BUILD BASICS

Hull design & construction considerations explained



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October 2026
Vol. 76 No. 911

model Boats

Superfast CMB

Packing a punch in 1:12 scale



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Sil (M-27))

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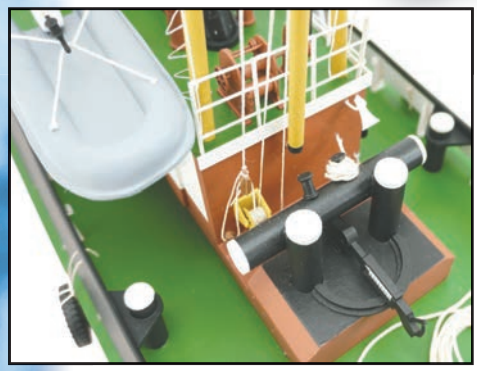




Additional Photo manual

428 Zeeland

Poly Hull 1:35
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The “WINSTON CHURCHILL”, later called the “ZEELAND” was built during the Second World War and equipped with a steam engine. It was, in fact, the last steam-driven tug for coastal use built for the Dutch company Goedkoop in Amsterdam. The vessel was later sold to the Dutch company Willem Muller in Terneuzen in 1964, where she was equipped with a diesel engine and renamed the “ZEELAND”. She was broken up in 1997 in Dordrecht, Holland. Says one of the ship’s captains, Henk de Winde, “She was a difficult lady to get along with, but after 25 years of happy marriage, I know that she was very special, and I am still not sure, which one of us was best.”

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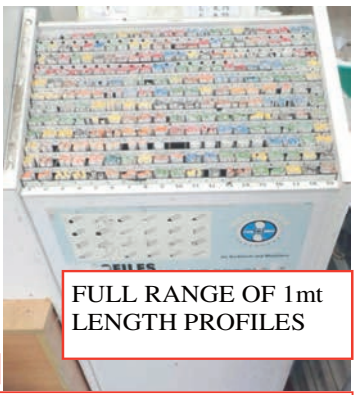

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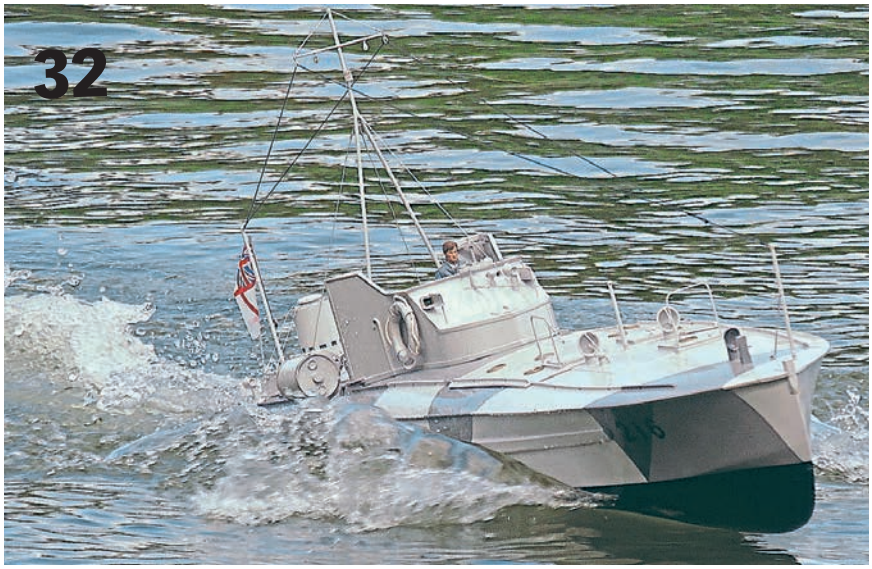
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WELCOME TO THE OCTOBER 2026 ISSUE OF MODEL BOATS

With so many reports of falling/depleted water levels in our model boating ponds and lakes during the back-to-back heatwaves experienced from May through to September this year, hopefully autumn will bring some much-needed rain. Although now I've said that, probably best to start building an Ark!

There are no Arks in this month issue, but we do have a good variety of content for you, including an article on the *Sil* (M-27) Spanish minesweeper that should have featured in our last edition but, due to a last minute flat plan (Editorial/Advertising page allocation doc) change, wasn't, despite an image of the model remaining in pride of place on the front cover! My sincerest apologies, therefore, for any confusion caused. How I failed to spot this glaring error I have no idea, but, in my defence, I was at that time juggling getting an issue to press while spending ten days out of the schedule in court (on jury service, not actually in the dock – although considering this shameful *faux pas*, perhaps I should have been).

Aspirational scratch builds, kit reviews and suggested modifications, restoration work, advice on basic hull design and construction, and tutorials on servo mounting and linkages and photo etch for beginners also feature, along with all your favourite regular pages.

Plus, there's an exciting, exclusive to Kelsey Media, competition offering you the chance to win a fabulous Viking cruise (see page 80), with no arduous rowing in heavy seas or bloody battles involved – we're talking a luxurious Rhone River cruise through southern France, worth £5,990 (for full details, see page 80). Someone is going to get lucky, and it could be you – *bonne chance!*

The next edition of Model Boats, which will be cover dated November but on sale from Friday, October 16, will include a free pull-out plan and build guide for a stand-off scale R/C Vosper Mk 5 frigate, courtesy of Glynn Guest, so be sure not to miss it.



In the meantime, enjoy your read,

Lindsey

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

OUT AND ABOUT

The 2026 Midlands Model Engineering Exhibition

Taking place at the Warwickshire Exhibition Centre, A425 Southam Road, Leamington Spa, CV31 1FE, from Thursday, October 15 to Sunday, October 18, will be the UK's largest model engineering exhibition, with doors open from 10am to 4.30pm on Thursday to Saturday and from 10am to 4pm on the Sunday.

As well as the hundreds of exhibits on display, including the competition class entries, also in attendance will be numerous specialist trade suppliers, offering everything from tools, machinery and materials to components and expert advice.

Plus, Neil Wyatt, the editor of *Model Engineer & Workshop magazine*, will be hosting a series of fascinating expert talks/presentations covering various different aspects of the hobby once again this year.

The venue offers free onsite parking, restaurant and coffee shop facilities, and a shuttle bus service



from Leamington Spa Railway Station on Thursday, October 15 (charges apply).

Tickets (for any one day) are priced at £14 for adults, with concessions, and can be purchased in advance via the exhibition's official website at www.midlandsmodelengineering.co.uk, where you can also find a full list of exhibitors, latest updates and the relevant form for those interested in submitting entries for consideration in the show's numerous competition classes.

2026 Yeovil Model Show



Between 10am and 4pm on Sunday, October 11, the Wellsprings Leisure Centre, Cheddon Road, Taunton TA2 7QP will play host to this year's Yeovil Model Show. thousands of models of all description will be exhibited, alongside with live modelling and painting demonstrations and numerous hobby related trade stands.

Admission to this family friendly event will be charged (cash only on the door) at £6 for adults, with concessions. The venue offers free onsite parking and disabled access, and hot and cold refreshments will be available to purchase throughout the day.

For further details, email yeovilmodelshow@gmail.com or phone/text Ken on 07759 137000.

Crowborough MBC Illuminated Sail

Starting at 4pm on October 31, 2026, the Crowborough Model Boat Club will be hosting an Illuminated Sail at the lake located in the grounds of Crowborough Leisure Centre, Eridge Road, Crowborough, East Sussex TN6 2TN.

Admission will be free of charge, but due to limited lakeside seating, the club recommends you bring your own portable/collapsible chairs /stools or outdoor cushions. Free parking is available just a short walk away from the lake.

OUT AND ABOUT

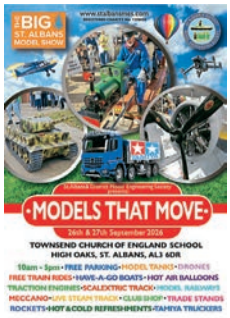
Buxton MBC Night Sail



On the evening of October 25, 2026, Buxton Model Boat Club will be holding its annual night sail on the main lake in Pavillion Gardens, Buxton SK17 6BE, starting at 5pm. Pay and display parking will be available in the park itself, while there will also be limited free parking available along Burlington Road. For further details, visit https://www.buxtonmodelboatclub.co.uk/events/

OUT AND ABOUT

2026 Big St Albans Model Show update



Further to flagging up the Big St Albans Model Show, scheduled for weekend of September 26/27 at the Townsend Church of England School, High Oaks, St Albans AL3 6DR, the organisers have now advised that, due to current water restrictions, the use of a boating pool for working model boat demos may not be possible at this year's event. There will, however, still be plenty of superb models on static display.

ARMCHAIR VIEWING

Doctor at Sea



If you fancy a hit of nostalgia, then tune into Rewind TV at either 10am or 8pm on September 11, 2026, for the 1960s' comedy *Doctor at Sea*, starring Richard O'Sullivan, Robin Nedwell, Geoffrey Davies, Ernest Clark and George Layton. If you're not already familiar with Rewind TV, which specialises in vintage UK and US television show, it can be accessed on the platforms Freeview (Channel 81), Freely (Channel 141), Freesat (Channel 164) and Sky (Channel 182).

BUY THE BOOK

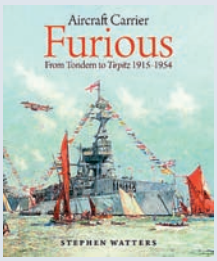
Kriegsmarine Norway Command 1940-45



Due for release on September 26, naval historian Lawrence Patterson's new book provides the first full history of the Kriegsmarine (the official navy of Nazi Germany from 1935 to 1945) while operating out of occupied Norway during World War II. Illustrations include rare and previously unpublished photographs, original artwork, diagrams and maps.

Published in paperback format and carrying ISBN 9781472871084, the title has an RRP (Recommended Retail Price) of £15.99 but can currently be obtained at the introductory price of £14.39 when ordered directly from https://www.ospreypublishing.com

Aircraft Carrier Furious
From Tondern to Tirpitz 1915–1954



Scheduled for release on September 30, 2026, Stephen Watters' new book, illustrated with a superb collection of ship plans and period photographs, tells the story of this hugely important experimental platform for the Fleet Air Arm between the wars, and how she then went on to serve with distinction throughout World War II.

Published in hardback format, carrying ISBN 9781036198855, the book carries an RRP (Recommended Retail Price) of £35, but can currently be purchased for the introductory price of £28 when ordering from https://www.pen-and-sword.co.uk



Hull design largely determines a vessel's maximum speed.

Understanding hull fundamentals

Antonio Alcaraz covers the most important considerations

While I am sure the majority of readers are seasoned vets when it comes to choosing and building hulls for radio-controlled models, in this article I would like to share some of my own experience in the hope that it will be of help to any newcomers to the hobby.

For those of us who build working models, the primary objective is to ensure that the finished boat behaves on the water as closely as possible to its full-size counterpart. Achieving this involves more than just good craftsmanship, a sound understanding of mechanics and electrical systems and some basic physics also come into play.

Unlike a static display piece, a working radio-controlled model must incorporate fully operational moving parts. These may include the propeller, rudder, radar scanner, winch or crane, depending on the prototype being modelled. As a result, the construction of a working model requires a rather different approach.

From the outset, the modeller should allow easy access to the interior of the hull for routine maintenance, such as changing batteries, servicing the motor or carrying out repairs and adjustments. Careful planning at the construction stage will make the model far easier to maintain and considerably more reliable in service.

Choosing the right materials

Selecting the right materials is an important consideration when building a working model boat, as it will inevitably be exposed to the elements throughout its life. Prolonged exposure to sunlight will eventually affect the paintwork, while fresh water can cause gradual deterioration and salt water is even more demanding because of its highly corrosive nature.

The model must also be capable of withstanding the inevitable knocks and bumps associated with transportation to and from the lake

"The hull is the most important part of any boat, whether full-size or model. Its design determines the vessel's buoyancy, stability and, ultimately, the maximum speed it is capable of achieving"

or pond, together with the occasional collision that can occur during club sailing sessions or at regattas.

Although this may sound rather pessimistic, these are the conditions that every working model is likely to encounter sooner or later. For this reason, careful selection of suitable materials from the outset will improve durability, reduce maintenance and ensure that the model continues to provide many years of reliable and enjoyable service on the water.

Hull design

The hull is the most important part of any boat, whether full-size or model. Its design determines the vessel's buoyancy, stability and, ultimately, the maximum speed it is capable of achieving.

The latter is sometimes overlooked by modellers, who attempt to increase performance by fitting a more powerful motor or a larger propeller in the hope of making the model faster. In reality, the result is usually little more than increased current consumption and a larger bow wave, while the model gains very little in terms of actual speed. The maximum speed of any displacement hull is governed primarily by its hull design rather than the amount of power installed (**see Photo 1**).

It is therefore essential to consider the type of hull when deciding what sort of model you wish to build. Whether the aim is a slow, steady-working vessel or a faster craft, the hull must be suited to its intended purpose. Hulls are designed to perform specific tasks and their shape reflects the role of the prototype, whether it is a merchant ship, fishing vessel, harbour tug, naval auxiliary, sailing yacht, sports boat or submarine. The range of possibilities is enormous, but before selecting a particular model it's worth considering a number of important factors (see **Photos 2** and **3**).

The relationship between a hull's length, beam and depth has a major influence on the way a model behaves on the water. As with any other aspect of model engineering, experience is gained progressively, and it's wise to build up both skills and knowledge before attempting more demanding projects.

For this reason, it is not advisable to choose an overly ambitious subject for a first model. Complexity is not determined solely by the amount of detail or the appearance of the vessel; more important is how the model performs on the water. If fundamental design considerations such as hull proportions, displacement and weight distribution are overlooked,

2



3



Choose a model that matches your level of experience.

"For those new to radio-controlled model boating, I'd recommend beginning with a design that offers good inherent stability. Fishing vessels, harbour tugs and motor yachts are all excellent choices"

the completed model may float below its designed waterline, with a corresponding loss of freeboard and, in extreme cases, an increased risk of taking on water or even sinking.

For those new to radio-controlled model boating, I'd recommend beginning with a design that offers good inherent stability. Fishing vessels, harbour tugs and motor yachts are all excellent choices, as their hull forms are naturally stable and forgiving, making them ideal subjects for a first working model.

The popularity of these types is reflected at almost all model boat exhibitions, and club sailing sessions and open days, where fishing boats and tugs are invariably among the most common models on display (see **Photos 4, 5 and 6**).

Once experience has been gained in both construction and handling, you can move on to more demanding subjects whose hulls present greater stability challenges. A good example is the Spanish Navy corvette *Infanta Cristina*, where careful attention to weight distribution and ballast is essential if realistic performance is to be achieved (see **Photo 7**).

The draught of a hull depends entirely on its design and the type of vessel it is intended to represent. At one extreme are racing powerboats, which, at full speed, rise onto the plane so that only a small portion of the hull remains in

4



5



6



Tugs and fishing vessels are among the most stable types of working model.

7



The corvette Infanta Cristina.

contact with the water, together with the propeller. This greatly reduces drag and allows very high speeds to be achieved (see **Photo 8**).

At the opposite end of the scale is the traditional sailing yacht, which typically has a deep keel. The combined effect of the hull and keel provides the stability required to resist heeling when sailing close-hauled (see **Photo 9**). Modern racing yachts, however, follow a different design philosophy. Although they also rely on a ballast keel for stability, the keel itself is long and relatively slender, terminating in a heavy bulb. This arrangement provides a powerful righting moment while minimising hydrodynamic drag, resulting in a faster and more efficient hull (see **Photo 10**).

Another interesting example is the fast patrol boat or motor torpedo boat. These hulls are designed with a pronounced V-section forward to improve their performance in rough water, while the after sections are comparatively flat. At low speeds the

8



A racing powerboat rises onto the plane at full speed.

9



A traditional sailing yacht relies on its deep keel for stability.

hull behaves as a displacement craft, but as speed increases it progressively rises onto the plane. The bow lifts clear of the water and only the flatter aft section remains in contact with the surface, greatly reducing drag and allowing the available engine power to be converted into speed much more efficiently. This is why increasing motor power produces a noticeable increase in speed with a planing hull, whereas the same is not true of a conventional displacement hull **(see Photo 11).**

Stability

Stability is one of the most important characteristics of any boat and is essential for safe and predictable handling on the water. As mentioned earlier, a vessel's stability is largely determined by the relationship between its principal dimensions. In general terms, a hull with a relatively wide beam in proportion to its length will be inherently more stable, whereas a long, narrow hull is likely to be less stable and more prone to rolling.

This relationship is just as important in radio-controlled models as it is in full-size vessels, and should always be considered when selecting a prototype for a new project.

Two good examples illustrate the difference perfectly. A harbour pusher tug such as the *Pierre Dure*, with its short, beamy hull, possesses excellent inherent stability, while a ship's boat such as *Elidir*, with its long and comparatively narrow hull, is naturally far less stable and therefore demands much greater care in both construction and operation.

The pusher tug is a good example of a naturally stable design. Its broad beam in relation to its length, combined with a flat-bottomed hull, provides excellent initial stability, making it an exceptionally forgiving model to operate. In fact, the builder of the example shown in **Photo 12** found it necessary to add a considerable amount of ballast before the model floated on its designed waterline, as the wide, flat hull offers a great deal of buoyancy.

10



A modern racing yacht achieves stability through its slender ballast keel and bulb.

11



A motor torpedo boat planes at high speed, greatly reducing hull drag.

12



The pusher tug Pierre Dure.

13

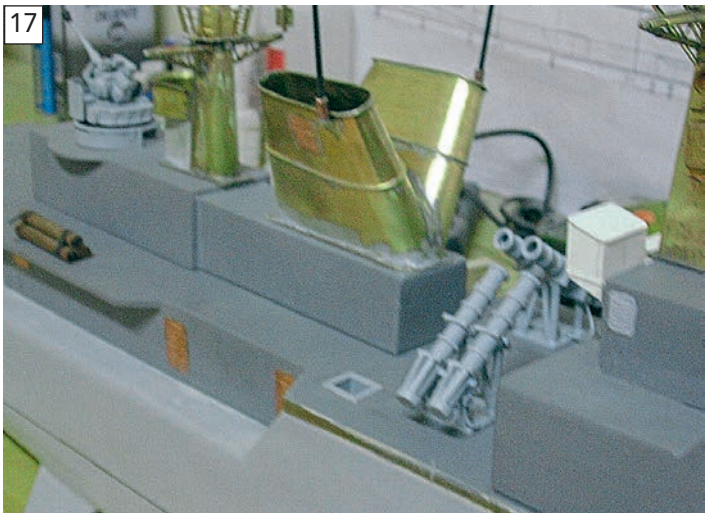


The ship's boat Elidir.









A heavy superstructure positioned high above the waterline can have a significant effect on a model's stability.

The ship's boat *Elidir*, by contrast, presents a much greater challenge. Its comparatively long, narrow hull and moderately rounded V-shaped sections provide less inherent stability and allow the model to heel more readily. In the case of the model shown in **Photo 13**, the problem was compounded by the builder's decision to fabricate the funnel from brass. The additional weight carried high above the waterline raises the model's centre of gravity, producing a pendulum effect that further reduces stability and increases the risk of excessive heel.

Another important factor that affects a boat's stability is the relationship between the weight and height of the superstructure and the vessel's draught. This is simply a matter of basic physics: the lower the centre of gravity in relation to the buoyancy of the hull, the more stable the boat will be. Conversely, excessive weight carried high above the deck will reduce stability and make the vessel more prone to heeling. A useful illustration of this principle is an iceberg. Approximately three-quarters of its volume lies beneath the surface, this much larger submerged mass providing the stability that keeps it upright. As the underwater ice gradually melts, the distribution of weight changes. Eventually, the centre of gravity shifts sufficiently for the iceberg to overturn, after which it settles once again into a new position of equilibrium.

When planning a new model, these factors should be considered from the very beginning. It is not enough simply to look at the relationship between the hull's length, beam and depth; equal attention should be paid to the materials used for the superstructure. If the superstructure is particularly tall and constructed from unnecessarily heavy materials, the centre of gravity will be raised, increasing the likelihood of the model heeling excessively on the water.

The *Elidir*, discussed earlier, is a good example of this principle in practice. Another model presenting similar challenges is the corvette *Infanta Cristina*. Both demonstrate how careful attention to weight distribution and the choice of construction materials can make the difference between a well-balanced, reliable model and one that is difficult to handle afloat.

The builder of the corvette *Infanta Cristina* faced exactly this dilemma. In order to reproduce the intricate details of the superstructure, including the funnels and the radar and communications mast, he chose to fabricate these components from sheet brass. Had they been made from timber, many of the finer details would have appeared overscale, while materials such as card or balsa wood would have been too fragile to withstand regular handling, transportation and exposure to water. Although the thinnest brass sheet available was used, the completed superstructure still added a considerable amount of weight high above the deck. Combined with the multiple deck levels characteristic of the prototype, this raised the model's centre of gravity significantly. As a result, the model developed a pronounced rolling motion when under way, particularly during turns, where there was a noticeable tendency to heel excessively. Correcting the problem with additional ballast proved difficult because the hull offered only limited reserve buoyancy.

Be aware, then, that the choice of construction materials can have a major influence on the handling and stability of a working model (**see Photos 14–17**.)

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CUX 87

Is Billing Boats latest incarnation of this 1:33 scale kit worth netting? **Tomasz Klyszynski** provides a hands-on working boat build review



When I was a child, my parents and I regularly spent our summer holidays on the Baltic coast. The village we visited was a typical fishing community. Outside the tourist season only a handful of people remained, so by October all you could hear was the wind. The only thing missing from the deserted streets was a tumbleweed rolling past - although that belongs in a rather different setting. The village's main attraction was its lighthouse. A close second, at least for me, were the fishing boats hauled up onto the beach, where they could be inspected at close quarters. Even with your eyes closed they were easy to find - you simply followed your nose!

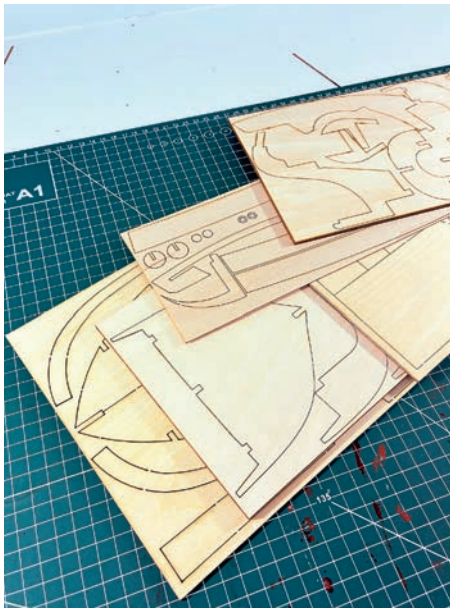
Those memories are what I associate with two of my most recent kit built models. Since the lighthouse had been built while the area was under German rule, the first on my bench was the shrimp cutter *CUX 87* – the second will be covered in next month's edition.

According to the manufacturer (Billing Boats), the kit has been produced to 1:33 scale and represents a typical German cutter used to fish for North Sea brown shrimp. *CUX 87* was built in Cuxhaven in 1952. The full-size vessel measured 18.35 m in length and was powered by a 200 hp two-cylinder diesel engine, giving a speed of 10-12 knots. She carried a crew of three and worked the fishing grounds around the Danish island of Rømø and along Germany's western coast.

These boats were based in harbours rather than hauled up onto beaches, but the connection formed in my mind all the same - probably because of their shape and purpose.



The box in which Billing Boats' 1:33 scale CUX 87 kit arrives.


Laser-cut parts for the CUX 87.

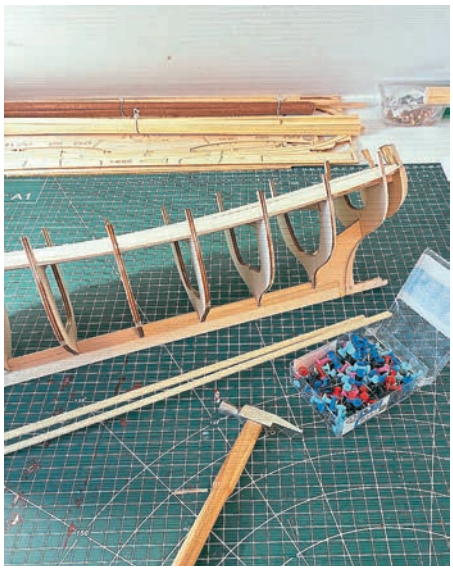

Timber strips and dowels supplied in the kit.



Netting, decal, cord and other materials included.


The metal, plastic and wooden fittings.


The CUX 87 hull framework.


Fitting the first hull planks.


The waterline marked and hull bottom painted.

"It's worth unrolling this at the start of the build so you can leave it to flatten while you work on constructing the hull, etc. The material is quite stiff, so the flatter it becomes, the easier it will be to handle later"

Kit contents

Inside the box are all the kit components, together with the older-style instruction booklet. A newer version with step-by-step photographs is now available, which makes the build considerably easier. The parts are laser-cut from plywood sheets of several thicknesses.

The kit also contains timber strips in various sections and colours for planking the hull and deck and



Shrimp-cutter camouflage!



CUX 87's wheelhouse components.



The wheelhouse clad in mahogany strips.

finishing the wheelhouse. Among them are other useful pieces, including round dowel for the masts.

One item that immediately catches the eye is the rolled-up green netting. It's worth unrolling this at the start of the build so you can leave it to flatten while you work on constructing the hull, *etc.* The material is quite stiff, so the flatter it becomes, the easier it will be to handle later.

The box also contains rigging cord, a hull decal and a selection of metal, plastic and wooden fittings.

Before you start building…

The cutter's hull framework provides enough room for an R/C installation, but this must be planned from the very start. There are few places where a service hatch can be installed, and the space beneath the aft wheelhouse is

'Planking the deck was deliberately left until after I'd completed the painting, as I wanted to avoid the risk of splashes and/or overspray, which would be very difficult to remove from thin veneer strips - particularly when we're talking orange"



The wheelhouse on its raised base.



A length of thread marks the centreline.



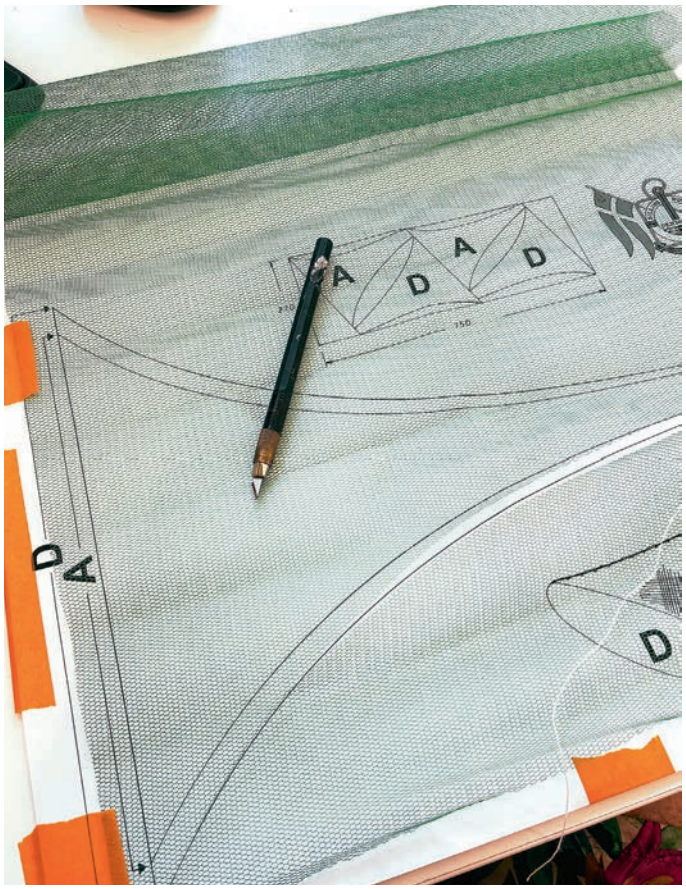
Deck structures in place.



The masts installed.



Standing rigging fitted.



Preparing the net panels.



Wooden floats for the nets.



Running rigging fitted.



The nets in position.



CUX 87's bathtub test.

not exactly generous, so you will need to give this some thought.

The hull

Construction of the framework progresses very quickly because the parts supplied are already cut out. The hull planking, however, is another matter; each strip must be shaped and fitted individually.

To hold the planks in place I used push pins and a small hammer – almost to scale.

Painting and deck planking

Once my hull had been fully planked and any small gaps filled, I applied a coat of primer. With this having dried, I could then mark the waterline and add some colour. I began with the bottom, using the traditional brick-red/brown shade associated with copper-based antifouling coatings. I doubt this particular paint actually contains any copper oxide, so I will have to keep an eye on *CUX 87*'s underside and remember to clean her well after every sailing session.

Planking the deck was deliberately left until after I'd completed painting the entire hull, as I wanted to avoid the risk of splashes and/or overspray, which would be very difficult to remove from thin veneer strips - particularly when we're talking orange! There would be no hiding any misdemeanors from the police boat that occasionally joins us on the water!

Fitting out the deck

With the hull and deck planking complete, it was time to begin work on the deck fittings, starting with the wheelhouse. For aesthetics alone, i recommend adding an LED to the interior, even if your finished model is intended for nothing more than display.

In the previous version of this kit, the wheelhouse had to be stained and the planking lines drawn from a supplied template. Now, mahogany strips, 0.7 mm thick and 2 mm wide, are included so you can actually plank it. There are, it has to be said, 'quite a few' of planks to fit, but the result is well worth the effort.

The wheelhouse stands on a raised base containing a skylight and several other fittings, including cleats for the rigging. This is another area that will restrict access to R/C equipment should you decide to install it.



In addition to the wheelhouse, several other fittings must be positioned on the deck. To place them accurately on the centreline, I stretched a length of thread between points at the bow and stern; this provided a clear reference for positioning everything correctly. Because the wheelhouse base was too tall for the thread to pass over it, I marked its position lightly on the deck.

Masts and rigging

With the deck structures and wheelhouse in place, I prepared and installed the masts. The full-size plan, together with the drawings and photographs in the newer instructions made this stage straightforward.

Once the masts are installed, tensioning the standing rigging can pull them out of alignment. Bear this in mind when using thick cord and aiming for taut lines.

