

Acoustic Emission Testing Course

Level III - Outline

- I. Basic Principles of AE – Review
 - a. AE Sources
 - b. AE Events characteristics
 - c. Stress wave characteristics
 - d. Source location
 - e. Load dependency
 - i. Kaiser and felicity effect
 - ii. Felicity ratio
 - f. Strength of materials and fracture mechanics
 - g. Review of and comparison with other NDT Methods

- II. Measuring and Recording AE
 - a. AE system components
 - i. System configurations
 - ii. Hardware
 - iii. Pre-amplifiers
 - iv. Analog and digital components
 - b. AE sensing
 - i. Piezoelectric transducers
 - ii. Transducer designs
 - iii. Design parameters
 - iv. Sensitivity
 - v. Couplant
 - vi. Transducer selection
 - vii. Transducer calibration
 - viii. Transducer attachment
 - ix. Cables
 - c. System set up
 - i. Hardware set up
 - ii. Software set up
 - iii. System calibration
 - iv. Trial run
 - v. Actual test

- III. Lab work (Sensor attachment, Simulated AE, Data acquisition, Source Location)

- IV. Applicable codes, procedures and standards

- V. AE Testing Procedure development
 - a. Designing a successful test
 - b. Preparation
 - c. Procedures
 - d. Stimulation
 - e. Data considerations
 - f. Load schedules
 - i. Initiation load

- ii. Maximum load
 - iii. Loading rates
 - iv. Holds
 - v. Excursions
 - g. Handling noise
 - i. Pre-test elimination
 - ii. In-test discrimination
 - iii. Post-test interpretation
- VI. Applications of AE Monitoring
 - a. Laboratory studies
 - b. Structural applications
 - i. Pressure vessels and piping
 - ii. Tube trailer recertification
 - iii. Fiber reinforced pressure vessels
 - iv. Aerial lift devices for personnel
 - v. Fracture critical members on bridges
 - vi. System and process monitoring
- VII. Lab work (Complete testing procedure demonstrations)
- VIII. Reporting