Southeastern Region

Remanufacturing Excellence at Williams Technologies

Competitive strength through people power and pull-through operations.

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Remanufacturing, a little-understood business, gives sophisticated products two, three, and even four lives. As practiced by Williams Technologies Inc. (WTI) in Summerville, SC, this work for large OEMs such as General Motors, Allison, and Caterpillar should not be confused with repairing or rebuilding. See the box, "Remanufacturing and Its Close Cousins: Definitions and the box, "About Williams Technologies." The company remanufactures automotive and industrial automatic and electronic/automatic transmissions.

Competition is intense. Franchised repair and other operations also vie for a chunk of the after market. To gain competitive advantage in this crowded field, WTI implemented workforce "empowerment" techniques, pull systems, close customer-supplier relationships, and other steps toward world-class manufacturing. This story describes a few improvement activities which were presented during their recent workshop.

Building Accountability

WTI sells the skills of its human resources to customers. Employee responsibility for the quality of their work is well entrenched at Williams Technologies, according to Kelly Turley, director of human resources. A new step, starting at the end of 1992, will be a revamped compensation system that rewards workers for learning. This pay for skills program will offer compensation reflecting the highest level to which a worker is certified.

The company already offers training in SPC, gaging, instrumentation, leadership, safety, etc., mostly taught on company time. Managers, supervisors, and others teach these sessions. Reimbursement for outside classes also is offered. Training is reimbursed according to the employee's grades — 100 percent for an A, 90 percent for a B, etc. The entire plant workforce also played a JIT/pull system "simulator" game.

Employee Involvement

Turley said the company builds employee involvement through several other means:

- The Bright Idea Club. Employees turn in ideas for improvements, and within 30 days management responds to the proposal. Tool design, safety, and other "bright ideas" have earned employees $50 plus a Bright Idea Club T-shirt. Work area brainstorming sessions also are encouraged.
- Recognition. In addition to awards for years of service, employees are eligible for manager/supervisor of the year and associate of the month/year awards. Associates of the month are invited to a banquet. Yearly awards for managers/supervisors and associates are rings; these winners also are entered in a drawing for a television or other prizes. Previous winners solicit nominations for new winners in their

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work areas. Then nominees as a group select monthly winners, who can win a watch and a certificate.

- A weekly employee newsletter shares information about employees, health and safety, and other topics.
- During plant-wide meetings every other month, managers discuss production schedules, safety issues, "how we're doing," Bright Idea awards, associate of the month and other awards, etc.
- An employee council meets every month with General Manager Jeff Anderson. A representative elected from each work area attends, and participants are asked to talk about their concerns.
- Bulletin boards posted in work areas show quality performance information for the area and other announcements.
- Multi-functional task teams tackle chemical reduction, sediment, environmental issues, uniforms, attendance, and other topics.

Attendance: Example of Employee Teamwork

WTI's attendance policy got started in the spring of 1990 when absenteeism ran 7.5 percent. Management encouraged a voluntary, multi-disciplinary task team with members from all plant areas to work out an initial plan. "It's been used and then modified, bringing us down to the two percent absenteeism level. Because people from different areas worked together on it, the plan helped us to build teamwork," said Jeff Anderson. "This multi-functional project team approach also helped us to weather the transition to pull systems and 'visual management' during the past two years."

The task team settled on a point system, giving employees points for consecutive working days and deducting points for absence or tardiness. "Minus" points, as they accumulate, draw supervisor counseling, then written warnings, and finally automatic termination. Employees accumulating specified "plus" point levels receive rewards such as a catered lunch served by the manager or supervisor of their choice, or a $50 check, a company jacket, free sick days equivalent to two percent absenteeism and, eventually, salaried status. By January 1993, all employees will be salaried; nearly all workers were on salary at the time of the workshop.

Remanufacturing and Its Close Cousins: Definitions

What's remanufacturing? How does it differ from rebuild and repair operations? Here's how Jeff Anderson of Williams Technologies defines the differences:

Remanufacture: Disassemble, clean, inspect; parts remanufactured to original OEM specifications, then reassembled and engineering changes/improvements installed; full factory testing; new factory warranty. Because new engineering changes are installed, the remanufactured product may have a stronger warranty than when its core was new.

