Wonderware MES/Operations

Real-time Manufacturing Execution Management

Efficiently and reliably manage the transformation of materials into finished products with Wonderware MES/Operations. Digitize and standardize work order execution processes, enforce products build to specification and capture manufacturing execution and material flow information in real time.

Summary

Wonderware MES/Operations offers a complete set of MES software functions to efficiently manage operational processes and data flow in industrial manufacturing plants. The software allows for a full electronic information and workflow management for manual job execution, as well as data download and execution on automated plant equipment.

Integrated with enterprise resource planning, Wonderware MES/Operations enables agile, short-term production management and provides schedule flexibility for the plant. Enforcement of product specifications such as bill of materials (BOM), setup parameters, rules of material flow and job execution sequence ensures consistent quality. Automatic electronic record keeping provides detailed product genealogy and end to end material traceability. Business applications can be updated with work in process (WIP) and inventory status information in real time. Execution history data offers drill down analyses of operational performance and identification of best practices, facilitating the continuous improvement process.

Business Value

Digitization and increased automation of operational processes can raise efficiencies, reduce errors and improve quality, ultimately increasing yields dramatically. Inventory turns faster, production lead times shrink and the business becomes more agile and responsive.

Benefits

+ Elimination of error prone paperwork
+ Increased automation of data capture and information management for decision support
+ Improved inventory velocity and reduced production order lead time
+ Lower variance in production results, less scrap and rework
+ Reduced risk of managing product recalls or production emergencies
+ Enhanced supply chain visibility
+ Reduced costs of production and of regulatory compliance
+ Secured brand equity and customer satisfaction

Production Management

Wonderware MES/Operations helps manufacturing companies electronically manage and document production, product and process quality, and end to end material flow. The software is designed to provide an information model to enforce business and data collection rules and to assist with job-related specification data and instruction documents in real time.

Work order execution is managed by scheduling instances of the product-related master process, scaled to the requested product quantity. Instances of the process are then broken into jobs and scheduled to equipment for execution on the plant floor.

Detailed records of product genealogy and material traceability allow for fast and effective responses to unforeseen events and help reduce the cost of compliance to consumer and product safety regulations.

Specification Management

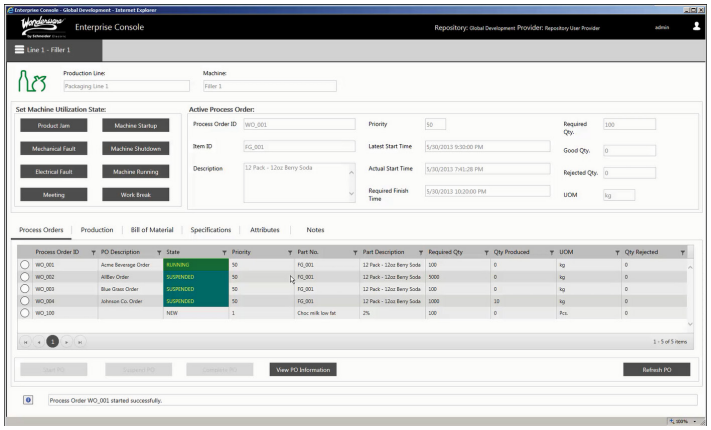
The Wonderware MES/Operations process model includes business rules and product specification information to provide and enforce work instructions, BOM, and setup information to both people and automated equipment. Material consumption can be verified against BOM specifications using barcode or RFID readers.

Inventory and Storage Management

Wonderware MES/Operations can be used for managing inventory and end to end traceability across fixed storage locations, mobile storage units or production equipment for raw materials, semi-finished and finished products.

