

Article Abstract

Title:	Thermo-mechanical fatigue behaviour and life prediction of C-1023 nickel based superalloy
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Journal:	<i>International Journal of Engineering, Science and Technology</i> , Vol. 3, No. 6, 2011, pp. 88-101.
Abstract:	Nickel based superalloys are used for manufacturing turbine blades and vanes components due to their ability to withstand high stress levels at high temperatures. The complex thermo-mechanical fatigue loadings that those components suffer (as a result of start ups and shutdowns) make life assessment a complex task. Working towards this end, the thermo-mechanical fatigue behaviour and life prediction of C-1023 nickel based superalloy was studied in this work. Several tests were conducted at different phase-shifts between mechanical and thermal cycles. It was found out that in-phase tests (where peak temperature coincides with maximum mechanical strain) were prone to intergranular fracture due to creep contribution. On the other hand, out of phase tests showed clear transgranular paths ascribed to fatigue damage. Finally, some simple damage parameters were found to be suitable tools for life prediction.
Keywords:	C-1023 superalloy, damage mechanisms, life prediction, thermo-mechanical fatigue.