Strain Analysis using Resistance Strain Gauges

The Strain Analysis course provides an introduction to electrical resistance strain gauges and the associated circuits for strain measurement and transducer applications. It covers the installation of foil gauges using cyanoacrylate and epoxy adhesives, inspection of installations, the measurement of strain and load, and the use of rosettes to determine principal values. The course uses lectures, demonstrations and practical tasks to provide participants with a good understanding of electrical resistance strain gauges, the selection and use of gauges and circuits for strain measurement and transducer applications, the positioning of gauges, and the methods used to install and test gauges and circuits. Some previous strain gauge experience is desirable.

Day 1

09.00 Registration and introduction.
Linear strain. Variation of strain with position. Displacement gauges and strain gauges.
Bridge circuits for strain gauges used for strain measurement and transducers.
12.15 Lunch
13.00 Circuit practice.
Long-leadwire circuits: introduction and practice.
Quarter-bridge calibration introduction.
16.45 End of Day 1

Day 2

09.00 Quarter-bridge calibration practice.
Foil strain gauge details.
Surface preparation procedure. Gauge bonding procedure for cyanoacrylate adhesive.

12.15 Lunch
13.00 Bonding practice using cyanoacrylate adhesive. Visual inspection. Documentation.
Gauge bonding procedures for epoxy adhesives.
Bonding practice using cold-curing epoxy adhesive.
16.45 End of Day 2

Day 3

09.00 Quarter-bridge wiring introduction.
Wiring practice with open-faced and encapsulated gauges.
12.15 Lunch
13.00 Full-bridge wiring: introduction and practice.
Visual inspection. Resistance and out-of-balance measurements. Documentation.
Protection: introduction and practice
16.45 End of Day 3

Day 4

09.00 Strain limit of gauge installations: introduction and practice.
Calibration of the full-bridge installed on Day 3.
Variation of strain with angular orientation. Principal strains from rosette measurements.
Correction of measured strains
12.15 Lunch

13.00 Stress. Young's modulus. Calculation of stress from measured strains. Multipoint strain measurement near a discontinuity. Maximum strain and stress.
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 12.

Course Fee
Inclusive of Code of Practice, Reference Book, course materials, lunches and refreshments.
£975

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.

All enquiries to:
John Edwards
BSSM
22 St Georges Road
Bedford
MK40 2LS

Tel/Fax: 01234 347778
Email: johnedwards@bssm.org