

# PROBABILISTIC MODELING OF FATIGUE CRACK GROWTH IN Ti-6Al-4V

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## ABSTRACT

This paper presents the results of a combined experimental and analytical study of the probabilistic nature of fatigue crack growth in Ti-6Al-4V. A simple experimental fracture mechanics is presented for obtaining statistical fatigue crack growth parameters from one or two fatigue tests. The experimental studies of long fatigue crack growth show that the variabilities in the long fatigue crack growth rate and the Paris coefficient are well described by the log-normal distribution. The variabilities in the Paris exponent are also shown to be well characterized by a Weibull distribution. The measured statistical distributions are incorporated into a probabilistic fracture mechanics framework for the estimation of material reliability. The implications of the results are also discussed for the probabilistic analysis of fatigue crack growth in engineering components and structures.