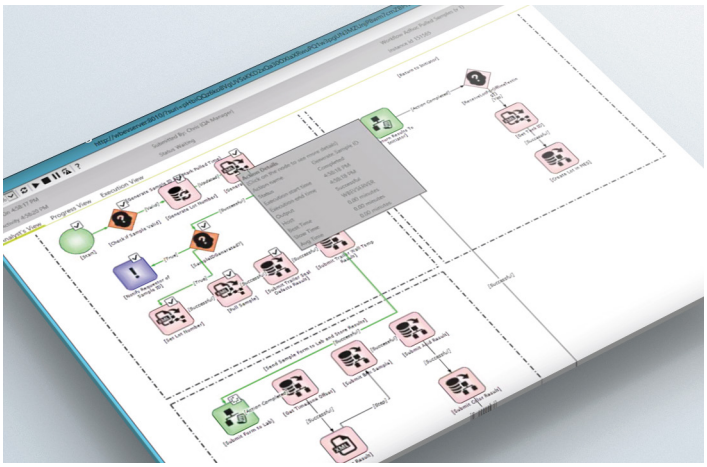
Material quantities are updated automatically in production inventory as materials are consumed and products are made.

You can additionally manage and track work order independent inventory operations such as material receiving, transfer related to pre- or post-production logistics or managing Kanban inventory.



Manufacturing Execution

Electronic workflow management provides integration of people and systems into operational processes and enforces consistent execution of operating procedures. Workflows can be defined in the process specification and business rules and automatically triggered from planned or unplanned production events to provide notifications and information to the right people requiring task execution, data entry response or decision making feedback.



Unique execution and data collection capabilities on automated plant equipment make Wonderware MES solutions the first choice for automated or fast moving goods manufacturing processes.

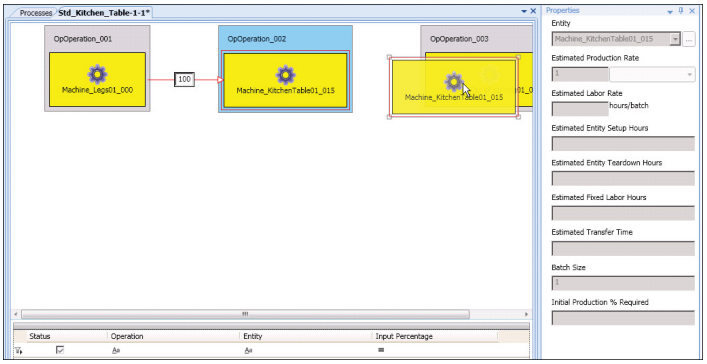
Wonderware System Platform is leveraged as the infrastructure for execution integrated with the plant equipment control systems. Native integration leverages the platform equipment model and facilitates transformation of control system data into consistent electronic records for storage in the MES database.

Labor Tracking and Certification Management

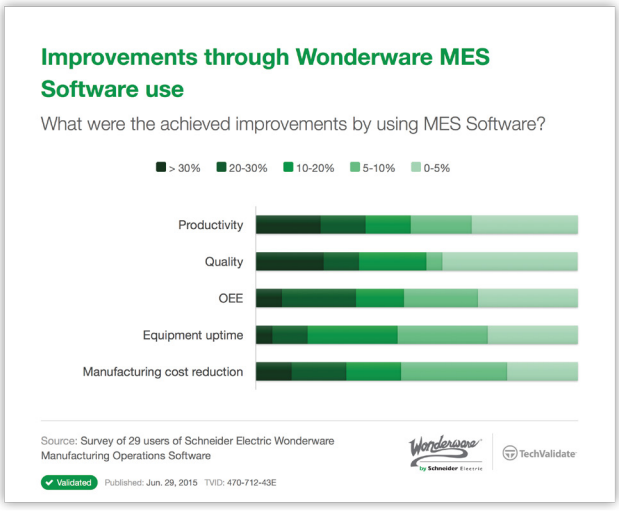
Wonderware MES/Operations tracks operators logged into jobs and captures time and duration on machines, which allows accounting of labor costs attached to work order execution by an operator or groups of operators. Jobs can be restricted to operators with valid certificates of necessary qualifications to run the job.

