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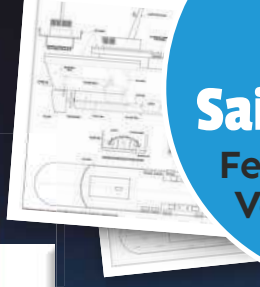

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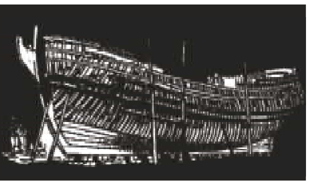

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This is just a selection from the huge range available

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1:24 Standing civilian crew member	£8.12
1:24 Seated crew figure wearing woollen hat	£8.12
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1:24 Civilian crew member standing wearing beret	£8.12
1:24 Civilian/R.N Officer wearing cap and pullover	£8.12
1:24 R.N/Civilian wearing waterproof jacket	£8.12
1:24 Standing civilian captain in sheepskin jacket	£8.12
1:24 Seated ships captain with cap and pullover	£8.12
1:24 Standing officer in wet weather jacket	£8.12
1:24 R.N/Civilian wearing waterproof jacket	£8.12
1:24 R.N crew in dress uniform leaning on rail	£8.12
1:24 Seated civilian crew member 1:24 scale	£8.12
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Crew member,1:32 Scale	£8.75
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Rigging Thread, 0.75mm Natural	£1.98
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Rigging Thread, 1.3mm Natural (10 mtr)	£2.54
Rigging Thread, 1.7mm Natural 5 mtr	£3.18
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This is just a selection of the range available.

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Lime Strip 0.6 x 4mm x approx 1 metre long	£0.38
Lime Strip 0.6 x 5mm x approx 1 metre long	£0.41
Lime Strip 0.6 x 6mm x approx 1 metre long	£0.44
Lime Strip 0.5 x 7x approx 1 metre long	£0.47
Lime Strip 0.6 x 8mm x approx 1 metre long	£0.25
Lime Strip 1.5 x 1.5mm x approx 1 metre long	£0.36
Lime Strip 1.5 x 10mm x approx 1 metre long	£0.73
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Lime Strip 1.5 x 5mm x approx 1 metre long	£0.55
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Lime Strip 1 x 1.5mm x approx 1 metre long	£0.36
Lime Strip 1 x 10mm x approx 1 metre long	£0.55
Lime Strip 1 x 2mm x approx 1 metre long	£0.37
Lime Strip 1 x 3mm x approx 1 metre long	£0.38
Lime Strip 1 x 4mm x approx 1 metre long	£0.39
Lime Strip 1 x 5mm x approx 1 metre long	£0.45
Lime Strip 1 x 6mm x approx 1 metre long	£0.50
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Lime Strip 1 x 8mm x approx 1 metre long	£0.53
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Lime Sheet 20mm thick x 100mm x 1 mtr	£31.76
Lime Sheet 3mm thick x 100mm x 1 mtr	£9.53
Lime Sheet 4mm thick x 100mm x 1 mtr	£12.71
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Scale Model Boats. Building & Operation	£9.95
Radio Control In Model Boats	£9.95
Introduction to Marine Modelling	£9.95
Ship Modelling Solutions	£9.95
Scratch Building Marine Models	£9.95
Super-detailing the Cutter Sherbourne	£19.00

This is just a selection from our huge range of books.

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Pin Pusher	£9.07
Waterline marking tool	£10.48
A3 cutting mat	£11.18
Pounce Tool with 4 wheels	£11.16

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SUBSCRIPTIONS
My Time Media Ltd., 3 Queensbridge, The Lakes,
Northampton, NN4 7BF.
UK – New, Renewals & Enquiries
Tel: 0344 243 9023
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EDITORIAL
Editor: Graham Ashby
Suite 25, Eden House, Enterprise Way,
Edenbridge, Kent, TN8 6HF.
Email: editor@modelboats.co.uk

PRODUCTION
Designer: Steve Stoner
Illustrator: Grahame Chambers
Retouching Manager: Brian Vickers
Ad Production: Steve Stoner

BUSINESS DEVELOPMENT MANAGER
David Holden: 07718 648689
Email: davidholden@mytimemedia.com

SUBSCRIPTIONS MANAGER
Kate Hall

MANAGEMENT
Commercial Sales Manager: Rhona Bolger
Email: rhona.bolger@mytimemedia.com
Tel: 01689 869891
Chief Executive: Owen Davies
Chairman: Peter Harkness

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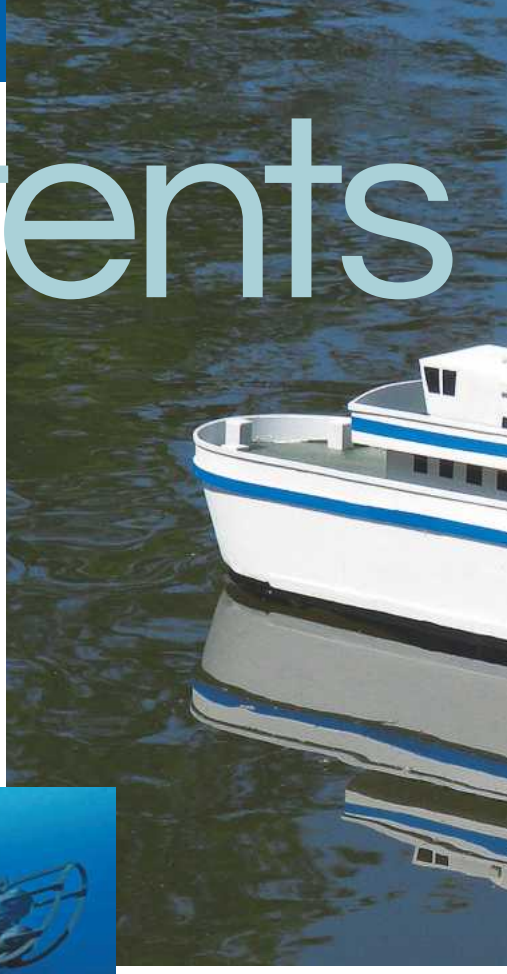
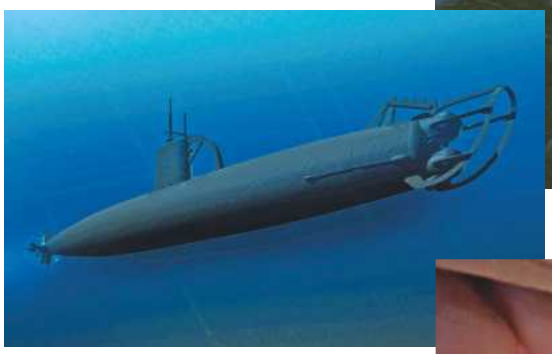
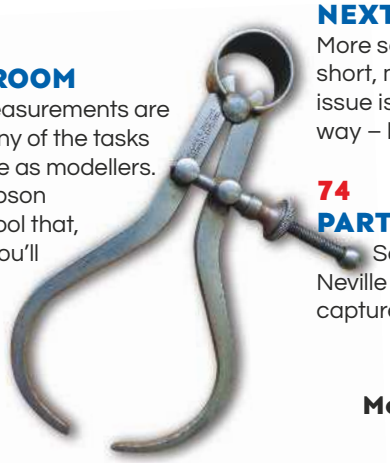
Regular Features







FREE PLAN!

36
JANUS
Aptly named after the mythical two-faced god of transitions, Glynn Guest details the design, the build and the unique handling characteristics of his island-hopping sea bus

Special Features

editorial

I have never really understood how modellers can adopt a discipline and stick with it, through thick and thin, for much or their hobby life. In many respects I admire this, for to do so is, surely, to love one particular genre so much that nothing else can compete for either one's time or one's attention. I often meet folk who, for example, only ever build tugs, do nothing but race sailing boats, or don't even register the existence of a ship that isn't painted grey and bristling with weaponry. As the years tick by I count myself very fortunate to be among the group of enthusiasts who can honestly say that they find something to inspire in just about every aspect of the hobby. As I thumb through the pages of this magazine, for example, I find myself desperately wanting Roger Suitters' outstanding NR-1 submarine, craving the sight, sound and smell of Phil Button's steam-sailer Mullogh, and genuinely inspired to have a go at making my own set of racing sails, as described by John Goodyear. But there's more. The external and internal detail on Bryon Calverley's outstanding troller has convinced me that I must properly detail the cockpit of my current motor boat build and, let's not beat about the bush, if that picture of Neville Wade's topsail schooner in Parting Shot doesn't make you want to rush out, get yourself a five-master and 'beat to windward' on a brisk day, nothing will.

With a new year comes the opportunity to draw a line under previous achievements, reassess priorities and make a determined effort to realise ambitions. With this in mind I'd openly encourage you to make 2018 the year that you try something different. If you've always wondered what on earth those confounded yacht skippers get out of sailing as close to the wind as possible in head-to-head competition, maybe you should have a go. You might just discover a tinge of excitement, underpinned with huge satisfaction and a camaraderie that only comes with shared tension, frustration and heightened emotions. On the other hand, it could be that you've never really had the time, or the confidence, to build from a plan but have always fancied doing so. In this case I say, bite the bullet, find a model that's manageable, then make this the year that introduces you to the immensely rewarding process of creating a working miniature of a vessel you love.

Model boating is a massively diverse hobby. There's so much to see, so much to try and so much to enjoy that it seems almost criminal not to have a go at something new every so often. Writing, as I am, at the dawn of 2018, I for one have plans to do exactly that during the next 12 months and if all goes well, you'll be the first to know.

Graham Ashby

Compass 360

Our news round-up from the model boating world

Editorial Contact: You can reach the Editor, Graham Ashby, via email to editor@modelboats.co.uk. The editorial postal address is: Graham Ashby, Model Boats, MyTimeMedia Ltd., Suite 25, Eden House, Enterprise Way, Edenbridge, Kent. TN8 6HF. Tel. 01689 869840.

BRASS MONKEY MEET

The weather lived up to the name of the Brass Monkey Marblehead event held on 10th December. Sailed at GMYC's Abbey Meads Lake in atrocious freezing conditions the forecast light showers and 20 to 40mph westerly winds were replaced with continual rain, sleet, snow and very little wind from almost any direction. The heavy snowfall further north prevented Phil Holliday from setting out but didn't stop Alf Reynolds and David Croom getting to Abbey Meads through the snow in Kent. Neither did it bother the Guildford team who erected two linked gazebos close to the edge of the southern bank to act as part of the control area for protection from the worst downpours. A ring of specially laid marks allowed windward legs to match the wind variation at some point around the course.

Rob Vice, who had upgraded his Uproar with a new Robot keel and new bulb, set the pace to win Race 1 from Roger Stollery's Uproar. He won again in Race 2 from Martin Crysell sailing a Prime Number. Then it was the turn of Peter Stollery to win from Roger, who then won Race 4. After another 2 races won by Rob and Roger there was a welcome break for lunch with the hot mulled wine, sausage rolls and mince pies helping to thaw out the frozen fingers.

As it began to snow harder, all agreed to another couple of races to end the madness and thaw and dry out properly on the way home. This, clearly, was a wise decision as it became difficult to see the boats through the blizzard conditions in the final race.

A tradition for this Christmas event, the prize-giving consisted of selecting by the order of finishing places, a wrapped prize, which was the entry fee. As this was the finale of the Games' events it was hoped to present the Midgley Memorial Mug to the winner, but the cold and wet was not conducive to doing the necessary calculations. That said, the top 3 are shown below.

Incidentally, the Marblehead events for 2018 have already been posted on the Guildford Model Yacht Club website at www.guildfordmyc.co.uk.

BRASS MONKEY

1.	Rob Vice	Uproar	11
2.	Peter Stollery	Uproar	11
3.	Roger Stollery	Uproar	12
4.	Martin Crysell	Prime Number	19
5.	Alan Viney	Priime Number	27
6.	Les Thorn	Paradox	31
7.	Alf Reynolds	Paradox	33
8.	Keith Bullard	Abel's	41
9.	David Croom	Starkers	49

GAMES

1.	Peter Stollery	378.9
2.	Rob Vice	348.8
3.	Roger Stollery	336.5

RED DRAGON

There's always something happening on our website at www.modelboats.co.uk indeed if you visit now you'll find a new competition to win an Artesania Latina plank-on-frame Chinese Junk kit. Featuring laser cut parts, premium quality walnut, sapele and basswood, step-by-step illustrated building instructions, plans, quality cotton thread, plus accessories in brass, wood and die-cast metal, it's the perfect model to get you going in this absorbing sector of the hobby.

Best of all, it's dead easy to enter! Just follow this link – http://www.modelboats.co.uk/competitions/ – register your details and we'll include you in the draw which closes on Friday 16th February. Best of Luck!

GOOD HOME NEEDED

If plank-on-frame static sailing ships are your bag and you have some experience in this field of model ship building, you might just be interested in the following from Donna Paterson.

"I have an unfinished project of my dad's that I have kept for sentimental reasons since he passed away six years ago. It's a half-built HMS Victory from the Sergal kit which I would now like to give to anyone with a passion for modelling and finishing my dad's project. My step mother was going to throw it away but I managed to save it from being put on the rubbish tip. My dad spent many hours putting the model together and since he was a joiner / carpenter by trade his attention to detail was meticulous. Anyway, I'm now looking for a good home for it. It's time to let it go."

From the photos that Donna has sent the hull appears to have been fully planked and looks to be about 80% finished. If you're interested, you have some previous building experience and you're looking for a model of Victory, contact the editor via editor@modelboats.co.uk and we'll put you in touch.

DIARY DATES 2018

24th March
Yeovil Model Show. Bucklers Mead Academy & Leisure Center, Yeovil. BA21 4NH. 10am to 4pm. Trade stands, hundreds of display models including boats from Shepton Mallet Drifters MBC, Warminster MBC, Yeovil Warship Association plus Weymouth & Portland MBC. Also aircraft, cars, military and much more. Free parking, hot and cold refreshments, advanced tickets available – email yeovilmodelshow@gmail.com or phone Ken on 07759 137000. Adults £5. Accompanied children (under 16) £2.50. Note, cash-only at the door.

5th & 6th May
Beale Park Spring Model Boat Show. See 'More Boats at Beale'. Contact Phil Montague on 07815 902045 or email phil.kentdda@yahoo.co.uk.

24th June
Alvaston Pirates Model Boat Club will once again be holding its annual regatta from 10am to 4pm. The day will comprise a display of models both on an off the water and, of course, visitors will be most welcome. There is ample free parking near the lake and the Waterside Café is available for refreshments. Details of the normal club sailing days and times, together with the location of the park and its facilities may be found on the club website at www.alvastonpiratesmodelboatclub.co.uk.

NEW POLL

Following the editor's short piece at the front of the magazine, if you visit the 'Model Boating Polls' section of the forum at www.modelboats.co.uk we're asking the question: "Of all the model boat disciplines that you've not yet tried, which would you most like to have a go at?"

With options that range from scale sail and square riggers to submarines, scale warships and yacht racing we'd love to hear your ambitions or 2018 and beyond. Incidentally, if you haven't already registered with the website you'll need to do this first but, fear not, it takes a matter of minutes and will give you access to all the member benefits, not to mention our latest FREE competition (see Red Dragon).

MORE BOATS AT BEALE!

Following last month's brief mention of Beale Park's Spring Model Boat Show on the 5th and 6th May, we're now able to furnish you with full details.

Run jointly by the Mid-Thames Model Boat Club and Kent Model Boat Display Team the show is open to all model boat clubs and their members who, we're told, can enjoy free entry to the Park, free parking and free overnight camping. Beale has a restaurant, childrens' play area, a Zoo and a miniature railway running around the extensive grounds. Organisers hope to provide modellers with numerous displays on the water and, in doing so, an entertaining day for all the family. For further details please contact Phil Montague on 07815 902045 or email phil.kentdda@yahoo.co.uk.

Test Bench

A round-up of all the latest kits, books and blingy bits

FREE LUNCH!

Test Bench is a service that we provide free of charge to manufacturers, distributors and retailers of model boat-related product. Covering all disciplines, anything from books to balsa is accepted for these pages. To submit material, email the editor via editor@modelboats.co.uk and make sure to include all relevant text and pricing information along with high resolution images. That's all there is to it. Don't let anyone tell you there's no such thing as a free lunch.

F-14 2.4GHz Package

For those who aren't familiar with it, the F-14 is Futaba's 4-channel 40MHz tray-style universal radio system that has the ability to be expanded to a full-function 8-channel transmitter featuring a multitude of control and accessory switches. Features include servo reverse, three blank panels for the installation of 24 option switches, two blank panels for optional channel sliders, a large battery compartment for NiMH packs of up to 3500mAh capacity (14 hour operating time) and a rather desirable twin-stick motor (or jib / mainsail) gimbal unit. Of course, most of that is old news, however you may not have been aware that the F-14 is now being offered with a 2.4GHz conversion module, R3008SB receiver and S148 servo. For anyone with an eye on building a submarine or swapping to 2.4GHz to operate a surface model with multiple 'bells and whistles', this transmitter could be the perfect partner.

Who can resist the optional twin stick throttle gimbal?

Expect to pay £159.99 for the standard 40MHz combo (complete with R168DF 8-channel receiver and S148 servo) and £379.99 for the 2.4GHz combo package (complete with R3008SB receiver and S148 servo). Check it out at **www.ripmax.com** or pop along to your local Ripmax stockist for a closer look.

Magic Vee

We all want model boating to thrive, we're all keen for youngsters to get involved and with this in mind there's every chance that the Joysway Magic Vee V4 can play a part. Boasting a top speed of 20km/h from its water-cooled 180 motor and 6V 280mAh NiMH battery, it comes supplied ready-built with everything needed to get you on the water fast, including a USB charger and pistol-style steer-wheel transmitter. Fast, agile and lots of fun it's everything you need for a low-commitment introduction to the hobby. Available from your local Ripmax stockist the Magic Vee V4 is priced at £44.99. **www.ripmax.com**

GP-850

Sparmax' new dual-action airbrush is supplied with both a round and fan-pattern air cap which delivers the minimum of overspray giving it an advantage over mini touch-up paint guns. It's great for small areas but also larger subjects where a high paint flow spray and wide spray patterns are required. Look forward to a 0.5mm nozzle and needle combination, a large 125cc removable gravity-feed fluid cup and a 5-year warranty! The price? A snip at £115.00. Check it out at **www.airbrushes.co.uk**

Soldering Helper

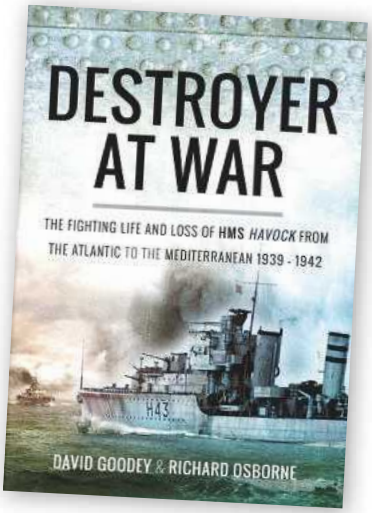
In answer to one of the most common problems when it comes to soldering – that of having enough hands to manage the job – Fastlad's new bench-top gizmo is guaranteed to take the frustration and faffery out of joining wires and soldering plugs. It's neat, it takes a variety of wire gauges and it's one of the most useful soldering aids we've come across. Oh, and at £4.99 it's dead cheap, too. www.fast-lad.co.uk

Destroyer at War

The Fighting Life and Loss of HMS Havock from the Atlantic to the Mediterranean 1939 - 1942

The destroyer, HMS Havock, second only in fame and glory to HMS Cossack, had earned her reputation guarding the convoys across the Atlantic in 1939, at Narvik in the abortive bid to stave off the German occupation of Norway in 1940, and in Dutch waters during the Blitzkrieg. Havock was then transferred to the Mediterranean, fighting in the Battle of Cape Spada in 1940, the Battle of Matapan in 1941 and the evacuations from Greece and Crete. Havock's duties in the Mediterranean continued, the ship being deployed off the Syrian coast, as well as escorting convoys to the besieged island of Malta and the equally beleaguered garrison at Tobruk. Then, in the Second Battle of Sirte in 1942, Havock was badly damaged and she limped into Malta for repairs. There she was heavily bombed and when Havock made a bid to reach Gibraltar, she was wrecked off Cape Bon. Her crew were captured and imprisoned in the infamous Laghouat internment camp in Algeria.

The authors, David Goodey and Richard Osborne have tracked down fifty of the surviving crew and from interviews have been able to compile one of the most detailed and certainly one of the most dramatic, histories of a destroyer during the Second World War. Destroyer at War tells the story of the battles and operations of a famous warship, one that had earned an astonishing eleven battle honours in its brief but glorious career.



Written by David Goodey and Richard Osborne, 293 pages, 241 x 165mm, over 38 mono photographs and maps. ISBN: 97811526709004. Price (RRP) £25.00. Published by Frontline Books, an imprint of Pen & Sword Books Limited, 47 Church Street, Barnsley, South Yorkshire, S70 2AS. Tel. 01226 734222 / 734555, website: www.seaforthpublishing.com. Available direct from the publisher or through the usual retail outlets – **John Deamer.**

French Warships

In the Age of Sail 1626 – 1786. Design, Construction, Careers and Fates

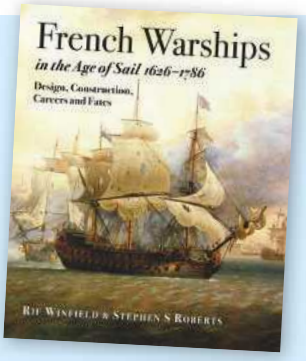
The origins of a permanent French sailing navy can be traced to the work of Cardinal Richelieu in the 1620s, but this naval force declined rapidly in the 1650s and a virtually new 'Marine Royal' had to be re-created by Colbert from 1661. Thereafter, Louis XIV's navy grew rapidly to become the largest and most powerful in the world, at the same time establishing a reputation for the quality of its ship design that lasted until the end of sail.

The eighteenth century was to see defeat and decline, revival and victory, but by 1786 the French Navy had emerged from its most successful naval war, having frequently outfought or outmanoeuvred the British Navy in battle, and in the process it made a major contribution to American independence.

In this new book, the authors, naval historians, Rif Winfield, and Stephen S. Roberts, provide the first comprehensive listing of these ships in English, that follows the pattern set by its companion volume, on the 1786 – 1861 period, in providing an impressive depth of information. It is organised by Rate, classification and class, with significant technical and building data, followed by highlights of the careers of each ship in every class. Thus, for the first time it is possible to form a clear picture of the overall development of French warships throughout the whole of the sailing era.

Certain to become the standard English-language reference work, its publication will be of utmost importance to naval historians, period warship modellers and general readers who are interested in navies in the age of sail.

Written by Rif Winfield & Stephen S. Roberts. Hardback, 438 pages, 297 x 255mm, over 200 illustrations, photographs, line drawings, ship plans, diagrams and maps in mono. ISBN: 978-1-4738-9351-1. Price



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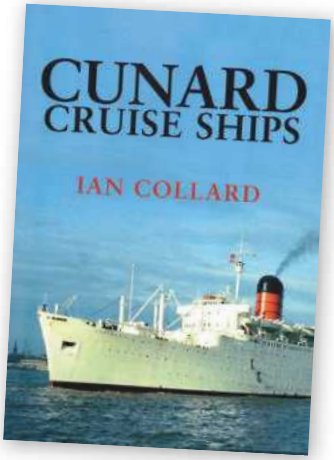

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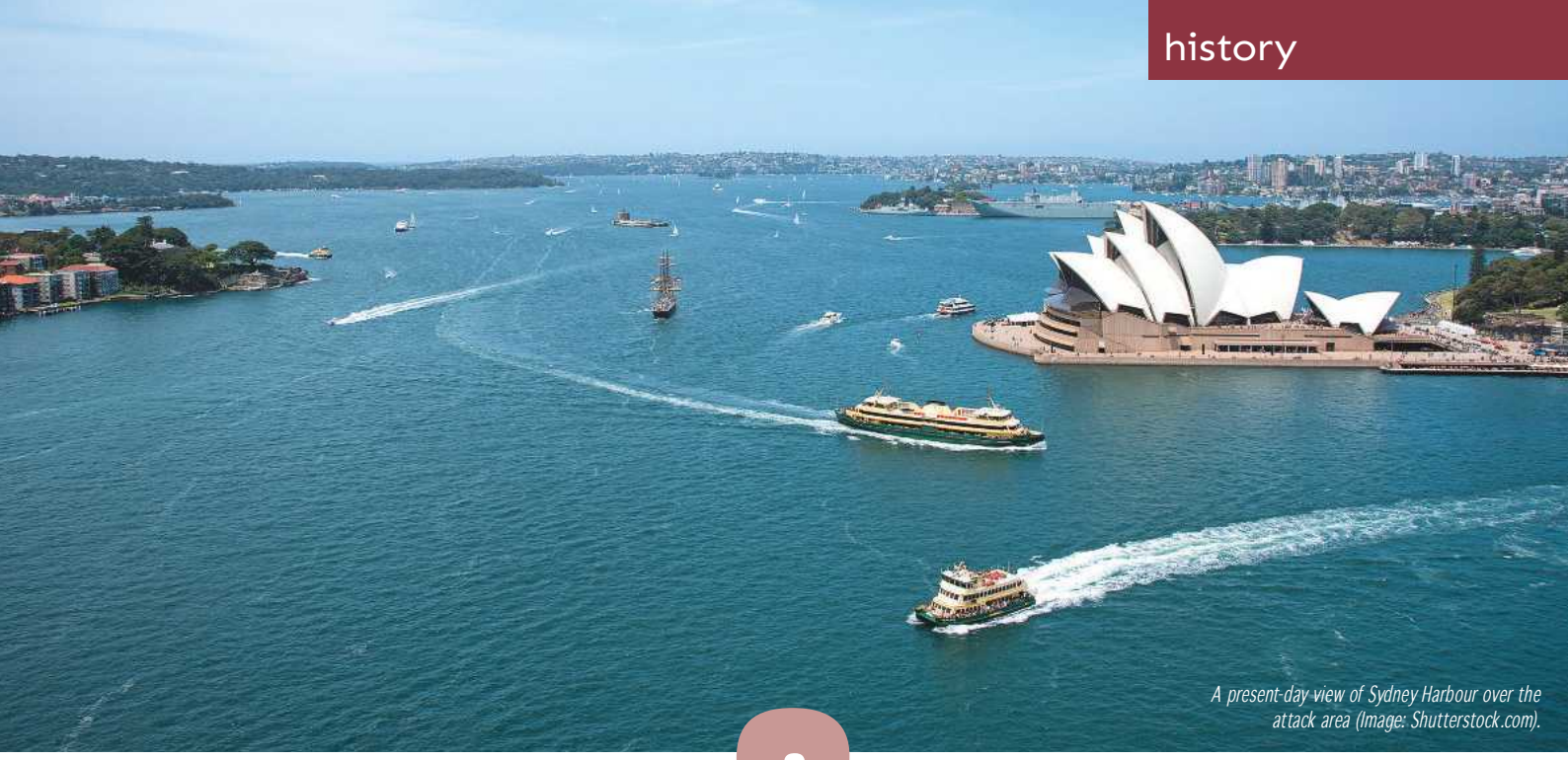


A present-day view of Sydney Harbour over the attack area (Image: Shutterstock.com).

