attention was turned to the plight of coral divers who risked their lives to retrieve highly sought-after coral from the rocky seabed around the coast of Spanish Catalonia, he was struck by the vision of an underwater ship that could harvest coral without endangering lives. The idea suited his altruistic outlook, and he somewhat naively assumed the world would beat a path to his door if he could provide such an underwater ship and explore the oceans for all mankind. So, he set out to build it.

Ictineo I

Monturiol had already thought of a name for his intended creation, *Ictineo*, formed from a combination of ancient Greek words meaning fish-ship, and began a study of existing

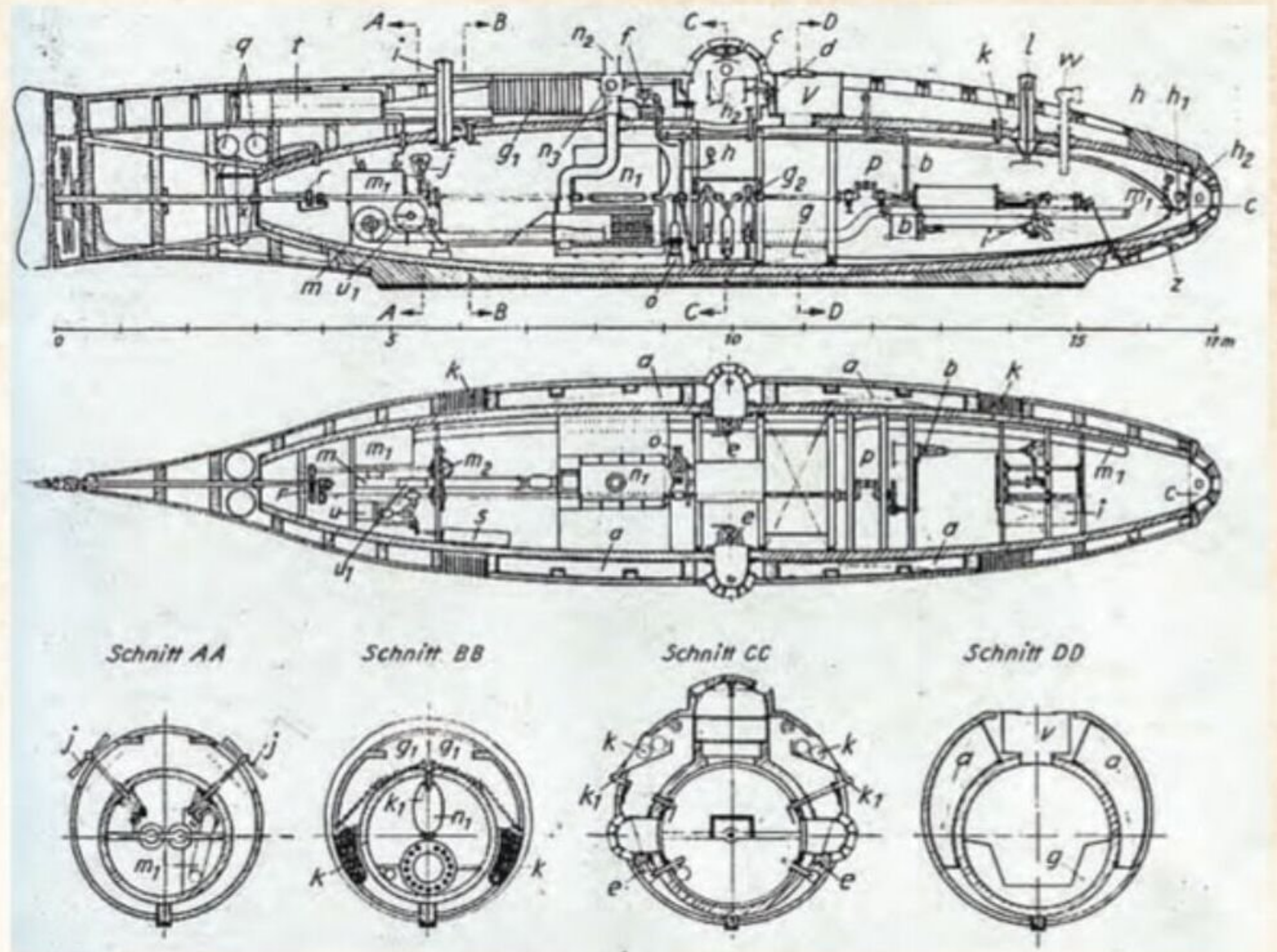
“This Communist revolutionary, lacking in any engineering qualifications, can be credited the first workable submarine – one that embodied several innovations now seen as crucial in the development of the modern submarine”

“Every aspect of its design represented a sound scientific solution”

submarine designs. It was some years before he could raise enough money to build it by public subscription, during which time he began applying his untrained mind to the problems of submarine navigation, such as depth control, stability, vision and habitability, making many observations and conducting numerous experiments. He also sought the help of an engineer (who later married his daughter) and a master shipbuilder. When his *Ictineo I* was launched at Barcelona harbour in June 1859 it was indeed fish-shaped, and some were inclined to ridicule it because it looked toy-like and was made of wood. But every aspect of its design represented a sound scientific solution.

Monturiol knew that the best hull shape for withstanding the pressure of the water at depth was a cylinder; but he also realised that a finely streamlined fish-like shape offered the least resistance to moving through the water. His solution, therefore, was to have a strong watertight inner cylinder housing the crew and most of the equipment and surround it with a lightweight streamlined hull that was free flooding, that is, open to the sea. This was the first ever double hull and was a neat solution to the conflicting demands of low drag and pressure resistance. He would have preferred to make it from steel but the funding was insufficient and so he turned to finely shaped tulip wood, a natural option, perhaps, for the son of a cooper.

Propulsion was human muscle via a hand-cranked propeller – there really was no alternative available at the time, with electric technology still in its infancy. To extend the endurance – some two hours with the crew breathing the air contained in the hull – Monturiol invented the first air scrubber,



Drawing of *Ictineo II* (Wikipedia).

which removed carbon dioxide by piping the air through calcium hydroxide. The ballast tanks totalled four in number and were situated in the free-flooding area between the inner and outer hulls and so disposed to allow adjustment of the trim as well as the depth. But perhaps the most surprising thing of all is that the *Ictineo*, unlike most early submarines, failed to kill any of its crew.

After making some 50 successful dives, its career only ended in January 1862 when another vessel collided with it whilst it was in dock. *Ictineo I* was 7 metres long with a 2.5 metre beam and displaced 10 tons.

Ictineo II

Again, raising funding by public subscription, Monturiol formed the company La Navegacion Submarina to build the successor to *Ictineo I*. Launched in 1864, *Ictineo II* was

*“Perhaps the most surprising thing of all is that the *Ictineo*, unlike most early submarines, failed to kill any of its crew”*

of similar conception to its predecessor but considerably larger, spanning 14 metres by 2 metres and displacing 46 tons. It had a vestigial upper deck with a squat conning tower amidships from which it could be steered. Able to remain submerged for over seven hours at a depth of 30 metres, its ballast tanks were aided by vertical propellers for depth setting and a movable weight for pitch control. In an emergency, ballast weights could be jettisoned to bring the craft to the surface.



Replica of *Ictineo II* (Wikipedia).

“Astonishingly, he had created the first ever air-independent heat engine for submarine propulsion, some 73 years before the German V-80 Walter U-boat”

At one stage, Monturiol fitted it with a gun which could be fired underwater, but this attempt to interest the government in its potential as a weapon of war backfired when the port authorities took exception to the mysterious explosions and waterspouts that began appearing in Barcelona harbour. Throughout its trials, one basic limitation remained – that of being human powered. Its best speed was only a couple of knots and was easily nullified by any prevailing current.

Electric power was not yet practicable, and the prime mover of the industrial age, the steam engine, would consume all the oxygen in the hull in a matter of minutes. But Monturiol, with the help of professors from the University of Barcelona, had been examining chemical means of replenishing the oxygen in the hull to permit breathing, and from his investigations came the answer to the engine problem. A mixture of 53% zinc and 31% potassium chlorate with 16% manganese dioxide acting as a catalyst reacted with enough heat to run the boiler of a steam engine, at the same time producing all the oxygen that would be needed for the crew to breathe! Astonishingly, he had created the first ever air-independent heat engine for submarine propulsion, some 73 years before the German V-80 Walter U-boat (see Flotsam and Jetsam, June 2023 issue).

Right: The monument to Monturiol in Barcelona (Wikipedia).

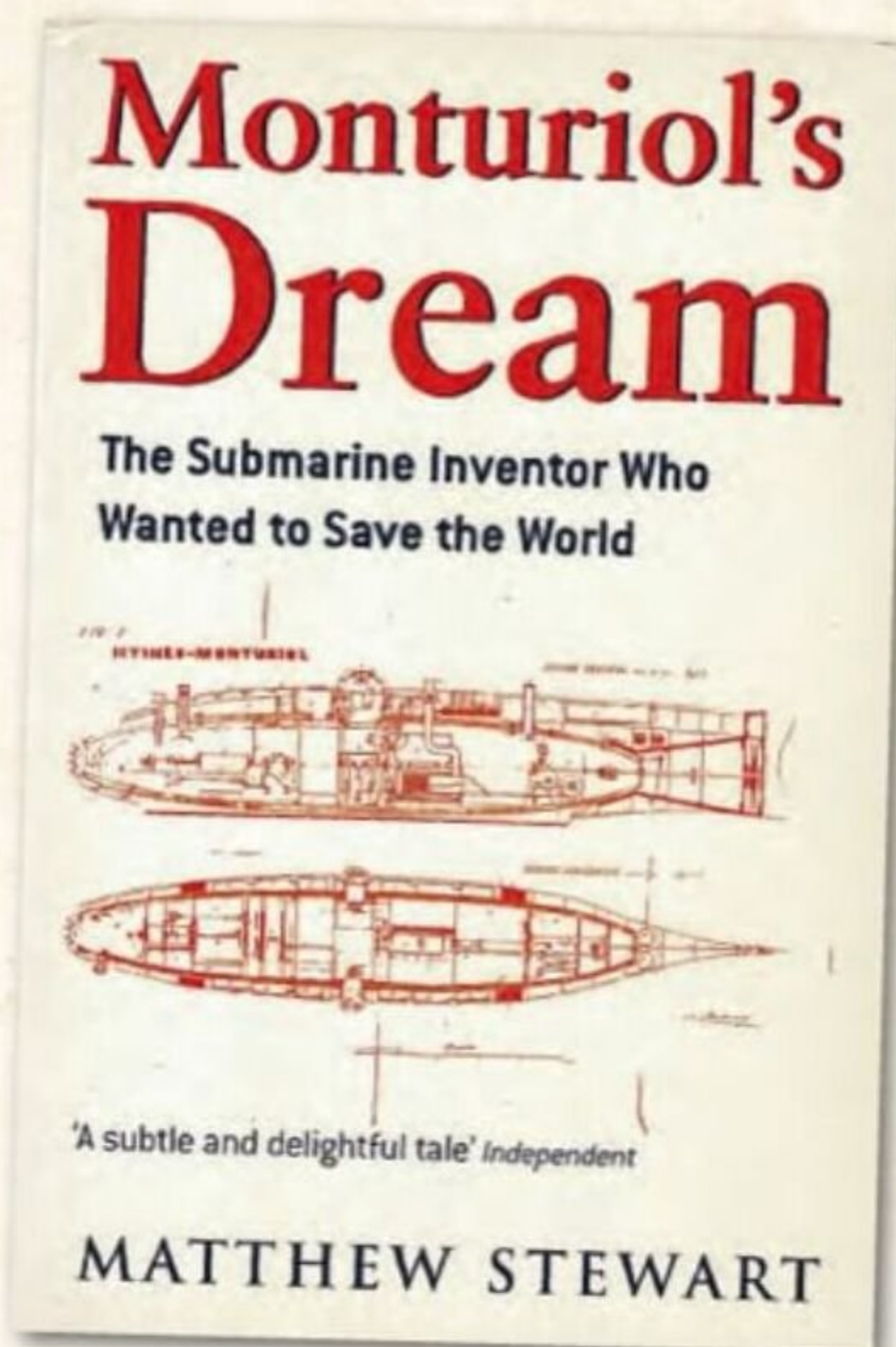
Below: Ictineo II in modelling literature.



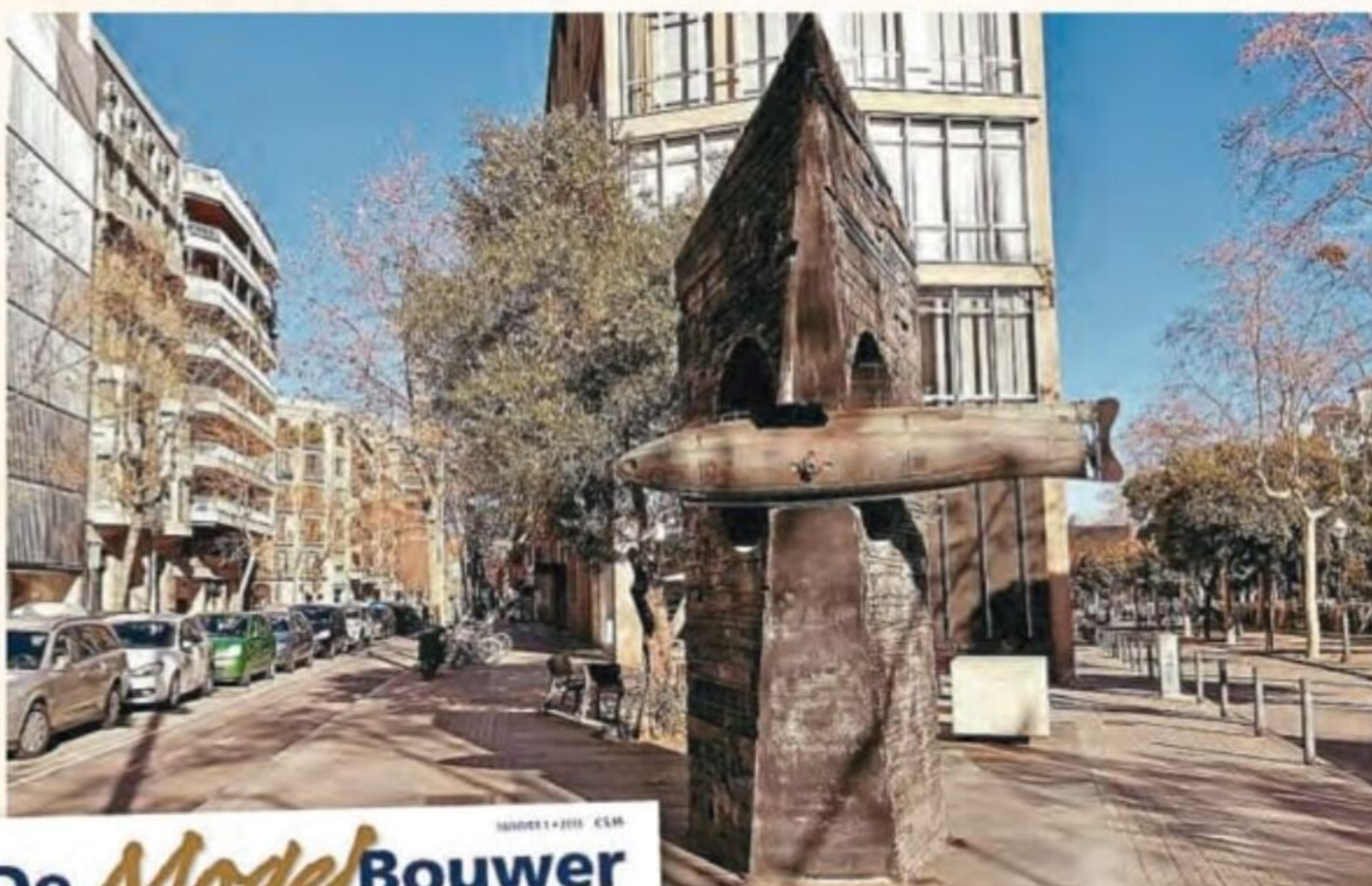
Viewing port detail (Wikipedia).



The Ictineo II kit by Wooden Kit



The excellent biography of Monturiol by Matthew Stewart.



Monturiol bought a second-hand six horsepower steam engine and with the help of his engineer son-in-law rebuilt it as two engines: a two-cylinder oscillator with coal fired boiler for surface propulsion, and a single-cylinder oscillator with chemically fired boiler for submerged operation. But time was running out. On December 14, 1867, he ran the chemical plant for the first time submerged and found that, while it worked well, it produced so much heat that conditions became unbearable for the crew. The heat would have easily transferred to the surrounding water had the hull been metal but, alas, wood was an insulator. Events followed quickly: Monturiol's shareholders became impatient with his endless search for perfection



Pedro Gómez with his Ictineo II R/C model and launch/recovery gear.



The model underway with a likeness of Monturiol waving from the conning tower.

“For the potential scratch-builder, the ultimate goal here is surely a working R/C model that duplicates the functions of the original as closely as possible”



The very finely craftsmanship displayed at tail end of the model, including the unique paired blades of the propeller.



Close up of one of the retractable manoeuvring propellers.

instead of concentrating on mining coral with what he had. The funding ran out and La Navegacion Submarina went bankrupt on December 23. Ictineo II, the most advanced submarine in the world at the time, was scrapped and Monturiol's dream came to an end.

Models

Ictineo I or II can make an attractive model because of its intriguing shape and planked wooden hull.

A kit of the Ictineo II was made by Anfora Modelisimo that had a sectioned hull, with all the interior arrangements visible on one side, including the twin boilers of the steam engines, but unfortunately it is no longer available.

A 1:46 scale kit with laser cut wooden parts is made by the Russian Wooden Kit company, part number 108WK, but be aware some of the documentation depicts a different kit! 3D printer files are available from cgtrader: <https://www.cgtrader.com/3d-print-models/miniatures/vehicles/print-and-build-your-own-model-kit-of-the-ictineo-ii>

For the potential scratch-builder, the ultimate goal here is surely a working R/C model that duplicates the functions of the original as closely as possible, including depth control without the aid of hydroplanes. Rising to this difficult challenge was Pedro Gómez, who assisted Antonio Barata to produce a 1:10 scale replica of Ictineo II, working from the original drawings in the Maritime Museum of Barcelona.

The model is built around an epoxy fibreglass hull beautifully planked in beech. The viewing portholes are tapered plugs of acrylic, sealing against radially laminated wooden seatings in the manner Monturiol intended. Copper cladding protects the wearing surfaces and all of the auxiliary equipment, such as the retractable vertical propellers for depth control, is functional. Powering this model with an electric motor would not have been in-keeping with the dedication Pedro has displayed to authenticity, so the model is powered by a steam engine, adapted to running from a tank of compressed carbon dioxide. The full story of its build (with Spanish text) can be viewed on YouTube: <https://www.youtube.com/watch?v=ggAcwpHlpNc> ●

Bonny Lad as originally built. While she looked fine, with all the weight too high up, when she heeled, she didn't want to right herself.

RETRO FITTING

Drawing on personal experience, **Nev Wade** encourages others to explore the joys of building backwards!

When you're new to model building your first scratch-built boat is a delight. You, not some kit manufacturer, can decide upon the 'where's and 'how's. Armed with limited information/experience, though, there is always the possibility that you will blunder on, unaware of where you're going astray. That was me in 2005/6, building a model of a yawl called *Sheila 2nd*. I got lots right, she looked OK, and I was filled with optimism when I took her for her first sail as *Bonny Lad* (named for the man who lent me the drawings – see the With a little help from my friends feature in last month's issue).

Besides having all the paraphernalia of sail and rudder control, I had decided to have a motor and prop on board, 'just in case', and that was my first mistake. I also had neglected to overly concern myself with keeping out water from the pond by effectively sealing the removable upper-works, and that almost caused a sinking!

In the event, the large motor, battery, ESC and prop shaft I'd fitted caused the onboard weight to be much too high up, making the boat heel right over and struggle to right herself. That, in turn, led to the side of the boat going under water for long enough to

take onboard sizeable amounts of H₂O. What with one thing and another, *Bonny Lad's* maiden voyage proved far too 'exciting'!

So, what to do? Well, to cut to the chase, I took out all the things associated with powered sailing and replaced them with the same weight of lead, glued into the keel as low down as possible.

By the next sail I had an excellent little boat, but she still took too much water aboard. *Bonny Lad* had what I considered a really nice cockpit, made as one piece with the cabin top; the whole thing was a removable, tight, fit with the deck, but I couldn't think of a way to retain this and make it watertight. Thus it was that I sealed in the whole of the top of the boat, making small hatches to enable me to get below when I had to. I then cut out the cockpit from the removable top of the boat (cabin, etc) and decked it over. The boat then sailed well and was reasonably watertight, though she had lost some of her looks.

*“What with one thing and another, **Bonny Lad's** maiden voyage proved far too ‘exciting’”*



The original cockpit.



Back in 2006, Nev felt the solution to making the boat watertight was to enclose everything in as simple a way as possible.



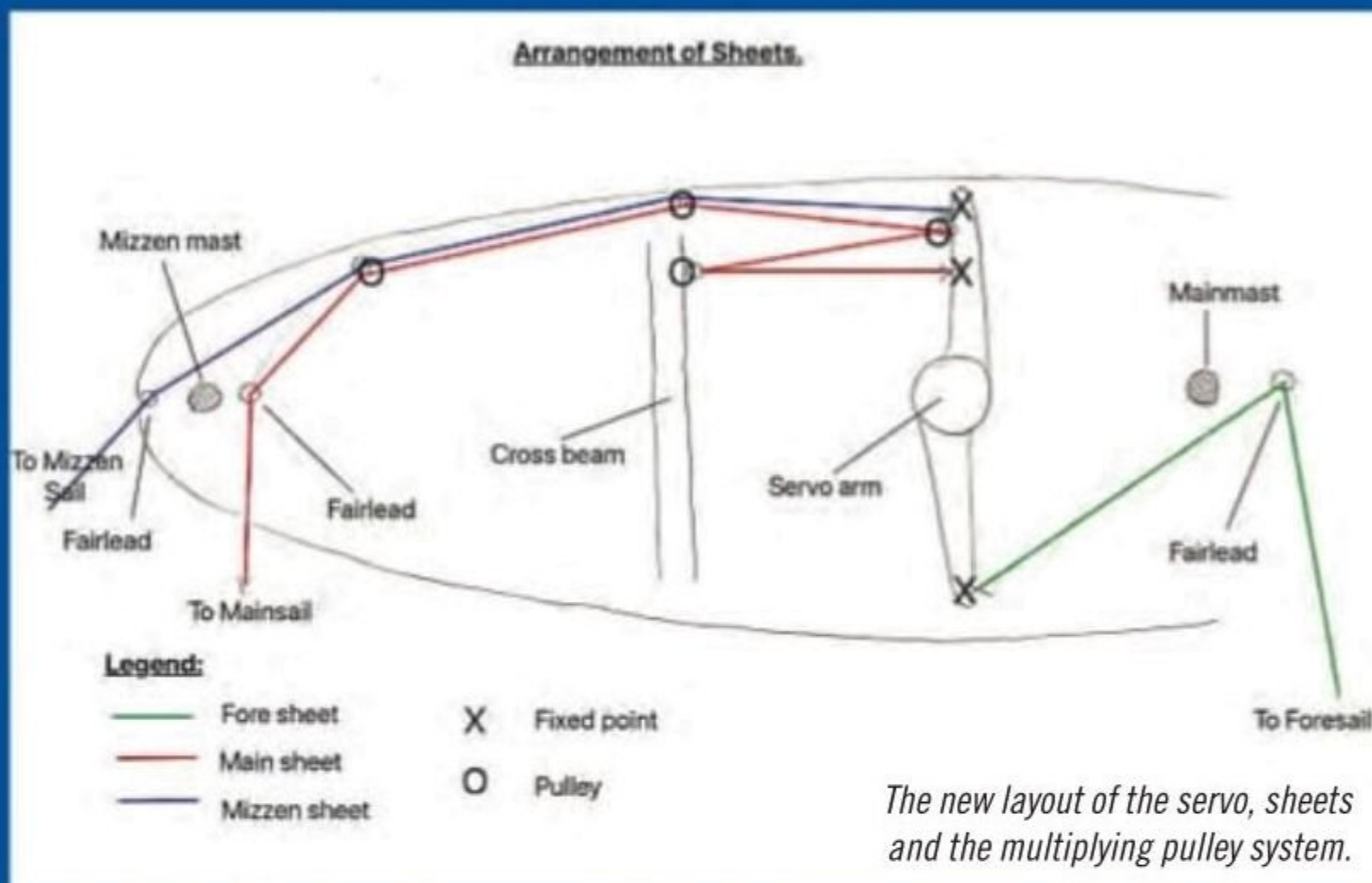
After boxing everything in, Nev's highly prized cockpit had to be cut off and decked over.