Process Modeling

Wonderware MES/Operations leverages a process model to describe the manufacturing process component operations and link business rules and specification information to product manufacturing.



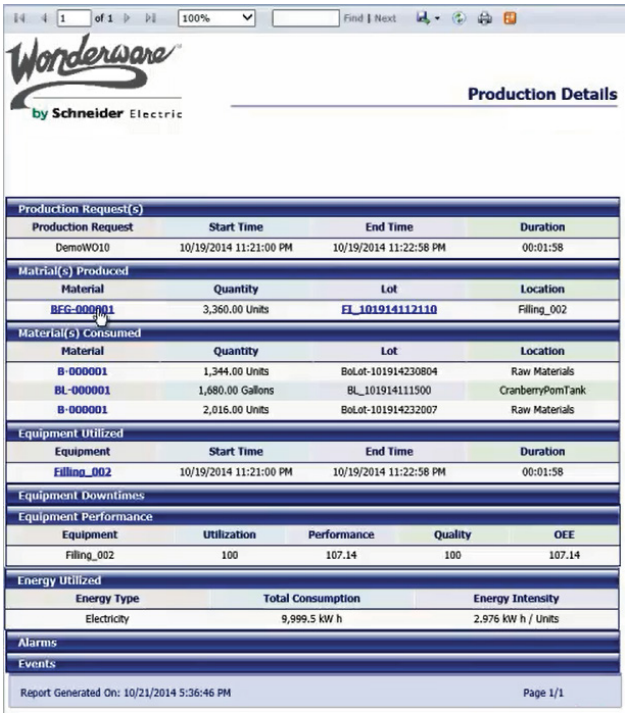
The process model allows defining and linking the operations, equipment, BOM and setup specifications, routings and flow of materials between operations and the data capture requirements for each operation or step within a process.
An 'operation' defines a task to produce an intermediate or finished product, including the raw materials or intermediate products consumed, any by-products produced, the equipment used to complete the task, data collection, sequence of steps and labor and machine time estimates.Dynamic routing accommodates rework by routing production to rework operations using reason codes.



Reporting

Wonderware MES/Operations includes standard reports which are published for flexible and collaborative information access via a web browser.

+ Genealogy by Work Order
+ Production by Equipment



Manufacturing Operations Management

Wonderware Manufacturing Operations Management is where inventory and production management, performance analysis, quality and compliance come together across a common platform and interface.

Wonderware MOM application functionalities can be scalable and incremental deployed at single or multiple sites.

Multi-site Operations Management

The key in multi-site applications is to enforce consistent reporting, analysis and standardization of business processes. Combining Wonderware MES and advanced workflow software capabilities offers a "model-driven," process-centric approach to MES standardization. Our methodology is based on reusable templates and an easy-to-use engineering environment that empowers users to create, deploy and refine standards and to adapt plant nuances easily.

Wonderware MES Technical Specifications:

Operating Systems

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Language Support

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For more information on Wonderware MES Software and Manufacturing Operations Management solutions, please visit wonderware.com/manufacturing-operations-management

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Wonderware MES/Performance

Manufacturing Operations Performance Management in Real-time

Reduce costs and increase return on assets (ROA) by monitoring, analyzing and continuously improving operating efficiencies. Wonderware MES/Performance combines production and equipment event tracking with work order execution progress information for a full manufacturing performance solution.

Summary

Wonderware MES/Performance software provides Overall Equipment Effectiveness (OEE) monitoring of production lines in real-time. Automated equipment efficiency tracking and line bottleneck determination quickly shows which plant assets are pulling their weight, and which ones are not. Critical line efficiency and equipment downtime information is communicated to operators and decision-makers, who can take immediate actions to improve performance and productivity. With this higher level of insight, users can quickly identify inefficiencies and attack problem areas which affect plant performance and capacity - unlocking more value from existing plant assets.

