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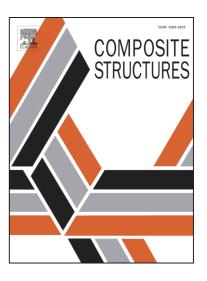
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Failure pressure analysis of composite repair system for wall loss defect of metallic pipelines

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Abstract

The aim of the present paper is to propose a simple methodology to predict the failure pressure of wall loss defect metallic pipes reinforced with a polymer based composite repair system. 80% wall loss defects were manufactured into the pristine pipeline specimen and the failure pressure of the repaired pipeline was determined using hydrostatic tests and validated with the proposed methodology. The proposed methodology defines a simple expression which allows to estimate the failure pressure using only the elastic properties of materials. A more conservative value of failure pressure was obtained by using this methodology as compared to the ISO/TS 24817 standard. However, the failure pipe exhibited a plastic deformation at far away from the defect region, consequently this behaviour needs to be considered in the failure analysis for an accurate prediction of failure pressure.

Keywords A. Defects; B. Plastic deformation; C. Numerical analysis; D. Mechanical testing

Abbreviations

P_i	Internal pressure (MPa)
	r
P_o	External pressure (MPa)
P_f	Failure pressure (MPa)
r_i	Internal radius of steel pipe (mm)
r_o	External radius of steel pipe (mm)
r_p	Outer radius of pipe at defect section (mm)
r_e	External radius of composite repair (mm)

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