Erosion enhanced corrosion and corrosion enhanced erosion of API X-70 pipeline steel

M.A. Islam*, Z. Farhat
Dalhousie University, Canada

Erosion-corrosion is common in oil and gas processing plants and pipelines where there is interaction between solid particles, corrosive fluid and target material. In this study, the synergism between erosion and corrosion of API pipeline steel has been assessed under liquid-solid impingement conditions in 2g/l NaCl solution purged with CO2 as the corrosive media and aluminum oxide as the erodent. The total material loss rate and the components of erosion, corrosion and their synergistic interactions have been determined. A test setup was designed to mitigate the limitations of the in-situ method (to avoid the fluctuation in electrochemical data due to bubble formation and turbulence). The flow velocity was varied from 36 to 81 ms-1, while angle of incidence was kept constant at 90°. The experimental results show that there is an immense correlation exists between erosion and corrosion. It is observed that erosion enhances corrosion and corrosion enhances erosion with each contributing to significant synergism.

Keywords: erosion, corrosion, synergy, erosion mechanism