

## Lubrication Management for Reduced Contamination and Increased Productivity

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### INTRODUCTION

Lubrication plays a vital role in machinery maintenance but most of the palm oil mills generally rely on unskilled workers to carry out this vital task with almost no guidance or proper training given to the persons handling the actual job. This article was written in response to a paper from SKF on the role of lubrication management and has been specifically adopted for the *Palm Oil Engineering Bulletin* for the benefit of the industry.

'At best', poor lubrication causes machine downtime; 'at worst' it contaminates final product, leading to rejected deliveries and therefore lost business. This article explains how better lubrication management practices can save money and increase productivity by preventing contamination of the lubricant, as well as the final product.

A lot of money can be lost when palm oil shipments are rejected because they have been contaminated by mineral oil.

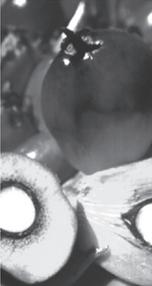
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"Today, all major countries make checks for mineral lubricating oil contamination of imported palm oil and if traces are found then the oil will be rejected," explains Janne Lundgren, SKF Food and Beverage Segment Manager for Asia Pacific.

It is not only the final product that can have an impact from faulty lubricant practices but also in the other process stages (*Figure 1*).

There are many sources of potential contamination that have to be overcome in the palm oil industry. For example, large hydraulic systems for screw presses can leak considerable quantities of oil into palm oil through over-lubrication of bearings and chains due to seal failures caused by the harsh industrial environment – an additional cause of potential contamination.

"To prevent product contamination and machine downtime, one of the areas with major impact is proper lubrication management," says Alain Noordover, SKF Maintenance Products, Netherlands. "This will also improve productivity, which means plants can achieve more production from existing capacity".



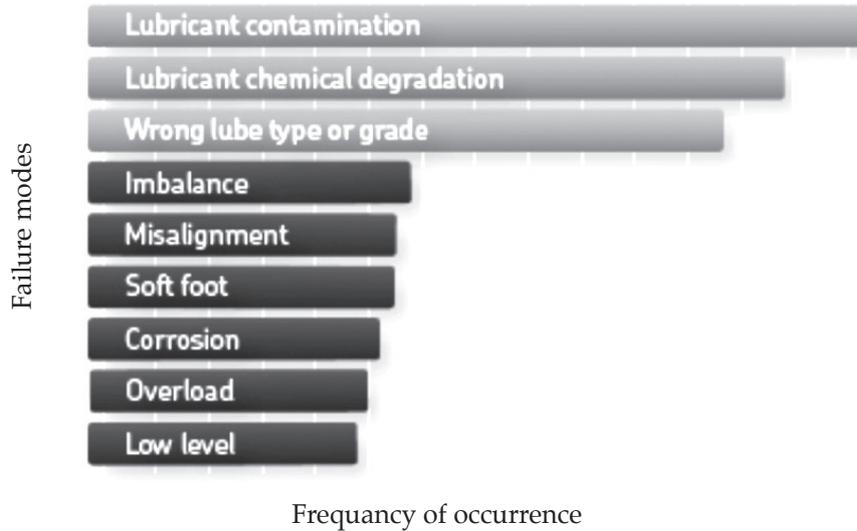


Figure 1.

### FROM LUBRICATION TO LUBRICATION MANAGEMENT – THE 5R APPROACH

A good lubrication programme can be defined by applying the 5R approach: “The right lubricant, in the right amount, reaches the right point at the right time using the right method”. This simple and logical approach, however, requires a detailed action plan, while a structured process can enhance the benefits.

### HOW CAN A STRUCTURED LUBRICATION MANAGEMENT PROGRAMME HELP THE PALM OIL INDUSTRY REDUCE TRACES OF MINERAL OIL IN PALM OIL?

SKF lubrication management process:

- SKF client needs analysis lubrication management;
- SKF lubrication audit;
- Improvement proposal;
- design and implementation; and
- optimisation.

