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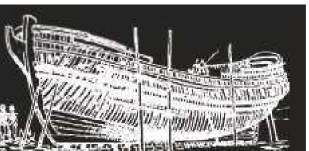

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Rectangular Carley Floats 38x30mm (2) 1:72	£13.86
2in Rocket Flare Set incl. Stowage Boxes 1:72	£11.28
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Twin .303 Lewis Gun Set 1;72 scale (2)	£7.69
Holman Projector 1:72 scale	£7.69
20mm Twin Oerlikon	£10.00
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Small cowl vents	£3.50
Boat hooks	£2.50
Ready Ammunition Lockers type 2	£4.50
Chemical smoke apparatus	£2.50
6pdr Mk.IIA gun on Mk.VII power mounting	£12.00
Twin manual 20mm Oerlikon on Bandstand	£12.00

Scalelink Etched Brass

11mm 3 rail stanchions & railing 840mm	£10.80
1:96 R.N 3 rail stanchions and railing 11mm	£10.80
1:128 scale vertical laddering	£10.80
1:72 R.N pattern 3 rail stanchions and railing	£10.80
1:192 R.N pattern 3 rail stanchions	£10.80
Clarendon serif Letters 2.5, 3 and 5mm high	£10.80
1:200 Angled step ladders with handrail	£10.80
Vertical rung ladders 4.5mm & 5.5mm wide	£10.50
1:128 Angled step companionway ladders	£10.80
1:128 scale vertical laddering	£10.80
5mm and 6mm wide Angled step ladders	£10.80
6mm & 8mm vertical rung laddering	£10.80

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
1:24 Standing R.N/Civilian officer with binoculars	£8.12
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
1:96 scale crew figure set	£7.37
Ships cat, sitting 1:48 Scale	£2.10
Bearded Officer, 1:32 Scale	£8.75
Crew member,1:32 Scale	£10.50
Officer, clean shaven, 1 32 Scale	£8.93
Bearded Officer1:48 Scale	£7.34
Crew member, leaning on rail 1:48 Scale	£7.56
Young boy,1:48 Scale	£4.55
Small standing dog 1:48 Scale	£2.03
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GM72/005 RN 1:72 Ratings – pullovers (3)	£7.40
GM72/006 RN 1:72 Officers – overalls (3)	£7.40
GM72/007 RN 1:72 Crew – duffle coats (3)	£7.40

Rigging Thread

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Rigging Thread, 0.25mm Natural	£1.70
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Rigging Thread, 0.5mm Natural	£1.81
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Rigging Thread, 0.75mm Natural	£1.98
Rigging Thread, 1mm Black	£2.10
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Rigging Thread, 1.3mm Natural (10 mtr)	£2.54
Rigging Thread, 1.7mm Natural 5 mtr	£3.18
Rigging Thread, 1.8mm Black	£4.31
Rigging Thread, 2.5mm Natural (2.5mtr)	£4.42

This is just a selection of the range available.

Timber

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Lime Strip 0.6 x 10mm x approx 1 metre long	£0.31
Lime Strip 0.6 x 3mm x approx 1 metre long	£0.35
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
Lime Strip 1.5 x 2.0mm x approx 1 metre long	£0.40
Lime Strip 1.5 x 3.0mm x approx 1 metre long	£0.45
Lime Strip 1.5 x 4.0mm x approx 1 metre long	£0.50
Lime Strip 1.5 x 5mm x approx 1 metre long	£0.55
Lime Strip 1.5 x 6mm x approx 1 metre long	£0.58
Lime Strip 1.5 x 7mm x approx 1 metre long	£0.61
Lime Strip 1.5 x 8mm x approx 1 metre long	£0.65
Lime Strip 1 x 1mm x approx 1 metre long	£0.36
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
Lime Strip 1 x 7mm x approx 1 metre long	£0.51
Lime Strip 1 x 8mm x approx 1 metre long	£0.53
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Lime Sheet 1mm thick x 100mm x 1 mtr	£5.40
Lime Sheet 1.5mm thick x 100mm x 1 mtr	£6.70
Lime Sheet 10mm thick x 100mm x 1 mtr	£15.59
Lime Sheet 2mm thick x 100mm x 1 mtr	£8.09
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
Lime Sheet 5mm thick x 100mm x 1 mtr	£12.71
Lime Sheet 6mm thick x 100mm x 1 mtr	£12.13
Lime Sheet 8mm thick x 100mm x 1 mtr	£13.86

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Scale Model Tugs	£14.95
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Scale Model Steamboats	£12.95
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Simply Model Submarines	£12.95
The Model Tug Boat Book:	£12.95
Scale Model Warships	£12.95
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Radio Control In Model Boats	£9.95
Introduction to Marine Modelling	£9.99
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.

Modelling Tools

Amati Electric Plank Bender	£31.54
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Swann-Morton 3 knife ACM Tool Set	£22.61
20 piece twist drill set .3 to 1.6mm	£13.23
Amati Pin Pusher De-Luxe	£11.45
Pin Pusher	£9.07
Waterline marking tool	£10.48
A3 cutting mat	£11.18
Pounce Tool with 4 wheels	£11.16

model Boats

Vol.68 Issue 810: May 2018

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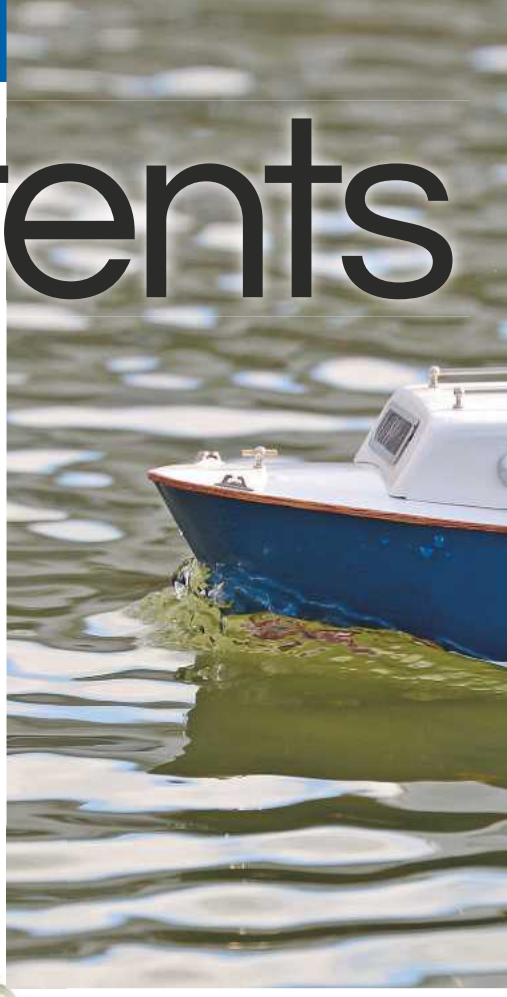

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QUICKIE PLAN

18 FREEMAN 22
Ray Wood relives precious memories with his one inch to the foot version of the evocative late-'50s cruiser

Special Features

editorial

Ian Williams makes a valid observation in his piece on getting started in fast electric racing. Quite early on in his article he talks about a genuine enthusiasm from people who have shown an interest in 'having a go' but then stop themselves because of the competition element. It's a feeling that I have some sympathy for yet, since it's primarily a negative and somewhat restrictive one, I always think it a great pity whenever it's expressed. My experience of these things tells me that once someone has decided against competitions, changing their mind is a little like turning a supertanker with a rusty rudder. I'm convinced there's psychology involved here too, possibly relating to a deep-seated and distant bad experience of competitive rivalry. School maybe? We've all been there. Competitions can indeed bring out the worst in people but that's not my experience of our hobby. You see, I've competed in events and matches many and varied in my time and whilst one or two can indeed be considered genuinely cut-throat, I've never (ever) taken part in an R/C model competition that wasn't civilised, good humoured and exceptional fun. It's only fair to say that my dip into radio-control car racing some years back revealed a certain Neanderthal side to one or two fellow competitors, but hey, that's cars. Alas, what people fail to appreciate when they dismiss having a go at a light-hearted club competition is how massively enjoyable and rewarding it can be, even if you're not a front runner.

A case in point: Until recently, I'd not really done any yacht racing, although I have owned a good number of sailboats and have thoroughly enjoyed silently plying the waters of my local pond over the years. However, having experienced the challenge and satisfaction of other R/C competitions I was very keen to see what sail racing had to offer. So, to cut a long story short, I bought myself a DF95 (see page 14), joined a group of locals who had just started a sailing club dedicated to the class, and threw myself in at the shallow end one Saturday morning back in the autumn of last year. Result? I've met a thoroughly lovely bunch of chaps with a common interest and, best of all, haven't had as much fun with a yacht in all the years I've owned one.

What's most relevant to the point I'm trying to make, however, is this: There I was, bringing up the rear of the fleet, when I suddenly realised that I wasn't alone. Just in front and just behind were one or two equally sedate boats and, before I knew it, there was a small 'competition within a competition' going on. I can't remember the result and, in truth, it really doesn't matter. What's important is that my overall lowly finishing position didn't take anything away from the enjoyment. What made it for me was the discipline of navigating a set course in a fleet of boats with skippers that, like me, were just out for a bit of fresh air and fun. Competitions? Seriously, you should have a go.

Graham Ashby

Compass 360

Our news round-up from the model boating world

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'M' CLASS RANKING

A fleet of 23 eager skippers travelled to Watermead for the first UK Marblehead class ranking event of 2018. Upon arrival all were greeted to mirror-like conditions but as if on cue, a light and shifting ESE wind arrived for racing to get underway at the prescribed 10am. With the fleet split into two heats (to suit the tight course area and sometimes limited vision at the weather and spreader marks) the first of two seeding races got underway using the tallest 'A' rigs.

From the outset and into the racing 'proper' the four skippers comprising Peter Stollery, James Edwards, Darin Ballington and Brad Gibson looked comfortable on the course with consistent results recorded throughout the day to sit them above the chasing pack. On numerous occasions positions were separated by the smallest of margins keeping the dedicated race team, led by Clive Bardell, on its toes.

Over the course of the day there were some very good performances with podium places in heats going to Vinnie Zammit, Hugh McAdoo, Tony Edwards, Rob Vice and Austin Guerrier. A good spirit was shared among competitors with relatively few racing incidents given the restricted control area and generous length of course; a good test of skill and boat performance. In the end the final result came down to the wire with Gibson's experience holding off the challenge of Ballington, Edwards and Stollery to take the win by a single point.

Across the board the standard and quality of racing continues to rise with a number of new builds hitting the water for the first time and good older designs mixing it with the front runners, a case in point being the upgraded 27-year-old Paradox design sailed by the winner. The key to success? Good speed and race management.

As the day drew to a close, skippers roundly congratulated the Watermead MBC race team for a great start to the M class ranking season. In addition to the prize-winners, Race Officer Clive Bardell presented the last placed skipper, Nigel Clarke, with a special prize, for there can only be winners if there are also those that don't reach such heights – **Brad Gibson**

There's more...

Keep up with all the latest Marblehead class news on the UK website marbleheadsailing.wordpress.com.

RESULTS (TOP TEN)

1.	Brad Gibson	Paradox	19
2.	Darin Ballington	Grunge	20
3.	James Edwards	Grunge	22
4.	Peter Stollery	Up	23
5.	Tony Edwards	Grunge	35
6.	Austin Guerrier	Quark	45
7.	Rob Vice	Uproar	56
8.	Vinnie Zammit	Starkers Cubed	57
9.	Hugh McAdoo	Prime Number	68
10.	Tony Guerrier	Quark	71

Brad Gibson's boat (2) out in front soon after this start. (Photo Roger Stollery)

KEEP IN TOUCH

If you're keen to keep in touch with the regular goings-on here at Model Boats, there's no better way than to cast an eye over our Facebook page every now and then for it's here that we post regular updates on all things magazine and model boat related. From subscription offers to news of website activity, competitions, what we've been up to during the month, what plans we have for the future and even updates on our own projects, Facebook is our voice between issues and, via the Visitor Posts section is a great place for you to share your model boating news, too. Feel free to join us at any time.

EXTRA CONTENT

Just a reminder that Model Boats Extra is up and running on our website and contains additional images that we've not been able to include in the magazine due to space restrictions. If you see this icon alongside an article, head over to **modelboats.co.uk**, scroll down the homepage and you find what you need under the 'Latest Articles' list.

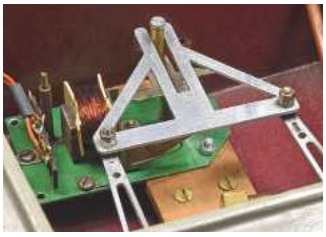
VINTAGE VOSPER

Our thanks to Ian Shields for these shots of his Crash Tender. For reasons many and varied old model boats have massive appeal but more so when they're fully kitted out with period radio and running gear. We'll let Ian take up the story:

"My brother-in-law Peter discovered the radio outfit in this Vosper at a junk shop in Huddersfield in the late 1950s. He obtained the plans shortly after, built the boat and bought the Frog 3.49cc diesel. He managed to get it all done and working by 1960 and I can remember seeing him sail it round the boating pond at Greenhead Park in Huddersfield before I even knew him. There

was no throttle control other than adjusting the compression a little. Steering was very arbitrary with the single escapement giving only left, centre, right, centre, so nothing proportional at all.

"Some considerable time after he became my brother-in-law (in about 2000) he gave me the boat as he knew I was interested



in them. I tried to get it working but without success. Then, in 2010, my cousin saw it. He's at the engineering workshop at Cambridge university and he reckoned one of his colleagues could get it going again. So, off the boat and accessories went to Cambridge. Nothing of it was heard again until 2015 when my cousin suddenly appeared with it. He said it had been fixed and was in working order and, in fact, had been sailed successfully."

Having been unable to get the boat going himself Ian suggests that he'd be happy to sell it to an enthusiast. If you're interested, drop us an email and we'll put you in touch.

DIARY DATES 2018

Sunday 22nd April
Steam & Mountfleet Models Open Day. 9:30am until 4:00pm at Wilton Park, Bradford Road, Batley, W17 8JH. Open to any steam models and any Mountfleet models. Up-to-date paperwork regarding boiler testing will need to be shown on the day. Paperwork for gas tank tests may need to be seen if applicable to your club's insurance. Testing of boilers can be arranged on the day but prior notice must be given. Static and on / off the water displays throughout the day, with a steamboat sail down the lake at around 2pm. Free car parking and refreshments available. Anyone who wishes to attend with any type of model will be most welcome. We hope to have some traders on site. Email Stan at kmbc2015info@gmail.com.

Sat / Sun 5th & 6th May
Beale Park Spring Model Boat Show, Lower Basildon, Reading, Berkshire, RG8 9NW. Contact Phil Montague on 07815 902045 or email phil.kentdda@yahoo.co.uk.

Saturday 12th May
Model Lifeboat Rally 2018. Knightcote Model Boat Club. Free car parking, club house, plus hot food and drinks. Large sailing water, model railway displays, local RNLI Guild stand and two excellent guest speakers, booked through the Lifeboat Enthusiasts' Society, in the on-site conference centre. Gazebos and tables can be provided, however if these are required visitors must contact Adrian or Chris before the event. New House Farm, Knightcote, Southam, Warwickshire, CV47 2EQ. Further details from Adrian Clutterbuck – Tel. 01604 846461, Chris Moir – Tel. 01926 612827 or visit: kmbcmodelboatclub.com.

Sunday 13th May
Bournville Model Boat Club Submarine Day – the whole day dedicated to all that submerge. 10:00am until 6:00pm. All are welcome to attend and, as all always, tea coffee and refreshments will be available. Disabled access is a given. Visit www.bournvillersmbc.org/ for further information.

Sunday 13th May
Scale / semi-scale navigation event – a joint venture by the Balne Moor Model Boat Club and the Model Power Boat Association. All who are interested in scale, semi scale and novelty boats are welcome to take part or simply bring your boat along for the static display. There will be two classes for navigation: up to 36" and over 36". £1.50 per boat. Novelty boats can be anything you like! Any boat will be accepted for the static judging. Entry to the competition is by completion of a form which can be obtained by emailing Mike Butler at mikebutler1949@gmail.com. The event will begin at 09.00 and finish about 16.00. More information can be found at: http://balne-moor-model-boat-club.myfreesites.net/.

Saturday 26th May
North West Scale Model Boat Club's 'Model Show' will be held at the Bag Lane Methodist Church, 58 Bag Lane, Atherton, Manchester, MJ46 0JX. 10am – 4pm. Boats, trucks, fairground models and a few aircraft. Free parking, refreshments and just £2 to get in! Accompanied children free. For further details please visit www.northwestscalemodelboatclub.co.uk or telephone 01257 270349.

Sunday 27th May
Edinburgh Model Boat Club's Start of Season Regatta at Inverleith Park, Stockbridge, Edinburgh, EH3 5NZ. All welcome, catering and comfort facilities will be on hand. See www.edinburghmodelboatclub.org.uk.

Sunday 27th May
Balne Moor Model Boat Club – Tugs & Navy Day. It's never a grey day when there are warships! Navigate our scale course, everyone welcome, non naval boats also welcome. £1 per boat, all types. 10:30 start. Bacon / sausage butties will be available as well as hot and cold drinks and home-made cakes… until they're gone! Satnav: DN14 0ER. More information can be found at: http://balne-moor-model-boat-club.myfreesites.net/ or by contacting: mikebutler1949@gmail.com.

Sat / Sun 26th & 27th May
Model Boat Mayhem at Wicksteed Park, NN15 6NJ. Our usual weekend of model boating fun. We invite all clubs and traders to display and sail. As usual different events will be organised including a Vic Smeed / Glynn Guest model boat competition, straight running demonstrations and warship displays. Entrance to Model Boat Mayhem at Wicksteed is free, however there is an entrance fee to enter the park (max price £6 per vehicle). Camping and onsite facilities are available via Wicksteed Park. For further information contact Nick Brown at raflaunches@outlook.com or visit www.modelboatmayhem.co.uk and click forum.

Test Bench

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.

Ship Modeller's Set

As boat modellers who know what a game-changer good tools can be, we figured you'd like to see this comprehensive Excel set that's been put together specifically for us nautical types. Packaged in a wooden chest the Deluxe Ship Modellers Set features a selection of high-quality knives, blades and tools that have been designed to accommodate the needs of both the beginner and expert. Priced at £48.99 the set is available in the UK from your local J. Perkins stockist. See more at: **www.jperkins.com.**

The 32 piece set contains:

1 x K1 knife
1 x K2 knife
1 x K5 knife
1 x Needle nose pliers with side cutter
1 x Needle point awl
1 x Sharp pointed tweezers
1 x Mitre box
1 x Razor saw
1 x Sanding block
4 x Assorted gouges
16 x Assorted blades
3 x Assorted drills

Challenge

Looking for an introduction to R/C boating, for yourself or perhaps to interest a younger member of the family? Then it's quite possible that you'll be looking for something that's Ready-to-Run, tough, easy to operate, and quick too. Boasting an impressive top speed coupled with proportional steering / forward and reverse throttle control, plus a 'get out of jail' self-righting capability, there's little that this all-inclusive package doesn't offer. All you need to add is 4 AA cells for the transmitter and you can be up and running in the time it takes to charge the supplied 2S 7.4V Li-Ion battery. Take a closer look at **www.jperkins.com** or make a dash to your local model shop armed with £49.99.

R3004SB

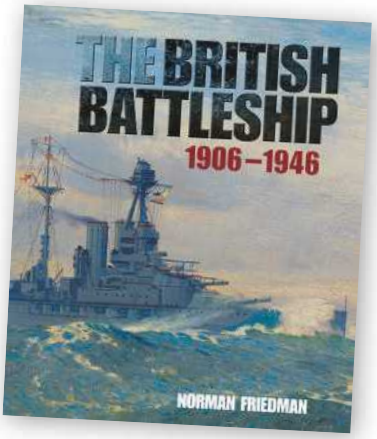
Soon to arrive in the UK is Futaba's new R3004SB slim 4-channel receiver which is perfectly suited to a variety of craft, not least those where space is at a premium. Offering a full range capability the no-frills splash-proof shrink-wrap case provides good protection whilst keeping the weight to just under 5g. With inline channel connectors it's slim too, making it ideal for secreting in the tightest of places. A pair of coaxial aerials provide solid, stable reception whilst an S-BUS2 port looks after any telemetry functions you may fancy. Take a closer look at **www.ripmax.com** or pop along to your local Ripmax stockist.

Quick-build Bounty

If you've always fancied having a go at a static plank-on-frame sailing ship but have been put off by the cost and level of commitment required, we might have just the thing to get you going. New to the Corel range is this diminutive yet delightful 1:130 scale kit of the famous 1784 merchant ship that gained notoriety for a certain mutiny.

Measuring 330mm long x 250mm high this quick-build 'plank on pre-carved hull' model offers a true flavour of period ship modelling with much of the tricky bit removed yet many of the endearing qualities retained, i.e. neat white metal fittings, differing wood types (ply, walnut and ramin), rigging, flag, gratings, deck planking and many other desirable details. It's the sort of thing you could build on a tea tray as and when you get the urge. Brilliant, we love it and at £40.89, what's not to like? Add to cart at **www.premiershipmodels.co.uk.**

The British Battleship 1906 – 1946



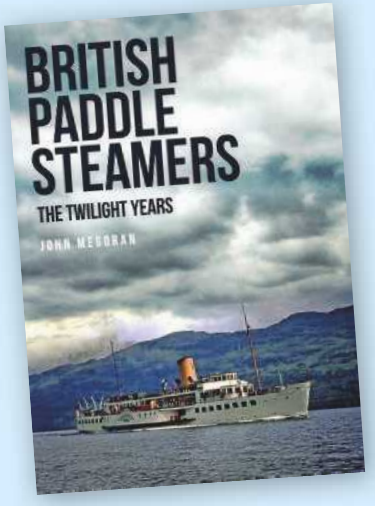
Battleships and battlecruisers, the subject of this book, were hardly the full sum of British naval power but they were certainly its most expensive element. The battle fleet, of which they formed the most impressive part, was conceived as a shield behind which large numbers of lesser ships could exercise such vital roles as protecting British commerce – the life blood of the Empire – and interdicting the enemy's commerce. Similarly, the shield could support operations abroad: anyone trying to stop those operations had to get past the battle fleet. Anyone contemplating an invasion of the British Isles had to deal with a battle fleet capable of wiping out its invasion force.

In this latest book, naval analyst, historian and author of over thirty books, Norman Freidman, covers the development of Royal Navy capital ships, including battlecruisers that predated the revolutionary Dreadnought of 1906 to the last of the line (HMS Vanguard) in 1946. Heavily illustrated with many rare and unusual photographs, the book is further advanced by plans specially commissioned from expert draughtsmen like Arthur David Baker III and John Roberts, while a colour section featuring the original Admiralty draughts includes a spectacular double gatefold.

Written by Norman Friedman, with ship plans by Arthur David Baker and John Roberts. Hardback, 448 pages, 296 x 257mm, over 450 mono photographs, line drawings, diagrams and plans, plus a nine page colour section. ISBN: 978-1-84832-225-7, price (RRP) £50.00. Published by Seaforth Publishing, 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**

British Paddle Steamers

The Twilight Years



In the aftermath of the Second World War paddle steamers in Britain initially did rather well, with four new ships built between 1946 and 1953 and sixty still in service nationwide. By 1955 this tide of optimism had turned and from then on it was downhill all the way.

In almost every subsequent year, one or two paddle steamers were withdrawn and sometimes five or six. By the late 1960s only a handful remained operational and, of these, all except one owed their continued existence to their usefulness as people-movers on the Clyde, Humber and Solent, rather than for excursions. Some, like Freshwater, Princess Elizabeth, Consul and Jennie Deans, enjoyed temporary new careers on services previously abandoned by their long-standing owners. A few, like Medway Queen, Compton Castle and Caledonia, became floating nightclubs, cafés or bars. Most, however, ended up under the scrap-man's torch.

In this new book, the author, John Megoran, who returned the paddle steamer Kingswear Castle to service on the Medway and Thames in 1985 and was her captain and manager for nearly thirty years, explores, with aide of photographs and captions, all the excursion paddle steamers withdrawn from service from 1955. In addition, he examines the sort of cruises which they ran and what became of them in the twilight years. I've always been interested in paddle steamers and having sailed on the Kingswear Castle twice (once in 1960 on the River Dart and again, fifty years later, in 2010 on the Medway with Captain John Megoran at the helm) I found this book both nostalgic and fascinating.

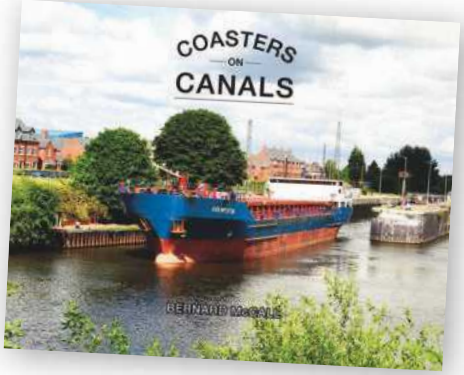
Written by John Megoran. Softback, 96 pages, 235 x 165mm, over 150 photographs in mono and colour. ISBN: 978-1-4456-7226-7. Price (RRP) £14.99. Published by Amberley Publishing Ltd. The Hill, Stroud, Gloucestershire, GL5 4EP. Tel. 01453 847800, website: www.amberley-books.com. Available direct from the publisher or through the usual retail outlets – **John Deamer**

Coasters on Canals

Coasters have always been a popular modelling subject, therefore, anyone visiting mainland Europe cannot fail to be impressed by the size of the canals and the size and quantity of commercial traffic on the canals. Vessels carrying cars and containers are commonplace, as are dry bulk cargoes or chemical and petroleum products. A huge amount has been spent, and continues to be spent, on developing the canals and their infrastructure.

In contrast waterways in the UK have seen no need to expand as they're mainly used for leisure purposes. The upper reaches of the Manchester Ship Canal, once visited by over 60 ships a week now sees 2 or 3 in the same period, whereas the Gloucester – Sharpness Canal and the Weaver Navigation no longer see any commercial ships.

This new work by coastal shipping expert, author and publisher, Bernard McCall, is lavishly illustrated and beautifully presented, with photographs in full colour, many taken by the author himself, each with a caption that details the canal, location and date where the photograph was taken, the name of the vessel, its country of registration, gross tonnage and the year of construction. Bernard also gives us a brief insight into the ship's career history, together with the company for whom it was originally built, along with any changes in appearance, ownership and name. Whether you're a ship modeller or coaster enthusiast, this book would make a welcome addition to your maritime reading matter.



Written by Bernard McCall. Hardback, 96 pages, 197 x 246mm, nearly 100 colour photographs. ISBN: 978-1-9029-53-88-5. Published by Bernard McCall, Coastal Shipping Publications, 400 Nore Road, Portishead, Bristol, BS20 8EZ. Tel. +44(0)1275 84617, email: Bernard@coastalshipping.co.uk. Website: www.coastalshipping.co.uk. Price (RRP) £16.00. Available direct from the publisher or through the usual retail outlets – **John Deamer**

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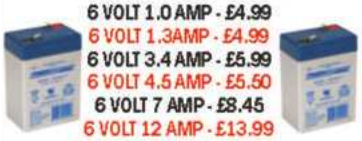

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A Dragon's Tale

John Tushingham explains the nitty-gritty of getting the DF Series up and running and talks us through the birth of big brother

Just in case you missed the last issue I began with an insight into how and why the Dragon Force 65 came to fruition, what it was like to deal with a Chinese manufacturing company and how, given the specification of the final production version, we saw it slotting into the existing sail race scene. Ultimately, then, we chose to pitch it as a good quality, inexpensive introduction to the RG65 class that offered huge potential as a restricted class boat. To suit this purpose, we formulated a simple set of rules ready for when the boat went on sale. Without such rules being available from launch we could foresee the urge for some owners to tinker with it, and at that stage it would have been very hard to pull it back into line as a restricted class.

One design?

So, why did we make it a restricted class rather than a true one-design? Well, you have to remember that it is a Joysway owned product and they had a fairly fixed idea of how it should be presented in terms of graphic appearance, hence the dragon printed sails. We did lobby for plain white ones but it had to have a certain showroom appeal. Not our taste but hey, did it really matter? We realised that had the rules been written on a one-design basis then owners would have been forced to stick with the standard printed sails and we knew that, in the sail department at least, Joysway would struggle to match the accepted standard for racing equipment. That's why they are a single panel design supported by simple measurement rules. Not

ABOVE: Due to the ongoing success of the '65 Joysway has invested in much higher grade tooling for the V6.

LEFT: Despite the DF having the ability to carry swing rigs and taller conventional rigs I don't see any desire to experiment in that way. Even so, the DF65 will continue to have that facility built in.

RIGHT: Although the DF65 V6 looks almost like a new design, its performance is no better or worse than any previous version.

ABOVE: December 2014. The final DragonFlite 95 prototype hull, beautifully built by Alex Cory. The deck design was not finalised at this stage, the final profile featured more detailing to provide rigidity.

RIGHT: August 2015. The first sample production boat. They sent over two samples, one white, one black. One feature that changed before the boat went into production was the keel. Originally it was to be extruded aluminium but the profile was not possible to extrude to the accuracy required. This could have been a big issue but Joysway came straight back to us to say they would like to supply it with a carbon keel; we didn't say no.

October 2015. The A rig profile was fixed back in January 2015, development of the B & C rig plans was undertaken once we had the sample boats. The D rig is a bit of a luxury, you'll very rarely need it as the C rig can get round the course in any reasonable racing conditions. But why struggle, put on the D rig and it will easily handle anything you can throw at it.

only does this allow for some personalisation but, more importantly, if the boat became a commercial success, it would not exclude other sailmakers benefitting from, and supporting, the class. I think it was a decision well-made and I don't think we'd be where we are now had it been tackled any other way.

Writing the DF65 class rules was not a job to rush but a lot more straightforward, I imagine, than formulating a set of rules for a new development class. We started from the premise that everything is to be used supplied and rigged as shown in the instruction manual, then proceeded to establish two things:

1. How to resist the natural urge to improve the boat's performance, real or imagined, through small 'tweaks' here and there.
2. How to eliminate the need for certification or event measurement where possible.

I have one test for the rules and keep it in mind when any amendments are required. Basically, I imagine I'm new to the sport, have bought and rigged my brand-new boat, followed the instructions to the letter (wishful thinking), then taken it to the lake for its first sail. What I wouldn't want at this point is numerous 'old hands' pointing out that I could have done this or that so much better than it says in the instructions and that, ultimately, I need to take it home and rebuilt it. That wouldn't feel good and it explains why some of the restrictions in the rules might seem a bit OTT. It is for the same reason that we've had to frequently say 'no' to enquiries about whether or not little tweaks are permitted.

Start of the DF series

When the boat was eventually launched in the UK (August 2013) we decided to race it within the RG65 class to see how things developed. We had the DF65 class rules published at launch which gave us the ability to award a prize for the first DF, and with this it became an unofficial sub class of the RG65. Turnouts began to rise and everything was good until the RG65 nationals in 2014. Here we sailed as one mixed fleet as usual, but the entry had reached a level where we had to run as a two fleet event under the HMS system. Conditions were mixed and a few of the top DFs always made it into the A fleet, but the bulk of the DFs could not compete with the lightweight thoroughbreds and remained in the B fleet. It split the racing for the Dragons, affected the results and, accordingly, there was a unanimous feeling amongst the DF sailors that there should be a dedicated DF65 racing series and championships, as well as participation at RG events. It was a controversial decision in the UK to form the DF65 class, not as far as the DF owners were concerned, but others saw it as a dishonourable action. They are, of course, perfectly entitled to that opinion but given the growth of the DF since then it would have been inevitable at some point. I'm happy to say that there is still a DF presence at RG events and the RG65 class has grown in the UK in recent years with a significant number of owners who participate in both classes. Despite the DF having the ability to carry swing rigs and taller conventional rigs I don't see any desire to experiment in that way, but the DF65 will continue to have that facility built in.

Big brother

In its first full year on sale three thousand seven hundred DF65s had been shipped and Joysway were, understandably very happy. Our working relationship with them continued to flourish and we got to know the owner and the rest of the team very well. The company had tasted success in the radio sailing field and wanted to make an ABS constructed IOM yacht and turned to us to design it for them. Bad idea. It took a lot of persuading that they needed to leave the IOM class alone and respect its position as a development class that sits at the top level of our sport. And besides, even if it were possible to produce a competitive plastic boat, the IOM did not need, or want, a mass-produced design, the class has a life of its own and a balance that seems to work. That said, I had been thinking of a big brother for the DF65 but designed to a very different brief.

I've raced Marbleheads and you can't help but be impressed with their windward performance, in a straight line! The rest of their sailing characteristics leave me bit frustrated, they don't turn corners very well and will far too easily nosedive downwind. Why is this? You have to look back at the

RIGHT: The new V6 DragonForce 65 is a thoroughly well engineered and presented product.

RIGHT: A look inside the box of the V6 RTR version that comes complete with 4-channel 2.4GHz radio.

LEFT: December 2016. The DragonFlite 95 and its new, 'mini me' little brother, the version 6 DragonForce 65. The perfect family!

ABOVE LEFT: A DragonFlite 95 in challenging conditions yet still sporting its versatile A rig.

ABOVE RIGHT: Bow of the DF65 V6, complete with rubber fender – an important detail.

development of the Marblehead. You see, the hull has always been the same length but the rig height and keel length have grown out of all proportion and the rules have been changed over time to allow this. The Marblehead, as it stands today, is now effectively a big powerful boat with a short hull length, quite the opposite of how it started out. And there's the problem. Downwind it can't accelerate as quickly as it needs in order to avoid tripping up over its long, heavy keel and the tall rig only makes things worse. In a strong breeze to windward, unless you have the stiffest carbon mast tube available, you end up applying a lot of kicker tension to counteract excessive mast bend. So, as you go through a tack the rig is unloaded and the mainsail leech becomes bar tight, making it very hard to accelerate out of the tack as you fight the boat's urge to luff into the wind. If you could dial out those issues you'd have a truly wonderful boat to race.

