

عنوان مقاله:

Stress Concentration Factors in KT-Joints Subjected to Complex Bending Loads Using Artificial Neural Networks

محل انتشار:

ژورنال مهندسی عمران، دوره 10، شماره 4 (سال: 1403)

تعداد صفحات اصل مقاله: 18

نویسندگان:

Mohsin Iqbal

Saravanan Karuppanan

Veeradasan Perumal

Mark Ovinis

Afzal Khan

Muhammad Faizan

خلاصه مقاله:

Fatigue analysis of tubular joints based on peak stress concentration factor (SCF) is critical for offshore structures as it determines the fatigue life of the joint and possibly the overall structure. It is known that peak SCF occurs at the crown position for in-plane bending (IPB) and at the saddle position for out-of-plane bending (OPB). Tubular joints of offshore structures are under multiplanar bending, comprising IPB and OPB. When a joint is subjected to IPB and OPB loads simultaneously, the peak SCF occurs somewhere between the crown and the saddle. However, existing equations estimate SCF at the crown and saddle only when a joint is subjected to IPB or OPB. It was found that the position and magnitude of peak SCF under simultaneous IPB and OPB depend on the relative magnitudes of these uniplanar load components. The crown and saddle position SCF can be substantially lower than the cumulative peak SCF. Empirical models are proposed for computing peak SCF for KT-joints subjected to multiplanar bending. These models were developed through regression analysis using artificial neural networks (ANN). The ANN training data was generated through 3716 ANSYS finite element simulations. The empirical model was validated using models available in the literature and can determine peak SCF with an error of less than 1.5%. Doi:

10.28991/CEJ-2024-010-04-04 Full Text: PDF

کلمات کلیدی:

.Fatigue Analysis; Stress Concentration Factor; Empirical Modeling; ANN; Multiplanar Bending Load; Tubular KT-Joint

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1982904>