I painted my standing rigging black. The supplied cord is natural and undyed, so I coloured it with acrylic paint. Worth noting, though, is that painted cord becomes slightly stiffer to manipulate and work with.

Now to those nets...

The full-size cutter's 200 hp diesel made sails unnecessary, so what are the masts for? The answer is those green trawl nets, hopefully flat by now.

You will find a template for cutting out the four net panels included with the kit. Take care to use the material efficiently and cut the pieces accurately, as pairs of panels must later be sewn together. The netting is quite stiff; if it still refuses to lie flat, tape it to a sheet of paper before cutting. Begin with the larger panels rather than the smaller ones.

After sewing each pair of panels together and attaching them to the previously prepared assembly made from a wooden rod and two plastic fittings, it's time to add the floats. These are small wooden balls with holes through their centres, which makes fitting them easier. However, they must be spaced evenly along a line that is left slack, as one edge of the net will later be attached to it. The length of the line must match the curve of the net. Written down, this sounds more complicated than it really is; once the parts are in your hands, the arrangement becomes much easier to understand.

With the nets prepared and the cutter's running rigging completed, you can fit the nets. As previously mentioned, they are fairly stiff, so I found several trial fittings were needed. Fortunately, though, the whole assembly can be put together dry, without permanently gluing the lines.

Each net is suspended from a chain







'Each net is suspended from a chain along one edge, which creates a very convincing effect - especially if you take the time to let all the components settle naturally under their own weight"

along one edge, which creates a very convincing effect - especially if you take the time to let all the components settle naturally under their own weight.

The model's overall width can be adjusted to suit the space available in its home port: the gear can be spread further from the hull or folded into a narrower position.

On the water

It was as this point I conducted the first water trial in the bath There were no shrimps to be found, but the trial did confirm my efforts in filling and sealing the hull to ensure watertightness had paid off.

This can be further evidenced from my maiden voyage shots, showing how the model performs on open water, in an almost natural environment.

Cue Ray Charles!

Next month, I'll be moving on to *Mary Ann*, so be sure not to miss the November issue, on sale from Friday, October 16. ●

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The *King of Hearts*

Part 1

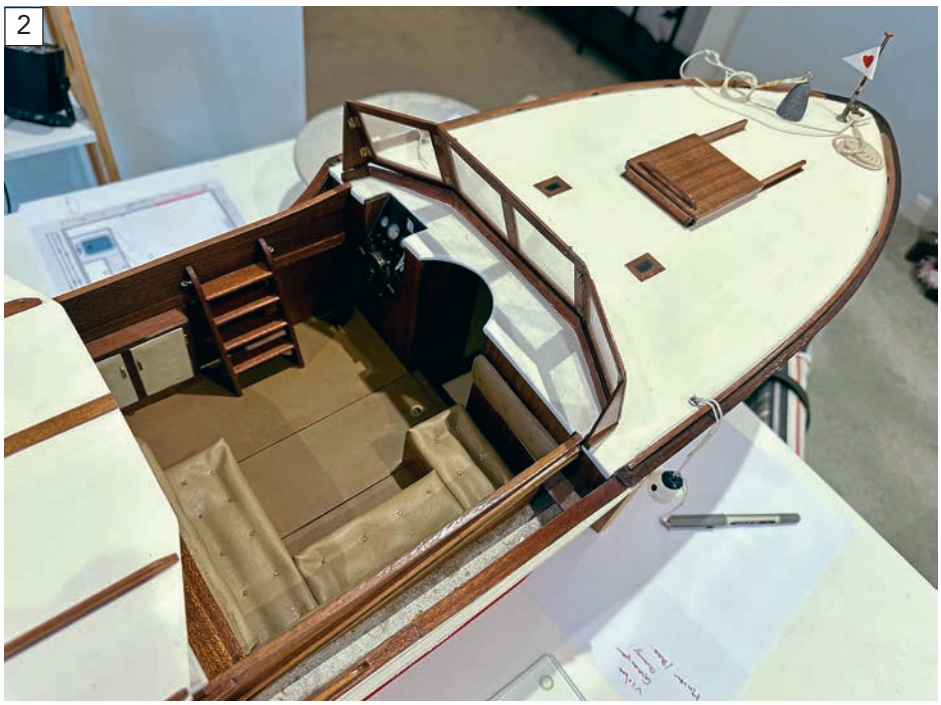
Neil Witt turns his hand to the restoration of a 1:12 scale Norfolk Broads' cruiser

This voyage of discovery started in May of last year with some scrolling of the Model Boat Mayhem Facebook Group. One post about the Mayhem event at Wicksteed showed lots of photos of the Ron Wem collection being sold by his family following Ron's passing. I saw a familiar hull shape in the photos – a 1:12 scale model of a Norfolk Broads cruiser built by Hearts Cruisers in Norwich. Seeing this instantly took me back to the early 1980s when my grandfather bought one of her sister ships, *Heartbeat* and kept her at Wayford Bridge on the River Ant for several years.

Ron's website (www.ronsboats.co.uk) showed there were a number of model Broads cruisers for sale, along with other boats, and the boat in the Wicksteed photos was the flagship of the Hearts Cruisers' fleet, the *King of Hearts*. After seeing more photos, I knew had to have this model. An exchange of emails with Ron's daughter Julie saw my offer accepted,



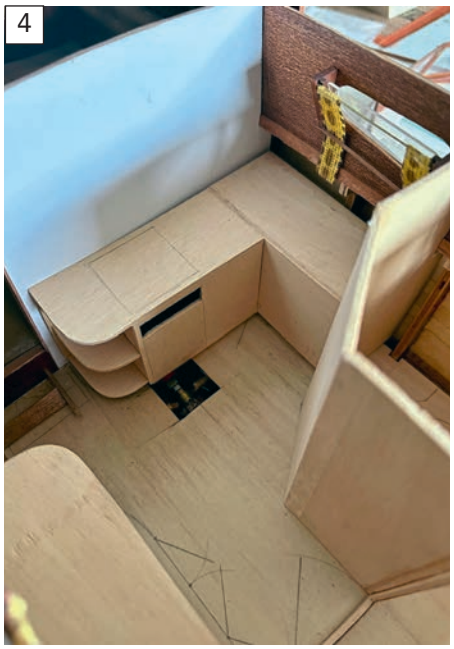
The King of Hearts on arrival.



The wheelhouse with sliding roof.



The rear cabin and heads compartment had already been marked out and started.



The fitting out of the galley had also been started.

followed by a 470-mile round trip from Plymouth to Dunstable to collect.

Initial thoughts

When the *King of Hearts* ended up on the dining table for a serious looking at (see **Photo 1**), it was obvious she was still in good condition externally, albeit a little tired in places. Even so, on removing the foredeck and stern cabin roof it came as a big surprise to find Ron had also started to fit out the interior. The centre saloon with sliding roof, although missing some details, had been nicely done (see **Photo 2**), the galley and stern cabins had bulkheads (see **Photo 3**) and some furniture already installed (see **Photo 4**). Having seen the quality of Ron's modelling, I instantly decided to carry on his work and fit a complete period interior.

"Having seen the quality of Ron's modelling, I instantly decided to carry on his work and fit a complete period interior"

Who was Rom Wem?

According to his website, Ron built over 50 boats after joining the Leighton Buzzard Model Boat Club in 1992. Looking at his extensive collection, it's easy to see that he had an affinity with boats of the Norfolk Broads, with over half the fleet being Broads cruisers. The impressive collection of 15 Broom Boats, a Norfolk boatbuilder based in Brundall, shows an amazing attention to detail, so it's no surprise to find that Ron had obtained original drawings from Broom Boats.

Ron used his model of *Skipper*, a balsa plank-on-frame hull, as the plug from which to create a three-part fibreglass mould. This was then used to produce four identical hulls with different superstructures for his fleet of Broom boats. This mould is now safely stored in my workshop as I bought it when collecting the *King of Hearts*, so one day there maybe another Broom 30 model on the water.

Ron's boats have frequented the pages of Model Boats magazine in the Readers Models section and in Dave Brumstead's Focus on Scale articles

5



readers' models

Broom Models

RON WEM'S fleet

The pictures show five of Ron's Broom models on his garden pond. All the full sized boats are based on the Aqua-fibre AF 30 hull, hence the hulls are all the same in their basic shape.

The **green** model boat *Skipper* has a balsa plank on frame hull produced to the builder's plan kindly supplied by Martin Broom. A mould was made from this hull whilst it was on the jig to produce GRP hulls for the other four models.

The **mahogany** topped model is of a boat he hired on the Norfolk Broads in the 1970's.

The model with a **light blue cabin** is an *Ocean 30* five berth cruiser from the same era.

Dino III **(white cabin)** and *Golden Dawn* **(yellow cabin)** are both models of privately owned twin engined Broom 30's which are based on the Rivers Cam and Thames respectively.

All the models are 1:12 scale and the superstructures have been copied from photographs and the Blake's hire brochures, as no plans are currently available. Radio control is 2.4GHz and the motors are mostly 550 types on 7.2v with Electronize speed controllers. The rest of Ron's fleet is on his website: www.ronsboats.co.uk.

52 www.modelboats.co.uk **Model Boats November 2013**

Ron Wern's Broom fleet as featured in Model Boats.

6



The King of Hearts at Wroxham. Image courtesy of the Wern family.

and show reports. The *King of Hearts* appeared in the January 2005 edition where Ron had shown her at the Wings and Wheels Model Spectacular at North Weald.

Ron had hired a number of cruisers for holidays on the Norfolk Broads and used photographs of these boats as a guide to building models. I am extremely grateful to his family for sending me a large collection of these as they show a variety of Broads cruisers, including the images of the full-sized *King of Hearts (see* **Photo 5**) that were used to aid Ron's building of the 1:12 scale model (see **Photos 7 and 8**).

Hearts Cruisers

Before beginning work I started to research the original vessel and the Hearts Cruisers yard. I remember the yard from the early 1980s, and a post about the boat to the Norfolk Broads Network web forum allowed me to make contact with Vaughan Ashby, whose father, Commander Ron Ashby, had bought the yard in 1948. I am extremely grateful to Vaughan as he has provided me with a vast amount of information about Hearts Cruisers and several photos of the full-sized *King of Hearts.*

Origins of the yard

The original boat yard was established in Norwich in 1878 by John Hart. Initially based at the Thorpe Gardens public house, a few years later the business moved to Thorpe Island. John died in 1898, and his son George continued the business until his death in 1927 when the yard was left to three of his sons. One son, Geoffrey, bought the other brothers out and continued the business under the name of G. Hart & Son.

Rebirth as Hearts Cruisers

A significant change came about in 1948 when Commander Ashby and his wife Eileen came to Norfolk after the

7



Ron Wern's model under construction. Image courtesy of the Wern family.

8



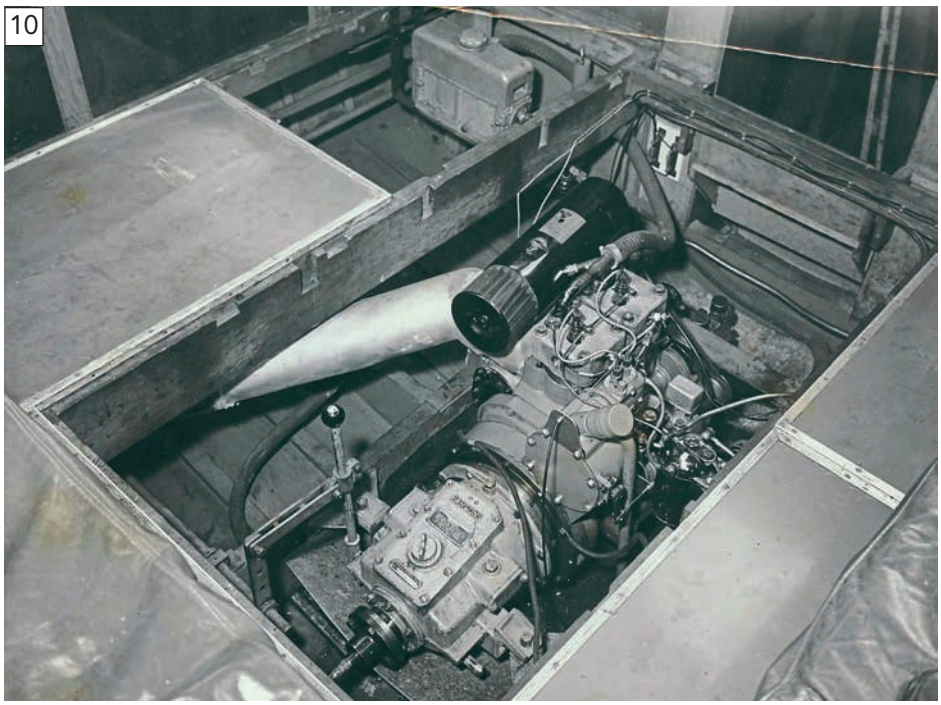
The. King of Hearts with her bulkheads fitted. Image courtesy of the Wern family.

9



The King of Hearts moored on a mud weight on Wroxham Broad.

10



The engine installation on the King of Hearts. Image courtesy of Vaughan Ashby.

war looking for a boating business and found Harts during a two-week holiday. This resulted in a new company being formed and the Hearts Cruisers name being established.

Commander Ashby, having served in coastal forces, bought a Motor Gun Boat hull from the Navy and had it towed to Thorpe where the yard fitted it out as a houseboat, named *Morning Flight*. The Ashby's idea was to stay on *Morning Flight* while they built a bungalow on the Island at Thorpe. They soon found themselves so comfortable on board, however, that they never built the house, continuing to reside on the boat for the next 41 years.

Commander Ashby's plan was to build one boat each year until the fleet got to 15, at which time they could make a comfortable living from boat hire. They started with the *Knave*, *Ten* and *Queen of Hearts*, of which the *Knave of Hearts* was the first hire cruiser to be built with a diesel engine, a prototype by Turner Diesels. The fourth boat in the fleet to be built was the *King of Hearts* (see **Photo 9**).

The new Hearts cruisers also featured the first fully opening sliding wheelhouse canopy. This meant that the wheelhouse itself could be made much larger and became the main saloon and dining area. To maximise capacity the design also incorporated mainly single beds to accommodate the parties of single young men or women from London or the Midlands arriving by rail.

The end of an era

The 1950s and 1960s were the heyday of Hearts Cruisers, when boating holidays were booming. In 1966, Hearts Cruisers was sold to the expanding Jenners boating group. Jenners rapidly acquired many boatyards but overextended financially and by 1968 the combined business was taken over by the Caister Group, part of a wave of corporate consolidation in the Broads leisure industry.

Subsequently, the Hearts yard continued to operate under larger owners such as Ladbrokes, Pennant, and later Richardsons. As the Broads holiday market changed independent yards declined and fleets became centralised. The Hearts Cruisers name survived, but its original identity faded under corporate ownership. The boat hire operation finally ceased in 2002, marking the end of over a century of continuous boating business on the Norwich site.

The *King of Hearts*

The *King of Hearts was* one of the better-known boats in the Hearts Cruisers' fleet, and like many of the vessels she followed the company's distinctive playing-card naming theme. She was designed in 1950 by Commander Ashby and his yard foreman Russell Newby, who had undertaken an apprenticeship during the war with Brooke Marine in Lowestoft. Ashby introduced the modern boat building methods he had learnt from his time in Coastal Forces motor torpedo boats during the conflict. Of particular interest is his use of cold moulded plywood for the foredeck and cabin tops. Following on from the first fully opening sliding wheelhouse canopy on the *Knave of Hearts* in 1948, the *King of Hearts* became the prototype for what has, over the years, become the

11



Safely through the Potter Heigham bridge. Image courtesy of Vaughan Ashby.

12



The gear lever and dashboard. Image courtesy of the Vaughan family.

"This, according to Vaughan Ashby, is what makes the King of Hearts very special and historic"

traditional Broads cruiser design. This, according to Vaughan Ashby, is what makes the *King of Hearts* "*very special and historic*".

The introduction of diesel engines to the Broads

The innovative installation of diesel engines in hire boats caused some consternation at the time. The original engine in the *King of Hearts* was a two-cylinder, 2 stroke, high revving engine with blown air scavenging (see **Photo 10**). The engine photos show the asbestos lagged dry exhaust and the cranks and levers attached to the gear lever of the Parsons mechanical box. Note the water tank to the top far left of photo, an early version of heat exchange cooling.

The gear lever was a solid connection to the gearbox, using levers and cranks, much like a railway signal box. The throttle control had a sliding gate at the bottom which, when shut, set the tick-over speed. Opening the gate and fully closing the throttle, would stop the engine.

In the centre of the dash panel was a wooden template used for casting the metal playing card plates which were mounted on the stem head of each boat – in this case, the King of Hearts. If the stem plate got damaged, the yard could cast a new one.

Deckhouse innovation

The innovative sliding deckhouse roof and folding windscreen allows Broads Cruisers to travel under the low bridges of the area (see **Photo 11)** by reducing air draft. Hearts' boats had an additional feature to ensure that the boats didn't get caught under the Broads bridges as their bow flags were set at an inch higher than the height of the saloon canopy when slid back. The flagstaff deck fitting had a valve spring fixed to the deck so if the boat approached a bridge and the tide was too high the flagstaff touched the bridge and bent over thus giving instant feedback for the helm to reverse out and wait for the tide to recede.

Borrowed from the Royal Navy

Correspondence with Vaughan Ashby showed that his father had used other ideas from his time in the Royal Navy. For example, his time serving had made him familiar with the type of fire extinguisher fitted to all Hearts cruisers. These were made by Pyrene and filled with carbon tetrachloride, with a pump handle on top. The fire extinguisher can be seen behind the helm's seat in **Photo 12**.

13



The faded name plate, plaque and playing card.

14



Replacements straight off the printer.

15



New nameplate, plaque and replacement mud weight.

"These were an Admiralty fitting used in the small craft of Coastal Forces during the war"

The *King of Hearts* had pair of deck lights, solid triangular glass prisms with the apex pointing downwards, which were 12-inches long and 3-inches wide. Mounted into the deck on a brass surround, these let light into the wing cabins and, by the effect of refraction, the cabin below. These were an Admiralty fitting used in the small craft of Coastal Forces during the war to let light into cabin areas below which were otherwise unlit.

Commander Ashby served during the war with Commander John Cornish, who later became the sales director for International Paints. He had a colour specially made up for Hearts' fleet, a deep rich cream colour called 'Hearts Sunshine'.

The 1:12 *King of Hearts*

Having received a plethora of information, anecdotes and photos of the Hearts' fleet and the *King of Hearts* from Vaughan, I soon had enough detail to start the restoration of the model's exterior, to complete the wheelhouse cabin/saloon area and to completely fit out the galley, rear heads compartment, rear cabin, the two forward compartments with bunk beds, forward heads and bow cabin.

Before any cosmetic work took place, I wanted to see the boat on the water, so needed to get the prop turning. The *King of Hearts* had a 20+ year old brushed motor with an Electronize Type 43 speed controller, so the first task was to get this working. I'm always sceptical when it comes to older electronics, especially those that may not have been used for 20+ years, and I was right to be so here. Once a 6v battery was connected the motor soon started smoking; it was, therefore, immediately removed.

A hunt through my spares boxes turned up an unused MFA 540 919D Series Motor and Gearbox with a 11:1 ratio, ideal for pushing a large model around. This fitted into the motor space with a small amount to adjustment to the bearers and once paired with a suitable ESC the *King of Hearts* was ready for her first voyage.

17



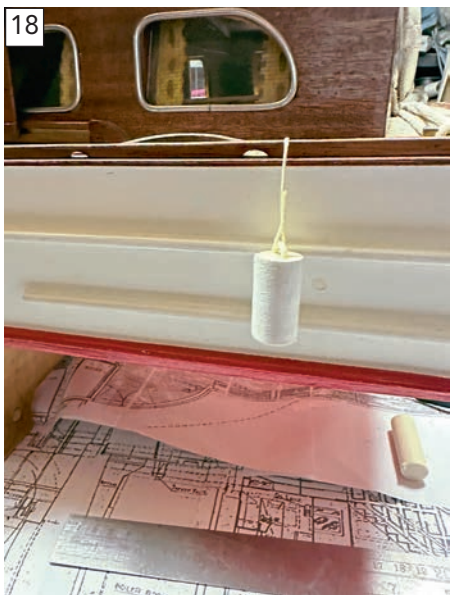
16

The new King of Hearts decal applied to the bow of the model.

Some exterior enhancements

The first time sailing the *King of Hearts* was a great success and allowed a good look at her in daylight. The hull and decks required just a light clean.

18



One of the new and now accurately represented fenders.





There's no way they will get repainted; they have a great patina. The exterior varnish was in good condition too, but the nameplates and Blakes' badges were not.

The original nameplates were letters applied to a plastic strip, and the letters had virtually disappeared over time. The Blakes' plaques (Blakes acted as an agent for boatyards such as Hearts Cruisers) and bow playing card had been printed on paper and glued to a backing plate, and these had faded significantly over time, too (see **Photo 13**). I'm fortunate to have a couple of 3D printers capable of multicolour printing, so decided to print new nameplates and Blakes' plaques (see **Photo 14**).

The original mud weight was a cut down lead fishing weight; this was out of scale, so a scale replica of the mud weight was also printed and filled with lead shot. **Photo 15** shows the new nameplate, Blakes' plaque and the replacement mud weight alongside the original one.

The bow playing card proved to be impossible to 3D print as the detail was too fine. Instead, the card was printed using a colour inkjet printer onto waterslide decal paper. Once printed, it was given several coats of clear lacquer to waterproof it and left to dry. It was then immersed in water to release the decal from the backing paper so it could be slid onto a piece of plasticard (see **Photo 16**). This card was then attached to the bow (see **Photo 17**).

Identified as incorrect on the model by Vaughan Ashby were the boat's fenders. These would, traditionally, have been plaited hemp with a painted canvas cover. Using Vaughan's photos, I was able to estimate their size and print my own scaled down set of fenders, which I covered in material cut from an old pillowcase and painted (see **Photo 18**).

Next month...

Having now covered the completion of the boat's exterior, Part 2 will detail the design, build and fitting out of the *King of Hearts* interior, so don't miss the November issue!

Acknowledgements

Sincerest thanks to:

- The Wem family for providing background information on Ron Wem and the photos of the 1:1 *King of Hearts*
- Vaughan Ashby for the history of Hearts Cruisers, the boats and the period photos.



Osprey 1:24

Boston Typhoon 1:32





Danny Boy 1:24

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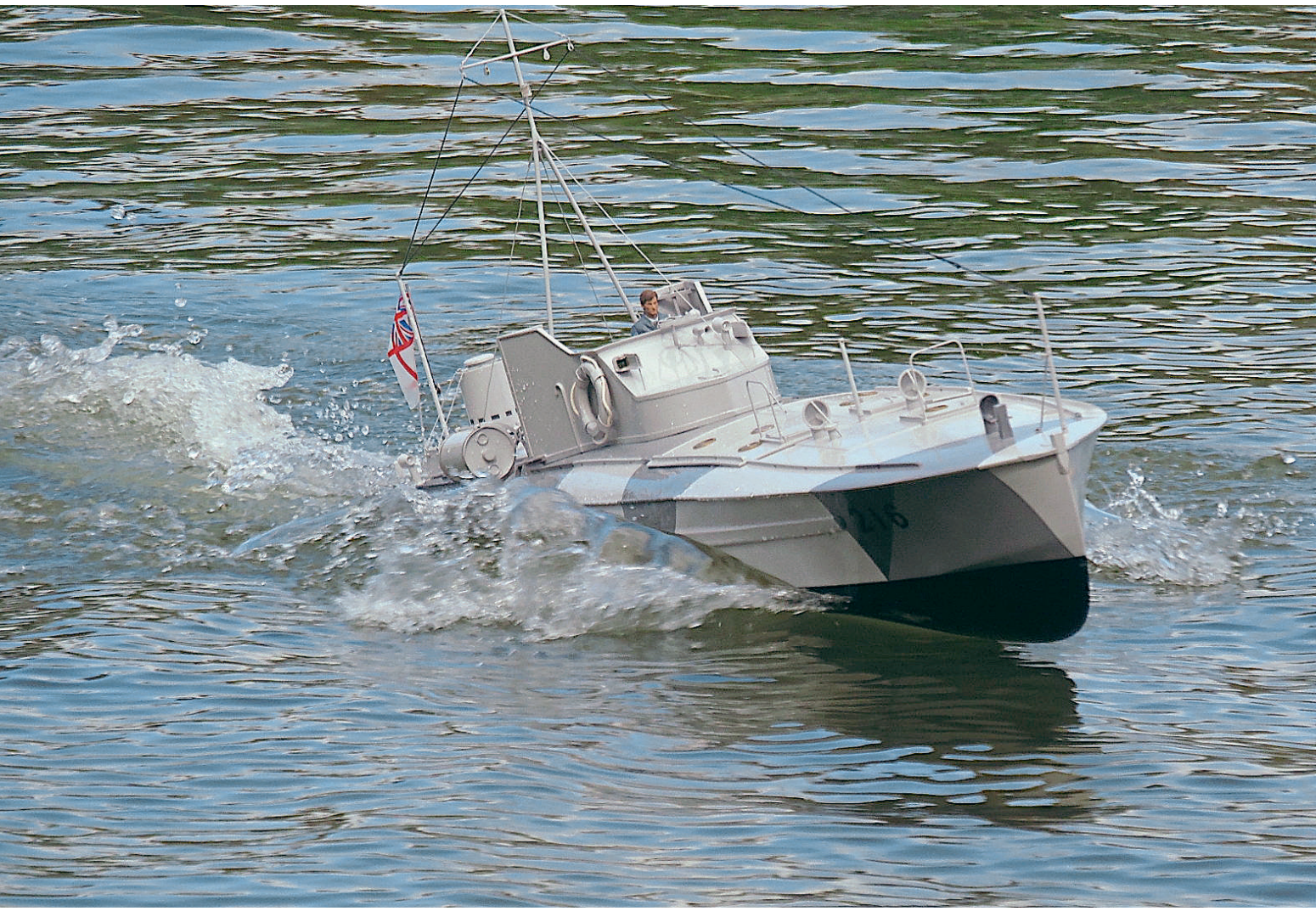


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A lot of punch for a little wooden box!

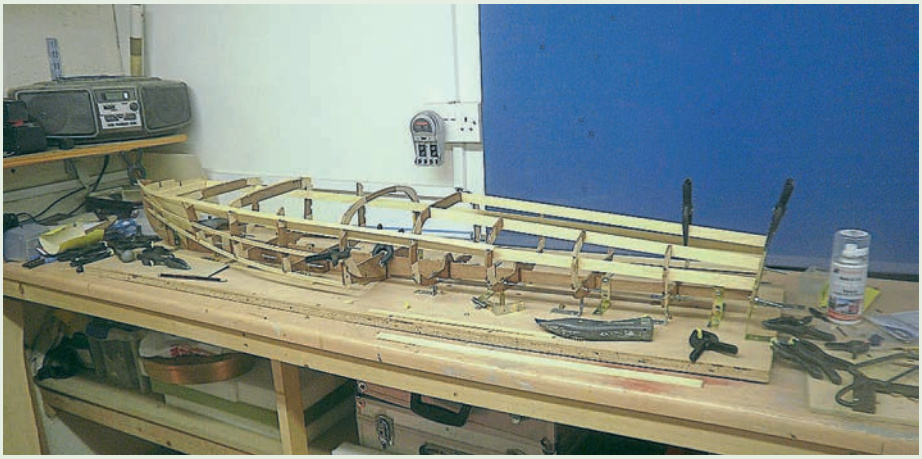
Nick Brown recounts how three generations of his family came together to work on a breathtakingly fast 1:12 scale World War II Coastal Motor Boat

World War I accelerated technological development at a pace far beyond that of the Victorian era. Although the torpedo boat concept had emerged in the 1870s – as seen in Thornycroft's HMS *Lightning* TB-1 – these early designs ultimately helped shape the destroyer as we recognise it today. However, such vessels still relied on conventional steam power, which limited their readiness and performance. What was needed was a faster craft that could be launched at a moment's notice, but the technology to make this possible had not yet arrived.

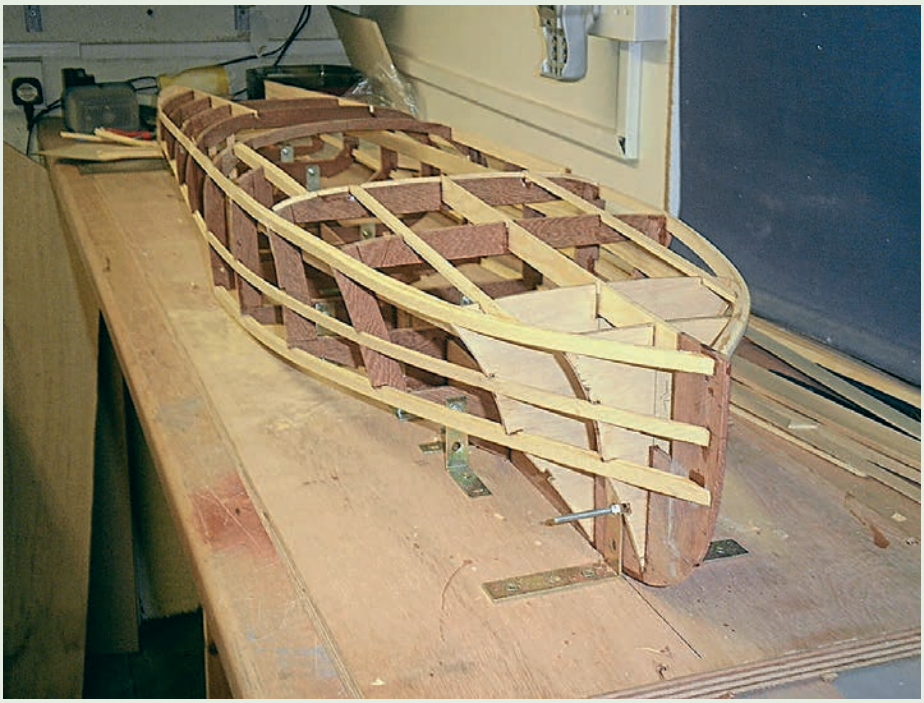
The invention of the internal combustion engine changed everything. It enabled the development of heavier-than-air aircraft and, when adapted for small wooden boats, allowed companies such as Thornycroft to create the first motor torpedo boats. As the design developed, a range of fast motor torpedo boats entered service under the name Coastal Motor Boats (CMBs). They varied in size, engine power, and capability:



An unidentified World War II-era Coastal Motor Boat operating in the Mediterranean, from Nick Brown's collection.







