

英国谢菲尔德大学机械工程系系主任Eann A. Patterson教授学术报告会(9月24日星期五9:00)

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发布人: [马元生](#) 发表日期: 2004-9-21 点击次数: 7296

英国谢菲尔德大学机械工程系系主任Eann A. Patterson教授学术报告会

题目: QUANTITATIVE MONITORING OF A FATIGUE CRACK USING DIFFERENTIAL THERMOGRAPHY

报告人: 英国谢菲尔德大学机械工程系系主任Eann A. Patterson教授

时间: 2004年9月24日上午9:00-10:30

地点: 力学所主楼312会议室

欢迎参加!

摘要:

QUANTITATIVE MONITORING OF A FATIGUE CRACK USING DIFFERENTIAL THERMOGRAPHY

Eann A. Patterson and John R. Yates

A novel approach for the calculation of the SIF range from thermoelastic images corresponding to fatigue cracks will be presented. The new approach is based on the Multi-Point Over-Deterministic (MPOD) method developed by Sanford and Dally. From a thermoelastic image, a set data points from the region surrounding the crack tip are collected. Subsequently, a mathematical expression describing the crack tip stress field based on Muskhelishvili's complex potentials in series form is fitted to thermoelastic data. As a result of the fitting process, the SIF range can be inferred. Additionally, the proposed method makes it also possible to include the crack tip location during the fitting process, making potentially feasible to monitor the fatigue crack path from the thermoelastic images. In order to assess the previous methodology, as A set of fatigue tests have been conducted using steel Single Edge Notched (SEN) specimens to validate the new methodology. Results show the ability of the technique to accurately predict the SIF range and locate the crack tip.

另, Eann A. Patterson 教授和 John R. Yates 教授9月22日和23日分别访问北京航空材料研究院和清华大学力学系, 并分别做学术报告。欢迎前往听讲。摘要如下。

Wednesday 22 September 2004 at Beijing Institute of Aeronautical Materials

APPLICATIONS OF PROJECTION MOIRE FOR NON-DESTRUCTIVE EVALUATION

Eann Patterson

Recent research on the use of moiré as an integral part of a non-destructive evaluation programme for the life-cycle of aerospace components will be presented. An introduction to geometric moiré for determining location and shape data will be included and its application to both aero-engine and airframe aerospace components will be illustrated.

Thursday 23rd September 2004 at Tsinghua University

USING WAVELETS TO FIND FATIGUE DAMAGING EVENTS

John R. Yates

A technique has been developed to identify the important features in fatigue road load data that cause the majority of the total damage. Fatigue damaging events, called bumps, are extracted from the original road load time history using a wavelet-based algorithm, called Wavelet Bump Extraction (WBE). WBE can be used to produce a mission signal that retains most of the fatigue damage whilst preserving the cycle sequences.

