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February 2022
Vol.72 No.855

model Boats



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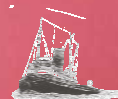
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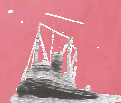


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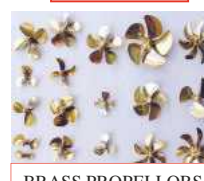
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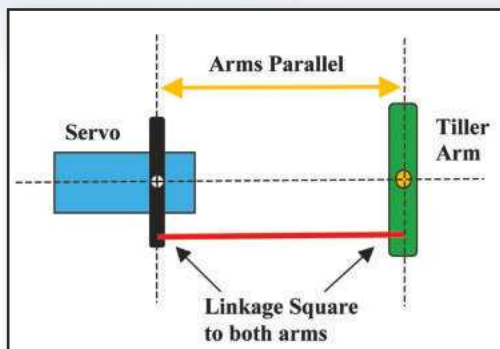
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Just a little hint of what you can look forward to in the March 2022 issue of Model Boats

If you pick up your copy of the magazine from a newsagent, as opposed to having it delivered via our subscription service, you will probably have noticed that we have, regretfully, had to increase the cover price this month. While we've tried to keep this markup at bay for as long as possible, huge increases to overheads driven by the rising price of paper, printing and fuel costs, have unfortunately left us with no other choice. On the upside, however, if you turn to page 79, there's an amazing New Year subs deal offering three issues for just £5 – which compared to purchasing your next three editions at newsstand will save you an incredible 73%.

I appreciate that magazines are one of life's little luxuries and that most of us are really starting to feel the pinch right now, thanks to just about every aspect of our day-to-day living becoming ever more expensive. However, in the grand scheme of things, it's worth remembering that your monthly mag still costs less than, say, a couple of pints of beer or a sandwich and a coffee in your local cafe – and, heaven knows, after the strange and difficult couple of years we've had we all need a little escapism and something more positive to focus on than how crazy the 1:1 scale world seems to have become!

With that in mind, as always we've tried to pack as much value into the pages ahead as possible, along with, courtesy of the kind folks at CML Distribution, the chance to win a truly superb ARTR (Almost Ready to Run) Joysway DragonForce 65 R/C yacht.

So, enjoy your read, and please keep your feedback and future content suggestions and contributions coming!

Lindsey

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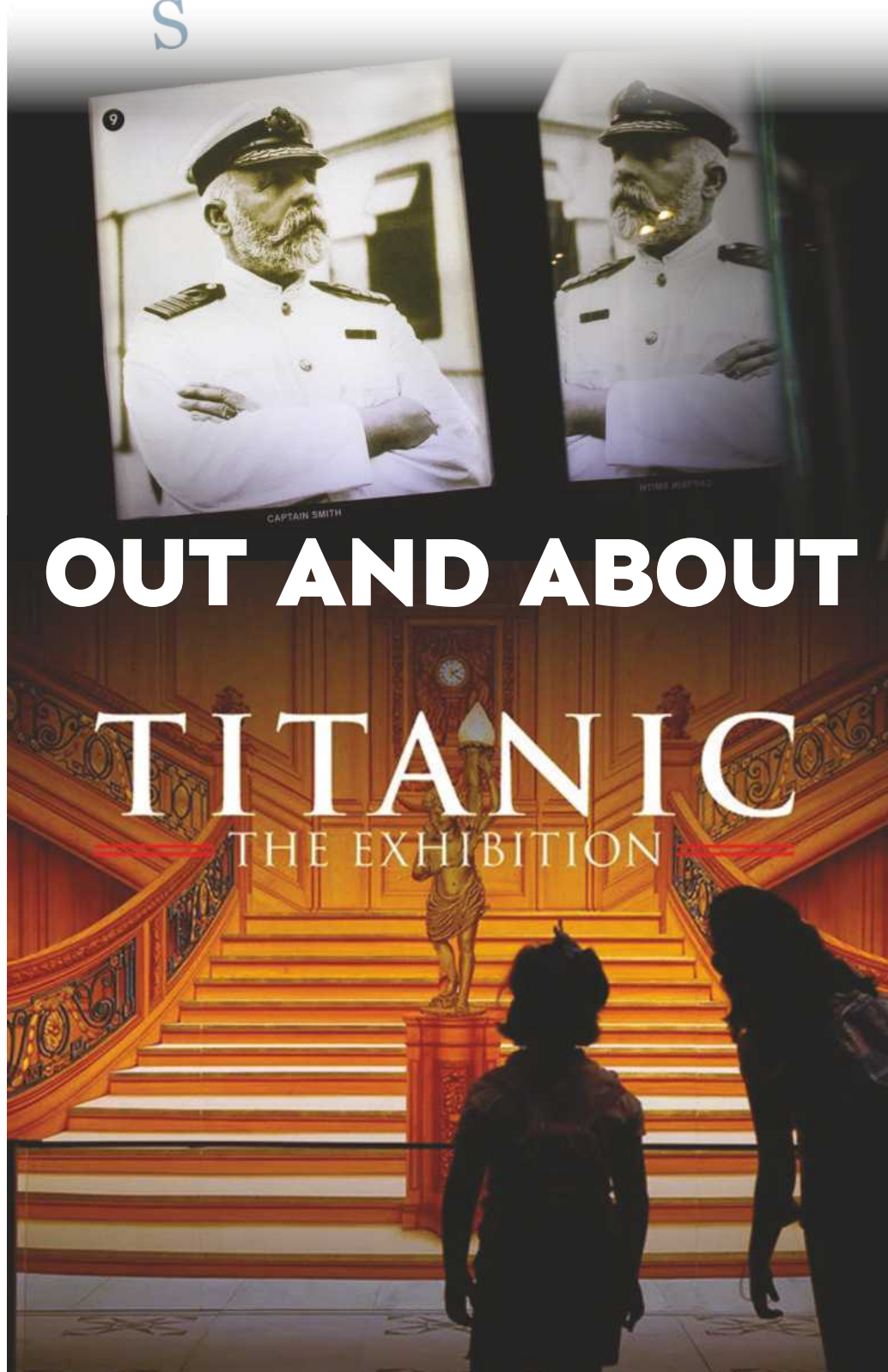
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Our hobby-related news round-up

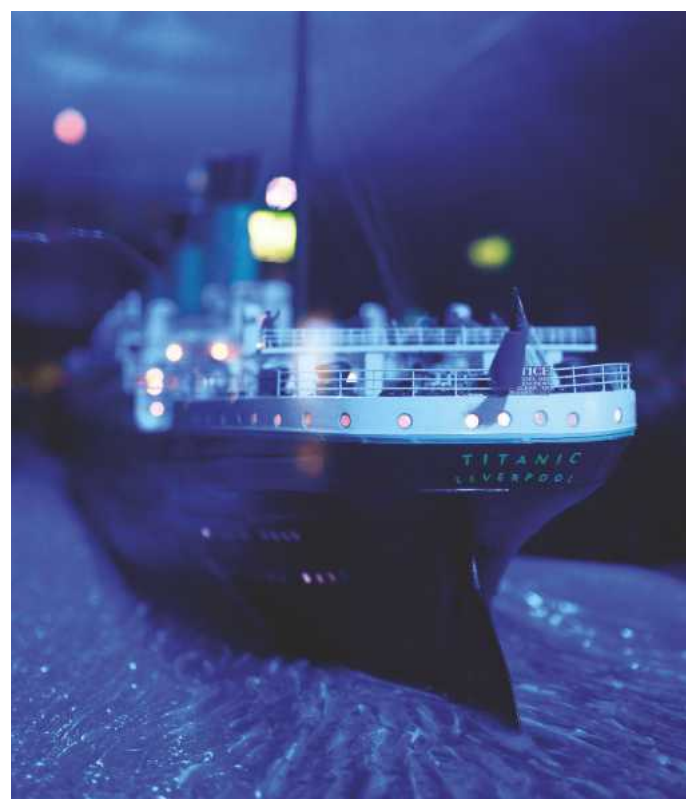
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Titanic: The Exhibition

After touring various cities in Europe, this immersive pop-up exhibition has now arrived in London (at Dock X London Retail Park, Unit 1, Canada Water, Surrey Quays Rd, London SE16 2XU).

Visitors will be able to walk through a detailed recreation of the ship's interior – from a first-



class suite to a humble third-class cabin – as the accompanying audio guide (for which you will need to take along your own smartphone and headphones) tells the ill-fated ship's fascinating, albeit tragic, story. Along with the testimonies of survivors, never before seen in the UK photographs, handwritten letters and personal belongings provide an intimate insight into the lives of the passengers aboard.

Opening hours are as follows:

- * Mondays, Wednesdays & Thursdays: 10am–7pm
- * Fridays: 10am–8pm
- * Saturdays: 9am–8:30pm
- * Sundays: 9am–8pm

To stagger admissions and reduce numbers within the venue at any one time, thereby complying with Covid regulations and enhancing visitor experience,

small group sessions (each lasting approx. 80-90 minutes) will be made available every half hour.

Standard access tickets are priced at £22.90 per adult, whereas 'VIP Access', priced at

£37.90, will include fast-track entry, a souvenir photograph and an exhibition booklet. For further details regarding concessions and group bookings, visit www.feverup.com ●

IN MEMORIAM



Chris Larsen

Over the Christmas holidays we were informed that on December 18, 2021, Chris Larsen, President and former

Chairman of the Northampton and District Model Boat Club, died peacefully, having sadly lost a long and very brave battle with cancer.

Speaking on behalf of the club, John Price, has paid the following touching tribute: "Chris had lived with cancer for over ten years. It's been hard

to face such a loss at what is, traditionally, a time of joy and goodwill, but however painful it's been for us, we all know how magnified that pain will be for his friend, soulmate and wife, Pamela, and our hearts go out to her.

"Back in the days when he was new to the hobby, Chris may have seemed an odd selection for Chairman at first. He was, however, always so enthusiastic and willing to help others, and would, without hesitation, volunteer to work for the club in any capacity required; so, all things considered, he was very much the right man for the job.

"Chairmanship, of course, brings with it issues and pressures, all of which Chris met with a positive humour, the sort of stoicism that we would see again later, and a confident but easy-going management style that never once edged towards authoritarianism. It's hard to say if those pressures told, but Chris always gave the appearance of enjoying the role and the value it gave to us all.

"Even after the diagnosis, Chris carried on as Chair until the physical strain became too much. While he needed frequent rests, his return was always anticipated gladly, as indeed was his invaluable input.

"An enduring memory is Chris's positive attitude to his diagnosis, and the treatments required. He'd often, when approaching a difficult procedure, say that if it gave him another six months he'd be happy; never a complaint about what he had to face, only gratitude for those who looked after him.

"Happily, Chris had a few of his "six months", but wouldn't it have been nice to have had one or two more? Because Chris was a gentleman, loved by all and born to be missed."

Our sincerest condolences to Chris's wife, Pamela, and his family and friends, including, of course, all his fellow club members at the Northampton and District Model Boat Club. ●

LEFT: An artist's impression of Northern Xplorer's new zero-emission cruise ship. Image courtesy of Northern Xplorer.

World's first hydrogen-powered cruise ships

Northern Xplorer AS (NX) has announced it hopes to have the first in a series of zero-emission, luxury cruise ships operational from 2024/2025. New government regulations coming into force in Norway from 2026 will make zero emissions mandatory in the world-heritage sites of Geirangerfjord and Nærøysfjord, effectively rendering them the world's first zero-emission marine zones.

The ships will feature clean technologies including fully electric propulsion, battery energy storage, hydrogen fuel cells and auxiliary renewable energy supply (wind and solar power). Sophisticated HVAC systems will safeguard against pathogen spread while extensive use of recyclable materials will promote circularity. They will also feature advanced LADAR technology to detect marine plastic debris and raise awareness of maritime pollution. ●

PRIZE DRAW WINNERS JSC lucky three!

In the December 2021 issue of Model Boats, we offered you the chance to win one of three superb JSC Gift Sets, each made up of the card kit for the cargo ship *Susanne*, the available to buy separately laser-cut extension pack for this kit, the tools and glue required for the build and a stunning 'water-effect' base on which to display the resulting model.

We are now delighted to announce the winning entrants in this prize draw as:

- * B. Pugh of Evesham, Worcestershire
- * K. Dobson, Sunderland
- * Jim Palmer, Troon, Ayrshire

Congratulations to you all!



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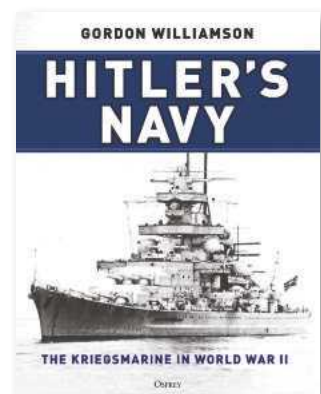
Shackleton, includes Shackleton's own accounts of his two most famous expeditions, entitled *The Heart of the Antarctic* and *South*, along with original photographs, drawings, maps, and panoramas.

Priced at £195, this Collector's Edition is exclusively available from The Folio Society (www.foliosociety.com). ●

Hitler's Navy: The Kriegsmarine in World War II

Scheduled for launch on February 3, 2022, this new book, penned by naval historian Gordon Williamson, promises to provide a complete history of the German Kriegsmarine throughout World War II, with detailed portraits of some of the most famous German vessels of all time: the capital ships *Scharnhorst* and *Gneisenau*, the cutting-edge battleships *Bismarck* and *Tirpitz*, and the famous cruisers of the *Deutschland* and *Admiral Hipper* classes, including *Admiral Scheer*, *Admiral Graf Spee* and *Prinz Eugen*. It also examines the roles played by a wide range of Kriegsmarine vessels such as light and auxiliary cruisers, destroyers, U-boats and E-boats, and smaller coastal, auxiliary and attack boats.

Due for release in hardback format, the title will carry an RRP (Recommended Retail Price) of £30. Advance orders can be placed via the publisher's website at www.ospreypublishing.com or directly with your local bookstore by quoting ISBN 9781472847928. ●



RIGHT: Why not sail under different colours with one of these spare/replacement hulls available from CML Distribution? Each hull comes with servo tray, deck eyes and finbox for a RRP of £64.99* For more information and to see the range of spares and accessories available for the Joysway Dragon Force 65 visit www.cmldistribution.co.uk



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Thanks to the incredible generosity of the kind folks at CML Distribution, this month we're able to offer you the chance to win this superb V6 ARTR (Almost Ready to Run) version of the Joysway Dragon Force 65 (Product Code JY8815A), which retails at £179.99!

The Joysway DF65 is currently by far the best-selling R/C yacht in the world. The reasons are as simple as the concept and design itself, which was developed in collaboration between Joysway and top R/C performance yacht designers. Sleek lines and competition-developed sails make the DF65 race, perform and compete in all wind conditions! It is a recognised competition R/C yacht that can be sailed at many clubs and events all over the UK and EU.

The boat is based on the ICE design, with an ABS hull, profiled aluminium fin and moulded plastic rudder. The A rig that comes with the boat is a full-sized, fractional low aspect rig, with carbon spars and a ball raced gooseneck.

SPECIFICATIONS

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Rig Height:	915 mm
Overall Height:	1338 mm
Total weight:	1200g (Batteries not included)
Sail Area (Mainsail):	1460 cm ²
Sail Area (Jib):	766 cm ²
Sail Area (Overall):	2226 cm ²
Hull Material:	Molded ABS with painted finish and logo sticker

WHAT'S INCLUDED

- * Fully Painted, Moulded ABS Hull
- * 50-micron mylar film racing sails with painted flow stripes and logo
- * Extruded carbon fibre mast and boom tubes
- * Extruded aluminium keel with zinc alloy ballast bulb
- * Metal geared digital rudder servo and fast, powerful sail winch
- * Display stand (Moulded plastic and glass fibre tubes)

Please note that radio gear is not included with this ARTR (Almost Ready To Run) V6 version. This can, however, be purchased directly from CML Distribution's website at www.cmldistribution.co.uk

CML Distribution also stocks an RTR (Ready To Run) version (Product Code JY8815), which includes everything necessary to get started (pre-installed servos, pre-assembled booms, sails, fittings, etc, meaning all you need to do is assemble the spars, mast, hang the sails and add 8xAA batteries, and which retails at £219.99. ●



JY881547



JY881546

Prize Draw courtesy of CML Distribution



JY881548

* Price correct at the time of writing.



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Ashley's take on the Tupolev A-3 Aerosledge.

Tupolev A-3 Aerosledge

The Iceman Cometh... So, what better time to share details of the little Russian workhorses built by **Ashley Needham** and his fellow Bushy Park boaters

“The rear fin shape and radial engine appealed to us both and we especially liked the possibility of a boat that could operate not only on a weed strewn pond but on the ice”

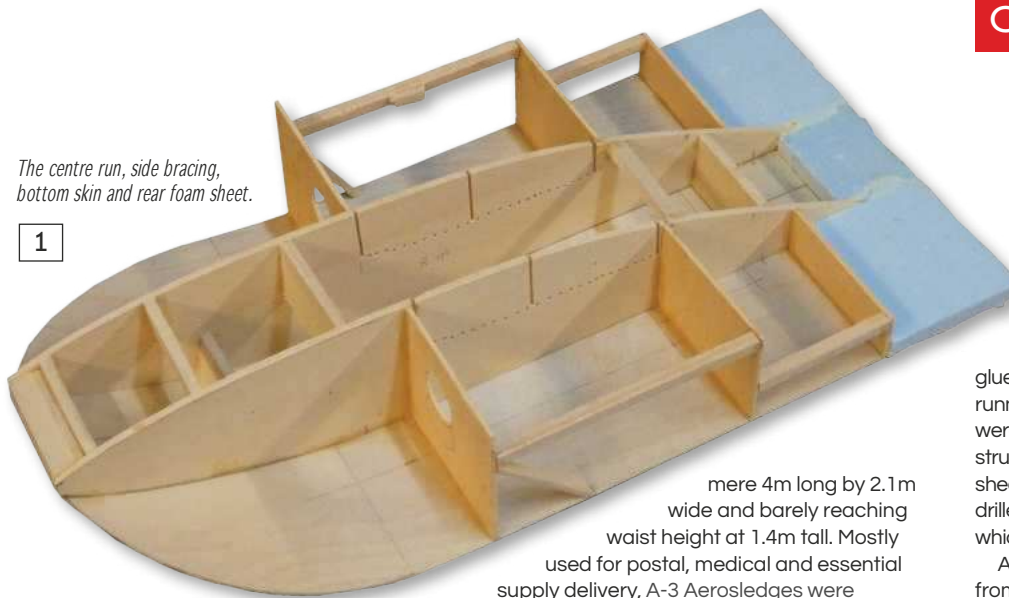
The Bushy Park boaters have recently been on a bit of an airboat (using either air props or ducted fan units) building path. These boats came about after a chat regarding possible new projects with my mate Trevor Holloway. Trevor produced a crumpled print of a picture he'd seen ages ago on the internet of a Russian water/snow vehicle propelled by a



The very futuristic-looking Tupolev A-3 Aerosledge: an all-metal amphibious aerosledge designed to transport passengers and light freight in remote areas of the Soviet Union. Officially known as the A-3 'Hope' ('Nadezhda' in Russian), it uses a single pusher propeller mounted behind the enclosed cabin to propel the craft over snow, ice or water. Image courtesy of Brandon Adams.

The centre run, side bracing, bottom skin and rear foam sheet.

1



mere 4m long by 2.1m wide and barely reaching waist height at 1.4m tall. Mostly used for postal, medical and essential supply delivery, A-3 Aerosledges were common a sight throughout Eastern Europe and remote areas of Siberia and served from the mid-1960s right through until the 1980s.

Along with better pictures, more details came to light. The Tupolev A-3 Aerosledge was a five-seater, with a large luggage space built into the nose and cabin, and had a radial aero engine, a very odd arrangement of two props bolted together not at 90 degrees but barely 5 or 10 degrees apart. In addition to the stylish tail fins, it had what appeared to be skates fitted underneath these fins (more on this later).

Design and construction

I dislike building in competition for things like this, so, as both Trevor and I were going to have a go, I opted to build the very simplest interpretation of the beast, while he went for a more sculpted version. We would be building 'in the style of' and not replicating an A-3, and neither boat would be a full-fat version full of curves. In description, the boat would have a flat bottom (no chine), a flat top (no round-down) and, you've guessed it, flat sides! The cabin would also have vertical sides, with a foam top for a bit of shape, and, similarly, a softwood nosepiece would be used also to round the very tip.

We all have our preferred method of construction, and the one I adopted follows that used for several of my other airboats. Mostly this concerns having a channel in the centre of the boat to provide not only longitudinal stiffness but to ensure I have the widest possible range of movement for the battery, as this usually comprises the only ballast and thus affects the balance for running. Two side-profile lengths of 3mm Lite-ply were cut, braced together

and glued centrally onto a shaped base sheet of 0.8mm ply. Several side pieces were fitted to support the thin bottom ply sheet and, later, the top sheet (see **Photo 1**). 10mm Styrofoam sheet was glued in place at the stern, and once dry, runners of 6mm square balsa strip or Styrofoam were glued into position with PVA to stiffen the structure and provide a surface which the side sheets could adhere to. Note the cuts and pre-drilled holes in the central runners (see **Photo 2**), which we shall return to in due course.

A motor support was fashioned next from a lamination of two pieces of 1.5mm ply, which provided the required stiffness, and holes were drilled ensuring the motor was positioned so as to provide clearance for the 7-inch prop above the foam. A small square of ply was added as a brace, although the strut was quite solid just sitting in its epoxy seat! Attention then turned to rudder operation. Having weighed up various other methods, I settled on using two servos, operated together via a Y-lead and separate plastic servo 'snakes'. This enabled easy access to the various screws, as there is a clear line-of-sight to these items through the deck opening. Finally, the inside was given a coating of Eze-Kote acrylic resin to waterproof it, and the top skin fitted.

Clever cheating?

I cut two identical pieces for the top and bottom skins so as to get the same curved front. As both the top and bottom curves (side profile) are different, the top being quite shallow, the edges of these skins would not match when using a set square vertically. It was just too difficult for my technical drawing skills to produce a shape that would match once curved. The difference, however, was actually quite minor and two minutes of sanding, using sandpaper on a vertical block, had it sorted. Having laid the top in place, which required trimming at the rear, so it sat properly on the foam and creating a cut-out for the motor mount, it was fixed in place with foaming Gorilla glue. Once dry, an access

The Tupolev A-3

Both Trevor and I reckoned a better picture of the Russian craft must be available, so once back home I typed in 'Russian snow airboat' (or something similar) on my internet browser. Instead of the anticipated hours of searching, literally hundreds of pictures flashed up of exactly the boat we were interested in, and it had a name: the Tupolev A-3 Aerosledge.

I was surprised not only by the almost instant result to my search but that it was not the obscure or one-off craft we'd supposed it to be. Over 800 had been made; indeed, it seems to have been the Russian equivalent of a Land Rover for snowy country use, and not really that much larger, measuring in at a

2



The grey foam fitted to the edges. Note the rear mount upstanding at the stern.

The pre-curved 0.8mm ply sides.



3

hatch was cut through in the previously marked position and combings fitted (the purpose of the aforementioned saw cuts and holes, therefore, now becoming obvious). The centre run provided the necessary curved former for the top until the glue has set, but once the hatch was cut out, the pieces could be broken off to lower the runners for better access, as they're quite tall and narrow (50mm between sides), making it tricky to 'fiddle' with the battery and tuck the wires in.

Work on the side

Having the top and bottom skins in place and well braced meant that I could lay the boat on its side over some 0.8mm ply and draw round it to get the side profile correct. If I'd cut the sides separately beforehand, I would have had to allow for the distortion of the curved bow. Once marked, the tail was drawn on. This has been altered a bit to get more of the rudder into the airstream, principally by making the flap longer compared to the

"Despite the theoretical undesirability of having water rudders on airboats, guess what? Yes, the Tupolev has a pair of water rudders! Also, at the bottom of the rear fins are blades (there is no other word for them): the A-3 has a pair of skates at the stern!"

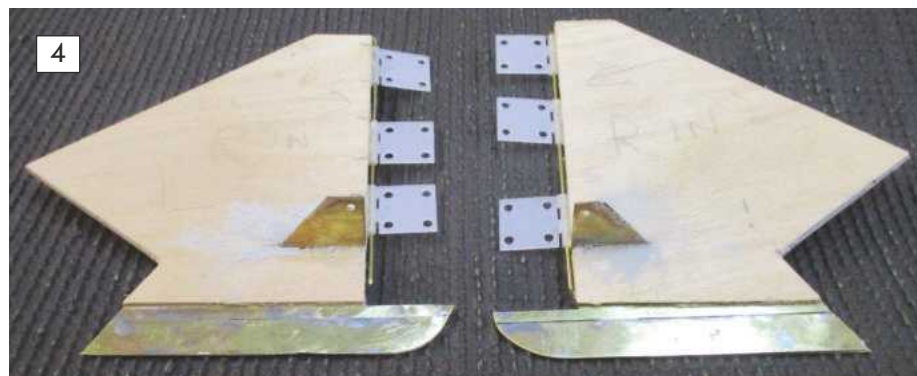
original, as if anyone will notice! Sides were cut oversize on the body, but to the right size for the tail. Separate pieces of 1.5mm ply were cut and Gorilla glued to the inside of the tail and incorporated hinge halves to match those on the rudder. Once dry, the sides were glued in place and trimmed as necessary (See **Photo 3**).

Trevor's boat differs in that he has used internal bracing to provide the shape rather than central ribs, and he built his from the top downwards: top, combing, sides, then bottom. He's incorporated some slope on the upper surfaces and chine at the front end; the rear 2/3rds of the hull bottom, however, is flat, as this is what we thought would be needed on snow or ice. Trevor used the same 0.8mm ply material for the skin of the hull at the front and underneath but a lamination of 1.5mm ply for the aft fin-section and rudders. He also managed to use just the one servo to operate his tail fins, which I couldn't manage due to the internal runners being in the way.

Tail empennage and resulting matters

Despite the theoretical undesirability of having water rudders on airboats, guess what? Yes, the Tupolev has a pair of water rudders! Having very stylish rear tail fins of a low form and sited at the outer edge of the prop arc, so not directly in the prop-wash, means there will be less rudder effect than one might desire (compared to having both fins located for good prop-wash), thus limiting the control force available from them. Also, at the bottom of the rear fins are blades (there is no other word for them): the A-3 has a pair of skates at the stern!

Just possibly, having too much air rudder control at speed would be a bad thing on snow and ice, making the craft directionally unstable and difficult to handle, thereby leading to spins and driver fatigue. With its history of designing supersonic bomber and fighter aircraft, however, we had to assume Tupolev knew what it was doing, and indeed discovered underneath it had provided three stainless steel ribs for directional control over ice. The side 'skates' don't protrude underneath the bottom surface by very much (about 10mm) and fit as close to the underside as is possible, so as not to catch weed or indeed the edge of any ice floes. However, as undesirable as water rudders are on an airboat, it does make all the difference in any sort of wind. Even with a large rudder directly behind the prop, airboats struggle in a breeze and even a small water rudder makes them much more usable throughout the year (see **Photo 4**).

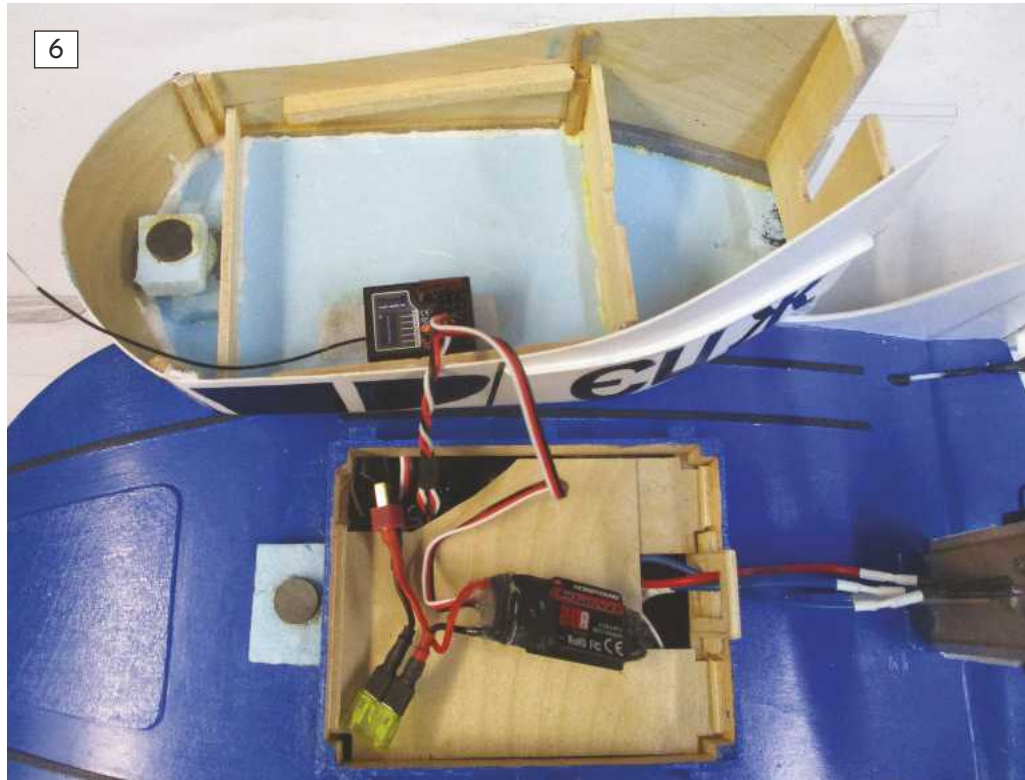


ABOVE: The tail fins showing Ashley's plywood lamination, and the brass strip and hinges incorporated. BELOW: In this view of the cylinder engine sported by Ashley's Tup, notice the water just over the rear shelf; this clears as soon as the boat moves forward.

5



6



The cabin construction, with the receiver inside the cabin and the sec on the sprung ply hatch.

Someone once said to me "The way to make a fast boat is to keep it light", but, in our opinion, there was only one way to construct the rear fins to stand up to some serious ice-work, and it wasn't going to be that light! I decided to make the tail end from a laminate of 0.8mm ply and 1.5mm ply, as per the body side. Sandwiching the plastic two-part hinges and the brass skate-rudders between the ply gave a good fixing for both items and made the air rudder nice and stiff. As we hoped that the models would eventually see some ice, we needed to take into account that the skates would take a bit of a beating. Brass sheet were, therefore, used on both models; reinforced on my version by soldering on a second strip (underneath the wood laminations), as I'd opted for a thin 0.42mm gauge to match the thickness of the hinge plates whereas Trevor had opted for 1mm sheet. My tail servo arm is in one with the brass sheet, bent at 90-degrees and having a second piece soldered underneath to stiffen. In total, five 2mm deep by 4mm wide strips of wood (make unknown!) were glued underneath the flat bottom to provide a few ribs for ice running; not so much for directional control but rather to add a bit of knock-resistance. Trevor opted for the same setup, viz. skid/servo arm, other than using the thicker sheet.

As I rather like the triangular rudder, that's what I went for – although I lengthened the top a bit to try and catch more of the propeller air-wash, while Trevor, probably more sensibly, made his fins square.