Rebuild: Disassemble; identify and scrap defective parts; replace marginal-quality parts and reassemble unit; may or may not test; broad wear tolerances acceptable; short warranty.

Repair: Identify and replace defective parts; test in end item assembly; little or no warranty.

Pull System: Need for Simplicity

Successful use of pull (JIT) systems at WTI incorporates visual techniques (layout for easy-to-see production flow) to support high-velocity operations, said George LaFlamme, production manager. There may be more than 750 components per unit being remanufactured, underscoring the need for simplicity in workplace organization.

Standard containers and quantities also help production speed. A "place for everything" philosophy, attention to housekeeping, and SPC use were evident in the plant. LaFlamme said employees at Summerville remanufacture approximately 200 transmissions a day on one line.

Heart of the Business: Core Management

Core management is a critical element of WTI's success. "Cores represent our raw material. (A core is a defective transmission that has been exchanged for a good one in the field.) We're dealing with thousands of types of cores," said John Carpenter, manager of materials. "When we receive them, we segregate them by type, so that we know what we're building is what we're tearing down." WTI has worked out programs with some customers — and is working with others — to ship units to be remanufactured on a JIT basis. Their setup includes a sorting process that assures the disassembly of a core type similar to the unit to be remanufactured and shipped. In turn, the customer or distributor must return a core similar to the one they received ("like for like"). Remanufacturing, not storage of mismatched cores, in other words, is an objective.

For example, WTI's customer Powertrain Division of General Motors (GMPT) orders a replacement transmission and then turns in one at the same time for credit. Carpenter said that as of September, all cores from GMPT distribution centers went to one location for sorting by type, further smoothing the process. All front wheel drive models, for instance, are broken into five models. GMPT provides a 16-week "reasonably firm" schedule, allowing WTI to run MRP and place back orders to GMPT for each core type and arrange JIT delivery schedules.

"Receiving the correct models JIT has primary importance," Carpenter said. "We don't want two months' supply of cores on hand. One week's supply is our goal for year-end and we eventually plan to reduce it to two or three days."

Two-Way Supplier/Customer Ratings

Communication with customers/distributors — talking directly and regularly with the customer's product team — keeps the improvements flowing. "We meet here with them at least two days a month," Carpenter said. "We want to know how they rate us, and their requirements, and we need to communicate our requirements."[1]

WTI discusses cost reduction assistance and price, schedule, parts delivery, and other factors with customers on a regular basis. Specifics, not just "how's it going" conversations, spark progress. They work through supplier rating forms with customers; GMPT ses-

sions are held monthly, for example. GMPT typically sends a team (engineering, materials, and field service representatives) to these meetings at WTI. WTI's team for the sessions generally includes production, quality, materials, personnel, and other functional representatives. Quality, inventory, performance to contract, and other indicators are rated, then multiplied according to the customer's weighting preferences.

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Another valuable communication tool evolved after one customer suggested that Williams should rate the customer's performance. Williams developed a customer rating sheet that's used in its own monthly rating sessions with GMPT. Delivery, schedule, new parts quality, price/cost communications, etc. are rated in this interactive process. "We communicate what is important to us in controlling cost and quality. Things they can do for us. In a partnership, it's a two-way street," said Peggy Goddard, quality manager.

"The reason our relationship is more successful than in the past is partly that we are building a common vision, and we are mutually dependent on each other," said Larry E. Dewey, marketing manager for Allison Transmission, a Williams customer who's keen on strengthening customer-supplier communications about performance. "We depend on them to be good stewards, and to provide us with a master schedule. They need us to supply the parts they need and for a master build schedule."

Dewey said systems for WTI/Allison ordering, shipping, and storing material on the shop floor began to improve after JIT and other improvement concepts were discussed starting in the fall of 1990. Salvage rates also improved markedly since the companies tackled excess floor space usage and other problems early last year. More inventory reductions, lower reject rates, and better teardown processes are additional targets.

Allison cores will be scheduled by assembly number, so they can schedule production on a pick list, Carpenter added. A trial of this process has started. Cores previously stored outside will be put in a core bank inside, and then moved to disassembly areas when needed.