Business Value

Keeping equipment operating at peak performance cuts cost, maintains profitability and helps companies remain competitive. Standardization of KPI's and best practices elevates performance consistently across the business.

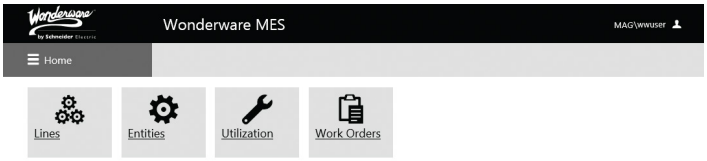
Benefits

+ Gain visibility to KPIs for line and equipment performance
+ Enable operators and decision-makers to take immediate actions to improve plant performance and productivity
+ Increase asset utilization with accurate information on line bottlenecks and equipment downtime
+ Improve the predictability of order fulfillment, with accurate planned vs. actual information
+ Determine and eliminate plant capacity losses with new insights from performance history data
+ Continuously improve operational efficiencies and plant throughput
+ Establish best practices by comparing line-to-line and equipment-to-equipment performance across the enterprise

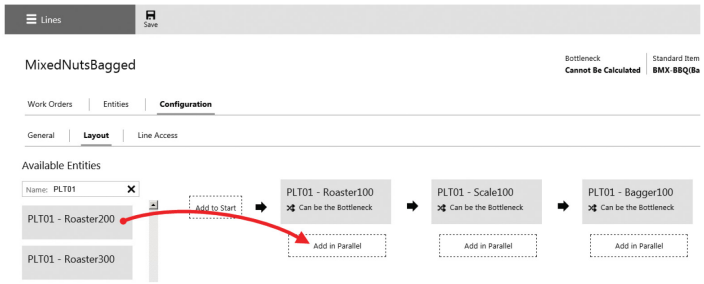
Manufacturing Performance Management

Wonderware MES/Performance software provides the ability to collect and store process data for visibility into Overall Equipment Effectiveness (OEE) key performance indicators (KPIs) and utilization information.

The software is designed to collect plant process information from operators and automated production equipment. It uses work order information manually entered, or provided from an external system, to accurately calculate the OEE KPIs based on work order start quantities and product-specific targets. The software then tracks performance across line equipment at the required production rate.

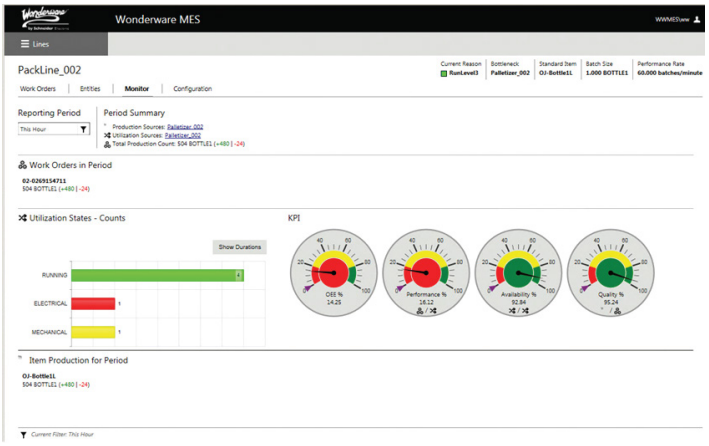


Wonderware MES/Performance is quickly set up by configuring equipment, lines, utilization states and reasons in its web-based user interface. A line is easily modeled by dragging and dropping available equipment into a layout that indicates the flow of product.



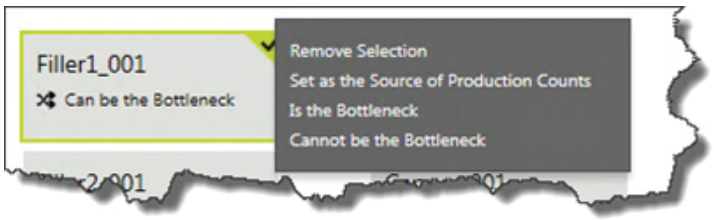
Integration with existing automation systems generates highly accurate and timely views of equipment performance, including short duration events which are not typically recorded. Short duration events can add a significant amount of downtime but when tracked, users see the impact of the events and have a path for improvement.

