

# WEAR<sup>®</sup> CHECK

Condition Monitoring Training

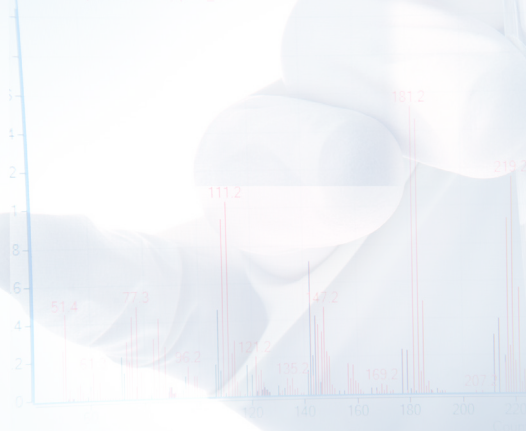


TRAINING & CERTIFICATION

Education  
is the most  
powerful weapon  
which you can use  
to change the world.

- Nelson Mandela





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# WearCheck Oil Analysis Training Courses

## Course overview

WearCheck has developed specialised training courses to help organisations gain maximum advantage from their oil analysis programmes. These courses were developed out of the company's partnership philosophy and the belief that a workforce which understands and is committed to the oil analysis programme will obtain far better results than one that gets by with a limited knowledge of procedures.

The courses on offer have proved highly successful in changing attitudes to oil analysis, giving staff a thorough knowledge of how the system works and renewed confidence in their ability to work smarter. The overall result has been a general improvement in the effectiveness of the maintenance programme with fewer mistakes, increased productivity and cost savings.


All courses are presented by qualified and experienced industry-recognised professionals.

## Format

WearCheck holds several scheduled public and onsite (at customer's premises) training courses throughout the year in South Africa and on the African continent.

## Target audience

Plant technicians, maintenance engineers, maintenance planners, lubrication engineers, foreman, artisans, condition monitoring personnel.



**WearCheck One (Wck1)**  
**Fundamentals Of Lubrication And Oil Analysis**

**Duration**

2 days.

**Course objectives**

To provide a firm theoretical and practical knowledge base of the basics of lubrication and oil analysis. To create an understanding of the role and importance of accurate implementation of that knowledge into the work environment in attaining the organisation's profit goals.

**Modules covered Wck1 day one**

- Functions of Lubricants;

- Base Stock Fundamentals;
- Mineral Oils;
- Synthetic Oils;
- Properties of Base Stocks;
- Lubricant Specification Systems;
- ISO Viscosity;
- SAE Gear;
- API Performance;
- Lubricant Additives;
- Lubricant Applications;
- Low SAPS Oils;
- Lubricant Storage and Handling.

### **Modules covered WCK1 day two**

- Maintenance Philosophies;
- Objectives and Functions of Oil Analysis;
- Sample Extraction;
- Sample Submission Form;
- The Wearcheck Process;
- The Laboratory Tests and Their Relevance;
- The Engine Killers;
- The Report;
- Reporting Structures.

### **Prerequisites**

No prerequisites other than a willingness to learn.

### **Deliverable**

All participants are supplied with their own manual to keep, and a certificate will be provided shortly after completion of the course.

### **Assessment**

Attendance register and an examination at the end of each day. Each examination consists of 20 multiple-choice questions. The passing grade is 70% Participants are required, at various stages in the course, to verbally acknowledge understanding of the work.

# WearCheck Two (Wck2) Report Interpretation

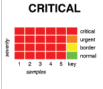
## Report Example Oil Analysis



Vehicle: B16  
 AL ID: F0N1JF7 CEMCON WHEEL LOADER  
 Model: F0N1JF7 CEMCON200  
 Component: Excavator  
 Make: F0N1JF7 CEMCON200

Code: 158PMT  
 Plant: AUTOLUBRIC 800 BAE 19480  
 Fleet Type:

### PROBLEM SEVERITY



**DIAGNOSIS**  
 1) Sample Number E202797 on 20/05/2018 from 1018 9H5  
 Viscosity appears low for this grade of oil. 4% Fuel dilution taking place - check fuel system for malfunctions.  
 Top and wear rates are high. Check that there is no air excessive. Critical action should be taken in the oil - check air intake system for leaks and for correct air filter. Oil separator or replace and replace filter.  
 The oil is not fit for further use due to contamination and degradation. Change the oil - please return feedback. REPEAT PROBLEM NAME, REPEAT PROBLEM OR otherwise. \*\*\* Wearcheck@wearspecialists.co.za change of items related or clearer number. \*\*\* On 18 Feb 2018 @ 10:50

**DISEASES**  
 1) Sample Number E202797 on 20/05/2018 from 1018 9H5  
 Water rates are normal for a full loadings. 10% Fuel dilution taking place - check fuel system for malfunctions. Warning: High levels of fuel oil dilute wear and other contaminant levels making readings appear normal or low. Fuel dilution and decreased viscosity makes the oil not fit for further use. Change the oil and of them. Please return feedback. REPEAT PROBLEM NAME.

2) Sample Number E202628 on 02/05/2018 from 1018 9H5  
 Viscosity appears low for this grade of oil. 8% Fuel dilution taking place - check fuel system for malfunctions. Warning: High levels of fuel oil dilute wear and other contaminant levels making readings appear normal or low. Fuel dilution and decreased viscosity makes the oil not fit for further use. Change the oil and of them. Please return feedback. REPEAT PROBLEM NAME.

3) Sample Number E202628 on 02/05/2018 from 1018 9H5  
 Viscosity appears low for this grade of oil. 10% Fuel dilution taking place - check fuel system for malfunctions. Warning: High levels of fuel oil dilute wear and other contaminant levels making readings appear normal or low. Fuel dilution and decreased viscosity makes the oil not fit for further use. Change the oil and of them. Please return feedback. REPEAT PROBLEM NAME.

4) Sample Number E437563 on 20/11/2018 from 1635 9H5  
 Viscosity appears low for this grade of oil. All wear rates are high. Critical action should be taken in the oil - check air intake system for leaks and for correct air filter. Oil separator or replace and replace filter.  
 4% Fuel dilution taking place - check fuel system for malfunctions. Check that there is no air excessive. Check for low oil pressure. The oil is not fit for further use due to contamination and degradation. Change the oil. Please return feedback. REPEAT PROBLEM NAME.

**PREVIOUS HISTORY**  
 On 31 May 2018 @ 7:12  
 Wkspk@wearspecialists.co.za change of filters on oil separator on fuel cap to ringwater's check fan built (oil).

On 18 Aug 2018 @ 09:1  
 Wkspk@wearspecialists.co.za change of filters check fuel and other contaminant levels making readings appear normal or low. Fuel dilution and decreased viscosity makes the oil not fit for further use. Change the oil and of them. Please return feedback. REPEAT PROBLEM NAME.

