Collaborative Production Management
cpmPlus for pulp and paper
Maximizing the performance of your assets

The best-in-class mill operations
Today’s economic environment requires paper producers to make continuous efforts to improve their mill operations, while increasing production efficiency and product quality. To a great extent, the productivity of a paper mill depends on its management having a clear view of actual performance levels.

Since mill performance is a result of several factors interacting within a complex industrial environment, performance maximization requires a deep understanding of production flows, the transparency of the manufacturing process and efficient tools for tracking production, measuring quality and optimizing the use of capacity, materials and energy.

Both day-to-day decision making and planning for the future require that the right information is easily available and presented in an understandable format. A key success factor lies in the ability to swiftly react to changes in the production environment, while maintaining effectiveness and the strategic direction taken.

cpmPlus for pulp and paper offers you the right tools for managing this task. This product can have a huge impact on the profitability of a paper mill, by providing real-time insight into the manufacturing process and efficient solutions for maximizing overall mill performance.

Benefits of cpmPlus for pulp and paper:
- Optimizing the use of capacity and materials
- Reducing production losses
- Improving inventory turns
- Increasing energy efficiency
- Optimizing quality
- Increasing manufacturing transparency and predictability
- Increasing the ability to react to changes in the production environment
- Increasing customer satisfaction
- Maximizing productivity and mill performance
Manufacturing visibility

CpmPlus for pulp and paper consists of integrated software modules with comprehensive functionality. Although all modules can be used on a stand-alone basis, true value is achieved when they are implemented together, forming an extensive and collaborative production environment. This includes a seamless view of any trustworthy business or manufacturing information, in the correct context, regardless of where it originates. CpmPlus also provides a reliable basis for the calculation of true performance metrics and a solid platform for the efficient use of ABB’s sophisticated optimization algorithms.

Dedicated to the pulp and paper industry

CpmPlus for pulp and paper is based on over three decades of experience in supplying information technology to the pulp and paper industry. The related solutions are configurable, designed for continuous operation and include functionality which fits even the most complex paper production process.

Our offering to the pulp and paper industry covers:

- Order management
- Production planning, scheduling and trimming
- Production management of pulp, paper, board and tissue production
- Quality management
- Customer service management
- Decision support
- Process data management
- Overall Equipment Effectiveness (OEE)
- Energy management and optimization
- Enterprise Connectivity integration platform

Focus on total cost of ownership

Today’s paper companies are securing their IT investments by selecting reliable vendors that offer systems with long lifecycles and predictable maintenance costs. ABB’s Collaborative Production Management (CPM) system delivery process has been developed to provide the best possible product fit with business processes and to maximize the effectiveness of project execution.

The system lifecycle does not end with the handover of the delivery project. The ABB CPM team has the essential task of ensuring easy and cost-effective version upgrades that keep the delivered system up-to-date. In support of systems during their entire lifetime, ABB offers various customer support services, from basic support line service to license upgrades and system development.

Standard integration with ERP

Building connectivity with a corporate ERP system often forms an essential part of a CPM installation. ABB offers a standard business interface enabling the smooth and accurate integration of business information in an ERP system with the manufacturing environment. An interface based on standard methods shortens implementation times and is easy to maintain.

ABB has extensive experience of developing and supplying CPM solutions. Currently, over 100 pulp and paper mills worldwide use ABB’s CPM solutions.
Production Planning decreases production costs by optimizing machine capacity and minimizing waste and inventories, while ensuring on-time delivery. This functionality covers rough planning, order scheduling and trimming.

Production Planning enables the real-time planning and optimization of production blocks, runs and orders. In addition to grade change costs, optimization takes account of machine-specific characteristics and planned downtimes, ensuring the best possible match between planned and actual delivery dates. All production steps, including the paper machine, winder, rewinder and sheeters are accounted for. The system minimizes the potential trim loss at the scheduling phase and supports WIP (work in process) storage planning. Possible bottleneck and overload situations are indicated in advance.

In the case of a change to an order or an unplanned disruption to production, production schedules can be easily re-optimized to respond to the customer’s dynamics in the best possible way.

