Fundamentals of MACHINERY LUBRICATION

Learn Precision Lubrication Skills for Maximizing Machine Reliability

HERE'S A SAMPLE OF WHAT YOU'LL LEARN:

- How to build a safe and effective lubricant storage and handling program
- How to rate filters and select the right filtration for the job
- Lubricant labeling and coding systems—what works and what doesn’t
- Industry’s best procedures for greasing electric motor bearings
- How to get the right lubricant in the right place at the right time and in the right amount

ENROLL TODAY!
Visit Noria.com or Call 800-597-5460

“The information from this course could save my company as much as $20,000 in monthly oil costs.”
Jeff Smith, Maintenance Planner, Mueller Copper Tubes

Presented by Noria Corporation
Take the Guesswork Out of Machinery Lubrication

If you aren’t using the correct lubricant at the right time in the right quantity and in the right place, you could be doing your equipment more harm than good. Modern lubrication programs have changed considerably from “old school” methods that have been passed down through generations. This course contains a strategic collection of the very best practices for applying and managing lubrication that you can take home and begin using right away.

What You Get When You Attend

- Case Studies
- How-to’s
- Worksheets
- Checklists
- Look-up Charts

When you leave this course, you’ll consider your course manual an indispensable on-the-job reference for years to come.

YOU’LL GAIN PRACTICAL NEW SKILLS THAT YOU CAN USE RIGHT AWAY:

1. The Secrets of Lubricant Selection :: This course will empower you with the knowledge to understand important lubricant properties and strategies to select the correct lubricant for each machine application.

2. The Best Practices for Lubricant Storage, Handling and Dispensing :: Learn how award-winning maintenance programs design lube storage areas, dispensing stations and transfer carts.

3. Grease Gun or Lethal Weapon? :: In the hands of an untrained operator, a grease gun can deliver pressure up to 15,000 psi. That's 30 times what a typical bearing seal can handle. Once the bearing seal is broken, the bearing is on its way to early failure. This course will teach you proper grease gun practices.

4. Effective Oil Analysis with Precision Oil Sampling :: Learn how to get data-rich oil samples, exactly where to install oil sampling ports, and what sampling equipment should and shouldn’t be used.

WHO SHOULD ATTEND?

- All Maintenance Professionals
- Lubrication Technicians
- Craftsmen or Millwrights
- Equipment Operators
- Laboratory Analysts
- Lubrication Engineers
- Maintenance Managers
- Maintenance Supervisors
- Manufacturing & Industrial Engineers
- Operations Managers
- Predictive Maintenance Technicians
- Reliability Engineers

WHAT INDUSTRIES WILL BENEFIT?

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

IF YOU USE ANY OF THESE MACHINES, THIS TRAINING IS A MUST:

- Electric Motors
- Compressors
- Diesel Engines
- Final Drives
- Gas Turbines
- Gearboxes
- Hydraulic Systems
- Hydrostatic Transmissions
- Paper Machines
- Process Pumps
- Rolling Mills
- Steam Turbines
- Blowers/Fans
APPLY WHAT & REAP THE
YOU LEARN & BENEFITS

An Organized & Safe Lubricant Storage Room

Solve Water-in-Oil Problems

Effectively Troubleshoot Lubricant-related Machine Failures

Reduce Energy & Fuel Costs

A More Effective Oil Analysis Program

When the goals of a lubrication program are in sync with the oil analysis program objectives, oil analysis becomes far more effective. Learn how to align the programs for maximum results.

Stop Costly Bearing Failures

Squeeze Maximum Life From Lubricants

Lubricants and hydraulic fluids can have infinite life when specific operating conditions are stabilized. The rising costs of new lubricants and the disposal costs of used fluids are directives for change. Learn a proven action plan for extending fluid life.

Stop Pesky Oil & Hydraulic Fluid Leaks

Leakage is a festering sore to a machine maintenance program. It is often the symptom of a host of other problems. If left unchecked, reduced machine performance is imminent. Eliminating leakage involves the lubrication and oil analysis programs and should be a principal goal.

