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GOING LEAN

Japanese Techniques Are Fueling Growth At Small Eastford Aerospace Manufacturer

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(NOTE: Whitcraft LLC and Connecticut Tool & Manufacturing Inc. are members of the ACM – Aerospace Components Manufacturers – Cluster)

EASTFORD -- Not long after he and his partner bought the aerospace manufacturing firm Whitcraft LLC, Jeffrey Paul discovered what a traffic jam is like in this rural town of about 1,600.

He was following a co-worker's car early one morning up County Road, which winds for about a mile from Eastford's only red light at the town's center to Whitcraft's blue-fronted headquarters.

Suddenly, both drivers braked to a stop.

There stood a cow in the middle of the road, Paul recalled. After a farmer shooed it aside, the Whitcraft president and his employee could move ahead to start their day. The plant has about 240 employees, who make parts for jet engines that power the military's F-22 Raptor and F-35 Joint Strike Fighter, and Airbus' super-jumbo A380 jetliner.

It is a curious blend of Windham County outback and 21st-century high technology, said Paul, who during mild weather likes to pedal a bicycle to work from his home in nearby Woodstock.

"I'll tell you, we are spoiled out here," he saidwith a smile. "It is a very neat setting."

The company, which sells to such aerospace giants as General Electric, Rolls-Royce, Pratt & Whitney and Sikorsky Aircraft, is growing rapidly.

Its bucolic setting, 37 miles east of Hartford, belies an up-to-date transformation undertaken by Paul and his partner and best friend, Colin Cooper, who is the company's CEO. The two engineers are aggressively applying "lean manufacturing" techniques at a plant where sheet metal has been turned into aircraft parts since 1960.

The "lean" philosophy, developed after World War II by Toyota Motor Co., has revolutionized manufacturing around the world. It has been adopted by major U.S. manufacturers - including United Technologies Corp. - during the past 15 years or so. "Going lean" involves a relentless effort to cut waste while striving for continuous improvement. Key objectives are speeding delivery and drastically reducing inventory - dropping any action that does not add value for a customer.

Soon after buying Whitcraft in 1998, the two began drawing on experience gained while working at Pratt & Whitney and Sikorsky Aircraft and concepts of manufacturing efficiency learned through an M.B.A. program at Columbia University.

At Whitcraft, the need for an overhaul of the production line was immediately apparent.

"When we walked through the factory when we bought it, there were piles of inventory everywhere," Paul said. "It was the previous owner's desire to save raw materials, but it wound up quadrupling the search time to find things. We saw a company that was producing more parts than were needed by the customer, and they had a lot of money tied up in inventory."

The new owners set out to end that costly practice.

Lean methods call for producing only what the customer needs, and no more. Instead of building a backlog of inventory, lean companies adhere to a "just-in-time" ethic by which orders are finished and shipped immediately.

It is a shift not just in operations, they say, but also in the company's culture.

To drive continuous improvement, lean relies on the expertise of front-line workers, those most apt to spot waste and inefficiency.

For Whitcraft, that has meant a steady move away from the classic "batch-and-queue" manufacturing process in which a company lays in a stock of raw materials - in this case, steel and specialized alloys - and passes it through a series of operations, winding up with many thousands of finished products.

Whitcraft has converted about half of its Eastford workplace into manufacturing "cells" staffed by two to 10 workers. In those areas, pieces are fabricated one by one, from start to finish, by workers who collaborate as a team.

Paul and Cooper have added 60 employees during the past year and a half, a 25 percent increase. They are considering an expansion of the 65,000-square-foot plant next year. They have also made key acquisitions in response to an aerospace market that has rebounded after the three-year, post-9/11 slump.

Two years ago, Whitcraft bought a similar company, Connecticut Tool and Manufacturing Inc. in Plainville, where the workforce since has grown from 50 to about 60. In January, Whitcraft purchased another longtime aircraft parts-maker, the 55-year-old Alden O. Sherman Co. of Norwalk, which employs about 50.Whitcraft, a privately owned company, would not disclose what it paid for the acquisitions.

Sherman, which sells sheet-metal parts and assemblies to Honeywell, General Electric and the federal government, brings Whitcraft another force of skilled technicians, machinists and engineers, Cooper said.

That acquisition "made sense for us because it provides Whitcraft with a broader array of manufacturing services to offer our customers," Cooper said. He said that Sherman also has contracts to sell "higher-level assemblies, rather than just the individual components that make up the assemblies" installed on jet engines - a profitable niche that the Eastford plant was not serving.

Implementing "lean" techniques came naturally to Whitcraft's owners.

In the late 1980s, both studied under the late W. Edwards Deming, an early U.S. proponent of management through continuous improvement. Beyond the theory, though, Paul said most valuable was his experience as a manager at Sikorsky's Bridgeport overhaul and repair center for helicopter blades, where he helped lead workers in numerous "kaizen" sessions - Japanese for continuous improvement.

The results convinced him that such techniques could bring dramatic gains to any business. And there was plenty of opportunity at Whitcraft.

Over the years, the new owners found, Whitcraft had inexplicably evolved a production line that deposited finished parts in a room near the front of its rambling, one-story plant. So crates being shipped had to be moved backward to the truck bays.

"One of the first kaizen events that we did was to move the shipping room 175 feet, to the center of gravity of the plant" near the final inspection area and truck bays, Paul said. "We figure we save about 22 miles of people walking every year."

Similarly, they found that the operator of a flatbed laser, which cuts holes in sheet metal plates, walked about 400 miles a year to fetch raw materials, deposit scrap, get finished parts inspected and perform other functions. The man spent roughly two hours of his workday just moving from place to place, Paul said.