Flotsam & Jetsam

59: The Sydney Harbour attack

John Parker remembers the Japanese submarine that almost wrought havoc on two unsuspecting capital ships back in 1942

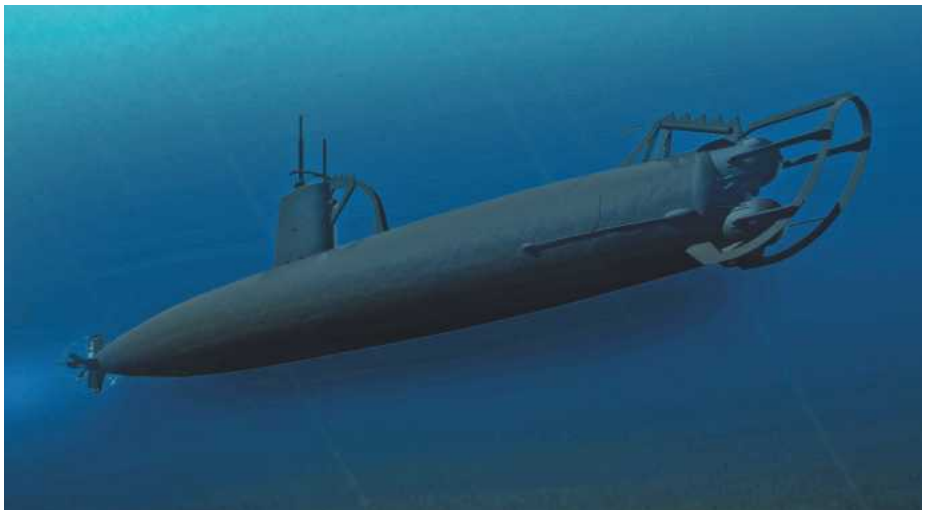
On Sunday 31st May 1942, three Japanese midget submarines penetrated Sydney Harbour under the cover of darkness. They not only found the harbour well lit up but had been able to use the Macquarie and Hornby lighthouses as beacons to guide them to through the heads. Several capital ships were at anchor amidst the criss-crossing paths of the harbour ferries, including the cruisers USS Chicago and HMAS Canberra, whilst repair work was in full swing under the floodlights of Garden Island Dockyard. Every indication pointed to the defences being at a low state of readiness, at a place far from where the Pacific war was being fought. The complacency was soon to be shattered...

The attack

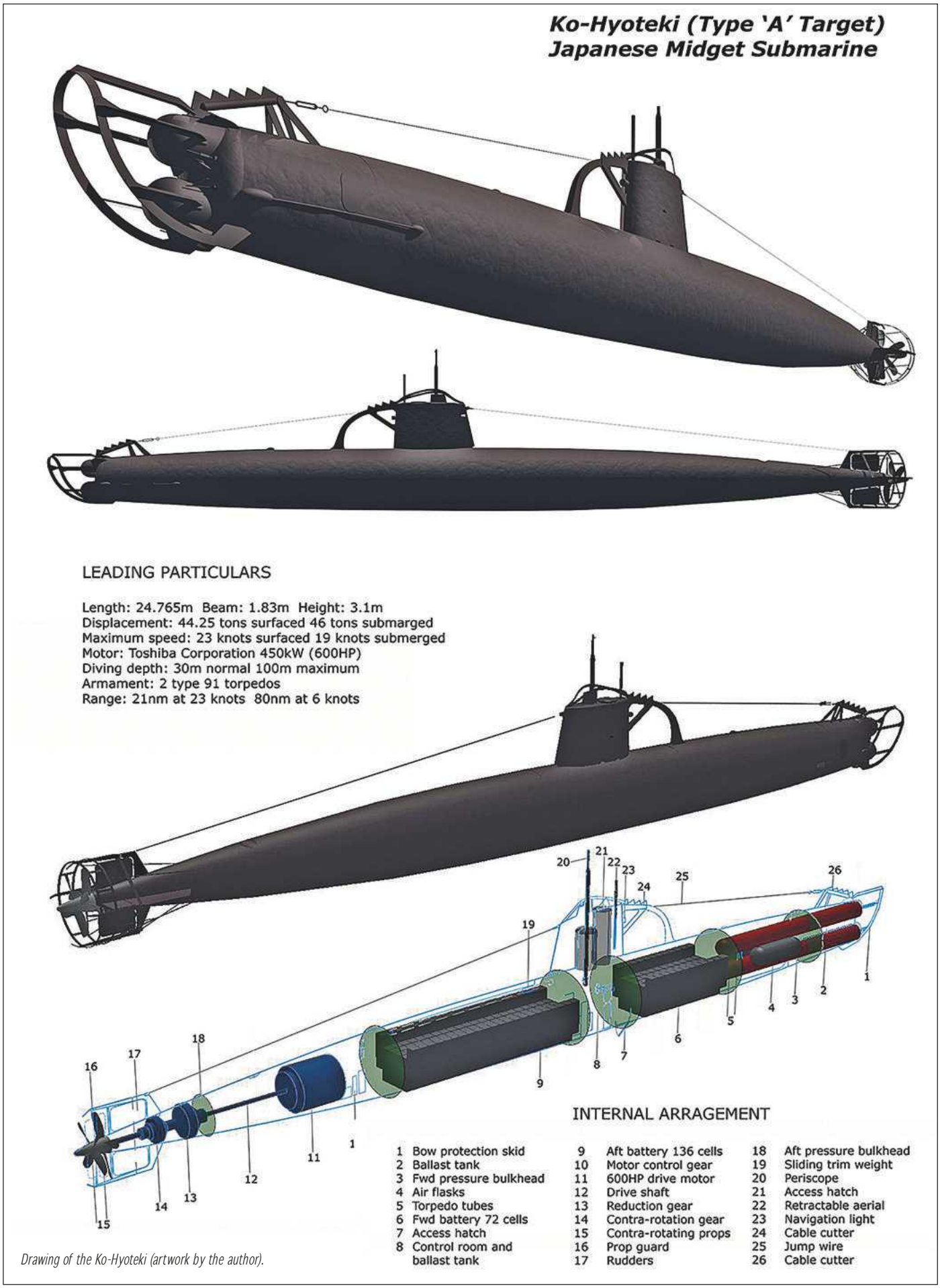
The first submarine to enter the harbour was the M-27 (using the usual convention of naming it after its mother submarine, the I-27, which had carried it to the vicinity of Sydney from Japan). It entered the harbour at 8:01pm in the wake of a ferry and its passage was detected by the inductive loop strung across the harbour entrance. However, the blip on the trace of the recorder was dismissed as an anomaly. It then got caught in an anti-torpedo net and broke the surface during attempts to thrash its way out. With this, the conning tower was sighted by a watchman whose report of a submarine, when it was finally believed, led to a belated sounding of the general alarm at 10:27pm. Before decisive action could be taken, the crew of the trapped M-27 detonated their scuttling charges and blew themselves up along with their craft.

Just before the general alarm was sounded, submarine M-24 entered the harbour and got into a firing position on the USS Chicago. It was spotted by an unusually alert searchlight operator aboard and the ship opened up with small arms fire as the target was too close for the 5 inch guns to bear. The harbour defences were, by this time, starting to wake up, but there was much confusion with orders being given and then countermanded and a general reluctance to believe they were under attack. The M-24 withdrew and manoeuvred into a new firing position off Bradley's Head, where the Chicago was silhouetted against the lights of Garden Island.

The third submarine, M-22, approached a harbour that was now on full alert and was soon attacked by patrol boats dropping depth charges. Having suffered uncertain damage, it remained stationary on the bottom for the next few hours. Shortly after midnight, the floodlights on Garden Island were finally turned off and M-24 fired its first torpedo. The

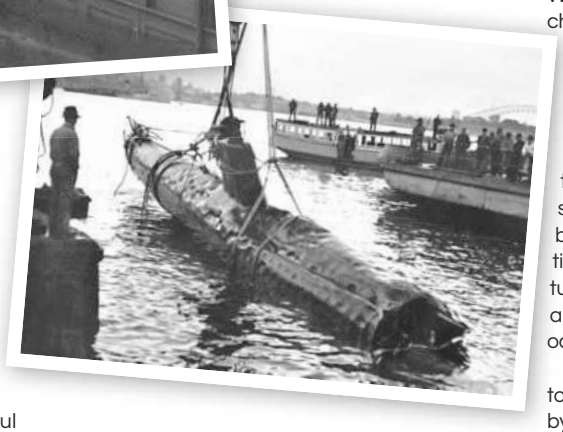


A Ko-Hyoteki midget submarine depicted underwater (artwork by the author).



Drawing of the Ko-Hyoteki (artwork by the author).

The requisitioned ferry HMAS Kuttabul was sunk at its mooring (Australian War Memorial photograph).



The stricken M-22 being recovered (Australian War Memorial photograph).

USS Chicago was, by this time, desperately trying to raise steam, making smoke that streamed back across the superstructure and gave it the appearance of being underway while still, in fact, stationary. Indeed this may have caused the M-24's aim to miss. The torpedo passed across the bow of the USS Chicago and exploded against the wall of Garden Island, badly damaging the Dutch submarine K9 and sinking the requisitioned ferry HMAS Kuttabul with the loss of 21 ratings who had been sleeping aboard. The second torpedo ran aground without exploding and M-24 then escaped from the harbour, leaving a spike on the trace of the loop recorder to mark its exit.

Around 3am the M-22 resumed its attack and entered the harbour, but was pounced upon by the patrol boats which managed to sink it with depth charges two hours later. The next day when the craft was recovered, they found the crew had died from self-inflicted bullet wounds to the head and a damaged bow skid had prevented the submarine from firing its torpedoes. The mother submarines, after waiting until 3rd June in the forlorn hope of recovering their charges, headed back to Japan, ineffectually shelling Sydney and Newcastle on their way.

The fate of M-24 was not known until 2006, when its wreck was discovered off Bungan Head, the remains of its two crew members presumably still inside. The relatively undamaged bow of M-22 and stern of M-27 were assembled into one visually complete composite submarine and taken on a tour of southern states by truck to raise funds for Australian troops overseas. Today it is the centrepiece of a permanent exhibition at the Australian War Memorial.

Thus, more by luck than design, the Allies had managed to thwart the Japanese attack and avoid what could have been a serious loss of ships and men. The Japanese midget submarines, curiously known as the Ko-Hyoteki Type A Target, had shown serious deficiencies in the role of harbour penetration, but this was a role which they had never been designed for, and which in no way detracts from the considerable technical achievement that their design represented.

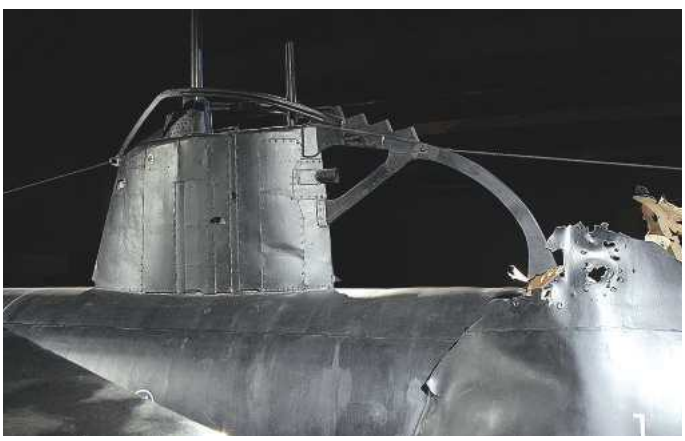
Ko-Hyoteki

Developed in the 1930s under high secrecy, the craft was designated Ko-Hyoteki Type A Target and produced under the guise of a high-speed submarine for target practice, whereas in reality it was intended for the long envisaged grand battle between the American and Japanese fleets. In this scenario, it was planned that large numbers of the craft would be released from their mother ships at a critical stage of the battle when enemy ships were heavily engaged by surface fire; they would then wreak havoc with their deadly torpedoes before diving away at high speed.

This explains the emphasis the design placed on high speed, albeit at the expense of range. There was no engine to drive a generator and recharge the craft's batteries, for the Ko-Hyoteki was purely electric and once the battery was exhausted it would have to be either recovered or scuttled. In prototype form, the Ko-Hyoteki achieved the unprecedented speed of 25 knots submerged. When the planned grand fleet strategy changed to one of a pre-emptive attack on Pearl Harbor, the craft was modified for harbour penetration, gaining cable cutters and a jump wire, elaborate guard structures for the torpedo tubes, propellers and conning tower, and it was given the ability to run in reverse. In this form its maximum submerged speed was reduced to 19 knots, but it was still the fastest submarine of its time. It was armed with two bow torpedo tubes in a vertical figure-of-eight configuration and was controlled by a two-man crew who occupied the small control room amidships.

That the Ko-Hyoteki found itself ill-suited to its new role in harbour attack is shown by its indifferent performance at Pearl Harbor, Diégo Suarez, Sydney and other deployments. Its only weapon, the torpedo, was not suited to a sneak attack as it would give away the position of the submarine either through causing it to bob to the surface (due to the submarine's poor depth control), through its wake, or the impulse of air used to fire it being highly visible to the vigilant look-outs. Despite the various guards that had been fitted, the Ko-Hyoteki was still very prone to becoming snagged in nets and underwater obstacles and a damaged bow guard could prevent the torpedoes being fired. It lacked endurance and the ability to recharge its batteries, though later versions attempted to address this shortcoming.

Restoration of the Australian War Memorial composite Ko-Hyoteki after forty years of storage in the open, revealed innovative weight-saving features and a high quality of materials and finishes. Traces of a zinc-rich coating were found on the hull and an acid resistant finish to the battery compartments, indicating that it was intended to have a significant service life and not just be expendable. Contrary to popular belief, it was never intended as suicide craft but in practice few of the crews survived.



Assembled from the relatively undamaged bow of M-22 and the stern of M-27 this composite hull is now on display at the Australian War Memorial and is well worth a visit.

Worth a go?

I have never seen a working model of a Ko-Hyoteki midget submarine, but I think it could be quite impressive. For a 102mm diameter hull (1:18 scale), the length would be 1376mm; 1:15 scale yields a hull 122mm diameter and 1651mm long. Bayonet separation of the hull into two or three sections suggests itself, as does the possibility of working torpedoes due to their large size at this scale. Only a small dive tank is required because of the small superstructure, but on the other hand the model would not be complete without the characteristic contra-rotating propellers and making these, along with the necessary shaft seals, would be a challenge.

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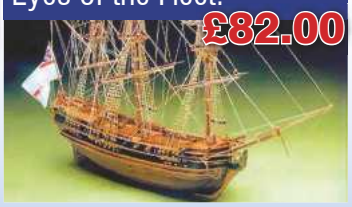

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NR-1

Not one to take the easy option, **Roger Suitters** scratch-builds the once secretive nuclear-powered engineering and research submarine

What to make next? This is a problem which faces most model makers at some time or other however the question was quickly answered for me as the American Nuclear Research Submarine No.1 (NR-1) had appealed to me for some time. It has a very unusual colour scheme, many rivets and vents on the deck and is refreshingly different in that it's nothing like the shape or form of a modern nuclear submarine.

Concept

NR-1 was conceived by Admiral Rickover during the 1960s and, to-date, remains the smallest nuclear submarine in the world to have been built. Its missions included search, object recovery, geological survey, oceanographic research and installation, and maintenance of underwater equipment. NR-1's unique capability to remain at one site and completely map or search an area with a high degree of accuracy was a valuable asset on several occasions. While being used as a research vessel, the submarine was painted red and black, making it easier to see. Notably, NR-1 assisted in the search for, and identification of, parts of the ill-fated Space Shuttle Challenger in 1986.

The submarine measured 45 metres (150 feet) in length, of which half was consumed by the water-cooled pressurised nuclear reactor. NR-1 was laid down in 1967, entered service in 1969, but was withdrawn in 2008. Propulsion was turbo-electric with two propellers, the drive units being mounted in the stabiliser / hydroplanes aft. Speed was 4.5 knots on the surface and 3.5 knots submerged. Normally, NR-1 was towed to its destination and there, with its crew of 11, plus two scientists, the submarine could dive to 3000 feet and remain there for some time.

Equipped with manoeuvring thrusters (bow and stern) plus an array of lights and a claw to retrieve any interesting objects on the sea bed, the crew was afforded precise control of the vessel if required, indeed it even had wheels that could be lowered from the keel so that NR-1 could actually roll along a flat sea bed. Notably, the submarine never received an official naval allocation, approved by the US Congress, but was home ported at the US Submarine Base in New London. NR-1 was never officially commissioned either, which is also worthy of note. In other words, it didn't officially exist, although on the internet there is a picture of the submarine together with an RN Type 23 frigate!

Quite a challenge

NR-1 seemed an interesting project to undertake but there remained one major problem. Details were (and are) few and far between and there are no plans available. That said, Jeffrey Larue of Sub-Committee fame and Mark of FX Models, who had produced a small static model of NR-1 for the US Navy, were able to answer many of my questions. Both live in the USA, so the internet was a boon, however unknown to me, Peter Washbrook, a close friend was also spending many hours on his computer, searching for photos of this unusual craft. So, a massive 'thank you' to these guys for all their help.

The plan of action was simple. Take a 100mm diameter acrylic tube for the main central hull section and design the model

around this key dimension. This would result in a model that was 1195mm long, which would be a practical size to handle and transport. The bow and stern sections would be GRP mouldings from masters (plugs) and these three items would, essentially, comprise the hull. Of course, it's not quite as easy as that but you get the idea. The thinking was that everything else would follow-on as you can't do much unless you have a hull! At this stage I also had no idea about how I planned to make it function, but that didn't stop me making a start.

Bow and stern plugs

The bow section as you can see is not like that of a modern nuclear submarine, nor is it like the classic diesel electric submarines of the W.W.II era. The stern section, meanwhile, is much simpler in that it's basically a shaped cone and could, therefore, be created using a lathe.

To start, cross-section frames were prepared with the aid of templates from the plan and glued together. The gaps between the frames were filled with expanded foam and more complex areas with a two-part foam mix **(Photo 1)**. With this, a hot-wire cutter was used to cut the styrene blocks to match the frames. In order to ensure that the diameter at the rear of the bow section was going to be identical to the 100mm acrylic tube central section, a 25mm long section of the same acrylic tube was cut and glued to the balsa bow plug at its rear-facing end. Now that the rough shape existed, Isopon P38 filler was applied all over to fill any obvious dents etc. The whole was then lightly sanded and a layer of Plaster-of-Paris applied up to the acrylic ring. Once dry, this was sanded to shape and another layer applied. This time, however, the Plaster-of-Paris was mixed with some GRP resin to create a harder and finer textured surface.

Exterior templates were made from cardboard and using these and workshop tools, the bow section was further sanded and filled to its approximate final shape. Once satisfied, a flat area had to be added to its lower section, this achieved by removing some of the plaster, then gluing a piece of styrene card in its place and filling any gaps. As you can see in **Photo 2,** this horizontal lower flat area acts as a reference point for the final shaping of the bow section. A similar flat section was also created on the top face of the bow for the 'run' to the towing mechanism **(Photo 3).** Clearly, the two have to be diametrically opposite one another and the line of the bow vertical between them. In this last picture, you can also see the groove on the starboard side around the bow section, which is for the recovery basket cable.

Stern cone

This was much easier in that it's basically a cone but with slightly curved sides. Only one template was needed, that being a piece of styrene card shaped to match the curve of the cone. The basic stern 'plug' of wood and foam was turned to shape on a lathe (with a tube inserted down the middle of it) and then coated with Plaster of Paris, as with the bow section. Much sanding then followed. Finally, when the plug looked reasonable, it was further trimmed in the lathe to end up looking as it does in **(Photo 4).**

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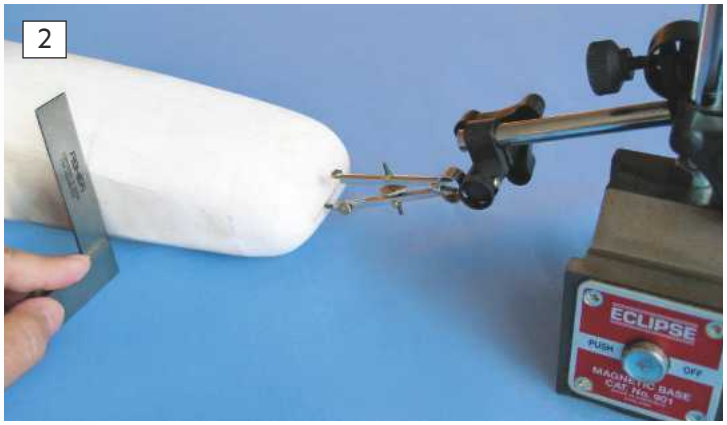

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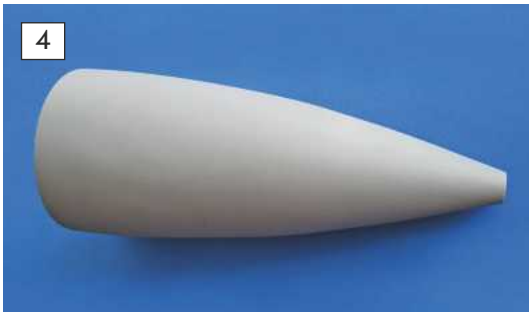


Readers will appreciate that the bow (and stern) units actually took many months to get right before detailing could commence and, of course, these were the 'plugs' for moulds and not the final components. Once I was (almost) satisfied, they were sprayed with grey primer to show any imperfections, which promptly resulted in more filling, more sanding and, yes, ...more primer!

Panel lines

In order to add the panel lines the bow plug was stood vertically and rotated by hand against a fine marker pen attached to a height gauge. To cut the fine shallow slot, a tool had to be made. This took the form of a U-shape frame cut from 5mm thick epoxy glass board. At the tip of each arm, slots were cut using a 0.18mm blade, whereupon the arms were slightly squeezed using a clamp and the self-same 0.18mm cutting blade glued into the slots, teeth facing outwards. Squeezing the arms enabled the frame to apply a slight tension to the blade, much like a hacksaw. With this, the U-frame was fixed to an 8mm brass tube which was secured to a height gauge with a spirit level positioned to check that the cutting blade was indeed horizontal. Once satisfied the blade was offered up to the marked line on the bow plug **(Fig.1)** and the plug slowly rotated to produce a fine and accurate slot.

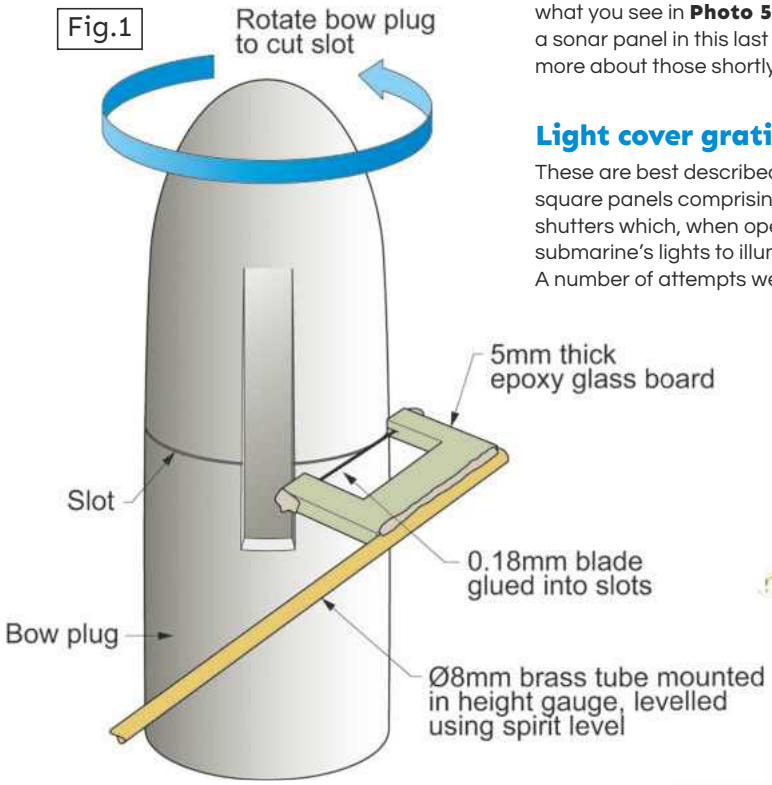
Absolutely riveting!

Since rivets had to be added, yet more lines were drawn onto the plug. The gaps between the rivets were determined from pictures and by counting, whereupon they were all marked on a strip of paper that was then wrapped around the bow and the rivet positions transferred using the inevitable fine marker pen once again. These marks were then drilled with a very small bit and dressmaker pins used for the rivets. Each pin head was viewed under a magnifying glass prior to its use and the oval-shaped ones discarded. The pin stems were cut to around 5mm and inserted in the holes with light dab of glue. A cloth or cotton bud dipped in alcohol wiped over the rivet head, removed any excess glue leaving, after a primer coat, what you see in **Photo 5.** You can also see a sonar panel in this last picture, although more about those shortly.

Light cover gratings

These are best described as small square panels comprising steel louvre shutters which, when opened, enabled the submarine's lights to illuminate the sea bed. A number of attempts were made to get this detail right. I started by gluing thin styrene strips overlapping each other, but this idea was speedily rejected for two reasons. First, it made the completed item far too thick, and second, from previous submarine experience, this shape tends to capture and hold air bubbles when the model is surfaced or submerged. This being the case a revised method was devised using gum strips which were cut, wetted and one edge overlapped with the next to eventually build up the required louvre form. Once dry, these were cut into square sections, a process that easily produced more panels than needed, allowing mistakes to be made and duff louvres discarded. At this stage the gummed strips are prone to damage, so the next job was to paint them with in grey gloss to stiffen them up. Next, the square sections were glued to 0.25mm styrene sheet, after which 0.25mm strips, with mitred corners, were fixed to the outer edges to create the frames. Any gaps were filled with proprietary modelling plastic body filler. Once satisfied, holes were drilled at each corner, into which a section of round 0.5mm brass rod was glued. To finish, a shim washer was placed over each rod, the surplus rod cut and filed away, and a dab of glue applied to each shim washer to create a dome. Result? A nice set of rivets around the edges.