Reduce Electric Motor Failures & Replacement Costs

Solve Annoying Hydraulic System Problems

Improve Equipment Meantime Between Failures

Create More Effective Lubrication PMs

Compare & Select the Best Lubricants for the Job

With hundreds of lubricant types, basestocks, additive packages and viscosity grades to choose from, how can a person decide which lubricant is right for a machine? The options are endless… Synthetic or hydrocracked?… EP or AW?… Naphthenic or paraffinic?… ISO VG 32 or 68?

Spend Less on Lubricants & Filters

Not More
FUNDAMENTALS OF MACHINERY LUBRICATION

How Lubrication Affects Machine Reliability
- Financial benefits from achieving lubrication excellence
- Four equipment maintenance strategies and when each applies
- Important implementation steps to lubrication excellence

Lubrication Fundamentals
- Six important functions of lubricating oils
- How oils and greases are formulated and why it is important
- How friction is generated in lubricated machinery
- The importance of oil film thickness and critical clearances

Understanding Additives, Base Oils and Grease Thickeners
- How lubricant properties irreparably change
- Seven important physical properties of a base oil
- The importance of API’s five base oil categories
- What causes grease to dry out and 18 ways to prevent it
- How to detect the root causes of lubricant oxidation
- When to select one of the six most commonly used synthetic base oils
- How to use temperature to determine the right base oil for your machine
- How to select grease thickeners for your application

Food-grade and Environment-friendly Lubricants
- Important USDA requirements and government regulations for food-grade lubricants
- What you need to know about food-grade additives, base oils and grease thickeners
- Guidelines for food-grade lubricants

Lubricating Grease Application Methods
- How to protect against incompatible grease mixtures
- Advantages and disadvantages of centralized lubrication systems
- Best practices for greasing motor bearings
- How to control pressure when greasing bearings
- The unique problems caused by over-greasing — specific steps to eliminate
- 3 critical instructions to give your electric motor rebuild shop
- Comparing single- and multi-point lubrication options
- How to calculate greasing intervals and quantity
- Best practices for ultrasonic/sonic-based greasing

Lubricating Oil Application Methods
- Overview of oil lubrication methods and devices
- How to use oil mist and other automatic lubrication methods
- Using pressure spray methods for gearboxes
- Best practices for the maintenance of grease guns and fittings

“ABSOLUTELY AWESOME!
Should reduce downtime 25 to 50 percent.”
Scott Gilreath, Lube Tech, UNICCO

Lubricant Performance Properties
- Key additives that enhance lubricant performance
- Viscosity grades, measurement and reporting
How to protect against problems caused by constant-level oilers
Overview of single-point direct lubrication systems

Journal Bearing Lubricants
The 8 most common journal bearing lubrication problems
How to select journal bearing viscosity based on speed

Rolling-element Bearing Lubricants
The nine critical factors affecting rolling-element bearing lubricant selection
How to convert required operating temperature viscosity to ISO viscosity grades

Gear Lubricants
5 key requirements for gear oil
How to select the best viscosity for a gear lubricant
Best practice guidelines for storing spare gear boxes – lubrication matters!
10 conditions that may require synthetic gear lubricants
Lubricant best practices for enclosed gears – a 12-point checklist
Mastering the challenges of open gear lubrication

Automotive and Mobile Equipment Drive-line Lubricants
How to read a motor oil label – what really matters
The six critical objectives a motor oil must accomplish
Understanding API service classifications for engine and gear oils
The No. 1 reason automatic transmission fluids fail and how to protect against it
Service classifications for automotive greases – how to select
Extending engine life – surprising engine oil filter study results

Compressor Lubricants
Steps you can take right now to combat compressor lubricant failure
The most common compressor lubricant stressors
When to use synthetic compressor lubricants and why

“Packed with powerful information that can be applied with measurable results, this course provides the right training to influence a cultural change in maintenance and operation organizations.”

Brian Baldwin, Reliability Engineering Manager, Dynergy

TAKE THIS COURSE ONLINE
Create your own flexible schedule to learn machinery lubrication and oil analysis best practices with Noria’s online Web-based training. This self-paced instruction is presented over the Internet to browser-equipped learners. Noria online training courses span the spectrum from “how to” results-based courses to skill-building courses to meet the needs of today’s industry professionals.

