Valmet DNA Machine Monitoring

Integrated online condition monitoring for paper and board production lines

Valmet DNA Machine Monitoring continuously monitors the mechanical condition and performance of critical machinery, components and processes in paper and board production lines. Online machine condition monitoring enables 24/7 monitoring, thus providing the fastest possible way to act on problems and secure the production, protect assets and increase working environment safety.

Based on the measurement of vibration and other critical process parameters, DNA Machine Monitoring provides the diagnostic tools for detecting vibration problems originating from bearings, rolls/roll covers, gearboxes, doctoring/coating blades, press fabrics and process equipment, to prevent and minimize unscheduled shutdowns.

DNA Machine Monitoring can work as a fully integrated application in the Valmet DNA automation platform or as a stand-alone monitoring system.

Predictive maintenance to increase reliability and availability

Immediate alerts define the location and indicates the severity and development of the vibration problems. Comprehensive analysis tools are available to define fault specific problems, such as:

• bearing defects
• gearbox faults
• roll cover defects/delamination
• resonance/barring
• misalignment
• unbalance
• wear and looseness
• insufficient lubrication.

Time-trending allows personnel to follow the fault development of a mechanical defect and helps in planning corrective actions and shutdowns.

Integrated application provides machine condition information for process operators and maintenance personnel through one common user interface.

Mechanical problems with machine components are detected, analyzed and time-trended. This ensures that problems are recognized quickly, their causes are correctly defined, and corrective actions are taken at the right time.
Monitoring, analysis and follow-up

DNA Machine Monitoring provides a comprehensive set of tools for alarm handling, fault analysis and fault trending. Machine condition parameters are measured in variable frequency ranges to ensure developing defects are detected. Alarm/alert limits can be set manually, e.g. for machinery with fixed speed, and with speed adaptive intelligent alarm handling (IAH) tool for machinery with variable speeds. Additionally the IAH tool provides information about the machines’ dynamic behavior at different speeds.

Analysis tools for fault diagnostic are:

- Spectrum and time signal (acceleration and velocity)
- Envelope spectrum and time signal
- Synchronized Time Average (STA) circular diagram, spectrum and time signal

Machine related data like bearing type, number of gear teeth etc. are entered into the analysis window to make analysis fast, easy and accurate.

Time-trends are shown with a related bar graph and alarm status for each monitored parameter.

Time-trends shows fault development and helps to schedule corrective actions and shutdowns timely.

Spectrum analysis with related trend

Head box pulsations are often related to upstream pumps or screens. Fixing these problems provides better process stability, quality and productivity.

Nip roll STA monitoring reveals how much of the total vibration is being generated by the press rolls and/or the fabric(s).
Benefits with integrated platform
DNA Machine Monitoring provides machine condition information for process operators and maintenance personnel through one common automation user interface. Operating in the same user environment makes communication and decision making fast and accurate.

Integration provides also easy and accurate correlation between vibration measurement and other process/machine condition parameters to determine the right cause to changes.

DNA Machine Monitoring equipment
Online machine condition monitoring is based on fixed installed sensors on the machinery, cabled to monitoring substations where measurements are collected in cyclic intervals or continuously, depending on the criticality of the machinery.

Correlation and event trending with DNA Tracer tool

ACN processing units for both centralized and field installation
I/O groups and analog I/O units for vibration measurements, and digital units for trigger and status signal measurements

Vibration sensor for wet and humid environment
Vibration sensor for dry and hot environment
Magnetic trigger sensor for roll/shaft rotational speed measurement
Pressure sensor for dynamic pulsation measurement in short circulation and head box
Junction box for terminating field signals and trunk cable
System integration brings cost benefits

An integrated solution allows shared system resources to be utilized for control and condition monitoring applications. The same operator work stations, history databases, system networks and engineering tools can be used by all applications. System maintenance is easier because only one engineering environment is needed.

Control Room
Operation, Maintenance, Reporting

Automation Room
Centralized
Safety instrumented system
Distributed

Office
Reporting, Enterprise Integration

Field
Controls, Optimization, Connectivity

Star or ring topology redundant Ethernet network

Firewall
Remote Connections

One platform for all control applications
- Integrates major field buses and field asset management

- Updating layered security with hardening, anti-virus and DMZ solutions
- Information through Web Service interfaces
- Concurrent solutions for operations and maintenance

Wireless solutions for operation and maintenance