



ENROL INC.

Solutions In Lubrication
Technical Advice, Training and Support

Lubrication Survey

STLE Toronto Section Education Seminar
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ENROL INC.



Overview and Contents

“Inadequate or improper lubrication accounts up to 60% of all mechanical failures in industry”

A carefully conducted lubrication survey is essential to the success of a program to prevent unnecessary failures and waste.

- **Different types of Lubrication Surveys**
- **Components of a Complete Lubrication Survey**
- **Lubrication Survey for Maintenance Program**
- **Three options for complete Lubrication Survey Program**

Lubrication Survey & Lubrication Management

- **Cost of lubrication is minor compared to the potential consequences of poor lubrication practices.**
- **Benefits of lubrication Survey and Lubricant management include:**
 - **Lower equipment maintenance costs:**
 - **Longer equipment life and more efficient and reliable operation of equipment.**
 - **Reduction in unscheduled downtime due to lubricant related equipment failure.**
 - **Lower lubrication cost:**
 - **Increased effectiveness and efficiency of lubrication staff.**
 - **Reduced lube inventories through lubricant consolidation.**
 - **Increased health/safety/environmental awareness related to lubrication practices.**

Lubrication Survey Programs

Lubrication Survey can mean various things

- **Lube Application Cross-Reference Table and general lubrication recommendations.**
 - Often provided as a value added service by the lubricant supplier
 - Usually completed infrequently.
- **Lube Audit**
 - Conducted by knowledgeable lubricant supplier personnel, knowledgeable in-house maintenance engineer or third party lubricant specialist.
 - Identifies opportunities for improvement in practices and lubricants
 - Conducted once as a special project or updated at scheduled intervals
- **Equipment Lubrication Survey**
 - Lubrication data recorded for all point on all equipment
 - Conducted by knowledgeable lubricant supplier personnel, knowledgeable in-house maintenance engineer or third party lubricant specialist
 - Routinely updated and installed on plant software or program

Lubrication Survey Programs

What is a Lubrication Survey (continued)

- **Plant and Process Equipment Lubrication Survey**
 - A complete lubrication survey with accurate data captures all lubricated assets
 - When properly implemented all equipment will receive the correct lubricant at the proper frequency and in the correct amount of lubrication eliminating lube-related failures.
 - The survey data can be used in a computer maintenance system to provide work routines, sample schedules and data capture for improved equipment reliability.
- **Ongoing Lubrication Maintenance Program**
 - Compile the lubrication survey and put it into action
 - Document lubrication and maintenance practices and identify gaps.
 - Best lubrication and maintenance practices become the goal
 - Used continuous improvement metrics and processes to close the gaps
 - Ongoing training
 - Assigned lubrication specialist to ensure maintenance time and resources are effectively used to maximize equipment life and reduce maintenance costs.

Lubrication Survey Process

How to start?

- Choose the type of Lubrication Survey
- Identify personnel to lead the project
- Hire outside resources if they are not already contracted.
- Include all staff in presentation of plan and encourage them to make suggestions

Lubrication Survey Process

Equipment and resources for Lubrication Survey:

- **Data collection equipment**
 - Android tablet,
 - iPad
 - Laptop
 - Include protective case with safety strap
 - Transfer/save data to external storage in real time to ensure no significant loss if audit equipment is accidently damaged
- Infrared temperature gun
- Flashlight with safety strap
- Sample thief, bottles & labels
- Lint-free rags
- Camera (smartphone or tablet camera with safety strap)
- Energy tester



Lubrication Survey Process

- Establish a logical sequence of equipment for the manufacturing process.
- Use process diagrams to understand equipment and in-house nomenclature.
- List of equipment by name, asset number, process description and lubrication points
- Access reference and support material:
 - Equipment history and information using computerized maintenance management system, plant maintenance files, OEM manuals and physical survey of the plant.

Typical information includes:

- Lube Route (include responsible person in process)
- Equipment Drivers
 - Electric motor bearings,
 - Internal combustion engine,
 - Turbine,
 - Hydraulic system, etc.
- Couplings
- Gear box, reducer or force multiplier
- Moving parts (bearings, pivots, slideways etc.)

