IndustrialIT cpmPlus
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 optimize plant operations and to improve production efficiency and product quality. The productivity of a paper mill depends to a great extent to its management having a clear view of the mill’s actual performance levels.

As mill performance is a result of several factors interacting in a complex industrial environment, the performance maximization requires a deep understanding of the process flows and efficient tools to measure, track and optimize the processes.

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. Only then, will managers get a picture of what really matters at the bottom line.

ABB’s Collaborative Production Management (CPM) solutions simplify this task by providing real-time visibility of the production and make the critical connection between financial control and mill floor operations.

Dedicated to the pulp and paper industry

cpmPlus for Pulp and Paper helps you to maximize the performance of your assets through:

- Improved capacity utilization
- Optimized material and energy use
- Minimized production losses
- Reduced inventories
- Optimized product delivery
- Optimized quality
- Optimized energy supply
- Increased transparency

Dedicated to the pulp and paper industry

cpmPlus for Pulp and Paper consists of integrated software modules with comprehensive functionality.

Although all modules can be used stand-alone, the biggest benefits are achieved when they are implemented together forming an extensive CPM system containing order data, production information, process variables, quality data, run-time parameters etc. This provides a reliable basis for the calculation of true performance metrics and a solid platform for efficient use of ABB’s sophisticated optimization algorithms for production scheduling, trim optimization, load planning, quality-based re-trimming and optimization of energy use and supply.

Standard integration to ERP

Building connectivity to the corporate ERP system is often an essential part of a CPM installation. ABB offers a standard business interface enabling the business information in the ERP system to be integrated with the manufacturing environment in a smooth and accurate way. A solution based on standard methods shortens the implementation time and is easy to maintain.

CpmPlus for Pulp and Paper consists of the following product modules:

- Production Planning
- Production Management
- Quality Management
- Customer Service
- Decision Support
- Process Data Management
- Energy Management
- Advanced Process Control
- Enterprise Connectivity
Focus on total cost of ownership

Paper companies of today are securing their IT investments by selecting reliable vendors that offer systems with long lifecycles and predictable maintenance costs. ABB’s fully productized CPM solutions and experienced project teams ensure the success of the investments. cpmPlus for Pulp and Paper is based on over three decades of experience of supplying information technology to the pulp and paper industry. The solutions are designed for continuous operation and have a robust product architecture and functionality to fit even the most complex production processes. The ABB cpmPlus products are continuously developed and new versions are released regularly.

ABB’s CPM system delivery process has been developed to provide the best possible product fit to your business processes and to maximize the project execution effectiveness.

The system life cycle does not end with the take-over of the delivery project. An essential task of the ABB CPM team is to ensure easy and cost-effective version upgrades that keep the delivered system up-to-date. To support the systems during their entire lifetime, ABB offers various customer support services from basic support line service to license upgrades and system development.

ABB has extensive experience in developing and supplying CPM solutions. Currently over 100 pulp and paper mills worldwide use ABB’s CPM solutions.
Production Planning is ABB’s solution for effective paper production planning. It provides tools to decrease production costs through optimizing machine capacity and minimizing waste and inventory, while ensuring on-time delivery.

Production Planning enables real-time planning and optimization of production blocks, runs and orders. In addition to grade change costs, the optimization takes machine specific characteristics and planned down-times into account, which ensures the best possible match between planned and actual delivery dates. All production steps including the paper machine, winder, rewinder, and sheeters are considered. The system minimizes the potential trim loss simultaneously in the scheduling phase and supports WIP (work-in-progress) storage planning. In the case of an order change or unplanned production upset, the production schedules are easily re-optimized to respond to the customer dynamics in the best possible way.

The integrated trimming package provides superior trim solutions based on sophisticated mathematical algorithms that support multi-objective optimization considering trim loss, knife changes, and deviation from order tolerances. The system is easily configured to consider restrictions such as maximum number of rolls per set, maximum and minimum roll diameter, quantity and width of small rolls, and edge roll restrictions in an order.

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

### Production Planning Benefits

#### Reducing your costs
- Higher material efficiency
- Minimized grade change costs
- Minimized trim losses
- Reduce customer return and rebate costs
- Possible bottleneck and overload situations are indicated in advance

#### Reducing your working capital
- Fluent production flow
- Minimized inventory
- Less material in process
- Savings up to 40% achieved!
Production Management

Production Management is ABB’s solution for managing the production process from the registration of a pulp bale or jumbo reel to the shipment of the final product. It can handle the most complex production process involving multiple mills and multistage product routes.

