

EXCAVATOR BOOM FOOT & HOIST CYLINDER MONITORING – LIEBHERR 9600

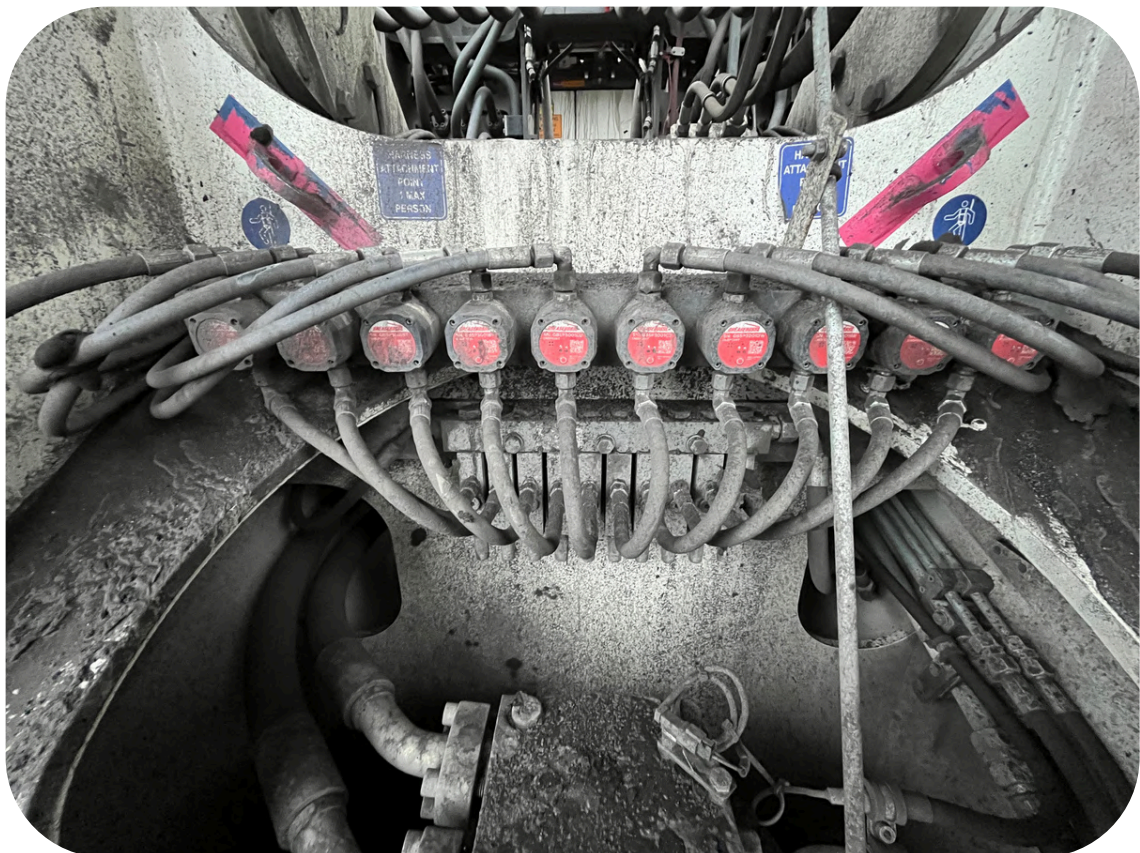
The customer, a tier 1 Australian mining company had experienced **repeated failures in the boom foot and hoist cylinder areas of their Liebherr fleet**. GreaseBoss implemented the Critical Point Monitoring solution by installing 12 Endpoint LF units, which provided near real-time lubrication volume data and allowed for visibility of the planned vs actual greasing volumes.

The GreaseBoss monitoring led to the detection of a bypassing injector on the swing box (not directly monitored by endpoints) and the identification of an incorrect pump timer setting, resulting in **significant grease consumption cost savings and prevented a potential swing box failure**.

CONTEXT

The customer experienced repeated failures in the boom foot and hoist cylinder areas of their Liebherr fleet, and the maintenance team had **no clear identification of the root cause**.

To provide the maintenance team with answers, GreaseBoss installed and monitored 12 Endpoint LF units on a custom-made bracket and directly mounted to injectors, measuring the grease volume data to the boom foot and hoist cylinders. **This installation has been providing reliable auto lube monitoring for 7 months and has detected a number of actionable issues during this time.**



SOLUTIONS PROVIDED

GreaseBoss implemented the Critical Point Monitoring solution, installing **12 Endpoint LF** units to monitor the boom foot & hoist cylinders, with custom made brackets.

