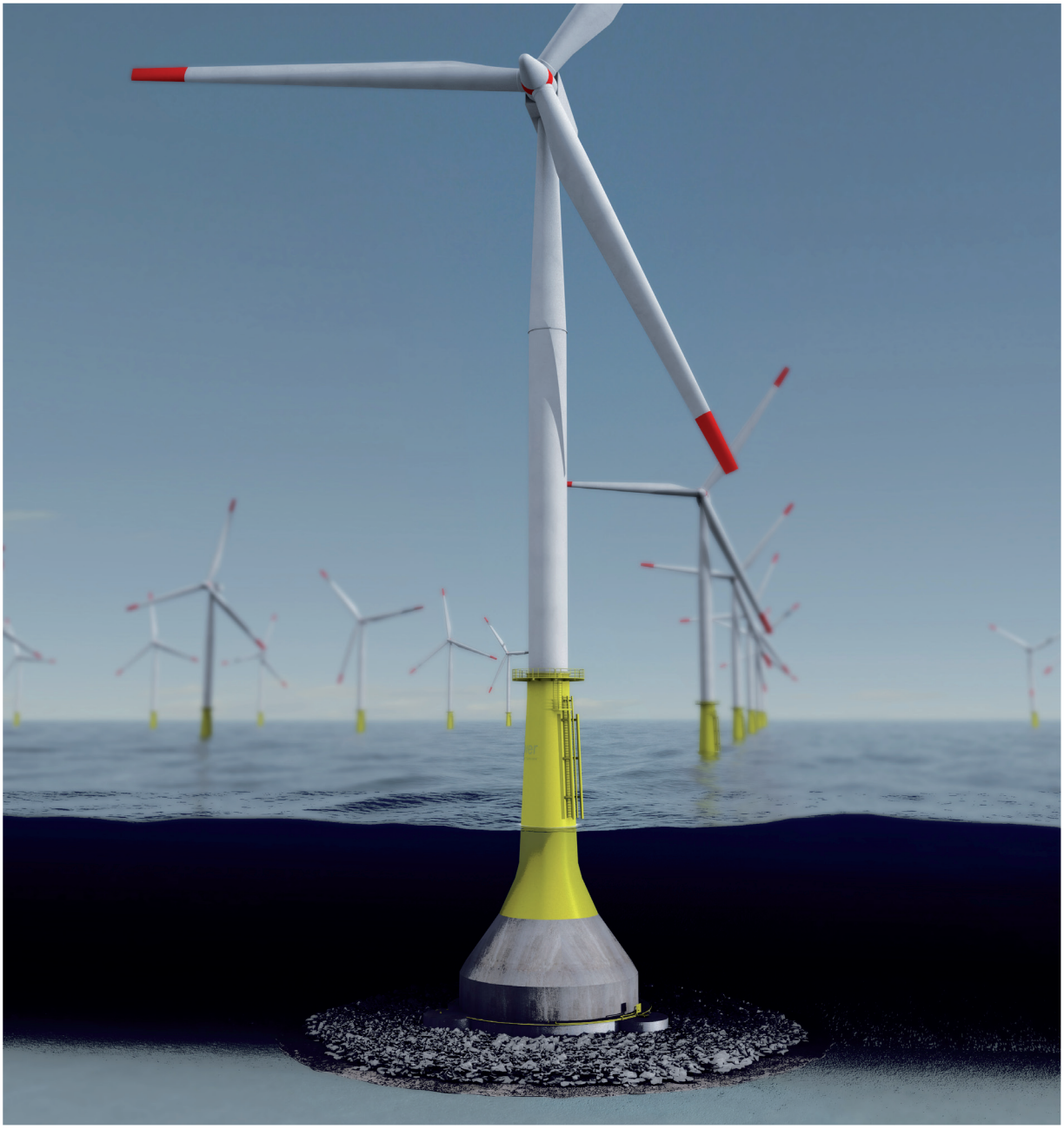
Cranefree® Gravity foundations

Cost-effective foundations for deeper water application



- Installed by towing vessels only
- No piling, dredging or seabed preparation
- Efficient mass production and serial deployment