We all know that hull length is one of the key components of good boat speed, so what would happen if we stretched out the DF65 to one metre long and kept with the same keel, rudder and rig? In January 2014 Joysway had agreed to the development of a bigger yacht and we had a full year in which to work on and deliver the final design to them in person at the 2015 Nuremberg Toy Fair. Game on!

The initial prototype was a very radical design, Mark Dicks drew up the hull lines of a one metre long boat with a maximum width of only one hundred millimetres. I had a wooden planked hull made locally and it was fitted with a fixed DF65 fin and rudder. It did carry a heavier, nine hundred gram keel bulb and had a larger rig, whilst the standard DF65 'A rig' slotted in nicely as a 'B'. It looked a bit weird but it would give us some idea if a long waterline, lightweight design, carrying a relatively small, low-aspect rig, would work. The first few times we got to sail it, it was in B rig conditions and it was a revelation; well balanced, tracked very well to windward and downwind it was absolutely amazing. So fast with almost no wake and eerily silent, it looked like you were fast forwarding a video. The acceleration was so rapid that it had almost no tendency to nosedive despite its slim hull. In fact it seemed to pick up its bow and just get on with it.

All the signs were looking good, until the first outing in lighter winds with the larger rig. It was awful. The small DF65 fin was obviously stalling out at low speed and to windward the balance was all over the place, almost unsailable. I didn't want to go any deeper than the DF65 fin so we had to find out how wide it needed to be to work in light winds, whilst being narrow enough to minimise drag downwind. Dave Creed helped out here by moulding a couple of aerofoil section sleeves that slid over the fixed DF65 metal keel. They were fairly crude but easy enough for us to keep trimming down until we seemed to have the correct balance. Now we had a hull and foils that worked and that gave me the platform to develop the sail plan. It was at this early stage that I got Buzz Coleman involved. He's an excellent skipper with a wealth of design and prototype production experience and is pretty handy on CAD design systems. I'm a graphic designer by trade, confident with 2D design software but detailed 3D work is a little beyond my pay grade.

We had to rethink the hull lines when Joysway informed us that the minimum width they would be confident to blow mould would be 125mm. It was a pity to go away from the rather extreme shape of the first design but perhaps a slightly wider hull would have more rounded handling characteristics. At that point we also had a rethink about the overall length. As people got to hear about the project one of the first questions was always "will it measure as an IOM?" We didn't want that confusion and reduced the length to nine hundred and fifty millimetres to position it below that class, leaving a clear upward progression for newcomers wanting to go further into the sport. It would have been easy to go the other way, make it longer and put it in direct competition with existing classes, however that goes against the philosophy of DFs as readily available introductory racing yachts. So, the hull got fleshed out and fine-tuned for trim using all the CAD facilities available to us.

Handover

Compared to the DF65 this was such a leap forward in the time and resources we had available for the boat's development. For example, the complete boat, including every individual fitting, was supplied to Joysway in CAD file format, we had the time to properly test an accurate prototype on the water, superbly built in record time by Alex Cory. That final prototype and CAD files were handed to Joysway at the January 2015 Nuremberg Show. I then had the opportunity to contribute even further to the product by reverting back to my daytime occupation

The DF95 cockpit with sheltered on / off switch.

Inside a 95. Much the same as the 65 V6 except the rudder servo and Rx have swapped sides.

ABOVE: The DF95s gooseneck and compression strut

ABOVE: DF boats are supported by a whole host of aftermarket spares and accessories, not least trim schemes.

as a graphic designer and producing the rigging instructions and packaging design, very satisfying for me personally to see it all through in such detail. At the following year's show the boat had just gone into production and was on display in its final form for the first time. Our first deliveries into the UK arrived later in April 2016.

One other design feature of the DF95, key to achieving the long waterline, lightweight boat idea, are the low aspect masthead rigs. "Is that the B rig?" was often heard on first sight of the boat. Conditioned to seeing the usual high aspect rigs on other classes it was an understandable response. I've lost count of the times I've had to explain the concept, but now, after eighteen months of DF95 fleet racing it's totally accepted and understood. It's amazing how quickly things change. The comparison of masthead and fractional rigs would warrant an article all of its own but I'm happy that I got the chance to incorporate them into what is now a mainstream class.

Looking dated

The DF65 suddenly started to look a bit dated next to the shiny new '95, even though it had been through five versions to improve certain areas and strengthen the hull moulding. With the ongoing success of the '65 Joysway had the confidence to invest in much higher grade tooling for the '95 and we knew what needed doing to bring the DF65 up to the standard of the 95; Joysway knew it as well and offered to produce new tooling for it. We took it a stage further and discussed with them a complete makeover, improving the rig components, sail quality and just as importantly, the overall appearance of the whole package.

It was a golden opportunity but one thing could not change – the performance of the standard boat. This new version must not put any of the previous examples at any disadvantage, apart from cosmetically. Buzz and myself set about this redesign in the same way that we tackled the 95, I worked in 2D, we evaluated the designs and then produced final 3D files for all new components. Again, it was a year-long process from agreeing the work to a production-ready state. As in the 95's development, we had access to 3D printing and Joysway were very quick to supply new hull mouldings for evaluation. When it finally went into production we'd tested it as thoroughly as possible and were confident that, although it almost looked like a new design, its performance was no better or worse than before. Mind you, I can't help thinking that it looks faster, even before it hits the water. The rigging instructions and packaging also got refreshed. The version 6 was a big investment for Joysway and to its great credit, the company did all this work at no significant price increase.

Numbers game

The DF65 has sold in amazing numbers since its launch in 2013, over twenty thousand boats to date, yet it has failed to get a foothold into many notable countries that have predominantly light weather conditions. We all knew it was not a great light weather boat, however there was a simple fix for that – give it a bigger A+ rig! A masthead design was the best way to achieve this. We didn't want to go to a taller rig so we had to maximise the sail area within the existing rig height. As such, the booms are slightly longer but the rig does fit into existing rig bags so portability has not been compromised. The A+ rig is very effective in winds up to about

RIGHT: A small fleet of DF95s battling it out in brisk conditions. Note that 259 is using a B rig.

ten miles per hour, it will sail to windward in slightly stronger winds but getting downwind starts to get a little tricky. The standard A rig is good up to around eighteen miles per hour so it still has a very useful role to play. It has, as expected, been a controversial addition to the DF65, indeed some clubs in the UK have decided to restrict their racing to the standard A rig which, of course, is absolutely fine. Nationally, in the UK, the A+ has been a class legal rig for most of the 2017 Travellers Series and those who have used it appreciate the better light wind performance. As time goes by I'm confident that it will be seen as a good thing and completes the DF65 package as an all-round performer.

The future

The DF95 came out as a well sorted boat right from the off, and the DF65 has matured likewise. A period of product stability can now be enjoyed in which Joysway and ourselves will monitor any issues and work to rectify any problems that may arise. These two classes are achieving what Mike and I dreamt of all those years ago. With a lot of hard work and Joysway's amazing support, radio sailing has, over a very short space of time, gained two new classes positioned to facilitate the growth of the sport. But that won't happen all by itself, the next bit is down you, the early adopters, the distributors and the core of enthusiasts who must come together to organise the classes on an international level. The boats are there.

When an International Class Association is formed one of its first objectives must be to stimulate the formation of national class associations where they don't already exist in those countries that are already sailing DFs, and encourage them to affiliate to their national radio sailing authorities. We're all too happy to run events using the Racing Rules of Sailing, but these rules are owned by World Sailing and we should all respect that and affiliate to our national authorities to legitimise their use in the DF classes.

I would love to see a new kind of international event, run as a kind of a radio sailing package holiday at which you can bring the family and charter your equipment from the organisers. Imagine a four day break to, say, Lake Garda in Italy. Fabulous location, all accommodation, entertainment, racing available as part of the package, just bring some clothes, turn up and sign in to get your boat for the event. No expensive air cargo or waiting for your damaged rig box to appear on the baggage carousel... Sounds good to me.

Freeman 22

Ray Wood relives precious memories with his one inch to the foot version of the evocative late '50s cruiser

My first boating holiday experience was on the River Medway with my parents and sisters back in the 1960s aboard a hired Freeman 22 cabin cruiser. The voyage consisted of a long weekend trip from Allington Marina, on the outskirts of Maidstone, up the river to Tonbridge. This trip entailed passage through various locks, which in those days were manned by keepers who did all the hard work. These days the upstream locks are DIY in operation, with only full-time lock keepers at Allington where the River Medway changes from tidal to non-tidal. Anyway, the trip upstream to Tonbridge took two days and the same to return. Measuring 22 feet in length, the Freeman 22, with its inboard engine, was one of the earliest mass-produced GRP moulded cruisers and was ideal for a small and practical hire fleet. Around 1500, of all the versions, were built over the years, indeed if you want reference material for the fittings, cockpit details and the numerous colour schemes, then look no further than the internet; simply Google 'Freeman 22, Boats for Sale'.

Deserving cause

The Freeman 22 is a classic design that well deserves being modelled and clearly justifies the drawing of a plan, if only to preserve its lines and curves for future generations of model boat enthusiasts. My plan is presented at 1:12 scale, i.e. one inch to the foot which, given the length of the full-size, creates a model that's 22 inches long. If you're keen to build one, the only major expense will be the necessary wood, a single 400-size brushed electric motor, its coupling, propshaft, plus its matching tube, rudder, and the usual glues, paints, batteries and R/C gear. With any luck these last items will already be to hand in your workshop.

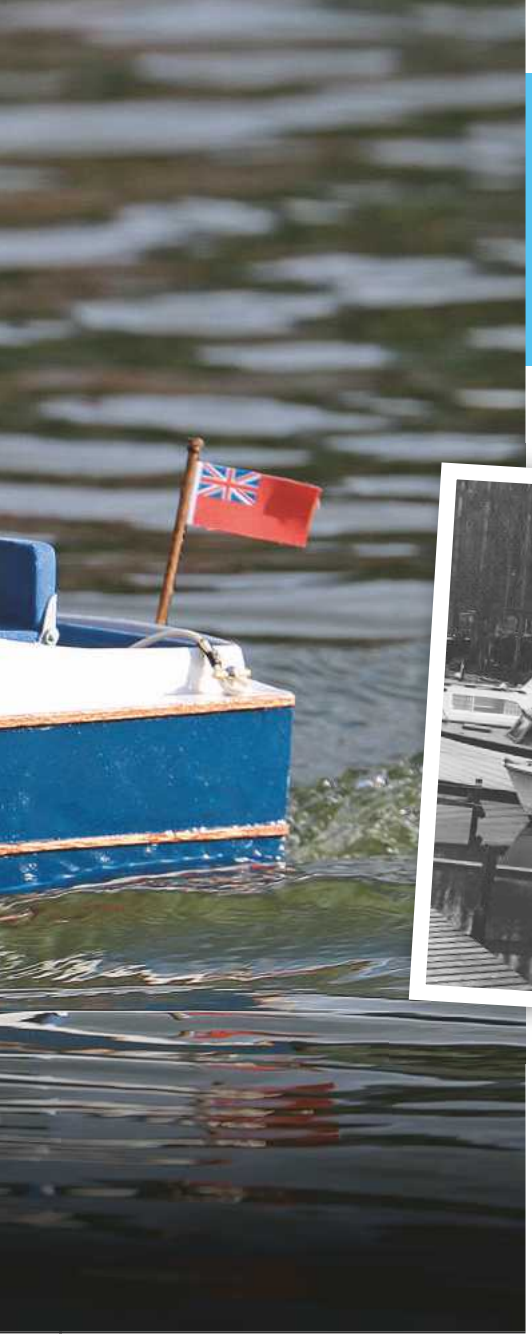
AT A GLANCE

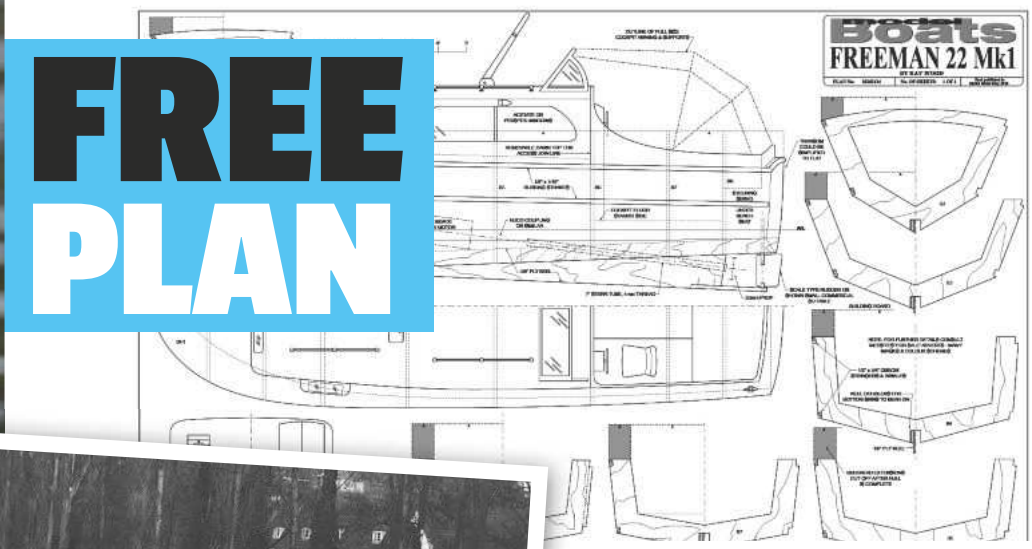
The Freeman 22 was the first ever production GRP boat and, as such, is widely regarded as a foundation block of the modern boat industry. At the time of its introduction in 1957 it offered luxury cruising with a nod to the popular Freeman caravans of the period. It was, in effect, the original 'caravan afloat'.

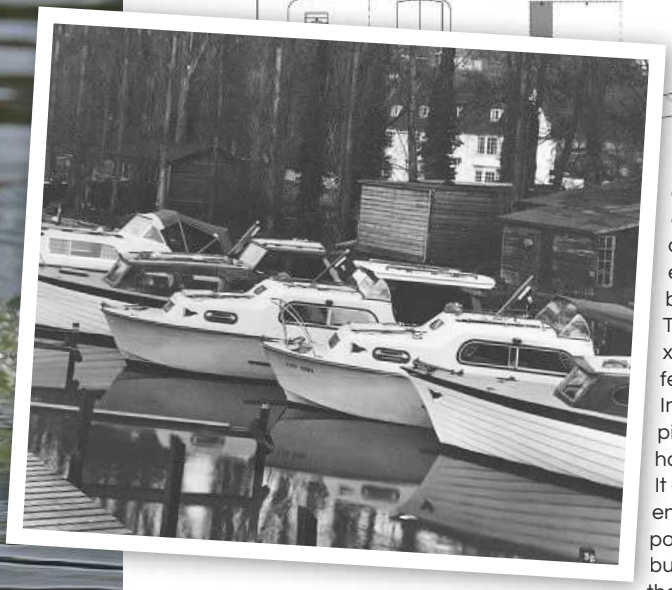
Making a start

The first step is to trace and cut-out the bulkheads and keel from the drawing. 1/8 inch (3mm) birch plywood from SLEC was used for these as it's very reasonably priced if you buy the 12 x 60 inch cross-grain sheets. That said, this little boat could be made completely from 1/8 inch (3mm) balsawood sheet as an alternative, so the choice is entirely yours. For the central keel and doublers I'd recommend 1/8 inch (3mm) plywood as this is the hull's backbone. Cut the propshaft slot in the central keel leaving just a remaining bridging tab to keep the two keel parts temporarily together. The doublers on either side of the propshaft will need to be hollowed to suit the 1/4 inch (6mm) diameter tube and bevelled to suit the angle of the forthcoming hull bottom skins. Once this has been done one doubler can be glued to the keel, whilst laid flat on a building board and, when the glue has set, the tab cut away and the second doubler

FREE PLAN







ABOVE: The Freeman 22 hire fleet (circa 1960) awaiting holiday makers at Allington Marina, Maidstone, on the non tidal section of the river Medway.

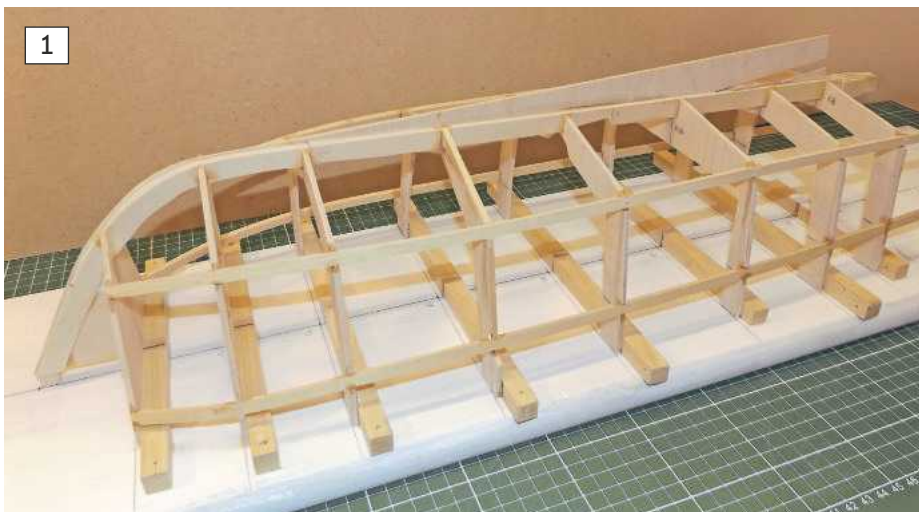
1. It doesn't matter how good you think your eye is, the only way to ensure accuracy is to build using an alignment jig.

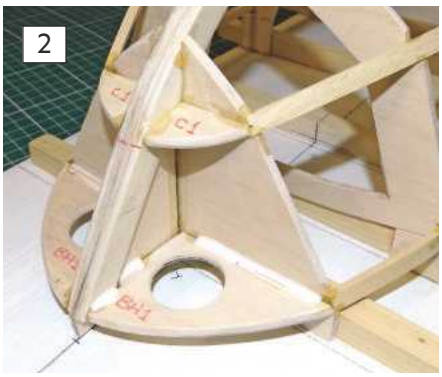
2. The breast hook (BH1) and C1 (which picks up the ends of the chine stringers.

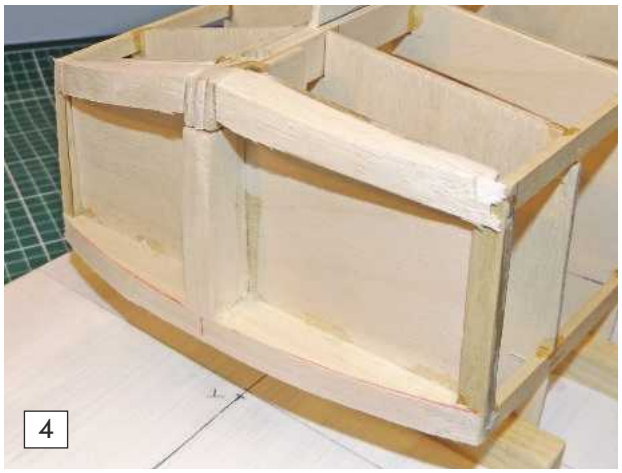
3. Balsa blocks sit above C1 to take care of that awkward, tight, compound curve at the bow.

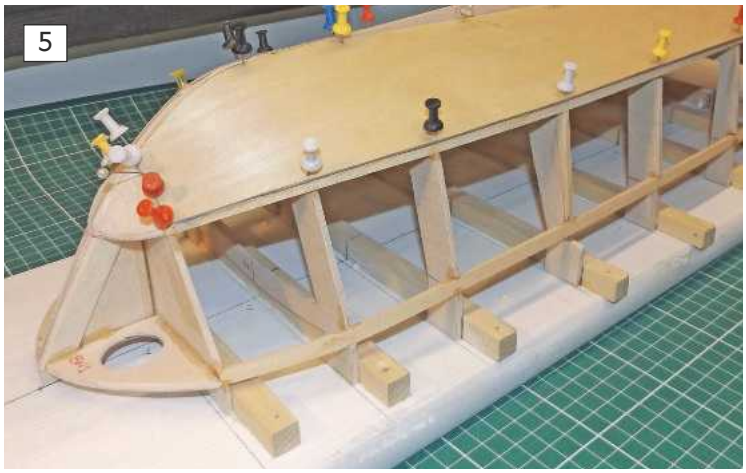
fitted. Gorilla glue was used for the main structural wood-to-wood joints, doing exactly what it says on the packet. With this, the forward doublers can be bevelled to suit the angle of the forthcoming hull bottom skins and glued to the keel, this completing the keel sub-assembly. Note that the propshaft tube is 7 inches long with an 8.5 inch shaft and, depending on the diameter of the tube that's used, it may be necessary to cut a small section from the upper keel and doublers to clear the coupling. The hole for the commercial rudder tube was 5/16 inch o.d. and requires doublers to allow it to be comfortably drilled.

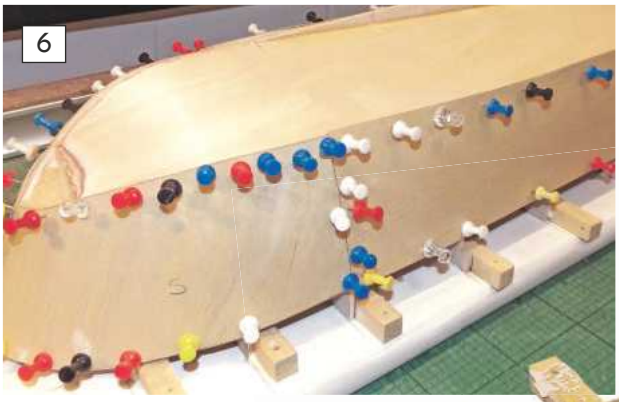
The basic hull is best constructed upside-down on a flat building board to ensure it's built straight and true to the centreline. Once complete, it can all be cut free. The bulkheads are drawn with extension feet that sit on the building board and maintain the correct levels. To help align the feet some lengths of 0.5 x 0.5 inch batten were glued across the feet and screwed to the building board. Incidentally, the building board used is a piece of 20mm thick MDF window sill which has been used for many of my model boats. It gets repainted white for each new project, enabling the centreline and the bulkhead positions to be clearly marked. With the bulkheads and their braces screwed to the board using the centreline, the keel assembly could be glued in position. Some small adjustments will normally be required here, mainly to the notches in the bulkheads which receive the keel. Once the bulkheads are positively mounted, they need to be chamfered to receive the gunwale and chine stringers, which should be steamed, or at least initially dampened, to enable them to take the curves more easily, before being finally glued and pinned in position. **Photo 1** shows the build thus far.











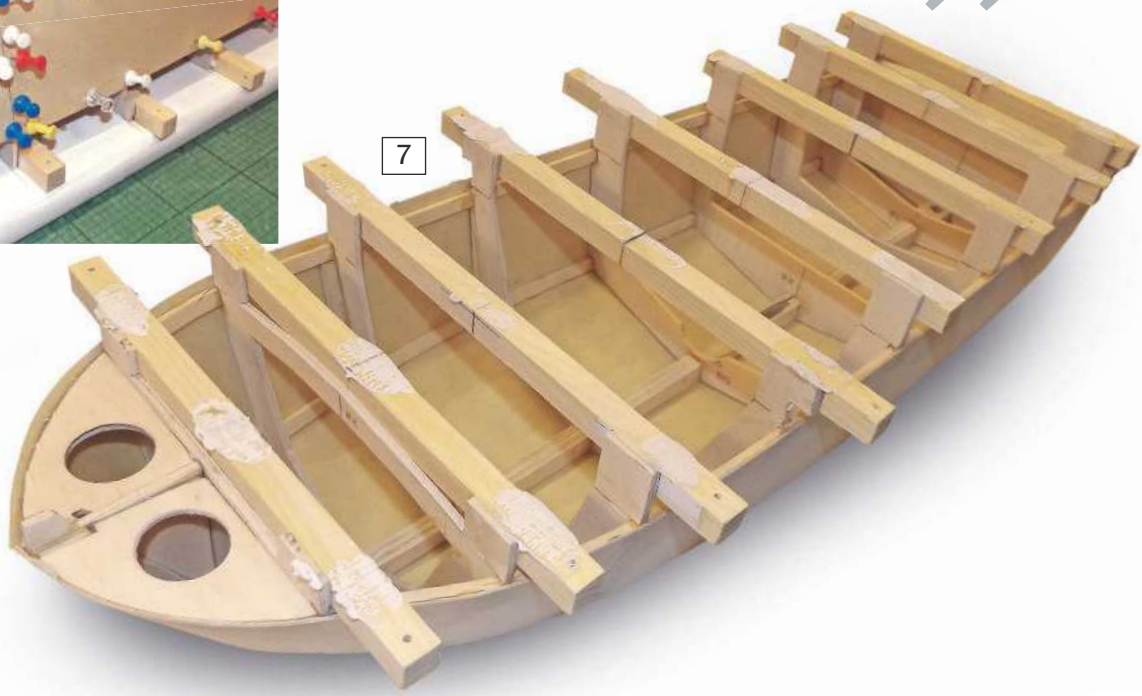
4. Block balsa over a false rear bulkhead is used to create a curved transom.

5. Given the price of plywood, it's wise to make card templates of the bottom skins to ensure absolute accuracy.

6. You'll find it easier to skin each side in two sections with a joint at B3.

7. With the perfectly 'square' hull removed from the base board the waste wood can be cut away.

> *"The Freeman 22 is a classic design that well deserves being modelled"*



The next stage is to fashion the breast hook (BH1), which fits under the foredeck **(Photo 2).** The bow section also needs soft balsa blocks both sides between its stem and C1 which picks up the ends of the chine stringers **(Photo 3).** The transom bulkhead is false and requires building-up with balsa formers externally, so that an overlay skin can be fitted to achieve a curved transom, this before the bottom and side sheet pieces are added. Of course, if you want to keep it simple, the transom could be left flat, although since I was endeavouring to create a scale model I went for the more attractive curved back end (**Photo 4).**

The bottom hull skins are of 1/32 inch (0.8mm) plywood and with the price of this material nowadays it's better to cut a card template to the exact size required and match it to fit the framework before attacking the rather more expensive wood. You can see in **Photo 5** why we added balsa blocks to the stem as there is no way that the thin plywood will easily accept that last very tight and complex curve. The plywood bottom skins are glued and pinned in position and, once set – again by leaving overnight – their edges along the stringers are trimmed to receive the side panels. The side skin panel shapes should also be traced and transferred to cardboard (or similar) to achieve an exact fit. As you can see from **Photo 6,** it is easier to 'skin' each side in two sections, a joint being made at a supporting bulkhead, in this case B3. This is all straightforward stuff and if everything has gone to plan, after smoothing the chine edges (but trying not to round them) we should now have a completed basic hull ready to be removed from the building board as in **Photo 7.** You can see from this last photo how, by only screwing the retainers to the base board at their ends, with blobs of PVA glue elsewhere, one can remove the hull relatively easily before cutting away the waste wood.

A stand?

This is a very good time to make a stand **(Photo 8)** as we're about to concentrate on the upper-works and interior. When you make yours note that it's handy if the waterline is parallel to the work surface as this will ensure that any parts which should be at 90 degrees to the horizontal, actually are.

For the decks (and cabin), plywood is probably the best material to use. MDF is too dense and in any case, it is not too good if it gets wet! **Photo 9** is of the plywood deck panels being glued in position. This is all straightforward model making, however do bear in mind that the deck is sheeted in sections to maintain the camber, the 1/32 inch (0.8mm) plywood deck side pieces

Given its significance, the Freeman 22 is a shape that deserves to been seen on the water.

following suit with a slight camber to the gunwale **(Photo 10).** Note here that the foredeck and side decks have a plywood upstand to prevent water being shipped and to locate the cabin structure.

Cabin & fitting out

The front section of the cabin is removable for access to the motor, R/C gear and battery. The rear open cockpit, meanwhile, is a big feature of the original craft which, at the time, was made and lined with a quality hardwood. Remaining in this area for the time being, the main cabin bulkhead can now be fixed permanently in place, allowing the removable cabin to be built in-situ which, of course, ensures a good fit to the deck.

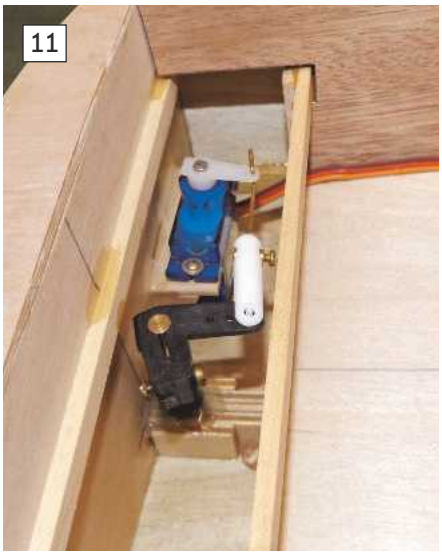
8. When you make your stand, aim to keep the waterline parallel with the work surface (see text).

9. Fitting the ply deck. Note the camber which is also carried by the side pieces.

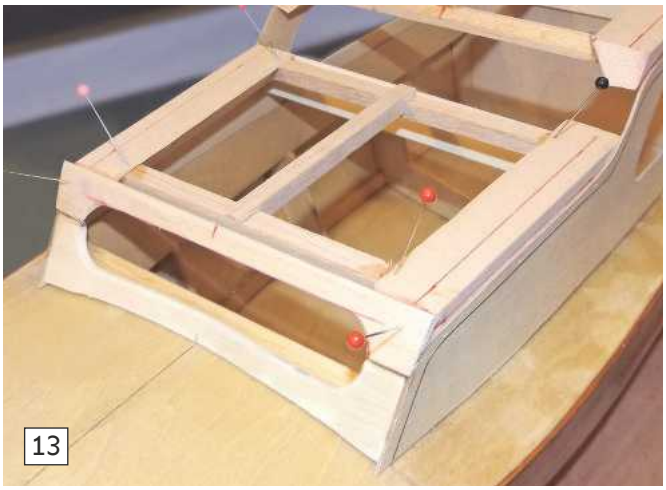
RIGHT: Small details make a massive difference to a relatively plain model like this. Make the effort, you'll be glad you did.

The cockpit floor and frames for the rear bench seat are next on the list, followed by the steering servo plus a commercial rudder horn. Brass wire (sporting an adjustable clevis) links the two **(Photo 11)** and if you're thinking that the servo is minute, fear not, it's more than powerful enough for the job. While were here, note that the rear seat is removable for access to the rudder servo,

10. Deck attached with a plywood upstand on the inner edge to prevent the shipping of water.



11. Rest assured, that rudder servo is more than adequate.



12. Motor installation doesn't get much simpler than this!

13. Constructing the cabin-top in situ makes for an accurate fit. Note the balsa triangular stock used for the rounded corners.

14. The cabin roofs attached, filler applied and corners rounded.

provision also being made for its lead to be routed to the main cabin, where the receiver will be located. From **Photo 12** you'll see that I've used a 400-type brushed motor, mounted on a balsawood block with dowels drilled and glued in it for the ultimate in sophisticated motor retention... Rubber bands! Which, of course, allow for slight movement to suit the Huco-type universal coupling.

The main cabin bulkhead and cockpit sides were veneered with 1mm mahogany sheet obtained from Mantua Models and the cabin door and consoles suitably marked. This was then painted with two coats of clear varnish to seal the surface. Similarly, the rubbing strips on the hull side and gunwale are pieces of 1/8 inch (3mm) wide mahogany, cut from sheet and glued in place.

Traced from the plan, the cabin sides were transferred to card which was then matched to the actual deck line to ensure a good fit. With this, the 1/32 inch (0.8mm) plywood pieces were cut to shape, including the window openings, using a good, sharp, Stanley knife. Since the cabin sides are vertical, suitable beam-wise spacers need to be made to keep them upright, whilst the rounded corners are easily achieved using 0.75 x 0.75 inch (18 x 18mm) balsawood triangular fillets as in **Photo 13.** Here you'll also see the cabin roof support beams which are cut from 0.25 inch (6mm) square balsawood with additional central beams to give the cabin roofs a slight camber. The roofs themselves are easily fitted and glued on to the balsa fillets with the corners rounded once the glue has set (**Photo 14).** Some lightweight filler, or a household Polyfilla, will quickly resolve any blemishes.

