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, sometimes called an MES, is a software application used to aid in 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 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
» KPIs, OEE, Analytics and Reporting
» Quality Management, Tracing, and Genealogy
» Automation

The main goal of MES software is quite simple: improve the manufacturing process. To achieve this, MES software generally focuses on 3 main areas of the production process: Planning, Execution, and Monitoring.

Business Drivers
» Improve product quality
» Reduce scrap and waste
» Get rid of just-in-case inventory
» Minimize lead time
» Improve time-to-market
» Improve traceability
» Reduce machine downtimes
» Make more informed decisions about production
» Improve throughput
» Synchronize global plant activities
» Track materials and shop floor activities in real-time
MES for Discrete 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, where individually produced units are not easily identifiable. Examples of process manufacturing include things like oil, salt or chemicals. Due to the large differences between process and discrete manufacturing types, the main usages of MES software differs drastically depending on the type of manufacturing taking place.

How exactly does 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 than every other discrete manufacturing process. In general, however, discrete processes fall into one of two categories: High Complexity/Low Volume processes or Low Complexity/High Volume processes. Depending on the type of process in question, MES provides different types of benefits to manufacturers.

» In the High Complexity/Low Volume setting, MES is used to improve production speed and reduce costs. The main purposes of MES in this setting are improving time-to-market, reducing cost 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, 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, analytics, and many more.

Advantages of MES: Production Planning

MES provides a number of features that strive to improve the planning of production processes, material and inventory management and tool availability among other important planning functions. For planning purposes, these tools provide a number of advantages in a discrete setting:

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

Advantages of MES: Production Execution

Of course, planning capabilities are just one set of features offered by MES products. MES also focuses on supplying the tools necessary to execute and monitor the execution of production processes. In the main, most MES tools provide features including:

» 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

Advantages of MES: Production Monitoring

MES provides Although planning and executing production processes are key components to the actual manufacturing process, understanding and analyzing the data retrieved during these activities is equally important. MES software generally provides features relating to data collection, analysis, and reporting. The feature set for these capabilities varies wildly depending on the specific software chosen, but the following features are generally available:

» Real-time data collection
» Data aggregation
» Reporting
» Analytics and visualization

The Critical Role of System Integration

While MES software applications offer a wide variety of functionalities and tools, it is quite rare that they operate in complete isolation. Generally speaking, MES software is integrated with existing systems on both the Shop Floor and Enterprise levels.
of an organization. While integration is not always necessary to utilize the features of MES software, these integrations allow for expanded capabilities of not only the MES software, but of 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, management of Product Lifecycle Management (PLM) data, advanced reporting and analytics tools, and many more.

How We Deliver MES

In addition to having a leading global 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. Our team designs and deploys standard and custom solutions for MES and Manufacturing Operations Management (MOM), providing functionality to help customers achieve production goals, optimize processes and remain competitive in a highly demanding market.

Our MES Services

» Requirements Gathering – Business & Process
» System Analysis & Integration Plan
» Solution Roadmap & Software Vendor Selection
» Solution Design & Development
» System Validation
» System Implementation & Go-Live
» Software End User Training & Documentation
» Ongoing System Maintenance & IT Support