The integrated trimming package provides superior trim solutions based on sophisticated mathematical algorithms that support multi-objective optimization. This takes account of e.g. trim loss, knife settings and deviation from order tolerances. The system is easily configured to cover restrictions set by orders, such as the maximum number of rolls per set, maximum and minimum roll diameter, quantity and width of small rolls, and edge roll restrictions.

On an enterprise-wide basis, Production Planning can optimize or re-optimize several machines situated in different locations, in order to provide the best possible solution. In addition to production costs, optimization then takes account of transportation and other location-related costs when analyzing the most appropriate production schedule for each order.

Benefits of Production Planning

- Increasing manufacturing predictability
- Ensuring delivery of ordered quantities to the right place at the right time
- Providing ability to respond quickly to changes in customer or production dynamics
- Increasing customer satisfaction

Reducing production costs

- Minimizing grade change costs
- Minimizing trim losses
- Increasing material efficiency
- Reducing customer return and rebate costs

Reducing working capital

- Fluent production flow
- Minimizing inventory
- Less material in process
Production Management manages the production process, from the registration of a pulp bale or jumbo reel to the shipment of the final product. This solution can handle the most complex production processes involving multiple paper machines and multistage product routes.

Production tracking functionality covers all operational functions dealing with the manufacture of paper products. This includes order management, pulp production, jumbo reel tracking, roll production tracking, sheet production tracking, tissue production, warehouse operations, delivery and load planning, loading operations and material management. In addition, Production Management includes versatile views and reports providing valuable real-time information on customer orders, produced units, lost time, stock etc.

The material management function keeps track of materials used in the winding, packaging and sheeting processes. Material inventories are updated on-line as new material is received or consumed on the mill floor.

Production Management is typically integrated with a mill’s enterprise and manufacturing systems, such as ERP, paper machine and winder control systems, PLCs and automatic warehouses. This allows seamless collaboration and the easy interchange of information.

Production Management provides for a full genealogy of both intermediate products and finished goods. Customer service personnel can easily track delivered units, starting from e.g. an order code or package number. Searches result in relevant production information, such as production stages and times, and possible quality measures originating from automation systems and laboratory tests.

Benefits of Production Management

- Improves cash-flow, since deliveries are “on-time” and “full”. Production Management avoids under/overproduction and returns immediate feedback to production planning.
- Reduces working capital by reducing raw material inventories, work in process (WIP) and finished goods inventories.
- Increases manufacturing transparency by providing full production visibility and a complete product genealogy.
- Streamlined operations – Production Management covers all common operational functions in a paper mill. Configurable displays with predefined user defaults ensure that all of the relevant information is always near to hand.
Quality Management manages quality-related data and reduces quality costs in a pulp or paper mill. It provides comprehensive quality control functions and effective tools for laboratory work and customer service.

Quality Management performs quality control in real time against product standards and customer specific requirements. The system immediately identifies any non-conformance in quality and provides mill personnel with actionable information in order to prevent losses in production and product quality.

Quality Management provides user-friendly entry sheets for the manual entry of quality data. Barcodes can be used to efficiently identify paper and process samples in the laboratory. Automatic scanning of the code ensures that the correct sample and test variables are entered on the value entry form. To further facilitate laboratory work, the system can be interfaced with analyzers and lab test equipment for automatic data collection.

Quality Management is typically integrated with automation systems such as Quality Control Systems (QCS), Distributed Control Systems (DCS), and Web Imaging Systems (WIS). This provides transparency in production and ensures that all relevant quality data is available in one, comprehensive system. Quality Management is fully integrated with the Production Management module but, if necessary, communication links can easily be established to third party manufacturing systems.

Quality Based Re-trim Optimization
Roll set analysis functionality combines profile scans, defect information and laboratory test results with the trim pattern for the jumbo reel. Thus, all applicable quality information is applied to individual rolls before the jumbo reel is cut at the winder. Roll quality is compared to customer specific quality requirements – in cases of poor quality, the system automatically downgrades the roll, preventing it from being shipped. This ensures that the customer requirements are fulfilled for every delivered roll. It also gives the operator a chance to re-trim in order to minimize losses.

