

عنوان مقاله:

Pile Apparent Fixity Length Estimation for the Jacket-type Offshore Wind Turbines under Lateral Loads Applicable to Fatigue Analysis

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خلاصه مقاله:

Modelling the soil-pile interaction using the Finite Element Method (FEM) might be a time-consuming process and required entirely specific soil properties. Moreover, most of the codes that have been developed for offshore wind turbines use one or more of some simplified linear foundation models suitable for dynamic analysis such as Apparent Fixity (AF) model. In the AF model for pile foundation systems, a fixity length level below the seabed is designated for the pile. It is assumed that the whole structure, including the pile and support structure, is cantilevered at the corresponding fixity length level without surrounding soil while has identical behavior to a pile penetrated the real soil. In this study, the apparent fixity length of the piles sustaining the OCF offshore wind turbine on the seabed is estimated using a nonlinear soil-pile interaction analysis following a dynamic response analysis of the structure under lateral loads during turbine power production. Given the stiffness coefficients of the pile heads, different apparent fixity lengths are obtained, and the minimum one, verified by modal analysis, is also determined, which can be presumed in fatigue analysis. It is also demonstrated that the estimated minimum fixity length has a smaller value than the piles' critical length.

کلمات کلیدی:

Offshore wind turbine, Jacket, Soil-pile interaction, fixity length, lateral loading

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