

Budgeting for Quality

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Improving quality on a budget is a challenge, especially in tough times. Here's how two manufacturers have improved their processes while keeping the cost of quality under control.

Marcus Brammer (center), a process improvement leader at International Specialty Products (ISP), and team members David Greene (left) and Chris Guthrie helped ISP reduce its cycle time by 20% last year.

A decade ago, W. Edwards Deming introduced his theory of quality in his book, *The New Economics*. Part of his theory involved what he called the System of Profound Knowledge. This states that any business can implement change by following a few simple rules. The rules include the following: set an example; be a good listener, but don't compromise; continually teach; and help people pull away from current practices and move into the new philosophy without feeling guilty.

Since Deming's death in 1993, the economy has entered even more turbulent times. Layoffs, corporate scandal, terrorist attacks and lack of consumer confidence have taken a toll. In a National Association of Manufacturers survey released last month, nearly three-fourths of respondents said they believe the U.S. faces a manufacturing "crisis."

Under the circumstances, some say the quality guidelines of the last century need updating to reflect this era's more difficult circumstances. Contemporary quality gurus, for example, are more cost-driven. Today, they say, a quality system like Deming's must also include directives that lower cost, increase capacity, maximize ROI, and tie quality to profit and loss. But while most managers would agree that quality is the single most important factor in productivity and profitability, they say the pressure of maintaining it without the higher budgets of yesteryear is challenging. Earlier this year, White House economic adviser Glenn Hubbard prodded manufacturers to open up those budgets by saying their reluctance to buy new equipment is a bigger threat to a U.S. economic recovery than war with Iraq. Nonetheless, every manufacturer knows that capital investment doesn't come without a guaranteed "home for the product." The reality is that companies are not buying new equipment like they used to, and their budgets for other types of improvements have often either been reduced or eliminated. In these times, how can companies maintain their quality standards and uphold continuous improvement?

Any quality initiative must be traceable to the bottom line, says Marc Beaulieu, plant superintendent of Louisiana Pacific's oriented strand board (OSB) plant in Athens, GA. "Every project you do is reflected in the profit-and-loss statement," he says. "Good metrics means a good profit." Five years ago, Beaulieu, Louisiana Pacific's corporate technical director at the time, was assigned to the Atlanta OSB plant to address quality problems. The problems involved moisture — an enemy to the OSB product, which is made from flakes of softwood oriented into strands and pressed into mats. When moisture content varies, panel separation occurs. Other

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quality issues Beaulieu said he faced were reducing production bottlenecks and increasing capacity. "We were handed a budget (from corporate) to work with," says Beaulieu, "and told to increase quality and lower costs. Corporate wanted results now, not two years down the road."

Accustomed to five-year plans for ROI, Beaulieu had to devise a strategy that would yield almost immediate returns. After 15 years as corporate technical director, he was confident in the idea he brought with him to the Atlanta plant: statistical process control (SPC), a way to monitor factory-floor processes and statistically analyze data to determine causes of variation during production. Beaulieu calls it an alternative to the effective, but time-consuming practice of performing root-cause analysis. His first step was to install real-time SPC analysis software.

Using the software, Beaulieu set up a database on a single computer on the plant floor where PLCs could collect data off the network from the newly devised stand-alone stations. In addition, operators could immediately access relevant drawings, photos and instructions as required. Through process monitoring, data collection and real-time statistical analysis, Beaulieu hoped to maximize quality and plant productivity. His goals were to reduce variation and run to target. He knew that product variation indicates a flaw in the manufacturing process and that understanding the flaw was the key to process improvement. There are usually several causes for variation, says Beaulieu. Some are equipment-related, some are due to process inconsistencies. Others may be maintenance-related or the result of operator adjustments.

"We knew that a lot of variation at the Atlanta plant was due to operator tampering," says Beaulieu. He defines this as the everyday, routine, adjustments operators make when they think something is wrong. "But, operators don't have the tools to make the right decisions," he says. "It's not enough to look at product and determine what is normal variation and what is not. Now we do it with stats and software."