Comprehensive production tracking ensures the real-time execution of the optimized production plans. The tracking covers pulp machines, paper machines, supercalenders, winders, re-winders, secondary roll-processing units, re-reelers, wrap lines, folio and cut-size sheeters, palletizers, and automated storage and retrieval systems, leaving no single material flow without tracing. Direct interfaces to shop floor devices allow automatic device control and output of data without manual intervention.

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

All warehouse transactions, such as receipts, deliveries, and rejections are captured for controlling and reporting purposes. Load plans and packaging lists are available on-line and shipment data is transferred to the business system for rapid invoicing and payment.

Production Management provides for full genealogy of both intermediate products and finished goods. It provides the complete history of produced packages including all production steps, re-classification actions and warehouse moves together with work station codes, timestamps and operator signatures.

Production Management Benefits

Executing your production plans optimally
- Avoiding under/overproduction

Reducing your working capital
- Reducing raw material inventories, WIP and finished goods inventory

Improving your cash-flow
- Ensuring that deliveries are “on-time - in full”

Reducing your costs
- Improving visibility to production and providing complete product genealogy
Quality Management is ABB’s solution for managing quality related data and reducing quality costs in a pulp or paper mill. It provides valuable tools for process development, laboratory work and customer service.

Quality Management performs comprehensive quality control using information from various sources including the laboratory, Quality Control System, Distributed Control System, and Web Imaging system.

Bar codes may be used to efficiently identify paper and process samples in the laboratory. Scanning of the code automatically opens the correct sample and test variables on the value entry form. To further facilitate laboratory work, the system can be interfaced to analyzers and lab test equipment for automatic data collection.

The roll set analysis 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. The roll quality is compared to customer specific quality requirements, and in case of poor quality, the system automatically downgrades the roll preventing it from being shipped. This ensures that the customer requirements are fulfilled in every delivered roll, and additionally, it gives the operator a chance to re-trim in order to minimize the losses.

Quality Based Re-trim Optimization

For an optimal re-trim solution, the 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. The optimization is run in the background and the re-trim solution is available shortly after the jumbo reel is ready at the paper machine.

Quality Management Benefits

**Preventing quality losses**

- Comprehensive quality control using information from various sources

**Reducing your customer rebate costs**

- Customer quality requirements are fulfilled in every shipped roll

**Improving your manpower efficiency**

- Configurable displays with predefined user defaults ensure that relevant quality information is always near to hand
- Automatic calculation of run, order and product statistics
- Built-in quality tracking functions
Customer Service

Customer Service is ABB’s solution for customer order management. It is a powerful tool to efficiently plan, coordinate and control the sales and delivery process in a paper company.

It provides customer service, marketing, and sales personnel the information they need to enter, change and track orders and respond to customer inquiries.

Customer Service streamlines the order entry workflow. Order entry personnel only have to enter the customer, quantity, and delivery time. Pricing, inventory and production reservations are handled automatically.

The market budgeting function interacts with the production planning to create sales budgets by markets. Order entry personnel can apply orders against market budgets to reserve production capacity instantly and easily.

The vendor managed inventory function supports production forecasts and replenishment functions with advanced mathematical algorithms. Through statistical data based on sales or consumption and visibility into warehouse and in-transit inventory, the system forecasts required production volume for stock products and generates replenishment orders.

Customer Service Benefits

Increasing your revenue
- Identifies high-margin products

Increasing customer satisfaction and markets
- Supports efficient customer service

Enhancing your trading partnerships
- Ensures on-time deliveries

Reducing your working capital
- Reduces inventories

Compliant with industry standards
- PapiNet
Decision Support is ABB’s powerful solution for production analyses and reporting. It improves efficiency by providing complete transparency to mill operations.

The required performance metrics are automatically generated by Decision Support’s unique productized data model. 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 has to be consolidated from a myriad of spreadsheets and printouts.

The dimensional data model of Decision Support allows performance and production analysis from several different perspectives 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 analyses. Easy to use ad hoc reporting supplements the pre-built reports and analysis.

The 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 to the pulp and paper industry.