Unique data collection capabilities on automated plant equipment make Wonderware MES/Performance the first choice for fast moving consumer goods manufacturing.



Line Bottleneck Determination

Production line performance is constrained by bottleneck equipment, but the location of the bottleneck is not obvious for operators and might change with the item produced or equipment failure. To track line OEE, the KPI calculations need to be based on the bottleneck performance and have to consider the amount of good production at the defined line's production source.



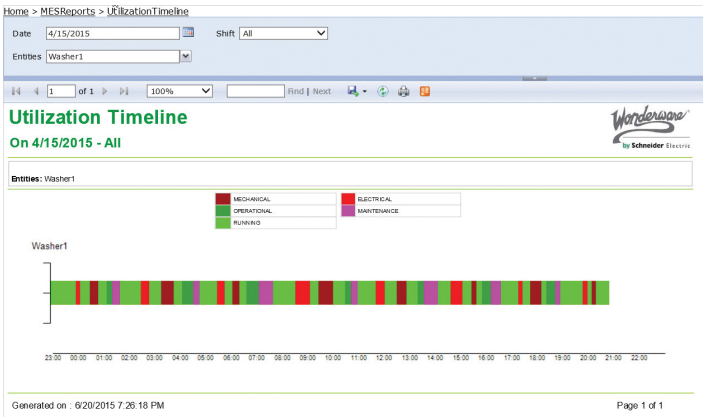
Wonderware MES/Performance determines bottleneck equipment both automatically and manually:

+ **Automatically,** by specifying which line entities could be the bottleneck. In this case, the bottleneck will be determined through continuous evaluation of performance rates.
+ **Manually,** by specifying the bottleneck position when configuring the line. In this case, the specified equipment is always used to set the line's performance amount.

Bottleneck determination helps focus attention on the issues that are truly impacting current performance.

Equipment Utilization Tracking and Monitoring

Wonderware MES/Performance tracks equipment utilization by creating an electronic record of different states and attached reasons. Utilization events, such as equipment start/stop or downtime for maintenance, define the state change. These events can be captured automatically from control systems or entered manually into the system by production operators, or as a combination of both.

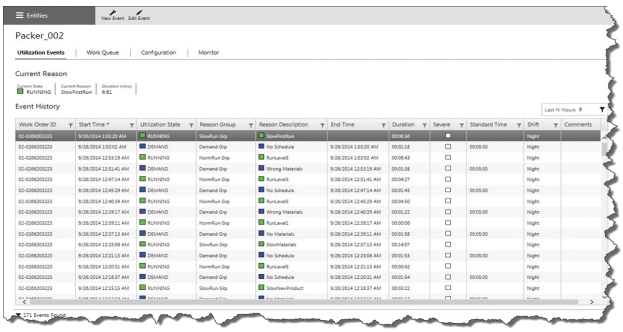


Automatic utilization event and reason capturing allows users to record short stoppages and frees up operators from manual data entry. Pareto graphs display rate counts, durations of utilization states and reasons associated to line or equipment performance.

Any number of utilization reason groups causing a state change for equipment (i.e. running, idle, in maintenance or down) can be defined to get the most accurate, detailed insights which downtime reasons appear most often, or cause the most downtime.

Automatic events may be modified by an operator or authorized person to further clarify the reason for the event, including the ability to merge events or split an event into one or more individual events.

