MANUFACTURING EXECUTION SYSTEM

Control And Automation

Global Dom coordinates the whole plant by providing an integrated control and automation system.

Each area of the production process (such as pickling, furnace, bundling etc.) is overseen by a monitoring system.

These control systems are based on autonomous PLC stations in order to manage all the functions of the process, the operating sequences and the safety of the plant. The different areas are also equipped with the necessary supervision systems of human/machine interface (HMI).

Control systems will perform the following function:

- automation sequences management (Automatic, Semi-automatic, manual)
- operator/machine interface
- alarm management (visualization, historical, and operator suggestions)
- machine parameters setting

All individual control systems related to each area can be connected to a so called "level 3" or "MES system" (Manufacturing Execution System). The MES carries out the production order management, the product tracking, the data logging and the monitoring and reporting plant performances. These are monitored both in terms of reliability and maintenance and of quality control.

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GD MES (Manufacturing Execution System)
Global DOM MES solution

GD MES is Global DOM platform developed specifically for cold drawings plants to supply a complete and integrated MES solution (Manufacturing Execution System) to the customer.

MES is usually categorized as Level 3 in Manufacturing automation models, where levels from 0 to 2 are used for Control while levels 4 or above are usually more related to strategic management such as ERP (Enterprise Resource Planning), PLM (Product Lifecycle Management), SCM (Supply Chain Management) and so on.
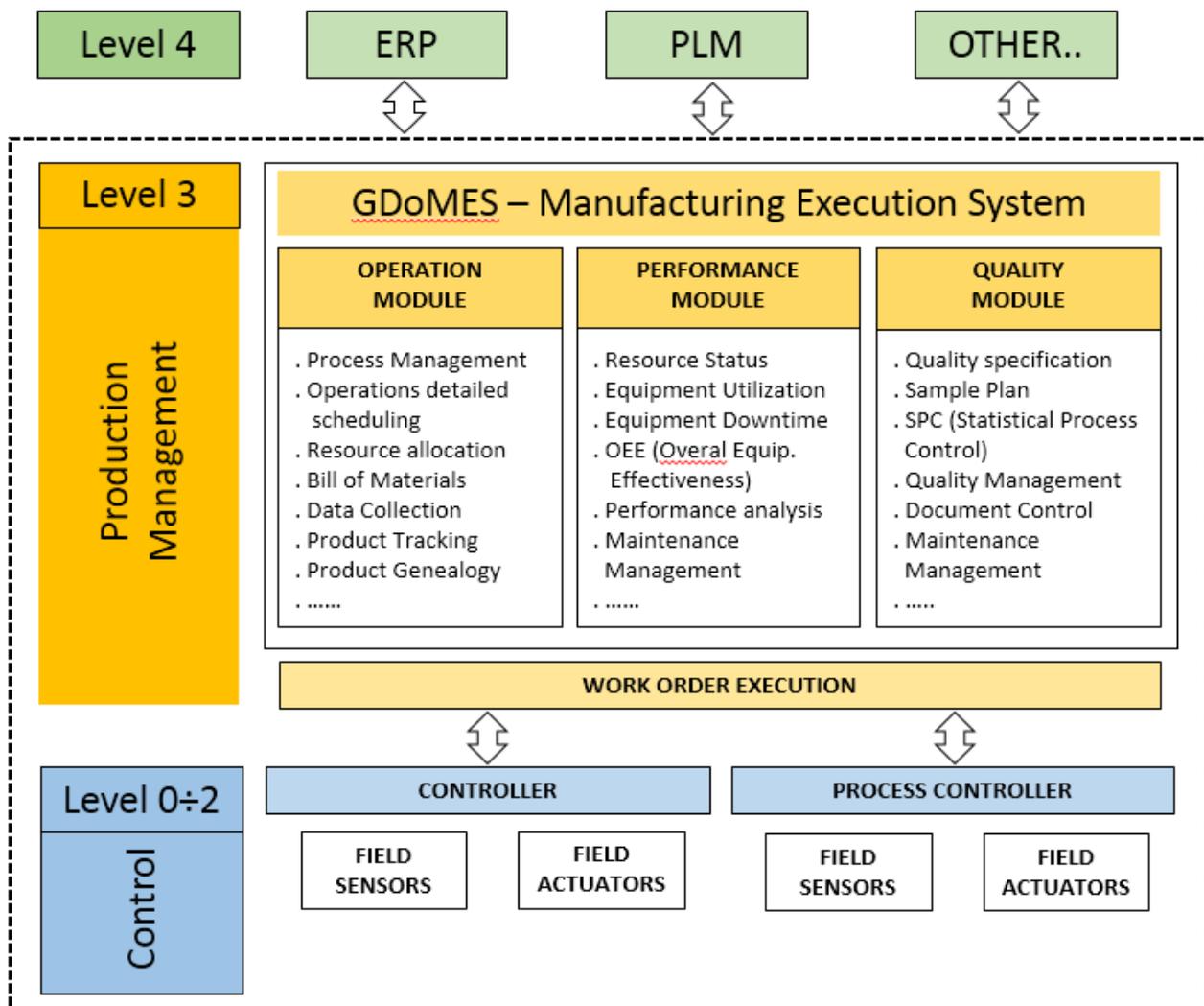
MES aims to empower decision makers and operators to manage production, the shop floor and the plant quality in real time and more effectively.