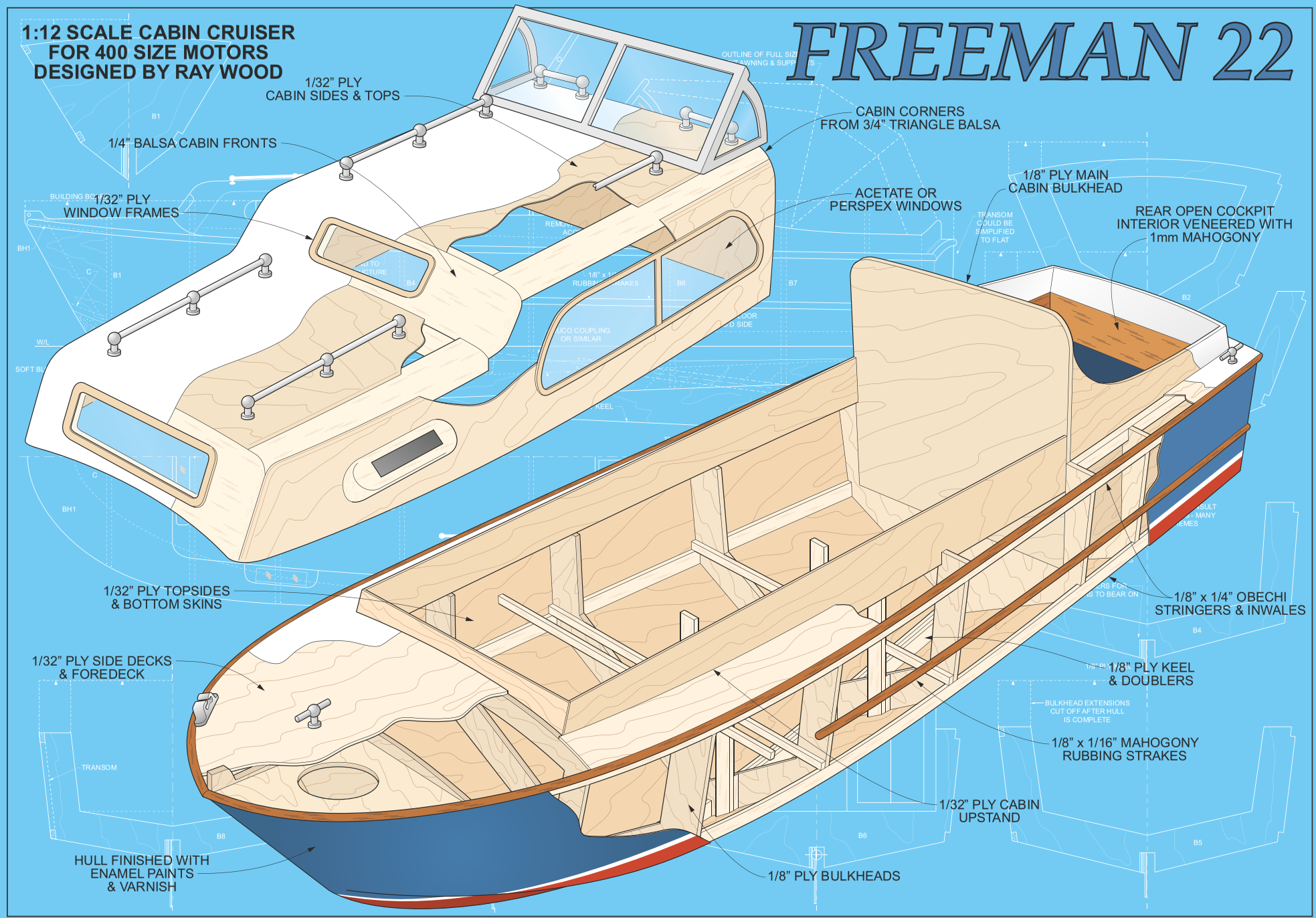
The cockpit details come next starting with a console and raised floor for the steering position. Window frames and windscreens are always a pain, although at this scale not quite so much. In the end these were all carefully traced and cut from 1/32 inch (0.8mm) plywood, a process which, if you adopt, will be a good test of your cutting skills.

Nine parts there

The hull and superstructure of my Freeman 22 were initially painted with Ronseal Hard Glaze clear varnish to seal the grain of the plywood, rubbing down between coats in preparation for the painting of the deck and cabin, which were a white gelcoat fibreglass on the original boats. Humbrol gloss enamel is as good as any for this model although do remember that many full-size boats were repainted and had

1:12 SCALE CABIN CRUISER FOR 400 SIZE MOTORS DESIGNED BY RAY WOOD

FREEMAN 22



free plan

I'm delighted with the way this one has turned out. Don't forget the curtains. Without them it looks bare!

ABOVE: One of these 2400mAh NiMH packs will run the boat for longer than I ever need to sail her. The other is used purely as useful ballast.

ABOVE RIGHT: Make sure you detail the cockpit. Mine is fitted out with a disorderly collection of bits and bobs and a charity shop crew figure, painted to look 'boaty'.

BELOW: Hang the expense, you can't beat a brass three-blader. This one's 25mm.

non-slip deck paint added later in their lives. This being the case you could probably paint your model in virtually any colour scheme you desire as the internet will reveal numerous alternatives. This prototype has a white waterline, red anti-fouling below it and blue top sides. The forward cabin side vents are unusual, being of a triangular shape, for which ply and balsa was used. Thin, clear, plastic sheet has been used for the window glazing, this glued to the frames with model aircraft clear canopy glue. The deck cleats and cabin roof grab rails are actually 3.1/2 inch gauge locomotive handrail knobs with 3/32 inch stainless steel rod, both obtained from Maidstone Engineering Supplies.

With regard to the cockpit, you can fit that out as you desire, the photos hereabouts showing how my prototype finally ended up. The disorderly collection of bits and bobs comprises a steering wheel from Cornwall Model Boats, a crew figure from a charity shop (painted to look 'boaty'), a spare flagstaff / Red Ensign which I had kicking about, and some scrap-box odds and sods that proved perfect for the throttle lever, chair and key float. If you're up for the challenge, full-size cruisers often have / had a canvas cover for the cockpit, mounted on hoops which would fold down on to the rear deck.

On the water

Ospray, was initially launched at the Chantry MBC's water which is at the Bluewater Shopping Centre in Kent, a great home for any model boat club, the large lake being adjacent to the main car parks and one of the pedestrian entrances to the mall. As you might imagine, the maiden voyage was perfectly successful, the model having good steering qualities in both forward and reverse. It was subsequently taken to Allington Marina for a demonstration in the basin for the marina's owner Adrian Larkin. With quite an assembly of boat owners gathering as the afternoon progressed there was much discussion about the ever-popular design, my model operating just where this story began many moon's ago.

For more Freeman 22 photos visit www.modelboats.co.uk

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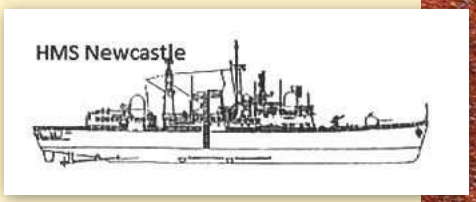
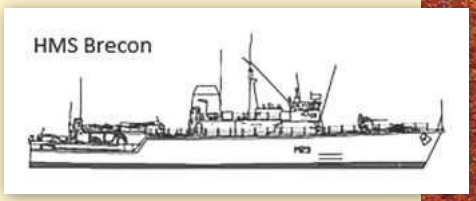
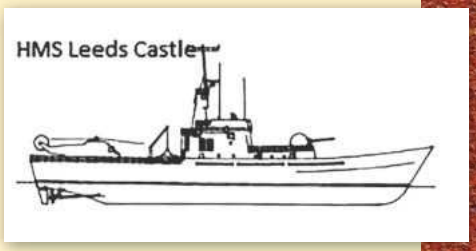
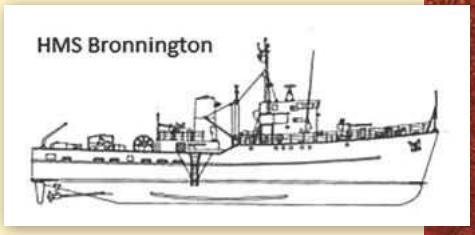
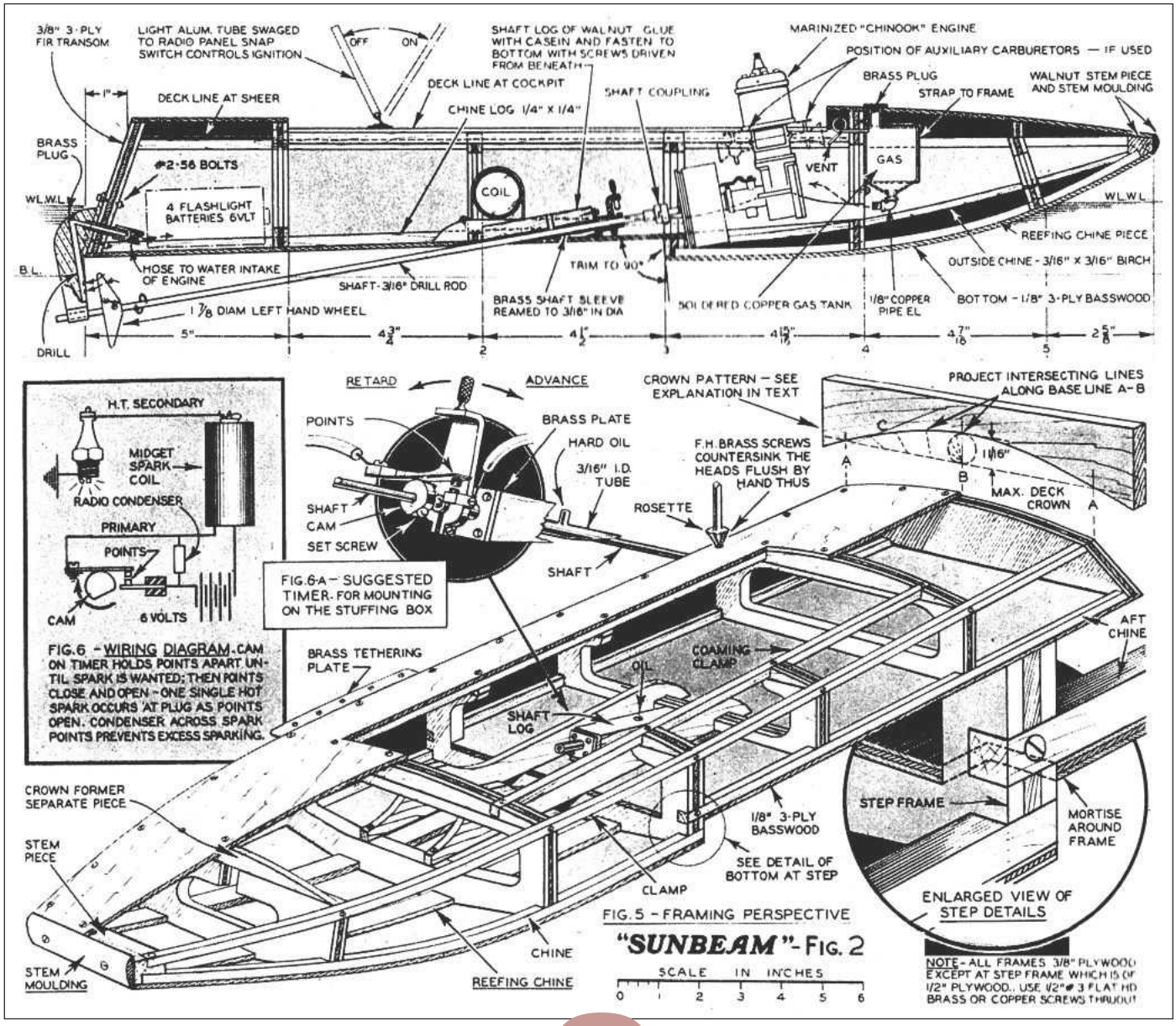










ABOVE: A hydroplane model plan from 1936 with a spark-ignition petrol engine.

Flotsam & Jetsam

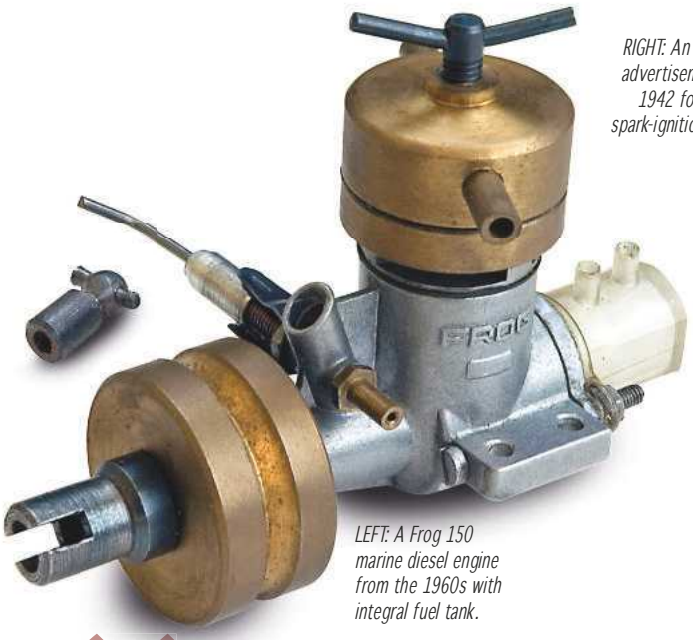
62: Model I.C. Engines

If you've ever wondered why older, classic, model boats are built like the proverbial brick outhouse it'll have everything to do with the fact that they were products of their time – a time when internal combustion engines ruled the model world. **John Parker** sheds some light...

As the internal combustion engine began to be applied to motorised transport around the turn of the twentieth century, it was inevitable that sooner or later attempts would be made to miniaturise it for the powering of models. Early experimenters found that the engine did not scale well into the tiny sizes needed for models and had to grapple with considerable problems in starting, ignition and lubrication. The pay-off, however, was a high power-to-weight ratio that made continuous flight possible in a model aircraft and soon provided a rival to the external combustion engine, the latter in the form of the flash steam plant, for high speed model hydroplanes.

Spark ignition

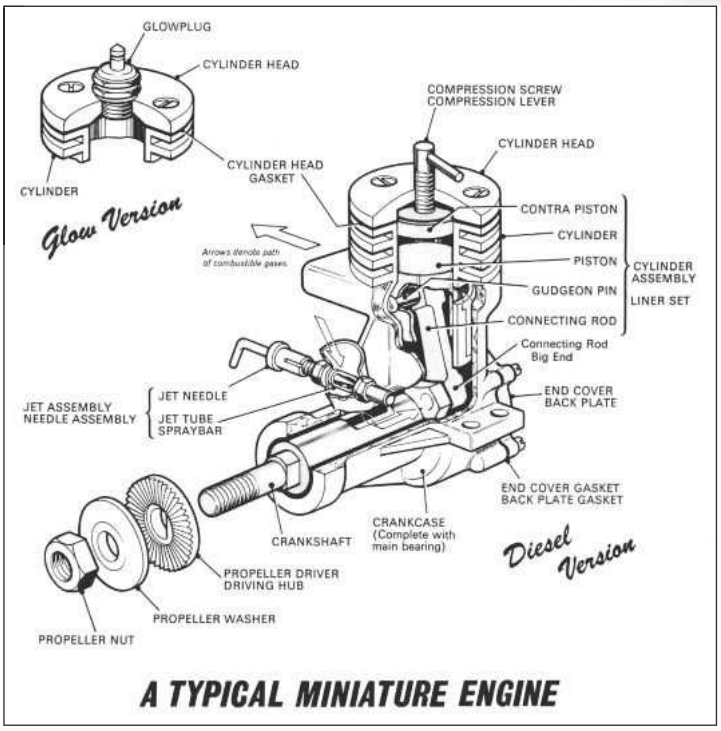
Attention focused on the two-stroke cycle engine as this did away with the complication of valve gear. The Sunbeam model hydroplane plan, published in a 1936 issue of the American Model Craftsman magazine, shows a typical design of the era. The engine is a petrol two-stroke and required an ignition system for its operation. This consisted of a dry battery, contact breaker points, condenser, miniature spark (ignition) coil and sparking plug. The contact breaker points that initiated the spark are shown mounted to the stern shaft via a lever that enabled the timing to be advanced or retarded to help starting or to suit different running conditions.



LEFT: A Frog 150 marine diesel engine from the 1960s with integral fuel tank.

RIGHT: An American advertisement from 1942 for a model spark-ignition engine.

…many feel that something has been lost with the decline of the model marine engine, and it's not something that can be replaced by any amount of volts or amps…



RIGHT: Cut-away drawing of a model engine from the 1975 Keil Kraft Handbook.

The engine has been 'marinised' – that is to say, provided with a water-cooling jacket around the cylinder in place of air-cooling fins and, lacking an airscrew to provide a flywheel effect, has a flywheel mounted on its drive shaft. This has been common practice throughout the history of model engines, with popular models offered as both aircraft engines – the principal market – and as marine engines when thus modified. Other points to note are the strong engine mounting to resist vibration, the water pick-up in the strut behind the propeller (with badly-designed abrupt change of angle) and the soldered copper 'gas' (fuel) tank. The model is presumably for tethered running as it lacks a rudder.

Looking at the general complication, it was clearly desirable that some simplification be effected, particularly if the engine was ever to be mass produced as a saleable product for all modellers, rather than remain the preserve of model engineers or experimenters. The obvious candidate for simplification was the ignition system. An engine-mounted magneto was used to provide a high-voltage spark and do away with the need for a battery and coil, but in the typically damp environment of a model boat that might be enveloped in spray, this often proved unreliable. Two developments provided alternative answers and paved the way for the mass production of the model internal combustion engine from the 1940s – the diesel engine and the glow-plug engine.

Diesel

The so-called diesel engine did away with the ignition system entirely and instead relied on the temperature rise produced by a high-compression ratio to ignite the volatile fuel, which was usually a mix of kerosene, ethanol, ether and castor oil. The ether provided the lower ignition temperature needed for compression-ignition and the castor oil provided lubrication. Strictly speaking, this is not a true diesel engine as fuel is not injected directly into the combustion chamber, but is commonly known as such. The model diesel engine may be recognised by having a lever-operated compression screw on its head in place of a spark plug. This operates a contra-piston that varies the volume above the piston and hence the amount of compression, to suit starting or running conditions. The engine was thus self-contained and independent of any external means for starting or running, but it required two adjustments, fuel (via the needle jet) and compression (via the compression lever).

The diesel engine was long popular in the UK and Europe, where it was accepted as the best way of achieving practical planing performance in a model boat.

Throughout the fifties and sixties, manufacturers such as Frog, E.D. and Davies Charlton sold many thousands of engines that were destined to power model boats, such as those made from the popular Aerokits range. The strongly-built Aerokits boats withstood well the rigours of diesel starting and free-running operation, usually calling for an engine of 0.5cc – 1.5cc (cubic centimetres) displacement for the smaller models or 2.5cc – 5cc in the larger sizes.

A survey of marine engines by Peter Chin, writing for Model Boats magazine in 1971, showed the diesel type to be still common in the smaller sizes (up to 2.5cc) but the glow-plug engine predominating above 3.5cc. The diesel engine continued to lose ground in the years that followed, not least with the decline of UK manufacturing and the growing popularity of radio control, for which it was less suited.

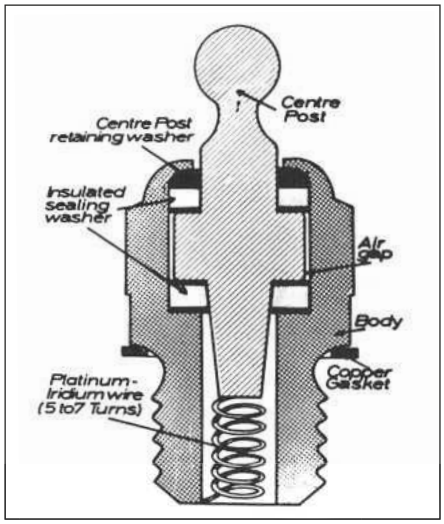
Glow-plug

The rival development to the diesel was the glow-plug or 'glow' engine, introduced in the USA around 1947. The glow-plug engine is dependent on a starter battery (originally a large Number 6 dry cell) from which it draws some two or three amps to energise the platinum filament of a glow-plug mounted atop the cylinder head. This causes the plug to glow red-hot and provide ignition, but once the engine is running the battery is no longer needed and is disconnected via its clip-on attachment. The engine continues to run due to the heat of combustion and the catalytic action of the platinum keeping the glow-plug glowing. Fuel is generally based on a mix of methanol and nitromethane, with castor (and latterly synthetic) oil for lubrication. The

LEFT: A Fuji marine glow-plug engine, circa 1970 (J. Boys).

RIGHT: An aircraft engine with clamp-on water-cooling collar and custom-made flywheel in a racing boat (J. Boys).

BELOW: Internal construction of a glow-plug.



nitromethane content has been responsible for the glow-plug engine also becoming known as a 'nitro' engine.

The need for a starter battery, which could go flat at inconvenient times, and a glow-plug, which could burn out, were disadvantages, but on the other hand the glow-plug engine needed only a single adjustment for fuel. Smoother running, faster revving and more powerful, the glow-plug was more suited to R/C models as it responded better to having a throttle fitted and it became the dominant type of model engine, relegating the diesel to the ranks of vintage modelling events. Because of their American origin, glow-plug engines have their capacity rated in cubic inches. A '15' engine, for example, has a displacement of 0.15 cubic inches and is the equivalent of 2.5 cubic centimetres.

ABOVE: Another view of the installation showing the expansion chamber tuned exhaust (J. Boys).

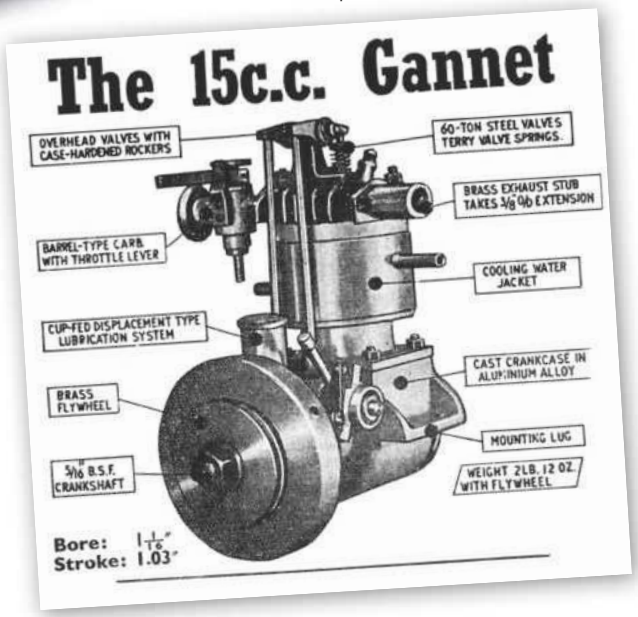
An aircraft glow engine could be fitted with a clamp-on water-cooling collar and custom-made flywheel as an alternative to using a specific marine engine, especially in racing craft. One such by fellow modeller John Boys is depicted as a trial installation during construction in 1980. Note the expansion chamber type tuned exhaust to offer a boost in performance.

Gannet

There have been very few engines produced for model boats that were not simply adaptions of model aircraft engines. Perhaps the best known of these was the English 15cc Gannet of the 1960s. A four-stroke overhead valve water-cooled petrol engine, it had displacement (oil cup) lubrication and provided power for a large (42 – 54 inch) model boat at tick-over to 10,000rpm. In 1965 it did not come cheap at £27/6/0 (twenty-seven pounds and six shillings) plus accessories, the equivalent of £392 today.

Other developments

More advanced manufacturing methods, particularly in Germany and Japan, along with demand from aeromodellers with ever deeper pockets, has seen some spectacular model engines produced in recent years. The four-stroke has made a comeback and is favoured for its torque and more realistic sound; models made by the Japanese O.S. company, for example, have beautifully tooled fully-enclosed valve gear and include a seven-cylinder radial for what must be the ultimate in realism for aircraft models. Spark-ignition has made a comeback too, with the aid of modern electronics in the form of a CDI (Capacitive Discharge Ignition) module. But, off-shore racers aside, I suspect that for the majority of boat modellers, powering their latest creation with an internal combustion engine is not an option they consider. It has been swept from the consciousness just as it was swept from most suburban lakes years ago because of the noise and pollution it was responsible for. Rightly so, perhaps, in an overcrowded world; the sound produced by a brace of racing 'flatties' with tuned pipes was never a pleasant one to those not involved and besides, we now have lithium batteries and brushless motors with which model boat speed records are set. And yet, many feel that something has been lost with the decline of the model marine engine, and it's not something that can be replaced by any amount of volts or amps.



A SELECTION OF OUR MODEL BOAT PLANS

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Greta	44	5.5	MM1036	17.50
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Savarona	36	4.25	MM1468	17.50
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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	49.00
Tern			MAR3702	13.00

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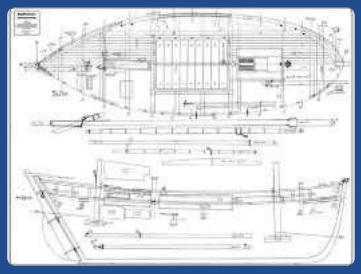
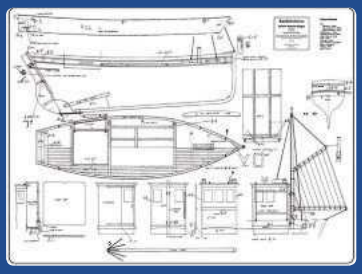
Undine	29.9	2.4	MAR2901	11.50
HMS Valiant Internal Workings			MAR3746	13.00
Nautilus	28	1.5	MM285	13.00
USS Nautilus	36	3	MM433	13.00
Type IX U Boat	45	4	MM471	13.00
Sardine	48	5.75	MM485	13.00
Sprat			MM624	13.00
Resolution Class & Type XXIC U-boat	39 & 38		MM1155	13.00
Charlie Class	40		MM1210	13.00
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

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Manx Nobby (Set)	42		DASET005	138.50
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Barge Yacht	38		MM902	13.00
Topsail Schooner	30		MM909	13.00
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
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Shallow but Stable

Can a shallow draught model boat really be a practical all-weather proposition? **Glynn Guest** suggests it can...

Many of my models are inspired by warships, some real, others fictitious. One problem that can occur is with the narrow beam that some models have, such as those based on destroyers and cruisers. This can lead to problems with transverse stability, resulting in a model that could potentially roll upside-down! It's worth pointing out that narrow beam models and, indeed, the full-size vessels, will always have a tendency to roll, such as when turning tightly or in rough conditions. This behaviour should not be confused with instability since they should return upright when the disturbing influence is removed.

Narrow stability

A common solution for a model design which may display poor transverse stability is to increase the models beam. This will always make things better, with the obvious caveat that this does not automatically give you the freedom to cover the upper works of a model with lots of heavy fittings and details.

A small increase in the beam may pass unnoticed on many models but taken to extremes could produce something with an obvious and unrealistic portly look. This is true of models based on slim warships as even a modest 10% increase in the beam can be noticeable. One answer to this problem has its roots in my modelling origins which were firmly based in aeromodelling. You quickly learn that success comes by building light but without sacrificing strength. Hence I usually try not to 'overbuild' my models yet make them tough enough for the terrors that they might encounter when sailing, i.e. fellow modellers who just do not watch or care where their creations are going! This approach allows for more ballast to be placed as low as possible inside these hulls and lowers the models final Centre of Gravity which, in turn, will aid stability.

Also, being very much in the stand-off scale camp – which usually determines that models are designed to look realistic and perform well on the water – can be an advantage. So, what's out of sight under the water is not critical and this can allow for a simplified or modified hull form. I'll confess to taking advantage by sometimes increasing the draught of the model. Very handy whilst attempting to fit-out the hull with hardware and squeeze the proverbial 'quart into a pint pot'. It also allows for more ballast which can increase stability.

Food for thought

One of the internet forums I regularly view is the American-based RCGroups, which covers all aspects of R/C models, and even a few non R/C ones. It has a broad International following and despite starting with the boat section I inevitably find myself wandering into other areas. Being in the 'deep draught = stable' camp, you can imagine my surprise when I came across someone who was building and sailing models of ocean going liners with very little draught in their hulls. Such models feature high superstructure blocks and can be notorious for poor stability, however videos showed these models sailing in a most reliable fashion. A modeller living in Scottsdale, Arizona who posts under the name 'Greenseaships', started describing these models in December 2007. He'd developed a lightweight method of

Fig.1

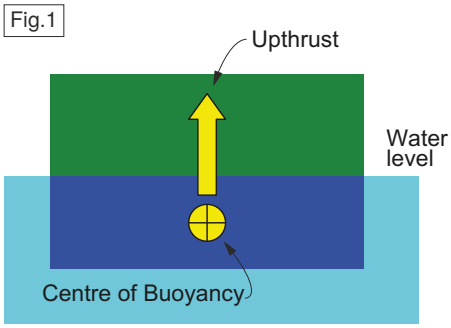


Fig.2

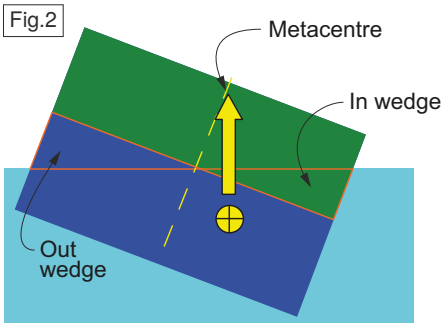
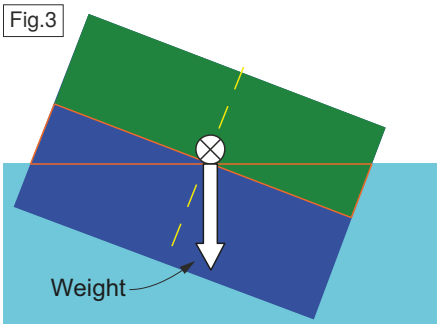


Fig.3



ABOVE: Cruise ships have a shallow draught for a variety of reasons which are mostly commercial. Passengers much prefer to go ashore on a quayside rather than be ferried from an off-shore anchorage.

BELOW: Narrow beam models will always have a tendency to roll, such as when turning tightly or in rough conditions. This behaviour should not be confused with instability.

> *"This was something of a puzzle which demanded some thought"*

construction using cardboard and foam sheets, the cardboard being strengthened and waterproofed with fiberglass resin. The result was lightweight models that appear to sit 'on' rather than 'in' the water yet look and sail beautifully. This was something of a puzzle which demanded some thought.

Metacentres & stuff

The transverse stability of both models and full-size vessels depends upon the movement of the hull's Centre of Buoyancy (CB) when the hull is heeled to one side, the CB being the point where the hull's buoyancy, or upthrust, can be considered to act. This is the same idea as a model's Centre of Gravity (C of G) being the point at which its weight is centred.

Consider a simple rectangular hull cross-section such as shown in **Figure 1.** The CB will be at the geometric centre of the underwater section. If the hull is heeled to one side, part of the section lifts out of the water whist the other side is more deeply submerged **(Figure 2).** The rectangular cross-section we have used produces two wedge shapes, hence the 'In' and 'Out' prefixes. To maintain the same total upthrust to support the hull, the volume of the 'In' wedge must equal the 'Out' wedge. In effect, some of the buoyancy has been transferred from the left-hand side of the hull section over to the right-hand side. It is not hard to see that the CB must also have moved to the right but it still acts vertically upwards. The point at which the upthrust passes through the middle-line of the hull is called the Metacentre. It can be thought of as the centre of the arc through which CB swings as the hull heels.

If the C of G is brought into the picture, it must – at least for a model that floats upright – lie on the vertical middle-line of the hull. The weight force can be considered to act from this point and always vertically downwards no matter what angle the hull might be at **(Figure 3).**

Put the upthrust and weight forces on the same diagram and it can be seen that if the C of G lies below the Metacentre then these two forces will act to oppose the heeling of the hull **(Figure 4)** by producing a corrective couple that tries to roll the hull back to the upright

From a period when cruise ships still had character, Caerleon Castle offers a '50s flavour.

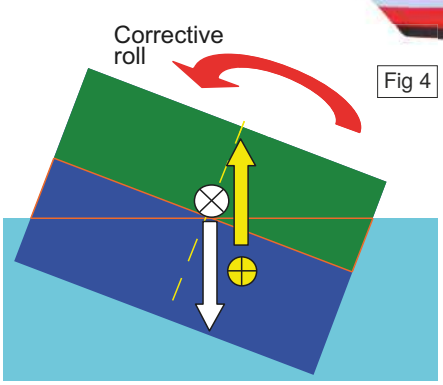


Fig 4

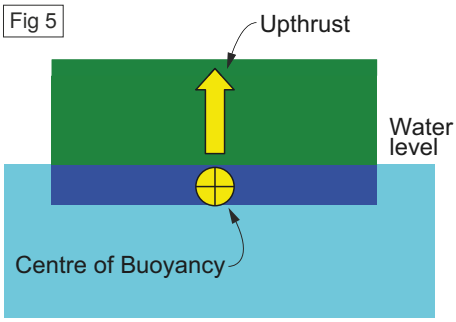


Fig 5

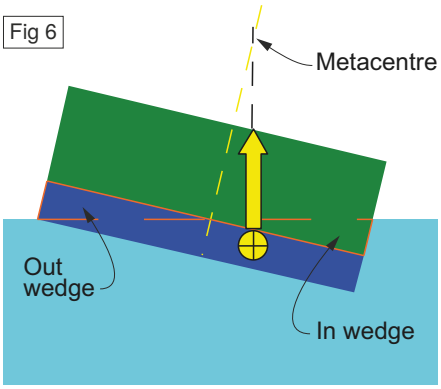


Fig 6

position. The distance between the C of G and Metacentre on the middle-line of the hull is called the Metacentric Height. This is often abbreviated to GM, G standing for gravity and hence weight. The convention is that if the Metacentre is above the C of G then GM is given a positive value, if below it becomes negative ('cos it's bad news, very bad news!).

Going shallow

It's not hard to see that a positive value of GM is needed to make a model stable. The larger it is the more difficult it will become for the model to roll. The term 'stiffness' can be used to describe how quickly a model responds to external disturbance, a subject some scale modellers delight in arguing about.

So, what happens when we have a shallow draught hull and it heels to one side? **Figure 5** shows a similar hull section but with much reduced draught. The CB is still in the middle of the underwater section of the hull but is now much nearer the water level, which sounds like it might be bad news. However, if the hull is heeled by the same amount things look quite different **(Figure 6).** The Out wedge has in effect transferred half of the hull volume on one side of the middle-line across to the other side. The effect of this transference is much greater than in the deeper draught section, compared with Figure 2 where the in and out wedges only make up a small proportion of the submerged hull. The result is that the CB will move much further from the middle-line. When the upthrust force is projected upwards, it will meet the middle-line at a much higher point, the end result – unless we really pile weight on top of the model – being a bigger Metacentric Height.

Double checking

I was still a little surprised at the idea that shallow hulls could be so stable and so drew some accurate hull sections to measure the results. A beam of six inches (150mm) was used with a deep draught of 1.5 inches (37mm) and a shallow draught of 0.5 inches (12mm). The same angle of heel was used on both. Much to my amazement, the shallow draught hull had a Metacentre some 2.5 inches (63mm) higher. Now, I know that the real vessels usually have narrower sections as you move to the bow and stern and this will reduce the final metacentric height of the whole hull.