The lightweight composite hull structure, built up from softwood strips and planks, is strongly reminiscent of early aircraft construction.

"As this was our first round-bilge vessel, our usual construction method had to be adapted…"

- 40 ft CMBs – single-engined craft carrying one stern-launched torpedo
- 55 ft CMBs – twin-engined boats capable of carrying two stern-launched torpedoes
- 70 ft CMBs – larger minelaying versions, one of which still survives at Chatham Dockyard.

CMBs proved fast, efficient, and difficult to detect. Their effectiveness was demonstrated in August 1919 during the British intervention in the Baltic Sea, when Lieutenant Augustus Agar sank the Bolshevik cruiser *Oleg* during the Kronstadt Raid. This success helped drive their development into Motor Torpedo Boats (MTBs), which later played an important role during World War II.

Even so, the original CMB design continued in production. Thornycroft built many examples for foreign naval forces, and while much of the design remained similar to its World War I predecessors, later versions introduced an important change: the engines were placed side by side rather than in a staggered layout. This allowed for a wider beam and improved internal arrangement.

Ordered in June 1940 and completed in January 1941, these later CMBs were deployed to the Mediterranean, operating from Suda Bay in Crete on espionage duties. Their service ended abruptly on May 23, 1941, when all CMBs at Suda Bay were destroyed in a fire caused by a German air raid targeting an ammunition ship moored in the harbour.

Choosing the CMB as a model project

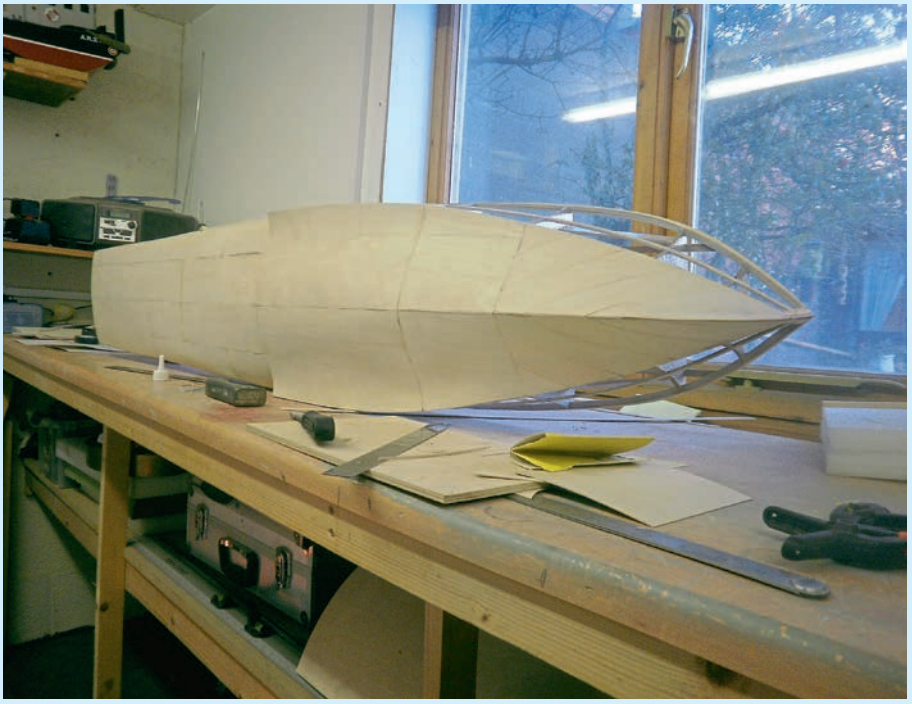
My dad and I were good friends with the late John Lambert, a renowned draughtsman known for his detailed drawings of destroyer-sized and smaller vessels; an excellent range of books featuring his work remains available from reputable booksellers. One of Lambert's drawings showed the 1940-41 55 ft CMB, redrawn from original plans held by the National Maritime Museum (NMM). As a model-making pair, my dad and I decided to build a working radio-controlled model of the CMB at 1:12 scale, matching our other models of fast motorboats used predominantly by the Royal Air Force. We wanted a project that was similar in character to our existing models but still distinctive. The CMB therefore seemed an ideal choice.

As a collector of original National Maritime Museum plans, I was able to source a couple of additional CMB drawings to support the John Lambert plans. When we studied these drawings, it became clear that the hull would present a new challenge. Unlike our usual hard-chine designs, this model would be our first round-bilge hull, making it a completely new experience for us.

The first step was to convert all the drawings to the same scale of 1:12, which was done by our local printing company. As this was our first round-bilge vessel, our usual construction method had to be adapted. Instead of working with straight-edged bulkheads, every surface would need to follow a curve. Once we had identified the bulkheads needed to form the sleek hull shape, Dad redrew each one by hand. He reduced every dimension to allow for the thickness of the planking and keel, ensuring the finished hull would match the intended lines.



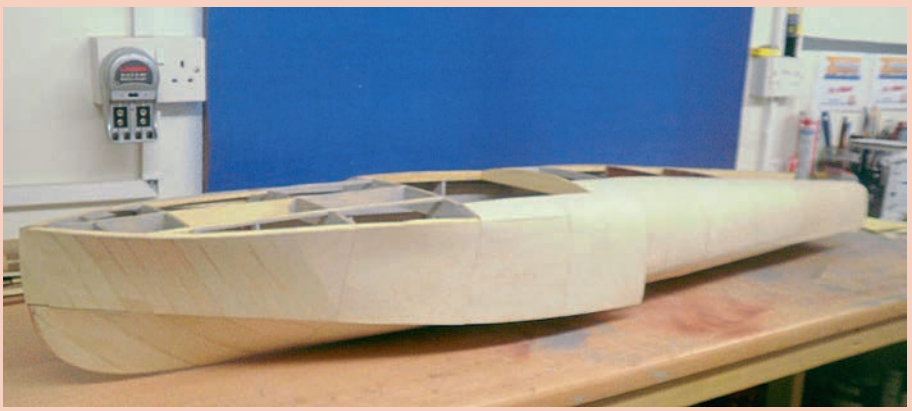




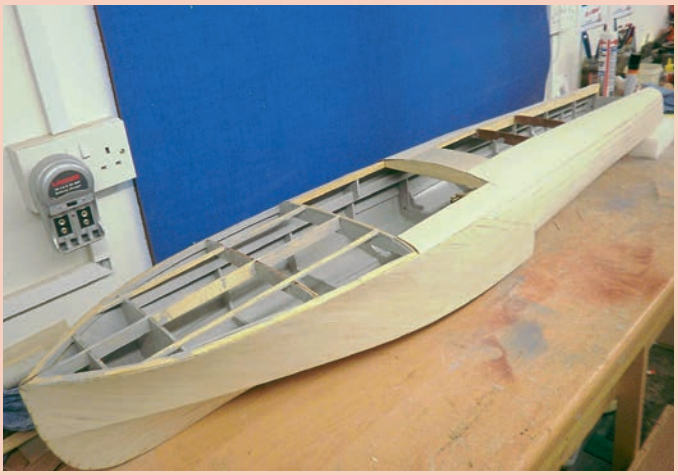
The first layers of hull planking and sheeting were applied using 1/16-inch plywood. Cyanoacrylate adhesive proved essential for holding the planks in place and helping them conform to the hull's curves.





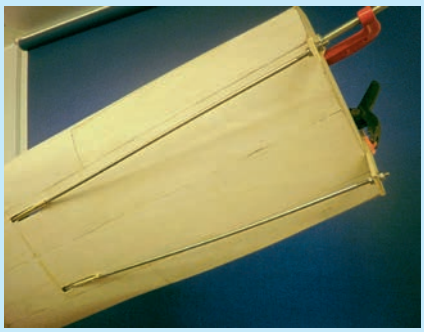




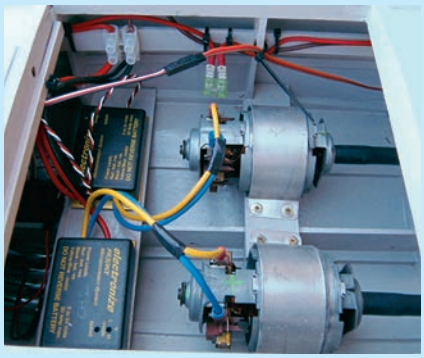




The completed hull shows the elegant lines of a fast hydroplane. The hull step on the underside is clearly visible, reflecting the vessel's high-speed design.











The running gear highlights the exceptionally long propeller shafts. These are connected to 12-volt car heater motors, controlled by older-style Electronize speed controllers.

Refining the bulkheads

Once the plans were ready, Dad transferred the redrawn bulkhead shapes onto 6 mm softwood planks. Each bulkhead was built up from four pieces to achieve the best possible symmetry. In truth, "*once we were happy*" really meant once Dad was happy. He would often remake any bulkhead that did not fit quite right, and I'm fairly sure every one was eventually replaced. It was a clear sign of his commitment to getting the project exactly right.

Once the bulkheads had been fitted to the keel pieces, it quickly became clear that the hull would need to be built in a similar way to an aircraft

"This little problem had to be taken in account to get the shaft into place, fit propellers, and be made removeable for any maintenance purposes"

structure. To create a rigid and robust shape, the frame would require a series of stringers running between the bulkheads. These stringers were cut from 10 mm square wood strip using our old Proxxon circular saw. Once fitted, they locked the bulkheads together and provided Dad with a firm surface for the later planking stage. Being constructed from a softwood also made sanding the hull structure to shape much easier in preparation for the planks.

Planking the hull

The hull was planked using 1/16-inch birch-faced plywood, cut into 1/2-inch-wide strips from a large 4 ft by 4 ft sheet. Cutting these strips was very much a two-person job: one person held the ruler firmly in place while the other cut along it with a Stanley knife. The first layer of planking was laid diagonally across the framework. This inevitably left some small gaps between the planks, but the second layer was applied lengthwise, matching the arrangement used on the original CMBs. Together, the two layers pulled the structure tightly into shape and created a lightweight but very strong composite-style hull. Areas where single sheets of ply could be attached in one piece were used around the upper hull sections and deck to make life easier.

At this stage of the hull build, the propeller shafts had to be considered. When measured, at around 14 inches, they proved to be unusually long for a model boat, which meant they would need additional support to prevent whipping. Fortunately, the

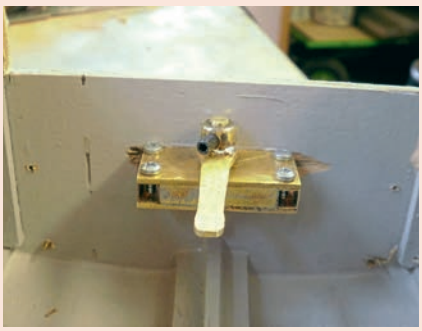


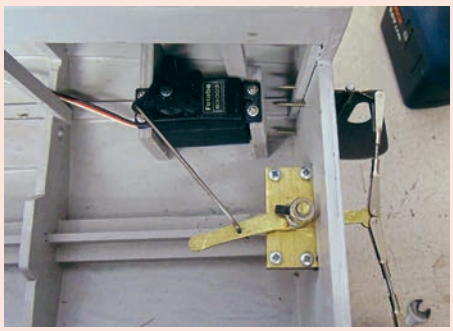


The distinctive rudders fitted to early torpedo motorboats such as the CMB were made from flat brass plate, soldered to their pivot points at the ends of the propeller shafts.

real CMBs faced the same problem. They used a supporting P-bracket positioned roughly halfway along the exposed section of each shaft. The main difficulty with CMB propeller shafts is that they do not simply end at the propellers. Instead, each shaft passes through the propeller and continues into a P-bracket at the stern, which also forms part of the rudder post arrangement. This little problem had to be taken in account to get the shaft into place, fit propellers, and be made removeable for any maintenance purposes. The measurements and requirements were sent off to SHG Marine (now sadly retired) for machining, and a beautifully straight and functional pair of shafts were promptly made. The propellers were produced by Simon Higgins of Prop Shop, with a screw thread passing through the whole of the propeller boss. At the time Simon only produced them in clockwise turning direction, which meant that the model would be more inclined to turn to starboard when travelling in a straight line.

Our large-scale fast boats have always used car heater motors as

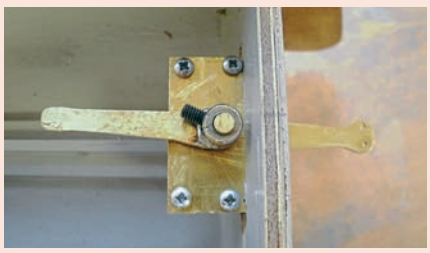






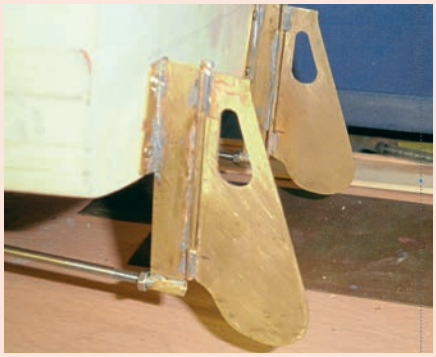


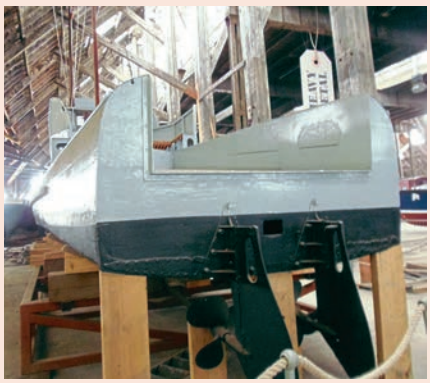












The homemade steering system was built around a brass box, with input and output arms linking the servo to the rudder tillers. The assembly was made from brass sheet and square rod. (Shown to the right is a real example of the 70ft CMB at Chatham)

our preferred method of power to the propellers. Designed to run continuously for hours if not days, they are tuned perfectly for this sort of scale power boat. While not easy to source anymore since the regulations for car scrapyards changed, we settled on a pair of motors from a VW Polo. Motor mounts needed to be made to fit them into the hull structure and a hard wood frame was used to ensure all that power was transmitted into the shafts.

Steering system

The next challenge was the steering system. The original CMBs used push arms to operate the twin rudders, but replicating this arrangement in model form would have been difficult, especially at our relatively early stage of model building. This model was built in 2011, when we were still developing our methods and experience. Instead, we used a more conventional steering arrangement while still trying to preserve the appearance of the original system. A brass box was soldered together, with an input arm connected to a standard servo and a lower output arm aligned with the rudder tillers. This assembly was fitted into a slot in the transom and sealed into the hull. We also allowed for the possibility of removing it later, should major maintenance ever be required. The tillers were connected to the steering arm by turnbuckles, allowing both rudders to move together. The rudders themselves were made from flat brass sheet, with cut-outs matching those on the original vessel.

Hull access and internal layout

Access to the inside of the hull was needed for the single sealed lead-acid (SLA) battery, the radio-control equipment, and future servicing of the shafts and motors. The internal layout therefore had to provide practical access without disrupting the appearance of the model. Three access points were planned: a forward hatch for the motors and radio-control equipment, including the receiver and speed controllers; a centre lift-off cabin for access to the battery; and, finally, a rear hatch created by the torpedo troughs and sealed in place until needed. The hatches and cabin were built from 1/16-inch plywood. This arrangement differed from World War I version of the CMB, providing a larger protected area where the crew could stand.

Following Lambert's drawings, the cabin was given its distinctive shape: a smooth, rounded form with a slightly pinched appearance. It was constructed from a softwood frame and covered with a 1/16-inch plywood skin, matching the simple, functional look of the original craft. Several small details were added to bring the area to life: a pair of navigation lights, a horn, a basic torpedo-aiming device, a boat's wheel, and a scratch-built instrument panel with throttles. The floor was finished as a planked representation, covering the compressed air launching mechanisms for the torpedoes. The area directly behind the steering position was reserved for self-defence machine guns, usually a pair of Lewis 0.303-inch guns, with a fire extinguisher underneath them. In this model the machine guns are currently













The hull was initially painted light grey, with a black anti-fouling finish applied to the underside. In Nick and his dad's early years of modelling, they used Dulux outdoor paint, which gave the model a smooth, silky finish.





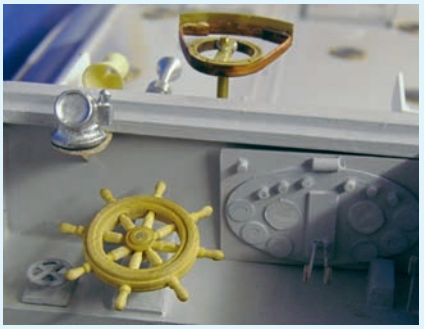
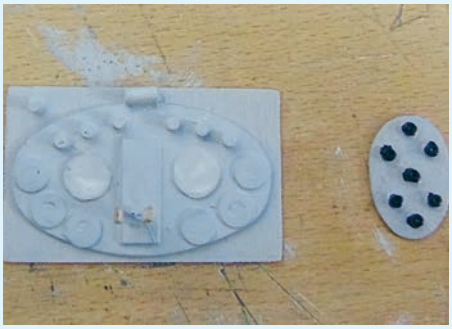
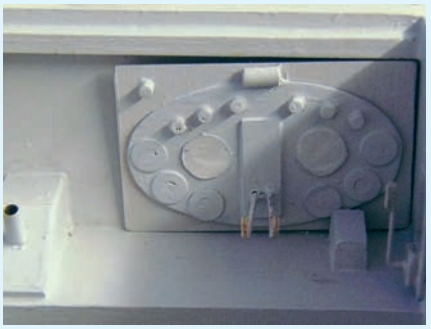


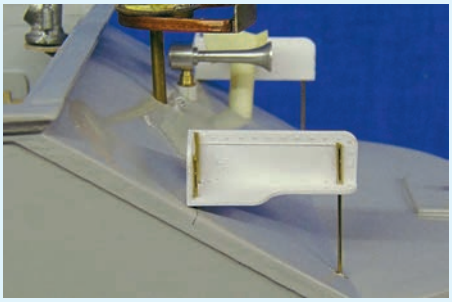
The forward access hatch on the full-sized CMB was removable to provide access to the engines. This practical feature worked so well that the same arrangement was used on the model.

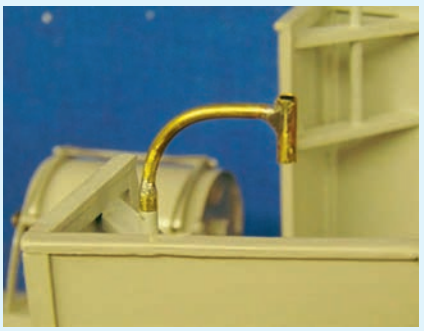




The cabin provided the second access point into the hull, giving access to the battery tray. It was larger than the cabins fitted to early World War I CMBs, with a more spacious standing area and provision for self-defence machine guns.









The cabin was fitted with the essential equipment needed to steer and control a fast torpedo boat. Details include the instrument panel with throttles, the ship's wheel, and the unusual quadrant device used as a simple torpedo aimer.

not fitted but their mounting positions are ready just in case.

The forward hatch on the original CMB provided access to the engines, making it ideal for the same purpose on the model. Several details were incorporated into this area: the large skylight openings were fitted with turned brass items sourced from RB Fittings, and the smaller companionway hatch provided a convenient place to conceal the on/off switches for the radio equipment.

Rear hatch and torpedo armament

The rear hatch is formed by the torpedo troughs, which support the CMB's main offensive armament: the 18-inch naval torpedoes. At the time, neither Dad nor I had much experience with metal machining, particularly lathe work. Fortunately, my grandfather, Arthur, had been trained to use lathes while working in the local ironstone quarries during the 1940s and 1950s, where they were used for railway repairs. Using the drawings as a guide, he made a pair of torpedoes from aluminium tube and rod. He then used lithoplate to make the control fins and propellers. We decided to leave the torpedo caps in a natural metal finish, creating a contrast with the rest of the model, which was to be painted in a distinctive splinter camouflage scheme.

The torpedoes are secured in clamps mounted on semicircular supports, similar to the arrangement used on the full-sized CMBs. On the original craft, these clamps could be eased off when preparing to fire. For the model, they were made from soldered brass sheet, with small wire handles added for detail. A non-working smoke generator was also fitted above the torpedoes, made from a plastic tube with a carved wooden top and held in place with wire rope. Although simple, this created an effective and convincing piece of deck equipment.

The final fittings were the mast, depth charges, and handrails. The mast was made from brass tube, while the handrail stanchions were formed from aluminium rod and drilled so a length of wire could pass through to create the rail. The depth charges were built in much the same way as the smoke generator. The most complex parts were the depth-charge holders; although largely decorative, they required careful construction.

> *"Although simple, this created an effective and convincing piece of deck equipment"*

Once Dad had made a jig to produce four identical sides, the holders could be soldered together, fitted around the depth charges, and secured with wire rope.

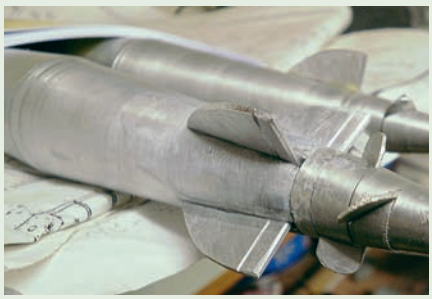
Although the model looked appealing in its natural wood finish, it still needed painting. Colour profiles suggested that Royal Navy CMBs in 1941 were finished in light grey with darker grey splinter camouflage to break up the boat's outline. Because few photographs survive showing the complete scheme, there was some room for interpretation, so we created a plausible version using Dulux outdoor paint. Crew-access areas were finished in medium grey to represent anti-slip paint, while the underside was painted glossy black to help the model achieve the high speed we hoped for.

Stepped hull ballet

The CMB hull is a stepped hydroplane, designed to balance on the stern (transom) and the hull step to reach high speeds. Recreating this behaviour in model form was not straightforward. To find the best running position, the battery had to be left loose inside the hull while we tested different locations. Once the 'sweet spot' was found, the model was able to achieve its best performance on the water; this proved to be just on the forward edge of the

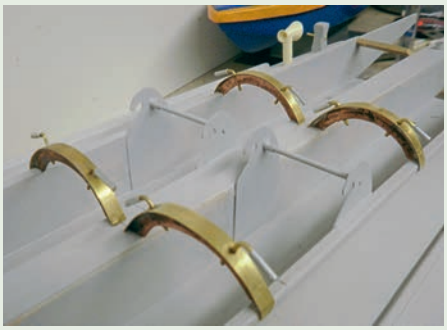






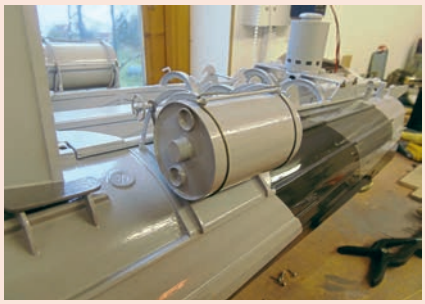




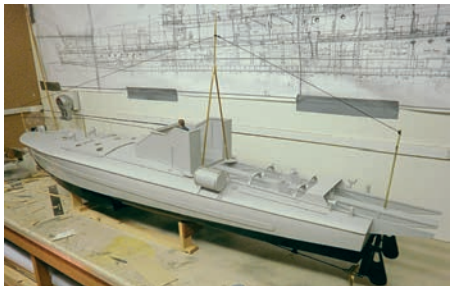


The rear access hatch was disguised as the torpedo troughs, with a pair of 18-inch torpedoes fitted in them. The torpedoes were made by Nick's grandfather, Arthur, and turned from aluminium on his lathe.



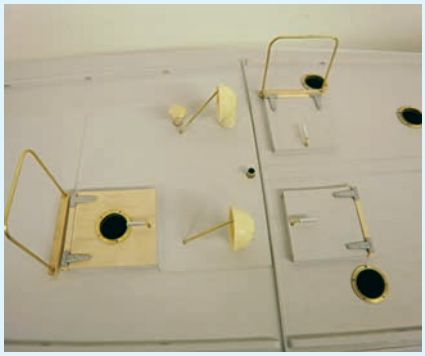


The depth charges formed the CMB's secondary offensive armament. Each charge was made from plastic tube to create the basic shape, then supported in an ornate brass cradle.



The mast and handrails were made from brass tubing, with brass wire threaded through drilled holes. The mast is unusual because it is a tripod design, a feature not fitted to World War I versions.





The model was detailed with brass portholes, companionways, and other deck equipment. These functional details help the 1:12 scale model look more convincing and realistic.



The splinter camouflage was based on World War II photographs. Because complete colour profiles are scarce, the scheme remains speculative, but it is likely close to that carried by the real vessels.



The battery tray was left unattached to the keel while the model's 'sweet spot' was established. Once positioned correctly, it allowed the hull to lift onto the step and achieve the high speeds expected of a hydroplane.

"We have clocked the model doing approximately 15 mph, which for a scale model is amazingly fast"

step if the torpedoes were always fitted in the troughs. The motors were pushed close to their upper limits, enabling the model to lift cleanly onto the step and gain speed balancing like a ballet dancer on his/her toes, and the speed pickup was dramatically noticeable in this condition.

We have clocked the model doing approximately 15 mph, which for a scale model is amazingly fast. This does mean that we have to respect other users of the lake, so we only push it to its limits when the water is clear of other sailors. As it accelerates, it produces the distinctive spray seen in many wartime photographs of fast coastal craft, giving the model a convincing sense of scale and movement.

Raising the bar

More than any model we had built before, the CMB pushed us to develop new skills and raise our standards.

The experience directly influenced the quality and ambition of later projects, including *Train Ferry 3*, HMS *X-1*, and HMS *Adamant*. All of these have appeared in previous editions of *Model Boats*. Looking back, the CMB was our first proper model boat, and the improvement in our work over the past 15 years can be traced back to the lessons we learned from this build. ●






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Model Boats is a friendly, inclusive, community-led magazine that welcomes everyone, from the complete novice to the seasoned vet, aboard. As well as including a FREE PLAN in every other issue, no aspect of the hobby is off radar, with content embracing everything from scale static display models to radio-controlled, combustion engine-powered and steam-driven working renditions. From model yachting skills to Fast Electric thrills, we've got it covered!

Lindsey Amrani

Editor

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Sil (M-27)

Antonio Alcaraz presents Gonzalo del Busto's magnificent 1:40 scale model of this Spanish minesweeper

The American-built MSC (Minesweeper, Coastal) class vessels were specifically designed for mine clearance operations in shallow, hostile coastal waters, where larger minesweepers were unable to operate effectively.

Under the terms of the Defence Agreement signed between Spain and the United States in September 1953, and as part of the Spanish Navy's Ship Modernisation Programme launched in April 1955, a total of twelve MSC class minesweepers were transferred from the US Navy to the Spanish Navy. Upon entering Spanish service, they became known collectively as the M-20 Nalón class**.** In keeping with Spanish naval tradition, each vessel was named after a Spanish river: *Nalón*, *Llobregat*, *Turia*, *Júcar*, *Ebro*, *Genil*, *Ulla*, *Miño*, *Duero*, *Sil*, *Tajo* and *Odiel*.

The focus of this article is Gonzalo del Busto's 1:40 scale model of *Sil* (M-27), a coastal minesweeper that served with the Spanish Navy from 1959 until 2003 – a remarkable 44 years of active service. Built by Tampa Marine Company of Tampa, Florida, the vessel's keel was laid down on July 1, 1953**,** and she was launched on April 19, 1954. She entered service with the US Navy on January 7, 1955 as USS *Redwing* (AMS-200) and was subsequently reclassified as MSC-200. Decommissioned at Norfolk on June 16, 1959, she was transferred to the Spanish Navy, where she entered service as *Sil*, M-29, one of the M-20 Nalón class minesweepers. In the late 1970s, she was reclassified as the patrol vessel PVZ-55, before reverting to her minesweeper role in 1982 as M-27. She remained in active service until her final decommissioning on April 15, 2003. Following her retirement, the hull was deliberately scuttled off the coast of Murcia to create an artificial reef.

Gonzalo, a model maker from Madrid, began his journey into ship modelling some 30 years ago. He initially built static models from commercial kits before moving on to radio-controlled models, again starting with kit-based projects. Today, however, he works almost exclusively from plans,

Specifications

Displacement:	355 tonnes (standard); 384 tonnes (full load)
Dimensions:	43.9 × 8.5 × 2.5 m (length × beam × draught)
Propulsion:	2 × General Motors 8-268A diesel engines, 880 hp
Maximum speed:	14 knots
Range:	2,700 nautical miles at 10 knots
Complement:	39 officers and ratings (including 3 officers)
Armament:	2 × 20 mm Oerlikon cannon (as originally fitted)
Radar:	Navigation radar: Decca TM 626 or RM 914 (I-band)
Sonar:	UQS-1
Call sign:	EBJD
Hull:	Wooden construction

producing models of exceptional quality. Since its foundation, Gonzalo has been a member of the Real Liga Naval Española Model Making Group, but, despite his obvious ability, he has never entered a modelling competition. Regular competitors may well be grateful for that, as there is little doubt that he would prove to be a formidable contender.

The build

Using as its basis the plans for the French coastal minesweeper *Lilas* (M682), published in the French modelling magazine *Modèle Réduit de Bateau*, Gonzalo's completed 1:40 scale build has an overall length of 1,120 mm and a displacement of approximately 10 kg**.** The reference plans depicted the minesweeper as she appeared in the 1950s, shortly after leaving the shipyard. Gonazalo's model, however, represents *Sil* (M-27), during her final year of Spanish service (2002), by which time her appearance had changed considerably from that shown on the original plans.

To reproduce the vessel accurately in this later configuration, extensive research was undertaken through specialist Internet forums, leading to contact with several former crew members of *Sil* and her sister ships. Their assistance, together with a collection of detailed photographs, made it possible to identify the numerous modifications introduced during the vessel's career and to reproduce the model as faithfully as possible in its final operational configuration.

The hull is of wooden construction, with 5 mm plywood frames mounted on a pine false keel and planked with 3 mm thick wooden strips. Once the planking had been completed, the hull was carefully sanded and sealed, both inside and out, with polyester resin. It was then filled, sanded to achieve a smooth finish, and finally painted with synthetic enamel paints.

