Paper Machine Performance
Increase Profits and Improve Quality

Optimizing paper machine performance takes ability to analyze, and identify data to capture higher productivity and improved profitability. Paper machine performance provides a comprehensive and complete machine analysis. With ABB Ability™ Collaborative operations comes the ability to do more, do better, together by gaining access to ABB:s deep domain expertise 24/7.

The ABB Ability™ Collaborative Operations Paper Machine Performance Service optimizes paper machine operation to improve the production throughput, increases uptime and reduces quality losses. Critical business and process Key Performance Indicators (KPI's) are monitored, and continuous improvement actions are implemented.

Paper machine performance service follows a proven three-step methodology to identify, classifiy and help prioritize opportunities to improve the performance of your paper machine. Data from your automation and production systems are collected and compared with paper machine benchmark targets.

1. Establish Baseline and Assess Improvement Potential
The current baseline of paper machine performance is compared to industry standards to establish expected capabilities. Current paper machine conditions are assessed to determine improvement potential. Comprehensive data mining techniques, proven control performance indicators and proprietary analytics tools are used to analyze process performance.

The paper machine performance service baseline provides information related to: steady-state machine variations, stability of the stock approach, potential profile improvements, and the effectiveness of the machine (transient) response. The baseline allows the assessment of improvement potential.

The paper machine performance baseline is transparent to production because all machine tests are performed inside product specifications. One of the tangible benefits of a paper machine baseline is the four-performance indices. A large index indicates problems with that segment of the process while a small index indicates that process segment is working well. These indices become the benchmarks that can be used to show how the machine is performing relative to itself and others over time. The paper machine performance baseline indices are:

• Product variability
• Stock approach stability
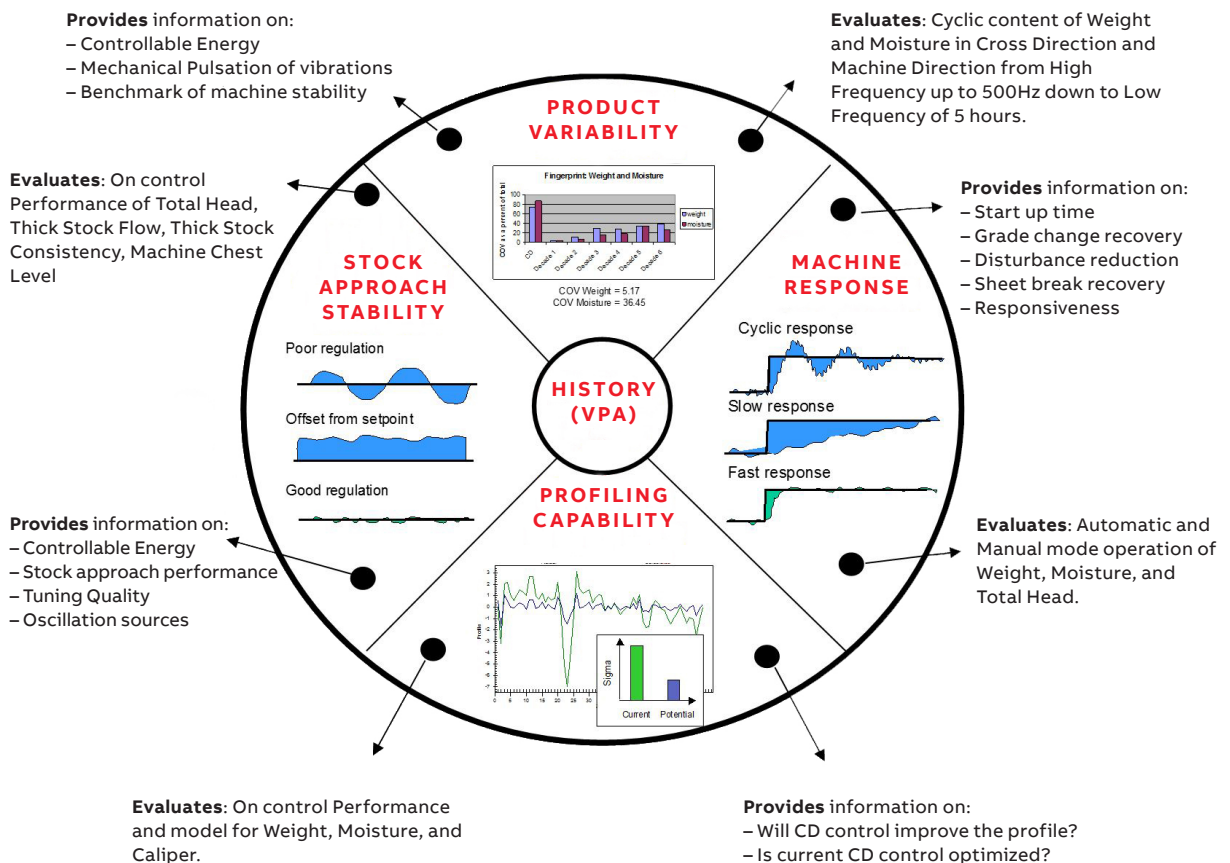• Machine response
• Profile capability

2. Implement Improvement Actions

The implementation plan is a series of practical solutions designed to raise the performance of the system to its optimal constraints. Typically solutions include: replacing bad valves, isolating high frequency machine problems related to rolls, pumps, screens, or machine clothing, cleaning up signal conditioning problems, optimizing or adding control logic, updating standard operating procedures, or re-tuning controls for optimal performance.

