Wave Induced REsonance and Load Effects on Support Structures of XXL monopile-based offshore wind tu

Publieke samenvatting / Public summary

Aanleiding

Over the past decades, offshore wind turbines have seen a rapid growth in size and power capacity: from several MW to the current 15MW and beyond. With their increase in size, waves in stormy conditions are becoming increasingly important in design. In storms, groups of large waves can trigger a resonant response of the structure. With the ever-increasing size of wind turbines, this resonant response is starting to drive the design of todays and especially future offshore wind turbines. Current design standards do not provide clear guidelines on how to account for this phenomenon in design. This emerging design regime, which increases uncertainty in the structural response loads, is not well addressed in current standards.

Doelstelling

To improve understanding and reduce uncertainty, this project extends the RUNWAVE JIP by testing 15 MW and 22 MW scale models in a wider and more realistic set of wave and turbine operating conditions, including short-crested and bimodal seas and multiple realisations to capture variability.

Korte omschrijving

In this project, wave-basin experiments are combined with numerical simulations to test current design methods for wave-induced resonance. The campaign covers a broad range of realistic wind and wave conditions that offshore turbines encounter

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during their lifetime. The analysis of these tests and model validations improves understanding of the key uncertainties and risks associated with wave-driven loads and provides guidance on the suitability and limitations of existing wave- and dynamic-response models in these conditions.

Resultaat

Overall, the project creates the essential basis for a future follow-up effort focused on advancing design methods to ensure system robustness given these new uncertainties.

De data in deze applicatie is afkomstig van de Rijksdienst voor Ondernemend Nederland (RVO) en wordt in samenwerking met de Topsector Energie ontsloten.
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