That meant the laser - a $470,000 piece of equipment that automatically records "beam-on" time - was in use only about 10 percent of the workday.

"It's not rocket science, but until you examine these processes in detail with these operators, you don't get these kind of revelations," Paul said. "We were shocked."

By reorganizing the workstation, the owners now have the laser operator standing still most of the day and the laser doing more cutting. Paul said the man recently joined a health club to make sure he gets enough exercise.

With Whitcraft making approximately 2,500 types of parts for its customers, the old production system would prove ruinous in today's hyper-competitive aerospace industry, the new owners said. Lean manufacturing, as its name implies, is intended to slim the production process and increase productivity.

It can meet a key requirement of a demanding marketplace, where customers year by year insist on lower prices for aerospace parts.

Frank Johnson, president of the Manufacturing Alliance of Connecticut, said today it is common for major aerospace companies to demand price cuts of 3 percent to 5 percent annually. That is one factor that makes lean production methods a matter of survival, not just of profitability, he said.

"It's imperative for those companies that can implement lean manufacturing to do it," Johnson said. "The only way companies in Connecticut can compete, with the high cost of doing business here, is through productivity gains. The objective is to put more pieces out the door than you did last year, and do it with the same number of employees."

Because "set-up" time when a machine takes on a new task halts the entire production line, Whitcraft has found ways to ease the transition.

Making all dies used on a punch press the same height eliminated the need to recalibrate and then test the machine before resuming work, Paul said. A transition that once took 45 minutes to an hour now requires about three minutes, he said. Workers are trained to think in those terms.

"We want that crew to think like the guys who change tires for Indy cars," Paul said. "They have to change dies and get back in the race."

Of the 6,000 or so manufacturers in Connecticut, roughly a third have embarked on the transformation to lean manufacturing to one extent or another, said M.L. "Bob" Emiliani, a professor of manufacturing and construction management at Central Connecticut State University who specializes in the topic.Connecticut has been a leader in this area, he said. In fact, the state allocated $2 million last year to train small and medium-size aerospace and defense contractors in lean manufacturing techniques. But Emiliani said, "It turns out there are not a lot of companies anywhere that are getting it right."

The system Toyota pioneered calls for a continuous cycle of process improvement with perfection - zero waste of time and materials - as its goal, he said. But equally important, Emiliani said, is "the respect-for-people principle."

Simply put, that means that workers who have just helped their company figure out how to do the work of five people using only four people should not be faced with job losses. Otherwise, Emiliani said, employees will react by thwarting improvements.

"The problem is too many companies focus just on the tools" for improving efficiency, he said. "But the intent of lean is to grow your business and improve profits and make better lives for your workers."

Whitcraft's owners say the proof of their attitude toward employees is their success in drawing workers from a radius of roughly a 45 minutes' drive from Eastford and investing in their capabilities.

The company has arranged for Quinebaug Valley Community College, based 17 miles away in the Danielson section of Killingly, to offer courses in blueprint reading and "shop math," a practical blend of algebra, geometry and trigonometry, in the plant's conference room.

Jill O'Hagan, who coordinates training for area businesses at Quinebaug, said Whitcraft's commitment is shown by its paying for workers' training. She said the company is wise to offer the 48-hour college courses - and a 2,000-hour sheet metal apprenticeship - because education builds employee loyalty.

"Whitcraft is very career-minded. They want to train people, and they want them to stay," O'Hagan said. "For a company in the middle of nowhere to have as sophisticated a training program as they do is really quite remarkable."

Whitcraft continues to hire for its operations in Eastford and Plainville as it expands facilities.

Last year's revenue of $38 million is expected to reach $52 million this year, the owners said. Profit figures are not made public. However, Paul pointed out that Whitford continues "investing in the business" and spent more than $2.5 million on new machinery, computers and software this year.

In Janurary, Pratt & Whitney recognized Whitcraft with its annual Supplier Gold award. The designation, held by only six companies, is given to vendors that respond effectively to Pratt's encouragement to use lean manufacturing methods.

Beth Schwarz, vice president of supply chain management at Pratt, said Whitcraft has a record of providing the highest-quality parts, delivered reliably on time.
"They embrace these lean practices, and they deliver really good business metrics," Schwarz said. To win the Gold designation, "they must have zero `escapes' - parts that have to be sent back. On-time delivery must be above 95 percent consistently, and that's almost perfect."

Stretching 6 feet across the wall of the Whitcraft boardroom is a chart tracking the flow of materials and information through the Eastford plant. Cooper and Paul said the chart is amended regularly. They said Whitcraft holds regular brainstorming sessions with small groups of workers to better manage five aspects of the business: environmental health and safety, on-time delivery, quality assurance, working capital and profitability.

Waste-cutting solutions can be as simple as moving a case of tools to within reach of a machine operator or as extensive as knocking down the walls of a manager's office, something that was done when it was found that the office intruded on efficient production.

Don Chrzan, Whitcraft's head of management information systems, said that in 1998 the plant had only three personal computers in use, all in the engineering department. Now, six servers on a fiber-optic network connect 120 computers throughout the plant. On any given day, Chrzan said, the system tracks roughly 32,000 part numbers and 2,500 work orders being processed.

"My job is more customer-focused now, [serving] the people on the job floor and people in other companies, too," Chrzan said. The automated system improves decision-making by giving managers instant access to price quotes, purchase orders, work orders and general ledger accounting.

"Our overarching philosophy is that if you give skilled technicians better information, they're going to make good decisions," Paul said. "People here are not shy about opening up and telling you what needs to be done. On Monday, we heard that the tube area needs more space because they have a large order coming in.

"This process has driven dozens and dozens of change events, and this company is unrecognizable, at least on the inside, from what it was."