

Study of 'Rolled in Scale' and 'Rolled in Scum' in Automotive Grade Cold-Rolled Annealed Steel Sheet

Authors : Soumendu Monia, Vaibhav Jain, Hrishikesh Jugade, Manashi Adhikary, Goutam Mukhopadhyay

Abstract : 'Rolled in scale' (RIS) and 'Rolled in Scum' (RISc) are two superficial surface defects on cold rolled and annealed steel sheets which affect the aesthetics of surface and thereby that of the end-product. Both the defects are believed to be originating from distinctly different sources having different mechanisms of formation. However, due to their similar physical appearance, RIS and RISc are generally confused with each other and hence attaining the exact root cause for elimination of the defect becomes difficult. RIS appears irregular in shape, sometimes scattered, and always oriented in rolling direction. RISc is generally oval shaped, having identifiable pointed edges and mostly oriented in rolling direction. Visually, RIS appears to be greyish in colour whereas RISc is whitish in colour. Both the defects have quite random occurrence and do not leave any imprints on the reverse-side of the sheet. In the current study, an attempt has been made to differentiate these two similar looking surface defects using various metallographic and characterization techniques. Systematic experiments have been carried out to identify possible mechanisms of formation of these defects. Detailed characterization revealed basic differences between RIS and RISc with respect to their surface morphology. To summarize, RIS was observed as a residue of an otherwise under-pickled scale patch on surface, after it has been subjected to cold rolling and annealing in a batch/continuous furnace. Whereas RISc was found to be a localized rubbing of the surface, at the time of cold rolling itself, resulting in a rough surface texture.

Keywords : annealing, rolled in scale, rolled in scum, skin panel

Conference Title : ICEFA 2019 : International Conference on Engineering Failure Analysis

Conference Location : Paris, France

Conference Dates : October 29-30, 2019