ABB Ability™ Manufacturing Execution System for pulp and paper
Proven. Flexible. Scalable.
ABB Ability™ Manufacturing Execution System for pulp and paper enables maximum performance for mills on the path to real-time visibility, operational intelligence and automation across the value chain.
Plan, optimize and continuously improve the production process

Modern information system monitors and tracks pulp, paper, packaging and tissue production for visualization and automation of the entire value chain.

Evolving market demands and competition require pulp and paper producers to continuously improve the agility and efficiency of their operations for the delivery of products of the right quality at the right time.

As digitalization progresses, it brings a free flow of data from both IT and OT applications across the value chain, making interoperability a basic expectation. Working with a partner who has the competency and clear focus on the entire pulp and paper operation, from mill floor to enterprise level planning, is the best approach to convert digital data into world-class business results.

Trust ABB and our Manufacturing Execution System (MES) specifically designed for pulp and paper to drive the best operational results. By leveraging our industry leadership, process expertise, and know-how of your operations and the technologies that enable it, we can help you reach your highest production potential.

ABB MES is the foundation for all operational collaboration, helping you satisfy changing market demands, dynamically and profitably.

Mills that work with ABB typically achieve:
- **2-5% manufacturing efficiency improvement** via loss reduction, improved yield and optimized asset and capacity utilization
- **2% production cost decrease** from energy, raw material and logistics savings
- **Up to 20% customer satisfaction improvement** with on-time and in full deliveries that meet quality requirements
- **25% total cost of ownership reduction** due to easier upgrades, configuration and high availability
ABB’s modular and flexible MES applications are designed specifically for the requirements of the pulp and paper process, allowing it to be efficiently adapted to different production environments and business rules. This is because it is built on decades of collaborating with, and delivering informational and operational technologies to, the pulp and paper industry.

ABB MES users benefit from the on-going investments in software development to future-proof their investment and their operations. Easy configurability, updates and other continuing services provided by ABB – often in a seamless cooperation with the customers’ own personnel – ensure that results and utilization are preserved, and total cost of ownership is reduced when compared to systems that require costly updates or replacements.

“We have partnered with ABB because of their demonstrated commitment to the pulp and paper industry, their proven technical solutions and worldwide team, as well as their clear strategies for future investment and improvement in their MES solutions.”

SAPPI
St Croix Tissue, Maine, USA

The mill was a greenfield site and had to balance implementing the system, building machines and infrastructure, and executing multiple start-ups. Yet they achieved a unique-to-the-MES-industry status when the mill went live on its own without the need for on-site support, as is typically required for MES implementations.

Ittihad Paper Mill, Abu Dhabi, UAE

Because the mill was the first pulp and paper site in the area, a lot of employees were new to the paper making process and systems – including MES. “Literally no one had any experience with an MES. Once we were in it, we found it to be very user friendly and not very complicated.”
“System integration has not only brought us new technology but also enabled us to build a system that matches our needs perfectly. We have realized considerable savings in our system costs.”

KOTKAMILLS OY
Process know-how produces the right partner

In an MES project, the identification and harmonization of business processes, and the change management goals for the user community is as important as the IT implementation. Having ABB as an experienced partner during the implementation phase helps you navigate the complex project and ensure positive outcomes and user acceptance, with tangible results.

ABB accompanies you for every step of your project, from the digital maturity assessments, building a desired digital architecture, commissioning, customized training and continuing support. With ABB MES, mills gain the flexibility needed to manage evolving operations at reasonable ownership costs, with the possibility to configure different functions without requiring a program change.

“In our evaluation of suppliers, ABB offered more flexibility around changes. ABB’s system could accommodate simple changes without significant cost increase.”

ST. CROIX TISSUE

Automation synergies and ERP integration fast-tracks the modern mill transformation

Papermakers on the path to Digital Transformation choose ABB for our overall understanding of the automation landscape. As MES optimization algorithms identify the best resource allocations, execution sequences and recipes, it helps to have a partner that deeply understands the automation and shop floor layers when establishing robust interfaces to these. For example, full connection to the automation level with bi-directional interfaces allows mills to set control priorities according to operational goals and production plans.
Flexible modules from order-to-invoice
End-to-end transparency for production efficiency

Our MES automates and harmonizes your business processes to enable data-driven insights to be distributed to the right people at the right time for faster decision-making that maximizes overall mill performance.

