

Modelling pipeline stray current corrosion

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DC stray current interference is a stochastic process that is determined by the passage of DC traction systems crossing buried pipelines. The signals are not constant, neither in amplitude, neither in duration as it is in AC interference. Understanding the corrosion mechanisms behind stray current corrosion is therefore very complex.

It is the aim of this article to investigate via modelling the corrosion behaviour of steel under various DC interference signals. Through computational modelling the mechanisms occurring on the steel surface of a pipeline coating defect or coupon are simulated over time for various interference conditions and CP levels. As a first stage pulsed signals were applied. Based on the simulation results a better understanding of the conditions under which DC interference is a risk are highlighted such that uncertainties are reduced, and Fitness for Service is improved. Synergies with AC interference