

The corrosion behavior of X65 steel in a flowing solution

Zhongxin Zhang, Guang-Ling Song*

Department of Ocean Science and Engineering, Southern University of Science and Technology,

Shenzhen 518055, China

*songgl@sustech.edu.cn, guangling.song@hotmail.com

Abstract A device was developed to simulate the flowing aqueous medium in pipelines. This new simulating method allowed normal electrodes or any specimens with a flat working surface area to be installed or removed directly any time during experiment. Meanwhile, many other monitoring techniques may also be simply used together with the electrode in the device. By weight loss analysis, electro-chemistry test and surface investigation after the immersion in the flowing NaCl solution, the corrosion behavior of X65 pipeline steel was studied. The results showed that the steel had a varying corrosion rate, increasing at first and then decreasing with the increase of flow velocity, exhibiting a peak on the corrosion rate-flow velocity curve. This confirmed that there was a critical flow velocity for X65 in aqueous flow^[1]. At the low flow velocity range, oxygen diffusion in the liquid should be controlling the corrosion process. When the flow velocity exceeded the critical flow velocity, corrosion mechanism might change.

Keywords: steel, corrosion, flow, simulating device

Reference

- [1] De Waard, C., Lotz, U. and Dugstad, A. (2002), "Influence of liquid velocity on CO₂ corrosion: a semi-empirical model", Corrosion, No. 106125, NACE.