## **Evolution** over **Revolution?**

Although many would argue that in recent years there has been no single 'step change' or revolution in vessel design, continuous development of new materials, propulsion systems and hull-forms are helping to provide a myriad of new and exciting, design possibilities. John Bonafoux, Managing Director of BMT Nigel Gee explains further.



## XSS24. The proof is in the pudding

The crew transfer vessels that BMT Nigel Gee has developed for the wind farm and offshore industries provide an excellent insight into how state-of-the-art technology can be used to fulfil a specific client brief by achieving outstanding speed and ride comfort (seakeeping) performance in high sea states. The XSS24 catamaran developed on behalf of Turbine Transfers is a highly advanced, next generation wind farm support vessel that will be used to support and service far offshore wind turbines all year round.

To date, existing catamaran designs of typically up to 20 metres in length have been used to provide an excellent service to wind farms located relatively close to the mainland. However, in order to service the next generation of wind farms located further offshore, where wave heights will be greater and transit times longer, maximising the operating envelope becomes more critical. The ability to transit

and transfer personnel to and from wind farms in higher sea conditions means that wind farms can be accessed more often with less weather days, potentially resulting in fewer vessels and technicians on each wind farm

Specialist hull form designs such as the Small Waterplane Area Twin Hull (SWATH) have been developed and proven in commercial and military applications by vessels which demonstrate by far the best seakeeping performance in large waves. However, the downside of the SWATH design is very high powering requirements, high capital costs and much higher running costs in comparison with less complex, fuel efficient catamarans. To achieve improved seakeeping whilst maintaining reasonable powering and fuel consumption levels semi-SWATH hullforms have been developed such as BMT's ModCat.

In 2001, BMT Nigel Gee undertook a research and development project sponsored by the US Navy's Office of Naval Research (ONR) to develop a catamaran hullform offering significantly improved seakeeping performance with minimal increased drag. The advanced semi-SWATH hullform of the ModCat demonstrated substantially improved seakeeping performance with only a 5% increase in drag when tested against a comparable conventional catamaran hullform. The ModCat hullform has subsequently been adopted for military applications in the Atlantic Ocean (e.g. 79m 'Sea Fighter' for the US Navy) and for rough water ferry operations in the Pacific Ocean (e.g. 57m 'Betico II' for Sudiles).

More recently there has been huge interest from major oil companies in adopting the BMT ModCat hullform for personnel transfer vessels to replace helicopter operations for transferring personnel to offshore oil platforms.

John Bonafoux

For further information, contact John Bonafoux at: admin@bmtng.com

Whether it is for high-speed passenger ferries, workboats, yachts or specialist military vessels, we now have access to a far wider range of materials that all require due consideration - anything from steel and aluminium through to advanced composites using carbon fibre, Kevlar and honeycomb sandwich construction, all with their own distinct advantages.

Furthermore, the development of pioneering propulsion systems such as the voith linear jet (VLJ), a hybrid design between a propeller and a waterjet, is also a key enabler and many owners are recognising the potential efficiencies and improvements in operational performance that such systems can offer. There is also huge interest in 'green' propulsion systems and innovative designs such as Project Vindskip™ that exploit the wind for propulsion is a fascinating concept with huge efficiency potential.

The use of modern nuclear power is yet another propulsion alternative which could offer huge benefits in terms of efficiency and reduced CO, emissions. However, it is still very much a politically sensitive and contentious issue within the commercial maritime sector. Although there are still some engineering challenges to overcome, R&D projects such as the the small modular reactor (SMR), discussed earlier in this issue

Using the fully proven ModCat hullform as a basis, the XSS24 has been

developed to go beyond semi-SWATH technology specifically to meet the exacting requirements of the offshore wind industry. The extreme semi-SWATH (XSS) technology being developed by BMT and Turbine Transfers effectively closes the gap between ModCat and SWATH technology, enabling the XSS24 to operate comfortably in high sea states with waves approaching from all directions, not only during transit, but also at zero speed. The result is a vessel which offers exceptional operational capability in a very specific role through highly intelligent, evolved design.

this clean energy source and further R&D investment should certainly be encouraged. A subtle revolution

Ironically, what makes a new, 'radical' hull form work so effectively can often come down to very subtle changes in the design. There are many examples where small changes in the hull form design have resulted in significant reductions in resistance, or major improvements in sea keeping ability. It is about taking a holistic approach to optimising the overall design that will ultimately have the biggest or most radical impact. Our new high efficiency crew boat design is a good example of this, where we have managed to achieve a 14% improvement in fuel efficiency over existing, high performance designs through careful optimisation of the overall hull form.

Although it is important for any design and engineering company to establish a culture of freedom where its people are encouraged to 'innovate' - think outside the box and experiment with new ideas, it is equally important to be grounded and realistic. Far too often we see wild claims related to vessel performance and possible fuel efficiencies for new designs that are somewhat overly optimistic.

John was a founding partner of Nigel Gee and Associates in 1986 and helped grow the company, now known as BMT Nigel Gee, to the success it is today. John understands the importance of a having a strong team who are passionate about producing designs that really meet clients' requirements. John is still involved at every level of the company and gets a buzz from taking a vessel design from concept to successful delivery.

of Focus, clearly highlight the viability of

## Design for the economic climate

In these challenging economic times being grounded in commercial realities is equally important when looking to remain competitive in the market place. Often, new vessel designs will be driven by a specific set of requirements from the customer. In other cases, the drivers for a more advanced vessel design stem from us working closely with the customer to understand their operational challenges or needs better and then developing a new design which we can demonstrate will provide substantial benefits to their operation.

Our diversity across different sectors can also lead to a significant competitive advantage. Our involvement in the design of most types of hull forms provides a breadth of knowledge with exposure to many different materials and technologies. Indeed, if you are limited to designing container vessels, then you are unlikely to get involved in any lightweight, aluminium or advanced composite material. Having a diverse portfolio of vessels provides the opportunity to cross fertilise technologies and consider all of the options to help deliver the optimum design for the customer.

The first XXS Catamaran windfarm support ver Cymyran Bay, in service with Turbine Transfers