Using historical data for asset management decision making
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How is asset management different from work management?

Process based work management – build and expand
- Initiate work from multiple sources –
  - Customer information system or engineering design systems
  - Geographical information systems
- Sequential tasks required and optional tasks
- May include remote locations, crews and dispatching
- Workflows that include estimates for designs, approvals, permits, scheduling
- Work request and work orders for cost of labor and materials

Asset management – maintain, replace and repair
- Maintenance and inspections
- Spare parts management
- Asset conditions
- Scheduled maintenance, checklist and safety procedures
- May include project teams for overhaul
Asset maintenance strategies – what data do you need?

- Run to failure (Gartner)
- Time-based
- Usage-based
- Condition-based
- Predictive
- Reliability centered
- Financially optimized

Preferred strategies for critical and high cost assets
Asset management based on ISO 55000/PAS 55

Best practices and questions to address

PAS 55/ISO 55000
Holistic approach to asset management reinforces the following best practices:
– Alignment with the Business Plan
– Risk Evaluation and Mitigation
– Lifecycle Cost Management

• What are my assets? Where are they?
• What is the condition of my assets?
• What is the risk associated with the failure of my assets?
• Is the risk manageable?
• If not, what corrective action needs to be taken in:
  – The Short Term
  – The Long Term
• Of the above actions, which actions yield the best return?
• How to optimize actions/decisions with a “fleet” perspective noting budget, performance and other constraints?
• Is the process repeatable, auditable and justifiable?
## Operational reporting to prescriptive analytics

<table>
<thead>
<tr>
<th>Operational Reporting</th>
<th>Dashboards</th>
<th>Business intelligence</th>
<th>Predictive analytics</th>
<th>Prescriptive analytics</th>
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<tbody>
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<td>Reports to help manage the business</td>
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<td>• Query and print hard copies</td>
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<td>• Visually appealing screens</td>
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<td>• Drill down capability for root cause analysis</td>
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<td>Data analysis with pre-packaged KPI's</td>
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<td>• KPI's established and data from operation automatically populates</td>
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<td>• Real-time view of how the business is performing</td>
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<td>• Intended to help people make better decisions vs. reactive</td>
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<td>Condition based analysis</td>
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<td>• Alarms and alerts</td>
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<td>• Intelligence built into monitoring and control</td>
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<td>• Prevent siloed issues before critical</td>
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<td>Algorithms, machine learning, and beyond</td>
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<td>• 100's of parameters monitored and combined with historical data</td>
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<td>• Financial, warehouse, labor and materials</td>
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Example Connected Asset Lifecycle Management

Solution for water/wastewater – monitoring and control with risk of failure example

Integration with DCS System drives repair vs. replace decisions
Asset Performance – Historical data makes this work
A fleet-wide analytics platform to improve processes through risk-based optimization

Continuous optimization and improvement

Connect / collect

Expert models
Statistical models (Machine Learning)

Analyze / predict

Inform / prescribe

Track

Act

All data sources:
• Sensors
• Historian
• Databases
• EAM

Advanced operational business intelligence

Enterprise asset and work management
Asset management – context within the organization

- Stakeholder Input
- Legal Requirements
- Strategic Planning
- Management Direction
- Asset Management
- Performance Management
- Risk Management

Asset Management Scope

- Lifecycle Asset Management
  - Create / Acquire
  - Use / Operate
  - Monitor / Maintain
  - Refurbish / Replace
  - Dispose / Salvage

- Asset Inventory
- AM Policy
- AM Strategy
- AM Plans
- Performance Monitoring
- Capital and O&M Budgeting
- Scenario Evaluation & Management
- Condition Assessment & Performance Monitoring

Line-of-sight Alignment

Strategic

Tactical
Asset maintenance strategies

1. Run to failure (Gartner)
2. Time-based
3. Usage-based
4. Condition-based
5. Predictive
6. Reliability centered
7. Financially optimized

Preferred strategies for critical and high cost assets
Asset Performance Management (APM)

Decision Support for Maintenance & Replacement
For a given project, what is the best alternative?
For a given budget, what is the “optimal” set of projects to execute?
For a given level of (acceptable) risk, what is the minimum budget required?
How does a selected portfolio mitigate risk as a function of time?
What is the impact of budget reduction on risk exposure?
How does the level of risk exposure evolve in time, by risk category, for a given portfolio of Projects?
What is the “optimal” sequence of project execution within a given portfolio?
Industry Challenges – Historical data helps address

1. **Funding for repair/replace aging infrastructure**
   - Automated data process, condition of assets and cost of maintenance vs. repair

2. **Cost of technology and proven ROI**
   - Reduce operating cost, provide deeper understanding of system performance, increase predictability of operations and maintenance needs and position infrastructure for long term health

3. **Sustainable water systems and regulations**
   - Comprehensive asset management plan across all divisions based on ISO 55000

4. **Reducing risk and resiliency**
   - Reliable energy efficient equipment with predictive analytics software
Enterprise Software

On the web

Website
new.abb.com/enterprise-software

LinkedIn showcase page
Search under “ABB's Enterprise Software Group”