

Restoration of scalable capacity in fatigue and fracture

by

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Scale shifting capability from short to long fatigue cracks is restored into fracture mechanics such that the modified ΔK would account for the crack surface tightness. The sigmoidal curve of the regular ΔK plot no longer apply. The data from the modified ΔK for short cracks may supplement the NASGRO FCGD. The danger of short/long crack growth (SLFCG) prompted FAA to introduce an added test known as LOV (Limit of Validity). Clearly, the FAA LOV has called for the tight-surface crack fracture mechanics in lieu of the free-surface fracture mechanics of the 1960s.

Biographical Sketch



Based on his earlier works in the field of fracture and continuum mechanics, Dr. Sih's recent works are concerned with mutiscaling and non-equilibrium for material in regions of nano-centimeter (10^{-7} -cm) to macro-centimeter (10^{-2} to 10^{-3} cm) and the meso zones where the system inhomogeneity comes into play. The main issue entails the space-time scale shifting from macro to the molecular scale such that chemical reactions can be treated to account for corrosion effects, in addition to effects of specimen size, time and temperature. High temperature creep and fatigue are cases in point.