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Investigating Jacket-Type Offshore Structures Failure Probability by Applying the Reliability Analyses Methods

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Abstract : For such important constructions as jacket type platforms, scrupulous attention in analysis, design and calculation processes is needed. The reliability assessment method has been established into an extensively used method to behavior safety calculation of jacket platforms. In the present study, a methodology for the reliability calculation of an offshore jacket platform in contradiction of the extreme wave loading state is available. Therefore, sensitivity analyses are applied to acquire the nonlinear response of jacket-type platforms against extreme waves. The jacket structure is modeled by applying a nonlinear finite-element model with regards to the tubular members' behave. The probability of a member's failure under extreme wave loading is figured by a finite-element reliability code. The FORM and SORM approaches are applied for the calculation of safety directories and reliability indexes have been detected. A case study for a fixed jacket-type structure positioned in the Persian Gulf is studied by means of the planned method. Furthermore, to define the failure standards, equations suggested by the 21st version of the API RP 2A-WSD for The jacket-type structures' tubular members designing by applying the mixed axial bending and axial pressure. Consequently, the effect of wave Loades in the reliability index was considered.

Keywords : Jacket-Type structure, reliability, failure probability, tubular members
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