However, even though it was a greatly simplified approach, the effect was still quite a dramatic.

Just in case I'd done something wrong, a quick test on the garden pond was called for. This was no more than using a plastic container – of about the right shape, with a rectangular cross-section – and placing it in the water. Adding a battery pack made it float level with a suitable shallow draught. Pushing down with a finger on any one side proved that it was obviously 'stiff' and would immediately, on letting go, spring back upright. A few more experimental prods convinced me that a shallow draught model could be stable. Luckily, the pond is in a sheltered corner of the garden so the neighbours do not think I'm crazy!

What next?

A new model had not been planned quite so soon after the last one but the idea of a shallow draught design would not go away. Whilst casting around for something suitable, I came across an outline for a model based on a small cruise liner which been drawn up many years ago. For some reason it had never been built but had the right proportions for this project. The original model was to have been some 40 inches (1016mm) long, with a beam of 5 inches (125mm) and draught of 2 inches (50mm). This would have given the model an operating weight of about 9 pounds (4kg). Modifying it to suit the shallow draught idea resulted in a slightly shorter but beamier model with a planned draught of a mere ½ inch (12mm) and a weight of around 2 pounds (0.9kg).

So, before any second thoughts could arise out came the balsa, liteply cutting mat and knives. The result? Caerleon Castle, the subject of next month's free plan.

BELOW: Caerleon Castle, my 'proof of concept' model and next month's free plan. The draught? 12mm!

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Boiler Room

Richard Simpson turns his painted and lagged Pendle into a fully operational boiler

By the end of the last issue we'd got our bare boiler to the point where it has a painted top surface and a lagged shell, ready to be fitted out for use. The boiler is a 3.1/2 inch vertical type from Pendle Steam Models which we're using to show that a custom boiler can be obtained at a reasonable cost. The most attractive aspect of this, of course, it the knowledge that it comes from a professional supplier, ready tested and certificated, needing only to be completed with mountings before use. So, this month we're going to complete the fitting out process and give the boiler a test steaming, ready for it to be fitted into a boat. The mountings are already collected (March issue) and test fitted so it is just a case now of assembling them onto the shell.

Sealing

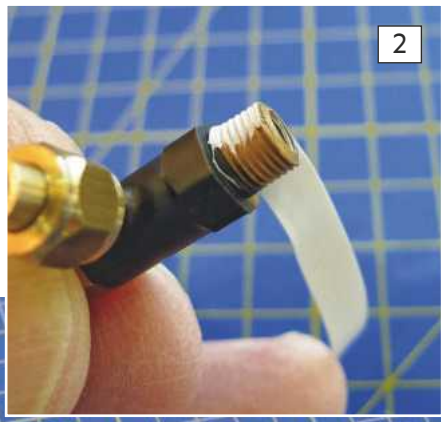
One of the first decisions to make when screwing the mountings into the boiler bushes is just how to seal the threads to ensure that leaks cannot occur. There are a great number of proprietary sealing mediums in various forms including liquid thread sealants from manufacturers such as Loctite and pastes of varying thicknesses which can set to either a hard or a soft consistency, these from manufacturers such as Hermetite and Stag. That said my own long-term favourite has been simple PTFE thread tape. I've used it in industrial applications many times over and grown to appreciate the ease of applying it and removing it afterwards, not to mention its ability to effectively seal threads and joints with its capability of being compressed into fine clearances. For modelling purposes the tape can be cut with a very sharp scalpel blade to a width that suits the thread **(Photo 1),** and then wrapped around in the direction of rotation, to ensure it is carried into the joint as the thread is tightened **(Photo 2).** If you wrap it the wrong way it can tend to 'unwind' as the fitting is tightened and fails to sit in the thread properly. You should not require more than a couple of turns to seal a thread and, if you've applied it correctly, the tape should be visible at the end of the thread so you know it is completely filling the threaded area. Tighten it down with enough torque to ensure the mounting is not free to rotate and all should be well.

There's a bit of a balance to consider when sealing a thread as this can depend on what it is you are sealing and what attitude you might require the fitting to be in. Another popular means of sealing the thread is either a fibre or a copper washer, but the challenge with these is that you have to compress them to obtain a seal and therefore the final attitude of the fitting is determined by the required compression. Also, washer seals lift the mounting away from the surface of the bush, so again, in the case of the gauge glass where the alignment is extremely critical, this could be a challenge.

Thread sealants score better here as they can seal at any angle, however it may also be a requirement that the mounting is tight and unable to rotate when in use. This is particularly important with the gauge glass as we will see later. It may well be that you prefer to use a thread sealant that sets hard and that would appear to offer the best of both worlds, however the main downside there is that this stuff can prove to be difficult to remove at a later date, even to the point of creating a failure of the thread.

1. PTFE tape actually cuts quite easily with a sharp scalpel blade, especially if it's of an older thicker type. More modern varieties tend to be a bit thinner.

2. Make sure you wrap it the right way around the thread. Get it right and the tape is pulled tighter into the thread, sealing it effectively. Get it wrong and it gets pushed out as you tighten the fitting.



Valves

The valves probably have a bit more flexibility in their attitude but you will almost certainly have an idea of the pipe runs you're going to use and will doubtless have preferences for the direction in which the valves and their hand wheels end up. By this stage of your project you should also have a good idea of where the boiler is going to sit in your model and just what access you will require to operate it, so the attitude of hand wheels will also be quite significant. You really will curse yourself if you flash up the plant in the boat for the first time only to find out that you can't reach the steam outlet valve hand wheel without burning the back of your hand on the boiler!

Apart from that the valves should be fitted as per your design with either straight or ninety degree types where appropriate for your plant. They should be tight when fitted so that at least they are unable to move, bearing in mind a fair amount of torque may be required to turn the hand wheel, so you should be looking for a reasonable tightening torque on the spanner when fitting.

Gauge glass

It's surprising that 'gauge glasses', or 'sight glasses' as you may know them, seem to frequently cause us challenges to fit. Just to put this into perspective, I took all the precautions I'm about to describe and, even with a brand new glass on a brand new boiler, I still managed to break the glass! Anyway, I'll describe the procedure I go through to fit a glass and point out the pitfalls, however even when you're being as careful as possible, it seems that you can only try to reduce the risk of breaking the glass rather than completely avoid it. The trick, above all else, is to ensure that the two fittings are in line. The slightest degree out of

3. Vernier calipers earning their keep again. Once you have an accurate measurement of the glass diameter you can go looking for a suitable piece of metal. It may even be worth turning one up for yourself.

4. Using a drill may seem adequate but the fit was not good enough (see text).

5. Assembling all the components onto the glass enables you to roll the 'O' rings over the end of the glass and avoid the risk of nipping it.

6. You might be lucky enough to get your hands on an old type of safety valve with a vent pipe and clip to hold it to the flue. This makes for a particularly neat installation.

alignment and the glass will break, usually when you're tightening the gland nut.

The procedure I employed was as follows. Firstly I fitted the lower mounting with the PTFE tape around the thread. I like the thread to be tight so sometimes find that I have to tighten it to a point where it may not be in alignment, in which case I remove it and either add a bit more tape or even go for a hardening sealant. I would avoid using a sealing washer as there is a possibility that this might put the fittings out of alignment in a radial plane and complicate the issue further. Fortunately, in this case the lower mounting was suitably tight when rotated to the correct attitude.

Next I fitted the top mounting and was happy, once again, to find that a suitable degree of torque was achieved when the attitude was correct. The next step was to remove the top cap where the glass is to be inserted, remove both gland nuts and the 'O' rings inside and then take the glass and a vernier caliper and measure the diameter **(Photo 3).** I then needed to find a piece of metal of exactly the same diameter (again as measured by the caliper) and drop it into the top mounting and through to the lower

mounting. This indicates just how exact your alignment is. You're looking for nothing short of perfection. The fittings must be perfectly aligned with exactly the same clearances around the metal rod, and everything must be checked again and again to be sure it's perfect. My mistake on this occasion started with not enough care at this point. You see, I used a drill to align the two fittings **(Photo 4)** which is not really good enough to ensure the best result where the flutes go through the top mounting. You really need to find a parallel piece of metal tube or rod of the exact diameter. Once you've adjusted the two mountings to give perfect alignment you can remove the rod and fit the glass. Some prefer to fit the gland nuts and 'O' rings before threading the glass through them but I much prefer to slide the glass in place and thread the nuts and the 'O' rings onto it as the glass passes through **(Photo 5).** This is a good bit more fiddly and you have to be careful not to put pressure on the glass but it does allow you to fit the 'O' rings over the end of the glass without nipping them, which can very easily happen when pushing the glass through the fitted 'O' rings.

The next job is to tighten the nuts to compress the 'O' rings and this was where I made my second mistake, which is, I suspect, the most common, i.e. to over tighten the nuts. They really need to only be finger tight but I had to just give them a 'nip' with a spanner, which was when I heard the disheartening 'click' of the glass breaking. Luckily I have plenty of spare glass to hand but I was particularly disappointed with myself for not taking enough care to avoid breaking it in the first place. I would suggest that you start

off with finger tight and only nip it up further if it leaks under pressure and you require it. You should be able to compress the 'O' ring enough by hand to seal it. So, when you've eventually got the glass in and suitably tightened up it is simply a case of fitting the top cap again.

Safety valve

The safety valve is fairly straightforward, these usually being fitted with an 'O' ring on the lower face to facilitate easy and frequent removal. I had an old valve from a disused boiler that came complete with a vent pipe and clip to neatly attach it to the funnel, which made for a very tidy arrangement **(Photo 6).**

Pressure gauge

The final Item to be fitted was the pressure gauge, which first of all required the working pressure to be marked on the dial according to the current testing requirements. This has to be applied to the face, not the glass, so it requires the front of the gauge to be removed **(Photo 7).** Sometimes the gauge front is held in place with screws and sometimes it relies on nothing more than a tight fit. I like to use a short section of thin stick on red model striping **(Photo 8)** which can be sealed in with a coat of matt acrylic varnish and makes for a very neat, clear and professional looking mark **(Photo 9).** The Pressure Gauge can then be fitted, ensuring that the supply pipe incorporates some form of trap, 'U' tube, or syphon, to protect the mechanism of the gauge.

Sometimes you can get the syphon supplied with the gauge but, if not, then you have to arrange it yourself. So, having now put all the bits and pieces onto the shell all that was left was a test run. The boiler was filled with distilled water to a half glass level and a disposable gas tank connected to the burner supply pipe. The gas was turned on at the tank and ignited at the top of the flue **(Photo 10).** The burner lit immediately and burned with a healthy noise. Within around five minutes the boiler had raised a noticeable pressure and before seven minutes was up the safety valve lifted at about 40 psi.

In conclusion, at this point we can see that with not too much effort we've turned a bare shell boiler into a fully equipped and working boiler for a good bit less money than a fully finished item. Plus, you have the satisfaction of knowing that the boiler is professionally built and tested but still with enough individuality to put a smile on your face. The Pendle boiler is very nicely made and performs well so you can rest assured that it will give you many years of trouble free service, not to mention the assurance of after-sales service from a British manufacturer **(Photo 11).**

Next month we'll see this project to a natural conclusion and put the boiler into a boat.

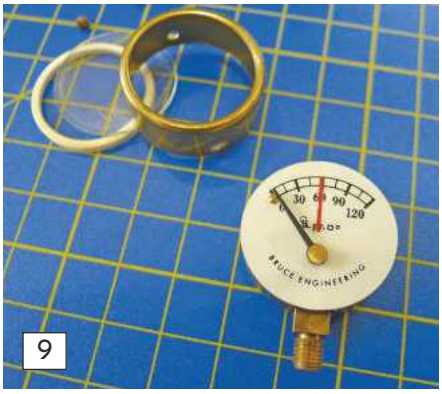
7. Taking the front off the gauge is done by simply prising it off with a screwdriver or undoing a couple of screws and slipping it off. Either way it's a simple task to remove the front to give you access to the face.

8. TrimLine is more commonly used for striping model aircraft but the thinnest line is perfect for marking gauge faces.

9. A simple light coat of matt clear acrylic varnish seals the mark and ensures it remains in place.

10. By filling with distilled water to half a glass and temporarily connecting to a gas tank, a test firing can be conducted. It raised steam very quickly and noticeably took quite a while to vent when finished so it clearly has a good steam space capacity.

11. A lovely custom boiler with the satisfaction of it being professionally built and certificated.



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Alpha

Looking to build your first yacht? Or even your second, third or fourth? **John Goodyear** offers up a quick-build RG65-legal racer

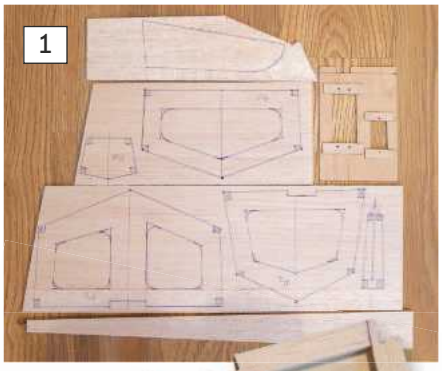
I'm confident that Alpha has met all the requirements I established before putting pen to paper, and she's attractive, too.

When the Editor approached me to design a radio-controlled yacht suitable for the widest range of potential skippers he presented me with a bit of a problem. How on earth, for example, do you please all of the people all of the time? Having accepted that this was not feasible my thoughts turned to the dark and distant days when I became interested in model yachts. What I was looking for at the time was an easy to construct design that would be enjoyable to sail and, perhaps, in the not too distant future, allow me to race with some hope of success at club level. And so the die was cast, I would design a model suitable for beginners along these lines. Graham approved so it was all systems 'Go'.

Before actually starting anything I set myself a few goals which determined that the model should be:

- Easy and inexpensive to build.
- Large enough to accommodate any type of current radio gear and batteries.
- Competitive in its performance.
- Attractive.
- Easy to transport to and from the water.

Based on the above, an IOM was clearly out of the question. Something smaller was needed and what better type to aim at than the RG65, the fastest growing class in the world, if statistics are to be believed. As such, the length would not exceed 650mm and the beam could be manipulated to allow easy installation and operation of any modern radio. Getting to the lake would also be pretty easy as a fully rigged RG65 will fit into a very small car. Attractive lines could be a problem, of course, as what appeals to some doesn't always find favour with others, but 'twas ever thus. As for performance? Well, the only way to establish this would be to build one and see. Time to start sketching and prevaricating in the hope of getting something on paper that looked as if it might work. Mercifully, some of our club skippers and myself have designed, built and sailed numerous new yachts over the past five years so I had a reasonable idea of what to do. The tricky bit was keeping everything in line with the design criteria previously noted.



1. There's no better place to start than cutting out a few formers. Note that I've also made the radio tray.

2. Formers 2, 3 and 4 require 10mm doublers, as here.

3. Just before you apply the stringers, give their respective notches a tidy. Note the ply building jig to hold everything in perfect alignment.

A plan is hatched

Fast forward two weeks and the plans for Alpha had been drawn and all necessary calculations made concerning what would fit where. Everything appeared to be acceptable, so it was off to the model shop to plunder their balsa stocks and also place an order with a mainstream supplier for the one commercial item needed to complete the build – a mast foot and kicking strap assembly. We'll come back to this next month.

Now, I can hear some readers saying: "Balsa? Isn't that a step back into the Dark Ages?" Well, not really, because carefully selected balsa coated with 12 or 24oz glass cloth and epoxy resin offers so many advantages over other more exotic materials. It's also a very easy material to work with, is readily available, inexpensive, light and strong. For modellers new to the game it is, frankly, the only way to go (see criteria 1 above).

If you're still reading at this stage the odds are that you might be tempted to visit your local modelling emporium, dig out the building board and start cutting and gluing. Before you make that pilgrimage, however, do please remember that balsa comes in many different grades and that some sheets will weigh almost twice that of others. With this in mind you should be aiming to build a model with a hull that is as light as possible to allow you to place all the weight in the engine compartment, i.e. the keel bulb. Be selective in your choice of wood and aim for something that is close-grained, relatively hard, and light. The lightest sheets in stock will probably be of no use being very soft, however with a bit of luck you will find something combining all the necessary characteristics. Whilst at the model shop you might as well pick up two pieces of carbon fibre tube for the mast and booms. For the mast you'll need a 1000mm length of 7mm OD tube with a 1mm wall thickness and a similar length of 5mm OD, again with 1mm wall thickness, for the booms. If the spares box is empty then you should also top up with quick-links, a small length of fine bore copper tube, and all the other bits and bobs that you will need to complete the build. My advice is to read this missive and study the plans 'before' going to the shop.

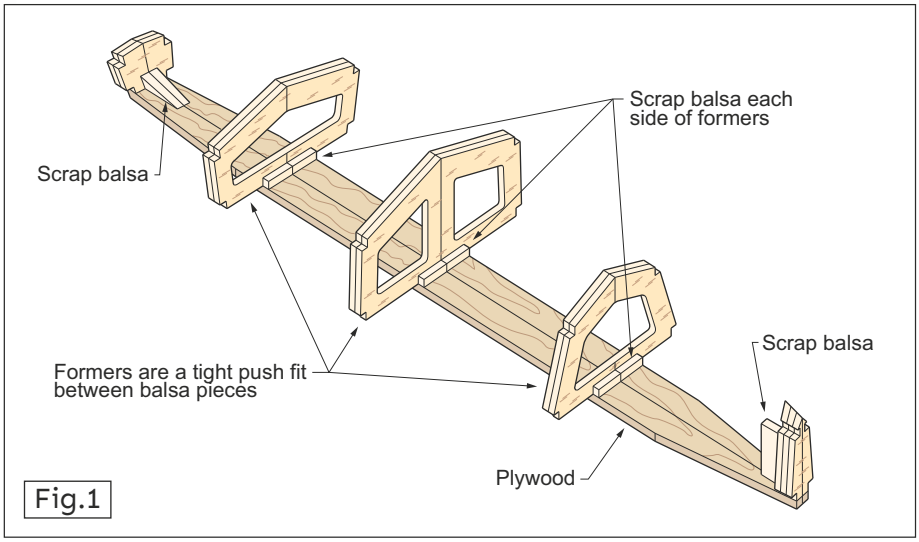


Fig.1

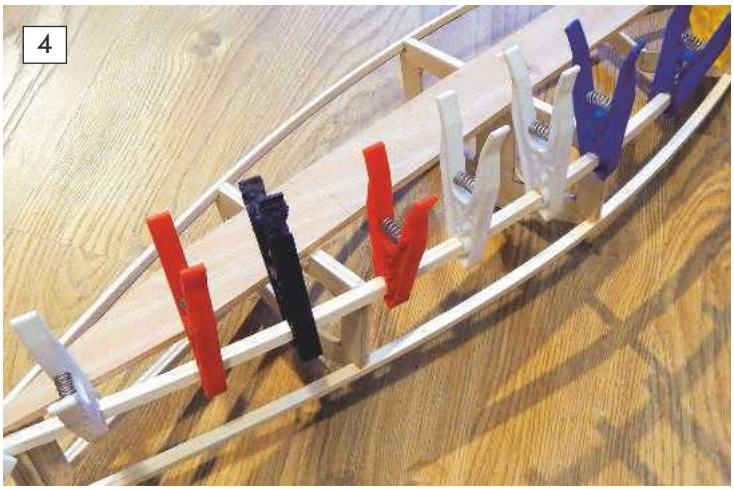
Let the build commence

Suitably armed, it's now time to commence cutting things out and sticking things together. The hull formers are a good place to start and as there are only five of them it makes for little work **(Photo 1).** I suggest 3/32" sheet but as I had a spare sheet of 1/8 doing nothing I cut mine out of this. Do cut out all the lightening holes as this will help reduce weight and enable the easy passage of the necessary wiring and switches. Once cut out, glue on 10mm wide 'doublers' all around the edges of formers 2, 3 and 4 **(Photo 2).** Double the entire section of F5 with an oversized piece of balsa laid cross-grain to the main piece. It needs to be oversize as it will be contoured to the shape of the hull sides and bottom. For F1, this needs to be tripled using progressively larger sheets of balsa laid cross-grain for exactly the same reason. There's nothing like giving the glue something to stick to.

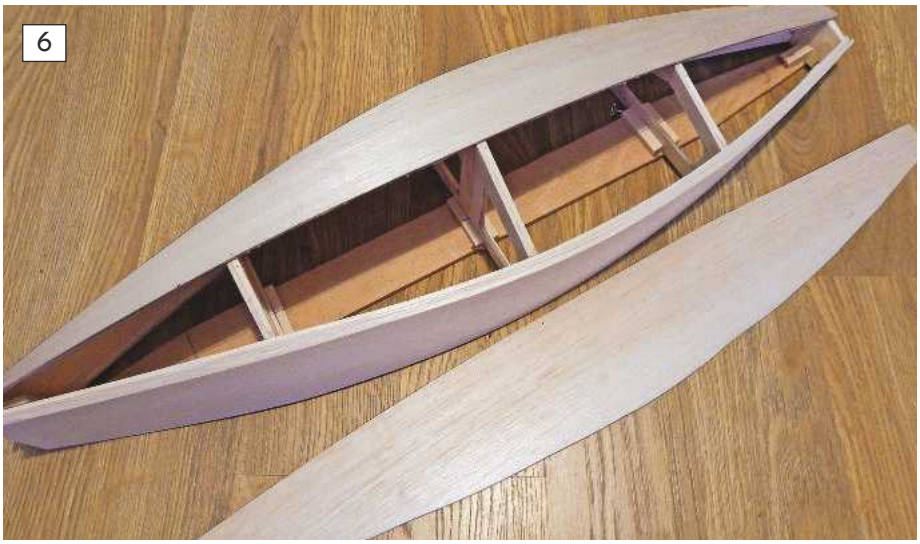
You will now need to decide on the type and form of building jig to use to assemble everything. I elected to use a piece of plywood suitably shaped to allow me to get at the edges of all the formers and the, (later to be added) hull sides **(Figure 1).** Having made a suitable device, mark off the position of the formers and glue down some pieces of scrap balsa to hold the formers at right angles to the jig and perfectly upright. The formers need to be a nice, tight push fit between their respective two bits of balsa. Once satisfied, pin the formers in place making sure that once the hull sides and bottoms have been glued on you can get at the pins for removal! If you can't, you will feel rather upset when it's time to remove everything from the board. Been there, done that.

ABOVE: It matters not how good you think your eye is, there really is no substitute for a building jig.

Time now for a bit of shaping of the cut-outs made in each former to accommodate the stringers **(Photo 3).** Since everything is assembled on the board at this stage you will have a good idea of what to shape and by how much. When gluing the stringers in place do ensure that the formers don't twist. It's best to glue them on in pairs with one at each side. When satisfied that all the glue has dried, fit the second stringers over the first, again working in pairs **(Photo 4).** Why two at each station and not one piece of thicker material? Well, thinner material bends easier and the glue in between makes for a laminate that is much, much stronger than one piece of thicker



4 & 5. Adding the stringers and side skins really starts to bring the hull to life.



6. Don't rush this bit. Time and patience will pay dividends with a perfectly-fitting bottom skin and centre joint.

wood, something that you will appreciate at the next stage of the build. Leave everything to dry well then gently plane the stringers to the shape dictated by the formers, but only do this along the hull sides. Don't worry about shaping the stringers to match the hull bottom, we will sort that out later.

When satisfied with all the shaping, dig out the craft knife and cut out the two hull sides. Developed shapes are shown on the plan, which will save you a lot of time and effort, and maybe a few curses. These shapes are deliberately shown a bit oversized to allow for any slight adjustments that may be necessary. Lay the first hull side up against the hull skeleton and mark out the position of all the gluing points. Apply your chosen glue, offer up the hull side and pin and peg in place as shown. Leave to dry well and then repeat for the other side. It's beginning to look a bit more like a yacht now isn't it? **(Photo 5)**.

Rest assured, you'll not be disgraced at your club. Alpha sails well... Really well.

The Next bit is a trifle tricky so think it all through before actually applying cutting edges to wood. Trim off most of the excess hull side projecting above the stringers at the interface between the sides and what will become the bottom of the hull. Leave anything at deck level for now, we will return here later. Now fit a nice new blade in the razor-plane, or similar, and contour the stringers and hull side edge to the line indicated by the formers. Be especially careful on the line between F1 and F2 where the intersection of the sides and hull bottom change shape markedly. Finish off with sandpaper and then repeat for the other side.

Right, let's deal with the most difficult part of the entire hull build – the fitting of the bottom hull panels. Approximate shapes are shown on the plan so cut out two pieces as indicated and test that they do indeed (roughly) conform to the desired shape. You can ignore any inconsistencies relating to the outer edges of the panels but you will need to do some very careful shaping of the edge that runs along the centreline of the hull. There is no easy way around all this. It's a matter of using your skills and eyesight to prepare a piece of balsa with an edge that runs nicely down the centreline. Time, patience and effort are required but you will get there in the end. Just don't forget that the more accurately you make the first panel the easier it will be to fit the second. When totally happy with the shape you have achieved, chamfer the centreline edge, so that you can later butt join the second panel to it, then glue in place. Step back and have a nice cup of tea and a bikky, the hard part is now over.

As a result of you spending so much time and endeavour in fitting the first bottom hull panel, the second one is easy. All you have to do is lay the panel over the hull and, working inside, mark out the centreline against the first panel and cut to shape. Check for fit, chamfer and check again. If it's all looking good then glue and pin in place and leave to set thoroughly. The basic hull is now almost complete **(Photo 6).**

At this stage in proceedings it's a good idea to rub everything down really well until a consistent finish is obtained. For this you'll need to use finer and finer grades of sandpaper or wet and dry, used dry, of course.

Epoxy time

We now have to think about imparting strength to the hull by applying lightweight glass cloth and epoxy (finishing) resin. With the usual disclaimer that I have no commercial interest in either supplier, I used

7. With a good, soft, small, modellers paintbrush start working in the middle of the hull and gently brush in the epoxy mix.

8. The 1/64 ply stern blanking piece.

9. The semi-completed hull with some of the trickier jobs behind us. It's a good place to be.

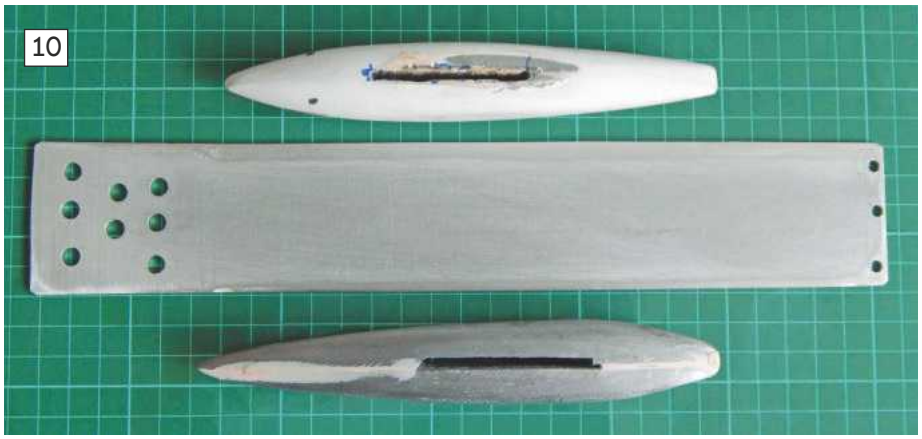
Zap Z-Poxy along with 24oz cloth. To prepare the hull for 'glassing' it needs to be rubbed down to a consistent finish. It doesn't need to be super-smooth, indeed there's a school of thought that suggests a bit of roughness helps the epoxy to bind better, which makes sense. Quite how you cover the hull is a personal choice. A fellow modeller in our club is brilliant and can (somehow) manage to cover the whole hull in one go and without any bubbles or ripples. Apparently he lays the weave of the cloth at 45 degrees to the length of the hull and just goes for it. Dear reader, I'm not as good and if you're a beginner to all this then may I suggest you won't be either. This being the case my advice is to use three pieces of cloth, one for the bottom and another one for each of the two sides? Assuming you agree and have the first bit of cloth cut, here's a really helpful tip: Two-part epoxy resins do not like being mixed in any ratios other than those they were formulated for. For the Z-Poxy I'm suggesting, this means equal parts of the resin and hardener. Note, also, that we only need a very small quantity of each component for each piece of cloth. For the bottom of the hull 3ml of each will be adequate and the only way to measure such small volumes accurately is to use a syringe. This technique of mixing equal amounts will ensure that the epoxy sets and doesn't finish up a nasty sticky mess. Here's another great tip as well: Mix in with the epoxy between 20 and 30%, by volume, of methylated spirits. This will dilute the mix and help it to flow easily through the glass cloth and into the wood. As for acquiring the 'meths' you can try camping shops where a small bottle will set you back around £5.00. Alternatively, pop along to your nearest Home Bargains shop where a bottle twice the size will cost you £0.99. No prizes for guessing where I bought mine!

Okay, you've got the cloth laid along the hull bottom with a nice bit of overlap all round. With a good, soft, small, modellers paintbrush start working in the middle of the hull and gently brush in the epoxy mix **(Photo 7).** Work your way along to both ends, simultaneously brushing out any bubbles as they appear, although you shouldn't actually get any thanks to the very low viscosity of the mix. When finished you can then, if you wish, take a credit card size piece of hard plastic and force out any excess resin by gently running it along the entire hull bottom. This will provide you with an absolute minimum weight hull but I don't recommend it if you're a beginner to this game. Better an extra 1 to 2 grams of resin and a lot more strength in the finished article in my opinion. When happy with things, wash your brush out very well in meths and leave the hull to dry for 24 hours. Now trim off the excess cloth with a razor blade and repeat the performance for the two hull sides doing one at a time. Once all the 'glassing' is done sand back the bow and stern and fit blanking pieces to protect the end grain in the balsa. I used 1/64 ply as shown in the photos which can be glassed over when we come to treat the deck **(Photo 8).**

Underwater bits

At this stage we can remove the semi-complete hull from the jig and admire our handiwork **(Photo 9).** Time to work inside the hull by making the keel box because all other fittings will use this to line everything up. First though you will need a keel. Now, historically I have made keels from rather exotic materials to achieve the most rigid component possible. For Alpha, however, I reverted to a piece of hard and stiff 2mm thick aluminium. Ideally, what you want is an old control panel box that spent the major part of its life housing electrical bits and pieces. Failing that it's amazing what you can find at your local tip! Alternatively, crawl the net and pay a visit to your local supplier of sheet metal. As an aside, I found one place offering to cut me keel size pieces of hard 316 grade stainless steel cheaper than corresponding aluminium ones. I was tempted but declined.

Having got your keel blank you will have to sweat a little filing it to an aerofoil shape remembering, of course, that the harder the metal the more difficult it will be to shape. I succumbed to using a belt sander after initial filing and it did a tolerable good job. Remembering the rule that anything adding weight above the waterline is generally a bad thing, drill out some lightening holes in the part of the keel that will fit inside the keel box. While you have the drill out it's a good idea to also drill out a few holes in the bottom of the keel to enable the glue to attach the lead keel bulb securely as shown in **Photo 10.** Note that I experimented with two bulbs of different weight to enable me to establish which would offer optimum performance. One was 'recovered' from another model but, after drilling out the old keel, was perfectly fit for purpose. As for making the lead bulb, this was covered in some detail in the September 2017 edition of MB within the feature about another of my yachts, Varmint. Not wishing to repeat everything said, in précis I suggest you make the bulb in two halves split longitudinally. To accomplish this make a half-section balsa master pattern and glue it to a ply backing piece. Next, make an imprint in some damp sand as shown in **Photo 11** ready to pour the lead into. Now a word of caution about melting and pouring lead. Lead dust and fumes are VERY nasty so wear heat-proof gloves and a mask at all times. You can melt the lead using an old saucepan and a



10. Keel and bulb ready to install. Be very careful working with lead when making the bulb and always wear a mask.

11. Sandbox keel moulding can be a very satisfying process. Note the half-section balsa pattern, behind.

blowtorch quite easily but do take great care. Pour the lead, allow to set, and then quench in water. You will have to prepare the mould again to cast the second piece and I suggest you use some new sand as the original will have become dry and friable and unable to hold the shape of the pattern. Once you have both pieces, file a groove into each ready to accept the keel (MASK NEEDED) and then glue together with epoxy. Looking good now isn't it? To finish, fill all the inconsistencies with car body filler, sand to shape (MASK) and stand back to admire your handiwork. You should aim to produce a bulb weighing around 550gm although this isn't critical. During development, the prototype Alpha was sailed with bulbs weighing 500, 550 and 600gms quite successfully. Don't fit the bulb to the keel yet though. (Note, the commercially available DF65 keel bulb weighs 545g. Just a thought – Ed.)

Install the keel box using the keel as an aid to alignment but only 'spot glue' it in place initially. Once this glue has set do some checks to make absolutely sure that the keel is vertical and also not twisted in the fore and aft plane. When entirely satisfied you can reinforce the keel box with more glue and remove the keel to make fitting out that bit easier. Glue the lead bulb to the removed keel and put to one side till later.

Enough for now

My thinking is that this should give you plenty to get your teeth into until I return next month to talk you through the remainder of the build and get Alpha on the water. Feel free to contact me with any questions or queries via the editor@modelboats.co.uk address and the team at the office will forward your mail, they're good like that.

