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Shakedown analysis of offshore structures under impact load

GUO Jun, WANG Jun, YANG Di

College of Shipbuilding Engineering, Harbin Engineering University, Harbin 150001, China

Key Words: *Shakedown analysis, Offshore structure, impact load, Kinematic shakedown theorem.*

Abstract: Ocean engineering structures are frequently subjected to repeated dynamic loads and impact loads. The dynamic strength analysis and shakedown analysis of offshore platform structure have an important place in ensuring the safety and reliability of ocean engineering structures under impact loads. Therefore the shakedown analysis theory was introduced to the ultimate strength analysis of brace strut of semisubmersible drilling platform considering wave impact load. According to the kinematic shakedown theorem and combined with the finite element calculation and analysis, a theoretical method of upper bound shakedown analysis for offshore structures under repeated impact loads was presented and compared with existing results to verify the reasonableness. Then by applying the theoretical method to shakedown analysis of brace strut under repeated dynamic loads, influence of shell thickness, stiffener thickness and stiffener spacing on shakedown limit were studied. The results show that the theoretical calculation method is agreed with the existing results. The limit load increases with the increase of shell thickness and stiffener thickness, while decreases with the increase of stiffener spacing.

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