
BEST-IN-CLASS FACILITY LUBRICATION PROGRAM

INTRODUCTION

Today's equipment is being asked to run faster and longer in harsh environments between scheduled maintenance. As a result, unscheduled outages contribute to some of the highest cost in today's industrial marketplace. Lubricants are key to avoiding these costs as the life blood vital to keeping equipment running.

At Mobil Serv | RIG we want to maximize your facilities uptime. Maintaining a Best-In-Class Lubrication Program ensures that equipment is properly lubricated in a safe, efficient and environmentally friendly manner. A strong lubrication program:

- Meets or exceeds equipment manufacturer recommended ISO cleanliness levels
- Minimizes downtime risk
- Extends equipment life
- And reduces required routine maintenance and man hours

Our Best-In-Class Lubricant Program serves as an early warning for problems and reduces total cost of equipment ownership.

OVERVIEW

Elements of a "Best-In-Class" Lubrication Program include:

- **Safety/Environmental Practices**—Principles to safely store, distribute and sample lubricants.
- **Training Materials**—Documents that explain the program and identify continuous improvement objectives that will be used to train any personnel involved in lubrication upkeep.
- **Program Management**—People practices and principles supporting a superior lubrication program.
- **Program Tracking**—Electronic tracking to monitor lubricant selection, work orders, targeted cleanliness, and frequencies. This is adaptive to condition based requirements.
- **Lubrication Procedures**—Formalized program steps that ensure equipment is lubricated with the right product, at the right time, in the right amount.
- **Delivery / Storage Instructions**—Steps that ensure lubricant integrity is maintained during delivery and storage.
- **Lubricant Dispensing Guidelines**—Ensure lubricants are distributed in the appropriate quantities, meeting or exceeding equipment manufacturer cleanliness specifications when added to equipment.
- **Equipment Contamination Control**—Practices that prevent externally and internally generated contamination.
- **Lubrication Maintenance Practices**—Implemented to optimize lubricant effectiveness over time and includes filter/breather checks, equipment needs, reservoir upkeep, and define acceptable ISO levels.
- **Lubricant Selection Audit**—A review of all lubricants in use with recommendations for Best-In-Class Mobil Lubricants to be used going forward that extend equipment life, save energy and increase productivity
- **Monitoring Guidelines**—Defines best practices for sample frequency, routes, and analysis by equipment piece to extend equipment life.
- **Sustainability / Adaptability Program**—Lubrication program that promotes long-term social, environmental, economic, health and continuous improvement goals.

ELEMENT DETAILS



ELEMENT 1: Safety / Environmental

The Best-In-Class Lubricant Program will first and foremost include safety and environmental considerations to be followed during execution. These items include (but are not limited to):

- PPE requirements
- Permitting requirements
- Lockout tagout procedures
- Housekeeping
- Spill prevention
- Handling of lubricants
- Lifting techniques
- Job safety analysis



ELEMENT 2: Training

The training program is to be taught to any personnel executing any aspect of the program, including safety, environmental, procedures, and program objectives. Additional suggested training includes:

- Oil analysis
- MLT or CLS—Machinery Lubrication Technician / Certified Lubrication Specialist
- Condition based lubrication for ultrasound greasing
- Filtration and condition monitoring
- Fundamentals of lubrication



ELEMENT 3: Program Management

Each site should have—at a minimum—one program “Champion.” Champions are charged with implementing or scheduling training and auditing the program execution at designated intervals. Champions maintain program integrity and move the program forward with continuous improvement objectives.

Utilization of Key Performance Indicators (KPI’s) and Continuous Improvement (CI) team reviews are two suggested ways to keeping the program from becoming a stagnate “order execution” style program. All team members are trained to have input and ownership of the program.

Best-In-Class Lubrication Program Management would include review boards of the site Champion, ExxonMobil Lube Engineer, Reliable Industrial Group and Lubrication Distributor representatives.



