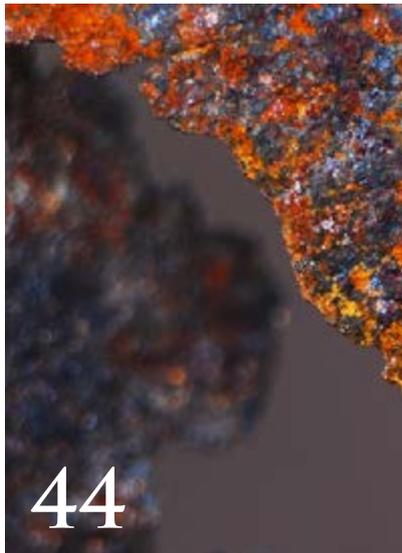


THE REPORT

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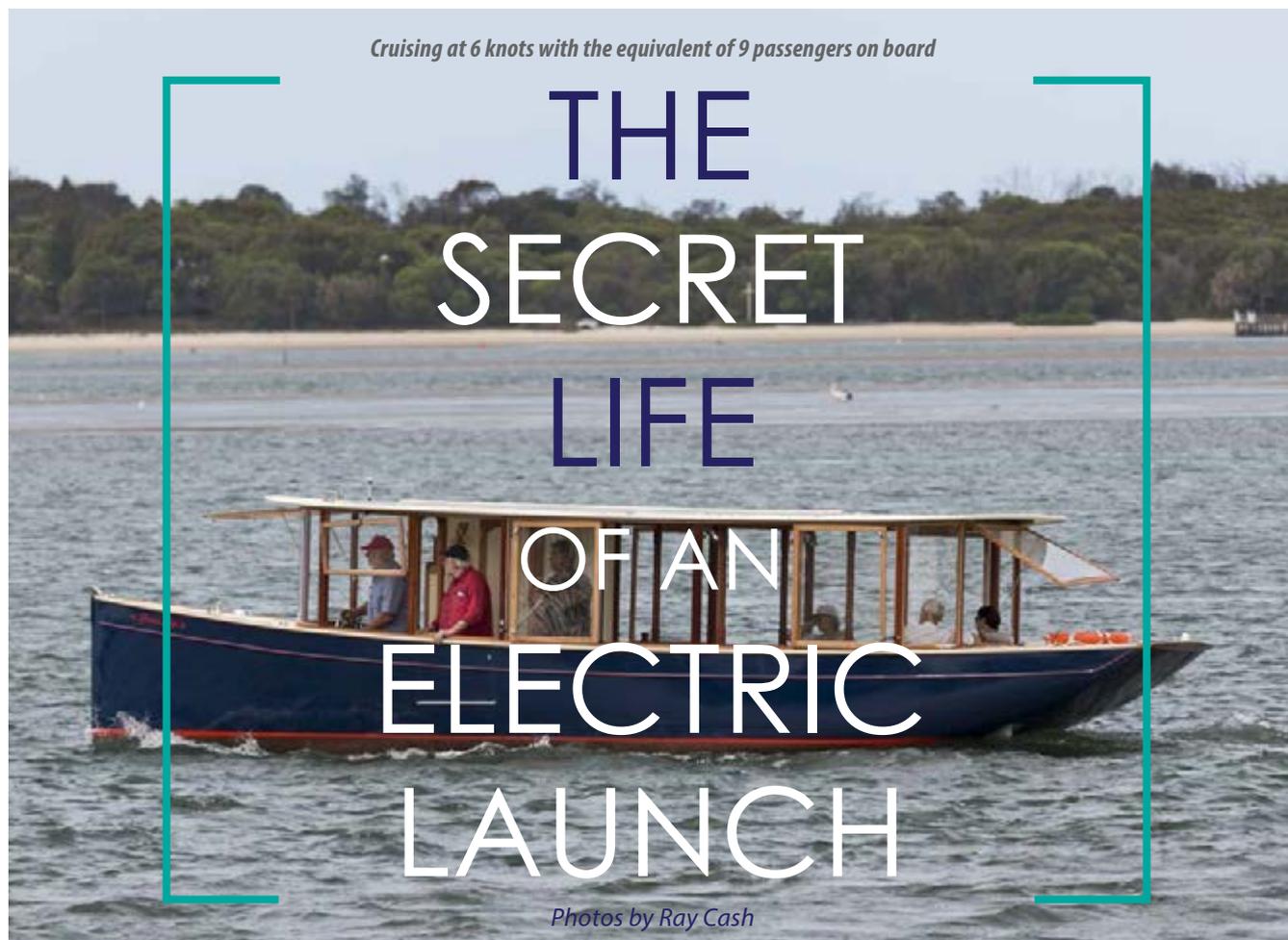