ABB’s comprehensive and modular solution covers all the core MES functionalities across the value chain, from order handling, through production, warehousing, shipping, and customer service management as well as acquisition and storage of resulting data and reporting. These modules work seamlessly together and can be further enhanced with other ABB Ability™ applications for pulp and paper to help you achieve new levels of operational efficiency.

The system supports different grades, production types and easy scaling of your enterprise’s manufacturing footprint from numerous production lines to multiple mills.

Ease of use with modern interface
All MES user interfaces and navigation have been co-created with pulp and paper customers, offering intuitive displays for superior mill-to-shop floor visibility, most of which are web-based. With dashboards easily configurable for different grades, users can make changes on the fly directly from the management environment. For instance, mills find value in the ability to email delivery notes, packing lists, invoices, and more from the system itself.

Order management and invoicing
All order entry and invoicing functions for end-customer products are covered to effectively streamline the order entry flow. Order Management performs multiple different checks to ensure the entered orders can be delivered in time, and provides the status of ordered, planned, produced, delivered and invoiced orders. Sales or mill personnel only need to enter the minimum information, since pricing and production reservations are handled by the system.

Production planning and scheduling
Production planning enables the real-time planning and optimization of production blocks, runs and orders. All production steps, including the paper machine, winder, rewinder and sheeters are accounted for. Production schedules are reoptimized after change orders or process disruptions. The system is easily configured to cover restrictions set by orders, such as the maximum number of rolls per set or edge roll restrictions. This helps decrease production costs while ensuring on-time delivery.

“The ability of the MES to connect and manage the flow of the work is the most important thing. We can do adjustments or change shipping dates – all key factors for success while also better managing expectations with our end customers…It would take seven planners to get the same accuracy (outside the system).”

ITTIHAD PAPER MILL
ABB’s MES suite covers the whole order-to-invoice process (red lines) and beyond, providing modules that also optimize the product value chain (grey lines).
Trim optimization

The trimming function prioritizes customer-specific quality requirements to maximize the value of the produced paper and the yield. It uses the jumbo reel cut plan to apply quality data to individual roll positions before the jumbo reel is cut at the winder. It compares roll quality to set standards and proactively detects if any roll position does not fulfill the quality requirements. Then roll positions are swapped to maximize yield and meet quality requirements. The resulting optimized trim pattern is sent to the winder and can be applied automatically if the winder cutting is fully automated.

Example at a fine paper mill
- Production: 480,000 tons per year
- Trim losses depending on grade: 0.25 – 1.25% of total volume
- Reduction of trim losses: 2.9 – 4.8 MUSD per year

Process data management

Bringing structure and standardization to data, which is often collected but underutilized, is a vital step towards creating a fully integrated digital infrastructure that allows asset and operational data to be accessed, visualized and analyzed for improved performance. ABB helps mills with:

- Retrieving and harmonizing decades of historical data from control systems and other sources
- Forming a scalable solution for high volume storage of any type of production data that is organized hierarchically based on standardized data models and structures shared across all levels
- Controlling and securing data that streams between layers, to and from the cloud, which is also available in real-time and at an optimized cost

Paper mills obtain the greatest benefit by applying an integrated data management approach simultaneously with their MES implementation, giving users enhanced access to the process data they most need while increasing cost efficiency.
Production management
Execute production plans optimally, avoiding under or over production, and gain full genealogy and traceability of products with Production Management. This module can be used to manage all manufacturing transactions from raw material management, through pulp production, jumbo reel tracking, roll production tracking, sheet production tracking, tissue production to the warehouse operations, material management, delivery, load planning and finally to truck loading. The system interfaces with production assets and provides an integrated production environment where production visibility is delivered to all users at all stages. It ensures that deliveries will be on-time and in-full.