In 2021, the whole watertight 'upper deck' was cut off so that Nev could examine the possibilities. The original arrangement of the sail arm servo can be well seen in this shot.



Everything but the steering servo removed.



The new layout of the servo, sheets and the multiplying pulley system.



Here the boat's bows are to the right. The sail arm servo is now centrally mounted and has a centrally pivoted arm, while the sheets for the main and mizzen sails are seen on the port side. The sheet for the main sail goes through the multiplying pulleys, while that for the mizzen sail is a direct run, both from the port end of the servo arm.

For the next 15 years, as a supporting act for my square-rigger models, *Bonny Lad* sailed like that. I still missed the cockpit, however, and finally resolved to see if I could apply the knowledge I'd gained during that time to retrofit it.

Confidence

One of the things you gain from doing something for years is confidence. In this case, I used that confidence to take a Dremel to one of my oldest boats. I cut and ripped away at the deck which was beneath the removable cabin/cockpit until I just had a big hole. I was, originally, only intent on regaining a cockpit, but as I looked inside the boat it struck me that there were improvements to be made to the sail control that I had fitted all those decades ago.

There are three sails on *Bonny Lad*, the fore, main and mizzen, and all were controlled by a sail arm servo mounted on the starboard side, with a long arm, pulling all three sheets. The mainsail is considerably bigger than either of the other two and so needs to be let out, or pulled in, more. I'd attempted to achieve this by connecting the main sheet to the end of the arm while connecting the others to a point midway along, which did give the main more movement, but it was never enough. Since those days, I have learned how to use 'multiplying pulley systems' to gain extra

movement of lines when necessary, so I decided that, while I was under the deck, I'd improve the sail control.

To that end, I took out the sail arm servo and some of the earlier mounting points and reinstalled them on the hull's centreline with a centrally mounted arm. I attached a new foresheet to the starboard arm end and a new mizzen sheet to the port arm end. That gave similar, and sufficient, movement to the fore and mizzen sails. For the mainsail, I arranged a pulley system, connected near the port end of the arm, to 'multiply' the movement of the mainsail (see diagram). If you look at the drawing, you'll see that anti-clockwise rotation of the sail arm servo will let 'out' the sails, while the opposite will pull them 'in'.

With that behind me, I could turn to the original purpose of this exercise, gaining a cockpit.

Making a swimming pool

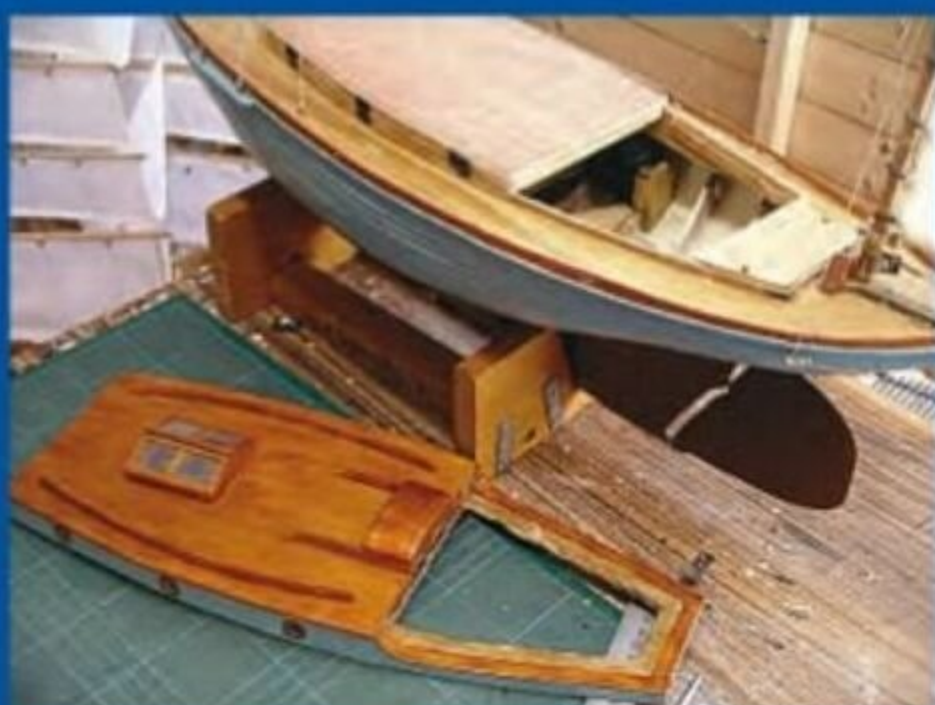
My problem was that I needed to create a water-tight recess, set into the deck of *Bonny Lad*, that was big enough to accept a new cockpit and would fit into the removable cabin/cockpit top of the boat. Fore and aft of that I needed to fit removable hatches to cover the sail control mentioned above and the top of the rudder shaft. These hatches had to be sealable so that when I fitted the cabin/cockpit the boat would be reasonably watertight. Here's how it came about.



Work on the sheets complete. The fore sheet is visible running forward from the starboard end of the servo arm.



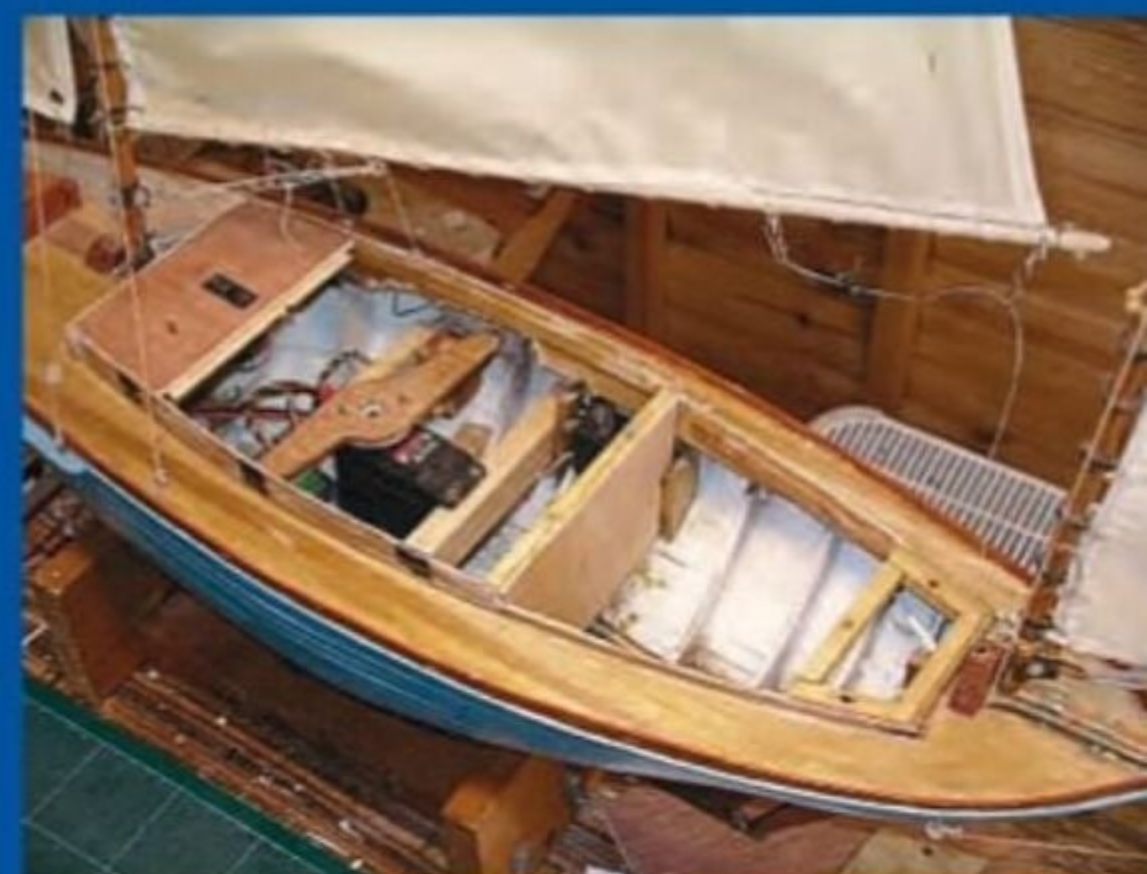
With the under-deck arrangements finalised, Nev cut out of the removable 'upper deck', creating the largest size cockpit opening that he could in order to understand what would be required below.



Now knowing where and how big the void required by the cockpit would be, Nev set about making new fixed and removable decks. The decks either side of the cockpit opening are removable.



The deck forward has in it the on/off switch and the charging points.



The bulkhead forward of the cockpit area being fitted.



The removable covers at either end of the cockpit area.



The aft side of the cockpit area going in.

Having finalised the sail control, I cut out of the cabin/cockpit top the largest size cockpit hole that I felt I could fit into the boat. I placed the top onto the boat to see where the water-tight recess (the 'swimming pool') would need to be. Armed with that information, I set about building the supports for the removable hatches, and then the walls of the 'pool'. The ends of the 'pool' could be vertical but needed to taper down inside the hull. Its sides had to slope 'inwards', again to cope with the hull's taper downwards. Lots of trial and error followed, including the making of paper templates, to get the shape of the wooden pieces required.

During this process it became obvious that the rudder linkage rod on the starboard side and the sheets for the main and mizzen sails on the port side would encroach on the 'pool'. The solution was in theory simple but proved awkward to put into practice. I had to make box-like 'insets' in each side of the pool, and then make them watertight, top and bottom. In the end, it came down to cutting bits of wood roughly to size and then shaping them down to fit. They were all glued in, and decorators' caulk used to seal any gaps. The whole pool was then given several coats of resin and varnish to finish off the waterproofing. I tested the pool by filling it full of water and leaving it for half an hour, checking the level of the water at the end.

"The solution was, in theory, simple, but proved awkward to put into practice"

The finishing straight

Now came the job of actually creating the cockpit. I put the removable cabin/cockpit top onto the boat in order to judge where to build yet another box, which would become the cockpit, within the 'swimming pool'. Again, it was trial and error, the aim being to end up with as big a cockpit as possible while still keeping all its sides symmetrical.



The rudder linkage on the starboard side and the main and mizzen sheets on the port side intrude into the cockpit area, so both had to be boxed in, for later waterproofing.



Decorators' caulk was used to start the water-proofing process.



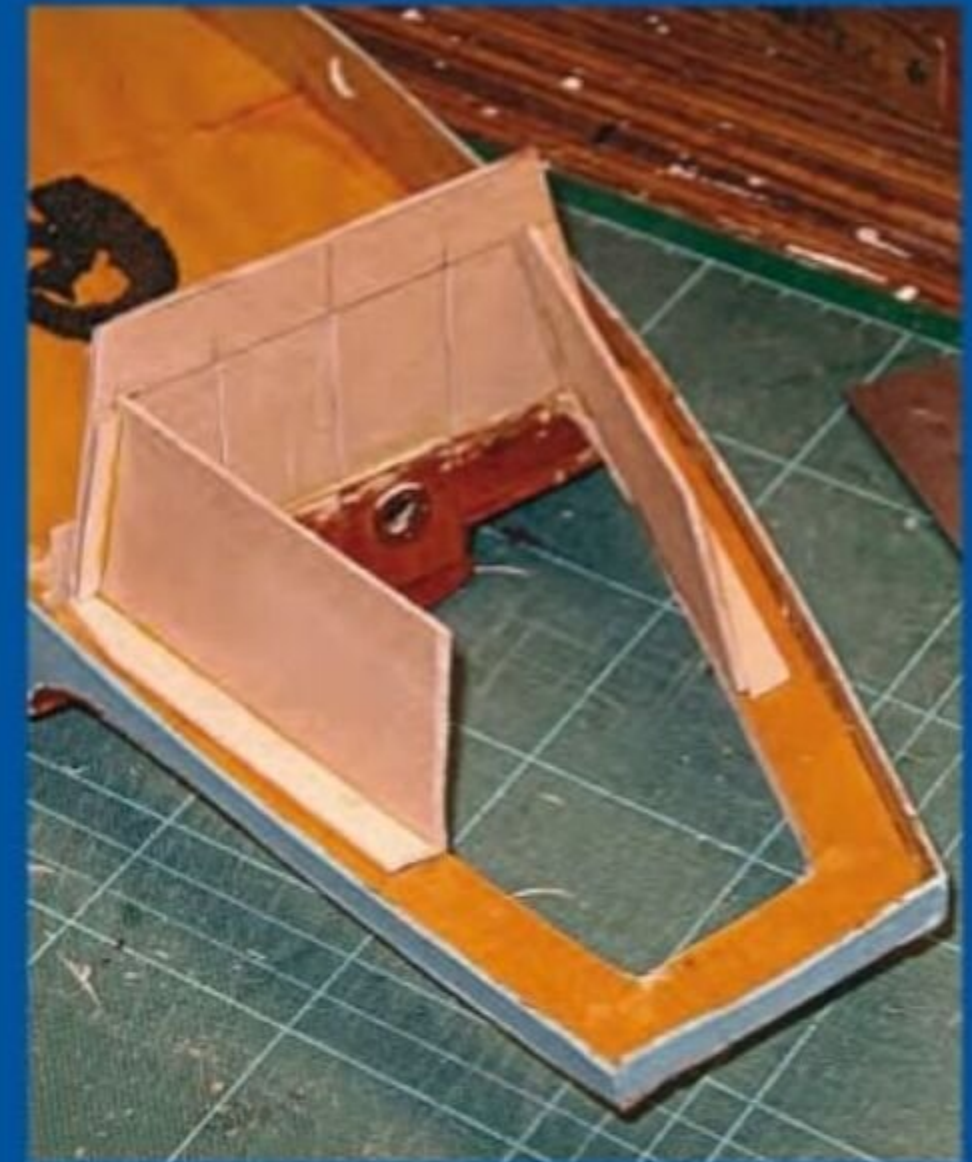
All the joints sealed with decorators' caulk. The next job would be to apply resin and then varnish to make this 'swimming pool' watertight.



Testing the watertightness of the 'swimming pool'. Nev filled it full of water and left it for half an hour to see if the level dropped. It didn't!



With the 'swimming pool' complete, Nev could now start making a cockpit to suit its shape.



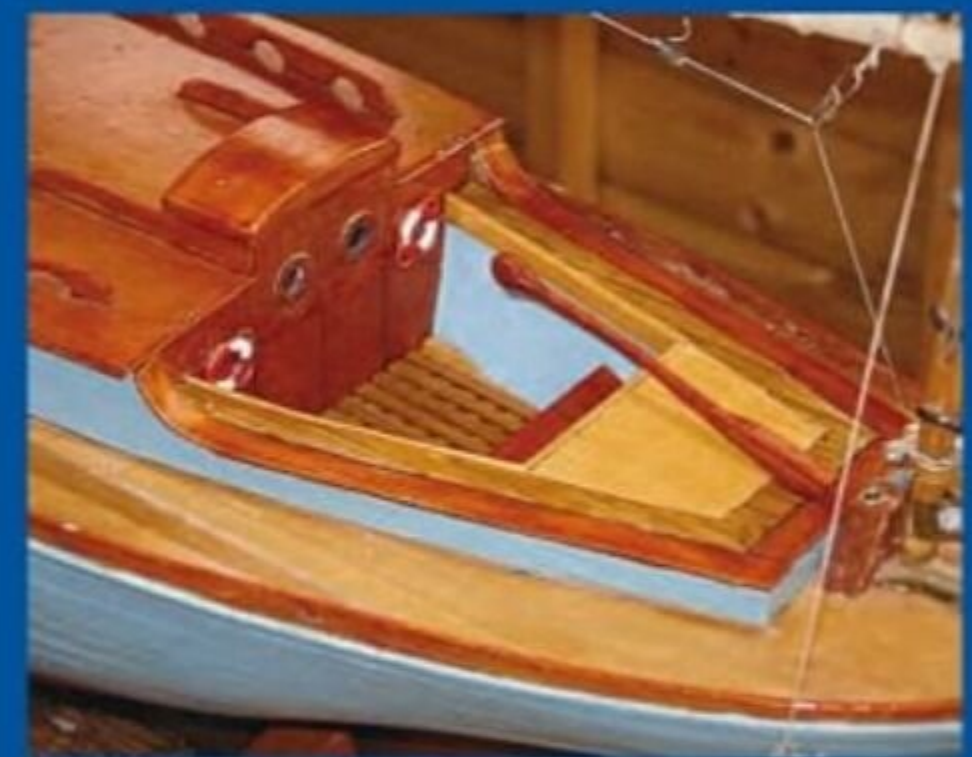
Right: Nev found making the cockpit as an upside-down box to fit into the 'swimming pool' proved an interesting spatial awareness challenge.



Nearly there now!



The cockpit shape completed.



The cockpit finished, including the addition of a tiller arm.

I marked out continuations of the cabin doors on the fore part of the cockpit and finished the sides and after part with lime wood, both as strip and as a small deck. The floor was fitted with gratings, and I drilled holes through the bottom to afford 'drain' into the 'swimming pool' (only important when lifting off the cabin/cockpit top to turn off the boat at the end of sailing).

Again, the whole lot was stained and varnished to match the existing boat, and I finished off the job by carving a tiller arm, à la the real boat.

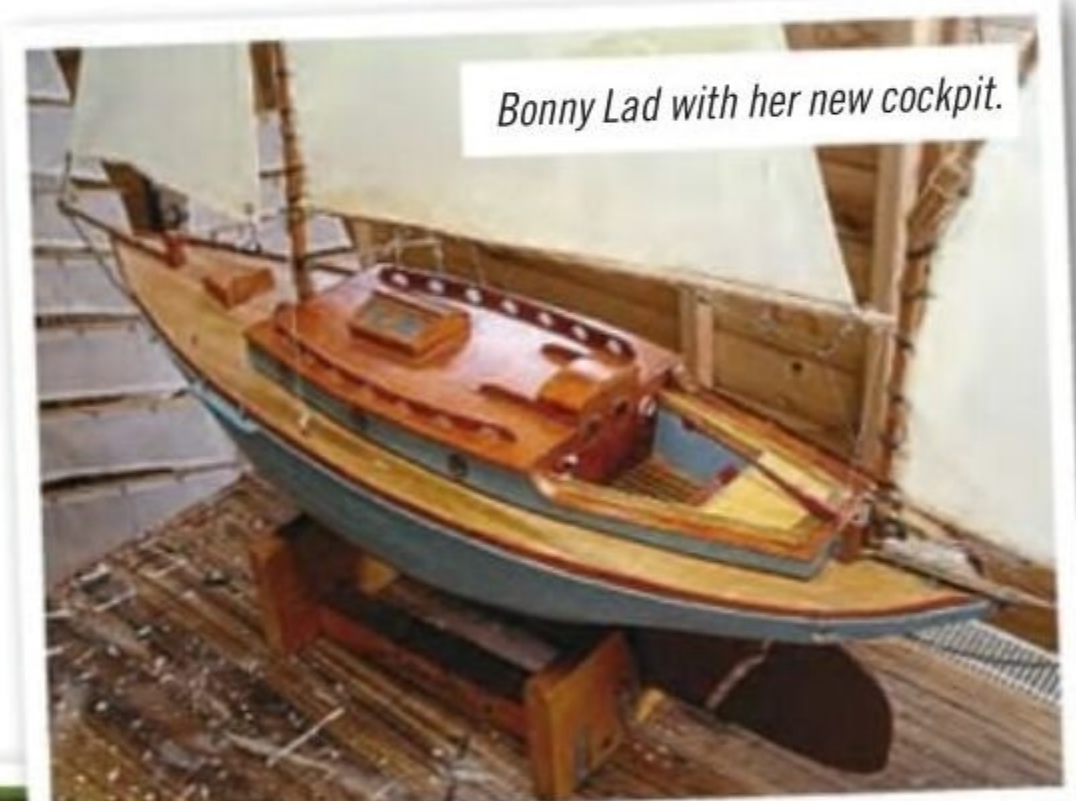
And the result?

Bonny Lad, just like *Sheila 2nd*, always sailed well reaching across the wind but, like the real thing, was a handful when sailing with the wind. That mizzen sail on a mast stepped so far aft always wanted to throw the boat around; you couldn't just leave her to sail herself as you could a Bermuda rig. That remains the case, even with the modifications, except that, with the ability to let the mainsail further out, the boat is somewhat more stable. None of the above is a problem however, it just makes her more interesting to sail.

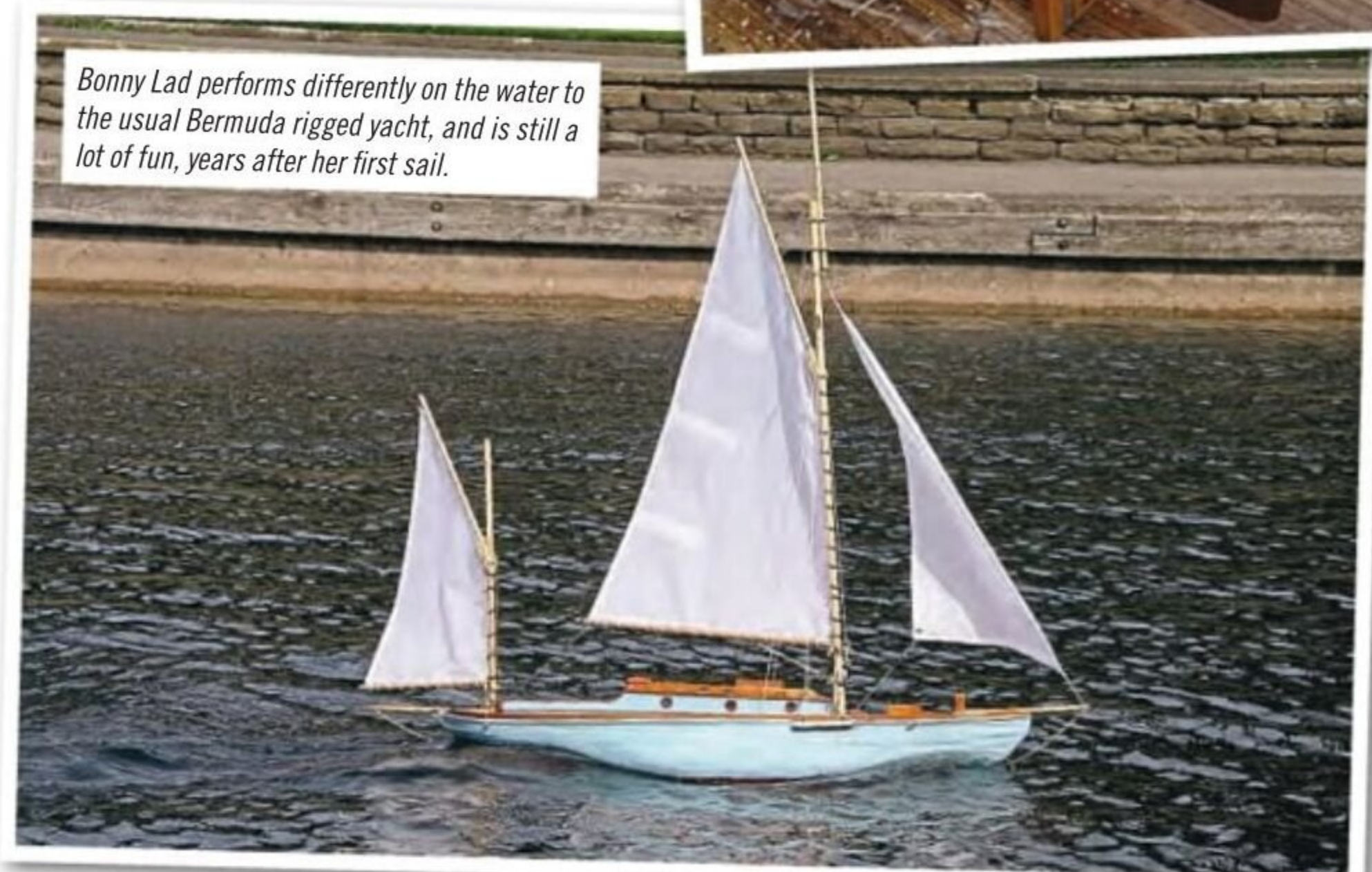
The sealing of the hatches is probably not as good as when there was an almost flat deck under the cabin/cockpit top, but I don't sail this boat for much more than 20 minutes

at a time so that's not a problem, and the 'swimming pool' is completely watertight.

