

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

Wednesday 10 March 2010, Time: 10am to 4pm

Room B4, Materials Science Centre, School of Materials,  
University of Manchester

**Organiser: Judith Shackleton,  
University of Manchester**

## Meeting Information

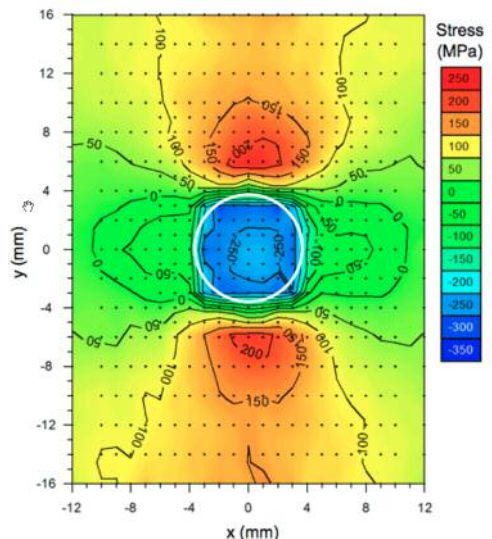
**Residual stress is one of the most common causes of catastrophic and unexpected failures in engineering components. Today, engineers are developing tools and strategies for managing detrimental residual stresses and for introducing beneficial ones across component scales ranging from microelectronics through to aero-engine 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 more experienced practitioners. The workshop aims to cover all diffraction methods, neutron, synchrotron and laboratory X-ray. Consequently it will also be of interest to those who already have experience in one field and would like to extend their knowledge into others. We will also cover sample preparation techniques as well as layer removal by electro polishing.

There will be an opportunity to make a measurement using two of Manchester's "state of the art" stress diffractometers. You can bring a sample if you wish; please let us know in advance.

This workshop will be run by Judith Shackleton, Dr Michael Preuss and Dr Jo Kelleher who are members of 'The Residual Stress and Damage Characterisation Unit' at The University of Manchester, School of Materials which is a centre of expertise for diffraction and many other 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 $\text{Sin}^2\psi$ Method

(Judith Shackleton)

- Applications
- Strengths
- Limitations
- Instrumentation
- Practical applications
- Data processing
- Hints, tips, tricks of the trade

## 4. Sample Preparation, Considerations and Electro-Polishing

(Dr Iain Brough, Materials Science Centre, School of Materials, University of Manchester)

- Methods
- Recipes
- How to get good results

## 5. 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

## 6. National Physical Laboratory, Good Practice Guide & the Residual Stress Working Group

(Mr Tony Fry, National Physical Laboratory)

## 7. Practical Demonstrations and a Chance to Have a Go

## Co-sponsors:

British Crystallographic Association, Bruker AXS Ltd., Engineering Integrity Society, Institute of Physics (Stress and Vibration Group), National Physical Laboratory, PANalytical, Proto Manufacturing and VEQTER Ltd.



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**IOP** | Institute of Physics  
Applied Mechanics Group



PANalytical



## Booking information (attendance limited to 10)

Please complete, photocopy and return to:

John Edwards, British Society for Strain Measurement, 22 St Georges Road, Bedford, MK40 2LS

Telephone/Fax: 01234 347778

E-mail: [johnedwards@bssm.org](mailto:johnedwards@bssm.org)

Name: \_\_\_\_\_

Institution: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Postcode: \_\_\_\_\_

Tel: \_\_\_\_\_

e-mail: \_\_\_\_\_

### Fees (VAT is not applicable)

BSSM and co-sponsor members £157.50 ☐

Non-members £206 ☐

Student (BSSM or co-sponsor members) £79 ☐

Student (non-members) £103 ☐

### Payment by cheque, credit/debit card (not AMEX) or invoice

Please make cheques payable to British Society for Strain Measurement;  
for payments by invoice please quote a purchase order reference number.

Please invoice  Purchase order reference:

Card No:

Start date:  /  Expiry date:  /  Issue No. (Switch/Maestro only):

Security code (last three digits on back of card):

## Venue Information

Workshop to be held at

Room B4  
The Materials Science Centre,  
University of Manchester,  
Grosvenor Street,  
MANCHESTER,  
M1 7HS.

Tel. +44 (0) 161 306 3581

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Organiser Judith Shackleton  
Judith.shackleton@manchester.ac.uk

Directions to the Materials Science Centre can be downloaded at  
<http://www.materials.manchester.ac.uk/aboutus/maps/index.html#materials>

