PAPER MACHINE FLUSHING

PREVENTING CONTAMINATION AND BLOCKAGE IN RETURN LINE

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Whitepaper

SYNOPSIS

Contamination buildup in dryer bearing return lines can cause reduced flow. The reduced flow will cause the bearing temperature to rise leading to bearing failure and unscheduled downtime.

INTRODUCTION

Paper machine lube oil systems are highly susceptible to contamination build-up. This is due to:

- Systems not being a closed loop.
- Contamination entering through unfiltered air vents, openings in the gear casings, and through the labyrinth seals.
- Older machinery with built up contamination over many years.

Contamination deposits are normally formed from water, spent additives, paper dust and oxidized oil by-products in the presence of heat. Deposits are found in:

- Reservoirs
- Return lines
- Enclosed gear casings
- Bearings

When the bearing drain gets blocked the oil puddles in housing and can leak out the labyrinth seal.

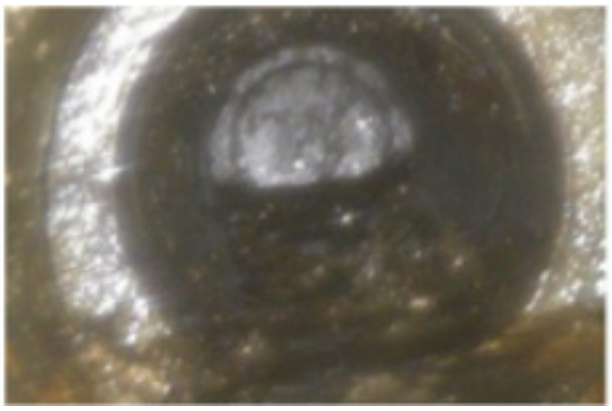

Figure 1. Bearing drain blocked

LEAKAGE CYCLES BUILD

Paper machines often get stuck in a cycle of lubrication leakage.

- Oil leaks out of the labyrinth seals onto the paper, decreasing flow
- Reduced flow compromises proper lubrication and efficiencies are affected.
- Temperatures rise
- Lubrication barriers are effected
- Oxidation deposits form and wear particles build up
- Causing additional leakage
- The cycle repeats and leakage gets worse

RIG's paper machine flush services are designed to target areas of contamination. Focusing on contamination in bearing housings and the return headers. Removing this contamination increases the flow back to optimal levels allowing heat and contamination to be carried away from the bearings.

IDENTIFYING LEAKAGE IN YOUR MACHINES

INVESTIGATE: Look for clues that the lubricant is not flowing effectively

EXAMPLE 1: WHAT TO LOOK FOR

The Paper Machine Dryer Bearings below are beside each other on the same machine. Bearing housing on the right has more paint missing and rust.

WHY?

- High Temperature?
- Exposure to Water?

Figure 2a. Left: Paper Machine Dryer Bearings

Figure 2b. Right: Paper Machine Dryer Bearings

IDENTIFYING LEAKAGE IN YOUR MACHINES

INVESTIGATE: Look for clues that the lubricant is not flowing effectively

EXAMPLE 2

The Dryer Bearings below are beside each other on the same machine. Bearing housing on the left is wet with oil indicating a labyrinth seal leak.

WHY?

- Damaged Seal
- Contamination build up blocking return line
- Contamination in Bearing Housing

Figure 3a. Left: Dryer Bearings wet with oil

Figure 3b. Right: Dryer Bearings

IDENTIFYING LEAKAGE IN YOUR MACHINES

EXAMPLE 3

The Paper Machine Dryer Bearing drain channel below are on the same machine. Wear metals, Oil oxidation, paper are just some of the material that can cause blockage in these areas.