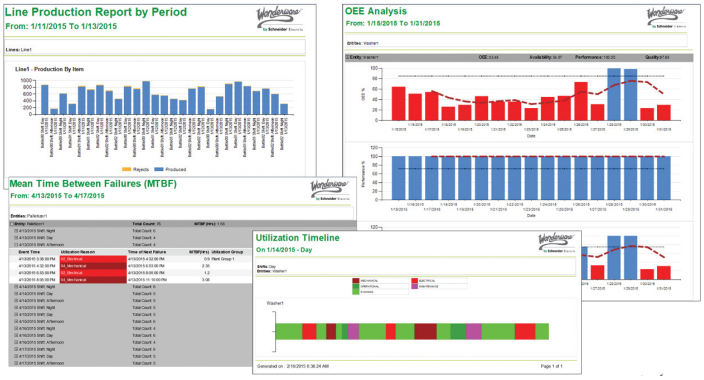
Accurate downtime information helps to rank and analyze the reasons impacting equipment utilization and provides actionable insights for improvement.



Reporting

The entire manufacturing facility operates better with enterprise-wide visibility into real-time production information. Wonderware MES/Performance achieves this with a reporting database optimized for retrieval speed (powered by Wonderware Intelligence) and a full set of interactive report views delivering information on production results and plant performance measures:

- + Line Production
- + Equipment Production
- + Utilization by Equipment
- + Utilization Analysis
- + OEE Analysis
- + Mean Time Between Failures
- + Mean Time to Repair
- + Utilization Timeline



Manufacturing Operations Management

Wonderware Manufacturing Operations Management is where inventory and production management, performance analysis, quality and compliance come together across a common platform and interface.

MES/Performance ensures that plant equipment is working to its fullest potential, MES/Operations enables effective process execution and MES/Quality helps to control, maintain and continuously improve production quality.

Wonderware MOM functionality can be scalable and deployed incrementally at single or multiple sites.

Multi-site Performance Management

The key in multi-site applications is to enforce consistent reporting, analysis and standardization of business processes. Our methodology is based on reusable templates and an easy-to-use engineering environment that empowers users to create, deploy and refine standards and adapt to plant nuances easily.

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Wonderware MES/Quality

Quality Management and Statistical Process Control for Manufacturing Operations

Safeguard quality and compliance by digitizing and automating quality operations and sample plan execution on the shop floor. Use powerful statistical process control (SPC) methods to empower stakeholders with visibility into trends and rule-violation notifications to effectively reduce quality losses, minimize variation and improve yields.

Summary

Wonderware MES/Quality software helps manufacturers increase efficiency by capturing and monitoring critical information in alignment with other operational activities and in response to shop floor events. MES/Quality is designed for quality data collection through enforcement of manual inspection procedures or direct sampling from automated plant equipment or control systems. Statistical Process Control (SPC) provides real-time visibility into trends, variation or non-conformance to enable rapid corrective and preventive actions. Wonderware MES software complements LIMS and quality management systems with automated data collection.

Business Value

Using Wonderware MES software, manufacturers can improve yields through increased product quality and operational efficiency. Automation, standardization and enforcement of inspection and data collection procedures help reduce costs while ensuring quality and maintaining regulatory and product safety compliance.