Decision Support finds a wide range of users from the production floor to the management. Financing and controlling get the reliable data and the reports they need for their work. Development can track the impact of innovations and investments to production performance and quality.

Decision Support provides also an efficient open gateway for providing reliable production, quality and inventory related measures and metrics to third party systems or Decision Support can be integrated to third party systems using a modern web based architecture.

**Decision Support Benefits**

**Improving your mill performance**
- Easy to detect and isolate problem areas
- Helps to find 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 life cycle product support
- Full vertical integration – one system for reporting
- Open gateway to 3rd party systems
- Modern web based architecture
Process Data Management

Process Data Management is ABB’s solution for industrial process data management. The solution is optimized for high performance process data management and extensive history recording.

Real-time process data is collected from various data acquisition systems through interfaces and stored in the database as time histories. The system can continuously receive, process and store several thousands of values per second and is scalable from small applications to enterprise-wide data warehouses.

The user interface is a modern presentation tool applying the latest usability engineering knowledge in visualization of process information. The flexibility of the user interface, together with the power of the database, provides an excellent combination improving information usability. Performance calculations, data displays and reports can be easily configured using built-in engineering tools. The navigation menu and data displays can be configured by the users themselves directly from the user interface using various display elements, such as chart and list controls.

Process Data Management contains several standard application modules in addition to basic process monitoring functions, for example:
- DCS event/alarm analyzing
- Process alarm management
- Operating diary
- Overall Equipment Effectiveness (OEE) reporting
- Wearing components management
- Integrated production planning
- Energy management

Standard application modules are highly configurable based on mill requirements. The mill-specific configuration is implemented with parameters stored in the database and without any application code modifications. This enables easy product version upgrading and significant reductions in system life cycle costs.

Process Data Management Benefits

Significant cost savings
- System installation, interfacing and commissioning require a minimum amount of engineering work
- Open standard interfaces enable easy data and function sharing with third party applications

- The graphic user interface, with easy-to-use generic trends, bar charts, alarm/event logs, and various list views combined with application-specific diagrams and reporting, provides superior usability resulting in higher productivity.
Energy costs take a remarkable percentage of the cost structure in the paper industry. ABB’s responds to this by offering Energy Management for energy cost cutting and energy supply optimization.

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

Opportunities for cost reduction 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. Energy Management also supports emission reporting and trading.

Energy Management includes planning and scheduling tools to optimize energy use and supply, energy balance management tools to support the real-time monitoring and control of the energy balance, and reporting tools to evaluate and report energy consumption, costs, efficiency, and other energy-related information.

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

Energy Management 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.

### Energy Management Benefits

**Significant cost savings**
- Lower electricity purchase prices due to accurate consumption forecasting
- Avoiding price peaks and penalty charges
- Employing optimal resources in the supply of electric power

- Enhanced awareness of energy consumption and energy costs
- Early detection of poor performance based on real time monitoring of performance against set targets
- Supports energy and emission trading
Focusing on the business needs of our customers

Industrial IT cpmPlus

ABB has always taken great pride in being the “engine room” for the global economy. In line with this spirit, ABB also offers Industrial IT cpmPlus solutions for the chemical, metal, cement, mining, and oil and gas industry in addition to the pulp and paper industry.

With today’s intense global competition and fast product-to-market cycles, it is increasingly important to have consistent streamlined solutions for information access, analysis and presentation across all levels of the corporation from the factory floor to the boardroom.

ABB’s standardized CPM solutions are flexible and scalable giving visibility for fast decision making thus increasing the availability of your plant and closing gaps between corporate management and production processes.

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

Combining cpmPlus and Full Service®

When an Industrial IT system with advanced optimization features is integrated with ABB’s Full Service® maintenance services, the result is a solution with unprecedented improvements to production efficiency.

The overall effectiveness of production equipment is commonly benchmarked using the OEE metric (Overall Equipment Effectiveness). OEE is calculated by multiplying the process availability by its performance rate and quality rate.

The resulting key figure indicates how much of the plant’s existing capacity can be economically utilized. In addition to availability performance OEE analysis tools help to identify the production facility’s main bottlenecks which can be analyzed further for root cause and improved or eliminated to gain productivity improvements.

Improvements and corrective actions based on accurate metrics and analyses can improve the efficiency of the production process by several percentage points, and even a single percent has a large effect on the bottom line.