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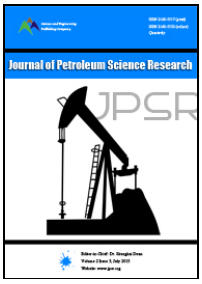


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# Matlab Based Performance Evaluation of Natural Gas Transmission System due to Corrosion

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**Abstract:** Pipe corrosion is one of the serious issues associated with transportation of gases using old pipes. As a result of internal corrosion due to the accumulation of various corrosive materials, the performance of the transmission pipes is affected with ages. This paper aimed to evaluate the effect of the age of pipes on the performance of natural gas transmission pipeline network system. A simulation model was developed for looped pipeline configuration using MATLAB programming code. Newton Raphson method was used to determine the unknown pressure and flow parameters which are essential to evaluate the performance of the pipeline networks. The mathematical model was derived from the principles of fluid flow, mass conservation, and compressor characteristics. The pipe flow equations were modified to incorporate the effect of the age of pipes for evaluating the performance of the pipeline networks with respect to ages. Analyses performed on a looped pipeline network systems demonstrated that age has significant effect on the performance of the network. It was noted that the flow capacities reduced by 5.06 and 6.75% when the service life of the pipeline network reached 15 and 20 years, respectively. With the current rising price of natural gas, the reduction in flow capacity could result huge amount of cost for the nation operating large volume of gases. The results of the simulation model have been verified and validated using the techniques available in the area of pipeline network simulation.

**Keywords:** Age of Pipe; Corrosion; Looped Pipeline Networks; Natural Gas; Pipe Roughness; Simulation Model

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