The GD MES solution is fully compliant with MESA model specifications for a MES system.

GD MES offers a complete set of MES software functionality to digitize the cold drawing plant operations' business rules and information management needs, as well as to automate data collection of operational execution. These functions include: a full product genealogy, complete works order execution, event history and material traceability. This ensures product safety and regulatory compliance and provides decision-making support through supply chain visibility of operational activities and work in progress in real time.

GD MES achieves these objectives through three main modules: operations, performance and quality.

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OPERATIONS MODULE

Objective

Operation module aim is to completely control and management of the production process increasing efficiency, quality and agility of operations.

Benefits

- Average manufacturing cost optimization.
- Average increased productivity.
- Average quality improvement

GD MES Operations Module provides the core of Manufacturing Execution Systems management capabilities to manage work order execution and to capture all execution detail and material flow information in real time on the shop floor.

The integration of all automations involved in production process, from Work Order planning to the single machinery control, allows the client:

- to have a unique interface where to organize and to track the entire production process;
- to automatically define and control the sequence of operations to be performed on each product upon the relevant Work Order (final product);
- to supply to each operation station a set of predefined settings depending on the incoming product and on its Work Order;
- to collect data from each production process that will be included in each single product's history;
- to manage manual modifications of production process sequence (re-work) where allowed and not allowing them in other conditions/cases;
- to keep real-time tracking of products within the plant;
- to have dynamically built reports over recorded data for production analysis: drill down from any Work Order to each production phases (with its own information) or drill up from a final product to its Work Order and the incoming material used to produce it.

The integrated and automated management of Work Order optimizes the work schedule and product runs, increasing throughputs and reducing losses.

The enforcement of product specifications, rules of material flow and sequence of process execution improve production's profitability by reducing scrap & reworks, and securing consistency in product quality.

Meeting both quality expectations and improved scheduling attainment additionally helps to ensure brand protection and increase customer satisfaction and loyalty.

