

Failure Analysis of a Medium Duty Vehicle Leaf Spring

Authors : Gül Çevik

Abstract : This paper summarizes the work conducted to assess the root cause of the failure of a medium commercial vehicle leaf spring failed in service. Macro- and micro-fractographic analyses by scanning electron microscope as well as material verification tests were conducted in order to understand the failure mechanisms and root cause of the failure. Findings from the fractographic analyses indicated that failure mechanism is fatigue. Crack initiation was identified to have occurred from a point on the top surface near to the front face and to the left side. Two other crack initiation points were also observed, however, these cracks did not propagate. The propagation mode of the fatigue crack revealed that the cyclic loads resulting in crack initiation and propagation were unidirectional bending. Fractographic analyses have also showed that the root cause of the fatigue crack initiation and propagation was loading the part above design stress. Material properties of the part were also verified by chemical composition analysis, microstructural analysis by optical microscopy and hardness tests.

Keywords : leaf spring, failure analysis, fatigue, fractography

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

Conference Location : Paris, France

Conference Dates : October 29-30, 2019