

Develop the necessary knowledge, skills and confidence to identify, assess and rectify many basic pipework vibration problems

VibTech Ltd provides practical on-site training based upon the good practice guidelines in the Energy Institute publication:

'Guidelines for the Avoidance of Vibration Induced Fatigue Failure in Process Pipework' 2nd edition 2008

Supplemented by over 30 years' professional experience in on-site measurement, assessment and pipework problem solving.



Choice of 5 Practical Courses:

- VT-1a - 1-Day Basic Awareness Courses
- VT-2a - 2-Day Level 1 'Analyst' Course
- VT-2b - 2-Day Level 1 'Practitioner' Course
- VT-3a - 3-Day Level 2 Intermediate Course
- VT-4a - 4-Day Level 3 Advanced Course

Most training courses are performed on customer's own sites (onshore only) and include hands-on practical sessions such as visual inspection and basic vibration measurements on customer's own pipework, looking at real examples.

Course Leader



Neil Parkinson BSc CEng FIMechE has over 30 years' experience in structural integrity monitoring, including pipework vibration assessments and problem solving.

Neil was Technical Director of AVT Reliability Ltd from 1993 to 2019, establishing AVT Reliability's pipework vibration services, including a range of vibration solutions.

Neil founded VibTech Ltd in 2012 to focus on pipework vibration training.

"Our primary aim is to help customers to dramatically reduce the risk of pipework vibration related incidents both onshore and offshore."

Who should attend?

Managers, Engineers, Supervisors, Technicians and Operators involved in:

- | | | |
|---------------------|----------------------------------|---------------------|
| ■ Asset integrity | ■ Piping Design /Stress Analysis | ■ Plant Improvement |
| ■ Plant Maintenance | ■ Process Engineering | ■ Plant Safety |
| ■ Reliability | ■ Mechanical inspection | ■ COMAH compliance |

What must the company provide?

- A suitable training room with screen and projector.
- Lunch and all refreshments per day.
- Safe access to on-site pipework for practical training sessions (VT-2b, VT-3a & VT-4a only).
- Suitable PPE for all delegates for practical sessions.
- Work permits for use of non ATEX certified instrumentation for any on-site practical sessions

Testimonials

See website: <https://www.vibtech.co.uk>

Course Booking:

Contact: Neil Parkinson

neilparkinson@vibtech.co.uk

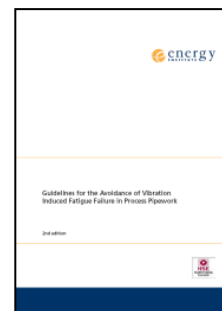
+44 (0)7305 986991

VT-1a 1-Day Basic Awareness Courses

Primary objectives of 1-Day course:

A good basic awareness of pipework vibration and the risks posed by vibration induced fatigue, a knowledge of the role of the Energy Institute guidelines and a knowledge of good and bad practice and common remedial solutions.

Emphasis is placed on raising awareness of the subject and only the essential theory is covered. This course does not include on-site practical sessions.



Timing:

1 day: typically 09:00 to 16:30

Venue:

Training Room

Course Content:

- Main Causes and Consequences of Pipework Vibration.
- Basic Assessment Methodology
- Visual Inspection
- Basic Vibration Measurement and Analysis
- Main Line & Small-Bore Corrective Actions

5 Key learning outcomes:

1. Gain an awareness of Pipework Vibration, including the main causes and consequences of pipework vibration.
2. Gain the necessary skills and confidence to be able to perform an initial visual assessment of pipework to be able to identify and prioritise potential areas of concern.
3. Gain familiarity with portable vibration measurement instrumentation and how to perform basic vibration measurements.
4. Gain an understanding of how to deal with common vibration problems.
5. Learn what constitutes 'good and bad practice' for avoidance of vibration induced fatigue.

How will delegates be assessed?

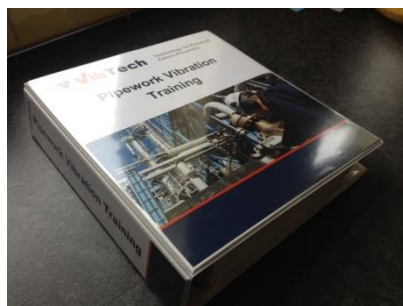
At the end of each training module, all delegates will be required to complete a multiple-choice test to ensure satisfactory level of understanding of each topic.