Powerplant

On the original craft, early models used a 100 bhp M-11 five-cylinder air-cooled radial engine while later models were fitted with an AI-14R nine-cylinder radial engine producing 260 horsepower. Both of our models use 28mm brushless outrunner motors: my version featuring 1300Kv and

200 watts, with Trevor's sporting a 1400Kv motor of approximately the same wattage. As an aside, the dimensions of our models were fixed by the use of 7-inch propellers as I knew from experience 28mm motors will turn 7-inch props satisfactorily, and there's a wide range of styles available at this size. As the prop on the real thing is almost as wide as the boat, a width of 200mm by about 400 long (overall, including fins) gave us the correct proportions and a decent boot-sized model: not too big, not too small, in fact, just right. I decided to use two props on the same shaft to emulate the odd setup on the original craft, as my 1300Kv motor should be OK with this. Trevor was going to try for a 6-inch propeller initially, as he has a higher revving motor and, prosaically, happens to have several 3- and 4-blade 6-inch props!

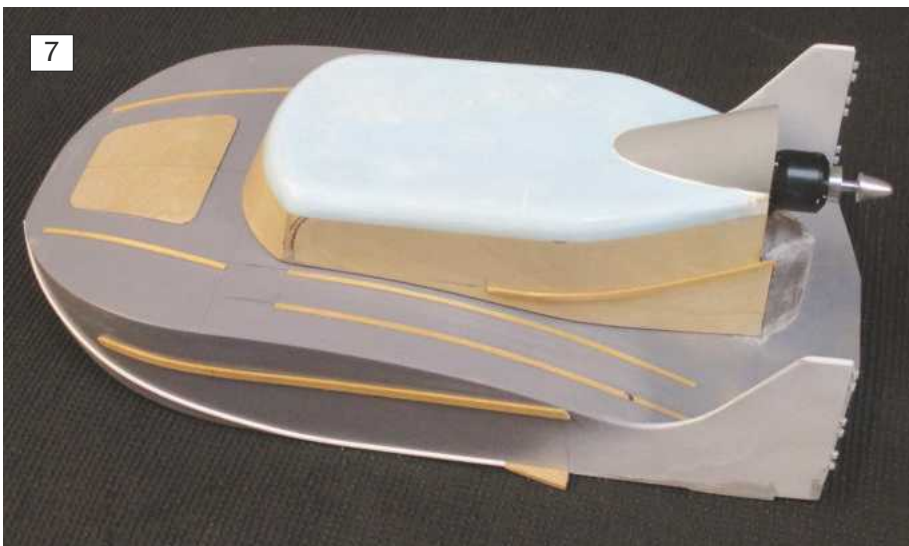
In any event, changing a motor on either design is as easy as removing four screws and unplugging the motor wires! To finish off, a fake radial engine was knocked up from plastic tube, wood dowel and BBQ skewers, similar to the Walrus one I made earlier (see Feb 2021 issue of Model Boats) – although with a touch more detail as it's more 'on view' than the one used in the aircraft, which, to a certain degree, is hidden behind the wings. It's a relatively heavy item but essential, as it's one of the key styling features of the craft. Also, unfortunately, we've had to use 5-cylinder radial engines (see **Photo 5**), as the 9-cylinder variety appeared to blank off too much of the propeller sweep.

Finishing off: cabin and associated detailing

Both models used the cabin combing as a base on which to construct the cabin over. I used 0.8mm ply with reinforcing strips here and there, and a 10mm Styrofoam top in order to round the corners down a bit. Unlike Trevor, I didn't cut out the windows, as by not doing so I could brace the cabin as necessary (see **Photo 6**). Trevor used 1.5mm ply, which being stiffer did not need so not much bracing, and glazed his windows with thin acrylic sheet afterwards, as he's also fitted a cabin floor and seats.

As with a car, there isn't much hanging on the outside on the actual Tupolev A-3 Aerosledge, it's quite clean. All that needed adding, therefore, was a bonnet-boot on the nose, a few rubbing strips, and, on Trevor's craft, spot-lamps, and that was about it. A combination of dowel, strip-wood or styrene shape, cut as required for the ribbing, served to do the job, while a piece of ply was used for the bonnet cover (see **Photo 7**).

7



Ashley's Tupolev A-3 Aerosledge just prior to painting.



ABOVE & OPPOSITE: Ashley's version of the *Tup*. Note the different Russian script applied to right and left sides.

8

Paint

We both opted for a brushed finish. I chose to work with Hobbies' acrylic paints, selecting a bright blue for the overall finish and white for the cabin and tail fins, on my version. Some sticky Russian lettering was ordered to add some authenticity. On arrival, these letters were a bit bulkier than I'd anticipated, but being very frugal, I used them anyway. Due to their size, I was unable to spell anything meaningful down the side of my craft as planned, so instead simply chose a group of three letters that were sufficiently different (to the normal Arabic ones) and plonked them on the cabin. My apologies to any Russian speakers if I've inadvertently managed to emblazon this model with something rude! As you'll see, I've also applied a red star, courtesy of a BECC vinyl sticker, to the

"My apologies to any Russian speakers if I've inadvertently managed to emblazon this model with something rude!"

fins (see **Photos 8 & 9**). Trevor went for a white top and red body, achieved using Hammerite gloss paint, with an ambulance-style red cross applied to the side and tail (see **Photo 10**).

Testing times, comrade

Obviously, the real thing worked well enough, but did this translate to our simplified-shape models? Of course it did! Having water rudders certainly ensures the craft will steer well, while

the 200-watt motors should provide more than enough power, although some experimentation with the props may be required.

Speaking of which, although I had several pairs of props that would fit on the shaft to give me the original's odd twin-prop look, being very thin none of them looked right. A single cut-down 8x4-inch prop, however, looks very convincing, as it gives a much fatter blade than an unmodified 6- or 7-inch one, and once balanced produces a healthy 13.5A/130-watts on the watt-meter.

Very testing times

Come the day, both craft were set adrift on the cold deep waters at Bushy Park for their first test! Motoring off slowly,

10



Fellow club member Trevor's *Tup* (left) in its bright red and white finish.



9

manoeuvrability was seen to be good, as expected. So, I increased the throttle and sent my craft heading out into the centre of the pond, turned it around, and then pushed the throttle to the max. Well, it was fast, but not that manoeuvrable at speed, with a turning circle rather wider than I would have liked. Because the air rudders are not that effective, and the water rudders are not that big, it sort of skidded around the corners. That said, it didn't skid as much as Trevor's – something which can only be due to the very shallow ribs I fitted (Trevor's boat is devoid of these). On both vessels, water could be seen banking up the sides and rear on long fast turns and could be heard 'interacting' with the prop but slowing down a bit soon restored

the manoeuvrability, and, at slower speeds, they turned really well. Overall, this didn't prove an issue, as they'd go wherever you pointed them with a bit of juggling on the controls, and they were decently fast.

Subsequent alterations have been confined to adjusting the rudder linkages to optimise movement either side.

Despite taking differing approaches to our builds, there's not much difference between the two craft in regards performance or handling. And even though Trevor's has significant chine on the bow, this is out of the water when moving at almost any speed. Both craft weigh in at approximately 750 gm excluding battery, and that's not too bad.

Snow and ice?

Our snow speeders have already indeed seen snow and ice! But, having 'built-in lightness', this, unfortunately, is their undoing on a frozen over lake. They just don't have enough weight to bite into the ice and provide directional stability. Much the same can be said for snow, although here the issue is the large flat underside, which sticks to the snow making it difficult to maintain headway (see **Photo 11**). Given a good shove and full throttle, progress can be made, as long as you have sufficient room. It's a bit disappointing really, but I suppose only to be expected; you can't scale water (or ice and snow). They will work on the hard stuff, just not that spectacularly!

We weren't really expecting to see much snow and ice, and our boats can, of course, be operated as simple skimmers and utilised

11 Tups on the snow. Yes, a static shot, as it was impossible to get decent 'on the move' pictures!



Ashley's Tup at speed, running flat and with very little wake.



“Our chaps at the pond know a good thing when they see it, and fellow club members Peter and Richard have both ‘appropriated’ the drawings to build their own versions”

all the year round. Weed doesn't present a problem as the low skates have proven to be quite immune to clogging up.

It has to be said these craft are a bit blocky, but the alternative would have been to spend hours cutting frames and using thin planking to get the correct curved

shape, which we didn't much fancy... However, there's no mistaking what they're supposed to be, and that was all we were really wanted.

Two more Tups

Our chaps at the pond know a good thing when they see it, and fellow club members Peter and Richard have both 'appropriated' the drawings to build their own versions. They were attracted not only because of the undoubted good looks of our originals and the prospect of a bit of snow and ice, but because of the remarkably stability (for an airboat) that these models have demonstrated over the months of hard use.

The craft are in a 2:1 length to breadth ratio, viz. 16-inches long by 8-inches wide, and, coupled with the motor being mounted as low as possible, this endows them with a low centre of gravity.

Other than my 1300Kv motor, all the others use 1400Kv brushless 28mm motors and their performance, despite a few minor differences, is about the same. Peter and Richard's boats were painted in complementing metallic green and silver colours (respectively), and the sight and sound of four Tup's all lined up and speeding across the pond is something to behold.

Fancy joining Cool & the Gang?

This is a relatively straightforward build – fast, fun, and Russian. What's not to love? Da! ●



Like herding cats! Left to right: Trevor, Richard, Ashley and Peter's boats out on the water together.

STEAM TUG KERNE / HMT TERRIER



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Merlin made magical again

Chris Browning explains how, with a touch of modern wizardry, he transformed a battered old 1960s' Sutcliffe tin toy into a truly charming little R/C model...

"I managed to identify the toy boat I'd been presented with as the 12-inch 'Merlin', first produced in 1963. The Merlin differed from most Sutcliffe boats that had been produced up until then, being that it was powered by an electric motor rather than by clockwork"

Early in the first lock down of 2020, I had restored to new condition a very old and rusty Mamod steam car. So, when fellow club member Eddy found a rusting old toy tin boat during a clear out at home, he passed it on to me, casually commenting: "As you made such a good job of the Mamod car, I thought you might like to have a go at this...". Our club is good like that!

The boat had the maker's name embossed in the metal hull: Sutcliffe. According to a website (www.sutcliffeboats.co.uk) dedicated to this brand's products: "Sutcliffe Pressings LTD produced boats from 1920 up until the factory's closure in 1984. Originally using 'hot air' propulsion they switched to clockwork motors in 1928. Early boats were based on a variety of different hull sizes compared to later boats, which focussed on 9" and 12" hulls".

I managed to identify the toy boat I'd been presented with as the 12-inch 'Merlin', first produced in 1963. The Merlin differed from most Sutcliffe boats that had been produced up until then, being that it was powered by an electric motor rather than by clockwork.

The Merlin is not uncommon, and a quick internet search found several good clean examples for sale, some with original boxes, for not much money. I concluded, therefore, that it wouldn't be committing a sacrilegious act by restoring, possibly improving, and perhaps even adding radio control to, this model.

Merlin as presented to Chris and in a very sorry state.



ABOVE: Rust had eaten clean through this old tin toy's windscreen strut.



ABOVE: The original rudder control and flag base.



ABOVE LEFT: The rudder as originally manufactured has an unusual pattern, with a hole in the top of the blade. Chris can only theorise on the reason for this, so can anyone cast more light on the subject? ABOVE RIGHT: With the deck having originally been attached to the hull by crimping the deck edge over and under its lip to make a watertight seal, it was necessary to grind off the rolled over edge in order to the gain access to hull's interior. BELOW: The interior, Chris soon discovered, was worse than the exterior for rust staining and pitting.

Tin and tech...

On closer inspection, however, it became abundantly clear what I was up against. The model's paint was chipped, there were rust spots and stains, one of the windscreen struts was entirely rusted through in one spot and its windscreen was dirty, cloudy, misshapen and brittle. The transfer representing the original company badge on the bow had all but been rubbed away, too.

The boat had originally been made in two main parts (hull and deck) with a clip-on hatch on its deck. This hatch, I realised, was too small to grant any useful access, being only big enough to load the battery for the motor. And with the deck having been attached to the hull by crimping the deck edge over and under its lip to make a watertight seal, I knew that, without the skills or workshop facilities to uncrimp, and eventually re-crimp the two, I'd have to find an alternative method of access to the inside of the hull.

After a couple of days of mulling this problem over, I decided the best way to go would be to file, or grind, off the rolled over edge, as this would leave the deck and hull with a mating flange, with the crimped under piece falling away.

Using a medium sanding drum in my Dremel, I made a trial grind, which worked just as I'd hoped, and gently continued around the whole deck to release the two parts from each other.

The rudder control, which originally worked by pressing a bent piece of wire against a ratchet arrangement, pivoted in a continuous deck top to keel tube to preserve watertightness. Thankfully, it was only soft soldered in place and was easily removed with a small blowtorch.

The interior was worse than the exterior for rust staining and pitting, and although the motor, an early Mabuchi-style Japanese 2x permanent magnet, did run, it had worn the old aluminium case into a large oval hole where nowadays you would find a bearing of some sort, so would need to be carefully removed. Likewise, the prop shaft was badly worn and pitted, as were the rudimentary shaft bearings, so these, too, would have to be extracted.

Everything was, therefore, removed from the interior, after which it was easy to see that there would be just enough room for a small R/C installation.



But... The boat is entirely made of metal so my R/C receiver would be housed inside a tin box, and the fact that I intended to use a 2.4 Mhz receiver meant there would be no chance of having any aerial wire outside the box, thus the receiver would, effectively, be shielded from the transmitter – wouldn't it? I would need to test this.

Consequently, before committing further, I rigged up an R/C receiver and battery, which I placed inside the two halves of the boat, held shut together by elastic bands, with a servo wired up outside, sporting a coffee stirrer and post-it note flag arrangement for visibility from the end of the garden. To my delight (and surprise) the servo waved just fine in 'range test mode', so I felt confident it would work for short close in sails on our club lake.

Happy with the results of my experiment, I was ready to commence the restoration.

Transformation

My first task was straightforward enough. I treated the hull, deck and hatch with paint stripper and then washed them clean.

As my soldering skills aren't quite as good as they could be, I repaired the windscreen strut with a sliver of brass and a smear of epoxy metal glue.

A replacement motor was temporarily fitted, and a new 2mm prop shaft and tube aligned and epoxied in place, as was a new rudder tube.

The old rudder was just a piece of tinplate rolled and soldered round a bicycle spoke, or similar, and this was in a very poor condition. A new rudder was, therefore, fabricated in brass and fitted to a new brass shaft, which was a good close fit to the new tube.

As an aside here, the rudder as originally manufactured has an unusual pattern, with a hole in the top of the blade adjacent to the post. Enquiries among the older – sorry, more experienced – club members, failed to elicit a plausible explanation for this design. My theory is it was designed to tie a piece of string to, which could then be let out as the boat was set off across the water and could be pulled home in the case of it stopping mid-pond. If you have an alternative theory, or better still know for sure, I'd love to hear from you!



ABOVE: Although the motor, an early Mabuchi-style Japanese 2x permanent magnet, did run, it would need removing and replacing.

Re-inspecting the hull, once everything had been cleaned out, revealed a couple of pin holes where the rust had eaten through; these were filled with a blob of epoxy glue on the inside and flatted off on the outside once the epoxy had dried. Everything was then primed and top-coated with Humbrol gloss acrylic spray, keeping as close to the original 'toy' colours as possible: red for the hull, white for the deck, and a pale French blue for the hatch. The deck fittings, all of which I soldered on, were picked out by hand with red used for the hull.

A new acrylic windscreen was fashioned and fitted using the old cloudy original as a template.

RIGHT: The hull and deck separated and stripped of paint.

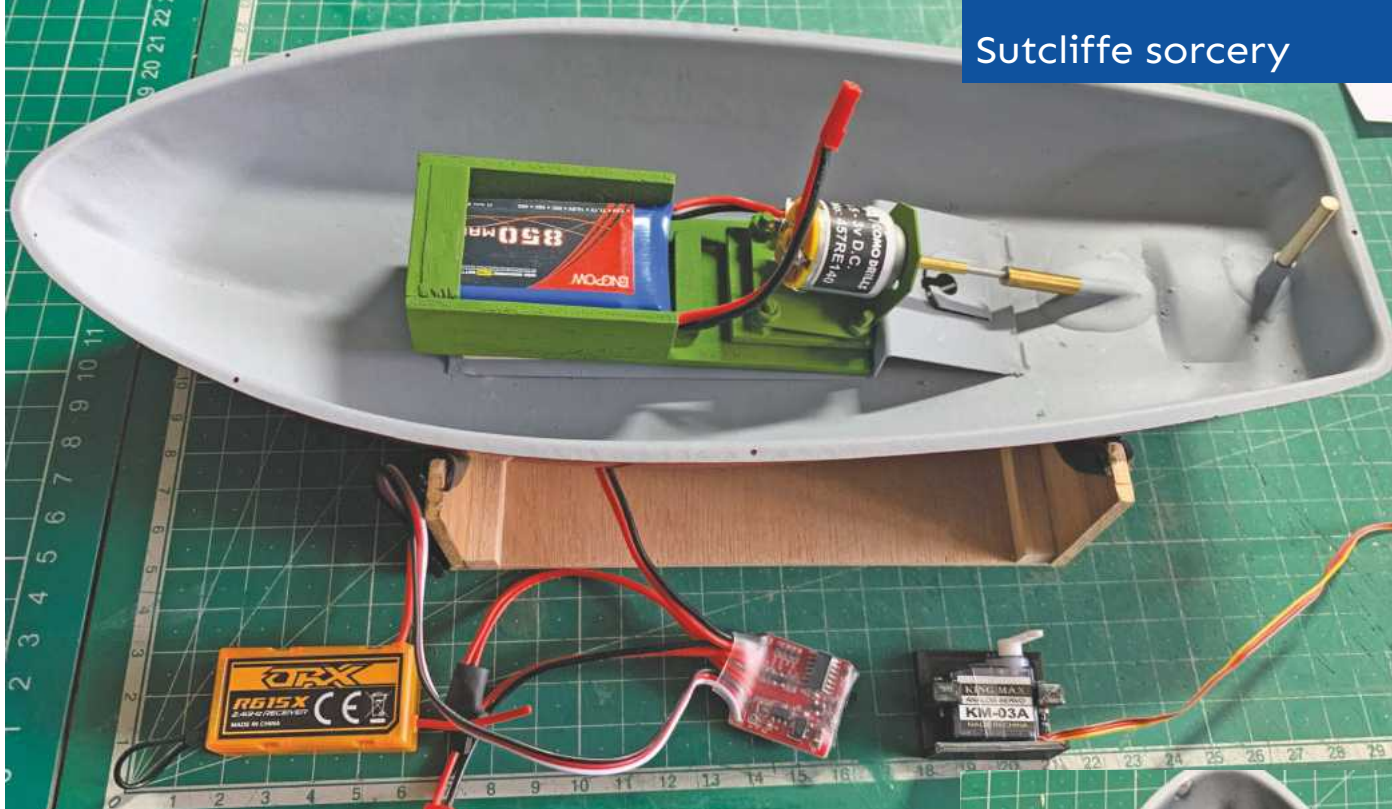
BELOW: Shiny new paint!

For the internals, a new engine mount and combined battery box was made in wood and painted in 'Engine Room' green. I had to be careful with the size and design of the battery box, as I needed to ensure I'd be able to access this through the quite small deck hatch after everything was eventually sealed up.

The motor used was a 140/1 MFA 3-9 volt (9200 rpm @ 6v), complete with a bracket, from the Component Shop, and the battery a small lightweight 2S lipo, delivering 7.4 volts.

The rudder servo, also from Component Shop, is a 3g Micro King Max (0.52 kg/cm torque), which was epoxied in place in a simple custom 3D printed mount of my own design. The ESC selected, purchased from eBay, was a postage stamp-sized lightweight 20-amp car one. It's of a type I've used successfully before in other projects and provides forward and reverse function. I removed the on/off switch from this ESC and extended the wires so I could use an old style 1960s' bedside lamp push switch on





ABOVE: The internal electronics tried out for size within the interior of the hull. RIGHT: Everything in place and ballast weights added to the bow.

the hatch while still being able to lift it enough to insert and connect the battery.

The original Sutcliffe badge was almost completely gone. Fortunately, however, by scouring online images I was able to find a reasonable match for this, which I duly copied across onto the desktop of my computer. This was then scaled to the correct size and using a DIY decal sheet bought from an online craft shop I was able to print out my own transfer on a home computer ink-jet printer. I sprayed the resulting print with clear lacquer to seal it from water. Once this lacquer was dry, the badge could then be cut out and used in exactly the same way as any waterslide transfer. Having been positioned on the boat and allowed to dry, I then gave it a further dust with clear lacquer to stop it being affected by any water splashes.

The finishing touch was to fit a flag and pole to the deck using the brass fitting already there. The flag was created from a small square of nylon fabric (blue to match the hatch), which I glued to a styrene rod.

There was no need for a bath ballast test because, being so small, the boat fitted easily in the kitchen sink. The only adjustment required was the addition of couple of self-adhesive wheel balancing weights, just to bring the bow down a little for the best aesthetic look.

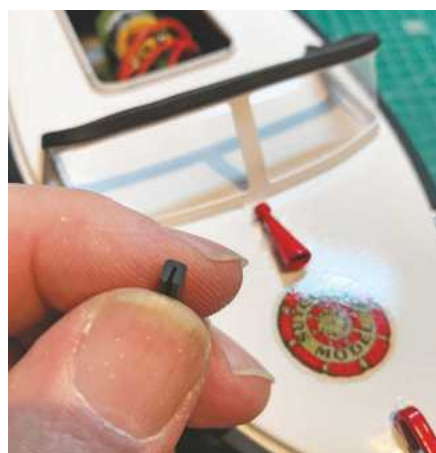
The deck and hull were then re-joined, with a smear of clear silicone bathroom sealer between the two flanges. The join was strengthened with five small 1.4mm spectacle repair size bolts, screwed into tapped holes in the hull flange: two on each side and one at the stern.

But while the resulting join proved watertight and stable, it did look a little 'raw' where it had been ground off. It was also slightly sharp to the touch. My first thought was to cover the edge with tape, but, in the end, I decided upon a rubber fender-style look. Initially I tried slitting some small-bore silicone tubing I had in the 'odds' box, but this didn't look quite right, and it wouldn't grip the edge and



ABOVE: The original Sutcliffe badge had almost entirely worn away, so Chris cleverly created his own very convincing replica transfer for the newly restored boat.

stay in place without glue. Results of another internet search drew my attention to some rubber U-section edging, 4mm deep with a 1mm channel, used for edging pressed metal panels commercially. This fitted perfectly and didn't require any glue; all I needed to do was cut small fillets at the corners of the transom and shape the two ends where they met at the bow. I also cut small pieces around the spectacle bolts so that the edging could lie flat and smooth, and grip, along the whole edge of



LEFT: Rubber U-section edging, of the type used for edging pressed metal panels commercially, was employed to provide a smooth rubbing strip edge to the deck/hull join lines.



What a transformation!

the boat, with just a drop of super glue at the bow for added security.

At the club lake, for her maiden voyage, I again tested the receiver; this time by walking along the bank while another club member checked for rudder and motor function. As before, this confirmed there was sufficient reception within the metal hull to control both. Admittedly, the operational distance wasn't too great, possibly extending just to the opposite shore, but, I decided, if I restricted my sailing to halfway out, everything should be fine.

This, however, proved not to be the case. Once on the lake, reception was all but gone! I could only assume the additional masking effect of the water was stopping any meaningful control. Nothing for it, then, but to go back to the drawing board...

Determined not to be beaten at this late stage in the project, I went back to the internet in search of some answers. I had in the back of my mind an article I'd read on extending the short 2.4 MHz aerials, and I did eventually find it, but didn't fancy the miniature soldering and search for fine coax cable, etc. Instead, I had a look at some of the R/C flying forums, as some of the planes are made from carbon fibre composite, which I happen to know is a

“Determined not to be beaten at this late stage in the project, I went back to the internet in search of some answers...”

very efficient radio shield, yet they still fly OK. The secret, I found out, is proprietary receivers made especially for carbon-bodied cars and planes which have extended aerials! Simple and obvious really!

A compatible long aerial receiver duly arrived in the post. Although I had always intended the deck and hull to be separatable for servicing, etc, I hadn't expected to be doing this so soon after sealing everything down. Nevertheless, the hull and deck were unbolted and split apart just as I'd hoped they would, and my new receiver was fitted in place of the original.

To get the extended aerial above the metal deck, I dismantled the flag post, substituted this with a styrene tube and drilled through the base of the flag socket on the deck.

Period charm infused with 21st century magic

With the boat reassembled, it was back to the club lake for a second attempt, which I am happy to report was a complete success. As I proudly sailed this new incarnation of Merlin up and down the shallows under full radio control, I could finally reflect on what a fun project this had been. Naturally, with this restoration I tried to retain all of Merlin's period charm, and yet I couldn't help but wonder what the original owner, from 60 years ago, would've made of the new technology installed. Hopefully, he/she would've be suitably spellbound! ●



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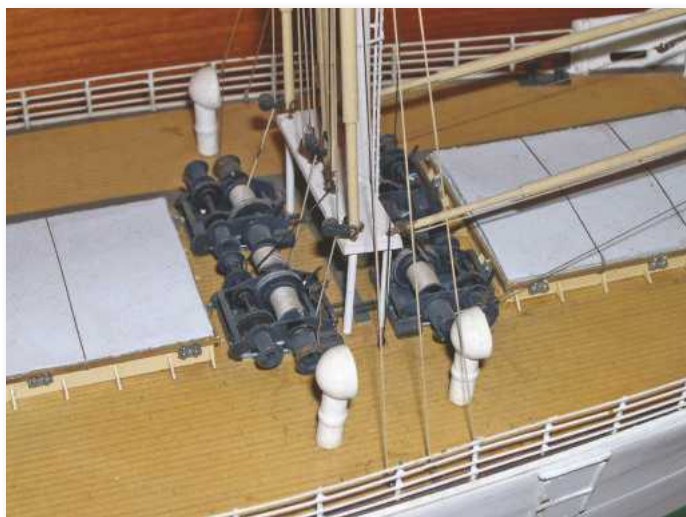
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ABOVE: Colin's SS Granada built in 1979 was a classic 'scratch-built' model, with the anchor chain being the only commercial fitting. BELOW LEFT: Repurposing 1: the cargo winches on Granada incorporated eyelets and wheels from Airfix tank kits. BELOW RIGHT: Repurposing 2: the fire buckets on the wheelhouse roof are in fact toy pistol 'caps'.



Is scratch-building dead?

Colin Bishop reflects on traditional model boat building and how much the hobby has changed over the decades...

The term 'scratch-building' is a term normally applied to the construction of scale model boats which are built literally 'from scratch'. It could also be used to describe powered or sailing competition models to some extent and, of course, static models, but it is the rather narrower definition of radio-controlled scale models we will be considering here. With the growing popularity of model boating after World War II, it became necessary to have a definition of scratch-building (as applied to scale models) so that when entering club or national competitions the judges could be clear which parts of the model had been constructed by the entrant and which had been sourced commercially and award marks accordingly. Of course, the term could also be applied to parts of a model

instead of the whole, so you could purchase a hull and scratch-build the superstructure and fittings, for example, and that is still very much the case today, but for the purposes of this article I will be looking at the definition as it applies to competitions.

For many years most model boat makers were in little doubt as to what constituted scratch-building: you constructed just about everything yourself from basic materials, mainly various types of wood and metal, with a leavening of other odds and ends – these including repurposed manufactured items, e.g., using eyelets to represent portholes. It was also permissible when entering competitions to use commercial fittings that would be very difficult to make yourself, such as fine chain and propellers.

Over the years, scratch-building became tinged with a certain amount of 'one upmanship' on the part of some competitively orientated builders, who delighted in pointing out what they regarded as inappropriate practices by fellow modellers. "He's got springs in the rigging!" they remarked disparagingly at one 1970s' Model Engineer Exhibition. These 'pot hunters', as they became known, were very much in a minority but their influence is still felt today, with some modellers feeling just a bit superior because they built it all themselves, whereas 'Charlie' bought a hull and all his fittings. At the other end of the spectrum, only recently there was an individual on one of the forums who claimed his boat was scratch built even though it was constructed from a kit, simply

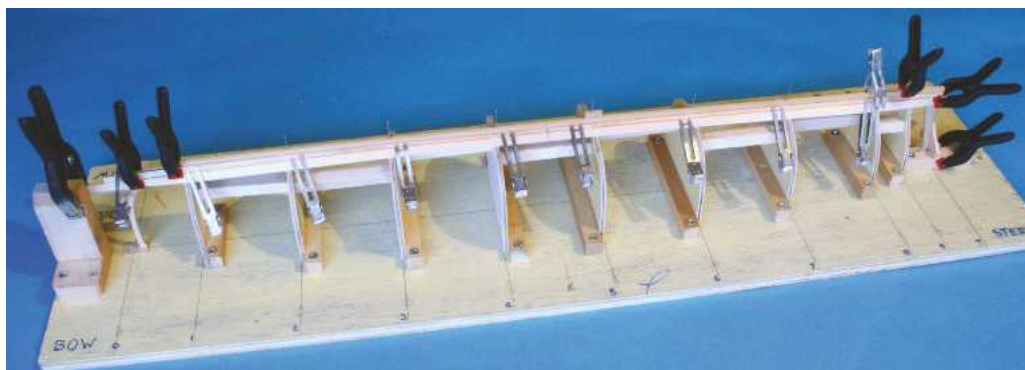
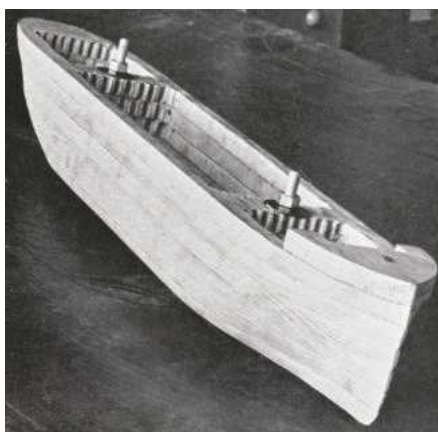
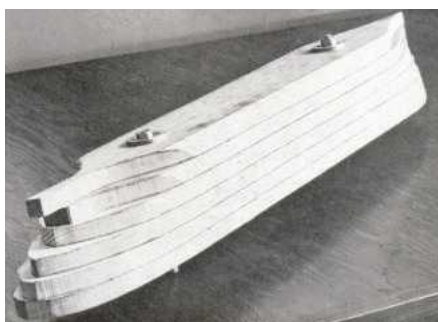
“To nail my own colours to the mast, I think that the term scratch-building is now largely obsolete in relation to competitions”

because he'd stuck all the bits together himself! There are also occasional online discussions as to what now, with the need to take into account new technology and building techniques, actually constitutes scratch-building.

To nail my own colours to the mast, I think that the term scratch-building is now largely obsolete in relation to competitions and should be consigned to oblivion. There are two main reasons for this. Firstly, the interest in entering serious competitions has dwindled almost to zero and there is hardly any left. Secondly, the introduction of new technology, particularly CAD (Computer Aided Design) and affordable 3D-printing has made it extremely difficult, if not impossible, to come up with a fair set of competition rules which would be universally accepted. There are some other factors, too, which I shall come to a little later.

My opinions are mine alone but I, and your Editor, would welcome comment and debate on the subject to stimulate interest in the hobby.

BELOW: 'Bread and butter' hulls could be very wasteful of wood!



ABOVE: The construction stages of a plank on frame hull. (Image courtesy of Brian King)

In the beginning...

When I first took up scale modelling in the late 1960s (as lads did in those days), there were really only two choices. You bought a kit, or you built your own model boat. The popular kits of the day included cabin cruiser designs, of which Aerokits and Keil Kraft were probably the best known, and semi-scale models of various types, such as tugs. If you made your model yourself you might typically use one of the excellent plans on the market (many of which are still available) and construct your model using mainly wood, of which balsa, birch ply and softwood were the most popular choices. Those with metalworking skills might use soldered tinfoil, often over a wooden mould, while some builders favoured waterproofed card and even gum strip paper. GRP was only just beginning to be experimented with for model hulls in those days; it wasn't in general use, and it required a wooden or plaster mould to be constructed first.

