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用再结晶法研究超载对疲劳裂纹扩展的效应

杨秉宪

北京航空学院

A STUDY ON EFFECT OF AN OVERLOAD ON FATIGUE CRACK GROWTH WITH RECRYSTALLIZATION TECHNIQUE

Yang Bingxian

Beijing Institute of Aeronautics and Astronautics

摘要

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**摘要** 本文用再结晶法测定了等幅循环载荷中施加超载后在裂纹尖端发生的高应变区内塑性应变,求得了此区域的各参数与J积分、裂纹尖端张开位移CTOD及超载对疲劳裂纹扩展的延缓效应。实验结果表明,用再结晶法研究超载对裂纹扩展的延缓效应是一种很有效的方法。

**关键词:**

**Abstract:** In order to study the mechanism of overload retardation effect, it is necessary to know the stress and strain distribution in the intense strain region at the crack tip under elasticplastic conditions. It has been proposed that at the crack tip exists a process zone in which the micro-fracture process takes place. However, the experimental verification has not appeared. By using the recrystallization technique, the large plastic strain in the intense strain region at the crack tip has been measured for compact tension specimens when an overload was applied to them under constant amplitude cycling loads. The parameters in this region and the J-integral has been determined, and the retardation effect of the crack tip opening displacement (CTOD) and the overload on the fatigue crack growth has been found. The experiment results show that the recrystallization technique is a very useful method for evaluating the retardation effect of an overload on crack growth.

**Keywords:**

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