

TRAINING GUIDE

Industrial Lubrication Fundamentals | Machinery Lubrication | Oil Analysis



TRAINING MATTERS

Find Your Perfect Fit. Get the Skills You Need with Noria's Diverse Training Opportunities





WHY CHOOSE NORIA?

The Difference is in the Details

It's been said that the only constant thing is change. At Noria, we realize change is vital for a company to thrive and sustain for the future. Positive change is impacted through a variety of means, but one important vehicle for change is education.

We are the Source.

Noria is the global authority in machinery lubrication and oil analysis. Each year, we train thousands of professionals worldwide – and in more than 10 different languages – on innovative plant reliability measures through excellence in machine lubrication. Our training encompasses all types of mechanized industries.

We Share Your Passion.

Noria continues to pursue a mission of inspiring change through education by providing customers with the tools, resources and expertise to achieve the tremendous, untapped potential that lubrication excellence has to offer.

We Have Been Down This Road Before.

Noria's team of experts combines a wide variety of industry experience in reliability, engineering and lubrication excellence to provide world-class training and expertise. Whether you need industry education, technical consulting, failure investigation or program/analysis development, our experts can help you.

Along with extensive experience, Noria's team relies on a large network of industry leaders to stay current with industry technologies, trends and client needs. Our team works hard to bring the best services and highest level of expertise to each client.



We Work Together with You.

Time is money, and your time is valuable. To accommodate our customers, Noria offers a variety of training options that includes online and private training. We can also customize course curriculum and training to achieve your desired results.

We Implement Change that Endures.

The difference is in the details. Noria's courses are designed to align with the needs of adult learners, as determined by expert staff that includes an adult-learning specialist, an instructional designer and multiple graphic artists and video/multimedia developers. Training sessions are goal-oriented, relevant and practical. Interactive opportunities are incorporated when possible to maximize knowledge retention and understanding.

We Want You to Succeed.

All course material – from beginner to advanced – is task-based and immediately applicable in the workplace. Students receive preventive maintenance tips and learn why every strategy is important. Knowledge is powerful and when our workforce becomes empowered with excellent lubrication methods, the results are a safer, more efficient and more reliable industry.

We Guarantee Satisfaction.

Noria proudly stands behind our training courses. If you're not satisfied with the information and insights you gain at these events, we will refund 100% of your paid registration fee.

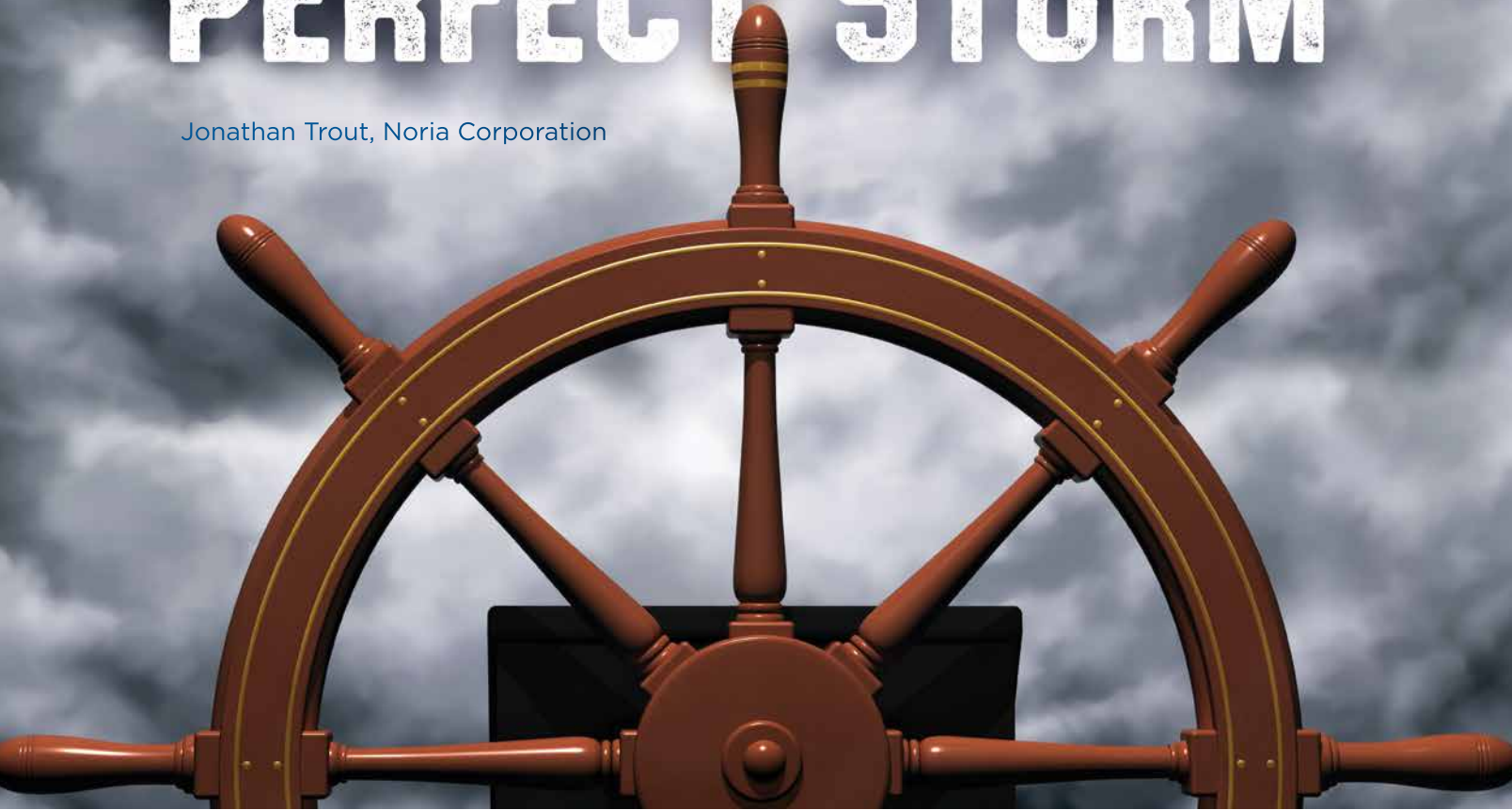
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WEATHERING THE PERFECT STORM

Jonathan Trout, Noria Corporation



The Perfect Storm of 1991 – the one that infamously took down the fishing vessel the Andrea Gail in the North Canadian Atlantic – began with a cold front on the East Coast of the United States. The cold front gave birth to an extratropical low just off Nova Scotia, and at the same time, a ridge of high pressure spanned from the Appalachian Mountains northeastward to Greenland. The cumulation of these ingredients eventually formed a nor'easter that absorbed Hurricane Grace.

Just as conditions were perfect for this massive storm to form nearly 30 years ago, manufacturing companies are dealing with the onset of a perfect storm themselves, one stirring up from issues such as an aging workforce, insufficient educational systems and the lack of technical apprenticeships, according to Terry Wireman in his book *Training Programs for Maintenance Organizations*.

As of 2018, finding skilled workers to fill available positions was rated as the No. 1 issue among employers, based on a recent Plant Services survey. The next two most pressing issues were knowledge capture/transfer (51 percent) and retraining/upskilling workers due to evolving roles and

responsibilities (49 percent). Despite U.S. manufacturers adding nearly 246,000 jobs last year (the most since 1988), a mix of baby boomer retirements and ever-changing roles, like the ability to use advanced technological tools on the job, has created a gap between supply and demand for manufacturing jobs. This gap could leave 2.4 million manufacturing jobs unfilled by 2028 and significantly impact the U.S. economy, according to Deloitte's 2018 skills gap study.

So, how is the manufacturing industry preparing for and combating this brewing perfect storm? It is tackling two of the biggest contributing factors: lack of education and/or technical apprenticeships. Not only is it crucial for employers to address these two factors, but it seems as if the younger generation realizes the importance of staying on top of new skills and technological trends. These younger workers are looking for jobs where employers provide a decent paycheck as well as continuing education in their field where they can make a solid impact on the job. The Plant Services survey found that 66 percent of workers say they have participated in or taken advantage of career-development programs offered by employers, while 51 percent say they are very



likely to engage with a mentor or a coach if their company provided the opportunity.

