

Production Management for the Pulp and Paper Industry

Industrial^{IT} Tools for Production Data Management



Towards Optimum Mill Performance with

Managing the production process

Industrial^{IT} Production Management is ABB's unique solution for managing the entire manufacturing process, from jumbo reel to customer shipment.

It is an advanced tool for the mill management as well as for the operators, linking the production floor to the executive floor. Typical functions include:

- Mill order processing
- Production planning integration
- Production tracking
- Warehouse management
- Delivery planning
- Shipping
- Real-time reporting

The solution can be flexibly configured to handle even the most complex production processes involving multiple machine centers and multi-stage product routes. It can also handle sheeting and other converting processes, where package level tracking is essential for efficient and correct mill operations.

Adding value to the supply chain

Industrial^{IT} Production Management allows managers to create and execute paper manufacturing schedules quickly and accurately. Alternatively, it can receive production plans from corporate planning systems and convert them into mill-specific schedules.

Comprehensive production tracking ensures the flawless execution of the production plans and provides for full genealogy of the intermediate products and finished goods. It also forms the basis for real-time reporting, facilitating managers to identify and remedy inefficiencies and bottlenecks.

Production tracking covers 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. Interfaces to these devices are provided to automate data collection and to direct processing.

The flexibility is retained through warehousing and delivery. The system's logistics modules help to streamline the warehousing and shipping operations, and to maximize operational efficiency resulting in on-time deliveries for the end customers.

Industrial^{IT} Production Management

Valuable Benefits

With Industrial^{IT} Production Management solution you can achieve following concrete benefits:

- Efficient customer service - on-line access to customer, production and delivery data.
- Increased production efficiency - integration of ABB's Production Planning algorithms means fewer production losses and less capital employed.
- Less over and under production - supervised plan execution.
- The right product at the right time to the right customer - positive identification of the individual jumbo reels, rolls, skids, pallets.
- Uniform end product quality - proactive production and quality management through the integration of ABB's Quality Management System.
- Increased production efficiency - speed and flexibility in production and logistics through a higher level of automation and information sharing.
- Continuous productive operation - robust technology and world-wide technical support services 24h/365 days.
- Lower life cycle costs - system based on products with open, configurable and extensible technical architecture.

Industrial^{IT} Production Management balances the business and strategic needs of the enterprise with the real world parameters of the mill and production, and provides a platform for next generation manufacturing operations.



Mill Order Processing and Production

Order Processing

A customer order, whether entered into the system directly or received via an interface with an enterprise level customer service system, is a request to manufacture and ship mill production.

Industrial^{IT} Production Management assigns a unique code to each order, which provides an enterprise-wide reference for specific information on the customer, product, quantity, quality, finishing, packing, and delivery, and allows order tracking and tracing. Order entry begins the production planning process by inserting the requested production quantities into the scheduling sequence, including roll finishing and sheeting schedules.

Production Plan Integration

Industrial^{IT} Production Management accounts for finished materials in inventory, as well as available production capacity, to determine the optimum way to fulfill the customer order. Based on the ordered quantities, the system helps the planning of the production and shipment schedules, including run sequences for paper production, cutting schedules for finishing operations and load plans for warehousing and shipping.

Special emphasis has been put into developing efficient optimization algorithms to cover various aspects of the production cycle. These tools are available as separate optional modules, and include the following:



Planning

- **Production Scheduling** enables real-time planning and control of production schedules using a highly visual planning environment. Schedule optimization algorithms let the planners to optimize the scheduling of blocks, runs and orders on the various machine centers, including a dynamic re-scheduling capability in the case of unexpected changes in the production.
- **Trim Optimization** offers superior trim solutions and ease of use for varying needs, including taking into account the specific requirements of combined roll and sheet production, or the handling of multi-stage planning problems. The optimization algorithms utilize the latest mathematical methods supporting multi-objective optimization and considering various goals, such as minimized trim loss, knife changes, or deviation from order tolerances.
- **Load Plan Optimization** allows for simulation of the loading of trucks and containers. The module incorporates advanced algorithms to optimally plan the usage of the loading space, resulting in a reduction of transport units required.

