

Knowledge Manager

Collaborative production management for the cement and minerals industries

Make goal-oriented decisions to meet your production targets

Integrated Collaborative Production Management solutions provide you with consolidated, consistent and clean information

With ABB's Collaborative Production Management (CPM) solutions, all operation, control, optimization and business systems are integrated as one so you can benefit from true integration of process, business, quality and energy data. The information is provided on a transparent platform in which consistent information is accessible to all users in clear, concise reports.

Be a more effective manager

You need to know if you are on target to meet your production, operational and quality objectives. With Knowledge Manager, you can make goal-oriented decisions by accessing the information you need at the right time and place, and in the right format. And you can identify deviations and best practices to keep your production on target.

Save money

Knowledge Manager's flat learning curve saves you instruction and implementation time. Investing in research into information systems technology, software programming or interfacing is unnecessary. For example, the industry-specific applications are available as a set of ready-built but configurable objects, enabling you to capitalize on the expertise of others who have already developed applicable solutions. Thus, the time needed to produce a working solution is much shorter, and involves less risk and less lead time before on-site knowledge management begins. You decide how much of the solution development you wish to do in-house and how much assistance you would like ABB to provide.

Knowledge Manager is good for your business

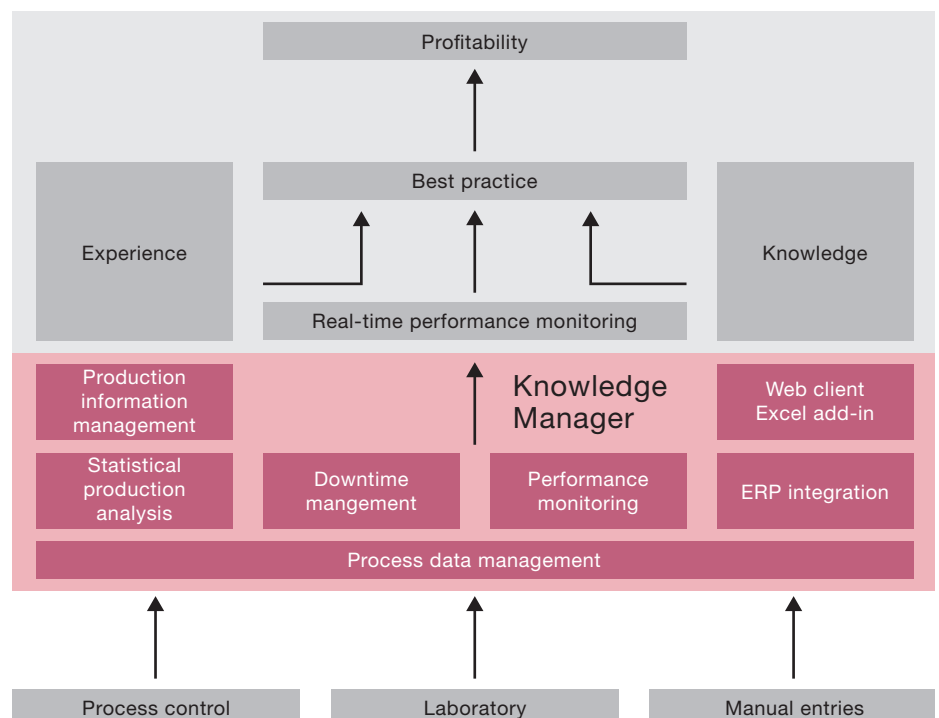
- Enforces information consistency across multiple business levels using unique data validation and period-closing functions, hence improving proof of performance and compliance
- Supports enforcement of best practices and working processes
- Increases effectiveness in production and maintenance management, resulting in reduced production costs
- Enables you to reach environmental, energy, production and quality goals
- Provides true integration of process, production and quality information

Modular design to meet individual needs

The core of Knowledge Manager comprises all the functions and components needed for industry-specific process and quality data warehousing, and focused information presentation. Knowledge Manager can be adapted and expanded to meet your specific requirements and can incorporate up to several hundred users in order to keep pace with growing demand.