There are no formal pass/fail criteria.

What will you receive?

All delegates will receive electronic PDF versions of Course notes (Option for professionally printed course notes in a quality lever-arch folder.)

In addition, each delegate will be sent a personal course attendance certificate.



VT-2a 2-Day 'Analyst' Course

Primary objectives of 2-Day 'Analyst' course:

An introduction to pipework vibration and the risks posed by vibration induced fatigue, a knowledge of the role of the Energy Institute guidelines and a knowledge of good and bad practice and common remedial solutions. Includes knowledge of basic visual inspection and basic pipework vibration surveys and assessment techniques and a knowledge of common remedial solutions and other specialist techniques, including strain gauges.

Emphasis is placed on the **theoretical** aspects of the subject and covers methods for the calculation of likelihood of failure (LOF) for Main lines, Small Bore Connections (SBCs) and Thermowells. This course does not include on-site practical sessions.

Timing:

2 days: Typically 09:00 to 16:30

Venue:

Training Room

Course Content:

- Basic Vibration
- Main Causes and Consequences of Vibration.
- Basic Assessment Methodology
- Likelihood of Failure Calculation Methods
- Visual Inspection
- Strain Gauging and Fatigue Analysis
- Basic Vibration Measurement and Analysis
- Specialist Techniques
- Main Line & Small-Bore Corrective Actions
- Good Design Practice Summary.

7 Key learning outcomes:

1. Gain an understanding of Pipework Vibration, including the main causes and consequences of pipework vibration.
2. Learn about theoretical methods for calculating 'Likelihood of Failure' (LOF) for Main Lines, Small Bore Connections (SBCs) and Thermowells.
3. Gain the necessary skills to be able to perform an initial visual assessment of pipework to be able to identify and prioritise potential areas of concern.
4. Gain an understanding of basic vibration measurements and vibration assessments against Energy Institute limits
5. Gain an understanding of other 'specialist techniques and when these should be used.
6. Gain an understanding of how to deal with common vibration problems.
7. Learn what constitutes 'good practice' for avoidance of vibration induced fatigue.

How will delegates be assessed?

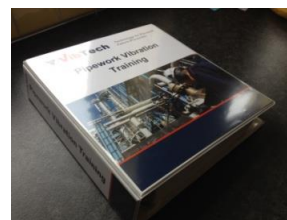
At the end of each training module, all delegates will be required to complete a multiple-choice test to ensure satisfactory level of understanding of each topic.

There are no formal pass/fail criteria.

What will you receive?

All delegates will receive electronic PDF versions of Course notes (Option for professionally printed course notes in a quality lever-arch folder.)

In addition, each delegate will be sent a personal course attendance certificate.



VT-2b 2-Day 'Practitioner' Course

Primary objectives of 2-Day 'Practitioner' course:

An introduction to pipework vibration and the risks posed by vibration induced fatigue, a knowledge of the role of the Energy Institute guidelines and a knowledge of good and bad practice and common remedial solutions. Includes a good knowledge of visual inspection and pipework vibration surveys and assessment techniques and a knowledge of common remedial solutions and other specialist techniques, including strain gauges.

Emphasis is placed on the **practical** aspects of the subject and only the essential theory is covered. The course covers essential data assessment methods.

Timing:

2 days: Typically 09:00 to 16:30

Venue:

Training Room + Site for practical activities

Course Content:

- Basic Vibration
- Main Causes and Consequences of Vibration.
- Basic Assessment Methodology
- Likelihood of Failure Calculation Methods
- Visual Inspection
- Strain Gauging and Fatigue Analysis
- Basic Vibration Measurement and Analysis
- Specialist Techniques
- Main Line & Small-Bore Corrective Actions
- Good Design Practice Summary.

