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Winning With Make-to-Order Manufacturing

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How make-to-order manufacturing paid off for GE's CAMCO by reducing finished-goods inventory, warehouse costs, and minimum production lot size.

by Jonathan Byrnes

Fifteen years ago, CAMCO, GE's Canadian appliance joint venture, revolutionized manufacturing: they cut the cycle time for manufacturing stoves, refrigerators, and other white goods from four months to three days.

And the new process didn't cost a cent. In fact, it generated cash from the start.

What did CAMCO do? How did they do it?

At GE, business innovation is part of the culture. Managers are driven to find ways to remain at the forefront of their industry. This is GE's ultimate competitive edge.

In 1988, CAMCO's vice president of manufacturing decided to scour the world looking for innovative manufacturing practices. In New Zealand, he discovered a company that had developed a powerful new way of manufacturing, and he brought the process back to Canada. This became the basis for CAMCO's great success. The process was eventually transplanted to GE's U.S. operations, and widely followed after that. This was the make-to-order process.

The traditional way

Before 1988, CAMCO was a traditional manufacturer. Each product was scheduled to be manufactured every four months, and four months of product was produced.

Forecasting was a Byzantine process. One hundred twenty days before production, projections were generated by sales reps, key account execs, and area sales managers. They were reviewed by zone administrators and zone managers, then by pricing managers and sales administrators. At sixty days before production, these were combined into a sales forecast that was reviewed by the VP Sales, the product managers, and the VP Marketing. Thirty days before production, the production schedule was set.

The problem was that at this point, everyone already knew that the schedule was obsolete, but there was no process for faster forecasting. Consequently, the company experienced a huge inventory buildup and declining service, despite the fact that each month, over 2.7 man-years of effort by eighty-seven employees from twelve different departments were devoted to forecasting.

Make-to-order process

The key insight at the core of the make-to-order process was that while the demand for individual products varied considerably from month to month, there was very little month-to-month sales variance for a product family as a whole. For example, within the RSCG (regular oven, steel backguard, coil cooktop, glass door) product family, the four product s had month-to-month sales variance of 24 percent, 16 percent, 14 percent, and 6 percent respectively. The whole RSCG product family, however, only had 2.3 percent month-to-month variance.

With this understanding, CAMCO reorganized its production to dedicate a constant amount of capacity to each product family. At the same time, the company developed the capability to alter the product mix within each product family every day.

In order to allay the concerns of the sales department, CAMCO's manufacturing group agreed to keep enough parts inventory to increase the production of any by 50 percent on any day. How did CAMCO do this without an explosion of component inventory?

Each time the company instituted an innovation, it built work-in-process inventory to ensure good performance.

In building a product , some parts are unique to that , while others are common to all products in the product family. The company moved aggressively to redesign its products, so they used a maximum number of common parts. (By the way, think about what this did for repair service parts inventories.)

This product redesign program had a huge impact. For example, in the range business, which comprised nine product families, the extra cost of buffering unique parts to accommodate a possible 50 percent increase in sales of any was $750,000. However, the company was able to remove $14 million in finished-goods inventory, which was half the total amount for the range business.

As CAMCO rolled out the make-to-order process in its range business, the company redesigned more products, and taught its key vendors the make-to-order process for their own companies. As a result, the $750,000 extra parts inventory declined to $300,000, and the $14 million remaining finished-goods inventory dropped to $8 million. CAMCO's other businesses achieved similar results.

The overall improvement was striking. In the old process, the order fill rate was below 60 percent, while in the new it exceeded 95 percent. Finished-goods inventory companywide dropped from $100 million to $35 million. Warehouse costs declined by 30 percent. Minimum production lot size fell from 200 to one. The "frozen" production schedule period dropped from sixty days to three days.

CAMCO implemented the new process in a well-controlled manner. Each time the company instituted an innovation, it built work-in-process inventory to ensure good performance. As each innovation proved itself, the company removed the extra buffer, and more.

Parallel changes
CAMCO instituted a set of parallel changes in several related areas of its business to enhance the effect of the make-to-order process.

- The company put all of its key managers on the same compensation performance metric. Everyone was measured and rewarded on (1) return on sales, and (2) fill rate.
- CAMCO worked intensively with its key vendors. Initially, the company picked five major vendors, and helped them institute the make-to-order process in their own companies. This allowed these suppliers to reduce their inventories of parts for CAMCO by 60 percent over a nine-month period. After that, the company reduced its supplier base from 1,300 to 400 in order to have more clout, and to enable it to work more intensively with those who remained. CAMCO invited a number of these key vendors to send engineers to work on CAMCO's premises as part of the product redesign teams.
- The company reduced the number of distribution centers from twenty-six to three. In the past, each distribution center carried a full line of products and served a dedicated geographic area. It also had several months of inventory. In the new system, each distribution center served one of CAMCO's three plants, each of which was dedicated to one business such as ranges. Each distribution center had visibility into national demand. This new distribution system combined with the efficient new make-to-order process to radically reduce the company's need for finished-goods inventory.
- When CAMCO eliminated its regional distribution centers, it established a set of regional cross-docks. This allowed the company to achieve freight efficiencies. CAMCO's manufacturing and distribution systems were so effective that its order cycle time, from order placement to product receipt, including manufacturing and shipping, was six days. About 60 percent of the products were shipped directly to accounts, while 40 percent were shipped to stock, primarily for smaller dealers.
- CAMCO also worked with its accounts. Traditionally, CAMCO's accounts held about sixteen weeks of inventory. The company helped them reduce their inventory levels to two weeks of product. The company also worked with its larger accounts to get them to order at regular intervals, e.g., weekly.

Key success factors
CAMCO's management reflected on their experience, and offered the following tips:

1. Work with the sales reps to be sure that they are comfortable with the new process.
2. Compensation alignment is absolutely critical.
3. "Just do it": the process is self-financing.
4. Implement the new process in increments; the company started with a 120-day cycle, then reduced it to three weeks, then one week, then three days.

5. Vendor commitment is crucial: "If the vendor doesn't want to do it, look for another vendor."
6. Rely on your vendors: "The vendors had far more flexibility than we ever believed; we never used our supplier base as a resource."

Final advice

CAMCO summed up its best practices: "Continuous improvement beats postponed perfection." Beware of "analysis paralysis." CAMCO's managers observed that some other companies had stumbled because they over-analyzed the process. Learning by doing is a very important element of any process, and you can start the change process without having all the answers in advance.

See you next month. 

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