Some commercial fittings were available to garnish your maritime masterpiece, but serious builders made their own.

For wooden models there were two favoured methods of construction. The first, plank on frame, is an elegant method based on full size boat and ship construction and remains very much in use to this day. As the term suggests, frames shaped to the cross section of the hull are erected along the length of a keel piece and then planks are attached lengthwise to complete the construction. It does, however, require

a degree of skill to achieve a neat and satisfactory result.

The second method, recommended at the time for the less skilled builder, is known as bread and butter and is more associated with the construction of prehistoric dugouts, except that planks are used rather than a solid block. Drawings are used to divide the hull into slices, most commonly horizontally (waterlines) but sometimes vertically (buttock lines). You would then take a trip to your local timber merchant and buy enough lovely yellow pine to plank up a solid block which would encompass the dimensions of your model hull. The next step (quite literally) would be to cut each plank to the shape of the hull at the appropriate waterline. This produced a stepped approximation of the hull when the whole thing was temporarily bolted together. You would then need to draw a line around each step with the hull upside down and unbolt it again. This would give some idea of how much of the middle of each plank could be removed while still leaving a reasonable hull thickness; usually most of it. Having laboriously cut out the middle of each plank, everything could be glued together to produce a hull shape stepped on both the inside and outside. Hence the term 'bread' (planks) and 'butter' (glue).

All you then had to do was to attack it with chisels, spokeshaves and sandpaper to get it totally smooth on the outside and fairly smooth on the inside. This took a long time. The finished result could look very good but

An example of composite construction. The bottom of the hull is one slice of 'bread and butter' to accommodate the turn of the bilge, while the upper parts are a mixture of sheet, plank-on-frame and solid balsa blocks. This method is quite economical in material.



BELOW: The propellers and anchor chain were the only external commercial items on Colin's Isle of Wight ferry Shanklin, built was built in the early 1980s and featured a balsa hull skinned in nappy liners (unused!) and resin.



David Abbott's 1886 tug Knight of St Patrick and minesweeper HMS Iveston were examples of museum quality working models during the 1980s – the heyday of the MPBA Scale Championships.

was likely to be rather heavy, which could pose stability problems for certain types of working model. You also had to purchase a large amount of very expensive wood, of which less than 10% remained in the model, with the rest having been reduced to shavings, sawdust and firewood. There had to be a better way!

The 1970s' revolution

Is this an exaggeration? No, I don't think so. The 1970s saw a veritable explosion of interest in scale model boating. Many things came together at about the same

time, of which the most significant was the introduction of affordable proportional lightweight crystal-controlled R/C outfits, which didn't require expertise in electronics and could be fitted by almost anyone. Initially quite expensive, prices came down as the decade went on and boat modellers of all types jumped at the opportunities offered. Now it was possible to run multiple boats on the water simultaneously, limited only by the number of frequency slots available. And the new gear was compact and could be fitted in a wider range of smaller models. Almost overnight it became practical to stage regattas with steering courses with several

models negotiating the hazards at the same time. Great fun!

But it wasn't just improvements in radio. Hitherto scratch-built scale models tended to come in two varieties: the super accurate ones which were static museum-type exhibits and the working models which had to accept compromises by omitting fragile detail and which often had their hulls deepened in order to accommodate the heavy motors, batteries and old-fashioned R/C gear needed to operate them. In the 1970s, however, the new efficient permanent magnet electric motors coming from Japan, together with NiCad batteries and lightweight R/C, enabled accurate scale working

models to be built and operated. New materials such as GRP and plasticard offered more constructional options.

The Model Power Boat Association (MPBA) was, and remains, the official national body for UK model powered boating, so it was natural that organised scale events would develop under its auspices and would run on a competitive basis. In due course, the National Scale Championship competition came into being and continued into the 2000s, albeit in a much-diminished form. This is not the place to chart the history of this hugely successful competition but it was responsible for stimulating a step change in standards for working scale model boats which approached and often surpassed their static 'museum' counterparts in quality. The rules of the competition were not confined to steering courses but also encompassed modelling standards as well. Alongside the MPBA events, the traditional static competitions continued around the country with the London Model Engineer Exhibition, sponsored by previous owners of this magazine, being considered the pinnacle of modelling excellence.

Competition issues

All these competitions were dependent upon definitions of scratch-building to judge the models, although the rules were not always the same. So, for many years the term 'scratch-building' continued to be an important consideration. I was Scale Secretary of the MPBA for several years and helped redefine the competition rules during the 1980s.

Complications arose when the originally clear distinction between kits and scratch-built models became blurred with the introduction of 'semi' kits, where the manufacturer would produce a hull and perhaps some superstructure mouldings but leave it to the modeller to do the rest. This was later extended to providing suitable fittings. The competition organisers responded by creating new classes for semi-kits and by requiring entrants in the scratch-built classes to declare all commercial fittings on their models, which generally knocked them out of contention for the top awards if there were too many.

Despite these problems, it still proved possible to devise rules to accommodate them for many years and the MPBA devoted a lot of effort into maintaining a level playing field. Awards for excellence, whether from the MPBA or MEX, were prestigious and respected.

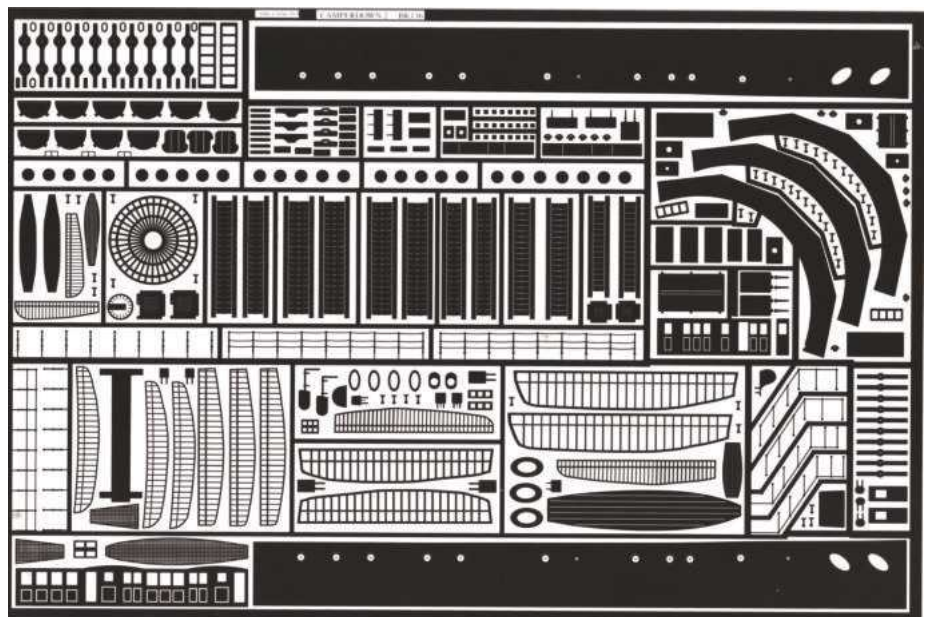
Meanwhile, wooden constructional methods had evolved from the wasteful bread and butter method in favour of plank on frame, and what might be termed 'composite construction' – whereby hulls could be built using a combination of bread and butter, sheet wood, planking and balsa blocks for the tricky areas. An alternative approach was to make a GRP hull, although this entailed the extra work of first forming a mould from a plug. Both methods are still in common use



Judging, using a comprehensive set of rules, was taken very seriously at MPBA competition regattas.



ABOVE: A younger Glynn Guest judging a Model Engineer Exhibition entry. BELOW: Photo-etch components designed and produced by the late Brian King for one of his award-winning Victorian battleship models. (Image courtesy of Brian King)



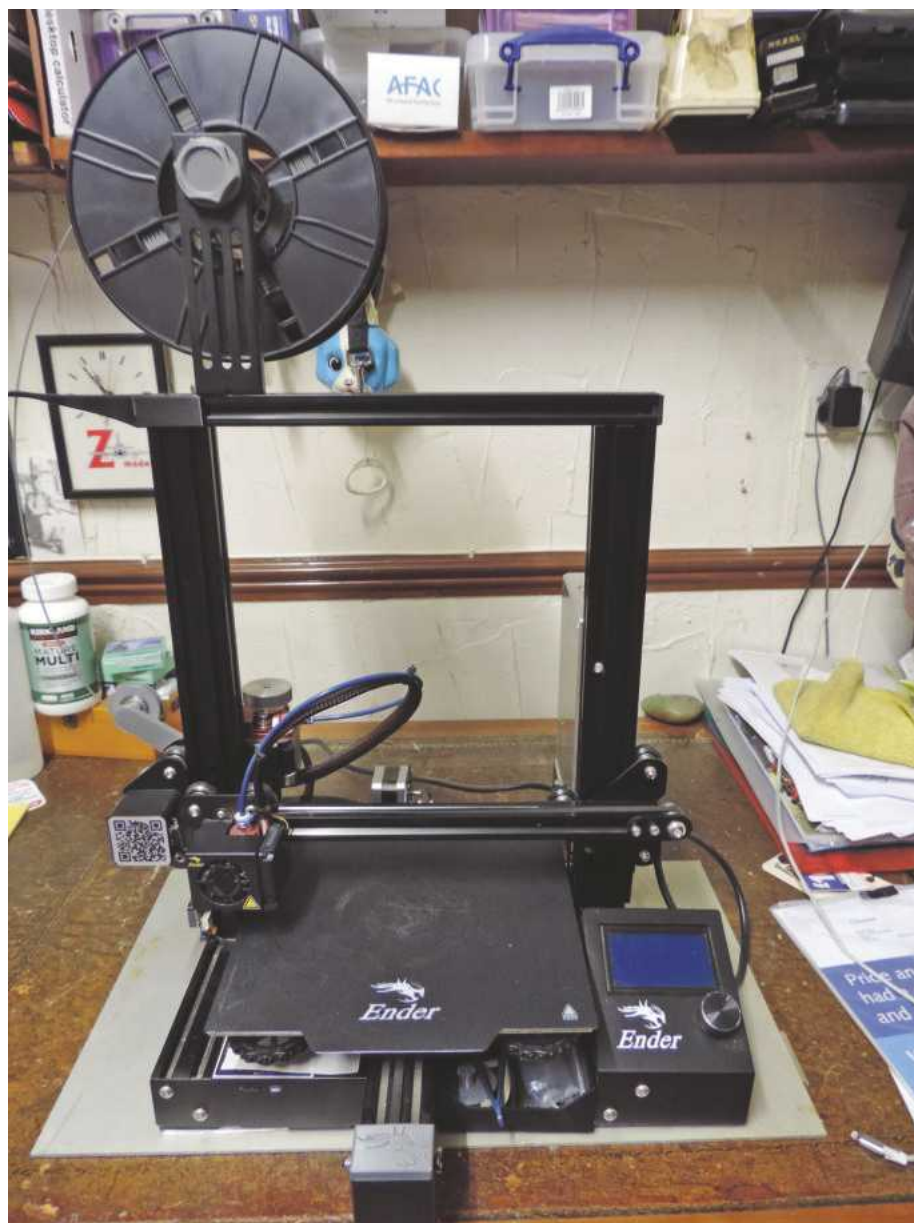
today, although it has become more common for GRP hulls to be purchased.

New options also became available for making fittings, employing moulding, photo-etching and casting in white

metal. Although initially introduced by kit manufacturers, the first two could also be employed by individual modellers for specific items, which were then considered to be scratch-built.



ABOVE: This display from Macs Mouldings shows what can be achieved with resin fittings. Modellers can use moulding kits from SYLCREATE, who advertise in this magazine, to create their own bespoke mouldings. BELOW: Ron Rees' Ender Pro 3D printer is now available for around £165. (Image courtesy of Ron Rees)



“The basis of scale modelling shifted with the increasing use of computerisation...”

But things change...

In the early 1990s my personal circumstances dictated a break from modelling, and I took up full-size boating for several years. Upon my return to modelling nine years later, things had changed enormously. The MPBA Scale Championship was a shadow of its former self and scale model boating appeared to revolve around informal ‘sail ins’ on club waters for the most part. The competitive element had all but vanished, along with most of those wonderful steering courses.

Moreover, the basis of scale modelling shifted with the increasing use of computerisation. Initially this manifested itself with the introduction of CAD design by kit manufacturers, together with laser-cut components which gave much greater accuracy than traditional die cut methods, so parts fitted together better. Over recent years these techniques have spilled over into the realm of individual model makers, together with the most innovative of all, 3D printing.

New century, new technology

The key to this second ‘revolution’ is largely founded on CAD techniques. It’s now possible to use a computer drawing program to design components and fittings which can then be printed, laser-cut or routed, and the machines used to produce them are now available in light use hobbyist versions at a cost of hundreds rather than thousands of pounds, although the more you pay the better quality and capacity you will get. As described in the next section, there are many different ways of exploiting this technology to arrive at the actual fittings you attach to your boat!

Simpler techniques require just the use of a PC and a printer, whereby you can scan, scale and print onto paper or other media to produce your own decals, flags and other items which might be a bit too small to lend themselves to conventional modelling methods.

So how does all this affect scratch-building?

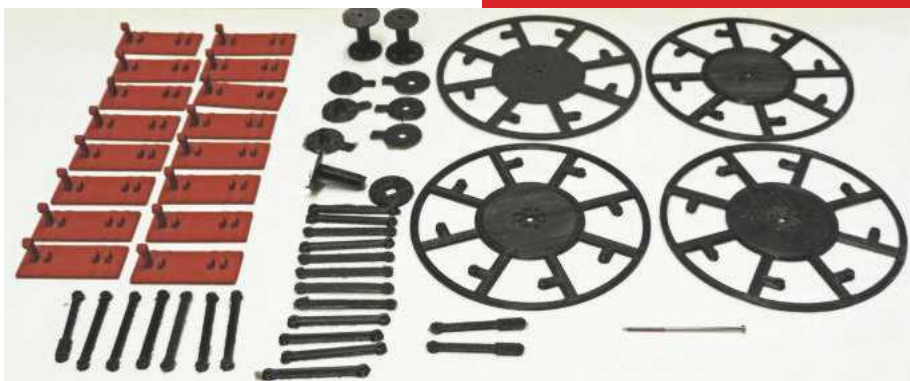
Well, for what it’s worth, my contention is that the term has become essentially irrelevant for the following reasons.

Interest in serious competitions, which assess the constructional work put in by the builder and the quality of the finished result, is pretty minimal now, so there’s no longer the need to define what is and what isn’t included when awarding marks.

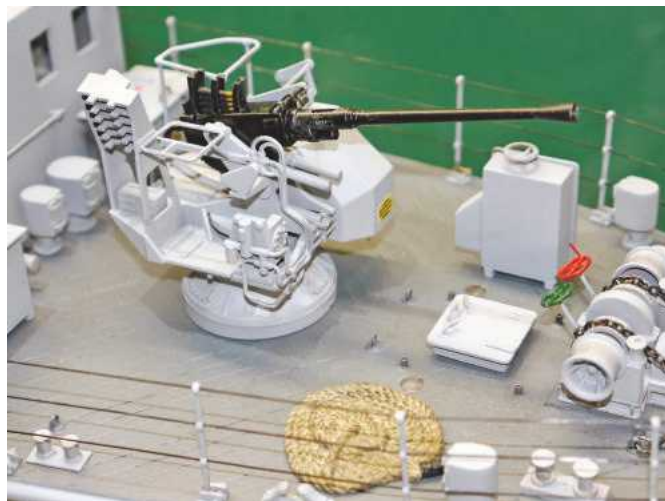
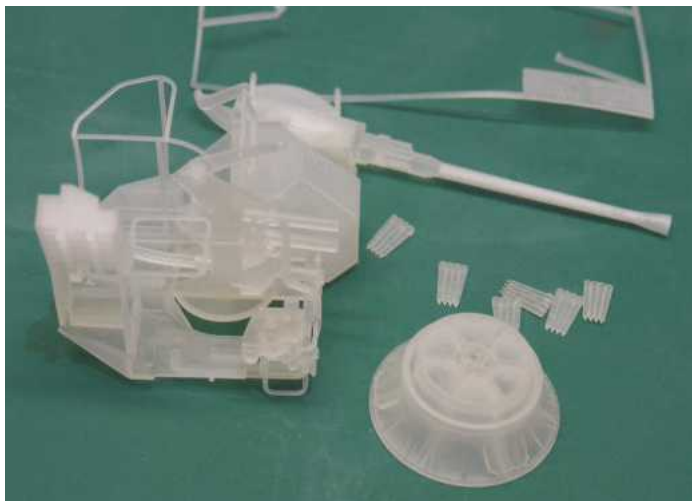
Even if it were the desire to resurrect such competitions, drafting a set of rules has become extremely difficult, if not impossible, now that technology allows you to construct much of the content of a model without reaching for the knife, file, or all the other tools

which were traditionally necessary – or even use wood and the other materials many of us have grown up with.

With a moderate knowledge of CAD and a 3D printer, today's modeller can design parts and fittings on their home computer and produce drawing files which can then be printed out ready for final finishing and painting. Or they can sketch out a design for a component which a professional designer



ABOVE: Feathering paddle wheel components produced by the Ender 3D printer from online library patterns. (Image courtesy of Ron Rees)



ABOVE LEFT: A 40mm Bofors gun printed by Shapeways and Mark Hawkins for Paul Freshney's HMS Aveley model. (Image courtesy of Paul Freshney) ABOVE RIGHT: The completed 40mm Bofors mounted on HMS Aveley. (Image courtesy of Paul Freshney) BELOW: Paul Freshney's HMS Aveley featured many 3D printed fittings developed in conjunction with Mark Hawkins and supplied through Shapeways. (Image courtesy of Paul Freshney)





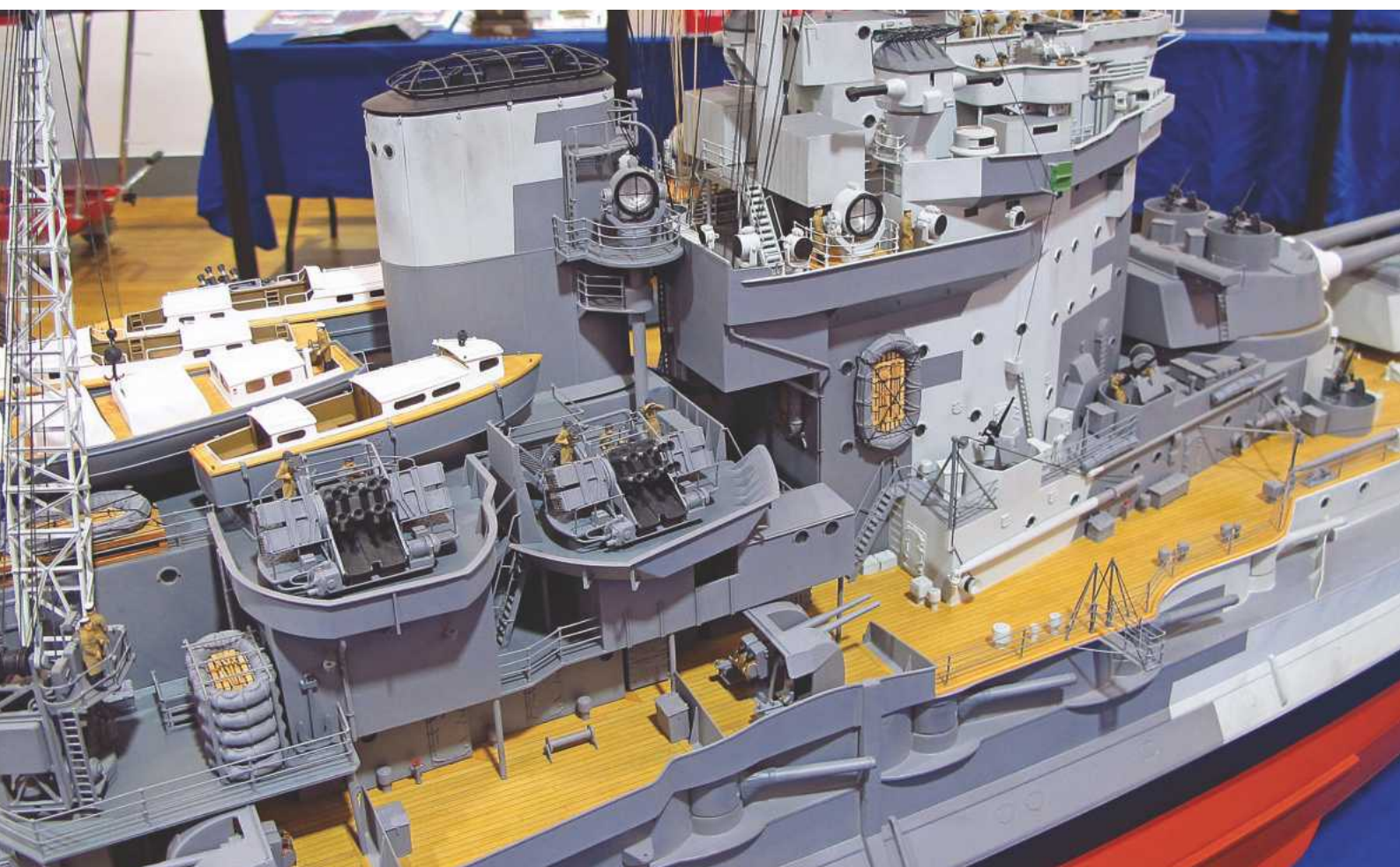
ABOVE: At small scales all you need is a PC and printer/scanner. The doors and windows here were constructed to a larger scale, scanned in and then printed out at the model scale. BELOW: The planking on this 1:150 scale model was produced on an Excel spreadsheet and printed onto cream coloured heavy cartridge paper before being stuck to the deck and varnished over.



can then turn into a CAD file, which can then be printed out on their own printer or sent to a professional 3D print shop to produce. For those who balk at the thought of learning CAD there are now downloadable CAD libraries of various components and fittings which can be printed out on home 3D printers and, if necessary, 'tweaked' to a particular scale. One of the best known is Thingiverse (www.thingiverse.com), which includes some useful model boat fittings, although you do have to search for them.

The January 2016 issue of this magazine carried an article by Ron Rees describing the use of home 3D printers for model making purposes and featured the Reprap Prusa 13 printer he purchased from China for £245. Ron has now moved on to the more sophisticated Creality 3D Ender Pro 3D printer, which can now be bought for around £160 as prices have come down. This machine printed the complex feathering paddlewheel as shown using a free online library file, although I have yet to attempt its assembly in respect of my current paddler project!

Given all these possibilities, just how could a competition judging panel accurately assess the degree of skill contributed by



Predating the latest technical innovations and techniques, this model of HMS Warspite by Colin Vass is a masterpiece of model making and took 16 years to build.



Andrew Dalton's Victorian battleship HMS Renown is another model that was many years in the making using traditional techniques, although various castings, mouldings, and etched brass patterns were employed.

the entrant simply by looking at the finished result? And going one step further, how could they fairly compare work produced by these methods with that by modellers who still enjoy the shaping of wood and all the 'traditional hands on' methods of construction, perhaps as a welcome change from their computerised day job? Different skill sets are employed to say the least! It would be a bit like judging between apples and pears – pointless really.

One thing that brings us all together as modellers is that whatever method we employ, we want to produce the best result that we can. In the past, it was the top-rated scratch-builders who produced the most admired models. This is no longer true, as a CAD file and 3D printer can produce parts of intricate quality that simply cannot be matched by even the best manual skills. So, if you want the ultimate quality then embrace modern technology to achieve it, and if this means buying parts or services in then so be it. You still have to paint them and fix them in place, etc, but you won't be spending hours trying to make something that will never match the appearance and quality of its computer-generated equivalent.

Having said all that, I still prefer working with wood, glue and bits and pieces in the

"I still prefer working with wood, glue and bits and pieces in the traditional way; that's simply what floats my boat!"

traditional way; that's simply what floats my boat! But, unlike in the past, I am now quite happy to pick and choose commercial items if it gets the job done faster. I like to build individual models but am happy to add commercial fittings if they're affordable and fit the bill. The finished result can still be a unique model that nobody else will have built.

So, to get back to the title of this piece – 'Is Scratch building Dead'? Well, yes, as it was originally defined, but times have moved on and there are now even more ways of building your own personal model boating masterpiece, and we should all welcome the new techniques which make it possible. We have never been so fortunate in the options available to us or the opportunities to embrace new technology if we wish, while still being able to carry on with traditional modelling practice if we prefer. It's all about choice and the expanded range of choice we now have can only be to the benefit of the hobby.

That's not to say that there are no longer virtuosos still producing work of the very highest quality using essentially traditional building techniques, regular contributor Dave Wooley is a prime example, but their numbers are dwindling fast, and they are not being replaced in like numbers. In the latter days of the Model Engineer Exhibition the average age of entrants and medal winners was well into the 70s, and that was ten years ago now! The models of HMS Warspite and HMS Renown shown were built largely using traditional techniques but took many years to construct, while Paul Freshney's HMS Aveley took a fraction of the time using 3D printed fittings.

Excellent models are still being produced but they do take advantage of modern technology in their construction in varying ways. And who can really argue with the fact that the method by which this is achieved is less important than the quality of the finished result? In the end it comes down to just how you want to pursue this fascinating hobby.

So, farewell scratch-building in its traditional incarnation and welcome to the 21st century methods that produce better scale models than ever before. What's not to like? ●



Scope for Smoke

Richard Norman provides a step-by-step guide to converting a nebuliser into a smoke effect device specifically for smaller models

It was on a fine sunny day at the Springbok Model Boat Club's lake at Alford (www.springbokmodelboatclub.com) that I first became interested in smoke effect for a scale boat. A fellow member, Tim Colmer, was cruising around the lake with his magnificent model of an Admiralty Steam Coaster and I was particularly drawn to the very authentic appearance of the smoke effect rising from the funnel, it really brought the model alive.

I have an 'Anteo' steam tug that I built some 30 years ago, fitted with a Maxwell Hemmens steam plant. Although the model performed well, the hassle of operating a steam plant (apologies to all steam aficionados!) together with the more recently introduced requirement for an annual boiler inspection has meant that the model has sat on the shelf and is seldom sailed.

I had long considered converting 'Anteo' to electric drive and seeing Tim's model with the smoke effect gave me the final impetus. The conversion was a success and Tim, and I can now 'smoke' away in formation on the lake.

'Anteo' is a fairly big model and, like all tugs, broad in the beam. Even so, accommodating a suitably sized electric motor, a 12-volt battery and the smoke effect unit was a very tight squeeze, and I only just maintained the waterline. The smoke effect unit, which was purchased via eBay, is large and, when filled with water, a weighty unit

"Amongst my fleet I have two 1:48 scale steam tugs and a steam coaster. I'd often thought how good these models would look on the water with 'smoke' pouring out of the funnel but couldn't find any suitable commercially available products for this size of model"

that requires a 12-volt supply. It works on the nebuliser principle, which vaporises ordinary tap water by ultrasonic vibration and, although effective and non-polluting, this unit is only really suitable for larger models running 12-volt batteries.

In recent years I've taken to scratch building smaller scale models and amongst my fleet I have two 1:48 scale steam tugs and a steam coaster. I'd often thought how good these models would look on the water with 'smoke' pouring out of the funnel but couldn't find any suitable commercially available products for this size of model. I have seen small oil burning smoke effect units but consider the effect to be less than realistic and certainly less than environmentally friendly.

So, I set about researching the principle behind nebulisers to see if there was any scope to make a smaller unit. Nebulisers are almost exclusively used for the delivery of medication for respiratory complaints such as asthma. However, Wikipedia informed me that: "A new significant innovation was made in the nebuliser market around 2005 with the creation of the ultrasonic Vibrating Mesh Technology". Mesh nebulisers are more efficient and have enabled the development of handheld portable devices. I won't cover how a mesh nebuliser works in this article, but I recommend Wikipedia for a straightforward explanation in layman's terms.

I subsequently discovered there are a number of these devices on the market at affordable prices. They are powered by either two or four AA batteries and interestingly many can run off a USB port, which for a model boater is a very convenient 5-volts.

I eventually decided to buy the one shown here (see **Photo1**) from Amazon: https://www.amazon.co.uk/gp/product/B08DCTF6ZN/ref=ppx_yo_dt_b_asin_title_o00_s00?ie=UTF8&psc=1 with a view to seeing if I could strip it down and modify it in some way to work as a 'smoke' generator. I figured that should I fail all I had to lose was the cost of the unit (£21.99 plus p&p at time of writing) whereas if I were to be successful I'd have achieved my aim.

“I set about converting what was a medicine dispenser into a model boat smoke generator and, for a relatively modest outlay, the end result exceeded my expectations”

On receipt of the nebuliser, although an unbranded product from China, I was immediately impressed with its quality and indeed the quantity and rate of flow of the vapour. It would have been all too easy to just lay the unit on its back with the nozzle pointing up the funnel but, unfortunately, in the nebulisation process bubbles are formed at the back of the nebuliser, which need to escape for the process to continue working, and, anyway, the medication cup would not hold sufficient water for a reasonable duration. So, I set about converting what was, after all, a medicine dispenser into a model boat smoke generator and, for a relatively modest outlay, the result exceeded my expectations. I decided, therefore, to put together this ‘How to Guide’, as it may be of help to those of you who want to have a go at this yourself.

Although this device is suited to a smaller boat, the ‘smoke’ output wouldn’t be out of place on a larger model, and of course two could be used together either for one large funnel or on a two-funnel arrangement.

How to make your smoker

After you have taken delivery of your nebuliser, it’s worth first reading the manual and then putting in a couple of AA batteries or plugging it in to a USB port. Add some water to the cup and familiarise yourself with the unit and its functionality. The nebuliser

consists of a top part, which comprises the medicine cup, and the nebuliser with its outlet nozzle, which I shall refer to as the head. This part is detachable by pressing a button on the back of the lower part, that I shall refer to as the body, which houses the batteries and Printed Circuit Board (PCB) (see Photo 2).

Next, consider how you will accommodate the converted unit in your boat and duct the

vapour to the funnel. Then, simulate this setup on the bench to ensure you will have a good smoke effect. Unlike smoke, the vapour from the nebuliser is cold and so has a natural tendency to sink and for that reason maintaining the velocity of the vapour through the pipework is important if it is to reach the funnel outlet with a realistic flow. That means keeping the ducting as short as possible with minimum bends and, bearing in mind Bernoulli’s Principle, try to maintain the pipe section; if your funnel is a significantly larger diameter than the ducting, then continue the ducting up inside the funnel to just short of the top (see **Photo 3**).

I found 21.5mm diameter plastic overflow pipe to be ideal for the duct, the diameter matches the nozzle of the nebuliser, and it is thin wall, so light in weight. Bends are available but it’s worth shopping around to find a swept elbow: Osma or Marley are good; the bend on the Floplast elbow is rather sharp. Alternatively, you could make a ‘lobster back’ elbow using segments of pipe stuck together. Tip – Subject to the design of your ducting, try leaving a gap of between 5mm and 12mm between the nozzle and the start of the ducting. This seems to make a



1



2



3



weight and stability not an issue, you can go as large on the reservoir size as you wish.

Also, at this stage consider how you are going to power the unit. I measured a running current of 0.3-amps on the USB connection, which suggests around 0.5-amps on the 3-volts from the 2x AA cells – not ideal for prolonged running. However, most speed controllers now have a 5-volt battery elimination circuit (BEC) facility to run the receiver, servos, etc. On both my applications to date, I have taken the supply from a spare channel on the receiver. If you don't have this facility, Components-Shop stock a small voltage reducer that gives a controlled 5-volts from a range of battery voltages.