Given this realization and the national discussions about supporting trade schools and manufacturing training programs at community colleges, many employers are partnering with educational programs for outreach efforts. Nearly 78 percent of organizations work directly with two- or four-year universities to find new talent. Notably, around 43 percent of organizations (one in five) said they have worked with adult education or retraining organizations to develop current employees' skills or to ensure potential candidates from high schools have the necessary skills.

Working directly with technical colleges and adult education organizations is not only a great way for manufacturers to guarantee the appropriate skills and training are being taught, but it also allows for opportunities like apprenticeship programs where students can learn precise skills through on-the-job training.

Lastly, it's important to consider employee retention as another ingredient contributing to the strengthening perfect storm. While 74 percent of employees say they'd be happy to remain at their current job over the next two years, that number is trending downward from just a year ago. Better pay and benefits lead the way as the top reason why workers would want to leave (71 percent), followed by more attractive job responsibilities (50 percent) and more potential to advance their career (45 percent).

When asked about factors that would cause them to leave their current organization voluntarily, 80 percent of millennials said dissatisfaction with the corporate culture would be the leading factor. About half of baby boomers reported the same thing. This could be due to a shift in leadership styles.

"Millennials are demanding improved workplace cultures and are voting with their feet," says Cheryl Thompson, founder of the Center for Automotive

Diversity, Inclusion and Advancement (CADIA). "They are not accepting poor leadership behavior that previous generations did."

Thompson also notes that more millennials are becoming managers and are leading in a more collaborative and inclusive way.

Despite their weariness of the corporate culture, millennials have a much more positive outlook than baby boomers on the use of technology to make their jobs easier. Technology, such as condition monitoring and asset management, are improving their teams' efficiency and simplifying daily tasks. With this outlook comes an eagerness to continuously learn new skills to remain valuable in the industry.

Although the perfect storm is rearing its ugly head, replacing the aging workforce is possible through education and training. The manufacturing industry is experiencing a rapid onset of technology with advancements in artificial intelligence (AI), robotics and the internet of things (IoT). This technology is changing the entire industry, including job skills and current roles. As these changes take hold, many are afraid some positions will be eliminated. However, more jobs are actually being created in manufacturing, according to Deloitte's skills gap survey.

Of the millions of jobs potentially going unfulfilled over the next decade, those positions dealing with digital talent, operational management and skilled production are poised to be nearly three times as difficult to fill in the next few years. In fact, a lack of personnel with the ability to interact with integrated technology was the biggest concern among maintenance managers when it comes to performing predictive maintenance tasks, based on a Reliable Plant survey.

The good news is we know how to weather the storm. Even better news? Current and potential workers are willing and even eager to develop and continually advance their skillset in the manufacturing industry. It's important

“As of 2018, finding skilled workers to fill available positions was rated as the No. 1 issue among employers.”

Plant Services

to ask yourself where you stand in terms of attracting and training the up-and-coming workforce. According to manufacturing employees, the biggest trends they see in their plants revolve around expanding digital and soft skills, leveraging the digital toolbox, and keeping humans in the loop while working alongside technology.

If you feel your staff is lacking in any of these areas or other skillsets, Noria offers evaluation and consultation, including planning and standardization services. From oil analysis and machinery lubrication programs to specialized training for new and skilled workers, Noria can provide onsite training for any level or technical experience you may have. If you're looking to ensure your workforce is equipped with proper onboarding and verification of best practices, tasks and procedures, Noria Workforce Solutions (NWS) is an ideal solution that offers a combination of onsite and offsite support for your entire team.

The skills gap is poised to reach nearly 2.4 million unfilled manufacturing jobs over the next decade. Consistently investing in training by developing a positive relationship between workforce development and highly skilled employees is key to preparing for this gap. The perfect storm is on the horizon. How will you weather it?

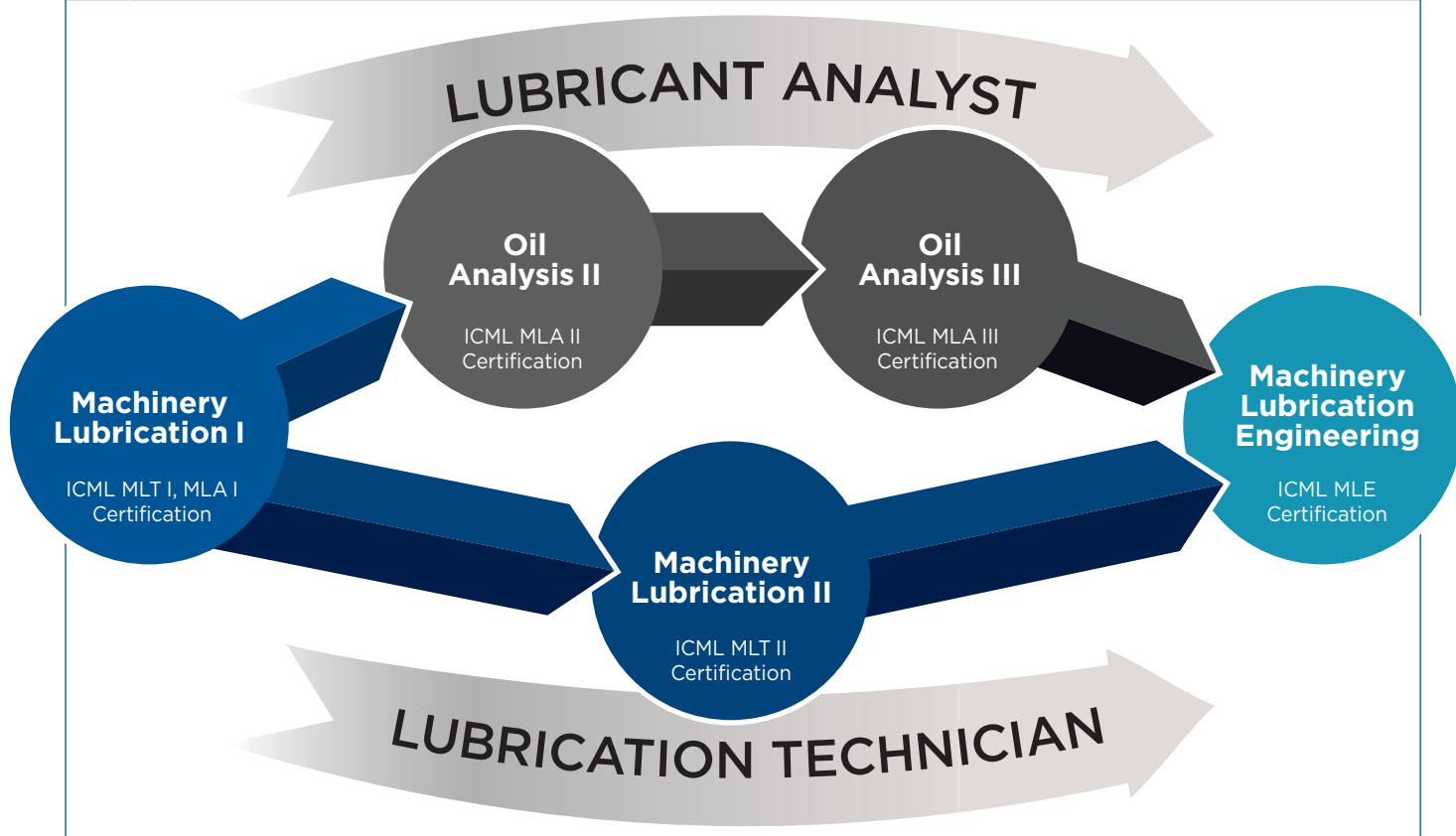


FIND YOUR PERFECT FIT

Something For Everyone

Noria's course plan is versatile. From beginners to experienced technicians and engineers, we can help you no matter what stage you are currently. Follow the entire course track, progressing from beginner to the expert level, or pick and choose according to your specific needs and interests.

CERTIFICATION SERIES



As a full member of the International Council for Machinery Lubrication (ICML), the courses in Noria's certification series align with ICML's body of knowledge and serve as certification preparation.





Want More Information?

Noria offers a suite of courses that appeal to maintenance professionals at any level and any expertise. Contact a Noria training advisor today by calling 833-273-6518, emailing training@noria.com or visiting noria.com/train.

