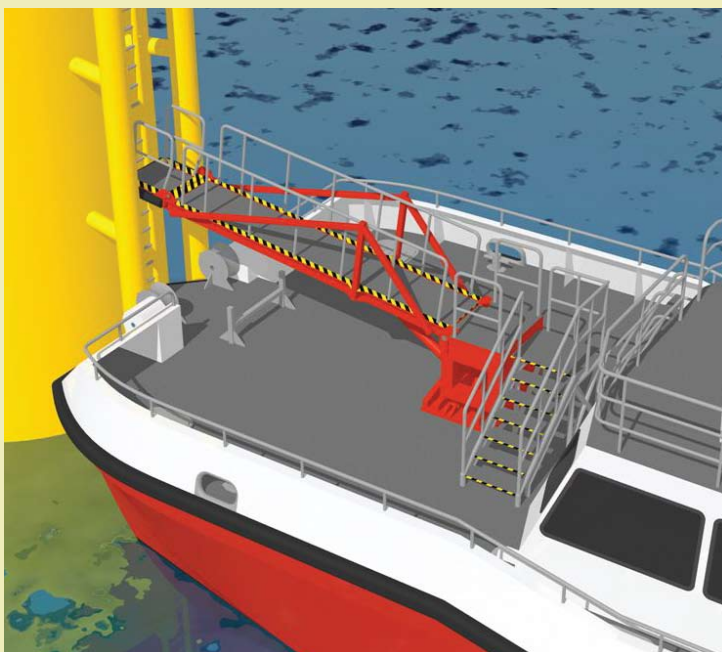


## Major Developments in Offshore Wind Installation & Support Capability

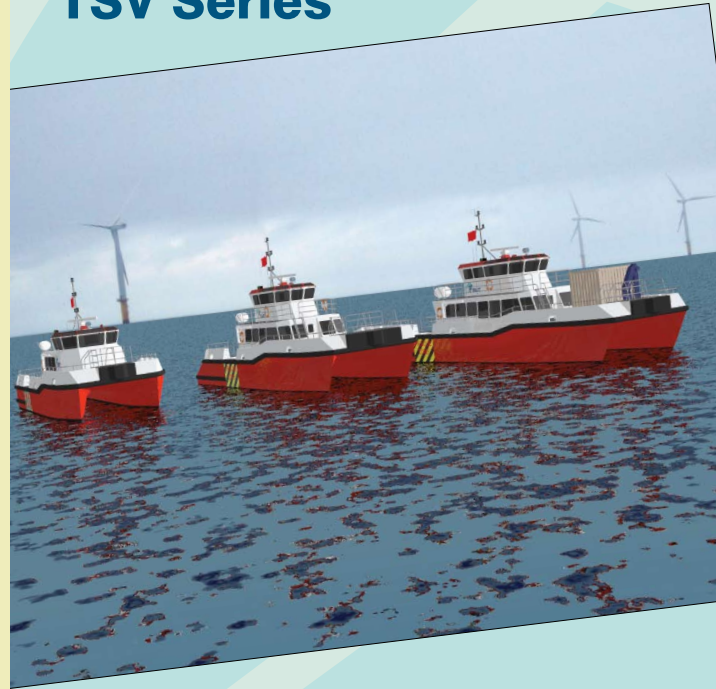
### Turbine Access System

BMT has teamed with specialist marine engineers Houlder Ltd to develop a Turbine Access System offering significant improvements in system safety and access at higher sea states without the requirement for a dynamic positioning system or complex stabilised platform. The patented technology requires that the support vessel maintains position in the traditional way (pushing against the turbine tower) whilst a unique, tuned damping system reduces the vessel's motion response at the bow but importantly does not attempt to fix the bow relative to the tower. The access ramp is heave and roll compensated providing a constant transfer position to the tower, either by way of a ladder or platform depending on the tower configuration.

Initial investigations have shown that, dependant on the vessel design, safe transfer at significant wave heights of 2m will be possible without any relative movement between the access ramp and ladder / platform position.



### TSV Series



BMT has developed a series of aluminium catamaran designs suitable for personnel transfer to near shore windfarms. The design portfolio extends from 17m to 24m in length and benefit from the company's experience of having designed in excess of 60 high speed aluminium catamarans. All the vessels are designed to the MCA SCV Code and incorporate features to ensure optimum efficiency and seakeeping relative to their length. The TSV 24 is designed specifically to minimise fuel consumption at 25 knots whilst offering the best possible motions of the TSV series. Design data has demonstrated that the TSV 24 will provide fuel savings of approximately 15% over a 20m vessel and significantly improved comfort levels in a seaway.



Gifford, BMT and Freyssinet have been selected by the Carbon Trust for the next stage of the Offshore Wind Accelerator (OWA) Foundations Project to continue the development of their Gravity Base Foundation and transportation concept. The GBF concept is designed to substantially reduce the installation costs of offshore wind turbine foundations and significantly expand the weather window for the installation of the concrete foundations. A key enabling element of the concept is the bespoke semi submersible barge capable of lifting and deploying the concrete gravity base foundation from the onshore construction site to the windfarm site. This will enable installation in up to 45 metres water depth and is therefore suitable for most Round 3 sites.

## Operation and Maintenance Vessel

Under client instruction, BMT has designed a unique Operation and Maintenance Vessel tailored to providing essential maintenance activities for offshore windfarms. Accommodating up to 20 technicians, the vessel incorporates full DP/II capability, motion compensated personnel turbine access as well as full ROV and dive support. The vessel is also capable laying inter-array cables and transporting large items of replacement equipment such as turbine gearboxes. BMT is also supporting the client in the tender stages of the project.



*The methods and concepts in this document are protected by international patent applications*



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