The algorithms take into account the paper industry specific characteristics; such as the effect of the varying roll diameters or the requirements of special roll or pallet stacking patterns.



Production Execution

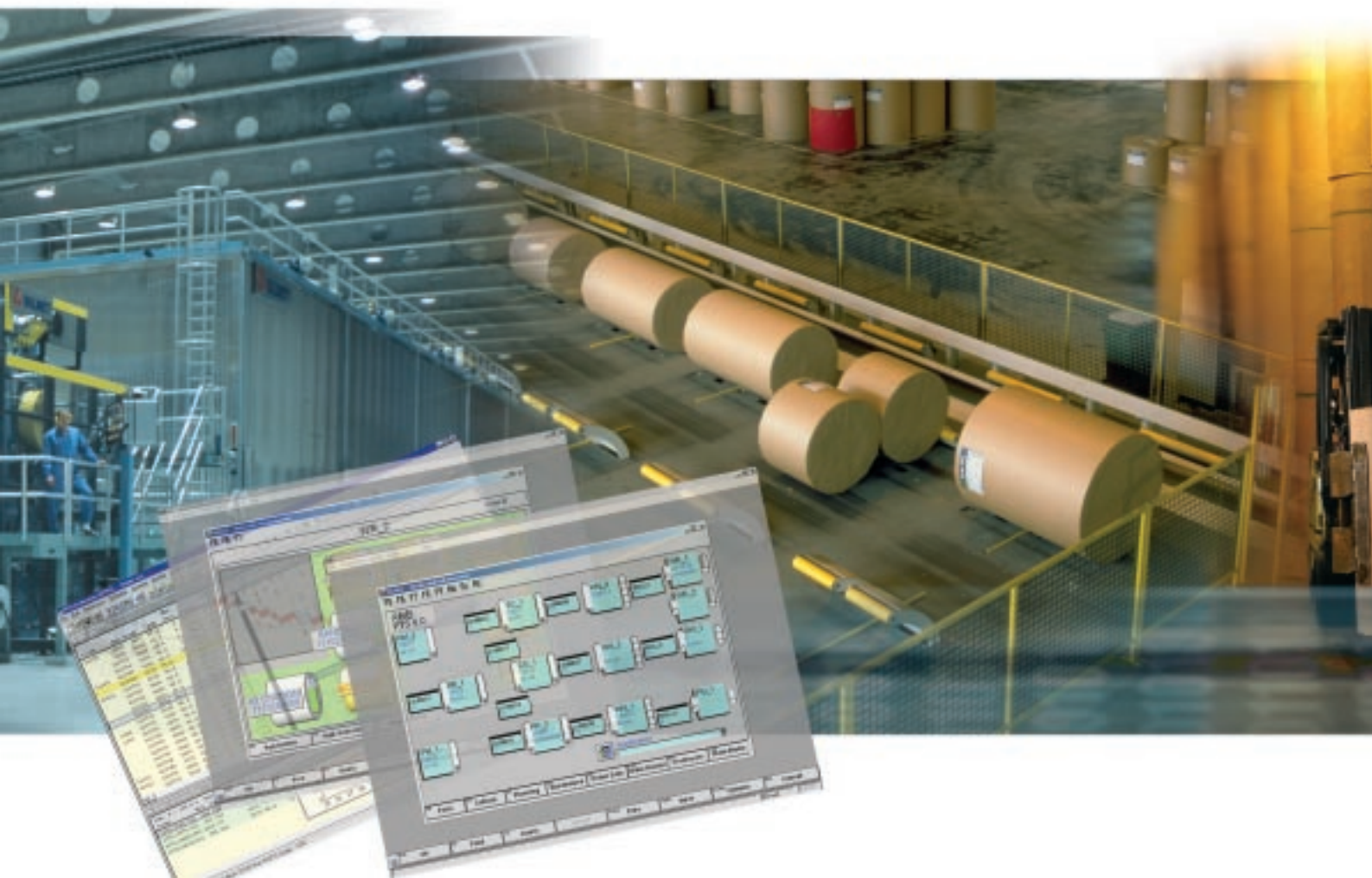
Production Tracking

Comprehensive production tracking acts as the basis of any production management activity, much in the same way as correct accounting is the basis for efficient financial control.