PROFESSIONAL DEVELOPMENT

Food
Processing
Equipment
Lubrication

Lubrication
Awareness

Oil Analysis
Report
Interpretation
Workshop

WORKFORCE DEVELOPMENT

Industrial
Lubrication
Fundamentals

Reliability
Skills Series

To determine the best course for you, contact us at **833-273-6518** or email training@noria.com.



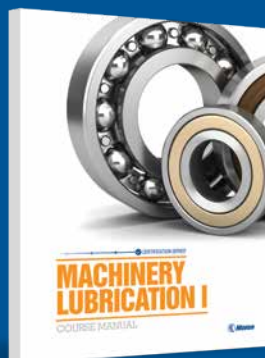
Lubrication Essentials for Everyone

MACHINERY LUBRICATION I

Learn the Crucial Elements of Maintenance, Lubricant Selection and Filtration

Early on, Noria's experts and instructional designers recognized an industry-wide need to establish an effective blueprint for a best-practice-based lubrication program. Machinery Lubrication I (ML I) provides the essentials of proper lubricant application while instilling proven industry methods for selecting, storing, filtering and testing lubricants for improved machine reliability. Through ML I, you will move beyond the dated methods of vague, non-specific lubrication procedures to understand what to do and why there is a right way to do it.

By completing the course, you will leave ML I with a solid understanding of the crucial relationship between lubricant health and machine reliability, as well as understand how doing simple tasks or inspections right will significantly extend machine life and cut costs. You will also gain better understanding of oil analysis, allowing you to align your efforts with those of maintenance professionals or oil analysis experts.



Want to learn more about this course?
Download our brochure or visit noria.com/train.

Training Options

- Public
- Online
- Onsite

Course Topics

- How Lubrication Affects Machine Reliability
- Lubrication Fundamentals
- Additives, Base Oils and Grease Thickeners
- Lubricant Performance Properties
- Additive Functions
- Food-grade and Environmentally Friendly Lubricants
- Grease and Oil Lubrication Methods
- Lubricants and Fluids for Journal/Rolling-Element Bearings, Gears, Automotive, Compressors, Steam/Gas Turbines, Hydraulics
- Contamination Control
- Oil Drains, Flushing and Reservoir Management
- Storing/Handling Lubricants

Get Certified

Machinery Lubrication I prepares students for the ICML's Level I Machine Lubrication Technician (MLT I), Level I Machine Lubricant Analyst (MLA I) and Machinery Lubrication Engineer (MLE) certifications.

“ I wish I would have had this course ”
30 years ago.

– Ian Brock, Millwright, Rio Tinto



Take This Course If You Are Responsible For:

- Lubrication procurement
- Equipment maintenance
- Ensuring equipment readiness and uptime
- Efficiency initiatives/design
- Procedure/quality-control implementation
- Identifying cost-saving methods
- Operations planning
- Equipment reliability

Don't Forget Your Study Packet

Designed for both ICML Level I MLT and Level I MLA certification, the Level I MLT/MLA Study Packet includes:

Flash Card Pack - 385 flash cards designed in preparation for ICML Level I MLT certification.

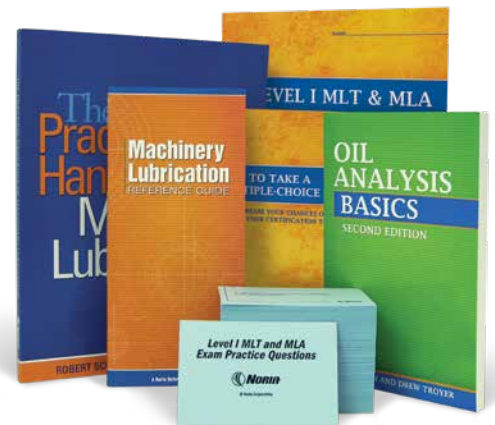
125-Question Practice Exam - A great assessment tool, this multiple-choice practice test is preparation for ICML Level I MLT certification. It is licensed for use by one person.

How to Take a Multiple-Choice Exam - This booklet contains advice from professionals who have passed ICML certification exams as well as helpful hints to prepare the night before the exam, steps to take before entering the exam room, techniques for time management during the exam, and advice for handling diverse types of questions.

Machinery Lubrication Reference Guide - Packed with useful checklists, look-up tables, charts and illustrations, this reference guide is designed to make information easily accessible where you need it. Also doubles as a handy, on-the-job reference tool!

Oil Analysis Basics - With 90+ illustrations, figures and look-up tables, this book presents the fundamentals of oil analysis for machinery condition monitoring in an easy-to-understand format. The book covers everything from how to take a proper oil sample to how to select a test slate for your applications.

The Practical Handbook of Machinery Lubrication - Noria's all-time bestseller, this book contains useful, actionable information that is ready for immediate use. The book contains understandable explanations of how lubricants work, what they're made of and how they break down. Covering topics ranging from engine lubricants to industrial oils and hydraulic fluids, *The Practical Handbook of Machinery Lubrication* is a page-turner that will not stay on the shelf.



Add the Study Packet to your course registration, or visit us at store.noria.com.



Advanced Training in Lubrication Excellence

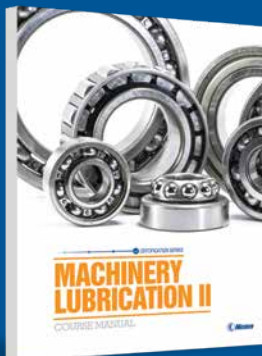
MACHINERY LUBRICATION II

Take Charge of Your Lubrication Program

Machinery Lubrication II (ML II) covers advanced lubrication topics like lubricant selection, troubleshooting, predictive maintenance and more. Designed for maintenance professionals with a solid understanding of the benefits and potential in excellent lubrication practices, this course builds upon their knowledge and provides an in-depth look into the world of lubrication.

Built as a continuation of ML I, the ML II course prompts you to analyze machines for wear symptoms and select lubricants and additives to counteract or prevent damage.

Through ML II, you will be able to distinguish the appropriate lubricants and additives for every application in your facility, guide staff in conducting basic maintenance and analyze machine/fluid indicators for potential problems. These tools will enable you to make comprehensive improvements in the workplace, resulting in key savings of time, money, storage space and training resources.



Want to learn more about this course?
Download our brochure or visit noria.com/train.

Training Options

- Public
- Online
- Onsite

Course Topics

- Lubrication Preventive Maintenance Optimization and Design
- Troubleshooting Lubrication Problems
- Lubrication and Oil Analysis Metrics
- Oil Drains, Flushing and Reservoir Management
- Accessorizing New Equipment for Lubrication Excellence
- Lubricating Grease and Oil Application
- Advanced Lubrication Techniques
- Base Oils
- Viscosity and Viscosity Index
- Oxidation and Thermal Stability
- Air Release and Foam Control
- Lubricant Degradation
- Lubricant Selection and Consolidation

Get Certified

Machinery Lubrication II prepares students for the ICML's Level II Machine Lubrication Technician (MLT II) and Machinery Lubrication Engineer (MLE) certifications.



Take This Course If You Are Responsible For:

- Lubrication procurement
- Equipment maintenance
- Systems operation/management
- Checking meters/recording instruments
- Mechanical inspections
- Controlling lubricant contamination
- Troubleshooting equipment design/process/material
- Equipment reliability
- Production management
- Procedure/quality-control implementation
- Identifying cost-saving methods



For more information
or to register for a
certification exam, visit
icmlonline.com.

Get Certified

Certification testing is the Friday following your training and conducted by the International Council for Machinery Lubrication.

Which Certifications?

Completion of Machinery Lubrication I and Machinery Lubrication II will prepare you for Level I Machine Lubrication Technician (MLT I), Level II Machine Lubrication Technician (MLT II) and Machinery Lubrication Engineer (MLE) ICML certification exams.

What Is ICML?

The International Council for Machinery Lubrication (ICML) is a vendor-neutral, not-for-profit organization founded to facilitate the growth and development of machine lubrication as a technical field of endeavor. In addition to other activities, ICML offers skill certification testing for individuals in the fields of machine condition monitoring, lubrication and oil analysis.

“...the information I learned can
improve our hydraulic systems by **40%**.”