The superstructure was constructed primarily from 3 mm plywood, while the remaining deck fittings and details were made from a variety of materials, including polystyrene, brass and card. The entire model was then finished with synthetic enamel paints.

Once the electrical installation, battery and radio-control equipment had been fitted, lead shot was added as ballast until the model floated correctly on its designed waterline, ensuring the proper trim and displacement.

The model is fully operational and powered by two electric motors, each driving a 40 mm four-bladed propeller. It is equipped with electronic speed

Mine warfare

The first submarine mine to be employed with practical success was invented by David Bushnell in 1777 and was used against the British fleet during the American War of Independence. Originally, what is now known as the submarine mine was referred to as a 'torpedo', a term popularised by Robert Fulton in reference to the electric torpedo rays which produce an electric discharge when touched.

Among the various types of torpedoes developed during the late 19th and early 20th centuries was one fitted with an internal power source, enabling it to travel in a straight line towards its target and detonate on impact. These devices eventually came to be known simply as *torpedoes*, while the earlier stationary weapons retained the designation of *mines*.

The Russo-Japanese War of 1904 marked the beginning of the large-scale use of naval mines by both belligerents. These were employed both defensively, to protect home ports and coastlines, and offensively, by laying minefields along enemy shipping routes or even within their territorial waters.

The resulting losses were considerable. The Japanese lost two battleships, four cruisers, two destroyers, a torpedo boat and a minelayer, while the Russians lost one battleship, one cruiser, two destroyers, a torpedo boat and a gunboat. Undoubtedly, however, the loss that had the greatest impact on the course of the conflict was the death of Admiral Stepan Makarov, who went down with the battleship *Petropavlovsk*.

In addition, mines that broke free from their moorings and drifted at sea posed a serious hazard to neutral shipping, resulting in the loss of numerous British, German and other merchant vessels.

The devastating effectiveness of naval mines gave rise to widespread concern that their skilful employment by even a second-rank naval power could threaten international maritime trade and undermine the naval supremacy of the major powers, particularly that of Great Britain.

For a variety of reasons, this weapon came to be regarded as inherently indiscriminate. At the Second Hague Peace Conference of 1907, a number of rules and prohibitions were adopted in an attempt to limit the dangers posed by naval mines, although these proved little more than idealistic aspirations.

Among the provisions adopted was the prohibition on *"laying unanchored automatic contact mines, except when they are so constructed as to become harmless within one hour after the person who laid them ceases to control them"*. Likewise, it was forbidden *"to lay automatic contact mines off the coast and ports of the enemy with the sole object of intercepting commercial shipping"*.

Despite these restrictions, they were widely ignored during the World War I**,** when naval mines were employed on an unprecedented scale. It is estimated that the belligerent powers laid more than 228,000 contact mines over the course of the conflict.

During World War II, extensive minefields were laid off the coasts of Europe, although they never reached the scale of those deployed during the previous conflict. Improved aerial reconnaissance and surveillance significantly reduced the extent of large-scale minelaying operations.

In the Pacific, the Japanese established vast defensive minefields around both the Home Islands and the territories they had recently occupied. As their offensive advanced, the United States, in turn, laid thousands of naval mines, and by the end of the war even Japanese territorial waters had been extensively mined. Aircraft and submarines played the principal role in these minelaying operations.

During the Korean War (1950–1953), North Korea's extensive use of magnetic mines resulted in the sinking of numerous American and South Korean warships and minesweepers. Minefields protecting the harbour of **Wonsan** delayed the American landings, despite repeated attempts to clear them through aerial bombardment.

Since then, the Suez Canal, the territorial waters of North Vietnam and the Persian Gulf have all witnessed the use of naval mines by the opposing belligerents in successive conflicts.

Types of naval mines

According to their method of deployment, naval mines may be classified as either drifting or moored. The former, prohibited under international law, are of limited military value because their movements are unpredictable, making them liable to damage not only enemy vessels but also friendly and neutral shipping.

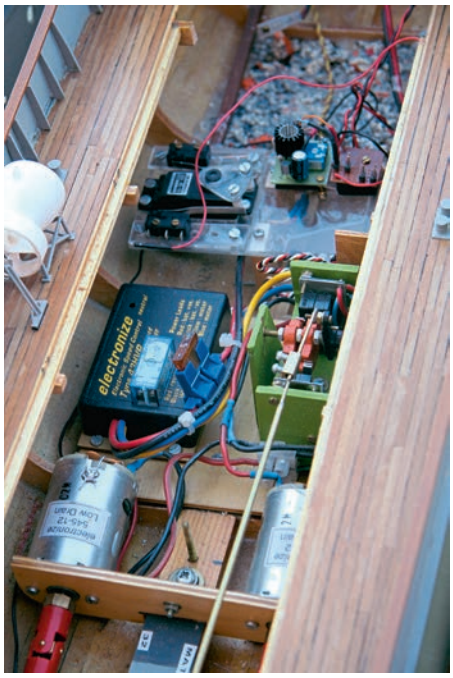
Moored mines are by far the most important type. They consist of a spherical explosive charge connected by a mooring cable to a steel mine anchor, usually of rectangular box construction, which secures the mine





Gonzalo del Busto's finished build of the Spanish minesweeper Sil (M-27).





The removable superstucture provides access to the electrical installation, battery and radio-control equipment.

control, a steering mixer, operational navigation lights, a working siren and a rotating radar aerial, all powered by a sealed 6 V, 12 Ah lead-gel battery.

The radio-control system currently provides three channels – for propulsion, steering and the siren – but is intended to be upgraded to five channels so that the navigation lights and radar can also be operated remotely. At present, these functions are switched on manually.

Initial sea trials revealed that the propulsion system provided only limited power, while the scale rudders, being built to the exact dimensions of the original vessel, offered insufficient steering authority. Astern performance was also found to be rather poor. To improve manoeuvrability, the rudder blade area will be increased, while the propulsion problem has been addressed by raising the supply voltage from 6 V to 12 V, a value fully within the motors' operating specifications.





As these photographs of Sil on the water clearly demonstrate, Gonzalo has established himself as a highly accomplished craftsman, renowned for his meticulous attention to detail.









to the seabed. Groups of these mines, laid in carefully planned patterns to form minefields, are deployed by specialised minelayers, destroyers or, in more hazardous waters, by aircraft and submarines.

Although their design has evolved considerably over time, the classic moored contact mine is generally spherical in shape and is suspended below the surface by its mooring cable. Its operating depth is normally set between three and ten metres below the surface, depending on the type of target and the characteristics of the waters in which it is laid.

Naval mines are primarily classified according to their method of activation and detonation:

- **Contact mines**
  These mines detonate when a vessel's hull comes into direct contact with one of the contact horns (or contact fuzes) projecting from the outer surface of the mine.

- **Magnetic mines**
  Extensively employed during the World War II, these mines detonate when the disturbance in the Earth's magnetic field caused by the passage of a vessel is detected by their magnetic influence fuze. Their effectiveness was greatly reduced by the introduction of degaussing systems, in which electrical coils installed around a ship's steel hull minimise—or, in some cases, virtually eliminate—the magnetic signature that would otherwise activate the mine.

  A further means of reducing a vessel's magnetic signature is the periodic deperming of its hull while in harbour. This process involves subjecting the ship to controlled electromagnetic fields in order to neutralise its residual magnetism and thereby reduce its vulnerability to magnetic mines.

- **Acoustic mines**
  These mines are triggered by the detection of noise generated by a vessel's machinery or propellers as it passes within range.

- **Pressure mines**
  These operate by sensing the change in water pressure created by the passage of a vessel. They detect the difference between the ambient hydrostatic pressure at the mine's operating depth and the pressure disturbance caused by a ship passing overhead or nearby.

- **Combined influence mines**
  Some naval mines employ a combination of two or more of the influence mechanisms described above – typically magnetic, acoustic and pressure sensors. Requiring multiple activation criteria significantly reduces the likelihood of accidental detonation and makes such mines considerably more difficult to counter.

Minesweeping

Minesweeping – the clearance of waters contaminated by enemy naval mines – is carried out by small, highly manoeuvrable vessels equipped with specialised systems for detecting, neutralising and destroying mines.

Until the 1980s, minesweepers were generally built with wooden hulls in order to minimise their magnetic signature and thereby reduce their susceptibility to magnetic mines. Today, they are more commonly constructed from glass-reinforced plastic (GRP) and incorporate extensive acoustic insulation together with low-noise propulsion systems, often including electric drive, to minimise both their magnetic and acoustic signatures.

Minesweepers are typically slow-moving vessels, designed for exceptional manoeuvrability and shallow draught. Their afterdeck is generally large and unobstructed in order to accommodate the wide range of sweeping gear and mine countermeasure equipment required for their operation.

There are two principal types of mine countermeasure vessel: minesweepers, which clear mines by sweeping designated areas with specialised equipment, and minehunters, which locate, identify and neutralise individual mines.

The detection and clearance of naval mines is a demanding, time-consuming and inherently hazardous task. Operations often involve long periods during which nothing appears to happen, yet crews must remain constantly alert. Proceeding at very low speed and usually operating in coordinated groups, these vessels methodically search the suspected area until a mine is located. Once a contact has been identified, the appropriate equipment is deployed to neutralise or destroy the mine, depending on the type of vessel and the tactical situation.

Photo etch basics

Richard Simpson provides a beginner's guide

Photo etch is a material that's been around in modelling for many years now. To create this, a mask is printed into a sheet of very thin brass plate (although other metals can also be used) before the plate is then etched in an acid bath to remove any areas not covered by the mask. This process enables very delicate and intricate parts to be manufactured in thin brass plate, which can then be bent into shape to create extremely detailed components.

While photo etch isn't generally strong enough to be a suitable material for the main model, it is frequently used as a means of adding fine detail. Its use has been led mainly by the plastic kit industry, where there are numerous kit accessory manufacturers whose ranges include detailing sets for many plastic kits both in production and out of production. **Photo 1**, for example, shows the photo etch set produced by Atlantic Models (https://atlanticmodels.net) for the now extremely old Airfix kit of HMS *Ajax* in 1:600 scale.

The use of photo etch has now also spread into model railways and many other areas of modelling and has progressed into such levels of sophistication as pre-painted accessories for kits, such as cockpit instrument panels and seat harnesses for model aircraft kits.

The trouble is, photo etch, along with many other potential enhancements for our models, can be seen as a bit of a dark art and many modelers tend to stay away from it. There are many instructional videos available online, but while some are very informative, others are less so and can simply confuse newcomers. So, the aim of this article is to offer a better insight into how the process works, the tools required, the techniques involved, and some of the potential pitfalls to watch out for.

What photo etch can do for you...

Brass photo etch can be produced to incredibly fine levels of intricacy, so when used on a plastic kit or a radio-controlled model can really elevate the level of detail achievable.

Items such as deck equipment and guns on warships can have photo etch bits and pieces added to them to create a finished item far superior to the original cast part. This can be nothing more complicated than adding a single small piece of photo etch, such as a gun sight, shield and handles, to enhance the finished look (see **Photo 2**). In many cases there is little or no folding to do and the additions can simply be fixed in place with a spot of cyanoacrylate glue.

Other items may be significantly more sophisticated, but probably one area that can have a huge impact on a model is handrails. Some kit manufacturers, such as Dean's Marine, already supply photo etch handrails with their 1:96 scale ships, which can be fitted into drilled holes in the deck, although when the scale gets smaller, the challenges start to increase.

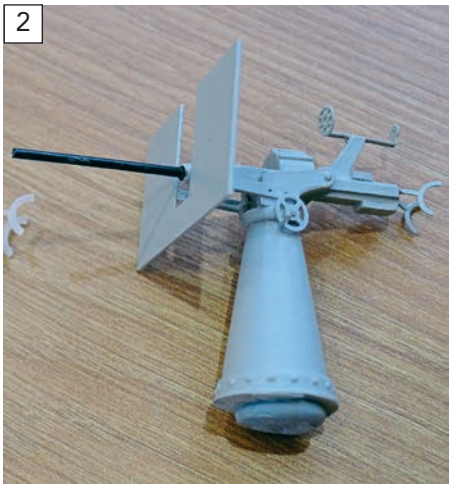
A good example of photo etch use on a radio-controlled models can be seen on HMCS *Bluebell* (**Photo 3**), which is included in Graupner's Premium Range of ready-built and ready-to-run model ships. Here photo etch has been used extensively as a detailing medium but in a noticeably thicker form. Handrails, the direction finder, deck locker hinges and fastenings, mooring winch handles and gun elements all benefit from brass photo etch detailing. The challenge with operational models is that photo etch can be extremely delicate and prone to damage, so is not always suitable unless produced in a thicker form.

When it comes to static models, however, there is almost no limit to the use of photo etch, as illustrated by the examples shown in this article. Firstly, included just to show what can be achieved but not recommended as a starting point, is a four-barreled pom-pom gun built from the Atlantic Models 1:600 scale HMS *Ajax* set. The gun (shown sat on a tin of Humbrol enamel) consists of ten separate parts

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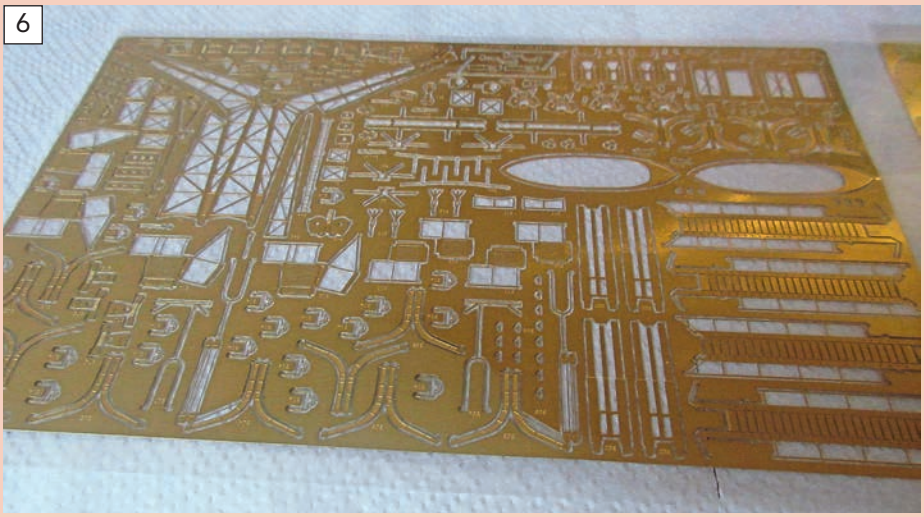
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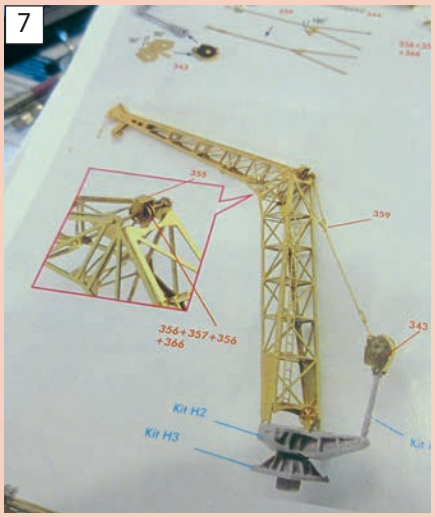
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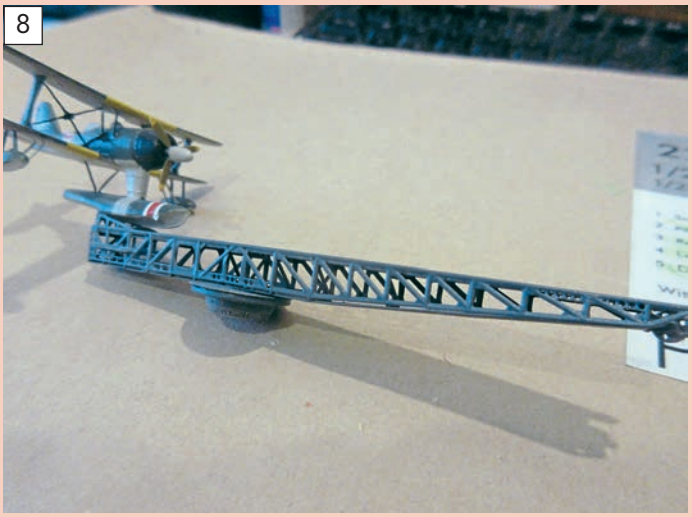
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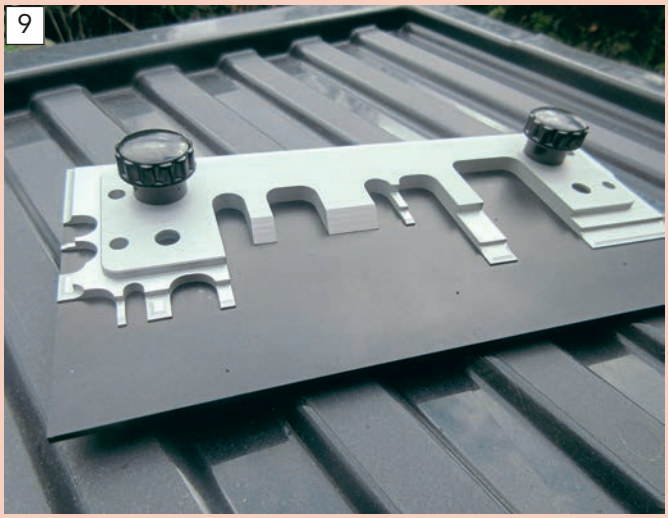


Image courtesy of Stan Reffin.

(see **Photo 4**.). Another example is the incredibly comprehensive aftermarket photo etch set for the 1:200 scale Trumpeter *Missouri* kit (see **Photo 5**); this set actually compromises 18 separate sheets of photo etch additional details for such things as guns, radars, cranes and handrails (see **Photo 6**), enabling the modeller to create incredibly detailed components such as the deck crane shown in **Photo 7** and the aircraft catapult shown in **Photo 8**.

Here, however, we shall be concentrating on how photo etch in its simplest form can be used, with a minimal amount of expenditure and effort, to enhance the overall look of a model.

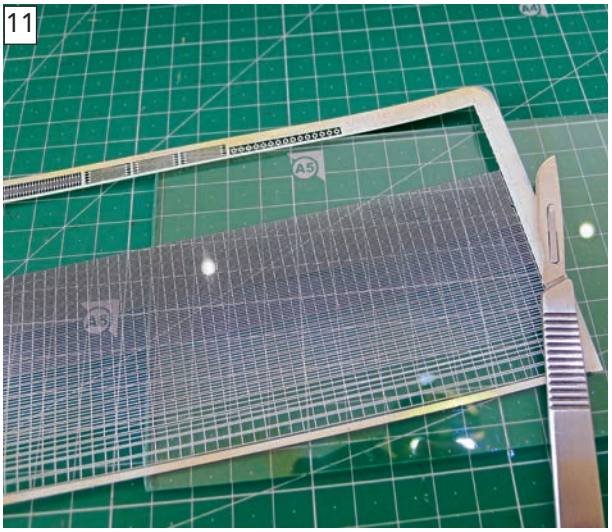
To give you an example of this, we're going to be looking at how I used photo etch for nothing more than handrails on one of my recent projects…

A working example

Some of you may remember an article of mine published in the April 2026 edition of Model Boats on masking, which included an explanation of why I was in the process of building a 20-year-old plastic kit of the *QE2*. One

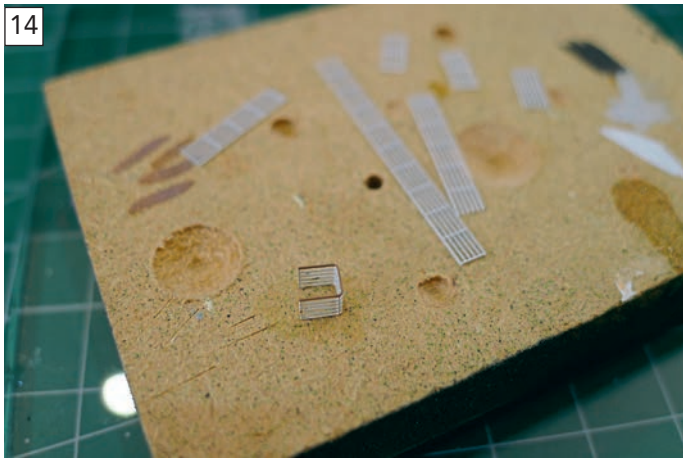

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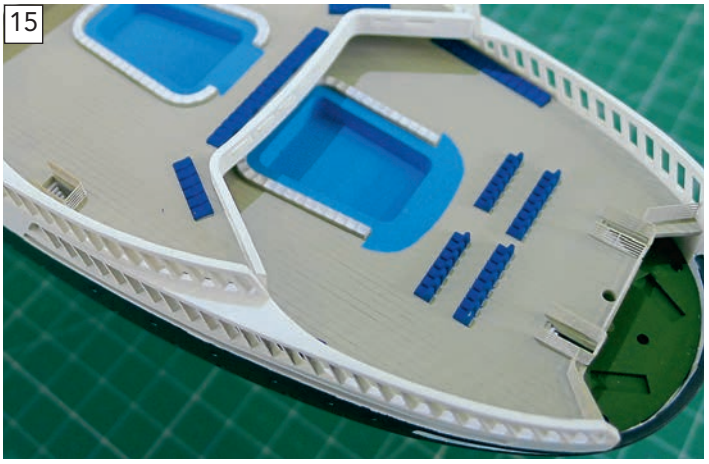

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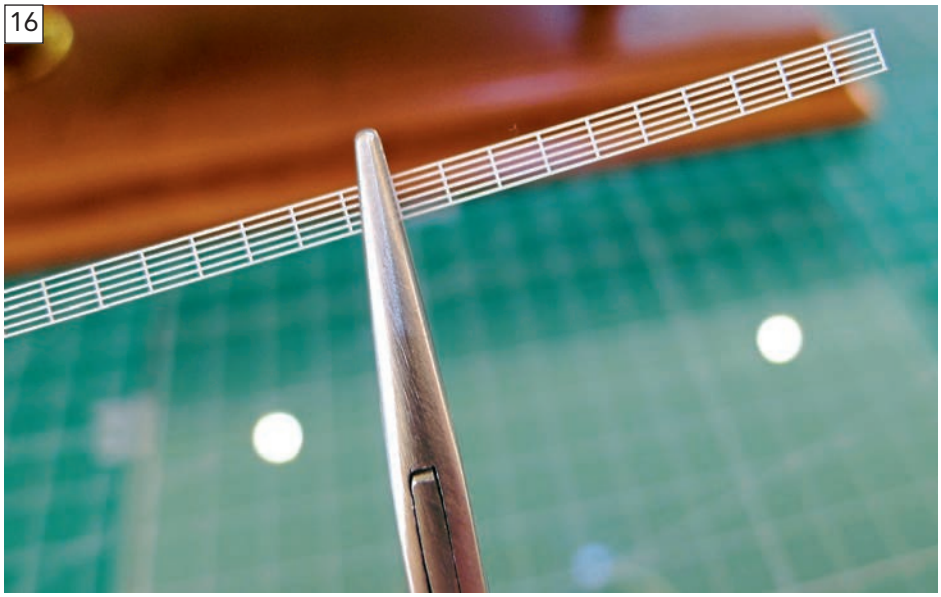

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thing I'd known right from the point of purchase all those years ago was that the addition of handrails would make a huge difference to the impact of the finished model. As there wasn't a specific set of photo etch parts available for this kit, I purchased a set of generic merchant ship photo etch accessories produced by Gold Medal Models in the same scale (1:450 scale) – sadly, now no longer in production.

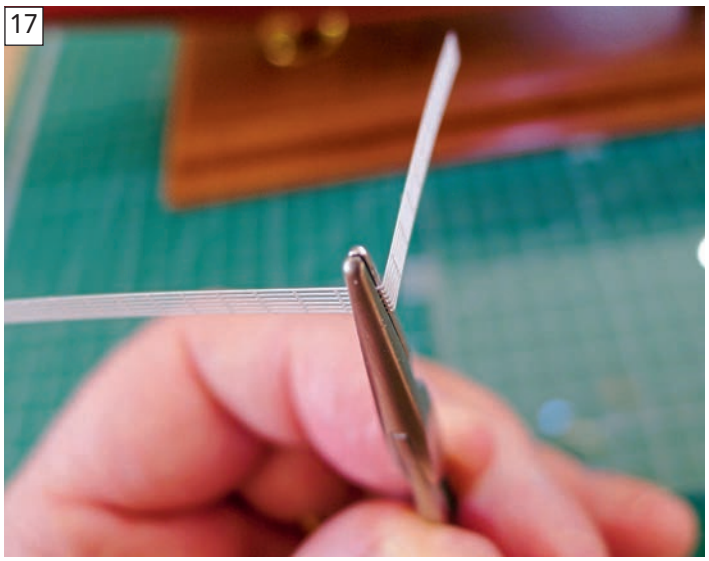
As I was putting this kit together, I started to think a bit more about just where I wanted to add my photo-etch handrails. The most obvious areas were around the stern deck and some of the stairwells, around the foc's'le, and, most noticeably, around the boat deck. These, then, would be the areas that I focused on, and so I began planning how I was going achieve the desired result.

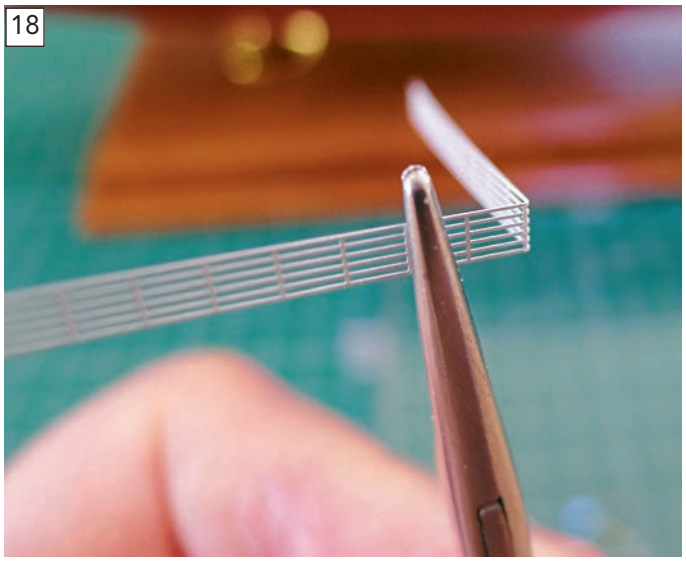
As the photo etch sheet contained numerous handrail configurations that varied in the number of horizontal rails, I had to think carefully about where I was going to use these different types to ensure I achieved consistency without running out of railings.

The planning

The first, most basic, decision was when to paint the handrails. Photo etch details on warships can usually be easily added then the finished item painted in one go, but this isn't always going to be the best way. I eventually decided that I'd paint the handrails while still attached to the fret, then I could fold them and glue them in place pre-painted. The final job would be to paint the brown taff rail, which I ended up doing in situ on the model; in retrospect, this would almost certainly have been easier if I'd painted it before fitting.

The next part of the planning was to decide how to divide the pieces to enable the best fit on the model. This did take quite a bit of thought. Photo


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etch handrails, especially in 1:450 scale, are significantly easier to handle if they can be made free-standing. A straight length of handrail will always require supporting while glue dries, which can be quite tricky on the very edge of a deck – there's always the risk of gluing the handrail to whatever you're supporting it with as well as the deck. If, however, you can arrange the sections of rail to be free-standing, then they can be dropped in place with glue on, adjusted for perfect position, and then left for the glue to dry. With this in mind, I decided to make a start on the area around the stern deck and the stairwells in the aft decks before tackling the boat deck. I then worked out how I would cut up the parts for the boat deck to provide as many free-standing parts as possible. The next job was to get some tools together.

The tools

The first piece of kit you'll need is a small piece of glass. It doesn't matter where it's from but ideally you want to avoid sharp edges. The glass from a small photo frame is a good call. I use glass as a base for all photo etch work, for reasons we will see as we go along.

There's no end of fancy tools available for bending photo etch parts, some very simple, others very complex and proportionally expensive (see **Photo 9** – on previous page). But for handrails, especially at 1:450 scale, a simple pair of clamping flat-faced forceps will be your best bet. These will allow you to clamp your handrails at a convenient point, ensuring they are perpendicular to the sides of the jaws; the rails can then simply be bent by hand. There's also a locking feature on these clamping forceps, which means you don't have to keep applying manual pressure to them while working (see **Photo 10).**

To remove the photo etch items from the fret, the best tool is a curved bladed scalpel, or any other very sharp curved bladed tool. The blade is then simply rocked over the easy to cut through attachment points while the fret is sat flat on the glass work area. I use a scalpel as the blade is nice and fine and can deal with very thin brass (see **Photo 11).**

Cutting brass photo etch can be tricky. Use the wrong tool and it will bend and be extremely difficult to get back into shape, so employing a tool specifically designed for the job is recommended. Xuron does a pair of photo-etch snips which are basically a very fine, robust and sharp pair of shears that cut brass photo etch beautifully without distorting it. While they may initially seem expensive, they should last many years if well looked after (see **Photo 12)**.

Tweezers are invaluable for handling photo-etch. Sometimes I use very fine pointed nose tweezers but, invariably, I turn to the trusty old tweezers given to me by father when I very first started building plastic kits. For good reason, we all tend to favour what we're most comfortable with.