7 Key learning outcomes:

1. Gain an understanding of Pipework Vibration, including the main causes and consequences of pipework vibration.
2. Learn about theoretical methods for Main Line Qualitative assessment plus calculating 'Likelihood of Failure' (LOF) for Types 1 & 2 Small Bore Connections (SBCs).
3. Gain the necessary skills and confidence to be able to perform an initial visual assessment of pipework to be able to identify and prioritise potential areas of concern - **supported by practical session**
4. Gain familiarity with portable vibration measurement instrumentation and how to perform basic vibration measurements and assessments against Energy Institute limits – **supported by practical session**
5. Gain an understanding of other 'specialist techniques and when these should be used.
6. Gain an understanding of how to deal with common vibration problems.
7. Learn what constitutes 'good practice' for avoidance of vibration induced fatigue.

How will delegates be assessed?

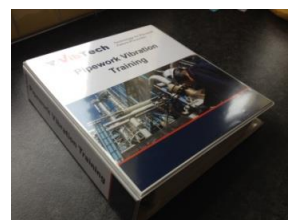
At the end of each training module, all delegates will be required to complete a multiple-choice test to ensure satisfactory level of understanding of each topic.

There are no formal pass/fail criteria.

What will you receive?

All delegates will receive electronic PDF versions of Course notes (Option for professionally printed course notes in a quality lever-arch folder.)

In addition, each delegate will be sent a personal course attendance certificate.



VT-3a 3-Day Intermediate Course

Primary Objectives of 3-Day Course:

A detailed introduction into the subject of pipework vibration and to raise the competence and confidence of existing staff to be able to perform their own basic visual inspection and basic pipework vibration surveys and assessments and have a good knowledge of common remedial solutions and other specialist techniques available to them. The course also covers methods for the theoretical assessment of likelihood of failure (LOF).

The intermediate course provides greater depth of knowledge regarding fatigue mechanisms and provides additional information on the selection and implementation of braces, dampers and absorbers for corrective actions.

Emphasis is placed on both **practical** and **theoretical** aspects of the subject. The course covers essential data assessment methods and included a practical session on the installation of bonded strain gauges for advanced fatigue assessments.

Timing:

3 days: Typically 09:00 to 16:30

Venue:

Training Room + Site for practical activities

Course Content:

- Basic Vibration
- Main Causes and Consequences of Vibration.
- Basic Assessment Methodology
- Likelihood of Failure Calculation Methods
- Visual Inspection
- Strain Gauging and Fatigue Analysis
- Basic Vibration Measurement and Analysis
- Specialist Techniques
- Main Line & Small-Bore Corrective Actions
- Good Design Practice Summary.

10 Key learning outcomes:

1. Gain an understanding of Pipework Vibration, including the main causes and consequences of pipework vibration.
2. Learn about theoretical methods for calculating 'Likelihood of Failure' (LOF) for Small Bore Connections (SBC) and for Main Line Flow Induced Vibration.
3. Learn how to perform an initial visual assessment of pipework to be able to identify and prioritise potential areas of concern - **supported by practical session**
4. Learn about portable vibration measurement instrumentation and how to perform basic vibration measurements and assessments against Energy Institute limits – **supported by practical session**
5. Learn how to perform basic 'impulse-response' natural frequency determination
6. Gain an understanding of other 'specialist techniques and when these should be used.
7. Gain familiarity how to install temporary strain gauges and to perform basic fatigue life estimates based on BS 7608.
8. Gain an understanding of how to deal with common vibration problems.
9. Gain an understanding of the selection and implementation of remedial pipe supports, including braces, dampers and absorbers.
10. Learn what constitutes 'good practice' for avoidance of vibration induced fatigue.

Other Course Details

As for 2-Day 'Practitioner' Course VT-2b

VT-4a 4-Day Advanced Course

Primary Objectives of 4-Day Course:

A detailed introduction into pipework vibration to raise the competence and confidence of staff to be able to perform their own basic visual, vibration and strain surveys and assessments

The advanced course also provides a good knowledge of common remedial solutions and other specialist techniques and provides additional information on the selection and implementation of braces, dampers and absorbers for corrective actions.

The course includes a practical session on the installation of bonded strain gauges for advanced fatigue assessments.

Emphasis is placed on both **practical** and **theoretical** aspects of the subject and covers in detail Quantitative Assessment Methods for the calculation of likelihood of failure (LOF) for Main Lines, Small Bore Connections and Thermowells, supported by worked examples.

