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Can lean be successfully applied in a high mix operation? Definitely, says University of Tennessee's Bill Parr.

Many manufacturers think of lean as a tool most suitable for high-volume, low-mix operations. But in recent times, companies with high product diversity (high-mix) and modest to low volumes have succeeded in applying lean ideas, both in production and in integration with customers and suppliers.

Applying lean in high-mix operations involves what we call configuring. You structure your products and the way they are presented to the market to create flow. You offer your customers choices, encouraging them to pick from a short list of options for which you have all required assemblies on kanban, instead of procured by special order from a supplier. This encouragement is done using lead time and pricing incentives, as well as presentation.

The result is that you can use pull methods (inherently faster and more efficient) for a segment of your business. This means shorter lead times for your customers, lower costs and inventory, and smoother operations—together with an increased flexibility in the eyes of the market.

Take the example of Trail King, a Mitchell, South Dakota-based manufacturer of open deck platform trailers and dump trailers. Jerry Thomsen, president of Trail King, says that in the mid 1990s, the company had 20 different product families with numerous models in each and unlimited variations possible, including customer choice of components, sizes, and other dimensions. "Production was engineer-to-order, with extensive custom drawings done for each order. Stall builds were used, and some common components were built, but most items were custom built or ordered, in a pure push system," he said.

The management team had the opportunity to see the results of lean implementation in another business unit in the same corporation. Although this company was more of a low-mix operation, the management team saw the benefits of lean in short lead times on orders, lower costs and inventories, and increased capacity and wanted to achieve those same benefits in their own organization. The puzzle they faced was how to apply what worked well in a low-mix, high-volume to their high-mix, relatively low-volume operation.

They began their lean journey, led by Dr. Tom Greenwood of the University of Tennessee, with clear objectives: a large increase in capacity with no major capital expense, major cuts in lead time, and improved cost efficiency. A target product family was picked based on its strategic impact and potential for business growth if lead times and costs were reduced.

The models and configurations of trailers in that family were studied to determine what was in common and what could be made in common. The result was a four-fold classification of the products:

- A Trailers: trailers made from all standard parts and options
- B Trailers: trailers made from all standard parts, but with custom assembly of those parts in nonstandard methods and locations to support customer need
- C Trailers: trailers made from mostly standard parts and options, with some modifications
- D Trailers: trailers that were complex or involved custom-procured parts and options

The manufacturing process was moved from a stall build to a pull process. Substantially lower lead times were promised (and achieved for A trailers). Since all parts and options were from a standard list, these could be on a kanban system with short cycle replenishment.

Point-of-use sub-assemblies and parts supported the new line. The sequential build (instead of the old stall build) made much shorter product flow times possible.

According to Thomsen, the results at Trail King were capacity increases of roughly 50%, coupled with substantial margin increases and a decrease in labor hours per trailer. “More trailers were sold, with more money made per trailer. WIP dropped by almost 70%, with rework experiencing a drop of over 60%,” he said.

“Tom Greenwood led us to think about how we specify trailers to be built and how we present ourselves to the market,” said Thomsen. “Moving to configure to order has made a massive difference in our effectiveness. The financial and marketplace improvement we have achieved would not have been possible without that move.”

This example discussed in this article is not unique. In “Becoming a Lean Enterprise,” (Strategic Finance, November 2002) the authors discuss two companies implementing lean. One, an aircraft manufacturer, experienced a very similar lean journey to the trailer manufacturer. They also had an extremely diverse set of products, with a “you can have it built your way” response to the customer on options. Although in a very different industry, they found that a substantial cut in lead time meant a major increase in sales, through freed-up capacity and increased market attractiveness. Their approach to improvement also involved implementing lean ideas, using configuration as the key idea to leverage improvement.

Another organization built an online order configurator that not only allowed the customer to configure the order and determine the price, but also the resulting lead time. In the past, their customers had configured the product their way, with standard lead times promised by the company. The result was that when the customer picked unusual items, the company struggled and expedited (often failing to meet the targeted lead time) or went back to the customer to explain that the standard lead times didn’t apply, creating customer discontent. The result of the new online order configurator was dramatic—customers could see the consequences not only in price but also in lead time of the choices they were making. The outcome of implementation of the new configurator was almost immediate: more customers chose options from the standard (A) list whenever possible to get shorter lead times.

Think of yourself on the car lot, looking at a car that meets your needs in all respects except for one option that wasn’t really that important to you. You can pick up the car in the lot today or get the one with the change in that one option, at a higher cost, in five weeks. Which would you pick? That’s what motivates customers to help you build flow in the A-line products.

Lean is no longer just for high-volume manufacturers. High-mix operations, even so-called job-shop operations, are benefiting from implementing lean strategies and concepts, using the configure-to-order concepts and other adaptations of classic lean ideas.

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