

Failure analysis of conveyor chain links: A case study

Abstract

This case study is to investigate the causes of failure of chain system through characterization on the failure component. The failures that occur are relate to welding because this dipping latex industry used customized chain that have to be weld in joining with outer chain links. The analysis revealed that the weld defect such as crater leads the crack propagation and added with cyclic loading that cause the fatigue failure. The fatigue failure occurs due to this generated crack at the outer circumference of the weld within chain attachment and outer chain links plate. This type of defect also can be categories as designing-in defect. Fatigue crack propagation was evident by progressive beach marks and the scanning electron microscopy (SEM) analysis revealed the types of microstructure that resulting at heat affected zone (HAZ). Hardness testing by using Rockwell Tester found the different hardness profile at three areas that are weld metal, base metal and heat affected zone. The maximum hardness values were found at heat affected zone and weld metal. Finite element method (FEM) that is Ansys Workbench was used to review the different size of outer link plate thickness that affected to the stress distribution. It was found that stress can be minimized with increasing the plate thickness.

Keywords; Chain Links, Defect, Failure Analysis