Production tracking covers paper machines, supercalenders, re-reelers, winders, re-winders, secondary roll-processing units, wrap lines, folio and cut-size sheeters, palletizers, and automated storage and retrieval systems, leaving no single material flow without tracing.

Production tracking provides for the active and automated control of various finishing operations. Direct interfaces to shop floor devices allow automatic control of these devices and retrieval of output data without manual intervention. This enables more efficient production and helps to reduce human error.

- **Machine Reel Tracking** enables the tracking of machine reels and all products manufactured from the machine reel using unique production identification numbers, and provides information for various production efficiency reports. Real-time information is used to control and streamline production in order to avoid over/underproduction and bottlenecks.
- **Winder Processing** assigns the rolls against the orders based on the optimized trim patterns. Unique roll numbers identify the individual rolls throughout the subsequent finishing processes, ensuring that the right product gets delivered to the right customer. Bar code tags allow easy identification throughout the mill.
- **Secondary Roll Processing** traces the rolls through the subsequent processing steps at re-winders, roll coaters and embossers.



Complete system support for complex product routing assigns the rolls against the corresponding orders automatically, resulting in efficient and proper production execution.

- **Sheet Production Tracking** provides the ability to register and control production at folio or cut-size sheeting, sorting, ream wrapping, pallet packing, and guillotine.
- **Wrap Line Processing** identifies the products to be wrapped, collects information about the products, controls the wrap line through on-line integration and produces package labels.
- **Lost Time Tracking** allows the logging and reporting of lost time per station, including shutdowns and breaks, and the aggregation of this information for accounting purposes, with the final goal being improved operational efficiency.

Production Reporting

A mill-wide log of production activity allows the generation of a series of production control and analysis reports. General reports are applicable to several different types of finishing units or stations, such as paper machine, winders, re-winders, and sheeters. Built-in standard reports allow for analysis of production efficiency, including the good production, production losses and lost time.

When problems are uncovered, exact troubleshooting is possible using the loglists, showing all the production transactions. As an example, the complete history of a finished package can be reported, including all the production steps, re-classification actions, warehouse moves, etc. - identified with production station code, timestamp, shift and operator signature.



Warehousing and Shipping

Warehouse Management

The system enables inventory control through the full range of warehouse operations, including normal transfers from roll wrap lines and pallet packing lines, and special transactions used in the warehouse office or at truck terminals. It also supports bar-coding and wireless technology for registering and tracking. Reporting and query of warehouse content can be done by package, product, article, or order item. All warehouse transactions, such as receives, deliveries, moves and rejections are captured for controlling and reporting purposes.

Loading and Shipping

Warehouse staff and foremen use the load plans as work instructions in loading operations. Load plans include information about which packages (rolls and pallets) will be loaded, where they are located in the warehouse (warehouse position), and into which vehicles they are to be loaded.

The loading process records the vehicle/container identification code and package identification codes. Packing lists can be printed after the load has been completed. Details of load plans and packing lists are available on-line; shipment data is transferred to customer service for rapid invoicing and payment.



CUSTOMER

Order Processing

Single set of enterprise data for fewer errors, lower costs.

Production Planning

Create optimized enterprise production plans; re-optimize across the enterprise to maintain margins despite breakdowns, cost spikes, order changes.

Production Tracking

Provide control through the entire supply chain, resulting in more efficient production.

Warehouse Operations

Control inventory through better information.

Load Planning and Delivery

Increase customer satisfaction through improved, low cost delivery.

Production Analysis

Review and streamline production processes to speed execution and reduce costs.



Order Processing

Production Planning

Production Tracking

Warehouse Operations

Load Planning and Delivery

Production Analysis



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