

# **Stress Analysis and Load Measurement using Resistance Strain Gauges**

The Stress Analysis and Load Measurement course provides instruction on the siting of strain gauges and the choice of gauge systems; it covers strain measurement, the correction of measured data, the determination of stress and yield load, the use of full-bridge circuits, the principal features of common load cells and the refinement of the bridge circuit. The course uses lectures and hands-on experience to provide participants with a deeper understanding of strain measurement, in order to improve the accuracy of data they use in the determination of stress levels and critical loads in structural components, and to appreciate design features incorporated in devices used to measure load. Previous experience with strain gauges is essential.

## **Day 1**

- 09.00 Registration and introduction.  
Strain and strain measurement methods.  
Quarter-bridge circuits: introduction and practice.
- 12.15 Lunch
- 13.00 Long-leadwire circuits: introduction and practice.  
Quarter-bridge calibration: introduction and practice.  
Correction of measured strains.  
Strain variation with position and orientation.  
Shear strain and principal strains.
- 16.45 End of Day 1

## **Day 2**

- 09.00 Shear stress and normal stress from measured strain.  
Yielding of components. Residual strain and stress.  
Practical determination of stress and yield load.
- 12.15 Lunch
- 13.00 Full-bridge circuits: introduction and practice.
- 16.45 End of Day 2

## **Day 3**

- 09.00 Circuit design for load measurement using a structural component.  
Bridge balancing and sensitivity adjustment.  
Elimination of temperature-induced changes.
- 12.15 Lunch
- 13.00 Practical force measurement systems.  
Load cell bodies.  
Gauges, resistors, adhesives and protection for load cells.
- 16.30 End of course.

**Course Venue**

School of Technology, Wheatley Campus, Oxford Brookes University

**Course Lecturers**

The course will be run by experienced lecturers from Vishay Measurements Group UK and Oxford Brookes University.

**Group Size**

Hands-on sessions form an important element of the course. It is therefore necessary to restrict the group size to about 10.

**Course Fee**

Inclusive of 'Resistance Strain Gauge Load Cells', course materials, lunches and coffee/tea £895 + vat

**Overnight Accommodation**

Details of local hotels are available on request.

**Certification**

The measurement of strain through the medium of a strain gauge depends for its success on a proper and acceptable installation of the strain gauge itself. For structural testing, design evaluation and sensor operation the installation of strain gauges is a skilled operation which requires considerable practical ability and know-how on the part of the installer. A poorly positioned or inadequate installation, resulting in erroneous measurements being taken, could turn out ultimately to have disastrous consequences.

The provisions of modern day consumer protection legislation and the requirements of various safety regulations make it necessary for critical measurements on components and structures to be carried out to an approved standard by competent persons who are qualified in the best techniques available.

To demonstrate your competence as a strain gauge user you should hold a BSSM Certificate. The certification scheme operates at three levels and complies with the European Standard EN473:1993. The levels cater for staff with a wide range of competencies and responsibilities, from strain gauge installation to analysis and design.