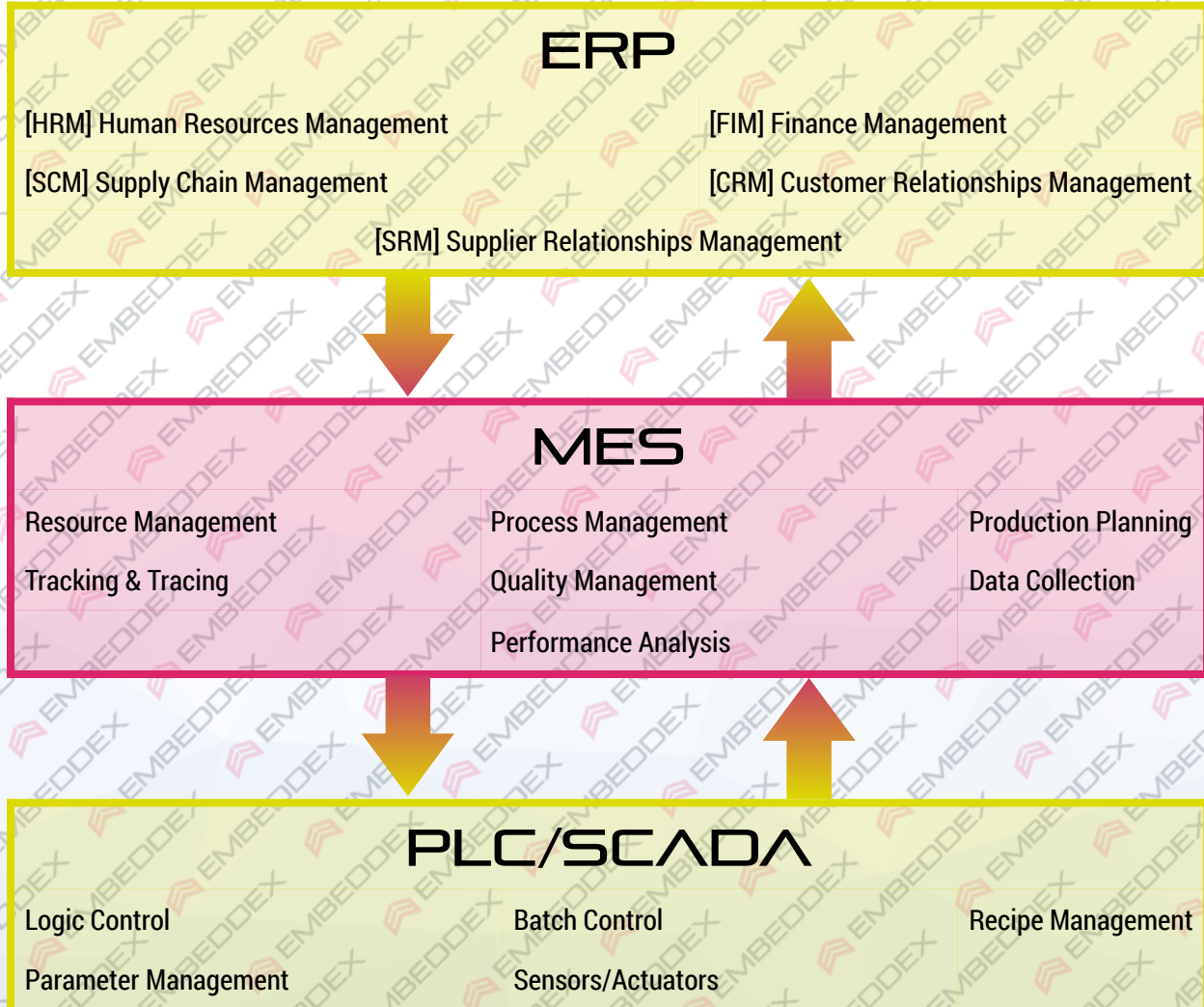


MANUFACTURING EXECUTION SYSTEMS (MES) are computerized systems used in manufacturing to track and document the transformation of raw materials to finished goods. MES provides information that helps manufacturing decision makers understand how current conditions on the plant floor can be optimized to improve production output.

