

Failure investigation on rusty mesh strainer of petrochemical plant

Abstract

The wire material of filter mesh is made of 304 grade stainless steel. The failure to run properly was due to the impact of burst and torn. The client also expects that the failure was due to corrosion problems. A visual inspection on the strainer mesh was found covered by brownish rust layers and some scratches at the damaged area. The rusty wire mesh that was washed with pickling acid showed a clean and smooth surface. Energy dispersive spectroscopy (EDS) examination of the rusty wire mesh surface indicated that it was only normal oxide precipitates. Thus, it's proven that there were no signs of severe corrosion attack on the failed sample. SEM micrographs showed the unidirectional scratch effects exist in the damaged area. The fractography study was found there was a typical ductile structure on the fracture surface of the wire. It is proven that the wire mesh was actually still in good condition and has not experienced any embrittlement problems as if it exposed to any corrosive environment. The root cause of the failure is shown by the effect of scratches in which it is usually caused by a mechanical forceful push by a hard object or in other words, it is caused by human error factor.

Keywords — Corrosion, ductile, failure analysis, stainless steel, wire mesh.