ELEMENT 4: Program Tracking

Modern lubrication programs include electronic cloud-based tracking. This eliminates data gaps between managers, teams and machines. The implemented tracking solutions should bring safety, operations, work orders, and maintenance tasks into a single easy-to-use application, and feature:

- Real-time communication and reporting
- Location mapping
- Digital inspection and audits
- Health, Safety and Environmental requirements
- Compliance requirements
- Planning and dispatch
- Work orders
- Lubrication management
- Time tracking
- Asset management
- Preventive maintenance scheduling
- Contamination control tracking
- Filter/breather tracking
- KPI dashboard



ELEMENT 5: Lubrication Procedures

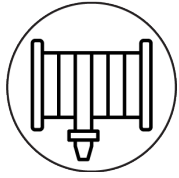
Exact procedures should be custom build for each location, task and piece of equipment. These procedures should include safety requirements, permit requirements, lubrication type, and the process steps to execute each work order. All procedures need to be consistently formatted, detailed, uploaded to the database, and included with work orders.



ELEMENT 6: Delivery / Storage

Detailed instructions for receiving and storing lubricants. The focus should be on the expected cleanliness levels of lubricants to be delivered and include how to maintain that cleanliness level prior to lubricants being transferred into equipment. Instructions should include information such as lubricant usage details and optimal storage locations. A Best-In-Class Lubrication Program will use positive / negative pressure lube rooms, color coordinated labeling systems, filter in / filter out programs, bulk storage tank cleaning, cross contamination prevention plans, and include an audit process.





ELEMENT 7: Lubricant Dispensing

Lubricant dispensing guidelines cover program elements such as: dedicated containers, transfer filter pumps, grease guns and hoses. Work order guidelines should be outlined and required to include equipment manufacturer cleanliness requirements / targeted cleanliness level requirements, filter ratings, equipment to utilize for transferal, and all specified lube points for accurate dispensing of products.



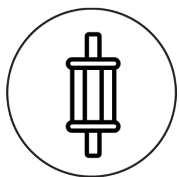
ELEMENT 8: Equipment Contamination Control

This part of the program is designed to prevent accidental internal or external contamination of lubricants. It includes the following information:

- Equipment manufacturer cleanliness level requirements for each piece of equipment
- Sampling frequency
- Sampling procedures
- Sampling locations
- And visual inspection alerts that trigger condition-based sampling



Also outlined here are all on-site testing capabilities for particle count, water contamination, and means to remove contamination. In addition, all relevant information for lubricant service requirements including varnish mitigation and flushing procedures should be included. This information is utilized by the reliability / maintenance team and turnaround planners.



ELEMENT 9: Lubrication Maintenance Practices

Used to optimize lubricant effectiveness over time, lubricant maintenance practices evaluate filters / breathers / lubricant fill access point requirements for each system, including offline "slip stream" dehydration and filtration needs. This information is then organized into a regular lubrication maintenance program that maintains required lubricant cleanliness levels, including regular reservoir cleaning.





ELEMENT 10: Lubricant Selection Audit

Every program should include a lubricant audit performed by the Program Champion in conjunction with ExxonMobil and RIG. Current lubricants are reviewed and documented, and Best-In-Class lubricants to be used moving forward identified. Selection criteria includes lubricants for each piece of equipment that meet or exceed equipment manufacturer specifications for reduced energy consumption, safety / environmental impact, equipment life expectancy, and/or increased uptime. Any changes to lubrication based on the audit will include a full procedure accompany the work order to execute the change.



ELEMENT 11: Monitoring

Monitoring designates sampling frequency, sampling routes and required analysis per piece of equipment. This includes on-site testing capabilities for particle count and water content. For best practices, any critical systems are recommended to include in-line continuous monitoring of particle count and water content.



ELEMENT 12: Sustainability / Adaptability

This final piece of the Best-In-Class Lubricant Program focuses on a sites long term social, environmental and economic health. Development of this part of the program requires input from the business side of the facility and the safety and environmental group.

Any guidelines developed here will need to be adaptable to changes in personnel, business needs and regulatory climate. While best practice processes may not change, the programs goals and objectives can. Utilizing the KPI's and Continuous Improvement teams to include annual goals will give transparency to program objectives.

This would be integrated with the E-Tracking Program and have the option for expansion needs. It would also allow sharing of information and best practices with other company owned facilities.

CONTACT RELIABLE INDUSTRIAL GROUP (RIG)

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