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Demand-based Flow Manufacturing For High Velocity Order-to-Delivery Performance

by R. Michael Donovan

Manufacturers today must become faster and more nimble than was needed in the past. Customers have become much more demanding and they expect deliveries on-time, every time. Many companies are feeling the pressure to implement higher velocity, quick response order-to-delivery processes to avoid the risk of losing business to faster performing competitors. As a result, more manufacturers are turning to Demand-based Flow Manufacturing techniques as a way to dramatically improve on cycle time, productivity, inventories and delivery. Although Demand-based Flow Manufacturing (DbFM) can achieve significant cost savings in the form of reduced inventory costs and improved productivity, the more significant strategic advantage comes from revenue building opportunities as customers respond more favorably to short cycle, on-time deliveries.

Pull, don't push

Among a growing number of manufacturers, Demand-based Flow Manufacturing (DbFM) has demonstrated its success as a high velocity order-to-delivery strategy and process. The root origin for DbFM is in the lean production methods first developed and remarkably well-practiced by Toyota.

In a DbFM environment, inventory is “pulled” only as needed through each production work center to satisfy a customer’s order. The pull approach differs radically from the more common, traditional “push” production method. In a push production environment, production is often driven by highly inaccurate sales forecasts, which compound the difficulty of responding to sudden and inevitable changes in customer demand with the result that cycle time and inventory are usually much greater than necessary.

With Demand-based Flow Manufacturing, customer configured orders can be filled just as quickly, and just as cost effectively, as higher volume standard items. This approach has proven its effectiveness in production environments involving highly variable and complex products – even engineered-to-order products. For example, one leading DbFM manufacturer of highly variable products has succeeded in cutting cycle time by 80%, while reducing factory floor space requirements by 50% and rework by 90%! Also, the average working capital needed was reduced by 50% over a two year period, providing a source of cash for other investment opportunities.

Demand-based Flow Manufacturing shifts the emphasis to production flexibility and throughput, with order-to-delivery cycle time compressed to the bare minimum. Today’s information systems technology, such as Advanced Planning and Scheduling, can be a great enabler to carry out the complex task of synchronizing the information and material flow needed

to achieve high-velocity production of highly variable products – including the uniquely configured one-of-a-kind product for a given customer. DbFM is one reason why a “configure-to-order” manufacturing strategy can be a much quicker and more reliable approach to serving customer needs.

It takes more than IT tools

Although new IT tools and applications are very important enablers for DbFM, organizational behavioral changes are also needed for successful implementation. Minor adjustments to material flow in production and the supply chain, or patchwork type improvements in inventory planning or production scheduling, are rarely sufficient for implementing DbFM. Achieving the breakthrough performance that is possible with Demand-based Flow Manufacturing will almost certainly require a major redesign of the entire order-to-delivery process. Those manufacturers who can pull together all of the isolated functional islands of the business in a coherent, integrated process, can easily cut cycle time by at least 60% and often much more.

Getting all of the pieces of the order-to-delivery puzzle coming together in a highly synchronized method requires having high quality information and material flowing through the system. Information technology may actually be a hindrance unless the *quality and speed* of the information flowing through the system supports an order-to-delivery process that is in balance and continuously flowing.

In many plants, equipment changeover time needs to be reduced so better flow and balance of material through fabrication and assembly can be achieved. In some cases, the company might need to reconfigure its manufacturing processes from large lot, mass-production methods to more flexible smaller lot methods for quick response and higher throughput. Sometimes easily justifiable capital investment is required, but often times substantial improvements in flexibility and cycle time reduction can be achieved with current equipment.

Those manufacturers who can pull together all of the system’s pieces with demand-based flow manufacturing processes can cut their cycle time by at least 60 percent and usually much more. The demand-based flow concept drives out the heavy costs resulting from imbalanced production schedules, excessive WIP, as well as WIP queues and the high fixed overhead costs resulting from trying to manage operations in disarray.

One leading company succeeded in cutting cycle time by 80 percent, reducing required factory space by 50 percent, and cutting rework by 90 percent. The average working capital needed to support the business dropped by more than 50% over a two-year period, which allowed for other investment opportunities.

Who can benefit the most?

Companies that can benefit most from DbFM are easy to spot. There are serious balance and flow problems, with long cycle times, excessive inventory and poor customer service as the norm. Also, work-in-process is frequently held up by poor information flow and administrative

and production bottlenecks. Scheduling is an impossible nightmare-like task in this kind of environment and there are higher overhead activity costs that result from trying to manage “operations in chaos.”

One of the weak links in many manufacturing companies is in the performance metrics used by management. Frequently, performance metrics focus only on such areas as labor efficiency, machine utilization, overhead absorption, and purchase price variance. When the pressure for performance improvement is focused on these areas, you can be sure that the organization will respond, but often in a detrimental manner.

For example, in order to satisfy “performance” measures, parts and products will be produced and put into inventory, even when they are not needed. The result of this practice, more often than not, is too much inventory of unneeded material and shortages of materials that are needed. Ultimately, cycle times become longer, and the customer-service level goes down, which is the exact opposite of what management wants to achieve.

Changing only performance measures will not bring about demand-based flow manufacturing, although it is critical to the transition. The lesson to remember is that management can ask for anything, but they will get what is measured and emphasized.

For managements that focus primarily on revenue and profit growth, implementing Demand-based Flow Manufacturing is an easy choice. That’s because a company doesn’t stay in business primarily by lowering its costs. Although cost containment is important, getting and keeping satisfied customers remains the primary goal of any successful business. The main reason for the growing popularity of DbFM among manufacturers is the dramatic improvement in customer satisfaction that can be achieved. It’s the “easy to do business with” strategy.

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