



INTEGRITY

Vibration Analysis

Category 2 Course

Vibration Analysis Category 2

This is a five-day course that extends the knowledge gained in the Cat 1 course. The theory behind vibrations, their characteristics and how these characteristics are used to analyse problems in equipment will be extended to cover phase. It will then move on to cover the types of instruments and transducers that are available, leading into a detailed explanation of the signal processing used to transform the analogue to the digital signal and then into the spectrum will follow. The course will then continue with further equipment knowledge, leading into outlining a systematic approach to vibration analysis and how to analyse vibration spectra for some common machinery problems. The application of acceptance test procedures and producing reports will round off the course.

There will be continuous assessment through the course with an optional certification exam leading to ISO 18436 certification through BINDT PCN scheme. The cost of the exam is initially included in the fee.

This course is intended for those with around 12 - 18 month's experience of data collection and who wish to extend their analysis techniques and knowledge. Previous attendance at VA Cat 1 is recommended. The course material is generic and applies to all vendors' equipment. As there will be calculations involved, a scientific calculator should be brought to the course. The detailed agenda is as follows:

Introduction to course

Maintenance Theories and Strategies

- Breakdown, Preventive, Predictive & Proactive Strategies
- Overview of alternative technologies including infrared thermography; lubricant analysis; ultrasound and MCSA

What is Vibration?

- Vibration amplitude response, spring mass & simple time waveform concept
- Effects of vibratory forces on the equipment

Vibration Characteristics

- Frequency - Frequency from the time waveform; Time domain to frequency domain- Complex vibrations; FFT Process
- Overall vibration and its limitations
- Amplitude -The three parameters of Displacement, Velocity & Acceleration
- General useful frequency ranges; Relationship between the three parameters

- Peak; Peak – Peak & RMS explained
- Explanation of phase, collecting phase data and interpreting the results
- Resonance & natural frequencies

Vibration Instrumentation

- Overall level meters; FFT Analysers; Real Time Analysers; Surveillance & Protection systems

Vibration Transducers

- Accelerometers; Velocity Transducers; Eddy Current Probes; Shaft Contact Probes

Signal Processing

- Input (integration & calibration); Anti-Alias Filter; A to D conversion; Window functions; FFT application; Averaging (including different types)
- Dynamic range
- Importance of resolution & accuracy; Effects on data collection time
- Effects of overlapping on data collection
- Stationary & non-stationary data

Application of international standards

Alarm methods & levels for assessing severity

Equipment knowledge

Systematic approach to Vibration Analysis

Diagnosing operating condition through vibration signature analysis

- Unbalance
- Misalignment
- Mechanical Looseness

- Belt Drives
- Eccentricity
- Resonance
- Rolling element bearing defects
- Gear defects
- Pump & fan problems
- Electric motor defects

Acceptance testing – access and safety

Certification Exam

- ISO 18346-2 Category 2
- Certified by British Institute of NDT

TRAVEL BY RAIL

The rail stations serving Monks Ferry have excellent services with lines running to West Kirby, New Brighton, Ellesmere Port, Chester and Liverpool. All three stations are within a 15 minute walk. Hamilton Square station, reached by a mainly off-road route across the southern edge of Hamilton Square, is just 8 minutes away. Why not make your journey multi-modal using your cycle and the train? Merseyrail is considered to be one of the most cycle friendly operators in the country

DESTINATION	PEAK TIME FREQUENCY
New Brighton	Every 15 minutes
Chester	Every 30 minutes
West Kirby	Every 15 minutes
Liverpool	Every 10 minutes

TRAVEL BY BUS

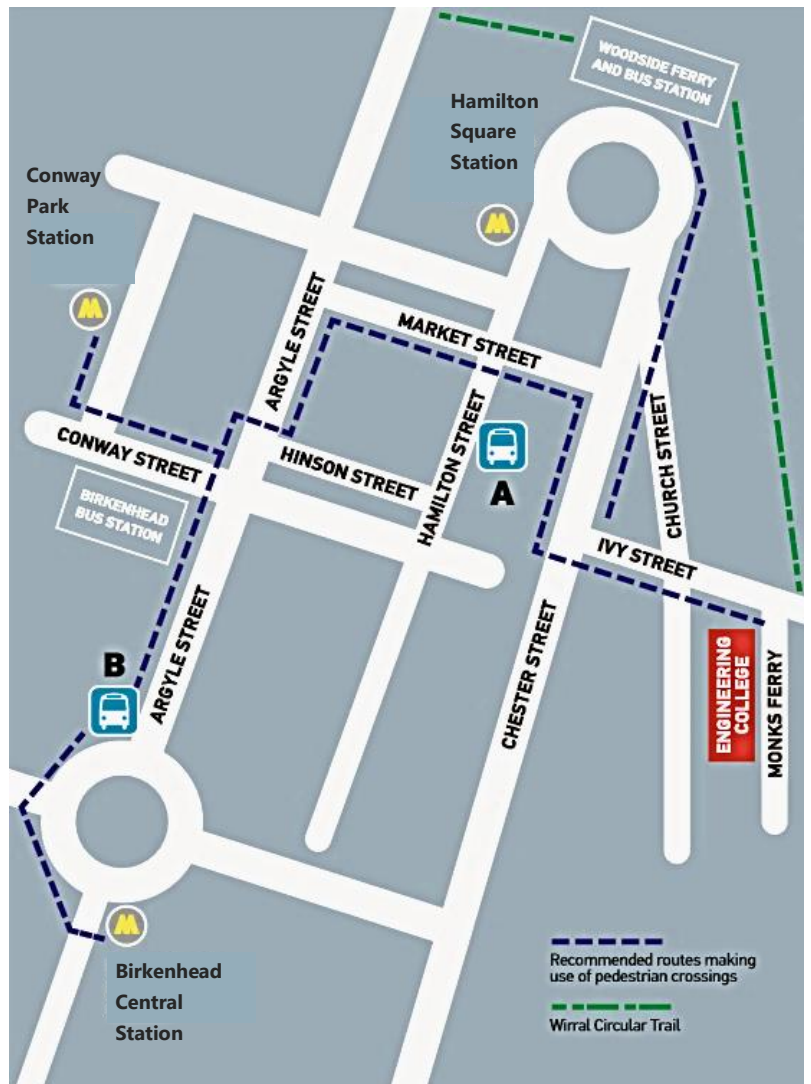
SERVICE	ROUTE	BUS STOPS	FREQUENCY
1,2	Liverpool - Chester Chester - Liverpool	A B	Every 10 mins Every 10 mins
407	Liverpool - Moreton Moreton - Liverpool	A B	Every 20 mins Every 20 mins
437	Liverpool - West Kirby West Kirby - Liverpool	A B	Every 10 mins Every 10 mins
464	Liverpool - New Ferry New Ferry - Liverpool	A B	Every 30 mins Every 30 mins
471, 472	Liverpool - Heswall Heswall - Liverpool	A B	Every 20 mins Every 20 mins
487	Liverpool - Neston Neston - Liverpool	A B	Every 30 mins Every 30 mins