Another area where suppliers seek Williams' expertise is environmental compliance. Scott Morford, manager of remanufactured products-product support area for Caterpillar Industrial Inc., said transmission remanufacturing requires attention to the handling engine oils, glycol, etc. Processes, cleaning, storage, and records-keeping must be addressed. "We're looking for long-term support in these areas," Morford said. "It gives a supplier an edge."

Environmental Concern

Environmental issues demand increasing attention, according to Bill McGowan, environmental safety coordinator. He noted that OEM customers and WTI must dispose of chips and machining coolant cleaned from their parts. WTI removes road grime and tar, burned-on oil, gasket material, and disposes of used oil filters, in compliance with increasingly complex environmental regulations.

A chemical and sediment task force checks all chemicals used in the company for safety, efficacy, etc.

Thanks to a waste minimization program started eight years ago, the company cut its use of hazardous chemicals. Citrus cleaner, for example, replaced mineral spirits, and highly caustic or corrosive chemicals used in washing and degreasing were replaced with other substances. "We continue to look for new alternatives," McGowan said. "We've been experimenting with baking soda in a high-pressure steam cleaner, but we need to make sure none is left as sediment. We're also concerned about cost control."

A chemical and sediment task force checks all chemicals used in the company for safety, efficacy, etc. Representatives of the cleaning room, an industrial hygiene nurse, the safety and environmental coordinator, a lab technician, quality and environmental engineers, and a production supervisor and operator participate in the team investigations. Williams also continues to update its air pollution control and storm water runoff control plans.

Performance Measures, Other Changes

Williams' performance measures reflect key continuous improvement areas. "We measure productivity, warranty rate, Bright Ideas submitted, etc.," said Jeff Anderson (see Figure 1). "When you're selling labor, and you're constantly reducing your selling price to customers, productivity is an important measurement. We measure transmissions per person per year, and that takes into account every person in the organization, direct and indirect."

Within the manufacturing cells, production to schedule is critical to support JIT operations. WTI measures linearity — achieving the exact production target — in each cell, posting daily and hourly results (see Figure 1).

They track performance, not against standards. Job standards were used in most areas of the company until several years ago. "We drew a line in the sand, and said, 'We measure from here,'" Anderson said. "We no longer need a herd of industrial engineers to generate standards that constantly change anyhow."

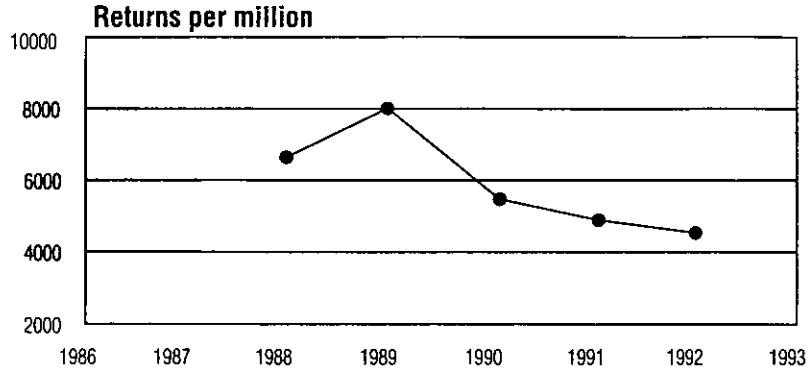
The company monitors supply spending (administrative and indirect production) through a checkbook system. Each month, managers receive a deposit in their "check-

About Williams Technologies (WTI)