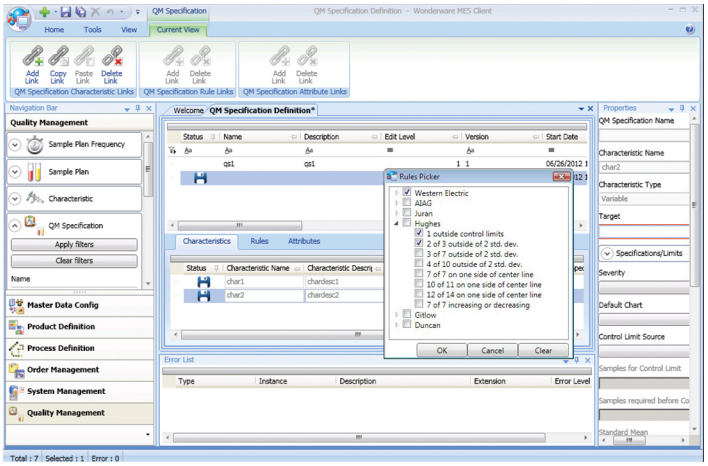
Benefits

+ Improve product quality and reduce losses through tighter process control.
+ Reduce lead time to corrective actions and minimize impact on downstream operations.
+ Enhance operational agility while securing compliance for ever-changing production schedules.
+ Predict issues and trigger preventive actions to avoid quality losses.
+ Reduce compliance cost with a complete electronic record of product quality and operational activities.
+ Improve yields and reduce giveaway by driving quality closer to specification limits.
+ Capture and digitize best practices and standardize processes for quality inspections, compliance, corrective and preventive action (CAPA), non-conformance (NC), material disposition or sign-off approvals across plants.

Quality Specification Management

Reduce off-spec production through enforcement of quality requirements

With Wonderware MES/Quality, is configured in three easy steps. First the user sets variables and different frequencies for quality data collection. Then the software assists in creating sampling plans that define the events and frequencies carried out to secure complete coverage of inspections and documentation. Finally, the user defines the quality specification for a product, an operation, or piece of equipment by selecting the required variables, a sample plan definition and SPC rules applied to the data.



Powerful specification version management functionality ensures data consistency and supports continuous improvement.

Users can also define as many quality specifications as required, including limits and rules for every product, process, equipment or any context that is meaningful for the business.

Sample Plan Execution

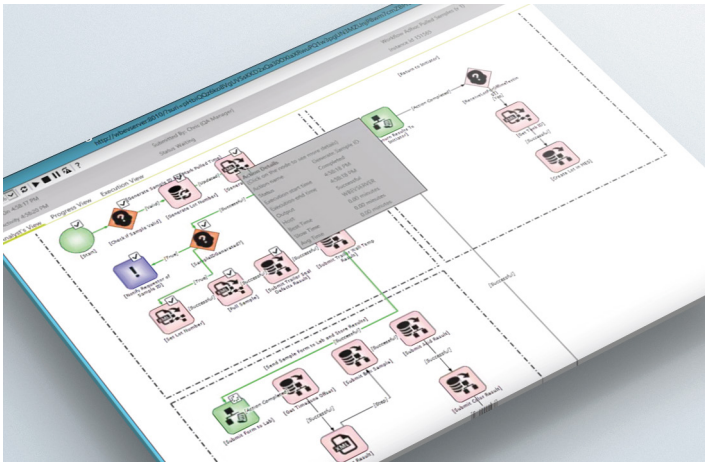
Quality operations management in the context of work order execution

The software dynamically manages quality data sampling requirements according to the work order specification and removes these distracting and difficult to manage tasks from operators. This increases scheduling flexibility and improves overall responsiveness to unplanned events.

When a work order is started, the specified sampling plans are automatically generated and dynamically maintained in alignment with the work order execution progress.

Future sample plans based on production unit count are predicted based on the standard production rate defined for the product currently produced. All related operator quality data entry requests and automatic sampling from connected devices are executed by the system. Spontaneous quality data samples can be triggered for unplanned or specified process conditions.

Workflow Management



Advanced workflow management capabilities automate and enforce routine quality data entry procedures as well as escalated responses, reducing time to action.

Integration with Wonderware Skelta BPM advanced workflow software allows users to model execute and document electronic workflows for manual sample data collection as well as any standard operating procedures in response to planned and unplanned events such as non-conformance, out-of-control conditions or rule violations.

Digitizing and automating the operational quality procedures brings peace of mind that products have been tested to comply with customer, internal or regulatory requirements before they leave the plant.

Statistical Process Control (SPC)

Empower stakeholders to reduce quality losses and take preventive action

Near real-time quality monitoring eliminates time delays to non-conformance notifications while minimizing impact on downstream operations. SPC analysis can be leveraged to “predict” issues and, in response, trigger preventive actions to avoid losses before they cost time and money.

