

## Degree of Bending in Axially Loaded Tubular KT-Joints of Offshore Structures: Parametric Study and Formulation

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**Abstract :** The fatigue life of tubular joints commonly found in offshore industry is not only dependent on the value of hot-spot stress (HSS), but is also significantly influenced by the through-the-thickness stress distribution characterized by the degree of bending (DoB). The determination of DoB values in a tubular joint is essential for improving the accuracy of fatigue life estimation using the stress-life (S-N) method and particularly for predicting the fatigue crack growth based on the fracture mechanics (FM) approach. In the present paper, data extracted from finite element (FE) analyses of tubular KT-joints, verified against experimental data and parametric equations, was used to investigate the effects of geometrical parameters on DoB values at the crown 0°, saddle, and crown 180° positions along the weld toe of central brace in tubular KT-joints subjected to axial loading. Parametric study was followed by a set of nonlinear regression analyses to derive DoB parametric formulas for the fatigue analysis of KT-joints under axial loads. The tubular KT-joint is a quite common joint type found in steel offshore structures. However, despite the crucial role of the DoB in evaluating the fatigue performance of tubular joints, this paper is the first attempt to study and formulate the DoB values in KT-joints.

**Keywords :** tubular KT-joint, fatigue, degree of bending (DoB), axial loading, parametric formula

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