-Vernon Player, *PDM Tech, International Paper*



Developing Verified Data

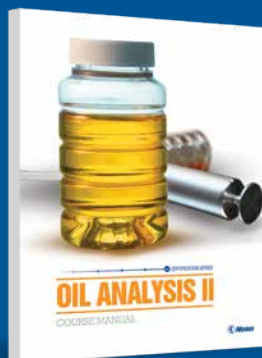
OIL ANALYSIS II

Uncover the Finer Aspects of Contamination Control and Comprehensive Oil Analysis

Oil Analysis II (OA II) approaches lubrication excellence through the critical information to be gleaned from oil analysis. By starting this course, you will understand the basic analysis procedures from ML I, and learn how to combine and apply these for more advanced strategies in conducting impactful predictive maintenance.

In OA II, you will gain everything needed to properly sample, monitor health and detect additive, thermal and particle factors that degrade lubricants via on-site tests and lab analysis. Taking knowledge from an oil analysis lab report, you will develop a proactive line of defense against failures, factoring lab findings into your own onsite analyses for more precise, timely maintenance.

By reviewing case studies, reading and interpreting oil analysis reports and participating in group problem-solving exercises, you will delve into the best practices of oil sampling, learn the fundamentals for conducting effective fluid analysis and become adept in analyzing lubrication systems for optimal efficiency and savings, ensuring that machine/fluid health, lubrication procedures and objectives reflect the ideal for the plant, its personnel and the bottom line.



Want to learn more about this course?
Download our brochure or visit noria.com/train.

Training Options

- Public
- Onsite

Course Topics

- Lubricant Health Monitoring
- Oil Analysis Fundamentals
- Oil Sampling – The Very Best Practices
- Fluid Properties Analysis
- Contamination Control and Proactive Maintenance
- Fault Detection and Wear Particle Analysis
- Instrument-free Onsite Tests
- Interactive Case Studies Workshop
- Test Results and Oil Analysis Report Interpretation

Practice In Class

Oil Analysis II includes practice oil analysis reports and individual and group participation in problem-solving exercises.

Get Certified

Oil Analysis II prepares students for the ICML's Level II Machine Lubrication Analyst (MLA II) and Machinery Lubrication Engineer (MLE) certifications.

“This is an outstanding course in understanding the desired state and use of oil and how to determine the best practices. I wish I would have taken it a year and a half ago.”

– Derik Williams, Engineer, US Army CERDEC



Take This Course If You Are Responsible For:

- Resource management
- Equipment maintenance
- Systems operation/management
- Lubricant health and cleanliness targets
- Mechanical inspections
- Diagnostics and equipment troubleshooting
- Efficiency initiatives/design
- Quality-control implementation
- Operations planning
- Sensor selections/installation
- Lubrication program effectiveness
- Choosing test slates

Don't Forget Your Study Packet

The Level II MLA Certification Study Packet is designed to prepare students for ICML Level II MLA certification. The packet includes:

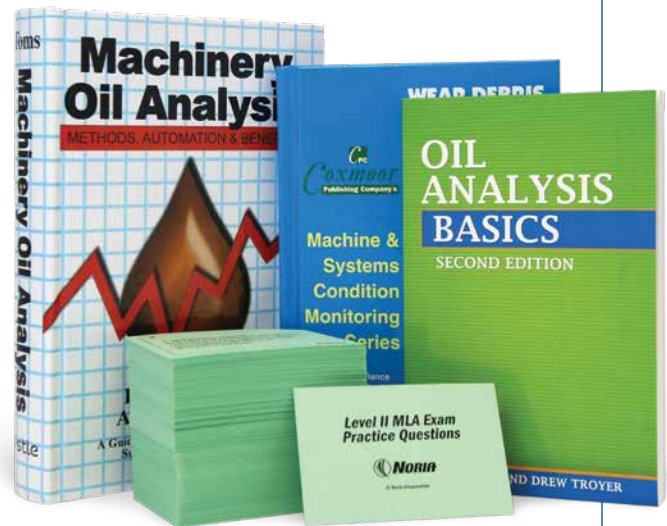
Level II MLA Flash Cards - 440+ flash cards designed in preparation for the ICML Level II MLA certification exam.

Oil Analysis Basics - With 90+ illustrations, figures and look-up tables, this book presents the fundamentals of oil analysis for machinery condition monitoring in an easy-to-understand format. The book covers everything from how to take a proper oil sample to how to select a test slate for your applications.

Wear Debris Analysis - With 70+ illustrations, figures and tables, this book offers a practical look at wear debris and wear particle analysis in many forms.

Machinery Oil Analysis Methods, Automation & Benefits - This unique, in-depth analysis presents the entire practice of oil analysis as a condition monitoring tool for machines. The book also describes the what, when, where and how-to for machinery lubrication concepts, machinery failure and maintenance concepts, machinery failure modes, oil sampling and testing, plus statistical analysis and data interpretation.

Add the Study Packet to your course registration, or visit us at store.noria.com.





Master Advanced Analysis

OIL ANALYSIS III

Training Options

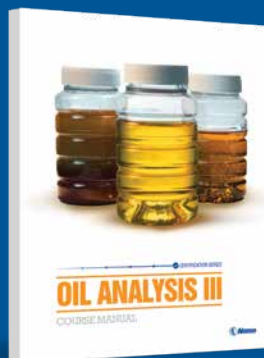
- Public
- Onsite

Take the Next Steps in Transforming Your Oil Analysis

Designed as a more in-depth look into this specialized field, Oil Analysis III (OA III) gives you the tools and education to develop, implement and sustain a first-rate, comprehensive oil analysis program. Merging the machine lubrication and oil analysis focuses of course prerequisites, OA III trains you to diagnose problems like contamination, corrosion and additive depletion – even with limited test results or difficult machines.

Through this course, you will compare detection and cost benefits/drawbacks for any type of lab test to select the most precise option for your needs. You will be able to gather extensive data on a lubrication program, make informed decisions and maintain the program as a major company asset. You will also gain strategies for applying your data and analysis to build strong proposals for improvement projects and calculate accurate return on investment predictions.

By completing OA III, you will attain the highest level of expertise and join the elite ranks of others who create or assess new oil analysis programs within any industrial workplace.



Want to learn more about this course?
Download our brochure or visit noria.com/train.

Course Topics

- Understanding and Analyzing Machine Wear
- Integrating Oil Analysis with Vibration Analysis
- Fluid Properties Analysis
- Additive Depletion
- Contamination Analysis
- Grease Analysis
- Onsite Oil Analysis Options
- Designing an Oil Analysis Program
- Cost/Benefit Analysis

Practice In Class

Oil Analysis III includes practice oil analysis reports and individual and group participation in problem-solving exercises.

Get Certified

Oil Analysis III prepares students for the ICML's Level III Machine Lubrication Analyst (MLA III) and Machinery Lubrication Engineer (MLE) certifications.

“ I was amazed of the information that’s out there, and the techniques or **tests that can be taken for oil analyses.** ”

-Reuben Cloudis, *Lubrication Tech, Huber Engineered Woods, LLC*



Take This Course If You Are Responsible For:

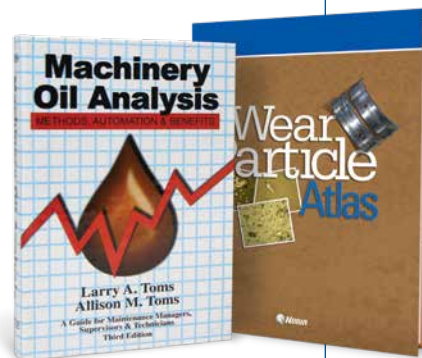
- Systems operation/management
- Operations
- Equipment maintenance
- Testing samples and interpreting results
- Mechanical inspections
- Diagnostics
- Troubleshooting equipment design/process/material
- Efficient utilization design
- Procedure/quality-control implementation
- Cost/benefit analysis
- Quality-control analysis

Suggested Reading

Machinery Oil Analysis Methods, Automation & Benefits - This book uniquely presents the entire practice of oil analysis as a condition monitoring tool for machines.

Wear Particle Atlas - A guide to wear particle analysis, this guide contains photographs of typical wear particles found in used lubricating oil, illustrative case histories and operational procedures for wear debris analysis.

