

**FLUKE**<sup>®</sup>

**Reliability**

**FLUKE ACADEMY**

# TRAINING OVERVIEW 2024

Singapore



# Introduction

The success of an organization today depends a lot on productivity, efficiency, knowledge and information, as sound decision making has become such a necessity. Equipping ourselves with up-to-date knowledge and technology is a requirement for every industry as an advantage in maximizing reliability and optimizing assets.

Fluke Corporation, the global leader in test and measurement instruments, has acquired PRUFTECHNIK, a market leader in precision laser shaft alignment, condition monitoring, and non-destructive testing. The Fluke brand has a reputation for portability, ruggedness, safety, ease of use and rigid standards of quality.



## **Training Objectives:**

Students will learn about the fundamentals of FLUKE's laser alignment and vibration.

Theoretical and practical sessions combined with sharing real experiences, will enable students to further develop and update their user skills, to understand and implement our FLUKE solutions.

## **Training Packages:**

Training will be conducted by experienced and certified FLUKE alignment and condition monitoring experts, and includes all necessary course materials, refreshments, and lunch.

## **Certificates:**

Mobius Institute certificates have a period of validity of five (5) years.

FLUKE certificates have a period of validity of (2) years.

*[NOTE: As of 1st of November 2019, Mobius Institute will be providing a digital certificate through their new digital certificate platform to all students instead of the hard copy being distributed to the students.]*

## **Participation:**

Our courses are ideal for anyone involved in the maintenance of rotating machinery, such as industrial service contractors, engineers in utilities or building facilities, maintenance engineers, vessels and offshore platform operators and technicians, etc.

## **Students:**

Limited places available with a minimum of 10 and maximum 20 students per course.

Confirmation of courses given only after minimum registrations of 5 students have been received.

## **Training Location:**

Training will be conducted in our Training Room at our Singapore office or any other selected venues upon arrangement and confirmation with training partner.

# Training Courses Overview

5170301 -5212304	<b>Mobius Institute</b> <b>Laser Shaft Alignment</b>	4
Training Dates:	25 – 26 Jan   27 – 28 Mar   25 – 26 Apr   27 – 28 Jun   25 – 26 Jul   19 – 20 Sep   24 – 25 Oct   09 – 10 Dec	
5208874-5212304	<b>FLUKE</b> <b>Field Balancing</b>	5
Training Dates:	13 - 14 Mar   10 - 11 Jul   06 - 07 Nov	
5208874-5212304	<b>FLUKE</b> <b>Vibration Analysis (CM) Level I</b>	6
Training Dates:	27 – 28 Feb   17 – 18 Jul   20 – 21 Nov	
5208874-5212304	<b>FLUKE</b> <b>Vibration Analysis (CM) Level II</b>	7
Training Dates:	29 – 30 May   11 – 12 Sep	
5170347-5212297	<b>Mobius Institute</b> <b>Certified Vibration Analysis ISO 18436-2, CAT I</b>	8
Training Dates:	04 – 08 Mar   26 – 30 Aug   25 – 29 Nov	
5170364-5212297	<b>Mobius Institute</b> <b>Certified Vibration Analysis ISO 18436-2, CAT II</b>	9
Training Dates:	13 – 17 May   14 – 18 Oct	
5170386-5212297	<b>Mobius Institute</b> <b>Certified Vibration Analysis ISO 18436-2, CAT III</b>	10
Training Dates:	23 – 27 Sep	
5170440-5212297	<b>Mobius Institute</b> <b>Asset Reliability Practitioner (ARP – A): Reliability Advocate (<i>Online</i>)</b>	11
5170469-5212297	<b>Mobius Institute</b> <b>Asset Reliability Practitioner (ARP – E): Reliability Engineer (<i>Online</i>)</b>	12
5208863-5212285	<b>FLUKE</b> <b>Product Training</b>	13
Training Dates:	16 Jan   13 Feb   12 Mar   18 Apr   23 May   13 Jun   16 Jul   13 Aug   17 Sep   10 Oct   14 Nov   19 Dec	

## Laser Shaft Alignment

Training course on shaft alignment for rotating machinery with focus on laser shaft alignment for standard applications using FLUKE (Pruftechnik) devices, with Mobius Institute training materials and practical hands-on training.

