## BSSM Workshop: The Measurement of Residual Stress using Diffraction Methods

Organisers: Judith Shackleton and João Fonseca, University of Manchester



# Meeting information

Date: 14th February 2007

Time: 10am to 4pm

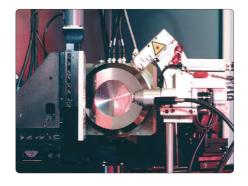
Venue: Materials Science Centre,

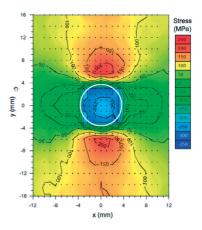
**University of Manchester** 

Residual stress is one of the most common causes of catastrophic and unexpected failures in engineering components.

Today, engineers are developing tools and strategies for managing detrimental residual stresses and for introducing beneficial ones across component scales ranging from those experienced in microelectronics through to aeroengine assemblies.

This workshop is aimed at anyone who would like to know more about measuring residual stress using diffraction techniques. It is suitable for beginners, as well as those with experience. The workshop aims to cover all diffraction methods, neutron, synchrotron and X-ray. Consequently, it is also of interest to those who already have experience in one field and would like to extend their knowledge into others. The workshop will cover sample preparation as well as layer removal by electro polishing. There will be an opportunity to make a measurement using Manchester's "state of the art" stress diffractometer.





This workshop will be run by Joâo Fonscea, Judith Shackleton and Jo Kelleher who are all members of The Residual Stress & Damage Characterisation Unit' at Manchester which is a centre of expertise for diffraction methods.

## **Programme**

- 1. Introduction to the School of Materials
- 2. Basic Crystallography & Diffraction

(Judith Shackleton, Materials Science Centre, School of Materials, University of Manchester)

- 3. Methods Using Laboratory X-rays, Specifically the Sin<sup>2</sup>psi Method (Judith Shackleton)
  - Applications
  - Strengths
  - Limitations
  - Instrumentation
  - Practical applications
  - Data processing
  - Hints, tips, tricks of the trade

### 4. Neutron & Synchrotron Methods

(Dr João Fonseca, Materials Science Centre, School of Materials, University of Manchester)

- Applications & advantages
- Differences from the laboratory based X-ray methods
- Main facilities

## 5. X-ray Elastic Constants

(Dr Jo Kelleher, Materials Science Centre, School of Materials, University of Manchester)

- Good sources of elastic constants
- Determining your own
- **6. Sample Preparation, Considerations and Electro-Polishing** (Dr Jo Kelleher)
  - Methods
  - Recipes
  - How to get good results
- 7. National Physical Laboratory, Good Practice Guide & the Residual Stress Working Group

(Tony Fry, NPL)

8. Practical Demonstrations and a Chance to Have a Go

### Co-sponsors:

British Crystallographic Association, Engineering Integrity Society, Institute of Physics (Stress and Vibration Group) and National Physical Laboratory,









# **Booking information** (attendance limited to 20)

Please complete, photocopy and return to:

Biana Gale, British Society for Strain Measurement, 7 Tythe Close, Flitwick, Beds, MK45 1LE

Telephone/Fax: 01525 712779 E-mail: bianagale@bssm.org

Name:	
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Fees	
Non-members £160	o-sponsor members) £60 + VAT
Please make chequ	que, credit/debit card (not AMEX) or invoice es payable to British Society for Strain Measurement; voice please quote a purchase order reference number.
Please invoice	Purchase order reference:
Card No:	
Start date:/_	Expiry date:     /     Issue No. (Switch/Maedtro only):
Security code (last three	ee digits on back of card):

## Venue details

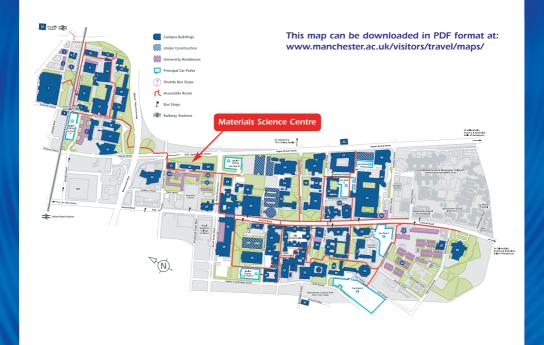
Workshop to be held at The Materials Science Centre, University of Manchester, Grosvenor Street, MANCHESTER, M1 7HS.

Tel. +44 (0) 161 306 3581 Fax. +44 (0) 161 306 3586

Organisers Judith Shackleton & João Fonseca



The University of Manchester



British Society for Strain Measurement. Tel: 0845 166 8382 email: info@bssm.org

