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# Lean manufacturing helps companies survive

Becoming more cost-efficient will have an impact after recession, too

By Paul Davidson  
USA TODAY

WILLIAMSPORT, Md. — A couple of years ago, Sealy, the world's top mattress maker, pieced together beds in a sort of stutter step. Today, it's a ballet.

At a plant here recently, two workers place rectangles of foam, fiber and cloth on a springboard with the dexterity of sandwich makers, briskly firing spray guns to glue the layers to each other and staple guns to bolt the cloth to the metal.

As they slide their handiwork onto a table, a "taper" just a few feet away grabs it and places it under the rat-tat-tat of a sewing machine that stitches the top panel to the rest of the unit. Within five minutes, a queen-size mattress is formed.

Previously, workers churned out dozens of unfinished mattresses at a time, loading them onto a conveyor. The taper, about 40 feet away, had to pick through 4-foot-high piles of them. Mattresses, which took up precious floor space, were sometimes damaged from rubbing against one another.

Sealy is among thousands of manufacturers that have remained profitable during the recession by using a practice called lean manufacturing to become more cost-efficient. It entails making each widget in an uninterrupted flow, rather than as part of unfinished batches; producing only what customers order; and ruthlessly chopping billions of dollars in inventory.

"The big advantage is less material handling, less movement and less dirt on the product," says Mike Hofmann, Sealy's executive vice president of operations. "They're only working on one bed at a time."

In the short term, as manufacturers slash inventories and reduce their workforces, the recovery could be slowed or delayed, experts say. Many, such as Sealy, are scaling



By Garrett Hubbard, USA TODAY

**Efficient:** Roxana Barrios, who works at the Sealy facility in Williamsport, Md., carries a mattress panel.

back through attrition and cutting temporary staff rather than resorting to layoffs.

Yet industrywide, some jobs will be lost permanently as manufacturers use their new cost efficiencies to wring more output from fewer employees, says Cliff Waldman, an economist at the Manufacturers Alliance, which does research for the industry. But by allowing U.S. manufacturers to better compete against low-cost rivals abroad, the maneuvers are helping them maintain profits and ultimately hire employees, economists say.

"Our response to the cost pressures brought about by globalization is . . . to produce cheaper and more efficiently," Waldman says. "It's survival."

Manufacturing productivity, or output

per labor hour, rose 4.9% in the second quarter, the highest since early 2005. A big portion of the gains can be traced to lean-manufacturing techniques, says economist Brian Bethune of IHS Global Insight.

They were pioneered by Toyota in the late 1980s as a way to reduce waste and eliminate steps that don't provide value to customers. While a growing number of companies have adopted the practices through the years, the number of converts has grown substantially during the economic downturn, Waldman says. Sixty-one percent of manufacturers said they have adopted lean practices or plan to do so this year, according to a spring survey by RSM McGladrey.

Faced with mandates to cut costs, most

## Lean strategy pares inventories, raw materials

are scrambling to make the changes in a few months instead of over a year or two as they were before the recession, says Anand Sharma, CEO of TBM Consulting. He estimates only 15% of manufacturers are applying lean policies extensively.

They're responding to a brutal climate. Manufacturers have cut production more than 14% since the recession began, even after a sharp rebound since June. They've eliminated 2 million jobs during the slump, more than any other sector.

Driving the lean movement is an urgent need to pare inventory, executives say. With revenue down and tight-fisted banks reluctant to lend, the makers no longer can afford to tie up hundreds of millions of dollars in raw materials that languish in factories for weeks or months.

"Inventory is evil," says Drew Greenblatt, CEO of Marlin Steel Wire in Baltimore. By trimming, "You find a big pile of cash."

The trend toward leaner stockpiles could dampen the early stages of a recovery, Bethune says. That's because economists expect the upturn's initial phase to be driven by a need to replenish depleted inventories, or at least draw them down slower.

Sealy launched its lean strategy about five years ago but has intensified it during the recession, Hofmann says. It's paying off. Net sales fell 14% in the third quarter to \$349 million from a year earlier. Yet earnings rose to \$12.1 million from \$10.9 million, and gross profit margin edged up to 41.8% from 40.5%.

### Streamlining at every turn

The 148,000-square-foot Williamsport factory started some lean practices in 2006 and added others about 18 months ago. Bed assembly has been streamlined at every turn. Before, mattress makers asked workers in carts to fetch raw materials from mammoth shelves 100 feet away, sometimes causing delays.

Top panels and side borders were made with no coordination. As a panel spilled off a long conveyor, a dedicated "match-up" worker grabbed it and sifted through mounds of borders to find its mate. In the course of a day, workers spent hours "hunting and pecking," says plant manager Ricky Johnson. Employees cranked out as many units as they could to ensure colleagues down the line had sufficient materials. They were paid based on the number they produced.

Today, raw materials are arrayed neatly a



By Garrett Hubbard, USA TODAY

**Lean manufacturing in action:** Vicente Barrera at the Sealy mattress facility in Williamsport, Md.

few feet from quilters and mattress makers. Workers hew to a precise schedule that reflects orders from retailers such as Mattress Discounters or Macy's. A woman who cuts the borders to length ensures that matching panels are being produced at the same time.