I am delighted that I now have my cockpit back and the mainsail goes much further out. It has been very rewarding to put the experience and skills I've gleaned over the years to good use, and I thoroughly recommend revisiting any of your own early builds you're perhaps not entirely satisfied with, and that you now feel could be improved upon. ●



Bonny Lad with her new cockpit.



Bonny Lad performs differently on the water to the usual Bermuda rigged yacht, and is still a lot of fun, years after her first sail.

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**PART
TWO**

LCVP MK.5

Dave Wooley concludes his hands-on guide to building this 1:16 scale assault landing craft from last month's free plan, designed by former Vosper Thornycroft naval architect Peter Brown



Having dealt with the basic structures of the hull, wheelhouse, arctic cover and ramp in Part 1 (see January 2024 issue, which included the free pull-out plan for this build) I can now move on to some of the fittings, the airbrush techniques and associated materials used for the model's finish, and the all-important on-water trials.

Bits and arctic cover handrails & bulkhead

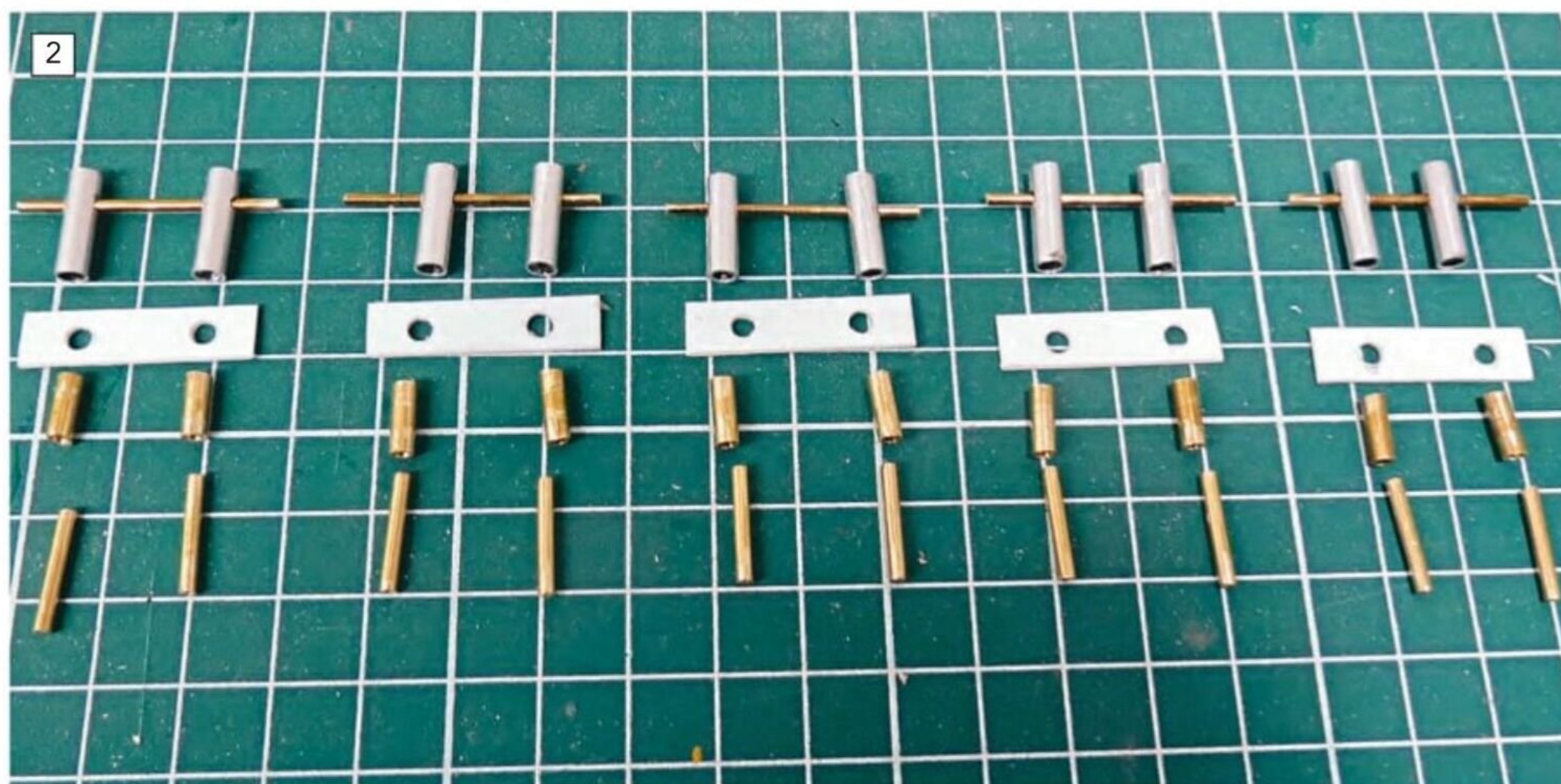
Along the edge of the gunwale port and starboard are eight small bits (see **Photo 1**). Rather than moulding in resin, I decided to fabricate all eight using aluminium tube for the barrels, brass for the connecting bar and

styrene for the bed. As these were mounted with the use of locating pins, I inserted a length of brass tube into the barrels as a sleeve and a length of brass rod for the pins into the sleeve (see **Photos 2 & 3**).

On the top edge of the arctic cover there are twelve handrails formed from 1mm dia brass rod folded to shape using a simple jig (see **Photo 4**). Not shown on the plan but clearly visible in photos are bolting flanges fitted to each end of the handrails, and which were formed from styrene sheet (see **Photo 5**). To ensure the gap between the rail and the top of the cover was uniform for all twelve handrails, a spacer was used (see **Photo 6**).



One of eight small bits along the model's deck edge.



Each of the bits is fabricated from eight separate parts.

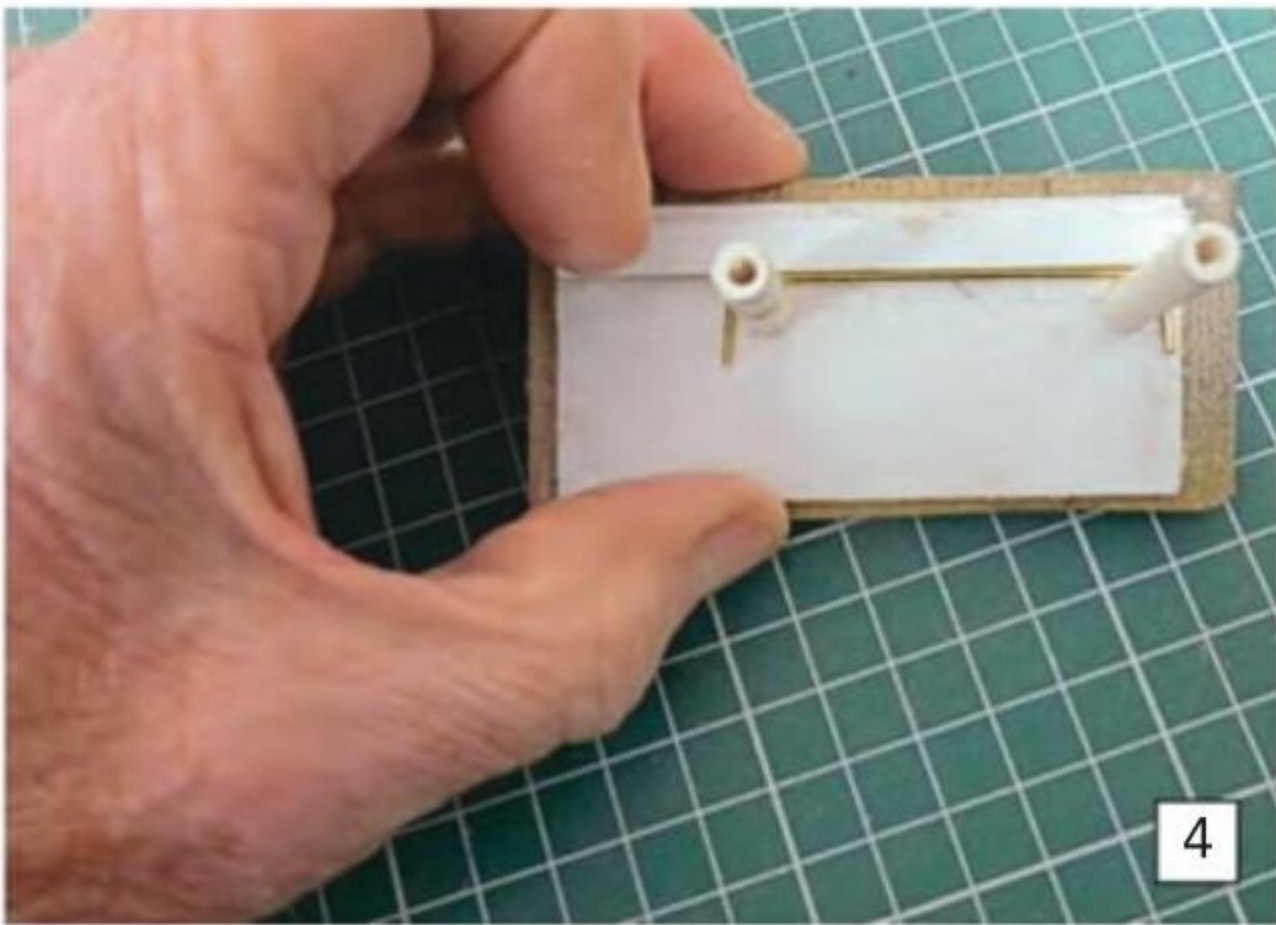


The bits are secured using brass pins inserted into the brass sleeves

The doors in the forward bulkhead were formed from styrene sheet with the rivet heads surrounding the edges from styrene rod. Brass sheet was used to create the handles and hinges (see **Photo 7**).

E/R deck vent and shipping hatch covers

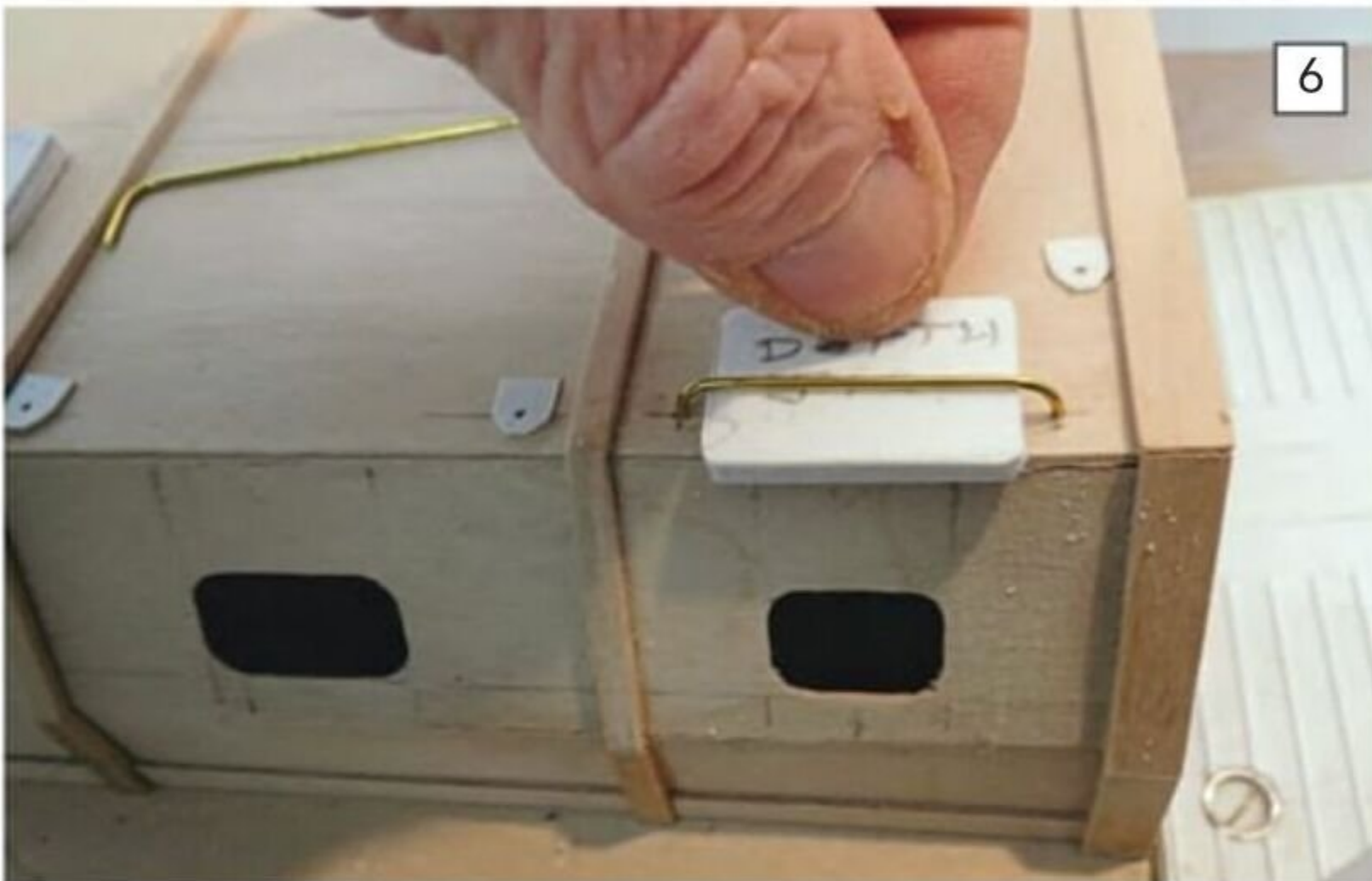
Forward of the wheelhouse are two engine access hatches and between these, immediately aft of the arctic cover rear hatch, is the engine room ventilator. I formed this from block balsa as its shape has compound curves on one side and balsa lends itself particularly well to the crafting of such shapes. Not shown on the drawing but which I decided to add to the vent's aft face is a 'Tee' socket spanner for the engine access hatch cover and shipping panel (upon which the vent is mounted) recessed holding down bolts (see **Photo 8**).



The handrails fitted to the arctic cover are formed using a simple jig.



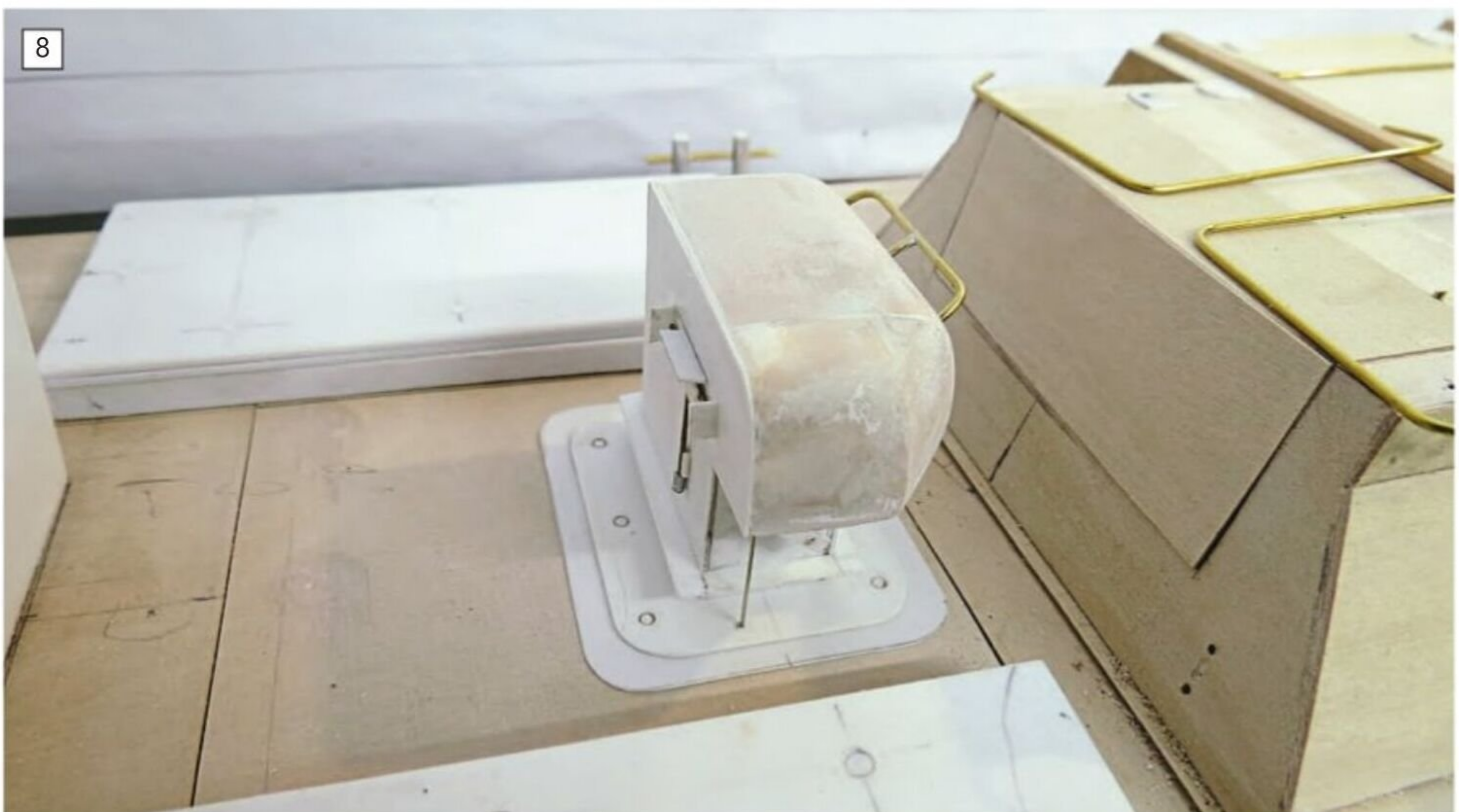
Handrails and their flanges ready to be fitted.



Using a spacer ensures continuity of depth.



The arctic cover forward bulkhead door.



The engine room ventilator formed from balsa.

“The resulting item, once airbrush painted in a stainless-steel finish and fitted to the model, looks satisfyingly realistic”



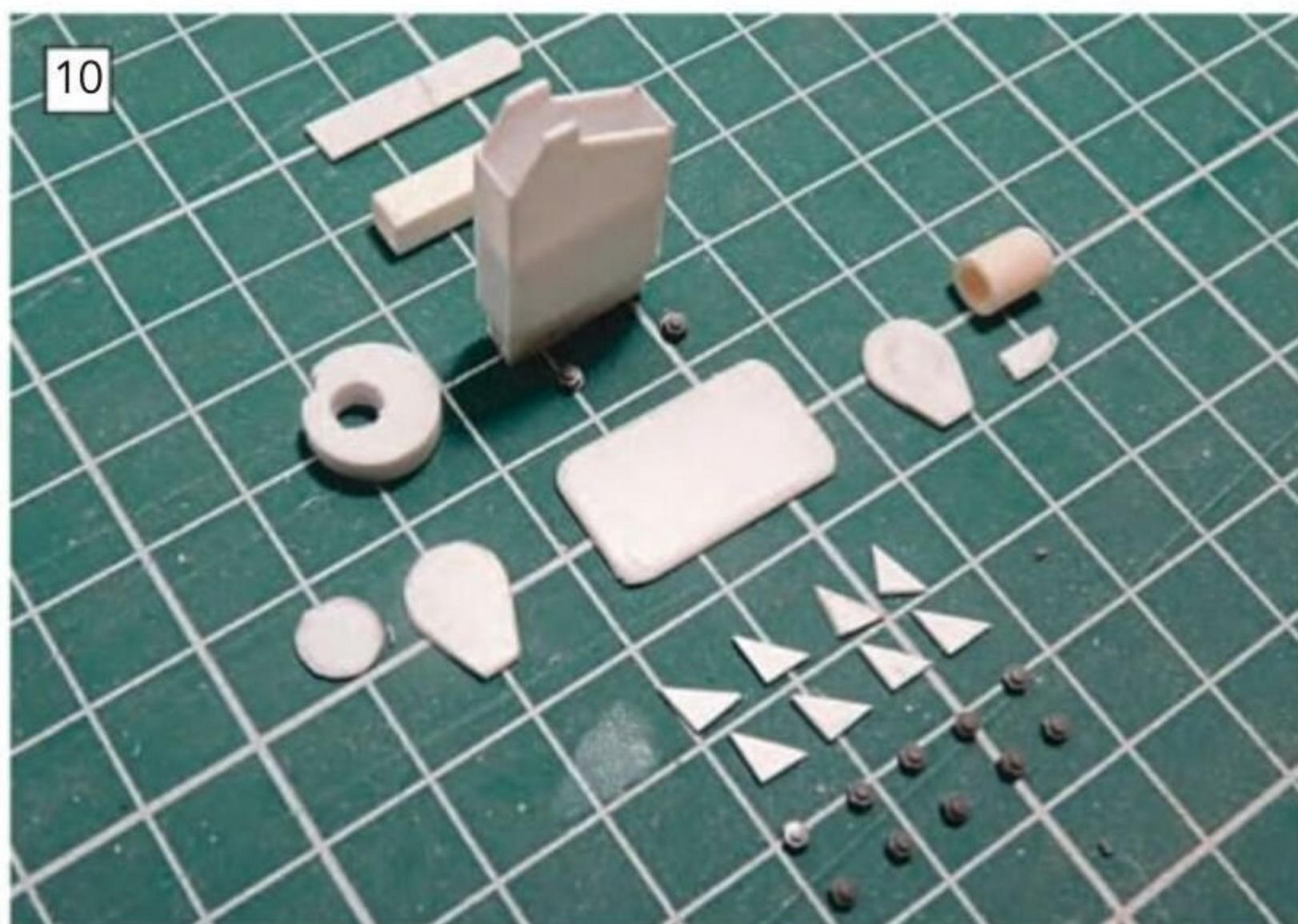
The after Henrikson lifting hook.

Henrikson lifting hook

Sited immediately forward of the wheelhouse is one of two Henrikson lifting hooks, which are part of the craft's lifting arrangements (see **Photo 9**). The forward one is stowed under the round-down and is not shown.

Referring to the drawing and making full use of several good images, I was able to break the hook down into its component parts (see **Photo 10**). The core of its construction was a rectangular box into which all the secondary parts were fitted with the hook sliding into the open top of the box.

Everything was then seated on a flat deck plate fitted with triangular webs around its bottom edge into which I inserted a series of moulded resin bolt heads (see **Photo 11**). The resulting item, once airbrush painted in a stainless-steel finish and fitted to the model, looks satisfyingly realistic.



The Henrikson lifting hook reduced to its component parts and constructed from styrene.



The fully assembled Henrikson lifting hook.

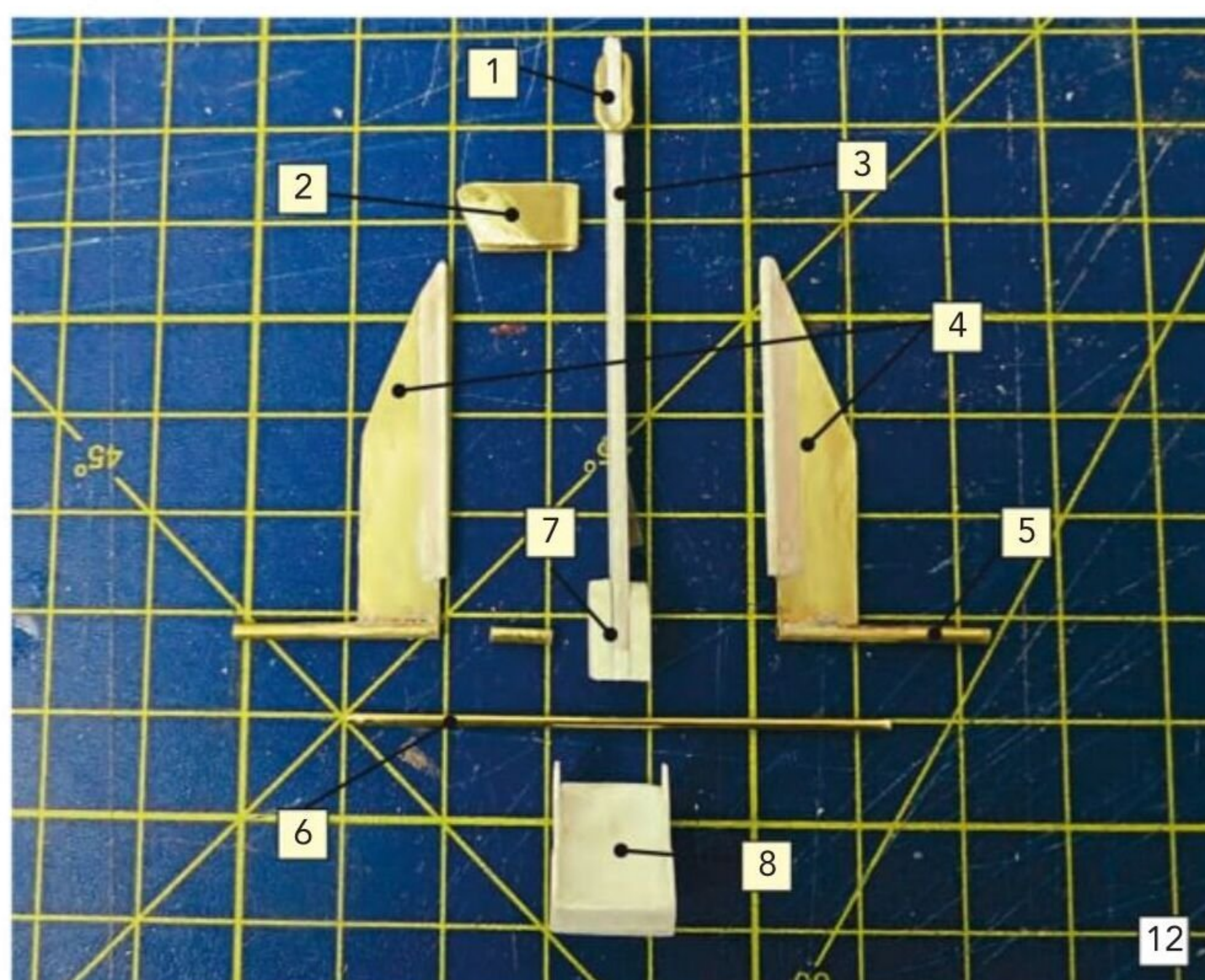
Danforth anchor and after guardrails & stanchions

The LCVF Mk.5 is equipped with a Danforth anchor and the model of it can be separated into eight parts:

- 1. The ring or anchor shackle
- 2. The shank holding bracket
- 3. The shank
- 4. Flukes
- 5. Tube for the stock
- 6. The stock
- 7. The crown
- 8. The seat

0.25 mm thick brass sheet was used for the flukes, and 1mm dia brass rod for the stock. Styrene completed the shank, crown and seat (see **Photo 12**).