Gateways were connected to the site OT network as a secure and reliable data backhaul option in the pit.

OEM lubrication specification data was set in the GreaseBoss Cloud as the target delivery volumes. The solution provided near real-time lubrication volume data, allowing for immediate comparison of **planned vs actual greasing volumes** to the OEM specification.



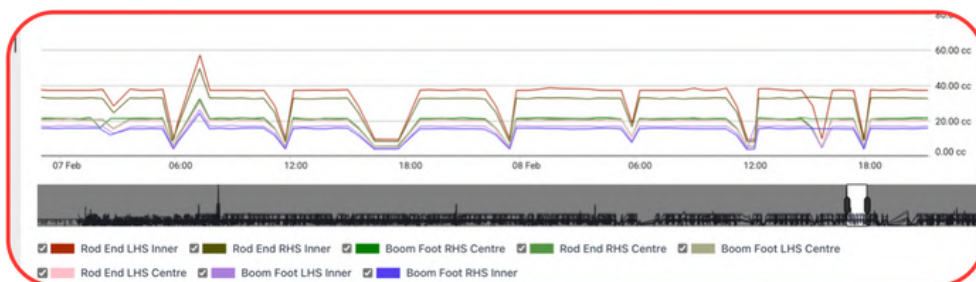
FINDINGS

ABILITY TO DETECT BYPASSING INJECTORS THAT ARE NOT DIRECTLY MONITORED BY ENDPOINTS

An unexpected, and unprecedented discovery, from this pilot was that the GreaseBoss system successfully alerted the maintenance team of lubrication issues on a bypassing injector that was not being directly monitored (on the swing box). **The GreaseBoss System quantified the impact that one bypassing injector on a non-critical point had on the entire lube system.** The OEM lubrication system monitoring alarm provided very little warnings or information around the issue and would not have enabled the technician to find the fault.

HEALTHY LUBE SYSTEM

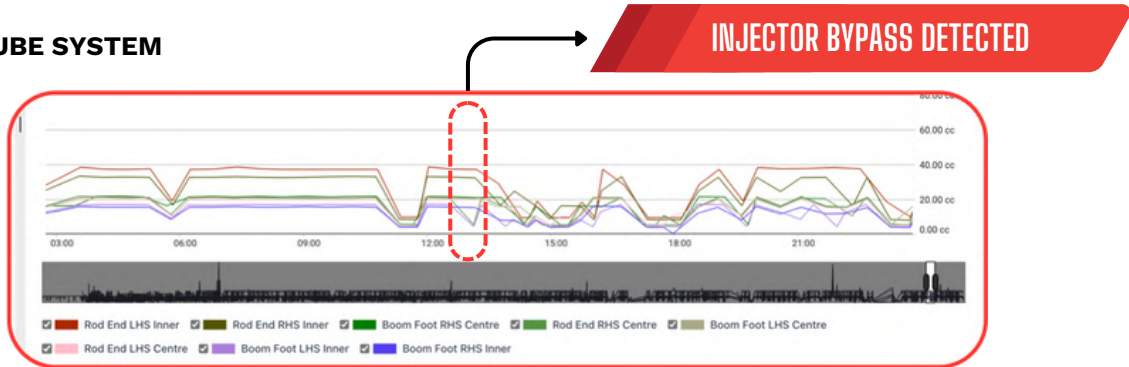
Below is the “healthy” lube system showing all monitored grease points trending together.



The data below shows the exact moment that an injector on the swing box (not directly monitored by Endpoints) started bypassing, the **system showed chaotic data trends** among the monitored endpoints, **enabling the identification of the issue and subsequent maintenance actions** to restore the system's consistency and health.

By identifying the impact of a bypassing injector, even when it was not directly monitored, the system showcased its advanced diagnostic capabilities.