Lubrication Survey Process

- List Lubricants (develop a table of logical abbreviations)
- List the Method of Application
- List the Service and Change Frequencies
- Note problems, concerns and recent changes. (make lots of notes)
- Ask questions and record regarding current :
 - OEM recommendations
 - current lubricant in use
 - maintenance frequency
 - lubrication intervals
 - quantities applied, leakage issues
 - oil drain Interval
 - application method
 - filter used, beta ratio
 - used oil analysis

Lubrication Survey Keys

- Measure and record operating temperatures
- Document operating conditions
- Vibrations data
- Contamination reports
- Record unusual odours, fog, vapours, environment, unusual conditions
- If possible use photographs to record improvement opportunities
- In complex cases record and provide photographic lube instructions.
- Document Storage, dispensing methods and lubricant housekeeping for improvement opportunities
- Record lubricant containers, sizes and usage in storeroom, lube storage areas and lube cabinets.
- Implement lubricant consolidation opportunities
- Develop plans:
 - for unique labeling,
 - methods of dispensing,
 - sealed containersto prevent misapplication and contamination



Lubrication Survey Process

Summary of Lubrication Program Development Phase

- Develop an Equipment List
- Conduct Lubrication Survey
- Document observations and conditions
- Select Lubricants
- Consolidate Lubricants (If applicable)
- Develop a Lubrication Manual or Database
- Purchase Necessary Lubrication Equipment
- Set Lubrication Preventive Maintenance (PM) Frequency
- Continue to update and record

Lubrication Survey Programs

Several options are usually considered to evaluate lubrication and lubrication related best maintenance practices.

1) Lubrication Audit:

- Time requirement 1-3 days on-site.
- Review current lubrication scheduling, routines, knowledge of equipment lubricant requirements.
- Identify potential improvements to improve reliability
- Review lubricants used and document general applications
- Identify opportunities to reduce costs in the lubricants, lubricant life, and provide a move to best practice for equipment lubrication, and contamination control.
- Identify opportunities to include advanced, synthetic or premium lubricant that may provide energy conservation or longer service life.
- Review current lubricant storage, and handling practices to identify improvements.
- Examine current lubricant and filter disposals practices and identify opportunities to reduce lubricant disposal and disposal cost

Lubrication Survey Programs

2) Lubrication Survey

- Timing requirements a week or more on-site
- Includes all parts of the first option with a focus on equipment specific requirements and review.
- Documenting key equipment specific lubricant requirements and verification of correct lubricant type and viscosity for application based on OEM recommendation and actual operation parameters.
- Using the identified key equipment operation parameters, i.e. operating temperature, lubricant make-up and relubrication volume, system change-out requirements determine and recommend opportunities for application of best practices.
- Review historic and current oil analysis sampling processes, testing intervals, and trending processes to identify equipment variations and changes to assist in proactively scheduling maintenance work.
- Identify opportunities for lubrication training, in plant lubrication documentation changes, MSDS process and availability.

Lubrication Survey Programs

3) Ongoing Lubrication Maintenance program

- Time requirement as with the second option plus an ongoing commitment
- Requires an organizational commitment to achieve best practises in all maintenance areas.
- Using a full audit/survey of the maintenance process using the Industry standard like Tompkins Scoreboard for Maintenance Excellence using 18 major functional areas in maintenance (or similar scoreboard)
- Assess for improvement opportunities using an evaluation criteria in 200 areas. This is a much broader approach than only lubrication and lubrication practices.
- The goal is to establish an organizational culture with a process that will continuously work to achieve best practices in many areas using assigned teams, specific maintenance related metrics and targets.
- Combined teams meet on a monthly, quarterly and annual basis with a dedicated facilitator (usually a third party like ENROL Inc.)
- The facilitator issues quarterly progress reviews and identified activities are adjusted and enhanced as required with seminars and training to address gaps and achieve closure on identified opportunities.

Lubrication Survey Programs

Questions?

Lubrication Management

The goal of lubrication management is to ensure:

- The RIGHT lubricant of the RIGHT quality
- Applied in the RIGHT place, at the RIGHT time, in the RIGHT quantity
- Handled and stored with the RIGHT health and safety practices,
- Disposed of in the RIGHT environmental manner

Lubrication Survey Benefits

In simple terms lubrication survey benefits:

- Reduces the number of lubricants purchased
- Reduces the number and type of lubricants warehoused
- Reduces the possibility for mis-application and cross contamination
- Reduces the number of lubricants that have to be documented and controlled as part of environmental compliance
- Provide and verify base data for lubricant management programs.