Data analysis was simplified by the software, says Beaulieu, which performs root-cause analysis and generates a report. Supervisors can monitor machine performance and processes from their office PCs as data is entered on the shop floor. This in itself was a significant savings because it meant inspectors who would normally have pursued root-cause analysis procedures were freed to perform other tasks.

"This software allowed us to operate with smaller budgets and still maintain quality and throughput," says Beaulieu, adding that its \$3,000 investment cost returns the company \$750,000 annually. But he cautions not to swing for the fences right away. "Focus on one or two projects," he says. "Pick those that will yield the best ROI without exceeding your budget."

Marcus Newman is a site process improvement leader at International Specialty Products (ISP), a Calvert City, KY-based producer of specialty chemicals. A Six Sigma black belt trained at Dow Chemical, Newman was assigned in 2001 to boost production of capacity-constrained products at the Calvert City plant without purchasing new equipment. The plant's first-pass quality percentage was so poor (58%) that for every pound of product sold, one pound had to be thrown out. The goal was to implement a strategy that defined the problem, built a team, reviewed data and sought causes. Historically, union conflicts at the Calvert City plant had stymied progress and made it difficult to build an effective team. When product

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quality became a serious issue, however, "Management and the union [the International Association of Machinists and Aerospace Workers] agreed that dramatic improvement was needed for survival," says Newman. In response, the union and management formed what they called a High Performance Work Organization (HPWO) in 1998. The partnership devised a 10-step process for implementation to get the plant running profitably. "It read like a map on how we agreed to work together," says ISP plant manager, Frank Stevens. "We first had to change our culture from an autocratic operation to one where everyone had some authority and accepted accountability. We developed shared tools."

Today, representatives from management and the union run each of ISP's seven production departments. "The only way the culture could change," says Stevens, "was to involve people in process improvement and solicit ideas from not only employees, but suppliers, and customers."

The HPWO was also able to take advantage of information the company had begun to gather using multivariable testing procedures developed by Qualpro, Inc., a Knoxville, TN-based consulting firm. ISP tailored experiments to determine the relationships between parameters of their manufacturing processes, like pressure and temperature, how they interact and why variability occurred when one of those were out of spec.

As ISP processes synchronized, first-pass yield increased dramatically. Today it's greater than 98%, according to Newman. With capacity up and production costs down, the Calvert City Site has now turned its attention to reducing waste and improving first-pass quality in other areas of the plant. It has also begun new programs, such as reliability-centered maintenance and Six Sigma. Newman says he uses the Six Sigma DMAIC (Define, Measure, Analyze, Improvement, Control) approach to address quality issues in 11 different batch reactor groups at Calvert City.

More than anything else, says Newman, what he and his crew did over the past three years was ask a lot of questions. "We ask what has happened and what is likely to happen," says Newman, "always keeping the bottom line in mind." He stresses that "You have to link your project activities with the bottom line impact. You also have to link process improvement with your bottom line. Know the potential value of a problem," he says, "and initiate a discovery phase to evaluate the opportunity against what it's worth."

In times of economic downturn, "Quality programs like Six Sigma have to be more business-like and deliver online results more quickly," says Chris Bogan, CEO of Best Practices Benchmarking & Consulting, Inc., a Chapel Hill, NC-based research firm. The rise in popularity of Six Sigma and similar efforts, says Bogan, has shifted some \$1 billion worth of ROI responsibility to intra-company business units. As a result, "Six Sigma has to deliver," he says. "Each Black Belt is responsible for saving x number of dollars to justify his or her job."

But when the squeeze is on, it can take even more resourcefulness to "continuously improve." When the going gets tough, ISP's Newman says, it's time to find the "hidden plant," a term from William E. Conway's book, *The Quality Secret*. This refers to the costs of plant inefficiencies, masked by accepted, unreviewed routines, including those off the plant floor. "Reduce variability, reduce waste, and you can find another 20% capacity," he encourages. And continue to welcome employees into the decision-making process. The edge is gained in both quality and

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maintaining the budget, says plant manager Stevens, when your 500 employees become 500 owners of the business.

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