

Taking a level-headed approach

Owner, guest and crew safety is of course paramount and overall comfort is a very close second. The developers and manufacturers of stabilising systems are delivering a myriad of systems to suit every type and size of vessel

Words: Adam Fiander

Like many last year, myself and family were dissuaded from a foreign holiday due to travel restrictions, but this year we hope and believe that things will be considerably different. We're seriously thinking about booking a sailing charter in Croatia, with another family of four, on two near identical 38 or 40-foot yachts.

For my part, I've sailed for the past thirty years and can't wait to get the shorts, the sunglasses and the sailing gloves on and start pulling on ropes and grinding winches. But the other, less experienced family have already voiced their concerns to me about the 'up-down' motion and seasickness, potentially ruining their anticipated and long-awaited week in the sun.

These very real concerns hit home as to why it's so incredibly important for stabiliser manufacturers and developers of roll-reduction systems to keep doing whatever it is they are doing. To keep coming up with ever more efficient ways of improving safety and passenger/crew comfort at sea.

Let's take a look, therefore, at what some manufacturers are doing, in terms of offering better efficiency, with increased performance, for less overall cost.

When referring to fins, it's electric fins that have caused the greatest amount of interest recently, with manufacturers claiming a number of USPs over electro-hydraulic equivalents.

Claims such as being easier to install, due to their less complex physical nature and being smaller in size, are major plus points, along with lower noise levels, less maintenance and reduced service-intervals which, on paper, would appear as extremely welcome benefits indeed.

Take, for example, Italian manufacturer, CMC Marine, who have pioneered electric fin systems and associated technology for a long period of time, about 15 years so they tell me. Their European Patent n° 2172394 assumes it was their system that was the first electric fin system placed on the open market.

Following on from Stabilis we now have CMC Marine's compact electric fins range, namely Waveless, with a remarkably small interior footprint of just 9.5 inches, meaning the Waveless range is perfect for yachts 12m upwards. Even despite the small dimensions, much of the same cutting edge technology and some of the parts and components are drawn from the larger Stabilis range.

Powered-up using AC batteries, or with a 24volt DC option, Waveless gyros are said to have more available torque than competitors, partly down to a 'flange on flange' bolted together system, instead of using the more common through-shaft to connect the actuator with the fin.

What with Stabilis, Waveless and CMC Marine's electric steering range, Directa, the next logical step was a system that allows them all to talk to each other, and that system is called ArgoTM, an integrated ride control system designed to control reciprocal interaction between stabilizer and steering systems.

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ArgoTM optimises course-keeping by guaranteeing better directional stability and reducing continuous course micro-corrections and ultimately increasing overall fuel economy.

CMC Marine founder and CEO, Alessandro Cappiello said, "100% electric was for us a fundamentally important choice from the outset, because it speaks of our desire for innovation and research into product solutions that improve upon their predecessors, while respecting the environment and the ecosystem at the same time. Our electric systems offer about 85% better efficiency, resulting in reduced power consumption for the same performance (about 40-50% less than a hydraulic system). Other benefits include significantly lower noise levels of under 45dBa."

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Depending upon the installation method, docking the vessel is not always essential and often this type of installation can be done alongside the quay

Electric stabilizer systems do not need oil, except for lubrication, so advantages in terms of carbon footprint can be made here. Integrated energy recuperation, from systems such as SKF's EFZ Electric Fin Stabilizer systems is another energy-saving gain.

Michael Christiansen, SKF Project Manager Sales told me how energy recuperation works: "When the fin is decelerated, electrical energy is returned back to the control box, where it is effectively 'stored', and reused again when the fins are accelerated, in combination with power provided from the yacht in a ratio of approximately 50:50. Any surplus electrical energy can then be fed back into the vessel and used again in powering up various other functions on the yacht, even down to boiling some water for a coffee, or switching on the TV."

The first public outing for SKF's electric fins was MYS in 2021 and Sascha Meinhardt, SKF Application Account Manager Yachts, told me the reaction from owners, captains, designers and boat builders had been overwhelmingly positive.

Available in varying sizes, with or without zero speed function, products on the test bench have been running for several hundred hours with very few issues and many shipyards have already expressed their interest in SKF's electric system, which should be ready for delivery at the end of 2022.

Another company committed to the development of fin technology is Sleipner, who are developing their first electric actuators for use with the 3rd generation of their award-winning Vector Fins™. Managing Director, Ronny Skauen, told me, "After listening to the demands of the market and solving three critical issues related to torque, safety, and noise – we have after years of work now found a way to close enough match the reliability and safety of hydraulic actuators with an electro mechanic solution."