The starting point is to perform a first assessment to ascertain main goals and concerns. The output is an appraisal of the

lubrication programme’s maturity level as well as an identification of the main strengths and areas with major opportunities for improvement.

### SKF Client Needs Analysis Lubrication Management

The second step is to evaluate the underlying weaknesses. This requires a detailed assessment of lubrication practices. A SKF lubrication audit is conducted mostly on the plant floor, requiring the involvement of the team in charge of lubrication. The audit questionnaire is structured to cover the different aspects of a lubrication programme.

### SKF Lubrication Audit

Here are some of the most important ones:

#### *Lubricant delivery, storage and handling.*

- Does the lubrication storage room provide a clean and safe environment for the lubricants?
- Lubricants can become unusable if incorrectly stored in a contaminated or a hot environment. For example, grease

can harden or soften beyond the limits required in these situations; it can also oxidise or be subject to excessive oil separation. Moreover, food grade lubricants (e.g. NSF H1 certified) should be stored in separate locations from the non-food grades to avoid mixtures or later misapplications of lubricants.

#### *Lubricant selection.*

- Is there a structured selection and consolidation process to optimise both the lubricants for the application and the inventory? Have food grade oils been considered as replacement for mineral oil, in areas with highest contamination risk of final product?

#### *Lubricant application.*

- How is it ensured that only the right lubricant is being supplied in the right way at the right point?

It is important to minimise the likelihood of oil/grease spills and contamination during the lubrication process and to apply the correct lubricant in the correct way. The time interval between each application of lubricant can also have a dramatic effect on the efficiency of the system, as can the volume of lubricant applied (*Figure 2*).



*Figure 2. Impact of excess lubrication.*

#### *Lubricant contamination and condition control.*

- How is the monitoring, removal and control of lubricant contamination handled?

#### *Lubrication programme management and personnel development.*

- Is there a structured and consistent process to execute and follow up lubrication tasks? Does it include key performance indicators, training and constant improvement goals?

#### *Lubrication practices standardisation.*

- Are all procedures properly documented, implemented and kept updated?

#### *Environmental, health and safety (EHS) practices.*

- Are EHS regulations considered in the lubrication programme?

#### *Automatic lubrication system practices.*

- Is the plant taking full advantage of available technologies to optimise machinery lubrication conditions?

The output of an SKF lubrication audit is a comprehensive report of current lubrication programme and its efficiency. It includes a detailed list of strengths and improvement opportunities along with a series of recommendations. It can also include a calculation of the potential financial benefits in improving the lubrication programme.

Once a complete diagnosis has been established and improvement opportunities have been identified, the third step is to create specific activities that can be undertaken to improve the lubrication programme.



## Improvement Proposal

Typical proposals might include, but are not limited to:

- lubricants selection and consolidation;
- lubrication routines design: tasks, inspections, lubrication cards;
- storage room design;
- colour coding implementation: tools and lubrication points;
- oil analysis programme design;
- contamination control programme;
- standard procedures generation;
- training; and
- centralised lubrication systems.

The fourth step is to design and implement an action plan. SKF can offer support by providing a range of maintenance tools and services: from consultancy to guiding the actual execution of a given activity, to training programmes and more.

## Design and Implementation

The fifth step concerns the evolution of the programme, which is measured through the use of key performance indicators. It

is important to determine any required adjustments and periodic reassessments which will provide insights into the overall evolution of the programme.

## Optimisation

By implementing this structured, process palm oil plants can reduce the risk of product contamination, whilst improving machinery efficiency and uptime. This means less rejection of palm oil shipments, more production from existing capacity and maximised profits.

In addition to lubrication management expertise, SKF has a unique understanding of rotating equipment and how machine components and industrial processes are interrelated, in every major industry worldwide – including the palm oil industry. This knowledge – coupled with its expertise in sealing solutions, lubrication systems, linear motion, machinery maintenance, power transmission, mechatronics, and services – enables SKF to deliver real-world solutions that help maximise mechanical performance over the entire life cycle of an asset.