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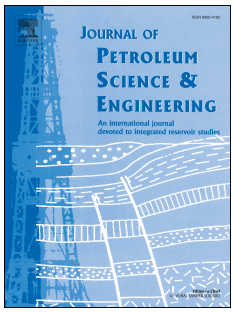

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Effect of the *Y/T* on the burst pressure for corroded pipelines with high strength

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Abstract: Pipelines are the fifth type of transportation, which has the highest efficiency and the least environmental damage for gas or oil transmission. Recently, the pipeline failures due to corrosion defects have attracted people's attention in maintaining pipeline integrity. Based on the double circular arc (DCA) model and elastic-plastic theory, an analytical solution of the corroded pipelines under internal and external pressures was obtained. And then, a new burst pressure equation of the corroded pipelines with high strength was further provided according to the von Mises criterion and previous equations. Compared with previous equations, this equation greatly extends the application scope and increases the calculation accuracy. The accuracy of our equation is validated by comparing with the full-scale experimental data. The effects of the thickness to diameter ratio, corrosion ratio and yield strength on the burst pressure are carefully investigated. The results reveal that when the thickness to diameter ratio is less than 0.1, the calculated results show a good agreement with the experimental data for the corroded and high strength pipes. Our research can provide a foundation for replacing the corroded pipelines at the bottom of the sea. In addition, our research is beneficial for the engineering design and integrity assessment of oil and gas pipelines.

Keywords: burst pressure, corroded pipe, integrity assessment, yield-to-tensile strength ratio (*Y/T*), DCA model, transport efficiency

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