MES FOR DISCRETE MANUFACTURING
How can a plant monitor, control and optimize real-time production activities to deliver a quality product quickly and cost-effectively?

What is MES?
A Manufacturing Execution System (MES) is a software application used to automate the planning, execution and monitoring of processes within a manufacturing environment. Typically, MES software applications include a multitude of features related to nearly every facet of the manufacturing context. These include, but are by no means limited to, the following major functionalities:

» Production order scheduling
» Production order execution and monitoring
» Inventory and material management
» Tool and machine management
» Real-time data acquisition
» Key Performance Indicators (KPIs), Overall Equipment Effectiveness (OEE), analytics and reporting
» Quality management, tracing and genealogy
» Automation

The main goal of MES software is quite simple: to improve and optimize the manufacturing process. To achieve this, MES software generally focuses on 3 main areas of the production process: production planning, production execution and production monitoring.

Business Drivers
» Improve product quality
» Reduce scrap and waste
» Eliminate just-in-case inventory
» Minimize lead time
» Reduce time-to-market
» Improve traceability
» Reduce machine downtimes
» Make more informed decisions about production
» Improve throughput
» Synchronize global plant activities
» Track shop floor materials and activities in real-time
Discrete vs. Process Manufacturing

Discrete manufacturing is a type of manufacturing in which distinct, individual items are produced. Examples of products produced by discrete manufacturing processes include things like home appliances, airplanes, and cars. This stands in stark contrast to process manufacturing, in which individually produced units are not easily identifiable. Examples of products produced by process manufacturing include things like oil, salt, and chemicals. Due to the large differences between process and discrete manufacturing types, the main usage of MES software also differs drastically depending on the type of manufacturing taking place.

How exactly does an MES work in a discrete setting? The answer to this question is not as simple as it may first appear. Each discrete manufacturing process is a bit different from every other discrete manufacturing process. In general, however, discrete processes fall into one of two categories: High Complexity/Low Volume or Low Complexity/High Volume. Depending on the type of process in question, MES software will provide different types of benefits to manufacturers:

» In the High Complexity/Low Volume setting, an MES is used to improve production speed and reduce costs. The main business drivers of MES in this setting are improving time-to-market, reducing costs by eliminating rework and waste, and providing high levels of traceability. In many cases, highly complex products can also benefit from some level of automation, which is another feature of many MES applications.

» On the other hand, Low Complexity/High Volume processes have an entirely different set of goals. In this setting, MES software is used to improve lead times, reduce waste, improve planning and scheduling capabilities, and track material consumption.

While the specific goals of MES software may vary depending on the type of discrete manufacturing process being considered, an MES provides some tools that are common to almost every discrete process. These include fine-tuned control over the execution of operations within a manufacturing process, in-depth data collection and intelligent analytics.

MES for Production Planning

An MES provides several features that strive to improve the processes related to production planning, material management, inventory management and tool availability. For planning purposes, successful MES solutions provide a number of advantages in a discrete setting:

» Improved accuracy in production order scheduling
» Ability to visualize availability of input materials
» Ability to schedule against tool availability
» Increased awareness of inventory levels
» Better communication with suppliers and consumers

Source: SIMATIC IT Unified Architecture Discrete Manufacturing (UADM)
MES for Production Execution

MES solutions for discrete manufacturing also focus on supplying the tools necessary to execute and monitor the execution of production processes. Most MES tools provide features for:

» Fine-tuned control over the execution of production processes
» In-depth monitoring of production process status
» In-depth tracking of production order genealogy
» Real-time data acquisition from the shop floor
» Automation capabilities

MES for Production Monitoring

Although planning and executing production processes are key components to the actual manufacturing of a product, understanding and analyzing the data retrieved during these activities is equally as important to drive process improvements. MES software generally provides capabilities for automated data collection, analysis and reporting. Production monitoring features generally include:

» Real-time data collection
» Data aggregation
» Reporting
» OEE and other KPI calculation
» Analytics and visualization

MES System Integration

While MES software applications offer a wide variety of functionalities and tools, it is quite rare that they operate in complete isolation. MES software is often integrated with existing IT systems on both the shop floor and at the enterprise levels of an organization. While integration is not always necessary to utilize the features of MES software, these integrations enable expanded capabilities of not only the MES software, but of other existing software applications being utilized across the organization. This being the case, most MES software applications offer the ability to create tight integrations with some of the most commonly used software in the industry. These integrations include software designed for advanced planning and scheduling at the enterprise level (ERP), Product Lifecycle Management (PLM), and advanced reporting and analytics tools.

How Engineering Delivers MES

Engineering Digital Industry has more than twenty years of experience delivering successful MES projects for customers in both the process and discrete manufacturing industries. This extensive expertise implementing digital manufacturing solutions for leading customers across different industries worldwide makes our team of engineers not only the most skilled MES specialists available, but also true subject matter experts.

In addition to having a leading team of some of the top MES technical experts in the world, Engineering has built a strong footprint across the entire spectrum of digital tools and systems for achieving discrete manufacturing excellence. Leveraging
We deliver the power of the Digital Thread for Industry 4.0. Leveraging our unique experience implementing and integrating the entire spectrum of digital tools, our team facilitates the adoption, implementation, integration and transformation journey for manufacturers across all industries worldwide. Engineering USA, formerly Hyla Soft Inc., is the North American business division of Digital Industry.

Our MES Services
» Industry 4.0 maturity assessment
» MES requirements gathering (business and process)
» MES system analysis and integration plan
» MES software vendor selection
» MES solution design and system development
» MES system validation
» MES system implementation and go-live support
» MES software end user training and documentation
» Ongoing system maintenance and IT support

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