On 10 Oct 2018 @ 13:06  
 Wkspk@wearspecialists.co.za change of filters check for poisoning or C. Oil.

On 07 Dec 2018 @ 18:02  
 Wkspk@wearspecialists.co.za change of filters repair a water pipe.

## Report Example Oil Analysis



WAGE B16 - EXCONE - AU B3

SAMPLE NUMBER	DATE	LAT	OLL	CONSUMPTION	SWR	LASTIC	OLN IN	FILTER	OLL
1	E202797	18/05/18	21/02/18	8/0	800	14/0	REFICE	CHARGE	OFFER
2	E202800	22/07/18	02/07/18	8/0	800	14/0	REFICE	CHARGE	OFFER
3	E202802	14/08/18	17/08/18	8/0	800	14/0	REFICE	CHARGE	OFFER
4	E437563	20/11/18	26/11/18	8/0	800	14/0	REFICE	CHARGE	OFFER
5	E202806	04/02/18	07/02/18	8/0	800	14/0	REFICE	CHARGE	OFFER

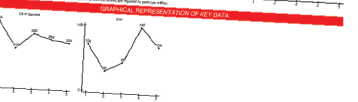


**CONTAMINANTS**

Element	Unit	Value	Unit	Value	Unit	Value	Unit	Value	Unit
Water	%	1.11	%	1.41	%	1.01	%	1.01	%
Acid	mg/kg	1.11	mg/kg	1.41	mg/kg	1.01	mg/kg	1.01	mg/kg
Aluminum	ppm	1.11	ppm	1.41	ppm	1.01	ppm	1.01	ppm
Chromium	ppm	1.11	ppm	1.41	ppm	1.01	ppm	1.01	ppm
Copper	ppm	1.11	ppm	1.41	ppm	1.01	ppm	1.01	ppm
Iron	ppm	1.11	ppm	1.41	ppm	1.01	ppm	1.01	ppm
Nickel	ppm	1.11	ppm	1.41	ppm	1.01	ppm	1.01	ppm
Silica	ppm	1.11	ppm	1.41	ppm	1.01	ppm	1.01	ppm
Sulfur	ppm	1.11	ppm	1.41	ppm	1.01	ppm	1.01	ppm
Titanium	ppm	1.11	ppm	1.41	ppm	1.01	ppm	1.01	ppm
Zinc	ppm	1.11	ppm	1.41	ppm	1.01	ppm	1.01	ppm

**ANTISTRESS & TEMPERATURE CONTROL**

Element	Unit	Value	Unit	Value	Unit	Value	Unit	Value
Water	%	1.11	%	1.41	%	1.01	%	1.01
Acid	mg/kg	1.11	mg/kg	1.41	mg/kg	1.01	mg/kg	1.01
Aluminum	ppm	1.11	ppm	1.41	ppm	1.01	ppm	1.01
Chromium	ppm	1.11	ppm	1.41	ppm	1.01	ppm	1.01
Copper	ppm	1.11	ppm	1.41	ppm	1.01	ppm	1.01
Iron	ppm	1.11	ppm	1.41	ppm	1.01	ppm	1.01
Nickel	ppm	1.11	ppm	1.41	ppm	1.01	ppm	1.01
Silica	ppm	1.11	ppm	1.41	ppm	1.01	ppm	1.01
Sulfur	ppm	1.11	ppm	1.41	ppm	1.01	ppm	1.01
Titanium	ppm	1.11	ppm	1.41	ppm	1.01	ppm	1.01
Zinc	ppm	1.11	ppm	1.41	ppm	1.01	ppm	1.01



WAGE B16 - EXCONE - AU B3

Condition Monitoring Specialists



www.wearcheck.co.za

WAGE B16 - EXCONE - AU B3

Condition Monitoring Specialists



www.wearcheck.co.za





## **Duration**

1 day.

## **Course objectives**

To provide a firm theoretical and practical knowledge of the process of the interpretation of the oil analysis laboratory tests into a mechanical diagnosis.

## **Modules covered WC2**

- The Diagnostic Process;
- Trend Analysis;
- Common Sources of Elements;
- Common Diagnostic Patterns;
- Elemental Families;
- Case Studies;
- Engines;
- Drivetrains;
- Hydraulic Systems;
- Transmissions;
- Group Work.

## **Prerequisites**

WearCheck One (Fundamentals of Lubrication and Oil Analysis), or equivalent. Familiarity with the laboratory tests is particularly important.

## **Deliverable**

All participants are supplied with their own manual to keep, and a certificate will be provided shortly after completion of the course.

## **Assessment**

Attendance register, satisfactory group participation in the case studies, and an examination at the end of the day. The passing grade is 70%.

**Basic Vibration Analyst (ISO 18436 CAT I)  
Training & Certification Course**



## **Duration**

3 days and 1 day for certification examination.

## **Course overview**

The Mobius Institute Category I – Basic Vibration Analyst training course and certification is designed for new vibration analysts, people collecting data and technicians wanting a deeper understanding of vibration analysis and condition monitoring. If you are ready to get started in this sector, this course is for you. You will learn why we monitor the condition of rotating machinery (and other critical assets), the importance of improved reliability, and how vibration can be successfully measured and analysed to provide an early warning system for a wide range of faults.

Using 3D animations, flash simulations, and numerous software simulators, we remove the mystery in vibration analysis. We have adopted a practical, hands-on approach to the topic, instead of just theory. The skills you gain during this course can be applied in your job, and you will gain a good understanding of what you are doing, and why. When senior vibration analysts attend our classes, they often say “if only I could have learned this way when I got started”. Here is your chance to do just that.

## **Format**

WearCheck holds several scheduled public and onsite (at customer’s premises) training courses throughout the year in South Africa and on the African continent. This course can be conducted live or via online learning.

## **Optional**

½ day review and certification examination (two hours), 70% passing grade required.

## **Public course pre-study**

Registered students have access to the online course before the class and after course completion to assist students with converting course content into practice.

## **Online learning**

Registered students have access to the online course content to provide ample time to study the material in preparation for the course.

## **Target audience**

Plant technicians, maintenance engineers, maintenance planners, lubrication engineers, foremen, artisans, condition monitoring personnel, including those who: are relatively new to vibration analysis, collect vibration data, analyse vibration data and those who wish to become certified to international standards by an accredited certification body.

