INTEGRATED SUPPLY

CASE STUDY

CONDITION MONITORING APPLICATION AGAINST A REPETITIVE BEARING FAILURE

A predictive maintenance approach with a properly working condition monitoring system saves £396,000 ($510,000) per failure.

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BACKGROUND

Bearings are critical components in mechanical systems, pivotal in reducing friction between moving parts and supporting loads. They operate under harsh conditions, including high loads, speeds, and varying temperatures. Over time, these conditions can cause wear and tear, leading to potential failures. Bearing maintenance is essential to ensure manufacturing assets' smooth operation and longevity. **Failure to maintain bearings adequately can lead to severe operational disruptions, costly repairs and extended downtimes**.

This case study covers our engineering support for one of our clients, who is a global leader in the food and beverage industry. Operating across multiple sites, our client is renowned for high product and production quality. Their operational mission includes minimising downtime and reducing their carbon footprint. Despite these efforts, **they faced significant operational challenges due to repetitive bearing failures** on their labeller machine. **Each failure caused up to 36 hours of production downtime, leading to an estimated financial loss of £396,000 ($510,000).**

To address this problem, our Reliability Engineer proposed an improvement project to significantly reduce the risk of downtime.

Importance of Bearing

- Reduce friction and support loads in mechanical systems
- Operate under high loads, speeds, and varying temperatures

Potential Issues

- Wear and tear over time
- Potential failures lead to operational disruptions, costly repairs, and downtime

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THE CHALLENGE

The primary challenge was **unexpected bearing failures leading to prolonged downtime and substantial financial losses**. The existing maintenance approach, which included a vibration control system and bi-weekly manual checks, was **ineffective due to data flow gaps in the CMMS system and unclear roles and responsibilities in interpreting the data**, highlighting the need for a more reliable and proactive approach.

Our goal was to **reduce unplanned downtime, enhance equipment reliability, and improve overall operational efficiency.**

OBJECTIVES

- Investigate and identify alternative bearing technologies.
- Assess current vibration systems on-site and improve as necessary.
- Expand current vibration analysis systems to continuously monitor equipment health and provide early warnings of potential issues.
- Minimise costly downtime incidents and associated financial losses by proactively addressing bearing-related problems.

THE SOLUTION

To address the challenge, we proposed a dual approach.

- **Advanced Bearing Solution**

Our team thoroughly examined the bearings' working conditions and available technologies for those conditions. Collaborating with manufacturers and experts, **we identified the most suitable solution for the labeller application. A new bearing product with an alternative material composition**, promising enhanced durability and performance, was selected.

- **Vibration Monitoring System**

An expansion of the existing vibration analysis system was planned. The new system would **continuously monitor equipment health in real-time, providing early warnings of potential issues.** The project included installing sensors and integrating data transfer to the platform provided by the supplier for continuous monitoring and analysis.

The solution also **involved training the on-site maintenance team** to build the required expertise allowing them to use and manage the analysis system effectively. Additionally, **we established routine maintenance schedules** for the bearings and the monitoring system.

The project cost was also remarkable, amounting to only £600 ($775) per bearing application.

> **"The proposal aligned perfectly with our mission to minimize downtime and boost operational efficiency. The projected cost savings and increased reliability were compelling reasons to move forward with the solution."**
>
> **Head of Manufacturing**

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RESULTS

Implementing the advanced bearing solution and vibration analysis system resulted in several key benefits:

- **Improved Equipment Reliability**

Adopting advanced bearings and continuous monitoring significantly reduced equipment failures, enhancing reliability and operational stability.

- **Cost Savings**

Regarding the previous incident, **the estimated savings were approximately £396,000 ($510,000) per incident**, based on 36 hours of downtime per incident and a cost of £11,000 ($14,170) per hour of unplanned downtime.

Increased Productivity

Production targets were consistently met or exceeded with minimised downtime and improved equipment reliability.

- **Employee Skill Development**

The training allowed the maintenance team to develop new equipment monitoring and analysis skills, contributing to a more skilled workforce.

In addition to all these benefits, the new approach moved our client's bearing maintenance maturity level from predominantly reactive to predictive, bringing them closer to a world-class level of asset management.

THE RISK FOR THE LOSS OF

£396,000 / $510,000

PER INCIDENT WAS REMOVED

A MAJOR SHIFT IN THE MAINTENANCE APPROACH

FROM TO

REACTIVE >>> PREDICTIVE

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