

department BUSINESS SURVIVAL STRATEGIES

by Thomas R. Cutler



Manufacturing execution systems and parametric equations: impacting the bottom-line of project-based metalworking

A complex manufacturer in metalworking production will have single parts and products that might take thousands of individual part numbers in a traditional system.

Parametrics is the ability to adjust or change based on parameters. The dictionary definition of a parametric equation implies that these parameters are based on coordinates. According to Randy Richel, chief executive officer of Edmonton, AB-based TRAKware, "MES (Manufacturing Execution Systems) technology solutions should include parametrics which go far beyond using parameters only to represent coordinates. Coordinates must have the capacity to dynamically adjust bills of materials, bills of labor, routings, costs, selling prices, and sizes."

Few MES solutions have an advanced parametric configurator allowing a user to build parts and products that have full parametric capabilities. Complex parts and products with unlimited variations must be represented by a single item to increase lean productivity and profitability.

Consider a parametric box that has a top, bottom, back, and two sides. The box can have the following characteristics: width: 12 in.-36 in. in 1/2 in. increments; height: 12 in.-36 in. in 1/2 in. increments; depth: 12 in.-36 in. in 1/2 in. increments; core material of back, bottom, sides, and top are made of a panel made from either 3/4 in. or one in. particle board; interior surfaces of melamine, general purpose laminate, or veneer; and the exterior surfaces can be melamine, general purpose laminate, or veneer

Based on these six parameters this box can have a number of variations for each parameter. For width, height, and depth the box can have 48 variations each; two types of core material; and three material types for each of the exterior and interior surfaces.

In a traditional MES system these variations could mean that more than 1.9 million different part numbers might have to be created to represent the different variations that this simple parametric box can have.

"When these concepts are extended to a 'real world' product, choosing a particular parameter not only changes the bill of materials, but also the bill of labor, and the labor routings - the configuration and management of the parts and product through a manufacturing process can be challenging task," says Richel. The ability to estimate and configure items quickly and accurately (when the production is a custom one-of-a-kind manufacturing process) must allow deliverables to be presented parametrically. The ability to estimate by the component or use traditional methods (by the lineal foot) is essential especially when building a catalog of standard parts and products. Quickly providing comprehensive alternative proposals with price

breakouts allows customer metalworking shops to avoid 'guess-timates' by having data and information to backup estimates.

Schedule projects against existing production while keeping track of changes through a comprehensive change order process is vital and impacts the ability to manage total project costs versus budgeted. Project-based metalworking process demands that MES solutions have the technological ability to purchase raw material to inventory or to a project and maintain perpetual inventory of raw materials. Likewise the capacity to maintain and issue inventory in multiple units of measure within one inventory item, maintain inventory of value added parts or finished products, and easily con-

vert normally manufactured items to buyout items (adjusting the bill of labor and the bill of materials automatically) are both expected and require (yet rarely found in MES solutions.)

Other material management data that is helpful includes the ability to track high, lows, vendor history, and track serialized inventory. In the adoption of industry best practices, multiple checks during purchase order reconciliation should also be provided. MES solutions are designed to improve business results by showing the user where their costs are being incurred; the result - controlling and reducing costs and providing an opportunity to increase capacity and increase sales.

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