### Target Students

Industrial/mechanical maintenance; technicians or engineers who are interested; involved in shaft alignment works in the industry. Basic knowledge/skills/experience on industrial rotating machinery maintenance is desirable.

### Content

- Introduction to Shaft Alignment
- What is Misalignment?
- Pre-Alignment checks and soft foot
- Determining the alignment state
- Laser Alignment Systems
- Shaft Alignment Mathematics – Offset, angularity and alignment mathematics.
- Understanding Dial Indicators and using Dial Indicators for Shaft Alignment
- Pre-Alignment Checks and Corrections
- Soft Foot Checks and Corrections
- Why is soft foot important?
- Test for soft foot and correcting soft foot.
- The Rim-Face Dial Indicator Method and the Reverse-Dial Method
- Laser Alignment
- Using the laser alignment system and performing laser alignment measurements
- Moving the Machine
- Dynamic and Thermal Movement
- Dealing with Dynamic Movements
- Machine Train Alignment

### Course fee

Classroom – SGD 1,100.00 (exclusive of 9% GST and inclusive of examination)

### Package content

- Practical exercises on machine simulator
- Students will receive comprehensive course material, refreshments, and lunch.
- Students who successfully complete the course will be awarded a Certificate of Completion by Fluke S.E.A and Mobius Institute

### Dates

25 – 26 Jan | 27 – 28 Mar | 25 – 26 Apr | 27 – 28 Jun | 25 – 26 Jul | 19 – 20 Sep | 24 – 25 Oct | 09 – 10 Dec

### Duration

09:30 to 17:30 (2 days)

## Field Balancing

This course delivers comprehensive knowledge of the principles of machine dynamic balancing, the methods to measure unbalance and how to correct it. The emphasis is placed on single- and two-plane field balancing techniques portable balancer instruments.

### Target Students

Mechanical/Electrical personnel with various levels of machinery experience

### Content

The emphasis is placed on single- and two-plane field balancing techniques portable balancer instruments. Topics such as pre-balance checks, influence coefficients, balance quality and tolerances, residual unbalance testing will be discussed and demonstrated. The workshops and demonstrations are performed with our 2 channel FFT Analyzer VIBXPERT II.

- Fundamentals of balancing
- Static, couple and dynamic imbalance
- Rotor types
- Balancing in 1 and 2 planes
- 1-plane-balancing with optimization of the second plane
- Free Balancing without compensation calculations
- Assessment criteria for the balance condition
- Reporting and Data Storage
- Device operation VIBXPERT II
- Balancing Tolerances
- ISO Balance Standards
- Balancing Near Resonance
- One Run Balancing with Saved Coefficients
- Beat Conditions
- Practical exercises

### Requirements

Student should have a good technical understanding. Basic knowledge of vibration measurement is a benefit but not essential.

### Course fee

Classroom - SGD 1,100 (exclusive of 9% GST and inclusive of examination)

### Package content

- Practical exercises on machine simulator and a final quiz
- Students will receive comprehensive course material, refreshments, and lunch.
- Students who successfully complete the course will be awarded a Certificate of Completion by Fluke S.E.A

### Dates

13 - 14 Mar | 10 - 11 Jul | 06 - 07 Nov

### Duration

09:30 to 17:30 (2 days)

## Vibration Analysis (CM) Level I

This course helps to prepare attendees and provide evidence of qualification and competence of individual to perform a range of simple, single channel machinery vibration condition monitoring and measurement activities. It is recommended for individuals as an introduction to machinery vibrations.

### Target Students

Industrial/mechanical maintenance; technicians or engineers who are interested; involved in condition monitoring works in the industry. Basic knowledge/skills/experience on industrial rotating machinery maintenance is desirable.

### Content

- Measurement of vibration characteristics and trend assessment
- Physical and machine-technical bases its vibration suggestion
- Understanding of good vibration measurement data
- Vibration measuring technology (i.e.: sensor technology, vibration measuring instruments, software, etc.)
- Measure and interpreting from overall values of machines and bearing sounds.
- Typical damages and their image in vibration behaviour of machines
- Practice examples and practical presentations
- View in the Level II vibration diagnosis.