Fig.1



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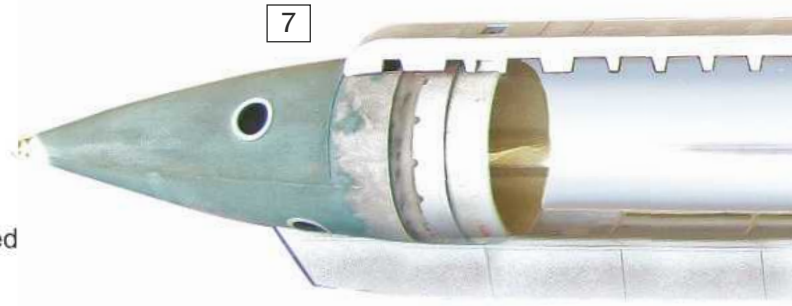


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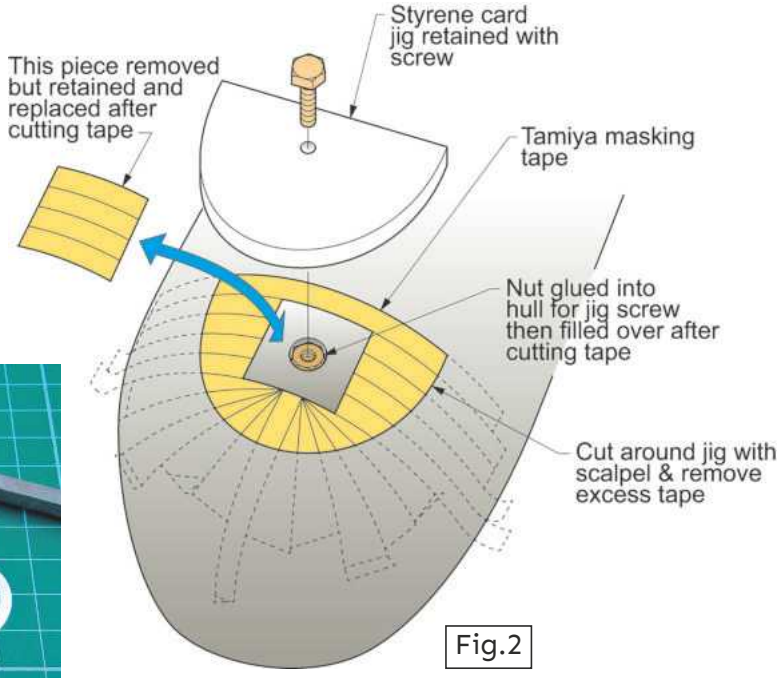


Fig.2

Thrusters

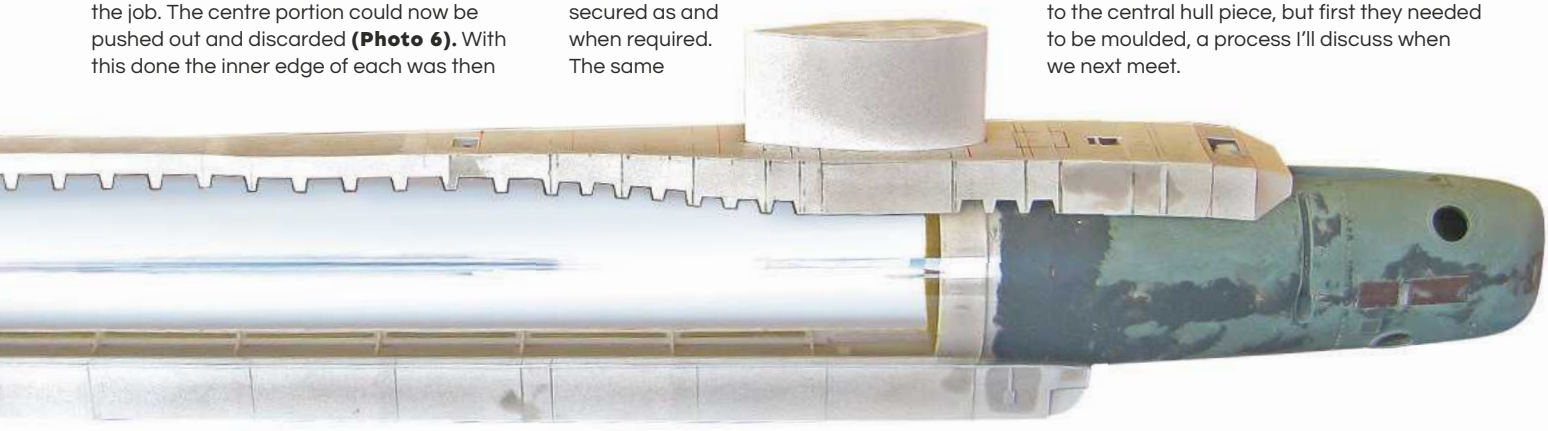
The bow (and stern) sections have large openings in them for the thrusters which are used to manoeuvre the craft under water. They appear to be an easy item to make but there are pitfalls if care is not taken, not least the fact that if they're incorrectly positioned they would look horrible! Each thruster opening has a raised edge and these were made from styrene card using a compass cutter to produce the rings. Numerous small cuts were made, rather than a single deep cut as too much pressure on the cutter only introduces distortion to the process. When cutting the inner circles, I did not break through the styrene card, for practical reasons. A hole was drilled in the centre of the disc which allowed a small screw to be inserted so that the discs could be placed in a mini-drill and spun up to remove edge burrs etc. A scalpel blade in a Swan Morton handle offered up to the spinning disc does the job. The centre portion could now be pushed out and discarded **(Photo 6).** With this done the inner edge of each was then tapered and a mark applied to reminded me which was each ring's inner face. The final task was to roll the styrene ring around a suitable tube until it had taken a curve identical to the hull's exterior shape. To secure these rings, Evo-Stik was used. If you refer back to **Photo 5** you can see one of these in place.

Sonar panels

Without doubt, making these at the top and bottom of the bow section really made the old grey matter work hard. You see, because the hull is curved what appears to be a half circle is, in fact, nothing like it. To start, then, sections of Tamiya masking tape were placed over the bow section and the centre-section of this masked area carefully cut out, but not discarded. Next, a styrene card jig of the required shape was made, with a hole in the centre. Said jig was placed on the top of the bow, over the masked area and a drill passed through the jig's hole. The bow section was then drilled to accept a BA nut. This nut was glued in, allowing the jig to be secured as and when required. The same procedure was repeated for the lower part of the bow section. With the jig secured to the hull, a scalpel blade was run around the its outer edge, lightly cutting through the tape, but not into the hull **(Fig.2).** The outer tape could now be peeled away, the jig removed, and the area over the nut filled, sanded smooth and covered with the saved piece of masking tape. The whole masked area was then lightly 'surface' drilled by hand, using a 0.3mm drill to give the flush fitting sonar panel effect, again clearly visible if you refer back to **Photo 5**.

Back soon

Broadly speaking, this was the bulk of the detail work on the bow section and, of course, similar work had to be carried out on the stern cone, but not quite so extensively because the latter has the hydroplanes and propulsion units attached to it. **Photo 7** is of these bow and stern 'master' sections (plus some others) attached to the central tube section. You'll note that I was making the keel and the upper casing all at very much the same time but for clarity I will discuss these items in more detail later. More important was the joining of the bow and stern sections to the central hull piece, but first they needed to be moulded, a process I'll discuss when we next meet.



Warwick the way to go?

Colin Bishop goes walkabout at the annual International Model Boat Show

ABOVE: This Puffer had a well and truly 'sorted' smoke system.

When the days start drawing in our thoughts turn to winter modelling projects and where better to start than the well-known Warwick Show where the combination of club stands, traders and the excellent indoor pool certainly get the creative juices flowing. This year's event was well up to standard although there were some noticeable absences on previous years in terms of club stands and traders. There's no doubt that it's becoming more difficult to successfully stage model boating shows as the recent demise of some well-known ones has shown. Model boaters are a declining breed due to advancing age while show overheads remain static or increase. That said, I've been told that attendance at the IMBS last year was slightly up on 2016 which is an encouraging sign for the future of this event, and long may it continue.

An innovation this year was to extend the appeal of the show by introducing a Tamiya Trucking display which even the boat modellers found impressive. Broadening the appeal of model boat events by adding other model disciplines is increasingly being seen as the way to keep shows alive, indeed maybe the future lies more with multi modelling exhibitions. After all, just because we're model boaters doesn't mean that we don't appreciate different types of modelling and I know a lot of people are actively involved in more than just model boating. Variety is also more likely to attract the general public as well as modellers themselves.

As usual, the club stands were superb with King Lear MBC taking the top award, however one of the things that gives this show its greatest buzz (apart from the steak and kidney pie in the restaurant), is the well-organised activity on the pool where poolmaster Steve Dean and his team do a sterling job. The pool is a good size which allows for themed sailing displays, such as lifeboats and warships, as well as accommodating larger and faster individual models. The 'have a go' sessions for youngsters on the Saturday and Sunday were also reportedly very popular although how to develop this initial spark of interests into increased club membership remains problematical in an age where there are so many other distractions for young people.

Space does not permit more than a representative selection of photos of models present but I hope it goes some way to showcasing the craft on display and afloat.

A tantalising glimpse of Ebbrix, Mountfleet's new twin hatch coaster; 1:32; 54" long; expected early summer 2018.

ABOVE: Mick French with his large model of HMS Ramilles. Mick's father served aboard and Mick was, for many years, secretary of the HMS Ramilles Association. The model was built by Mick with help from friends and taken to the final Reunion of the Association in April 2017.

BELOW: The Association of Model Barge Owners put on its usual impressive display.

ABOVE: Blackheath club's Phil Abbott (right) doing double duty for his own club and for the Model Power Boat Association.

BELOW: As you can see Bob is no stranger to boat building having himself started in the family business in 1952.

ABOVE: A very unusual model of a semi-submersible oil rig support vessel.

BELOW: Who could resist such a charming little motor boat. Built by Bob Lower it's a model of a full-size cruiser that was the work of his brother Charlie (circa 1964) whilst employed in the family business, R Lower & Sons, Newhaven.

ABOVE: A superb working model of Admiralty Train Ferry No.3 of 1917, built by Steve Brown of the Wicksteed Park Club from National Maritime Museum plans.

LEFT: The pool is big enough to allow several models to operate simultaneously which certainly adds to the impact.

RIGHT: The Bournville Club stand featured two working submarines opened up for inspection.

ABOVE: Soon to be re-released by SLEC as part of the Vintage Model Boat Company range, the Sportsman is 32" long, has an 8" beam and takes a 1000kV outrunner and 3S LiPo. Available spring 2018.

RIGHT: Older lifeboats definitely have a unique appeal.

From the VMBC range the lovely Fairey Huntsman 31, designed by regular MB contributor Dave Milbourn.

ABOVE: On the King Lear MBC stand was Drumbeat of Devon, a fishery protection vessel based on a modified Stan Patrol 2200 design. Built in 1991 the full-size is capable of 22 knots and has an endurance to support herself and her crew for up to six days at sea.

LEFT: Lovely build quality on this Caldercraft 'Sir Kay' Round Table Class minesweeper.

BELOW: Sometimes even lifeboat men need rescuing!

LEFT: A large and realistic MTB which performed very well, to the delight of spectators.

RIGHT: The classic Vintage Model Boat range is now available again and was displayed in its entirety on the SLEC stand.

The W.W.I shallow draught monitor HMS M.33 in Portsmouth Historic Dockyard's No.1 dry dock.

Range Finder

Dave Wooley takes a tour of HMS M.33, the sole remaining British veteran of the 1915 Gallipoli campaign

It has been some years since I last visited M.33 which is now preserved in the Number One dry-dock within the Portsmouth Historic Dockyard complex. In 2000, its hull was treated to neutralise the ongoing decay in its steelwork, something overseen by Southampton University, indeed this was discussed in the November 2000 issue of Model Boats.

HMS M.33 was built in great haste by the Harland & Wolff Shipyard in Belfast between March and June of 1915. She was armed with two shielded 6 inch guns and a single 6 pdr, with the primary purpose, in August 1915, of providing gunfire support for the landings on the Gallipoli Peninsula at Suvla Bay. That, and the subsequent attempt to force the Dardanelles using naval power, was a failure, with HMS M.33 being withdrawn in January 1916.

After W.W.I, M.33 saw action during The War of Intervention in Northern Russia around Murmansk and Archangel, as well as along the River Dvina, providing gunfire support for the Allied withdrawal from that conflict and then returning safely to the UK in late-1919. By 1925 her name was changed from M.33 to HMS Minerva along with her role which shifted from gunfire support to mine laying training duties. Later, during the following interwar years, she was a boom defence workshop and fuel depot ship and just prior to W.W.II was given the somewhat glamorous name of Hulk 23 and became a floating office at Gosport.

The warship was purchased in 1987 by the Hartlepool Preservation Trust, but returned to Portsmouth in 1990, and in 1991 was berthed at the Naval Dockyard on behalf of Hampshire County Council Museum Service. Finally, in 1997 she was docked-down within the No.1 Dock, to stabilise her now rapidly corroding hull. In 2000, an electrolytic technique was employed to remove chlorides from between the riveted joints and together with the submarine Holland No.1, was the largest artefact to undergo this form of treatment, which brings us nicely to the November 2000 article in MB. Fourteen years later Hampshire County Council transferred HMS M.33 to the National Museum of the Royal Navy, within the Historic Dockyard complex, which is where we are now.

Shallow draft

The word 'monitor' derives its meaning from the 19th Century American Civil War and the shallow draft iron clad turreted USS Monitor **(Photo 1),** although it could be said that the concept goes further back to 1682 with the French Navy deploying a 'galiote à bombe'. This was basically the name for a short beamy vessel firing two forward pointing mortars at high angle to shell the forts along the Algerian coast.

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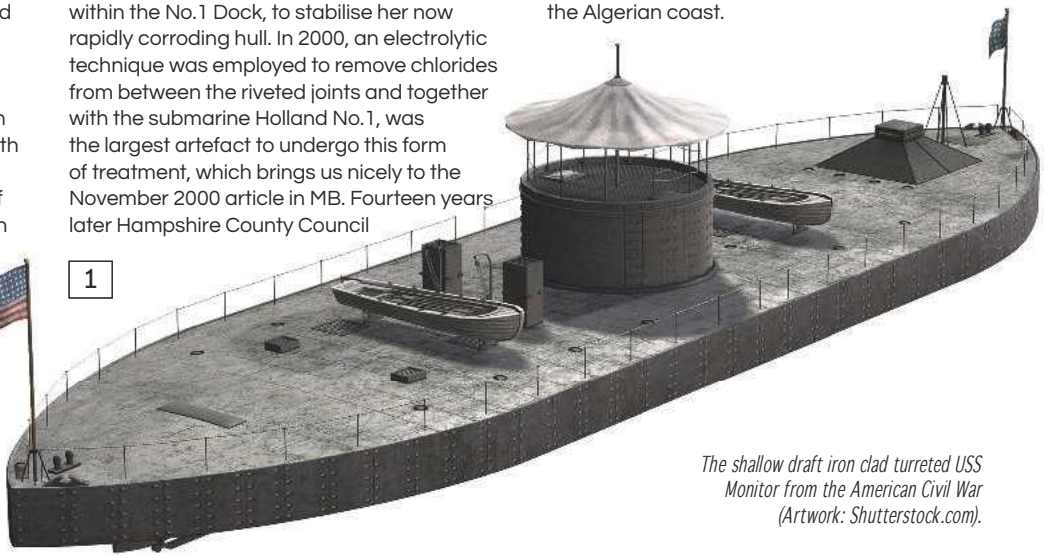

The shallow draft iron clad turreted USS Monitor from the American Civil War (Artwork: Shutterstock.com).


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4

2. Some of the regular deck fittings on the otherwise uncluttered forecastle.

3. The relatively high breakwater. Note that the main deck of M.33 comprised riveted steel plates rather than wooden planks.

5. The beautifully preserved six inch 50 calibre naval gun with most of its operational fittings in place, including the training wheels and a working breech.


5

4. The steam powered windless. I cannot be certain as to the origins of this piece of equipment and would query whether it's original to M.33.

6. Looking towards the wheelhouse at the magazine access hatch.

7. The superbly restored wheelhouse.


6

7

When you view the forecastle of M.33, you can almost see that concept in practice, as she was primarily designed and built for the purpose of shelling the Ottoman positions during the ill-fated Gallipoli campaign. The six inch 50 calibre guns, fore and aft, were more familiar on light cruisers of the day than this 535 ton, 170 foot long, 31 foot beam, shallow draft warship. When you move around the forecastle, you see the vessel as being relatively uncluttered, a fact highlighted in **Photo 2** (looking forward along the port side) and in the principle features, including the breakwater **(Photo 3),** and the steam windless **(Photo 4).** These last pictures also give a good idea of the deck plates and how well they have been preserved and painted. The netting on the deck side handrails is non-standard but is there, I guess, for modern health and safety reasons.

The forward six inch Mk.XII gun on a Mk.IX mounting was originally at the Gunnery Training School HMS Excellent on Whale Island in Portsmouth but was installed on HMS M.33 in March 1992, the original weapon having long disappeared. The two cylinders on the top of the gun are the recuperator cylinders and are fixed. Meanwhile the recoil cylinders, which do move, are hidden beneath the barrel and its mounting **(Photo 5).** Looking aft now, from the same position, gives us a view of the magazine hatch **(Photo 6),** with **Photo 7** showing the front of the bridge and the empty range finder plinth. Within the bridge is a raised steering position which provides a good view forward **(Photo 8).**

Over to starboard and **Photo 9** reveals more detail around the wheelhouse along with the starboard searchlight platform.

8. The helm is raised on a platform within the wheelhouse to give an uninterrupted field of vision.

9. The bridge and its surrounding fittings (Shutterstock.com).

10. Raised clear of the deck is the binnacle and over to starboard is a semaphore, usually operated by a number of levers.

Remaining in the same area, but taking a closer look at the fittings adjacent to the binnacle, the signalling position includes a semaphore. Although this semaphore device currently lacks some of its working features, nonetheless it conveys the concept of how this piece of signalling equipment would have looked **(Photo 10). Photo 11,** meanwhile,

11. Much of the funnel detail has close similarities to that of the 1:96 HMS Skirmisher previously featured in this column.

12. As you can see, the foremast is quite basic.

13. The lower signalling halyards with their pulleys and an aerial spreader.

14. A general view along the starboard amidships side.

15 & 16. Note the detail on the bulkhead beneath the boat stowage platform. The purpose of the brackets and lugs is not known.

17. The watertight door giving access into the deck housing on its port side. Note that the door opens forward, something that is usually standard on ships of all types.

18. A view looking forward, from aft, along the starboard side.

19. The aft six inch 50 calibre gun has great historical significance in its own right, coming as it does from HMS Canada.

highlights the funnel and its fittings, including the stays, horn and external access ladder with a small platform near the top.

The mast, complete with its crow's nest is not that complex, but for those modelling HMS M.33, the wireless arrays with their spreaders could be quite a challenge **(Photo 12).** It's worth highlighting the mast fittings, the examples shown in **Photo 13** being the halyards and pulleys which, it should be noted, are small. When building HMS Skirmisher to 1:96 scale, I made a point in that mini-series of showing how to scratch-build pulleys such as these. Also in this last picture, is a wireless aerial spreader, some of which could be more complex with six arms, or perhaps even more.

We now have a general starboard side view of the bridge, funnel, searchlight and main superstructure housing **(Photo 14).** Note here that the searchlight is on rails so it can be moved from starboard to port and vice-versa. Moving to the top of the superstructure, there are three cowl vents, one of which is mounted on a skylight type of housing providing internal ventilation. On the starboard side of the superstructure, just below the boat stowage **(Photo 15),** is some small, but nevertheless relevant, detail. It may seem obvious but these small features can easily be overlooked **(Photo 16).** Similarly, in **Photo 17** is an example of detailing on one of the deck housing's watertight doors.

Behind the main deck superstructure unit is the aft magazine hatch and associated shell lifting davits **(Photo 18).** Note, slightly behind, that the two doors in the bulkhead are quite different from that shown earlier, whilst mounted on top of the deck housing is the 6 pdr gun.

The final picture of this ship's tour shows the aft six inch 50 calibre gun which is a Mk.XVII on a Mk.IX mounting **(Photo 19).** Nothing notable you may think, other than its age, but this gun has W.W.I Battle of Jutland history, it being previously fitted to the dreadnought battleship HMS Canada.

That warship was originally destined for Chile albeit under a different name, but on completion in August 1915 was taken over by the British Government. However, in 1920 HMS Canada was returned to Chile under her original name of Almirante Latorre, and she remained an active part of its navy until 1959.

There's plenty more

Of course, this has been only a brief glimpse of what can be seen, indeed there's much more to view inside. Walking around the deck and into the spaces below gives an intimate impression of what life aboard such vessels must have been like in the early part of the 20th Century. During active service, this monitor operated at the extremes of working conditions, from the humidity and heat of the Dardanelles to the cold of northern Russia, and remember that there was no air conditioning! If you are in Portsmouth, or nearby, its Historic Dockyard is well worth a visit and can very easily occupy a full day.

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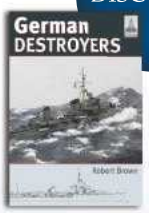

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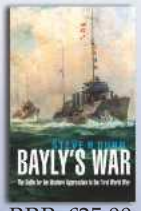

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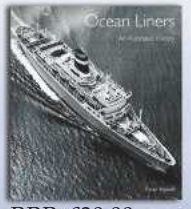

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Falconbrook

Having paused to down a slice of turkey and a dollop of festive pud, **Dave Brumstead** is back to tackle the superstructure and detailing

If you're joining us anew, we're about half way through the build of the Models By Design semi-kit which started life as a basic fibreglass hull and superstructure, complete with a suitable prop shaft, plastic card sheet and strip material, Kort nozzle, and rubber fendering. Using various internet sources, along with the James Pottinger free plan of the Thames tug Blackboys (December 2007 issue), from which Falconbrook started life, we've built and fitted out the hull and are about to start on the superstructure. So, let's get cracking...

Superstructure

To begin, any blemishes on the surface of the moulding were identified, filled with Isopon P38 and sanded smooth. Next, the positions of the cut-outs (windows, door etc.) were found by referring to photographs of the full-size tug published alongside the Pottinger plan. These were marked out, chain drilled (using masking tape to help reduce drill slip) and filed to shape **(Photo 1).** The portholes were drilled out to suit some commercial product I had in stock and with this the superstructure was masked for painting **(Photo 2).** All paints used were from the Halfords range but since they're gloss the plan was to coat with Humbrol matt acrylic varnish. **Photo 3** shows the superstructure with the green applied prior to the application of the orange and white. Incidentally, where a sharp edge was required I used my favoured Tamiya masking tape.

With the painting complete, white plastic angle (from the Evergreen range) was painted with Tamiya Chrome Silver and cut to form the window frames **(Photo 4).** These were stuck in place with R/C Modellers Glue although the window glazing itself was left until the superstructure had been sprayed with varnish.

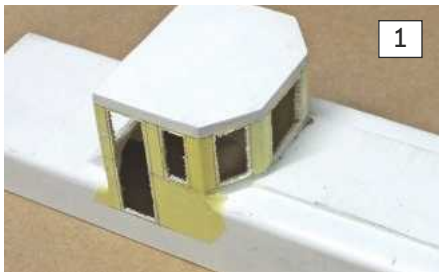
The superstructure roof was made separately from 1.5mm plastic card atop a piece of 2mm thick wood to accommodate the edging which hangs below the roof line. The roof was painted orange and the edging strip later cut away to allow the fitting of some Billing port and starboard lights.

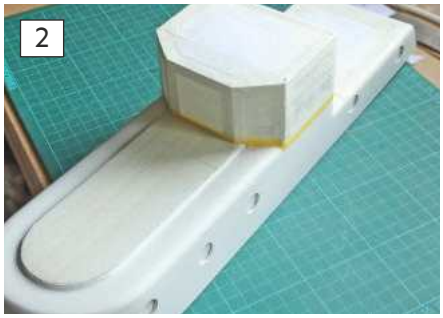
Deck fittings

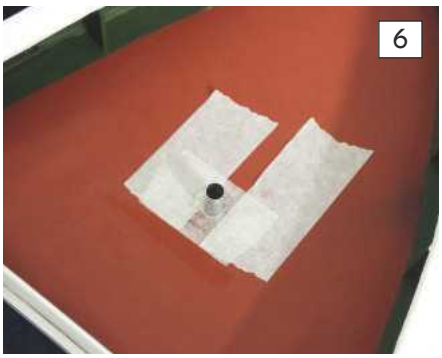
On to the bollards and the foremast base, the latter appearing to be positioned immediately in front of the superstructure on the deck. All were fashioned from dowel **(Photo 5),** the mast base being 15mm dia. with the top radiused and a hole drilled to take the foremast. A piece of tube was inserted into the lower half of the mast base to provide a more effective fitting with a corresponding hole made in the deck **(Photo 6).** The other bollards were also radiused, drilled, and fitted with 1mm brass locating pins before being glued in place.

Looking a little like a manhole cover, the stern deck circular hatch was made from two 2mm plastic card discs plus a Macs Mouldings resin bolt on cover. The edges of the discs were covered with a strip of 0.5mm x 4mm styrene and the whole painted white, with a black base.

You'll notice a further two bollards at the side of the rear superstructure. Since these







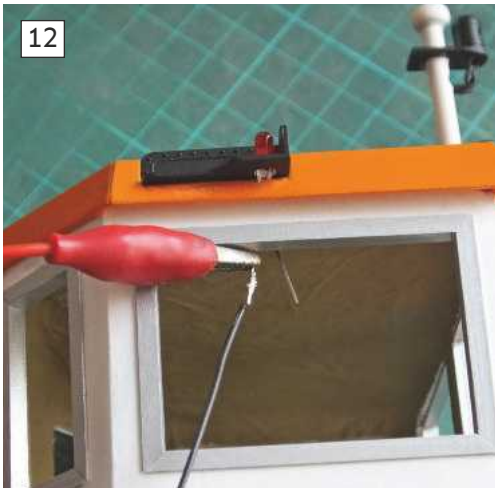
have a slight inward lean and rest on the superstructure itself, it made sense to pin them here rather than to the deck, as before. Angled at the base for the correct tilt the plan was to glue these in position after fitting the tow bows **(Photo 7).**

To make the tow bows 3.5mm knitting needles were formed around a purpose-made jig which matched the profile of the rear superstructure **(Photo. 8).** With the bows shaped, 3.96mm square section tube from Precision Metals – into which the knitting needles were a close sliding fit – was stuck in the required position on the side of the superstructure with double-sided tape. With this, each tow bow was fitted into the square tube and, after checking the position, two 1mm holes were drilled through the tube, the tow bows and the superstructure. Each tow bow was aligned using scrap balsa for spacing from the superstructure and its adjacent bow **(Photo 9).** When all were fitted satisfactorily the bows were glued to the square section, removed and painted black. Finally, 1mm diameter flat head brass pins were used to finally attach the tow bows and square section to the superstructure.

Moving on, I continued with some of the smaller parts including the tow hook, which was made from 1.5mm plastic card, brass wire and 2mm nuts and screws, then painted with Halfords matt black before being glued and pinned on the rear of wheelhouse **(Photo 10).** The main mast, fitted to the rear of the superstructure, was made from suitable aluminium tube with a cap cut from a knitting needle. This tube was drilled to take wiring for two LEDs, after which two plastic card

platforms were fabricated for two Billing brass light fittings **(Photo 11)**. The LEDs, meanwhile, were wired directly to the resistor board. Constructed in much the same way, the foremast uses aluminium tube with reducing diameters. Since the foremast remains in place when the superstructure is removed, the wiring is fitted with a suitable plug and socket to connect to the supply board which is mounted in the superstructure.

