Seabed Characterisation Jack-Up Rigs

A.P. van den Berg and Keppel FELS are collaborating to enhance the safety of jack-up rig installations by integrating probes into jack-up rig legs designed to characterise seabed properties prior to installations.

To assure availability of geotechnical information and to minimise uncertainties and risks associated with jack-up installations, seabed-probing equipment developed by A.P. van den Berg will be integrated into jack-up rigs. The technology applied in this process is based on the ROSON- soil inspection equipment for Cone Penetration Testing (CPT).

From the jack-up rig, operators will be able to profile the seabed underneath each leg and identify potential installation hazards using the integrated seabed-probing equipment. Any shift in final rig location or offset with respect to existing soil boreholes location can be addressed immediately with this approach.

In this application, soil investigation is carried out while the spudcans are pinned at the seabed. As soon as the legs are seated stably, the seabed probing device, which can be either fixed or made retrievable along the legs, immediately operates and captures seabed penetration resistances. From there, strength characteristics of the seabed can be derived and further interpretations can be made.

In collaboration with the Centre for Offshore Foundation Systems (COFS) at the University of Western Australia, special software is designed for this application. It interprets the measured values with which potential installation hazards are identified and prediction of leg penetration is derived with various levels of analysis. Together with the existing geotechnical information, this on-site assessment provides a strong basis for the jack-up operators to decide preventive measures when potential leg-installation hazards are present.