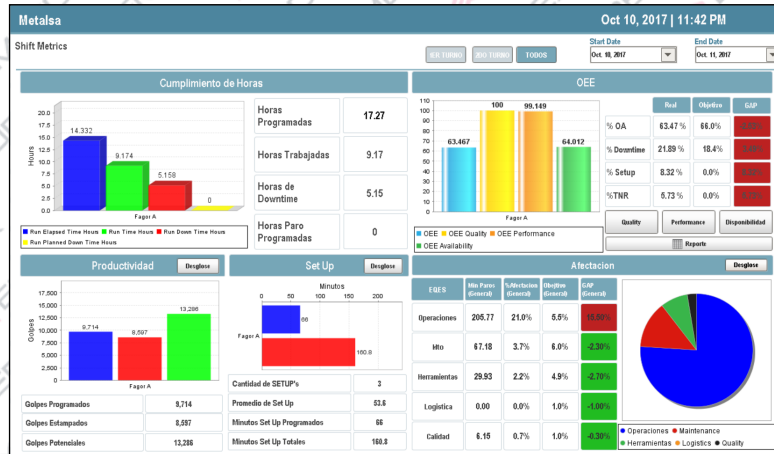


MES works in real time to enable the control of multiple elements of the production process (e.g. inputs, personnel, machines and support services).

MES may operate across multiple function areas, for example: management of product definitions across the product life-cycle, resource scheduling, order execution and dispatch, production analysis and downtime management for overall equipment effectiveness (OEE), product quality, or materials track and trace. MES creates the "as-built" record, capturing the data, processes and outcomes of the manufacturing process. This can be especially important in regulated industries, such as food and beverage or pharmaceutical, where documentation and proof of processes, events and actions may be required. The idea of MES might be seen as an intermediate step between, on the one hand, an enterprise resource planning (ERP) system, and a supervisory control and data acquisition (SCADA) or process control system on the other.

METALSA – AUTOMOTIVE INDUSTRY (Monterrey, México)

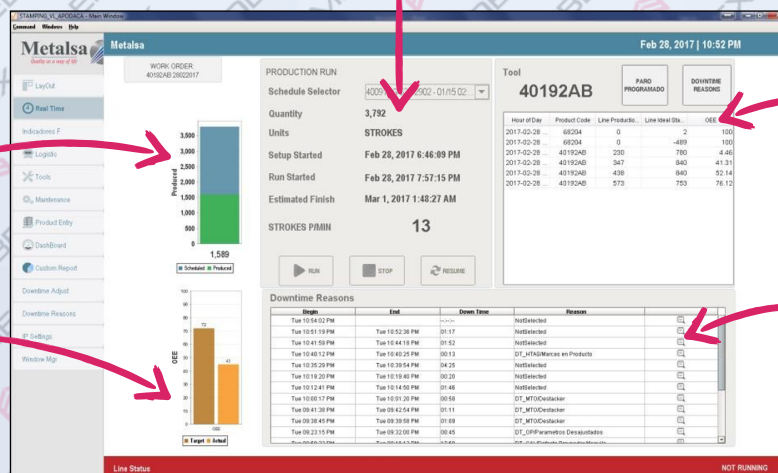
SCOPE: Implementation of an automatic MES platform, including OEE, Production Scheduling, Maintenance Scheduling, Resources Management, ERP Connection



MES: Realtime and historic production KPI's

Here, several KPIs are being displayed to provide key insights of the production floor. On the first graph, you can see how effective you were with the execution of your hourly plan, getting information on Effective hours vs. planned hours, downtime, etc. On the lower left, the productivity of the machine itself is displayed, as well as the amount & time spent during setups. On the upper right, the OEE and each of its components is displayed, as well as the percentage of time that impacted this metrics. Finally, on the lower right, a detailed view of each of the contributing factors to the total downtime is shown. This information can be displayed either in real time (for the current shift) or in historic mode (displaying the information for a previous day or range of days).