## **Course objectives**

To provide a solid understanding of vibration analysis fundamentals, including:

- The Benefits of Condition Monitoring and Improving Reliability;
- Techniques such as Acoustic Emission, Infrared Analysis (Thermography), Oil;
- Analysis, Wear Particle Analysis and Motor Testing;
- How Machines Work;
- How To Analyse Vibration Spectra and the Basics of Fault Diagnosis, Unbalance;
- Misalignment, Looseness, Rolling Element Bearings, Faults, Resonance and Other Conditions;
- How Vibration Measurements Describe the Condition of the Machine;
- How to Collect Good, Repeatable Measurements,
- What is Meant by Analyser Settings such as Fmax, Resolution and Averaging;
- An Introduction to Setting Alarm Limits.

## **Modules covered CAT I Vibration Analyst**

Maintenance practices

- Condition monitoring
  - Acoustic Emission (Ultrasound);
  - Thermography;
  - Oil Analysis;

- Wear Particle Analysis;
- Motor Testing;
- Vibration Analysis.
- Principles of Vibration
  - Introduction;
  - Introduction to Time Waveform;
  - Introduction to the Spectrum;
  - Introduction to Forcing Frequencies;
  - Explanation of Different Vibration Units;
  - Brief Introduction to Phase.
- Data Acquisition
  - Review of Data Acquisition;
  - How to Measure Vibration;
  - Where to Place The Sensor;
  - Understanding Axial, Radial, Vertical and Horizontal Readings;
  - Mounting the Accelerometer and Surface Preparation;
  - Naming Conventions;
  - What are “Routes” and How to Create Them.
- Signal Processing
- Vibration Analysis
  - The Spectrum Analysis Process;
  - Introduction to Resonance;
  - Diagnosing Common Fault Conditions.
- Setting Alarm Limits
  - The Iso Standard for Setting Alarms;
  - Band Alarms;
  - Envelope Alarms.

### **Certification prerequisite**

While prior experience is not required to attend the training course, at least six months’ experience is required for full certification.

### **CAT-I Certification**

All Mobius certified analysts receive personalised logos with their certification number and name for their own professional use.

Mobius Institute also maintains a listing of all certified analysts on our website and provides each analyst with a certification confirmation webpage.

**Deliverable**

All participants are supplied with their own manual to keep, and a certificate will be provided shortly after completion of the course.

**Assessment**

Attendance register, satisfactory group participation, and an optional examination at the end of the course. The passing grade is 70%.

Intermediate Vibration Analyst (ISO 18436 CAT II)  
Training & Certification Course



## **Course**

### **Duration**

4 days and 1 day for certification examination.

### **Course overview**

The Mobius Institute Intermediate Vibration Analyst training & certification ISO 18436 CAT II course is for people who have mastered the basics of vibration, but who need to be able to: collect good data, be able to set up the data collector correctly, analyse a range of fault conditions and understand balancing and alignment.

The CAT II course teaches you to test machines correctly, accurate diagnosis of faults, how to perform additional diagnostic tests for verification, how to set vibration alarm limits and how to correct certain faults. You will learn what your analyser settings mean so that you can take the best measurements, and why the vibration signatures change the way they do, as well as how to use time waveform analysis and phase analysis to verify fault condition.

The Mobius Institute is ISO/IEC 17024 and ISO 18436-1 accredited, therefore you are assured that your certification meets the highest global standards, and our training teaches you everything you need to know according to the ISO 18436 standard for vibration analyst training

### **Format**

WearCheck holds several scheduled public and onsite (at customer's premises) training courses throughout the year in South Africa and on the African continent.

This course can be conducted live.

### **Optional**

½ day review and certification examination (three hours), 70% passing grade required.



### **Public course pre-study**

Registered students have access to the online course before the class and after course completion to assist students with converting course content into practice.

### **Online learning**

Registered students have access to the online course content to provide ample time to study the material in preparation for the optional certification examination.

### **Certification prerequisite**

Prior experience is not required for attending the training course, but 18 months of experience is required for certification.

### **Target audience**

Plant technicians, maintenance engineers, maintenance planners, lubrication engineers, foremen, artisans, condition monitoring personnel. It is recommended that you have at least 18 months' vibration analysis experience and a thorough understanding of vibration theory and terminology. 18 months' experience is required for Category II certification. The course is for technicians who need an in-depth study of machinery faults and their associated spectrum, time waveform and phase characteristics.

A Category II analyst must know how to test machines correctly, how to diagnose faults accurately, perform additional diagnostic tests for verification, how to set vibration alarm limits, and how to correct certain types of faults before doing this course. You need to understand what your analyser settings mean so that you can take the best measurements. You also need to understand why the vibration patterns change the way they do and how to use time waveform analysis and phase analysis to verify the fault condition.

## **Course objectives**

To Provide A Solid Understanding Of:

- How a Reliability-Centred Maintenance Approach and a Well-Designed;
- Programme Improve Overall Equipment Effectiveness (OEE) and Boost the Bottom Line;
- Condition Monitoring Technologies Including Acoustic Emission, Infrared;
- Analysis (Thermography), Oil Analysis, Wear Particle Analysis and Motor Testing;
- Via Supplementary Training;
- How Machines Work (Via Supplementary Self-Study of the 'Equipment Knowledge' Section);
- How to Select the Correct Measurement Location and Axis, and Collect Good, Repeatable Measurements;
- What the FMAX, Resolution, Averaging and other Analyser Settings Mean, and How to Select the Optimum Settings for a Wide Variety of Machine Types;
- How to Analyse Vibration Spectra, Time Waveforms, Envelope (Demodulation), and Phase Measurements;
- How to Diagnose: Unbalance, Eccentricity, Misalignment, Bent Shaft, Cocked Bearing, Looseness, Rolling Element Bearing Faults, Journal Bearing Faults, Gearbox Faults, Resonance, and Other Conditions;
- How to Set Alarm Limits Manually and with Statistics;
- How to Balance and Align a Machine and Correct a Resonance Condition.

## **Modules Covered Cat II Intermediate Vibration Analyst**

- Review of Maintenance Practices;
- Review of Condition Monitoring Technologies;
- Principles of Vibration;
- Data Acquisition;
- Signal Processing;
- Vibration Analysis;
- Fault Analysis;
- Analysis of Gears;

- Equipment Testing and Diagnostics;
- Corrective Action;
- Running a Successful Condition Monitoring Programme;
- Acceptance Testing;
- Review of ISO Standards.

### **Certification prerequisite**

While prior experience is not required to attend the training course, at least 18 months' experience is required for certification.

### **CAT II Certification**

All Mobius certified analysts receive personalised logos with their certification number and name for their own professional use. Mobius Institute also maintains a listing of all certified analysts on our website and provides each analyst with a certification confirmation webpage

### **Deliverable**

All participants are supplied with their own manual to keep, and a certificate will be provided shortly after completion of the course.

### **Assessment**

Attendance register, satisfactory group participation, and an optional examination at the end of the course. The passing grade is 70%.

