**DECISION & CONTROL**

CONDITION-BASED MAINTENANCE OF ROTATING MACHINERY

When in operation, machines and vehicles produce vibrations. By monitoring the characteristic patterns in these vibrations we know when components, such as bearings or gears, start to show faults, typically as a result of mechanical wear. This knowledge allows us to schedule maintenance well before failure, but only when the system needs it, reducing downtime and optimising the maintenance costs. Flanders Make offers customised monitoring solutions to detect and diagnose faults in machines and vehicles based on sensing technologies for vibrations, acoustics and e-motor currents.
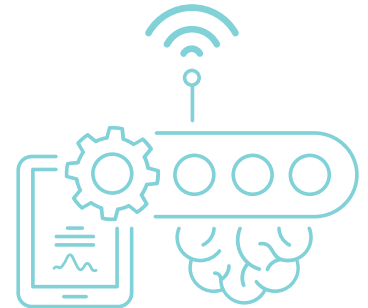
In our Smart Maintenance Lab, we capture the vibration data of vehicles and machines using accelerometers. We connect this information with other available parameters such as temperature, rotational speed, etc. The signals are then processed using smart fault detection and prediction algorithms. Our algorithms can be implemented on embedded hardware to process the data and optionally send the health indicators to a cloud environment for easy monitoring.

If you are looking for a partner to evaluate and demonstrate the feasibility of condition monitoring for your specific machine or vehicle, we can help by installing our portable monitoring system, gather machine data and process them using our algorithms. Secondly, we also offer our proprietary algorithms for robust fault detection and prediction, ready for use with low-cost vibration sensors. Thirdly, our test infrastructure for customised testing of bearings and gears is available for different types of bearing or gear faults. Finally, we can provide well-documented vibration datasets from accelerated life tests on bearings to test, evaluate or benchmark existing condition monitoring solutions.

We use various unique software and hardware tools in this process:

- Robust fault detection and prediction algorithms for faults in bearings, gears, motors, etc.
- A wide range of sensing technologies (e.g. low-cost, MEMS-based accelerometers and microphones, ultrasound sensors, current sensors, etc.).
- Portable condition monitoring system for data acquisition and processing.
- Bearing setups in smart maintenance lab for high-quality datasets.

Vibration-based condition monitoring of an expander machine

PROBLEM

The current maintenance strategy applied to expander machines is time-based (preventive) maintenance. This manual inspection requires, every week, a lot of manpower. Furthermore, when the machine breaks down, the production comes to a complete standstill.

SOLUTION

Installing a condition monitoring system using low-cost accelerometers. By adding a software toolbox we can use vibration signals as health indicators to continuously monitor the condition of the expander machine.

CUSTOMER VALUE

- Reduction of manpower:
  - Periodic & manual inspections on expander machines by technicians are no longer required.
- Condition-based instead of time-based maintenance:
  - Maintenance can be planned according to the actual machine condition.
- Minimisation of production loss due to prevention of unexpected machine breakdowns.