For the red and green navigation lights, mounted on the wheelhouse roof, Billing light boxes were used, drilled for LED wiring, then glued in position **(Photo 12).** The wiring from the LEDs is fed through the superstructure to my homespun resistor board – a piece of 2mm plastic card with resistors in place to reduce the 6V supply voltage to that required for the LEDs. Since the stern lights (on the mainmast) and port and starboard lights remain fitted to the superstructure, no separate plugs and sockets are required.

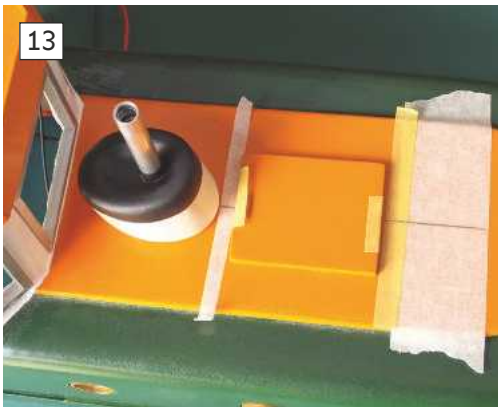


Fine detail

Various fittings for the superstructure were now made, the first being the funnel. Starting with a balsa block this was shaped using the photos as a guide and, when happy, treated with EzeKote and given a covering of fine fibreglass cloth, followed by 4 or 5 more coats of EzeKote. When dry, it was rubbed down and sprayed Ford Ivory from stock. When this was dry the funnel was masked and the upper part sprayed with Halfords Matt Black. Finally, the exhaust pipe was fitted and the assembly glued in place **(Photo 13).** Note the hatch in front of the funnel (a resin item from Macs Mouldings) and, on other photos, the vent positioned on the port side of the funnel. This was made from two different diameter plastic tubes and a piece of plastic card, painted to suit. To add more detail, lifebelts were added from the spares box.

Cut a dash

The internal dashboard and wheelhouse interior was constructed separately from plastic card as a complete unit with the ship's wheel, compass and throttle control fitted, as well as the floor **(Photo 14).** I don't know where the skipper came from but he looks about the right size and suitably workmanlike.



And so, to glazing the windows. With the frames already glued in place, clear plastic material from stock was used and each window individually cut to fit its frame, then set with Deluxe Materials R/C Modellers Glue, which dries clear.

The receiver, speed controller, battery etc. were now installed **(Photo 15)** along with a main power switch (the large green one) and a smaller light switch hidden beneath. This bypasses the main switch to allow the model's lights to be displayed at model shows, etc.

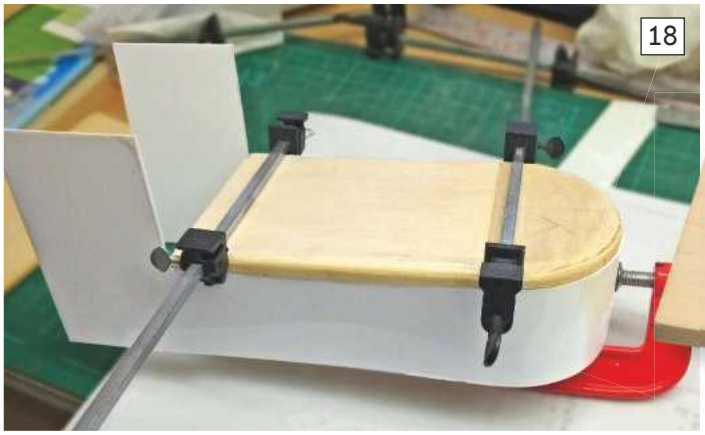
Model name transfers from Ian's Boats (www.iansboats.co.uk) were fitted as required, **(Photo 16)** whereupon the hull could be sprayed with the Humbrol acrylic matt varnish.

Handling

Into the test tank she went to determine the waterline, the exercise resulting in only a small amount of lead being needed each side of the main drive battery. The next move was straight down to the lake at Brentwood to test her handling capabilities which proved Falconbrook to be highly manoeuvrable thanks to the Kort nozzle. And the icing on the cake? The fenders, knitted by Mrs B!

No superstructure – no fear!

Upon completion of the model, I checked with Models By Design to see if the various



parts were still available as I'd moved house and this had extended the build time of the Falconbrook. I was advised that with the exception of the superstructure and the prop, everything else was available.

This being the case, and for the benefit of anyone contemplating the Falconbrook, I decided that the best way forward was to scratch-build the superstructure based on the available information. It looked a straightforward build with the only 'shaped' part being the cabin front which, in the end, I made from balsa block that was cut and sanded to shape.

From the biggest piece of plastic card I had to hand I cut out the front, sides and wheelhouse sides as one piece, then wrapped it around the balsa block to check for accuracy **(Photo 17).** When I was satisfied with the fit, the balsa block was glued to a ½" balsa sheet which would form the top of the forward superstructure. Next, an edging strip was glued around the top of the balsa to act as a lip for the plastic card to butt up to. When this was dry, the top edge was sanded to give it a radius and the plastic card sides glued to the forward part of the superstructure **(Photo 18).** I then turned my attention to the after part of the superstructure and made this from balsa sheet and added the edging for the plastic card as well as support strips of balsa for the sides **(Photo 19).** The after part was now fitted to the forward part and secured with supporting strips. Meanwhile, the rear of the wheelhouse was added to give some support. With the superstructure up the right way, the front window sections were fitted **(Photo 20),** followed by the roof. The raised central section of the forward superstructure was shaped from a piece of obeche I had to hand, otherwise it would have been balsa. This was glued in place with Aliphatic resin which was used for all wood-to-wood joints and, when dry, filled as required. From here the superstructure could be given a coat of primer, to highlight areas that need further attention and finished in your preferred method.

Great result

I've thoroughly enjoyed building this model and have been totally satisfied with the result, which not only looks the part but handles particularly well on the water. Building from a semi-kit isn't for the beginner but it isn't massively daunting either. Maybe it's time you gave it a go?

JANUS

Aptly named after the mythical two-faced god of transitions, **Glynn Guest** details the design, the build and the unique handling characteristics of his island-hopping sea bus

Someone once asked me how I came up with ideas for a new model. I had to confess that inspiration just appears from the proverbial 'no place', in fact the problem is rarely a lack of ideas, it's more the opposite with too many ideas to choose from. This model is a good example, since it was one of three potential subjects that came back with me after a holiday in the Mediterranean.

We had to make a short sea crossing in the middle of this holiday and travelled on a small ferry. On the return trip, I realised that these ferries after sailing straight into the harbour, did not make a 180 degree turn before the return journey and were clearly just as happy sailing in either direction. Upon reflection, this was sensible as it must save them valuable time on what can be a relatively short crossing. Taking a good look at the vessel's layout and operation, it was clear that they were double-ended with propellers and rudders at both ends of the hull and thus was sown the idea of making such a model.

A little thought and some sketching revealed that independent control of motors and rudders could enable a craft to perform some interesting manoeuvres. I was not too clear how to have a logical arrangement of the transmitter controls to achieve this, but the idea was too tempting not to give a try.

AT A GLANCE

Janus is based upon one of numerous small ferries that operate frequent island-hopping services. It features a rudder and propeller at both ends of the hull allowing the craft to be sailed in either direction under full control. Independent 4-channel control of the rudders and motors enables precise manoeuvres to be performed.

Design considerations

Janus has been designed with a strong freelance style with some considerable influence from the ferry which inspired it in the first place. The first drafts produced a pleasant looking model, but it would have been a shade too big for comfort. A little pruning of length and beam made for a more convenient size without spoiling the appearance.

Although the model was not going to be scale in the strict sense, it had to maintain a consistent scale size in its proportions. Nothing looks sillier than a model with some parts suitable for midgets, whilst others would only match giants. For Janus, something around 1:72 scale (or one inch equals six feet) looked about right and this could allow it to carry passengers and crew from OO/HO scale railway figures if you feel so inclined. The resulting design uses 1/4 inch (6mm) thick balsa sheet to create a framework for the hull, the sides being covered by 1/8 inch (3mm) balsa. Alternative materials could be used, but believe me, unless you're an awful builder and even worse at sailing models, this method is more than strong enough.

Economy of scale

Three sheets of 1/4 inch (6mm) by 4 inch (100mm) balsa ought to be more than enough for the basic hull frame and perhaps even less if, like me, you cannot bear to discard wood offcuts of any significant size. The hull side sheeting (skins) consumes two sheets of 1/8 inch (3mm) balsa and, again, the scrap box enabled me to economise a little. Even more economy was made by making use of 'free' scrap cardboard for the superstructure and for some of the detail parts.

Janus is powered by two Mabuchi RE 385 type motors. RE 360s would be good alternatives but not the 380/400 type, unless

you plan for very high speeds and probably a somewhat short-lived model. The motors are connected to the Radio Active brand of propshaft and tube with 40mm diameter three-bladed plastic propellers. I had to buy a pair of 9 inch (229mm) long tubes which then had to be cut down to fit the model.

The two rudders are commercial items and, similarly, need their shafts and tubes cutting down to fit inside the hull. You could fabricate your own from suitable sheet metal, rod and tube, but whichever way you go, a double-sided tiller arm is to be recommended for each rudder. This enables a closed-loop linkage to be made between its servo and tiller arm and avoids any risk of the rudder going over-centre and jamming. If you plan to use independent control of both motors and rudders, then a transmitter with at least four functions will be needed, together with a matching receiver. Likewise, two motor speed controllers will be required, the prototype having twin Mtroniks Micro Viper Marine 10 ESCs. Their current rating and smooth control makes them ideal for the recommended motors, plus their small size allows them to fit into any convenient space.

Hull construction

The hull parts were cut from 1/4 inch (6mm) balsa sheet **(Photo 1)** using templates made from thick card to ensure consistency of shape. The doublers, which reinforce some of the balsa joints, were then glued to the hull bottom and the bow / stern bottom pieces **(Photo 2).** At this point I realised that the cut-out for the rudder servos had not been made in the bow / stern bottom pieces and reasoned that doing this now would save a lot of frustrating work later and probably a few choice words!

Transverse support strips were added to the two bulkheads, although note that the upper strip fits across the whole width of the bulkhead whilst the lower one does not. This is to accommodate the doublers that are fitted to the underside of the bow and stern bottom pieces. With this the two propshaft tube support blocks were laminated from balsa sheet, the central piece having a gap that matched my proposed propshaft tubes. After the glue had set, these were shaped to fit flush between the doublers.

The hull assembly involved the novel experience of building mirror image structures at each end. Here, then, the bulkheads and tube support blocks were first glued to the hull bottom and doublers, then the bow / stern bottom fixed to the bulkheads and support blocks **(Photo 3).** Before reaching for the glue it's worthwhile having a trial run to check that the parts fit together properly as modifying the shape of any part that's covered with glue is not recommended. Only when the glue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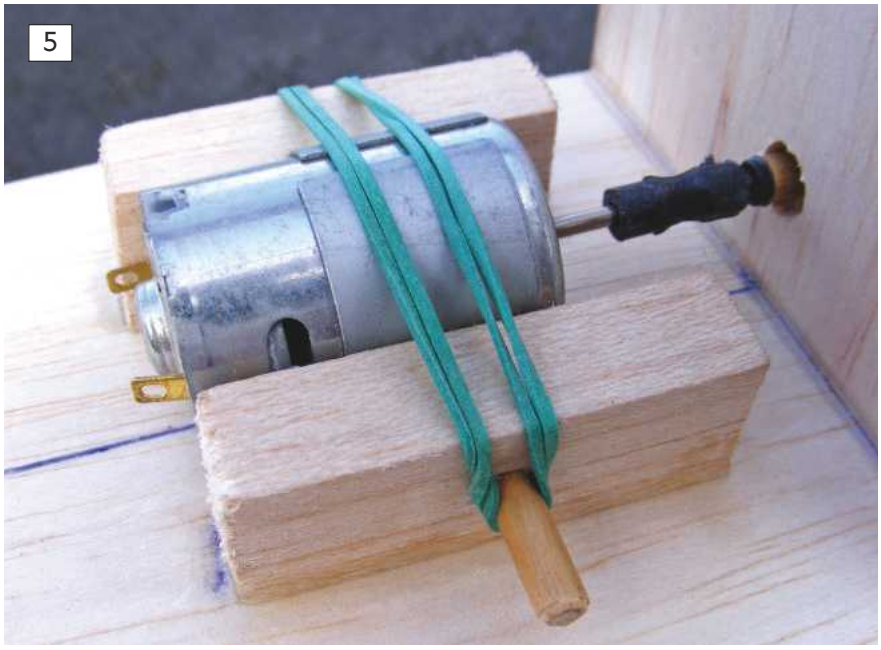
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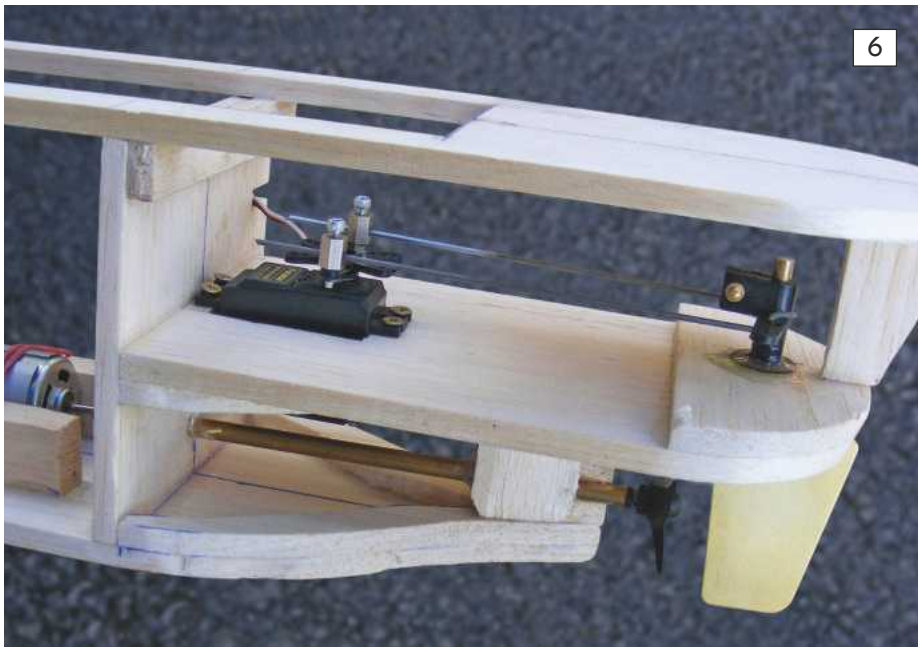
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was fully set, could the bow and stern frame sections be added and glued to the underside of the deck piece **(Photo 4).** A check for alignment is essential before clamping the glued joints and leaving the adhesive to set. Incidentally, I always leave the freshly glued assembly to cure overnight no matter what time period the instructions suggest.

All the glued joints were carefully examined and even if they looked sound, a little extra reinforcement was applied. This was no more than a bead of glue applied along each joint and then smoothed to a fillet with a fingertip. This may seem unnecessary and even paranoid but I have never had a glued model joint fail in normal usage and they have at times even withstood abnormal usage!

The edges of the hull frame are best sanded at this time to avoid getting dust where you least want it. A sanding block, which can be nothing more than a convenient piece of wood with sandpaper wrapped and pinned around it, is ideal for this job. The sanding block(s) should be long enough to cover both the deck edges and the hull bottom edges. This will enable the hull side sheeting to fit flush and make for a strong glued joint. Note that edges at the bow / stern will have to be angled rather than square to the deck and hull bottom.

Drivetrain x two!

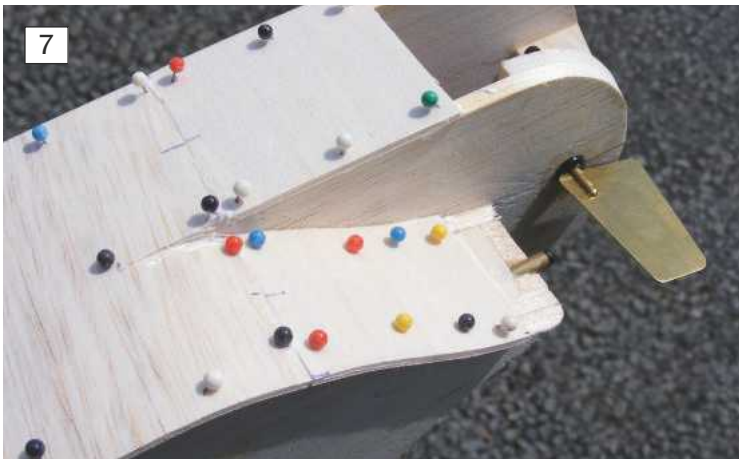
Not having the hull side sheeting in place makes it much easier to add the propshafts and motors and ensures they are all correctly aligned. I chose direct drive which requires both a motor and its propshaft to be in line. To achieve this, the holes through the bulkheads and support blocks were made a shade oversize. Packing with balsawood scraps allowed adjustments to be made until I was perfectly happy. A piece of tube that was a close fit over the shafts was a great aid in achieving this.

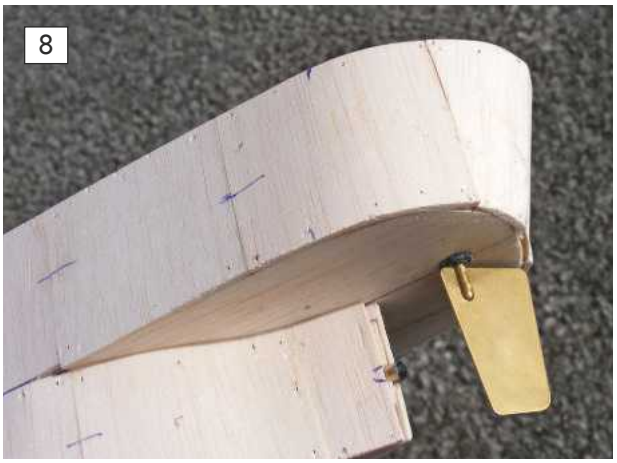
The propshaft tubes were secured in the bulkheads and support blocks with epoxy adhesive. The motors are held on either side by balsa blocks glued to the hull bottom. Short lengths of dowel had been glued into these blocks so that suitable elastic bands could be looped over the motors to keep them secure **(Photo 5).** The actual coupling between a motor and its propshaft must be reliable. I had planned to use some flexible tubing to do this, a system which has worked well in the past, but this time nothing with the right diameter to fit securely on the propshaft could be found. Luckily, in one of my 'bits & pieces' boxes, I discovered a couple of small spring couplings which could be firmly fastened to the shafts with grub screws. It's always worth sorting out a reliable coupling as fumbling around through the deck access opening is not a fun activity on any model.

Rudders and servos

The rudders are two commercial items that needed their shafts and tubes shortening so the tiller arm would fit under the deck. Holes were drilled through the bow / stern bottom and reinforcing pieces to match these tubes. After double-checking that the rudders could not foul the propellers, the tubes were firmly epoxied in place.

The rudder servos (one for each end of the hull) fit into the slots cut in the bow / stern bottom pieces using some balsa packing to provide suitable purchase for the securing screws. A double-sided or closed-loop servo to tiller arm linkage was used with a Z-bend





in the linkage wire at the tiller arm and a pair of adjustable pushrod connectors in the servo arm. A little care was taken to get the arms and linkage wires parallel to each other, thus ensuring a smooth and even rudder movement at each end of Janus **(Photo 6).**

As a result of the limited access to the tiller arms, the rudders were left in place whilst completing the model, a situation that called for a little care to avoid letting any subsequent glue, sealant or paint get on the linkages. The drive motors and servos, on the other hand, were easily removed for later reinstallation.

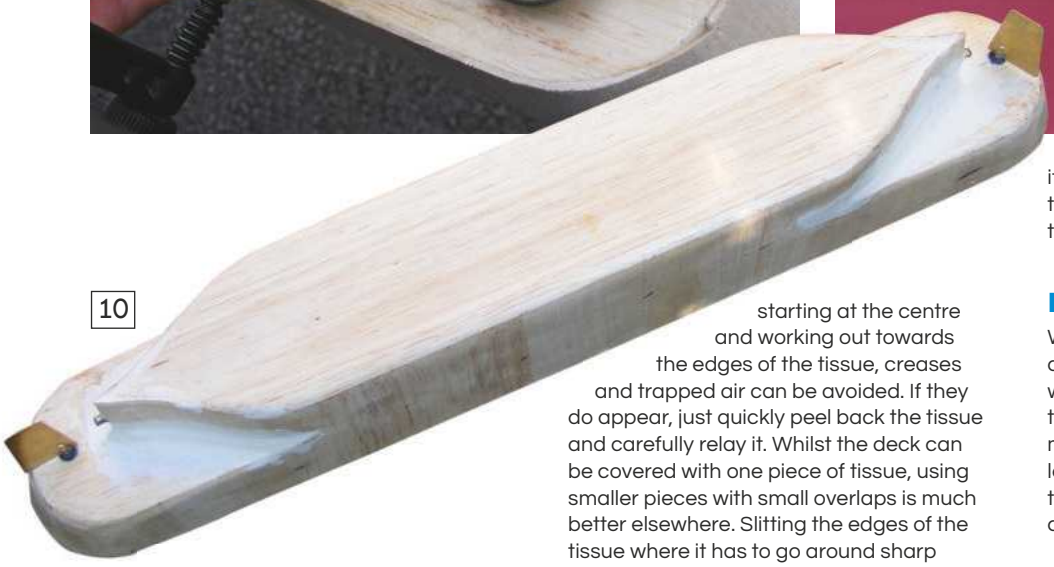
Hull sides

These are from slightly over-long 1/8 inch (3mm) balsa sheet with the grain running vertically. If the edges of the hull frame have been sanded correctly, these sheets ought to fit positively in place. The amidships section of the hull side, being parallel, allows the sheets to fit flat and they should only need securing with a few pins. Do remember to apply a bead of glue along the edges of the sheets where they butt to the adjacent panels. The bow and stern areas (which are, of course, identical) are a little more demanding and will require the use of more pins. Note that a smooth change in direction is needed at the point where the lower part of the side sheeting sweeps in and underneath the hull. Cutting a slit part-way through the sheeting comfortably facilitates this detail and helps create a neat job **(Photo 7).** The curved bow / stern areas, meanwhile, were easier to cover with small pieces of balsa sheet, the odd triangle helping to keep the wood grain vertical, **(Photo 8).** The upper edges of the side sheets should be sanded back flush with the deck, however the lower hull edges can be sanded to a radius. Note that only a modest amount of material should be removed from the edge between the side and hull bottom (see cross-section on plan), to avoid weakening this joint. Other areas which are backed with internal doublers can be more heavily sanded.

There was still a sharp corner where the side sheets met the bow and stern bottom sections and to my mind this did not look right and might even have affected the water flowing past the hull. As a result the corner was blended into the hull section by first soaking some balsa strips in warm water – to make them more flexible – before pressing them into the corner to take up the desired shape **(Photo 9).** Once dry, the strips were glued in place and later profiled to a more concave section using sandpaper wrapped around a suitable dowel. The final shape was produced using ready mixed domestic filler and yet more sanding **(Photo 10).** This proved to be quite a dusty job and was definitely not one for indoors!

Surface sealing

I like to give my models a simple test float on the garden pond as soon as possible. This to confirm the stability and operation. With Janus, the experimental nature of its propulsion and steering made an early water test even more pressing. To begin, then, the outer surfaces of the hull were sealed



and waterproofed with cellulose dope and tissue. A couple of thinned coats of dope were applied, to better penetrate into and strengthen the wood, followed by a coat of neat dope. Light sanding between coats removed the surface fuzz and produced a smooth base. Model aircraft tissue was then stuck to the hull with neat dope. The 'crinkly' tissue, of the type used as gift wrapping, is not recommended as usually it will not lay-down on the surface very well, especially if compound curves are involved. The tissue was cut into convenient shapes, laid on the hull and a well-loaded brush used to work the dope into and through the tissue. By starting at the centre and working out towards the edges of the tissue, creases and trapped air can be avoided. If they do appear, just quickly peel back the tissue and carefully relay it. Whilst the deck can be covered with one piece of tissue, using smaller pieces with small overlaps is much better elsewhere. Slitting the edges of the tissue where it has to go around sharp curves can also help.

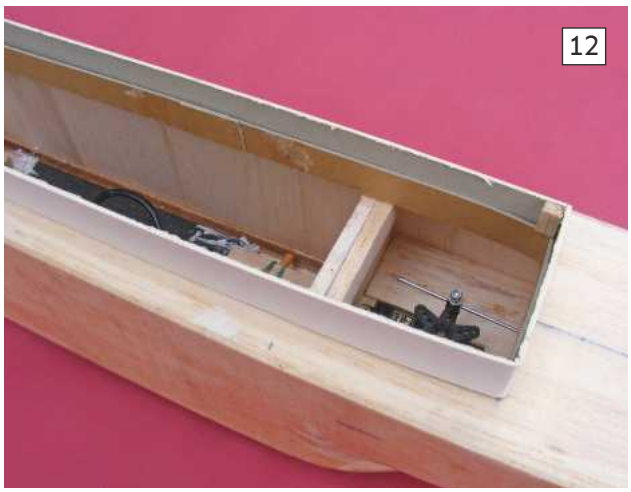
A light sanding followed by a couple more coats of neat dope will produce a good base for finishing the model. Whilst not indestructible, the tissue does strengthen the hull's surface and ensures that any impact damage will be localised. The solvent in the dope – which makes its use outside, or in a very well ventilated space, desirable – also softens the previous coats before drying to make an excellent bond with little risk of delamination. Other methods of sealing the hull are available so feel free to make your choice based on what you are experienced and comfortable with. As for me? I like cellulose dope, finding it quick and easy to use, plus I have several tins in stock and numerous rolls of tissue that need using.