PERFORMANCE MODULE

Objective

Performance module aim is to improve assets efficiency and to reduce line costs.
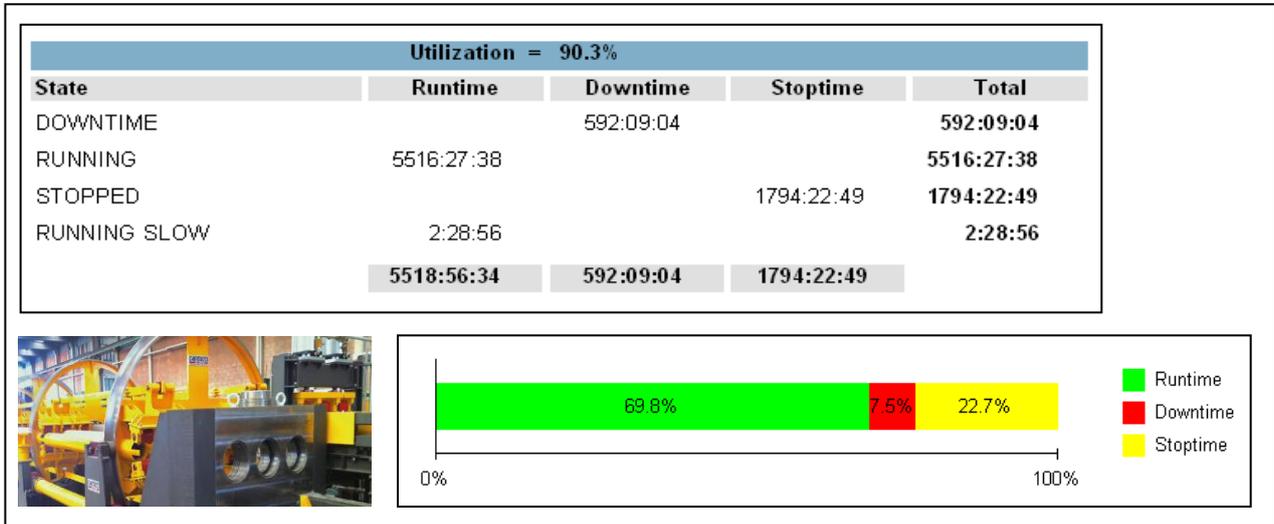
Benefits

. average OEE (Overall Equipment Effectiveness) improvements

. average reduction of equipment downtime

. Unlock the true capacity of existing assets ("hidden factory")

GD MES Performance module provides Overall Equipment Effectiveness (OEE) monitoring combined with equipment utilization to improve operating efficiency, to reduce costs and to increase Overall Return On Assets (ROA).

The integration of each machine or process station's automation in GD MES system, allows the client:

- to record and analyze each machinery utilization and downtime;

- to analyze Overall Equipment Effectiveness (OEE) of the complete plant or of the single station;

- to estimate completion date of each Work Order in progress;

- to recognize and to remove any possible bottle neck in the production process.

Utilization = 90.3%				
State	**Runtime**	**Downtime**	**Stoptime**	**Total**
DOWNTIME		592:09:04		**592:09:04**
RUNNING	5516:27:38			**5516:27:38**
STOPPED			1794:22:49	**1794:22:49**
RUNNING SLOW	2:28:56			**2:28:56**
	5518:56:34	592:09:04	1794:22:49	

The integration of GD MES Performance module with production stations' automation generates very accurate reports about equipment performance including short duration events that typically never get recorded.

Automated equipment efficiency tracking and automatic line bottleneck determination quickly show what plant assets are working to full capacity, and which ones are not.

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Critical line efficiency and equipment down time information is communicated in real-time to operators and decision-makers, who can take immediate action to improve performance and productivity.

With this higher level of insight, it is possible to quickly identify eventual inefficiencies and attack problem areas, which affect line performance and capacity, unlocking more value from the existing plant assets.

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QUALITY MODULE

Objective

Quality module aim is to program quality sampling and to manage relevant data collection to supply an almost real-time quality report.

Benefits

. Increased product quality and yields

. Increased quality data accuracy

GD MES quality module allows:

- to organize a quality sampling plan to check production results;
- to execute the defined quality sampling plan, minimizing its impact on production efficiency;
- to supply different SPC (Statistical Process Control) reports, integrated in OEE analysis;
- to export / expose quality data to other customer's systems.

GD MES Quality module allows the definition of individual quality specifications for products to be produced, equipment to be used and operations to be executed or combinations of these to be administered.

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

Operator quality data entry requests and procedure enforcement, or automatic sampling from equipment are executed by the system according to quality specifications.

Sample data can be displayed instantly in SPC charts to production or quality operators for closed loop quality control.

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" quality issues and, in response, trigger preventive actions to avoid quality losses before they cost time and money.