FAULTY LUBE SYSTEM

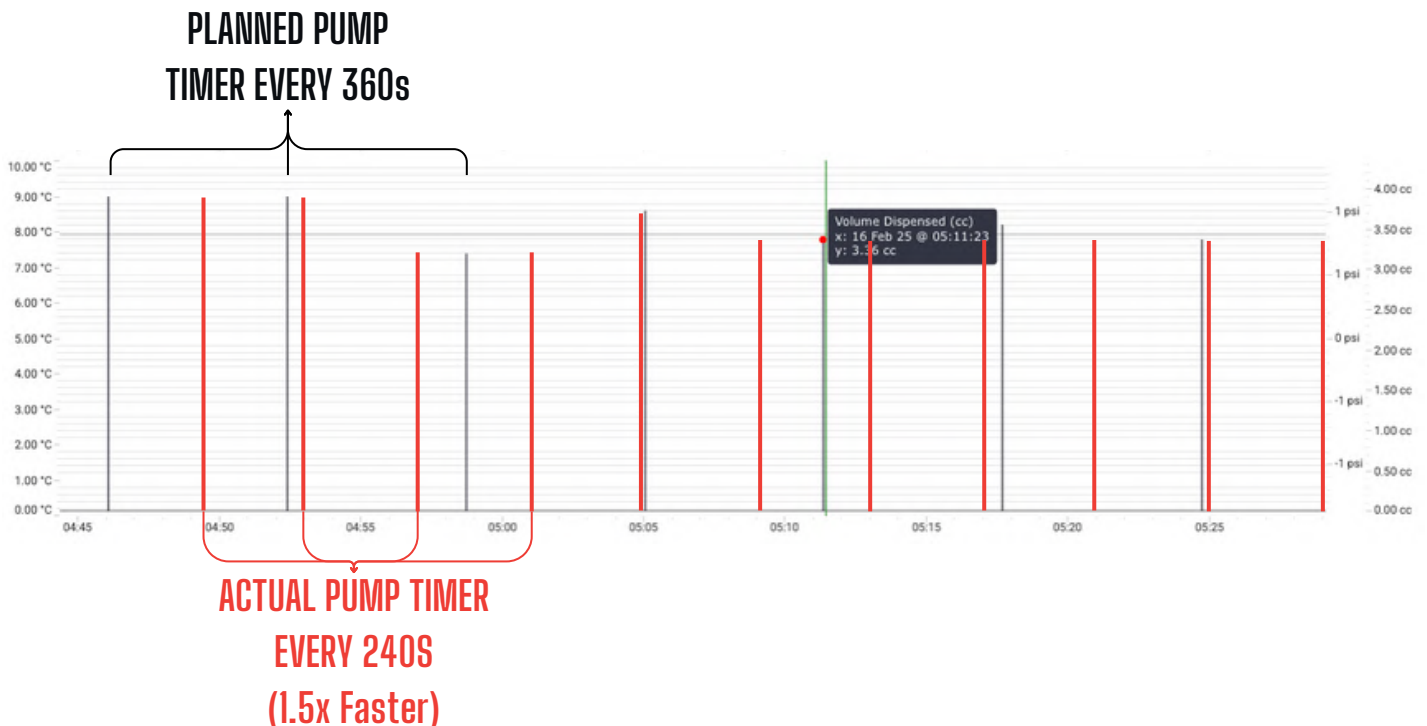


This finding has significant implications for future fleetwide installations, as it allows customers to proactively address lubrication issues, and obtain cost effective monitoring of both critical points as well as the lube system as a whole.

A Machine Learning system is now being developed to automatically detect and alert on this type of failure in the GreaseBoss Cloud.

ABILITY TO DETECT INCORRECT PUMP TIMER SETTING

Our customer experienced **significant overgreasing** issues on their excavator **due to an incorrect pump timer setting**. By analysing the data, we discovered that the pump timer was set to run every 240 seconds instead of the intended 360 seconds. **This discrepancy resulted in the system being overgreased by 1.5 times** compared to a comparable excavator.



MEASURABLE OUTCOMES

CERTAINTY OVER GREASE APPLICATION VOLUMES TO CRITICAL POINTS

The GreaseBoss system has provided visibility and certainty to the site maintenance team over the grease volume application to the critical boom foot and hoist cylinder points over the past 7 months. During this time, there has been no failures of these components.

COST EFFECTIVE CRITICAL POINT AND LUBE SYSTEM HEALTH MONITORING

The installation demonstrates the ability for the GreaseBoss system to provide a cost effective solution that provides detailed monitoring for critical grease points, whilst also providing a full lube system "health" monitoring benefit to detect issues across the whole lube system.

VISIBILITY AND CONTROL OVER GREASE CONSUMPTION

Identifying and rectifying the incorrect pump timer setting allowed the customer to grease exactly as per the OEM specifications and **avoid approximately \$70,000 in wasted grease per year. This type of savings, across a large HME fleet can**

PREVENT \$70,000 IN WASTED GREASE/YEAR ON ONE ASSET

**POTENTIAL FOR HUNDREDS OF THOUSANDS IN ANNUAL GREASE
CONSUMPTION SAVINGS ACROSS HME FLEET**