Figure 4a. Before

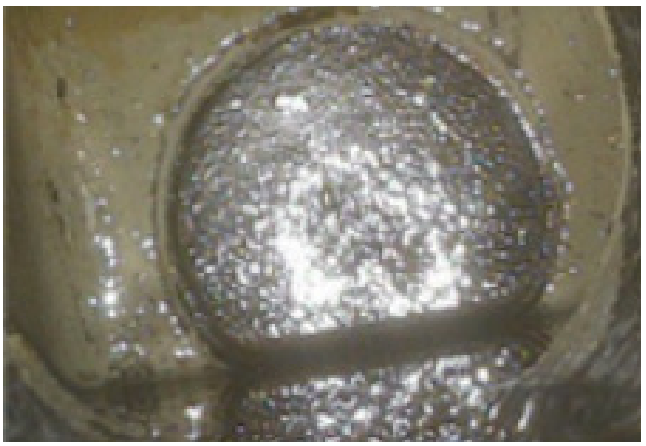

Figure 4b. After

RECOMMENDED INVESTIGATION TOOLS

TEMPERATURE GUN

Monitor Bearing Temperatures. Use a Temp Gun to take readings across all the bearings to find “Hot Spots”.

BORE SCOPE

Use a bore-scope to go inside bearing and visually inspect condition of drain.

Figure 5. Temp Heat Gun

Figure 6. Bore-Scope

FLUSHING & CLEANING STEPS

1. Bearing Housings – Flush each bearing housing individually using “feed and return” method.
2. Gear-case – Manually clean through bottom access covers and/or flush.
3. Return Headers – Use a power auger to break-up sludge and flush from header ends to water traps and water traps to reservoir. Flush in sections with feed and return pumps.
4. Supply Headers – Rarely we discover that the supply headers require flushing. There are usually upper and lower headers. Utilize the same flush method as return headers.

