

Study of the Effects of Sulphide Stress Corrosion on Tensile Strength of Pipeline Steel Used in Petroleum Industry

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The phenomenon of sulfide stress corrosion (SSC) can result in catastrophic failures of pressurized equipment and piping, resulting in extensive damage, injuries and possible fatalities. Sulfide stress corrosion, a major degradation process in metals, is commonly associated with the petroleum industry where high concentrations of H₂S is involved. The term, “Sulphide Stress Corrosion”, is a customary term for aqueous corrosion in the presence of hydrogen sulfide (H₂S) at a level high enough to significantly affect the corrosion behavior and corrosion products compared with the same conditions without H₂S. Sulphide stress corrosion resistance of pipe line steel is evaluated in NACE “B” solution at room temperature. This research focuses on the corrosion mechanism and variation of tensile strength with time. A constant stress of 40 MPa that is 10% of yield stress of the API 5L Grade B steel was applied to a set of samples and they were kept at a constant H₂S environment for a predetermined time period. Thereafter, microstructural analysis was carried out for cross sections of the corroded specimens using SEM /EDS. The depth of corrosion versus exposure time and tensile strength versus exposure time graphs were plotted while monitoring corrosion propagation within the pre-determined time slots.

Keywords: *Sulphide Stress Corrosion, API 5L Steel, Tensile strength, Depth of corrosion*