NB. These routes drop off at either stop B or Birkenhead Bus Station on their way to Liverpool. There are a further 20 services covering most of Wirral available from Woodside Bus Station, which is an 8 minute walk away and Birkenhead's main Bus Station on Conway Street is only 12 minutes away.

TRAVEL BY CAR

From North / Liverpool: Travel west through the Birkenhead tunnel (toll charge on exit), looping sharply back to the left immediately upon exiting the tunnel (do not exit via toll booths straight ahead). Proceed through exit signposted Hamilton Square, the follow directions as for 3 and 4 below.

From South: From M53, exit junction 5 and follow A41, signposted Cammell Laird, for 4/5 miles. Pass Cammell Laird Shipyard on the right and McDonalds on the left, as you approach Birkenhead Tunnel. Move into middle lane as you pass McDonalds. Turn right at the traffic lights, crossing oncoming traffic and into Ivy Street. Head towards the river about 200 metres Cross Church Road and proceed down the hill. Follow the road around to the right into Monks Ferry Business Park. The Engineering College is located in the long white building on the right hand side. Free Car parking is available in the main visitors' car park immediately adjacent.



TRAVEL BY FOOT

LOCATION	WALKING TIME/ DISTANCE
Hamilton Square Woodside	8 minutes/0.4 miles
Conway Park Station	14 minutes/0.7 miles
Birkenhead Bus Station	12 minutes/0.6 miles
Birkenhead Central Station	14 minutes/0.7 miles

KEEP IN TOUCH

Don't forget to keep in touch via our website, telephone, and social media!
 Website www.theengineeringcollege.co.uk
 Telephone 0151 666 1028
 Facebook @theengineeringcollege
 Twitter @theengcoll
 Instagram @theengineeringcollege

COURSE APPLICATION FORM

Please complete the form in BLOCK CAPITALS

1. Surname or Family Name:

2. First Name or Given Name(s):

3. Title (Ms, Mrs, Mr etc.):

4. Address for correspondence:

5. Telephone Number (Day-time):

Contact Number In Case of Emergency:

6. Email:

7. Date Of Birth:

8. Training Course for which you are applying:

9. Do you have any food allergies?:

10. It would be very helpful to us if you could indicate how you heard about the course/module for which you are applying:

Newspaper or Magazine (If so, which one?)	<input type="checkbox"/>
Course brochure emailed to me	<input type="checkbox"/>
Course brochure given to be my an acquaintance	<input type="checkbox"/>
Recommended by a friend	<input type="checkbox"/>
Website	<input type="checkbox"/>
Other (please specify:)	<input type="checkbox"/>

11. Please sign and date:

Signed:	Date:
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When completed, this form should be returned to:

Office Manager
 PSW Integrity Ltd
 1a Hamilton Street
 Birkenhead
 Wirral
 CH41 6DJ

Notes:

- Any applicants with any disability or medical condition may wish to draw this to the attention of the Office Manager or Trainer. Such information will be treated in confidence and is only requested in order that PSW may offer advice on what facilities are available for learners with disabilities or special medical conditions.
- Much of the information of a personal nature, which is requested, on this form is required for administrative or statistical purposes. It should be noted that this information will be held and processed electronically and will be covered by the provisions of the Data Protection Act.
- Should you require accomodation whilst attending this course please contact the Office Manager who can arrange this for you should you require.

LOCAL HOTEL LIST

Leasowe Castle Hotel

Leasowe Road

Moreton

Wirral

CH46 3RF

Tel: 0151 606 9191

Email: reservations@leasowecastle.com

The Village Hotel Bromborough

Pool Lane

Bromborough

Wirral

CH62 4UE

Tel: 0151 556 4595

Email: reservations@village-hotels.com

Mercure Woodhey House Hotel

Berwick Road West

Welsh Road

Little Sutton

CH66 4PS

Tel: 0151 339 5121

Email: reservations@woodheyhouse-hotel-chester.com

The Grove House Hotel

Grove Road

Wirral

CH45 3HF

Tel: 0151 639 3947

Email: reception@thegrovehouse.co.uk