**Advanced Vibration Analyst (ISO 18436 CAT III)  
Training & Certification Course**



## **Duration**

4 days and 1 day for certification examination.

## **Course overview**

The Mobius Institute Advanced Vibration Analyst training & certification ISO 18436 CAT III course is 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. If you wish to truly advance in vibration analysis and be able to run a successful condition monitoring team, then you are ready for this course. The course exceeds the ISO 18436-2 Category III standard and meets the ASNT Level III Recommended Practice.

The CAT III course teaches you to diagnose all the common faults conditions with rolling element and sleeve bearing machines by utilising time waveforms, phase readings and other techniques to diagnose faults. You will also learn machine dynamics (natural frequencies, resonance, etc.) and how to perform resonance testing and correct resonance problems. The course also covers single and cross-channel measurement capabilities of your analyser. After completing the CAT-III course, you will be able to set and run a successful vibration programme and mentor the junior analysts.

The Mobius Institute is ISO/IEC 17024 and ISO 18436-1 accredited, therefore you are assured that your certification meets the highest global standards, and our training teaches you everything you need to know according to the ISO 18436 standard for vibration analyst training.

## **Format**

WearCheck holds several scheduled public and onsite (at customer's premises) training courses throughout the year in South Africa and on the African continent.

This course can be conducted live or via online learning.

## **Optional**

One day review and certification examination (four hours), 70% passing grade required.

## **Compliance**

ISO 18436 Category III – Vibration Analyst, ASNT SNT-TC-1A recommended practice.

## **Public course pre-study**

Registered students have access to the online course before the class and after course completion to assist students with converting course content into practice.

## **Online learning**

Registered students have access to the online course content to provide ample time to study the material in preparation for the optional certification examination.

## **Target audience**

The Vibration Specialist Advanced course is aimed at personnel who have at least two years' vibration analysis experience and Category II certification by a recognised certification body. The course provides an in-depth study of diagnostic measurement techniques and the associated application of the techniques. Course delegates should either be the leader of the vibration team or take a leading role in diagnosing faults and making the final recommendations. Delegates must fully understand all data collector options, special test capabilities, all analysis tools and must understand the widest range of fault conditions.

It is recommended that you have at least 2 years' vibration analysis experience (36 months' experience is required for Category III certification). The course is aimed at technicians who are seeking to become certified to international standards (ISO-18436) by an accredited certification body, and who want to understand all condition monitoring technologies, how and when to apply them, as well as understand machine dynamics (natural frequencies, resonance, ODS), how to

perform resonance testing and how to correct resonance problems.

### **Course objectives**

After the course, you will have a complete understanding of vibration and phase analysis, dynamic balancing and shaft alignment, and a developing knowledge of machine dynamics and all condition monitoring technologies.

### **Modules covered CAT III Advanced Vibration Analyst**

- Review of Condition Monitoring Technologies and the ISO Standards;
- Signal Processing and 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 Resonances;
- Rolling Element Bearing Fault Detection;
- Journal Bearing Fault Detection;
- Electric Motor Testing;
- Pumps, Fans and Compressors;
- Gearbox Fault Detection;
- Corrective Action;
- Running A Successful Condition Monitoring Programme;
- Acceptance Testing;
- Review Of ISO Standards.

### **Certification prerequisite**

Prior experience is not required for attending the training course, but 36 months' experience and ISO CAT II certification (or a minimum of 60 months' experience in lieu of CAT II certification) is required for certification.

### **CAT III Certification**

All Mobius certified analysts receive personalised logos with their certification number and name for their own professional use.

Mobius Institute also maintains a listing of all certified analysts on our website and provides each analyst with a certification confirmation webpage.

**Deliverable**

All participants are supplied with their own manual to keep, and a certificate will be provided shortly after completion of the course.

**Assessment**

Attendance register, satisfactory group participation, and an optional examination at the end of the course. The passing grade is 70%.



Precision Shaft Alignment  
Training & Certification Course



## **Duration**

2 days

## **Course overview**

The advent of laser alignment systems has greatly improved the ease of precision alignment. In this course, we discuss the benefits, basic theory of operation, and tips and techniques for successful use of precision alignment.

The unique Mobius alignment training uses 3D animations and software simulators that completely demystify and demonstrate the alignment process. You will see the machine from all angles and be able to visualise and understand the effects of misalignment and the 3D nature of moving and aligning the machine. The course covers the readings and 3D alignment process and uses over 1000 narrated and illustrated slides to explain alignment. The course is divided into sections, which can be taken in any order. Quizzes are included throughout for students to test their knowledge as they progress.

The Mobius Institute is ISO/IEC 17024 and ISO 18436-1 accredited, therefore you are assured that your certification meets the highest global standards, and our training teaches you everything you need to know according to the ISO 18436 standard for vibration analyst training

## **Format**

WearCheck holds several scheduled public and onsite (at customer's premises) training courses throughout the year in South Africa and on the African continent.

This course can be conducted live or via online learning.

## **Optional**

No examination, no required pass rate. However, the course material includes regular quizzes for students to self-test to ensure the subject matter is understood.

## **Compliance**

No pre-requisite qualifications or experience.

## **Online learning**

Not available online.

## **Target audience**

If you align machines, you need to do this course. If you operate a modern laser alignment system, you can either simply do what the equipment tells you to do, or you can do this course and gain a deep understanding of alignment. You will then be able to anticipate problems and complete any alignment job successfully, no matter what model or alignment system you operate.

## **Course objectives**

After the course, you will have a complete understanding of shaft alignment – the reasons for doing alignment, pre-alignment checks and corrections (including how to identify and correct soft foot), the operation of dial indicators and the use of rim-face and reverse-dial methods. You will understand the process and how the calculations must be performed.

Your machines that have been precision aligned will run longer, use less energy and cost less to operate. Vibration caused by misalignment greatly reduces the life of bearings, seals, shafts and couplings – you will have the knowledge and skills to use a dial indicator tool or laser alignment system to precisely align two components. You will learn how to recognise misalignment and successfully set up the alignment job, perform the alignment and move the machine. We use 3-D animations and software simulators that completely demystify and demonstrate the alignment process.

## **Modules covered Precision Shaft Alignment**

- 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;
- Using Dial Indicators for Shaft Alignment;
- Pre-Alignment Checks and Corrections;
- Soft Foot Checks and Corrections;
- Why is Soft Foot Important?;
- Testing for Soft Foot;
- Correcting Soft Foot;
- The Rim-Face Dial Indicator Method;
- The Reverse-Dial Method;
- Laser Alignment;
- Using the Laser Alignment System;
- Performing Laser Alignment Measurements;
- Moving the Machine;
- Dynamic and Thermal Movement;
- Dealing with Dynamic Movements;
- Machine Train Alignment;
- Hands-On Training.

