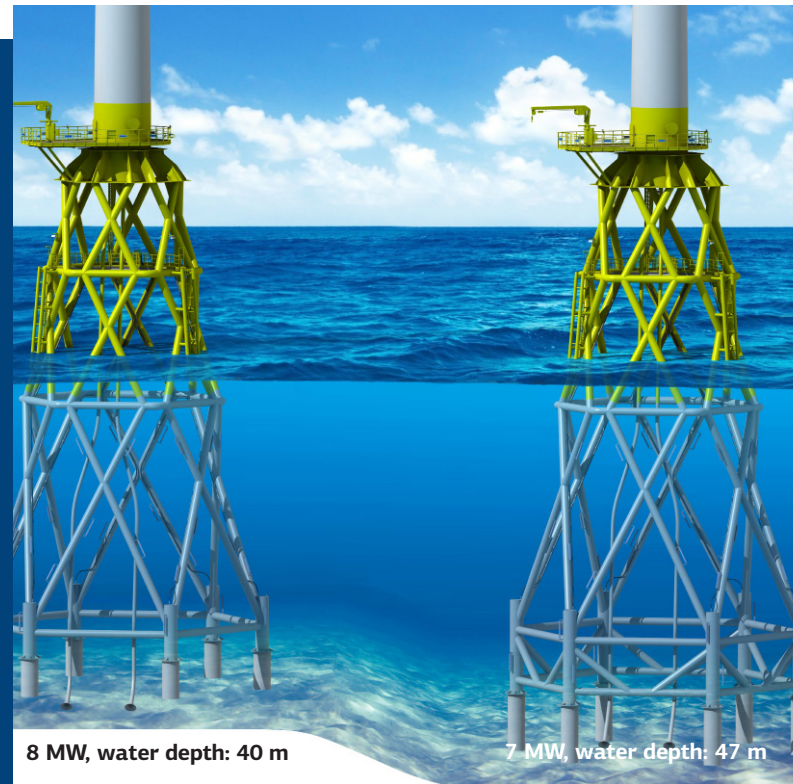


DTC-Foundations[®] – intelligent solution for the demands of tomorrow



The future of the offshore wind power industry is largely dependent on the development of future offshore electricity generation costs. The German government is already targeting a reduction of these costs to 10 ct/kWh and further countries will follow. One of the main areas of potential cost reductions is that of the substructures. One instrument for lowering costs while maintaining or even improving quality levels is industrialisation!

Industrialisation begins with design. We know from other sectors (e.g. car manufacturing and aviation) that approx. 80 % of production costs are determined by development and product management work. Design projects for offshore substructures often begin on the basis of already known structural elements, without an adequate consideration of manufacturing and business processes. An unsatisfactory depth of detail when looking at materials, manufacturing and logistics processes often leads to unforeseen time and cost overruns, along with the resulting cost-intensive adjustments which must be made.

To avoid these unwelcome consequences the “HEXABASE” was

developed according to the principles of “Design to Cost (DTC)”.

DTC is a proactive, systematic procedure to enable the control of costs throughout the entire development phase in such a way that the desired targets are achieved. The following methods were used, among others, in the development of the “HEXABASE”:

- Quality Function Deployment
- Target Costing
- Design for Manufacturing and Assembly
- Process Costing
- Value Analysis
- Simultaneous Engineering

In the systematic development of the “substructure” product, all the upstream and downstream elements of the value chain must be considered.

For the “HEXABASE”, the consideration of the methods above led to some targets competing with one another. Especially the development of an optimal structure for dispersing loads was a challenge when up against minimising the number of different building components. The latter had been given a higher priority due to the backdrop of requiring industrial (series) manufacturing.

The result: with extremely conservative load assumptions and environmental variables, the “HEXABASE” consists of a combination of

- 8 connection elements
- 2 tube diameters and
- 6 wall thicknesses,

which are not to be considered as multiplicative number of options!

Graphics: MOG

Changes in the conditions, such as the turbine or the site (wind, waves, water depth), do not lead to changes in these values. Thanks to the low number of different construction categories, an industrial manufacturing is possible which is also part of the design consideration process. The work required for monitoring and guaranteeing quality is thus significantly reduced.

The design of the “HEXABASE” additionally considers matters of corrosion protection, HSSE and installation. Through the use of an innovative coating system (RELEST[®]), which was developed for offshore use and to market maturity together with BASF Industrial Coatings Solutions Europe

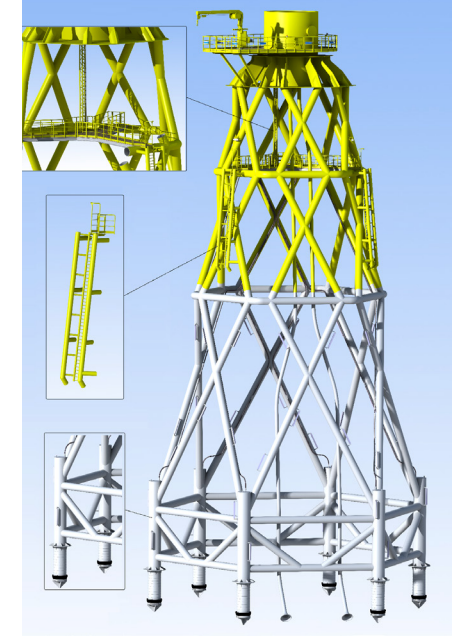
and MOG, the anode mass is reduced by approx. 80 %.

Foundation piles with a diameter of below 2 m cause considerably lower noise emissions during the ramming process, so that only a bubble curtain is required to meet the stipulated thresholds.

HEXABASE, as a multisite and multisize substructure, reduces the processing times for approval and certification procedures, as well as in the downstream engineering, which thus reduces the costs.

Minimised combinations of source materials, repeated processes and a high flexibility in connection with diverse HSSE-compatible characteristics form the basis for a substructure which achieves a shoulder-to-shoulder alliance of technology, ecology and economics.

Visit MOG and thyssenkrupp at WindEnergy Hamburg: Hall B2 EG, Booth 111



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