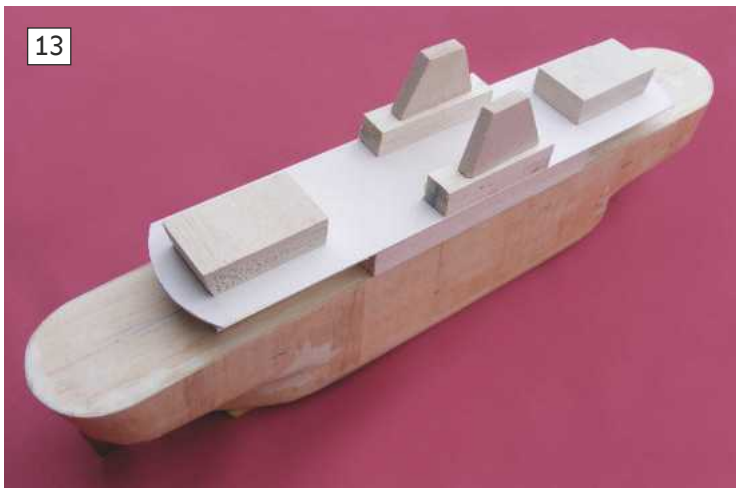
Pond trials

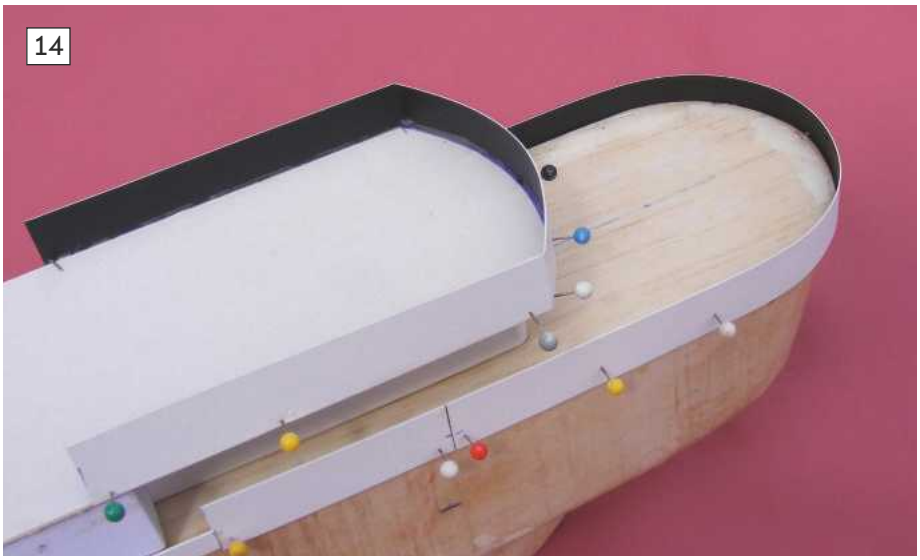
With the motors and servos duly reinstalled and the battery pack, receiver and ESCs wedged into the hull, Janus was placed in the water. It floated and was stable, but sat much too high. Raiding the collection of lead ballast weights soon had it floating at the desired waterline where its radio control could be safely operated.

Due to the small size of the pond I was only able to confirm that the model would move forwards and backwards, although with this design it may well have been backwards and forwards? It was possible to just about turn the model around, so conventional manoeuvrability looked okay. The tricky part was figuring out how to use the transmitter sticks to make it move sideways and rotate. After some weird antics, this was found to be possible, but it seemed prudent to stop before Janus was damaged in the confined space.

This initial trial also revealed that Janus would have an operating weight of about 5.75lbs (2.6kg), a bit heavier than expected. The current drawn from the battery pack with







both motors at full power was 2.5 amps. This was expected to give the model adequate performance and duration without having to use very high capacity NiMH battery packs.

Card is King

My valuable stash of 'useful materials' was raided to complete Janus, which included the use of balsa and cardboard. I know some modellers will shun cardboard because it is cheap, but that's the very reason I like it. Yes, it will go soggy and lose its strength if it is allowed to become soaked with water, but the answer to stop this happening is to use a surface sealing coat (cellulose dope in this case), sensible operation and regular maintenance. By all means substitute alternative materials, but do watch for any excessive top weight. Solid pieces of teak and numerous metal and resin fittings may add to your feeling of pride, but that might disappear when the model follows suit in the middle of the pond!

Card was used to make a coaming strip around the deck internal access opening. This card was about 1/16 inch (1.5mm) thick and came from some old packaging. This should be glued square to the deck to enable the superstructure to slide over it. Two coats of dope sealed the coaming strip and thoroughly bonded it to the deck **(Photo 11).** The superstructure was started by fitting a one inch (25mm) card strip around the outside of the coaming strip. If you have a long enough strip it could be simply bent around the corners and its ends joined. Mine was made from two pieces and so had to have two bends and two glued joints. To reinforce the glued joints, small pieces of balsa strip were added **(Photo 12).** Incidentally, remember that glue must be used carefully to avoid sticking the superstructure to the coaming or deck.

I wanted to extend the superstructure out to the hull sides in the amidships area and for this the easiest way seemed to be to make up two suitable size blocks from laminations of balsa and then glue them to the superstructure sides. After this the upper deck was cut from card and glued in place. Note that it extends beyond the superstructure sides at both ends and goes out to the hull sides **(Photo 13).** Card bulwarks were also added around the bow and stern edges of both the main and upper decks **(Photo 14)** whilst lengths of card also formed rubbing strips around the deck edges and along the amidships waterline. Balsawood was used for the remaining structures. A tip for producing a smooth finish on balsa is to glue some thin card to its surface then seal this with dope.

Visual clue

The colour scheme of the model was loosely based on the vessel that had inspired this project in the first place. A white hull and superstructure produced an appropriately smart look. The decks were matt green and funnel blue with a black top. The hull beneath the waterline was painted gloss black to improve the model's appearance when sailing.

Windows in the bridges and around the superstructure were made from black self-adhesive plastic film. Well, one could say it was sailing in the Mediterranean and needed tinted windows to cut down the sun's glare? The hull looked bare without the name of a ferry service along its sides so, again, black plastic film was used and a suitable font found inside the domestic PC. This was scaled up, printed out, then stuck to the plastic film with latex glue. After the glue had set the letters were cut out, protective backing peeled off and the film stuck to the

hull. Yes, I know computer driven cutters are available which can do this, but this method is particularly economical.

At this point Janus still looked bare, so some blue self-adhesive strips were stuck around the bulwarks and rubbing strips. Some life raft containers were also made from dowel and added to the superstructure. White might have been a more accurate colour, but orange works well for them. **Photos 15 and 16** show the colour scheme, but there was something else that suddenly occurred to me… The final touches were to put some markings on the funnel. Realising that as Janus is double-ended, it might get confusing when sailing it and applying full-ahead, only to back into something unforgiving, a visual hint of 'front and back' was needed. This took the form of an arrow like funnel marking which points in what would be the nominal ahead direction, taking care to make sure both funnel's markings pointed in the same direction! As a further aid, a small flag was fixed to the aft mast, all of which can be seen in images of the model on the water.

Trimming up

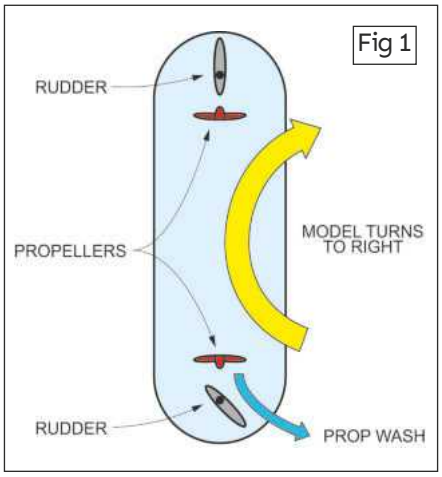
Since the earlier test in the garden pond had revealed that the model was going to need a substantial amount of ballast to float on its planned waterline I now had to address the question of where to put it, as there's not a lot of space between the two bulkheads. This lead me to removing the servos and adding ballast to the end compartments. The weight took the form of those numerous small coins that you always seem to find in your pockets after returning from a holiday abroad. A spray of adhesive into these compartments ensured that this 'value addition' to the model would not shift whilst sailing. Only sufficient ballast was added to the level of the propshaft tubes to avoid fouling the servos when they were refitted. The remaining ballast took the form of steel bars lying on the hull bottom, cut to fit between the motors. This allowed the battery pack to sit on top them to one side of the hull with the receiver and ESCs on the other side. These items were all secured by a piece of foam plastic pressed between them. A little extra ballast was then needed to get Janus floating perfectly upright and with very positive overall stability, **Photo 17** being of Janus 'at rest' as it were.

Tx controls

A lot of time was spent trying to figure out a way to arrange the transmitter controls and, alas, scouring the manual that came with a computer R/C outfit did not uncover any magic solution to the problem. Anyway, thus far she's been sailed with each motor and rudder on one of the two dual axis sticks, with horizontal (side to side) motion controlling the rudders and vertical (up and down) for the motors. It may well be that one of those fancy programmable add-on gizmos might help with the control and if you figure something out, then please let us all know it about it, via the Editor.

Sailing trials

These took place on one of those bright sunny days with only a light breeze. With its different steering and propulsion system, this was not the time to start with full power and zoom into the middle of the lake before banging the rudder stick full over. Low speed sailing close to the bank did not reveal any problems



so the speed was gradually increased until Janus ran at full power. This was all done just using the single motor and rudder and sailing it in a conventional mode **(Fig.1).** The model handled perfectly normally despite the presence of a propeller and rudder at the front. The top speed in this condition was measured at around 3ft/sec. (0.9m/s) which, with a nominal scale of about 1:72, would create the appearance of a full-size vessel travelling at 15 to 16 knots, a reasonable speed I thought.

Interestingly, powering up the bow propeller had no noticeable effect on the model's speed. This might have been expected since it would be working in its reverse mode which is usually less efficient. However, running this bow propeller in its ahead direction was found to give a very powerful braking effect, handy for any misjudged docking manoeuvres!

The turning circle, when sailing in this conventional operating mode, was found to

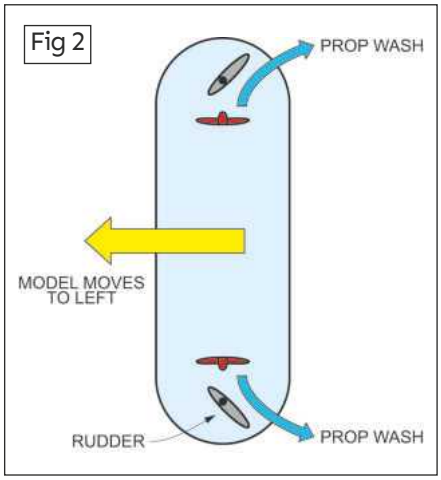
be tight as befits a short hull with big rudders that pivot through some 40 to 45 degrees. A circle of 5 feet (1.5m) in diameter was achieved with no problems. During this part of the trial, the effect of the bow rudder was tested and was found to have only a slight influence on the model's heading or tightness of turn, indeed the lack of prop wash over the rudder blade was probably the reason. Whilst operating in the conventional mode, astern sailing was also tried. As expected the rudder was less effective, but steering control could be maintained. Interestingly the rudder at the other end of hull then had more effect.

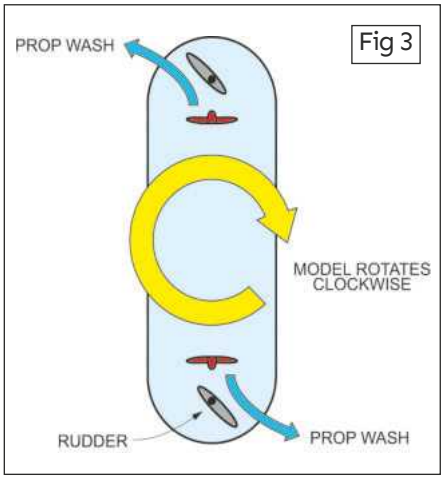
Second stage trials

With conventional sailing more or less settled, it was time to try coordinated use of the twin propellers and rudders. Luckily the water was reasonably clear and with the model close to the bank, I could observe the rudder positions before applying any power.

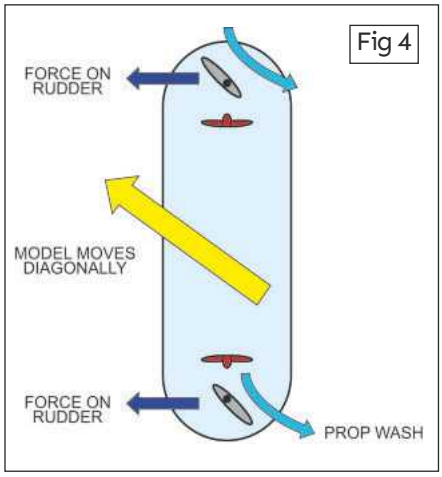
Sideways motion was tested first, this with the rudders set as in **Fig.2** and the motors driving prop wash over them. Luckily there was no one around to see my jaw drop as the model motored sideways across the water. It soon became apparent that due to slight differences between rudder angles and motor speeds, some rotation of the model was occurring whilst moving sideways. After a little experimentation I found it best to leave the rudders at full deflection and correct any such drift with individual motor speed.

Rotation was tested next, with the rudders as shown in **Fig.3.** Full rudder deflection and power to both motors did get the model spinning on the water in an impressive manner. In effect you have powerful bow and steer thrusters in this model. Again, I found it best to use maximum rudder deflection and make adjustments using motor speed.





The last manoeuvre to try was to move the model diagonally, **Fig.4.** This proved to be more tricky, since the aft rudder operates in the wash from the propeller, but the bow rudder experiences a much less powerful flow of water over it. I tried to even these effects by running the stern motor slower and reducing the rudder angle. This improved things, but keeping the model moving diagonally without rotation creeping in is challenging and demanded constant motor throttle adjustments.



Sailing conclusions

There is a saying that 'practice makes perfect' and this model certainly supports it. At first it is quite a handful to coordinate your transmitter stick movements with what you want the model to do. Even sailing in the conventional mode can be confusing with the model's symmetrical profile. Hence, my strong recommendation that you add visual clues such as the funnel markings and flag. The sideway, rotation and diagonal movements were more demanding, especially since it was not possible to create intuitive transmitter stick movements to cope with all the manoeuvres possible, but as with any new thing, you have sometimes to be prepared to learn and adjust how you operate it. It's always interesting trying new ideas and learning from them.

You may fancy a model like this without the complication of having independent rudder and motor control at each end of the hull. A conventional single screw and rudder model would be no problem and quite a nippy performer in its own right, however the underwater shape of the bows would probably best be altered to a more appropriate form. Another alternative could be to have both the bow and stern propellers connected to a single motor and this would demand using a pair of opposite handed propellers. A simpler solution might be to remain with two motors, but both driven from a single ESC. Fancy manoeuvres would not be possible, so you might as well drive both rudders off a single servo. It would, however, give you a model that could be sailed in either direction easily and under full control.

Food for thought

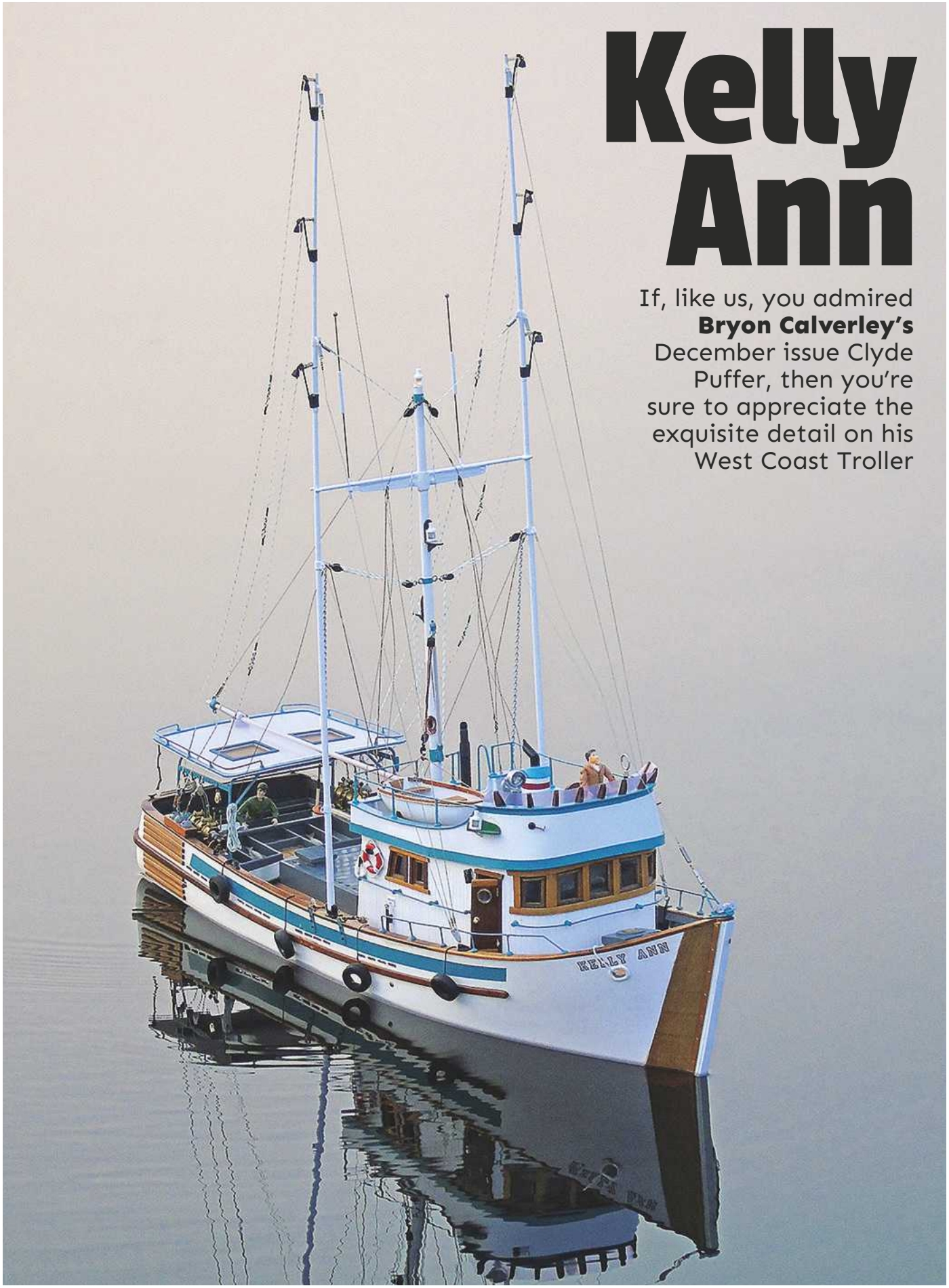
Since completing Janus we've had another holiday in the same region that inspired it. A few more double-ended ferries were seen, albeit of different designs. These included loading and unloading ramps at each end and exposed vehicle decks, and so the option for a wide variety of models is open to you. Hopefully we will see a few such models which will make spectators look twice as they move in unexpected directions. They might also give the designers of scale steering courses something to think about!

DATAFILE

Scale:	1:72 (approx.)
Length:	28" (710mm)
Weight:	5.75 lb (2.6kg)
Motors:	Brushed RE 385 x 2
ESC:	10A brushed x 2
Battery:	6-cell 7.2V NiMH
Rec'd radio:	4 channel

Kelly Ann

If, like us, you admired **Bryon Calverley's** December issue Clyde Puffer, then you're sure to appreciate the exquisite detail on his West Coast Troller



I was aware that the small village of Tofino on the West coast of Vancouver Island was home to a fleet of traditional fishing Trollers. This genre of fishing vessel can be seen from Alaska to Southern California, crewed by hardy seasoned fishermen spending many days at sea, sometimes as far out as 50 miles offshore. It was in Tofino during a holiday weekend, then, that I had the opportunity to look closely at the designs alongside the quay. On returning home I called the club librarian who confirmed that a set of plans was available. My preference in model boats has always been older working vessels (see Byron's Clyde Puffer in the December '17 issue – Ed.) so a Troller, I thought, would be a satisfying build.

It's worth noting that Trollers are not to be confused with conventional trawlers which deploy nets to catch fish. The boats, which vary in size between 18ft (day boats) and 60ft (trip boats) are purpose-built to catch a particular species of salmon. For this they use baited lines at specific depths utilising heavy lead weights suspended from long outrigger or trolling poles on each side of the deckhouse. The poles are stored in the upright position for transit, but lowered to an almost horizontal position, away from the boat, during the trolling process, which is carried out at speeds of 3 to 4 knots. The fishing lines are stainless steel, payed out and retrieved using hydraulically operated gurdies situated aft, each linked to a separate line.

Character detailing

Although this model is not a replica of any particular Troller, I believe it to be an accurate representation of a typical USA and Canada West Coast craft of this name. The scale of the model is 1:24 allowing some character detailing to be added, not least to the interior where, as you'll see from John Callin's superb photos, I've fitted it out with stove, sink, diner, toilet and wheelhouse detail – an immensely satisfying process.

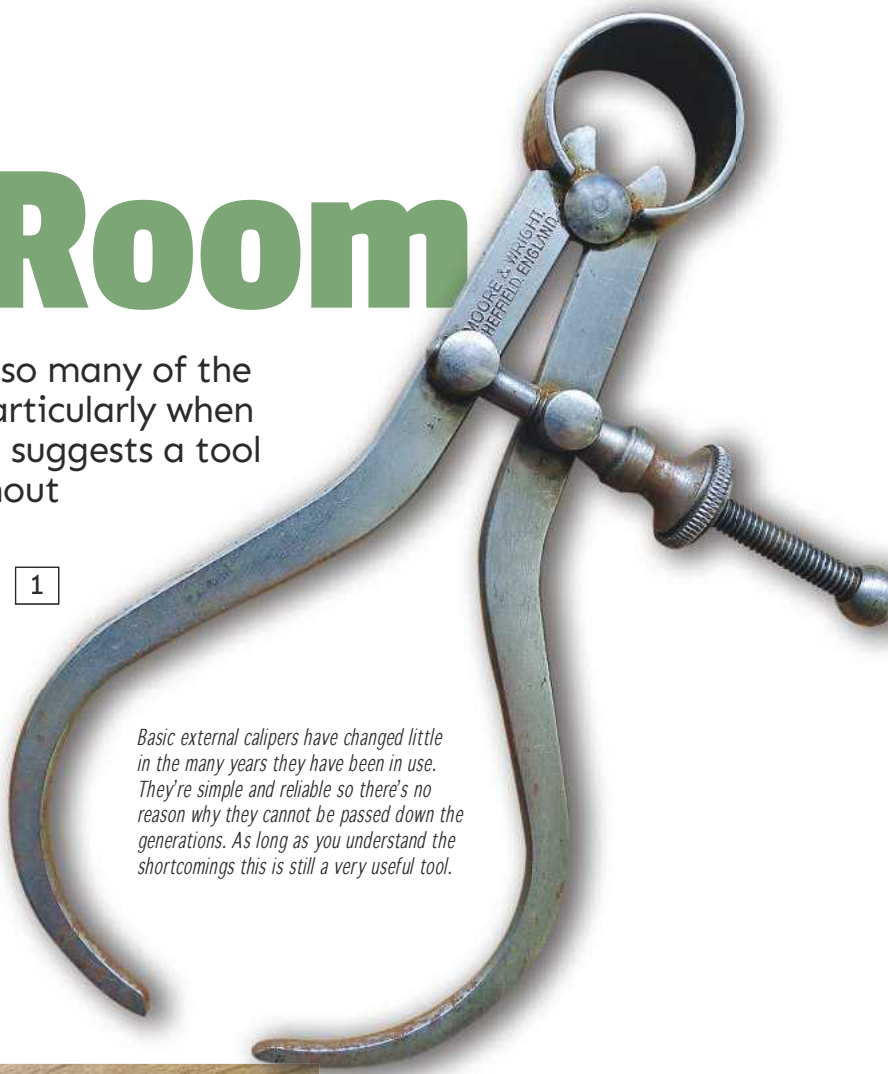
The model measures 38 inches in length and was scratch-built using traditional plank on frame construction methods along with the boat builder's best friend, yellow Cedar, as the planking timber. A 12 – 18V Robbe 755/40 brushed motor is used to drive a 3 inch, three-blade, brass propeller and the whole is guided by 9-channel Turnigy radio using just three of the available channels.

Bryon's West Coast Troller – a labour of love? We think so.

Boiler Room

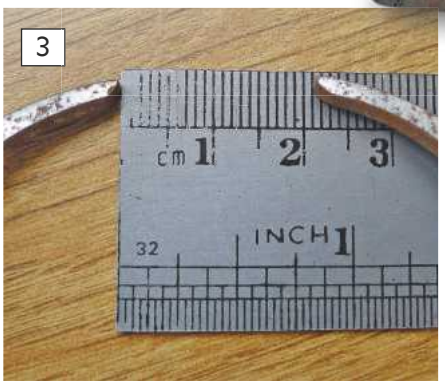
Accurate measurements are key to so many of the tasks we undertake as modellers, particularly when working in metal. **Richard Simpson** suggests a tool that, once used, you'll never be without

As is regularly the case with these articles, the subjects come about from conversations I have with modellers at the pond side and at shows, so I get an opportunity to see just what type of things might prove useful to discuss. This was the case with a recent conversation where a modeller was bemoaning the fact that his handrail stanchions were not sitting vertically and, consequently, did not have the consistently neat upright line he was hoping for. When I enquired how he went about drilling the deck, and how he measured for the drill bit and setting-up the process, it quickly became apparent that the main reason for the wayward stanchions was the fact that he had simply used the nearest drill size that he could find, which seemed to generate something in the region of the good old engineering expression, 'a rattling good fit'!



1

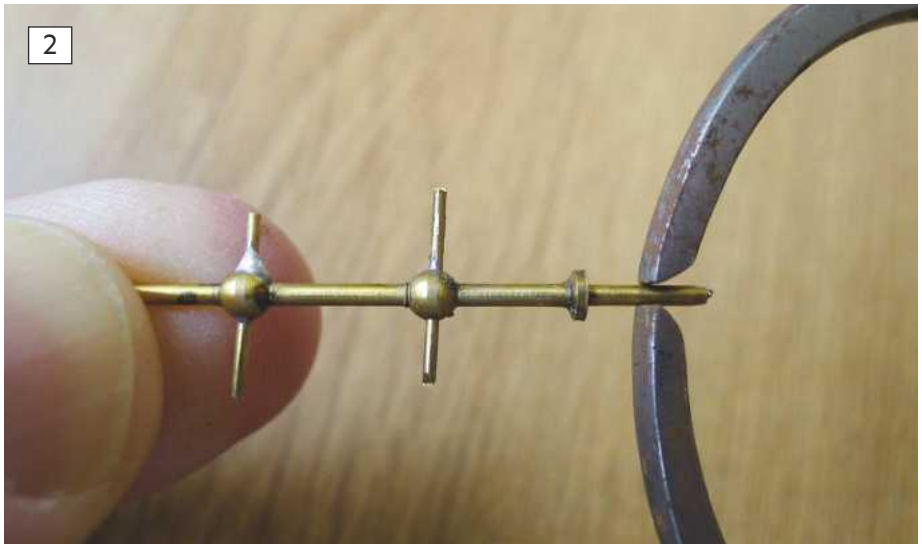
Basic external calipers have changed little in the many years they have been in use. They're simple and reliable so there's no reason why they cannot be passed down the generations. As long as you understand the shortcomings this is still a very useful tool.



3

3. Reading from a steel rule is always going to be a bit fraught and will invariably include a number of inaccuracies. Even the fact that the caliper is not in the same plane as the rule introduces errors, but when you try to decide just what part of the tip is showing the reading, you can understand the challenge.

2. The challenge with most calipers is knowing what degree of pressure is required to obtain a correct measurement. They should touch, without feeling too tight, when slid over the surface.



2

The idea of accurately measuring the diameter of the stanchion base and drilling to a perfect size had never occurred to him, indeed the mention of the words 'Vernier' and 'caliper' seemed to create something of a trance-like state. Calipers sit on my workbench as long as I am there and are used frequently, and certainly daily. I wouldn't dream of drilling a hole in either wood, metal or plastic that I'm not completely happy will be of the correct diameter for its use, whether that is a tight fit for a stanchion in a deck, or a clearance hole for a nut and bolt fastening. Consequently, I thought it might be a good idea to have a look at what a pair of calipers can do for us and just how they play such an important part in achieving sound engineering and modelling practices.