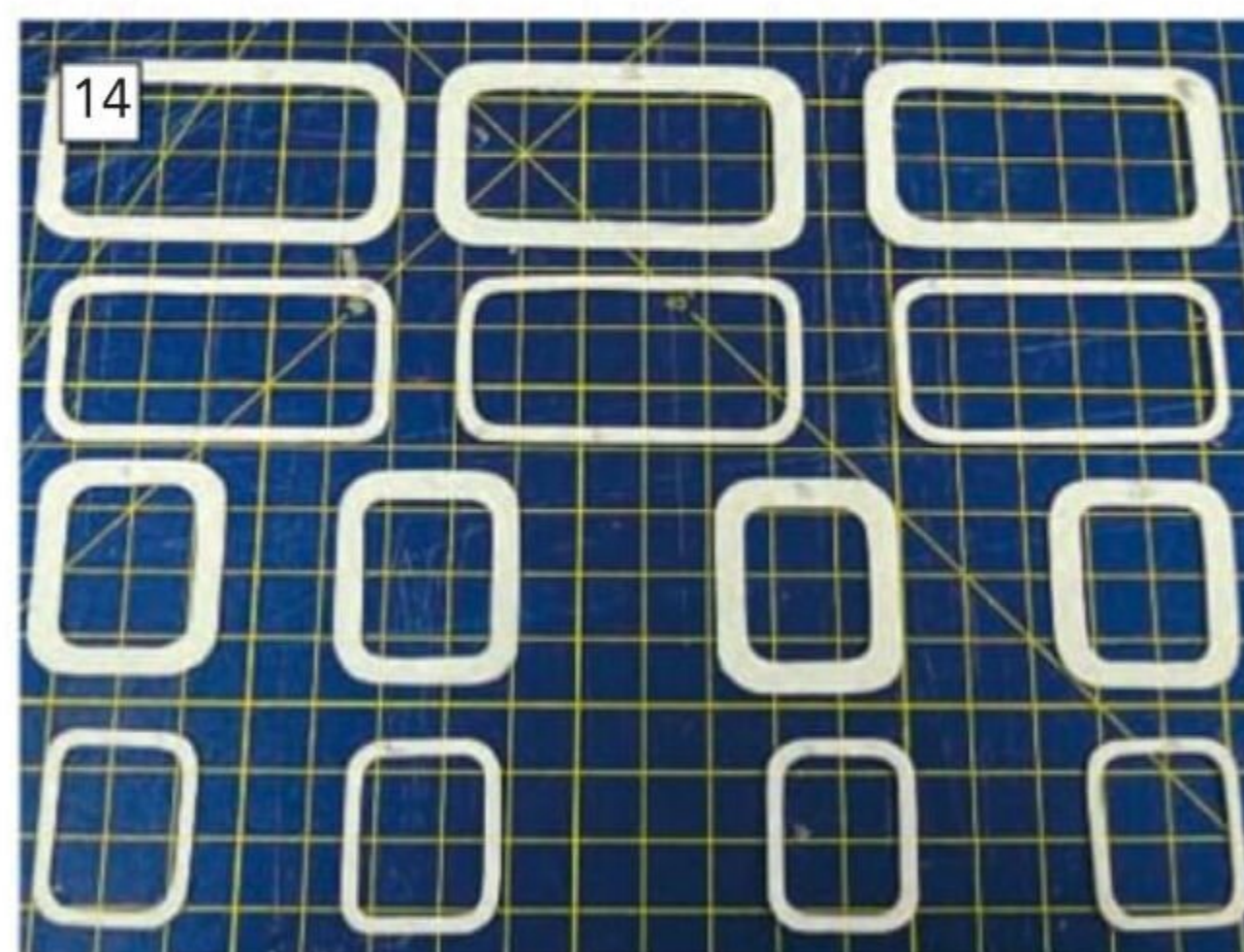
Photo 13 shows the Danforth anchor stowed on the outside of the after guardrails and stanchions, which were made from 1.5mm dia brass rod and with 0.50mm thick brass sheet to form the life ring brackets.



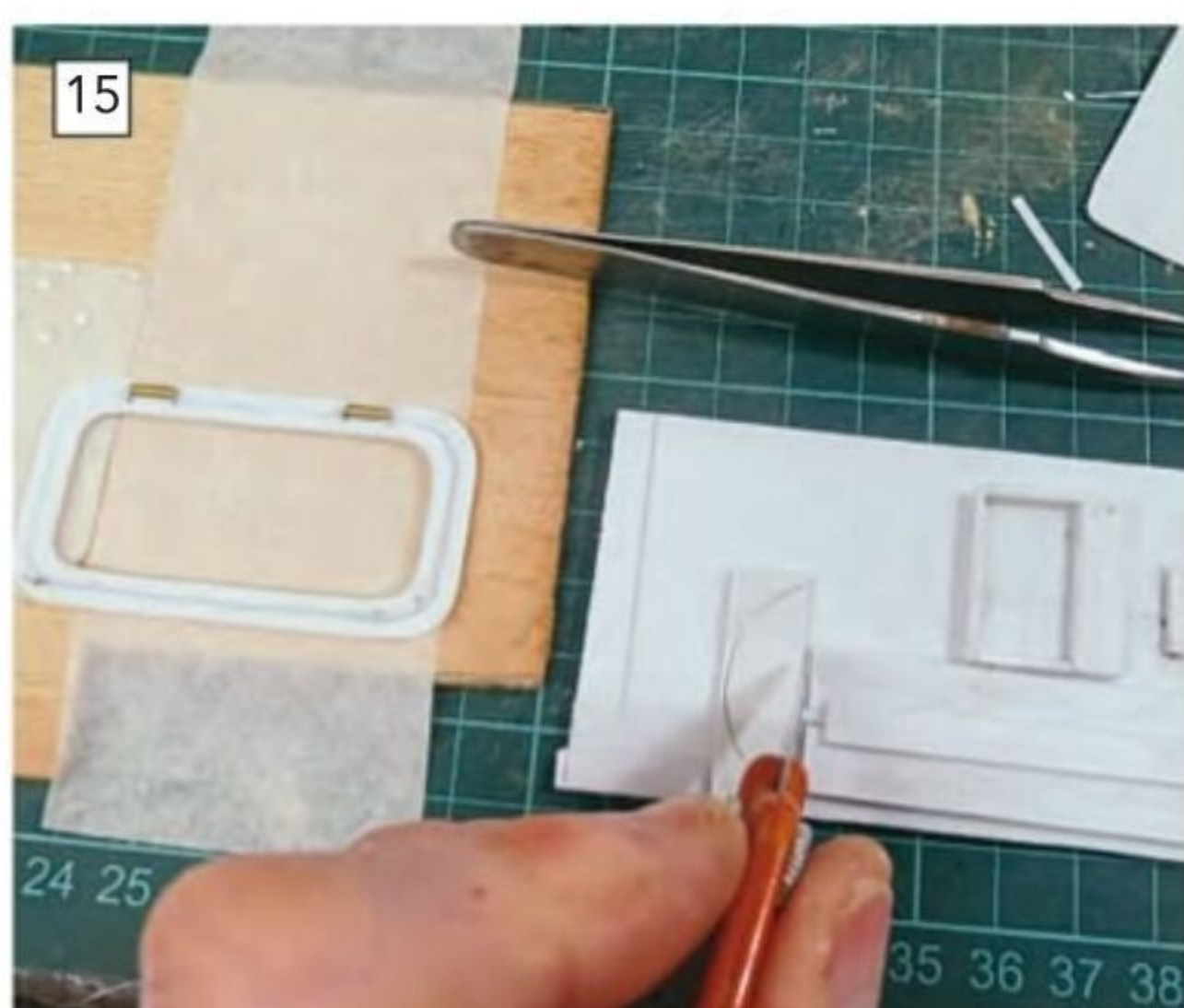
Danforth anchor fabrication from brass sheet and styrene.



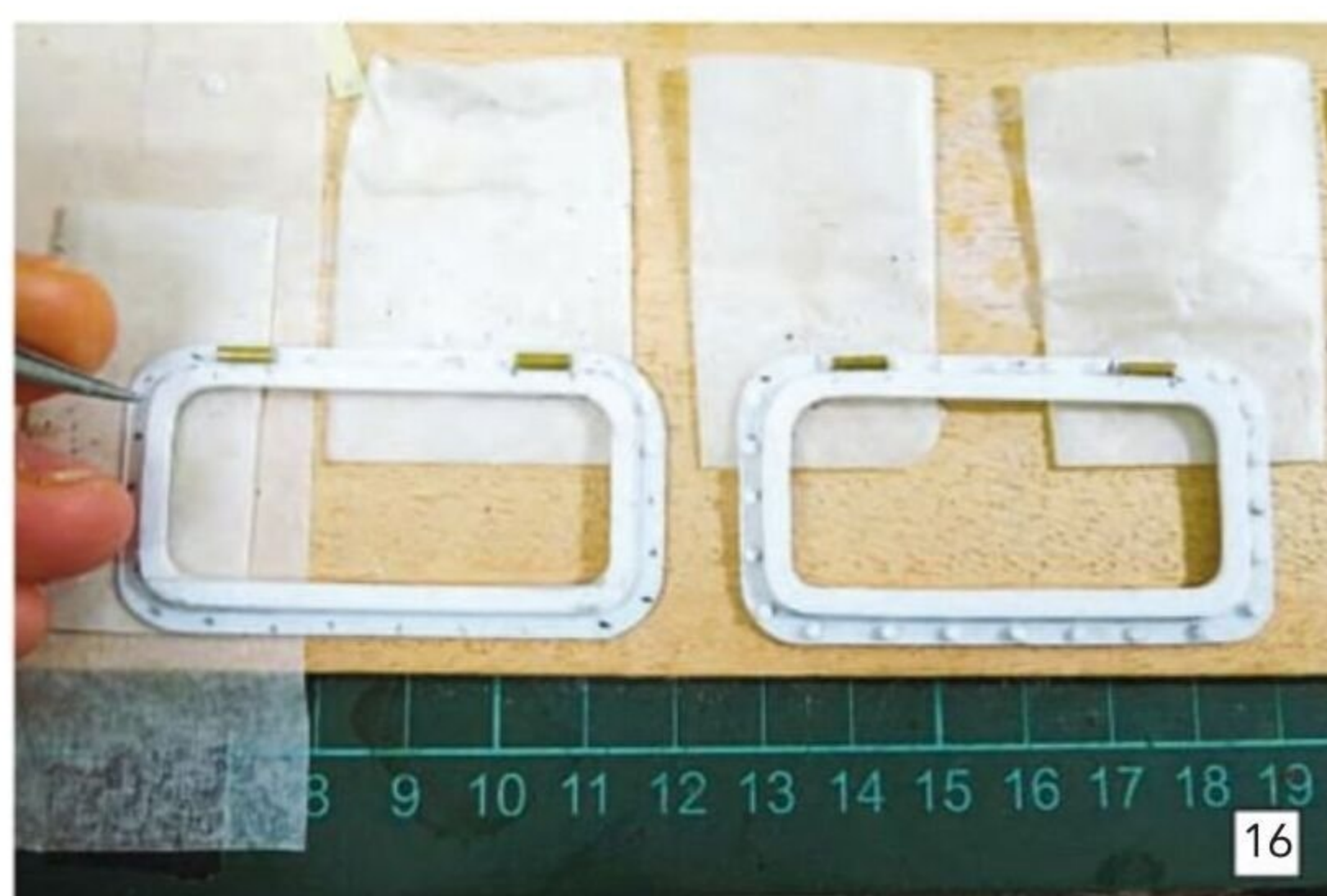
Danforth anchor stowed outboard of the guardrail.



The wheelhouse window frames formed from styrene sheet.



Use of a simple jig to form the styrene rod window frame bolt heads.



Fixing the bolt heads around the window frame.

Wheelhouse window frames

The window frames were each marked and cut from 1 mm thick styrene sheet (see **Photo 14**). Around the circumference of each frame are a series of bolts securing the outer frame to the side of the wheelhouse. These were cut from Evergreen 1.6 mm dia styrene rod using a simple jig to ensure thickness and symmetry (see **Photo 15**) and carefully placed in position around the frame (see **Photo 16**).

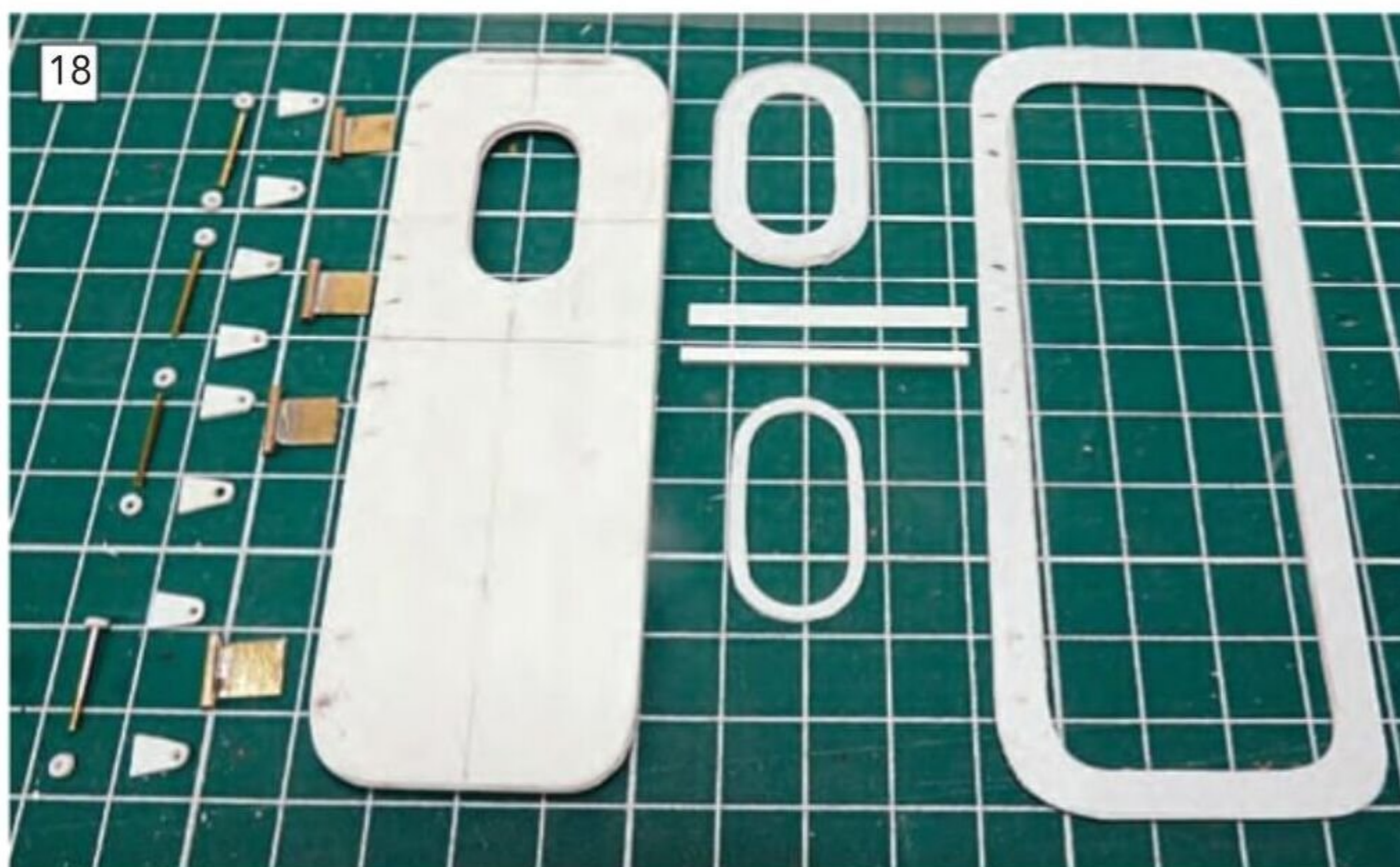
Wheelhouse door, roof and aft deck fittings

The after face of the wheelhouse is fitted with a watertight door (see **Photo 17**) and each part of the door frame, door panel, window frames, door strips and parts of the hinges were formed from 1mm thick styrene; the remainder of the hinges were made from brass tube soldered to brass strips into which brass pins fit to complete the working hinge (see **Photos 18 & 19**).

With just two parts to describe the build of this model, details of the construction of some of the fittings and equipment could not be adequately covered; these include those on the aft deck, on the wheelhouse roof, the buffers on the outboard sides of the wheelhouse, and the liferafts. However, these are all shown in detail on the plans and should present little difficulty for the modeller in their manufacture (see **Photos 20 & 21**).



Wheelhouse after face with door.



All the individual parts of the wheelhouse door, including hinges, frames and the door panel.



Adding the working hinges to the assembled door.



The wheelhouse door in place together with all the transom overhang deck fittings.



Wheelhouse roof and aft deck fittings and equipment on an actual LCVP Mk.5. Photo Crown Copyright.

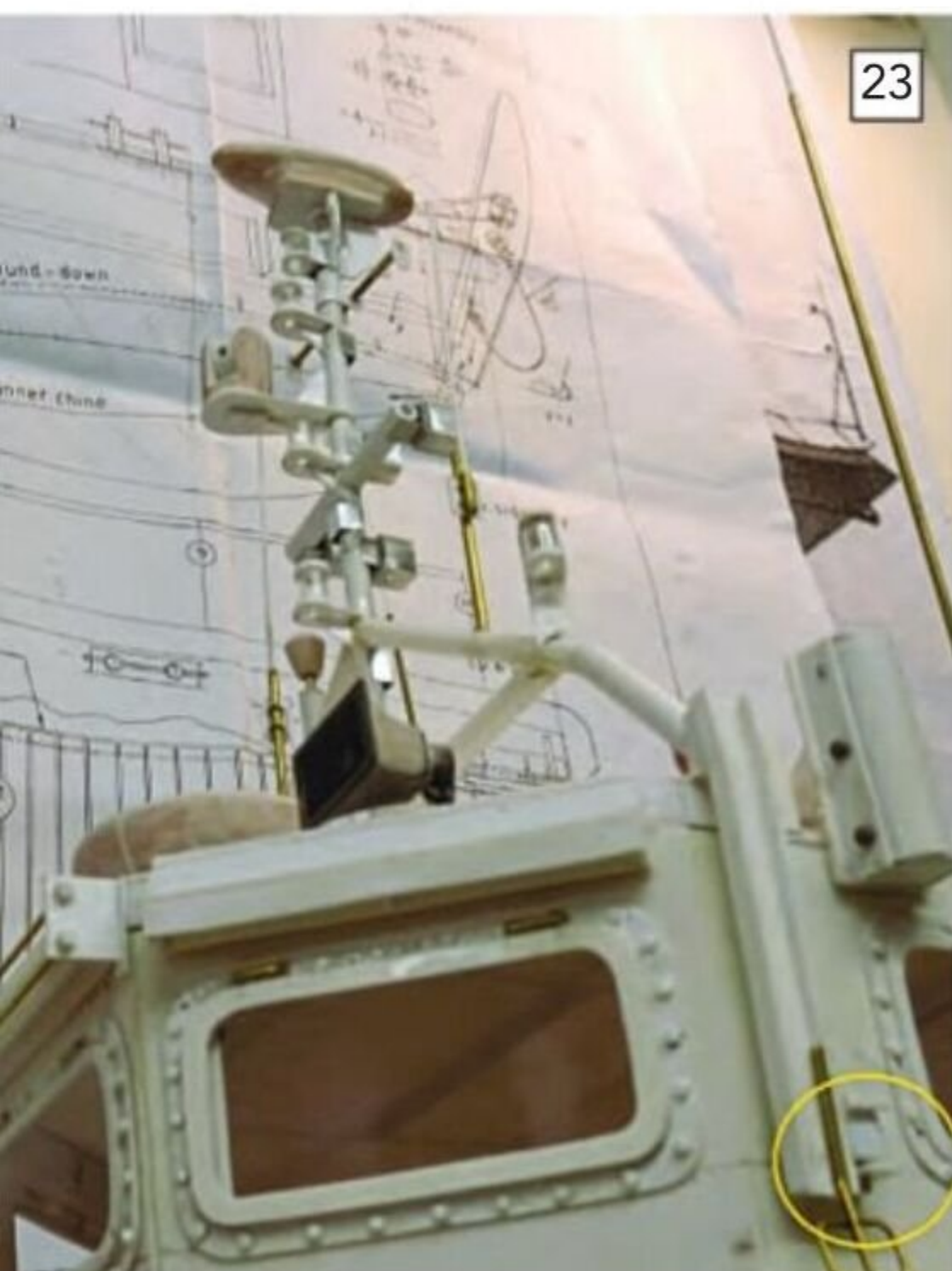
Mast and whip antennas

Owing to the constrained stowage aboard the LPDs, the LCVP Mk.5 has a mast that can be lowered manually by removing a pin (see **Photo 22**) – a function replicated on the model, which is clearly shown on the drawing and is also ringed in yellow in **Photo 23**. The upper mast frame was made from Evergreen 4.8mm dia plastic tube, with an aluminium tube inserted into the vertical section of the mast to increase strength. The lower mast arm was a channel fabricated from styrene, as was the remainder, including the spars and an assortment of small platforms which support the navigation and operational lighting, together with the various sensors and satellite compass aerial.

The craft are also equipped with two drop-down whip antennas. These are also lowered by removing a pin that secures the operating arm when in the vertical position and are shown ringed in red in **Photo 24**.



The mast can be lowered by removing locking pins on either side of the wheelhouse.



The method for lowering the mast by removing the locking pins is replicated here on the model ringed in yellow.