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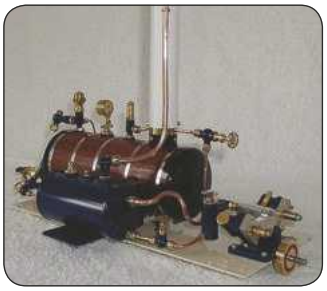

The illustration shows the "Ribbersdale" boiler mounted on a common bedplate with the "Richmond" twin cylinder steam engine and a steam oil separator. The "Ribbersdale" boiler is constructed from copper components and silver soldered. The boiler is stoved with high temperature paint at 175 degrees C. The boiler is lagged with individual hardwood planks and held by stainless steel bands. To improve the boiler performance it is fitted with a ceramic burner. The finished boiler is pressure tested to 150 psi for continuous working pressure of up to 80 psi. A test certificate is supplied with the boiler confirming the test and guarantee of quality. The boiler is fitted with a water filler bush, pressure gauge, water gauge glass and blowdown valve, safety valve, vacuum valve, steam on/off valve, ceramic gas burner, gas pipe and gas on/off valve. The white/cream stove painted chimney is pre-drilled for the exhaust pipe bracket should you wish to extend the exhaust pipe alongside the chimney.
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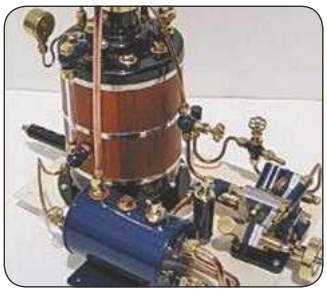
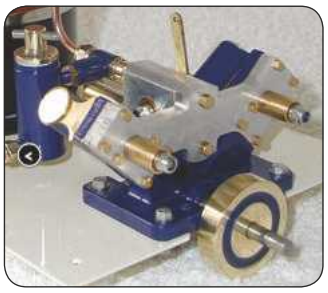


The illustration shows the "Wharfedale" boiler mounted on a common bedplate with the "Richmond" twin cylinder steam engine and a steam oil separator. The boiler can be fitted with either the "Richmond" engine or "York" engine and a steam oil separator. These can be purchased as single items. The "Wharfedale" boiler is constructed from copper components and silver soldered. The boiler is stoved with high temperature paint at 175 degrees C. The boiler is lagged with individual hardwood planks and held by stainless steel bands. To improve the boiler performance it is fitted with a ceramic burner. The finished boiler is pressure tested to 150 psi for continuous working pressure of up to 80 psi. A test certificate is supplied with the boiler confirming the test and guarantee of quality. The boiler is fitted with a water filler bush, pressure gauge, water gauge glass and blowdown valve, safety valve, vacuum valve, steam on/off valve, ceramic gas burner, gas pipe and gas on/off valve. The white/cream stove painted chimney is pre-drilled for the exhaust pipe bracket should you wish to extend the exhaust pipe alongside the chimney and also includes a polished brass flared top. This plant is suitable for installation in all my boat products with ample power to drive your boat satisfactory.
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Range Finder

Dave Wooley moves amidships to continue his tour of the Type 23 Frigate HMS Iron Duke

Just as a reminder we completed last month's tour just aft of the foremast. Moving on we can now take a close look at the area amidships. The emphasis here is on the detail in and around the various structures. There is certainly no chance of missing the crest on the side of the up-take casing which is the family crest for Arthur Wellesley, Duke of Wellington. It's worth noting how the crest is fixed to the casing. When building the 1:72 HMS Daring the crest was similarly raised off the surface and was superbly reproduced for that project by BECC **(Photo 1).**

Returning to the forward deck house structures, on the main deck level sited both to port and starboard is a jackstay hoist for replenishment at sea, or RAS as it is known. This involves keeping two vessels in very close quarters on a parallel course for an extended period and is an incredibly stressful operation that requires great skill and concentration **(Photo 2).** There are a number of superb models by commercial model makers John and Julian Glossop depicting this operation in detail in both the Portsmouth Naval Museum and Davenport Naval heritage Centre, Plymouth. They're well worth viewing.

Moving to the rear of the forward deck housing and viewing upwards towards the foremast, here we can appreciate all the support detailing beneath the walkways and platforms and the two flag lockers that extend beyond the walkway **(Photo 3).** We'll pause in this area for a moment and move over to starboard where we have a view of the SCOT-1C satcom dome. As an observation with reference to model makers it's interesting to note that the stanchions around the platform are angled inwards **(Photo 4).** Directly beneath the SCOT platform is a cluttered area comprising an assortment of electrical boxes, phones and loud speakers. As is often said, it's the small items that can make the model **(Photo 5).**

1. The heraldic crest for HMS Iron Duke.

2. Part of the elevating hoist positioned to port and starboard for use with RAS operations.

3. Looking up towards the structures abaft of the foremast.

4. At the base of the foremast mounted on extended platforms are the SCOT-1C satcom domes.

5. An assortment of fittings located beneath the SCOT radome platform.

6. On the main deck beneath the foremast. It's worth noting the different sizes of WT door.

7. Remaining in the space amidships between the forward deck housing and funnel up-take.

At deck level we have a good perspective on the arrangement of the space at the rear of the forward deck housing. Note the starboard deck winch (there's also one to port which is cropped from the image) which forms part of the equipment for replenishment at sea **(Photo 6).** Remaining within this gap between deck housings and turning 180 degrees the view is immediately forward of the funnel up-take casing. Always evident is the number, shape and size of the external vents. These, even on the most stealthy of ships, will always be evident in some shape or form **(Photo 7).**

Halmatic 24 RIB

For the first time I've managed to get a close-up view of the Halmatic 24 RIB interior which is now standard aboard the 23s and 45s. When building HMS Daring I went into detail on how to scratch-build the Halmatic 24 at 1:72 scale. However, getting the pictures I wanted at that time was difficult as the 24s where stowed in their boat galleries. Well, as luck would have it the port RIB on the Iron Duke was lifted clear of the chocks and positioned at deck level which provided the opportunity to get detailed shots from a very obliging crew **(Photo 8).** Interesting to note is that the engine can be started whilst coupled to the davits due to the fact that it has a dry running ability, thus once in the water there's no need to start up. The inflatable collar is made from a seven compartment composite neoprene tube that's 500mm in diameter, whilst the hull incorporates a combination of carbon Kevlar in its construction. The 24 is fitted with removable modular seating for up to six people with a helm position for two and a further two fixed seats forward of the engine box. Meanwhile, to assist in the safest possible launch and retrieval there's an all composite lifting arrangement with a single point lifting hook, ringed red in **(Photo 9).**

In **Photo 10** we get a clear view of the control console which incorporates engine management dials, navigation equipment, an emergency engine kill switch (ringed in yellow) and the steering wheel over to port.

8. Mounted either side of the funnel up-take casing is the Halmatic 24 RIB.

9. The seating arrangement on the Halmatic 24 RIB. Note the addition of hand grips; there's a lively ride in store!

10. Over to port is the steering position whilst starboard is for navigation.

11. A sliding rail system ensures that the entire heavy-duty collar can be easily removed from the rigid hull.

12. A view of the transom highlighting the water jet and the capsize reversal system fixed to the back frame.

Photo 11 gives us a detailed view of the bow arrangement with the 175 litre fuel tank situated under the deck. Finally, at the transom of the 24 we get a good perspective of the Hamilton HJ241 water jet unit (ringed yellow in **Photo 12)** that's powered by a single six-cylinder Yanmar marine diesel, the whole capable of producing around 39 knots, although it's not specified whether this is at full load or empty. Mounted on the small frame aft is a blue flashing light, coms aerial and also an inflatable self-righting bag ringed red. For those interested in scratch-building a Halmatic 24 a full build sequence was provided in the September and October 2014 issues.

Seahawk EOFCF & TDS

Moving up to the rear of the funnel casing, **Photo 13** exposes a considerable amount of detail, for example how the aerial lines are tied in to the insulators and the funnel casing. Within this area (ringed in red) is the MSI Seahawk Electro Optical Fire Control System linked to the 30mm guns to provide control capabilities against not just air targets but fast inshore attack craft **(Photo 14).**

Adjacent to the Seahawk EOFCF is the is the Target Designation Sight (TDS). You'll see that at the head of the sight is a pair of binoculars, the height of these being adjustable to suit the operator, and at the top of the pedestal an illuminated bearing scale allowing the operator to align the sight with a given target bearing **(Photo 15).**

Our final shot for this month **(Photo 16)** pans back to show the area separating the funnel exhaust housing from the main mast deck housing. Clearly visible within that deck housing are the doors ringed in red enclosing the fixed twin 324mm ASW Torpedo tubes.

13. A shot abaft of the funnel up-take exposing the various vents and the electro-optical fire control system.

14. The Seahawk Fire Control, linked to the 30mm guns.

15. BELOW: In tandem with the Seahawk is the plinth supporting the Target Designation Sight.

16. RIGHT: A general shot to starboard of the area moving aft from the main mast.

The four-masted full rigged sailing ship Peter Rickmers.

Ship-rigged sail control

Neville Wade discusses his tried and tested method for square-riggers

Having been interested in the real thing since childhood, in 2005 I decided to try my hand at the building and sailing of a radio-controlled square-rig sailing ship. As luck would have it, it all worked, and rather well, indeed since then, eleven more similar square-rig sailing ships have left my shed, some of which are used here to illustrate this article.

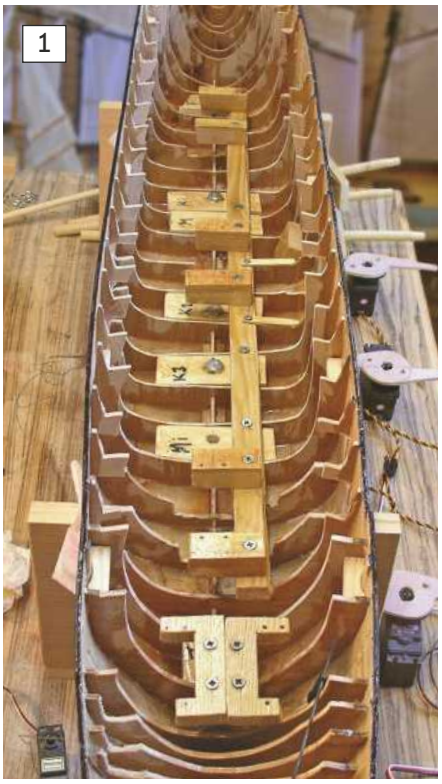
When sailing one of these models, the usual question asked by spectators is: "How do you make the sails move, to catch the wind?" This was a question that, prior to 2005, had occupied me for quite a while until a book called 'An Introduction to Radio Controlled Scale Sailing Models' by Phillip Vaughan Williams came into my possession. In said book are many excellent tips for all manner of subjects relating to 'Scale Sailing Models' not least the control of the yards of a sailing ship. One of the methods described, near as damn it, the way in which real multi-masted sailing ships and their crews did it all. So, I decided that this was the way forward and the following is an outline of how the system works in miniature.

Mock-up

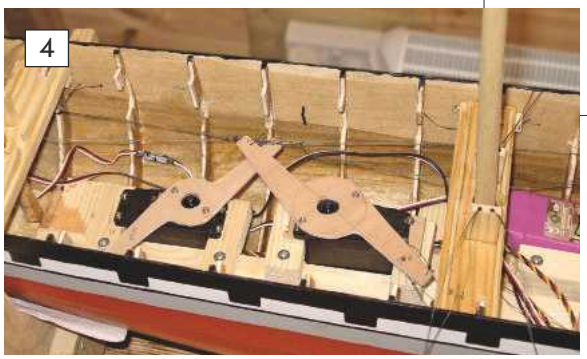
The square sails on a 'square-rigger' are the ones carried on the spars called 'yards', which are set at right angles to the line of the ship's hull. On a real sailing ship, they are rotated in the horizontal plane, by 'braces', attached to the ends of these yards. The braces are led to the next adjacent mast, usually (but not always) astern of the one whose yards are to be turned, the terminology for this being 'braced'. They are then led down to the deck from where they are actually hauled to get the yards, and therefore the sails, to the correct angle required by the wind's direction and the vessel's desired direction of travel. As is always the case with something like this, a mock-up is as good a way as any to check if the concept seen in Mr Vaughan William's book would actually work.

The mock-up was simply two pieces of plywood, one simulating a deck and the other the bottom of the hull, between which were fixed two servos. Each servo had a home-made centrally pivoted arm, to the

A hull ready for servos...



...And again with the electronic hardware fitted.



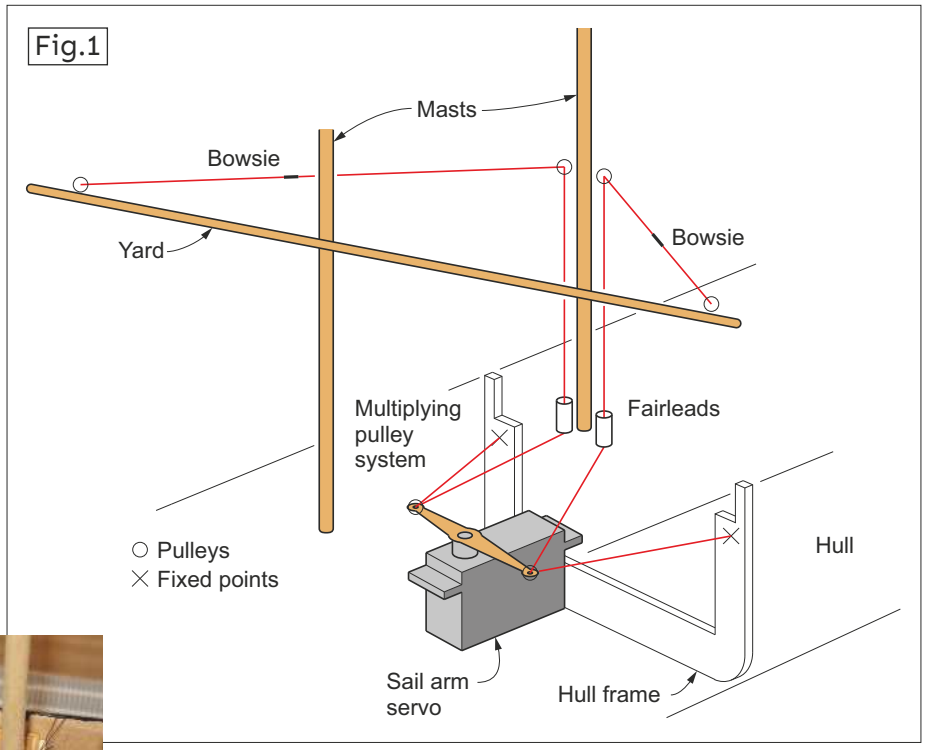


Figure 1. A diagrammatic representation of the braces for one yard on one mast.

3. Three sail arms for the control of the yards on three masts.

4. Each servo arm has two braces per side, one for the bottom yard and one for the top.

ends of which were attached lengths of free running fisherman's braid or, in other words, fishing line. The masts were made from dowel and yards hung on them using hooks and screw-eyes, which enabled them to 'brace' round far enough for the initial tests. The pieces of braid were led up through holes in the deck, then up the masts to screw-eyes and, finally, across to the yards of the mast in front, where they were tied-off.

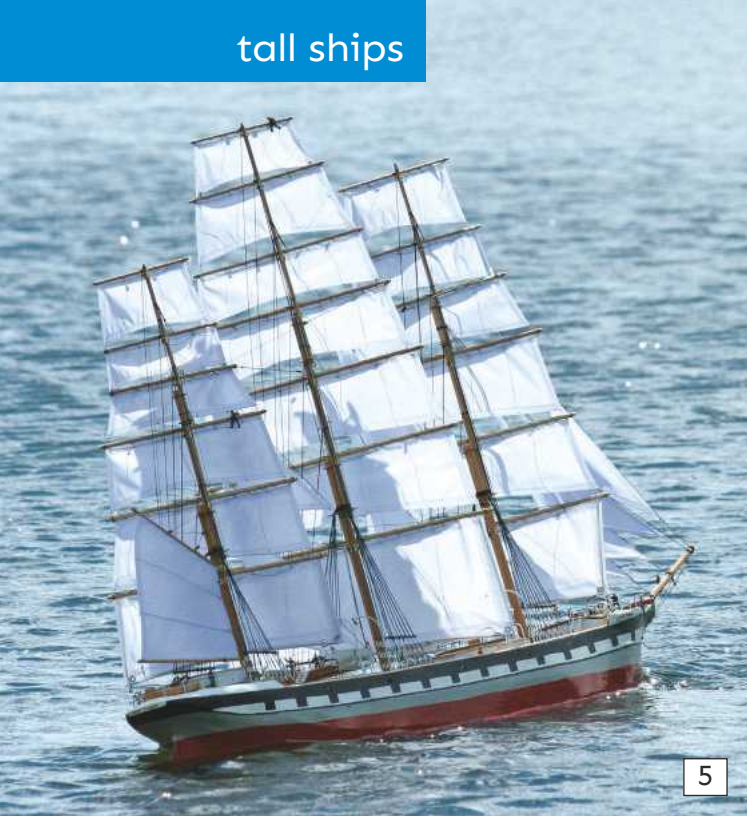
With the whole contraption set up to use one servo for the operation of a single yard on the foremast and another servo for the yards on the main and mizzen masts, it was ready to go. As you will by now have deduced, it worked, for if it hadn't, you wouldn't be reading this article. Mind you, it was crude, not least because it didn't move the yards round very far due to the lack of servo arm travel etc. However, it was certainly good enough to commit to building that first square-rigger in 2005 and much was learned from it and improvements incorporated in later projects.

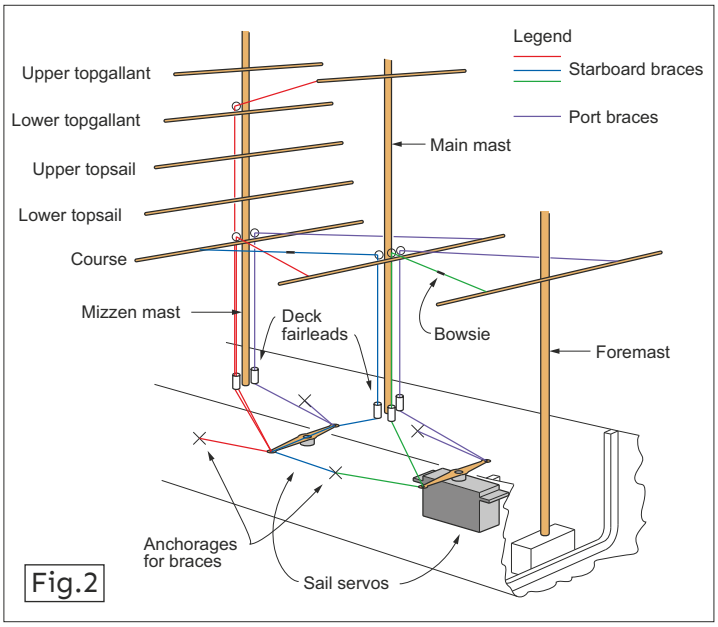
Since then...

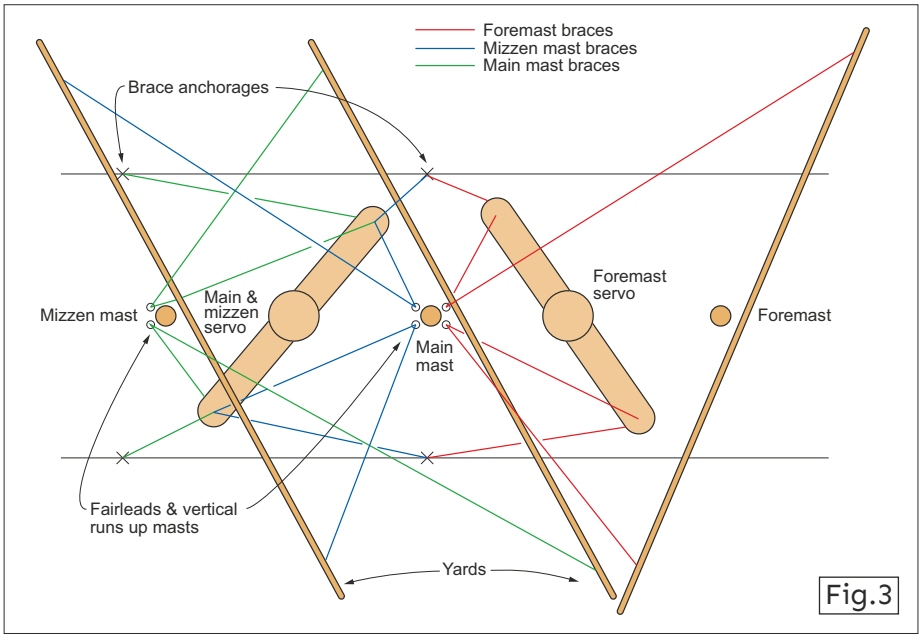
Model sailing ships of this type have to carry a heavy (often removable) keel because they would otherwise simply capsize. As a result, they generally have robust hulls with large wooden blocks in the bottom to carry the keel and step the masts. Over the years, different methods for fixing the sail control servos (which have long wooden arms to operate their related brace) have been tried, although the current method is what you see here. Inside the hull, on the aforementioned wooden blocks, a length-wise batten is fixed to practically the whole length **(Photo 1).** Further pieces of wood are then fixed to this to which the sail arm servos are attached **(Photo 2).**

There are two important differences between this installation and the mock-up. One is the way in which the braid is attached (the line which makes the braces) and the other is the type of sail control servo that's used. In the mock-up, the braces were connected directly to the ends of the centrally pivoted servo arms. When attached like this, a yard will move only the same distance as the ends of the arm, which is not enough. You see, it's vital that one is able to brace round the yards to within 30 degrees or so of a hull's centreline. To achieve this the answer has been to adapt something that I believe R/C model yachtsmen use, namely a multiplying pulley system. **Figure 1** is a diagrammatic representation of this concept and the braces. This drawing shows the layout of a pair of braces for one yard on one mast. In addition to the below deck arrangements already described, the run of the braces above deck can also be seen. They go up the adjacent mast to a height that's level with the yard they are to operate. From here they go around pulleys (actually screw eyes) and then across to their yardarms, passing through a bowsie en route. At the yard, they go around pulleys (made from fishing swivels), attached to it via loops of cord and then return halfway back to the adjacent mast, where they are attached to the bowsies. Thus, each brace can have its length adjusted and on each mast there are two sets of braces, one for the bottom yard and one for another near the top. So, the 'bracing effort' is spread all the way up. Finally, and this is important, the braces attached in this fashion can be released at either end from the servo sail arm and its related yard arm by opening the 'gate' of the swivel (or snap link), and detaching it from its related loop of cord. This facilitates an easy change of the sail arm, or the brace itself. After running the pairs of braces for a mast, it is a simple matter to set them up by squaring the yards, centring the sail arm in the middle of its rotation, and adjusting the bowsies to achieve the required arc of travel for the yards. **Photo 3 and 4** shows the hull installation of such, showing their runs from fixed attachment points, through swivels attached to the ends of centrally pivoted servo arms and thence through fairleads and on up the adjacent mast. Identical braces are fitted to all three sail arms, two per side for each mast, a total of twelve in all. The actual braces (thin black cord) can just be seen in Photo 3 laid over the hull's port and starboard sides, pending the arrival of their related yards. One set of braces for one mast obviously doesn't amount to all that is required for a sailing ship which, of course, could have two, three, four or even five masts. The type of rig that a model has, and the number and arrangement of its square-rigged masts, will alter the way in which the braces are arranged. Anyway, **Photo 5** shows Mount Stewart using this system out on the water.

The second change from the original mock-up was arrived at after trial and error, and







5. The wool clipper Mount Stewart, its mechanical parts shown in Photo 3.

Fig.2 - Diagrammatic representation of the braces for a three-mast fully-rigged sailing ship.

Figure 3. The sail control mechanisms for a three-mast sailing ship, viewed from above.

that is to use the most powerful servos one can readily purchase and to make one's own sail arms for them from wood, as can be seen in the photos.

Three mast

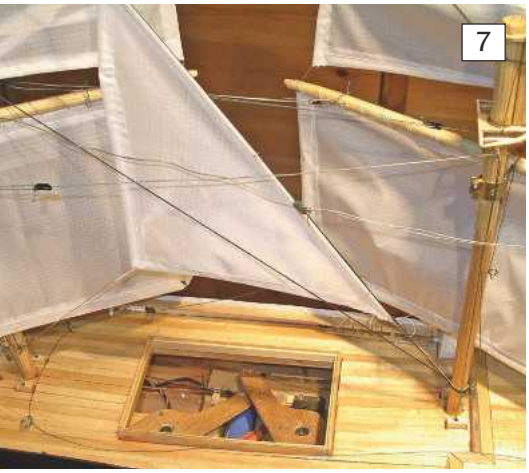
Adopting the systems and principals above **Figure 2** shows a diagrammatic representation of a three masted full rigger with square sails on all its masts, the aft sail arm servo between the main and mizzen masts operating the yards on them either side of it, with the related braces running fore and aft. The forward sail arm servo, meanwhile, operates just the fore mast yards with their braces running aft from it and up the main mast. **Figure 3** is a diagrammatic representation looking down on the whole thing when moving the yards. It looks a bit complicated but actually isn't once one understands the principles of it all. In **Photo 6** the three masted model, the Joseph Conrad, can be seen under way using a system identical to that shown in Figure 1 and Figure 2.

Overlapping sail arms

Where the gap between the masts is large enough it is sometimes possible to fit two sail arm servos by overlapping them so as to separately operate the yards on individual masts. **Figure 4** is a representation of this concept and **Photo 7** shows it fully installed. Note that in this last picture, the pulleys made from screw eyes, the swivels at the yard arms, and the bowsies, can clearly seen.

Five mast

A ship such as this is perhaps the most difficult to build as a fully functioning R/C model,



7. An overlapping servo sail arm installation. Please note the relationship of the angles between these arms and the yards, remembering that the sail arm on the right controls the yard on the left and vice versa.

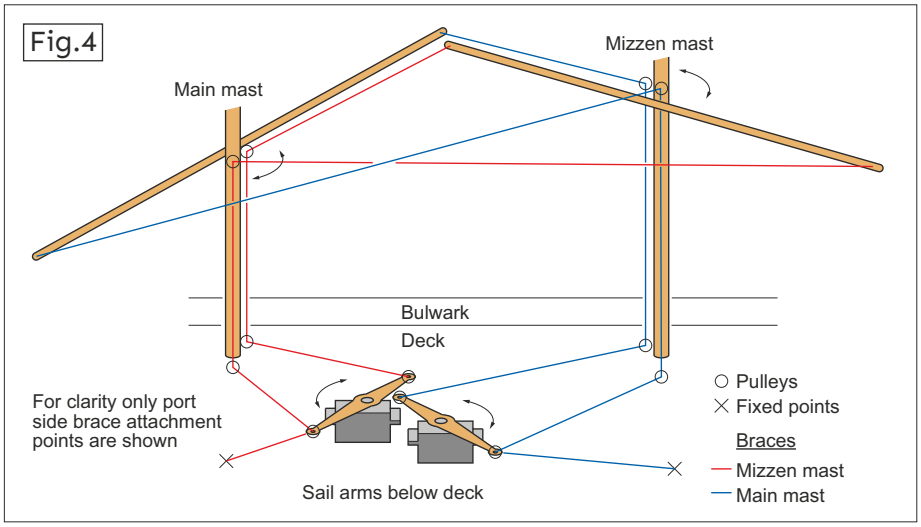


Figure 4. If space is tight it is possible to have two servos and their sail arms overlapping as shown here.

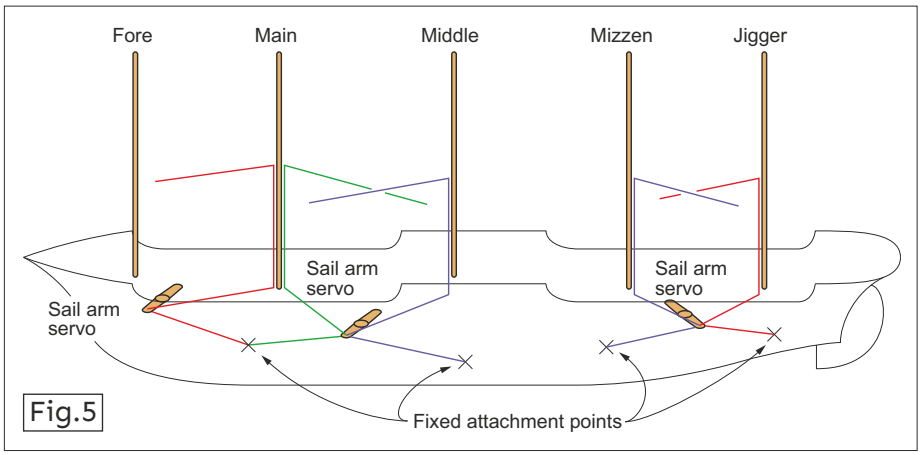


Figure 5. The ultimate sailing ship model with five masts! There are three servo-driven sail arms; one for the foremast, one each for the main and middle masts and for the mizzen and jigger.

Figure 5 illustrating the complexity of the sail control arrangements, although the principles are much the same as for a ship with fewer masts. Just to prove it is all possible, **Photo 8** is a model of the German five-masted sailing ship Preussen, underway with full radio control. The remaining photos show a variety of the sailing ships that have been built in recent years, illustrating the different angles to which yards have to be braced for a square-rigger to make forward progress.

Control of the sails on all these models requires a different approach to the conventional use of the transmitter controls. Most of the dual axis stick return springs are removed, but then have ratchets fitted to them, which helps a good deal. The choice of which stick to use for which mast and its sails can also make a considerable difference to the ease with which a sailing ship can be persuaded to make progress across a pond. Some of the sailing manoeuvres involved – for instance that of 'tacking ship' – require the yards to be braced around in a very specific way, so it's important to try and make the transmitter controls as intuitive as possible, indeed we'll continue this discussion with a forthcoming article on the actual sailing of a square-rigger.

Full control

I hope the above has shown that no problem is ever insurmountable and that a square-rigger with a full sail set, sailing at speed under proper radio control, is a sight to behold. **Photo 9** perhaps shows what it's all about with the foremast yards of Peter Rickmers taken aback during tacking, just like the real ship, and only possible by having individual control of the sails on each mast. Mr Vaughan Williams' book was the stimulus for me to concentrate on building these fascinating ships from a bygone era and I have to say that there is much still to be learned from books rather than just using the internet to solve a problem.

Preussen, with her five masts, on the water.

One of the reasons for separating the sail control between the masts. Here, the foremast yards of Peter Rickmers are taken aback during tacking, just like the real ship.

TAI KOO IV

Phil Scales puts his stamp on a fourth dynasty multi-task diesel tug

The tug TAI KOO IV was the fourth to bear the name at Hong Kong Salvage and Towage Ltd. and the first diesel tug of that name. TAI KOO means 'Great and Venerable' in Cantonese. Built in Japan to the company's own design the tug served Hong Kong Salvage and Towage from 1993 until 2004 and had two identical sisters.

My reason for building this particular vessel from scratch was mainly because I've been aboard her and some of her sisters in Hong Kong while both ship-handling and on standby. One particularly exciting and memorable duty involved running close, very close, alongside a 100,000 ton tanker at about 9kts for several miles as bow tug and then docking it at the oil terminal as a three tug operation.

TAI KOO is quite large at 35 metres long and has a multipurpose function in that she can do normal ship-handling or deep sea salvage and rescue and is equipped accordingly. She is also fitted for FiFi 1 firefighting (with three powerful mast-mounted monitors), can carry out anti pollution duties using side booms, has a stern roller and tugger winch for anchor handling and can, if needed, carry two twenty foot containers aft.

With two Yanmar diesel engines producing just over 4000HP she has a bollard pull of 55 tons, a top speed of 14 knots and she is very manoeuvrable. Fully air conditioned inside and very colourful she makes a most impressive sight.

Modified moulding

To make the model I had a number of reasonable pictures, plus the benefit of my own on-board shots. I also had the Jim Pottinger article and 1/50th plan along with 100 or so invaluable close-up on-board photos provided by her then shore manager Alan Lloynd.

The hull, to 1/35 scale, is a modified Mobile Marine moulding of Rowangarth / Eldergarth. With some alterations to bulwarks (including complete replacement at the stern) and provision of a stern roller, this hull proved a perfect size and shape. The superstructure is largely from 1mm and 2mm plasticard, the reverse angles of the bridge being quite tricky. Speaking of which, the bridge is fully detailed inside with all relevant equipment and a helmsman, Cap't Chan. Both the winches and the davits, crane, RIB etc. were scratch-built, mainly from plasticard, and are fully detailed. The bow roll fender is a piece of hydraulic hose and the segmented fender is cut from an insulation mat and is complete with fixing bolts. The complex mast, meanwhile, is from plastic tubing and sheet with sprue railings and with all fire monitor pipework included. All lettering including the Chinese characters are from vinyl as are the hull markings.

This very colourful tug is entirely brush painted in Humbrol enamels and particular care was needed to mix the correct shade of hull grey to be authentic. A Hong Kong flag is flown from the mast and all crew members

ABOVE: Close-up of the bridge showing the multiple angles. Note the detailed life ring and strobe buoy plus the red and green deck lights. The bridge interior can just be seen.

are correctly shown in orange boiler suits and with hard hats on the foredeck. Why do the deck lights come in red and green? A common question. The green lights are mains lights from the generator and the red ones are battery emergency lights, so now you know.

The tug is on four-channel 2.4GHz control, including two steerable nozzles and a working bow thruster. Power is from two 12V large Buhler motors driving 85mm props in 90mm resin nozzles. It has strong eye bolts in the fore deck and a reinforced bitts at the stern to undertake quite heavy towing. As you can probably imagine, she sails particularly well with great power and presence and just like the real tug dips her stern quarters below water in steep turns, hence the water on deck.

ABOVE: Port side view showing the fire hydrants plus detailed life rafts, boarding light, side tyres and deck crane.

BELOW: Bow view showing the forward ship-handling winch. Note the two air conditioning boxes and bridge roof detail.

