

Instability analysis of pressurized pipes with longitudinal surface cracks

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Abstract

Recently three of the authors of this paper presented analytical solutions for reference loads of plate geometries with semi-elliptical surface cracks subjected to tension, bending, combined tension-bending and biaxial tension. These solutions were shown to provide more accurate crack driving force estimates than the conventional limit load solutions available in the literature, and the method behind them allowed for a wider application range. Within the present paper a methodology for the fracture analysis of thick-wall pressurized pipes using the R6 assessment method and considering both, biaxial and combined tension-bending loading is developed and validated. The analyses are carried out analytically, and the comparison between the predicted critical loads and experimental burst test failure loads shows satisfying agreement, this way demonstrating the potential of the proposed method.

Full-text

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