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Chapter 4 – Fatigue Crack Initiation and Propagation

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Abstract

The resistance of metal alloys to fatigue can be classified into four major regimes: low-cycle fatigue (or short life), limited resistance (between $10^5$ and $10^6$ cycles), high-cycle fatigue (between $10^6$ and $10^7$ cycles) and gigacycle (more than $10^7$ cycles). This chapter introduces the basic concepts of cyclic mechanical behavior, crack initiation and propagation in these different regimes.

Keywords

Crack path; Fatigue Crack Initiation; Fatigue crack propagation; Gigacycle fatigue; High-cycle fatigue tests; Interaction between modes; Mixed-mode fatigue crack growth; Multiaxial fatigue; Plastic or low-cycle fatigue tests