You can purchase these books online at store.noria.com.



Avoid Costly Mistakes And Reap The Benefits Of Good Oil Sampling

A small misstep when installing sampling ports, performing oil sampling or choosing lubricants can translate into expensive problems. For most facilities, these mistakes are only apparent after problems arise or through expert analysis. For example, a large steel mill installed 1,200 new sampling ports and, after gathering strange data on multiple occasions, learned they had been placed in the wrong locations.

Another Noria customer had been conducting oil analysis for years but was still unable to detect bearing failures that shut down

production. The company discovered that the tests being conducted could only identify degraded or wrong lubricants – not impending failure.

Successful oil sampling requires know-how. Improper sampling port placement, running the wrong tests, poorly collected samples and more can compromise accuracy or even eliminate valuable information. Noria can lend you the expertise to avoid these costly mistakes so you can reap the full benefits of good oil sampling.



A Holistic Approach Toward World-Class Lubrication

MACHINERY LUBRICATION ENGINEERING

Training Options

- Public (four days)
- Onsite

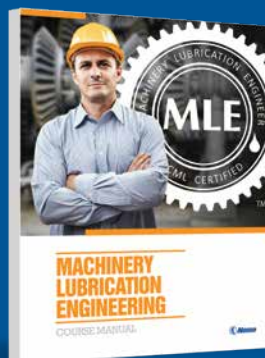
Course Description

A need for solid competency related to lubricants and lubrication is vital to facilities around the world. Go beyond the traditional lubricant and lubrication subjects and undertake a holistic approach toward developing, implementing and managing a world-class lubrication program with the Machinery Lubrication Engineering (MLE) course.

By connecting the objectives of a lubrication program with the core topics of reliability and asset management, the MLE course enables reliability and asset leaders to develop expertise related to lubricants and lubrication. Focusing on the strategic challenges faced by plant lubrication professionals, MLE also delves into maintenance and reliability concepts, placing an emphasis on lubrication and asset management. Through this course, you will gain the required knowledge for applying lubrication engineering skills to effectively provide engineering leadership to a typical industrial plant, mill or site.

If you are a reliability professional tasked with the strategic leadership of a comprehensive reliability and asset management program, the MLE course is designed for you.

Please note: Noria recommends that individuals taking this course have 5-10 years of industry experience; have attended ML I or II, or OA II or III; or hold a Level I, Level II or Level III MLA, or Level I or Level II MLT certification(s) from the ICML.



Want to learn more about this course?
Download our brochure or visit noria.com/train.

Get Certified

Machinery Lubrication Engineering prepares students for the ICML's Machinery Lubrication Engineer (MLE) certification.



Course Topics

- Management of lubricated machinery assets in the context of ICML 55.01 and ISO 55001
- Analyzing abnormal events where lubrication is the cause or a contributing cause
- Managing a lubrication team, including lubrication technicians and lubricant analysts
- Managing lubrication suppliers and service providers
- Writing specific lubrication procedures consistent with best practice for various tasks
- Determine the optimum reference state for lubricant handling, storage, consumption and conservation, as well as new machinery specifications and commissioning
- Environmental conservation practices, including best practices in waste oil and used filter disposal
- Manpower planning, administration, staff training and certification
- Lubrication information management system(s)
- Failure modes and effects analysis (FMEA), root cause analysis (RCA) and troubleshooting
- Reliability-centered maintenance (RCM) planning initiatives
- RCA activities relating to failures of grease- or oil-lubricated machinery
- Reporting and performance metrics
- Defining overall lubrication program goals, budgets and plans
- Evaluating proposed lubrication capital expenditures using standard economic analysis methods
- Implementing overall lubrication effectiveness (OLE) metrics and other key performance indicators
- How to reach diagnostic conclusions and implement action plans to change machinery design, lubricant selection, lubricant application methods, lubrication maintenance plans and prescribed analytical methods

Who Should Attend?

Machinery Lubrication Engineering (MLE) is designed for an experienced professional with extensive training and experience in areas that include, but are not limited to, the strategic leadership, development, implementation and management of the lubrication program. Those interested in the MLE course are likely to be involved with troubleshooting tough problems identified by routine analysis and inspections. Job titles include:

- Lubrication and reliability professionals pursuing management
- Staff engineers
- Consultants or advisors
- Plant engineers
- PdM engineers
- Manufacturing engineers
- Process engineers
- Reliability engineers or managers
- Maintenance engineers
- Leaders responsible for technicians, analysts, inspectors, operators, millwrights and others performing a wide range of lubrication-related work

Individuals interested in the MLE course may hold other certifications such as Certified Maintenance & Reliability Professional (CMRP), Machine Lubrication Technician (MLT), Machine Lubricant Analyst (MLA), Certified Lubrication Specialist (CLS) or Certified Reliability Engineer (CRE).

What Industries Will Benefit:

- Aerospace
- Automotive Manufacturing
- Earthmoving
- Food and Beverage
- General Manufacturing
- Lumber and Wood
- Municipal Utilities
- Petrochemical
- Pharmaceuticals
- Power Generation
- Primary Metals
- Process Manufacturing
- Pulp and Paper
- Rubber and Plastic
- Textile
- Transportation

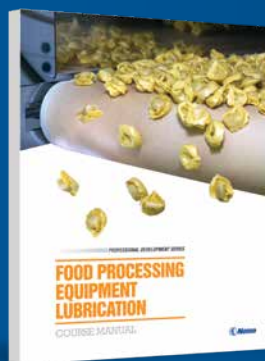


FOOD PROCESSING EQUIPMENT LUBRICATION

Bridging the Gap Between Regulation and Reliability

Course Description

When it comes to food processing, effective lubrication is fundamental to reliable and efficient manufacturing. When the Food Safety Modernization Act (FSMA) was enacted in 2011, manufacturers contributing to the creation of food, pharmaceuticals and dietary supplements were mandated to implement systems and controls that specifically address the hazards which impact the safety of the food supply. This new law puts the burden on the individual company's CEO and board of directors to ensure that the food produced is safe. The implementation of the Hazard Analysis and Critical Control Points (HACCP) and the Hazard Analysis and Risk-Based Preventive Controls (HARPC) emerged as primary guiding principles, shifting the focus on responding to contamination in the U.S. food supply to prevention.



Want to learn more about this course? Download our brochure or visit noria.com/train.

Training Options

- Online

Course Topics

- How to develop a plan for assessing current food-grade lubricant use
- How to conduct a Hazard Analysis and Critical Control Points (HACCP) review of your lubrication program
- How to develop compliant standard operating procedures
- How the various food-grade lubricant requirements and consequences of non-compliance contribute to the biological, chemical and physical risks outlined in FSMA
- How to prepare for an FDA inspection and know what you will need for an FDA inspection

Get Certified

Food Processing Equipment Lubrication prepares students for the ICML's Machinery Lubrication Engineer (MLE) certification.



Who Should Take This Course?

