

Chloride Stress Corrosion Cracking (Cl-SCC) and Where to Find It in Petrochemical Plant

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In petrochemical industries, variety of corrosion and environmental-assisted cracking damages are the main concerned issues for plant integrity and maintenance. Chloride-Stress-Corrosion-Cracking (Cl-SCC) is one of the concerned damage mechanism particularly for downstream process plant where constructed material is austenitic stainless steel and serviced under chloride-contaminated process. Typically, Cl-SCC is susceptible to occur in stressed austenitic stainless steel which serviced in aqueous environment with chloride contamination. High stress point such as heat-affected zone (HAZ) of weldment and cold-formed elliptical head are the main concerned points that contained high residual stress which induced Cl-SCC to occur there. To prevent Cl-SCC damage in the plant, among of stress reduction, environmental control and higher Cl-SCC resistance material application are the typical methods to consider. Heat treatment of cold-formed elliptical head has been proved that can decrease Cl-SCC susceptibility to the equipment. Thermal spray coating with higher resistance material and shot-peening method on austenitic stainless-steel specimens were tested and investigated in laboratory test by boiling $MgCl_2$ resulted in greatly Cl-SCC resistance enhancing to the specimens. Thermal Spray Coating with Alloys C-276 was selected to apply on oxygen analyzer probe which was found severe Cl-SCC damage on the probe after 2 months of operation in severe Cl-SCC condition of waste heat boiler. The investigated result was shown that the probe with coating can survive in the condition longer than before and no sign of leaking had been found for 1 year of operation.