A parametric study of an offshore concrete pile under combined loading conditions using finite element method

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ABSTRACT

Offshore piles are commonly used as foundation elements of various offshore structures, especially large structures such as Tension Leg Platforms (TLP). The stress distribution within such a large structure is a dominant factor in the design procedure of an offshore pile. To provide a more accurate and effective design, a finite element model is employed herein to determine the stresses and displacements in a concrete pile under combined structural and wave loadings. The vertical structural load is essentially a static load, while the lateral wave loading fluctuates in time domain and is directly affected by the incident wave angle. The parametric study will consist of varying certain parameters of the pile to study the effects of the stress distribution under various combinations of structural and wave loadings.

KEYWORDS

Offshore foundations, concrete pile, finite element analysis, wave load, wave-structure interaction.