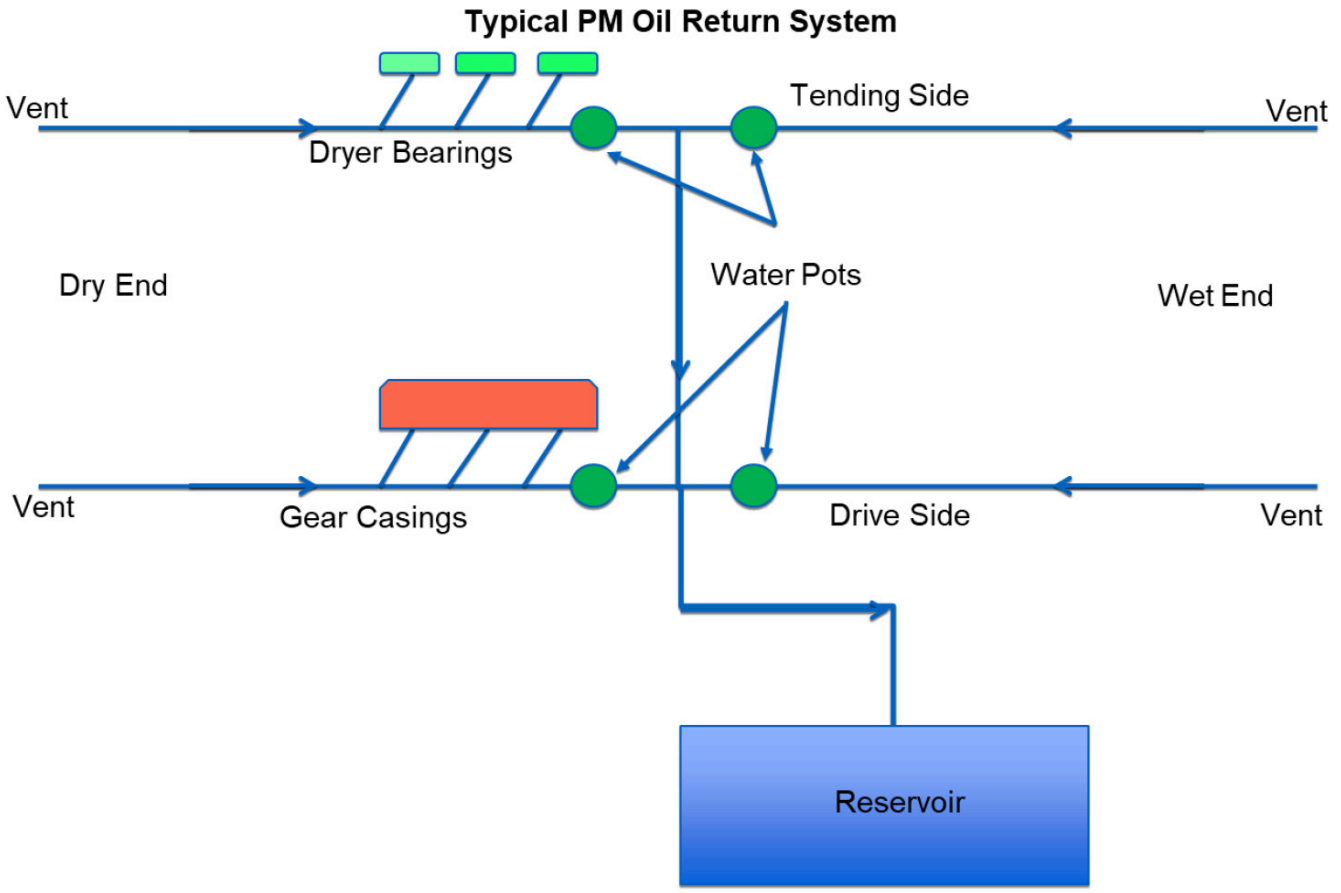

Figure 7. Typical PM Oil System

PAY SPECIAL ATTENTION TO RESERVOIRS

When flushing contamination out of the bearings and headers it is important to include cleaning the reservoir and recondition the lubricant. This can include filtration for particulate and dehydration for water removal.

Figure 8a. Before Cleaning

Figure 8b. After Cleaning

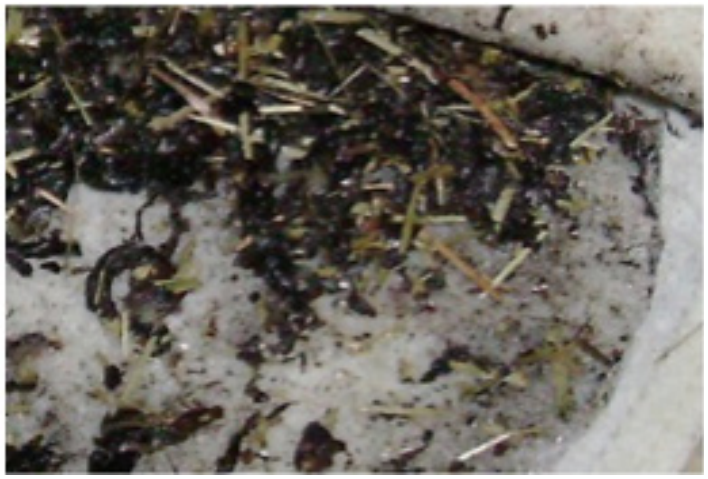

Figure 9a. Examples of Contamination removed from flush and reservoir cleaning

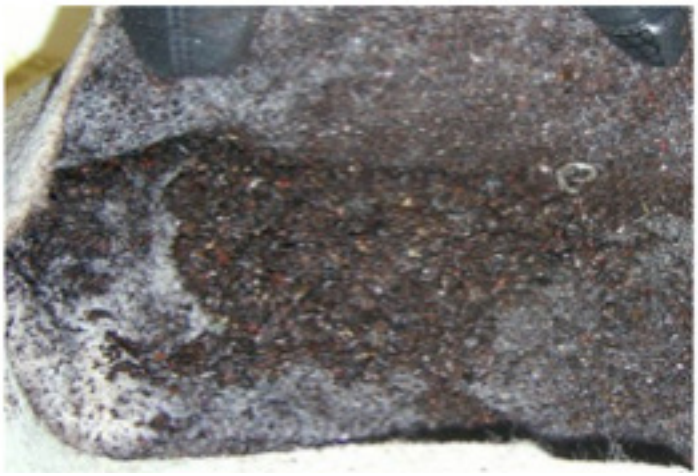

Figure 9b. Examples of Contamination removed from flush and reservoir cleaning

CONCLUSION

Keeping your lubricants flow path clean and clear will keep the lubrication system working at an optimal level, maintaining bearing temperatures within manufacturers recommendations and avoiding downtime.

Flushes have cleaned out oxidation and have been proven to reduce bearing temperature up to 20-degrees.

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