Timing:

4 days: Typically 09:00 to 16:30

Venue:

Training Room + Site for practical activities

Course Content:

- Basic Vibration
- Main Causes and Consequences of Vibration.
- Basic Assessment Methodology
- Likelihood of Failure Calculation Methods and worked examples
- Visual Inspection
- Strain Gauging and Fatigue Analysis
- Basic Vibration Measurement and Analysis
- Specialist Techniques
- Main Line & Small-Bore Corrective Actions
- Good Design Practice Summary.

11 Key learning outcomes:

1. Gain an understanding of Pipework Vibration, including the main causes and consequences of pipework vibration.
2. Learn about theoretical methods for calculating 'Likelihood of Failure' (LOF) for Main Lines, Small Bore Connections and Thermowells – **supported by worked examples.**
3. Learn how to perform an initial visual assessment of pipework to be able to identify and prioritise potential areas of concern - **supported by practical session.**
4. Learn about portable vibration measurement instrumentation and how to perform basic vibration measurements and assessments against Energy Institute limits – **supported by practical session.**
5. Learn how to perform basic 'impulse-response' natural frequency determination.
6. Gain an understanding of other 'specialist techniques and when these should be used.
7. Learn how to install temporary strain gauges and to perform basic fatigue life estimates based on BS 7608 – **supported by on-site practical session.**
8. Gain an understanding of how to deal with common vibration problems.
9. Gain and understanding of the latest Energy Institute guidance on Small Bore Tubing.
10. Gain a greater understanding of the selection and implementation of remedial pipe supports, including braces, dampers and absorbers – **illustrated by case studies.**
11. Learn what constitutes 'good practice' for avoidance of vibration induced fatigue.

Other Course Details

As For 3-Day Course VT-3a

Course Content Comparison

Section	Course Modules	VT-1a	VT-2a	VT-2b	VT-3a	VT-4a
		1-day	2-day	2-day	3-day	4-day
Pipework Vibration Theory						
	Basic Vibration		√	√	√	√
	Structural and Acoustic Resonance		√	√	√	√
	Main causes & consequences of vibration problems	√	√	√	√	√
	Basic Fatigue		√	√	√	√√
	Basic Assessment Methodology	√	√	√	√	√
Calculation Methods						
	Main line Qualitative LOF Assessment	√	√	√	√	√
	Quantitative LOF Assessment - Flow Induced Vibration (FIV)		√	√	√	√
	Quantitative LOF Assessment – Mechanical Excitation		√		√	√
	Quantitative LOF Assessment – Pulsation					√
	Quantitative LOF Assessment – Acoustic Induced Vibration (AIV)		√		√	√
	Quantitative LOF Assessment – Valves					√
	Quantitative LOF Assessment – Cavitation and Flashing					√
	Quantitative LOF Assessment – Small Bore Connections		√	√	√	√
	Quantitative LOF Assessment – Thermowells		√		√	√
Assessments and Analysis						
	Visual Inspection	√	√	√	√	√√
	Basic Vibration measurements	√	√	√√	√	√√
	Basic Vibration analysis	√	√	√√	√	√√
	Basic Strain measurements		√	√	√	√
	Basic Strain analysis and fatigue Life estimation		√	√	√	√
	Specialist Techniques		√	√	√	√√
	Natural Frequency Determination				√	√
Corrective Actions						
	Main line corrective actions	√	√	√	√	√√
	Good design practice Summary	√	√	√	√	√
	SBC Bracing		√	√	√√	√√
	Dynamic Vibration Absorbers (DVA)		√	√	√	√√
	Visco-Elastic dampers		√	√	√	√√
Practical Sessions						
	Practical Visual Inspection Exercises		√	√√	√√	√√
	Practical Vibration Instrumentation Familiarisation Exercises			√√	√√	√√
	Practical Vibration Exercises			√√	√√	√√
	Practical Natural Frequency Determination Exercises				√	√√
	Practical Strain Exercises			√	√	√√
Worked Examples						
	Worked Example 1 – SBC LOF calculation Types 1 - 4					√
	Worked Example 2 – Flow Induced Vibration					√
	Worked Example 3 – Flow Induced Pulsation					√
	Worked Example 4 – Surge/Momentum Change					√
	Worked Example 5 – Intrusive Elements					√

Suggested Course Modules are for Guidance Only - Courses can be tailored as required

Course Booking or further information:

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