Competitive for projects with

- water depths of more than 25 m
- 3.6 MW turbines or larger
- large-scale developments
- and/or challenges with piling

Cranefree® Gravity foundations are offered on EPCI basis by market leader MT Højgaard, in cooperation with foundation specialists Seatower

seatower

MTHøjgaard

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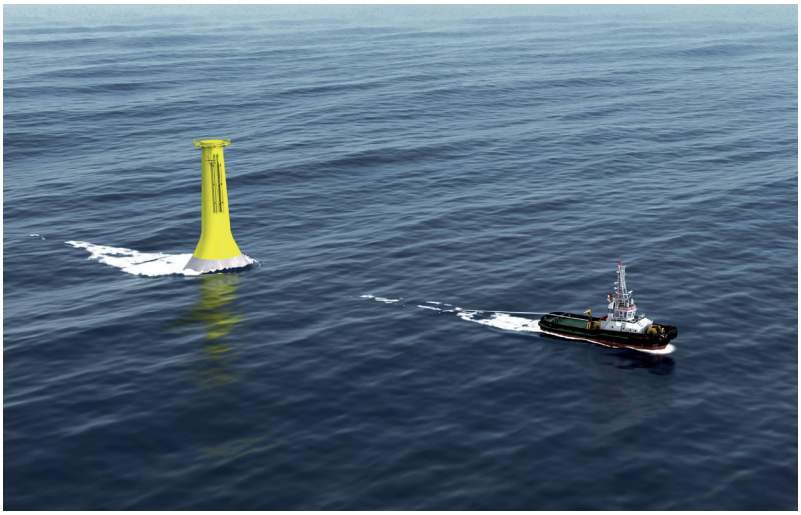

Cranefree Gravity (CFG) foundations, developed by Seatower, enable low total project costs. This is particularly due to the efficient deployment method: Tow the foundation to site, lower it to the seabed by water ballasting, inject concrete under the foundation, and pump sand into it. On site installation requires weather windows of only 12 hours, and can be done in up to 2 m significant wave height (H_s). Weather delays are thereby reduced by up to 80%. Only standard equipment (towing vessels) is used, which is inexpensive and readily replaced if required.

Furthermore, the concept requires no dredging or pile hammering.

The use of CFG foundations can reduce the foundation project's risk by up to 85%.

The foundations are made of a combination of concrete and steel.

There are important efficiencies at all steps of the value chain:

Prefabrication of steel
The possibility of doing prefabrication at fabrication yards anywhere in the world can have a significant impact on the total project cost.

The steel parts are designed in sections that can be efficiently transported and assembled.

Construction
The construction can be undertaken in harbours available for instance along the coasts of the North Sea Basin. A draft of only 5-6 m and limited land areas are required.

The CFG concept favours local content, which can be important for the project. Loadout can be done in several ways, but always cost-efficiently – without the need of a heavy-lift crane vessel.

Transportation and installation
Towing can take place in up to 5 m wave height (H_s). The weather windows needed for the on-site installation are only 12 hours of up to 2 m H_s. This means reduced weather downtimes, and thereby reduced risk of project delays.

Avoiding large crane vessels and jackup barges saves money and removes a number of major risks related to such vessels – for instance the risk of sudden unavailability of the vessel during a project (due to breakdown, contractual issues or other). Should delays occur anyway, the project can catch up simply by deploying additional towing vessels.

CFG foundations require no dredging, pile hammering or other seabed preparations. Piling and dredging are increasingly being restricted to protect the environment.

Operation
Similar gravity structures have been used for almost 40 years in the North Sea and elsewhere. These foundations are many times bigger than Cranefree Gravity foundations. This track record means that teething problems have been tackled previously. Even though the concept is innovative, the engineering is proven and well understood.

There is no maintenance required during the operational phase.

Decommissioning
Decommissioning is achieved by a reversal of the installation process, using towing vessels only. No parts of the foundation are left behind at the installation site.

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