This flexible training format provides convenience for companies, allowing students to learn at their own pace and schedule. Courses may be repeated as many times as desired during the one-year subscription period, and students receive a printable certificate upon course completion.

Why online training?
Affordable – Reduce training costs while improving productivity to affect your bottom line.
Flexible – Learn at your own continued pace, anytime, anywhere. Available 24/7, so you can stop, rewind and replay.
Easy – No computer knowledge required! Simply click, watch and learn.

Visit noria.com/train to view our course list and purchase online or call 800-597-5460, ext. 233 to purchase for groups.
Steam and Gas Turbine Lubricants

- Why turbine/generator lubricants are the No. 1 contributor to forced outages
- Comparing steam and gas turbine oils – how they differ
- Checklist for best practice steam turbine lubrication

Hydraulic Fluids

- How to select the ideal hydraulic fluid viscosity for gear, vane and piston pumps
- Nine key hydraulic fluid requirements and why they matter
- Specific conditions that may require a synthetic hydraulic fluid
- Fire-resistant hydraulic fluids – what you need to know
- Hydraulic system maintenance best practices – 21-point checklist

Contamination Control

- Strategies for building reliability through contamination control
- The seven most destructive contaminants and how to control them
- Specific steps for managing a proactive lubricant management program
- The ISO Solid Contaminant Code – understand it, track it
- 10 ways to get more mileage out of portable filter carts
- How dirt, metal particles and soot mechanically destroy machine surfaces
- Guidelines for controlling machine surface fatigue and extending machine life
- The No. 1 cause of machine wear and how to manage it
- How to set realistic cleanliness levels for lubricants

“Implementing the basic principles taught during this training would prevent premature failure of most all of our rotating machinery!”

Brittany Russo, Reliability Engineer, Braskem

Oil Drains, Flushing and Reservoir Management

- How to optimize and extend oil change intervals
- Interval vs. condition-based oil changes – pros and cons
- Metrics for monitoring lubricant consumption
- Best practices for oil changes
- Know how and when to perform a flush
- The best procedures for oil draining and refilling
- How and when to use the bleed-and-feed strategy for extending oil drains
- Selecting the right cleaning and flushing procedures

Storing, Handling and Managing Lubricants

- How to set up a world-class lube room
- How to know when to reject a new oil delivery
- How to optimize your lubricant selection and procurement process
- How to implement a lubricant consolidation program and select suppliers
- Used lubricant storage, handling and disposal best practices
- Bulk lubricant storage do’s and don’ts
- Guidelines for storing and handling drums
“Until I attended this training, I had no idea how poor our best practices were. Improvements will be easy. Justifications will be easy. Recouping the cost of this class will take about a week!”

Tim Pendley, Mechanical Engineer, Westlake Chemical

Design and Inspect for Lube Excellence

- World-class strategies for accessorizing equipment for lubrication excellence
- Seven critical accessories for lubricant inspection and sampling
- The right machine accessories for effective contamination control

Used Oil Sampling and Analysis Fundamentals

- What oil analysis can tell you
- Types and categories of oil analysis
- Applications for oil analysis
- Overview of oil analysis tests
- Elements of a successful oil analysis program
- How clean should oil sample bottles be?
- How to find the best sampling locations

Essential Field Inspections

- 12 questions your oil filter will answer about your machine
- Visual inspections you can get big results from right now
- Quick tips for using scent, sound and touch to inspect lubricants

“The presentation is full color and high quality, making the information easy to comprehend and remember.”