Sleipner advised me that more information will be forthcoming once all the development work and sea-trials have been completed. They believe we can expect a host of new and efficient features within the new electric system. Not least a compact actuator with brushless torque motor, a patent-pending system for noise reduction, fail-to-safe breakage point and position lock, and all from a unit that is claimed to be easy to service and easy to install.

Ronny said, "Our 3rd generation Vector fins offer up to 50% better lift to drag ratio when compared to our original Vector Fins from 2013. The significant lift force will soften the ride for a better driving experience, and they can be positioned further aft than existing fins without causing negative side effects. The net result will be even better stabilizing forces both at anchor and underway and, for shipyards and retro-fit, they are in fact easier to install."

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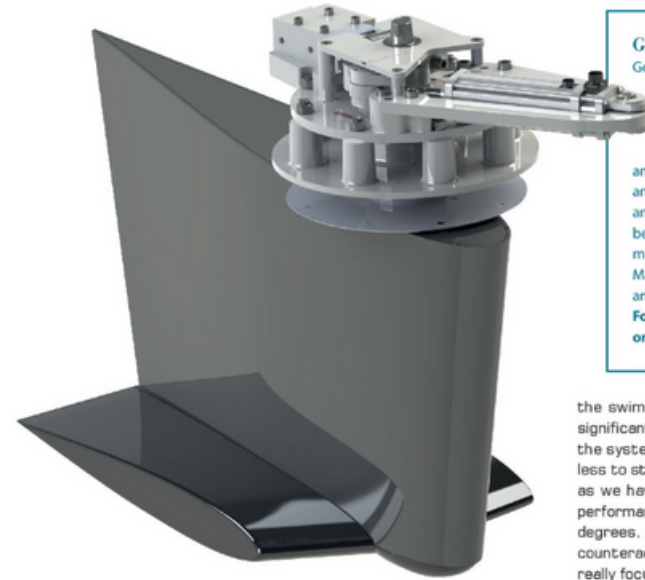
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the swimming effect, and our current software version has a significant improvement already for the overall performance of the system in addition to the Vectors' natural benefits causing less to start with. Our software is under constant development as we have seen how critical the control system is for overall performance. Our upcoming electric actuators can turn 360 degrees, allowing more flexibility to optimise the algorithm to counteract the aforementioned 'swimming-effect', but still we really focus mostly on avoiding to actually put the fins in the full 'reverse position' for practical reliability reasons, by experience we know that 'Murphy never rests.'

Paired together with latest improvements to Sleipner's Vector Fins, this actuator/fin combo should be one to watch, at least if the pre-production statistics are anything to go by.

Intelligent functioning of a fin is not just down to the shape and profile of the structure. Of course it's the algorithms in the software that determines how the fins react to the conditions and Ronny said, "Input data, timing, and the start and stop angle of each fin can be fine-tuned to reduce

Dynamic Marine Systems (DMS Holland) have adopted an alternative approach with their stabilizer and roll-reducing solutions. Rather than championing one kind of technology over another, DMS have instead opted towards offering different products for different problems. Amongst their product inventory are gyros, fins and all manner of different systems, based upon the fact that hulls come in different shapes and sizes and are designed to cruise at vastly different speeds.

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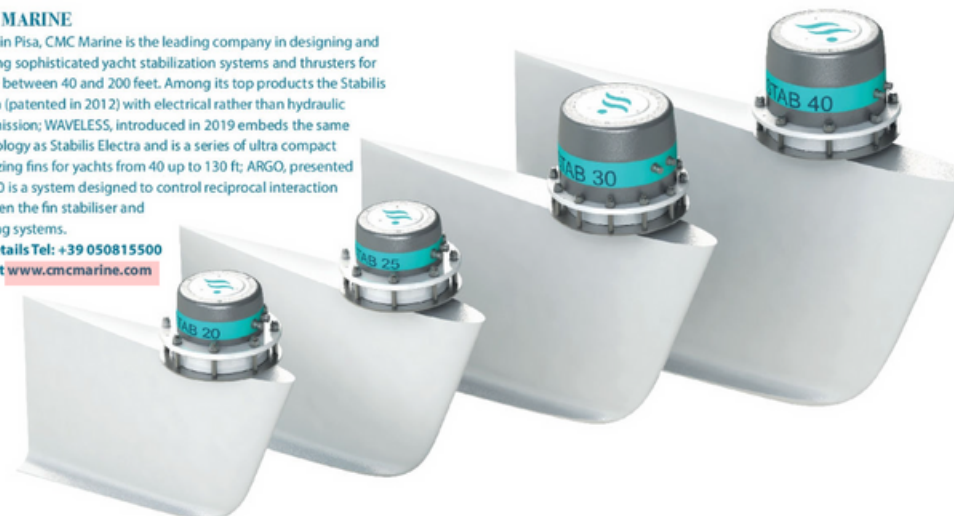
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CMC MARINE

