Strength Virtual Measurement

ABB Ability™ Performance Services for paper mills

Lab measurements are valuable in understanding the strength of your paper, but the lack of frequent measurements could be affecting your process optimization opportunities – and your profitability. ABB Strength Virtual Measurement provides self-correlating calculations for an accurate, online strength measurement that enables mills to produce more on-spec paper at less cost.

Overview

Mills can significantly optimize processes with frequent and reliable measurement of paper or board properties. ABB’s Strength Virtual Measurement uses machine learning-generated models to predict one or more strength properties for accurate, online measurements. This enables operators to keep strength properties within their lower limits, helping to reduce raw material usage and increase machine speed. With decades of end-to-end domain expertise and ABB Ability™ platform as the foundation, Strength Virtual Measurement provides the most accurate and reliable measurements.

Strength Virtual Measurement creates online measurements through a three-step process. First, an initial static strength model is created using historical machine data to establish an initial expectation of the accuracy of the calculated strength. Once the accuracy of an initial model is confirmed, an online calculated strength measurement (also known as a soft sensor) is implemented by leveraging the ABB Ability™ platform. The strength calculation is further improved by gaining a better understanding of machine operation, systematic model refinement, and the implementation of alerts to suspend measurement during periods of un-modeled machine operation.

The third step is on-going performance monitoring and periodic model checks to maintain and optimize the strength calculation. Model updates are provided to compensate for process or machine changes. This approach enables mills to produce a stronger sheet at less cost, decrease variability and reduce recovery and grade change times.

Features

- Automatic, non-invasive data gathering and analysis with ABB’s proprietary tools
- Online measurement for one or more properties at a frequency needed to meet machine-specific requirements
- Self-correlating calculations based on lab and online inputs
- Operator alerts and alarms to drive action
- Performance monitoring and periodic model updates
- Easily connects to existing systems

Benefits

- Lowers fiber and/or chemical costs
- Enables more consistent quality
- Improves runnability
- Enables faster grade changes
- Increases paper machine speed
- Increases mill profitability

Dashboard showing before (top left – lab only) and after implementation of online strength calculation (bottom left), which enables weight reduction (top right) and speed increase (bottom right).
Typical operations (periodic strength measurements from the lab)

Average strength closer to off-spec limit saving fiber and chemical costs

With ABB Strength Virtual Measurements

Grade change

Off-spec paper

Online strength calculation helps to reduce fiber and/or chemical costs, maintain more consistent quality, and improve grade changes.

Red dot = Lab measurements

Available online strength properties:
- Short-Span Compression Test (SCT)
- Ring Crush Test (RCT)
- Concora Corrugating Medium Test (CMT)
- Other strength properties per request

Monitored KPIs
- Fiber and chemical savings
- Quality rejects
- Calculated strength correlation with lab measurements
- Average strength deviation from target
- Speed of paper machine

Digital platform
Pulp and paper companies are looking to digital solutions for new ways to automate and optimize their mills. ABB Ability™ is a unified, digital platform that extends from device to edge to cloud. It securely collects data from devices at mills, applies advanced analytics, generates actionable insights and provides advanced automation for customer operations at all levels of the enterprise.

Delivery method
Collaborative Operations, an ABB Ability™ offering, connects services that leverage the availability and transparency of data from the Ability platform into a data ecosystem. By connecting ABB and customer experts to actionable data, advanced analytics tools and predictive monitoring in a collaborative environment, advanced automation solutions can be implemented and optimized. Problems can also be quickly diagnosed and corrective actions implemented, with continuous improvement efforts prioritized.

Digital services available for delivery under this model, such as Strength Virtual Measurements, focus on maximizing equipment and process performance to ensure efficient operations. The Ability™ platform enables structured modeling, monitoring and analysis of the online calculated strength and its impact on paper costs, quality, and runnability.

With periodic reviews by ABB experts, optimization actions are implemented when identified to improve both the accuracy and robustness of the online strength calculation.

Our ABB Ability™ solutions enable mills to know more, do more, do better, together

Requirements
- 24/7 Internet connectivity
- ABB Ability™ data collection for performance monitoring