Periodic Maintenance Reports (PMRs) for Gearless Mill Drives (GMDs)
Periodic Maintenance Reports for Gearless Mill Drives
From corrective to predictive maintenance

Gearless Mill Drive (GMD) – the bottleneck in mineral processing:
- High-efficiency and low-maintenance drive technology for large grinding mills
- Bottleneck in the mineral concentration process

Remote diagnostic services:
- Troubleshooting
- Periodic maintenance reports
- Condition monitoring

Customer value:
- Reduction of unplanned downtime
- Optimization of operational efficiency
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How ABB technology changes the landscape

**ABB DriveMonitor (DM):**
- Monitors and analyzes GMD in real time
- Determines current health status and sends notifications in case of system irregularities

**ABB Remote Access Platform (RAP):**
- Establishes & manages remote connection between remote service center and sites
- Provides reliable and secure connectivity

**Installed base of GMDs as of 2013:**
- 110 units (incl. orders)
- > 1 GW installed power
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Overall architecture

- PLC (e.g. 800M)
- PEC (e.g. 800PEC)
- Transient Recorder
- DriveMonitor
- Remote Access Platform
- Control room

**PLC (e.g. 800M)**
- Data acquisition and logging
- Data analysis
- Storage of data and analysis results
- Generation of notifications
- Visualization
- Automatic updates

**PEC (e.g. 800PEC)**

**DriveMonitor**
- Management of remote connections
- Automatic and manual file transfers
- Sending of notifications

**Remote Access Platform**

**Control room**
- Supervision of installed base
- Home base for troubleshooting and supportline activities
Periodic maintenance reports:

- Health of the drive system and operational status delivered periodically

Features:

- Preventive and predictive maintenance
- Comprehensive reports delivered periodically
- Detailed analyses of the electrical, mechanical, and thermal aspects of the drive system

Benefits:

- Summary with most important findings
- List of recommended maintenance actions
- Follow-up telephone conference
- Reduction of unplanned stops, alignment of required maintenance actions with planned stops
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The Report

Summary of a periodic maintenance report:

1. Summary of findings

   Operation report

   - All values appear acceptable. If the shutdown (beginning of May) is not taken into account, the mill was utilized for more than 99.5% of the remaining time.

   Data availability (Snapshot comparison and long term observation)

   - All values appear within expected ranges.
   - The availability of data was almost perfect over the reporting period.
   - There was no alarm or event data available.

   Ring motor air gaps

   - It appears that air gap sensor 6 is not working as expected (air gap 6 is the only air gap in the 12'clock position):
   - It appears that a different scaling is used in the TR (refer to 5.1 “Trend - air gap measurements”)
   - It appears that a significant offset may be set for air gap 6.
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The Report

Pole profile and rotor shape analysis:

Air gap [mm]

- mean value
- max. value
- min. value
- previous value
- mean pole profile
- ± 1 std. dev.
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DriveMonitor (DM)

ABB DriveMonitor is a diagnostic intelligent system:

- Industrial PC with H/W firewall and optical link
- Framework for data acquisition and processing

Features:

- Data acquisition from different signal sources
- Data storage and consolidation in dedicated database
- Intelligent signal processing and analysis algorithms
- Immediate notification about health status of drive system

Benefits:

- Mere data is transformed into valuable information that helps reduce downtime and increase performance
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Remote Access Platform (RAP)

ABB RAP is the standard solution for remote connectivity:

- Comprehensive remote access and audit functions
- Strong security concept and easy maintenance

Features:

- Desktop sharing
- Alarms and notifications
- Web browsing
- File transfer

Benefits:

- Instantaneous access from anywhere on the planet for ABB experts and customer personnel
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What is the benefit for the customer?

- “Knowledge is power” (Francis Bacon)
- Focus is shifted away from corrective to preventive and predictive maintenance
  - Reduction of unplanned downtime
  - Reduction of maintenance effort

Overall equipment effectiveness (OEE)

\[
\text{OEE} = \text{Availability} \times \text{Performance} \times \text{Quality}
\]

- Increase in OEE → increase in profit
- RDS maximizes OEE using two levers:
  - Reduction of unplanned downtime → availability
  - Reduction of rate losses → performance
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Overall equipment effectiveness

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