

Study mechanic-reliability of the steel pipeline with presences of the localized defects

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Abstract : The energy demand such as gas and oil requires more and more the construction of new pipeline. The transport networks of hydrocarbons are working for gas in the continuous feed of many industrial sectors. Therefore, the service life and safety of these structures are important parameters to ensure the continuity distributions operations. The reliability of these industrial facilities is largely conditioned by specific characteristics for each system, in its conditions of use, its environment. Generally the causes of deterioration of hydrocarbon transportation pipelines are related to the presence of apparent defects (pinholes, cracks, corrosion.....etc.). A study was conducted to evaluate the reliability of these structures according on parameters (depth, length, thickness...). A mechanical model of degradation was used to assess the probability of failure through dimensions of defects. The object of this study is to analyze the defects located on a pipe under a calculation code based on reliability starting from a mechanical model, which integrates uncertainties through probabilistic models and geometric parameters. The parametric study show that the degree of influence of various parameters is not constant and the most dominant variable is the trio, diameter, operating pressure and the depth of the defect, are predominant. The reliability index after optimization of the variable converges towards more or less acceptable values.

Keywords : Reliability, pipeline, Defects, Mechanical Model.