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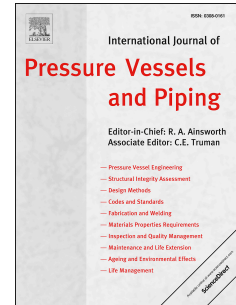
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# A Fuzzy Logic method: Predicting pipeline external corrosion rate

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## Abstract

Oil and gas pipelines are among the largest and most important infrastructures of the modern world. Although rare, pipeline breakdown or leakage exposes public and the environment to safety and health hazards. In this paper, a methodology to predict the external corrosion rate based on the combination of the measurement of six soil parameters and a reduced amount of inspection corrosion rate data is presented. The method provides a relatively user-friendly procedure that can be of use by the industry to focus the efforts towards optimizing the security and the continuity of the service. Furthermore, it reduces inspection costs, as a lesser number of in-situ inspections are required compared to the traditional inspection methods.

*Keywords:* Corrosion, Pipeline, Soil, Fuzzy Logic, Inspection

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## 1. Introduction

Pipelines are generally recognized to be the safest and most economical way of transporting hazardous substances in comparison with other methods of transport, such as road and rail (Markowski & Mannan, 2009). Included among the aforementioned hazardous substances are flammable materials like natural gas, petroleum and refined products. The supply chain of these materials is composed of more than 3.5 million kilometers of pipelines worldwide. For instance, the Spanish pipeline network adds up to: gas 10,481 km; oil 616 km; refined products 3,461 km (CIA World Factbook, 2016). However this numbers are minuscule compared to those of the United States: gas 1,984,321 km; petroleum products 240,711 km.

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