



# **MASTERING LUBRICANT ANALYSIS ( MLA II )**

- ◆ **Learn from the world's leading experts**
- ◆ **Learn how to implement Best Practices**
- ◆ **Achieve peer recognition**
- ◆ **Raise your lubrication management to World Class standards.**

## **2018 Course dates**

- ◆ **22 - 24 May**
  - ◆ **ICML Exam. - 25 May**
- ◆ **6 - 8 November**
  - ◆ **ICML Exam - 9 November**

## **Venue**

- ◆ **The National Waterways Museum, Ellesmere Port, Cheshire, UK.**

**An ICML certification course to help you:**

- ☑ **understand the fundamentals of lubrication and oil analysis**
- ☑ **get more out of your lubrication strategy**
- ☑ **improve your oil analysis success**
- ☑ **increase reliability**
- ☑ **increase profits and turnover**
- ☑ **improve your quality goals**
- ☑ **improve your health & safety success**
- ☑ **reduce your environmental impact**
- ☑ **ensure compliance with ISO9001/ISO55000**
- ☑ **design your own 'Best Practice' lubrication programme.**

**Reliability through Lubrication**



**KEW Engineering Ltd is pleased to bring you our 2016 course with a reliability focus, “*Mastering Lubrication Analysis*”, in line with the ICML certification structure.**

This course, based on our experience, is targeted at helping your company’s reliability drive in the areas of lubrication, oil analysis and contamination control.

The course not only covers the fundamentals, but provides best practice solutions to ensure your plant achieves world class levels in lubrication management.

The course is designed to be interactive, and attendees will be encouraged to participate with questions and discussion. Worked examples and Case Studies will be a key part in this training.

The content covers the body of knowledge as laid out by the International Council for Machinery Lubrication (ICML) for Machine Lubricant Analyst Level II (MLAII) certification. Get your staff qualified and on the road to achieving best practice and world class standards.

We look forward to having you join our course.

## Who Should Attend?

- ✓ Plant Managers
- ✓ Operations Managers
- ✓ Plant Engineers
- ✓ Reliability Engineers
- ✓ Lubrication Technicians
- ✓ Oil Analysis Practitioners
- ✓ Condition Monitoring Specialists
- ✓ Plant Operators
- ✓ Maintenance Technicians

**Whatever your industry, if you are involved in some way with lubricants, this course is for you!**

## Meet Your Expert Course Leader

**Martin Williamson** is a graduate Mechanical Engineer from the University of Cape Town and began his maintenance career working in the mining industry. This experience included condition monitoring with a focus on oil analysis and Tribology. In 1994, Martin joined Pall Filtration and provided technical support on their contamination monitoring instruments to clients in a variety of industries. He later joined Entek IRD to work in product management of their oil analysis tools, as well as providing a technical support role including training on oil analysis to international clients. For the last 10 years, he has been presenting training classes and undertaking consulting projects on an international level on behalf of Noria Corp and other key clients such as BP, Dow Corning, Marathon Oil and Cargill. He attained his CMRP (Certified Maintenance & Reliability Professional) status with SMRP (Society for Maintenance & Reliability Professionals) and has been involved with ICML (International Council for Machinery Lubrication), as well as working on various related ISO working groups. Martin is currently managing director of KEW Engineering Ltd.



# Course Content

## Lubricant roles and functions

- ◆ Base oil
  - ◆ Functions
  - ◆ Properties
- ◆ Additive functions
  - ◆ Surface active additives and their functions
  - ◆ Bulk oil active additives and their functions
- ◆ Synthetic lubricants
  - ◆ Synthetic lubricant types
  - ◆ Conditions dictating their use
- ◆ Lubrication regimes
  - ◆ Hydrodynamic
  - ◆ Elasto-hydrodynamic
  - ◆ Boundary

## Oil Analysis Maintenance Strategies

- ◆ Fundamental aspects of Reliability-Centered Maintenance (RCM)
- ◆ Fundamental aspects of Condition-Based Maintenance (CBM)
  - ◆ Predictive maintenance strategies
  - ◆ Proactive maintenance strategies

## Oil Sampling

- ◆ Objectives for lube oil sampling
- ◆ Equipment specific sampling:
  - ◆ Gearboxes with circulating systems
  - ◆ Engines
  - ◆ Single and multi-component circulating oil systems with separate reservoirs
  - ◆ Hydraulic systems
  - ◆ Splash, ring and collar lubricated systems
- ◆ Sampling methods
  - ◆ Non-pressurized systems
  - ◆ Pressurized systems - Low
  - ◆ Pressurized systems - High
- ◆ Managing interference
  - ◆ Bottle cleanliness and management
  - ◆ Flushing
  - ◆ Machine conditions appropriate for sampling
- ◆ Sampling process management
  - ◆ Sampling frequency
  - ◆ Sampling procedures
  - ◆ Sample processing