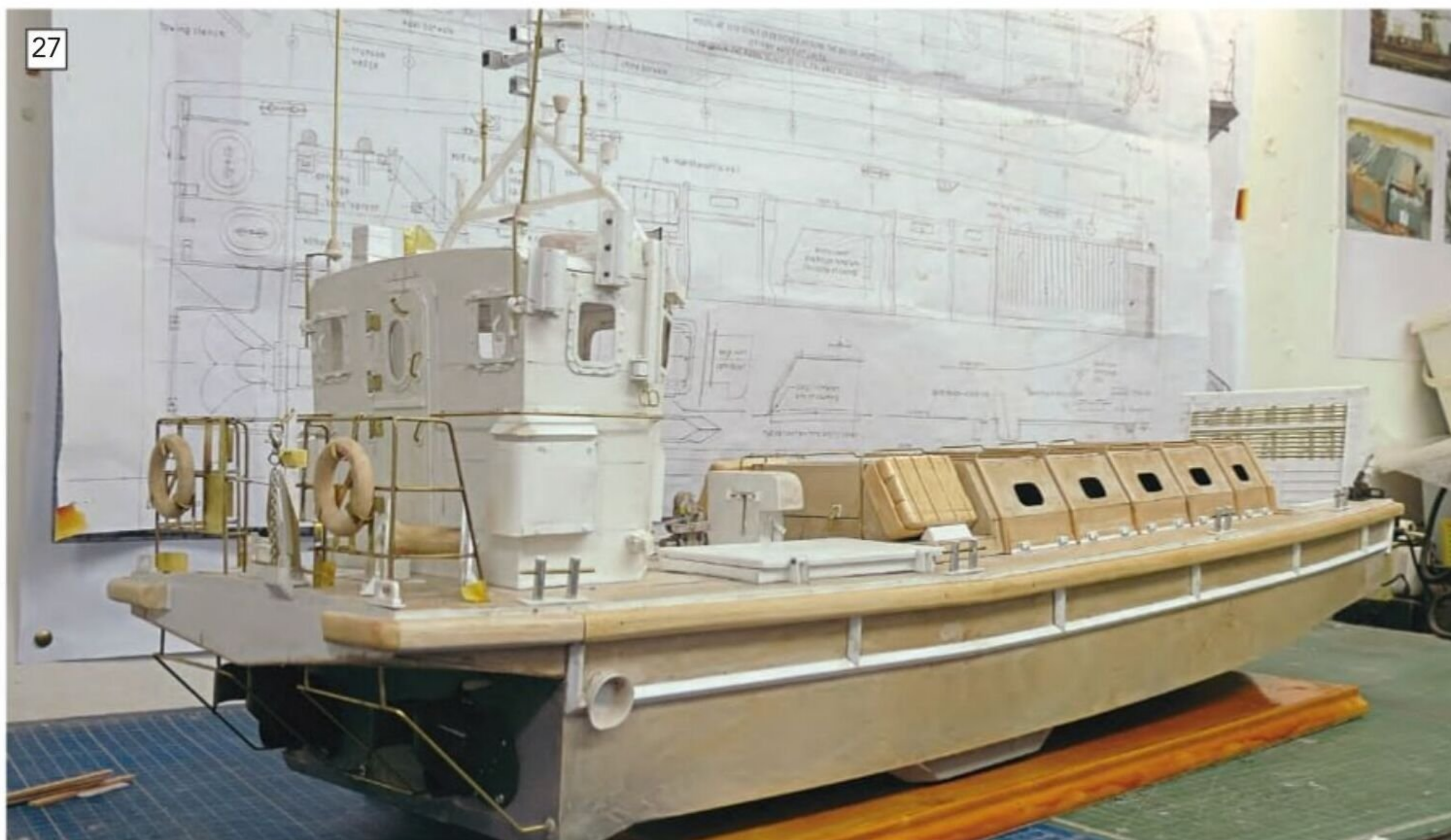
The whip aerials on the wheelhouse roof can each be dropped by removing a pin (ringed here in red).



Fixed to the lower edge of each section of the arctic cover are two lifting handles.



L20A4 Universal Gun Mounts (UGM) with L7A2 GPMG's



Dave's 'dry assembly' prior to primer coating.

Model enhancements

I decided to add a number of 'enhancements' to the model not shown on the plans but which can clearly be seen in the many photos of the craft available on the Internet. These included lifting handles on the arctic cover sections (see **Photo 25**), liferaft lashings (see **Photo 9**), wheelhouse aft bulkhead window ballistic protection covers and sundry other bulkhead mounted equipment including a SART (Search and Recovery Transponder); beach recovery hawser and anchor warp (see **Photo 17**) and a pair of L20A4 Universal Gun Mounts (UGM) to carry L7A2 GPMG's (General Purpose Machine Guns), see header image in Part 1. These were replicated for this model in 3D by Mark Hawkins from drawings by Peter Brown (see **Photo 26**).



Each of the water jets sealed into the cofferdam and transom.

Final touches prior to airbrushing

Dry assembly

Before applying the surface primer, it's always wise to first conduct a 'dry assembly', i.e., the bringing together of all parts without actually affixing them to check both fit (which obviously you want to be as precise as possible) and that no one part interferes with another (see **Photo 27**).

Internal installation

I've found that painting the interior of a model boat prior to the installation of electrics and jet drives is essential (see the Hamina missile boat featured in August-September 2021 issues of Model Boat) and the jet drives need to be fixed in with a silicone sealant around the inside of the cofferdam and where the stator enters the transom (see **Photo 28**).

Power was provided by two sticks of 7.2v 4.3Ah NiMH cells secured into place via a band of VELCRO tape (see **Photo 29**). I located these for ease of access, close to the RX and ESC, beneath the arctic cover. All the servos were replaced by new more powerful ones of the same make that could operate with the BECC (see **Photo 30**).

Preparation/airbrushing and final assembly

The external timber surfaces were given two coats of sanding sealer, sanded down between coats, followed by Halfords acrylic grey primer, which I find provides an excellent key for the subsequent application of other acrylic sprays.



Velcro used to secure the batteries while permitting their movement when adjusting trim.



All the electrical control and power systems finally in position.



The 16-person inflatable life raft containers port and starboard, with a further 6-person raft container mounted on the engine access hatch to port, were formed from balsa.



Atop the wheelhouse roof are various fittings clearly defined on the drawing, together with four buffers (all ringed in yellow), two on each wheelhouse side.

The camouflage scheme colours that most closely represented the original were Tamiya NATO Brown XF68 (for the basecoat) followed by Tamiya NATO Black XF1, while for the hull below the waterline I chose Tamiya Matt Black. Finally, several coats of Mr Hobby UV-CUT super clear were applied to protect the painted surface from sunlight, dust, and spray.

Unlike the 'splinter' disruptive camouflage scheme on the Finnish Hamina missile boat, here the blend is more subtle and the lines of demarcation less demonstrative. To achieve this, the airbrushing was applied freehand with astonishing results, and I must thank my friend Dave Howard for his tutorial and assistance on freehand camouflage application. I should in all fairness point out that this is something that takes a fair amount of practice to master and requires both a steady hand and a keen eye. If, therefore, you don't feel confident about attempting this yourself, then a more traditional approach can be undertaken using masking tape (see Photos 31-35).

On the water trials & conclusion

The real test of any R/C model is its performance; how it responds in certain conditions and its operational duration on the water. Here, it would also be a test of the electrical and jet-drive installation. With a scale model that has a lively performance, there is always the potential for that lively performance to appear decidedly un-scale like. I am, therefore, delighted to report that this model certainly gives a realistic impression of the full-sized LCVP Mk.5.

Managing the twin water jets does require a little practice. It is here that a programmable R/C TX provides for those



Just like the full-size LCVP Mk. 5, the mast and whip aerials drop down to lay on the roof.

"This is something that takes a fair amount of practice to master, and requires both a steady hand and a keen eye"

Right: The completed transom overhang; each life ring is cut and formed from balsa.



Either side forward are the two GPMG's 3D printed with brass barrels for added strength.

fine adjustments like end points on the servo, particularly evident when adjusting the throw on the servo arm to match that on the jet nozzle tiller arm (which is smaller than the servo arm). Also controllable independently are the buckets that allow the model to be rotated 360 degrees within its own length. Having the ability to use a dual combination of independently operated jet thrust and buckets, the model can be made to move directly sideways thereby mimicking the use of bow thrusters.

The water jet combination and batteries used in my model gave about 30 minutes on the water as the jet drive draws more amps than a conventional propeller drive. As the motors are brushless, a move to Lipo batteries would improve running time, but these types of cells require a greater level of monitoring.

So, there you have it: a really great project that will satisfy even the most ardent of scale modellers, resulting in a model with truly exhilarating on the water performance (see Photos 36-38). ●

Using the buckets independently, the model, like the full-size craft, can turn within its own length.



36



The full size LCV Mk.5 is capable of 25 kts (light). Here we see how the jet drives produce a realistic performance from the model, even in rough conditions.

Acknowledgements

Dave would like to extend his thanks and appreciation to:

- NRO RN Northwest for arranging access to HMS Albion/LCVP Mk.5
- The captain and crew of HMS Albion for their help and assistance while aboard
- Peter Brown for his exceptionally fine set of modellers draughts and his clear and concise insight into the nuances of the construction.

■ David Howard for his airbrushing tuition.

■ Mark Hawkins for his assistance with the UGM fit: further information from hawkins080@gmail.com

■ Arthur Barlow for his lathe work on the round down recessed lashing eyes.

■ Albion Alloys for all the metal materials and Mr Hobby paint accessories: <https://www.albionhobbies.com/>

The LCV Mk.5 has beach grounding barwales and a semi-planing bow form, and this makes for a very stable hull, as demonstrated here.

37



THE SMIT NEDERLAND

Brian Knight shares his experience of building this Billing Boats' 1:33 scale tug kit, with some handy tips and tricks thrown in along the way





I think a look back in time at model boat building makes you more appreciative of how far the hobby has come. I started modelling soon after World War II, in 1946, actually. There were few kits available in those days, most being from Keil Kraft, which produced mainly aircraft models. As far as radio-control, that was in a dream world. Those of you around my age will remember the early introduction of R/C, which involved an ED unit powered by a 65-volt dry battery and a large 1.5-volt large radio battery housed in a large red metal box. The box was fitted with a 7ft aerial, and control was made possible by a push button on a flying lead: one push for right rudder, release for straight, or two pushes for left, with the rudder controlled by a mechanical escapement, and there was no control for the motors.

But back to 2023... The more I see of the scratch-built models featured in this magazine, the more humbled I am. So many are simply absolutely superb. It has, however, been many years since I've done any scratch building. With technological advances such as vacuum forming, fibreglass moulding, 3D-printing and laser cut parts, I now find it easier to build from kits.

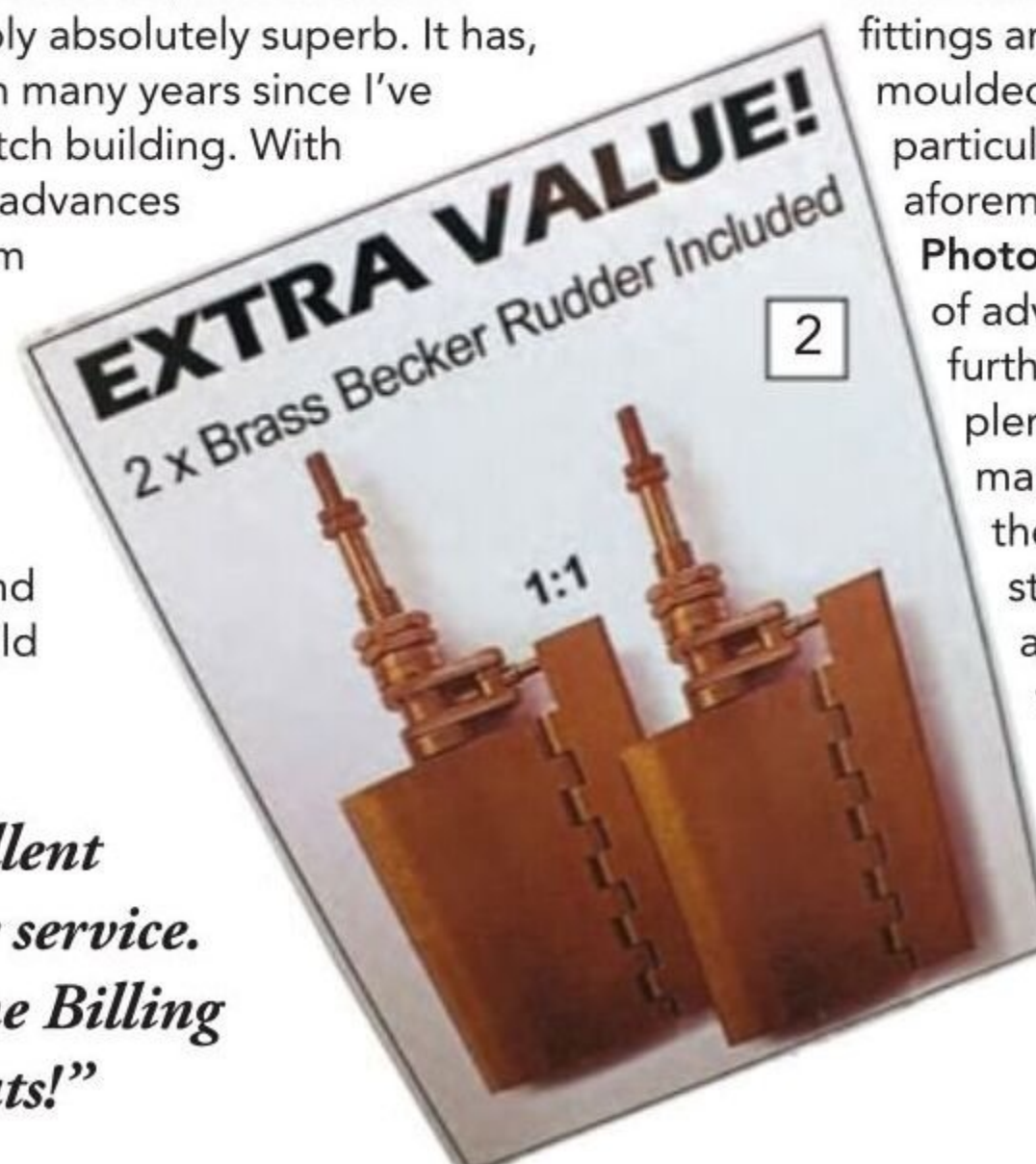
"Excellent customer service. Well done Billing Boats!"

So, following completion of Billing Boats' reformed *Calypso* kit, which proved to be both of fantastic quality and a project that proved both challenging and rewarding, I recently embarked on a further Billing's offering, namely the *Smit Nederland*. Featuring a wealth of detail and being to the larger scale of 1:33, this also incorporates a favourite of mine, a Becker rudder (more on this later).

My intention here is not to focus in depth on each individual sequence of the build, as full instructions for all of Billing's models are available on its website, along with useful reference photos of each prototype. Instead, what I hope to do is supply some hints and tips for those also interested in embarking on this build.

On opening the box...

Photo 1 illustrates the kit as it arrived in all its glory. One of the features of Billing Boats' kits is that nearly all the detailed fittings are in beautifully turned or moulded brass. In the case of this particular kit, one of these is the aforementioned Becker rudder (see **Photo 2**). However, my first piece of advice, before proceeding any further, is to be sure to spend plenty of time studying the manuals and plans and itemising the contents of your kit. On studying mine, I discovered a small but important item was missing. A quick email to the manufacturer, however, resulted in a replacement by return of post – excellent customer service. Well done Billing Boats!





Make a stand

The next task is to fabricate a stand, not simply for display of the finished build but because this will prove invaluable during the build. Occasionally parts for a stand will be included in a kit. Not so here, but no problem as with a contour gauge I was able to format and create one in 6mm lite ply (see **Photo 3**).

Working with vac-formed plastic

Billing Boats' kit for the Smit Nederland supplies you with a vacuum formed hull. Now, vacuum formed plastic can be a hard material to glue, mainly because it's flexible and epoxies and superglues are generally not. However, as with many other little challenges I've encountered over the years, I've found a solution to this. I wash the hull inside and out with dishwashing liquid, in the same way I do fibreglass hulls. I also lightly sand the surface with dry 600 water paper before I then glue the main parts inside (namely the motor mounts, shafts, rudder posts, supports and strengthening sections) with a glue gun.

Many have raised concerns about whether the use of a glue gun risks melting a hull, but I've never found this to cause any kind of distortion. Likewise, while the special glue sticks and the glue gun (see **Photo 4**) don't achieve the prettiest of finishes, for gluing parts to the interior of a hull I have found nothing stronger.

I am also aware that some find it a challenge to accurately trim the vacuum formed plastic parts included in kits, as the markings aren't always perfectly clear, so here's a little tip... I line the markings with coloured masking tape (see **Photo 5**) so that, whether using a knife, scissors or a rotary cutter, the edge of the masking tape serves a guide.

"As with many other little challenges I've encountered over the years, I've found a solution to this..."



Site right

As with all builds, I would urge you to give lots of forethought to where your motors are going to sit, bearing in mind future ease of access once your deck has been fitted; this is also the case for the ESC units, rudder servo, tiller arms and all connections. Fortunately, however, the design of this tug has the advantage of a very large access aperture (more on this later).

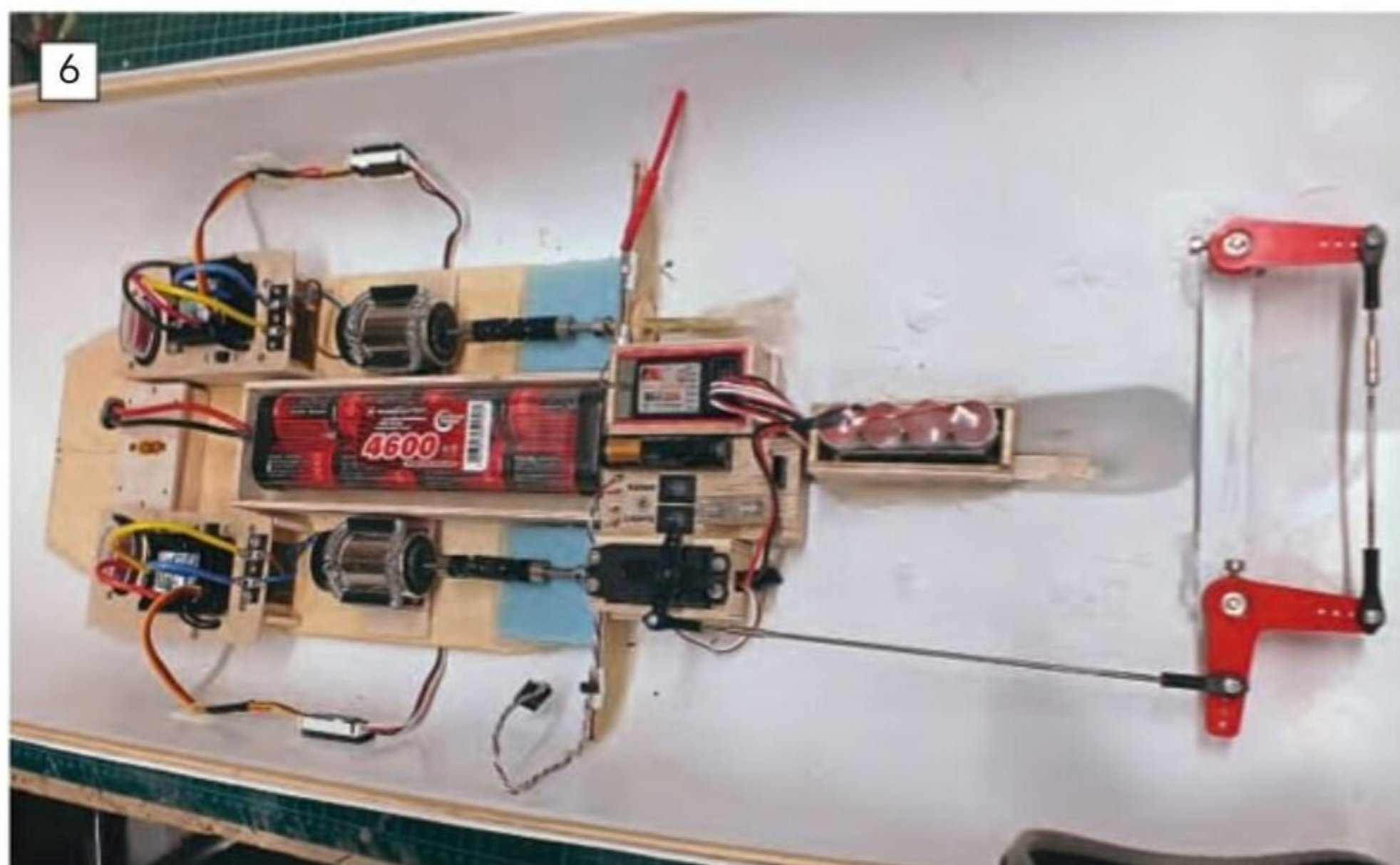
Shaft misalignment is the primary cause of wear and noise, and with my Smit Nederland kit I noticed that the manufacturer's usually well-made and aligned couplings were a little out of true. As with some of my previous builds, therefore, I rectified this by fitting an extension piece in the centre of the coupling to reduce any slight misalignment.

The motors and mountings I used in this model came from Mobile Marine and are precision low-rev, high-torque units, just the job for a tug. I did, however, add springs on the mounts to provide a little extra friction.

Photo 6 illustrates the completion of all the interior hardware, electrical and electronics. The 4.8v battery has a dual function when the model is in operation; it supplies both

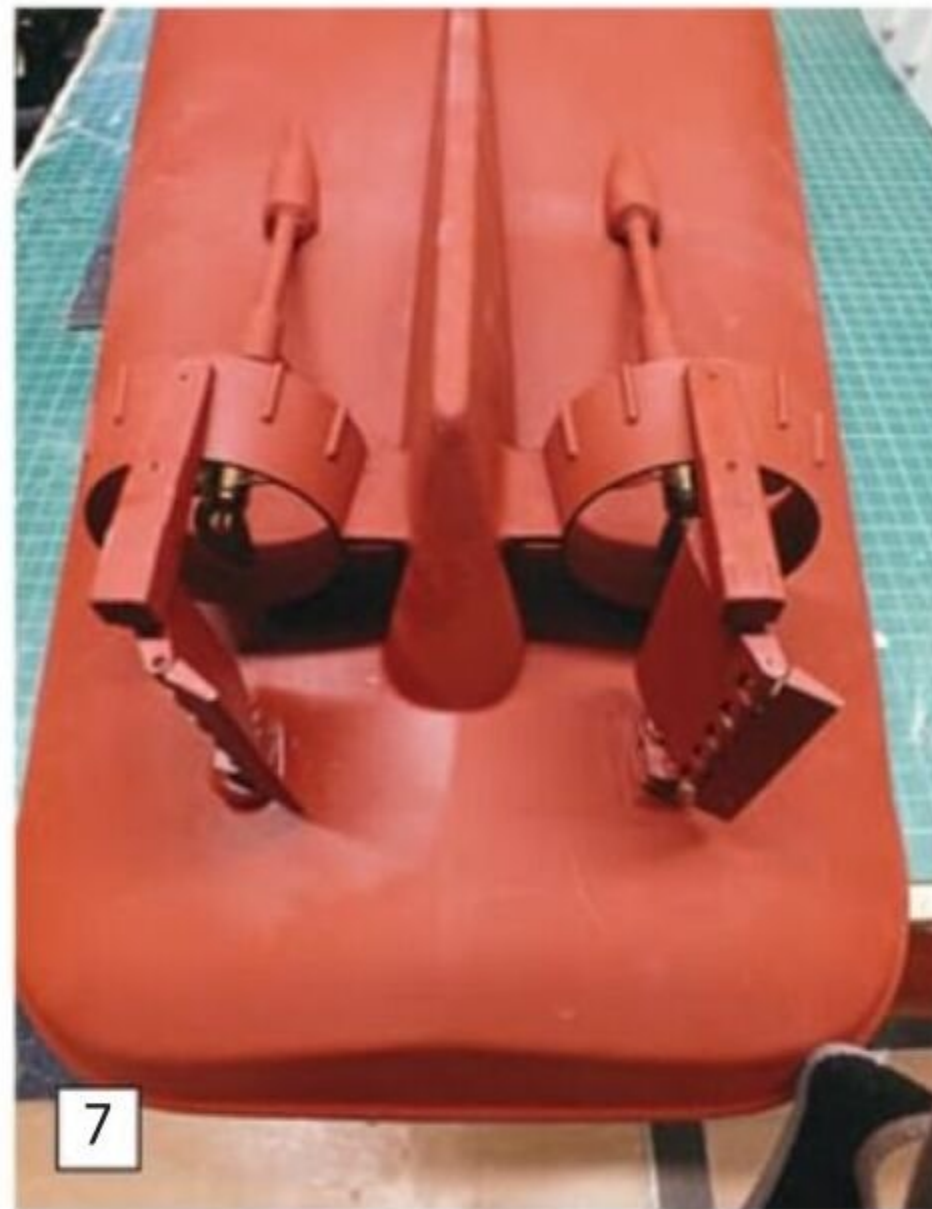


the power for the receiver (with twin screws I prefer a separate RX battery rather than using BEC from the speed controllers) and the power for the lighting used when the tug is on display at the various model shows my club participates in. The single cell dry battery is for the radar. All the woodwork has had a coat of sanding sealer and a coat of varnish to seal against any water ingress. I have also left room for the main battery box to move further forward if I need more weight forward. You will notice that, where possible, I hide as much of the wiring as I can.