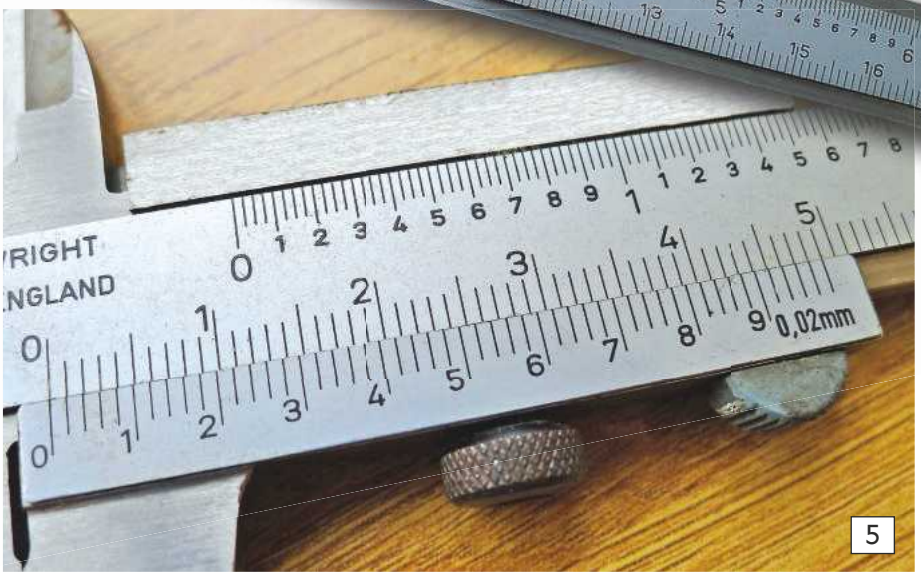
Definition of calipers

These are basically a device used for measuring the internal or external dimensions of an object, or part of an object, such as the diameter, bore or even across its flats. The device is available in a number of different arrangements but all are designed to achieve the same end result, namely the measurement of a specific dimension of the object.

Calipers, in their most basic form, consist two strips of metal joined by a pivot at one end with the other ends free to open and close under the operation of a threaded rod that connects across the two. Consequently, there are Internal Calipers, where the ends

4. Vernier calipers have been around for many years and have changed little. They are fairly robust but using them as miniature adjustable spanners will almost certainly affect their accuracy!

5. The Vernier scale is on the slide and the measurement scale is mounted on the frame. The screw below the slide allows it to be locked when the best measurement has been obtained.



"...the greatest gift ever bestowed upon the engineering student world"

of the arms curve outwards, and External Calipers, where the ends of the legs turn inwards **(Photo 1).** The idea with these basic calipers is that you open or close them on the object to be measured **(Photo 2),** then transfer the set measurement to a steel rule to determine the distance between them **(Photo 3).** Not surprisingly, this involves quite a degree of skill to achieve anything like an accurate measurement, with inaccuracies creeping in due to the pressure the tips exert on the object and the reading of the tips against a steel rule. It is easy to see that transferring the measurement from the stanchion, as in **Photo 2**, would be far from easy to determine from the rule in **Photo 3**. They are, however, still used frequently by machinists who set them up to a specific dimension then apply them to a piece of work that is being roughly turned to size before the final cut, which is then guided by a micrometer.

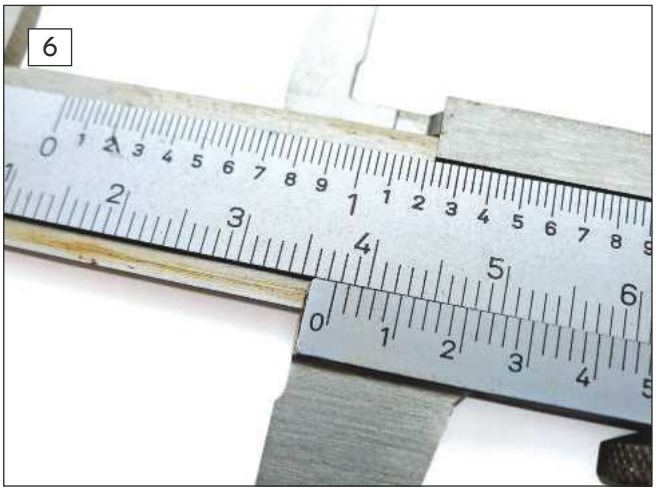
6. Reading the measurement isn't difficult once you know how. The zero of the Vernier scale denotes the whole number of millimetres. This forms the basis of the reading before the decimal part is added. In this case, then, it would be 37mm.

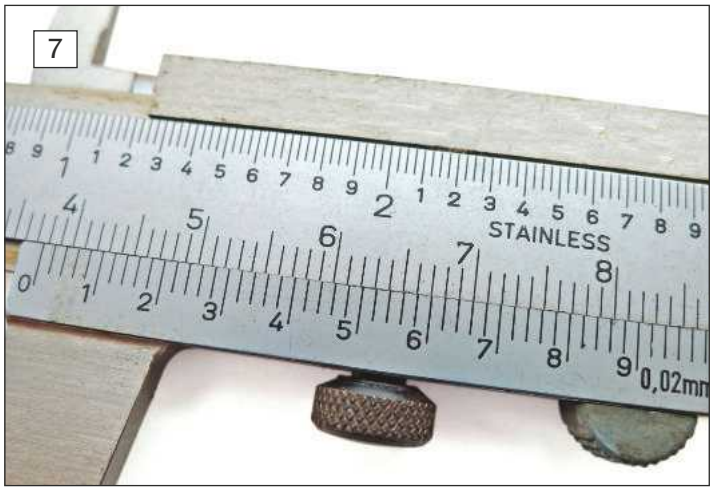
Vernier caliper

The engineering world requires greater degrees of accuracy than these basic tools can provide, which is why the Vernier caliper was devised **(Photo 4).** This tool uses a frame with a sliding jaw that moves along it. Sometimes the slide is moved simply by hand and sometimes there may be a fine screw thread for accurate precise adjustments. Internal and external jaws are built into the frame and the slide, and a scale is etched along the frame with a Vernier scale etched on the sliding jaw part. There is usually a locking screw on the slide as well, so that the slide can be fixed in position when set, to avoid it becoming displaced during the process of reading the scale. This is the device that will give you the exact distance that either the internal or external faces are apart **(Photo 5).** If you apply the caliper to an object, remove it and read the scale, the reading given will give you the dimension of the object. The problem with a Vernier caliper is, once again, the degree of pressure applied to the object by the jaws, and by far the biggest challenge with these devices is getting people to understand how to read the Vernier scale.

7. The best alignment here is at the '7' position so the actual reading is 37mm plus 0.7mm, giving a total of 37.7mm. You can verify it looks reasonable if you look at the zero line again, where you can see that it is around two thirds over towards the 38mm mark.

While we're on the subject – taking a metric Vernier because it's easier to explain – the





whole number of millimetres is determined first, a straightforward process of taking the nearest whole number below the zero point on the Vernier scale. Using the example shown in **Photo 6,** it is 37mm. For the more accurate reading of the portion of the millimetre to be added to that, we look along the Vernier scale until we come across the point where the lines of the Vernier scale align most perfectly with the lines on the main scale. In this case it would be at the '7' position **(Photo 7).** The reading here, then, is 37.7mm. It could be argued that if you're really competent with this mechanical caliper, and the alignment is halfway between the '7' and the '8' (and this particular tool would allow you to read that), then the true reading would be 37.75mm. However, you're probably beyond the accuracy of taking the measurement from the object in the first place, particularly as differences in the pressure applied would give you greater inaccuracies.

Electronic caliper

The final type of caliper I am going to discuss is the electronic version of the Vernier caliper, usually referred to simply as an electronic caliper **(Photo 8).** This does away with the challenge of reading a Vernier scale and since it provides an accurate, easy to read dimension, it's considered to be the greatest gift ever bestowed on the engineering student world. The use of the internal and external jaws is identical to the Vernier caliper, but the challenge with varying pressure on the workpiece remains exactly as before. You now also have a battery to change from time to time, however you can also read in metric or imperial dimensions at the press of a button. Listen carefully and you can almost hear those engineering students cheering! Imperial measurements can only be measured in decimal divisions and not fractions, so anyone wanting to know how many sixty-fourths are involved will still have to do some mathematics – sorry about that. So, no great surprise here, but I recommend using metric readings wherever possible.

Another useful feature found on most electronic calipers is a zero button, which allows you to set the position of the zero point with the jaws closed. This allows for any inaccuracies included as a result of temperature differences or misshapen parts on the device and ensures a greater degree of accuracy than you could expect from the mechanical Vernier caliper. Electronic Calipers are now extremely inexpensive, easy to obtain and should be in everyone's toolbox. With an Electronic Caliper you can measure perfectly and, assuming you have the right drills, use precisely the right size bit for every job. Don't forget that even Imperial drills can be considered with metric measurements, because all you are doing is measuring the drill for suitability against the part. Just because it says 3/16 inch on the drill does not mean that it would not be the perfect drill for a 4.76mm hole. A good selection of appropriate size drills will give you the best chance of having the right one to hand **(Photo 9),** and don't forget that drills of just about every dimension imaginable can be purchased individually from engineering traders.

I firmly believe that if you use calipers frequently to obtain accurate measurements for whatever purpose, your modelling standards will improve noticeably and with the cost as low as it is now, there's no reason why you shouldn't have one to hand. Something as simple as ensuring that a set of handrails are straight, consistent and true **(Photo 10)** should be very easy to achieve, especially with the perfect drill size being used and, of course, applied vertically!

8. Electronic calipers are an excellent tool and allow quick, easy and accurate measurements to be taken from any part of the model or material being worked. Every modelling workbench should have one.

9. The Caliper tool needs supporting with a suitable range of drills to choose from, these being plentiful and relatively cheap nowadays from many trade suppliers. Having the right drill for the job enables small diameter parts around a model to be properly located in the right size hole.

10. Once the correct drill has been decided, and the drill applied perfectly vertically, there is no reason why a line of handrail stanchions should not look as perfect as they do on a real ship.

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1:700 Scale Naval Dioramas

Force H in North Africa

Chris Drage transports us back to Algeria, 6th April 1943, where preparations for the Allied invasion of Sicily are in full swing...

Algiers, 6th April 1943, a general view of the harbour.

A diorama depicting a port is always a great excuse for 'packing them in there'. Indeed, in this one I managed to get two capital ships, a large cruiser and an equally large transport in, with a host of smaller vessels around and about. If you've ever lived near a port, you will know just what busy places they can be and even more so in wartime I suspect. I'm particularly fond of this diorama as everything came together well in that it creates an atmosphere of being busy whilst at the same time being more or less historically accurate. There are 'stories' within a 'story' from the activity on HMS Formidable's flight deck, and the loading of stores on her port side to the loading of supplies and ordinance aboard the troop transport. If you can add little 'pockets' of activity to your dioramas, this will heighten the interest and reality of it all.

Algeria, 6th April 1943

Literally meaning 'The Great Harbour', Mers-el-Kebir is a port on the Mediterranean Sea, near Oran in North West Algeria and is famous for the attack on the French Fleet in 1940. By 1943, it was a busy port with the allies using it in preparation for the forthcoming invasion of Sicily in September of that year.

HMS Formidable was the only aircraft carrier in the Mediterranean after Operation Torch, until she was joined by HMS Indomitable in mid-June 1943 as part of the build-up for the Allied invasion of Sicily (Operation Husky). She remained in the Mediterranean and covered the invasions of Sicily and mainland Italy in 1943 before beginning a lengthy refit. At Gibraltar, the new C-in-C of Force H, Vice Admiral Willis, hoisted his flag aboard HMS Nelson which continued to be deployed mainly for support duties in the western Mediterranean as part of Force H. She too supported the invasion of Sicily and later the Salerno operation. Early in 1943 HMS Newfoundland (a later Uganda Class version of the Colony Class cruisers) became Flagship of the 15th Cruiser Squadron and joined the Mediterranean Fleet for the Sicily Campaign. A number of archive photos reveal that all three ships were in Mers-el-Kebir during March and April 1943. This diorama features the capital ships: HMS Nelson and HMS Formidable at anchor in the outer harbour, whilst HMS Newfoundland and a troop transport load stores against the outer wall (a breakwater-come-quayside).

HMS Formidable

This aircraft carrier is based on the early Aoshima HMS Illustrious kit and, as such, the overall detailing is crude. I believe the newer mouldings have resulted in an improved kit. As always, the addition of etch brass components enhances these small models considerably. At the time of building there were few resin-detail aftermarket parts for RN aircraft carriers, thus she's modelled as she is, warts and all. To try and distract attention from the kit's obvious short comings, additional 'activity' was

HMS Formidable at anchor.

Some of the added detail on Formidable. Note the worn / overpainted flight deck.

modelled on and around the ship. On deck, Supermarine Seafire fighter planes have been parked on their outriggers whilst Fairey Albacores are being prepared for a routine patrol. Ahead of them, a flight of Grumman Martlets is being brought up by lift and similarly prepared. Meanwhile, to port, a tug has brought a large barge to the ship's side and HMS Formidable's cranes are loading the stores on to the flight deck. The aircraft were all WEM (White Ensign Model) kits whilst the harbour vessels are all part of the Tamiya Tugger Set. I was fortunate to have been sent annotated IWM archive photos of HMS Formidable's flight deck and this could be painted very accurately indeed, and does represent what she looked like at this stage of the war. Note the worn and in places, overpainted deck camouflage pattern. I'm pleased with the result, it's just a shame about those hideous kit-supplied 40mm and 4 inch anti-aircraft guns.

Supplies being loaded aboard while Fairey Albacores are readied for a routine patrol.

The battleship HMS Nelson, at anchor.

HMS Nelson

This battleship was pretty much an out-of-the-box build and again, to add interest and realism, items like a gangway and mooring booms were added as it is probably correct to assume that she too would be taking on stores from a small vessel moored alongside. Later IWM (imperial War Museum) photos (now in the public domain), show the capital ships in harbour, inside the outer wall.

HMS Newfoundland

This cruiser was chosen because at the time it was a new white metal Skytrex kit and it compared very favourably with HMS Kenya (see Part 8 of this series in November 2017). However, like HMS Kenya it had to be 'butchered' and detailing items added. Cast metal cranes and catapults can never represent these items as well as photo etched brass. In order to achieve an excellent model, then, be prepared to purchase a number of etched brass sets to obtain the right items such as the catapult, cranes, davits, Oerlikons, radar aerials and railings. Other items replaced on this model were the whalers, which on all the Skytrex kits are just a tad over-scale in their beam. There are minor problems, but as white metal is much easier to cut away and adapt than you may realise, the problems are by no means insurmountable. A bit of judicious filing here and there, application of filler (e.g. in the case of the deck) and some plastic rod and strip results in a most acceptable model. The items that will need to be scratch-built are

Starboard side detail on HMS Nelson.

ABOVE: HMS Newfoundland alongside the breakwater.

ABOVE RIGHT: Photo etched brass catapult, cranes, davits, Oerlikons, radar aerials and railings have been added.

the masts, as cast white metal masts look terrible. I have depicted HMS Newfoundland inside the outer wall, also busily loading stores from a lighter.

Troop Transport

This vessel started life as a resin casting that a fellow modeller sent to me to evaluate. It represents a pre-war cargo / passenger vessel and seemed to be an ideal subject to convert into a W.W.II merchantman. To achieve this, various detailing parts were added from the Tom's Modelworks Liberty Ship etched brass set. Vehicles, in desert colours, from the old Skywaves 1:700 Beach Head Vehicles set have been loaded onto her decks. She is depicted as being loaded with munitions, stores and ordinance for the forthcoming invasion of Sicily.

Seascape and other details

The seascape was made in the usual manner but with an initial covering of coarse acrylic gel being applied to the MDF baseboard instead of the more usual Polyfilla. This, it was hoped, would help produce an impression of a slight breeze on the smooth water. The outer wall was made using thick plastic strip with rodding added to the inner side to represent wooden piles, whilst the outer side had crushed coal applied to represent rocks that had been added to aid the breakwater. Only by referring to photographs can you get these details right. With regard to painting, the water near the capital ships had to be blue, or blue-green, to represent the depth required for them to be anchored. As the sea approaches the outer wall it gets progressively more green as it shallows. Inside the outer wall, the cruiser and transport sit on green water characteristic of shallow water with a sandy bottom. Watered-down toothpaste was added around each vessel in the outer harbour and applied to the edge where the 'rocks' on the outer wall meet the sea. It's a calm day but there is always a slight swell with small wavelets at the water's edge. To complete the seascape, a small coaster is negotiating her passage past the two capital ships, and making its way towards the harbour entrance.

There are always some small details to bear in mind. Note that large ships invariably have small diesel engines continuously working, even in port, so both HMS Nelson and HMS Formidable have a small cascade of cooling water emanating from their hulls. Also, if you do depict ships together at anchor, they invariable point in the same direction; in most seas this is due to the tide and / or the wind, whilst in this diorama it's due to the small breeze as the Mediterranean does not have an appreciable tide.

Conclusion

And there you have it. Not completely accurate to the last detail, as size and space always dictates that the ships have to be brought into closer proximity than would be the case in reality. Call it 'artist's licence' if you like but in the end a diorama should have enough salient details to provide the viewer a visual impression of reality. With enough visual clues available, both the eye and mind are tricked into believing that here before one is a little bit of reality captured and frozen in time.

This is the last in this Waterline Series, at least for the time being, and I do hope it has inspired one or two of you to have a go at this branch of the hobby. It really can make a nice change from building R/C models.

References

Scalemates
Website: www.scalemates.com
Aoshima HMS Illustrious, Ref. No. 051047

Wonderland Models
Website: www.wonderlandmodels.com
Tamiya 1:700 scale HMS Nelson kit,
Ref. No. 77504

Mod Roc
This is a plaster bandage used by sculptors and is handy, especially if creating a mountain or cliff.

Polyfilla
Ideal for creating seascapes and any number of other features.

Primer Coat
Halfords Grey Plastic Spray Primer.

Acrylic Paints
Artist's acrylics, available from most art retailers. The varnish is Tamiya gloss.

Enamel Paints
Humbrol and WEM Colour Coat.

Other materials
Assorted plastic rodding and strip.
Assorted brass rodding and steel wire.

The pre-war passenger / cargo vessel cum troop transport ship.

Activity around the troop transport ship. Note the vehicles in desert colours.

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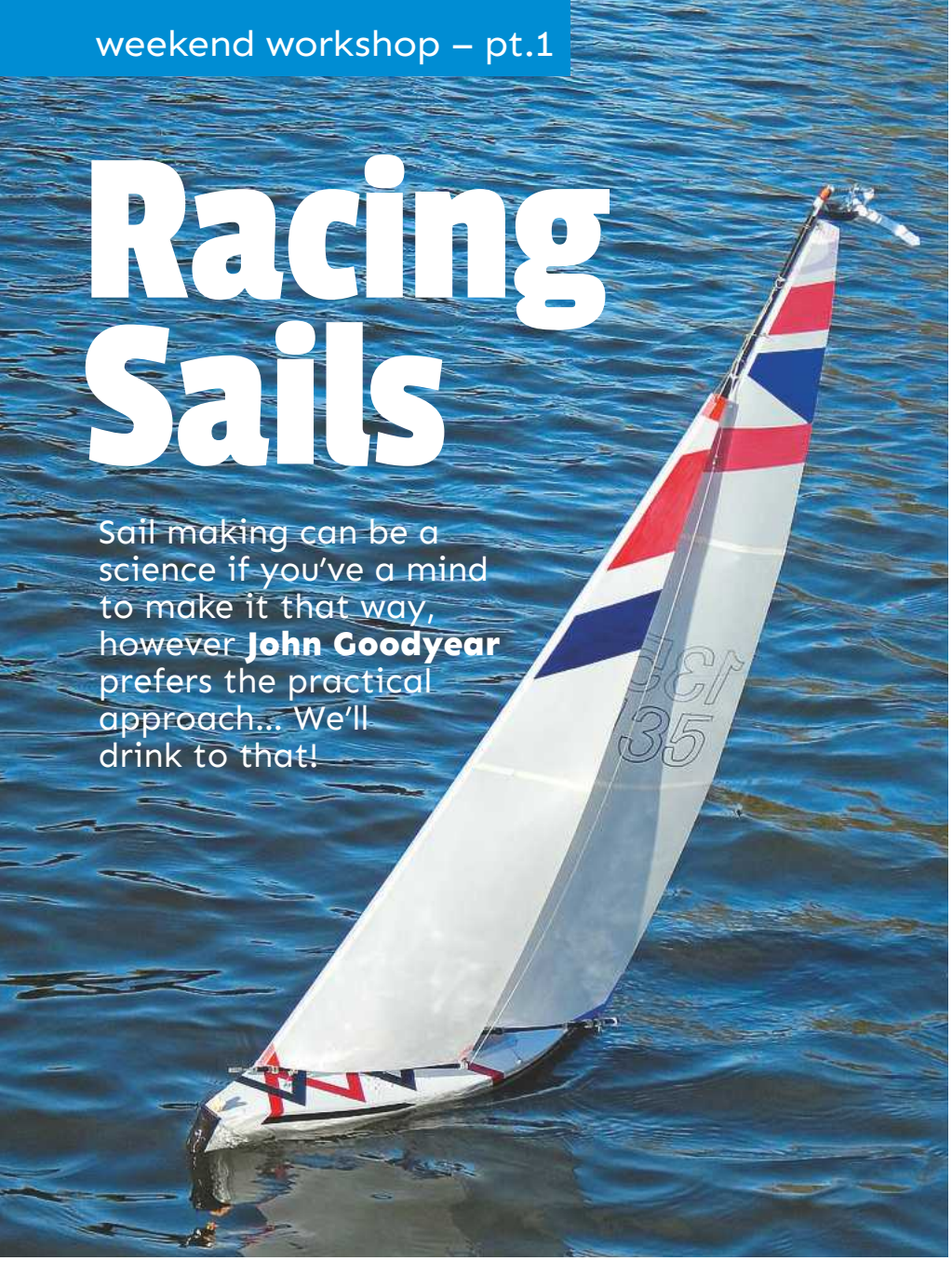
Racing Sails

Sail making can be a science if you've a mind to make it that way, however **John Goodyear** prefers the practical approach... We'll drink to that!



MATERIALS

Rip-stop Nylon: Fabworks www.fabworks.co.uk. Tel. 01924 466031
Mylar: SailsEtc www.sailsetc2.com. Tel. 01376 570583
3mm eyelets: eBay
Dyneema: eBay
Double-sided tape: Samuel Taylors Crafts – www.samueltaylors.co.uk Tel. 01484 435235

Before moving on it might be appropriate to consider the materials we need in order to produce something workable. Currently, Mylar (Trade Name) in various thicknesses is the most widely used material and works astonishingly well. It's readily available in various thicknesses but for our purposes 35, 50 and 75 micron are the grades we'll be using. Other materials are available, however, and should not be discounted. Within our sailing group – the Retired Old Friends Wednesday Afternoon Club (www.rofwac2.weebly.com) – we must have experimented and evaluated most of what's even remotely likely to work. As noted here in a previous article, we've used shower-curtain plastic, rip-stop nylon, PTFE coated cloth, florist wrapping, polypropylene sheet and even an old plastic tablecloth, amongst others. I have to say that in certain (light air) conditions rip-stop nylon performs very well and for the purpose of experimenting, florist wrap is brilliant and almost free. If you want your yacht to get noticed then a set of sails covered in pretty flowers or bright red mushrooms could be for you. The rest of us will go for the clear stuff.

Permit me to start by stating categorically that I am no expert when it comes to making sails for model yachts. There are others 'out there' who undoubtedly are and if you want the very best sails for your yacht then these people will happily sell you a set. Most will provide you with positively excellent products and at a reasonable price. Buying from them will, however, remove the satisfaction of making something eminently functional yourself and, with a lot of practice and a fair bit of luck, something that will enable you to be competitive at all levels. Interested? Then read on.

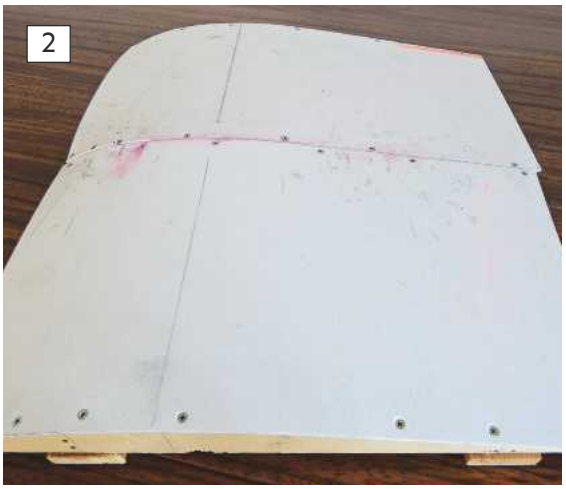
Setting the scene

Let's start by considering the type of sails we'll be making. For almost all racing we are talking about Bermuda Rigs either mounted conventionally on a fixed mast with two booms or in the form of a swing rig where the whole unit rotates. In other words, and in simple terms, we are looking at a complete rig where the sail at the front of the yacht is smaller than the one at the back and where both work together to propel the yacht, hopefully, forward. I did say it would be simple, didn't I? For other types of rig such as those fitted to, say, a gaff rigger, please stop reading now.

Tooled up

If you're still with me I guess there's some interest so let's move right along. The first thing to consider is the size and shape of the sails you might wish to make. If you're planning to make another (better?) set for an existing yacht or from a plan then no problem as you will know all the necessary dimensions.

1

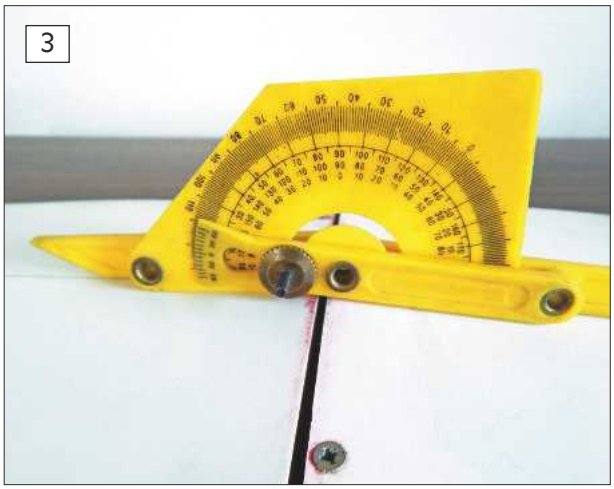


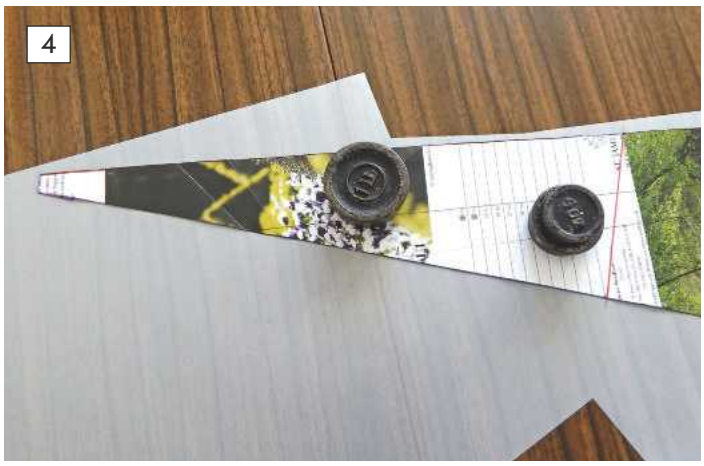
2. Overall view of my battered building jig with Eppler 205 aerofoil section.