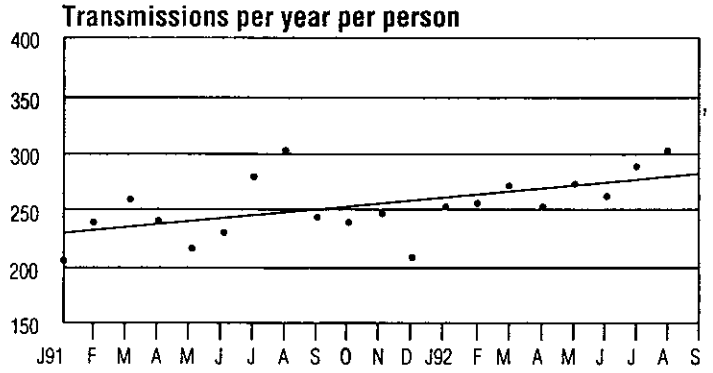
Williams Technologies Inc. (WTI), Summerville, SC, remanufactures automotive, heavy duty, and industrial automotive and electronic transmissions for major OEMs. They handle mechanical, electronic, and hydraulic components and assemblies. The company is a corporation owned by the W.W. Williams Company of Columbus, OH.

Pull systems, visual management, and other improvement techniques are used in WTI operations. All 270 employees will be salaried at the facility as of the first quarter in 1993.

PPM Warranty Rate



Productivity



Final Assembly Production Linearity

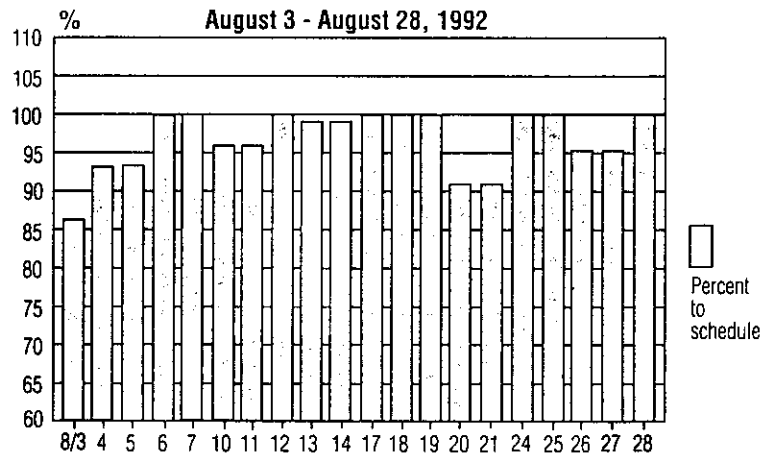


Figure 1. *Williams Technologies' warranty rate, productivity, and production linearity rates reflect the company's continuous improvement efforts. Linearity reflects how well they meet production objectives, cell by cell.*

books" equal to their monthly budget. Purchase orders cannot be placed without a "check" attached. Outlays cannot exceed the checkbook limit, unless a special request to management is approved. Supply spending dropped 34 percent during the checkbook setup's two-year existence.

Anderson said Williams' financial performance is good, thanks to its focus on quality, process, and people improvements. "We've been able to reduce our selling price to our customers by 12 percent over five years, plus absorb about 18 percent inflation in wages and material," he said.

More Improvements in the Works

Continuous improvements with occasional "leapfrogs" will be needed in all areas of the business to assure Williams Technologies' long-range success, Anderson believes. Among the ongoing or planned refinement areas he noted:

- All operator instructions were available on terminals as of September. Text and color illustrations help workers handle mixed model production. Instructions previously were posted at operator stations.
- A "Leapfrog Project" team is studying means to better the company's performance relative to competitors.
- Two hours is the company's WIP inventory target for spring 1993; it totals four hours now.
- A pay for skills compensation program, set for a year-end trial run, may need fine tuning.

Editor's note:
Speakers during the Williams Technologies workshop who are not quoted in this article included WTI's Chuck Norton, production manager and manager of quality engineering; David J. Malchano, director of research, development, and technology; Tom Sawyer, manager of machining operations; Vadene Echols, design control engineer; and Tom Popejoy of General Motors' Powertrain Division. A remanufacturing panel discussion during the event featured speakers Mike Schwenk of Jasper Engine Exchange; Chet Watson of Retrofit Remanufacturing Group. Electronic Systems Division, Salvage Technologies, Cincinnati Milacron; Richard Erne of Eastman Kodak; and Dave Hagen of Source Inc.

[1] Added detail about Williams Technologies' customer relationships is featured in the article, "Take Down the Walls! Building World-Class Customer/ Supplier Partnerships" by Patricia E. Moody in the September/ October 1992 issue of *Target*.