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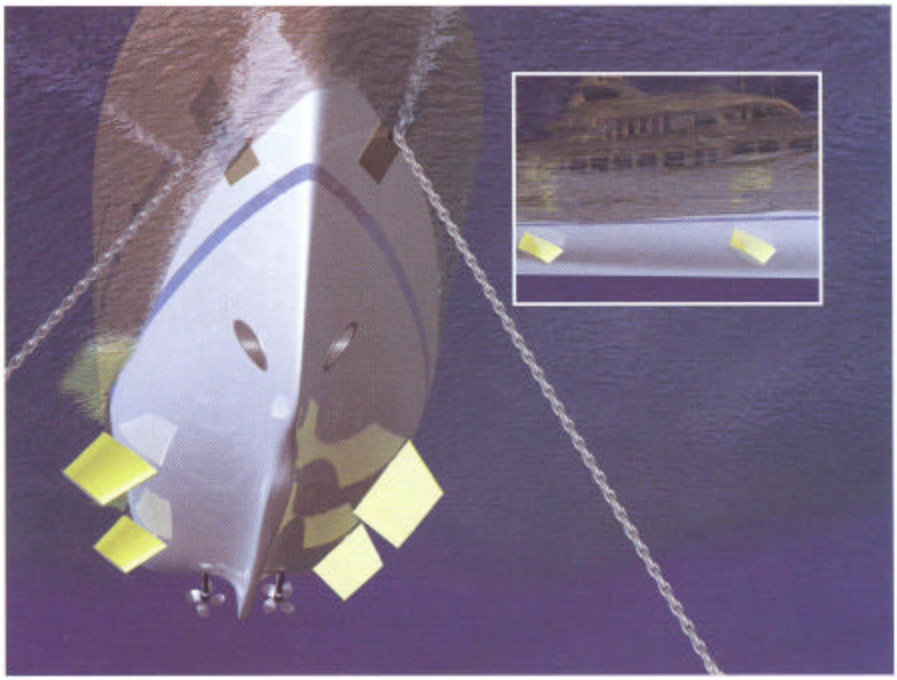
Active Fin Stabilisation – At Anchor



Quantum has successfully fitted five yachts, including four Feadships, with 'at anchor' stabilisation upgrade packages. All of these are in addition to the first such application to the 230' Amels-built yacht, MY Boadicea, which has been in service for over three years. This stabilisation process has the ability to keep yachts which are at anchor stable in uncomfortable conditions caused by counteracting swells. Quantum says that the technology is embodied in two distinctly different processes. One is Zero Speed, a process which is directed at new construction projects where the hull units, controls, power packs and fins are purpose-designed to incorporate all the mechanical, hydraulic, control surfaces and electronics to deliver the 'at anchor' stabilisation capabilities. The other process, On Anchor stabilisation was developed in conjunction with Quantum Stabilisers for retrofit to those vessels that have sufficiently sized mechanical/hydraulic components for the application.

The process includes complete and thorough inspection and overhaul of the existing mechanical and hydraulic systems, including servo-valves, bearings and seals. Hydraulic cylinders are replaced with Quantum designed high load, heavy-duty cylinders engineered to withstand the increased duty and loads. The upgrade also includes the replacement of the existing power pack with Quantum's custom designed, ultra quiet Hydraulic Power System, the installation of an electronic control package to control the fin response and movements, and the installation of larger, specially designed fin blades, which incorporate innovative design features to increase the efficiency of energy transfer at anchor.

The basic principles can be explained as follows: the wave or swell motion frequently encountered in anchorages can be effectively counteracted with active fins providing that they are correctly designed, sufficiently sized and have the power to react according to the motion (accelerate and decelerate) through their entire range of movement. The electronic sensors pick up the roll angle, roll velocity and acceleration; they then transmit those inputs to the central stabiliser control. The central control unit processes the inputs from the sensors, determines the correct fin response (based on the vessel specific system setup) and transmits the signals to the system's hydraulic power and control system. The fins then move to counteract the wave/swell action. The variables that determine how well the process works include the yacht's hull form, its stability characteristics, its natural roll frequency and the frequency of the swells encountered. The most uncomfortable conditions are when the swell frequency is equal or near to the yacht's natural roll frequency. Unlike flume or anti-roll tanks, the On Anchor system's electronic controls have the ability to adjust to differing swell conditions and frequencies. As with any new technology, there are learning curves and ongoing research to ensure that the system becomes more efficient. Presently, there are some limitations to the implementation of the technology; for example, the vessel's roll period has to be within a certain range to ensure success, i.e. not too fast and not too slow. The vessel's hull form and surface area need to be sufficient to accommodate the larger fins required by the system, as the stabilisation process requires a significant increase in fin total surface area. Finally, the system has been developed as a retrofit process for a specific type of stabiliser, the Vosper 3L, that is commonly used amongst the larger yachts, owing to Quantum's long-term expertise, in the guise of Peter Florence, in installing these systems. It is understood that the system has also been successfully retrofitted to Koop Nautic installations, however the technology used by other stabiliser systems is not technically advanced enough and therefore incompatible due to inherent weaknesses. While the focus of this report is primarily refit oriented, the Zero Speed stabilisation system referred to above has been developed as a specific solution for new builds under the Quantum Controls name. The product series comprises the QC1000, QC1500 and QC 1800.

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