Savings of up to \$500,000 with every installation

- Real-time automated key performance indicators (KPIs) to support decision making, enabling best-in-class manufacturing and savings of up to \$300,000 per year
- Emissions tracking and compliance certificates save up to two person-weeks each month
- Two person-weeks saved per month through advanced material balancing tools
- \$200,000 savings through enterprise resource planning (ERP) integration and consultancy



A powerful aid to monitor plant performance

Production information management

Knowledge Manager production information management drastically simplifies production management, covering functions such as:

- Production tracking
- Process operations monitoring
- Material storage management
- Energy and emissions monitoring
- Reporting of all information

Identifying the influences that process parameters have on product quality, production capacity, energy consumption and emission levels is now easier than ever. Powerful analysis tools are conveniently available through your Web browser. After all, successful process information is key to your plant operation.

The Knowledge Manager production management functionalities include calculating, consolidating and reporting capabilities. Knowledge Manager also integrates information like production-related data, process variables, energy indexes and run-time quality parameters in comprehensive process operation reports.

Support of planning, operation and production at multiple levels

Immediate access to up-to-date information is essential to production planning. Knowledge Manager provides reliable online reports about your plant's conditions, such as product inventory, capacities of process equipment and availability. You can expect better utilization of energy, equipment, inventories and capacities.

Knowledge Manager helps process managers to identify the influences that process parameters have on, for example, product quality and production capacity. Thanks to advanced consolidation and centralization functionalities, regional managers can obtain a new level of regional and corporate KPIs, allowing for performance comparisons in cockpit-like displays.

Performance monitoring key functions

- Visualization and analysis tools
- Reports, charts and trends
- Operation and process reporting
- Energy reporting
- Material and stock tracking
- Environmental reporting
- Production reporting
- Operation and production limits
- Calculation of KPIs
- Unique data validation and drill-down methods
- Visualization of consolidated, consistent and transparent information



Minimize downtime

Take the guesswork out of maintenance

You are most certainly not earning money during downtime. Reducing downtime and keeping up production capacity is vital for any manufacturing plant. And correct information is the key. Knowledge Manager downtime management solutions ensure that you know what your most costly problems are, taking the guesswork out of maintenance.

Identify costly weak points

Use Knowledge Manager's tools for easy identification of failing equipment. Pareto analysis is used to determine the most costly weak points in your production process.

Forecast the next maintenance events

Identification of failing equipment is based on event and alarm statistics. Results can be viewed by period, eg, daily or weekly, or ordered by frequency, eg, top 10 occurring. Maintenance events for specific process equipment are forecasted using run-time counters, production totals or cumulative energy utilization.

Root cause analysis tools

Pareto analysis is based on configurable causes derived from a plant-specific fishbone diagram. Reliable statistical information about the causes of downtime is the basis for corrective action. The information is essential for justification of investments like capital expenditure or personnel training.

With Knowledge Manager's multidimensional, product-related Pareto analysis tools and its ability to separate low production periods from production stops, Knowledge Manager enables you to focus your maintenance analyses on further reducing production costs.

Integrate with maintenance management systems

Knowledge Manager provides great synergies when interfacing with Enterprise Resource Planning (ERP) systems. Direct integration with maintenance management systems at the ERP level is an obvious advantage.

Transferring data such as stops, run-time and downtime statistics to maintenance management systems, such as the SAP PM module, is easy.

Key functions of downtime management

- Tracking of production stops
- Tracking of low production rate periods
- Maintenance forecasting support
- Alarm and event recording and statistics
- Reporting, charts and trends
- Pareto analysis
- Multidimensional cause categorization
- Root cause analysis tools
- Calculation of KPIs



Integrated ERP connectivity links process and business

Integrate manufacturing and business

Knowledge Manager's ERP Connector provides the connection to ERP software. Specifically, Knowledge Manager ERP Connector extends the reach of Knowledge Manager to your enterprise applications by supporting direct interaction between the manufacturing and business processes. Using this connector, manufacturing information is integrated with the ERP system, and business information is seamlessly integrated with the manufacturing environment.

