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Structural Analysis of Port Fouad Ferryboat Wheel Deck

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Port Fouad ferryboat is an important facility that had always been used to transport people and cars in Suez Canal area from Port Said and Port Fouad and vice versa; nowadays, with the expansion of Port-Fouad city, about 120 cars and 15 trailers are being transported per hour. The structural design of this vessel has evolved through years and the Suez Canal Shipyard had gained accumulated experience based on the vessel's operation. Recently, the designers observed that it is better to insert additional tripping brackets in the deck panel although not recommended by the rules of the classification society. This study aims to justify the need to insert these brackets by using a detailed hull module analysis of the main middle block of the ferry boat. All required construction drawings, scantlings and structural details had been provided. The finite element modelling and analysis are carried out using Autodesk Inventor software. With the aid of loading charts, the worst loading conditions according to the wheel loads are applied in order to detect the critical areas and members within the block for two different configurations regarding the wheel deck tripping brackets. For simplicity, the analysis had been considered static; this is accepted as the purpose of this comparative study is not to obtain absolute values of the stresses and strains. The main indicators of the critical areas are the Von Mises stress and the equivalent strain resulting from the post-processing of the models. The study had shown that there is no significant difference between both structural configurations considered. However, more elaboration of the analysis is required to take into account the live load nature of the wheel loads on ferry boat main deck.