The New Paradigm: Lean, Automate, Differentiate

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Fresh out of college with a manufacturing engineering degree, Dallas, Texas-based Bob Duncan believed that he could revolutionize the furniture industry by eschewing old-line manufacturing processes and focusing on Lean, automation and burgeoning technology. He incorporated American Leather in 1990 with a simple-but-bold premise: He would make custom leather furniture and get it out the door in less than 30 days.

Outside the American Leather facility in Dallas, Texas

Duncan, who still heads up American Leather as its CEO, says, “Lean manufacturing was really the core differentiation of the business back when we started in 1990. Everything we do is made-to-order. We went into an industry where we were shipping three to five times faster than the industry normal, and offering a really nice level of customization. That’s what really differentiated the company to begin with.”

Twenty-two years ago, when the company began, Duncan was acutely aware of the challenges of bringing Japanese production methods, such as the Toyota Production System and just-in-time, to an industry that had been focused on traditional batch manufacturing. At the time, a custom-colored leather couch would have a “lightning-fast” lead time of about ten to twelve weeks. And Lean, Duncan says, was the “antithesis” of how these manufacturers did their business.

He says, “To go into an established company and say, ‘We’re going to do everything the opposite of how you’ve done it the last 100 years,’ is extremely challenging.”

Today, the company maintains its promise of getting a custom-made, high-quality piece of furniture from order to finished product in three weeks or less, with pieces in more than 600 retail locations around the country. Clearly, Duncan’s efforts have been successful, which he attributes significantly to being an agile start-up that bee-lined toward differentiating itself from its U.S.-based competitors — and taking a pre-emptive leap ahead of its future rivalry from China.

Bob Duncan, CEO, American Leather

Going Lean

But in its beginning years, American Leather’s status as a start-up meant that Duncan was strapped for capital to invest in the high-tech equipment that would

make his business more efficient. Fortunately, upholstered leather furniture — which the company made solely in its first 15 years of business — lends itself remarkably well to what Duncan calls “a lot size of one” mentality.

Most importantly, upholstery is still, and will be into the foreseeable future, a craft done by hand. American Leather uses a more “European” type of upholstering, which involves sewing all the pieces together to create a cover, which is slipped over the frame. This is a more engineered approach, and requires significantly more detailed design effort on the front end but results in a much more consistent and better tailored product. In many ways it’s similar to the upholstery methods used in the automotive industry.

And leather was initially very appealing because the economies of scale are inherently very low. Duncan says, “No matter how big you were, the largest manufacturers in the world still had to cut the hides one at a time. You can’t stack cut leather.” Every hide is unique with varying shapes and natural markings. Of course, this fit in well with the “lot size of one” mentality. Duncan adds: “I felt it was easier to have an economy of scale at a much lower volume and to be competitive from a cost standpoint at a lower volume.”

In order to accommodate this more complex upholstery technique, the company has put a large emphasis on engineering each piece to be as easy to produce as possible. Designers work in conjunction with engineering to create CAD designs with a number of built-in benefits. For example, the frame is designed so that it’s essentially impossible to put together incorrectly, which helps speed up assembly time and completely eliminate guesswork or taking manual measurements. This has also dramatically improved the quality of the frames themselves.

Duncan says the quality and consistency are higher because of the company’s dedication to a slightly more sophisticated, engineered technique. In addition, it fit well into the company’s early promise of delivering high-quality goods.

By starting with a Lean mentality in conjunction with start-up agility, Duncan says that early employees learned to assume that the current production line was subject to constant change, and would always be “different 12 months from now.” And just a few years after production was ramped up, the company invested heavily in automation.

Automate, Automate, Automate

While 1992 was the first true year of production at American Leather, the company had to wait until 1995 to make its first significant investments in automation and computer-aided technology to make its production line more accurate and efficient. According to Duncan, the company started with CNC routers to cut the furniture-grade plywood.

The company feeds those highly-engineered computer designs straight into the CNC routers so that each cut is made with exacting precision for the best quality and repeatability. Duncan says, “By using computerized technology to cut the parts, we

get extremely accurate part shapes. And so the parts are perfect, so that when you go to assemble it, everything is easier and more accurate."

Duncan quickly found that while cutting identical pieces of furniture-grade plywood is one challenge, cutting leather with the same efficiency is another altogether. Even though the company has one of the largest inventories of leather in North America in its 250,000 square-foot facility, deciding how an individual piece will be used can be a difficult endeavor.

In order to help speed up the process of deciding how a piece of leather will be cut-up to make a particular piece of furniture, and to enhance the quality of each, American Leather invested in a "leather nesting" system. Duncan says his company was one of the first American manufacturers to invest in that field, and back then, the technology was more or less in its infancy. Duncan classified his company as a "beta tester," or "early adopter" of the technology, but he says it's more than paid off once getting past the initial hurdles.

With the nesting system, operators lay out a hide on a large table, while the machine takes note of its dimensions and tallies up what parts will need to be cut from it. The operator guides each part, represented by green laser outlines, into the place that makes the most sense based on the natural shading variations of each hide. This eliminates flaws in the final piece and ensures the highest use of each hide.

This system is about the most efficient and quality-focused of any leather cutting process that currently exists. It maximizes the inherent benefits of computer data-tracking, along with the subjective decision-making of the operator, all before sending the hide off to the CNC machines, which cut the leather with the precision of a die cutter: 0.004 inches or better.

Duncan says, "We've been fully automated in the fabrication of the components for probably close to 12-15 years. Any leather, fabric or wood cutting is done by some type of computer-controlled device, whether it's a water-jet cutter or a router."

Thinking Different

An aerial view of the American Leather plant floor.

Duncan says the key to his business has always been finding ways to differentiate American Leather from its competitors. Back in 1990, that competition was primarily other American furniture makers who relied on batch manufacturing, and Duncan's insistence on Lean and automation was enough to keep growing. But today, much of his competition comes from China, and he says that on price or volume, it's almost impossible to compete.

"Luckily for us, frankly, the model we adapted became the model for survival for many American industries," Duncan says. "Where you see manufacturers succeed is when they take advantage of the fact that they're here, close to the customer,

they offer highly customized products and they deliver them very quickly."

Even today, Duncan believes that manufacturers will need to offer more customization in their products in order to compete against China and other low-cost markets. By relying more heavily on skilled engineers, manufacturers will be able to provide value-added benefits that simply aren't possible with high-volume, low-cost batch manufacturing. And clearly, if this is possible in an industry that's still mostly made-by-hand, it seems clear that more automation-friendly processes should benefit from this revolution as well.

Even though American Leather is now very much an established company, it seems clear that Duncan hasn't completely abandoned the start-up mentality that he used to found and grow the company just two years out of college. That combination of start-up agility and mass customization at rapid speeds continues to be the core of his business model, and he believes it will soon become the de-facto model for American manufacturing success. It's worked well for American Leather, to say the least.

Duncan adds: "We make everything here in Dallas, Texas, and have been able to have a business that has grown more or less in double digits every year since we started, and we're very fortunate in that respect. I think there's a lot of potential here in the States for custom-made products that are shipped in a timely fashion."

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