Integration made simple

Protect your long-term investments by using industry standards. All the methods required for connecting to the ERP and transferring manufacturing information are fundamental to the Knowledge Manager ERP Connector. Engineering and configuration of the ERP connector is done through the Knowledge Manager Application Developer Toolkit – ie, the same tools and methods applied in report configuration are used to configure the ERP connectors.

Knowledge of the ERP internals, ERP interface technologies and software development is not required in order to use, configure or maintain the connectors. No specific customization is required in most of the ERP modules; the Knowledge Manager ERP Connector replaces the re-entering of data with electronic data transfer.

Integrate consolidated, validated and approved information

Although integration is automatic, Knowledge Manager allows for validation, manual correction and approval of information before it is transferred to the ERP system.

Advantages of the ERP interface

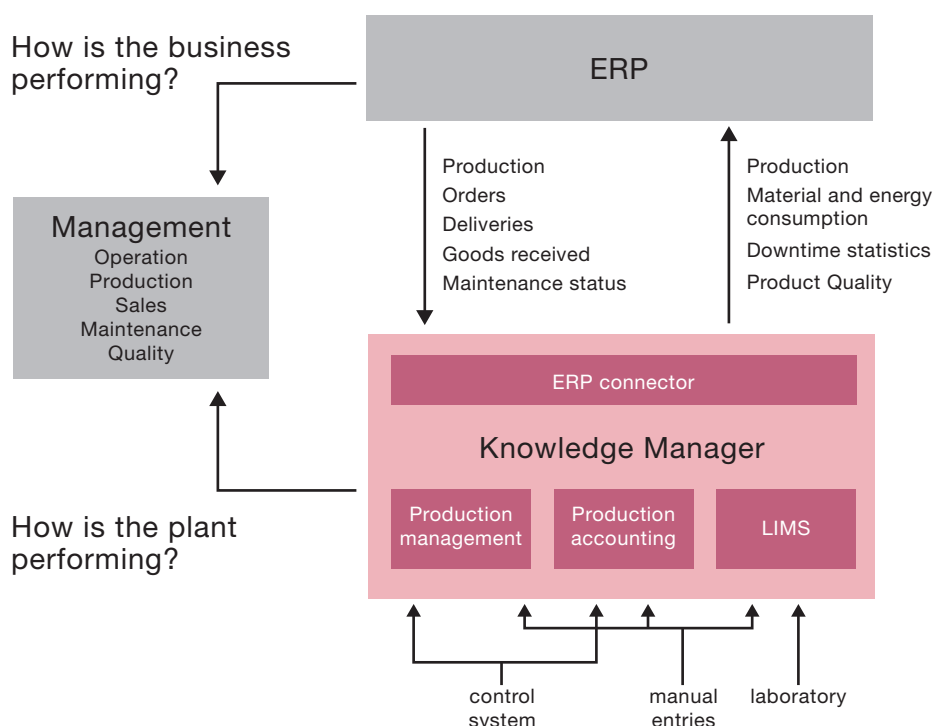
- Online integration of manufacturing in the overall business process
- Prepackaged solution based on standard methods
- Short implementation time
- Easy to maintain; no ERP experts required
- No specific knowledge of ERP programming required

Applications

- Product costing
- Production planning
- Materials management
- Plant maintenance
- Quality management

Key functions of the ERP connector

- Manufacturing information integrated in the ERP system
- Business information integrated in Knowledge Manager
- Can be integrated with:
 - SAP PP-PI connector
 - SAP PM connector
 - SAP MM/SD connector
 - SAP QM connector
- Online exchange between ERP and Knowledge Manager
- Engineering and configuration through Knowledge Manager toolkit



Boost process understanding with statistical analysis of production and quality information

Correct product quality during production

Statistical Process Control (SPC) information enables operators to compensate for or eliminate problems before out-of-specification product is produced. In Knowledge Manager Statistical Production Analysis, the trend functions X chart, EWMA chart and CUSUM chart have been selected to match requirements specific to manufacturing processes. The X-Y graphs show the possible correlation between two variables, with automatic compensation of time delay. Histograms allow for readable statistics of run-time quality measurements.