Alfredo Romaro
Maintenance Technician, Kawneer Company
Join This List of World-class Companies That Have Benefited from Noria Training

3M
Alabama Power
Alcoa
Alumax
Ameren
American Electric Power
ArcelorMittal
Archer Daniels Midland
Barrick Goldstrike
BHP
Boeing
Boise Cascade
BP
Cargill
Castrol
Caterpillar
Centralia Mining
Chevron
Citgo
Clopay
ConAgra Foods
ConocoPhillips
Constellation Energy
Dow Chemical
Dow Corning
DTE Energy
DuPont
Dynegy
Elk Lilly
Entergy
ExxonMobil
First Energy
Florida Power
Ford Motor Co.
Formosa Plastics
General Electric
General Mills
General Motors
Geneva Steel
Georgia Pacific
Georgia Power
Goodyear
Great Lakes Chemical
Harley-Davidson
Holcim
Honeywell
Intel
Heinz
Houston Metro Transit
International Paper
Invista
John Deere
Kinder Morgan
Koch Industries
Lockheed Martin
Lukens Steel
M&M Mars
MillerCoors
Michelin
Mosaic
Noranda Aluminum
Nova Chemicals
Owens Corning
OxyChem
Pacific Gas & Electric
Peabody Energy
Pfizer
Powder River Coal
PPG Industries
Procter & Gamble
Progress Energy
Reliant Energy
Rio Tinto
Seattle Times
Seminole Electric
Shell Oil
Southern Company
Temple-Inland
Texaco
Texas Instruments
Toyota
TXU Energy
Unilever
U.S. Army
U.S. Navy
U.S. Postal Service
USG Corporation
Verso Paper
Via Rail Canada
Westinghouse
Weyerhaeuser
Whirlpool
Willamette Industries

ONSITE TRAINING

Need to train your team, but it’s always been too expensive? More and more companies are realizing the value of bringing training onsite. This flexible and cost-effective option allows you to train as many employees as desired.

The benefits of onsite training are obvious and rewarding:

> Tailored curriculum to address your company’s needs in a more personable, intimate setting
> Cost-effective return on investment – with significant savings onsite versus travel expenses and time away from the plant, downtime and schedule disruptions are minimized
> Confidential company issues and solutions may be discussed freely onsite
> Strong team-building opportunities

Lubrication is the foundation of reliability, lubrication training is the catalyst for change, and Noria is the world leader in lubrication and oil analysis education and consulting. Bring us onsite for tailored, private team training – call us today at 800-597-5460, ext. 233.
From Our Resource Center...

The Level 1 Study Packet
The Level I MLT / Level I MLA Study Packet Includes:

- **Flash Card Pack**: 385 flash cards to help you prepare for both ICML Level I MLT and Level I MLA certification.

- **125-Question Practice Exam**: This multiple-choice practice test is a great self-assessment tool and helps you prepare for both ICML Level I MLT and MLA certification. Licensed for use by one person.

- **How To Take A Multiple-Choice Exam**: Includes advice from professionals who have passed ICML certification exams as well as helpful hints for the night prior to the exam, steps to take before entering the exam room, techniques to manage your time during the exam and advice for handling different types of questions.

- **Lubrication Fundamentals**: Discusses lubricant basics, machine elements that require lubrication, methods of application, lubrication, lubricant storage and handling, and lubricant conservation.

- **Oil Analysis Basics**: Presents the fundamentals of oil analysis for machinery condition monitoring in an easy-to-understand format. You'll learn 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**: Once you start reading this book, you probably won't stop until you finish it. It is that easy to read. You'll find understandable explanations of how lubricants work, what they're made of and how they break down. Topics ranging from engine lubricants to industrial oils and hydraulic fluids are covered.

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**Get Certified!**

Level I certification testing will be held on the Friday following the training by the International Council for Machinery Lubrication.

**How To Certify**

There are two ways to register for a certification exam.

- **Online**: www.LubeCouncil.org  Phone: 918-259-2950

**What Is ICML?**

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

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“This course has provided me with an in-depth view on how to create a world-class lubrication program.”

Dennis Hill, Facility Engineer, Alcoa

Preparation tools for ICML Level 1 MLT and Level 1 MLA

Retail Price: $416.95

Your Price: $355

Plus $14 for shipping in the U.S.

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**Which Certifications?**

This course is designed to help you prepare for the following ICML certification exams:

- Level I Machine Lubricant Analyst (MLA)
- Level I Machine Lubrication Technician (MLT)

Find out more about these ICML certification exams at the ICML web site: www.LubeCouncil.org