



ELiSE

Evolutionary Light Structure Engineering

Renewable energy

Offshore foundation

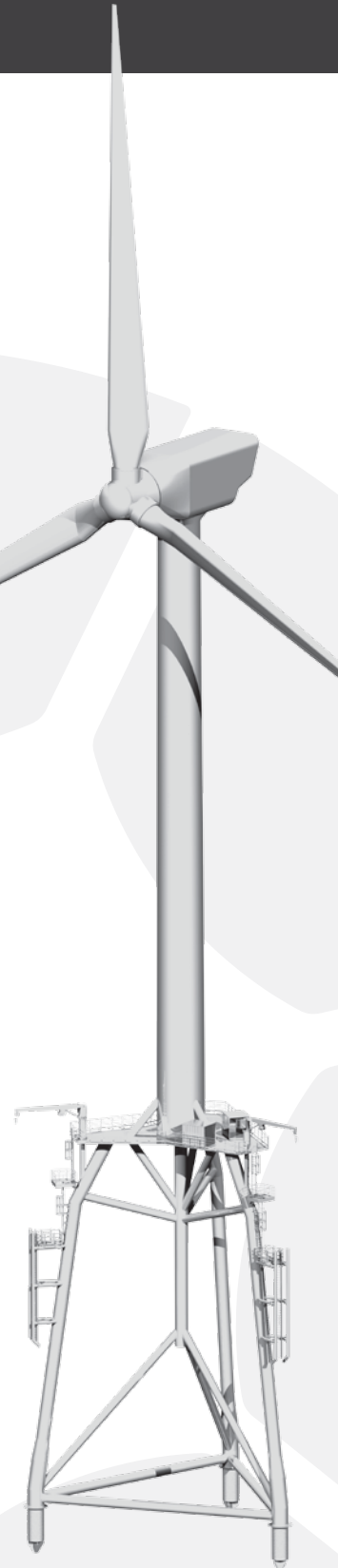
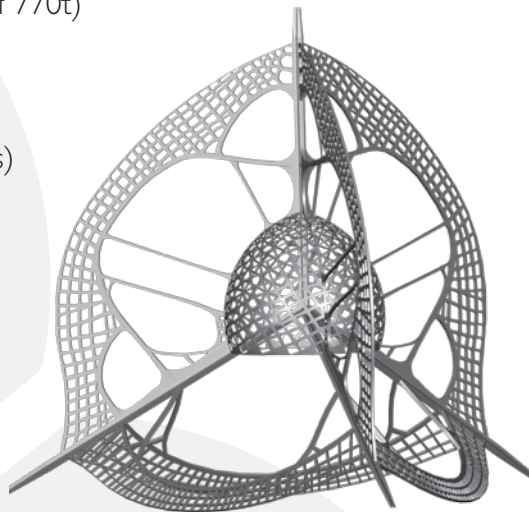
Within the scope of the increasing need of regenerative energy, the development of foundation structures for offshore areas such as multi-megawatt-wind-turbines becomes more and more important. Within these structures steel needs to be used very efficiently to enhance the cost-effectiveness of innovative regenerative technologies. Therefore mainly semi-finished steel products are taken providing easy industrial availability and allowing economically efficient construction.

Using ELiSE (Evolutionary Light Structure Engineering) we were able to develop a powerful and potentially cost-effective tripod foundation structure with a weight almost 50 % lower than conventional structures. In contrast to conventional procedures such as topological and morphological optimization, ELiSE gives the possibility to generate and evaluate a vast variety of different constructive solutions for structural problems.

Starting point for the new development were the geometries of the lightweight exoskeletons of marine Radiolarians, single-cell organisms with distinct exoskeletons. Finite element analysis of representative load cases has shown that those skeletons can be used for new bearing structures of offshore foundations.

Effective production processes and the use of semi-finished products are planned, ensuring that the total costs for construction and transport are clearly below the costs of current solutions.

- > Significantly reduced weight (400t instead of 770t)
- > Homogeneous stress distribution
- > Mainly built out of standard elements (tubes)
- > Predefined bending direction of the convex tubes affords lighter design



WeserWind GmbH
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WEIGHT REDUCTION

48%

LEARNING FROM NATURE

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