

Micrographic technique for linear-elastic fracture evaluation of crack initiation zone

Abstract

Post fracture analysis is an important methodology to provide enormous important physical insights to the failure mechanisms of a material. The novelty of micrographic approach or technique for linear-elastic fracture characterization of a metallic solid in particular has adopted material forensic techniques for post fracture evaluation through microscopic measurement of crack initiation zone using the Infinite Focus Microscope (IFM) and the Scanning Electron Microscope (SEM). The IFM has been utilized to analyze the surface roughness profile of the critical fractured surfaces and identify the transition crack initiation zone to develop over a small region of crack increment of about 17 microns. Alternatively, the high magnification SEM could also measure the band width or the incremental crack length at initiation to about 10 microns, in addition to the capability to reveal the microstructures of the crack; namely river patterns and the feather marks, which appear as trademarks leftover due to cleavage linear-elastic fracture. © Asian Network for Scientific Information.