## Lubricant health monitoring

- ◆ Lubricant failure mechanisms
  - ◆ Oxidative degradation
    - ◆ The oxidation process
    - ◆ Causes of oxidation
    - ◆ Effects of oxidative degradation
  - ◆ Thermal degradation
    - ◆ The thermal failure process
    - ◆ Causes of thermal failure
    - ◆ Effects of thermal degradation
  - ◆ Additive depletion/degradation
    - ◆ Additive depletion mechanisms
    - ◆ Additives at risk for depletion/degradation by the various mechanisms.
- ◆ Testing for wrong or mixed lubricants
  - ◆ Baseline physical and chemical properties tests
  - ◆ Additive discrepancies
- ◆ Fluid properties test methods and measurement units
  - ◆ Kinematic Viscosity (ASTM D445)
  - ◆ Absolute (Dynamic) Viscosity (ASTM D2983)
  - ◆ Viscosity Index (ASTM D2270)
  - ◆ Acid Number (ASTM D974 et al)
  - ◆ Base Number (ASTM D974 et al)
  - ◆ Fourier Transform Infrared (FTIR) analysis
  - ◆ Rotating Pressure Vessel Oxidation Test (ASTMD2272)
  - ◆ Atomic Emission Spectroscopy

## Lubricant contamination measurement and control

- ◆ Particle contamination
  - ◆ Effects on the machine
  - ◆ Effects on the lubricant
  - ◆ Methods and units for measuring particle contamination
  - ◆ Techniques for controlling particle contamination
- ◆ Moisture contamination
  - ◆ Effects on the machine
  - ◆ Effects on the lubricant
  - ◆ States of coexistence
  - ◆ Methods and units for measuring moisture contamination
  - ◆ Demulsibility measurement
  - ◆ Techniques for controlling moisture contamination
- ◆ Glycol coolant contamination
  - ◆ Effects on the machine
  - ◆ Effects on the lubricant
  - ◆ Methods and units for measuring glycol contamination
  - ◆ Techniques for controlling glycol contamination
- ◆ Soot contamination
  - ◆ Effects on the machine
  - ◆ Effects on the lubricant
  - ◆ Methods and units for measuring soot contamination
  - ◆ Techniques for controlling soot contamination
- ◆ Fuel contamination (fuel dilution in oil)
  - ◆ Effects on the machine
  - ◆ Effects on the lubricant
  - ◆ Methods and units for measuring fuel contamination
  - ◆ Techniques for controlling fuel contamination
- ◆ Air contamination (air in oil)
  - ◆ Effects on the machine
  - ◆ Effects on the lubricant
  - ◆ States of coexistence
  - ◆ Methods for assessing air contamination
    - ◆ Air release characteristics (ASTM D3427)
    - ◆ Foam stability characteristics (ASTM D892)
  - ◆ Techniques for controlling air contamination

## Wear Debris Monitoring and Analysis

- ◆ Common wear mechanisms
  - ◆ Abrasive wear
    - ◆ Two-body
    - ◆ Three-body
  - ◆ Surface fatigue (contact fatigue)
  - ◆ Two-body
  - ◆ Three-body
  - ◆ Adhesive wear
  - ◆ Corrosive wear
  - ◆ Cavitation wear
- ◆ Detecting abnormal wear
  - ◆ Atomic emission spectroscopy methods
    - ◆ Inductively coupled plasma (ICP) spectroscopy
    - ◆ Arc-spark emission spectroscopy
  - ◆ Wear particle density measurement
- ◆ Wear debris analysis
  - ◆ Ferrogram preparation
  - ◆ Filtergram preparation
  - ◆ Light effects
  - ◆ Magnetism effects
  - ◆ Heat treatment
  - ◆ Basic morphological analysis

# Get Qualified by the International Council for Machinery Lubrication



Transfer your skills to new career opportunities.

A qualification from ICML will aid compliance with your company's ISO 9001:2000 *Quality management systems - Requirements for training and qualification of personnel*.

The International Council for Machinery Lubrication, offering examinations which comply with the latest international standard ISO 18436-4:2008 *Condition monitoring and diagnostics of machines -- Requirements for qualification and assessment of personnel -- Part 4: Field lubricant analysis*.

Register online at for your MLA II examination at:

[www.lubecouncil.org](http://www.lubecouncil.org)  
Or call +1 918 259 2950

## Course Information

Our English language courses are taught exclusively by Martin Williamson.

- Please enquire for non-certification courses which can be modified to meet your specific needs and presented on-site.
- Please contact your local office for further information.

### 2018 Course dates (Tue - Thur + Friday)

- 22 - 24 May
  - ICML MLAII Exam. - 25 May
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  - ICML MLAII Exam - 9 November

### Venue

The National Waterways Museum, Ellesmere Port, Cheshire.

### Costs

- £950.00 per person exc. VAT
- Group discounts available.
- ICML Exam fee - US\$275.00

Note. The ICML examination is optional and at additional cost

## What past attendees thought:



"Excellent information and real world examples. Good format allowed interaction within group"

**Mark Fleury, Owner, Fleury Engineering.**



"This course was well presented, the information was very interesting."

**Oliver Mangan, Fitter, Lagan Cement**

"Very good with lots of practical tips and insights. I have found this course very valuable, it has improved my knowledge immensely in the area of lubrication"

**Chris Abiodun, Reliability Engineer, BP**

"This is one of the best courses on the subject of lubrication I have ever attended with loads of practical information that could easily be implemented for equipment reliability improvement."

**Mohammad Naseer Uddin, Senior Reliability Engineer, PDO.**

## KEW Engineering Ltd.

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Our courses can be offered in English language in most countries. Please contact us to find out how our partners can offer local language courses in Japan, China and Malaysia.