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Optimum of Offshore Structures Lifting Padeyes Using Finite Element Method

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Abstract : Padeye design and analysis plays important roles during the lifting, load out and installation of heavy structures. This paper explains the disadvantages of limiting the effective thickness of the cheek plate to 75% of the main plate thickness. In addition, a sensitivity study about the impact of the out of plane force on the padeye design is discussed. This study also explains the fabrication requirements to ensure that the designed strength is achieved. The objective of this study is to elaborate and discuss the philosophy of padeye design and to propose the suitable effective cheek plate thickness to be considered in the analysis of padeye. A finite element analysis using London University Structure Analysis System (LUSAS), is conducted and compared with the hand calculation. The benefits and advantage of using FE analysis is addressed in this paper. At the end of this paper, a guideline elaborating the philosophy of the design of the padeye is developed and the suitable effective thickness of cheek plate to be considered in the design is recommended. In addition, a comparison between the finite element result and the hand calculation using beam theory is discussed as well.

Keywords : cheek plate, effective thickness, out of plane force, Padeye
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