For reference, the total weight of my converted unit was 65 grams and 100 grams with a full tank of water.

Once you feel happy that you have an installation plan, it's time to start the conversion process. It's likely that this method would be compatible with other makes of handheld mesh nebulisers on the market but, so far, I have only converted the one I've provided the link for.

Modifying the head

First detach the head, place a strip of tape over the throat to the nebuliser and place the cap provided over the nozzle to prevent any swarf reaching the nebuliser.

Next, with a razor saw, or similar, cut off the lugs that hold the lid, cut the medicine cup as shown to provide a platform for the project box and then clean up the faces with a file to give a good fit (see **Photo 5**).

Cut a slot in the project box to match the throat to the nebulizer, chamfering the edges to allow the air bubbles that will form to rise freely (see **Photo 6**). The slot can be on the long or short side of the box depending on what best works for your installation. I have



significant improvement to the vapour flow (see **Photo 4**). Also, if you can accommodate it in your design, the flow seems better if you can have a short straight before the elbow.

The brim capacity of the medicine cap provided is 12ml, and this gave a running time of 25 minutes. I considered a good hour would be acceptable, so that would require around 30ml. I settled on a 54x37x32 deep plastic project box from Component-Shop as a suitable reservoir, which later, when installed, provided a running time of over 1hr 15min. However, if you wish to run for longer without a top up and have the space in your hull, with





“As soon as you extract the PCB, make a note of which wire goes where, as even with careful handling a wire or two could become detached from the board”

drill a small breather hole in the lid – I used a 0.5mm diameter drill.

You can now finalise the mounting of the unit in the hull. The tank and nebuliser head assembly needs to be readily removable for emptying after use; it also needs to be accurately located if the ducting is fitted to a removable superstructure to ensure good and consistent alignment. I have used an elastic band or an ‘O’ ring to hold the tank in place, and a lug profiled to suit the curved foot at the bottom of the unit ensures accurate alignment. There is a convenient 3mm deep x 17mm wide slot in the base which is good for a locating tab.



Modifying the body

To extract the Printed Circuit Board (PCB) from the casing, remove the four screws on the base and the top two screws, then prise apart the halves of the casing by inserting a screwdriver into the medicine cup, catch and twist – you don't need to be too hesitant as the casings will be discarded, but be careful not to damage the PCB held within.

TIP – as soon as you extract the PCB, make a note of which wire goes where, as even with careful handling a wire or two could become detached from the board.

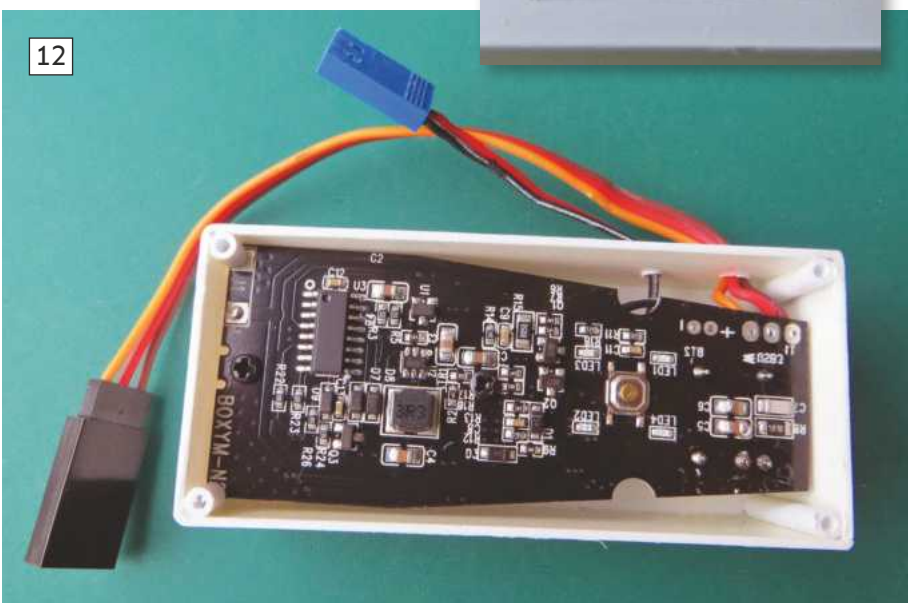
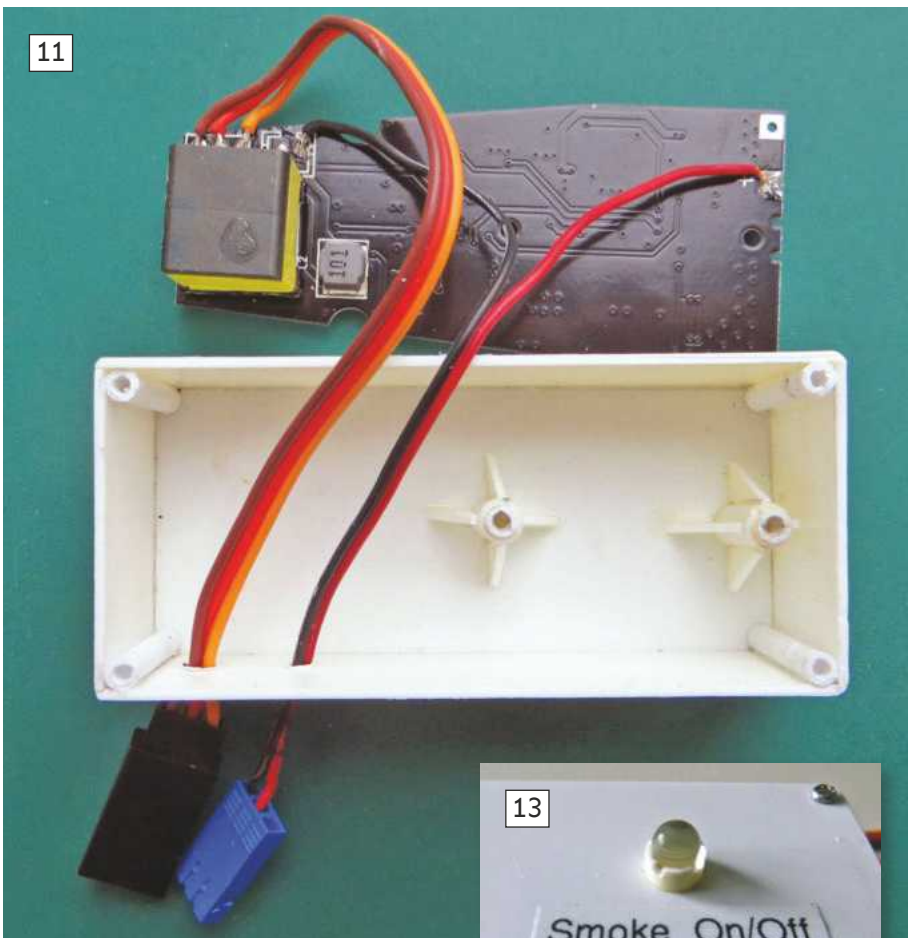
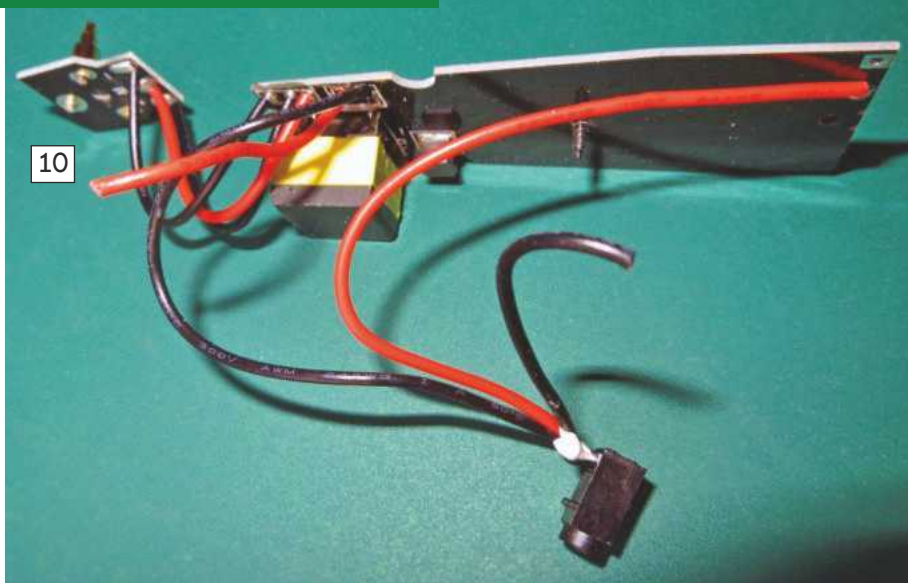
Cut the two wires that go to the batteries and then remove the PCB from the battery

now made up two units covering both options to suit my two applications: longitudinally in the tug and transverse in the coaster (see **Photos 7 & 8**). To provide a robust mechanical connection between the tank and the head, drill holes for two small screws (brass or stainless steel), with a clearance hole in the box and a tapping size on the head (see **Photo 9**).

Then, glue the two items together, being careful that no adhesive runs down the throat. I tried various adhesives for this purpose but settled on 10-minute epoxy, which works well with the screws, holding the parts together while setting. Once the adhesive has set, it's worth at this stage checking for any leaks and rectifying if necessary.

In this application the lid provided with the project box doesn't require the screws also included to keep it in place as it clicks nicely into the box, but you will need to glue on a handle to ease removal. It's very important to





holder which is attached with two small screws (see **Photo 10**).

Note on the PCB where the red and black wires from the power socket are attached; this is where your 5v power supply will be connected.

I made a new housing for the PCB from 1mm plastic card, with a 1.5 mm plastic card lid. The outside dimensions are 76 long x 33 wide x 20 deep. I glued 3.2mm diameter plastic tube sections in the four corners and glued pillars on the base to mount the PCB using the original fixing screws (see **Photos 11 & 12**). I also used the four screws from the bottom of the body to fix the lid.

You now need to fashion a push button on the lid to operate the PCB mounted switch. Adjacent to the switch on the PCB are four surface mounted LEDs; for these to remain visible on the new push button, I used a short length of 5mm diameter clear acrylic rod, sliding in a sleeve made from 6.3mm diameter plastic tube glued through the lid – all from my scrap box (see **Photo 13**).

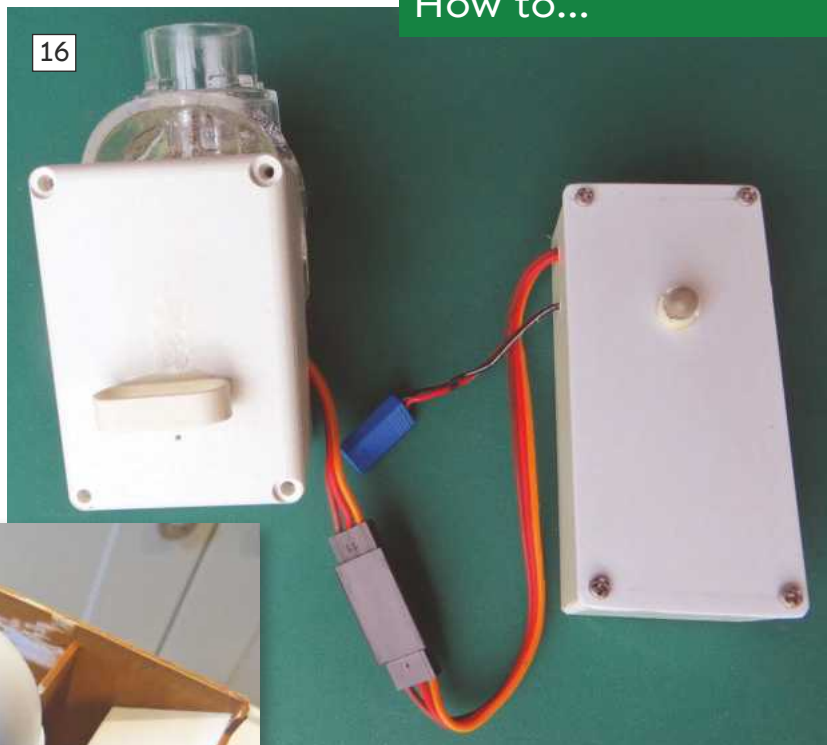
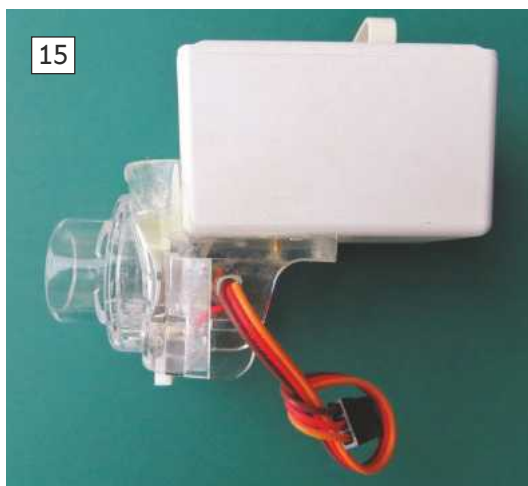
Wiring up

Now to the wiring for which you will need a small tipped soldering iron. The three sprung contacts that carry the signal from the PCB in the body to the nebuliser head I replaced with a servo extension lead cut in half to provide a plug and socket for ease of removal for tank emptying. Care must be taken when soldering the wires to the nebuliser not to apply more heat than you need to avoid melting the acrylic housing. I passed the wiring through a tight-fitting hole drilled at the side to avoid the wires pulling on the terminals (**Photos 14 & 15**). Likewise, tight fitting holes were drilled where the wires pass into the PCB box. And don't forget to pass the wires through the box before soldering to the PCB! For the power lead, I used the wire and plug from a defunct servo (with the signal wire stripped away) to connect the PCB to the receiver.

Installation

Your 'smoker' is now complete and ready for installation (see **Photo 16**). The PCB box could be left loose in the hull but preferably fixed in a convenient place with ready access to the switch.

On both the units I have made to date, for some unknown reason, the low water level cut-out has failed to work so it is especially important not to let the nebuliser run dry.



The installation in my tug is particularly confined and I noticed that the flow of vapour from the funnel slowed when all the deck hatches were in place. I suspect there is some venturi effect where the vapour entering the ducting draws air from the surrounding space and hence drops the air pressure below decks. I overcame this by boxing in a volume below and between the two boiler room cowl vents to form a plenum chamber. Onto this I fixed a 25mm, 5-volt computer cooling fan to draw ambient air into the hull and this proved very successful. Essentially, the only exit for this forced air is out through the vapour ducting thereby assisting the flow of vapour out of the funnel (see **Photo 17**). This may be a feature to consider for your own installation.

You will find that the vapour from the funnel is soon dispersed by a strong breeze and that the smoke effect is at its best running at scale speed on a calm day.

And as a final tip, I found that the unused spring-loaded contacts are ideal as a electrical connection between hull and removable superstructure for a lighting circuit or as you can see in **Photo 17** for a forced air fan – let nothing go to waste!

Smoke on the water

It is a rare moment of joy in this Covid ridden world when you press the button for the first time and the 'smoke' instantly comes pouring out of the funnel. Happy sailing but always remember, smoking can be addictive. ●



Richard's steam coaster, Ben Maye, and steam tug, Danny, both fitted with the smoke effect device explained in this feature, show off just how convincingly it can be used to create smoke on the water.





Aptitude

“This led me to do a bit of head scratching, even though I had the photo instructions”

Mike Smith explains how he put both his modelling and electronic skills to the test while constructing this semi-scratch tug featuring working lamps and LEDs compliant with the latest towing light regulations...

Following on from my explanation last month of how I converted a static scale model crane into a fully functional, joystick-controlled, piece of equipment for one of my R/C boats, this month I will be covering the build of 1:32 tug whose deck it was mounted on.

Based on Mobile Marine Models' Euro-Girl kit, I've named my now completed semi-scratch model 'Aptitude'. She weighs in at approx 8.2kg, measuring 760mm in length, with a beam of 230mm and total height to top of mast of 430mm. I purchased various items required as I progressed with the build, starting with the fibreglass hull, a set of twelve drawings covering each part and photo instructions on how to fit the two motors and kort nozzles.

I decided to give myself the extra challenge of adding fully working lamps and LEDs in accordance with the latest towing light regulations. This would require some electronics to monitor the receiver's output to the electronic speed controllers (ESCs) to then turn on and off the respective lights in the direction of sail (see lower deck).

The cargo deck area was to be removable to facilitate fitting different panels and provide access to the motor rubber couplings.

Card

Firstly, I decided to buy three sheets of card, in 0.8, 1.5 and 3mm, to make mock-ups of the decking and superstructure, as this would give me some foresight on how easy it would be to work from the drawings and a better understanding of what goes where. I'm very glad I did, as I would've wasted a considerable amount of wood had I not done so.

Fettle and drilling

The next job was to fettle the hull and drill out various shapes, e.g., the anchor recesses, wash ports, etc. Part of this was drilling holes/slots for fitting the two T12 12 pole 12-volt motors, prop shafts, stuffing tubes, twin kort nozzles, tiller arms and P-frames. This led me to do a bit of head scratching, even though I had the photo instructions, and took a few days to complete.

Propulsion

The 48mm metal four-blade left and right-hand propellers were bought from Prop Shop.

I determined that for model boats with twin props the port prop has a

right-hand thread and the starboard prop has a left-hand thread. Looking towards the stern, the port prop on my tug rotates clockwise and the starboard prop rotates counterclockwise to sail forwards. Conversely, to sail to stern the port prop rotates counterclockwise and the starboard prop rotates clockwise. Hopefully, that's correct.

The instructions recommended making a 3mm by 50mm diameter plastic disc to be screwed on the end of the prop shaft at the correct position directly below the rudder post. **Photo 1** shows the disc on starboard side in a dry run.

Enlisting the help of a Protorlign tool the port side propulsion assembly was tacked in place with a hot glue gun. The above procedure was also carried out on the starboard prop assy, making sure the korts were inline and exiting out of the hull at the same angle, as illustrated in **Photo 2**. When tested, both propulsion parts were properly glued together using a hot melt gun, P38 and resin/matting, as can be seen in **Photos 3** and **4**. I must admit I could have done with a friendly octopus to help me hold all the parts together!

12mm x 3mm plywood stringers were glued around the inside of the hull 4mm below the wash ports, filled with P38 filler to ensure these would support the 4mm deck.

A power supply was used to vary the voltage and the motor position was adjusted while reading the lowest current and lowest noise level to achieve the best position for the



assembly. Some sanding of the inner korts with a Dremel was required.

When I replaced the Protoralign with the rubber couplings, the rotating volume became noisier, even with Admiralty prop shaft grease applied into the stuffing tube. Over a period of usage, however, the noise reduced dramatically and is no longer an issue; probably the slightly curved rubber drive couplings became straighter and softer.

Water test

Before carrying out more building work, a water test was needed. For this, the hull was placed in bath water. Sealed bags of heavy iron filings (removed from ankle weights) were used to sink the hull to the correct waterline,

which required around 8.2kg. Fortunately, no water leaks were found.

At this point I didn't have all the R/C and electronic speed controllers (ESCs) to hand, so I connected a variable DC bench power supply to both motors. They developed a strong torque in the water at different voltages, even with all the weight. The voltage would eventually be a pulse width-modulated voltage generated by the ESCs once wired in.

Decking

After shaping the plywood deck to fit the inner hull contours, the two decks and coaming walls were glued together – these can be viewed resting on the stringers in **Photo 5**. You may notice that the port side of the cargo hold is off centre; this is to allow the crane to be fitted on the port side. The inner hull was sprayed with Halfords grey primer.



Pushers

The pusher pieces were made by copying the drawings onto card and then cutting them out. Due to the shape of my hull being different to the Mobile Marine Models' drawings, more cutting was required; in fact, I had to remake some of the pieces. The card templates were then transferred to 0.8mm ply. During assembly they were checked against the hull, as they had to be shoe-horned onto it – not as easy as it looked. Glue, resin and matting were applied to ensure a firm fit, as evidenced in **Photo 6**.

Final hull painting

With the hull, pushers, deck sanded, props removed, and the tubes taped with masking tape, it was given two coats of Halfords grey primer. After masking off above the waterline black gloss spray was used for the underside and pushers. Once totally dry, the black was masked off and the orange/red was applied above the waterline (see **Photos 7** and **8**). This painting was carried out over many days because of cold weather.



Superstructure

Batteries

I had to give some thought to how best to provide the voltage to all lights in the superstructure as well as the ESC, receiver,

servo, two motors and a crane. Eventually I settled on a 12-volt 7Ah lead acid battery in the hull to power all the electric items, except for the lights. For these I chose a second 6-volt 3.2 Ah lead acid battery, which I housed in the lower deckhouse, so as not to drain the main battery. These batteries also formed part of the ballast.

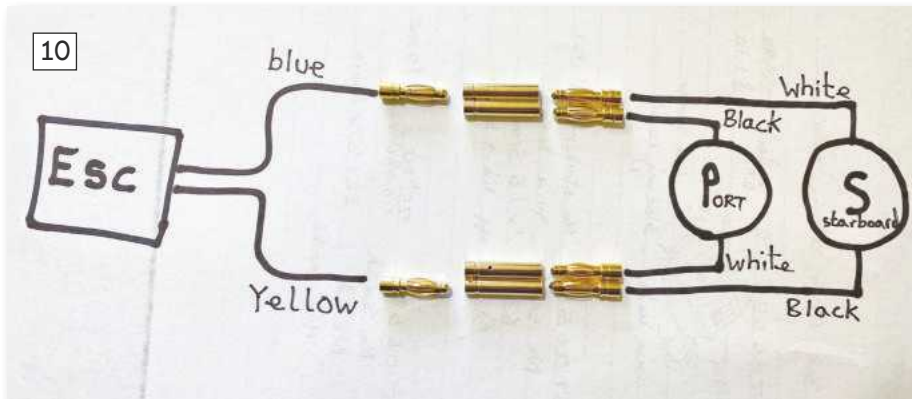
Kort steering servo

A small 9-gram servo was converted to rotate from 0 to 180-degrees by unsoldering the potentiometer inside it; this was replaced with resistors and connected to Channel 1 of the receiver housed in the hull. You can watch YouTube videos on how this is done. After a bit of trial and error, I connected a 2mm copper wire from the servo arm to one kort steering arm. As you will see in **Photo 9**, I found bending the wire into a 'V' shape helped the movement of the kort nozzles.

I used a bike wheel spoke to connect the tiller arms of the two kort nozzles, thereby achieving +/- 30 degrees rotation of the korts.



“There was no provision for working lights on the design drawing for this tug and so I had to figure out a way to route and solder the wiring myself”



Motor wiring

The ESC output blue and yellow wires and motor wires were soldered to GTIWUNG gold plated male bullet connectors. Two pairs of female connectors were soldered together make a “Y” lead. These were connected to give the correct rotation of each propeller (see **Photo 10**).

There was no provision for working lights on the design drawing for this tug and so I had to figure out a way to route and solder the wiring myself. LEDs weren’t suitable in all cases, as the type and angle of lights differ (e.g., 112, 135-, 225- and 360-degrees) depending upon their purpose, so I felt where necessary I should fit bulbs with their correct housing, even though they draw more current. The interior lights, though, are LEDs.

The lights in the whole superstructure and mast worked out to draw approximately 1.4-amperes, giving just over two hours of working lights.

This is where the fun started, as, naturally, when considering how best to assemble the superstructure, there were various factors

to I had to take into account, including the lights, routing of the wiring and any future electrical repairs. Should I design a removable mast with a connector for the wires, or a detachable wheelhouse or upper deck? If so, how? Velcro? Hidden screws? Plug in electrical plugs/sockets? And how would I get 28 wires to run through the mast down to the upper deck and then into the lower deck?

Wheelhouse

The clock was ticking, so I decided to take a punt and glue all three structures together. Next time I’ll think about using the plug and socket idea, or perhaps the light control circuit board could be housed in the wheelhouse roof – thus there would only be three wires routing down to the lower deckhouse.

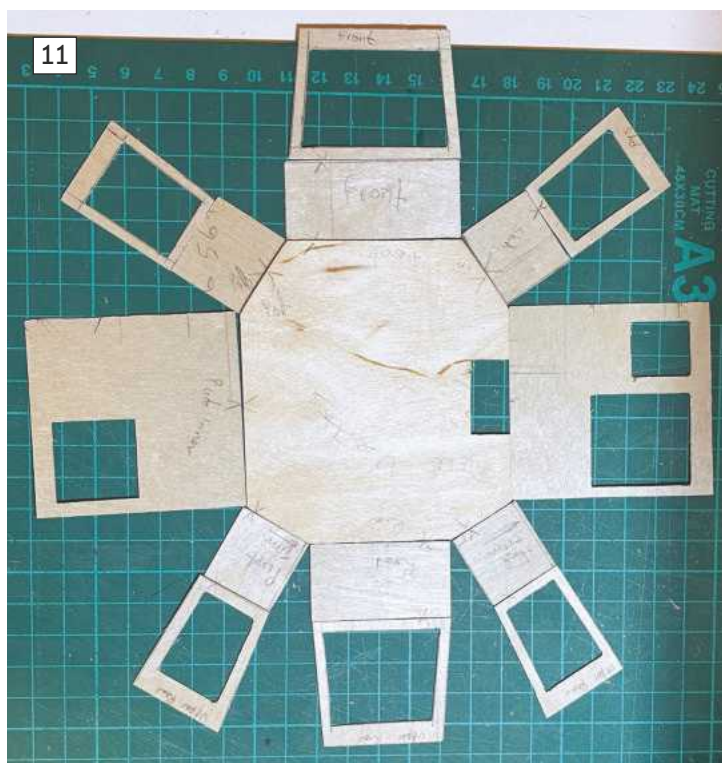
On this model there are 15 sections for the wheelhouse walls, some with sloping sides, which made gluing everything together very time consuming (see **Photos 11** and **12**). Also, my measurement and cutting skills



were not up to par and filler had to be used to plug gaps. Also, after the roof section was assembled, I needed to make some alterations to fit the wheelhouse walls.

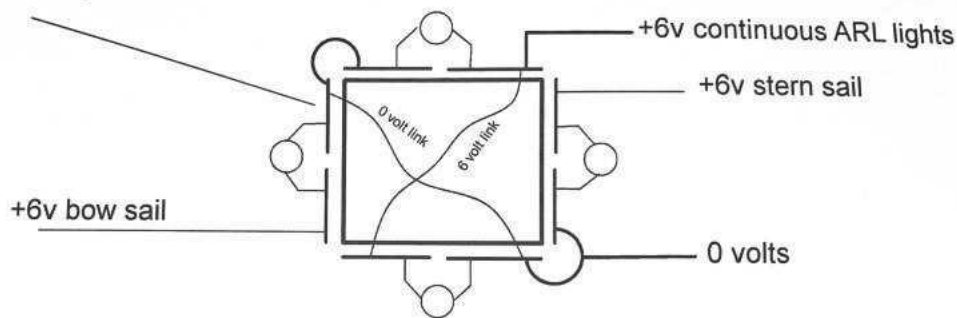
If I were to build this type of structure again, I would reduce the quantity of panels and probably use plastic, because the ply proved difficult to sand smooth.

To reduce the wires from the mast I cut 0.3mm brass plate into eight pieces then glued them to the mast with a 1mm gap between each piece, as shown in **Photo 13**.



8 brass sections along the length of mast

Figure 1



4 Wires soldered to the brass sections looking down the mast

The circles represent the bulbs.

14



15



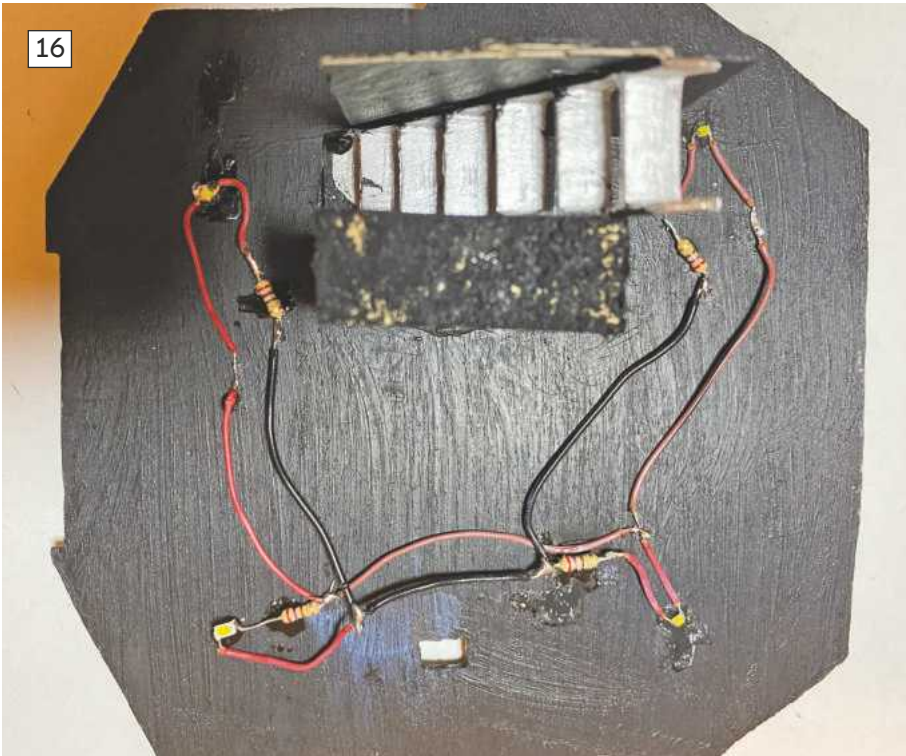
The wiring sketch (see **Figure 1**) shows the eight brass sections, to which each lamp wire was soldered: the common 0-volts, the continuous +6 volts, switched +6v for forward sail and the switched +6v for stern sailing. This was prototype quality, because I was designing on the fly.

Photo 14 shows lamp shelves glued in place. The very thin lamp wires were soldered to the brass sections quickly and carefully because the plastic covering melts easily. During this stage the search, tow and stern lamps on the roof sides were also wired up and taped off prior to painting.

Photo 15 shows the wheelhouse cab I decked out with a chair, desks and dual control panels.

I wanted to use up my red surface mount device (SMD) LEDs, but they were tiny, and I mean tiny! Using a 1mm soldering iron tip and magnifying glasses, however, I managed to solder them to resistors.

16



17



I've used 20mA (0.02A) for LED current and it hasn't let me down yet. $6\text{-volts} \div 0.02\text{A} =$ a resistor of value 300 ohms (300R). I had 330R in stock and they were fine to use, although 270R would work as well. These were glued to the wheelhouse ceiling and the wires were routed down a box section through the floor to the ceiling of the upper deck, as seen in **Photo 15** and **16**.

At this point I was working on all three structures in parallel, allowing paint to dry before carrying out similar procedures on each, and checking all three structures fitted together (see **Photo 17**).

With the roof resting on top of the wheelhouse but not yet glued, two coats of grey primer were applied to the whole wheelhouse (see **Photo 18**).

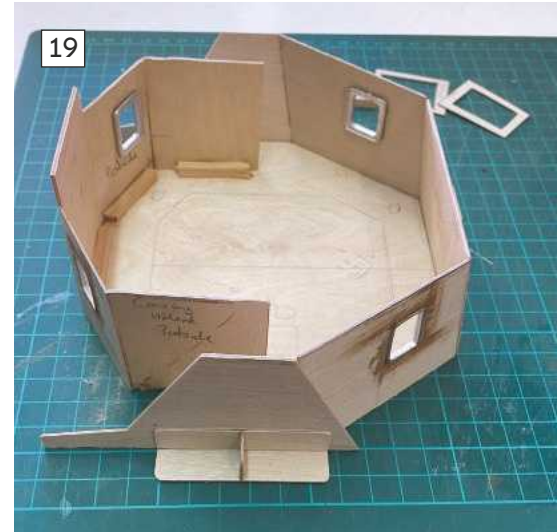
Prior to the windows being fitted, areas were masked off to spray the roof green, and then walls and mast white. After this, the lamp housings were glued to the brackets on top of the bulbs. The windows were cut and glued into place using some canopy glue I'd bought at the Blackpool Model Boat Show, as this, a member of the Kirklees Model Boat Club had advised me, would avoid a plume effect on the windows.