In SPC, quality is emphasized as a process characteristic. If the process is controlled and improved, product quality will be automatically maximized. Product specifications thus are normally left out of quality improvement activities until the process has been optimized. Once the process is stable, product specifications are compared with process control limits to determine if the process is capable of manufacturing the product to those specifications.

Process and quality improvement

Statistical process control charts contribute to process and quality improvement by:

- Providing snapshots of the processes' conditions and quality improvement over time
- Providing information for problem correction and process improvement
- Indicating what the process is actually capable of doing during cause correction and process improvement activities

Statistical Production Analysis

Statistical Production Analysis provides powerful tools to:

- Effectively monitor quality-related process variables
- Verify whether the variables are randomly scattered around the mean and normally distributed
- Detect variability and statistical process changes to prevent the process from becoming unstable

Tools

- X charts (Shewhart)
- EWMA charts
- CUSUM charts
- Histograms
- Multivariable X-Y graphs



Flexible and reliable system architecture

Maximum information availability

Knowledge Manager offers open intranet solutions for the acquisition and distribution of plant information. It is based on industry standards, ranging from the hardware and operating system to database management (RDBMS).

Desktop functions use the familiar Windows environment and Internet standards. The software is developed to support a component structure, and its service-oriented architecture (SOA) is based on a model consisting of data collector nodes, application and database servers, and thin clients. Redundancy can be provided at all levels when the site situation demands high reliability.

Data collectors gather live data from different sources and provide store-and-forward data buffering. OPC DA and HDA are used to communicate with ABB and other vendors' control and PLC systems. Other protocols are also available when OPC is not.

The business logic is located in the application server, which is the software component responsible for all server and user applications. It provides services such as data integration and consolidation, visualization of information, user authorization and client access management. Interfaces to laboratory instruments and ERP systems also run on the application server.

The repository for the historical information and process-based knowledge is the process and quality data warehouse managed by the database server. Data can easily be kept online for years without archiving. Server hardware performance and storage space are the only restrictions for the quantity and the lifetime of data.

Access information from your desktop using thin clients

The only software that needs to be installed on client computers is a Web browser. Using this thin client Web-based technology, it is possible to analyze and review the collected information from various perspectives, generate focused reports to aid management in informed decision making, and discover new opportunities by exploring historical and current process and quality information. With the thin client, users can navigate through the system to view documents, reports and graphs, and even make manual entries or modify personal reports using a standard Web browser.

Keep your data secure and auditable

User authorization and management, status monitoring, data retrieval and processing, configuration handling, consistency checking and enforcement are a given with Knowledge Manager. Role-based system security settings and client access control incorporate the Windows user accounts from your plant domain.

Auditing reports are available to ensure actions of individual users can be traced. Knowledge Manager provides self-diagnostic tools that support the system administrator without requiring prior knowledge of any specific technology.

Adapt and customize to meet your needs

ABB knows that you have unique requirements for data evaluation and the acquisition of information. To meet individual needs, Knowledge Manager provides a range of easy-to-use configuration tools. The Knowledge Manager Toolkit is a graphical and menu-driven configuration tool used to set up process tags, logs, calculations, trends, templates and reports using simple drag-and-drop editing. With this all-in-one toolkit, you can create and customize displays, reports, trends, manual entry forms, survey sheets, etc. and make them available to other users. Templates for reports and graphs can be created from a comprehensive library of prebuilt business objects. The Knowledge Manager Toolkit also embeds various scripting tools for additional complex processing of data and advanced templates and reports.

Enjoy flexibility

- No specialist programming or Web development knowledge required
- Toolbox with preconfigured elements
- Simplified editing
- Full system configuration setup and management

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