Actual scheduled order information



Actual Production vs. Scheduled Production

Actual OEE vs. Target OEE

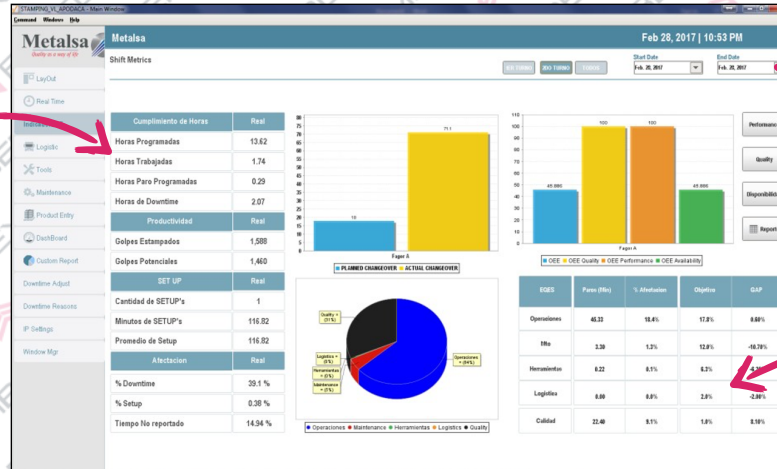
Hour x hour production, OEE and production information

Latest downtime events minutes failure description

MES: Realtime and historic production KPI's

In the previous image, a comparison between both the scheduled production and target OEE against the real production and actual OEE value is shown in the two graphs on the left, and on the right side a summary of information regarding the current order is displayed, such as the current order being executed, the hour x hour production, and a list of the latest downtime events, the amount of time and the reason for each one of them.

Scheduled hours, productivity, setup

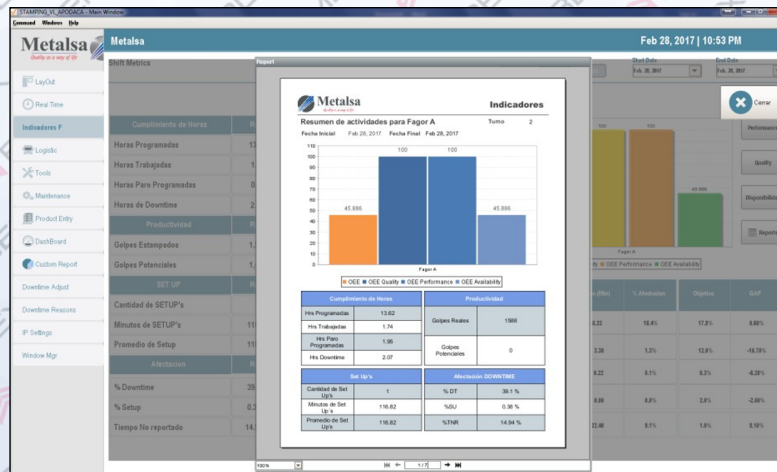


Date and shift selection

Downtime per area, downtime minutes summary

MES: Historical Data, self-created customized reports

Historical data can be displayed for its analysis, by choosing a date and shift to show. A summary of the scheduled hours, productivity and downtimes, as well as graphs displaying a comparison between scheduled and actual work performed and OEE results allow for an easy review of the KPIs for any shift in the past.

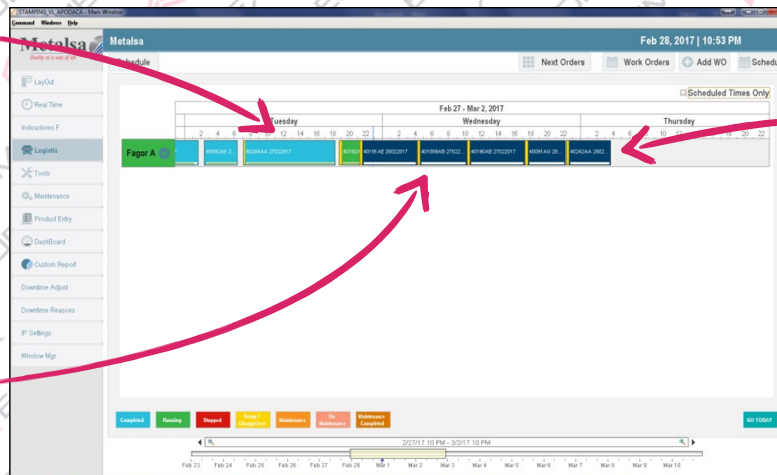


MES: Automatic Report Generation

Automatic report generation allow for any of the relevant information selected by the user to be automatically formatted and exported as a PDF, for later review and analysis.