After some touching up, the roof was finally glued in place and the scratch-built radar and compass were fitted.

Holes were drilled for various items, e.g., door handles, stanchions, flood light, etc, and, together with the steps, these were then glued into place.

"This, a member of the Kirklees Model Boat Club had advised me, would avoid a plume effect on the windows"

19



Upper deck

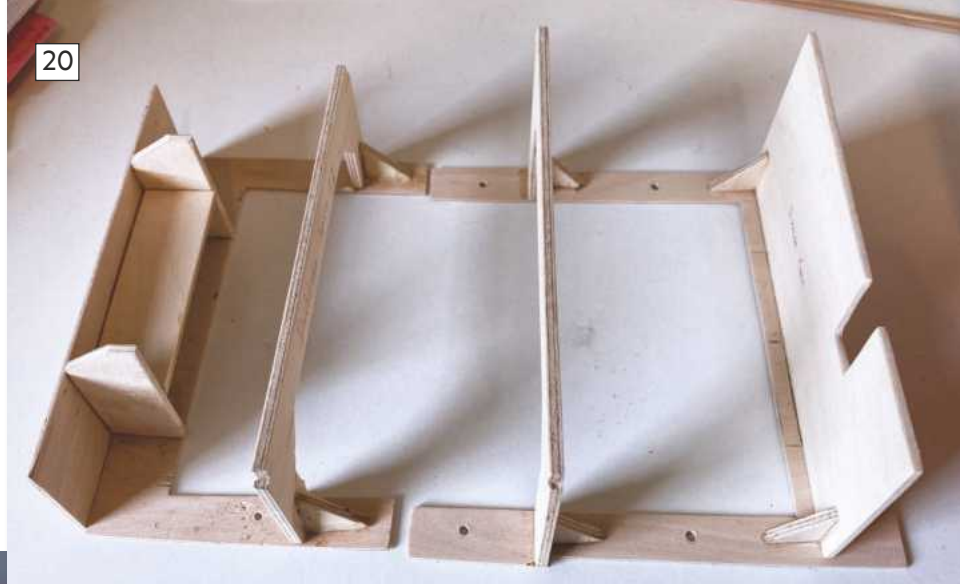
Photo 19 shows the unpainted upper deck prior to a hole being added so I could route the wires into the lower deck before it was given a coat of grey primer. Window frames were fitted, and the roof was cut to fit.

I used white 5mm LEDs behind frosted plastic windows, but white SMD LEDs for the ceiling and their wires were soldered to the 6-volt and 0-volt wires coming down from the wheelhouse. Finally, the walls were painted white and then the wheelhouse was glued on top.

18



20



Lower deckhouse assembly

In **Photo 20** you can just see that the frame is in two pieces, because the front part of the foredeck rises about 12mm, and these had to be screwed onto the hull while building the lower deck (before the roof is glued), to be unscrewed later. **Photo 21** shows the underneath of this deck.

The navigation light bracket was painted black and two sets of red/green lights

21



complying with the towing regulations (as far as I understand to be correct for this tug) were fitted, as were the flood lights.

With all the wires now inside the lower deckhouse, the upper deck was glued on top.

The wires were trimmed, connectors crimped on and plugged into the pcb pins. The lighting system was tested via the joystick control and fortunately all was OK.

Lower deckhouse electrics

Receiver to ESC retrofit

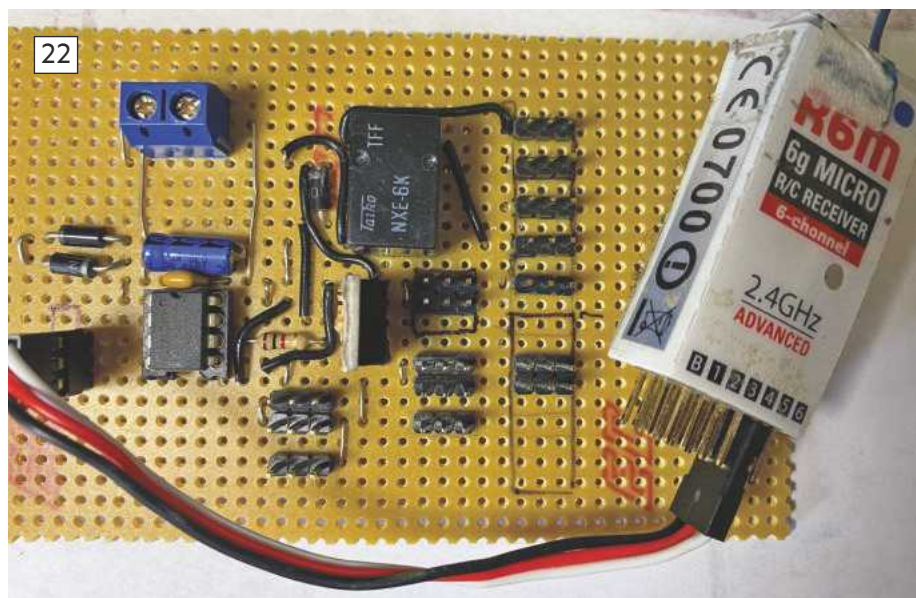
On the day of *Aptitude's* first sail, I found, at water's edge, it was a bit of a struggle to hold the superstructure under my arm while trying to connect and disconnect cables with my one remaining free hand. So, I came up with a possible solution. Want to know if it worked? Then please read on...

Photo 22 shows you my printed circuit board (pcb), where all the wires from the superstructure are connected, and a 6-volt lead acid battery with switch are housed in this lower deck. Two spring contacts were retrofitted facing down towards the hull in order to make electrical contact with two brass strips when the superstructure sits on the hull. The weight of it hopefully should maintain electrical contact.

In the hull a three wire 'Y' lead was connected to Channel 3. The second end is connected to a Hobbywing 1060 ESC, and the third end (connector cut-off) is soldered to the two brass strips that are glued just behind the coaming, with the brass facing upwards to accept the spring contacts.

Two wires from the pcb were soldered to these contacts. As soon as the superstructure is fitted the lights would be under throttle control.

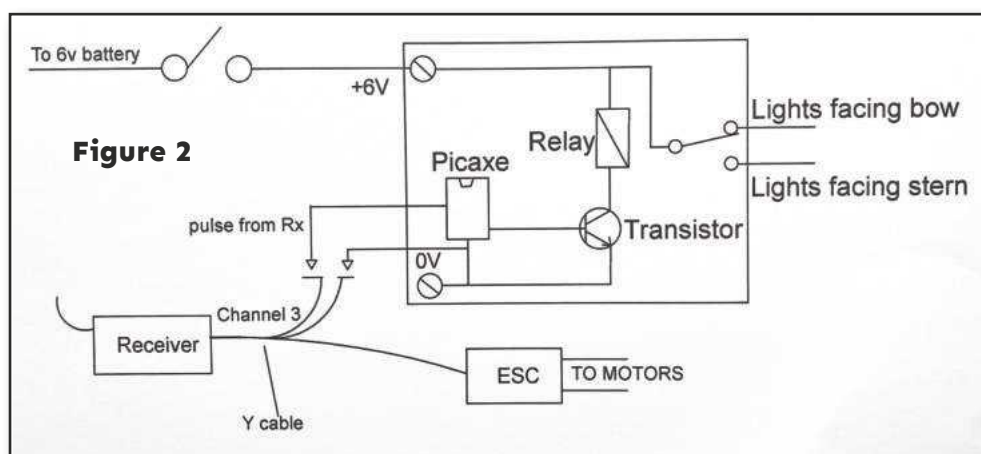
22

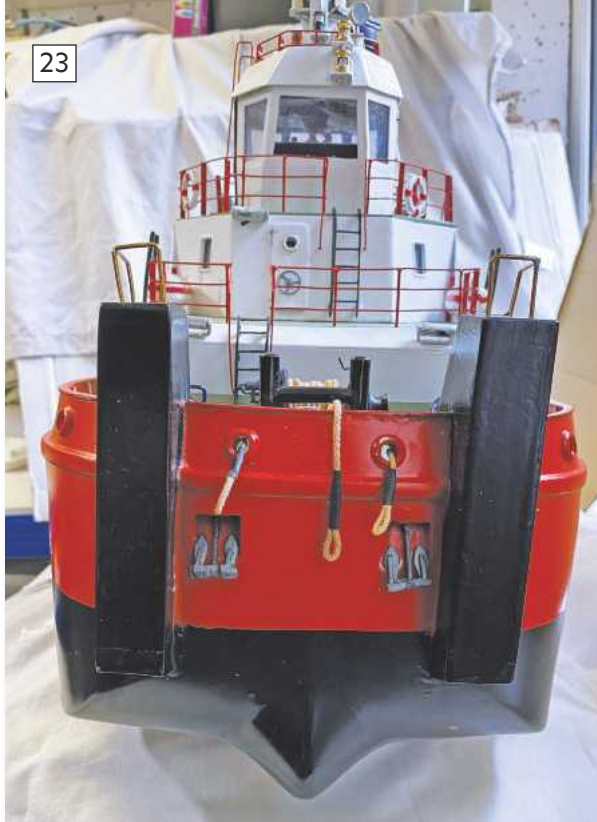


Light control circuit

I'll not go into too much techy detail regarding the circuit in **Figure 2**, but if you want to know more you could possibly read a very good article by Roy Cheers in the May 2020 edition. Roy describes how pulses from radio control can be connected to a now popular 'Arduino' circuit board, which can then be programmed to switch relays, read sensors, etc.

Figure 2 shows a controller chip called a 'Picaxe tm' and has similar functions to the Arduino. The circuit (some items deleted for ease of explanation) operates the lights by





monitoring the pulses from the receiver (any type) on the two spring contacts.

If the pulse width is more than 1.5ms (milliseconds) the relay turns off, thus providing +6 volts to the bow pointing masthead, navigation red/green, tow and stern lights, i.e., joystick, in up forward sail position.

As soon as the joystick is moved to the down to the stern sail position the pulse becomes less than 1.5ms and the Picaxe is programmed to turn the relay off via the transistor, thus swapping +6 volts to the stern pointing masthead, navigation red/green, tow and stern lights.

The program in BASIC loops from Tug to Goto tug continuously. See below: -

```
Tug:  Pulsin c.4,1,w2
      If w2 > 150 then low c.1 : endif
      If w2 < 150 then high c.1 : endif
Goto Tug
```

NOTE 1: The line pulsin stores the width of the receiver's pulse into w2 (a memory location).

NOTE 2: The two lines if w2... check if it's bigger than > 150 or less than < 150. Low means turn relay off, and high means turn relay on.

Last stages

The brass 1.3mm handrails were cut and bent to shape along with the white metal stanchions. Brass though stanchions have a better finish, take up paint better and are less easy to bend by mistake, but more expensive.

The next session was making and fitting steps, gate, handrails and main deck furniture. Five winch kits and three scratch escape hatches were built (see **Photo 23**).

Vinyl lettering was used for the tugs name, Aptitude, and water marks, which was then carefully covered with a coat of gloss varnish. Lastly, three figures were painted and glued in place.

24



In hindsight, it would have been cheaper to buy everything from Mobile Marine Models at the same time, not only in terms of saving on postage but because I would have known the exact size of items, such as windlass, life raft, launcher, etc, and have been able to add locating lugs to lessen the chance of these coming adrift after gluing.

Adding the spring contacts, however, solved my problem of connecting wires at the water's edge.

Potential pulling power

Aptitude sails very well and looks particularly good all lit up after dark (see **Photos 24** and **25**). Thankfully, navigation and tow lights operate just as they should with direction of sail. Tugs, of course, aren't meant to travel fast but, when the joystick is operated, I've discovered there's surprising amount of speed to be had until water begins to spill over the bow, which may indicate that Aptitude will have the ample torque to pull a heavy load. ●

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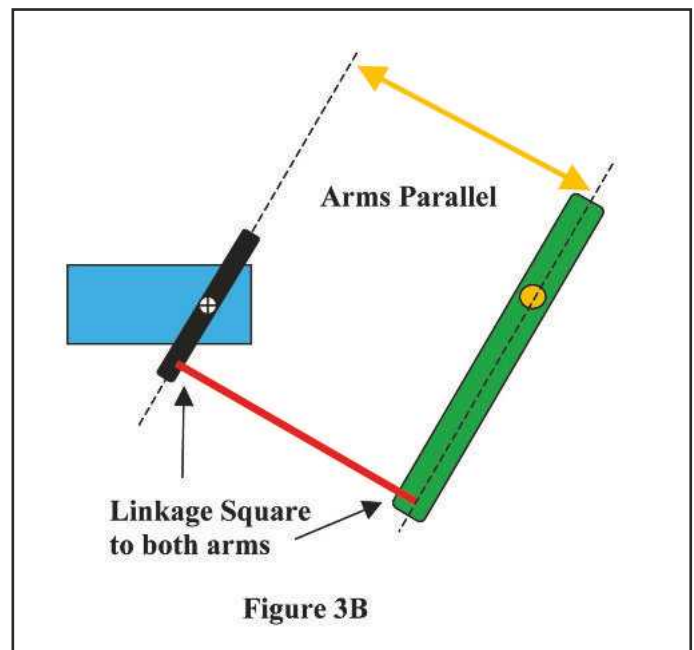
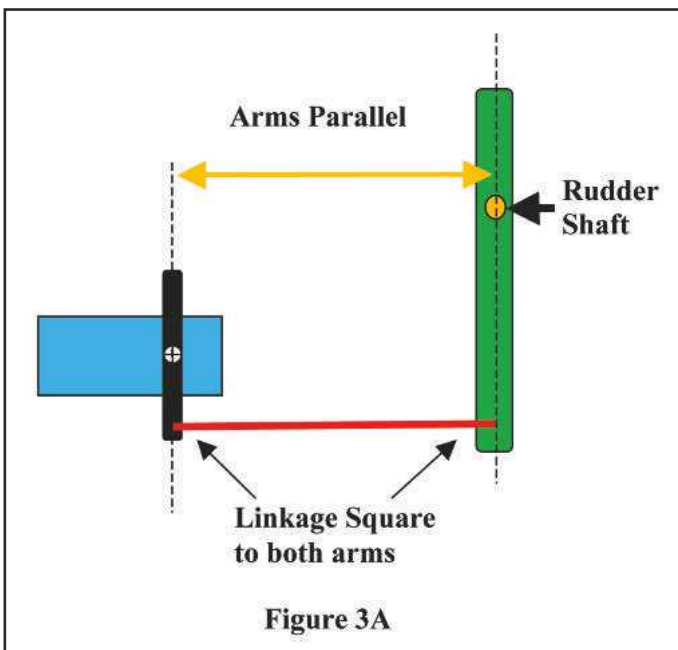
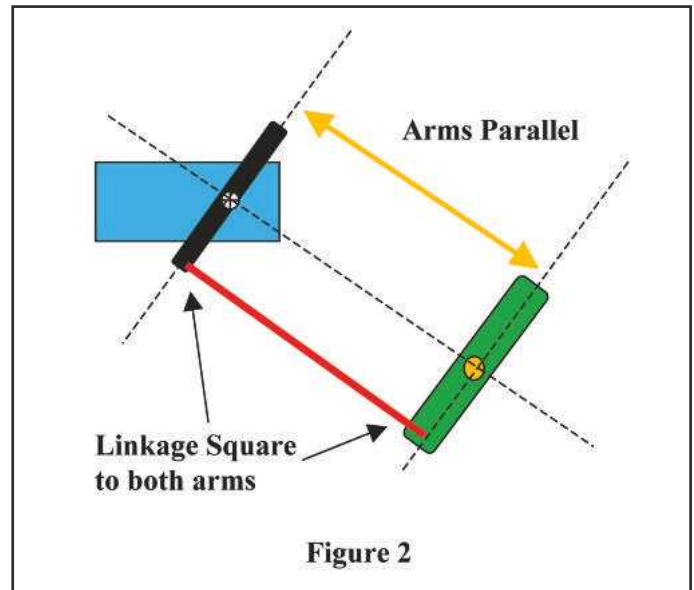
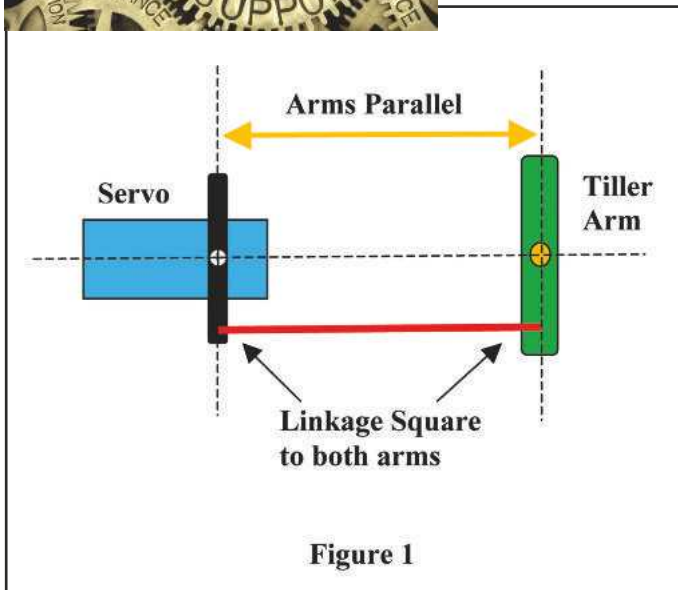
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“This isn’t hard to achieve with a little care in the placement of the rudder servo and its linkage to the tiller arm”



Keeping Square

Glynn Guest steers us towards achieving better rudder control

It's not unknown for modellers to complain about their creations having funny steering characteristics, like an obviously larger turning circle in one direction than the other way. Sometimes this can be due to quirk of the hull, propeller and rudder combination, but I suspect that in most cases it's a simple problem with geometry.

It's usual that you need the rudder to move through the same angle no matter which direction you push the transmitters stick or,

for the more rotary inclined, turn the wheel. This isn't hard to achieve with a little care in the placement of the rudder servo and its linkage to the tiller arm.

If you want the tiller arm to exactly duplicate the movement of the servo arm, in other words both move through the same angle, then you just need to keep the arms, servo and tiller, parallel. At the straight (rudder deflection zero) position this requires the linkage to be square (at 90-degrees) to both

the arms and hence the same distance along the arms from the rotation axis (see **Fig 1**).

This method has two potential drawbacks. Firstly, it's not always possible to place the servo in this perfect position. However, all is not lost, as the linkage geometry doesn't really care just where the servo and rudder shafts are. Just keep the linkage square to the arms and identical servo and tiller arm movement will occur (see **Fig 2**).

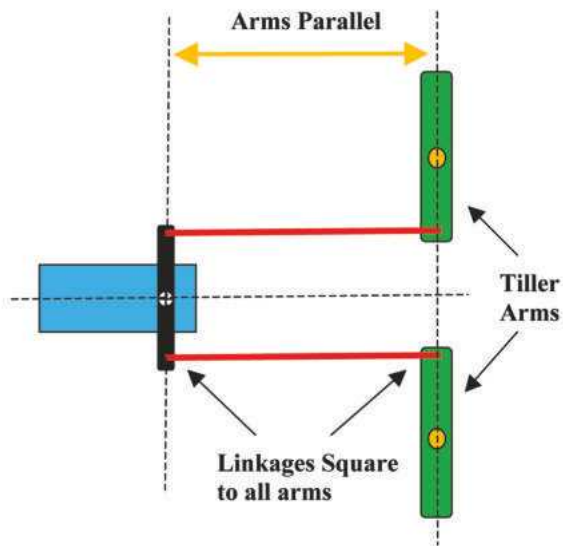


Figure 4A

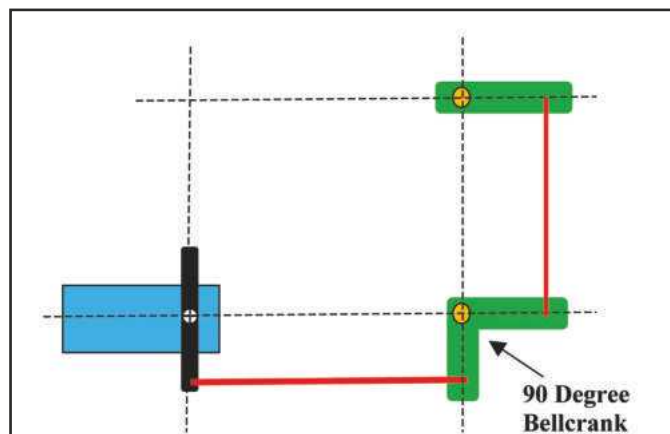


Figure 4B

By now, the second drawback might have been seen. I expect some people will be crying that this method will move the rudder through the same maximum rotation as the servo (usually 45-degrees either way) and this is way too much for the rudder of a model boat. I'll agree that, from actual tests some years ago, rather than someone else's opinion, I found that rudder angles greater than about 30-degrees didn't gain much in general sailing. However, moving the rudders at larger angles can be handy when manoeuvring at slow speeds, and also to bring the model to rest in emergencies. Of course, even if your model does have the potential for such large rudder movements, you don't have to use them with proportional R/C, unless you are the sort who can only 'slam' the transmitter controls from side to side with nothing in-between.

If you need to reduce the maximum movement of the rudder when the rudder stick is at the extreme position, then a 'Rate Switch' on the rudder channel could be used. I've used one of these to tame the rudder response on a few fast models with great success. This could mean you'll have to read the instructions that came with the radio outfit to get the movement you desire.

An alternative is to use a linkage hole position that is further out on the rudder tiller arm. This can lead to slightly uneven rudder movements, but being square can minimise this problem (see **Fig 3A**). If a servo can't be placed like this then just remember the linkage geometry still doesn't care where the servo is, as long as things are square at the zero rudder angle (see **Fig 3B**).

What about twin rudder set-ups, you might be asking about now. Well, the same idea of keeping linkages square is still valid, and this can be done using one of two methods (see

Fig 4). Now for the moment of truth... Recently one of my models featured twin screws and rudders. I went for simplicity and used a most 'unsquare' linkage system. The rudder movements were wildly asymmetric, and you know what, the model behaved perfectly when sailing. I know some people would be offended by this, probably quoting 'Ackerman Steering', as needed on road vehicles to give safe turning without rapid tyre wear, but water is more forgiving than the friction forces between wheels and road surfaces.

So, provided your linkages are reasonably square and, perhaps more importantly, secure, don't worry too much. Set the rudder up so the model runs straight, readjusting the linkage back to square if needs be, then learn how it responds to the rudder at all speeds.

Finally, enjoy your model and ignore those who might say that by their standards, it's not right. ●

IN BETWEEN ISSUES...



While awaiting your next copy of Model Boats magazine, why not visit our website at **www.modelboats.co.uk** or our Facebook page at **www.facebook.com/modelboatsmag**, where you'll find additional content, be able to interact with both the MB team and fellow enthusiasts in the model boating community and be given a sneak peek at what you can look forward to in the next edition.



All about the base...

Dirk Bonne shares details of an incredible diorama built to serve as home to an equally realistic and impressive working cargo vessel when she's not out on the water...

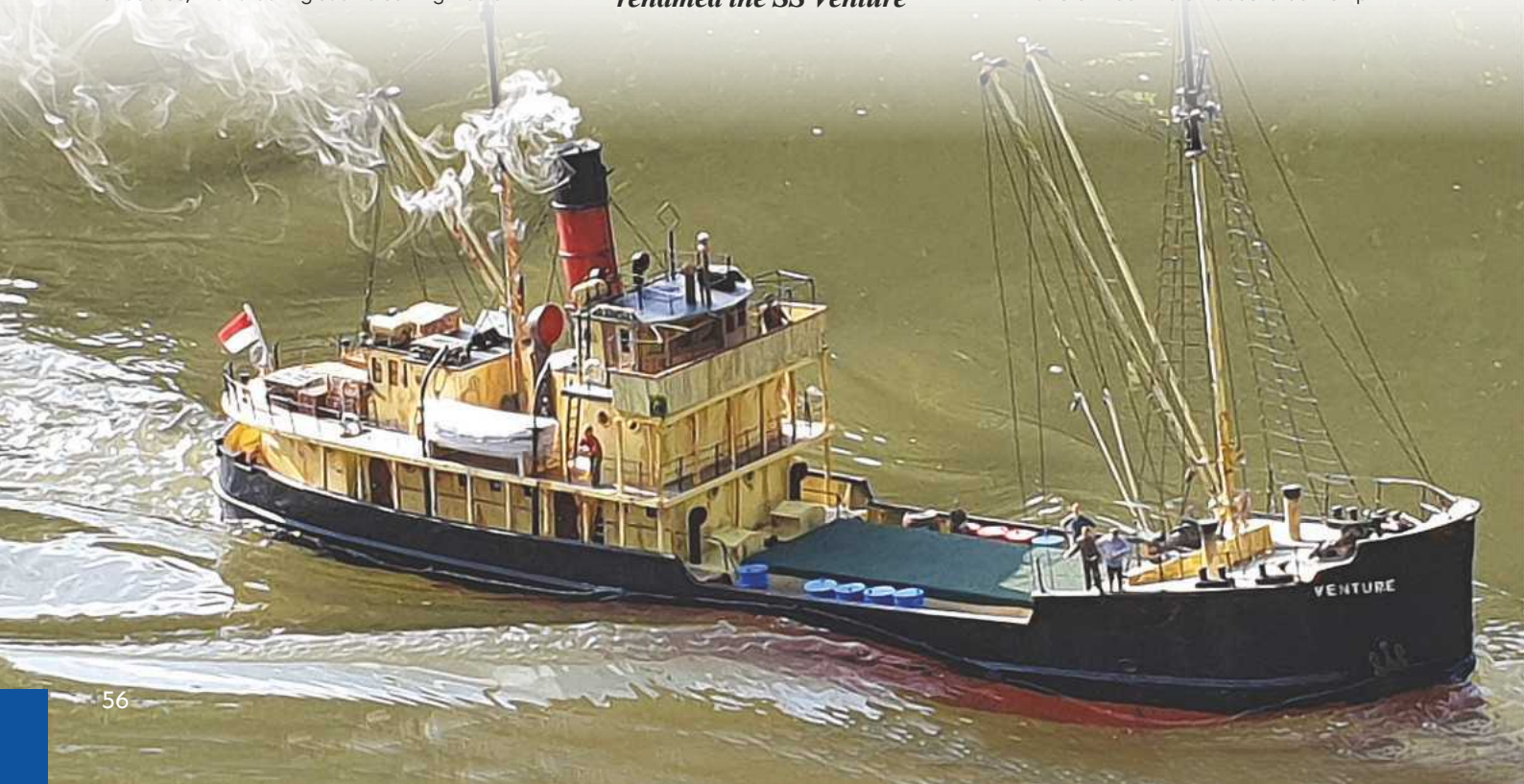
When not sailing our model boats, they are usually either packed away or displayed at home on cradles/stands, perhaps on shelves or in glass cases. Recently, however, I decided to have a go at showing one of my models off as the centrepiece in a quay-side diorama. I realised, of course, that creating such a setting would

"In 2003 Mypuck was purchased for use in the remake of the spectacular film King Kong. For this role, she was transformed into a 1930s' steamship, and renamed the SS Venture"

require required a lot of time and effort, but I've always loved a challenge! And now complete, I believe all my hard work has really paid off.

The star of the show

The resulting diorama is now home to the cargo vessel originally known as Mypuck. Built in 1956 in Delfzijl (Holland), she spent most of her working life in Scandinavia under the ownership of various companies. In 2003, however, Mypuck was purchased for use in the remake of the spectacular film King Kong. For this role, she was transformed into a 1930s' steamship





“A good base for my reconstruction of the SS Venture was Caldercraft’s SS Talacre”

and given a huge chimney, big vents, a wooden wheelhouse, and, of course, a rusty weather-beaten look, and renamed the SS Venture, Special scale models of her were also built for use by the studio’s visual effects team.

Afterwards, she remained inactive for a very long time, simply moored up in Wellington harbour in New Zealand. Sadly, after years of neglect, she finally scuttled to create an artificial reef in 2010.

Various pictures I managed to find online helped me to build this ship. A good base for my reconstruction of the SS Venture was Caldercraft’s SS Talacre. I was able to use the hull of this old freighter, and some of her vents, winches and lifeboats. Of course, the hull needed many modifications, particular to the stern, which needed to be expanded. I built a new funnel in light metal and installed a smoke generator (6V) from Seuthe, together with a plastic injection tube as an oil-fumes collector.

When it came to lighting, I chose bulbs of a more yellow shade, to better correspond with the spirit of that era; only the spots on the masts are strong white LEDs lamps.

Both the smoke generator and lights were connected with a 6V battery in the first cargo hold. When sailed, I place another battery (6V) in her cargo hold, which is covered with an extra deck hatch. The ship’s engine is a Graupner speed 600, which provides a leisurely and realistic pace.

Nowadays, once rusty old bucket has fulfilled her duties of providing some pond side entertainment, I simply clean her up, take her home and return to her quayside residence ready for the loading a consignment of new tractors!



As you can see, Dirk Bonne’s superb model of SS Venture wasn’t built as a static model, and she looks simply spectacular and performs beautifully out on the water.

Putting the more into moored

I based my diorama on the port of Ostend, in Belgium. There are still some fascinating old harbour buildings there, amongst which is Hangar No. 1. Built in 1906, it is today the

sole surviving large warehouses serving the port (there were originally four). Unfortunately, the building is now in bad shape, but there are plans afoot to restore it to its former glory. This, along with a loading shed, container



When not attracting the admiration of those pondside as she cruises effortlessly through the water, SS Venture is now displayed as the centrepiece of this superb dockyard diorama, based on the port as Ostend, Belgium. No longer requiring a cradle for support, she sits securely in a slot cut into the insulating board used to create the foreground, convincingly finished to represent the murky quayside water.

“Scaled down to 1:50 in keeping with SS Venture, the original warehouse, which has a length of 200-metres, would measure in at a whopping 2-metres long! The solution to this dilemma proved to be a nifty little trick...”

yard, coal storage, railway tracks, etc, were all to be included.

Scaled down to 1:50 in keeping with SS Venture, the original warehouse, which has a length of 200-metres, would measure in at a whopping 2-metres long! Obviously, that would take up an enormous amount of display space at home and would be way too

bulky and heavy to transport should I decide to exhibit it any shows, etc. The solution to this dilemma proved to be a nifty little trick. I would construct only half of the building (which, when reduced to 1:50 scale, would measure up at a more manageable 40 inches) and affix a mirror to one end, so that when viewed from a certain angle, the reflection within would create the optical illusion of the entire hangar having been modelled.

For the brick walls I used plastic wall panels, while the quays and the cobblestones were created from foam panels. To create an aged effect, I applied a thinned down grey paint to the walls of the hangar with a cloth, before wiping this off so that the only trace of remaining could be seen in the mortar, before painting the bricks using a brush. I employed the same technique for the cobblestone panels, but this time used a brown wash

between the stones, which themselves were painted grey. I also added little detail touches to just about everything else; for example, rusting the metal gates, weathering down the wooden fencing, etc.

Honing your weathering skills takes time and a great deal of experimentation. If you're a complete novice, there are some little tips I can pass on, though. For example, never apply paint as straight on to the item in question. Instead, first dilute it with a dash of white spirit and then application use a piece of cloth or a hard brush rather than a paint brush to spread, blend and soften the whole effect. If you're not completely satisfied with the result, you can simply wipe it away and start over; there will be a lot of trial and error but after some practice you'll find it will get a lot easier to achieve the effect you want.