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Electric boats operate at a fraction of the cost of conventional fossil-fuel powered boats. They offer maximum torque through the whole rev range and ride in silence with no emissions. This means that marinas and waterways will be cleaner and quieter. No noise and no fumes from conventional engines to contend with. But are electric boats the thing of the future? Derek Ellard of Scruffie Marine, based in North Tamborine, Queensland, Australia thinks so and is involved in building them.



BY DEREK ELLARD

Reading this magazine for the first time, I was struck by the complexity of modern shipbuilding technology. For the 21st century marine surveyor it must surely be somewhat daunting and yet today's professional has a battery of modern electronic tools to help in his assessments.

As both a designer and boat builder, I am keenly aware of new materials and techniques but my heart is with those glorious maritime creations of a century ago. All very well you many say, but

we can't live in the past and let's face it, today's vessels are infinitely more efficient and much safer. Yet there is a powerful yearning for an elegance, a gracefulness almost lost in 21st century boating. So our first production boat, launched over 25 years ago, was a modern take on a traditional Swallows and Amazons dinghy and our latest, the solar-electric Secret 33 SE continues the line – a boat from the Jazz Age with a lithium heart – a boat with a soul.

As a boy in the 1950s I learnt to sail on England's East Coast. I was thrilled to encounter sailing barges

and Essex smacks yet shocked to see first class racers rotting in the mud at West Mersea. But their DNA lives on in the new electric Secret. The demanding brief was for a stable 12-passenger shallow draft solar-electric tourist boat, low on maintenance, high on Edwardian aesthetics. Being a sailor at heart, I had already drawn up many variations in the "spirit of tradition" notably the Secret 20, a gaff cutter or shall we say, a "smackette." The new 33-footer, her bigger sister, was drawn as a yacht first, just as were many early 20th century motor boats. I reasoned that an



The author guns it



A long lean hull with fuel tanks on the roof

SECRET 33

solar
electric
launch

easily driven 33-footer would work very well with the limited power of electric propulsion. So I designed the new boat with the option of a deeper three-quarter length ballasted keel or skeg, generating two boats for the price of one hull mould – I get my racy gaffer and the client gets his electric launch.

I drew up a set of lines and as usual agonised over the coach roof height, sheer line, and counter stern. Finally the dining table was cleared for more pedestrian use and the drawings dispatched to my computer friendly colleague for subtle corrections and sundry calculations.

A long fine entry, flattish deadrise and that essential counter meant that the batteries and ballast could be kept well forward for good load bearing capacity. We later fitted a 200-litre water ballast tank aft to help keep her stern down when unladen.

With a beam of 2.5m and with a weight on the road trailer of 3.42 tonnes, the boat is trailerable and international shipping is viable with a flat-rack container.

During the design and development stage we made every effort to enhance stability and this process continued during the build – nearly a half tonne of lead shot and epoxy settled nicely in the bottom of the hull and a big AGM house battery plus eight chunky lithium batteries were all installed as low as possible. The upper works were kept as light as practical and windage kept to a minimum. The GRP hull was built in alternating layers of chopped strand mat and woven cloth with 4mm core-mat at the heart of the layup. From the turn of the bilge to the keel, the hull was 12mm thick, doubled where the interchangeable keels sit in their recesses forming a good strong backbone. The sides were a little more modest at 8mm. Plentiful 12mm marine ply bulkheads, both transverse and fore and aft, were well filleted and glassed in place with reinforcing to gunwales and seat stringers. Various structural items such as seat

sections and seat divisions were also glassed in to further strengthen the monocoque. We specified 12mm marine ply for the sole and used a tough durable vinyl coving from Japan on top. This fake teak flooring sounded awful but the samples were reassuringly robust and frankly didn't look too bad at all. Under the sole and in all available extremities we installed more closed-cell foam than was necessary. The decks were manufactured in foam-core glass to our specifications in order to ensure good structural integrity. Up on the roof we went lighter with more foam and less glass, all laid up in one continuous section with no joints. The roof laminate material was also used for horizontal bench tops and upright seat sections, all in matching cream gelcoat – we don't do white.