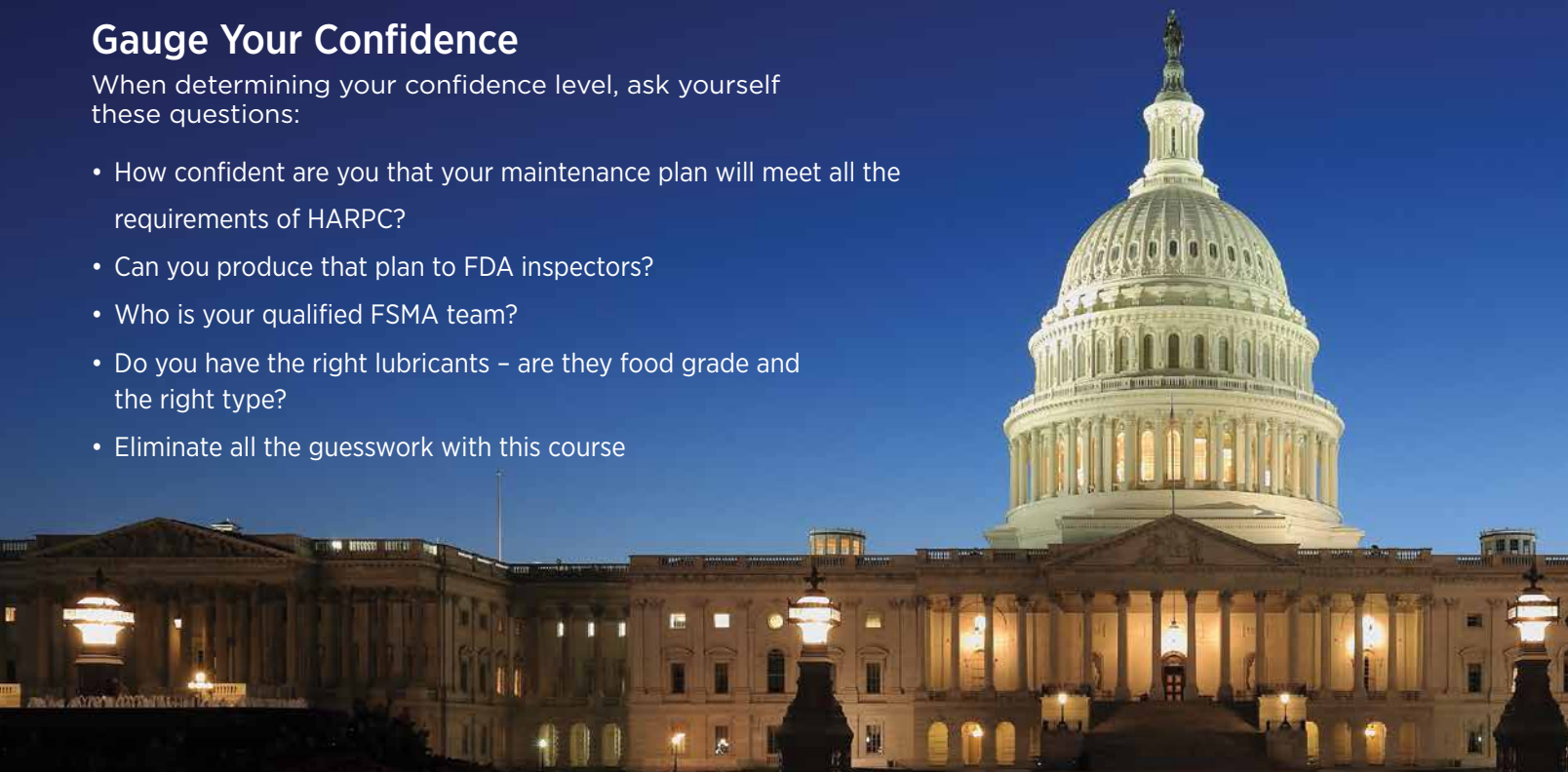
- Maintenance Managers
- Operations Managers
- Plant Managers
- Lubrication Program Managers



Gauge Your Confidence

When determining your confidence level, ask yourself these questions:

- How confident are you that your maintenance plan will meet all the requirements of HARPC?
- Can you produce that plan to FDA inspectors?
- Who is your qualified FSMA team?
- Do you have the right lubricants – are they food grade and the right type?
- Eliminate all the guesswork with this course





LUBRICATION AWARENESS

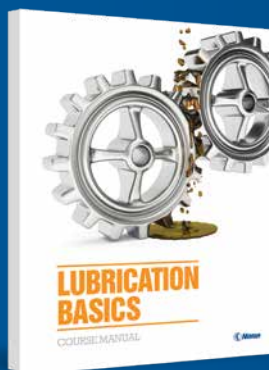
Standardized Lubrication Training for Your Facility

Course Description

When implementing a lubrication program, it's important to have as many people as possible understand the basics of lubricants, lubrication and contamination control. Having everyone on the same page is important to the success of a lubrication program.

This four-hour course provides an overview of how lubricants work and many elements that are important to an effective lubrication program. Attendees will leave the training with an understanding of why lubricants should be cared for as an important asset and why lubricating machinery correctly is critical.

Use this course as standardized training across your organization and for bringing new hires up-to-speed.



Want to learn more about this course? Download our brochure or visit noria.com/train.

Training Options

- Onsite
- Online

Course Topics

- Maintenance and Machine Reliability
- Tribology, Wear and Viscosity
- Base Oils and Additives
- Grease Fundamentals
- Lubricating Oil: Application Methods
- Lubrication Grease: Application Methods
- Lubrication Application: Electric Motors
- Particle Contamination
- Water Contamination
- Contamination Control
- Oil Drains, Flushing and Reservoir Management
- Lube Room, Handling, Storage and Management of Lubricants
- Field Inspections, Basic Machine Care and Daily Rounds



“Wonderful and impactful information that has aided me in my role thoroughly.”

- Rayce Luke, Team Member, Mars



Take This Course If You Are Responsible For:

- Electric Motors
- Compressors
- Diesel Engines
- Final Drives
- Gas/Steam Turbines
- Gearboxes
- Hydraulic Systems
- Hydrostatic Transmissions
- Paper Machines
- Process Pumps
- Rolling Mills
- Blowers/Fans

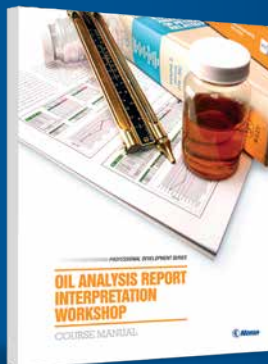


Catch Critical Early Warning Signals

OIL ANALYSIS REPORT INTERPRETATION WORKSHOP

Course Description

High-quality oil analysis is one of the most valuable tools in the condition-monitoring toolbox. Oil analysis labs work hard to place critical machine condition data at your fingertips, but it's up to you to take it the rest of the way. In this course, you will learn a systematic approach to translating oil analysis reports into actionable maintenance decisions. You will learn how to select the right tests for measuring the right data points for specific processes, environments and machine conditions. The course also touches on achieving accurate and consistent data collection, removing data noise to accurately identify false results, elemental analysis interpretation, interpreting metallurgical composition combinations to identify wear modes, setting key performance indicators (KPIs) and alarm limits.



Want to learn more about this course? Download our brochure or visit noria.com/train.

Training Options

- Public
- Onsite

Course Topics

- Using trend report results to identify potential lubricant failures
- Identifying machine wear and failure modes from report data
- Determining when to change, clean or restore lubricant properties
- Identifying when additives have been depleted
- Using elemental analysis results to determine wear locations and mechanisms
- Selecting correct test packages for collecting meaningful data on in-service lubricants
- Extracting meaningful analysis from test reports
- Determining lubricant condition and actions to ensure optimum lubricant performance
- Identifying when the environment and operation have impacted the lubricant
- Applying a systematic approach to reviewing test results and setting next steps
- Identifying data noise from improper lubricant sampling and diagnosing potential sources
- Identifying a quality lab based upon key standards
- Integrating field test and lab analysis results for developing a lubricant health scorecard
- Applying a systematic approach for quick and effective data interpretation
- Interpreting results for determining base oil and additive health, process and environmental contamination, filter performance and machine wear



“ This course was extremely informative and engaging. We were able to have technical discussions about plant applications that related directly to the course. ”

– Brison Louque, MW QC Supervisor, CF Industries



Who Should Attend?

- Machinery Lubricant Analysts
- Lubrication Program Managers
- Lubricant Lab Personnel
- Reliability Engineers
- Predictive Maintenance Specialists

If You Maintain Any Of These Machines:

- Gearboxes
- Hydraulic Systems
- Compressors
- Final Drives
- Rolling Mills
- Electric Motors
- Paper Machines
- Diesel Engines
- Blowers/Fans
- Process Pumps
- Gas Turbines
- Steam Turbines

Reduce Data Interpretation Errors

Even if you do everything else right, the success of an oil analysis program always comes down to correct interpretation of test data. In this course you'll learn a systematic approach to translating your oil analysis data into actionable information. You'll learn how to get the most from your oil analysis program and stop jumping to conclusions too early in the process, reducing errors in interpretation.





Bridging The Gap

INDUSTRIAL LUBRICATION FUNDAMENTALS

Training Options

- Onsite

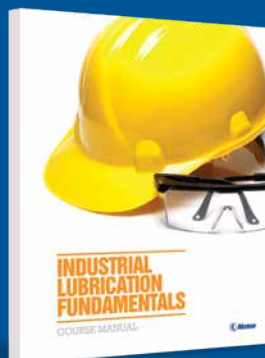
Lay the Groundwork for Future Contributions

Every job has a specialized skillset rooted in its foundation. Industrial Lubrication Fundamentals is the starting point for individuals with all levels of mechanical or maintenance experience. This essential course provides strong techniques and perspective for those with some lubrication knowledge, while presenting sound practical material and instructions for those starting their journey in the field.