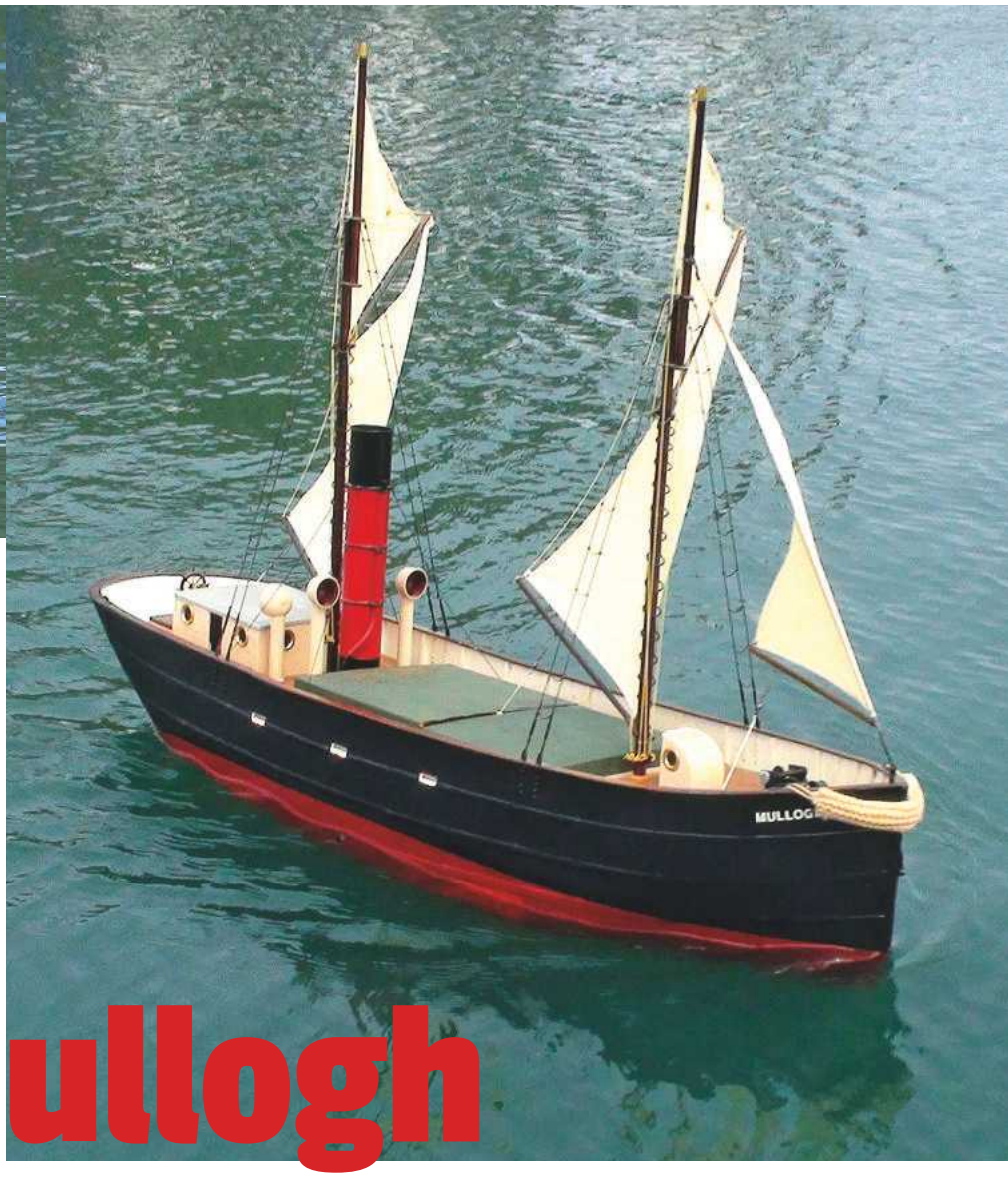
The stern towing deck with main towing winch, tugger winch, stern roller and hydraulic pins, all to allow anchor handling.

A general side view showing the layout and colour scheme. Note the two main winches.

ABOVE: The foredeck area and ship-handling winch with two crewmen engaged in rope handling.

LEFT: General view from the stern quarter showing the layout and main winch deck.

BELOW: Close-up of the stern towing deck showing the winches, deck crane, container lashing eyes, spare anchor and various stowed items.



ABOVE: The result of all my labours has been a unique model that's almost totally scratch-built.

RIGHT: I'm delighted to report that the sails work very well at powering such a big and heavy tub of a model.

With the build complete and all boxes ticked, **Phil Button** is lake-bound with a morning of steaming and sailing in his sights...

S.S. Mullogh

I had chosen the boating lake at Sheringham (in Norfolk), the year was 2014, the month September, the day warm with a stiff breeze blowing. The auspices were good for the first voyage under sail.

After setting the steam / sail switch to the sail position and checking all radio control functions, the model was put in the water and allowed to sail away. The sails worked very well at powering such a big and heavy tub of a model, however the rudder gave negligible control of where she went. It was clear that the rudder needed the propeller wash for effective steering, especially as steering under steam power had previously been brilliant. This implied that the water flow past the rudder when under sail was nowhere near sufficient. A practical possible solution would be to make a rudder extension that could be fitted over the rudder for use when sailing.

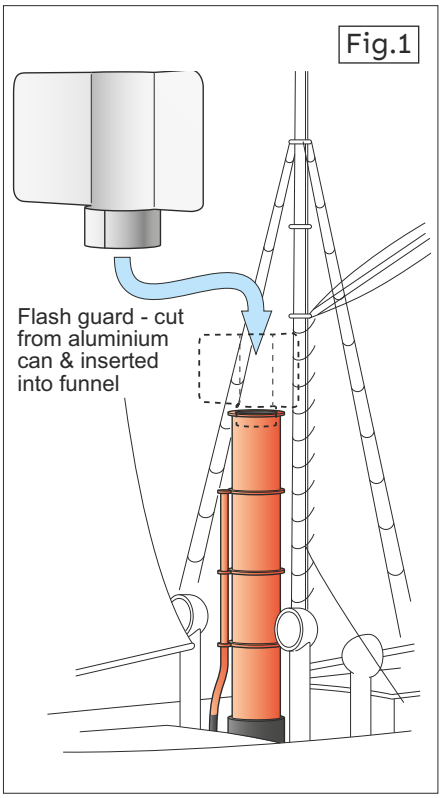
As sailing was clearly now not possible in this initial configuration, I switched over to the 'steam' position and made ready to operate. Having filled the boiler with water and the engine lubricator with steam oil, the gas was turned on and the burner lit from the top of the funnel. But disaster (with a capital D) swiftly followed! The flash of flame at the top of the funnel burned through some of the rigging on the mainmast which, to be fair, is pretty close to it. One lives and learns!

Temporary repairs were made to the rigging whilst waiting for steam pressure, then the engine was oiled all round and the radio control functions checked for their correct operation. When steam pressure was available, the regulator was opened fully and the engine turned over by hand to expel any condensed steam to the oil interceptor. The regulator was then closed to wait for the safety valve to lift as a check that it was working – they do sometimes stick. With this, the model was returned to the water and we (the model and I) then enjoyed a terrific morning's boating.

Another difficulty that become apparent now that the sailing rig had been installed was that the boiler water level sight glass had become very difficult to see; the sails made it hard to get one's head into the right place. This was particularly problematic in bright sunlight as the gauge is underneath part of the deck.

Remedial actions

So, as a result of my semi-successful morning at the lake, three important changes had become necessary:

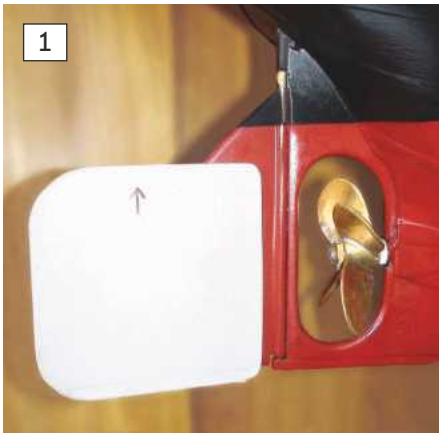


1. Improve the response to the rudder when under sail.
2. Prevent incineration of the mainmast rigging when lighting the boiler.
3. Significantly improve the visibility of the boiler water level gauge.

To start, a large rudder extension was fabricated from several layers of white plastic sheet, glued together with a shaped space between the two outer layers so that it was all a tight fit over the existing rudder, but only to be used when sailing **(Photo 1).** The arrow is to ensure that I do not try to fit it upside-down and, of course, eventually it will be painted black so that it's not so obvious when in the water.

After a bit of thought, the answer to the flame flash on lighting the boiler was a simple temporary guard cut from an empty aluminium aerosol can. The lower part of the guard has two curved wings that are a push fit inside the top of the funnel and the upper part keeps the flash away from the mainmast rigging **(Figure 1).** The flash guard is simply slipped into the top of the funnel for lighting the boiler and then removed when it's done its job.

Following further sailing trials at Alvaston Park in Derby (home of the Alvaston Pirates MBC. And, yes, I do get around) these remedies proved successful. Incidentally, when not in use, both items are stored in the radio control compartment in the forward hold so they're always with the model.



TOP: The sailing rudder extension is simply a tight fit over the existing rudder. It works well.

LEFT: That lifting handle, bolted securely to the bulkhead. Note the aluminium flash guard stowed in the forward section (bottom right of the picture).

To improve visibility of the boiler water level gauge, a metal screen was fitted around three sides of the glass tube. The screen was painted with diagonal black stripes, following full-size locomotive practice. When the stripes are seen through the water-filled part of the sight tube, they are refracted and their apparent angle changes, making it easier to tell where the water level is. Also, to help in overcoming the darkness inside the hull, a white LED was added close to the water gauge, powered from the radio receiver battery pack **(Photo 2).** This picture also shows the 'bent' diagonal lines for a full boiler).

As a final modification, since S.S. Mullogh is rather an awkward lump at an all-up weight of 20kg, a lifting handle was added inside the radio control compartment, underneath the forward cover of the main hatch **(Photo 3).** This was an old chrome-plated handle that had been salvaged from somewhere (no idea where) and was fixed to the bulkhead by two bolts. As it turns out, the handle has come out fairly close to the balance point of the model so most of the lift is by the handle, with a steadying hand under the curve of the stern.

Conclusion

The result of all my labours has been a unique model, almost totally scratch-built that steams and sails superbly well and is a pleasure to own and operate. The biggest drawback is her all-up weight of 20kg, particularly as I'm not getting any younger, but this has been overcome by the use of a folding shopping trolley (£9.99 from Aldi) to transport it from the car to the lake. The use of simple webbing strops is a bonus when launching as this avoids straining my back.

Postscript

Since writing this article, there has been an 'incident' in which the engine stopped running when out on the lake and so stopped using steam (and therefore driving the model) with the gas still turned on. By the time she was recovered, the boiler had run dry and the excess heat had turned the boiler lagging to charcoal and scorched some of the inside of the boat. As a result, the model has now been fitted with a radio-controlled gas shut-off valve so that one can turn off the burner remotely if it ever happens again. See 'Shutting the Stable Door' in the January 2016 issue for details.

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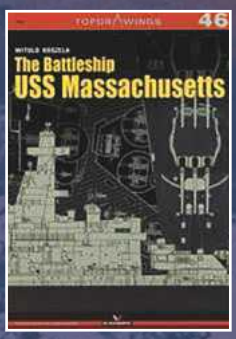

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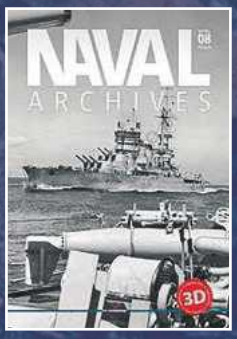

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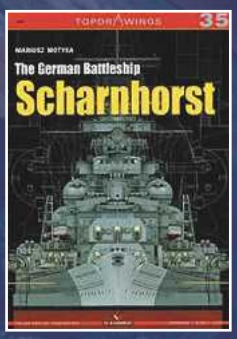

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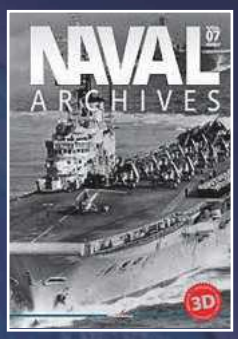

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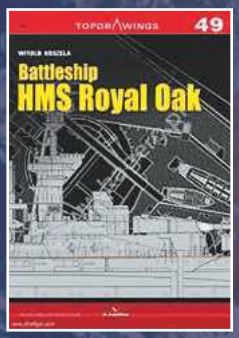

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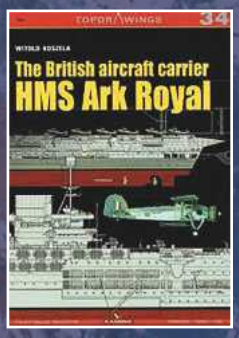

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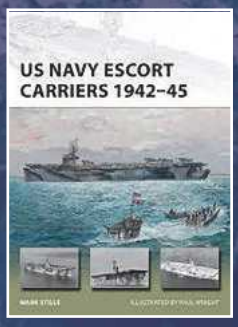

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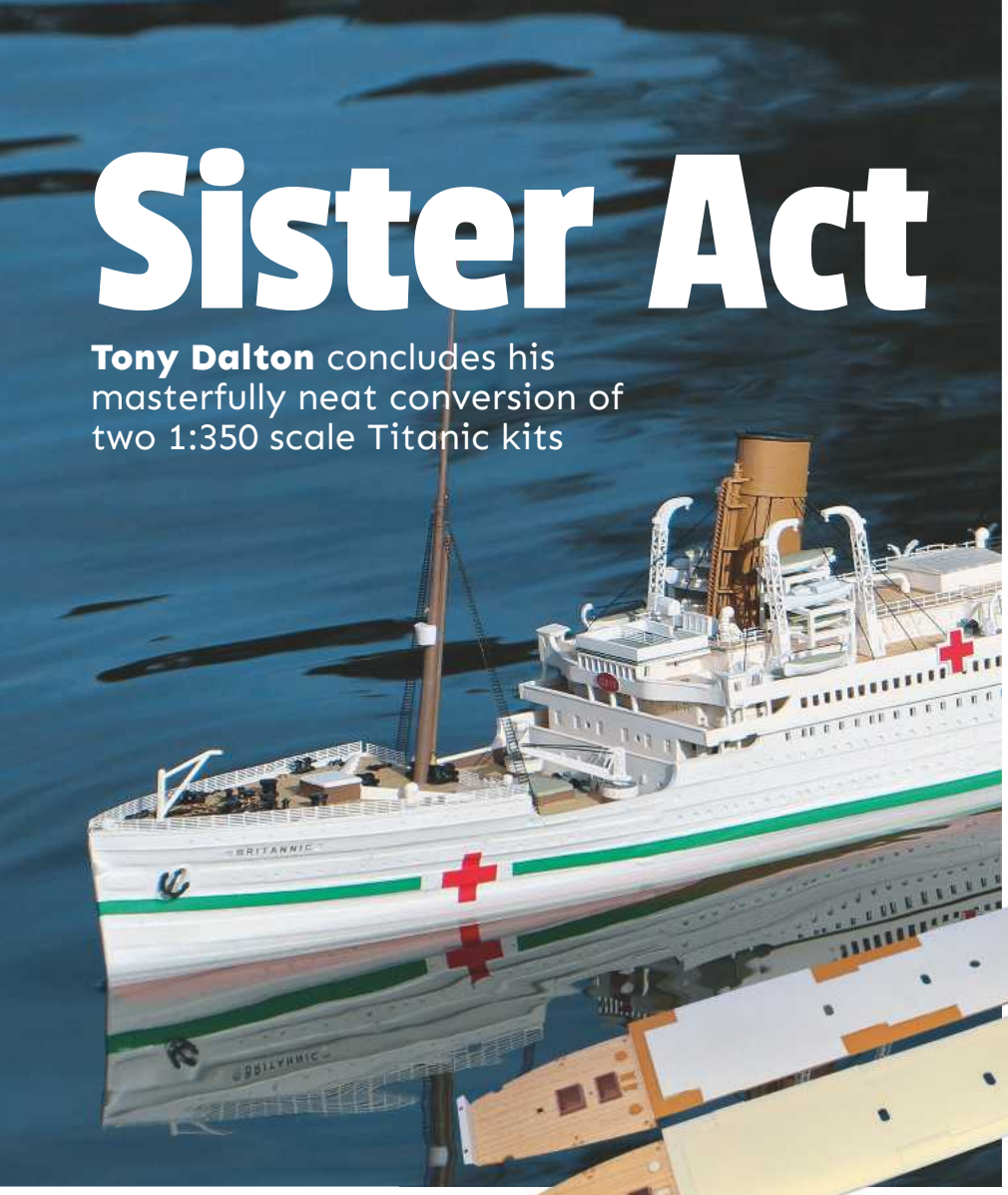
26008 Higgins PT Boat	£16.99
26010 USS Kidd	£11.99
26011 USS Massachusets	£11.99
34001 USS Arizona Squadron at Sea	£16.99
34002 USS North Carolina Squadron at Sea	£16.99
34003 USS Texas Squadron at Sea	£16.99
34004 USS Saratoga at Sea	£16.99
34005 USS Lexington at Sea	£16.99
34006 USS Alabama at Sea	£16.99

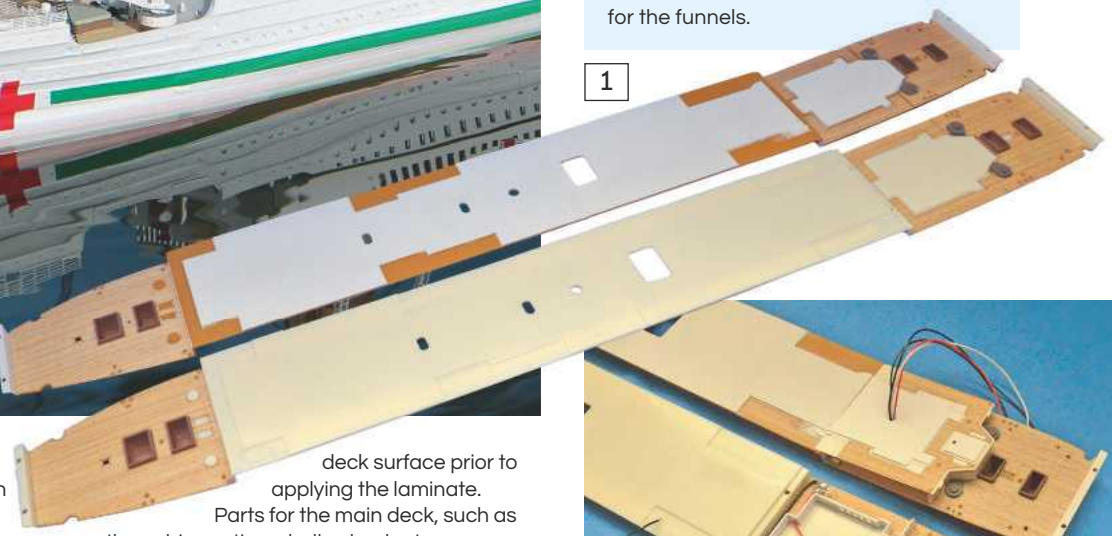
Sister Act

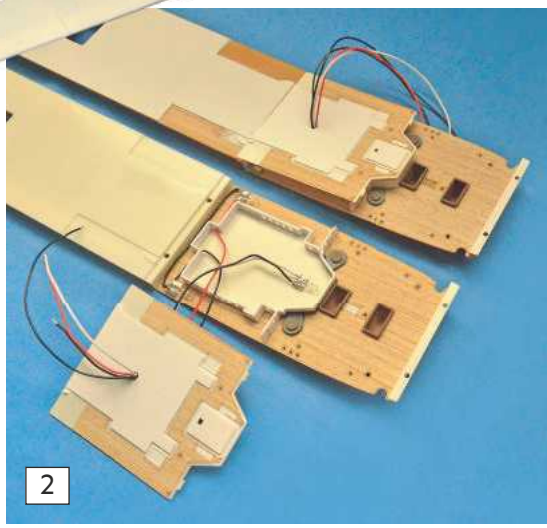
Tony Dalton concludes his masterfully neat conversion of two 1:350 scale Titanic kits

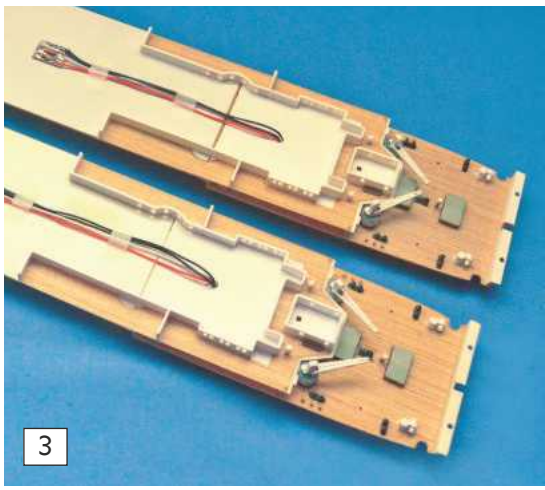


NO-ONE REALLY KNOWS

Any reference to paint colours in this article is purely generic as there are two pages in the Minicraft instructions devoted to colours and descriptions of the paint. Add to this that the Titanic Forum devotes even more pages and goes into detail about how to mix paints to achieve what is thought to be the correct colour. My favourite is 'White Star Buff', which suggests that Harland & Wolff mixed its own paint colours. Mind you, during W.W.II all such information pertaining to the construction of these ships was destroyed during bombing raids. As the Titanic Forum concludes, it is very much up to the individual modeller as to what shade of dull red / brown one uses for the funnels.







Welcome back! We're currently part way through the conversion of an old Entex Titanic kit to an R/C version of the hospital ship Britannic, alongside a similar R/C conversion of the Minicraft Titanic kit. I'm building them in parallel and from the outset I decided that each should be treated to the etched brass detail set (supplied with the Minicraft kit only) and the after-market laminated decking sets. In the last issue we built the hulls and installed the running gear, electrics and the main deck before giving both models a lick or two of paint. On, now, to the superstructure...

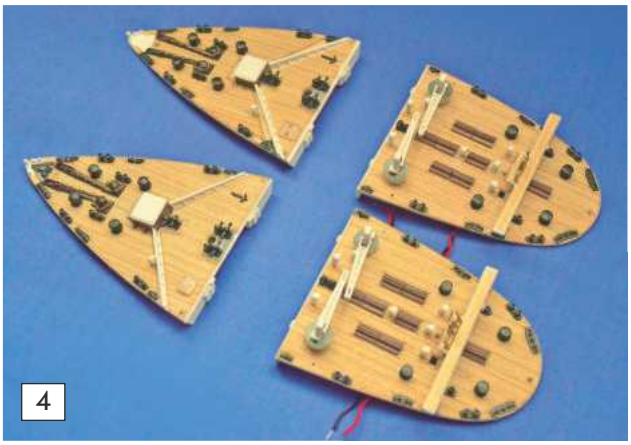
Plastic modelling

The upper deck and superstructure of each model is probably the more complex part of the construction. Starting with the main deck, the cabin areas were painted white, the crane mounts painted grey and the hatch openings in both the well decks painted brown. When the paint was thoroughly dry, the appropriate sections of wood laminate decking from the after-market accessory packs were peeled from their film backing sheets and glued in place on the well decks **(Photo 1).** Note that whist the decking used is self-adhesive, experience has taught me not to rely on this alone as over time it has a tendency to lift and buckle. To ensure it remained firm, I applied very fine lines of cyano along the deck surface prior to applying the laminate.

Parts for the main deck, such as the cabin sections, bollards, cleats, pumps, benches and hatch covers were identified and removed from their sprues, cleaned of any injection moulding marks and suitably painted. Where required, laminate decking was also added along the way.

LED lighting for the aft cabin was added before finally fitting the roof, **Photo 2** showing the lighting of both vessels, with and without the roof assembly in place. **Photo 3,** meanwhile, shows the terminated wiring and a hint of the remaining cabin sections glued into place on the main deck.

The fore and aft (poop) decks were the next items to be assembled. Parts such as cleats, bollards, anchors, bench seats, hatch covers, winches, cranes and skylights were all identified, cleaned and painted. I decided to add some LED lighting to the underside of the aft deck wherein a couple of small LEDs, resistors and associated wiring completed this job. The deck laminate was bonded to each of these decks before all the individual small items were fitted and glued in position. It was while fitting the laminate decking to the fore decks that I noticed a difference between the two kits in that their breakwaters were at completely different angles from the centreline. Two laminate decking sets to suit the Minicraft kit (nothing available for Entex)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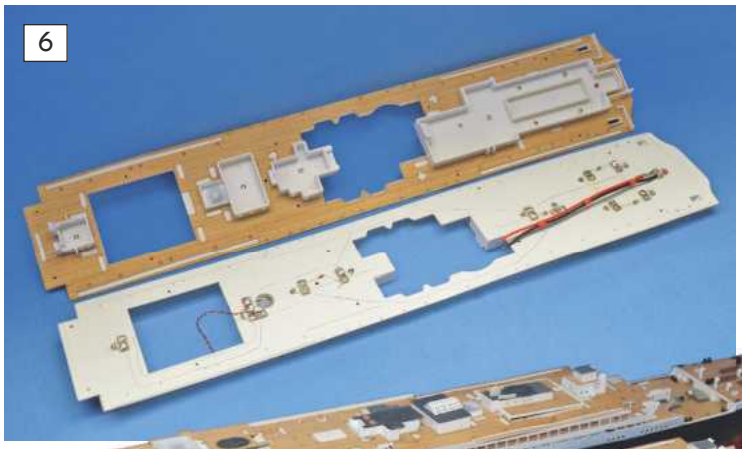
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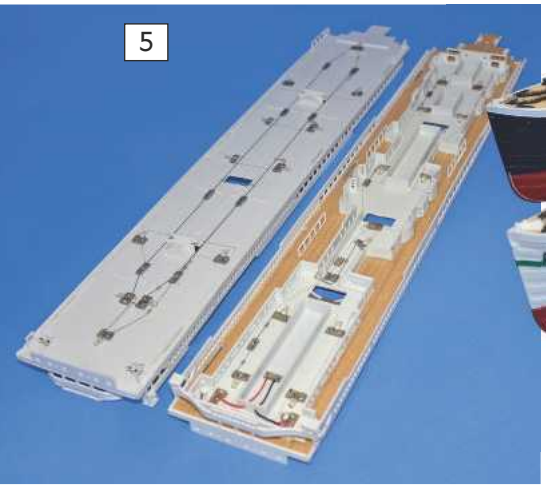
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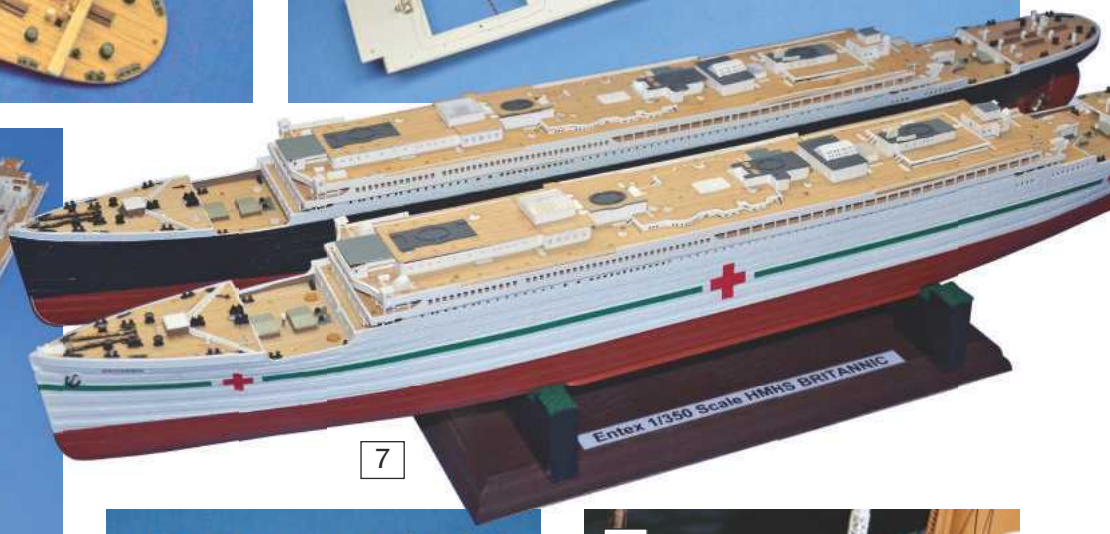

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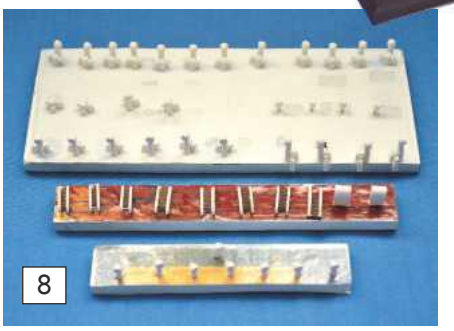
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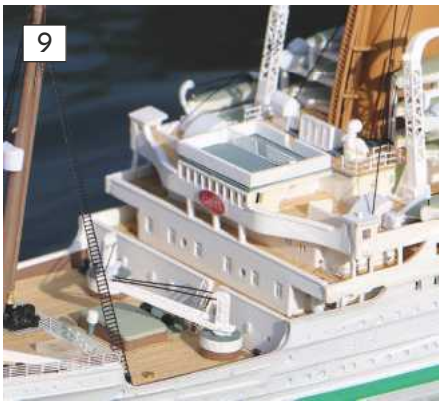
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had been purchased on the assumption that they were identical, so it was necessary to manually cut the laminate in order to fit it to the Entex (Britannic) foredeck. Close inspection of the completed decks **(Photo 4)** will reveal this modification.

With the main, fore and aft decks now basically completed, they were fitted and screwed into position on their respective hulls.

Upper decks

The promenade deck was next in line for attention. Each was being built as a stand-alone sub-assembly which, when complete, would be screwed to the main deck and, thus, removable. As with previous assemblies, all necessary cabin parts were identified, cleaned and painted. The promenade deck was weighted down on a flat surface before gluing the cabin sides into place, first the port side and then the starboard side, which was done in order to try and remove the slight bow in the deck piece. With both sides bonded in position the remaining cabin sections were trimmed to fit and glued. When this was complete, the laminate decking (yes, more of it!) was trimmed where necessary and bonded. LED lighting was then added to the deck unit which took a lot of planning, things to consider being the direction and position of each LED (with a maximum of three LEDs in series – everything running from a 7.2 volt battery) and the routing of the interconnecting wiring. The final design encompassed running two supply lines (one positive and the other negative) down each side of the deck. These supply lines were mounted on small pieces of copper laminated board, as were all the LEDs. Each set of LED lights has its own series resistor. Also included in the wiring were the port and starboard navigation lights which took the form of small chip LEDs with fine tin / copper wires attached. The assembled promenade deck, showing both the deck sides complete with LED wiring, is shown in **Photo 5.**

The boat deck itself was straightforward in that it only required a couple of coats of white paint, after which the wood laminate decking was applied. That said, the sub-assemblies required individual masking to allow different colour paints to be applied before the wood laminate decking could be placed in position. Having assembled each boat deck, its LEDs and associated wiring was added using the same technique as the promenade deck, except that holes were drilled in the deck and all the LEDs were inserted into these to illuminate the superstructure on the other side **(Photo 6).**

With the assembly and wiring of both individual decks complete, they were trial fitted together, revealing a small problem in that the boat deck, which was not intended to be glued to the promenade deck, would not sit completely flat. To correct this, ten 12BA tapped spacers were made and placed in position between the two decks. These

Suppliers

Minicraft Deluxe Titanic Kit:
Amazon

Etched brass rails & ladders:
Tom's Model Works

MFA 140 DC motors:
Component Shop

Mtroniks Viper Marine 20 ESC:
Howes Models

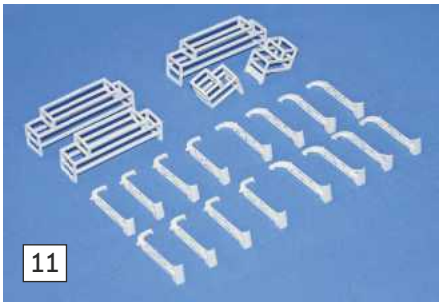
Artwox Models, wood decking:
Free Time Hobbies

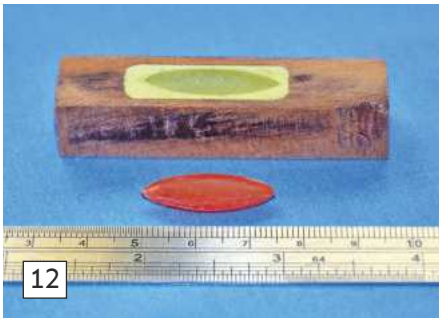
Brass propellers:
The Prop Shop

BECC vinyl labels:
Cornwall Model Boats

Bonded polyester thread V69:
Point North Profabrics

Gantry davits for Britannic:
Shapeways





secured the boat deck to the promenade deck and minimised any distortion between them. The decks could now be wired together to complete the LED installation. Additional wires were added to the aft lighting termination point allowing connection to the R/C switch. With the assembly and wiring now complete, the promenade and boat deck assemblies could be trial fitted into position on the main decks **(Photo 7).**

Fittings

There are many small parts in both kits that require removing from their sprues, cleaning and painting, indeed an example of them is shown in **Photo 8.** These parts have been mounted on strips of wood using double-sided tape to allow them to be painted. The plastic moulded access ladders shown in this picture were later discarded in favour of more delicate etched brass types.

Fitting the Welin davits to the Titanic (Minicraft) was very simple, as there are slots in the boat deck where the sets of davits are to be fitted; two sets (of 8 davits / 4 boats)

on either side making a total of 16 lifeboats. However, the Welin davits on the Britannic (Entex) were totally different in both quantity and layout. To start, the existing slots in the deck were filled-in and covered with strips of wood laminate. The two davit sets were then modified to produce one set (of 12 davits / 6 boats) on either side. The missing solid guard rails, where the original davits were positioned on the Titanic, required building-up using strips of plasticard before placing the modified davit assemblies into position on the boat deck.