Wonderware MES/Quality includes rich SPC trend and chart display capabilities. Sampled data can be displayed instantly in SPC charts and monitored by operators. These include notifications for violations of control and specification limits. Additional notifications can be configured based on a large set of standard SPC rules indicating specific trends and behavior of quality characteristics.

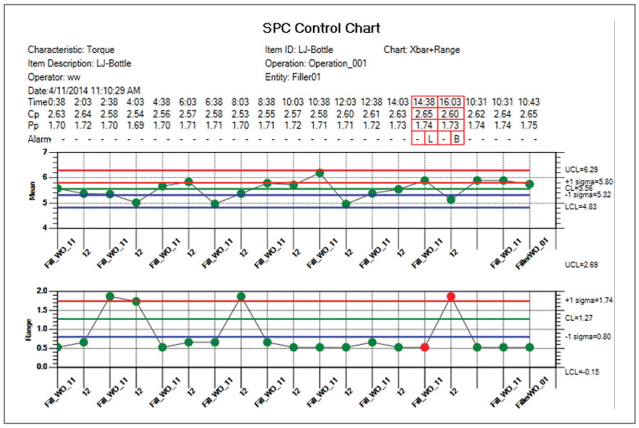
All industry standard SPC charts are included:

+ X-bar and Range or Sigma
+ X-individual and Moving Range
+ Moving Average and Range or Sigma

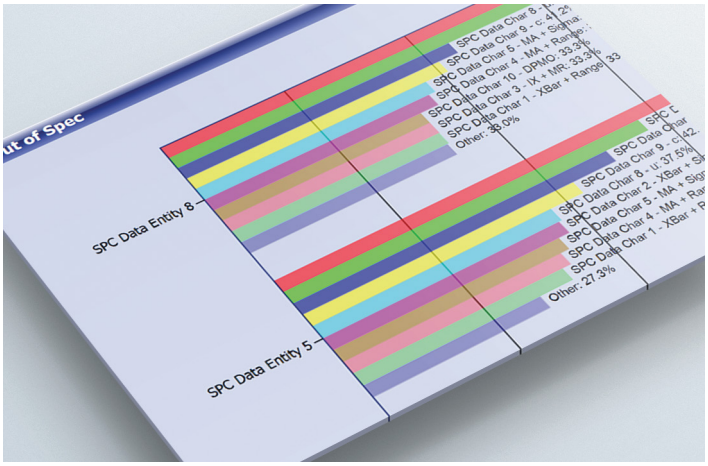
Attribute Charts include:

+ P
+ U
+ Np
+ C
+ Defects per Million opportunities (DPMO)

SPC charts offer rich information and display options including statistics on the chart, individual values, mean, and range as well as Cp / Cpk / Pp / Ppk KPI’s.



Quality Reporting



Many standard reporting formats are included with Wonderware MES/Quality. These include quality characteristic detail reports, which filter sample data on multiple characteristics and summary reports, which provide details on equipment, product, work order and operation category. These reports are published for flexible information presentation via a web browser.

Quality – A Core Pillar Of Manufacturing Operations Management (MOM)

Wonderware Manufacturing Operations Management is where inventory and production management, performance analysis, quality and compliance come together across a common platform and interface.

Where MES/Quality helps maintain and continuously improve production quality, MES/Operations ensures that processes are executed to specification and MES/Performance ensures plant equipment is working to its fullest potential.

Wonderware MOM is scalable and can be deployed at single or multiple sites.

Multi-site MOM

The key in multi-site applications is to enforce consistent reporting, analysis and standardization of business processes. Wonderware uses a unique approach to multi-site MOM that models real-world interactions between the plant, processes and people. Our methodology is based on reusable templates and an easy-to-use engineering environment that empowers users to create, deploy and refine standards.

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