

Seismic Behavior of Suction Caisson Foundations

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Abstract : Increasing population growth requires more sustainable development of energy. This non-contaminated energy has an inexhaustible energy source. One of the vital parameters in such structures is the choice of foundation type. Suction caissons are now used extensively worldwide for offshore wind turbine. Considering the presence of a number of offshore wind farms in earthquake areas, the study of the seismic behavior of suction caisson is necessary for better design. In this paper, the results obtained from three suction caisson models with different diameter (D) and skirt length (L) in saturated sand were compared with centrifuge test results. All models are analyzed using 3D finite element (FE) method taking account of elastoplastic Mohr–Coulomb constitutive model for soil which is available in the ABAQUS library. The earthquake load applied to the base of models with a maximum acceleration of 0.65g. The results showed that numerical method is in relative good agreement with centrifuge results. The settlement and rotation of foundation decrease by increasing the skirt length and foundation diameter. The sand soil outside the caisson is prone to liquefaction due to its low confinement.

Keywords : liquefaction, suction caisson foundation, offshore wind turbine, numerical analysis, seismic behavior

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