The 'water' at the front of the diorama, in which the hull of my cargo vessel now sits, was made from a 6 cm xps insulating board. Once I'd cut out the correctly sized and shaped gap into which my model could be inserted – which, I am not going to lie, did prove quite a challenge – I sprayed the remaining surface with a glossy dark green paint of the insulating board, already backed with a heavy grade paper, to simulate still water.

My crane represents one of the six half gantry cranes installed at the beginning of the 20th century. By happy coincidence, one of these has been preserved and had an exhaustive restoration about a year ago. Having managed to get hold of the plans, I was, therefore, able to build a scaled down replica from various plastic parts available at the hobby store. The resulting model has also been heavily weathered as, rather than represent it in its restored form, I wanted to represent it as it would have looked back in the 1960s.

In fact, nearly everything you'll see in my photographs got this treatment, save for the consignment of shiny new tractors ready for



Shown here on a traditional wooden cradle, SS Venture looks magnificent in her own right, but Dirk decided she deserved to be viewed and appreciated both on and off the water in as realistic a setting as possible.



loading onto the ship. I wanted to pack in as much detail and realism as I could, so I've even incorporated the exterior of a tiny brothel as per current restoration plans!

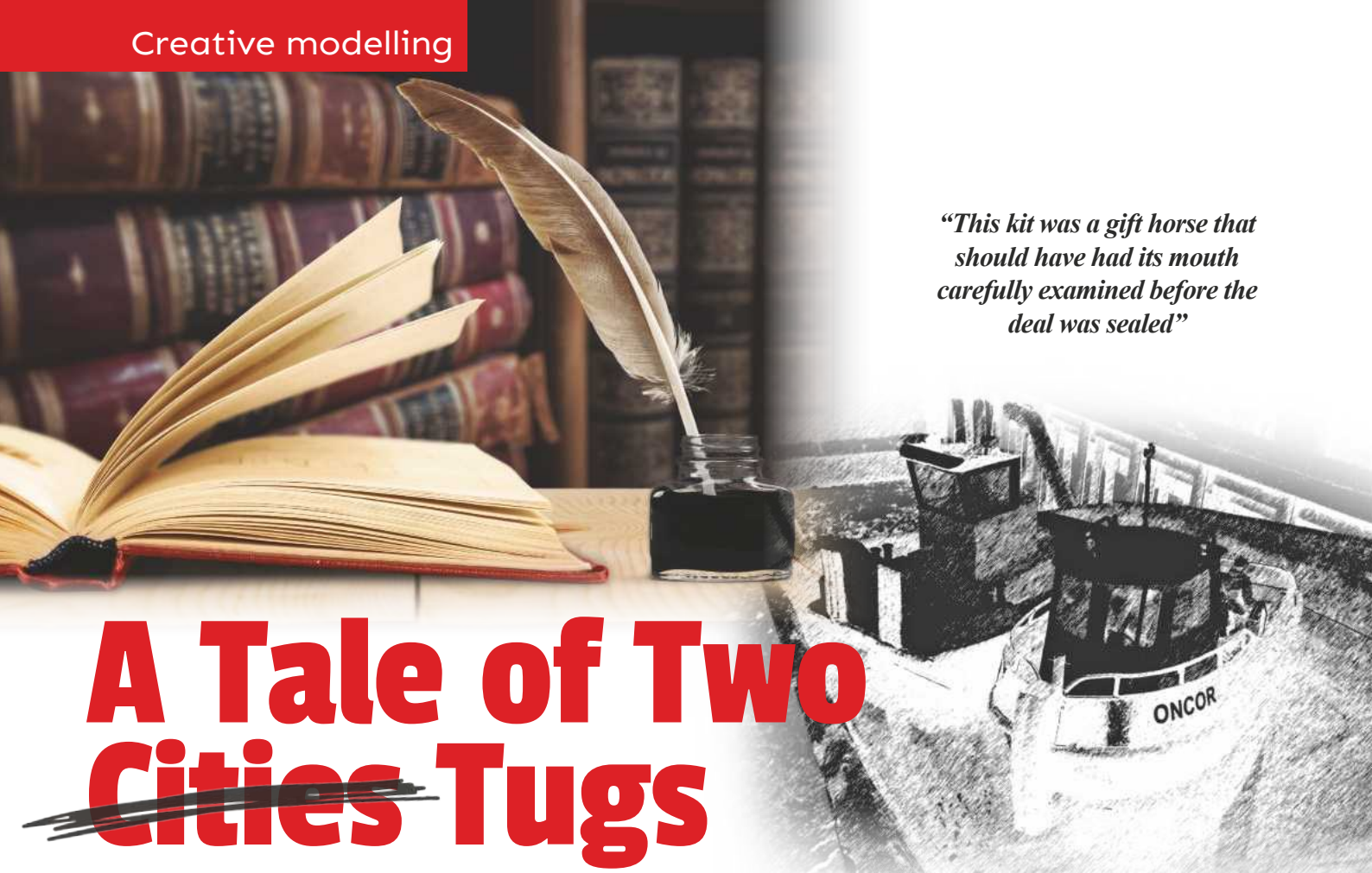
The figures ashore and on the ship are a mixture of modified Preiser figurines and (printed) 3D-Studio-Figures, an excellent 3D scan service offering a lot of (unpainted) figures at different scales, in a variety of poses, to suit a wide range of scenarios.



Go on, take the scenic route!

While this venture was hugely time consuming, enormously challenging and really stretched me as a modeller at times, all of this was balanced out by the fun I had. So, if you're pondering a new challenge for 2022, embarking on a project like this will allow you to create something truly unique. ●

The closer you look, the more detail you will find packed as. Dirk clearly spent hours considering all the little touches he could add into this diorama to really bring the whole scene to life!



"This kit was a gift horse that should have had its mouth carefully examined before the deal was sealed"

A Tale of Two Cities Tugs

A friend in need is a friend indeed but, fortunately, unlike Dickens's classic, **Eric Belshaw's** story has a happy ending...

It was the best of times, it worst of times, it was the age of wisdom, it was the age of foolishness"... Why am I quoting Mr Dickens? Well, while this is *A Tale of Two Tugs* and not *A Tale of Two Cities*, there are certain parallels to be drawn...

Great expectations

My story begins when a friend and fellow boater (who shall remain nameless), having hastily snapped up an inexpensive new kit from an online auction site, called me to discuss his woes, confessing that despite his initial enthusiasm he now found himself well and

truly out of his depth. So, in the true spirit of fraternity, naturally, I stepped in with an offer to tackle the construction myself, confident that, despite the insurmountable difficulties he was experiencing, my wisdom and skills would save the day.

Once more unto the breach...

When the kit arrived, along with my friend's assurance that everything he'd received was included in the box, an inspection of its contents revealed there was no instruction manual nor list of contents; neither was there plan or a picture of the finished model to give visual reference to what I would be working towards. Hmm... I examined each laser-cut ply panel,

only to find that some crucial shapes were missing, and there were other shapes that simply didn't seem to fit with the others around them. This kit was a gift horse that should have had its mouth carefully examined before the deal was sealed. "Where the Dickens do I go from here?", I found myself wondering. Well, "Once more to the internet, once more...", to paraphrase Mr Shakespeare!

The scant information I could key into my PC's search engine was that the model had come from China, was a mini tug and had a reference number of 804. Fortunately, however, this combination of data threw up two results: an 'Aliexpress' listing and a picture of the Damen Stan Tug 804.

The Aliexpress listing gave completed model pictures, some build images of the basic structure, some suggested construction stages and the all-important parts identifier.

A few twists of my own

Armed with this information, I then discovered that two bulkheads and one longitudinal frame were missing from the box, as was the motor, prop shaft, propeller and rudder. All the plastic mouldings and 3D-printed parts

A friend in need is a friend indeed, but when Eric volunteered to take over the construction of a kit his pal was struggling with, he discovered it had come with neither instructions or a parts listing; indeed, there weren't even any pictures of the finished build he could reference. Fortunately, with a little online research, he managed to find some helpful information and some photos of the Damen Stan Tug 804 completed as per the manufacturer's intentions.





LEFT: The electrics installed by Eric.

“I have McDonalds, Starbucks and Costa to thank for supplying the planking...”

a shaft coupling, shaft and propeller were picked up from eBay.

I fitted the rudder shaft through a non-kitted piece of timber glued to the hull inside and I used silicon sealant to secure the stern tube after a suitable motor mounting had been fabricated.

Fibreglass tissue was used to coat the underside of the hull and resin was poured into the spaces inside it before the deck was added. In retrospect, it would have been better if I'd used glass cloth on the outside – maybe's next time!

The gunnel went on surprisingly easily, and the cabin assembly was, likewise, just as simple – too simple. This is where we come to the age of foolishness. I had no crew, no cabin interior, no running light, no mast and I hadn't fitted the cab door (luckily). It was back to the scrap box, then, and to that wonderful provider of 90 mm tall crew, 'Star Wars'. Lando Calrissian and a Hoth warrior were commandeered from my grandchildren's toy box and, after a bit of modification, pressed into service as tug crew.

Painting and decorating finished the project. In hindsight, though, I think I may have given this little tug the wrong name; 'Oncor' sounds way too much like 'Encore!' and the considering the build of this model proved such a performance, it's not something I'd hasten to repeat.

were AWOL, too, as was the hull planking and gunnel stern quarter sections. But, on the plus side, I now had the fundamental shapes, so at least the longitudinal frame and missing bulkheads could be made from scraps of ply I had left from over from other projects. While creating these parts, I also had time to think about how I could craft my own substitutes for the other missing items.

Dowel, 30-amp single core wire (with insulation) and the insulation from 60-amp wire replaced the gunnel capping, fore deck handrails and the various towing bollards. The safety bars over the cabin were fashioned from copper tube, scrounged from a failed steam project. The cabin window frames were fashioned from bent and soldered copper wire and the 'glass' was cut from a curtain pole box salvaged from stuff my wife would otherwise simply have put into the recycling.

The rest of the fittings, lights, mast, searchlight, etc, were concocted from bits and bobs in my scrap box (I cannot emphasize enough how every modeller should have one these!) and from my collection of LEDs.

The hull framework was assembled onto the building board provided and the side plating and 'plank on frame' areas were completed. I have McDonalds, Starbucks and Costa to thank for supplying the planking (think drink stirrers!).

Recreating the missing flank pieces for the stern proved fiddly, but I eventually got there after scalding my fingers numerous times while trying to bend the ply scraps until I had to the correct shape. I filled the hull 'cavities and fissures' with car body filler and then sanded everything smooth. Indeed, the

results were so pleasing, I was loath to drill the stern tube and rudder holes.

I fabricated a rudder assembly from my stock of brass rod, tube and plate; the motor was donated from a defunct printer and



Eric decided to name his version of the completed tug, Oncor but while we feel he deserves a round of applause, we're not going going to shout 'Encore!', as he assures us this build was not a performance he'd care to repeat in a hurry!



Tug No. 2 – well, actually, No. 3...

They say envy is a sin and I now know why, because my second tug was the direct result of finding myself coveting another's model at the lake where I took Oncor for her maiden voyage.

On-board Oncor everything worked, she sailed beautifully, her lights came on, and went off, when commanded. She could turn sharply and be steered while going astern. She performed so well, in fact, that nobody noticed her. Instead, all of the group that had gathered round the pond's focus was on a new Sprinter Pusher tug.

So, I took some dimensions and memorised her shape sufficiently well to allow a sketch to be made, which indicated the possibility of cardboard construction.

Fortunately, I had loads of card left over from a yacht project and I'd bought two prop shafts from eBay when I built Oncor. As this pusher tug was, shape wise, just a box with a few curvy bits, a simple 'development' would produce the curvy box I wanted (a 'development', by the way, is a flat shape that can be bent and twisted to form a hollow shape).

Back, then, to Dickens, and to an age of foolishness – definitely!

The rather floppy box created from my 'development' needed stiffening with 6 mm square wooden batons. Hull cavities were sealed with knotting varnish, both inside and out. I've included a photo of the power and control installation. Thank goodness for hot melt glue!

A card main deck, hull reinforcing band and deck hatch wall completed hull construction.

The cabin deck and cabin were constructed from card boxes with some clear plastic used for the windows. The mast and running lights were replicas of the items I'd made for 'Oncor'

The 'Pushing Columns' were just another pair of boxes, but the fore and aft deck walls were different. These walls were laminated onto wooden formers, layer over layer, glued together and soaked in varnish to stiffen the resultant part. Amazingly, this worked!

I pondered over a suitable name for this creation, and I came up with No. 3, as if spoken with an Afro Caribbean or Irish accent, it gives this tug an eco-friendly aura.

The wheelbarrow had to serve a flotation tank, because we've had the bath replaced with a walk-in shower (something else, perhaps, to be attributed to an age of foolishness). On her maiden voyage, however, 3 showed incredible manoeuvrability, although, it's fair to say, distinct lack of speed.

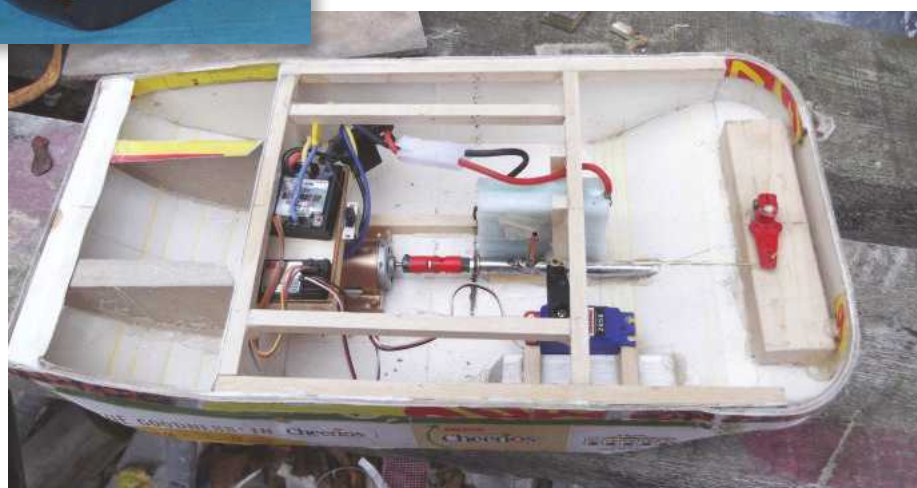
All's well that ends well...

I now own two unique tugs, both with very interesting and diverse characteristics, and worthy, I think, of a final quote from Dickens: "It is a far, far better thing that I do (or have now finished) than I have ever done".

Now, what's next? ●



INSET: The pusher tug that served as the inspiration for No 3. ABOVE: Thinking outside the box was the order of the day for these projects, right down to the flotation test tank used by Eric, a.k.a. the garden wheelbarrow!



ABOVE: No.3's hull and machinery. BELOW: No.3's deck house removed to show battery access.



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ABOVE: Printed matter related to model boats.

do not manufacture any of their goods, but sell inferior English or Foreign made Ships, Engines, Fittings, etc, which are made of such flimsy and trumpery materials that they are quite useless for practical purposes..."

Filling its pages are finished racing yachts, steamboat and warship hulls, scale fittings, steam engines of all types and the castings needed to make them, boiler and locomotive fittings, early electric motors and curious items such as compressed air motors, bichromate batteries and a water turbine.

The prices listed in the catalogue may at first seem laughably low, until the effects of 95 years of inflation are taken into account, whereupon they serve to remind us that the goods in Stevens's catalogue were very much the preserve of the well off. For example, a simple 54-inch (1372 mm) model steamboat with a single cylinder slide valve engine is listed at £21 – about two months' wages for a skilled worker at the time. But the sheer variety of parts available, often in a choice of several scales or sizes, is impressive. Unfortunately, the market was changing, and it seems the Victorian values of Stevens's were slow to adapt; I understand the firm closed its doors just a few years after my catalogue was printed.

Another catalogue in a similar mould to Stevens's is *The Model Engineer's Handbook and Catalogue* from Australia's own Model Dockyard of Melbourne. The 1935-1936 edition reveals a similar, though more restrictive, range of parts for the model engineer, with a few tables of screw threads and wire gauges to justify the handbook title. Many of the items listed are clearly of English origin, such as the Stuart steam engines, but a local influence can be seen in the book titles and some of the locomotive types. Included is a range of items for the aeromodeller, balsa wood apparently being in plentiful supply,

scale, a left-handed four-blade propeller and a small Wasteney Smith stockless anchor, but the turnover of these items would never sustain a high street shop without other lines such as kits or toys, hence the specialist's mail order catalogue. Old ones in particular, with their Victorian-style line illustrations and quaint descriptions, make for some interesting browsing.

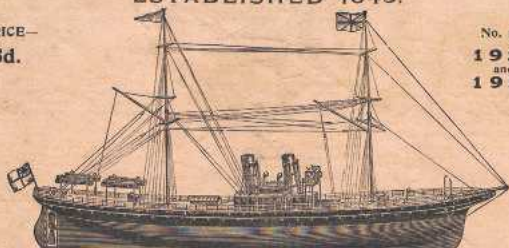
Specialist catalogues

There have always been a great many modellers beavering away in remote places that have relied on a mail order catalogue. The marine modeller might require for his model some three-hole stanchions in 1:72

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 Horizontal Copper Boiler and fittings, No. 509, price 29/6
 Size 2. Ditto, Cylinder, $\frac{1}{2}$ -in. bore, $\frac{1}{2}$ -in. stroke. Suitable for a 3-ft. 6-in. to 4-ft. boat. Height 6-in., weight 24 oz. Price 40/-
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 Size 3. Ditto, Cylinder, $\frac{1}{2}$ -in. bore, 1-in. stroke. Suitable for a 4-ft. to 4-ft. 6-in. boat. Height 7-in., weight 40 oz. Price 54/-
 Horizontal Riveted Copper Boiler and fittings, No. 509, price 55/6
 Size 4. Ditto, Cylinder, 1-in. bore, 1-in. stroke. Suitable for a 4-ft. 6-in. to 5-ft. boat. Height 8-in., weight 54 lbs. Price 79/-
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 Size 5. Ditto, Cylinder, 1-in. bore, 1-in. stroke. Suitable for a 5-ft. to 6-ft. boat. Height 10-in., weight 74 lbs. Price 97/6
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2.	"	$\frac{1}{2}$ -in.	$\frac{1}{2}$ -in.	82/-	6-in.	46-oz.	4-ft. 6-in. to 5-ft. 6-in.
3.	"	1-in.	1-in.	111/-	7-in.	74-oz.	5-ft. 6-in. to 6-ft.
4.	"	1-in.	1-in.	172/-	8-in.	104-oz.	6-ft. to 6-ft. 6-in.
5.	"	1-in.	1-in.	205/-	10-in.	134-oz.	8-ft. to 10 ft.
6.	"	2-in.	2-in.	375/-	15-in.	214-oz.	10 ft. to 15 ft.

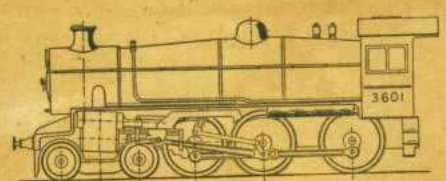
Copper Boilers to suit above Engines, with fittings, see page 68, No. 509.
 Size 1, 39/6 2, 55/9 3, 64/- 4, 101/- 5, 110/-



ABOVE LEFT: Stevens's Model Dockyard catalogue of 1927-1928. ABOVE RIGHT: A page of steam engines from Stevens's catalogue.

RIGHT & BELOW: Model Dockyard catalogue.

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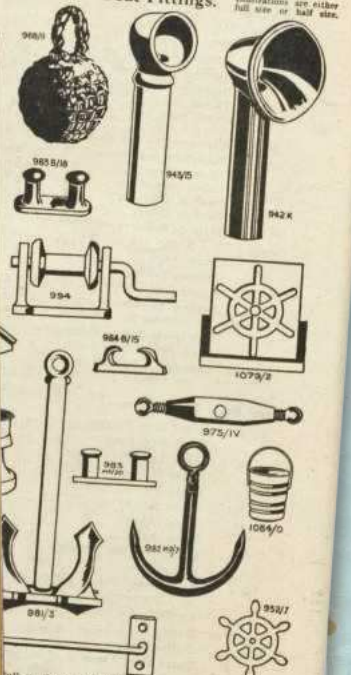
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RIGHT: Web Model Fitting Company catalogue.

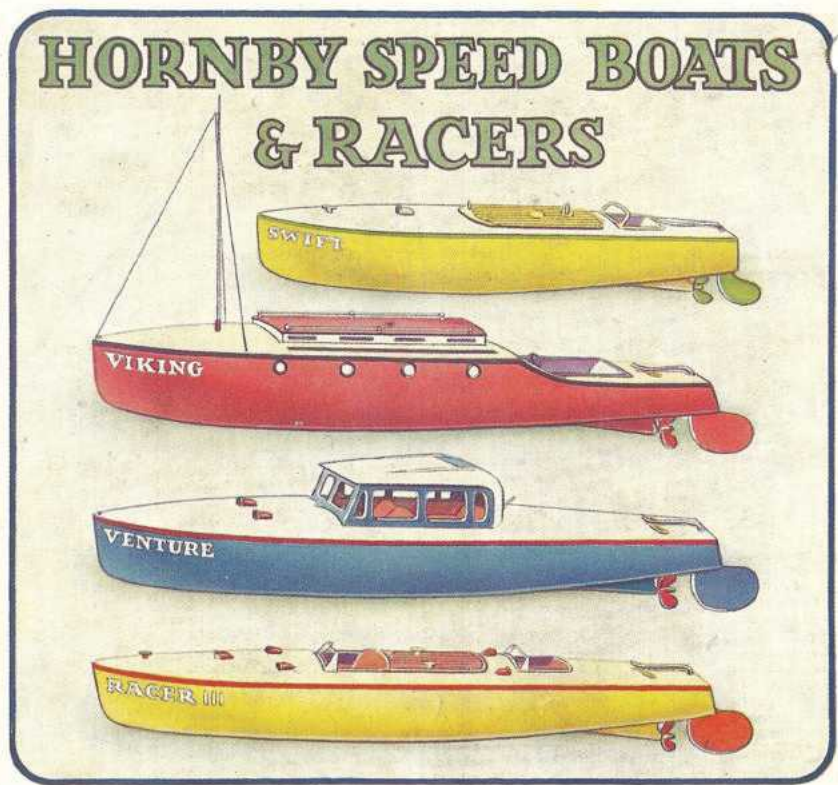
"Production of these would soon cease forever, as World War II had broken out and the toy factories turned to war work; lucky was the enthusiast who was able to buy one from remaining stock"

along with a selection of early model i.c. engines. This was a time of great interest in aviation, with the MacRobertson Air Race to Melbourne having made headline news in 1934, won by the De Havilland DH88 Comet.

The Web Model Fitting Company of London specialised in model ship fittings, publishing a catalogue that hardly changed over the years, apart from the listed prices. My example is the fourth edition and I think dates from the 1950s or 1960s. There is reference in the introduction to the company dating from the pre-war period; it advertised prominently in the pages of Model Boats over the years but seems to have ceased trading sometime in the 1990s. From the fine illustrations, the fittings appear to have been of high quality, nicely finished and made to fairly large-scale sizes; consequently, they were expensive and probably intended more for the government or professional model maker rather than the hobbyist.

General toy catalogues

In contrast to these specialist suppliers are the pages of general toy or hobbyist retailers, many of whom dedicated a few pages of their catalogue to a basic range of fittings for the modeller wanting to make a model boat. The pages of Walther and Stevenson Limited of Sydney are typical, with a page or two of propellers, rudders and stern tubes, followed by a list some simple steam engines and fittings and then an interesting page of clockwork launch engines, and another detailing a couple of electric motors (both wound-field, with the basic one available as a build-it-yourself option). The date is not shown



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HORNBY RACERS.

These Run considerably faster than the Speed Boats, but have a shorter range. They steer very well. HORNBY RACER No. 3 as illustrated—travels over 300 ft. on one winding. 16 1/2 in. long, 3 1/2 in. beam — 32/6
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WALTHER & STEVENSON PTY. LIMITED.

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CATALOGUE No. 390.

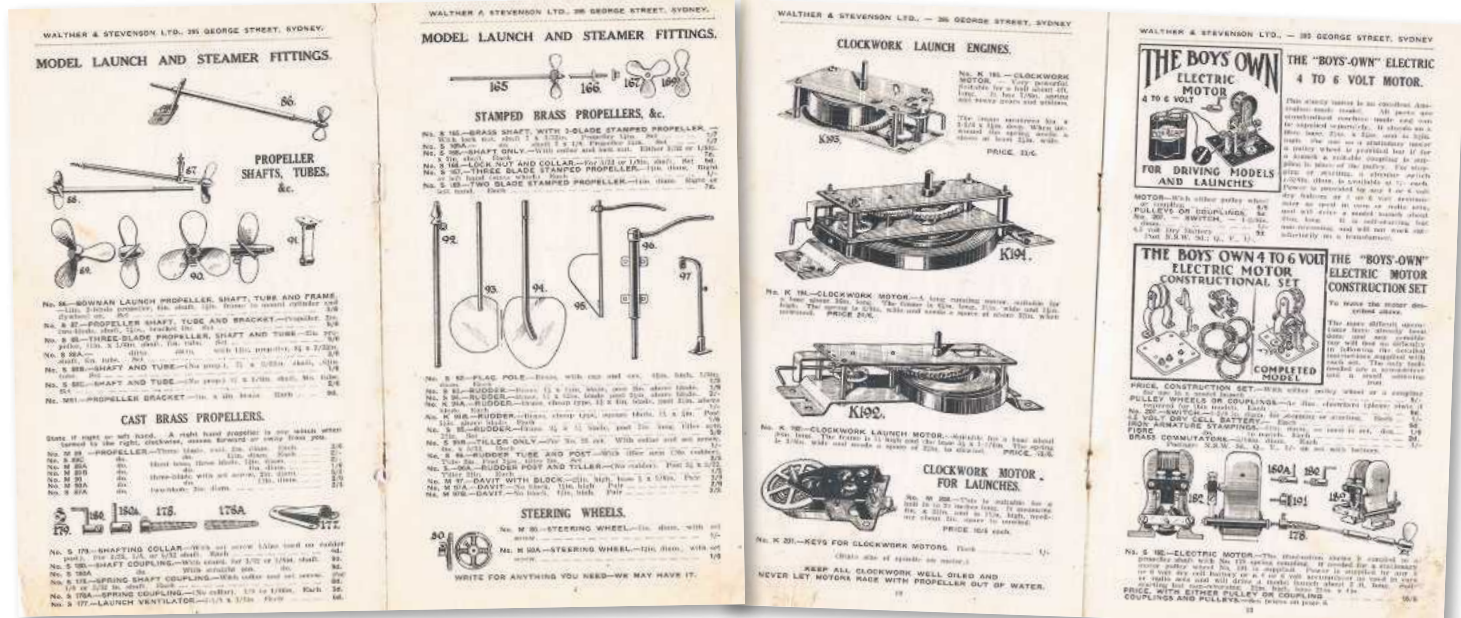
DECEMBER, 1939.

Hornby clockwork speedboat range.

on the loose pages I have, but I would guess they are from the 1930s or 1940s. Also from a Walther and Stevenson general toy catalogue, but this time clearly marked December 1939, is a nice colour illustration of the Hornby

clockwork speedboat range. Production of these would soon cease forever, as World War II had broken out and the toy factories turned to war work; lucky was the enthusiast who was able to buy one from remaining stock.

BELOW: Pages from the Walther and Stevenson general toy catalogues.



INSTRUCTIONS FOR MODELS Nos. 3, 4 and 5

These splendid motor boats have been specially designed for speed and length of run. At the same time they are thoroughly stable and will run well even when the surface of the water is disturbed by a moderate breeze. There is no finer outdoor sport than model motor boat racing, and the Hornby Speed Boats are ideal for the purpose. The clockwork motor fitted to these boats is of exceptional power, and maintains a

steady rate of speed throughout its long run. It is started and stopped by means of a single lever placed in a convenient position. The rudder is controlled by a tiller 6 that can be fixed firmly in any desired position by means of a tiller rack, thus making it easy to determine the boat's course in the water.

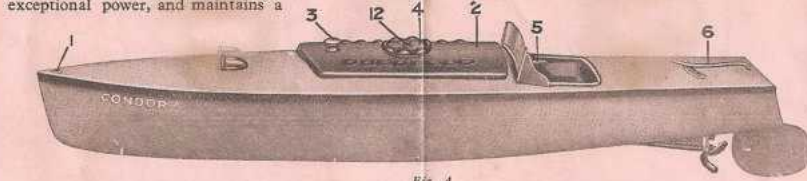


Fig. A

In order to facilitate winding, a hole 12 is bored in the hatch of Speed Boat No. 3, nuts are seen in Fig. D, which shows the No. 3 Speed Boat with the hatch 2 removed. The motor 8 is then lifted clear of the studs, the front fixing tongue being withdrawn from the front bracket by a slight backward movement.

WINDING THE MOTOR
In order to facilitate winding, a hole 12 is bored in the hatch of Speed Boat No. 3,

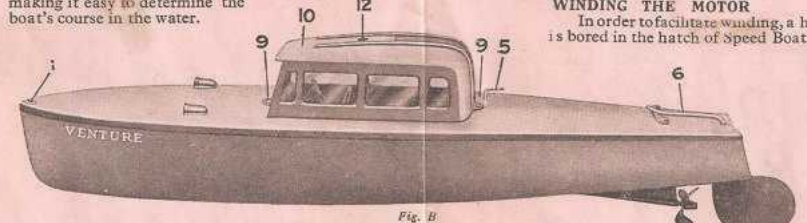


Fig. B

OILING THE MOTOR AND PROPELLER

Before a boat makes its first trip the propeller shaft should be oiled thoroughly. The method motor differs slightly from that of the other boats.

In boat No. 3 (Fig. A) the hatch 2 is released by turning the tiller 4 to the left, and is then oiled. The hatch is then replaced and the tiller 4 is turned back to its original position with the arrow pointing forward.

In boat No. 4 (Fig. B) two bolts 9 will be noticed, one forward of the cabin 10, and one aft. These bolts

the cabin of Limousine Boat No. 4, and the cabin top of Cabin Cruiser No. 5, immediately above the winding spindle. The shaft of the winding key is passed through this hole, and is thus guided on to the spindle without any difficulty. Boat No. 3 is fitted with a winding hole cover 4, the hole in which must be brought into line with that in the hatch before the key can be inserted. With this boat, after winding, care should be taken to see that the winding hole cover is turned to the closed position, to keep out water. When the winding key has been placed in position over the spindle, the start and stop lever 5 fitted in the cockpit of Speed Boat No. 3, and immediately behind the cabin in boats Nos. 4 and 5, is moved to the extreme right, if it is not already in that position, and the motor

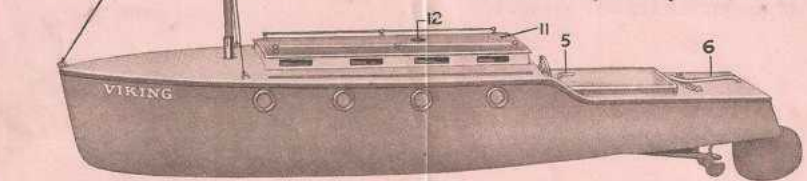


Fig. C

the cabin top may then be lifted completely off. In boat No. 5 (Fig. C) the motor is reached by sliding the cabin top 11 towards the stern.