3. Continuous Improvement

With ABB Ability™ Collaborative Operations paper machine performance can be continuously analyzed and improved. Key information is monitored by ABB experts on a daily basis and compared against performance benchmarks. The Paper Machine Performance service provides 24/7 monitoring capabilities to identify continuous improvement actions to help to ensure process performance remains at peak levels.

EXAMPLE HOW THE BASELINE CAN ANSWER KEY QUESTIONS ABOUT THE PROCESS:

Provides information on:
– Controllable Energy
– Mechanical Pulsation of vibrations
– Benchmark of machine stability

Evaluates: On control Performance of Total Head, Thick Stock Flow, Thick Stock Consistency, Machine Chest Level

Evaluates: Cyclic content of Weight and Moisture in Cross Direction and Machine Direction from High Frequency up to 500Hz down to Low Frequency of 5 hours.

Provides information on:
– Start up time
– Grade change recovery
– Disturbance reduction
– Sheet break recovery
– Responsiveness

PRODUCT VARIABILITY

STOCK APPROACH STABILITY

MACHINE RESPONSE

HISTORY (VPA)

PROFILING CAPABILITY

Fingerprint: Weight and Moisture

COV Weight = 5.17
COV Moisture = 36.45

Poor regulation

Offset from setpoint

Good regulation

Cyclic response

Slow response

Fast response

Provides information on:
– Controllable Energy
– Stock approach performance
– Tuning Quality
– Oscillation sources

Evaluates: Automatic and Manual mode operation of Weight, Moisture, and Total Head.

Evaluates: On control Performance and model for Weight, Moisture, and Caliper.

Provides information on:
– Will CD control improve the profile?
– Is current CD control optimized?

Production and process KPIs

The following key performance indicators will be monitored on a regular basis and activities will be performed by ABB experts to help improve the overall product quality:

- Production
  - Quality
  - Production throughput
  - Sheet break losses
  - Grade change losses
  - Start-up/recovery losses

- Process
  - Paper variability
  - Process stability
  - Instrumentation performance

Benefits
- Increased production
- Lower maintenance, raw material and energy costs
- Reduced product rejects
- Fewer sheet breaks
- Cost savings through collaborative operations
- Faster problem identification
- Decreased disturbances
- Quicker grade changes
- Higher availability
- Consistent quality

Features
- Site assessment to establish baseline and identify initial improvement actions
- Implementation of prioritized recommendations
- Continuous improvement based on KPIs
- Periodic checks by ABB Collaborative Operation monitoring experts
- Automatic, non-invasive data gathering with ABB's proprietary data collection tools
- Continuous data analysis for faster optimization
- On-site or remote access for customer and ABB service personnel
- Remote diagnosis and proactive support from ABB experts
- Secure communications

COLLABORATION IN DATA-DRIVEN ECOSYSTEM
PEOPLE MAKE THE DIFFERENCE

Customer
Apps, view installed assets, view operations

Consultant
Analysis, advanced maintenance, operations optimization

3rd party
Analytics, services, generate solutions

ABB engineer
Remote connection, update task list, live monitor progress

ABB collaboration expert
Root Cause Analysis, advanced services

People

Web portal

Data gets aggregated and analyzed in the cloud and is available to key stakeholders of the collaborative operations ecosystem so they can make data driven business decisions

Collaborative Operations Ecosystem

Collaborative Operations center

Services

Advanced algorithms analyze data automatically and present actionable insights for engineers at the mill level.

Edge devices/ Fog

Data from devices like motors, drives etc. are gathered by sensors and transferred to Edge devices for analysis
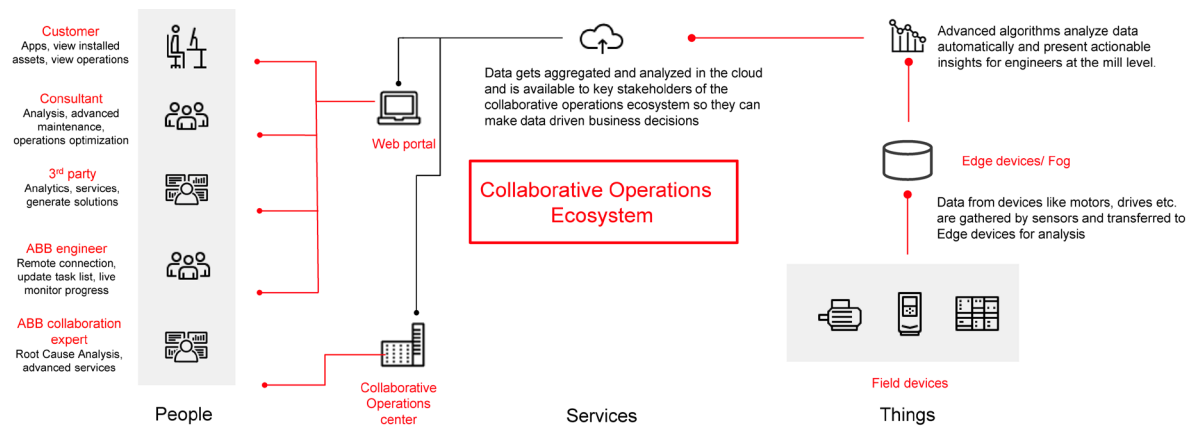
Field devices

Things

ABB Ability™ technology collects, aggregates, analyzes, and presents actionable information on KPIs to enable experts to improve paper machine performance.

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