### Course fee

Classroom – SGD 720 (exclusive of 9% GST)

### Package content

- Practical exercises on machine simulator and a final quiz
- Students will receive comprehensive course material, refreshments, and lunch.
- Students who successfully complete the course will be awarded a Certificate of Completion by Fluke S.E.A

### Dates

27 – 28 Feb | 17 – 18 Jul | 20 – 21 Nov

### Duration

09:30 to 17:30 (2 days)

## Vibration Analysis (CM) Level II

This course helps prepare attendees to perform basic machinery vibration analysis on industrial machinery using single-channel measurements, with or without triggers signals, according to established and recognized procedures. It helps to understand and diagnose different faults. It covers basics of sensors, database and data collector setup, data collection, signal processing, and fault analysis.

### Target Students

Industrial/mechanical maintenance; technicians or engineers who are interested; involved in condition monitoring works in the industry. Good knowledge/skills/experience on industrial rotating machinery maintenance is required and previous condition monitoring analysis experience mandatory (i.e.: CM Level I or similar).

### Content

- Measurement of vibration signals and their interpretation
- Suggestion kinds of vibration and factors of influence
- Basic concepts of the vibration diagnosis (i.e.: time signal, amplitude spectrum, envelop spectrum, basic frequency, harmonious, side band, sensor technology, vibration measuring instruments, software, etc.)
- Signature understanding & practical vibration diagnosis (i.e.: imbalance vibration, component resonances, faulty shaft alignment, electric mistakes, tooth intervention mistakes, belt vibration, roller bearing damages, hydraulic vibration suggestions, problems in journal bearings, etc.)
- Typical damages and their image in vibration behaviour of machines

### Course fee

Classroom – SGD 960 (exclusive of 9% GST)

### Package content

- Practical exercises on machine simulator and a final quiz
- Students will receive comprehensive course material, refreshments, and lunch.
- Students who successfully complete the course will be awarded a Certificate of Completion by Fluke S.E.A

### Dates

29 – 30 May | 11 – 12 Sep

### Duration

09:00 to 17:00 (2 days)

This course is the ideal starting place for new vibration analysts, people collecting vibration data, and those who want a better understanding of vibration analysis and condition monitoring.

### Certification prerequisite

Prior experience is not required for attending the training course, but 6 months of vibration analysis / condition monitoring experience is required for certification.

### Content

- Condition monitoring and vibration analysis
- Introduction to vibration measurements and principles of vibration
- An introduction to the time waveform, spectrum and forcing frequencies.
- A brief introduction to phase
- Data acquisition
- Understanding axial, radial, vertical, and horizontal readings
- A quick introduction to mounting the accelerometer and surface preparation
- Naming conventions
- What are “routes” and how do you create them?
- Signal processing
- Spectral averaging
- The spectrum analysis process
- A quick introduction to resonance
- Diagnosing common fault conditions
- Setting alarm limits

### Certification examination

Duration: 2 hours

### Course fee

Classroom – SGD 3,208 (exclusive of 9% GST and inclusive of examination)

Online Self-Paced Training – SGD 2,880 (exclusive of 9% GST and inclusive of examination)

### Package content

- Students will receive comprehensive course materials, refreshments, and lunch.
- Registered students are given access to the online version of the course via the Mobius Institute Learning Zone before the class and for six months after the course completion to assist them with converting the course information into practice.
- Students who successfully complete the course will be awarded a Certificate of Completion and a certificate for Certified Vibration Expert, Category I as per ISO Standard 18436-2

### Dates

04 – 08 Mar | 26 – 30 Aug | 25 – 29 Nov

### Duration

09:30 to 17:30 (4.5 days)

### Category I – Candidate Profile:

- You are relatively new to vibration analysis.
- You are or will be collecting vibration data
- You are or will be analysing vibration data
- You look forward to the opportunity to develop your skills in the field of machine condition and vibration analysis
- You are seeking to become certified to international standards (ISO-18436) by an accredited certification body
- You want to become more valuable to your employer



## Certified Vibration Analysis ISO 18436-2, CAT II

This course is intended for people who have mastered the basics but who need to be able to take good data (and decide how the data collector should be set up), analyse a range of fault conditions, and understand balancing and alignment.

### Certification prerequisite

Prior experience is not required for attending the training course, but 18 months of vibration analysis / condition monitoring experience is required for certification.

