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ABSTRACT

A multifactorial study of erosion–corrosion (E–C) is carried out to quantify the effects of velocity, particle concentration, temperature, pH, dissolved oxygen, and copper ion content, with respect to the transport of tailings slurry through an API 5L X65 pipe. The experimental design is implemented using a rotating cylinder electrode and evaluating the resulting E–C damage by weight loss. An analysis of the statistical significance reveals that the variation in the wear rate is explained by three main effects (velocity, oxygen, and temperature) and two interactions (velocity/oxygen and particle/copper content). An empirical equation is formulated to produce contour maps of the main interactions. It is concluded that the primary damage mechanisms are the deposition of corrosion products consecutively disturbed by impinging particles and localized plastic deformation.

Keywords: Erosion–corrosion, Multifactorial, API 5L X65 steel, Rotating cylinder electrode.