For an optimal re-trim solution, re-trimming can be done using Q-Trim, ABB’s unique solution for quality based re-trimming. Q-Trim suggests how the produced jumbo reel should be cut in order to maximize the value of the produced paper. Optimization is run in the background and the re-trim solution is available soon after the jumbo reel is ready at the paper machine.

Benefits of Quality Management
- Increased production efficiency – quality deviations are recognized at an early stage of the papermaking process.
- Consistent product quality – process conditions and product quality are compared to the relevant specifications in real-time.
- Improved customer satisfaction – Quality Management validates that the quality of delivered units truly conforms to customer-specific requirements.
- Higher quality levels – the quality database contains valuable information on process improvements and product development.
Order Management covers all order entry and invoicing functions dealing with the manufacture of customer products at a paper mill. Designed purely for the pulp and paper industry, this functionality is fully integrated with other product modules of cpmPlus for pulp and paper.

Order Management effectively streamlines the order entry flow. Customer and consignee default values are typically defined beforehand, in order to make order entry fast and reliable. Sales or mill personnel only need to enter the minimum information, since pricing and production reservations are handled by the system.

Order Management performs three different checks to ensure that the entered orders can be delivered in time; ATP – Available To Promise (from stock), CTP – Capacity To Promise, and STP – Semi-finished To Promise. The last check allocates raw material to the final order and is used e.g. for the sheeting process. Additionally, if the Production Planning module is available, the PTP – Profitability To Promise check can be used. This check takes production costs into account and returns the production slot considered best from the profitability point of view.

Order Management contains tools for the easy tracking of customer orders. The included views show the status of ordered, planned, produced, delivered and invoiced orders, as well as warehouse quantities.

The invoicing function covers the handling of invoices and credit notes. Invoicing defaults such as payment terms, charges and discounts are copied from the customer profile, minimizing the amount of manual work. Order Management supports automatic document creation run periodically or by request. These documents can also be delivered directly from the system e.g. by email or fax.

**Benefits of Order Management**
- Improved visibility – complete transparency of production, since the system is fully integrated with Production Management, Production Planning and Quality Management
- Improved customer satisfaction – deliveries are “on-time” and “full”
- Pulp & Paper design – Order Management responds to industry specific needs
- Scalability – functional palette can be easily extended with modules from Production Management, Quality Management and Production Planning
Decision Support is ABB’s powerful cpmPlus solution for production analysis and reporting. It improves efficiency by providing complete transparency within mill operations.

Decision Supports’ unique data model automatically generates the required performance metrics for the available production data. The inbuilt set of performance metrics and measures can easily be extended to include mill or corporate-specific data. Gone are the days when data had to be consolidated from a myriad of spreadsheets and printouts.

The dimensional data model for Decision Support enables performance and production analysis from several perspectives. It also allows drilling through multiple levels or hierarchies, from the top view in a scorecard or dashboard to the smallest detail. The results can easily be shared with all stakeholders or saved for further analysis. Easy-to-use ad hoc reporting supplements pre-built reports and analyses.

This analysis allows decision making to be based on hard facts, not guesses. The required actions can be taken internally or using ABB’s unique experience as a product and service provider for the pulp and paper industry.

Decision Support has a wide range of users, from the production floor to management. Financial managers and controllers obtain reliable data and the reports they need. Process developers can track the impact of innovations and investments on production performance and quality.

Decision Support also provides an efficient, open gateway to the provision of reliable production, quality and inventory related measures and metrics for third party systems. Alternatively, Decision Support can be integrated with third party systems using modern, web-based architecture.

**Benefits of Decision Support**

**Improving your mill performance**
- Helps to detect and isolate problem areas
- Helps to identify best practices through increased transparency
- Easy benchmarking
- On-line strategy follow-up, e.g. Balanced Score Card metrics

**Reducing your total cost of ownership**
- Fast implementation
- Full lifecycle product support
- Full vertical integration – one system for reporting
- Open gateway to 3rd party systems
- Access to reports via web
cpmPlus History is ABB’s solution for industrial process data management. It combines state of the art software technology with our extensive experience gained in supplying demanding industrial process information solutions worldwide.

cpmPlus History is optimized for high performance process data management and extensive history recording. It combines process data and relational data in the same database and contains built-in functionality for e.g. measurement processing, value validation, history recording, event logging and the calculation of aggregates and statistics.