Based in Pisa, CMC Marine is the leading company in designing and building sophisticated yacht stabilization systems and thrusters for yachts between 40 and 200 feet. Among its top products the Stabilis Electra (patented in 2012) with electrical rather than hydraulic transmission; WAVELESS, introduced in 2019 embeds the same technology as Stabilis Electra and is a series of ultra compact stabilizing fins for yachts from 40 up to 130 ft; ARGO, presented in 2020 is a system designed to control reciprocal interaction between the fin stabiliser and steering systems.

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"The argument that a 'one product suits all' approach is never going to work successfully in every instance," so says DMS Sales & Marketing Director, Patrick Noor, who adds "The market for under 30m yachts is totally different than the market for over 30m. At the top end of the market, you rarely get to speak to the owner, and sometimes the owner doesn't get what is right for the boat."

Even if their first product, the innovative dual-axis anti-roll system has been placed on the backburner for the time being, the company is still moving forward at a rapid pace. From a two-person start-up in 2012, DMS now employs 14 people and is forecasted to increase to 30 employees over the next five years. Their second product was the Magnus Master: for low-speed cruising yachts and semi-displacement vessels up to 30m. Driven by a shallow

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and easy to locate electric direct-drive motor; at speeds above 12 knots the roll-damping effect becomes negligible, and the product sensibly retracts.

Last of all, DMS Universal is an up-to-date operating system that can be swapped in place of a malfunctioning, or parts-redundant control box, to prolong and extend the working life of fins and actuators and so forth, as opposed to scrapping and replacing expensive hardware that otherwise had nothing wrong with it in the first place. The potential for cost-saving here is huge, and I think DMS Holland should be commended for having this kind of money-saving attitude.

But with all that's been said about alternative stabilisation technology, it's gyros that have been around the longest and the technology shows little sign of plateauing anytime soon. Credit where credit is due I say.

Early criticism from competitors levelled at the cost, the size and general inconvenience of gyros taking up large amounts of space inside a hull, have largely diminished. Manufacturers have bounced back with a vengeance, with new gyro systems that are not only smaller, but are quicker, easier and less expensive to maintain.

Based in La Spezia, Italy, take Smartgyro, for instance, who's modular gyro units can be serviced, maintained and assembled directly inside the boat.

Incorporating the sphere with flywheel and base frame negates the need for the gyro to be shipped back to the factory for servicing. Seamless installation and onboard maintenance mean vessel downtime is reduced. New design opportunities are created for builders, and there is increased potential for installation in vessels with small or restricted access spaces.

The range includes systems for a variety of vessels in the 30 to 80ft range. With further units under development, the SG series now consists of the SG20 (45 to 55ft), SG40 (50 to 60ft), SG60 (55 to 65ft) and SG80 (over 60ft). Average power

consumption is said to be considerably lower than for competitor units, suggesting that other products might require a larger generator for the same level of roll-reduction.

Even down to the smallest detail, such as having entirely recyclable cardboard packaging and reusable wooden crates, it's clear that efficiency and sustainability are key considerations for Smartgyro and I commend any company with that kind of positive attitude. With a six-model gyro range aimed squarely at yachts and megayachts in the 20m plus category, VEEM Marine from Australia has focussed on making it as easy as possible for customers, from all over the world, to buy their product.

What exactly do I mean by that? Well, even though these are large and complex products, VEEM Marine are still able to offer a lot of product 'off the shelf' and ex stock.

Brett Silich, Global Commercial Manager, told us "Clients can purchase our product often with very short lead times for refit projects, and we saw this became a real selling point last year, for owners having quickly made a decision they would like stabilisation onboard. Depending upon the installation method, docking the vessel is not always essential and often this type of installation can be done alongside the quay."

Brett is convinced that in the often heated debate over 'gyros versus fins', the stabilisation of a vessel at rest (when owners desire the best performance for using toys, for swimming, diving and even for pilots trying to land or take off in helicopters), is superior with the correctly paired gyro(s), over all other stabilisation means.

Brett feels gyros offer greater options for designers and naval architects, in particular with the trend for explorer-style yachts, transiting areas with the potential for ice, that otherwise would not be suitable cruising ground for external appendages, such as fins. "Gyros are completely contained within the hull," says Brett, "and for environmentally conscious owners pursuing DNV Silent or RINA Dolphin underwater noise classifications, gyros have lower noise and vibration levels inside and out."