Improvements seen at one European mill:
• 35% work-in-progress reduction
• 40% slow moving inventory reduction
• 11% customer service average time reduction
• Reduced inventory write-offs 67 t/month
• Savings 4-5 million Euro per year

Quality data management
Both producers and end-customers often want quality assurance of a specific delivery before and after shipment. Quality Data Management collects all quality-related data into one interface and provides real-time assurance of meeting product standards and customer-specific requirements. The system immediately identifies any non-conformance in quality of specific rolls or sheets and provides mill personnel with actionable information for more effective process control. It also enables automatic reclassification based on measured quality and customer requirements and can store quality values for years. The results are reduced production losses and increased customer satisfaction from more consistent quality.

With Quality Data Management, a printing paper mill was able to achieve:
• 20% less customer returns
• 52% reduction in claims
• 30% less quality-related waste due to repurposing material to different customers

Standard integration with ERP
ABB offers seamless integration of manufacturing and business information with ERP systems, enabling a single point interface. This interface, based on standard methods and decades of experience, shortens implementation, is easy to maintain, and helps maximize the investments you’ve already made.

“A single report from the new system equals several reports from the old systems.”

STORA ENSO

Reporting
Reports that are relevant and actionable for the context of each user station are included in the system. Ad hoc reports can also be created and shared by users based on universal data. Decision Support is another module of reporting that is web-based and designed to be used by many different functions and levels in the organization to bring real-time transparency using industry standard KPI’s.

“From day one, we started gaining visibility very quickly. We’re able to build reports that are easier for us to understand, and help us make decisions at a faster pace. We can move business forward at a faster pace.”

KPAQ INDUSTRIES
Effectively optimize your entire operation
Take your mill to the next level with additional digital applications and services

With MES as the foundation, adding and integrating other ABB Ability™ solutions helps streamline operations and maximize optimization efforts.

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**Energy management**

Energy management leverages real-time data from your process monitoring, automation, production planning systems as well as energy providers to help manage and optimize your energy operations. It includes applications to help reduce energy consumption by comparing the actual consumption against targets and identifying, in real-time, the areas for improvement.

Energy load forecasting tools help you get the best price for energy or help with energy supply planning. Energy monitoring and reporting calculates efficiencies and helps to visually analyze the use of energy and utilities. Energy demand and supply optimization calculates the optimum use of supply resources to meet the consumption schedules with user applied objectives.

Energy Management can be used as a single mill energy reporting application or can grow to a company-wide system serving hundreds of users who can manage energy planning and procurement for your corporation.

Example case at a European Cartonboard mill
- Optimized refined mechanical pulp (RMP) operation according to electricity spot price
- Accurate power consumption forecast for electricity purchase
- 14.5% total savings in electricity costs over two sample periods

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“ABB’s (energy) solution is good. I know companies offering similar products, but in my opinion, the ABB one is the best.”

MAYR-MELNHOF KARTON

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**Cyber security**

The Cyber Security Reference Architecture is an ABB-developed design standard for industrial systems and associated security controls that meets or exceeds relevant IEC levels. ABB engineering teams use the architecture during system deployments, while our service teams use it to update and modernize existing customer networks to bring them in line with current cyber security standards and best practices.
Continuous improvement
Continuous improvement is a suite of software tools to visualize and uncover hidden potential and to provide production teams with decision support and a collaboration platform to capture those opportunities.

The Overall Equipment Effectiveness (OEE) module calculates and analyzes OEE for individual equipment in real-time. This helps uncover hidden potential and motivate production teams to maximize equipment utilization, uptime and quality, as well as classify events. Comments and events can be linked to the Diary module, which provides users with visual KPIs and events, and shared log entries to help with asynchronous collaboration to improve OEE.

Sustaining services
Services are offered for training, routine inquiries and support, change requests, emergency 24/7 support, and software updates. The service agreement can be tailored to meet your needs with consideration of your strategies for level one support and software update deployment. For example, updates can be delivered on a frequent basis to a customer-defined template. This enables updates to be rolled out to each mill system independently or scheduled and executed jointly between ABB and the customer at the mill level, on an interval that is mill-specific.
The digital transformation journey that we have been on with ABB has so far enabled us to increase OEE and set a new output record.

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