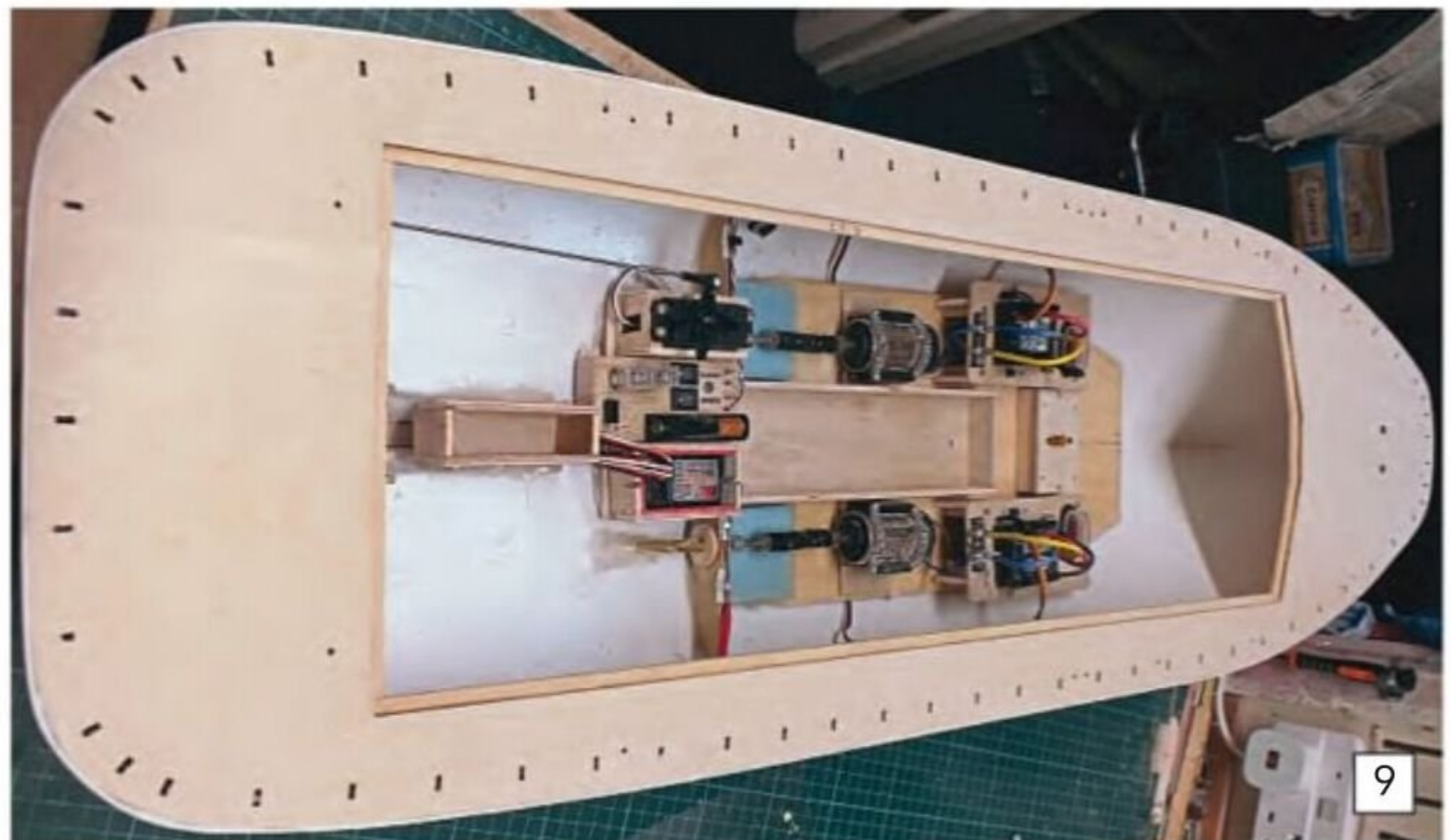
Because the internal end of the shaft is well below the waterline, I expected some seepage, so I placed a shallow tray with foam to catch any water. The thin cable on the port side is for the lights and radar and will connect to the deck when it is fitted.

I removed the props, shafts and rudders and the sealed off all apertures prior to spray painting everything with a coat of red underwater primer. **Photo 7** shows the resulting underside of the hull complete all its external fittings and offers a visual on the principle behind the Becker rudder and how it functions when turned on, while **Photo 8** provides a close-up of its mechanism.



The deck

Fitting the deck stabilises the hull and allows work on the superstructure to commence (not necessary in that order). With the deck in situ (see **Photo 9**), you see just how large the access aperture within it is! I normally secure my hatches with magnets, but as in this case the hatch is, basically, the deck, I doubt even the strongest magnets would hold this down, and any movement could leave all of the superstructure and a very large amount of the deck furniture vulnerable to loosening. So, I did the following... I fitted two extra pieces of wood to slide under the foredeck (see **Photo 10**) and two rotating keys at the stern to latch under the deck (see **Photo 11**). I would disguise the rotating handles on the deck later.



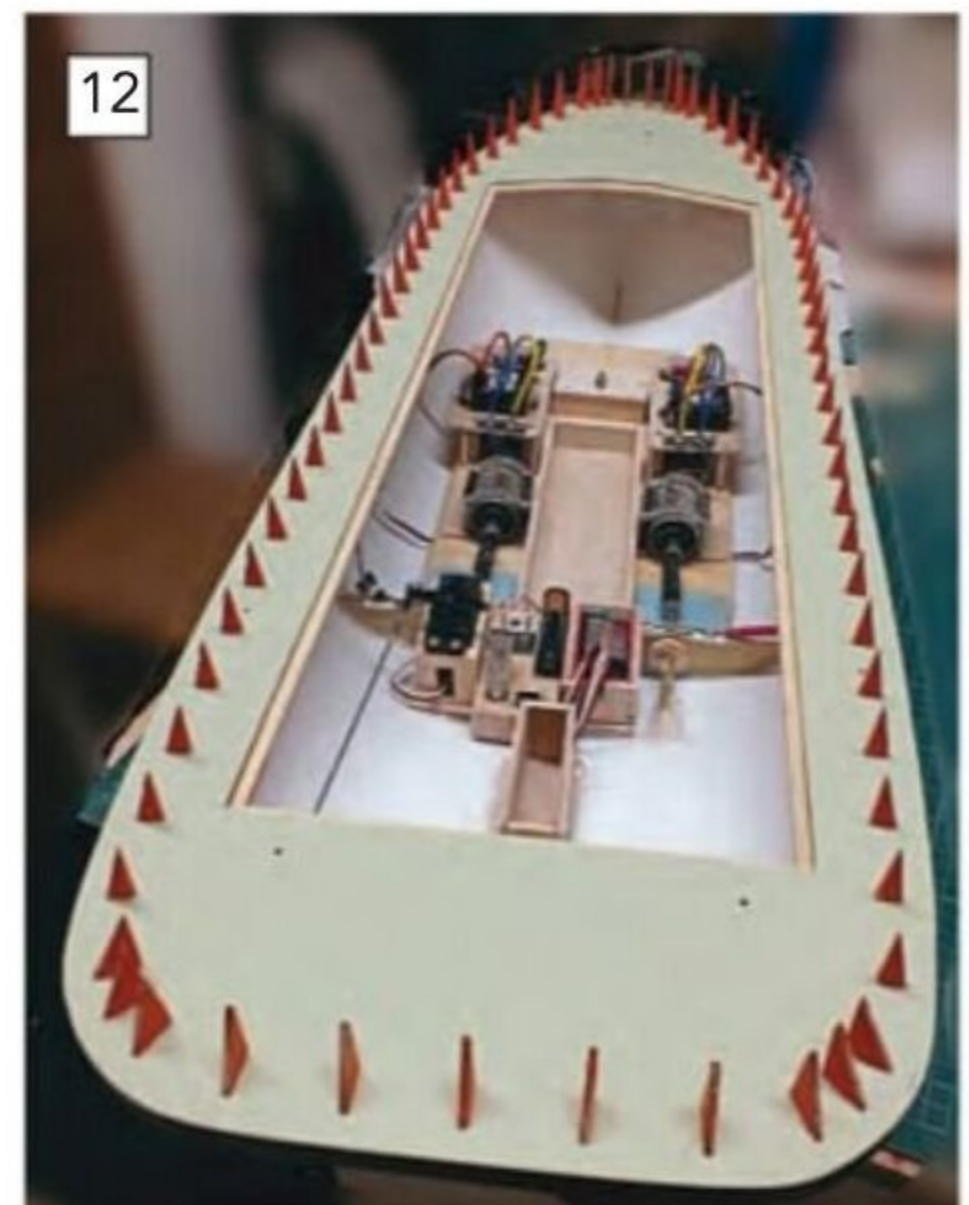
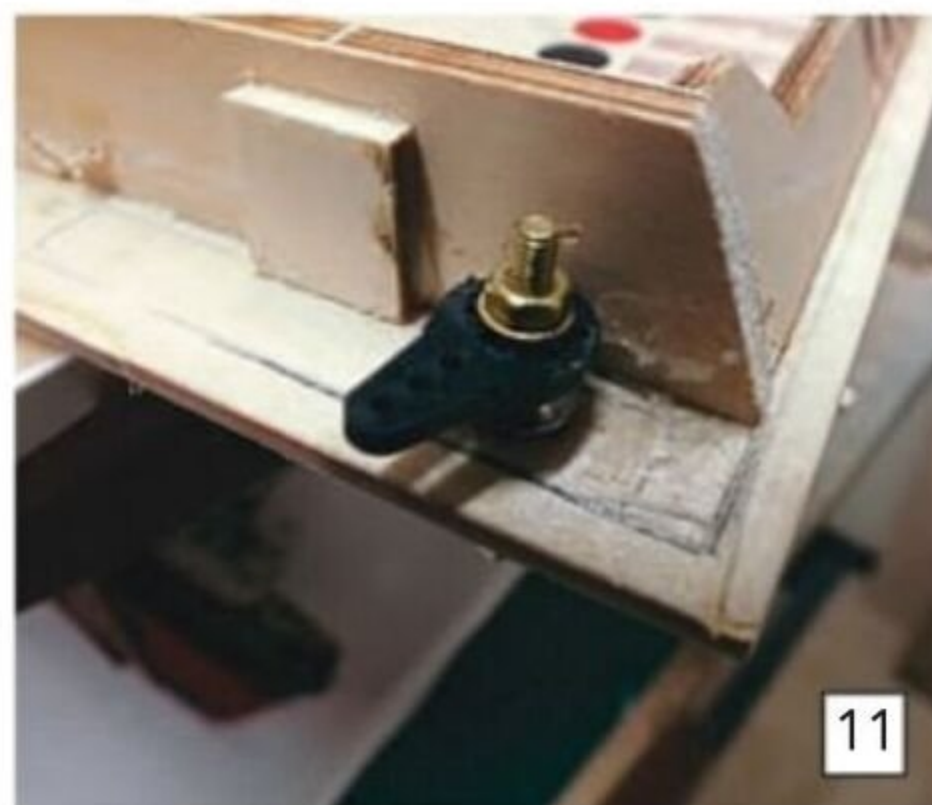
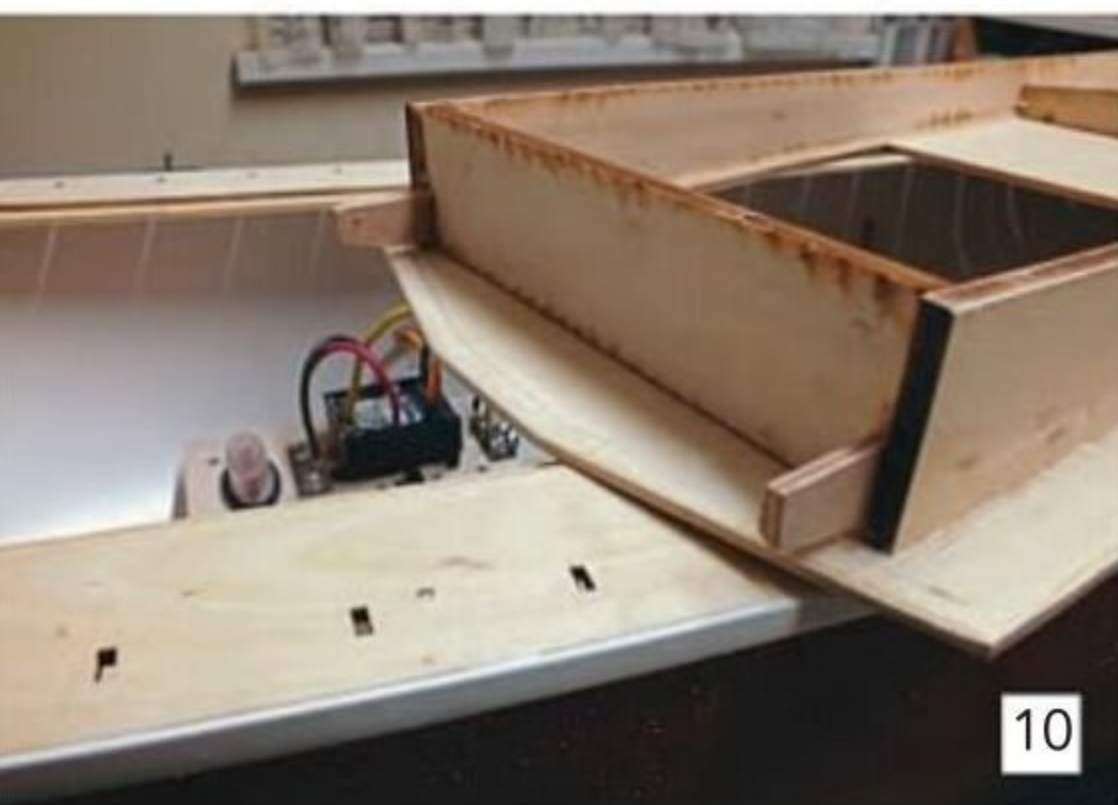
Bulwarks

Fitting the bulwark supports requires a little patience. Not all the supports are the same size, so they have to be individually organised in sequence of assembly (see **Photo 12**). You will notice I pre-painted mine ahead of the final finish to make things a little easier for myself (painting has always been my Achilles' heel). I use a variety of paints, acrylic, enamel and spray for different projects, but here I found the huge selection of colours in Vallejo's drop bottle acrylic paint range perfect for all the fine detail and figures, and it covers very well, too. I think worth sharing is a little tip I've discovered to eliminate any wastage, and one that leaves you with

only your brush to clean between different applications. I simply lay down a piece of masking tape, squeeze a sufficient amount of paint for my immediate needs onto it and then, once I've finished the painting task I've been tackling, simply dispose of the masking tape, leaving no messy containers to contend with (see **Photo 13**).

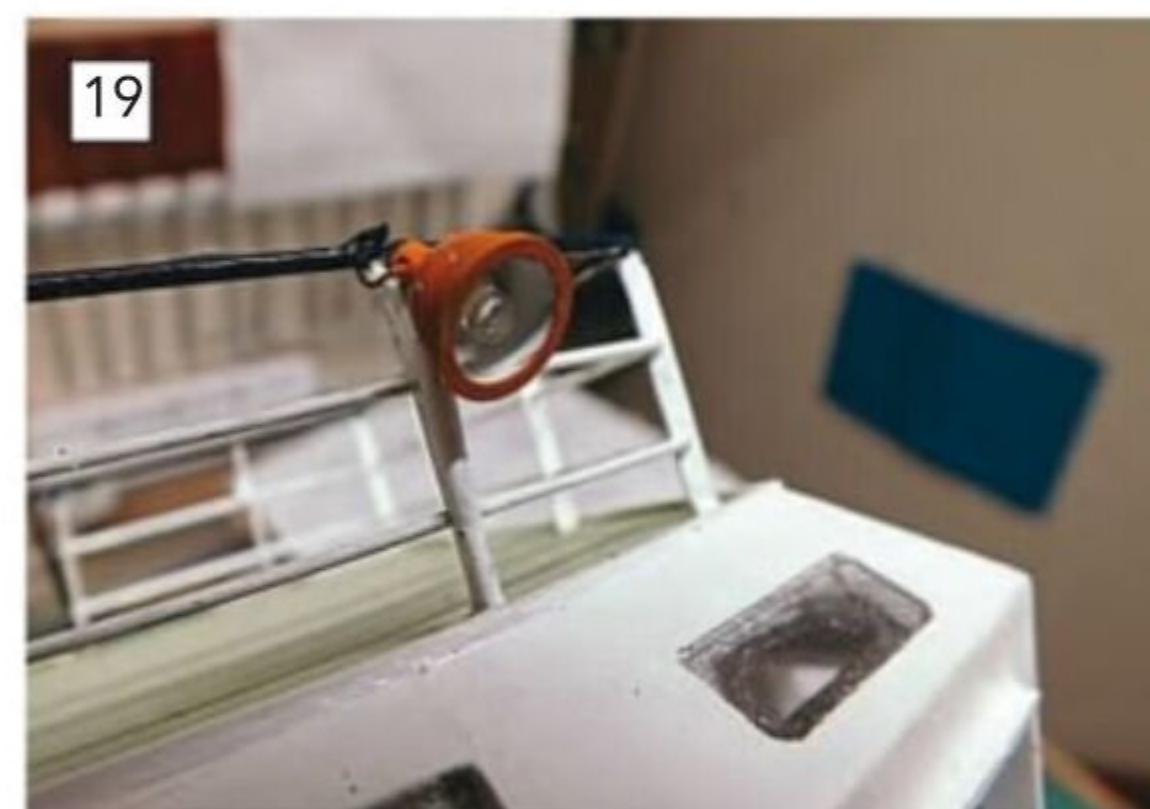
The bulwarks themselves (see **Photo 14**) need some pre-forming, but soaking in water and heating with both a heat bending tool and heat gun does this well. Once glued and

fitted, now comes something that requires considerable patience and a steady hand (harder when you get older): painting the inside of the bulwarks without spoiling the deck. Naturally, you'll need to first affix some masking tape in strategic places.





“Once glued and fitted, now comes something that requires considerable patience and a steady hand...”



Keeping busy

While waiting for glue, paint, etc, to dry, some of the other mini assemblies (full details of, and instructions for, can be viewed on Billing Boats' website) can be sanded and given a final coat of paint (Photo 15).

The bridge and lights

Photo 16 shows the interior of my model still needing to be tidied up, and with the doors and slides ready to install. The upper section and windows, too, are shown yet to be fitted (these will require some careful lining up because of the angles). The two superstructure sections and the exhaust stacks can also be seen awaiting final assembly and painting (see Photo 17).

As stated, I would be fitting working lights, so I will describe how I modified the deck lights supplied in the kit. I prefer to use 3mm LEDs as standard and use either domed or flat nosed depending on whether they are required for spot or ambient lighting (see Photo 18). As you will see, the anode (longest leg) has a small diameter heat shrink fitted, which enables it to be insulated to the brass housing; the cathode is soldered to the casing and filed to the contour. The light is then fitted to the railing and soldered (see Photo 19). This makes the railing the negative. A wire soldered to the base of a railing stanchion is connected to the negative battery supply, while the wire from the lamp is connected via a resistor to the positive supply.

With the hull and fixed deck ready, all the detail and furniture, along with the tyre fenders, can be added. The instructions show the bow fenders constructed from ply. However, as I intend to use my model as a working tug, I decided to replace these with shaped rubber blocks. I still had the rope detail left to tackle, but this would be completed once everything else was finished (see Photo 20).

Ballasting

With the help of a kind neighbour with a bath (I only have a shower), I found 4.5 kilos of lead was required to lower the model to its waterline. Allowing for the weight of the superstructure, that gave a total weight of over 8 kilos – I really must stick to smaller boats in future!

Screw, don't glue

With most of the detailing work on the superstructure and removable deck section done, I made the decision to screw, rather than glue, the superstructure sections to the deck. Apart from being less messy, this provides easier access to the interior as and when required.

The lowerable mast

With a certain number of failures and unprintables, I managed to fit working lights to the mast; the mast being illustrated here in its, so much easier for transporting, lowered position (see Photo 21).

Little extras

Although acceptable ropes are included in this kit, I decided to use alternatives purchased from Ropes of Scale. I have used this supplier's ropes before and find them very pleasing, as they are slightly larger, although still to scale for this model, and they're naturally coloured.

My figures were sourced from Martin at Docklands Models, and I should point out these have been suitably painted, albeit with a none too steady hand, by yours truly. Martin produces excellent 3D printed items for all types of model boats. These are available in a number of scales, and he also offers a bespoke 'made to fit' service.

Photos 22 and 23 illustrate my completed build, with both the figures and ropes mentioned above featured.

“The Becker rudder is, as expected, very efficient, affording very tight turns without the independent use of the motors”



On the water

I am now waiting on the good weather days hopefully ahead and a weed free lake on which I can sail. Unfortunately, our scale operating lake behind the Halfway House in Yeovil is at the moment unusable due to the ingress of weed, so I must thank the Sutton Bingham Sailing Club at Sutton Bingham reservoir for the use of their water (see **Photos 24 & 25**) for this model's first outing.

I am delighted to say she performed perfectly, with lots of power and a good turn of speed (so important when you need to get out of trouble in a hurry!). The Becker rudder is, as expected, very efficient, affording very tight turns without the independent use of the motors. I have noticed a very slight seepage from the rudder shafts, but otherwise the Smit Nederland is a very dry boat, even in choppy water.

Hats off to Billing Boats for another fine model! ●



LITTLE URCHIN

Dave Wiggins explains why getting less than he bargained for prompted this month's trip down Memory Lane...

I think by now we're all familiar with the potential risks involved when purchasing items via online auction sites, and much of this month's instalment of Memory Lane radiates around one of my more ill-advised 'wins'...

A bad buy

So, I bought myself a vintage *Sea Urchin*, and got stung! For those of you unfamiliar with Aerokits, this is the smallest of the once terrifically popular 'Sea' series of model boat kits designed by Mr Les Rowell, which were marketed and distributed by Keil-Kraft.

When said kit duly arrived, I had a nasty shock, in that the box was virtually empty. Despite obviously having viewed the pictures posted by the seller in his listing, it now became evident they had been carefully 'posed'. The listing had been worded to explain that the seller was merely acting as an agent for a third party (the owner) and that he himself 'knew nothing about models', so perhaps his online description of the kit (or to be more precise, the completeness of its contents or lack thereof) could be classified as 'uninformed' rather than outright dishonest. Even so, I was unhappy to be paying for something no sane modeller or collector would have bid on had they been made aware it was not a kit on offer but merely a few left over bits and pieces and some torn documents.

When life gives you lemons...

After a bit of 'to and fro' with this middleman/vendor, I obtained a small refund and set about making myself all of the missing birch ply parts. Fortunately, I was able to create accurate templates by referencing parts from another example of the kit that I just happened to own.

This process is surprisingly easy nowadays using an ordinary home inkjet printer in photocopier mode and some thin card as backing before cutting a set of replacement parts in appropriate thicknesses of marine (birch) plywood, as used by Aerokits back in the 1960s. Illustrated are some of the bulkhead templates I made for myself using this method, as well as a picture of the kit used to source accurate outlines.

In for a penny...

I thought you may also be interested to see a sample Keil-Kraft advertisement of the period. I also checked out a late '60s' K-K 'Handbook' and was amused to find that this little boat cost just 35 shillings back in 1969.