### Content

- Review of condition monitoring technologies
- Understanding signals: modulation, beating, sum/difference
- Data acquisition
- Signal processing
- Vibration spectrum analysis
- An introduction to time waveform analysis and orbit analysis
- Phase analysis: bubble diagrams and ODS
- Enveloping (demodulation), shock pulse, spike energy
- Fault analysis
- Equipment testing and diagnostics including impact testing (bump tests) and phase analysis.
- Corrective action
- Running a successful condition monitoring program
- Acceptance testing
- Review of ISO standards

### Certification examination

Duration: 3 hours

### Course fee

Classroom – SGD 3,715 (exclusive of 9% GST and inclusive of online examination)

Online Self-Paced Training – SGD 3,340 (exclusive of 9% GST and inclusive of online examination)

### Package content

- Students will receive comprehensive course materials, refreshments, and lunch
- Registered students are given access to the online version of the course via the Mobius Institute Learning Zone before the class and for six months after the course completion to assist them with converting the course information into practice.
- Students who successfully complete the course will be awarded a Certificate of Completion and a certificate for Certified Vibration Expert, Category II as per ISO Standard 18436-2

### Dates

13 – 17 May | 14 – 18 Oct

### Duration

09:30 to 17:30 (4.5 days)

### Category II– Candidate Profile:

- You have a good understanding of the vibration fundamentals
- You want to be capable of confidently diagnosing a wide range of fault conditions, correcting certain conditions, and taking accurate measurements
- You look forward to the opportunity to develop your skills in the field of machine condition and vibration analysis
- You are seeking to become certified to international standards (ISO-18436) by an accredited certification body
- You want to become a key member of your condition monitoring team

This course is intended for people who are confident with spectrum analysis but who wish to push on and learn more about signal processing, time waveform and phase analysis, cross-channel testing, machine dynamics, and fault correction.

### Certification prerequisite

Prior experience is not required to attend the training, but certification requires 36 months vibration analysis / condition monitoring experience and ISO Category II certification, or a minimum of 60 months experience in lieu of ISO Category II certification.

### Content

- Review of condition monitoring technologies and the ISO standards
- Signal processing and the data acquisition
- Time waveform analysis
- Phase analysis
- Dynamics (natural frequencies and resonance)
- Testing for natural frequencies
- Operating Deflection Shape (ODS) analysis
- Modal analysis and intro to FEA
- Correcting resonance
- Rolling element bearing fault detection and journal bearing fault detection
- Electric motor testing
- Pumps, fans and compressors
- Gearbox fault detection
- Corrective action
- Running a successful condition monitoring program
- Acceptance testing

### Certification examination

Duration: 4 hours

### Course fee

Classroom – SGD 4,332 (exclusive of 9% GST and inclusive of online examination)

Online Self-Paced Training – SGD 3,890 (exclusive of 9% GST and inclusive of online examination)

### Package content

- Students will receive comprehensive course materials, refreshments, and lunch.
- Registered students are given access to the online version of the course via the Mobius Institute Learning Zone before the class and for six months after the course completion to assist them with converting the course information into practice.
- Students who successfully complete the course will be awarded a Certificate of Completion and a certificate for Certified Vibration Expert, Category III as per ISO Standard 18436-2

### Dates

23 – 27 Sep |

### Duration

09:30 to 17:30 (4.5 days)

### Category III – Candidate Profile:

- You have at least two years of vibration analysis experience
- You want to be a leader of the vibration team, or take a leading role in diagnosing faults and making repair recommendations
- You want to understand all data collector options, special test capabilities, all analysis tools and understand the widest range of fault conditions
- You are seeking to become certified to international standards (ISO-18436) by an accredited certification body
- You want to understand all condition monitoring technologies, how and when to apply them
- You want to understand machine dynamics (natural frequencies, resonance, ODS), how to perform resonance testing and how to correct resonance problems

This course seeks to achieve two goals:

1. Present the business case and explain how it is possible to assess the benefits to an organization. This comes in a form of justifying a new programme, expanding an existing programme, or to simply breathe new life into a stale programme.
2. Demystify the concepts, terminologies, and the processes required to improve reliability and performance. All the key issues will be covered, from defect elimination to the development of the asset strategy, from condition monitoring to operator driven reliability, from culture change to continuous improvement, and much more.