In order to secure the greatest speed and steadiness of running, this oiling should be repeated from time to time. It is important that the oil used

should not be too thick. The special Meccano Oil is the best for this purpose, but if this is not available, sewing machine or typewriter oil will do quite well. A small amount of graphite grease, which is supplied by Meccano Ltd. in tubes and may be purchased from any Meccano dealer, should be brushed occasionally over the coils of the spring when this is unwound, in order to prevent rusting.

The clockwork mechanism should not be re-

is then wound up

The rudder is now set to the required angle, and the boat is placed in the water and started by moving the start and stop lever to the extreme left.

The start and stop lever should never be used to stop the motor when this is running with the boat out of the water, as the sudden checking of the motor in this manner places a severe strain on the gears and might damage the propeller shaft. The motor should be stopped before the boat is removed from the water by moving the start and stop lever over to the extreme right.

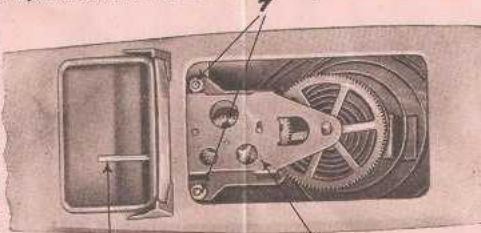


Fig. D

motor should be allowed to run in perfect condition when

MECCANO LTD - BINNS ROAD - LIVER

"Careful reading of the instructions reveals some surprising recommendations..."

(Incidentally, that motor at the bottom of page 12 of the Walther and Stevenson's catalogue looks like it might be suitable...) All useful information no doubt, but I wonder how many of these instruction leaflets were simply glanced at and then misplaced or thrown away in the rush to try out the new toy?

If ever there was a product that required instructions, it was the Taycol wound-field electric motors of the 1950-1960s, with their numerous confusing terminal connections and options for reverse running or fitting suppressors for radio control. The instructions went some way toward explaining things, but Taycol also added to the confusion by using the same photo interchangeably for the Target and Torpedo models. Careful reading of the instructions reveals some surprising recommendations, such as lubrication of the bearings every 15 minutes and the use of light motor oil on the commutator to help the operation of the copper gauze brushes.

Conclusions drawn

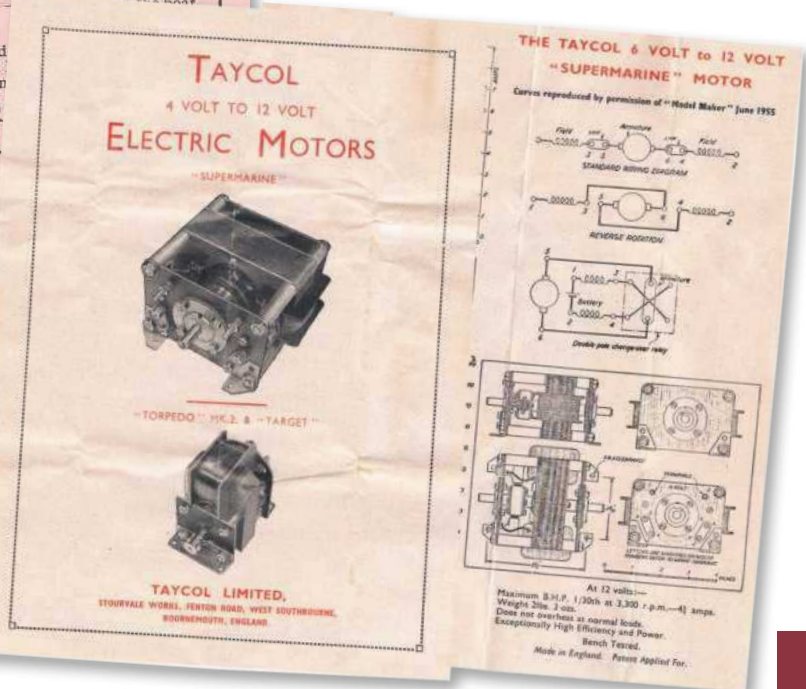
Printed matter can be a useful resource in tracing the history of a product and is very much part of a product's charm to a collector; it can also provide invaluable insight into a product's specification, operation or maintenance. Despite the temporary nature usually intended for them, many catalogues and leaflets are of a high standard of design and have survived in good condition and in sufficient numbers to form an attractive collection in their own right. ●

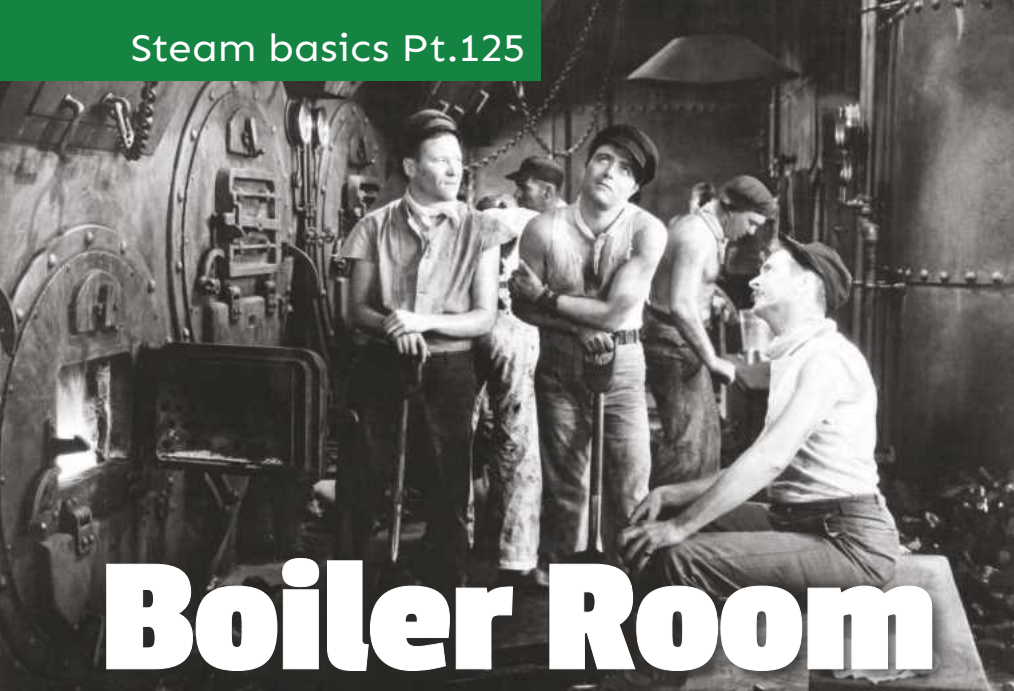
Instruction leaflets

Another type of printed matter is the instructions that were packed with the original product. Included in my illustrations are the instructions provided by Meccano Limited in 1933 for the aforementioned Hornby speedboats. The leaflet covers three distinct but similar models. It goes into quite some detail on caring for these models, including oiling the motor, applying graphite grease to the spring to prevent rusting, proper use of the control lever and even how to replace the motor should it become necessary.

ABOVE: Instructions packed with a Hornby speedboat.

RIGHT: Taycol electric motor instruction leaflet.





Boiler Room

Richard Simpson offers some sage advice on shaft couplings

Something that sits in the bottom of all our boats, but which sometimes fails to get the recognition it deserves, is the shaft coupling. Now, shaft couplings can sap propulsion power from steam engines or motors; they can fail completely, rendering a boat at the mercy of angry geese; some even have the potential to come apart and destroy a fair chunk of the model before it comes to a rest in a pile of twisted plastic, rubber or brass. Couplings should, therefore, be contemplated at the design stage of your model, with the type being chosen as one of the primary considerations. It's very important to understand the two different types of misalignment, i.e., angular misalignment and parallel misalignment. The two are quite different and cannot be addressed in the same way.

Angular misalignment is where the two shaft ends would theoretically pass through each other if they were imagined as continuing. This is a common occurrence when deliberately designed into the installation to keep the steam engine horizontal for the sake of aesthetics or access, yet the propeller shaft has been angled downwards to exit the hull at the correct depth.

Parallel misalignment, however, is a different proposition and is frequently the result of poor installation. For example, great care may have been taken to install the engine perfectly in line with the shaft but a mistake in fitting has resulted in it being, say, 2mm high; so, if the shaft ends were similarly imagined as continuing in this case, they would pass each other with an offset of 2mm. This is sometimes considered as less of a challenge to deal with; however, in reality, it's a bigger problem. If you think of this in terms of a railway line, angular misalignment requires nothing more than a curve to join the two rails. Parallel tracks, however, require two track points and a section to join them in order to create a crossover. You are, therefore, dealing with two curves, not just the one.

Your coupling choice should factor in the following considerations at the design stage:

"It's very important to understand the two different types of misalignment, i.e., angular misalignment and parallel misalignment. The two are quite different and cannot be addressed in the same way"

The power being transmitted to the shaft

This can vary considerably. However, in the case of steam models, power is invariably modest. Unfortunately, I have never seen a figure for any type of coupling that states the power it is capable of transmitting, so you're in the dark a little here. Comparing with existing set ups at your club is a safe way to go. Bear in mind, also, that too big a coupling may be as bad an idea as too small a one.

The length of the coupling

Some couplings, in particular a double universal joint, can get very long. If you have



The supplier of Club 500 kits, Club 500 Slipway (see the ad on page 80), offers a solid coupling to help with alignment of the motor and shaft. This simply replaces the normal coupling while you set the position of the motor.

limited space or, more likely, you have an idea of where you want your boiler and engine to sit for either stability or access reasons, then this can also preclude some types of couplings.

Ease of access

You will almost certainly at some point in the future want to remove the propulsion system for maintenance, especially in the case of a steam plant. Out of necessity, then, the coupling has to be easy to access, remove and refit. Tightening up a coupling then building the remains of the bulkheads and decks around it may well give you some serious challenges in the future when the steam engine has to be extracted for a service.

Reasonable expectation

Probably one of the most important considerations is invariably that the coupling is not a means of addressing poor alignment. How many times have we heard "Oh, don't worry about that, the coupling will take care of it". While a coupling is designed to allow for misalignment, it is also important to realise that the further out of alignment the two ends of the shaft are, the more power will be absorbed by the coupling. Ideally, you should be aiming for an installation where the two ends of the shaft could be joined by a turned solid bar of brass and the coupling is only there to help with any slight inaccuracies.

BELOW: Simplicity can frequently be the best policy. This pin-on-pin coupling is straightforward to construct, easy to split from the model, allows a lot of tolerance with shaft misalignment and results in very little frictional loss.



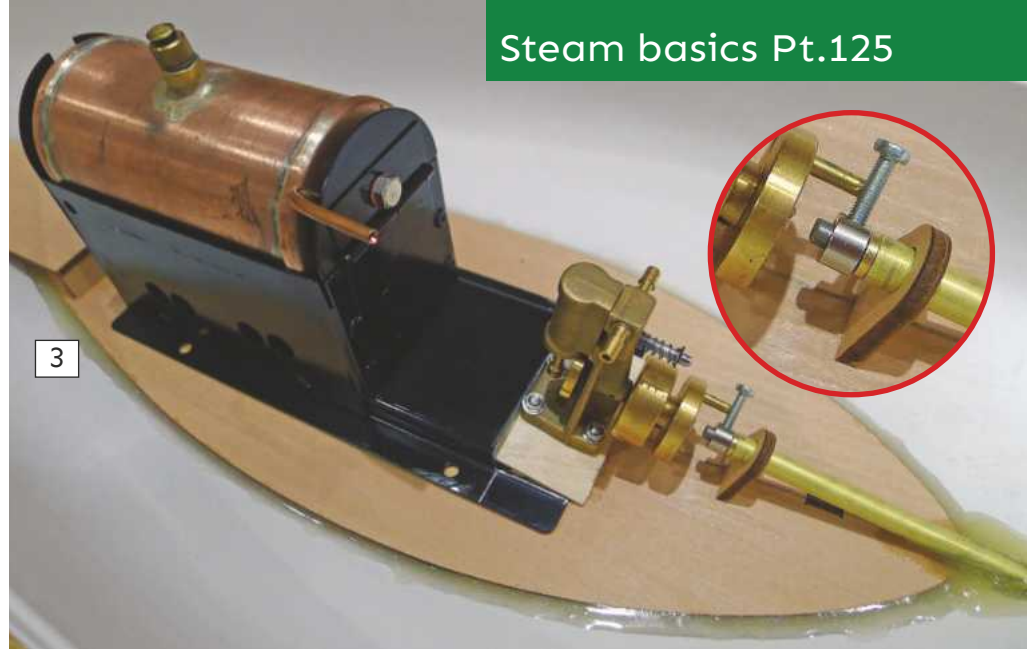
Types of couplings

Solid Shaft

As already mentioned, if you have perfect alignment between the two ends of the shaft you could consider using a turned solid brass bar as a coupling. In fact, when I put together a Club 500 model I use the manufacturer's supplied shaft alignment tool, which is simply a turned piece of brass of the same diameter and length as the coupling (see **Photo 1**) and hold the model vertically while the cement below the motor sets. This ensures that the motor is in perfect alignment with the shaft and could theoretically be then left like that. If you could guarantee that your installation was perfect then you could certainly try it; but, of course, only a minute amount of inaccuracy in terms of anything greater than the bearing clearance would lead to premature bearing wear and eventual failure. The great advantage for high performance set ups is, of course, that the balance can be made perfect and there is absolutely no power loss through the coupling.

Pin-on-Pin

A coupling I've seen used once or twice with great success is nothing more complex than a pin fitted into the engine flywheel – parallel with, but at an offset to, the centre line – which pushes a right-angled pin fitted to the propeller shaft end, as used on the Krick Borkum (see **Photo 2**), and Krick Anna (**Photo 3**) models illustrated. This is a very useful coupling for a steam plant, for a couple of reasons. Firstly, nothing has to be disconnected to remove the engine. If you have the boiler and engine all on the one base, the whole plant can be lifted out after doing nothing more than disconnecting the engine control valve, servo linkage and,



This pin-on-pin coupling required nothing more complicated than putting a screw into a collar on the shaft. A piece of plastic tube over the screw before use then ensured smooth, quiet and reliable operation.

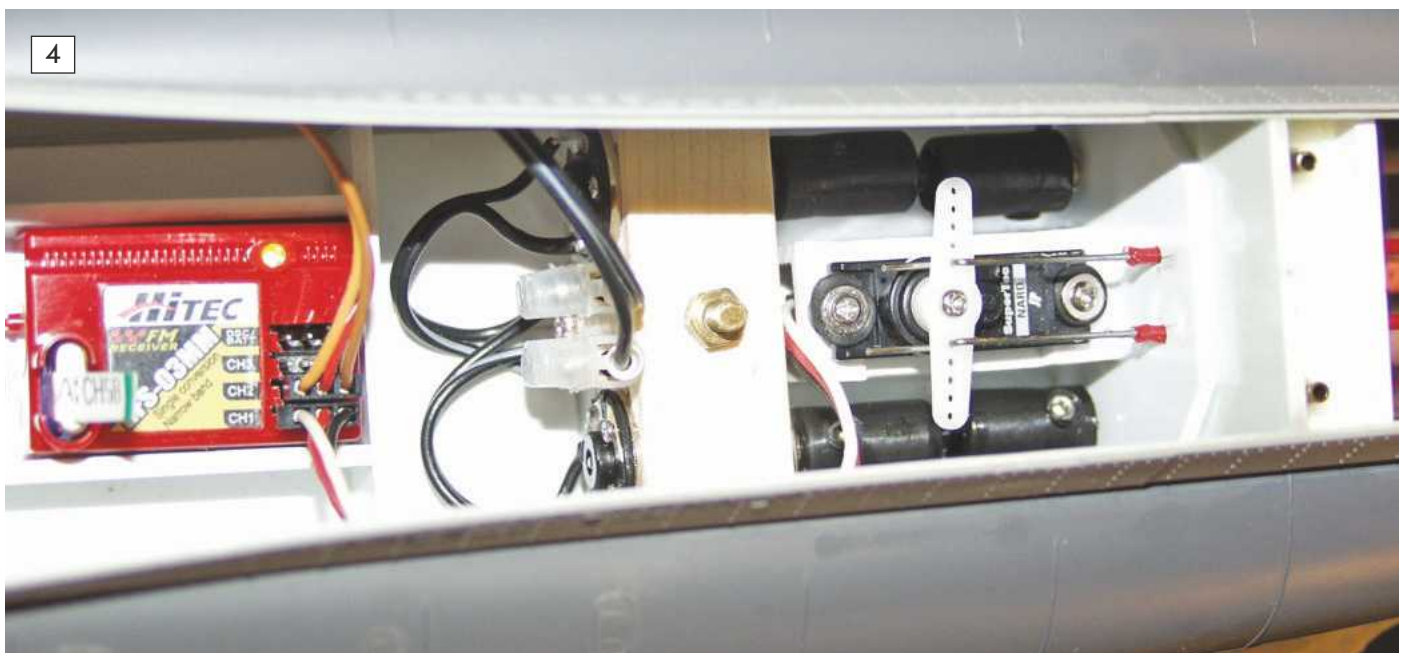
possibly, the gas pipe. If the engine and the shaft are correctly aligned there will actually be very little rubbing of the two pins; however, this arrangement is particularly forgiving if they're not – all this means is that the two pins will rub together slightly as they rotate. To help reduce noise and friction, a plastic tube can be slid over one or both of the pins, making for a smooth and quiet rotation. If you think about it, the losses are nothing more than the friction between the points of contact where the two round pins rub against each other. This creates very little friction, so the coupling, despite looking a little crude, is actually very forgiving and very efficient. It can also accommodate angular misalignment and parallel misalignment just as effectively.

Flexible Tube

Continuing with the theme of simplicity, the next coupling to consider is the flexible tube. This could be rubber, silicone, or something a little more substantial for higher powers,

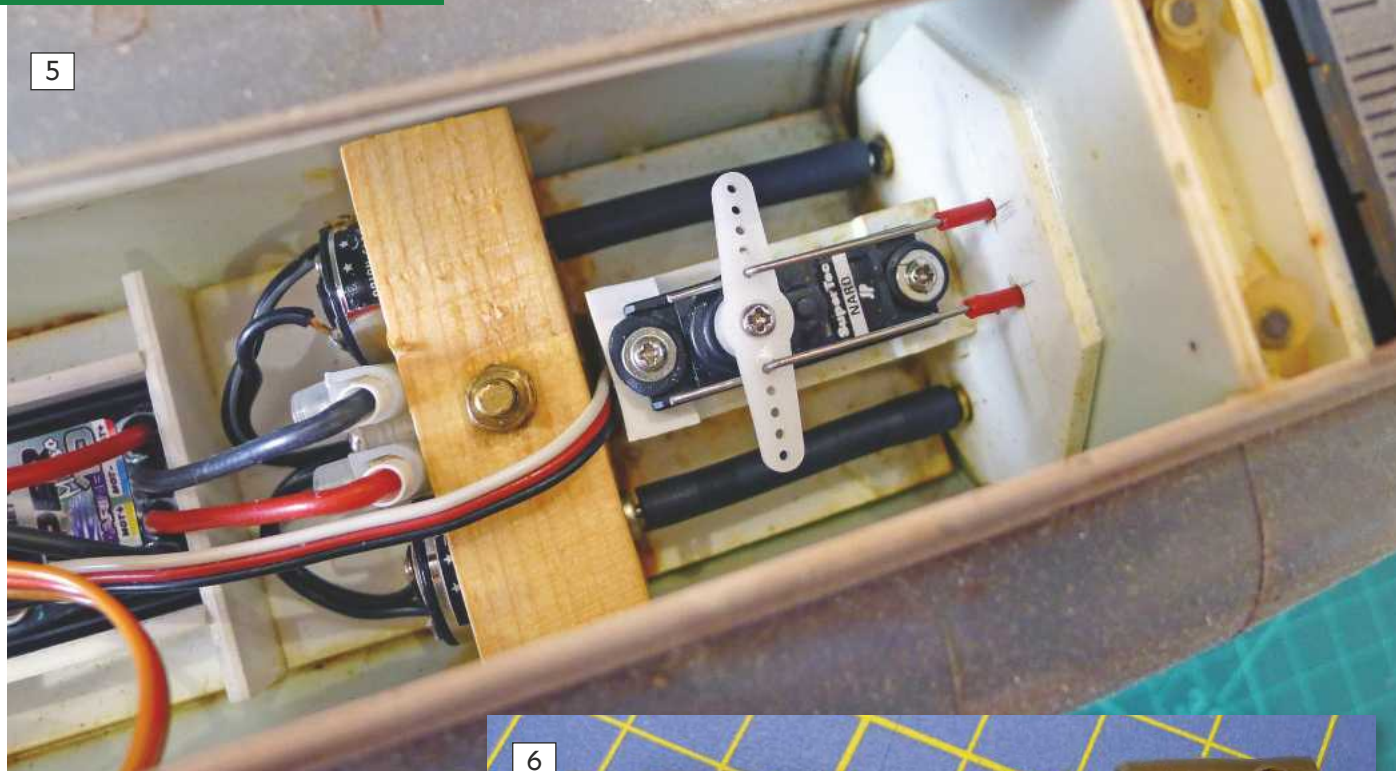
although this type of coupling is usually used for low powers. The rubber tube can be simply slid over the end of the shafts, as long as it's a tight enough fit to avoid slippage. Grip could be helped with a twist of wire, or a spot of glue, but this will make the coupling a lot more difficult to dismantle when the time comes. The advantages, not surprisingly, are that this coupling is very cheap and easy to obtain and is surprisingly effective at dealing with both angular and parallel misalignment. It's also very quiet and smooth in operation, so for very small powers is well worth considering.

As an example, many years ago I converted a Revell Type VII U-Boat to a radio-controlled model. The two motors were two very small servo motors, so I was dealing with very small shafts and very low power. I first tried a Dog Bone coupling (see **Photo 4**) – more on which, in a minute – but unfortunately experienced very bad vibration and noise as a result of the couplings being out of balance themselves. I therefore replaced these



Dog Bone type couplings seem frequently to be a big chunk of plastic on a very small diameter shaft, which is possibly what so often puts them out of balance. It's worth noting these are better suited to slow revving engines and motors.

5



ABOVE: For really small power and shaft diameters a rubber tube works surprisingly well. Such couplings make a huge difference to the degree of vibration and noise a model makes and improve things substantially.

INSET: The Dog Bone coupling consists of the three-pieces, which are held together by locking the sockets onto the shafts. The shafts must, therefore, have no longitudinal play to ensure the coupling remains intact.

couplings with two pieces of rubber tube and the model was transformed into a perfectly quiet and smooth runner (see **Photo 5**). There's a lot to be said for a bit of rubber tube!

6



Dog Bone Coupling

The name of this coupling, not surprisingly, comes from the fact it contains a central piece that resembles a bone. The ends of the central piece are made of crossed circular webs, which locate into the square sockets mounted on the shaft ends, where the webs

on the end of the bone locate in the corners of the square. This allows the transmission of power through the bone-piece joint while restricting it from rotating (see **Photo 6**). Because these couplings have a lot of surfaces rubbing together inside the socket as a result of the complex shapes involved, and because such complex shapes are invariably made of soft-moulded plastic, it seems they're frequently badly out of balance. The fact that a stainless-steel grub screw is used to lock the ends with no compensation for its weight doesn't help either. This may be acceptable for very slow revving shafts but, even at 1:72 scale U-Boat speeds (see above), the vibration can be very concerning. They do accommodate both angular and parallel misalignment, but I have to say I'm probably not going to use one again.

Universal Joints

The Universal Joint, or UV joint, is probably the most common of all couplings to be found in our model boats. It usually consists of a central brass cross-piece running in two plastic ends with bearings moulded into them, and splined sockets on the shaft sides. Varying brass fittings can be slid into these splines, placed to match the characteristics of the shafts to be joined. These can be threaded or plain and are available in a range of sizes, making this type of coupling a very flexible solution (see **Photo 7**). Removal is also very easy, as the splined brass fittings can be simply slid apart, so there's nothing to unscrew to split the coupling. The main disadvantages of a UV joint firstly derive from the fact that a single joint can only accommodate angular misalignment, and

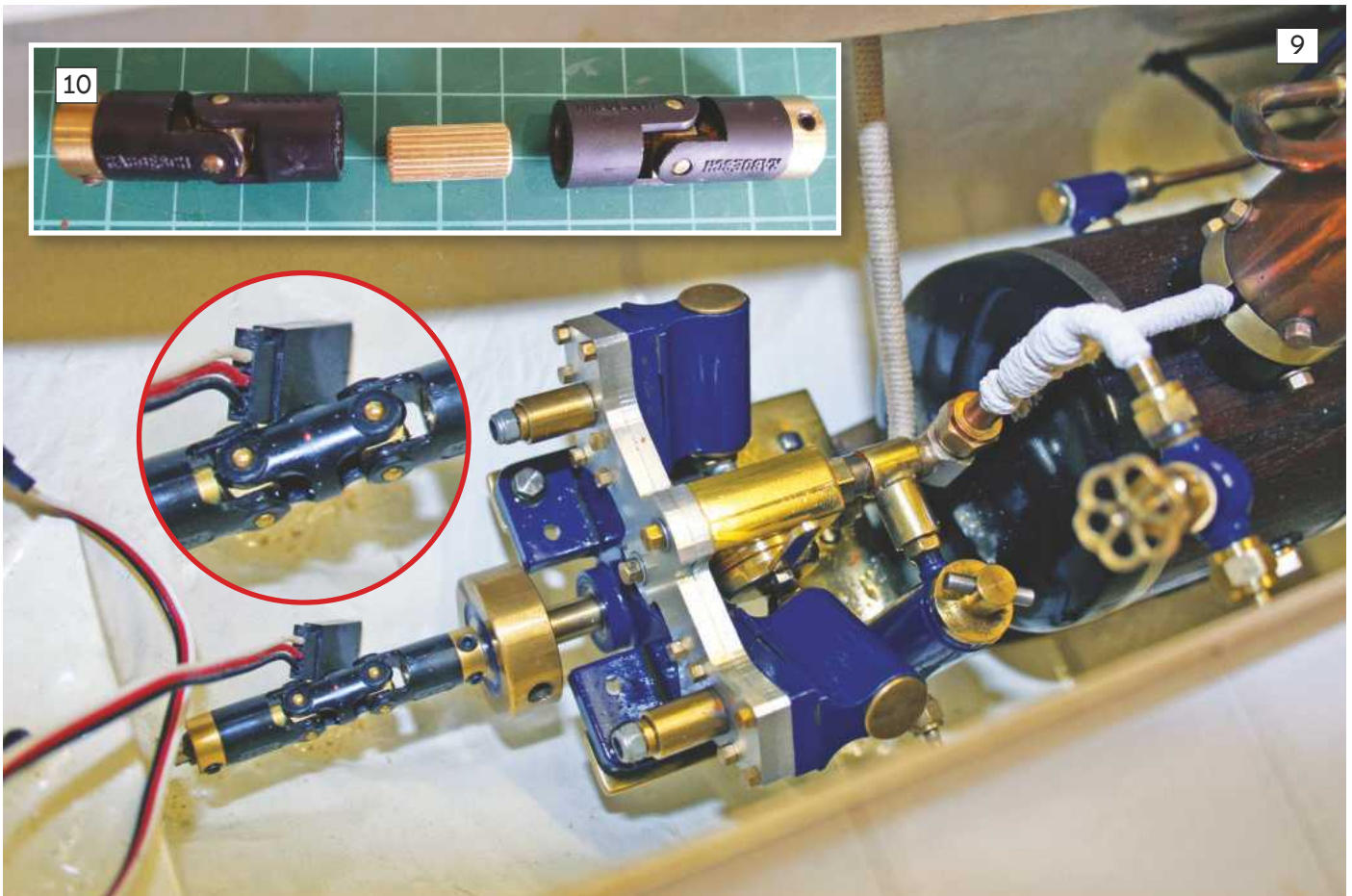
7



A single UV joint can feature any combination of inserts used at either end. In this case, there's a 5mm plain shaft on the motor side and a 4mm threaded shaft on the propeller side. The motor side of the coupling is held by a locking grub screw, tightened onto a flat, and the propeller side has a half size brass lock nut tightened against it.



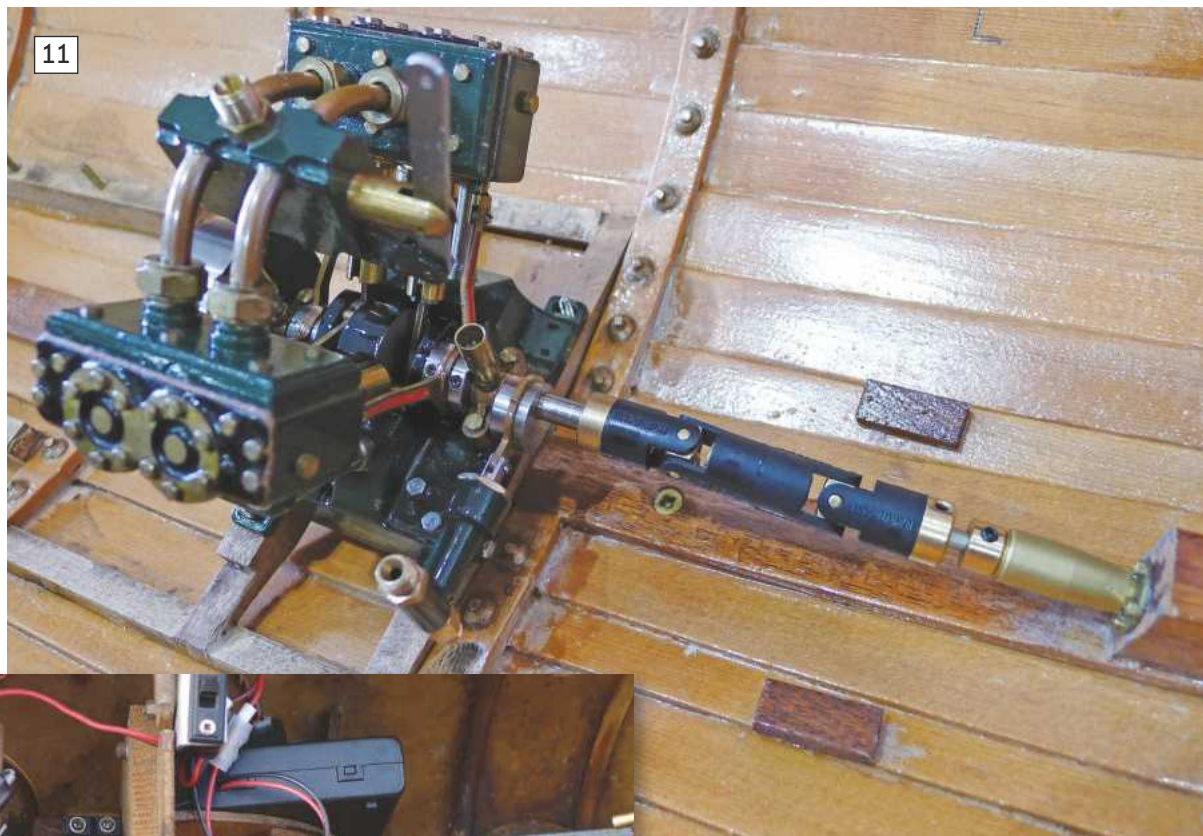
ABOVE: While UV joints will absorb power proportionally to the degree of misalignment, they can still be used in a performance situation if great care is taken to ensure that the misalignment is kept to an absolute minimum. BELOW: UV joints, such as this one, can be found with a double central link. This ensures that both angular and parallel misalignment is taken care of. INSET: An alternative is to make up your own double UV joint by inserting a brass splined connector between two single joints. This makes the overall length slightly greater but could be convenient if there's plenty of space in the model.



secondly that the coupling tends to be quite a long arrangement, sometimes making it difficult to get into the model. If you are 100% sure that you have only angular misalignment,

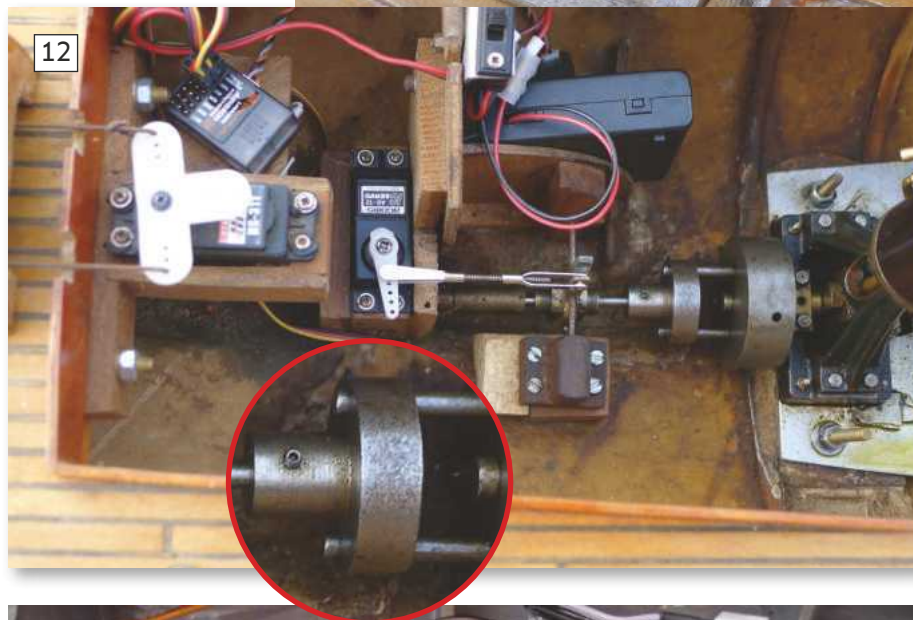
then you could use a single UV joint (see **Photo 8**). If, however, you're not completely certain, there's also the option of either using a purpose-made double UV joint, which

incorporates two joints into the central piece (see **Photo 9**), or a brass splined joining piece to allow two single UV joints to be combined (see **Photo 10**). You can now see how this



RIGHT: When fitted correctly the double UV joint will absorb little power and give complete flexibility of the transmission. It also allows for very easy dismantling, as the spline simply pulls out of the socket to split the shaft.

