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**Failure pressure analysis of composite repair system for wall loss defect of metallic pipelines**S. Budhe<sup>a</sup>, M.D. Banea<sup>a</sup>, N.R.F. Rohem<sup>b</sup>, E.M. Sampaio<sup>c</sup>, S. de Barros<sup>a</sup><sup>a</sup>Federal Center of Technological Education in Rio de Janeiro - CEFET/RJ, Rio de Janeiro/RJ, Brazil<sup>b</sup>Instituto Federal Fluminense, Rio de Janeiro, Brazil<sup>c</sup>Universidade do Estado do Rio de Janeiro-UERJ, Rua Bonfim, 25. Nova Friburgo, 28625-570 Rio de Janeiro, Brazil

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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)
$P_o$	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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