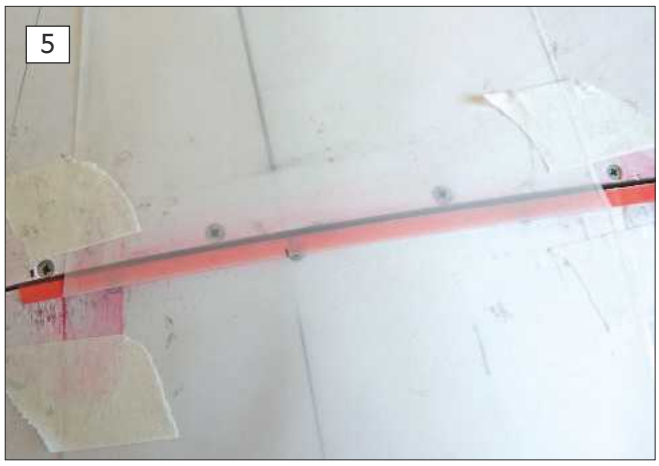
3. Setting the angle between the jig sections.

4. Marking out the top section of the jib using the card template.

5. Two sections taped down for joining. The red band is the backing to the double-sided tape.







If, however, you're designing a set from scratch to equip, say, a new hull, then you will need to do a bit of thinking and calculating. We'll return here later but now is a good time to jump right in and make some sails so let's look at the tools needed.

Mercifully, what's required is not expensive or complicated and will probably be found in the average modeller's toolbox. To start, then, a very sharp craft knife is essential. I now tend to use the ones with snap-off blades and discard them regularly. Usually, I only have to imagine the blade is showing evidence of bluntness and it's history. At £1 for a packet of five from Poundland this is not going to break the bank. You will also need a small and larger pair of sharp scissors, a one metre steel rule, a 12" ruler, a sharp pencil, some double-sided tape and some masking tape **(Photo 1).**

If you simply wish to produce a sail with no built-in curve or camber to a known pattern then all you have to do is get out the scissors and craft knife and cut away. For finishing you can then deploy the techniques noted elsewhere in this feature. All I will add at this point is that sails with a camber / aerofoil section will almost invariably outperform sails made by just cutting out a piece of material. So, if you're thinking of racing, even at club level, then cambered sails are the way to go.

To make sails with camber or 'flow' built in you will need to make a building jig to allow the sail parts to be assembled correctly. Now, I make no bones about it, this might take you some time and effort but it is an essential part of making sails that perform well. Trust me, your endeavours in making such a jig will be well rewarded. A fellow member of our club whose carpentry skills far exceed my own made a most marvellous device from solid oak which functions brilliantly and I can only applaud him. Appreciating that I could not hope to emulate him I made my jig **(Photo 2)** from some formers, two bits of hardboard and a pair of hinges. It looks a bit battered because it's had lots of use but it still functions perfectly. In essence, it consists of the top section of an aerofoil, in my case currently an Eppler 205, hinged in the middle to allow it to be set at various (small) angles **(Photo 3).** I will leave it to you to decide on the aerofoil to use. All I can say is that the Eppler 205 seems to work well.

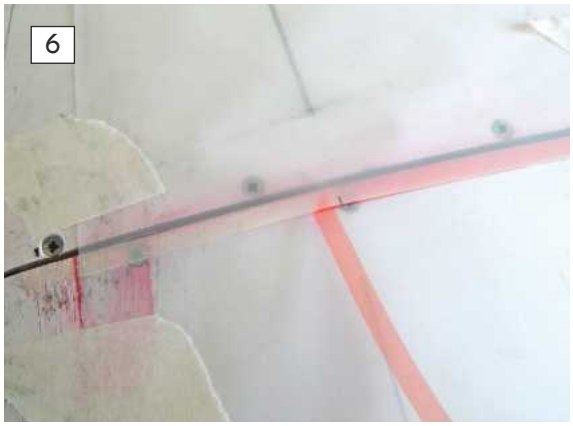
> *"…if you're thinking of racing, even at club level, then cambered sails are the way to go"*

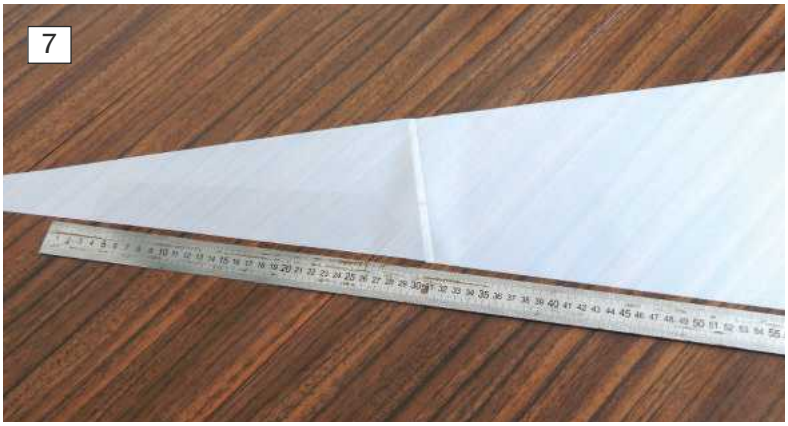
As an aside, I feel I ought to point out that there are other devices out there which permit cambered sails to be made. The most popular at the moment is something called the Giorgio Device. This is a very, very simple unit which at least one modeller I know uses successfully. For my part, I have never been satisfied with the result obtained despite many efforts. Neither, I should add, have a great many of my fellow club members.

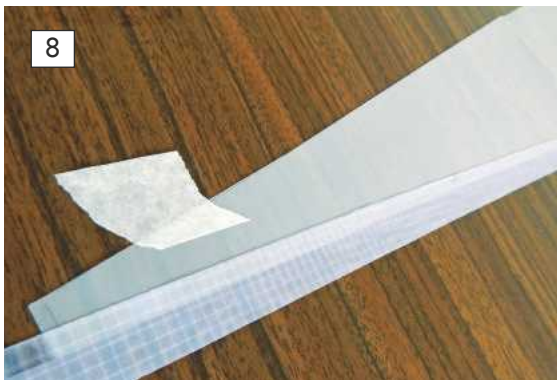
The final thing we need, of course, is some sail material and for the sake of simplicity I am going to assume we use Mylar in thicknesses of 35, 50 and 75 micron. Right, we're now almost ready to start the exciting bit of cutting and sticking. The sails made as a result of this feature were for an RG65 racer, specifically a JIF which we sail as an independent class within ROFWAC and our parent club, the Kirklees Model Boat Club. The sails were made to the readily available plans using 50 micron Mylar at the request of the Skipper who commissioned them.

It's a kind-of magic!

In order to keep the plan in good condition the first step is to make some copies in cardboard **(Photo 4).** I found old calendars ideal but there are lots of other options. Armed with these copies you need to decide where the joints are going to go to induce camber and how many of them you need. For RG65 size sails one joint in both sails is usually adequate but I was asked to put two in the main on this occasion. As for where to place the joints, this is a moot point. On this occasion, however, and again at the request of the skipper concerned,







6. Peeling away the backing of the double-sided tape.

7. Once the halves are joined you'll need to check the line of luff edge.

8 Cutting the luff tape.

9 A dose of WD40 applied to the Dyneema will stop it sticking to the double-sided tape.

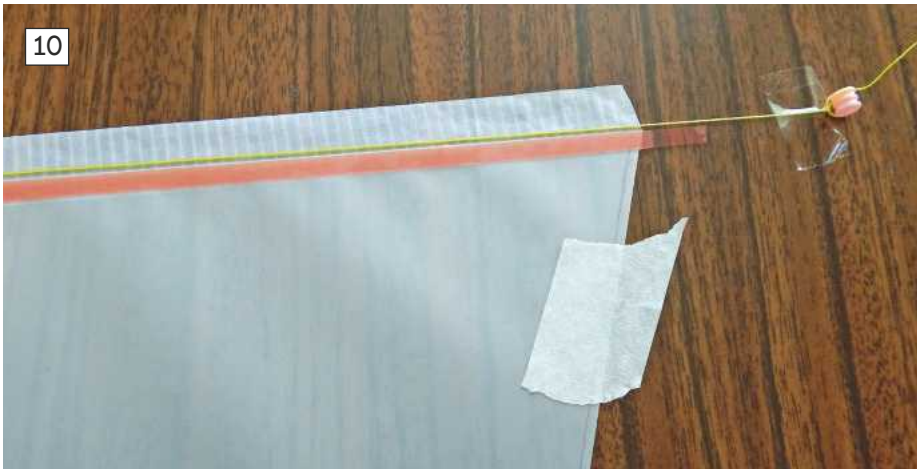
10 Double sided tape attached and the Dyneema in place.

the sails were split into sections based on dividing the height by 2 for the jib and 3 for the main. The only other thing to bear in mind is that the joints in each panel must be at 90 degrees to the leach or back edge of each sail.

We next have to decide how best to manipulate the Mylar which invariably comes on a roll to protect it and to make it easy to ship. Unfortunately, this method of packaging does impart an in-built curve into the material which steadfastly refuses to be removed; at least, not by any techniques I've tried. The only way to combat this is to cut panels which alternate the inbuilt way in which the Mylar curves. No big deal but something worth remembering.

Based on all the above it's time now to make up the jib, so here we go. Cut out both panels about 15mm oversize using the card templates and allowing for the 6mm overlap that will arise as we join the panels. Next, we have to decide where we want the point of maximum camber to lie. I once read that for a sail to provide top speed the point of maximum camber should lie at 35% of the chord. For maximum pointing ability it should be 40%. Now, maybe I'm greedy but I want both! On this basis I set the point of maximum camber on all my sails at 37 / 38%. Incidentally, I've made sails with the camber point at 35 and 40% and couldn't detect any difference in performance, so maybe I'm just not that good?

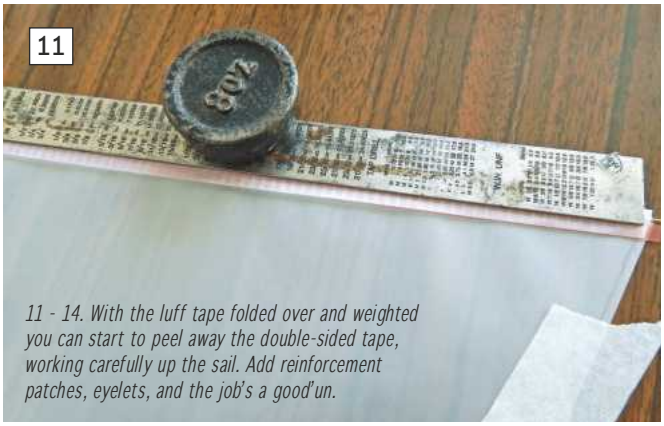
Right, let's start making the joints. Lightly tape down the first section of the jib to the building jig with the joint line exactly at the point where the two jig halves meet. Use masking tape for this. The point of maximum camber



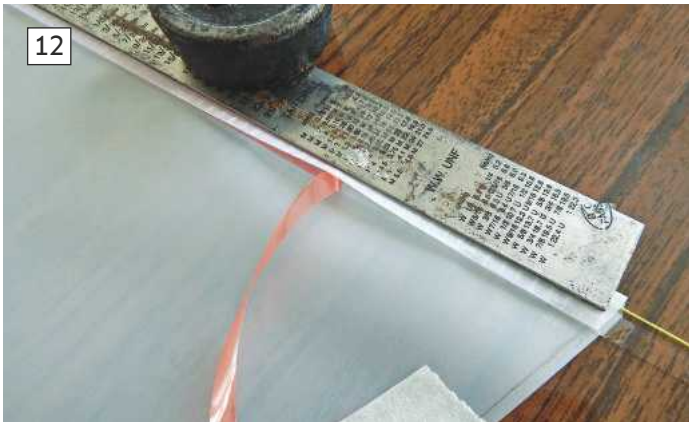
that you have chosen should lie at the highest point on the building jig. We now need to apply a strip of 6mm wide double-sided tape. This stuff, incidentally, can usually be found in craft shops specialising in card making and the like. Just make sure you buy the waterproof variety! The tape I use has a red backing strip which shows up quite well during the joining process. When you apply this, do make sure that it's done without introducing any tension. It is, in fact, best to cut a strip of the necessary length half an hour or so before use, then hang it up somewhere to allow it to relax. With the tape in place and with the backing still attached we now need to position the next panel over the double-sided tape and lightly fasten it down with masking tape **(Photo 5).** When you're satisfied that everything lines up, (and only when) you can commence peeling the backing strip off from one side and follow it along pressing the top panel down onto the bottom **(Photo 6).** Once done, remove all the masking tape, trim the double-sided tape and remove the sail from the board. If you now hold it vertically and apply a little tension you should see a delightful curve along the chord. Flex the sail and the curve should flip from one side to the other. Magic, isn't it?

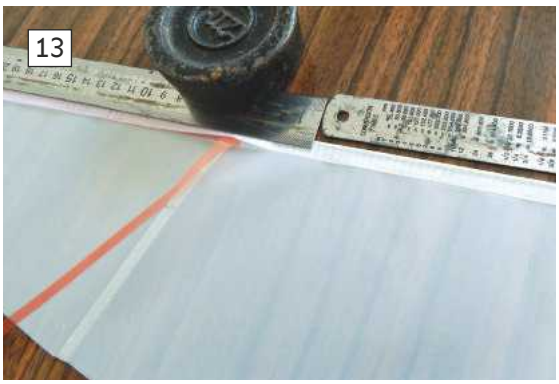
Luff line & pocket

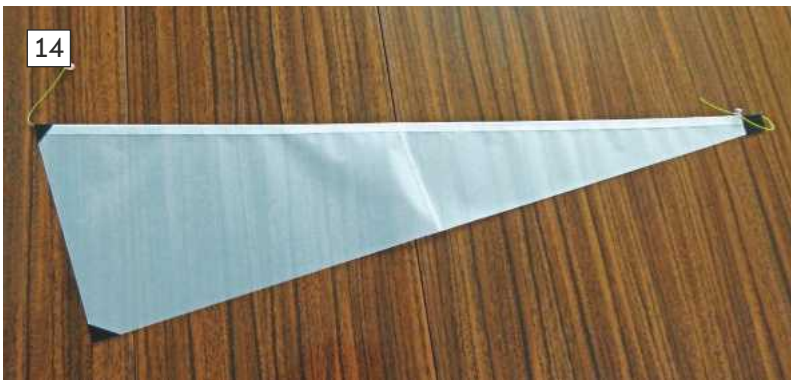
The next stage is to lay the joined jib on the table and check that the leading edge is straight. It probably won't be due to the jointing process so trim until it is **(Photo 7).** This, incidentally, is why we made the sail parts oversize to begin with. Once satisfied it's time to make the pocket to hold the luff line,



11 - 14. With the luff tape folded over and weighted you can start to peel away the double-sided tape, working carefully up the sail. Add reinforcement patches, eyelets, and the job's a good'un.







which permits the sail to be tensioned and attached to the mast and boom. I have to say that most of my fellow club members say that this is the most daunting part of making a jib and I think they're right, but it has to be done.

Let's start by laying out the sail and attaching it lightly to the building board or table with masking tape. Cut two pieces of double-sided tape to the necessary length and allow them to relax somewhere out of the way. Whilst this is going on cut a piece of rip-stop nylon to the length of the luff and 16mm wide **(Photo 8).** Once done put to one side and prepare a piece of rigging cord (Dyneema) to the correct length, plus at least 300mm. Now, this stuff is remarkably resistant to sticking, but double-sided tape is remarkably sticky as you will no doubt have discovered. To eliminate any possibility of the two items joining forces I treat the Dyneema with WD40 and, trust me, this stops sticking **(Photo 9).** Next, tie a bead or something similar onto each end of the length of Dyneema as insurance later on. You really, really don't want the luff line to slip out of the pocket. Many, many will be the angry words if you let this happen.

Returning now to the sail, stick down the relaxed double-sided tape to the edge of the luff, peel off the backing strip and stick down the rip stop nylon very carefully. Remember, you only have about 2mm of 'spare' to play with. Remove everything from the table, turn over and lightly tape down again. Apply the second bit of double-sided tape to the luff edge and then place the anointed length of Dyneema and tension it up before sticking it down to the table at each end of the sail **(Photo 10).** It needs to be very close to the edge of the luff and the applied length of double sided tape, but not touching. Now is a good time to recruit a helper to fold over the rip stop nylon to complete the pocket and temporarily hold it in place with straight edges and weights **(Photo 11).** Once everything is in place remove the backing strip from the double-sided tape at one end and gradually work your way down the sail pressing the rip stop nylon into place **(Photo 12 & 13)**. Remove everything from the table and admire your handiwork, we're almost there!

Dig out the sail pattern again, lay it on top of the jib, draw round to get the final shape and size and trim the excess off from the head, foot and leach. All that remains to complete the sail is to attach reinforcement patches at each corner. Historically I've used all manner of materials for this including the 'proper stuff' that professional sail makers use, thin plastic, rip-stop nylon etc. For this particular set of sails, however, I elected to use Gorilla tape which, according to the adverts "sure is tough." All I know is that it is indeed strong yet flexible and does what it is supposed to do extremely well **(Photo 14).** As for eyelets, I now exclusively use 3mm units sourced either online or from a local craft shop. Smaller sizes (2mm) are available and they are more discrete but despite having the necessary tooling I've never had much success with them mainly, I imagine, due to my ineptitude. Whatever type and size you elect to use do invest in the proper tooling to make the hole to accommodate the eyelet and to close the eyelets after insertion. I use a block of oak to punch the holes and close things up which seems to work well without damaging the tools.

So, there's the jib successfully complete. Or is it? Dear reader, I have to say that despite having made a great many sails successfully I still find myself discarding about 20% of my output due to the sail not setting properly. If you're in any doubt about what you've made the cost involved in materials is negligible so don't be frightened to ditch it and start over again. Next time it WILL be better. So, see how you get on making a jib and I'll be back next time to talk you through the 'main'. Until then...

Our father, Tony Lench, died in 2011. He loved the sea and especially the ships that sailed on it and so he started modelling them! Napoleonic frigates, an Elizabethan Galleon and latterly Thames barges, built with loving care, bore testament to his talent and knowledge. On his passing the collection has passed to our family, and to museums. However there are still examples of his work to find a home and as a keen lifetime reader of Model Boats we know that he would love them to go to someone who will enjoy them as we do.

Bark Fore and main masts square rigged with mizzen rigged fore and aft. **offers invited**

Sloop Single masted fore and aft rigged. **offers invited**

Two Masted Schooner Two masted fore and aft rigged. **offers invited**

Revenue Cutter c1900 We think this is Dad's first model. **offers invited**

As fellow enthusiasts we hope you enjoy his model ships as he did. For further information please contact **Michael & David Lench 07774 453382**

OSA 2 Fast Missile Boat

With the deck suitably plated **Dave Wooley** turns his attention to the humble handrail

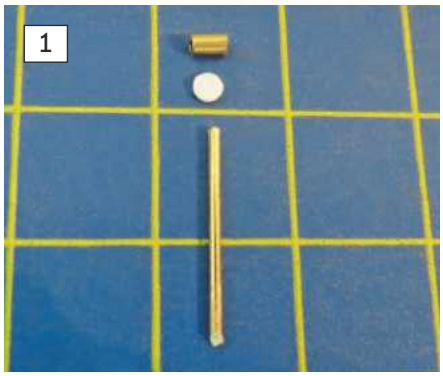
On the OSA boats, there are a number of different handrail types, however here we're focusing on the single handrails secured to the main deck housing sides. Basically, they are very simple, being just rails with two or more supporting lugs. In fact, you can purchase suitable lugs, and lots of other items, all at various scales from Eileen's Emporium, a supplier very well known to model railway enthusiasts (details at the end). However, the thrust of these articles is more about DIY and how straightforward the process is to make these parts at a fraction of the cost of commercial items. Also, during this process, you can refine your skills, which can then be adapted for other projects.

Single handrails

The handrails that are attached to the deck housing are located from the wheelhouse and back along the entire length of the superstructure unit on both sides. Each rail consists of two or three supporting lugs, depending on the length, and the first task is to form these. Referring to **Photo 1,** the lugs that hold the rails in place are created from:

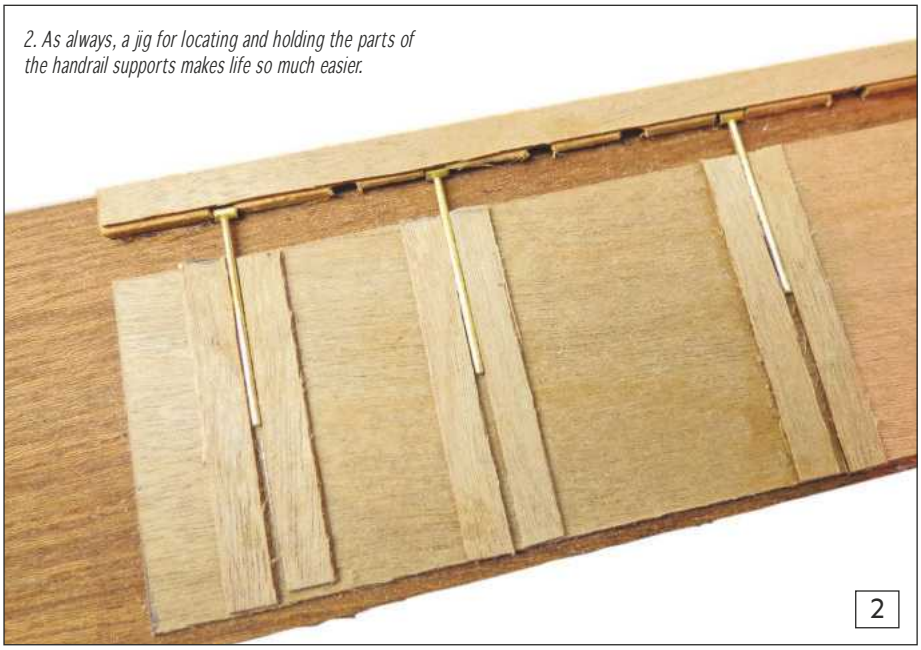
- 1.2mm (outside diameter) brass tube cut to 2.5mm in length.
- A styrene circular backplate 0.5mm thick and 2mm in diameter.
- A length of brass rod for the fixing pin, 20mm in length.

The backplates can either be stamped-out using a leather hole punch, once you've selected the desired hole diameter, or parted-off from a length of 2mm styrene rod. The choice is yours but either way a small hole will still need to be drilled in its centre.



1. The parts that comprise a handrail supporting lug are small but not difficult to source.

2. As always, a jig for locating and holding the parts of the handrail supports makes life so much easier.



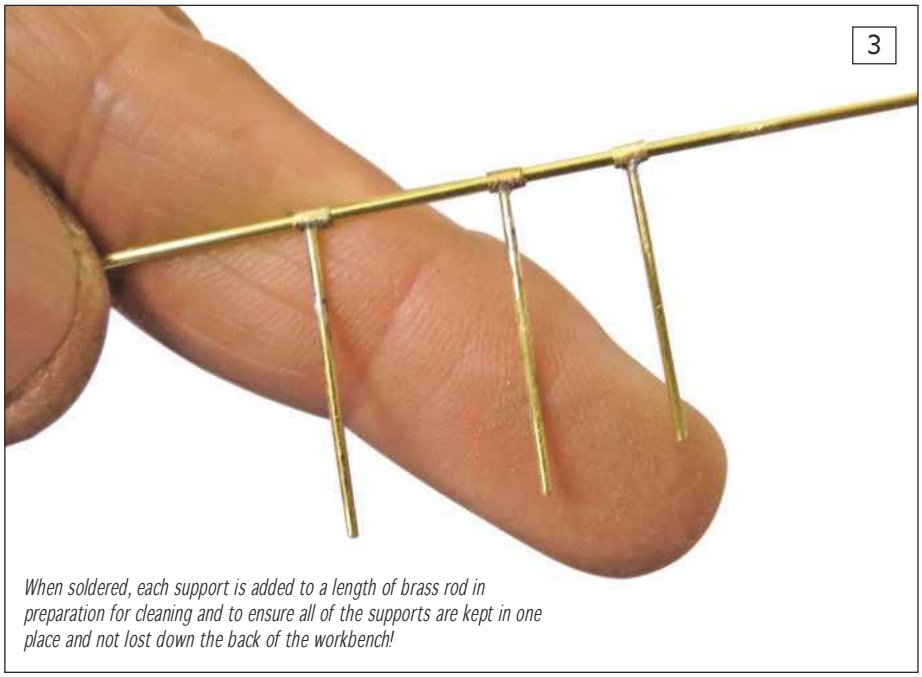
Preparation for soldering

Regular readers of this column will know that in order to make a task easier, I often make use of a jig to ensure that the job in hand is not just less demanding, but is also consistent when being repeated. The task, then, was to solder the brass fixing pin to the lug. It sounds straightforward enough, but the method required a little lateral thinking. The jig was made with the aim of holding the lug(s) firmly in place to allow the fixing pin to line up with the centre of the tube. As there were 22 lugs and 22 pins, the jig was made to allow three lugs and pins to be soldered during one session, followed by the next set of three and so on until the soldering job was complete. Past experience dictated that a few spares should be made too!

The timber jig not only ensures consistency, but also allows the brass pin to be located on the centre line thus maintaining consistency when the lug and pin are set in place. In order to maintain that centre line, the fixing pin was raised by 0.5mm using 0.5mm plywood with the pin set into grooves as in **Photo 2.**

Preparation for soldering has previously been mentioned in this column, particularly when using a solder paste. Once again, this was the most suitable solder for this type of job, as only a very small amount is actually applied to the joint. Flux can be used which will help with the 'flowing' of the solder but all that is normally required is to apply the solder bit to the job and the paste should then readily run into the joint. As in my August 2017 article, a digital soldering station was used as the temperature can be accurately pre-set. The solder paste was as before, i.e. MG Chemicals Solder Paste, obtained via Amazon; where would we be without them?