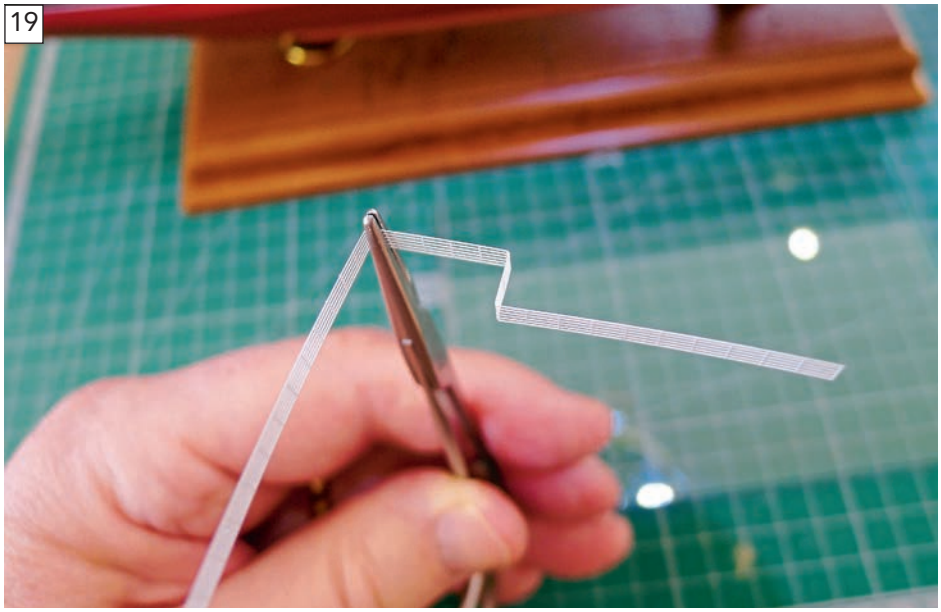
Finally, glue… This is very much a matter of personal preference. Some will suggest cyanoacrylate or various other options, but I prefer something that's easy to apply, allows me time to manipulate a part into that perfect position before it sets, dries to an unnoticeable finish, and has reliable holding strength. So, I use good old white PVA glue, watered down somewhere in the region of two thirds glue to one third water (see **Photo 13**).

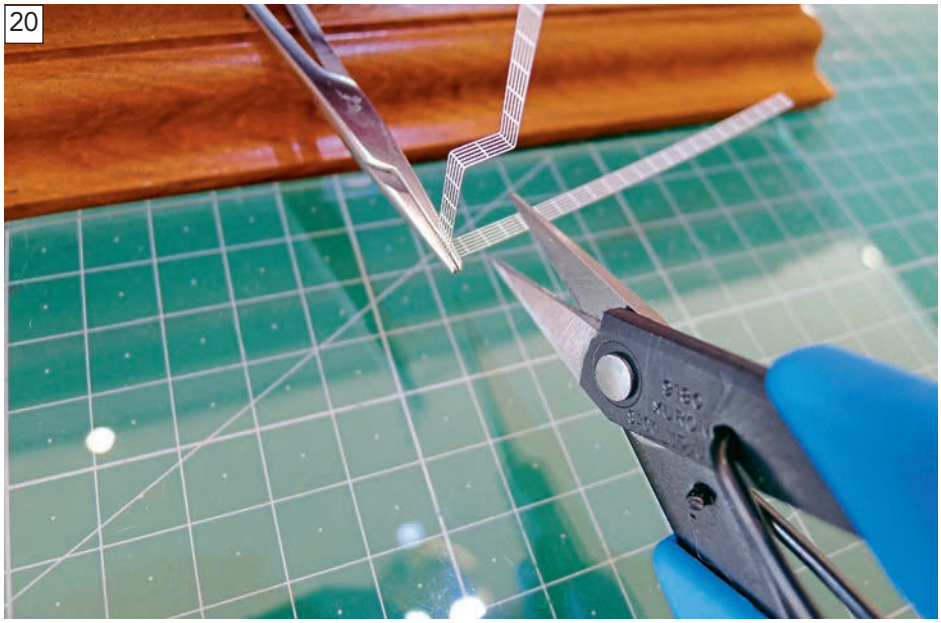
The process

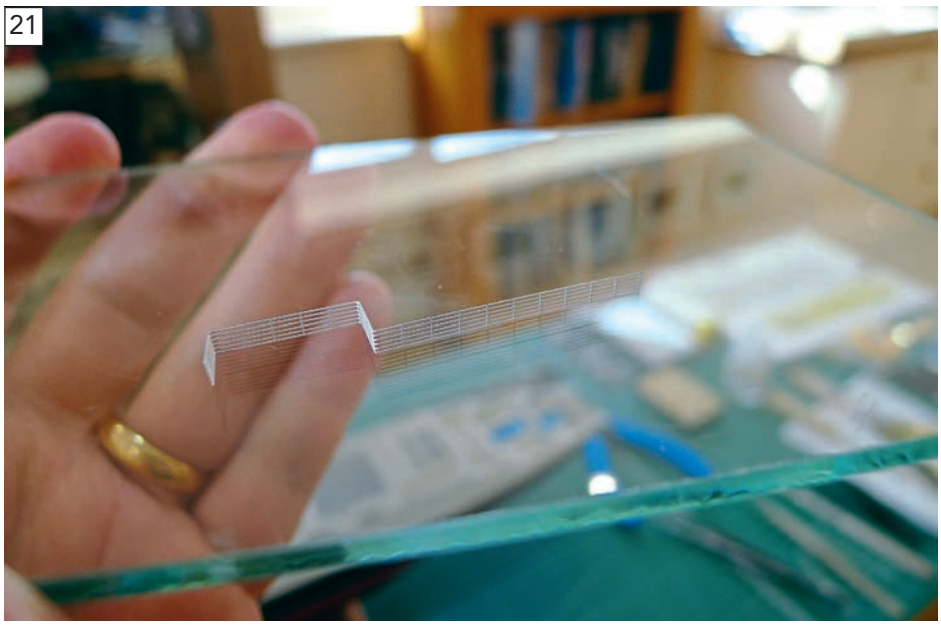
I first worked on a simple test piece to get a feel for the bending process and see how the dimensions looked when the handrails were bent along the line of the stanchions (see **Photo 14**). I started with the railings around the stern of the aft deck. I had two sets of steps that required handrails around them, as well as handrails around the deck itself. I decided that I could make each of the sets of handrails around the steps and the two side pieces as stand-alone items. The only straight part would then be the piece in the middle, but if I did that last at least I'd have other items to lean it against.

Having done that part, applying the glue proved bit of a challenge. Using a paintbrush resulted in most of the glue wiping off rather than staying on the lower edge. I would need to look at an alternative method. I was, however, happy with the forceps for bending, and the stand-alone parts had proved easy to handle (see **Photo 15**).

The handrails on the boat deck were a whole different story. Initially, I was tempted to make the sections around the davits as individual stand-alone pieces, one per pair of davits, and then use them to rest the long straight pieces along the outer edge on, but I knew the straight lengths would still be too tricky to handle. I therefore came up with a series of stand-alone pieces, each incorporating the area around the davits and a section of main deck handrail. I had pre-painted the deck on the area around the davits, so I had to measure up the handrails to go around those areas. The handrail was offered up to the model and the sections counted to give the length of the deck edge piece (see **Photo 16**). The handrail was clamped in the forceps, and a right-angle bend was created around the jaws (see **Photo 17**). After moving the forceps along an appropriate distance, another bend was created in the handrails for the side of the davit area (see **Photo 18**). The forceps were then, again, moved along the length of the davit area and







the final bend created in the handrails (see **Photo 19**). This gave a shape looking pretty much like a question mark. Finally, the remaining side was trimmed to length with the cutters (see **Photo 20**).

Another benefit of using the glass as a work surface was the fact that the free-standing parts could be placed on it and tweaked to ensure that they sat perfectly flat (see **Photo 21**).

Time, then, to improve the gluing process. Here, I placed a blob of PVA glue onto the glass and added a few drops of water (see **Photo 22**). This was mixed and then spread out on the glass. The section of photo-etch was then placed in this puddle of glue (see **Photo 23**) before being transferred with tweezers to the model. My glue formed a nice row of drops along the bottom rail enabling me to place the part on the deck, adjust its position, and then leave it alone while the glue spread out and set. I did one piece on either side of the ship before leaving the glue to thoroughly set for a couple of hours before adding another piece to either side. This process took me a few days, as I had to allow time for the glue to set and ensure that each part was the best possible fit.

Once both sides of the boat deck had been completed, the difference between the standard kit and the improved version was quite dramatic.

The finishing touch was to paint the taff rail. Here, I decided to have a go with a new range of paint pens available from AK Interactive (see **Photo 24**); these are available from most plastic kit suppliers. While the tip of these pens is quite large, it's still fine enough to apply paint to handrails with impressively neat results (see **Photo 25**).

Conclusions

While some of the more comprehensive photo etch aftermarket sets can be a bit daunting for a newcomer, there's no doubt that something as simple as adding handrails can make a huge difference to the overall appearance of a finished kit build.

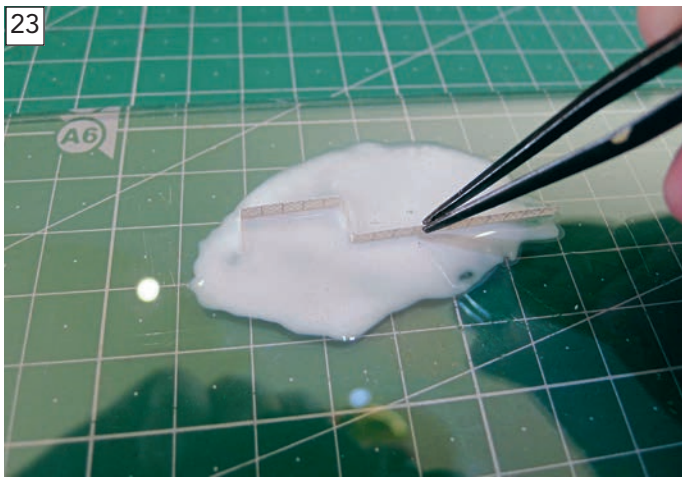
As it's very delicate and prone to damage, the use of photo etch on operational models can be a bit limited. Heavier gauge brass types, as seen on Graupner Premium Range models, however, are more robust.

Adding photo etch handrails is certainly a simple enough addition and well worth considering for a static model (see **Photos 26** and **27**). The right tools play an important part, as does a convenient gluing process, but probably the single most significant aspect of a successful job is arranging

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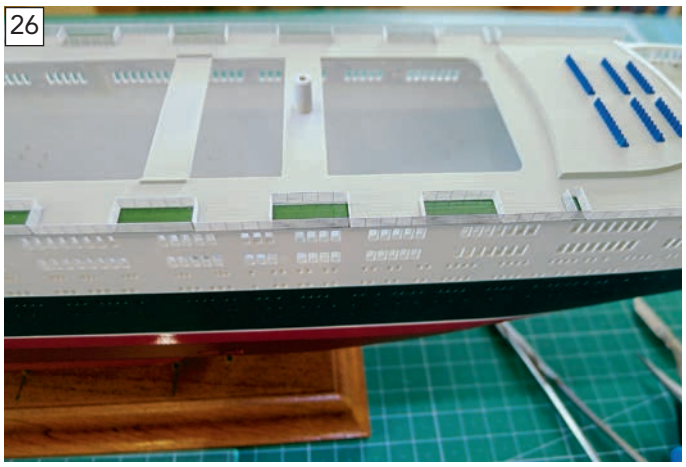
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AK
FLAT BLACK
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BROWN
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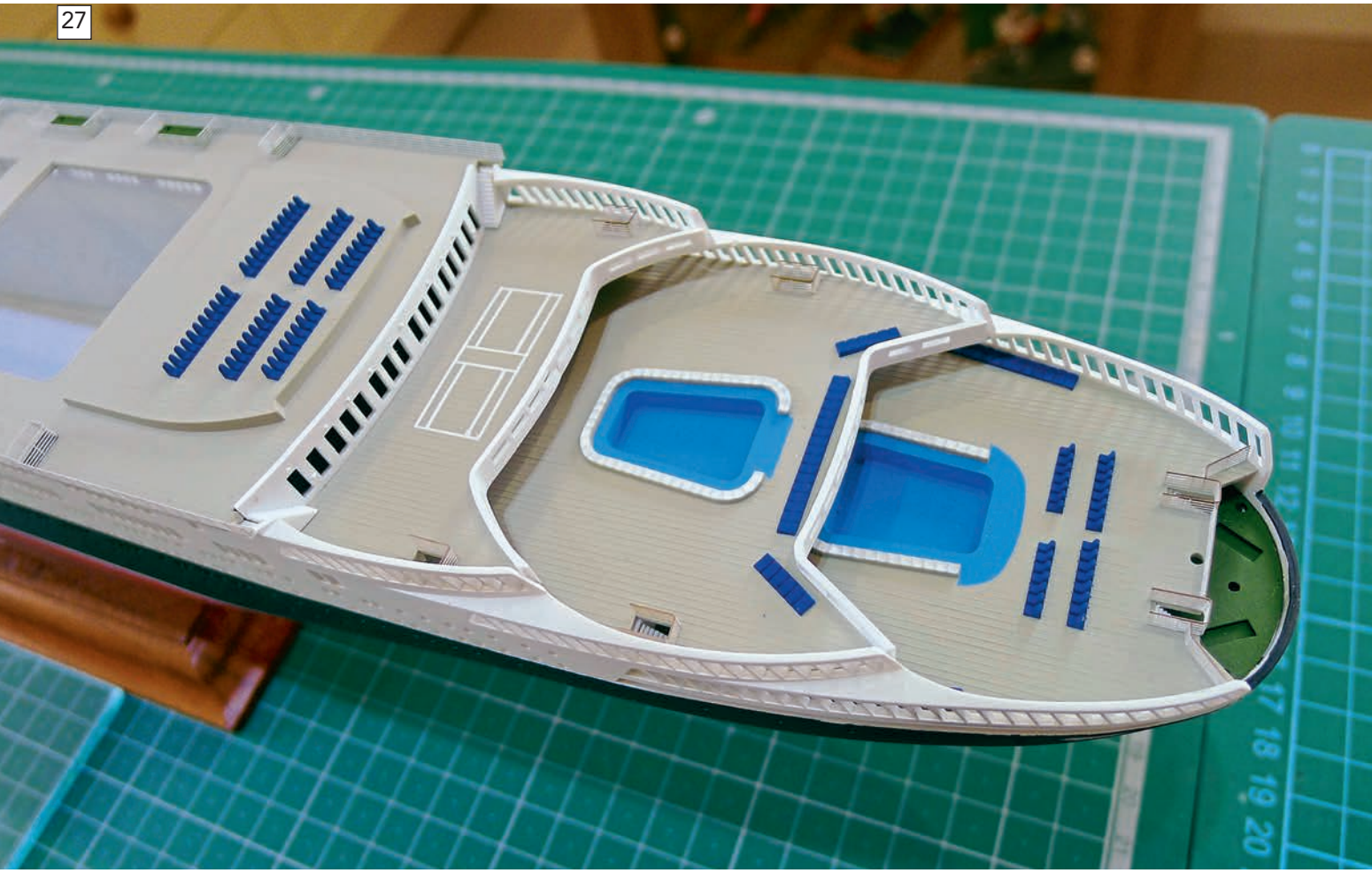
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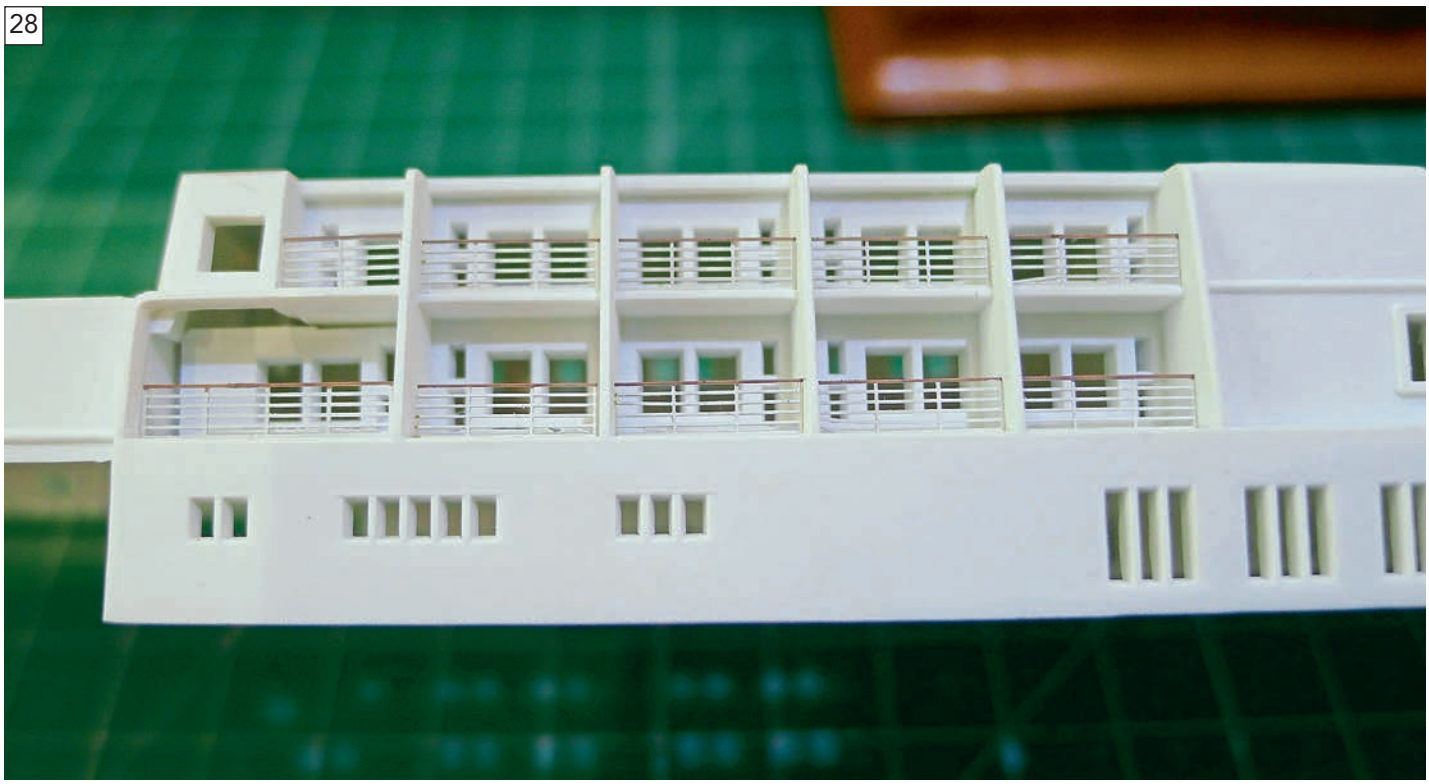
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the handrails into convenient stand-alone sections. Having said that, there will always be those situations where the handrails cannot be arranged in a stand-alone fashion, in which case the most accurate cutting possible will give you a snug enough fit to hold the photo-etch parts without deforming them (see **Photo 28**). ●



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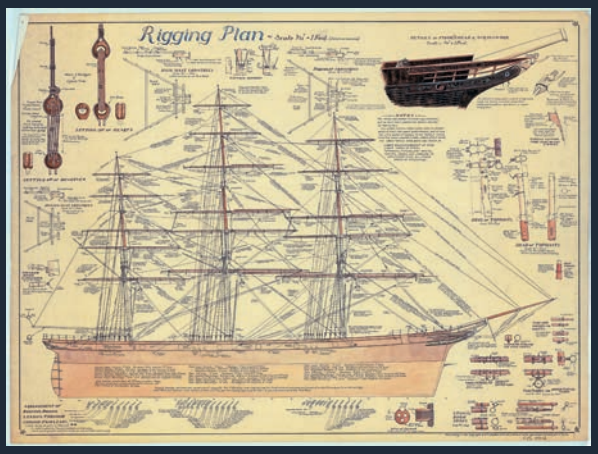
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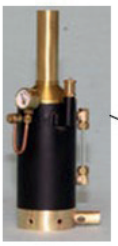
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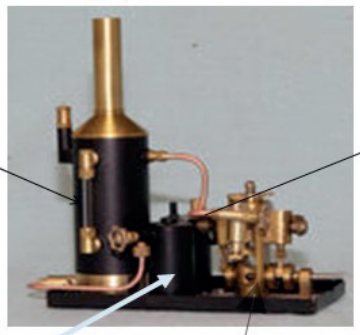
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HMS Warspite, 1944

Chenghao Jiang shares details of the modifications and enhancements he’s made to Trumpeter’s 1:700 scale kit for this legendary Royal Navy battleship, with some handy tips and tricks thrown in along the way…

I first became interested in scale modelling by chance during my high school years, and the subject of this article is a model I built while at university.

HMS *Warspite* is probably a battleship that needs little introduction among naval enthusiasts. She’s one of the most legendary warships ever to have served with the Royal Navy. From the flames of the Battle of Jutland to her operations across the Mediterranean, from the long-range bombardment that struck Italian battleships from more than 20 kilometres away to the thunder of her main guns during the Battle of Cape Matapan, and from facing modern guided bombs during Operation Avalanche to supporting the Allied landings in Normandy, HMS *Warspite* experienced some of the most important naval events of the 20th century. Even after suffering heavy damage many times, she always returned to service and continued fighting.

Whenever the story of this famous battleship is remembered, the sound of her ship’s bell seems to echo across the waves. Although the physical ship no longer exists today, her spirit and legacy remain unforgettable. So, it was with great respect for HMS *Warspite* that I began this project.

At full size, *Warspite* was a huge battleship. However, when reduced to 1:700 scale she becomes surprisingly small.

The finished model is only around 28 cm long – not much larger than the hand of many basketball players. However, with careful planning and patience, even such a small model can contain an incredible amount of detail.



The Trumpeter 1:700 scale kit on which Chenghao based his model, along with the Paddle Wheel Studio 3D-printed parts and Flyhawk photo-etched accessories used to enhance it.

The kit and upgraded parts

To reduce difficulties during the later stages of construction, I prefer not to compromise when selecting materials and accessories. So, for this project, while the main kit used was Trumpeter’s 1:700 scale HMS Warspite, the model was enhanced with Paddle Wheel Studio’s 3D-printed upgrade parts and Flyhawk photo-etched accessories.

Hull construction

Before any build begins, I usually spend time preparing the basic surface of the model. I carefully sand the parts to create smooth and clean surfaces, leaving only the basic outlines of the structure. Afterwards, I use a hobby knife to recreate panel lines and simulate the joints between steel plates. Details such as portholes, watertight doors and ladders can then be reproduced later using photo-etched parts.

“For modellers who are worried about making mistakes during sanding, this is a simple but effective method of preventing accidental damage”

For those wanting to achieve even finer results, additional details such as



Filling gaps and restoring panel lines on kit's plastic hull.



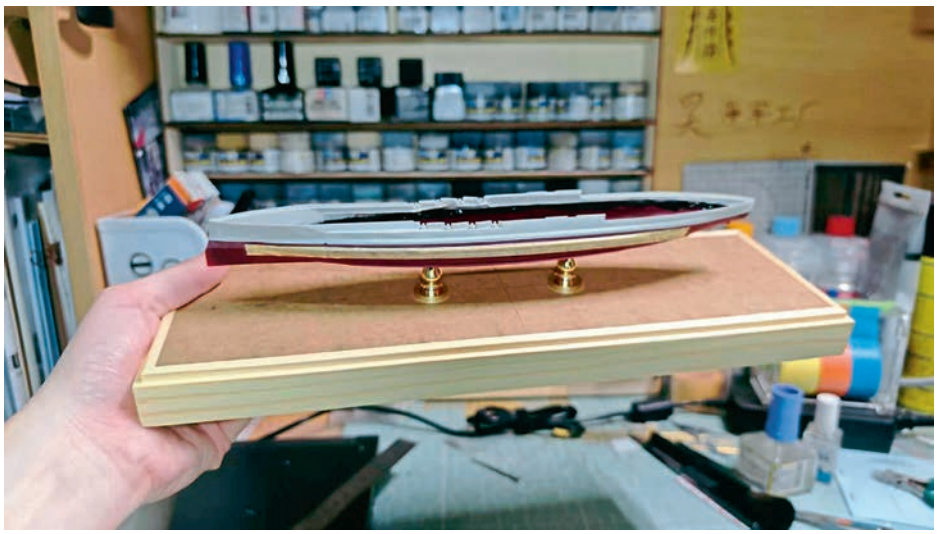
Construction of the ship's protective railings.

"This handy little hack costs nothing and can create convincing results using materials that might otherwise simply have been discarded"

masts and pipes can be scratch built from ABS plastic or brass rods.

Construction then begins by assembling the hull first and then reinforcing the internal joints with additional glue. A stronger hull structure helps improve the long-term durability of the model.

On this model, the raised structures on the lower part of the hull represent the torpedo bulges. During sanding, therefore, I applied masking tape over these areas to protect the surrounding surface details. For



The wooden display plinth built by Chenghao for the model.



Chenghao's neat method of separating small components into groups and affixing them to masking tape on small blocks ahead of painting.

modellers who are worried about making mistakes during sanding, this is a simple but effective method of preventing accidental damage while smoothing the seams. Trust me, you will find applying a small amount of masking tape far less troublesome than repairing damaged details.

Before attaching the deck, I also drill holes underneath the hull to allow the model to be fixed securely to a base with screws, as a good secure display method helps protect the finished model.

On this occasion, I constructed a wooden display plinth, which I finished with a wax oil, not only to bring out the natural beauty of the wood but to seal and protect it from airborne moisture.

Creating additional structural details

Because I wanted to represent HMS *Warspite* in my preferred configuration, i.e., as she served during the Normandy Landings in 1944, additional modifications were required.

I think worth sharing is how I constructed of the protective structures along both sides of the hull. Here, instead of throwing away the unused photo-etched brass pieces, I put them to good use. Each piece was cut to the required length and gently heated with a lighter to make it easier to bend before being placed flat on the work



Introducing gradation effects to the deck's 'wood' with the use of masking and multi spray paint layers.

"The reward of following this process is the wood gradually develops noticeable gradations, better representing the effects of long-term use and weathering"

surface; I was then able to use the body of a pen to gently roll and press the brass sheet into a nice even curve. Once the correct shape had been achieved, it was then attached directly to the hull. This handy little hack costs nothing and can create convincing results using materials that might otherwise simply have been discarded.

Creating the wooden deck effect

As always, I spent a considerable amount of time on making the deck look as authentic as possible. I began by spray painting the entirety of it in a basic wood-coloured finish. Once dry, very thin strips of masking tape were randomly applied before spraying another layer of paint in a slightly different shade over the surface. This procedure was then repeated several times, changing the position of the masking strips and the shade/tone of the paint applied each time. The reward of following this process is the wood gradually



Affixed to paint pots using double sided tape allows during painting and weathering process allowed the hull to be maneuvered without the risk of getting fingerprints on, or other blemishes to, the finish in progress.



A line up of the individually constructed ship’s boats prior to be fitted.



Despite its diminutive size, Chenghao added additional detail to the Supermarine Walrus by creating his own struts and thin wire tensioning rigging for between its wings.

develops noticeable gradations, better representing the effects of long-term use and weathering. Yes, it requires a considerable amount of patience, but I find that listening to music while I work makes the long hours of spent on such a task much more enjoyable.

Handling small superstructure components

After completing the deck, the next stage was the construction of the superstructure and the many small components that would really bring this battleship to life.

At 1:700 scale, most of the parts are extremely small, and if a component accidentally falls onto the floor, finding it again can be surprisingly difficult. So, I’ve developed a simple method that saves me from having to scrabble around on my hands and knees searching for parts have gone missing. I attach a layer of double-sided tape onto small wooden blocks, then place any components likely to go AWOL onto the tape.

This also allows components with same colour requirements to be organised into groups and holds them securely in place while being painted.

These wooden blocks can, of course, be reused many times. In fact, some of my mine been in continuous use for various different projects for some years now.

For small-scale modelling, adopting this simple habit can greatly improve both efficiency and enjoyment.

Painting the hull

Before painting, I always secure a hull in place using paint pots and double-sided tape. This allows me to handle/maneuver the hull without directly touching it, thus preventing fingerprints or accidental damage to the paint finish. Once painting is complete, the areas where the supports are attached can simply be repaired with a small amount of additional paint.

For this project I wanted not only did I want to reproduce the correct wartime scheme but also to create stronger visual depth.

I particularly enjoy adding light and shade effects to my models. Using a 0.2 mm airbrush nozzle, I apply slightly lighter shades to selected areas as subtle highlights. These small changes can create a clear contrast between light and shade, making the structure appear much more three-dimensional.

On HMS *Warspite*, I also applied highlights to the central areas of the individual armour plates and panels. This helped emphasise the texture of the steel structure and made the separate plates appear more realistic.

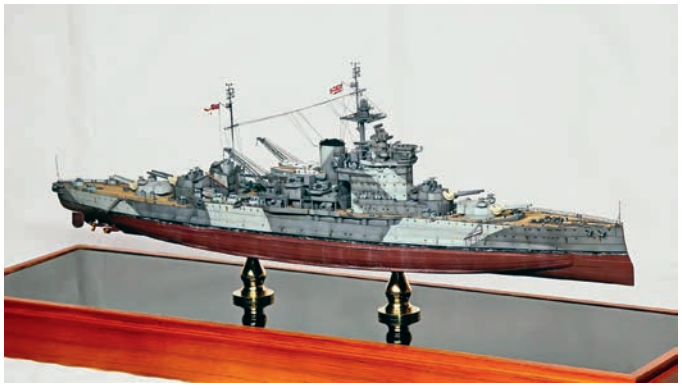
I have always been interested in art, and the inspiration for this technique comes from traditional drawing and oil painting. Understanding how light interacts with surfaces has greatly influenced my approach to scale modelling. I believe that painting a model isn’t simply about applying colours, it’s also about creating depth, atmosphere and visual storytelling.

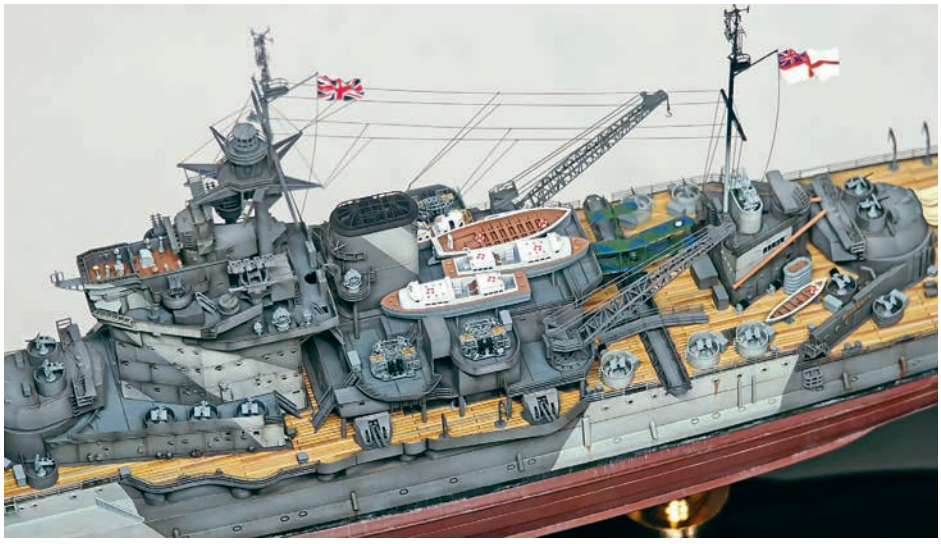
Weathering

In addition to painting, weathering is another important stage in creating a realistic ship model.

