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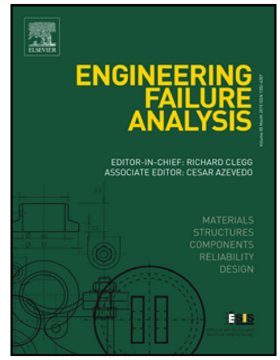

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Revised Burst Model for Pipeline Integrity Assessment

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Abstract

Failure of pipeline is often caused by corrosion. It affects the health, safety, environment and economy considerably. To prevent pipeline failure, it is necessary to focus on the corrosion and pressure of the structures. Burst pressure is a key factor to assess the integrity of a pipeline. There are three means to determine burst pressure. These are lab testing, evaluation criteria and the Finite Element Method (FEM) modeling. However, the results of the burst pressure assessment using evaluation criteria are too conservative compared to the results of an actual pipe burst experiment and FEM modeling.

The objectives of this paper are to analyze the changing trend of burst pressure of pipelines with different defect dimensions; to compare the FEM results with those of the evaluated criteria (DNV model) to indicate the conservative property; to revise the DNV model and verify its validity with actual burst experiments. The revised DNV model predicts burst pressure more reliably that could result in better engineering design of pipelines.

Key words: Burst pressure, Finite Element Analysis, Corrosion defect, DNV model

1. Introduction

Pipelines used to transfer oil and gas has been buried underground and in deep seas, so often have been corroded by internal and external conditions. This type of corrosion can have catastrophic effects on production losses, health and safety, and the environment in the offshore industry (Bjornoy O, 2001). The important parameter for evaluating the integrity of pipelines is burst pressure. Being able to predict burst pressure on time could prevent environmental and economic hazards caused by the failure of a pipeline (Veritas, Rules and Standards, 2010).

The assessment of failure of a pipeline involves determining if the stress exceeds the