JIPs - sharing experiences and building knowledge

Joint Industry Projects are still one of the most important steps in the development, sharing and application of knowledge. Participants are welcome to join the following initiatives.

BreaKin

Wave impact loading on offshore structures due to BREAKing waves and their KINematics

BreaKin is a joint research initiative addressing wave impact loading on offshore structures due to deepwater BREAKing waves and their KINematics. The objective of the BreaKin JIP is to get more insight into the scale effects involved in wave-in-deck model tests and to link wave kinematics with impact loads.

To quantify loads due to breaking waves, model tests are currently the option of choice. However, it is suspected that scale effects lead to an overestimation of the prototype loading, therefore it is important to examine how conservative load measurements are. To understand how realistic model testing is in this respect, it is necessary to quantify scale effects. To do so, model tests on structures at different scales and ambient pressure conditions will be carried out in MARIN's Depressurized Wave Basin.

The project started in 2016 and is running until spring 2018. Participants currently include MARIN, Statoil, Shell, Aker Solutions, GustoMSC, ConocoPhillips and Maersk Oil.

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GBS

Optimising workability and reducing the cost of GBS installations for the offshore wind industry

When wind turbines are larger and need to be installed in deeper water, a Gravity based structure (GBS) can be a feasible option. To reduce the overall cost of offshore wind energy we need to optimise the workability of the GBS installation process. This requires a better understanding of the towing and installation of such large concrete structures. This includes aspects like towing stability, tug handling, operational logistics, hydrodynamic response in waves and bottom interaction during the placement.

The objective of the GBS JIP is to improve the engineering methods of the Transport & Installation of gravity based wind turbine foundations. This will lead to more effective and safer operations, with better workability and optimised logistics. The project started late 2016 and is still open for new participants.

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Offshore Maintenance

Operability of wind park maintenance vessels

For maintenance on offshore wind turbines a wide range of vessels and strategies is available. The objective of the Offshore Maintenance (OM) JIP is to select the most suitable maintenance strategy and vessel for a wind park and for any time of the year. To realise this objective the existing Operations and Maintenance Tool (O&M Tool), developed by the Energy research Centre of the Netherlands (ECN), has been extended with vessel hydrodynamics (contributed by MARIN) and human factors, provided by TNO. The O&M Tool, including enhancements, is shared with the participants of the JIP to calculate the operability of their maintenance solution.

The project got underway in 2015 and so far 14 different participants have joined including research institutes, shipbuilders, OM operators, OM personnel, access system operators and utility companies.

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ComMotion

Computational methods for moving and deforming objects in extreme waves

ComMotion is the latest in a line of joint industry projects focusing on the development of the CFD code ComFLOW – a fast and efficient tool for the simulation of violent free surface flows around offshore structures. ComFLOW sets itself apart from other CFD codes by its unique set of dedicated numerical algorithms, designed to have optimal performance in the field of wave impact simulations. Within the ComMotion JIP, developments focus on extending the functionality of ComFLOW to fast simulation of multiple, interactively moving bodies (including their moorings, fenders etc.), simulation of hydro-elastic structures, and generation of deterministic steep and breaking waves, in combination with current. Within the JIP, the computational efficiency of the code is also optimised by employing the latest hybrid parallelisation techniques.

Participants are still welcome to join the JIP, which will run until end 2018. Code validation, benchmarking and developments made in previous ComFLOW JIPs will be made available to all participants.

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Moonpool-2

Moonpools in waves during operations

Large water motions occurring in the moonpool when the vessel is operating or transiting in waves can be critical, as the equipment installed in the moonpool could be damaged. To minimise the risk of damage, the operations may even have to be suspended. Recently, its predecessor, the Moonpool JIP, which investigated the mechanisms leading to water motions in the moonpool during transit, was successfully completed However, the effect of incoming waves was not considered in that project.

Moonpool-2 aims to investigate water oscillations occurring in moonpools during operations in waves. Different moonpool configurations will be considered, from rectangular bare to confined turret moonpools. The JIP is expected to start in Q2, and will be conducted in close cooperation with oil companies, vessel design companies, classification societies, operators and offshore contractors.

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