HMS *Warspite* was a battleship with an extraordinary combat history, having served through many years of operations.









Chenghao’s completed build.

I wanted, therefore, to represent the appearance of a veteran warship rather than a completely clean, freshly painted, as it left the shipyard vessel.

I use oil paints to create effects such as weathering, water stains and rust. However, I prefer to keep the effects subtle. The purpose is not to make the ship look poorly maintained, but simply to reflect years of active service and combat.

The ship’s boats & lifebuoys

Even the smallest deck fittings and equipment can contribute to the character of a vessel, so the ship’s boats received my full attention, as did the lifebuoys – the latter providing a little pop of colour.

The Supermarine Walrus

The Supermarine Walrus amphibious aircraft carried by HMS *Warspite* is another distinctive feature of this model, it’s blue and green camouflage scheme standing out nicely against the ship’s overall battleship grey finish.

Despite its diminutive size (it’s tiny enough to sit on a fingertip), to improve its detail, I used fine brass rods to create the struts and extremely thin metal wire to reproduce the delicate tension rigging between the wings

For anyone interested in enhancing similar small-scale aircraft details, I would highly recommend trying this.

Silhouette essentials

The final stage of the project focused on fitting items such as the masts, antennas, rigging and all the remaining small structural details. These elements are extremely delicate at 1:700 scale, but they play an important role in completing the overall silhouette of the battleship. So, while this work was fiddly and very time consuming, the end result was really rewarding.

Keeping history alive and the hobby moving forwards

Throughout this project I tried to give HMS *Warspite* the respect, care and attention to detail she deserves, as, for me, scale modelling isn’t just about producing a miniature object, it’s my little way of helping to preserve maritime history.

It has been some years now since I completed HMS *Warspite*, but since then my aim with each new project has been to further hone my skills and techniques. I am always grateful for the tips and tricks others share in this magazine and look forward to contributing more of my own in the near future. ●





The Not Much

Looking for a project that offers a bit of a challenge but isn't going to cost the Earth? Then **Eric Belshaw**'s fun, budget-friendly, 'spares box' airboat design may provide some inspiration…

The subject of this article is another of my 'Bottle Boat' projects – these builds are intended to make use of whatever may be readily to hand. This design for this one was inspired by an airboat in a 'YouTube' video clip I'd watched, while the name for the boat popped into my head on recalling a recent Model Boats article on the altogether more refined build of an Emmet-style steamboat called the *Nonsuch*.

After a rummage round, I found I had an EDF (Electric Ducted Fan), plus a couple of other brushless motors and aircraft propellers, going spare, plus, on further examining my resources, 27 damaged arrow shafts, five identical plastic pop bottles, (that would be soda bottles for the non-British), an empty plastic box that had originally contained metal washers, and a couple of 'For Sale' signs from a friendly local car lot.

Before getting started, I replayed the YouTube video footage several times until I had a clear mental picture of the proportions of the airboat that I could construct from these resources.

I then sketched out a few different configurations, eventually settling on two forward sponsons, followed by a single central body that would carry the fan and house the battery, ESC and receiver.

The build

From my stash, I selected some arrow shafts that would space the sponsons laterally, and another that would serve as a central spine terminating in the cap of the body's central bottle. More arrow shafts were destined to become bracing struts to stiffen the three-bottle body structure.

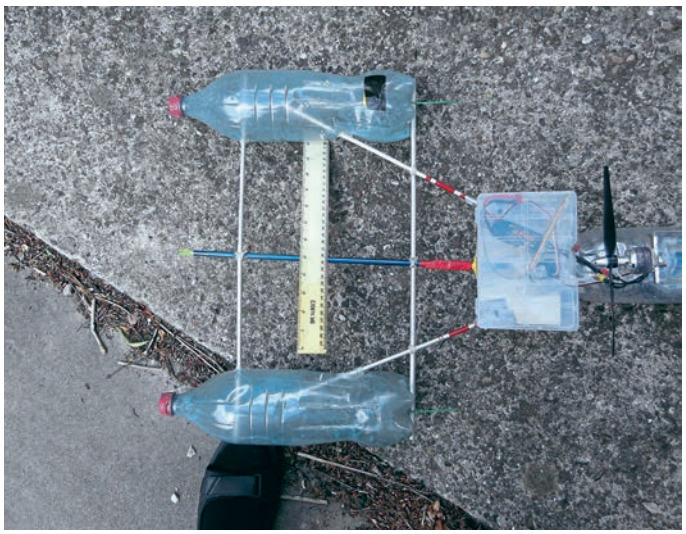
Having laid the selected shafts on my assembly table and taped them to the bottles based on my initial sketches, I then fiddled around with the layout of bottles spacers and struts until I was confident in the arrangement.



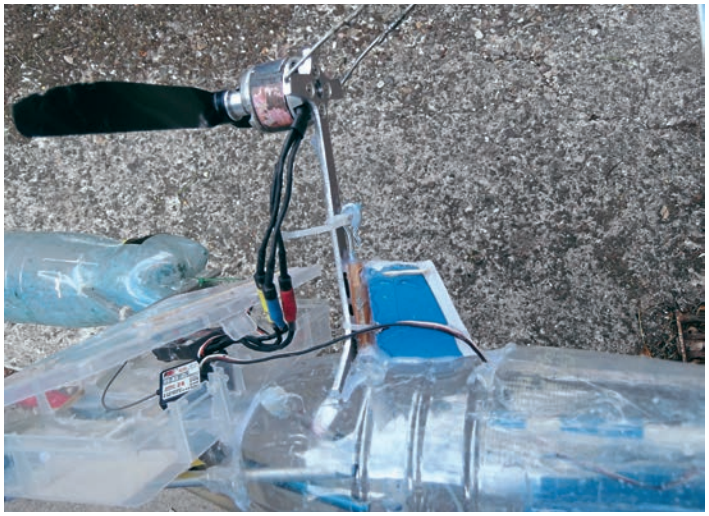
The final mock-up configuration for Eric's airboat design.

The plastic bottles come with a moulding line, and this line ensured an accurate, vertical mid-point for the hole to take the lateral sponson spacers. The two hole positions for each spacer were marked on the same circumferential





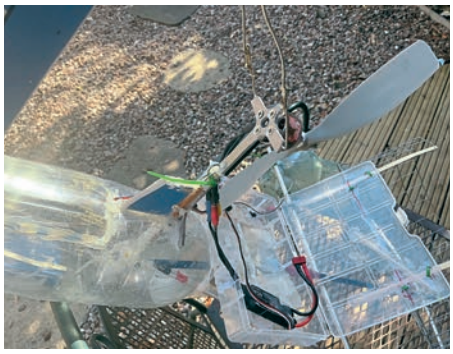
Bottle spacing and spar separation.



The pylon Installation with extension.



The final rudder configuration.



The pylon extension for larger propeller.

line. The arrows destined for sponson spacers were cut to length and the diameter was measured several times to ensure a snug fit in the proposed bottle holes. I then drilled the bottle holes and glued the spacers in place with hot melt glue. Gluing like this required some care to be taken, as otherwise the hot glue can distort and deform the thin plastic of the bottles.

I had previously marked the bracing strut hole positions and drilled both bottles, but I stopped short of gluing the



The pylon extension front ,motor and propeller removed

struts in, as movement of these struts was needed to position the centre body.

There were two holes in the centre body for these struts and one hole

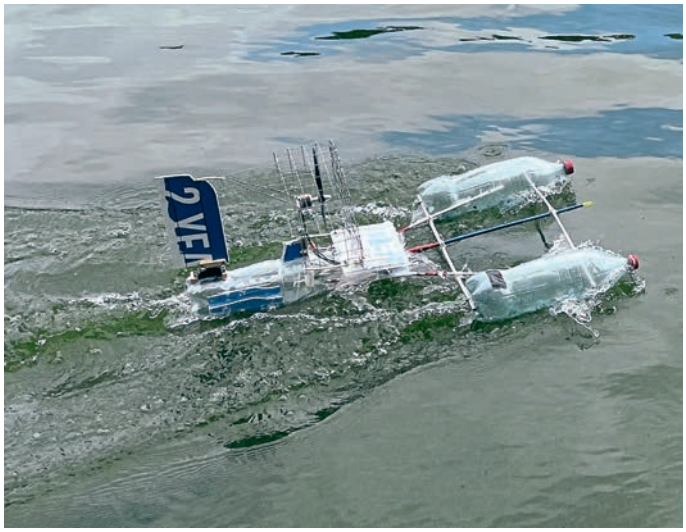
"On our first visit to the boating lake in Alvaston Park, off she went – fast enough to race a snail and lose!"

directly above the strut junction where the motor pylon would be installed.

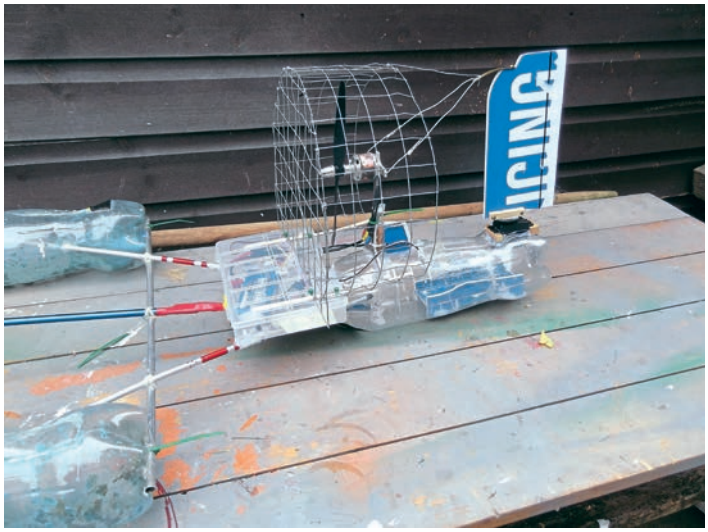
Next, I cut a rhomboid shaped gusset from the 4 mm thick foamboard sign and glued it to the pylon, with enough pylon pole sticking down to go right through the bottle.

I didn't drill a hole in the bottle of the centre body to take the pylon; instead, I cut a flap in the top just behind the gusset so that I could dribble hot melt glue onto the foot of the pylon and press the splodge of glue onto the inside of the bottom. No holes, no leaks.

During the pylon/gusset installation I used a lot of guess work, but cutting the spacers, struts and centre spine did require measurements. However, I had quite a stock of arrows of similar diameter and two unused bottles to cope with my mistakes.



It works!



The propeller guard.

With the pylon in place, I could install the struts and the central spine. The junction of these three rods could have glue dribbled onto them through a flap in the top of the centre body.

Hot melt glue was liberally applied to the holes that contained the struts and central spin. Once this had cooled, the spine was lashed to the sponson spacers where they crossed, and the lashings were sealed with superglue.

After six hours of work, I had a structure that was light and stiff – so light, in fact, that I began to consider ballast to ensure the boat sat 'in' the water not just 'on' it.

I used glue and cable ties to fix the ducted fan unit to the pylon and gusset.

I mounted a waterproof servo into the rear most part of the centre body top as the rudder drive.

The flap I had made for gluing the shafts now became the battery access, ESC location and receiver space. Notches were cut into the flap to take the three wires for the motor and the cable from the rudder servo (I used a soldering iron to form the notches to enhance the hatch strength).

There was no switch on the ESC I used, so once the battery was plugged in everything was live. During my multiple viewings of the YouTube clip, I had seen the boat featured run on grass, gravel, concrete and water, so having gravel in my back garden, that was going to be my test ground.

I grabbed the controller and put the boat on the gravel. The motor speed ramped up as I pushed the control lever. The boat vibrated and twitched but didn't move. I put my free hand down to the boat but removed it hastily as the boat careered backwards. So, after recovering the model from the garden's flower bed, I reversed the red and yellow phase connections to correct the motor rotation.

Well, she moved, but she couldn't be steered. The rudder blade needed to be larger. This meant providing a top pivot, as the connection to the servo couldn't tolerate the motor thrust.

I tried the improved model on the concrete side path of my house and found I could steer her confidently. But as she flicked and jumped around the concrete, I began to reconsider ballasting the sponsons before putting the boat on the water.

Consequently, I mixed up 100 grams of stone powder and watered-down white glue, then spooned 50g into each sponson. A little vibration ensured that the mixture settled into the lowest place in each sponson.

The first on water trial

On our first visit to the boating lake in Alvaston Park, the weather was good, with just a little onshore breeze. I connected the battery, taped up the flap in the main body bottle and gingerly put the boat in the water. The centre body rode lower than I expected, and the sponsons where not much better. But off she went – fast enough to race a snail and lose! This was not the performance I'd expected, although she did steer effectively,

So, it was back to the workshop to try to improve its performance by spooning out the ballast and replacing the Lipo 2200mah with a lighted 800mah item of the same voltage.

The second outing

Having made these changes, I returned to the boating lake. On arrival and after connecting the battery, though, as I put *Not Much* on the path near the water, I somehow tripped on the outer curb and knocked the controller on the ground, causing her to hurtle along the tarmac. Scooping up the controller, I flicked the rudder and the boat suddenly leapt over the curb and landed in the water, where her helter-skelter career immediately reduced to a crawl. She steered back to me nicely, but the centre body was still too low in the water. Back to the drawing board!



The propeller guard open.

"While static, the boat showed a much-reduced draft both fore and aft, and, once powered up, the puller motor propels her at a reasonable speed, even creating a bow wave – well, three bow waves, actually"

Looking through my collection of random brushless motors, I found one that had a higher rating than the ducted fan unit. I also found two differing puller propellers in my scrap bin, so pressed the larger blade twist item into service.

This larger diameter blade meant mounting the motor further up. To achieve this is, I manufactured a pylon extension from a scrap piece of 3 mm aluminium that gave the height to swing the larger propeller and that incorporated a motor interface.

I checked the centre of gravity of the modified boat without the ESC and battery. Longitudinally it was just forward of the pylon.

A redundant plastic box was temporarily mounted close to this location, just in front of the propeller.



The small battery and ESC were put inside and there was no significant change in the longitudinal CoG position. This temporary measure was, therefore, made permanent.

Third time's a charm!

I approached the next 'on water trial' with some trepidation, but I needn't have worried. While static, the boat showed a much-reduced draft both fore and aft, and, once powered up, the puller motor propelled her at a reasonable speed, even creating a bow wave – well, three bow waves really.

Steering depended on wind strength now that the boat was much lighter; in a gentle breeze she steered well and even maintained a straight course.

I have uploaded a video of the *Not Much Mk 1* onto the Alvaston Pirates Facebook page or those that are interested.

Out of the water, *Not Much* is a speed freak! Rev up the motor and initially nothing will happen, but then suddenly she will hurtle away like the proverbial Bat. She likes Tarmac better than concrete, and both of those better than flag stones.

Come the winter, I will try ice boating by adding skates to the three hulls.

With low surface friction, nimble control is essential. And I've had to shroud the propeller, of course, so that no bystander gets shredded by an accidental collision. Safety first.

To sum up...

Has this airboat justified its name? Well, I already had all the components and raw materials, the only costly resource was the hot melt glue, so the name sticks!

Repurposing material to make models boats has become a passion of mine, so between now and the winter I will be working on another bottle boat, a single-hulled Catboat using as many household throw-aways as I can. If it works, there could be another article for Model Boats

In the meantime, I urge as many of you as possible to consider submitting either feature length articles on your own projects for consideration or content for the 'Your Models' section to the editor, as I know she shares my belief that keeping the magazine as inclusive as possible will encourage others and, hopefully, help grow the hobby. Happy sailing! ●

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A conceptual rendering of Habakkuk II (curated AI image)

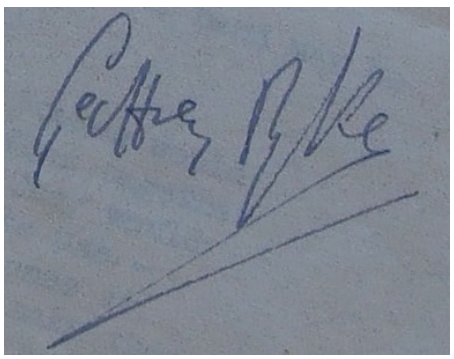
The carrier that was put on ice

John Parker reflects on a 'truth can be stranger than fiction' World War II experiment, and the cold, hard facts it presents as a modelling project

The U-boat menace facing Britain during both World Wars was so serious that the British Admiralty was prepared to consider some wild schemes to combat it. In World War I, it trained seagulls to land on the periscopes of U-boats to hopefully render them blind from an accumulation of droppings. But the seagulls proved quite indiscriminate, just as happily relieving themselves on the periscopes of British submarines. In World War II, a gigantic aircraft carrier made essentially of ice, to close the 'Atlantic Gap' where U-boats could hunt freely beyond the range of Allied land-based aircraft, was proposed. This bizarre idea garnered support at the highest level and made considerable progress toward reality before succumbing to mounting difficulties and the changing war situation.

Geoffrey Pyke

It was Geoffrey Pyke, an eccentric British inventor attached to the Combined Operations Headquarters, who suggested that a large aircraft carrier could be made of ice to eliminate the vast amount of steel, in short supply because of the war effort, required. The ice could be made for 1% of the energy required for an equivalent mass of steel. He envisaged a vast floating airfield rather than a conventional ship, with a flat


Geoffrey Pike's signature (Wikimedia Commons).

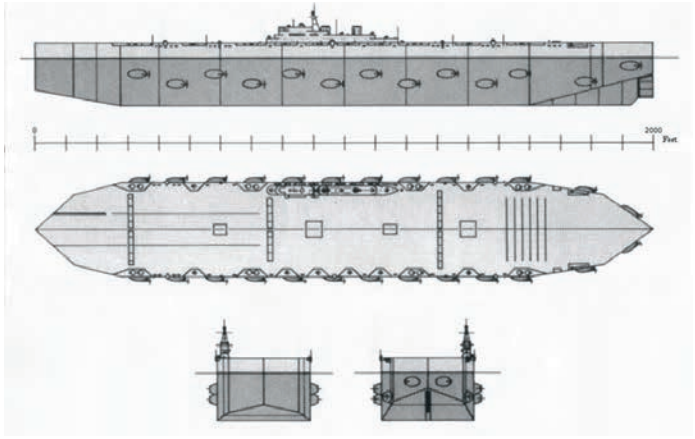
flight deck and hangars, fuel stores and workshops that could support operations by twin-engined and heavy bombers unable to operate from the



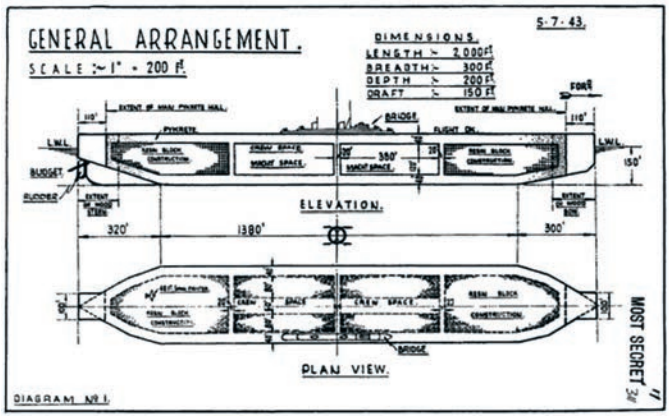
A 2-inch block of pykrete hit by a rifle round (Charles Nichols, Wikimedia Commons).



Water and sawdust in proportion to make Pykrete (Wikimedia Commons).



A conceptual design of the Project Habakkuk carrier (Wikimedia Commons).



Aircraft carrier drawings (Wikimedia Commons).

small escort carriers available.

The proposal had its merits but had its problems too. The ice, surprisingly strong, was nevertheless prone to cracking under stress and had the annoying tendency of melting in the sun. Floating ice bergs had an alarming tendency to roll over and would require a draft of hundreds of feet in order to support a flight deck that was a safe distance, about 50 feet or so, above the surface of the water. This in turn endowed the carrier with so much drag that powering and manoeuvring it would become impossible. It looked like the proposal was a non-starter.

Pykrete

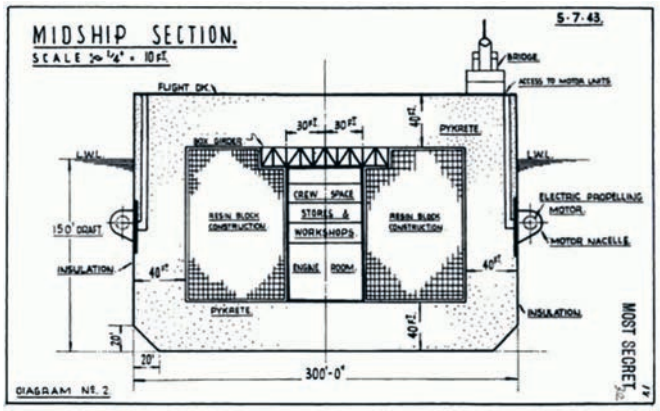
The outlook for Pyke's floating airfield was transformed when the molecular biologist Max Perutz, working in secret in a London meat market behind a screen of pig carcasses to disguise his activities, came up with a new material which he called pykrete, after Geoffrey Pyke. Pykrete was ice with a proportion (usually 14%) of wood pulp added, which completely transformed the nature of the ice. It gave it similar strength to concrete, made it machinable (for example, it could be sawn or turned on a lathe), melt more slowly and float better.

"It was Geoffrey Pyke, an eccentric British inventor attached to the Combined Operations Headquarters, who suggested that a large aircraft carrier could be made of ice to eliminate the vast amount of steel, in short supply because of the war effort, required"

Pyke took the development to Lord Mountbatten, chief of Combined Operations, who quickly arranged to call on Prime Minister Churchill with a sample block of pykrete. According to Mountbatten, Churchill was taking a bath at the time, and he threw a small sample block of pykrete into the bath to demonstrate how well it floated and how, after the outer layer of ice melted, the wood fibres that were newly exposed formed an insulating layer that greatly slowed the rate of subsequent melting. With Churchill's backing, it was decided to proceed to full-scale experimental and design work in 1942-1943.

HMS *Habbakuk*

The envisioned carrier was designed under the code name Habakkuk, in reference to a passage in the Hebrew bible, and the definitive version became known as *Habakkuk II* or HMS *Habakkuk,* though never commissioned as such. It took the form of a rectangular slab 2000 feet (610m) long and 300 feet (91m) wide, with a covering of insulation material and a flight deck on top. The displacement was 2.2 million tons. A cross-section showed a 40-foot (12m) thick outer shell of pykrete – believed to be torpedo-proof, enclosing



A cross section, showing 12m thick pykrete walls (Wikimedia Commons)



A pykrete ice dome built in Juuka, Finland (Wikimedia Commons)

spaces for the hangars, stores and workshop and machinery spaces, including a refrigeration plant with a network of cooling pipes running throughout the ship. A conventional engine installation would have created too much heat, so instead a turbo-electric powerplant was used to supply 33,000 hp (25,000 kW) to 13 electric propulsion pods on each side, expected to provide a speed of 6 to 7 knots.

Handling would be cumbersome, even with the giant 100ft (30m) high rudder, but neither speed nor manoeuvrability were of great importance. Supplies of wood pulp could be carried that would enable a section of damaged hull to be repaired in-situ with a newly-cast replacement. An island superstructure and bridge controlled aircraft movements, with the complement to consist of 150 long range twin-engined aircraft or a smaller number of heavy bombers. 40 twin 4.5-inch (114mm) gun turrets and numerous AA weapons lined the edges of the flight deck for defensive armament.

Test model

A test model was built at Patricia Lake in Alberta, Canada, as the location provided all the necessary materials and a safe secluded place to work on the secret project. It measured 60 feet by 30 feet (18m x 9m), displaced around 1,000 tons and resembled an accommodation block, with a roof of logs to provide insulation. A single-horsepower motor provided the necessary refrigeration to keep the structure frozen while various tests were performed on it throughout May 1943, the cut-off date for approval if the full-size carrier was to be completed in 1944.

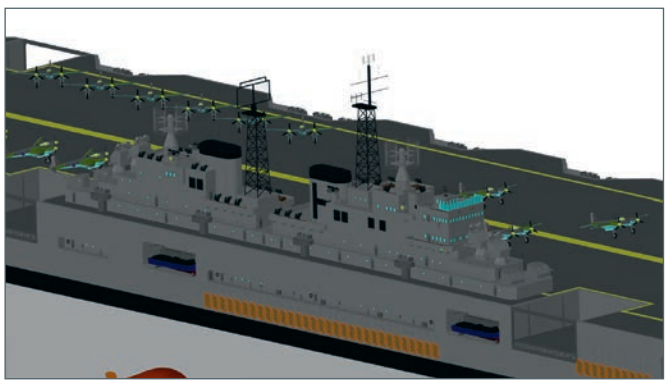
Unfortunately, the tests showed that pykrete was prone to cold, or plastic flow. When subjected to a constant load, it deflected slowly over time. It could be cured of this sagging tendency, but only by cooling it further to minus 16 degrees Centigrade, which had grave consequences for the Habakkuk project because a far greater quantity of steel would be required to provide the extra refrigeration capacity, network of cooling pipes and outer insulation. This fact and the increasing demands being made on the 'cheap and easy' solution meant it was rapidly becoming an expensive and complicated nightmare.

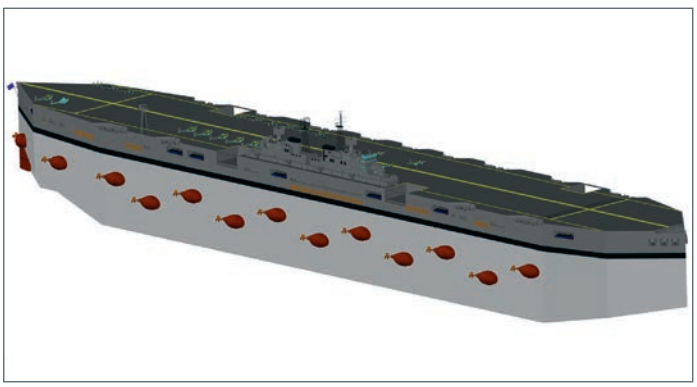
Meanwhile, the war was entering its final stages. Longer range aircraft and operation from the Azores were helping to close the Atlantic Gap, escort carriers were available in greater numbers, and the tide was steadily turning against the U-boats. A giant aircraft carrier that would be expensive, consume vast resources, be difficult to launch and operate and take a year to build was no longer seen as a good idea and it was cancelled in December 1943. The only remains today are the sunken steel remnants of the test vessel on the bed of Patricia Lake.

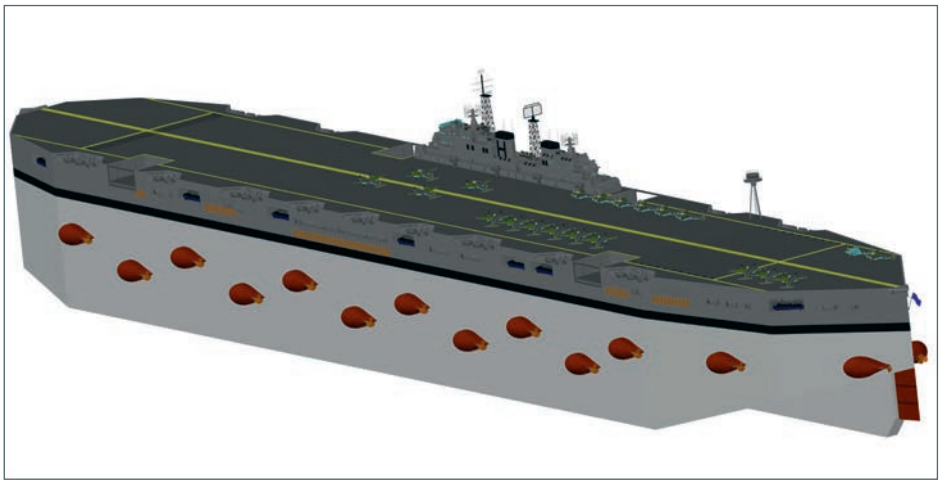
"The outlook for Pyke's floating airfield was transformed when the molecular biologist Max Perutz, working in secret in a London meat market behind a screen of pig carcasses to disguise his activities, came up with a new material which he called pykrete"

Modelling *Habakkuk II*

It comes as no surprise to learn that there are no kits available of this intriguing and obscure might-have-been, but designers have been busy creating 3D-printing files from which a model may be made; for example, see Yeggi or Sketchfab.







Ed Galea's AutoCAD drawing of Habakkuk II (Ed Galea).

Such is the enduring fascination of the *Habakkuk* that some modellers have been drawn to considering it as modelling project, if only as a thought experiment. One such is Task Force 72 member Ed Galea, who has been scoping out the possibilities with an AutoCAD drawing. Ed envisages the construction would be a raft above the waterline, with the 'ice hull' built as an open frame aluminium structure clad in white Corflute (fluted plastic sheet). Assembly of the modular components would be required lakeside, which also aids with transport and storage. The propeller pods could be made operational, but a more practical solution may be submerged bilge pumps. Steering would be affected via thrust vectoring, and bow/stern thrusters, as Ed anticipates the rudder would be largely ineffective.

"Providing the all-important aircraft for the flight deck of the model wouldn't be an issue, considering the wide availability of World War II era kits. But, of course, there's a 'little' problem…"

Providing the all-important aircraft for the flight deck of the model wouldn't be an issue, considering the wide availability of World War II era kits. But, of course, there's a 'little' problem – at 1:72 scale, a *Habakkuk II* would be 8.5 metres long! Even at the smaller 1:144 (aircraft) scale it would stretch to 4.25 metres. Some savings could perhaps be made by eliminating the R/C system in favour of a human operator hidden within the vast hull, with perhaps a second 'human servo' turning the rudder on command, but on sober reflection, the project, like its full-size counterpart, may have to be considered impractical. ●

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Servo mounting and linkages

Glynn Guest provides a quick tutorial

Many servos are supplied with rubber inserts to fit over the mounting lugs at the ends of the servo cases. These are intended to isolate the servo from the vibration caused by powered models. To ensure that the servo mounting screws are not over tightened, thus compressing the rubber and creating a mounting that is too rigid, small ferules are usually supplied to limit screw tightness **(**see **Photo 1)**.

