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PREDICTING SAFE LIFE OF MAIN GAS PIPELINES UNDER CHEMICAL CORROSION ACCELERATED BY MECHANICAL STRESSES

Background
Corrosion and thinning of the walls of gas pipelines result in increased hoop stresses. According to theory of mechanochemistry of metals this leads to higher corrosion rate and even heavier wall thinning, and, therefore, the prediction of the pipeline safe life based on the assumption of constant corrosion rate within a specified life, gives initially overestimated value.

Aims and Objectives
Estimation of gas pipeline safe life, considering the influence of the hoop stresses in the pipe wall on the intensity of corrosive attack.

Methods
Study of the kinetics of mechanoelectrochemical behavior of steels in conditions of their active dissolution with deformation at constant rate till destruction.

Results
Based on the knowledge of mechanochemistry of metals analytical dependence was obtained suitable for predicting the life of main pipelines operated in conditions of mechanochemical corrosion.

It is shown that the presence of residual stresses in the pipe actual resource can be reduced by almost an order. This confirms the need of complex anticorrosive activities for planned and existing pipelines.

Key words: prediction, safe life, main gas pipeline, mechanochemical corrosion

References


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