عنوان مقاله:

Investigation of the influence of geometric design and temperature variations on fatigue life of pressure vessel pipe clips

محل انتشار:

بیستمین همایش ملی و نهمین کنفرانس بین المللی مهندسی ساخت و تولید ایران (سال: 1402)

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خلاصه مقاله:

This study explores the impact of visual designs on the fatigue lifetime of three pipe clip samples subjected to cyclic loads. Analyzing stress, appearance, and temperature variations is crucial for optimal clip design. The research emphasizes the significance of shape in resisting cyclic loads and improving fatigue life. simulations of three common pipe clips reveal distinct reactions to forces, showcasing the importance of appearance in fatigue resistance. Optimizing clip appearance enhances resistance to cyclic loads, prolonging fatigue life. The study's finite element analysis identifies pipe clip ۱, with stress۱۸۱.۳۰Mpa, as superior to clip ۲ with stress ۲۳۱.۵۶Mpa and also pipe clip ۳ with stress ۲۱۷.۷Mpa. pipe clip ۱ not only exhibits greater resistance but also ensures a more favorable stress distribution. Result, illustrate the crucial role of shape in fatigue resistance. The study also investigates temperature differences, showing that, for pipe clip ۱ increase in temperature difference from ۵۳ to ۹۰ resulted in a quarter of fatigue life for the pipe clip. This research sheds light on the optimization of pipe clip appearance for enhanced fatigue resistance in industrial applications, contributing to the longevity and performance of these components.

کلمات کلیدی:

"pressure vessel"– "fatigue"– "pipe clip"– "thermal stress"– "optimal shape