

Failure Pressure Estimations for Pipes with Combined Corrosion Defects on the External Surface: A Comparative Study

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In this research paper, the failure pressure predictions were obtained for a pipeline section by analyzing a combined corrosion defects, which joins together a general corrosion and a pitting corrosion defects. Well-known conventional mathematical methods were used in this study to predict the failure pressure of corroded steel pipelines, such as: B31G, RSTRENG-1, Shell-92, DNV, PCORR, and Fitnet FFS. The equations reported for corrosion defects with more complex characteristics developed by Choi *et al.*, and Cronin *et al.* were also used. Furthermore, Finite Element (FEM) is one of the most employed nonlinear methods because of its good response of pipeline failure prediction under the corrosion mechanism. So, FEM methodology results the least conservative in comparison with the others mathematical models, according to the literature, for this reason it was used to compare the standard deviation σ of the methods. Failure pressure predictions determined that the most conservative methods were: Shell-92, Fitnet FFS, Choi's method, B31G, RSTRENG-1, Cronin's method, PCORR and DNV, in that order.

Keywords: Corrosion Defect, Pipeline Steels, Failure Pressure and Finite Element Method.

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