### **Certification prerequisite**

Prior experience is not required for attending the training course.

### **Deliverable**

All participants are supplied with their own online manual to keep, and a course-completion certificate which will be provided shortly after finishing the course.

### **Assessment**

Attendance register, satisfactory group participation and practical.

Balancing  
Training & Certification Course



## **Duration**

2 days

## **Course overview**

The Mobius Institute Balancing Rotating Machinery training course is created in line with the idea that machines that have been precision balanced run for longer, use less energy and cost less to operate. Unbalance causes fatigue, reduces the life of bearings and can make looseness and resonance conditions far worse. This course will equip technicians with the knowledge and skills to use a vibration analyser/ balancer - or even a simple sheet of graph paper and a protractor - and balance a machine without having to remove it from the plant.

## **Format**

WearCheck holds several scheduled public and onsite (at customer's premises) training courses throughout the year in South Africa and on the African continent.

This course is conducted live, not via online learning.

## **Course length**

The Balancing course covers two days.

## **Optional**

No examination option.

## **Compliance**

No qualification pre-requisites to complete this course.

## **Public course pre-study**

Not required.

## **Online learning**

Not available.

## **Target audience**

The Balancing Rotating Machinery course is aimed at condition monitoring professionals who need to recognise unbalance and set up the balance job for a successful balance. If you have to balance machines, then you need this course. If you have a modern analyser/balancer you can choose to simply follow the machinery instructions, or you can do this course and gain a deeper understanding of what you are doing, anticipate problems and complete any job successfully. Your skills will equip you with the know-how to operate all models of balancing equipment.

## **Course objectives**

In the course, you will cover an introduction to vibration, phase and vectors, and the complete balancing process. Candidates will learn how to perform a single plane balance with vectors, and how to balance a machine using the single-plane and two-plan balance function of your analyser. After watching a complete demonstration of the balancing process, candidates will be able to practice it themselves. The use of 3-D animations, flash simulations and software simulators demonstrate and explain the balancing process.

## **Modules covered**

- What is Unbalance?;
- Why do Machines Become out of Balance?;
- Using Vibration Analysis to Ensure a Machine is out of Balance and Not Misaligned;
- Dealing With Runout and Eccentricity, etc.;
- The Balancing Check-List;
- Practical Issues;
- Quick Review of Amplitude and Phase Readings;
- Collecting Vibration and Phase Readings;
- Understanding Vectors;
- Single Plane Balancing;
- Estimating the Size For the Trial Weight;
- Adding Weights;
- Two-Plane Balancing;

- The Static-Couple Method;
- Balancing Overhung Machines;
- A Quick Review of Balancing Flexible Rotors;
- Balancing Standards
- Why Balancing may not be Successful;
- The Four-Run Method – Balancing Without Phase;
- A Quick Introduction to Shop Balancing;
- Demonstration of Balancing Process, Taking Readings;
- Balancing a Machine.

### **Certification prerequisite**

Prior experience is not required for attending the training course.

### **Deliverable**

All participants are supplied with their own manual to keep, and a certificate will be provided shortly after completion of the course.

### **Assessment**

Attendance register, satisfactory group participation.



**Mobius Asset Reliability Practitioner (ARP CAT-I Advocate)  
Training & Certification Course**



**Duration**

2 days and 1 day certification examination.

**Course overview**

The Mobius Institute Asset Reliability Practitioner (ARP) Category I manager-engineer awareness course is designed to give all levels of condition monitoring professionals and maintenance personnel an overview of the reliability and performance improvement process.

**Format**

WearCheck holds several scheduled public and onsite (at customer's premises) training courses throughout the year in South Africa and on the African continent.

This course can be conducted live or via online learning.

**Optional**

Certification examination (two hours), 70% passing grade required.

**Compliance**

No training or previous qualifications required to register for this course.

**Public course pre-study**

Registered students have access to the online course before the class and after course completion to assist students with converting course content into practice.

**Online learning**

Registered students have access to the online course content to provide ample time to study the material in preparation for the optional certification examination.

**Target audience**

The ARP course (manager-engineer track B) is aimed at senior management, maintenance and operations/production management,

engineers, junior reliability engineers as well as condition monitoring professionals who need to understand the big picture of the reliability and performance improvement process.

The course provides in-depth explanation of how and why to improve the reliability and performance of assets/machinery in any operation – whether it is a production line manufacturing products or a commodity, or provides an essential service, or relies on machinery/electrical equipment or is even involved with protecting the country.

### **Course objectives**

After the course, you will have a complete understanding of the concepts, terminology and the process to improve reliability and performance. All key issues are covered, from defect elimination to development of the asset strategy, from condition monitoring to operator-driven reliability, from culture change to continuous improvement, and more. The business case for reliability improvement is presented, along with how to measure the benefits for your organisation. This can be used to justify a new programme, expand an existing programme or rejuvenate an existing programme.

Using animated simulations to explain complex concepts, the course gives graduates a clear vision of the process and how to justify the initiative, and why certain programmes work while others fail.

Reliability practitioners are recognised for their knowledge, experience and contribution to boosting performance in an industrial facility. The Mobius ARP certification scheme recognises three levels of practitioners – the advocate who contributes to the initiative, the reliability engineer and the programme leader.

### **Modules covered**

- Introduction to Reliability and Performance Improvement;
- Benefits of Reliability Improvement;
- Assessing Your Benefits;
- Culture Change;

- Selling to Senior Management;
- Strategy;
- Understanding Failure;
- Defect Elimination;
- Assessment of Strategy;
- Work Management;
- Spares Management;
- Precision and Proactive Work;
- Condition Monitoring;
- Breaking out of Reactive Maintenance;
- Continuous Improvement.

### **Certification prerequisite**

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

ARP CAT-I Certification: all Mobius certified analysts receive personalised logos with their certification number and name for their own professional use. Mobius Institute also maintains a listing of all certified analysts on our website and provides each analyst with a certification confirmation webpage.

### **Deliverable**

All participants are supplied with their own manual to keep, and a certificate will be provided shortly after completion of the course.

### **Assessment**

Attendance register, satisfactory group participation, and an optional examination at the end of the course. The passing grade is 70%.

**Mobius Asset Reliability Practitioner (ARP CAT-II Reliability Engineer)  
Training & Certification Course**



## **Duration**

4 days and 1 day certification examination.

## **Course overview**

The Mobius Institute Asset Reliability Practitioner (ARP) Category ii provides reliability engineers with core education in their chosen field. The reliability engineer has a critically important but challenging role. In most organisations there are almost infinite opportunities for improvement but understanding what to change and how to change it is difficult. Analysis is not enough. Action must be taken, or nothing will change. Part of the challenge is that the reliability engineer may not have the authority to make changes, merely recommend them. The issue is addressed in this course.