Based on extensive collaboration between Noria and plant reliability professionals, the skillset for basic lubrication excellence provides students with the most useful, up-to-date information. This course presents materials in a task-based context, so students receive a well-rounded experience by engaging in interactive exercises, discussing case studies and gaining confidence through hands-on examples.

Who Should Attend?

As an entry-level course, Industrial Lubrication Fundamentals is designed for individuals with little to no technical background, who are responsible for lubrication tasks. Attendee job titles may include lubrication technicians, maintenance technicians, millwrights, mechanics, oilers, machine operators, multicraft technicians, etc.



Want to learn more about this course? Download our brochure or visit noria.com/train.

Course Topics

- Receiving and Inspecting New Lubricants
- Maintaining Lubricant Containers, Machines and Lubricant Storage Areas
- Maintaining Lube Room Inventory
- Removing Contaminants from New Oils with Filter Carts or Installed Systems
- Protecting Lubricant Integrity through Contamination Control
- Transporting and Applying Lubricants
- Conducting Field Inspections on Machines
- Excluding and Removing Contaminants from Lubricated Machines
- Sampling Lubricants
- Importance of Safety, Leak and Spill Response, and Disposal of Hazardous Materials
- Modifying Machinery for Contamination Control, Safety and Reliability Improvement
- Understanding the Communication and Administrative Tasks Necessary for Your Role



Take This Course If You Are Responsible For Maintaining:

- Electric Motors
- Compressors
- Diesel Engines
- Final Drives
- Gas/Steam Turbines
- Gearboxes
- Hydraulic Systems
- Hydrostatic Transmissions
- Paper Machines
- Process Pumps
- Rolling Mills
- Blowers/Fans

Training That Benefits Your Entire Facility

Training is an ongoing process; not just a one-time event. We realize the need for constant training and made this course easy to take back with you. Upon taking this course, you will receive 90-day access to Noria's video-based procedures used in the course. Each video procedure comes with a printable job aid to ensure you can take the training with you as you head out to the plant floor. With access to our world-class procedures, you can refresh and review the content learned in the course anytime and anywhere.

Topics Include:

- Conducting inspections
- Oil changes
- Electric motor bearing regreasing
- Installation of external oil level indicators, valves, quick connectors and more
- Oil sampling
- Using top-up containers
- Oil filtration using a dedicated filter cart

“ **Very good class for novice or experienced personnel.** Great refresher on basics and great information on new and improved technology. ”

– Scott Jaynes, HE Shop, Teck Alaska Red Dog



RELIABILITY SKILLS SERIES

Quickly provide fundamental and best-practice training to everyone in your plant or your entire company with these great online lessons.

How to Use a Grease Gun explains that while the grease gun is one of the most widely used tools for machinery lubrication, few are trained on grease gun best practices. When used or loaded improperly, the grease gun can become a safety risk to both the lubrication technician and the machine.

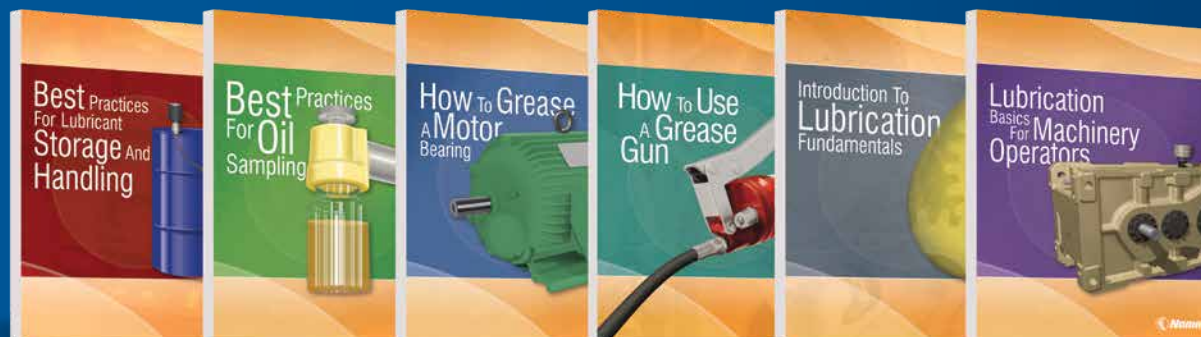
How to Grease a Motor Bearing provides plant personnel with an overview of the best practices for lubricating electric motor bearings. Use it to train operators, lubrication technicians, mechanics, electricians and maintenance personnel for years to come.

Introduction to Lubrication Fundamentals provides a solid foundation on the basics of industrial lubricants and tribology, including oil and grease properties, additives, synthetics, mineral oils, lubricant oxidation and many other important topics.

Best Practices for Oil Sampling shows you how to design and implement a world-class oil sampling program that will deliver better results and help you focus on improving equipment reliability.

Best Practices for Lubricant Storage and Handling provides procedures you can implement right away. From delivery to dispensing to filling the machine, you'll learn the very best practices for new oil storage and handling.

Lubrication Basics for Machinery Operators offers lubrication basic training, including how to recognize the early signs of lubrication-related problems, grease gun basics and safety, checking oil levels, cleaning and inspecting machinery, oil leak inspections and more.

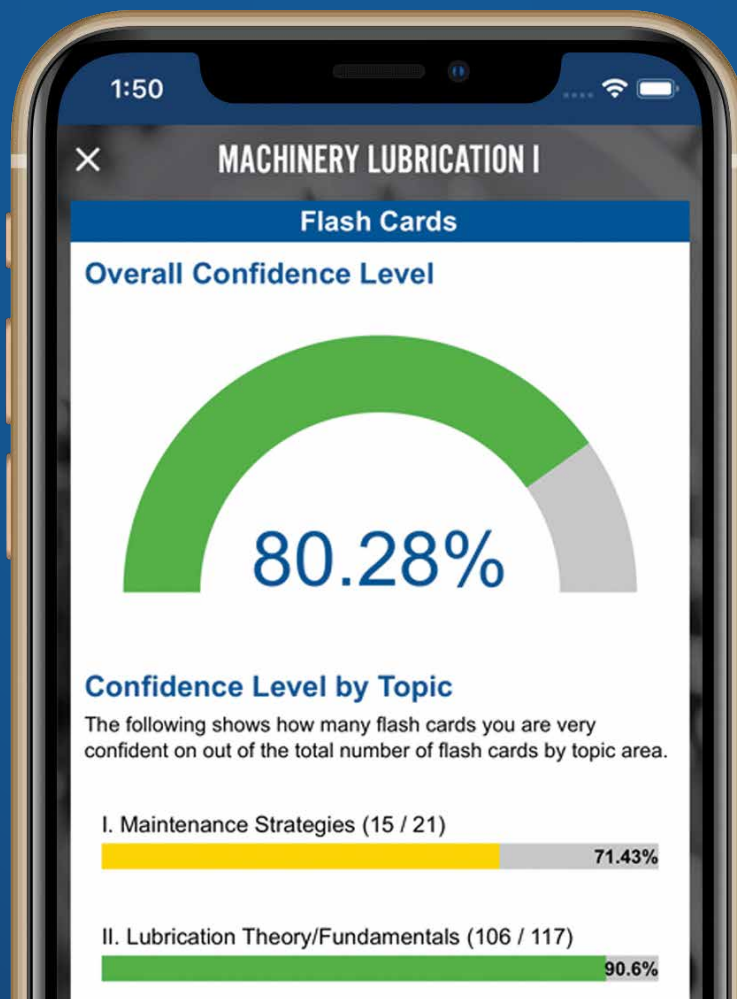


Want to learn more about the Reliability Skills Series of courses?
Download our brochure or visit noria.com/train.

ENHANCE YOUR SKILLS AND ADVANCE YOUR CAREER WITH THE **NORIA ACADEMY APP**

Now Available **En Español**

The Academy app is free with your purchase of any Noria certification courses:
Machinery Lubrication I, Machinery Lubrication II and Oil Analysis II.

