

The Relationship between Fatigue Crack Growth and Residual Stress in Rails

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Abstract : Residual stress and fatigue crack growth rates are important to determine mechanical behavior of rails. This study aims to make relationship between residual stress and fatigue crack growth values in rails. For this purpose, three R260 quality rails (0.6-0.8% C, 0.6-1.25 Mn) were chosen. Residual stress of samples was measured by cutting method that is related in railway standard. Then samples were machined for fatigue crack growth test and analyze was completed according to the ASTM E647 standard which gives information about parameters of rails for this test. Microstructure characterizations were examined by Light Optic Microscope (LOM). The results showed that residual stress change with fatigue crack growth rate. The sample has highest residual stress exhibits highest crack growth rate and pearlitic structure can be seen clearly for all samples by microstructure analyze.

Keywords : residual stress, fatigue crack growth, R260, SEM, ASTM E647

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