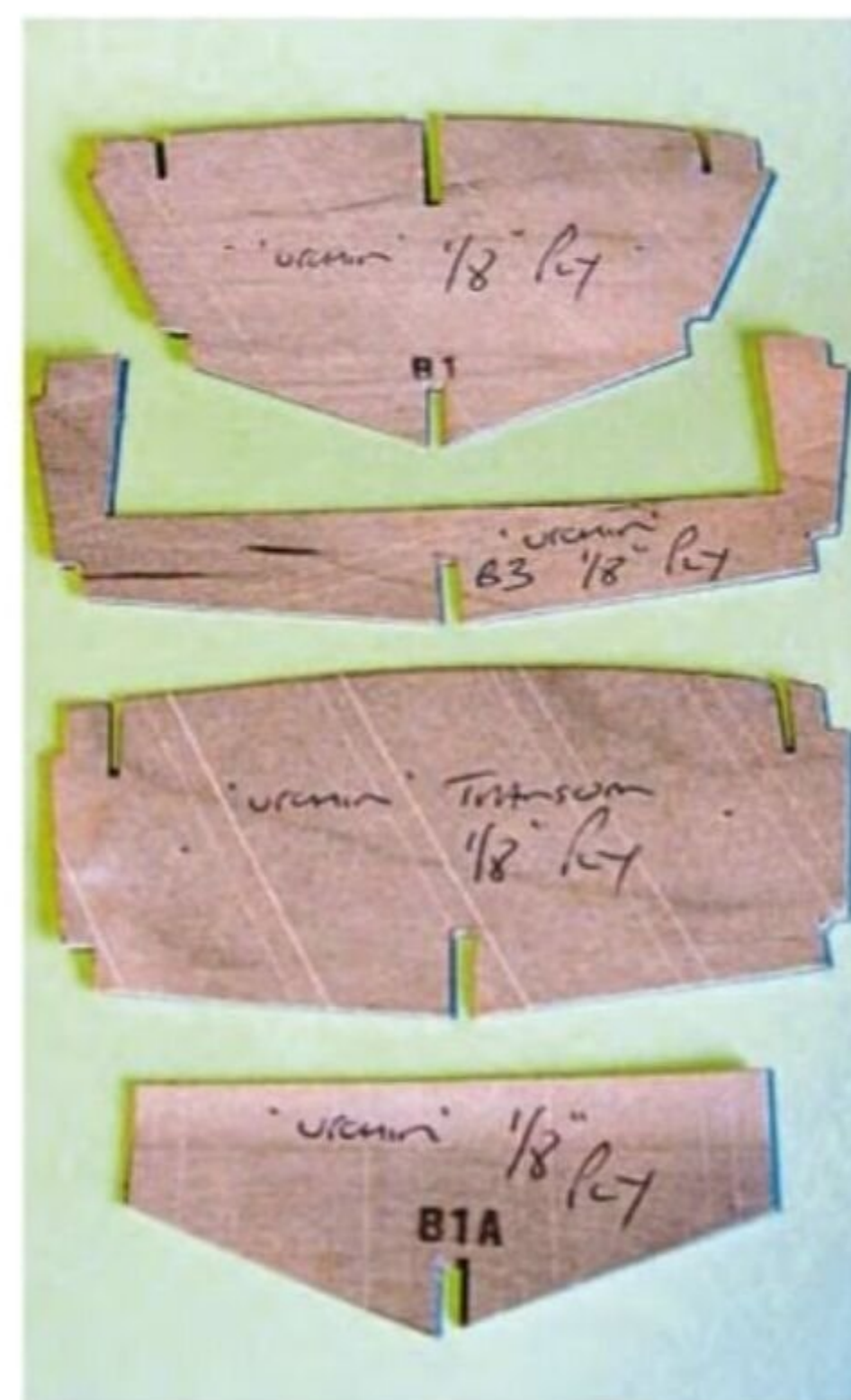
Samples from the kit Dave used to create outlines for replica parts.

"So, I bought myself a vintage Sea Urchin, and got stung!"



A sample sheet of bulkhead templates for a 1960s' Sea Urchin model

In the same catalogue, however, the recommended 'Dart' 0.5cc diesel for the Sea Urchin easily exceeded the kit price at a further £4, while its water-cooled cylinder jacket and flywheel would have set you back another 36 shillings, so no wonder most of these little boats ended up either being electric-powered builds or just sat on a proud parent's mantelpiece! And that was, needless to say, not the end of the expense...



Archival advertising from a 1960s' Keil Kraft handbook.

"The recommended 'Dart' 0.5cc diesel for the Sea Urchin easily exceeded the kit price at a further £4, while its water-cooled cylinder jacket and flywheel would have set you back another 36 shillings, so no wonder most of these little boats ended up either being electric-powered builds or just sat on a proud parent's mantelpiece"



A small sample of period deck fittings, maker unknown.



Mersey Marine's 'modellers gauge', courtesy of the late David Edge.

Left: These two flyers, from a '60's Sea Urchin kit, are now collectable in their own right.



An early '60s' pack of modellers pins, again, courtesy, the late David Edge.

"Just a bob (1 shilling) would have bought you one of these in 1969, and it's evident from the well-used example illustrated here just how far that modest investment went"

Accessories for Urchins

One obviously needed lots of other bits and bobs to actually complete one of these Aerokits boats. Here, then, are details of just a few...

First up is a sample of white metal (lead) deck fittings suitable for any Aerokit. For a model as small as the Urchin a couple of each of the cleats and fairleads would maybe do for starters, and the two little ventilators shown in my picture could perhaps be added to the fore cabin roof. Not much more is needed. The cabin roof handrail shown in the advertising is easily shaped from any bit of surplus timber – a tiny bit of scrap mahogany might look nice.

Next up comes something that would have been really useful back in the day, an Imperial modeller's gauge made by Mersey Marine (Mersey made most of the boat fittings for Keil-Kraft). Just a bob (1 shilling) would have bought you one of these in 1969, and it's evident from the well-used example illustrated here, sadly obtained from a good friend's estate, just how far that modest investment went. This simple little device could be used to measure various sizes of piano wire, thicknesses of plywood and widths of strip Balsa or Obeche.

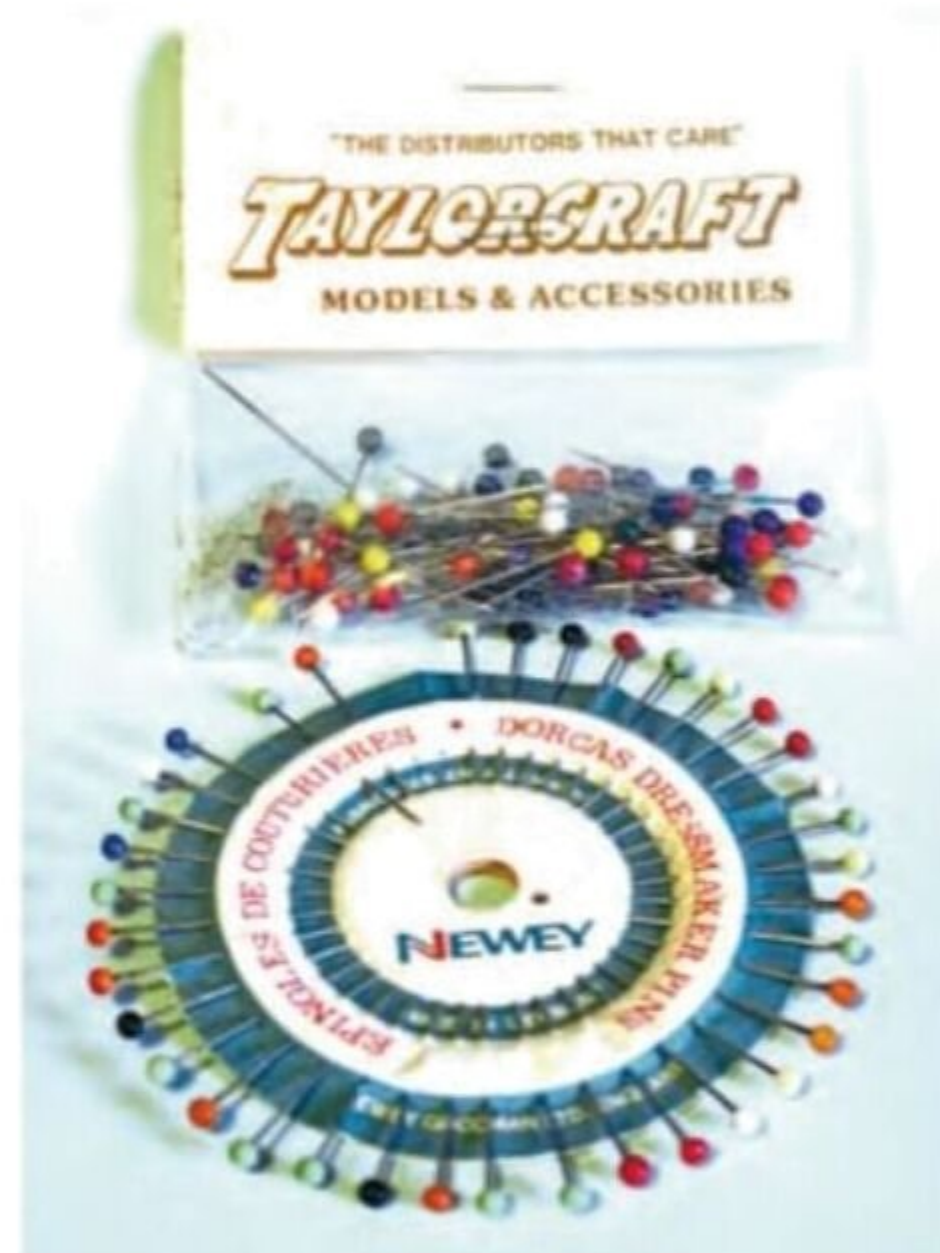
Every Aerokit contained a tiny pack of very small brass nails that could be used, along with a small tin of 'Cascamite' marine resin glue, to construct the model – and, glory of glories, some were still sat in my denuded kit box! Aerokits' nails are really quite interesting, as they are so variable. Sometimes, they are indeed solid brass

pins, but more often they are cheaper brass plated steel pins; a magnet is a good test for determining what you have. Both have their advantages and I'm content with either. Purists may prefer the former, although the downside of brass, of course, is that it's soft and easily bends under the hammer. It can be infuriating when using modern epoxy glue to find yourself scrabbling about to replace bent nails as the glue hardens!

Speaking of pins, no 1960s' model maker's workshop, shed or kitchen table would have been complete without a box or two of what have always been termed 'modellers' pins'. It was decades before I discovered exactly what I'd been paying for all those years were actually dressmaker's requisites. These (although not the lovely old Keil-Kraft box featured in my photo, again, passed on to me in a deceased friend's estate) can still be cheaply purchased at any dressmaker's shop today.

Memory Lane March

Next month I'll be moving on from modestly valued bits and bobs to something a little bit different, so join me again then. ●



Modelling pins as sold by both dressmakers (on round cards) and hobby shops.



The Keil-Kraft marine pamphlet from the 1960s' model kit opened out.

BOILER ROOM

Richard Simpson encounters a very unusual plant

I think it would be fair to say that over 90% of the plant I test as a Boiler Tester are manufactured units with previous certification, and usually below the 3 bar-litre limit. In most cases I've done the previous test myself, so I'm familiar with the plant and the owner and the steam test will usually be around a 15-minute process, finishing with the boat going on the water for a sail.

Occasionally, though, something a little bit out of the ordinary comes along that requires a bit more thought and preparation, possibly even some homework, before determining the best course of action. Sometimes this might be an old, secondhand unit that has been picked up with no paperwork, no information, and which has obviously been home made to a dubious standard, leaving me verging on the decision not to test. At other times it might be a plant that has history and provenance and has been brought to me by a responsible owner wanting to do the right thing and get his model certificated so he can use it under the blanket of a club's insurance. The latter was the case with a plant installed in a beautiful model John Goodyear had owned for most of his life. Apparently, he'd saved this from being disposed of in his younger years but had only recently decided to finally put it through a strip down, hydraulic test, rebuild and a steam test to get it fully certificated (see **Photo 1**).

Rarely, though, does something come along that has to be considered as just that little bit special. Such was the case when I was approached by modeller John Cox a few months ago. He informed me that he had a home built plant that he'd been advised could not be tested but which he would appreciate me having a look at for an additional opinion. This, of course, initially raised concerns. However, as the story began to unfold, the more and more interesting things became...

My reason for deciding to relay it here is not only to bring the superb piece of unusually designed model engineering the plant subsequently turned out to be to your attention but also to point out to there is help available for owners and builders of one-off

"As the story began to unfold, the more and more interesting things became..."



An unusual model built originally by Mr. John Goodyear's boss in his much younger days. A full strip down for a hydraulic pressure test and the model was able to be certificated.

units such as this who are looking to get them certificated. Despite some steam modellers thinking that the certification process is there to get in the way of them enjoying their models, it's actually there primarily to ensure that a standard of safe practice is followed in both design and operation, as well as offering help and advice to anyone who isn't sure of the best way forward. There is a wealth of information available from not only the steam testers but also the organisations that support them. It is there to make use of.

The backstory

John told me the story began with him building a model of a Stuart Turner high speed engine when he was a Rolls Royce apprentice back in 1962. This led to the design and subsequent build of a plant to power the engine from around 1970 to 1975, which he home built in local school evening classes. This also involved test runs to perfect the combustion and comprehensive calculations to support the design. Having then built himself a pretty impressive steam plant, his interest was further tempted when he saw a passenger vessel, the King George V, sailing out of Oban through the Kerrera



Mr. John Cox with his model the King George V, in the region of 50 years in the making but getting tantalisingly close to being completed.

Sound in around 1980. This prompted the drawing up of a design for the build of a model, which then sat on a shelf along with the plant until 2019!

In 2019 the build of the ship began – as we all know, you can't rush into these things! The plant was modified in 2022, to try to comply with current regulations as well as fit the hull of the progressing model (see **Photo 2**). That's when John came up against the challenge of finding a boiler inspector who was prepared to look over the plant and advise a course of action, if indeed there was to be one. The lack of original certification as well as unusual arrangement of the plant proved to be off putting to local model engineering clubs and John was informed that the plant could not be tested. As a last resort, having heard that I test plant for the Kirklees Model Boat Club, he made contact with me. I advised him that I would have a look at the plant and have a chat with him if he was prepared to bring it to my workshop. We could conduct a pressure test to at least demonstrate that the plant merited further investigation before making any decisions, but I was open to doing anything that was possible, even if this resulted in it being decided that the plant could not be tested. John agreed with this and so we arranged a visit to give the plant the once over.

The visit

When John arrived with his plant on the appointed day, I must admit my first thoughts were along the lines of what had I got myself

Right: Both boilers are pretty packed with tubes, meaning that around the top one third of the rows will be always above the water level. While this will reduce the heat transfer into the water to turn it to steam, it will help to take the temperature of the steam higher and improve its dryness.

“The lack of original certification as well as unusual arrangement of the plant proved to be off putting to local model engineering clubs and John was informed that the plant could not be tested”

into. In just about all aspects the plant was unusual. There were two horizontal fire tube boilers, joined together by their steam outlets into a common manifold to feed a single engine (see **Photo 3**). John was hoping the two boilers could be tested independently and considered as separate to keep the individual boilers below 3 bar-litres, therefore avoiding subsequent hydraulic pressure tests. This I had doubts about because the boilers were connected together. Another concern was the fact that the boilers were completely tubed across the entire diameter, and being horizontally positioned meant that some tubes would never be submerged in the water (see **Photo 4**). This is something that is not usually



Because the plant has a single engine, the two boilers are connected together with a manifold on the steam outlet lines to supply steam to the engine, as well as a number of other users of steam.



“When John arrived with his plant on the appointed day, I must admit my first thoughts were along the lines of what had I got myself into. In just about all aspects the plant was unusual”

designed into full-sized marine boilers as it can lead to overheating of the tubes, but whether it would be a concern in a model boiler I could not be sure. Finally, the feed system consisted purely of a manual feed pump, meaning that the model had to be brought into the bank to top up both the boilers (see **Photo 5**). The feed lines had been isolated so the boilers were not connected on the feed side (see **Photo 6**), but the duration would be limited to the amount of water in the boiler and this, of course, had the potential to allow the boiler to run out of water before the available fuel was used.

I advised John that I was happy to do a pressure test, individually on the two boiler shells, then I would take my thoughts and concerns to the Federation of Model Engineering Societies for advice and guidance. I had to make up a silver soldered connection to enable my pipework to be connected to the boilers and we conducted a twice times working pressure hydraulic test on both boiler shells independently, which was possible with them both still fitted in their framework using a combination of plugs and crimped fittings (see **Photo 7**). Both passed perfectly, so it was time to start the homework.

The homework

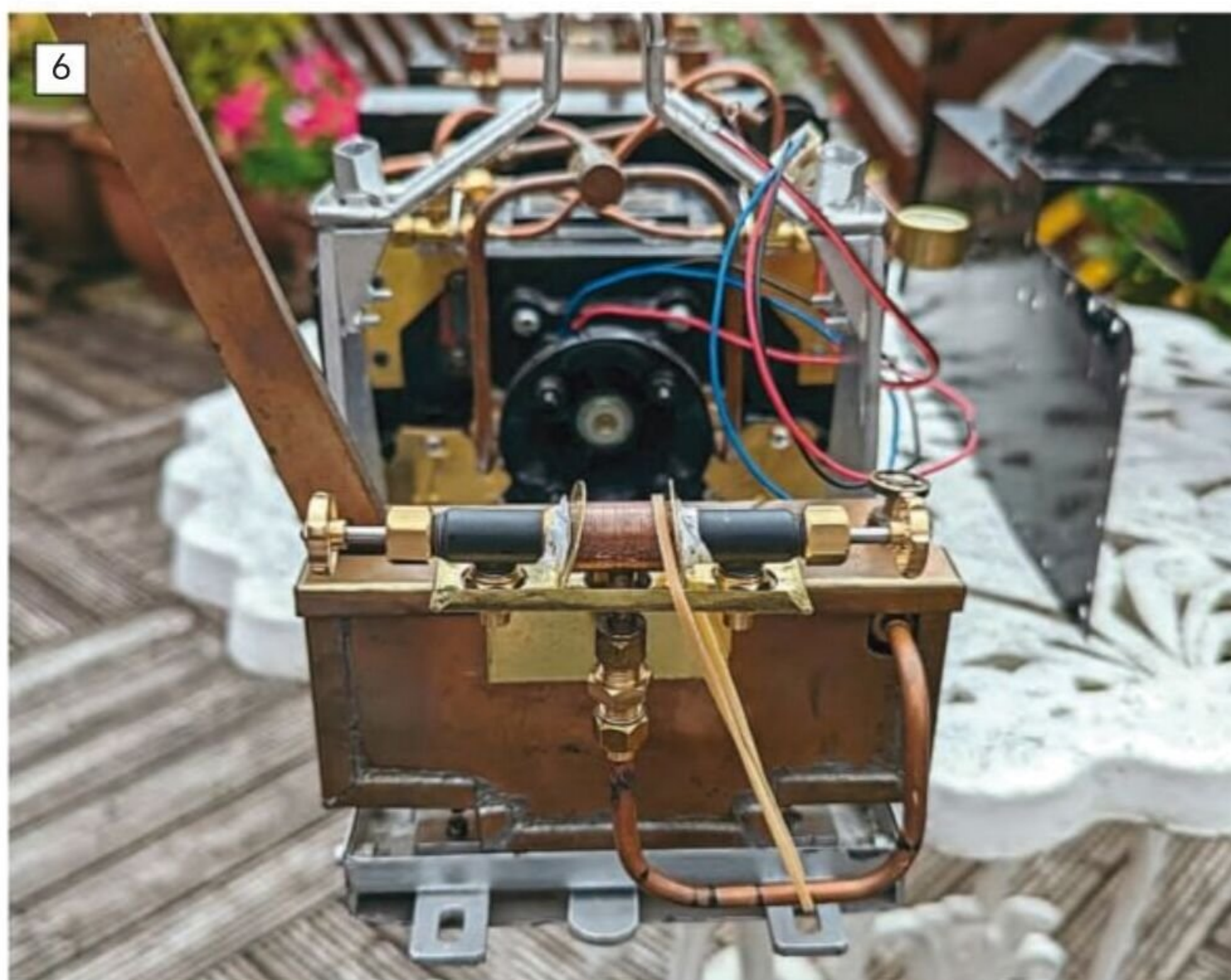
One of the great advantages of your club being affiliated to the Federation of Model Engineering Societies is that you have access to the huge amount of expertise there is available there. I put together a lengthy report on the plant, including photographs and copies of all the extensive calculations that John had done in around 1970, and asked my point of contact in the Federation for his input and thoughts. After he'd received feedback from other colleagues within the Federation, we exchanged a number of e-mails and ended up agreeing on the following points regarding the plant.

Because the two boilers were physically connected together at their outlets they had to be considered as a single volume. This would mean that the plant as a whole would be considered as being above the 3 bar-litre limit and would therefore need to be tested according to the requirements of *The Boiler Test Code 2018 Volume 1 – Boilers 3 bar litres to 1100 bar litres*.

The fact that some of the fire tubes were not designed to be submerged was not considered as a concern. This was due to the fact that boiler designs already exist where this is the case, particularly in locomotive applications,



There is only a single water pump fitted, which is a manually operated pump, requiring the model to be brought to the bank for a top up of the boilers.



The boilers can actually be considered as separate from the feed side as there is an isolation valve to each boiler. The single pump is not an issue, but it does mean that Clause 11.7b of the 'Orange Book' must be complied with.



Right: The boilers were both pressure tested to 2 x working pressure, with all openings either blanked with a plug or a crimped connection. All soldered joints were clearly visible and both boilers held pressure perfectly.

“One of the pleasures of taking on the role of a club boiler tester is that occasionally you get to help someone who has a very unusual plant to get it certificated and able to be used on public waters”

and, in addition to this, John’s calculations and experiments verified that the temperatures expected in the area of the exposed tubes fell well within the melting point of the silver solder used in the construction, with a suitable factor of safety included.

While the use of a single manual feed pump was not considered a concern, what did remain a concern was the fact that there was a potential for the fuel carried on the model to outlast the water in the boiler. This is in contravention of the requirement of clause 11.7b, which requires the fuel to be exhausted before the water level reaches a critical point. For the plant to meet this requirement, either an engine driven or an electric powered feed pump should be fitted that can then ensure the fuel is spent before the feed water is used up. On this plant, while there are isolation valves in the fuel lines and a radio-controlled emergency gas shut off valve (see **Photo 8**) they are not automatically operated by a water level sensor, so they cannot be considered as meeting the requirement of clause 11.7b.

To progress then, the first point could not be circumnavigated, so John would have to accept that the boiler would require a hydraulic test every four years, but the last point could be accommodated in either one of a couple of ways. One would be to ensure that there was never more fuel in the model than there is water by experimentation and calculation; this can be achieved by weighing the gas tank prior to running the plant to ensure the requirement is met. The other would be to fit an additional driven pump to prolong the duration of the feed water.

In conclusion

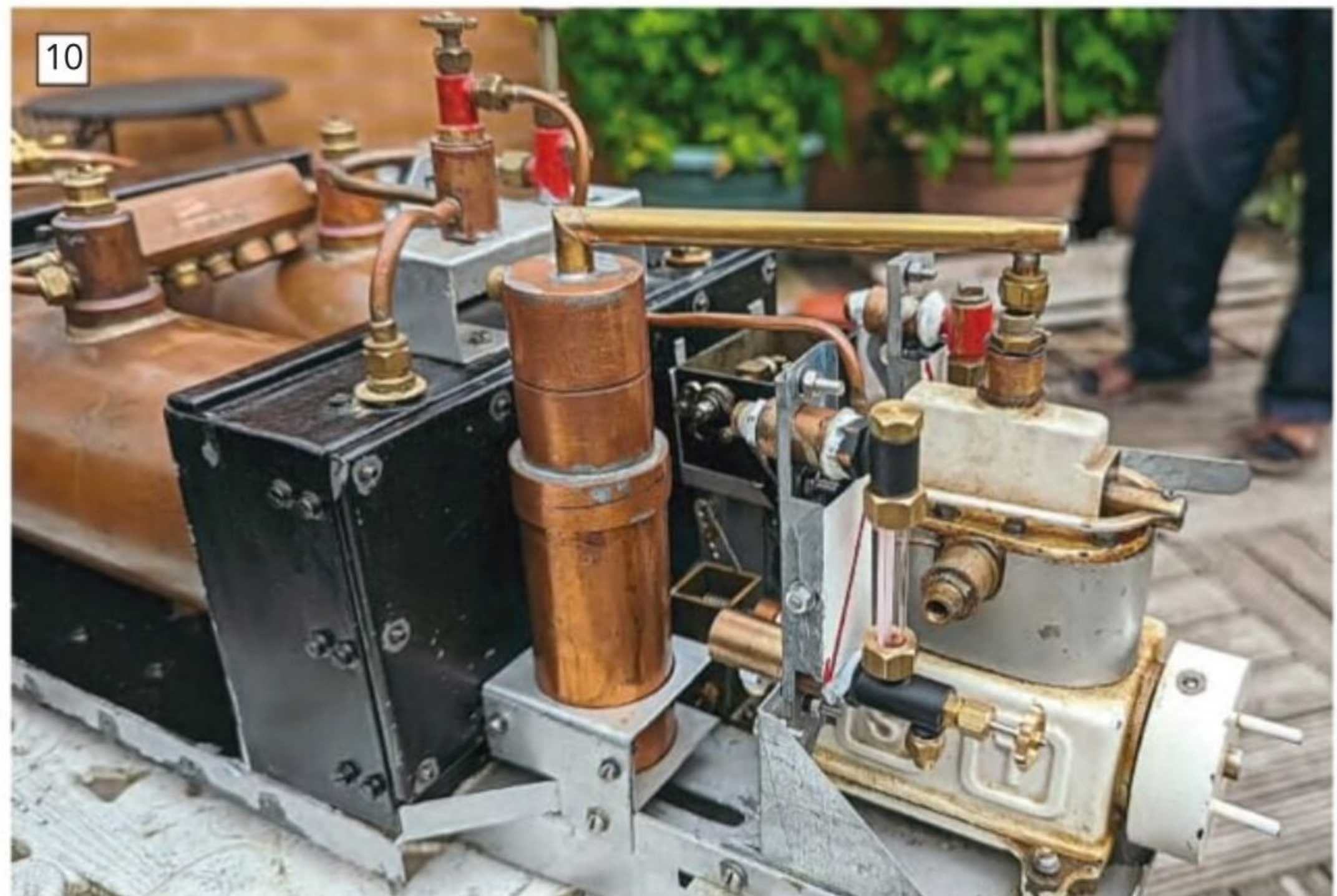
I think one of the pleasures of taking on the role of a club boiler tester is that occasionally you get to help someone who has a very unusual plant to get it certificated and able to be used on public waters. Sometimes things take a bit of research and a bit of discussion with those in the business but, ultimately, we are all here to do our best to try to help modellers get their plant operational, safely and legally.