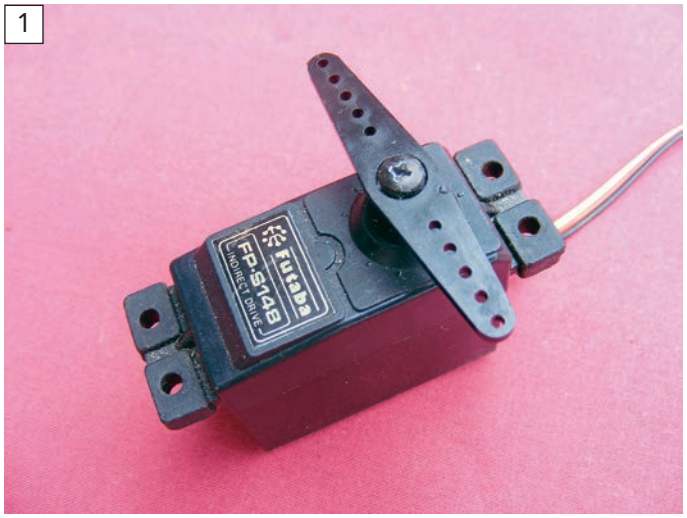
Such precautions might be needed in high-powered models but, to be honest, in most of my boats I've left these ferules, and sometimes even the rubber inserts, out. So far, nothing has failed due to this omission. I do however try to ensure that the servos are held firmly, with no chance of moment when operating. This is especially true for the servo operating the rudder.

Rudder servos

My rudder servos are usually secured to balsa, either strips stuck to a suitable position in the hull (see **Photo 2**) or blocks stuck to the hull structure (see **Photo 3**). Sometimes a suitable cut-out can be made for the rudder servo (see **Photos 4 and 5)**. Balsawood will create a firm servo mounting, yet one which

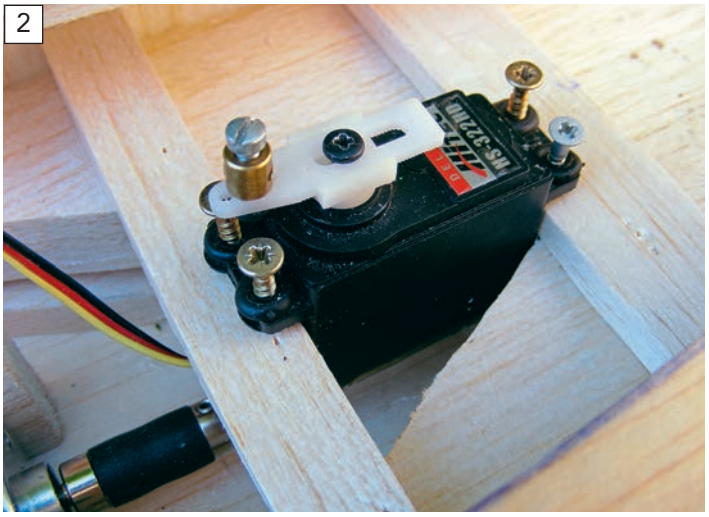
"My test for a good rudder servo mounting is to gently try to move the rudder blade with my fingertips. I say gently, since excessive force might actually drive the servo gears around, which is never a good thing to do"

1



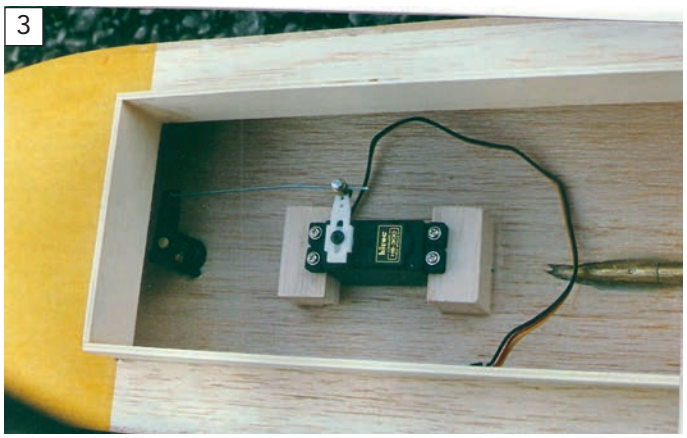
Rubber inserts in servo mounting lugs.

2



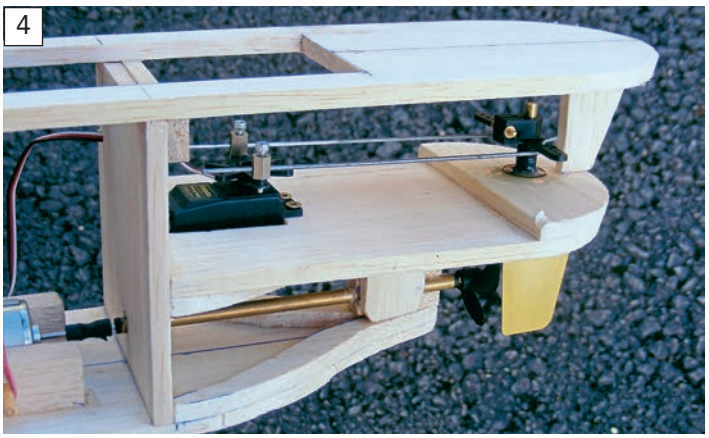
Servo secured between two transverse balsa strips.

3

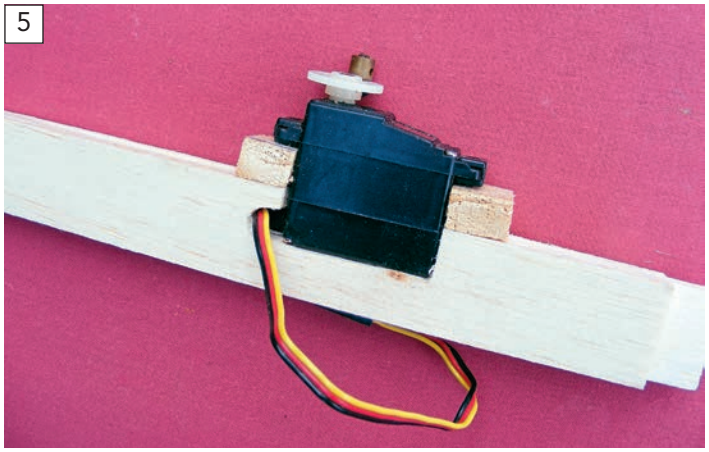


Servo secured to balsa blocks glued to hull bottom.

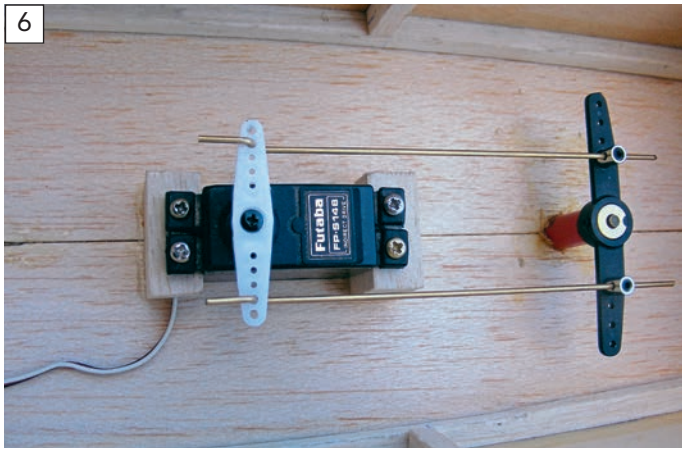
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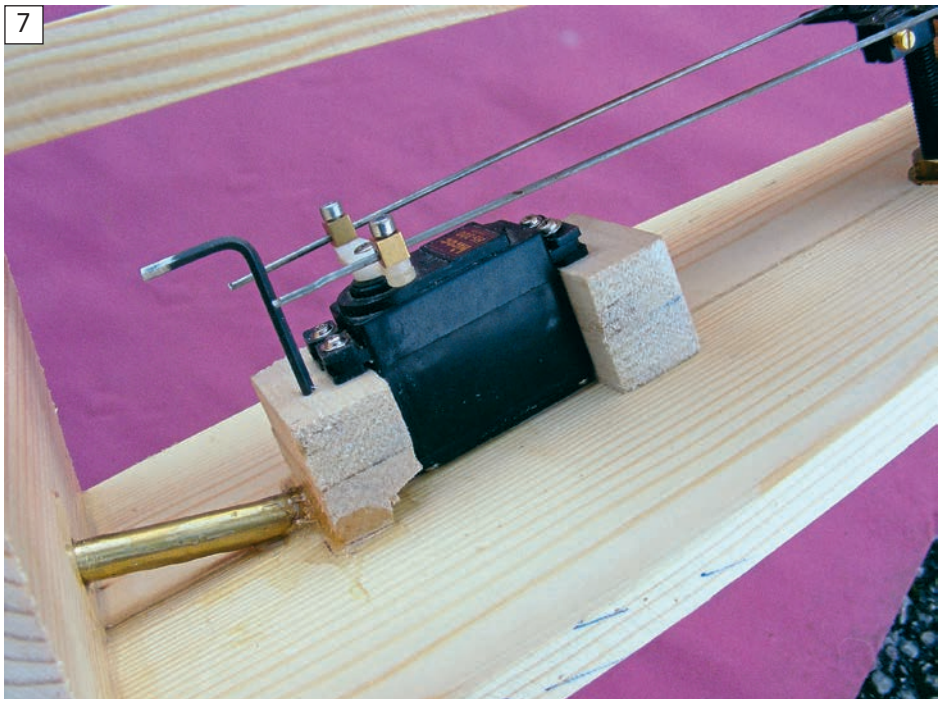
A cut-out made for the servo in hull structure.



Servo fitted into keel.



Double linkage between servo and tiller arms.



An Allen key, for push rod connectors, secured into servo mounting block.

"Excessive movement suggests that the steering linkage has too much free play. This can result in a model that will not hold its heading consistently"

will hopefully 'give' before things are damaged in an accident.

My test for a good rudder servo mounting is to gently try to move the rudder blade with my fingertips, with the R/C switched off of course! I say gently, since excessive force might actually drive the servo gears around, which is never a good thing to do. The ideal is for a barely perceptible moment of the rudder to be felt; *i.e.*, where you can just feel it but probably not see it.

Excessive movement suggests that the steering linkage has too much free play. This can result in a model that will not hold its heading consistently, although this should not be confused with the effects of wind and waves. One of the common causes of this free play are holes in the servo and tiller arms being too large for the linkage arms. Another possibility is that the linkage between servo and tiller arms could be flexing under load and need stiffening up.

This is where I extoll the virtues of the double or closed-loop linkage, which can create a very positive but still free movement of the rudder; that is two links from each side of the servo output arm to either side of a double tiller arm **(**see **Photo 6)**. Ideally, the hole spacings on both arms ought to be the same so that the two links remain parallel at all times. This will allow the rudder to turn smoothly with no extra strain in the linkage. This method also enables the rudder to move through the maximum angle, usually 45 degrees either way, of the servo's rotation but with no risk of it locking in place. I also suspect that the 'push-pull' action on the servo arm is better for the servo mechanism. If less movement is needed, then the transmitter's servo throw, or travel, adjustment could be used.

The 'Z bend' method

I am a fan of using the simple 'Z bend' method to connect up linkages and have yet to have one fail. However, if you try to use Z bends at both ends of a wire linkage, it can be a challenge to get the length exactly right. For this reason, I tend to use Z bends at one end and those adjustable push rod connectors (often called linkage stoppers on some internet sites) at the other. It's not a bad idea to keep the tool needed to fasten/unfasten the connector on the model where it's needed, rather than somewhere in a toolbox, your pockets or left behind at home (see **Photo 7)**.

Checks worth making

Sometimes the linkage is fine, but the servo arm has excessive movement due to wear in the gear train. If the rudder servo has become 'slack' in its operation, then replacement is the best idea. But, before doing this, it's worth double checking that the servo mounting is still firm. The mounting screws can work loose, holes open up a little, and even the structure to which servo is secured can become loose. The latter might be the result of some impact damage to the rudder while sailing.

Alternative employment

If a servo has to be replaced, then don't automatically discard it. If it still operates reliably, then other, less demanding, uses for it may be found. If all else fails, then you could open up the servo and use it to power one of those small plastic kit conversions that some people like to indulge in. ●

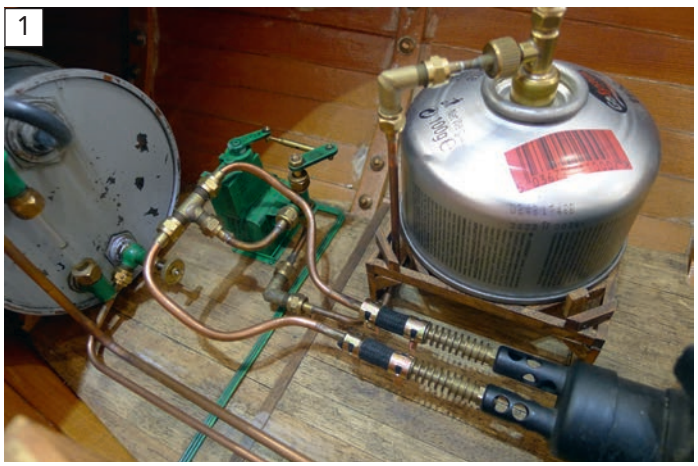
BOILER ROOM

Richard Simpson reviews an innovative new valve that may just prove disaster averting

In last month's instalment of Boiler Room, I recounted how the failure of a sight glass eventually led to an overheated boiler and a fire starting in the boiler cladding woodwork of one of my steam-powered models. I was very lucky to have retrieved the model from the lake with little damage done to it – the only real repairs required being the re-cladding of the boiler with some new wooden planks. Had the wind been in a different direction, or had there been no wind at all, I may quite easily have been looking at a total loss. There were obviously lessons to be learnt from what I did wrong on the day – or more accurately, what I chose to ignore. However, there may well still be instances that occur, whether as a result of our own mistakes or due to circumstances beyond our control, where we're going to be left with a boiler burner still operating on a boiler with no water in it as our boat drifts slowly across the pond. No attenuator valve, or any form of electronic gas valve, is going to shut the flame down because there's no steam pressure without water, so the flame is going to remain on full. So, what additional feature might we consider including to save our precious models in such a situation? The answer is a gas shut off valve. What do I mean by that? Well, I am talking about a valve operated by a servo from your transmitter that can shut off the gas supply to the burner completely. Interestingly, the latest version of the electronic Automatic Boiler Control System from Denes Designs does include a gas shut off feature in the event of the feed tank running dry, but this can also be of limited value if the boiler is out of water and the feed tank is full, in the case of, say, the feed water system failing in some way. What we want is a valve that can be closed when we make the decision to do so should something untoward happen.

I have had conversations at the pondside on this very subject many times but, up until now, I've only been able to suggest valves that could be used in such a way. The challenges are that the valve must be capable of being operated from fully open to fully closed with the 90-degree movement of a standard servo. The two possible valves that could be considered are what are currently supplied as a gas control valve (see **Photo 1),** but that only shuts down to a pilot flame setting, and a water control valve (see **Photo 2)**, which, being designed for water use may not be sealed as well as we need for gas flow control. Now, however, we have another valve to consider, which is just in the process of being introduced to the market. It has been designed from the ground up by Martin Baylis of Martin Baylis Engineering and will soon become available directly through this company (https://www.model-steam-engines.co.uk/) or via Forest Classics (https://forestclassics.co.uk). This valve is designed specifically to control from fully open to fully closed with a normal standard servo, giving the operator the ability, in the event of something going wrong, to immediately shut off the gas supply. It does not do this by a rotational movement, as has been tried in the past. Instead, the valve is held open by a clip that fits in a groove that's machined into the valve spindle. If the clip is removed, the valve snaps closed. This has the major advantage that the valve under no circumstances whatsoever can re-open and allow gas

1



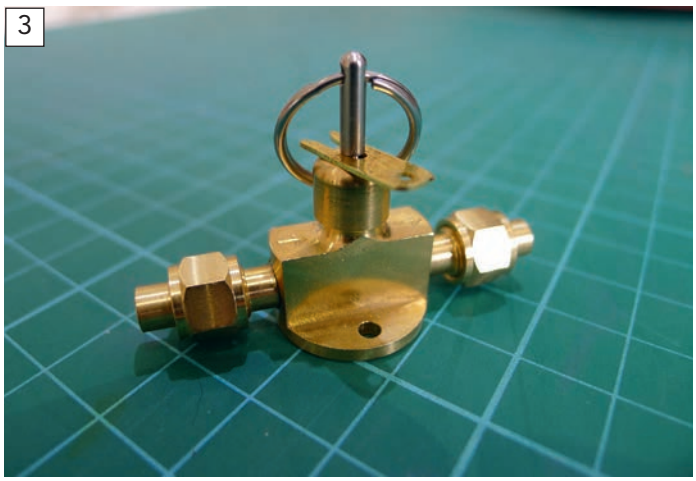
A servo operated gas valve such as this, that operates from open to closed in 90 degrees of movement, can be arranged to shut off the gas supply, but there's always the possibility that it could re-open if some other fault in the model allows it to.

2



Valves designed for water control also work from open to closed in 90 degrees of movement but, being designed for water, may not be sealed enough to prevent gas passing.

3



The new valve from Martin Baylis Engineering/Forest Classics operates by removing a brass clip, that allows the valve to close. The valve is held open by a spring.

4



When the brass clip is removed the valve snaps closed, completely sealing off the gas supply. There is no way that gas can pass again until the model is returned to the bank and the operator manually resets the valve.

"This valve is designed specifically to control from fully open to fully closed with a normal standard servo, giving the operator the ability, in the event of something going wrong, to shut off the gas supply"

to the burner again. Obviously, this will disable the model until such time as it can be recovered, but it does ensure that the boiler burner is permanently shut off, and no stray signal or unusual fault can re-open the valve. I am aware of one model boat club at least that stipulates all steam-powered model boats operated by its members must be fitted with such a gas shut off device. Whether other model boat clubs follow this lead remains to be seen, however, it's still well worth considering.

The valve

So, having had a look into the requirement for such a valve and discussing it with the kind people at Martin Baylis Engineering and Forest Classics, they agreed to let me have one of their new valves to try out before it actually hits the shelves. The valve arrived in my workshop and was unpackaged for a close inspection. As with everything that comes from Martin Baylis Engineering, I was immediately impressed by the quality of the machining. The brass valve is beautifully finished, and the valve spindle comes fitted with its securing clip affixed to the groove in the spindle (**Photo 3**). I had a play with the clip and thought it felt a little tight to remove. As it's made of thin brass plate, however, I found the clip could be eased open slightly, making for a much easier fit on the spindle and therefore requiring less force to remove it. The spindle is spring loaded so that if the spring clip is removed the valve will immediately snap closed (see **Photo 4**). The valve is small and light, so should prove easy to fit into most existing steam plant installations, and the valve body incorporates a flange with two mounting holes drilled into it. The valve can therefore be secured to any suitable spot around the model. I suspect the valve will work even if only supported by pipework, but that would very much depend on the free length of pipe and its rigidity. The valve comes fitted with ¼ x 40 tpi nuts and cones to suit 1/8-inch pipe.

5



A perfect boiler to set up a demonstration of the valve operation: Richard's Pendle vertical boiler was fitted out and clad for a review article in 2018 and hasn't done a lot, apart from attend shows, since then.

6

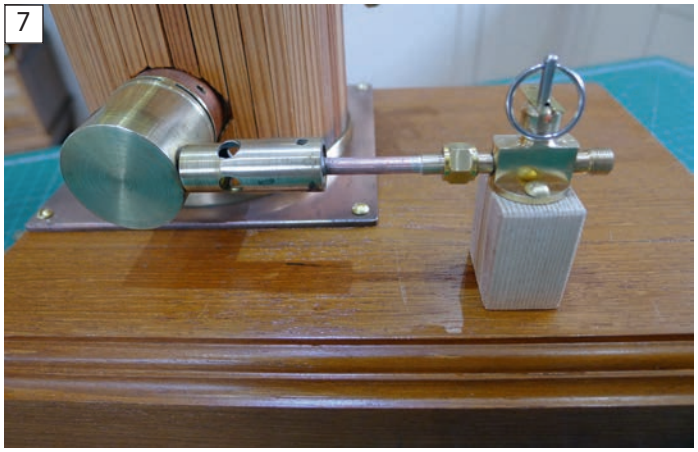


The shut off valve was mounted on a wooden block to bring it up to the centre height of the burner, which would then allow a nice straight pipe run from the burner to the gas bottle.

The installation

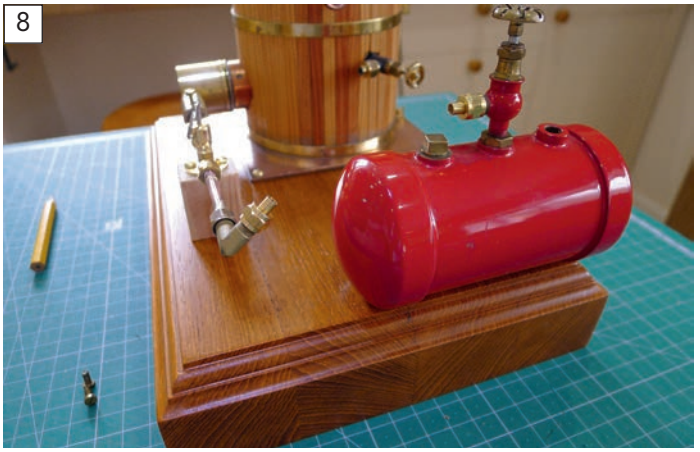
The options I had with the valve were to either put it into one of my existing steam models or make up a test rig for it. With the former option I figured there'd be a bit more work required to locate the valve and the servo and then hide the servo with some appropriate woodwork. I decided that for the purposes of this review the latter option would not only be quicker but would better enable me to view the operation of the value and its associated bits and pieces. The disadvantages would be that I'd need to make up pipework from scratch and add a battery and a receiver to observe the valve operate under normal conditions. I therefore decided to get out a Pendle vertical boiler that I reviewed in the March 2018 to June 2018 instalments of Boiler Room. The boiler was fitted out with cladding, and all the necessary mountings, so would

7



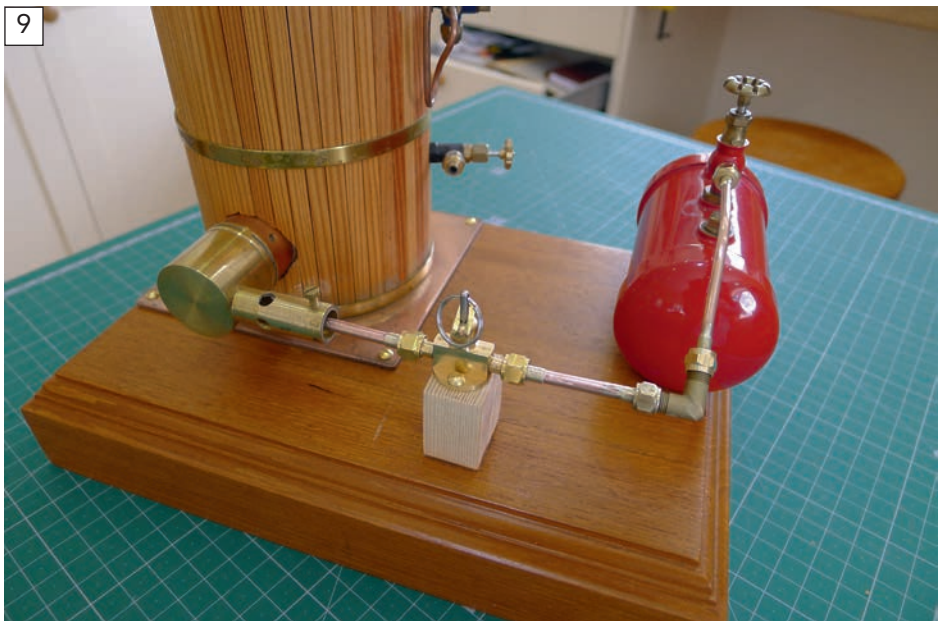
White it may be possible to rely on pipework to support the valve it would need to be particularly rigid as the force required to reset it would tend towards fixing it firmly to a structure with the screws in the base.

8



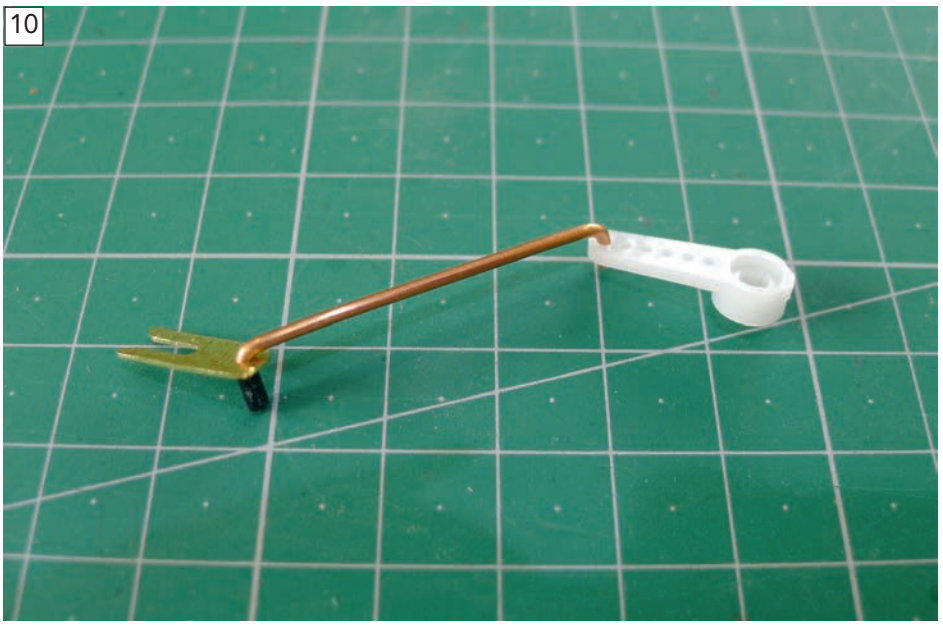
Using a 90-degree elbow makes for a more flexible pipe run to the gas tank valve and avoids a 90- degree bend in the pipe. Richard could have made up an entirely new pipe, but why make things more difficult?

9



In the end, neat enough for a demonstration and display set up. It might well sit on a table at a couple of shows this year.

10



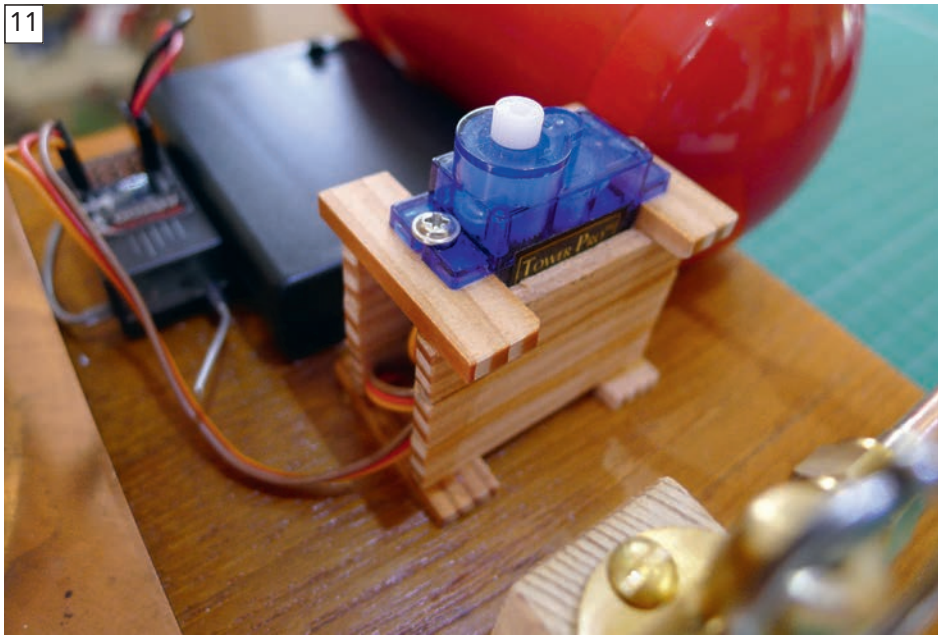
Although Richard would normally fit an adjustable clevis on his servo linkages, for a simple operation like this a fixed length of copper wire did the job. The brass clip was secured with heat shrink and a spot of cyanoacrylate glue.

make a perfect subject on which to test the gas shut off valve (see **Photo 5**). I also had available a spare refillable gas tank, a spare receiver, a spare battery box, a spare micro servo and even a spare block of wood to mount it all on, I was feeling lucky.

The first job was the pipework. I screwed the boiler down to the wooden base in the corner to give me the most room, then mounted the gas shut off valve on a block of wood so I could sit it at the same height as the burner, giving a horizontal pipe run. I didn't have any brass screws small enough to fit the valve base, so I drilled the holes out to suit the ones I had and screwed it to the wood block (see **Photo 6**). The pipe that was supplied with the boiler was 5/32" pipe, so I replaced the cones supplied with the valve with 5/32" ones and simply cut the pipe in half. The ends were cleaned up and the cones silver soldered to the ends. The pipework was then assembled (see **Photo 7**) and an elbow fitted to the free end of the pipe to determine the position of the gas tank relative to the right-hand edge of the base. With the location sorted, the base was drilled and a long countersunk set screw used to secure the gas tank (see **Photo 8**). With the gas tank in place, a section of 5/32" pipe was made up with silver soldered cones and ¼ x 40 tpi nuts to connect the gas tank outlet valve to the elbow, making for a neat pipe run. Once the pipework was finished, the wooden base that the shut off valve was screwed to was glued to the base with a spot of epoxy glue (see **Photo 9**).