Here in Australia we are blessed with plentiful supplies of excellent boatbuilding timber which we used to advantage. The laminated beams and support posts were of Queensland Red Cedar (*toona ciliata*) once used for those glorious vintage Sydney Harbour skiffs. Silky Oak (*grevillea robusta*) was used extensively for the fit-out trim, being both durable and spectacularly beautiful. We also used spar grade Douglas Fir in the laminated deck beams and all structural timber was saturated with epoxy and preservative. The timber brightwork outside had six coats of the excellent Awlwood while satin varnish was used inside. We used UV-resistant high-density extruded PVC for the roof edging and rub rails for a good strength to weight ratio and excellent durability, the colour perfectly matched to the gelcoat.

For the glazing we opted for cast acrylic bedded in foam and silicone with four large side-opening plus two large top-hung windows fore and aft, the bow panel being of toughened glass. The thermoformed fixed curved corner panes reduce wind resistance and add a touch of Art Deco. They also, unofficially, add a degree of stiffness to the upperworks.

Back inside, the bulkhead division panels, shelves, and so forth we built from 12mm foam-core PVC, again thermo-formed to suit. These sections were sprayed with 2-pack before bonding with slotted timber sections and modern miracle adhesive.

The goal was for a rot-proof structurally sound and aesthetically pleasing hull. We'd like to think we succeeded.

Successful solar-electric propulsion systems involve some judicious juggling of batteries, motors, hull forms and sunshine with a weather eye on speed and payload. So while high speed shenanigans off the Greenland coast are out, sensible displacement-speed cruising in sensible latitudes are easy to achieve.

Secret 33s weigh in at under 3 tonnes and with a full complement of passengers they'll hit over 4.0 knots when the 1.2kW solar input equals the draw on the batteries, that's allowing for losses in the power train too. So with a not too early start on a sunny day, lunch at a quayside restaurant and a light touch on the throttle, day-long free fuel is entirely feasible.

While the prototype and the second vessel were fitted with a brace of Torqeedo Cruise 4.0 outboards which we mounted on sliding pads, all subsequent models will feature the Finnish Oceanvolt 10kW sail drives. Among the advantages of this single motor installation, fitted forward of the rudder, is real time global monitoring. A small bow thruster will ensure safe manoeuvring.

The solar array comprises a bank of sixteen lightweight panels, each one raised with 9mm plastic spacers to keep the panel and the passengers cool. They feed the battery banks via voltage regulators and the built-in smart chargers top it all up via the mains, if necessary. For remote operations a small diesel charger can be incorporated and there's space for even more

lithium batteries for those who suffer from range anxiety. The batteries and chargers are located in a spacious locker forward with four inlet vents and a solar powered extractor on the foredeck.

With regards to usability, the skipper's needs are addressed with a step up on to the foredeck for anchoring and easy access to the mooring cleats without leaving the helm. He'll enjoy good all round vision thanks in part to those aforementioned rounded bulkheads. He'll love the instant torque of the brushless electric motors, the boat's easy motion, and the sprightly top speed of 7.7 knots.

Passenger feedback is uniformly positive so far:

"I closed my eyes and I was on a sailing boat," said one; "The only sound was the happy chuckle of the water," said another. While one passenger said, "Very comfortable, nice and stable, and surprisingly fast!"

While we are a minor player in the world of electric boating, we have worked hard to create a viable electric ferry that doesn't look like an aluminium rocket ship in a sci-fi movie.

The Secret 33s are all custom built so a big variety of fit-out options are there for all occasions, except the Greenland water skiing championships of course!

Now for that Secret 33 gaff yawl...

About Scruffie Marine

Scruffie Marine offers unique kit sailing boats, custom built timber boats, ready to sail fibreglass boats, and elegant solar-electric boats. They have been in production for over 25 years, designed in-house and built with care. They are beautifully styled in the spirit of tradition!

For more information visit: www.scruffie.com

SECRET 33

an
elegant
ferry or
family
boat



Life in the sub tropics



Some of the builder's timber indulgences