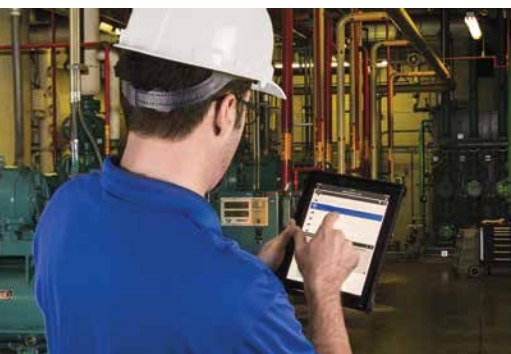




Services & Solutions

Lubrication Program Development

Noria's Lubrication Program Development (LPD) is a comprehensive lubrication overhaul of your facility. Starting with a 540-point assessment of your existing lubrication practices and materials, we use our findings to detail your "roadmap" to lubrication excellence. After developing a custom lubrication program, Noria experts then deliver detailed instructions for maintenance routes, hardware modifications, lubricant types and procedures. We also make recommendations for redesigning your lubricant storage area to preserve lubricant quality and maximize space.

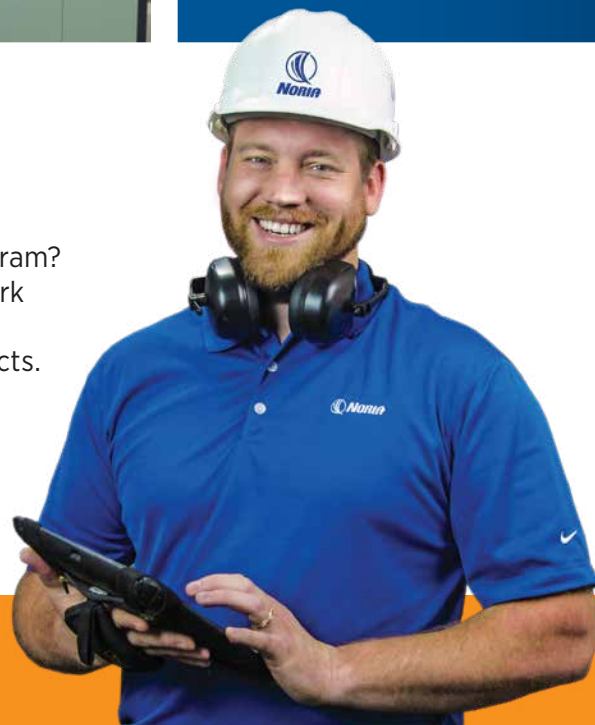


Prevent Mechanical Failure,
Train Personnel And
Maximize Efficiency
In One Program.



Need help enhancing your lubrication and oil analysis program? Workforce Solutions is your answer. Utilizing Noria's network of skilled professionals, this short-term solution provides a combination of onsite and offsite support for various projects. Whether your facility needs help with routes, onboarding and/or verification of best practices, tasks and procedures, Noria can help. To learn more, visit:

noria.com/serve/workforce-solutions



Education & Training

To achieve plant-wide lubrication excellence, Noria can train all personnel – from those with no technical background to those with specialized roles. Noria offers five nationally recognized courses on machinery lubrication and oil analysis, with four of these containing certification preparation. For more details visit:

noria.com/train



Technical Consulting

Lubrication-enabled reliability is Noria's core mission; we supply answers and advice for any reliability issue about lubrication. Over the years, Noria technical consultants have provided expert witnessing and forensic investigations, laboratory studies, benchmarking and specialized troubleshooting on a variety of machine parts and systems.

For More Information,
Call 800-597-5460

Failure Investigation

Machine and lubricant failures – those are words no one likes, but there is a solution. Noria's network of expert investigators covers a multitude of industries and applications. Our technical consulting team has decades of experience in root cause analysis, tribological studies, lubricant analysis, debris/wear particle identification, metallography and more. Our failure investigators will provide the answers and solutions to quickly and efficiently identify the cause to ensure a complete and permanent fix.





ONLINE LEARNING

We realize schedules get hectic. That's why Noria offers three courses online: Machinery Lubrication I, Machinery Lubrication II and Food Processing Equipment Lubrication. With our online learning, you receive:

- **Flexible Certification Preparation:** Gain the right understanding and steps for excellent condition-based maintenance, prepare for a certification test and do it all on your own time – whenever it is best for you.
- **Onboarding:** Use this training for onboarding new employees or to get your team up to speed quickly, efficiently and in alignment with your company culture, skills requirements and performance expectations.
- **Self-paced:** Log in anywhere, anytime on your customized schedule for one year. Play, pause, rewind and replay as often as needed. Learn while maintaining plant and operational schedules. ADA-compliant closed captioning is available.
- **Pre-/Post-assessment Quizzes:** Track your knowledge and understanding through each section with quizzes designed to show your progress and areas that may require further attention.
- **Noria Academy App:** Enjoy access to flashcards, multiple-choice practice exams, quick-question reviews and comprehensive feedback charts. The Academy app is free with the purchase of Machinery Lubrication I and Machinery Lubrication II.

For more information, visit noria.com/train or call 833-273-6518.

Available Courses

- Machinery Lubrication I
- Machinery Lubrication II
- Food Processing Equipment Lubrication
- Lubrication Awareness

Key Features

- 125-question pre- and post-assessments for Machinery Lubrication I and Machinery Lubrication II
- Knowledge checks for each section to evaluate your understanding and ensure you know what to work on before moving forward
- Step-by-step interactive demonstrations of common lubricant analysis tests for Machinery Lubrication I and Machinery Lubrication II
- SCORM compliant, tablet ready
- Includes closed captioning
- Machinery Lubrication I and Machinery Lubrication II meet the training requirements for the ICML MLA and MLT Level I certifications, and MLE certification

Why Train Online?

Affordable: Reduce training costs and improve productivity.

Flexible: Anytime, anywhere. Online training enables your team to learn at their own pace.

Easy To Use: Noria's simple click-and-watch training method is easy for anyone to use.

Course Manual: Downloadable PDF manual for future reference.



ENTERPRISE LEARNING

Online Training

Bring online machinery lubrication and reliable skills training to your entire company through Enterprise Online Learning. We can host the training content on your Learning Management System (LMS) or provide a private, customized learning portal for your team. Our online learning solutions provide the following features:

- Monitor learning progress
- Train on your team's schedule
- Verify skills
- Prepare for industry certification
- Reduce travel expenses
- And more!

All modules are compliant with all training industry standards, and we can successfully implement the following reporting formats: AICC, SCORM 1.2 and xAPI. If you don't have an LMS, ask us about a no-hassle, branded solution for your organization.

Available Courses

- Machinery Lubrication I
- Machinery Lubrication II
- Food Processing Equipment Lubrication
- Lubrication Awareness
- Reliability Skills Series
 - How to Use a Grease Gun
 - How to Grease a Motor Bearing
 - Introduction to Lubrication Fundamentals
 - Best Practices for Oil Sampling
 - Best Practices for Lubricant Storage and Handling
 - Lubrication Basics for Machinery Operators

BRING NORIA TRAINING TO YOU

Available Courses

- Industrial Lubrication Fundamentals
- Machinery Lubrication I & II
- Machinery Lubrication Engineering
- Oil Analysis II & III
- Lubrication Awareness
- Oil Analysis Report Interpretation Workshop

Private Onsite Training

Looking for a personalized training plan for your facility? We offer onsite training to meet your company's schedules, goals and budget needs.

Online training allows for personalized training with examples from onsite equipment, allowing employees to rotate through consecutive one-day trainings and bring personnel from multiple plants to one onsite training. Whether you have 15 people or 500, we are committed to providing options that will have the smallest impact on your production.

For more information, visit noria.com/train or call 833-273-6518.



1328 East 43rd Court
Tulsa, OK 74105
noria.com

TRAINING MATTERS

Find the training that works for you. Noria's machinery lubrication and oil analysis training courses offer something for all levels of expertise, from beginners to experienced technicians and engineers. Enroll today to learn precision lubrication skills for maximizing machine reliability. [For dates and locations, check out \[noria.com/train\]\(http://noria.com/train\).](http://noria.com/train)