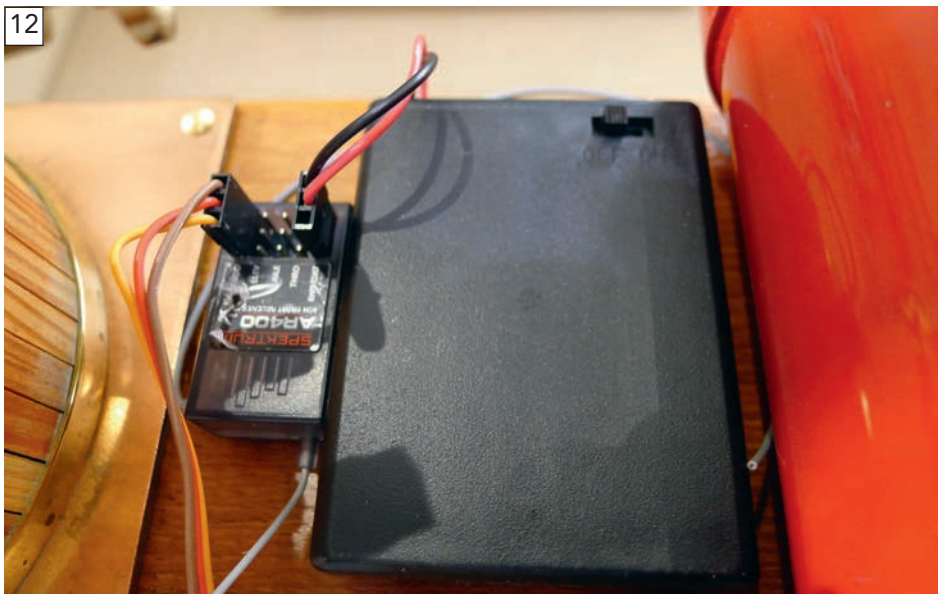
Next the electronics… Luckily, I had a spare old receiver but, unfortunately, it was only a four-channel receiver. If I was fitting this into a model, I would want to operate the valve with a simple on/off channel, but the four-channel receiver only has four proportional channels; good enough to do a

11



A wooden frame was cobbled together from softwood strip to bring the servo up to the same height as the shut off valve, which also allowed the spare cable to be tucked away below the servo.

12



The battery box cable was fitted with a servo lead plug, and the box and the receiver were simply fixed to the base with a piece of double-sided foam tape.

demonstration but not how I would fit it into a model. An appropriate servo plug was fitted to the battery box cable and the receiver was bound with my Spektrum transmitter. When that all worked, I plugged in the micro servo and decided on the best attitude to mount it. I only required 90 degrees of movement to pull out the brass clip and the micro servo looked like there would be ample movement on the end of the servo arm. I was thinking initially that it would be nice to have an adjustable linkage, which is how I'd normally arrange a servo linkage, but in this case the brass clip has a couple of millimeters of play in it, so I decided that wasn't necessary. I therefore used a short section of domestic cable electrical copper core. The brass clip was mounted on the end and secured with a small piece of heat shrink, and the servo arm was drilled out to suit the copper wire (see **Photo 10**). The micro servo was mounted into a wooden frame, which lifted it to the appropriate level for the valve clip, and the micro servo was also epoxied onto the wooden base (see **Photo 11**).

The final job was to mount the battery box and the receiver, which was simply done with a piece of double-sided foam tape in a neat location next to the gas tank (see **Photo 12**), and fit the linkage (see **Photo 13**). Once the micro servo epoxy had cured the spare cable was wrapped up underneath it and it was plugged into the receiver. With everything in place (see **Photo 14**), I couldn't resist a test run. I switched on the transmitter (see **Photo 15**,) and then the receiver battery and flicked the appropriate transmitter lever to operate the valve. It worked perfectly. Time to try it out for real.

The test

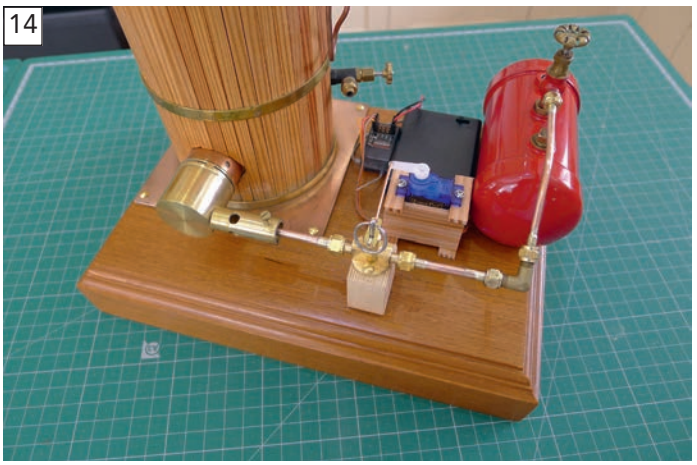
I filled the boiler up to around just over half a glass (see **Photo 16**), put some

13



The linkage was fitted and the micro servo epoxied in place. Note the valve has two arrows on the body to indicate the gas flow. The valve must be fitted the correct way round to ensure that the gas is sealed off completely when the valve operates.

14



Quite a neat little demonstration and display set up, with the working of the valve in a real live boiler setting easy to see.

15



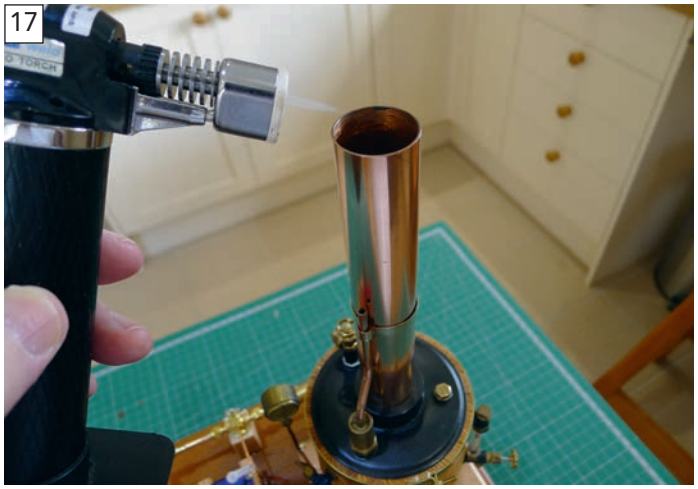
Richard couldn't resist a quick test with the transmitter. The servo operated and pulled the brass clip out neatly; with no way the valve could allow gas to pass once operated. Time to get the boiler flashed up!

16



Richard didn't need a boiler at a normal level for boat operation, just over half a glass was plenty enough to let a pressure build up and give a realistic condition.

17



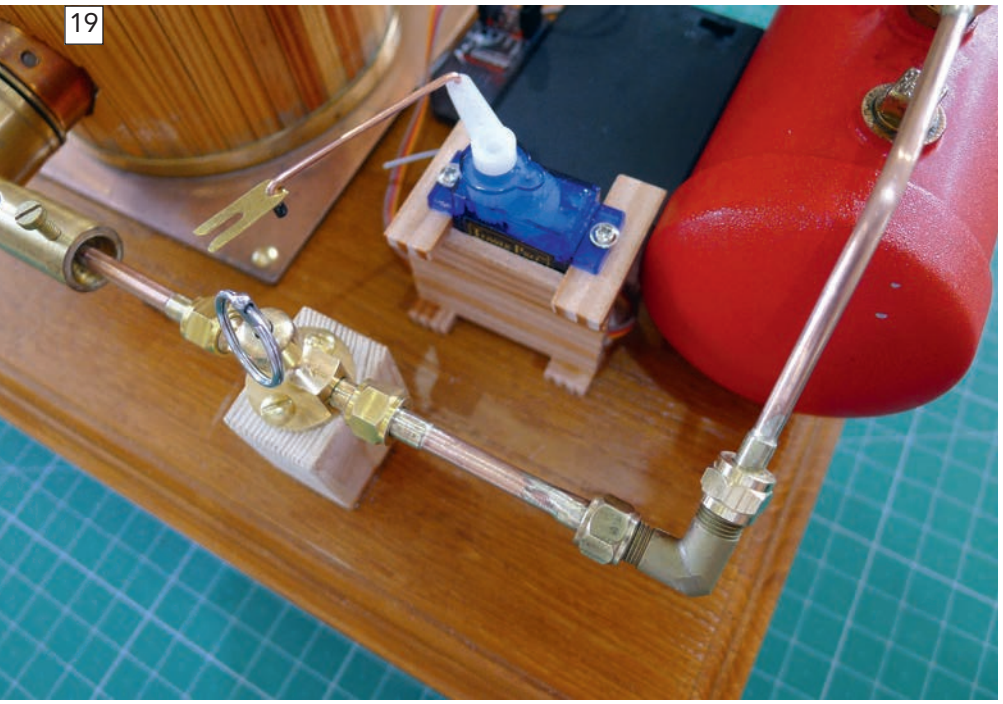
The boiler lit first time and the burner sounded good, which was a bit of a surprise as it hadn't been fired up for a number of years! Things were going surprisingly smoothly.

18



Just shy of working pressure Richard to operate the valve. Using a proportional channel meant that he only had to move the appropriate lever over, and it didn't matter if it centralized again as the valve cannot reset itself.

19

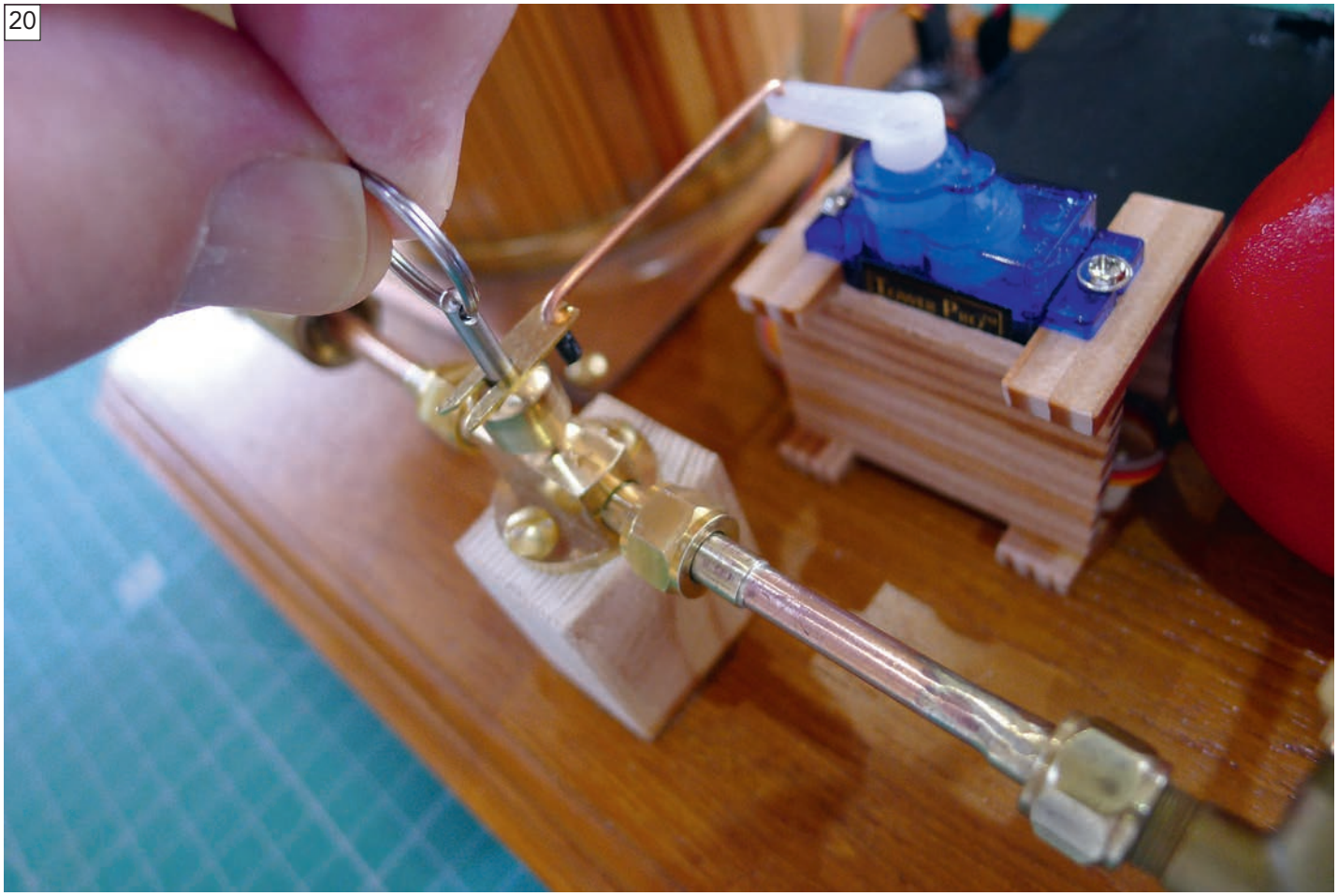


Once the brass clip is removed the valve closes and the gas is immediately shut off. Quick, easy, failsafe, does the job and, hopefully, prevents any unpleasant damage to a model boat.

"There is no way that gas can be opened up again until the boat is returned to the bank and the operator can gain access to the valve"

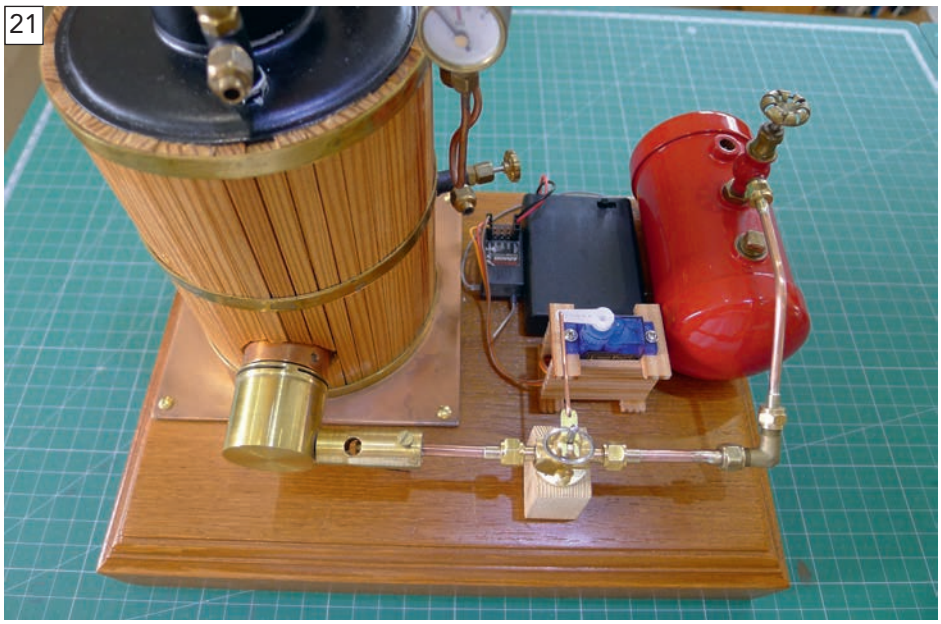
gas in the gas tank and fired up the boiler (see **Photo 17**). It hadn't been run for a few years so I was pleased to see that it lit and worked as usual. The shut off valve was set, the valve on the gas tank opened up fully and the boiler quickly came up to pressure. I didn't need to see a high pressure to prove the valve worked, I just wanted to see it worked under normal operating conditions. Once the pressure was just short of the normal working pressure (see **Photo 18**), I operated the valve. The servo pulled the brass clip out, the valve closed (see **Photo 19**), the gas immediately shut off completely, and the burner went out. Simple, effective and efficient, the valve worked perfectly. There is no way that gas can be opened up again until the boat is

20



The valve can only be reset manually by pulling up the valve spindle with the key ring type split ring and sliding the brass clip back into the groove cut into the spindle.

21



All in all, a nice little demonstration set up that can shows how this valve works and what it can do for you.

returned to the bank and the operator can gain access to the valve. To reset the valve two hands are required, so when mounting it in a model this should be taken into consideration. One hand is required to lift the valve spindle with the fitted key fob type clip ring (see **Photo 20**) while the other replaces the brass clip into the groove in the spindle. The spring in the valve is quite strong so it does require a degree of force to lift the valve, which obviously then ensures a good sound gas shut off. Having said that, the micro servo operated the valve easily, so a small servo can be used which can then easily be hidden in the model somewhere. One thing I did notice during the test was that the valve became quite hot, so I'd recommend not mounting it too close to the burner when installing it.

Conclusions

So having fitted the gas shut off valve into an operational boiler set up I can say without hesitation that the valve works perfectly. It is secure in so far as, once it is operated it can in no way be reopened until the model is returned to the bank and manually reset. The valve is small, light and very neat, is easy to install in any existing pipework and can simply be operated with any existing transmitter and receiver set up. A micro servo does the job perfectly so should be easy to install and then hide and simply plug into a spare channel in the receiver. An on/off channel would be best, but a spare proportional channel could be used as the valve won't reset even if the servo returns to its normal position. If I'd had one of these values fitted when my *Borkum* model caught fire, as described last month, it would have saved me having to reclad the boiler, so I highly recommend this addition to any steam plant installation (see **Photo 21**). ●

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**

Award winning *BAT*

Recently I purchased, through the builder's estate, the award-winning 1:8 scale live steam model of the steam launch *BAT*, scratch built by the late Frank N. Norton of Birchington, Kent. What initially appeared to be an exceptional model has gradually revealed itself to have a remarkable and extensively documented history.

The model is accompanied by what I believe to be an exceptionally rare archive, including the original International Model Engineering Exhibition Gold Medal, the original Gold Medal certificate, Olympia exhibitor display card, Frank Norton's original construction notes, extensive build photographs, workshop engineering photographs, photographs of the model under steam, original photograph albums, research material used during construction, the original archive CD and the original purpose-built storage and transport case.

Since purchasing the model, I have spent considerable time researching its history, and one of the most rewarding discoveries has been finding just how well its exhibition career was documented within the pages of *Model Boats* magazine.

Included within the archive is an original copy of the April 1997 issue of *Model Boats*, in which Frank Norton and Steam Launch *BAT* features.

I have also acquired an original copy of *Model Boats* from November 1984, which contains the excellent four-page article on Keith Townsend and his



The late Frank N. Norton of Birchington, Kent, with his scratch build of the award-winning 1:8 scale live steam launch BAT.





celebrated 1:8 scale Steam Launch *BAT*. It provides fascinating historical context for one of the finest model steam launch designs ever produced and makes for an interesting comparison with Frank Norton's own interpretation.

Perhaps the most fascinating part of the research is that the archive supports exactly what your April 1997 article describes. Frank was clearly never satisfied with simply winning. His own construction records and photographs show that, after achieving First in Class and Best in Show at Windermere, he dismantled significant parts of the completed model to improve its historical accuracy. The deck was completely re-planked, over 300 individual deck plugs were fitted, and the original steam engine was removed and replaced with the beautifully engineered installation that remains in the model today before it went on to receive the Gold Medal at Olympia.

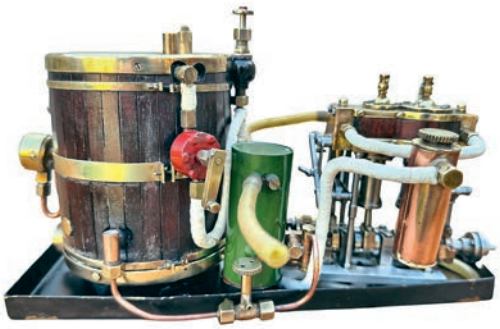
The archive also includes a copy of the original 1996 International Model Engineering Exhibition Competitors' Guide, which explains the judging criteria in detail. It describes the Gold Medal as "*the highest accolade that can be awarded*" and notes that "*only a very few entries reach this pinnacle of perfection*", placing Frank's achievement into context.

As someone who has developed a genuine admiration for Frank Norton's workmanship while researching the model, I felt this story might be of interest to fellow readers. After all, it's not often that an important exhibition-winning model resurfaces nearly 30 years later still accompanied by its medal, original documentation, construction archive, photographs and contemporary publications.

RICHARD DOWN
EMAIL

What a beautifully crafted model, Richard! And how wonderful that all the accompanying archive material related to it has survived and is now safely in your custodianship! Ed.









The model is now in the possession of Richard Down, who purchased BAT *complete with her original purpose-built storage/transportation case and a large archive of related material including research and build information, period photographs and awards won.*

USS *Constitution*

I have now completed the 1:72 scale kit for the USS *Constitution* from Agora Models, and I have to say, so far, she is the best I ever made. The level of detail is extraordinary (even the lower deck cannons are full, not half, replicas), and the quality of materials is top of the line. Even so, is always my preference, I have carried out some further customisation:

- The deck has a pattern of my own creation
- I've added the copper sheathing to the hull (using Billing Boats copper plates)
- The bulwark interiors have been painted green
- The ropes have been replaced with high end ones in three different colours – dark brown, black and tan – and in various sizes
- I've fitted LED lights throughout, and have scratch built three lanterns for the deck
- I've also intalled hammocks I made myself

This was a time consuming but incredibly rewarding project and I would highly recommend the kit to others.

JOHN ALIPRANTIS
EMAIL

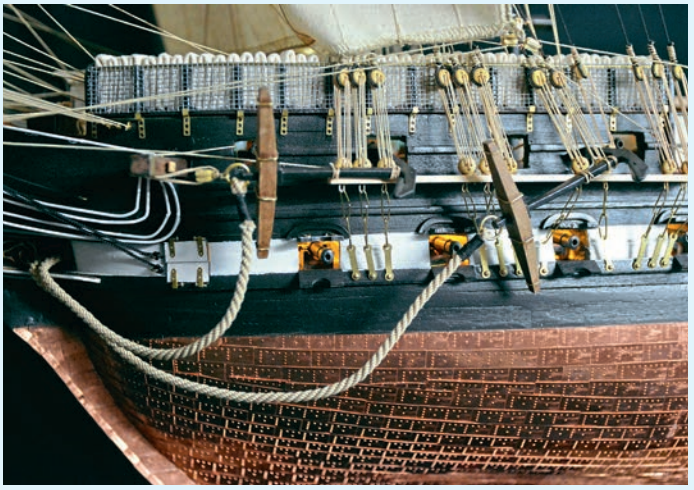


Another masterpiece, John – she really is exquisitely detailed. It's always a pleasure to share your magnificent work. Ed.

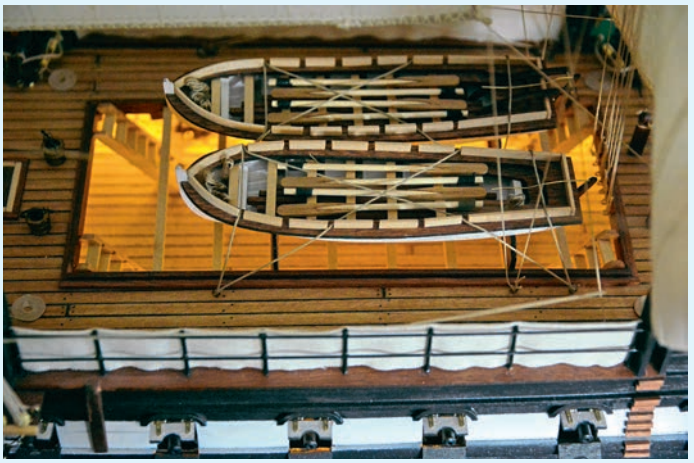












John Aliprantis's completed model of the USS Constitution, affectionately known as 'Old Ironsides', built from the 1:72 scale Agora kit and further splendidly customised.

Charmice

You may remember my 8ft 3in motor yacht, *Christine*, which you kindly featured in the Your Models section of the magazine some time ago now. So, I thought you might like to see my latest creation, which I've named after my granddaughter, Charmice (shown proudly modelling alongside the boat in one of my photos). This boat was built mainly from scrap pieces of wood that I had lying around in the garage, apart from the hull which was skinned in 3mm marine ply – a sheet of which I had left over from the construction of *Christine*.



Charmice out on the water.

I'd like to think that other people will find this boat as attractive as I do, and that she may inspire others who are thinking about starting a project of their own.

TIM DAVISON
EMAIL



Tim Davison's granddaughter, Charmice, poses with his latest build, which he's named after her.

Great to hear from you, Tim, and, once again, lovely work. Charmice looks delighted with her namesake, and thanks to her posing alongside the boat we get a much better sense of just how big the model actually is; something not so apparent from shot taken on the water from some distance. So, thanks to you both! Ed.

Alvis Stalwart gratitude

I really appreciate you having run my Alvis Stalwart appeal and would like to thank all those who replied, including Robert Hinton, the writer of the article I'd been looking for, who has kindly supplied lots of really helpful information.

I have now made a start and am sending you a photograph of work underway. Some details may, of course, need to be improved upon as the build progresses, but I will be forever grateful and raise a glass to you all!

CHRIS LLOYD
EMAIL

Thanks so much for this update, Chris. Can't wait to see the finished build. Ed.



Tim Davison's granddaughter, Charmice, poses with his latest build, which he's named after her.

Sea Falcon SOS response

Bravo to all of you who responded to John Bowkett's appeal for assistance in seeking a copy of the Sea Falcon article that appeared in the February 1961 edition of Model Maker. All scans and offers of help have now been forwarded on to John and have been much appreciated. Ed.



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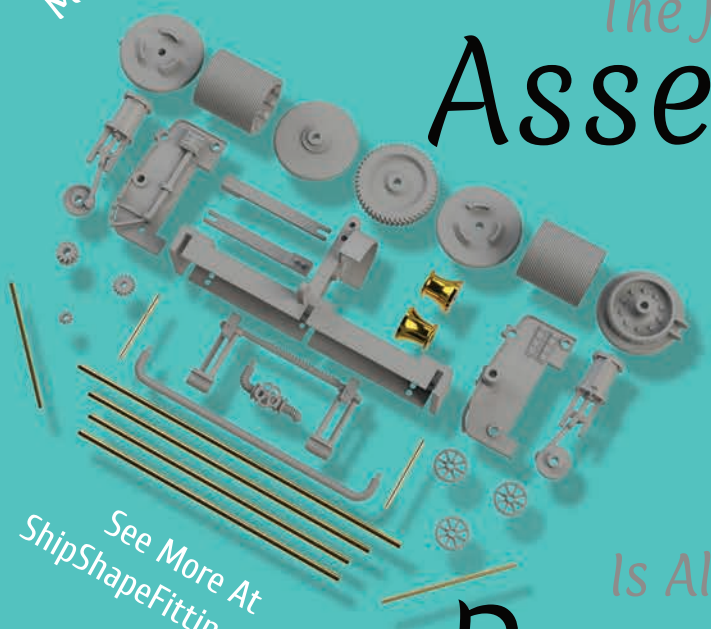
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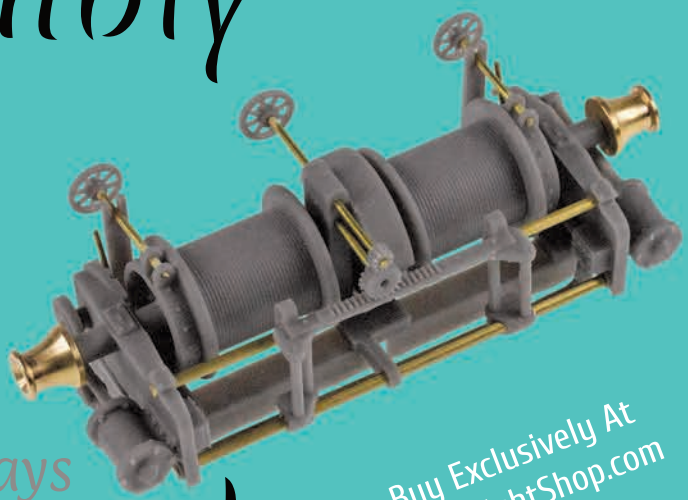
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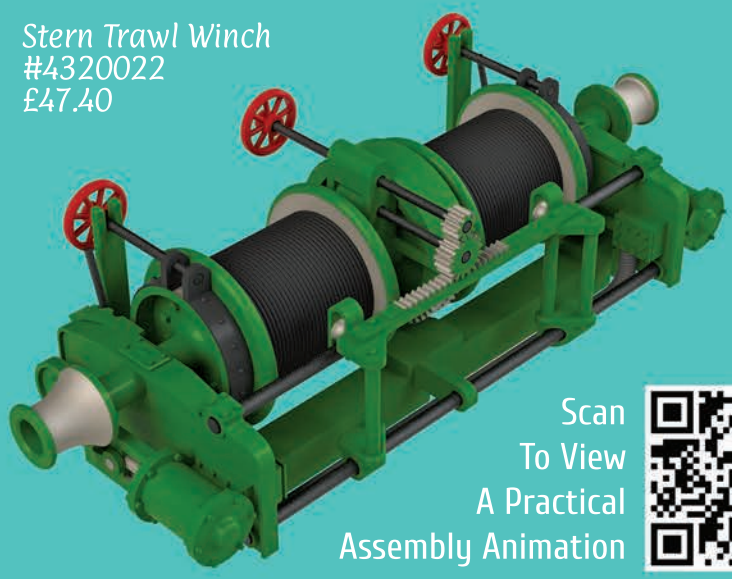
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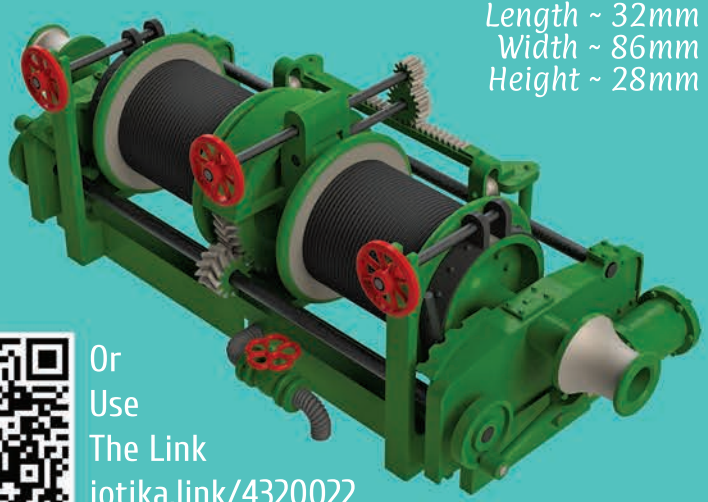
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