When you look at the incredible levels of skill and expertise that has gone into the design and build of this plant (see **Photo 9**), it really would be a crying shame not to see it finally on the water, doing what it was designed to do. I’m looking forward to John getting the remaining couple of things sorted out to enable this to happen. Then, as an added bonus, we will get to see a beautiful Stuart Turner high speed engine doing its best to push this incredible model around (see **Photo 10**). ●

Right: The gas side is fitted with servo operated shut off valves but, as these are manually operated via the transmitter, they cannot be considered as meeting the requirements of Clause 11.7b.



The complete plant as ready to fit to the model. It has been built as a modular unit so the entire plant can be removed as a single unit. This is no mean achievement with such a complex plant and demonstrates the high level of expertise that has gone into this build.



The business end doing all the pushing is a Stuart Turner high speed twin cylinder piston valve operated engine. This particular engine layout gives one of the highest power to weight ratios available, but it does require a substantial steam supply, hence the double boiler arrangement.

model Boats

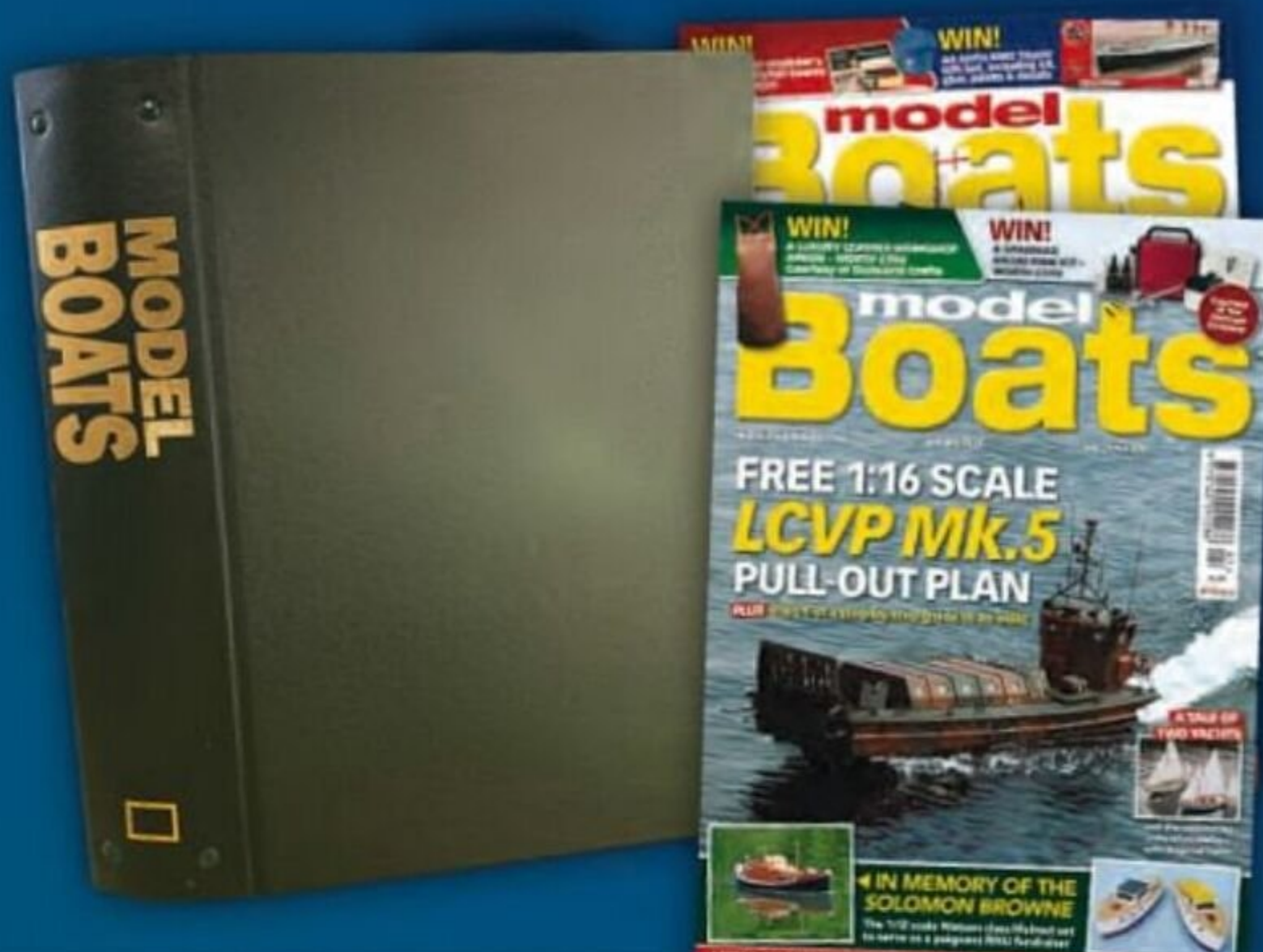
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Your Models

Whether you're highly skilled and experienced or completely new to the hobby, you're definitely invited to this launch party! So please keep the contributions coming by emailing your stories and photos to editor@modelboats.co.uk

LCM 711

With the publication of the landing craft model plans in October/November I was inspired to have a go at making one myself. I did some research and produced this stand-off scale model of a Royal Navy LCM (Landing Craft Mechanised). I designed much of the detail in FreeCad and then 3D-printed it, but for hull I followed the published design, just upscaling it a little to approximately 1:35. The figures and Jeep I found free on the Thingiverse!

I'm new to R/C modelling so I'm afraid the paintwork is not up to the usual standard seen on the pages of the Your Models section. Let's just say I went for a 'well-used' look.

STEVE CHAMBERS
EMAIL

I love that even though new to R/C modelling Glynn's plan motivated you to have a go yourself, Steve! No apologies needed for less than perfect paintwork; the very fact that you completed the projected and, as we can see from your pics, have since got the model successfully operating on the water is such an achievement. Bravo! Ed.



Newcomer to R/C modelling Steve Chambers based the hull for this LCM 711 model on a recently featured Glynn Guest plan, upscaling it a little to approximately 1:35, and designed much of the detail incorporated himself.





Lachlan Maclean's delightful scratch-built model of the fishing vessel he once owned and operated off the coast of the Isle of Eigg.

Tyak-Mor

When I retired from engineering, I decided to set my garden shed up as a workshop and start building model boats. I am now sending you some photos of my first ever scratch built model boat, which I hope you will consider for inclusion within the Your Models section of the magazine.

In the past I had been a fisherman and for some years had owned the real life, full-size *Tyak-Mor*, a Cygnus 32, from which I caught lobster and crab off the Island of Eigg where I was born. So, I adapted Jim Pottinger's plans for *Aurora*, a 40-foot Cygnus, modifying the frames, etc, to create a model measuring 32 inches long with beam of 12 inches, equating to 1 inch to 1 foot. Starting with the keel, I then built my model using the plank on frame construction method, with everything, apart from the window frames and fairleads, made within the confines of my shed. I also fitted her with working light.

Sea trials will be done in the new year, but I can tell you she floats well and is now ballasted ready to go.

**LACHLAN MACLEAN
GLALASHIELS**

She's really lovely, Lachlan! I do hope you will send in some follow up photos of her on the water in the near future. Ed.



Inspired by Ray Wood's Osprey design, which featured as a free plan in the July 2022 issue of Model Boats, Matt Cook's two beautiful plank-on-frame builds out on the water.

Osprey x 2!

I would like to thank the Model Boats team, and Raymond Wood in particular, for the free plan for 'Osprey' included in the July 2022 issue.

I built the boat pretty much according to the plan (colour scheme aside) last year but have now finished a half-size version as well. The smaller one,

however, is not motorised but towed by the larger one, which sails very nicely.

I'd be delighted if you could tell Raymond how much I enjoyed this as my first plank-on-frame build.

I am sending you a photo of the small one's first sail on the pond.

MATT COOK, EMAIL

Absolutely gorgeous, Matt. I have, of course, passed your thanks on to Ray, who is as delighted as I am that his plan inspired your first ever plank-on-frame build, and just as impressed by what a fabulous job you have done.

Ed.

Barry Fletcher's superbly built Windermere steamer gliding through the water.



Windermere steamer

Here is a steamer I designed with the Windermere collection as inspiration. She is 43 inches long, with a beam of 12 inches. She has a fully planked hull, built as per the full-size practice of tapering the planks; you plank and plank and plank and, before you know it, you're still not done!

I also designed and built her steam plant, and it's now most gratifying to see her under steam.

**BARRY FLETCHER
EMAIL**

What a very elegant model, Barry! All that planking really paid off. Ed.

Vivid & Mary Ellen

Thanks for publishing my invite to fellow IOW model boat enthusiasts in last month's issue. As you mentioned in your reply to that letter that you'd be interested in seeing some of the model built by our little group, to kick things off I am sharing two of mine.

Vivid

I find I need to be inspired by something, however small, before I build a model. I also have a narrow window of interest. Firstly, it must sail; then, it should be dated between 1850 and 1960; and, lastly, I want to be able to research the type's history and preferably be able to find stories about the individual boat, her home port and possibly her crew. So, having just read John Leather's interesting book *Smacks and Bawleys* and the dust cover had admired the lovely colour photo of the bawley *Saxonia*, once owned by the well-known barge master, Jim Lawrence, on the dust cover, that was it – I had decided upon my next build.

The bawleys fished the lower Thames and Medway for whitebait and shrimps. They were probably so called because they had a boiler on board so the shrimps could be brought up in the net and placed straight into the boiling copper. They would be landed, cooked and ready for sale either on the beach or, after being put straight onto a London bound train, at Billingsgate Market. This trade continues to this day, but now using motorboats, with the picturesque stalls along Leigh-on-Sea waterfront still doing very brisk trade.



The servo layout in Peter's beautiful bawley, Vivid.

Bawleys were a fairly heavily built boats, as they had to dry out on hard sand at the turn of each tide. They were lovely sailing craft, however, with a fine entry rounding out to a fairly flat floor so they could be stood upright to dry out. They carried a lofty gaff mainsail – often with a topsail above, a working headsail, and a gib on a bowsprit. The mainsail was loose fitted with no boom.

Drawings for the build came from Inshore



The pin rail on Peter's model: on the real vessels wooden pins could be dropped in either side of the tiller to keep the boat sailing on a steady course while the crew were busy working with the catch on deck.

Craft by Basil Greenhill and Julian Mannering, which were enlarged on a printer. The frames were transferred from the drawing by laying the frame profile on 2.5mm ply and pricking through with a stylus every 10mm or so, transferring the frame shape onto the ply. Once cut out these frames were set up on the building board with the keel profile and planking could begin. The hull was planked with pine strips cut from lengths of floorboard on my table saw.

It is important to note that the pine used was good quality knot free redwood pine and not the soft, grown quickly, pine from 'sustainable forests' that is often used these days.

The planks were glued to each frame and along the edge to the previous plank. With the planking complete, I then reinforced the inside of the hull with fibreglass. The outside was then sanded smooth and finished with car body filler.

Bawleys had wide side decks for working the nets and a narrow central cockpit containing the boiler. At the aft end of the cockpit was a pin rail, so that wooden pins could be dropped in either side of the tiller to keep the boat sailing on a steady course while the crew were working on deck. At the forward end of the cockpit was a hand-cranked winch (pronounced as wink) for hauling the nets.



The 'wink', a hand-cranked device for hauling in the nets.



The boiler in which a catch of shrimps could be immediately cooked on board.



The model complete and ready to be sailed.



Vivid on the water.

For my model, the same piece of pine floorboard was used to make the mast and spars. Lengths were cut 12mm square for the mast and 8mm for the gaff, topmast and bowsprit. These were then planed to an octagonal, with a slight taper introduced, and then, with one end in an electric drill and the other end gripped in sandpaper, spun up until a perfect round was achieved. If you're intending to try this method, be aware the sandpaper becomes very hot and use a good pair of gloves.

With the spars set up and with the gaff at the right angle, paper patterns for the sails could now be made. Please note, I have tried in the past working from just measurements but always with disastrous results. The sail material I use is cambric, which is a very dense weave cotton. Any dense weave cotton of around 800 TPI (threads per inch)



Set up on Peter's building board, with the first few planks fitted, work begins on the *Mary Ellen*.



Planking complete.



Awaiting fittings and rig.

will be fine. Don't use a synthetic material if you intend to dye your sails as it won't accept the dye. Indeed, even a mix of synthetic and cotton will drastically alter the colour you're hoping to achieve.

With the addition of the shrimp boiler, turned from a piece of hardwood, and a crew member warming his hands by the boiler, my model was just about ready for her first sail.

I have tried in the past to sail with just internal ballast as per a real boat, but stability has always proved a problem in windy conditions. Instead, therefore, I now fit a dummy fin keel with ballast at the bottom. This fin has a length of 6mm studding on top that passes up through a tube in the bottom of the boat to above the waterline, with a wing nut on top – quick and easy to fit and it doesn't show while sailing.

I named the boat *Vivid* as, many years ago,

a friend of mine in Burnham on Crouch had owned an old bawley of the same name (by that point fitted with engine) and made his living by running supplies out to the pirate radio ships off the East Coast in the good old days of the 1960s.

Mary Ellen

Living in the wilds of the Back of the Wight, as the southwest corner of the Isle of Wight is known, we do not have access to a mains gas supply; instead, we have a container of LPG in the garden which is filled periodically by a large tanker. Over the years I have got to know the driver and have discovered that he owns a 1934 gaff cutter. One day, while talking boats he asked if I could build him a model of his own boat, the *Mary Ellen*, and, as I had just finished my last build and the bench was free, I agreed.

That was when he explained that the boat had been built in Harwich by a yard which had traditionally always built fishing smacks and bawleys. The hull design, therefore, had followed the yard's normal pattern and no drawings had ever been made. All he had was a selection of photos of his boat for me to go by.

So, having spent my formative years training as a shipwright on the East Coast and having studied East Coast fishing boat design, I set to and made some working drawings of a hull, determined to capture the real thing as closely as possible.

The build followed my usual method of creating ply frames before planking in pine (cut from a length of floorboard). I then use a light fibreglass woven roving, with polyester resin applied on the inside between the frames to seal and strengthen the hull.



Mary Ellen on her stand, but now ready to be sailed.

On turning up to make the next gas delivery, however, he dropped an unexpected bombshell: he wanted to be able to sail this model via radio control. My original understanding was that we had been taking about a static model! Fortunately, this came before I had fitted the deck, so I could still work out servo mountings, rudder push rods and mainsheet leads fairly easily. I would also, however, have to make provision for a detachable false keel for sailing.

Onwards, and once I'd fitted all the radio gear, the ply deck could go on; on this I drawn pencil lines to represent planking before staining with my special weathering solution to create the illusion of a weathered pine deck.

Cabin and cockpit came next, which were to be varnished mahogany. My stash of wood was running a bit low, but I managed to find enough to plane down to 1.2mm and use as a veneer over the 4mm ply cabin and cockpit sides. The

fore hatch and other deck fittings were made from mahogany offcuts, including the skylight on the main cabin top. Mast and spars were made from yet more floorboard, while the standing rigging was constructed from fishing trace wire and the sails fabricated from cotton cambric.

As some of the photos he had given me showed her chocked up ashore in the boatyard for the winter, I felt this would be an appropriate way to display her. Using a piece of 20mm MDF I managed to create that 'boatyard look', using model train ballast for the base and dowels for the props, and I have to say the overall effect was satisfyingly realistic.

I think I managed to build a reasonable likeness to the gas man's boat, and as I haven't had our supply cut off, I think it's safe to say he must be reasonably pleased with the model too!

PETER SIMMONDS
ISLE OF WIGHT



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We're delighted to report the Billing Boats' US Coast Guard kit Nick Horne generously put up for grabs on these pages in the December 2023 offer has now found a new home.

US Coast Guard kit changes hands

I am pleased to let you know that David Newell came over last Saturday and collected the Billing Boats' US Coast Guard kit you kindly allowed me to offer via the Letters pages of the December 2023 issue. He is happy to have it and tells me he's looking forward to completing the model. We, in turn, are very pleased it is going to a good home and want to thank you for your support and help at Model Boats magazine.

NICK HORNE
EMAIL

I'm happy to say I collected the US Coast Guard kit from Nick yesterday

afternoon and had a good chat with him and his wife over a cup of coffee. Nick had everything needed to finish the build, but I will update the radio and electronic side of things (with help from my friends in the Phoenix Model Boat Club).

Thanks for putting me in touch with Nick. The RNLI will be giving our club a talk in early March so I will make a donation then.

DAVID NEWELL
EMAIL

Nick/David: it really was my pleasure to be able to put you in touch with each other!
Ed.



SS Normandie

The *Normandie* article (featured in the December 2023 issue of *Model Boats*) was particularly interesting for me because of the unusual amount of technical detail included. I was intrigued by the initial attempt to use 3-bladed propellers transmitting 40,000shp as early as 1935 because the blade loadings would have been huge. It was little wonder they had severe propeller excited vibrations!

I was involved with some single screw ships in the 1970s which were 'only' transmitting 32,000shp with 4-bladed props and the vibration was so bad at full power that they didn't lay our places at the dinner table until we were seated and could catch the cutlery before it vibrated off the table!

Later, I was involved with the building of some twin-screw vessels transmitting 27,000shp on each shaft, powered by 8-cylinder diesel engines. Calculations showed there was a risk of propeller excited vibrations so three precautions were taken: 5-bladed props were used; instead of having the usual equal 45-degree engine crankshaft angles they were made 53.5/46.5-degrees; and, finally, a very clever device to synchronise both engines and vary the angle between them so the vibrations from one prop could cancel the vibrations of the other. Physically, the latter worked fantastically well, it was just a pity we could never prove its effectiveness as the first two measures proved so successful

that there were no vibrations to cancel out!

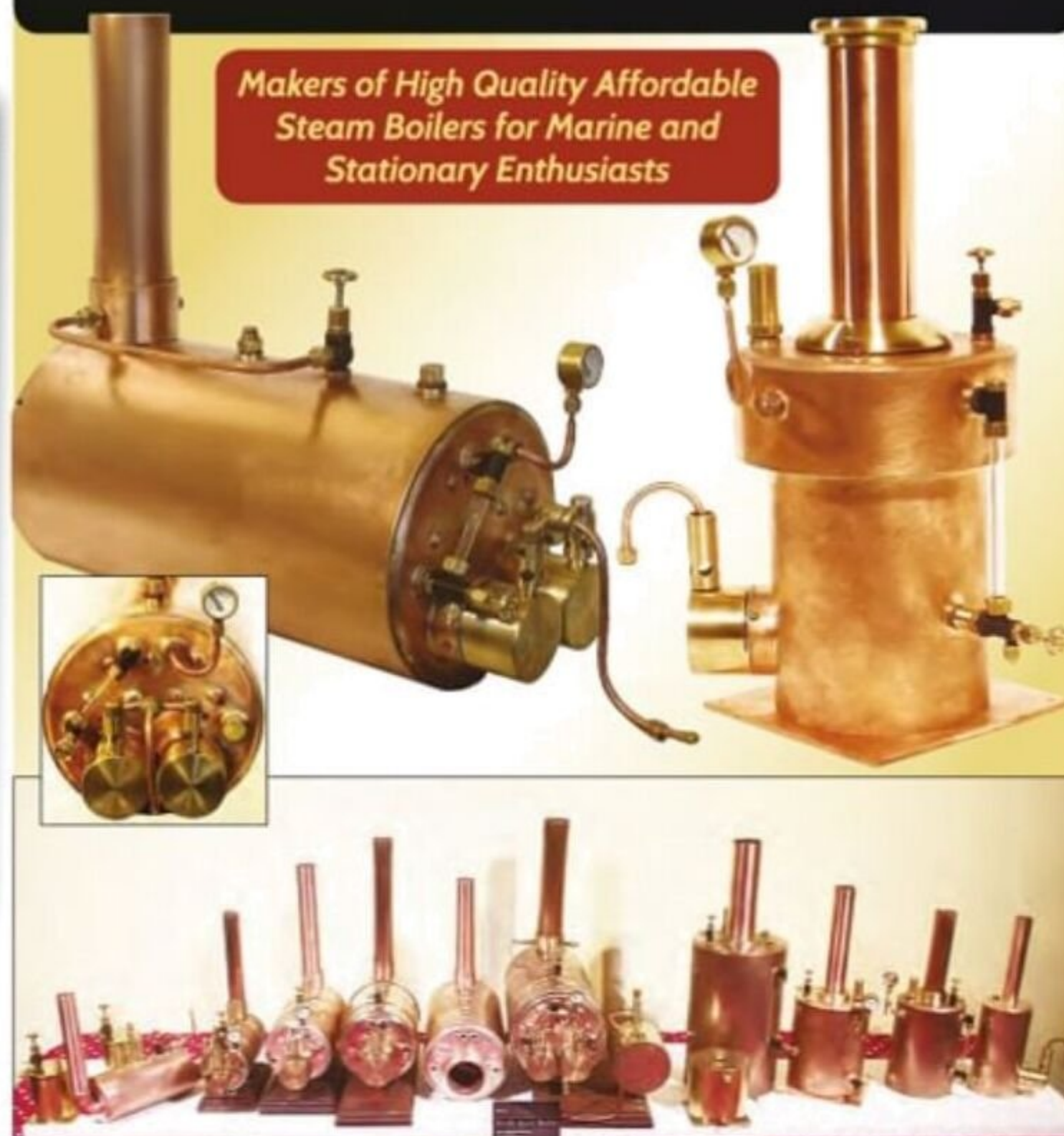
Just a final thought; our synchronising gizmo was a very difficult trick to pull off with a pair of huge diesel engines, but it would have been fairly simple with the electric motors on the *Normandie* and might have saved the owners, CGT, a lot of propeller excited heartache and cost!

TIM GIBBS
KENWITH CASTLE MBC
BIDEFORD

Glad you enjoyed this feature, and what fascinating engineering insights – thanks, Tim. Ed

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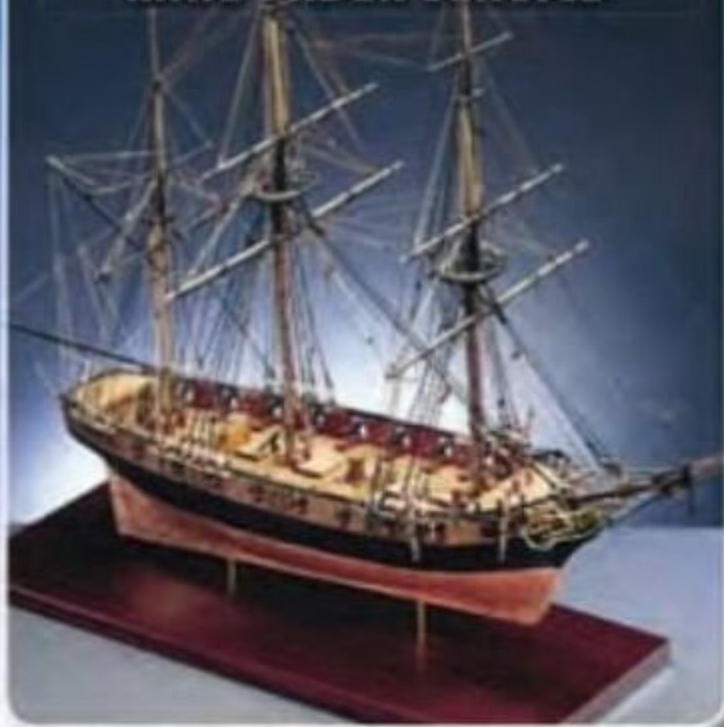
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