## **Format**

WearCheck holds several scheduled public and onsite (at customer's premises) training courses throughout the year in South Africa and on the African continent.

This course is conducted in a hybrid version – both live and incorporating online education.

## **Optional**

Certification examination (three hours), 70% passing grade required.

## **Compliance**

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

## **Public course pre-study**

Registered students have access to the online course before the class and after course completion to assist students with converting course content into practice.

## **Online learning**

Registered students have access to the online course content to provide

ample time to study the material in preparation for the optional certification examination.

### **Target audience**

The Asset Reliability Practitioner (ARP) Category II “reliability engineer core education” course is intended for industrial reliability engineers charged with helping the organisation improve reliability and performance, and for anyone else in the organisation who desires an in-depth knowledge of the reliability and performance improvement process.

Whether your organisation manufactures products or a commodity; provides an essential service; relies on machinery/electrical equipment, or is involved with protecting their country, this course will provide a memorable explanation of how and why to improve reliability and performance.

### **Course objectives**

The course covers the A-Z of reliability improvement. While it is not yet possible for you to be an expert planner/scheduler, or condition monitoring analyst, or lubrication engineer, you will gain a very solid knowledge in all these areas. You will learn how to justify and prioritise your activities and take all the necessary steps to engineer a successful reliability and performance improvement initiative and avoid the obstacles that have derailed many programmes in the past.

Understanding complex topics is made easier with the renowned Mobius Institute animations and animated simulations. You can watch any part of the course, or the entire course, online before you attend the live event, and you can watch it again soon afterwards to refresh your memory and improve your understanding.

Reliability practitioners are recognised for their knowledge, experience and contribution to boosting performance in an industrial facility. The Mobius ARP certification scheme recognises three levels of practitioners – the advocate who contributes to the initiative, the reliability engineer and the programme leader.

## **Modules covered**

- Introduction to Reliability and Performance Improvement;
- 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.

## **Certification prerequisite**

Prior experience is not required for attending the training course, but two years' general industrial experience is required for certification.

## **ARP CAT-II certification**

All Mobius certified analysts receive personalised logos with their certification number and name for their own professional use. Mobius Institute also maintains a listing of all certified analysts on our website and provides each analyst with a certification confirmation webpage.

## **Deliverable**

All participants are supplied with their own manual to keep, and a certificate will be provided shortly after completion of the course.

## **Assessment**

Attendance register, satisfactory group participation, and an optional examination at the end of the course. The passing grade is 70%.



**Mobius Asset Reliability Practitioner (ARP CAT-III Programme Leader)  
Training & Certification Course**



## **Duration**

4 days and 1 day certification examination.

## **Course overview**

While technical knowledge is an advantage in this role, it is essential that you can lead people, communicate frequently and clearly, and have strong budget and project management skills. You must have a crystal-clear vision of how the programme will benefit the business and its employees, and a detailed plan - with milestones - on how to achieve those goals. You must also understand the nature of the challenges that you will face and have a proactive strategy for overcoming those challenges.

This course is designed to prepare you for that role, and to strengthen your knowledge and skills if you already hold that position. Course content is based on 30+ years of experience, where we have seen a relatively small number of companies truly succeed in their mission, and countless companies fail.

To ensure that your time is put to best use, you can watch any part of the course, or the entire course, online before you attend the live event. And you can take it again soon afterwards to refresh your memory and improve your understanding.

## **Format**

WearCheck holds several scheduled public and onsite (at customer's premises) training courses throughout the year in South Africa and on the African continent.

This course is conducted live – with online material also available.

## **Optional**

Certification examination (three hours), 70% passing grade required. Compliance: Prior experience is not required for attending the training course, but four years of general industrial experience is required for certification.

## **Public course pre-study**

No pre-study required.

## **Target audience**

The Asset Reliability Practitioner (ARP) Category III “Reliability Programme Leader” course is intended for those who have taken the lead role in the reliability and performance improvement programme. Great responsibility comes with this great opportunity, and the aim of this course is to set you up for success.

Whether your organisation manufactures products or a commodity, provides an essential service, relies on machinery/electrical equipment, or is involved with protecting their country, this course will provide a memorable explanation of how and why to improve reliability and performance.

## **Course objectives**

This in-depth course equips delegates with the skills to implement effective reliability strategy and establish the value of the initiative by gaining support from senior management all the way down. Students will master information management, key measures and metrics, along with defect elimination and managing a multi-site programme. Other skills include overcoming common challenges and implementing continuous improvement processes.

## **Modules covered**

- Introduction to Reliability and Performance Improvement;
- Overview of Implementation Strategy;
- Establishing the Value of the Initiative;
- Establishing Corporate-Wide Support;
- Supporting Information Management and Key Measures and Metrics;
- Defect Elimination;
- Managing a Multi-Site Programme;
- Overcoming Common Challenges;
- Continuous Improvement.

**Certification prerequisite**

Prior experience is not required for attending the training course, but four years' general industrial experience is required for certification.

**ARP CAT-III Certification**

All Mobius certified analysts receive personalised logos with their certification number and name for their own professional use. Mobius Institute also maintains a listing of all certified analysts on our website and provides each analyst with a certification confirmation webpage.

**Deliverable**

All participants are supplied with their own manual to keep, and a certificate will be provided shortly after completion of the course.

**Assessment**

Attendance register, satisfactory group participation, and an optional examination at the end of the course. The passing grade is 70%.

# Maintenance, Spares And Stock Control Training Course



**Duration**

1 day

**Course overview**

The Maintenance, stores and stock control training course is created to introduce the artisan to the importance of spares and parts control.

**Format**

WearCheck holds several scheduled public and onsite (at customer's premises) training courses throughout the year in South Africa and on the African continent.

This course is conducted live, not via online learning.

**CPD points**

One.

**Optional**

No examination option.

**Compliance**

No qualification pre-requisites to complete this course.

**Public course pre-study**

NOt required.

**Online learning**

Not available.

**Target audience**

The course is aimed at team members who are responsible for the installation and maintenance of an organisation's physical assets. It is beneficial for a range of artisans, including operations process controllers, SHE representatives, maintenance supervisors, quality controllers, inspectors and any technicians nominated by management.

## **Course objectives**

It is not cost-effective for an operation to keep every spare part in stock. This course teaches delegates to run a well-managed spares department with efficient procurement systems in place. This approach boosts productivity by ensuring that the correct quantities of spare parts are available when necessary.