After putting the final stitching on a panel, a worker strides to a rack about 10 feet away, picks up the matching border and places them together in a cart.

Each bed is completed in four hours, down from 21, because there's less wasted time between production stages, and median delivery times have been cut to 60 hours from 72. Plants have cut their raw-material inventories by 50% to 16 days' worth. By eliminating thousands of square feet of "work in process" — piles of partly finished beds — and moving workers closer together, the Williamsport facility last year freed enough space to combine two shifts, slicing costs.

### Going lean

Percentage of companies responding "yes" to the survey question: Is your company implementing lean operating principles?

Industry segment	'08	'09
Industrial equipment	61%	65%
Food and beverage	45%	52%
Metal fabrication	68%	68%
Transportation equipment	42%	70%
Building materials	51%	55%
Plastics	65%	64%
Electronics	61%	67%
Chemicals	55%	59%
Printing, publishing	55%	51%
Medical devices	61%	87%
<b>Total</b>	<b>56%</b>	<b>61%</b>

Source: RSM McGladrey Manufacturing and Wholesale Distribution national online survey conducted March 11-April 13 with 920 executives of U.S. manufacturing and wholesale distributors.

Companywide, Sealy has reduced its workforce by 30% in five years through attrition and temporary staff cuts, Hofmann says. It now employs far fewer material handlers. Productivity is up 50%.

The shift by Sealy and others represents a new perspective. For nearly a century, manufacturers believed that cranking out hundreds or thousands of parts then shifting the load to the next worker was most efficient. It ensured makers never ran out of parts or finished goods. And it minimized equipment changeovers to make different parts that could

take hours or even days.

Yet along with forcing companies to carry too much inventory, the strategy yields a high rate of defects: A worker down the line finds a flaw only after hundreds of tainted parts had been made, Sharma says.

To fix those problems, Marlin Steel Wire — which makes metal baskets that

manufacturers use to carry their widgets on assembly lines – had to speed changeovers that took two hours.

One recent morning at Marlin's 19-employee Baltimore plant, about 75 miles from the Sealy facility, four workers converged on a machine that bends steel wires into frames. Gears and material that make the bottom frame had to be replaced with ones that form the larger top frame.

Like a NASCAR pit-stop crew, they moved rapidly. One lifted a heavy coil of steel from its mooring and replaced it with a thicker wire. Another switched out small wheels that pull the coil, while the two others substituted the tube through which it passes and the knife that trims it. They finished in 4 minutes, 59 seconds. Previously, just one technician handled the switch.

The quick turnabouts allow Marlin to make one basket at a time in teams instead of having isolated workers performing the same task hundreds of times.

### 'Much smoother now'

When Eugene McCallum, who was bending a basket bottom to form its sides, was forced to wait for his next unit, he went over and helped the grinder, who smoothes out rough spots and had a small backlog. Meanwhile, the basket welder, Jerry McDowell, 23, noticed the handle

maker had failed to add three welds. He told him after just three baskets were made incorrectly.

"It runs much smoother now," McCallum, 34, says. "I like it better as a team. If we have a problem, we catch it ahead of time."

Delivery times have been cut to as little as a day from weeks, Greenblatt says. Hundreds of steel coils that filled a third of his 13,000-square-foot factory and a 28,000-square-foot warehouse are gone, shaving his raw-materials inventory from \$200,000 to \$28,000.

Dana, which makes parts for commercial vehicles, has cut \$200 million a year in inventory and \$170 million in annual operating costs since initiating lean practices in early 2008, Vice President David French says. It also has slashed its global staff by 6,200 workers this year, some of which are "permanent structural reductions" resulting from increased productivity, Dana said in a news release. The company broke even in the second quarter, improving from a loss of \$122 million a year ago.

Carlisle Tire used lean techniques to save so much inventory space that three factories with 450,000 square feet were consolidated into a 130,000-squarefoot facility, says Fred Sutter, group president.

Many manufacturers continue to refine their initiatives based on a lean credo of "continuous improvement."

Two years ago, ConMed, a medical device maker, shortened its assembly line for surgical staplers from 3,000 to 1,000 feet by putting workers in teams. Recently, it trimmed the line to 600 feet by eliminating time and space previously used to allow glued pieces to dry before moving down the line, says David Johnson, vice president for global operations.

Lean efforts often peter out.

Jeffrey Liker, a business professor at the University of Michigan, says many manufacturers lose their lean-manufacturing gains after a few years because managers fail to monitor their viability as sales volumes or other conditions change.

Lantech, which makes machines that pull stretch wrap over large palettes for stores such as Wal-Mart, saw productivity rise 15% a year as it adopted lean strategies from 1993 to 2000, says CEO Jim Lancaster. But from 2001 to 2006, the company gave back much of the gains as workers continued to use the same system despite product design changes, causing delays.

Lancaster says he ultimately required managers to continually monitor workers' progress and precisely measure obstacles.

"People want results, but they don't necessarily want to go through pain to achieve the results consistently," Liker says. "Everybody would like to take a pill where they lose 20 or 30 pounds."

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