With the first three lugs soldered, these could be transferred to a length of wire rod, representative of the actual rail, in preparation for trimming and cleaning. This ensures they are all together as it's so easy to misplace these small parts, as we all know **(Photo 3).**

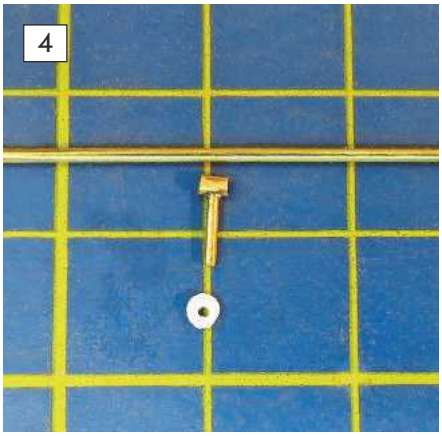


When soldered, each support is added to a length of brass rod in preparation for cleaning and to ensure all of the supports are kept in one place and not lost down the back of the workbench!

Fixing the handrail supports

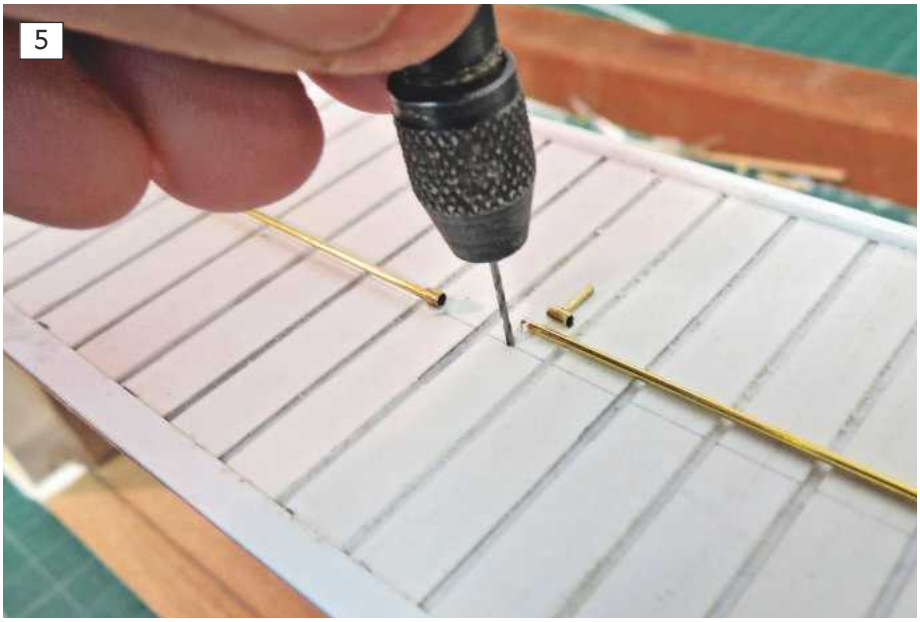
With the soldering complete and all the lugs cleaned and prepared, their extended pins could be trimmed to 6mm length. At this stage, each of the styrene backplates needed to be drilled to correspond to the brass pins **(Photo 4).** Having lined and set out the location of each length of rail on the superstructure unit and the position of each set of its lugs, work could now begin on locating them, indeed a pin vice came in very handy for this job **(Photo 5).** The backplate was then fitted to the pin and fixed in place

4. Cleaned, bases prepared and their locating pins cut to length, the supports are ready to fit.



5. Using a pin vice, holes were made in pre-determined positions on the superstructure ready to accept each of the supports.

6. A handrail support. At this stage the backplate is fitted but not yet fixed.

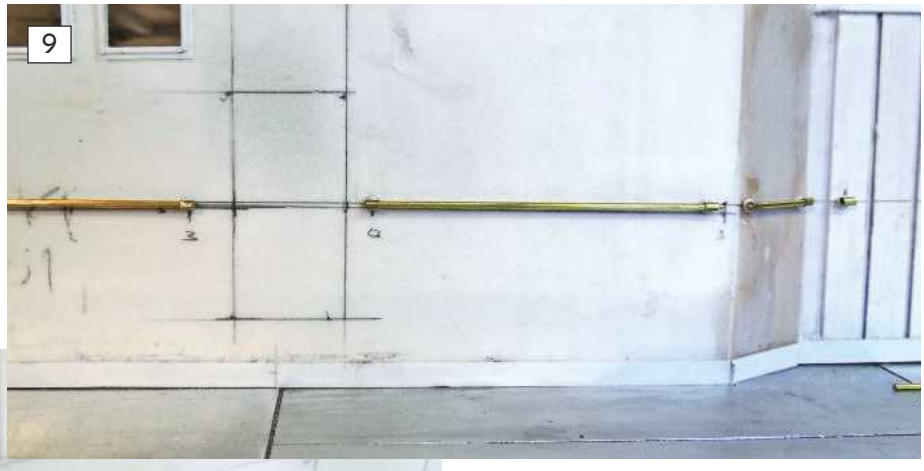


7. The supports in place, but with only their backplates glued to the superstructure.

8. With the handrail in place and the gap between it and the deckhouse correctly adjusted, the brass support could be fixed. For the time being, however, the rail itself remains removable.

9. Here the handrails need to be adjusted to match the sheer of the deck.

10. The handrail continues on the front of the wheelhouse.



whilst allowing the rail support to still be adjustable **(Photo 6).**

In **Photo 7** all the supports have been added in preparation for the threading of the rails. Although an exact fit is desirable with the ends of each rail corresponding to the last support, it is easier to cut the handrail itself slightly over-long and file its ends down later until the desired result is achieved **(Photo 8).**

The handrails extend around the wheelhouse, but due to the sheer, or rise, in the deck from aft of it, they need to follow a parallel line between the deck and the rail as indicated in the picture of an OSA boat earlier. This may seem obvious, but errors can (and will!) be made, so it's best to follow the old dictum of; 'Mark and measure twice, but only fix once' **(Photo 9)**. Our final picture **(Photo 10)** shows a typical handrail extending round the front face of the wheelhouse. A very satisfactory result using bespoke supports that have cost a fraction of a commercial product.

Next Month

It's worth noting that the design establishments of the old Soviet Union and its Navy were considered by their western counterparts to be very conservative, maintaining a rigid philosophy. That, as we shall soon see, was not always the case. Join me in the March issue when we'll be discussing the watertight doors and upper bridge detail work.

References and acknowledgements

Eileen's Emporium:
For small fittings in various scales. Web: www.eileensemporium.com.
Tel: 01531 828009.
Albion Alloys:
For fine brass wire and tube. Website: www.albionalloys.co.uk
MTB Hulls:
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Gay Class Fast Patrol Boat	28.2	7.7	MAR2554	18.99
HMS Magpie	26.8	4.25	MAR3259	11.50
Vosper MTB379			MAR3505	14.00
Singapore Knot	28.5	8.25	MAR3670	12.50
Vosper MTB	26.25	7	MM2062	13.00
Halvorsen Seaplane Tender	38.3		MM2077	13.00
US Coast Guard 38' Picket Boat			MM2098	12.50
Vosper RTTL	34	9.5	MM530	14.50
Brave Borderer	36		MM609	13.00
Brave Borderer Hull	36		HULMM609	98.50

Tyne Class Lifeboat MM1390

Vosper MTB379 MAR3505

Life Boat Plans & Hulls

	Length (in)	Beam (in)	SKU	Price (£)
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RNLB Plymouth Lifeboat	39	11	MM418	17.50
Rother Class Lifeboat	28		MM1286	17.50
Tyne Class Lifeboat	31	9.75	MM1390	12.50
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Rigging & Fittings For Marblehead			MM503	12.50
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Rhythm (1M Class)			MM1466	17.50
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Katie (Gaff Rig Pilot Cutter) Hull	40	12.5	DAH001	106.00
Lady Ma (Small Katie - Mevagissey Lugger)	20	6.5	DAP002	15.50
Lady Ma (Small Katie - Mevagissey Lugger) Hull	20	6.5	DAH002	52.50
Ibex (Brixham Trawler)	49.2	11.4	DAP004	21.00
Ibex (Brixham Trawler) Hull	49.2	11.4	DAH004	118.50
Manx Nobby	42		DAP005	21.00
Manx Nobby Hull	42		DAH005	131.50
Breeze (Bristol Channel Pilot Cutter)	40	13	DAP006	15.50
Breeze (Bristol Channel Pilot Cutter) Hull	40	13	DAH006	131.50
Lindy Lou (Mevagissey Fishing Boat)			DAP007	15.50
Ute	24.5	8	MM2079	13.00
Ute Wood Pack	24.5	8	WPMM2079	31.00
Tern			MAR3702	13.00

Submarines

	Length (in)	Beam (in)	SKU	Price (£)
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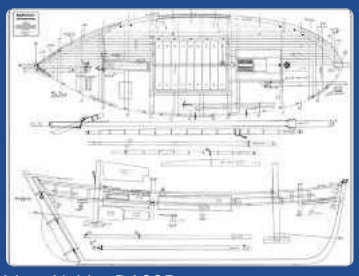
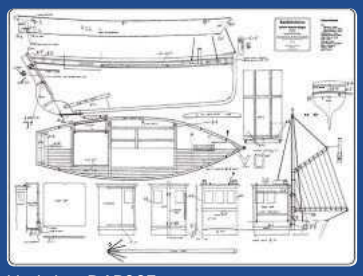
Submersible	15	6.75	BM1426	13.00
Type XVII U Boat			MAGM2030	13.00
Undine	29.9	2.4	MAR2901	11.50
HMS Valiant Internal Workings			MAR3746	13.00
Nautilus	28	1.5	MM285	13.00
USS Nautilus	36	3	MM433	13.00
Type IX U Boat	45	4	MM471	13.00
Sardine	48	5.75	MM485	13.00
Sprat			MM624	13.00
Resolution Class & Type XXIC U-boat	39 & 38		MM1155	13.00
Charlie Class	40		MM1210	13.00
Submarines F & B1	53		MM1248	13.00
Hollandi	25.5		MM1378	13.00
HMS Tabard	51	5	MM1396	13.00



Manx Nobby DA005



Lindy Lou DAP007

Sailing Yachts

	Length (in)	Beam (in)	SKU	Price (£)
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Manx Nobby (Set)	42		DASET005	138.50
Dutch Auxiliary	16.5		MM240	12.50
Bluebottle	35	8	MM293	12.50
Plane Jane	36		MM823	13.00
Barge Yacht	38		MM902	13.00
Topsail Schooner	30		MM909	12.50
Dabchick	24	6	MM1024	12.50
Starlet	34	9.5	MM1048	12.50
Dutch Yacht	18.5		MM1203	13.00
Ranger	33		MM1403	13.00
Gremlin	20.5	6	MM1505	13.00
Jenny	63.5		MM2070	13.00

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S.S. Mullogh

Phil Button returns with sights set on giving his scratch-built steam-sailer an early bath

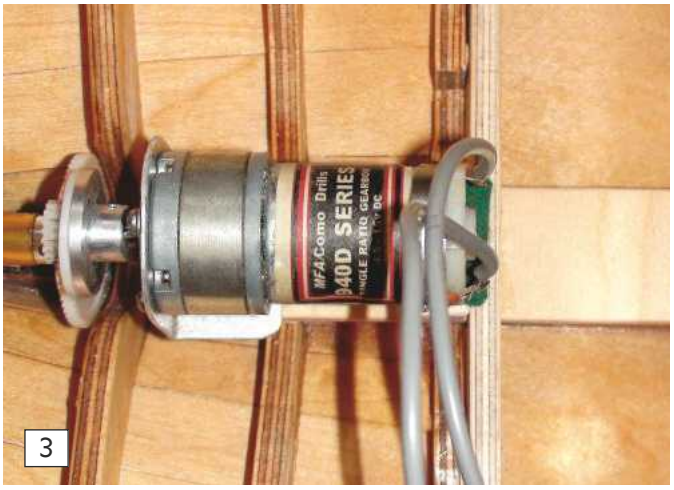
Welcome back to this latest instalment of my scratch-built steam sailer series in which, having built the hull, we're going to make the masts and get her wet.

As you might expect, both masts are made from dowel, the upper and lower sections of each being joined part way up using drilled ply mounts that are glued in place before being finished with a wood stain and satin varnish. Even though they look identical, each mast is, in fact, slightly different and, as such, needed an identity tag on its base – 'F' for the foremast and 'M' for the mainmast. In order to fasten the upper end of the forestay to the foremast, a brass bracket was made, then glued and pinned at the correct height. The aforementioned bracket has a hole in its front side to take the forestay **(Photo 1).** At the point where the two sections of mast join, a bracket, with two drilled holes on each side, takes the top end of the shrouds and is screwed to the top of the mast joiner. The mast stays, meanwhile, were made of multi-strand bicycle gear cable and assembled on the model to ensure they were the correct length. To fix the top end of a stay, a loop was formed in the wire which was then passed through the drilled hole in the mast bracket and the free end secured within a tubular crimp alongside the main wire. To finish the detail the loop was pulled tight, the crimp soldered in place and the excess wire cut off.

At the lower end of the stays, a loop was made using the same basic process, but this time it goes through the eye of a brass bottle screw **(Photo 2).** The bottle screws (purchased from Cornwall Model Boats) are there to allow the rigging to be tensioned in order to keep the masts straight, however these can also be completely unscrewed when required to allow easy mast removal for transport. Each bottle screw is lashed to the chainplates with thin soft iron wire at its bottom end.

Roll-up

With the masts fitted, the model looked a little bare without its funnel so I thought it best to rectify the situation. I usually make funnels from any old bit of thin-wall tubing, often



aluminium and steel tubes in all sizes that have been salvaged from empty aerosols and gas canisters. I rarely throw such things away, however in this case I couldn't find a tube of the right diameter that was long enough, so decided to make my own funnel from tinplate. The process is quite simple as all you need is a piece of tinplate of the right size (in this case cut from an old 5 litre paint thinners can), a rubber sheet or pad, a piece of round steel of a diameter smaller than the finished tube and lots of patience. In short, you place the tinplate on the rubber sheet and roll the steel over it with quite a heavy downward pressure, making sure that you have the tinplate the right way round. With this the plate will start to curve. It takes a while and it's hard on the hands, but eventually you will have formed a tube with an overlapping edge. All that's needed now is to solder along the seam and there it is. If you're anything like me the end result will not be pretty, but filing, filling and sanding can then work wonders. The bands, which are usually to be found around the top of the funnel and also lower down, were made from copper wire and soldered on. Once again, more filing, filling, sanding and patience is required for a decent result.

Impatience prevails

Although by nature I'm fairly easy going, having a semi-complete model with no 'works' gets me to wondering whether there is any short cut that can be taken to see it on the water. If nothing else, seeing a model afloat and moving adds that extra little bit of incentive to get on and finish it all.

Having a wander around the workshop, a Como Drills 940D51 brushed geared motor came to light, having been left over from a similar episode of impatience with another steam ship some time ago. A cheap and cheerful Chinese electronic speed controller (removed from a boat that went brushless) and a 12V 7Ah sealed lead acid battery also came to light. With these basic ingredients, a temporary electric installation could be assembled to get S.S. Mullogh on the water quickly. Mind you, on 12 volts the geared motor runs at 2500rpm (no load), whilst the proposed steam engine runs at only 750rpm. Another search around the workshop unearthed some plastic gears that had been stripped from a defunct inkjet printer and, for reasons that I fail to recall, had been mounted to metal bosses. They were duly pressed into service to give an additional gear reduction between the geared motor and the propeller shaft. The motor was mounted on a plywood strip and screwed into the hull in the right position for the gears to mesh **(Photo 3).**

The rudder was next to receive my attention for although it was already installed, no servo was connected. To rectify the situation, a servo and linkage were added to the prepared location at the stern, however somewhat amazingly for such a large and spacious hull, only a micro-servo could be used in this relatively tight space as there's nowhere else to put it without incurring a very long linkage.

With the speed controller fixed to its side, the battery was fitted in a simple ply box that was pinned to the keel **(Photo 4),** whereupon all that remained was to install an Orange (generic) 2.4GHz receiver, to work my Spektrum transmitter, wire it all up and test it. No receiver battery pack was required as this speed controller had a BEC facility. All well and good so far but, of course, the model needed weighting down to its proper waterline so that it would float 'in' the wet stuff rather than 'on' it. Off to the domestic test tank (a.k.a. bath) I went, then, complete with a box of lead. To achieve the correct waterline, around 15kg of ballast had to be added which, I am sure you will agree, is no small amount. My supply of ballast is in the form of lead water pipe, salvaged from my daughter's house (not the local church roof), the pipe being cut into useful lengths before being squashed flat in the vice. As you can imagine, this model is rather large for bath tests so there wasn't much chance of a domestic power trial. Note, also, that during the ballasting process I used a spirit level across the main hatch coaming to check for any port or starboard list.

Maiden voyage

In July 2013, S.S. Mullogh was packed into the car, together with a couple of working 'spare' boats just in case, and off we went to Sheringham Boating Lake in Norfolk for its maiden voyage. The day was not what I would consider ideal for a maiden, as there was a bit of a swell on the lake and a very stiff and cool breeze coming off the sea, but it would do for this big and heavy model.

After checking that all the radio control functions were working correctly, the model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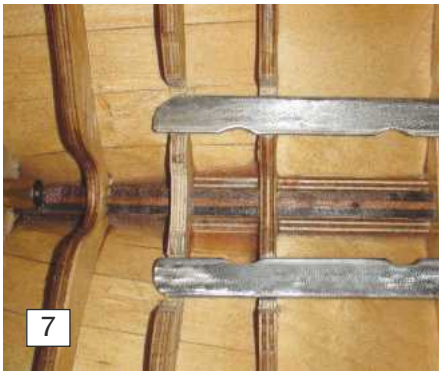
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was switched on and placed into the water **(Photo 5).** It was then motored around the lake and, apart from a slight list to port that was easily corrected by ballast changes she did all that was expected of her. As a result of the gear ratio being incorrect the speed was rather slow but it didn't matter. You can see from **Photo 6** that with a bit of elbow-grease the home-made funnel had turned out rather well.

Engine installation

Having seen the model actually on the water, one felt more inclined to get on with installing the steam plant and the sailing rig. After removing the temporary electric motor, battery, speed controller and receiver, careful measurements were taken of the steam engine's baseplate and crankshaft centre height, whereupon it was found necessary to cut and file some of the formers in the engine room at the after end of the model, ready to accept the 12 x 12 x 2mm steel angle engine bearers. These were positioned in the hull **(Photo 7)** and attempts made to get the engine through the hatch to check the alignment. I already knew that this was going to be a tight fit through the engine room hatch access, but horror of horrors, it would not go in at all with the steel bearers in place as it fouled on the lower edge of the forward hatch coaming. After a bit of thought and a few seconds with a 'power file', part of the hatch coaming vanished and with it, the problem.

Engine alignment with the propeller shaft was checked using a temporary solid coupling, **(Photo 8),** to make sure that all was well before removing the engine and fixing its steel bearers in place with car body filler. Subsequently, during final fitting of the engine, small shims (thin pieces of metal sheet) were used as a packing between the engine and its bearers to make the alignment with the propeller shaft 100% correct when it was all properly bolted down.

Since steam engines tend to be messy beasts with a habit of throwing steam, lubricating oil and water all over the engine room space, I decided that the void beneath the engine, which would be impossible to get at with it fitted, needed to be filled so as to route drips and splashes to somewhere that could be easily reached. Therefore, said void was packed with car body filler, then sanded to shape to clear the crankshaft. The cutaways in the engine bearers are there to clear some engine assembly bolts that came below the base plate.

Finally, the engine was once more persuaded into the engine room, aligned with the propeller shaft using the solid coupling and the engine bearers marked for the fixing bolts. With this the engine was removed, yet again, so that the steel bearers could be drilled and tapped 4BA for the bolts. At one point in the removal process, I wound up with the engine caught somehow and my fingers jammed between it and the coaming. All quite painful and it took a bit of jiggling to extricate my fingers and the more valuable engine (?) without any damage!

Before returning the engine to its place and finally bolting it down, I needed to attend to an issue with the propeller shaft that had occurred on my steam tug MSC Archer, namely water leakage. Although the shaft was fitted with a lip seal, a small amount of water was getting into the tube and rusting the ball bearings. You have to keep in mind here that it works about 50mm under the water's surface. Anyway, since the same design was being used on S.S. Mullogh, I decided to add an oiling tube to the shaft.

Of course, the propshaft tube was already firmly fixed in the model and could not be removed, so it was drilled in-situ with a grease coated drill in an attempt to keep swarf out of it. A piece of scrap copper tube was fixed


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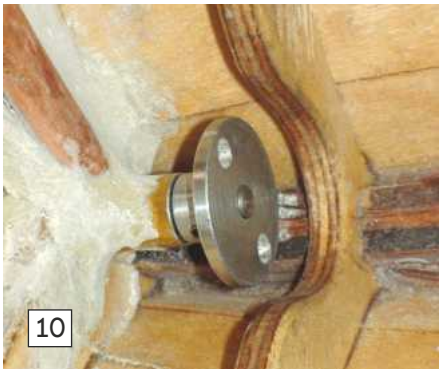
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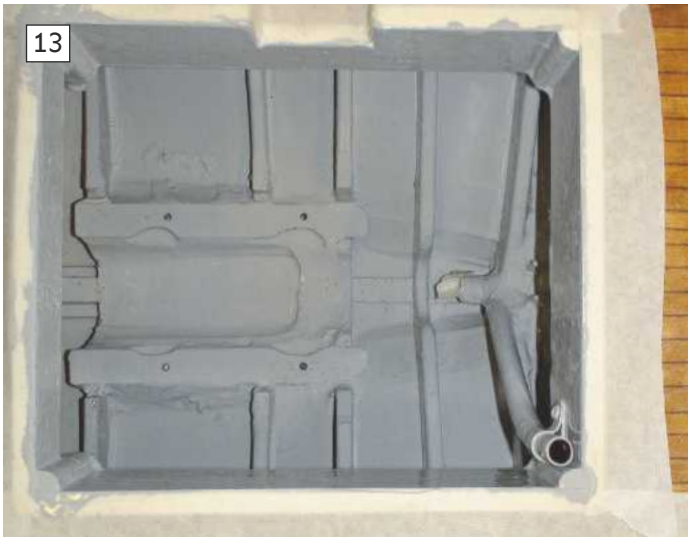
close to the shaft, with a P-clip holding the top end and the lower end encased in car body filler. To connect the engine to the propeller shaft a simple pin coupling was built, **Photo 9** showing the engine's half-coupling being bored to fit and in **Photo 10,** the propeller shaft's half-coupling fitted to it in the hull. The beauty of this coupling system is that it's a doddle to disconnect when needed, by just sliding it all apart. One trick I've learned (the hard way, of course) is to always file a flat on any propshaft for the coupling grub screw to bite into, and to use a thread locking compound on the grub screw. Otherwise, by application of Murphy's Law, it will definitely work loose sooner or later and always at the worst possible time.

The boiler (removed from MSC Archer) was complete with an aluminium base plate which was to be retained. In order for it to fit into this hull, the top section of a few formers in the main hold were trimmed away to allow it to sit on top of the keel as low as possible **(Photo 11).** Incidentally, in case you are wondering, the numbers in this photo are a leftover from the temporary electric power installation and relate to the lumps of lead ballast used on that first trial voyage. Some of the boiler fittings needed to be repositioned to help get it in but it still would not fit within the intended location until part of the aft lower edge of the main hatch coaming was cut away to clear the safety valve **(Photo 12).**

Finally, for Part 4 of this project, the hull was given a coat of gloss grey paint in the engine and boiler room areas to assist with protection from oil, water and steam. And, yes, the engine was taken out yet again! There's no particular reason why it had to be a grey in colour other than the fact that a part-used tin of same was to hand **(Photos 13 and 14).**

Right, that's it for this time. Next month (March 2018 issue) we'll continue with the radio control installation and hull fitting-out.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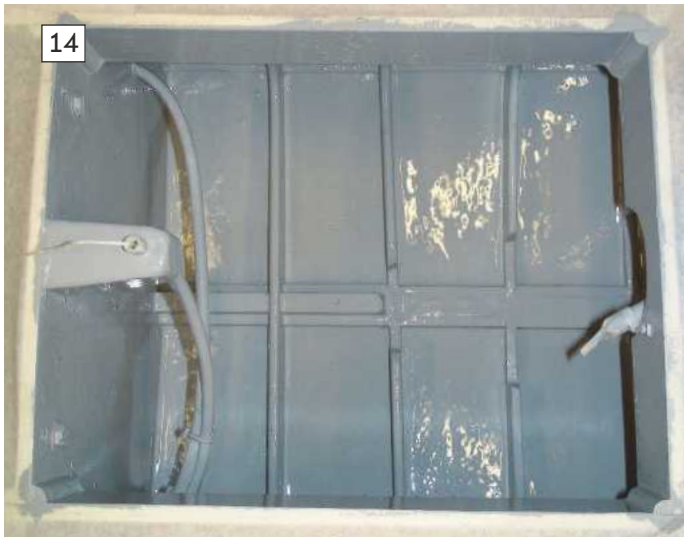
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Farman Airboat

Model Boats March 2018 on sale 16th February

S.S. Beaverford

Next month in model Boats

As if to reinforce the fact that here at Model Boats we love it all, the March issue will be loaded with varied content. From our regular contributors covering steam, warships, vintage matters and build techniques to an enticing mix of special features, this is an issue you'll not want to miss. Join us, then, and enjoy Ashley Needham's 1924 Farman Airboat, Roy Cheers' cargo liner S.S. Beaverford, an update on the editor's Sea Breeze build, more NR-1 sub progress, more sail making tips, Mullogh, Mooring Post and oodles more.

Boiler room

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PARTING SHOT

Topsail schooner. Another from the Neville Wade fleet (see Mount Stewart – January 2018 issue), this 1450mm long five mast topsail schooner is based on the post war German built Carl Vinnen, circa 1922. Weighing 5kgs with a sailing keel of 8.2kgs Neville reports her to be “an excellent sailer, well able to beat to windward and deal with real 20mph winds.”

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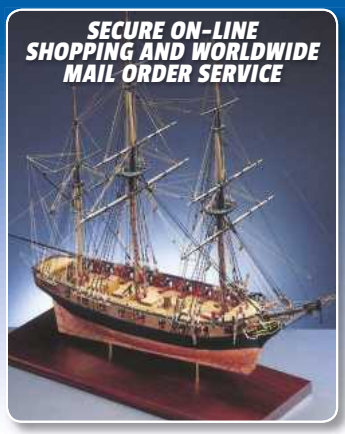

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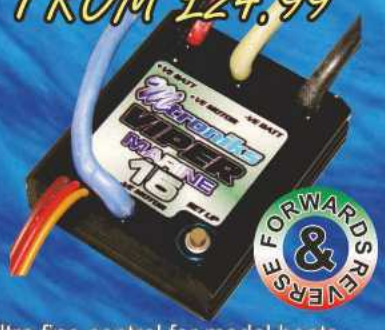

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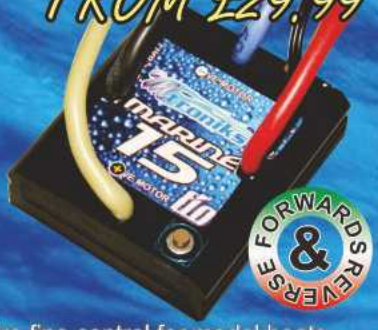

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