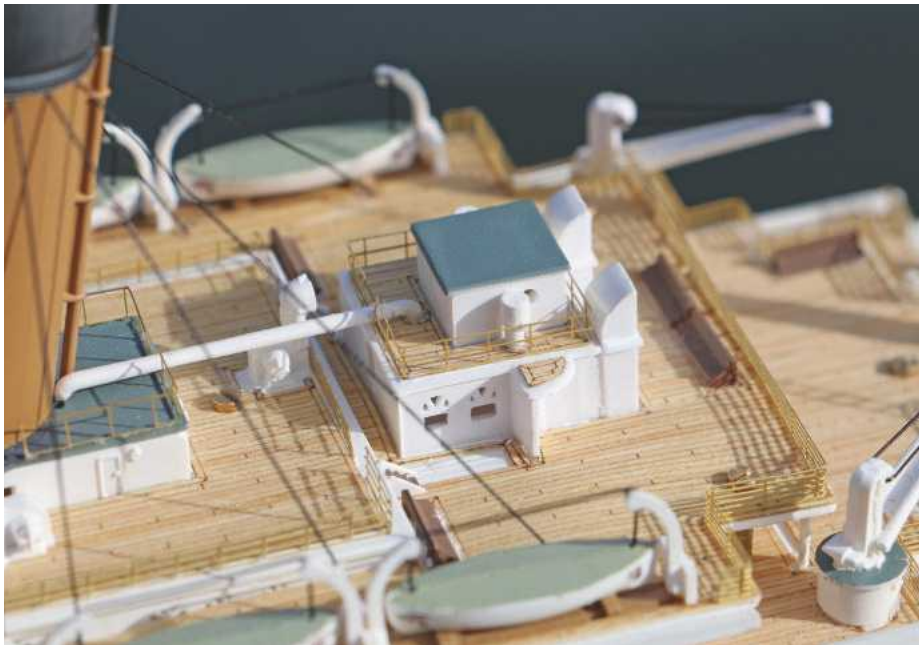
At this stage, the etched brass guard rails had also been painted, shaped and glued into position so I turned my attention to the funnels. Assembly of these is straightforward, however the inside halves of each needed to be painted matt black, to represent soot, before final assembly. The funnels were then masked ready for painting. Note that the Titanic funnels are painted differently to the Britannic. With this done, no less than 40 lifeboats were removed from their frets, cleaned, painted white and, when dry, the hulls masked and their tops painted a canvas colour. Similarly, the masts, crow's nest, ship's bell and mast light cover were painted.

BELOW: Titanic - The laminated wood decking and etched brass railings practically transform these models.

Parting company

At this point, the two models parted company. Completing Titanic was simply a case of building in accordance with the instructions however there are one or two points worth noting. First, it was apparent that the cotton supplied with the Entex kit was very furry whilst the monofilament supplied with the Minicraft kit was a translucent dirty-grey colour. Not unsurprisingly neither appealed, however a look in the store cupboard found something suitable, except that it was grey rather than black. The reel of thread had a manufacturer's name printed on it and although no longer in business, a Google search lead to a website that had some very useful information regarding size and strength of such thread. It also appeared to suggest that what I needed was a bonded polyester thread.

Fitting the funnels and stays to Titanic required the removal of the boat deck from the promenade deck to allow all the cables to be threaded through holes in the deck itself. This was easily done and the cables glued into position below it. The boat deck was then replaced and the four funnels glued to their mountings. Once the glue had set, the cables were threaded through the appropriate holes, pulled taught, glued, and the caps and braces inserted and fixed in position. Finally, 18 of the



20 lifeboats were glued into their respective positions on the boat deck.

To complete the Titanic construction, the derrick cranes, aft docking bridge, anchor crane and masts were fitted, although the masts were not glued. Apart from the rigging, Titanic was now complete.

Back to Britannic

Returning now to the construction of Britannic, there were a number of modifications to be made, the simplest being the addition of an open bridge which was mounted on the roof of the existing bridge. This was made from strips of styrene and a small piece of etched brass railing **(Photo 9).**

The aft (poop) deck had an additional level on the Britannic, effectively covering the existing deck (see Mailbag, page 64 – Ed). This additional level was made from 1mm thick styrene that was cut to the required shape and covered with some spare overlay wood laminate decking. The whole was mounted on two existing aft (poop) deck pillars with an additional cabin made from styrene. The docking bridge was mounted on top of the additional deck using another two styrene cabins **(Photo 10).**

LEFT: Titanic - A point of interest: The upper deck in this photo is the boat deck / second class promenade whist the deck below is the rear of A-deck, the first class promenade. This meant that second class passengers could look down on first class passengers. The lowest visible deck in this shot was, once again, a second class space.

The funnels, cables and lifeboats were attached to Britannic using the same method as employed for Titanic, however there were many more lifeboats on this ship as a result of the Titanic disaster. In order to carry these additional boats, four sets of gantries were added, one across the aft deck and the other three across the boat deck. For the model the gantries were easily constructed using 1.5mm square styrene strip, however there were also some sets of large cranes to lift the boats off the gantries and these promised to be slightly harder to recreate. In searching for suitable materials to construct them, I came across a website that actually made exactly what I wanted using a 3D printing machine – they were duly purchased! **(Photo 11).**

BELOW: A great shot of Titanic's beautifully uncluttered boat deck! Note the bonded polyester thread.

In order to create the 60+ additional lifeboats needed for Britannic, a mould was created made from a small block of wood with a cavity machined into it. This cavity was filled with Milliput two-part epoxy putty and then a spare lifeboat, after being coated with Vaseline, was pressed into the mould to produce a male impression of its hull. Once the Milliput had set hard the lifeboat was removed and the surplus protruding from the top of the mould sanded away. To use the mould it was first coated with Vaseline whereupon a small amount of David's Fastglass (from car accessory shops) was mixed and poured in. After allowing this to cure (15 minutes or so) the lifeboat was removed from the mould. **Photo 12** shows the mould plus a single lifeboat.

With both models now 99% finished the final task was to fit the removable masts together with their ratlines. To achieve this, the tops of the ratlines were loosely hooked into some sliding links mounted on the sides of the masts. Voila!

All said & done

Both models sail very well indeed although it should be noted that they're only really suited to light wind conditions and will tend to list if caught by a strong enough side wind. It's a small price to pay for when they are on the water they always draw favourable attention, not least the more famous of the two. What of the lights? Well, I have to say I think they're pretty effective. Take a look at **Photo 13** and see what you think.

I hope you've found this article informative and I sincerely hope you've been inspired to construct something similar and perhaps, even, produce an article or two for this great magazine. Speaking of which, I'd like to say a big 'thank you' to Paul Freshney (Editor emeritus) for publishing my articles over the years and encouraging me in my endeavours.

References & acknowledgements

Titanic Research & Modelling Association

www.titanic-model.com

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3.46cc E.D. HUNTER MARINE diesel with R/C throttle, flywheel coupling and double ball race. Bench test run only and in original box – offers? Tel. 01616 339884 (Oldham).

BOAT COLLECTION, 20 boats in all to include six 1/12 scale lifeboats. Mersey Rother, Solent, Wavney and more. Ill health forces sale. Please ring for details. Tel. 07546 188258 (Notts).

MOUNTFLEET LOWGARTH TUG complete kit, untouched apart from a small amount of work to hull. Also includes Torpedo 800 motor and action electronics PII0 sound unit – £295. Buyer to collect. Tel. John on 01159 334047 (Notts).

CABIN CRUISER, glass fibre hull only. Length 45", beam 13.5", weight 10¼ lbs. Gunnel rubbing strip needs renewing, otherwise excellent condition with no crazing. Drilled for twin props and twin rudders – £25. Buyer to collect. Tel. Nigel on 01202 880814 (Wimborne).

REVELL QUEEN MARY 2, 1:400 scale, complete and untouched kit – £65. Tel. John on 01159 334047 (Notts).

FIVE HARD-BOUND VOLUMES of Model Engineer and Electrician, July 1914 to December 1916. Very good to excellent condition – £25 inc. postage. Tel. 01243 371705 (Hants).

AMATI RMS TITANIC KIT (new), including R/C fittings and instructions, 34" long. RRP £452, will sell for £270. Billings Smit Nederland kit (new), 34" long. RRP £390, will sell for £250. Tel. 01845 501922 (North Yorks).

GANNET 15cc FOUR-STROKE petrol engine, spark ignition, water cooled flywheel, coupling, exhaust pipe / silencer, float chamber, thermos syphon cooling with coil header tank, fuel tank and instruction book – £200. Tel. 01285 860565 (Glos).

PERKASA TORPEDO boat, ready to go – £250. Predator power boat, ready to go – £180. Tel. 07771 843556 (Hants).

MARTEN HOWES BAYLISS, single cylinder steam engine and boiler, gas burner and condensate tank. Mounted on aluminium base. Original boiler certificate. Steams well – £615. Telephone 07818 418766 (West Sussex).

TWO STEAM BOATS, Gas fired. Windermere type, two cabins, 48" long, SVS steam plant and in very good condition. The other is a Clyde Puffer with a twin cylinder engine, large boiler, 36" long and also in very good condition. £695 each ovno. Buyer collects. Tel. 01706 868616 (Rochdale).

HMS SPEEDY 1828, revenue cutter, plank on built-up frames, not a kit. Originally intended for museum display – £150 (no offers). Telephone Ron on 01904 491614 (York).

FLOWER CLASS CORVETTE, Revell, HMS Snowberry. Three-quarters finished but ill health has ceased production. Buyer collects – £100 ono. Email marciagordon@live.co.uk for photos or tel. 01877 382486 (Stirling).

TYPE VII U-BOAT, 6ft 6in long with brass etched deck, hull only – £250. Icelandic trawler, 4ft – £300. Scharnhorst, 6ft long, 3/4 built – £300. Telephone 07742 064216 (East Yorkshire).

HMS EXETER. 1:128-scale, excellent scratch-build – £300. Also 1:96 HMS Illustrious, Sirmar RTR with Harriers and Decoperms – £400. Eileen fishing boat, plank-on-frame – £200. Resolve tug, 1:48-scale – £400. Aerokits PT boat – £100. Telephone 0131 661 3295 for details (Edinburgh).

WANTED

MIRROR DINGHY KIT. Original by Osborne models but latterly by Jotika. Completed model considered. Tel. Jim on 02476 673894 (Coventry).

JOHN LAMBERT PLAN LO103 of a 6PNR Hotchkiss gun. Tel. Mike on 01522 530244 after 6pm (Lincoln).

ST CANUTE TUG in any condition for restoration. Tel. 01227 792976 (Kent).

BUILD ARTICLES for Miranda steam launch, featured in Model Boats 1983 July, August and October. Photocopies or magazines required. All costs will be paid for as looking for an old clubmate. Tel. 07484 104451 (Lancashire).

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Mailbag

Air your views, seek a solution, or just tell us what you're up to in the pages of the hobby's favourite R/C model boat magazine

We welcome all letters of model marine interest, please title your email 'Model Boats Mailbag' and send to: editor@modelboats.co.uk

Earnshaw

When I first saw this model on the cover of the February 2016 issue it brought back fond memories of short pleasure cruises along the Yorkshire coast. I really liked the look of this ship, which has lots of character, and was delighted to find a Glynn Guest free plan inside the issue. I found the drawing easy to follow and understand, and Glynn's constructional advice was a great help, too. I compromised on a few items, for example: the railings are made from a wild bird peanut feeder, the upper deck and awning supports are BBQ skewer sticks and wood coffee stirrers, whilst the awning cover is from a discarded window blind. Lifeboat davits are thin knitting needles.

Our thanks to Stan Reffin for this shot of Earnslaw, the 1912 Edwardian twin screw steamer that inspired Glynn's design. Earnslaw sails on lake Wakatipu, New Zealand and is the only remaining commercial passenger-carrying coal-fired steamship in the southern hemisphere.

My favourite way of sealing hulls and decks is to glue sections of brown wrapping paper to them with aliphatic resin that's been mixed with a small amount of water. This works really well. When dry I then add a coat of Deluxe Materials Eze Dope, which was the method used this time. For Earnshaw the hull was then sprayed with grey primer. I marked the decks with a fine black ballpoint pen to represent planking, followed by two coats of varnish. The hull and superstructure were then finished with gloss paint.

The model has navigation plus main deck and upper deck lighting that looks very effective on night sailings. It's powered by two brushed motors which I salvaged some years ago, but from what, I don't remember. Anyway, they're connected to a single 15 amp Mtroniks electronic speed controller and there's a standard servo controlling rudder.

The build took some time, but with a few hours here and a few there eventually everything started to come together, especially when I got the paints and colours on. I've really enjoyed building this ship and enjoy sailing it, too.
Keith Tomlinson

Have-a-go-boats

In response to the March issue editorial – How do we encourage youngsters into the hobby? – I have to add that members of the Shepton Mallet Drifters MBC have, over the last 12 months, run Have-A-Go-Boats in aid of various charities and for the pleasure of our young people. We charge 50p for five minutes hire of our radio controlled little tugs. Between £500 and £600 was taken in 2017. This means that over 1000 young (and young at heart) people have used these boats and enjoyed the experience. Some, of course, are returnees. We all feel that the time and effort is well spent for not only are we making donations to Hestercombe House, plus Gardens and St. Margaret's Hospice (both in Taunton) we're also introducing these young people to the hobby of Model Boats. Maybe with the efforts of other clubs, such as the Eastleigh & District MBC, we will have a future when the X-Box gets put in the cupboard.
Vernon Sear

Perma-Grit

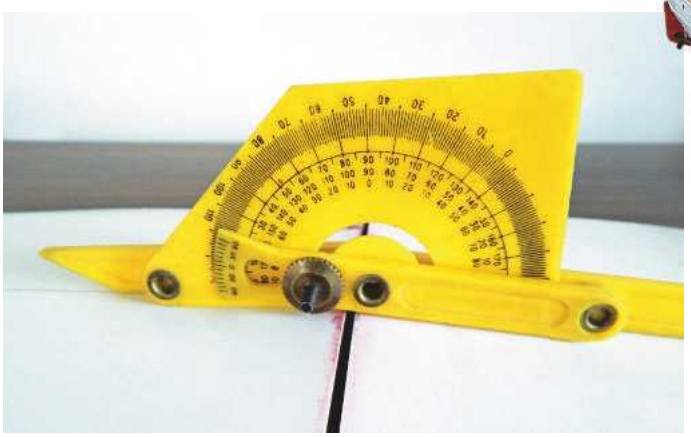
In his Sea Breeze review (April issue) the editor makes mention of his 'trusty Perma-Grit sanding block'. Could I have more details please? *Ron Richards*

*Ron, Perma-Grit manufactures tungsten carbide grit abrasive sanding tools that are renowned for their longevity and ability to work a variety of materials from glass fibre to wood, stone, metal and many others. I have a two-sided coarse / fine aluminium sanding block and I swear by it. Buy one, you'll thank me (www.permagrit.com) – **Ed.***

Racing sails

On page 57 of John Goodyear's sail making article (Model Boats, February 2018), photo 3 shows an angle gauge in yellow plastic, used for setting the jig sections. Would you kindly advise me of the maker and / or brand name and the availability of this instrument as I do try to make my own Mylar sails and I'm sure this would be a big help. Really enjoy your magazine and have been a subscriber for many years.
John Inverarity, Australia

*John, we've had a good many questions about this. The tool you need is an 'Angle Gauge Protractor'. Pop it into a Google search and you'll be presented with numerous examples on eBay, Amazon and at various other outlets – **Ed**.*



Just the ticket #2

Regarding the letter 'Just the ticket' (March issue), I have a twin-screw speedboat courtesy of a manager's clearance at Maplins; my second venture into model boating. It used a 40MHz control system with tank steering that seemed to lose its proportionality on turning resulting in manoeuvres that resembled an old threepenny bit (more severe than a modern pound). The old salts at Millhouses Park in Sheffield recommended going to the 2.4GHz system with two ESCs, a rudder / throttle mixer being the way to go. As a result I visited my local model shop, Nitroflight models, in Rotherham, and whilst there didn't seem to be a lot of boat stuff in the shop, mainly things with wheels or wings, I explained what I was attempting. "You want one of these," was the reply, pushing a KA-6 combo onto the counter, "with a pair of waterproof ESCs. Simply connect them into sockets 1 and 2 on the Rx and switch the Tx to the delta wing setting." I duly removed the old sealed control module from the boat, disconnected the red wire from one ESC, after dire warnings from the shop owner, and connected everything up, mounting the components with double-sided sticky pads.

Bath tests proved the screws were turning in the right directions and that going astern was not a viable option, so the jumpers on the ESCs were repositioned give forward only control. The only downside of the delta wing function is that forward is right aileron and left / right is down / up elevator. Even so, I'm coping okay with it.

I've now purchased further KA-6 receivers for my third and fourth boats, a DF65 and DF95, both bought without the Rx.

Ian J Plant

Finding a crew

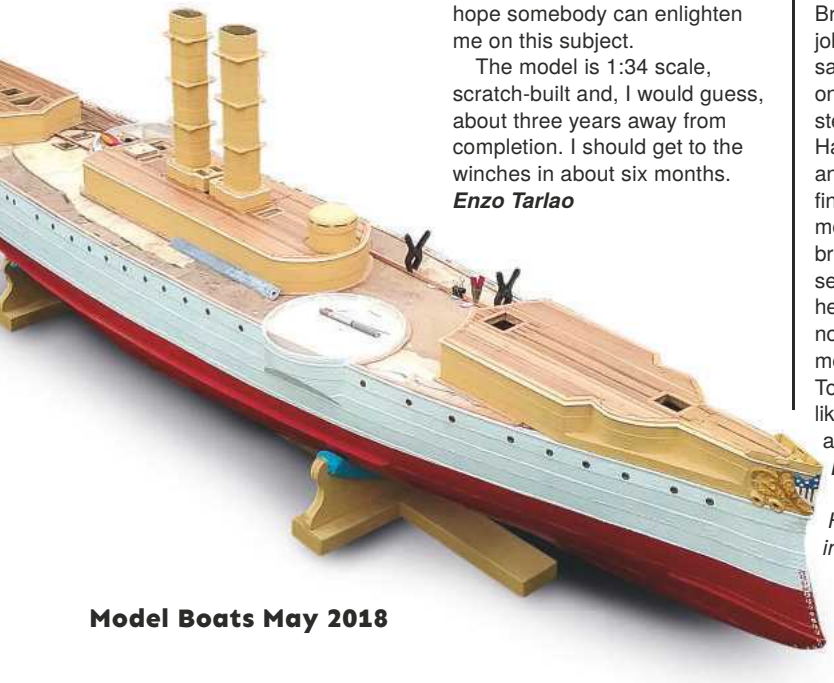
With reference to Mr Day's enquiry about 1/48 crew figures (Mailbag; March), one good source is the Tamiya 1/35 Miniature Series containing numerous military figures wearing uniforms / overalls and easily modified. The US Aircrew set is particularly good and available at most model shops. More expensive are the high-quality sets of prepainted 1/50 figures from Preiser. General workmen, mechanics in overalls, some in uniform (German railway staff etc.). Again, these are easily adapted to 1/48 or 1/50 seagoing crew. I hope this is of some help. *Tony Shields*

Help!

Many years ago I was overwhelmed when, through your magazine, I received all that was missing to complete a Billings model I was working on. Now I am at it again. I have plans, drawings and photos of USS Maine but I am still at a loss about the winches. Were they manual? Were they steam? Were they electric? And also where were they? Especially those for the gigantic davits amidships. I have already tried to get information from the Brooklyn naval museum (twice) but there was no response. I hope somebody can enlighten me on this subject.

The model is 1:34 scale, scratch-built and, I would guess, about three years away from completion. I should get to the winches in about six months.

Enzo Tarlao



Back end of Britannic

Just had quick look at the Britannic article and a cracking job Tony Dalton has made. That said, I'd like to make comment on the fact that the shot of the stern seems wrong. Based on the Harland and Wolf plans I have, and most of the images I can find, the rear of the ship had the morgue added with the docking bridge above in a very simple set-up. She also did not receive her full set of gantry davits so none were placed above the morgue. I would be interested in Tony's comments as with ships like Britannic new information is always coming to light.

Rob Griffin

Hi Rob, You're quite correct in your findings, indeed it is well documented that not all of the additional gantries where installed during the refit as the ship had to rush off to the First World War. I should say that most, if not all, of my information came from the Titanic Research and Modelling Association website (titanic-model.com) which included a few photographs. I decided to fit all the gantries as, for me, it seemed to somehow complete the model. As for the morgue, alas I did not have your advantage of a drawing or a picture of the area in question. I sincerely hope this answers your question. I should also mention that a lot of my friends have suggested that I build a model of the Olympic just to complete the set.

Tony Dalton

OSA 2 Fast Missile Boat

Dave Wooley breaks out his digital soldering iron and sets to work on some humble two-bar handrails

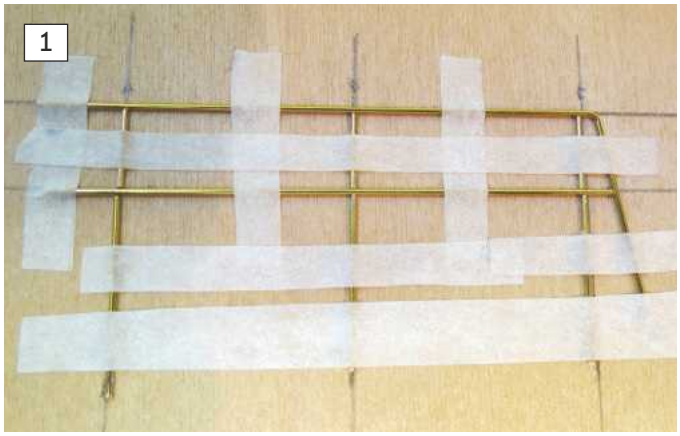
For much of the 1950s and early '60s Soviet naval design had a basic utilitarian philosophy that employed straightforward and uncomplicated construction methods. This Soviet philosophy was very much extended to the smaller units of the Soviet fleet and the OSA 2s were no exception. However, as we shall see here and in later issues, whilst the fittings can appear utilitarian they do the job and with over 110 OSA boats built and almost a quarter of the entire production exported to sympathetic nations, including Syria, Iraq, Cuba, Vietnam and many others, the proof of the pudding was very much proven in the eating. That said, there were distinct variations depending on national requirements, indeed as mentioned in part 1 the export variant known as 205U differed in a number of respects to the OSA 2 that was in service with the Soviet Navy. It could be said that no two OSA 2s where the same yet at the same time there was also some commonality of fittings which have been discussed in the past. So, for this month's build we'll focus our attention on the two-bar upper rails which will be fitted along the top edge of the deck housing and on the top surface of the two ventilator housings. These will use 0.8mm brass rod with the vertical and horizontal bars soldered at each joint.

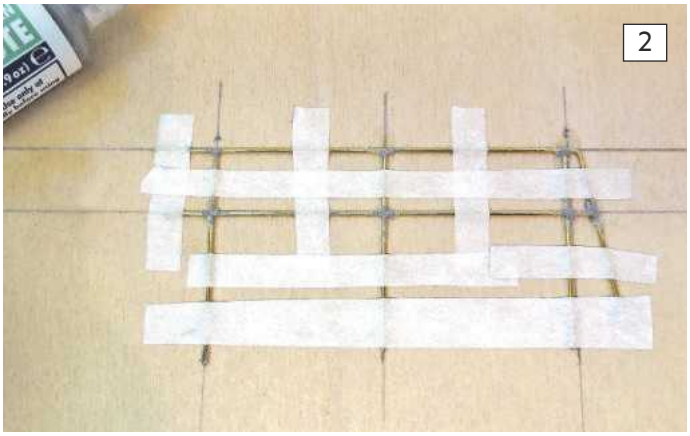
Preparation

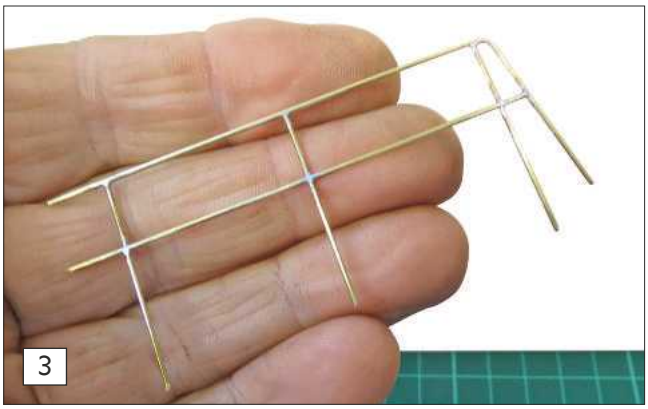
Although preparation for soldering was discussed when forming the foremast I think it prudent to highlight these methods again as they also applied to soldering the rails. Here, then, the required shape and size is laid out on a section of timber onto which is placed the various lengths of 0.8 wire. Instead of commencing with the vertical bar (which, in truth, is not a stanchion) as is normal practice, I'll commence with the upper and lower horizontal bars into which will be fitted the two-part vertical bars **(Photo 1).** Here, all seven joints have been cleaned in preparation for soldering and, once again, the solder of choice is lead-free solder paste which can be applied to each joint using a small length of wire as very little is required to complete the job. As in previous soldering sessions, I've become keen on applying heat using a temperature controlled soldering iron that's digitally pre-set to 350 degrees. The tip of the iron will heat up almost instantly and, as well as the digital readout, a red indicator light

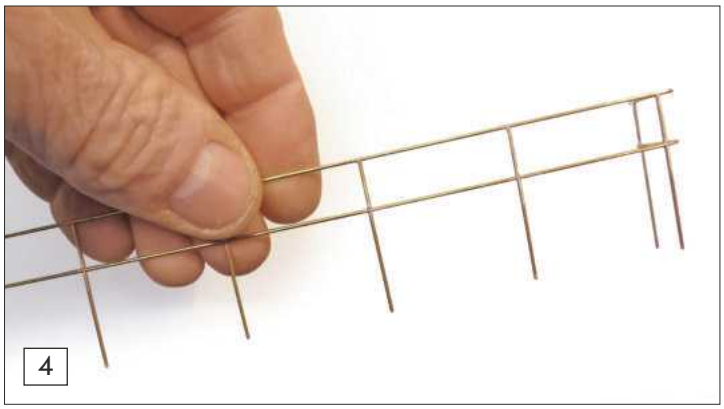
1. The basic preparation for soldering one of the rails as fitted to the elongated deck housing.

2. Applying the solder paste to each joint.









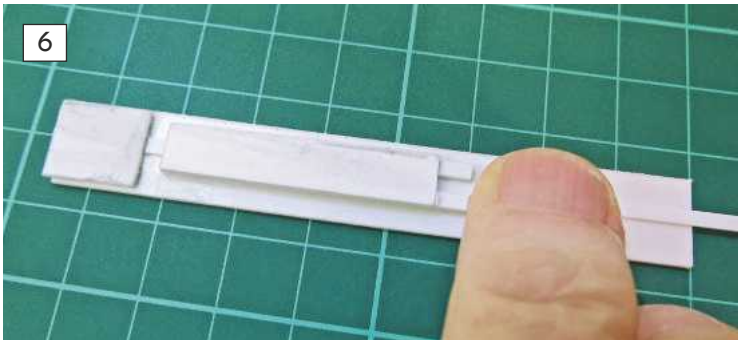
3. The result of cleaning off any unwanted solder around the joints using 400 wet 'n' dry.

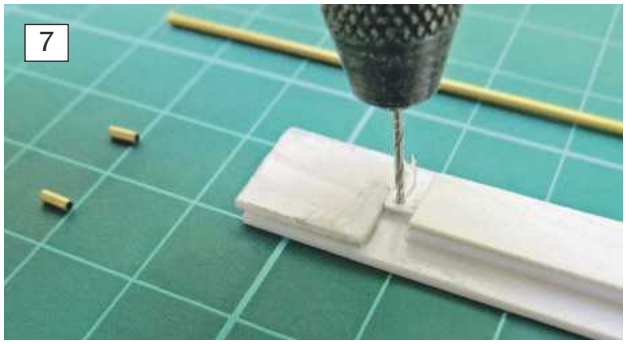
4. The same method as applied to the longest run of rails.

5. Two eyes are soldered to each end onto which a chain will be fixed. This configuration differs markedly from OSA boat to OSA boat.

will commence flashing when the tip reaches its required temperature. At this point we're ready to solder **(Photo 2).**

For good results I apply fresh solder to the tip of the iron then wipe it clean on the damp sponge. Following this the tip is applied close to the joint whilst in direct contact with the surface of the metal. Here the solder should easily flow into the joint. With the soldering completed, and if the job is in any way fragile, I find it useful to gently clean each of the joints with fine emery cloth, or 400 wet 'n' dry, whilst keeping the job in place. Once satisfied that the joints have been tidied up, the soldered rails can be removed from the board and the underside gently cleaned down **(Photo 3).** The longest length of rail (running along the top edge on each side of the deck housing after section) is formed using the same method as the shorter lengths. Here, however, the after end is folded through 90 degrees and an eye soldered to the end of the top rail to receive a chain **(Photo 4 & 5).**

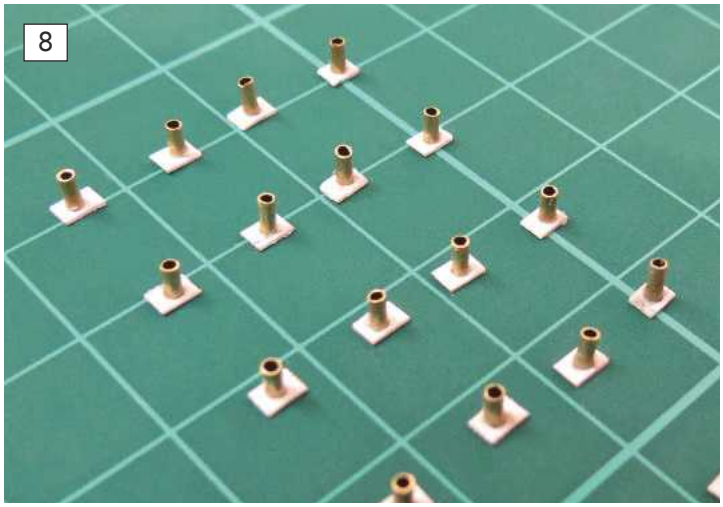




6. A simple but effective jig for cutting and drilling each baseplate.

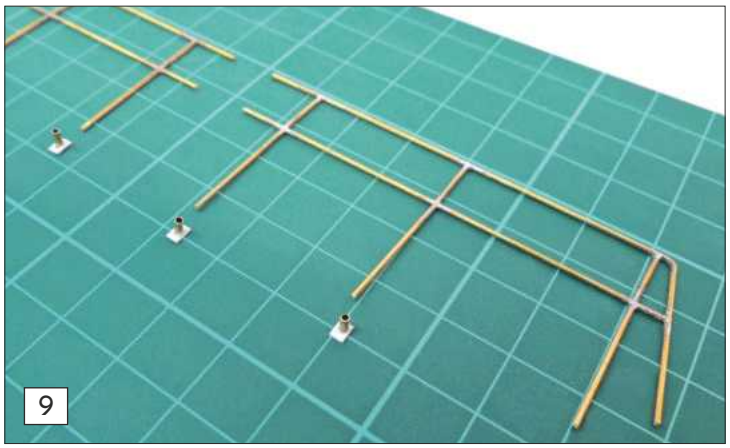
7. Using a pin vice an opening is drilled to accept a 1mm tube.

8. The 1mm tubes set into each styrene baseplate.



Positioning the rails

The next step is to carefully mark out the positions of each vertical bar and fit the rail into its location, whilst determining the height as, once again, in **Photo 5.** Once the location on the rail is determined the baseplate and tube support can be prepared and cut to size.