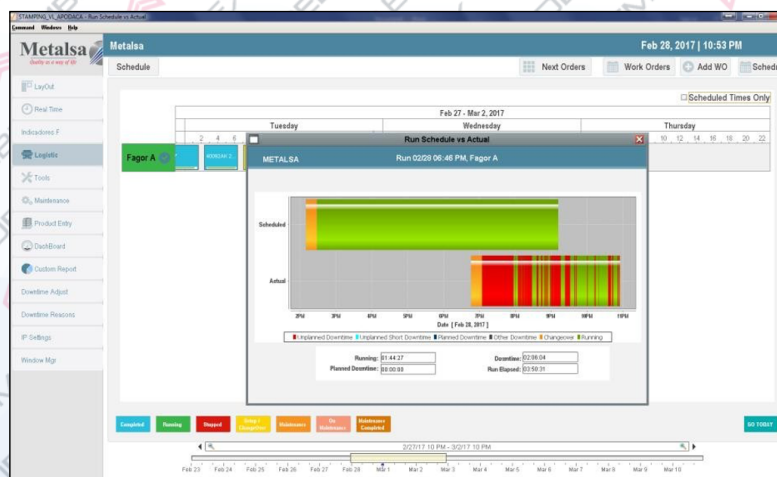
Past orders

Future orders



Schedule
timeline view

MES: Production Scheduling

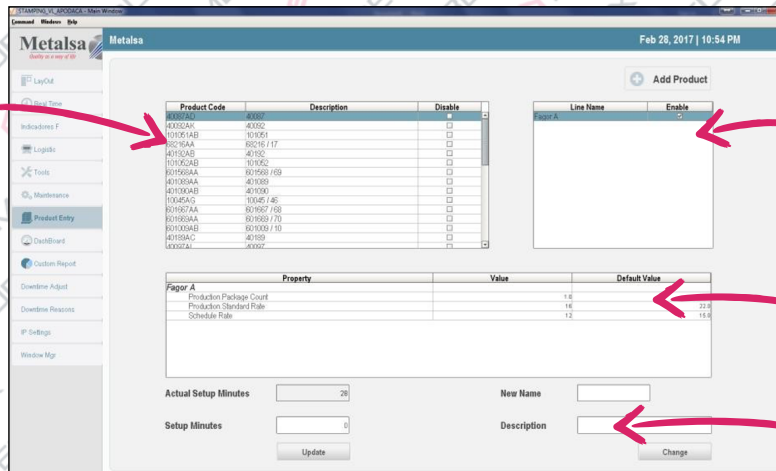


MES: Production Schedule vs Actual Production

A timeline can be generated displaying both the past and future orders to be manufactured in any assembly line, showing the expected time for completion and giving a better sense of the work allocation possible for each work unit.

Once an order is completed, a timeline displaying the expected amount of time for manufacturing an order (plus setup when applicable) against the real time it took to complete the order, including downtimes and other factors that contributed to extending the expected time.

Product administration



Lines available to configure a product

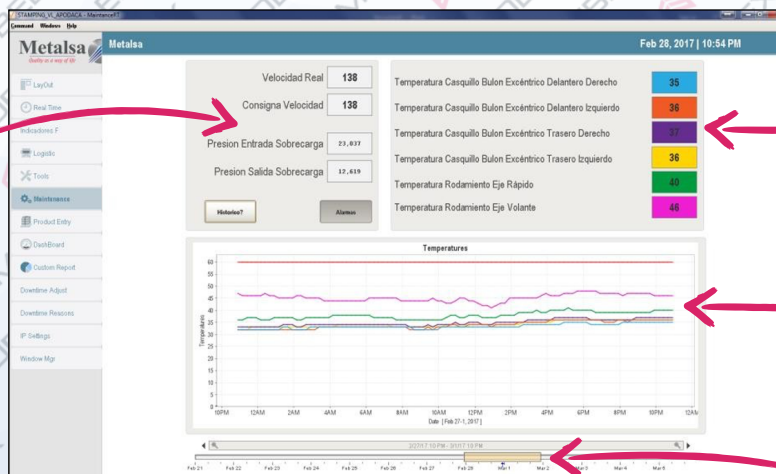
Standard rate, schedule rate for the selected product and machine

MES: Product Management

Setup minutes management for the selected product and line

This window allows you to configure how a product runs on a specific manufacturing cell, for example how many strokes per minute can be achieved in a particular cell, as well as the amount of time it takes to setup a particular machine before production can begin.

Machine pressure and velocity



Actual temperature data

Temperature historics

MES: Maintenance Data

Date selection

Track & Trace: The parameters of the process are recorded each cycle, and historic data can be retrieved to better understand when a problem or quality issue arise.