## **Modules covered**

- Inventory Basics;
- Cost-Cutting Versus Critical Equipment Investment;
- Customer Service;
- Improving Availability and Flexibility to Internal Customers;
- Stock Types: Maintenance / Critical Spares / in Transit from Supplier / Booked for Shutdown;
- Correct Storage of Sensitive Equipment;
- Managing Harmful Environmental Factors to Minimise Equipment Damage;
- Avoiding Lubricant Contamination;
- Managing Unique Practices and the Responsibility of Stores Personnel;
- Booking out Equipment After Hours;
- Disposal of 'Dead' Stock Items and Improving S5.

## **Certification prerequisite**

Prior experience is not required for attending the training course.

## **Deliverable**

All participants are supplied with their own manual to keep, an outline of types of spares that must be in stock, a case study and spares-related templates. A certificate will be provided shortly after completion of the course.

## **Assessment**

Attendance register, satisfactory group participation.

**Operator Asset Care  
Training Course**





**Duration**

1 day

**Course overview**

The Operator Asset Care training course is designed to empower operators to maintain certain aspects of their own equipment, independent of the maintenance department. Activities include daily inspections, lubrication, parts replacement, detections of abnormalities and precision checks. Operator asset care aims to prevent deterioration, restoring equipment to its ideal state and reporting abnormalities to the maintenance department. It is an approach that enables traditional maintenance practices to change from reactive to proactive by sharing responsibility for machinery condition, performance and maintenance.

This is an interactive course and it has been developed in alignment with the 7 Steps of Autonomous Maintenance.

**Format**

WearCheck holds several scheduled public and onsite (at customer's premises) training courses throughout the year in South Africa and on the African continent.

This course is conducted live, not via online learning.

**CPD points**

Three.

**Optional**

No examination option.

**Compliance**

No qualification pre-requisites to complete this course .

**Public course pre-study**

Not required.

## **Online learning**

Not available.

## **Target audience**

The course is aimed at team members who are responsible for the installation and maintenance of an organisation's physical assets. It is beneficial for a range of artisans, including operations process controllers, SHE representatives, maintenance supervisors, quality controllers, inspectors and any technicians nominated by management.

## **Course objectives**

The goal of this course is to place powerful and proven maintenance tools in the hands of your entire workforce. By learning to care correctly for their own equipment, it reduces the workload on the maintenance department and boosts productivity.

Operators will learn how to keep equipment running smoothly, how to inspect for problems during regular cleaning, how to contain debris that can shorten equipment life, how to manage lubrication effectively, how to use activity boards and meetings and how to use standard operating procedures and one-point lessons to promote effective equipment maintenance.

Attendees will gain an understanding of the roles of operators in improving reliable asset operation, making the maintenance of machinery condition everyone's responsibility, the importance and difference between 'age-related' and 'random' failures, the use of techniques such as audible, tactile and visual inspection, the causes of asset failure and how breakdown can be avoided in the first place, and the importance of bearing, seal, lubrication failure and the degradation of overall machine life.

## **Modules covered**

- Becoming Equipment-Conscious Operators;
- Cleaning is Inspection;
- Inspection;

- Using Localised Containment;
- Effective Equipment Lubrication;
- Activity Boards and Meetings;
- One Point Lessons.

### **Certification prerequisite**

Prior experience is not required for attending the training course.

### **Deliverable**

All participants are supplied with their own manual to keep, an outline of types of spares that must be in stock, a case study and spares-related templates. A certificate will be provided shortly after completion of the course.

### **Assessment**

Attendance register, satisfactory group participation.

Lean Maintenance Planning (LMP)  
Training Course



**Duration**

3 days

**Course overview**

Effective and reliable (lean) maintenance is no longer optional in order to be competitive in today's fast-paced global business world. In order to streamline an operation's maintenance scheduling, costs and reliability, lean maintenance planning plays a critical role.

**Format**

WearCheck holds several scheduled public and onsite (at customer's premises) training courses throughout the year in South Africa and in Africa.

This course is conducted live, not via online learning.

**CPD points**

Three.

**Optional**

No examination option.

**Compliance**

No qualification pre-requisites to complete this course.

**Public course pre-study**

Not required.

**Online learning**

Not available.

**Target audience**

This course is designed for a wide audience, including maintenance artisans, maintenance supervisors, production supervisors, production managers, maintenance managers, logistics supervisors and managers, plant managers, plant engineers, maintenance planners, maintenance schedulers and any person identified by management for development.

## **Course objectives**

Attendees will learn to incorporate lean maintenance planning and scheduling into their daily operations, which will contribute significantly to the following:

- Reduced Maintenance Costs. Avoiding Over-Insurance on Outdated Equipment/Assets;
- Improved Utilisation by Reducing the Effects of the Three Demons: Defects, Delays And Deviations;
- Waste Elimination and Cost Reductions Due to “Uptime”;
- Improved Staff Performance and Motivation;
- Improved Management and Leadership Resulting in Greater Team Effectiveness;
- Improved Quality of Maintenance Work - Man, Machine, Methods and Materials.

## **Modules covered**

- Maintenance, Failure, Reliability and Asset Management;
  - Maintenance A – Z;
  - Maintenance Objectives and Methodologies;
  - Strategic Importance of Planning Maintenance;
- Maintenance Planning;
  - Maintenance Planning and Measurements;
  - The Work Planning Process;
- Scheduling;
  - Principles of Scheduling;
  - Advance Scheduling;
  - Work Scheduling.

## **Certification prerequisite**

Prior experience is not required for attending the training course.

