A Comparative Study of ICDA and ILI in Subsea Pipelines

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This study provides a comparative analysis of Internal Corrosion Direct Assessment (ICDA) and In-Line Inspection (ILI) methodologies for subsea pipelines. It reveals that while ICDA is effective in predicting corrosion depth during its Pre-assessment and Indirect Inspection stages, it struggles with accurately locating specific damage points. This difficulty arises because internal corrosion is often localized and influenced by factors like severe corrosion at joints, making it challenging to identify critical defects even when predictive models highlight vulnerable areas. Moreover, there is a notable difference in the effectiveness of inspection and defect detection when conducted onshore compared to offshore environments.

The study also explores the impact of corrosion inhibitors on inspection processes. These inhibitors are generally effective against widespread corrosion but are less effective at preventing localized pitting. This variability introduces randomness on predicting defect location, which challenges the standard inspection approach outlined by NACE SP-0116. This standard assumes a pattern of widespread corrosion for detailed examinations, but it is inadequate for pipelines with inhibitors where pitting is unpredictable.

To address these issues, the study recommends enhanced inspection strategies. For pipelines that cannot be inspected using traditional pigging methods, it suggests increasing inspection frequency beyond the ICDA guidelines. These adjustments aim to improve defect detection accuracy and better manage the complexities introduced by corrosion inhibitors, ultimately ensuring more reliable pipeline integrity.

Keywords: Direct assessment, ILI analysis, Corrosion Prediction, Inhibitor, Localized Corrosion

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