To achieve consistency I devised another jig to allow the baseplate to be cut and drilled to ensure that the small support tube will fit through the plate and onto the deck. This has the advantage of making it easy to remove the rails as and when required. In fact, there's no real need to actually apply any adhesive as this method gives a firm slide fit. The baseplate is formed from styrene (Evergreen 134), fed through a bespoke jig, then drilled to accommodate 1mm OD tube **(Photo 6 & 7).**

Baseplate & tube

It only took a short time to produce all the 0.75 x 2mm baseplates required, with each 1mm brass tube inserted into the baseplate as in **Photo 8.** Just as a demonstration, in **Photo 9** I've lined up the respective base plate and tube with each vertical bar. These are then inserted onto the bar and pushed well up. As they are a push fit each baseplate and tube will hold position until moved. With this, all I needed to do was place the set of rails into their respective pre-drilled holes and slide each baseplate and tube onto the deck edge. With each of the baseplates and the exact positioning of the rail confirmed the baseplate and tube can be set into place. Once set and firm the rail can easily be lifted clear leaving the baseplate and tube anchored to the deck **(Photo 10).** Our parting shot for this month shows all the rails fitted into their baseplates but not fixed into place **(Photo 11).**

9. Each combined baseplate and tube will be push-fitted onto each vertical rail.

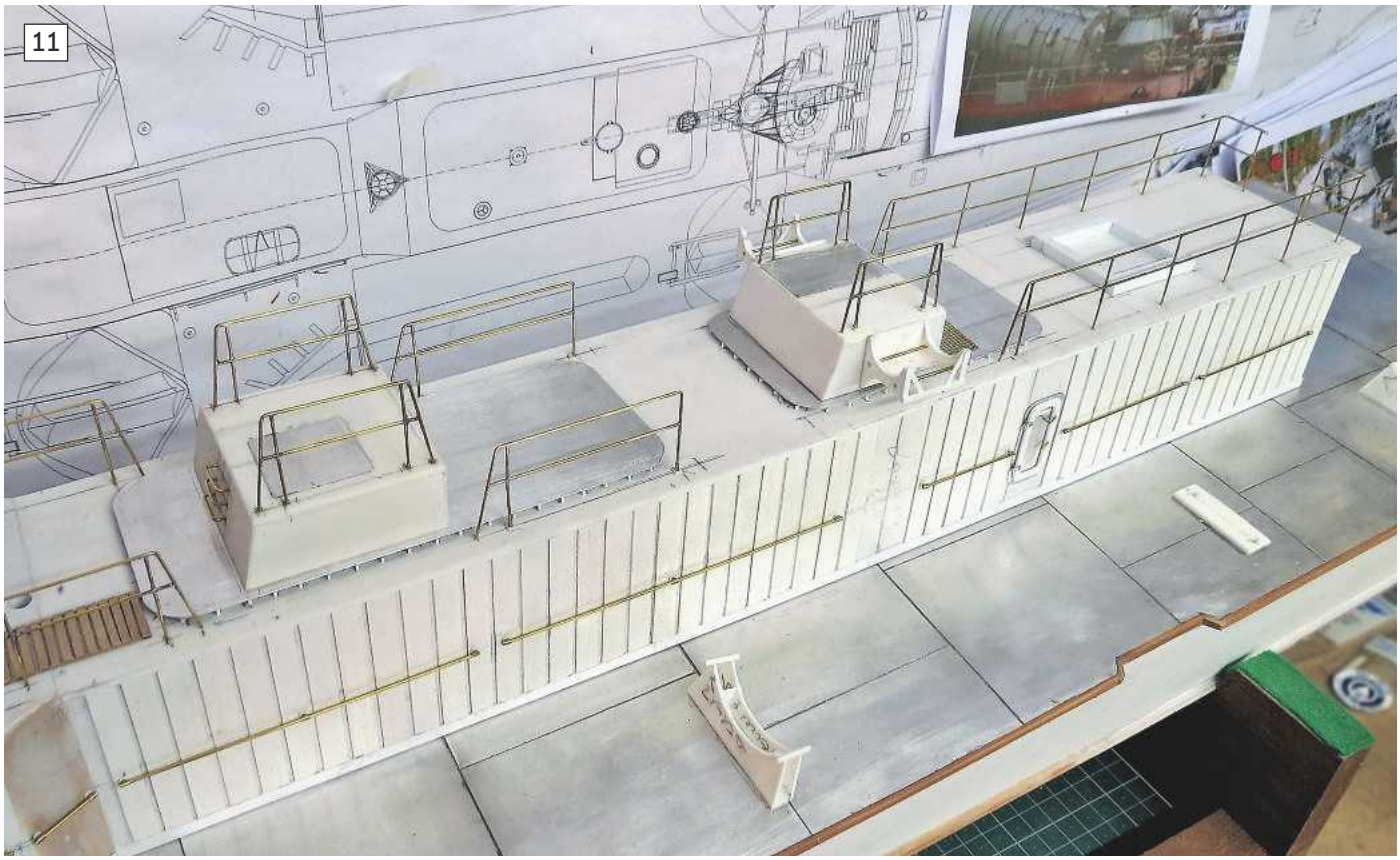
10. When set the rail can be lifted clear of the baseplate and tube.

11. Each set of rails comfortably in place, although note that they can be easily removed as required.

Next time...

Continuing with the construction of the various fittings we'll be focusing on the Pelorus and the central targeting sight for the operation of the forward and aft AK230 twin gun mountings.

References and acknowledgements
The folk at **Albion Alloys** for their help and assistance: www.albionalloys.com



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Going like the clapp

Fact: Fast boats are fun. Add a competitive edge and it's a recipe for excitement by the bucketload. Fancy a go? **Ian Williams** describes how to get started

As a devout Fast Electric racer who's written many-a magazine article about all aspects of the sport, I tend to keep my ears to the ground as far as information on the hobby goes. These days that means keeping tabs on the various FE websites and forums as well as the various R/C groups that I'm a member of on Facebook. Now, it just so happens that on one of the Facebook threads there was a discussion about how to encourage people to get into the hobby. Amongst the replies was one asking a variety of questions including, how to start in fast electrics, where all the clubs are, what the class rules mean, how to get a boat, whether to buy second-hand or new, RTR or hull only, etc. etc. They're very sensible and common questions and, as a result, I thought I'd attempt to answer them, as best I can, in this one article. So, if starting out is where you're at, you've come to the right place. Read on...

First things first

Before we get going, I just want to make a few comments about how to increase the membership of FE related clubs. You see, I've been building, selling and racing fast electric boats for a long time now and have often seen guys on their own running FE boats that have a genuinely good performance. When I've approached and commented on how well the boat is running they're usually quite enthusiastic, however as soon as racing is mentioned things change. Amazingly, the most common comment is something like "I wouldn't be any good alongside all those experts." This, of course, is rubbish and I am always at pains to explain that you couldn't call any of us racers 'experts'. Sure, we may have a bit more experience but we all had to start from the beginning. I don't know whether it's just a lack of confidence or the fear of competition but I've heard that quoted quite a lot and certainly more times than you would expect. This is interesting because the one reason for not wanting to race that I would expect to hear most – it's too expensive – is probably the least used, which is quite surprising as that is the impression most people seem to have of competitive boating. Whilst it's true that racing can be expensive, the fact of the matter is that it needn't be. You really can have a competitive set-up without spending a fortune.

Racing today is far cheaper than it used to be. To give you just one example: Before LiPo cells became available we were using NiMH cells and at that time the Mono 2 and Hydro 2 boats were running 12 cells (14.4 volts). To get good cells, we were paying £10 to £12 per cell. That's right! Each pack would cost around £120 to £140 and you needed more than one pack to race a full day. You could get by with two packs, but you really needed three for a full day's racing. That is a fair chunk of money, and that's without even touching on the boat and running gear. The need for three packs was because NiMH cells needed to be rested before they could be fully recharged. If you tried they would accept a charge but often you would only get around 80% of the maximum capacity. Modern LiPos don't seem to have this problem and are quite capable of being recharged with only a short rest period. To be honest, having a pack for each of the three heats would be a good idea, but two LiPo packs are more than adequate. Having mentioned the Mono / Hydro 2 classes, I should explain that a 4S LiPo (14.4 volts) will give the same, if not better, performance for around £45. You can, of course, pay less than that and still get reasonably competitive cells, or more if you can afford something better. Bear in mind, though, that for National and International classes there is either a weight limit for the cells or a requirement to fit a current limiter. But this, I think, is something for a future article.

Spoilt for choice

Years ago, if you wanted a fast electric boat you had to design it yourself or build one from plans. There were no kits available. Today, there are many different examples around, a good number of which can be purchased ready to run. The choice of which to buy is determined by several factors:

1. Whether the boat is to be used for fun running or competition.
2. How much building you are prepared to do.
3. What sort of boat you like the look of.
4. How much money you have to spend.

If you want a fun running boat, there are plenty of RTR or ARTR boats to choose from. Most of these will be moulded from some kind of plastic. ARTR plastic boats are quite comprehensive and will usually have the drive system, motor, speed controller and propeller pre-installed, leaving, perhaps, the receiver and decals for you to fit. Most RTR boats will have all that plus pre-fitted R/C gear, and some may even include cells and a charger. Boats such as these do not require any real building skills, so are ideal as a first boat.

The Helion Rivos BL makes a superb low-cost introduction to Sunday morning fast electric fun. Get a few of these and you have the makings of a great competition.

Hydro & Marine Drifter going well and driven by Chris Hobbs' young (and very competent) son James.

BELOW: My Hydro & Marine Intruder. A 4S LiPo and a 3000KV Plettenberg brushless motor are secreted under the hood.

ABOVE: Bad day - Chris Hobbs with his new (and rather expensive) Etti Vertigo.

Now, some of the ARTR and RTR boats can be well made with decent motors and hardware and are usually pretty quick and definitely value for money. However, if you're considering proper racing, be aware that fiberglass or carbon hulled boats will take the hurly-burly of racing, whereas plastic or ABS hulls generally won't, or not for very long at least. If you just want a little gentle Sunday morning competition with some clubmates then most of the better quality ARTR or RTR boats will be fine and give hours of fun. Boats such as the Helion Rivos BL (brushless version) shown here, and the Thunder Tiger Outlaw JR are good sport boats.

If you want to try your hand at racing the choice can be a little more difficult, depending on how seriously you want to compete. The most popular racing classes are those for mono hulls, but not so many manufacturers make suitable boats for these classes, not least because competition mono hulls need a self-righting ability. So, most racing mono hulls are provided by specialist manufacturers. Many are advertise on the web, indeed this is a good place to look. You can be reasonably certain that a successful competition design will, if built correctly and with quality components, perform as advertised. However, boats such as these tend to be very 'bare bones' in comparison to a plastic kit boat, often consisting of not much more than a bare hull and a sheet of setup instructions. That said, if you're already a modeller there are plenty of how to articles and videos around the web, not to mention advice from your club members and articles such as those we'll shortly be publishing.

Cat lover

Normally I would recommend starting racing in one of the mono hull classes as monos are the easiest to set up and operate. However, it is worth making mention of some other hulls that are eminently suited to starting out, namely catamarans.

A couple of years ago the Northern Amp Draggers club instigated a new racing class. The Cat Class. This was in response to several people who had bought semi-scale models of offshore racing cats. There seems to be quite a number of these models around (from various sources) and they all look good, very much like the real thing. The class proved popular and was taken up by the MPBA as a national class. The rules are simple, there is no size limit – however most seem to use hulls around 28 to 30 inches long – cells are from 4S to 6S, and there are no battery weight limits. That said, 6S boats are only allowed to run 4800mAh cells, whilst 4S boats can use up to 6000mAh. Race time is six minutes.

There are several suitable boats for the class, the HobbyKing Apparition Catamaran (available as a hull only or ARTR), the new C1 Flowmaster Catamaran ARTR, and the Genesis Catamaran ARTR, all of which are moulded in GRP. There's also a couple of moulded ABS catamarans, such as the Relentless which could be made competitive, but do bear in mind my earlier comments about the strength of ABS hulls. Proboat cats such as the Blackjack 29 and Mystic 29 are also excellent ARTR boats for this class. Truth is, an old and very battered Mystic in the hands of Keith Mallam won the National Cat title in 2015.

My Apparition catamaran.

Clubs & comps

If you're thinking about getting into fast electrics, even 'fun' types, my advice would be to check out a model boat club in your area. For racing, it's best to get an idea of which pure racing models are available before you spend money. A good place to look is one of the many club or national race meetings which are held during the season from March to October. Here you'll get an idea of what is competitive and what is not, and you can speak with the owners of the various boats being raced and find out

Chris Hobbs' boat sees off the flying boat of Paul Heaton in a Mono 2 race.

Paul Heaton's Mono 2 seems to like flying!

Sprintcat i.c. hull with a big HET Typhoon brushless motor.

what sort of components they have used and what modifications, if any, they have had to make. Also, you'll see what's now possible, in performance terms, from modern fast electric boats. One of the comments often heard from spectators is that they 'never thought electric boats could go so fast'.

So, if you're keen to get started in racing, your first move should be to make contact with a local club. Most model boat clubs have one or more members who are into fast electrics and some clubs even hold their own race meetings. Club racing is much more relaxed than national competition and some clubs adopt a 'run what you brung' or a one design class to try and encourage as many people as possible to have a go. This can be a lot of fun.

Even better is to contact the MPBA fast electric section (mpba-fes.org.uk) which will give you contacts and the race classes and rules. Whether you want to race at club, national, or even international level, you will need to obtain a copy of the relevant rules and regulations in order to build a suitable boat which conforms to the particular class you wish to compete in. Many clubs base their competition rules wholly or partly on MPBA and NAVIGA regulations, making it easy to run at local, national and international level.

There are basically two forms of FE being run in the UK. Submerged drive boats, which run anti-clockwise on a triangular or M-shape course, and surface drive boats, which run clockwise around an oval course. I'm not going to run through all the racing classes here as there are quite a few and there may be slight variations at club level. The main MPBA website (www.mpba.org.uk) will give you contact details of the clubs affiliated to the MPBA. The main Fast Electric clubs in the UK are SWARM (South West Area Racing Modellers) in the south west (http://www.swambc.webeden.co.uk/), ELECTRA (www.electrafying.com) and Ostend Ospreys (www.ostendospreys.wordpress.com) in the south, and The Northern Amp Draggers (www.ampdraggers.co.uk) in the north. Check out their respective websites which are also connected to the MPBA site.

My strong advice to anybody considering running any kind of boat in competition or in a public place would be to join a club affiliated to the MPBA or join the MPBA directly as a country member. There are several advantages of being a member, the main one being the fact that you will have five million pounds worth of 3rd party insurance in case of accidents. Check out the insurance tab on the MPBA main website for full details of this.

Out-and-out speed

Before we wrap things up for this session, I should mention that there's a third national competition type for FE boats run by the MPBA once a year – Straight Away Speed Records. (SAWS). The setting of speed records holds a fascination for many people, indeed the idea of building a boat as light as possible and with the greatest amount of power is certainly a challenge, and pure speed machines can be very exciting to drive.

ABOVE: Keith Mallam with the Wilkinson Sword Trophy (it's a real sword) for fastest speed at the UK SAWS Records day

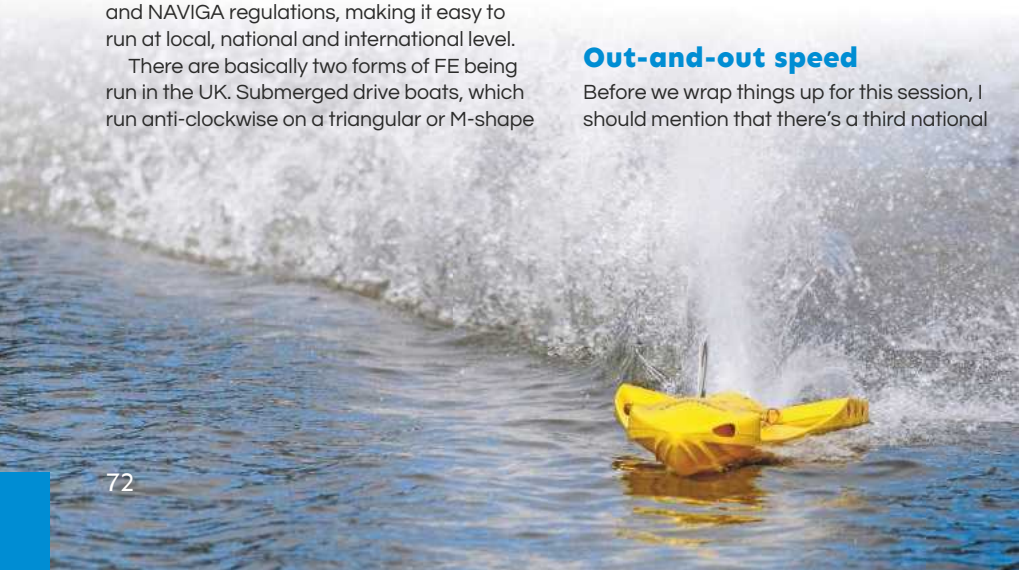
Until fairly recently, speed records in the UK were the province of those with the means to buy expensive rare earth motors and lightweight cells, but a revision of the regulations and cheaper and more powerful brushless motors, cells and radio equipment has created many more classes to try and encourage as many people as possible to have a go. The speed course is between two points 110 yards (1/16th mile) apart. Boats are timed each way and in order to get a time, you must make one run in each direction. The aggregate times of your two best runs are used to calculate your average speed over the course, and you will get the fastest speed if you drive the straightest, therefore shortest, course, between the two timing points. Food for thought, perhaps?

Mini mono

With all said and done, my feeling is that the best competitive racing class for beginners is the Mini Mono Class. These small (450mm max.) boats will run at 30+ mph for six minutes so still more than exciting when there are six of you racing round an oval. They are robust, reasonably cheap to buy and set up, and are really cheap to run for a season. As with all racing monos they are self-righting so you don't have to sit a race out upside-down. Overall a good introduction for newbies young and old. On the other hand, if you are in the northern area and you do happen to have one of the Cats I mentioned earlier come along and race it. This class is really turning out to be very entertaining.

If you have any questions or need further advice, feel free to contact me by email at: electro-marine@talktalk.net.

LEFT: Going like the clappers! Tom Watson's Eraser mini mono.



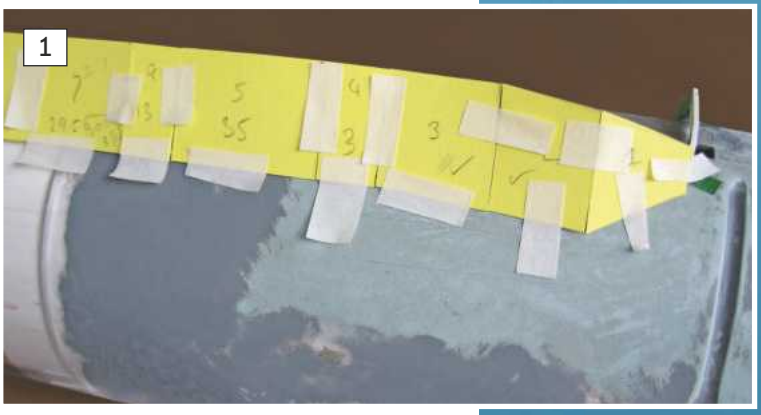
NR-1

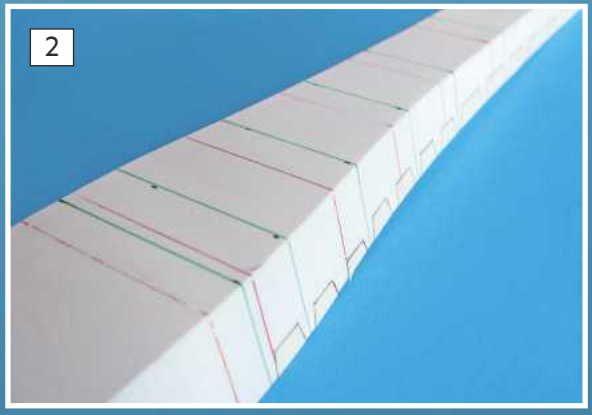
After months of mould-making **Roger Suitters** finally gets stuck into detailing – first stop, casing plates and rivets

In the last issue, if you remember, we spent some time working on the keel unit and used redundant cardboard boxes to create templates for the various parts, which were then used to fashion the actual part in styrene sheet. It's a tried and tested method and one we're going to revisit now in the fabrication of the top casing.

Said casing is a key feature on the NR-1 and is, in many ways, a throw-back to W.W.II-era submarines. It consists of many steel plates, all riveted together. Starting at the bow end, then, the panels were cut from thin cardboard **(Photo 1),** each being temporarily attached to its neighbour with strips of masking tape. Given that the main pressure hull is cylindrical, one has to appreciate that as the profile of the casing changes, so too does the shape of each steel plate. The real work is in making the cardboard version, for when this is right it's relatively easy to create the final version from styrene sheet of various thicknesses **(Photo 2 & 3).** In this last picture you can see a strengthening bar being added to the inside of the casing as a result of the freeing holes having been opened out. **Photo 4**, meanwhile, shows the inside rear end of the casing – the little brass bosses ensuring it engages with a mounting on the main hull – whilst **Photo 5** is of the forward end, which fits immediately behind the towing gear. The crafty bit is that the outer riveted plates were then stuck over this former, thus hiding the odd mistake. Said plates are 0.25mm thick with pins (as used before) pushed through them and then ground away on the blank side **(Photo 6)**. Each of the plates is stuck on with double-sided tape rather than glue and, so far, none have come off. Another point to note is that the outer casing sides do not actually meet the pressure hull, as you can see in **Photo 7** of the completed and painted forward casing. This is another reason for having an inner former with the riveted plates added to its exterior. As a result of all this, and the convoluted curves on the casing, this part of the build was not a short weekend's work!

This sort of construction needs patience and there's quite a bit of redundancy as one throws away parts that are just 'not quite right'. Mind you, there's no doubt that using cardboard for templates does save an awful lot of time in the long run.



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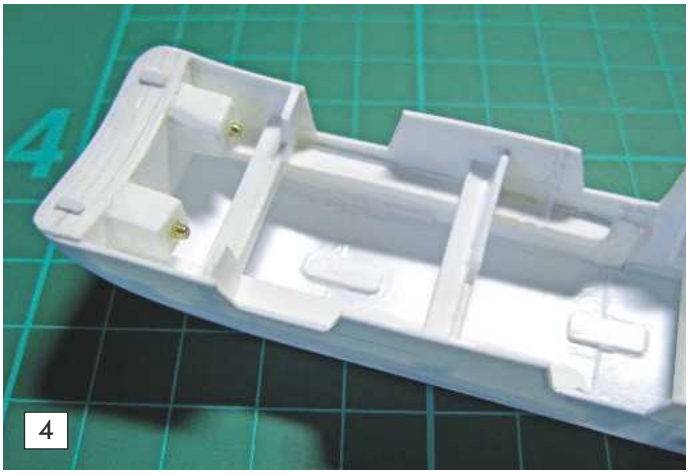
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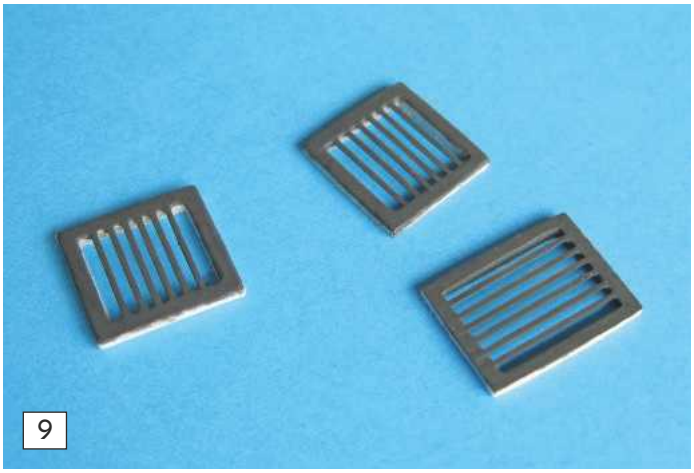
Securing the casing

On the top of the casing are three grille vents, one approximately 75mm from each end and the other near the centre of the submarine. Under each vent a flat styrene beam was glued and drilled to allow a threaded stud to pass through. A nut then secures it at each location, this being hidden by the removable grille. **Photo 8** is of the aft part of the casing, the square hole being for the grille. Fitting the blocks and their studs to the main central tube section of the hull required careful alignment, initially tacking the blocks to the acrylic tube and then reinforcing the joints with epoxy adhesive.

The grilles themselves have frames made of 2.5mm square styrene, with vee grooves cut in their undersides to accept 0.5mm round brass rod, glued in place. A bit of careful filing and sanding followed, to end up with the painted result as in **Photo 9.** These grilles also allow the escape of trapped air from beneath the casing, always a bugbear for model submarines as excess air can affect their buoyancy quite markedly. Inside the casing its frames are also shaped to aid the passage of air out via the grilles.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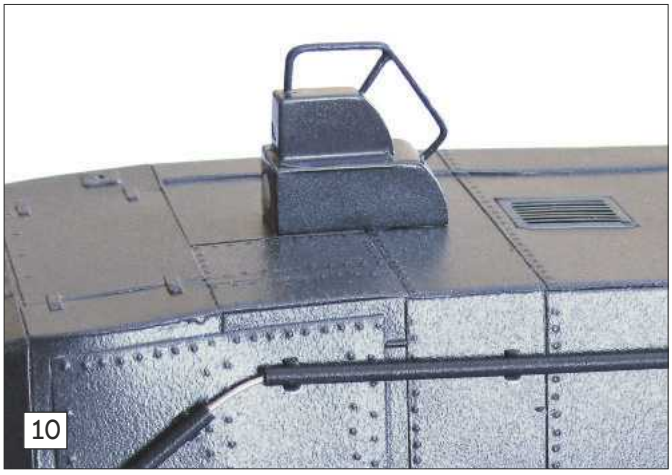
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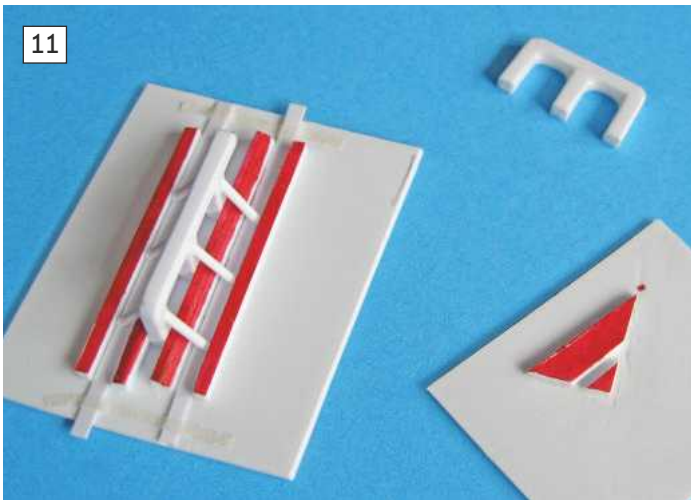
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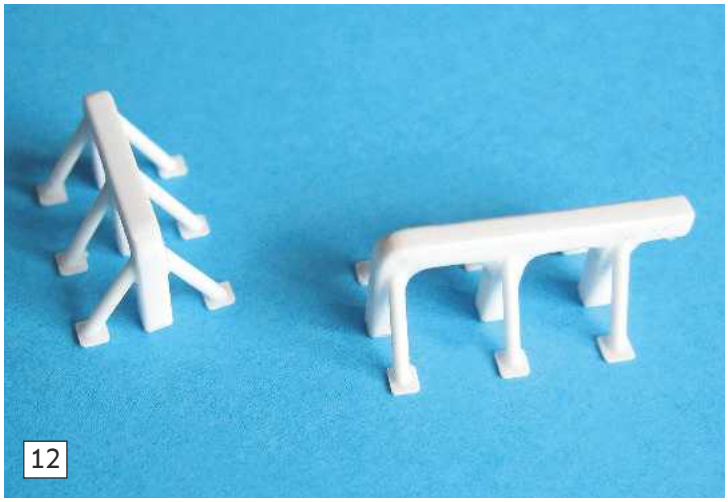
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Other fittings

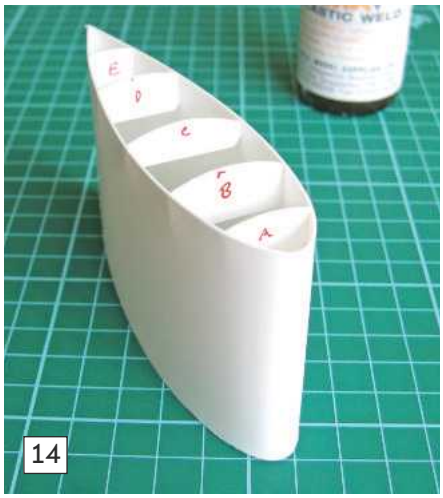
On top of the casing, towards the bow, is a double box. The larger lower box, contains a camera (I assume) and the upper box contains the forward navigation light. Both were made from styrene card, then filled with Alumilite resin so they became solid yet still quite light in weight. The camera lens is a very short piece of brass tube, glued to white styrene sheet and the tube filled with two-part clear epoxy which, if slightly overfilled, will take on a dome shape. Thus, it appears to be a lens over a white reflector. After the two boxes were glued together, the handrail was made from brass rod, soft-soldered together **(Photo 10).**

There are also two large orange painted bars, which do the job of bollards. Each unit comprises one horizontal top bar with three square vertical bars supporting it beneath. Also, on each side there are another three round support bars. A simple jig made the task easy **(Photo 11)** with the unpainted result in **Photo 12** and on the model in Photo 7. To get curved joints where the vertical bars join the top horizontal bar, Alumilite resin carefully applied to the inner corner took on the required shape, setting hard quite quickly for final filing and adjustment. The feet on the side support legs are styrene strip glued to each three-in-one piece, then cut away as necessary to leave the individual square feet all in line and at the same height and angle of incidence.


13

Conning tower

As you can see, this is a major feature of the model with lots of detail and more of those dreaded rivets. After some thought I decided the best way to make it was to use 0.75mm styrene card, reinforced with glass fibre. To start, half the required shape was marked out on folded paper, which was then opened up so the full tear drop section could be transferred to two pieces of styrene card which would become the top and bottom of a former box **(Photo 13).** With the box assembled, a cardboard strip was cut and trimmed until it could be fitted around the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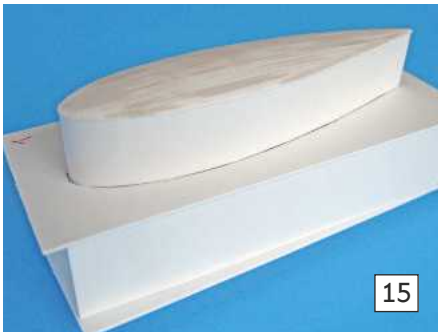
inner edge of the teardrop profile, this giving the total length of the piece of styrene that was to fit in the hole. Where would we be without cereal boxes? A matching strip of styrene was now placed in the teardrop hole and left overnight to take the curved shape. I had considered warming it in hot water but this was not actually required.

Next day, the two ends of the conning tower side piece were glued together and left to thoroughly set. I now had the sides of the conning tower nicely shaped whilst held in the former. But how to do the domed top section? The first task was to glue some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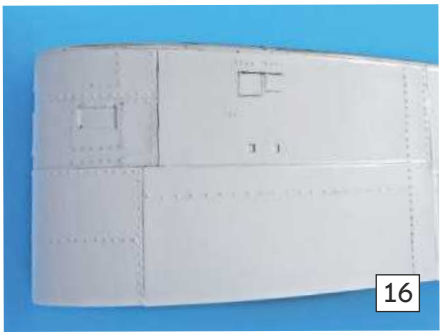
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17

shaped pieces of styrene inside to create a framework for the top **(Photo 14).** In the end I decided to use thin strips of styrene to cover the framework because this way the 'planks' each conform to the compound curves nicely along the length of the tower. Also, running each strip between one's fingers, enables them to be easily bent and slightly twisted as required. Once complete, and whilst the conning tower was held in the jig, they were smoothed with wet and dry sandpaper, filler applied and the process repeated, **(Photo 15).** Note that a small overhang has been left at the top. Once the top of the conning tower was satisfactory, the frames were broken-out and the inside given a covering of glass fibre resin and tissue to make it all more rigid. The resin will not attack the styrene to any degree but still adheres well enough.

Riveted panels

The conning tower top was left with a very slight overhang to allow for the thickness of the plating detail sections. Once again, these panels were made from 0.25mm styrene card, with their rivets inserted as for the hull casing. The panels were glued in place with liquid polystyrene glue **(Photo 16)**. Of course, it wasn't quite as simple as that as the two sides of the conning tower are not identical, the starboard side having an access door in it. Here, the door's shape was cut from the relevant riveted panel before it was fitted. Once that was done, the riveted panel was glued in place and a very thin strip of styrene glued around the inside edge of the door opening to create the frame **(Photo 17).** This was then sanded smooth and a door made to fit.

The hydroplanes mounted on the conning tower (a standard feature on US Navy submarines) are cast in Alumilite resin from moulds in the same way as the stern rudders and hydroplanes. Only one needs to be made as they are identical, the opposing moulding needing simply to be turned upside-down to mirror the first.

Back soon

That's it for now, I've run out of space so I'll see you next month when we'll finish the detailing and get some paint on the hull.

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Where better to start than with yet another FREE plan! Adopting the theme of this month's article on shallow draught hulls, and putting all the theory into practice, Glynn Guest has penned a right corker in the form of Caerleon Castle, a small 1950 / '60s era cruise ship. Since square rig sailing ships have such massive appeal we've asked Neville Wade to return and explain how best to handle one on the water and we've finally made space for that feature on Kim White's 1:72-scale model of the W.W.I battlecruiser HMS Invincible – prepare for a treat. Elsewhere in the issue we've a piece on a resurrected George Turner Models vintage speedboat, a review of the Amati Grand Banks 46' Modern Schooner and more of John Parker's wonderfully evocative retro ramblings. Of course, there's also subs, steam, warships, a photo report from the Midhurst Model Exhibition, a Vic Smeed scale-up and oodles more.

Caerleon Castle

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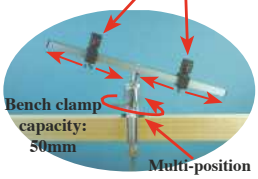

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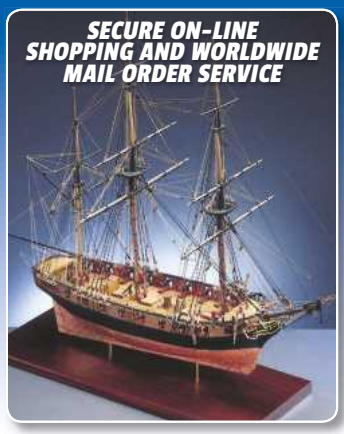
PARTING SHOT

Misty morn. Richard Simpson's Envoy Class tug – HMS Enigma – is backlit by rays of early morning sunlight that pierce the mist and catch the smoke falling away astern. Built from the Model Slipway 1:48 scale kit, the tug has a Steam Master smoke generator and was photographed at Batley Park, West Yorkshire.

Camera: Canon EOS 30D
Focal length: 260mm
Aperture: f7.1
Shutter speed: 1/400th second
Photographer: Richard Simpson



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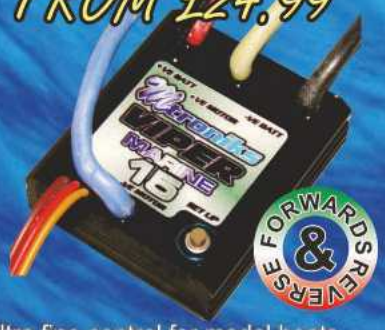

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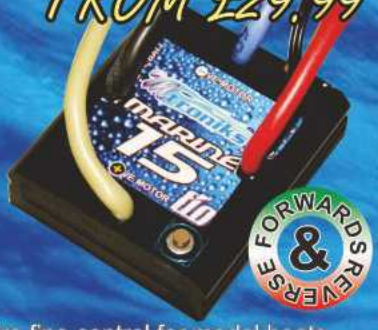

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