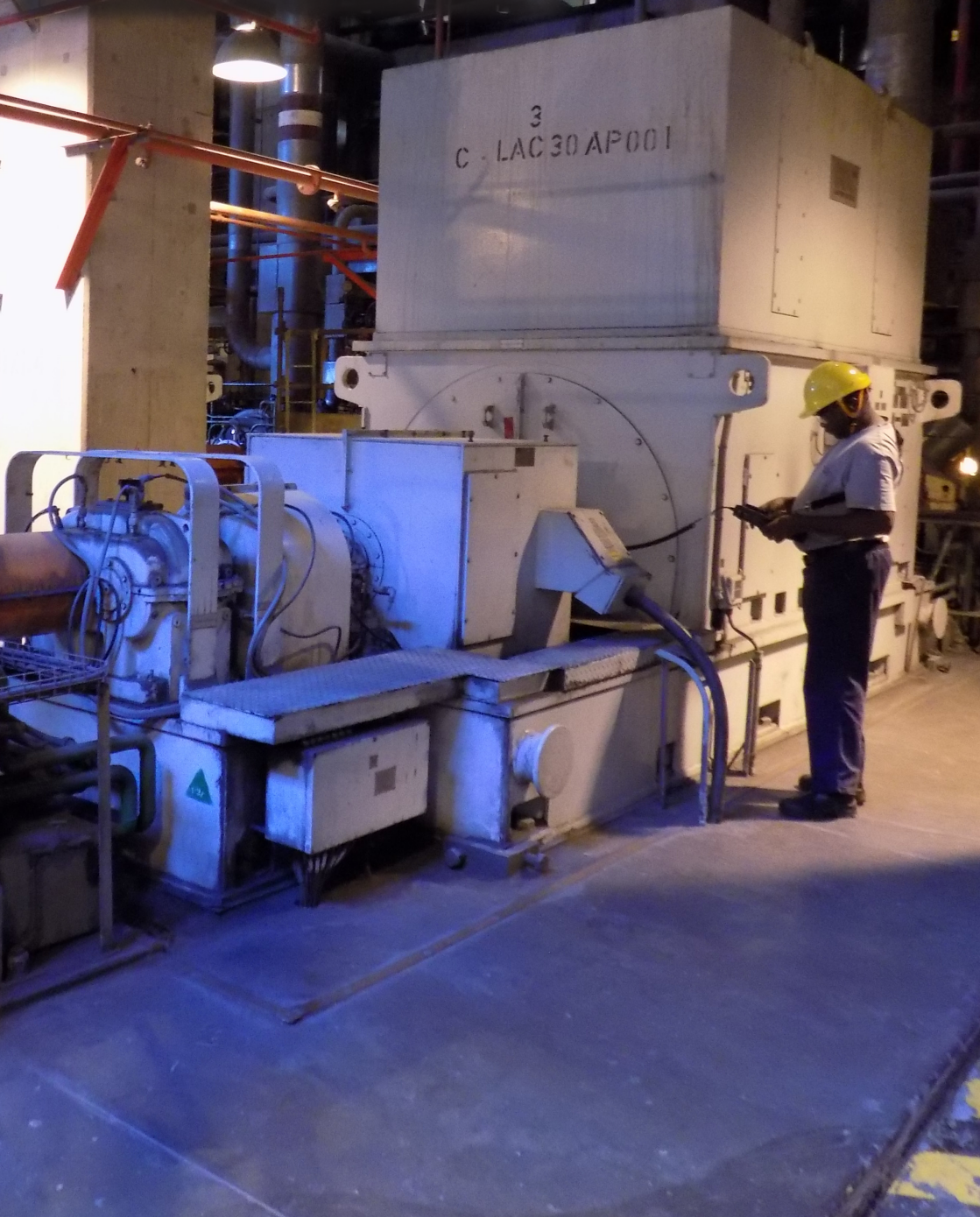
## **Deliverable**

All participants are supplied with their own manual to keep. A certificate will be provided shortly after completion of the course.

## **Assessment**

Attendance register, satisfactory group participation.

Root Cause Failure Analysis (RFFA)  
Training Course



**Duration**

1 day.

**Course overview**

Root cause failure analysis (RCFA) is a tried and tested method of recoding, analysing and solving recurring downtime, and is critical to business success.

**Format**

WearCheck holds several scheduled public and onsite (at customer's premises) training courses throughout the year in South Africa and on the African continent. The scheduled public courses are hosted at the ABB School of Maintenance premises at 2 Lake Road, Longmeadow Business Park, Modderfontein, Johannesburg, RSA.

This course is conducted live, not via online learning.

**CPD points**

One.

**Optional**

No examination option.

**Compliance**

No qualification pre-requisites to complete this course.

**Public course pre-study**

Not required.

**Online learning**

Not available.

**Target audience**

This course is specifically for the engineering and maintenance departments and team members who are responsible for the installation and maintenance of an organisation's physical assets.



## **Course objectives**

Quick, temporary fixes are only short-term solutions. Sooner or later, cracks will appear and cause sudden failure and extended downtime. These 'quick-fixes' often become habitual behaviour, and they are not sustainable. RCFA must be implemented for long-term solutions. Attendees will gain insight into proven RCFA techniques and practices, and how to apply them.

## **Modules covered**

- Low-Hanging Fruit, Surface And Root Causes;
- Types of Maintenance Overview According to Industry;
- Analysing Different Types of Failure, Causes of Failure;
- Recording Severe Failures in Categories (Groupwork);
- Mechanical Failures;
- Electrical Failures;
- Electronics and Control Systems Failures;
- RCFA Case Studies:
  - Video of an Explosion;
  - Video of Technology Used for RCFA;
- Practical Application:
  - Complete 5W2H Hard Copy Template;
  - Manual Pareto Graph (80:20);
  - Manual Fishbone Using Examples from the Plant;
  - Manual A3 or 8D Report from the Fishbone Finding;
  - Failure Analysis in Maintenance Work;
  - Complete Two 5WHYs Using Course Findings.

## **Certification prerequisite**

Prior experience is not required for attending the training course.

## **Deliverable**

All participants are supplied with their own manual to keep. A certificate will be provided shortly after completion of the course.

## **Assessment**

Attendance register, satisfactory group participation.

## Why WearCheck?



WearCheck serves the earthmoving, industrial, shipping, aircraft and electrical industries through the scientific analysis of used oil from mechanical and electrical systems.

WearCheck's reach is extensive, with offices and laboratories throughout the world in Angola, Botswana, the DRC, Dubai, Ghana, India, Ivory Coast, Mozambique, Namibia, Pakistan, South Africa, Zambia and Zimbabwe.

We have ISO 9001 and ISO 14001 certification and ISO/IEC 17025 accreditation.

### Why Wearcheck?

We provide:

- complete predictive maintenance solutions;
- solid infrastructure;
- testing of all fuels;
- state-of-the-art lab equipment;
- technical support and on-site sampling;
- our product knowledge;
- original equipment manufacturer (OEM) relationships;
- universally supported software;
- diagnosis.

The oil conditioning monitoring Specialists!

**800 000** samples per annum

**40+** years' experience

## How To Register For Our Training Courses



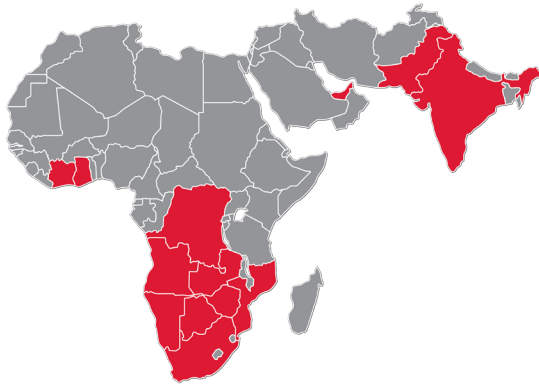
### Contact

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[www.wearcheck.co.za](http://www.wearcheck.co.za)



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