Rockwell Automation
Condition Monitoring

A Predictive element of a Strategic Approach to Maintenance

Intro to Vibration

SEEMS BAD. LET'S SHUT IT DOWN
I THINK IT'S MISALIGNED
I DON'T THINK IT'S TOO BAD! LEAVE IT ALONE
Vibration Analysis

The vibration analysis says it’s out of balance. At 7 mm/sec it’s only slightly rough.

That’s good! We can continue operations but plan maintenance.

What is Condition Monitoring?

- Condition Monitoring is the collection and trending of parameters which change when machine condition begins to degrade.

  - The goal is to identify changes in the condition of a machine that will indicate some potential failure.

  - Physical characteristics are identified that collectively indicate the current condition of the machine.
  - Each of these characteristics is measured, analyzed, and recorded so that trends can be recognized.

Example: Vibration level increasing with time.
Innovation in ICM: Wireless & Hosting

- **Wireless**: Integrated solution using XM / Enwatch with industrial GPRS modem
  - Commercial Off The Shelf products (COTS) in IP56 enclosure
  - Apply anywhere where there is GSM without IT complexity
  - Leading protection / surveillance hardware
  - How it works:

- **Hosted**: Emonitor software on a central secure server
  - Hosted software with ‘local’ functionality
  - Access via Citrix
  - Central point for data import from multiple sources
  - Data easily analysed elsewhere
Remote Condition Monitoring

- Data collection and analysis online via internet
- Cost effective
- Robust
- Flexible
- Adaptable
- Upgradeable
- COTS – Commercial Off The Shelf solutions

Technical Overview

- Types of regime
- Data Transfer
- Data Harvesting
- Secure Connections
- Data Analysis

Portable:
- Low frequency data collection
- Low start-up cost per point
- Labour intensive
- No protection

For Low criticality items

Surveillance:
- High frequency data collection
- Medium cost per point
- Automatic data collection
- No protection

For Medium criticality items

Protection:
- High frequency data collection
- Local protection relay
- High start-up cost

For High criticality items
Direct Monitoring System Configurations

Single Location

- Processor
- Power Supply
- EWEB or ENet/IP
- DeviceNet
- Power Supply

To HMI

XM
XM

Sensors

Distributed Systems

Control Section

- Processor
- Power Supply
- EtherNet/IP
- EWEB

ENet/IP To Add'l Cabinets

Remote Section

- 1788-EN2DN
- Power Supply
- XM
- XM

Sensors

Direct Monitoring Single Location System

- 1768 CompactLogix System
  - 2 MB memory - 84 machines
  - Web pages & faceplates as HMI, authenticated e-mails
  - L43, EWEB, DNet, I/O, XM, power supply

- XM120 or XM160
  - 2 channel XM120 for spectrum band alarms
  - 6 channel XM160 for overall alarms only
  - XM, power supply
Direct Monitoring Distributed Systems

• 1768 CompactLogix System
  – 2 MB user memory - 84 machines max
  – 64 EtherNet/IP connections - 32 remote cabinets max
  – Web pages & faceplates as HMI, authenticated e-mails
  – L43, ENet/IP, EWEB, power supply
• XM120 or XM160
  – 2 channel XM120 for spectrum band alarms
  – 6 channel XM160 for overall alarms only
  – EN2DN, XM, power supply

Support & Maintenance Services

• Start-up & Commissioning - *estimated* functions, not fixed price unless project
  – XM start-up - estimated at 8 modules per day
  – Logic and HMI customization - needs to be scoped
  – Emonitor database set-up
• Remote Analysis
  – Fixed price based on machine or point count
  – Program start-up
  – Web reporting
• Local service delivery leader involved in specification and implementation of all support services
Analysis

- 10 UK Based engineers
- Average 20 years of industry experience per engineer
- Eight large ICM analysis contracts in: Paper & Pulp, Marine, Oil & Gas, Mining
- Vibration / Oil analysis / Thermography / Ultrasonic
- Domain experts in ICM hardware and asset management
- Integration expert from ICM into automation systems

Field electromechanical work

Through our local offices and partners, we can deliver:
- Alignment / Balancing
- Lubrications
- Thermography analysis
- Take portable vibration / lubrication data
- Replace motors / bearings
- Deliver and install motor control equipment
- Hold local spares (consignment stock)
- Guarantee engineering response times
Red to Green - ICM in practice

Every X minutes

Work Order

Emonitor Software

Alarm

Review

Industrial Condition Monitoring
Pricing example XM160

XM160 6ch incl engineering:
12000Euro
Overview of ICM Services supplied to British Gypsum Ltd

ICM Services

- 400 machines covered by vibration monitoring on monthly routine
- 400+ machines covered by thermal imaging on monthly routine
- 100+ slow moving units additionally covered by Ultrasonic
- 10 units with oil analysis baseline data - oil analysis routine to be developed over next 12 months.
Success stories

Application notes:

http://www.rockwellautomation.com/services/conditionmonitoring/

‘Condition Monitoring literature’
Thank You for listening!

Questions?