### **Certification Prerequisite**

Prior experience is not required for attending the training course, but 6 months of general industrial experience is required for certification.

### **Content**

- Introduction
- Benefits and assessing your benefits.
- Culture change
- Selling senior management
- Strategy (Plan / Mission / Vision / Team / Support)
- Understanding failure
- Defect elimination (i.e.: DFR, procurement, acceptance, testing, operators, etc.)
- Asset strategy (i.e.: RTE, CBM, IBM, MAL, ACR, BOM, MOC, FMEA, RCM, PMO & RCA)
- Precision and proactive work (i.e.: lubrication, alignment, balancing & fastening)
- Condition monitoring (i.e.: CBM, VA, OA, UT, WPA, MCE, IR, etc.)
- Breaking out of reactive maintenance
- Continuous improvement (i.e.: KPIs, benchmarking & education)

### **Course fee**

Online Self-Paced Training – SGD 2,480 (exclusive of 9% GST and inclusive of online examination)

### **Certification examination**

Duration: 2 hours

### **Package content**

- This is the “classic Distance Learning”. It is Jason Tranter’s videos teaching the courses, and the students can watch them at any time if they have an internet connection.
- Students have 4 months of access to the course.
- Students who successfully complete the course will be awarded a Certificate of Completion and a certificate for Asset Reliability Practitioner, Category I as per Mobius Institute Board of Certification (MIBoC)

This course covers the A-Z of reliability improvement. While it is not possible to be an expert planner/scheduler, or condition monitoring analyst, or lubrication engineer, students will gain a very solid knowledge in all these areas. Students will know how to justify and prioritize their activities and take all the necessary steps to engineer a successful reliability and performance improvement initiative; and avoid the obstacles that have derailed so many programs in the past.

### Target students & qualification prerequisite

Prior experience is not required for attending the training course, but 6 months of general industrial experience is required for certification.

### Content

- Introduction
- Strategy and implementation
- People management
- Defect elimination
- Reliability engineering
- Asset strategy development
- Work and spares management
- Precision skills (precision and proactive maintenance)
- Condition monitoring
- Continuous improvement

### Course fee

Online Self-Paced Training – SGD 3,580 (exclusive of 9% GST and inclusive of online examination)

### Certification examination

Duration: 3 hours

### Package content

- This is the “classic Distance Learning”. It is Jason Tranter’s videos teaching the courses, and the students can watch them at any time if they have an internet connection.
- Students have 4 months of access to the course.
- Students who successfully complete the course will be awarded a Certificate of Completion and a certificate for Asset Reliability Practitioner, Category II as per Mobius Institute Board of Certification (MIBoC)

## Product Training

These product training courses delivers comprehensive knowledge of the principles of machinery shaft alignment and condition monitoring by using PRUFTECHNIK's alignment and condition monitoring tools.

### Target students & requirements

- Prior experience is not required for attending the training course, but general and basic understanding of alignment and condition monitoring is recommended.
- Participants must be equipped with their own respective products needed for the training.

### Content

- Strategy and implementation
- People management
- Defect elimination
- Reliability engineering
- Asset strategy development

### Course fee

Classroom – SGD 370 (exclusive of 9% GST and inclusive of examination)

### Package content

- Students will receive comprehensive theoretical and practical demonstration on respective products, along with refreshments and lunch.
- Students who successfully complete the course will be awarded a Certificate of Completion

### Training Dates

#### 1. SHAFTALIGN touch / OPTALIGN touch

- 16 Jan 2024
- 18 Apr 2024
- 16 Jul 2024
- 10 Oct 2024



#### 2. ROTALIGN Touch / ROTALIGN Touch EX

- 13 Feb 2024
- 23 May 2024
- 13 Aug 2024
- 14 Nov 2024



#### 3. VIBXPERT II / VIBSCANNER 2 / VIBSCANNER 2EX

- 12 Mar 2024
- 13 Jun 2024
- 17 Sep 2024
- 19 Dec 2024



### Duration

09:30 to 17:30 (1 day)

# Fluke

## Keeping your world up and running

Your partner for machine reliability and predictive maintenance solutions



**Machine Alignment**



**Condition Monitoring**



**Non-Destructive Testing**



**Fluke South East Asia PTE LTD**

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