Condition Based Maintenance (CBM)

VTT TECHNOLOGY

The condition based maintenance (CBM) ensures that maintenance is performed at the right time and only if necessary. It includes condition monitoring, automatic diagnosis and prognosis as well as management of maintenance information.

SOLUTION

CBM comprises analysis of various condition related features derived from vibration, temperature, pressure, flow etc. measurements from critical components such as bearings, gears, electrical devices, or engines and structure elements. The data is collected at regular intervals or continually and when necessary wirelessly transmitted to IoT network, and analyzed in a real-time.

IMPACT

CBM of equipment and machinery enables higher productivity, optimal operation and maintenance, improves the reliability of a system and employees safety, and decreases maintenance costs.

Process

- Specifying measurement needs
- Development of measurement algorithms
- Measurement data analysis
- Design of CBM based concept
O&M Analytics - a toolbox for decision support from condition monitoring data

- Automation of diagnostics and prognostics, and more optimized operation and maintenance.
- Increases the knowledge of the operation and behaviour of machines and processes throughout their entire life-cycles.
- Supports different phases of condition based maintenance with tools that extract essential information and automate data processing. For example,
  - Fault detection of industrial centrifuges based on measured electrical current
  - Centralized monitoring of a fleet of machines that supports organizational learning
Toolbox features

Toolbox features include modules for:

- Data import
- Data preparation
- Feature extraction
- State recognition
- Load profiles
- Anomaly detection
- Analysis of causality
- Time-frequency analysis
- Analysis of bearings and gearboxes
- Decision support
General Machine Health Solutions

Our focus

- Development of monitoring, analysis and management systems of machines and structures.

Our competences

- Condition monitoring, diagnostics, prognostics
- Measuring methods
- Tribology (friction, wear, lubrication).
- Vibration and shock attenuation
- Fatigue and durability of structures.
Light Remote Solutions for O&M

The goal is to provide easily exploitable methods and technologies related to operation and maintenance that can be implemented for lightweight and cost-effective solutions for a range of services to implement. For Example:

- Fault and usage history of the machine
  - Operating hours, fuel consumption, fault history of the components
- Safety tracking
  - Load situation, tilting and other wanted alarms concerning safety
Heavy Remote Solutions for CBM

- Global Asset Management (GAM): Highlights
- The selected Internet-of-Things (IoT) platform for GAM platform development
  - Microsoft Azure Intelligent Systems Service
  - IoT framework consisting of MS products & services
- Condition Based Maintenance (CBM) Phase 1, Demo:
  - Example of E-maintenance Network and Modern Integrated Control System in Mobile Machinery
Additional information

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