BELOW: Sometimes a home-made coupling, such as this controllable pitch propeller arrangement, is required. In this instance, the shaft must be allowed to move longitudinally, so the coupling has to accommodate this movement. Here, then, two pins allow the shaft fitting to slide over them while they rotate. Perfect alignment is essential to prevent these pins binding.



emulates the two railway points arrangement, as described earlier (see **Photo 11**).

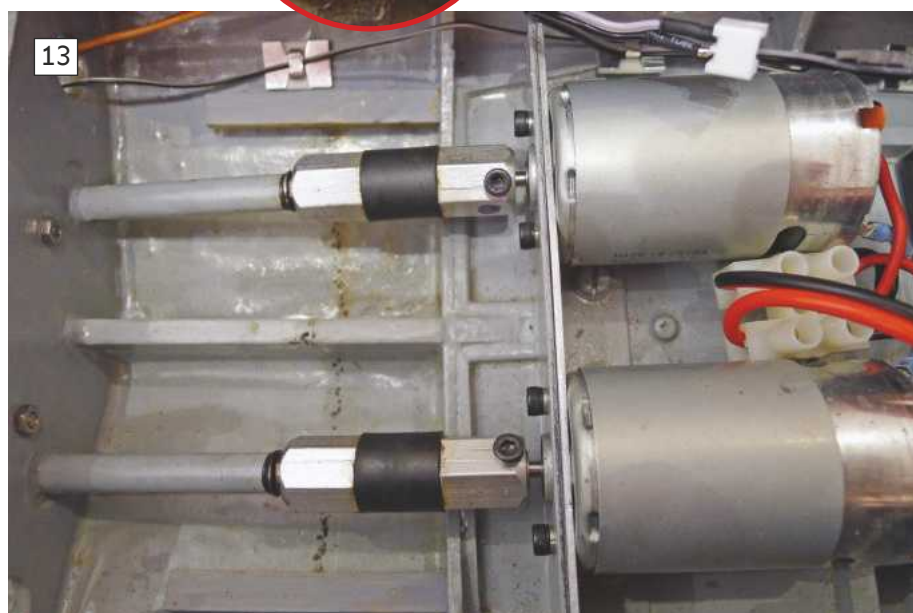
Another disadvantage worth noting is the fact that the greater the misalignment, the greater the rotation of the central brass pins in the plastic bearings will be. These are invariably a close fit and rely on the inherent lubricating properties of the plastic, but they do create resistance. Consequently, such couplings can absorb a noticeable amount of power, particularly if two are used and especially if the misalignment is significant. More so than with any other type, when using a UV joint, the closer you get to perfect alignment the better the transmission will be.

The odd ones

Not surprisingly, as with everything else, there are one or two options that do not fit the normal arrangements.

A controllable pitch propeller is a good example of where a special coupling is required (which may well need to be a home-made one) to accommodate the longitudinal movement of the shaft. In this case, two pins provide the transmission while allowing movement, but obviously very close care and attention is required when building to ensure the alignment remains perfect (see **Photo 12**).

Another type that I've come across is an arrangement where two aluminium shaft fittings are bonded together by a block of rubber. This allows a small degree of flexing and keeps vibration and noise down to a minimum, but, again, does demonstrate that the coupling is not a means of allowing misalignment; you still need to ensure the highest possible standard of build to make the coupling an insurance item rather than a dependent one (see **Photo 13**). ●



One of the rarer couplings Richard has come across: the rubber block allows a degree of movement, but only to the point of making the drive train smooth and quiet. The more out of alignment the shafts are, the more power the rubber will absorb.

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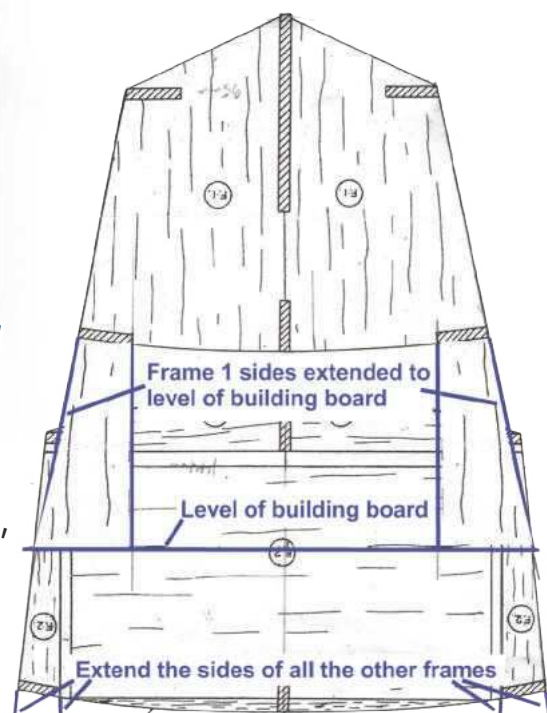
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"I've built three 1:1 plywood dinghies in New Zealand, and so, based on this, I decided to treat the construction of Wavemaster in the same way"

Wavemaster

Sadly, in 2019, shortly after he'd completed this project, **Tim Ridge** passed away suddenly. Fortunately, his wife, Margaret, found this feature, which he'd written up but had yet to submit, and recently forwarded it to us. And we're so that grateful to her to for allowing us to share Tim's splendid work...



I have always thought of water-craft models as works of art. A well and faithfully made model of a sailing ship, an Atlantic liner or a lowly coaster can be an artefact of real beauty and you simply can't help but appreciate its form, finish and the skilled workmanship that has gone into it. From the outset, this is what I hoped to achieve when building Wavemaster...

Why Wavemaster?

Back in my teens I bought the Veron 'Wavemaster' kit expecting its assembly to be somewhat like a jigsaw puzzle and naively imagining it could be completed in an afternoon. I never got beyond the framing and some covering-in; consequently, the abandoned project lay in our loft for some years and when I joined the Merchant Navy disappeared without trace when my parents moved house. Now on the opposite side of the bell-shaped curve, I seem to have re-connected with some premature ambitions, so when I saw in Model Boats that Veron plans were being offered by a Mr King, I promptly obtained plans for the 'Wavemaster' and the 'Police Launch'.

The plan drawings: marking and checking frames

In contrast to when I made that first attempt as a teenager, I now have experience, a good selection of woodworking tools and lots of left-over wood. I've built three 1:1 plywood dinghies in New Zealand (two YW Herons and a New Zealand 'P' Class) and so, based on this, I decided to treat the construction of Wavemaster in the same way. I have a basic table-mounted circular saw with a fine 185mm blade, which will cut down a thickness of 1mm and this enabled me to make my own scale planks, and sheet 60mm in width.



The outer diagonal planking coupled with an inner skin not only makes for an attractive finish but a structurally sound one too!

Construction of the frames and keel

As with the dinghies, Wavemaster was framed upside-down on my building board. A building board has to be very robust and perfectly flat; I used a 1.5 metre piece of 400mm by 50mm aged pine. The sides of the frames have to be extended vertically on the plan drawings to the level of the building board (the diagram included here shows the Police Launch frame 1). A line parallel to the waterline was, therefore, drawn well clear of the frames and the frame sides extended using a sharp pencil. The frames were traced from the plan onto grease-proof paper and then pricked through onto some 4mm ply left over from building the dinghies. Everything must be exact at this stage, but I discovered that in the plan drawings the left and right sides of some frames are not mirror images. This is a trap for young and old players (I have found Frame 3 in the Police Launch plans has the same problem). The correct width can be sourced from the fore-and-aft deck plan. The keel I cut from 12mm left over 5-ply, pricking it through from the plan. The stringers are 5mm square, sawn from pine skirting board. The original kit

was based on a rectangular box with a carved bow block for the lower chine to the stem; however, following full-size practice I took the stringers all the way forward to the stem.

Power considerations

At this stage I planned for power and propulsion. In New Zealand there is, at present, no comprehensive supplier for model boat equipment and so during a trip to Melbourne I made contact with the people at 'FloataBoat', who are excellent and comprehensive suppliers for model craft. Having had no prior experience of radio control, I relied on the advice given: to buy the whole system from propeller to transmitter. Subsequent problems were entirely due to my mistakes.

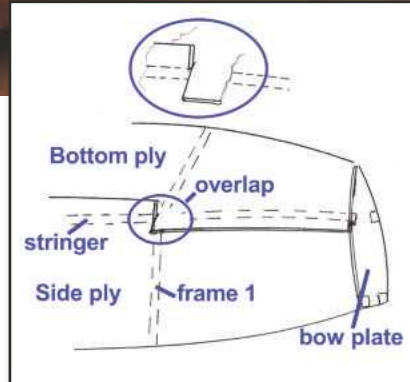
Skinning and planking

I created an inner and outer skin. I was keen for the sake of appearances to use an outer diagonal finish and I cut planks from New Zealand Rimu skirting board. This is a red, prettily grained, timber that was used for cheap furniture and mouldings before Radiata pine

The model near completion and with most of her fittings in place she was ready for her maiden voyage.



became ubiquitous. For the inner skin I used 2mm bendy ply from the left-overs bin. The bottom was covered first and sanded back to the chine stringers to receive the upper skin. A change occurs forward of Frame 1 where the bottom skin lies outside the side skin, requiring a notch in the side skin. A carved bow block, as in the original kit, can avoid awkward carpentry. At this stage the propeller shaft and rudder tube were fitted as in the plan.



The deck

The deck at the sides, bow and stern were covered in with balsa (also leftovers), then planked from Radiata skirting board strips. Access to the hull was planned by making all cabin top and pilot deck coverings removable.

Cabin, windows and deck fittings

The cabin sides were traced from the plan drawings. For me, the rounded windows were both in the 'too-hard-basket' and didn't relate to full-size practice, so I squared them and used thin Rimu strips as window frames. For the fittings I undertook lots of internet research and elected to make and scale everything to New Zealand marine survey requirements. This may seem pedantic, but it means that all the deck fittings look in proportion to the finished craft, which I feel is an outstanding attraction in the appearance of any model. The windows I agonised over, even contemplating very thin glass. In the end, however, plastic cut from transparent supermarket ready-made salad boxes did the job, secured with double-sided tape.

Installing motor, radio control and battles with matching speed controllers to power and wiring

Prior to making the decked cabin roofs and cockpit decks I installed the brushless motor, receiver, speed controller and battery box. I wanted to use a 12-volt motorcycle battery and early trim and waterline bathtub trials showed this to be feasible. Unfortunately, due to lack of savvy, I tried the fully charged battery with the controller provided – and destroyed it! Fortunately, the kind folk at FloataBoat came to my rescue, and I now use a properly rated controller. Wiring-up to achieve full functionality, speed and manoeuvrability was, for me, the most challenging technical part of the build – but I learnt, and so my next project, the Police Launch, should be much easier.

Painting

Treating the wood and painting progressed in stages, from framing to the very end. At framing and covering in, as with full-size practice the timber was treated with a two-pot epoxy branded in New Zealand as 'Everdure'. This penetrates ply to the glue

A work of art

"I was filled with an immense sense of satisfaction when I overheard a spectator mum saying to her two young sons "What a beautiful boat, it looks like a work of art!""

face and seals it. The hull was subsequently varnished gloss and deck matt, with several coats of much diluted varnish and rubbing down. As far as practicable, the cabin sides and fittings were painted prior to assembly; nevertheless, a lot of touching up was needed before final completion.

Completion – well, almost...

On the subject of completion, I had planned to make handrails, which a full-size 40-foot launch of comparable style would certainly have. The fall-back was to launch at the current stage (shown in the photo) and add further details piecemeal, enthusiasm dependant!

On the water

Wavemaster made her maiden voyage on the Scale Marine Modellers' freshwater pond at Panmure Basin in Auckland; these helpful people offer their facility to non-members on Sunday afternoons. She was slow – probably at scale speed for a Norfolk Broads cruiser on which the original kit was based (6 knots or so full-size). I have since bought, but not yet fitted, a larger diameter propeller, up from 30mm to 40mm, and a motor with an increased shaft speed. She does look pretty on the water, though, and I must admit I was filled with an immense sense of satisfaction when I overheard a spectator mum saying to her two young sons: "What a beautiful boat, it looks like a work of art!". ●

BELOW: Removable cabin roof and cockpit floor sections give access to the radio gear. RIGHT: On the water for the first time!



Your Letters

Got views to air or information to share?
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Can anyone reading cast any light on the origins of this charming little rowing boat?

Advice sought on mystery rowing boat

I recently acquired this 30-inch in length rowing boat at an auction but without the radio control unit with the hope and expectation of repairing and restoring her to working order. But having no experience of radio-controlled models I was hoping for some advice on what I should be looking for and what characteristics I should look for in my search for an R/C unit. As you will see from the attached sketch, it has five functions that need controlling.

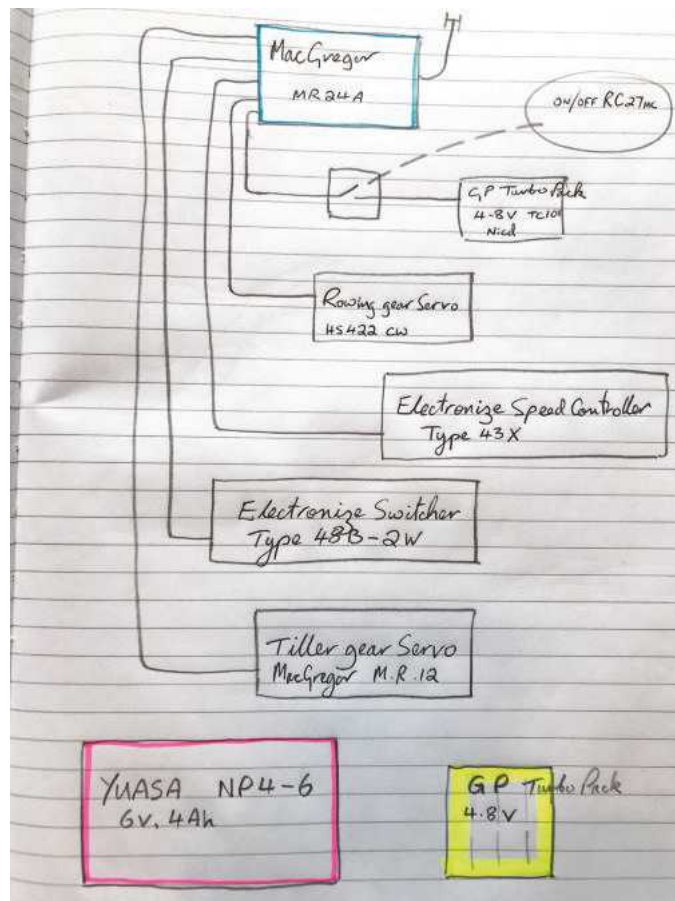
I guess I will also need to replace the power packs, shown at the bottom of my sketch. One last thing. Can anybody advise what make of model this is and/or confirm the year of manufacture?

**KEN JOYNES
SOUTHAMPTON**

As 'Chief Cook and Bottle Washer' rather than resident expert, I passed your questions over to one of our knowledgeable contributors, Richard Simpson, who has kindly provided the following advice:

"While I have not made a rowing boat, I do have a fair bit of experience with radio-controlled installations in model boats, in particular steam powered ones, so I will try to help with a constructive answer.

As regards the radio, you first have to make a basic decision as to what frequency type you wish to use. By far and above the most popular nowadays is the 2.4ghz system, which doesn't interfere with any other transmitters, so there's no longer a need for frequency control at a club. 2.4ghz also has a much better range and is a more reliable signal so is definitely the way to go. Your next decision is whether you want a radio set for this model only or whether you are likely to have more models in the future that you would like to use the same transmitter for. You would only then need to buy a receiver for each of your other models. You can then select a transmitter that can handle multiple receivers – although not simultaneously, you have to change the transmitter to communicate with another model. Not surprisingly, multiple model transmitters are more expensive.



Ken Joynes' sketch of the five functions he needed help on advice on controlling.

With those decisions made you can then look at the various sets out there and what they include. If you're relatively new to these things and you want the set up to be as simple as possible you will be better off with a kit that includes the receiver so you can be sure that they are compatible. So, you obviously need a six channel 2.4ghz radio transmitter and receiver. As an example, I use a Spectrum Dx6e transmitter, which I use to control all my boats, as well as cars, a steam lorry and tanks, but it will cost around £150. You can get a much simpler single use set for around £50.

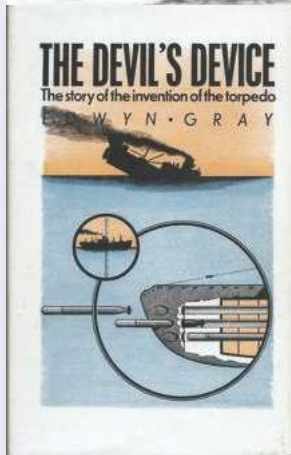
As regards the batteries, the Yuasa is a lead acid gel cell, which could be replaced directly from a supplier such as Component Shop, or, if the motor and speed controller can take it, which I strongly suspect they could, you could replace that with a 7.2 V NiMH battery pack. Check the voltage requirements for the motor and speed controller and, if you can't identify you might be better staying with 6 V to be on the safe side. Your lead acid battery is 4 ahr or 4000 mahr and, as you can now buy NiMH batteries of up to 5000 mahr, it would even last longer on the water. The lead acid battery you

have will also play a big part in the model stability, so changing battery will require you to do some testing in the bath to make sure it remains stable. The 4.8 V battery is a standard four AA cell rechargeable receiver pack. Your battery packs will also depend on the charger you have available and what type of batteries it will charge. Again, Component Shop, Howes or many other R/C model supplier outlets will be able to help with suitable chargers but you're best going for one that can charge all your battery types from the one unit.

I'm afraid I have not seen the model before so personally I cannot identify it. I suspect, however, it's either completely scratch built or, possibly, converted from a static display model. Perhaps when Lindsey publishes this someone reading will be able to tell us more".

So, massive thanks for Richard for this very comprehensive reply, and I will be keeping my fingers crossed that someone out there may spot your photo, Ken, and be able to shed more light on the origins of your rowing boat. Lastly, I've just got to say I am loving the look of sheer determination on the face of your figure at the oars! Ed

The Mk 3 Whitehead torpedo fired from East Dock, Goat Island, Newport Torpedo Station, Rhode Island, 1894



Recommended reading: Edwyn Gray's book *The Devil's Device*.

The von Trapp torpedo connection

I read the piece about Georg von Trapp in the December issue and of course - against the background of *The Sound of Music* - he and his seven musical children make a fascinating story. The more so because, as your readers may be aware, the children's mother was Agathe Whitehead, one of the grandchildren of Robert Whitehead, the inventor and developer of the Whitehead torpedo.

The whole Whitehead family features in Edwyn Gray's definitive book 'The Devil's Device' (Seeley, Service & Co. Ltd, 1975).

**CHRIS GILL
EMAIL**

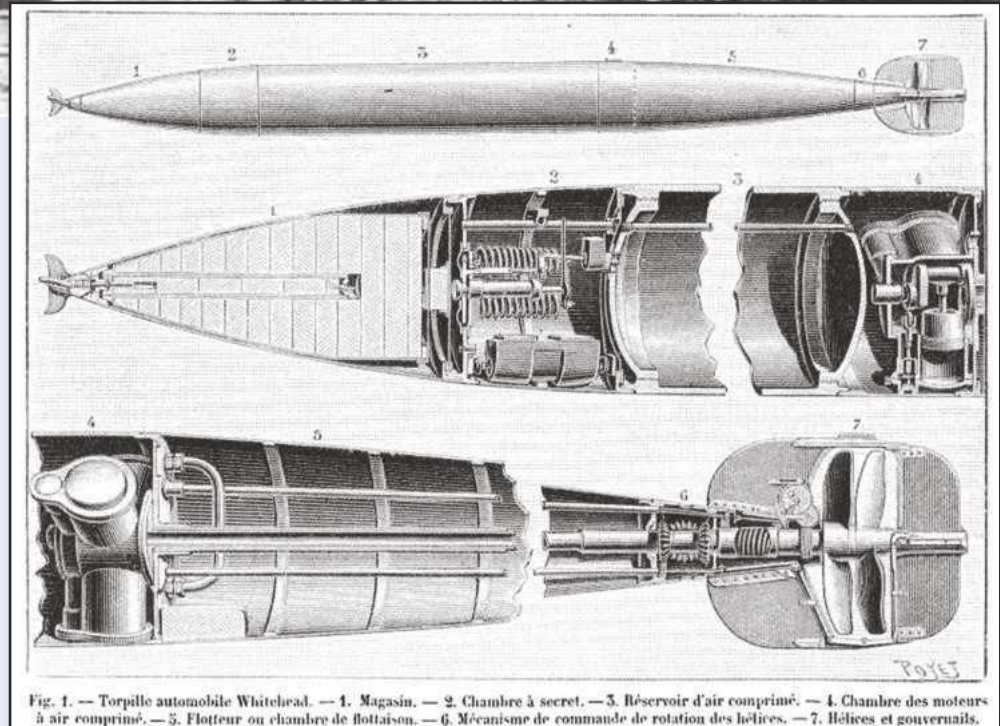
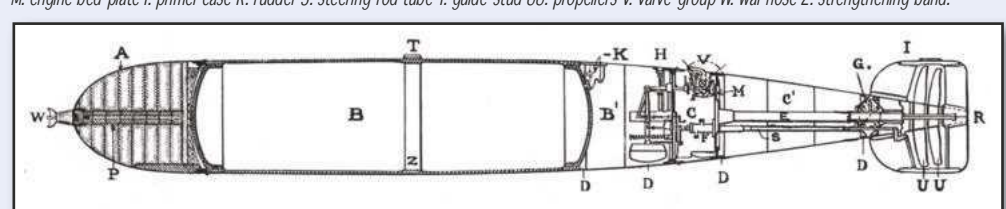


Fig. 1. — Torpille automobile Whitehead. — 1. Magasin. — 2. Chambre à secret. — 3. Réservoir d'air comprimé. — 4. Chambre des moteurs à air comprimé. — 5. Floteur ou chambre de flottaison. — 6. Mécanisme de commande de rotation des hélices. — 7. Hélices et gouvernails.



Thank you so much, Chris, for adding to John Parker's fascinating feature. I am sure you're right in your assumption that some readers may be aware

of this von Trapp family connection to Robert Whitehead and the Whitehead torpedo, but I certainly wasn't. Being a bit of a trivia geek, this much appreciated little

nugget of information prompted a brief but enjoyable half hour of surfing the internet to learn a little more and finding a few fascinating photos to share here. **Ed**

SL Scrapwood origins

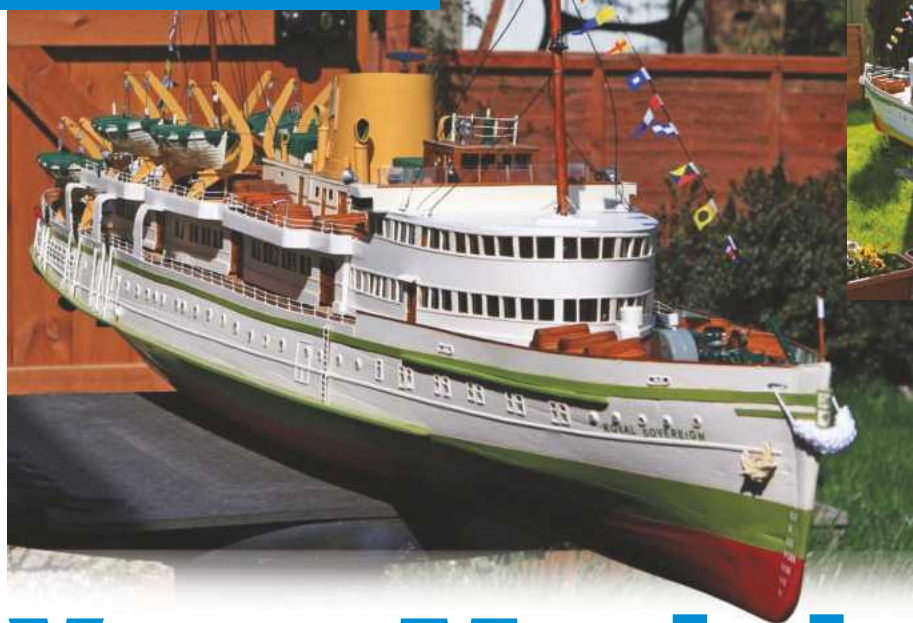
Further to the feature on SL Scrapwood in the July 2021, I believe the 'Scrapwood' to be a 49.5-inch-long design by a chap called John L. Langford, who designed three models all on the same, or very similar, hull. The give-away for me was that the frames were made up of several pieces in the hull the contributor of this feature, John Mileson, renovated. Nicely done, by the way, John - not an easy job! These models were called the Barbara, Margaret and Elizabeth and plans have been sold by Brown, Son & Ferguson Ltd of Glasgow. I have a copy of the last handbook of powered craft, post decimalisation, but these models were also featured in an older copy, circa 1960s.

Brown, Son & Ferguson now has an online presence and still produces a powered craft and sailing ship catalogue of plans; the newer book, as mentioned by Dave Metcalf in his letter last month, has the shipwright plans range, including the Glen Eagle.

Last, but not least, thanks for injecting new blood into the magazine.

**DAVE ALLEN
HULL, EAST YORKSHIRE**

Thank you so much for your lovely letter and kind words, Dave, and likewise for the photocopied pages of your handbook. I would love to be able to share the pages featuring Barbara, Margaret and Elizabeth here but unfortunately my scanner is on the blink (oh, the joys of working from home!). **Ed**



- Soethe 12-volt smoke generator
- 12-volt interior lighting circuit using LED strips
- 3-volt incandescent lighting circuit for deck lights, navigation lamps, mast lamps, and some interior lights – all fed from a 9-volt SLA via a DC-DC voltage step down converter.
- Electric Blige Pump (MFA)

PETER FITZGIBBON
EMAIL

She's absolutely splendid, Peter! I am loving all the detail you've put into her. Having done a quick recce online I see the Royal Sovereign was, not surprisingly considering her history, the subject of quite a few picture postcards in her day. I, and I am sure you, too, would love to hear from anyone who was either the recipient of one of those postcards, or better still anyone out there who remembers taking a day trip to the coast aboard her. It's perhaps too much to hope that anyone may have some old photos of their outing stashed away, but who knows? Over to you, chaps! Ed

Your Models

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

TSMV Royal Sovereign

Built at the William Denny & Bros shipyard in Dumbarton and launched in 1948, the TSMV Royal Sovereign was one of several excursion vessels operated by Eagle Steamers (General Steam Navigation Co) up to the 1960s and dubbed 'London's Luxury Liners'. These ships were favourites of day trippers from London to Southend, Margate and other destinations on the Essex and Kent coasts and were capable of carrying nearly 1,800 passengers per trip.

In 1967 Royal Sovereign was adapted and operated as a cross-channel car ferry named Autocarrier before being employed as a ferry on a number of routes in the Mediterranean from the 1970s onwards. The much-changed vessel made her final voyage to the Aliaga shipbreaking yard in Turkey in 2007, thus concluding almost 60 years of service.

My 6ft plank-on-frame model was built over several years from a full set of William Denny shipyard drawings sourced from the National Maritime Museum. She is fully seaworthy thanks to dual Mtroniks brushless motors and ESCs set up for differential thrust, Futaba rudder servo, and Radiomaster 6-channel 2.4GHz receiver – all controlled by a Radiomaster TX16S transmitter. The principal power supply is a 12-volt SLA.

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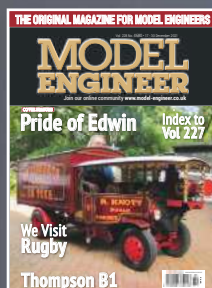
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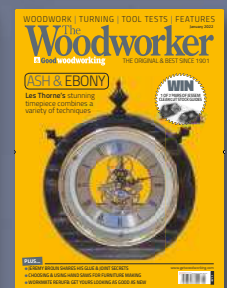
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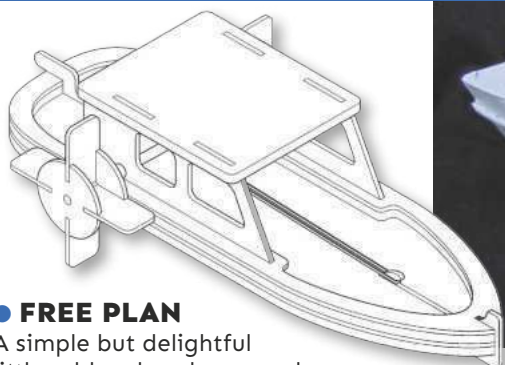
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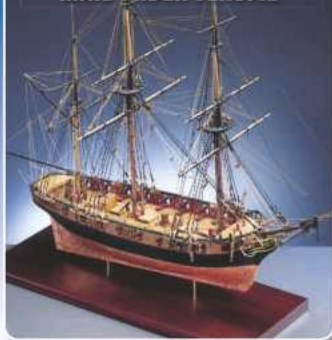
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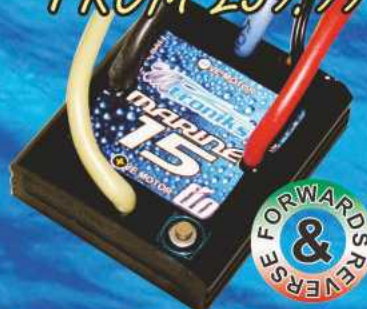
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