The system can continuously receive, process and store several thousands of values per second. It is scalable, from small data loggers to enterprise-wide multi-node systems. Industry-standard interfaces, including OPC / DA, HDA, ODBC/SQL and web services, are available for data collection.

The system’s easy-to-use user interface includes a rich set of native displays such as lists, trends and diagrams. All displays are highly configurable directly from the user client, without any modifications to the application code. This enables easy product version upgrading and significant reductions in system lifecycle costs.

cpmPlus History forms a solid but flexible base for versatile collaborative production management applications such as

- Event/alarm analysis
- Operating diary
- Integrated production planning
- Overall Equipment Effectiveness (OEE)
- Energy management
- Emission reporting

New dimension of integration

cpmPlus History is fully integrated with ABB’s automation system, System 800xA, which seamlessly interlinks collaborative production management with automation, thus forming the “brains of the paper mill”. The outcome not only provides superior information usability to all users connected to the enterprise network, it also incorporates smart cpmPlus solutions for e.g. the optimization of quality, energy and material use.

Benefits of cpmPlus History

- Improving the transparency to production by providing real-time information to all system users
- Providing seamless collaboration and the easy interchange of information
- Enabling a direct reaction to changes in the process
- Providing data and event histories for analysis and benchmarking purposes
- Providing a solid and versatile platform for various applications
- Lifecycle cost savings – a scalable, fully productized solution that is easy to install and upgrade.
Energy costs account for a remarkable percentage of the paper industry’s cost structure. ABB has responded to this by offering cpmPlus Energy Manager, for improving energy efficiency and reducing energy costs.

cpmPlus Energy Manager lowers your energy costs by optimizing the use of the available power sources. It supports energy trading based on the balance between predicted consumption schedules, existing sales and purchase contracts, and the company’s own power generation.

Cost reduction opportunities are greatest when both electricity consumption and prices vary over time, which is common in open electricity market environments. Typically, the overall cost reduction can be 2 to 5 per cent of the total energy cost.

In the balancing process, schedules are usually calculated and agreed a day ahead. In strategic planning and budgeting, schedules may extend over years, while during real-time monitoring they cover the next few minutes or hours.

The solution is scalable, from single plant energy reporting systems to multi-mill systems serving hundreds of users at mill sites, and corporate-level regional centers covering all aspects of energy planning, operation and reporting.

Benefits of cpmPlus Energy Manager
- Enhancing awareness of energy usage and efficiency
- Predicting energy demand based on production data
- Balancing energy usage against purchased energy commitment
- Optimized energy production and procurement
- Easy-to-use scenario handling
- Managing energy sales
- Supporting sustainable manufacturing.
Focusing on the business needs of our customers

cpmPlus for a collaborating environment
Since economics and energy are key factors in every business today, it is increasingly important to have consistent, streamlined solutions for information access, analysis and presentation across all levels of the enterprise. This means that everyone is involved and needs the right data, at all times and in every location. This level of collaboration, combined with cross-functional capabilities, is vital to success.

Integrating business and manufacturing information allows paper producers to switch from a throughput based environment to a financial production one, where decisions can be made by understanding the financial impacts of production decisions.

ABB’s cpmPlus solutions are flexible and scalable, providing visibility in support of fast decision making. This means transparency throughout your mill operations and closing the gaps between corporate management and production processes.

Commitment to the pulp and paper industry
Achieving true bottom line results calls for more than just a new system. It takes people who understand your business – with in-depth skills, a strong track record and proven products and solutions.

ABB’s history is full of innovations that help papermakers realize higher levels of productivity and profitability. For more than 100 years, we have been inventing products and services that bring unique value to your operations. That is why we continue to invest heavily in research and development today. It is also why you will always derive the utmost value from an ABB solution.

ABB’s pulp and paper portfolio is a suite of solutions consisting of all major automation systems commonly used in the manufacture of pulp, paper, board or tissue, and based on a unified architecture.

Attain best-in-class manufacturing operations and best-in-class collaboration!