

Abstract

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Stability of Y stiffeners in ship plating under uniaxial compressive loads

Ship plates are stiffened using different stiffeners. In this paper, a Y stiffener is considered and investigated. A Y stiffener–plate combination model is used to represent the stiffened panel. Our contribution includes characterizing the local instability (buckling) of Y stiffeners in stiffened panels under the action of uniaxial compressive loads. The mathematical derivations have been carried out to find the elastic buckling coefficient for the web of the T-part of the Y stiffener under suitable boundary conditions. Then, the critical value of the buckling stress has been calculated. Using the value of the critical stress, the assumption of uniform stress distribution, the buckling load is calculated for the Y stiffener–plate combination model. Using curve fitting of the analytically obtained results, approximate expressions for calculation of the elastic buckling coefficient of the T-part of the Y stiffener are obtained. These approximate expressions enable designers to calculate easily the elastic buckling coefficient from which the critical buckling stress of the T-part is obtained.